



BT SERIES INSTALLATION, OPERATION & MAINTENANCE MANUAL

Buffer Tanks
Hydronic Thermal Storage Tanks



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Qualified installer only –

This product must be installed only by a qualified service technician. The installation must be done using recognized industry practices, and in compliance with this manual and all applicable codes. Failure to comply could result in death, serious injury or substantial property damage.

For information not included in this manual, see the following:

This manual includes only basic information for installation, operation and maintenance of thermal storage tanks and supplemental back-up heaters. For more advanced applications and information not shown in this manual, contact Technical Support for assistance and supplemental instructions. Call 413-564-5530 in Westfield, MA or visit our website at www.mestek.com to send an e-mail or review technical literature.

Section 1: Introduction

Hazard Definitions

The following terms are used throughout this manual to bring attention to the presence of potential hazards or to important information concerning the product.

▲ DANGER Indicates an imminently hazardous situation which, if not avoided, WILL result in death, serious injury or substantial property damage.

▲ WARNING Indicates an imminently hazardous situation which, if not avoided, COULD result in death, serious injury or substantial property damage.

▲ CAUTION Indicates an imminently hazardous situation which, if not avoided, MAY result in minor injury or property damage.

NOTICE Used to notify of special instructions on installation, operation or maintenance which are important to equipment, but not related to personal injury hazards.

To reduce the risk of excessive pressures and temperatures in this water heater, install temperature and pressure protective equipment required by local codes and 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 requirements for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22.

This valve must be marked with a maximum set pressure not to exceed the marked maximum working pressure of the water heater. Install the valve into an opening provided and marked for this purpose in the water heater, and orient it or provide tubing so that any discharge from the valve exits only within 6 inches above, or at any distance below, the structural floor, and does not contact any live electrical part.

The discharge opening must not be blocked or reduced in size under any circumstances. Hydrogen gas is produced in a hot water system served by this heater that has not been used for a long period of time (2 weeks or more). Hydrogen gas is extremely flammable. When hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow.

There should be no smoking or open flame near the faucet at the time it is open. When a water heater is installed in a closed water-supply system, such as one having a back-flow preventer in the cold-water supply, means shall be provided to control thermal expansion. Contact the water supplier or local plumbing inspector for information regarding the control of this situation.

BT Series Overview

The BT Series are water tanks suitable for storage of water and water/glycol mixtures for use in all hydronic systems for heating, cooling, or a combination of both heating and cooling. The wide operating range of 32-194°F (0-90°C) allows its use with heat-pump, geothermal, fossil fuel or solar systems, or any combination thereof. The tanks are designed for space conditioning only. They are not approved for potable or domestic water.

The tank's volume provides thermal storage to retain energy during period of off cycle or defrosting, and buffering, to extend boiler or heat pump cycle times, increasing overall system efficiency and allowing tighter control of supply temperature. Additionally, each tank is equipped with four circulation ports; when piped in a primary/secondary arrangement, this ensures hydraulic separation of the system.

When energized, the electric heating elements provide 3kW each* of heat to the contents of the buffer tank. *10,500 BTU/hr in the BT13-H. 20,500 BTU/hr in all other sizes.

This can be used to achieve three distinct purposes, as controlled by the Solstice Heat Pump, and configurable through the Carel µC2 control interface. Refer to the individual heat pump operation manual for specific parameters to control the following features.

1. **Standby Freeze Protection.** When the chiller is in Standby (inactive) and the water within the chiller drops below a predetermined temperature determined by the heat pump control, the chiller will engage the circulator immediately, and energize the electric heaters after an adjustable time delay.
2. **Heat Pump Heat Boost.** If the water temperature in the circuit starts below, or falls below, a predetermined temperature, the heat pump will engage the electric heaters after the adjustable time delay. The heaters will continue to operate until the temperature exceeds the setpoint temperature by a predetermined amount.
3. **Defrost Operation.** If this feature is enabled the heat pump will engage the heater during defrost operation in order to provide an additional heat source to offset heat lost from the system. This feature must be enabled in the Heat Pump control to activate.

As with any hydronic heating system, it is HIGHLY recommended that an oxygen barrier tubing is used throughout the system.

▲ WARNING Buffer tanks are to be used in hydronic heating and/or cooling systems only. All local plumbing codes must be adhered to. Do not operate beyond specifications on the rating plate. Failure to comply can result in property damage, personal injury, or death.

The major components of the BT Series are:

- The BT13-H, BT26-H and BT40-H contain a welded, 18-gauge (.047") grade 304 stainless steel inner tank with ports for circulation, air separation & pressure relief, and drain. BT80-H contains a 16-gauge (.059") SSC inner tank.
- 50mm (2") expanded polyurethane insulation for R11 insulating value.
- Outer shell of .020" powder coated carbon steel.
- ¼" ID temperature sensor well, isolated from the tank interior.
- ½" NPT aquastat well, open to the tank interior.
- Two each 240VAC 3 kW resistive electric heating elements (one heater for BT13-H).
- Electrical junction box for connecting electrical power and safety circuit wiring for the electric heaters.

DO NOT use for potable water heating. The storage tank and components are not suitable for the application.

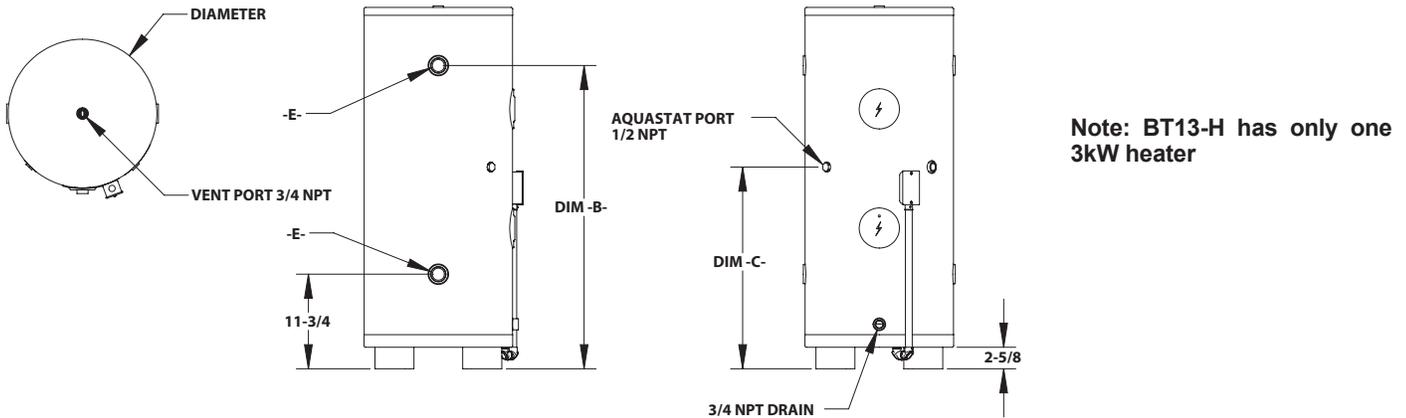
Additional Components Required

- Air Separator and Pressure/Temperature relief valve, to be located directly in the top of the tank.
- Expansion tank sized for the entire system volume, including the BT tank, and intended operation mode; heating, cooling, or combination.
- 30 amp magnetic contactor to supply power to the heating elements if used with other than Solstice SCM or LAHP heat pump.

Section 2: Specifications & Dimensions

Figure 2 BT13-H, BT26-H, BT40-H and BT80-H (ALL DIMENSIONS IN INCHES)

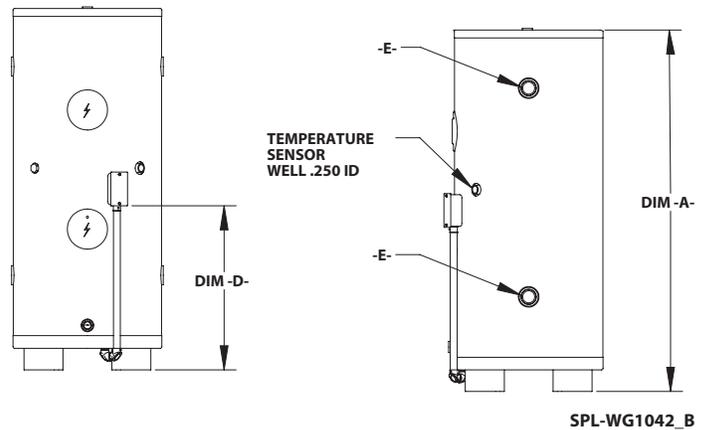
Standard Buffer Tank



Specifications

Model		BT13-H	BT26-H	BT40-H	BT80-H
Dimensions	Diameter	18-1/2"	18-1/2"	18-1/2"	23-5/8"
	A	29-1/6"	45"	60"	64-1/8"
	B	21-1/2"	37-3/4"	52-3/4"	55-1/2"
	C	19-5/8"	25 1/8"	34-1/8"	34-5/8"
	D	16-1/2"	20-1/2"	26-5/8"	32-1/2"
Port Diameter NPT	E	1-1/2"	1-1/2"	1-1/2"	2"
Capacity	US Gal	13	26	40	80
Max Water Flow	GPM	36	36	36	48
Ship Weight	lbs	40	84	104	130
Empty Weight	lbs	38	77	97	125
Full Weight	lbs	148	304	446	805
Min Circuit Ampacity	Amps	15	30	30	30
Max Working Pressure	PSI	100			
Electric Heat Capacity	kW	3	6	6	6

*Not suitable for potable water



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Section 3: Location & Mounting

Failure to comply with all of the guidelines IN THE FOLLOWING could result in death, serious injury or substantial property damage.

The installation must comply with all applicable local codes.

Prepare the Unit

- Step 1 Inspect the unit for shipping damage. DO NOT use if there is a risk that the damage could affect unit operation.
- Step 2 Make sure all required components are available.

Location

- Step 1 Locate the buffer tank only indoors, protected from weather.
- Step 2 Place the buffer tank on a stable surface that will not shift, and is, or can be made level.
- Step 3 If the buffer tank is in a location that may be subject to seasonal flooding, it must be put upon a raised structure to ensure that no portion of the buffer tank can be submerged.

Handling/Hoisting

Never attempt to move the buffer tank with any water in it.

The empty buffer tank may be moved safely by two individuals over flat, level ground or floor.

For moving the empty buffer tank over uneven ground, stairs, onto or off of a vehicle; a lifting point may be fabricated by assembling a 3/4 NPT, steel or brass, pipe nipple into the branch

Figure 3 Hoisting



of a 3/4 NPT tee and engaging the nipple into the 3/4 NPT port in the top of the tank. A lifting cable can then be threaded through the run of the tee and attached to a hoist or crane.

Ensure the tank is level and stable, with no wobbling or rocking, by installing inorganic (metal, plastic or composite) shims under the feet.

CAUTION When using Pex tubing, an oxygen barrier tubing must be used.

Refer to Solstice Heat Pump installation manuals for information on system Glycol/Water concentrations.

Section 4: Electrical Connection

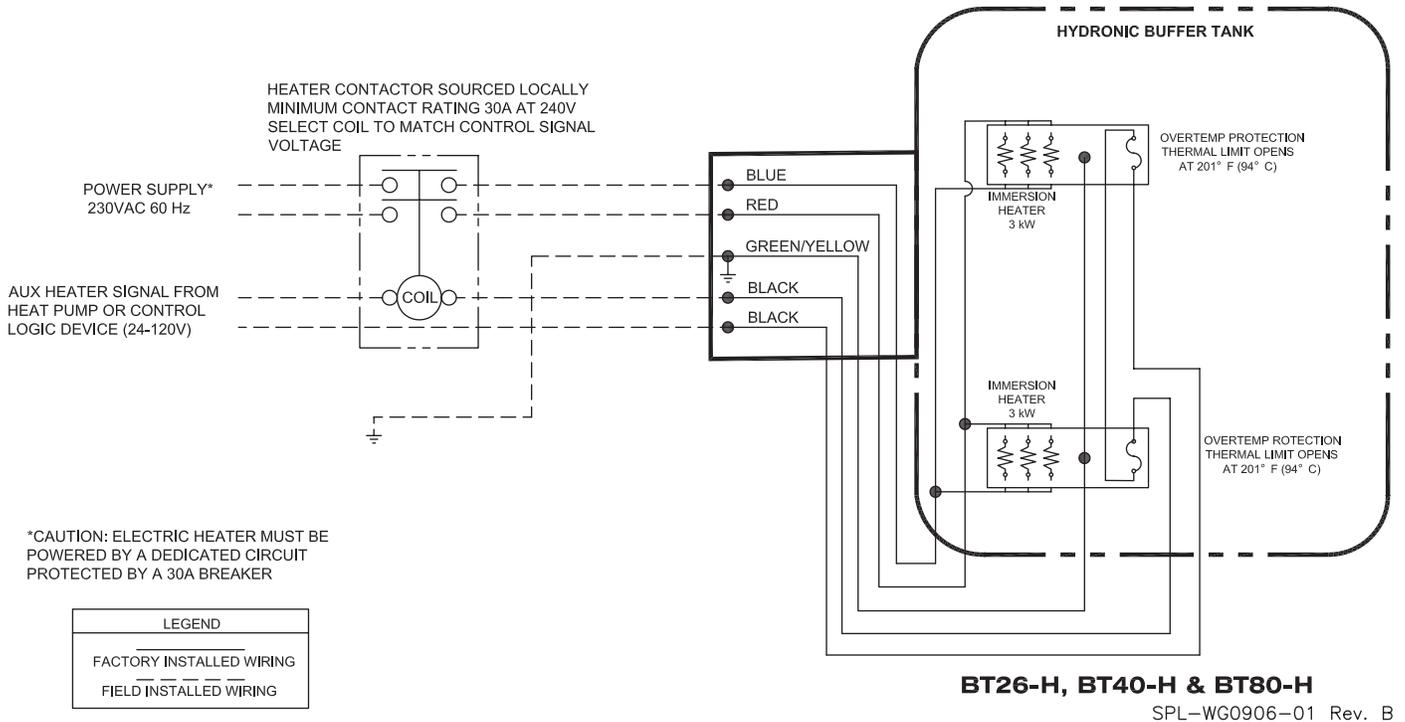
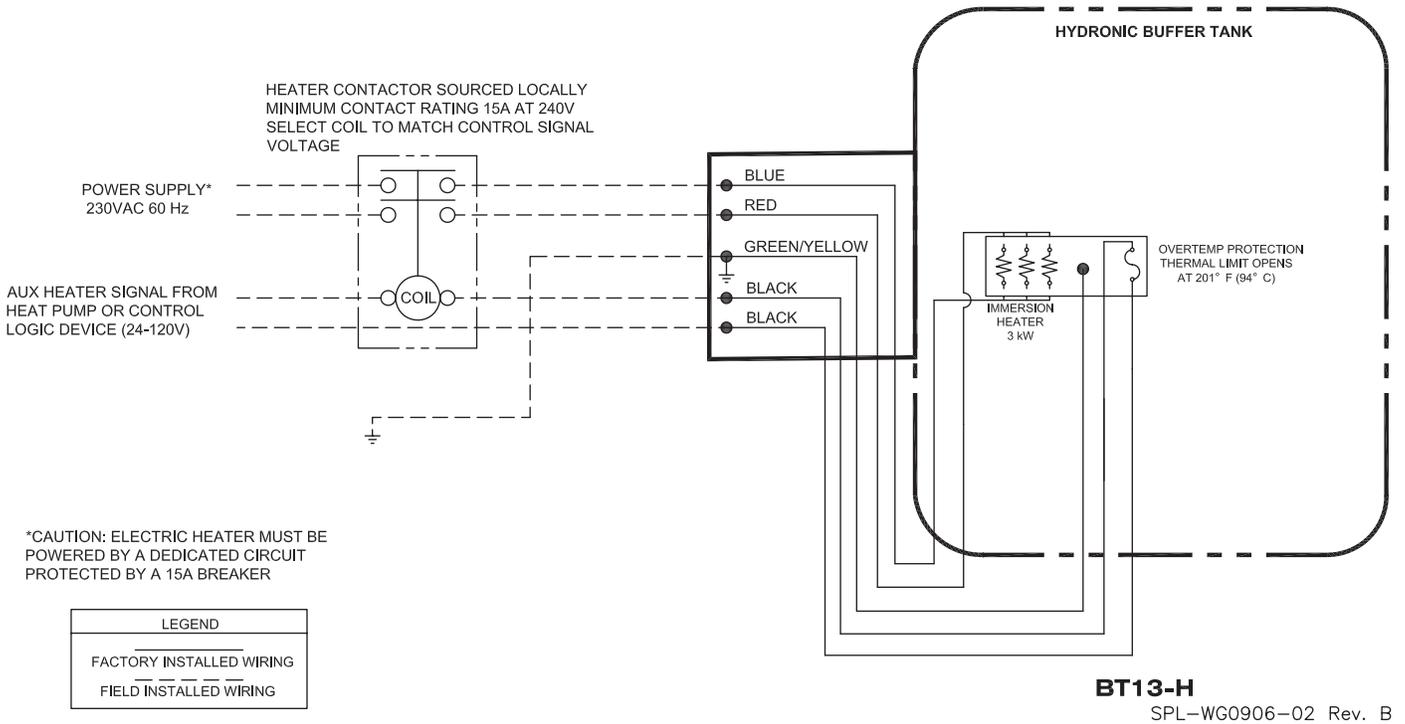
Overcurrent Protection

Provide a separate power source and overcurrent protection for the immersion heater. Refer to the Figure 4 for detailed wiring.

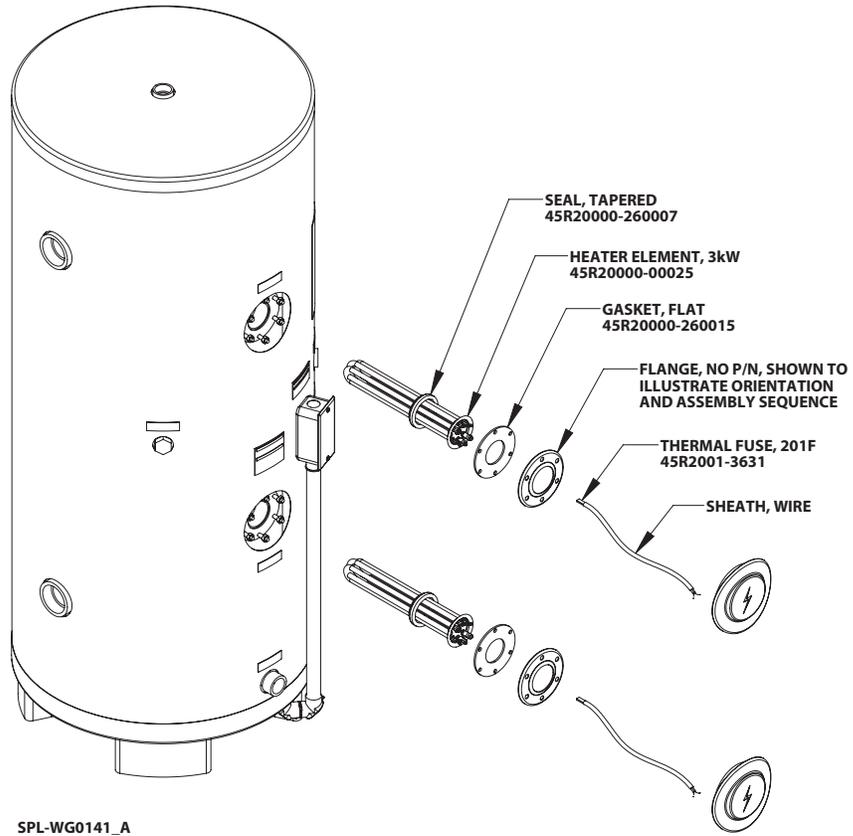
The figure below shows the electrical circuit for connecting the buffer tanks to Solstice Heat Pumps.

Figure 4 Field Connections

Typical standalone configuration shown. Certain heat pumps may incorporate some devices shown here, but the Over-temperature protection circuit must be wired to the controlling device according to that unit's published installation manual.

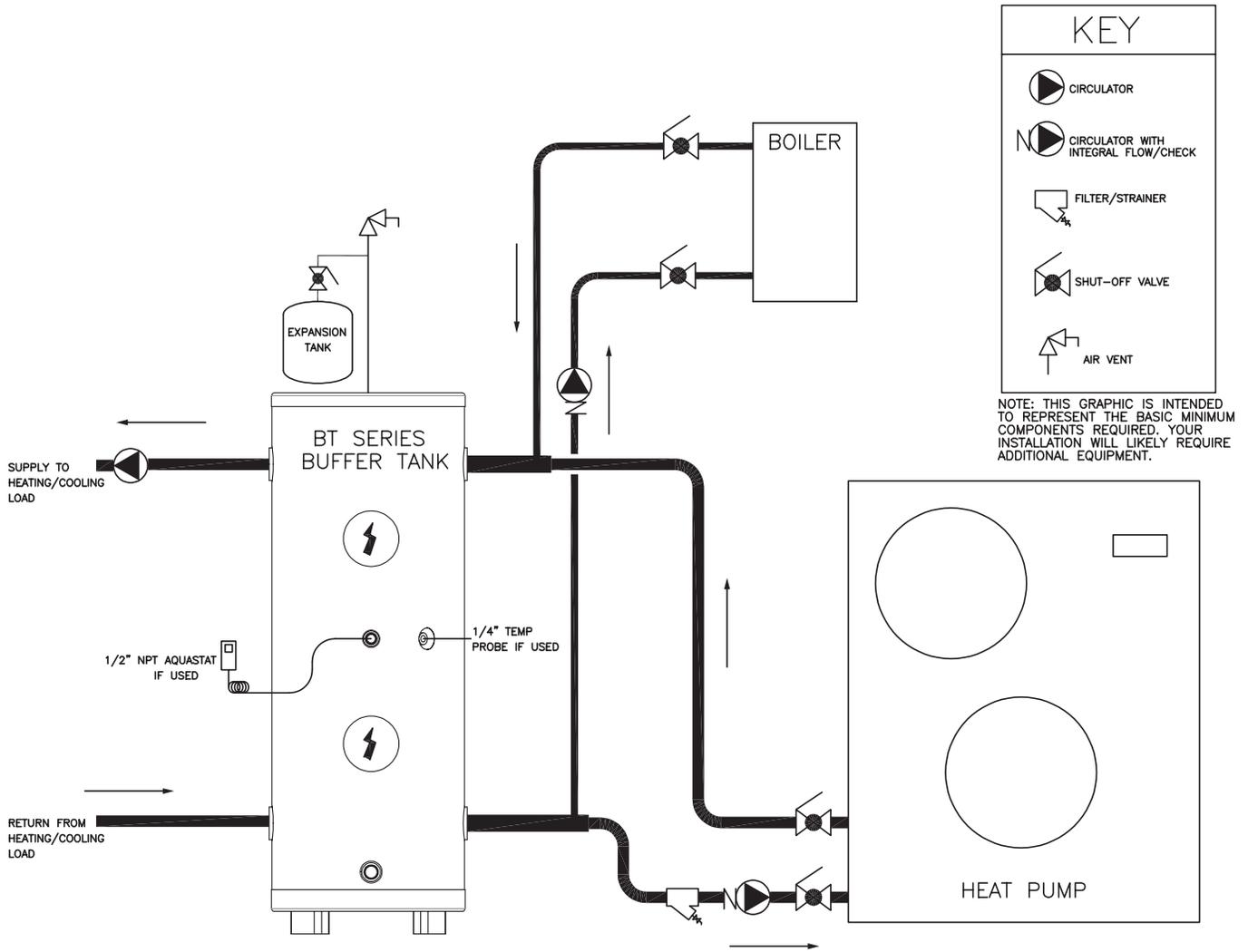


Section 5: Replacement Parts



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Section 6: Piping Diagrams



FOUR PIPE BUFFER TANK CONNECTION

Section 7: Limited Warranty

The Manufacturer warrants to the original owner at the original installation site that the Product will be free from defects in material or workmanship for a period not to exceed five (5) years from startup for fan coil units and ten (10) years for buffer tanks. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.

This limited warranty does not apply:

- (a) if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way.
- (b) to any expenses, including labor or material, incurred during removal or reinstallation of the Product.
- (c) to any workmanship of the installer of the Product.

This limited warranty is conditional upon:

- (a) shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid.
- (b) determination, in the reasonable opinion of the Manufacturer, that there exists a defect in material or workmanship.

Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.



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