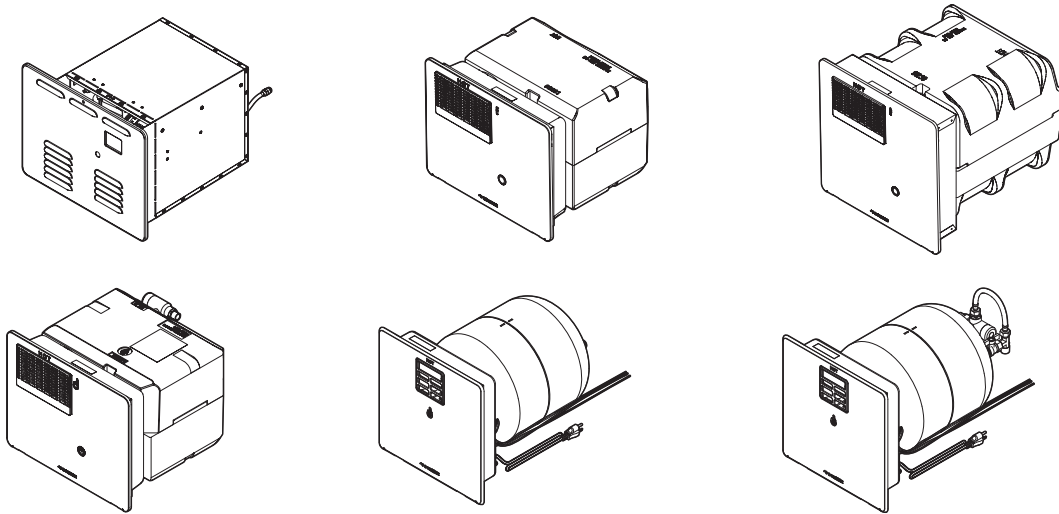


DOMETIC **HEATING** **WATER HEATERS**



G6A-8E, GH6-8E, G10-3E, GH10-3E, WH-6GA, GC6AA-10E, GCH6A-10E, GC10A-4E, GCH10A-4E, WH-6GEA, OD-5001, G6A-7, G10A-2, G9-EXT, G16-EXT, GE9-EXT, GEH9-EXT, WH-9EXT, GE16-EXT, GEH16-EXT

EN

Water Heater

Service Manual. 2



WARNING: BURN HAZARD, FIRE, EXPLOSION, AND/OR CARBON MONOXIDE HAZARD.

Keep the Water Heater area clear of combustible cleaning materials, gasoline, and other flammable vapors and liquids. Failure to obey this warning could result in death or serious injury.



WARNING

Cancer and Reproductive Harm
www.P65Warnings.ca.gov

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result, causing property damage, personal injury, or death.

– Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

– WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your recreational vehicle.
- Clear the recreational vehicle of all occupants.
- Turn off the gas supply tank valve(s) or main gas supply.
- Immediately call your gas supplier for instructions. If you cannot reach your gas supplier, call the fire department.

– Have the gas system checked and leakage source corrected by a qualified installer, service agency, manufacturer or dealer, or the gas supplier.

Service Center & Dealer Locations

Visit: www.dometic.com

Read these instructions carefully.

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1 Explanation of Symbols and Safety Instructions

This manual has safety information and instructions to help you eliminate or reduce the risk of accidents and injuries.

1.1 Recognize Safety Information

 **This is the safety alert symbol.** It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

1.2 Understand Signal Words

A signal word will identify safety messages and property damage messages, and also will indicate the degree or level of hazard seriousness.

DANGER!

Indicates a hazardous situation that, if **not** avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation that, if **not** avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation that, if **not** avoided, could result in minor or moderate injury.

NOTICE: Used to address practices **not** related to physical injury.

 Indicates additional information that is **not** related to physical injury.

1.3 Supplemental Directives

To reduce the risk of accidents and injuries, please observe the following directives before proceeding to service or maintain this appliance:

- Read and follow all safety information and instructions.
- Read and understand these instructions before service or maintenance of this product. For additional information on replacement service, refer to the appropriate installation manual.
- When servicing the appliance, replacement parts and installations must comply with all applicable local or national codes, including the latest edition of the following standards:

U.S.A.

- ANSI/NFPA70, National Electrical Code (NEC)
- ANSI/NFPA 1192, Recreational Vehicles Code
- ANSI Z21.57, Recreational Vehicles Code
- ANSI Z223.1, NFPA 54 National Fuel Gas Code
- ANSI/RVIA LV, Low Voltage Systems in Conversion and Recreational Vehicles

Canada

- CSA C22.1, Parts I & II, Canadian Electrical Code
- CSA Z240 RV Series, Recreational Vehicles
- CAN/CGA B149, National Gas and Propane Installation Code

1.4 General Safety Messages

DANGER! CARBON MONOXIDE POISONING HAZARD.

This product can produce carbon monoxide, which has no odor and can be life-threatening. Avoid improper adjustment, alterations, service, or maintenance. Follow instructions for the proper installation of this appliance. Failure to obey this danger notification can result in improper installation causing carbon monoxide poisoning that will result in death or serious injury.

⚠ WARNING: ELECTRICAL SHOCK, FIRE, AND/OR EXPLOSION HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Use only Dometic replacement parts and components that are specifically approved for use with the appliance.
- Avoid improper installation, adjustment, alterations, service, or maintenance of the appliance.
- Do **not** modify this product in any way. Modification can be extremely hazardous.
- Use care when diagnosing and/or adjusting components on a powered unit.
- Disconnect power to the appliance before service or maintenance.
- Do **not** cause a short in the control terminals of the appliance.
- Shut off and disconnect all gas sources before performing service or maintenance on this appliance.
- Dometic gas-operated products are for use with liquid propane (LP) gas only in recreational vehicles only, such as travel trailers, motor homes, and tent campers.
- Do **not** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Shut off all gas appliances and pilot lights when refueling gasoline or LP tanks, or when the vehicle is in motion.
- After service, perform a leak check on the gas system, like a pressure drop test. Verify that there is a sufficient gas supply before attempting to light any burner. Air in the line will significantly delay the burner ignition and a burner may light unexpectedly as the air in the line clears out and is replaced by LP gas.

⚠ WARNING: SERVICE HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Service, installation, repairs, and preventative maintenance should be done by a qualified service person only.
- The appliance should be inspected before use and at least annually, by a qualified service person only.

⚠ WARNING: HIGH TEMPERATURE HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Do **not** touch or put combustibles on or near the appliance.
- Supervise young children in the same room as the appliance.

⚠ WARNING: ELECTRICAL HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Label all wires prior to disconnection when servicing. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.
- Do **not** connect 120 VAC to a 12 VDC circuit.

⚠ WARNING: CARBON MONOXIDE POISONING HAZARD.

Gas flames consume oxygen, which must be replaced to assure proper combustion. Provide fresh air during testing, service, and maintenance of this appliance. Failure to obey this warning can result in death or serious injury.

2 Intended Use

This service manual is intended for use by OEM service center and dealer technicians. It is not intended for use by RV owners, or those unfamiliar with the workings of Water Heaters used in the RV industry.

Readers of this manual are assumed to have a basic understanding of RV Water Heater best practices and experience in the proper use of the tools and materials related to the installation, operation, maintenance, and servicing of the gas and/or electric Water Heater equipment used in the RV industry.

The Water Heater service manual is a resource created to help service technicians identify the product by serial number, diagnose an operational issue, and efficiently and effectively process warranty claims.

3 Troubleshooting

This section has tables showing the main causes for Water Heater issues.

Review the “Troubleshooting Table” on page 5 to help you identify the suspected operational issue, the potential causes, and the diagnostic procedure associated with those issues.

Refer to the “Diagnostics Table” on page 8 for links to specific component diagnostic tasks intended to help you confirm the suspected operational issue and potential cause.

Remember to check the basics, including contributing issues, before replacing any parts. Refer to “Installation Issues” on page 29 and “Maintenance” on page 48 for more detail.

Troubleshooting Table

Operational Issue	Potential Reason	Page
Gas Only and Gas/Electric Combination Water Heaters (Standard and EXT)		
The gas solenoid valve opens, but there is no spark.	There is no voltage going out from the ignitor on the control board.	20
	The electrode has shorted out.	22
The gas solenoid valve opens and there is a spark, but there is no ignition.	The gas pressure is too low or absent.	29
	The orifice is blocked.	25
	The electrode has shorted out.	22
	The burner tube is blocked.	20
	The burner tube is misaligned.	
	The air shutter requires adjustment.	
	The flame spreader is misaligned.	
	The gas solenoid valve is defective.	23
The gas solenoid valve fails to open and there is no spark.	The wall switch is defective.	28
	The wall switch is wired incorrectly.	
	The DC voltage is too low or absent.	29
	The E.C.O. is in open circuit.	22
	The thermostat is in open circuit.	27
	The thermal cut-off is in open circuit.	26
	The control board is defective.	20
	The 2 A fuse on the control board is blown.	
	The electrode has shorted out.	22
The gas solenoid valve fails to open, but there is a spark.	There is no power going out to the gas solenoid valve from the control board.	20
	The gas solenoid valve is defective.	23
	The voltage is less than 10.5 DC Volts.	23

Operational Issue	Potential Reason	Page
The burner will not ignite, has an erratic burner flame, or is sooting.	The air shutter requires adjustment.	20
	The burner tube is blocked.	
	The burner tube is misaligned.	
	The flame spreader is misaligned.	
	The orifice is blocked.	25
	The system has improper gas pressure or is using bad LP gas.	29
	The gas solenoid valve is defective.	23
	The U-tube is blocked or collapsed.	49
The water is too hot or is too cold.	If the thermostat is set within the normal operating range, starting a heating cycle at 120 °F (49 °C) ± 8 degrees and ending a heating cycle at 140 °F (60 °C) ± 6 degrees, there is no operational issue.	27
	The thermostat is out of calibration.	
	The thermostat is not seated on the tank correctly.	
	The thermostat is defective.	
	EXT models only: the mixing valve is defective.	24
	EXT models only: the screen for the mixing valve is blocked.	
There is excessive weeping coming from the pressure/temperature (P/T) relief valve.	The bypass kit is not set properly.	40
	Some weeping or dripping occurs as the water heats up.	25
	The thermal expansion air pocket needs to be re-established.	
	The P/T relief valve has been dry-fired or is defective.	
	The thermostat is defective or out of calibration.	27
	The thermostat is not seated on the tank correctly.	
The gas/electric combination model operates using gas but does not operate on electric power.	There is no power going out to the relay from the control board.	20
	There is power to the relay, but the relay is not closing.	26
	The heating element is defective	24
	The AC voltage is too low or absent.	29
	The wall switch is defective.	28
	The wall switch is wired incorrectly.	
The gas/electric combination model is not operating while using either gas or electric power.	The wall switch is defective.	28
	The wall switch is wired incorrectly.	
	The E.C.O. is in open circuit.	22
	The thermostat is in open circuit.	27
	The thermal cut-off is in open circuit.	26
	The 2 A fuse on the control board is blown.	20
	The control board is defective.	
	The DC voltage is too low or absent.	29

Operational Issue	Potential Reason	Page
On Demand Water Heaters		
When the water is running, the appliance does not attempt ignition and the fan does not run.	The water flow is less than 0.8 gpm (3.0 lpm) at the faucet.	24
	The winter/summer setting on the modulating valve requires adjustment.	28
	The E.C.O. is in open circuit.	22
	The E.C.O. needs to be reset.	
	The inline 3 A fuse at the Water Heater is blown.	15
	The wall switch is defective.	28
	The wall switch is wired incorrectly.	
	The modulating valve is defective.	24
	The DC voltage is too low or absent.	29
When the water is running, the fan runs, but the appliance does not attempt ignition.	The pressure switch is defective.	25
	The pressure switch is blocked.	
	The electrode has shorted out.	22
	The flue tube is blocked.	49
	The 2 A fuse on the control board is blown.	20
	The control board is defective.	37
The water temperature at the faucet is too hot, too cold, or inconsistent.	The water flow is not between 0.8–1.5 gpm (3.0–5.7 lpm) at the faucet.	24
	The inlet water temperature is too hot or too cold (60 degree temperature change at full flow).	27
	The winter/summer setting on the modulating valve requires adjustment.	28
	Restrictors are being used on the faucets and the shower heads.	N/A
	The gas pressure is not between 11–13 in. W.C. when entering the appliance under 50% demand.	29
	The user is not turning on the hot-water tap fully and slowly to introduce the cold water.	27
The E.C.O. trips repeatedly.	The cold-weather thermostat is loose and not tight against the heat exchanger.	27
	The winter/summer setting on the modulating valve requires adjustment.	28
	The incoming water temperature is too hot.	27
	The E.C.O. is defective.	22
Gas Only - Pilot Water Heaters		
The pilot lights but fails to stay lit.	The pilot flame is insufficient.	25
	The pilot orifice is blocked.	
	The pilot was not lit properly.	
	The thermocouple is weak.	26
	The gas valve is not functioning because of a tripped E.C.O.	23

Operational Issue	Potential Reason	Page
The pilot fails to light.	The gas pressure is too low or absent.	29
	The pilot gas line is blocked.	25
	The pilot orifice is blocked.	
	The gas valve is defective.	23
The main burner has an erratic flame or fails to light.	The burner tube is blocked.	20
	The burner tube is misaligned.	
	The main burner orifice is blocked.	
	The flame spreader is misaligned.	
	The air shutter requires adjustment.	
	The gas valve is defective.	23

Diagnostics Table

Component	Page
Burner Assembly	20
Control Board (Standard and EXT)	20
E.C.O.	22
Electrode	22
Gas Solenoid Valve	23
Heating Element	24
Mixing Valve	24
Modulating Valve	24
Orifice	25
P/T Relief Valve	25
Pilot Assembly	25
Pressure Switch	25
Relays	26
Tank	26
Thermal Cut-Off	26
Thermocouple (Gas Only - Pilot Model Only)	26
Thermostat (Cold-Weather)	27
Thermostat (Standard)	27
Wall Switch	28
Winter/Summer Setting Screw	28

4 General Information

This section provides reference information on the tooling, terminology, model identification, and components associated with the different models.

 The images used in this document are for reference purposes only. Components and component locations may vary according to specific product models. Measurements may vary ± 0.38 in. (10 mm).

4.1 Tools and Materials

Dometic recommends that the following tools and materials be used while servicing the appliance:

Recommended Tools	
Common Hand Tools	Wire Strippers/Crimpers
U-Tube Manometer	Jumper Wire
Water Heater Board Tester	Leak Test Solution
Multi-Meter - DC/AC Voltage, Ohms Resistance, DC Millivolts	Substance Temperature Thermometer

4.2 Terminology

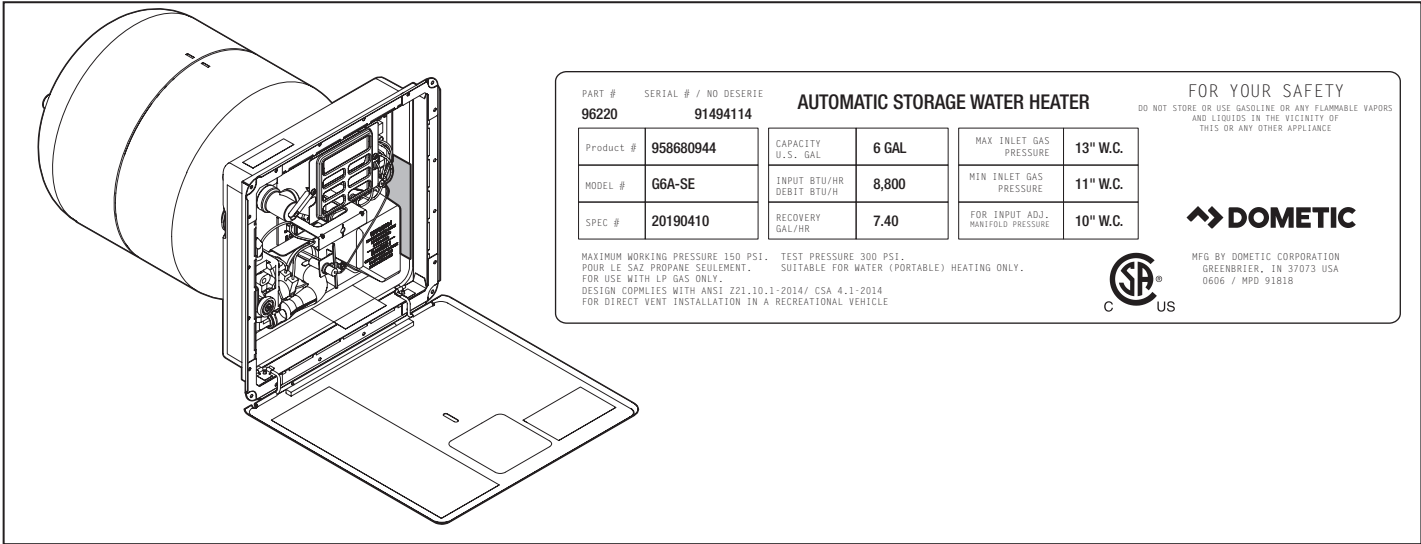
The following table defines some of the terms that are typically used when dealing with the Water Heater units.

Term	Definition
Air Shutter	A part on the burner tube that slides to adjust the flame height.
Anode Rod	A rod that attracts the corrosive elements in the water held in the Water Heater to help prevent internal corrosion. Do not use an anode rod in a Dometic Water Heater. Use of an anode rod voids the warranty.
Bypass Kit	A combination of hoses and valves that aid in the Water Heater winterization process.
Circuit Board Tester	A third-party diagnostic tool used to test the electrical functions of a control board.
Diffuser Tube	A tube that acts as a directional water flow device. Cold diffusers force cold water to the bottom of the tank and hot diffusers allow water to be pulled from the highest point inside the tank.
DSI	An initialism for direct spark ignition.
E.C.O.	An initialism for energy cut off. It is a normally closed safety temperature switch that opens if the water temperature exceeds 180 °F (83 °C).
Electrode	A conductor that establishes an electric spark at the burner for ignition. It senses a flame is established and signals the control board.
Flame Spreader	A round, deflative device found at the combustion end of the main burner.
Flue Tube or U-Tube	A combustion and water heating surface area on the inside of the tank.
Gas Pressure	The amount of gas supplied to the Water Heater, measured in inches of water column (W.C.).
Gas Solenoid Valve	A 12 VDC mechanical device that turns the flow of gas Off and On.
Gas Supply	A fuel source that feeds the gas solenoid valve with 11 in. W.C.
Hot Rod	An aftermarket heating method that screws into the drain plug. Do not use an aftermarket hot rod in a Dometic Water Heater. Use of a hot rod voids the warranty.
Magnet (Gas Only - Pilot models only)	A device that when receiving 12 mV or more of electricity, allows gas to flow freely to the pilot without the user holding the pilot knob.

Term	Definition
Main Burner Gas Control	The component that supplies gas to the main burner when the control knob is set to the On position and the temperature lever is set to the desired temperature.
Main Burner Orifice	The component that ignites the gas when it reaches the end of the burner tube.
Mixing Valve (EXT models only)	The component that mixes hot and cold water to a fixed temperature of approximately 130 °F (54 °C).
On/Off Switch	A control that supplies 12 VDC to the Water Heater when in the On position and stops the voltage when in the Off position.
Orifice	A precision-drilled component that meters the flow of gas.
Pilot Gas Control (Gas Only - Pilot models only)	The component that supplies gas to the pilot orifice when the control On/Off pilot knob is held at the pilot position.
Pilot Orifice (Gas Only - Pilot models only)	The component that meters the gas to the thermocouple. The flame produced should be high enough to engulf the thermocouple.
Pressure/ Temperature (P/T) Relief Valve	A component designed to open when the temperature of the water reaches 210 °F (99 °C) or the pressure in the heater reaches 150 PSI.
Sight Glass	The burner flame viewing port located on the access door.
Soot/Sooting	A black powder created when incomplete combustion occurs.
Temperature Knob (Gas Only - Pilot models only)	The knob location that, when turned, determines the burner cycle and water temperature within a range of 70 °F–140 °F (21 °C–60 °C).
Thermal Cut-Off	A heat-sensing fuse that sends power to the thermostat and is normally closed. When the fuse is tripped by excessive heat [208 °F (98 °C)], the fuse cuts power to the control board and shuts down ignition.
Thermocouple (Gas Only - Pilot models only)	A device that generates millivolts of electricity when heated.
Thermostat	A non-adjustable temperature switch that opens and closes, based on the temperature level, to cycle the Water Heater heating cycle off and on.
Winterization	The process of preparing a Water Heater for cold winter storage.

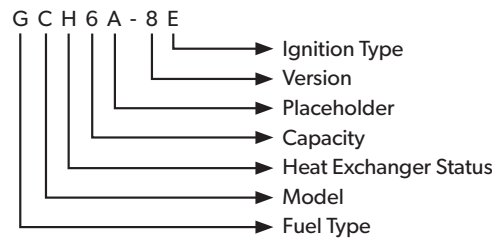
4.3 Model Identification

This section explains the breakdown of the model identification numbers.

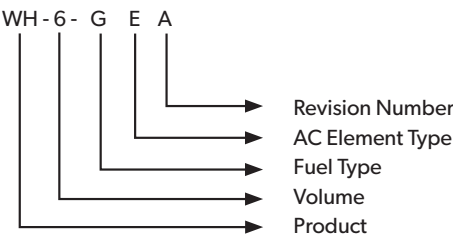


1 Data/Model Tag Location

Model Identification Examples for Gas Only, Gas/Electric Combination, and Pilot Models

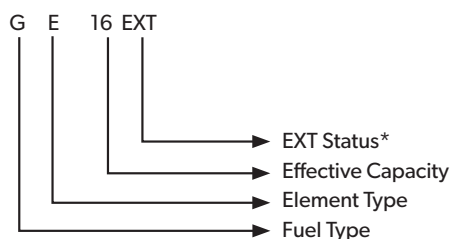


Fuel Type	G = LP gas
Model	No letter = Gas only - electric C = Gas/electric combination
Heat Exchanger Status	No letter = No heat exchanger H = Heat exchanger
Capacity	6 = 6 gallons 10 = 10 gallons
Placeholder	N/A
Version	Version number of the Water Heater based on the model and capacity. 6-gallon, gas only: 1-8, none 10-gallon, gas only: 1-3, none 6-gallon, gas/electric: 1-10, none 10-gallon, gas/electric: 1-4, none
Ignition Type	No letter = Pilot E = Electronic

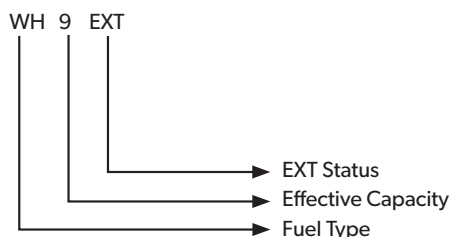


Product	WH = Water heater
Volume	6 = 6 gallons
Fuel Type	G = Gas (propane)
AC Element Type	E = Electric
Revision	A

Model Identification Examples for Electronic Exothermal Technology (EXT) Models

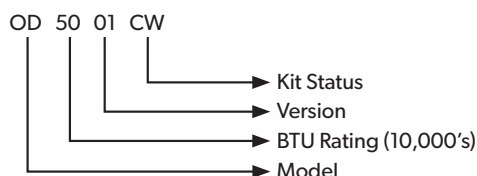


Fuel Type	G = LP gas
Element Type	E = Electric None - Gas only
Effective Capacity	9 = 9 gallons 16 = 16 gallons
EXT Status	EXT = Electronic exothermal technology



Fuel Type	G = LP gas
Effective Capacity	9 = 9 gallons
EXT Status	EXT = Electronic exothermal technology

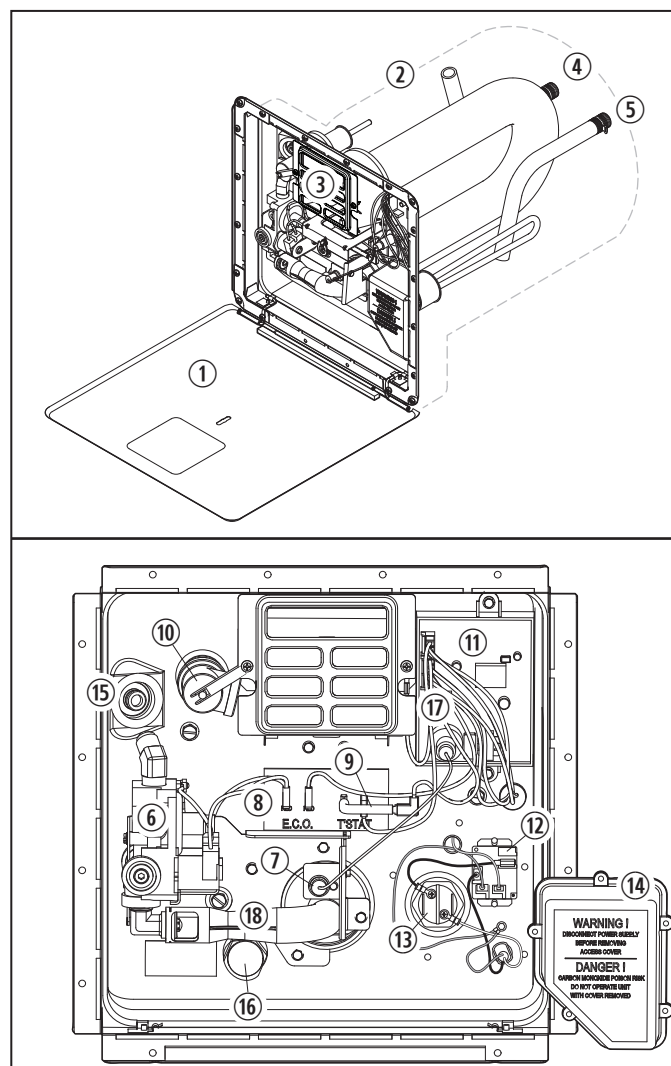
Model Identification Breakdown Example for On Demand Models



Model	OD = On demand
BTU Rating (in 10,000s)	50
Version	01 = 1
Kit Status	CW = Cold-weather None = No kit

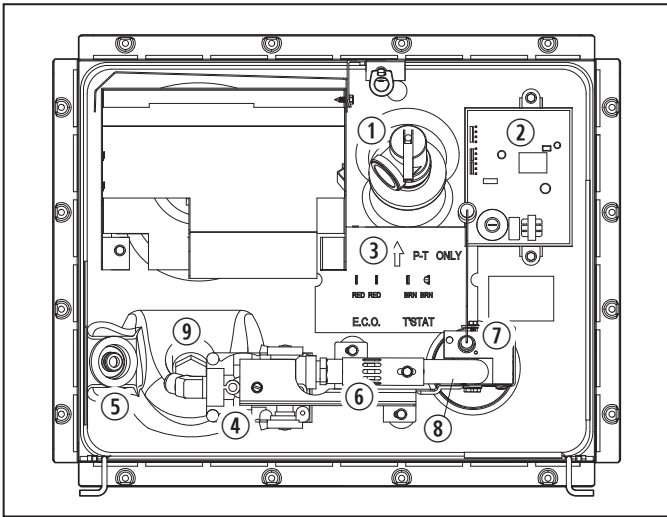
4.4 Component Locations

This section shows the general component locations for the Water Heater models. Actual model component locations may vary.



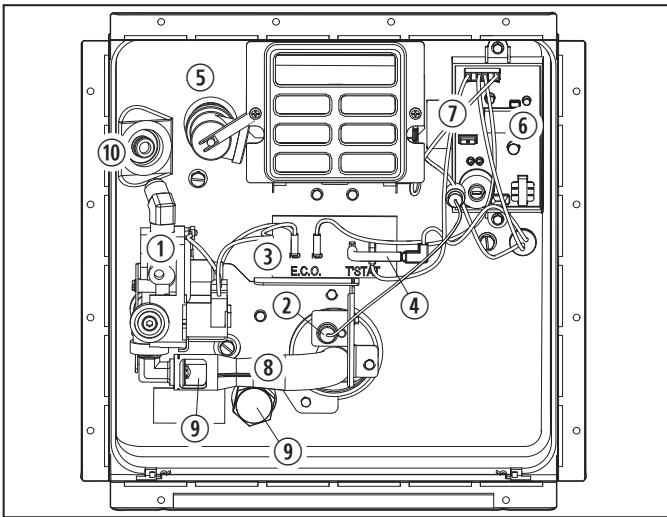
2 Gas/Electric Combination (Standard and EXT) Component Locations

- | | |
|----------------------|---|
| ① Access Door | ⑪ Control Board |
| ② Water Heater Tank | ⑫ Relay |
| ③ Flue Assembly | ⑬ Heating Element |
| ④ Hot-water Outlet | ⑭ Sealed Electric Junction Box/Element Access Cover |
| ⑤ Cold-water Inlet | |
| ⑥ Gas Solenoid Valve | ⑮ Gas Inlet |
| ⑦ Electrode | ⑯ Drain Plug |
| ⑧ E.C.O./Thermostat | ⑰ Wire Harness |
| ⑨ Thermal Cut-off | ⑱ Burner Tube |
| ⑩ P/T Relief Valve | |



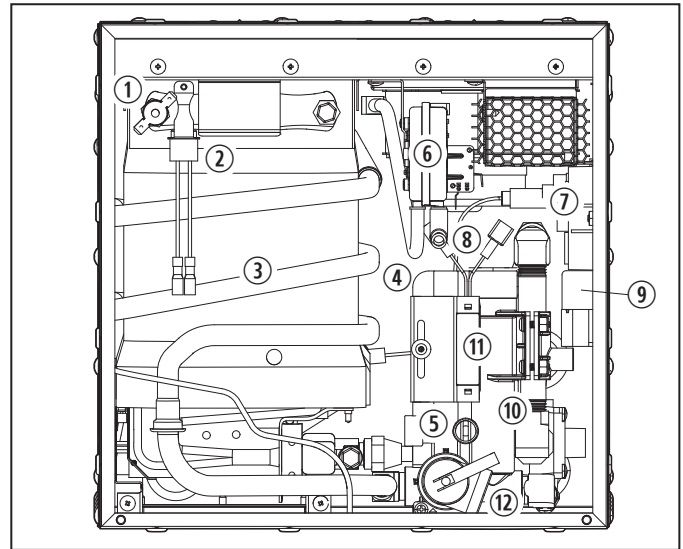
3 Gas/Electric Combination (Standard and EXT) Component Locations

- | | |
|---------------------|---------------|
| ① P/T Relief Valve | ⑥ Air Shutter |
| ② Control Board | ⑦ Electrode |
| ③ E.C.O./Thermostat | ⑧ Burner Tube |
| ④ Gas Valve | ⑨ Drain Plug |
| ⑤ Gas Inlet | |



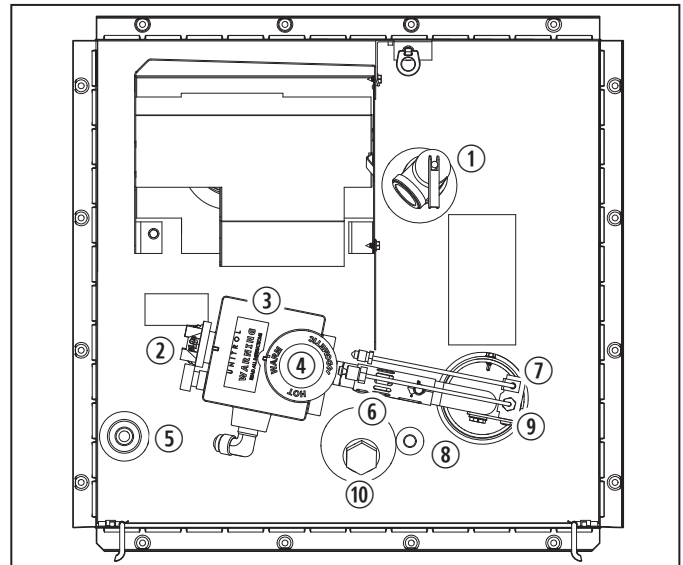
4 Gas Only (Standard and EXT) Component Locations

- | | |
|----------------------|-----------------|
| ① Gas Solenoid Valve | ⑥ Control Board |
| ② Electrode | ⑦ Wire Harness |
| ③ E.C.O./Thermostat | ⑧ Burner Tube |
| ④ Thermal Cut-off | ⑨ Drain Plug |
| ⑤ P/T Relief Valve | ⑩ Gas Inlet |



5 On Demand - Gas Component Locations

- | | |
|----------------------------|-------------------------|
| ① E.C.O. | ⑦ Control Board |
| ② Cold-Weather Kit | ⑧ Pressure Switch Elbow |
| ③ Heat Exchanger | ⑨ Relay |
| ④ Gas Valve Assembly | ⑩ Modulating Valve |
| ⑤ Summer/Winter Adjustment | ⑪ Reed Switch |
| ⑥ Pressure Switch | ⑫ P/T Relief Valve |



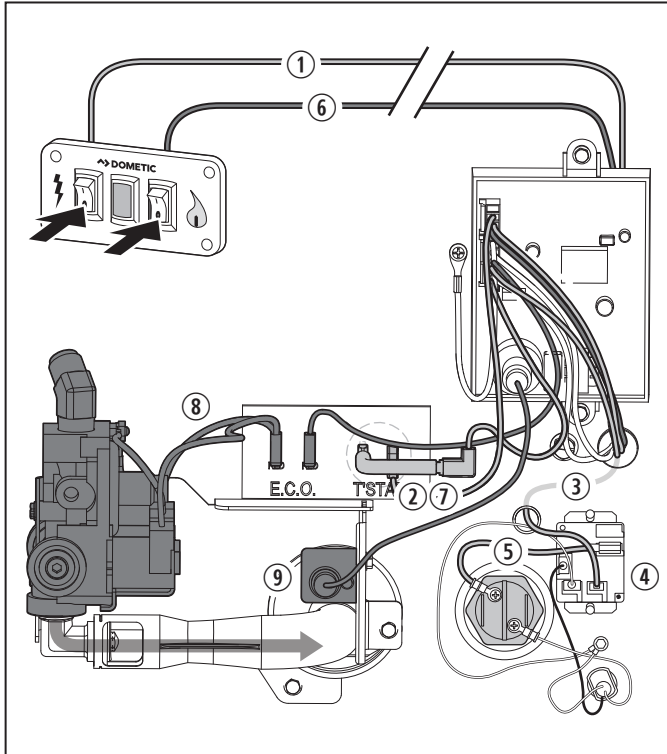
6 Pilot Component Locations

- | | |
|--------------------------|------------------|
| ① P/T Relief Valve | ⑥ Air Shutter |
| ② Pilot Knob (On/Off) | ⑦ Thermocouple |
| ③ Gas Valve | ⑧ Burner Tube |
| ④ Temperature Adjustment | ⑨ Pilot Assembly |
| ⑤ Gas Inlet | ⑩ Drain Plug |

4.5 Sequence of Operations

Understanding the sequence of operations for a Water Heater is an important part of diagnosing the operational issues occurring in the Water Heater. This section details the sequence of operation for each Water Heater type.

Gas/Electric Combination Models



Gas/Electric Combination Water Heater Operation Flow
1–5 = Electric Sequence of Operations
6–9 = Gas Sequence of Operations

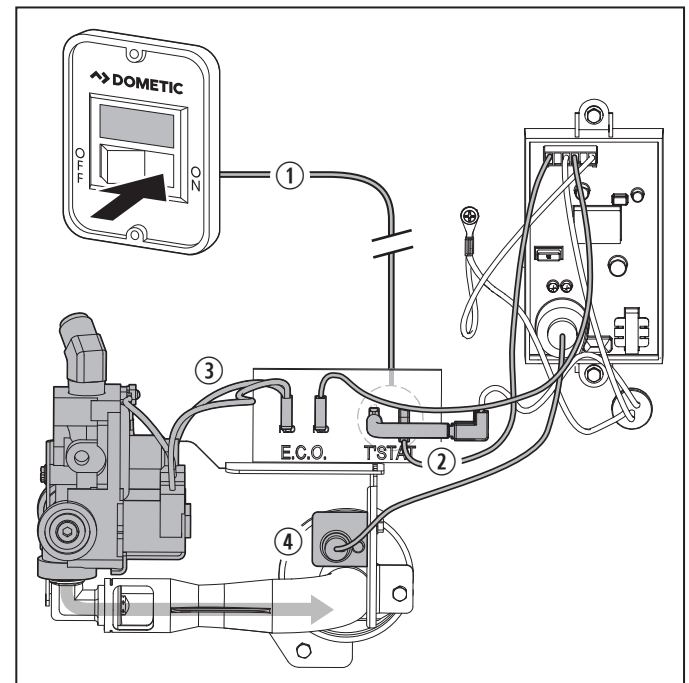
Electric Sequence of Operation for Gas/ Electric Combination Models

1. With the wall switch turned On for electric, 12 VDC power is sent out of the switch and into the white wire on the wire harness and into the control board.
2. DC voltage leaves the control board on the top brown wire, passes through the thermostat and the thermal cut-off, and travels back into the control board on the bottom brown wire.
3. DC voltage leaves the control board on the yellow wire to the relay on the back of the Water Heater.
4. DC voltage closes the relay with an audible click.
5. AC voltage travels on the black wire from the relay to the heating element.

Gas Sequence of Operation for Gas/Electric Combination Models

6. With the wall switch turned On for gas, 12 VDC power is sent out of the switch and into the orange wire on the wire harness and into the control board.
7. DC voltage leaves the control board on the top brown wire, passes through the thermostat and the thermal cut-off, and travels back into the control board on the bottom brown wire.
8. DC voltage leaves the control board on the red wire, moves through the E.C.O., and opens the valves to allow gas to flow through the gas solenoid valve.
9. Voltage leaves the ignitor circuit on the control board to create a spark. The ignitor attempts to light for seven seconds.
 - a. If the unit lights, the electrode heats up and sends a ground signal to the control board. The ignitor stops sparking and the valves stay open during the heating process.
 - b. If the unit fails to ignite, there is an approximate 10-second delay before the next attempt.
 - c. After three failed ignition attempts, the Water Heater goes into lockout mode.

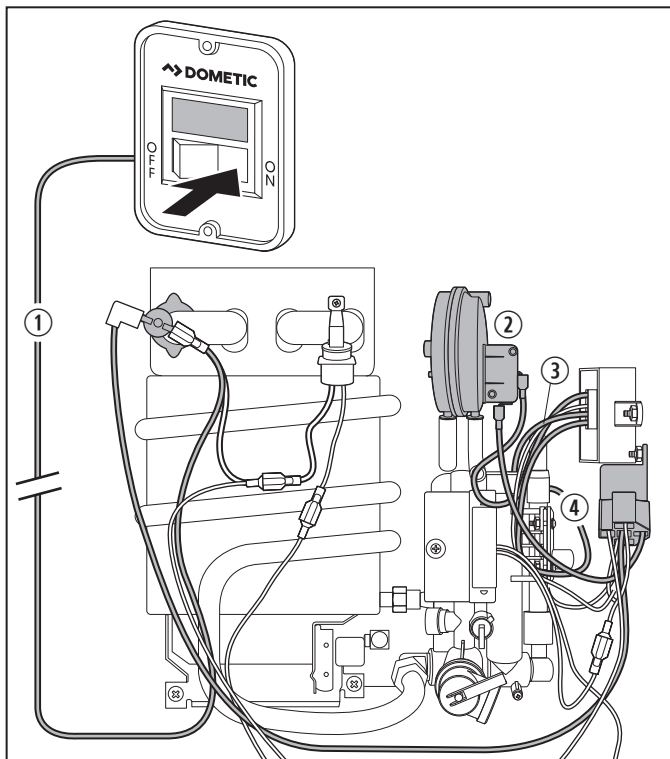
Gas Only Models



7 Gas Only Water Heater Operation Flow

1. With the wall switch turned On, 12 VDC power is sent out of the switch and into the brown wire on the wire harness.
2. Power passes through the thermostat and the thermal cut-off and into the control board through the brown wire.
3. DC voltage goes out of the control board on the red wire, moves through the E.C.O., and opens the valves to allow gas to flow through the gas solenoid valve.
4. Voltage leaves the ignitor circuit on the control board to create a spark. The ignitor attempts to light for seven seconds.
 - a. If the unit lights, the electrode heats up and sends a ground signal to the control board. The ignitor stops sparking and the valves stay open during the heating process.
 - b. If the unit fails to ignite, there is an approximate 10-second delay before the next attempt.
 - c. After three failed ignition attempts, the Water Heater goes into lockout mode.

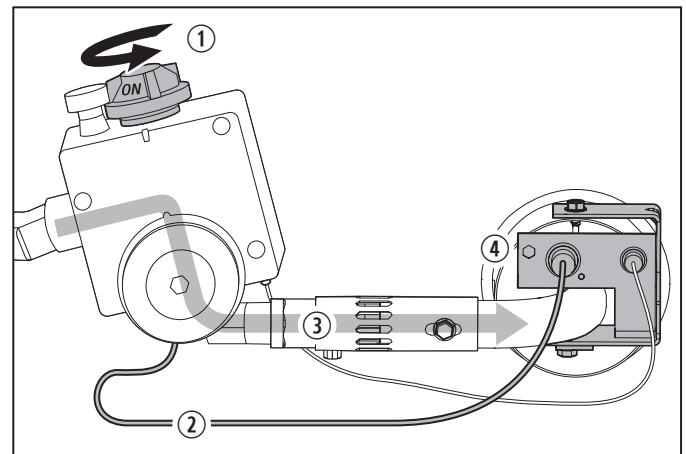
On Demand Models



8 On Demand Water Heater Operation Flow

1. With the wall switch turned On, 12 VDC power is sent out of the switch and into the red wire on the wire harness. The voltage moves through the 3 A fuse, through the E.C.O., where it splits off into two directions, one to the relay and one to the modulating valve.
2. Once water flow exceeds 0.8 gpm (3.0 lpm), a poppet lifts off of a seat. Magnets in the poppet activate a proximity switch on the front of the modulating valve, closing the switch and passing power to the relay coil.
3. After receiving power at the relay, power is sent to one side of the pressure switch and to the blower motor.
4. Once airflow is established, the pressure switch closes and sends power into the brown wire on the control board.
5. DC voltage travels on the red wire from the control board to the gas solenoid valve.
6. Voltage leaves the ignitor circuit on the control board to create a spark. The ignitor attempts to light for six to eight seconds.
7. After three failed ignition attempts, the Water Heater goes into lockout mode and the lockout lamp illuminates.

Gas Only - Pilot Model



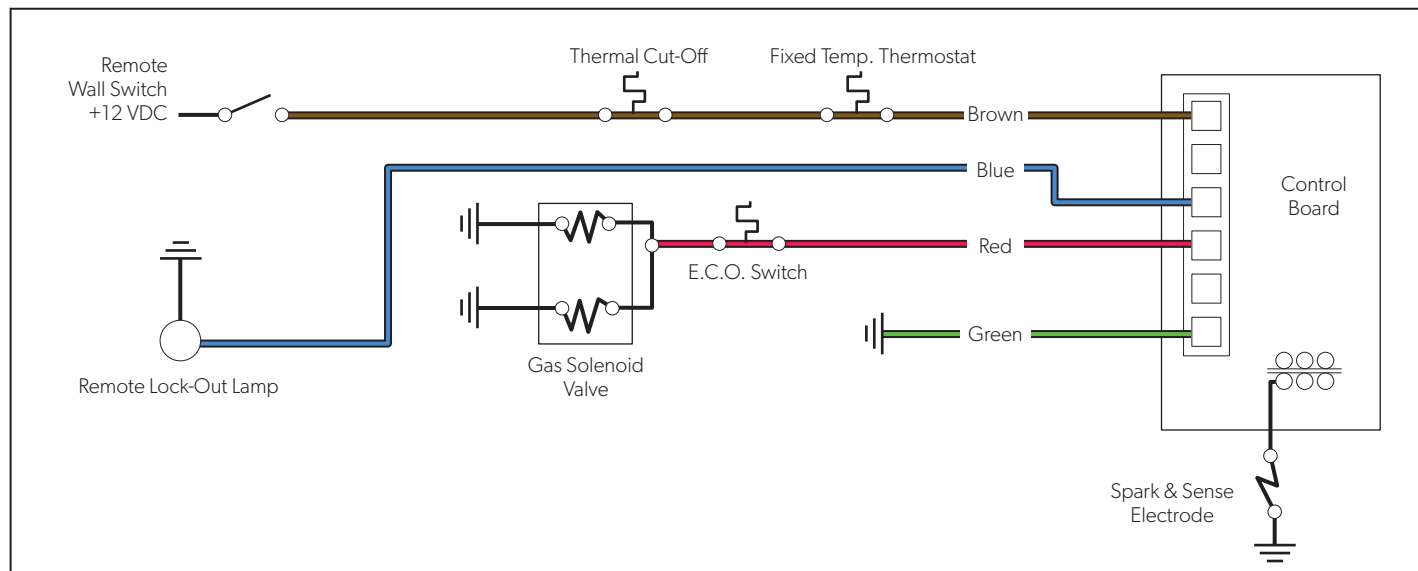
9 Gas Only - Pilot Water Heater Operation Flow

1. Once the pilot light is lit and the lighting control dial is in the On position, the thermocouple is heated.
2. The heated thermocouple generates millivoltage to the gas control's magnet assembly that allows gas to flow freely to the pilot.
3. When the thermostat calls for heat, the gas control supplies gas to the main burner.
4. The pilot ignites the gas when it reaches the end of the burner tube.

5 Wiring Diagrams

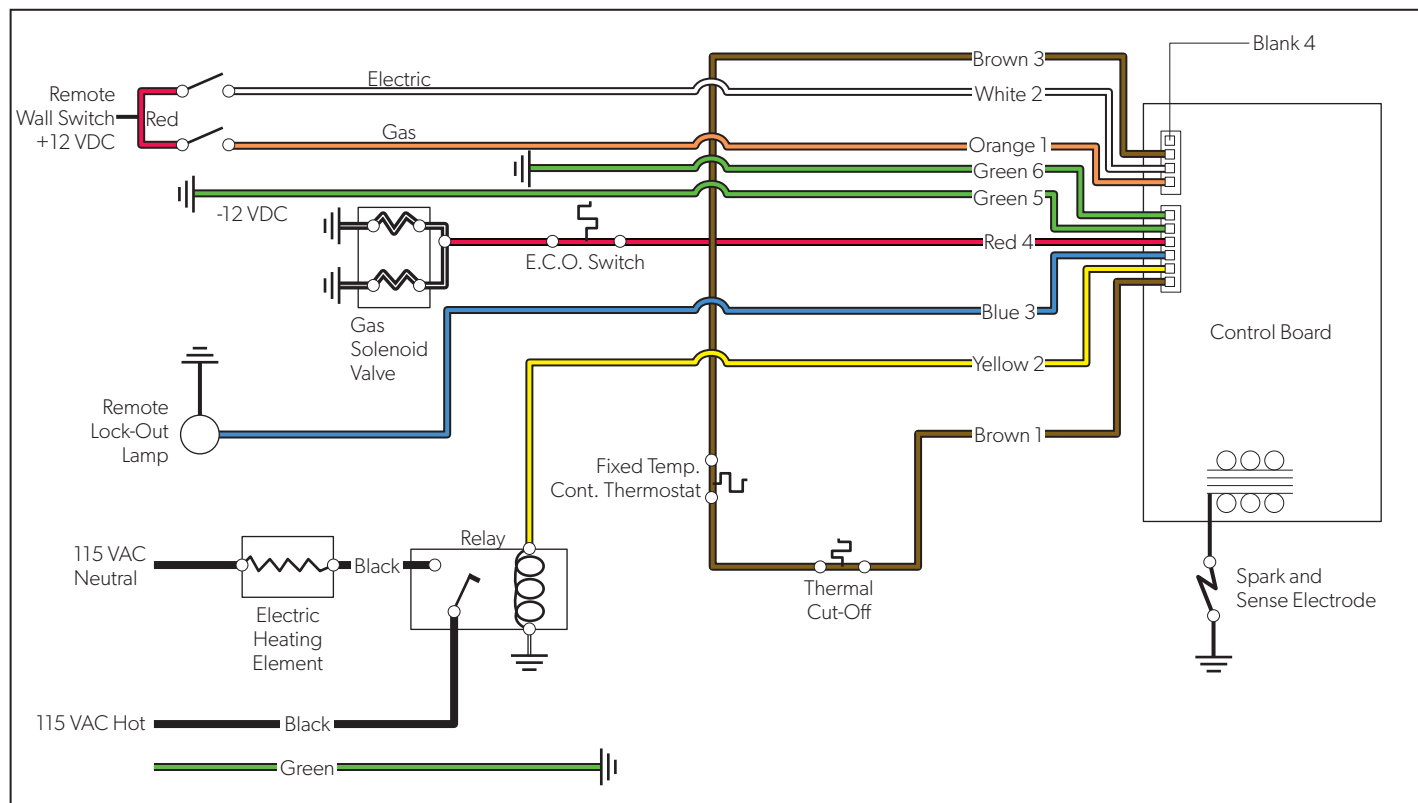
This section provides examples of the wiring specifications for the various Water Heater models.

Gas Only Models

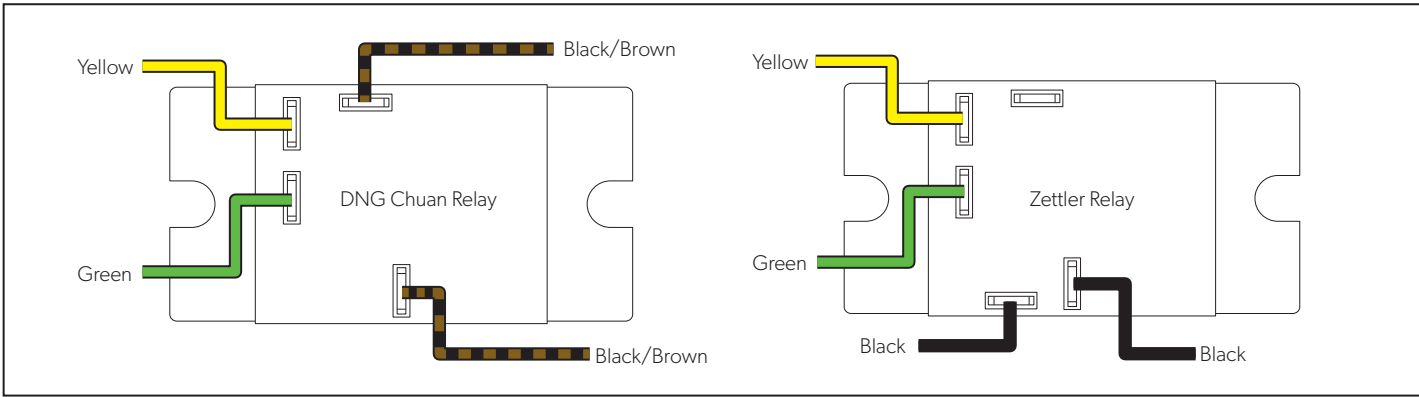


10 Gas Only Wiring Diagram

Gas/Electric Combination Models

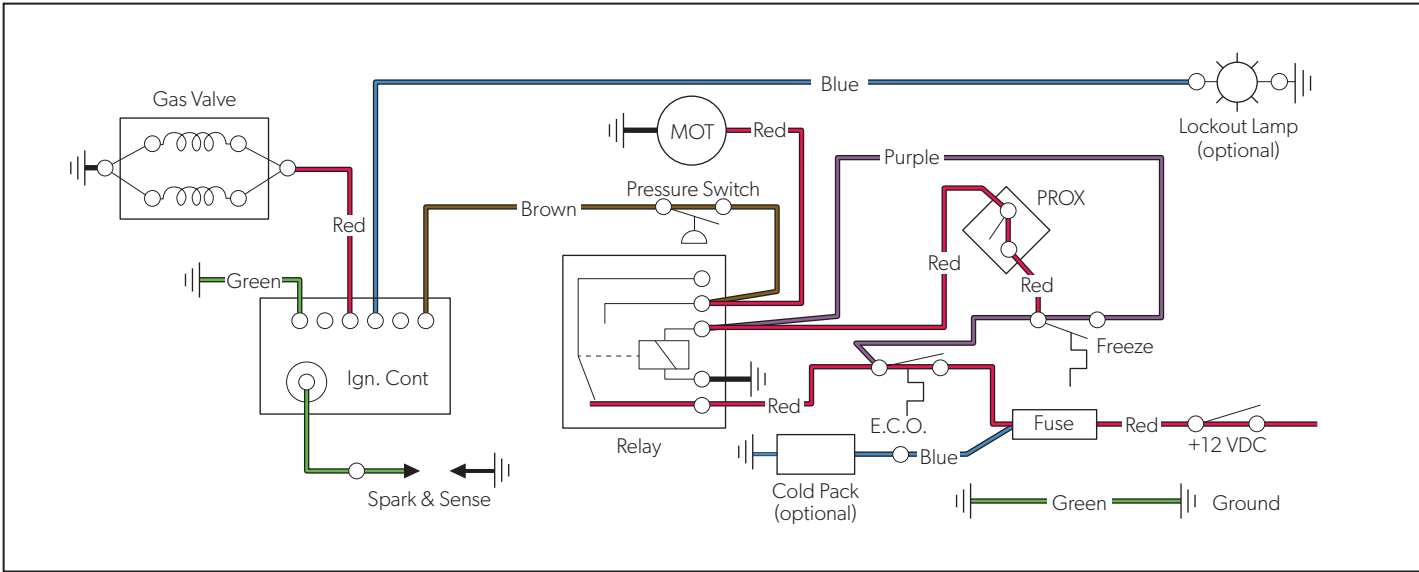


11 Gas/Electric Combination Wiring Diagram

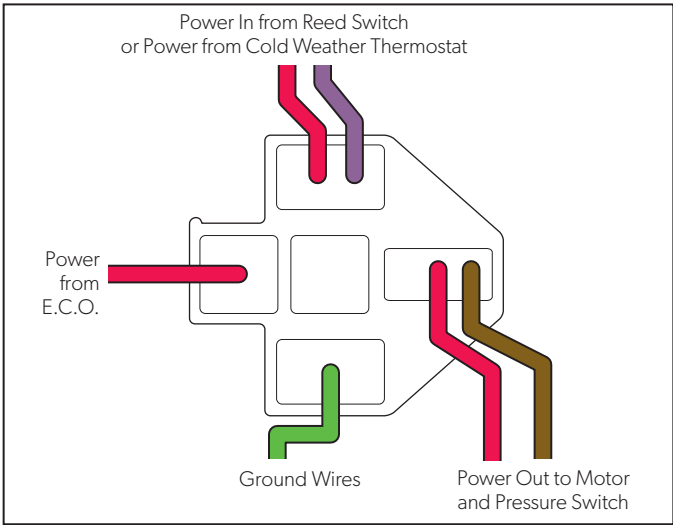


12 Gas/Electric Combination Relays Wiring Diagram

On Demand Models

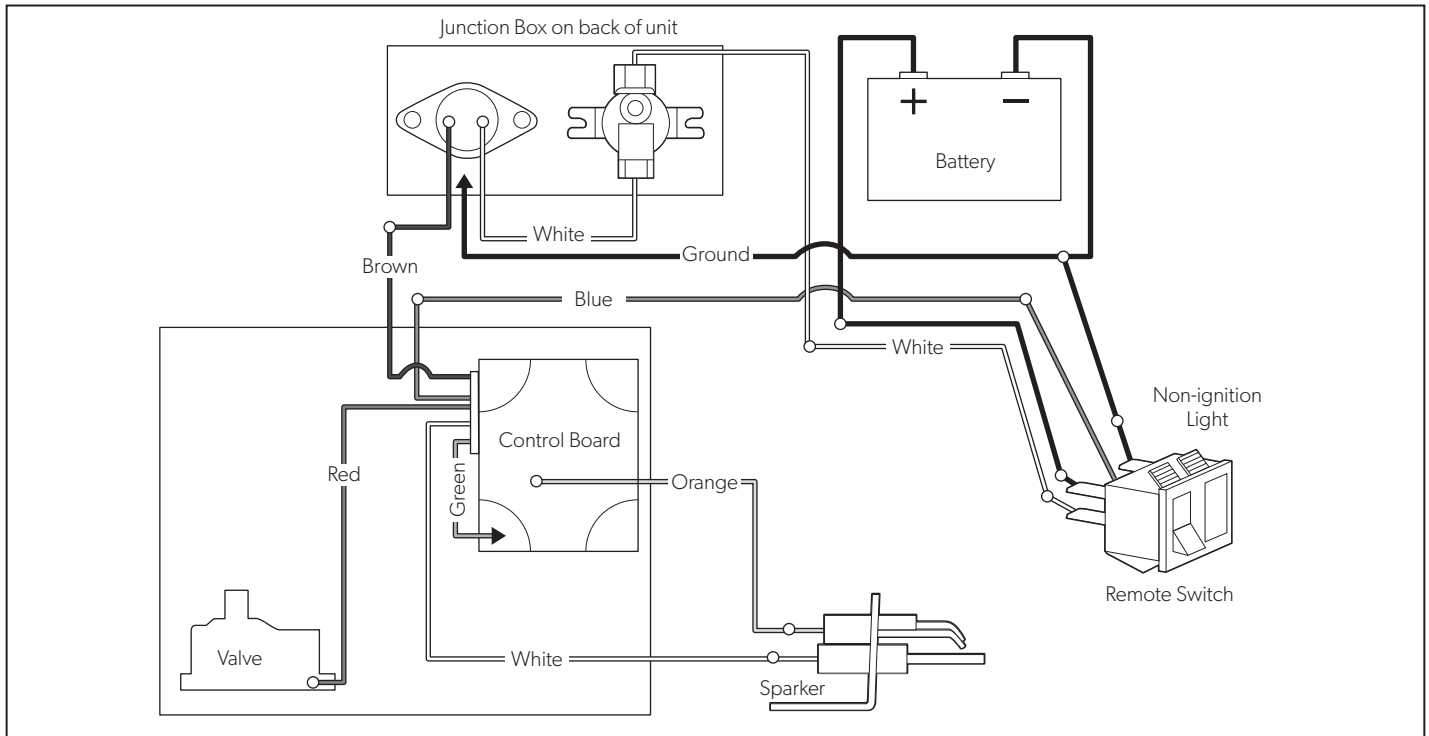


13 On Demand Wiring Diagram

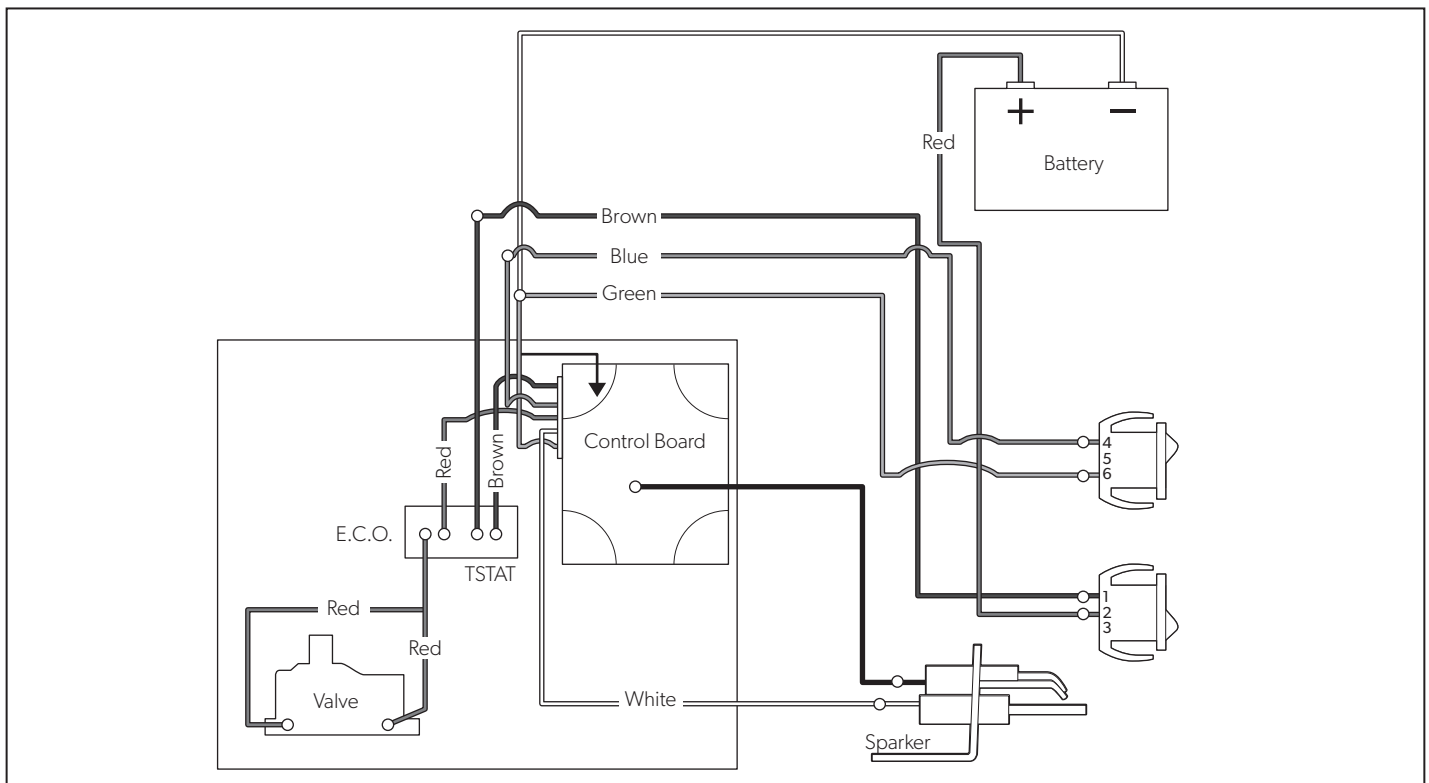


14 On Demand Relay Wiring Diagram

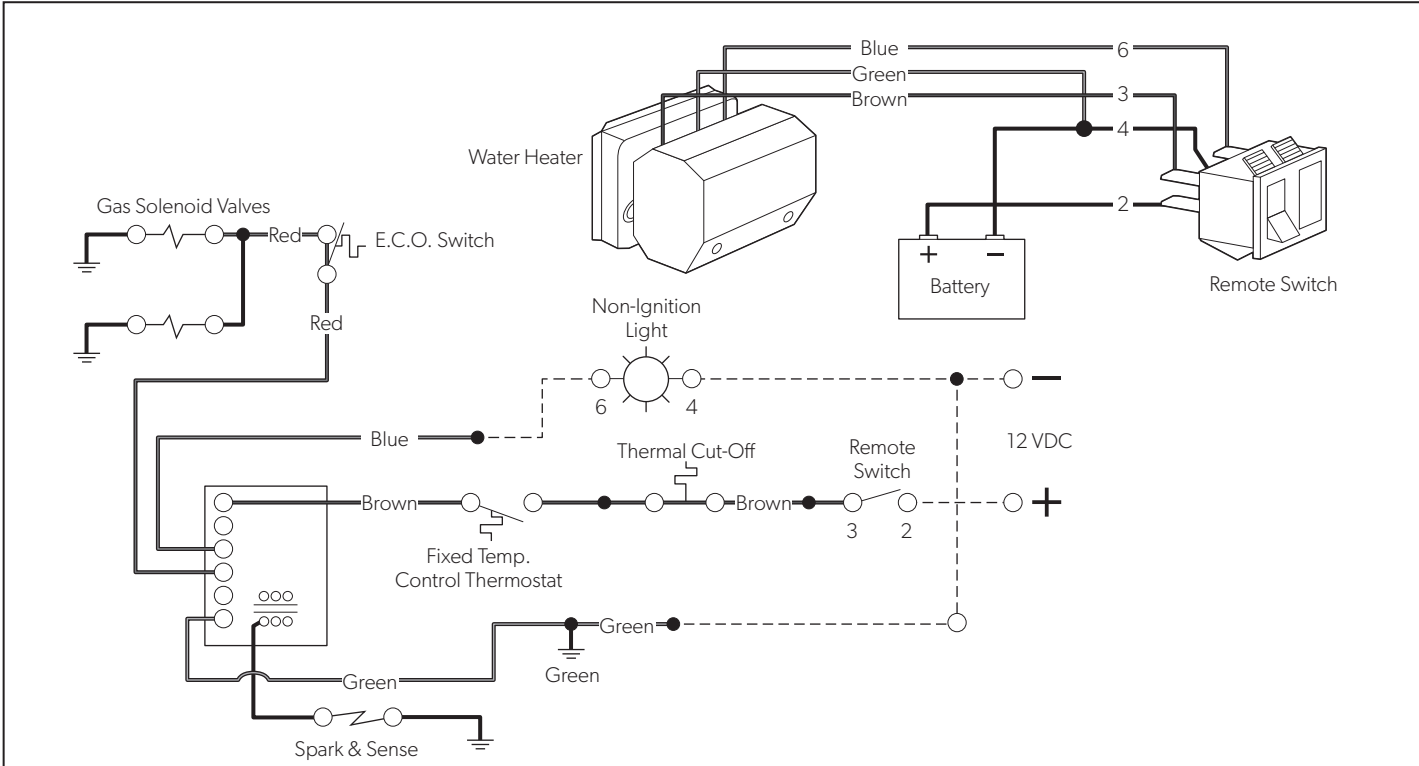
Other Models



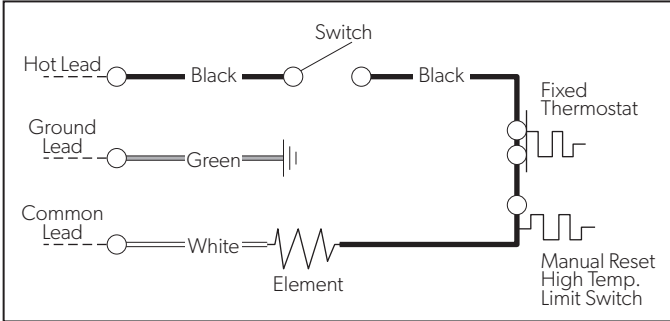
15 Water Heater Wiring Schematics: G6A-2E, G6A-3E, GH6-4E, GH6-3E (Rear Mount E.C.O. and Thermostat Models)



16 Water Heater Wiring Schematics: G6A-3E, G6A-4E, GH6-3E, GH6-4E, GCH6-4E, G6A-6E, GCH6-6E, GH6-6E (Front Mount E.C.O. and Thermostat Models)

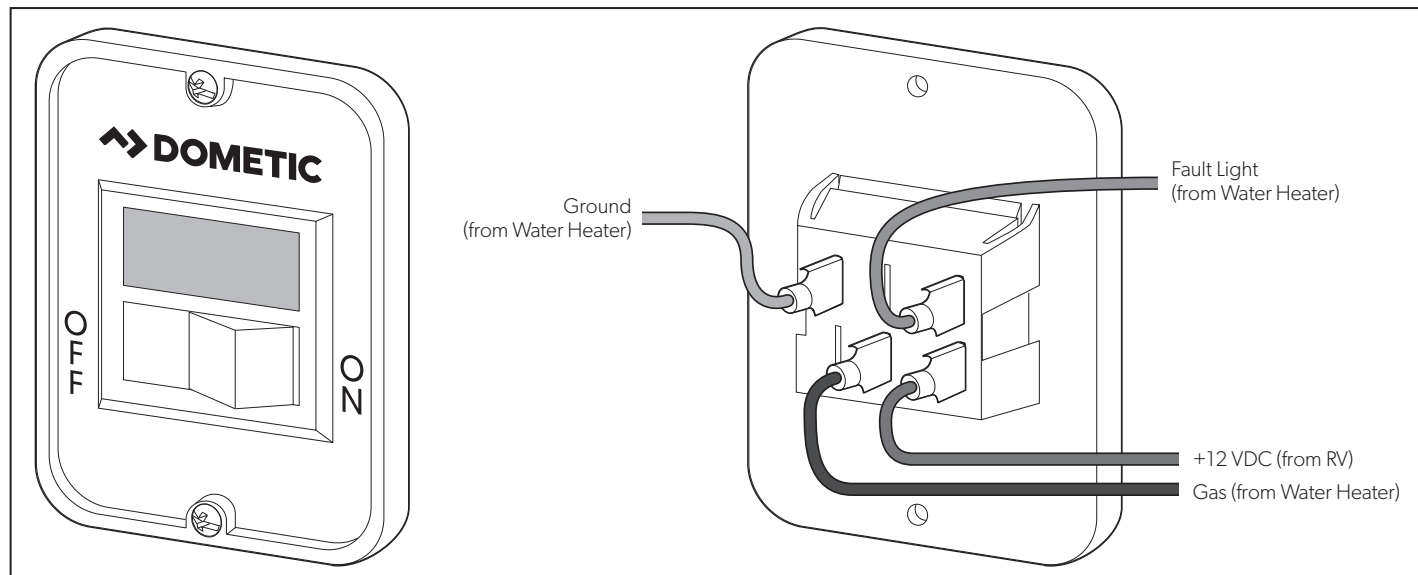


17 Water Heater Wiring Schematics: G6A-7E, GH6-7E, GC6A-7E, GCH6-7E, GC6AA-7E, G6A-8E, GH6-8E, GC6AA-8E, GCH6AA-8E, GCH6A-9E

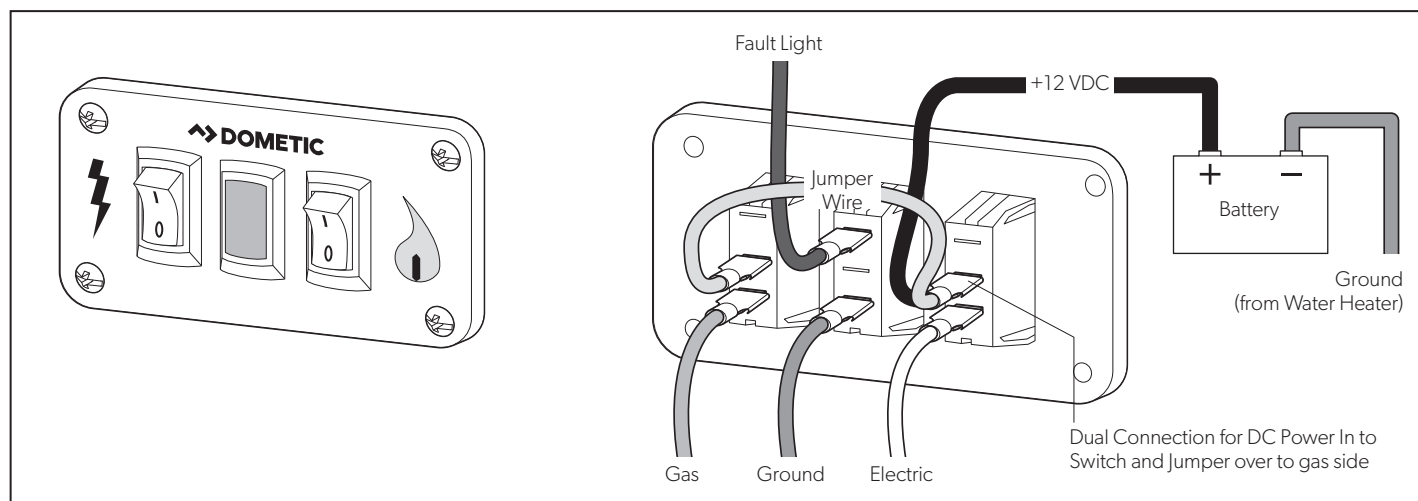


18 110 VAC Wiring Schematic

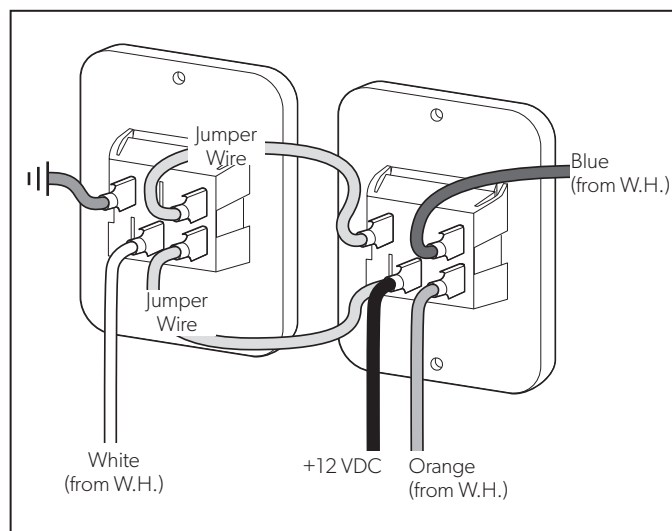
Switch Wiring



19 Gas Only/Single Wall Switch Wiring



20 Gas/Electric Combination Wall Switch Wiring



21 Wall Switch Wiring from a Three-Wire to a Four-Wire

6 Diagnostic Procedures

You can identify operational issues using either component-based diagnostic procedures, or through error codes found on the Dometic wall switch.

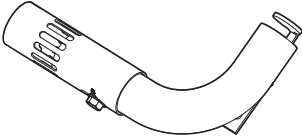
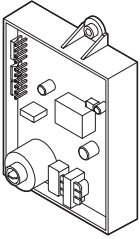
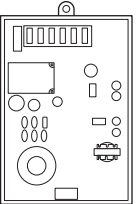
Refer to “Component-Based Diagnostics” on page 20 and “Error-Based Diagnostics” on page 28 for more details.

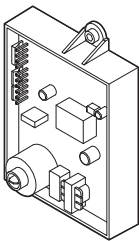
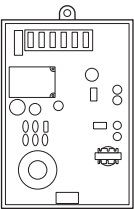
i Images in this section are general depictions and are informational only. Actual model components vary by model type. To see model type components, refer to “Component Locations” on page 11.

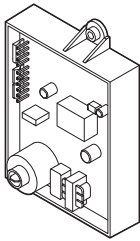
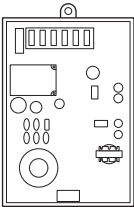
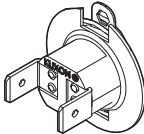
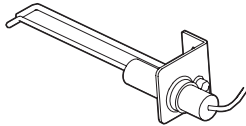
6.1 Component-Based Diagnostics

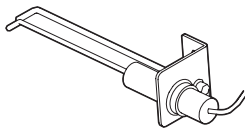
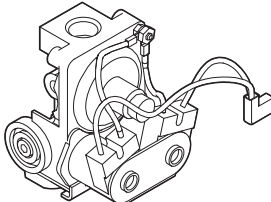
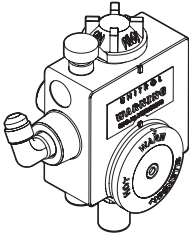
This section has information to help you identify various operational issues by diagnosing individual component parts.

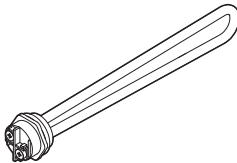
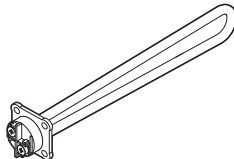
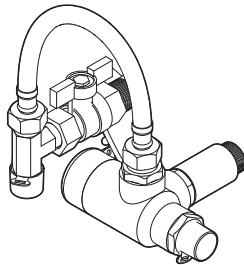
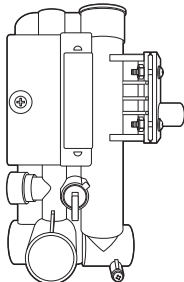
Remember to check the basics before replacing any parts, such as contributing issues. Refer to the “Installation Issues” on page 29 and “Maintenance” on page 48 for more detail.

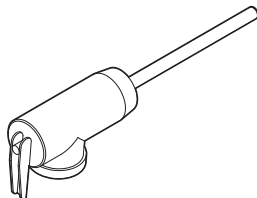
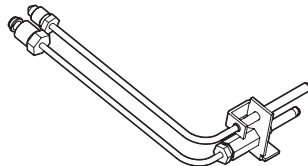
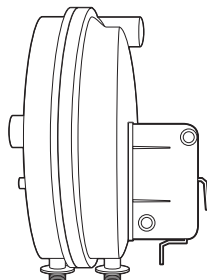
Component	Diagnostic Question	Action Based On Status	Page
Burner Assembly			
	Does the gas solenoid valve open, with a spark present, but there is no ignition? Does the burner fail to ignite, have an erratic burner flame, or is sooting? Gas Only - Pilot Models: does the main burner have an erratic flame or fail to light?	Perform the following checks: - Check the burner tube for blockages or misalignment. Clear any blockages and realign the burner tube. - Check that the flame holder in the end of the burner is clear. Clear any blockages. - Gas Only - Pilot Model Only: - Check the main burner orifice for blockages. Remove the blockages if found. Confirm the air shutter opening is 0.25 in. (6 mm). If the air shutter is not to specification, adjust the air shutter opening. - Check the alignment of the flame spreader and realign if necessary.	49
Control Board (Standard and EXT)			
 Gas/Electric Combination Control Board  Gas Only Control Board	Does the gas solenoid valve open with no spark present? Does the gas solenoid valve fail to open, but a spark is present? Does the gas solenoid valve fail to open and no spark is present? Does the gas/electric combination model operate using gas but does not operate on electric power? Does the gas/electric combination model operate using electric power but does not operate on gas? Does the gas/electric combination model not operate on either gas or electric? On Demand Models: when the water is running, does the appliance fail to attempt ignition and the fan fail to run? On Demand Models: when the water is running, does the appliance fail to attempt ignition but the fan runs?	Perform all relevant checks to determine whether the control board is defective. If so, replace the control board.	37

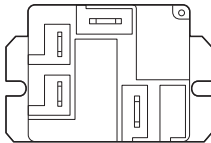
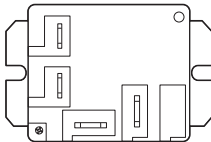
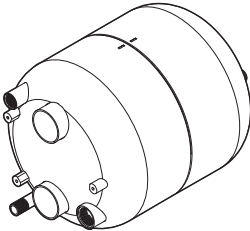
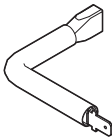
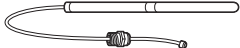
Component	Diagnostic Question	Action Based On Status	Page
Control Board (Standard and EXT) Continued			
 Gas/Electric Combination Control Board  Gas Only Control Board		GAS ONLY BOARDS	
		Check for power on the brown wire. If there is no power on the brown wire, the problem is not with the board.	37
		• Check the thermostat for problems.	27
		• Check the thermal cut-off for problems.	26
		• Confirm the wall switch(es) is operational. • Confirm the wall switch(es) is wired correctly. • Confirm there is a minimum of 10.5 VDC at the switch(es).	28
		Check for power going out to the gas solenoid valve from the control board on the red wire. Unplug the electrode from the ignitor on the control board and cycle.	37
		• If you have no power on the red wire when the electrode is unplugged, replace the control board.	
		• If you have power on the red wire when the electrode is unplugged, replace the electrode.	38
		GAS/ELECTRIC COMBINATION BOARDS	
		Confirm there is power at the white wire when electric is turned to On and/or there is power at the orange wire when the gas is turned to On. If no power is present, the problem is not with the control board. Check the wall switch(es).	15
		• Confirm the wall switch(es) is operational. • Confirm the wall switch(es) is wired correctly. • Confirm there is a minimum of 10.5 VDC at the switch(es).	41
		Confirm there is power at the brown wire at the top of the control board and no power at the brown wire at the bottom of the control board. If this scenario is true, the problem is not with the control board. Check the following:	15
		• Is the thermostat an open circuit?	27
		• Is the thermal cut-off an open circuit?	26
		Confirm there is power at the brown wire at the bottom of the control board and no power at the yellow wire when electric is turned to On or at the red wire if the gas is turned to On. If this scenario is true, check the following:	15
		• Confirm that the 2 A fuse on the control board is not blown.	49

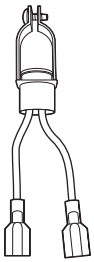
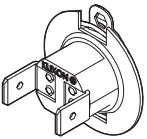
Component	Diagnostic Question	Action Based On Status	Page
Control Board (Standard and EXT) Continued			
 Gas/Electric Combination Control Board		• Confirm that the E.C.O. is not an open circuit.	32
		• Confirm that the gas solenoid valve has resistance.	35
		If all of the checks are confirmed, replace the control board.	37
		 Gas Only Control Board	
		GAS BOARD AND GAS/ELECTRIC COMBINATION BOARD	
		Check for power going out from the ignitor on the control board. Unplug the electrode from the ignitor on the control board and cycle. • If there is no spark, replace the control board.	37
		• If the control board does send spark, replace the electrode.	38
E.C.O.			
	Does the gas solenoid valve fail to open and no spark is present? Does the gas/electric combination model fail to operate using either gas or electric power?	If yes, check for continuity.	32
		If there is no continuity, replace the E.C.O.	33
	On Demand Models: when the water is running, does the appliance fail to attempt ignition and the fan fail to run?	Reset the E.C.O.	50
		Check for continuity.	32
		If there is no continuity, replace the E.C.O.	33
	Does the E.C.O. trip repeatedly?	On Demand Models Only: Check if the incoming water temperature is too hot.	27
		If so, confirm that the thermostat is seated on the tank properly.	11
		If the thermostat is seated properly, but the water is getting too hot, replace the E.C.O. and thermostat.	33
		Perform all checks to determine if the E.C.O. is defective. If so, replace the E.C.O.	33
Electrode			
	Does the gas solenoid valve open, with no spark present?	Perform the following checks:	
	Does the gas solenoid valve open and there is a spark, but there is no ignition?	• Confirm there is a gap of 1/8 in. (3 mm) between the ground wire and the electrode. If the gap is larger or smaller than the specification, adjust the electrode.	39
	Does the gas solenoid valve fail to open and no spark is present?		
	On Demand Models: when the water is running, does the fan run, but the appliance fails to attempt ignition?	• Confirm the electrode is not arcing other than on the tip of the spark probe.	38

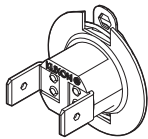
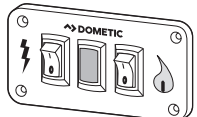
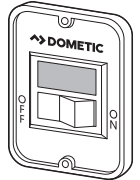
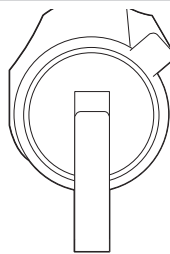
Component	Diagnostic Question	Action Based On Status	Page
Electrode (Continued)			
		Inspect the electrode for visible damage or a crack in the ceramic. If the electrode is arcing outside of the tip of the spark probe or there is visible damage or cracks in the ceramic, the electrode has shorted out. Replace the electrode.	38
		Unplug the electrode from the ignitor on the control board and cycle. If there is no spark, replace the control board.	37
		If the control board does send spark, replace the electrode.	38
Gas Solenoid Valve/Gas Valve			
 	Does the gas solenoid valve fail to open when there is a spark?	Perform all checks to determine if the gas solenoid valve is defective. If so, replace the gas solenoid valve. - Confirm voltage to the gas solenoid valve is a minimum of 10.5 VDC. - Confirm the resistance on the gas solenoid valve is between 15–25 Ohms.	35
	Does the gas solenoid valve fail to open and there is no spark?	Confirm that the 2 A fuse on the control board is not blown.	49
		Unplug the electrode from the ignitor on the control board and cycle. If there is no spark, replace the control board.	37
		If the control board does send spark, replace the electrode.	38
	Does the gas solenoid valve open and there is a spark, but there is no ignition?	Perform all checks to determine if the gas solenoid valve is defective. If so, replace the gas solenoid valve. - Confirm voltage to the gas solenoid valve is a minimum of 10.5 VDC. - Confirm the resistance on the gas solenoid valve is between 15–25 Ohms.	35
	Does the burner fail to ignite, have an erratic burner flame, or is sooting?	Check the flue tube for blockages. Remove the blockages if found.	49
		Perform all checks to determine if the gas solenoid valve is defective. If so, replace the gas solenoid valve. - Confirm voltage to the gas solenoid valve is a minimum of 10.5 VDC. - Confirm the resistance on the gas solenoid valve is between 15–25 Ohms. - Confirm there is 10 in. W.C. gas pressure at the valve.	35
	Gas Only - Pilot Models: does the pilot light, but fail to stay lit?	The gas valve is not functioning because of a tripped E.C.O.	22
	Gas Only - Pilot Models: does the pilot fail to light?	Perform all checks to determine if the gas valve is defective. If so, replace the gas valve.	35
	Gas Only - Pilot Models: does the main burner have an erratic flame or fail to light?	Check the main burner orifice for blockages. Remove the blockages if found.	49

Component	Diagnostic Question	Action Based On Status	Page
Heating Element (Gas/Electric Combination models)			
 Screw-in Heating Element	Does the gas/electric combination model operate using gas but does not operate on electric power?	Perform the following checks:	
		Check the voltage. If the heating element has 110 VAC but is not getting hot, replace the heating element.	37
		Perform an Ohms test on the heating element.	36
		If the reading is not between 9–11 Ohms, replace the heating element.	37
 Bolt-in Heating Element		i When replacing the heating element, confirm whether you need the bolt-on or screw-in type. They are not interchangeable.	
Mixing Valve (EXT Models)			
	EXT Models: Is the water is too hot or too cold?	If you experience low flow from the hot-water faucet or notice the water is not as hot coming from the Water Heater, the mixing valve may be faulty. Perform the following checks:	
		Low flow or cold water from the EXT Water Heater models is a result of corrosion on the seats and/or debris blocking the inlet screen (if equipped) of the mixing valve. Remove the mixing valve and make sure the mixing valve screen is clear of debris.	48
		Verify the water temperature at the tank is hot enough. The EXT thermostat is set to start a heating cycle at approximately 135 °F (57 °C) and will shut off at approximately 155 °F (68 °C) with a goal of approximately 130 °F (54 °C) at the faucet.	26
		If the checks verify the mixing valve is defective, replace the mixing valve.	42
Modulating Valve (On Demand Models)			
	When the water is running, does the appliance fail to attempt ignition and the fan fail to run?	Check for continuity at the two white wires coming from the reed switch. Make sure the water flow is at least 0.8 gpm (3.0 lpm) during the test.	46
		If there is no continuity, the modulating valve is defective. Replace the modulating valve.	45
		Perform all checks to determine if the modulating valve is defective. If so, replace the modulating valve.	45
	Is the water temperature at the faucet too hot, too cold, or inconsistent?	Check for continuity at the two white wires coming from the reed switch. Make sure the water flow is at least 0.8 gpm (3.0 lpm) during the test.	46

Component	Diagnostic Question	Action Based On Status	Page
Orifice			
	Does the gas solenoid valve open when there is a spark, but there is no ignition?	Check the orifice for blockages.	49
	Does the burner fail to ignite, have an erratic burner flame, or is sooting?	If blockages are present, clean the orifice.	36
P/T Relief Valve			
	Is there excessive weeping coming from the pressure/temperature (P/T) relief valve?	Confirm the weeping is excessive. Some weeping or dripping occurs as the water heats.	50
		If the weeping is confirmed as excessive, the P/T relief valve may have been dry-fired or is defective. Replace the P/T relief valve.	40
		Re-establish the thermal expansion air pocket.	39
Pilot Assembly (Pilot Models)			
	Does the pilot light fail to stay lit?	Perform the following checks: Confirm operation. Hold down the button for at least 30 seconds when lighting the pilot.	N/A
		Check the flame. The flame should be blue, 0.25 in. tall, and surround the thermocouple. A weak pilot flame can be caused by low gas pressure or a partially blocked pilot orifice or pilot gas line.	
	Does the pilot fail to light?	Perform the following checks:	
		Confirm the gas pressure is not too low or absent.	29
		Remove the pilot gas line to confirm gas is present from the gas valve when in the pilot position. If gas is present, there is a blockage in the pilot gas line or pilot orifice. Clear the blockage.	N/A
		If no gas is present, confirm that gas is coming into the gas valve. If there is gas in the gas valve, the gas valve is defective. Replace the gas valve.	35
Pressure Switch (On Demand Models)			
	When the water and the fan are running, does the appliance fail to attempt ignition?	Check for continuity across the two terminals on the pressure switch when the fan is running.	43
		If there is no continuity, check that the straw, hose, and inlet/outlet nipples are free from debris. If a blockage is found, clean the straw, hose, and inlet/outlet nipples.	49
		Confirm that the Water Heater fires when the two wires connected to the switch are jumped.	42
		If the burner does not fire, confirm the voltage to the motor is at least 10.5 VDC. If so, the pressure switch is defective. Replace the pressure switch.	43

Component	Diagnostic Question	Action Based On Status	Page
Relay (Gas/Electric Combination Model)			
 Standard Relay	Does the gas/electric combination model operate using gas but does not operate on electric power?	Perform the following checks: Determine if power is going out to the relay from the control board on the yellow wire. Check for continuity from the AC power in to the AC power out on the relay. Make sure you have at least 10.5 VDC from the yellow wire on the board through to where it plugs into the relay. Make sure you have a good ground from the relay to the grounding screw. If there is no continuity or the voltage is not to specification, the relay is defective. Replace the relay.	38
 Zettler Relay			
Tank			
	Is the Water Heater leaking or is there a leak coming from the Water Heater tank?	Check to see if the Water Heater is leaking water. If so, confirm the Water Heater is leaking from the tank and not from the plumbing, fittings, or P/T relief valve. If it is, replace the tank or the Water Heater. A tank leak that is not a pinhole or small leak at a weld is not a warrantable item. This indicates that the unit was not winterized or not winterized properly.	N/A
Thermal Cut-Off			
	Does the gas solenoid valve fail to open and no spark is present? Is the gas/electric combination model not operating while using either gas or electric power?	Inspect the thermal cut-off for visible damage. Determine if the plastic sheathing has heat damage or if it is melted. If there is damage, replace the thermal cut-off.  Replacement of the thermal cut-off due to heat damage is not covered under warranty.	34
		Check for continuity.	33
		If there is no continuity, the thermal cut-off is defective. Replace the thermal cut-off.	34
Thermocouple (Gas Only - Pilot Model Only)			
	Does the pilot light, but fail to stay lit?	The thermocouple may be weak or the gas valve is defective due to a tripped E.C.O. Perform the following checks:	
		Test the thermocouple port on the gas valve.	47
		Perform a DC millivolts test on the thermocouple when in flame for at least 30 seconds. The reading should fall between 16–21 DC millivolts.	47
		If the thermocouple proves defective, replace the thermocouple.	48

Component	Diagnostic Question	Action Based On Status	Page
Thermostat (Cold-Weather) (On Demand Models)			
	Does the E.C.O. trip repeatedly?	Confirm the cold-weather thermostat is seated tightly to the heat exchanger. If the cold-weather thermostat is not touching the heat exchanger, it will kick on but not kick back off when the ambient temperature drops below 40 °F (4.5°C) and eventually it will trip the E.C.O. If the cold-weather thermostat is loose, tighten the set screw.	44
		Confirm continuity. If there is continuity when the ambient temperature is above 40 °F (4.5°C), the cold-weather thermostat is defective and will cause the burner to fire without running water through the system. Replace the cold-weather thermostat.	44
Thermostat (Standard)			
	Does the gas solenoid valve fail to open and no spark is present?	If yes, check for continuity across the terminals at room temperature.	32
	Is the gas/electric combination model not operating while using either gas or electric power?	If there is no continuity, replace the thermostat.	
	Is the water too hot or too cold?	Test the temperature of the water in the tank. Extract water through the P/T relief valve and use a surface temperature thermometer (meat thermometer) to read the temperature.	N/A
	When the water is too hot:	Confirm that the thermostat ends the heating cycle at approximately 140 °F (60 °C) ± 10 °F (± 5.5 °C) or approximately 155 °F (68 °C) ± 10 °F (± 5.5 °C) for EXT models. If the heating cycle ends close to these temperatures, the operation is normal.	N/A
		If the heating cycle does not end close to these temperatures, confirm that the thermostat is seated on the tank properly.	11
		If the thermostat is seated properly and the water is still getting too hot, replace the thermostat.	33
		OD Model Only: Check the operation to confirm the user is turning the hot-water tap fully and slowly to introduce the cold water.	N/A
	When the water is too cold:	Confirm that the thermostat calls for heat after a heating cycle when the temperature reaches 120 °F (49 °C) ± 10 °F (± 5.5 °C) or approximately 135 °F (57 °C) ± 10 °F (± 5.5 °C) for EXT models. If the thermostat calls for heat close to these temperatures, the operation is normal.	N/A
		If the thermostat does not call for heat close to these temperatures, confirm that the bypass kit is set properly.	40
		If the bypass kit is set properly and the water is too cold, replace the thermostat.	33
		OD Model Only: Check the operation to confirm the user is turning the hot-water tap fully and slowly to introduce the cold water.	N/A

Component	Diagnostic Question	Action Based On Status	Page
Thermostat (Standard) Continued			
	Is there excessive weeping coming from the pressure/temperature (P/T) relief valve?	The thermostat may be out of calibration. Check to see if the water is getting too hot.	26
		Confirm that the thermostat is seated on the tank properly and is tight to the water tank.	11
		Some weeping or dripping occurs as the water heats up, this is normal operation. Check the P/T relief valve.	25
Wall Switch			
 Gas/Electric Combination Wall Switch	The gas solenoid valve fails to open and there is no spark. Does the gas/electric combination model operate using gas but does not operate on electric power? Is the gas/electric combination model not operating while using either gas or electric power?	The wall switch may be defective or wired incorrectly. Perform a continuity test.	41
 Gas Only Wall Switch	On Demand Model: When the water is running, does the appliance fail to attempt ignition and the fan fail to run?	The wall switch may be defective or wired incorrectly. Perform a continuity test.	41
Winter/Summer Setting Screw (On Demand Models)			
	When the water is running, does the appliance fail to attempt ignition and the fan fail to run? Does the E.C.O keep tripping? Is the water temperature at the faucet too hot [above or below 110 °F–115 °F (43.3 °C–46.1 °C)]? Is the water temperature at the faucet too cold [below 110 °F–115 °F (44 °C–46 °C)]?	When the water temperature is above or below 110 °F–115 °F (44 °C–46 °C), the winter/summer setting screw may need adjustment. - Set the screw at the default 12 o'clock setting. - If the water is too hot, turn the screw in small increments to the right (clockwise) until the desired water temperature is reached. - If the water is too cold, turn the screw in small increments to the left (counter-clockwise) until the desired water temperature is reached.	45

6.2 Error-Based Diagnostics

The Dometic wall switch has a red LED fault light that is energized by sending DC voltage from the blue wire on the control board. The red light illuminates to indicate an identified operational error. Refer to the following table to diagnose system errors based on the Water Heater model.

Model	Fault Description	Possible Cause	Recommended Action	Page
Gas/Electric Combination	The E.C.O. is in open circuit or becomes an open circuit during the heating cycle.	The E.C.O. or thermostat is defective.	Test and diagnose the E.C.O.	22
	The gas solenoid valve has no resistance.	The gas solenoid valve is defective.	Test and diagnose the gas solenoid valve.	23

Model	Fault Description	Possible Cause	Recommended Action	Page
Gas Only or Gas/Electric Combination	The Water Heater failed to light after three ignition attempts.	There are many possible causes for a unit not to light.	Refer to the troubleshooting section.	5
Gas Only	The LED light illuminates for a few seconds prior to each ignition attempt.	This is a normal LED function for the Water Heater.	No action necessary.	N/A

7 Installation Issues

Many of the Water Heater problems are caused by issues outside the product itself. When diagnosing a Water Heater problem, always check the issues described in this section before replacing components.

Operational Issue	Potential Issue
The gas solenoid valve opens and there is a spark, but there is no ignition. The burner fails to ignite, has an erratic burner flame, or is sooting. On Demand Models Only: the water temperature at the faucet is too hot, too cold, or inconsistent. The pilot fails to light.	Gas pressure issue
The gas solenoid valve fails to open and there is no spark. The gas solenoid valve does not open, but there is a spark. The gas/electric combination model operates using gas but does not operate on electric power. The gas/electric combination model is not operating while using either gas or electric power. When the water is running, the appliance does not attempt ignition and the fan does not run.	Power issue

7.1 Power Issues

If the Water Heater is experiencing a source issue from the power supply of the RV, the fix is not related to the Water Heater and could be the result of a converter issue. Use a digital or analog volt meter to take voltage readings. Confirm the voltage to the Water Heater is between 10.5 and 13.5 VDC during operation, testing with the interior lights both On and Off.

This check should be made using the battery, converter, or generator, where applicable. Do not use a test light, as it does not provide enough useful information for a proper diagnosis.

7.2 Gas Pressure Issue

Check that the gas pressure is set at a minimum of 11 in. W.C. (at the Water Heater), with a minimum of 50% (ideally 100%) of other gas-fired appliances operating while the Water Heater is in operation. The pressure should be tested using a U-tube manometer. If using a digital-type manometer, calibrate it often with a U-tube manometer.

Check the outside air temperature. As the air gets colder, it reduces the capacity of liquid propane (LP) and the gas pressure is affected by a combination of the fill level of the LP tanks and the ambient temperature outside.

To raise the tank temperature and increase the capacity of the tank:

1. Place an insulated, fire-resistant blanket over the tanks.
2. Place an illuminated 75 W light bulb under the blanket.

The temperature of the bottle should rise 10–20 °F [(-12)–(-7) °C] over a brief period of time, which increases tank capacity.

8 Service Procedures

⚠ WARNING: ELECTRICAL SHOCK, FIRE, AND/OR EXPLOSION HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Always disconnect the unit from power before servicing.
- Always ensure sufficient ventilation so that the heat generated during operation can dissipate.
- Protect the appliance and power cable against heat and moisture.

⚠ WARNING: BURN HAZARD, FIRE, EXPLOSION, AND/OR CARBON MONOXIDE HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Keep the Water Heater area clear of combustible cleaning materials, gasoline, and other flammable vapors and liquids. Do **not** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Be sure the unit is vented and sealed properly to avoid the collection of carbon monoxide inside of the RV.
- All combustion air must be supplied from outside of the RV. All combustion products must be vented to the outside of the RV.
- Do **not** vent the Water Heater with a venting system that serves another appliance.
- Do **not** vent the Water Heater to an outside enclosed porch area.
- Protect building material from flue gas exhaust.
- Install the Water Heater on an exterior wall with access to a door opening to the outdoors.
- Do **not** alter the Water Heater for a positive grounding system.
- Do **not** high-potential test (HI-POT) the Water Heater unless the DSI control board has been disconnected (DC HI-POT).
- Do **not** use a battery charger to supply power to the Water Heater at any time or when testing.
- Should overheating occur, or the gas supply fail to shut off, turn the operating switch to the Off position and remove the red wire from the left hand terminal of the E.C.O. switch or turn the gas Off at the LP tank.
- Use with LP gas only.
- Shut off gas appliances and pilot lights when refueling.
- Turn gas Off at the LP tank when the vehicle is in motion. This disables all gas appliances and pilot lights.
- Gas appliances must **not** be operated while the vehicle is in motion. Unpredictable wind currents may be created which could cause flame reversal in the burner tube, which could result in fire damage. The thermal cut-off could also be unnecessarily activated, resulting in a complete shutdown of the Water Heater and requiring replacement of the thermal cut-off.
- If the Water Heater has not been used for more than two weeks, hydrogen gas may form in the water line. Under these conditions, to reduce the risk of injury, open the hot-water faucet for several minutes at the kitchen sink before you use any electrical appliance connected to the hot-water system. If hydrogen gas is present, you will probably hear sounds like air escaping through the pipe as water begins to flow.
- Do **not** smoke or have any flame near an open faucet.
- Place the thermal cut-out back in the factory default position after service. Do **not** over bend or under bend the thermal cut-out.

⚠ WARNING: FIRE AND/OR ELECTRICAL SHOCK HAZARD. Failure to obey the following warnings could result in death or serious injury:

- Make sure there are no obstacles (wires, pipes, etc.) inside of the RV roof or walls at the installation locations.
- Shut off the gas supply, disconnect the 120 VAC power from RV, and disconnect the positive (+) 12 VDC terminal from the supply battery before drilling or cutting into the RV.
- When a cord and plug connection to the power supply is used on a Water Heater, the power cord must be UL listed as suitable for damp locations, hard, or extra hard usage. The cord must be a flexible type such as S, SO, ST, STO, SJ, SJT, SJTO, HS, or HSO described in the National Electric Code ANSI/NFPA 70. The length of the external cord to the Water Heater, measured to the face of the attachment plug, shall be no less than 2 ft (60.96 cm) and no more than 6 ft (182.88 cm). The supply cord must be a minimum of 14 AWG. The attachment plug must be rated at 15 A.

⚠ WARNING: ELECTRICAL GROUNDING HAZARD.

When an appliance is equipped with a three-prong (grounding) plug for your protection against shock hazards, it should be plugged directly into a properly grounded three-prong receptacle. Do **not** cut or remove the grounding prong from this plug. Failure to obey this warning could result in death or serious injury.

⚠ CAUTION: SCALDING HAZARD.

Turn off the Water Heater before opening the P/T relief valve to establish air space. Storage water **must** be cool. Failure to obey this caution could result in minor or moderate injury.

NOTICE: Do **not** operate without water in tank. Product failure can occur.

NOTICE: Do **not** route wires around sharp objects or where they could be smashed. Damage to the wires can occur.

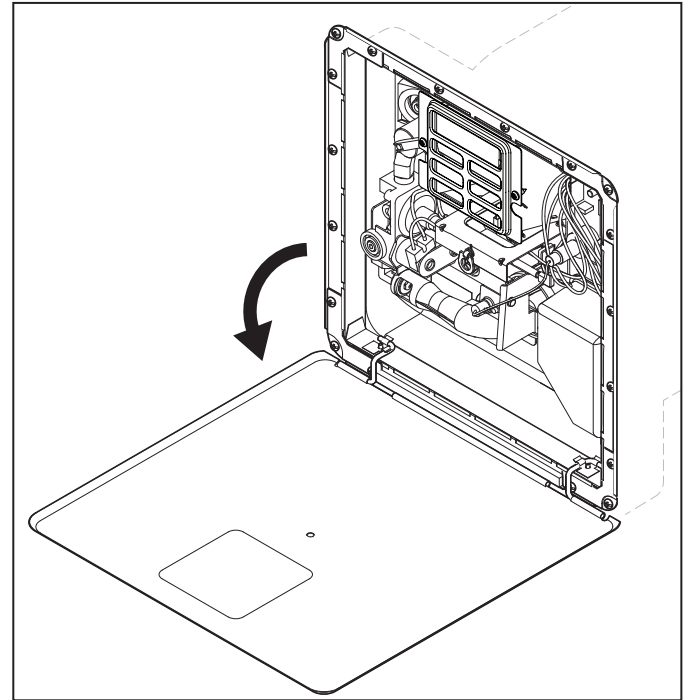
NOTICE: Do **not** lift, push, or misalign the main burner tube. Damage to the burner and the Water Heater can occur.

Remember to check the basics before replacing any parts, such as contributing issues. Refer to the "Installation Issues" on page 29 and "Maintenance" on page 48 for more detail.

i Images in this section are general depictions of the appliances and are informational only. Actual model setup may vary. To see general component locations, refer to "Component Locations" on page 11.

This section has information to help you access the components for diagnosis and service.

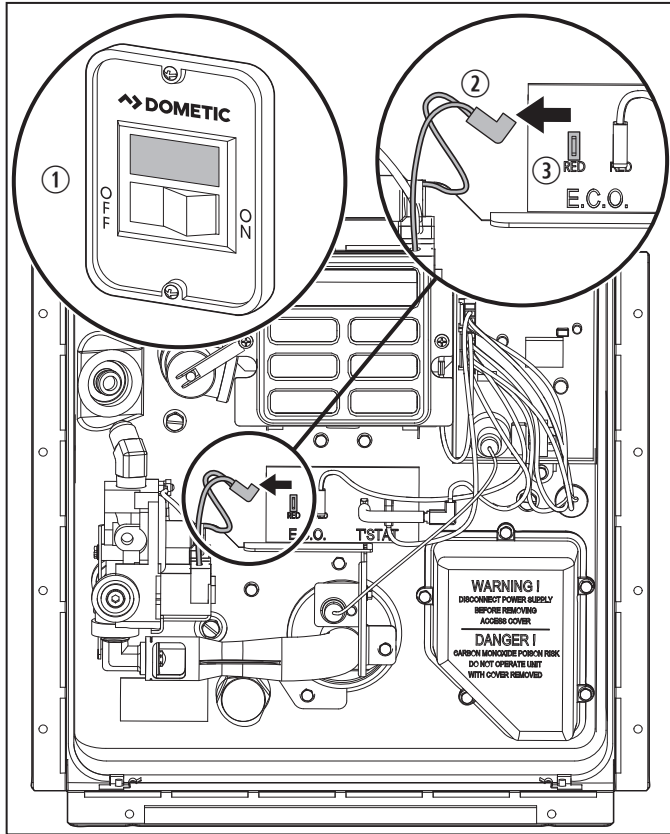
8.1 Accessing the Components



22 Accessing the Components

1. Rotate the handle on the outside of the Water Heater access door to align with the slot in the door.
- i** Some models may only require you to grab the handle.
2. Pull the door open.
3. Gently lower the door until the components are visible and easily accessed.

8.2 Shutting Down the Water Heater



23 Shutting Down the Water Heater

- ① Control Switch
- ② Dual Red Wire
- ③ E.C.O. Switch

i Perform these steps before performing any service on the Water Heater.

1. Place the control switch in the Off position.
2. Turn off the gas supply.
3. Disconnect the dual red wire by pulling it from the left-hand terminal of the E.C.O. switch.
4. To turn the Water Heater On, reverse steps 1–3.

8.3 Performing a Gas Leak Test

⚠ WARNING: FIRE AND/OR EXPLOSION HAZARD.

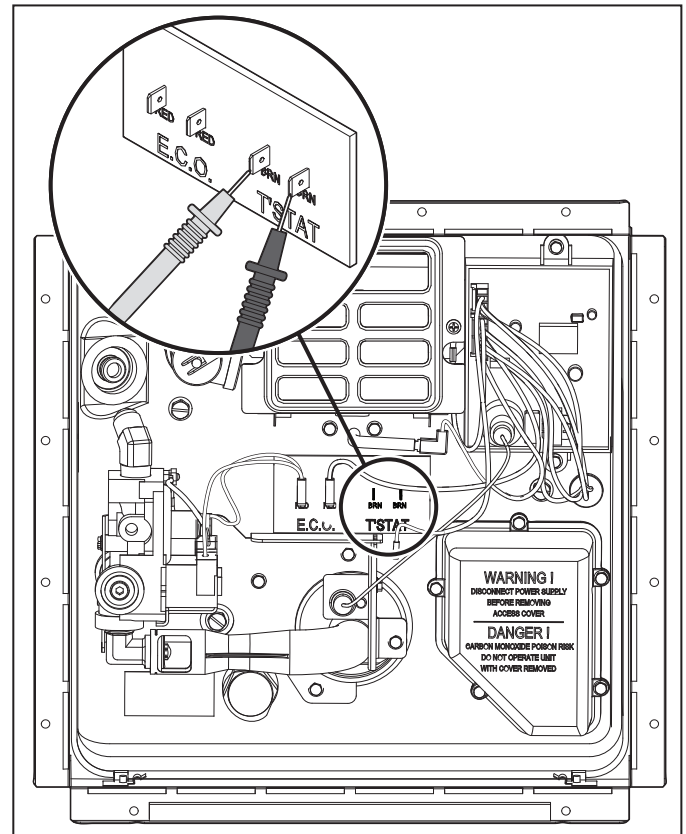
Do **not** use matches, candles, or other sources of open flame when checking for gas leaks. Failure to obey this warning could result in death or serious injury.

1. Turn on the gas.

2. Locate the component for testing. See “Component Locations” on page 11.
3. Place a non-corrosive leak detection fluid into a spray bottle.
4. Lightly spray the component with the fluid.
5. Look for bubbles forming on the component. The appearance of bubbles indicates a leak in the component.

8.4 Performing a Thermostat or E.C.O. Continuity Test

i Gas Only or Gas/Electric Combination (Standard and EXT) Models



24 Performing a Thermostat or E.C.O. Continuity Test

1. Set your multi-meter to the Ohms resistance setting.
2. Disconnect the wires from the thermostat or E.C.O. being tested.
3. Attach the leads of the multi-meter to the terminals of the thermostat or E.C.O. being tested.

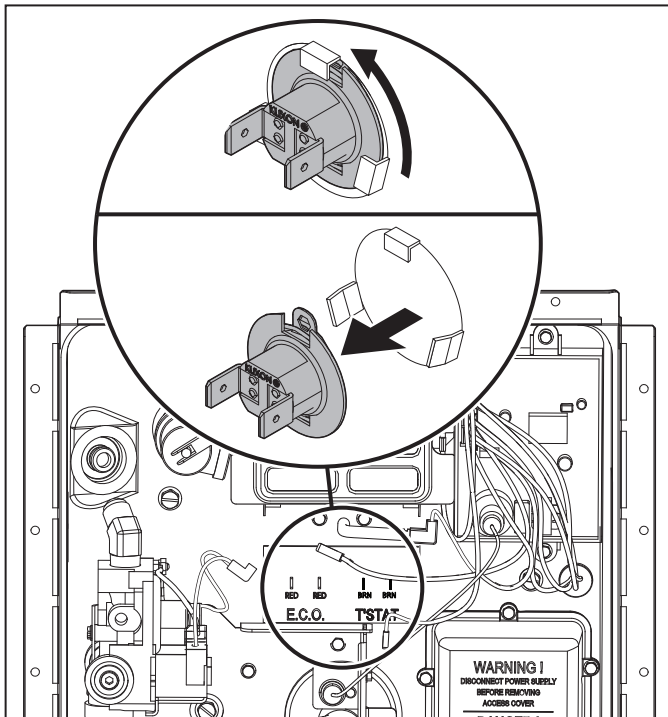
- The readings should confirm continuity/closed circuit at Water Heater temperatures below 140 °F (60 °C) ± 10 °F (± 6 °C) for a thermostat or below 180 °F (82 °C) ± 10 ° (± 6 °C) for an E.C.O.

i Consult the operating manual for your multi-meter for specific device function.

If the reading shows no continuity/open circuit, it indicates a faulty thermostat or E.C.O.

8.5 Replacing a Thermostat or E.C.O.

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



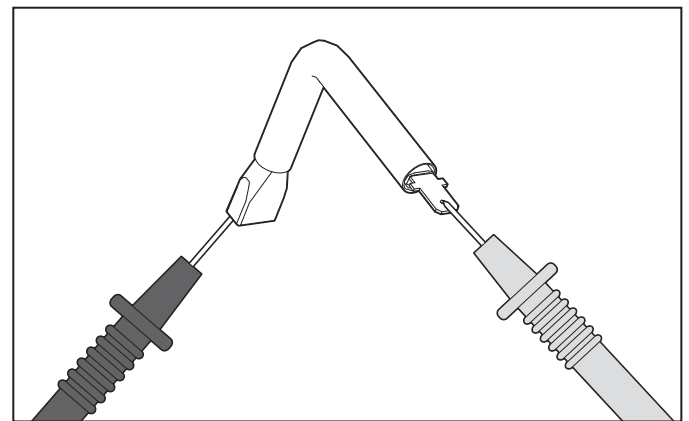
25 Replacing a Thermostat or E.C.O.

- Perform the steps in "Shutting Down the Water Heater" on page 32.
- Disconnect the wires connecting the thermostat and the E.C.O. to the components applicable to the model. See "Component Locations" on page 11 for more detail.
- Remove the black faceplate cover.
- Bend two of the three tabs outward at the thermostat or E.C.O. location.

- Rotate the existing thermostat or E.C.O. to align the notch with the tab that is not bent outward.
- Pull out the existing thermostat or E.C.O.
- Slide the new thermostat or E.C.O. metal eyelets into the mounting location.
- Align the notch on the new thermostat or E.C.O. with the tab that is not bent outward.
- Push down and rotate the thermostat or E.C.O. until the notch is no longer over the tab.
- Confirm the terminals are in the proper position to install the faceplate.
- Bend the remaining two tabs back into place over the thermostat or E.C.O.
- Confirm that the thermostat or E.C.O. is seated properly on the tank.
 - The spring is behind the plastic cover.
 - All three tabs are bent over the thermostat or E.C.O. to hold it in place.
- Reinstall the faceplate and wiring removed in step 2.

8.6 Performing a Thermal Cut-Off Continuity Test

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



26 Performing a Thermal Cut-Off Continuity Check

- Perform the steps in "Replacing a Thermal Cut-Off" on page 34 to remove the thermal cut-off.
- Set your multi-meter to the Ohms resistance setting.

3. Attach the leads of the multi-meter, one to each end of the thermal cut-off.
4. The reading should confirm continuity/closed circuit.

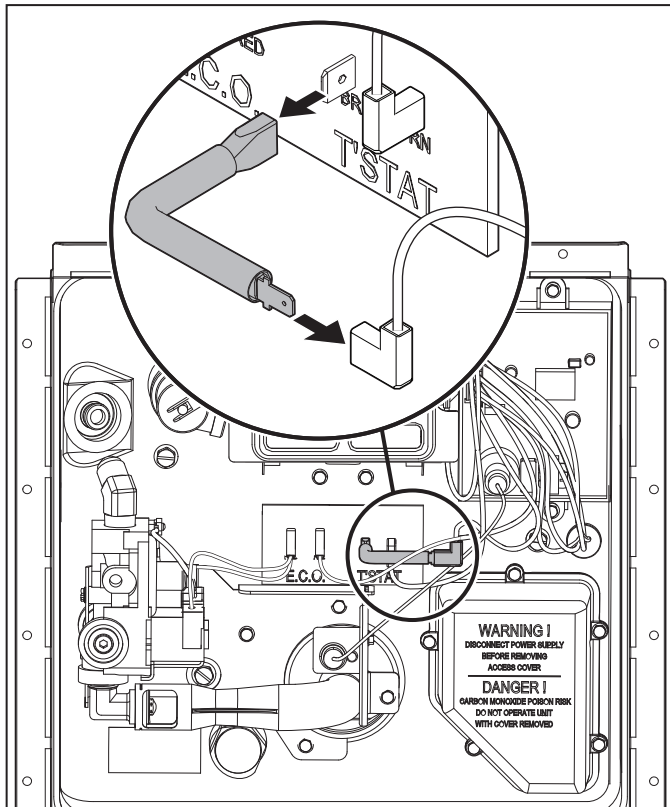
i Consult the operating manual for your multi-meter for specific device function.

If the reading shows no continuity/open circuit, it indicates a faulty thermal cut-off.

- i** Place the thermal cut-out back in the factory default position after service. All 6-gallon and 6-gallon EXT model Water Heaters bend at a 90° angle to the left. All 10-gallon and 16-gallon EXT model Water Heaters bend at a 90° angle to the right.

8.7 Replacing a Thermal Cut-Off

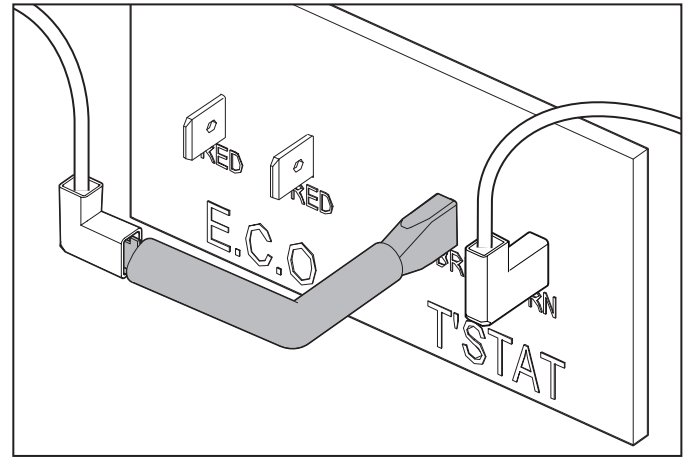
- i** Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



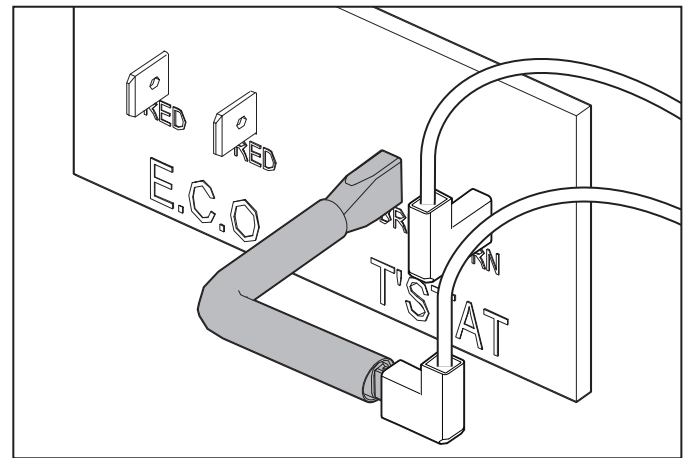
27 Replacing a Thermal Cut-Off

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Note the orientation of the thermal cut-off.

3. Unplug the thermal cut-off from the thermostat.
4. Disconnect the brown wire.
5. Reverse steps 3–4 to install the new thermal cut-off using the orientation noted in step 2.



28 6-Gallon and 6-Gallon EXT models

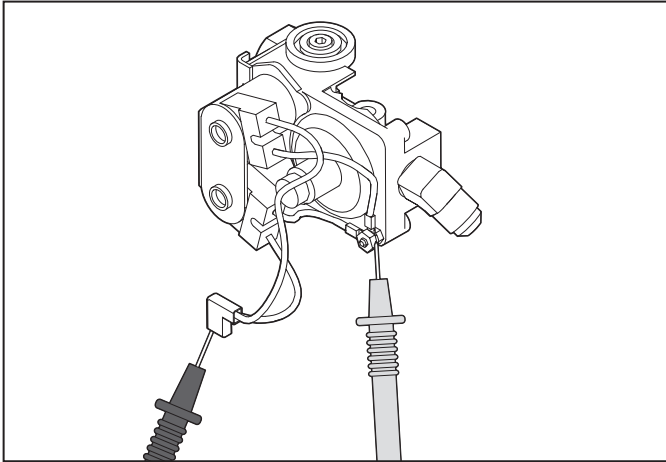


29 10-Gallon and 16-Gallon EXT models

Place the thermal cut-out back in the factory default position after service. All 6-gallon and 6-gallon EXT model Water Heaters bend at a 90° angle to the left. All 10-gallon and 16-gallon EXT model Water Heaters bend at a 90° angle to the right.

8.8 Performing an Ohms Test on the Gas Solenoid Valve Coils

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



30 Testing the Gas Solenoid Valve Coils

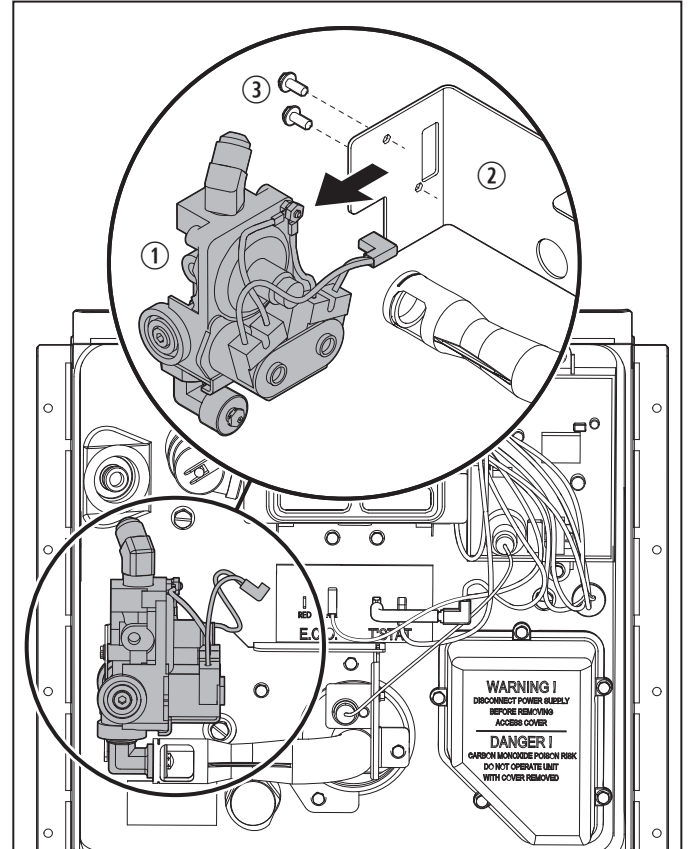
1. Perform the steps in "Replacing the Gas Solenoid Valve" on page 35 to remove the gas solenoid valve.
2. Set your multi-meter to the Ohms resistance setting.
3. Disconnect the wires from each solenoid coil.
4. Attach the leads to the terminals of one coil. The reading should be between 15–25 Ohms.
5. Repeat step 4 for the second solenoid coil.

i Consult the operating manual for your multi-meter for specific device function.

If the readings fall outside of the specification, it indicates a faulty solenoid coil.

8.9 Replacing the Gas Solenoid Valve

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



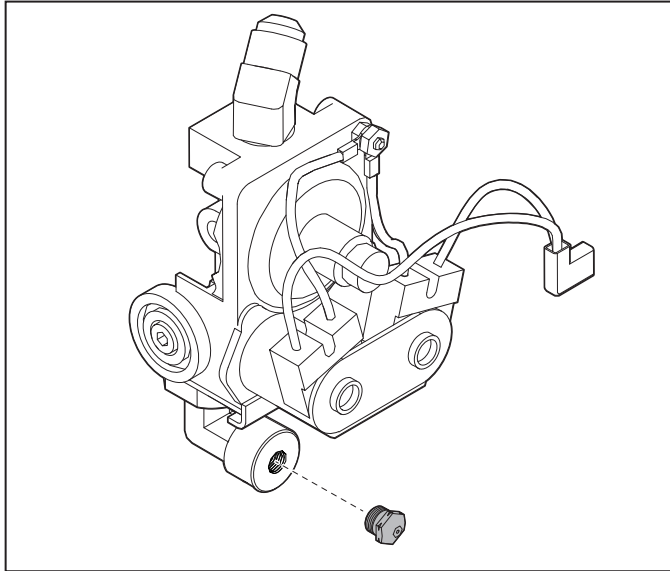
31 Replacing the Gas Solenoid Valve

- ① Gas Solenoid Valve ③ Screws
② Bracket

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Remove the incoming gas supply line.
3. Remove the screws that attach the existing gas solenoid valve to the bracket.
4. Slide out the exiting gas solenoid valve.
5. Reverse steps 1–4 to install the new gas solenoid valve.

8.10 Removing the Orifice for Cleaning

- i** Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



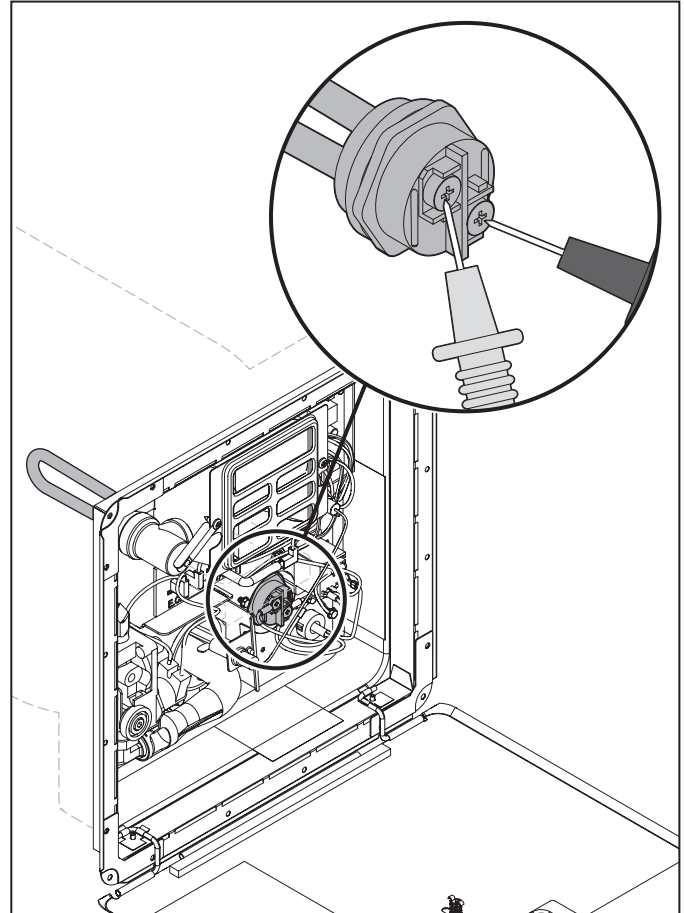
32 Removing the Orifice for Cleaning

1. Perform the steps in "Replacing the Gas Solenoid Valve" on page 35 to remove the gas solenoid valve.
2. Use a wrench to loosen the orifice.
3. Unscrew the orifice from the gas solenoid valve.
4. Soak the orifice in an alcohol-based solvent or use a non-metal instrument to clear any debris.
5. Reverse steps 1–3 to re-install the components.

- i** Confirm the orifice is completely dry before re-installing.

8.11 Performing an Ohms Test on the Heating Element

- i** Gas/Electric Combination (Standard and EXT) Models Only



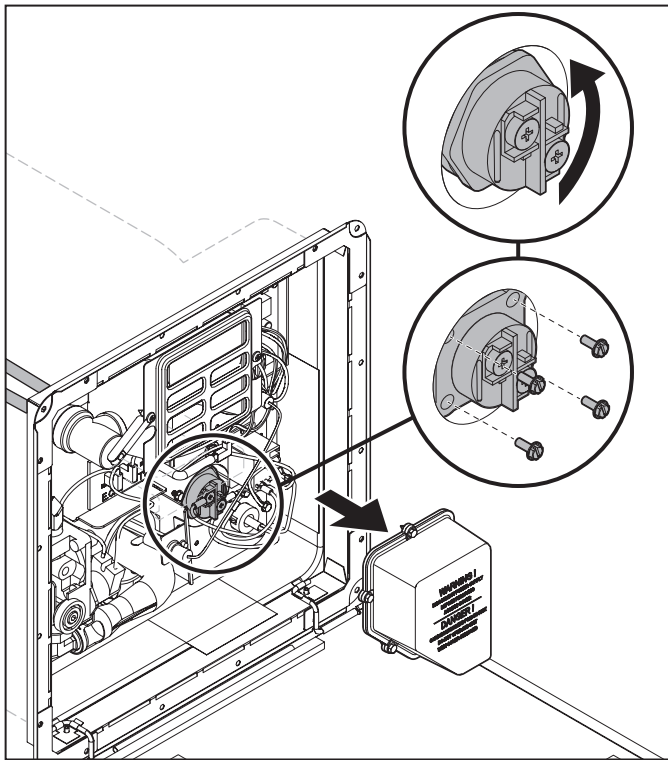
33 Performing an Ohms Test on the Heating Element

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Set your multi-meter to the Ohms resistance setting.
3. Locate the relay access cover and remove.
- i** If you do not see a relay access cover, the relay is at the rear of the Water Heater and the element is in a plastic box at the rear of the Water Heater.
4. Disconnect the two wires going to the heating element from the relay.
5. Attach the leads to the terminals of the heating element. The reading should be between 9–11 Ohms.
- i** Consult the operating manual for your multi-meter for specific device function.

If the readings fall outside of the specification, it indicates a faulty heating element.

8.12 Replacing the Heating Element

i Gas/Electric Combination (Standard and EXT) Models Only



34 Replacing the Heating Element

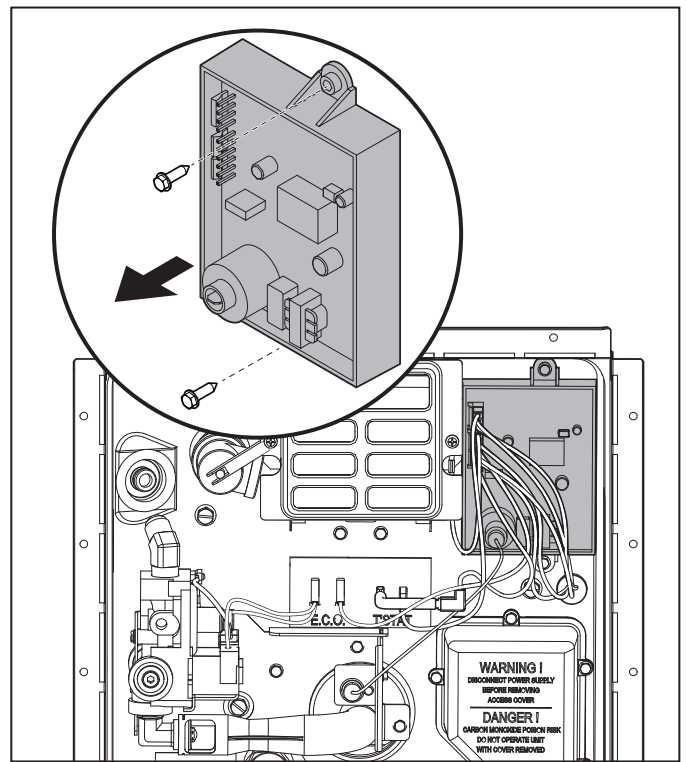
1. Perform the steps in "Shutting Down the Water Heater" on page 32.
 2. Let the water in the Water Heater cool or let the water run until it is cool.
 3. Turn off the main water supply (the pump or water hook up source).
 4. Remove the external drain plug to drain the water out of the Water Heater.
 5. Locate the relay access cover and remove.
- i** If you do not see a relay access cover, the relay is at the rear of the Water Heater and the element is in a plastic box at the rear of the Water Heater.
6. Disconnect the two wires going to the heating element from the relay.
 7. Determine if you have a bolt-in or screw-in heating element model.
 - A screw-in model has no bolts.
 - A bolt-in model has four bolts securing the element in place.

i Bolt-in elements are used on older models. All current and new models use screw-in elements.

8. Remove the heating element:
 - Screw-in model: turn the heating element to unscrew and pull the element out.
 - Bolt-in model: remove the four bolts securing the element in place and pull the element out.
9. Reverse steps 1–8 to install the new heating element.

8.13 Replacing a Control Board

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



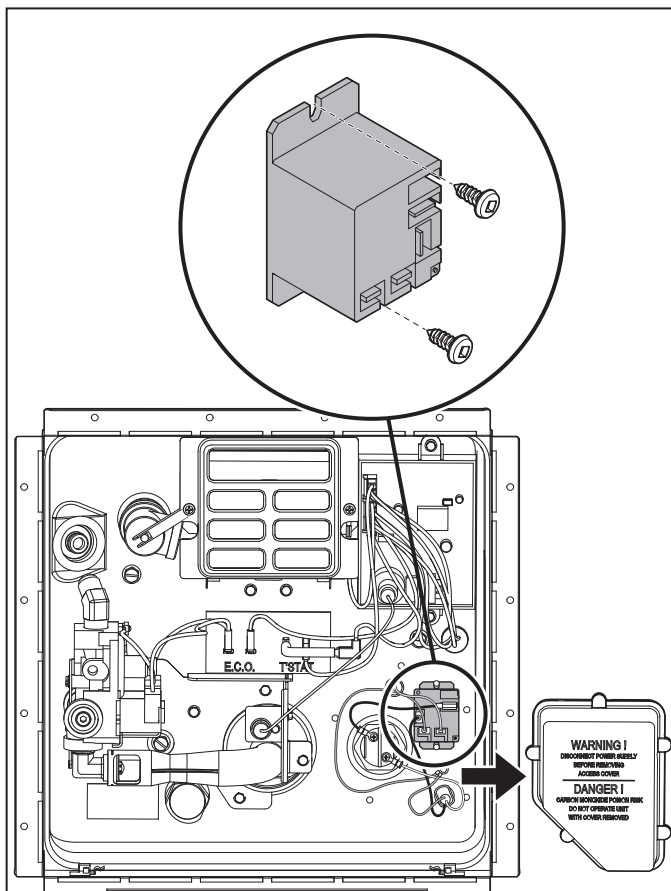
35 Replacing a Control Board

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Disconnect power to the Water Heater.
3. Unplug the wiring harness from the control board.
4. Disconnect the electrode wire from the ignitor.
5. Remove the screws at the top and bottom of the control board.
6. Lift out the control board.
7. Reverse steps 1–6 to install the new control board.

- i** Make sure that the electrode wire is pushed tightly onto the ignitor on the control board and the cover is placed back over the connection.

8.14 Replacing the Relay

- i** Gas/Electric Combination (Standard and EXT) Models Only

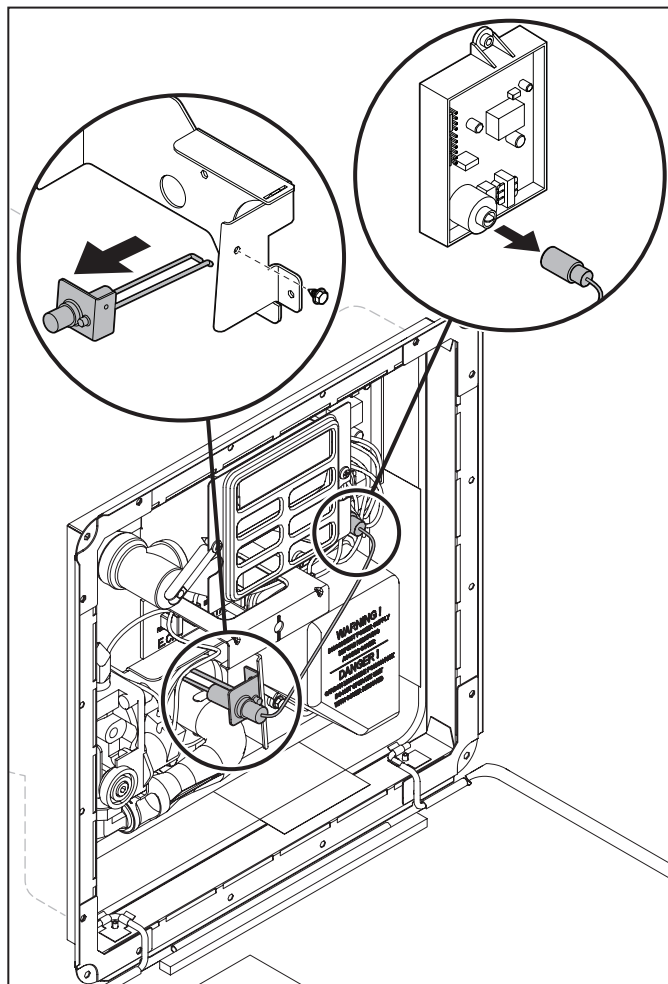


36 Replacing the Relay

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Locate the relay access cover and remove.
- i** If you do not see a relay access cover, the relay is at the rear of the Water Heater.
3. Note the orientation of the wires on the relay.
4. Disconnect the wires from the relay.
5. Remove the two screws attaching the relay to the bracket.
6. Remove the relay.
7. Reverse steps 1–6 to install the new relay.

8.15 Replacing the Electrode

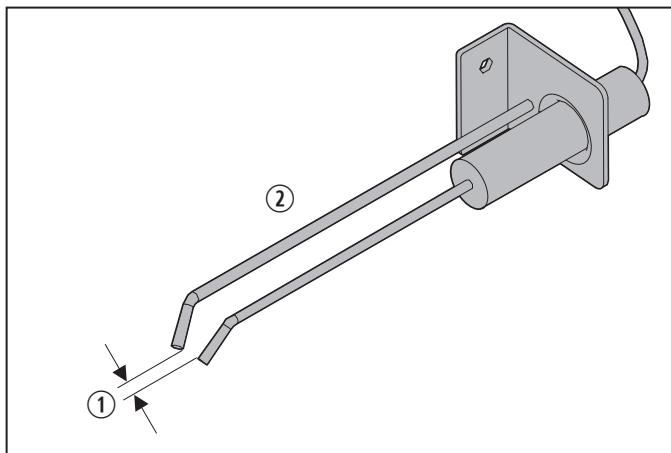
- i** Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Remove the incoming gas supply line.
3. Disconnect the dual red wire attached to the E.C.O.
4. Disconnect the electrode wire from the ignitor located on the control board.
5. Remove the three screws securing the burner assembly/gas solenoid valve in place.
6. Remove the burner assembly/gas solenoid valve.
7. Remove the mounting screw for the electrode bracket.
8. Remove the electrode.
9. Reverse steps 1–8 to install the new electrode.

8.16 Adjusting the Electrode Gap

- i** Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



37 Adjusting the Electrode Gap

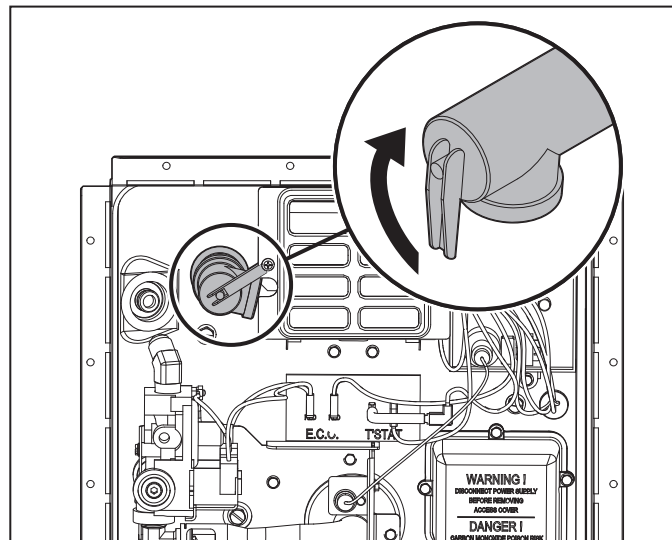
- ① Gap: 1/8 in. (3 mm) ② Ground Wire

1. Perform the steps in "Replacing the Electrode" on page 38 to remove the electrode.
2. Confirm the electrode has a 1/8 in. (3 mm) gap from the end of the electrode to the ground wire.
3. Adjust the gap, as necessary, by gently bending the ground wire to meet the electrode.

- i** Do not bend the wire with the white porcelain insulator. The insulator may crack causing spark failure.

8.17 Re-establishing the Thermal Expansion Air Pocket

- i** Gas Only or Gas/Electric Combination (Standard and EXT) Models Only

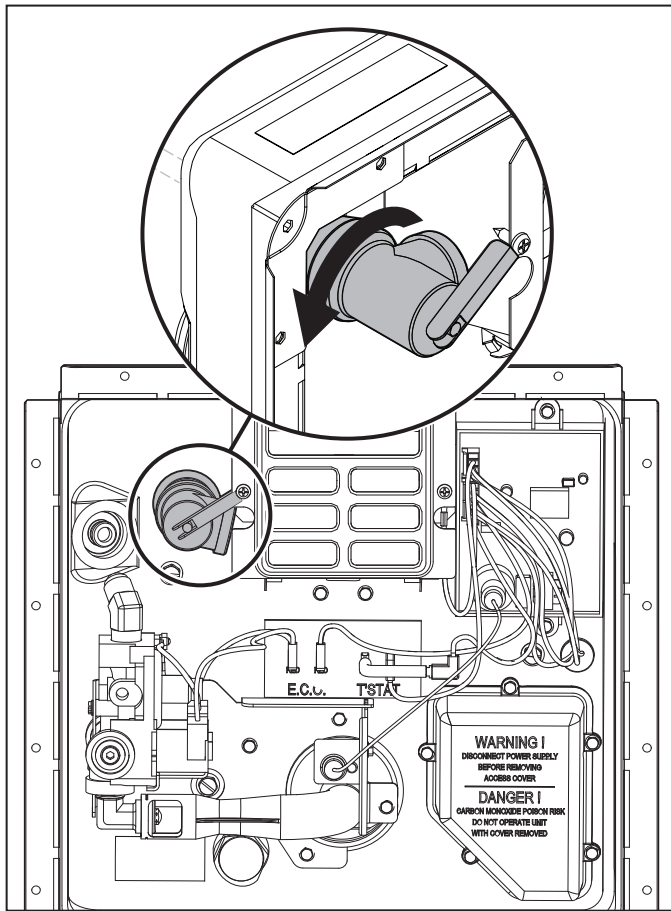


38 Re-establishing the Thermal Expansion Air Pocket

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
 2. Let the water in the Water Heater cool or let the water run until it is cool.
 3. Turn off the main water supply (the pump or water hook up source).
 4. Open the hot-water faucet closest to the Water Heater to release built-up pressure.
 5. Pull the handle of the P/T relief valve straight out and allow water to flow until it stops.
 6. Push the P/T relief valve handle in allowing it to snap shut.
 7. Close the faucet.
 8. Turn on the water supply.
 9. Turn on the Water Heater and test.
- i** At least once a year manually operate the P/T relief valve to check functionality.
10. If the P/T relief valve exhibits excessive weeping, repeat Steps 1–9.

8.18 Replacing the P/T Valve

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



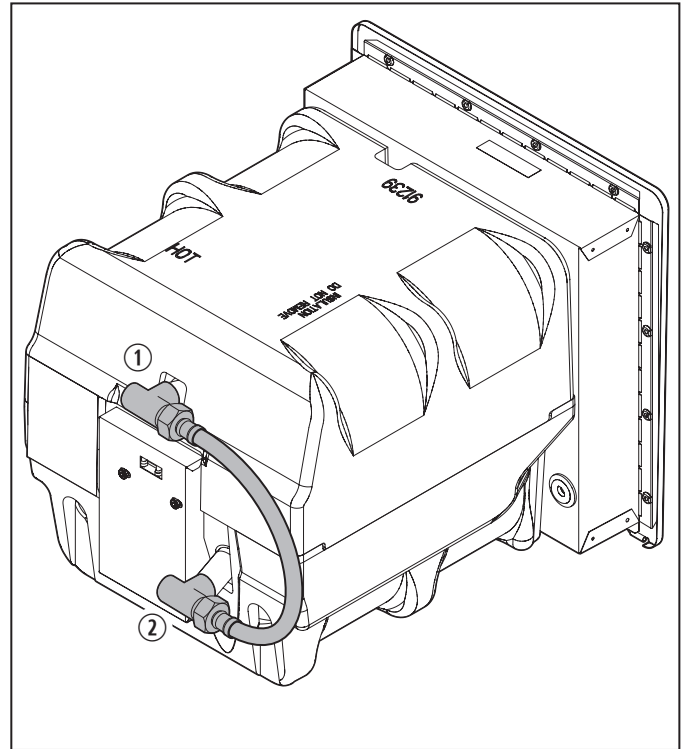
39 Replacing the PT Valve

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
 2. Let the water in the Water Heater cool or let the water run until it is cool.
 3. Turn off the incoming water supply.
 4. Turn off the main water supply (the pump or water hook up source).
 5. Open the hot-water faucet closest to the Water Heater to release built-up pressure.
 6. Unscrew the P/T relief valve from the Water Heater.
 7. Reverse steps 1–6 to install the new P/T relief valve.
- i** When replacing the P/T valve, make sure the water discharge opening on the valve is in the same position as before service.

8. Perform the steps in "Re-establishing the Thermal Expansion Air Pocket" on page 39.

8.19 Confirming the Bypass Kit Placement

i Gas Only or Gas/Electric Combination (Standard and EXT) Models Only



40 Confirming the Bypass Kit Placement

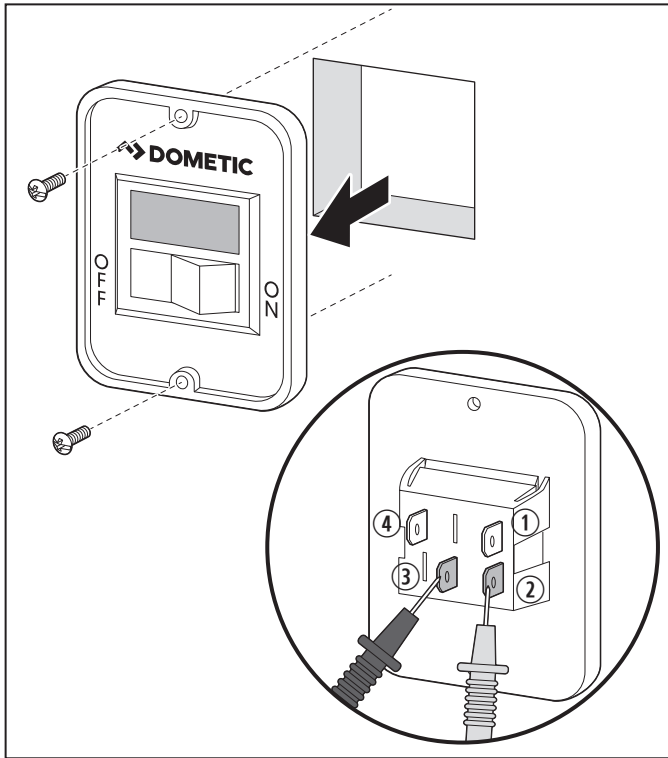
- 1** Hot Water Outlet to RV **2** Cold Water Inlet to Water Heater

i Image is for informational purposes only. Bypass kits vary in appearance and may not match the image.

8.20 Performing a Wall Switch Continuity Test

Use one of the following procedures to test continuity as determined by the Water Heater model being serviced.

8.20.1 Gas Only (Standard and EXT) Models

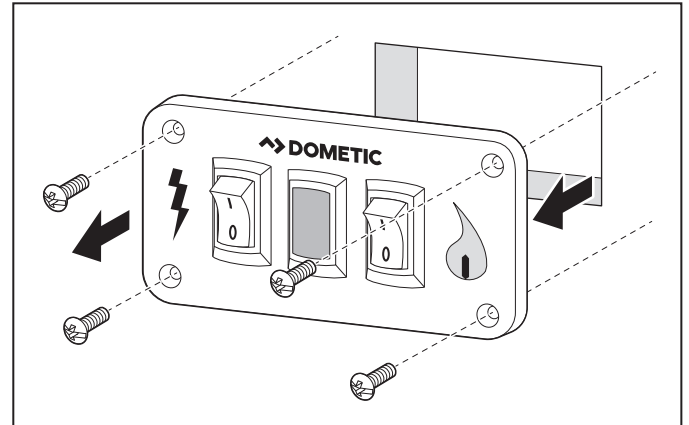


41 Gas Only (Standard and EXT) Models

1. Turn off power to the wall switch.
2. Remove the two screws securing the wall switch in place.
3. Pull the switch out from the wall.
4. Note the orientation of the wires on the wall switch.
5. Disconnect the wires from the wall switch.
6. Set your multi-meter to the Ohms resistance setting.
7. Touch the leads to terminals 2 and 3.
8. When the gas switch is turned on, you should have continuity across the two terminals.

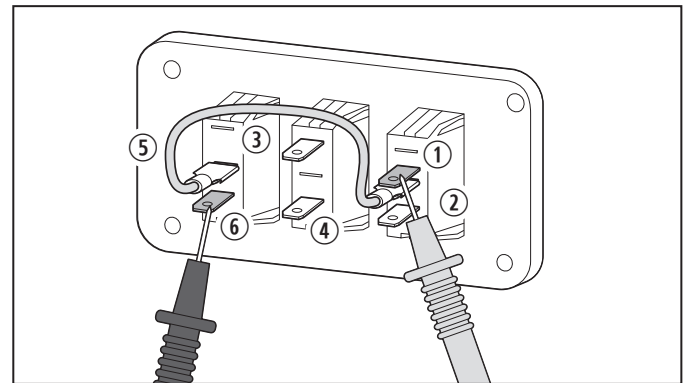
If there is no continuity, then the wall switch is faulty.

8.20.2 Gas/Electric Combination (Standard and EXT) Models



42 Gas/Electric Combination (Standard and EXT) Models

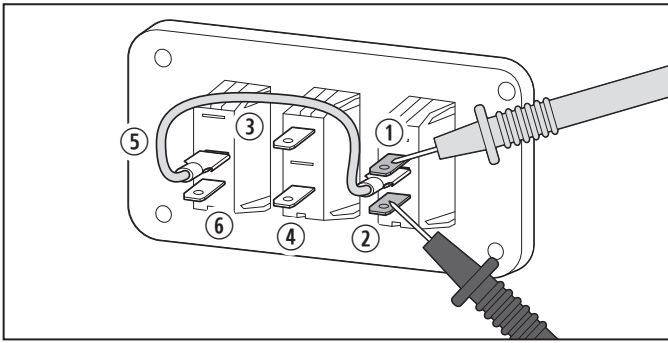
1. Turn off power to the wall switch.
2. Remove the four screws securing the wall switch in place.
3. Pull the switch out from the wall.
4. Note the orientation of the wires on the wall switch.
5. Disconnect the wires from the wall switch, with the exception of the jumper wire.
6. Set your multi-meter to the Ohms resistance setting.



43 Gas Switch Continuity Test

7. Touch the leads to terminals 1 and 6.
8. When the gas switch is turned On and the electric switch is turned Off, you should have continuity across the two terminals.

If there is no continuity, then the gas switch is faulty.

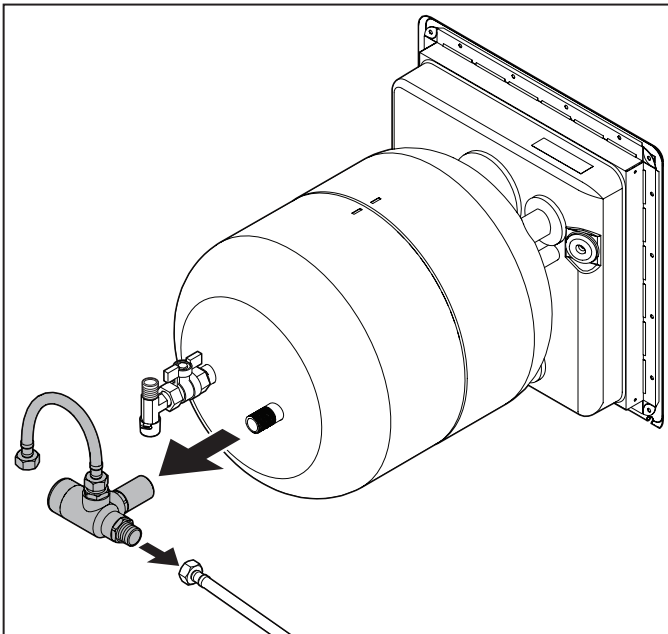
**44** Electric Switch Continuity Test

9. Touch the leads to terminals 1 and 2.
10. When the electric switch is turned On and the gas switch is turned Off, you should have continuity across the two terminals.

If there is no continuity, then the electric switch is faulty.

8.21 Replacing the Mixing Valve

i EXT Models Only

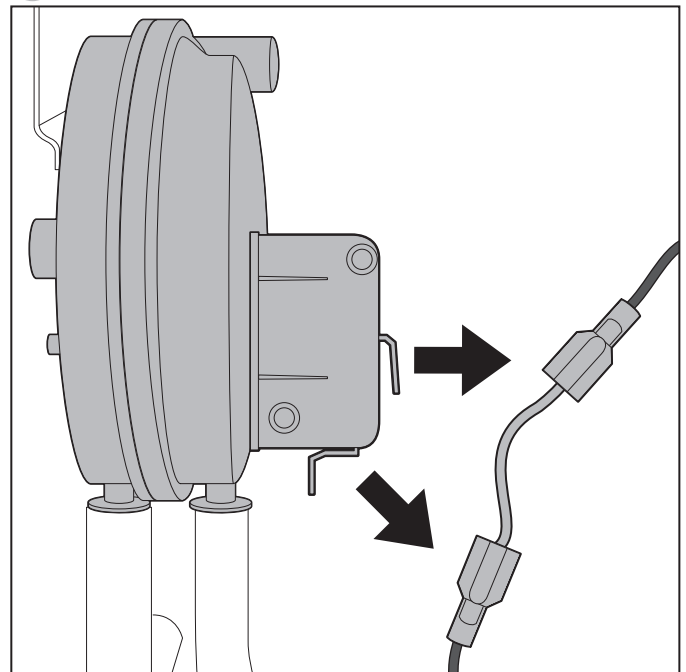
**45** Replacing the Mixing Valve

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Let the water in the Water Heater cool or let the water run until it is cool.
3. Turn off the main water supply (the pump or water hook up source).

4. Unscrew and remove the external drain plug to drain the water out of the Water Heater.
5. Unscrew and remove the mixing valve hose from the incoming water line connection.
6. Unscrew and remove the hot-water hose from the mixing valve.
7. Unscrew and remove the mixing valve from the hot-water outlet on the tank.
8. Reverse steps 1–7 to install the new mixing valve.

8.22 Bypassing the Pressure Switch

i On Demand Models Only

**46** Bypassing the Pressure Switch

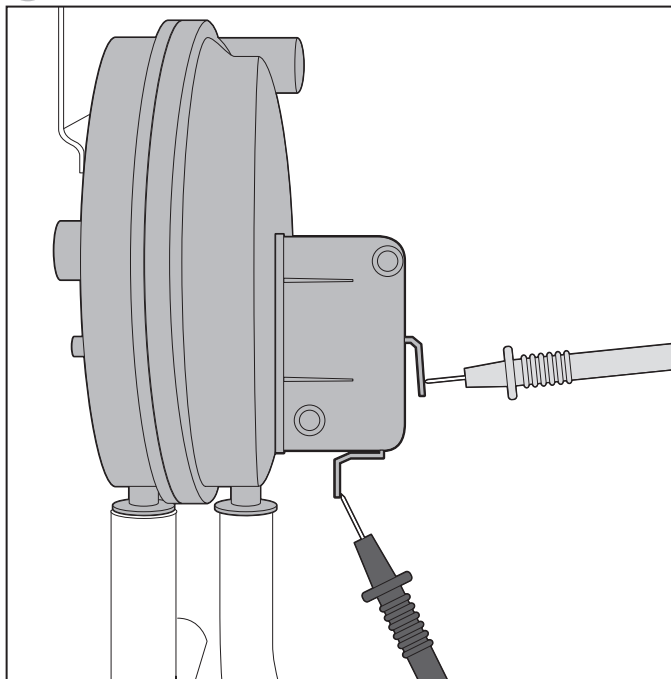
i Only bypass the pressure switch for testing.

1. Place the control switch in the Off position.
2. Pull the two brown wires off of the pressure switch.
3. Place a jumper wire between the two brown wires.
4. Place the control switch in the On position.
5. Turn the hot water On at a faucet in the RV.

The Water Heater should attempt to ignite. If it only attempts to ignite when the pressure switch is bypassed, then the pressure switch is faulty or the hoses could be blocked.

8.23 Performing a Pressure Switch Continuity Test

i On Demand Models Only



47 Performing a Pressure Switch Continuity Test

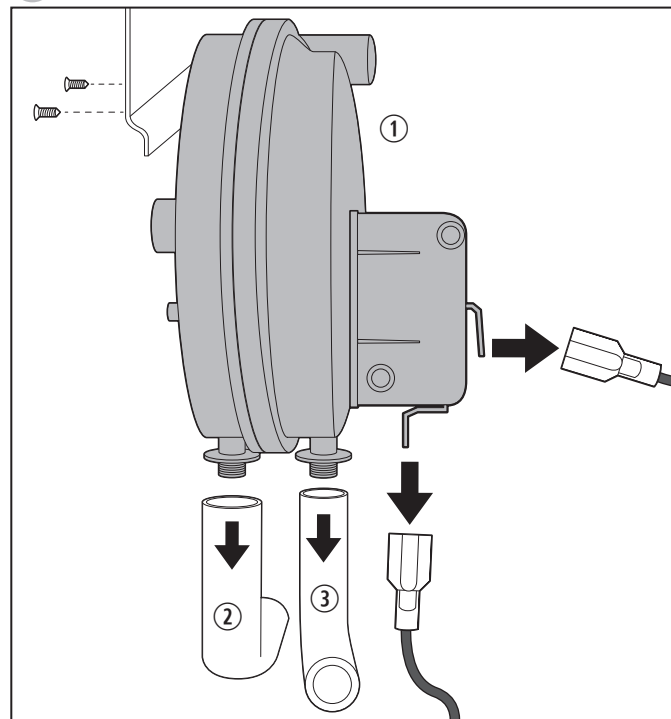
1. Place the control switch in the Off position.
2. Pull the two brown wires off of the pressure switch.
3. Set your multi-meter to the Ohms resistance setting.
4. Attach the leads of the multi-meter, one to each terminal of the pressure switch.
5. When the fan is running you should have continuity across the two terminals of the pressure switch.

i Consult the operating manual for your multi-meter for specific device function.

If the reading shows no continuity/open circuit, it indicates a faulty pressure switch or the pressure switch hoses could be blocked.

8.24 Replacing the Pressure Switch

i On Demand Models Only



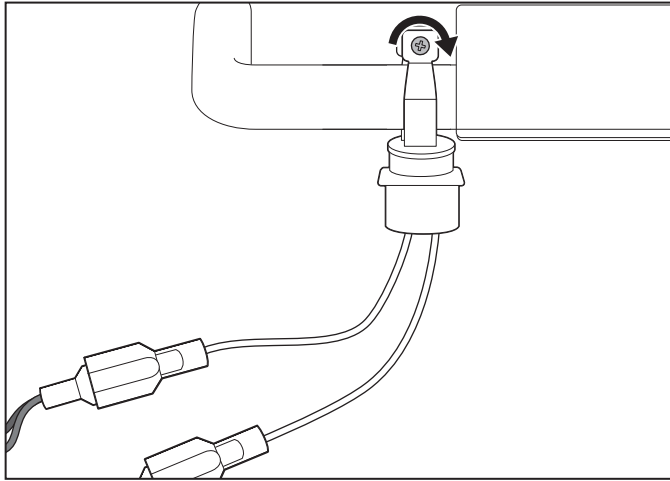
48 Replacing the Pressure Switch

- ① Pressure Switch ③ Pressure Straw
- ② Pressure Hose

1. Place the control switch in the Off position.
2. Pull the two brown wires off of the pressure switch.
3. Note the orientation of the hose and straw.
4. Pull the pressure hose and straw off of the pressure switch.
5. Remove the two screws securing the pressure switch to the Water Heater.
6. Remove the pressure switch.
7. Reverse steps 1–6 to install the new pressure switch.

8.25 Tightening the Cold-Weather Thermostat Set Screw

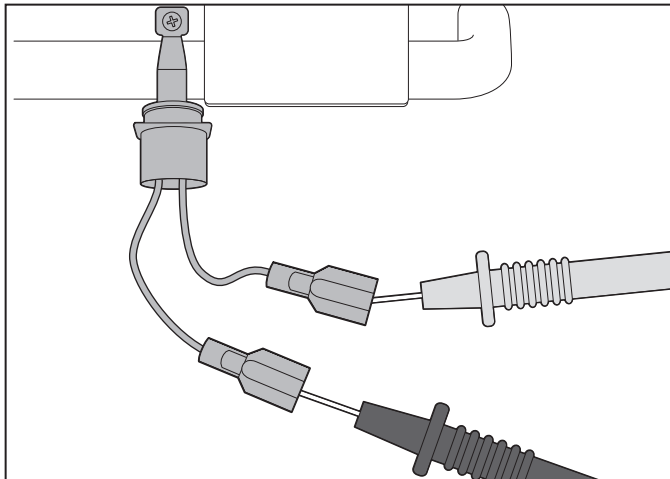
i On Demand Models Only



49 Tightening the Cold-Weather Thermostat Set Screw

8.26 Performing a Cold-Weather Thermostat Continuity Test

i On Demand Models Only



50 Performing a Cold-Weather Thermostat Continuity Test

1. Place the control switch in the Off position.
2. Disconnect the two wires connected to the white leads coming off of the cold-weather thermostat.
3. Set your multi-meter to the Ohms resistance setting.
4. Attach the leads of the multi-meter, one to each lead of the cold-weather thermostat.

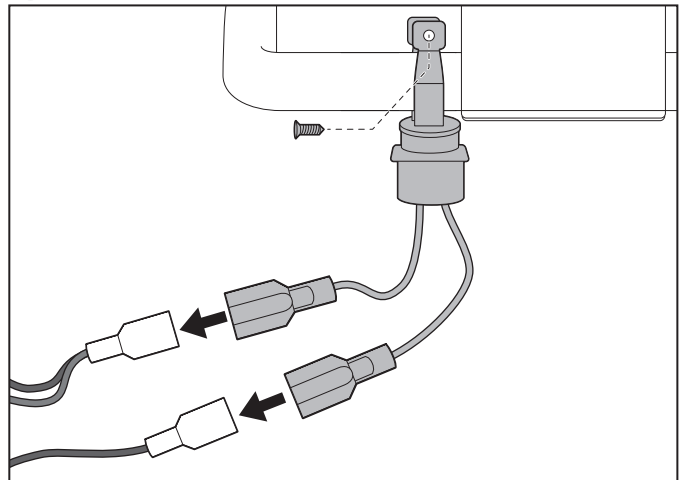
When the ambient temperature is below approximately 40 °F (4.5 °C) you should have continuity across the two leads of the cold-weather thermostat.

i Consult the operating manual for your multi-meter for specific device function.

If the reading shows continuity/closed circuit, above 40 °F (4.5 °C), the cold-weather thermostat is faulty.

8.27 Replacing the Cold-Weather Thermostat

i On Demand Models Only

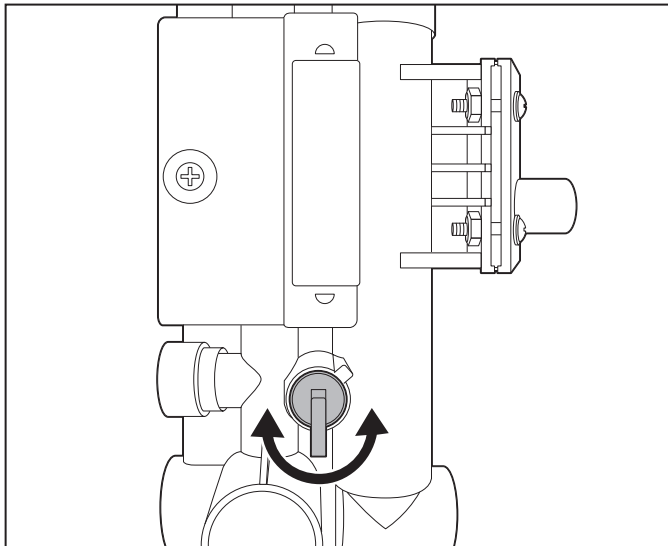


51 Replacing the Cold-Weather Thermostat

1. Place the control switch in the Off position.
2. Disconnect the two wires connected to the white leads coming off of the cold-weather thermostat.
3. Remove the screw holding the clip onto the heat exchanger.
4. Remove the cold-weather thermostat.
5. Reverse steps 1–4 to install the new cold-weather thermostat.

8.28 Adjusting the Winter/Summer Setting

i On Demand Models Only



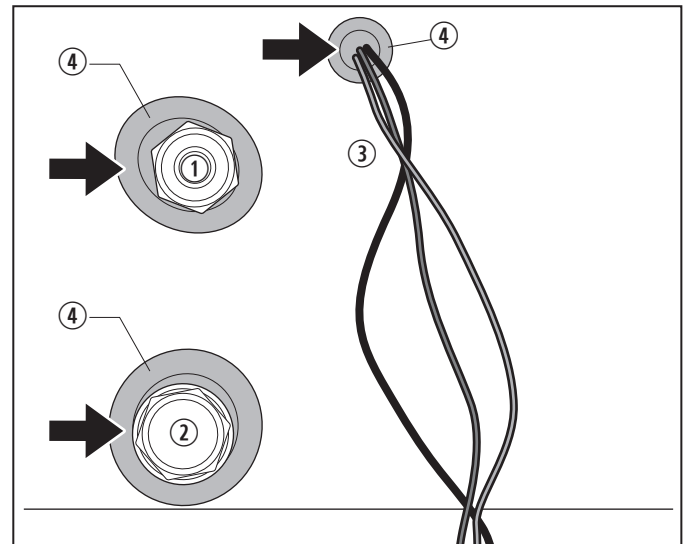
52 Adjusting the Winter/Summer Setting

8.29 Replacing the Modulating Valve

i On Demand Models Only

i Replacing the modulating valve requires removal of the Water Heater from the RV.

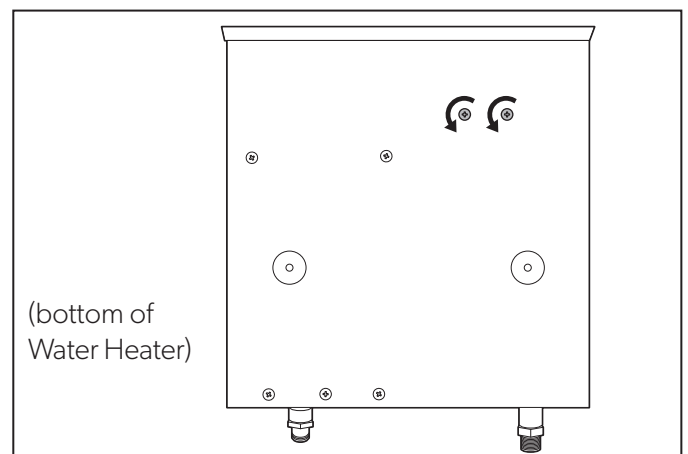
1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Let the water in the Water Heater cool or let the water run until it is cool.
3. Turn off the main water supply (the pump or water hook up source).
4. Open the hot-water faucet closest to the Water Heater to release built-up pressure.
5. Pull the handle of the P/T relief valve straight out and allow water to flow until it stops.
6. Push the P/T relief valve handle in allowing it to snap shut.
7. Close the faucet.



53 Disconnecting the Water Heater

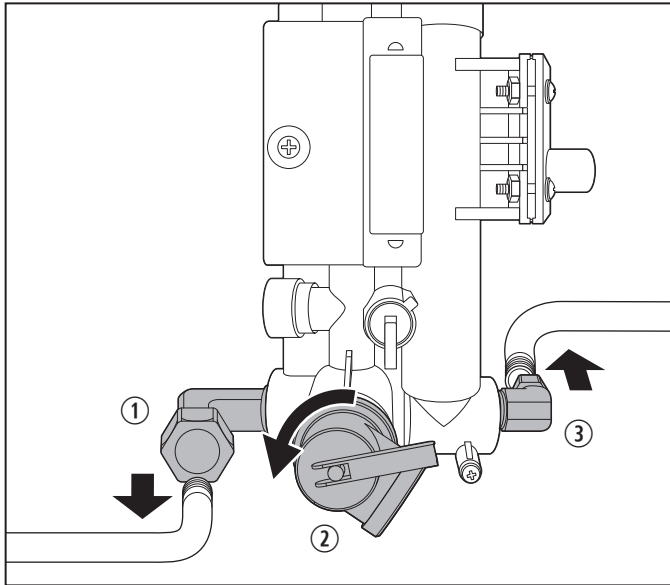
- | | |
|--------------------|------------------|
| ① Gas Connection | ③ Wiring Harness |
| ② Cold Water Inlet | ④ Rubber Grommet |

8. Disconnect the cold-water inlet hose and remove the fitting.
9. Disconnect the hot-water outlet hose.
10. Disconnect the gas connection.
11. Disconnect the wiring harness from the back of the Water Heater.
12. Remove the mounting hardware securing the Water Heater to the RV.
13. Remove the Water Heater from the RV.
14. Push the rubber grommets from the gas connection, wire harness, and cold-water inlet into the back of the Water Heater.



54 Removing the Screws from the Bottom of the Casing

15. Remove the two mounting screws at the bottom of the Water Heater casing that secure the modulating valve to the Water Heater.



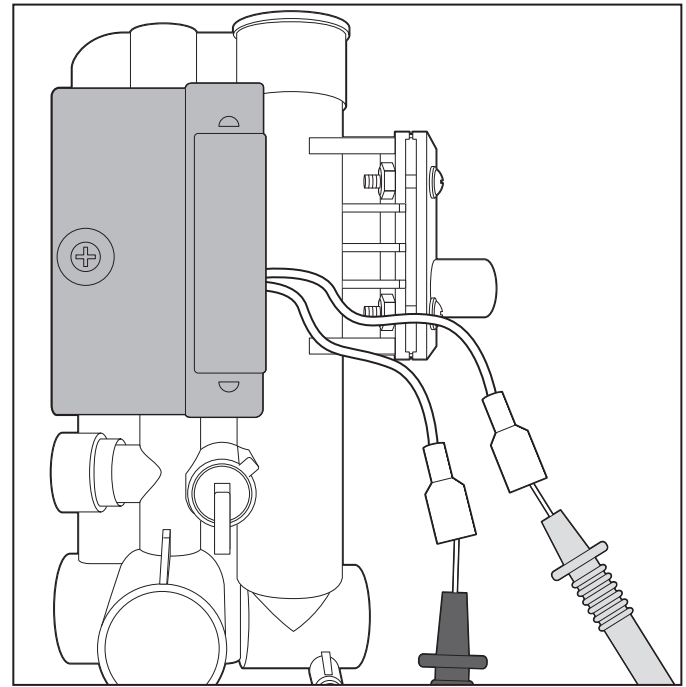
55 Disconnecting the Heat Exchange, P/T Valve, and Gas Line

- ① Heat Exchange ③ Gas Line
② P/T Relief Valve

16. Remove the modulating valve from the heat exchanger.
17. Unscrew the P/T relief valve from the modulating valve.
18. Remove the gas line from the modulating valve.
19. Remove the gas solenoid valve from the modulating valve.
20. Reverse steps 1–19 to install the new modulating valve.

8.30 Performing a Reed Switch Continuity Test

i On Demand Models Only

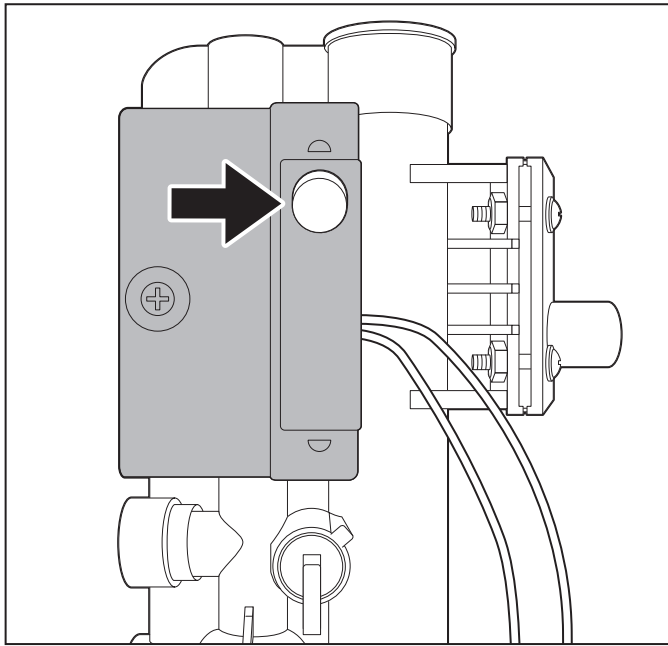


56 Performing a Reed Switch Continuity Test

1. Place the control switch in the Off position.
2. Disconnect the two wires connected to the white leads coming off of the reed switch.
3. Set your multi-meter to the Ohms resistance setting.
4. Attach the leads of the multi-meter, one to each lead of the reed switch.
5. When the water is flowing at a rate of at least 0.8 gpm (3.0 lpm), you should have continuity across the two leads of the reed switch.

i Consult the operating manual for your multi-meter for specific device function.

If the reading shows no continuity/open circuit, it indicates a faulty reed switch.

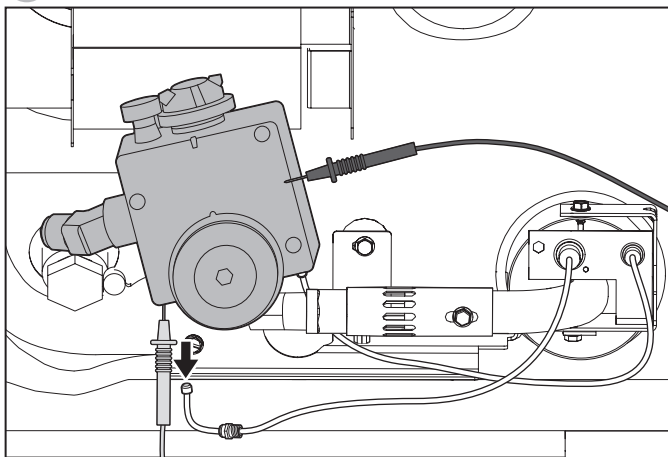


57 Performing a Reed Switch Continuity Test with a Magnet

- i** You can also place a magnet at the top of the reed switch and then check for continuity. You should have continuity when the magnet is placed in this location.

8.31 Performing a Thermocouple Circuit Test

- i** Gas Only - Pilot Model Only



58 Performing a Thermocouple Circuit Test

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Remove the thermocouple line from the bottom of the gas valve.

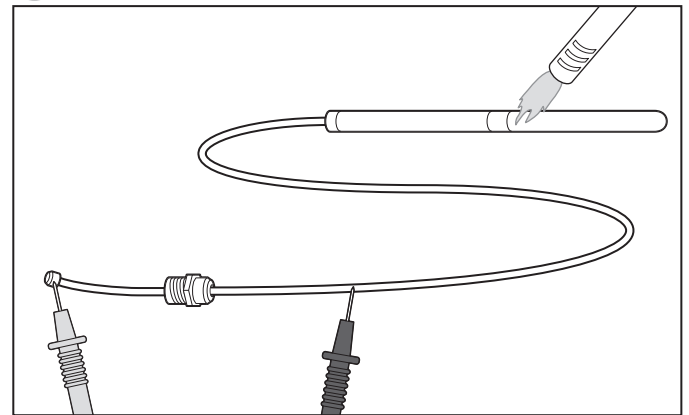
3. Set your multi-meter to the Ohms resistance setting.
4. Attach one lead of the multi-meter into the center of the thermocouple port.

- i** Be sure to center the lead to the thermocouple port. Touching the sides will create a false reading.
- 5. Attach the other lead of the multi-meter to the body of the gas valve. You should have continuity.
- i** Consult the operating manual for your multi-meter for specific device function.

If the reading shows no continuity/open circuit, it indicates a faulty gas valve.

8.32 Testing the Thermocouple

- i** Gas Only - Pilot Models Only



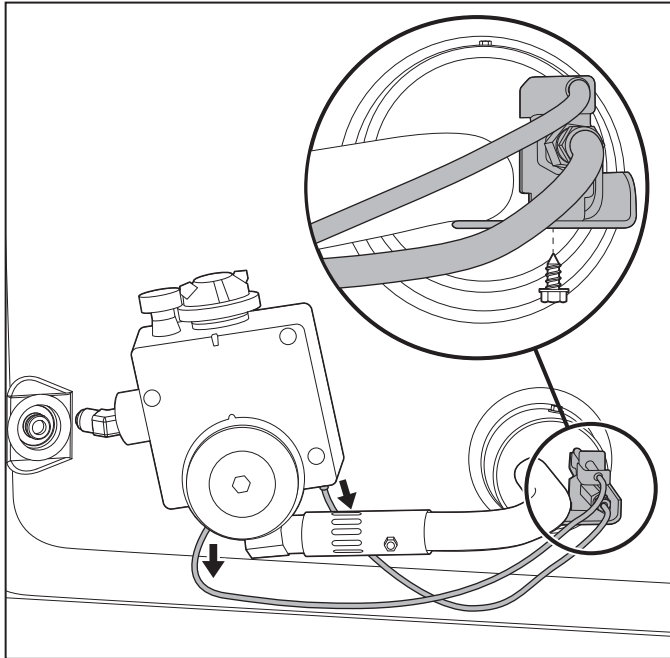
59 Testing the Thermocouple

1. Perform the steps in "Replacing the Thermocouple" on page 48 to remove the thermocouple from the gas valve.
2. Set the multi-meter to the DC mV setting.
3. Connect the negative lead from the multi-meter to the center of the thermocouple line.
4. Using a grill lighter, heat the thermocouple end for at least 30 seconds, then remove the heat.
5. Connect the positive lead from the multi-meter to the center of the thermocouple connector. The reading should be between 16–21 mV DC.

If the reading is outside of that range, the thermocouple is faulty.

8.33 Replacing the Thermocouple

i Gas Only - Pilot Models Only



60 Replacing the Thermocouple

1. Perform the steps in "Shutting Down the Water Heater" on page 32.
2. Unscrew the existing thermocouple and pilot gas line from the bottom of the gas valve.
3. Remove the screw from the bottom of the pilot assembly bracket.
4. Remove the pilot assembly with the thermocouple attached.
5. Unscrew the existing thermocouple from the pilot assembly.
6. Install the new thermocouple by reversing steps 1–5.

i To avoid damaging the thermocouple when attaching it to the pilot assembly and gas valve, hand-tighten the connection. Once attached, secure the connection with a 1/4 turn using a wrench.

9 Maintenance

⚠ WARNING: ELECTRICAL SHOCK, FIRE, EXPLOSION, AND/OR CARBON MONOXIDE HAZARD. Failure to obey the following warnings could result in death or serious injury.

- Use only Dometic replacement parts and components, which are specifically approved for use with the appliance.
- Do **not** use matches, candles, or other sources of ignition to test fittings and gas lines for leaks.
- Avoid improper installation, adjustment, alterations, service, or maintenance of the appliance. Service and maintenance must be done by a qualified service person only.
- When performing any maintenance or care, shut off the gas supply at the LP container before disconnecting a gas line.
- Keep the control compartment clean and free of gasoline, combustible material and any flammable liquids and vapors.

i During service of the controls, label all wires before disconnecting any wires.

i Verify proper operation after servicing.

The following maintenance and safety checks should be performed once a year, or as needed, depending on the use of the appliance. Failure to properly maintain the appliance may void the warranty and could result in unsafe operation. Preventive maintenance is not covered under the warranty.

9.1 Cleaning the Mixing Valve Screen

i EXT Models Only

When necessary, clean the mixing valve screen.

1. Remove the mixing valve (refer to "Replacing the Mixing Valve" on page 42).
2. Take out the screen.
3. Remove any debris restricting the water flow.

4. Soak the mixing valve in a hot white vinegar bath and flush out the tank.
5. Reinstall the mixing valve screen and valve.

9.2 Flushing the Tank

Use this procedure for general flushing of the tank.

1. Turn off the main water supply (the pump or water hook up source).
2. Remove the drain plug to drain the water from the tank.

i If the water drains sporadically or trickles out of the drain hole, open the P/T relief valve then use a small gauge wire or coat hanger to remove any obstructions from the drain hole.

With the tank drained, approximately 2 qt (1.9 L) of water remains at the bottom of the tank. This water contains most of the corrosive particles. To remove these particles, use an "RV Water Heater Flushing Tool." The wand of this flushing tool allows the water jet to clean at different angles inside of the tank. Cleaning at different angles inside of the tank will suspend and flush the corrosive particles out of the drain coupling.

3. Continue flushing the tank until the water being flushed from the drain coupling is draining as clear water.
4. Replace the drain plug.

9.3 Cleaning the Pressure Switch Hose, Nipples, and Straw

To clean the pressure switch hose or nipples, use a toothpick. To clean the pressure switch straw, use a brush or blow out the straw using air.

9.4 Checking the DSI Control Board

The Water Heater comes factory-equipped with a 2 A fuse on the DSI control board to protect from wiring shorts. If the 2 A fuse is blown, the Water Heater will not operate.

- Check for a short external to the DSI control board. If there are no electrical shorts or the shorts are corrected and the problem is still present, replace the 2 A fuse with a mini ATO-style fuse.

NOTICE: Do not install a fuse larger than 3 A.

If the fuse is good and the unit is inoperative, check for excessively high voltage to the unit (more than 14 volts) or for low voltage (below 10 VDC) on the thermostat line.

- Check for intermittent functionality of the DSI control board. If the DSI control board is experiencing intermittent functionality, remove the DSI control board and clean the terminal block with a pencil eraser.

9.5 Inspecting the Burner and Burner Assembly

Perform the following checks for the main burner and burner assembly:

- Ensure the main burner and the valve manifold are aligned with each other.
- Inspect for and remove any debris such as dust or insect nests in the compartment burner and flue assembly.
- Inspect the main burner orifice, clean and adjust the main burner as necessary.
- Spiders, mud wasps, and other insects can build nests in the burner tube. This will cause poor combustion, delayed control, or flame outside of the combustion tube and the burner assembly. Inspect and clean the burner tube on a regular basis. Run a flexible wire brush down the burner tube to remove obstructions, and then clean the burner tube and the burner assembly.
- For models with air shutters: confirm the air shutter is open 0.25 in. (6 mm). If not, adjust the air shutter. If more air is needed for the installation (high-altitude installations), adjust the opening of the air shutter in small increments until appropriate.

- Listen for a change in burner sounds or look for changes in flame appearance from a hard blue flame to a soft lazy flame or one that is very yellow. These are indications of an obstruction in the burner tube or the burner assembly.
- Confirm the flame spreader is in alignment. The flame spreader should be straight and in the middle of the burner tube, allowing for an even flame.
- Make sure the U-tube is not blocked or collapsed. Clear any blockages, if present.

9.6 Understanding P/T Valve Weeping

A P/T relief valve dripping while the Water Heater is running does not mean it is defective. During normal expansion of water, the P/T relief valve is heated in the closed water system of an RV. This may cause the P/T relief valve to drip.

9.7 Resetting a Locked-Out Control

 Gas/Electric Combination (Standard and EXT) Models Only

When the electric element switch is turned to the On position, the relay closes and passes 110 VAC to the element. If the thermostat fails, the E.C.O. opens and locks out the system. To correct, check the E.C.O. to assure good contact with the tank. Reset the control by turning the electric switch to the Off position then to the On position.

10 Disposal



Place the packaging material in the appropriate recycling waste bins, whenever possible. Consult a local recycling center or specialist dealer for details about how to dispose of the product in accordance with all applicable national and local regulations.

11 Replacement Parts

For the most current parts information, visit www.dometic.com.

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dometic.com

**YOUR LOCAL
DEALER**

dometic.com/dealer

**YOUR LOCAL
SUPPORT**

dometic.com/contact

**YOUR LOCAL
SALES OFFICE**

dometic.com/sales-offices
