

Therma-Stor II-6

Installation Instructions

Read and Save These Instructions

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Serial No. _____

Purchase Date _____

Customer Name _____

1. Introduction

The Therma-Stor II-6 is an insulated water storage tank and refrigerant heat recovery device.

Therma-Stor Heat Recovery Water Heaters are intended for inside installation unless an adequate cover is installed to protect the unit from external moisture. Failure to adequately protect the unit from external moisture will result in premature condenser plate failure and void the warranty.

2. Choosing The Location For The Therma-Stor II-6

The location for the Therma-Stor II-6 should be chosen carefully. The following guidelines must be observed.

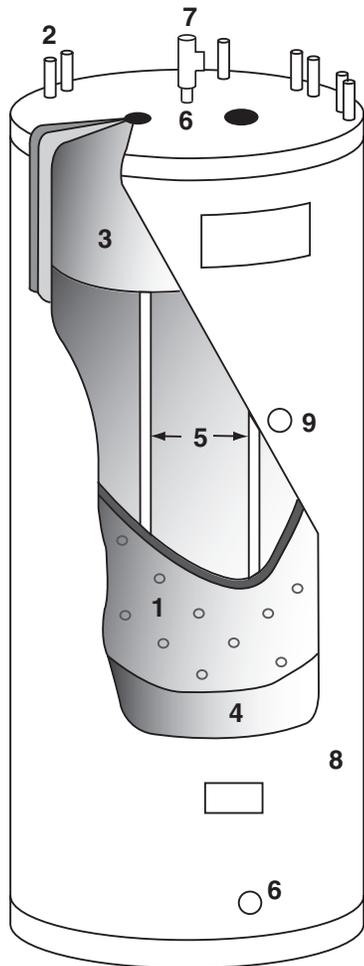
1. The Therma-Stor II-6 should be in a clean dry place as close as possible to the compressors to minimize the refrigerant line lengths.
2. It should be located with adequate clearance for ease of installation and service.
3. It must be in an area that is protected from freezing.
4. It should be located where water would not damage the surroundings or critical areas of the building if a fitting leaks. If a pitched floor to an open drain is not available, a catch pan should be constructed. See Figure 1.
5. Therma-Stor units must not be located where flammable liquids are stored or where combustible vapors might be ignited by the arc drawn inside the thermostat when it cycles if one is used.

CAUTION

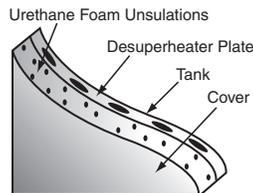
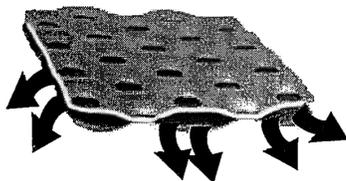
Caution: Failure to properly install the discharge line from the safety relief valve could result in hot water spraying on a person causing burns.



Specifications subject to change without notice.



Therma-Stor plate design, with rapid, free-flowing paths for refrigerant gas, promotes excellent waste heat transfer throughout the tank.



3. Specification Information

Features and Specifications

- Tank Dimensions
Diameter: 29 1/4", Height: 62 1/4", Weight: 400 lbs
- 114 gallon water capacity
- Rated for 450 psi refrigerant operating pressure
- 150 psi maximum operating water pressure
- Double wall protection between refrigerant and water
- Double normal water heating tank insulation
- UL Listed
- Approved for Canada

3.1 Construction Specifications

1. Vertical six circuit desuperheater plate welded and expanded for internal refrigerant passage.
2. Refrigeration connections are 3/4" O.D. inlets, and 5/8" O.D. outlets. (Six Sets)
3. Industrial glass lined hot water storage tank.
4. 1-3/4" foam-in-place urethane insulation.
5. Dual anode protection against corrosion for extended tank life.
6. Water inlet and outlet are 1-1/4" male NPT.
7. 150 PSI and 210°F pressure/temperature relief valve.
8. Attractive enameled galvanized external wrapper.
9. 3/4" NPT midport for recirculation loop return or medium temperature water out.

3.2 Operation

The Therma-Stor II-6 produces and stores hot water by transferring refrigeration waste heat to cold water. This cost-efficient alternative for producing hot water fits any existing refrigeration system and improves the system's efficiency at the same time. Hot water production depends on the evaporator load, run time of the compressor, and water usage.

3.3 Application Specification

The Therma-Stor II-6 can accommodate evaporating loads of up to 4 tons per circuit when utilizing R-22 or R-502 and 2 tons per circuit on R-12. The individual circuits can be joined at the inlets for larger loads. Considering the limited condensing capacity, Therma-Stor's are not intended to substitute the need for air or water cooled condensers.

4. Installing the Therma-Stor II-6 and Plumbing

Many localities have enacted regulations, ordinances or codes governing the installation of water heaters and heat reclaimers. All local electrical, refrigeration and plumbing codes must be complied with and the installation must be accomplished only by qualified personnel.

1. After the location has been determined, the Therma-Stor II-6 should be moved into position and leveled.
At this time reevaluate the working space allowed for making the refrigeration connections and checking for refrigeration leaks.
2. The cold water inlet is located at the bottom of the tank. Provide a union, shut-off valve, and drain valve for this connection. Refer to Figure 1 for typical arrangements.
3. The hot water outlet is at the top of the tank. A reducing tee and a combination pressure/temperature relief valve are furnished with the Therma-Stor II-6. These must be installed so the sensing element extends inside the tank and the hot water discharge is horizontal, as shown in Figure 3 and 4. Connect the outlet of the relief valve to a suitable drain. The drain

pipe must pitch downward from the valve and should be no smaller than the size of the outlet valve. The end of the drain line should be close to the floor with a 6" air gap. It must not be concealed and should be protected from freezing. No valve of any type may be installed between the relief valve and the tank or in the drain line.

4. If additional water storage is desired an insulated storage tank may be installed. This tank should be set beside the Therma-Stor II-6. Connect the inlet and outlet together with no check valves. See Figure 2.

4.1 Control Valves (Optional)

A water bleed valve is used to remove excessive energy from the Therma-Stor II-6 to limit the water temperature. The valve is normally open so water will flow from the Therma-Stor II-6 when the valve is not energized. When the water temperature rises to the thermostat set point, hot water will be bled through the valve to dissipate more energy than is being absorbed. The water temperature will drop to the aquastat cut-in temperature and then the valve will be activated stopping the flow. Only the amount of hot water equal to the excess refrigerant energy will be bled off.

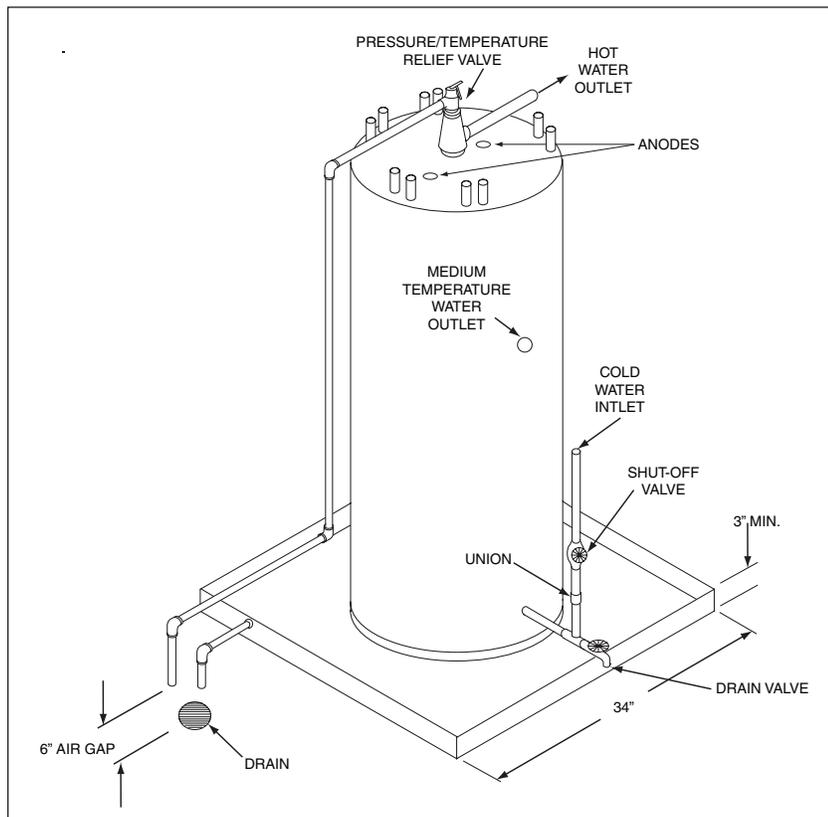


Figure 1: Therma-Stor II-6 plumbing

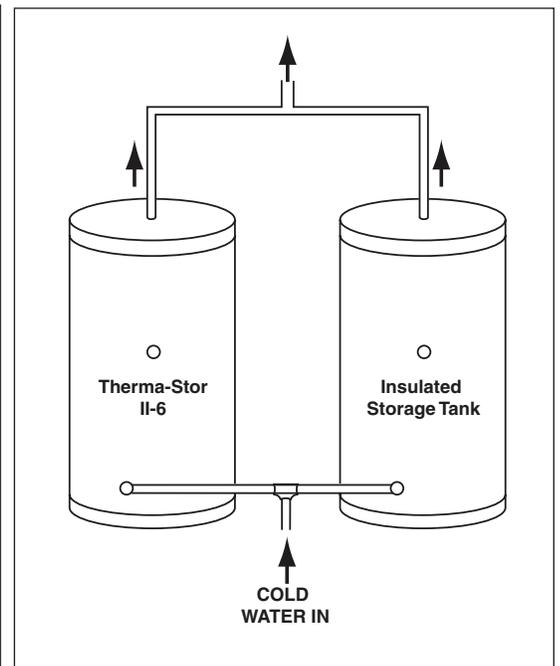


Figure 2: Plumbing the II-6 with an optional storage tank.

4.2 Valve Selection

1. The total connected refrigeration system capacity must be less than 15 tons of evaporator load.
2. Provisions must be provided to safely dispose of the bleed water.
3. Considerations should be made to accommodate a flow rate of 40 gallons per hour. See Figure 3 for the preferred installation.
4. Install an aquastat in the midport (See Figure 1) or on the hot water piping to control the power to the water solenoid.
5. To fill the Therma-Stor II-6, close the drain valve and open a hot water tap to bleed the air from the tank as it fills. Open the inlet water valve. Allow sufficient time for the tank to fill as indicated by a steady flow of water, then close the water tap and check for leaks.
6. If the optional valve is used, power will have to be applied to the valve in order to close it while checking for leaks.

CAUTION

Caution: To reduce the risk of excessive pressures and temperatures in this water heater install temperature and pressure protective equipment required by local codes but not less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic testing laboratory that maintains periodic inspection of production of listed equipment of materials, as meeting the requirements of Relief Valves and Automatic Gas Shutoff Devices for How Water Supply Systems. ANSI Z21.22-1971. 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 will exit only within 6 inches above or at any distance below the structural floor and cannot contact any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances.

5. Installing the Refrigeration System

5.1 Installation Layout

The Therma-Stor II-6 is designed for use in refrigeration systems that have adequately sized air or water-cooled condensers. The Therma-Stor II-6 should be installed between the individual compressors and condensers. A number of possible combinations are shown in figures 7-10.

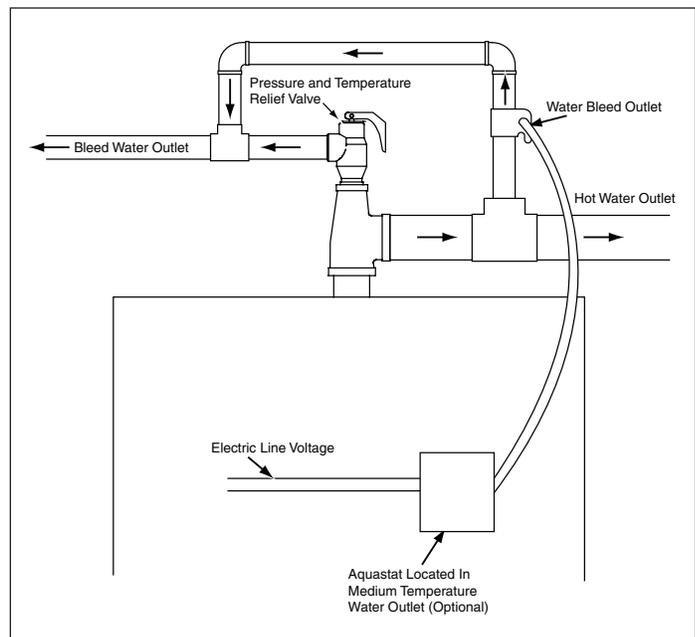


Figure 3: Therma-Stor bleed valve location (if used)

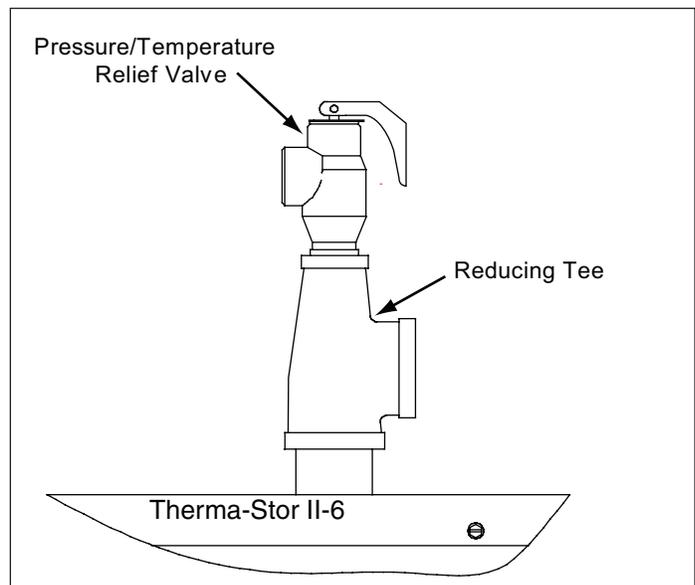


Figure 4: Pressure/temperature relief valve installation

5.2 Refrigerant

The Therma-Stor II-6 desuperheater plate is designed for low pressure drop. Each of the six sections of the plate will handle up to 4 tons of R-22, R-502, or 2 tons of R-12. See Figure 6.

5.3 Refrigerant Lines

The compressor discharge line size is usually adequate for normal installations. However, if lines are more than 20 feet long, they should be sized for a maximum of 15 psig pressure drop. (See ASHRAE piping tables.) Lines should be installed to pitch toward the Therma-Stor II-6 and condenser, and to drop down from the compressor discharge to form a 6" trap to prevent oil and liquid refrigerant from accumulating on the discharge valve plate.

When installing a Therma-Stor II-6 on an existing refrigeration installation, extreme care must be used not to damage the existing system. If the tubing must be routed into an existing cabinet, the following precautions must be taken:

1. If cabinet openings or modifications have to be made, they must be accomplished in such a manner as not to be detrimental to the cabinet. DO NOT cut into electrical enclosures.
2. Do not route tubing through electrical enclosures or cabinet section containing live metal parts. The tubing must be properly supported and protected from sharp edges and moving parts.
3. The tubing must be mechanically isolated from structural building members.

5.4 Refrigerant Connections

The Therma-Stor II-6 line connections are made of copper tubing.

Note: Be careful not to burn wrapper on insulation when brazing refrigeration lines.

All joints should be checked for leaks and the lines evacuated according to standard refrigeration practices.

