TX Indirect Water Heater

This manual applies to the following models:

- TX-40
- TX-50
- TX-80
- TX-110

The surfaces of these products contacted by potable (consumable) water contain less than 0.25% lead by weight as required by the Safe Drinking Water Act, Section 1417.

Product Information: This user manual must always accompany the specific unit as recorded below.	
Model #:	
Serial #:	
Installation Date:	
Wholesaler Name:	
Contractor Name:	
Additional Information:	

Latest Update: August 11, 2020

NOTE:

TO THE INSTALLER: This manual is the property of the owner and must be affixed near the water heater for future reference.

NOTE:
TO THE OWNER: This water heater should be inspected annually by a qualified Service Agency.

NOTE:
TO THE OWNER: Register the water heater in order to get the limited lifetime warranty within 90 days.

WARNING!
Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified Installer or Service Agency.

FOR YOUR SAFETY:
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Installation and service must be performed by a qualified Installer or Service Agency.

Table of Contents

SECTON 1: SAFETY

The warranty on this water heater is in effect only when the water heater is installed and operated in accordance with these instructions. The manufacturer of this water heater will not be liable for any injury or property damage resulting from failure to comply with these instructions.

WARNING!

This water heater must be installed strictly in accordance with the instructions enclosed, and local electrical, fuel and building codes. It is possible that connections to the water heater or the water heater itself may develop leaks. **IT IS THEREFORE IMPERATIVE** that the water heater be installed so that any leakage of the tank or related water piping is directed to an adequate drain in such a way that it cannot damage the building, furniture, carpeting, adjacent areas, lower floors of the structure, or other property subject to water damage. This is particularly important if the water heater is installed in a multi-story building, on finished flooring, or carpeted surfaces. **DHT WILL NOT BE HELD LIABLE** for damage caused by water from the water heater, pressure relief valve, or related fittings. Closets without drains and carpeted areas are examples of unsuitable locations for any water heater. Select a location as centralized within the piping system as possible.

- The heater should be located in an area not subject to freezing temperatures in any location selected. It is recommended that a suitable drain pan be installed under the water heater.
- This pan shall be a minimum of 50mm (2 in.) deep and have a diameter that is a minimum of 50mm (2 in.) greater than the diameter of the water heater.
- Suitable piping shall connect the drain pan to a properly operating floor drain.

SECTON 1.1: Relief Valve Requirements

FOR YOUR SAFETY:

To reduce the risk of excessive pressures and temperatures in this water heater, install temperature and pressure protective equipment required by local codes. It should be no less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, as meeting the latest edition of ANSI Z21.22.

Requirements for Relief Valves and Automatic Gas Shut-off Devices for Hot Water Supply Systems:
This valve must be marked with a maximum set pressure not to exceed the marked MAXIMUM working pressure of the water heater (150 PSI).

How to Install:

1. Install the valve into an opening provided and marked for this purpose in the water heater.
2. Orient it or provide tubing so that any discharge from the valve will exit only within 6 inches above, or any distance below the structural floor and cannot contact any live electrical part.
3. The discharge opening must not be blocked or reduced in size under any circumstances.
4. The end of the relief pipe opening should terminate near a floor drain or other suitable location not subject to blocking or freezing.
5. ***DO NOT*** thread, plug, or cap the relief pipe opening.

DANGER:

Water temperatures over 125°F can cause severe burns instantly or death from scalds.

- Children, disabled, and elderly are at the highest risk of being scalded.
- See instruction manual before setting temperature at water heater.
- Feel water before bathing or showering.
- Temperature limiting valves are available; see manual.

NOTE:

The TX Series Indirect Water Heater is deemed to be used in a "commercial setting" if at any time the unit is operated at a temperature over 150°F. Refer to warranty for additional information.

SECTON 2: PRODUCT SELECTION/PERFORMANCE

DHT's TX Series are indirect water heaters that use part of the home's boiler heating hot water to heat domestic water. They offer lower installation and maintenance costs in addition to operational cost savings due to higher efficiency of the combination system. These units can be coupled with both condensing and non-condensing type boilers with a wide range of operating temperature ranges to achieve high efficiency within an optimized space. Stored hot water inside the tank helps to meet the large instantaneous demand within a short period and provides thermal mass for storage. This helps to reduce the number of cycles on boiler under the periods of no load to low load conditions and ensures there is always hot water present.

Domestic cold water enters the unit through the cold water inlet connection toward the bottom of the tank, and hot water is supplied through the connection on top (see Section 3). If the tank temperature falls below the set point, boiler water is pumped through the heat exchanger coils, where it heats the domestic water to recover the water temperature inside the tank to set point. Boiler water enters the heat exchanger through the inlet connection located on top of the heat exchanger and flows downward to have counter flow arrangement for effective heat transfer.

The unit is fully constructed of high-quality 444 stainless steel materials; fully automated welding technology; and passivated preventing corrosion, offering excellent performance and service for many years. Unlike glass-lined water heaters, an anode is not needed, reducing maintenance costs for the consumer.

1. The following guidelines apply to residential systems only. For commercial or institutional installations contact the factory directly for assistance.
2. Determine the quantity of domestic hot water required. Factors to consider:
    a. Estimate typical peak hour demand. Determine the general time of day (morning, noon, evening) when the most hot water is used. Use chart below to determine potential maximum usage.

Estimate of Peak Domestic Hot Water Usage

Use	Average Gallons of Hot Water per Usage		Times Used During One Hour			Times Used During One Hour
Showering	20	X		X	=	
Bathing	20	X		X	=	
Shaving	2	X		X	=	
Hands and Face Washing	4	X		X	=	
Hair Shampooing	4	X		X	=	
Hand Dish Washing	4	X		X	=	
Automatic Dish Washing	14	X		X	=	
Food Preparation	5	X		X	=	
Wringer Clothes Washer	26	X		X	=	
Automatic Clothes Washer	32	X		X	=	
	Total Peak Hour Demand			=		

b. Estimate unusual peak draw demand. Whirlpool baths, hot tubs, and multiple head showers require large quantities of hot water in a short period of time. Contact fixture manufacturer for quantity of water required. Generally speaking, these circumstances can be met only with larger storage volumes.
c. Domestic Water Temperature. Most residential usage will be satisfied with 120°F water, the temperature setting recommended by the Consumer Product Safety Commission. Some applications, such as laundry machines and dishwashers, may require a higher temperature.

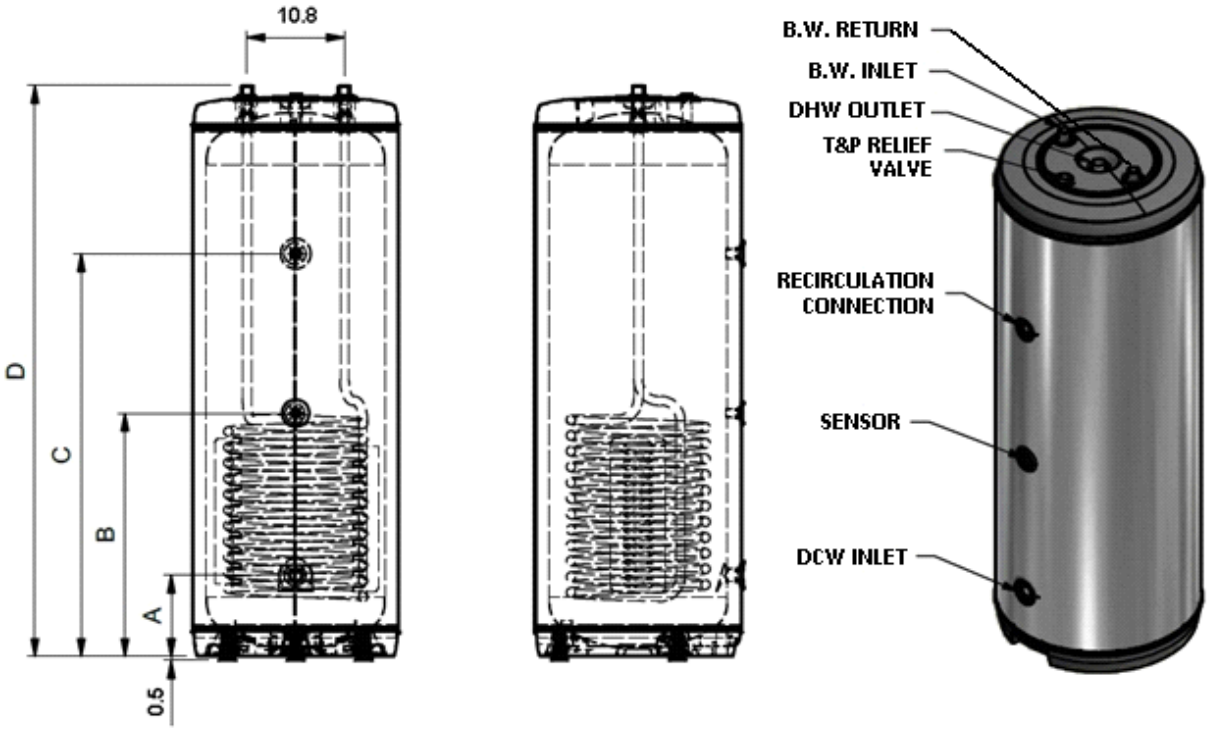
Ratings can be improved by increasing the TX Series thermostat setting and using a mixing valve to temper the hot water to the proper temperature. When temperatures greater than 119°F are required, use a mixing valve at the outlet of the water heater or anti-scald fittings at point of use.

Performance Ratings

Model	TX-40	TX-50	TX-80	TX-110
Capacity(Gallons)	40	50	80	110
Heat Exchanger Surface Area sq.ft.	10.4	12.6	15.0	23.0
Recommended Flow Rate gpm (Boiler Water)	10	10	14	14
Pressure Drop Ft. Hd. (Heat Exchanger)	7.1	7.3	5.0	6.5
First Hr. Ratings gph 90^{o} Rise	210	249	336	396
Continuous Flow gph 90^{o} Rise	168	197	252	280
First Hr. Ratings gph 77^{o} Rise	238	282	379	443
Continuous Flow gph 77^{o} Rise	197	229	295	327
Boiler Size Btu's Required	120,000	140,000	180,000	199,000

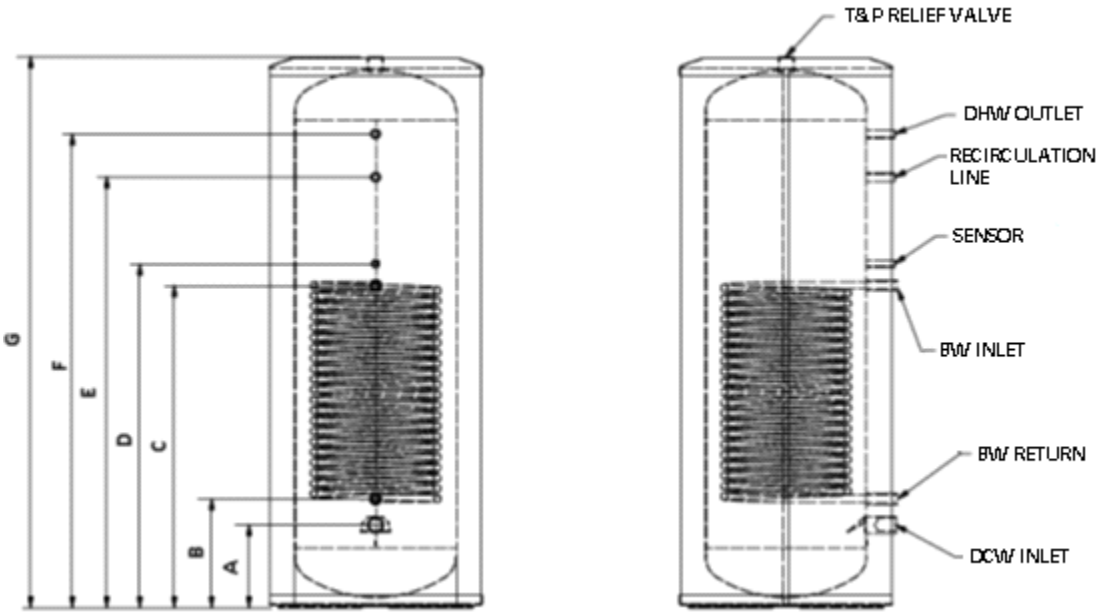
NOTE: Above ratings based on boiler maintaining temperature of 180 degrees Fahrenheit.

SECTON 3: TANK SPECIFICATIONS



Specifications

Physical Specifications				
Model Number		TX-40	TX-50	TX-80
Diameter Of Tank		23”	23”	23”
Volume (Gallons)		40	50	79
Height To Connection (Inches) *See above drawing*	(A) Domestic Cold Water Inlet	4.8	4.8	9.0
	(B) Control	21.5	24.8	27.0
	(C) Recirculation	n/a	n/a	44.7
	(D) Boiler Water Inlet (Feed)	38.4	46.3	63.4
	(D) Boiler Water Outlet (Return)	38.4	46.3	63.4
	(E) Domestic Hot Water Outlet	36.8	44.7	61.8
	Overall Tank	38.9	46.8	64.3
Coil Surface (Square Feet)		13.1	15.2	16.8
Net Weight (Lbs.)		86	98	132
Shipping Weight (Lbs.)		94	123	143
Filled Weight (Lbs.)		420	516	792
Connections				
Temp. & Press. Relief Valve		¾”	¾”	1”
Domestic Hot Water Outlet		¾”	¾”	1”
Domestic Cold Water Inlet		¾”	¾”	1”
Boiler Water Outlet (Return)		1”	1”	1”
Control		½”	½”	½”
Boiler Water Inlet (Supply)		1”	1”	1”
Recirculation		-	-	¾”



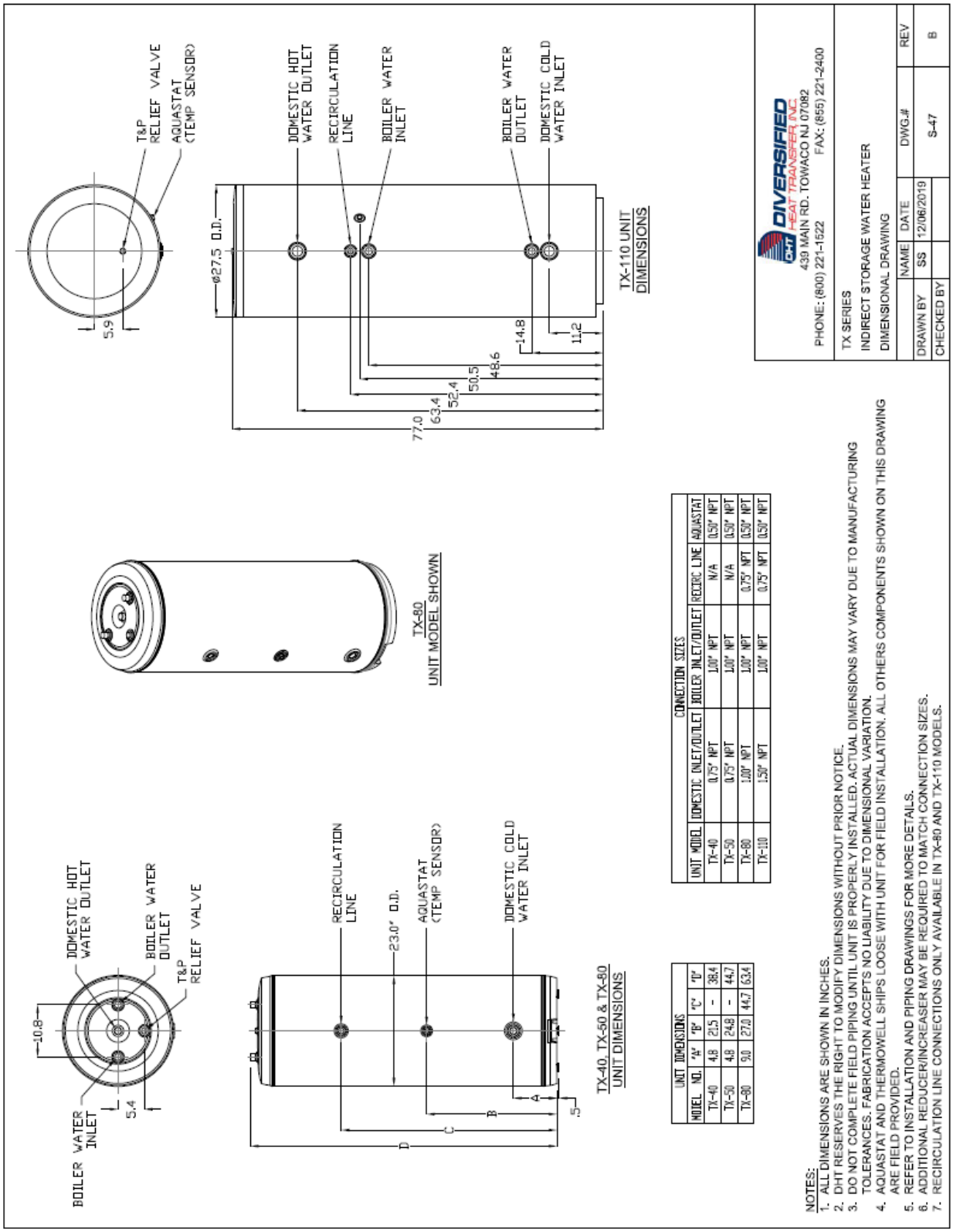
Specifications

Physical Specifications		
Model Number		TX-110
Diameter of Tank		28”
Volume (Gallons)		110
Height To Connection (Inches) *See above drawing*	(A) Domestic Cold Water Inlet	11.2”
	(B) Boiler Water Outlet (Return)	15.1”
	(C) Boiler Water Inlet (Feed)	44.2”
	(D) Control	46.1”
	(E) Recirculation	52.4”
	(F) Domestic Hot Water Outlet	63.4”
	(G) Overall Tank	77.0”
Coil Surface (Square Feet)		23.7
Net Weight (Lbs.)		154
Shipping Weight (Lbs.)		176
Filled Weight (Lbs.)		1073
Connections		
Temp. & Press. Relief Valve		¾”
Domestic Hot Water Outlet		1 ½”
Domestic Cold Water Inlet		1 ½”
Boiler Water Outlet (Return)		1”
Control		½”
Boiler Water Inlet (Supply)		1”
Recirculation		¾”

NOTE:

Refer to TX Series dimensional drawing available on DHT website for most up-to-date, complete dimensional details and connection orientations.

TX Series Dimensional Drawing



SECTON 4: INSTALLATION AND PIPING

SECTON 4.1: LOCATION OF THE TX SERIES WATER HEATER

Locate the heater so that there is easy access to the control, piping, valves, drain, and heater for future servicing and maintenance. The heater is to be kept in an area where it is not exposed to freezing temperatures.

Also, the heater must be located in an area where a leak (e.g. from the piping€ or fittings, from any temperature and relief valve discharge, or from the tank itself), will not cause personal harm or damage the surrounding area. The tank should be installed in an area with a floor drain or in a pan suitable for water heaters.

NOTE:

DHT will not be held liable for any damages caused by water leakage.

The floor or area where the tank is installed must be capable of supporting the tank when filled with water. (Refer to Table at right.)

FOR YOUR SAFETY:

Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance. Controls on this appliance could ignite vapors causing an explosion.

SECTON 4.2: PIPING INSTALLATION INSTRUCTIONS

1. General
    a. All plumbing must be in accordance with the requirements of the authority having jurisdiction.
    b. Use both thread tape and pipe dope on all mechanical connections.
    c. Zone valve (if used) and circulator must be sized to provide minimum flow rate specified in the table to the right, Flow Specifications. Use 1 inch nominal copper tubing between boiler and heat exchanger. See the tables on Friction Loss. Point of emphasis: using a zone valve without a full bore may cause high pressure drop, which will adversely affect performance. Use extreme care when selecting zone valve.
        i. All piping must be adequately supported.
        ii. Allow for thermal expansion.
        iii. Dielectric Unions (recommended) - used to electrically isolate the TX Series tank from the connected domestic water piping. This helps to minimize the possibility of corrosion damage.

Flow Specifications

Model No.	Recommended Flow Rate	Heat Exchanger Pressure Drop (Ft. Hd.)	Boiler Water Connection Sizes
TX-40	10 GPM	7.1	1”
TX-50	10 GPM	7.3	1”
TX-80	14 GPM	5.0	1”
TX-110	14 GPM	6.5	1”

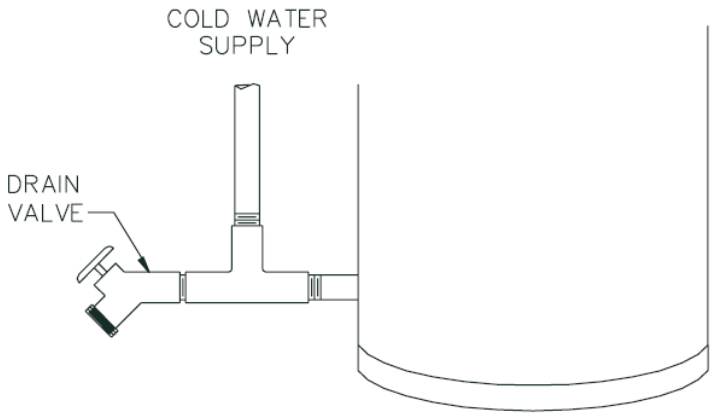
Friction Loss per 100 Feet of Tubing (psi)

Tubing Type	Flow Rate (gpm)	
	10 gpm	15 gpm
Type K	3.1 psi	6.5 psi
Type L	2.7 psi	5.7 psi
Type M	2.3 psi	4.7 psi

Friction Loss Allowance for Copper Fittings (feet of straight tubing)

Fitting	Wrought	Cast
90º Elbow	1	4
45º Elbow	1	2
Tee, Run	½	½
Tee, Branch	3	5
90º Bend	2	-
180º Bend	2	-
Gate Valve	-	1

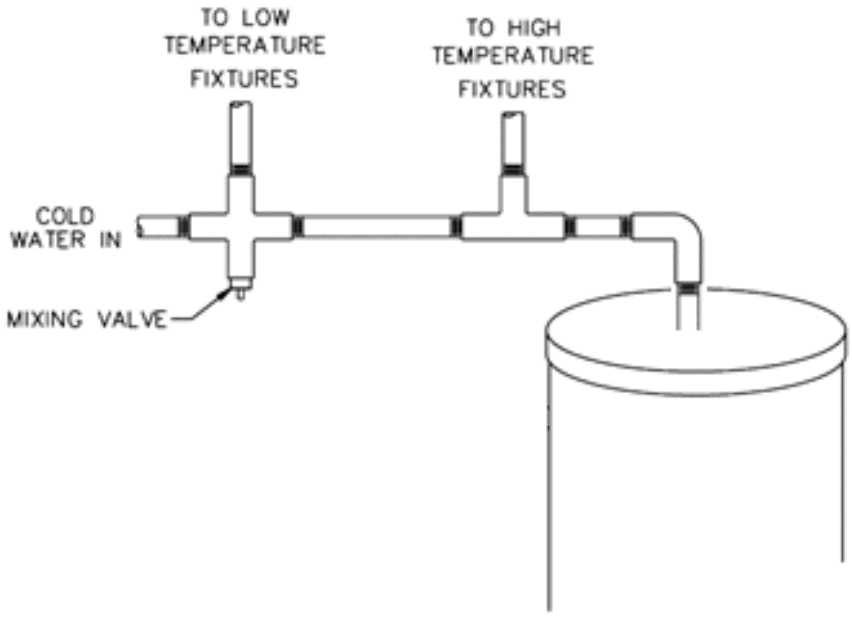
2. Domestic Water
    a. *Cold Water In*. Install brass tee and drain valve (not provided). Install shutoff valve between water supply and cold water inlet for ease of service as shown in the exhibit below.



    b. *Standard Domestic Hot Water Out*. A heat trap will improve energy efficiency by reducing piping heat loss.

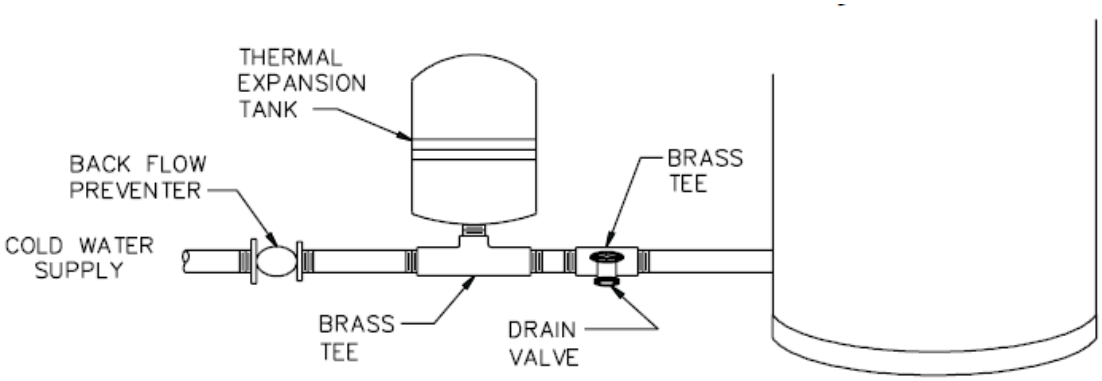
Thermostatic Mixing Valve

At times a thermostatic mixing valve may be recommended or required. The thermostatic mixing valve blends domestic cold water with hot water exiting from the heater, to yield a more constant desired temperature. Risk of scalding is not eliminated with the use of a thermostatic mixing valve. Refer to literature provided by valve manufacturers for recommended installation.



Expansion Tank

When a back flow device or check valve is installed in the system, a Thermal Expansion Tank designed for use with potable water will be required. Locate the expansion tank on the domestic cold water line near the heater between the back flow preventer or check valve and the heater (see piping diagrams). Refer to the Thermal Expansion Tank manufacturer literature for sizing.



Vacuum Breaker

DHT recommends that a vacuum breaker be installed on the domestic piping to the heater. The vacuum breaker protects the heater in the event that tank pressure falls below atmospheric pressure.

Temperature & Pressure Relief Valve (T&P)

A T&P is required on all TX Series Indirect Water Heaters. Install a T&P valve (long element type) into the tapping designated for the T & P.

Install temperature and pressure protective equipment required by local codes, but no less than a combination temperature and pressure relief valve certified as meeting the requirements for Relief Valve and Automatic Shutoff Devices for Hot Water Systems, ANSI Z21.22, by a nationally recognized testing laboratory that maintains periodic inspection of listed equipment or materials.

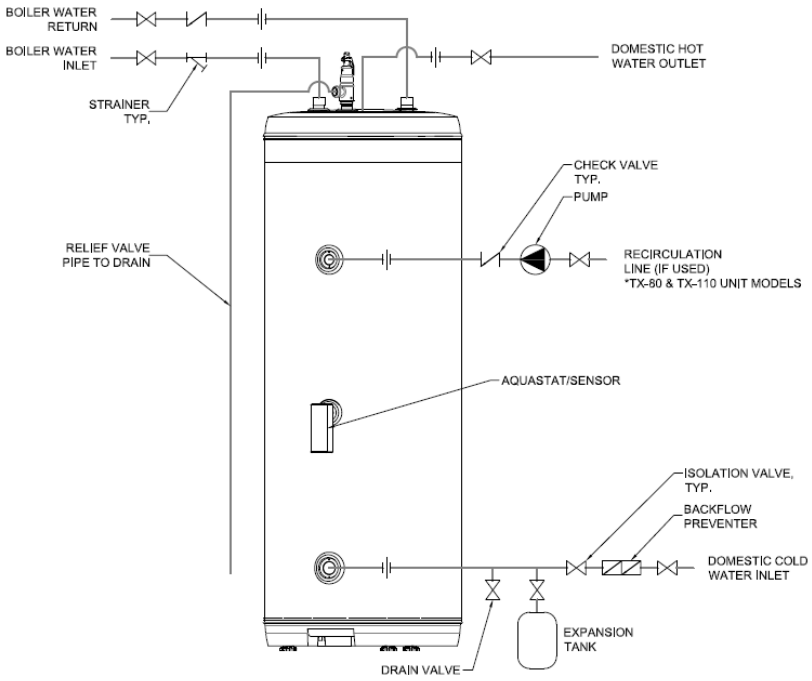
The valve must be oriented, provided with tubing, or otherwise installed so that discharge can exit only within six (6) inches above, or at any distance below, the structural floor and cannot contact any electrical part. The valve must be piped to an area where discharge will not cause personal injury or damage the surrounding area.

WARNING: TEMPERATURE & PRESSURE RELIEF VALVE

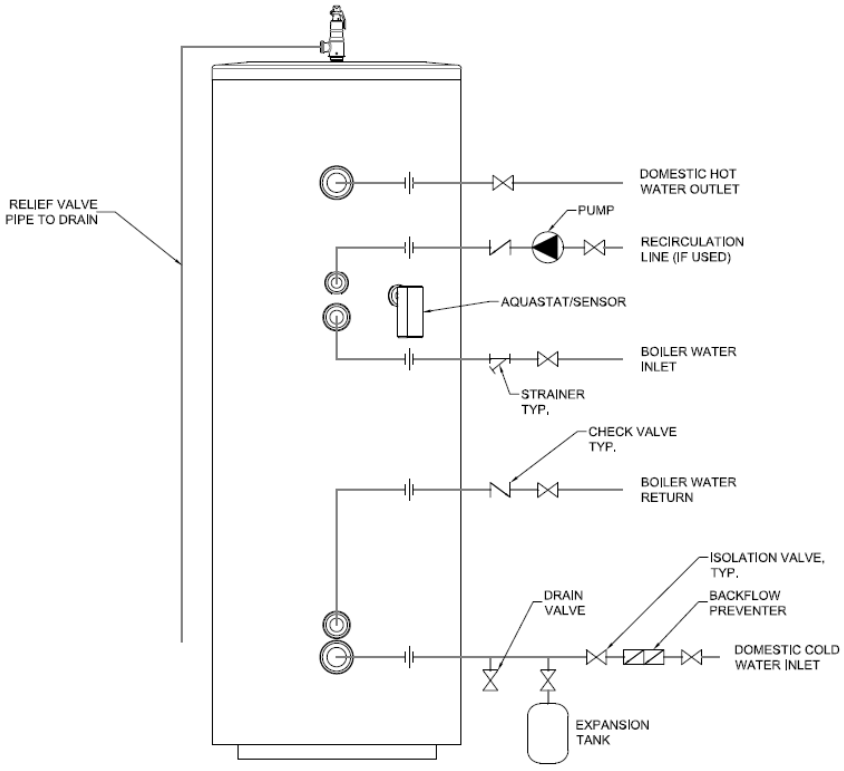
- Install a T&P with a rated capacity that is equal to or greater than the output of the energy source.
- Removal of the T&P, or failure to replace temperature-pressure relief valve, will release the manufacturer from any claim which might result from excessive temperatures and pressures.

SECTON 4.3: TANK INSTALLATION

SINGLE UNIT INSTALLATION



TX-80 UNIT SHOWN HERE
FOR SINGLE UNIT INSTALLATION

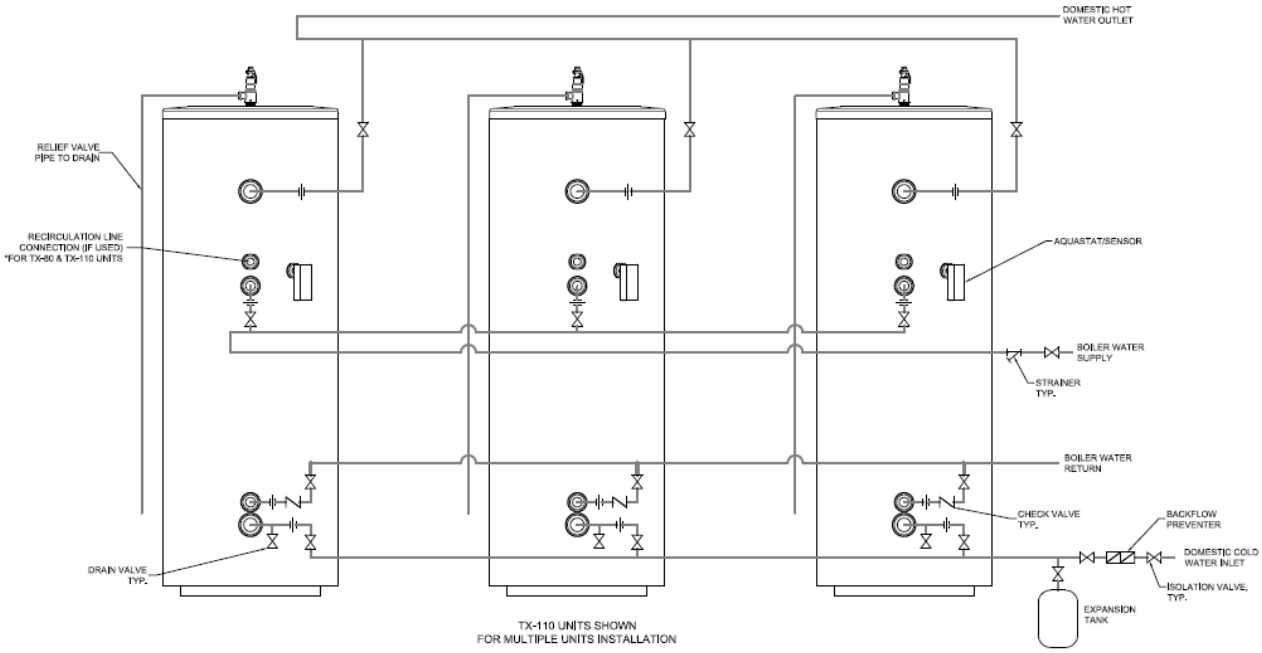


TX-110 UNIT SHOWN
FOR SINGLE UNIT INSTALLATION

MULTIPLE UNITS INSTALLATION

NOTES:

- These are typical installation piping drawings. Consult local codes and authorities.
- Refer to dimensional drawing for actual size and location dimensions of piping and other connections since they vary depending upon unit model.
- Relief valve shall be installed to safe drain according to appropriate plumbing codes.
- Piping connections to the unit shall be provided with unions or flanges maintaining enough clearances for service. Dielectric fittings are suggested to make connections between dissimilar metals to prevent galvanic corrosion.
- A check valve may be utilized in place of backflow preventer if permitted by local codes.
- Piping installation components are supplied by others in the field.
- Expansion tank shall be installed whenever a backflow preventer or check valve is present in the system. Locate the Thermal Expansion Tank on the domestic cold water line between the heater and backflow preventer or no return valve.
- Use balancing valves to balance the flow through all units if the piping arrangement is not reverse return.
- Recirculation line connections available only for TX-80 and TX-110 unit models.

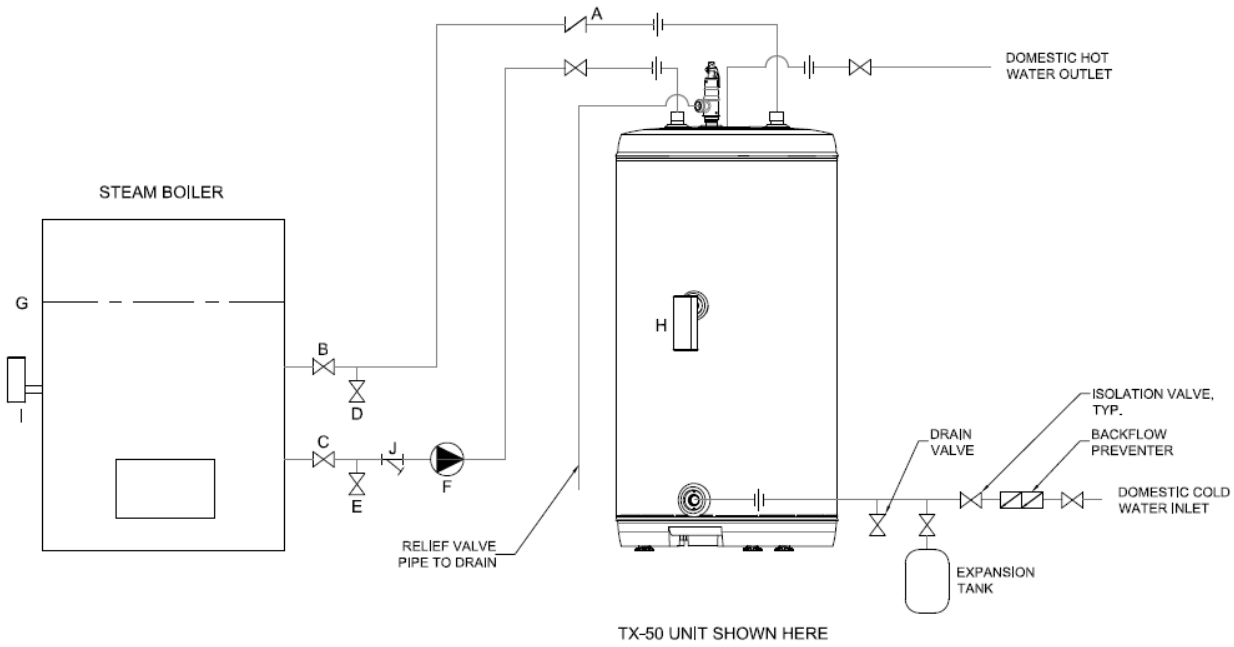


Multi Units Installation

SECTON 4.4: PIPING INSTALLATION INSTRUCTIONS FOR USE WITH A STEAM BOILER

INSTALLATION:
Install valves B and C a minimum of 6” below water line G. Keep valves as close to the boiler as possible. Install boiler drains D and E as close as possible to valves B and C.

FILL AND PURGE:



TX-50 UNIT SHOWN HERE

A.	Flow control/Check valve	F.	Permanently lubricated pump
B.	Ball or gate valve	G.	Water level
C.	Ball or gate valve	H.	Tank Aquastat
D.	Boiler drain	I.	Boiler Aquastat
E.	Boiler drain	J.	Strainer

1. Close valves B and C.
2. Attach a hose from an independent water source to boiler drain E.
3. Attach a hose to boiler drain D leaving open end of hose in an empty bucket or basin.
4. Open boiler drains E and D and allow water to fill coil of tank. Continue to allow water to flow until the flow is free of air (smooth, non-sputtering flow).
5. Close drain D and then boiler drain E.
6. Open valves B and C and observe boiler water level at the gauge glass, making sure that is remains at its original level.
7. Fill the potable water side of the tank and purge air from the tank by opening a hot water faucet.
8. When the power is switched on, the tank aquastat will turn on pump F, and when the temperature of the boiler falls below the set-point, the boiler will fire.

NOTE:

When installing the TX Series Indirect Water Heater with a steam boiler, the water flow (direction) is reversed through the tank coil (heat exchanger). The boiler water enters at the bottom of the coil and exits from the top of the coil. At no time should live steam be used in the tank coil (heat exchanger).

SECTON 5: ELECTRICAL AND CONTROLS WIRING

NOTE:

All wiring must be done in accordance with national, state, and local codes. Adhere to the National Electric Code - ANSI/NFPA 70-1990 in the absence of any other codes.

FOR YOUR SAFETY:

Power must be shut off before installing or servicing the water heater. A separate shut-off switch should be installed to support future servicing or an emergency shut down. The entire heating system should have its own designated electrical circuit.

The TX Series water heater operates in much the same way as an additional heating zone, either utilizing the same circulator as household heating or its own circulator. The water heater temperature is maintained by the use of an immersion type aquastat. The aquastat is installed into the immersion well on the heater and secured by tightening the set screw or clamp.

The aquastat operates in much the same way as a thermostat. When the water temperature falls below desired set point inside the tank, the set of contacts make (close) and when the temperature rises above the set point inside the tank, the contacts break (open).

The aquastat should be tied into the boiler system and controls. When the tank calls for heat the aquastat contacts close and signal the boiler controls, allowing the boiler to maintain temperature and proper operation of the tank circulator.

DHT recommends the use of a priority control to help the boiler maintain desired temperature and satisfy the tank's BTU requirements (domestic water temperature).

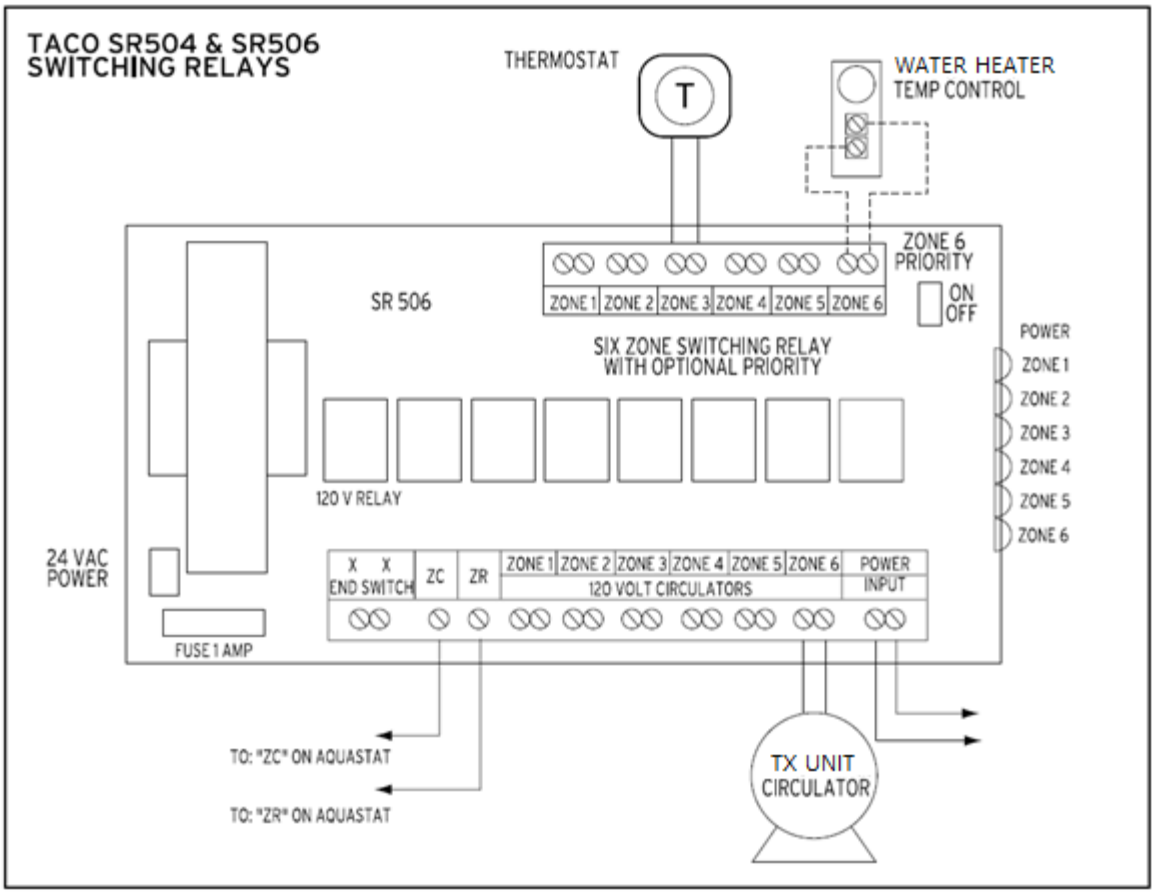
The TX Series water heater recovery ratings are based on the boiler's ability to maintain 180 degrees Fahrenheit. It is important that the installer, plumber, or heating technician responsible for installing the heater make certain that the boiler capacity (BTU) is adequate to satisfy the heater's BTU requirements.

DANGER:

Water temperatures over 125°F can cause severe burns instantly or death from scalds.

- Children, disabled, and elderly are at the highest risk of being scalded.
- See instruction manual before setting temperature at water heater.
- Feel water before bathing or showering.
- Temperature limiting valves are available; see manual.

TANKLESS COIL BOILER APPLICATION



Operation: When any thermostat calls for heat, the boiler is given a signal to start. The appropriate circulator is energized only when the boiler temperature is above the set low limit.

Priority Operation: When zone 6 is switched to the priority setting and is actuated, all other zones will stop operation until zone 6 is satisfied. When zone 6 is not switched to priority, all zones will operate independently.

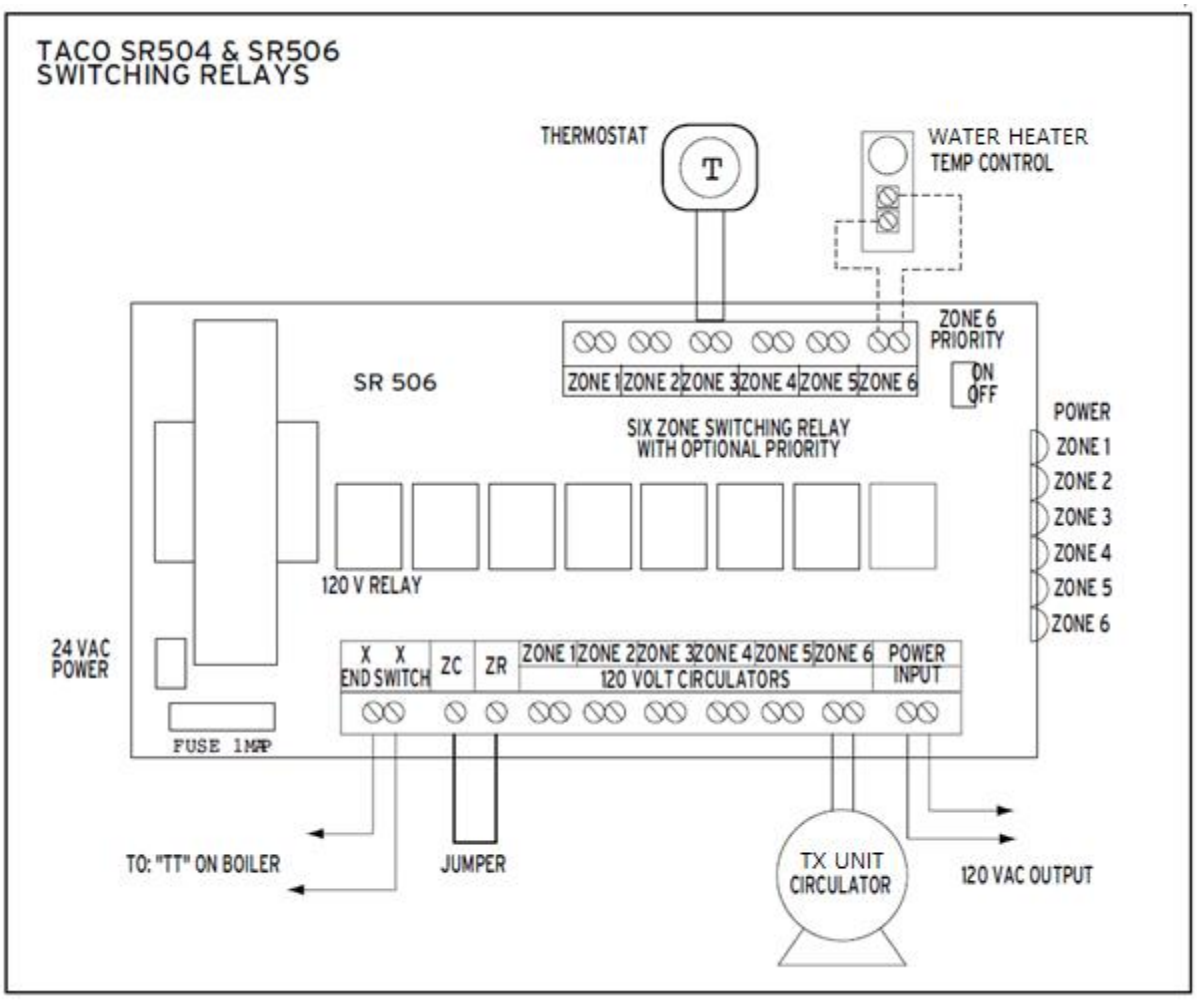
Jumper Placement: REMOVE the jumper between terminals ZC and ZR. Connect terminal ZC to ZC terminal on the aquastat control. Connect terminal ZR to ZR terminal on the aquastat control. Confirm polarity is consistent between boiler aquastat and switching relay.

Power Input: Connect 120 volt as power input to terminals N and H. Neutral wire to terminal N. Hot wire to terminal H.

NOTE:

Aquastat: The water heater aquastat has operating set point range from 100°F to 240°F. The differential is variable from 5°F to 30°F. It is set at 120°F set point with 5°F differential.

COLD START BOILER APPLICATION

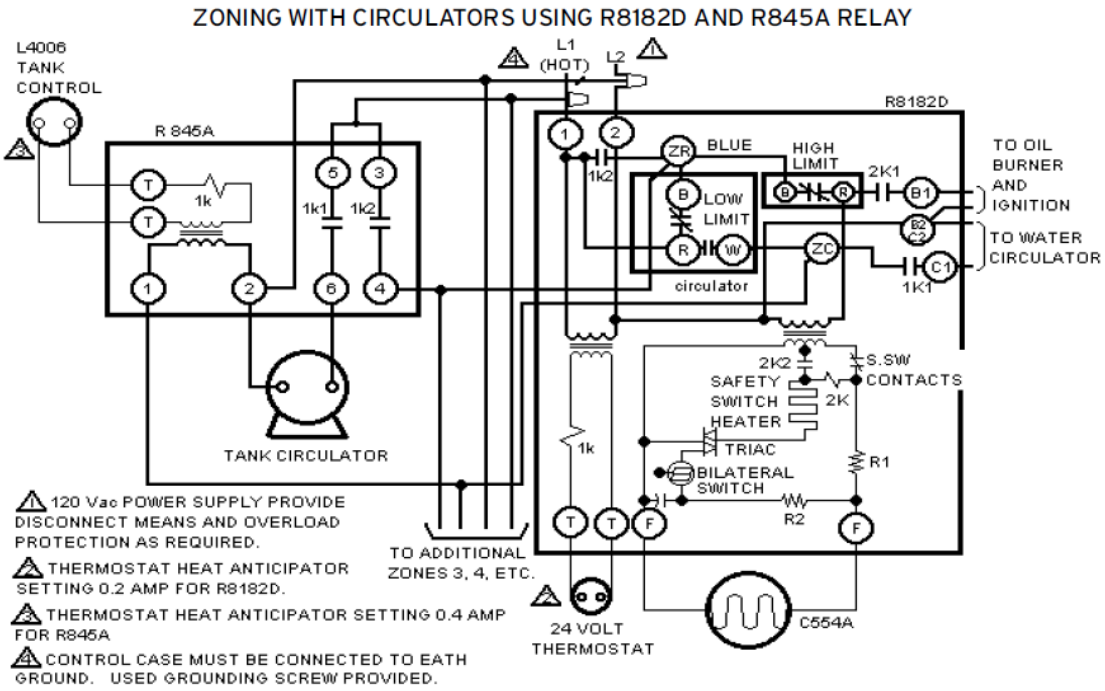


Operation: When any thermostat calls for heat, the appropriate circulator is energized, and the isolated end switch (X and X) will start the boiler.

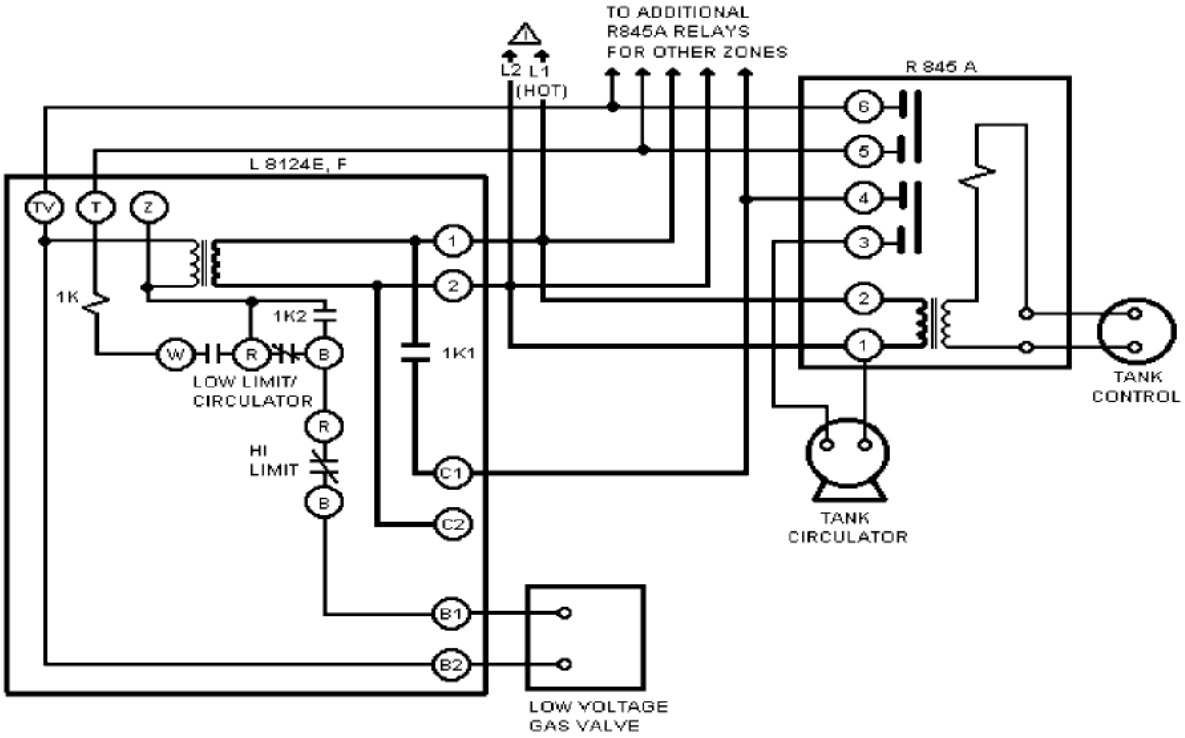
Priority Operation: When zone 6 is switched to the priority setting and is actuated, all other zones will stop operation until zone 6 is satisfied. When zone 6 is not switched to priority, all zones will operate independently.

Jumper Placement: The jumper should be placed between terminals ZC and ZR. Connect the isolated end switch to the aquastat control on the boiler.

Power Input: Connect 120 volt as power input to terminals N and H. Neutral wire to terminal N. Hot wire to terminal H.

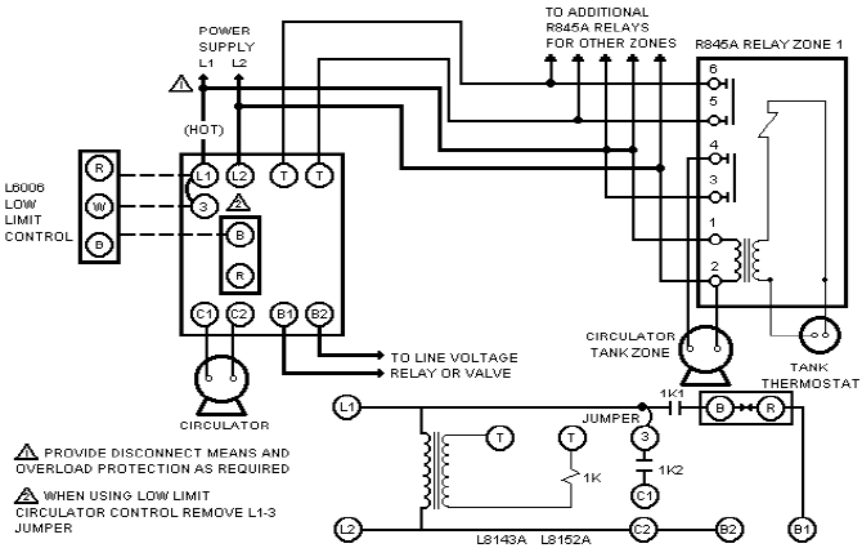


ZONING WITH CIRCULATORS USING L8124 E-F AND R845A RELAY

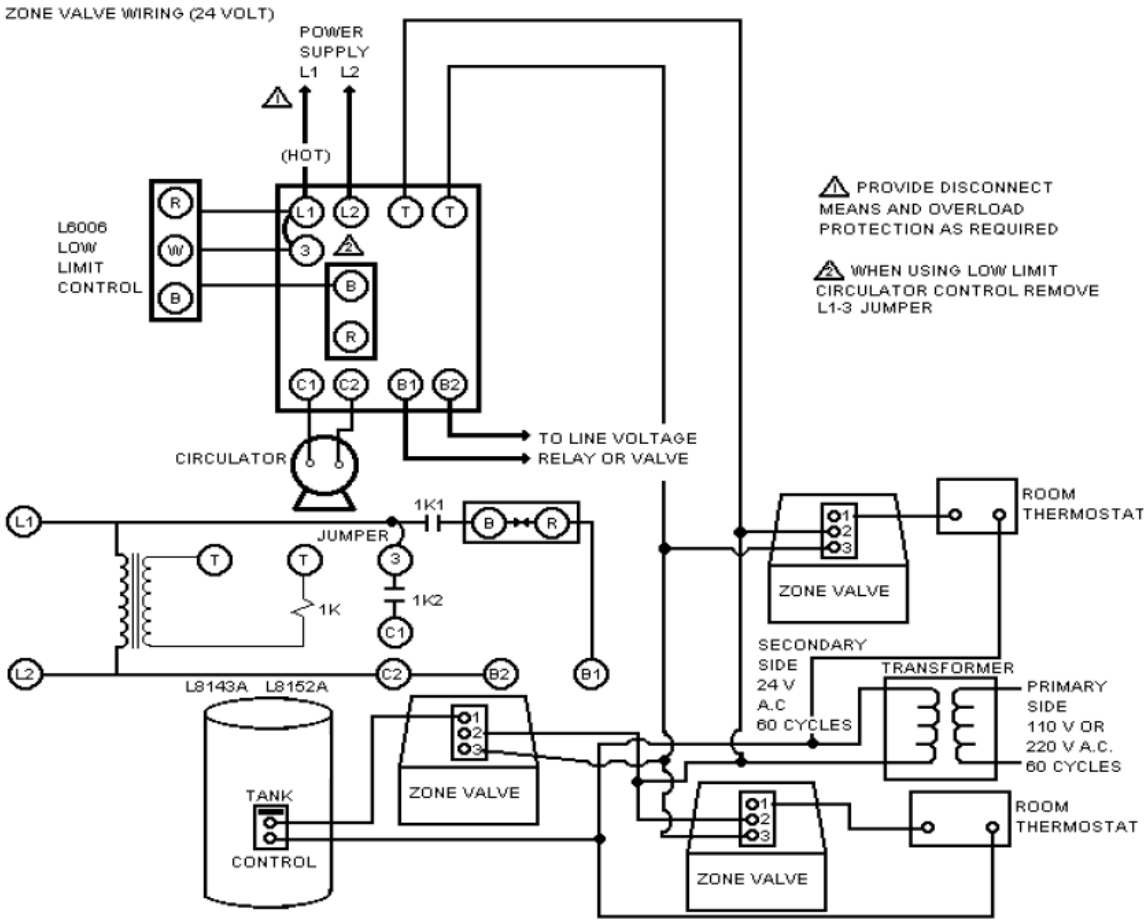


⚠ POWER SUPPLY PROVIDES DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED

USING L8148A OR L8152A COLD START BOILER CONTROL WITH CIRCULATORS



USING L8143A OR L8152A COLD START BOILER CONTROL WITH ZONE VALVES



SECTON 6: MAINTENANCE

To ensure efficient and safe operation, DHT recommends the servicing of the heater by a competent service technician.

WARNING!

Turn off/disconnect all electric power before attempting any maintenance procedure.

SECTON 6.1: WATER HEATER MAINTENANCE

Lime or Sediment Buildup (Every 6 months)

To reduce the buildup of lime or sediment, it is recommended that the tank be flushed every six months.

1. Drain the tank through the drain valve at the bottom of the tank until the water is clear.
2. Inspect the tank for any deposits of lime or sediment.
3. Remove lime, scale, or deposits using care not to damage the tank lining.

Temperature & Pressure Relief Valve (Every 12 months)

1. Before manually testing the T&P relief valve, make sure the valve is piped in a manner that will not cause harm or damage any surrounding area.
2. Manually open the relief valve and allow it to flush out any lime or sediment deposits.
3. Allow the relief valve to snap shut, making sure the seal closes properly.

NOTE:

Also refer to the manufacturer's documentation for the T&P relief valve that was supplied with your unit for additional maintenance/installation/setup instructions.

Others

Check all domestic and boiler water piping, joints, valves, and other fittings for any signs of leakage. Repair or replace if necessary.

SECTON 6.2: TROUBLESHOOTING

The following table summarizes the problems that may be encountered over the life of a DHT TX Series Water Heater, and the procedures to remedy those problems.

SYMPTOM	PROBABLE CAUSE(S)	REMEDY
Entire System is OFF	1. External power supply disconnected or ON/OFF switch failed/OFF.	1. Check to make sure service switch/fuse is ON and there is power supply available. Replace the ON/OFF switch if faulty.
Unit is not heating the domestic water (no hot water present at the faucet).	1. Isolation valve(s) is/are closed. 2. Aquastat is not set properly. 3. Boiler is not operational. 4. Boiler feed circulation pump malfunctions/failed. 5. The heat exchanger coil is scaled. 6. Boiler water or domestic water inlet strainer clogged. 7. Electrical power supply is disconnected or ON/OFF switch failed/OFF. 8. Zone valve (if utilized) is closed.	1. Check to make sure isolation valves on both boiler and domestic water piping are open. 2. Check the set point settings on the aquastat. Readjust the set point settings if below the required temperature. Repair or replace aquastat if faulty. 3. Start the boiler and refer to boiler startup or installation instructions if needed. Check to make sure boiler main service switch/fuse is ON and electrical power supply is available. 4. Check the power supply and inspect the circulation pump for proper operation. Repair or replace the circulator if not functioning properly. 5. Clean the heat exchanger coil per instructions. Call DHT or your authorized representative for instructions on repair or replacement if necessary. Also ensure the water quality levels are within the allowable limits. 6. Blowdown and clean the strainer. 7. Check to make sure power switch is ON and there is power supply available. Repair or replace if necessary. 8. Check the power supply and inspect the zone valve for proper operation. Repair or replace if necessary.
DHW supply temperature is too high water too hot at faucet).	1. Aquastat is not set properly. 2. Boiler feed circulator does not deactivate. 3. Improper system piping.	1. Check the set point settings on the aquastat and readjust if set higher than the required temperature. Repair or replace aquastat if faulty. 2. Check the circulator on/off temperature settings and electrical wiring. Inspect, repair and replace the relay switch or aquastat if not functioning properly. 3. Check to make sure water heating piping and components are installed in accordance with instructions in Section 4.2.
Water heater is not able to maintain the required temperature at the rated capacity or slow recovery.	1. Aquastat not set properly. 2. Boiler water supply temperature is low.	1. Check the set point settings on the aquastat and readjust if below the desired temperature setting. 2. Check to make sure the boiler water inlet temperature gauge reading is equal to the design conditions. Readjust the boiler supply water

	3. Insufficient boiler water flow to heat exchanger. 4. Boiler water or domestic water inlet strainer clogged. 5. The heat exchanger coil is scaled. 6. Water heater being used at higher than rated design capacity.	temperature if necessary. 3. Check to ensure proper boiler water flow to heat exchanger per design conditions. Also check the feed water circulator for proper operation. 4. Blowdown and clean the strainer. 5. Clean the heat exchanger per instructions. Call DHT or your authorized representative for instructions on repair or replacement if necessary. Also ensure the water quality levels are within the allowable limits. 6. Check to make sure the operating conditions do not exceed the design conditions. Use larger size unit if load exceeds the design capacity.
Temperature and Pressure relief valve "pops."	1. Improperly sized or disconnected expansion tank in closed loop piping system. 2. System/incoming water pressure is too high. 3. Relief valve is faulty. 4. Aquastat not properly set or defective.	1. Install the properly sized expansion tank in the closed loop piping system as shown in Installation and Piping drawings in Section 4.2. 2. Bring the system water pressure below the relief valve setting. 3. Inspect and adjust or replace the relief valve if it has failed. Contact DHT representative for replacement. 4. Check and readjust as necessary. Replace the aquastat if faulty.
A loud banging noise in the water heater or water piping (not to be confused with a normal clicking noise made during operation).	1. Water return piping has not been installed properly to allow the water return circulation; the water return line is restricted; or the water return check valve is leaking or has failed. 2. Improperly sized or disconnected expansion tank in closed loop piping system. 3. Inadequate water hammer arrestors.	1. Rearrange the water return piping and inspect the valve for proper drainage. Also check to make sure there is no restriction in the water return line. Replace the check valve if it is leaking or has failed. 2. Install the properly sized expansion tank in the closed loop piping system as shown in Installation and Piping drawings in Section 6.3. 3. In order to avoid any shock waves, install water hammer arrestors/shock absorbers in the hot and cold water systems as needed. Also check for any trapped air in the domestic water system.
Excessive boiler cycling	1. Aquastat not properly set or defective. 2. Load is excessive. 3. Incorrect boiler temperature limit settings.	1. Check and readjust the set point settings on aquastat. Replace the aquastat if faulty. 2. Water heater is undersized or reduced load. Use larger size unit. 3. Increase boiler temperature limit settings.

SECTON 6.3: PARTS AND ACCESSORIES

The following is a list of typical parts that are generally replaceable by personnel trained/certified on DHT, Inc., TX Series water heaters. The replaceable parts may vary, depending on the unit and the particular design specifications in which the unit was constructed. If there are questions concerning the replaceable parts for the unit, refer to the original design specifications, or contact DHT, Inc.

NOTE:

All replacement parts of unit can be ordered directly from your local authorized DHT sales representative/agent. Please have the unit's model and serial number available before contacting.

ITEM NO.	PART NO.	QUANTITY	DESCRIPTION
1	RB450-TX-40	1	TX-40 TX SERIES INDIRECT WH
	RB450-TX-50		TX-50 TX SERIES INDIRECT WH
	RB450-TX-80		TX-80 TX SERIES INDIRECT WH
	RB450-TX-110		TX-110 TX SERIES INDIRECT WH
2	MELE-04-0005	1	AQUASTAT (FOR USA ONLY)
	MELE-04-0002		AQUASTAT (FOR CANADA ONLY)
3	RB450-WELLS	1	AQUASTAT WELL
4	MPART-E-RV1-0006	1	T&P RELIEF VALVE
5	MPART-E-05-0001	1	DRAIN VALVE
6	RB450-TX-LEGS	3	LEGS
7	RB450-TX-BUSHING	1	S.S. REDUCING BUSHING – 1" x ¾" (FOR: MODELS TX-40, TX-50 & TX-80)
8	RB450-TX-40-CARTONS	1	CARTONS TX-40
	RB450-TX-50-CARTONS		CARTONS TX-50
	RB450-TX-80-CARTONS		CARTONS TX-80
	RB450-TX-110-CARTONS		CARTONS TX-110

SECTON 7: TX SERIES INDIRECT WATER HEATER WARRANTY

LIMITED WARRANTY FOR DIVERSIFIED HEAT TRANSFER, INC.
TX SERIES INDIRECT-FIRED WATER HEATER

Your TX Series indirect-fired water heater is protected by these warranties.
These warranties are applicable to ***original residential or commercial/industrial purchasers only.***

The following warranties are exclusive and are given and accepted in lieu of any and all other warranties, express or implied, including without limitation the implied warranties of merchantability and fitness for particular purpose, and any obligation, liability, right, claim or remedy in contract or tort, whether or not arising from Diversified Heat Transfer's negligence, actual or imputed.

The remedies of the ORIGINAL PURCHASER shall be limited to those provided herein to the exclusion of any other remedies including without limitation, special, indirect, incidental and/or consequential damages including, but not limited to property damage, lost profit, or damages alleged to have been caused by any failure of Diversified Heat Transfer or meet any obligation under this agreement including the obligation to repair and replace set forth below.

No agreement varying or extending the foregoing warranties, remedies, or this limitation will be binding upon Diversified Heat Transfer unless in writing and signed by a duly authorized officer of Diversified Heat Transfer. Diversified Heat Transfer does not assume or authorize any other person to assume for it any other liability in connection with the sale of its products.

THIS WARRANTY EXTENDS ONLY TO THE FIRST (ORIGINAL) RETAIL PURCHASER OF THE TANK AND ONLY WHILE THE TANK IS OWNED BY THAT PURCHASER AND REMAINS AT ITS ORIGINAL LOCATION. CHANGE IN OWNERSHIP OR RELOCATION OF THE TANK SHALL FOREWITH TERMINATE THIS WARRANTY WITHOUT FURTHER NOTICE.

WARRANTY COVERAGE FOR RESIDENTIAL USE – 10 YEARS/ LIMITED LIFETIME IF REGISTERED WITHIN 90 DAY (1 YEAR PARTS)

The warranties listed in this section shall apply to Diversified Heat Transfer TX indirect-fired water heaters used in residential setting by the original purchasers only. A "residential setting" as used herein shall mean usage either (a) in a single family dwelling in which the original consumer purchaser of the indirect-fired water heater resides on a permanent basis or (b) in a multiple family dwelling provided that such TX indirect-fired water heater services only one family unit in a multiple family dwelling; provided that the term "residential setting" shall not include any usage of the TX indirect-fired water heater above 150 degrees Fahrenheit and 150 psi.

During the specified 10-year warranty period of the indirect-fired water heater, Diversified Heat Transfer Inc., will repair or replace, at its option, without charge, any indirect-fired water heater having a defect or malfunction that results in a water leak from the outside jacket, inner tank, or heat exchanger as a result of normal use and service. It is expressly agreed between Diversified Heat Transfer and the original residential purchaser that repair or replacement is the exclusive and sole remedy of the original purchaser.

NOTE: Product must be registered within 90 days of installation to acquire the Limited Lifetime coverage. Any claim under this warranty must be verified by an authorized Diversified Heat Transfer (also referred to as DHT) representative: If the claim is found to be valid, DHT will repair or replace the tank as set forth herein, within a reasonable time after verification. If DHT chooses in its discretion to repair any indirect-fired water heater for which there is a valid warranty claim, DHT shall provide parts that are compatible with the subject indirect-fired water heater, which parts need not be identical to the original. If DHT chooses, in its discretion, to replace any indirect-fired water heater for which there is a valid warranty claim, DHT shall replace the subject indirect-fired water heater with the same model or, if such model is not available, with a model which is, in DHT's reasonable judgment, the nearest compatible model available at the time of replacement. Removal of the TX water heater and replacement with a different brand will fully invalidate this warranty coverage.

If Diversified Heat Transfer is unable to repair or replace or otherwise comply with its liability under these warranties, after a reasonable number of attempts, then the original consumer purchaser's sole and exclusive remedy for such a breach shall be either a replacement product or a full refund of the purchase price (exclusive of freight, labor, and installation), as determined by Diversified Heat Transfer.
If the original purchaser cannot provide proof of purchase, then DHT may request proof of residency dating back to the date of manufacture of the tank. In such a case the warranty period will begin from the date of manufacture as determined by the tank serial number.

OWNER RESPONSIBILITIES: The Owner or Qualified installer/Service Technician must:

A) Maintain the water heater in accordance with the maintenance procedure list in the manufacturer's provided instructions. Preventive maintenance can help avoid any unnecessary breakdown of the water heater and keep it running at optimum efficiency.
B) Maintain all related system components in good operating condition.
C) Keep the water heater free of damaging scale deposits.
D) Warranty card must be filled out and mailed in or online within 90 days of installation. If the warranty card is not filled out, the original purchaser must have proof of install with an invoice in case of warranty.
E) Maintain water conditions with the following parameters:
    a. Temperatures/water pressure/chloride levels (measurable amounts of any compound containing chlorides) 150°F or lower/150 P.S.I. /150 ppm chlorides for residential use.
    b. PH between 6.0 and 8.0.
    c. Hardness not higher than 7.0.
F) Ensure that the product not supplied or operated by any form or water softener with ion exchange filter that is regenerated salt.
G) Water test may be requested if there is question about the water quality with regards to a malfunction of the TX water heater.

WARRANTY EXCLUSIONS:

A) Production of noise, taste, odor, discoloration, or rusty water.
B) Incidental property damage, loss of use, inconvenience, or other incidental or consequential costs.
C) The TX indirect-fired water heater used for non-potable applications, such as pool or process heating.
D) The failure or malfunction results from failure to keep the tank full of potable water, free to circulate at all times and with the tank free of damaging water sediment or scale deposits.

E) Cost associated with the replacement and/or repair of the unit including:
   a. Any freight, shipping, or delivery charges.
   b. Any removal, installation, or re-installation charges.
   c. Any material, and/or permits required for installation, re-installation or repair.
   d. Any charges to return the defective water heater and/or component to the manufacturer.

F) Parts:
   a. In the event that any part of such water heater is found to be defective in material or workmanship during this one-year period, DHT will repair or replace, at its option, the defective component parts (consisting of the Honeywell Aquastat and well).

NOTE: Product must be registered within 90 days of installation to acquire the Limited Lifetime coverage.

WARRANTY COVERAGE FOR COMMERICAL USAGE - 8 YEARS (1 YEAR PARTS)

The warranties listed in this section shall apply to Diversified Heat Transfer TX indirect-fired water heaters used in a commercial setting by original consumer/purchasers only. A "commercial setting" as used herein shall mean any usage not falling within the above definition of a "residential setting." A TX indirect-fired water heater shall be deemed to be used in a "commercial setting" if at any time it is operated at a temperature up to 150 degrees Fahrenheit and 150psi.

If at the time of a request for service the original business purchaser cannot provide a copy of the original sales receipt, installation bill, or equivalent document, then the warranty period for the indirect-fired water heater shall be eight (8) years from the date of manufacture of the indirect-fired water heater as determined by the tank serial number.

During the specified warranty period of the indirect-fired water heater, Diversified Heat Transfer Inc., will repair or replace, at its option, without charge, any indirect-fired water heater having a defect or malfunction that results in a water leak from the outside jacket, inner tank, or heat exchanger as a result of normal use and service. It is expressly agreed between Diversified Heat Transfer and the original residential purchaser that repair or replacement is the exclusive and sole remedy of the original purchaser.

Any claim under this warranty must be verified by an authorized Diversified Heat Transfer (also referred to as DHT) representative: If the claim is found to be valid, DHT will repair or replace the tank as set forth herein, within a reasonable time after verification. If DHT chooses in its discretion to repair any indirect-fired water heater for which there is a valid warranty claim, DHT shall provide parts that are compatible with the subject indirect-fired water heater, which parts need not be identical to the original. If DHT chooses, in its discretion, to replace any indirect-fired water heater for which there is a valid warranty claim, DHT shall replace the subject indirect-fired water heater with the same model or, if such model is not available, with a model which is, in DHT's reasonable judgment, the nearest compatible model available at the time of replacement. Removal of the TX water heater and replacement with a different brand will fully invalidate this warranty coverage.

If Diversified Heat Transfer is unable to repair or replace or otherwise comply with its liability under these warranties, after a reasonable number of attempts, then the original business purchaser's sole

and exclusive remedy for such a breach shall be either a replacement product or a full refund of the purchase price (exclusive of freight, labor, and installation), as determined by Diversified Heat Transfer.

If the original purchaser cannot provide proof of purchase than DHT may request proof of occupancy dating back to the date of manufacture of the tank. In such a case the warranty period will begin from the date of manufacture as determined by the tank serial number.

OWNER RESPONSIBILITIES: The Owner or Qualified Installer/Service Technician must:

A) Maintain the water heater in accordance with the maintenance procedure listed in the manufacturer's provided instructions. Preventive maintenance can help avoid any unnecessary breakdown of the water heater and keep it running at optimum efficiency.
B) Maintain all related system components in good operating condition.
C) Keep the water heater free of damaging scale deposits.
D) Warranty card must be filled out and mailed in or online within 90 days of installation. If the warranty card is not filled out, the original purchaser must have proof of install with an invoice in case of warranty.
E) Maintain water conditions with the following parameters:
    a. Temperature/water pressure/chloride levels (measurable amount of any compound containing chloride) 150°F or lower/150 P.S.I./150 ppm chlorides for commercial use.
    b. PH between 6.0 and 8.0.
    c. Hardness not higher than 7.0.
F) Ensure that the product is not supplied or operated by any form of water softeners with ion exchange filter that is regenerated by salt.
G) Water test may be requested if there is question about the water quality with regards to a malfunction of the TX water heater.

WARRANTY EXCLUSIONS:

A) Production of noise, taste, odors, discoloration, or rusty water.
B) Incidental property damage, loss of use, inconvenience, or other incidental or consequential costs.
C) The TX indirect-fired water heater used for non-potable applications, such as pool or process heating.
D) The failure or malfunction results from failure to keep the tank full of potable water, free to circulate at all times and with the tank free of damaging water sediment or scale deposits.
E) Costs associated with the replacement and/or repair of the unit, including:
    a. Any freight, shipping, or delivery charges.
    b. Any removal, installation, or re-installation charges.
    c. Any material, and/or permits required for installation, re-installation. or repair.
    d. Any charges to return the defective water heater and/or component to the manufacturer.

WARRANTY COVERAGE FOR INDUSTRIAL USAGE - 5 YEARS (1 YEAR PARTS)

The warranties listed in this section shall apply to Diversified Heat Transfer TX indirect-fired water heaters used in an industrial setting by original consumer purchasers only. An "industrial setting" as used herein shall mean any usage not falling within the above definition of a "commercial setting." A TX indirect-fired water heater shall be deemed to be used in an "industrial setting" if at any time it is operated at a temperature up to 180 degrees Fahrenheit and 150 psi.

During the specified warranty period of the indirect-fired water heater, Diversified Heat Transfer Inc., will repair or replace, at its option, without charge, any indirect-fired water heater having a defect or malfunction that results in a water leak from the outside jacket, inner tank, or heat exchanger as a result of normal use and service. It is expressly agreed between Diversified Heat Transfer and the original business purchaser that repair or replacement is the exclusive and sole remedy of the original purchaser.

Any claim under this warranty must be verified by an authorized Diversified Heat Transfer (also referred to as DHT) representative: If the claim is found to be valid, DHT will repair or replace the tank as set forth herein, within a reasonable time after verification. If DHT chooses in its discretion to repair any indirect-fired water heater for which there is a valid warranty claim, DHT shall provide parts that are compatible with the subject indirect-fired water heater, which parts need not be identical to the original. If DHT chooses, in its discretion, to replace any indirect-fired water heater for which there is a valid warranty claim, DHT shall replace the subject indirect-fired water heater with the same model or, if such model is not available, with a model which is, in DHT's reasonable judgment, the nearest compatible model available at the time of replacement. Removal of the TX water heater and replacement with a different brand will fully invalidate this warranty coverage.

If Diversified Heat Transfer is unable to repair or replace or otherwise comply with its liability under these warranties, after a reasonable number of attempts, then the original business purchaser's sole and exclusive remedy for such a breach shall be either a replacement product or a full refund of the purchase price (exclusive of freight, labor, and installation), as determined by Diversified Heat Transfer.
If at the time of a request for service, the original business purchaser cannot provide a copy of the original sales receipt, installation bill, or equivalent document, then the warranty period for the indirect-fired water heater shall be five (5) years from the date of manufacture of the indirect-fired water heater as determined by the tank serial number.

If the original purchaser cannot provide proof of purchase, then DHT may request proof of occupancy dating back to the date of manufacture of the tank. In such a case the warranty period will begin from the date of manufacture as determined by the tank serial number.

OWNER RESPONSIBILITIES: The Owner or Qualified Installer/Service Technician must:

A) Maintain the water heater in accordance with the maintenance procedure listed in the manufacturer's provided instructions. Preventive maintenance can help avoid any unnecessary breakdown of the water heater and keep it running at optimum efficiency.
B) Maintain all related system components in good operating condition.
C) Keep the water heater free of damaging scale deposits.
D) Warranty card must be filled out and mailed in or online within 90 days of installation. If the warranty card is not filled out, the original purchaser must have proof of install with an invoice in case of warranty
E) Maintain water conditions with the following parameters:
    a. Temperatures/water pressure/chloride levels (measurable amounts of any compound containing chloride) 180°F or lower /150 P.S.I./80 ppm chlorides for industrial use.
    b. PH between 6.0 and 8.0.
    c. Hardness not higher than 7.0.

F) Ensure that the product is not supplied or operating by any form of water softeners with ion exchange filter that is regenerated by salt.
G) Water test may be requested if there is question about the water quality with regards to a malfunction of the TX water heater.

WARRANTY EXCLUSIONS:

A) Production of noise, taste, odors, discoloration, or rusty water.
B) Incidental property damage, loss of use, inconvenience, or other incidental or consequential costs.
C) Costs associated with the replacement and/or repair of the unit, including:
    a. Any freight, shipping, or delivery charges.
    b. Any removal, installation, or re-installation charges.
    c. Any material, and/or permits required for installation, re-installation. or repair.
    d. Any charges to return the defective water heater and/or component to the manufacturer.

REPLACEMENT TANK - WARRANTY RESIDENTIAL, COMMERCIAL, OR INDUSTRIAL APPLICATION

For either a residential, commercial, or industrial application, the following applies to both when a replacement tank is provided for a tank found to be under warranty.

The replacement tank warranty assumes the remaining warranty period left from the original tank purchased.

A) These warranties are void and shall not apply under the following circumstances:
    1. The TX water heater was not installed or repaired by a heating contractor whose principal occupation is the sale, installation, and repair of plumbing, heating, and/or air conditioning equipment.
    2. These warranties cannot be considered as a guarantee of workmanship of an installer connected with the installation of the TX water heater, or as imposing on Diversified Heat Transfer liability of any nature for unsatisfactory performance as result of faulty workmanship in the installation or repair which liability is expressly disclaimed.
    3. The failure or malfunction results from improper or negligent operation, abuse, misuse. or maintenance or unauthorized alteration.

Malfunctions resulting from or repairs necessitated by, uses of the indirect-fired water heater for purposes other than that for which it was designed, or resulting from flood, fire, or wind.

PROCEDURES FOR WARRANTY SERVICE REQUESTS

ANY CLAIM FOR WARRANTY ASSISTANCE MUST BE MADE IMMEDIATELY UPON FINDING THE ISSUE. TO FILE A CLAIM UNDER THESE WARRANTIES, CONTACT DIVERSIFIED HEAT TRANSFER, INC., AT THIS ADDRESS: 439 MAIN ROAD, TOWACO, NEW JERSEY 07082 OR CALL DIVERSIFIED HEAT TRANSFER AT (800) 221-1522 AND ASK FOR CUSTOMER SERVICE OR MANUFACTURER REP.

At the time a claim is filed, the original purchaser must present a copy of the original sales receipt, installation bill, proof of delivery, or equivalent documents evidencing both ownership of the TX Series indirect-fired water heater and installation in the dwelling or commercial property owned by the original purchaser.

WARRANTY COVERAGE QUESTIONS

If you have questions about the coverage of this warranty, please contact DHT at 439 Main Road, Towaco, New Jersey 07082, (800) 221-1522 and ask for customer service or manufacturer rep.

This warranty is to be governed by and construed in accordance with the laws of the State of New York without regard to the principles of conflict of laws.

DIVERSIFIED HEAT TRANSFER RESERVES THE RIGHT TO CHANGE SPECIFICATIONS OR DISCONTINUE MODELS WITHOUT NOTICE.