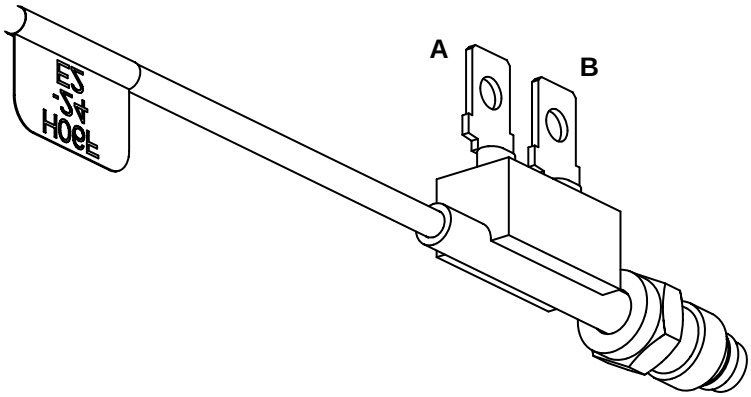
Testing Thermocouple Output on Australian Fryers

A slight decrease in thermocouple output can lead to intermittent ignition failure in a millivolt fryer. Follow these steps to analyze a millivolt system.



As a preliminary step, ensure the following conditions are meet:

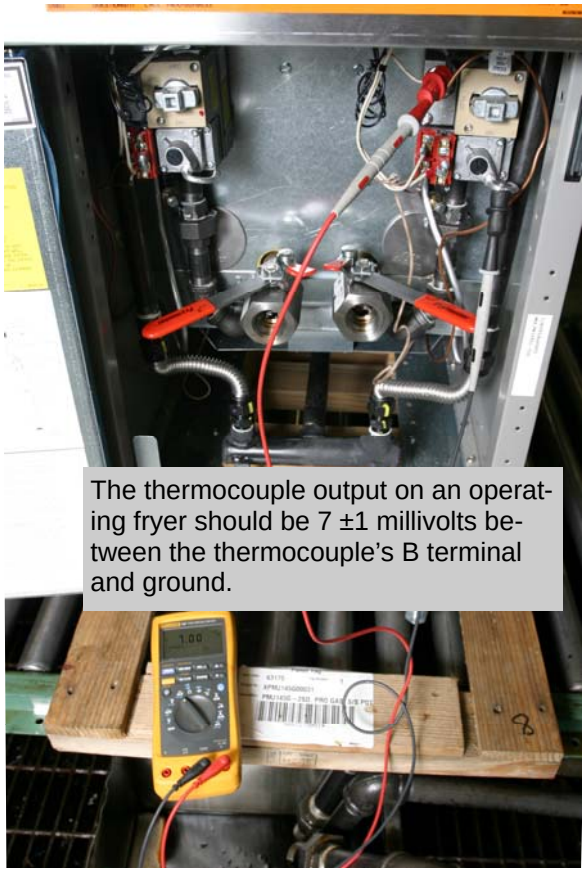
1. Ensure all terminals in the thermocouple circuit are free of corrosion.
2. Ensure all terminal-wire connections are soldered. There should be no crimped terminals.

Do not proceed to testing until all terminals are clean and all terminal-wire connections are securely soldered.

Test the Thermocouple

Readings from the A terminal reveal the voltage output with the pilot coil closed. Readings from the B terminal reveal the output available to close the pilot coil.

1. Remove the hi-limit lead from the thermocouple's A terminal (see above).
2. Set a meter to millivolts and clip the black lead to a good ground.
3. Depress the pilot button and light the fryer.
4. Continue to hold the button in and connect the red lead to the A terminal of the thermocouple.
5. The reading of this unloaded circuit should be a minimum of 28 millivolts.



The thermocouple output on an operating fryer should be 7 ±1 millivolts between the thermocouple's B terminal and ground.

Test the Loaded Circuit

1. With the pilot on and the fryer calling for heat, measure the millivolt output from the B terminal (shown above) and ground.
2. There should be approximately 7 millivolts.
3. Leave the meter connected and **close the fryer door**.
4. Monitor the millivolt output for five minutes as the fryer operates. The output should remain 7 ± 1 millivolts .

Troubleshooting

Problems in this millivolt circuit are difficult to diagnose due to the small amount of current. Regular multimeters are not up to the task. Try inserting new components in the circuit, measuring their effect on the voltage drop.

1. Connect a new hi-limit externally to the circuit and measure voltage output through the new component between the B terminal and ground. Is the voltage greater than with the existing unit and at least 7 millivolts? Change hi-limit
2. Connect a new gas valve to the existing thermocouple while operating the existing valve with the pilot knob depressed. Check the voltage required to close the pilot valve.

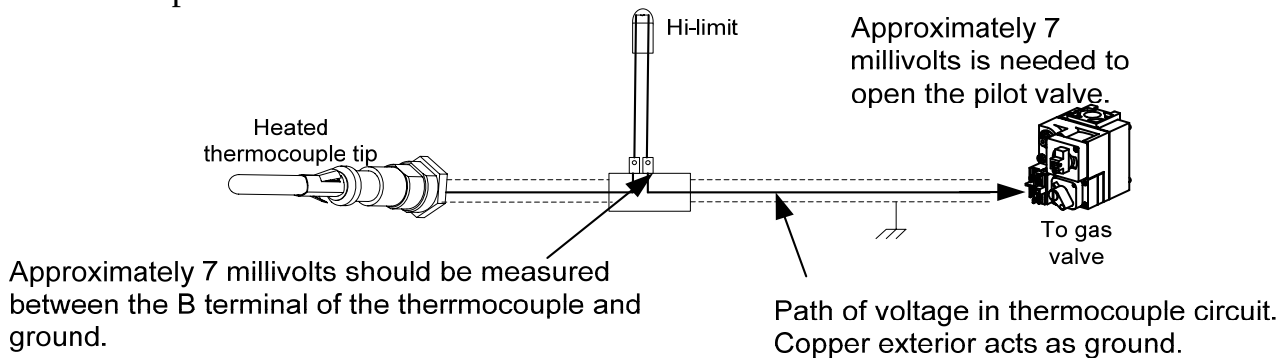
Only the tip of the thermo-couple should be in the flame.

Troubleshooting the Circuit

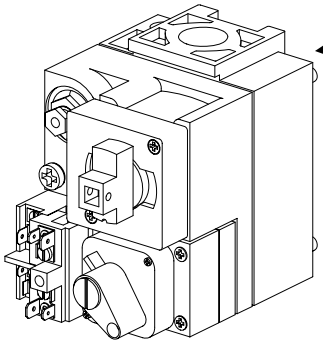
Increasing the millivolt output in a thermocouple circuit can involve repositioning the thermocouple in the flame and examining environmental conditions to ensure the lower body of the thermocouple is not getting as hot as the tip. The difference in temperature is what produces the voltage.

- The tip of the thermocouple, and only the tip, should be cherry red 30-45 seconds after pilot ignition.
- Only the tip of the thermocouple lead should be in the flame.
- Any unnecessary resistance in the circuit, wire nuts, corroded or loose terminals, will reduce the millivolt output below the amount necessary to hold the pilot coil.
- Minor variations in the loaded millivolt circuit will be seen as the burner ignites and warms the lower body of the thermocouple.
- Resistance in the hi-limit shouldn't be considered automatically as the likely cause of failure in a millivolt fryer.

Thermocouple Schematic

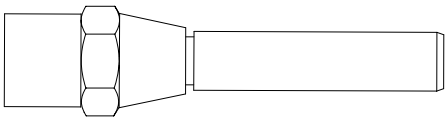


Parts Unique to Australian Frymaster MJ45 Millivolt Fryers

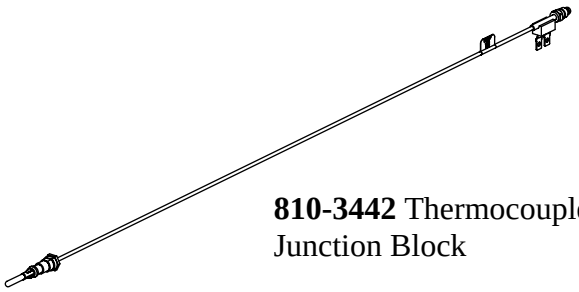


807-4137: Honeywell Millivolt LP and NAT Gas Valve

807-4160: Honeywell 24-Volt LP and NAT Gas Valve



106-8433: Hi-Limit



810-3442 Thermocouple with ECO Junction Block