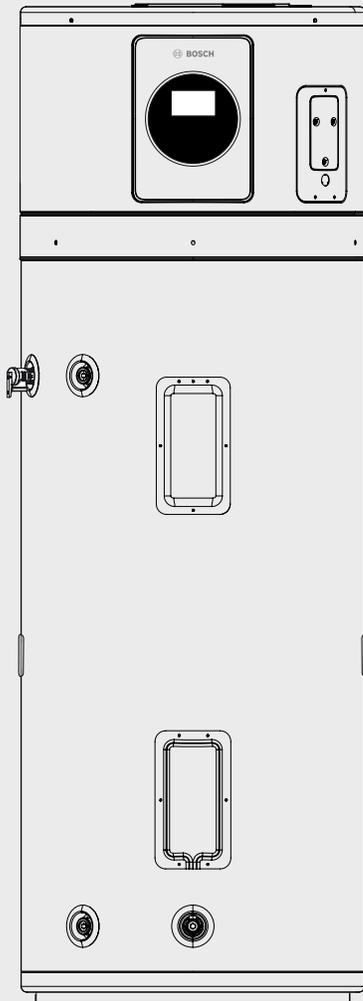




Installation and Operating Instructions

Hybrid Electric Water Heater GreenTronic 7000 T

TR7000T-50US | TR7000T-80US | TR7000T-50CA | TR7000T-80CA



⚠ WARNING:

The information in these instructions must be followed exactly. Improper installation, adjustment, service or maintenance will void warranty and can cause property damage, personal injury or death.

⚠ WARNING:

Installation and service must be performed by a qualified installer or service agency.

⚠ WARNING:

READ ALL INSTRUCTIONS BEFORE USING THIS WATER HEATER. Install or locate this water heater only in accordance with the installation instructions. Use this water heater only for its intended use as described in this manual.



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1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

The following keywords are defined and can be used in this document:

DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.

NOTICE
NOTICE is used to address practices not related to personal injury.

Important information

The info symbol indicates important information where there is no risk to people or property.

1.2 Safety

Please read before proceeding

The warranty on this water heater is in effect only when the water heater is installed, adjusted, operated, and maintained in accordance with these instructions. The manufacturer of this water heater will not be liable for any damages resulting from failure to comply with these instructions. Read these instructions thoroughly before proceeding.

WARNING
Improper or dangerous operation!

- Installation and service must be performed by a qualified installer or service agency.
- Improper installation, adjustment, alteration, service or maintenance can cause injury, death, or property damage.

WARNING
Indoor installation only!

- DO NOT INSTALL OUTDOORS. This water heater is certified for indoor installation above freezing temperatures only. Failure to follow these instructions could result in FIRE, PROPERTY DAMAGE, and/or PERSONAL INJURY OR DEATH.

DANGER
Hazardous voltage!

- Check the data plate on the water heater before installation to make certain the voltage shown is the same as the electric supply to the water heater.
- This water heater must be connected only to a properly grounded electrical supply. Do not fail to properly ground this water heater (see chapter "Electrical Connections").
- Turn off the electrical supply before servicing this water heater.

WARNING
Improper or dangerous operation!

- Do not use this water heater if it has damaged wiring, is not working properly, or has been damaged or dropped.

WARNING
Fire, explosion!

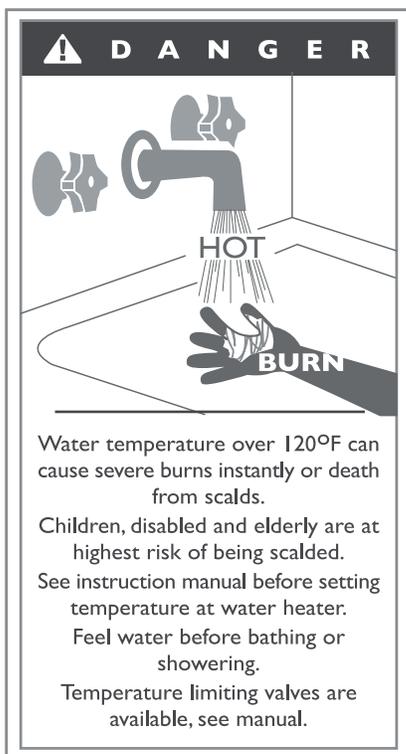
- This appliance shall not be installed in any location where flammable liquids are stored or vapors are likely to be present. Flammable vapors may be drawn to this water heater from other areas of the structure by air currents.

WARNING
Scald hazard!

- Scald injury is heightened by increased water temperatures. Hot water can produce 3rd degree burns in 6 seconds at 140°F (60°C) and in 30 seconds at 130°F (54°C).
- If the water heater setpoint is set too high there is serious potential for SCALDING.
- Children, the disabled and the elderly are at highest risk of being scalded.

Temperature	Time to Produce Serious Burn
120 °F (48 °C)	More than 5 minutes
125 °F (51 °C)	1.5 to 2 minutes
130 °F (54 °C)	Approx. 30 seconds
135 °F (57 °C)	Approx. 10 seconds
140 °F (60 °C)	Less than 5 seconds
145 °F (62 °C)	Less than 3 seconds
150 °F (65 °C)	Approx. 1.5 seconds
155 °F (68 °C)	Approx. 1 second

Table 1



When this water heater is supplying general purpose hot water requirements for use by individuals, a thermostatically controlled mixing valve for reducing point-of-use water temperature is recommended to reduce the risk of scald injury. Contact a licensed plumber or the local plumbing authority for further information.



WARNING

Dangerous operation, personal injury!

Water piping, fittings, and valves must be properly installed for the correct and safe operation of this water heater. Please note the following:

- DO NOT install this water heater with iron piping. The system should be installed only with new piping that is suitable for potable (drink-able) water such as copper, CPVC or polybutylene
- DO NOT use any pumps, valves, or fittings that are not compatible with potable water
- DO NOT use valves that may cause excessive restrictions to water flow. Use full flow ball or gate valves only
- DO NOT use 50/50 tin-lead solder (or any lead based solder) in potable water lines. ONLY use 95/5 tin/antimony or other equivalent materials
- DO NOT tamper with heating elements, electrical connections, refrigerant circuit, or temperature and pressure relief valve. Tampering with any of these components is DANGEROUS and can result in property damage, severe injury or death. Tampering voids all warranties. Only qualified technicians should service the above components
- DO NOT use with piping that has been treated with chromates, boiler seal, or other chemicals
- DO NOT add any chemicals to the system piping which will contaminate the potable water supply



WARNING

Personal injury or death!

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



- Battery type: CR2032
- Battery power supply: 3.0V
- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above (manufacturer's specified temperature rating) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.



WARNING

Personal injury!

- This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that residential water heaters must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For residential water heaters up to 52 gallon capacity, a brochure with generic earthquake bracing Instructions can be obtained from: 2808 Metropolitan Place Pomona, CA. 91767 USA 1-888-883-0788 or ask a water heater dealer.

FOR INSTALLATIONS IN THE STATE OF MASSACHUSETTS

Massachusetts Code requires this water heater to be installed in accordance with Massachusetts 248-CMR 2.00: State Plumbing Code and 248-CMR 5.00.



Applicable local codes govern installation.

OWNER:

Retain these instructions and warranty for future reference. Retain the original receipt as proof of purchase.

2 Specifications

	TR7000T-50US	TR7000T-50CA	TR7000T-80US	TR7000T-80CA
Part Number	7-738-007-434	7-738-007-436	7-738-007-435	7-738-007-437
Nominal Capacity	50 Gallon		80 Gallon	
DOE Rated Storage Volume	45 Gallon		74 Gallon	
First Hour Rating	72 Gallon		91 Gallon	
Water Connections	¾" NPT			
Max. Water Pressure	150 PSI (1.03 MPa)			
Temperature Setpoint Range	109 – 149 °F (43 - 65°C)			
Power Supply	208-240V / 30 A (1Ph 60Hz)			
Electric Heating Elements	2 x 4,500 W			
Refrigerant	R-134a			
Compressor Rated Input	408 W			
Compressor Heating Capacity	1,593 W			
Noise Level	< 50 dB(A)			
Ambient Operation Temperature	5 – 115 °F (-15 - 46°C)			
Ambient Operation Temperature for Heat Pump	37 – 109 °F (3 - 43°C)			
Ingress Protection Rating	IP21			
Product Dimensions	66 ½" x 21 ¾" (169 cm x 56 cm)		74 ½" x 25 ¾" (190 cm x 66 cm)	
Product Net Weight	218 lbs (99 kg)		293 lbs (133 kg)	
Product Operating Weight	593 lbs (269 kg)		901 lbs (409 kg)	
Shipping Dimensions (H x W x D)	75" x 28 ¾" x 27 ½" (191 cm x 73 cm x 70 cm)		79 ½" x 30 ¾" x 29" (202 cm x 77 cm x 74 cm)	
Shipping Weight	265 lbs (121 kg)		360 lbs (164 kg)	

Table 2 Specifications by model

3 Dimensions

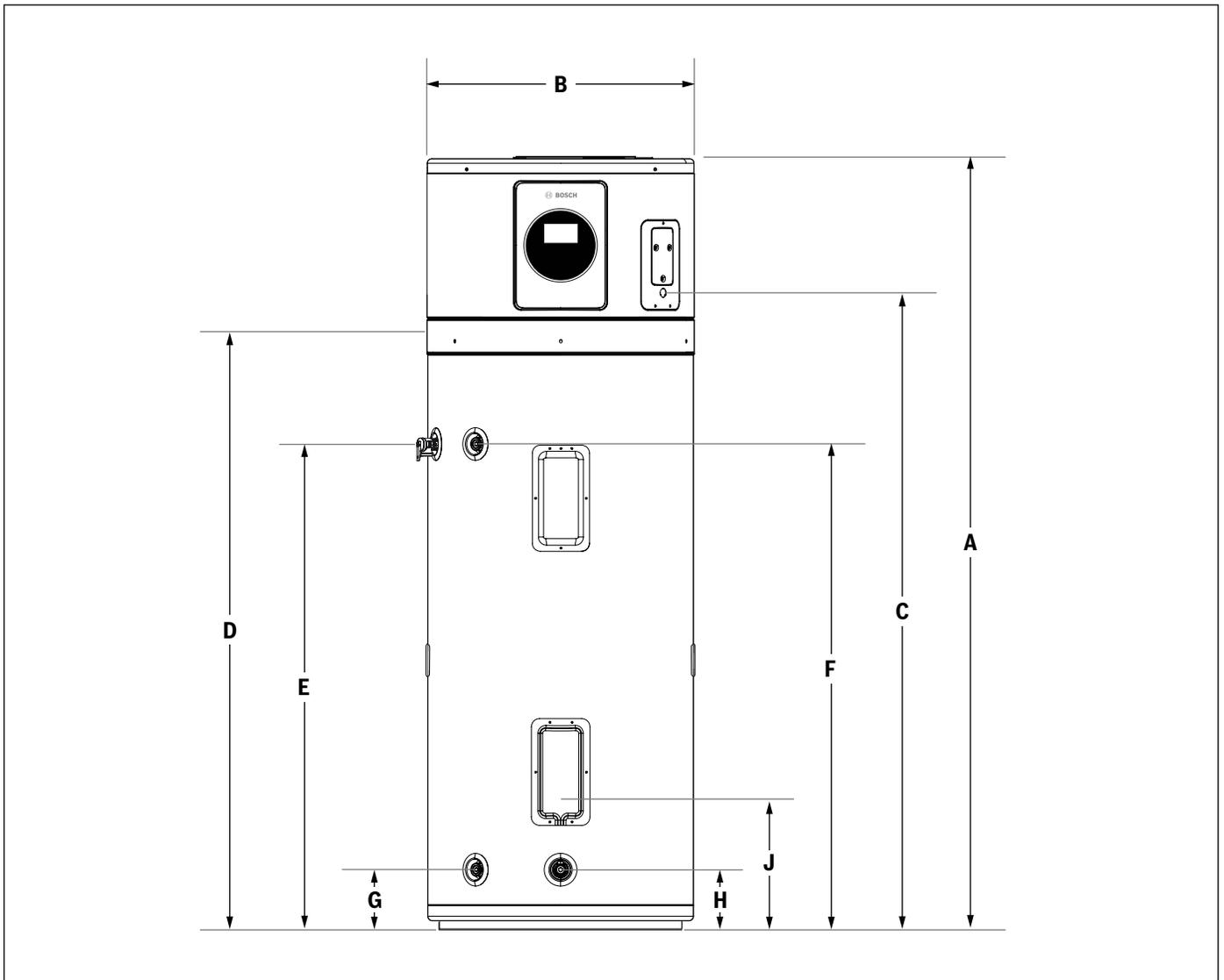


Figure 1

Model Number	Dimensions in inches (floor to)								
	Height	Diameter	Electrical Knockout	Condensate Drain*	T&P Relief Valve	Hot Water Outlet	Cold Water Inlet	Drain Valve	Lower Heating Element
	A	B	C	D	E	F	G	H	J
TR7000T-50US TR7000T-50CA	66 ½ (169 cm)	21 ¾ (56 cm)	53 ½ (136 cm)	49 ½ (126 cm)	39 ¾ (101 cm)	39 ¾ (101 cm)	5 ½ (14 cm)	5 ½ (14 cm)	14 (36 cm)
TR7000T-80US TR7000T-80CA	74 ½ (190 cm)	25 ¾ (66 cm)	61 ½ (157 cm)	57 ½ (146 cm)	46 ¾ (119 cm)	46 ¾ (119 cm)	5 ½ (14 cm)	5 ½ (14 cm)	12 (31 cm)

Table 3

* Not visible from the front of the water heater

4 Getting Started

4.1 Location

WARNING

Fire, explosion!

- Areas where flammable liquids (gasoline, solvents, liquid propane, butane, etc.), or other substances which emit flammable vapors are stored may not be suitable for water heater installation. Natural air movements can carry flammable vapors varied distances from where they are stored or used. The water heater thermostat contacts can arc and ignite these vapors causing property damage, serious burns or death. Never store or use flammable substances in the same room or area containing an electric water heater. Gasoline or other flammable substances must never be used in the same room or area containing a water heater or other spark-producing device.

WARNING

Personal injury, product damage, property damage!

- Indoor installation only. Do not install outside. Failure to follow this warning could result in property damage, severe personal injury, or death.



Local codes and requirements in your area may require that the water heater be installed in such way that the bottom heating element is elevated at least 18 inches from the floor.

This residential water heater should be installed in a clean, dry location with an ambient temperature always above freezing and close to where a good electrical connection can be made. The unit should be as close as possible to major usages of hot water. The unit can be installed on a combustible floor with 0 inches minimum clearance between the rear of the water heater and combustible walls. The water heater should be located so that all electrical controls, air filter, heating elements, drain valve and water connections are accessible. For easy servicing the anode rod increased top clearance is recommended. Refer to table 4 for required clearance for operation and maintenance.

If the unit is installed in an enclosed room and not fully ducted, a space of 700 ft³ (19.8 m³) is required to provide enough airflow. Insufficient space will cause higher power consumption. Check space requirements below in chapter 5.2.

To have maximum efficiency, install in an area that remains in temperature range between 37 °F (3 °C) and 109 °F (43 °C) to ensure operation of heat pump.

In normal conditions the water heater operates below 49dB(A), which is comparable to a quiet refrigerator, but keep this in mind when choosing a location.

	Required Clearance for Operation	Required Clearance for Service
Air Exhaust	6" (15.3 cm)	6" (15.3 cm)
Top	20" (51 cm)	50 Gallon: 25.5" (65 cm)
		80 Gallon: 32" (81.3 cm)

Table 4 Required minimum clearances

4.2 Air Flow Requirements

This water heater uses the heat in the air to heat up the water in the tank. Therefore a minimum enclosed space of 700 ft³ is required to ensure desired operation. Not enough air flow may result in increased usage of the electric heating elements and therefore reduction of efficiency and increased power usage.

If installation place is smaller than 700 ft³, consider louvered door options to the space or ducting the air flow to and from the unit. Refer to the options shown below.

Air flow options and space requirements:

Air Flow Opening	Ducting	Minimum Installation Space Requirement (ft ³)
Enclosed room	none	700 (19.8 m ³)

Table 5

Air Flow Opening	Ducting	Minimum Installation Space Requirement (ft ³)
Fully louvered door OR upper & lower louvers in door OR upper louver with undercut door	none	84 (2.4 m ³)

Table 6

Air Flow Opening	Ducting	Minimum Installation Space Requirement (ft ³)
Upper louver OR undercut door	Inlet OR outlet	None

Table 7

Air Flow Opening	Ducting	Minimum Installation Space Requirement (ft ³)
None	Inlet AND outlet	None

Table 8

4.3 Electrical Requirements

Hardwire the water heater per local codes.

Electrical Requirements	
Required breaker size:	208V/240V (60Hz) 30A double pole breaker
Required wiring gauge:	10 AWG

Table 9



Power supply for a condensate pump is not supplied from the water heater.

4.4 Draining Requirements

NOTICE

Property damage!

- This water heater must be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the water heater or to lower floors of the structure. When such locations cannot be avoided, a suitable drain pan must be installed under the water heater. Such pans must be at least 2 inches deep having a minimum length and width of at least 2 inches greater than the diameter of the water heater and should be piped to an adequate drain.

4.4.1 Drain Pan Installation

It is recommended to install a drain pan under the water heater, especially if leaks can substantially destroy the building structure. In some cases code may even require it.

Water Heater Size	Minimum Required Drain Pan Diameter
50 Gallon	26" (66 cm)
80 Gallon	30" (77 cm)

Table 10

4.4.2 Condensate Drain

The water heater produces condensate during operation which must be drained properly. Do not use drain pan for condensate. Provide proper drainage with piping or a condensate pump. The condensate does not need to be neutralized. The water heater comes supplied with a 6 foot long, 1/2 inch diameter drain hose.

4.5 Water Chemistry Requirements

NOTICE

Product damage!

- Chemical imbalance of the water supply may affect efficiency and cause severe damage to the appliance and associated equipment. Water quality must be professionally analyzed to determine whether it is necessary to treat the water. Various solutions are available to adjust water quality. Adverse water quality will affect the reliability of the system. In addition, operating temperatures above 135°F (57 °C) will accelerate the build-up of lime scale and possibly shorten appliance service life. Failure of an appliance due to lime scale build-up, low pH, or other chemical imbalance IS NOT covered by the warranty.

The water must be potable, free of corrosive chemicals, sand, dirt, and other contaminants. It is up to the installer to ensure the water does not contain corrosive chemicals or elements that can damage the water heater. Potable water is defined as drinkable water supplied from utility or well water in compliance with EPA secondary maximum contaminant levels (40 CFR Part 143.3). If the water contains contaminants higher than outlined by the EPA, water treatment is required.

If you suspect that your water is contaminated in any way, discontinue use of the appliance and contact an authorized technician or licensed professional.

Following water chemistry limits must be observed for the water supply:

	Value
pH	6.5 to 8.5
Hardness	5 to 14 Grain/US Gallon
Chlorine Concentration	≤ 100 ppm
Total Dissolved Solids	≤ 500 ppm
Conductivity µS/cm	≤ 1200

Table 11 Water Chemistry Limits

5 Installation



WARNING

Personal injury, property damage!

- This water heater must be installed in accordance with all national, state and local codes and ordinances. If additional information are desired, the latest edition of the National Electric Code "NFPA 70" are recommended. This code can be obtained from the National Fire Protection Association at Battery March Park, Quincy, MA 02269. For Canadian installations, refer to the Canadian Electric Code (CSA22.1). A copy can be purchased from the Canadian Standards Association at 5050 Spectrum Way, Mississauga, ONT L4W 5N6.



Before proceeding with the installation, close the main water supply valve, open a water faucet to relieve the water pressure, and then close the faucet.



This water heater is not intended for space heating applications.

5.1 Inspect Shipment

Items included in the packaging:

- Hybrid electric water heater
- Installation manual
- Warranty document
- Insulation pipe sleeving (4)
- Condensate drain pipe

INSPECT SHIPMENT - for possible damage.

- The manufacturer's responsibility ceases upon delivery of goods to the shipper in good condition. Any claims for damage, shortage in shipments, or no delivery must be filed immediately against carrier by consignee.
- Do not install if the tilt sensor on the outer packaging has tripped.

5.2 Placing the Water Heater



Make sure to read chapter "Getting Started" which provides relevant information to location, space and drain requirements.

- Remove carton box over unit.
- Place drain pan.
- Lift water heater from the base (foam is bolted to the pallet).
- Position water heater to maintain access and clearance requirements.

5.3 Plumbing

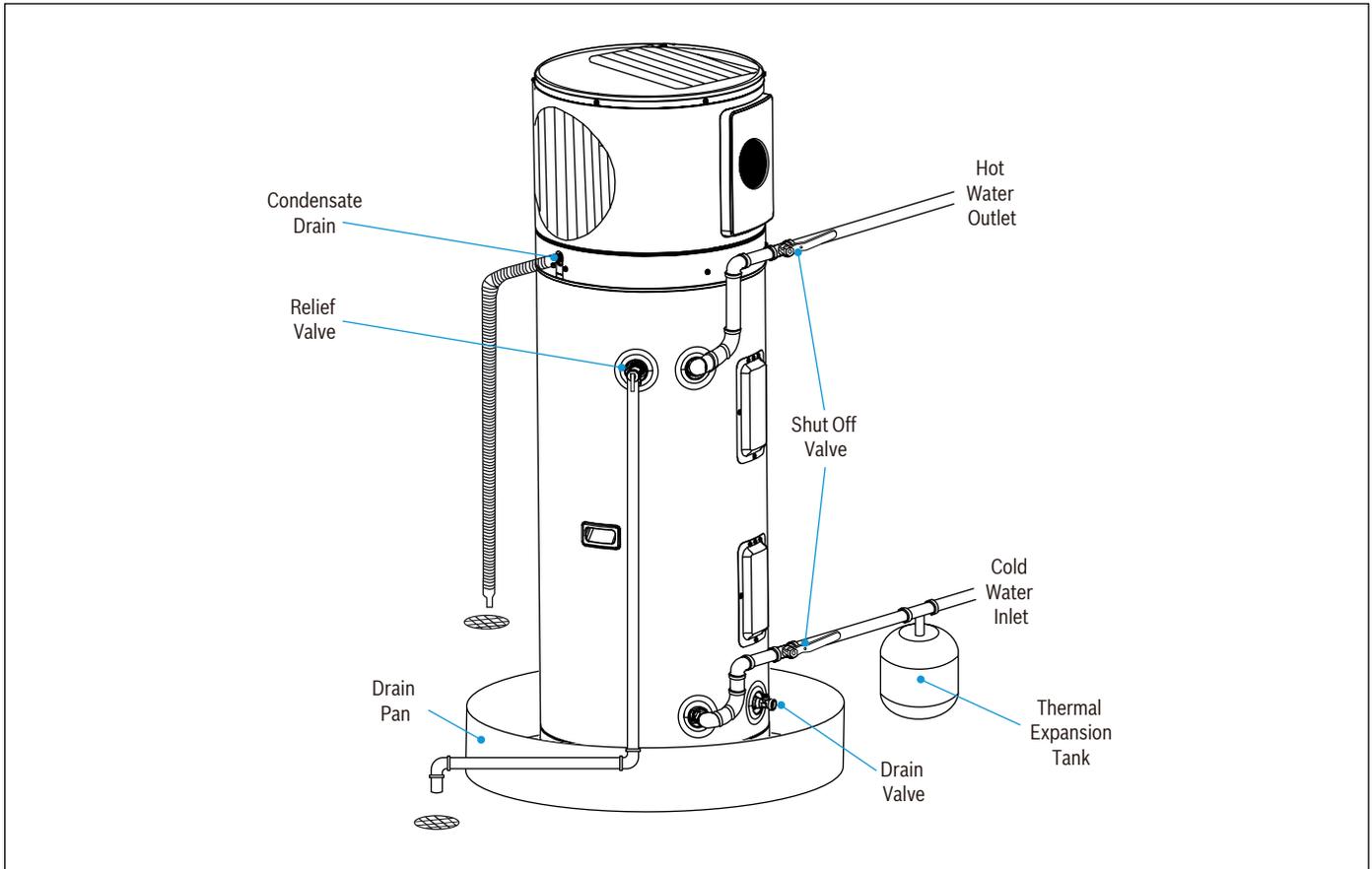


Figure 2



It is highly recommended to use dielectric unions. Dielectric unions can help prevent corrosion caused by small electric currents common in copper water pipes and can help extend the life of the water heater.

- The water connections of the water heater are located on the side
- The cold water connection is on the bottom
- The hot water connection is on the top
- By providing unions and shut off valves on the water connections, the water heater may be disconnected for servicing when necessary
- Installation of mixing valve (field supplied) is recommend if not already required by code
- All hook-ups must comply with all local codes

Water supply pressure should not exceed 80% of the working pressure of the water heater. The working pressure is stated on the data plate. If this occurs, a pressure limiting valve with a by-pass may need to be installed in the cold water inlet line. This should be placed on the supply to the entire building in order to maintain equal hot and cold water pressures.



If the water heater is enrolled in a utility DR program that allows the utility to temporarily increase the storage temperature setpoint higher than set by the user, a thermostatic mixing valve shall be installed. If used, the thermostatic mixing valve shall:

- Be certified to ASSE 1017 - Performance Requirements for Temperature Actuated Mixing Valves in Hot Water Distribution Systems
- Be installed according to the manufacturer's installation instructions
- Be configured to limit the delivered water temperature to that required by the user



Heat cannot be applied to the water fittings on the water heater as they may contain nonmetallic parts. If solder connections are used, solder the pipe to the adapter before attaching the adapter to the hot and cold water fittings.



Always ensure that all fittings are free from leaks.

5.3.1 Closed System /Thermal Expansion

NOTICE

Product damage, property damage!

- Do not install a check valve or other back flow device that creates a closed system unless required by code. A closed system may result in frequent discharge due to thermal expansion from the pressure relief valve.

Periodic discharge of the temperature and pressure relief valve may be due to thermal expansion in a closed water supply system. The water utility supply meter may contain a check valve, backflow preventer or water pressure reducing valve. This will create a closed water system. During the heating cycle of the water heater, the water expands causing increased pressure inside the water heater. The temperature and pressure relief valve may discharge hot water under these conditions which results in water escaping from the valve and a build-up of lime on the relief valve seat. To prevent this from happening, it is recommended to:

- Install a diaphragm-type expansion tank that is suitable for potable water on the cold water supply line. The expansion tank must have a minimum capacity of 1.5 US gallons for every 50 gallons of stored water.

5.3.2 Relief Valves

WARNING

Personal injury, property damage!

- The pressure rating of the relief valve must not exceed 150 PSI, and not exceed the maximum working pressure of the water heater as marked on the rating plate.

WARNING

Personal injury, property damage!

- Failure to maintain a listed, adequately sized temperature & pressure relief valve will release the manufacturer from any claim which might result from excessive temperatures and pressures.

This water heater comes equipped with a temperature & pressure relief (T&P) valve with a pressure rating of 150 PSI. Provide tubing so that it terminates not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or flood level rim of the waste receptor, or as required by local code, and does not contact any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances.

Your local jurisdictional authority, while mandating the use of a temperature-pressure relief valve complying with ANSI Z21.22-CSA 4.4 and ASME, may require a valve model different from the one furnished with the water heater.

Compliance with such local requirements must be satisfied by the installer or end user of the water heater with a locally prescribed temperature-pressure relief valve installed in the designated opening on the water heater in place of the factory furnished valve.

For safe operation of the water heater, the relief valve must not be removed from its designated opening or plugged.

Piping used should be of a type approved for hot water distribution. The discharge line must be no smaller than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line. The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line.

Excessive length, over 30 feet, or use of more than four elbows can cause restriction and reduce the discharge capacity of the valve.

The temperature & pressure relief valve:

- Must not be in contact with any electrical part
- Must be connected to a proper discharge line which terminates at an adequate drain
- Must not exceed the working pressure shown on the data plate of the water heater
- Must be of materials listed for hot water distribution

Discharge Line

WARNING

Scald hazard, property damage!

- Discharging water may be hot and can cause scald injuries and property damage. Discharge lines must be properly installed and piped to an adequate drain.

The discharge line:

- Must not be smaller than the pipe size of the relief valve
- Must not be capped, blocked, plugged or contain any valve between the relief valve and the end of the discharge line
- Must terminate 6 inches above a floor drain or external to the building
- Must be capable of withstanding 250°F (121°C) without distortion
- Must be installed to allow complete drainage of both the temperature and pressure relief valve and discharge line

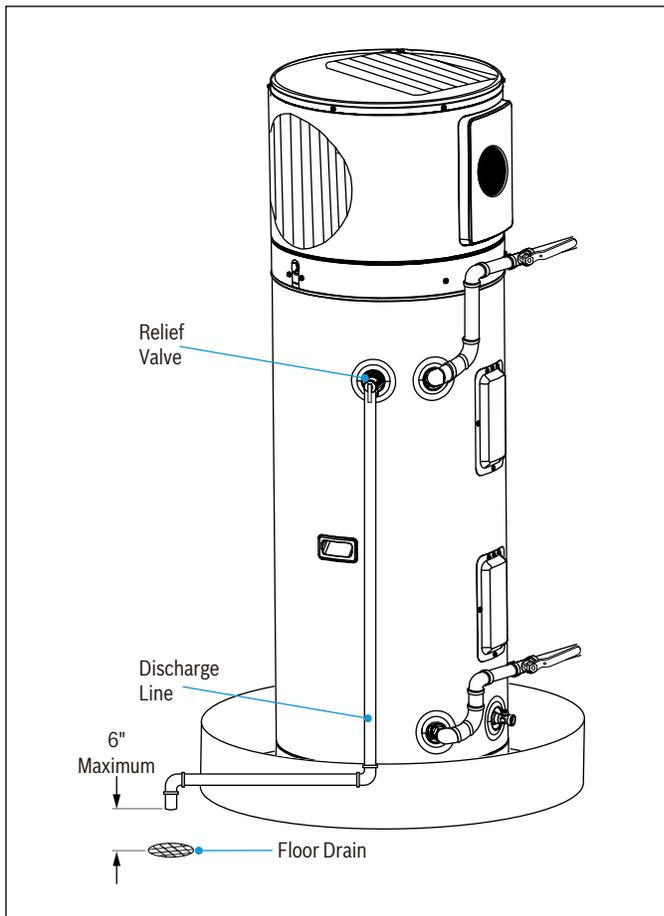


Figure 3 Relief valve installation

5.3.3 Condensate Drain

The water heater will produce condensate during operation. Install supplied drain pipe to properly drain the condensate. Neutralizer is not required.

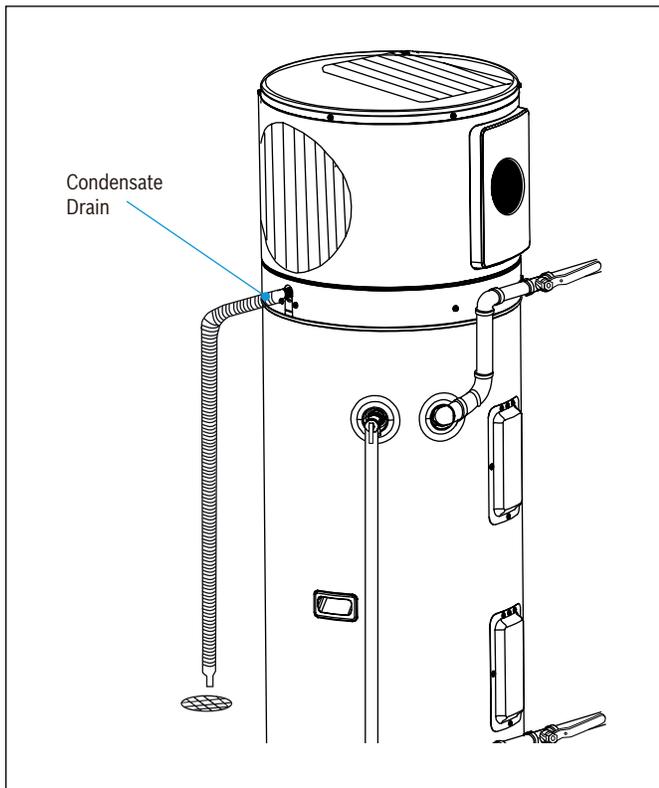


Figure 4 Condensate drain

5.3.4 Filling the Water Heater

After piping and hook-ups are completed:

1. Open all hot water fixtures.
2. Open shut off valve on cold water inlet and hot water outlet to fill tank.
3. As each hot water outlet delivers water free from air, it can be shut off.
4. Check the system for leaks.

5.4 Electrical

5.4.1 Electrical Connections

! WARNING

Fire, shock hazard, property damage!

- Do not use this water heater with any electrical supply voltage other than specified. Check the data plate on the front of the water heater for the correct voltage rating. Failure to use the correct voltage can result in death, serious bodily injury or property damage. If you have any questions or doubts consult your electrical utility company before installing this water heater.

! WARNING

Hazardous voltage!

- Qualified electrician required.
- Before installing electrical wiring, make sure the electrical supply to the water heater is turned "OFF".

! WARNING

Improper operation!

- DO NOT ALTER any of the internal wiring.

NOTICE

Product damage!

- Before energizing the water heater, make certain that the water heater is completely full of water and that the cold water inlet valve is open. If the heating elements are not completely immersed in water at all times, they will be damaged if energized for even a short time.

When making the electrical connections, always make sure:

- The electrical supply has the proper overload fuse or breaker protection
- Wire sizes and connections comply with all applicable codes
- Wiring is enclosed in approved conduit (if required by local codes)
- The water heater and electrical supply are properly grounded

To connect wiring:

1. Provide a separate disconnect switch for the water heater.
2. Open knockout to gain path for wires into the power supply box.
3. Open the power supply box.
4. Optional: Remove CTA 2045 port cover and remove connector to gain better access to terminal block.
5. Pull wires through the knockout and connect wires to the terminal block.
6. Properly ground the unit.
7. Close all covers.

WARNING
Shock hazard!

- Check wire tightness from and to power supply terminal block.

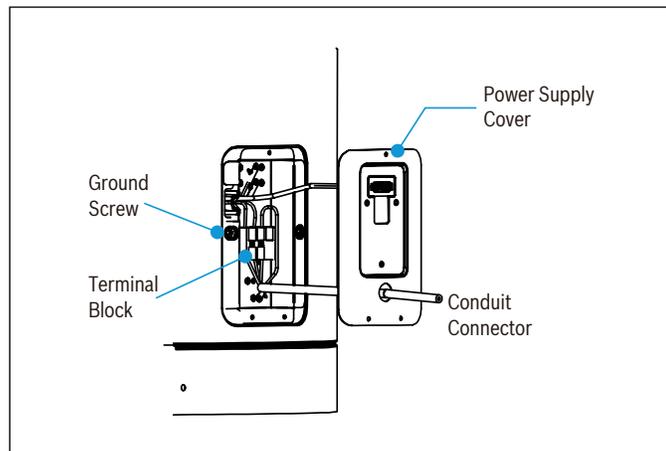


Figure 5 Wiring connection

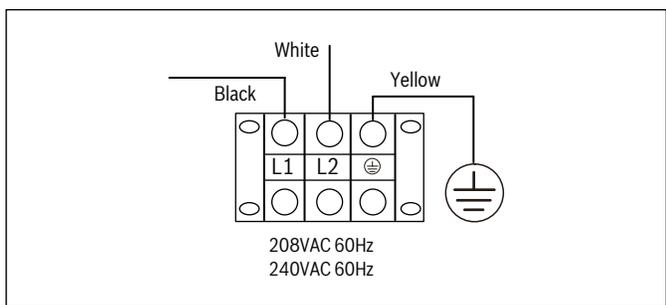


Figure 6

5.5 Ducting



If ducting is installed, make sure to adjust F40 setting to 1. See chapter Advanced Settings for more details.

Check chapter on Air Flow Requirements if ducting is necessary. Ducting is an option to ensure enough air flow. Before designing the duct system, always check with local building and HVAC codes. Read these instructions carefully for ducting unit to outdoors or other spaces. Any ducting configurations that do not comply with these instructions are not supported.

This water heater must be ducted separately from other appliances. Only use ducting approved for HVAC applications. Ensure ducting is adequately supported and that UL Certified terminations are used.

HVAC approved indoor registers are required. To minimize transmission of vibration or noise, rigid ducting must be isolated from floor joists or other structural members. Utilize a short section (12" or larger) of flexible duct between the water heater and rigid ducting as an isolation method. Every foot of flexible ducting counts as three feet of rigid ducting. Ducting must be insulated per HVAC codes and to prevent condensation.

Cold air exhaust must be sufficiently away from structures to prevent condensation on surfaces. Increasing resistance to airflow and regular filter maintenance will maximize heater performance. Providing unit with warm moist air is beneficial to the performance of the water heater.

Considerations when planning the duct system:

- Use direct route for running the ducting. To maximize airflow, reduce elbows/bends used in layout as much as possible
- Utilize largest duct size possible
- The total length of duct is the length on the inlet plus the length on the outlet
- Inlet and outlet ducting do not have to be the same length.
- Elbows, bends and termination decrease total allowable ducting length. See Table 13

Duct Type / Diameter	8"	7"	6"	5"
Rigid	357 ft (109 m)	168 ft (51 m)	68 ft (21 m)	18 ft (5.5 m)
Flexible	131 ft (40 m)	68 ft (21 m)	26 ft (7.9 m)	--

Table 12 Maximum total equivalent duct length

5.5.1 Equivalent Feet for Duct Accessories

Elbows/Bends

An elbow is defined as a rigid duct with a flex bends greater than 45°. If a bend is needed that has a tighter radius than its diameter, then a rigid elbow must be used. Table 13 lists the maximum number of elbows/bends allowed.

Terminations/Registers

Table 13 accounts for equivalent feet for terminations includes the rodent screen and it accounts for the duct reducer and termination/register. Smaller diameter terminations and registers with more than a 2ft (0.6m) connection should not be used.

Damper

An approved damper should be installed no further than 10ft (3m) of rigid ducting total (two elbows equivalent) from the unit if ducting to the outside while using an exhaust duct only (no intake duct). This action will prevent outside air from entering the living space.

Description	8"	7"	6"	5"
Elbow / Flexible Bends (Each) [Maximum Allowed]	5 ft [8]	5 ft [6]	5 ft [4]	5 ft [2]
8 in. UL Certified Termination for ducting outside (Each)	5 ft	5 ft	5 ft	5 ft
Reduced diameter UL Certified Termination for ducting outside (Each)	N/A	10 ft	15 ft	20 ft
8 in. Register for ducting inside (Each)	5 ft	5 ft	5 ft	5 ft
Reduced diameter Register for ducting inside (Each)	N/A	10 ft	15 ft	20 ft
Rodent Screen (must be greater than 83% open area) (Each)	1 ft	1 ft	1 ft	1 ft
Approved 8" diameter Duct Damper	25 ft	20 ft	10 ft	5 ft

Table 13 Equivalent feet for duct accessories/reduced diameter terminations

5.5.2 Duct Installation

NOTICE

Product damage!

- Horizontal termination to the outside is recommended to avoid water getting into the unit.

Determine the duct terminal location and create a hole through the exterior wall to accommodate the UL Certified Termination that is sufficient to prevent water entering the water heater.

8" Duct Adapters are available for this unit with following part numbers:

Adaptor Type	Part Number
Intake Duct Adaptor	7738007443
Exhaust Duct Adaptor	7738007444

Table 14 Duct adaptor part numbers

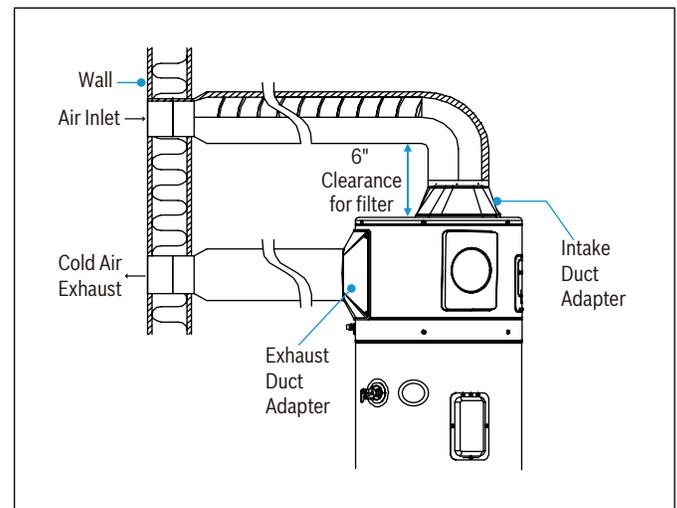


Figure 7 Horizontal duct installation example

6 Operation

CAUTION

Fire, explosion!

- Hydrogen gas (EXTREMELY FLAMMABLE) can be produced in a hot water system served by this water heater that has not been used for a period of two weeks or more. It is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system.
- You will hear a strange sound of air escaping if hydrogen is present. Do not have open flame or smoke near any faucet if this is the case.

6.1 Safety Precautions

WARNING

Improper operation!

- If the water heater has been subjected to fire, flood or physical damage, disconnect all power to water heater. DO NOT operate the water heater again until it has been checked by a qualified service technician.
- DO NOT use this water heater if any part has been under water. DO NOT attempt to operate or repair the unit! It must be replaced.

- Fill water heater completely before supplying power to the water heater.
- If cold water supply shut-off valve is closed, DO NOT turn on water heater
- It is recommended that a qualified person or service technician performs the work.

6.2 End User Operation

6.2.1 Overview of Control

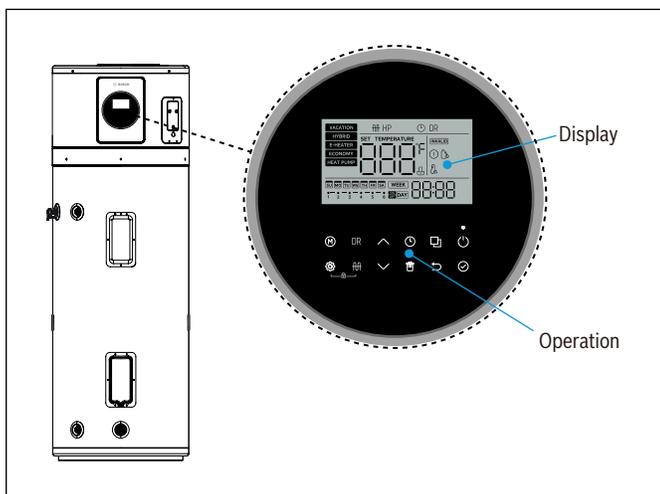


Figure 8

Buttons Overview

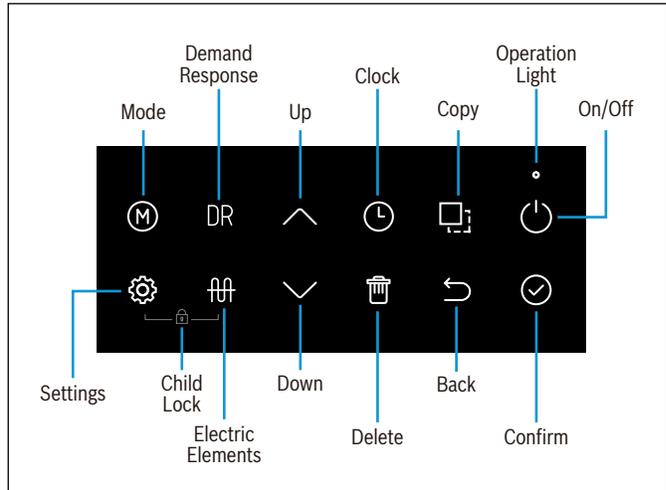


Figure 9

Display Icons Overview

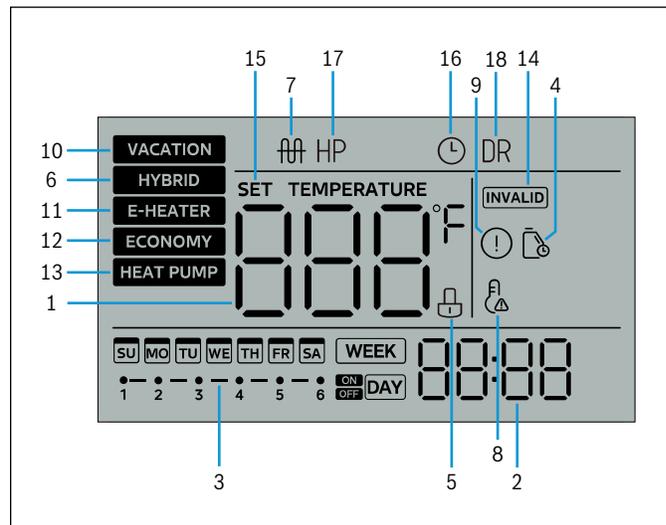


Figure 10

No.	Icon	Description
1		Main Display: This icon will be illuminated if the screen is unlocked. It shows the following values: <ul style="list-style-type: none"> The measured water temperature in the tank The setpoint temperature Remaining days of vacation in vacation mode Error code if fault is detected, see troubleshooting section for more details
2		Time and Clock Setting: This icon shows the current time. This value must be set upon installation. It also shows the time when using the scheduling function.
3		Scheduling: This icon is used to show the scheduling programmed by the user. If no scheduling is used, the icon will not be present. For the scheduling function: <ul style="list-style-type: none"> The day that has been scheduled will be displayed The dots and dashes represent different scheduled on/off cycles on a given day The day and time that is being scheduled will flash on and off when being set
4		Maintenance Reminder: This icon will flash to remind the user to conduct maintenance on the product. The time interval is default to 365 days and can be set in the engineering settings.
5		Child Lock: This icon will be displayed when the child lock is activated. This will prevent all operational buttons from being pressed.
6		Hybrid Mode: This icon will be displayed when hybrid mode is selected. This mode will minimize recovery time while still utilizing the heat pump and allows the heating element and heat pump to run simultaneously under certain operating conditions.
7		Electric Resistance Heating Element: This icon is displayed when the heating element is being used to heat the water. The electric resistance element button can also be used to manually activate the heating elements if the operation mode and conditions allow.
8		Scald Risk Alert: This icon is displayed when the temperature is higher than 122°F (50°C) to notify the user of high water temperatures.
9		Error Alert: This icon is displayed when there is an error and/or lockout. Contact a qualified technician if activated.
10		Vacation Mode: This icon is displayed when vacation mode is selected. In this mode, the tank will maintain the temperature at 59°F (15°C) to save energy.
11		E-Heater Mode: This icon is displayed when E-Heater mode is selected. This mode will only utilize the electric resistance heating elements to heat up the water.
12		Economy Mode: This icon is displayed when economy mode is selected. This is the default mode and will heat the water as high as possible before using electric resistance heating elements.
13		Heat Pump Mode: This icon is displayed when heat pump mode is selected. This mode will allow only the heat pump to function unless the unit is under certain extreme operating conditions.
14		Invalid: If a function or button is invalid, the icon will temporarily flash.
15		Set Temperature: This icon is displayed when the user is setting the water heater temperature.
16		Clock: This icon is displayed when the clock is being set.
17		Heat Pump: This icon is displayed when the heat pump is operating.
18		Demand Response (DR): This icon is displayed when the user presses the "DR" button to turn on demand response functionality. If a UCM is connected to the unit and the water heater receives a power limit request, basic or advanced load request, or emergency curtailment request, it will flash slowly. If there is an emergency shutdown request, the icon will flash quickly.

Table 15 Display icon descriptions

6.2.2 Turning on the Water Heater

NOTICE

Product damage!

- Before supplying power to the water heater make sure the water heater is filled with water! Damage caused by dry fire will not be covered by warranty.

To turn on the water heater supply power to the unit and press the on/off button. The water heater will not supply hot water instantly. Depending on the operation conditions and the selected mode and temperature the unit might need up to 1 day to reach target state.

6.2.3 Selecting Operation Mode

The water heater has 5 operation modes. Economy is the default operation mode. To change the operation mode, press the Mode button as often as needed to reach preferred operation mode. New operation mode will be saved immediately. The Hybrid mode and the E-Heater mode expire after 72 hours, the water heater will automatically switch to Economy mode after expiration. Refer to below table for more details.

Operation Mode	Efficiency	Recovery	Remarks
VACATION	N/A	N/A	Vacation mode will put the water heater to target set temperature of 59 F to protect the water heater while not use for the length of the selected days (1 – 360 days). Further details in chapter 6.2.5.
HYBRID	Low	High	Hybrid mode utilizes the heat pump and the electric heating elements to heat up the water. Efficiency is lower and the water heats up faster compared to economy mode. Only active for 72 hours.
E-HEATER	Very Low	Very High	E-Heater only utilizes the electric heating elements to heat up the water. It is the least economic mode but is the fastest way to heat up the water in the water heater tank. Only active for 72 hours.
ECONOMY	High	Low	Economy mode utilizes the heat pump and the electric heating elements to heat up the water. It's the default mode. Efficiency is high while it takes longer to heat up the water.
HEAT PUMP	Very High	Very Low	Heat pump mode only utilizes the heat pump to heat up the water. It is the most efficient way to heat up the water but also takes the longest.

Table 16 Operation modes

6.2.4 Water Temperature Setting



DANGER

Scald hazard!

- There is a hot water scald potential if the thermostat is set too high. Households with small children, disabled, or elderly persons may require a 120°F (49°C) or lower thermostat setting to prevent contact with HOT water.

The temperature of the water in the water heater can be selected between 109 - 149 °F (43 - 65 °C). Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater. The lower the temperature setting, the greater the savings in energy and operating costs.

To comply with safety regulations the temperature is factory set at 120°F (49°C) for US models and 140°F (60°C) for Canadian models. Temperature set point may need to be changed depending on local code requirements. Water temperature above 125°F (52°C) can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined in this manual and on the label on the outside of the water heater.

Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. Contact a licensed plumber or the local plumbing authority for further information.

When used in demand response applications a thermostatic mixing valve conforming to ASSE 1017 shall be installed on the hot water supply line following all manufacturer installation instructions.

To set a new temperature for the water heater, press the up or down button, to increase or decrease the temperature in 1-degree steps. The new temperature will be saved immediately.

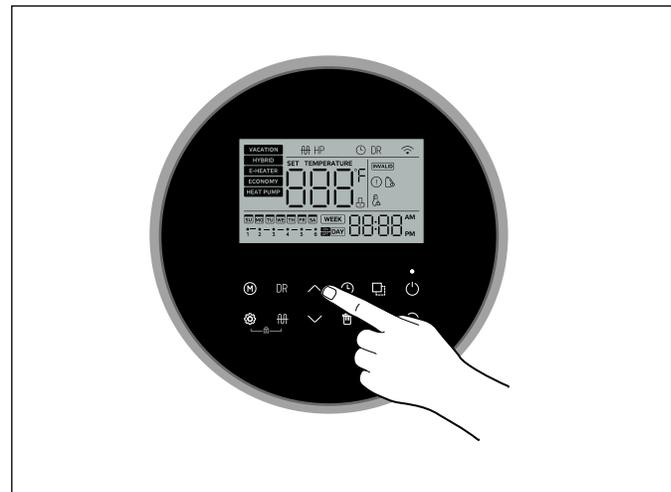


Figure 11

6.2.5 Vacation Mode

The water heater will keep the temperature in the tank at 59°F (15°C). Frost protection is active.

To put the water heater in vacation mode for the desired amount days, bring the water heater to operation mode vacation by pressing the mode button. The display will show the number of days the unit remains in vacation mode. To change the number of days, press up and down button to change between 1 – 360 days. Press confirm button to save the change.

6.2.6 Schedule

The water heater is equipped with two schedule modes, daily schedule and weekly schedule. The schedule is off when none of the following symbols are shown on the display: Week, Day, or Clock. To turn on and off the schedule, press the clock button to toggle between week schedule, day schedule or schedule off.



Set up clock and weekday before scheduling.

Set up clock and weekday by pressing and holding the clock button for 3 seconds. The weekdays will flash. Use the up and down button to select today's weekday. Press the confirm button to save. Next, change the time by using the up and down button. Press the confirm button again to save.

Weekly Schedule

The weekly schedule allows to program six on and off times for the water heater for each weekday individually.

To set up a weekly schedule follow steps:

1. Press the clock button until "WEEK" is shown on the display.
2. Press the confirm button to start setting up the schedule. Choose day, then start time, end time to set maximum 6 slots for every single day.
3. Set operation mode by pressing the mode button.
4. Set target temperature by pressing the up and down button.
5. Use the copy button to copy the schedule from one day to another day.

Daily Schedule

The daily schedule allows to program six on and off times. The schedule will be repeated every day.

To set up a daily schedule follow steps:

1. Press the clock button until "DAY" is shown on the display.
2. Press the confirm button to start setting up the schedule. Choose start time and end time for maximum 6 slots.
3. Set operation mode by pressing the mode button.
4. Set target temperature by pressing the up and down button.

6.2.7 Legionella Protection

This water heater has a function to prevent legionella growth. If turned on the unit will raise the temperature inside the tank to a temperature of 140 - 158°F (60 - 70°C) depending on the settings (default: 149°F /65°C). The temperature will be hold for 30 minutes.



Scald hazard!

Scald injury is heightened by increased water temperatures. Hot water can produce 3rd degree burns in 6 seconds at 140°F (60°C).

Mixing valve must be installed when legionella protection function is enabled.

If the user wants to use the function refer to the advanced settings (chapter 6.4.2) F07, F09, F17 and F26.

6.2.8 Turning Off Water Heater

To stop using the water heater for a longer time, check vacation mode option, otherwise:

1. Turn off water heater by pressing on/off button
2. Disconnect power to the water heater
3. To prevent freeze damage and/or the buildup of hydrogen gas, drain the water heater completely by opening the drain valve on the bottom of the unit, if you are leaving the unit off for an extended period of time.

6.3 Demand Response

If the water heater is enrolled in a utility DR program that allows the utility to temporarily increase the storage temperature setpoint higher than set by the user, a thermostatic mixing valve shall be installed. If used, the thermostatic mixing valve shall:

- Be certified to ASSE 1017 - Performance Requirements for Temperature Actuated Mixing Valves in Hot Water Distribution Systems
- Be installed according to the manufacturer's installation instructions.
- Be configured to limit the delivered water temperature to that required by the user.

The water heater is equipped with a demand response port, the CTA-2045 port, which is located above the electric wiring. Different programs might be offered by utilities and service providers to use the port. Bosch does not supply the UCM module which connects to the CTA-2045 port, nor offers any programs to take part in. The product is Ecoport certified.

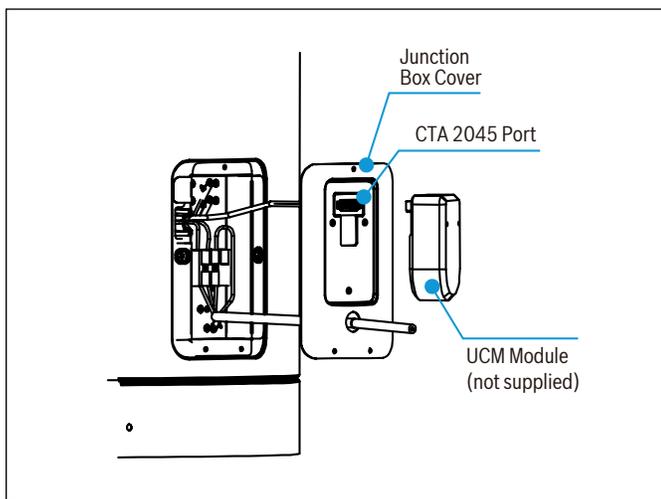


Figure 12

When a UCM module for demand response is installed, demand response will be activated. DR will show up in the display. When the unit is actively controlled through the module, the DR icon will flash. To interrupt demand response control, press the DR button. DR will disappear from the display.



Demand Response can only be deactivated for 72 hours. After 72 hours demand response will be activated automatically again.

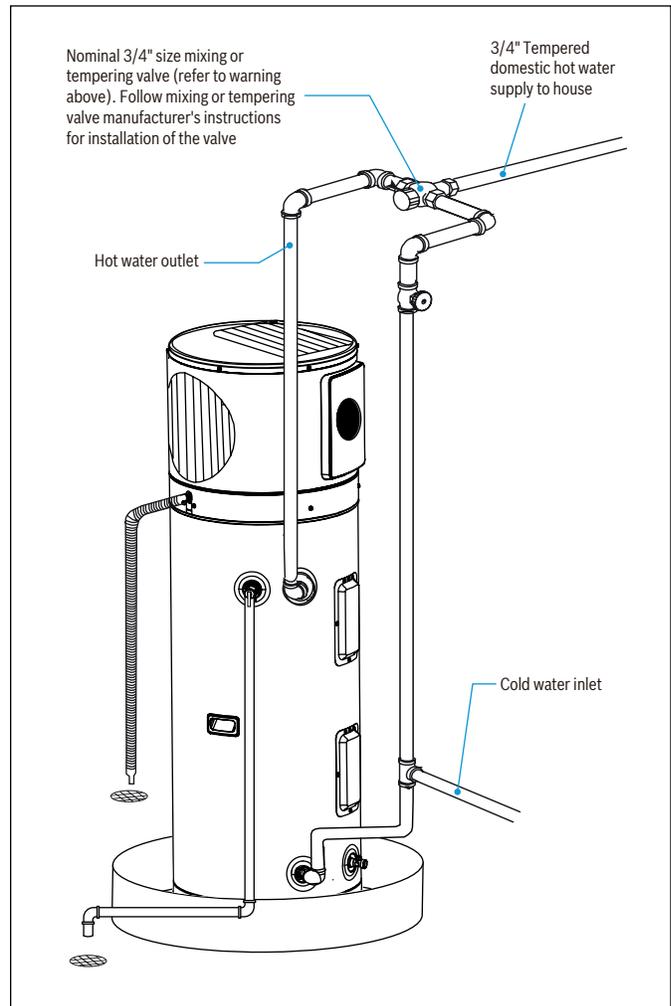


Figure 13 Installation with thermostatic mixing valve

6.4 Advanced Options for Technician

6.4.1 Operating Parameters

These units are values only and cannot be changed

1. Press the settings button once to read out various sensor values and settings of the water heater. Refer to below table.

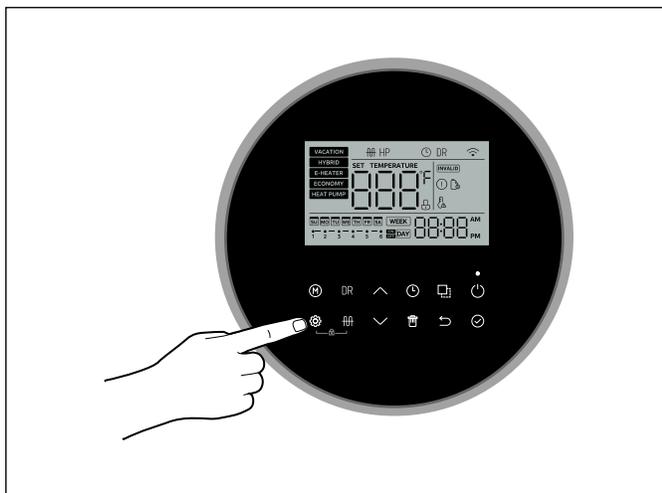


Figure 14

2. Press down button to scroll to the next item.

Item	Description	Unit	Value expected
F5U	Tank temperature at upper heating element	°F or °C (depends on F01 settings)	Variable
F5L	Tank temperature at lower heating element	°F or °C (depends on F01 settings)	Variable
F5I	N/A – not available	N/A	---
F5	Heat pump stop temperature	°C	65 (equals 149 °F)
F3	Refrigerant temperature into evaporator	°F or °C (depends on F01 settings)	Variable
F4	Air intake temperature	°F or °C (depends on F01 settings)	Variable
Fp	Refrigerant temperature after compressor	°F or °C (depends on F01 settings)	Variable
Fh	Refrigerant temperature into compressor (suction line)	°F or °C (depends on F01 settings)	Variable
On	N/A – not available	N/A	---
FFr	N/A – not available	N/A	---
Ff	Legionella protection set point temperature	°C	65 (equals 149 °F)
CO	Current amperage draw	A	Variable (0 – 25)
F0	Fan speed	RPM x 10	Variable (0 – 140)
E0	EPROM	N/A	Variable

Item	Description	Unit	Value expected
EEr	Expansion valve opening	000 format	Variable
EEC	Compressor status	(Status indication)	0 (off) or 1 (on)
PUP	N/A – not available	N/A	---
PS	N/A – not available	N/A	---
Ff	Fan type	Binary	1
Hf	Heating type	Binary	1
KP	Compressor type	Binary	1
F5I	N/A – not available	N/A	---
S10	Tank capacity	Liters	170 (TR7000T-50CA) 190 (TR7000T-50US) 280 (TR7000T-80CA) 300 (TR7000T-80US)
P4P	N/A – not available	N/A	---
UU	Product type	Binary	0 (hybrid electric water heater)
U1	Software version	000 format	Variable
U2	Display software version	000 format	Variable
U3	N/A – not available	N/A	0
U4	N/A – not available	N/A	1
Ur	Region	Binary	2
1Er	Error history: Most recent error code	0000 format	Variable
2Er	Error history: Second recent error code	0000 format	Variable
3Er	Error history: Third recent error code	0000 format	Variable
HHH	Maintenance reminder	Days	Variable
FLF	Set point temperature	°F or °C (depends on F01 settings)	Variable
End	End of operating parameters menu	N/A	---

Table 17 Operating parameters

6.4.2 Advanced Settings



WARNING

Improper or dangerous operation!

- The following settings are explicitly for a qualified installer or service agency.

Press the settings button for more than 3 seconds to enter advanced settings.

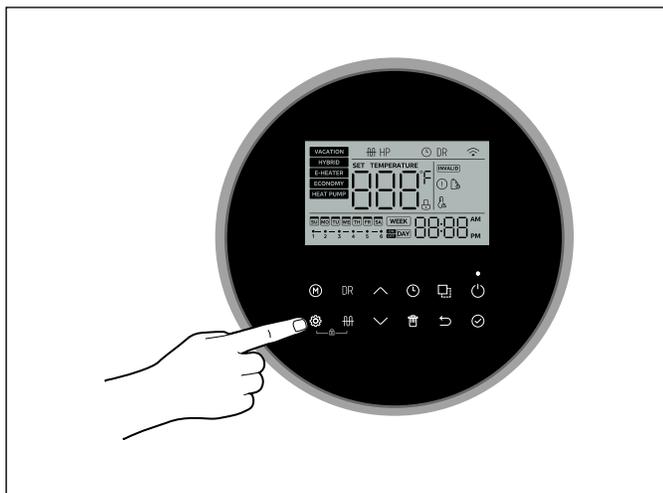


Figure 15

Item	Description	Options
F01	Unit conversion for temperature display	0 – Celsius 1 – Fahrenheit
F02	Maintenance reminder	0 – No maintenance reminder 1 – Maintenance reminder (default)
F03	Time for maintenance reminder	Select 30 – 365 days (default: 365)
F04	Reset maintenance time	Select 1 and confirm to reset day count of maintenance reminder
F05	Clear error code history	Select 1 and confirm to clear error code
F06	Electric heating elements	DO NOT ADJUST (default: 1)
F07	Legionella protection	0 – off (default) 1 – on (SCALD RISK, refer to chapter 4.2.6)
F08	Electric heating element auto activation temperature	DO NOT ADJUST (default: 5)
F09	Legionella protection cycle time (hour)	Select hour of day: 0 - 23 (default: 23)
F10	Not applicable to this product	
F11	Set vacation mode temperature	Select 10 - 20°C (equals 50 - 68°F)
F12	Not applicable to this product	
F13	Not applicable to this product	
F14	Time until electric heating element activates when heat pump is not able to increase tank temperature	Select 1 - 150; Unit: 10 minutes (default: 84 equals 840 minutes/14 hours)
F15	Dry fire protection	DO NOT ADJUST (default: 1)
F16	Overcurrent protection	DO NOT ADJUST (default: 1)
F17	Legionella protection temperature	Select 60 - 70°C (equals 140 - 158°F)
F18	Maximum temperature setpoint	Select 65 - 70°C (equals 149 - 158°F)

Table 18 Advanced Settings

Item	Description	Options
F19	Not applicable to this product	
F20	Not applicable to this product	
F21	Modbus address	Not applicable (default: 1)
F22	Not applicable to this product	
F23	Reset unit to factory settings	Select 1 and confirm to reset
F24	Not applicable to this product	
F25	Not applicable to this product	
F26	Legionella protection cycle time (minutes)	Select minutes of the hour: 0 - 59 (default: 0)
F27	Activation of electric heating element when heat pump is not able to increase tank temperature	0 – off 1 – on (default)
F28	Not applicable to this product	
F29	Not applicable to this product	
F30	Backlight behavior	0 – Backlight always on 1 – Backlight turns off after 3 seconds
F31	Not applicable to this product	
F32	Not applicable to this product	
F33	Not applicable to this product	
F34	Mute sound	0 – sound is on (default) 1 – sound is off
F35	Automatic child lock	0 – off (default) 1 – on
F36	Not applicable to this product	
F37	Not applicable to this product	
F38	Auto shutoff valve leak protection	0 – off (default) 1 – on
F39	Manual activation of legionella protection	0 – off (default) 1 – on
F40	Duct settings	0 – no duct 1 or 2 – select if duct is installed

Table 19 Advanced Settings Continued

7 Maintenance

⚠ DANGER
Hazardous voltage!

- Before removing any access panels or servicing the water heater make sure the electrical supply to the water heater is disconnected. Failure to do this may result in DEATH, SERIOUS BODILY INJURY OR PROPERTY DAMAGE.

⚠ WARNING
Modification, tampering!

- Tampering with the electrical heating elements, electrical connections, refrigerant circuit, or temperature and pressure relief valve is dangerous and may result in serious injury or death. Tampering voids all warranties. Only properly trained, qualified service personnel should service these components. Do not attempt to modify or change this water heater in anyway.
- Modifying or rewiring internal components by unauthorized persons will void the warranty, can nullify the Underwriter's Laboratories (UL) certification of the water heater and could result in property damage or personal injury for which the manufacturer cannot be responsible.

⚠ CAUTION
Personal injury, product damage!

- Do not use this water heater if any part has been under water. Immediately call a qualified service technician to replace any part of the control system which has been under water.

Proper preventative maintenance is required to maintain the warranty and will significantly extend the life of the water heater.

To obtain service on your water heater when adjustment, repair, or routine maintenance is required, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency.

Following maintenance is required:

Required Maintenance	Frequency
Drain Water Heater	annually
Test T&P Valve	annually
Heating Elements	annually
Anode Rod	annually
Air Filter	3 months
Ducting (if installed)	annually

Table 20 Regular maintenance requirements



Utilize F02 and F03 settings to remind the user of maintenance.

7.1 Drain Water Heater

⚠ WARNING
Scald hazard!

- The water drained from the tank may be hot enough to present a SCALD HAZARD and should be directed to a suitable drain to prevent injury or damage.

NOTICE
Product damage!

- When draining the water heater, make sure that the power source to the water heater is shut off before draining water. and completely fill with water before re-energizing.

Drain a few quarts of water to flush out accumulated sediment after the first 6 months then annually thereafter. This will flush sediment deposits from the bottom of the heater and lengthen the heater's service life.

Foreign material can wash in and unless the water supply is naturally soft (0 to 5 grains hardness), scale or lime deposits will accumulate in the tank. Hard water scale precipitates at an increasingly high rate in proportion to an increase in water temperature.

Failure of the tank or heating elements due to accumulated deposits does not fall within the scope of the warranty.

1. Disconnect power from water heater.
2. Attach a hose to the drain valve and connect it to a drain or a bucket.
3. Close the cold water supply line shut-off valve.
4. Open drain valve.
5. Flush until water runs clear.
6. Open hot water faucet to let air escape.
7. Re-open cold water supply line shut-off valve.
8. Close hot water faucet once air has been bled from system.
9. Make sure the water heater is completely filled before re-energizing.

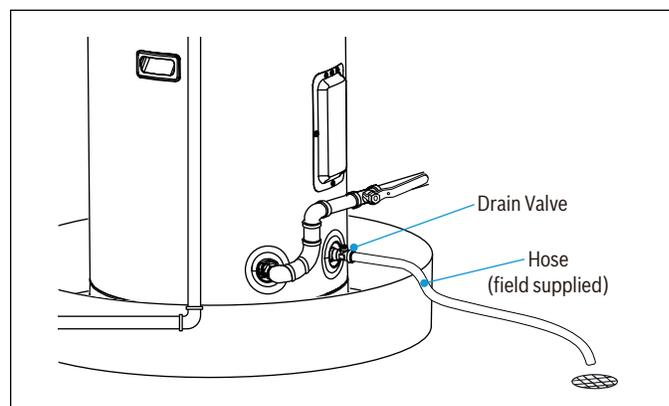


Figure 16 Draining the water heater

7.2 Test the T&P Valve

WARNING
Scald hazard!

- The water drained from the tank may be hot enough to present a SCALD HAZARD and should be directed to a suitable drain to prevent injury or damage.

Test the operation of the relief valve after filling and pressurizing the system and at least annually.

1. Place bucket underneath the discharge line of the T&P valve.
2. Lift the lever as shown in figure 17.
3. Make sure water discharges freely.
4. Close lever
5. Check for any leaks after closing the valve

If the valve fails to operate correctly or leaks after closing, replace immediately.

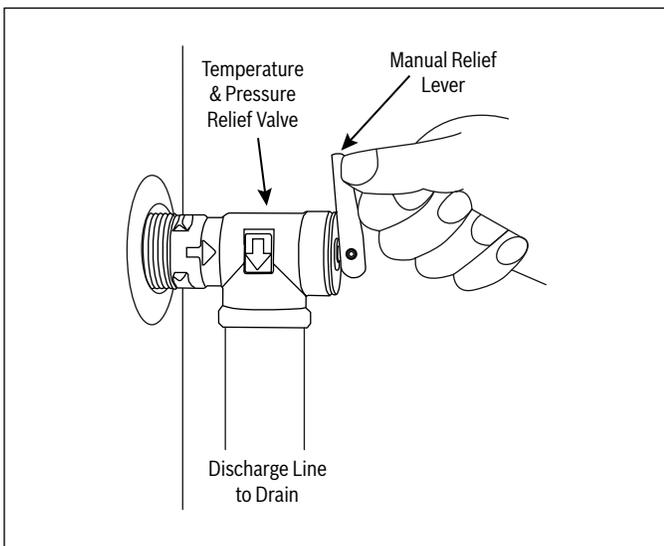


Figure 17 Testing the temperature & pressure-relief (T&P) valve

7.3 Heating Elements

WARNING
Hazardous voltage!

- Removal and replacement of the heating elements involves the disconnection of electrical wiring. These procedures must only be performed by a qualified service technician.

The electric elements are mounted inside the tank to transfer heat directly into the water. These electric elements can become laden with lime and mineral deposits that reduce their effectiveness or cause them to overheat and short out.

At least once a year check the heating elements and if they are coated with calcium, clean them using white vinegar and a stiff bristle brush.



Make sure you have new gaskets available before servicing the elements.



Figure 18 Example heating element with mineral deposits

To check or replace an element:

1. DISCONNECT POWER at the breaker to the water heater.
2. Drain tank, see 7.1 for further details.
3. Use 1 1/2" socket wrench to remove heating element.
4. Service element or replace.
5. Add new gasket when tightening the element, if needed. Do not overly tighten as this may break the gasket and creates leaks.
6. Open faucets to let air escape.
7. Fill the tank with water until water runs normally.
8. Check for leaks before turning on power.

7.4 Anode Rod

The anode rod is a sacrificial metal rod that avoids corrosion and premature failure (leaks) in the tank. It is a consumable item. The anode rod will need to be replaced before it is depleted. The water heater comes with a magnesium zinc anode rod. Inspect the anode rod after the first six months of operation when you drain and flush the tank. Replace the anode rod if it is partially depleted or substantially worn out (See Figure 19). Thereafter, inspect the anode rod annually or more frequently if needed. If you use a water softener, your anode rod will deplete faster than normal and as such would need more frequent inspection.

Certain water conditions will cause a reaction between this rod and the water heater, potentially causing smelly water. The parts list includes an aluminum anode for such cases in which the water has a different odor or discoloration due to this reaction. A water conditioning company might have to be contacted to supply filtration equipment if the issue persists.

Part Number	Material	Model
7738007479	Magnesium	TR7000T-50
7738007480	Magnesium	TR7000T-80
7738007481	Aluminum	TR7000T-50
7738007482	Aluminum	TR7000T-80

Table 21 Anode rod part numbers

NOTICE

Warranty exclusion!

- Damages or malfunction caused by lack of anode rod maintenance is not covered by the warranty.



Figure 19 Anode rod examples

To inspect or replace the anode rod:

1. Shut off water heater
2. Close cold water line and drain a few gallons of water through the faucet or hot water line to remove water pressure in the tank.
3. Remove the head cover of the water heater by unscrewing 6 phillips head screws
4. Locate white anode rod cap and remove it
5. Take 1 1/8" socket head with a 18 inch extension to unscrew anode rod
6. Check and/or replace anode rod and screw back in

7. Fill water heater by opening the cold water line again
8. Check for leaks before mounting the head cover and powering the unit

7.5 Air Filter

Clean air filter every three months, or more frequently if installed in an area with poor air quality, which is located on the top of the water heater (if not ducted). Simply push the little handle in the front to remove and rinse with water to clean it.

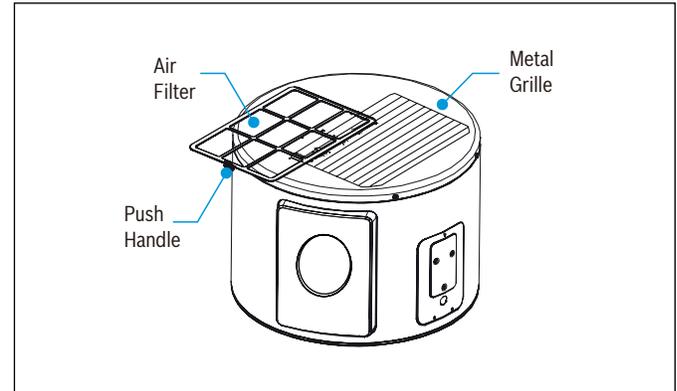


Figure 20 Filter cleaning

8 Troubleshooting

Problem	Possible Cause	Corrective Action
Display is not powered	No power to the water heater	<ol style="list-style-type: none"> 1. Check for tripped breaker, restore power 2. Check voltage at terminal block (~208-240V)
	No power to the display	<ol style="list-style-type: none"> 1. Check connection on main board to display 2. Check if display connection has power 3. If power from mainboard connection is available, replace display board
	TCO tripped	<ol style="list-style-type: none"> 1. Understand cause of TCO activation 2. Reset TCO
	Board failure	Replace failed board
No hot water	No power	<ol style="list-style-type: none"> 1. Check for tripped breaker, restore power 2. Check voltage at terminal block (~208-240V) 3. Check if display has power, if not see above
	Vacation mode is active	<ol style="list-style-type: none"> 1. Check operation mode on display for VACATION 2. Change to desired mode
	Error Code	<ol style="list-style-type: none"> 1. Error code is displayed 2. Check error code table and follow corrective actions
	Water heater has not recovered	<ol style="list-style-type: none"> 1. Check current temperature on display 2. Change operation to mode with higher recovery rate, refer to section "Selecting Operation Mode"
	Plumbing Issues	Check for plumbing issues (e.g. crossover, bad mixing valve, etc.)
Running out of hot water	Wrong operation mode selected	Select mode with higher recovery rate
	Setpoint temperature too low	Raise setpoint, refer to section "Water Temperature Setting"
	Demand response is active	Check if DR is activated, refer to section "Demand Response"
	Water heater is undersized	<ol style="list-style-type: none"> 1. Stagger hot water usage 2. Check with your installer
Temperature too high	Setpoint temperature too high	Lower setpoint
	Plumbing Issues	Check for plumbing issues (e.g. crossover, bad mixing valve, etc.)
Water pressure too low	Plumbing Issues	Check for plumbing issues (e.g. closed cold water supply valve)
Smelly water	Water quality issue (e.g. excessive sulfate)	Consider using an aluminum anode rod (part number: 7738007481 for 50 Gallon, 7738007482 for 80 Gallon)
Water in drain pan	Leak from drain valve	<ol style="list-style-type: none"> 1. Verify drain valve is fully closed 2. Replace if it still leaks
	Leak from water connections or condensate drain	<ol style="list-style-type: none"> 1. Check for leaks 2. Tighten connections 3. Replace if necessary
	Leak from T&P valve	<ol style="list-style-type: none"> 1. Check for leak at T&P valve 2. Replace T&P valve
	Leak from tank	Inspect tank for leakage, and replace whole unit if necessary

Table 22

8.1 Error code table

An active error code will be shown in the display as the table indicates below. Recent error codes which have been cleared will be shown in the operating parameters (Chapter 6.5.1.: 1Er, 2Er, 3Er) with an history reference number not the actual error code designation. Please refer to below table to reference back to the original error code.

Error Code	History Reference Number	Description	Result	Corrective Action
EC52	8	Temperature sensor T3 not detected	Water heater will operate by using electric heating elements only.	1. Check connector CN28 to main board 2. Check resistance, refer to chart "Electric Resistance Specifications"
EC53	7	Temperature sensor T4 not detected	Water heater will operate by using electric heating elements only.	1. Check connector CN28 to main board 2. Check resistance, refer to chart "Electric Resistance Specifications"
EC54	5	Temperature sensor TP not detected	Water heater will operate by using electric heating elements only.	1. Check connector CN28 to main board 2. Check resistance, refer to chart "Electric Resistance Specifications"
EH00	2	Heat pump failure	Water heater cannot operate	Call technician
EH03	3	Fan error	Water heater cannot operate	1. Check if fan can move freely 2. Inspect wire for damage 3. Check connector CN12 to main board
EH0b	1	Display communication failure to board	Water heater cannot operate	1. Verify display connector CN53 on main board 2. Re-energize unit
EH5d	11	Heating elements open circuit	Water heater will operate by utilizing heat pump	1. Verify wire connections 2. Check for resistance for elements (12.8 Ohms at 240 V) 3. Replace heating element
EH5H	6	Temperature sensor TH not detected	Water heater will operate by using electric heating elements only.	1. Check connector CN29 to main board 2. Check resistance, refer to chart "Electric Resistance Specifications"
EH5L	9	Temperature sensor T5L not detected	Water heater will operate by utilizing heat pump	1. Check connector CN24 to main board 2. Check resistance, refer to chart "Electric Resistance Specifications"
EH5U	10	Temperature sensor T5U not detected	Water heater will operate by utilizing heat pump	1. Check connector CN24 to main board 2. Check resistance, refer to chart "Electric Resistance Specifications"
EHP	12	Heat pump system fault (Activates when PH20, PH21, PC30, PC06 appears 3 times in a row or at least one error code lasts longer than 1 hour)	Water heater will operate by using electric heating elements only.	Call technician
FC06	23	Auto shut-off valve not detected	Water heater can operate normally	1. Check if auto shut-off valve is installed 2. If not installed, make sure F38 is 0 3. Replace faulty auto shut-off valve
PC06	19	High temperature at TP (TP > 230°F / 110°C)	Water heater will operate by using electric heating elements only.	Clears when TP < 194°F/90°C: if error repeats, call technician
PC30	18	High refrigerant pressure detected > 435 PSI when compressor on > 350 PSI when compressor off	Water heater will operate by using electric heating elements only.	Call technician
PH15	4	Electric leakage detected	Water heater cannot operate	1. Disconnect from power immediately 2. Call service technician
PH20	14	Compressor is not able to heat up refrigerant	Water heater will operate by using electric heating elements only.	1. Check if sensor are properly mounted 2. Check temperature delta on the refrigerant line 3. Call technician
PH21	15	Compressor working current too large	Water heater will operate by using electric heating elements only.	1. Power off unit and wait 1 hour before re-energizing 2. If error persists, call technician
PH22	16	Leak sensor activated	Water heater can operate normally	Check for leaks and fix leaking part
PH24	17	T5L < 39°F/4°C and T4 < 45°F/9°C: Frost Protection active	Water heater will operate by using electric heating elements only.	Frost protection deactivates automatically. If inlet air is ducted, consider taking indoor air
PH91	22	Evaporator temperature too low	Water heater will operate by using electric heating elements only.	1. Check temperature sensor T3 (connections and resistance)
PH9b	20	Water temperature exceeds set point by 9°F (5°C)	Water heater cannot operate	1. Check resistance of temperature sensor T5U 2. Replace if out of specification
PHdH	13	Dry burning protection is running	Water heater cannot operate	Make sure water is in the tank by opening hot water faucet
PHL1	21	Water detected in condensate tray	Water heater will operate by using electric heating elements only.	Check if condensate drain is blocked

Table 23

8.2 Thermal Cutout

The water heater is equipped with a thermal cutout (TCO) that is located above the upper heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the TCO breaks the power circuit to the water heater. Once the TCO activates, it must be reset manually.



WARNING

Personal injury, product damage, property damage, improper operation!

- Resetting TCO - The cause of the high temperature condition must be investigated by a qualified service technician and corrective action must be taken before placing the water heater in service again.

To reset the TCO (Refer to Figure 20):

1. Disconnect all power to unit.
2. Remove the upper heating element cover and insulation.
3. Press the button to reset, refer to below picture.
4. Put back the insulation and screw on upper heating element cover before turning on the power to the water heater.

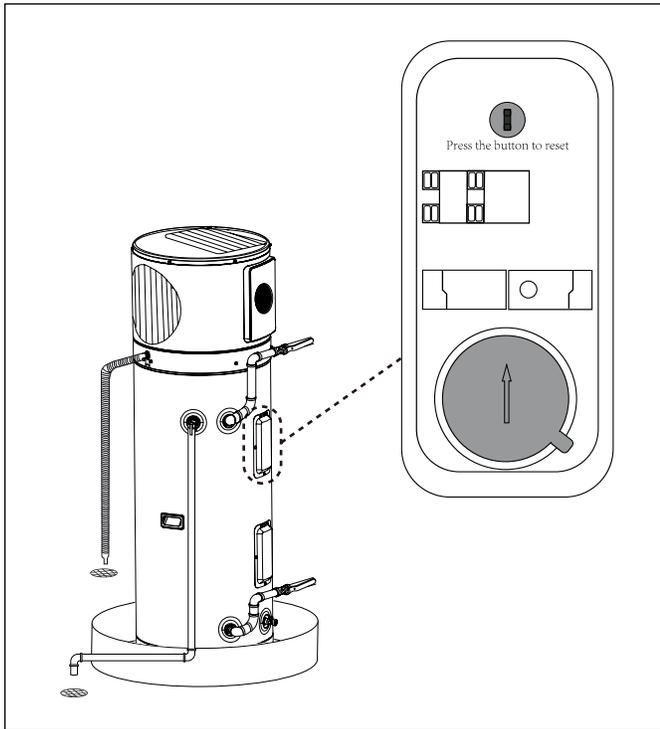


Figure 21 Thermal cutout (TCO) location

8.3 Electric Resistance Specifications

The water heater is equipped with multiple temperature sensors and heating elements that are based on resistance values. The Electric Resistance Specification table details the correct resistances for each heating element and temperature sensor. These resistances are measured without the component being wired. If the resistances vary from the specified values significantly at the specified temperature, it could be a sign that a replacement component is required. Contact a qualified technician for more information

Part	Resistance Specifications (±5%)
Electric Heating Element	12.8 Ohm
T3	10 kOhm (at 25°C)
T4	10 kOhm (at 25°C)
TP	5 kOhm (at 90°C)
TH	10 kOhm (at 10°C)
T5L	17.6 kOhm (at 50°C)
T5U	17.6 kOhm (at 50°C)

Table 24 Electrical resistance specifications

8.3 Electrical Diagram

This guide recommends minimum branch circuit sizing and wire size based on National Electric Codes.

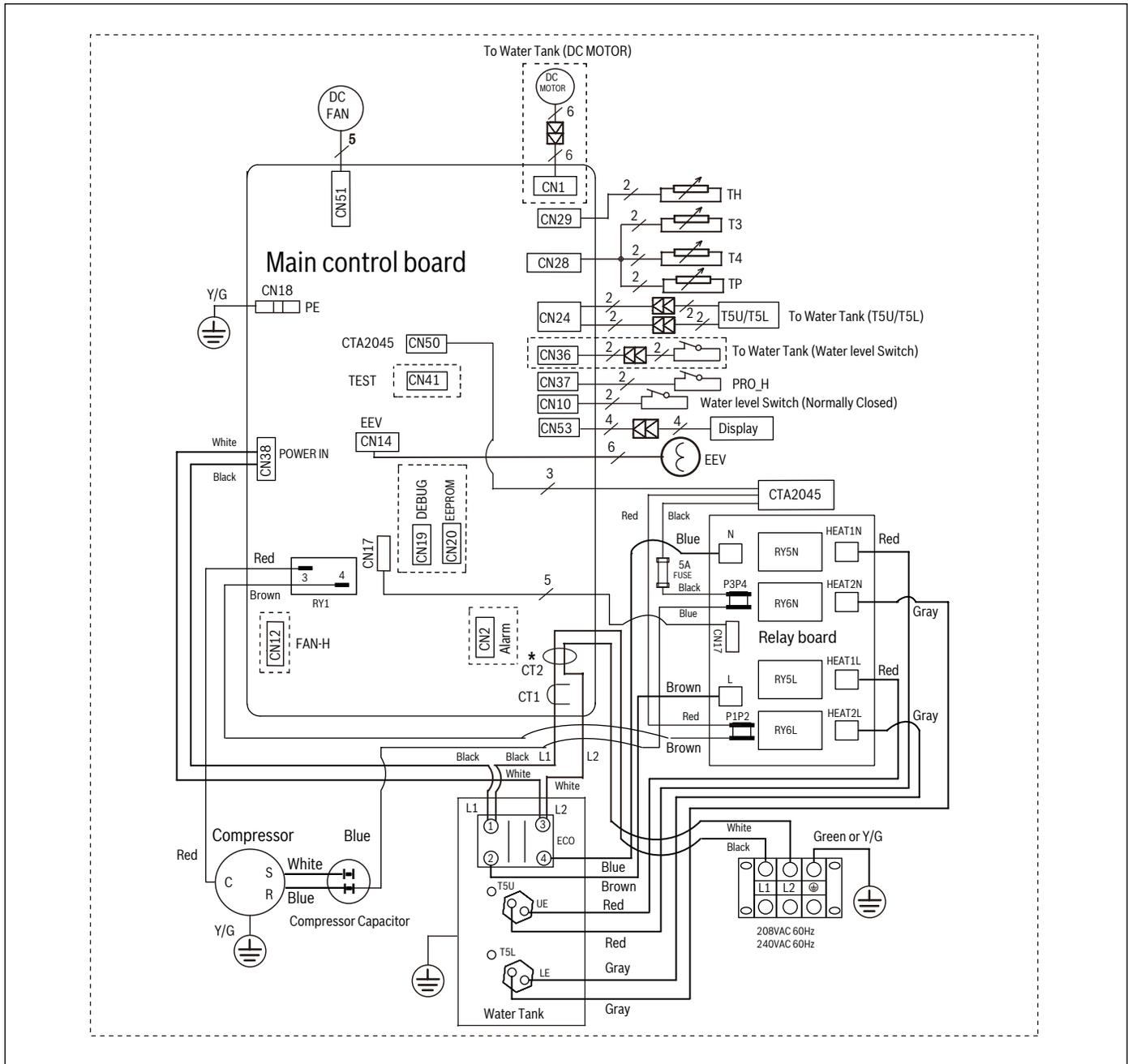


Figure 22 Electrical diagram

Water Heater Wattage at 240V	Phases	Recommended Over Current Protection (Fuse or Circuit Breaker) Amperage Rating	Copper Wire Size AWG Based on N.E.C. Table 310-16 (75°C)
		208 - 240V	208 - 240V
5,500	1	30	10

Table 25

Online Help Resources

Alternatively, please visit our Service & Support webpage to find FAQs, videos, service bulletins, and more; www.boschheatingcooling.com/service or use your cellphone to scan the code below.

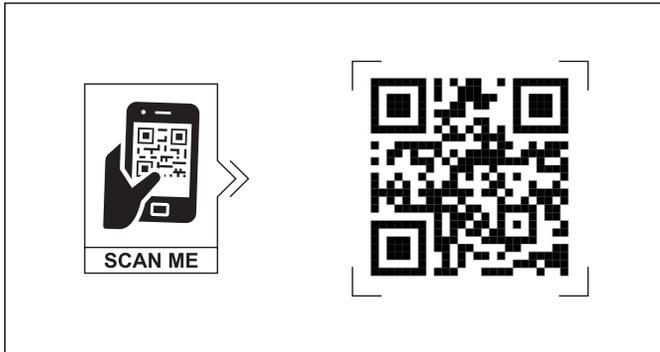


Figure 23

9 Water Heater Components

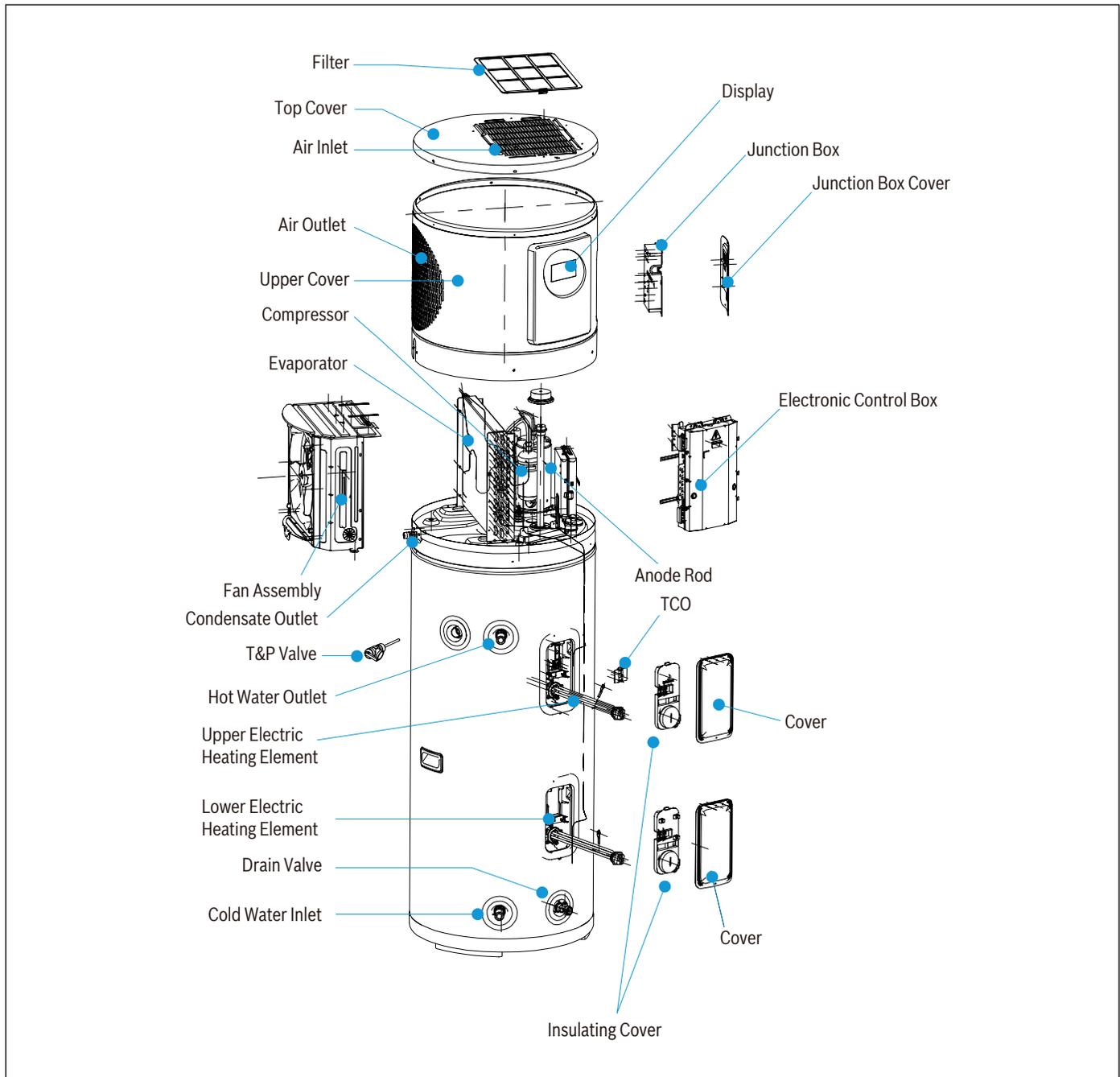


Figure 24 Water heater components

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BTC 755003301 A / 04.2024

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