

EXEL Water Heating System

Installation & Operations Manual

AREF.V2.102324

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Save this manual for future reference

1. PURPOSE

This document provides detailed instructions for installation, operations, and support for Apparent's Excitation Element Water Heating System 1.0 (EXEL). Save this manual for future reference.

Instructions are provided for the installation of the EXEL system including control elements, communication package and web-based application software for installation and customer interface.

As the number of PV panels and electric water tank sizing may vary depending on the model, follow respective manufacturers' guidance for installation and operations to maintain warranties. **All instructions should be read and understood before installation and operation of the system.**

For safety, qualified installers should be trained and conform to safety standards and precautions.

1.2 Disclaimer

Conditions and methods of installation may vary based on location. Apparent Inc. is not responsible for loss, damage, or expense arising from improper installation, operation, maintenance, and/or use of equipment. Apparent reserves the right to change the manual without prior notice.

THIS WATER HEATER IS EQUIPPED WITH ADJUSTABLE THERMOSTATS TO CONTROL WATER TEMPERATURE. HOT WATER TEMPERATURES DESIRED FOR AUTOMATIC DISHWASHER AND LAUNDRY USE CAN CAUSE SCALDS RESULTING IN SERIOUS PERSONAL INJURY AND/OR DEATH. THE TEMPERATURE AT WHICH INJURY OCCURS VARIES WITH THE PERSON'S AGE AND THE TIME OF THE EXPOSURE. THE SLOWER RESPONSE TIME OF CHILDREN, AGED OR DISABLED PERSONS INCREASES THE HAZARDS TO THEM. NEVER ALLOW SMALL CHILDREN TO USE HOT WATER TAP UNATTENDED, OR TO DRAW THEIR OWN BATH WATER. NEVER LEAVE A CHILD OR DISABLED PERSON UNATTENDED IN A BATHTUB OR SHOWER.

WARNING **CAUTION**

FOR SAFE INSTALLATION AND OPERATION - Follow the instructions in the instruction manual provided. A replacement copy may be obtained by writing the manufacturer
This appliance must be installed in accordance with the manufacturer's instructions, local codes, utility company requirements, and/or in the absense of local codes, the latest edition of the National Electrical Code
FOR YOUR SAFETY - DO NOT - store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliances. Keep rags and other combustibles away.
CAUTION - Risk of electric shock. Connect Branch circuit equipment grounding means to water heater. For detailed information refer to instructions manual.
WATER LEAKAGE - Regardless of the material from which a water heater is constructed, it will at some point leak, due to the corrosive action of water. This water heater must not be located in an area where leakage will result in damage to adjacent area or lower floors. When such area cannot be avoided, it is recommended that a suitable catch pan, adequately drained, be installed under the water heater. See instruction manual.
When a supplemental heat source is connected to the Household Electric Storage Tank Water Heater, provision must be made to limit the heat source temperature not to exceed that of the water heater thermostat setting
CAUTION: If the water heater has been retrofitted with supplemental heating equipment you must adjust both the thermostat controlling the supplemental heat source and the thermostat on the water heater to the same temperature. Failure to adjust both thermostats to the same temperature can cause loss of proper temperature control.
CAUTION: To reduce risk of electric shock or fire use only on a utility supply having a maximum 125/230V three wire system
Install temperature and pressure protective equipment required local codes, but no less than a combination of temperature and pressure relief valve certified as meeting the requirements for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22, by a nationally recognized testing that maintains periodic inspection of production of listed equipment or materials. The valve must be oriented, provided with tubing, or otherwise installed so that discharge can exit only within 6 inches above, or at any distance below, the structural floor, and cannot contact any live electrical part
Warning: California law requires that this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See Instruction Manual for information regarding correct installation procedures.
WARNING: Cancer and Reproductive harm www.P65Warnings.ca.gov

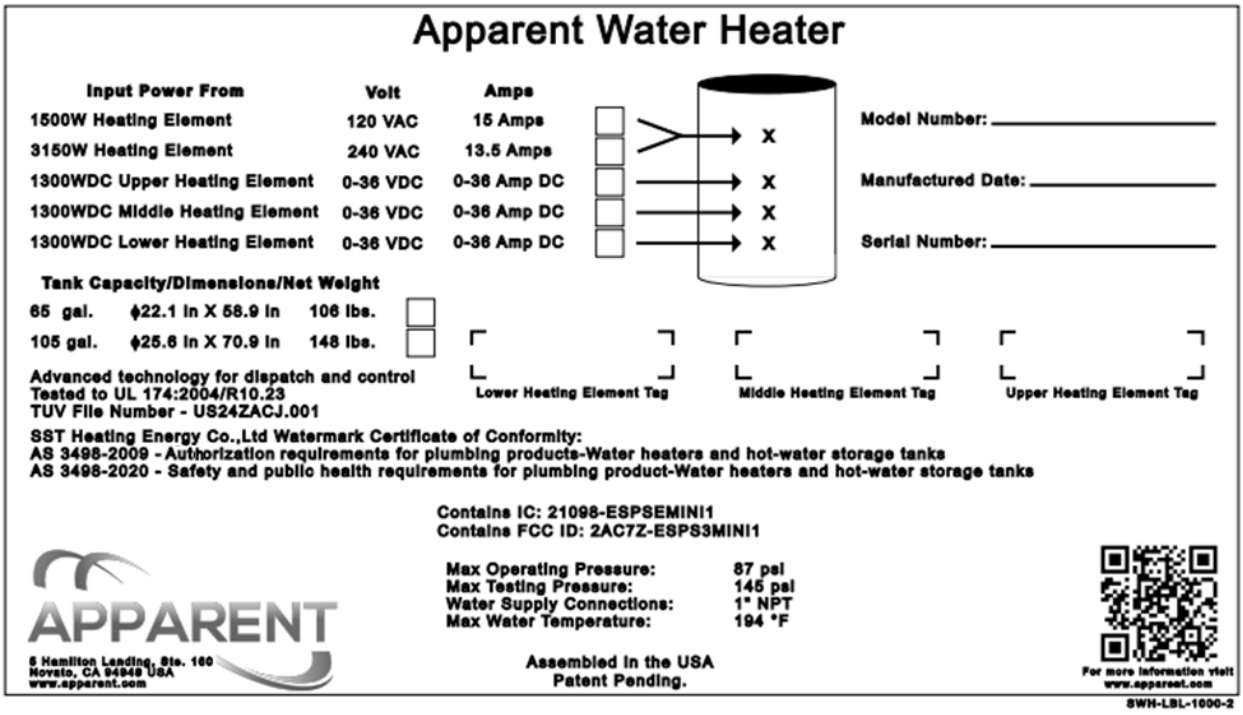


1.3 Precautions & Warning Labels

This system contains DC powered components and an AC powered component for standard installations. Observe all precautions and warning labels per manufacturer specifications.

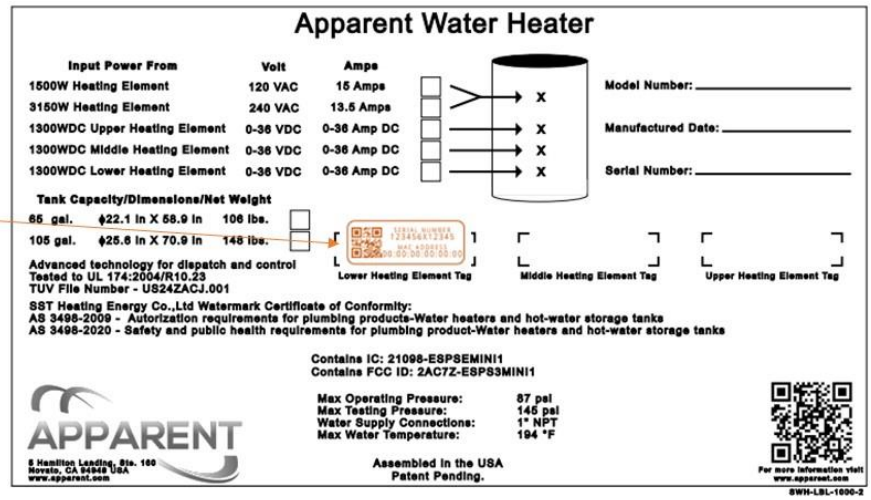
A product configuration label (Figure 1) is provided on Apparent Water Heaters for installers to indicate the installed configurations at site for reference. AC components are standard for the upper element. DC elements up to 3 elements may be installed on standard water tanks depending on the model option.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Observe all safety messages and warning labels to avoid possible injury or death.



(a)

Affix MAC label corresponding to the control card and location to the tank label.



(b)

Figure 1. a) Water Heater Configuration Main Label and b) MAC address label corresponding to control card and element affixed to corresponding installed location on tank.

2. SAFETY

2.1 General Safety

- Consult and follow local codes and other applicable laws concerning required permitting, including installation, inspection requirements, building codes, and regulations.
- PV module should be installed and maintained by qualified personnel. Refer to the panel manufacturer's installation information guide and warranty.
- Follow all electrical safety precautions for all components around the water heating system.
- Wear proper protective clothing as prescribed by local safety codes and laws, including insulated tools when installing equipment.
- Due to the risk of electrical shock, take precautions and follow regulations for all system components, including wires, connectors, panels, and when working in wet conditions.

3. INSTALLATIONS

EXEL 1.0 System is designed to work with standard electric water heaters that have a minimum of two heating elements (top and bottom configurations). Application tank sizes can range from 40 gallons to 100 gallons. Apparent's EXEL standard tank sizes range from 60 to 100 gallons with single element up to three element configurations.

The ExElement, refers to Apparent's DC powered heating element, which is in place of the lower heating element, typically an AC element on standard tank configurations. Figure 2 depicts a standard EXEL water heating system's major components and AC and DC element configuration.

The EXEL Water Heating System is comprised of 3 major components.

1) PV panels (4 panels per each ExElement)
2) Water tank, and
3) Apparent's EXEL Control System and DC Heating Element package.

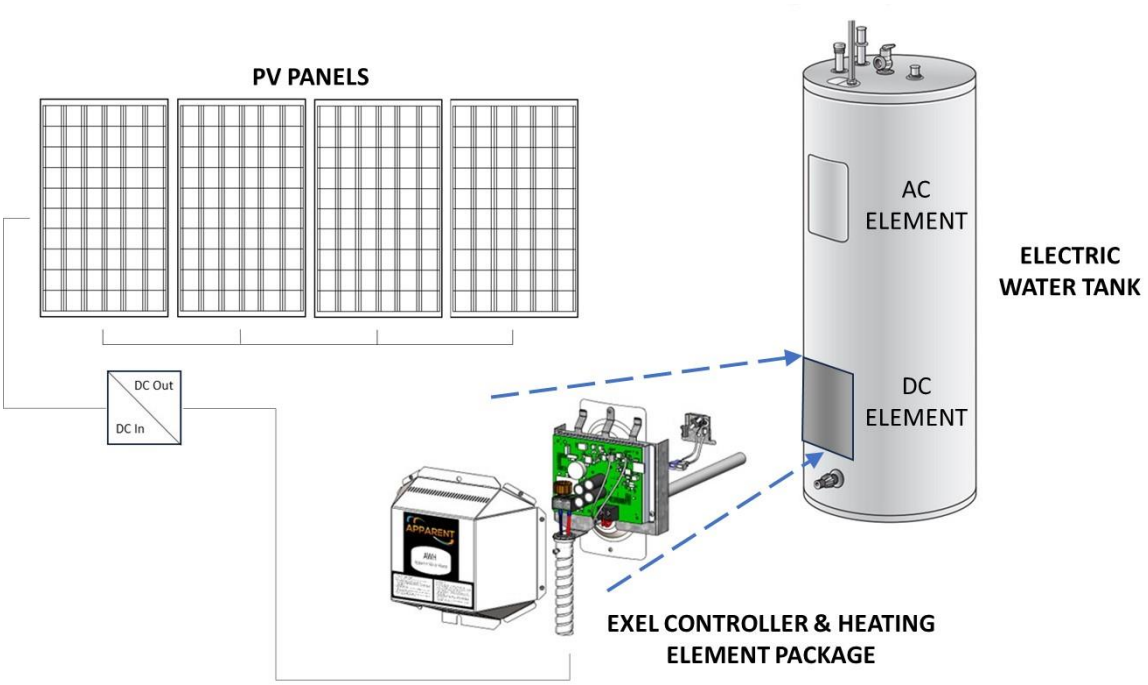


Figure 2. Apparent's EXEL Water Heating System Components in Single DC ExElement configuration.

3.1 PV Panels

The ExElement is designed with an operational voltage range and paired with PV panels connected in parallel using the wiring harness provided for optimal performance. While other PV panels may be used, performance may vary, and warranty may not be guaranteed. Figure 3 summarizes the ratings and performance specifications for the PV panels and the input and output voltage ranges.

- Ensure panels are properly sited and positioned for optimal performance.
- Follow PV manufacturer's instructions for installation, operations, care and maintenance. Observe proper ratings and performance.
- Use Tier 1 rated panels that meet the electrical requirements for the EXEL Control System and DC Heating Element package to ensure the best performance from the water heating system.
- Comply with all permitting and local code requirements for the installation of PV panels, as required.

Input Characteristics	
Input Voltage Range	12.5VDC – 52 VDC
DC Input Protection	70VDC; 50A Fuse Protection Reverse Polarity Protection Short Circuit Protection
Max Connector Ratings	600V, 67A 10 – 6 AWG
Output Characteristics	
Output Power Max	1300 W
Max Connector Ratings	600V, 45A 18 – 8 AWG
Output Protection	Short Circuit Protection, Load faults
Temperature Settings	
Default Factory Setting	125°F (51.7°C) ; 140°F (60°C) with thermostatic mixing valve
Max Settable Water Temperature	158°F (70°C)
Overtemperature Protection	170°F ± 5°F (77°C)
Overtemperature Release	140°F ± 11°F (60°C)
Environmental Characteristics	
Operating Temperature Range; Ambient	-10°C - 40°C
Relative Humidity	95% Non-Condensing
Communications	
2.4GHz WiFi 802.11 b/g/n	

Figure 3. PV Panel and Electrical Specifications.

3.2 Water Tank Heating Element Installation

- Ensure the tank is properly located and installed.
- Follow tank manufacturer's instructions for installation, operations, maintenance to meet warranty requirements.
- Observe recommended temperature settings which will satisfy hot water needs. Default setting for the system is set at 158°F (70°C). **Observe local ordinance and codes for temperature settings**. See Section 3.4 for configuration and settings for control card.
- Tank design and performance will vary based on size and manufacturer. Follow instructions from tank manufacturer for removal of the lower AC heating element.
- See steps in Section 3.3 to replace the lower AC heating element with the DC ExElement, temperature sensor and controller.
- Follow tank water fill-up procedure before connecting power to the heating elements to prevent damage to the elements.

3.3 EXEL Controller Device and Heating Element Package

- The EXEL water heating system is equipped with the ExElement and control card protected by a cover plate.
- For servicing needs, unscrew lower cover plate on the water tank. Remove ONLY the control card, heating element and sensors as needed for troubleshooting or repairs. (Figure 4)

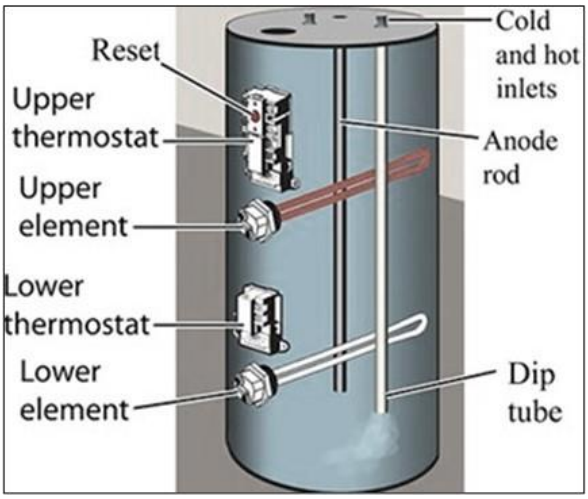


Figure 4. Typical water tank upper and lower thermostats and elements configuration.

- Professional installers are recommended for troubleshooting and repair. Replace with the DC powered ExElement and temperature sensor plate with Apparent parts (Figure 5). Ensure the DC ExElement is properly inserted and screwed in. Ensure the temperature sensor bracket is in contact with the inner tank.

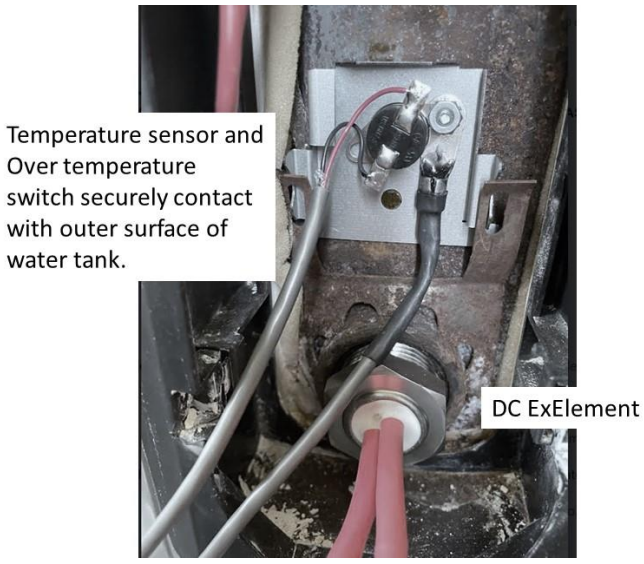


Figure 5. Positioning of ExElement and temperature sensors.

- Secure the Controller mount to the tank and secure the control device to the mount using screws provided. (Figure 6)

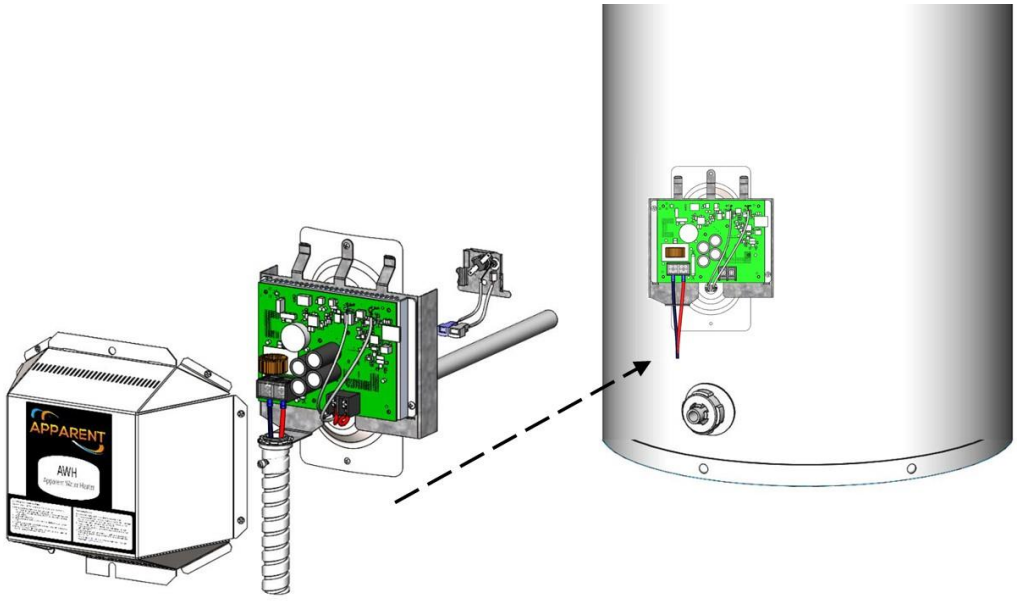


Figure 6. Attached control device using mounting bracket to tank.

- Connect the 2 sensors - a temperature sensor and an external over temperature switch to the control device.
- Connect the DC ExElement leads to the output terminals on the control device.
- Connect the solar panels to appropriate terminals on the control device; positive to positive and negative to negative on the terminals of the device.
- Green LED light on control board device should illuminate indicating control device has power. (Figure 7)
- **Note the MAC address on the sticker on the control board device. It is in xx:xx:xx:xx:xx:xx format. This MAC address is needed when connecting to WiFi as outlined in step 3.4.1 and 3.4.2 and should match the MAC address label affixed to the Tank main label (Figure 1b).**
- Secure the Cover over the control device to complete installation. (Figure 8)
- To set up WiFi connection and data monitoring, proceed to System Configuration steps in Section 3.4

Note: The DC ExElement is specifically designed for maximum efficiency when used with Apparent's control board. If alternative control boards and heating elements are used, the warranty is voided, and the system may not function properly.

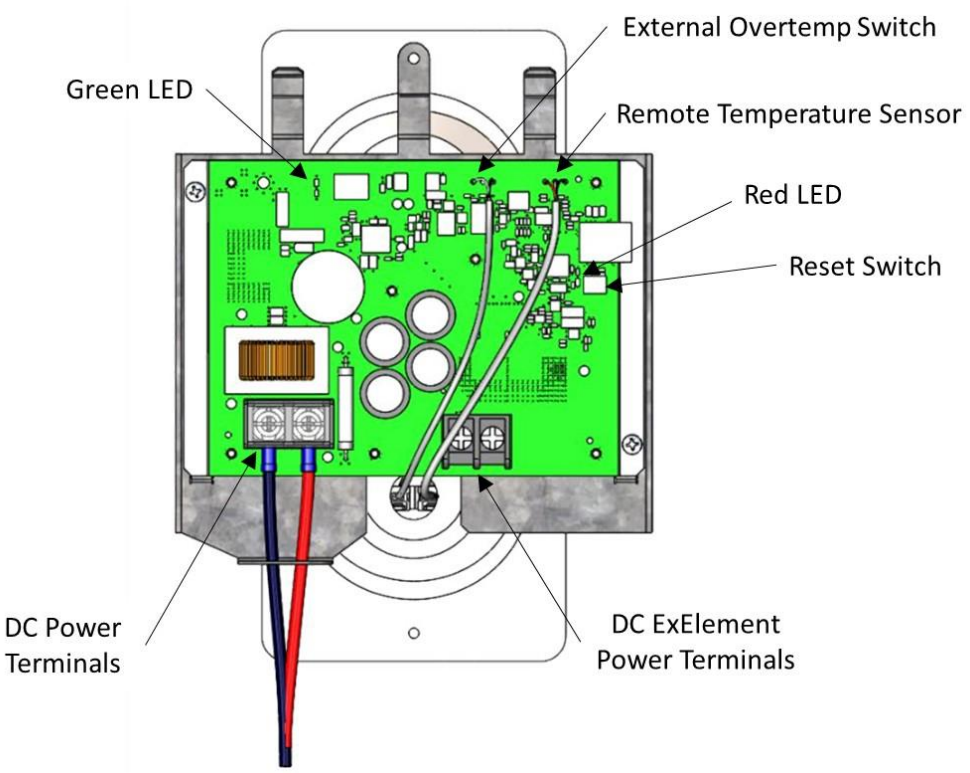


Figure 7. Control device layout (Version 1.x).

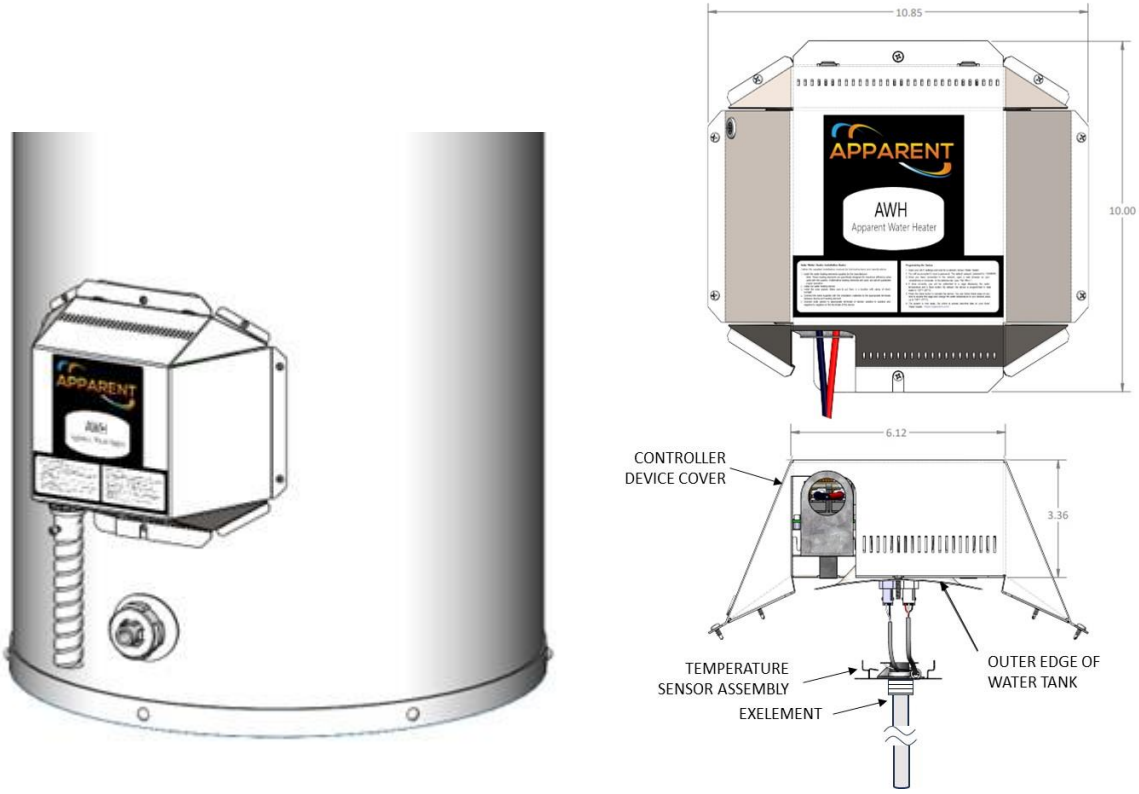
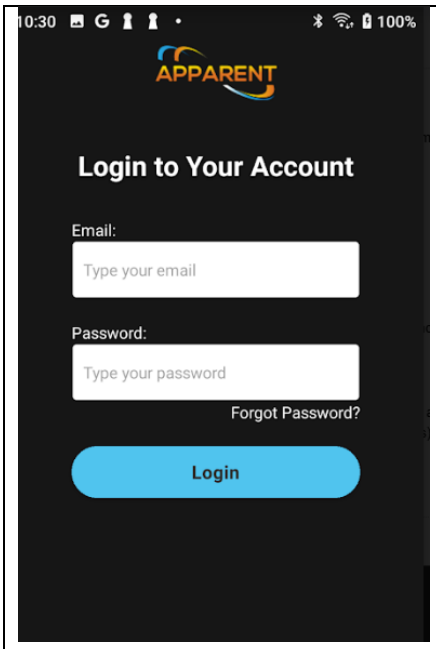


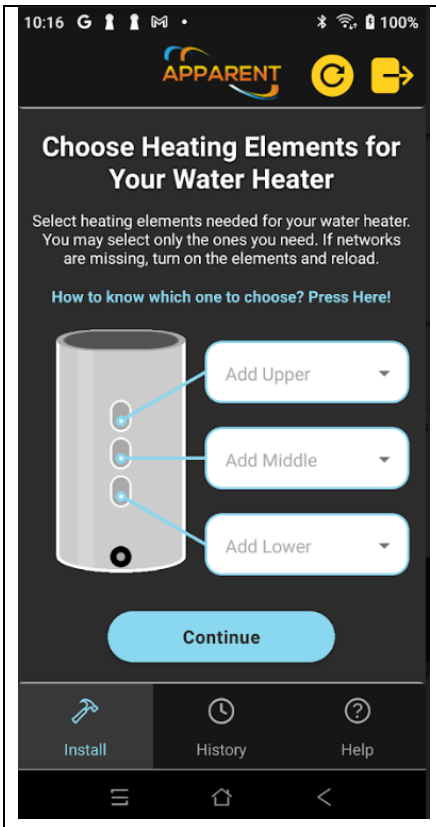
Figure 8. Installed EXEL element and control device with external cover.

3.4 Online Access Configuration & Setup for Controller

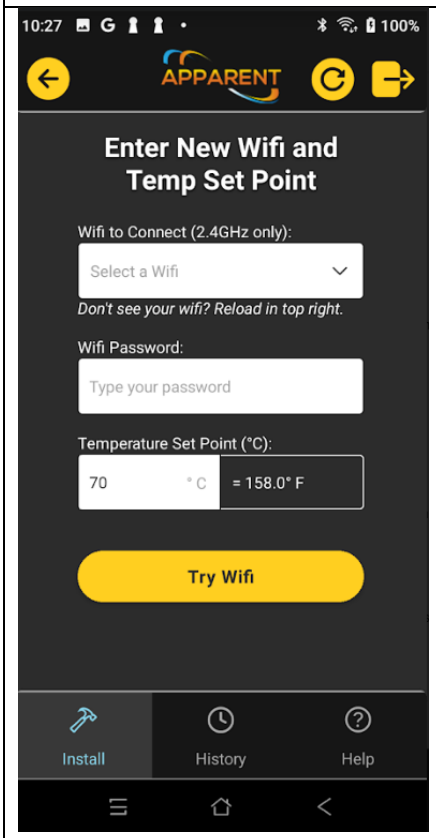
3.4.1. For WiFi enabled sites – Using Installer App.

Use the EXEL Installer App for smartphone (available for Andriod phones) and follow the online instructions for configuring the water heater and registering the water heater. App may be downloaded from the smartphone online store or from Apparent's website (www.apparent.com).

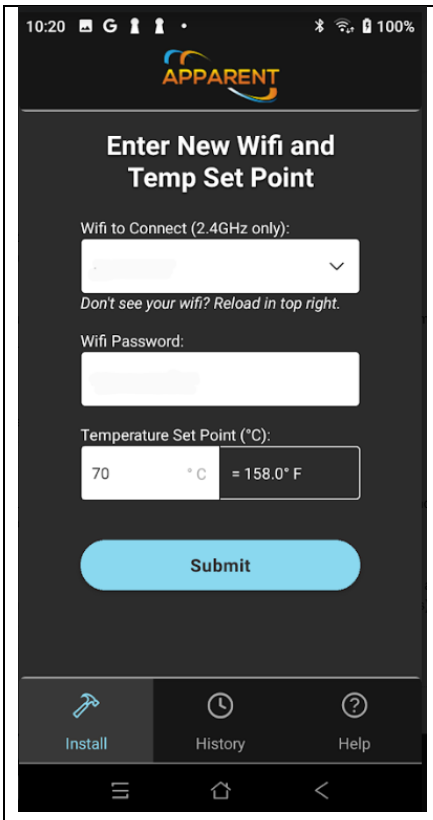
	- Download the Apparent Water Heater Install App from the Google Play Store.
	- Open the App.
	- Login
	  ○ Enter your login credentials then press Login.
	  ○ If you do not have a login, you must email to have an account created for you. See Section 6
	  ○ You should not need to login again for 30 days unless you otherwise sign out.



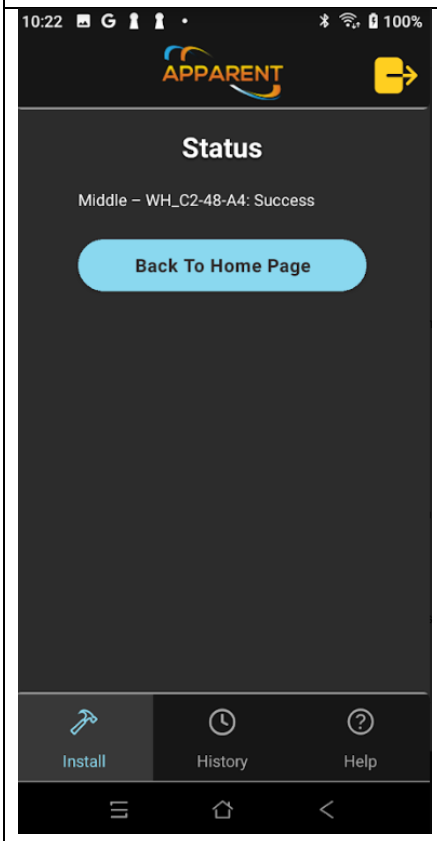
- Go to the Install tab (bottom left) within the app.
- Allow location permission for the app to detect/connect to WiFi networks.
- Match Heating Elements for Your Water Heater.
  - Match each heating element to their installed positions on the water heater. Each heating element will have a unique id, "WH_XX_XX_XX", where Xs are the last 6 digits of the MAC address on the card.
  - You must add at least one element to the water heater, but you may leave unused positions blank. Default should be in the lower position.
  - Once selected, click "Continue."



- Enter New Wifi and Temp Set Point
  - Select your local Wi-Fi network and enter its password.
  - Enter the new temperature set point (default is 70° C).
  - Press "Try Wi-Fi" to verify the connection to the WiFi you have just entered.

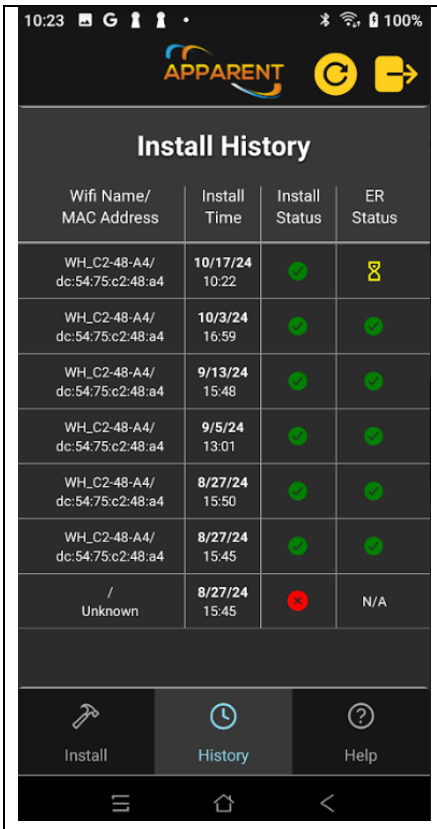


- Once successful, the "Try Wi-Fi" button will change to a "Submit" button. Press this to finish the setup.

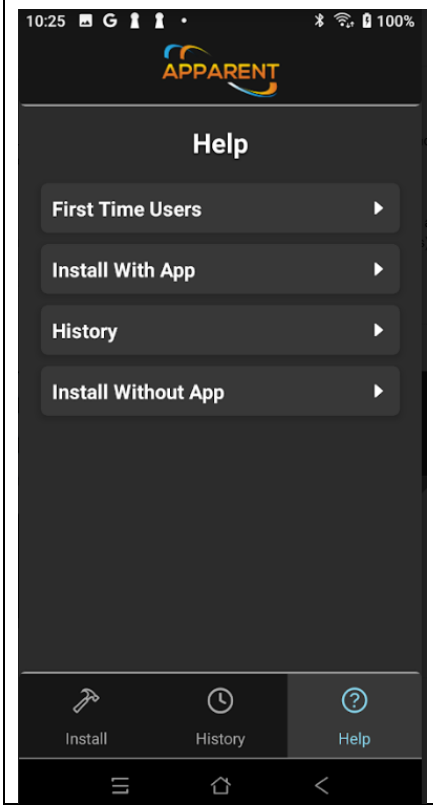


- Confirm Status
  - Check the status of the setup. If successful, you will see "Success" next to each heater. Click the button to return home.
  - If any setup fails, follow the on-screen instructions to retry the setup for those heating elements.

Note: On some phones an error message may appear. If you see "Success" on the status page matching the location of the element selected for install, the setup was successful, and you can disregard the error message.



- Go to the 'History' tab (bottom middle).
- Both the 'Install Status' and the 'ER Status' of your most recent install should show a green check mark icon (may take around 20 minutes).
- If you see a yellow hourglass under 'ER Status' of your most recent install(s), this simply indicates that our servers are still waiting for a report from the heating element.
- An orange WiFi symbol means your phone is unable to connect to the internet ('ER status' cannot be checked without an internet connection). Establish an internet connection (or connect to WiFi) and press reload.
- A red 'x' or N/A means the installation was unsuccessful. Repeat this process starting from the Install Tab section above.

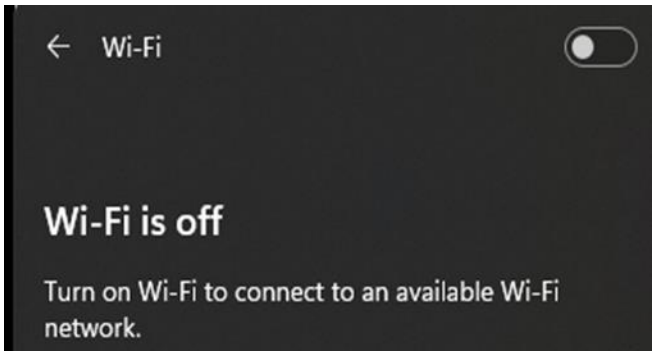


- Help screen provides instructions for installation with and without the application.

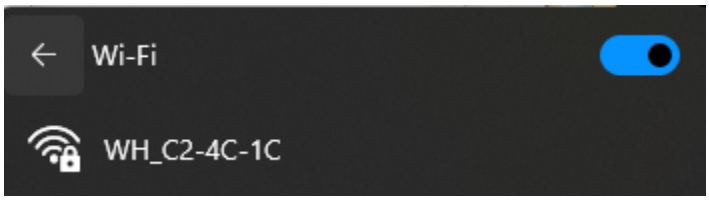
3.4.2. For WiFi enabled sites – Manual Configuration without App

Registration and Installation can be done using a laptop computer or smartphone following these instructions

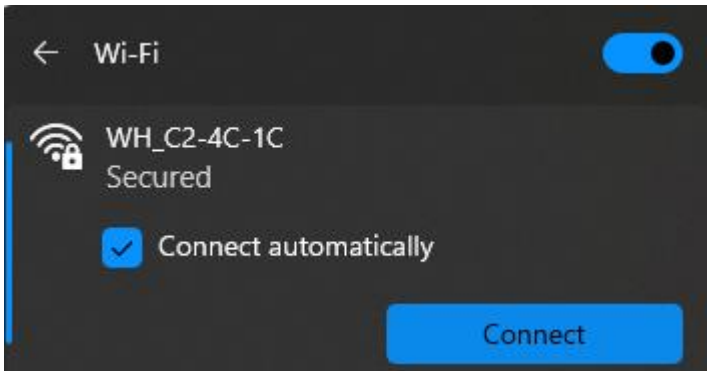
- Connect the water heater to power. Confirm the Red LED light is ON, indicating the control board is working. ***NOTE:*** *Some boards may also have a Green LED to indicate power.*
- The Red LED may blink during WiFi connection. ***NOTE:*** *After power is applied to the controller, if the local network's WiFi credentials have already been entered, these credentials will automatically be applied after five minutes and nothing further needs to be done to connect to the local Wifi network. Otherwise, continue with this installation.*
- Have computer or smartphone with WiFi access.
- Turn off the computer or smartphone WiFi.



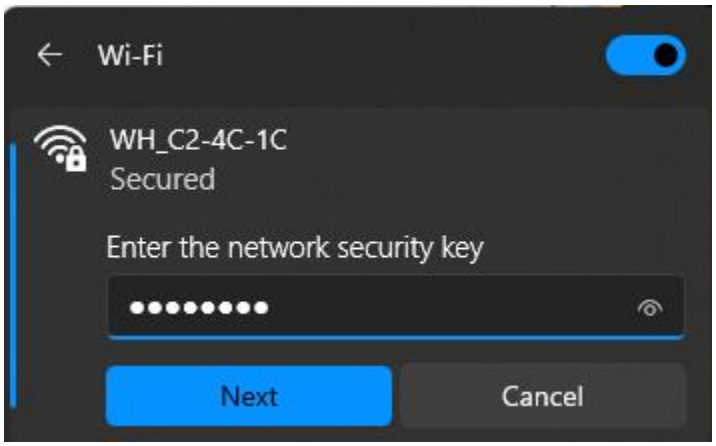
- Turn WiFi back on and open WiFi settings with the "Available WiFi" list. Look for the entry that starts with "wh_" and has the last 6 characters of the MAC address of the control board that is being installed from the list.



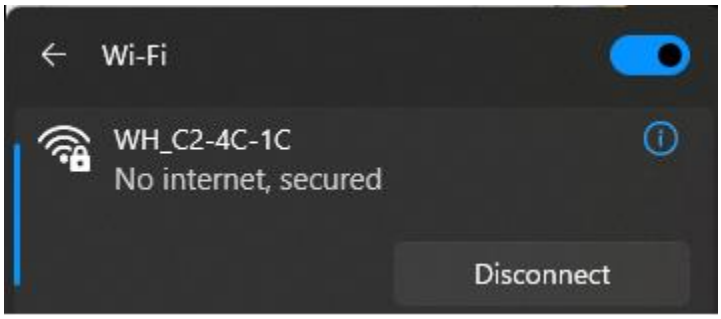
- Select the water heater and click connect.



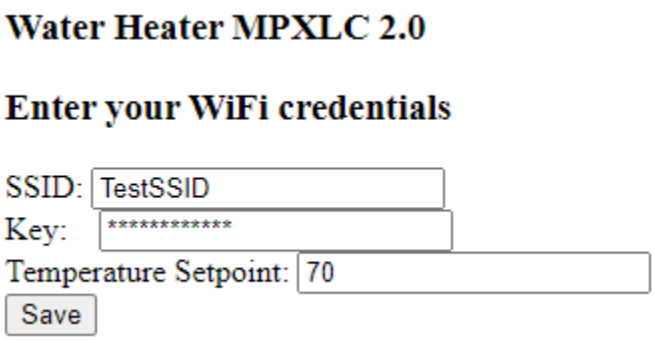
- Enter the default password “hotwater” and click “Next”



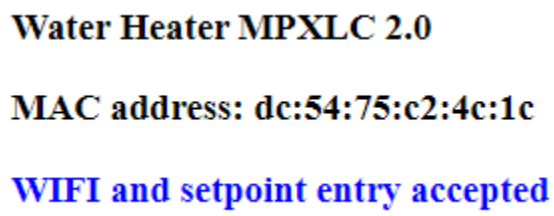
- Wait for the connection to be made with the controller. The connection will indicate no internet.



- Once connected to the controller, open a web browser and enter “192.168.4.1” as the URL. The AP server webpage from the controller will display.



- Enter the customer's WiFi SSID and password.
- Verify the Temperature Setpoint and click "Save." By default, the device is set to 158°F (70°C). You can follow the steps at any time to change the water temperature up to 158°F (70°C).
- Verify the Water Heater MAC address that appears matches the MAC address on the control board and WiFi and setpoint entry indicates accepted.



3.4.3 For sites without WiFi

- Check to ensure the green LED is on before securing the cover. The green light indicates that the system is receiving power to operate even if WiFi for data monitoring is not available.
- Follow the steps to Register product when WiFi access is available.

4. OPERATIONS

Extending the life of any system includes proper installation, maintenance and operations. Consult with an authorized Apparent installer or contact Apparent.

- To ensure proper water tank system functions, follow the manufacturer's recommended maintenance for cleaning, purging, and performance checks.
- Follow the manufacturer's recommended cleaning for PV panels to ensure the highest efficiency of the system.
- Register the EXEL Water Heating System online (See Section 3.4).

5. WARRANTY INFORMATION

The buyer **must register** this product to take full advantage of Apparent's warranty coverage within 30 days of installation date. Registering is an online process that involves login and monitoring service through Apparent's igOS™ platform.

5.1 Limited Warranty

Apparent's warranty provides protection against defects in workmanship and materials of OEM products which includes the EXEL heating element and controls package, from the original date of purchase for a registered product for 1 year.

The basic warranty for the EXEL Water Heating System is listed below for the complete water heating system. The basic warranty provides protection against defects in workmanship and materials for the system as provided below. The PV panels and water tank reference OEM warranties for parts, labor and specific warranty terms dependent on the models. Warranty work should be handled by professional installers authorized by Apparent or may risk voiding the warranty. Two additional categories of warranties may be available at time of purchase based on the unit purchased*.

Basic Warranty:

- 10 years for PV panels
- 8 years for the seal water tank (specific to model number for tank)
- 2 years for the EXEL controls and heating element
- 1 year on parts

5.2 Exclusions & Limitations

Failing to register the system within the specified timeframe could void the warranty benefits. The warranty is linked to the buyer and is not transferable. The name listed at the time of registration is the sole recipient of the warranty.

Conditions not covered by warranty:

- Damages from faulty installation or misuse of the water heater or installation by a non-licensed professional.
- The limited warranty certificate has a complete list of exclusions and limitations specific to the water tank and PV panels. Refer to specific manufacturer for reasons.
- Failures, malfunctions and/or damages caused by abuse, accident, fire, flood, freeze and lightning.
- Failures, malfunctions and/or damage caused by operations exceeding maximum settings or overriding controls and manufacturer recommended settings.

- Removal of rating labels.

5.3 Component Warranties

Unless designated under an unbundled product warranty specification (e.g. unique OEM product), a 1-year Limited Warranty is provided by Apparent for OEM products and covers defects in workmanship and materials from the original date of purchase excluding labor. The warranty is not transferable and must be registered and/or comply with respective OEM manufacturer warranty requirements to receive coverage.

5.4 Claims

The following are needed to make a warranty claim. Registered owner and proof of purchase. Apparent's liability for any damage to or damage caused by use of the system shall, in no event, exceed the actual cost paid for the system. Contact Customer Service for additional information.

Parts and accessories should only be installed by professional and qualified installers. Failure to follow manufacturer's installation and use instructions may cause damage, injury or loss of life. It is your responsibility to seek professional advice when installing and using this system.

5.5 Apparent Obligations

Any repair or replacement of device will not extend the warranty period beyond the basic terms following the original date of purchase and product activation or beyond ninety days following the date the repaired device is returned to you, whichever is longer. All replaced products and all parts removed from repaired products become the property of Apparent. This Limited Warranty covers both parts and the labor necessary to repair the system. Please contact Apparent's Customer Service for details on the company's policy regarding return shipping.

- Apparent, at its option, may repair or replace the defective product following the registration date and/or activation date of the unit and that Apparent determines a defect that is covered by the Limited Warranty.
- Apparent, at its option, may use new and/or reconditioned parts in performing warranty repair and building replacement products. Apparent reserves the right to use parts or products of original or compatible design (i.e. upgrades) in the repair or replacement.

6. CUSTOMER SERVICE

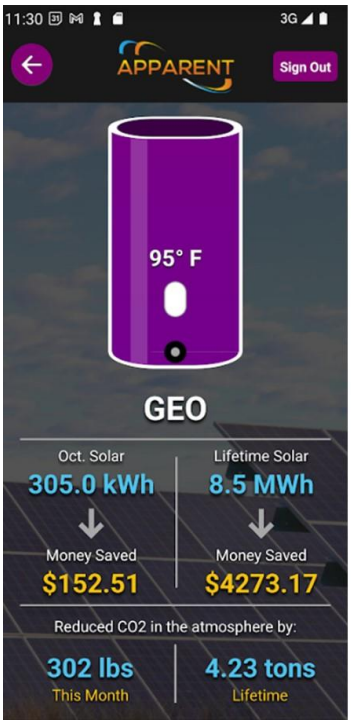
6.1 Customer Inquiries

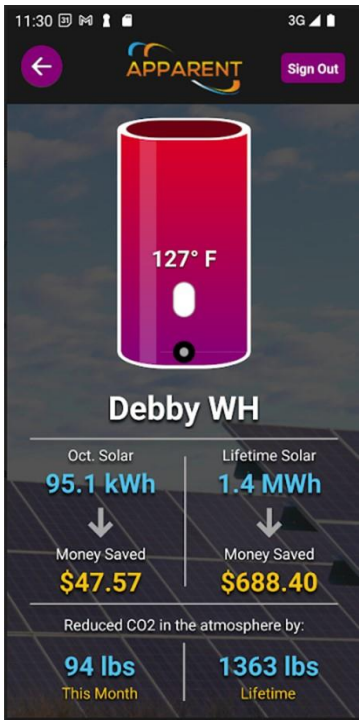
For information pertaining to the product, troubleshooting or warranty service, first contact your installer/merchant. If you are unable to contact the installer/merchant, or the installer/merchant is unable to provide service, contact Apparent directly at:
Email: exelwh@apparent.com
Website: www.apparent.com/waterheater

Contact Address:
51 Digital Drive
Novato, CA 94949
www.apparent.com

6.2 Customer Hot Water System Monitoring

Apparent provides a convenient and easy way for customers to name the system and monitor the real-time status of EXEL, providing water temperature reading, total energy savings by month and since install (lifetime) and carbon emission reductions information.





To access this feature, download the Customer Monitoring Application software from Apparent's website: www.apparent.com

For smartphones (Android or iOS), follow the login information to connect with the EXEL system.