

Technical Service Bulletin 030608

Calibration of IOX / DCX Grid Voltage and Current Meters

The grid current meter measures the current intercepted or emitted by the IOT grid electrode. Positive grid current typically indicates that the IOT grid is intercepting beam current because it is being overdriven (grid is swinging positive) or has suffered an internal mechanical deformation (end of life IOT). Negative grid current typically indicates that the IOT is emitting electrons because it has become contaminated with emissive material boiled off of the cathode. This is a sign of excessive filament voltage.

The correct calibration of the grid voltage meter is essential for monitoring the bias operating point of the IOT (idle current level).

Procedure 030608: Calibration of IOX / DCX Grid Voltage and Current Meters	
Applicability	All IOX and DCX transmitters.
Prerequisites	None.
Equipment Required	Multimeter, 1000 ohm 10W dummy load.
Comments	The correct calibration of the grid voltage meter is essential for monitoring the bias operating point of the IOT (idle current level).

1. Press **HPA START MODE** button on HPA control panel to extinguish high voltage.
2. Allow high voltage to fall completely to zero.
3. Gain access to high voltage compartment via key interlock system.
4. Discharge all high voltage circuits with grounding hook.
5. Remove cover to gain access to IOT filament terminal connections in IOT junction box.
6. Measure voltage appearing across grid and cathode leads to IOT, either at IOT junction box or at output of filament / bias / ion supply.

WARNING: There is 3kV present on ion pump lead (when installed). Be careful to not inadvertently touch the ion pump lead while performing this measurement.

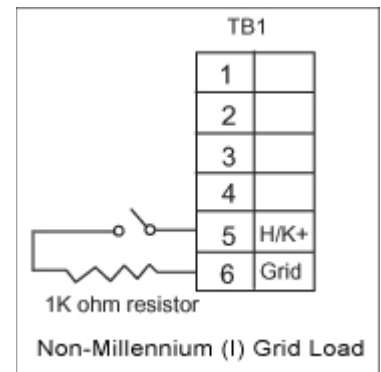
7. Calibrate grid voltage meter, as necessary, by issuing following commands via HPA control panel: **Information Access > System Operations > HPA Maintenance > Password = 5555 > Meter Calibrations > Filament, Bias, Ion > Grid > Voltage.**
8. Use **Up** and **Down** menu options to adjust displayed meter readings until correct value is obtained. Press **Save** to save calibration and return to previous menu.
9. Select (bias) **Current** option on HPA control panel to begin grid current calibration routine.

10. HPA controller asks that the grid bias level be adjusted to 100V. Select **I've done that** to skip this step.

NOTE: The built-in grid current calibration routine requests that the grid bias voltage be set to -100V and that a 1000 ohm dummy load be used for calibration. This is requested so that the meter may read a perfect -100mA during the final calibration step. It is not absolutely necessary to change the bias voltage to 100V if one simply uses the Ohm's Law relation $I = V / R$ to calculate what the expected current would be given the nominal grid bias voltage level. For example: for a nominal grid bias voltage level of 88 volts, the 1000 ohm load will cause an 88 mA current to flow. This procedure uses such an approach.

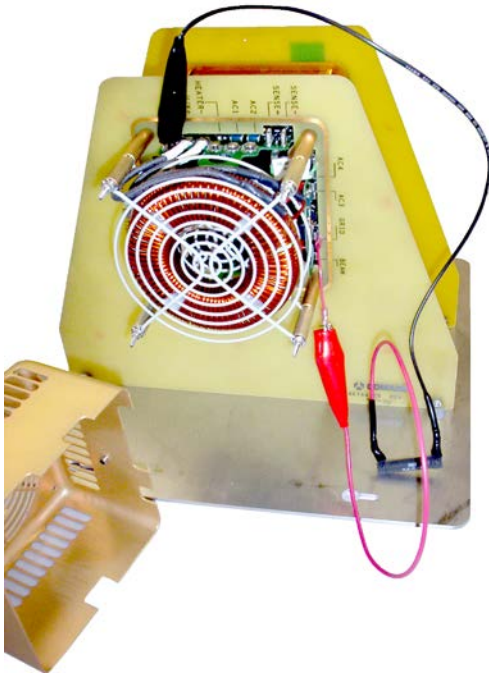
11. Verify that display grid voltage reading is calibrated and select **Save** to pass to next step in built-in routine.
12. Verify that the grid bias supply is unloaded and select **No load present** to zero the grid current meter.
13. When prompted to install a 1000 ohm 10W resistor, press **STOP MODE** button on HPA control panel to extinguish grid bias supply.
14. Discharge IOT filament, bias, and ion terminals with transmitter grounding hook.
15. Attach 1000Ω (5W minimum) resistor load across "H/K+" and "GRID" terminals on FBI supply. Do not leave HK+ lead to IOT disconnected. It may be necessary to fabricate a spade-lug Y adapter to allow the 1000Ω load and HK+ leads to be simultaneously connected to the HK+ terminal on the FBI supply.

CAUTION: The filament portion of the FBI supply must be properly loaded at all times. Do not operate the FBI supply with the HK+ lead removed as this will break the filament circuit and possibly damage the filament supply.



CAUTION: On Millennium FBI supplies, ensure that "H/K+" and the IOT Heater Lead do not come in contact with each other when toaster is on. This would cause a catastrophic toaster failure.

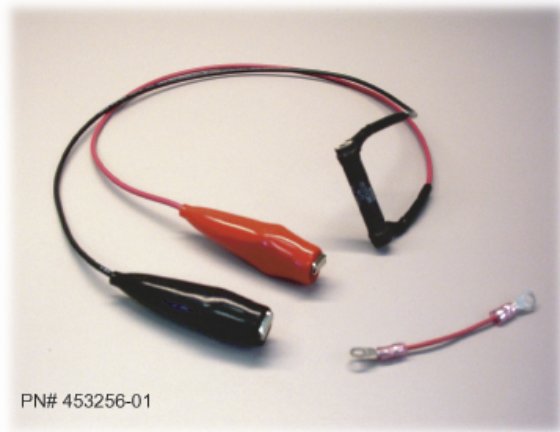




Load across Millennium Toaster

NOTE: Ready-made grid dummy load assemblies are available from Comark. Request part number 453256-01.

Tiny O-lug jumper cable is included for millennium bias supplies. O-lugs are smaller than bias output lug-sleeve, so as to not stretch sleeve and cause intermittent connection when regular bias lead is reconnected. However, this may require some mechanical deformation of jumper O-lug to allow for a reasonably tight connection to older (stretched out) output lug-sleeves.



PN# 453256-01

16. Press **HPA START MODE** button on HPA control panel to activate grid bias supply.
17. Select **Load installed** to access grid current calibration menu.
18. Use **Up** and **Down** menu options to adjust displayed meter readings until correct value is obtained, as calculated in previous step. Press **Save** to save calibration and return to previous menu.
19. Press **STOP MODE** button on HPA control panel to extinguish grid bias supply.
20. Discharge IOT filament, bias, and ion terminals with transmitter grounding hook.
21. Remove 1000 ohm dummy load and restore equipment to original condition.
22. HPA Start, Press **Load removed**
23. Select **Previous Screen** option five times to return to top-level **Information Access** menu.

WARNING: The dummy load may be HOT. Allow dummy load to cool before attempting to remove it.

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