

GIRARD PRODUCTS. LLC.

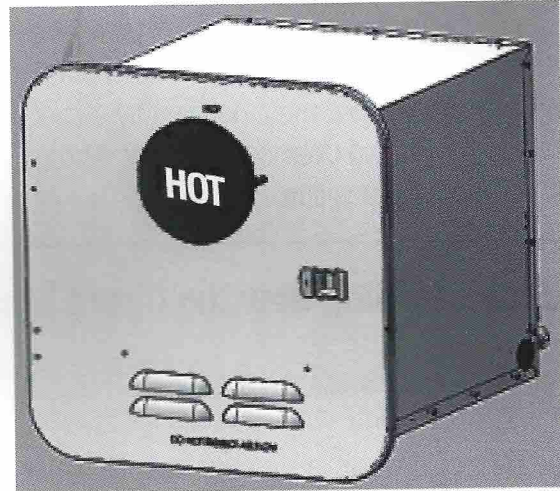
Technical Manual

Model: GSWH-2

Features:

- Demand Tankless Water Heater
- LP Gas / Induced Draft
- Constant Outlet Temperature
- Linear Gas Control Valve
- Electronic Gas Modulation
- Microprocessor Controls

- **Installation**
- **Operation**
- **Service and Maintenance**



Installation and service must be performed by a certified installer, service agency or gas supplier.

This water heater is certified for installation in Recreation Vehicles (RV's) and is not for use in Marine or Space Heating Applications.

For service and spare parts:
Australian RV Accessories
924 Burwood Highway
Ferntree Gully
Victoria 3156
Australia

This Water Heater is not suitable for use as a pool heater.

Girard Products LLC, 1361 Calle Avanzado, San Clemente CA 92673 USA

TANKLESS WATER HEATER - Model GSWH-2

Operation



CONSUMER SAFETY WARNING!

- Use with LP gas only.
- Shut off all gas appliances and pilot lights when refueling.
- Turn gas OFF at the LP tank when vehicle is in motion. This disables all gas appliances and pilot lights. Gas appliances must never be operated while vehicle is in motion.
- LP tanks must be filled by a qualified gas supplier only.
- Should overheating occur, turn gas OFF at the LP tank and turn the operating switch to the OFF position.

A: Understanding How the Girard Tankless Water System Works

In a conventional installation the Girard Tankless Water Heater is connected to:

1. The RV's cold water system deriving its water input from a pressurized (310 kPa or greater) source such as a shore connection or an RV water pump connected to the RV's fresh water storage tank. NOTE - A steady water flow (no pulsating) will ensure a consistent temperature and performance.
2. The RV's hot water system (i.e. faucets and shower).
3. The RV's LP Gas system capable of supplying its rated BTU requirement. The Girard Products model GSWH-2 introduces a new generation of smart tankless water heater designed specifically for Recreation Vehicles (RV). Its configuration and size are consistent with the tank based RV water heaters currently in use and is designed for OEM's and after- market use by the RV industry.
4. The RV's 12VDC electrical power.

The Water Heater's microprocessor based controller (Control Module) receives from electronic sensors the data it needs to decide each step of the Model GSWH-2 operation.

1. Display on the User Control Panel (UCP) each phase of the Water Heater's operation and receive from the user the operation parameters desired:
 - ON/OFF to activate
 - Desired outlet temperature
2. Verify that all components are in working order and that it is safe to start the unit upon sensing the minimum amount of water flow required (2.65 liters/min)

3. Verify that the blower is operating and supplies the air flow needed to maintain clean combustion.
4. Open the gas control and light the burner according to the procedure required by the safety standard.
5. Adjust the gas flow to reach and maintain the desire temperature set by the user
6. Continue operation as long as:
 - The water flow is above the minimum required
 - The presence of flame is verified
 - No unsafe condition develops
7. Provide the user with a visual indication of the operating conditions turning on the appropriate icon and displaying the current outlet temperature:
 - Fan icon on: Blower operating
 - Flame icon on: Burner is lit and flamed is detected
 - Shower Head on: Water is flowing
8. The button marked "C/F" determines if the temperature is displayed in °F or °C degrees
9. Whenever the "UP" or "Down" are pressed the display shows the set temperature.
10. If an unsafe condition is encountered and the unit shuts off, the display will show an Error Code corresponding to the actual condition that caused the unsafe condition.

See **Troubleshooting** section for a list of all error codes.

B. Water Control Valve Flow Optimization (optional)

The Water Control Valve of the GSWH-2 provides good control of the outlet temperature within a wide range of inlet water temperatures as are normally encountered in Recreational Vehicles. The unit is shipped with the Water Control Valve set at fully open/maximum flow. If desired, the operating flow can be manually adjusted. It is located on the rear of the water heater. In case of operation with extreme cold inlet water temperatures (approximately less than 7°C.



Figure 1

C: Operating Procedures

The Model GSWH-2 can be operated from the User Control Panel (Figure 9) which includes the Power ON/OFF switch.



Figure 2

The model GSWH-2 can be operated in two different ways:

1. Operate like a Tank Water Heater. The user turns on the hot water and add cold water to achieve the desired Hot water temperature.
2. Select the desired temperature by adjusting temperature setting up (^) or down (v). The UCP settings are from 35°(C) to 51° (C). The unit will maintain the set temperature.

Note – The recommended and Factory setting is 46° (C).

For normal operation:

1. Turn on the power. The panel will light and will display the current temperature at the inlet of the unit.
2. Press a temperature selection arrow (up or down) to see the current set temperature.
3. Adjust the set temperature to your preference.
4. Turn on the faucet.



WARNING!

It is dangerous to operate a Tankless Water Heater unattended. This may occur accidentally if a sufficient leak develops in the water system or if a faucet is left open. For this reason The GSWH-2 will automatically turn off after operating for 20 minutes and displays Error "En" on the Display.

D: Troubleshooting

a. Tools required:

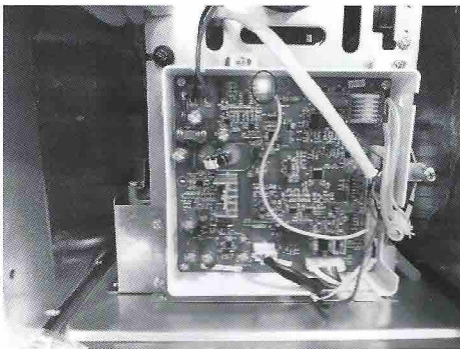
1. Voltmeter
2. Thermocouple readout or thermometer
3. Gas pressure manometer
4. Screwdrivers (Slot and Phillips heads)
5. Pliers (Regular and Needle Nose)

b. Installation verification:

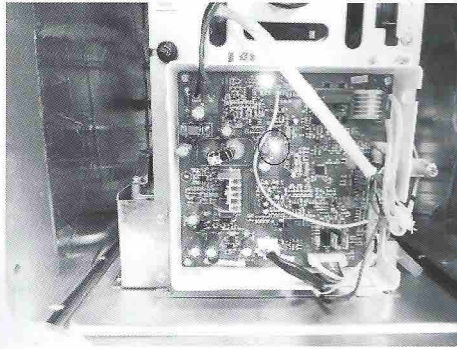
Open the door and verify that:

1. There is no obstruction to the air flow within the housing (Objects, dirt or other)
2. The Exhaust tube is free and clear of any obstruction (Leafs, insect nests, other)
3. Verify that the water inlet valve is wide open
4. Remove the Fuse located below the ON/OFF switch and verify that it is not blown.
5. Open lid of Control Box pulling on the left edge
6. Verify that the board is clean and shows no signs of burns or overheating around any component
7. Verify that all connections are in place and solid (See Figure 4 and Figure 5 below)
8. Turn ON power switch
9. Verify that the indicator light comes ON.
10. Verify that the unit is connected to 12VDC power supply using the Voltmeter (See section d.)
11. Verify that there is gas available (Tank not empty and lines full).

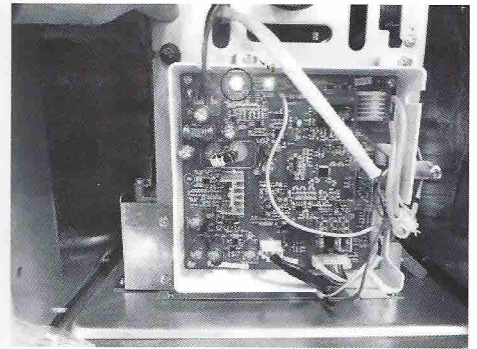
Mother board visual indicators:



Power On



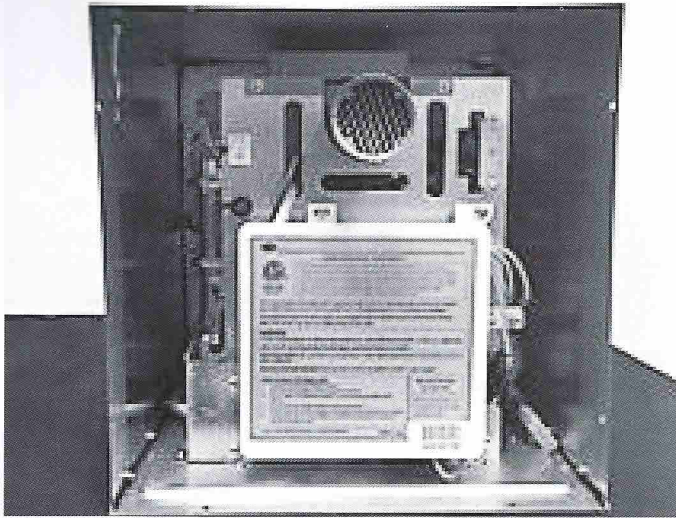
Unit Running



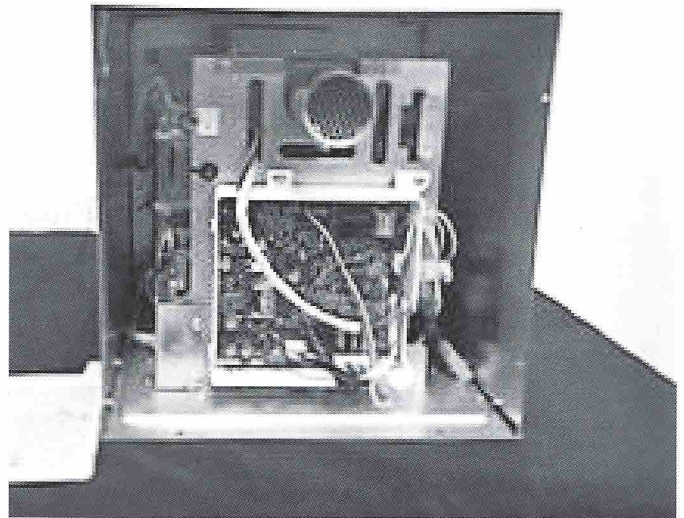
Low Voltage (< 10VDC)

If any Malfunction occurs during operation, refer to the following illustrations to gain access to all major components of the unit and proceed to the troubleshooting procedures (see below in this manual). Unit cannot be operated without firewall in place. Make sure to determine a probable cause before gaining access to the major components.

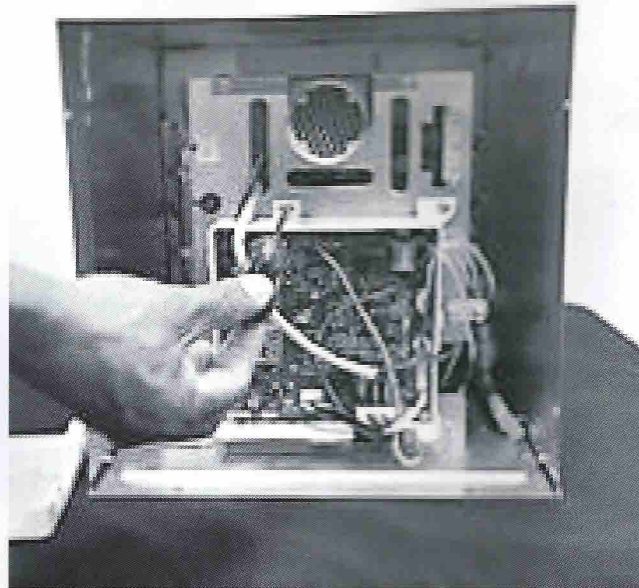
C. Access to major components:



Step 1a - Remove lid of Control Box

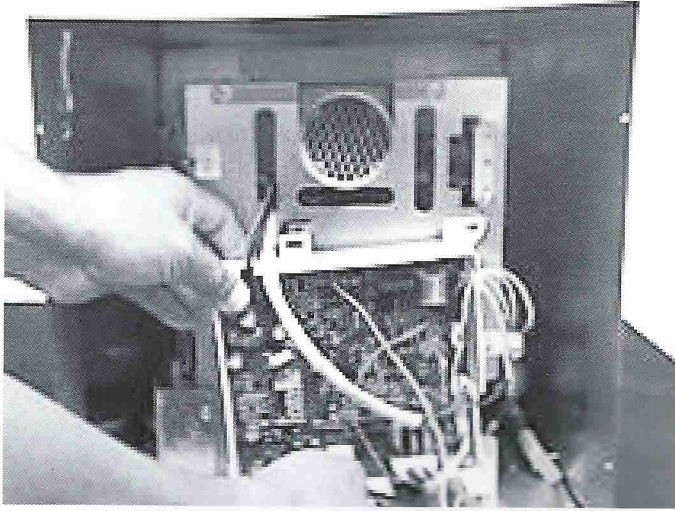


Step 1b - Control Box Open

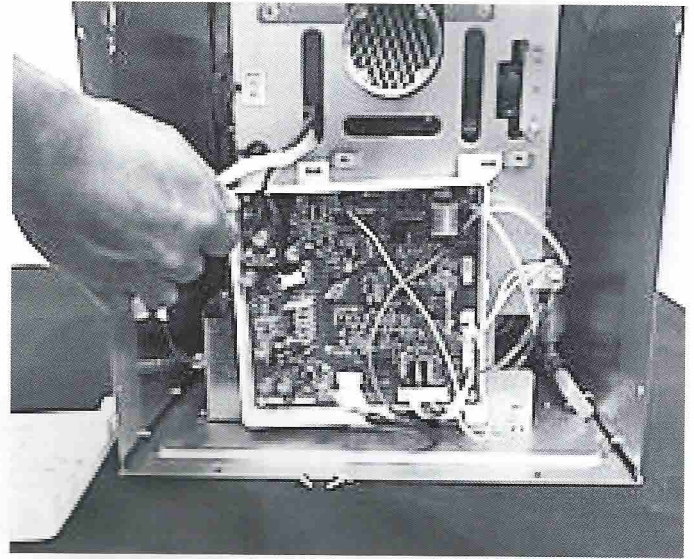


**Step 2 - Remove Housing of Control Box
from firewall**

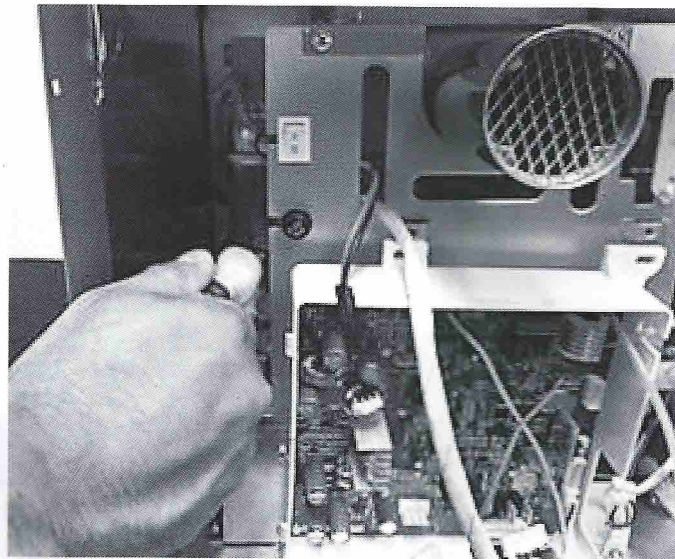
C. Access to major components continued:



Step 3 – Unplug all connectors from Control Board and note location

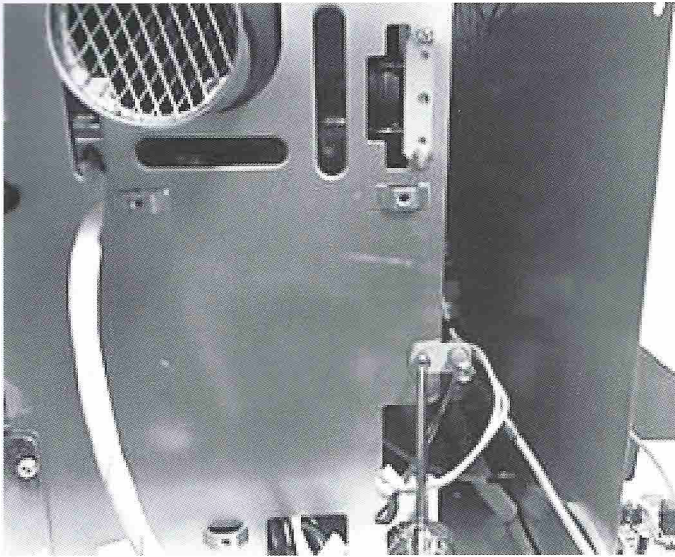


Step 3a - Connectors Unplugged

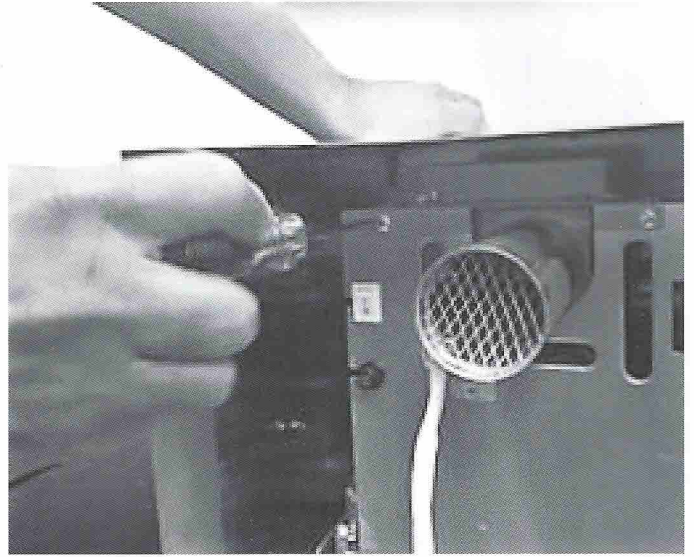


Step 4 - Cut wire wrap around power wires to allow extension

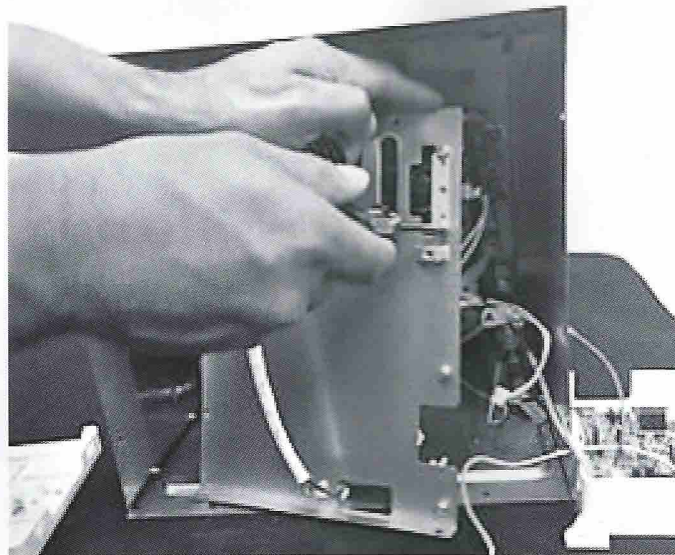
C. Access to major components continued:



Step 5 – Remove mounting screw of test port

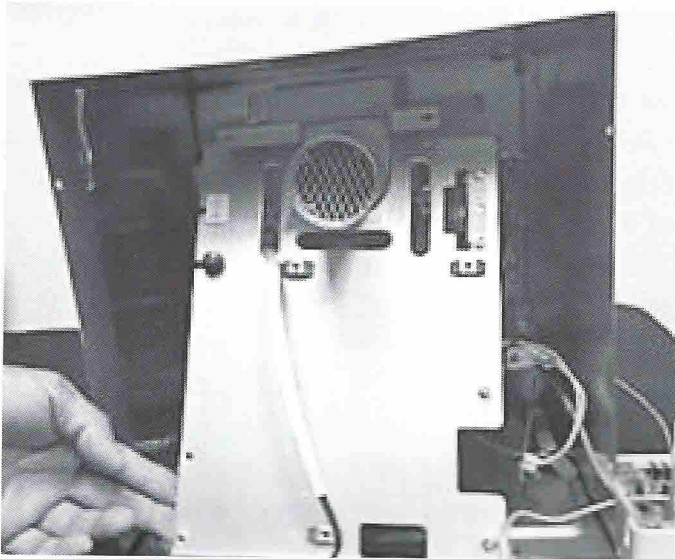


Step 6 - Remove all firewall mounting screws

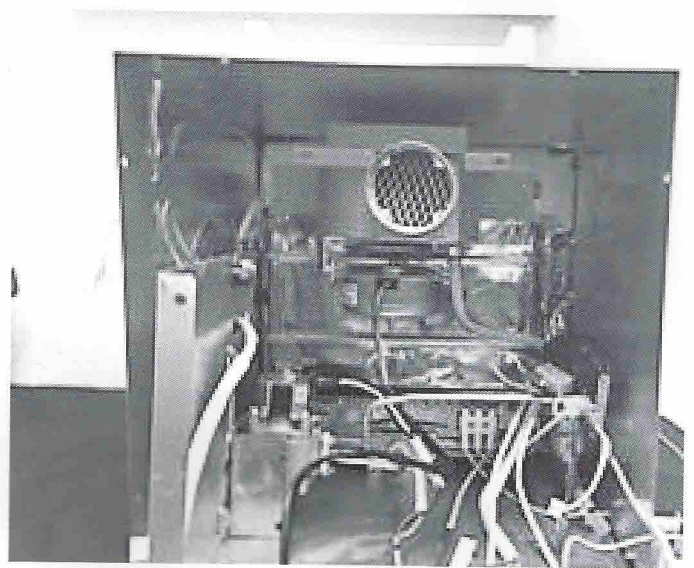


Step 7 - Remove Pressure Sensor mounting screws

C. Access to major components continued:



Step 8 – Remove Firewall and turn to rest on left side



Step 9 - Major components are now accessible

d. Malfunctions and repair

Malfunction 1:

Unit does not attempt to light when water is turned on.

Error codes: E0, E3, E4, E5, E7, E8, E9

Procedure:

If any of the above Error codes are displayed proceed as follows:

- 1. E0** - Verify connections to the Probe. Verify with a Voltmeter that the resistance of the outlet probe is not an open circuit or a short. If it is install a new Probe.
- 2. E3** - Verify with a Voltmeter that the resistance of the ECO is not an open circuit. Let water flow through the unit to cool off. If needed install new ECO
- 3. E4** - Verify with a Voltmeter that the resistance of the inlet probe is not an open circuit or a short. If it is install a new Probe.
- 4. E5** - Verify Motor power connection.
- 5. E7** - Inspect Linear Valve.
- 6. E8** - Inspect Air Pressure Switch.
- 7. E9** – Verify that there is a short in the flame sensor (Sensor touching burner or wires shorted)

D. Malfunctions and repair (continued)

Malfunction 2: Unit attempts to light but does not ignite the gas

Error codes: E1

Procedure:

Inspect Major Components (See below)

Verify that none of the following conditions are present:

1. Lack of Gas in the tank
2. Faulty Igniter (no spark)
3. Faulty Igniter connections
4. Improper distance between the Igniter and the Burner
5. Accumulated dirt or obstruction between Igniter and Burner
6. Low Gas Inlet pressure

Correct any improper condition and install a new Igniter if needed.

Malfunction 3: Unit ignites the gas but shuts off soon after

Error codes: E2

Procedure:

1. Notice if buzzer sounds to indicate the failure of the flame sensor.
2. Follow same procedures outlined for Malfunction 2 above looking specifically at the Igniter electrodes.

Malfunction 4: Unit shuts off while running

Error codes: E1

1. Make sure that the ECO is not open. If it is run cold water through the unit too cool off the ECO.
2. Follow same procedures outlined for Malfunction 2 above

Malfunction 5: Water output temperature is less than indicated on the User Control Panel (UCP)

1. Verify the manifold pressure of the gas at the test port using the Manometer.
2. Make sure that the voltage applied to the Mother board is $>11V$
3. Verify accuracy of the outlet temperature probe using a thermocouple or thermometer.

Malfunction 6: Unit is too noisy

Inspect motor and blower assembly to determine a possible cause.

E. Error Codes on User Control Panel

E0: Water Outlet Temperature Probe failure.

An open circuit or short circuit condition is detected: This could be due to an internal failure in the Temperature Probe or to a faulty connection (Wires)

E1: Ignition failure or accidental flame off during ignition.

If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds, the gas valve is de-energized and a new inter-purge and ignition routine will begin. If the burner does not light, the control 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 control will go into LOCKOUT and the unit will need to be turned off before it can operate again. This could occur for a number of reasons. The most common are:

- Lack of Gas in the tank
- Faulty Igniter
- Faulty Igniter connections
- Improper distance between the Igniter and the Burner
- Accumulated dirt or obstruction between
- Igniter and Burner
- Low Gas Inlet pressure

E2: Flame sensing interrupted during normal operation. Buzzer will sound.

Possible causes are the same as indicated by Error E1 if any of these conditions occur during normal operation. A lock out will occur also in these conditions.

E3: ECO open before ignition or during normal operation.

This occurs if the ECO thermostat opens. Under normal circumstances this is due to the Temperature of the water at the Outlet exceeds 60°C. The cause must be identified and removed before restarting the unit.

E4: Water Inlet Temperature Probe probe failure.

An open circuit or short circuit condition is detected: This could be due to an internal failure in the Temperature Probe or to a faulty connection (Wires)

E5: Blower motor failure.

No motor signal was detected before ignition or during normal operation. This could be also caused by a wiring fault in the motor connections.

E6: Over Temperature.

Outlet Water Temperature has exceeded 60°C for 3 sec.

E7: Linear valve failure:

The Controller Module detects an open circuit in the Linear Valve control circuit before ignition or during normal operation indicating a faulty Valve.

E8: Air pressure switch:

Air pressure switch not detected for 7 sec. before ignition or is cut-off for 2 sec. during normal operation. This failure may be caused by a faulty motor or a blockage in the air supply or in the exhaust system.

E9: Flame sensor:

















Flame is sensed before ignition. Buzzer will sound. This is displayed when a short is detected in the flame sensor.

End: System Timer:

Water Heater ran longer than 20 min.

F: Replacement Parts: Components

#	Description	Photo	Qty
1	Shell Top		1
2	Proportional Valve (Gas Valve)		1
3	Valve Bracket		1
4	Power switch & Fuse holder Assy		1
5	External Fuse10A		1
6	Controller Bracket		1
7	Air Pressure Switch		1
8	Control Box (Microprocessor)		1
9	User Control Panel (UPC) Remote Cont.		1
10	Water Pipe Screw Cover		1
11	O-Ring		1
12	Inlet-Valve Gas Train		1
13	Valve-Burner Gas Train		1
14	Igniter		1
15	Burner		1
16	Shell Bottom		1

#	Description	Photo	Qty
17	Pressure Relief Valve Direction Tube		1
18	Pressure Relief Valve		1
19	Water Pipe Assembly		1
20	Flow Switch Inlet		1
21	Filter Screen Inlet		1
22	Dust Cap: Inlet/Outlet		1
23	Flow Switch Inlet Knob		1
24	Water Flow Sensor		1
25	Rubber Gasket		1
26	Temperature Probe for Water Inlet		1
27	Inlet Thermostat (Antifreeze)		1
28	Temperature Probe for Water Outlet		1
29	Heater Exchanger		1
30	(ECO) T-Switch		1
31	Strain Relief		1
32	Blow Motor Assembly		1

G. Functional Diagram of the Water Heater

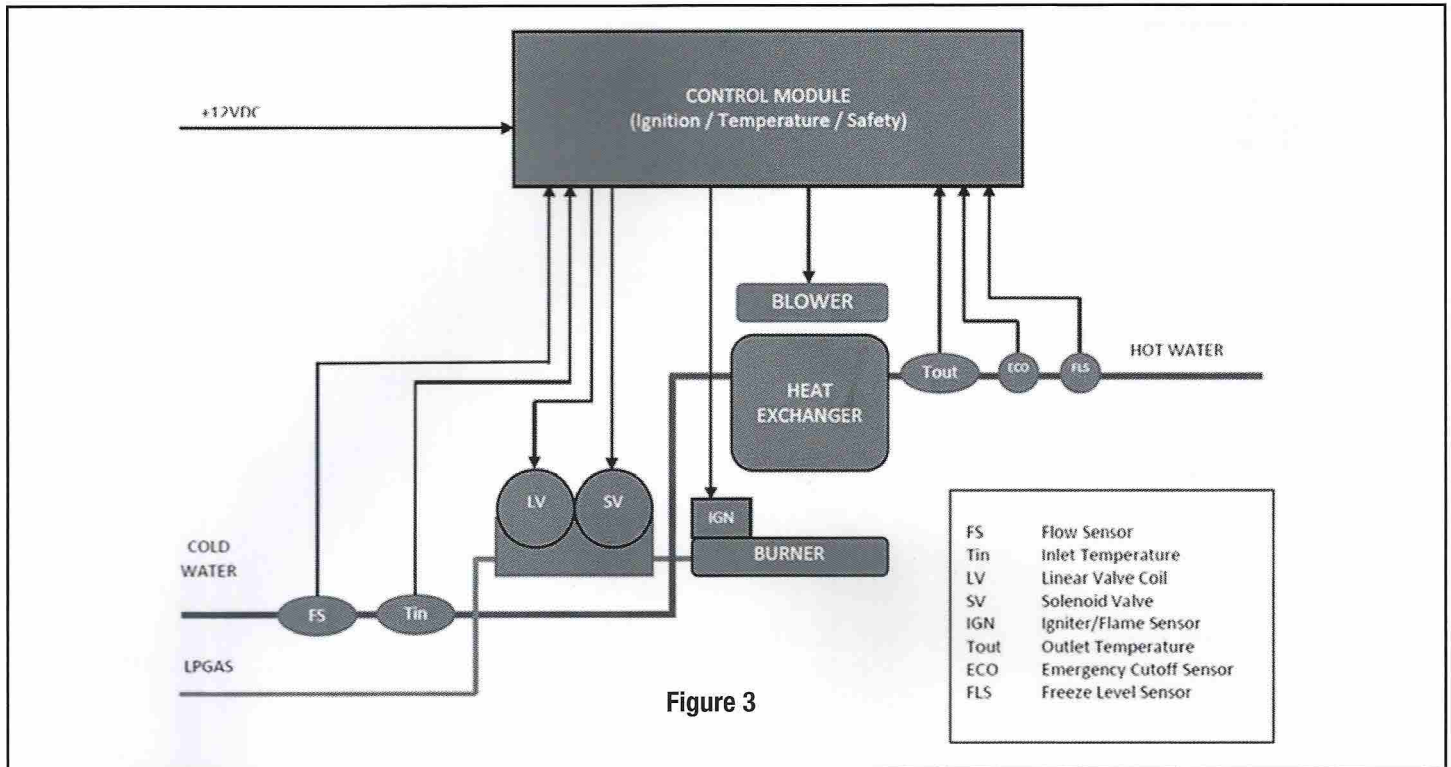


Figure 3

H. Wiring Diagram of the Electrical Connections within the Unit

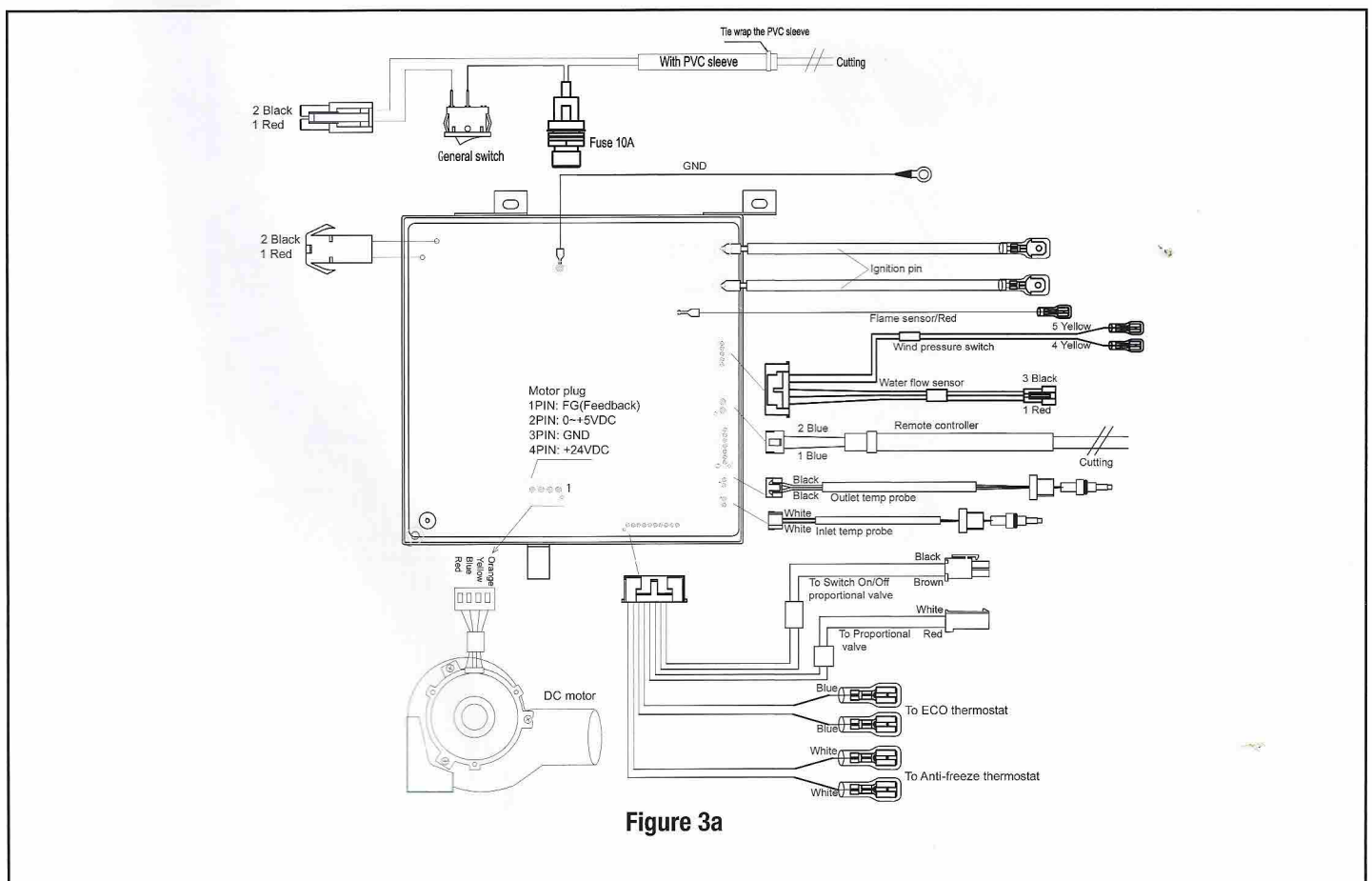
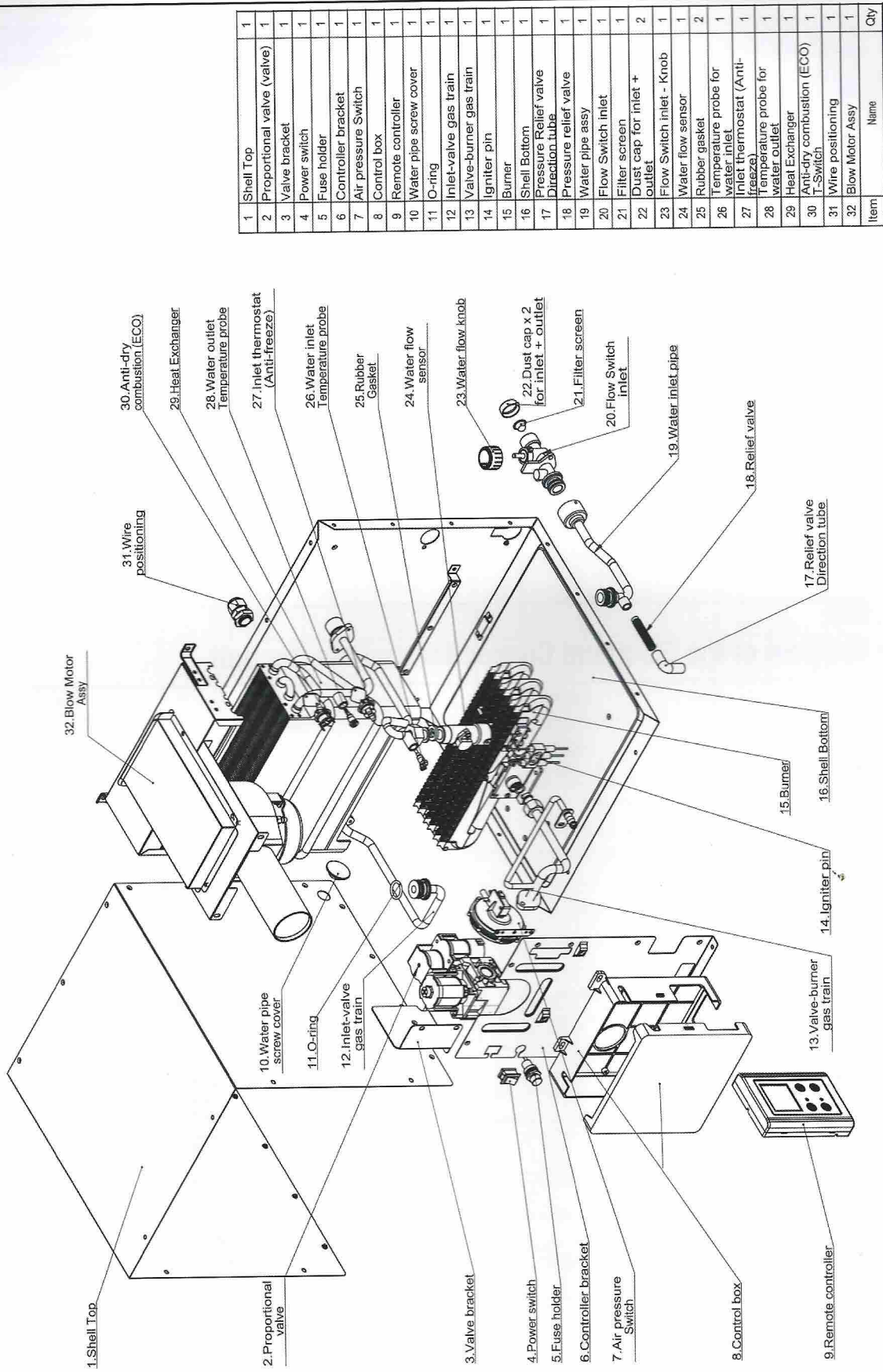


Figure 3a

Exploded view of all of Components



Item	Name	Qty
1	Shell Top	1
2	Proportional valve (valve)	1
3	Valve bracket	1
4	Power switch	1
5	Fuse holder	1
6	Controller bracket	1
7	Air pressure Switch	1
8	Control box	1
9	Remote controller	1
10	Water pipe screw cover	1
11	O-ring	1
12	Inlet-valve gas train	1
13	Valve-burner gas train	1
14	Igniter pin	1
15	Burner	1
16	Shell Bottom	1
17	Pressure Relief valve Direction tube	1
18	Pressure relief valve	1
19	Water pipe assy	1
20	Flow Switch inlet	1
21	Filter screen	1
22	Dust cap for inlet + outlet	2
23	Flow Switch inlet - Knob	1
24	Water flow sensor	1
25	Rubber gasket	2
26	Temperature probe for water inlet	1
27	Inlet thermostat (Anti-freeze) water outlet	1
28	Temperature probe for water outlet	1
29	Heat Exchanger	1
30	Anti-dry combustion (ECO) T-Switch	1
31	Wire positioning	1
32	Blow Motor Assy	1

Figure 4

J. Control Module and its Connections

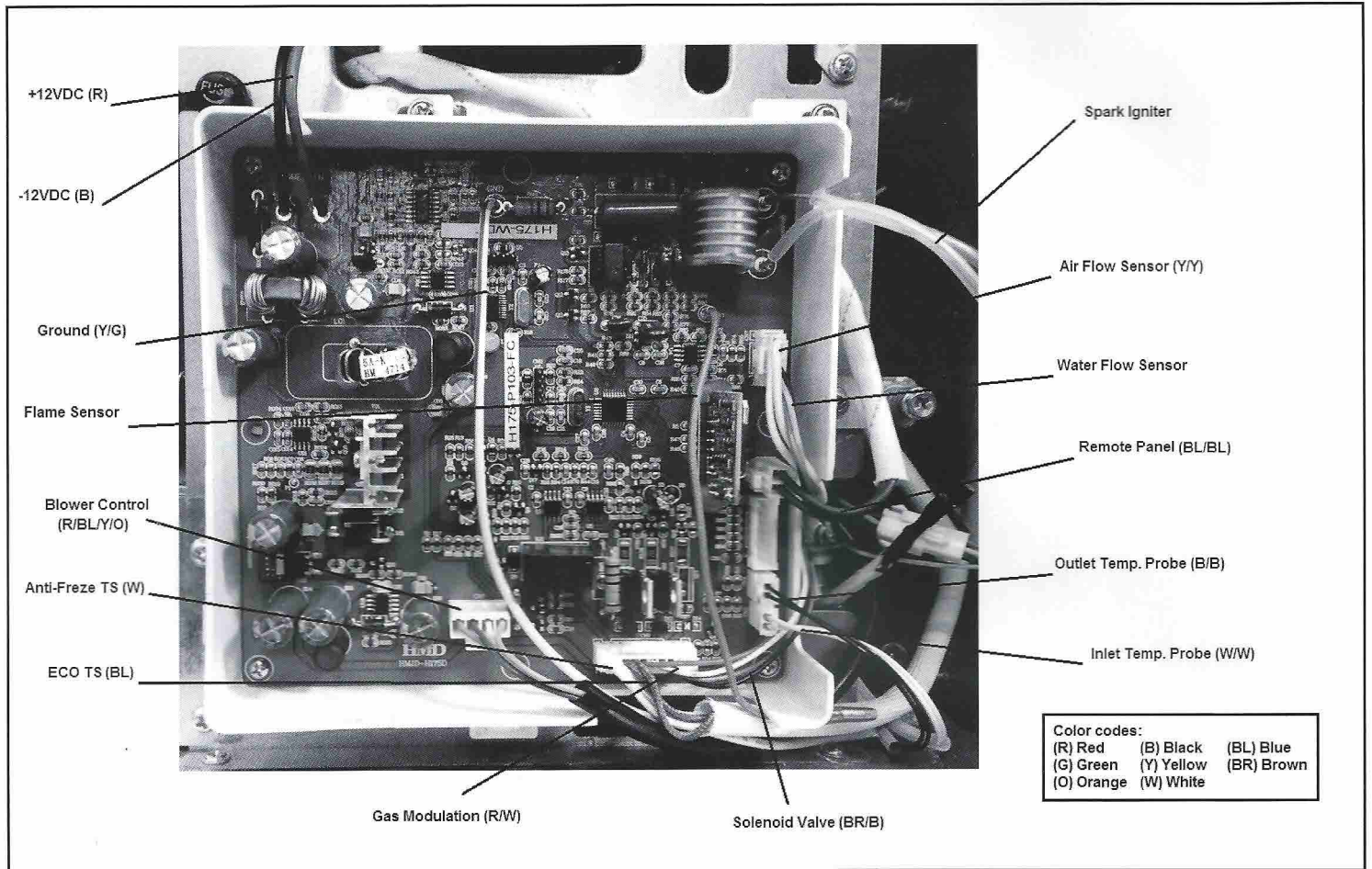


Figure 5

Notes:

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www.greenrvproducts.com
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