



12-013

29, October, 2012

## TROUBLESHOOTING A DARK CAL / SHUTTER WARNING IN AN SOX ANALYZER

### **I. PURPOSE:**

The purpose of this note is to describe the steps to perform and correct the “**DARK CAL / SHUTTER**” warning message in an SOX analyzer.

### **II. TOOLS:**

1. Flat Head screw driver
2. Cross Head screw driver
3. ¼ inch wrench

### **III. PARTS:**

N/A

### **IV. PROCEDURE:**

1. Input zero air to the analyzer. Press **SETUP, MORE, DIAG, 929 ENTER**; the display should read **SIGNAL I/O**. Press **ENTER**. Press **NEXT** until you see **PMT\_SIGNAL** or something very similar, and observe / record the MV reading.
2. Press **NEXT** until you see **DARK SHUTTER** or something very similar, and press **ON / ENABLE**. This should actuate the Shutter Assembly (figure 1). Verify that the shutter arm moves to the closed /down position, if it does not then try cycling it on and off 5 times. If it still does not move from one position to the other, then replace the shutter assembly. If the shutter arm does move to the closed /down position then proceed to step 3.
3. Press next until you see **UV LAMP\_SIGNAL** and observe the **MV** reading. If the **MV** reading does not go below **100MV**, then manually press the shutter arm down with your finger and hold. If the **MV** reading does go below **100MV** then replace the shutter assembly. If the **MV** reading still does not go below **100MV** then scroll to **DARK SHUTTER**, press **OFF / DISABLE** and proceed to step 4.
4. Make the room as dark as possible, put the lid on the analyzer, cover it with a blanket or a jacket, turn off the lights in the room. Observe the **PMT\_SIGNAL**, if the **MV** reading does not go below **100MV**, proceed to step 5. If the **MV** reading does go below **100MV**, then you have a light leak. To locate the light leak, check all of the black pneumatic lines to the Reaction Cell for cuts or openings. Check all of your pneumatics to the reaction cell for loose or defective fittings. Verify that the Reaction Cell is assembled correctly. If you are having trouble finding the light leak, shine a small flashlight along the Reaction Cell pneumatics, and along the points where the Reaction Cell parts connect. Observe the **PMT\_SIGNAL**, when the **MV** reading fluctuates, the place that you are shining the light is where the light leak is located. Make the required repair. If this does not fix the **DARK CAL / SHUTTER** error, go to step 5.

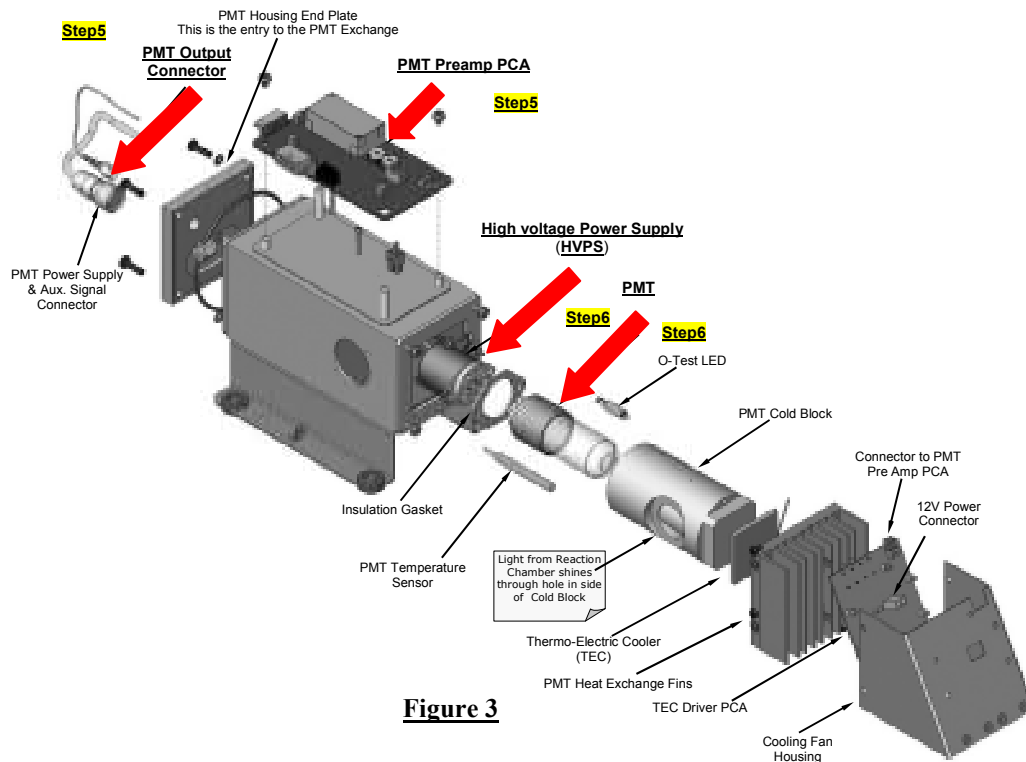
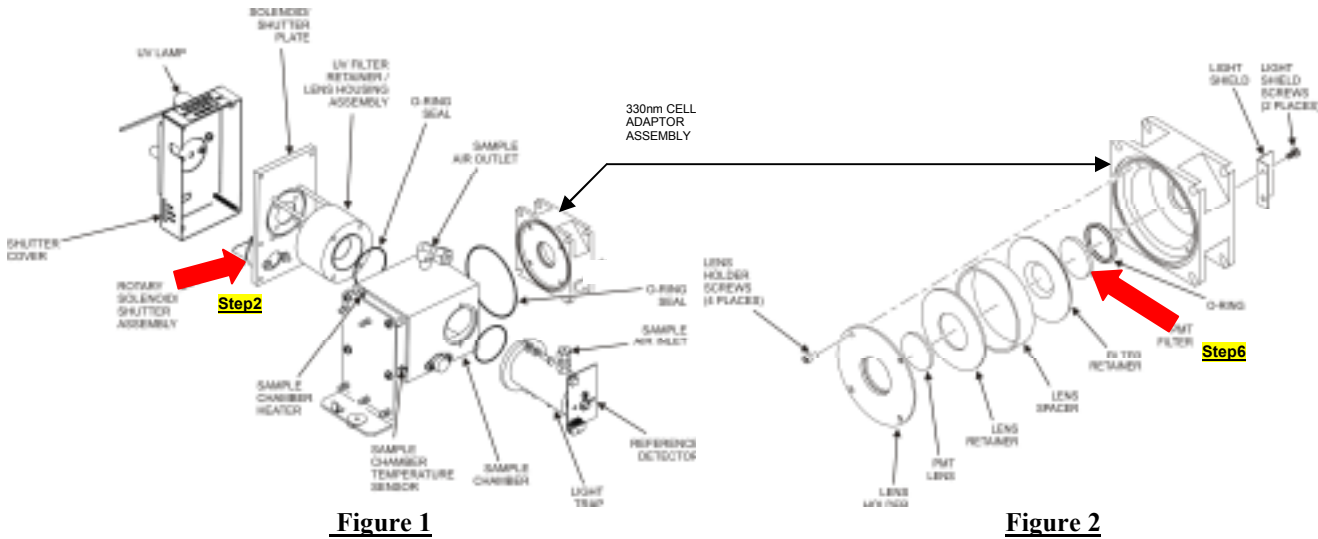
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5. Unscrew the PMT Output Connector/Coax cable from the PMT housing (Figure 3). Observe the **PMT\_SIGNAL**; if the **MV** reading does not go below **100MV** then replace the **PMT PRE-AMP** board. If the **MV** reading goes below **100MV** proceed to step 6.
6. Your **DARK CAL** warning is caused by one of three things; a noisy/bad **PMT** (Figure 3), an unstable **HVPS** (Figure 3), or a badly degraded **330nm (blue)/360nm (purple) PMT Filter** located in the cell adaptor assembly (Figure 2). Replace one of these three parts, one at a time until the **PMT\_SIGNAL MV** reading goes below **100MV**, and the **DARK CAL / SHUTTER** error clears.



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