



BT2-1025
45W30-WG0848

BT SERIES INSTALLATION, OPERATION & MAINTENANCE MANUAL

Buffer Tanks
Hydronic Thermal Storage Tanks



SECTION 1: INTRODUCTION		SECTION 4: ELECTRICAL CONNECTIONS	
Model BT Overview	2	Overcurrent Protection & Wire Sizing	4
SECTION 2: SPECIFICATIONS & DIMENSIONS	3	SECTION 5: REPLACEMENT PARTS	4
SECTION 3: LOCATION & MOUNTING		SECTION 6: PIPING DIAGRAMS	5 & 6
Prepare the Unit	3	SECTION 7: LIMITED WARRANTY	7
Location	3		
Handling/Hoisting	3		

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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 (152 mm) 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 (3.08 kW) in the BT13-H. 20,500 BTU/hr (6.01 kW) in all other sizes.

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

1. **Standby Freeze Protection.** When the heat pump is in Standby (inactive) and the water within the heat pump drops below a predetermined temperature determined by the heat pump control, the heat pump 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" /1.2 mm) grade 304 stainless steel inner tank with ports for circulation, air separation & pressure relief, and drain. BT80-H contains a 16-gauge (.059" /1.5 mm) SSC inner tank.
- 50mm (2") expanded polyurethane insulation for R11 insulating value.
- Outer shell of .020" (0.5 mm) 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.

Section 2: Specifications & Dimensions

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

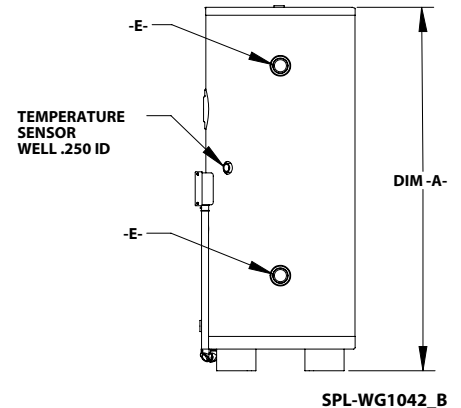
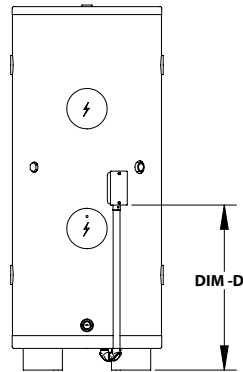
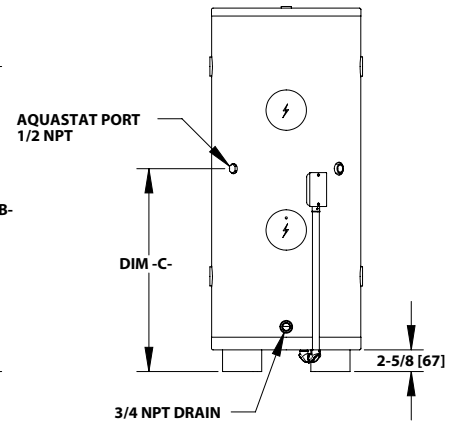
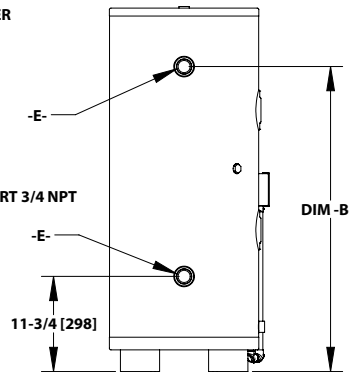
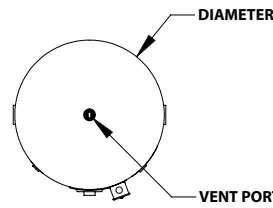
Note: BT13-H has only one 3KW heater

Standard Buffer Tank

Specifications

Model		BT13-H	BT26-H	BT40-H	BT80-H
Dimensions	Diameter	in 18-1/2	in 18-1/2	in 18-1/2	in 23-5/8
		mm 470	mm 470	mm 470	mm 600
	A	in 29-1/6	in 45	in 60	in 64-1/8
		mm 741	mm 1143	mm 1524	mm 1629
	B	in 21-1/2	in 37-3/4	in 52-3/4	in 55-1/2
		mm 546	mm 959	mm 1340	mm 1410
	C	in 19-5/8	in 25-1/8	in 34-1/8	in 34-5/8
		mm 498	mm 638	mm 867	mm 879
Port Diameter NPT	E	in 1-1/2	in 1-1/2	in 1-1/2	in 2
		mm 419	mm 521	mm 676	mm 826
Capacity		Gal 13	Gal 26	Gal 40	Gal 80
Max Water Flow		l 49	l 98	l 151	l 303
		GPM 36	GPM 36	GPM 36	GPM 48
Ship Weight		lbs 40	lbs 84	lbs 104	lbs 130
		kg 18.14	kg 38.1	kg 47.17	kg 58.97
Empty Weight		lbs 38	lbs 77	lbs 97	lbs 125
		kg 17.24	kg 34.93	kg 44.00	kg 56.70
Full Weight		lbs 148	lbs 304	lbs 446	lbs 805
		kg 67.13	kg 137.89	kg 202.3	kg 365.14
Min Circuit Ampacity	Amp	15	30	30	30
Max Working Pressure		PSI 100	PSI 100	PSI 100	PSI 100
		kPa 690	kPa 690	kPa 690	kPa 690
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.

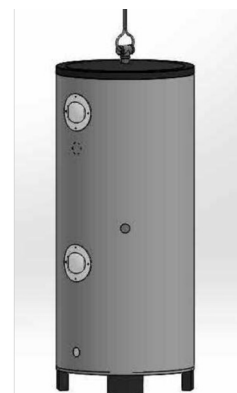
Handling/Hoisting

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

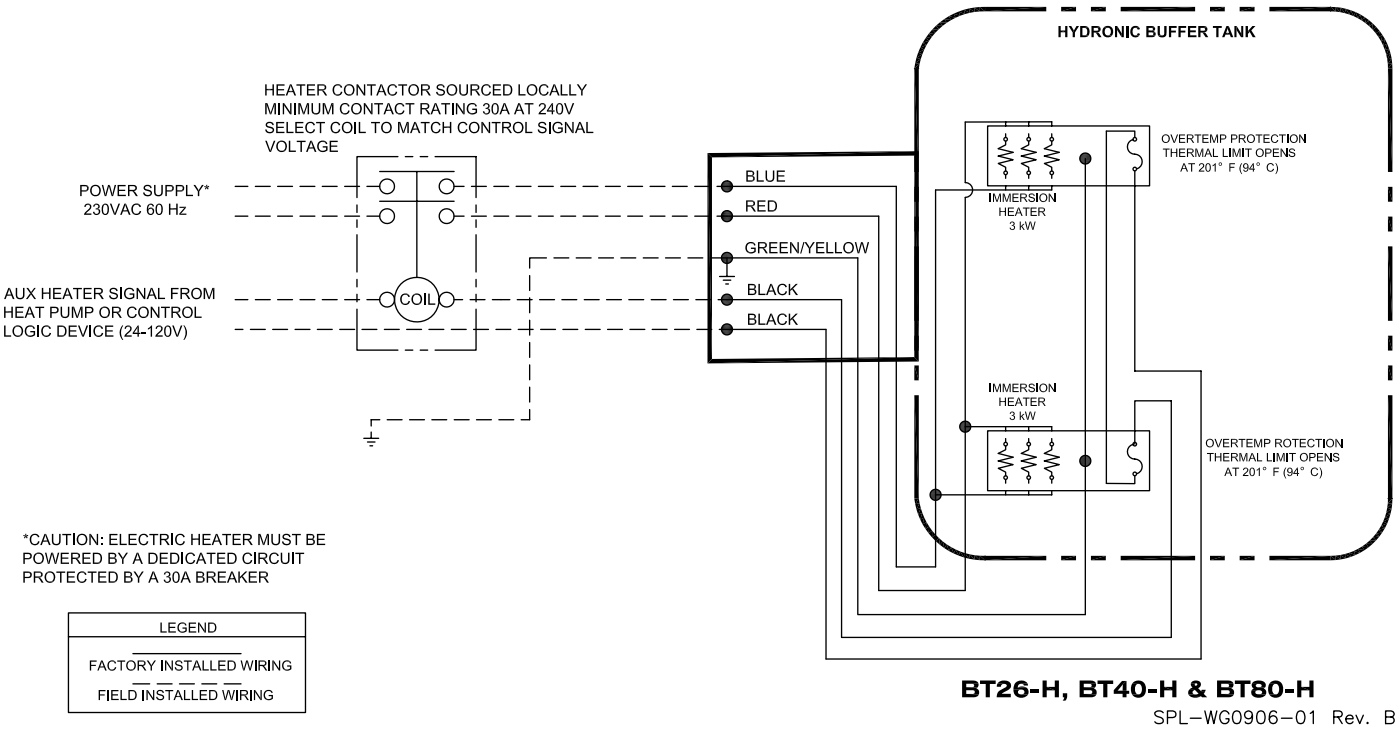
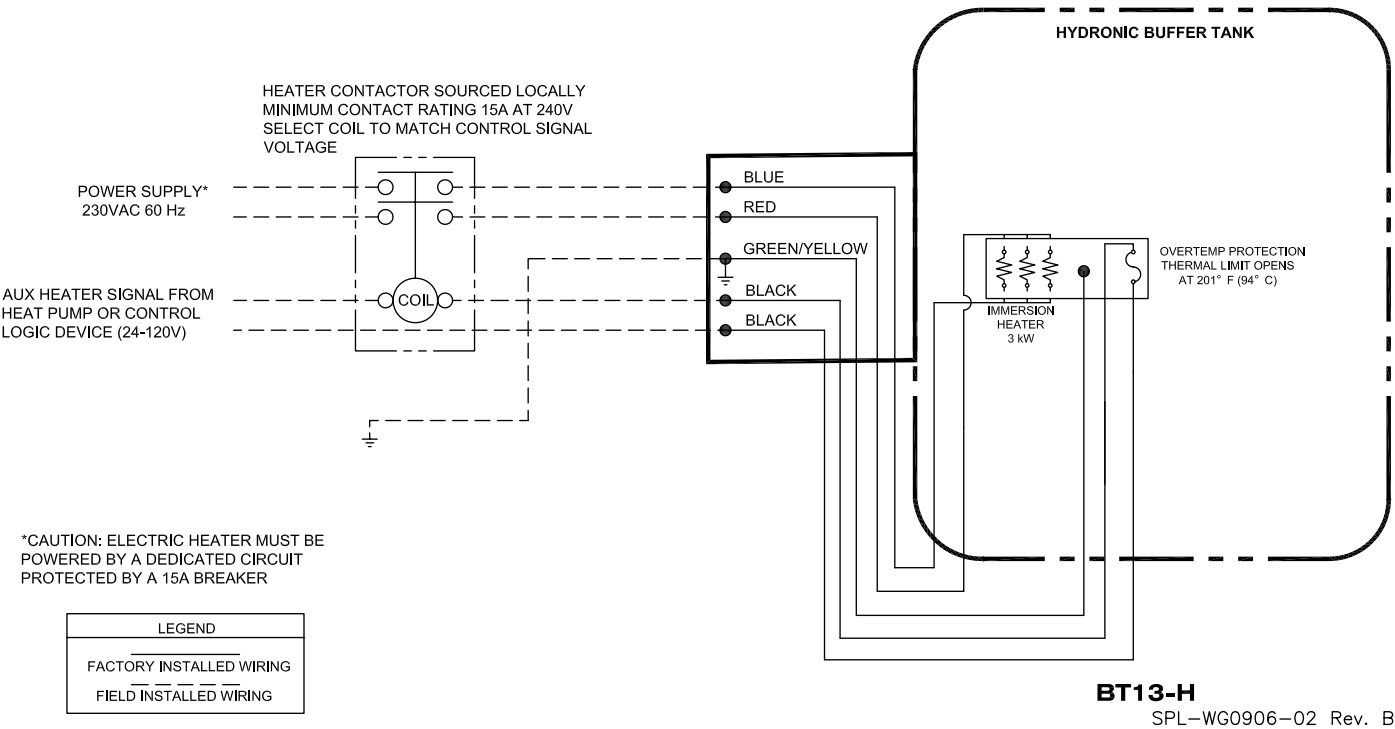
Overcurrent Protection

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

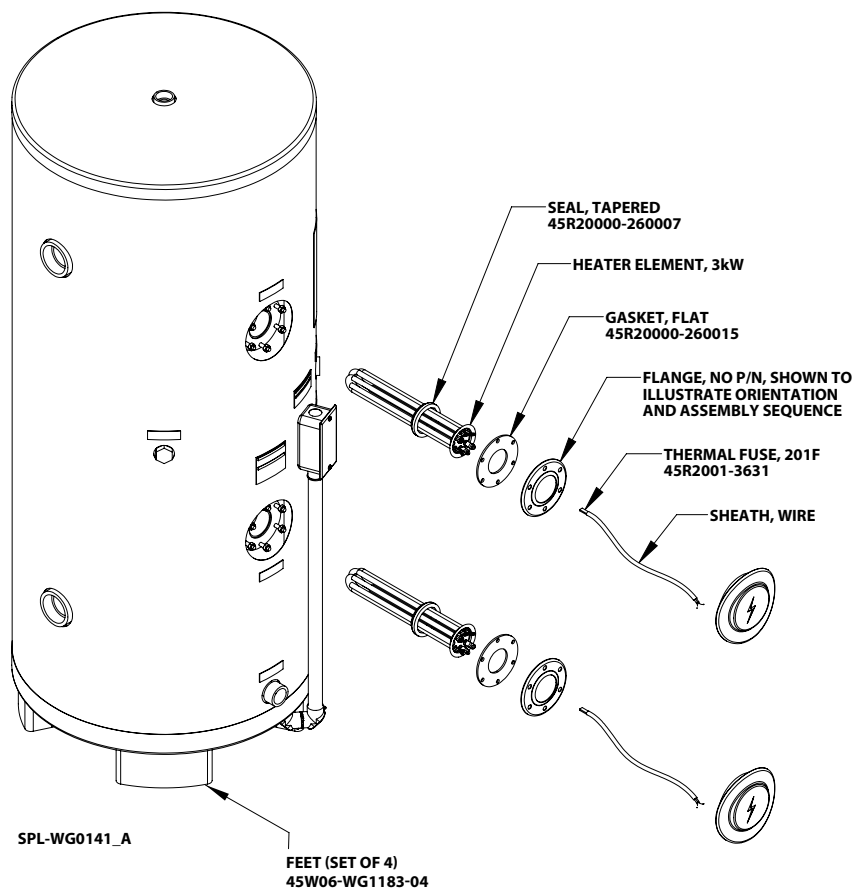
The figure below shows the electrical circuit for connecting the buffer tanks to Solstice Heat Pumps.

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.

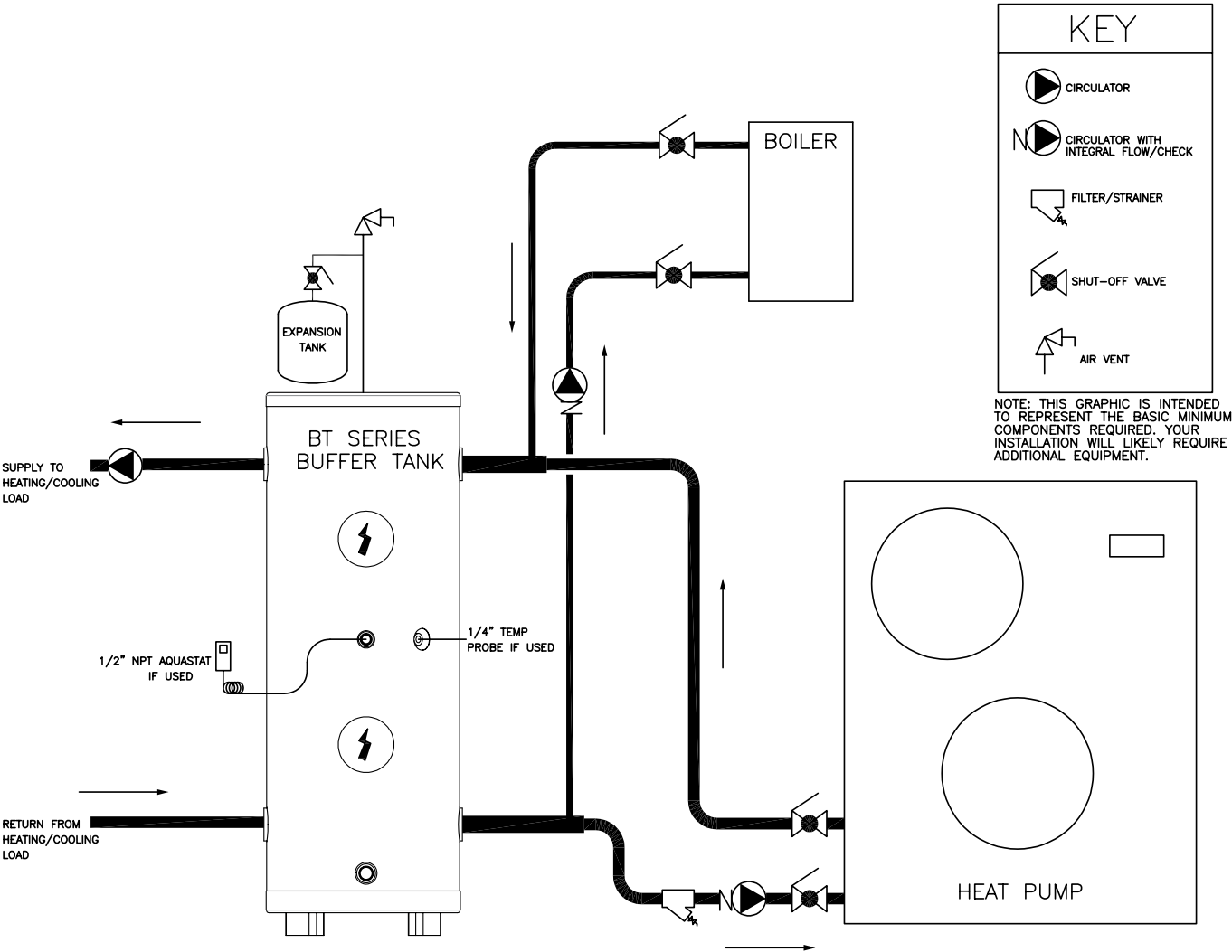
Figure 4 Field Connections



Section 5: Replacement Parts



Section 6: Piping Diagrams



FOUR PIPE BUFFER TANK CONNECTION

Section 7: Limited Warranty

SpacePak Buffer Tanks

The “Manufacturer” warrants to the original owner at the original installation site that the Hydronic Buffer Tanks (the “Product”) will be free from defects in material or workmanship for a period not to exceed ten (10) years from the startup, provided the product is installed in accordance with the manufacturers installation instructions. 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.

The following items apply to each Limited Warranty offered by SpacePak.

- 4) **NO LABOR.** Each Limited Warranty offered by SpacePak does NOT include labor or any other costs incurred for service, maintenance, repair, removing, replacing, installing, complying with local building and electric codes, shipping or handling, or replacement of the System/Products, compressors or any other parts. For items that are designed to be maintained or replaced by the original owner, the original owner is solely responsible for all labor and other costs of maintaining, installing, replacing, disconnecting or dismantling the System/ Products and parts in connection with owner-required maintenance. Please consult the applicable technical documentation for regularly suggested maintenance procedures.
- 5) **PROPER INSTALLATION.** This Limited Warranty applies only to Systems/Products that are sold by SpacePak HVAC representatives, installed by contractors who are licensed for HVAC installation under applicable local and state law, and who install the Systems/Products in accordance with (i) all applicable building codes and permits; (ii) SpacePak’s installation and operation instructions; and (iii) good trade practices.
- 6) **BEFORE REQUESTING SERVICE,** please review the applicable technical documentation to insure proper installation and correct customer control adjustment for the System/Products. If the problem persists, please arrange for warranty service.
 - a. **TO OBTAIN WARRANTY SERVICE:**
 - i. Contact the licensed contractor who installed the System/Products or the nearest licensed contractor, dealer, or distributor (whose name and address may be obtained on our website at www.SpacePak.com) of any defect within the applicable warranty time period.
 - ii. Proof of the installation date by a licensed contractor is required when requesting warranty service. Present the sales receipt, building permit or other document which establishes proof and date of installation. In the absence of acceptable proof, this Limited Warranty shall be deemed to begin one hundred twenty (120) days after the date of manufacture stamped on the System/Products.
 - iii. This Limited Warranty applies only to System/Products purchased on or after February 1, 2021 only while the System/Products remains at the site of the original installation, and only to locations within the continental United States, Alaska, Hawaii and Canada.
 - iv. 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. Determination, in the reasonable opinion of the Manufacturer, that there exists a defect in material or workmanship.
 - b. **THIS LIMITED WARRANTY DOES NOT COVER:** property damages, malfunction or failure of the System/ Products, or personal injury caused by or resulting from: (a) accident, abuse, negligence or misuse; (b) operating the System/Products in a corrosive or wet environment, including those containing chlorine, fluorine or any other hazardous or harmful chemicals or environmental factors, including sea- or salt-water; (c) installation, alteration, repair or service by anyone other than a licensed contractor or other than pursuant to the manufacturer’s instructions; (d) improper matching of System/Products components; (e) improper sizing of the System/Products; (f) improper or deferred maintenance contrary to the manufacturer’s instructions; (g) physical abuse to or misuse of the System/Products (including failure to perform any maintenance as described in the Operation manual, or any System/ Products damaged by excessive physical or electrical stress; (h) System/Products that have had a serial number or any part thereof altered, defaced or removed; (i) System/Products used in any manner contrary to the Operation Manual; (j) freight damage; or (k) events of force majeure or damage caused by other external factors such as lightning, power surges, fluctuations in or interruptions of electrical power, rodents, vermin, insects, or other animal- or pest-related issues.
 - c. **THIS LIMITED WARRANTY ALSO EXCLUDES:** (a) SERVICE CALLS WHERE NO DEFECT IN THE SYSTEM/ PRODUCTS COVERED UNDER THIS WARRANTY IS FOUND; (b) System/Products installation or set-ups; (c) Adjustments of user controls; (d) System/Products purchased or installed outside the continental United States, Alaska, Hawaii and Canada; or (e) System/Products purchased or installed prior to **February 1, 2021**. Consult the operating instructions for information regarding user controls.



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