GREAT LAKES ELECTRIC – SOLAR ENERGY

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PRIOR TO INSTALLATION, PLEASE CHECK FOR UPDATES TO THIS DOCUMENT AT:

www.glesolar.com/installation

This symbol is a safety alert. Review and obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

This symbol indicates a hazardous situation. These hazardous situations, if not avoided, will result in serious injury or death.

WARNING

This symbol indicates a hazardous situation. These hazardous situations, if not avoided, could result in serious injury or death.

CAUTION

This symbol indicates a hazardous situation. These hazardous situations, if not avoided, could result in minor or moderate injury.

NOTICE

This symbol is used to address items not related to personal injury.

This symbol is used to identify risk of burning due to contact with hot surfaces or contact with hot liquids.

This symbol is used when there is a risk from falling or stumbling.

This symbol is used when there is a risk from product tipping over.

This symbol is used when there is additional information, advice, or tips available for an item or purpose.

TABLE OF CONTENTS

Safety Instructions

For safety reasons, installer must read this entire document carefully before beginning the installation process to reduce the risk of personal injury or property damage.

Safety Precautions:

Please Read Before Starting!

⚠ Use Solar Water Heater System only as directed and described. Other use or mis-use will void all warranties and may lead to personal injury or property damage.

⚠ Solar Water Heater System must be properly installed as described in the installation documentation before it is used or warranty will be void.

⚠ Do not cover or obstruct unit in any way as this may reduce or prevent proper performance.

⚠ Do not store or place combustible materials on or near the Solar Water Heater System.

⚠ **⚠ CAUTION** Always wear appropriate safety equipment during installation or maintenance of unit such as safety glasses and protective gloves.

⚠ **⚠ CAUTION** Use caution when handling glass evacuated tubes and follow installation documentation explicitly.

⚠ **⚠ CAUTION** After unit is installed, return water line may be hot!

⚠ **⚠ CAUTION** Ensure that all Solar Water Heater System components are kept away from children and animals.

⚠ Though durable, evacuated tubes are glass and will break if dropped or hit with force. Use care in handling.

⚠ Units must be installed in compliance with all national, state and local Mechanical and Plumbing Code Standards.

⚠ **⚠ CAUTION** Always call your local utility companies before digging to ensure location of any pre-existing underground utilities.

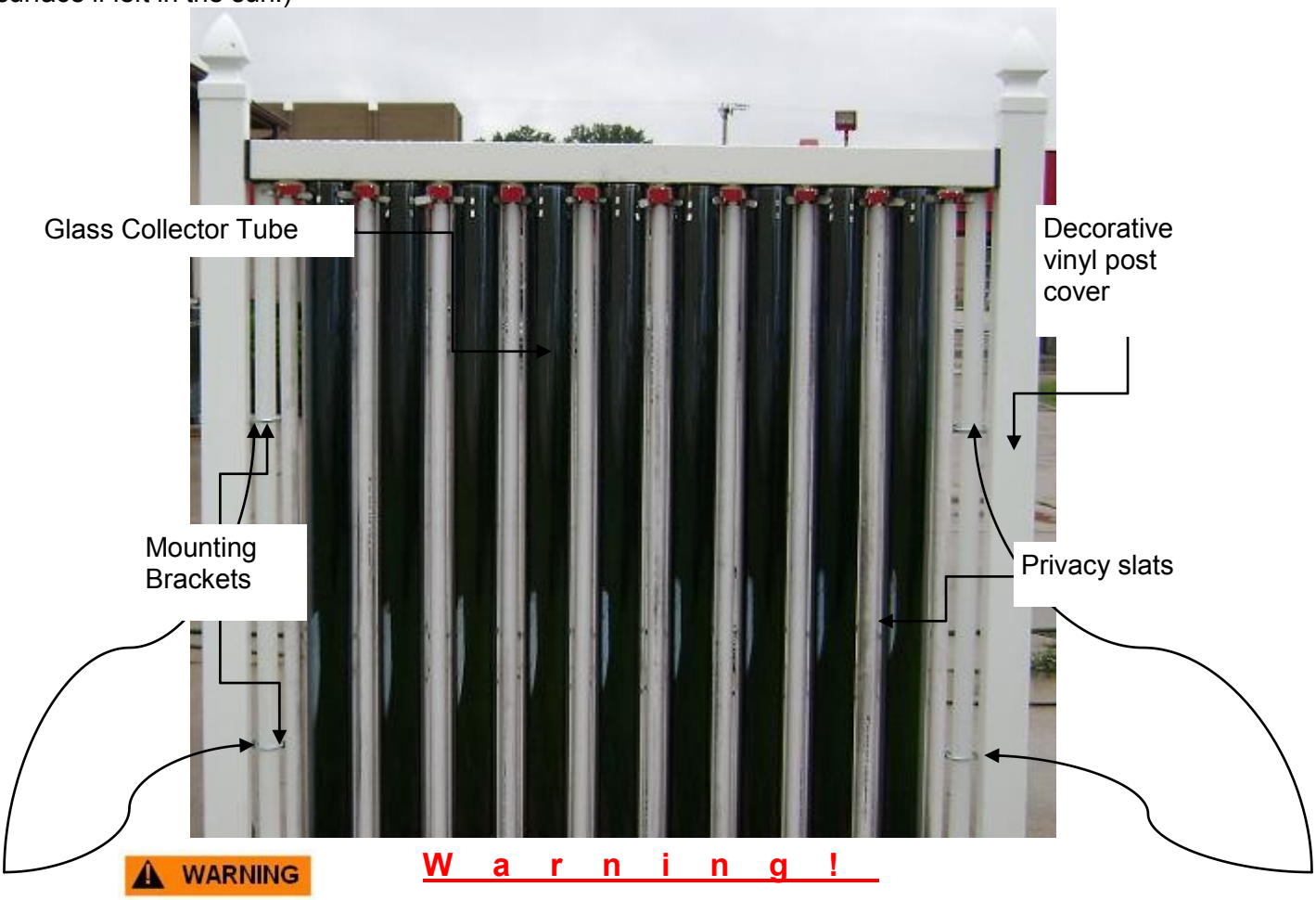
⚠ System may weigh as much as 250 pounds prior to installation in packaging. Appropriate resources should be utilized to handle system to reduce risk of damage or injury.

Always handle the unit by the end steel posts, never by the stainless steel tanks.

NOTICE

Note Before Starting:

- Installation of this Solar Water Heater System requires resources necessary to lift and handle the Solar Water Heater System which weighs as much as 250 pounds in packaging.
- It is recommended that installation be scheduled for a cloudy day if possible.
- Evacuated tubes are to remain in closed packaging out of direct sunlight until they are to be installed. (Tubes are highly efficient radiant heat capturing devices and will become extremely hot on the inner surface if left in the sun.)



These Brackets are required! They are not optional. Failure to support upper portion of unit could cause damage or personal injury and will void your warranty!

Figure 1: High Efficiency Solar Water Heater, mounted in a fence configuration with optional privacy slats installed

1.0 Foundation Setup:

1.1 Determine Collector Location

1.1.1 GLE representative should have worked with you to determine the appropriate size and number of collectors needed. If not, please contact your local representative. Their contact information can be found at http://www.glesolar.com or call (269) 408-8276.

1.1.2 GLE representative should assist in identifying the optimum location and orientation for the collectors. Optimum orientation based on best practices is with the faces of the unit facing East and West so as to achieve the most direct sunlight collection. An alternately efficient orientation is with the faces of the unit facing North and South.

1.1.3 Best practice dictates location in an area with greatest solar exposure and limited shading from buildings, structures, trees, and other objects of shading.

1.1.4 It is also recommended that the shortest length of piping should be applied to facilitate an efficient installation. Increased piping lengths may be applied in order to locate in an area of greatest solar exposure without significant impact on performance with appropriate insulation.

1.1.5 Ensure there are no existing underground utilities prior to ground preparations by calling your local utilities.

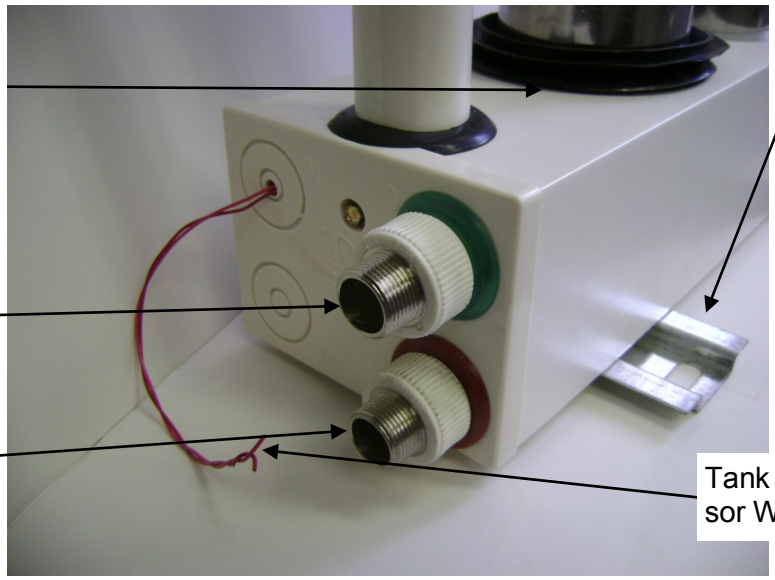


Figure 2: Solar Collector Base setup showing 1 of 4 bolting positions.

1.2 Layout and Ground Preparations

1.2.1 After area to be used has been cleared by local utilities to dig, using dimensions as shown in Figure 3 on page 7, and Figure 4 on page 8, layout fence post positions and optional collector base bore holes.

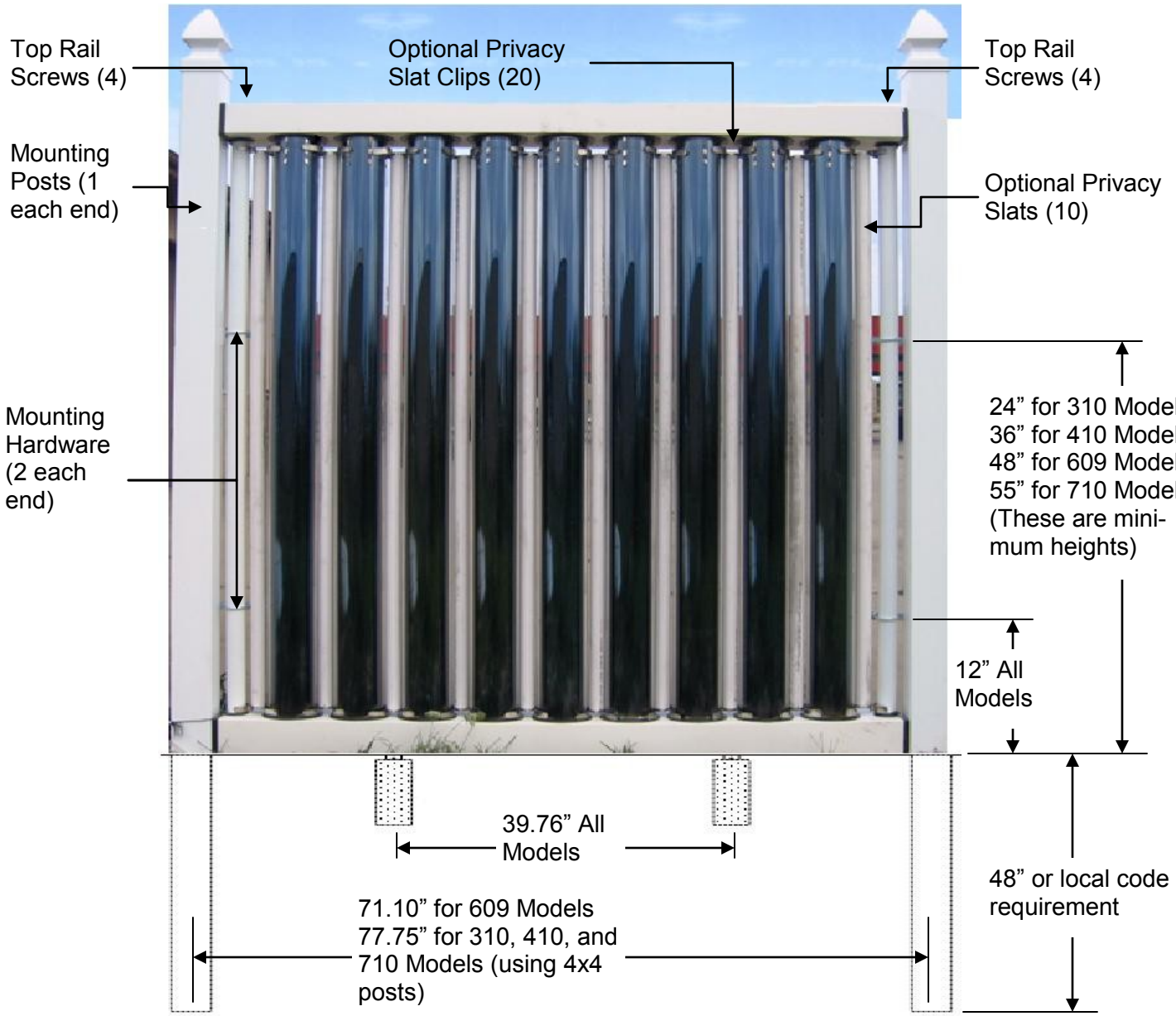


Figure 3: High Efficiency Solar Fence details for mounting. Shown with optional Privacy Slats and Decorative 4x4 post covers.

1.2.2 Using a powered or manual bore tool, bore fence post holes to described depth or in accordance with local code requirements.

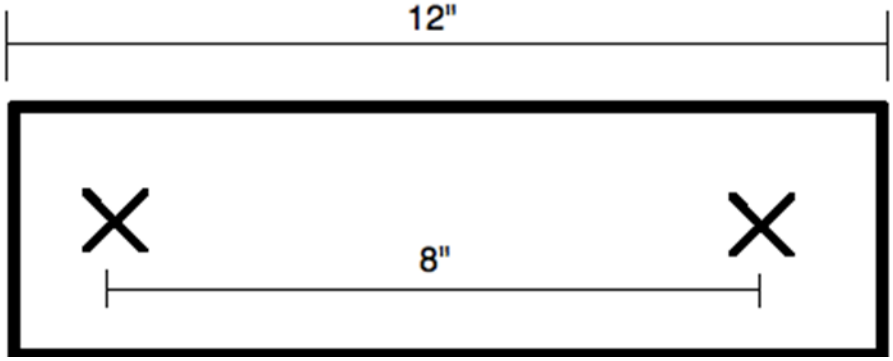


Figure A: Jig to layout lag bolts in concrete foundation pads.

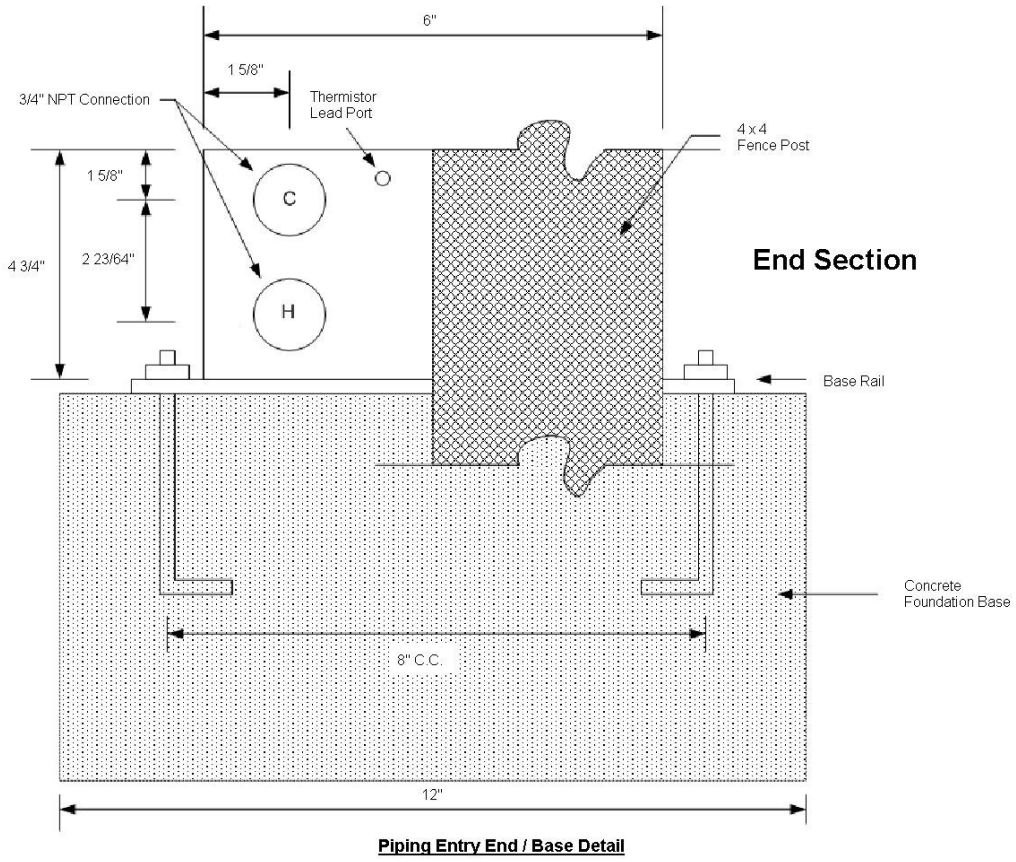


Figure 4: End View Detail of Collector Base showing optional Mounting

1.2.2.1 When using optional 4-point mounting base rails, these foundations must be set first.

1.2.3 Dig optional foundation pad holes and frame 12” square or use 12” Diameter “Sonotube” or equivalent product with 1/2” anchor bolts as shown in Figure 3 above, and Figure 4 on page 8. A jig should be used to properly space the lag bolts. The jig can be seen below in Figure A on page 7. You can pour pre-cast foundations or use quickset on the job site. Verify foundation frame or tube are level and square. If not using foundation, pre-fab concrete pads should be used.

1.2.3.1 Foundation pads need to be 12” in diameter. Mounting base rails are 9” in length, and mounting holes are 8” on center.

1.2.3.2 Depth of foundation pads

- For 3ft tall units, foundation pads need to be 6” deep
- For 4ft tall units, foundation pads need to be 9” deep
- For 6ft tall units, foundation pads need to be 12” deep
- For 7ft tall units, foundation pads need to be 18” deep.

1.2.3.3 Mounting base rails are 40” apart, in order to make setting the pads level and square easier, a jig should be made. The jig can be seen below in Figure B on page 9. All jigs can be made out of plywood or some other related material.

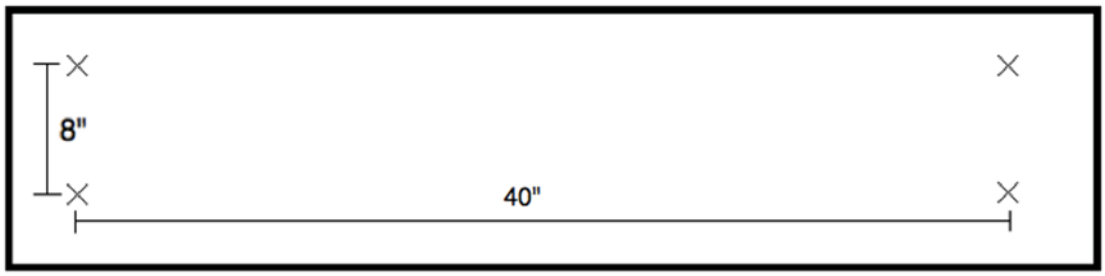


Figure B: Jig used to layout out foundation pads

1.3 Setting Posts and Footings

1.3.1. Pour concrete foundation pads and secure anchor bolts. As an alternative method, you can use expanding anchor bolts (wedge bolts) or Tapcons into cured concrete. Allow concrete to cure.

1.3.2. Once units are secured to foundation pads, insert 4x4 posts as described in Figure 3 on page 7. Wrap posts in construction felt or plastic to help extend the life of the post. Over time, if not wrapped, concrete will eat away at wooden posts. Pour concrete into post holes and allow to cure. Verify that posts are plum and square to the foundation pads.

1.3.3. If mounting on a flat roof, ensure that appropriate supports are used. Contact GLE representative for details.

1.3.3.1 Once post have cured into concrete, attach post fastening hardware to 4x4 posts. Use post fastening hardware that is provided or other alternatives such as steel conduit hangers .

When using conduit hangers, measure 5/8” off of the edge of the 4x4 on the side closest to the middle of the unit and pre-drill your holes to attach hardware. Use hanger bolts to mount post-fastening hardware onto. If you are by salt water, it is recommended that you use stainless steel fasteners. You want to have 2 fasteners per post, mounted 4” from the top and bottom of rails, for a total of 4 fasteners per unit. If using vinyl post covers, put vinyl post covers on first, then mount fasteners to support post.

1.3.4. Warning: unit must be secured at the top and bottom of the unit for proper installation! Failure to do so could cause personal injury or property damage and will void warranty.

1.4 Unpacking Collector Main Assembly

1.4.1. Prior to opening packaging, inspect for obvious external shipping damage. If no damage proceed with installation. If package is damaged, contact your GLE representative immediately. With appropriate resources based on panel size, remove collector from packaging. Properly dispose of packaging and shipping materials. Reuse or recycle where possible.

1.4.2. Inspect unit for any obvious damage or missing parts. If unit is damaged or missing parts, contact your GLE representative immediately. If no issues proceed with installation.

1.4.3 Remove top rail by taking out 2 screws in each end plate, plug and bolt on the top side of the top rail where the post meets the rail, and mounting bracket attached to post (which holds the end caps in place).

1.5 Setting Up Collector Main Assembly

1.5.1. If optional foundation is used, with appropriate resources based on panel size, place collector main assembly over foundation bolts and secure to pad with appropriate hardware.

1.5.2. Attach unit to side support posts with appropriate hardware. If using vinyl post covers, put vinyl post covers on, then attach unit to support posts with appropriate hardware.

1.6 Multiple Collector Installation

1.6.1. If installing multiple collector units, repeat steps 1.2 through 1.5.2. **Note: When installing multiple collectors, series piping connections must be made as the installation progresses. Use flexible tubing for these connections, where possible to serve as expansion and movement isolators.**

1.6.2. Ensure that End units and Middle units are installed in the proper locations and that no more than four (4) units are connected in series together. Make sure units are properly positioned to have temperature sensor wires at closet point to input/output end.

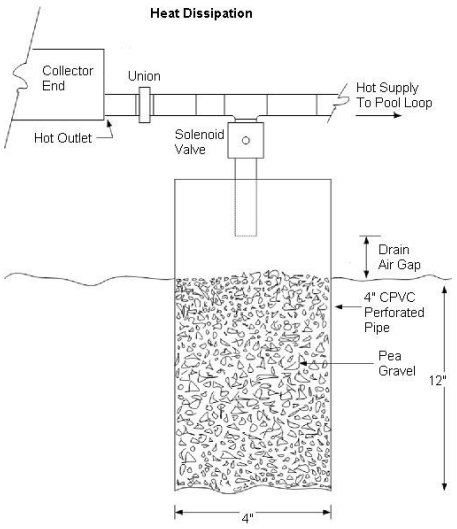
1.6.3. If only installing one unit with plans to install additional units later, a Middle unit can be installed with a loop back connection appropriately applied.

2. Safety Heat Dissipation

2.1 Provide a Means to Dissipate Heat

Either a heat dissipation loop will need to be installed or a French drain type pit as pictured below in Figure 5. These are for user safety in case there is ever an over production of hot water with no usage allowing for a replenishment of cold water to pass the heat to. This loop or drain can also be used to prevent a low temperature condition by allowing for a short flow circulation of the system.

2.1.2 Drain Detail



3. Electrical Wiring and Controller Connections

3.1 Wire Routing and Connection (example for Tekmar control)

3.1.1. Connect two (2) Collector Thermistor wires to Controller position 7 and 8 as described in Figure 6.

3.1.2. Connect two (2) Application Thermistor wires to Controller position 7 and 9 as described in Figure 6.

3.1.3. All wiring should be supervised or completed by a licensed Electrician. All work must be in compliance with NEC 2008. Only use single strand shielded wire between 14 and 18 Ga. Ensure that all wires are routed and fixed such that there is significant space between sensor wires and line voltage wires.

3.1.4. Use only single strand shielded wire between 14 and 18 Ga.

3.1.5. Note that a Class II Transformer may be required for some controls.

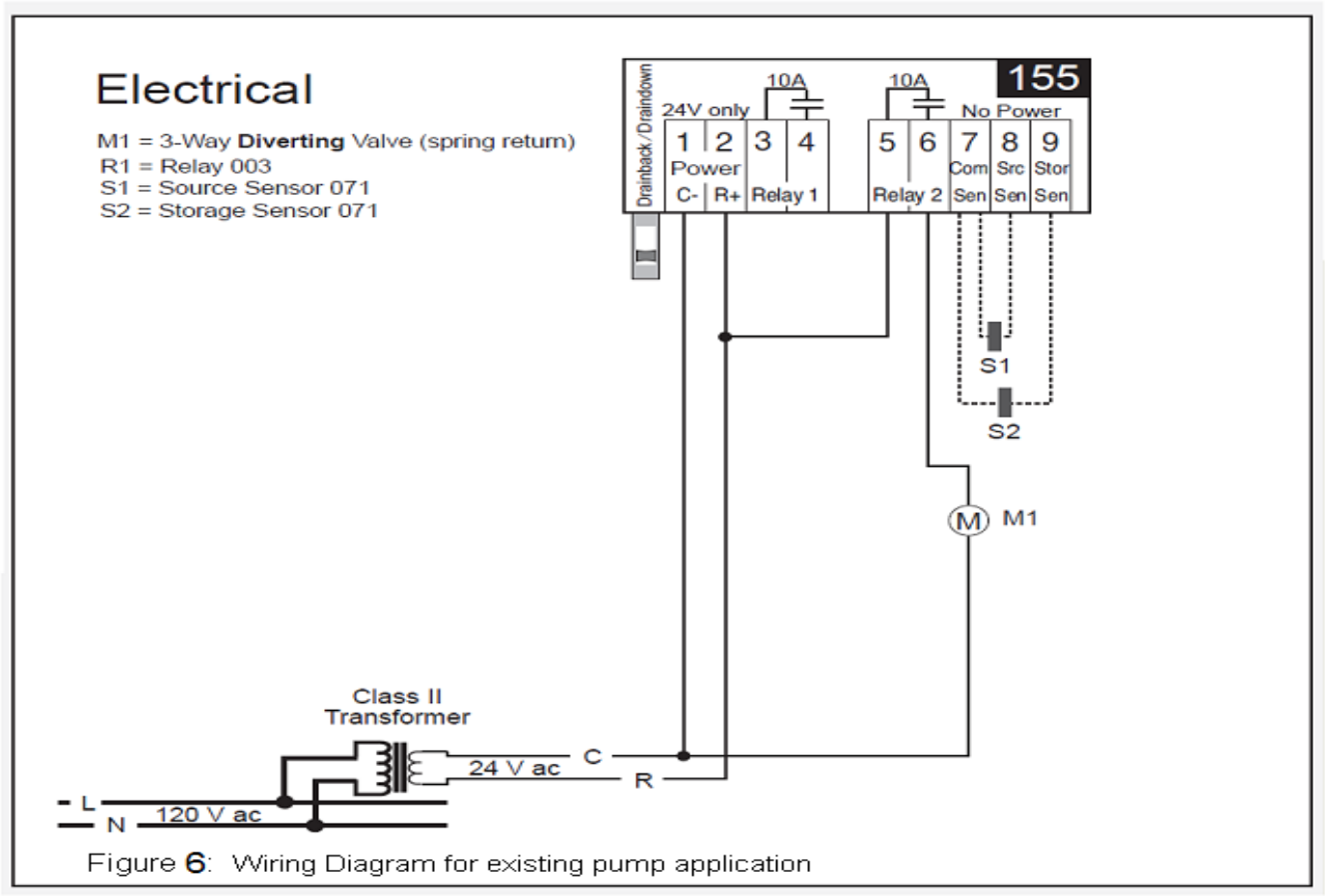


Figure 6: Wiring Diagram for existing pump application

3.2 Alternate Wire Routing and Connection

3.2.1. If required, connect pump wiring to Relay position 3 and neutral as described in Figure 7.

3.2.2. Ensure that all wires are routed and fixed such that there is significant space between sensor wires and any 120 volt or higher wires to prevent electrical noise in control.

3.2.3. Use only single strand shielded wire between 14 and 18 Ga.

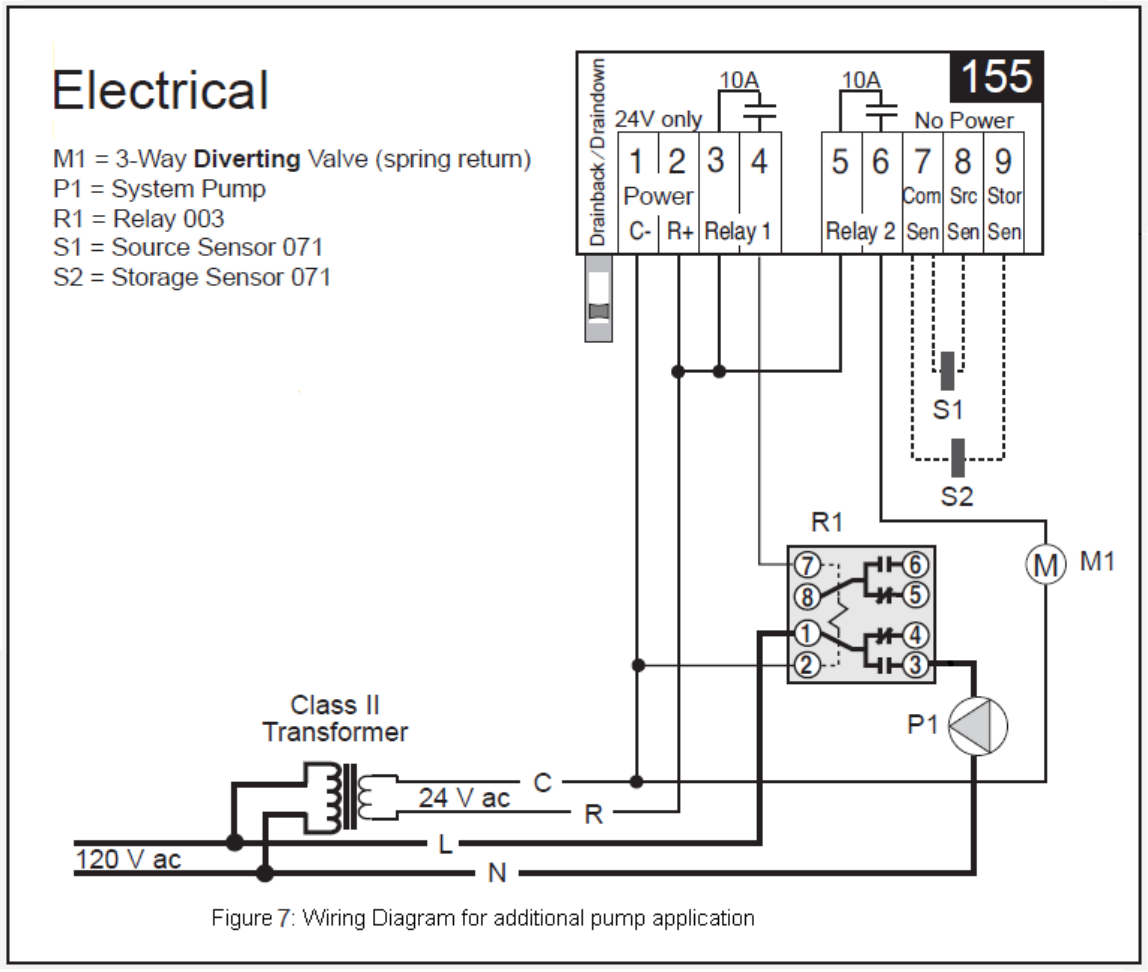


Figure 7: Wiring Diagram for additional pump application

4. Plumbing Connections

4.1 Piping and Fittings

4.1.1. All piping inside of solar units is ¾", so it is recommended to use ¾" or 1" piping. Piping can consist of either copper or corrugated steel. Copper piping cannot be directly used when running pool water directly through units. Do not use PEX, due to the potential of excess fluid temperatures of 200° F.

- Armaflex Duosolar VA is recommended when using corrugated steel piping. Piping comes pre-insulated and contains a low voltage thermostat wire inside the insulation.
- Use Teflon tape and pipe dope to properly seal threading of fittings.
- When threading fittings on solar units, use channel lock pliers and/or box wrench, clamped onto male pipe end coming out of unit, to prevent over torquing and possible damage to pipe end.
- Over-tightening of fittings can cause damage to units.

4.1.2. For multiple units, they have to be connected in series. For copper, connections should be made using 3/4" C x F connection, Cast DZR Brass to Copper. For corrugated piping, use Armaflex ¾" Female Compression Fitting. Unions and/or compression fittings are highly recommended to allow for future maintenance.

4.2 Plumber

4.2.1. All work should be performed under the supervision or guidance of a licensed plumber and in accordance of all local codes relative to the installation site.

4.3 Pressure Test

4.3.1. System should be pressure tested before it is filled with fluid. Close off ball valves to existing system configuration. You do not want to pressurize the existing system or introduce air into existing system. Use air compressor to fill system to 30-40psi, and hook up a pressure gauge. Make sure system psi stabilizes and holds. If pressure drops, check fittings. If pressure maintains, system is ready to be filled.

4.4 Fill and Air Purge

4.4.1. Fill system with transfer pump. Make sure all valves are closed off to existing system, or the T&P release valve will blow off. Transfer pump will fill at pressures up to 40psi. Once system is filled, keep cycling the fluid through it with the transfer pump to air purge system. Once purged, open all valves.

5. Installing Glass Collector Tubes

5.1 Installation of Collector Tubes

5.1.1. Carefully remove Tubes from shipping containers and properly discard packaging.

5.1.2. Remove one tube at a time to prevent tube heating prior to handling.

5.1.3. Remove top rail from Collector Base by removing four (4) screws from each end as described in Figure 3 on page 6.

5.2 Individual Placement of Tubes

5.2.1. (Ensure to utilize appropriate resources based on the size system for this step.) Apply a black seal to bottom end of tube, approximately 1/4” from the end. Slide each glass tube onto a separate stainless steel tube, being careful not to scratch the inside of the glass tube and lowering slowly into place. Repeat until all tubes are in place.

5.2.2. Apply upper rubber seal to glass tube.

5.2.3. Once tubes are in place, put top rail back on. Replace all bolts/screws that were originally removed except bolt in the end cap that is on the opposite side of the plumbing fittings. This is to make future maintenance access easier.

5.2.4. Repeat steps 5.1 through 5.2.4 for each panel.

6. Privacy Slats (Optional)

6.1 Unpack Slats and Retainer Clips

6.1.1. Remove all Privacy Slates and Retainer Clips, ensuring that there are two (2) Retainer Clips for each Slat.

6.1.2. Properly dispose of packaging

6.2 Install Lower Retainer Clips

6.2.1. Place one (1) Retainer Clip at the base of the unit as shown in Figure 1 between the Glass Collector Tubes.

6.2.2. There are two (2) sets of Retainer Clips specifically designed for each end, upper and lower. These will only fit in these locations and must be installed at this time.

6.3 Install Privacy Slats and upper Retainer Clips

6.3.1. Place the bottom of a Privacy Slat onto the previously installed lower Retainer Clip

6.3.2. Snap upper Retainer Clip in place. Privacy Slat should not fall if installed properly.

Note:

Each collector requires between 0 and 7.5 gpm flow rate. Do not exceed four (4) collector panels per bank. If initially, the total flow rate is not met, then increase closure of the pressure regulator valve until total flow is met.

See GLE Website for optional system configurations or contact your GLE Dealer.

Winterization or temporary stopping of thermal production options:

Units may be drained and covered if not to be used for a week or more for open looped configurations or 30 days or more for a closed loop configuration.

During summer months, one or all of the tubes may be covered to reduce or stop hot water productions by using GLE tube covers, available through GLE dealer and distribution channels.