
eco-LOGICAL
Heat Pump Water Heaters
ENERGY STAR PARTNER
eco-LOGICAL

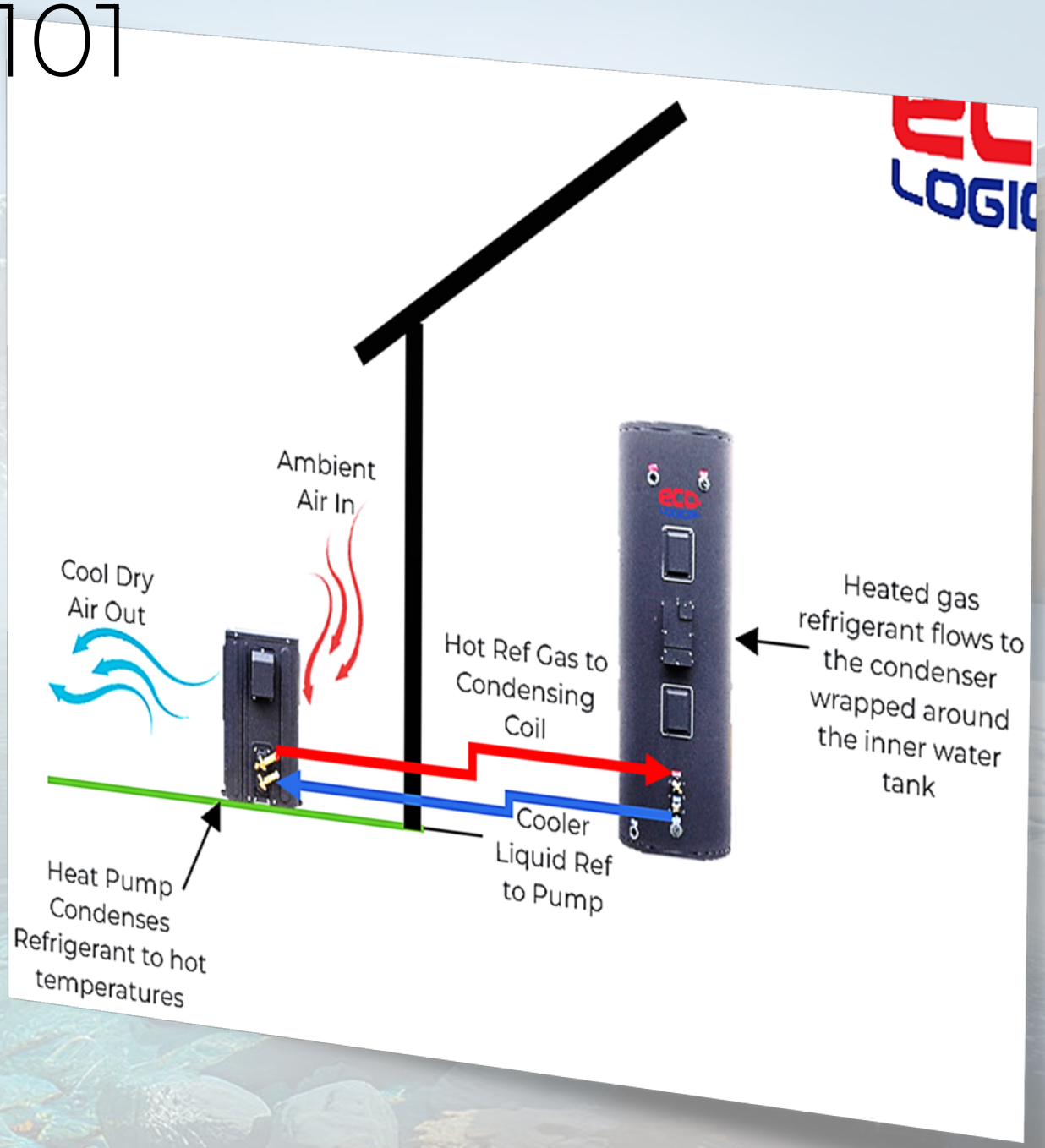
OMNI™ Split System 101

The OMNI split system is a hybrid heat pump water heater.

- It consists of two main components: a water tank and a separate heat pump unit connected by refrigerant lines.
- The outdoor heat pump unit extracts heat from the air outside, even in cold temperatures, and transfers the heat energy to the water tank stored up to 33' away.
- In cold climates, where the outdoor air temperature reaches 5°F or water temperature is below 39°F, the OMNI uses backup electric heating elements to help heat the water.
    - This is comparable to cold-climate heat pumps used for space heating, which can operate efficiently in extreme cold temperatures.

This design solves many of the issues commonly found in integrated tower heat pump water heaters.

- Plus it's easier to set up.
- With its two-piece design, one person can easily move it/ transport it, and it fits into tighter spaces without hassle.



Eco-Logical® OMNI™ Series

Certifications -3 Models

- ENERGY STAR® 5.0
- ENERGY STAR 1.2 Advanced Communication
- NEEA 8.1 Tier 3-4
- UL Listed
- TechClean CA listed
- CEE T1
- AHRI 1430 eco-port tested (CTA-2045)
- California JA13 Compliant
- CEC Listed
- 2025 CEE Award Winner

OMNI-50HP1 -50g 120v

OMNI- 50HP2 - 50g 240v

OMNI-80HP2 -80g 240v

Eco-Logical® OMNI™ Series

Performance

- COP 5.3 – 5.45
- R513a Low GWP Refrigerant (573)
- PANASONIC DC Inverter compressor
- SCOP 2.9 – 3.7
- UEF 3.3 – 4.23
- First Hour Rating 50-82g
- 120v and 240v Versions
- Heat Pump operating range 5°F to 120°F
- Hybrid Mode Operating Range ∞
- Dual Electric Resistance backup elements
- Sound level indoors 0 DB
- Sound level outside 49 DB
- Blue Enamel Anti-Corrosive, Durable, Lining

ATTENTION
R513A
LOW GLOBAL WARMING POTENTIAL REFRIGERANT

Torque Fittings to max 30 N-m (22 lb.ft)

Eco-Connect™ Self-Sealing Coupling & Pre-Charged Line Set

R513A

SPECIFICATIONS* - R513A split Type US (DC inverter)				
Description		50 Gal.	50 Gal.	80 Gal.
Power supply		110-120V~, 1Ph, 60Hz	208-240V~, 60Hz	208-240V, 60Hz
Nominal tank volume	Gal	50	50	80
Actual tank volume	Gal	46	46	75
Heating capacity (Heat pump only)	kW	2.28	2.28	2.82
EBH (Electric backup heater)	kW	0.76-1.0kW (110-120V)	2.7-3.6kW (208-240V)	2.7-3.6kW (208-240V)
UEF		3.3	4.23	4.11
Average Input (Heat pump only)	kW	0.43	0.42	0.52
COP @ A67.5 °F W57.9 °F–125.1 °F		5.3	5.45	5.45
SCOP		2.9	3.7	3.7
First Hour Rating (FHR)	Gal	50	57	82
Gallon Per Hour HP Only/ Hybrid	GPH	20/ 30	27/ 56	33/ 62
Current (Heat pump only)	A	4.59	2.04	2.53
Max. input power	W	1,730	4,250	4,450
Max. current	A	14.5	18.5	19.8
Air flow	m3/h	480	480	500
Max.leaving water temperature (Heat pump only)	°C/°F	65°C/150°F	65°C/150°F	65°C/150°F
Working ambient temperature (Heat pump only)		5°F/120°F	5°F/120°F	5°F/120°F
Sound pressure level	dB(A)	DB 49	DB 49	DB 49

ATTENTION

R513A

LOW GLOBAL WARMING POTENTIAL REFRIGERANT

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Torque Fittings to max 30 N-m (22 lb.ft)

Eco-Connect™ Self-Sealing Coupling & Pre-Charged Line Set

OMNI Benefits

- Eliminates usual Integrated Tower concerns
  - **Slimmer tanks** 18.5” allow for the tightest installs (50g)
  - Condensate **drainage is outside** and not an issue
  - No concerns for effecting room conditioning
  - **Noise is moved outside** but still operates quieter than a tower at 49dB
  - **Venting is not an issue** with the heat pump located outside
- The OMNI runs refrigerant through the wall, not water
    - **No concern for additional water pump, cold climate heat tape or power outages/ water freeze**
- No panel upgrade when using the 120v model (dedicated line required)
- Video training or live training upon request and for large scale projects

Bonus, the tank can lay down on its side for transport.

Tank 130 Pounds

Heat Pump 65 Pounds

Split vs Tower Overcome the Barriers

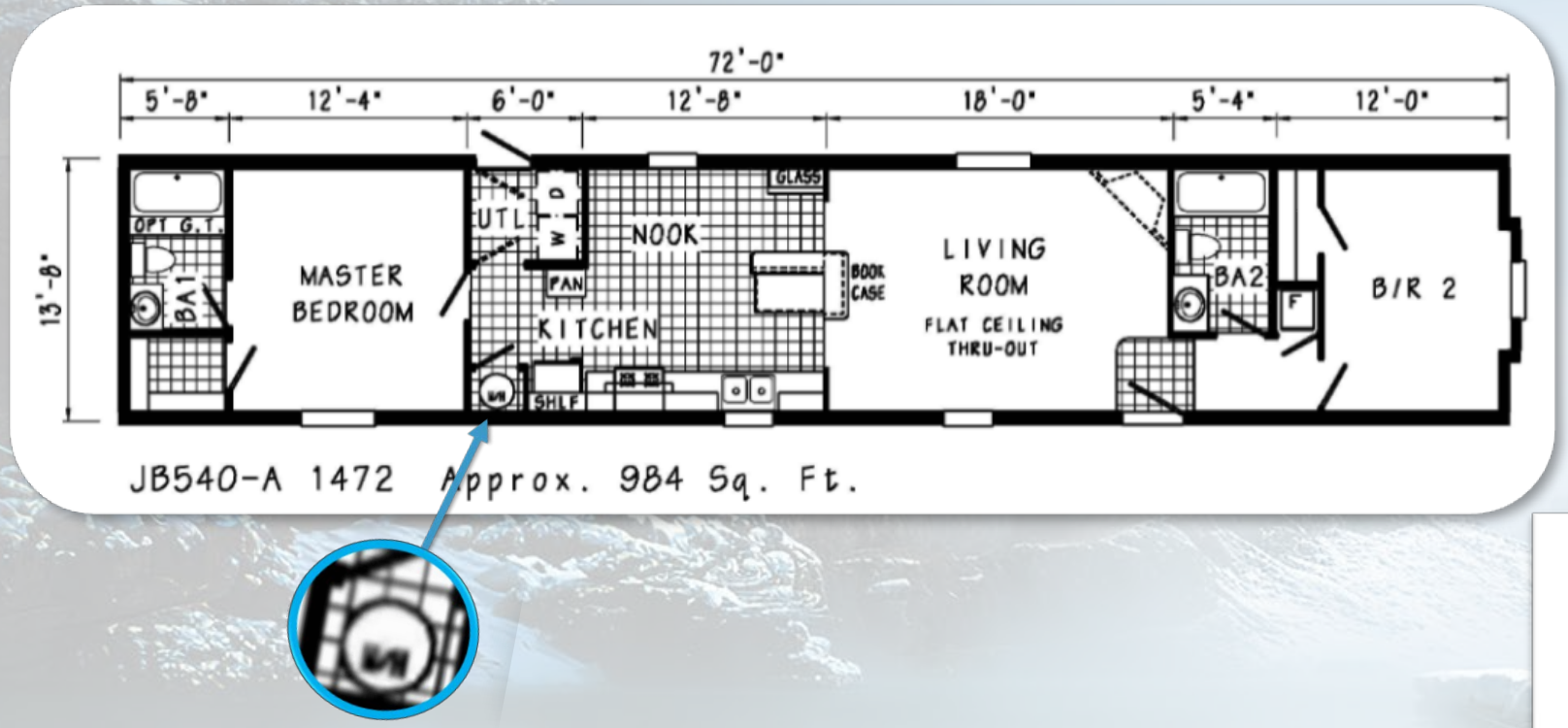
Space

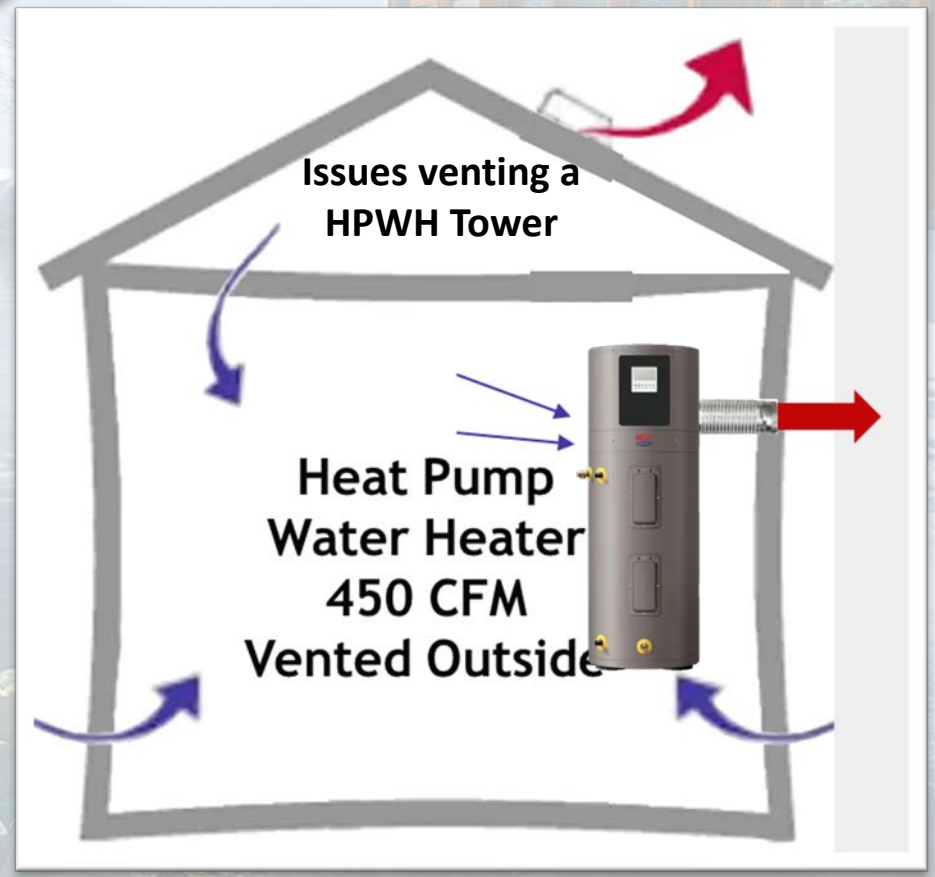
Noise

Venting & Room Conditioning

And of course, condensate drainage

Small Spaces to Large Homes





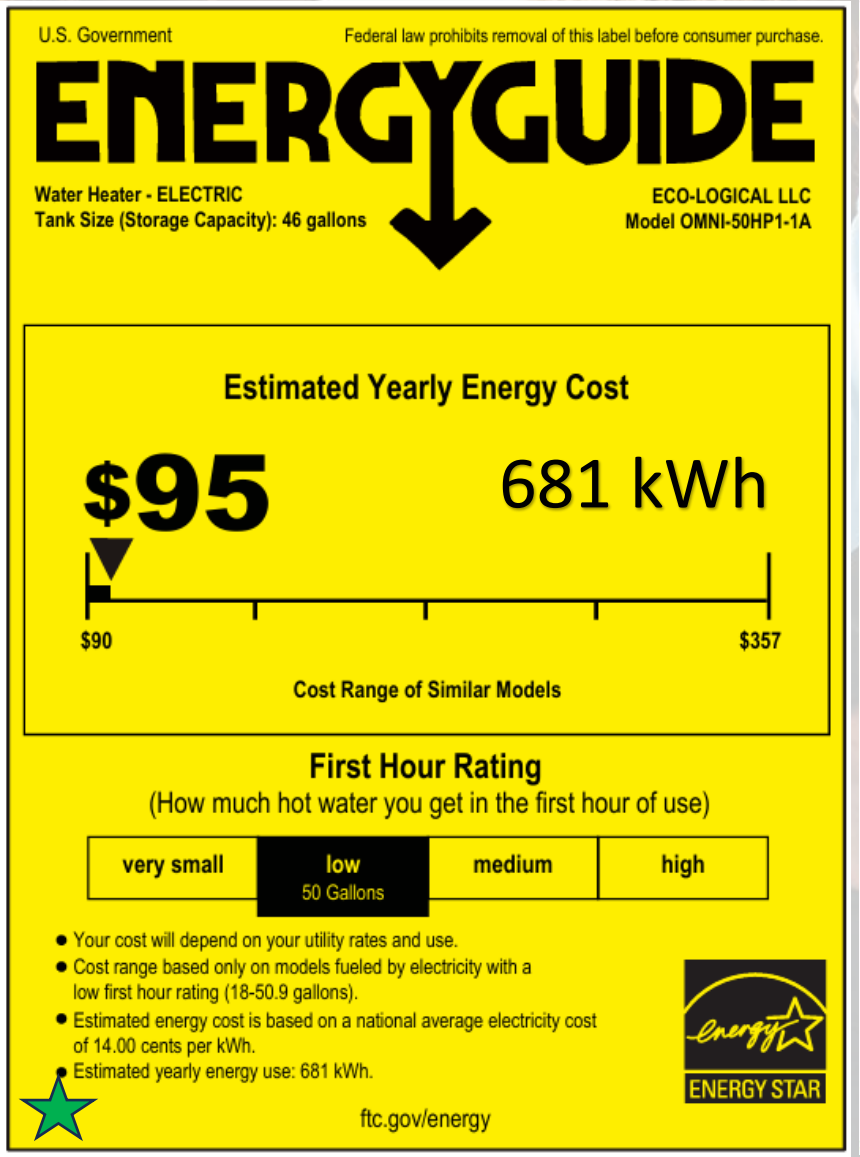
Designed specifically for this market:

- 18.5" Slim tank
- Slimmer than any Integrated tower
- 120v Model
- For mobile homes
- For ADU's
- For Multi-Family
- And Conventional Homes

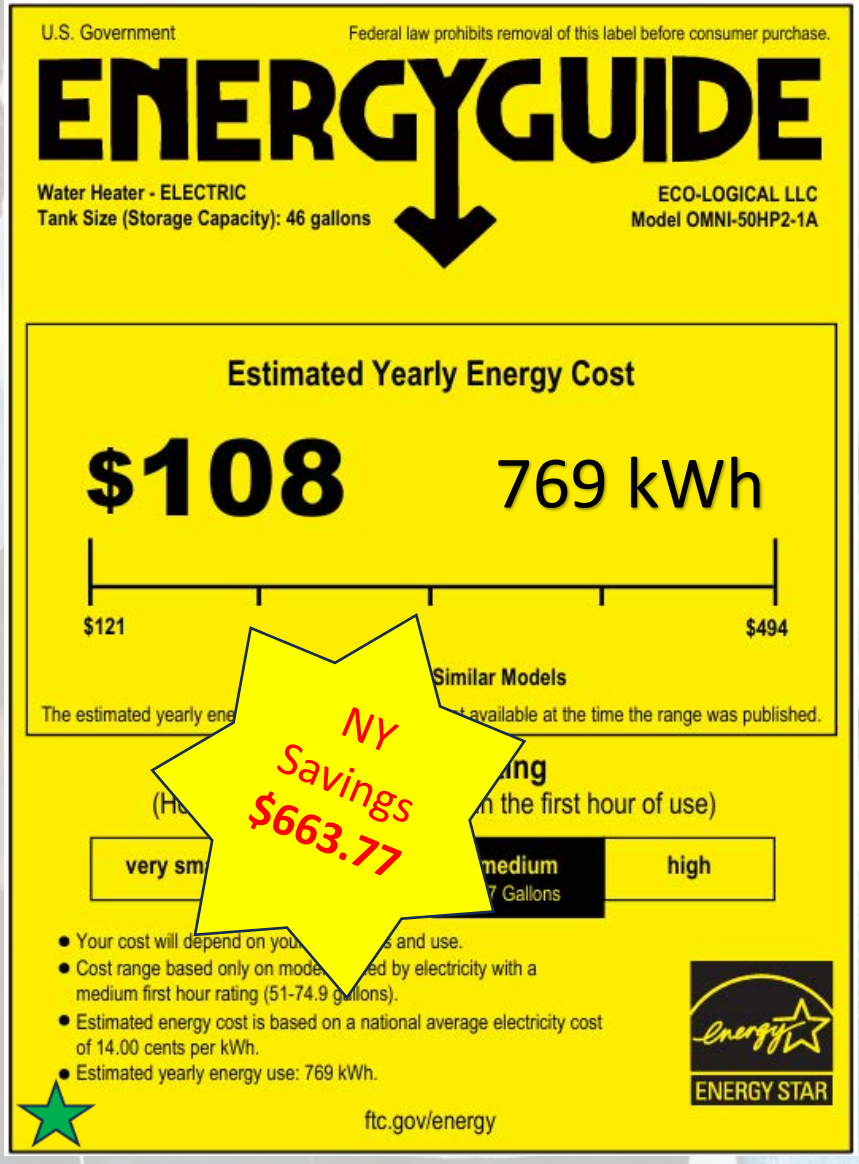
Made For All Homes

Household Energy Usage/Savings

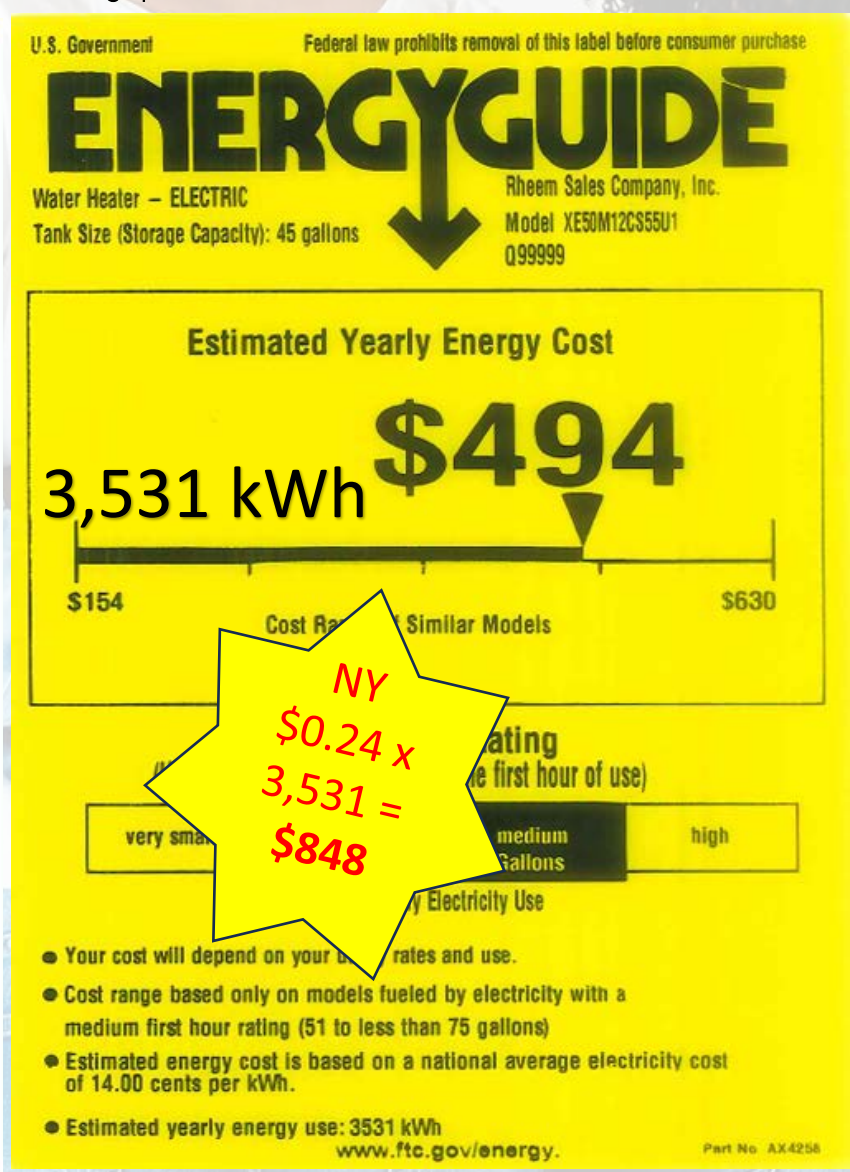
OMNI 120v 50G 81% Savings



OMNI 240v 50G 78% Savings

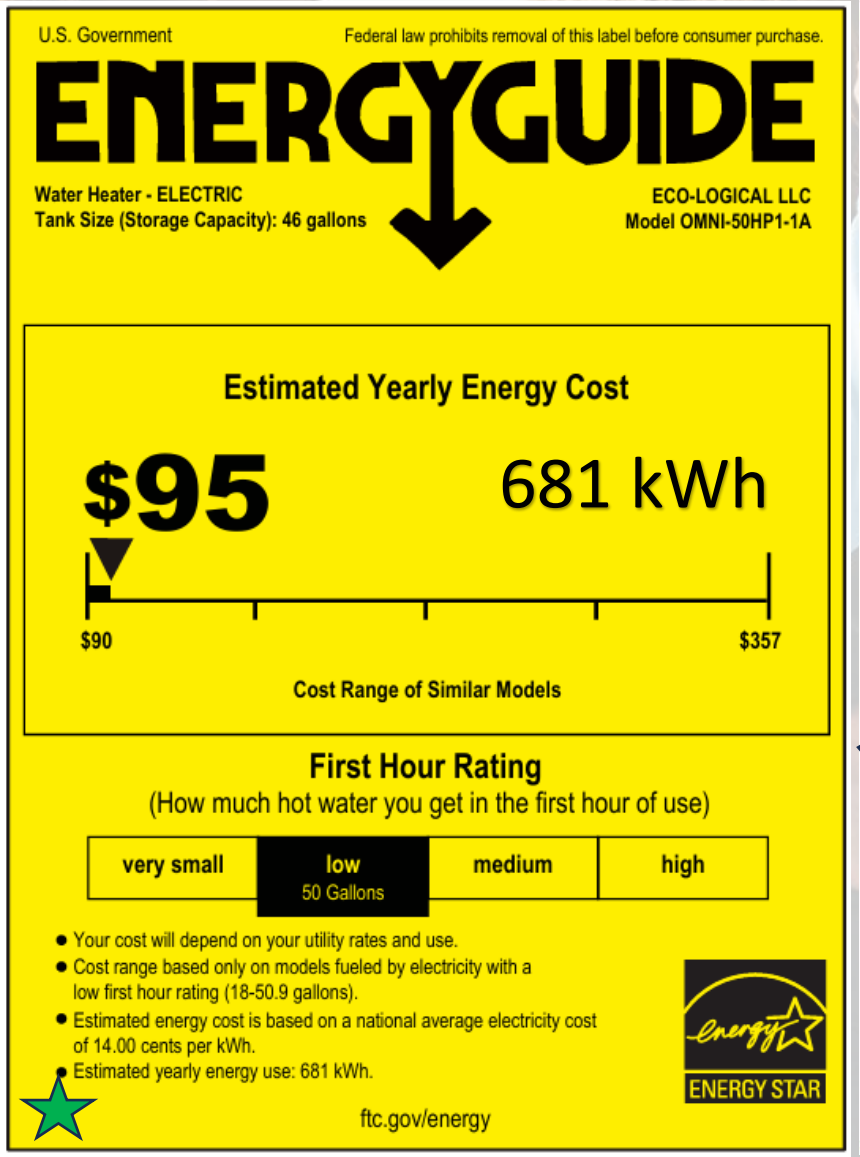


Typical 40G Electric MH WH

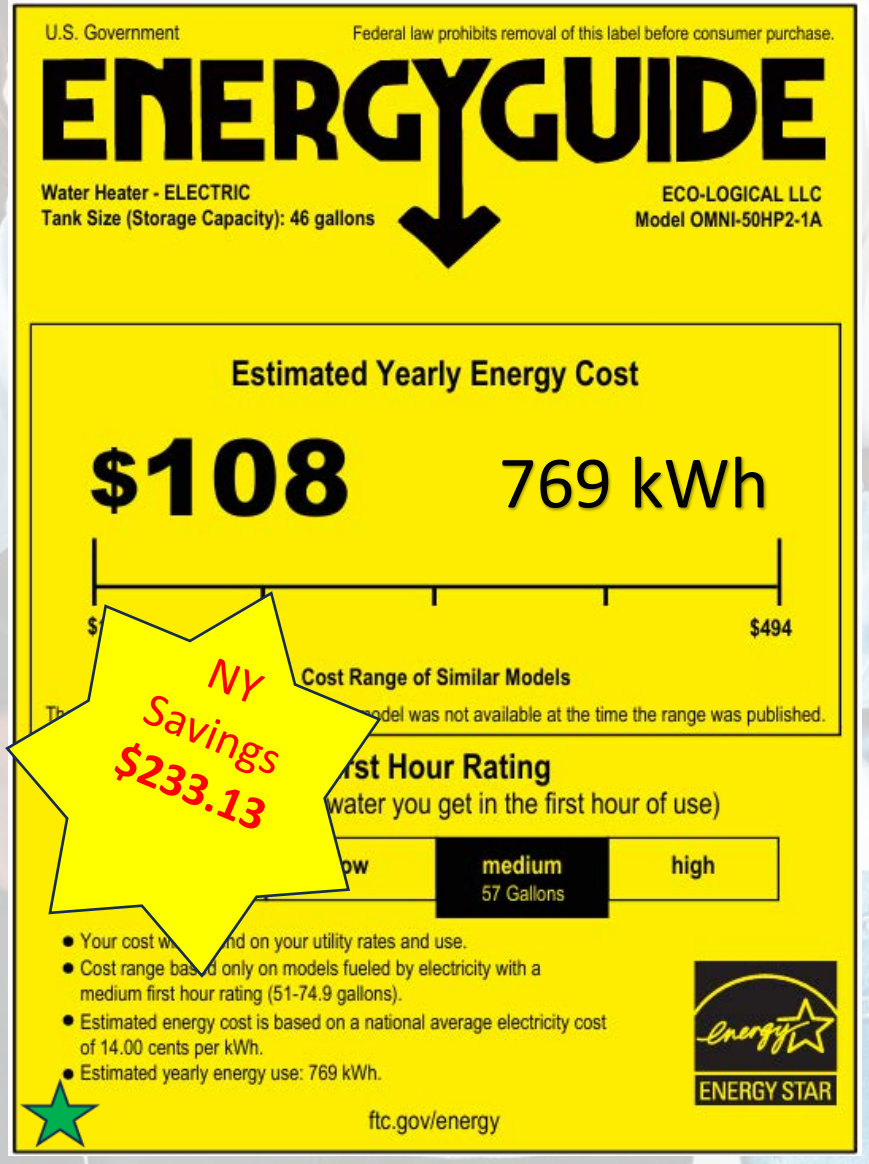


Household Energy Usage/Savings

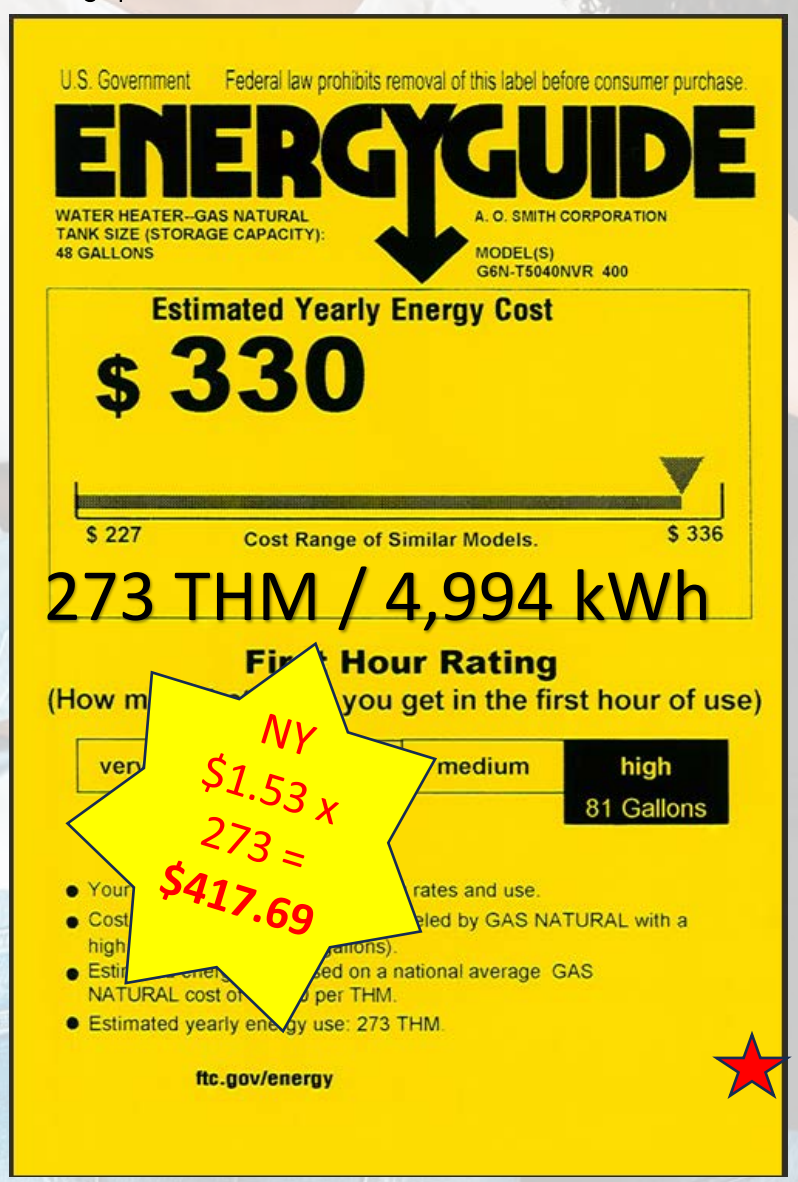
OMNI 120v 50G 71% Savings



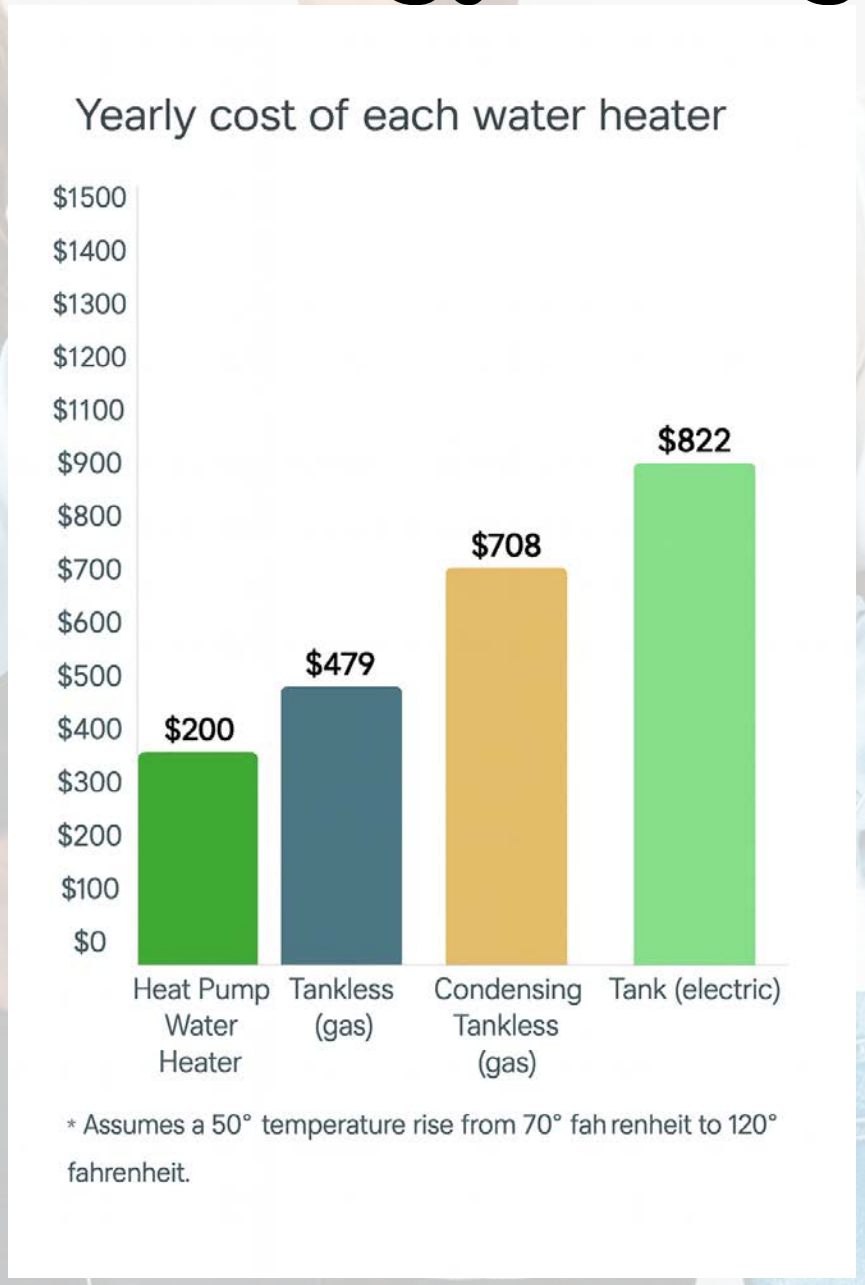
OMNI 240v 50G 67% Savings



Typical 46G Gas MH WH



Household Energy Usage/Savings



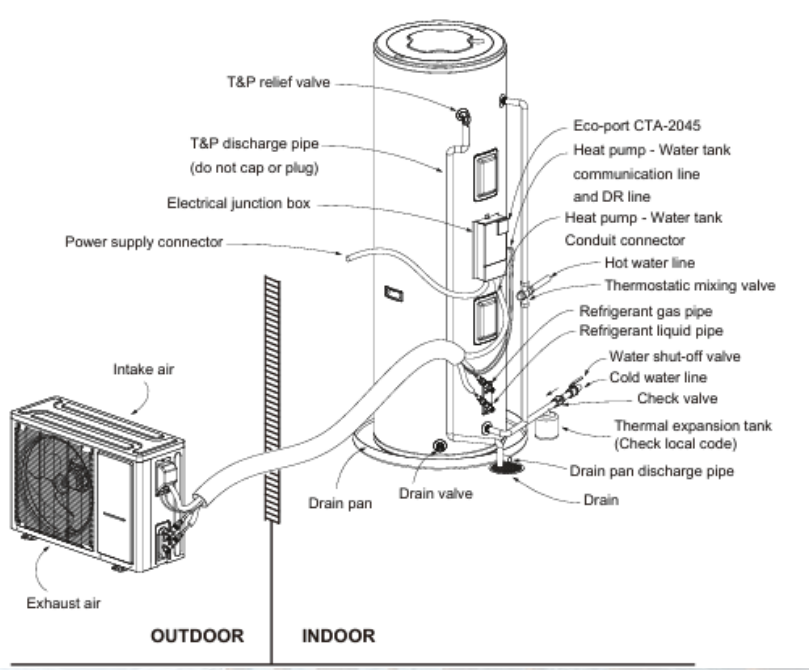
Eco-Logical® OMNI™

What is difference when installing the OMNI
The OMNI Hybrid HPWH installs similar to towers in many ways, some things are even easier

Here is what's similar:
- Run electric for fuel switching replacements
- Connect plumbing the same
- Pressure relief the same
- Drain pan and petcock
- Fire up process
- No HVAC tools required

Here is what you do not need to do:
- No need for any venting
- No need for any condensate drain or pump

Here is what is different:
- Power runs to heat pump from tank
- Requires a second switch box by the exterior heat pump
- Run lines and low power through the shell from HP to Tank
- Connect the Self-sealing Eco-Connections
- Mount the exterior HP on the ground or wall



OMNI™ Split System Installation Benefits

The OMNI split system is a hybrid heat pump water heater.

- EPA Section 608 Certification <u>IS NOT REQUIRED</u>
- You can order a 240v or 120v model (80g 240v only)
- For Pro Plumbers the 16' refrigerant lines feature Eco-Connect System™ that are quick connect, no vacuum or refill with HVAC tools required
  - Just a torque wrench to make sure you don't under or over tighten the fittings
  - A union and extra pre-charged line set can take you to 28' with no special HVAC tools
- Re-Sealable for service!!!!!
- For Pro Contractors with HVAC techs, they will be right at home as the system is just like a ductless mini-split and lines can be welded in for up to 33' with standard flare connections
- A1 Non-Flammable refrigerant

Tank 130 Pounds evenly distributed

Heat Pump 65 Pounds

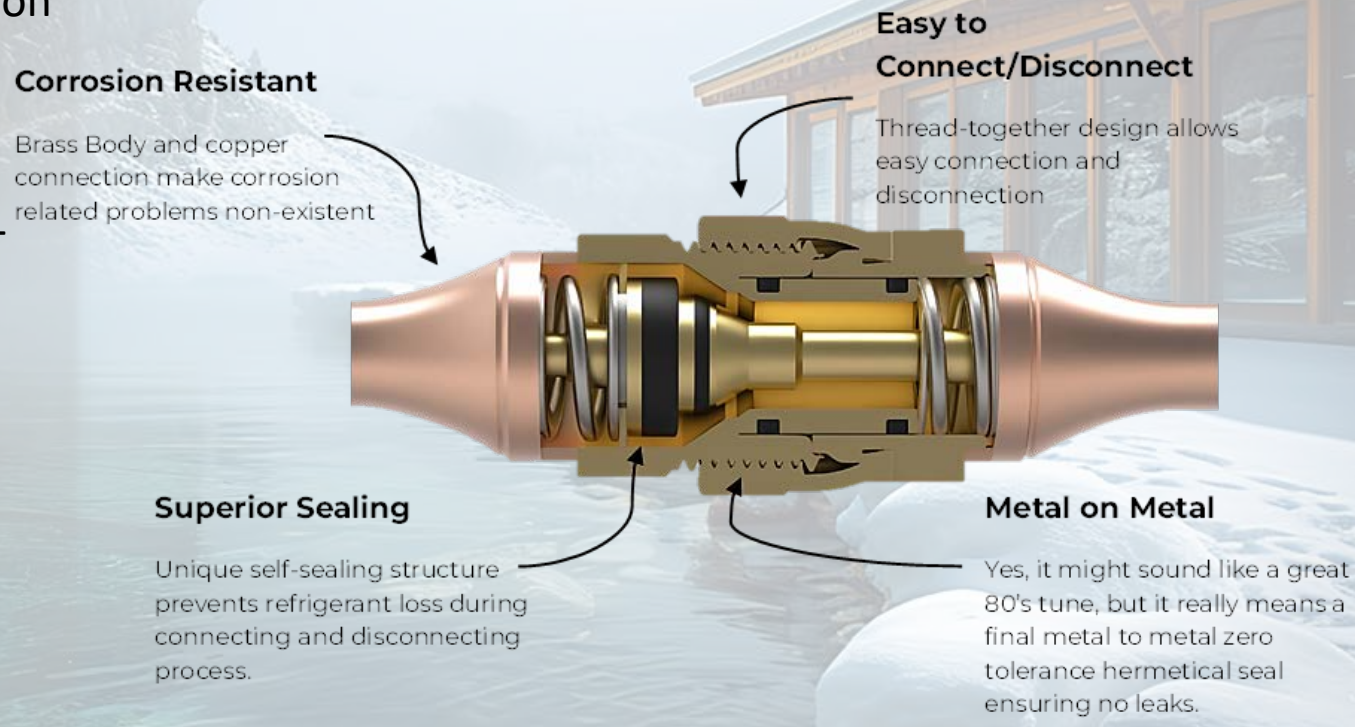
Bonus)-the-tank-can-lay-down-on-its-side-for-transport(-

Eco-Connect™ Line Set

The **Eco-Logical® OMNI™** features the industry's first pre-charged R-513A refrigerant line set designed specifically for Heat Pump Water Heaters. **This means no need for the EPA 608 certification.**

Our **Eco-Connect™** system enables quick and easy installation without the need for specialized HVAC tools or a licensed HVAC technician.

To ensure long-term durability and system integrity, we've sourced only the **highest-quality self-sealing connectors**—rigorously selected to meet the demands of our **10-year equipment warranty**.



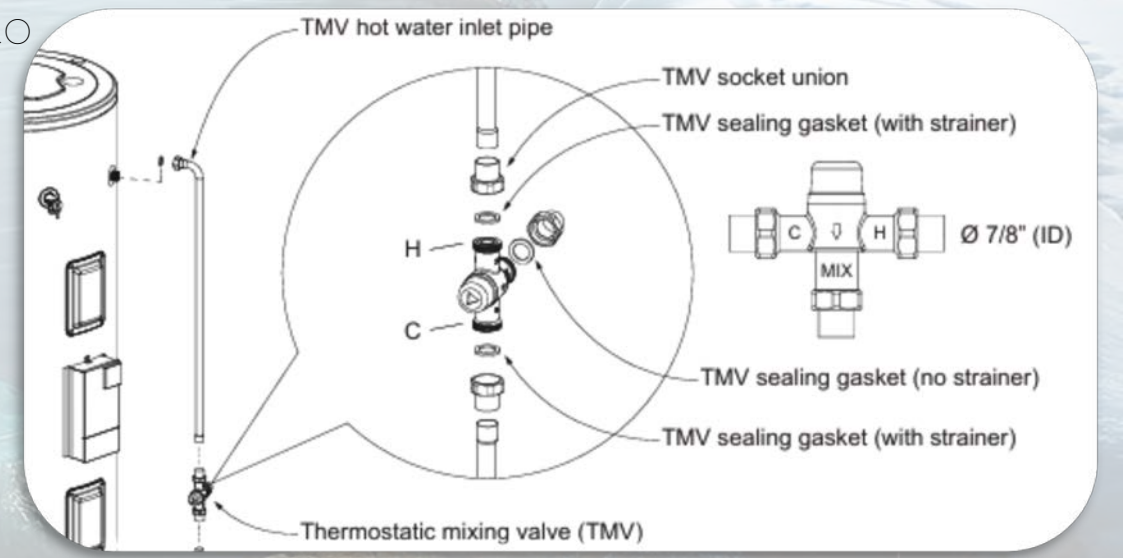
Why so **confident** with the **Eco-Connect**? Because every component is built to perform:

- Certified to **UL 207** standards for hermetically sealed connectors
- Constructed from **premium copper and brass**
- Equipped with **high-strength spring-loaded seals**
- Engineered with **top-grade rubber and polymer O-rings**
- Finished with a **precision metal-on-metal zero-tolerance seal**
  - Yes, hermetically sealed

OMNI Installation Benefits

All OMNI models have the ability to heat to 160° for high demand, sanitation, and demand response commands

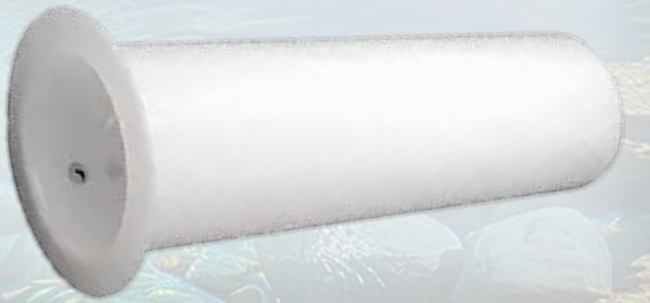
- High quality UL 1017 listed Thermostatic Mixing Valve (TMV) included on all OMNI models to adjust water output temperature
- UL requires we supply a TMV for the 120v model
  - The OMNI 120v heats water to a factory set 140° for optimal performance and the TMV puts out safe 120°F water
- We opted to also include a TMV with the 240v OMNI
  - The 240v OMNI is set factory set to heat the water to 125° as default
  - That is the optimal setting for the 240v OMNI performance
  - The addition of a TMV, safely allows customer to increase water tank temperature and control the output if they set it too high
  - For high use households you can adjust the temp for higher volume of hot water



OMNI Optional Accessories

Clean and familiar installation. Customers are very familiar with ductless mini-split technology and will appreciate the benefits of having the Heat Pump outside, not making noise, or conditioning their living space. Not to mention worry of a condensate pump.

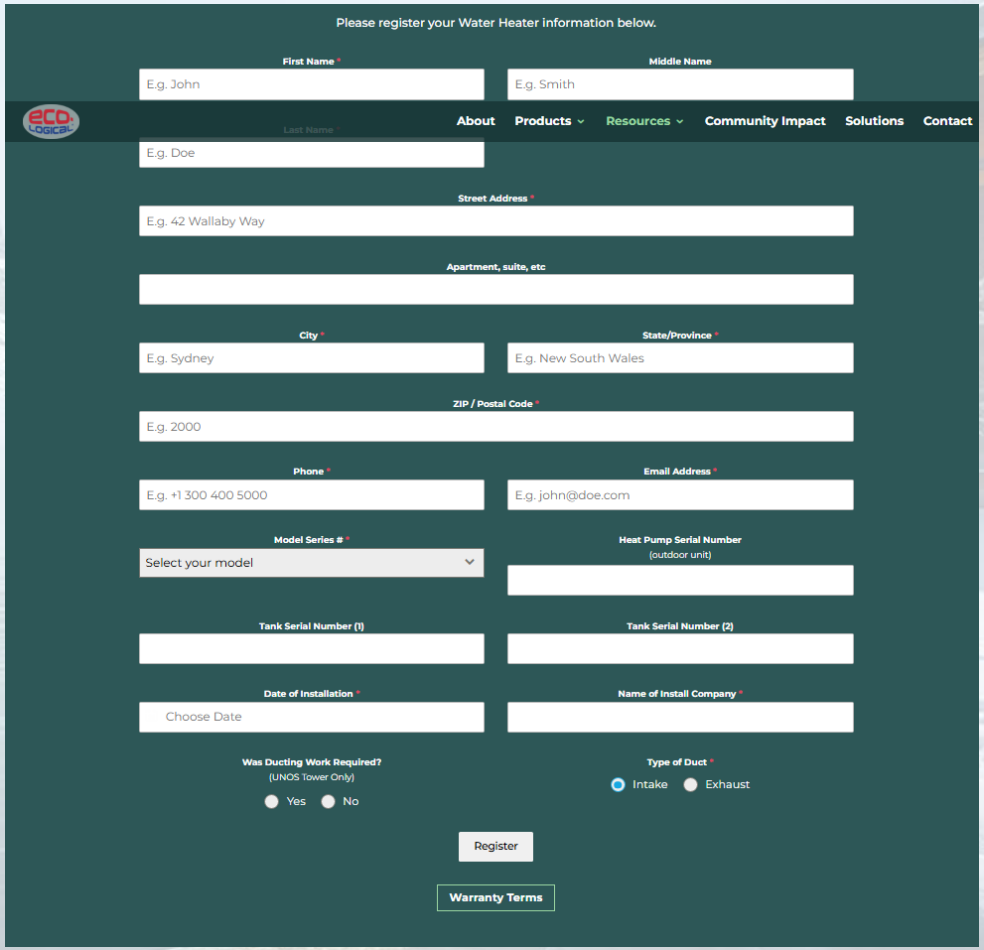
- Mounting Options
  - Wall mount cold or warm climate
  - Platform on the ground warm climate (poly slab, pavers, or tall stand)
  - On a stand for cold climates (about 12-13”)
  - Roof mount
- Line Set extension and Union for up to 28’ (max 33’)
- Communication line extension
- Universal Control Module for demand response (Skycentrics/eRadio)
- Similar to ductless mini-split:
  - Wall Collar
  - Line covers
  - Wrap



Eco-Logical Warranty for the Customer

Designed and built to last with decades of products delivered in European, Australian, Asian, and New Zealand markets.

- 10 year parts warranty / 1 year labor
- Easy web registration via QR code on the tank or visit our web page or our app
- Live customer support or web support



855-ECO-HPWH (855-326-4794)

Eco-Logical Warranty & Service Installer

Designed and built to last with decades of products delivered in European, Australia, Asian, and New Zealand markets.

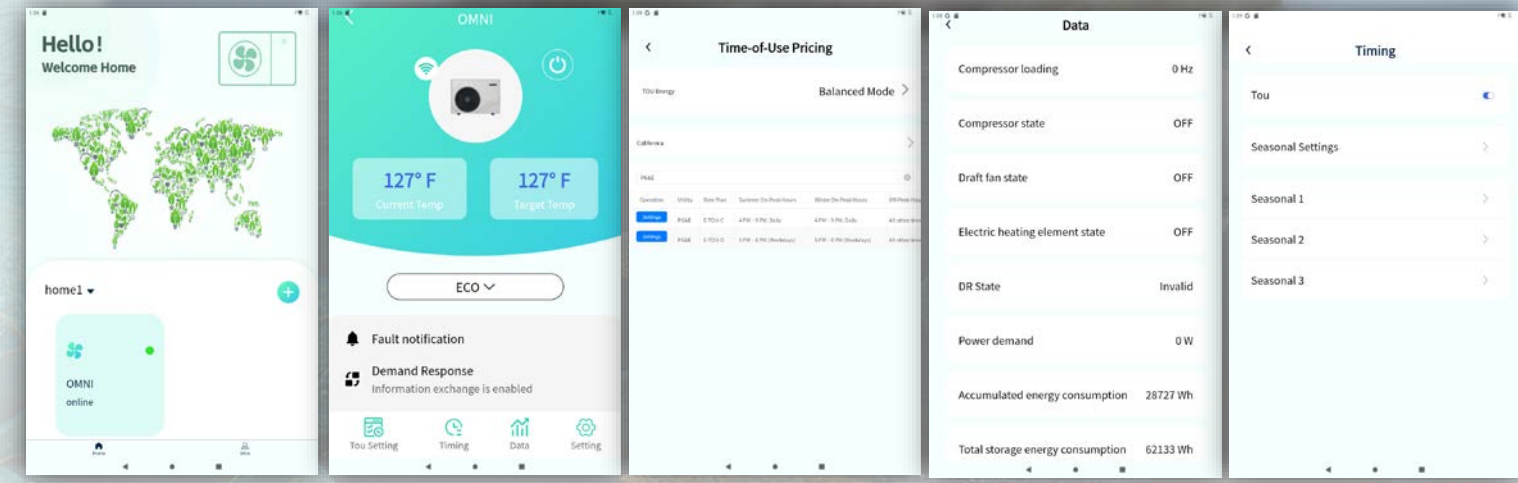
- Certification Program - Soon
- Web training or live training upon request
- Live installer support
- Master Plumbers and HVAC Techs available for support
- Currently using a swap out scheme:
  - If the tank needs replacing, we swap it out with you
  - Same with the heat pump
  - But the advantage is they are separate units and can actually be swapped
  - The quick connect is re-sealable
- Can operate on back up elements if there is a heat pump repair or error

855-ECO-HPWH (855-326-4794)

Eco-Logical® Smarts

Connectivity, ENERGY STAR 1.2 AHRI 1430, CTA-2045B L2, JA13 Compliant *(California)*

- Eco-Logical App Android/ iOS* Dec25’
- 5 modes, settable on the app or key pad
  - Eco
  - Turbo
  - Electric Resistance Only
  - Hybrid
  - Vacation
- A certified eco-port
- Accepts any Universal Control Module
  - eRadio
  - Skycentrics
- Time of Use:
  - Drop down menu for all existing TOU schedules
  - Or ability to manually enter TOU schedules
- Back-up clock battery to maintain setting during a power outage

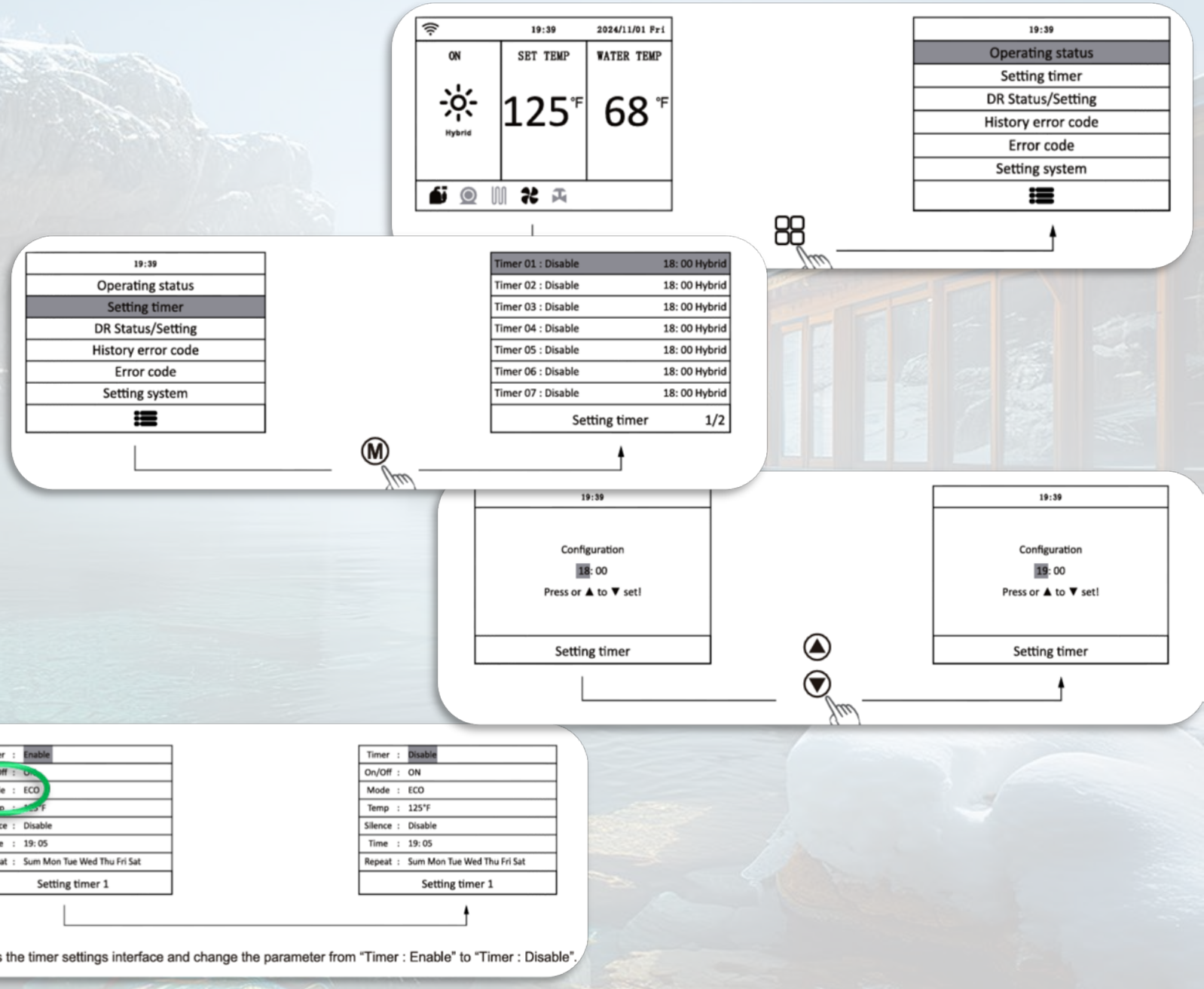


Eco-Logical®

Manual TOU Setting – Isn't fun but it is functional

- Select the day
- Set the time of action and end of action
- Select action (Heat Pump Only or Off)
- Repeat for each day
- Enable "Timer" to lock in schedule

- Extended tools available on the keypad
  - System Settings
  - Operation modes
  - Diagnostics
  - Error history
  - Temperature settings



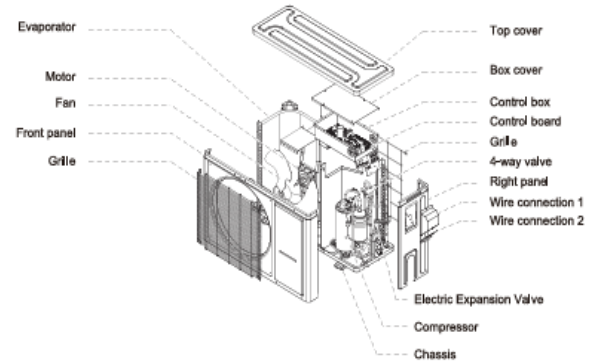

Can we get a Bio Break

OMNI – How it crosses the plumbing HVAC world

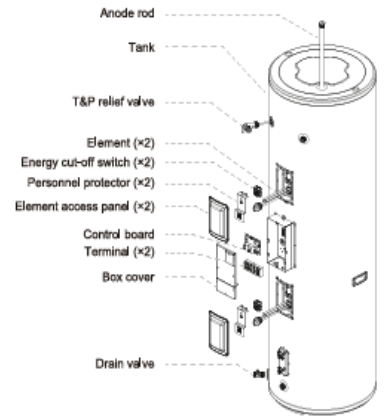
In the OMNI heat pump water heater, the control valve is an Electronic Expansion Valve (EEV), while TXV is a Thermostatic Expansion Valve — the key difference is that the EEV is electronically controlled by the system's controller for precise, variable refrigerant flow adjustment based on real-time sensors (enabling better efficiency and adaptability in inverter-driven setups like the OMNI), whereas a TXV is a mechanical device **that relies on a sensing bulb and pressure** to regulate superheat without any electronic input.

- Similar to a ductless mini-split but.....
- Runs shorter and fewer duty cycles
- The heat pump uses a precise electronic expansion valve 30.43oz for the system
- For service volume of refrigerant is more important than pressure
- The water tank temperature varies greatly so a sub cooling-subfreezing – super heating is not an appropriate diagnostic metric (unlike room temperature)
- So grabbing the pipe and adding refrigerant until it gets “cold or hot” will not work servicing this unit

OMNI-50HP1H-1A, OMNI-50HP2H-1A, OMNI-80HP2H-1A



OMNI-50HP1T-1A, OMNI-50HP2T-1A, OMNI-80HP2T-1A



Install Video - Center for Employment Training

Installation – Set Up

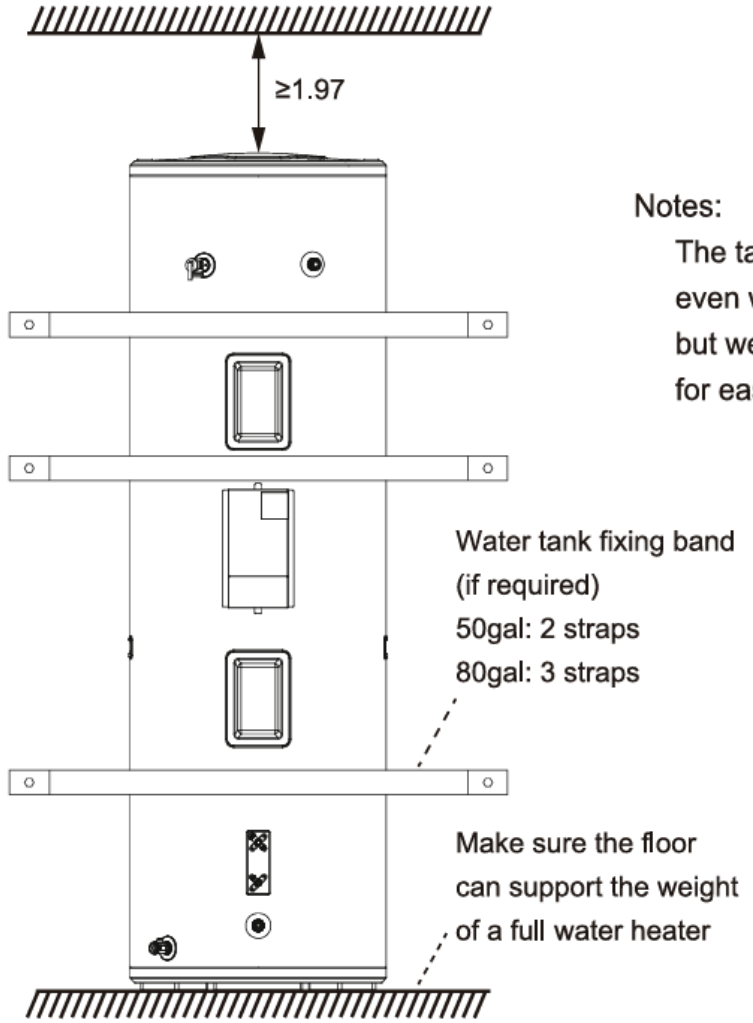
- READ THE MANUAL
- READ THE TECHNICAL SERVICE BULLETINS
- Material you may need:
  - **Open end torque wrench**
  - Typical Plumbing tools and materials
  - A platform, stand or wall mount
  - Lag bolts
  - Sleeve and collar for wires and lines
  - 2 switch boxes check local code
  - A **thick** soap solution

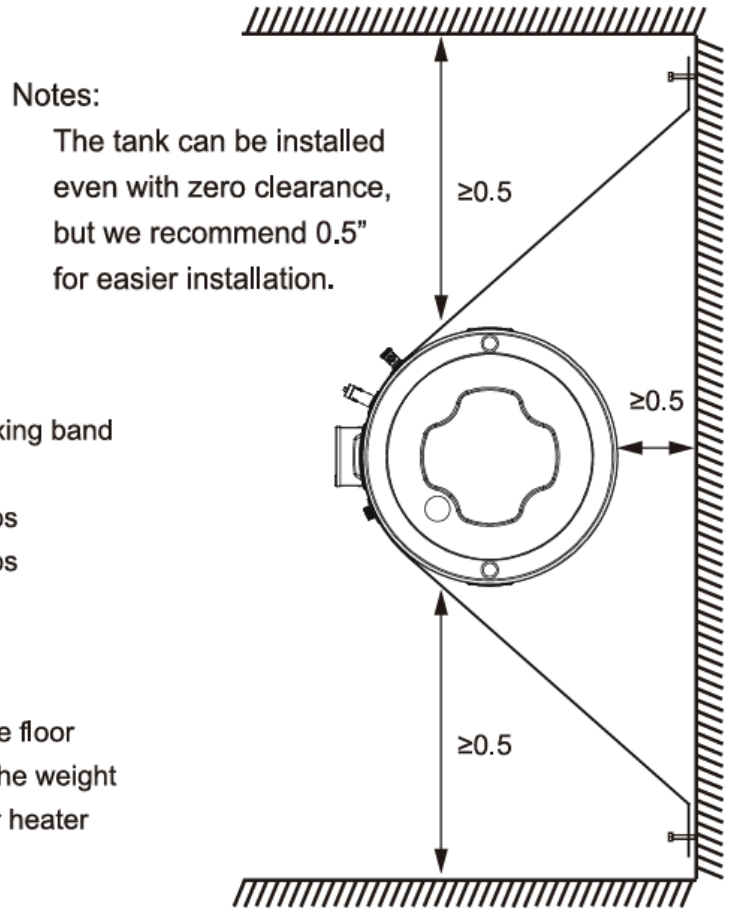
Item	Quantity
Heat pump outdoor unit	1
Water tank	1
T&P relief valve	1
Installation & user manual	1
Wire controller	1
Condensate drain joint	1
Condensate hose	1

Item	Quantity
Refrigerant connection tube (Pro-Plumber Model Only)	2
Drain valve	1
Thermostatic Mixing Valve	1
Piping (120V only)	1
Grey insulating sleeve	4

Placing the Tank

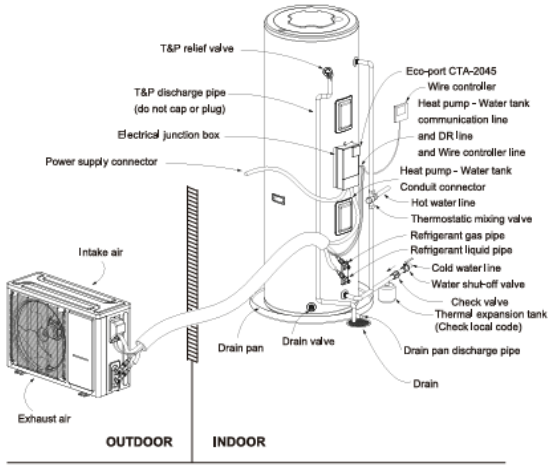
- The Tank does not require ventilation and can be installed against a wall but LEAVE ROOM TO MAKE CONNECTIONS
- The Tank is 18.5” x 72” or 22” x 71”
- Use a pan where required and make sure the flooring is in good condition otherwise repair it
- Use Seismic straps where required

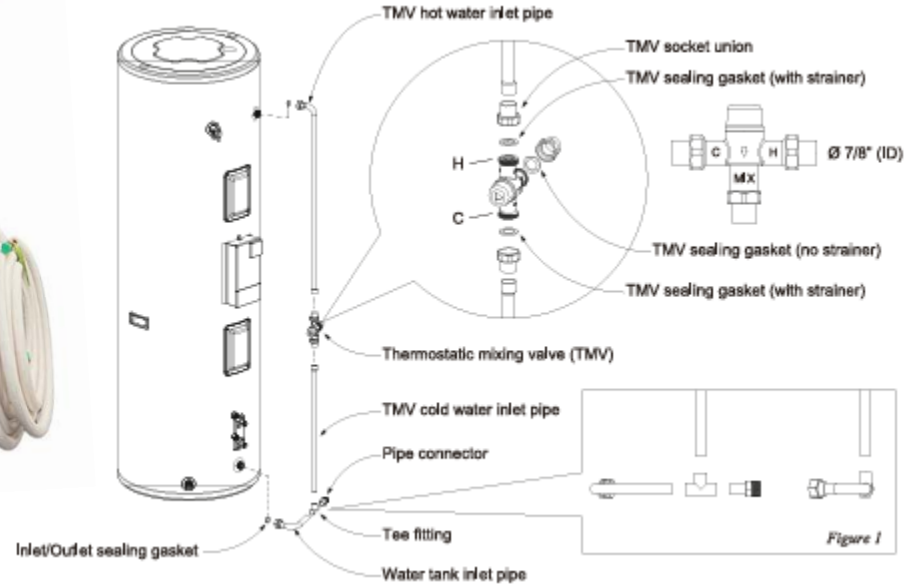




OMNI – How it crosses the plumbing HVAC world

- The tank installs just like a typical electric water heater
- 120v 20 amp breaker or 240v 30 amp breaker optional models
- After connecting the power to the tank, it then runs outside to the heat pump
- There are low voltage data cables that also run through the shell to connect the tank and heat pump
- Finally a set of refrigerant lies run between the tank and the heat pump
- Always install the included **thermostatic mixing valve**
- Always install an expansion tank where a curb stop is present



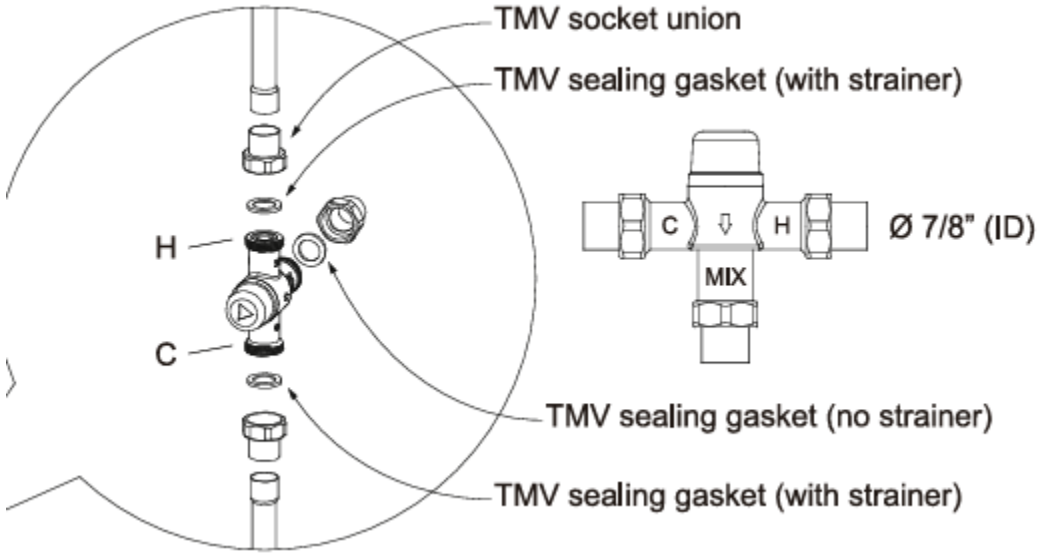


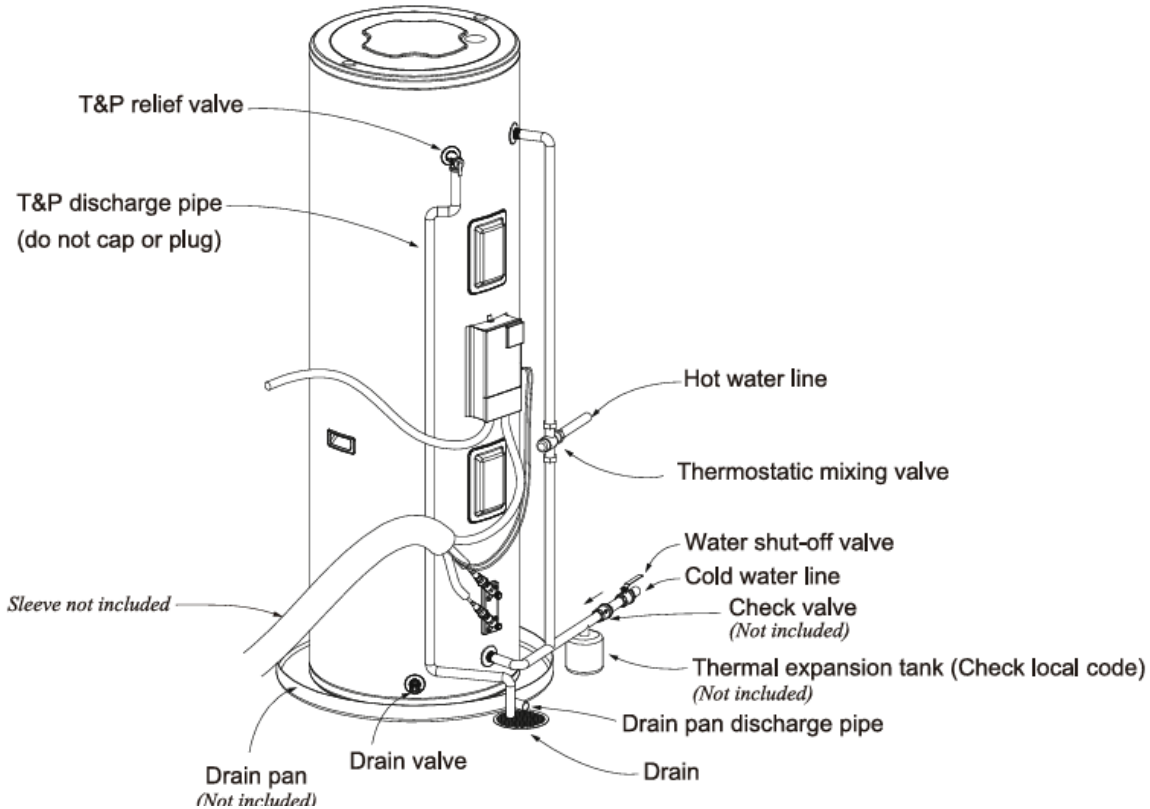
Connect the Plumbing

Basic plumbing connection for a water heater apply
Points of difference:

- Must install the TMV on the 120v model –SCALD WARNING
- Highly recommend installing the TMV on the 240v model – Convenience and Super Powers
- Pay attention to soft parts in TMV, do not melt them
- Expansion tank if already required
- Recirculation Pump should be on demand and or with a timer setting

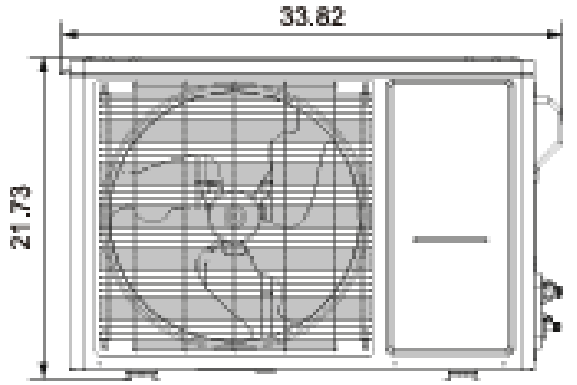
Model	Setpoint (°F)	Increment (°F)	Estimated FHR (gal)	Est. Efficiency Drop (%)	UEF
OMNI 120V 50G	**140**	**0**	**51**	**0**	**3.3**
OMNI 120V 50G	145	5	55.1	1.5	3.25
OMNI 120V 50G	150	10	59.2	3	3.2
OMNI 120V 50G	155	15	63.3	4.5	3.15
OMNI 120V 50G	160	20	67.5	6	3.1
OMNI 240V 50G	**122°F**	**0**	**57**	**0.00%**	**4.23**
OMNI 240V 50G	125°F	3	59.8	0.90%	4.19
OMNI 240V 50G	130°F	8	64.4	2.40%	4.13
OMNI 240V 50G	135°F	13	70.8	3.90%	4.07
OMNI 240V 50G	140°F	18	73.6	5.40%	4.01
OMNI 240V 80G	**122°F**	**0**	**84**	**0.00%**	**4.11**
OMNI 240V 80G	125°F	3	88.1	0.90%	4.07
OMNI 240V 80G	130°F	8	94.9	2.40%	4.01
OMNI 240V 80G	135°F	13	101.7	3.90%	3.95
OMNI 240V 80G	140°F	18	108.5	5.40%	3.89

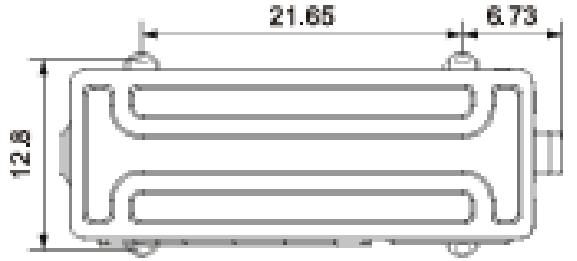


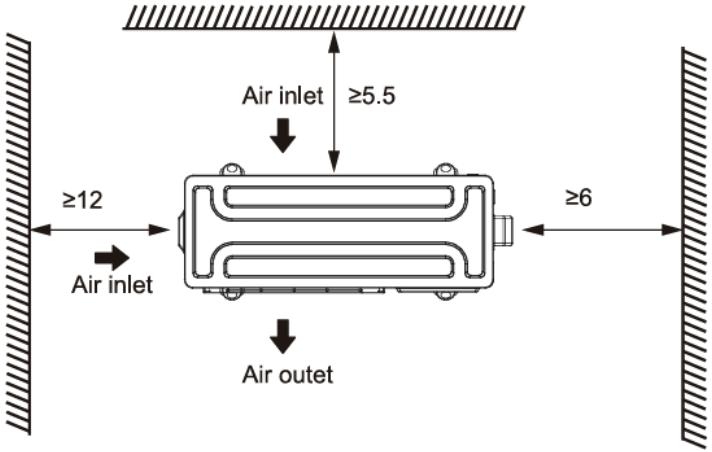


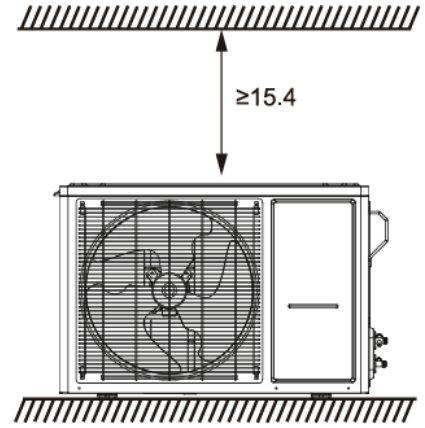
Placing the Heat Pump

- The Heat Pump can work in an enclosure like a garage or large basement. If in an enclosure it will require 700 to 1,000 cubic feet of free air flow
- Outside place the heat pump level on a platform made of concrete, poly, or other sturdy substance you can bolt to
- In cold climates it is recommended to install on a level pad with a 12” tall stand, or wall mount at least 12” off the ground
- Make sure condensate drain will not drain in a high traffic area
- Mount at least 6” away from the wall
- And at least 12” from the vent side
- Securely bolt to the mount







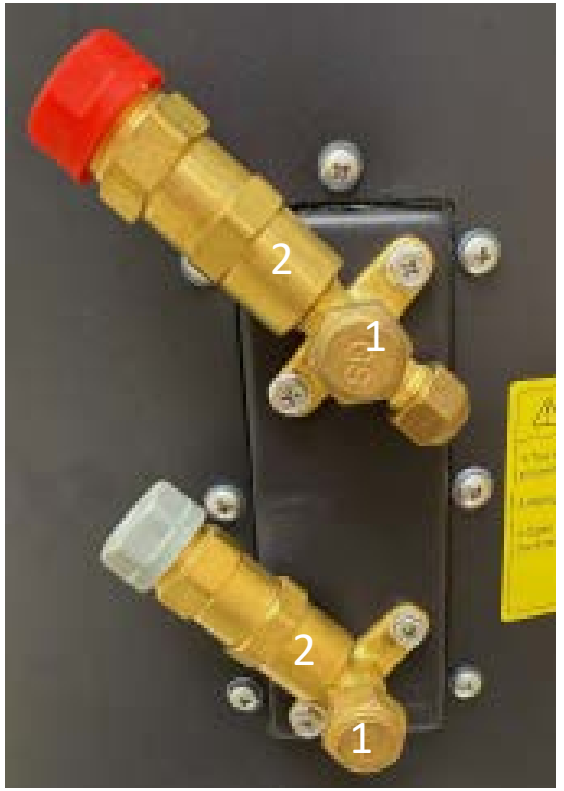


Line Set – Quick Connect

- The system heat pump, tank, and line set are pre-charged
- The line set that comes with the unit is 16’ equipped with quick connections
- An additional line set kit of 12’ can be purchased to extend the total length to 28’
- The kit includes low voltage/data cable extensions and a quick connect union
- Connecting
  - Verify that the service ports (1) are all in the closed position, if not close them
  - Check to see if the king valve adapters (2) for the quick connect are tight
  - If the service valves are open and the adapters are loose, contact your distributer
  - If the adapters are loose but the valves are closed, simply snug the adapters and proceed
  - Coil extra line set and secure in a horizontal position

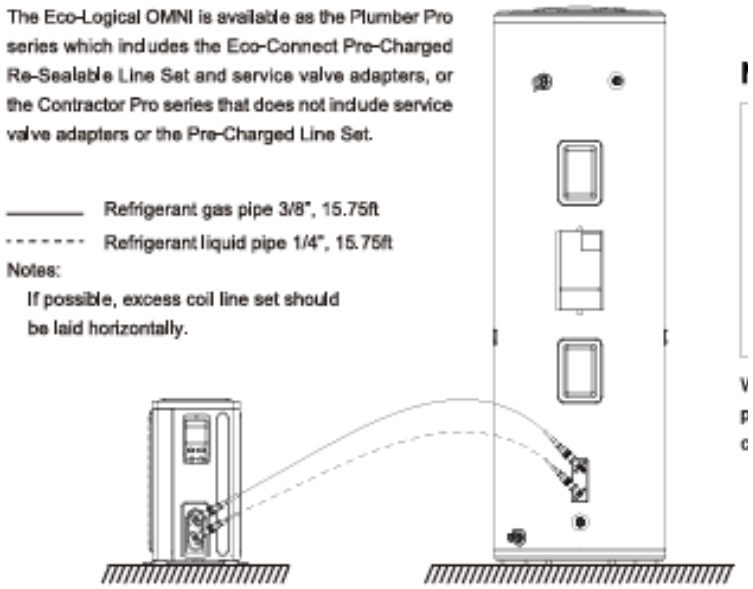
NOTICE:

When installing refrigerant pipeline, please note the minimum curvature diameter.



Torque to 20-22 ftlb (25-32Nm)

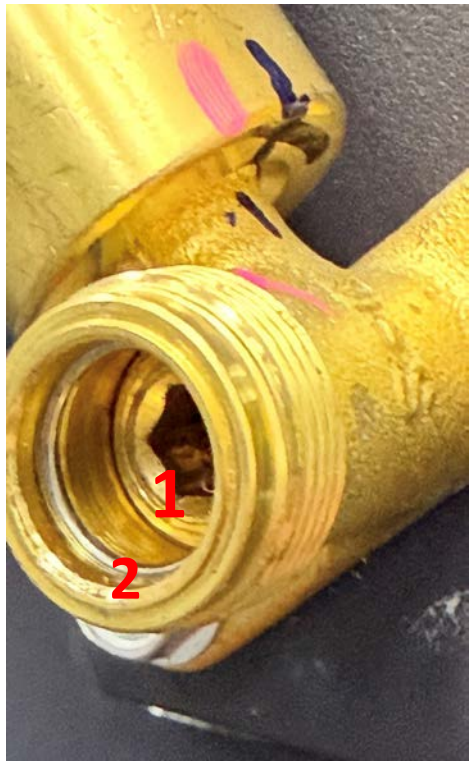
The Eco-Logical OMNI is available as the Plumber Pro series which includes the Eco-Connect Pre-Charged Re-Sealable Line Set and service valve adapters, or the Contractor Pro series that does not include service valve adapters or the Pre-Charged Line Set.



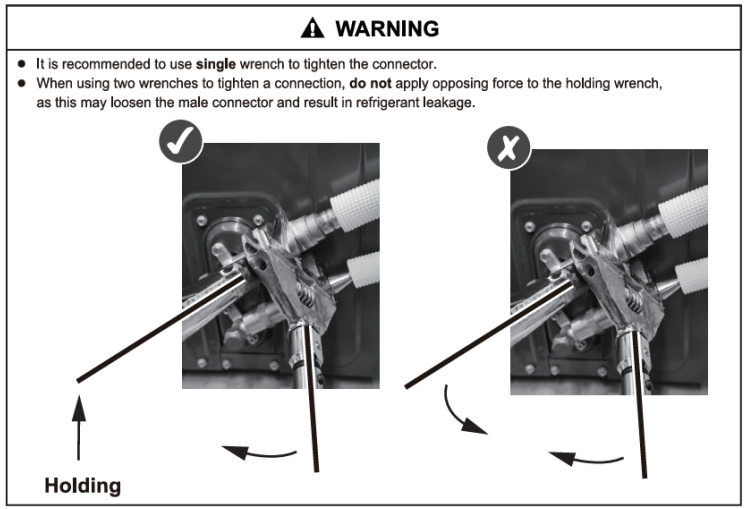
Line Set Quick Connect

- When connecting the quick connectors, make sure all service ports are closed
- The line set has a small amount of refrigerant and they are very robust springs sealing the ends:
  - **In one deliberate action seat the connector, and screw on by hand without pausing to hand tight**
  - **Then use the torque wrench to finish it off to 22 ftlbs**
- Once you have done this on all connection points open the service valves on the tank and the heat pump
- The service port allen screws (1) have a backing o-ring (2) to stop them from coming all the way out
- Open the valves completely (partially open can cause poor operation and frost build up)
- Now use a sauce of your choice to soak down the connections and look for bubbles
- If you see any bubbles, close the service valves and double check your quick connector connections

Service port hex screw in closed position



⚠ **WARNING:** Improper torque can lead to fitting leaks, properly torque the quick connect fittings.

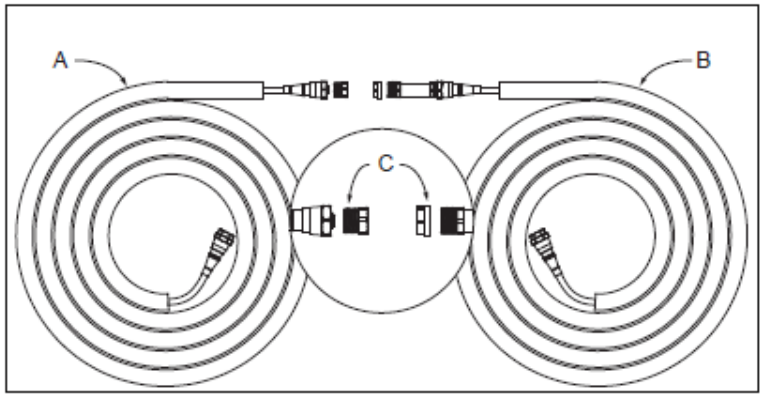


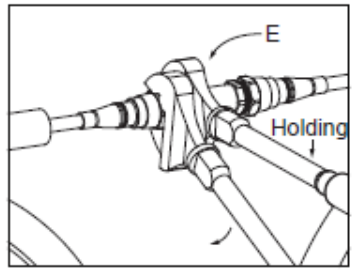
Eco-Connect Pre-Charged Extension

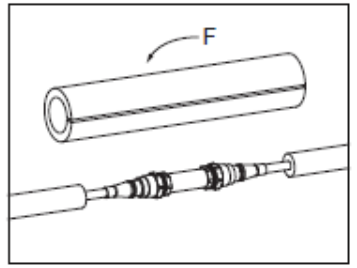
Item	Quantity
Refrigerant connection extension tube (Pre-charged) (3/8" and 1/4")	2
Communication extension line	1
DR extension line	1
Grey insulating sleeve	2

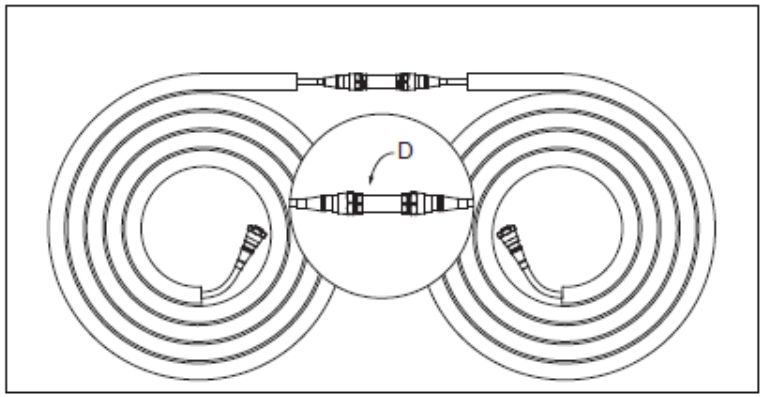
- No vacuum required,
- No HVAC tools needed
- All pre-charged
- Includes low voltage electric connection lines

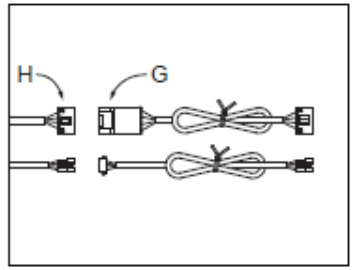
When tightening the connections to the union, do not let the line rotate. Hold the union in position and only allow the quick connect to rotate







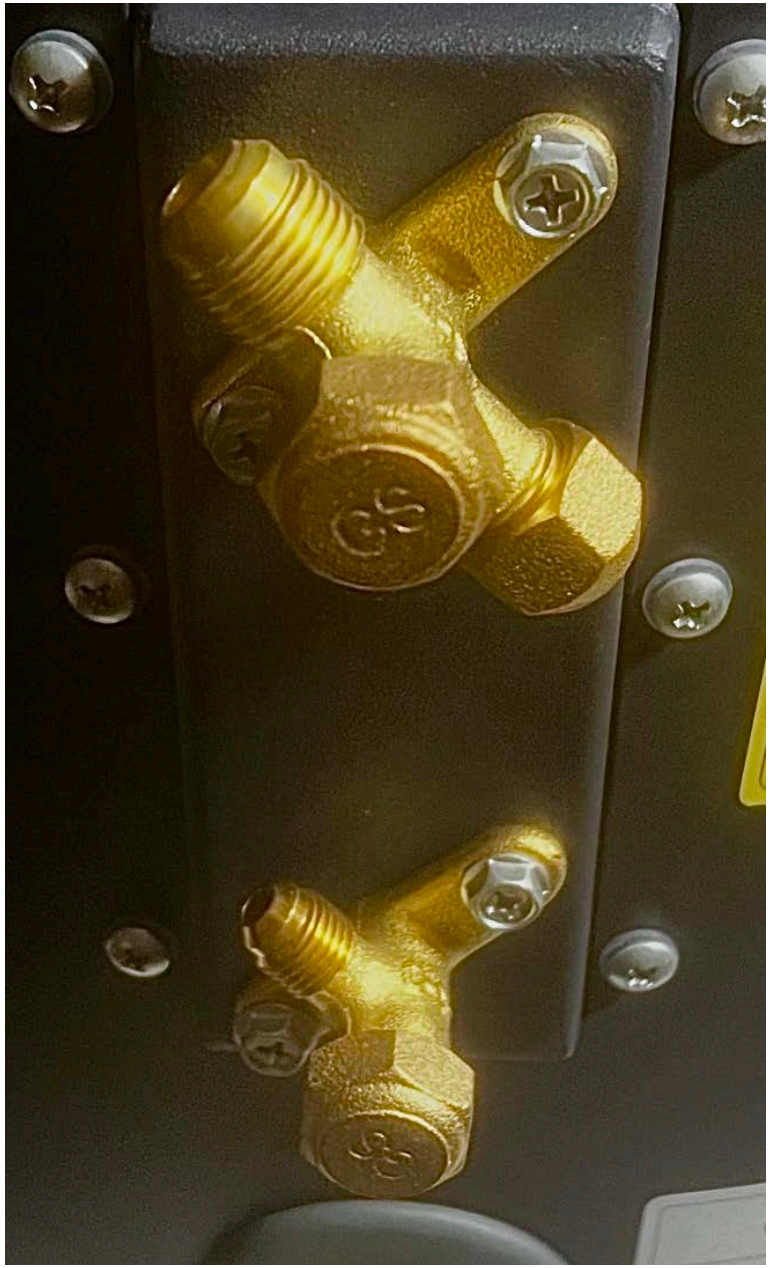




Line Set Standard HVAC

- For contractors with proper license to handle refrigerant you can run your own line sets to the desired length up to 33’.
- Ensure the service valves are close, then remove all four quick connect adapters
- Follow standard HVAC flare and connection protocols
- Total system 30.43 oz (includes tank .88 oz)

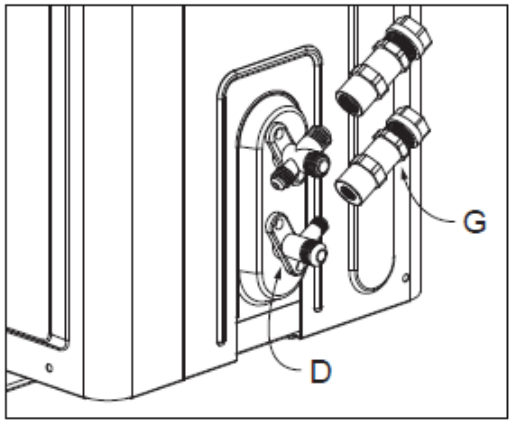
Total Line Length (ft)	Charge Formula	Total Refrigerant (g)	Total Refrigerant (oz)
16	50g + 15g × 0	50	1.76
21	50g + 15g × 5	125	4.41
26	50g + 15g × 10	200	7.05
31	50g + 15g × 15	275	9.7
33	50g + 15g × 17	305	10.76

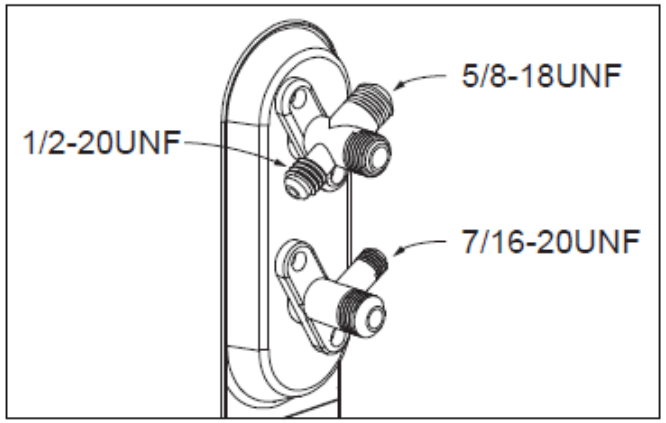


Standard Flare Connections

A refrigeration engineer is required to evacuate the unit if pre-charged coupling are not used.

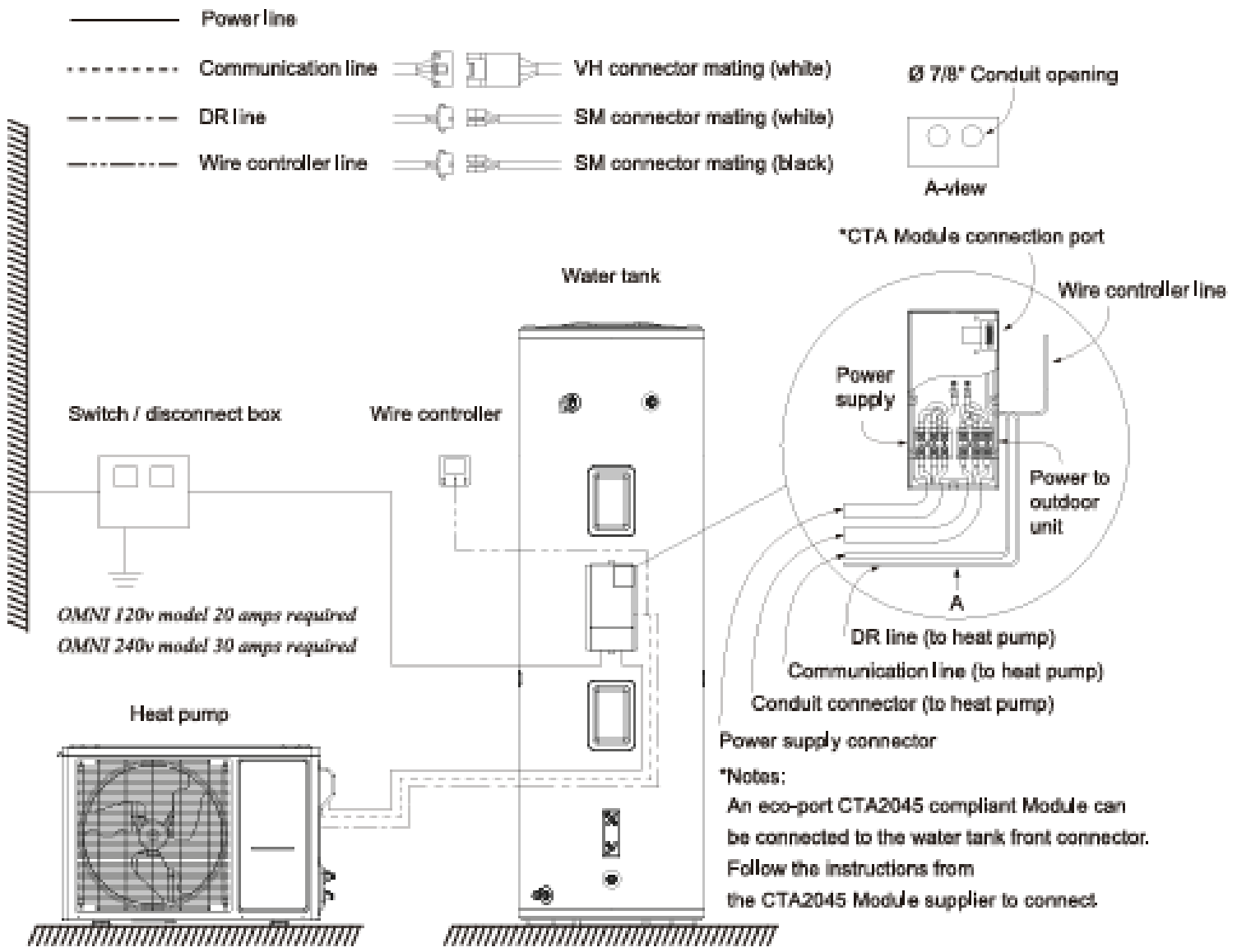
- Clarify that the 2- and 3-way valves on the heat pump unit are closed (D).
- Remove the Eco-Connect quick connectors (G) from these 2 valves. Repeat the same procedure for the water tank.
- Retrieve the pre-prepared refrigerant connection pipe. Note:The gas pipe is 3/8", liquid pipe 1/4".
- Verify that the bell cap of the insulation connecting pipe is in good condition, and there is no abnormal deformation or damage to the bell mouth and the pipe body.
- Drop a small amount of lubricating oil on the copper nut of the connecting pipe and screw it on the joint of the heat pump and the water storage tank respectively.
  Note: The tightening torque of 3/8" copper pipe bolt is about 25~30N·m, 1/4" copper pipe bolt is about 15~20N·m.
- Check whether the pointer of the pressure gauge returns to zero, if it does not point to zero, please use it again.
  If the pointer of the pressure gauge points to vacuum quickly, check whether the valve of the pressure gauge is open (A).





Electrical

- 50g available in 120v or 240v, 80g only 240v
- Electrical routes from panel -> switch box -> Tank -> through shell -> **to outdoor switch box** -> heat pump
- 120v 14.5 amps on a 20amp breaker #12 wire
- 240v 18.5- 19 amps 30amp breaker #10 wire
- Connect the DR and Comms wires – make sure they snap together and color for color
- BLK to BLK/ WHT to WHT



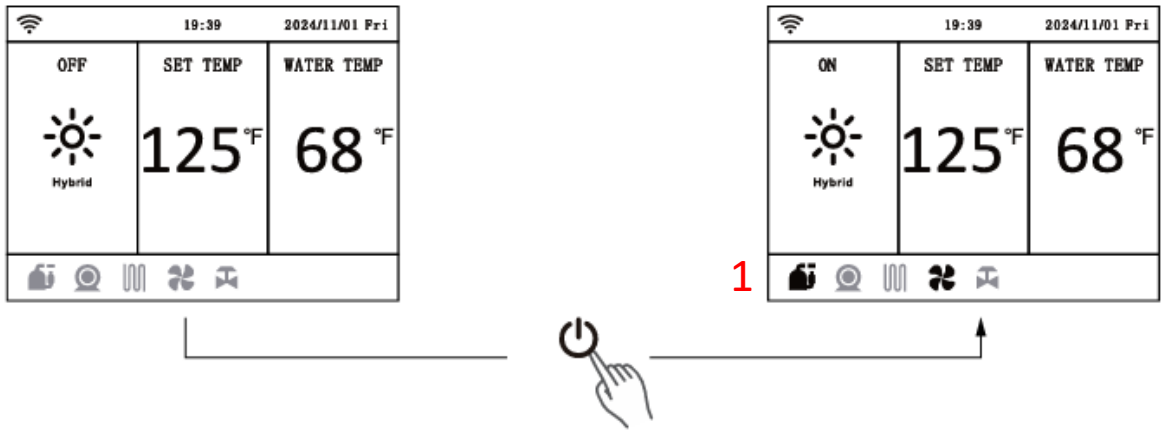
Don’t forget outdoor switch box

Fire It Up!

- Hold the phone, make sure the tank is full before firing it up
- Retrace your steps and check all:
  - Wiring connection
  - Water connections
  - No air bubbles in the water and pressure is between 22 and 100 psi
  - Controller connections snapped in
- Ok, you're ready, flip the breaker and both switch boxes on
- Wait a second for the control pad to come to life
- And for the moment of truth, hold the power button down on the keypad for a couple seconds
- Within 15 seconds the status will show on the key pad and the heat pump will kick on
- Now walk over to the heat pump because its so quiet you won't know its running
- You will see the activity at the bottom light up (1)

On/Off button

Power on the heat pump, hold down the On/Off button for 1 second to switch on or off the heat pump.



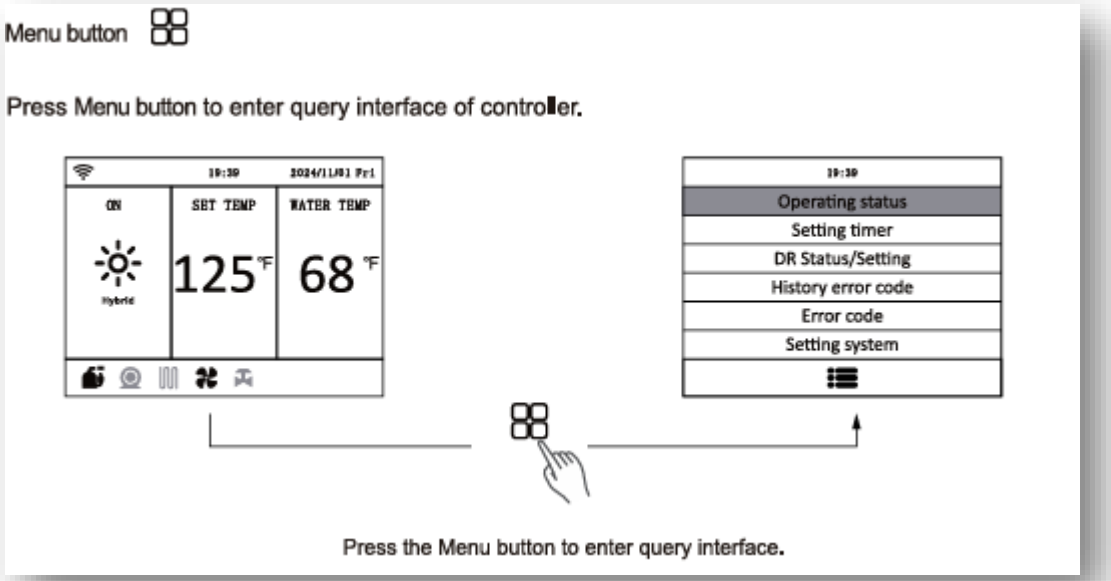
Hold down it for 1 second to switch on.

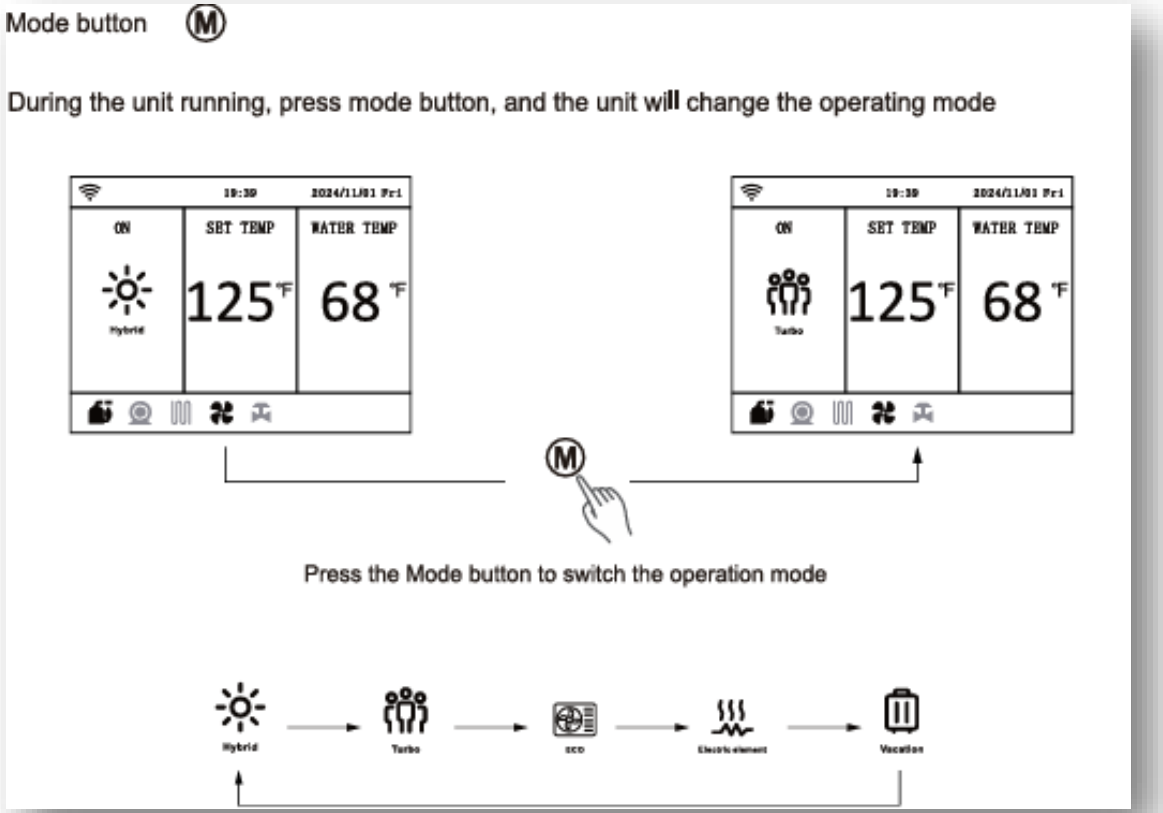
If you receive an error code a few minutes after startup (ex. E01, E02, etc)
Power cycle the unit by turning off the power at the panel box for about 20 seconds. Restart the system and check again.

Congrats, now on to the settings

Basic Settings

- Mode = M
- Set the clock
- Change Celsius to Fahrenheit



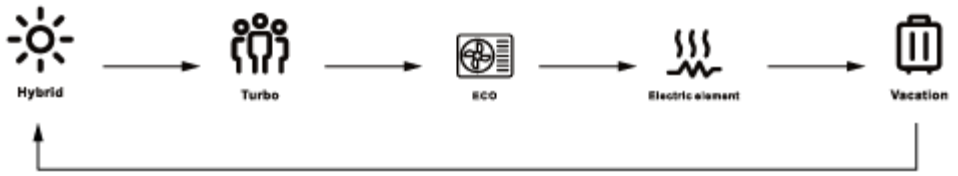


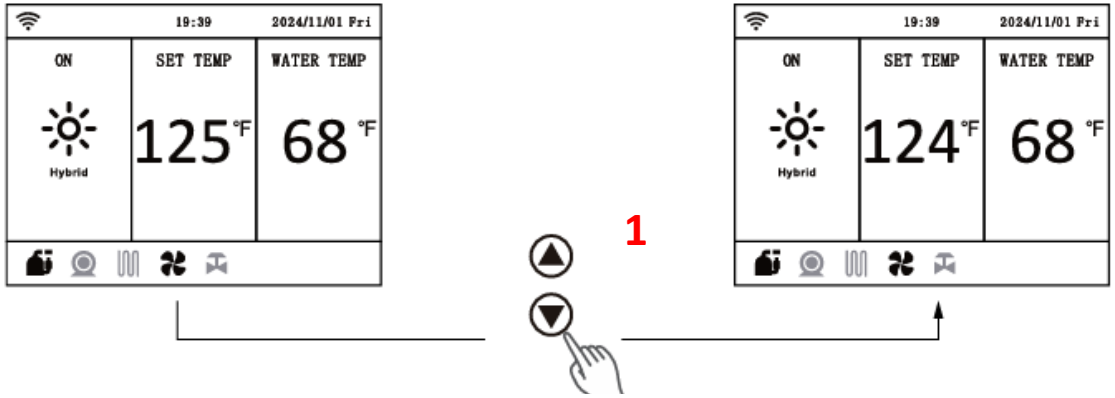
Pro Tip: After you start the system put it into "Turbo Mode" to help speed up the tank temperature, return to Hybrid Mode before you leave, but if you forget it will return to Hybrid Mode after 48 Hours.

These two buttons are used to set the required water temperature, clock and to pageup or pagedown in query interface of controller.

Basic Setting

- **Switch Celsius to Fahrenheit**
- Typically you will want to leave the customer in Hybrid mode
- Hybrid mode is what all of our savings data derive from and offers the best customer satisfaction
- Additionally you will want to set the tank temperature to what suits the home use. If they are a high user and expect multiple showers in a row with 4 or more people in the house, don't be afraid to set the tank temperature 10-15 degrees higher than factory setting. (1) **Super Power**
- Remember you installed a mixing valve to deliver 125 degree water (this too can be adjusted if the users rather have 130)
- This little adjustment will deliver the users a much higher first hour rating with very little sacrifice to energy savings
- On the flip side if you are dealing with a low user and in a warmer climate "eco-mode" will optimize even greater savings
- For Time of Use and Demand Response see the manual



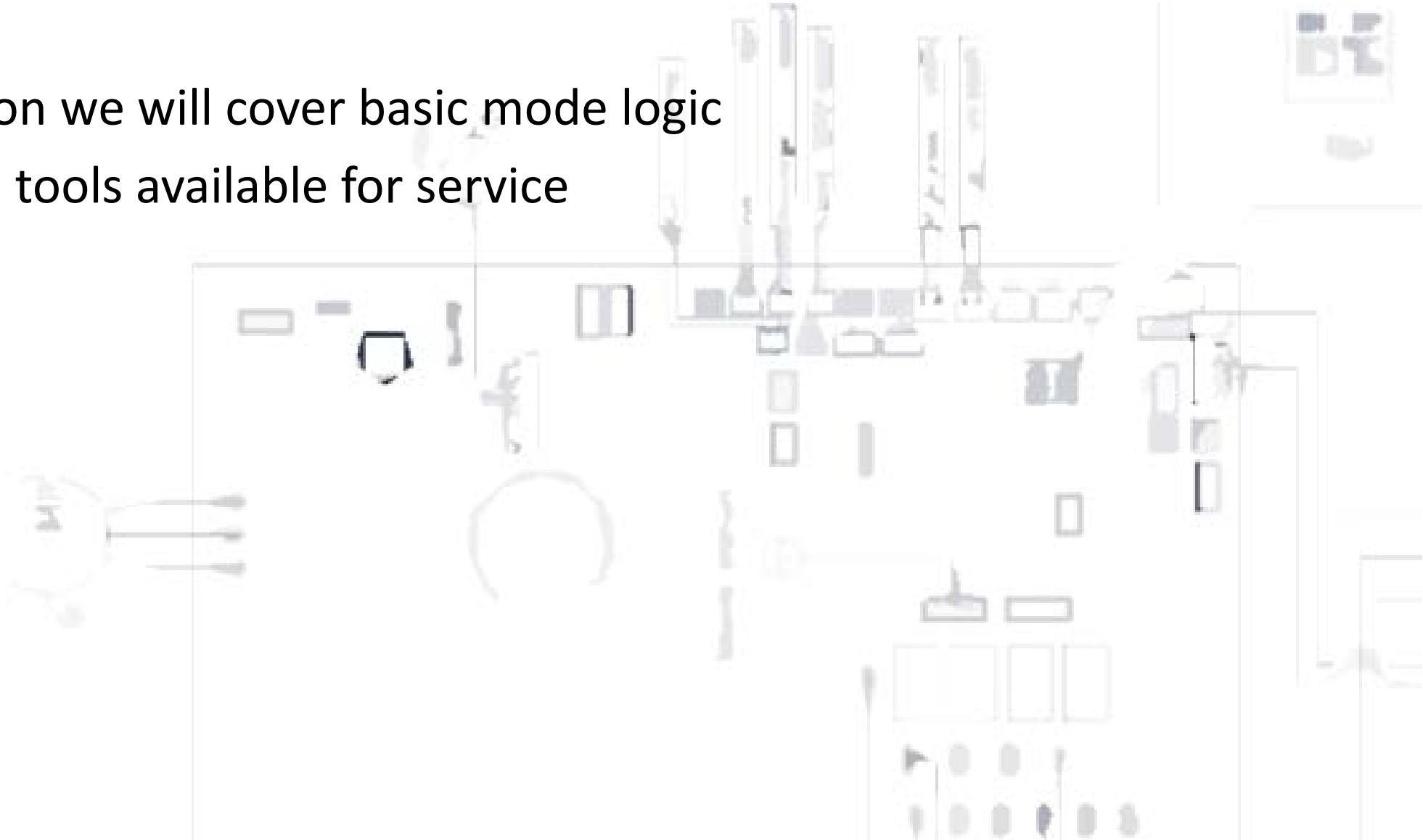


Icons	Explanations
Hybrid	***HYBRID MODE*** **-** System default mode. Pressing this button will allow high efficiency heat pump operation with supplementary heating from a backup heating element during periods of high demand.
Turbo	***TURBO MODE*** **-** Press this button to run the heat pump and electric heating simultaneously, heating the water temperature to the set temperature as quickly as possible.
ECO	***ECO MODE*** **-** Provides the highest efficiency and lowest cost operation by using only the heat pump for heating while in safe operating range of the heat pump.
Electric element	***ELECTRIC MODE*** **-** The water heater functions as a conventional electric unit, relying on only the elements for heat. It is recommended to use only when the heat pump system malfunctions, it is high-energy consumption heating mode.
Vacation	***VACATION MODE*** **-** This mode is recommended when the water heater is not in use for a long period of time. This mode minimizes energy consumption and prevents the water heater from freezing during cold weather.
	Compressor running icon This icon will be lightened once compressor runs.
	Fan running icon This icon will be lightened once fan motor runs.
	E-heater icon This icon will be lightened once lower E-heater in water tank works. This icon will be blink once upper E-heater in water tank works.
	4-way valve icon This icon will be lightened once 4-way valve works.


You Can Stop
Here
The Next
Section is
Very
Technical

Uh Oh Now What? – Service & Support

- In this section we will cover basic mode logic
- Preview the tools available for service



Eco-Logical® OMNI™ Operating Logic

List for Working Logical:

1.Hybrid mode （default mode）	5-8
2.ECO Mode	9
3.Turbo mode	10
4.Electric element mode	11-12
5. Vacation mode	13
6. 48-hour reset function	14-15
7.Defrost operation	16
8.Super heat control	17
9.Other functions	18
10.System protection	19-22

Referent notes:

Te = Ambient temperature
T average = T1*k+T7*(1-k), where K is typically set to 0.3
T1 = lower water temperature
T7 = upper water temperature
Ts1 = setting temperature **Ts = Suction temperature** **Tc = Coil temperature** **Td = Discharge temperature**

Working Logic:

Temperature limit of working environment Ambient:

- Enter protection

Te > 53℃（127 ℉）; or Te < -16℃（3℉）, the "PA" fault display will be reported.

The lower electric element will replace the compressor for heating

- Exit protection

Te≤ 50℃（122℉）; or Te≥-13℃（8.6℉）, the "PA" fault display will disappear. The compressor continues to operate normally.

Working Mode: 1.Hybrid Mode (Default Mode)

- The compressor and the upper heating element are used for combined heating. When the "PA" limit is triggered, the lower electric element replaces the compressor.
- The temperature setting range : 100~149°F
- Initial Setting Temperature: 125°F (240v) 140°F (120v) (actual control is converted to °C).

Working Mode: 1.Hybrid Mode (Default Mode)

- **Compressor control:**

The compressor starts/stops heating based on the set temperature and dead zone temperature.
Its frequency is adjusted according to ambient temperature:
Low frequency is executed at high ambient temperatures.
High frequency is executed at low ambient temperatures.

Enable heating conditions:
A. Turn on
B. T average < Ts1-5℃ (Ts1-9°F) (dead band)

- **Heating is enabled when all conditions are met.**

Turn off heating conditions:
A. Turn off.
B. T average ≥ Ts1.
C. "PA" limit is triggered.
D. Temperature T1 failure occurs.
E. High/low pressure protection is activated.
F. DC fan failure occurs.
G. Compressor failure occurs.

- **Heating is turned off when any condition is met.**

Working Mode: 1.Hybrid Mode (Default Mode)

- **Electric heating elements control:**

- **Upper electric heating element control-- EH1 (30A relay 1):**

The EH1 is controlled by the upper water temperature T7, with the electric auxiliary executing independent heating temperature (parameter 19/address 349), and using independent return difference (parameter 18).

Enable heating conditions:	Turn off heating conditions:
A. Turn on	A. Turn off
B. T7 < 53-6°C（127.4-10.8℉）,and T7 < Ts1	B. T7 ≥ 53°C（127.4℉） (parameter 19), and T7 ≥ Ts1
C. T7 < Ts1	C. T7 ≥ Ts1
D. Meet the electric heating start delay time 60 sec	D. T7 sensor fault
• Heating is enabled when all conditions are met.	• Heating is turned off when any condition is met.

Working mode: 1.Hybrid mode (default mode)

• **Lower electric heating element control-- EH1 (30A relay 1):**	
Enable heating conditions: A) Turn on B) Ambient temperatureTe ＜ -15℃（5°F） (parameter 17/address 347) C)Taverage＜Ts1-5℃（Ts1-9°F） D) The upper electric heater EH1 is not in the ON state. • Heating is enabled when all conditions are met.	Turn off heating conditions: A) Turn off B) Ambient temperature Te ≥-15℃+3℃.（5°F+5.4°F） C) T average ≥Ts1 D) The upper electric heater is in the ON state. E) T1 is faulty, and T7 is also faulty • Heating is turned off when any condition is met.

Working mode: 2.ECO Mode

- Normally, only the heat pump operates. If the operating temperature exceeds the ambient temperature range, the electric auxiliary heater will automatically take over from the heat pump.
- The operating conditions of the compressor are the same as those in Hybrid mode.
- The upper electric heating element remains Off.
- Automatic control of lower electric auxiliary EH2 (30A relay 2):

Enable heating conditions:
A) Turn on
B) Ambient temperatureTe ＜ -15℃（5°F） (parameter 17/address 347)
C)Taverage＜Ts1-5℃（Ts1-9°F）
D) The upper electric heater EH1 is not in the on state.

- Heating is enabled when all conditions are met.

Turn off heating conditions:
A) Turn off
B) Ambient temperature Te ≥-15℃+3℃.（5°F+5.4°F）
C) T average ≥Ts1
D) The upper electric heater is in the on state.
E) T1 is faulty, and T7 is also faulty

- Heating is turned off when any condition is met.

Working mode: 3.Turbo mode

- All operational logic remains consistent with Hybrid mode, however the operating frequency of the inverter compressor is increased by 20% compared to Hybrid mode.

Working mode: 4.Electric element mode

- Control of electric heating elements:

Automatic control of the upper electric heating element EH1 (30A relay 1):

- EH1 is controlled by upper water temperature T7
- Electric auxiliary executes independent heating temperature (parameter 19/address 349)
- It is independent Temperature hysteresis

Enable heating condition:

A. Turn on

B. T7 < 53-6℃（127.4-10.8℉）,and T7 < Ts1

C. T7 < Ts1

D. Electric heating start delay time of 60 seconds is met

- Heating is enabled when all conditions are met.

Turn off heating conditions:

A. Turn off

B. T7 ≥53℃ （127.4℉）(parameter 19),and T7≥Ts1

C. T7≥Ts1

D. T7 sensor fault

- Heating is turned off when any condition is met.

Working mode: 4.Electric element mode

- Automatic control of lower electric auxiliary EH2 (30A relay 2):

Enable heating condition:
A) Turn on
B) T average < Ts1-5℃ （Ts1-9℉）
C) The upper electric heater EH1 is not in the ON state.

- Heating is enabled when all conditions are met.

Turn off heating conditions:
A) Turn off
B) T average ≥Ts1
C) Upper electric heater is in the ON state
D) T1 is faulty and T7 is also faulty

- Heating is turned off when any condition is met.

Working mode: 5. Vacation mode

- In this mode, regular heating function is suspended, and only the function of maintaining water temperature at 28℃ (82F) is preserved.
- The system can be scheduled to automatically switch to standard mode heating after the vacation period ends.
- The default vacation period is 7 days, with adjustable scheduling options available to users.

Working logic: 6. 48-Hour Reset Function

Energy-saving priority hierarchy:
1. Vacation mode
2. ECO mode
3. Hybrid mode
4. Turbo
5. Electric element
Note: • Upon initial power-up following shipment or power-off, the system must default to Hybrid mode. • If the user-set mode has higher energy-saving priority than standard modes (1 and 2), the automatic reset function will not execute. • However, if the user-set mode has lower energy-saving priority than standard modes (4 and 5), the automatic reset function must execute.

Working logic: 6. 48-hour reset function

Reset function description:
To prevent user extended in-efficient modes that could result in elevated electricity costs due to prolonged electric auxiliary heating usage, and to comply with energy efficiency certification requirements for NEEA 8.1 qualification • Upon power-on, the heat pump must default to Hybrid mode during initial startup. • If operating in a non-default mode (due to user extended setting or other reasons), the system must automatically revert to Hybrid mode after 48 hours, unless that specific mode offers superior energy savings (refer to the aforementioned energy-saving priority hierarchy).

Working logic: 7.Defrost operation

- The heat pump employs a four-way valve for reverse defrosting. When ambient temperature falls below the threshold where frost formation may occur during heat pump operation, defrosting is initiated by detecting the temperature difference between the evaporator and ambient temperature, combined with compressor operating time considerations.

Defrosting process:

1. Compressor on

2. Fan stops

3. Four-way valve reversing

Note:

- The defrosting process will bypass most pressure and temperature protections, retaining only the inverter circuit protection function.

Working logic: 8.Super heat control

- **Heat pump system operation is based on suction superheat control, which involves adjusting the electronic expansion valve through the difference between Ts and Tc, supplemented by discharge superheat protection for corrective measures.**

Working logic: 9.Other functions

- **1. Power-off memory function.**

The system will automatically remember all the settings before the power outage, ensuring a seamless restoration of the previous configuration after the power failure.

- **2. Timed power-on/off function**

Users can configure scheduled power-on/off operations through the wired controller interface.

- **3. Refrigerant recovery function (reverse operation)**

The refrigerant recovery function can be set by operating the remote controller;

Working logic: 10.System protection

• High-pressure switch protection	• OFF: 3.0MPa±0.05Mpa, • ON: 2.4MPa±0.05Mpa.
• Trigger condition:	HP switch OFF for 2 seconds → Compressor shutdown
• Recovery:	1. Continuous ON state for 20 seconds → Automatic recovery 2.Three consecutive triggers within 1 hour → System lock requiring power cycle for reset
• Exemptions：	Non

Working logic: 10.System protection

• **Low-pressure switch protection**	• OFF： 0.05MPa±0.05Mpa， • ON: 0.15MPa±0.05Mpa.
• Trigger condition1:	1.Compressor operation ≥ 5 minutes 2.LP switch Off for 3 minutes 3.Ambient temperature Te is not less than -10℃ （14℉）
• Trigger condition2:	1.Compressor off 2. LP switch Off for 1 minute
• Recovery:	1.Continuous ON state for 20 seconds → Automatic recovery 2.Three consecutive triggers within 1 hour → System lock requiring power cycle for reset
• Exemptions：	1.Defrost operation 2.Oil return operation

Working logic: 10.System protection

• **Discharge temperature over-temperature protection**	
• Initial condition	Td ≥ 105 -10℃ （221-18℉）→ Start monitoring Td ≥ 105℃（221℉）→ Compressor frequency limitation activated Td ≥ 115℃（239℉）for 10 seconds → Compressor shutdown
• Recovery:	3-minute downtime required and Td<90℃（194℉） Three occurrences of Td ≥ 115℃ （239℉）within 1 hour → Lock protection (power cycle required for reset)

Working logic: 10.System protection

- **Compressor delay protection**
- After compressor startup, restart is prohibited within 3 minutes except during defrosting processes.

Working logic: 10.System protection

- **Inverter current protection control**
- The main control board and drive module feature built-in current protection to address issues such as increased current from oil starvation wear or liquid hammer in the compressor.
- Three consecutive abnormal shutdowns within 1 hour → System lock, re-powering on for reset.

Working logic: 10.System protection

- **Overtemperature protection of inverter IPM module**
- The drive module includes built-in temperature protection to address potential heat dissipation issues or abnormal temperature rise from faults.

Working logic: 10.System protection

• **Winter antifreeze protection (For water tank, This function requires a power-on state)**
• In the off state, when T1 ≤5℃（41℉）, anti-freezing protection is activated, and the heat pump (compressor) is turned on for anti-freezing;
• When T1≥12℃（53.6℉）, exit protection,maintain the original state from 5 ~12℃（41~53.6℉）;
• If heat pump encounters operational limitations or faults → Electric heating activation for antifreeze protection
• When there is a temperature fault in the lower part of the water tank, antifreeze protection will not be activated;

Refrigerant charging guidelines for Omni Split System

Prepare the tools

Wrench

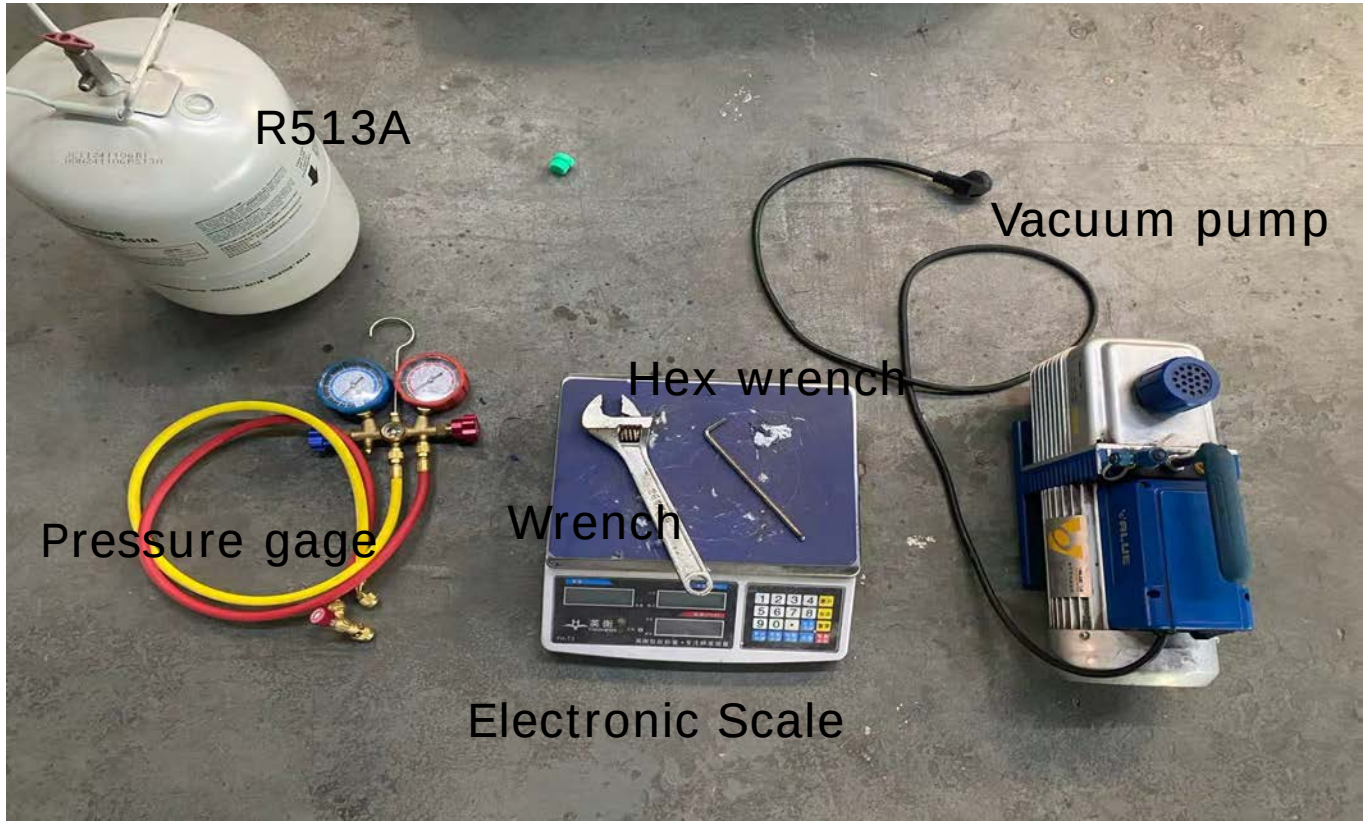
Hex wrench

Vacuum pump

R513A

Pressure gage

Electronic Scale



New School Tech, New School Refrigerant Charge Process

Click image to stat web video

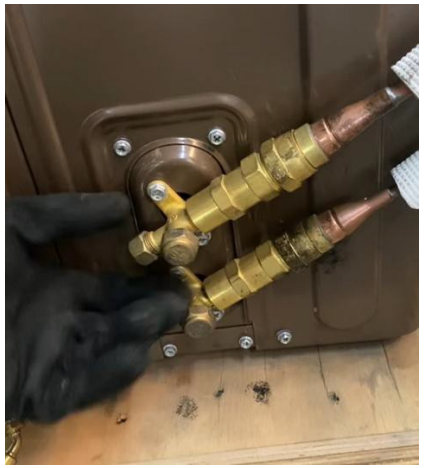
- OMNI is Equipped with a commercial grade Panasonic DC Dual Rotary Inverter Pump.
- It used an Electronic Expansion Valve not a TXV
- The EEV uses signals from multiple sensors to adjust the refrigerant flow
- On the fly, opening and closing the needle and flow super fast and never static
- Impossible to add ref based on sub cooling or super heat converted to pressure
- Liquid volume is the only way to fill the OMNI (weigh-in)

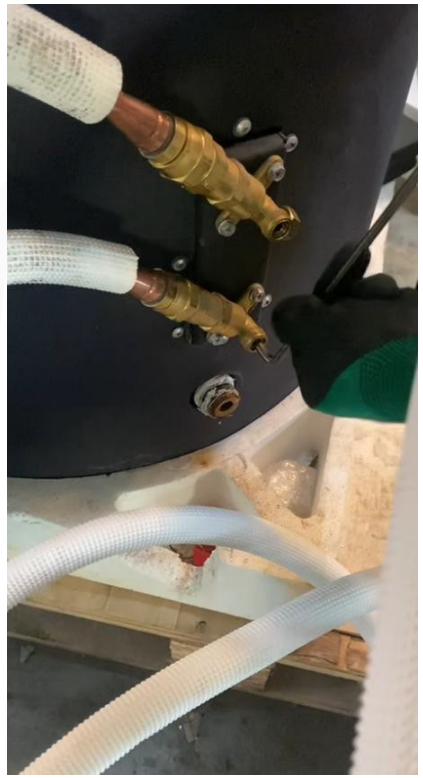
Video credit to Craig Migliaccio of AC Service Tech LLC

www.eco-logical.com

1.Drain out all refrigerant from the whole system.

Open the service cap on the heat pump(outdoor unit) and connect to the pressure gage with one pipe, open all caps on the shult-off valves, open the shult-off valves (both on heat pump and water tank)with the hex wrench.





If you have an error code always power cycle the unit by turning off the power at the panel box for about 20 seconds. Restart the system and check again. Before servicing

After connecting the system, loosen the two valves of the pressure gage.
drain out all the refrigerent from the system.

2.Vacuum

After draining out the refrigerant from the system, connect the vacuum pump with the other pipe of the pressure gauge.
Evacuate for at least 10 to 15 minutes until the pressure gauge shows negative pressure (-1)

After the vacuuming is completed, tighten the two valves of the pressure gauge, connecting the refrigerant tank and turn it on, to avoid any air entering, loosen the other valve and make sure the refrigerant flows out, then close the valve.
The electronic scale is reset to zero and ready to be charged with refrigerant.
Be careful not to get frostbitten by the refrigerant.

3.Refrigerant charging

Open the two valves of the pressure gage to start charging the amount of refrigerant required by the system, (Nameplate on each unit indicates the required amount of refrigerant)
When approaching the required amount, slow down the charging speed by closing the valve slightly.
After the charging is completed, close the two valves of the pressure gage and close the refrigerant tank.
Remove the pressure gage and cover all the valves with caps.




Check the leakage with soapy water on each connection.

Force Charge Condition

When the refrigerant system is fully depleted (e.g., due to a leak or damage), it may be difficult to:

- Pull a full vacuum, and
- Recharge the system using the standard HVAC servicing process.

In some cases, it may be necessary to force the compressor on and reverse its direction to complete a full charge. This is a common procedure with air handlers that operate in both heating and cooling modes.

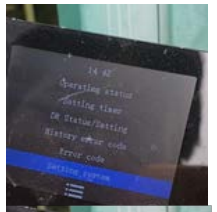
Because the OMNI™ is a heating-only unit, it does not include an obvious “cooling” setting in its menu or manual. However, the unit does include a Refrigerant Recovery Mode, which functions similarly to cooling mode and allows the compressor to run in reverse for charging.

Correction

If standard recharging methods are unsuccessful, follow the procedure below to enable **Refrigerant Recovery Mode** and complete the charging process.

Step 1 – Connect Equipment

1. Connect your HVAC charging equipment as you would with a standard mini-split system.
2. Begin with your typical re-charging setup.



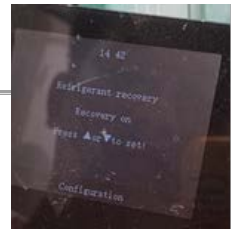
Step 2 – Access Refrigerant Recovery Mode

1. Power on the unit.
2. On the wired controller, navigate:
    - **Setting System → Configuration → Refrigerant Recovery**
    - Status will display **“Disabled.”**

3. Use the ▲/▼ arrow keys to change the status to **“Recovery On.”**
4. Proceed with charging the system.

Step 3 – Return to Normal Operation

1. Once the system is fully charged, return to the same menu.
2. Toggle **Refrigerant Recovery** back to **“Disabled.”**
3. Verify system pressure and check for leaks.
4. Complete the service procedure.



Sometimes it is helpful to pull complete power from the system for 25 seconds.

Then restore power and the system should turn on to allow access to the settings and Refrigerant Recovery Mode.

Codes and How to Chase the Solutions

- The following section is for when you have tried resolving issues by:
  - Checking for water leaks
  - Water pressure issues
  - Refrigerant leaks
  - Servicing the refrigerant system
- But still have an error code or malfunction

First step should always be to power cycle the unit by turning off the power at the panel box for about 20 seconds. Restart the system and check again. Before servicing.
This will allow you to monitor behavior if it faults again.

Eco-Logical® OMNI™

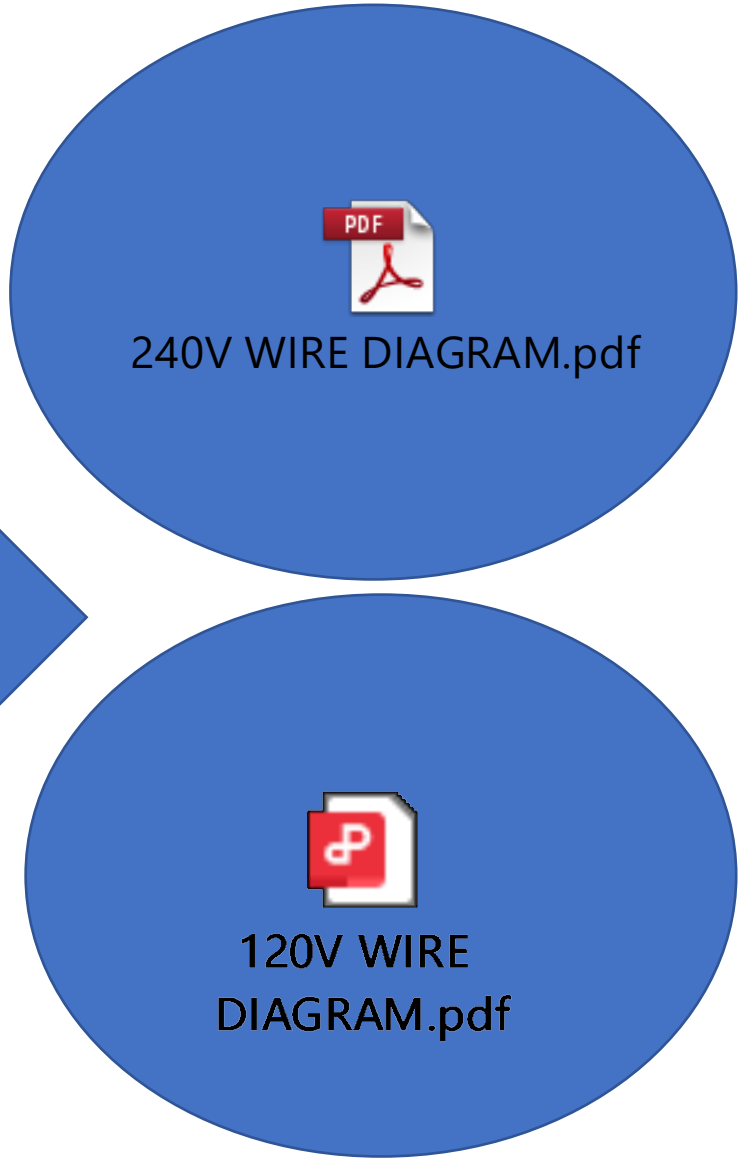
Split System Heat Pump Water Heaters
Maintenance Guidelines

DRAFT

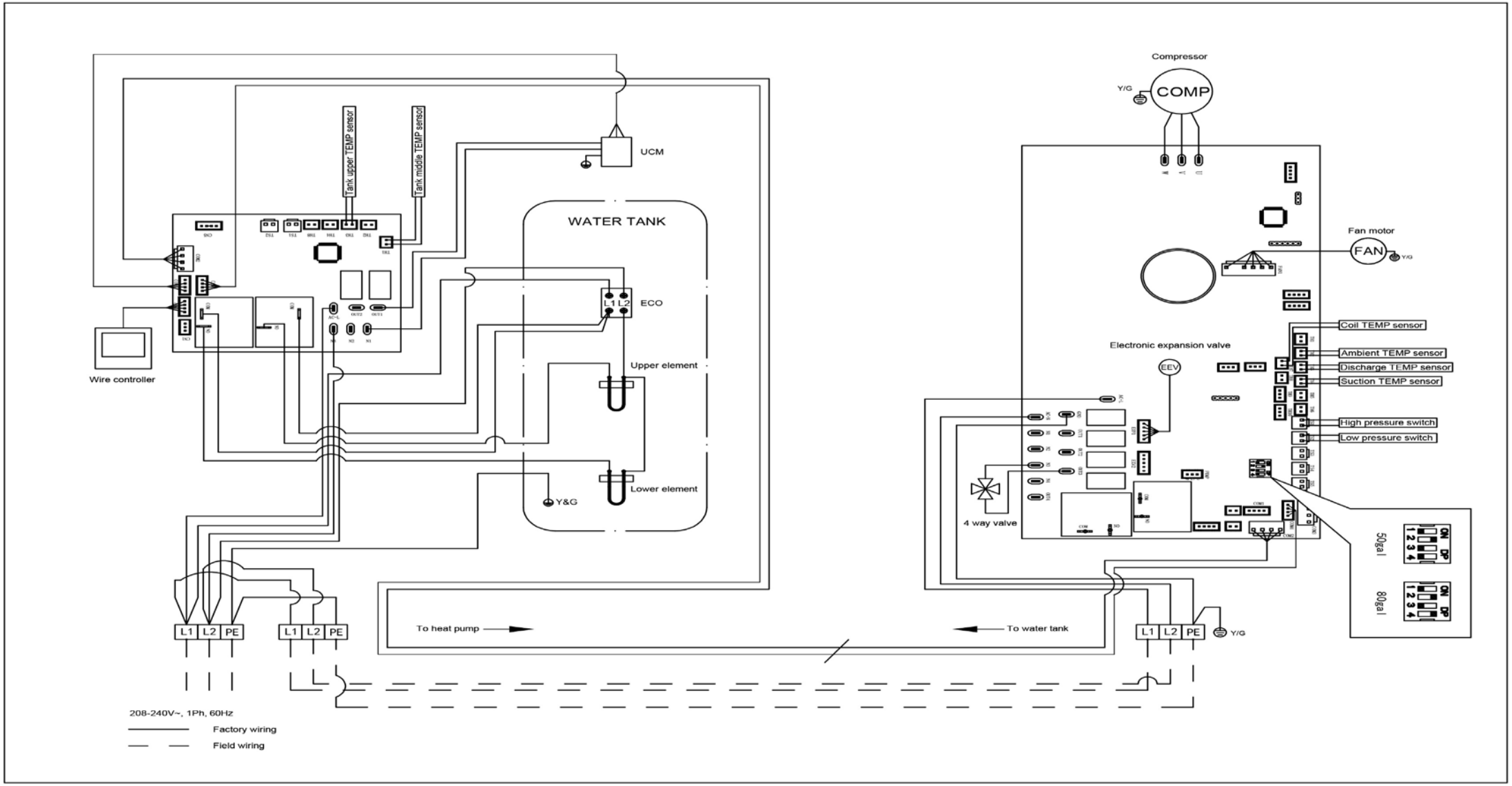
Contents

1.Electrical control wiring-Wiring diagram

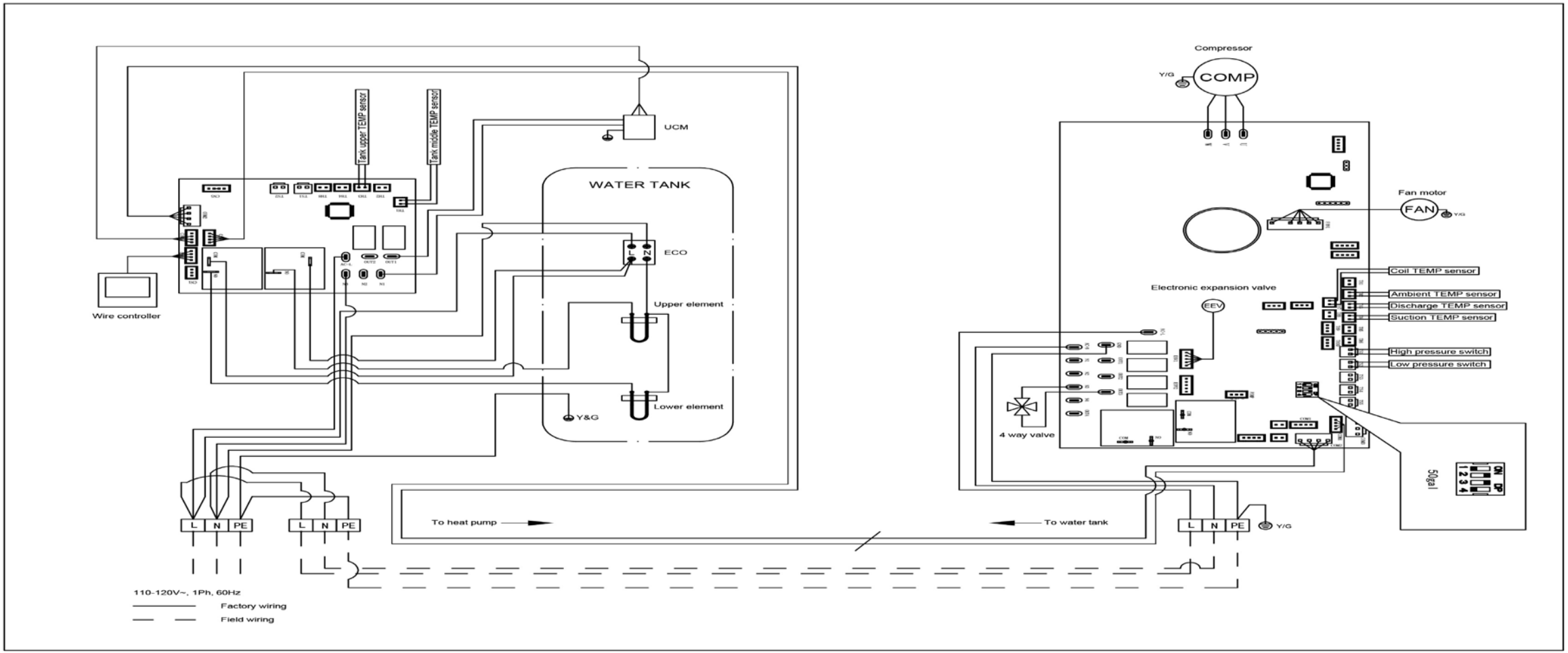
The wiring diagram is helpful for finding information about each terminal and can be found in the user manual or on the cover of the electrical control box.



240V WIRE DIAGRAM



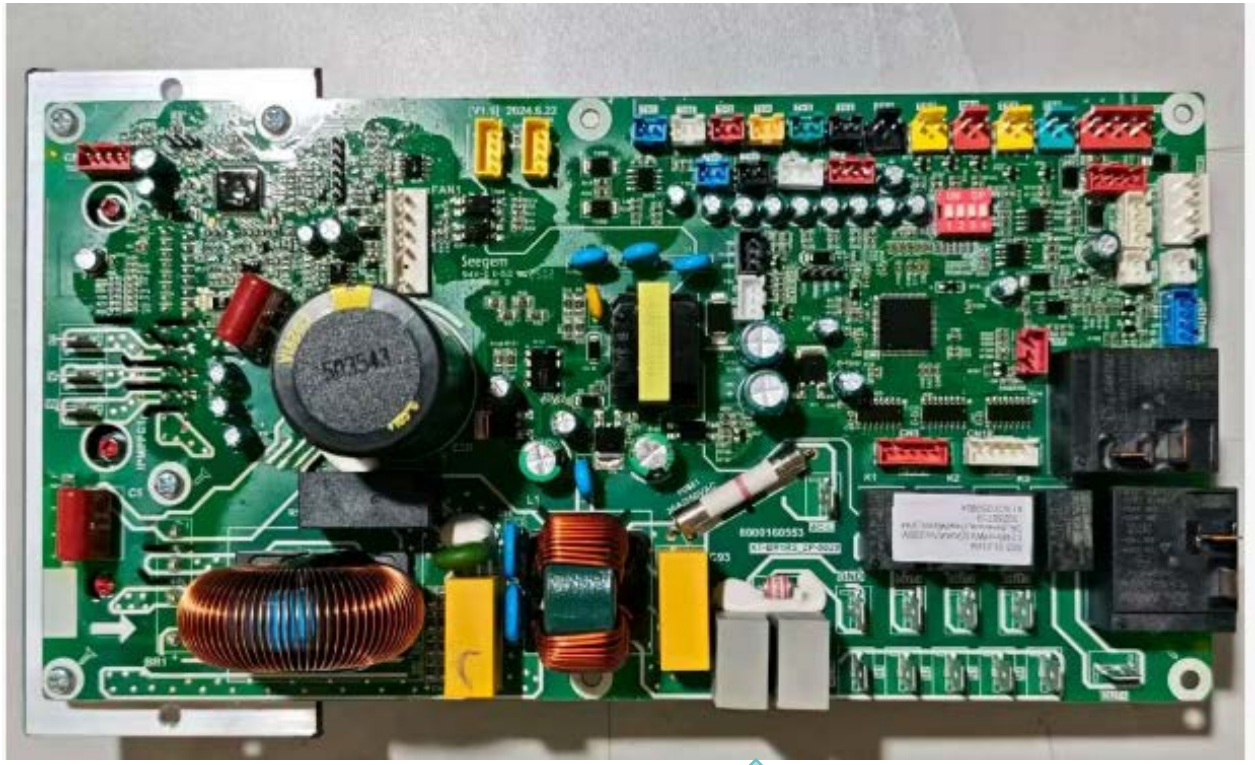
120V WIRE DIAGRAM



2.Electrical control wiring-PCB

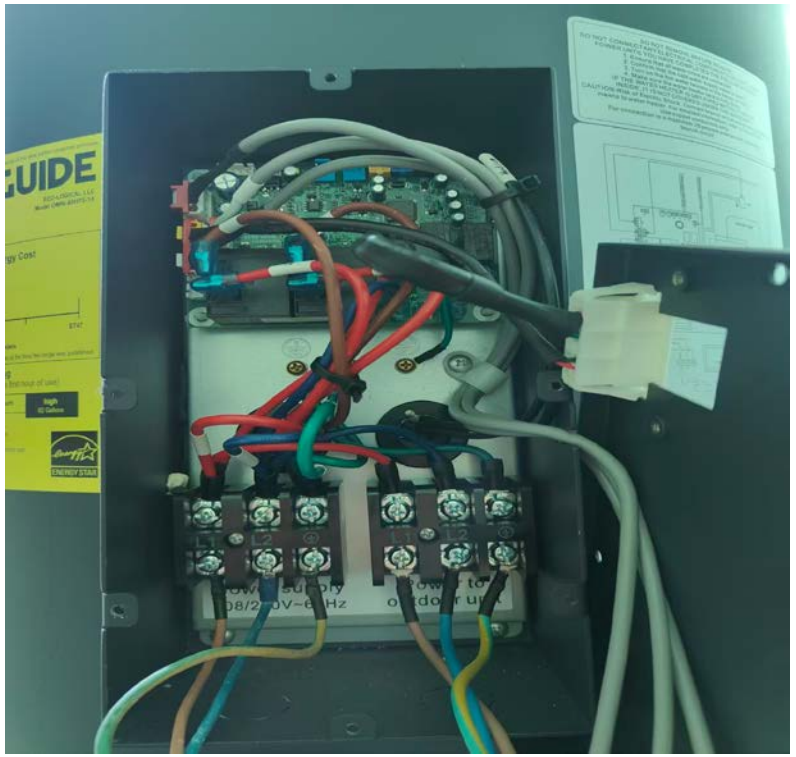
Understanding PCB boards can help in quickly resolving malfunction issues.

PCB of the water tank

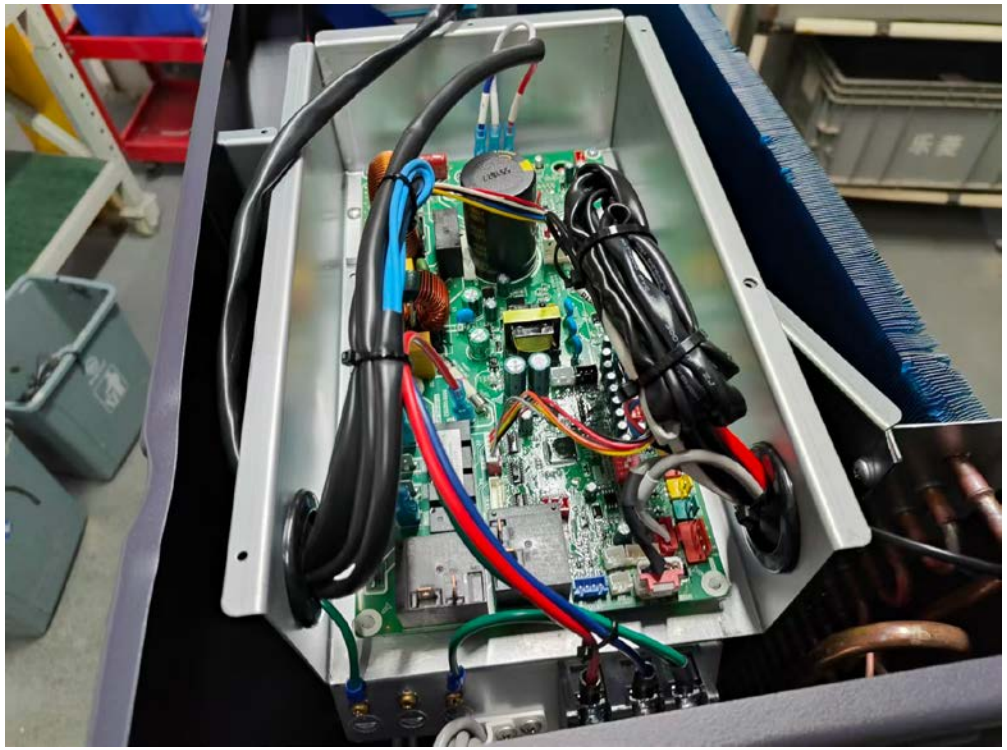


PCB of the heat pump

Understanding the wiring of PCB is helpful for quickly resolving malfunction issues.



PCB wiring of the water tank



PCB wiring of the heat pump

02. Error Codes and Fault Diagnosis-

Description	Code	Indicator light
Middle water temperature sensor error	P01	☆Flash
Coil temperature sensor error T3	P03	☆Flash
Suction temperature sensor error T4	P04	☆Flash
Outdoor ambient temperature sensor error T5	P05	☆Flash
Anti-freeze protection	P06	Defrosting icon☆Flash
Discharge temperature sensor error T6	P07	☆Flash
Upper water temperature sensor error T7	P08	☆Flash
Temperature Limit of Operation Range/Enter protection/temperature protection for the water tank	PA	☆Flash
High pressure protection	E01	☆Flash
Low pressure protection	E02	☆Flash
DC fan mortor failure	E03	☆Flash
Over-high protection of discharge temperature	E04	☆Flash
Communication error	E08	☆Flash
Compressor out of sync / failed to start / phase missing	C11	☆Flash
Over-temperature protection for driving IPM	C12	☆Flash
Drive DC bus voltage over-voltage and under-voltage protection	C13	☆Flash
Drive input overcurrent protection / phase current over Flow protection / current detection circuit failure	C14	☆Flash
Hardware protection of the drive module / IPM module Temperature sensor failure	C15	☆Flash
Drive Module Protection (FO)	C16	☆Flash
Main control - Press machine drive communication failure	C17	☆Flash
Communication failure between the DC fan board and the main controller	C18	☆Flash

02. Error Codes and Fault Diagnosis-Fault Diagnosis

P01:Temperature sensing failure at T1 in the middle of the water tank

Temperature probe in the middle of the water tank

The temperature in the middle of the water tank corresponds to the TH1 PCB board of the water tank.

▶Step 1: Check the connection status of the bottom water temperature sensor (T1)

▶ Step 2: Open the cover and check if the connectors are properly connected.

▶ Step 3: If all connections are normal, then check whether the resistance value is 5K or infinity. Use the multimeter to set it to the resistance measurement mode for testing.

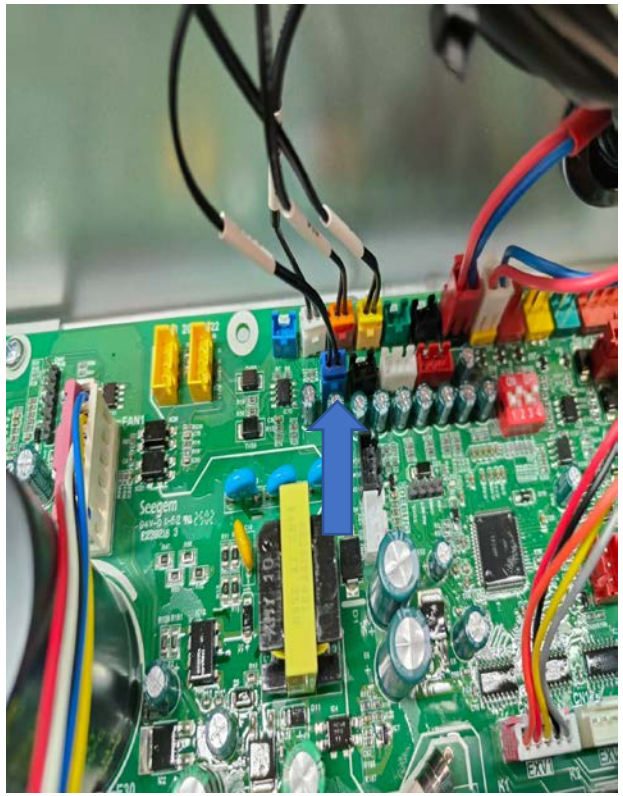
▶ Step 4: If the sensor is damaged, replace it with a new one.

▶ Step 5: If the sensor is of the 10K type, a new sensor needs to be connected to check if there is any fault on the PCB.

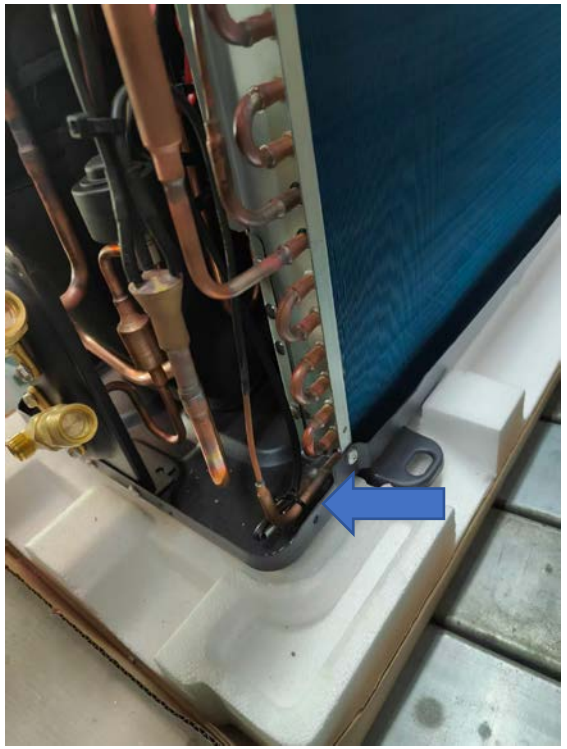
▶ Step 6: If P01 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

P03：Coil temperature sensing failure T3



Heat pump PCB board TH7 port



Position of the coil temperature probe

▶Step 1: Check the connection status of the coil temperature sensor (T3)

▶ Step 2: Check if the coil temperature sensor (T3) is damaged.

▶ Step 3: If all connections are normal, then check whether the resistance value of T3 is 10K or infinity.

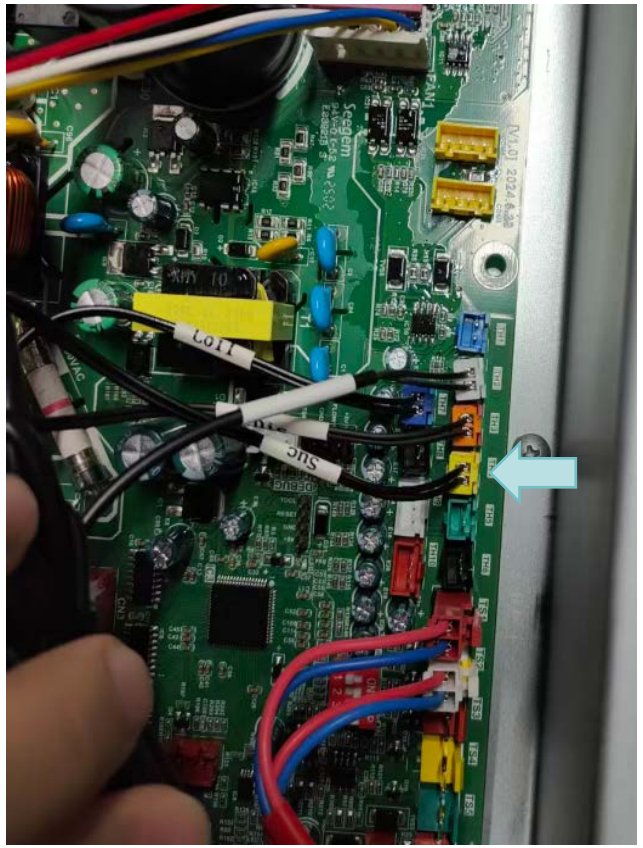
▶ Step 4: If the sensor is damaged, replace it with a new one.

▶ Step 5: If the sensor is of the 10K type, a new sensor needs to be connected to check if there is any fault on the PCB.

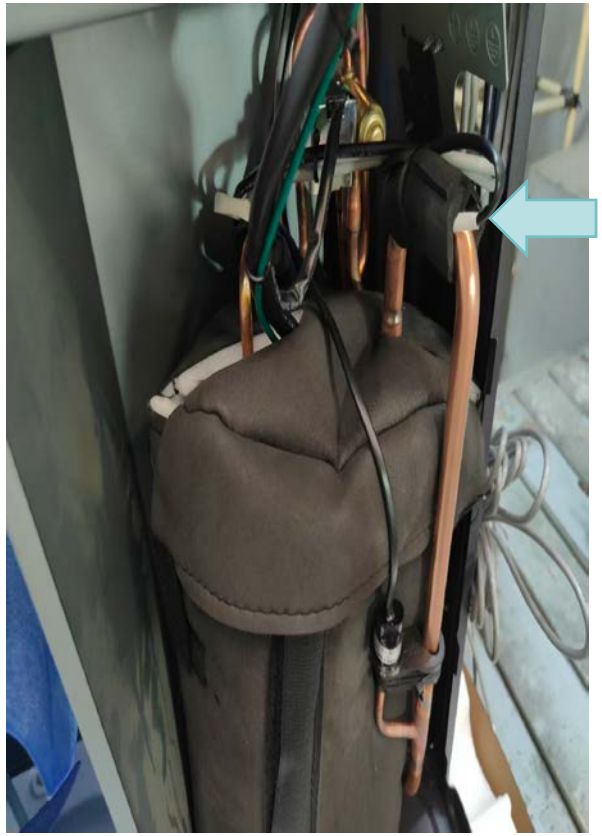
▶ Step 6: If P03 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

P04:Suction temperature sensing failure T4



Heat pump PCB board
TH4 port



The position of the exhaust gas temperature probe

▶Step 1: Check the connection status of the coil temperature sensor (T4)

▶ Step 2: Check if the coil temperature sensor (T4) is damaged.

▶ Step 3: If all connections are normal, then check whether the resistance value of T4 is 10K or infinity.

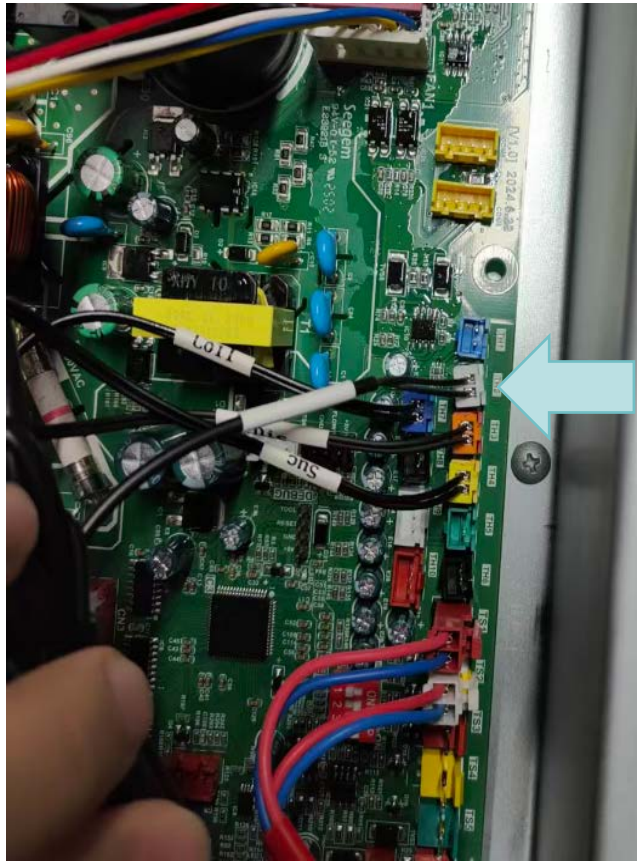
▶ Step 4: If the sensor is damaged, replace it with a new one.

▶ Step 5: If the sensor is of the 10K type, a new sensor needs to be connected to check if there is any fault on the PCB.

▶ Step 6: If P04 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

P05:Outdoor ambient temperature sensor failure T5



Heat pump PCB board
TH2 port

Position of the ambient temperature sensor

▶Step 1: Check the connection status of the coil temperature sensor (T5)

▶ Step 2: Check if the coil temperature sensor (T5) is damaged.

▶ Step 3: If all connections are normal, then check whether the resistance value of T5 is 10K or infinity.

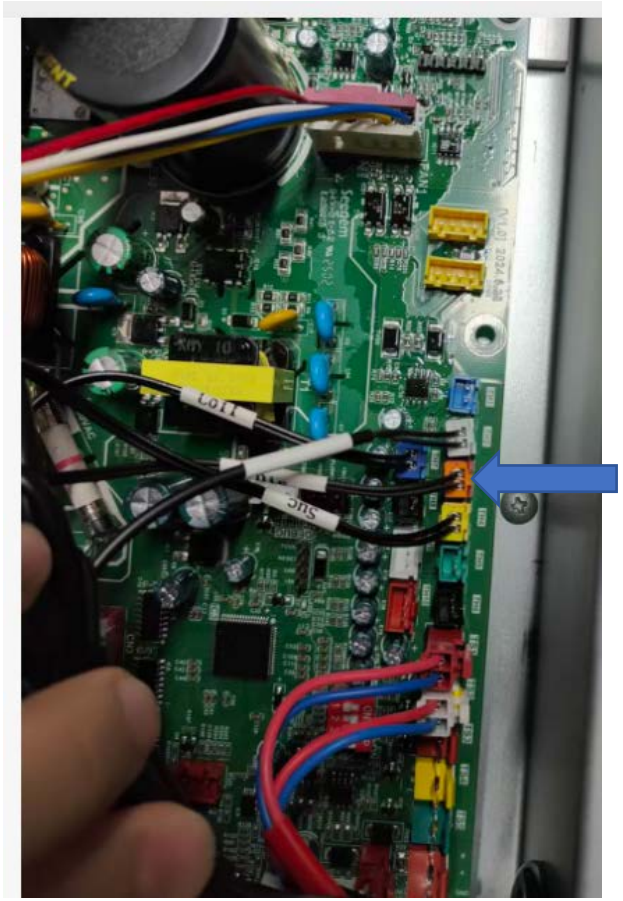
▶ Step 4: If the sensor is damaged, replace it with a new one.

▶ Step 5: If the sensor is of the 10K type, a new sensor needs to be connected to check if there is any fault on the PCB.

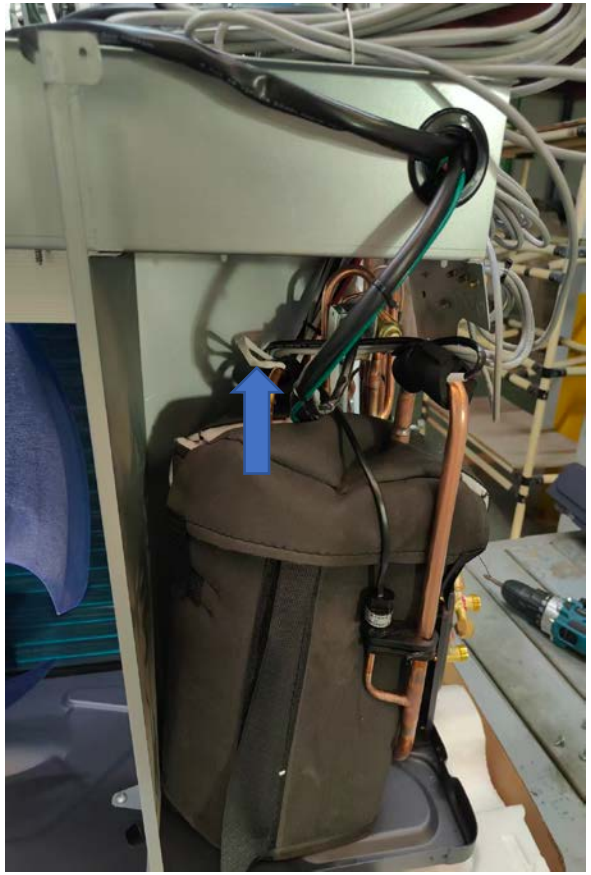
▶ Step 6: If P05 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

P07:Discharge temperature sensing failure T6



Heat pump PCB board TH3 port

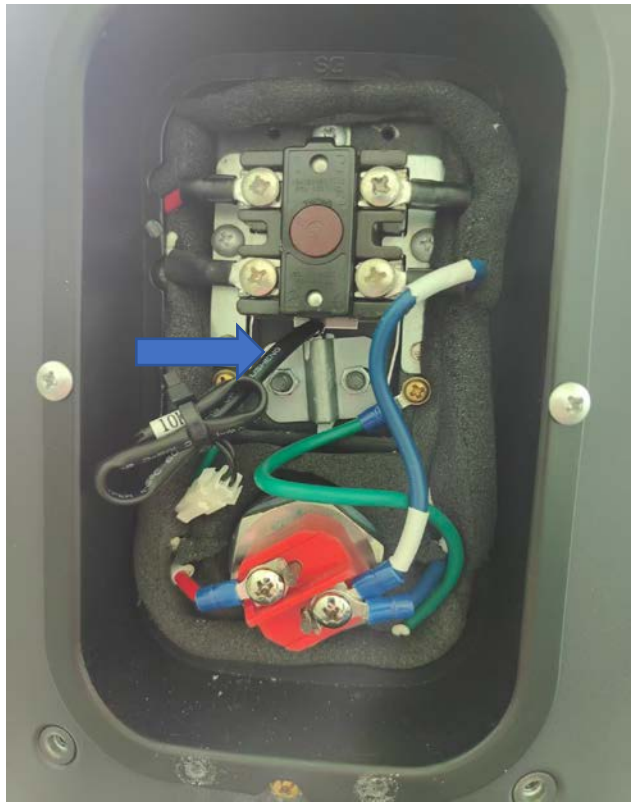


Discharge temperature probe position

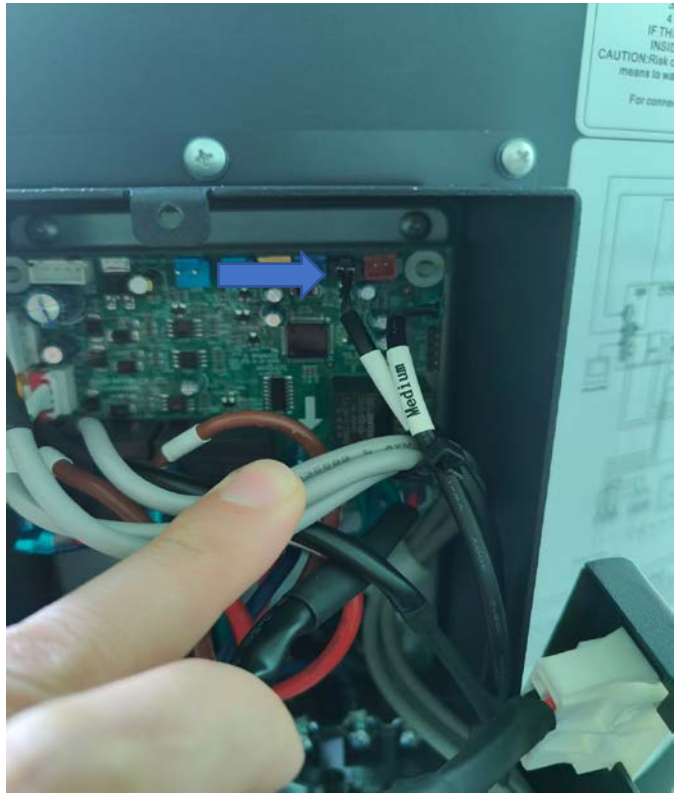
- ▶Step 1: Check the connection status of the coil temperature sensor (T6)
- ▶ Step 2: Check if the coil temperature sensor (T6) is damaged.
- ▶ Step 3: If all connections are normal, then check whether the resistance value of T6 is 50K or infinity.
- ▶ Step 4: If the sensor is damaged, replace it with a new one.
- ▶ Step 5: If the sensor is of the 50K type, a new sensor needs to be connected to check if there is any fault on the PCB.
- ▶ Step 6: If P07 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

P08:Upper temperature sensor failure on the upper part of the water tank T7



The temperature probe on the upper part of the water tank



The temperature at the upper part of the water tank corresponds to the TH3 PCB board of the water tank.

▶Step 1: Check the connection status of the coil temperature sensor (T7)
▶ Step 2: Open the cover and check if the connectors are properly connected.
▶ Step 3: If all connections are normal, then check whether the resistance value of T7 is 10K or infinity.
▶ Step 4: If the sensor is damaged, replace it with a new one.
▶ Step 5: If the sensor is of the 10K type, a new sensor needs to be connected to check if there is any fault on the PCB.
▶ Step 6: If P08 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-

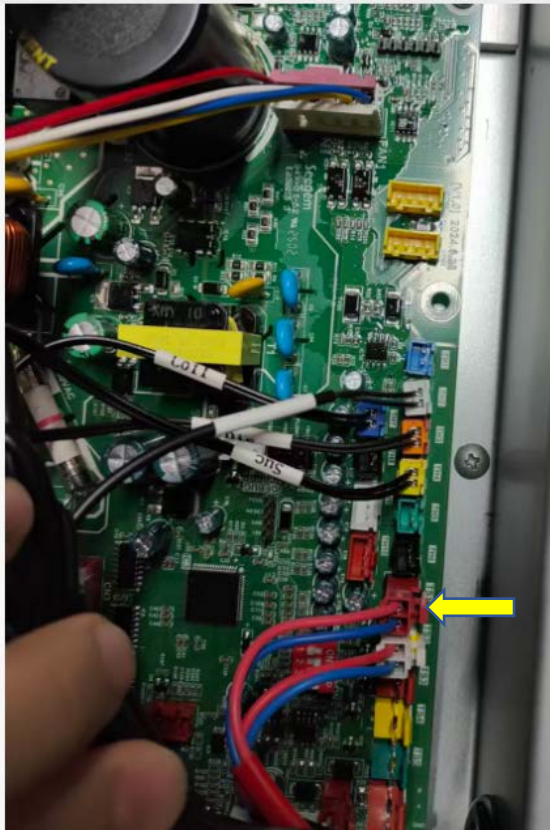
PA: Limiting environmental conditions for the press machine operation or temperature protection for the water tank

It is normal and no need for repair. The heat pump operational temperature range is from 5°F to 110°F.

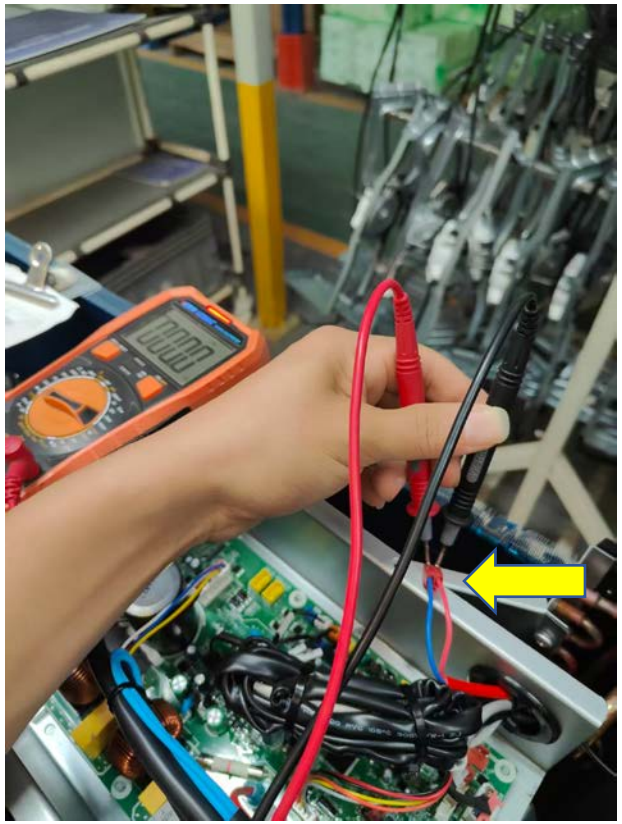
If the ambient temperature is out of this range, the unit will show the PA to notify. During this period, the backup electrical elements will be used.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E01:High pressure protection failure



Check whether the terminal TS1 of the high-voltage switch is loose.



Set the multimeter to continuity test mode (beep function) and check if the switch conducts electricity.

▶Step 1: Check whether the high-voltage switch (TS1) is properly connected.

▶ Step 2: Check whether the high-voltage protection switch is closed.

▶ Step 3: Check whether the high-voltage switch and the lines are damaged.

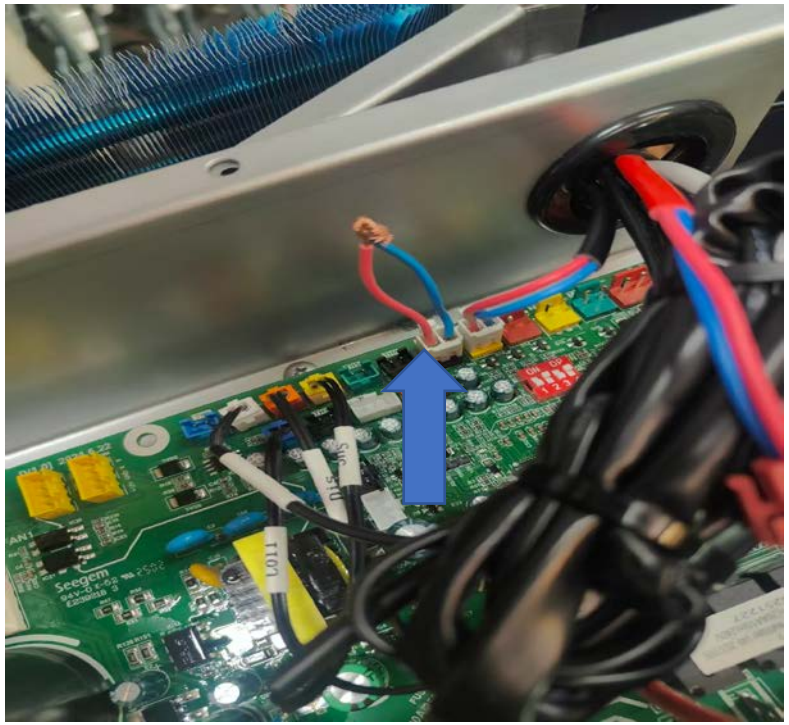
▶ Step 4: Check if it is functioning properly of short-circuit the terminals of the high-voltage protection switch.

▶ Step 5: If E01 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E01:High pressure protection failure

Check if the red line of high-voltage switch wiring is damaged.



Check if it is functioning properly of short-circuit the terminals of the high-voltage protection switch.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E01: High pressure protection failure

Check if the water tank is in a state of low water. Pull the safety valve switch. If no water is coming out of the water tank, it indicates that the tank is low on water and needs to be refilled.

Check if the water tank is full of water. Pull the safety valve switch and water should be flowing out normally, indicating that the tank is fully filled.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E02:Low pressure protection failure

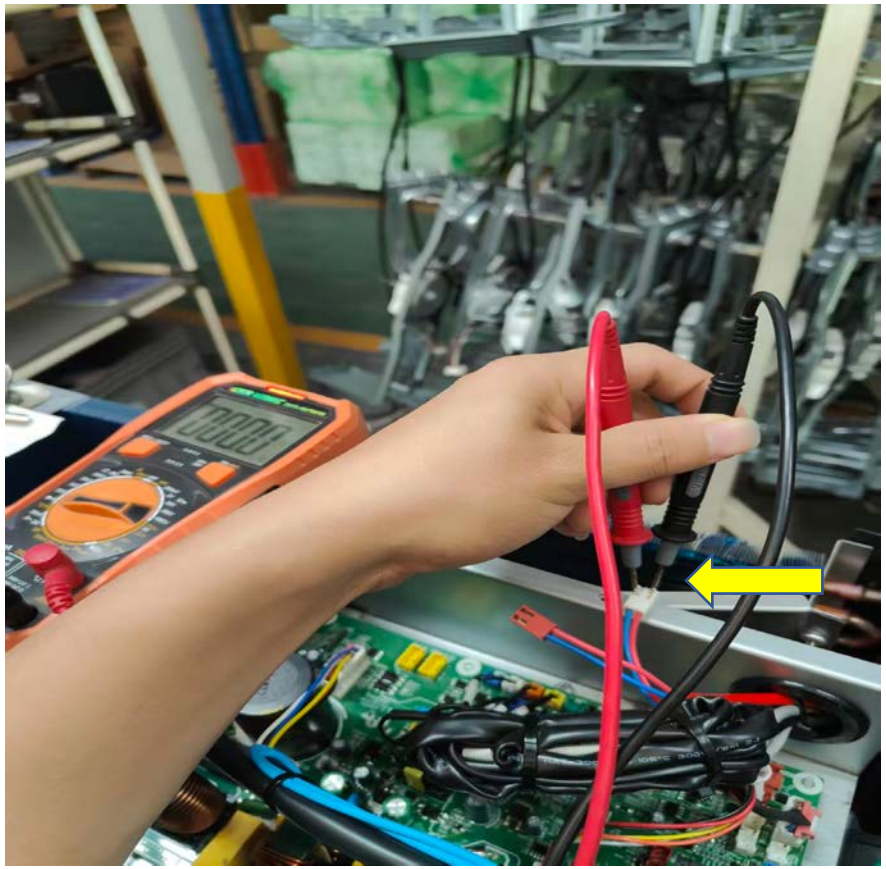
Check whether the terminal TS2 of the high-voltage switch is loose.

Check if the low-voltage switch wiring is damaged.

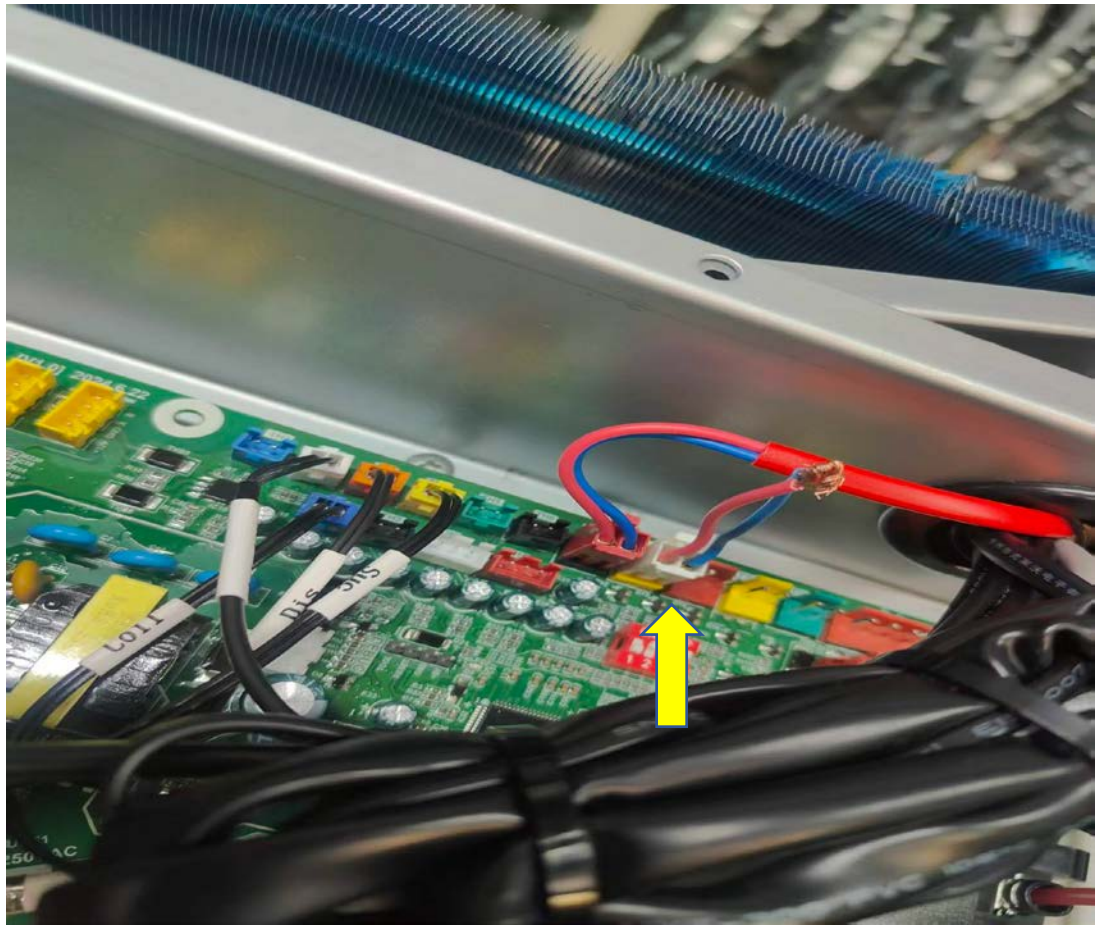
▶Step 1: Check whether the low-voltage switch (TS2) is properly connected.
▶ Step 2: Check whether the high-voltage protection switch is closed.
▶ Step 3: Check whether the high-voltage switch and the lines are damaged.
▶ Step 4: Check if it is functioning properly of short-circuit the terminals of the low-voltage protection switch
▶ Step 5: If E02 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E02:Low pressure protection failure



Set the multimeter to continuity test mode (beep function) and check if the switch conducts electricity.



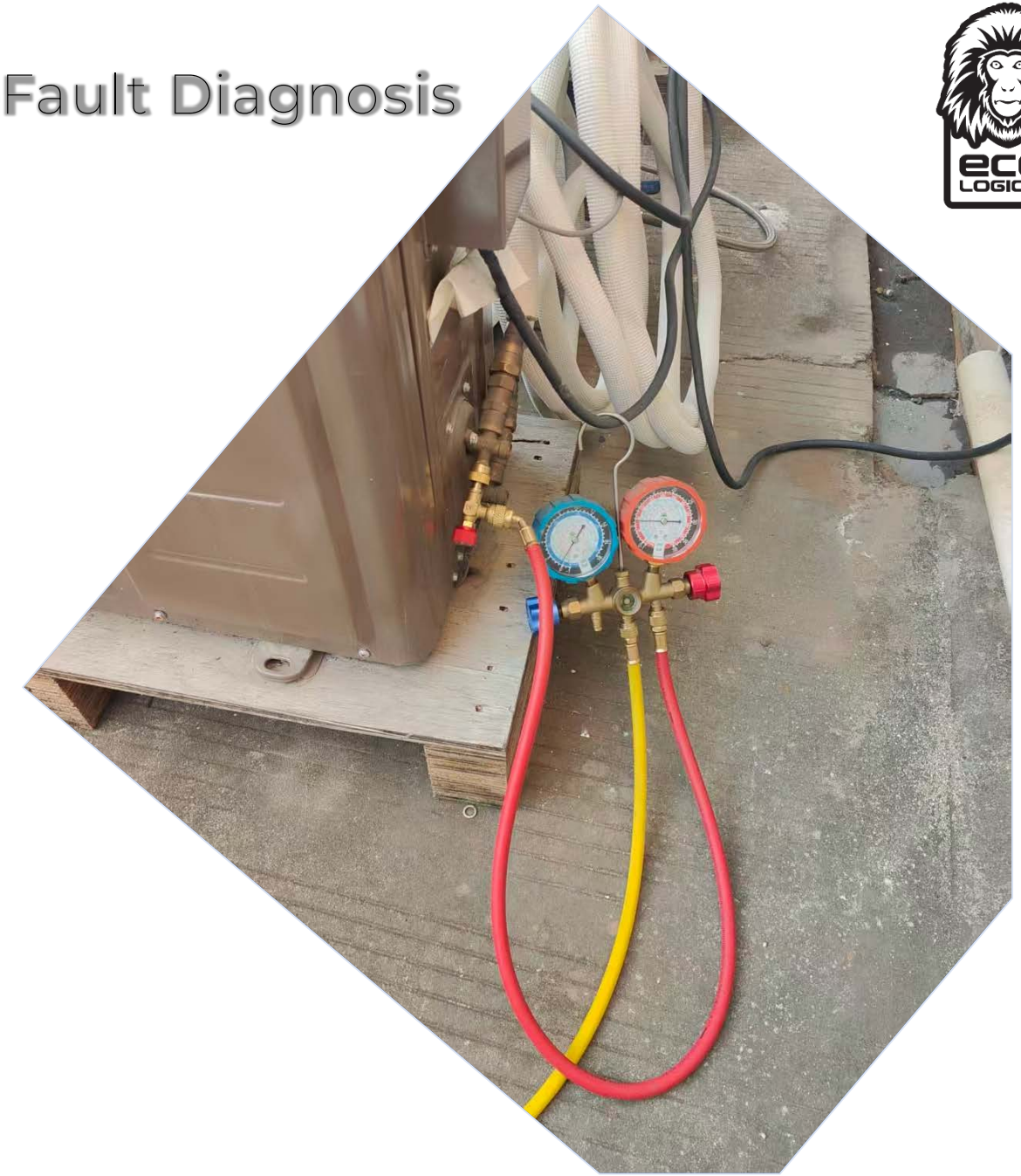
Check if it is functioning properly of short-circuit the terminals of the low-voltage protection switch.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E02:Low pressure protection failure

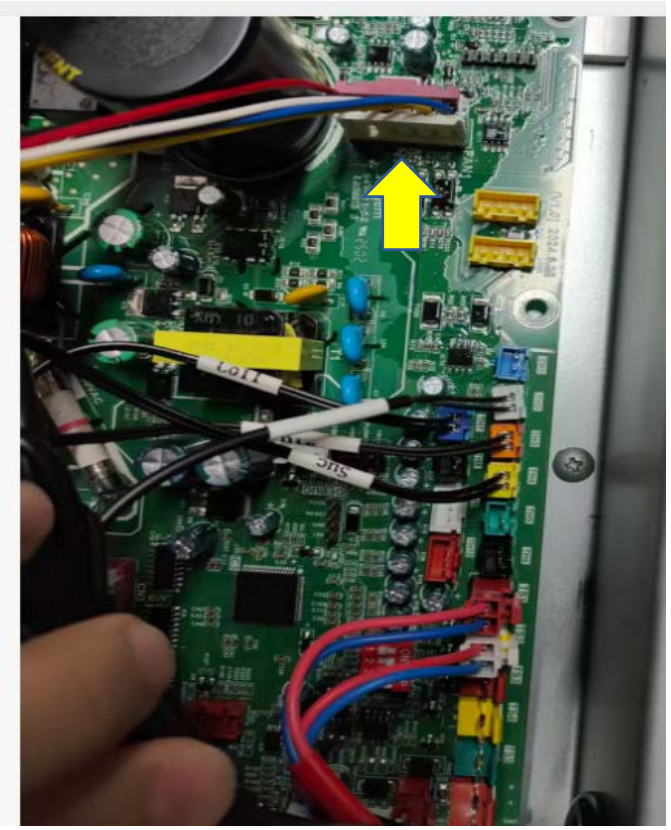
Use the pressure gauge to detect whether the refrigerant pressure is normal by connecting to the ports of the three-way valve.

If the system pressure is below the normal range, it may indicate a leak in the system. In this case, a new heat pump should be replaced or professional maintenance should be carried out.

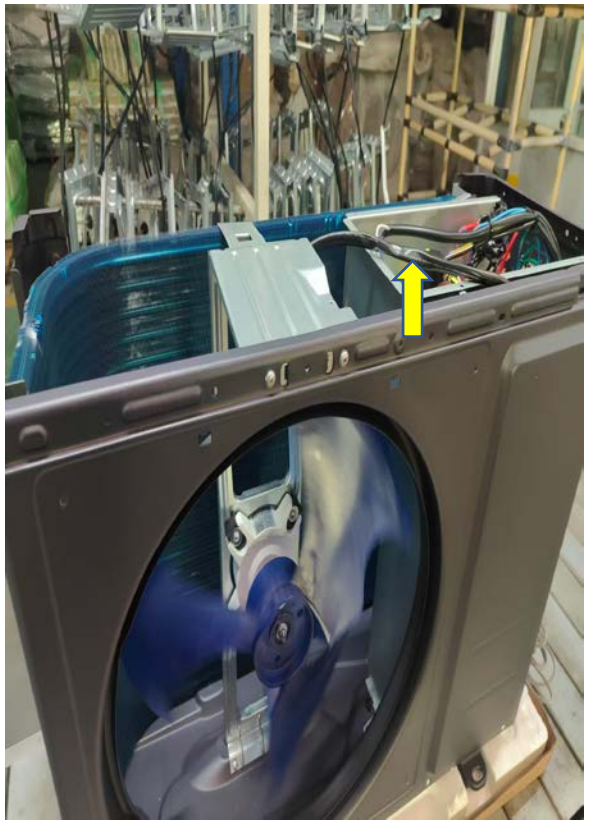


02. Error Codes and Fault Diagnosis-Fault Diagnosis

E03:DC fan motor failure



Fan connection port



Fan and wiring inspection

▶Step 1: Check whether the DC fan motor is properly connected.

▶ Step 2: Check if the fan is blocked by any object.

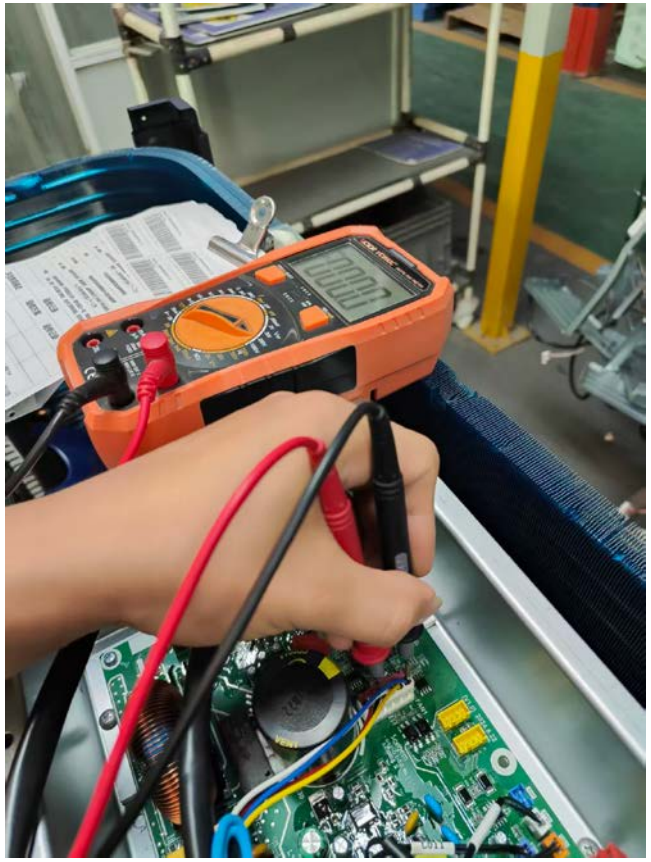
▶ Step 3: Check whether the lines are damaged.

▶ Step 4: Check if it is functioning properly of short-circuit the terminals of the low-voltage protection switch

▶ Step 5: If E02 continues to occur, replace the new PCB board.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E03:DC fan motor failure



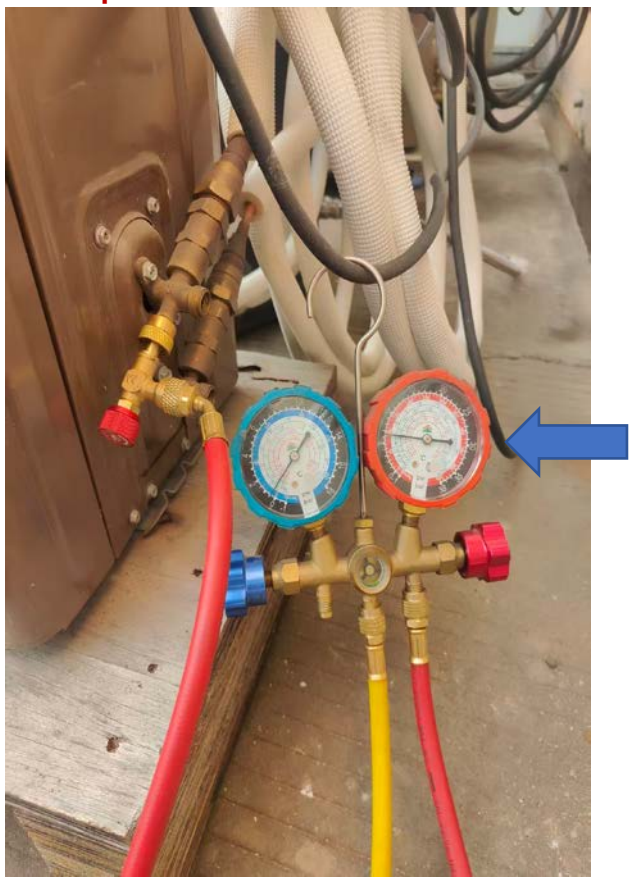
The multimeter measures the voltages of each wire sequence and the ground wire.

Voltage values of the five-wire DC variable-frequency fan					
Wire	Red wire	Black wire	White wire	Yellow wire	Blue wire
Function	Fan power supply		Fan control circuit power supply	Fan drive	Fan feedback
voltage values	+310V	Ground wire	+15V	0~5.6V	0~15V

02. Error Codes and Fault Diagnosis-Fault Diagnosis

E04:Over-high protection of discharge temperature failure

Use the refrigerant gauge to check the static pressure corresponding to the ambient temperature.



Static displayed pressure

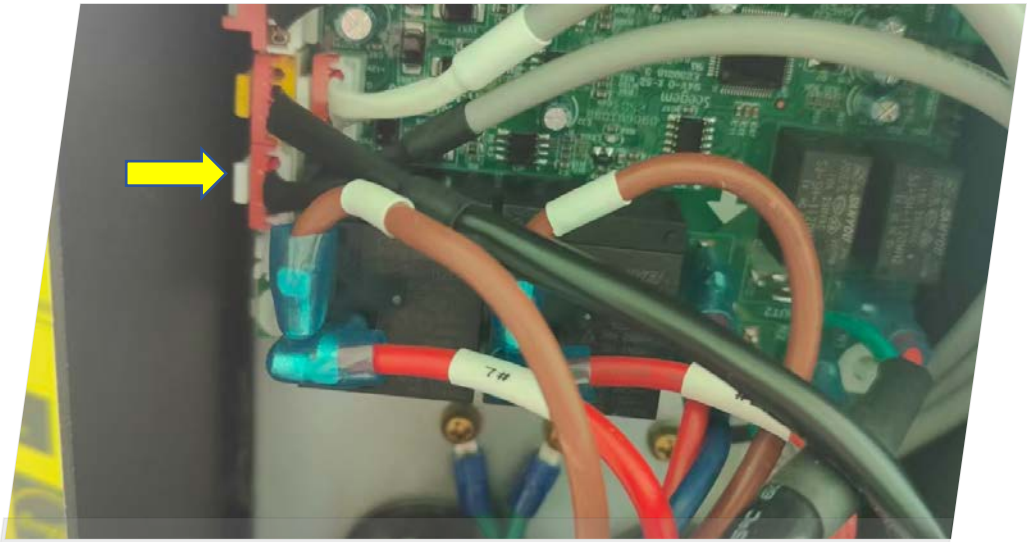
▶Step 1: Check whether the resistance value of T4 is 50K or infinity.

▶ Step 2: Use the pressure gauge to detect whether the refrigerant pressure is normal by connecting to the ports of the three-way valve.

If the system pressure is below the normal range, it may indicate a leak in the system. In this case, a new heat pump should be replaced or professional maintenance should be carried out.

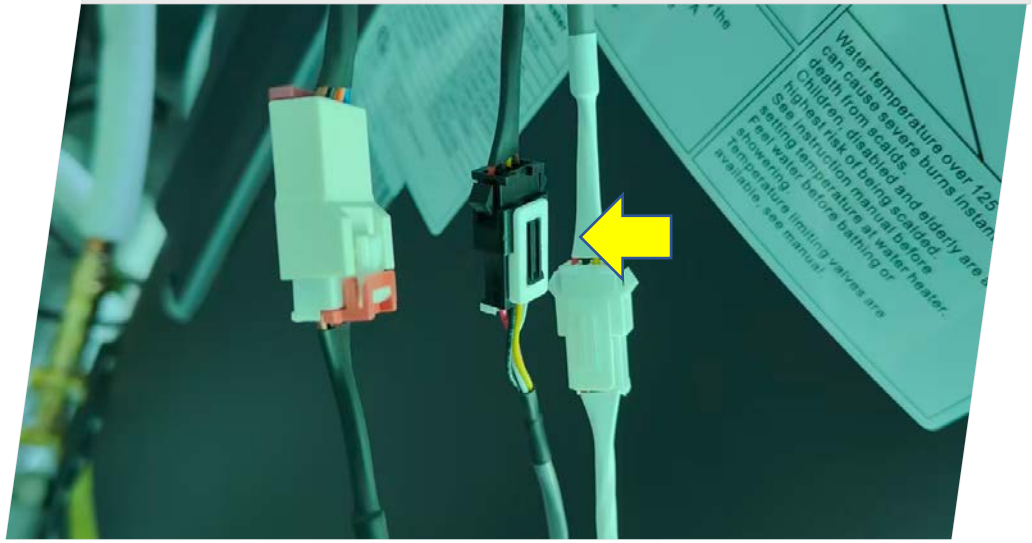
02. Error Codes and Fault Diagnosis-Fault Diagnosis

E08:Communication failure



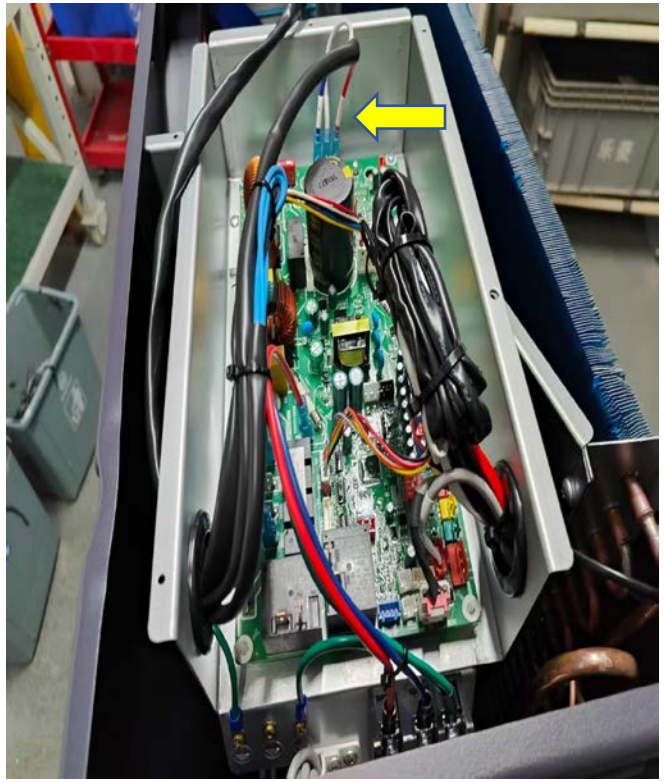
Check whether the connection of the COM1 terminal is securely plugged in.

Check whether the connection terminals are securely fastened and whether the wiring body is damaged.

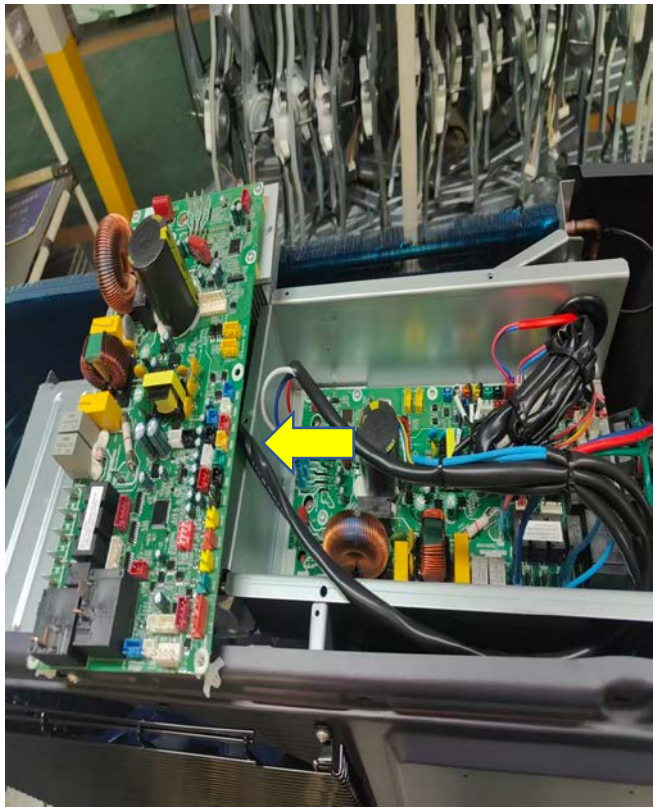


02. Error Codes and Fault Diagnosis-Fault Diagnosis

C11：Compressor out of sync / failed to start / phase missing



Check three-phase wires the U, V, and W



Replace with a new PCB board

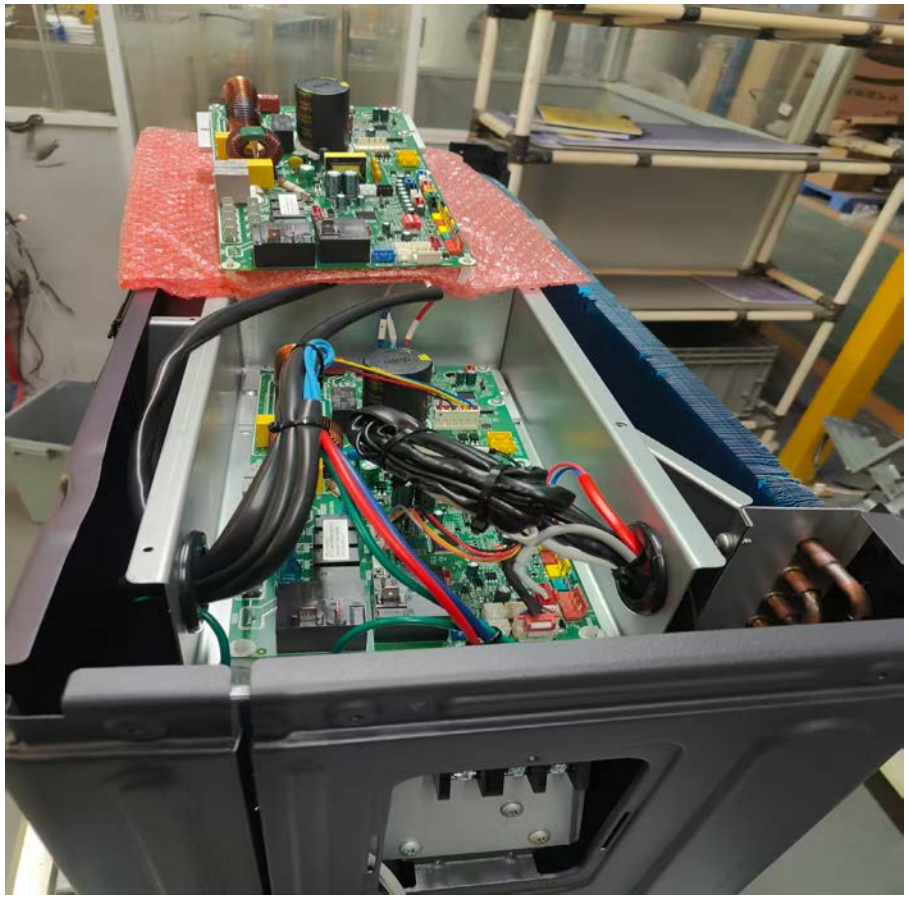
▶Step 1: Check the connection of the UVW three-phase wires from the driver board to the compressor.

▶ Step 2: Replace the driver board.

▶ Step 3: Replace the compressor.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

C12：Drive IPM overheat protection

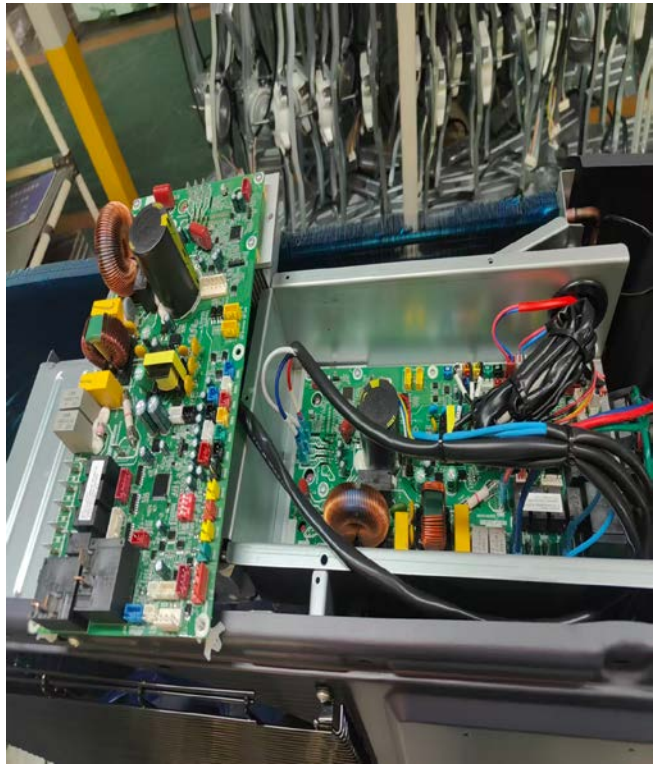


A new heat pump PCB board needs to be replaced.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

C13:Drive DC bus voltage protection

To check the input voltage by a multimeter.

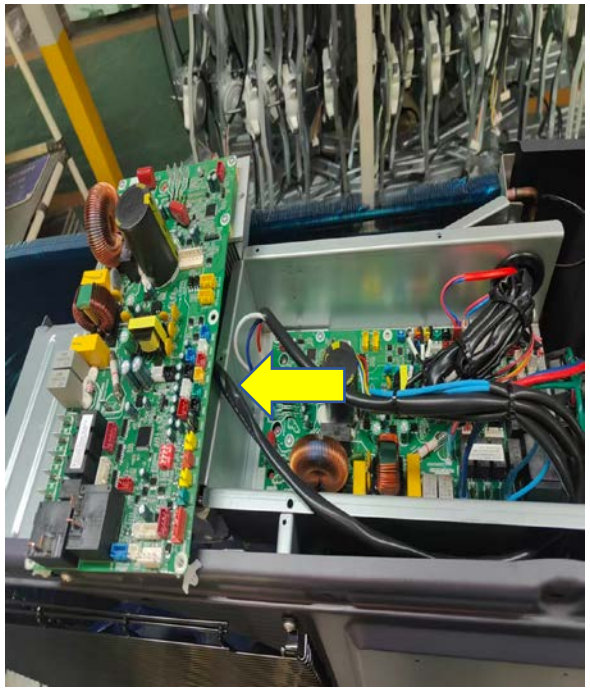


Replace with a new heat pump PCB.

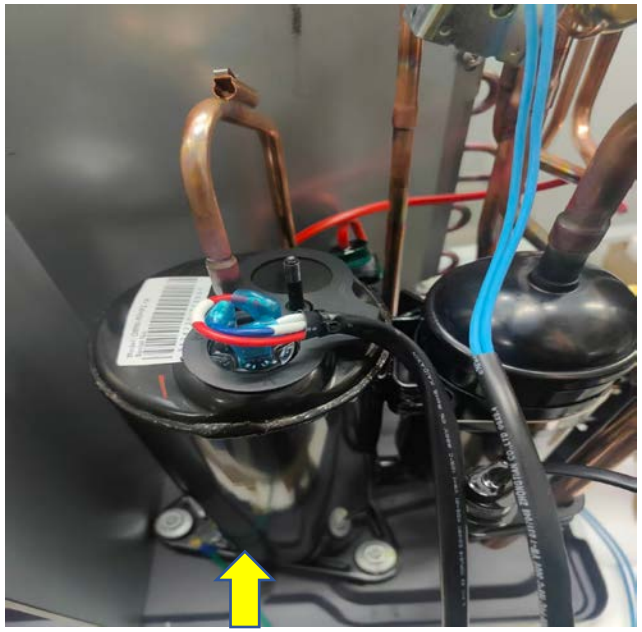
- ▶Step 1: Check the input power voltage
- ▶ Step 2: Replace the driver board.
- ▶ Step 3: Replace the compressor.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

C14:Inverter current protection



Replace a new heat pump PCB.

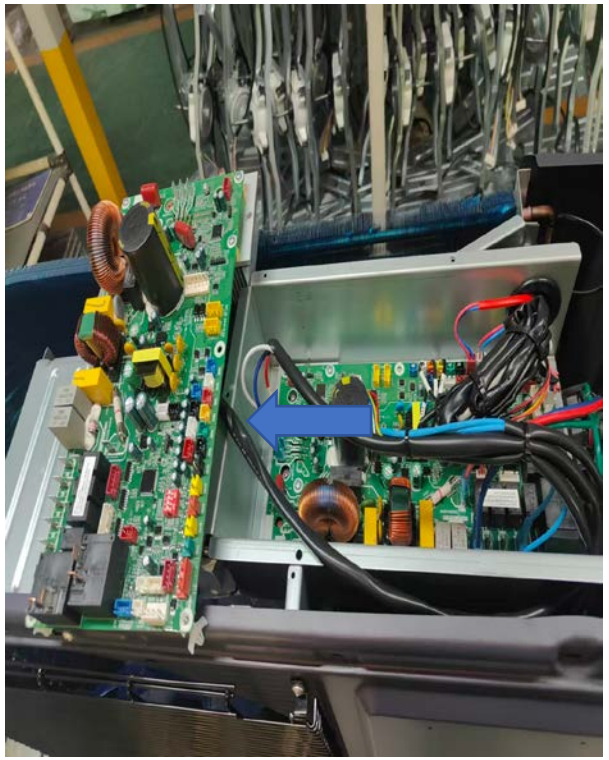


Replace the compressor.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

C15:Inverter temperature protection

Check the ambient temperature of the heat pump.



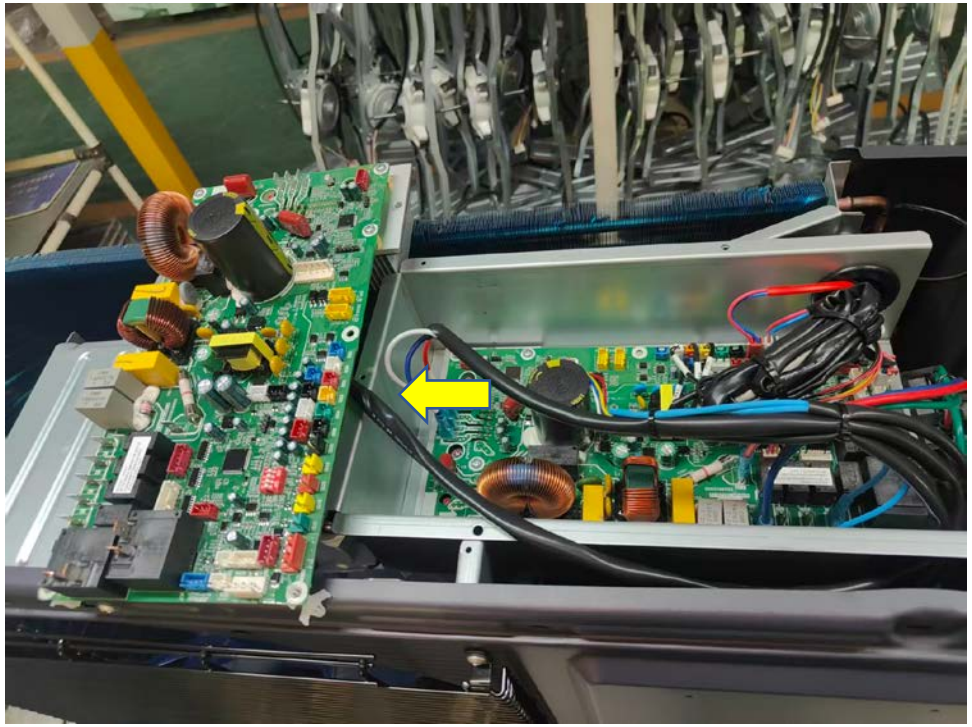
Replace a new heat pump PCB.

▶Step 1: Confirm whether the operating ambient temperature of the heat pump exceeds the upper limit specified for the designed data.

▶ Step 2: Replace a new heat pump PCB .

02. Error Codes and Fault Diagnosis-Fault Diagnosis

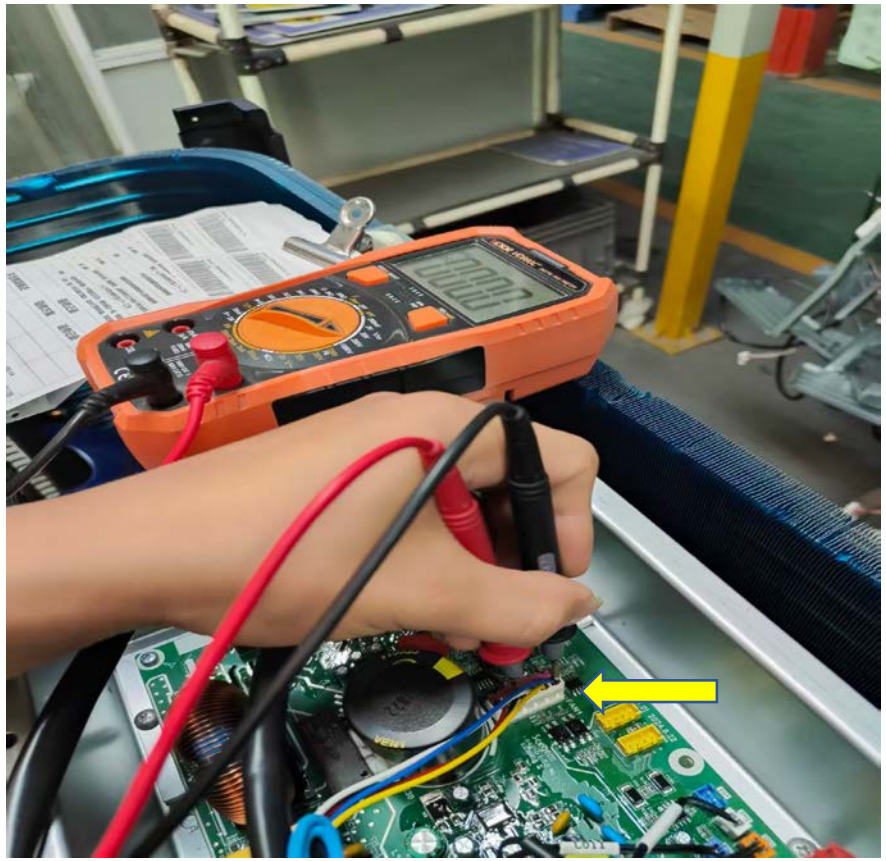
C16:Drive module protection (FO)
C17:Communication error 3 (mainboard and Inverter)



The PCB board is damaged and needs to be replaced with a new heat pump PCB.

02. Error Codes and Fault Diagnosis-Fault Diagnosis

C18:Communication error 4 (mainboard and DC fan)



Use a multimeter to measure the voltage between each phase of the motor and the ground wire to determine if the motor is damaged.

▶Step 1: Check the connection between the DC motor and the control board. Use a multimeter to measure the voltage between each phase of the motor and the ground wire to determine if the motor is damaged.

▶ Step 2: Replace the DC motor.

▶ Step 3: Replace a new heat pump PCB.

1. The Eco-Logical OMNI uses a DC inverter compressor.

A) True

B) False

2. For DC inverter heat pumps like the OMNI, refrigerant charging is based strictly on volume, not pressure.

A) True

B) False

3. The OMNI uses which type of expansion valve?

A) TXV (Thermostatic Expansion Valve)

B) EEV (Electronic Expansion Valve)

C) Fixed orifice

4. Why does the OMNI charge by volume rather than pressure?

A) Because EEV valve modulate electronically

B) To avoid overcharging in variable-speed operation

C) Both A and B

5. A low refrigerant E02 code on the OMNI means the system has too much refrigerant.

A) True

B) False

6. High refrigerant E01 on the OMNI typically indicates:

A) Refrigerant overcharge or high water pressure

B) Low ambient temp

C) Sensor failure

7. When using Eco-Connect quick-connects on the OMNI, what is the required torque spec?

A) 30 N·m (22 ft-lbs)

B) 18 N·m (13 ft-lbs)

C) No torque needed

8. Eco-Connect fittings are reusable—you can disconnect and reconnect them multiple times without recharging.

A) True

B) False

9. The Eco-Connect system has built-in:

A) Washers, springs, and spacers for repeat use

B) One-time seals

C) Pressure relief valves

10. Can you skip Eco-Connect and use standard HVAC flares on the OMNI?

A) Yes, but torque must match flare specs

B) No, it's not allowed

C) Yes, but only for 1/4" lines

11. Why is Eco-Connect preferred over standard flares?

A) Easier service, no special tools beyond torque wrench

B) Reusable without leak risk

C) Both A and B

12. The included TMV is required on the 120v OMNI

A) True

B) False

13. If E02 (low refrigerant) appears during install, first check:

A) Line set connections for leaks

B) Compressor speed

C) Water flow

14. For high refrigerant E01, the fix often starts with:

A) Recovering all refrigerant and refill by weight

B) Adjusting pressure manually

C) Replacing the EEV valve

15. The OMNI's EEV valve differs from old TXV because:

A) It uses electronic control for precise superheat

B) It requires pressure gauges for charging

C) It's mechanical only

BONUS: What kind of monkey is this, and what is his name?

Nice One!

1. True – OMNI is DC inverter for variable speed efficiency.
2. True – Volume-based due to EEC modulation.
3. B- EEC (Electronic Expansion Valve) – Modern electronic control.
4. Both A and B – Prevents over/under-charge in inverter mode.
5. False – E02 low = undercharge/leak.
6. A- Overcharge/ restriction – or high water pressure
7. A- 30 N·m (22 ft-lbs)
8. True – Designed for repeat disconnects.
9. A- Washers and spacers – For reliable reseal.
10. A- Yes, but torque must match flare specs – Standard practice allowed.
11. Both A and B – Service-friendly and leak-proof.
12. True- required for safety on the 120v and recommended on the 240v for super power
13. A- Line set connections – Most common cause.
14. A- Recover system refill by weight – Volume method for DC inverter.
15. A- Electronic control for precise superheat – Unlike mechanical TXV.
16. Bonus: Japanese Snow Monkey or Macaque (Muh-Caulk) Name is Kyle

Thank You

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