Baseline Test Data for OMC In-vacuum DCPDs
R. Abbott, Caltech
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For Hardware Version: D060572-B2

1. **Overview**

An analysis is performed on the DCPDs to compare them to the baseline results obtained from the prototype units manufactured for the eLIGO LLO OMC.

A full visual inspection is performed on the interior of each unit prior to welding shut

2. **DC Measurements**:
   2.1. DC Characteristics, quiescent current draw, no light.
      2.1.1. + 15 volt supply current is 30mA, +/- 5mA
      2.1.2. - 15 volt supply current is -30mA, +/- 5mA
   2.2. Output DC Offsets
      2.2.1. The DC offset voltages were measured differentially at the output of the pre-amplifier using a Fluke DC voltmeter

Table 1 (Output Offset Data)

DCPD Serial Number	Specified DC Offset	Measured DC Offset
S1400357	+/- 200uV	0.1 mVDC

   2.3. PD Bias line transient voltage suppressor (TVS) breakdown voltage corresponding to 1mA TVS current must be measured for each unit. This revision of the design has a higher breakdown voltage TVS (18V vs. 12V on the original revision). This was done to permit higher DCPD biases to allow higher photocurrents.
      2.3.1. Voltage for **1mA** TVS current conducting through D6 is **20V** +1VDC, -0VDC for all three units.

Specified D6, 1mA conduction Voltage		Measured D6, 1mA conduction Voltage
20VDC +1VDC, -0VDC	20.8 VDC	1 mA

   2.4. Measure the functionality of the transimpedance selection relay, and check that the input impedance indeed is 100 ohms and 400 ohms.

   • Relay functional check OK [pass]

3. **Transfer Function and Noise**:
   3.1. Verify the transfer function and noise spectra are identical to the baseline data posted on the Advance LIGO wiki (+/-0.1dB for the transfer function, and +/- 1dB for the noise).
   3.2. Use an oscilloscope to check each unit for high frequency oscillations, and none were observed.
   3.3. Measured the bias line input to DCPD differential output transfer function to be in agreement with the baseline data.

   • Transfer Function OK [pass]

   • Noise OK [pass]

   • No observed oscillation [pass]

   • Bias transfer function OK [pass]