

TECHNICAL SERVICE DEPARTMENT

Technical Service Bulletin

1-800-432-8373

Universal Commercial Gas Electronic Spark Ignition Sequence

Troubleshooting Tips

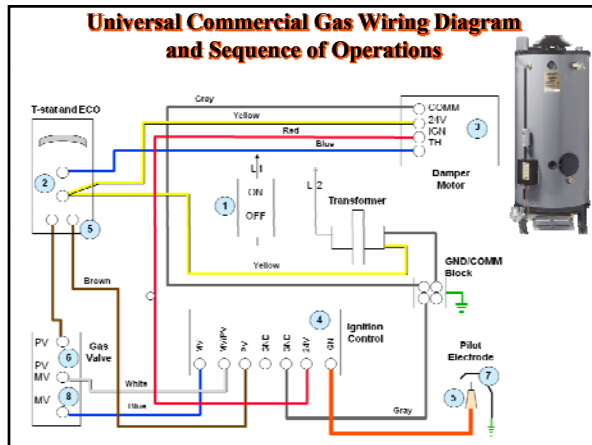
- Properly installed to code
- Properly vented to code
- Adequate combustion air – fresh air
- Connected to 120 volt source
- Gas pressure between 4.5 and 10.5 inches w.c.
- Multimeter set to AC voltage scale
 - 120 volts or 24 volts AC



Tank is cold and full of water.

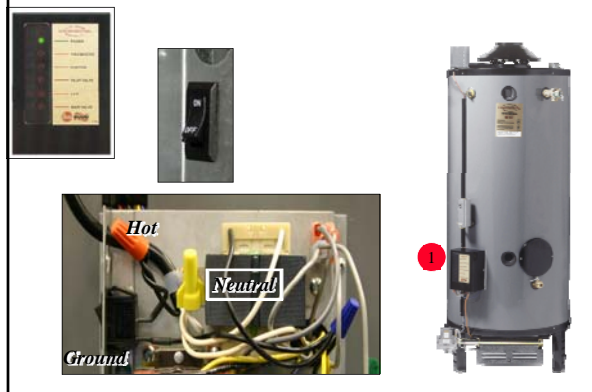
Heater is wired to a 120 VAC source.

Gas supply is connected to heater and valve is set to ON position.



This is a wiring and sequence diagram. The steps shown on this slide match the sequence of operations step that follow.

1 - Power to the Unit



A normal 120 VAC circuit is connected to the water heater; black to black, white to white and green to ground. IF you have power to the machine, and the transformer is working, the green LED label **POWER** will be on.

120V is extended from the switch to the 24V step down transformer.

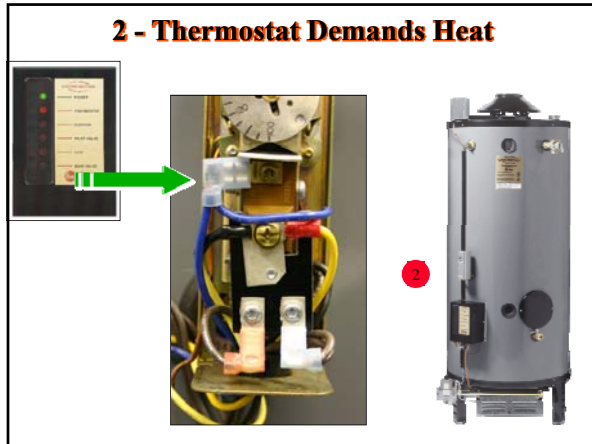
24V is extended from the transformer to the thermostat.

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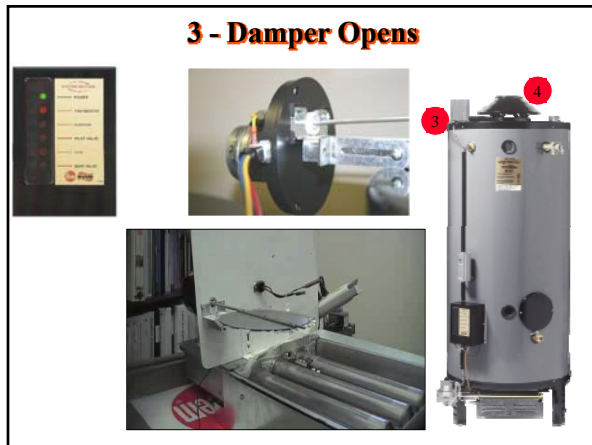
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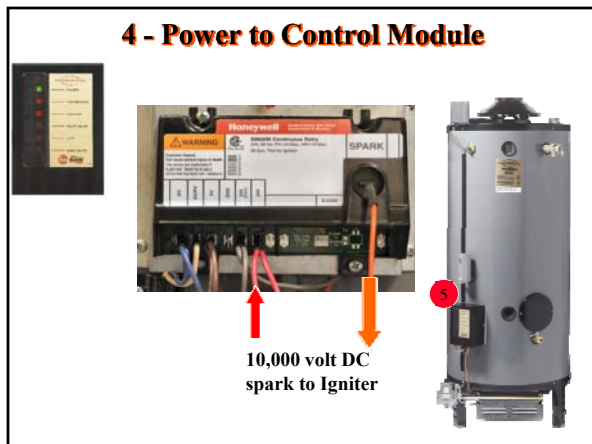
When the thermostat calls for heat, contacts close and pass the 24V through the blue wire to the damper assembly terminal.

IF the thermostat is working and demanding heat, the red LED labeled **Thermostat** will be on.



The blue wire provides power to the damper motor that drives the damper blade open. The damper blade, being open, will allow combustion gases to escape through the venting.

Second, when the damper is opened to the correct position, 24V power passes to the IGN terminal of the damper assembly.



Power is now being supplied to the 24V terminal of the control module by the red wire. This is the only wire that feeds power to the control module.

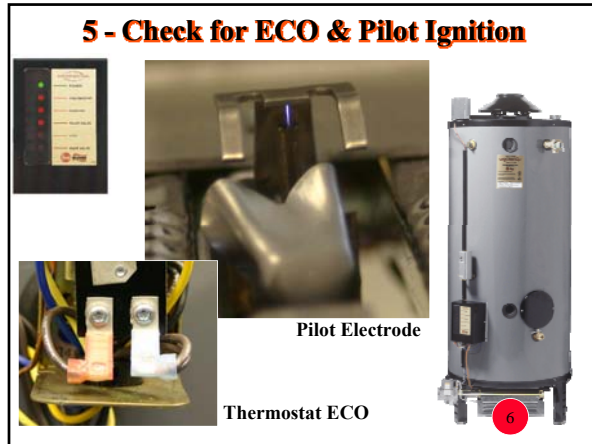
The control module now starts a 90 second try for ignition along the orange wire.

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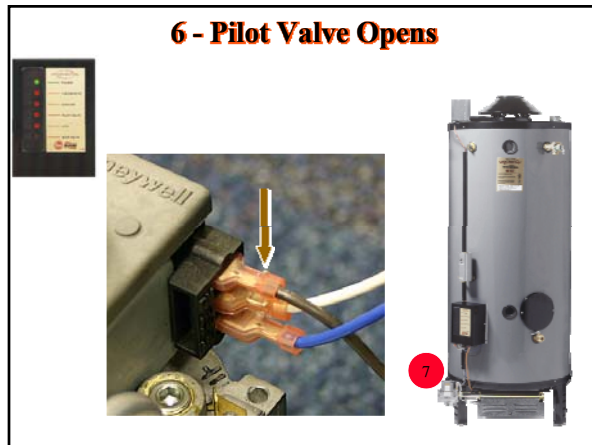
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The control module attempts two events simultaneously. The ignition control module generates a 10,000 volt spark at the pilot electrode assembly and attempts to light the pilot. You will hear a distinctive 'clicking or arcing' noise.

At the same time the control module send 24V from the PV (pilot valve) terminal to the ECO along the brown wire.

If the ECO has been tripped due to an overheated tank, the sequence will stop here. The ECO is an auto reset. Check the water temp of the tank.



The spark ignitor will continue to spark for 90 seconds; then stop.

If the ECO is not tripped, 24V is relayed through the ECO to the PV terminal of the gas valve along the brown wire.

This activates the first automatic valve and pilot gas is allowed to flow through the pilot supply tube to the pilot burner.



The pilot gas is ignited by the sparking pilot electrode and the pilot flame is established.

Through a flame recognition of at least one micro amp (a very small electrical current produced by the flame), the ignition control module ends the spark generation.

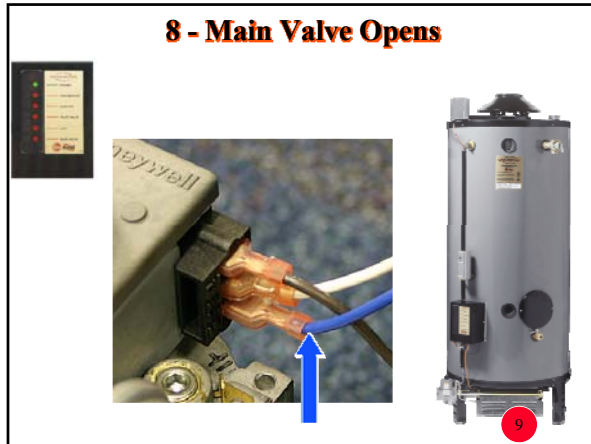
If there is flame rectification, you will have a constant pilot flame.

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After the pilot is lit and recognized by the electronic control, the ignition control module energizes the main valve.

The ignition control opens the second automatic valve by relaying 24V from the MV (main valve) terminal to the gas control valve along the blue wire.

Gas begins to flow to the main burner while the pilot flame remains lit.



The main burner lights and begins to heat the water in the tank.

When the water temperature reaches thermostat setting, the thermostat contacts will open and suspend power to the damper assembly.

Several things will happen. First, without 24V relayed by the blue wire, the damper motor closes the damper blade.

Second, without 24V relayed by the red wire, the control module will not receive power. The pilot valve and main valve, held open by 24V, are closed.

The main burner will shut off and the heater is back into stand-by mode.