GIRARD TANKLESS WATER HEATER



LIPPERT
TECHNICAL INSTITUTE

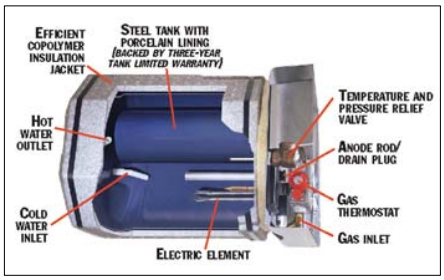
1

TANK VS TANKLESS

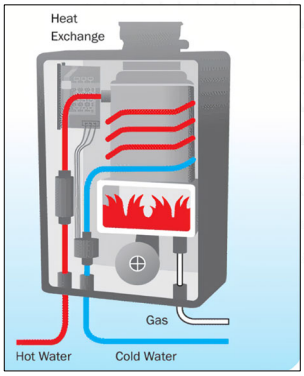
Tank Water Heater
Water is stored in a tank to be heated
Uses an electric heating element and/or gas burner that maintains temperature 24/7
Uses anode rods to reduce corrosion to the tank itself

Tankless Water Heater
No storage tank
Water absorbs heat from gas burner as it flows through system
Endless hot water flow

Tank



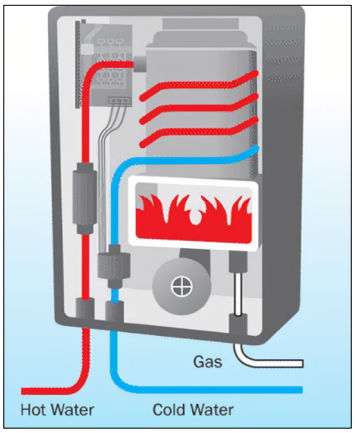
Tankless



2

HOW IT WORKS

1. A hot water tap is turned on.
2. The water flow sensor detects the water flow and ignites the burner to heat the water.
3. Water circulates through the heat exchanger.
4. Water flows to faucet or shower.
5. When the tap is turned off the burner turns off.



3

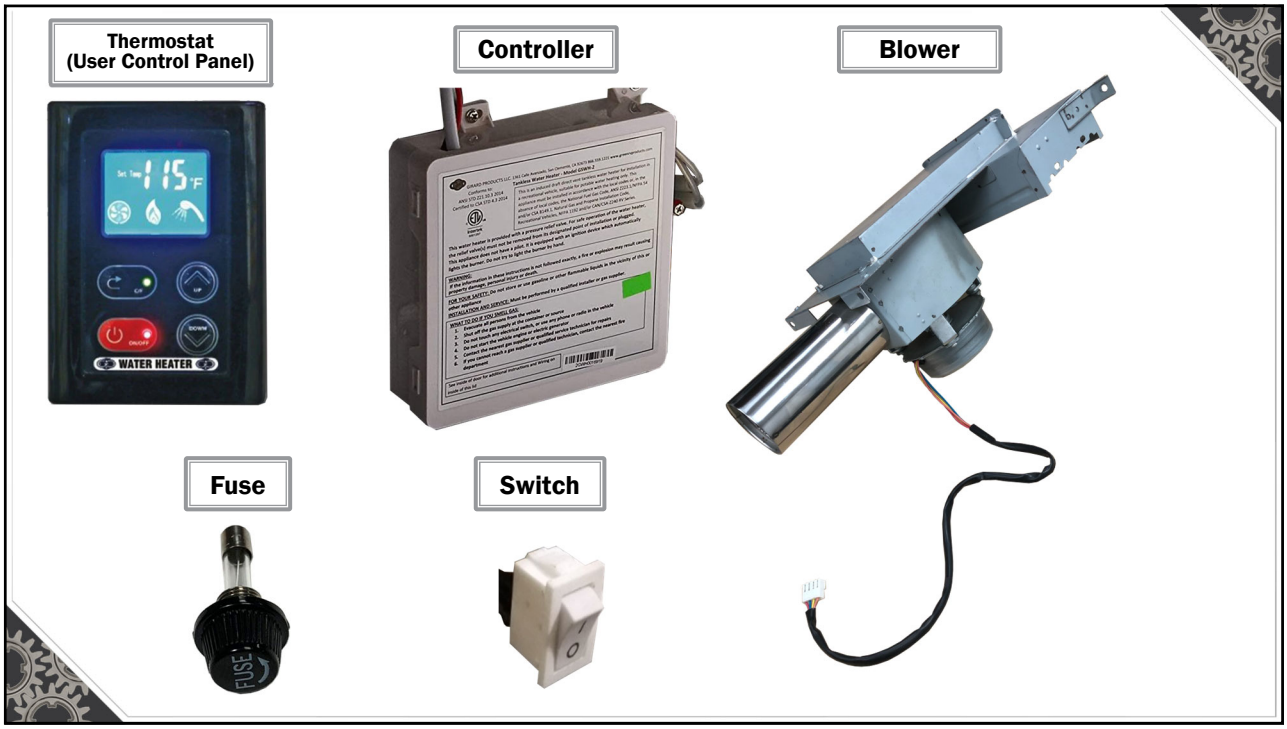
FEATURES OF GIRARD TANKLESS WATER HEATER

- Endless flow of hot water
- 42,000 BTUs (1 – 1.5 gallons per minute)
- 12V operating at less than 3 amps
- Gas powered
- Freeze protection designed for winter use
- Sliding latch hinged door
- Temperature setting 95 – 124 degrees

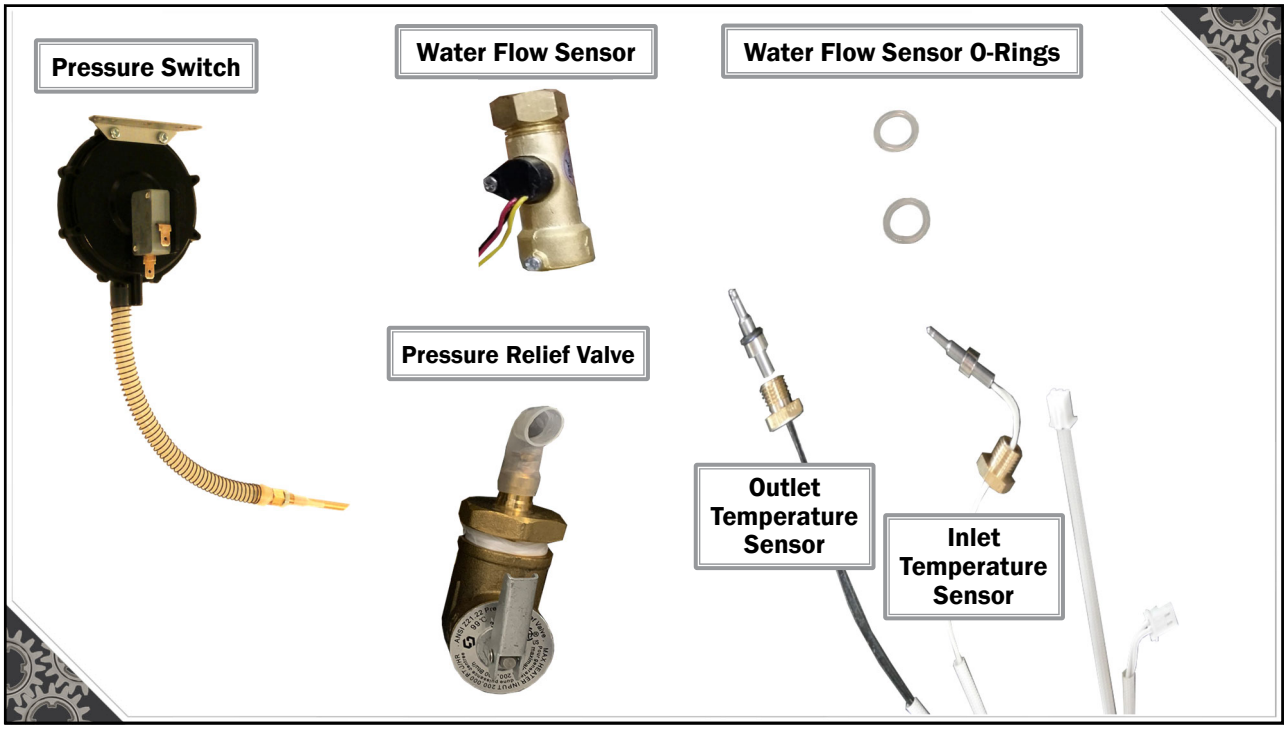




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Thermostat
(User Control Panel)
Controller
Blower
WATER HEATER
Fuse
Switch

5


Pressure Switch
Water Flow Sensor
Water Flow Sensor O-Rings
Pressure Relief Valve
Outlet Temperature Sensor
Inlet Temperature Sensor

6

Heat Exchanger



Burner



Solenoid Valves



Water Inlet Pipe

Water Outlet Pipe

Gas Valve Pipe

Water Flow Control Valve







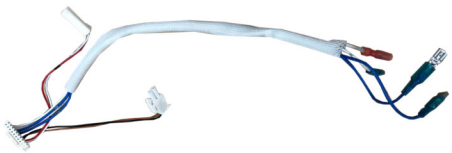


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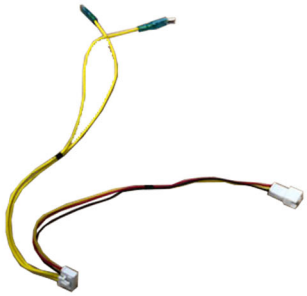
Energy Cutoff Switch (ECO)



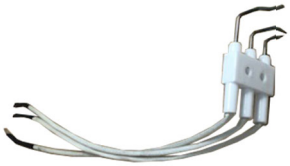
Energy Cutoff Switch Wires



Blower Harness



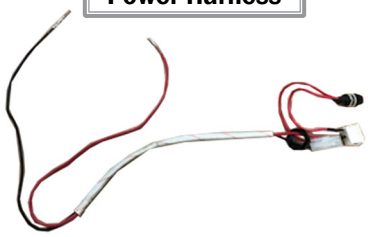
Ignitor



Thermostat Harness



Power Harness

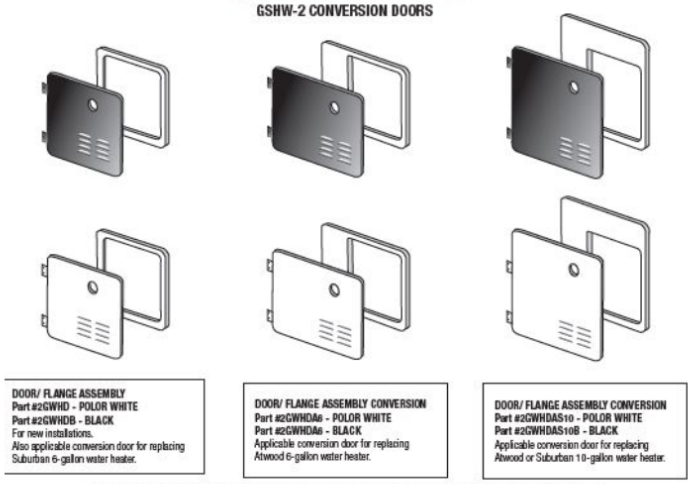


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GSWH-2 Water Heater Conversion Doors

GIRARD PRODUCTS, LLC.

GSHW-2 CONVERSION DOORS



DOOR/ FLANGE ASSEMBLY
Part #2GWHD - POLOR WHITE
Part #2GWHDB - BLACK
For new installations.
Also applicable conversion door for replacing Suburban 6-gallon water heater.

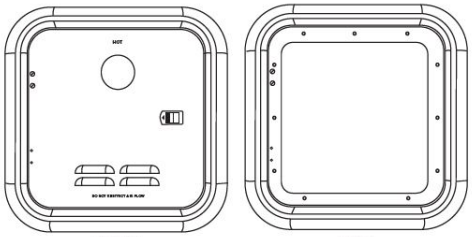
DOOR/ FLANGE ASSEMBLY CONVERSION
Part #2GWHDAs - POLOR WHITE
Part #2GWHDAs - BLACK
Applicable conversion door for replacing Atwood 6-gallon water heater.

DOOR/ FLANGE ASSEMBLY CONVERSION
Part #2GWHDAS10 - POLOR WHITE
Part #2GWHDAS10B - BLACK
Applicable conversion door for replacing Atwood or Suburban 10-gallon water heater.

NOTE: GSWH-2 DOORS ARE NOT COMPATIBLE WITH EARLIER GIRARD WATER HEATER MODELS GWHW-1 AND GSWH-1M

DOOR TRIM RING

Part #	Description
2GWHDTR-B	Trim Ring Black (2GWHDB Door Kit)
2GWHDTR-W	Trim Ring White (2GWHD Door Kit)



FRONT BACK

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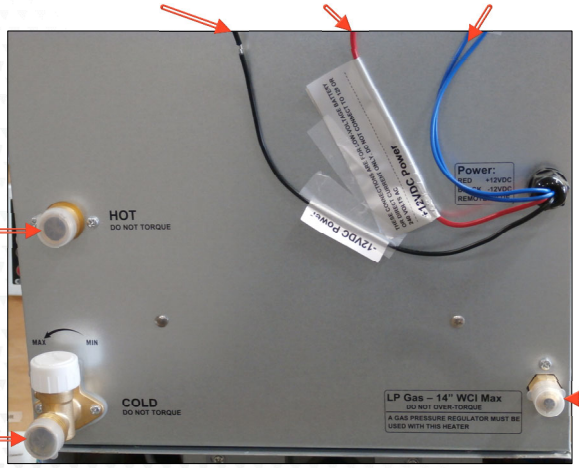
CONNECTIONS

Thermostat

12V Ground black

12V Positive red

2 Blue wires to Thermostat

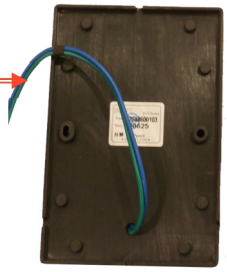


Hot water outlet

Cold water inlet

3/8" Gas inlet

2 Blue or a green and blue wire connect to 2 blue wires on back of water heater. Polarity does not matter.



Later models use sheathed cables with no polarity.



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OPERATION

Operate in 2 ways:

1. Turns on the hot water at faucet and add cold water to achieve the desired hot water temperature.
2. Adjust temperature setting up or down on thermostat from 95° to 124° F. 115° F is recommended setting.
3. Winter use device automatically turns on blower and lights burner if temperature drops below 36° F and turns off at 48° F as long as power and gas are turned on.

Fan Icon
Blower is working

Flame Icon
Burner is lit and flame is detected



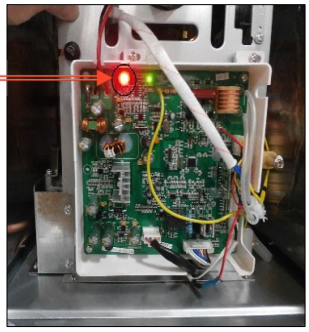
Shower Head Icon
Water is flowing

Green LED indicates good voltage of up to 17 volts

Amber LED stays on during operation



Red LED indicates voltage is below 10 volts and no operation occurs



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VISUAL INSPECTION

Open the door and verify that:

1. There is no obstruction to the air flow within the housing.
2. The exhaust tube is free and clear of any obstructions.
3. Water inlet valve is wide open.
4. Fuse is not blown.
5. Controller board is clean and shows no signs of burns or overheating around any components. Connections are in place and solid.
6. Turn on power switch and verify indicator light comes on.
7. Unit is connected to 12VDC power supply.
8. Unit has gas available.
9. Inspect copper tubes for cracks or textured patches that bulged from freezing water expanding.

Performance Specifications	
BTU/HR	42,000 BTU
Fuel	Propane (LP Gas)
Inlet Pressure	11" WCI Min. to 14" WCI Max.
Manifold Pressure	1.5" – 7.8" WCI
Power Input	12VDC < 3 amp
Water Operating Pressure	125 PSI Max
Dimensions	W x H x D 12.5" x 12.5" x 15.5"
Shipping Weight	22 lbs.
ECO	Max Temperature 140° F

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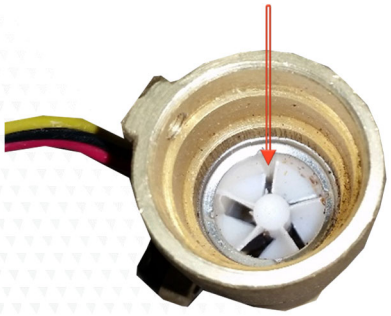
WATER FLOW TEST

1. Check for bypass mixing of hot and cold causing slower flow than .6 GPM.
2. Check for outdoor faucets.
3. Check for filters and other appliances restricting water flow.
4. Test flow by timing how long it takes to fill 1 gallon. Less than 1m 25 seconds is sufficient flow for the water heater to start.



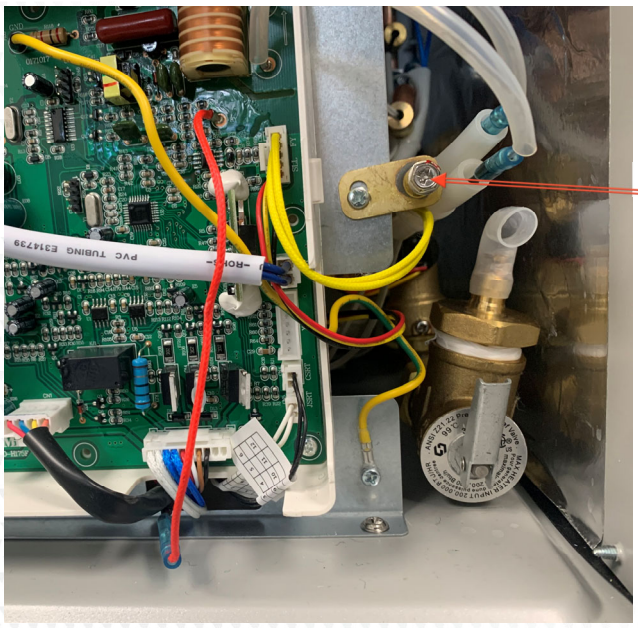
Faucet icon means water is flowing

Impeller



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PRESSURE RELIEF VALVE TEST



Pressure limit is 125 PSI
Maximum test pressure for water heater is 110 PSI

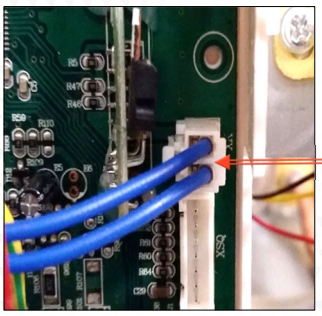
Pressure tap, test port.

1. Remove screw
2. Attach manometer
3. Average 7.5” on high and 1.5” on low

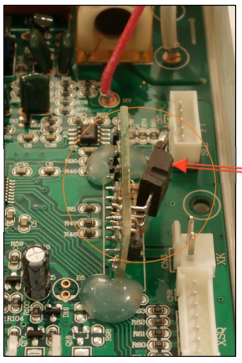
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THERMOSTAT TEST

1. Test voltage at thermostat connection on control board.
   - Voltage is **NOT** fluctuating between 9 and 11 VDC = replace controller
2. Test voltage at the thermostat .
   - Voltage is fluctuating between 9 and 11 VDC and the wire connections are good = replace thermostat
   - If there is good power at the control board and bad power to the thermostat then there is a wiring issue



Thermostat Harness



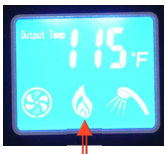
If blue wires are wired together at thermostat or back of water heater this component will overheat and burn out

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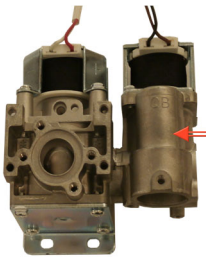
GAS SOLENOID VALVE SIDE TEST (E1)

Solenoid gas valve fails to open, then no gas will be supplied to the burner and an E1 fault code will occur.

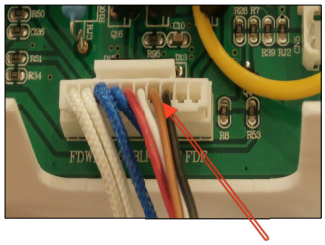
1. Confirm that gas tank is turned on and that they have propane in the tanks.
2. Confirm that gas has purged through the entire gas plumbing system by lighting the range and resetting the water heater a minimum of 3 times.
3. Confirm that the spark is occurring at the tips of the igniter. Visually inspect the igniter for obstructions or debris.
4. Smell for the scent of gas from the exhaust during the two trials for ignition.
5. Check the brown and black wires on the 8 pin wire connector at the bottom right side of the board to ensure integrity. Unplug the connector, gently pull on the brown and black wires. Visually inspect the connector and plug back in.
6. Test voltage of gas solenoid side valve out of brown and black wire during the trial for ignition.
7. The resistance on the coil should be approximately 110 ohms.
8. The output gas pressure of the gas valve can be measured at the test port on the right side of the controller. There should be 1.5" WC on low heat and 7.8" WC on high heat. If there is no pressure, then the gas valve is not opening.



Flame icon means valve is open and gas is flowing



Gas Solenoid Valve Side



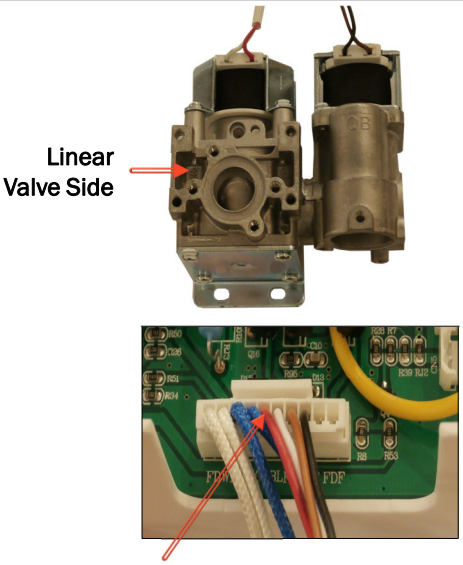
Gas Solenoid Valve Side
(Brown and Black)

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LINEAR VALVE SIDE TEST (E7)

The board also sends voltage to the linear (modulator) side of the gas valve on the red (+) and white (-) wires at the 8 wire connector at the bottom of the board.

1. Check the connection of the white and red wires on the 8 wire plug as well as the connections behind the firewall.
2. Unplug 8 wire connector and measure resistance of the coil. The resistance should approximately 80 – 100 ohms.
3. If the resistance is proper and the connection is good, then replace the controller.
4. If the resistance is not proper and the connection is good, then replace the valve.



Linear Valve Side
(Red and White)

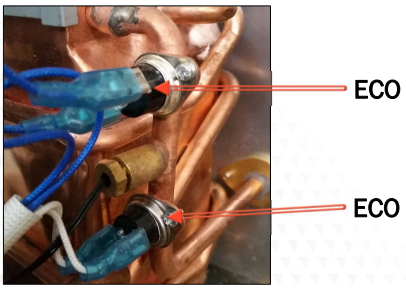
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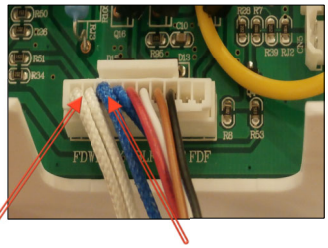
ENERGY CUTOFF SWITCH TEST (E3/E6)

E3 error code = ECO opens before ignition or during normal operation. Under normal circumstances this is due to the temperature of the water at the outlet exceeds 140°F. The cause must be identified and removed before restarting the unit.

E6 error code = outlet water temperature has exceeded 140°F for 3 seconds. The main cause of overheating in this water heater is purging all of the air out of the plumbing and high temperature cold water coming into the water heater. Southern states in the summer time can get extremely warm water right out of the ground. When these conditions occur ensure that your water flow is proper.

- Check incoming water source
- Check continuity at 8 wire connector





ECO
(White and White)

ECO
(Blue and Blue)

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INLET/OUTLET TEMPERATURE SENSOR TEST (E4/E0)

E4 error code = inlet water temperature sensor failure
E0 error code = outlet water temperature sensor failure

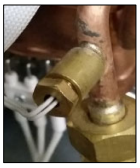
Check for proper connection at the board if it is good then replace the temperature sensor

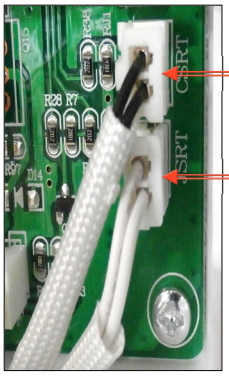
Outlet Temperature Sensor





Inlet Temperature Sensor





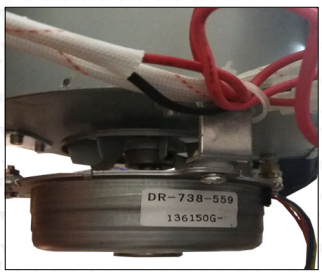
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BLOWER MOTOR NON-OPERATIONAL (E5)

Water heater comes on and immediately gives an E5 error code. This occurs if no motor signal was detected before ignition or during normal operation.

1. Confirm that the motor blower wheel is not blocked by turning the blower, under blowing housing.
2. Use multimeter to confirm that there is voltage out of the board to the motor on the 4 wire plug. Voltage = replace motor and no voltage = replace controller.

NOTE: It is possible that the blower is good and a bad controller could send wrong voltage and not fault code. If this occurs the shower head icon will turn on and you will not be able to change the set temperature.

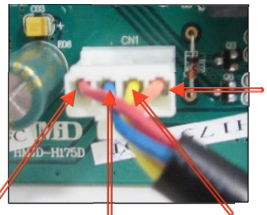






Fan Icon
Blower is working

Shower Head Icon
Water is flowing



Feedback
(Orange)

17 - 24 VDC
(Red)

Ground
(Blue)

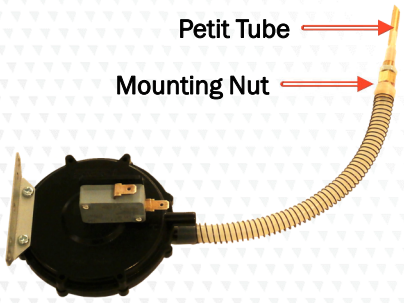
0 - 5 VDC
(Yellow)

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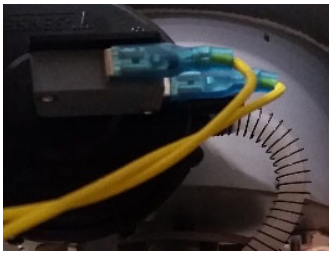
PRESSURE SWITCH TEST (E8)

Air pressure switch not detected for 7 seconds before ignition or is cut-off for 2 seconds during normal operation. This failure may be caused by a faulty motor or a blockage in the air support or in the exhaust system. E8 error code occurs when the controller does not see the pressure switch close.

1. Check for integrity and connections of the hose.
2. Check the wire connections on the controller and the pressure switch.
3. Check the integrity of the petit tube in the blower housing. Ensure the mounting nut is not loose and the standpipe is not twisted out of position. The petit tube should be facing away from the blower wheel.
4. Check for debris in the open pipe of the pressure switch.
5. Test continuity by jumping 2 yellow wires. If it doesn't work, replace the pressure switch.





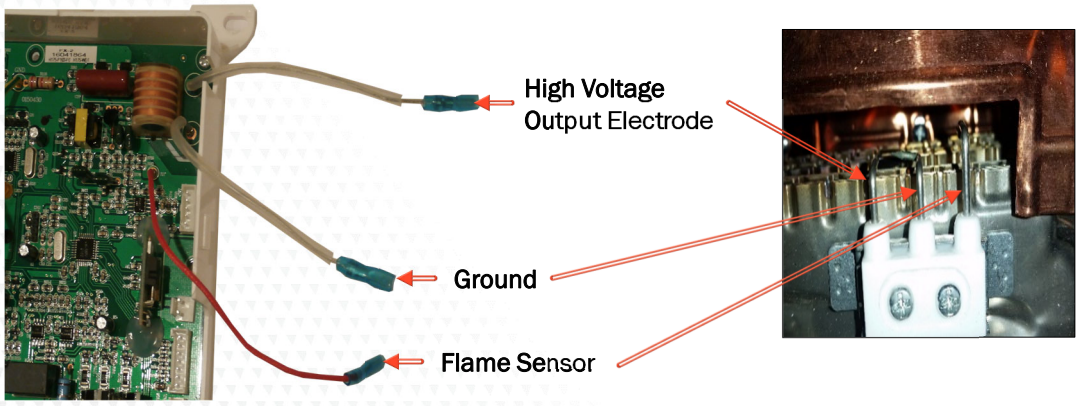


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IGNITER TEST (E1/E2/E9)

High voltage is sent to the igniter from the wires at the top right of the board. Left is high voltage electrode, center is ground, and right is the flame sensor.

1. Inspect for cracks on ceramic of the igniter
2. Check the wire connections
3. Check for misalignment
4. Check for spark



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ERROR CODES

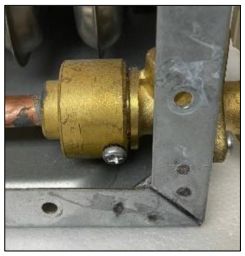
Error Code	Probable Cause	Corrective Action
E0	Unit does not attempt to light when water is turned on. Water outlet sensor failure.	Verify connections to the sensor. Verify with a voltmeter that the resistance of the outlet sensor is not an open circuit or a short. Replace water outlet sensor if needed.
E1	Ignition failure or accidental flame off during ignition. If the established flame signal is lost while the burner is operating, the controller will respond within .8 seconds, the gas valve is de-energized and a new inter-purge and ignition routine will begin. If the burner does not light, the controller will de energize the gas valve and will make two attempts to relight the burner. If the burner does not relight after the three trials the controller will go into lockout and the unit will need to be turned off before it can operate again.	**Inspect major components:** 1. ECO is not open. If it is run cold water through the unit to cool off the ECO 2. Lack of gas in tank 3. Faulty igniter (no spark) 4. Faulty igniter connections 5. Improper distance between the igniter and the burner 6. Igniter and burner 7. Accumulated dirt or obstruction between igniter and burner 8. Low gas inlet pressure Correct any improper condition and install a new igniter if needed.
E2	Flame sensing interrupted during normal operation. Buzzer will sound.	
E3	Unit does not attempt to light when water is turned on. ECO open before ignition or during normal operation. Temperature exceeds 140 degrees.	Verify with a voltmeter that the resistance of the ECO is not an open circuit. Let water flow through the unit to cool off. Replace ECO if needed.
E4	Unit does not attempt to light when water is turned on. Water inlet temperature sensor failure.	Verify with a voltmeter that resistance of the inlet sensor is not an open circuit or a short. Replace water inlet temperature sensor if needed.
E5	Unit does not attempt to light when water is turned on. Blower motor failure.	Verify motor power connection. Replace blower motor if needed.
E6	Outlet water temperature has exceeded 140 degrees for 3 seconds	Reduce temperature setting.
E7	Unit does not attempt to light when water is turned on. Linear valve failure.	Inspect linear valve for open circuit. Replace linear valve if needed.
E8	Unit does not attempt to light when water is turned on. Pressure switch or motor failure.	Inspect exhaust pressure switch for blockage in tube. Inspect for faulty motor and blockage in exhaust system.
E9	Unit does not attempt to light when water is turned on. Flame sensor failure.	Verify that there is a short in the flame sensor (Sensor touching burner or wires shorted)

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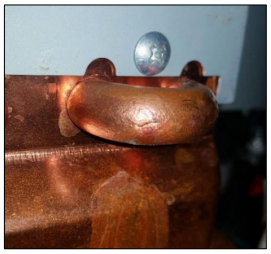
FREEZE LEAKS

Water left in the water heater can result in damage due to the expansion of ice in the pipes of the water heater. This will cause two situations in the plumbing of the water heater.

1. Expansion of the ice forces apart the flow sensor from the pipe flange which holds the o ring which creates the seal between the two parts. This can also happen at the connection between the inlet pipe and the inlet water valve. When this situation happens, it is repairable. Many times, the tip of the set screw will break off inside the grove of the plumbing flange. If this occurs reposition the plumbing for a good fit and then replace the screw. If the screw cannot be removed, then replace the flow sensor and / or the inlet pipe. Access to the inlet pipe set screw is through the back left side of the water heater case as looking at the water heater from inside the RV.
2. Expansion of ice in the pipe expands to the point that the pipe breaks. Normally you will see a crack in the pipe and the area around the pipe causes a textured effect on the copper. The heat exchanger is available and can be replaced







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WINTERIZATION

Freezing of the water heater and its plumbing components will result in severe damage not covered by warranty. For this reason it is advisable to follow the recommendation(s) below if the unit is to be stored in a freezing environment or for long periods of time. At the start of the winter season or before traveling to a location where freezing conditions are likely, the unit must be winterized. The very small amount of water present in the heat exchanger DOES NOT require the installation of a bypass kit.

Winterization can be accomplished using one of the two common methods of winterization used for RV water systems:

- Compressed Air method: Drain all water from the system opening one tap at a time and using compressed air to purge all remaining water.
- Anti-freeze method: Follow the recommendations of the Recreational Vehicle manufacturer and fill the system with a non toxic anti-freeze. Make sure that the anti-freeze flows from each tap to complete the process.

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Question and Answer

If you have questions, please feel free to ask us now. Otherwise, we are available and happy to discuss anything presented with you.

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