

# 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.

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## 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)



## 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

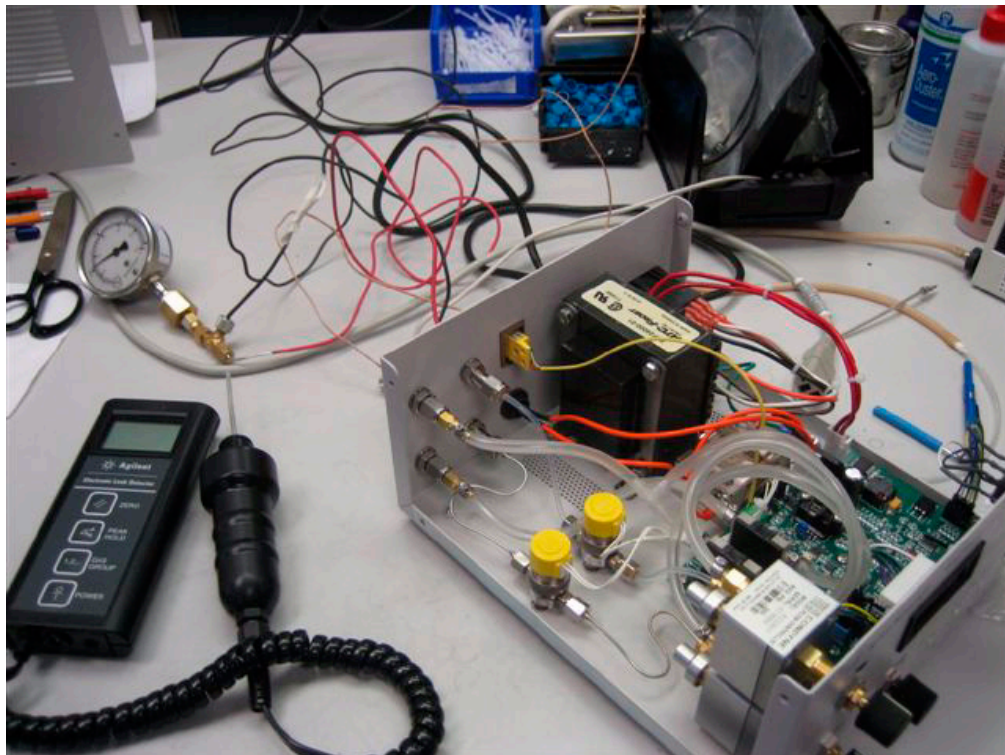
## Setup

**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

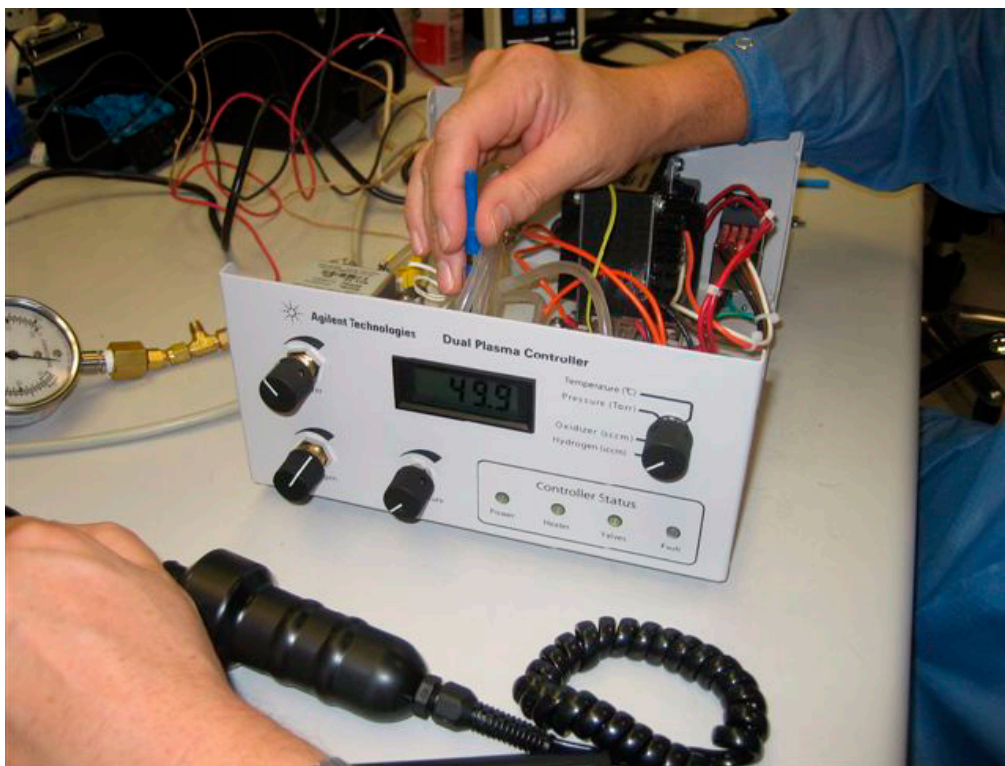
- 1 Supply 25 psig pressure to the air line (gas pressure should be going to the inlet and the outlet should be plugged).
- 2 Once 25 psig is verified on the manometer, switch the air gas supply off. Record pressure reading and note the time.
- 3 Set temperature set point to 800°C. (Verify switch on 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  $150 \pm 2$  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  $50.0 \pm 0.2$  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  $100 \pm 2$  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  $50 \pm 0.2$  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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