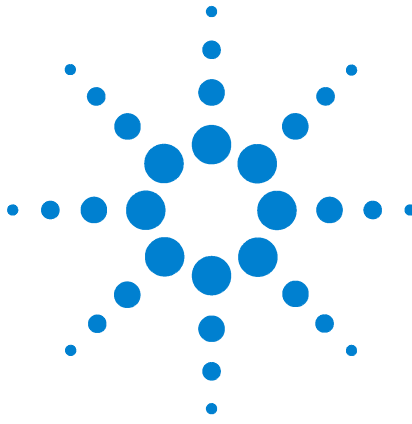




Calibration and Performance Check: Agilent Dual Plasma Controller

Purpose

Outline the steps used to calibrate and verify the performance of the Agilent Technologies Dual Plasma Controller.

Scope

This procedure applies to the calibration and performance verification of all Dual Plasma Controllers.

Safety

WARNING

The burner may be hot (800 °C); do not touch it.

Materials

- Trimpot Adjustment Tool
- Two 5/16-inch Open End Wrenches
- Two 7/16-inch Open End Wrenches
- Two 1/2-inch Open End Wrenches
- Two 1/16-inch VICI plugs
- 0.1-inch Jumper
- Mass flow style Flow meter
- Flow adapter fitting (design in progress)
- 0-30 psi manometer
- Dual Plasma Burner (mounted)



Agilent Technologies

Procedure

Configure voltage by setting the selection module to the desired value and installing the appropriate fuses, see Table 1.

Table 1 Fuses and voltage selection

	Fuse	Voltage selection module
120 V Unit	2 Amp, 250 V Slow Blow	115
230 V Unit	1 Amp, 250 V Slow Blow	230

Setup

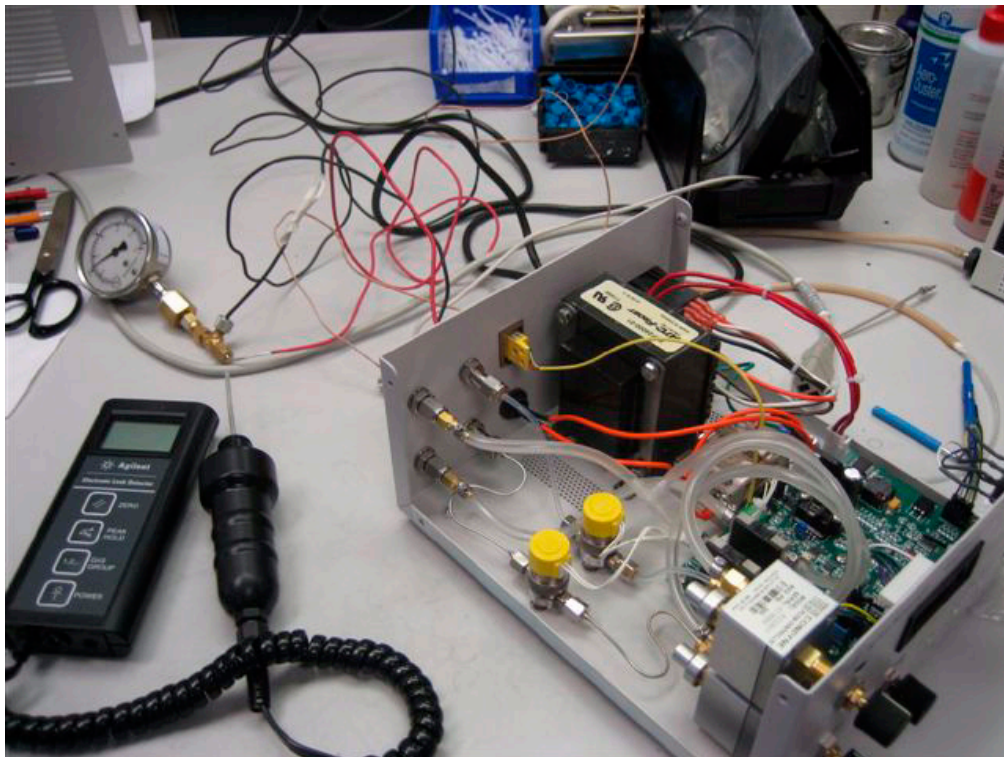
WARNING

The burner may be hot (800 °C); do not touch it.

- 1 Remove the VICI nut and ferrules from the air and hydrogen outlets, placing them in a safe place.
- 2 Cap the 1/16-inch air and hydrogen outlets with the 1/16-inch VICI plugs.
- 3 Adjust both the air and hydrogen flow controller front knobs fully clockwise to “full on” position.
- 4 Install the 0.1-inch jumper across JP1 right next to the pressure sensor. (This bypasses the safety circuit which prevents gas flow when the pressure is greater than 575 torr).
- 5 Connect the thermocouple and heater power cord from the burner.
- 6 Plug in the unit and turn it on.

Air Channel Leak Test and Burner Check

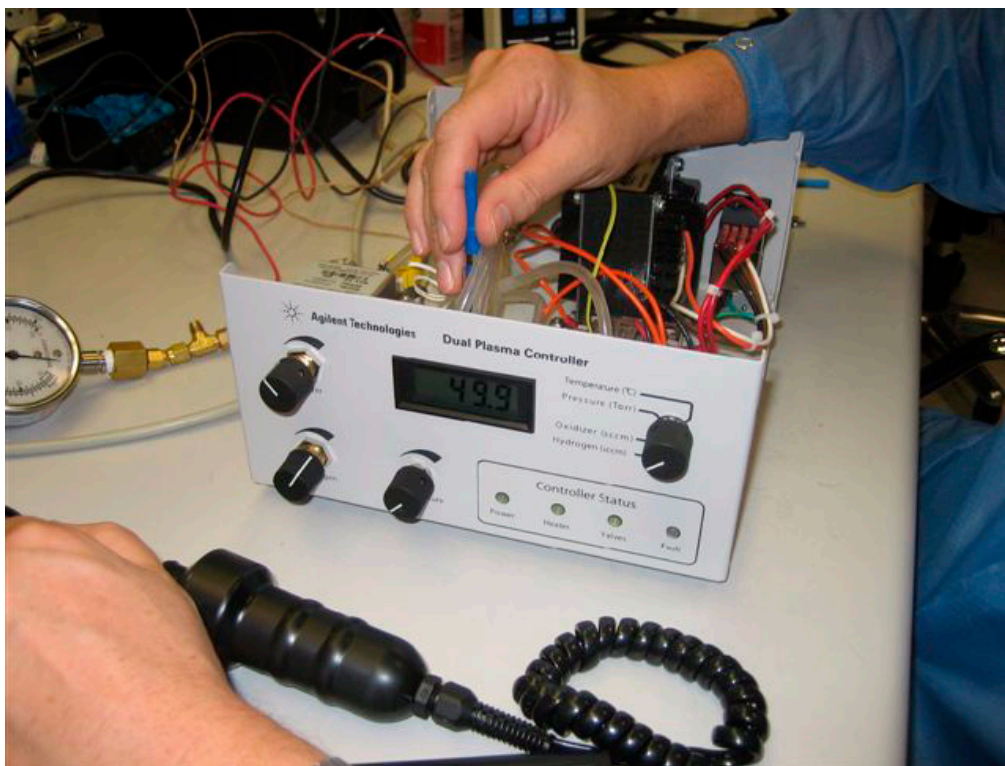
- 1 Supply 25 psig pressure to the air line (gas pressure should be going to the inlet and the outlet should be plugged).
- 2 Once 25 psig is verified on the manometer, switch the air gas supply off. Record pressure reading and note the time.
- 3 Set temperature set point to 800°C. (Verify switch on PCB is in “Set Point” position)
- 4 Verify unit reaches 800°C indicated by front panel heater LED illuminating green.
- 5 Approximately 10 minutes after the time noted in [step 2](#), record the pressure reading on the manometer. If the pressure drop is more than 3 psi, troubleshoot for leaks.



Air Flow Calibration (Flow Controller Located On Top)

Set the range of the air flow controller.

- 1 Turn on the digital flow meter and set gas type to AIR. A mass flow type flow meter must be used.
- 2 Remove the 1/16-inch VICI plug from the 1/16-inch bulkhead air outlet.
- 3 Connect the digital flow meter to the 1/16-inch bulkhead air outlet.
- 4 Turn the 25 psi air supply back on.
- 5 Adjust the back setscrew on the air flow controller until the air flow is 150 ± 2 mL/min. The back setscrew is located on the opposite side of the flow controller relative to the front knob.



Calibrate the air flow rate.

- 1 Adjust the front knob on the air flow controller until the air flow rate is 50.0 ± 0.2 std. mL/min (as measured on the digital flow meter).
- 2 Set display knob to "Oxidizer".
- 3 Adjust trim pot RP2 "OXID SPAN" on PCB until display reads 50 sccm.
- 4 Remove the .1-inch jumper from JP1; confirm that the air flow drops to 0 and the red "Fault" LED illuminates.
- 5 Replace the jumper on JP1.

Hydrogen Channel Leak Test

- 1 Connect a 25 psig hydrogen supply to the hydrogen inlet port on the back of the controller.
- 2 Once 25 psig is verified on the manometer, switch the hydrogen gas supply off. Record pressure reading and note the time.
- 3 After 10 minutes, record the new pressure on the manometer.
- 4 If the pressure has dropped more than 3 psi, troubleshoot for leaks.

Hydrogen Flow Calibration (Flow Controller Located On Bottom)

Set the range of the hydrogen flow controller.

- 1 Remove the 1/16-inch VICI plug from the 1/16-inch bulkhead hydrogen outlet.
- 2 Remove the digital flow meter from the air outlet, and connect the flow meter to the hydrogen outlet.
- 3 Check that the hydrogen supply is still at 25psig. Adjust as necessary.
- 4 Adjust the back setscrew on the hydrogen flow controller until the air flow is 100 ± 2 mL/min. The back setscrew is located on the opposite side of the flow controller relative to the front knob. Record this maximum hydrogen flow rate on the Record of Test.

Calibrate the hydrogen flow rate.

- 1 Adjust the front knob on the hydrogen flow controller until the hydrogen flow rate is 50 ± 0.2 std. mL/min (as measured on the digital flow meter).
- 2 Set display knob to "Hydrogen".
- 3 Adjust trim pot RP3 "H2 SPAN" on PCB until display reads 50 scam.
- 4 Remove the thermocouple connector from the back of the instrument. Confirm that the red "Fault" LED illuminates. Re-attach the thermocouple.
- 5 Remove the .1-inch jumper from JP1; confirm that the hydrogen flow drops to 0 and the red "Fault" LED illuminates.
- 6 Remove the gas supply, plugs, and flow meter from the instrument.
- 7 Replace the VICI nut and ferrule set on the outlet fittings.

Pressure Calibration

- 1 Offset will have been previously set in board test.
- 2 Set the display knob to "Pressure".
- 3 Adjust RP1 (PRS SPAN) on the circuit board until the pressure reading on the front display is 760 ± 5 .



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