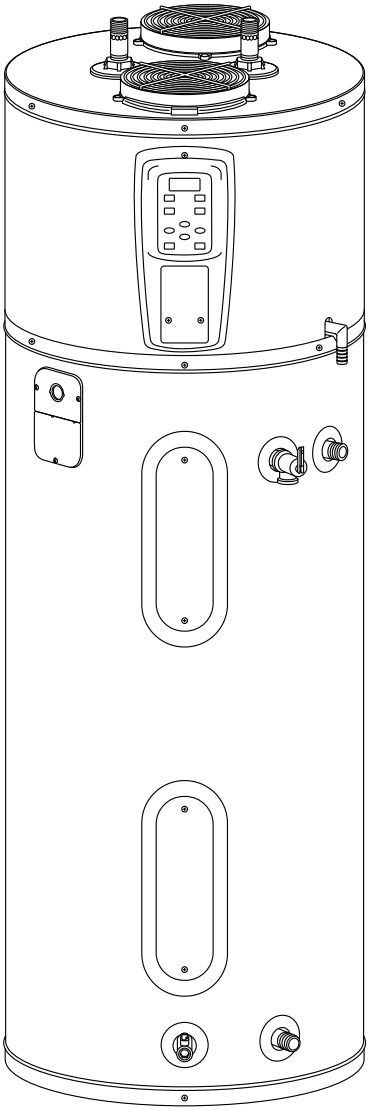
Service Handbook

Hybrid Electric Heat Pump Water Heater

FOR USE ONLY WITH THESE MODELS:

BRAND	STANDARD MODEL	PREMIUM MODEL	120V MODEL
A. O. SMITH (WHOLESALE)	HPTS-50 HPTS-66 HPTS-80	HPTA-40 HPTA-50 HPTA-66 HPTA-80	HPTV-50 HPTV-66 HPTV-80
A. O SMITH (RETAIL)	HPS10-50H45DV HPS10-66H45DV HPS10-80H45DV	HPA10-40H45DV HPA10-50H45DV HPA10-66H45DV HPA10-80H45DV	HPV10-50H01DV HPV10-66H01DV HPV10-80H01DV
CANADIAN A. O. SMITH (WHOLESALE)	HPTS-50 202172T25 HPTS-66 202172T25 HPTS-80 202172T25	HPTA-50 202172T25 HPTA-66 202172T25 HPTA-80 202172T25	
CANADIAN A. O. SMITH (RETAIL)	HPS10C-50H45DV HPS10C-80H45DV	HPTS-50 202172T25 HPTS-66 202172T25 HPTS-80 202172T25	
AMERICAN	HPS10250H045DV HPS10266H045DV HPS10280H045DV	HPA10240H045DV HPA10250H045DV HPA10266H045DV HPA10280H045DV	HPV10250H009DV HPV10266H009DV HPV10280H009DV
LOCHINVAR	HPSA050KD HPSA065KD HPSA080KD	HPPA040KD HPPA050KD HPPA065KD HPPA080KD	HPV050KD HPV065KD HPV080KD
RELIANCE	10-50-DHPTS 10-66-DHPTS 10-80-DHPTS	10-40-DHPTA 10-50-DHPTA 10-66-DHPTA 10-80-DHPTA	10-50-DHPTV 10-66-DHPTV 10-80-DHPTV
STATE	HPSX-50-DHPT HPSX-66-DHPT HPSX-80-DHPT	HPAX-40-DHPT HPAX-50-DHPT HPAX-66-DHPT HPAX-80-DHPT	HPVX-50 HPVX-66 HPVX-80



LOW LEAD CONTENT

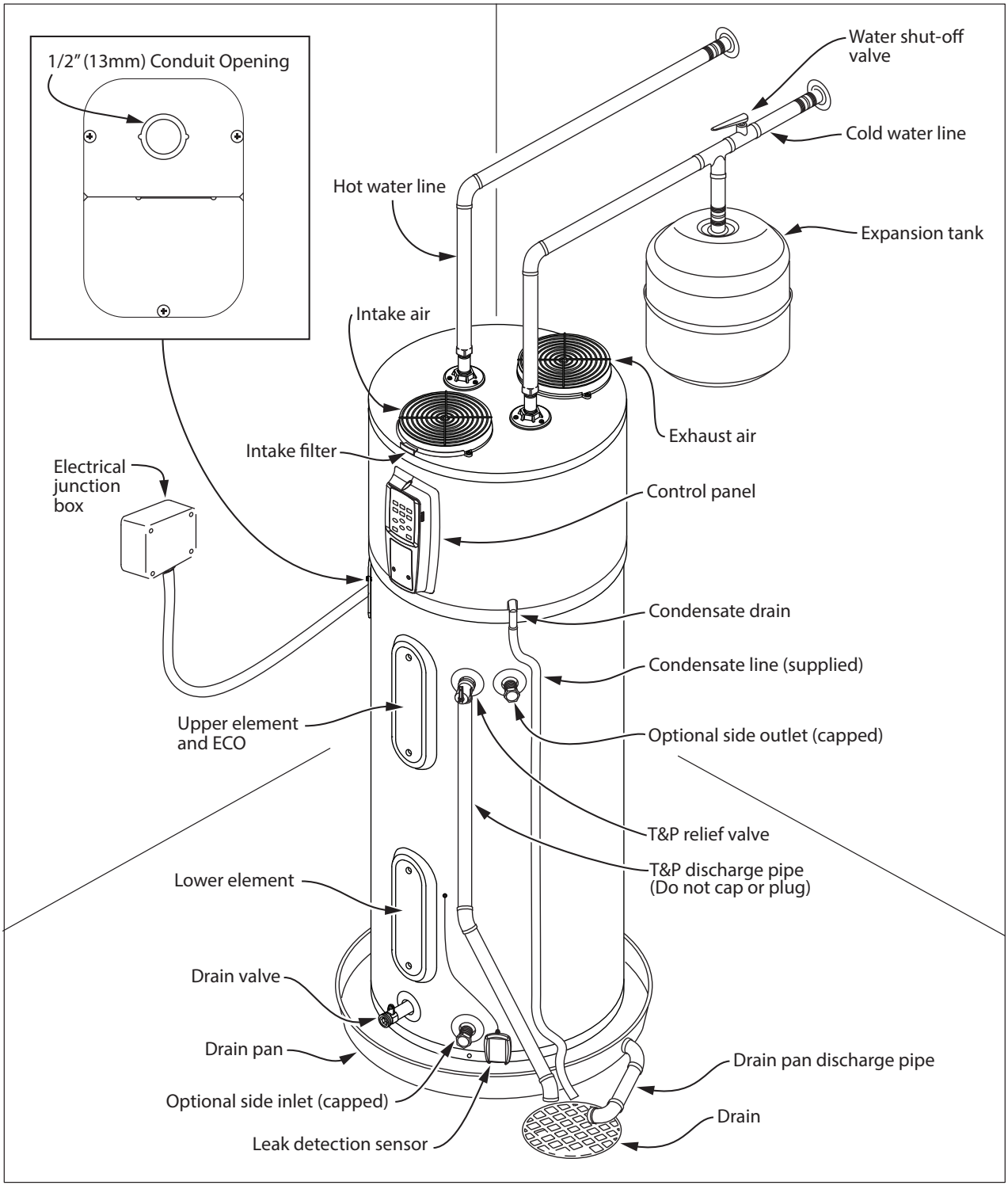
AHRI CERTIFIED®
www.ahridirectory.org

THIS SERVICE HANDBOOK IS FOR USE BY QUALIFIED SERVICE PROFESSIONALS ONLY.

TABLE OF CONTENTS

BASICS 2
Completed Installation (Standard Model) 3
Completed Installation (Premium Model) 4
Completed Installation (120V Model) 5
SAFETY 6
Risks During Installation and Maintenance 7
Risks During Operation 7
OPERATION 9
Tools Required for Servicing Residential Electric Heat Pump Water Heater Models 9
Water Temperature Adjustment 9
Operating Mode Descriptions 9
Other Operational Modes (HPO/ICE) 10
Accessing the Maintenance Display 11
TROUBLESHOOTING 12
Before Using 12
Drips from Temperature and Pressure (T&P) Relief Valve Discharge Pipe 12
Condensate Pump Optional Overflow Shut-off Switch 12
Closed System/Thermal Expansion/T&P Drip 13
Checking and Adjusting the Air Charge of the Thermal Expansion Tank 13
Power Cycling the Unit (Standard & Premium Models) 14
Power Cycling the Unit (120V Model) 14
Dry-Fire Protection System Diagnostic 14
Limp Mode 14
Clearing Error Code 14
Post Installation Review 14
Control Assembly Diagnostic Code Chart 15
MAINTENANCE 18
Testing the Element 18
Replacing Heating Element 18
T&P Relief Valve Maintenance 19
Air Filter Maintenance 19
Evaporator Coil Maintenance 20
Check/Reset Energy Cut Off Button (ECO) 21
Replacing ECO 21
Replacing Anode 23
SERVICE 25
Replacing Smart Valve 25
Replacing Control Assembly 28
Replacing Daughter Board 30
Replacing Diptube 32
Replacing Run Capacitor 34
Replacing Power Cord (120V units only) 36
Replacing Condensate Drain Valve 38
Replacing Condensate Drain Switch 40
Replacing Flex Hoses 42
Replacing Expansion Valve Solenoid 44
Replacing Fan Motor Assembly 46
Replacing Upper & Lower Thermistors 49
Replacing Sensor Wire Assembly 52
Replacing Outlet Thermistor 56
Replacing Inlet & Outlet T-Nipple 60
SYSTEM CHECKS 64
Compressor Check Flowchart 64
Fan Check Flowchart 66
APPENDIX 67
A.O. Smith App Setup and Connectivity 67
Daughter Board Overview (All Models) 75
Control Board Overview (All Models) 76
Repair Parts (Standard Model) 78
Repair Parts (Premium Model) 80
Repair Parts (120V Model) 82
Wire Diagram (Standard & Premium Model) 84
Wire Diagram (120V Model) 85

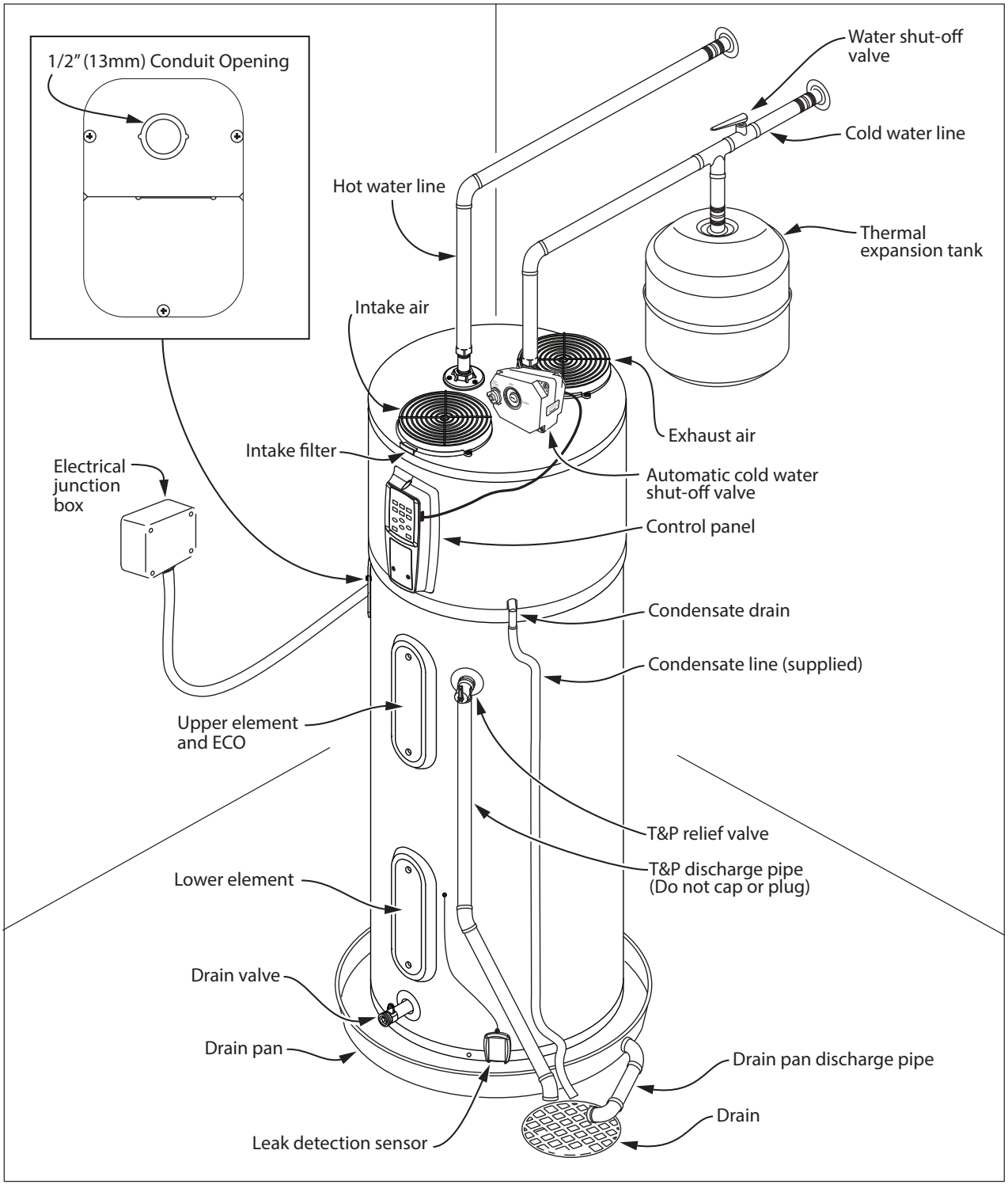
COMPLETED INSTALLATION (STANDARD MODEL)



Notes:

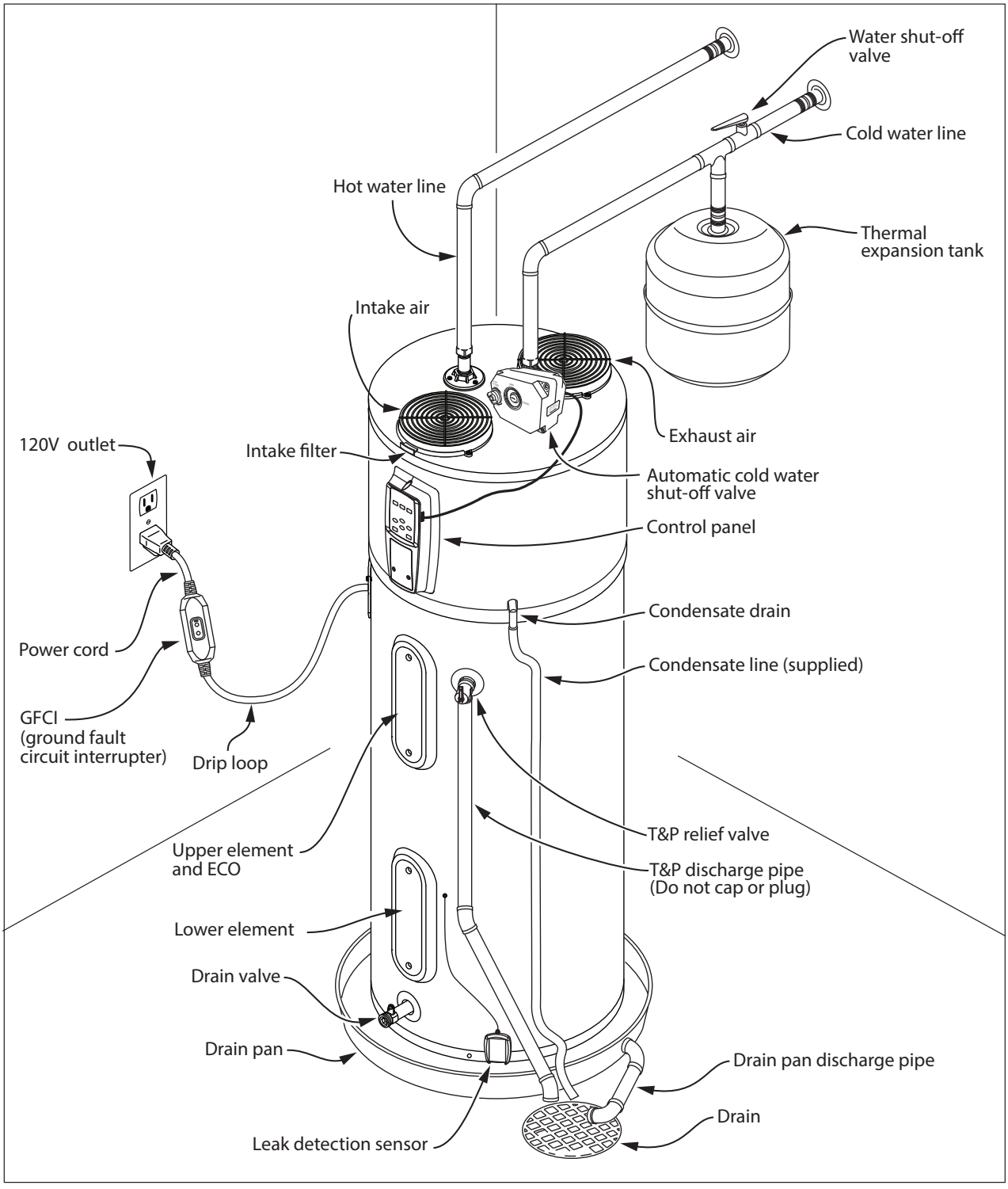
1) If copper piping is used, then unions must be dielectric at inlet and outlet.
2) Plumb piping to desired inlet and outlet, either top or side (not in combination), and cap unused inlet and outlet to avoid water leaks (Standard Model only).

COMPLETED INSTALLATION (PREMIUM MODEL)



Note: If copper piping is used, then unions must be dielectric at inlet and outlet.

COMPLETED INSTALLATION (120V MODEL)



Note: If copper piping is used, then unions must be dielectric at inlet and outlet.

IMPORTANT SAFETY INFORMATION

Read and follow all safety messages and instructions in this manual.

This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible property damage, serious injury or death. Do not remove any permanent instructions, labels, or the data plate from either the outside of the water heater or on the inside of the access panels. Keep this manual near the water heater.

DANGER	**DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.**
WARNING	**WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.**
CAUTION	**CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.**
NOTICE	**NOTICE indicates practices not related to physical injury.**

Important information to keep

Fill out this section and keep this manual in the pocket of the water heater for reference.

Date Purchased:

_____

Model Number:

_____

Serial number:

_____

Maintenance performed:*	Date:

**Drain and flush tank, clean air filter, clean condensate pan, and remove and inspect anode rod after first six months of operation and at least annually thereafter. Operate the Temperature and Pressure Relief Valve (T&P) annually and inspect T&P valve every 2-4 years (see the label on the T&P valve for maintenance schedule). If no label is attached to the T&P Relief Valve, follow the instructions in the T&P Relief Valve Maintenance section of this manual. See the Maintenance section for more information about maintaining this water heater.*

This product is certified to comply with a maximum weighted average of 0.25% lead content as required in some areas.

Table 1: ASSE 1082

ASSE 1082 Test Conditions	40 Gallon	50 Gallon	66 Gallon	80 Gallon
Water Heater Connection Size	3/4" NPT			
Maximum Setting	150°F (66°C)			
Maximum Working Pressure	150 PSI (1034 kPa)			
Maximum Flow Rate at Minimum Temperature Rise	2 GPM (7.5 L/min)	2.5 GPM (9.4 L/min)	3.5 GPM (13.2 L/min)	4 GPM (15.1 L/min)
Minimum Flow Rate at Maximum Temperature Rise	0.5 GPM (1.8 L/min)	0.6 GPM (2.2 L/min)	0.8 GPM (3 L/min)	1 GPM (3.7 L/min)
Maximum Flow Rate at +70°F (+39°C) Temperature Rise	2 GPM (7.5 L/min)	2.5 GPM (9.4 L/min)	3.5 GPM (13.2 L/min)	4 GPM (15.1 L/min)
Pressure Drop at Maximum Flow Rate	2 PSI (13.7 kPa)	2.5 PSI (17.2 kPa)	3.5 PSI (24.1 kPa)	4 PSI (27.5 kPa)

IMPORTANT SAFETY INFORMATION

To reduce the risk of property damage, serious injury or death, read and follow the precautions below, all labels on the water heater, and the safety messages and instructions throughout this manual.

RISKS DURING INSTALLATION AND MAINTENANCE

Electric Shock Risk

Contact with the electrical parts in the junction box and behind the access doors can result in severe injury or death from electrical shock:

- Disconnect power by opening the circuit breaker or removing the fuses before installing or servicing.
- Use a non-contact circuit tester to confirm that power is off before working on or near any electrical parts.
- Replace the junction box cover and access doors after servicing.

Lifting Risk

⚠ WARNING! The water heater is heavy. Follow these precautions to reduce the risk of property damage, injuries from lifting or impact injuries from dropping the water heater.

- Use at least two people to lift the water heater.
- Be sure you both have a good grip before lifting.
- Use an appliance dolly or hand truck to move the water heater.

RISKS DURING OPERATION

Scalding Risk

This water heater can make water hot enough to cause severe burns instantly, resulting in severe injury or death.

- Feel water before bathing or showering.
- To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point-of-use. These valves automatically mix hot and cold water to limit the temperature at the tap. Mixing valves are available at your local plumbing supplier. Follow the manufacturer's instructions for installation and adjustment of the valves.
- The thermostat(s) on this water heater have been factory set to approximately 120°F to reduce the risk of scalding. Higher temperatures increase the risk of scalding, but even at 120°F, hot water can scald. If you choose a higher temperature, Thermostatic Mixing Valves located at each point-of-use are particularly important to help avoid scalding.

Table 2: Scalding Table

Temperature	Time to Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

For more information about changing the factory thermostat setting(s), refer to the "Water Temperature Adjustment" section in this manual (page 9).

Even if you set the water heater thermostat(s) to a low setting, higher temperatures may occur in certain circumstances:

- In some cases, repeated small draws of water can cause the hot and cold water in the tank to "stack" in layers. If this happens, the water can be as much as thirty degrees hotter than the thermostat(s) setting. This temperature variation is the result of your usage pattern and is not a malfunction.
- Water temperature will be hotter if someone adjusted the thermostat(s) to a higher setting.
- Problems with the thermostat(s), or other malfunctions may result in higher than expected water temperatures.
- If the water heater is in a hot environment, the water in the tank can become as hot as the surrounding air, regardless of the thermostat setting.
- If the water supplied to the water heater is pre-heated (by a solar heating system) the temperature in the tank may be higher than the water heater's thermostat setting.

To reduce the risk of unusually hot water reaching the fixtures in the house, install Thermostatic Mixing Valves at each point-of-use.

If anyone in your home is at particular risk of scalding (for example, the elderly, children, or people with disabilities) or if there is a local code or state law requiring a certain water temperature at the hot water tap, these precautions are particularly important.

IMPORTANT SAFETY INFORMATION

According to a national standard American Society of Sanitary Engineering (ASSE 1070) and most local plumbing codes, the water heater's thermostat should not be used as the sole means to regulate water temperature and avoid scalds.

Properly adjusted Thermostatic Mixing Valves installed at each point-of-use allow you to set the tank temperature to a higher setting without increasing the risk of scalds. A higher temperature setting allows the tank to provide much more hot water and can help provide proper water temperatures for appliances such as dishwashers and washing machines. Higher tank temperatures (140°F) also kill bacteria that cause a condition known as "smelly water" and can reduce the levels of bacteria that cause water-borne diseases.

Water Contamination Risk

Do not use chemicals that could contaminate the potable water supply. Do not use piping that has been treated with chromates, boiler seal, or other chemicals.

Fire Risk

To reduce the risk of a fire that could result in property damage, or serious injury or death:

- Do not store things that can burn easily such as paper or clothes next to the water heater.
- Be sure the junction box cover and the access door covers are in place. These covers keep debris from entering and potentially being ignited, and help keep any internal fires from spreading.
- Keep the water heater from becoming wet. Immediately shut off the water heater and have it inspected by a qualified person if you find that the wiring, thermostat(s) or surrounding insulation have been exposed to water in any way (e.g., leaks from plumbing, leaks from the water heater itself can damage property and could cause a fire risk). If the water heater is subjected to flood conditions or the thermostat(s) have been submerged in water, the entire water heater must be replaced.

Explosion Risk

High temperatures and pressures in the water heater tank can cause an explosion resulting in property damage, serious injury or death. A new Temperature and Pressure (T&P) Relief Valve is included with your water heater to reduce risk of explosion by discharging hot water. Additional temperature and pressure protective equipment may be required by local codes.

A nationally recognized testing laboratory maintains public inspection of the valve production process and certifies that it meets the requirements for Relief Valves for Hot Water Supply Systems, ANSI Z21.22. The T&P Relief Valve's relief pressure must not exceed the working pressure rating of the water heater as stated on the rating plate.

Maintain the T&P Relief Valve properly. Follow the maintenance instructions provided by the manufacturer of the T&P Relief Valve (label attached to T&P Relief Valve). If no label is attached to the T&P Relief Valve, follow the instructions in the T&P Relief Valve Maintenance section of this manual.

An explosion could occur if the T&P Relief Valve or discharge pipe is blocked. Do not cap or plug the T&P Relief Valve or discharge pipe.

Fire and Explosion Risk if Hot Water is Not Used for Two Weeks or More.

⚠ CAUTION! Hydrogen gas builds up in a hot water system when it is not used for a long period (two weeks or more). Hydrogen gas is extremely flammable. If the hot water system has not been used for two weeks or more, open a hot water faucet for several minutes at the kitchen sink before using any electrical appliances connected to the hot water system. If hydrogen is present there will probably be an unusual sound such as "air" escaping through the pipe as hot water begins to flow. Do not smoke or have an open flame or other ignition source near the faucet while it is open.

Your safety and the safety of others is extremely important in the servicing of this water heater. Many safety-related messages and instructions have been provided in this handbook and on your water heater to warn you of a potential hazard(s). Read, understand and follow all instructions in this handbook and in the Installation Instructions and Use & Care Guide that shipped with the water heater.

The information contained in this handbook is designed to answer common situations encountered when operating or servicing the residential electric heat pump water heater, it is not meant to be all-inclusive. For topics not covered in this handbook, please contact the technical information center listed on the water heater's warranty sheet.

This handbook is intended for use by qualified service technicians.

The water heater must be returned to a safe condition anytime the water heater is left unattended during or after servicing. All original components must be re-installed and all safety measures must be

implemented. Additionally, the water temperature setting should be returned to the manufacturer's set point of 120°F.

Tools Required for Servicing Residential Electric Heat Pump Water Heater Models

- Safety gloves
- Non-contact circuit tester
- Common hand tools (screwdrivers, pliers, wire cutters, wrenches, etc.)
- Digital multimeter (with alligator leads and continuity tester)
- Clamp style amp meter
- Megohm meter
- Water pressure gauge
- Garden hose (draining tank)
- Thermometer (2x)
- Ratchet and breaker bar
- 10 mm hex socket for anode
- 1-1/16" 6 point deep well socket for anode (1/2" drive minimum)
- 18"-20" extension for anode (1/2" drive minimum)
- 1-1/2" socket for element (1/2" drive minimum)
- 6" extension for element (1/2" drive minimum)
- 1/4" socket for tank thermistors
- 5/16" nut driver for ground screws
- 6-8" pipe wrench for flex hoses and t-nipples
- Basin wrench for flex hoses and t-nipples
- Pipe joint compound or thread sealant tape
- Masking tape and a permanent marker to mark wires

Water Temperature Adjustment

The water temperature can be adjusted from 95°F/35°C to 150°F/65°C by pressing ⌃⌄ followed by the ENTER button to lock in the desired temperature. The Control Assembly is unlocked by default. To lock the display after setting the parameters, press the ENTER button. The water temperature can be adjusted quickly by pressing the "Temperature Up" button and holding for three seconds.

NOTICE: For increased water demand, switching (temporarily) to Hybrid Mode or Electric Mode will decrease recovery/re-heat time. If Electric Mode is selected to accommodate increased water demand, return the water heater to the default operating mode (Hybrid) after the temperature set point has been recovered. Failure to do so will not allow the water heater to operate at peak efficiency.

Operating Mode Descriptions

The operating modes can be changed by pressing the button for any desired mode. The Operation Mode Indication Light will turn on when the relevant mode is selected.

Electric Mode

The water heater functions as a conventional electric unit, relying on only the elements for heat. This mode may be useful in periods of increased hot water demands. When Electric Mode is selected, the duration timer will be displayed. The default Electric Mode days are preset at 3 days. Press the Up and Down buttons to modify the timer to the desired number of Electric Mode days (setting range: 1 to 7 days). The timer will blink on the display; press the Mode/Enter button to confirm the Electric Mode timer.

You may choose to keep the water heater in this mode indefinitely. Once Electric Mode has been selected, press the Electric Mode button again and hold for 5 seconds. The Control Assembly will beep once, signaling the setting range has now been adjusted (setting range: 1 to 99 days or permanently ON). Press the Up and Down buttons to modify the timer to the desired number of Electric Mode days. Setting the timer below 1 day, or above 99 days, will activate the mode permanently and the Control Assembly will display "ON."

To deactivate Electric Mode, simply select the button for any other desired mode.

Heat Pump Mode

Provides the highest efficiency and lowest cost operation by using only the heat pump for heating. Recovery time and efficiency will vary with ambient temperature and relative humidity. Efficiency will be greatest, and recovery quickest, when both are high. At lower temperatures and relative humidity levels, efficiency will be lower and recovery will take longer. Heat pump operation is allowed between 37°F/3°C to 120°F/48.9°C ambient temperature. At ambient temperatures lower than 37°F/3°C and greater than 120°F/48.9°C, the heat pump will not operate. Similarly, if the water temperature in the tank is less than 59°F/15°C, the heat pump will not operate. The Control Assembly will display the code HPO (see page 10), and the unit will operate in Electric mode until ambient air and water temperatures return to the safe operating range of the heat pump.

OPERATION

Hybrid Mode

This is the default, recommended setting, combining high energy efficiency with reduced recovery time. This mode uses the heat pump as the primary heating source. One of the heating elements (upper or lower) will provide supplementary heating if demand exceeds a predetermined level so that the set point temperature can be recovered more quickly.

Hot Water + Mode

This mode operates simultaneously with Hybrid, Heat Pump, or Electric Mode, and allows the user to raise the water heater tank temperature in increments of 10°F to increase hot water capacity while maintaining the temperature set point.
Hot Water + mode has three settings:

- Level 1 (one LED indicator) temperature set point + 10°F
- Level 2 (two LED indicators) temperature set point + 20°F
- Level 3 (three LED indicators) temperature set point + 30°F

Hot Water + Mode provides highest efficiency at temperature set points between 120°F and 130°F, and may not provide additional performance at higher set point temperatures.

When Hot Water + Mode is activated, the LED indicator for the selected operating mode (Hybrid, Heat Pump, or Electric Mode) will remain lit.

Guest Mode

This mode uses both the heat pump and heating elements to reach the maximum tank temperature, while maintaining the temperature set point at the Control Assembly. This allows the water heater to accommodate an increase in hot water demand in scenarios where guests, or additional users, require greater hot water capacity.

When Guest Mode is selected, the duration timer will be displayed. The default Guest Mode days are preset at 3 days. Press the Up and Down buttons to modify the timer to the desired number of Guest Mode days (setting range: 1 to 7 days). The timer will blink on the display; press the Mode/Enter button to confirm the Guest Mode timer.

NOTICE: Operating the water heater in Guest Mode may increase energy consumption.

Vacation Mode

To save energy, select Vacation mode to lower the temperature setting on the thermostat if you plan to be gone for an extended time.

NOTICE: Vacation mode has a fixed set point of 50°F/10°C.

When Vacation mode is selected, the vacation timer will be displayed. The default vacation days are preset at 7 days. Press the Up and Down button to modify the timer to desired number of vacation days (setting range: 1 to 99 days or permanently ON). The vacation timer will blink on the display; press the Mode/Enter button to confirm the vacation timer. To deactivate Vacation mode, press the Vacation mode button to return to the previous operating mode or press the button for any other desired mode.

When the vacation days decrease to 9 hours remaining, the Control Assembly will automatically switch to the previously selected mode.

NOTICE: Normally, the display will only show the remaining vacation days.

Sleep Mode

The display will go into “Sleep Mode” for energy saving if there is no operation on any button for 15 minutes. All of the display and lights will be turned off except for the “Operational Mode Indication Light,” which will remain illuminated while the unit is powered on. The unit can be awakened by pressing any button.

Other Controls

°F/°C SWITCH:

Press “Temperature Down” button and hold for 3 seconds to switch temperature unit between Fahrenheit and Celsius.

Other Operational Modes (HPO/ICE)

Table 3: Other Operational Modes

Display	Description
ICE	Heat Pump Defrost
HPO	Heat Pump out of Operating Range

HEAT PUMP DEFROSTING INDICATION (ICE):

There will be frost accumulating on the evaporator when the heat pump is operated under low ambient temperatures. The controller will order the unit to enter into defrosting cycle to optimize the heat pump operation performance. During the defrosting period, the user interface module will display ICE as an indication.

OUT OF HEAT PUMP OPERATION RANGE (HPO):

The Control Assembly will display HPO as an indication that the ambient and/or water temperature condition is out of the heat pump operation range.

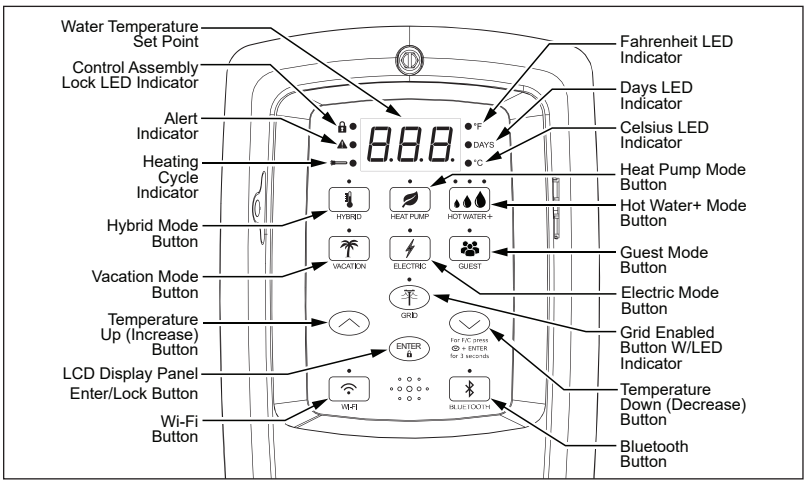


Figure 1 - Control Assembly (Premium Model Illustrated)

Accessing the Maintenance Display

1. Press the Up and Down Temperature buttons ⌃⌄ at the same time and hold for (3) seconds. The display will enter the Maintenance Display Mode. The display will alternate between the display designation (Example: P1 or H1) and the associated information.
2. A total of 14 options are available in this mode (see Table 4 below). Use the Up and Down Temperature buttons ⌃⌄ to switch between options.
3. The display will revert to normal operation after no buttons have been pressed over a period of approximately (15) seconds.

NOTICE: The water heater will conduct a system diagnostic (approximately seven (7) to ten (10) minutes) each time power is applied from an off state (the Control Assembly will display a series of single, alternating dashes repetitively during system diagnostic). Once the diagnostic sequence has finished, normal operation will begin and the fan will turn on. If the system diagnostic yields any codes, reference the diagnostic codes section in this Service Handbook (see pages 15-17).

Table 4: Maintenance Display

Display		Message	Meaning	Resistance Values	
				R-25°C	B/R-25/50°C
1	P1	Upper Tank Temperature	Measured at outer upper tank wall	50kΩ±2%	4000Ω±2%
2	P2	Lower Tank Temperature	Measured at outer lower tank wall	50kΩ±2%	4000Ω±2%
3	P3	Coil Temperature	Measured at hairpin of evaporator	10kΩ±2%	3950Ω±2%
4	P4	Discharge Temperature	Measured at compressor discharge pipe	50kΩ±2%	4000Ω±2
5	P5	Suction Temperature	Measured at evaporator outlet pipe	10kΩ±2%	3950Ω±2%
6	P6	Ambient Temperature	Measured within heat pump component assembly	10kΩ±2%	3950Ω±2%
7	P7	EEV Pulses	EEV (Electronic Expansion Valve) opening indication	N/A	
8	P8	Upper Element Status	0: Upper element is off / 1: Upper element is on		
9	P9	Lower Element Status	0: Lower element is off / 1: Lower element is on		
10	P10	Software Version	“vXY” means the software version is “X.Y”		
11	H1	History Fault Code 1	Newest active fault code		
12	H2	History Fault Code 2	Historical fault code		
13	H3	History Fault Code 3	Historical fault code		
14	H4	History Fault Code 4	Historical fault code		

⚠ WARNING! Do not cap or plug the T&P Relief Valve or discharge pipe, and do not operate the water heater without a functioning T&P Relief Valve - this could cause an explosion.

Before Using

1. Make sure the water heater has been properly installed, according to the Installation Instructions and Use & Care Guide. The water heater must be installed upright and level. If the water heater was placed on its side for an extended period of time, allow the water heater to remain in the upright position with the power disconnected for 12-24 hours before operation.
2. Make sure the air filter is correctly installed and free of dust and lint.

NOTICE: The top of the unit must be kept clear to provide air into the water heater. Verify nothing is blocking the intake or exhaust air flow (see "Repair Parts" illustrations starting on page 78).

3. Make certain the tank is completely filled with water (see Installation Instructions and Use & Care Guide).
4. After the water heater is completely filled with water, connect electrical power to the water heater.

NOTICE: The water heater will conduct a system diagnostic (approximately seven (7) to ten (10) minutes) each time power is applied from an off state. Normal operation will begin after the system diagnostic has been completed. If the system diagnostic yields any codes, reference the diagnostic codes section in this manual (see pages 15-17).

5. Adjust the set point temperature. See the "Water Temperature Adjustment" section on page 9.

IMPORTANT: Do not attempt to operate this water heater if the unit has been submerged, subjected to flooding, or surrounding insulation has been exposed to water in any way.

Do not attempt to repair a unit that has been subjected to flood conditions. Water heaters that have been subjected to flood conditions, or any time the unit has been submerged in water, must be replaced.

Drips from Temperature and Pressure (T&P) Relief Valve Discharge Pipe

A small amount of water dripping from the Temperature and Pressure (T&P) Relief Valve usually means the home's water pressure is too high or you need a properly sized and pressurized Thermal Expansion Tank. Refer to the Installation Instructions and Use & Care Guide and the "Checking the Air Charge of the Thermal Expansion Tank" section of this handbook on page 13. A large amount of hot water coming from the T&P discharge pipe may be due to the tank overheating.

Water Pressure too High: High water pressure can cause the T&P Relief Valve to drip. Install a Pressure Reducing Valve (PRV) on the main cold water supply line. Adjust the PRV to between 50 and 60 psi.

Thermal Expansion Tank: Install a Thermal Expansion Tank. If a Thermal Expansion Tank is already installed and the T&P Relief Valve discharge pipe drips, the Thermal Expansion Tank may be pressurized to the wrong pressure or the internal bladder may be defective. Refer to the instructions that came with the Thermal Expansion Tank for more information, and see "Checking the Air Charge of the Thermal Expansion Tank" section of this hand book on page 13.

Debris: In rare cases, debris can stick inside the T&P Relief Valve preventing the valve from seating fully. In that case, the T&P Relief Valve discharge pipe will drip. You may be able to clear debris from the T&P Relief Valve by manually operating the valve, allowing small quantities of water to flush out the debris. See the label on the T&P Relief Valve for instructions.

If the water pressure is between 50 and 60 psi, a Thermal Expansion Tank is installed and properly pressurized, the valve has been cleared of any debris, and it still drips, the valve may be broken. The T&P Relief Valve must be replaced.

Condensate Pump Optional Overflow Shut-off Switch

The wiring loop is located next to the condensate drain connection. If pump is not connected you will find the wiring loop behind the removal label (Figure 2).

Two 22 AWG wires should be connected to the two wires on the water heater using wire connectors or other approved means to make the power connections.

Understand the importance of routine inspection/maintenance of the condensate drain pan, the condensate drain valve, and lines. This is to prevent any possible drain line blockage resulting in the condensate drain pan overflowing.

NOTICE: If water is coming from the overflow slot of the condensate drain, this indicates that both condensate drain lines may be blocked and immediate action is required. See "Replacing Condensate Drain Valve" on page 38 for access and service instructions.

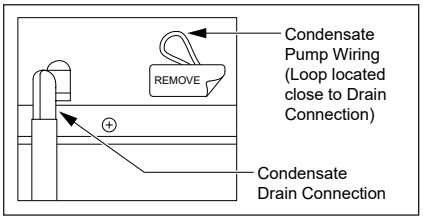


Figure 2 - Condensate Drain Connection and Wiring

Closed System/ Thermal Expansion/ T&P Drip

Most public water systems are required to prevent water flowing from points of use (residences, businesses, etc.) back into the municipal water supply. This creates what is known as a "Closed System."

As water is heated, it expands. In a closed system the expansion of the water has nowhere to go, resulting in an increase in pressure. This increased pressure in the system can damage the water heater and may cause the T&P Relief Valve to open and relieve the pressure. Premature tank failure will result if this condition is not corrected. To prevent thermal expansion from increasing the system pressure, a properly sized Thermal Expansion Tank should be installed on the cold water supply to the water heater (see examples in the "Completed Installation" figures on pages 3-5). The Thermal Expansion Tank must be charged with air to match the incoming water pressure. Failure to install a properly sized Thermal Expansion Tank in a closed system will void the warranty on the water heater in the event of tank failure. Always follow the manufacturer's instructions that come with the Thermal Expansion Tank.

Contact a plumbing service agency or your retail supplier regarding the installation of a Thermal Expansion Tank.

Checking and Adjusting the Air Charge of the Thermal Expansion Tank

1. Turn power OFF to the water heater at the circuit breaker or remove disconnects (disconnect 120V model from outlet).
2. Run cold water out of the tap for 10 seconds to relieve thermal expansion and then turn the faucet **OFF**.
3. Connect a water pressure gauge to the plumbing system and record the incoming water pressure.
4. Shut the cold water supply **OFF**.
5. Open a hot water tap and relieve pressure from the plumbing system.
6. The preferred method for checking air pressure of a Thermal Expansion Tank is to remove it from the plumbing if possible. Where it is not possible to remove the Thermal Expansion Tank, take necessary precautions to ensure water pressure at the plumbing connection to the Thermal Expansion Tank has been relieved. Failure to relieve water pressure at this location may invalidate the air pressure check. Improperly installed or charged Thermal Expansion Tanks can result in premature leaking of the water heater.

NOTICE: The air pressure check is not valid unless the Thermal Expansion Tank is completely removed from the system.

7. Remove the cap from the air pressure Schrader valve and use the air pressure gauge to measure the air pressure charge of the Thermal Expansion Tank. The air pressure charge should match the recorded incoming water pressure.

NOTICE: If water, rather than air, comes out of the Schrader valve the Thermal Expansion Tank will need to be replaced.

8. If the air charge does not match the incoming water pressure, adjust it by adding pressure with an air compressor or by relieving excess pressure at the Schrader valve until the air charge in the tank matches the pressure of the incoming water.
9. Re-install the Thermal Expansion Tank.
10. Open all plumbing shut-off valves and restore power to the water heater.
11. Check for leaks.

Power Cycling the Unit (Standard & Premium Models)

1. Locate and turn **OFF** the water heater's circuit breaker or remove disconnects.
2. Locate electrical junction box on side of water heater, remove cover and identify the two (2) power wires.
3. Turn circuit breaker back **ON** (or re-install the disconnects) and check for power on both incoming power wires using a voltmeter.
4. Again, turn **OFF** the water heater's circuit breaker, or remove disconnect and replace electrical junction box cover, before performing maintenance work.

NOTICE: When powered on the unit will start to run a system diagnostic. This typically takes seven (7) to ten (10) minutes and the Control Assembly will display a series of single, alternating dashes repetitively during this period.

Power Cycling the Unit (120V Model)

1. Disconnect electric power to water heater (remove plug from properly sized and grounded 120V outlet).
2. Reconnect electric power to water heater (insert plug into properly sized and grounded 120V outlet).

NOTICE: When powered on the unit will start to run a system diagnostic. This typically takes seven (7) to ten (10) minutes and the Control Assembly will display a series of single, alternating dashes repetitively during this period.

Dry-Fire Protection System Diagnostic

This water heater is equipped with "Dry-Fire" protection. When powered on the unit will start to run a system diagnostic. This typically takes seven (7) to ten (10) minutes if Dry-Fire detection indicates there is insufficient water in the tank.

If Dry-Fire detection indicates the tank is full of ≥ 115°F water, the system diagnostic will typically take a minute.

Limp Mode

The heater will continue operating with one failed heating method by switching into Limp Mode:

- (Limp Mode 1): If the control assembly determines that the upper element has failed, the upper element call for heat will be satisfied by the lower element.
- (Limp Mode 2): If the control assembly determines that the lower element has failed, the lower element call for heat will be satisfied by the upper element.
- (Limp Mode 3): If the control assembly determines that the heat pump is unavailable, both the upper and lower elements will satisfy the call for heat.

NOTICE: The Control Assembly will operate in Limp Mode until the failure is corrected. See the "Replacing Heat Element" section on page 18 and the "Replacing Upper & Lower Thermistors" section on page 49.

Clearing Error Code

To temporarily clear an error code from the control assembly display, press the Up and Down Temperature buttons  at the same time until the display shows "CLR."

Post Installation Review

1. Understand how to use the Control Assembly to set the various modes and functions.
2. Hybrid Mode is the recommended Operating Mode. Review the various Operating Modes and which mode may be best based on ambient temperature and hot water demands.
3. To maintain optimal operation, check and clean the air filter as needed (see "Air Filter Maintenance" section on page 17).
4. The Installation Instructions and Use & Care Guide should be kept with the water heater for reference.

TROUBLESHOOTING

CONTROL ASSEMBLY DIAGNOSTIC CODE CHART

ERROR CODE	INDICATES	CORRECTIVE ACTION*
No Error Code Displayed **Not Enough Hot Water**	High usage, plumbing leak, operating mode adjustment	1. Check for plumbing leak. 2. Adjust temperature; see scald warnings on heater and in manual. 3. Contact a qualified person to perform a volume test.
No Error Code Displayed **Water Too Hot**	Water temperature set too high or grounded element	1. Reduce temperature setting; or 2. Turn off electrical power at the breaker. 3. Check element circuits for resistance of 5-25 ohms (replace if required, see page 18). 4. Turn on electrical power at breaker. 5. If error persists, contact a qualified person.
No Error Code Displayed **No Hot Water**	No power, control panel or thermostat operation	1. Turn off electrical power at breaker. 2. Unplug and reconnect 24 pin connector. 3. Turn on electrical power at breaker. 4. Contact a qualified person to verify correct voltage to unit. **NOTICE:** If the control panel was not connected via Wi-Fi or Bluetooth, the time will need to be set.
001 with an alert Icon flashing. **(also flashing red LED and beeper.)**	Dry-fire, electrical power on with the tank not completely full of water	1. Turn off electrical power at breaker. Add water, open a hot water faucet to bleed all air until water flows without air bursts. 2. If tank is full of water, inspect daughter board relay and confirm wires are routed to the proper terminals (see the “Replacing Daughter Board” section on page 30). 3. Turn on electrical power at breaker. 4. See “Important Safety Information” on page 7.
003 with an alert Icon flashing. **(also flashing red LED.)**	Upper thermistor sensor failure **NOTICE:** Upper thermistor sensor is mounted to tank and located above upper element	1. Turn off electrical power at the breaker. 2. Check electrical connections at Control Assembly board. 3. If there are no issues with the wiring, replace the thermistor. 4. Turn on electrical power at breaker. **NOTICE:** The Control Assembly will go into Limp Mode until the failure is corrected. See page 14.
004 with an alert Icon flashing. **(also flashing red LED.)**	Lower thermistor sensor failure **NOTICE:** Lower thermistor sensor is mounted to tank and located above lower element	1. Turn off electrical power at the breaker. 2. Check electrical connections at Control Assembly board. 3. If there are no issues with the wiring, replace the thermistor. 4. Turn on electrical power at breaker. **NOTICE:** The Control Assembly will go into Limp Mode until the failure is corrected. See page 14.
006 with an alert Icon flashing. **(also flashing red LED and beeper.)**	Internal Processor Error - Frequency Fault - Standard AD Reference Fault - Non-Volatile Memory Fault - Crystal Fault	1. Turn off electrical power at the breaker. Now turn on electrical power to see if error clears. If error has not cleared, turn off electrical power at the breaker and replace the Control Assembly. 2. Turn on electrical power at breaker.
009 with an alert Icon flashing. **(with flashing red LED.)**	Power supply voltage is too low or too high	Check for loose electrical connections, refer to “Power Cycling the Unit” on page 14.
021 with an alert Icon flashing. **(also flashing red LED.)**	Upper element circuit failure **NOTICE:** Lower element is still operable	1. Turn off electrical power at the breaker. 2. Check element circuits for resistance of 5-25 ohms (replace if required, see page 18). 3. Check wires at elements, thermostat and Control Assembly board for damage. 4. Turn on electrical power at breaker. 5. If the error persists, contact a qualified person. **NOTICE:** The Control Assembly will go into Limp Mode until the failure is corrected. See page 14.

TROUBLESHOOTING

ERROR CODE	INDICATES	CORRECTIVE ACTION*
022 with an alert Icon flashing. **(also flashing red LED.)**	Lower element circuit failure **NOTICE:** Upper element is still operable	1. Turn off electrical power at the breaker. 2. Check element circuits for resistance of 5-25 ohms (replace if required, see page 18). 3. Check wires at elements, thermostat and Control Assembly board for damage. 4. Turn on electrical power at breaker. 5. If the error persists, contact a qualified person. **NOTICE:** The Control Assembly will go into Limp Mode until the failure is corrected. See page 14.
025 with an alert Icon flashing. **(with flashing red LED.)**	Heat Pump Coil Temperature Sensor is not functioning	1. Power off (“Power Cycling the Unit,” page 14). 2. Disconnect and reconnect the J9 connection from control board. 3. Inspect wire for damage. 4. Re-install Control Assembly. 5. Reconnect power. 6. If error persists, replace temperature sensor.
026 with an alert Icon flashing. **(with flashing red LED.)**	Heat Pump Suction Temperature Sensor is not functioning	1. Power off (“Power Cycling the Unit,” page 14). 2. Disconnect and reconnect the J9 connection from control board. 3. Inspect wire for damage. 4. Re-install Control Assembly. 5. Reconnect power. 6. If error persists, replace temperature sensor.
027 with an alert Icon flashing. **(with flashing red LED.)**	Heat Pump Discharge Temperature Sensor is not functioning	1. Power off (“Power Cycling the Unit,” page 14). 2. Disconnect and reconnect the J9 connection from control board. 3. Inspect wire for damage. 4. Re-install Control Assembly. 5. Reconnect power. 6. If error persists, replace temperature sensor.
028 with an alert Icon flashing. **(also flashing red LED and beeper.)**	Ambient Temperature Sensor failure	1. Turn off electrical power at the breaker. 2. Turn on electrical power at breaker to see if code clears. If error persists, call our Technical Assistance Hotline which is listed on the water heater's warranty sheet for further assistance.
029 with an alert Icon flashing. **(also flashing red LED and beeper.)**	Outlet temperature sensor failure **NOTICE:** Guest Mode and Hot Water + Mode will be unavailable until the failure is corrected	1. Power off (“Power Cycling the Unit,” page 14). 2. Disconnect and reconnect the J3 connection from control board. 3. Inspect wires for damage. 4. Re-install Control Assembly. 5. Reconnect power. 6. If error persists, replace outlet temperature sensor. **NOTICE:** The Control Assembly will go into Limp Mode until the failure is corrected (see page 14). During this period, the temperature will be locked to the user set point.
031 with an alert Icon flashing. **(also flashing red LED and beeper.)**	Water Leak	1. Turn off electrical power at the breaker, check all electrical connections, and wiring for damage. 2. Check for plumbing leaks and correct accordingly. 3. If tank is leaking, replace the unit. 4. Turn on electrical power at breaker.
044 with an alert Icon flashing. **(with flashing red LED.)**	SAC anode depleted	1. Turn off electrical power. Shut off the cold water valve at the main line and open a hot water faucet to release pressure from the water heater. 2. Remove anode rod (see page 23). 3. Inspect anode rod and replace if necessary.
046 with an alert Icon flashing. **(also flashing red LED and beeper.)**	Shut-off Valve (if applicable)	1. Turn off electrical power. Shut off the cold water valve at the main line and open a hot water faucet to release pressure from the water heater. 2. Check the shut-off valve, making sure the valve is not stuck in the open or closed position. 3. Replace the shut-off valve, if needed. 4. Turn on electrical power at breaker. 5. Open the cold water valve to fill the heater with water, open a hot water faucet to bleed all air until water flows without air bursts.

TROUBLESHOOTING

ERROR CODE	INDICATES	CORRECTIVE ACTION*
047 with an alert Icon flashing. **(also flashing red LED.)**	Smart Valve failure **NOTICE:** Guest Mode and Hot Water + Mode will be unavailable until the failure is corrected	1. Power off (“Power Cycling the Unit,” page 14). 2. Reconnect power. If error persists, replace Smart Valve (see “Replacing the Smart Valve,” page 25). **NOTICE:** The Control Assembly will go into Limp Mode until the failure is corrected (see page 14). During this period, the temperature will be locked to the user set point.
048 with an alert Icon flashing. **(with flashing red LED.)**	Battery Low Energy	1. Make sure the battery protective tab has been properly removed from the battery tray, located on the left side of the Control Assembly. 2. Locate the battery tray on the side of the Control Assembly. 3. Remove the Phillips head screw, slide the battery tray out from the Control Assembly. 4. Remove the old BR2032 battery and replace with a new Panasonic® BR2032 or Murata CR3032 battery. 5. Reinstall the battery tray with new battery and hand tighten the Phillips head screw to secure the battery tray in the Control Assembly. **NOTICE:** If the Control Assembly was not connected via Wi-Fi, Bluetooth, or powered by a power source, the time will need to be set.
080 with an alert Icon flashing. **(with flashing red LED.)**	Air filter is dirty	1. Turn off electrical power to the water heater. Now turn on electrical power to see if error clears. If error does not clear, proceed to step 2. 2. Take the tab on the air filter and remove (slide) it from the air intake duct adaptor located on the top of the unit. 3. If you are replacing the filter, skip to step three. To clean the filter, use a vacuum with a hose attachment to remove any dust or debris. 4. Place the new or cleaned filter into the water heater.
081 with an alert Icon flashing. **(with flashing red LED and beeper.)**	Condensate management	1. Ensure unit is installed level. 2. Check for blocked condensate drain line or valve. Clear drain line and valve as necessary. 3. If an accessory condensate pump was installed: Turn off power to the water heater at the breaker and check control wire connections to condensate pump. See “Connecting the Condensate Pump Optional Overflow Shut-Off Switch” on page 12. Reconnect power. 4. Check to see if the accessory condensate pump is plugged in and has power. 5. Ensure the pump is operating properly, check pump outlet tube for blockage. 6. Repair or replace accessory condensate pump as necessary. 7. If problem persists, call our Technical Assistance Hotline which is listed on the water heater’s warranty sheet.
083 with an alert Icon flashing. **(with flashing red LED and beeper**.)**	Heat Pump Compressor suction pressure is too low	1. Follow the compressor check procedure as outlined in the "System Check" section of the manual (see pages 64 & 65). 2. If problem persists, call our Technical Assistance Hotline which is listed on the water heater’s warranty sheet.
084 with an alert Icon flashing. **(with flashing red LED and beeper**.)**	Heat Pump Compressor is not functioning	
085 with an alert Icon flashing. **(with flashing red LED and beeper**.)**	Heat Pump Compressor discharge temperature is too high	
086 with an alert Icon flashing. **(with flashing red LED and beeper***.)**	Fan speed feedback	Call our Technical Assistance Hotline which is listed on the water heater’s warranty sheet for further assistance.

*These instructions are brief and intended as guidance for a qualified person. If you lack the necessary skills to perform these procedures call the Technical Assistance Hotline which is listed on the water heater’s warranty sheet for assistance.
**Audible alarm will beep if error code is triggered three (3) times in one (1) hour.
***Audible alarm will beep if error code is triggered three (3) times in seventy-two (72) hours.

Testing the Element

1 With power to the water heater **OFF**, remove the upper element access panel, insulation and plastic cover.

2 Loosen the two (2) screws on the upper heating element and remove both power wires.

3 Set multimeter to Ohms and measure resistance between the two upper heating element screws (reading should be between 5 and 25 Ohms).

4 If the resistance reading is either below 5 Ohms or above 25 Ohms, replace upper element. If the element's resistance is good, proceed to next step.

5 Check for a grounded or shorted element using continuity or resistance as follows:

A. Place a test probe on one of the element terminals and the other test probe on the element flange or tank shell. Ensure a good connection.

B. If either test shows continuity, the element is grounded and should be replaced.

If either test shows less than infinite resistance or continuity, the element is grounded and should be replaced.

Replace the elements as required.

Replacing Heating Element

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn the power to the water heater **OFF**.

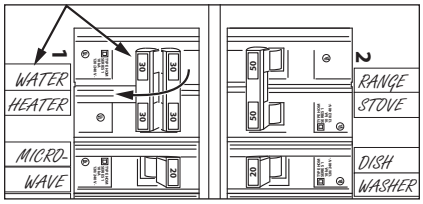


Figure 3 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

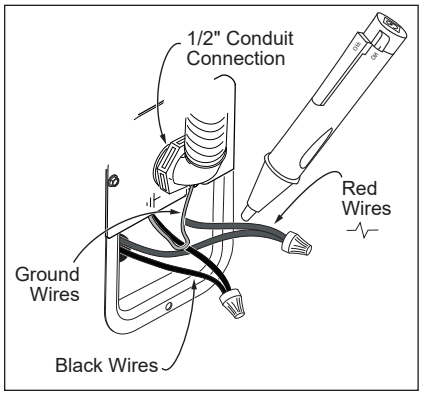


Figure 4 - Non-Contact Circuit Tester

3 Open a hot water faucet and let the hot water run until it is cool.

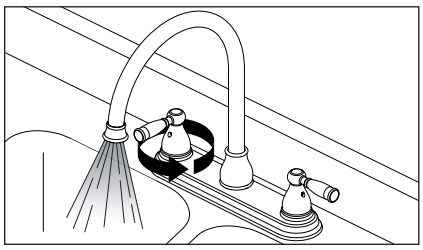


Figure 5 - Water Faucet

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4 Connect a garden hose to the drain valve and place the other end of the hose in a drain or outside (or use buckets). Turn **OFF** the cold water valve that supplies the water heater. Open the drain valve on the water heater. Opening a hot water faucet will help the tank drain faster.

5 Remove the upper or lower access panel on the water heater, and then fold back the insulation and remove the plastic element/thermostat cover.

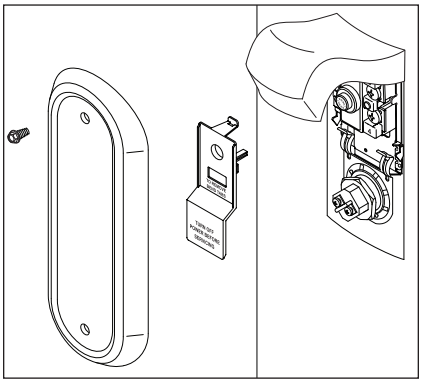


Figure 6 - Access Panel

6 With the tank drained and power off, remove the power wires from the element you intend to replace.

7 Remove the bad element using an element wrench.

8 Make sure the new element is the correct replacement by referring to the water heater's data plate for voltage and wattage information.

9 Clean the threads in the tank opening with a rag. Insert the new element equipped with a rubber gasket. Use a drop of hand dishwashing liquid to lubricate the gasket to help avoid damaging the gasket as it is being tightened. Tighten with an element wrench.

NOTICE: Do not turn power back on until the tank is completely full of water.

10 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three minutes to make sure the tank has all the air removed and is completely full of water. Once you are certain the tank is completely full of water, close the hot water faucet.

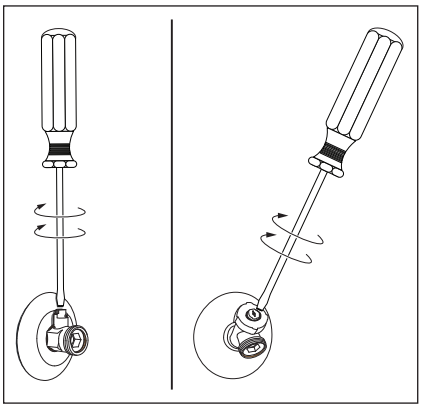


Figure 7 - Drain Valve

11 Check the newly installed element for leaks. If a leak is present, tighten the element until the leak stops. If you cannot stop the leak, drain the tank and remove the element. Inspect the gasket for damage. If the gasket is damaged, replace the gasket and reinstall the element.

12 Once the element is successfully installed and there are no leaks, replace the power wires, thermostat cover, insulation, and access panel. Make sure all wire connections are tight. Replace the cover on the electrical junction box.

13 Turn power **ON** to the water heater at the circuit breaker/ fuse box. It may take two hours for the tank to heat up.

T&P Relief Valve Maintenance

Read and follow the operating and annual maintenance instructions provided by the manufacturer of the T&P Relief Valve (yellow label attached to T&P Relief Valve). Minerals in the water can form deposits that cause the valve to stick or create blocked passages, making the T&P Relief Valve inoperative. Follow these guidelines:

- At least annually, inspect the T&P Relief Valve and discharge pipe for damage caused by corrosive water conditions and mineral deposits. Operate the T&P Relief Valve manually to ensure the waterways are clear and the valve mechanism moves freely (below). Before operating the valve manually, check that it will discharge in a place for secure disposal. If water does not flow freely from the end of the discharge pipe, turn OFF the power to the water heater. Call a qualified person to determine the cause.

⚠ WARNING! Hot water will be released. Before operating the T&P Relief Valve manually, check that it will discharge in a safe place. If water does not flow freely from the end of the discharge pipe, turn the power to the water heater OFF. Call a qualified person to determine the cause.

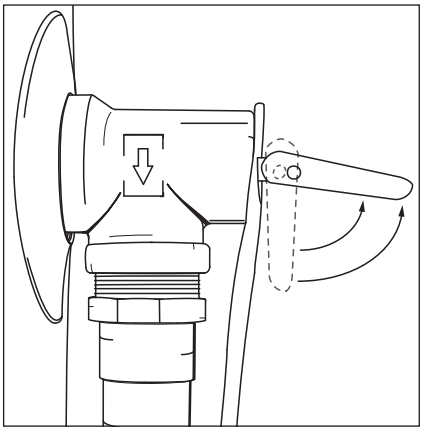


Figure 8 - T&P Relief Valve

- Damage caused by corrosive water conditions, mineral deposits, or other platforms can only be determined when a qualified person removes and inspects the valve and its components.
- Note that a dripping T&P Relief Valve is usually caused by the home's water pressure being too high or the lack of a Thermal Expansion Tank. If your T&P Relief Valve drips, refer to "Drips from T&P Relief Valve Discharge Pipe" section on page 10.

Air Filter Maintenance

To maintain optimal operation, check and clean the air filter as needed. The heater will monitor the heat pump operation status and indicate whether the filter should be cleaned. If the Control Assembly displays error code 080, this indicates the filter should be cleaned or replaced with the following process (see exploded view of unit on last page for air filter location).

NOTICE: Before attempting to clean or replace the air filter, turn **OFF** the power to the water heater at the circuit breaker/fuse box or unplug it.

1 Take the tab on the air filter and remove (slide) it from the top facing air intake duct adaptor.

2 To clean the filter, use a vacuum with a hose attachment to remove any dust or debris.

3 Slide the new or cleaned filter into the air intake duct adaptor.

4 Turn **ON** power to the water heater at the circuit breaker/ fuse box.

NOTICE: The water heater may conduct a system diagnostic prior to operation.

Evaporator Coil Maintenance

The evaporator coils may accumulate dust, dirt and debris if adequate air flow is not allowed through the air intake and exhaust ports of the water heater. Check the evaporator coils and clean as needed to maintain optimal operation of the heat pump. Follow the procedure below to keep the evaporator coils clean and free of debris.

NOTICE: Before attempting to clean the evaporator coils, inspect the air filter on the air intake duct adapter. Clean if necessary. Confirm there are no blockages at the air intake or exhaust ports.

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1. Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2. Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3. Remove the Phillips head screw from the control assembly and set it aside in a safe place. If equipped, disconnect the automatic cold water shut-off valve connector from the side of the control assembly and place it out of the way.

4. Shift the control assembly up and away from the water heater shroud.

5. Disconnect all six (6) connectors from the control assembly board and set it aside in a safe place.

6. Open a hot water faucet and let the hot water run until it is cool.

7. Turn the cold water supply valve **OFF**.

8. Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

9. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

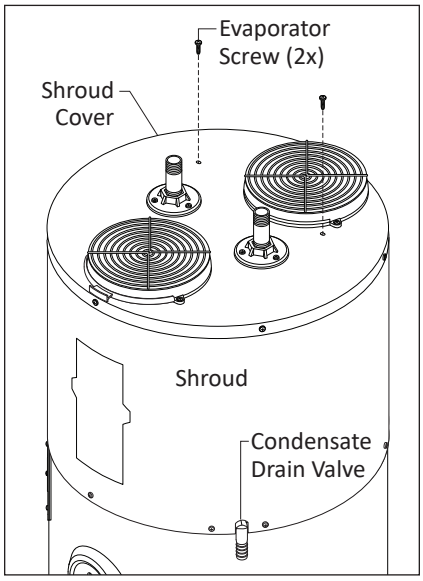


Figure 9 - Evaporator Screws

10. Locate and remove the eight (8) screws around the bottom perimeter of the shroud.

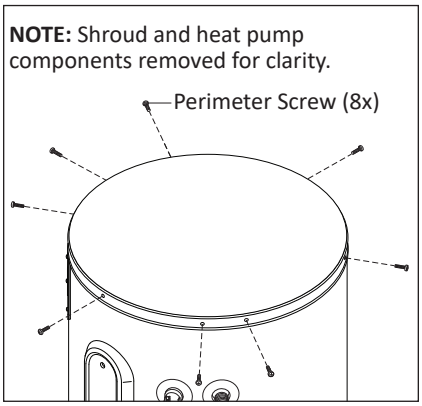


Figure 10 - Perimeter Screws

11. Lift the shroud up and over top nipple connections. Remove shroud completely, or prop it up such that access to the evaporator assembly is available.

12. Inspect the evaporator coils for dust, dirt or other debris. If debris is present, use a soft tip brush or fin comb to gently remove any debris.

IMPORTANT: Use caution when cleaning evaporator fins. Damaging the fins may impact the efficiency and performance of the water heater.

13. Once debris has been removed, spray coils using evaporator coil cleaner. Rinse cleaner with a spray bottle and water even when using non-rinse coil cleaner.

14. Dry any liquid and remove all leftover debris found in the condensate drain pan. If debris is present it can block drainage through the condensate hose.

NOTICE: In the event of a blockage, the control assembly will display error code 081 indicating the overflow switch in the condensate drain pan has been tripped.

15 Set shroud back into place and secure to heater with the eight (8) perimeter screws previously removed in **Step 10**.

16 Fasten the shroud cover to the evaporator with the two (2) screws previously removed in **Step 9**.

17 Reconnect cold water supply and hot water supply connections at top of unit.

NOTICE: Inspect gaskets in flex hoses and confirm they are fully seated before reconnecting cold water supply and hot water supply.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

18 Reconnect any ducting to the intake and exhaust duct adaptors.

19 Locate the control assembly previously set aside in **Step 5**. Make all wire connections.

20 Insert the bottom lip of the control assembly into the opening of the water heater shroud and shift down. Use the guides on the control assembly to properly seat the control into place.

21 Reinstall the Phillips head screw removed in **Step 3** into top of control assembly. If equipped, reconnect the automatic cold water shut-off valve.

22 Turn the cold water supply valve **ON**.

23 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Check/Reset Energy Cut Off Button (ECO)

The Energy Cut Off (ECO) shuts off power to the water heater's elements if the temperature of the water in the tank gets too hot. If the ECO has tripped, you will have no hot water. A tripped ECO can usually be reset. Investigate the cause of the overheating and repair the problem. Do not turn the power back on until the cause of the overheating has been identified and repaired.

To check the Energy Cut Off (ECO):

- Turn **OFF** power to the water heater.
- Press the red ECO reset button (see Figure 11).

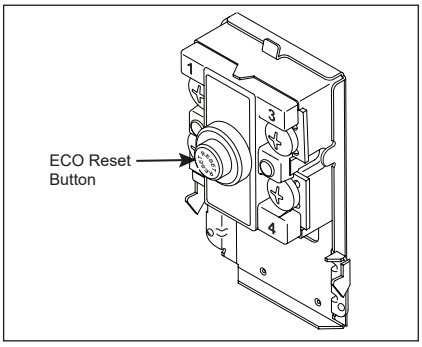


Figure 11 - ECO

- The ECO was tripped if you hear a click when it is reset. In most cases a tripped ECO indicates that the tank overheated due to a problem with one of the elements. Check the upper and lower elements and replace if necessary (see page 18).
- The ECO was not tripped if you do not hear a click. In that case, verify power to the upper terminals. If there is power, check power to the lower terminals of the ECO. If there is no power to the lower terminals, replace the ECO.

Replacing ECO

Removing ECO

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

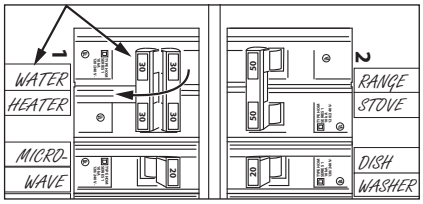


Figure 12 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the upper access panel on the water heater by removing the two (2) Phillips head screws. Pull the upper access panel away from the water heater. Carefully fold back the insulation and remove the plastic personnel protector.

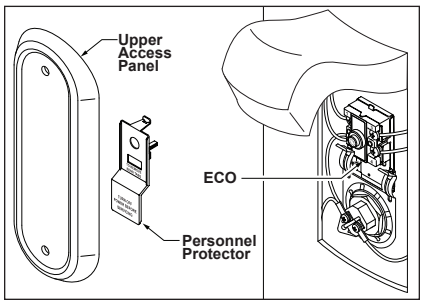


Figure 13 - Remove Upper Access Panel and Personnel Protector.

4 Mark the wires with tape so you will know how to attach them to the new ECO.

5 Use a Phillips screwdriver to loosen the four (4) screws that secure the wires to the ECO. Slide wires out from terminals.

6 Use a flat head screwdriver to pull clips outward on each side of mounting clip. Slide ECO upward and remove from mounting clip.

7 The replacement ECO should match the original ECO.

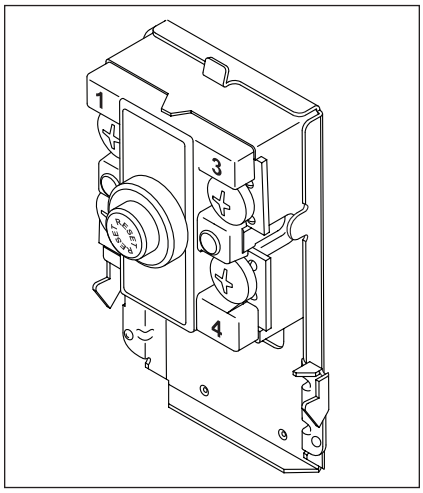


Figure 14 - Replacement ECO Should Match Original ECO

Installing New ECO

8 Place the back of the replacement ECO against the tank, just above the mounting clip. Slide the ECO downward until the clips snap over the tabs, securing the ECO in place.

9 Make sure the new ECO fits snugly against the tank. You should **NOT** be able to slip a business card between the ECO and tank. If needed, you can bend the mounting clip until the ECO fits tightly against the tank.

10 Attach the wires following the diagram below. Make sure all wire connections are tight. Tighten the four (4) Phillips head screws to secure wires to ECO.

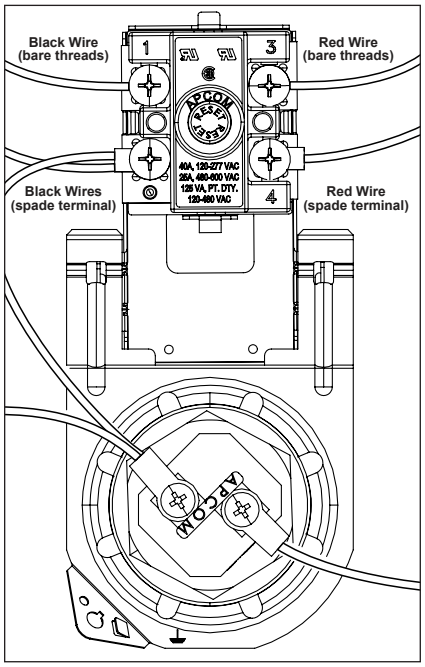


Figure 15 - ECO Wiring

11 Replace the plastic personnel protector and insulation. Reinstall the upper access panel to the water heater using the two (2) Phillips head screws.

12 Replace the cover on the electrical junction box.

13 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Anode

Removing Anode Rod

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

NOTICE: The anode rod may be removed through the air intake port if overhead clearance is sufficient. The manufacturer recommends using a 1-1/16” socket wrench with a 20" extension if removing the anode rod through the air intake port.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

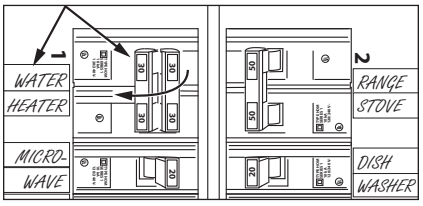


Figure 16 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4 Turn the cold water supply valve **OFF**.

5 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

6 Open the drain valve on the water heater.

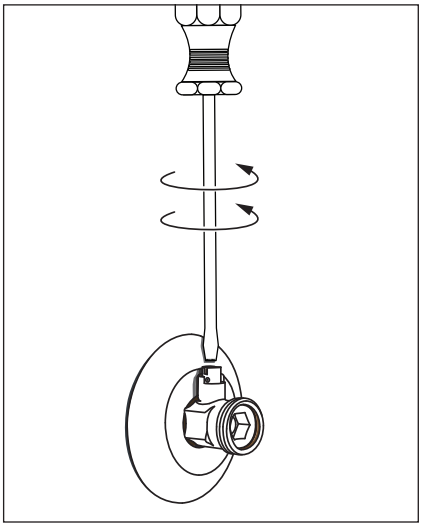


Figure 17 - Opening Drain Valve

7 Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and proceed to the next step.

8 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

⚠ CAUTION! Residual water pressure may still be present in the water lines and tank.

9 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

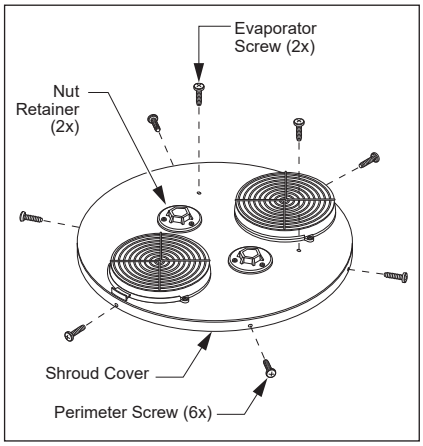


Figure 18 - Removing Shroud Cover

10 Lift the shroud cover up and away from the unit to gain access to the anode rod.

11 Once the anode rod is exposed, remove the top nut with a 10 mm hex socket wrench and remove the wire terminal (**DO NOT** remove the lower hex nut from bolt).

Place top nut aside in a safe place to reuse later with new anode rod.

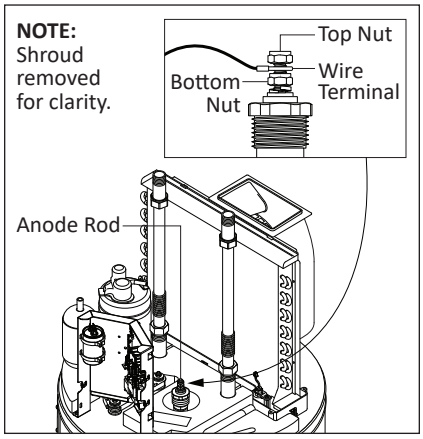


Figure 19 - Anode Access

12 With the wire terminal removed, use a 1-1/16" socket wrench with an extension to remove the anode rod. Inspect the anode rod and replace if depleted.

Installing New Anode Rod

13 Apply thread sealant tape or pipe joint compound to the threads of the replacement anode rod and install. Tighten the anode rod with the 1-1/16" socket wrench.

14 Connect the wire terminal and secure with top nut set aside in **Step 11** (requires 10 mm hex socket).

15 Install shroud cover to water heater by following the instructions outlined in **Step 9** in reverse order.

16 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

NOTICE: DO NOT restore power back to the water heater unless the tank is completely full of water.

17 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three (3) minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

18 Remove the three (3) screws securing intake duct adaptor (closest to front side of water heater) to shroud cover. Lift intake duct adaptor up and away from shroud cover to visually inspect for leaks around the anode fitting and water connections. If there are no leaks, proceed to **Step 19**. If there is a leak, turn **OFF** water supply to the water heater, open a faucet to eliminate pressure, and tighten the anode rod further. Return to **Step 17**.

19 Install intake duct adaptor to shroud cover and secure with three (3) screws. Reconnect any ducting to the intake and exhaust adaptors.

If equipped, reconnect the automatic cold water shut-off valve.

20 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Smart Valve

Accessing Smart Valve

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

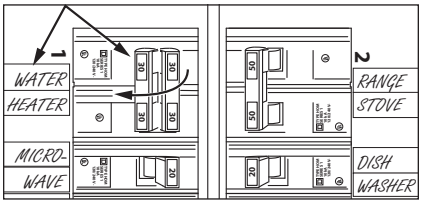


Figure 20 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4 Turn the cold water supply valve **OFF**.

5 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

6 Open the drain valve on the water heater.

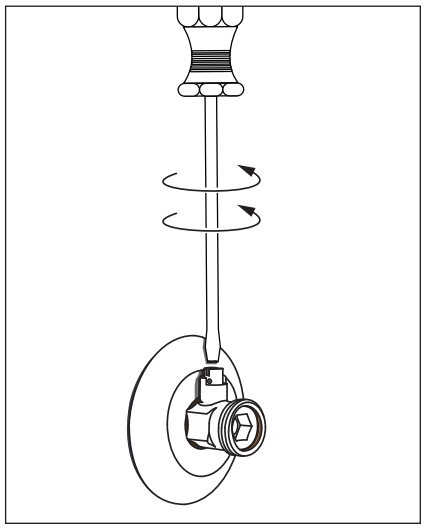


Figure 21 - Opening Drain Valve

7 Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and proceed to the next step.

8 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

⚠ CAUTION! Residual water pressure may still be present in the water lines and tank.

9 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

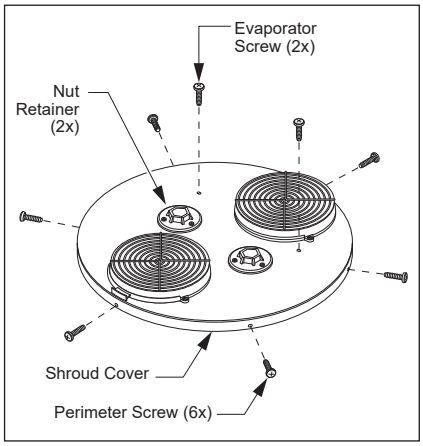


Figure 22 - Removing Shroud Cover

10 Lift the shroud cover up and away from the unit to gain access to the Smart Valve.

Removing Smart Valve Assembly

11 Disconnect the 8 pin wire harness located on top of Smart Valve as shown in Figure 23. Place wires aside in a safe location so they are not damaged.

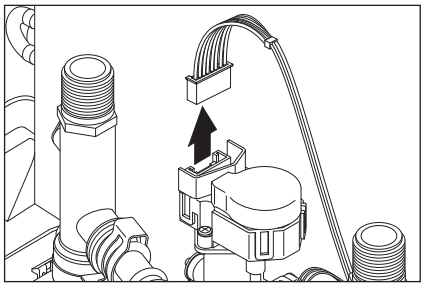


Figure 23 - Disconnecting 8 Pin Wire Harness

12 Disconnect the 3 pin wire harness. Connector will be located near the cold water supply opposite from Smart Valve as shown in Figure 24. Place wires aside in a safe location so they are not damaged.

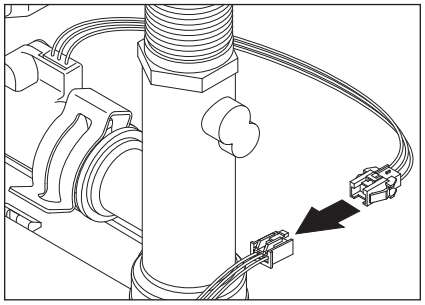


Figure 24 - Disconnecting 3 Pin Wire Harness

13 Remove the two (2) spring clips securing Smart Valve to cold t-nipple and flex hose to hot t-nipple.

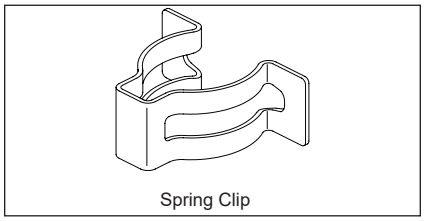


Figure 25 - Spring Clip

⚠ CAUTION! Water may still be present in the valve and flex hose assembly. Place a rag under the flex hose and valve connection points to prevent water from escaping into the heat pump compartment.

14 Gently remove Smart Valve and flex hose from hot and cold t-nipples.

15 Properly dispose of Smart Valve, flex hose and spring clips.

Replacing Smart Valve Assembly

NOTICE: DO NOT reuse old spring clips and O-rings. Use new spring clips and O-rings provided in kit.

16 Remove new flex hose from service kit. Carefully bend flex hose to allow for easy connection to Smart Valve and hot t-nipple as shown in Figure 26.

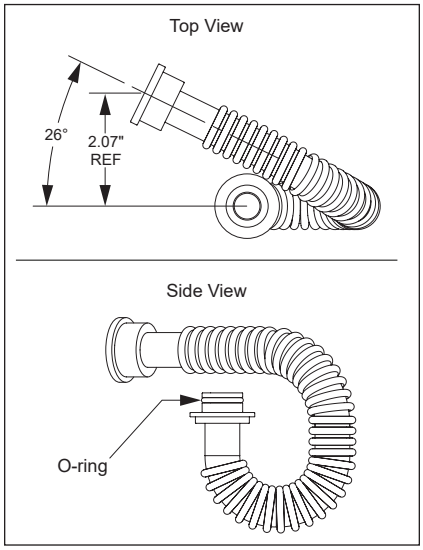


Figure 26 - Bending the Flex Hose

17 Remove new Smart Valve from service kit. Install male end of flex hose with small O-ring (14.5mm) to Smart Valve outlet as shown in Figure 27.

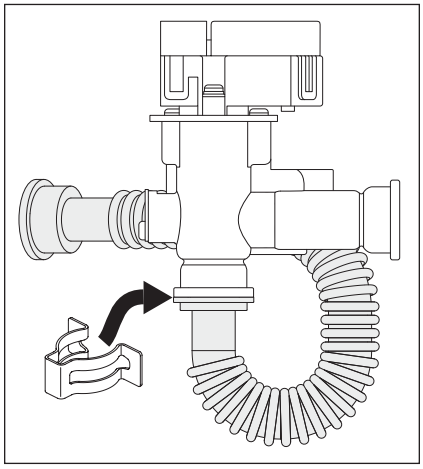


Figure 27 - Installing Flex Hose to Smart Valve

NOTICE: Inspect flex hose O-ring for damage or debris. Handle with care and verify lubricant has been applied to O-ring.

18 Remove one (1) spring clip from kit. Install spring clip over Smart Valve outlet and flex hose to secure the assembly as shown in Figure 27.

19 Remove O-rings installed to hot and cold t-nipples and replace with large O-rings (15.5mm) provided in kit.

NOTICE: Handle with care and verify lubricant has been applied to O-rings.

20 Carefully install Smart Valve inlet to cold t-nipple. Remove one (1) spring clip from kit. Install spring clip over Smart Valve inlet and cold t-nipple to secure Smart Valve.

21 Carefully install female end of flex hose to hot t-nipple. Remove final spring clip from kit. Install spring clip over flex hose and hot t-nipple to secure flex hose.

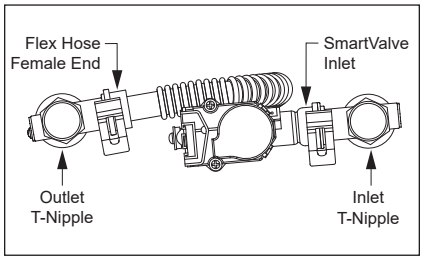


Figure 28 - Smart Valve & Hose Orientation

22 Locate the 3 pin wire harness connector previously set aside in **Step 12** and connect it to the 3 pin wire harness connector on new Smart Valve assembly.

23 Locate the 8 pin wire harness previously set aside in **Step 11** and connect to Smart Valve assembly.

NOTICE: Confirm all wire connections are tight and oriented such that they will not interfere with other components.

Checking for Leaks

24 Install shroud cover to water heater by following the instructions outlined in **Step 9** in reverse order.

25 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

NOTICE: DO NOT restore power back to the water heater unless the tank is completely full of water.

26 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three (3) minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

27 Remove the three (3) screws securing intake duct adaptor (closest to front side of water heater) to shroud cover. Lift intake duct adaptor up and away from shroud cover to visually inspect for leaks around Smart Valve, flex hose and t-nipples. If there are no leaks, proceed to **Step 28**.

If there is a leak, turn **OFF** water supply to the water heater and open a faucet to eliminate pressure. Remove supply connections and shroud cover using the instructions outlined in **Steps 8 & 9**. Check that all water connections are tight and confirm spring clips are properly installed. Return to **Step 24**.

Returning Heater Back To Normal Operation

28 Install intake duct adaptor to shroud cover and secure with three (3) screws. Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

29 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

Replacing Control Assembly

Removing Control Assembly

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

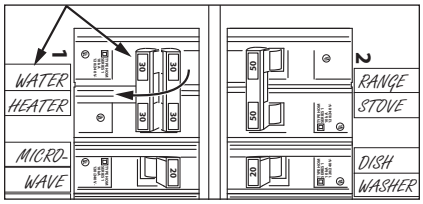


Figure 29 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the Phillips head screw from the control assembly and set it aside to be used with the new control assembly. If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way (see Figure 32 on page 29).

4 Shift the control assembly up and away from the heat pump shroud.

5 Disconnect all six (6) connectors from the control assembly board. Properly dispose of damaged control assembly.

Installing New Control Assembly

6 Reconnect all six (6) connectors to the new control assembly by snapping them into place (see Figure 32 on page 29 for pin connector locations).

7 Insert the bottom lip of the control assembly into the opening of the heat pump shroud and shift down. Use the guides on the control assembly to properly seat the control into place.

8 Reinstall the Phillips head screw removed in **Step 3** into the top of the control assembly. If equipped, reconnect the automatic cold water shut-off valve.

9 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Configuring New Control Assembly for Wi-Fi & Bluetooth Connectivity

This water heater comes equipped with the iCOMM™ remote monitoring system. It allows users to monitor critical operations and diagnose issues remotely using the manufacturer's water heater app (available for iOS and Android).

To configure the new control assembly for Wi-Fi & Bluetooth connectivity, you will need to contact our Technical Assistance Hotline to update the new controller Device Serial Number (DSN).

10 To locate the DSN value, use a Phillips screwdriver to remove the two (2) screws securing the face plate to the control assembly.

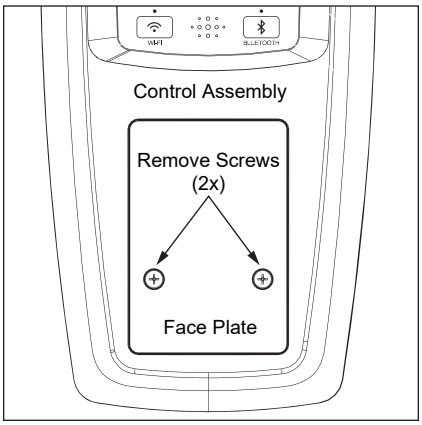


Figure 30 - Removing Face Plate Screws (2x)

11 Remove the face plate to reveal the DSN value printed below the QR code. Make note of the DSN value, along with the water heater model number and serial number located on the water heater rating plate.

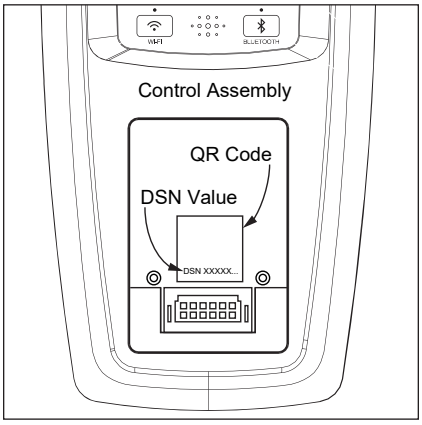


Figure 31 - Identifying DSN Value

Technical Service Note: For instructions on pairing the new DSN value with the water heater, see pages 68-69 in the "A.O. Smith App Setup and Connectivity" section of this Service Handbook.

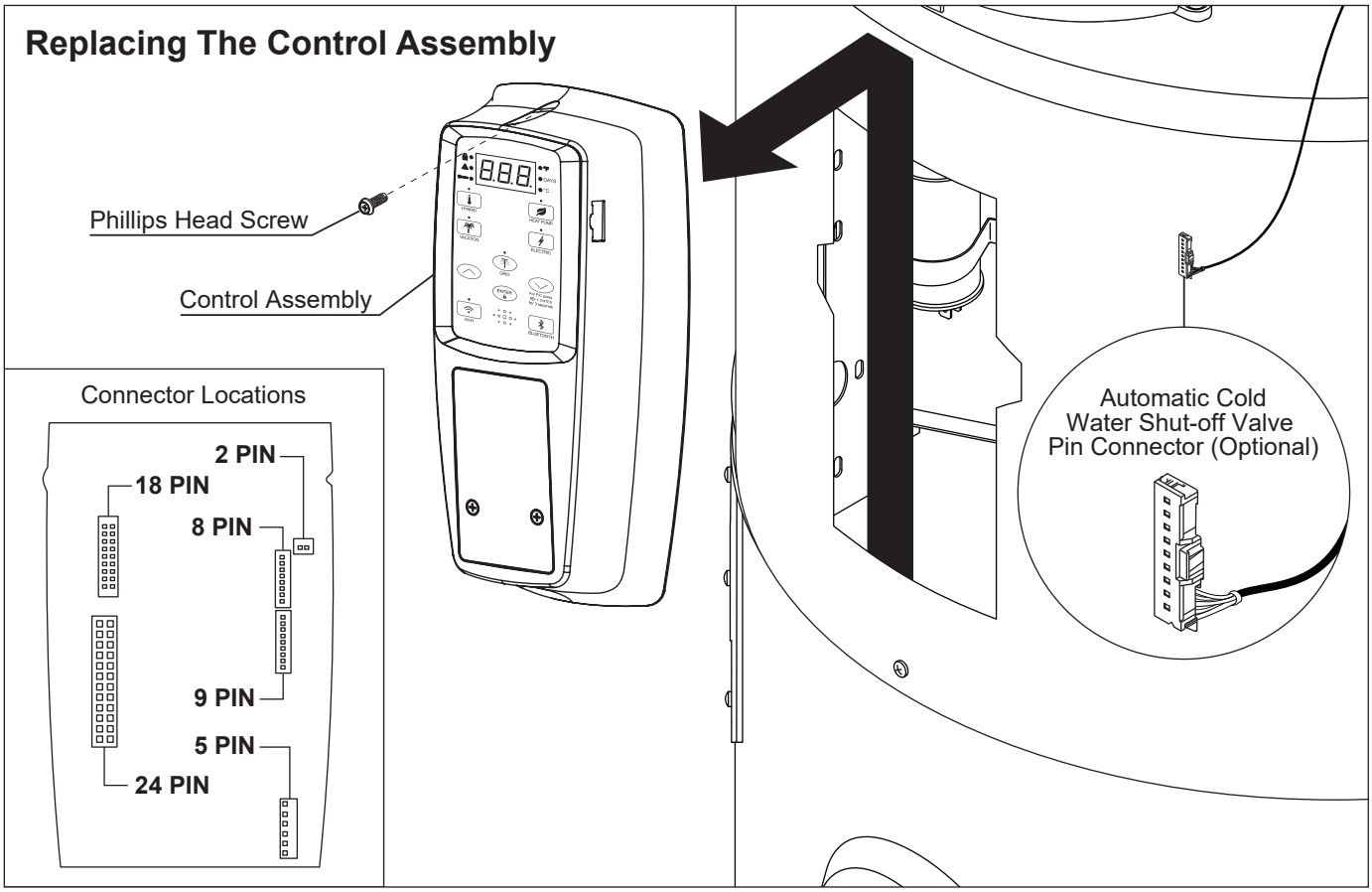


Figure 32 - Replacing the Control Assembly

Replacing Daughter Board

Removing Daughter Board

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

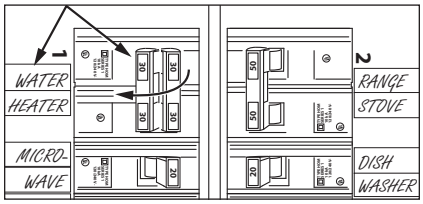


Figure 33 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the Phillips head screw from the control assembly and set it aside in a safe place. If equipped, disconnect the automatic cold water shut-off valve connector from the side of the control assembly and place it out of the way.

4 Shift the control assembly up and away from the heat pump shroud.

5 Disconnect all six (6) pin connectors from the control assembly board and set it aside in a safe place.

6 Locate the daughter board on the right side of the bracket facing the opening in the heat pump shroud.

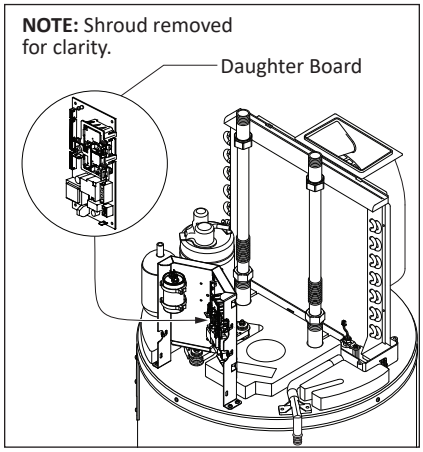


Figure 34 - Locate the Daughter Board

7 Use a Phillips screwdriver to loosen the three (3) screws securing the **RED**, **BLUE** and **WHITE** wires to relay. Slide wires out from relay terminals.

IMPORTANT! Note orientation of wires as show below in Figure 35. Failure to reconnect wires properly may trigger a dry-fire fault even if the tank is full of water. In the event this occurs, the control assembly will display error code **001**.

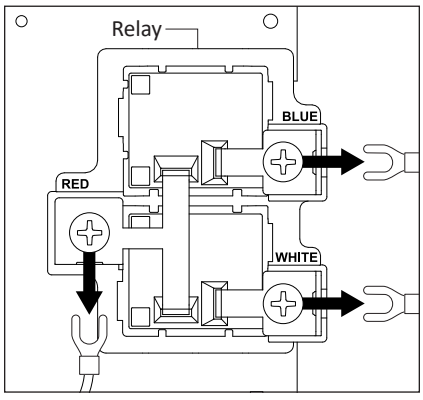


Figure 35 - Disconnect Relay Wires

8 Disconnect the four (4) pin connectors located on the left side of the board, the power connector located on the right side of the board (red wires), and the spade terminal located on the bottom of the board (black wire).

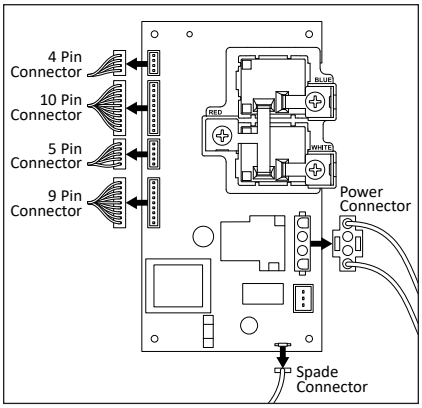


Figure 36 - Disconnect Remaining Wires

NOTICE: Mark the wires with tape so you will know how to attach them to the replacement board.

9 Use a Phillips screwdriver to remove the four (4) screws securing the board to the bracket. Carefully remove any washers or spacers seated between the board and bracket. Discard old hardware and use only new hardware provided in kit to install replacement board to bracket.

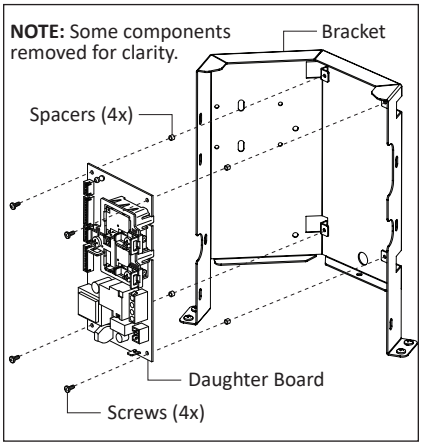


Figure 37 - Remove the Daughter Board

NOTICE: Some boards may be affixed to bracket using one (1) screw and three (3) snap-in spacers. Remove snap-in spacers from bracket before installing replacement board.

Installing New Daughter Board

10 Using the spacers and screws provided in the kit, gently thread screws through the four (4) corner holes in replacement board. Slide spacers onto screw threads from backside of board.

11 Place the board against the bracket and begin to thread screws into bracket holes, alternating between the four corners. **DO NOT** overtighten.

NOTICE: Be careful not to drop spacers between board and bracket during installation.

12 Once the board is installed to the bracket, begin reconnecting all connections removed in **Step 7** and **Step 8**.

IMPORTANT! Confirm wires are properly connected to terminals on relay as shown in Figure 35.

13 Locate the control assembly previously set aside. Reconnect the six (6) pin connections removed in **Step 5**.

14 Slide control assembly back in place. Locate the screw set aside in **Step 3**. Replace screw to secure control assembly to heat pump shroud. If equipped, reconnect the automatic cold water shut-off valve connector into side of control assembly.

15 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Diptube

Removing Diptube

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

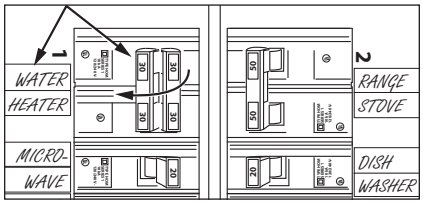


Figure 38 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4 Turn the cold water supply valve **OFF**.

5 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

6 Open the drain valve on the water heater.

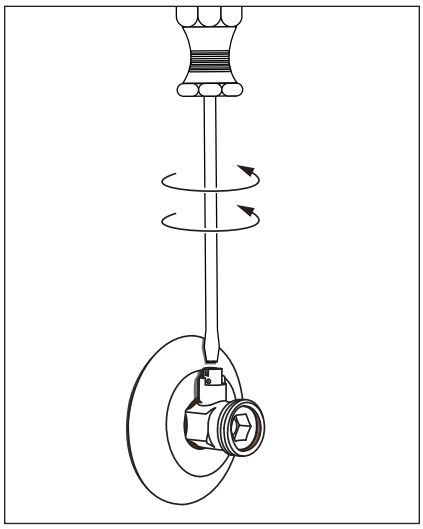


Figure 39 - Opening Drain Valve

7 Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and proceed to the next step.

8 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

⚠ CAUTION! Residual water pressure may still be present in the water lines and tank.

9 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

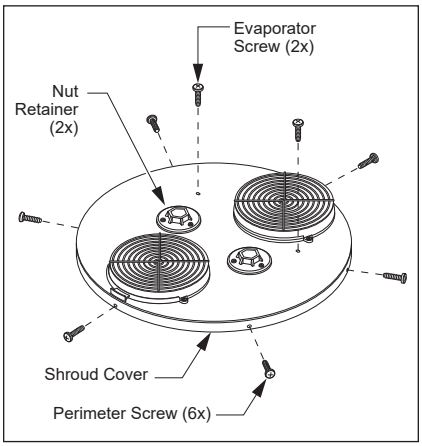


Figure 40 - Removing Shroud Cover

10 Lift the shroud cover up and away from the unit to gain access to cold water inlet connection on right side of the tank.

11 Once cold water inlet connection is exposed, use a pipe wrench and adjustable wrench to remove flex hose from nipple on right side of tank.

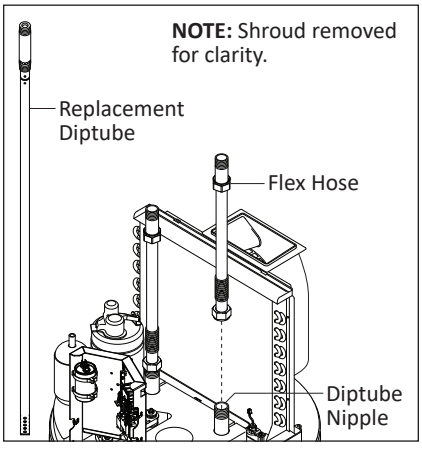


Figure 41 - Diptube Access

12 With flex hose removed, use a pipe wrench and adjustable wrench to remove diptube nipple on right side of tank. Discard old diptube.

Installing New Diptube

13 Apply thread sealant tape to nipple on replacement diptube. Slide diptube into tank opening where the previous diptube was removed and turn clockwise until tight. Use an adjustable wrench to tighten one additional half-turn. **DO NOT** overtighten.

14 Inspect gaskets in flex hoses and confirm they are fully seated. Place the flex hose back onto the diptube nipple at the tank. Hand tighten flex hose fitting, then use an adjustable wrench to tighten one additional half-turn. **DO NOT** overtighten.

15 Install shroud cover to water heater by following the instructions outlined in **Step 9** in reverse order.

NOTICE: Flex hose connections must be aligned with nut retainers to install shroud cover to shroud. Adjust flex hoses accordingly.

16 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

NOTICE: DO NOT restore power back to the water heater unless the tank is completely full of water.

17 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three (3) minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

18 Remove the three (3) screws securing intake duct adaptor (closest to front side of water heater) to shroud cover. Lift intake duct adaptor up and away from shroud cover to visually inspect for leaks around the water connections. If there are no leaks, proceed to **Step 19**. If there is a leak, turn **OFF** water supply to the water heater, and open a faucet to eliminate pressure.

Remove flex hose and diptube following the instructions outlined in **Steps 9-12**, and inspect gaskets and nipple threads for damage or debris. Proceed to **Step 13**.

19 Install intake duct adaptor to shroud cover and secure with three (3) screws. Reconnect any ducting to the intake and exhaust adaptors.

If equipped, reconnect the automatic cold water shut-off valve.

20 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Run Capacitor

Checking Capacitance

Follow the procedure below to determine if capacitance is within the specified range listed on the run capacitor: **12 microfarads ± -5%**

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

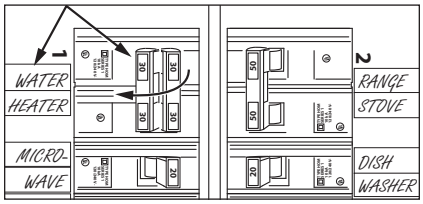


Figure 42 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the Phillips head screw from the control assembly and set it aside in a safe place. If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

4 Shift the control assembly up and away from the heat pump shroud.

5 Disconnect all six (6) pin connectors from the control assembly board and set it aside in a safe place.

6 Locate the run capacitor on the left side of bracket facing the opening in the heat pump shroud.

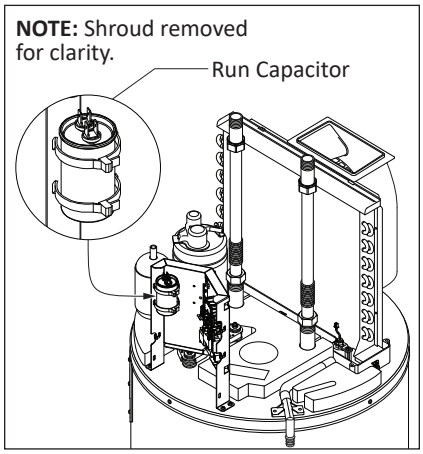


Figure 43 - Locate Run Capacitor

7 Use needle-nose pliers to carefully disconnect wires from run capacitor terminals.

⚠ WARNING! The run capacitor may still be charged and needs to be discharged. It is important to follow the procedure outlined in Steps 8 and 9 to dissipate the energy from the run capacitor.

8 Attach one end of the lead to one terminal with an alligator clip. Attach the other end of the lead to the blade of a well insulated screwdriver.

9 Touch the tip of the screwdriver to one of the terminals on the run capacitor and hold it there for approximately 20 seconds.

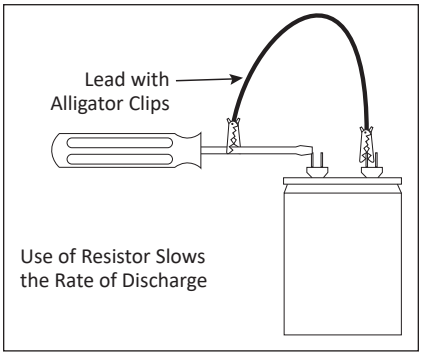


Figure 44 - Discharge Run Capacitor

10 Using a multimeter, attach the leads to the two (2) terminals located on the run capacitor and set the multimeter to read "capacitance." Take measurements at the multimeter 2-3 times, swapping the leads across the terminals located on the run capacitor.

11 Determine if average capacitance is within the specified range listed on the run capacitor: **12 microfarads ± -5%**

If the capacitance is in range, follow **Steps 1-7** in reverse order to restore power back to the water heater.

If the capacitance is out of range, use the following procedure to replace the run capacitor.

Removing Run Capacitor

12 Locate the two (2) cable ties affixing the run capacitor to the bracket. Use cutting pliers to cut cable ties and remove run capacitor from bracket. Properly dispose of run capacitor and cable ties.

Installing New Run Capacitor

13 Secure replacement run capacitor to bracket with the two (2) cable ties provided in the kit.

14 Connect wires to the replacement run capacitor as shown in the figure below.

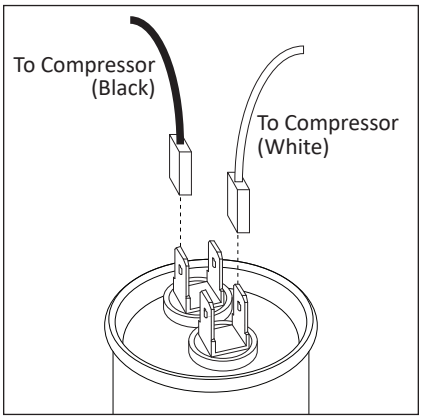


Figure 45 - Connect Wires to Run Capacitor

15 Reinstall control assembly to heat pump shroud by following the procedure outlined in **Steps 3-5** in reverse order.

16 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Power Cord (120V units only)

Accessing the Junction Box

1 Locate the circuit breaker providing power to water heater and turn it **OFF** (or remove the circuit's fuses). Once the circuit breaker has been turned off, disconnect the water heater's 120V power cord from wall outlet.

2 Locate the electrical junction box on the side of the water heater. Remove the one (1) screw securing the bottom cover to the junction box. Remove bottom cover and set aside in a safe place. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the two (2) screws securing the top cover to junction box. Gently pull the top cover away from junction box.

4 Inspect and take note of wire arrangement in the junction box for proper reconnection (see Figure 46).

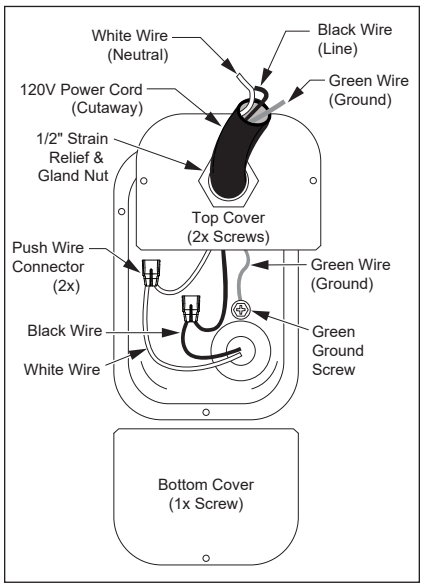


Figure 46 - 120V Power Cord Wire Diagram

Removing Power Cord

5 Locate the push wire connector joining the power cord's white wire (neutral) to the water heater's white wire. Cut the wires at the connector to remove them (see Figure 47). Properly dispose of wire connector.

6 Locate the push wire connector joining the power cord's black wire (line) to the water heater's black wire. Cut the wires at the connector to remove them (see Figure 47). Properly dispose of wire connector.

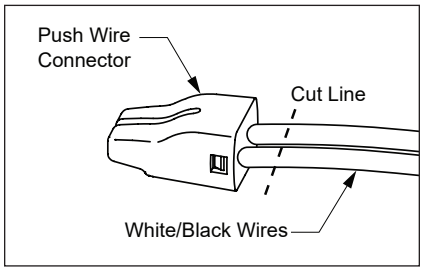


Figure 47 - Cut Wires at Push Connectors

7 Use a Phillips screwdriver to loosen the green ground screw and disconnect the power cord's green wire (ground).

8 Loosen gland nut from strain relief (see Figure 48). Once the gland nut has been loosened, carefully pull the power cord through the gland nut, strain relief, top cover and retaining nut. Be careful not to drop components after removing the power cord.

Properly dispose of power cord.

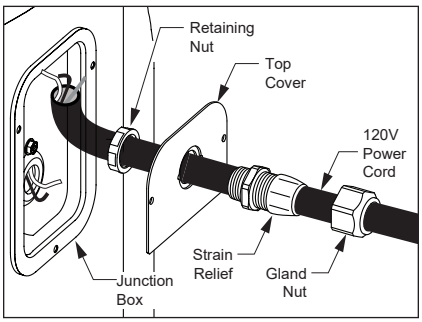


Figure 48 - Remove Power Cord from Strain Relief

Installing New Power Cord

9 Locate new power cord and lever wire connectors provided in kit.

10 Slide power cord through strain relief assembly components as shown in Figure 48 above.

11 Secure the retaining nut and strain relief to the top cover. Keep the gland nut loose to adjust the amount of slack needed to allow for proper wire connection at the junction box (see Figure 49).

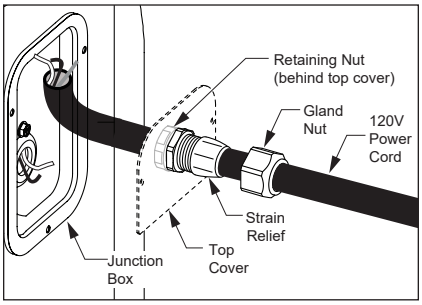


Figure 49 - Install Power Cord Through Strain Relief

12 Connect the power cord's green wire to the ground terminal and tighten the green ground screw.

13 Strip end of insulation from the water heater's black wire previously cut in **Step 6**. Locate one (1) lever wire connector provided in the kit and join the power cord's black wire and the water heater's black wire. Confirm connections are secure and tight (see Figure 50).

14 Strip end of insulation from the water heater's white wire previously cut in **Step 5**. Locate one (1) lever wire connector provided in the kit and join the power cord's white wire and the water heater's white wire. Confirm connections are secure and tight (see Figure 50).

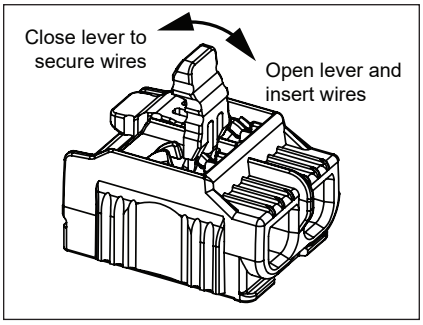


Figure 50 - Lever Wire Connector Operation

15 Once all connections have been secured, adjust power cord through strain relief such that it sits snuggly inside the junction box.

IMPORTANT! Outer insulation jacket of power cord shall protrude no more than 1 inch through strain relief into junction box. Following this guideline will allow for easy reinstallation of junction box covers and will help reduce the risk of electrical fire hazard.

16 Install the top cover to the junction box using the screws previously removed in **Step 3**.

17 Tighten the gland to secure the power cord in place.

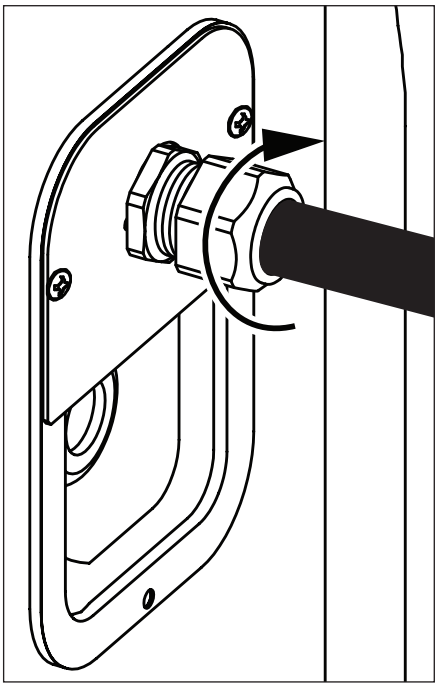


Figure 51 - Tighten Gland Nut & Secure Power Cord

IMPORTANT! Confirm power cord is fully seated in strain relief and that no wires are exposed. When properly installed, the strain relief will protect the power cord and junction box from exposure to debris and water damage.

18 Install the bottom cover to the junction box using the screw previously removed in **Step 2**.

Returning Heater Back To Normal Operation

19 Restore power to the water heater at the circuit breaker (or replace the circuit's fuses).

20 Plug the power cord into the appropriate 120V wall outlet.

21 The water heater is now ready for normal operation. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section in the manual provided with the water heater.

Replacing Condensate Drain Valve

Removing Condensate Drain Valve

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

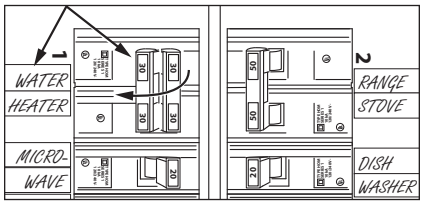


Figure 52 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the Phillips head screw from the control assembly and set it aside in a safe place. If equipped, disconnect the automatic cold water shut-off valve connector from the side of the control assembly and place it out of the way.

4 Shift the control assembly up and away from the water heater shroud.

5 Disconnect all six (6) pin connectors from the control assembly board and set it aside in a safe place.

6 Open a hot water faucet and let the hot water run until it is cool.

7 Turn the cold water supply valve **OFF**.

8 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

9 Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

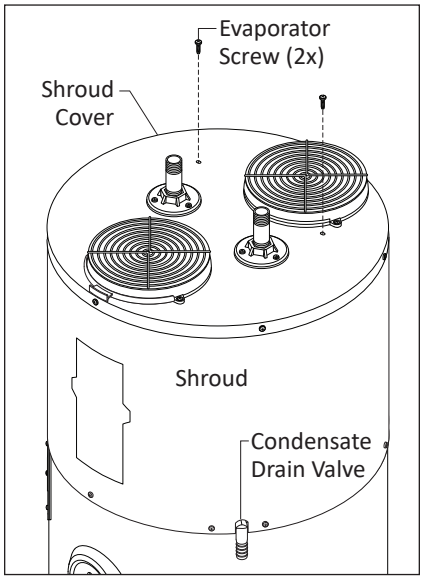


Figure 53 - Evaporator Screws

10 Locate and remove the eight (8) screws around the bottom perimeter of the shroud.

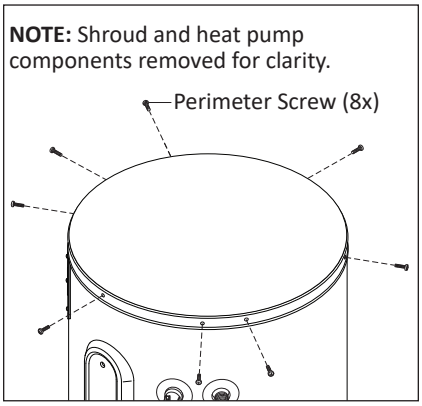


Figure 54 - Perimeter Screws

11 Lift the shroud up and over top nipple connections. Remove shroud completely, or prop it up such that access to condensate drain valve is available.

12 Remove condensate hoses from both ends of condensate drain valve.

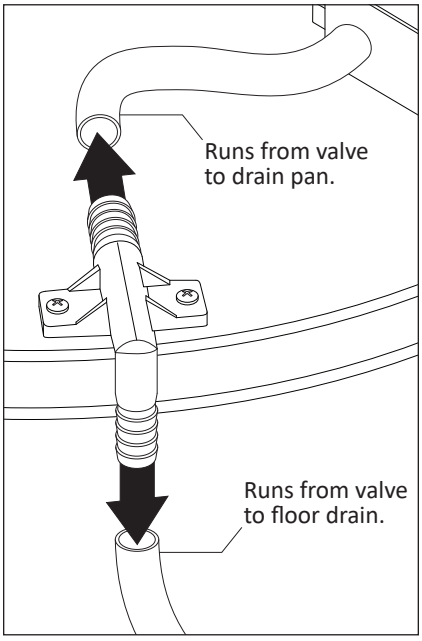


Figure 55 - Remove Condensate Drain

13 Use a Phillips screwdriver to remove the two (2) screws securing condensate drain valve to heater. Remove condensate drain valve and dispose of properly.

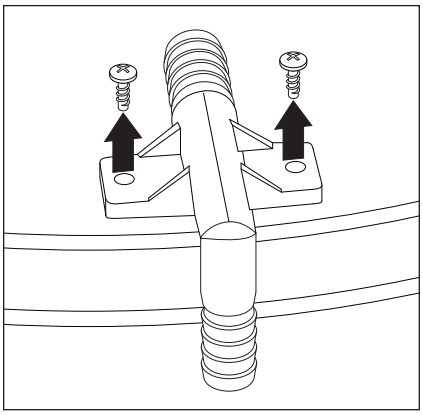


Figure 56 - Remove Condensate Drain Valve

Installing New Condensate Drain Valve

14 Orient new condensate drain valve such that it directly aligns with screw holes. Use the new hardware provided in service kit to install condensate drain valve to heater. **DO NOT** use old hardware previously removed.

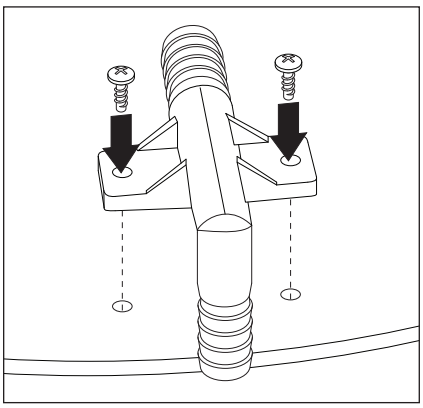


Figure 57 - Installing Condensate Drain Valve

15 Attach condensate hoses to both ends of new condensate drain valve, making sure hoses fully cover the barbed ends of the condensate drain valve.

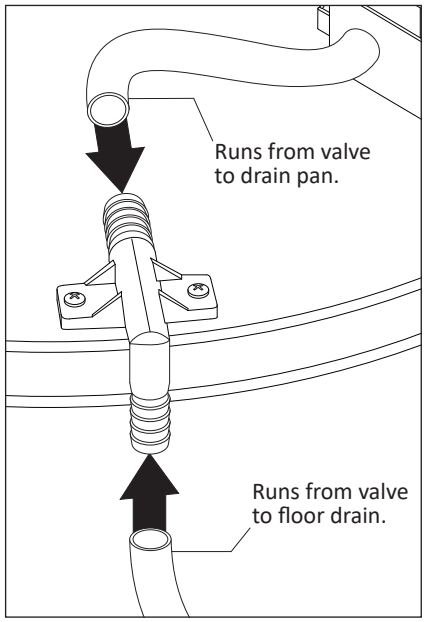


Figure 58 - Attach Condensate Hoses

16 Set shroud back into place and secure to heater with the eight (8) perimeter screws previously removed in **Step 10**.

17 Fasten the shroud cover to the evaporator with the two (2) screws previously removed in **Step 9**.

18 Reconnect cold water supply and hot water supply connections at top of unit.

NOTICE: Inspect gaskets in flex hoses and confirm they are fully seated before reconnecting cold water supply and hot water supply.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

19 Reconnect any ducting to the intake and exhaust duct adaptors.

20 Locate the control assembly previously set aside in **Step 5**. Make all wire connections.

21 Insert the bottom lip of the control assembly into the opening of the water heater shroud and shift down. Use the guides on the control assembly to properly seat the control into place.

22 Reinstall the Phillips head screw removed in **Step 3** into top of control assembly. If equipped, reconnect the automatic cold water shut-off valve.

23 Turn the cold water supply valve **ON**.

24 Check for leaks. If leaks are present in the system, turn the cold water supply valve **OFF**, disconnect water connections (**Step 8**), and inspect connections for damage or debris. Reconnect water connections as instructed in **Step 18** and turn the cold water supply valve **ON**.

25 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Condensate Drain Switch

Accessing Condensate Drain Switch

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

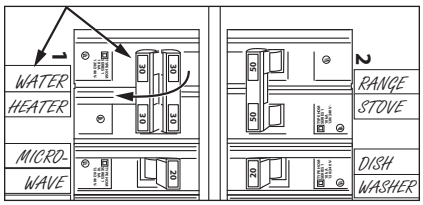


Figure 59 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Turn the cold water supply valve **OFF**.

4 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

5 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

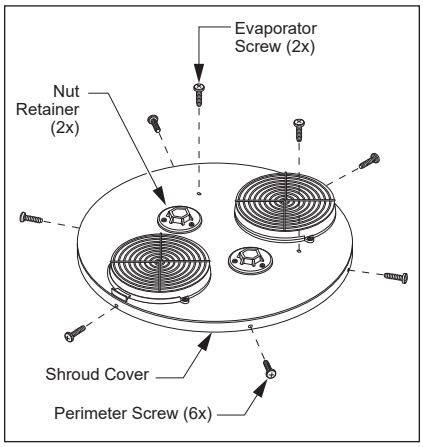


Figure 60 - Removing Shroud Cover

6 Lift the shroud cover up and away from the unit to gain access to the condensate drain switch.

Removing Condensate Drain Switch

7 Locate condensate switch assembly (see Figure 61).

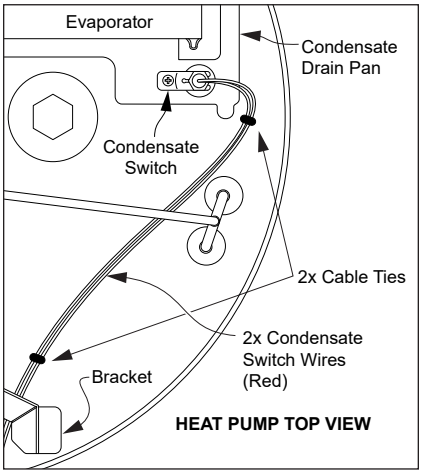


Figure 61 - Locating Condensate Drain Switch

8 Use a Phillips screwdriver to remove bracket screw securing condensate switch to the condensate drain pan fixture.

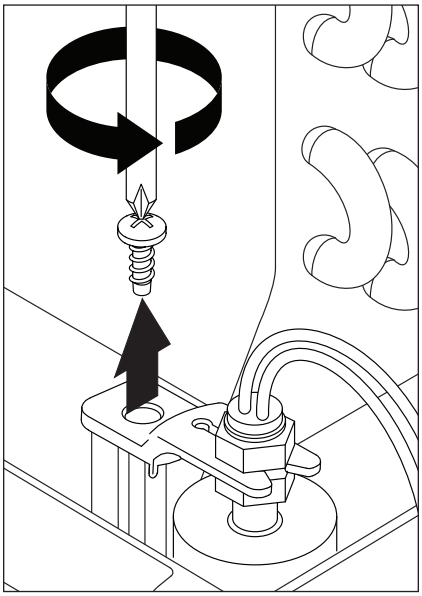


Figure 62 - Removing Condensate Switch

NOTICE: Condensate switch may be factory installed facing the opposite orientation. Position new condensate switch as shown in Figures 62 & 65.

9 Remove the Phillips head screw from the control assembly and set it aside in a safe place.

10 Shift the control assembly up and away from the water heater shroud.

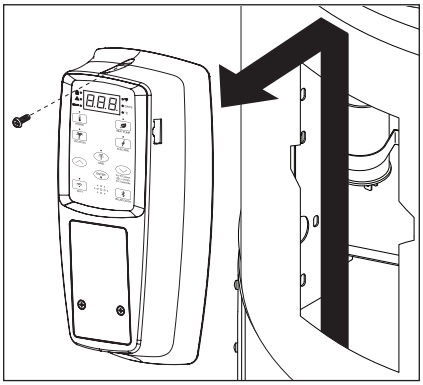


Figure 63 - Removing Control Assembly

11 Disconnect the condensate switch wires from the J1 control board terminal located behind the control assembly (see Figure 64).

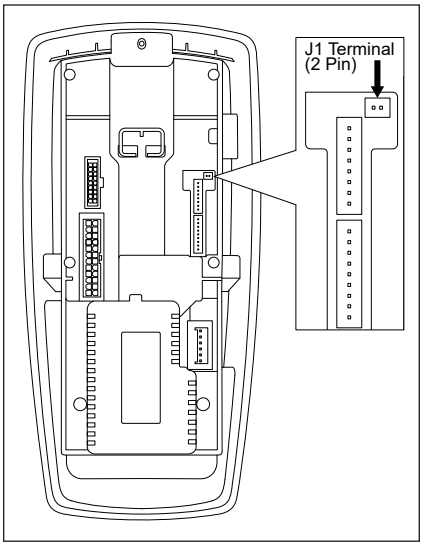


Figure 64 - Locating J1 Terminal on Control Board

12 Trace the wires back to the condensate switch and remove any cable ties securing the wires. Note the approximate cable tie locations to re-secure using new cable ties in **Step 15**. Remove condensate switch and wires from the heat pump compartment and properly dispose of assembly.

Installing New Condensate Drain Switch

13 Locate the new condensate switch assembly and bracket screw provided in the kit. Position condensate switch assembly such that the float is facing opposite of the condensate drain tubing. Secure condensate switch to drain pan fixture with new bracket screw.

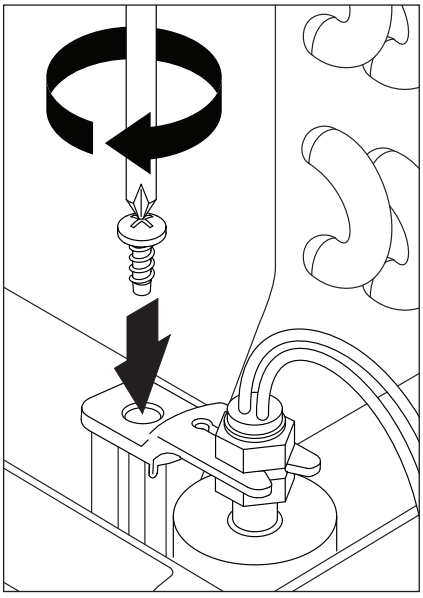


Figure 65 - Installing New Condensate Switch

14 Run the new condensate wires under the bracket (see Figure 61) and reconnect them to the J1 terminal on the control board.

15 Locate the new cable ties provided in the kit and secure the condensate wires such that they will not interfere with other components in the heat pump compartment (see Figure 61 as reference).

16 Insert the bottom lip of the control assembly into the opening of the water heater shroud and shift down. Use the guides on the control assembly to properly seat the controller into place.

17 Reinstall the Phillips head screw removed in **Step 9** into the top of the control assembly.

Returning Heater Back To Normal Operation

18 Install shroud cover to water heater by following the instructions outlined in **Step 5** in reverse order.

19 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

20 Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

21 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

Replacing Flex Hoses

Accessing Flex Hoses

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

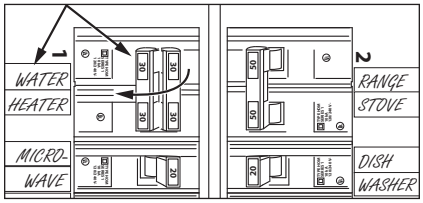


Figure 66 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4 Turn the cold water supply valve **OFF**.

5 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

6 Open the drain valve on the water heater.

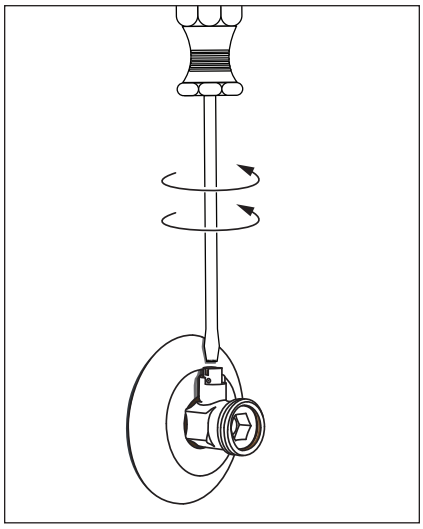


Figure 67 - Opening Drain Valve

7 Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and proceed to the next step.

8 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

⚠ CAUTION! Residual water pressure may still be present in the water lines and tank.

9 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

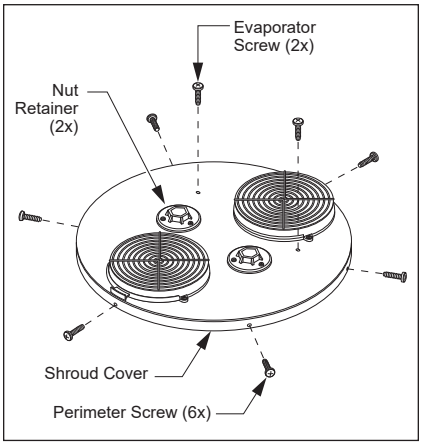


Figure 68 - Removing Shroud Cover

10 Lift the shroud cover up and away from the unit to gain access to flex hoses.

NOTICE: Reference Figure 69 on the following page to determine the type of flex hoses used in your water heater.

Removing Flex Hoses

11 Once flex hoses are exposed, use an adjustable wrench on the flex hose and a pipe wrench at the nipple to remove flex hoses.

12 With flex hoses removed, use the same procedure as above to remove nipples attached to top of flex hoses. Place top nipples aside in a safe place to reuse later with new flex hoses.

Installing Flex Hoses

13 Inspect gaskets in new flex hoses and confirm they are fully seated. Place new flex hoses onto nipples at the tank. Hand tighten flex hose fittings, then use an adjustable wrench on the flex hose and a pipe wrench at the nipple to tighten one additional half-turn. **DO NOT** over tighten.

14 Connect top nipples set aside in **Step 12** to top of flex hoses. Hand tighten flex hose fittings, then use an adjustable wrench on the flex hose and a pipe wrench at the top nipple to tighten one additional half-turn. **DO NOT** over tighten.

15 Install shroud cover to water heater by following the instructions outlined in **Step 9** in reverse order.

NOTICE: Flex hose connections must be aligned with nut retainers to install shroud cover to shroud. Adjust flex hoses accordingly.

16 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

NOTICE: DO NOT restore power back to the water heater unless the tank is completely full of water.

17 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three (3) minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

18 Remove the three (3) screws securing intake duct adaptor (closest to front side of water heater) to shroud cover. Lift intake duct adaptor up and away from shroud cover to visually inspect for leaks around the water connections. If there are no leaks, proceed to **Step 19**. If there is a leak, turn **OFF** water supply to the water heater, and open a faucet to eliminate pressure.

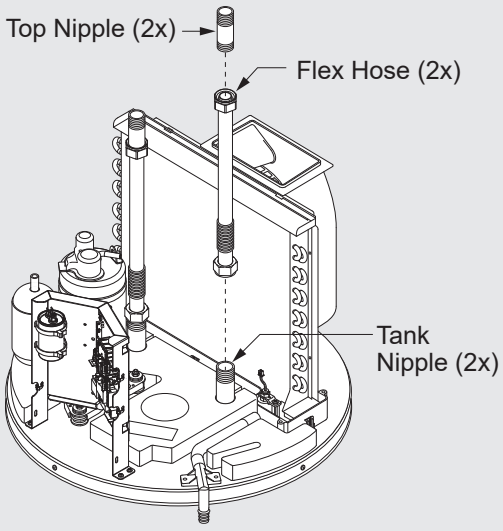
Remove flex hoses following the instructions outlined in **Steps 9-12**, and inspect gaskets for damage or debris. Proceed to **Step 13**.

19 Install intake duct adaptor to shroud cover and secure with three (3) screws. Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

20 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

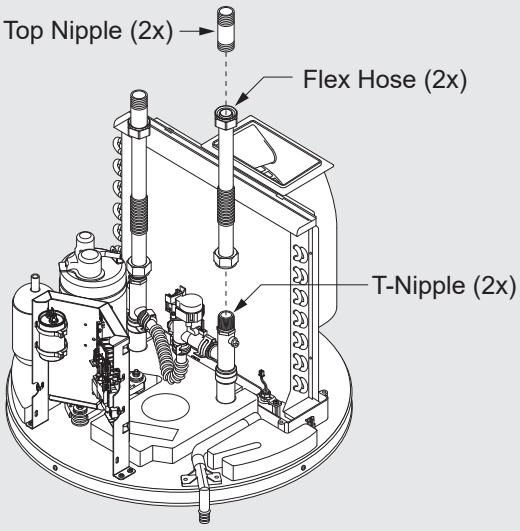
NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

Standard Heat Pump



NOTE: Shroud removed for clarity.

Heat Pump with Smart Valve Assembly



NOTE: Shroud removed for clarity.

Figure 69 - Determine Flex Hose Type

Replacing Expansion Valve Solenoid

Accessing Expansion Valve Solenoid

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

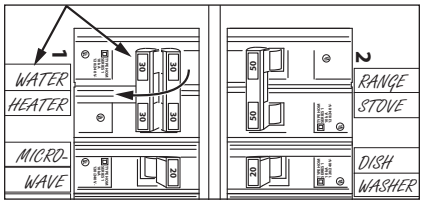


Figure 70 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Turn the cold water supply valve **OFF**.

4 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

5 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

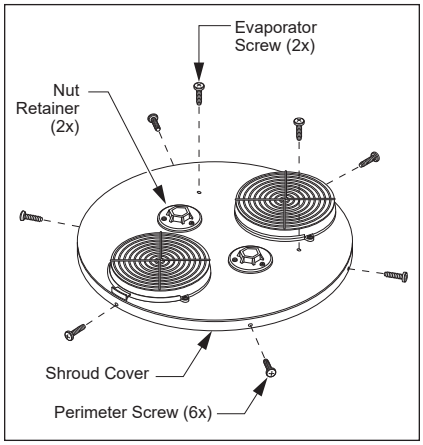


Figure 71 - Removing Shroud Cover

6 Lift the shroud cover up and away from the unit to gain access to the expansion valve solenoid.

Disconnecting Expansion Valve Solenoid

7 Remove the Phillips head screw from the control assembly and set it aside in a safe place.

8 Shift the control assembly up and away from the water heater shroud.

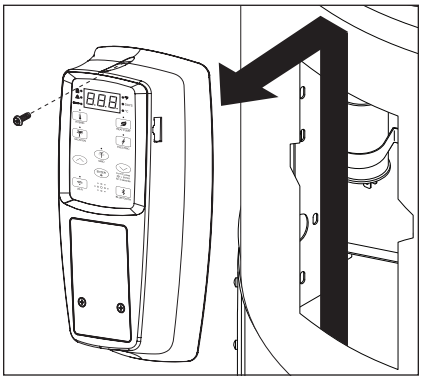


Figure 72 - Removing Control Assembly

9 Locate the printed circuit board (daughter board) installed to the bracket behind the control assembly. Disconnect the solenoid wires at the J4 terminal.

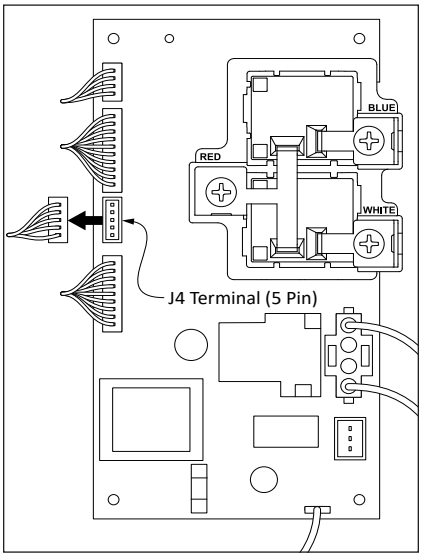


Figure 73 - Locating J4 Terminal on Printed Circuit Board

Removing Expansion Valve Solenoid

10 Locate expansion valve solenoid within the heat pump compartment (see Figure 74).

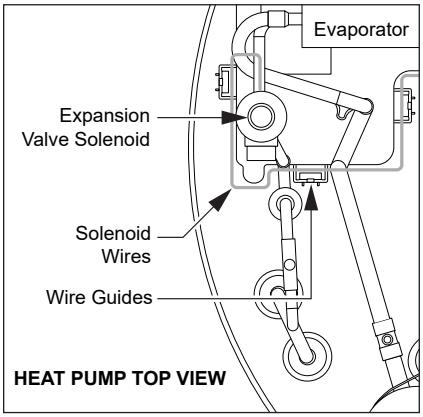


Figure 74 - Locating Expansion Valve Solenoid

11 Cut the cable tie securing the solenoid to the expansion valve. Remove the solenoid from the expansion valve and gently pull the wiring up and away from wire guides. Note the path of wires for re-installation in **Step 13**. Properly dispose of assembly components.

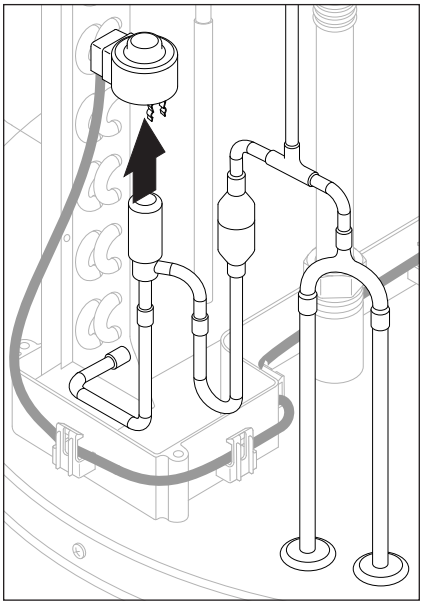


Figure 75 - Removing Expansion Valve Solenoid

NOTICE: Use caution and do not remove additional wires secured by wire guides.

Installing New Expansion Valve Solenoid

12 Fit new solenoid onto the expansion valve and confirm solenoid clamp is engaging the copper tubing. Use one of the cable ties provided in the kit to secure the solenoid to the expansion valve.

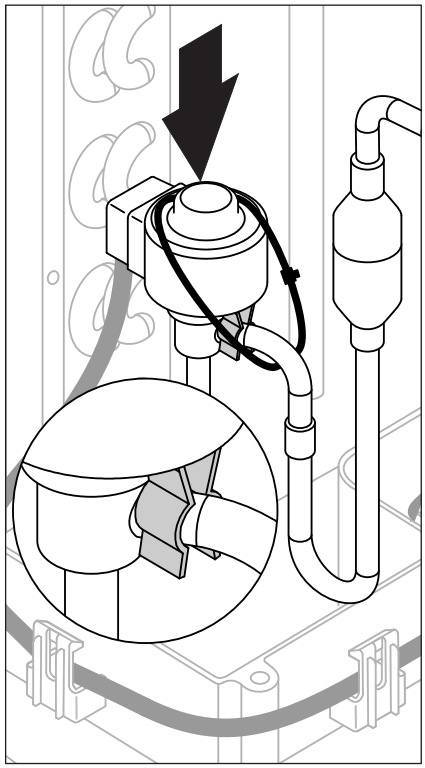


Figure 76 - Install New Expansion Valve Solenoid

13 Run the new solenoid wires through the wire guides and under the daughter board bracket. Connect wires to the J4 terminal on the daughter board (Figure 73).

14 Locate the additional cable ties provided in the kit and secure the solenoid wires such that they will not interfere with other components in the heat pump compartment.

15 Insert the bottom lip of the control assembly into the opening of the water heater shroud and shift down. Use the guides on the control assembly to properly seat the controller into place.

16 Reinstall the Phillips head screw removed in **Step 7** into the top of the control assembly.

Returning Heater Back To Normal Operation

17 Install shroud cover to water heater by following the instructions outlined in **Step 5** in reverse order.

18 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

19 Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

20 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

Replacing Fan Motor Assembly

Disconnecting Power to Water Heater

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

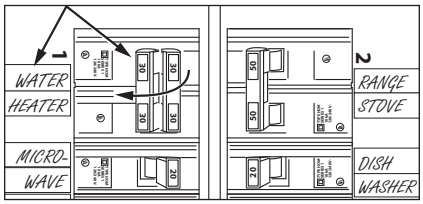


Figure 77 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

Removing Control Assembly

3 Remove the Phillips head screw from the control assembly and set it aside in a safe place.

If equipped, disconnect the automatic cold water shut-off valve connector from the right side of the control assembly and place it out of the way.

4 Shift the control assembly up and away from the water heater shroud.

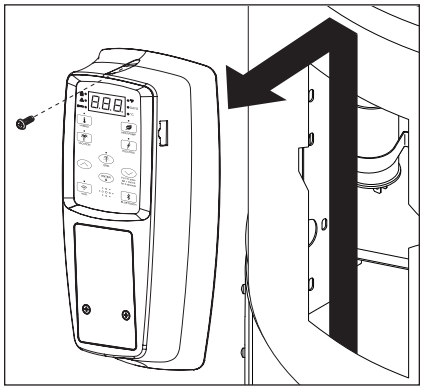


Figure 78 - Removing Control Assembly

5 Disconnect all six (6) pin connectors from the control assembly board and set it aside in a safe place.

Draining Water Heater

If the backside of the water heater is inaccessible, you will have to drain the tank to move the heater so access to the fan motor assembly is available.

6 Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

7 Turn the cold water supply valve **OFF**.

8 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

9 Use a flathead screwdriver to open the drain valve on the water heater.

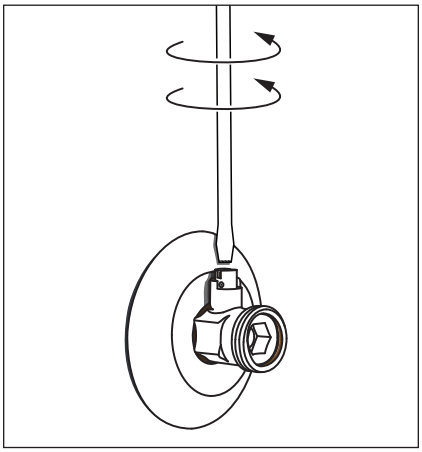


Figure 79 - Opening Drain Valve

10 Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and hot water faucet. Proceed to the next step.

Removing Heat Pump Shroud

11 Remove any ducting from the intake and exhaust duct adaptors. Use an adjustable wrench to disconnect cold water supply and hot water supply.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

12 Locate and remove the two (2) evaporator screws on the shroud cover and the eight (8) screws around the bottom perimeter of the shroud. Lift the shroud up and away from the unit to gain access to the heat pump compartment.

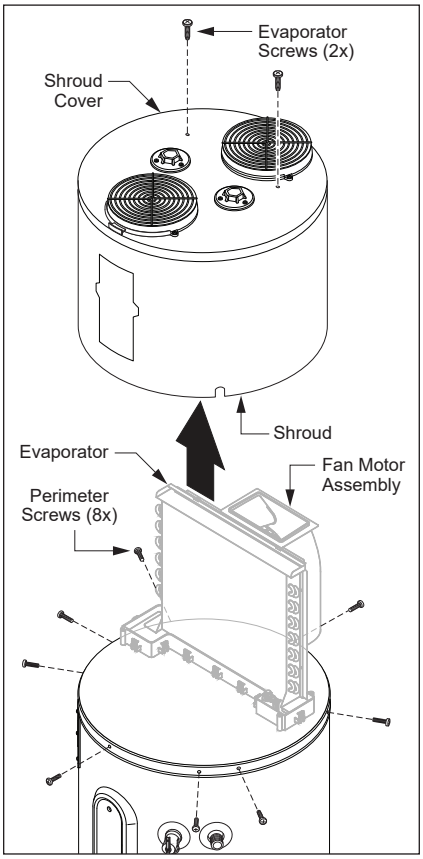


Figure 80 - Removing shroud cover

Removing Fan Motor Assembly

13 Access fan motor assembly from backside of water heater.

14 Locate fan motor power cord previously disconnected from the control assembly in **Step 5.** Note the location of cable ties securing the power cord for re-installation later in **Step 19**. Remove cable ties and gently pull power cord up and away from wire guide (see Figure 81).

NOTICE: Use caution and do not remove additional wires secured by wire guide.

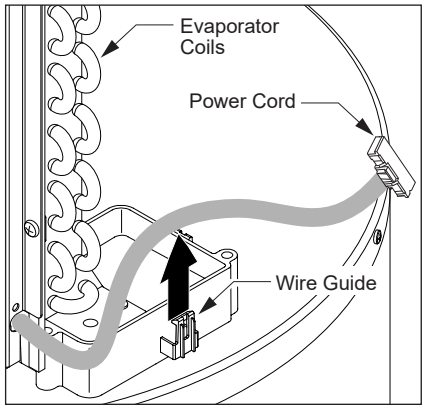


Figure 81 - Removing Fan Motor Power Cord

15 Locate the six (6) screws securing fan motor assembly to evaporator. Use a Phillips screwdriver to remove the screws.

NOTICE: DO NOT reuse old hardware. New hardware is provided in the kit to install new fan motor assembly.

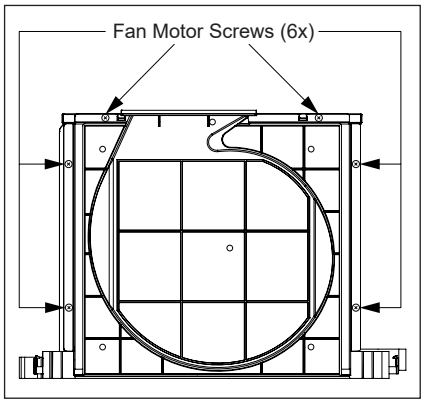


Figure 82 - Removing Fan Motor Screws

16 Lift the fan motor assembly up and over brackets located on the topside of the evaporator. Properly dispose of fan motor assembly.

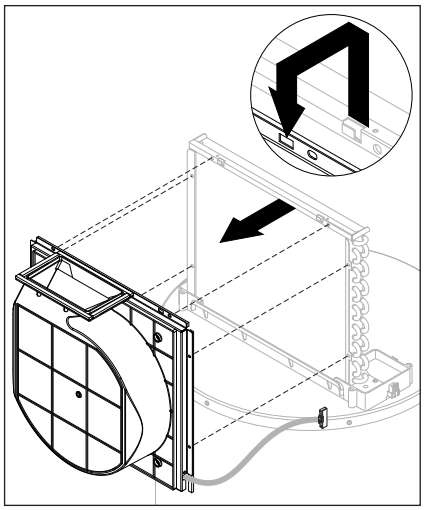


Figure 83 - Removing Fan Motor Assembly

Installing New Fan Motor Assembly

17 Locate new fan motor assembly provided in kit. Gently hang fan motor assembly over evaporator brackets and properly align screw holes.

NOTICE: Confirm foam insulation on backside of fan motor assembly makes good contact with evaporator.

18 Secure fan motor assembly to evaporator with the six (6) screws provided in the kit.

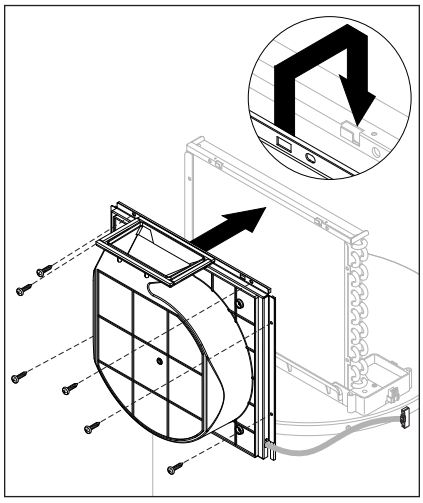


Figure 84 - Installing Fan Motor Assembly

19 Run the fan motor power cord through the wire guide and use the new cable ties provided in the kit to secure the power cord to the heat pump compartment (as noted in **Step 14**).

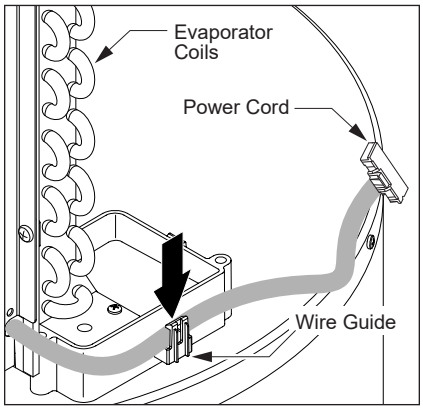


Figure 85 - Installing Fan Motor Power Cord

Returning Heater Back To Normal Operation

20 Install shroud to water heater by following the instructions outlined in **Step 12** in reverse order.

21 Locate the control assembly set aside in **Step 5**. Reconnect all wires including the fan motor power cord at the J8 terminal.

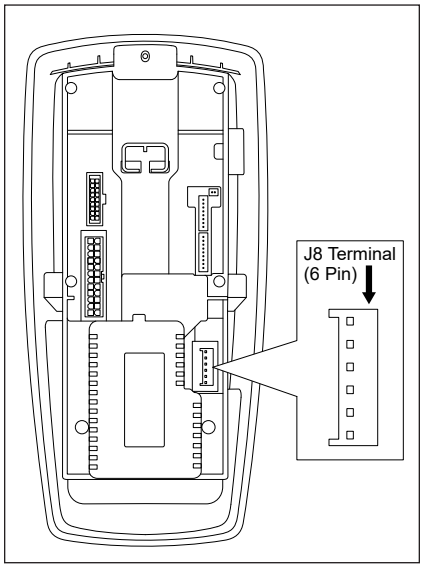


Figure 86 - Reconnecting Wires to Control Assembly

22 Insert the bottom lip of the control assembly into the opening of the water heater shroud and shift down. Use the guides on the control assembly to properly seat the controller into place.

23 Reinstall the Phillips head screw removed in **Step 3** into the top of the control assembly.

24 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

25 Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

26 Turn the cold water supply valve **ON**.

27 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

Replacing Upper & Lower Thermistors

Removing Upper Thermistor

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

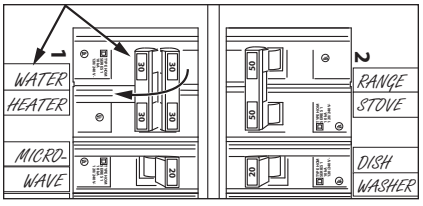


Figure 87 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Remove the upper access panel on the water heater by removing the two (2) Phillips head screws. Pull the upper access panel away from water heater.

4 Carefully fold back insulation to expose the upper thermistor. Use a piece of masking tape to hold the insulation flap up and out of the way.

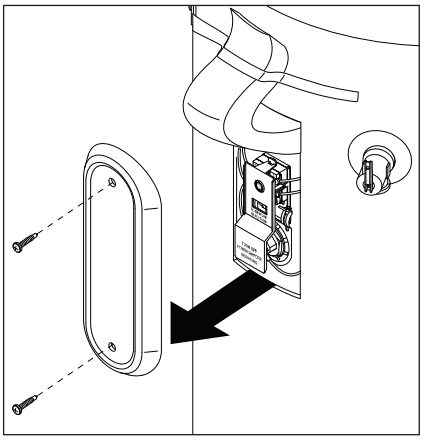


Figure 88 - Removing Upper Access Panel

5 Use a ratchet with a 1/4" socket or 1/4" nut driver to remove the nut securing the thermistor against the tank. Set the nut aside in a safe place and remove thermistor from tank. Pull thermistor wire down so it may be cut and spliced in the following steps. **DO NOT** remove residual thermal grease at the location of the thermistor. Thermal grease will be reused later in **Step 9**.

NOTICE: The upper thermistor will be located above the Energy Cut-Off (ECO) switch.

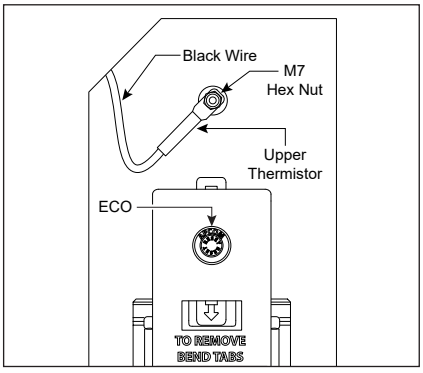


Figure 89 - Upper Thermistor Exposed

6 Use wire cutters to cut the thermistor wire as shown in Figure 90. Do not strip the insulation from the end of the wire.

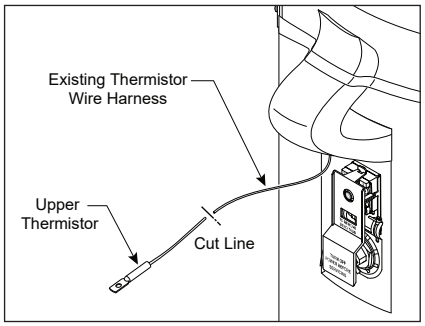


Figure 90 - Cut Existing Thermistor (Upper) Wire

Installing New Upper Thermistor

7 The replacement Thermistor Wire Harness included in the kit will also have to be cut as shown in Figure 91. Cut wires approximately six (6) to eight (8) inches from the base of the thermistors. Set aside thermistor with red wire lead to later replace the lower thermistor.

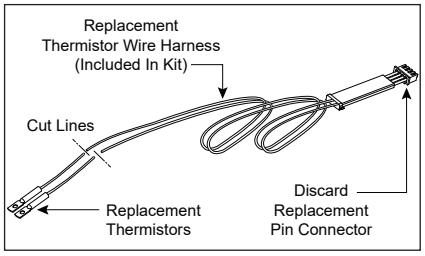


Figure 91 - Cut Replacement Thermistor Wires

8 Using a splice connector included in this kit, insert the ends of the wires into the splice connector as shown in Figure 92 on the following page. **DO NOT** strip the insulation from wires. Use pliers to squeeze the top of the connector down, locking the two wires together.

NOTICE: Do not squeeze connector prior to inserting the wire.

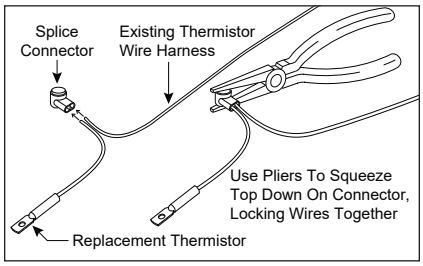


Figure 92 - Splice Connector

9 Position the thermistor back in the same orientation that it was removed. Use your finger to apply some of the residual thermal grease to both sides of thermistor. Locate the nut removed in **Step 5**. Use a ratchet with a 1/4" socket or 1/4" nut driver to install the nut, securing the thermistor against the tank.

10 Remove and discard the tape holding the insulation flap up. Place the insulation flap down to the original position.

11 Reinstall the upper access panel to the water heater using the two (2) Phillips head screws.

Removing Lower Thermistor

12 Remove the lower access panel on the water heater by removing the two (2) Phillips head screws. Pull the lower access panel away from water heater.

13 Carefully fold back insulation to expose the lower thermistor. Use a piece of masking tape to hold the insulation flap up and out of the way.

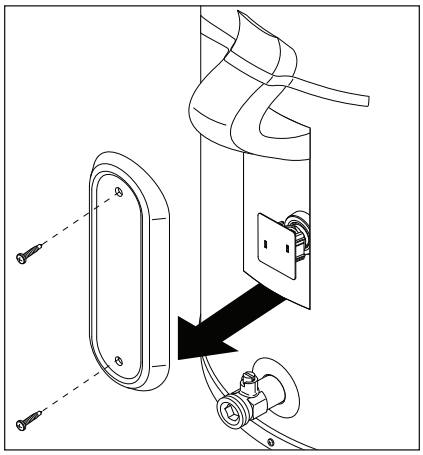


Figure 93 - Removing Lower Access Panel

14 Use a ratchet with a 1/4" socket or 1/4" nut driver to remove the nut securing the thermistor against the tank. Set the nut aside in a safe place and remove thermistor from tank. Pull thermistor wire down so it may be cut and spliced in the following steps. **DO NOT** remove residual thermal grease at the location of the thermistor. Thermal grease will be reused later in **Step 18**.

NOTICE: The lower thermistor will be located above the lower element as shown in Figure 94.

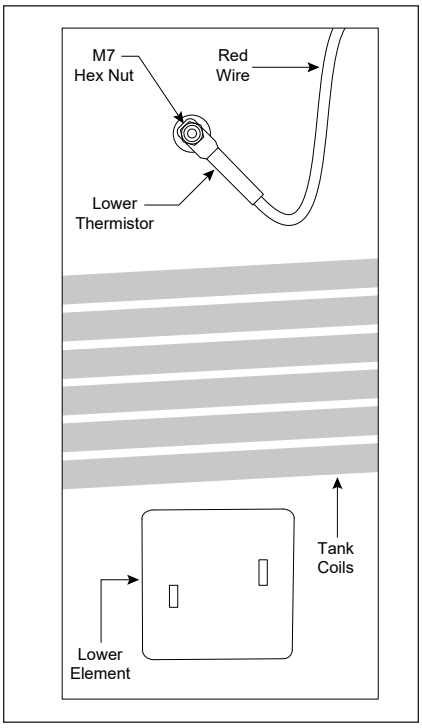


Figure 94 - Lower Thermistor Exposed

15 Use wire cutters to cut the thermistor wire as shown in Figure 95. Do not strip the insulation from the end of the wire.

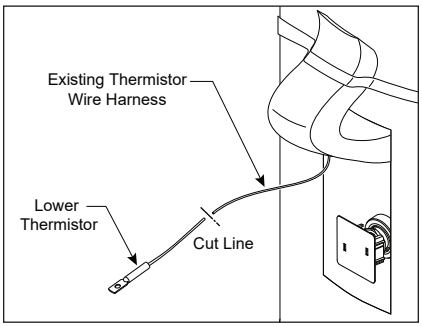


Figure 95 - Cut Existing Thermistor (Lower) Wire

Installing New Lower Thermistor

16 Locate the thermistor with the red wire lead set aside in **Step 7**.

17 Using a splice connector included in this kit, insert the ends of the wires into the splice connector as shown in Figure 92. **DO NOT** strip the insulation from wires. Use pliers to squeeze the top of the connector down, locking the two wires together.

NOTICE: Do not squeeze connector prior to inserting the wire.

18 Position the thermistor back in the same orientation that it was removed. Use your finger to apply some of the residual thermal grease to both sides of thermistor. Locate the nut removed in **Step 14**. Use a ratchet with a 1/4" socket or 1/4" nut driver to install the nut, securing the thermistor against the tank.

19 Remove and discard the tape holding the insulation flap up. Place the insulation flap down to the original position.

20 Reinstall the lower access panel to the water heater using the two (2) Phillips head screws.

21 Replace the cover on the electrical junction box.

22 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

Replacing Sensor Wire Assembly

NOTICE: It is recommended to replace all four (4) temperature sensors if the control assembly displays one of the following error codes:

Code	Description
025	Coil Temperature Sensor
026	Suction Temperature Sensor
027	Discharge Temperature Sensor
028	Ambient Temperature Sensor

Accessing Sensors

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1. Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

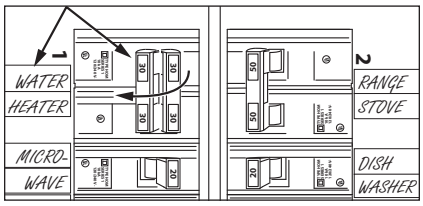


Figure 96 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2. Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3. Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4. Turn the cold water supply valve **OFF**.

5. Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

6. Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

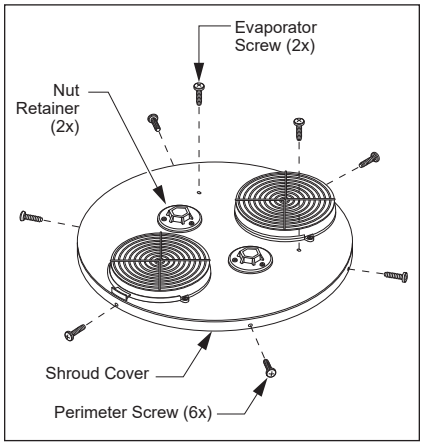


Figure 97 - Removing Shroud Cover

7. Lift the shroud cover up and away from the unit to gain access to the sensors.

Removing Sensors

8. Remove the Phillips head screw from the control assembly and set it aside in a safe place. If equipped, disconnect the automatic cold water shut-off valve connector from the side of the control assembly and place it out of the way.

9. Shift the control assembly up and away from the heat pump shroud.

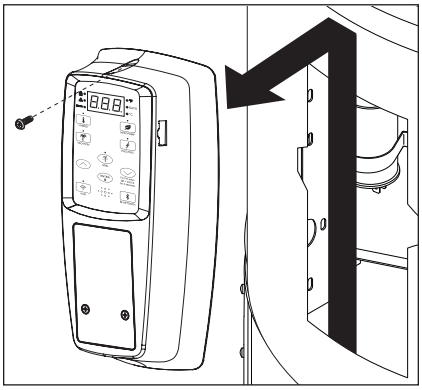


Figure 98 - Removing Control Assembly

NOTICE: For sensor locations, see Figure 107 on page 55.

10. Disconnect the wire harness from the J3 pin connector on the back of the control assembly (see Figure 99 on the following page).

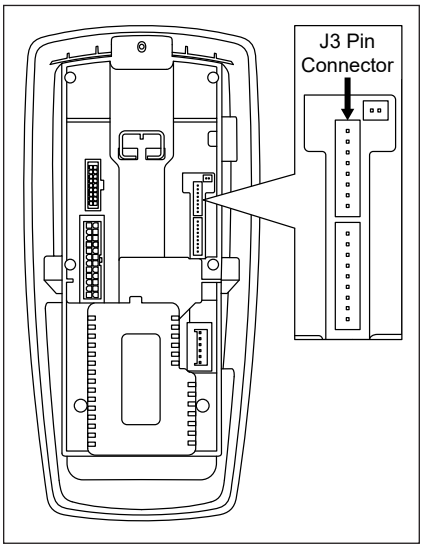


Figure 99 - Disconnect J3 Pin Connector

11 Loosen gland nut on backside of bracket (see Figure 100). Pull Ambient Temperature Sensor (blue wires) out through hole in bracket.

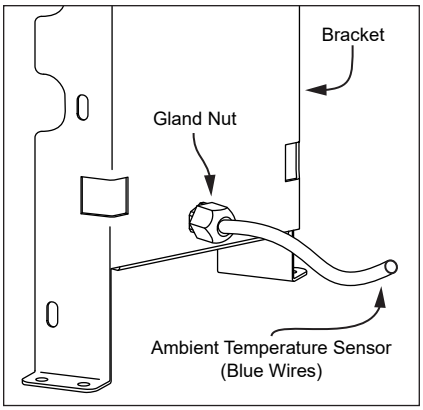


Figure 100 - Ambient Temperature Sensor (Located Behind Bracket)

12 Locate Coil Temperature Sensor (black wires). Remove foam insulation and discard. Pull upward on clip to remove sensor and clip from fixture (see Figure 101).

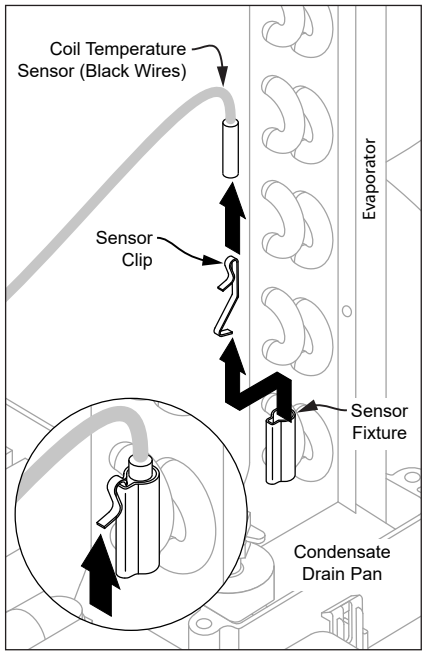


Figure 101 - Coil Temperature Sensor (Located Bottom Right Side of Evaporator)

13 Locate Discharge Temperature Sensor (yellow wires). Cut cable tie(s) securing foam insulation around sensor. Slide insulation up to reveal sensor. Pull downward on clip to remove sensor and clip from fixture (see Figure 102). **DO NOT** discard insulation.

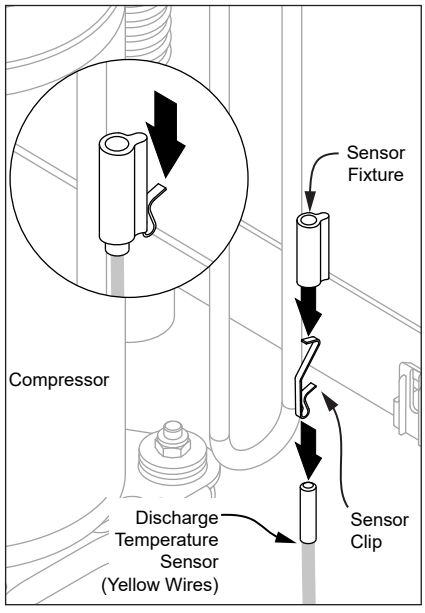


Figure 102 - Discharge Temperature Sensor (Located Right Side of Compressor)

14 Locate Suction Temperature Sensor (green wires). Cut cable tie(s) securing foam insulation around sensor. Slide insulation down to reveal sensor. Pull downward on clip to remove sensor and clip from fixture (see Figure 103). **DO NOT** discard insulation.

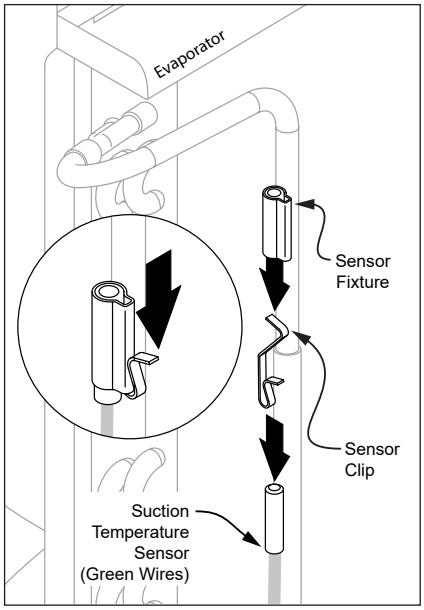


Figure 103 - Suction Temperature Sensor (Located Top Left Side of Evaporator)

15 Once all clips and sensors have been removed from fixtures, pull wire assembly out from underneath bracket. Properly discard of materials.

NOTICE: Old sensor clips removed may look different in appearance than the new sensor clips provided in the kit. Discard old sensor clips and **DO NOT** reuse.

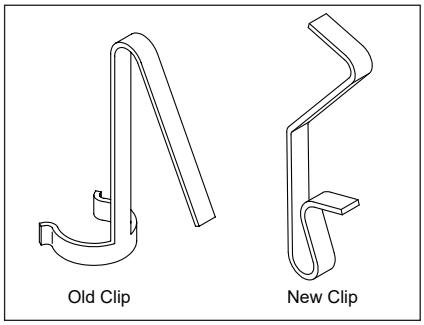


Figure 104 - Sensor Clip Comparison

Installing New Sensors

16 Run new Coil, Suction and Discharge Temperature Sensors underneath right side of bracket.

17 Locate the three (3) new sensor clips provided in the kit and properly orient each one so they will easily slide into fixtures (Figures 105 & 106). Once clips have been inserted into fixtures, carefully insert sensors into fixtures such that the sensors fully seat.

IMPORTANT! Foam insulation **MUST** be installed around the Coil, Suction and Discharge Temperature Sensors. Failure to do so may result in inaccurate readings at the sensor locations and could impact the efficiency of the water heater.

18 Locate foam insulation square provided in the kit. Wrap foam insulation around Coil Temperature Sensor.

19 Slide insulation down and over Discharge Temperature Sensor. Secure insulation around sensor with two (2) cable ties placed above and below sensor.

20 Slide insulation up and over Suction Temperature Sensor. Secure insulation around sensor with two (2) cable ties placed above and below sensor.

21 Slide Ambient Temperature Sensor through hole in bracket and gland nut. Confirm sensor protrudes approximately three (3) inches, then hand tighten glad nut to secure sensor cable.

22 Install shroud cover to water heater by following the instructions outlined in **Step 6** in reverse order.

23 Reconnect cold water supply and hot water supply connections at top of unit if removed.

NOTICE: Inspect gaskets in flex hoses and confirm they are fully seated before reconnecting cold water supply and hot water supply.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

24 Reconnect any ducting to the intake and exhaust adaptors.

25 Connect the new wire harness to the J3 pin connector on the back of the control assembly (see Figure 99).

26 Slide control assembly back in place. Locate the screw set aside in **Step 8**. Replace screw to secure control assembly to water heater shroud. If equipped, reconnect the automatic cold water shut-off valve connector into side of control assembly.

27 Turn the cold water supply valve **ON**.

28 Check for leaks. If leaks are present in the system, turn the cold water supply valve **OFF**, disconnect water connections (**Step 5**), and inspect connections for damage or debris. Reconnect water connections as instructed in **Step 23** and turn the cold water supply valve **ON**.

29 Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

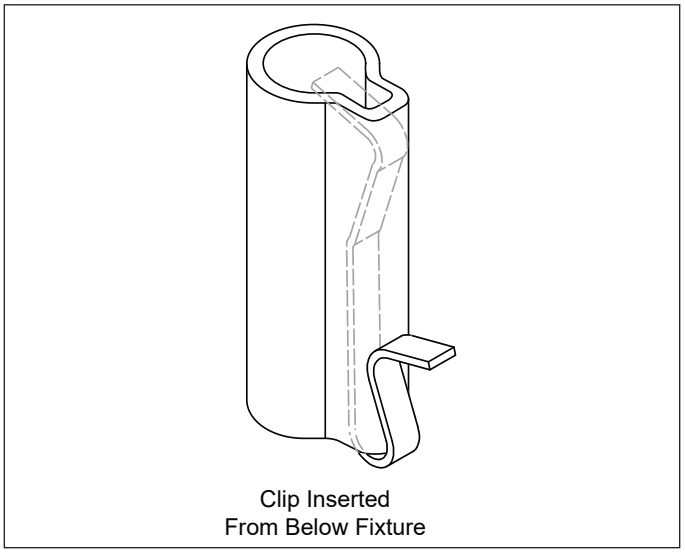


Figure 105 - Clip Inserted from Below Fixture

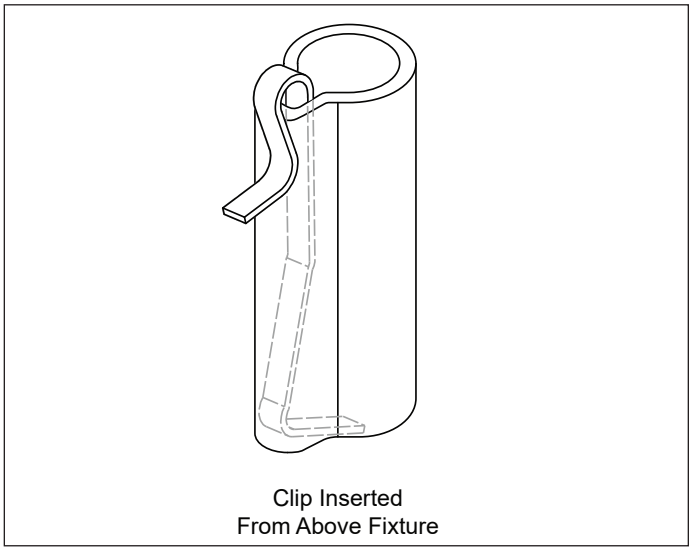


Figure 106 - Clip Inserted from Above Fixture

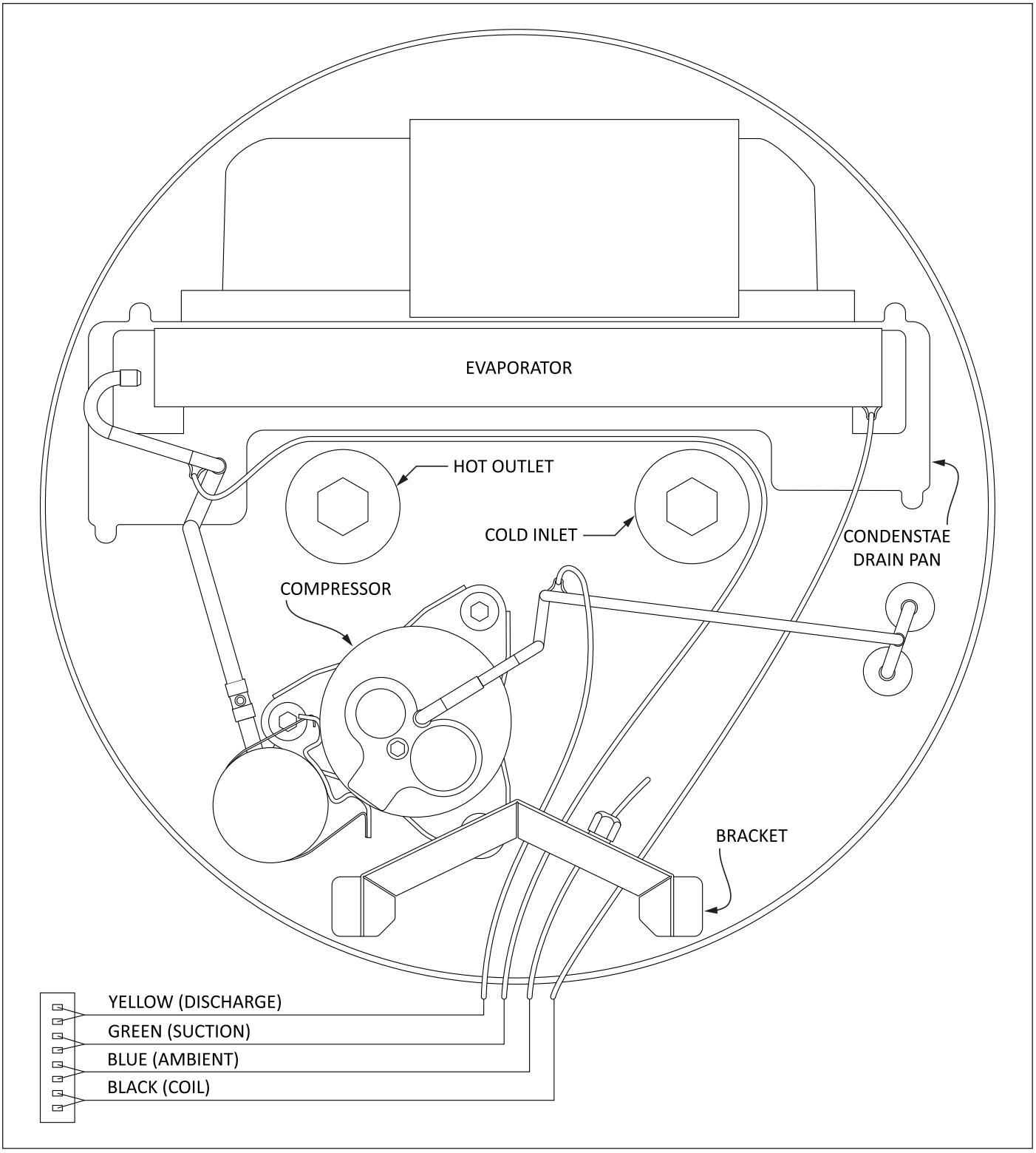


Figure 107 - Sensor Wire Diagram

Replacing Outlet Thermistor

Removing Outlet Flex Hose

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1. Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

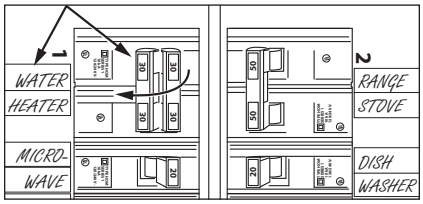


Figure 108 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2. Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3. Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4. Turn the cold water supply valve **OFF**.

5. Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

6. Use a flathead screwdriver to open the drain valve on the water heater.

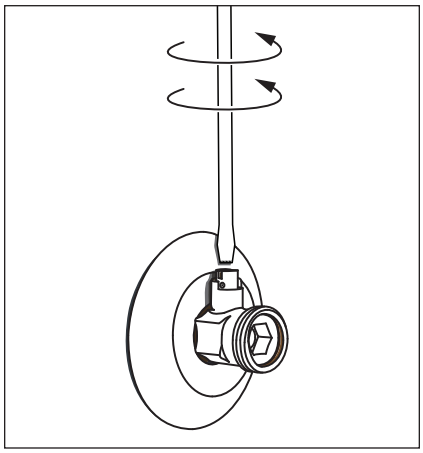


Figure 109 - Opening Drain Valve

7. Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and hot water faucet. Proceed to the next step.

8. Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

⚠ CAUTION! Residual water pressure may still be present in the water lines and tank.

9. Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

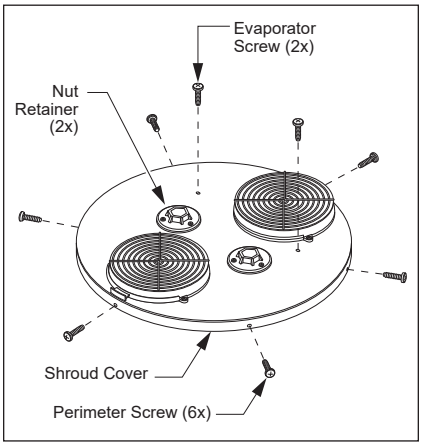


Figure 110 - Removing Shroud Cover

10. Lift the shroud cover up and away from the unit to gain access to outlet flex hose.

11. Once the outlet flex hose is exposed, use an adjustable wrench on the flex hose connection and a pipe wrench at the outlet t-nipple to remove flex hose. Place flex hose aside in a safe place to reuse later.

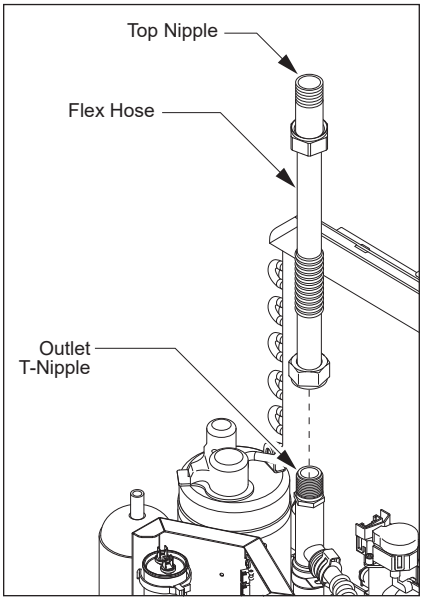


Figure 111 - Removing Flex Hose

Removing Smart Valve Assembly

12 Disconnect the 8 pin wire harness located on top of Smart Valve as shown in Figure 112. Place wires aside in a safe location so they are not damaged.

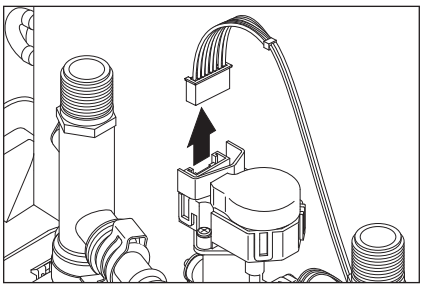


Figure 112 - Disconnecting 8 Pin Wire Harness

13 Disconnect the 3 pin wire harness. Connector will be located near the cold water supply opposite from Smart Valve as shown in Figure 113. Place wires aside in a safe location so they are not damaged.

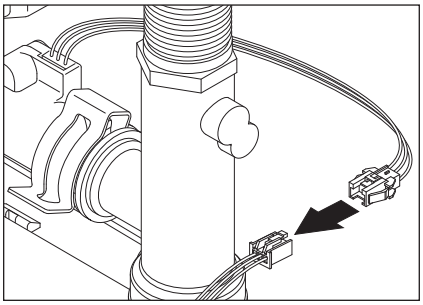


Figure 113 - Disconnecting 3 Pin Wire Harness

14 Remove the two (2) spring clips securing Smart Valve to cold t-nipple and flex hose to hot t-nipple.

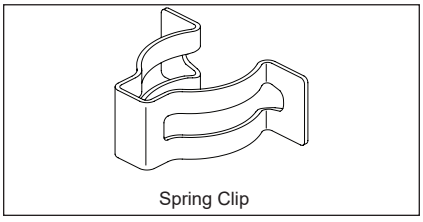


Figure 114 - Spring Clip

⚠ CAUTION! Water may still be present in the valve and flex hose assembly. Place a rag under the flex hose and valve connection points to prevent water from escaping into the heat pump compartment.

15 Gently remove Smart Valve and flex hose from hot and cold t-nipples.

NOTICE: Use caution when handling Smart Valve and hose. **DO NOT** bend hose out of factory configuration.

Removing Outlet T-Nipple

IMPORTANT: Before removing the outlet t-nipple, observe the rotational orientation of the valve. Figure 115 below provides the factory installed offset between the t-nipples. T-nipples **MUST** be installed to the factory offset orientation to properly accommodate the Smart Valve and hose assembly. Failure to do so may result in leaks and potential property damage.

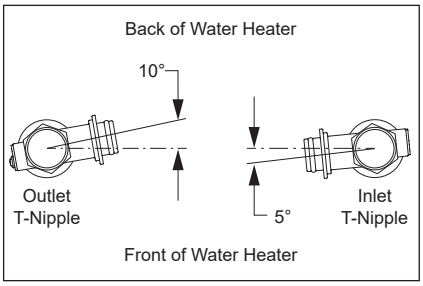


Figure 115 - Inlet and Outlet T-Nipple Orientation

16 Locate the thermistor wire installed to the outlet t-nipple. Cut the thermistor wire at the t-nipple and disconnect the opposite end from the wires leading to the control assembly. Properly dispose of thermistor wire.

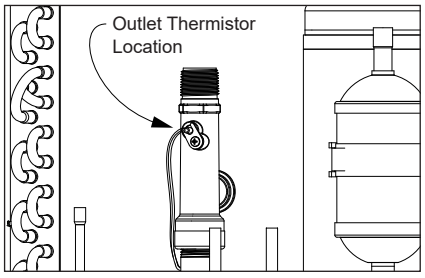


Figure 116 - Outlet Thermistor Location

17 Place a small pipe wrench (no larger than 8" in length) at the tank nipple located under the outlet t-nipple. This will counter torque when removing the t-nipple and will prevent the tank nipple from being removed.

Use a basin wrench to engage the hexagonal flats located at the top of the outlet t-nipple. Carefully remove the outlet t-nipple.

⚠ CAUTION! Use care when rotating basin wrench not to interfere with and damage the evaporator fins.

18 Use a Phillips screwdriver to remove the screw and retainer securing the thermistor to the outlet t-nipple. Remove the thermistor and properly dispose of materials.

Assembling New Thermistor to Outlet T-Nipple

19 Locate the new thermistor wire, O-ring, retainer and screw provided in kit.

Apply lubricant and slide O-ring over thermistor. Install the thermistor to the outlet t-nipple and properly position the retainer in place. Use a Phillips screwdriver to install screw to retainer, securing thermistor to outlet t-nipple (see Figure 117 on the following page).

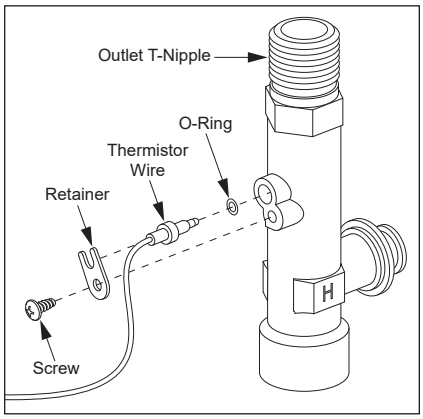


Figure 117 - Installing Thermistor to Outlet T-Nipple

20 Carefully wrap the thermistor wire one half-turn around outlet t-nipple and hold the wire in place with a piece of masking tape. This will protect the thermistor wire from damage when installing the outlet t-nipple.

Installing Outlet T-Nipple

21 Place a small pipe wrench (no larger than 8" in length) at the tank nipple located at the outlet supply side of the tank. This will counter torque when installing the t-nipple and will protect the tank nipple from over-tightening.

Hand tighten the outlet t-nipple to the tank nipple. Use a basin wrench to engage the hexagonal flats located at the top of the outlet t-nipple and tighten such that its orientation is angled 10° toward the back of the water heater as shown in Figure 115.

22 Remove masking tape holding thermistor wire to outlet t-nipple and connect it to the wires leading to the control assembly.

Installing Smart Valve Assembly

23 Locate the two (2) large O-rings provided in kit. Apply lubricant and install O-rings to grooves located on both the inlet and outlet t-nipples.

NOTICE: Inspect O-rings for damage or debris. Handle with care and verify lubricant has been properly applied to O-rings.

24 Install Smart Valve and hose assembly to water heater by following the procedure outlined in **Steps 12-15** in reverse order.

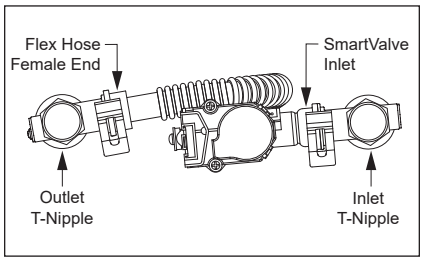


Figure 118 - Smart Valve & Hose Orientation

NOTICE: Confirm all wire connections are tight and oriented such that they will not interfere with other components.

Installing Outlet Flex Hose

25 Install outlet flex hose to water heater by following the procedure outlined in **Step 11** reverse order.

Checking for Leaks

26 Install shroud cover to water heater by following the instructions outlined in **Step 9** in reverse order.

NOTICE: Flex hose connections must be aligned with nut retainers to install shroud cover to shroud. Adjust flex hoses accordingly.

27 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

NOTICE: DO NOT restore power back to the water heater unless the tank is completely full of water.

28 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three (3) minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

29 Remove the three (3) screws securing intake duct adaptor (closest to front side of water heater) to shroud cover. Lift intake duct adaptor up and away from shroud cover to visually inspect for leaks around the t-nipples, Smart Valve assembly and flex hoses. If there are no leaks, proceed to **Step 30**.

If there is a leak, return to the beginning of these instructions to regain access to the heat pump compartment and check assemblies for loose connections and damaged or deformed O-rings.

Returning Heater Back To Normal Operation

30 Install intake duct adaptor to shroud cover and secure with three (3) screws. Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

31 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

Replacing Inlet & Outlet T-Nipple

Removing Flex Hoses

⚠ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power OFF. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

1 Turn **OFF** electric power to the water heater at the circuit breaker/fuse box.

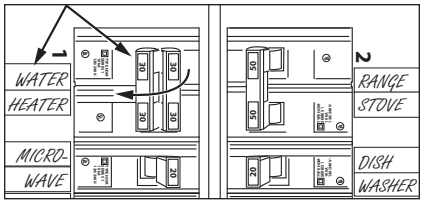


Figure 119 - Circuit Breaker

NOTICE: For 120V units, disconnect power cord from wall outlet and proceed to **Step 3**.

2 Open the electrical junction box on the side of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is **OFF**.

3 Open a hot water faucet and let the hot water run until it is cool.

⚠ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

4 Turn the cold water supply valve **OFF**.

5 Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.

6 Use a flathead screwdriver to open the drain valve on the water heater.

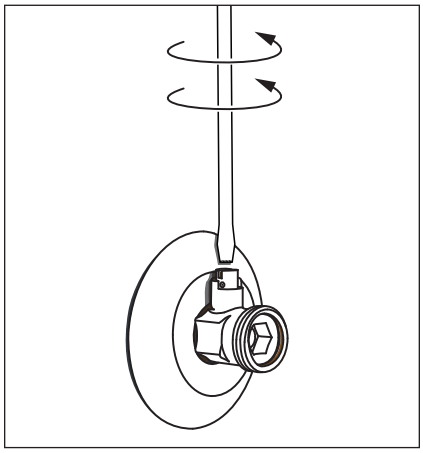


Figure 120 - Opening Drain Valve

7 Open a hot water faucet to help the water in the tank drain faster. Once the tank is drained, close the drain valve and hot water faucet. Proceed to the next step.

8 Remove any ducting from the intake and exhaust duct adaptors. Disconnect cold water supply and hot water supply if top connections are used (some units use side connections and do not have to be disconnected).

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections.

If equipped, disconnect the automatic cold water shut-off valve pin connector from the right side of the control assembly and place it out of the way.

⚠ CAUTION! Residual water pressure may still be present in the water lines and tank.

9 Remove the six (6) screws located around the perimeter of the shroud cover. Locate and remove the two (2) screws on top of the unit fastening the shroud cover to the heat pump evaporator.

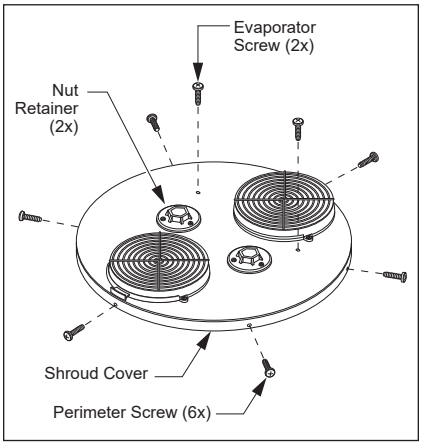


Figure 121 - Removing Shroud Cover

10 Lift the shroud cover up and away from the unit to gain access to flex hoses.

11 Once flex hoses are exposed, use an adjustable wrench on the flex hose connections and a pipe wrench at the t-nipples to remove flex hoses. Place flex hoses aside in a safe place to reuse later.

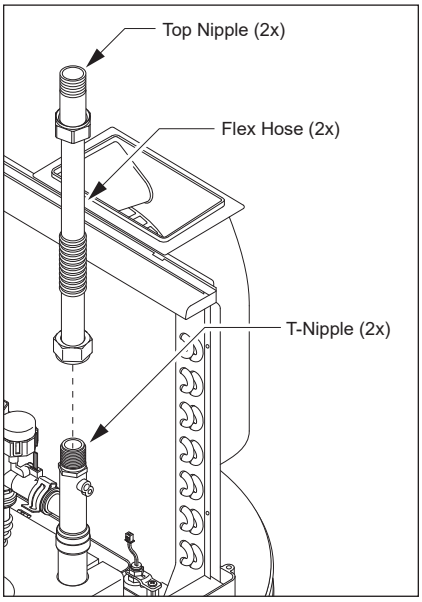


Figure 122 - Removing Flex Hoses.

Removing Smart Valve Assembly

12 Disconnect the 8 pin wire harness located on top of Smart Valve as shown in Figure 123. Place wires aside in a safe location so they are not damaged.

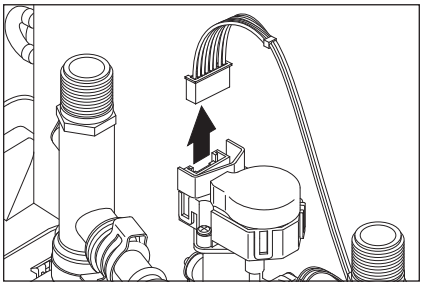


Figure 123 - Disconnecting 8 Pin Wire Harness

13 Disconnect the 3 pin wire harness. Connector will be located near the cold water supply opposite from Smart Valve as shown in Figure 124. Place wires aside in a safe location so they are not damaged.

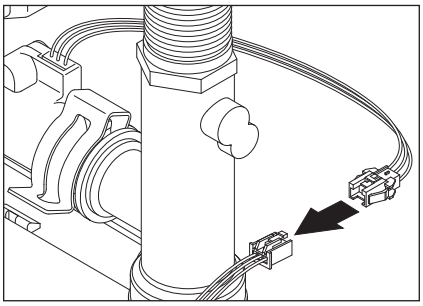


Figure 124 - Disconnecting 3 Pin Wire Harness

14 Remove the two (2) spring clips securing Smart Valve to cold t-nipple and flex hose to hot t-nipple.

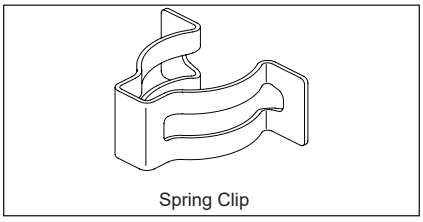


Figure 125 - Spring Clip

⚠ CAUTION! Water may still be present in the valve and flex hose assembly. Place a rag under the flex hose and valve connection points to prevent water from escaping into the heat pump compartment.

15 Gently remove Smart Valve and flex hose from hot and cold t-nipples.

NOTICE: Use caution when handling Smart Valve and hose. **DO NOT** bend hose out of factory configuration.

Removing Inlet & Outlet T-Nipples

IMPORTANT: Before removing the inlet and outlet t-nipples, observe the rotational orientation of the valves. Figure 126 below provides the factory installed offset between the t-nipples. T-nipples **MUST** be installed to the factory offset orientation to properly accommodate the Smart Valve and hose assembly. Failure to do so may result in leaks and potential property damage.

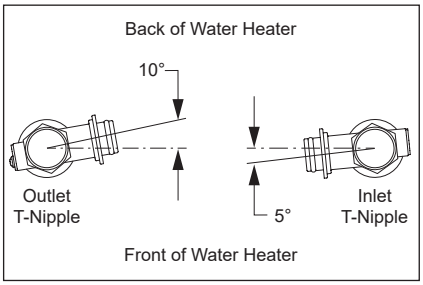


Figure 126 - Inlet and Outlet T-Nipple Orientation

16 Locate the thermistor wire installed to the outlet t-nipple. Cut the thermistor wire at the t-nipple and disconnect the opposite end from the wires leading to the control assembly. Properly dispose of thermistor wire.

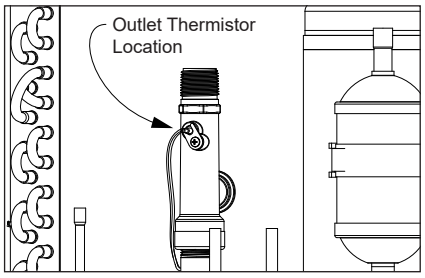


Figure 127 - Outlet Thermistor Location

17 Place a small pipe wrench (no larger than 8" in length) at the tank nipple located under the outlet t-nipple. This will counter torque when removing the t-nipple and will prevent the tank nipple from being removed.

Use a basin wrench to engage the hexagonal flats located at the top of the outlet t-nipple. Carefully remove the outlet t-nipple.

⚠ CAUTION! Use care when rotating basin wrench not to interfere with and damage the evaporator fins.

18 Repeat the procedure as outlined in **Step 17** to remove the inlet t-nipple.

Properly dispose of both inlet and outlet t-nipples once removed.

Assembling New Outlet T-Nipple

19 Locate the two (2) large O-rings provided in kit. Apply lubricant and install O-rings to grooves located on both the inlet and outlet t-nipples.

NOTICE: Inspect O-rings for damage or debris. Handle with care and verify lubricant has been properly applied to O-rings.

20 Locate the diffuser provided in the kit and insert it upright into the bottom orifice of the outlet t-nipple. Verify the diffuser seats snuggly and does not travel (see Figure 128).

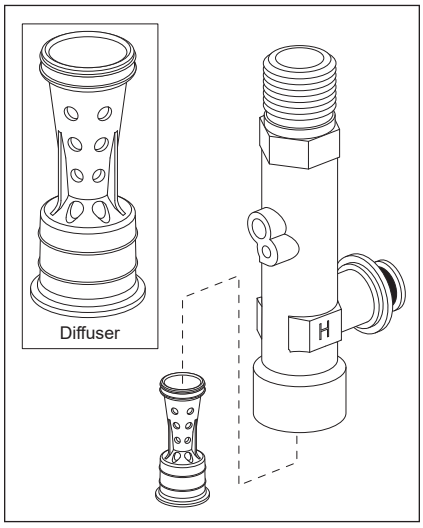


Figure 128 - Installing Diffuser to Outlet T-Nipple.

21 Locate the new thermistor wire, O-ring, retainer and screw provided in kit.

Apply lubricant and slide O-ring over thermistor. Install the thermistor to the outlet t-nipple and properly position the retainer in place. Use a Phillips screwdriver to install screw to retainer, securing thermistor to outlet t-nipple (see Figure 129).

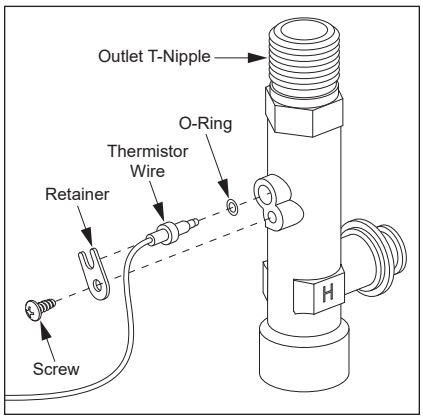


Figure 129 - Installing Thermistor to Outlet T-Nipple

22 Carefully wrap the thermistor wire one half-turn around outlet t-nipple and hold the wire in place with a piece of masking tape. This will protect the thermistor wire from damage when installing the outlet t-nipple.

Installing New Inlet & Outlet T-Nipples

23 Place a small pipe wrench (no larger than 8" in length) at the tank nipple located at the outlet supply side of the tank. This will counter torque when installing the t-nipple and will protect the tank nipple from over-tightening.

Hand tighten the outlet t-nipple to the tank nipple. Use a basin wrench to engage the hexagonal flats located at the top of the outlet t-nipple and tighten such that its orientation is angled 10° toward the back of the water heater as shown in Figure 126.

24 Repeat the procedure as outlined in **Step 23** to install the inlet t-nipple. Tighten inlet t-nipple such that its orientation is angled 5° toward the front of the water heater as shown in Figure 126.

25 Remove masking tape holding thermistor wire to outlet t-nipple and connect it to the wires leading to the control assembly.

Installing Smart Valve Assembly

26 Install Smart Valve and hose assembly to water heater by following the procedure outlined in **Steps 12-15** in reverse order.

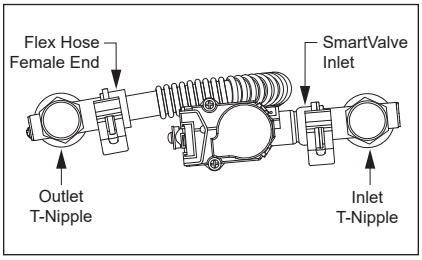


Figure 130 - Smart Valve & Hose Orientation

NOTICE: Confirm all wire connections are tight and oriented such that they will not interfere with other components.

Installing Flex Hoses

27 Install flex hoses to water heater by following the procedure outlined in **Step 11** reverse order.

Checking for Leaks

28 Install shroud cover to water heater by following the instructions outlined in **Step 9** in reverse order.

NOTICE: Flex hose connections must be aligned with nut retainers to install shroud cover to shroud. Adjust flex hoses accordingly.

29 Use an adjustable wrench to reconnect cold water supply and hot water supply connections at top of unit if removed.

To avoid damaging gaskets in the flex lines, use a pipe wrench at the hot and cold nipples to counter torque when installing or removing water connections. **DO NOT** over tighten.

NOTICE: DO NOT restore power back to the water heater unless the tank is completely full of water.

30 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three (3) minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

31 Remove the three (3) screws securing intake duct adaptor (closest to front side of water heater) to shroud cover. Lift intake duct adaptor up and away from shroud cover to visually inspect for leaks around the t-nipples, Smart Valve assembly and flex hoses. If there are no leaks, proceed to **Step 32**.

If there is a leak, return to the beginning of these instructions to regain access to the heat pump compartment and check assemblies for loose connections and damaged or deformed o-rings.

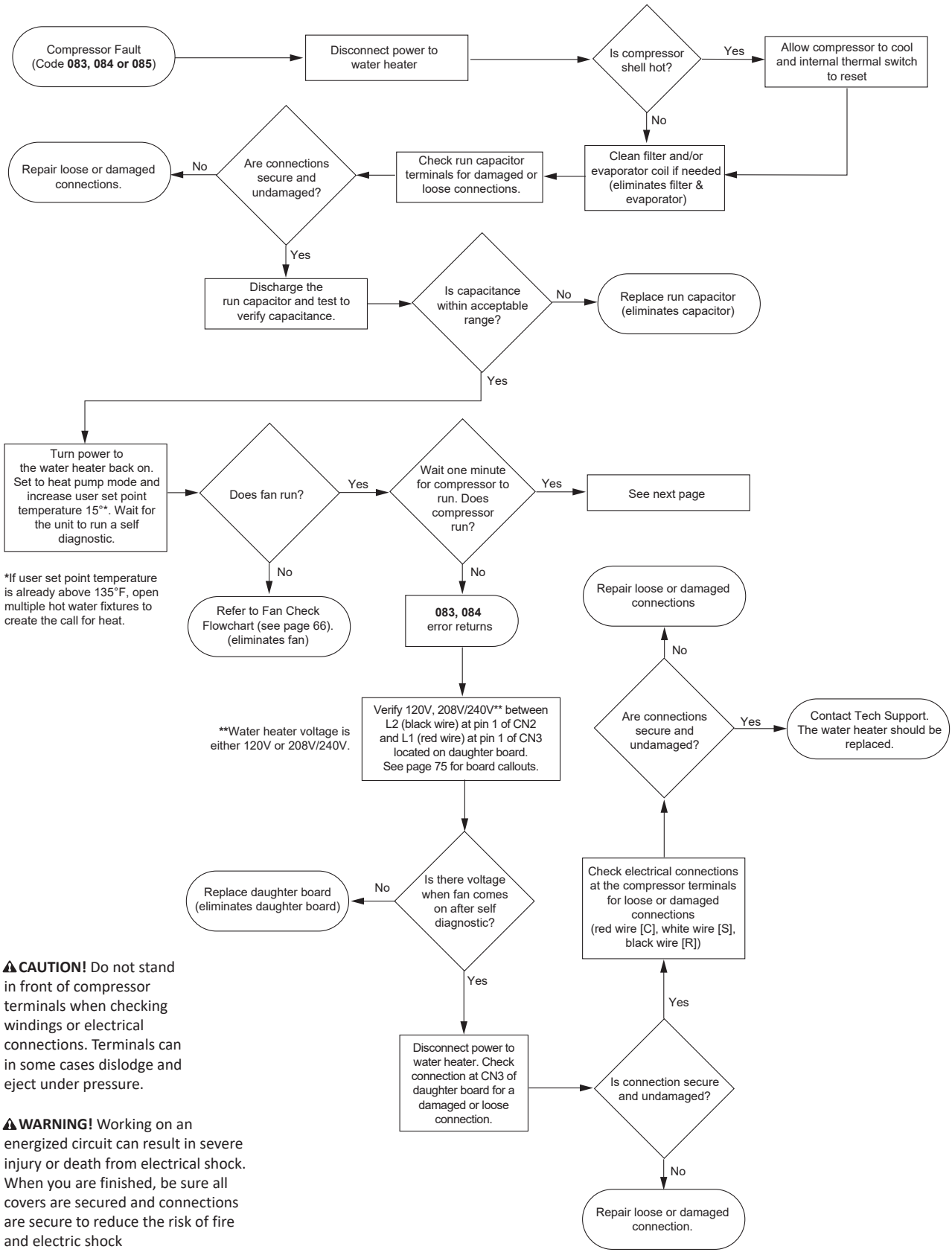
Returning Heater Back To Normal Operation

32 Install intake duct adaptor to shroud cover and secure with three (3) screws. Reconnect any ducting to the intake and exhaust adaptors. If equipped, reconnect the automatic cold water shut-off valve.

33 The water heater is now ready for normal operation. Restore power to the water heater. It may take several hours for the tank to heat up depending on the tank size, temperature setting, and cold water supply temperature.

NOTICE: If the system diagnostic yields any codes, reference the diagnostic codes section on pages 15-17.

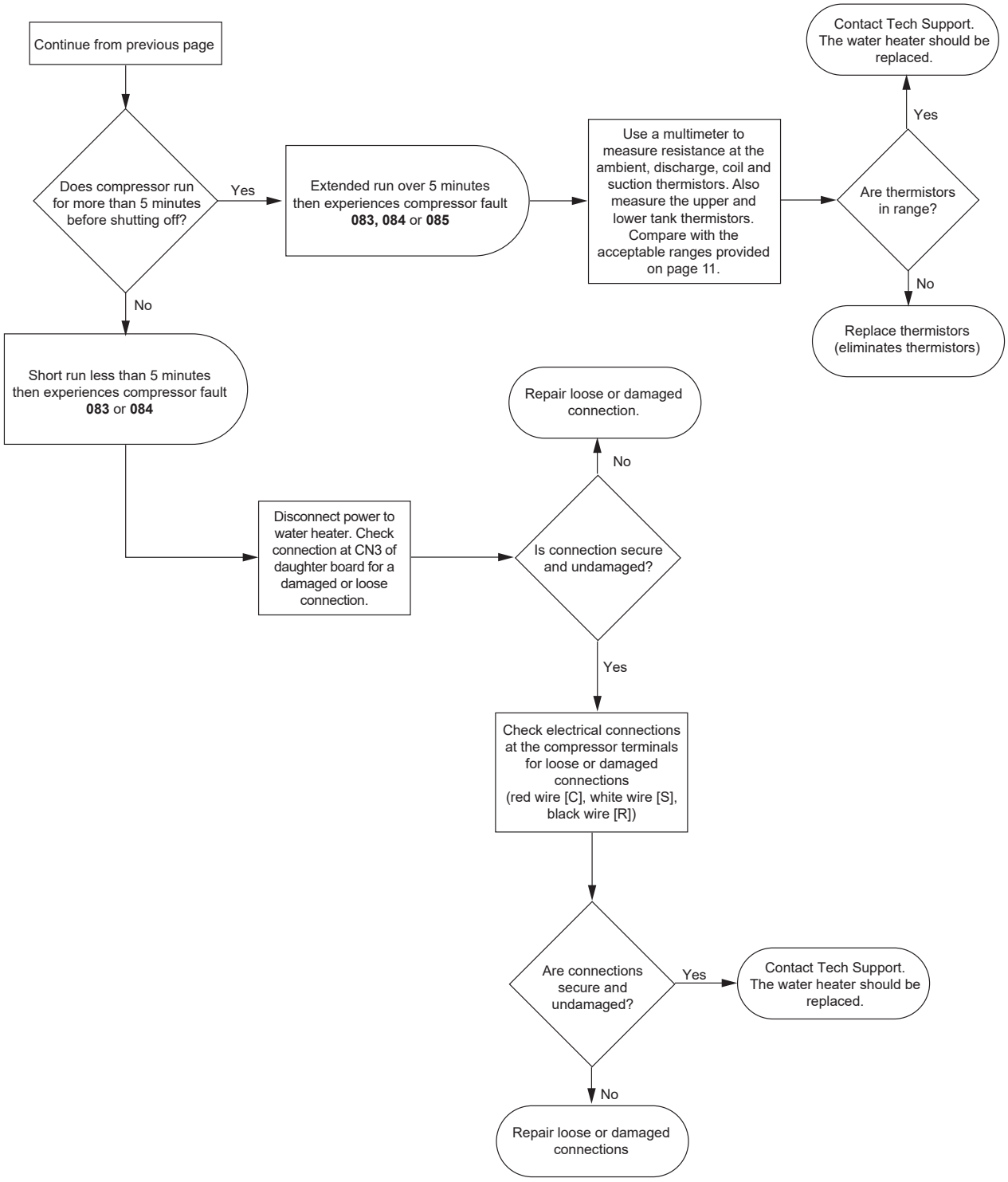
COMPRESSOR CHECK FLOWCHART



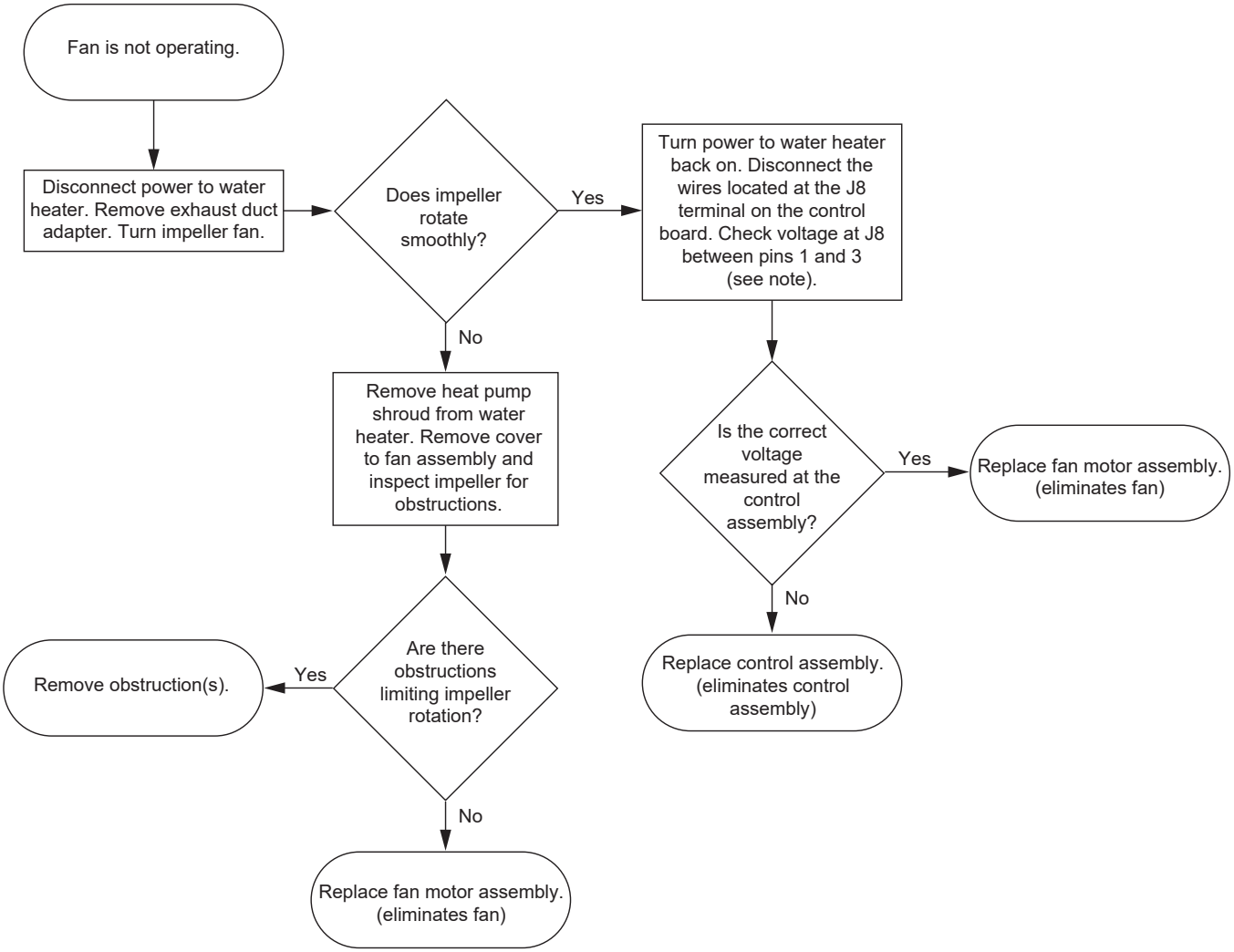
⚠CAUTION! Do not stand in front of compressor terminals when checking windings or electrical connections. Terminals can in some cases dislodge and eject under pressure.

⚠WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. When you are finished, be sure all covers are secured and connections are secure to reduce the risk of fire and electric shock

COMPRESSOR CHECK FLOWCHART



FAN CHECK FLOWCHART



NOTICE: Proper fan voltage is either 170V DC ± 15% (for 120V models) or 340V DC ± 15% (for 208V/240V models). Refer to the "Power Cycling the Unit" section on page 14.

Table 3: FAN MOTOR RESISTANCE

TERMINAL CHECK	RESISTANCE VALUES
VDC (Red) - GND (Black)	∞
VCC (White) - GND (Black)	1K-2KΩ
VSP (Yellow) - GND (Black)	100K-300KΩ
FG (Blue) - GND (Black)	∞

A.O. SMITH APP SETUP AND CONNECTIVITY

The A. O. Smith App must be downloaded to connect to, control and monitor the water heater remotely.

Download App

1. Locate the Quick Reference Guide located on the water heater.
2. Scan the QR code on the Quick Reference Guide with your device to be taken directly to the app (Figure 131).

⚠ **HELP:** If the Quick Reference Guide is unavailable, download the app from the App Store or Google Play.

Create User Account

1. Select “Create My Account” located at the bottom of the *Welcome* screen (Figure 132).
2. Select either “Homeowner” or “Professional” as the User Type, then select “Save & Continue” at the bottom of the screen (Figure 133).

Homeowner User Type:

If you own and use a compatible water heater in a typical residential setting, choose “Homeowner.”

Input the required information to complete account registration (Figure 134).

NOTE: Password must contain at least: 8 characters, one lowercase letter, one uppercase letter, one number, and one special character.

Accept the Terms & Conditions and Privacy Policy, then select “Create My Account” located at the bottom of the screen.

Professional User Type:

If you install, recommend, manage or purchase compatible water heaters for a company or building, choose “Professional.”

A professional will be asked to select a job function (Figure 135).

Input the required information to complete account registration (Figure 136).

NOTE: Password must contain at least: 8 characters, one lowercase letter, one uppercase letter, one number, and one special character.

Accept the Terms & Conditions and Privacy Policy, then select “Create My Account” located at the bottom of the screen.

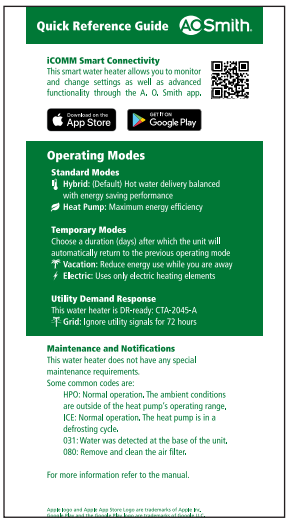


Figure 131 - Quick Reference Guide

Figure 132 - Create My Account

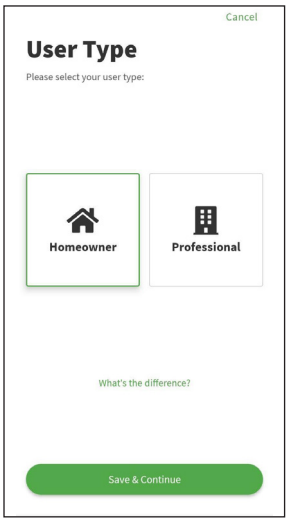


Figure 133 - User Type

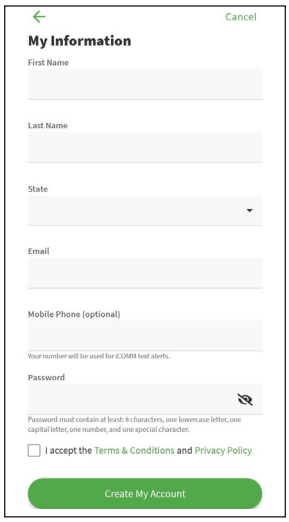


Figure 134 - Homeowner Info

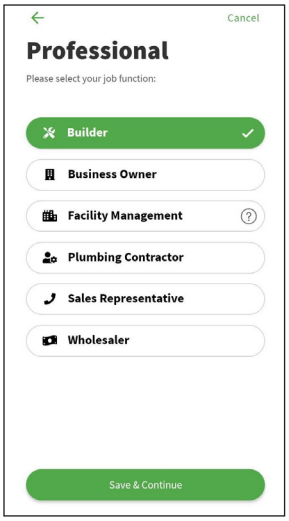


Figure 135 - Professional Job Function

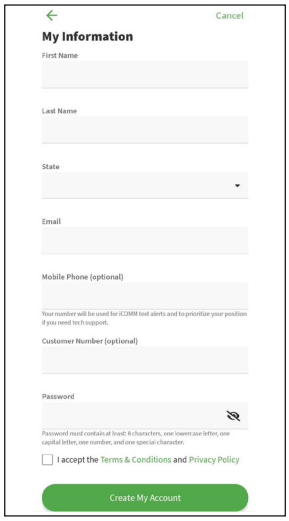


Figure 136 - Professional Info

APPENDIX

A.O. SMITH APP SETUP AND CONNECTIVITY

Once the user account has been registered successfully, the app will prompt you to add the water heater.

NOTE: There is no 'account registration successful' screen. Instead, if account registration is successful, you will be taken to the *Let's Get Started* screen.

Add Water Heater

1. Select "Add My Water Heater" from the *Let's Get Started* screen (Figure 137).
2. Input the required installation information (Figure 138). You may rename the water heater at any time.
3. Allow the app to access your camera when prompted. Use the camera on your device to scan the Serial Number QR Code located on the rating plate (Figure 139).

Alternatively, you may select the option at the bottom of the screen to "Enter Serial Number Manually." This will allow you to manually enter the serial number located on the rating plate.

4. Next you will be asked to scan the DSN (Device Serial Number) QR Code located on the control assembly behind the face plate (Figure 140).

Alternatively, you may select the option at the bottom of the screen to "Enter DSN Manually." This will allow you to manually enter the DSN value located on the control assembly.

NOTE: To locate the DSN value QR code, use a Phillips screwdriver to remove the two (2) screws which secure the face plate to the control assembly (Figure 141). Remove the face plate to reveal the DSN value and QR code (Figure 142).

HELP: QR Code Not Recognized

If you receive the "QR Code Not Recognized" message above, or if the app indicates the water heater serial is incompatible, you should do the following:

✓ Confirm the app is allowed access to your camera.

✓ Confirm you are scanning the correct QR Code.

✓ To complete **Step 3**, you must scan the QR Code on the rating plate located on the side of the water heater.

✓ To complete **Step 4**, you must scan the QR Code on the control assembly located on the front of the water heater.

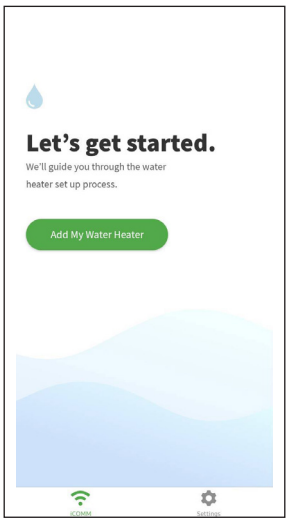


Figure 137 - Add My Water Heater

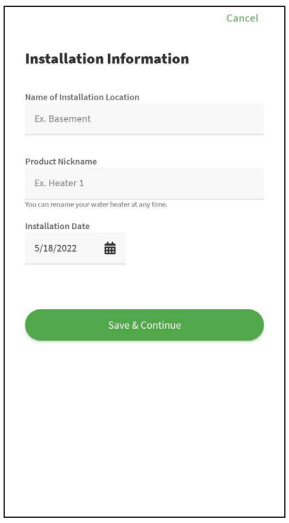


Figure 138 - Installation Information

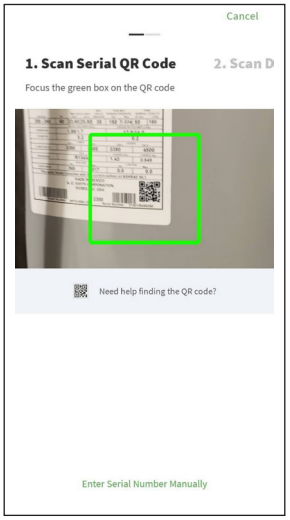


Figure 139 - Scan Serial QR Code

Figure 140 - Scan DSN QR Code

Figure 141 - Face Plate Screws (2x)

Figure 142 - DSN Value QR Code

APPENDIX

HELP: QR Code Not Recognized

If you continue to receive the message above, contact the Technical Assistance Hotline which is listed on the water heater's warranty sheet for further assistance.

5 Once the water heater serial number has been registered successfully, you will be taken to the water heater home screen and prompted to connect the water heater. Select the option to "Connect" (Figure 143).

6 Choose to connect via Wi-Fi or Bluetooth (Figure 144).

NOTE: Bluetooth connectivity available for Heat Pump units only.

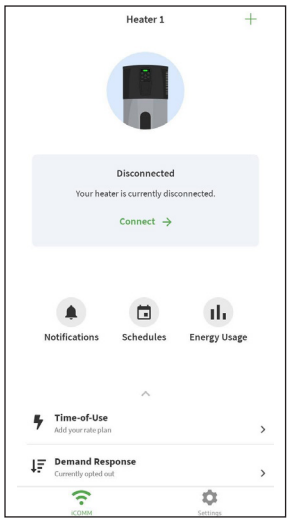


Figure 143 - Connect Heater

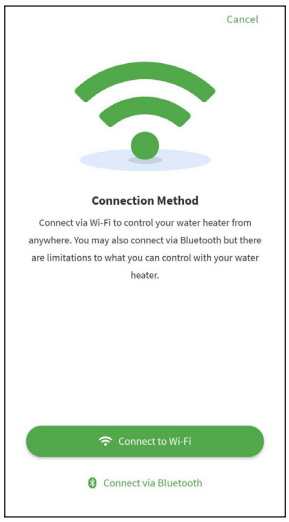


Figure 144 - Connect to Wi-Fi

Configure Wi-Fi in App:

Observe the status of the Wi-Fi button LED indicator located on the water heater control assembly.

If the LED indicator is off, press the Wi-Fi button to activate the Wi-Fi radio. The LED indicator will begin to flash green. The Wi-Fi radio is now on and ready to be configured within the app. Proceed to **Step 1** (see Page 70).

However, if the LED indicator is solid green, the Wi-Fi radio was previously connected to a local network and may need to be reset.

HELP: Follow the procedure(s) below to reset the Wi-Fi connection or restore the Wi-Fi radio to factory settings:

Turn Wi-Fi Radio Off (All Units)

Press and hold the Wi-Fi button for 3 seconds (or until you hear a single beep). This will turn the Wi-Fi radio off, but will remember saved Wi-Fi networks.

Restore Wi-Fi Radio to Factory Settings (Electric Units Only)

Press and hold the Wi-Fi button and ⌃ for 3 seconds. This action deletes any saved Wi-Fi networks, and also turns the Wi-Fi radio off.

Restore Wi-Fi Radio to Factory Settings (Heat Pump Units Only)

Press and hold the Wi-Fi button for 10 seconds. You may hear short beeps, but continue to hold the button for 10 seconds to initiate the factory reset process for the Wi-Fi radio. Once that process has started, you will hear a short beep followed by a long beep. This action deletes any saved Wi-Fi networks, and also turns the Wi-Fi radio off.

A.O. SMITH APP SETUP AND CONNECTIVITY

Connect Wi-Fi in App:

1 Enable Wi-Fi connectivity on your device. Confirm the LED indicator is flashing green on the control assembly. If so, select the option to “Connect to Wi-Fi Now” at the bottom of the screen (Figure 145).

2 The app will display a temporary Wi-Fi network to connect to your device. Select the network that matches the water heater DSN value, and your device will connect to the Wi-Fi radio (Figure 146). The app will begin the communication process of linking the water heater to the Wi-Fi router.

3 Select your preferred Wi-Fi network from the list provided within the app (Figure 147). The LED indicator will pulse from dim to bright when attempting to connect to the local network. Once connected to a Wi-Fi network, the temporary connection between your device and the water heater will be automatically terminated.

NOTE: Connecting to a Wi-Fi network that has been secured and password protected is recommended.

⚠ **HELP:** If the app does not prompt you with a list of available Wi-Fi networks, access Wi-Fi settings on your device and select your preferred network.

4 Enter the Wi-Fi password (Figure 148).

5 Once the water heater has successfully connected to your preferred local Wi-Fi network, the app will prompt you with the *Water Heater Added* screen. Select “Return to Dashboard” at the bottom of the screen to then configure the water heater Set Point, Mode, and Time of Use Rate Plan if applicable (Figure 149).

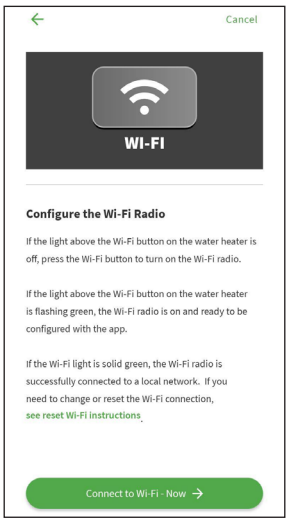


Figure 145 - Configure Wi-Fi Radio

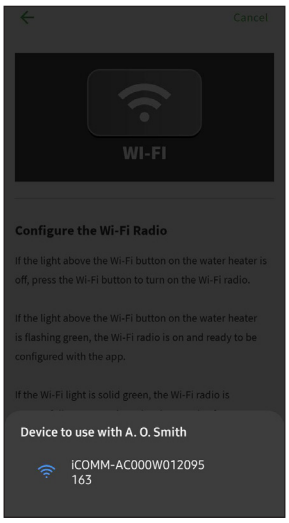


Figure 146 - Connect to iCOMM

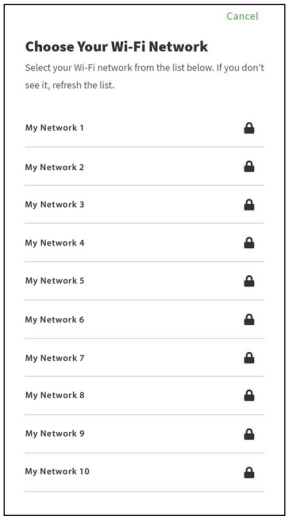


Figure 147 - Select Wi-Fi Network

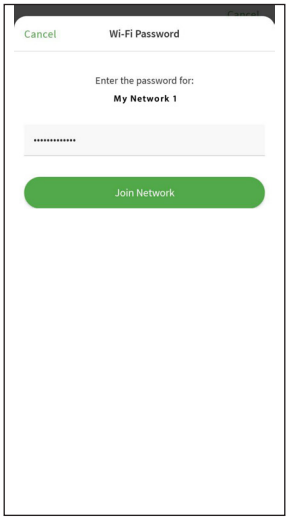


Figure 148 - Enter Wi-Fi Password

Figure 149 - Water Heater Added

APPENDIX

A.O. SMITH APP SETUP AND CONNECTIVITY

⚠ **HELP:** If your device is unable to connect to the water heater, or if the water heater is unable to connect to your preferred Wi-Fi network (Figures 150 & 151), you may choose to select “Try Again” or select “Set Up Manually” at the bottom of the screen to begin the manual Wi-Fi configuration process.

Connect Wi-Fi Manually:

1. Select “Set Up Manually” from the *Unable to Connect* screen. The app will alert you to stay connected to the iCOMM network, even though it does not provide internet access (Figure 152). Select “Continue” to proceed to the next step.

NOTE: If your device asks if you would like to stay connected to the iCOMM network at any point during the process, select “Yes.”

2. The app will confirm the water heater is broadcasting a Wi-Fi signal. If the water heater Wi-Fi signal is detected, the app will ask you to manually connect to the iCOMM network via the Wi-Fi settings on your device (Figure 153).

3. Open the Wi-Fi settings menu on your device and search for the iCOMM network. Connect to the iCOMM network (Figure 154). Return to the app and select “Continue” to proceed to the next step.

4. Select “Connected” on the following screen. Your device should still be connected to the iCOMM network (Figure 155).

⚠ **HELP:** The screen referenced in Figure 155 may display an inaccurate product image with instructions. If this is the case, follow **Steps 1 - 6** in this section of the guide to successfully connect the water heater to your preferred Wi-Fi network.

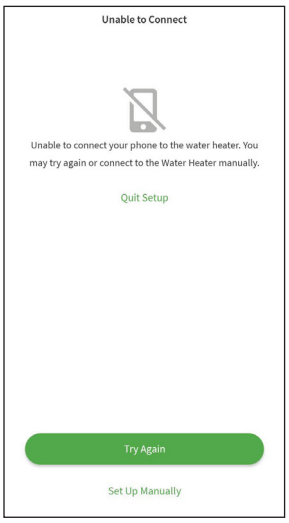


Figure 150 - Unable to Connect Device

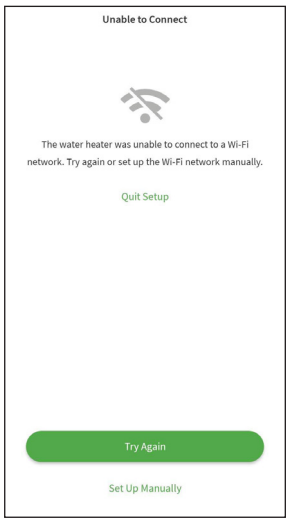


Figure 151 - Unable to Connect Heater

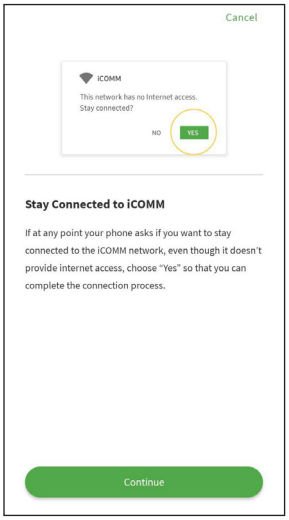


Figure 152 - Stay Connected to iCOMM

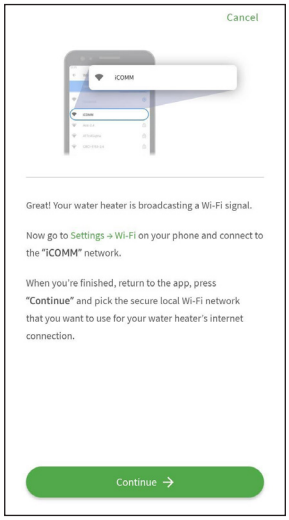


Figure 153 - Go to Device Settings

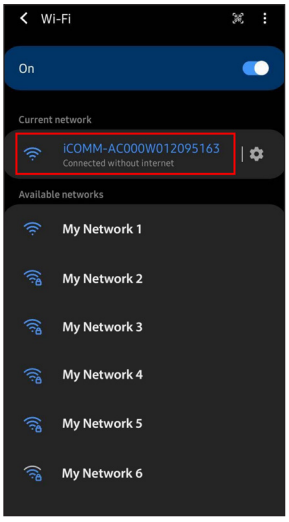


Figure 154 - Wi-Fi Settings on Device

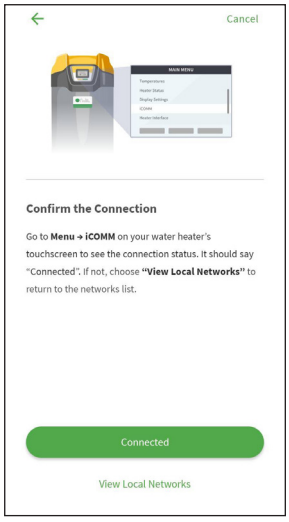


Figure 155 - Confirm Connection

A.O. SMITH APP SETUP AND CONNECTIVITY

5 The app will prompt you to disconnect from the iCOMM network, and connect to your preferred local Wi-Fi network (Figure 156). Open the Wi-Fi settings menu on your device, search for you preferred Wi-Fi network, and connect. Return to the app and select “Done” at the bottom of the screen.

6 Once the water heater has successfully connected to your preferred local Wi-Fi network, the app will prompt you with the *Water Heater Added* screen (Figure 157). Select “Return to Dashboard” at the bottom of the screen to then configure the water heater Set Point, Mode, and Time of Use Rate Plan if applicable.

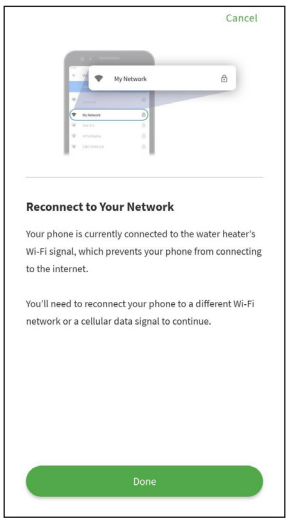


Figure 156 - Reconnect to Wi-Fi

Figure 157 - Water Heater Added

Connect Bluetooth in App:

1. Select the option to “Connect via Bluetooth” at the bottom of the screen (Figure 158).

2. Enable Bluetooth on your device. You may do so by selecting the enable button in app (Figure 159), or manually from your device settings.

⚠ **HELP:** If you experience difficulty enabling Bluetooth in app, go to your device settings to manually enable Bluetooth (Figure 160).

3. Enable Location on your device. You may do so by selecting the enable button in app (Figure 159), or manually from your device settings. Allow the app to access your device’s location when prompted (Figure 161).

NOTE: You will not be able to continue until both Bluetooth and Location have been enabled.

4. Select the “Next” button at the bottom of the screen to continue once Bluetooth and Location have been enabled (Figure 162).

5. Observe the status of the Bluetooth button LED indicator located on the water heater control assembly.

If the LED indicator located on the control assembly is off, press the Bluetooth button once to activate pairing mode. The control assembly will beep once and the LED indicator will begin to flash green. The Bluetooth radio is now in pairing mode, and is ready to connect with the app.

When the LED indicator turns solid green, your device has paired with Bluetooth and will automatically take you to the next screen (Figure 163).

NOTE: The Bluetooth connection will terminate after ten (10) minutes of inactivity.

⚠ **HELP:** To manually deactivate pairing mode, press and hold the Bluetooth button for three (3) seconds. The control assembly will beep once and the LED indicator will turn off.

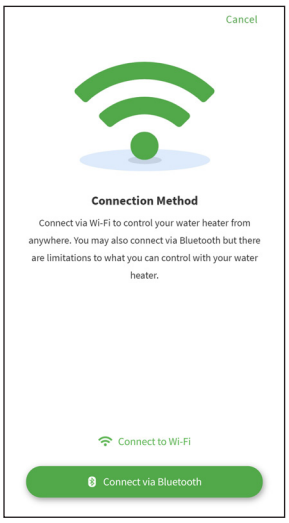


Figure 158 - Connect via Bluetooth

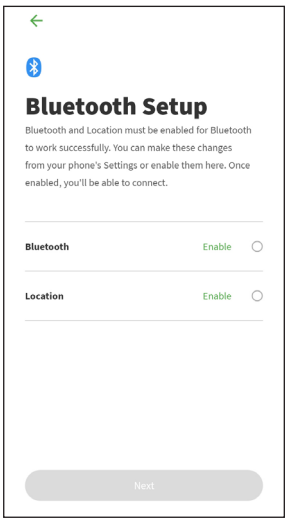


Figure 159 - Enable Options

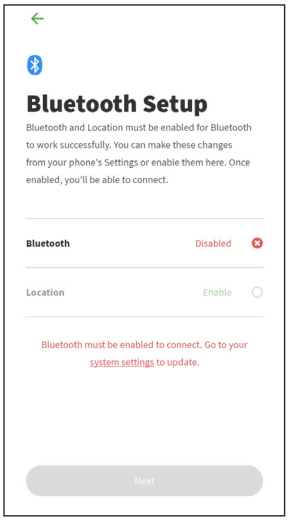


Figure 160 - Enable Bluetooth

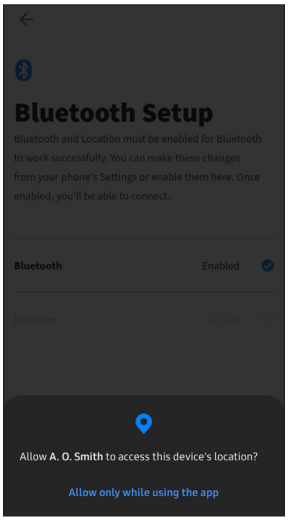


Figure 161 - Allow Location

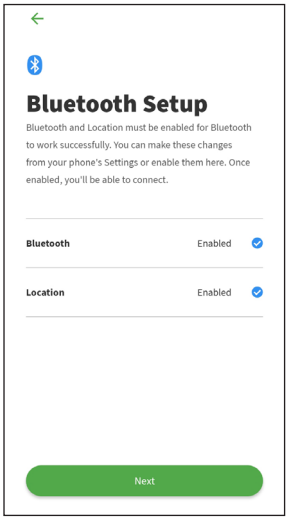


Figure 162 - Confirm Options Enabled

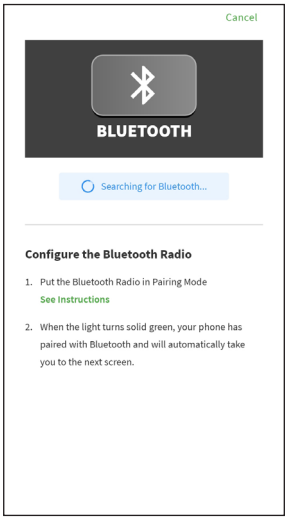


Figure 163 - Configure Bluetooth Radio

A.O. SMITH APP SETUP AND CONNECTIVITY

6 Once the water heater has successfully connected to Bluetooth, the app will prompt you with the *Water Heater Added* screen (Figure 164). Select “Return to Dashboard” at the bottom of the screen to then configure the water heater Set Point, Mode, and Time of Use Rate Plan if applicable.

HELP: Follow the procedure as outlined below if you were unable to establish a connection via Bluetooth:

1. Deactivate pairing mode at the control assembly. To manually deactivate pairing mode, press and hold the Bluetooth button for three (3) seconds. The control assembly will beep once and the LED indicator will turn off.
2. Reactivate pairing mode at the control assembly. To manually reactivate pairing mode, press the Bluetooth button once. The control assembly will beep and the LED indicator will begin to flash green.
3. Select the “Try Again” button located at the bottom of the screen (Figure 165).
4. Alternatively, you may choose to connect to a Wi-Fi network for more control over your water heater (see page 69).

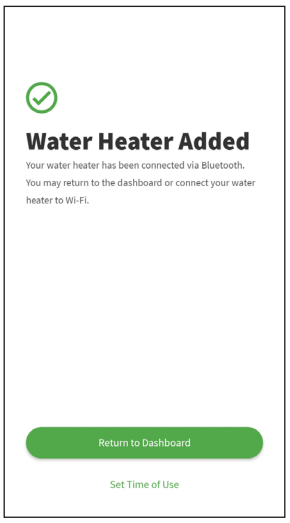


Figure 164 - Water Heater Added

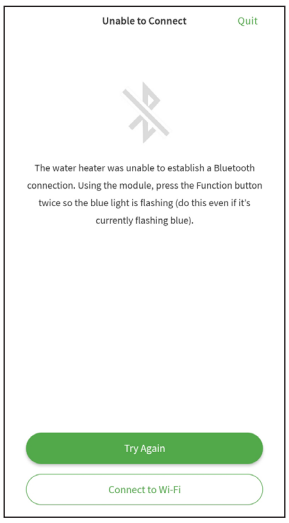


Figure 165 - Unable to Connect

DAUGHTER BOARD OVERVIEW (ALL MODELS)

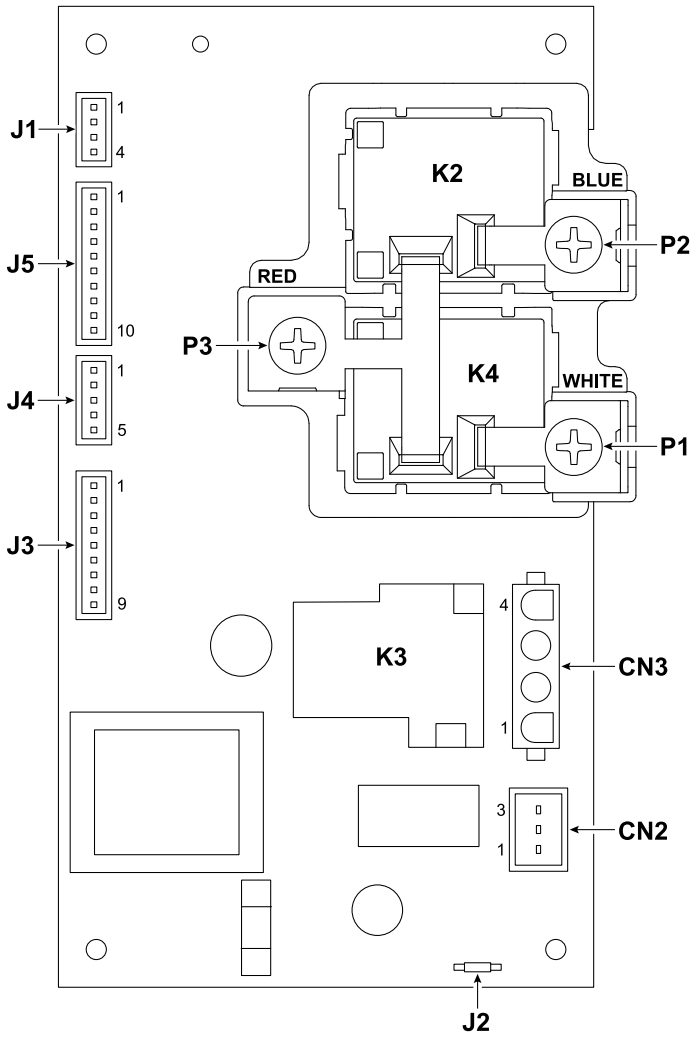


Figure 166 - Daughter Board

J2 LINE 2:

• NULL LINE

CN2 UNUSED:

• PIN 1 - LINE 2
• PIN 2 - UNUSED
• PIN 3 - CONNECTED TO K1 RELAY

K3 COMPRESSOR RELAY:

• CONTROL THE COMPRESSOR POWER

CN3 COMPRESSOR POWER:

• PIN 1 - LINE 1
• PIN 2 - LINE 1
• PIN 3 - COMPRESSOR POWER
• PIN 4 - COMPRESSOR POWER

J3 (COMMUNICATE WITH THE CONTROL BOARD):

• PIN 1 - COMPRESSOR RELAY 12V DRIVE DIG OUT
• PIN 2 - COMPRESSOR RELAY ENABLE DIG OUT
• PIN 3 - EEV CH1 DIG OUT
• PIN 4 - EEV CH2 DIG OUT
• PIN 5 - EEV CH3 DIG OUT
• PIN 6 - EEV CH4 DIG OUT
• PIN 7 - FOUR VALVE OUT
• PIN 8 - GND
• PIN 9 - +12V

J4 EEV (CONNECT WITH EEV):

• PIN 1 - EEV CH1 DIG
• PIN 2 - EEV CH2 DIG
• PIN 3 - EEV CH3 DIG
• PIN 4 - EEV CH4 DIG
• PIN 5 - +12V

J5 (COMMUNICATE WITH THE CONTROL BOARD):

• PIN 1 - UPPER TEMPERATURE SENSOR
• PIN 2 - UPPER RELAY +24V DRIVE
• PIN 3 - UPPER RELAY ENABLE DRIVE
• PIN 4 - FREQUENCY DET DIG IN
• PIN 5 - UPPER RELAY DETECTION
• PIN 6 - LOWER TEMPERATURE SENSOR
• PIN 7 - LOWER RELAY +24V DRIVE
• PIN 8 - LOWER RELAY ENABLE DRIVE
• PIN 9 - LOWER RELAY DETECTION
• PIN 10 - VOL ANA IN

J1 (CONNECT WITH TEMPERATURE SENSOR):

• PIN 1 - UPPER TEMPERATURE SENSOR
• PIN 2 - DGND
• PIN 3 - LOWER TEMPERATURE SENSOR
• PIN 4 - DGND

CONTROL BOARD OVERVIEW (ALL MODELS)

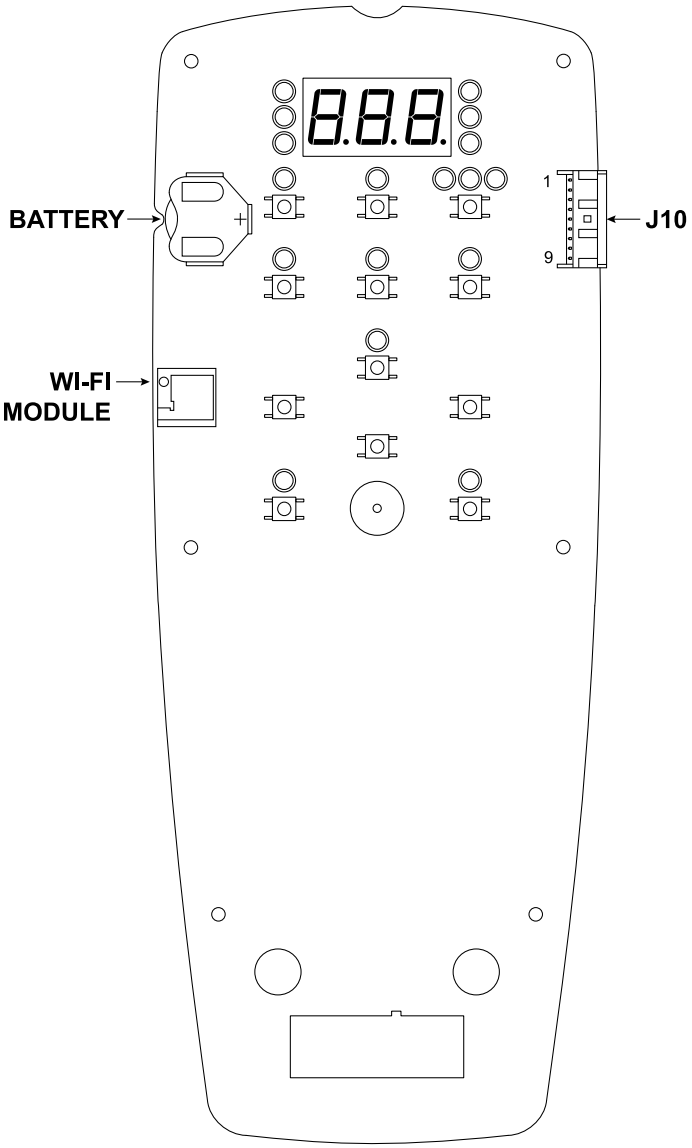


Figure 167 - Control Board (Front Side)

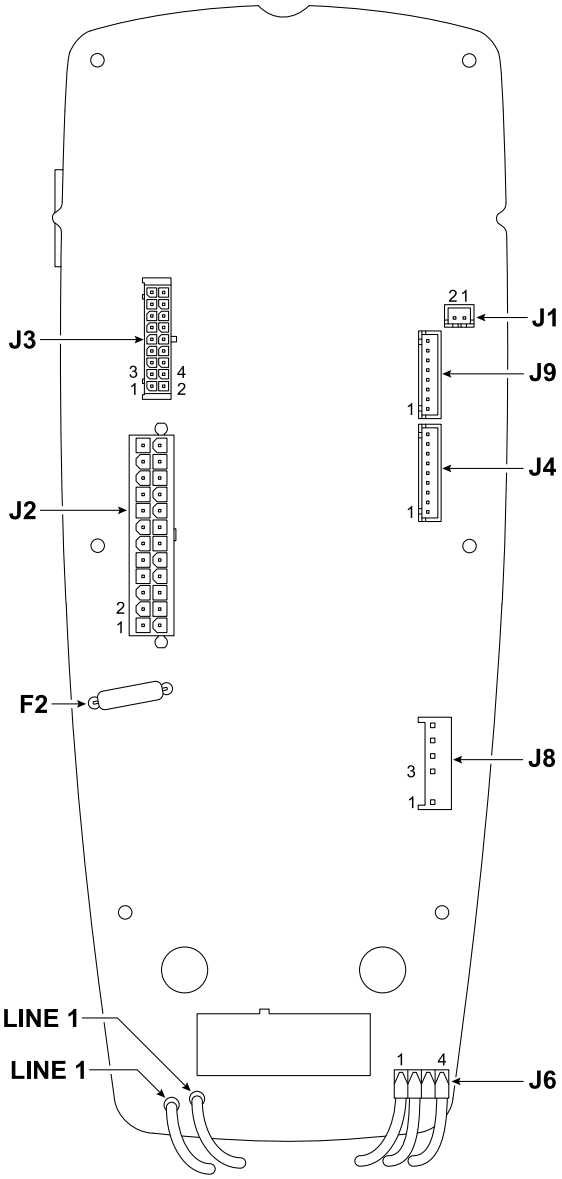


Figure 168 - Control Board (Back Side)

NOTICE: See following page for Control Board callouts.

APPENDIX

CONTROL BOARD OVERVIEW (ALL MODELS)

J1 WATER ALARM:

- PIN 1 - WATER ALARM SENSOR
- PIN 2 - DGND

J2 POWER/RELAY/ECO/LEAK DETECTION:

- PIN 1 - UNUSED
- PIN 2 - UNUSED
- PIN 3 - AC INPUT L1
- PIN 4 - UNUSED
- PIN 5 - UNUSED
- PIN 6 - LOWER SENSOR
- PIN 7 - GND
- PIN 8 - LOWER RELAY +24V DRIVE
- PIN 9 - LOWER RELAY ENABLE DRIVE
- PIN 10 - RELAY CONNECTION
- PIN 11 - ECO DETECTION
- PIN 12 - DGND
- PIN 13 - AC INPUT L2
- PIN 14 - UNUSED
- PIN 15 - UNUSED
- PIN 16 - UNUSED
- PIN 17 - PE GND
- PIN 18 - UPPER SENSOR
- PIN 19 - GND
- PIN 20 - UPPER RELAY +24V DRIVE
- PIN 21 - UPPER RELAY ENABLE DRIVE
- PIN 22 - RELAY CONNECTION
- PIN 23 - ECO DETECTION
- PIN 24 - LEAK DETECTION

J3 BYPASS VALVE AND SAC:

- PIN 1 - DGND
- PIN 2 - BYPASS VALVE CCW DIG IN
- PIN 3 - +5V
- PIN 4 - BYPASS VALVE CH1 DIG OUT
- PIN 5 - BYPASS VALVE CH2 DIG OUT
- PIN 6 - +12V
- PIN 7 - BYPASS VALVE CH3 DIG OUT
- PIN 8 - BYPASS VALVE CH4 DIG OUT
- PIN 9 - DGND
- PIN 10 - BYPASS VALVE HALL DIG IN
- PIN 11 - +5V
- PIN 12 - BYPASS VALVE NTC1 ANA IN
- PIN 13 - DGND
- PIN 14 - BYPASS VALVE RESERVED DIG IN
- PIN 15 - UNUSED
- PIN 16 - BYPASS VALVE NTC2 ANA IN
- PIN 17 - DGND
- PIN 18 - SAC ANODE

J4 DRIVE COMMUNICATION WITH DAUGHTER BOARD:

- PIN 1 - COMPRESSOR 12V ENABLE DIG OUT
- PIN 2 - COMPRESSOR RELAY DIG OUT
- PIN 3 - EEV CH1 DIG OUT
- PIN 4 - EEV CH2 DIG OUT
- PIN 5 - EEV CH3 DIG OUT
- PIN 6 - EEV CH4 DIG OUT
- PIN 7 - FOUR VALVE OUT
- PIN 8 - DGND
- PIN 9 - +12V

J9 SENSOR:

- PIN 1 - AMBIENT TEMPERATURE SENSOR
- PIN 2 - DGND
- PIN 3 - COIL TEMPERATURE SENSOR
- PIN 4 - DGND
- PIN 5 - SUCTION TEMPERATURE SENSOR
- PIN 6 - DGND
- PIN 7 - DISCHARGE TEMPERATURE SENSOR
- PIN 8 - DGND

F2 FUSE:

- PIN 1 - F2 (3.15A, 250V) FUSES

J8 DC FAN:

- PIN 1 - FAN POWER
- PIN 2 - UNUSED
- PIN 3 - GND
- PIN 4 - FAN INTERNAL CIRCUIT POWER
- PIN 5 - FAN SPEED CONTROL VOLTAGE
- PIN 6 - FAN SPEED FEEDBACK

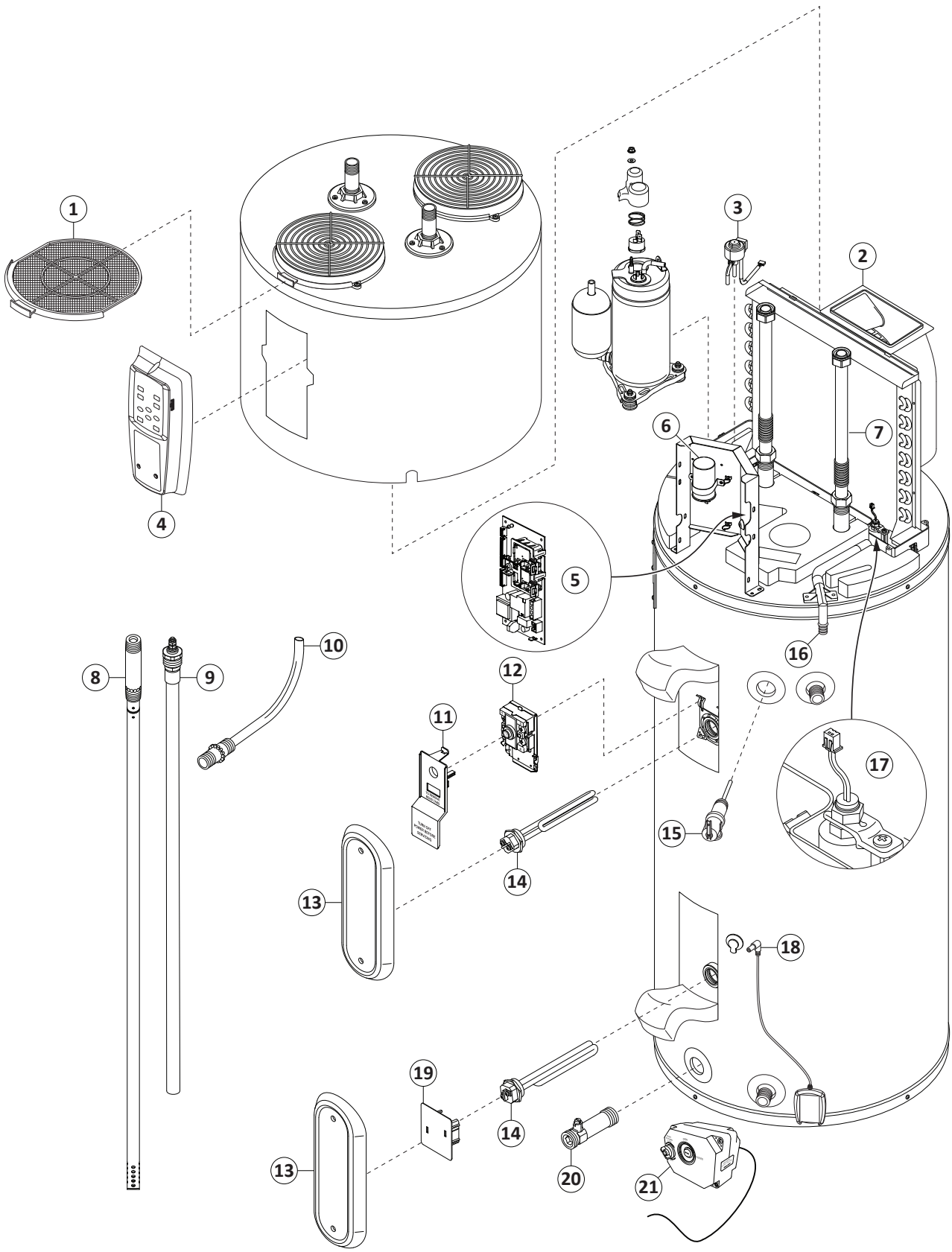
J6 485 COMMUNICATION:

- PIN 1 - 485-A
- PIN 2 - 485-B
- PIN 3 - UNUSED
- PIN 4 - DGND

J10 WATER LEAKAGE & SHUT-OFF VALVE:

- PIN 1 - DGND
- PIN 2 - DGND
- PIN 3 - CLOSED FEEDBACK
- PIN 4 - CUT MOTOR B
- PIN 5 - CUT MOTOR A
- PIN 6 - OPEN FEEDBACK
- PIN 7 - +12V
- PIN 8 - 485-A
- PIN 9 - 485-B

REPAIR PARTS (STANDARD MODEL)



APPENDIX

REPAIR PARTS (STANDARD MODEL)

REPAIR PARTS

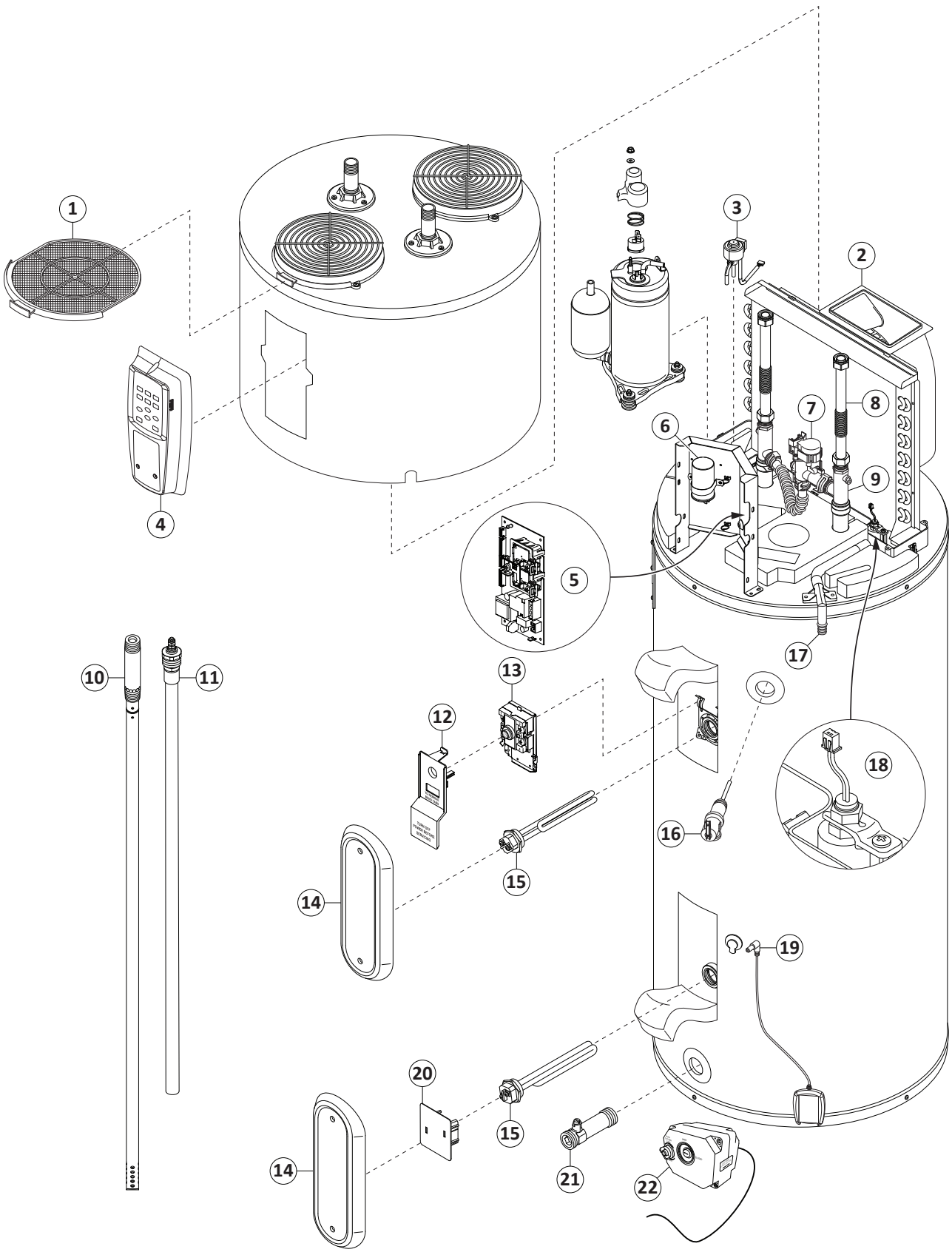
Repair parts may be ordered through your plumber, local distributor, Lowe's®, or by calling our Technical Assistance Hotline which is listed on your warranty. When ordering parts, always give the following information:

1. Model, serial and product number
2. Item number
3. Parts description

ITEM NO.	PARTS DESCRIPTION
1	Air Filter
2	Fan Motor Assembly
3	Electronic Expansion Valve Solenoid
4	Control Assembly
5	Daughter Board, 208V/240V
6	Run Capacitor
7	Flex Hoses (2x), Gaskets
8	Dip Tube, for 50 gallon
	Dip Tube, for 66 gallon
	Dip Tube, for 80 gallon
9	Anode Rod, 37" for all models
10	J-Tube, for 50 gallon
	J-Tube, for 66 and 80 gallon
11	Upper Element Personnel Protector
12	Energy Cut-Off (ECO) Switch
13	Element Access Panel
14	Element, 4500 Watts
15	Temperature & Pressure Relief Valve
16	Condensate Drain Valve
17	Condensate Drain Switch
18	Leak Detection Sensor
19	Lower Element Personnel Protector
20	Drain Valve
21	Automatic Cold Water Shut-Off Valve
22	Upper / Lower Tank Thermistor Assembly*
23	Ambient / Discharge / Coil / Suction Temperature Sensor Assembly*

*Not shown

REPAIR PARTS (PREMIUM MODEL)



APPENDIX

REPAIR PARTS (PREMIUM MODEL)

REPAIR PARTS

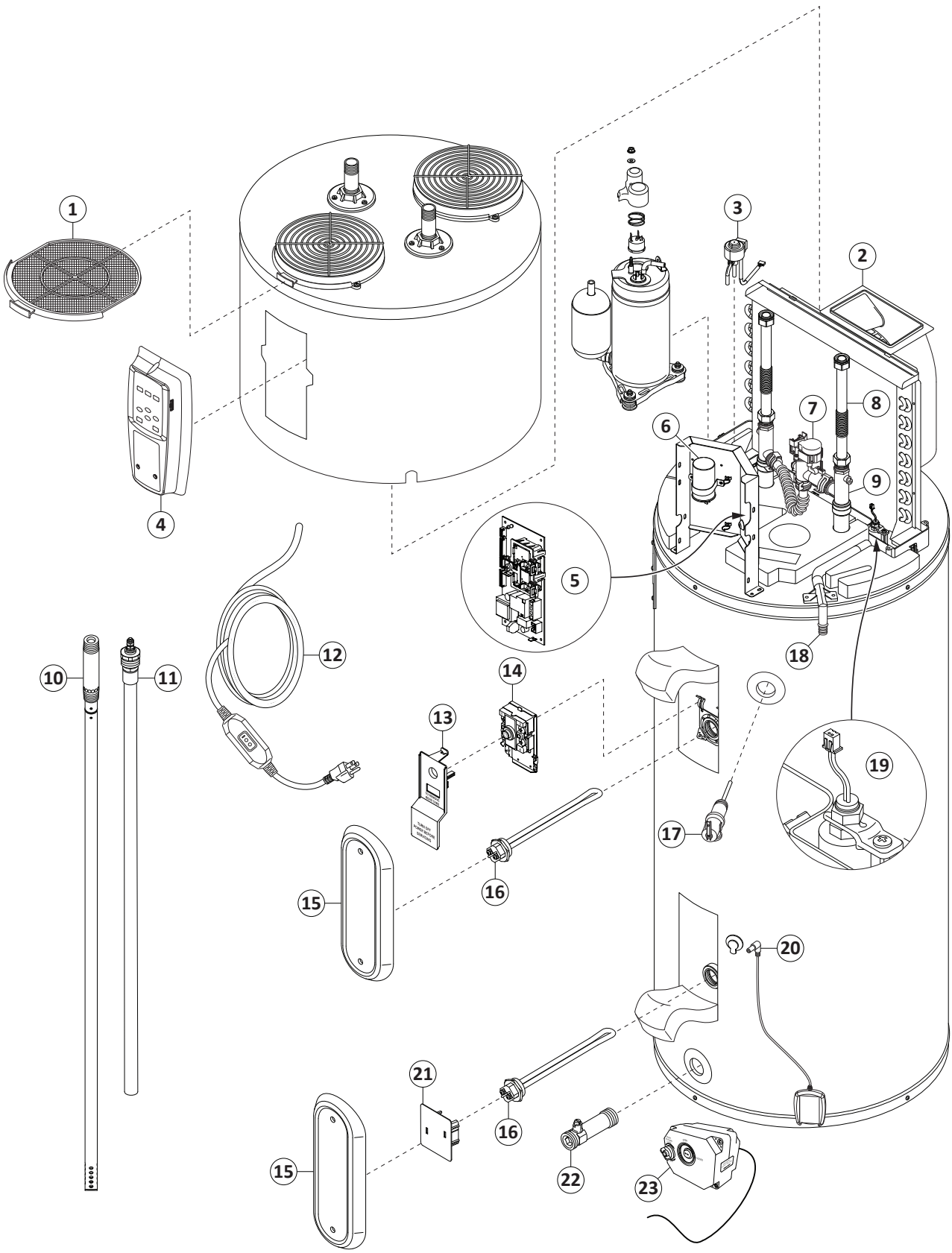
Repair parts may be ordered through your plumber, local distributor, Lowe's®, or by calling our Technical Assistance Hotline which is listed on your warranty. When ordering parts, always give the following information:

1. Model, serial and product number
2. Item number
3. Parts description

ITEM NO.	PARTS DESCRIPTION
1	Air Filter
2	Fan Motor Assembly
3	Electronic Expansion Valve Solenoid
4	Control Assembly
5	Daughter Board, 208V/240V
6	Run Capacitor
7	Smart Valve Assembly
8	Flex Hoses (2x), Gaskets
9	Inlet / Outlet T-Nipple Assembly
10	Dip Tube, for 40 & 50 gallon
	Dip Tube, for 66 gallon
	Dip Tube, for 80 gallon
11	Anode Rod, 37" for all models
12	Upper Element Personnel Protector
13	Energy Cut-Off (ECO) Switch
14	Element Access Panel
15	Element, 4500 Watts
16	Temperature & Pressure Relief Valve
17	Condensate Drain Valve
18	Condensate Drain Switch
19	Leak Detection Sensor
20	Lower Element Personnel Protector
21	Drain Valve
22	Automatic Cold Water Shut-Off Valve
23	Outlet Thermistor Assembly*
24	Upper / Lower Tank Thermistor Assembly*
25	Ambient / Discharge / Coil / Suction Temperature Sensor Assembly*

*Not shown

REPAIR PARTS (120V MODEL)



APPENDIX

REPAIR PARTS (120V MODEL)

REPAIR PARTS

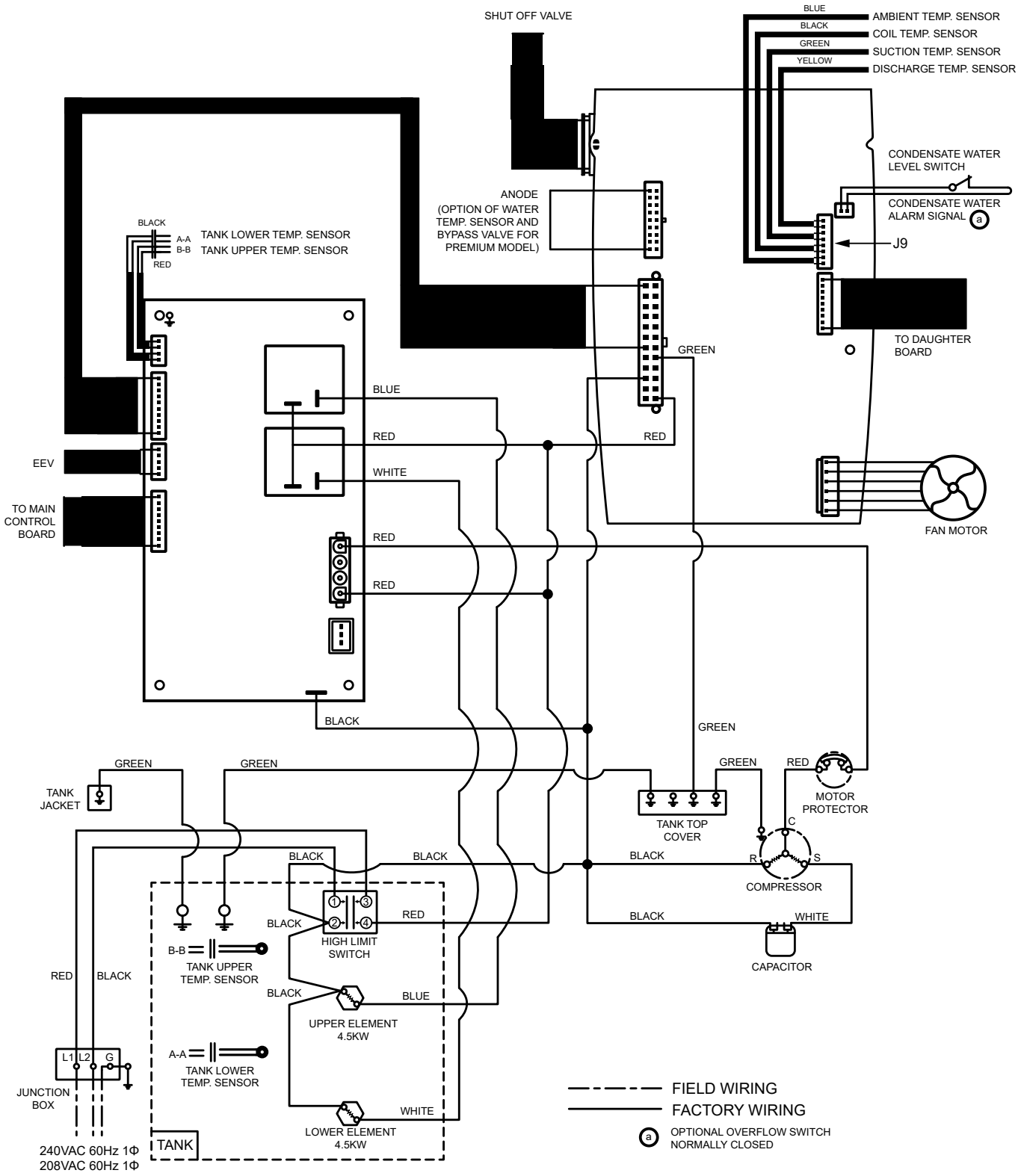
Repair parts may be ordered through your plumber, local distributor, Lowe's®, or by calling our Technical Assistance Hotline which is listed on your warranty. When ordering parts, always give the following information:

1. Model, serial and product number
2. Item number
3. Parts description

ITEM NO.	PARTS DESCRIPTION
1	Air Filter
2	Fan Motor Assembly
3	Electronic Expansion Valve Solenoid
4	Control Assembly
5	Daughter Board, 120V
6	Run Capacitor
7	Smart Valve Assembly
8	Flex Hoses (2x), Gaskets, for 50/66/80 gallon
9	Inlet / Outlet T-Nipple Assembly
10	Dip Tube, for 50 gallon
	Dip Tube, for 66 gallon
	Dip Tube, for 80 gallon
11	Anode Rod, 37" for all models
12	120V Power Cord
13	Upper Element Personnel Protector
14	Energy Cut-Off (ECO) Switch
15	Element Access Panel
16	Element, 900 Watts
17	Temperature & Pressure Relief Valve
18	Condensate Drain Valve
19	Condensate Drain Switch
20	Leak Detection Sensor
21	Lower Element Personnel Protector
22	Drain Valve
23	Automatic Cold Water Shut-Off Valve
24	Outlet Thermistor Assembly*
25	Upper / Lower Tank Thermistor Assembly*
26	Ambient / Discharge / Coil / Suction Temperature Sensor Assembly*

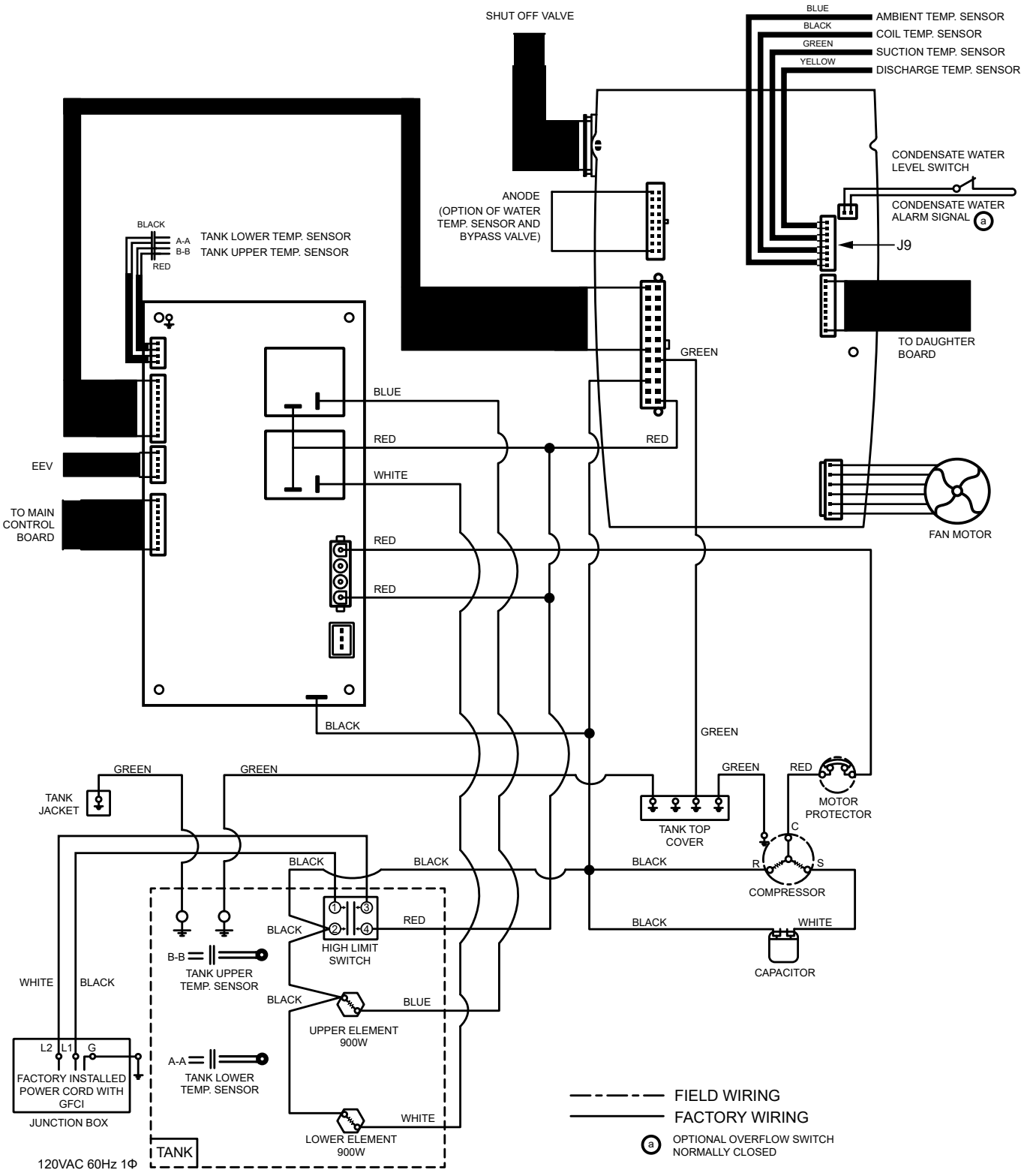
*Not shown

WIRE DIAGRAM (STANDARD & PREMIUM MODEL)



APPENDIX

WIRE DIAGRAM (120V MODEL)



APPENDIX