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INSTRUMENTS
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Service Note

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HOW TO CHANGE A M400A W/NO OPTIONS TO A PHOTOMETER

I. PURPOSE:

The purpose of this service note is to instruct the user on how to convert an M400A analyzer with no options into a photometer, which has a pressurized Reference air for the Meas/Ref valve. The intent of this is so that one can use the zero air from the M401 as both the reference for the photometer & for the M401.

II. TOOLS:

7/16 Open-end Wrench
9/16 Open-end Wrench
Adjustable Wrench

III. PARTS:

KIT000157

IV. PROCEDURE:

1. Remove power from the instrument.
2. Remove the top cover assembly.
3. Refer to FIGURE 1 for the next few steps.
4. Disconnect the 1/8" tubing at the MEAS/REF valve from the NO port of the valve and remove the nut and ferrule from the tubing. The nut and ferrule will be used to attach the new tubing to the valve.
5. Disconnect the 1/8" tubing from the sample filter going to the Teflon tee at the center of the Teflon tee. Remove the nut and ferrule from the tubing.
6. Take the tubing mentioned in step 5 and install it into the NO port of the MEAS/REF valve. Use the nut and ferrule that were removed in step 4 to fasten the tubing to the valve.
7. Disconnect the 1/8" tubing from the NC port of the MEAS/REF valve. Remove the nut and ferrule from the tubing. They will be used to connect the new tubing to the valve.
8. Using diagonal cutters cut the two tie wraps that hold the Teflon tee to the MEAS/REF bracket.
9. Once the tie wraps have been cut remove the scrubber and Teflon tee all at the same time. NOTE: Save these parts in case you would like to return the instrument back to its previous configuration.
10. For the next few steps refer to FIGURE 2.
11. Take the KIT000xxx and remove the parts. Locate the assembly that contains several fittings in a straight line.
12. Take the assembly mentioned in step 11 and install the side with the ¼" fitting in to the rear panel through the Dry Air inlet port. This assembly is installed from the inside of the instrument.
13. Take the assembly that contains the flowmeter w/ needle valve and connect it to the Dry Air inlet port from the outside of the instrument.
14. Ensure all of the fittings are tightened.

15. Cut a 3' long piece of the ¼" tubing contained in the kit and attach it to the brass tee using the nuts and ferrules provided in the kit. This is the vent line, which must be vented to atmosphere to keep the instrument from pressurizing.
16. Take the 1/8" tubing and connect it to the 1/8" connector that was installed in step 12.
17. Take the other end of the tubing and install it to the NC port of the MEAS/REF valve. Use the nut and ferrule mentioned in step 7. The length of this tubing should equal the length of the tubing from the COM port of the MEAS/REF valve to the sample filter plus the length of the tubing from the sample filter to the Sample inlet port on the rear panel of the instrument. Add about 6" to the measured value and then cut the tubing to that length. Use a Service Loop if necessary to fit all of the tubing inside the instrument. Refer to the note below and FIGURE 3.
18. Take the remaining ¼" tubing and attach it to the bottom elbow of the Flowmeter w/ needle valve. This tube will be connected to the M401 at the tee on top of the Zero Air scrubber.
19. Once the M400A has been converted to the photometer, connect the M401 reference air to the connection on the Photometer input & turn on the M401. You should have about 30 psig to this connection. Now throttle this valve so that you have approximately 1.5 to 2 LPM of flow going though the flow meter on the back of the M401. Monitor the sample pressure via the front panel. The pressure should not drop more than .1"hg when the valve switches. If you cannot tell if the valve is switching put your finger on the valve, you might be able to feel it switch. Caution, the valve is likely to be warm to the touch. If the pressure drop is greater than .1"HG than cut the tubing mentioned in step 17 in 1 inch increments until the pressure drop is less than .1"HG when the MEAS/REF valve switches. **CAUTION DO NOT OVER CUT.** If too much of the tubing is cut off this will increase the pressure drastically.
20. Once the pressure is within specifications. Connect the M400A (Photometer) from the Sample inlet port to the M401 via one of the IZS vent ports.
21. Generate SPAN gas from the M401, SPAN the M400A by pressing SPAN and then ENTR.
22. Generate ZERO from the M401, Zero the M400A by pressing ZERO and then ENTR.
23. The instrument is now ready for use.

NOTE: **The length of the tubing connected to the NC port of the MEAS/REF valve must equal the length of the tubing going to the sample filter plus the tubing from the sample filter to the rear panel Sample inlet port. REF Tubing Length = Length of tube from COM port of MEAS/REF valve to Sample Filter + Length of tubing from Sample filter to Sample inlet port on the rear panel + 6" of allowance**.

FIGURE 1.

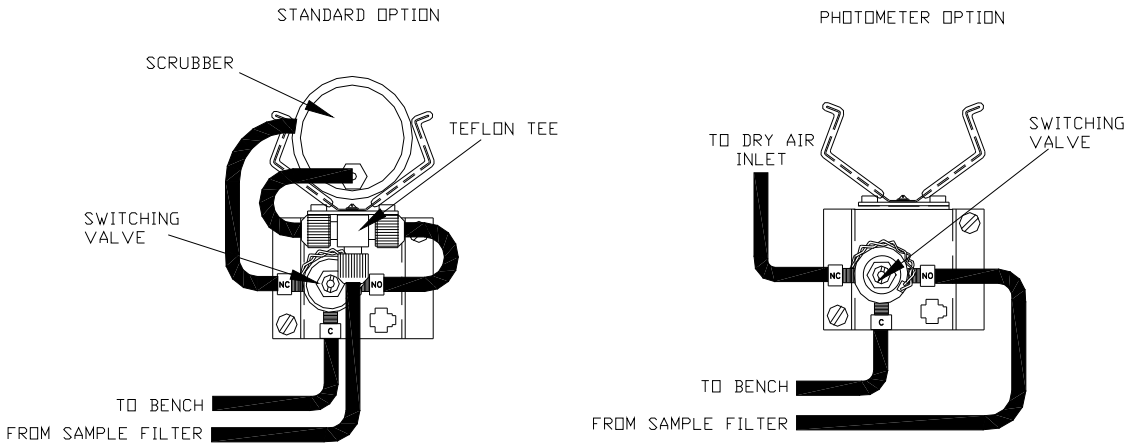

FIGURE 2.

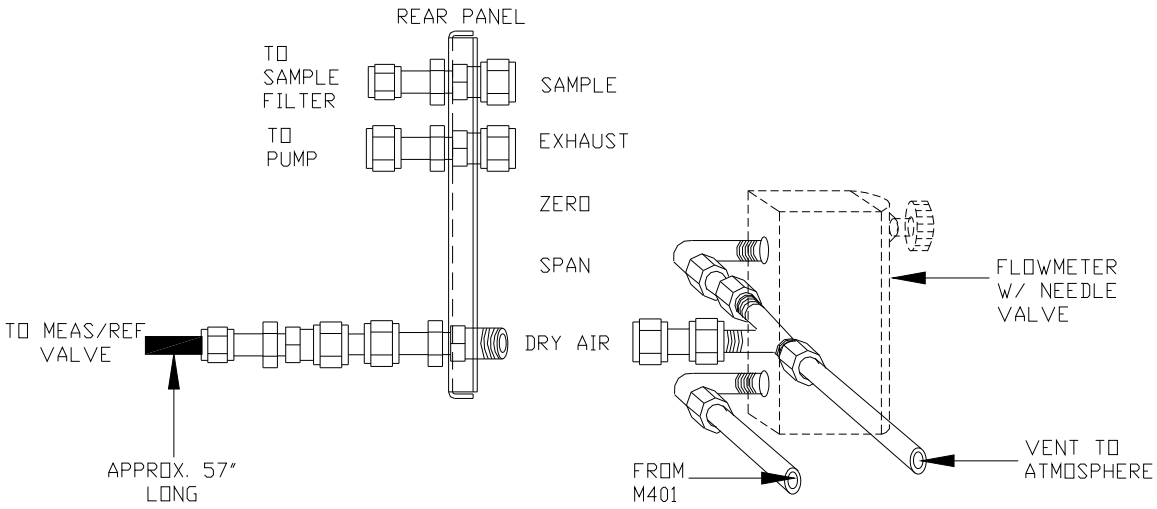

FIGURE 3