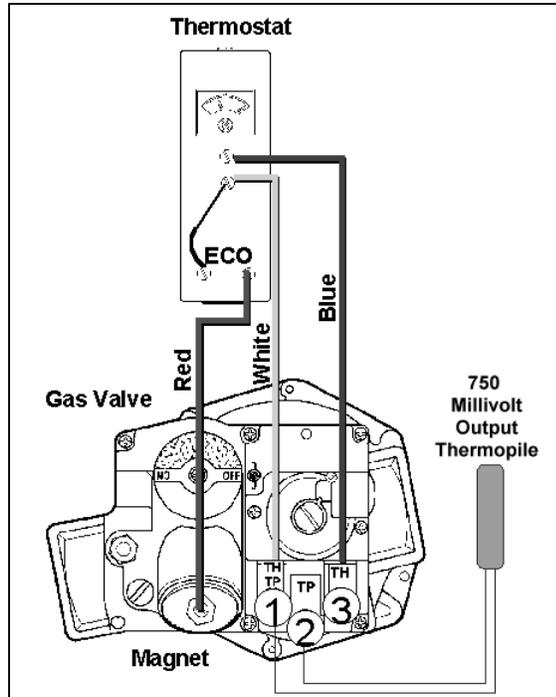




## Commercial Gas - Standing Pilot "R" and "RF" Series Diagnostics

### R & RF Operations Sequence



1. With the gas valve gas cock depressed in the pilot position - Light the pilot.
2. The thermopile, being heated by the pilot flame, produces a millivolt current to terminals 1 & 2 of the gas valve.
3. Terminal #1, via the white lead, connects to the center terminal of the thermostat.
4. The circuit continues through the jumper, then through the ECO bulb, immersed in the waterway, to the right lower terminal of the thermostat.
5. The circuit continues via the red lead to the gas valve magnet assembly.
6. The magnet assembly is energized by the millivolt circuit to ground - thereby locking the pilot in the OPEN position.
7. The circuit continues through ground to terminal #2, to the other side of the thermopile.
8. The pilot remains "ON".
9. Turn the gas cock valve from "Pilot" to "On" and increase the thermostat temperature setting so the contacts close. This continues the millivolt circuit from the top thermostat terminal to the "TH" right terminal #3 of the gas valve.
10. The main gas valve opens, allowing gas to flow to the main burner to light and heat the tank to temperature.
11. When the water is heated to the thermostat setting, the thermostat top and center contacts open and the gas valve

shuts off the main burner.

### Troubleshooting

#### Pilot goes out - occasionally

- (A) Check for poor corroded connections. Clean. Be sure they are tight.
- (B) Be sure thermopile is embedded in the pilot flame for greatest temperature.
- (C) Weak thermopile output. (Do Thermopile Output test.)
- (D) Weak Magnet assembly. (Do Auto Pilot Drop-out test.)
- (E) Thermostat contacts dirty - rotate dial (numerous times.)

#### Pilot will not light

- (A) Poor flame impingement.
- (B) Weak magnet assembly in gas valve. (Do Auto Pilot Drop-out test.)
- (C) Weak thermopile - low output. (Do Thermopile Output test.)
- (D) ECO Open on thermostat.
- (E) Thermostat contacts dirty - rotate dial numerous times.

#### Main Burner will not light

- (A) Thermopile may have corroded terminals.
- (B) Thermopile output too low. (Do Auto Pilot Drop-out test.)
- (C) Gas Valve actuator not operating properly.
- (D) Thermostat contacts dirty - rotate dial (numerous times.)



Commercial Gas - Standing Pilot “R” and “RF” Series Diagnostics

**ECO activates (tank overheats above 200°)**

The ECO microswitch opens to shut off the gas valve. This may have been due to stacking. Draw cold water through the heater to cool down the ECO. If it continues, check temperature at which the ECO opens. Verify thermostat calibration.

**Test Information - Using a Milivolt Multimeter - see table below.**

*\* To perform this test, light the pilot. Place the millivolt meter leads on terminal 1 & 2 until maximum MV output is obtained (approximately 325 MV). Blow out the pilot. Do not remove the meter leads. Watch the millivolt meter drop until the magnet disengages. You will hear an audible click. This should be between 120 MV - 30 MV.*

To Test:	Turn Gas Cock:	Main burner should be	Thermostat Contacts are:	Meter leads on terminals	MV reading should be:	Service
Complete System	ON	ON	Closed	2 & 3	100 MV or more	Check gas valve
Thermopile Output	PILOT	OFF	Open	1 & 2	325 MV or more	Check thermopile
System Resistance	ON	ON	Closed	1 & 3	80 MV or less	Check thermostat and thermostat wiring connections
Auto Pilot Drop-out *	PILOT	OFF	Open	1 & 2	Between 120 - 30 MV	Check gas valve