



TwinTemp Hydronic Heating/ Water Heating Operating Instructions

For maximum heat and hot water output, it is recommended to use the LPG mode of operation in addition to the 120 volt electric element. Electric element operation should be used for minimal hot water demand such as washing hands or dishes. It is not necessary to have the water system filled to use the space heating system, but the heating system must be filled with anti-freeze.

To Start Up System:

- Turn on the propane supply.
- Turn on 12 volt power switch on the right side of the TwinTemp cabinet.
- Turn on 12 volt power switch on coach, if applicable.
- Burner will start-up and system will be up to operating temperature in approximately 10-15 minutes depending on position of Summer/winter valve.

Summer Operation

Position Summer/Winter valve in Summer position.

When the space heating function of the *TwinTemp* is not needed, the heated anti-freeze should not be circulated to the blowers. To prevent this circulation, the Summer/Winter by-pass valve should be turned ¼ turn. When heating is again needed, this valve handle should be turned ¼ quarter turn from the Summer position to the Winter position. This adjustment should only be needed twice a year for summer/ winter operation.

Summer
Position



For Space Heating:

Position Summer/Winter valve in Winter position.

Turn on main coach thermostat and set to desired temperature.

When the system reaches set temperature the blowers will turn on and heat is delivered.

When room reaches set temperature, the pump and blowers for that zone will go off. If tank temperature is below set temperature the burner will stay on until tank reaches set temperature.

NOTE: the heat register blowers will not activate if the tank temperature is below 160° F. This assures that the hot water function takes priority under heavy usage conditions. Blowlers will resume operation when tank returns to operating temperature.

Winter
Position



For Hot Water

TwinTemp unit and water system pump must be turned on or connect to city water system.

Turn on hot water tap.

Note: During heavy heat and hot water demand, the hot water system takes priority and the heat register blowers may shut off briefly to maintain hot water supply. Hot water temperature is factory set at approximately 120 degrees. To change temperature, consult the operating manual.

Once the tank reaches set temperature (5-15 minutes after system is turned on), continuous hot water is delivered when any tap is opened. Delivery temperature is determined by the setting of tempering valve

Warning: this valve is factory set at about 120° F. adjusting temperature any higher could result in severe injury due to scalding.

Tank thermostat turns pump 1 and burner on automatically when tank temperature starts to drop. Anti-freeze circulates from burner and back to tank as it heats. Burner remains in high fire and gas modulates burner to low burn until set temperature is attained. When set temperature is reached, burner and pump shut down and system returns to stand-by mode.

Winter Mode Hot Water Production

During winter operation if the system has been dormant for more than 20 minutes turn on interior thermostat to call for heat. When the heat register blowers come on turn off thermostat and turn on hot water tap. Preheating the system is required in winter mode for hot water production due to 3 gallons of cold fluid in the hydronic loop suddenly being returned to the TwinTemp tank lowering the fluid (boiler antifreeze) temperature required for hot water production. Once fluid temperature reaches set temperature the system will make continuous hot water.

To Use With 110 Volt Heating Element

Turn on 110 volt element switch located inside coach.

Let the unit heat up for a minimum of 30-60 minutes.

Note: In the 110 volt mode of operation the electric element supplies the heat until demand exceeds its capacity at which time gas burner automatically ignites.

The *TwinTemp Jr.* is equipped with one 110 VAC electric heating element. The element provides limited amounts of hot water or space heating, such as washing hands or dishes. The electric element can be used with or without the propane burner, but for continuous hot water or space heat, the propane burner must be used. To operate, turn the 110 volt switch on in the coach.

For small amounts of hot water only, there is no need to turn the 12 volt power on to the *TwinTemp*. However, if space heat is required in very cold weather, the 12 volt switch should be turned on. If there is a higher demand for heat than the 110 volt element(s) can provide, the propane burner will activate automatically. For best operation, turn the 110 volt element on about 30 minutes before turning 12 volt switch on. This allows the tank to come up to temperature utilizing the electric element before the burner can activate. This will help conserve propane

Routine Maintenance

All faucet aerators and showerhead screens in the coach should be cleaned regularly. It is recommended that the *TwinTemp* be inspected by a qualified service technician at least once a year. Particular attention should be paid to the following:

- Be sure that the air inlet openings and flue area are clear of any debris or obstructions (leaves, bugs, nests, spider webs etc.). Be sure nothing is stored against the unit that would block air or access.
- Inspect boiler anti-freeze level in reservoir tank. Top off if necessary with a 50/50 mix of specified boiler anti-freeze and water.
- Check that heater mounting is still secure to the coach. Tighten if necessary.
- Visually inspect wiring and hoses. Be sure there is no chafing of the insulation.
- Drain boiler antifreeze every two years and replace with new. (system holds approximately 6 gallons of a 50/50 boiler antifreeze/water mix)
- Inspect for evidence of antifreeze leaks at internal and external plumbing connections and correct if needed.

PrecisionTemp

TwinTemp-2 / Junior

Service Pack

***Please read the enclosed “PrecisionTemp
Warranty Procedure Policy” and contact
PrecisionTemp PRIOR to proceeding with
service.***

800-934-9690

NOTE: This manual covers both TwinTemp models and drawings illustrate the two zone TwinTemp-2. These drawings also illustrate the Junior model with the exception of components related to zone 2.



Tankless Hot Water and Temperature Control Specialists

NOTICE

Before proceeding with any repairs or parts replacements on the TwinTemp check the following:

- **Is the coolant level in the tank up to the bottom of the fill cap?**
- **Is the power turned on and at least 11.5 VDC under load?**
- **Is the gas supply turned on?**
- **Is there any by-passes open, preventing proper circulation of coolant?**
- **Is the flue pipe blocked?**
- **Is there adequate combustion air in the TwinTemp Compartment?**
- **Are there any service codes?**
- **Are the thermostats turned on?**
- **Are there any loose wires or kinked pipes?**

If after checking the above, the problem still exists, it is advised to call PrecisionTemp to assist in troubleshooting. In any event, Precision Temp must be contacted prior to performing any warranty work.

See the “PrecisionTemp TwinTemp Warranty Procedure Policy” prior to performing work.

Call 800-934-9690

9:00 am to 5:00 pm Eastern Time weekdays

**After hour’s technical service- Monday thru Friday
6-9 pm, Saturday 9am-3pm ET. 513-373-8357.**

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PrecisionTemp TwinTemp Warranty Procedure Policy

The following procedure must be followed to implement the PrecisionTemp "Manufacturer's Limited Parts and Warranty". Please refer to the "Manufacturer's Limited Parts and Warranty" for full terms.

To Make a Warranty Claim

1) When possible, contact PrecisionTemp prior to service being performed. The technician must call PrecisionTemp @ 513-641-4446 or 800-934-9690 prior to performing work. NO work should be preformed prior to calling PrecisionTemp. This work would be considered unbillable time and could void the warranty.

If it is known in advance that warranty work must be done on PrecisionTemp equipment outside of PrecisionTemp's normal business hours, (9:00 AM – 6:00 PM Eastern time), call the above numbers in advance for a phone number of a PrecisionTemp technician to assist you after hours.

2) If it is known in advance that a part is needed for the service, the service call must not be made until part is on-site.

3) The equipment serial number MUST be on any and all paper work pertaining to the warranted product i.e.: Invoices, Work Orders, Tech Notes, and RGA's.

4) Any parts replaced under warranty must be returned to PrecisionTemp within 15 (fifteen) days of claim.

5) Any parts being returned to PrecisionTemp MUST have an RGA number. If an RGA number was not included with the warranty replacement part the service agency must call PrecisionTemp to obtain an RGA number before returning the part.

6) Hourly rate and travel expense must be approved in advance of work being performed. Under no circumstances will PrecisionTemp pay overtime fees.

7) All warranty invoices must be accompanied by copies of the technician's work sheets that details the service performed and hours worked.

PrecisionTemp will cover warranty work done only on products manufactured by PrecisionTemp for defects with the product, not problems related to the coach systems or installation or related equipment issues such as:

- Improper water pressure.
- Improper installation including blocked access to heater access panel.
- Improper voltage to unit.
- Cold water bypass.
- Improper power hookup or power turned off.
- Undersized gas line or low gas pressure.
- Blocked air supply.
- Peripheral equipment such as water pumps, faucet, batteries, etc.
- Sludge buildup or blockage in hydronic plumbing.

Warranty coverage is based on PrecisionTemp's warranty policy. PrecisionTemp may, at times, arrange service as a courtesy to the customer. This does not necessarily mean that PrecisionTemp is responsible for the charges. PrecisionTemp will not pay for additional time required to gain access to its equipment or the technician not being given access to equipment in a reasonable time-frame. PrecisionTemp reserves the right to accept or deny warranty claims based on the above policy.

IMPORTANT INFORMATION

- The TwinTemp system uses Propylene Glycol antifreeze, high temperature, non toxic with “inhibitors for copper and aluminum” in a “50/50 mix with water”.
- PrecisionTemp requires *Rhogard boiler antifreeze with pro-tek 922 inhibitors for proper protection.*
- Do not use Propylene Glycol antifreeze which is pre mixed, standard RV antifreeze or antifreeze without proper inhibitors.
- **WARNING! DO NOT MIX** “Propylene Glycol antifreeze” and “Ethylene Glycol antifreeze”. They are incompatible and will turn into a heavy sludge when mixed.
- Contact PrecisionTemp if Rhogard is not available locally

TwinTemp Description of Operation and Sequence of Operation

Technical Description of Operation-

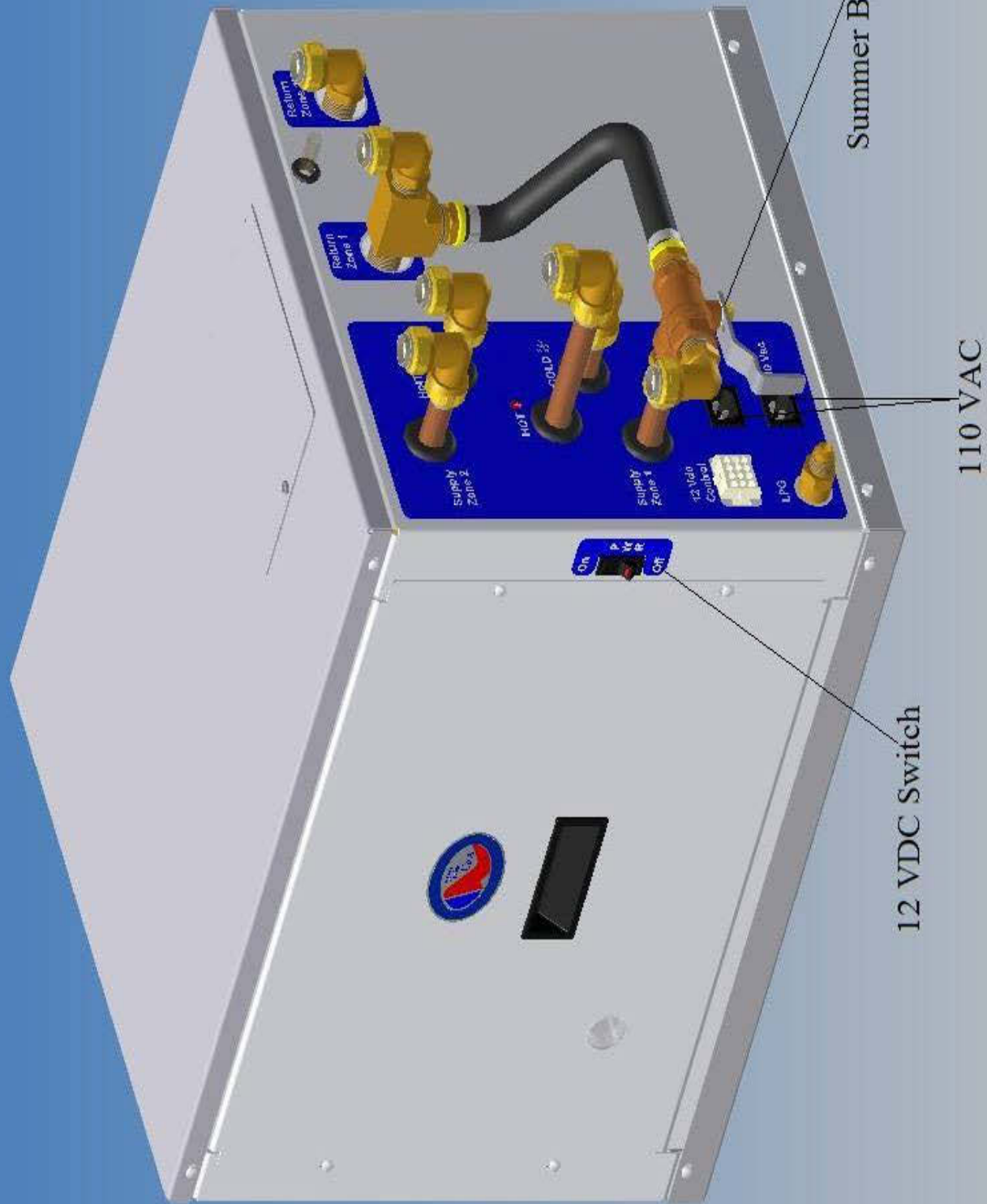
The *TwinTemp* systems provide quiet space heating utilizing liquid to air blowers or radiant devices, while producing a continuous supply of hot water. Its *Variflame* gas modulation enables it to use a very small tank and still maintain efficiency without rapid burner cycling. This greatly reduces startup time and standby heat loss. Unlike its diesel counterparts the *TwinTemp* has an instant on burner and modulates the gas flow on a 4-1 ratio.

A copper heat exchanger inside the tank of heated antifreeze is used to indirectly heat the potable water. This method is not only efficient, but will extend the life of the critical heat exchange elements, tank and circulating pumps.

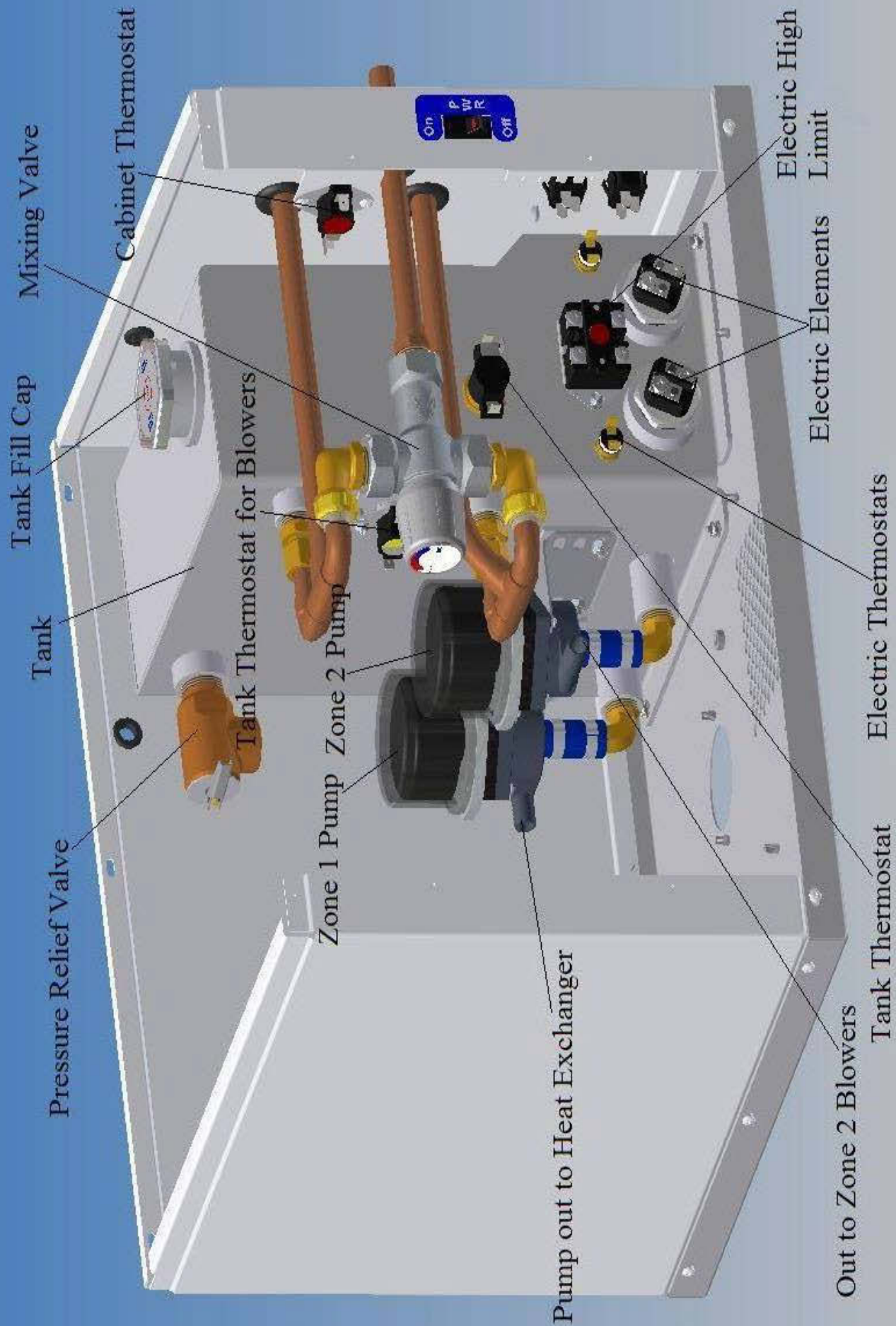
Sequence of Operation

- The power and propane are turned on to the *TwinTemp*. If the **Tank thermostat** senses low tank temperature (below 190° F), it will send 12 vdc power to the green **control board** and **Pump 1 (rear) pump**. Note- the Junior has one zone pump and the *TwinTemp-2* has 2 zone pumps.
- Anti-freeze starts to circulate from the bottom of the **tank**, through **Pump 1**, to the burner **heat exchanger**, out to **Zone 1 blowers** and back to **tank**.
- Simultaneously, the **control board** powers the **power vent relay** which activates the **power vent** and fluing is proofed by the **pressure switch** via the 1/4" hose. The **pressure switch** sends 12 VDC to the **ignition board** (if flue is blocked, burner will not light).
- The **solenoid gas valve** is energized and a spark is affected to the **igniter probe** over **burner** via the heavy ignition wire. The flame is proofed via the same igniter element and yellow wire.
- Gas flow is adjusted by the **gas modulating valve** based on antifreeze temperature. Temperature readings are taken twice per second by the **T-Mid Thermistor**. As set temperature (about 190° F) is approached, the gas flow is reduced as much as 70% by reducing the voltage to the **gas modulating valve** until set temperature is achieved and the **burner** goes off.
- When a hot water tap is opened, cold water enters the copper tank heat exchanger imbedded in the **tank** and the heat transfer takes place. The hot water exits the tank coil through a **tempering valve** that can be set to any temperature between 100°-145°. As the **tank** cools, the burner cycle starts again when the **tank thermostat** senses the **tank** is getting cold.
- If the zone 1 room thermostat senses low room temperature, it sends power to the zone's **relay** that then powers **pump 1**, **control board** and the zone blowers.
- When the zone 2 (*TwinTemp-2* only) thermostat calls for heat the zone 2 **relay** sends power to the **pump 2** and the **blowers** in zone 2 are activated. The **burner** will be activated by the **tank thermostat** as above if the antifreeze temperature falls below set temperature.
- The **blower thermostat** will turn off the Zone 1 blowers if tank temperature drops below 160° F.
- NOTE: The **bold orange** terms are identified and pictured in the following pages.

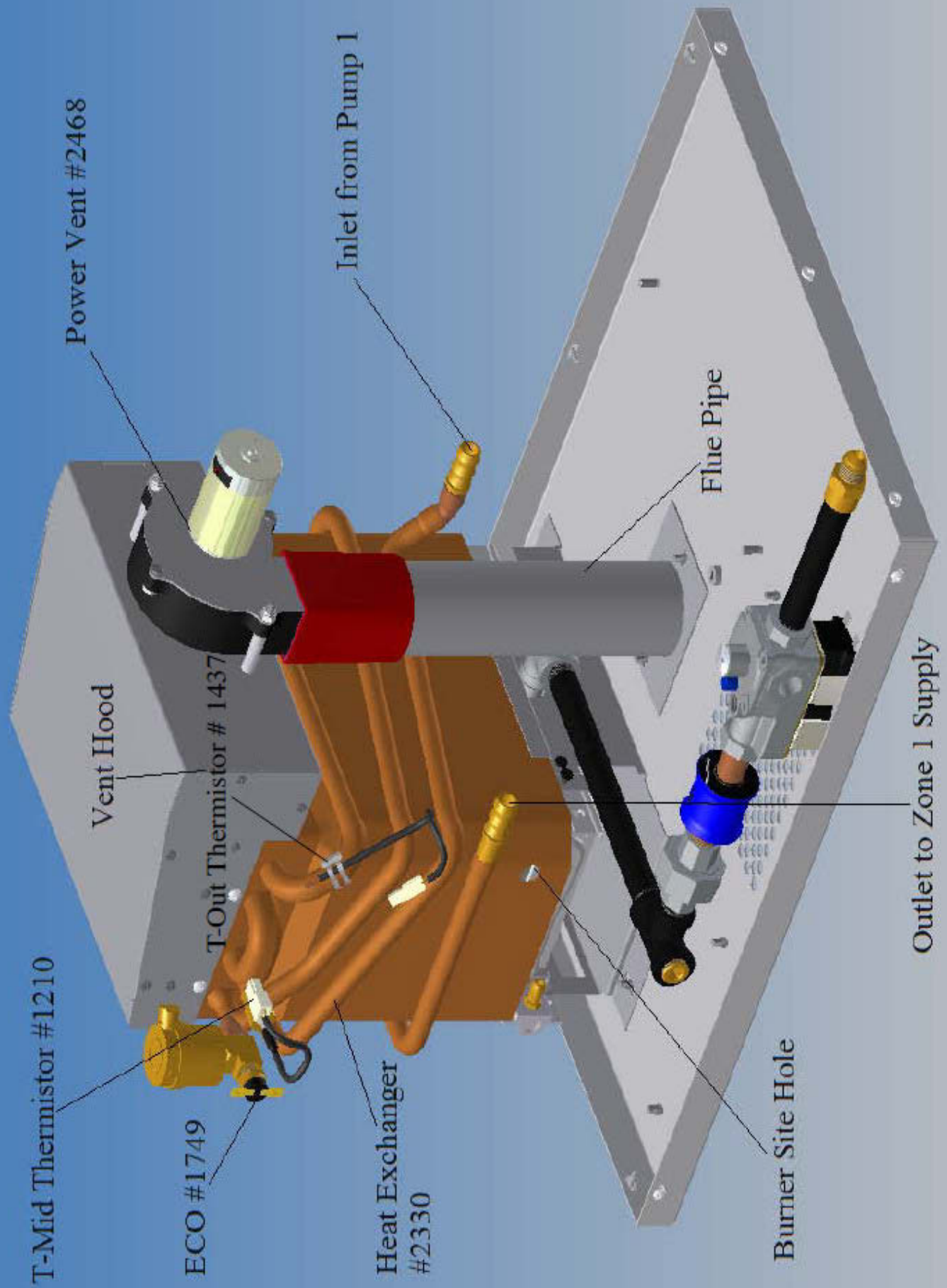
TwinTemp-2 Hookup Panel

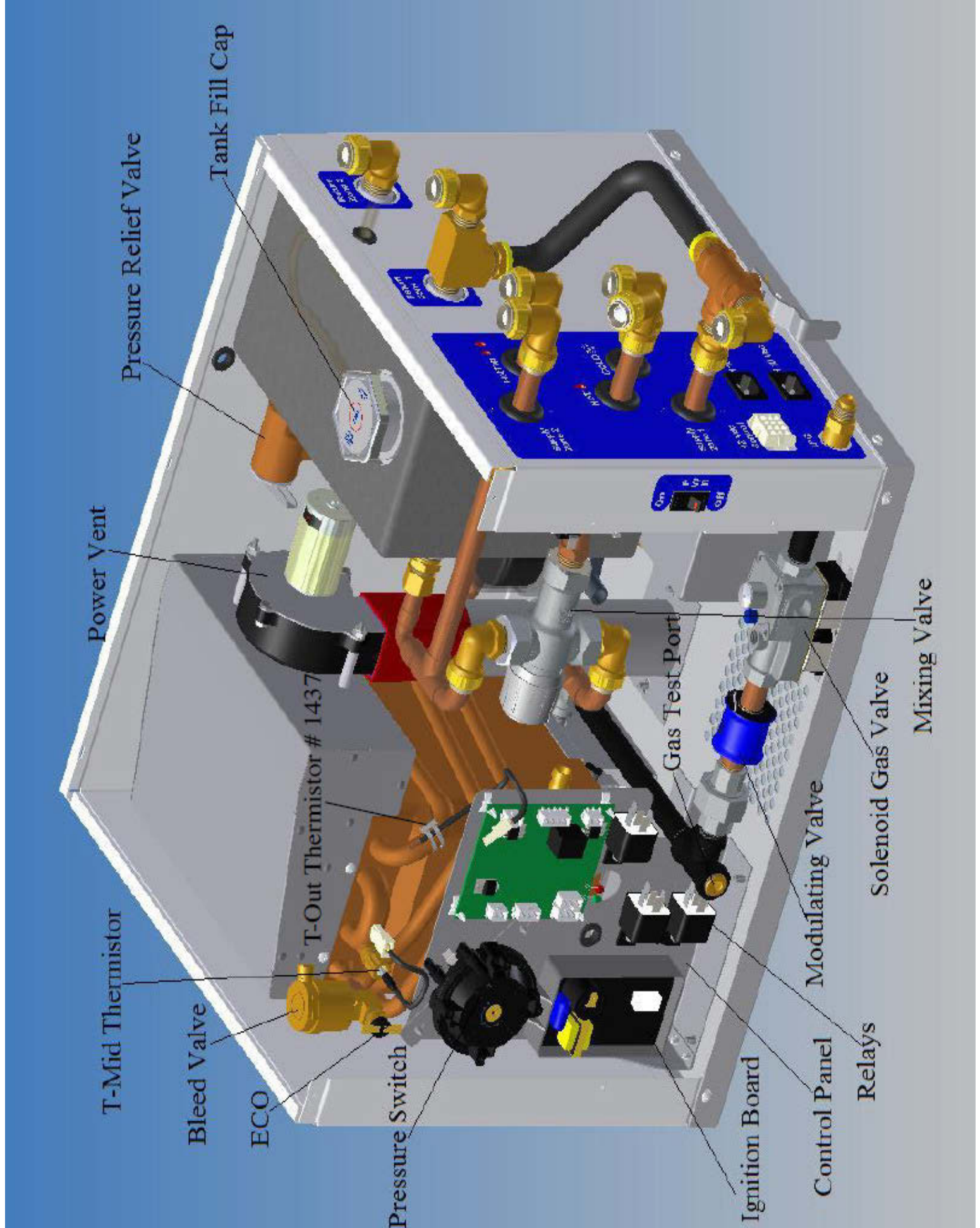


Tank/ Pump Assembly

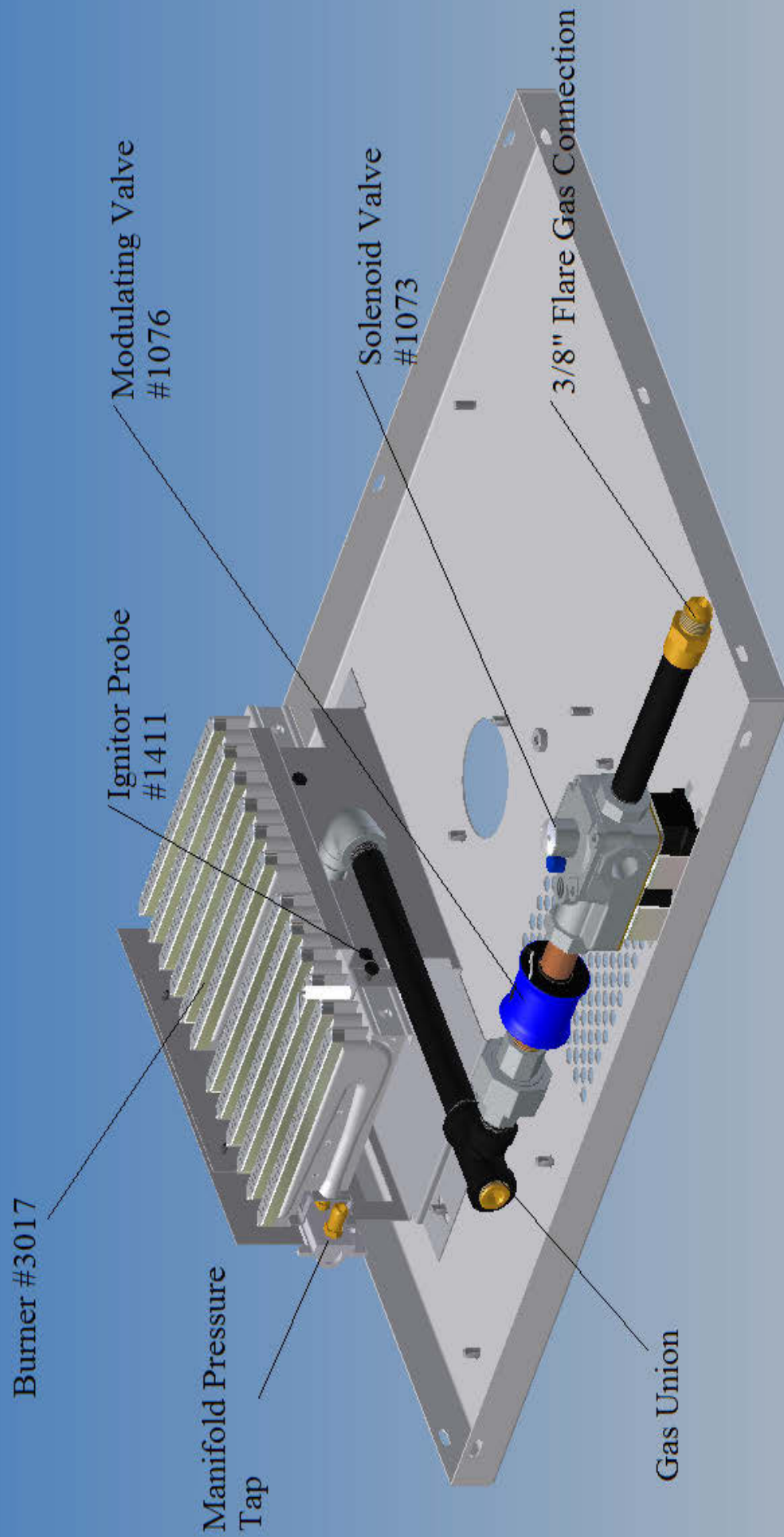


Heat Exchanger/ Flue Assembly

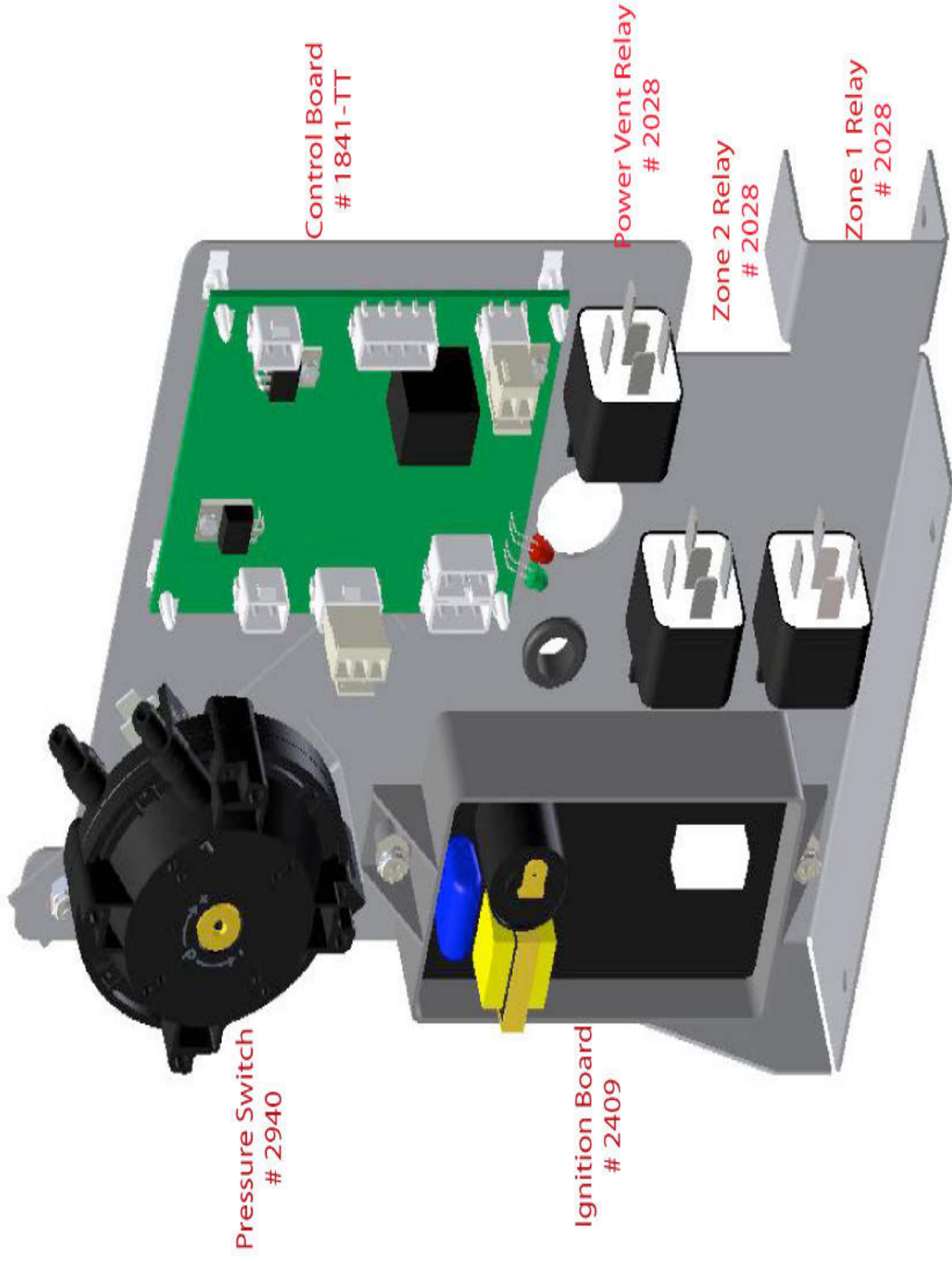


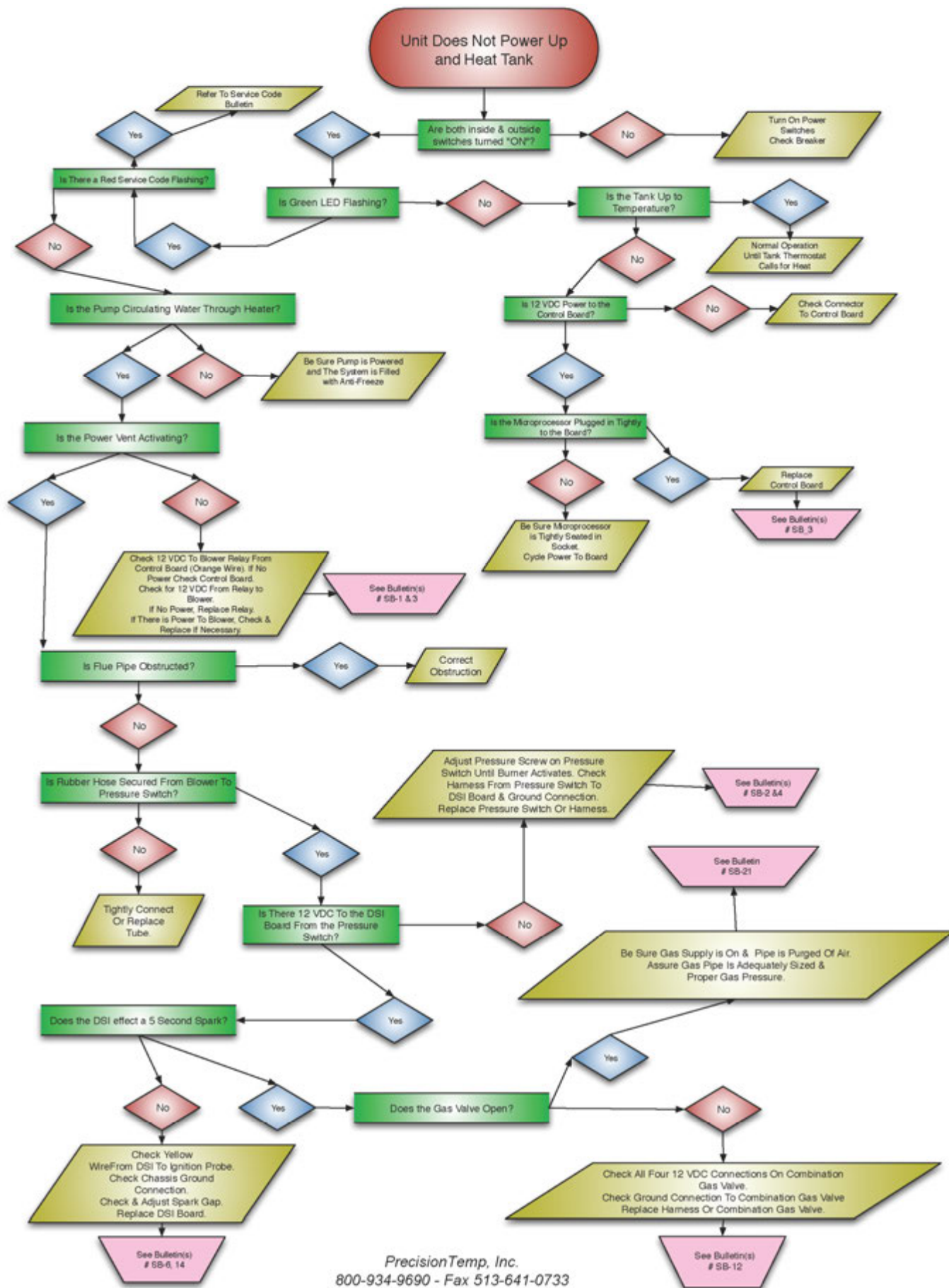


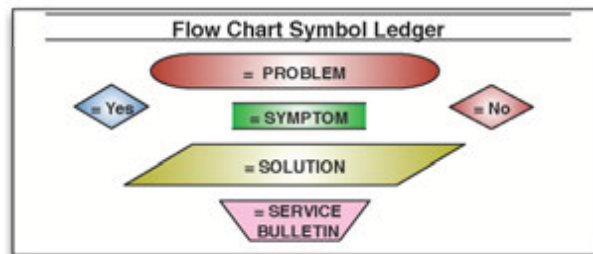
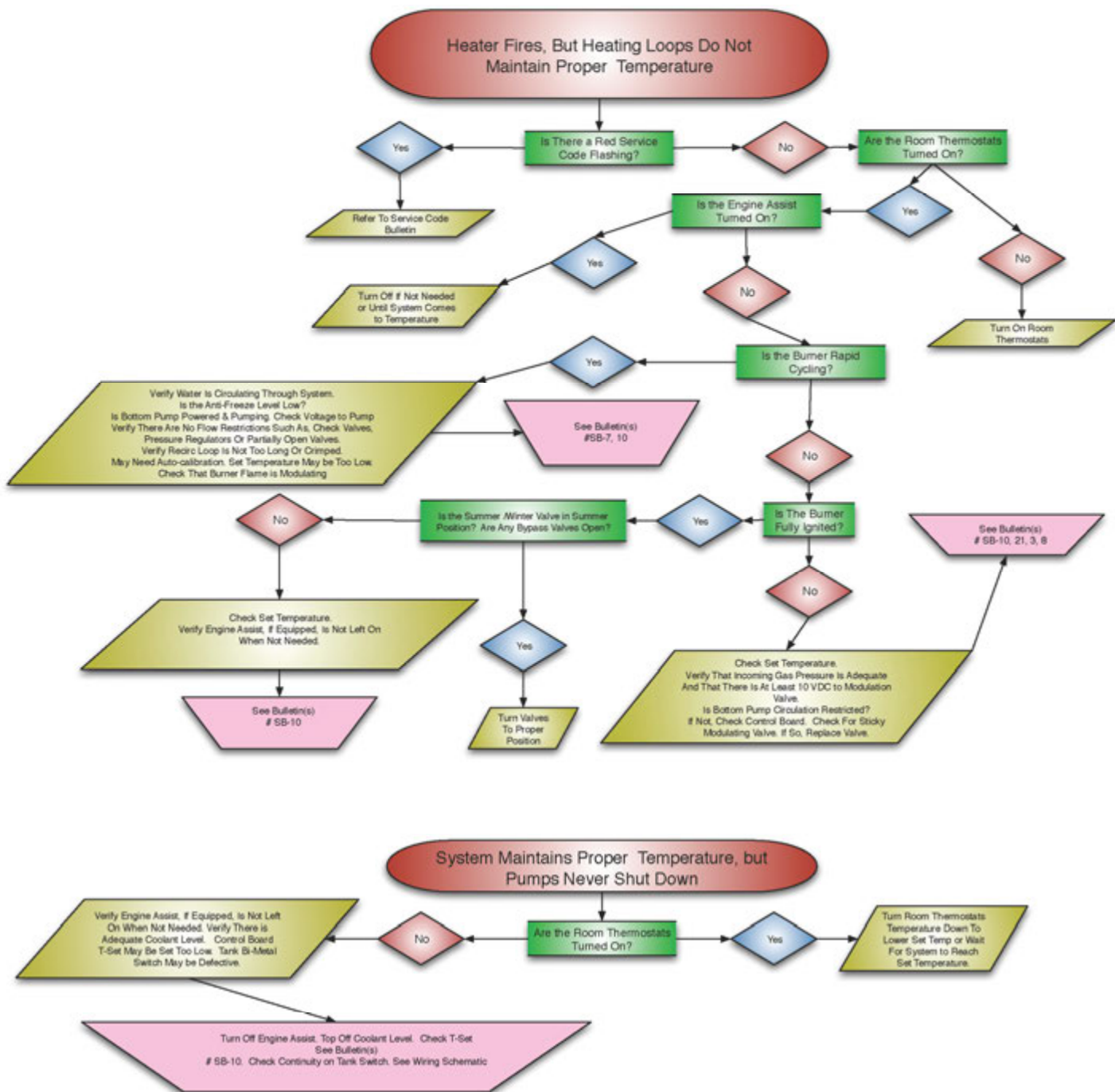
Gas Train



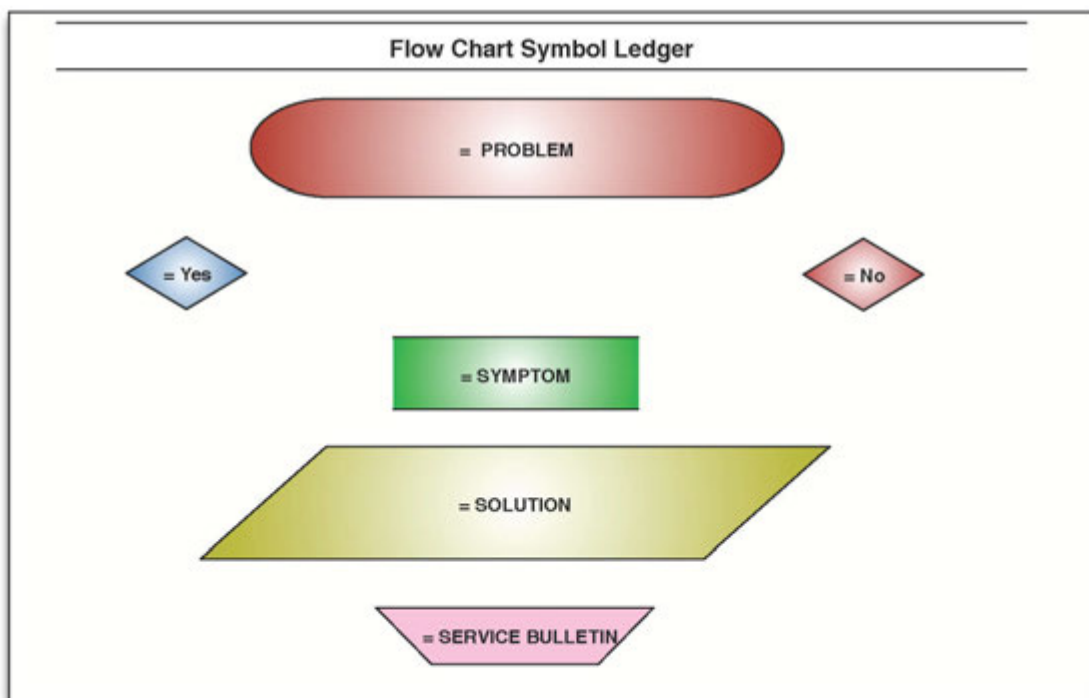
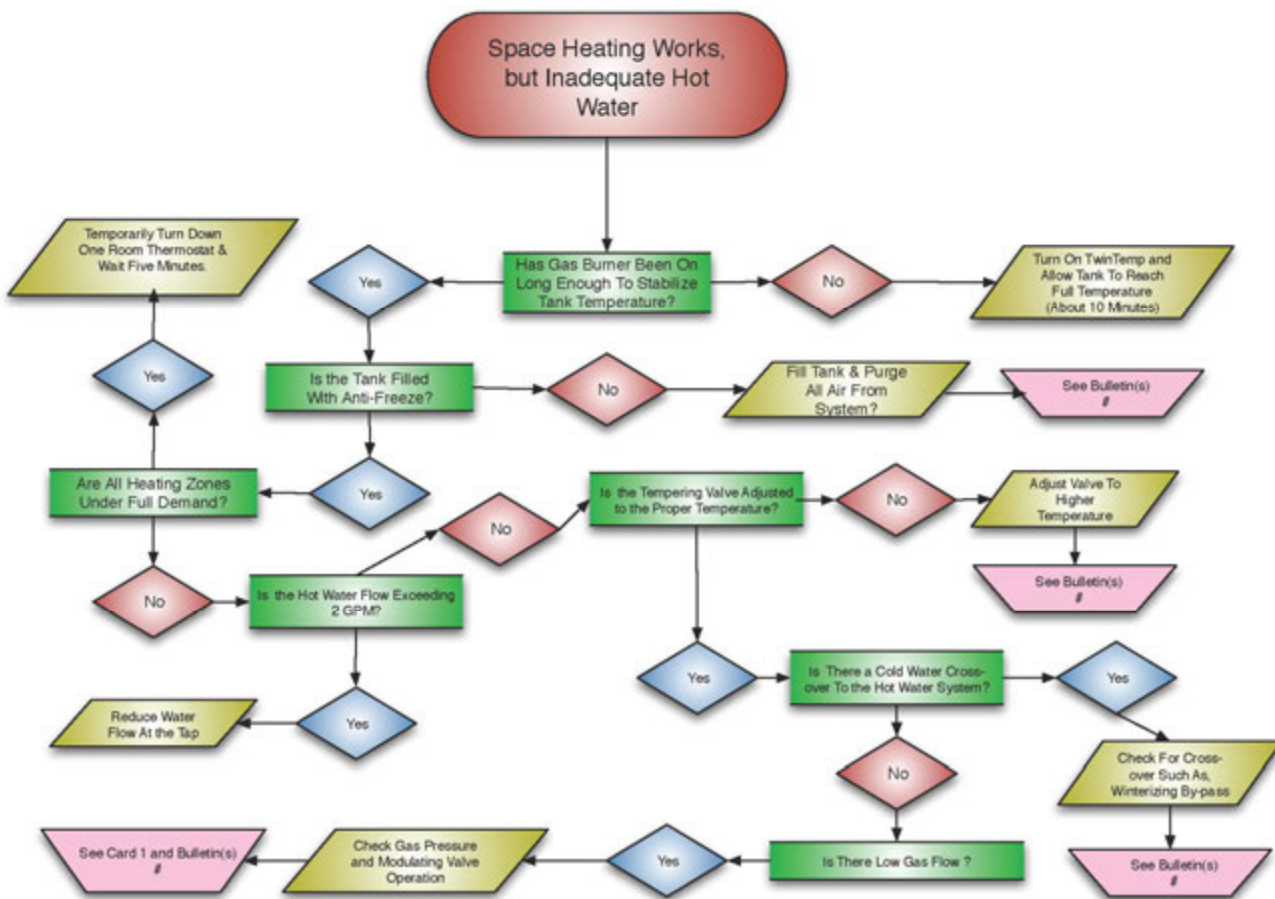
Control Panel



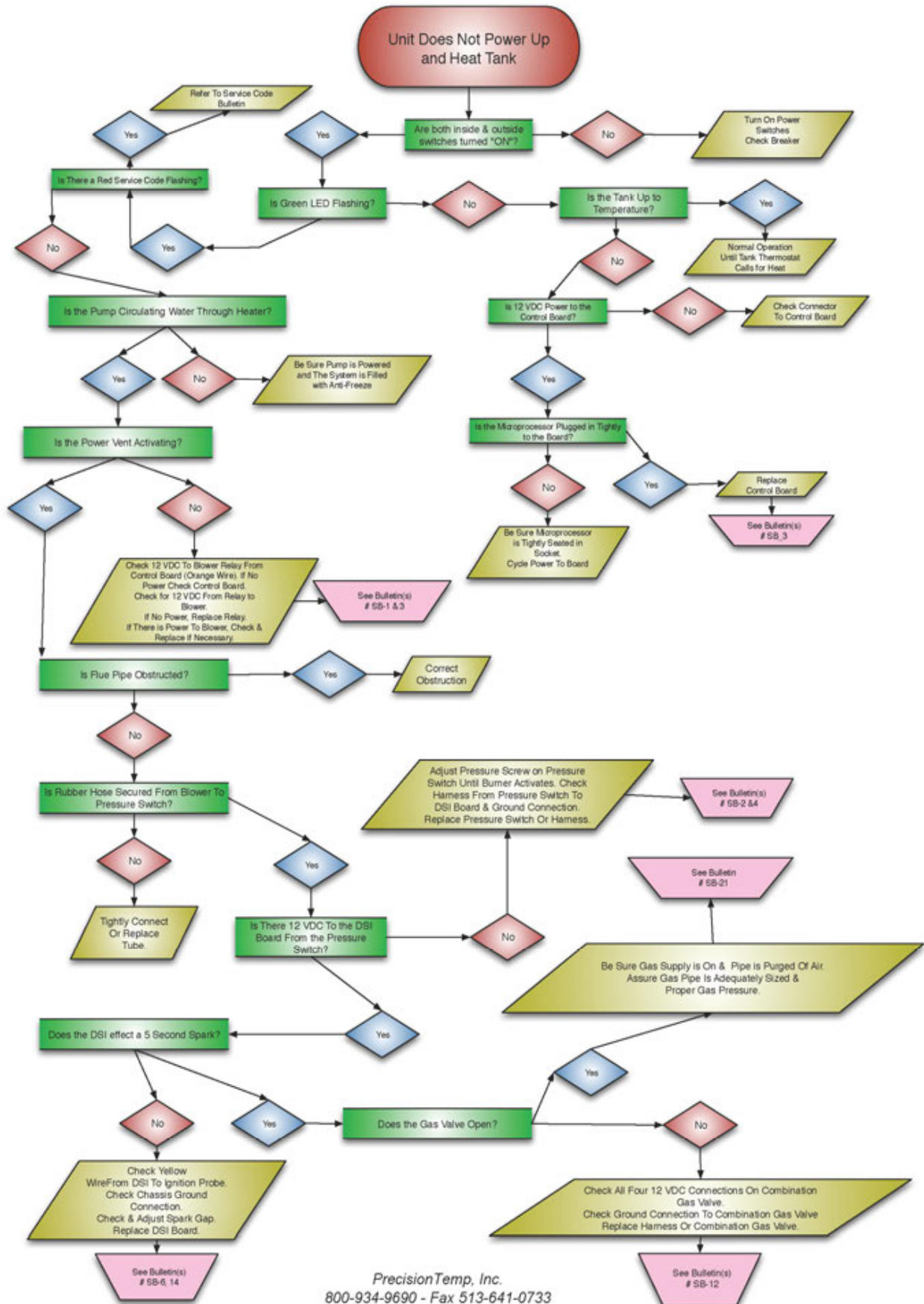




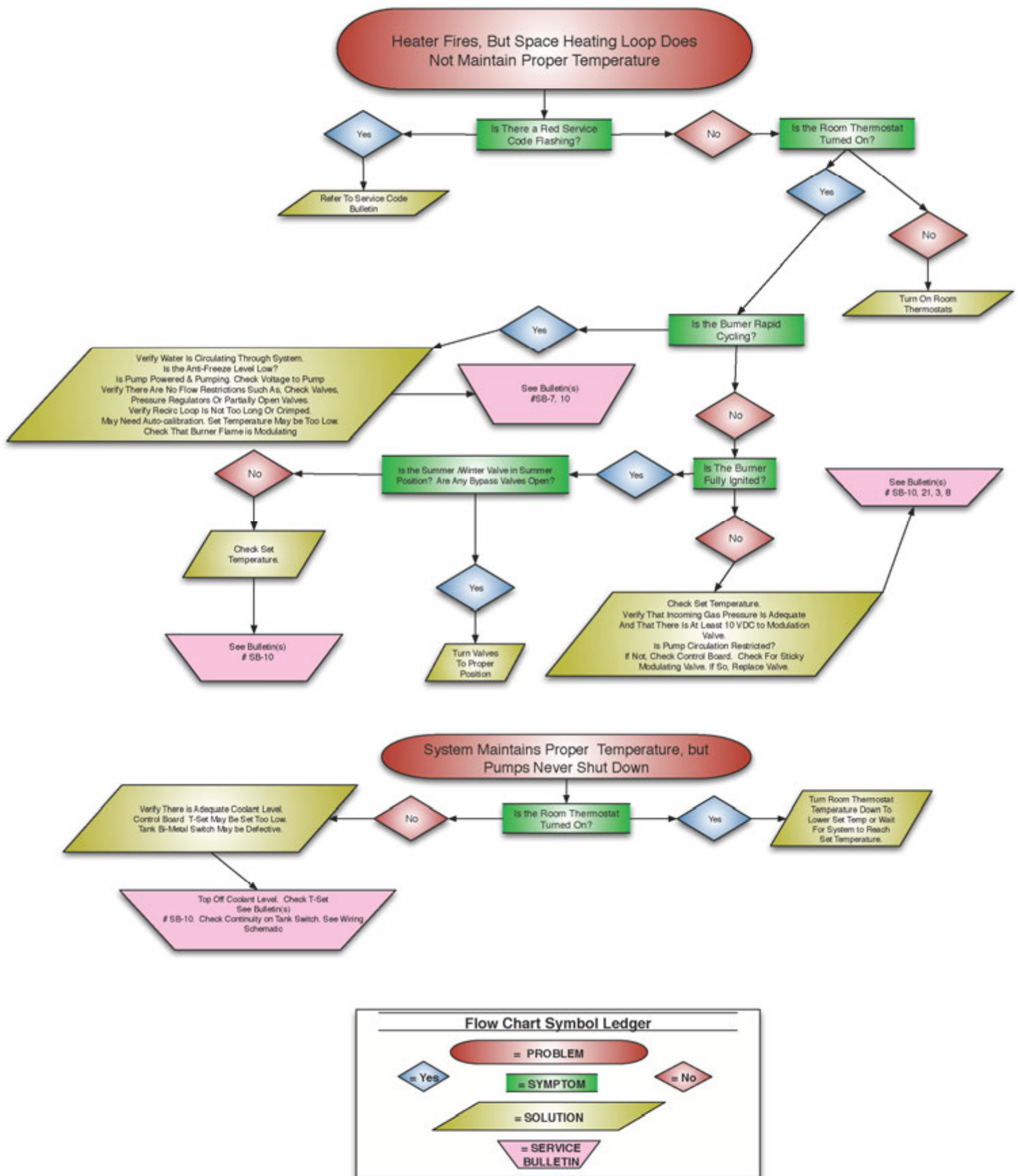
TwinTemp Troubleshooting Guide - Chart 3



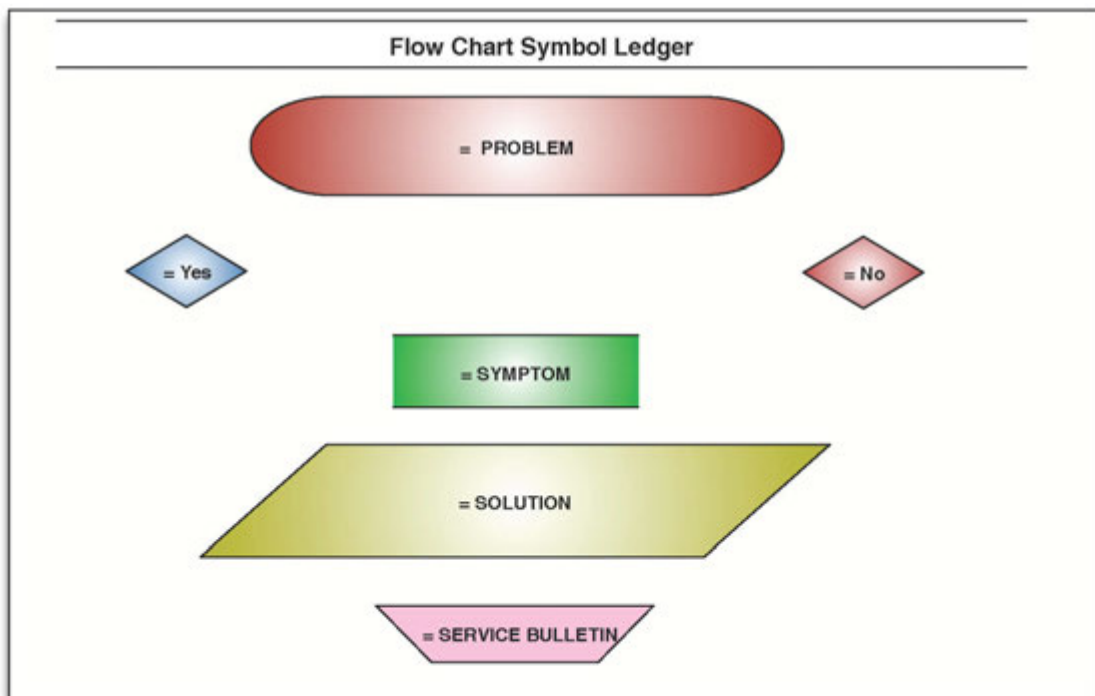
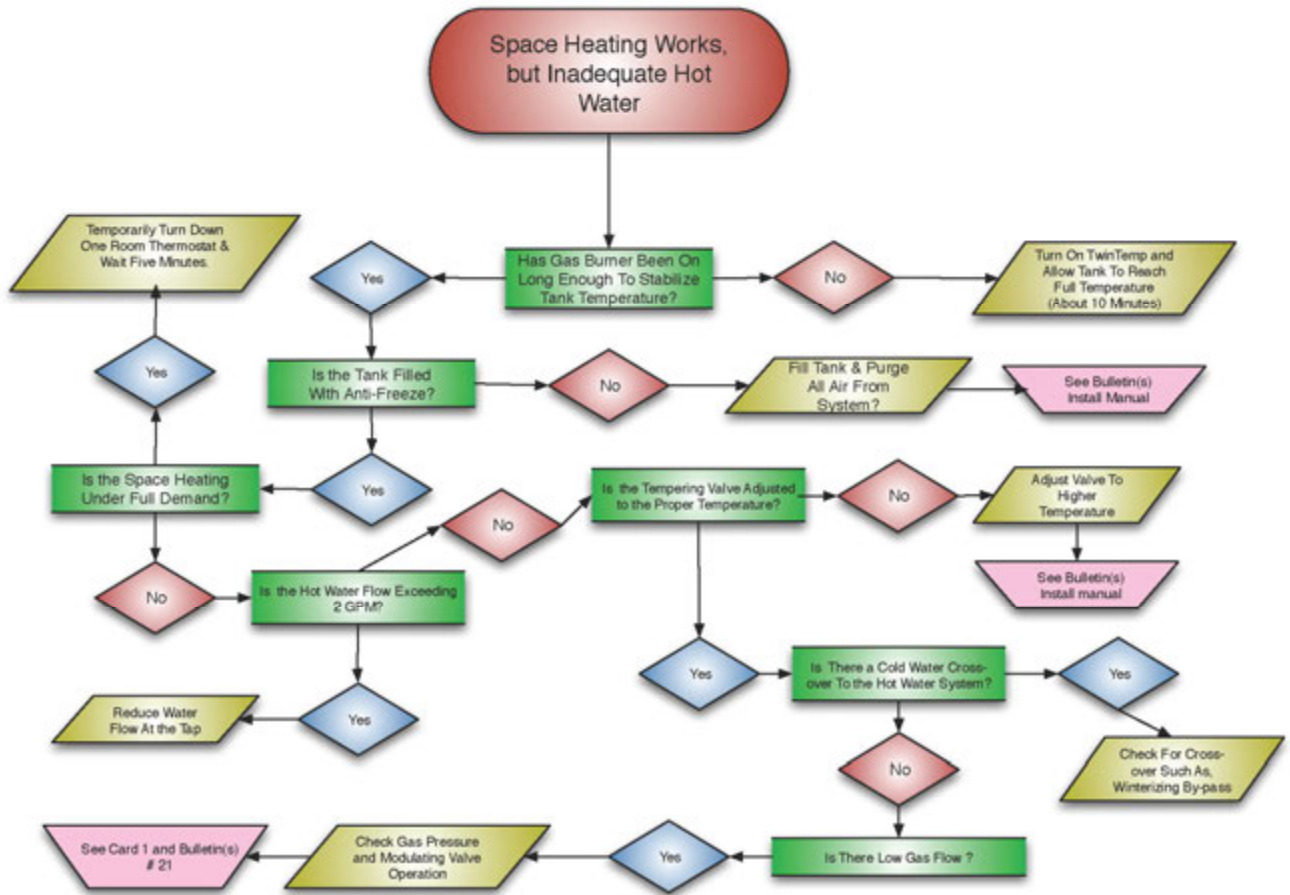
TwinTemp Junior Troubleshooting Guide - Chart 1

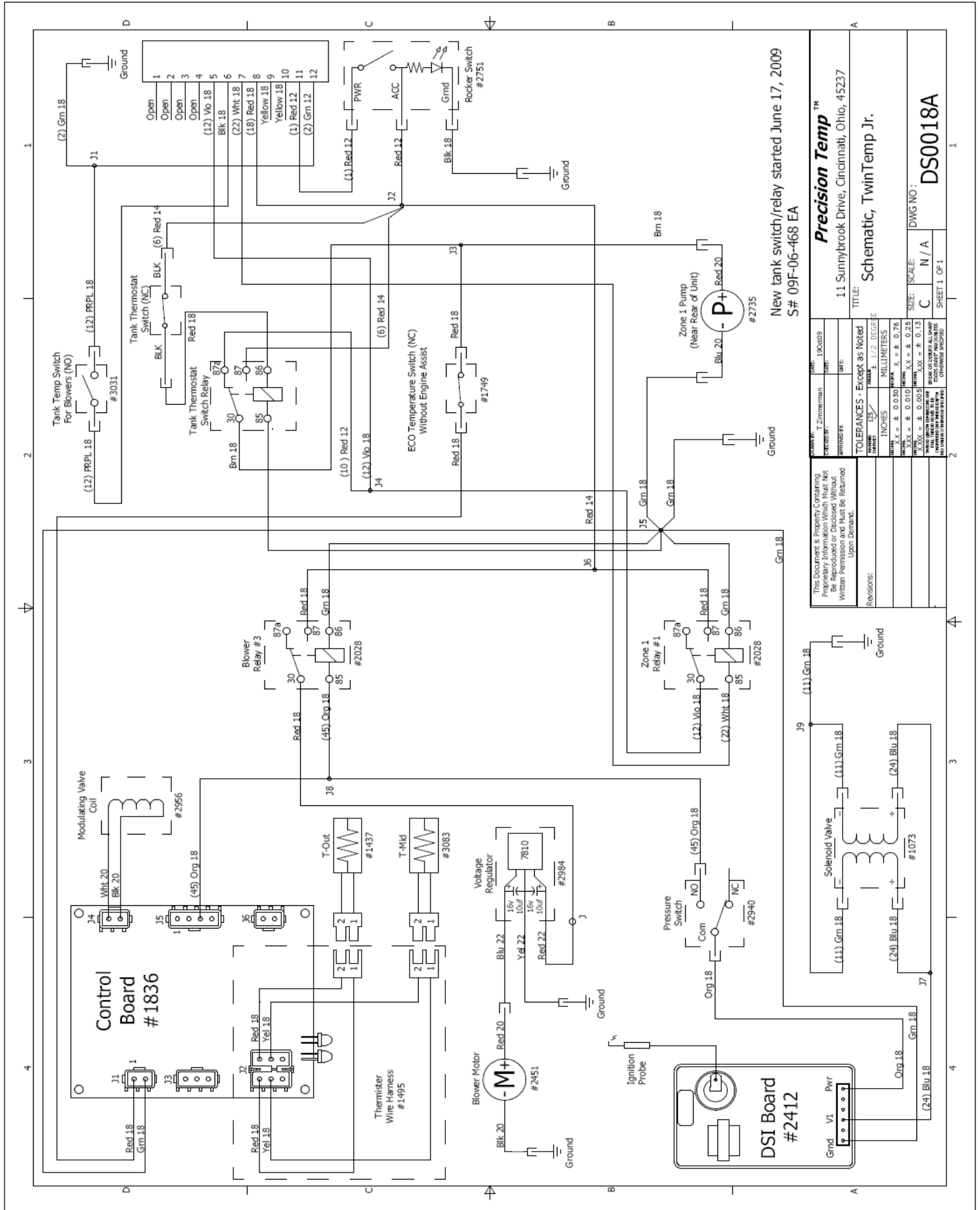


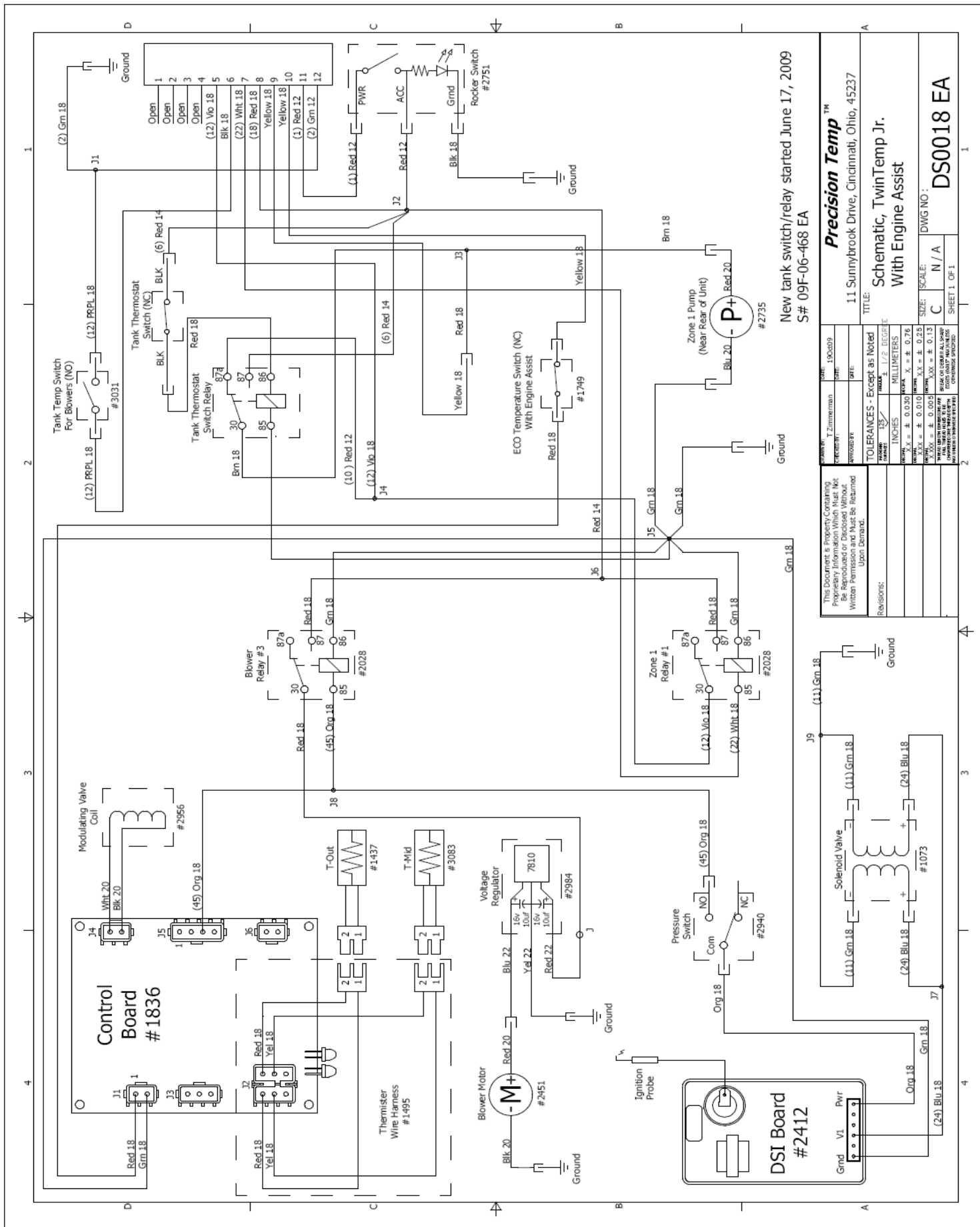
PrecisionTemp, Inc.
800-934-9690 - Fax 513-641-0733
www.precisiontemp.com



TwinTemp Junior Troubleshooting Guide - Chart 3



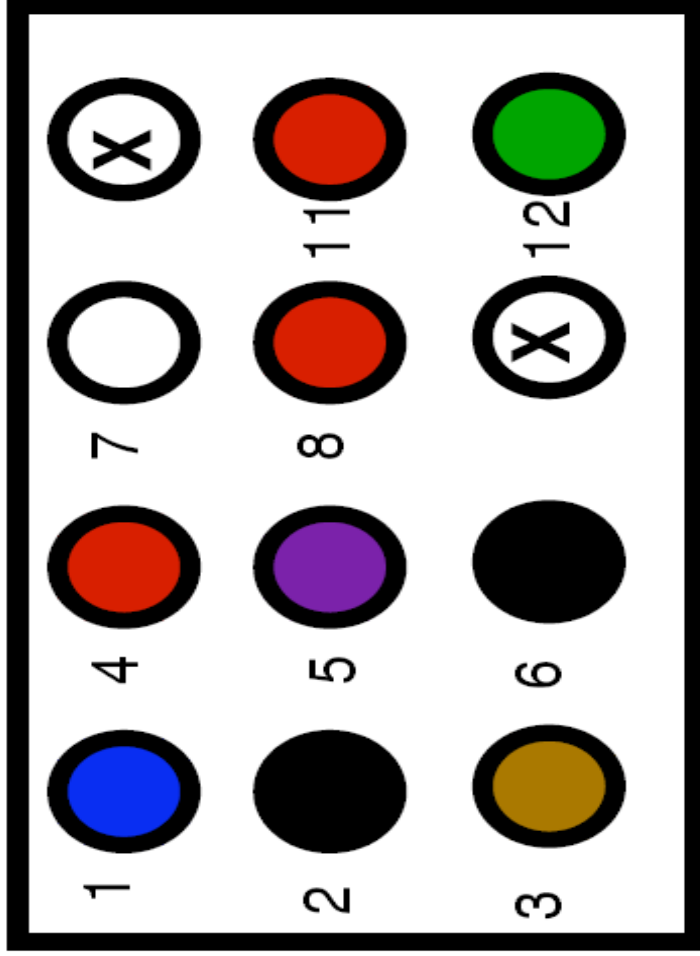




New tank switch/relay started June 17, 2009
S# 09F-06-468 EA

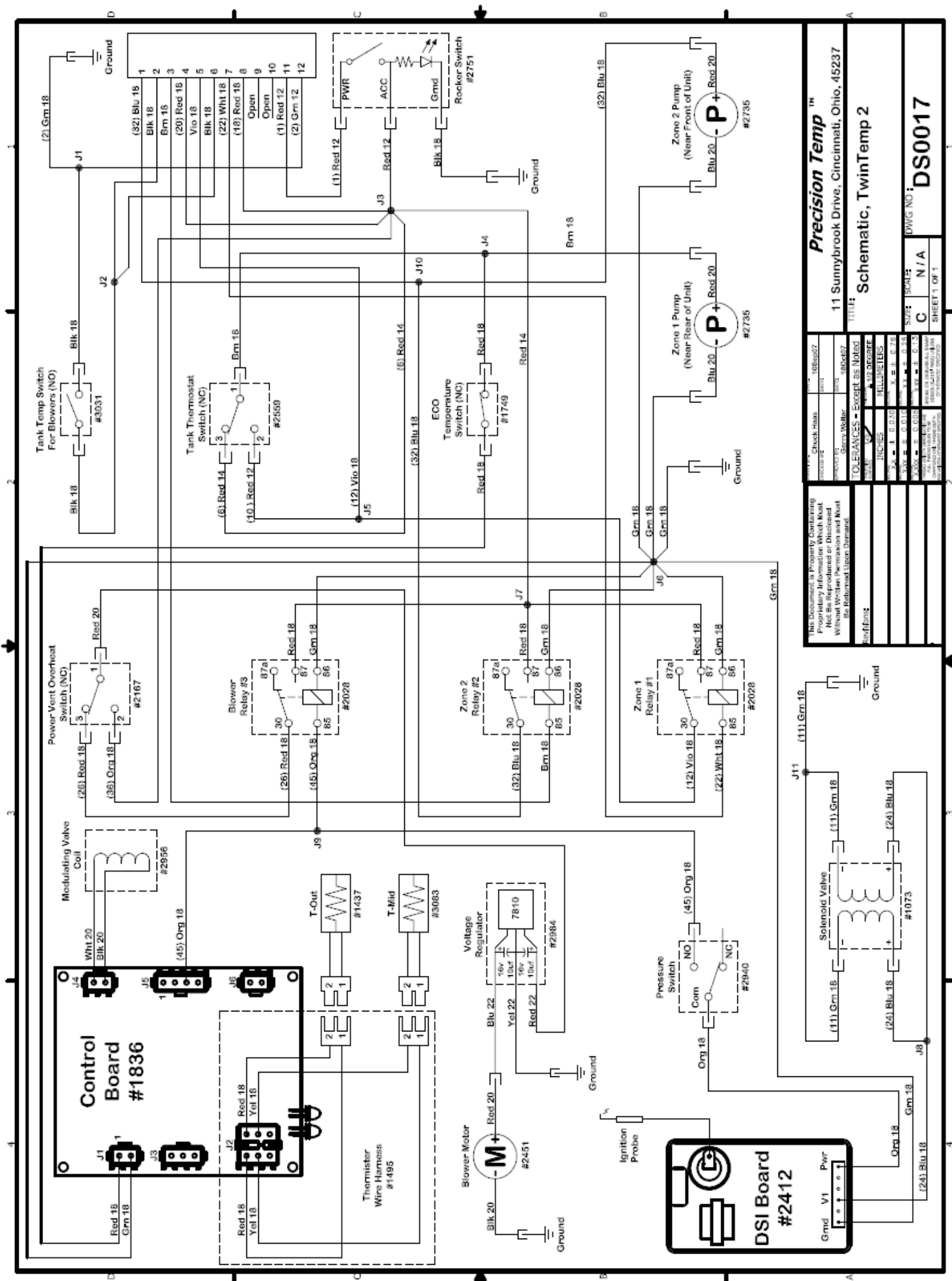
| | | | |
|--|--|--------------------------|-----------------|
| Precision Temp™ 11 Sunnybrook Drive, Cincinnati, Ohio, 45237 | | DATE: 1/30/09 | BY: [Signature] |
| TITLE: Schematic, TwinTemp Jr. With Engine Assist | | SCALE: C | N/A |
| DWG NO: DS0018 EA | | SHEET 1 OF 1 | |
| TOLERANCES - Except as Noted DIMENSIONS: INCHES ± 1/32" DEGREE MILLIMETERS ± 0.13 | | REVISIONS: 1. [Blank] | |
| THIS DOCUMENT IS PROPERTY OF PRECISION TEMPERATURE CONTROLS, INC. IT IS TO BE REPRODUCED OR DISCLOSED WITHOUT WRITTEN PERMISSION AND MUST BE RETURNED UPON DEMAND. | | REVISIONS: 1. [Blank] | |

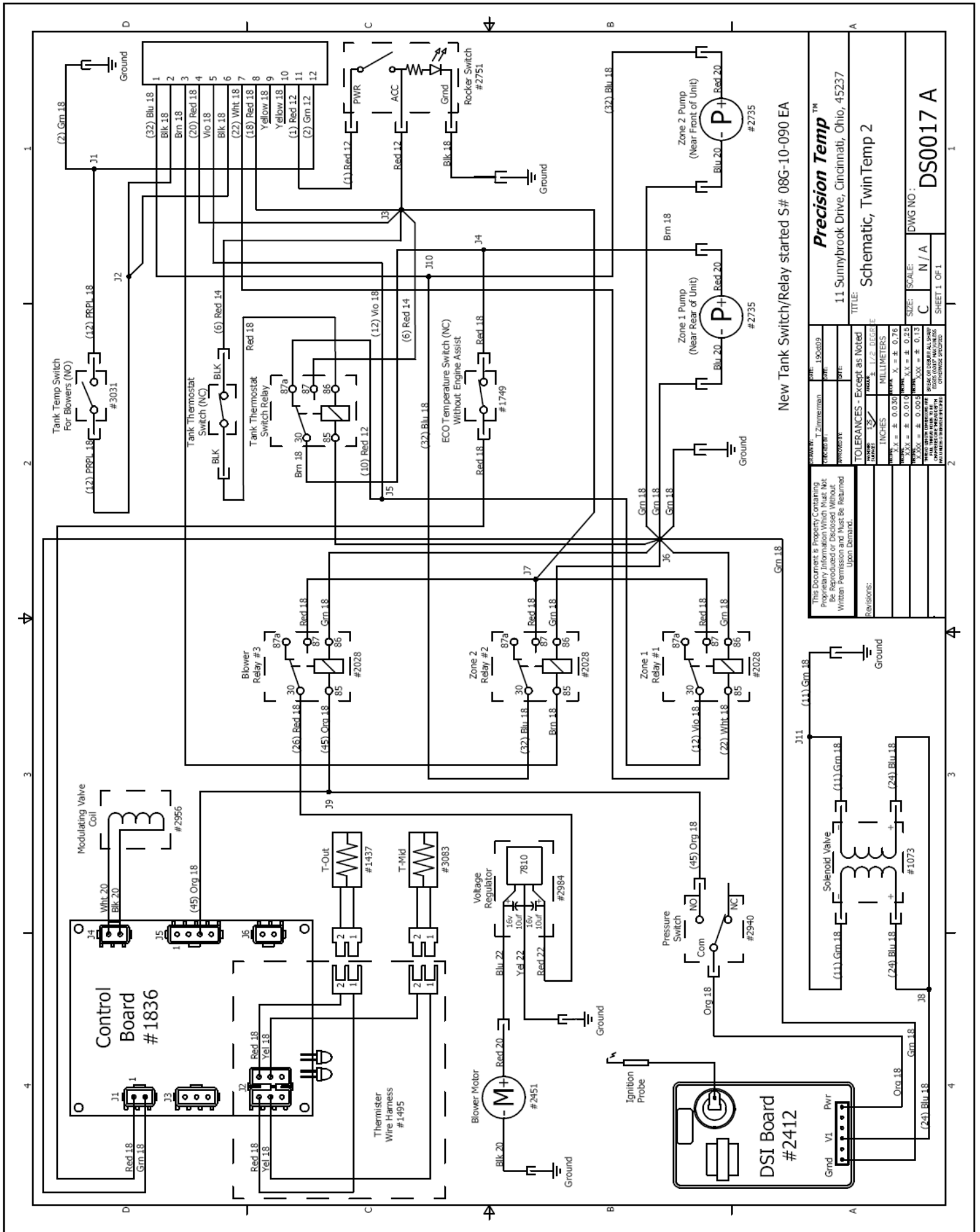
12 Pin Connector Diagram (Viewed From Outside Case)

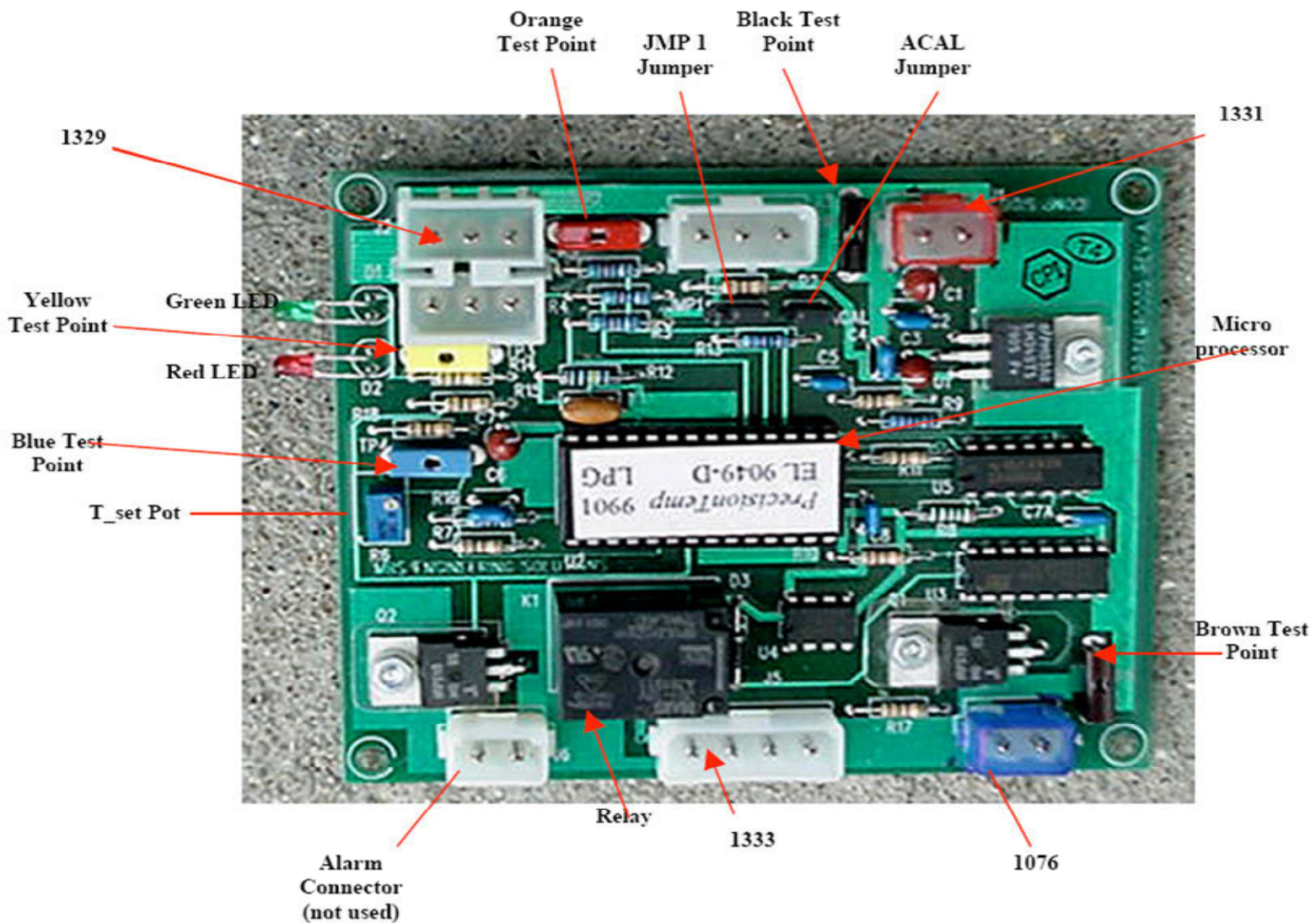


1. Blue Zone 2 Blower +
2. Black Zone 2 Blower -
3. Brown Zone 2 T-stat-
4. Red Zone 2 T-stat +
5. Purple Zone 1 Blower +

6. Black Zone 1 Blower -
7. White Zone 1 T-stat -
8. Red Zone 1 T-stat +
11. Red 12 VDC Supply +
12. Green 12 VDC Supply -







1076- Modulating Gas Valve Connection

1329- Thermistor Wiring Harness Connection

1331- Power Supply Wiring Harness Connector

1333- DSI Wiring Harness Connector

Alarm- Alarm connector not used (in this application)

ACAL Jumper- Jumper for Auto-Cal

JMP 1 Jumper- Board Function Jumper (Do not change!)

Orange Test Point- Test point for T Out Thermistor

Yellow Test point- Test point for T Mid Thermistor

Blue Test Point- Test point for setting temperature

Brown Test Point- Test point for Modulating Valve

Black Test Point- Test point for ground (common)

TwinTemp Service Codes

- **SB-7-RC- Lost autocal or not autocal displays alternating green and red flash**
- **SB-15, 17- T-Mid or T-Out failure displays steady red and flashing green LED**
- **Lock out after 10 ignition attempts displays red and green LED flashing together**

Note: The TwinTemp will reset or clear codes, with power applied to the control board, every 10 minutes. Hard faults or open circuits will not be erased.

TwinTemp Service Bulletin Index

Model: TwinTemp

- SB-01 Power Vent Blower Exchange Procedure
- SB-02 Pressure Switch Adjustment
- SB-03 Circuit Board Replacement
- SB-04 Pressure Switch Replacement
- SB-06 Direct Spark Ignition (DSI) Board Change
- SB-07 Auto-Calibration
- SB-08 Modulating Valve Change Procedure
- SB-09 Heat Exchanger/ Burner Change Out Procedure
- SB-10 Changing Set Temperature
- SB-11 Tempering Valve Adjustment and Replacement
- SB-12 Gas Solenoid Change Procedure
- SB-14 Igniter Cap Adjustment
- SB-15 T-mid Thermistor Change Procedure
- SB-16 T-out Thermistor Change Procedure
- SB-17 Re-Circulating Pump Change Procedure
- SB-18 Temperature Switches Replacement
- SB-19 110VAC Heating Element Replacement
- SB-20 Tank Replacement Procedure (CALL PRECISION TEMP)
- SB-21 Gas Valve Pressure Check and Adjustment
- SB-22 Thermistor Reading Procedure
- SB-23 Removing and Replacing TwinTemp Unit

Model: TwinTemp

SB-I Power Vent Blower Replacement

Other service documents required: SB-2 Pressure Switch Adjustment

- **Tools & Supplies Required-**

- 3/8" nut driver
- 7/16" nut driver
- Phillips Head Stubby Screw Driver
- Flat Blade Screwdriver
- Utility Knife
- Silicone Sealant

1. Remove front panel and top of unit using Phillips head.
2. Disconnect spade connectors from blower and voltage regulator.
3. Remove spring clamp from pressure switch tube and remove.
4. Using 3/8" nut driver, remove the two 10-32 lock nuts from the hood studs securing the blower.
5. Using the 7/16" nut driver, loosen clamps holding rubber collar on flue pipe below blower.
6. Remove the old blower, taking care not to lose the aluminum spacers. Rubber collar may have to be slipped down to remove blower.
7. Install new blower by reversing the process. Be sure to install aluminum spacers. The rubber collar may have to be raised up again so flue pipe installs over the blower outlet.
8. Using silicone sealant, seal opening between blower outlet & flue pipe. Models produced after 1/2010 do not require silicone.
9. Re-connect hose to blower barb and test pressure switch operation using SB-2.

Model: TwinTemp

SB-2 Pressure Switch Adjustment

- **Tools & Supplies Required:**

- Flat blade screw driver
- Stubby Phillips screw driver
- Allen wrench set

1. Remove access panel with stubby Phillips screw driver.
2. Turn the TwinTemp on. With the blower running, verify if the burner is staying on, cycling rapidly or not at all.
3. If burner is not staying on or cycling, using the flat blade screw driver, turn the adjustment screw on the pressure switch counter-clockwise until the burner lights plus one full turn.
4. Block flue. If burner is staying on even with a blocked flue, turn the screw clockwise until burner goes off with flue blocked plus an additional ½ turn.
5. Block flue and verify burner goes out. If it does not, turn screw clockwise until it does.
6. Unblock flue and verify burner ignites.
7. After adjusting the pressure switch perform several ignitions with the cover on case, to verify proper adjustment of the pressure switch by covering and uncovering the flue pipe.
8. Replace access panels.

Ref: TwinTemp Component Illustration

Model: TwinTemp

SB-3 Circuit Board Replacement

Other service documents required: **SB-7** Auto-Calibration, **SB-10** Changing Set Temperature

- **Tools & Supplies Required:**

- Needle-nose pliers

1. Turn off power. Disconnect all electrical connectors at the circuit board. Careful to pull on the connectors, not the wires.
2. Remove the old circuit board. Needle-nose pliers can be used to remove the circuit board nylon standoffs.
3. Install the new board with the LED's located on the lower left side. Reconnect all connectors to the board. CAUTION: there are three two-pin connectors. Be sure that the power supply connector (red and green wire) goes to upper right corner (red connector) and the modulating valve connector (black wire) goes to lower right (blue connector) (see Heater board diagram). The third two-pin connector should already have a connector installed into it. Leave this connector as is.
4. The set temperature should be preset to 4.45-4.60 VDC (195°F). Refer to manual if a further adjustment is needed. See SB-10.
5. Perform auto-calibration per SB-7.

Kit Parts List:

P/N 1841-56 control board and 9098-O Micro-controller chip (already installed in board)

Model: TwinTemp

SB-4 Pressure Switch Replacement

- **Tools & Supplies Required:**

- Stubby Phillips screwdriver
- 11/32" nut driver
- Utility knife

1. Remove access panel with stubby Phillips screw driver.
2. Turn off gas and electric to unit.
3. Disconnect 1/4" spade connectors.
4. Disconnect 1/4" ID rubber vacuum tube. Cut with utility knife if necessary.
5. Remove lock nuts from studs using 11/32" nut driver.
6. Install new switch, reversing above procedure.
7. Test switch and adjust if necessary using service bulletin # SB-2.
8. After adjusting the pressure switch perform several ignitions with cover on case, to verify proper adjustment of the pressure switch by covering and uncovering the flue pipe.

Ref: Pressure switch #2940, TwinTemp Component Illustration, Service bulletin SB-2

Model: TwinTemp

SB-6 Direct Spark Ignition (DSI) Board Change

- **Tools & Supplies Required:**

- 11/32" socket
 1. Turn off power
 2. Remove front access panel and disconnect all connectors from the DSI board. Be sure to pull on connectors, not wires.
 3. Remove the DSI board and re-attach the wire harness. Be sure to route the ignition wire separate from the other control harnesses. (If a new harness is supplied, use it and discard the old harness.)

Kit Parts List: #3158 Direct spark ignition board

Reference illustrations: Components Illustration

Model: TwinTemp
Software: 9098K and Later
SB-7 Auto Calibration Procedure

- **Tools & Supplies Required:**

- Needle nose pliers

1. Turn off power. Let system cool to under 120° before proceeding. Remove access panel. From the heater control board, remove the 2-pin (right) jumper from the terminal marked “Acal” using pliers or fingers (see view of Heater Control Board). Be sure gas supply is on.
2. Turn power ON. The unit will ignite at the ignition gas flow and fluctuate the gas flow to the burner. Over the next 1 minute the gas flow will change slightly as the computer determines the proper voltage for minimum flow. After the computer completes auto-calibration the burner will automatically shut off.
3. Turn off power.
4. Replace jumper on board.
5. Turn power on to check the unit for normal operation.

Figures- 200-14 View of heater control board

Model: TwinTemp

SB-8 Modulating valve replacement

- **Tools required:**
- 13/16" open end wrench
- 12" adjustable wrench.

When performing the following, always back up mating plumbing fitting with a wrench to avoid damage to gas train. Be sure not to allow any pipe dope to get into any components of the gas train. NEVER use pipe dope on a flare fitting.

1. Turn off power to unit.
 2. Disconnect the blue & white wire connected to the gas valve.
 3. Turn the gas supply to the unit off.
 4. Unplug modulating valve wire from the heater control board.
 5. Separate the gas union between the burner and modulating gas valve with the adjustable wrench.
 6. Remove flare nut from inlet fitting of gas valve with 13/16" wrench.
 7. Remove the gas valve assembly and then remove modulating valve from gas valve.
 8. Install new modulating valve in reverse order using approved pipe sealant, taking care that sealant does not get into the modulating gas valve. Be sure to observe gas direction arrows when re-assembling.
 - 9. Pressurize gas line. An auto-calibration must be done after replacing the modulating valve. (See bulletin # SB-7)**
- ▶ **Be sure to check all gas fittings with a leak test solution before energizing. After energizing, check for leaks at the union.**
- ▶ **Note: It may take several attempts at ignition to purge all of the air out of the refitted gas line.**

Figures- 200-14 Component illustration, Auto Calibration bulletin #SB-7

Model TwinTemp
SB-9 Heat Exchanger/ Burner Assembly Replacement

- ▶ Contact PrecisionTemp Service Department
- ▶ 513-641-4446 or 800-934-9690

Model- TwinTemp

SB-10 Changing Set Temperature

- Tools & Supplies Required-
- Small flat blade screwdriver
- Digital Multimeter

The temperature on the TwinTemp Junior has been factory set to approximately 195° antifreeze temperature. It is not recommended that you change this setting. Doing so could result in inadequate performance and the pump never shutting down. If it is necessary to change the setting please follow the instructions below.

1. Open access door. Locate the Heater Control Board (see Heater Control Board illustration). The adjustment screw is located on a small blue block at the left side of the board.
2. A small bald screwdriver should be used. To decrease temperature, turn screw counterclockwise.
3. Use a voltmeter, placing the black lead into the black test point and the red lead into the blue test point. Adjust the screw to read 4.40 VDC – 4.60 VDC on the voltmeter. This will set the temperature control to the recommended temperature.
4. Now run heater stabilization temperature with all blowers off. There should be no sign of boiling and the pump should shut down when tank reaches proper set temperature.

See Heater Control Board illustration

Model: TwinTemp

SB-11 Tempering Valve Adjustment and Replacement

- **Tools & Supplies Required-**
- Channel Locks
- Phillips screwdriver

The tempering valve is adjusted to about 120° at the factory. It is not advisable to set it to a higher temperature, since scalding may result. If adjustment is needed, proceed as followed.

1. Turn on TwinTemp Junior until tank is up to operating temperature.
2. Remove front cover & locate tempering valve (see TwinTemp Junior Components Illustration).
3. To increase hot water output temperature, turn gray knob counter-clockwise. To decrease the temperature turn gray knob clockwise. Adjustments should be made in ¼ turn increments.
4. Turn on hot water and tap and let run for at least 45 seconds to test outlet temperature and re-adjust if necessary.

To replace the valve, proceed as follows. Newer models will have quick disconnect fittings replacing nuts and gaskets.

1. Remove front cover.
2. Turn off water pressure, depressurize system and let cool.
3. Using the Channel Locks loosen the three large nuts on the ports of the tempering valve and remove back nuts completely.
4. Slide old tempering valve and gaskets off of the mating flanges.
5. Take care to clean dirt and old gaskets off of the mating flanges.
6. Slide new valve into place, taking care to install in proper orientation (Hot inlet up).
7. Carefully slide new gaskets between the valve housing and mating flanges.
8. Tighten the nuts with the Channel Locks.
9. Turn on water pressure and check for leaks.
10. Adjust temperature as described above.

Kits Parts List & References- #3128- Tempering Valve with shark bite fittings 100°-145°F, TwinTemp Components Illustration

Model: TwinTemp

SB-14 Igniter Adjustment

- **Tools & Supplies Required:**

- Short Phillips screwdriver
 - Small flashlight
1. Remove access panel from TwinTemp
 2. Turn power off, water off and gas off.
 3. Remove ignition cable from bottom of igniter probe. Pull on connector, not the wire.
 4. Loosen screw on igniter clamp enough to allow for movement of the probe.
 5. Through open in lower heat exchanger view igniter probe position over burner.
 6. Manually turn probe to position the tip directly over burner element, allowing for a 1/8" gap.
 7. Hold probe in set position and tighten screw to secure it, being sure probe is still directly over burner element and about 1/8" above it.
 8. Reinstall Ignition Cable.
 9. Turn on power only. When unit tries to ignite, view spark through opening. Verify proper gap and spark during ignition.
 10. Reinstall access panel, turn water and gas supply on.

Model: TwinTemp

SB-15 T-mid Thermistor Change Procedure

- **Tools & Supplies Required:**

- 9/16" open end wrench
 - Adjustable wrench
1. Remove old thermistor. CAUTION: Use two wrenches on the hex (9/16") of the thermistor and an adjustable wrench on the hex located on the heat exchanger fitting. Failure to do so may seriously damage the heat exchanger.
 2. Slide the nut and the new ferrule over end of the thermistor probe with tapered end toward tip.
 3. Insert the thermistor tip into the heat exchanger until the heat shrink (black) on the thermistor touches the fitting and tighten the fitting finger-tight. The final tightening should be done using two wrenches as described in step 1.
 4. Check the resistance across the thermistor leads. Under room temperature conditions the value should be between 700-1100 OHMS. A further check can be done by comparing the resistance to the other thermistor. If both thermistors have been exposed to the same temperature they should be within +/- 50 OHMS.
 5. Wrap the harness together with the other thermistor harness and connect into the yellow thermistor harness that goes back to the control board.

Kits Parts List: #3207 T-mid thermistor including ferrule

Model: TwinTemp

SB-16 T-out Thermistor Change Procedure

- **Tools & Supplies Required:**

- Scissors (or other cutting tool)

1. Remove the wire ties, metal tape, and old thermistor. Clean off the old heat sink and be sure copper is wiped clean. Note: some units may have a clip on thermistor that just snaps off the pipe.
2. Place an ample amount of heat sink compound on the pipe wire where the thermistor will be located.
3. Place the thermistor into the heat sink with the wire leads pointing down along the tube.
4. Wrap metal tape around the tube and thermistor (or snap on new thermistor).
5. One wire tie goes around the wires as a strain relief. The other goes near the thermistor (about ¼" away from the head) to hold the thermistor against the tube. **Caution: 1) Do not place the tie wrap over the thermistor as may crack the thermistor, and 2) do not over tighten the wire ties.**
6. Wrap the thermistor harnesses together and connect into the thermistor harness that goes back to the control board.
7. Perform test of the unit.

Kits Parts List: #1437 T-out thermistor

Model: TwinTemp

SB-17- Re-circulating Pump

• **Tools & Supplies Required:**

- Phillips screwdriver
- Side cutters
- Ratchet with 3/8th wrench
- Needle nose vise grips

1. Turn off power and gas and let system cool.
2. Zone 2 pump must be removed to access Zone 1 pump.
3. Depressurize tank by carefully opening the fill plug located on the tank under the top of the access panel.
4. Remove front access panel. Zone #2 pump is located closest to the access door.
5. Drain and save fluid from the system.
6. Disconnect connectors from the pump. Be sure to pull on the connectors and not the wires.
7. Clamp off black hose pump with vise grips. Using the side cutters cut the banded clamps off the hose. Take clamp off black pump hoses using the vise grips.
8. Carefully cut banded clamps on the suction and discharge side of the pump.
 9. Using a 3/8th quarter inch drive socket remove the 2 nuts from pump bracket.
10. Remove connectors from pump. Be sure to pull on connectors, not the wires. Carefully remove pump from unit.
11. Reverse procedure to re-install using new hose clamps.
12. To remove Zone 1 pump the Zone 2 pump must be removed first.
13. Using the same procedure used in removing the Zone 2 pump, disconnect and remove the Zone 1 pump.
14. Reverse procedure to re-install.
15. Fill system with fluid.
16. Check for fluid leaks and top off fluid.
17. Turn gas on and run the TwinTemp-2/ Junior for 12-15 minutes to bleed any trapped air pockets in plumbing, re-check for leaks and top off fluid.
18. Top off fluid with a 50/50 mix of Rhogard Propylene Glycol Boiler antifreeze

Note: If a banging sound is heard during ignition, an air pocket is trapped in the heat exchanger. Turn off gas and continue to purge air from the system for an additional 15-20 minutes.

Model: TwinTemp

SB-19 Electric Heating Element

- **Tools & Supplies Required:**

- 1-1/2" deep well socket
- 11/32" socket

1. Disconnect all power from TwinTemp, de-pressurize tank and drain anti-freeze.
2. Remove access cover from the TwinTemp unit.
3. Remove 11/32" nuts from the heating element cover.
4. Slip cover to left.
5. Disconnect wires from heating element.
6. Using a 1 and 1/2" deep socket turn counter-clockwise and remove element.
7. Reverse procedure for installation being sure to install new gasket.
8. Top of fluid level in tank and purge all air from the system.

Kits Part List: # 2248 Electric Heating Element,
50/50 propylene glycol boiler antifreeze / water mix

Model: TwinTemp

SB-21 Gas Pressure Check and Adjustment

- **Tools & Supplies Required:**

- Small flat blade screwdriver
- 3/16 hex key, Manometer
- 1/8" NPT fitting from manometer hose
- **Dynamic gas supply pressure (to TwinTemp regulator)= 11.0 WCI**

1. Turn off power to TwinTemp unit.
2. To test manifold gas pressure, use a 5/16" allen wrench or 3/8" open end wrench to remove test port plug. Install tube from manometer using a 3/8" npt onto test port. Be sure it is a tight fit and doesn't leak.
3. Turn power on. The TwinTemp unit will start the ignition sequence and the burners will ignite.
4. Gas pressure should read between 1.0 WCI (at low burn) to 9.2 WCI (at max burn).
5. Placing a magnet between the mod valve coil and the combination gas valve will fully open the modulating valve. Maximum gas pressure should read between 9 WCI and 9.5 WCI.
6. When testing is completed turn off power and close valve at the test port.

- **To test gas pressure at the Maxi Control valve:**

1. Turn off power to TwinTemp unit
2. To test gas pressure at the Maxi Control valve, remove the hex plug from the valve. Insert a 1/8" NPT fitting in place of the plug and connect hose from the manometer.
3. Turn on power to TwinTemp unit.
4. The TwinTemp unit will start the ignition sequence and the burners will ignite.
5. Gas pressure should read approximately 11 WCI with the burner on.
6. If an adjustment is needed to reach 11 WCI remove the pan head screw from the Maxi Control and turn the nylon screw which is exposed. Turn the nylon screw clockwise to increase and counter-clockwise to reduce pressure, not to exceed 11 WCI.
7. When testing is complete turn off power and reinstall plug and screw in Maxi Control Valve.

NOTE: if maximum pressure cannot be achieved by adjusting the Maxi Control valve, check the main gas regulator at the propane supply and adjust if necessary to achieve the 11 WCI.

Model: TwinTemp

SB-22 Thermistor Reading Procedure

The precise temperature of the coolant in the heat exchanger can be determined by reading thermistor DC voltages at the colored test points on the green control board (SEE ELECTRONIC CONTROL BOARD) with a multi-meter and referring to the “Thermistor Calibration” table.

The **black multi-meter probe** should go into the **black test point** and the red probe should go into the following test points:

- **Orange Test Point = Outlet temperature (T-out)**
- **Yellow Test Point = Mid-HX temperature (T-mid)**

Power must be on to the TwinTemp to take readings, but the burner does not necessarily have to be activated. Refer to the DC voltage reading in the “volts” column on the “Thermistor Calibration” chart. The corresponding temperature is the column to the left of the volt reading.

NOTE: Voltage on the T-Mid thermistor (Yellow test point), should be between **.65 – 70 VDC when burner goes off** and between **.71 - .75 VDC when burner re-ignites**.

If the voltage plunges much below the off reading when the burner goes off, check the anti-freeze level and the zone 1 pump performance or for any obstruction in the zone 1 anti-freeze system. There is inadequate circulation through the burner heat exchanger.

If the re-ignite voltage is much higher than the above voltages, check that T-set voltage on the blue test point is between 4.40 - 4.55 volts.

Model: TwinTemp

SB-23 Removing & Replacing TwinTemp Junior Unit

1. Turn off all power to TwinTemp Junior and disconnect all electrical connections.
2. Turn off water and gas supply.
3. Drain TwinTemp J unit by disconnecting heating “supply” plumbing connection and turn on 12 VDC power to pump anti-freeze from tank.
4. Disconnect remaining gas, water and fluid lines.
5. Unscrew the exhaust pipe from under the coach.
6. Remove the 4 mounting nuts and washers from the under coach floor.
7. Carefully remove the TwinTemp Junior unit from the coach.
8. Reverse procedure to install TwinTemp Junior Unit.
9. Top off all fluids.
10. Run system to purge air from all lines and recheck fluid until tank is full.
11. Check anti-freeze level and top off if needed.
12. Start up unit and test using the “Start-up and Testing” Document.

Thermister Calibration

Check @ colored test point

Yellow = T-Mid

Black = Common

Orange = T-out

Inboard Blue wire = T-in

| K-OHMS | °F | Volts | K-OHMS | °F | Volts | K-OHMS | °F | Volts | K-OHMS | °F | Volts |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 2.500 | 41.19 | 4.1514 | 0.273 | 135.06 | 1.7411 | 0.179 | 156.54 | 1.2971 | 0.107 | 184.70 | 0.8657 |
| 2.400 | 42.68 | 4.1223 | 0.271 | 135.42 | 1.7327 | 0.177 | 157.13 | 1.2863 | 0.106 | 185.24 | 0.8590 |
| 2.300 | 44.25 | 4.0911 | 0.269 | 135.79 | 1.7244 | 0.175 | 157.73 | 1.2755 | 0.105 | 185.78 | 0.8523 |
| 2.200 | 45.89 | 4.0575 | 0.267 | 136.16 | 1.7159 | 0.173 | 158.34 | 1.2646 | 0.104 | 186.33 | 0.8455 |
| 2.100 | 47.62 | 4.0214 | 0.265 | 136.53 | 1.7075 | 0.171 | 158.95 | 1.2537 | 0.103 | 186.88 | 0.8388 |
| 2.000 | 49.45 | 3.9825 | 0.263 | 136.91 | 1.6990 | 0.169 | 159.58 | 1.2428 | 0.102 | 187.44 | 0.8320 |
| 1.900 | 51.38 | 3.9403 | 0.261 | 137.28 | 1.6904 | 0.167 | 160.21 | 1.2316 | 0.101 | 188.01 | 0.8252 |
| 1.800 | 53.43 | 3.8944 | 0.259 | 137.67 | 1.6818 | 0.165 | 160.85 | 1.2204 | 0.100 | 188.58 | 0.8183 |
| 1.700 | 55.62 | 3.8444 | 0.257 | 138.05 | 1.6732 | 0.163 | 161.50 | 1.2092 | 0.099 | 189.16 | 0.8115 |
| 1.600 | 57.95 | 3.7897 | 0.255 | 138.44 | 1.6645 | 0.161 | 162.16 | 1.1979 | 0.098 | 189.75 | 0.8046 |
| 1.500 | 60.45 | 3.7295 | 0.253 | 138.83 | 1.6558 | 0.159 | 162.82 | 1.1866 | 0.097 | 190.34 | 0.7977 |
| 1.400 | 63.15 | 3.6630 | 0.251 | 139.23 | 1.6470 | 0.157 | 163.50 | 1.1751 | 0.096 | 190.95 | 0.7908 |
| 1.300 | 66.08 | 3.5892 | 0.249 | 139.63 | 1.6382 | 0.155 | 164.19 | 1.1637 | 0.095 | 191.55 | 0.7838 |
| 1.200 | 69.27 | 3.5067 | 0.247 | 140.03 | 1.6293 | 0.153 | 164.89 | 1.1521 | 0.094 | 192.17 | 0.7769 |
| 1.100 | 72.78 | 3.4140 | 0.245 | 140.44 | 1.6204 | 0.151 | 165.60 | 1.1405 | 0.093 | 192.79 | 0.7699 |
| 1.000 | 76.67 | 3.3091 | 0.243 | 140.85 | 1.6114 | 0.149 | 166.32 | 1.1288 | 0.092 | 193.42 | 0.7629 |
| 0.900 | 81.03 | 3.1892 | 0.241 | 141.26 | 1.6024 | 0.147 | 167.05 | 1.1170 | 0.091 | 194.06 | 0.7558 |
| 0.800 | 85.97 | 3.0511 | 0.239 | 141.68 | 1.5933 | 0.145 | 167.79 | 1.1052 | 0.090 | 194.71 | 0.7488 |
| 0.700 | 91.67 | 2.8902 | 0.237 | 142.11 | 1.5842 | 0.143 | 168.55 | 1.0933 | 0.089 | 195.37 | 0.7417 |
| 0.600 | 98.39 | 2.7003 | 0.235 | 142.53 | 1.5751 | 0.141 | 169.32 | 1.0813 | 0.088 | 196.03 | 0.7346 |
| 0.580 | 99.88 | 2.6581 | 0.233 | 142.96 | 1.5659 | 0.139 | 170.10 | 1.0692 | 0.087 | 196.71 | 0.7274 |
| 0.560 | 101.44 | 2.6144 | 0.231 | 143.40 | 1.5566 | 0.137 | 170.89 | 1.0571 | 0.086 | 197.39 | 0.7203 |
| 0.540 | 103.06 | 2.5690 | 0.229 | 143.84 | 1.5473 | 0.135 | 171.70 | 1.0449 | 0.085 | 198.08 | 0.7131 |
| 0.520 | 104.75 | 2.5218 | 0.227 | 144.28 | 1.5379 | 0.133 | 172.52 | 1.0326 | 0.084 | 198.78 | 0.7059 |
| 0.500 | 106.52 | 2.4728 | 0.225 | 144.73 | 1.5285 | 0.131 | 173.35 | 1.0202 | 0.083 | 199.49 | 0.6987 |
| 0.480 | 108.36 | 2.4218 | 0.223 | 145.18 | 1.5191 | 0.129 | 174.20 | 1.0078 | 0.082 | 200.21 | 0.6914 |
| 0.460 | 110.30 | 2.3687 | 0.221 | 145.64 | 1.5096 | 0.128 | 174.63 | 1.0016 | 0.081 | 200.95 | 0.6841 |
| 0.440 | 112.34 | 2.3134 | 0.219 | 146.11 | 1.5000 | 0.127 | 175.07 | 0.9953 | 0.080 | 201.69 | 0.6768 |
| 0.420 | 114.49 | 2.2556 | 0.217 | 146.57 | 1.4904 | 0.126 | 175.51 | 0.9890 | 0.079 | 202.44 | 0.6695 |
| 0.400 | 116.75 | 2.1954 | 0.215 | 147.05 | 1.4807 | 0.125 | 175.95 | 0.9827 | 0.078 | 203.21 | 0.6621 |
| 0.380 | 119.15 | 2.1324 | 0.213 | 147.52 | 1.4710 | 0.124 | 176.40 | 0.9764 | 0.077 | 203.98 | 0.6548 |
| 0.360 | 121.70 | 2.0666 | 0.211 | 148.01 | 1.4612 | 0.123 | 176.85 | 0.9700 | 0.076 | 204.77 | 0.6474 |
| 0.350 | 123.04 | 2.0325 | 0.209 | 148.50 | 1.4514 | 0.122 | 177.30 | 0.9637 | 0.075 | 205.57 | 0.6399 |
| 0.340 | 124.42 | 1.9976 | 0.207 | 148.99 | 1.4415 | 0.121 | 177.76 | 0.9573 | 0.074 | 206.38 | 0.6325 |
| 0.335 | 125.13 | 1.9799 | 0.205 | 149.49 | 1.4316 | 0.120 | 178.23 | 0.9509 | 0.073 | 207.21 | 0.6250 |
| 0.330 | 125.85 | 1.9620 | 0.203 | 149.99 | 1.4216 | 0.119 | 178.70 | 0.9444 | 0.072 | 208.05 | 0.6175 |
| 0.325 | 126.58 | 1.9438 | 0.201 | 150.50 | 1.4115 | 0.118 | 179.17 | 0.9380 | 0.071 | 208.90 | 0.6100 |
| 0.320 | 127.32 | 1.9254 | 0.199 | 151.02 | 1.4014 | 0.117 | 179.65 | 0.9315 | 0.070 | 209.77 | 0.6024 |
| 0.315 | 128.08 | 1.9068 | 0.197 | 151.54 | 1.3912 | 0.116 | 180.13 | 0.9250 | 0.069 | 210.65 | 0.5948 |
| 0.310 | 128.86 | 1.8879 | 0.195 | 152.07 | 1.3810 | 0.115 | 180.62 | 0.9185 | 0.068 | 211.54 | 0.5872 |
| 0.305 | 129.64 | 1.8689 | 0.193 | 152.61 | 1.3707 | 0.114 | 181.11 | 0.9120 | 0.067 | 212.46 | 0.5796 |
| 0.300 | 130.45 | 1.8496 | 0.191 | 153.15 | 1.3604 | 0.113 | 181.61 | 0.9054 | 0.066 | 213.38 | 0.5719 |
| 0.295 | 131.26 | 1.8300 | 0.189 | 153.70 | 1.3500 | 0.112 | 182.11 | 0.8989 | 0.065 | 214.33 | 0.5642 |
| 0.290 | 132.10 | 1.8102 | 0.187 | 154.25 | 1.3395 | 0.111 | 182.62 | 0.8923 | 0.064 | 215.29 | 0.5565 |
| 0.285 | 132.95 | 1.7902 | 0.185 | 154.81 | 1.3290 | 0.110 | 183.13 | 0.8857 | 0.063 | 216.27 | 0.5488 |
| 0.280 | 133.82 | 1.7699 | 0.183 | 155.38 | 1.3184 | 0.109 | 183.65 | 0.8790 | 0.062 | 217.27 | 0.5410 |
| 0.275 | 134.70 | 1.7494 | 0.181 | 155.96 | 1.3078 | 0.108 | 184.17 | 0.8724 | 0.061 | 218.29 | 0.5332 |

| Part # | TwinTemp Part List | 8/2009 |
|---------|---|--------|
| 1411 | Spark Ignition Probe | |
| 1073 | TwinTemp Gas Solenoid LPG | |
| 1076 | 3/8" LPG Modulating Gas Valve Assy, | |
| 1103 | Modulating Valve Coil | |
| 1412 | Wire, Ignition Cable | |
| 1437 | T-out Thermister (red wires) | |
| 1495 | Thermistor Wiring Harness | |
| 1749 | Bimetal ECO 1/8" NPT @ 220° F +/- 7 auto reset at 170° F | |
| 1829 | DSI Wiring Harness | |
| 2028 | Relay, Omron | |
| 2123 | Tempering valve w/flanges (all models prior to 3/2007) | |
| 2162 | Electric Elements 200 deg. tank Thermostat (prior to 11/2007) | |
| 2248 | Electric Heating Element | |
| 2451 | Power Vent Blower Motor Assy. | |
| 2464 | 15 Amp Circuit Breaker | |
| 2558 | Room Thermostat / wall mount | |
| 2559 | 190 deg. Bimetal tank Thermostat (Obsolete 6/2009 use p/n 3264) | |
| 2582 | Air bleeder vent | |
| 2735 | Magnetic Drive Pump Brushless 12 VDC | |
| 2737 | Summer/Winter ball valve | |
| 2748 | 1/2 Heater Hose Elbow | |
| 2751 | On/Off switch TT2 & Jr. | |
| 2838 | Low profile secondary liquid to air heat exchangers w/fans | |
| 2844 | Tank assembly for the Twin Temp-2 Dual Zone | |
| 2828 | Tank Assembly for the Twin Temp Jr. Single Zone | |
| 2932 | Heat Exchanger (Specify 'G', 'F' or 'C' model) | |
| 2940 | Pressure Switch, .1 WCI Vacuum (normally open, 12v DC) | |
| 2942 | Complete wire harness for TT-2 | |
| 2950 | 220 deg. Switch, High Limit, Manual Reset (used w/Electric element) | |
| 2952 | Electric Elements hi limit ECO 200-20 deg. (after 11/2007) | |
| 2984 | 10vDC blower voltage regulator | |
| 3012 | Complete wire harness for TT-Junior | |
| 3017 | Burner Assembly | |
| 3033 | 7 psi Radiator Cap | |
| 3121 | Liquid to air heat exchanger with one fan | |
| 3122 | Liquid to air heat exchanger with one fan and thermostat | |
| 3128 | Tempering Valve (shark bite fittings) | |
| 3158 | DSI Board | |
| 3166 | DSI adapter bracket used with P/N 3158 | |
| 3207 | Assembly T-Mid (Yellow wire) | |
| 3227 | Pressure Relief Valve 3/4 npt set @ 30 psi | |
| 3258 | 180 deg. Bimetal tank Thermostat | |
| 3264 | 180 deg. Tank Thermostat Retrofit <u>Kit</u> (replaces P/N 2559) | |
| 9098 | Micro processor software chip | |
| 1841-56 | Control Board & Microprocessor for TwinTemp | |
| | | |

The *TwinTemp* systems are certified as a power vented automatic instantaneous water heater/ furnace, designed to be installed in recreational vehicles or mobile homes. This appliance must be installed in accordance with local codes or in the absence of local codes the following applies:

- **Manufactured Home: Title 23 CFR, Part 3280**
- **Recreational Vehicle: ANSI A119.2/ NFPA 501-C-1987**

Every *TwinTemp* is inspected and tested before it leaves the factory. In order for this unit to operate safely and effectively, all installation instructions must be followed. Failure to comply with all installation and operating instructions will void the warranty. *PrecisionTemp, Inc.* will not be responsible for anything that is a result of non-compliance.

**FOR YOUR SAFETY
WHAT TO DO IF YOU SMELL GAS**

- Extinguish any open flame.
- Shut off the gas supply at the container or source.
- Do not touch any electrical switch or use any phone or radio in the vehicle.
- Do not start the vehicles engine or electrical generator.
- Contact the nearest gas supplies or qualified service technician for repairs.
- If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
- Do no turn on the gas supply until the leak(s) has been repaired.

FOR YOUR SAFETY
DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

WARNING!

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the installation instructions and/ or operating instructions provided with this appliance. A qualified installation service agency or the gas supplier must perform installation and service.

Keep this book with the *TwinTemp* at all times. It contains instructions regarding installation, operation and maintenance of your *TwinTemp*. If you need further information, contact your dealer, your nearest service center or *PrecisionTemp Inc.*

Installation Instructions

Please read these instructions thoroughly before starting your installation

Note: These instructions apply to both models. The *TwinTemp-2* is a dual zone heating unit whereas the *Junior* is a single zone. Both also provide continuous hot water. Installation is identical except for the additional zone, optional engine assist and *HotTap* on the *TwinTemp-2*.

The *TwinTemp* is designed to be installed in a ventilated compartment of the vehicle such as a lower luggage compartment or “basement” and vented through the bottom of that compartment to the outside. The heater must not be mounted in the living area of the vehicle or in a way that receives its combustion air from the living area or flues into the living area of the vehicle. Doing so will void the warranty and cause the heater to malfunction and could cause damage, injury or death.

Please read these instructions before making any modification to the construction of your RV.

Installation Overview

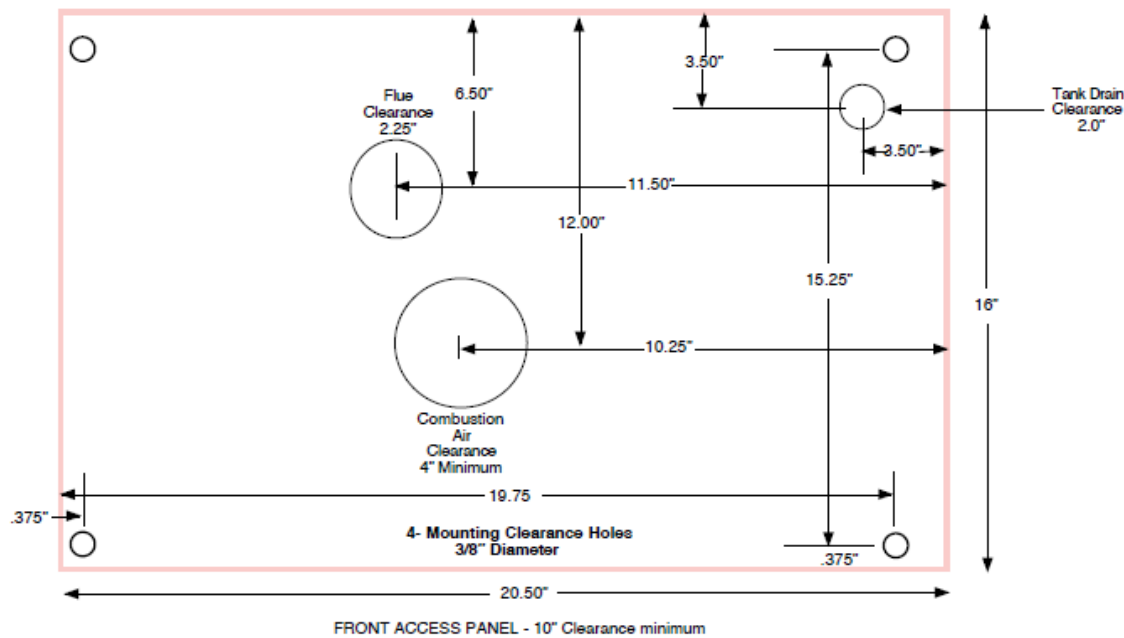
The installation of the *TwinTemp* is done in three steps:

- Installation of main heating unit and exhaust system
- Installation of blower heating units and thermostats
- Routing wiring and high temperature tubing from main heating unit to blowers

Installation of main heating unit and expansion tank

When selecting an installation location, please note the following installation requirements:

- Surface should be able to support at least 100 pounds
- The front panel of the heater should be accessible for inspections or servicing
- The vent must be able to be installed through the floor without interference with frame members or other equipment
- The compartment where the heater is installed must not be air tight from the outside. There should be at least 12 square inches of fresh air available from the outside, NOT FROM THE LIVING AREA OF THE VEHICLE. **Caution:** the combustion air cannot be supplied from any compartment which may contain combustible gases (i.e. battery gases, gasoline fumes, propane fumes, etc.)
- Water, gas and electric line should be able to run to the installation.
- Installation must be done to allow at least 10” access to the front and at least 8” access above the unit. There must be access to all plumbing connections on the right side of the heater if they are not made prior to securing the installation into place.
- There should be at least 1” clearance in the back. At least 8” of top clearance in recommended to facilitate startup.
- It is recommended to install the heater as close to the gas supply as practical to minimize the length of the gas line.



Note the locations of the flue cut-out and mounting holes. Be sure they will not interfere with any framing members, wiring or equipment under the coach. Be sure to observe proper clearances around the unit. Drill the four 3/8th mounting holes. Next cut the 2.25 minimum hole for the flue and the 4" minimum hole for the combustion air. Be sure they are located where they cannot be covered or blocked.

NOTE: If the *TwinTemp* cannot be mounted with sufficient access to the connection side of the unit to make connections after installation, the se connections must be made prior to mounting the unit. See sections regarding Plumbing Hook-ups, Wiring Hook-ups and Gas Line Hook-up.

Screw the short end of the supplied vibration absorbing mounting studs into the bottom of *TwinTemp*. These studs are used to secure the *TwinTemp* to a floor 1' thick or less. (Note: See below if the floor is more that 1" thick.) If the installation is located in a position which allows access to all hookups after installation, the *TwinTemp* can now be installed and secured. Lift the *TwinTemp* into position taking care not to damage the flue transition pipe, protruding from the bottom. Align the flue transition pipe with the flue cutout and all of the mounting studs with the 3/8" mounting holes. Drop the unit into place and secure from below with the flat washers and lock nuts. Following the instructions on the package, install the expansion tank in the same compartment. Attach and clamp the clear tube to the bottom barb on the tank and the barb fitting to the radiator cap.

If the floor is more than 1" thick the *TwinTemp* must be secured with the proper length 1/4"-20 bolts, but the vibration absorbing pads must still be used under the unit.

- Using a hack saw, cut off the treaded studs from the vibration absorbing pads and place pads on the floor near the mount holes prior to placing the unit.
- Set the unit in place on the vibration absorbing pads, align with the mounting holes and run the bolts from underneath to secure into place.

Exhaust Pipe Installation

The exhaust pipe assembly is supplied in two parts. They are a 2" aluminized steel elbow and a 2" X 18" aluminized steel pipe. After the *TwinTemp* unit is secured into place the exhaust is installed as follows:

- Fit the 18" long pipe into the 2" elbow and push the flare side of the elbow up onto the flue tailpiece of the *TwinTemp*.
- Locate the pipe out from under the coach while positioning it so that it point about 30° to the rear of the coach.
- Allowing for about 2" to protrude from under the coach, mark the length, remove and cut to size.
- Clamp or screw the cut pipe to the elbow and re-position and install to the *TwinTemp* flue tailpiece.
- Screw or clamp assembly into place and use a proper exhaust bracket to support the bottom of the coach. A chrome tailpiece can now be installed.

NOTE: The above procedure is a typical exhaust installation. If the coach floor is more than 1" inch thick or the tail pipe needs to be longer than 18", contact *PrecisionTemp* for additional components and information.

Interior Heat Exchanger (Blower) and Room Thermostat Mounting Locations

Up to four blowers per zone, or a total of eight blowers, can be installed in the *TwinTemp-2* system. Up to six blowers can be installed in the *TwinTemp Junior* system. In a two zone system, the living and kitchen areas are general put on one zone and the bedroom and bath area on the other zone. Each zone is controlled by its own room thermostat. The mounting locations for the thermostats should be selected carefully to ensure even heat distribution throughout each heating zone. Do not mount the thermostat where it can be affected by drafts, dead spots behind doors, radiant heat from the sun, appliances or unheated areas such as an outside wall behind thermostat.

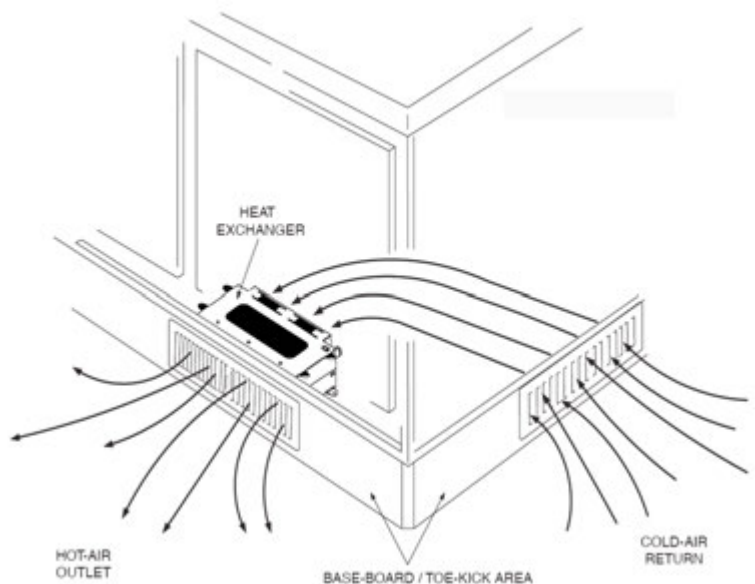
Locate the heat exchangers so that even heat distribution will be felt throughout the interior. For slideouts, it is recommended to place blower(s) on the opposite side of the coach, pointing towards the slideout. Sufficient return air must be supplied to each interior blower. (See Illustration 2) Mounting blowers without sufficient ventilation will severely reduce their overall heating performance. In order to provide sufficient ventilation, the return air registers must be the same size or larger that the outlet registers. Return air must be supplied from the interior heating zones. Allow for access to all heat exchangers for tubing hook-up and for potential servicing and cleaning.

To mount the blowers once all permanent mounting locations have been selected, cut out the opening for each outlet air and return air register and screw down each heat exchanger permanently into place.

- Cut an opening for each heat exchanger and cold air return.
- Mount each heat exchanger permanently into place.
- Install the hot air outlet and cold air returns.

There must be complete access to the heat exchangers until the plumbing and electrical hook-ups have been made.

Illustration 2



Mounting locations for the water, gray and black tank heat exchanger

A tank blower should be strategically placed in the domestic water plumbing area to prevent freezing of the plumbing lines and storage tanks. Position the tank heater in the storage tank/ plumbing bay area so even heat distribution will be achieved. **NOTE:** The optional heat exchanger with the built-in thermostat should be used. This blower should be installed in zone one loop.

For best heating results, place the exchanger as close to the floor of the plumbing bay as possible (heat will naturally rise). Sufficient ventilation (cold air return) must be supplied. Return air should be supplied from the same compartment.

Connecting Gas Supply

The gas line should be of approved type and size with a 3/8" female flare nut. If the gas line is very long or has numerous bends, it should not be less than 3/8" ID or performance of the *TwinTemp* will suffer. The maximum inlet gas pressure must not exceed 13 water column inches and no less than 10 WCI. This gas line should be one uninterrupted line from the LPG tank regulator with no tees or connections within the coach. Some standards may require a manual gas shut off valve in the gas line external to the *TwinTemp*. The *TwinTemp* must be isolated from the gas supply system during any pressure testing of that system at test pressures equal to it or in excess of 1/2 PSIG. The flare nut on the gas line should be hand connected to the flare connection on the *TwinTemp* to assure it's not cross-threaded.

No pipe dope should be used on this flare connection. Tighten with a wrench. This connection should be tested for leaks prior to start up, using soapy water or liquid leak test solution. **Do not use a flame to test for leaks.**

Wiring

The *TwinTemp* is pre-wired internally with a 12 pin connector for all of the 12 VDC hookups (see Illustration 4). A mating pig tail is supplied to make all field connections. Observe the illustration color codes, the wiring sizes and procedure described below. The 12 VDC *TwinTemp* power switch should remain OFF during installation.

Note: Illustration 4 shows the *TwinTemp-2* connector. The Zone 2 terminals are not used for the *Junior*. **All connections should be secure and not in a wet location.**

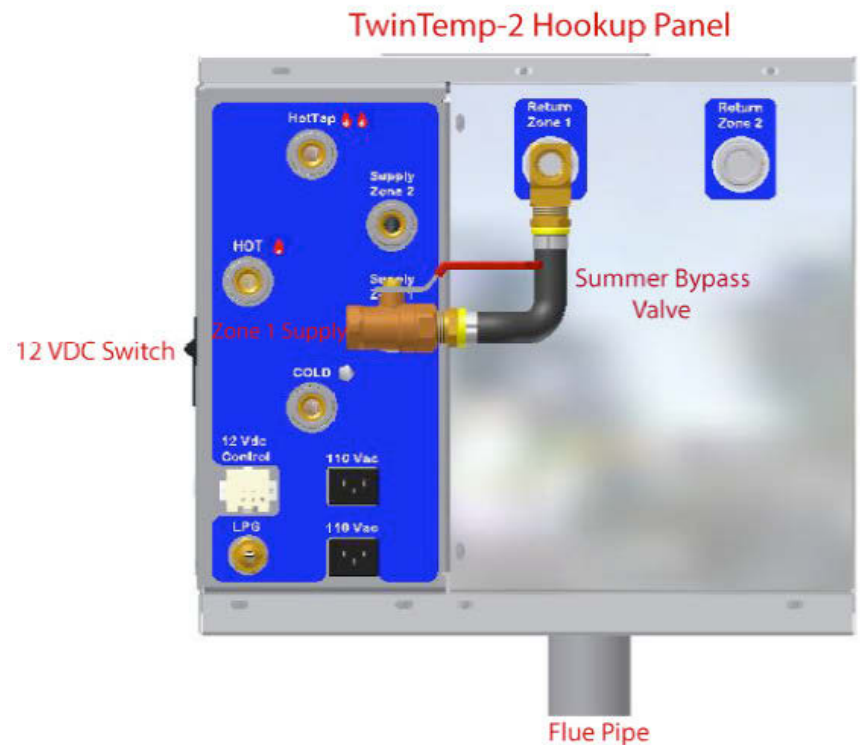
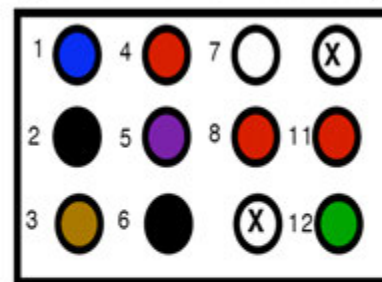


Illustration 3

12 Pin Connector Diagram (Viewed From Outside Case)



- 1. Blue Zone 2 Blower +
- 2. Black Zone 2 Blower -
- 3. Brown Zone 2 T-stat-
- 4. Red Zone 2 T-stat +
- 5. Purple Zone 1 Blower +

- 6. Black Zone 1 Blower -
- 7. White Zone 1 T-stat -
- 8. Red Zone 1 T-stat +
- 11. Red 12 VDC Supply +
- 12. Green 12 VDC Supply -

12 Volt DC Power Hook-up

This is the main power harness that should be switched at a panel inside the coach on a 15 amp circuit. The wire must not be smaller than 12 gauge. Red is positive (+) and black (or green) is negative (-). Under-sizing this wire will result in the *TwinTemp* malfunctioning.

Zone 1 Thermostat and Blower Harness

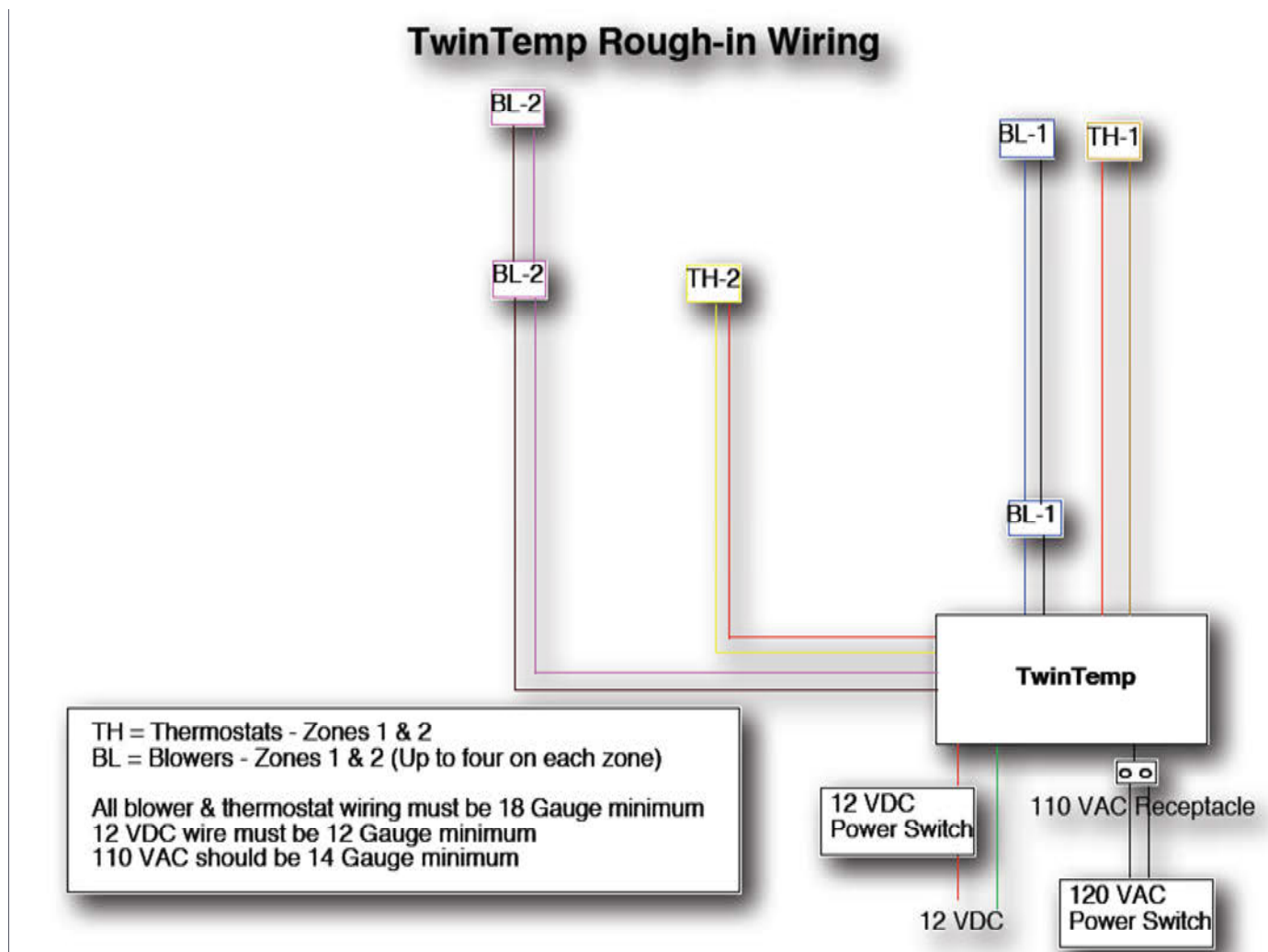
Run 18 gauge wires to the Zone 1 room thermostat, observing the wire colors in the illustration to assure continuity of operation. 18 gauge minimum wires should be wired parallel to each blower in the Zone 1 circuit. The black wire is negative (-) and should be connected to the black wire on the blowers and the colored wire is positive and connected to the red wire on the blowers. Again, observe all wire colors in the illustration.

Zone 2 Thermostat and Blower Harness (*TwinTemp-2* only)

As in Zone 1, run 18 gauge wires, observing wiring colors of the illustration and be sure both thermostats are turned to their lowest setting during installation. Observe polarity of thermostat.

110 Volt AC Electric Elements Cords (Single Element/ Circuit on Junior)

These wires are provided with a 15 am “SJO” plug that is to be plugged into a switched outlet “handy box”. These should be dedicated 15 amp circuits that are switched at a panel inside the coach. Keep Power off to this circuit at this time. If this circuit is energized prior to filling the system with antifreeze, severe damage will occur.

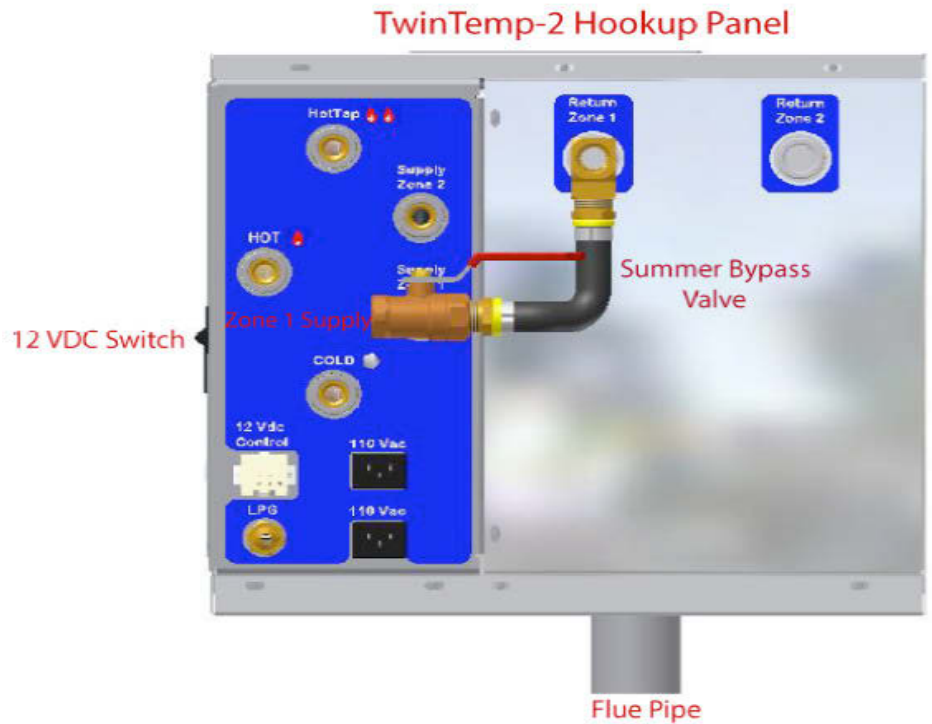


Plumbing

The plumbing installation involves three systems:

- Zone heating system blowers
- Domestic hot water system
- *HotTap* system (optional)

It is recommended to use 5/8" OD minimum PEX high temperature tubing and push fitting, similar to what *PrecisionTemp* can supply. Otherwise, an adapter will be required to make the connections.



Zone Heating System Blowers Piping

Illustration 6

The heating system consists of two separately controlled zones with up to four blowers in each zone (*TwinTemp-2*). The *Junior* can service up to six blowers. The *TwinTemp* has a supply line and a return line connection for each zone (see Illustration 6). It is suggested to use the **red PEX line for Zone 1** and the **blue PEX pipe for Zone 2** to avoid confusion during hookups.

Prior to running the PEX pipe, it is advisable to connect all PEX push fittings to the blowers and the *TwinTemp* water/ anti-freeze connections. Use a high quality Teflon tape on these fittings when making the connections. Take care not to let the Teflon tape get into the system.

The **Zone 1** loop should be used for the longest loop with the most blowers in it, generally the living room/ kitchen loop. Install all PEX pipe and mark with labels at both ends. Arrows should indicate the supply and return lines.

Minimize extreme bends and any extreme rises in height should be avoided. Where possible use “flow bender” clamp rather than elbow fittings the reduce restriction. *PrecisionTemp* can supply the flow benders. Be sure the secure all PEX where necessary and apply protective shielding in areas where chafing may occur.

As shown in Illustration 6, the 3 way by-pass valve and tee fitting has been installed between the supply and return fittings in **Zone 1**. This is to prevent the heated anti-freeze from circulating to the blower units in warm weather, when space heat is not required.

Connect to the **Zone 1** supply line from the *TwinTemp* to the by-pass tee and then continue it to the closest blower unit. Be sure the end of the PEX is cut perfectly square and push it into the push fitting until it bottoms out. Then pull gently on the PEX tube to assure it is tight into the fitting to avoid leaks. Continue this process until all blowers in the **Zone 1** loop have been plumbed (up to four blowers).

From the top outlet fitting of the final blower in the **Zone 1** loop, **return the red PEX line to the 3 way by-pass valve and continue back to the *TwinTemp* “Zone 1 in” (return) fitting** of the *TwinTemp*. As above, all PEX tubing should be tightly secured to all of the push fitting on the blowers and *TwinTemp*. (*The junior can accommodate up to six blowers on its single zone.*)

Repeat the above process for the Zone 2 loop using blue PEX piping.

Domestic Hot Water Piping

Although the *TwinTemp* is capable of delivering continuous hot water on demand, the plumbing system for the domestic hot water is plumbed exactly as it would be with basic recreational vehicle hot water systems. (see Illustration 6). The pressure cold water supply is connected to the “cold” fitting on the *TwinTemp* and the hot water line to the fixtures is connected to the “hot” fitting. As when running the heating system tubing, be sure to secure the push fitting to the *TwinTemp* using teflon and cut the PEX tubing square and bottom it out into the push fittings.

If the coach is equipped with water pipes other than 5/8” OD PEX tubing, adapters should be used to make the connections to the 1/2” NPT connections on the *TwinTemp*. See Illustration 6 “Winterizing” drawing to incorporate the winterizing valve set into fresh water system (**what do I do here????**) this will assure a convenient way to drain the fresh water system and prevent freezing of the *TwinTemp* potable water circuit during freezing conditions. Severe damage can occur if this procedure if not followed.

***HotTap* Piping (*TwinTemp*-2 Option)**

The *HotTap* is a dedicated high temperature hot water tap for food and drink preparation. It can dispense water as high as 190° F and **must not** be installed when or where there is a risk of scalding. The suggested location is on the kitchen sink countertop near the regular water tap. A clearly visible warning sticker (supplied with the *HotTap*) should be placed near the *HotTap*. To install the spigot, follow the instructions packed with your *HotTap*. The piping to the *HotTap* must be 1/4” soft copper tubing. The tubing should be routed from the *TwinTemp* compartment to under the sink area where the *HotTap* is installed.

The copper tubing should be routed from the *HotTap* and the *TwinTemp* by the 1/4” compression fittings supplied.

Filling Heating System with Anti-Freeze

Before turning on the power to the *TwinTemp* system, it must be completely filled with boiler anti-freeze/ water mixture and completely purged of all air. A 50/50 mixture of water and a high temperature **boiler antifreeze propylene glycol with inhibitors** must be used. *PrecisionTemp* can supply this non-toxic boiler anti-freeze or recommend approved suppliers. **Never use automotive or other toxic / non toxic anti-freeze.** Remove the small access panel on the top of the *TwinTemp* using a Phillips screw driver.

Fill system as follows:

- Remove the radiator tank fill cap from the top of the tank (see Illustration 8).
- Loosen the small cap of the brass air purging device on top of the heat exchanger.
- Using a funnel, fill the tank with 50/50 anti-freeze/ water mix. This should be about 2.5 gallons.
- The Summer bypass valve should be in the “Winter” position as shown in Illustration 8 (**still right???**)
- Turn on propane supply and cycle the 12 volt power switch in 5 second intervals until the burner lights. This will purge the air from the gas line.
- Set the Zone 1 room thermostat to its highest setting. The Zone 1 pump will circulate the hot anti-freeze through the blower circuit and the anti-freeze level in the tank will drop. Note: Blowers will not come on until tank anti-freeze heats to 160°F.
- Top of the tank with anti-freeze solution until the level stops dropping.
- Turn on the Zone 2 thermostat (*TwinTemp*-2 only) to activate the Zone 2 pump and continue to top off the tank as the fluid level drops. After all blowers come on, level fluid will drop some more. Top off until tank is full. (cont.).
- Carefully replace the fill cap.
- Allow both pumps to run for about 15 minutes. Now turn off and check the fluid level and top it off if necessary.
- Close small cap on Brass air purging device.
- Check all fittings in heating system and correct if necessary.

Note: As unit heats up the anti-freeze will expand into the expansion tank. After all expansion has taken place, be sure expansion tank is filled to full line. When the unit is shut off and cools down the fluid level in the expansion tank will lower. When cold, be sure to fill above the “Add” line. If expansion tank is ever empty, check the fluid level in the *TwinTemp* tank and top off if necessary.

NEVER remove the tank cap when it is hot.

(manual continues on next page)

TwinTemp Start-up / Testing Procedure

Filling system with anti-freeze

- * All power, water and gas should be off. Thermostat(s) set to lowest setting
- * Remove access panel and radiator cap from top of TwinTemp
- * Turn Summer / Winter valve to Winter position. See illustration
- * Open bleeder valve on top of copper heat exchanger. See illustration
- * Using funnel, fill tank with about 3 gallons of 50/50 propylene glycol/water anti-freeze mix
- * Turn on 12 volt power and switch on TwinTemp. (Do not turn on propane)
- * Turn room thermostat to highest settings
- * As anti-freeze level in tank drops, top off tank with anti-freeze mix
- * Replace radiator cap assuring cap and seat are clean
- * Fill expansion tank to about 1/3 full level with anti-freeze mix
- * Turn off 12 volt power and turn on propane supply & check for leaks
- * Turn 12 volt power back on and cycle power about 3 time to purge air from gas line
- * Leave power on & burner should fire. Run system until burner shuts down.
- * **Note:** If pump sounds as if it's cavitating, cycle power several time to dispel air
- * When all air is out of system Close bleeder valve before system cools down

Start-up & Testing Space Heating System

- * Turn off power & room thermostat(s) to the lowest settings
- * Turn on propane 12 volt power
- * Observe that flame is on and remains on. It should take about 10 minutes to bring system to temperature and burner goes out.
- * Turn room thermostat(s) to highest setting and verify all blowers come on and deliver heat. Then turn thermostat off. NOTE: Tank temperature must be 160° before blowers will come on
- * Turn thermostat(s) off and let system run until burner goes off.

Testing Water Heating System

- * TwinTemp power should remain on and system up to temperature
- * With water in the system, turn on the pressure pump or city water pressure
- * Open hot water tap and purge out all air
- * Water should be hot (about 120°) within about 30 seconds and temperature should stabilize. Let run for at least five minutes & verify burner on TwinTemp activates to maintain temperature.
- * Turn off tap & check for leaks and correct if necessary

Testing Electric Heating Element(s)

- * Be sure system is filled with anti-freeze and turn on 110 volt element(s) from a cold start
- * Let heat up for at least 20 minutes.
- * Check blower and hot water operation as described above.

NOTE: The 110 volt element is used for minimal needs since it has only 20% the capacity of the propane burner.

SYSTEM MUST BE DRAINED OF ALL WATER OR WINTERIZED TO AVOID CATASTROPHIC FREEZING!!!
SEE "FREEZE PROTECTION PROCEDURE"



Bleeder Valve



Winter Setting

NOTE: These positions apply to TwinTemps with Serial #07X-10-195 and later. On units with earlier numbers, the handle positions are opposite those illustrated.



Summer Setting

Sequence of Operation

Before using the *TwinTemp* for the first time, it is important to know the proper sequence of operation to ensure understand of its operation. **Sequence of Operation is as follows:**

- The 12 VDC power switch on the *TwinTemp* is turned on.
- Tank thermostat inside turns on Pump 1 and the burner ignites automatically.
- Anti-freeze circulates from burner to Zone 1 blowers and back to the tank as it heats.
- Burner remains in high fire until set temperature is approached and gas is modulated to a low burn until set temperature is attained.
- Burner and pump shut down when set temperature is attained. This takes about 5-15 minutes depending on ambient temperature.
- *TwinTemp* is now in standby mode until a room thermostat is activated or hot water is called for.

If Room Heat is Needed

Set Zone 1 or Zone 2 (*TwinTemp* only) thermostat to desired temperature. The corresponding pump and blowers will activate and within seconds heat is delivered from blowers. When tank temperature is below set point the burner will re-light and maintain proper tank temperature. When room reaches set temperature, the pump and blowers for that zone will go off. If tank temperature is below set temperature, pump 1 and the burner will stay on until tank reaches set temperature.

NOTE: the blower will not activate if the tank temperature is below or drops below 160° F. This assures that the hot water function takes priority under heavy usage conditions. Blowers will resume operation when tank temperature goes over 160° F.

If Hot Water is Needed

Once the tank reaches set temperature (5-15 minutes after system is turned on), continuous hot water is delivered when any tap is opened. Delivery temperature is determined by the setting of tempering valve (Adjustable 100° - 145° F). (See Illustration 8)

Warning: this valve is factory set at about 120° F. adjusting temperature any higher could result in severe injury due to scalding.

Tank thermostat turns pump 1 and burner on automatically when tank temperature starts to drop. Anti-freeze circulates from burner and back to tank as it heats. Burner remains in high fire and gas modulates burner to low burn until set temperature is attained. When set temperature is reached, burner and pump shut down and system returns to stand-by mode.

To Operate the *TwinTemp*:

Hot Water

- Pressurize the water system by turning on pump or city water pressure.
- Purge all air from system by turning on taps until there is a steady stream of water. Turn off taps. Check for leaks.
- Turn on the propane supply at tank and the manual gas valve if installed in system.
- Turn on the 12 VDC power supply and switch on *TwinTemp*. If this is the first the system has been used, power may have to be cycled several times in 5 second intervals until air is purged from the gas line. Using sight hole, verify that burner is on.
- It will take about 5-15 minutes for the system to heat up.
- Turn on any hot water tap. Continuous hot water will be delivered in the time it takes to get from the *TwinTemp* to the tap. Hot water temperature can be changed by adjusting the mixing valve. (see Illustration 8)

Hot Tap (if equipped)

- Follow procedures 1-5 above.
- Depress lever on *HotTap* dispenser until hot water is dispensed. **WARNING: WATER IS EXTREMELY HOT AND CAN CAUSE SERIOUS INJURY!**
- Put container under dispenser, taking care to avoid splashing.

Space Heating

- Follow procedure 3-5 of “Hot Water” section above.
- Set the appropriate zone room thermostat to the desired temperature.
- Blowers in that zone will provide heat within seconds of being activated.
- When set temperature is attained, blowers will shut down.

NOTE: the blowers will not activate if the tank temperature is below 160° F. This assures that the hot water function takes priority under heavy usage conditions.

WARNING: Always turn off the 12-volt power supply to the heater during any fueling operations. Operating the *TwinTemp* or any other ignition source during fueling could cause a fire or explosion, which could result in serious injury or death.

NOTE: Should overheating occur or the gas supply fails to shut off, turn off gas valve at the supply tank. Immediately call a qualified service technician.

Do not use this appliance if any part has been under water. Immediately contact a qualified service technician to inspect the appliance and replace any part of the control system and any gas control which has been under water.

NOTE: When using an “on/off” button on a shower head or and outside was down box, always turn off the hot and cold water valves when finished. Not doing so will result in cold water bleeding into the hot water system and cold water or alternating warm and cold water will result.

The *TwinTemp* is designed to give a continuous flow of hot water as long as required and maintain the set temperature through all flow rates within the capacity of the heater (88° F temperature rise per GPM).

110 Volt Heating Element

The *TwinTemp-2* is equipped with two 110 VAC electric heating elements and the junior with one element. These provide limited amounts of hot water or space heating, such as washing hands or dishes. The electric element can be used with or without the propane burner, but for continuous hot water or space heat, the propane burner must be used. To operate, turn the 110 volt switch(es) on in the coach and be sure the power wire is plugged into the handy box(es) in the *TwinTemp* compartment.

For small amounts of hot water only, there is no need to turn the 12 volt power on to the *TwinTemp*. However, if space heat is required in very cold weather, the 12 volt switch should be turned on. If there is a higher demand for heat that the 110 volt element(s) can provide, the propane burner will activate automatically. For best operation, turn the 110 volt elements on about 30 minutes before turning 12 volt switch on. This allows the tank to come up to temperature utilizing the electric element before the burner can activate. This will help conserve propane.

NOTE: Be sure that the anti-freeze level is up to the “Fill” line on the expansion pack before turning the 110 volt element(s) on. Serious damage can occur to the system if the fluid level is low.

Changing Hot Water Temperature Setting

The temperature on you *TwinTemp* has been factory set to approximately 120° F. it is not recommended that you set the temperature any higher.

WARNING: Changing this setting could result in dangerously hot temperatures that could result in severe injury.

If it is necessary to change the setting it can be done as follows: Open access door on the front of the heater. Locate the tempering valve (see Illustration 8). Turn the adjustment knob **counterclockwise to increase temperature** or **clockwise to decrease temperature**. The setting range is between 100° F to 145°F.

Summer Operation

When the space heating function of the *TwinTemp* is not needed, the heated anti-freeze should not be circulated to the blowers. To prevent this circulation, the Summer by-pass valve (see Illustration *) should be turned ¼ turn. The Summer position is opposite the position in Illustration 8 (**correct?**).

When heating is again needed, this level should best turned ¼ quarter turn from the Summer position to the same position as is shown in Illustration 8. this adjustment should only be needed twice a year for summer/ winter operation.

Routine Maintenance

All faucet aerators and showerhead screens in the coach should be cleaned regularly. It is recommended that the *TwinTemp* be inspected by a qualified service technician at least once a year. Particular attention should be paid to the following:

- Be sure that the air inlet openings and flue area are clear of any debris or obstructions (leaves, bugs, nests, spider webs etc.). Be sure nothing is stored against the unit that would block air or access.
- Make sure anti-freeze level in tank is full and up to the “Fill” line on the expansion tank. Top off if necessary with a 50/50 mix of specified boiler anti-freeze and water.
- Check that heater mounting is still secure to the coach. Tighten if necessary.
- Visually inspect wiring and hoses. Be sure there is no chafing of the insulation.
- Drain boiler antifreeze every two years and replace with new. (system holds approximately 6 gallons of a 50/50 boiler antifreeze/water mix)

NOTE: This winterizing procedure applies to all TwinTemp Models produced from January 2008 to present

TwinTemp Water System Draining / Winterizing Instructions

Note: Even though the heating circuit of the TwinTemp is filled with anti-freeze, the TwinTemp potable water heat exchanger **MUST NOT** be allowed to freeze. Freezing can cause severe damage to the unit and is not covered by warranty. When the coach is going to be on the road or laid up in freezing weather without the TwinTemp operating, the plumbing system must be drained or winterized as follows:

To drain the fresh water system in order to avoid freezing and damage:

- * Turn off water pump or city water pressure
- * Turn the black Hot & Cold Drain Valve handles to the opposite positions pictured
- * Open the highest hot and cold water taps to permit water system to drain from the "Hot Winterizing Drain" and the "Cold Winterizing Drain".

After Water has drained:

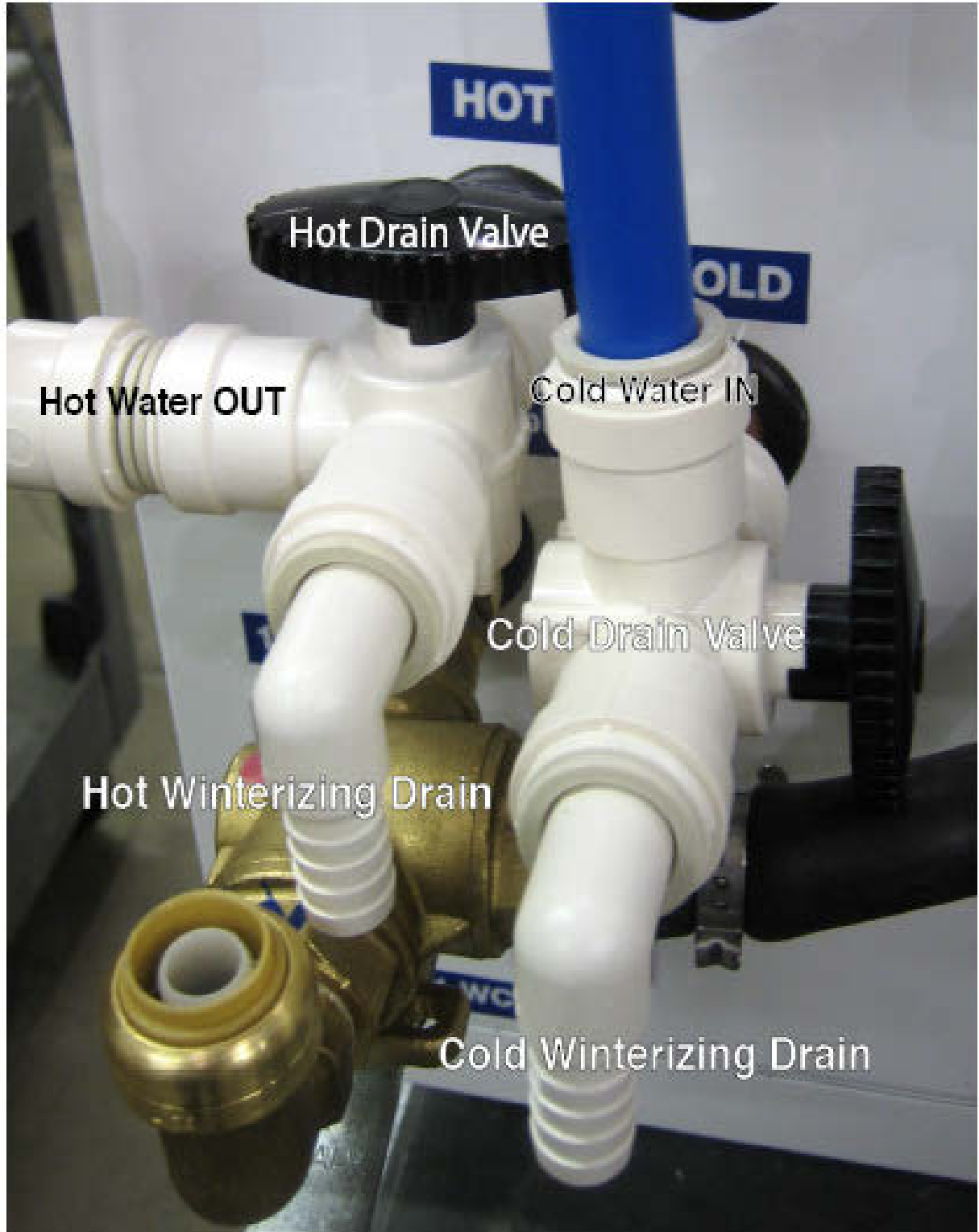
- * After water has drained, close Hot & Cold water taps
- * Apply air pressure to the "Hot Winterizing Drain" outlet to force water from TwinTemp heat exchanger until air is heard coming from "Cold Winterizing Drain".

Leave valves in this position until you are ready to refill the system with water.

To use water system:

- * Turn the Black Hot & Cold Drain Valve handles to the positions as pictured
- * The system is ready for use

Valves shown in operating positions.



NOTE: This winterizing procedure applies to all TwinTemp Models produced from October 2007 to January 2008.



Freeze Protection / Winterizing Procedure

Note: Even though the heating circuit of the TwinTemp is fill with anti-freeze, the potable water heat exchanger of the TwinTemp can freeze just like any plumbing in the coach and should be protected accordingly. Freezing can cause severe damage to the unit and is not covered by warranty. When the coach is going to be on the road or laid up in freezing weather without the TwinTemp operating, the plumbing system should be drain or winterized as follows:

- * Follow coach manufacturer's procedure to winterize the coach plumbing. If the hot water system is blown out with air, the TwinTemp will be protected when air is dispelled from both the hot and cold water taps. If RV anti-freeze is used the TwinTemp will be protected when the non-toxic anti-freeze flows from both the hot and cold water taps.

When the coach is not being completely winterized, the TwinTemp must be drained when in freezing conditions, as when being transported.

For draining the fresh water system to avoid freezing and damage:



- * Turn off water pump or city water pressure
- * Turn the drain valve handles on the TwinTemp unit as follows:
- * Turn Black handle on the hot water outlet to the vertical  position.
- * Turn Black handle on the cold water inlet to the horizontal  position
- * Open the highest hot and cold water taps to permit water to drain from open end of valves.

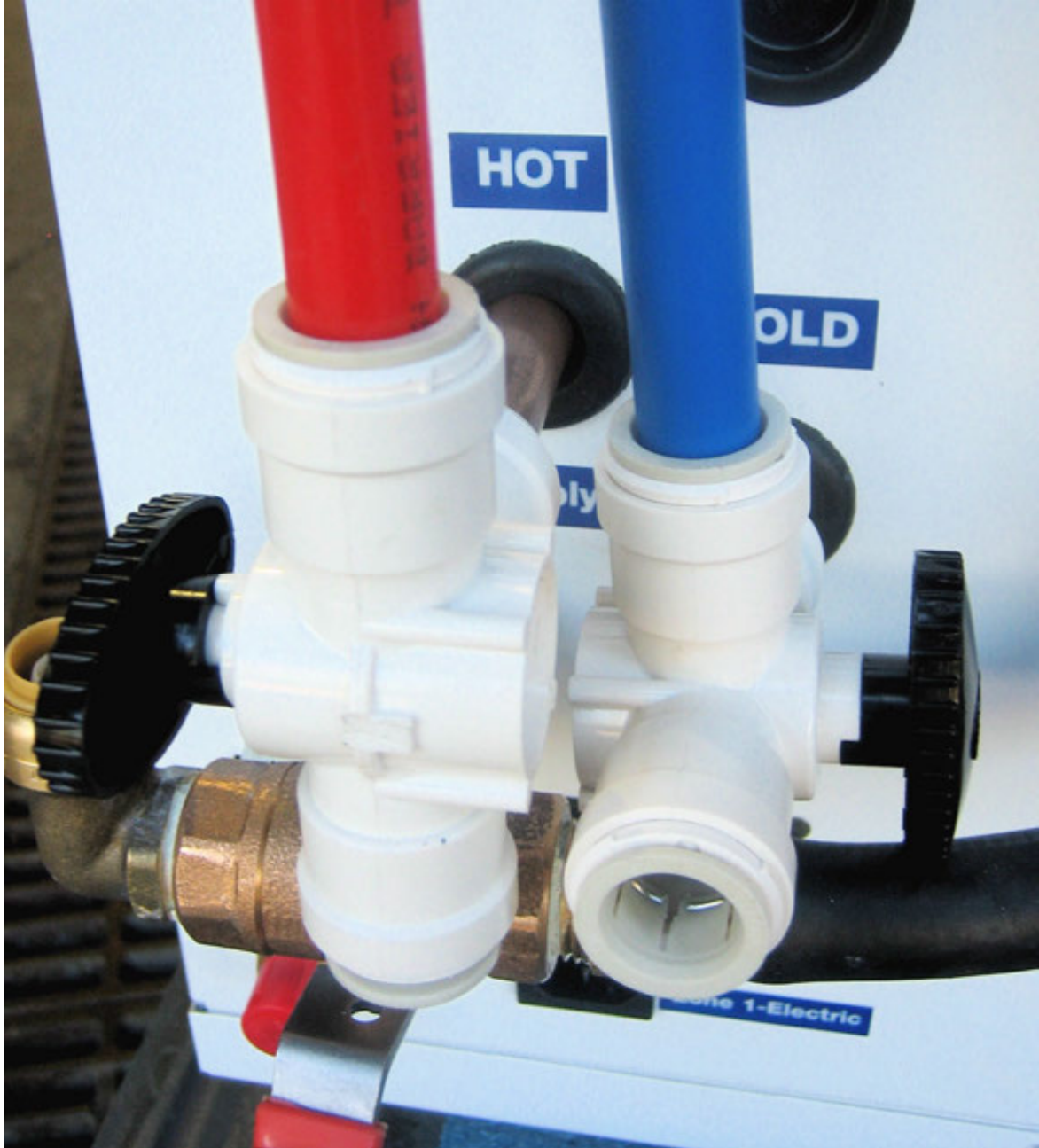
After Water has drained:

- * Apply air pressure to the drain tube of the hot water outlet valve to force water from TwinTemp heat exchanger until air is heard coming from cold water drain valve.

Leave valves in this position until you are ready to refill the system with water.

To refill system:

- * Turn Black handle on the cold water outlet to the vertical  position
- * Turn Black handle on the hot water inlet to the horizontal  position
- * The system is ready for use



**NOTE: The following winterizing procedure applies to
TwinTemp Models produced before September 2007**

TwinTemp-2 / Junior Winterizing Setup and Procedure

For normal operation, turn all handles as pictured at right. This closes the drains and permits fresh water operation.

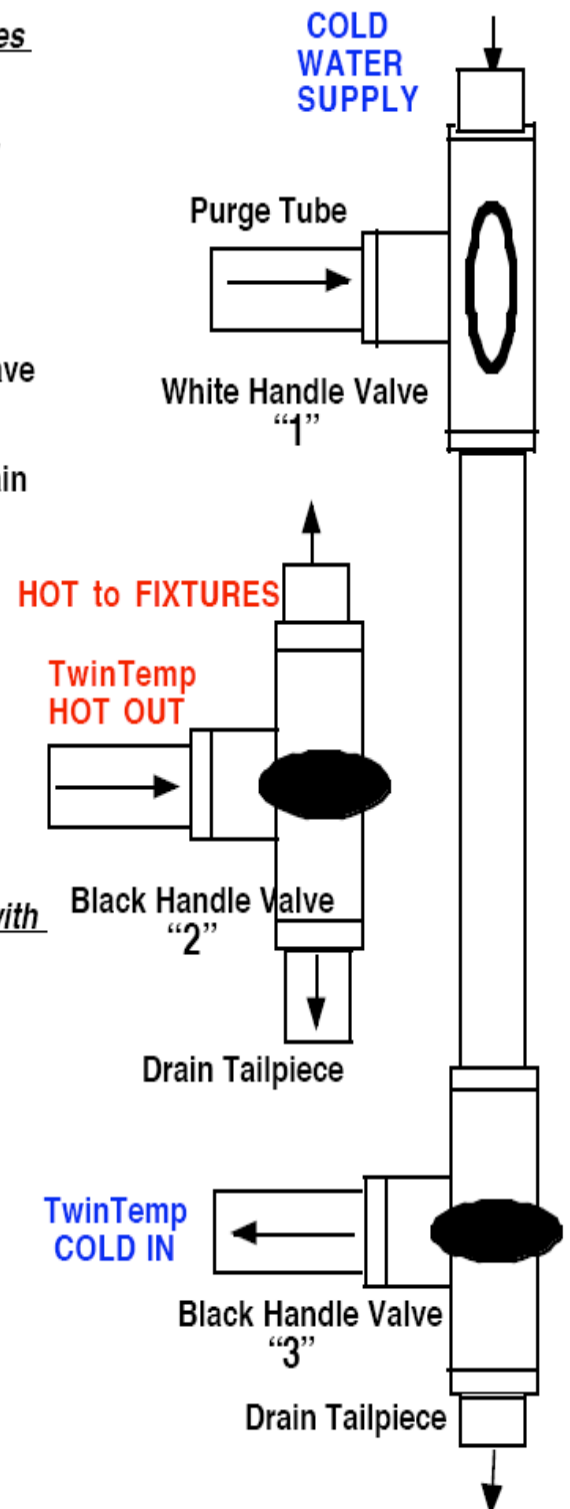
For draining the fresh water system to avoid freezing and damage:

- * Turn off water pump or city water pressure,
- * Turn the valve handles as follows:
- * Turn Black valve handle "2" and "3" to the vertical position. Leave White handle "1" in the vertical position.
- * Open the highest hot and cold water taps to permit water to drain from valve tailpieces.

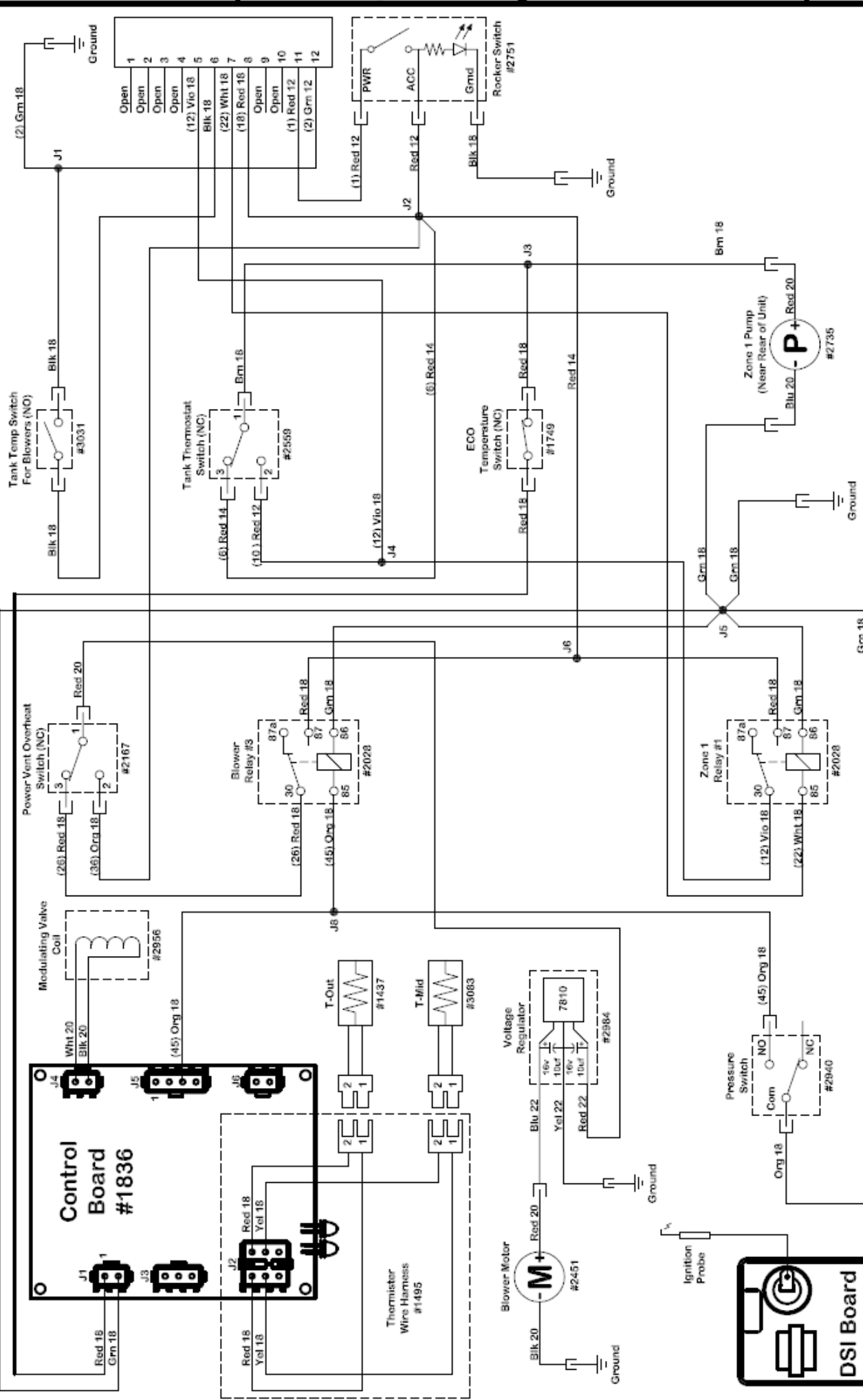
After Water has drained:

- * Turn White handle "1" and Black handle "3" to the horizontal position. Leave Black handle "2" in the vertical position.
- * Apply air pressure to the "Purge Tube" of Valve "1" to force water from TwinTemp heat exchanger until air is heard coming from valve "2" tailpiece.

Leave valves in this position until you are ready to refill the system with water and then return them to the position pictured at right.



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[illegible]

TwinTemp Hydronic Heating/ Water Heating Operating Instructions

For maximum heat and hot water output, it is recommended to use the LPF mode of operation in addition to the 1220 volt electric element. Electric element operation should be used for minimal hot water demand such as washing hands or dishes. It is not necessary to have the water system filled to use the space heating system, but the heating system must be filled with anti-freeze.

To Start Up System:

- Turn on the propane supply.
- Turn on 12 volt power switch on the right side of the unit.
- Turn on 12 volt power switch on coach.
- Burner will start-up and system will be up to operating temperature is about 10 minutes.

For Space Heating:

Turn on main thermostat and set to desired temperature.

Blowers will turn on and heat is delivered within about two minutes.

System and blowers will cycle to maintain set temperature.

For Hot Water

Turn on water system pump power switch located near galley or be connected to city water system.

Turn on hot water tap.

Note: During heavy heat and hot water demand, the hot water system takes priority and the blowers may shut off briefly to maintain hot water supply. Hot water temperature is factory set. To change temperature, consult the operating manual or *PrecisionTemp*.

To Use With 110 Volt Power

Turn of 110 volt element switch located inside coach.

Let the unit heat up for approximately 30 minutes.

Follow the first 3 steps of “To Start Up System” above.



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Note: In the 110 volt mode of operation the electric element supplies the heat until demand exceeds its capacity at which time gas burner automatically ignites.

TwinTemp Preventive Maintenance Schedule

- 1. Clean interior of TwinTemp Cabinet. ***
- 2. Inspect all wiring connectors for corrosion and tighten if needed. ***
- 3. Performance test heating and hot water function. ***
- 4. Check for fluid leaks at plumbing connections. *****
- 5. Drain and refill boiler antifreeze. ****
(Use only approved boiler antifreeze)
- 6. Check boiler antifreeze level in overflow bottle and top off as needed. ******

*** Annual inspection**
**** Every 2 years**
***** Quarterly inspection**
****** Bi-Monthly**

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Over the years of running a mobile RV repair service, having a dedicated place to access service manuals for all the different appliances and components found on RVs was something that I always had a desire to create.

I hope this resource makes your RV repairs easier, as it has mine, but please be careful and follow proper safety practices when attempting to repair your own RV.

If in doubt, please consult with a professional RV technician!



DARREN KOEPP - OWNER, MY RV WORKS, INC.

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