



**TELEDYNE
INSTRUMENTS**

Advanced Pollution Instrumentation

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Service Note

95-025 Rev B
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M700 WITH PHOTOMETER

M700 DARK OFFSET CALIBRATION

In the M700 with photometer, the UV detector preamp was designed with a 125 ± 50 mVDC offset in the circuit in order to prevent the V/F card from ever seeing a negative voltage. This offset is read by the analyzer and subtracted from every PHOTO REFERENCE and PHOTO MEASURE reading taken.

The number of millivolts per unit of concentration is determined by taking a PHOTO REFERENCE reading and subtracting the DARK offset from it. The difference between the two is then divided by the full scale of the M700 bench to yield a number of mV per unit of concentration. If the dark offset has been incorrectly calibrated and is very near the PHOTO REFERENCE value, the number of mV between the PHOTO REFERENCE and the DARK becomes very small. The mV/unit now becomes microvolts/ unit and differences of microvolts between PHOTO REFERENCE and PHOTO MEASURE become large concentrations. This causes normal lamp flicker to be seen by the M700 as huge swings in the concentration. In fact it is not uncommon, in these circumstances, to see a reading of -MAX or +MAX for concentration.

The M700 with photometer and present software cannot turn the bench lamp power supply off during a dark calibration. As a result, the dark offset will read the current PHOTO REFERENCE value rather than the dark offset voltage during a DARK CAL operation. The calibrator O3 functions will no longer perform properly.

To properly calibrate the dark offset, you must unplug the bench lamp from the power supply, (disconnect J2 on the lamp driver supply), and then perform the DARK CAL function in the photometer menu. When performed correctly, the DARK CAL value that is returned should be $125\text{mV} \pm 25\text{mV}$.

The DARK CAL procedure that follows is the correct one for the M700 with photometer. It should be performed on initial setup. After the initial setup the DARK CAL procedure should be done when the lamp has been replaced, and or a new detector.

During normal operation the PHOTO REFERENCE voltage will decrease as the lamp ages. When this voltage has dropped below 3000mVDC it should be adjusted up using R7 on the UV detector preamp to a value of 4500 ± 100 mVDC (loosening the thumbscrew and rotating the lamp may be necessary to achieve 4500 mV). After this adjustment has been made the DARK CAL procedure should be performed. The calibrator will give you several months or more of trouble free operation before needing another adjustment of the PHOTO REFERENCE.

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To perform the DARK CAL, first unplug the lamp from J2 of the Lamp Driver Supply. Press SETUP-MISC-DARK-CAL and enter the password. Press ENTR and you will see a number starting with 0% and going to 100% at which time the new dark offset will be displayed. You can also display the dark offset value by pressing SETUP-MISC-DARK-EDIT. The number displayed should always be $125 \pm 50\text{mVDC}$. If you see a number higher than 175mVDC there is a problem and you should consult the factory for assistance.

Once the correct number is displayed for dark offset, plug the bench lamp back into J2 of the lamp driver supply and you can resume normal operation.