TELEDYNE
INSTRUMENTS
Advanced Pollution Instrumentation
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Service Note

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MODEL 300 MIRROR CLEANING PROCEDURE

I. PURPOSE:

The optical bench has been designed to require little or no service or adjustment. In particular, the analyzer should function properly for long periods without the need for cleaning or other service to the optical elements. If, however, it is suspected that the optical bench has been contaminated, the optical elements can be cleaned as follows.

II. TOOLS:

I. #2 Phillips screwdriver
7/16" & 9/16" wrenches
Diagonal cutters
Oscilloscope
Service note "maximizing M300 energy"

III. PARTS:

II. Lint free tissue
Acetone or other residue-free lens cleaning liquid.
Small tie wraps

III. PROCEDURE:

Accessing all of the mirrors can be most easily accomplished by removing the optical bench:

1. Turn off the analyzer and unplug from power outlet.
2. Disconnect all electrical and pneumatic connections to the optical bench.
3. Remove the four screws that hold the optical bench to its shock mounts and remove the optical bench from the analyzer.
4. Remove the objective mirror (the end of the bench that is closest to the front of the analyzer) by removing the mounting screws, taking care to retain the three .010" shims (between the mirror and the bench).
5. Remove the field mirror (the end of the bench that is closest to the synchronous motor and IR source) using the same procedure as the objective mirror.
6. Remove the input mirror (the round knob at the top rear of the optical bench) by removing the two small screws that go through the mirror.
7. Remove the output mirror (the round knob on the rear side of the optical bench on the outside of the bench) by removing the two small screws.
8. Follow steps 9 through 12 for each mirror to be cleaned.
9. Blow off particulates using filtered air or dry nitrogen. Keep pressure to a minimum. If the pressure is too high, "sandblasting" action will occur and damage to the mirror might be beyond usability.
10. Wet white Kleenex brand tissue with acetone. Kleenex must be white. Colored tissues contain particulates!
11. Using minimal pressure (weight of tissue), slowly drag tissue across the optical surface. This action must be done slow enough so that the evaporation line of the acetone does not exceed 1/8" from the trailing edge of the tissue.

12. If contamination on the surface is of a water base, it will be necessary to complete step 11 replacing acetone with Windex brand glass cleaner. If the Windex leaves behind a residue, repeat using the acetone.
13. Re-assemble the optical bench by replacing the mirrors in the reverse of the removal process. When tightening the screws on the objective and field mirrors ensure that the o-rings are in the groove in the mirror and that they are not pinched when tightening the mounting screws. Tighten the screws evenly and securely.

NOTE: WHEN INSTALLING THE FIELD AND OBJECTIVE MIRRORS IT IS VITAL THAT THE SHIMS BE PLACED BETWEEN THE MIRROR AND THE BENCH. THEY ARE NOT WASHERS THAT GO BETWEEN THE SCREW AND THE MIRROR.

14. Re-install the optical bench into the analyzer and reconnect all electrical and pneumatic lines.
15. Turn the analyzer on and allow it to warm up for 30 minutes.
16. If you have an oscilloscope follow the procedure “MAXIMISING M300 ENERGY”, if you do not, then go to the next step.
17. Loosen (but do not remove the screws for both the input and output mirrors. Display the CO MEAS test function on the instruments front panel. Fine adjust the position of the input and output mirrors by slightly rotating them until you achieve a maximum CO MEAS value.
18. Follow the quick calibration procedure for this analyzer.