



This manual covers the Chiltrix All-Stainless Steel tank models VCT19, VCT37c, VCT60, and DHW80, and serves as a general guideline for using other brands of tanks with the Chiltrix air to water heat pump. Incorrect installation, operation, or service can damage the water tank, your property, other equipment, and present risks including fire, scalding, electric shock, explosion, injury, or death.

IMPORTANT! This manual covers the CX50-1 & CX34-4 models only. Please check the serial number of the CX outdoor unit before using this manual. When unpacking- don't throw away the small plastic bag that contains the wire grommets for the temperature sensors.

READ THIS FIRST.....Page 2-5
Important Information: Applies to All Chiltrix Tanks

Buffer Tanks..... Page 6-11
19, 37, 58 gallon Buffer Tanks

DHW80Page 12
Indirect Coil DHW Tank

DHW InstallationPage 13
& Options Including Anti-Legionella Function

Emergency Heat.....Page 18
For use with buffer tanks

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IMPORTANT
Check All Tank Ports
For Watertight Plug,
Including Under Any
Element Cover(s)

NOTE
Chiltrix does not
recommend use with
recirculating hot
water systems.

CAUTION!

Read the Important Information that applies to all Chiltrix tanks before proceeding to model specific information. See Page 1-4.

Maximum temperature for DHW setting or Emergency Heat setting is 120 °F. The maximum allowed service water pressure is 90 PSI.

THERMOSTATS / ELEMENTS

Chiltrix provides only storage tanks and does not provide heating elements or thermostats. Install UL Listed elements or thermostats per the element or thermostat manufacturers instructions.

**** PLUGS:** Note that some tank ports may be un-used in your application and must be plugged. Any pre-plugged ports must be inspected for tightness. **Note that any plugs provided with the tank are finger-tight only and may not be leak-proof. Inspect and verify that all ports including any ports under the element cover(s) are tight, properly seated, and leak-proof. When unpacking, don't throw away the plastic bag with the grommets for sensor wells.**



⚠ WARNING

Read and understand this instruction manual and safety messages before installing, operating, or servicing this water heater.

Failure to follow these instructions and safety messages could result in death or serious injury.


This manual must remain with water heater.

CAUTION

Improper installation and use may result in property damage.

- Do not operate water heater if flood damaged.
- Inspect and replace anode.
- Install in location with drainage.
- Fill tank with water before operation.
- Be alert for thermal expansion.


Refer to this manual for installation and service.



⚠ WARNING

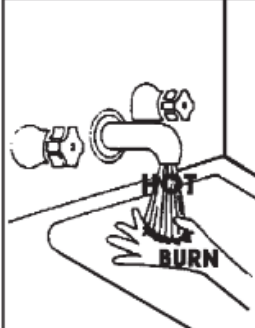
Explosion Hazard

- Overheated water can cause water tank explosion.
- Properly sized temperature and pressure relief valve must be installed in opening provided.



⚠ WARNING

- Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF."
- Failure to do this could result in death, serious bodily injury, or property damage.



⚠ DANGER

Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.


Feel water before bathing or showering.

Temperature limiting valves are available.


Read this instruction manual for safe temperature setting.

⚠ WARNING

Fire Hazard / Electric Shock Hazard

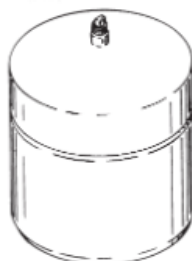


If you are installing any electric resistance elements and/or thermostats, refer to the instructions provided by the manufacturer of such items.





INSTALL VACUUM RELIEF IN COLD WATER INLET LINE AS REQUIRED BY LOCAL CODES.



INSTALL THERMAL EXPANSION TANK OR DEVICE



INSTALL SUITABLE METAL DRAIN PANS UNDER HEATERS TO PREVENT DAMAGE DUE TO LEAKAGE. REFER TO WATER HEATER LOCATION, SEE "LOCATING THE SOLAR WATER HEATER" SECTION.

Never operate any electrical heating element without being certain the tank is completely filled with water. If any air is left in the top of the tank, a heating element can burn out. Further, any air in the system when used as a closed-loop buffer tank may cause corrosion problems to occur in the tank or elsewhere in the system.

LOCAL CODES The installation of all tanks must be in accordance with these instructions and all applicable local codes and electric utility requirements. In the absence of local codes, install in accordance with the latest edition of the National Electrical Code (NFPA-70).

A TEMPERATURE-PRESSURE RELIEF VALVE For protection against excessive pressures and temperatures **MUST BE INSTALLED** in any tank that contains a heating source. If a tank has a heating element or coil this section applies to you. Install temperature-pressure protective equipment required by local codes, but not less than a combination temperature-pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, as meeting the requirements for Relief Valves for Hot Water Supply Systems, the latest edition of ANSI Z21.22. Position the valve downward and provide an all-copper discharge pipe that must terminate a maximum of six inches above a floor drain or external to the building. In cold climates, it is recommended that the discharge pipe be terminated at an adequate drain inside the building. Be certain that no contact is made with any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances. Excessive length, over 15 feet, or use of more than two elbows, can cause restriction and reduce the discharge capacity of the valve. No valve or other obstruction is to be placed between the temperature-pressure relief valve and the tank. Do not connect tubing directly to discharge drain unless a 6" air gap is provided. To prevent bodily injury, hazard to life or damage to property, the temperature-pressure relief valve must be allowed to discharge very hot water or steam should circumstances demand. **If the discharge pipe is not directed to a drain or other suitable means, any discharge may cause injury or property damage.** The Discharge Pipe: • Shall not be smaller in size than the outlet pipe size of the temperature-pressure relief valve, or have any reducing couplings or other restrictions. • Shall not be plugged or blocked. • Shall be of material listed for steam distribution. • Shall be installed so as to allow complete drainage of both the temperature-pressure relief valve, and the discharge pipe. • Must terminate six inches above a floor drain or external to the building. In cold climates, it is recommended that the discharge pipe be terminated at an adequate drain inside the building. • Must not have any valve between the relief valve and tank. When installing the temperature-pressure relief valve, use two or three turns of Teflon® tape or other suitable thread sealer around the threaded end of the valve.

The temperature-pressure relief valve should be manually opened once a year. Caution should be taken to ensure that (1) no one is in front of or around the outlet of the temperature-pressure relief valve discharge line, and (2) the water manually discharged will not cause any bodily injury or property damage because the water may be extremely hot. If after manually operating the valve, it fails to completely reset and continues to release water, immediately disconnect power to any heating elements, close the cold water inlet to the water heater, follow the draining instructions, and replace the temperature-pressure relief valve with a new one. If the temperature-pressure relief valve on the tank weeps this may be due to thermal expansion. The water supply serving the water heater may have a check valve installed. Contact the water supplier or local plumbing contractor on how to control this situation. **Do not plug or block the temperature-pressure relief valve.** Install back-flow-preventer as required by local code.

ANODE

All Chiltrix DHW tanks contain a magnesium anode rod, which may slowly deplete (due to electrolysis) prolonging the life of the water heater by protecting the tank from corrosion. In a closed oxygen-free hydronic system such as when the tank is used as a buffer tank, the anode should not deplete. In a water heating application, adverse water quality, hotter water temperatures, high hot water usage, and water softening methods can increase the rate of anode rod depletion. Once the anode rod is depleted, the tank may begin to corrode, eventually developing a leak. Even a stainless steel tank is subject to corrosion due to water quality issues and must have an anode in good condition. Certain water conditions will cause a reaction between the anode rod and the water. The most common complaint associated with the anode rod in a potable water heating tank is a “rotten egg smell” produced from the presence of hydrogen sulfide gas dissolved in the water.

IMPORTANT: Do not remove this rod permanently as it may void any warranties. A special anode rod may be available if water odor or discoloration occurs. **NOTE:** This rod may reduce but not eliminate water odor problems. The water supply system may require special filtration equipment from a water conditioning company to successfully eliminate all water odor problems. Artificially softened water is exceedingly corrosive because the process substitutes sodium ions for magnesium and calcium ions. The use of a water softener may decrease the life of a water heater tank. The anode rod should be inspected after a maximum of three years and annually thereafter until the condition of the anode rod dictates its replacement. **NOTE:** artificially softened water requires the anode rod to be inspected annually. The following is a sign of a depleted anode rod: The majority of the rod’s diameter is less than 3/8. If the anode rod shows signs of depletion it should be replaced.

NOTE: Whether re-installing or replacing the anode rod, check for any leaks and immediately correct if found. Chiltrix anode rods use standard threads and can be replaced **ONLY AFTER DISCONNECTING POWER TO ALL ELEMENTS OR THERMOSTATS AND PROPERLY DRAINING THE TANK.**

PRESSURE

Do not exceed 90 PSI service water pressure.

Always install a proper drain pan w/ drain under any tank.

IMPORTANT
Check All Tank Ports
For Watertight Plug,
Including Under Any
Element Cover(s)

TEMPERATURE

Maximum allowed operating temperature setting is 122 °F. However, tanks used for potable water may (and should be) periodically set to a higher temperature for a period of time to prevent legionella in a potable water tank.

LEGIONELLA

Consult your local codes or health department for definitive information on temperatures and holding times. In general, some industry guidelines indicate that you must raise the water temperature of any potable water heating tank to above 140 °F and hold it at that temperature for at least four hours on a weekly basis, or heat to 160F and hold for at least 30 minutes, to avoid legionella growth in the tank. Higher temperatures and longer holding times increase the effectiveness of preventing legionella. **YOU MUST CONSULT YOUR LOCAL CODE AND/OR HEALTH DEPARTMENT FOR SPECIFIC ANTI-LEGIONELLA REQUIREMENTS. See manual section on automated anti-legionella procedure available under Option #2.**

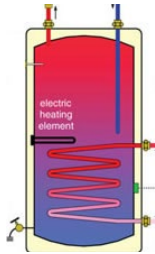
ANTI-SCALD VALVES

Install anti-scald valves on the outlet to any potable water heating tank per local code. Skin damage in adult humans occurs in about 5-10 minutes at 120°F, 15-30 seconds at 130°F, and 3-5 seconds at 140°F. Above 140F the danger is much higher. Children and others with sensitive skin will be scalded quicker and at lower temperatures. During or after an anti-legionella procedure, tank temperature may be in the 140F-170F range ⁴ and can be very dangerous. **ALWAYS INSTALL AN ANTI-SCALD VALVE ON ANY DHW TANK.**

Important Terminology

Indirect DHW Tank

An indirect tank, also known as a heat exchanger tank or a solar tank, is a tank with a coil inside. Heated fluid from an external source such as a heat pump, boiler, or solar thermal system is circulated through the coil. The coil gets hot and heats the surrounding water in the tank.



This type of tank should have at least one backup heating element/thermostat, magnesium anode, TPV (temperature/pressure valve), and an anti-scald valve installed on the hot water outlet. The backup element may be fully controlled by the element tstat. Power to the element/tstat may or may not be controlled by Chiltrix depending on system design. An anti-legionella (automated or manual) function must be employed, see section on legionella.

Buffer Tank

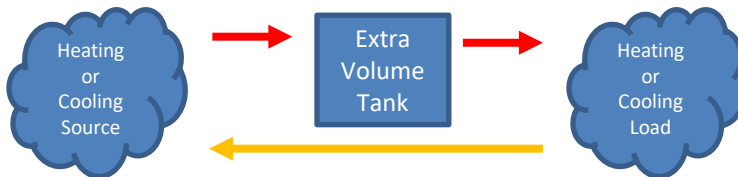
Always required with radiant heating or cooling, a buffer tank is defined as a tank that has at least one set of supply/return ports on the supply side and at least one set of supply/return ports on the load side. A buffer tank serves to hydraulically separate the supply side pump(s) from the load side pump(s) and provides thermal buffering.



A buffer tank can **never** be used for backup heat. Electric heating elements may be installed in a buffer tank only for **emergency** heat. If so, a TPV and element thermostat set at max 120F is required.

Volume Expander (Extra Volume) Tank

A volume-expander tank is used inline on the supply side with Chiltrix when the total fluid volume is less than 15-20 gallons, to stabilize the system and reducing cycling/hunting.



While not recommended, backup heat can be installed inside an inline volume expander tank. In this case a tank thermostat and TPV must be installed. Contact Chiltrix technical support for instructions. The recommended backup solution is the optional V18 dynamic variable backup heater.

Expansion Tank

This type of tank is designed to accept water volume expansion that occurs when water is heated. A 2-liter expansion tank is included inside the Chiltrix heat pump and can handle a system of up to 25 gallons total volume. Systems with larger volumes will need to have an additional expansion tank provided by the installer. Not supplied by Chiltrix.



Understanding Backup Heat Vs. Emergency Heat

In the Chiltrix lexicon, these terms have a distinct meaning. For space heating, backup heat refers to adding additional heat into the system at times when the CX34 or CX50 cannot keep up due to extremely low outdoor temperatures. This extra heat is typically metered in dynamically by the optional Chiltrix V18. For space heating, ***emergency heat*** refers to a condition where the CX34 or CX50 is inoperative, for example, a tree falls and crushes the CX unit. In this example, heating elements (controlled by a standard element thermostat with max setting 120F) located inside a buffer tank can be **manually** activated. See buffer tank section of the manual. **Backup heat must never be used inside a buffer tank.** For DHW, backup heat refers to an electric element in the tank that can provide heat when the CX cannot meet the load due to outdoor conditions, or because of unusual demand.

VCT19

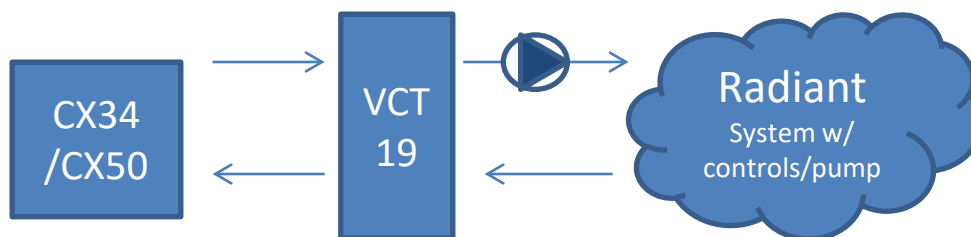
The VCT19 is an all-stainless multi-purpose tank that can be used to add additional fluid volume to a hydronic system or to provide a buffered hydraulic separation between a primary loop (supply side) and a secondary loop (load side) such as a radiant system. Inner and outer tank is SUS 304 stainless steel with 2" poly insulation. A VCT19 may also be used as a backup heating tank although the recommended backup heat solution is the dynamic V18. If a VCT19 is used inline for backup heat (not preferred, see V18), the element must be controlled by a standard thermostat set at max120F and powered by a circuit with a contactor (controlled by the CX unit). A TPV must be installed. Contact Chiltrix support dept. for details.

The VCT19 has 4x 1" NPT ports: 2x ports (supply/return) on the supply side, and 2x ports (supply/return) on the load side. Other ports: 1x 3/4" TPV, 1x 3/4" drain, 1x 1" NPSM (element). There is a thermostat housing, with wire channel and grommet.

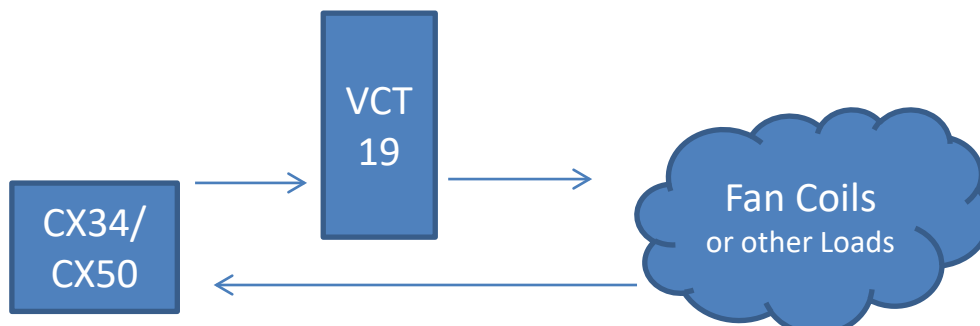
The VCT19 is generally used as a buffer tank for connecting a single CX unit to a secondary loop such as for radiant heating or cooling system. It may also be used for *emergency* heat for use in the event that the normal heat source is unavailable. Emergency heat is defined as use during such time as when the Chiltrix unit is totally unavailable such as if damaged by a falling tree. It may also be used for "backup heat" which is defined as additional heat added to the system to make up for any shortfall of BTUs when the heating load exceeds the compressor capacity. However, backup heat in the Chiltrix design will be far more efficient when provided by the V18 dynamically variable backup heater.

Installers: Make sure to check every port including those under any thermostat covers. Ensure that unused ports are plugged, plugs properly seated, and tight.

Used as a buffer tank:



Used as an inline or extra-volume tank:



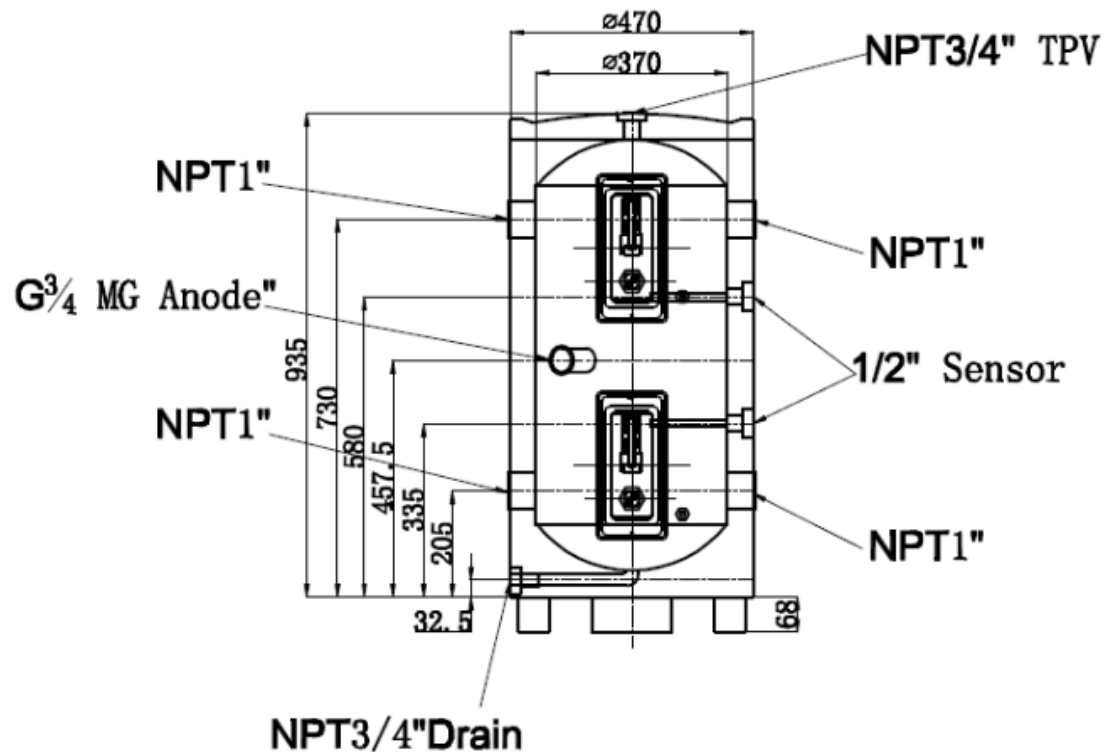
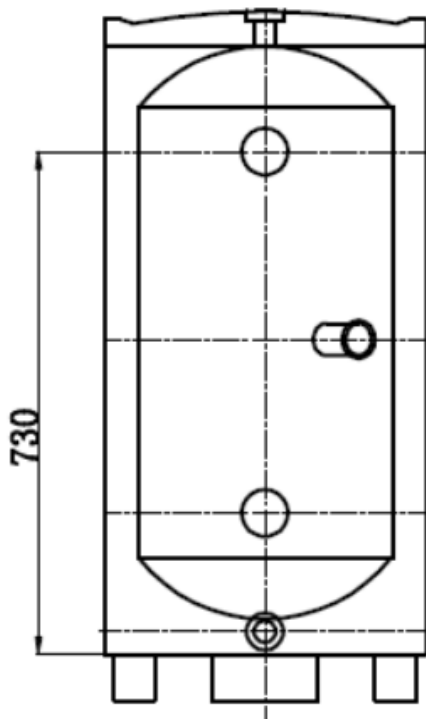
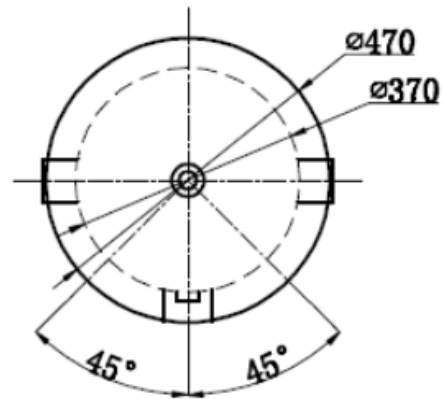
Multi-Function Stainless Steel Tank - Model VCT19

19 gallons/80 liters
 Stainless Steel Inner Tank w/ Stainless Steel Jacket
 2" Polyurethane Insulation
 2x Element ports 1" NPSM
 2x Element/Thermostat Cavities w/ Covers
 Supports up to 2x 5500w Elements
 2x Inlet Ports 1" NPT Female
 2x Outlet Ports 1" NPT Female
 1x Drain Ports 3/4" NPT Female
 2x 1/2" Sensor Wells
 1x 3/4" Anode Port
 Diameter 18.5"
 Height 39"
 Weight 51 Lbs.

Buffer / Multi-Purpose
 All-Stainless Steel Tanks

Applications:

Small Buffer Tank
 In-line Volume Expander
 Back-Up Heat Tank



VCT37

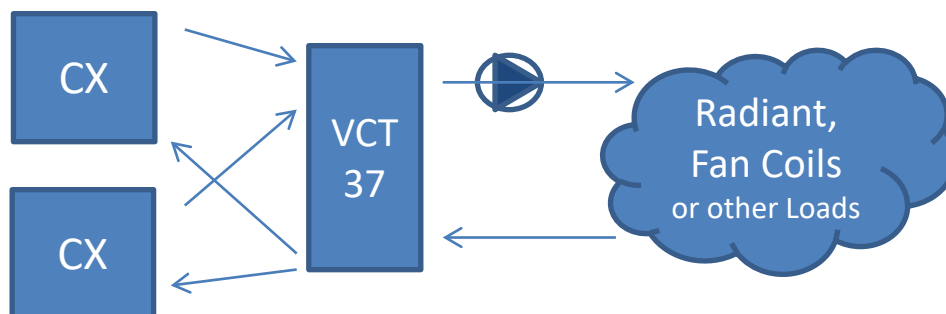
The VCT37 is an all-stainless multi-purpose tank that can be used to combine two or three Chiltrix outdoor units for connection to a hydronic system. It provides hydraulic separation between two or three Chiltrix units to avoid balancing issues, and additionally can provide a buffered hydraulic separation between a primary loop (supply side) and a secondary loop (load side). A VCT37 may also be used as an inline backup heating tank although the recommended backup heat solution is the dynamic V18. If a VCT37 is used inline for backup heat, the element must be controlled by a standard thermostat set at max 120F and powered by a circuit with a contactor (controlled by the CX unit). A TPV must be installed. Contact Chiltrix support dept. for details.

The VCT37 has 6x 1" NPT ports and 4x 1.5" NPT ports: 6x ports (supply/return) on the supply side are configured as three for supply and three for return, for connecting up to three Chiltrix outdoor units. The load side has two 1.5" NPT ports for connection to the load side requirements. Other ports: 1x 3/4" TPV, 2x 3/4" drain, 2x 1" NPSM (element). There are two thermostat housings, with wire channels and grommets. The additional drain port is configured to allow the tank to properly drain when installed as a horizontal tank.

The VCT37 is generally used as a buffer tank for two or three CX units used together and/or to separate them from a secondary loop such as for radiant heating or cooling system. It may also be used for *emergency* heat for use in the event that the normal heat source is unavailable. Emergency heat is defined as use during such time as when the Chiltrix units are totally unavailable such as if damaged by a falling tree. However, it *should not* be used for "backup heat" which is defined as additional heat added to the system to make up for any shortfall of BTUs when the heating load exceeds the compressor capacity. Backup heat in the Chiltrix design should be provided by the V18 dynamically variable backup heater.

Installers: Make sure to check every port including those under any thermostat covers. Ensure that unused ports are plugged, plugs properly seated, and tight.

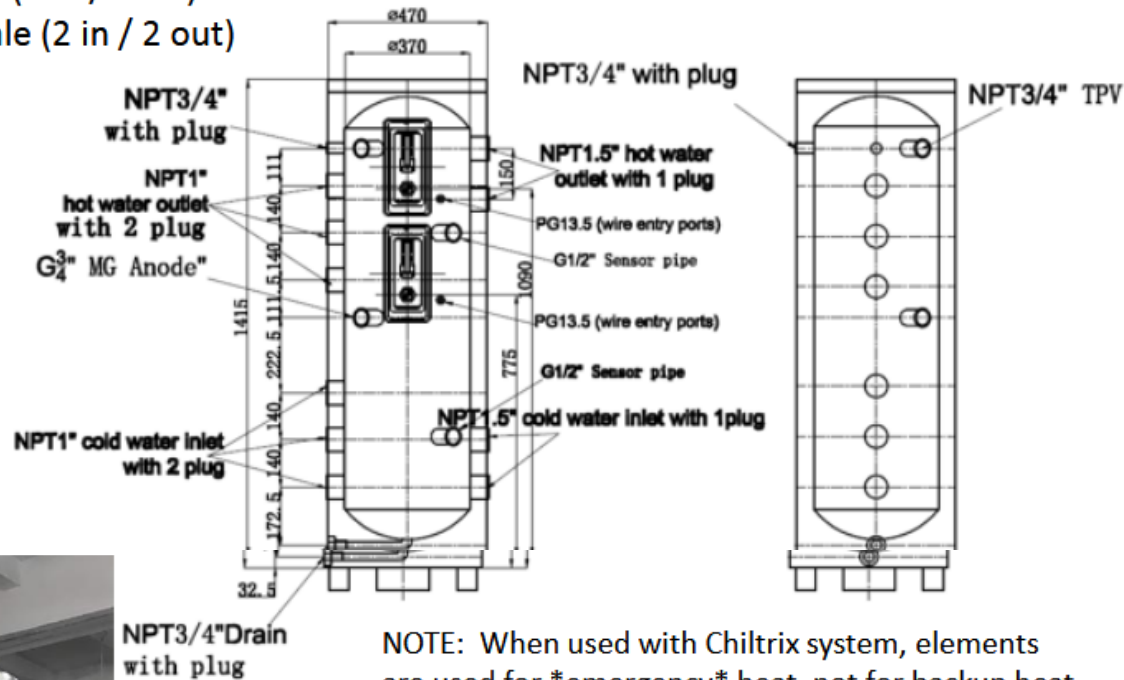
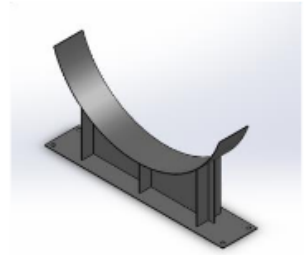
Example shows using VCT37 to combine two CX units



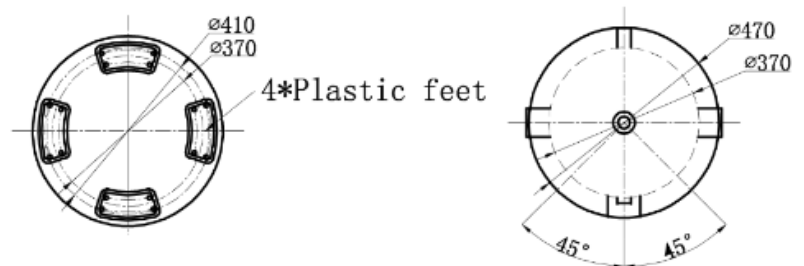
Vertical Configuration Model VCT37C

37 gallons/150 liters
 Stainless Steel Inner Tank w/ Stainless Steel Jacket
 2" Polyurethane Insulation
 2x Element ports 1" NPSM
 2x Element/Thermostat Cavities w/ Covers
 Supports up to 2x 5500w Elements
 6x Side 1 Ports 1" NPT Female (3 in / 3 out)
 4x Side 2 Ports 1.5" NPT Female (2 in / 2 out)
 2x Drain Ports 3/4" NPT Female
 2x 1/2" Sensor Wells
 1x Anode Port w/ Anode
 Diameter 18.5"
 Height 58.5"
 Weight 74 Lbs.

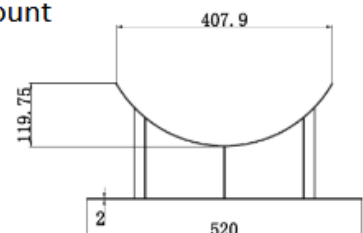
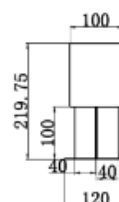
Optional Cradle
 For Horizontal
 Application : Specify
 Model HCT37



NOTE: When used with Chiltrix system, elements are used for *emergency* heat, not for backup heat. For backup heat, see Chiltrix V18.



Optional Cradle Mount



VCT60

The VCT60 is an all-stainless multi-purpose tank that can be used to combine two or three Chiltrix outdoor units for connection to a hydronic system. It provides hydraulic separation between two or three Chiltrix units to avoid balancing issues, and additionally can provide a buffered hydraulic separation between a primary loop (supply side) and a secondary loop (load side). If a VCT60 is used inline for emergency heat, the element must be controlled by a standard thermostat set at max 120F and powered by a circuit with a contactor (controlled by the CX34). A TPV must be installed. Contact Chiltrix support dept. for details.

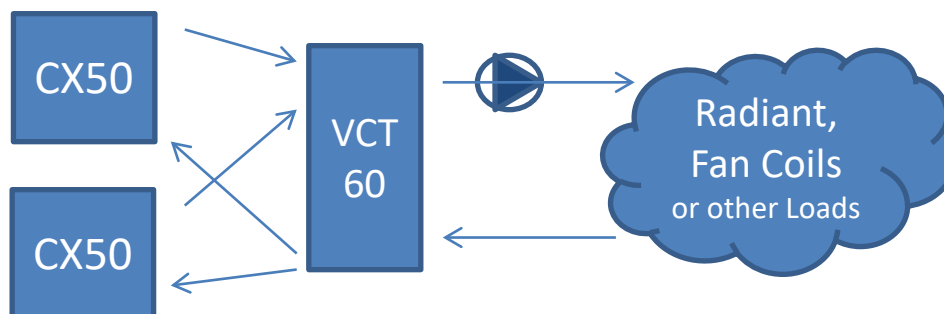
The VCT60 has 6x 1.25" NPT ports (side 1) and 4x 1.25" NPT port (side 2):

Other ports: 1x 3/4" TPV, 2x 3/4" drain, 2x 1" NPSM (element). There are two thermostat housings, with wire channels and grommets. The additional drain port is configured to allow the tank to properly drain when installed as a horizontal tank.

The VCT60 is generally used as a buffer tank for two or three CX34 or CX50 used together and/or to separate them from a secondary loop such as for radiant heating or cooling system. It may also be used for *emergency* heat for use in the event that the normal heat source is unavailable. Emergency heat is defined as use during such time as when the Chiltrix units are totally unavailable such as if damaged by a falling tree. However, it *should not* be used for "backup heat" which is defined as additional heat added to the system to make up for any shortfall of BTUs when the heating load exceeds the compressor capacity. Backup heat in the Chiltrix design should be provided by the V18 dynamically variable backup heater.

Installers: Make sure to check every port including those under any thermostat covers. Ensure that unused ports are plugged, plugs properly seated, and tight.

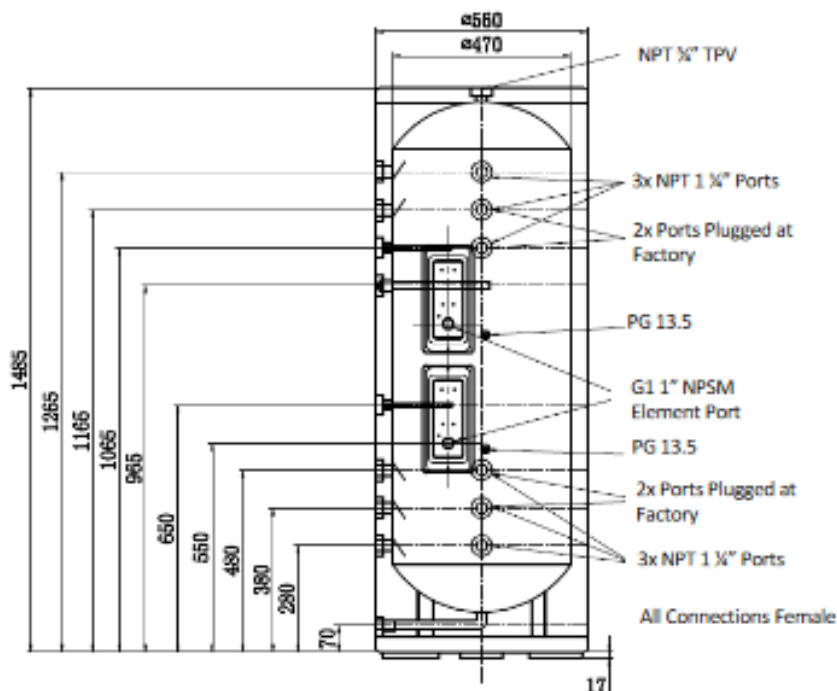
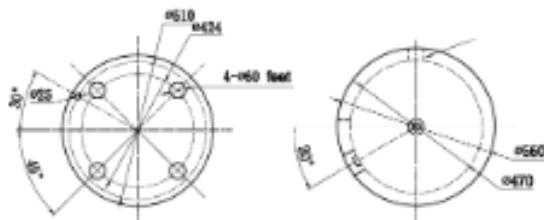
Example shows using VCT60 to combine two CX50 units



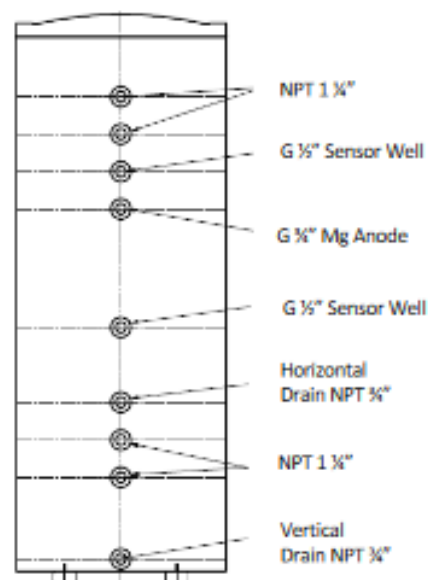
VCT60 Buffer Tank

58 gallons/220 liters
 Stainless Steel Inner Tank w/ Stainless Steel Jacket
 2" Polyurethane Insulation
 2x Element ports 1" NPSM
 2x Element/Thermostat Cavities w/ Covers
 Supports up to 2x 5500w Elements
 6x Side-1 Ports 1.25" NPT Female (3 in / 3 out)
 4x Side-2 Ports 1.25" NPT Female (2 in / 2 out)
 2x Drain Ports 3/4" NPT Female (Vertical/Horizontal)
 2x G 1/2" Sensor Wells
 1x G 3/4" Anode Port w/ Anode
 2x PG 13.5 Wiring Grommets
 Diameter 22.05"
 Height 59.84"

Dimensions: Millimeters unless otherwise noted



Buffer / Multi-Purpose
 All-Stainless Steel Tank
 58 Gallons / 220 L



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DHW80 70 Gallon (Net) Domestic Hot Water Tank

The DHW80 is an ultra-high grade all-stainless (Duplex 2205) water tank that can be used to heat water via an indirect source such as a heat pump or boiler. This high grade of stainless steel is very strong and highly resistant to corrosion.

When used with a Chiltrix hydronic system the DHW80 tank requires a Chiltrix (G1) valve. The G1 valve is 240v primary and requires conduit, install per code. If used with a Chiltrix system of two or more outdoor units, it will need two (G1) valves. G1 valves have a CV of 15 (.74 ft. head at 5 GPM)

The DHW80 has net 70 gallons of water storage, it has 1" NPT cold water inlet, 1" NPT hot water outlet, a ¾" NPT TPV port, a ¾" NPT drain port, a 1" NPSM (element) port with a standard thermostat mounting location & cover. Insulation is 50mm poly.

When used with a Chiltrix system the tank may have a standard heating element and thermostat installed, usually 5500w.

Generally, the tank temperature should be set at 120F. There are two options for installation/control, one includes an automated anti-legionella function. Anti-legionella function and backup heat require the addition of a standard heating element and standard hot water tank thermostat. You will install the tank temperature sensor (included with all Chiltrix outdoor units) in the upper sensor well.

The net 70 gallons of storage at 120F contains the same BTU value as a tank of 60 gallons at 140F. With the 120F 70 gallon net tank, the stored energy difference means that the amount of cold water mixed at the point of use will be lower.

If the Chiltrix DHW80 does not meet your hot water volume requirements you can use almost any indirect water tank (or solar tank) that has at least a 1" diameter coil inside and that has a provision for at least one backup heating element.

First Hour rating:

This type of tank does not have a first hour rating as there is no way to calculate it. Note that heating water with a heat pump is 2-5x more efficient than a standard tank however it is not an extremely fast way to heat water. You may consider adding a modulating tankless heater on the outlet side of the tank, such as an Ecosmart unit which can offer extreme high first-hour capability, if and when needed, and would be inactive when not needed.

Make sure to carefully read all pages of this manual for important warnings and cautions that must be observed. Fire, electrocution, scalding, injury or death, and/or property damage, or damage to the Chiltrix heat pump are all possible with an improperly installed water heating tank. This tank should only be installed by a properly licensed and qualified professional. THIS TANK MUST HAVE A TPV AND ANTI-SCALD VALVE INSTALLED.

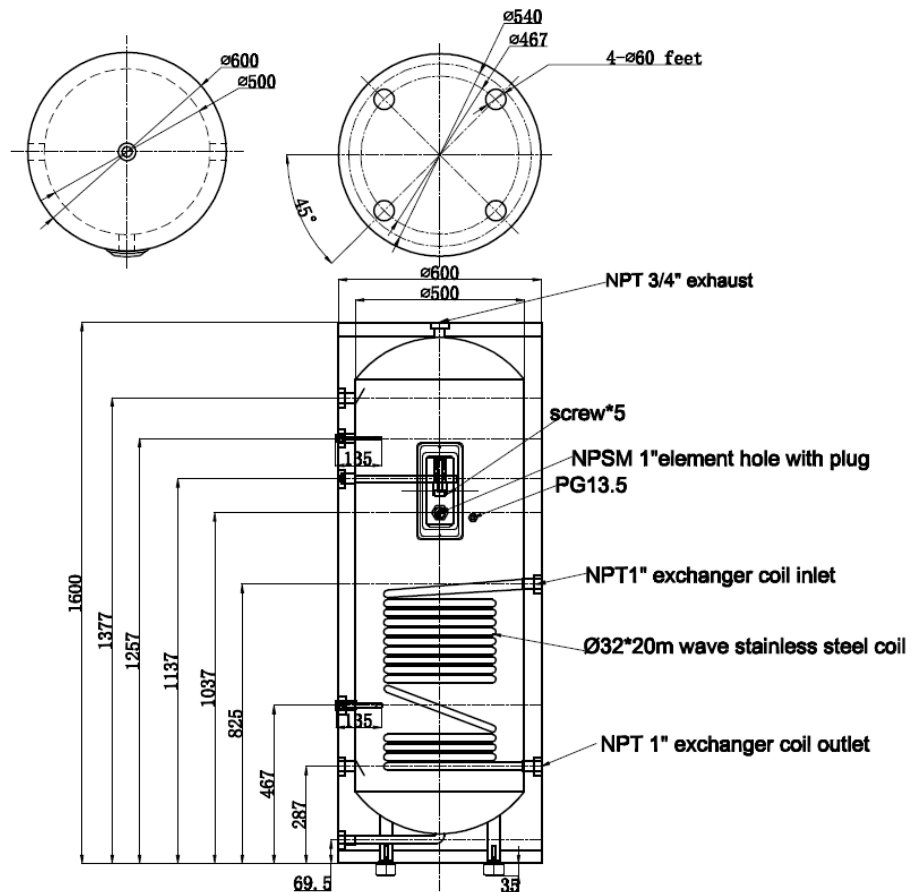
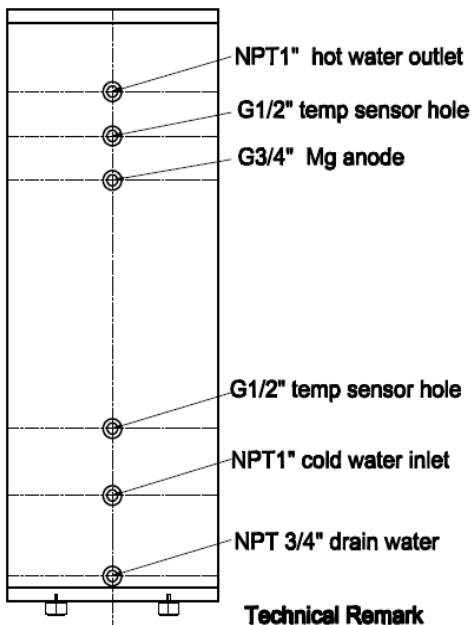
DHW80 Heat Pump Water Tank / Indirect Coil Tank / Solar Hot Water Tank

80 Gallons Gross/70 Gallons Net
 2205 Duplex Stainless Steel Inner Tank
 2205 Duplex Stainless Steel Indirect Coil
 Indirect Coil: 1.25" x 72' Convoluted (Wave)
 SUS 304 Stainless Steel Outer Shell
 2" Thick Polyurethane Insulation
 1x Element Port, 1" NPSM, Up To 6000W
 1x Drain Port 3/4" NPT Female
 2x 1/2" Sensor Wells
 1x Anode Port w/ Magnesium Anode
 Pressure Drop 4.35 PSI/ 10.04 Ft. head
 Cold Inlet 1" NPT
 Hot Outlet 1" NPT
 1" NPT Coil Connectors
 Tank Diameter 23.6"
 Tank Height 64"
 Empty Tank Weight 88 Lbs.

Ultra-High Grade
 Stainless Steel
 Duplex 2205
 Inner Tank & Coil

Tank Diameter 23.6"
 Tank Height 64"
 Empty Tank Weight 88 Lbs.

Convoluted "Wave" Coil For Faster Heating



DHW40 follows the same procedures except note, max element on
 DHW40 is 3500W.

DHW Installation & Control Options:

NOTE: Always install the tank sensor in the upper part of the tank

Option #1 20th Century Method (European)

We no longer recommend this option but it is simple to install and has been used this way for decades all over the world. In Option #1, the tank element is controlled solely by its attached standard water heater thermostat.

NOTE: THERE IS NO AUTOMATIC ANTI-LEGIONELLA FUNCTION IN OPTION #1. SEE Option 2.

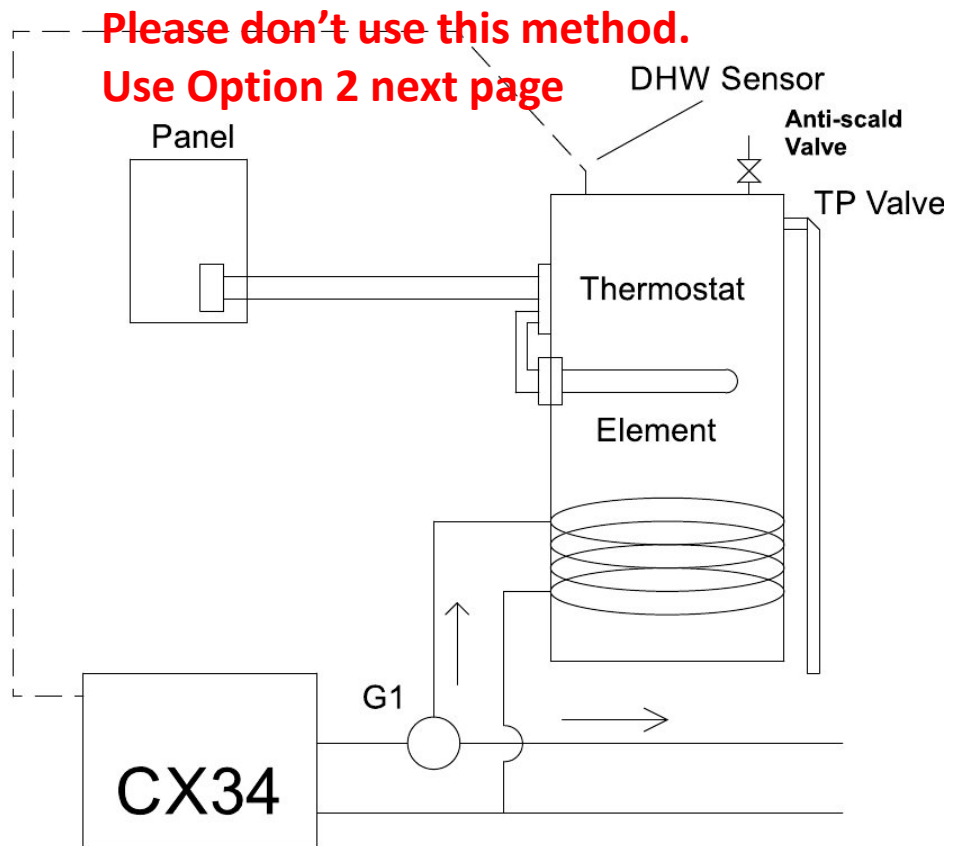
It is very simple and works as follows: The CX unit will work to heat the tank when the tank falls below the set point. The tank has a standard electric backup element & thermostat that works as backup for the heat pump. You will install a standard tstat/element such as from Home Depot. Set the element thermostat for 110F (10F lower than CX DHW setting). When the CX cannot keep up and tank drops below 110F, the tstat will activate the element for backup heating, stopping at 110F. It's that simple.

A G1 valve will be installed in the loop as the first device on the loop before any fan coils or tanks (but after any V18, if installed). G1 requires a conduit (240v). Refer to the appropriate CX unit installation manual.

This is Option #1, the old way and not the recommendation. **Option #1 does NOT have an automated anti-legionella function** and the customer must perform a temperature reset periodically, manually setting the tank to 140F and hold at least 6 hours, once per week. **MAKE SURE YOUR CUSTOMER UNDERSTANDS THIS.** See DHW Option #2 next section for an alternate & better method.

In Option #1 the heating element is managed only by its thermostat. Set the thermostat to a setting 10F cooler than the CX DHW temperature target. The element will activate when the CX unit cannot keep up with the demand.

NOTE: A TPV must be installed and properly vented. An anti-scald should be added and may be required by code.



For anti-legionella, the Option #1 user will be required to manually set the tank tstat to 140F and hold it at that temperature for at least 6 hours, once per week, to prevent legionella growth. In this option #1, the backup electric element is always fully and solely controlled by the standard tstat set point.

Example tstat/element:

Element: <https://www.homedepot.com/p/Everbilt-5500-Watt-240-Volt-Lime-Life-LWD-Fold-Back-Element-15017/205680999>

DHW Thermostat (for single element): https://www.homedepot.com/p/Everbilt-T-O-D-Style-Upper-Element-Thermostat-for-Non-Simultaneous-Design-Residential-Electric-Water-Heaters-EB11698/204834379?MERCH=REC-PIPHorizontal2_rr-205680999-204834379-N

DHW Installation & Control Options:

NOTE: Always install the tank sensor in the upper part of the tank!

Option #2 PREFERRED METHOD

The 21st Century Method (Includes Automatic Anti-Legionella Function)

This is the recommended method. In this way, the standard element/tstat allows a temperature setting of at least 140F(60C). As shown on the drawing on the next page, there is a contactor located between the mains power and the element/tstat, the contactor is controlled by the CX34, and the CX34 will allow/deny power to the backup heating element. The tstat is used as a safety mechanism to stop the element at 140F in case of contactor or sensor failure. Set the tstat to 140F.

Operation:

The CX34 will activate the element if the compressor cannot meet the DHW target temperature of 120F after 15 minutes of running and will operate the element to reach tank setpoint of 120F before releasing the contactor. In addition, once per week the CX34 can activate automated anti-legionella mode, raising the tank temperature to 140F and holding at that temperature for four hours.

DHW tank temperature is controlled by the CX34 and backed up with a heating element. Requires installer provided 40a contactor and 24vac transformer. See electrical and piping connection diagram next page.

If the DHW target is 120F, the compressor will start heating if the tank temperature drops to 116F, and the backup heater element will only start after the compressor is running for 15 minutes and cannot reach 120F. In that case., the compressor will work with the element to heat DHW to 120F. When the set point is reached the CX34 will stop the backup element by releasing the contactor, and exit from DHW mode. If the outside temperature is above the P09 setting, the backup is disabled. P09 = ambient temp to activate E1 DHW e- heater.

DHW Rules: To enable DHW, P56 must = 1 To disable, P56=0

E1 is the backup element control. If the DHW tank temperature is set to 49°C (120F) and the tank temp drops below 47°C (116F), the CX34 will engage DHW mode and the compressor will run at full speed. Set P09 =20°C (or other such ambient setting as desired). Once per week, the tank should rise up to 60°C (140F) and hold for at least 1 hour, see below. Please always set the normal DHW target temp to <= 49°C (120F).

To set up anti-legionella use the following parameters

To set a schedule for the legionella function, you must set the following parameters under manufacturers settings.

P81 Virus killing interval days 7~99days. Day 7 is Sunday.

P82 Start virus killing time 1~24hours

P83 Virus killing holding time 5~99min (set this for 60 mins)

P18 Target temperature of virus killing 55~60°C (60°C recommended for 1-hour hold time).

P53 Virus Kill Function 1= on, 0 = off

To set up Legionella to run once a week at a 60°C for one hour starting at 2:00 am, use the following settings.

P81 =7 (Day 7)

P82 =2 (Start virus killing time)

P83 =60 (1 hour hold time)

P18 =60°C (Holding temp)

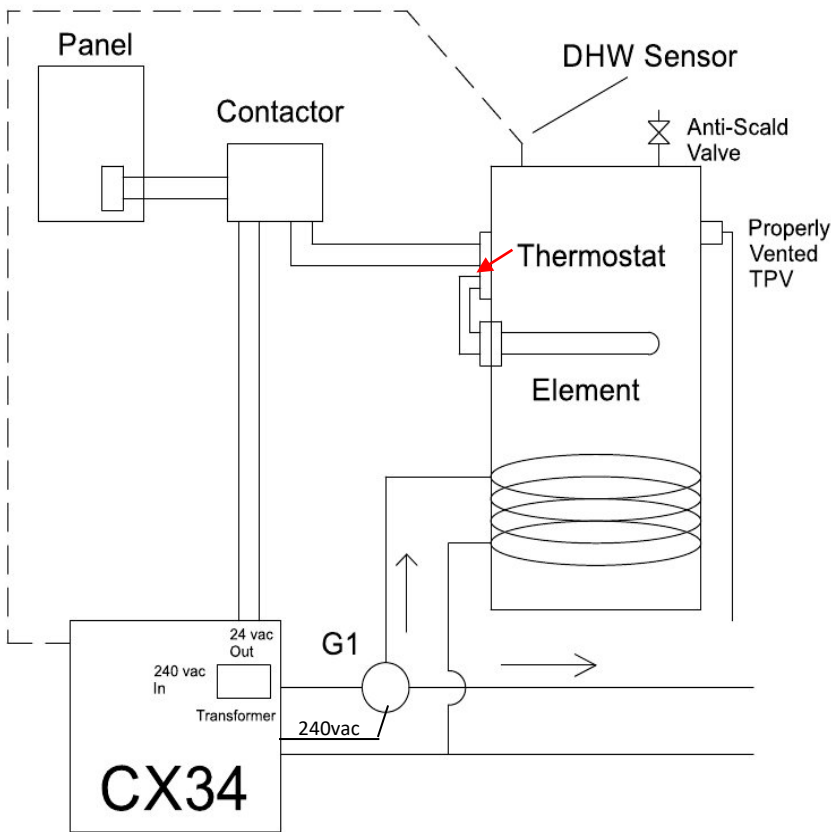
P53 =1 (Legionella Kill Function Activated)

YOU MUST FIRST INSTALL ANTI-SCALD VALVE AND TPV

When C24 = 1, G1 valve is active in DHW mode.

See Option #2 Drawing next Page

Option #2 Piping & Wiring Diagram



In Option 2, the CX34 controls the tank temperature. The element thermostat is set for 140F, which only controls the upper limit. Actual tank temperature setting and element is controlled by the CX34.

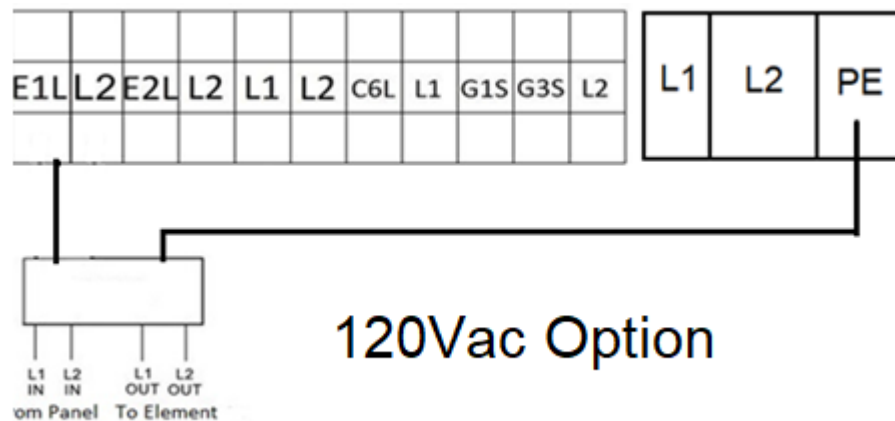
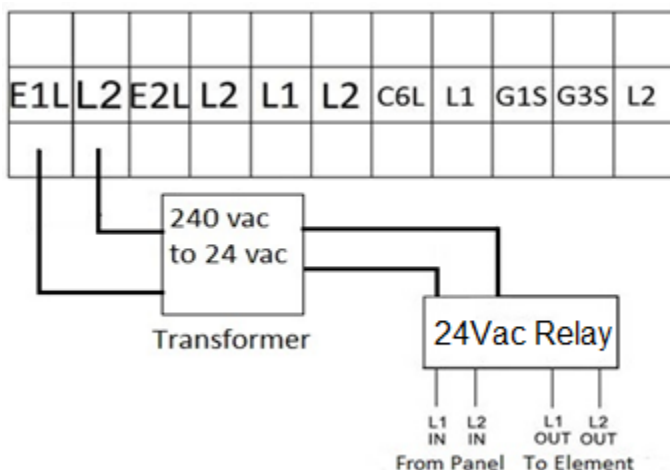
Required: An anti-scald valve installed per local code, and a properly vented TPV.

IMPORTANT NOTE: G1/G2/G3/DN25/DN32 valves use British Parallel Threads. We include the NPT adapters. Best-Practices for using parallel threads are required to prevent leakage and/or O-ring damage. See required best-practices at <https://www.chiltrix.com/documents/Chiltrix-3-way-valve.pdf>

Example Contactor:

https://www.homedepot.com/p/Packard-24-Volt-Coil-Voltage-F-L-Amp-40-Pole-2-Res-50-Amp-Definite-Purpose-Contactor-C240A/203565786?MERCH=REC-PIPHorizontal2_rr-203565676-203565786--N

When C24 = 1, G1 valve is active in DHW mode. Also, DHW is enabled when P56=1



120Vac Option

Connecting DHW

Please review the CX34 manual. The detailed high-res wiring diagram is here <https://www.chiltrix.com/documents/CX34-2-wiring-diagram-HIGH-RES.pdf>

The tank sensor is to be connected to IN7 as shown below. First, remove the dummy plug. Always locate the tank sensor in the upper part of the tank, under the insulation and in firm thermal contact with the tank wall if no sensor port is available in that location.

(TH7)10K resistor (DHW temp sensor)  CN6 DHW Port

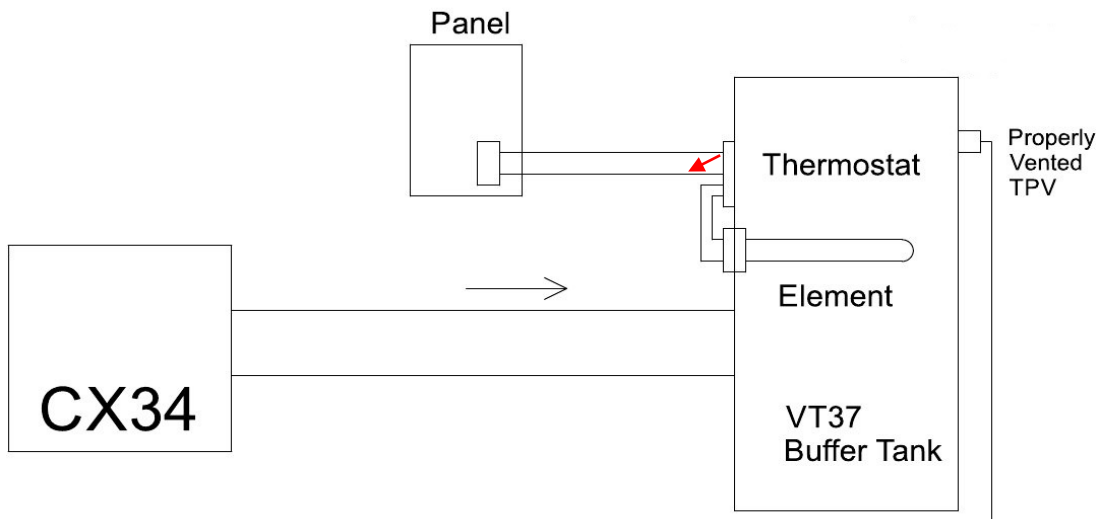
To enable DHW a DN25 or DN32 (as applicable)(G1) valve must be installed and enabled. For dual CX34s there will be 2x G1 valves wired in parallel. DHW is enabled from the standard controller as: Hot Water, Cooling & Hot Water, or Heating & Hot Water.

Max allowed DHW set point 122F (50C)

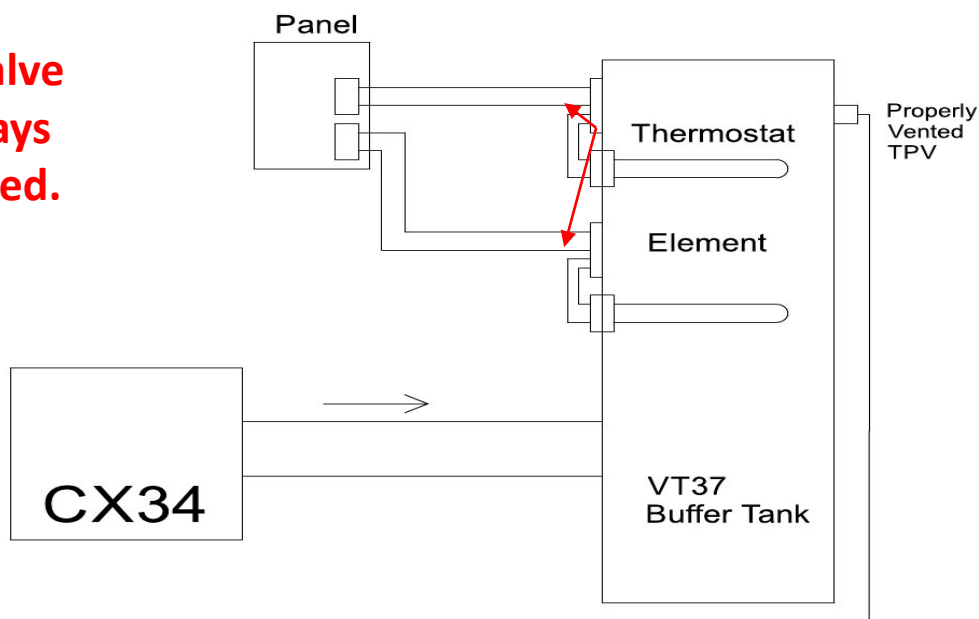
Set parameter P56=1 Valid

Please review the CX34 manual for additional DHW requirements and settings.

Buffer Tank With Emergency Heat



**TPV Valve
Is Always
Required.**



IMPORTANT NOTE

Never, ever, use heating elements in a buffer tank for backup heat. The above diagram is for EMERGENCY HEAT ONLY. The elements must be connected to a standard water heater thermostat that can be set for Max. 120F and must be only powered-on manually, and only in the event of total CX34 unavailability, and only after CX34 has been completely disconnected from all sources of electrical power. Connect a properly rated dedicated power circuit from the breaker panel to each thermostat used, mark the breakers clearly and permanently. **This is NOT for backup heat, for backup heat see the Chiltrix V18 dynamically variable inline heater.**

DO NOT TRY TO USE EMERGENCY HEAT IN AN INLINE TANK. FOR EMERGENCY HEAT TO WORK IT MUST BE INSTALLED IN A TRUE BUFFER TANK AND HAVE A LOAD SIDE PUMP ENGAGED. WHEN EMERGENCY HEAT IS ACTIVE THE CX34 MUST BE DISCONNECTED FROM POWER.

Image of supply side of VCT37



Image of thermostat/element cavities of VCT37
(Same as VCT19 and DHW80 cavities, except the VCT37 has 2x)
Covers off.



Image of thermostat/element cavities of VCT37
(Same as VCT19 and DHW80 cavities, except the VCT37 has 2x).
Covers on.



Image of VCT37 1.5" NPT load side load side outlet ports
Inlets ports are the same, located at bottom of tank.



Image of VCT19 1" NPT load side load side inlet and outlet ports.
Supply side ports are identical.

