EarthLinked®

STORAGE WATER HEATER
MODELS GSTE-60, GSTE-80 & GSTE-119

Installation, Operation & Maintenance Manual

Disclaimer

The EarthLinked® Storage Water Heater is sold as a component part of an EarthLinked® Space Heating and Cooling System or an EarthLinked® Commercial Water Heating System. It must be properly sized, matched and installed with other system components to provide the intended performance and safe operation of the system. This component must be installed by an authorized, trained technician who has successfully completed the ETI training class and passed the final examination.

Installation must be made in accordance with this manual and the installation manual for the appropriate system noted above. Failure to provide installation by an authorized, trained installer in a manner consistent with the appropriate manuals will nullify the limited warranty coverage for the system.

Earthlinked Technologies shall not be liable for any defect, unsatisfactory performance, damage or loss, whether direct or consequential, relative to the design, manufacture, construction, application or installation of field specified components.

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1. General Description of Applications

The GSTE-60, GSTE-80 and GSTE-119 Storage Water Heaters are applied to the following EarthLinked® systems. Installation instructions for each of these applications follow.

- **Earthlinked® Commercial Water Heating Applications** providing heated **potable water** from the compressor unit and delivered to a storage water heater, where reserve electric heating is required if the compressor unit is out of service. The electric heat would be activated manually at the breaker if the compressor unit is taken off line. This application is detailed in Section 2.

- **EarthLinked® Domestic Water Heating Applications utilizing the Domestic Water Module (DWM)** providing heated **potable water** from the DWM and delivered to a storage water heater, where reserve electric heating element is required if the compressor unit is out of service. The electric heat would be activated manually at the breaker if the compressor unit is taken off line. This application is detailed in Section 3.

- **EarthLinked® Desuperheater Water Heating Applications utilizing the SD Compressor Unit** (equipped with a desuperheater) or the **Model DSH-1872 Desuperheater Kit applied to an SC or SW compressor unit** providing heated **potable water** to supplement the standard electric storage water heater. In this application, the desuperheater operates to heat water when the EarthLinked® Heating and Cooling System is operating in cooling mode. The desuperheater functions to supplement, but not replace, the water being heated by the standard storage water heater. This application is detailed in Section 4.

- **EarthLinked® Hydronic Heating and Chilled water Cooling Applications utilizing the Hydronic Water Module (HWM)** providing heated **hydronic water solution** from the HWM and delivered to the storage water heater (the primary circuit) where an electric heating element supplements the heating of the hydronic water solution as a function of outdoor temperature, controlled by an outdoor thermostat. This application is detailed in Section 5.

IMPORTANT!

Read the manufacturer's instructions concerning the proper installation of the Model GSTE Storage Water Heater in Section 7 before installing in the Earthlinked® systems described above. Installation must be consistent with all applicable codes and regulations.

The EarthLinked® Model GSTE Storage Water Heater description appears in Figure 1. In addition to the storage water heater, temperature control Model HHK-1872 is required for commercial water heating, domestic water heating and radiant panel hydronic heating applications; and the temperature control Model CWK-1872 is required for chilled water cooling applications.

EarthLinked® Storage Water Heater List Price

DESCRIPTION

EarthLinked® 60, 80 and 119 gallon storage water heaters are designed for applications where water storage plus supplementary electric heat are required. These are approved for potable water and hydronic water solutions.

The insulated, glass-lined tank contains a 4500 watt element to provide electric heat backup in (1) hydronic systems (SCW,HCW,HWW compressor units or hydronic water module, HWM), (2) domestic water heating (DWM) systems, (3) commercial service water heating (CWH) or (4) operate as the storage water heater in systems containing an EarthLinked® desuperheater.

The hydronic heat temperature control kit, Model HHK-1872, is an immersion control ordered separately and required for commercial water heating, domestic water heating and radiant panel hydronic heating applications. The kit is complete and includes the temperature control, immersion well and conductive heat compound.

The chilled water temperature control kit, Model CWK-1872, is an immersion control ordered separately and required for chilled water cooling applications. The kit is complete and includes the temperature control, immersion well and conductive heat compound. A 3/4" x 1/2" reducing bushing is required.

MODEL	STORAGE, US GAL.	GEO CONN., NPT	DESUPER CONN., NPT	HOT/COLD CONN., NPT	DIMENSIONS, INCHES							SHIPPING WT., LBS.
					A	B	C	D	E	F	G	
60GSTE	60	1½"	1"	1"	22	60	52¼	53	29¼	17	4¼	235
80GSTE	80	1½"	1"	1"	24	62¾	56	57	30¼	18	5¼	252
119GSTE	119	1½"	1"	1"	29	64	56½	57¾	32½	15	7½	382

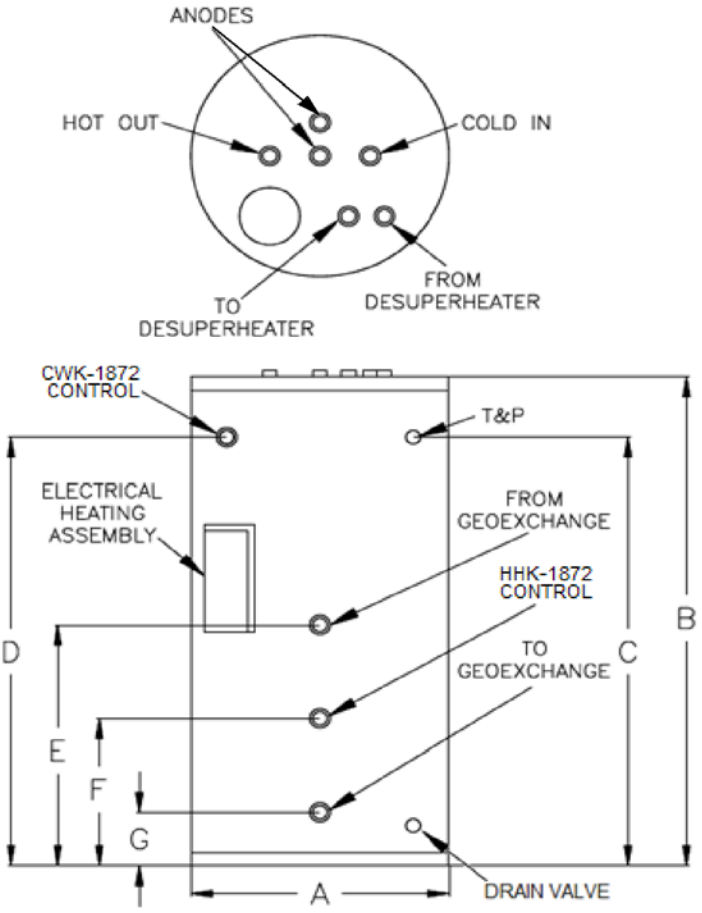

Figure 1. GSTE Storage Water Heater Description

2. EarthLinked® Commercial Water Heating Applications

Figure 2a illustrates a typical installation of a GSTE storage water heater with a commercial water heating compressor unit. Location of the tank from the compressor unit is to be no more than 10 ft. apart. Water piping and connections between the compressor unit and tank are all 1-1/2" Type L copper. Hot water supply to the system is out the top of the tank as shown. Details for the ports and connections on top of the tank are shown in Figure 2b. The electrical field wiring for the HHK-1872 temperature controller and the storage water heater electric element and thermostat are illustrated in Figure 2c.

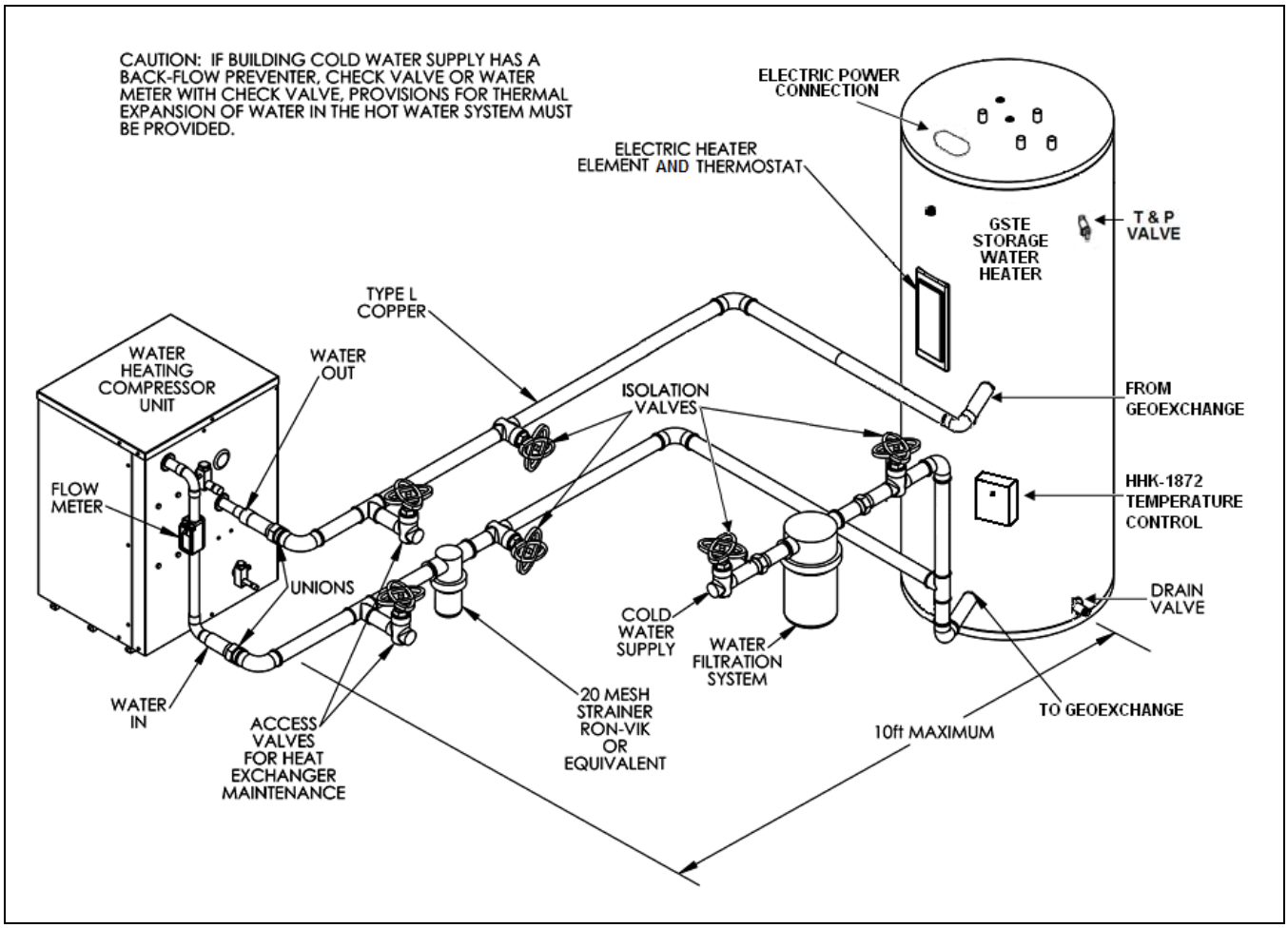

Figure 2a. Commercial Water Heating Application

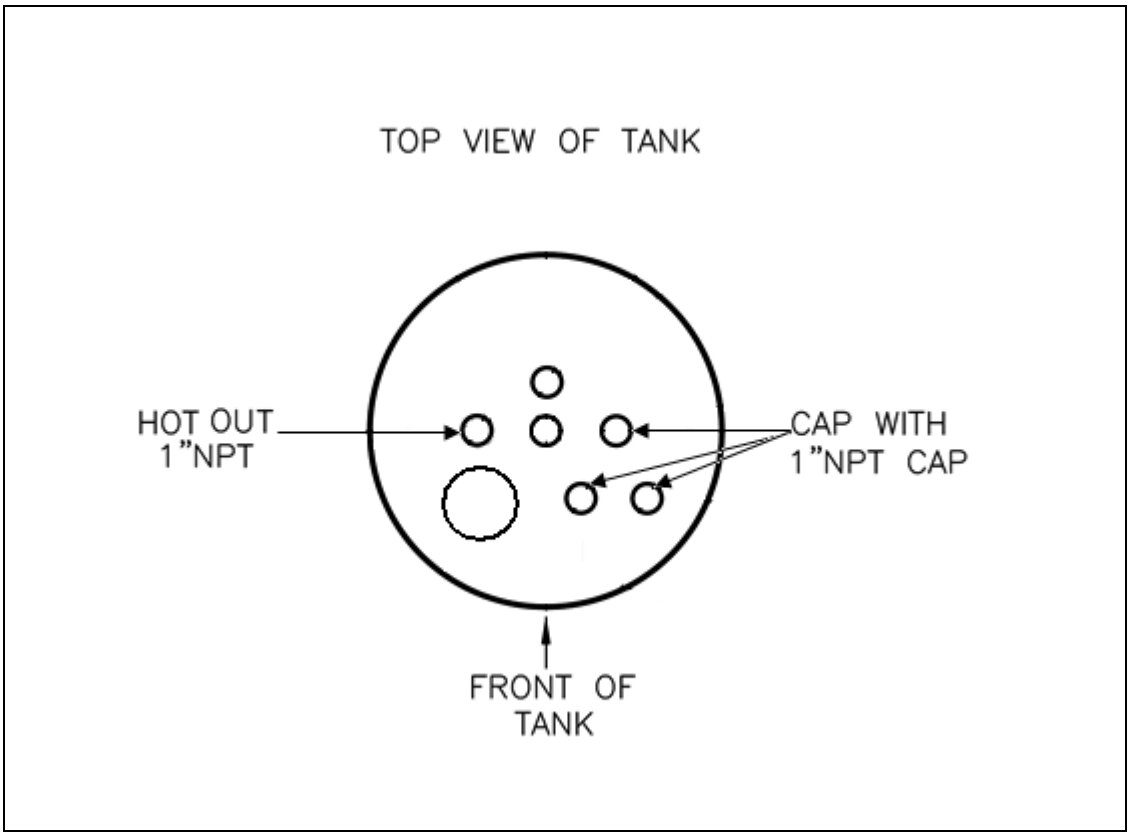

Figure 2b. Top of Tank Connections – CWH

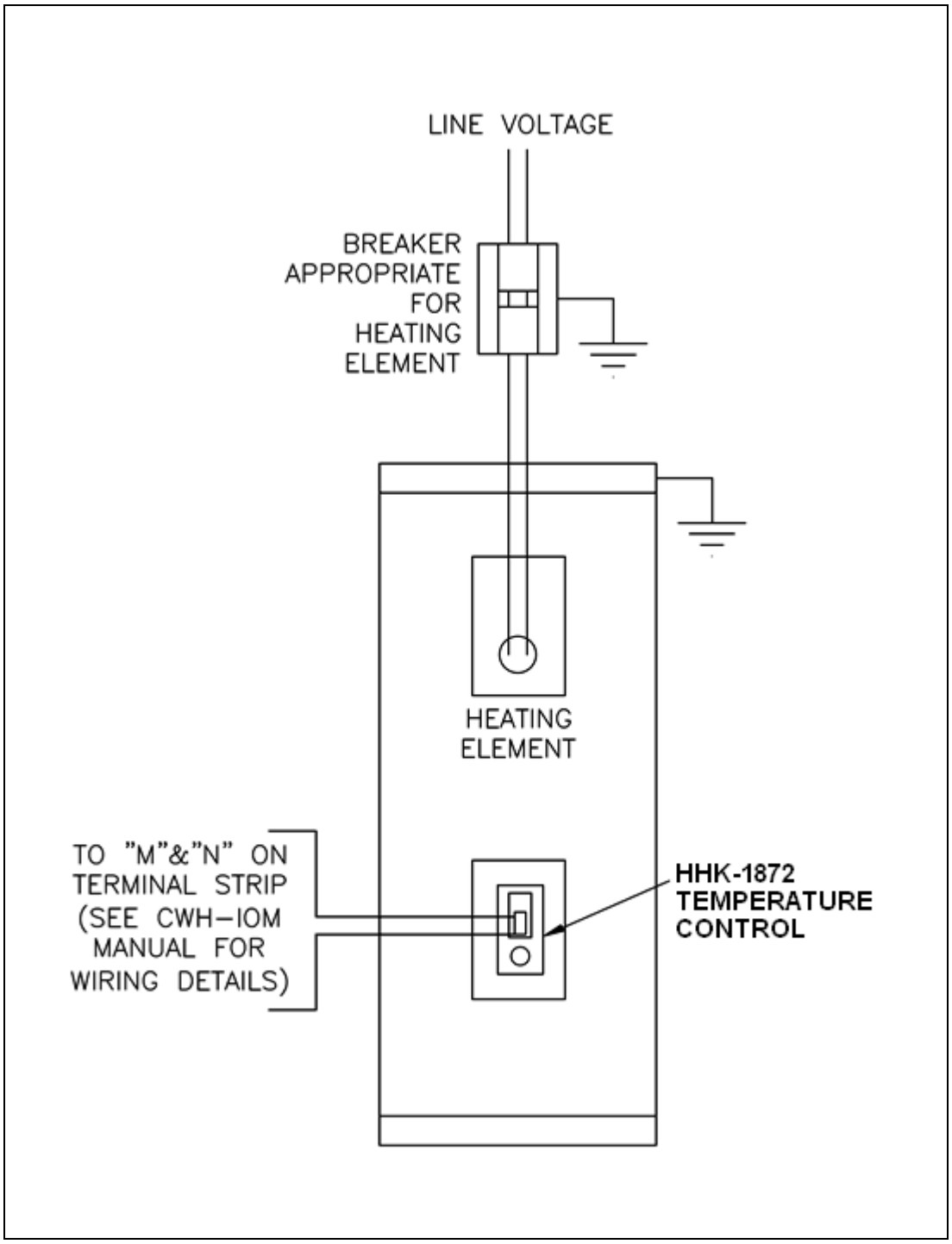

Figure 2c. Electrical Field Wiring – CWH

3. EarthLinked® Domestic Water Heating (DWM) Applications

Figure 3a illustrates the installation of GSTE storage water heater with a Domestic Water Module for a residential heating application. Location of the GSTE storage water heater from the DWM is to be no more than 10 ft. apart. Water piping and connections between the compressor unit and tank are all 1-1/2” Type L copper for the models DWM-4248 and DWM-6072**.** Piping and connections are 1” Type L copper for model DWM-1836. Detail for the ports and connections on top of the storage water heater are shown in Figure 3b. The electrical field wiring for the electric heater element and thermostat are illustrated in Figure 3c.

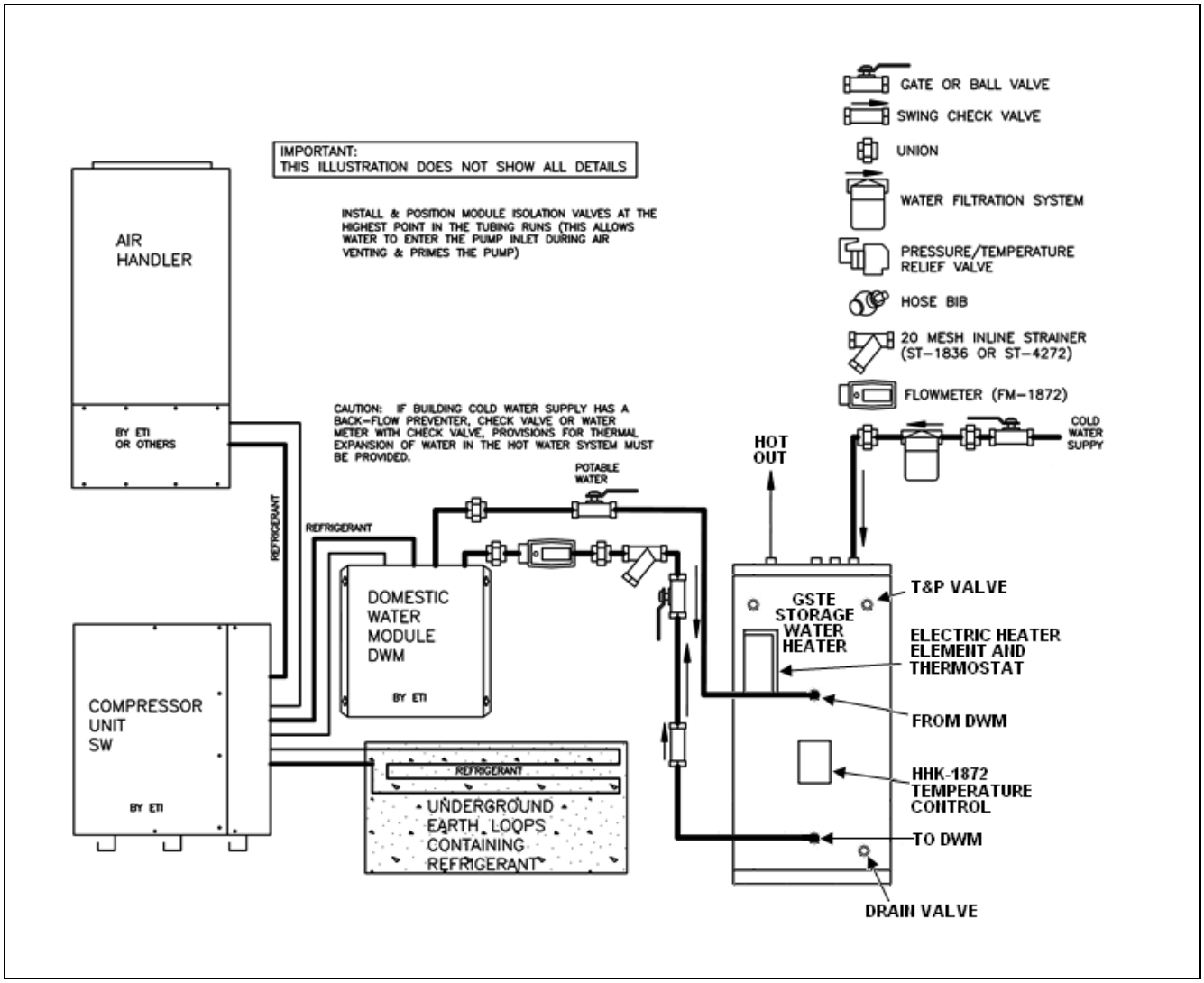

Figure 3a. Domestic (DWM) Water Heating Application

IMPORTANT!

The electric heater element and thermostat are for emergency backup only. Not to be activated when domestic water module (DWM) is supplying heated water.

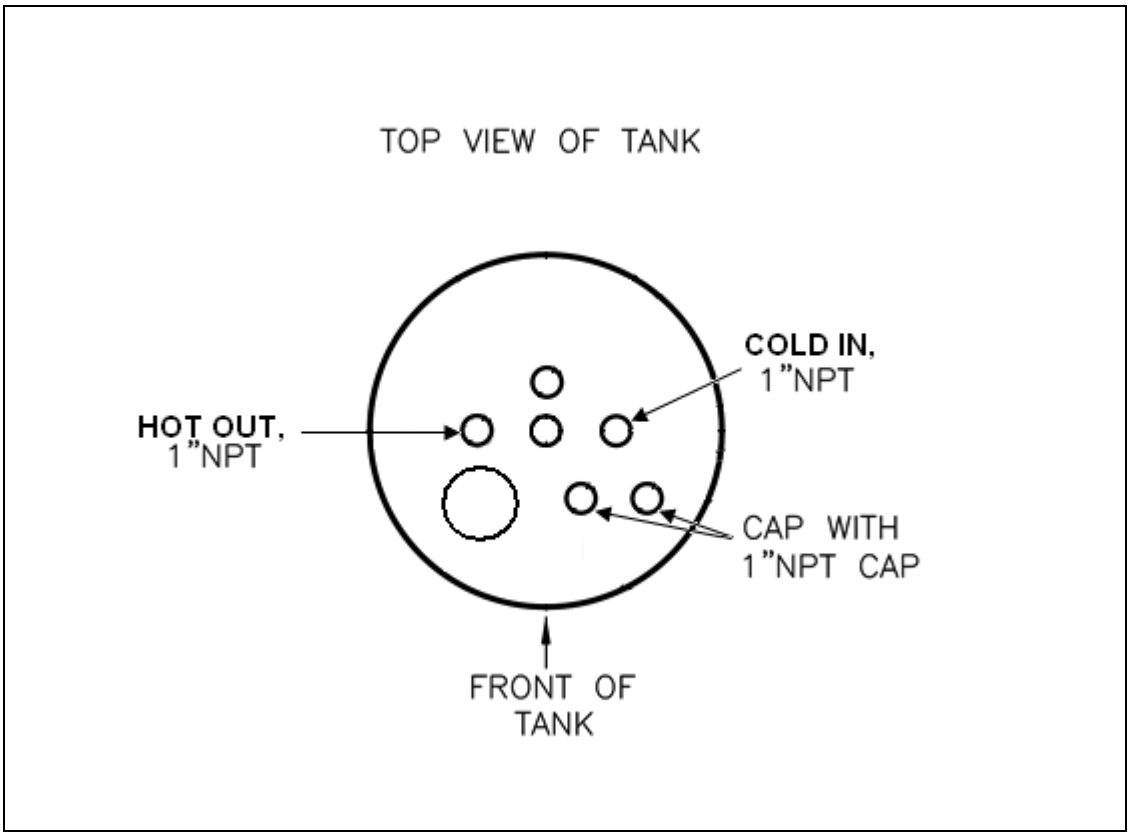

Figure 3b. Top of Tank Connections – DWM

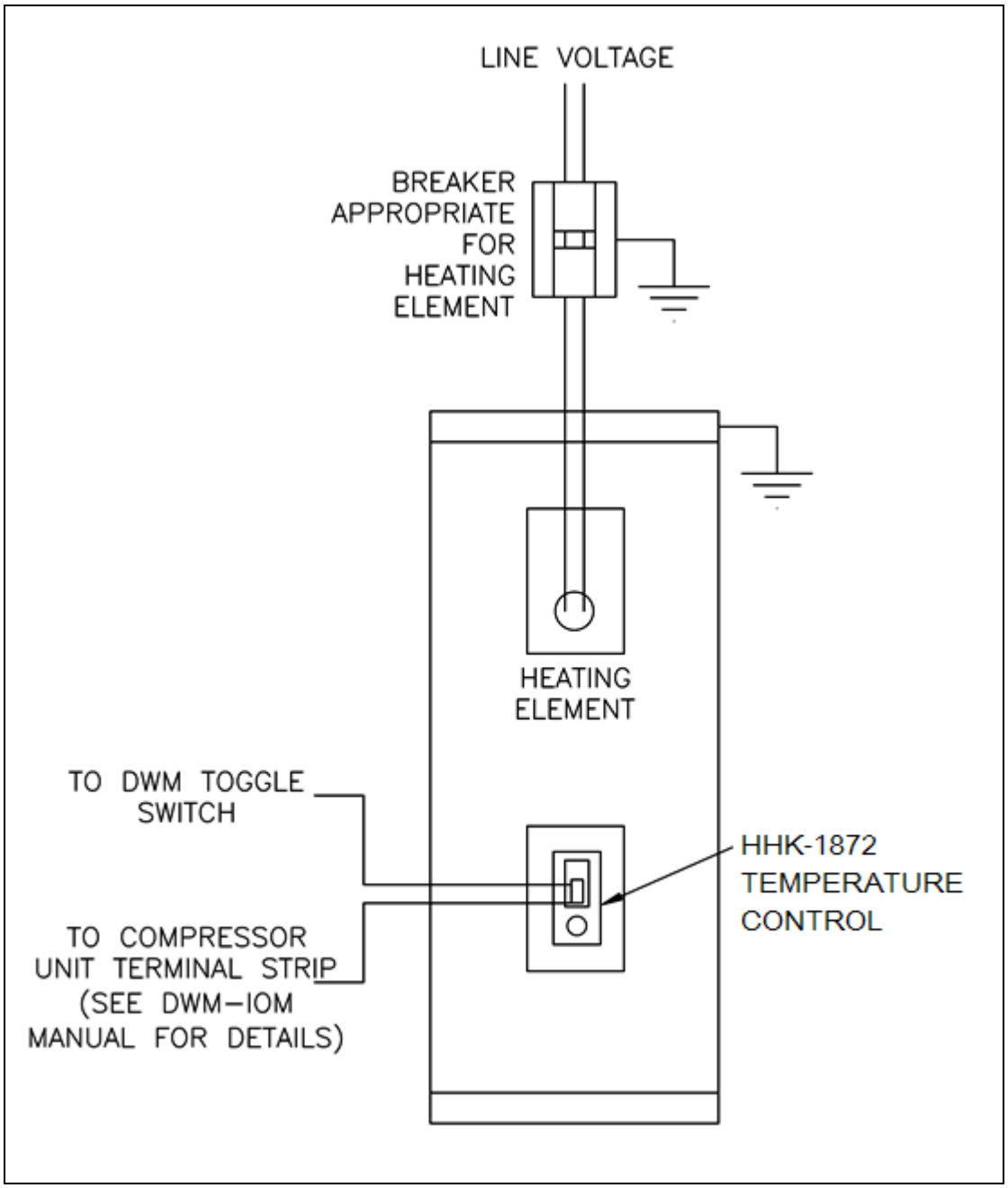

Figure 3c. Electrical Field Wiring – DWM

IMPORTANT!

The electric heater element and thermostat are for emergency backup only. Not to be activated when domestic water module (DWM) is supplying heated water.

4. EarthLinked® Desuperheater Water Heating Applications

Figure 4a illustrates the installation of a GSTE storage water heater with a Desuperheater supplementing the hot water heating function. Although the desuperheater in Figure 4a is shown as a separate unit, (as Desuperheater Kit Model DSH-1872 applied to SC and SW compressor units) the installation instructions apply to the SD compressor unit also.(The SD incorporates the desuperheater within the compressor unit cabinet). Location of the water heater from the Desuperheater (or the SD compressor unit) is to be no more than 10 ft. apart. Water piping connections between the Desuperheater (or SD compressor unit) and the water heater are ½" Type L copper. Details for the ports and connections on top of the water heater are shown in Figure 4b. The electrical field wiring for the electric heating element and thermostat are illustrated in Figure 4c.

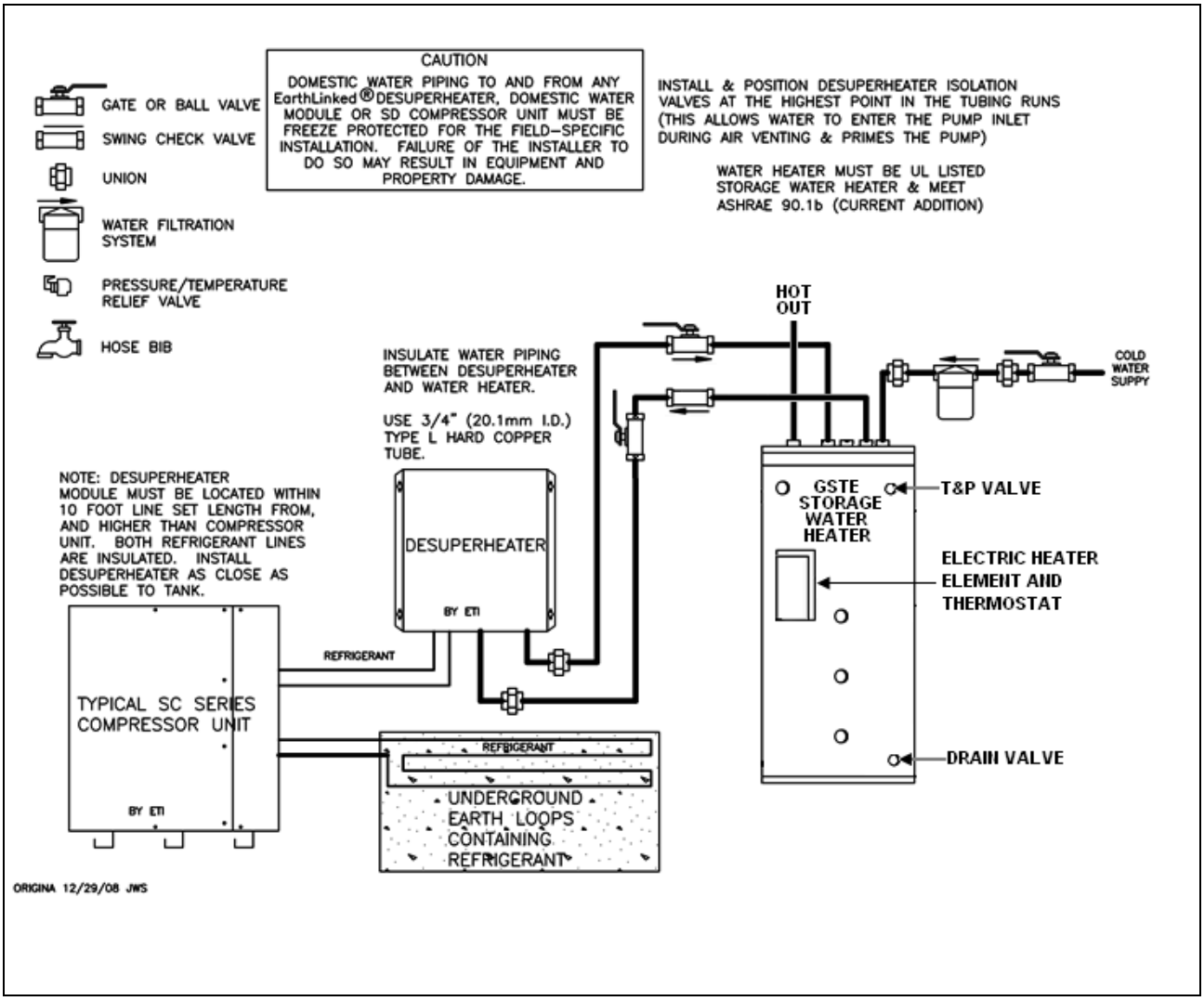

Figure 4a. Desuperheater Water Heating Application

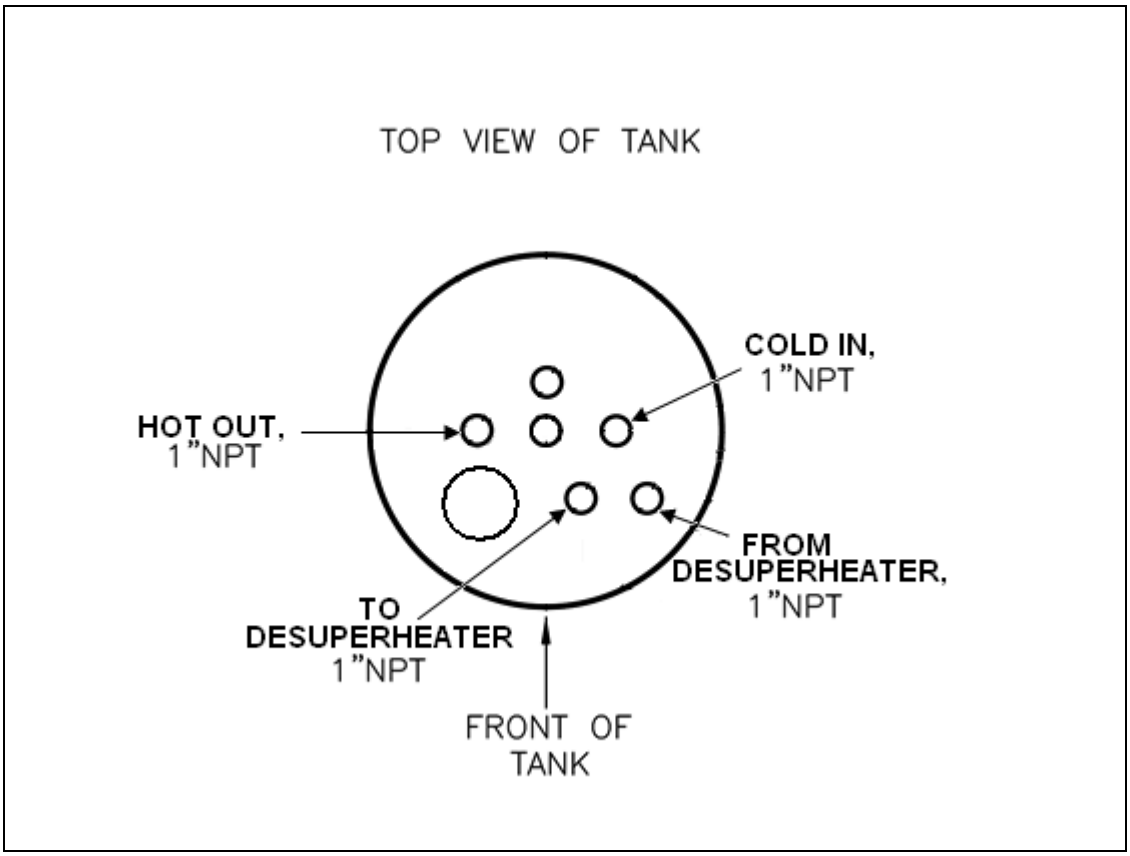

Figure 4b. Top of Tank Connections – Desuperheater

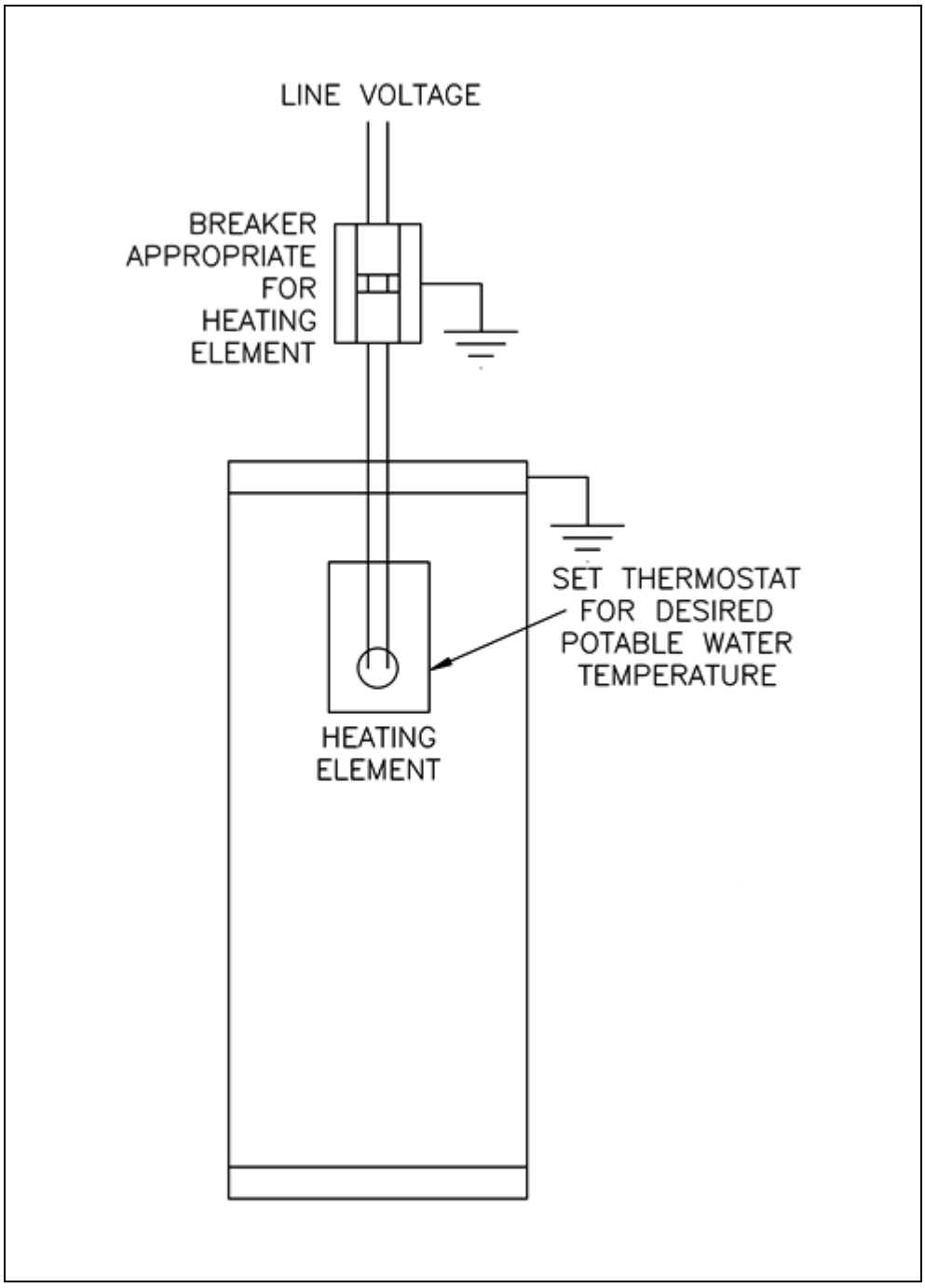

Figure 4c. Electrical Field Wiring – Desuperheater

5. EarthLinked® Hydronic Heating and Chilled Water Cooling (HWM) Applications

Hydronic Heating Only:

Figure 5a illustrates the installation of a GSTE storage water heater with the Hydronic Water Module (HWM) providing heated water (only) to a hydronic system. Location of the storage water heater from the HWM is to be no more than 10 ft. apart. Water piping and fittings between the HWM and the storage water heater are to be 1" Type L copper for model HWM-1836, and 1-1/2" Type L copper for models HWM-4248 and HWM-6072. Detail for the ports and connections on top of the tank are illustrated in Figure 5b. The electrical field wiring for the HHK-1872 temperature controller and the electric heater element and thermostat are illustrated in Figure 5c.

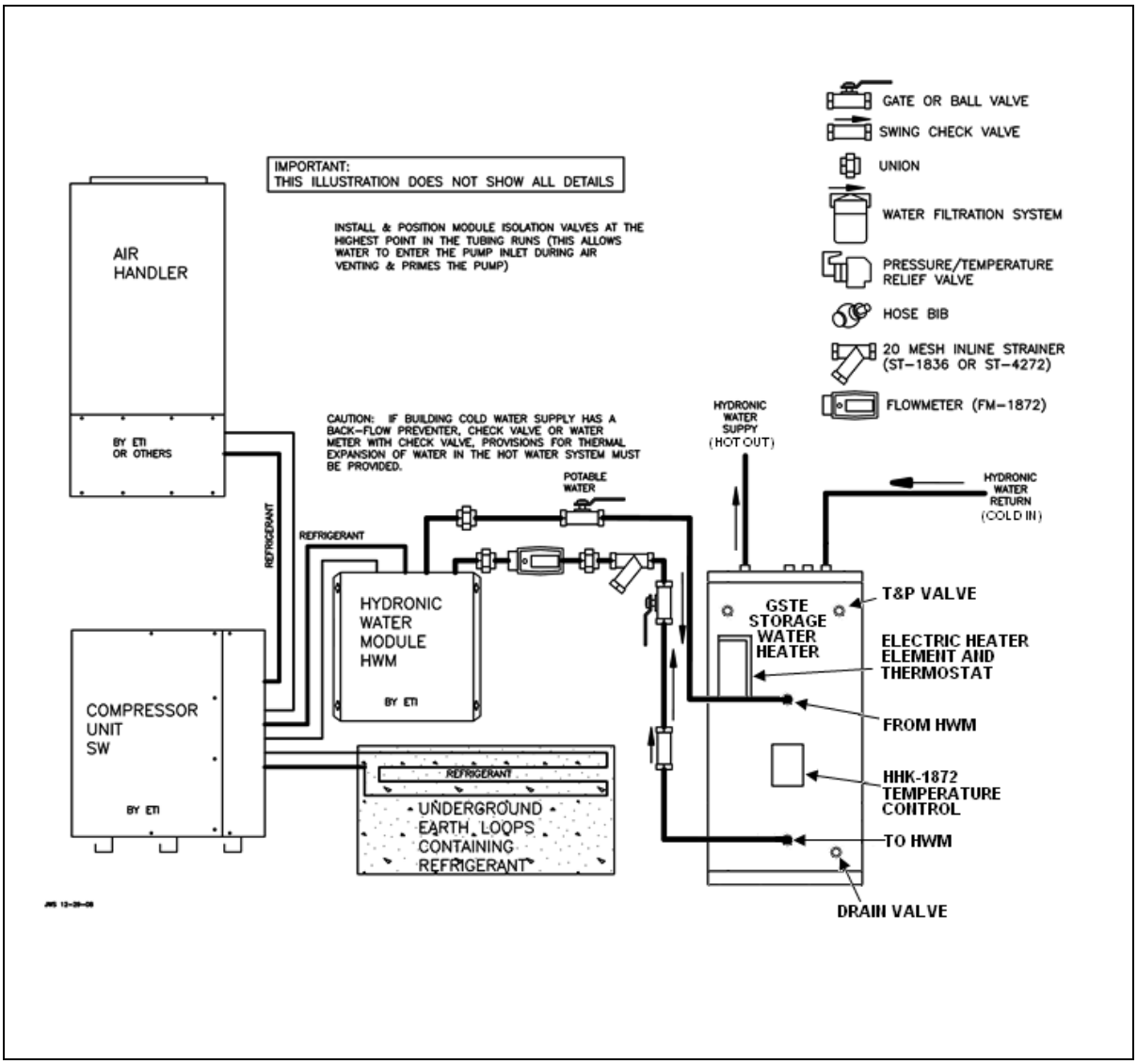

Figure 5a. Hydronic Heating (HWM) Application

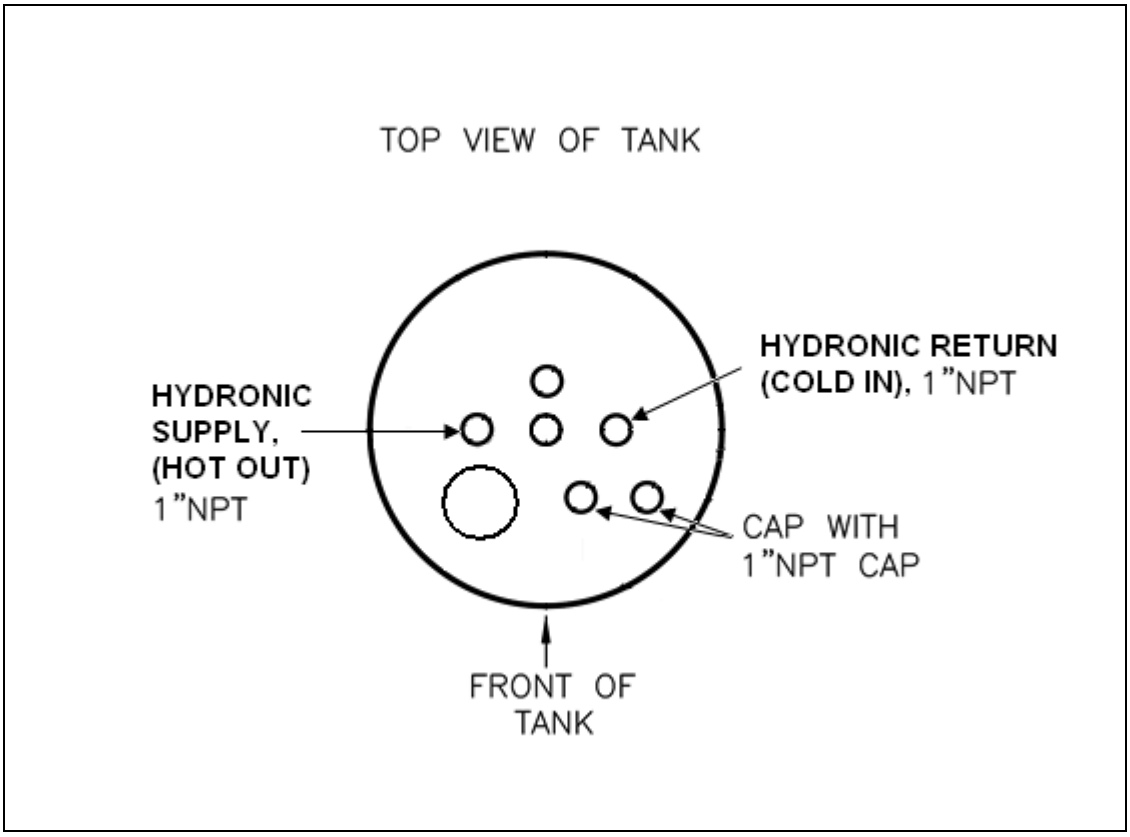

Figure 5b. Top of Tank – Hydronic Heating (HWM)

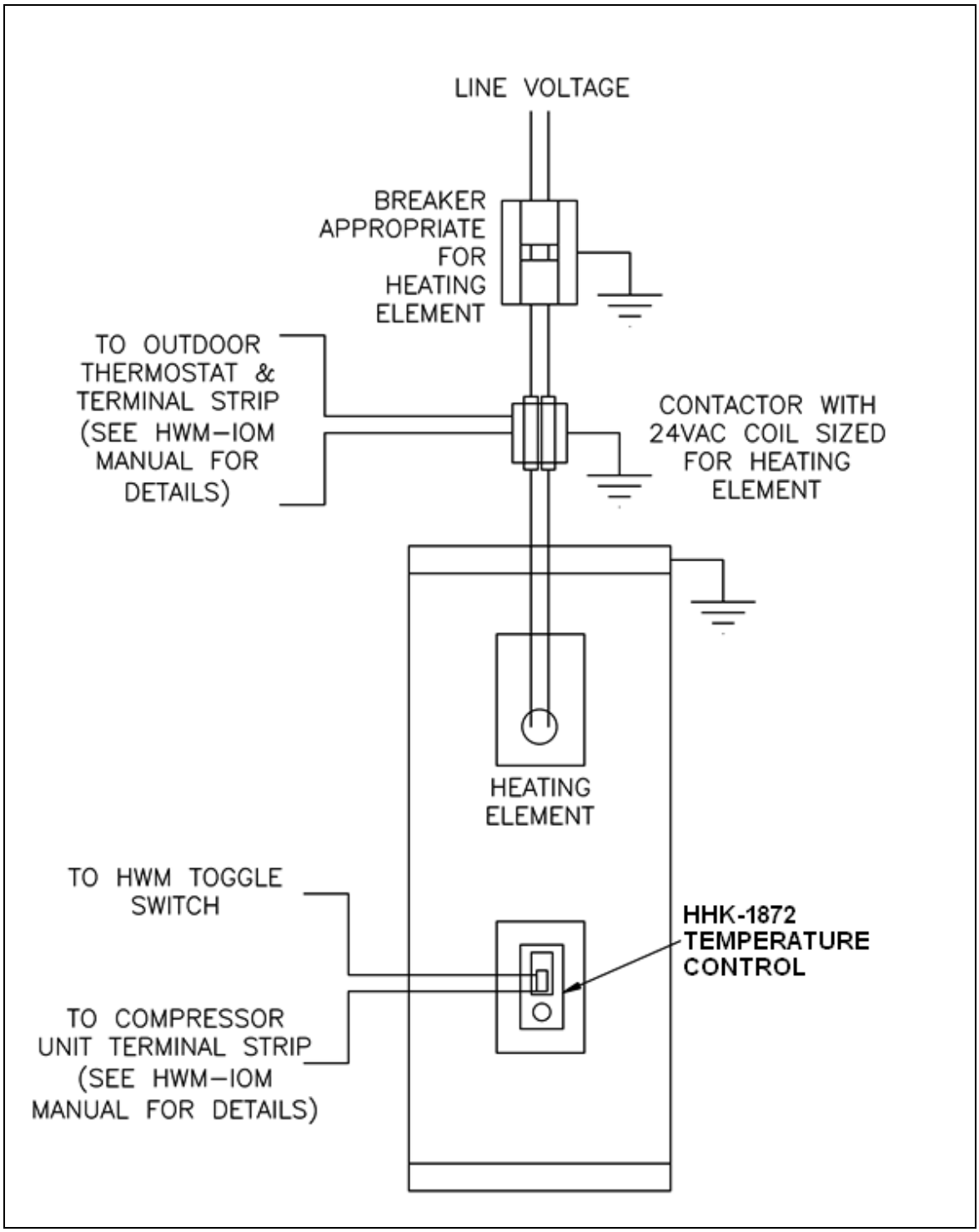

Figure 5c. Electrical Field Wiring – Hydronic Heating (HWM)

Hydronic Heating and Chilled Water Cooling:

Figure 5d illustrates the installation of a GSTE storage water heater with the Hydronic Water Module (HWM) to provide hydronic heating and chilled water cooling. Location of the storage water heater from the HWM is to be no more than 10 Ft apart. Water piping and fittings

between the HWM and the storage water heater are to be 1” Type L copper for model HWM-1836, and 1-1/2” Type L copper for models HWM-4248 and HWM-6072.

Detail for the ports and connections on top of the tank are illustrated in Figure 5e.

The electrical field wiring for the HHK-1872 temperature controller, the electric heating element and thermostat, and the CWK-1872 temperature controller is illustrated in Figure 5f.

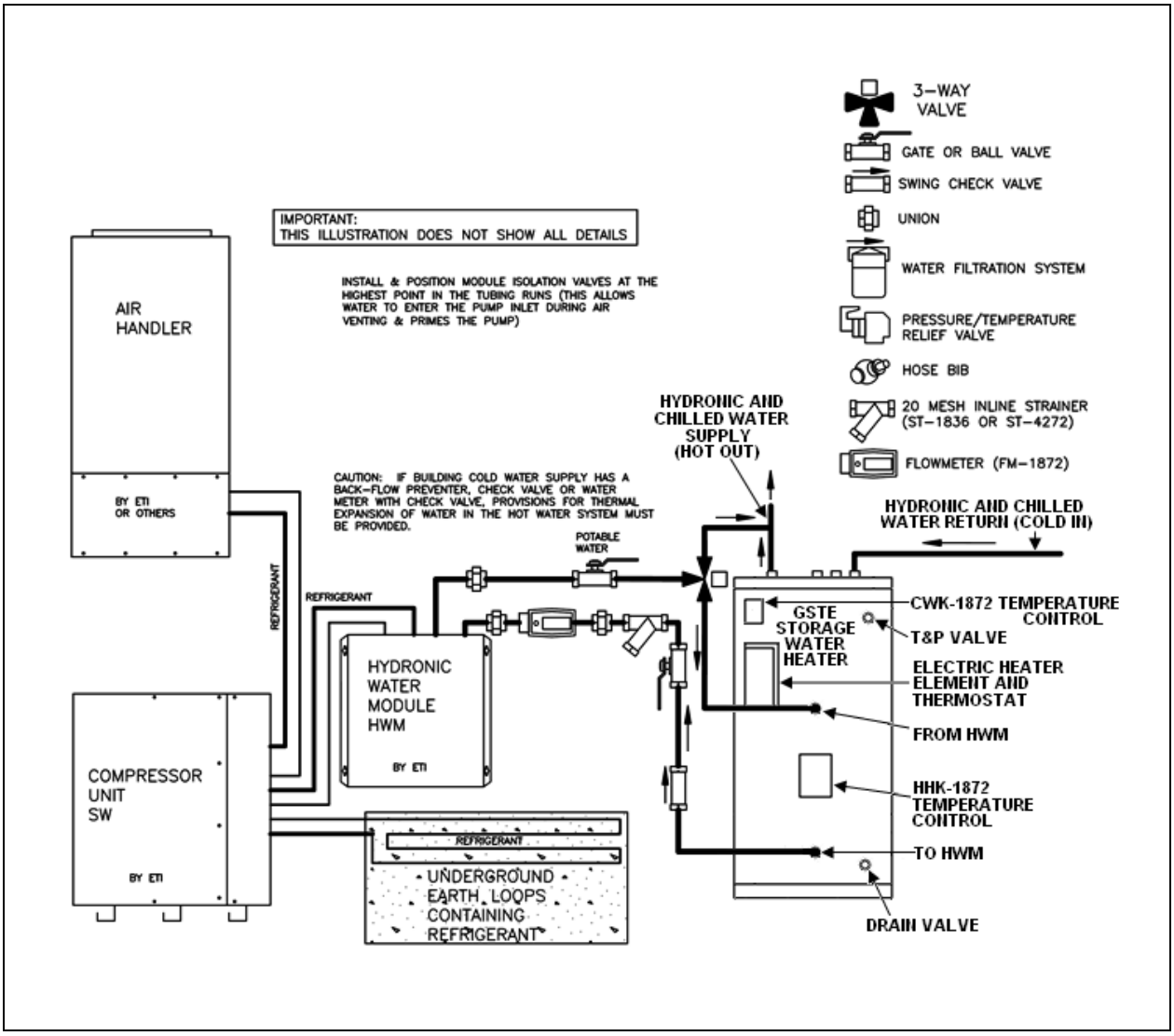

Figure 5d. Hydronic Heating and Chilled Water Cooling (HWM) Application

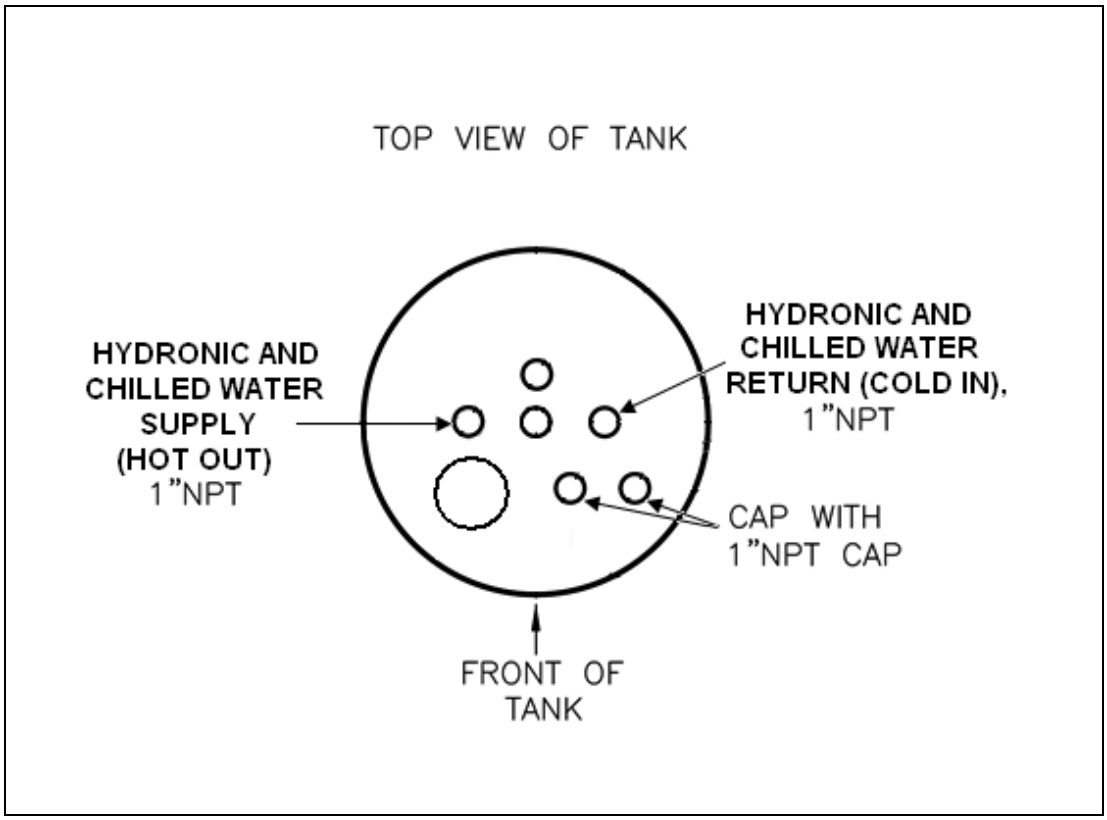

Figure 5e. Top of Tank Connections – Hydronic Heating and Chilled Water Cooling (HWM)

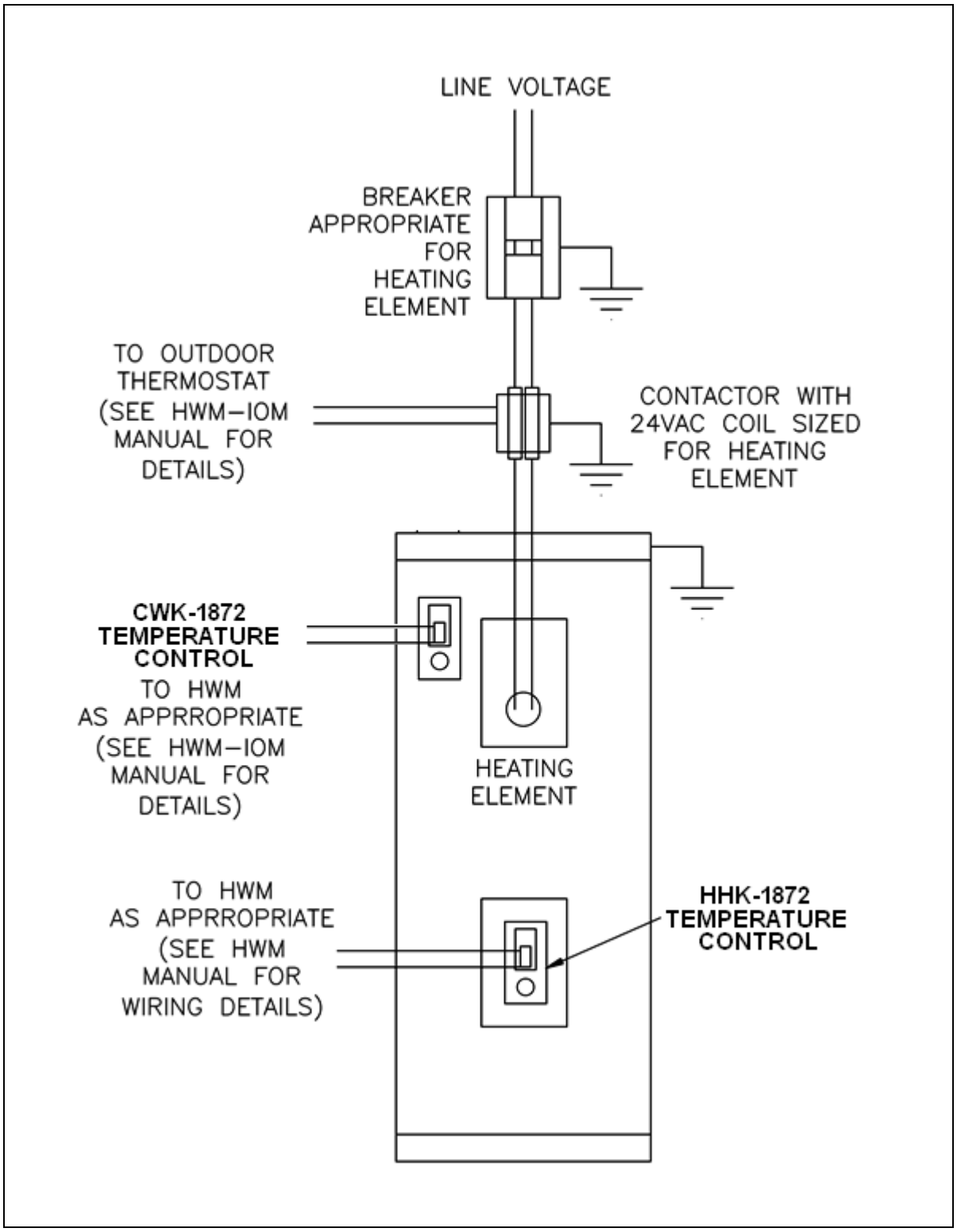

Figure 5f. Electrical Field Wiring – Hydronic Heating and Chilled Water Cooling (HWM)

6. Operation

The GSTE storage water heater operates in conjunction with the other components of the EarthLinked® system. Entire system operational functions are detailed in EarthLinked® system manuals. The following operational functions pertain only to the storage water heater.

HHK-1872 Temperature Control Setting

The temperature control setting on the storage water tank/heater, ETI Model HHK-1872, is set at the time of start-up. For optimum **Commercial Water Heating (CWH)** system performance, the temperature control setting should be limited to a **maximum water temperature rise through the compressor unit of 60F.** The following lists the maximum temperature control set points, based on the cold water supply temperature:

Cold Water Supply Temperature, °F	Max. Temperature Control Set Point, °F
55 and above	110
45	105
40	100

Freeze Protection

In the event that the compressor unit and GSTE storage water heater system is to be shut down for extended periods of time with surrounding air temperature below 32°F, the system is to be drained of water, to prevent freezing damage to the compressor unit, storage water heater and other interconnected piping components.

Hydronic Heating and Chilled Water Cooling Systems

When the GSTE storage water heater is applied to hydronic systems and anti-freeze solution is utilized, ETI recommends the preferred use of propylene glycol (non-toxic) in the appropriate mixture percentage with water. Ethylene glycol solution is also an acceptable anti-freeze.

GSTE as Booster Heater

When the GSTE storage water heater is applied as a booster heater in tandem with a storage water tank (which stores water at 110F maximum) for the purpose of raising the water temperature, the thermostat controlling the electric heating element can be adjusted to the appropriate water temperature utilizing the following thermostat markings:

Thermostat Marking	Temperature, °F
Minimum	110
HOT	120
A	130
B	140
C	150
VERY HOT	160

7. Maintenance

The following schedule covers the items that require regular checking and maintenance on the GSTE storage water heater. The details for each item follow the maintenance schedule.

Maintenance Schedule

Every 6 Months (First Year Only)
Check Anode Rod(s)

Every 12 Months
Check Anode Rod(s)
Flush Tank
T&P Valve

Check Anode Rod(s) – First Year

The anode rods should be inspected twice the first year. The first time check the anode rods is six months after the heater is installed.

The anode rod is a 3/4" diameter magnesium rod that "sacrifices itself" to control corrosion. If an anode rod has reduced in size to 1/4" diameter or shows signs of pitting it is time for replacement. To check the anode rod, follow these steps:

- Turn OFF the electric power.
- Shut OFF the water supply by means of the main cold water supply isolation valve.
- Open a drain valve in the piping illustration long enough to relieve the tank pressure and drain water, as appropriate, to lower water level below top of tank.
- Remove caps on top of the storage tank.
- Use a 1-1/16" six-sided socket wrench and breaker bar. Snap hard to break the anode rod seal.
- Remove rod(s), inspect and replace with new rod(s) as necessary. (An anti-sieze pipe sealant is recommended, teflon tape is acceptable). Replacement anode rods are specified in the storage water tank and storage water heater literature that came with the tank or heater. The anode rods can be ordered through the local Bock dealer listed at www.bockwaterheaters.com
- Tighten the anode rod nut(s) and snap the caps into place.
- Be sure all drain valves are closed, turn on the main cold water supply isolation valve and purge the air from the tank and associated piping, as appropriate.
- Turn ON the electric power and initiate normal unit operation.

Check Anode Rod(s) – After First Year

- Repeat the inspection and maintenance as required on a once-a-year basis after the first year, unless necessary to inspect more often.

Flush Tank

- Turn OFF electric power.
- Close the isolation valves between the GSTE storage water heater and other EarthLinked® system components.
- Close the main cold water supply isolation valve to the storage water tank/heater.
- Open a faucet downstream of the hot water outlet on the storage water heater.
- After connecting the storage water heater drain valve to a drain hose, open the drain valve and drain the entire tank of water to an open drain.
- Close tank drain valve.
- Open the main cold water inlet valve and fill the storage water heater with clean water until it is approximately 25% full.
- Turn off the main cold water supply isolation valve, open storage water heater drain valve, and observe the water coming out the drain valve going into the drain.
- Continue to flush the tank as noted above until the water coming out the drain valve is clear and free of sediment.
- Close the drain valve and the faucet.
- Open the main cold water supply valve and fill the storage water heater and piping system with water.
- Open the isolation valves between EarthLinked® system components and the storage water heater and purge air from system.
- Turn ON electric power and initiate normal system operation.

T&P Valve

Check the GSTE T&P Valve for proper operation by doing the following:

- Turn OFF electric power.
- Attach a drain hose to the valve, with water discharge directed to an open drain.
- Lift the lever at the end of the valve several times.
- The valve should operate freely and return to its original position properly.
- If water does not flow out of valve, close main cold water supply isolation valve to the system, and close isolation valves between EarthLinked® system components and the storage water heater, and lower the water level to below the T&P valve.
- Remove valve and inspect for corrosion or obstructions.
- Replace with new valve if necessary. DO NOT REPAIR AND INSTALL THE FAULTY VALVE.
- Open the isolation valves between the EarthLinked® system components and the storage water heater. Open the main cold water supply to fill the system. Purge air from system.
- Turn ON electric power and initiate normal system operation.

8. Manufacturer's Instructions

The storage water heater Models 60 GSTE, 80 GSTE and 119 GSTE are manufactured and warranted by Bock Water Heaters, Inc. of Madison, Wisconsin.

Prior to installing this storage water heater, read and follow the installation instructions attached to the storage water heater tank.

For recognition purposes, the first page of the Bock Installation Instructions for the "Geo-Stor™ Geothermal Storage Tank with Electric Backup" is on the following page.

To the Installer:
Please attach these instructions next to the water heater.

To the Consumer:
Please read these and all component instructions and keep for future reference.

Geothermal Storage Tank with Electric Backup

Instruction Manual

GEO-STOR™

Warranty, Registration Card and Parts List are included.
Homeowner: Please remember to <u>return</u> the Registration Card!

⚠ WARNING
Improper installation, adjustment, alteration, service or maintenance can cause serious injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified installer or service agency.

⚠ CAUTION
The recommended temperature for normal residential use is 120°F. The dial on the aquastat does not always reflect the out-coming water temperature, which could occasionally exceed 120°F. The variation in out-coming temperature could be based on factors including but not limited to usage patterns and type of installation. Test your water at the tap nearest to the water heater.

⚠ WARNING
Hotter water increases the risk of scald injury. Before adjusting the water temperature setting, read this instruction manual. Temperatures at which injury occurs vary with the person's age and the length of exposure.

The slower reaction time of children, elderly, and physically or mentally challenged persons increases the scalding hazard to them. It is recommended that lower water temperatures be used where these exposure hazards exist. Such households may require a temperature setting less than 120°F to prevent accidental contact with hot water.

To lower water temperature use point-of-use temperature limiting devices.

⚠ WARNING
Water heater blankets are not recommended and will void the warranty.

THIS MANUAL HAS BEEN PREPARED TO ACQUAINT YOU WITH THE INSTALLATION, OPERATION, AND MAINTENANCE OF YOUR WATER HEATER AND TO PROVIDE IMPORTANT SAFETY INFORMATION.

INSTALLER RESPONSIBILITIES
Please read all instructions thoroughly before installing or placing the heater into service. This unit must be installed by licensed or authorized installers, or technical personnel that service water heating equipment. The heater must be installed in accordance with all local codes and ordinances.

These instructions are a guide for the correct installation of the water heater. The manufacturer will not be liable for damages caused by failure to comply with the installation and operating instructions outlined on the following pages.

⚠ CAUTION
The recommended water temperature setting for normal residential use is 120°F/49°C.

HANDLING
Before uncrating, check for shipping damage. Report any damage to your carrier. Note damage on bill of lading or delivery receipt and file a claim.

FAILURE TO FOLLOW THESE INSTRUCTIONS OR ALL APPLICABLE BUILDING CODES AND REGULATIONS VOIDS THE WARRANTY ON THIS WATER HEATER.

Read all instructions thoroughly before attempting installation or operation of your water heater. Keep these instructions for future reference.

Local plumbing and electrical codes must be followed in the installation of this water heater. In the absence of a local code use the UNIFORM PLUMBING CODE and the NFPA Code. Local codes may supersede instructions in this installation manual.

These instructions are a guide for the correct installation of the water heater. The manufacturer will not be liable for damages caused by failure to comply with the installation and operating instructions outlined on the following pages.