

VAPOR ADSORPTION OPTION

M I C R O M E R I T I C S



INSTALLATION INSTRUCTIONS

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(Rev A)

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ABOUT THIS MANUAL

The following formats may be used in this manual.



NOTE - Notes contain important information pertinent to the subject matter.



CAUTION - Cautions contain information to help prevent actions that may damage the analyzer or components.



WARNING - Warnings contain information to help prevent actions that may cause personal injury.

Field Labels and Screen Titles

Labels and Buttons	Description
Buttons (in the application)	Buttons in the application are represented as bold font and blue letters — such as: Save , Edit , and Replace All .
<i>Field Labels</i>	Field Labels are represented as italicized words — such as: <i>Sample</i> , <i>Automatically Collected</i> , and <i>Analysis Conditions</i> .
Keyboard Commands	Keyboard commands are represented as bold font and black letters — such as: F2 and Alt+F4 .
Menu Instructions	Menu instructions are represented as bold and italicized words — such as: File > New Sample and Reports > Start Report .
<i>Screen Tabs</i>	Screen Tabs are represented as italicized words — such as: <i>Sample Description</i> , <i>Analysis Conditions</i> , and <i>Report Options</i> .
<i>Screen Titles</i>	Screen Titles are represented as italicized words — such as: <i>Analysis Adsorptive Properties</i> , <i>Free Space</i> , and <i>Sample Tube</i> .

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ABOUT THE VAPOR ADSORPTION OPTION



This document contains instructions for installing the Vapor Adsorption Option on the ASAP 2020 and ASAP 2020 Plus analyzers. For operating instructions on the ASAP 2020 Plus, refer to the ASAP 2020 Plus Operator Manual (part number 202-42800-01). For operating instructions on the ASAP 2020, refer to the document Vapor Adsorption Option User Guide (part number 202-42854-01).



Water Vapor Controller



Temperature Controller

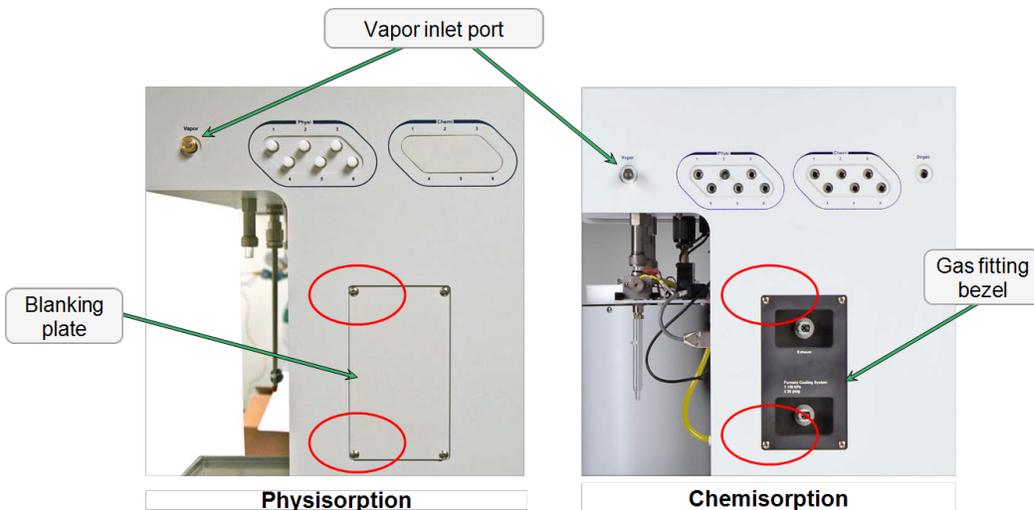
The Vapor Adsorption Option enables the use of vapors as the adsorbent for physical adsorption analyses when the sample is near or above room temperature. The analysis system is heated to approximately 45 °C and the vapor source to approximately 40 °C, which allows analyses at or below 35 °C.

The Vapor Adsorption Option consists of:

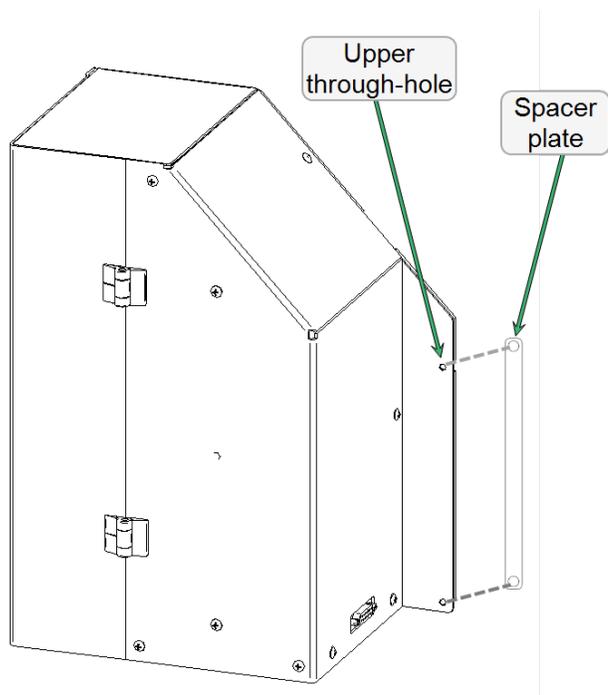
- a heated manifold installed inside the upper cabinet
- a vapor source enclosure installed on the right exterior side of the analyzer at the vapor port
- a temperature controller

VAPOR SOURCE ENCLOSURE

The vapor source enclosure is installed on the right side of the analyzer.



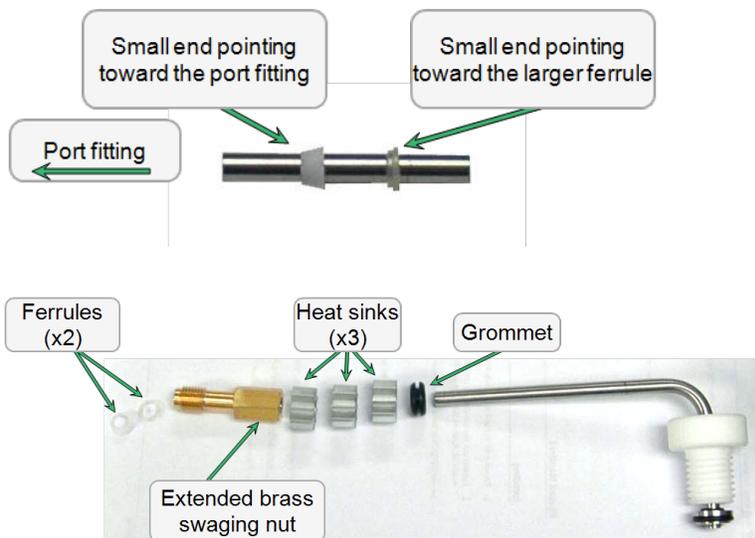
1. Backfill the vapor inlet port (valve 8 on the instrument schematic) to slightly above atmospheric pressure, then close the valve.
2. Power off the analyzer.
3. Inside the vapor source enclosure, remove the two nuts securing the grommet bracket (an L-bracket with a keyhole and notch). Put the bracket and nuts aside. This bracket will be reinstalled in step 14.
4. On the right exterior side panel of the analyzer, remove the inlet plug and two ferrules from the *Vapor* inlet port. Ensure that two ferrules are removed. If only one ferrule is removed, the second one may be lodged inside in the *Vapor* inlet port and must also be removed. The two ferrules may also be pressed together to appear as one unit. These ferrules cannot be reused.
5. Remove the two screws on the left side of the blanking plate (for physisorption) or the gas fitting bezel (for chemisorption) to expose the screw holes. Put the two screws aside or discard.
6. Place one 8-32 \times 5/8 retaining screw into the upper through-hole of the vapor source enclosure.



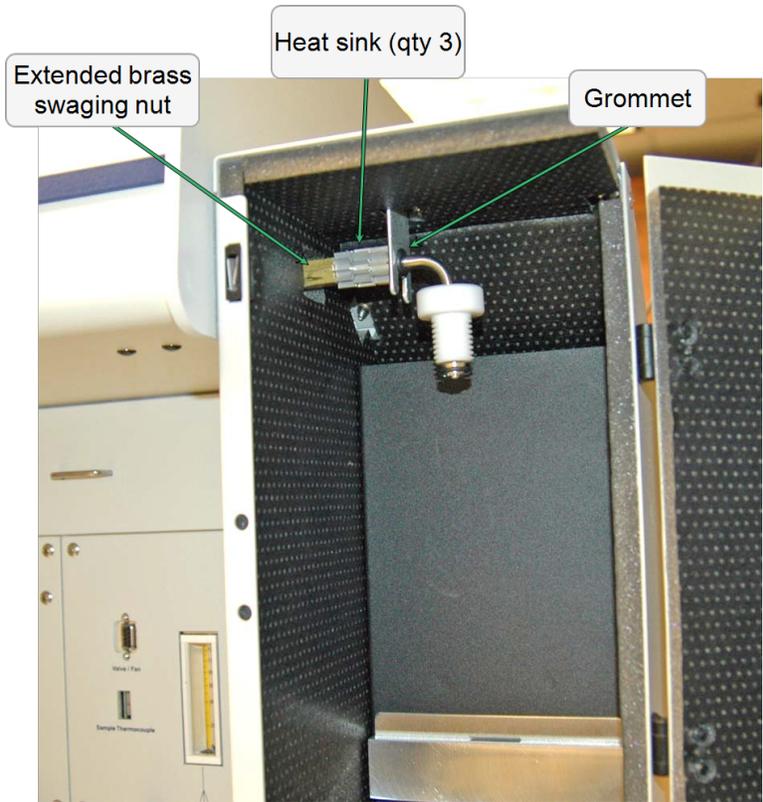
7. Place one spacer plate for a physisorption analyzer or two spacer plates for a chemisorption analyzer onto the retaining screw.
8. Position the vapor source enclosure to align the retaining screw with the top screw hole in the right exterior side of the analyzer. Loosely secure the retaining screw.
9. Align the screw hole in the bottom of the spacer plate(s) between the screw hole in the side of the analyzer and the side of the vapor source enclosure.
10. Insert an 8-32 \times 5/8 retaining screw through the vapor source enclosure, the spacer plate(s), and the analyzer. Tighten both retaining screws.
11. Position the black vapor clamp block to the right side of the analyzer so that it clamps onto the edge of the analyzer. Secure the bracket to the vapor source enclosure with two 10-32 \times 3/4 screws included in the kit.



12. Assemble the vapor tube components. Ensure the ferrules are properly oriented.



13. Insert the assembled vapor tube through the vapor connector on the upper left side of the vapor source enclosure. Loosely secure the connector.
14. Reinstall the grommet bracket that was removed in step 3. Carefully maneuver the vapor tube assembly so that the bracket seats into the groove of the grommet.
15. Insert the two 6-32 bracket nuts and tighten, then tighten the extended brass swaging nut on the vapor tube assembly.



HEATED MANIFOLD



If the Vapor Adsorption Option was ordered at the same time as the analyzer, the heated manifold was factory installed and this section can be skipped.

1. Remove the top and upper rear panel of the analyzer.
2. Remove the two retaining screws from the cover enclosing the analysis manifold. Put the screws aside for the installation of the heated cover.
3. Remove and discard the analysis manifold cover.
4. The heated cover of the Vapor Adsorption Option will not fit with existing gas inlet evacuation tube. Remove the existing physisorption tube (and chemisorption tube, if installed) and replace it with the one included in the accessories kit. If the chemisorption option is installed, replace that tube also.



Physisorption
evacuation tube

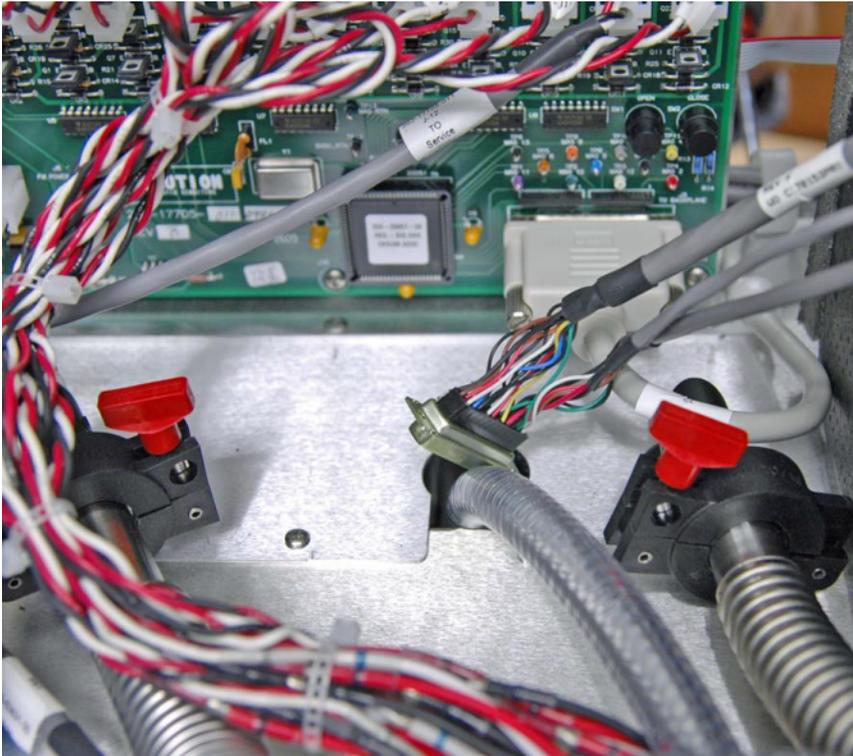
Chemisorption
evacuation tube

5. Install the insulation foam on the water vapor tube. The insulation may need to be trimmed slightly to fit the manifold cover.

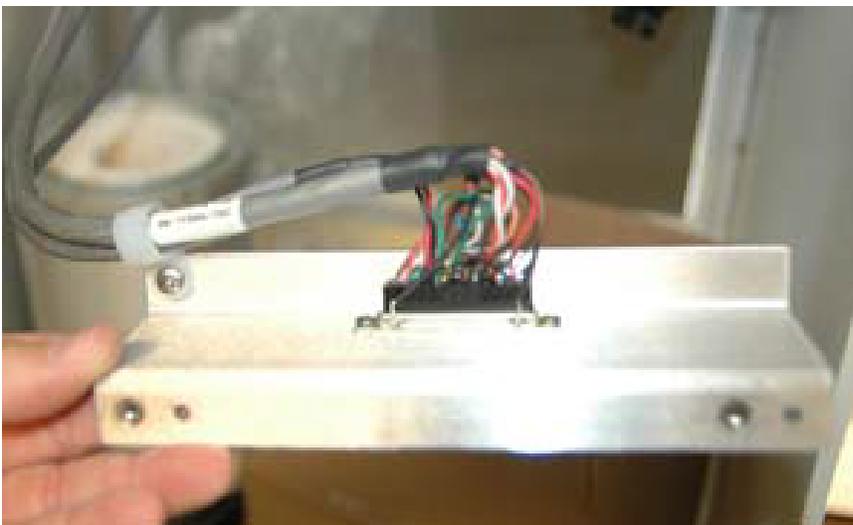


6. Place the heated manifold cover over the analysis manifold and secure with the two screws removed in step 2.

7. Route the wiring through the top panel then through the high-vacuum pump area. Removal of the back cover of the high-vacuum pump area may make this process easier.



8. Attach the wiring harness to the bracket with two 4-40 × 3/16 screws included in the accessories kit.
9. Secure a cable clamp in the threaded hole on the lower part of the bracket with a 6-32 × 8 screw.



10. When facing the back of the instrument, install the bracket on the degas side (the right side) of the analyzer. The upper part of the bracket contains two threaded and two unthreaded mounting holes.

If you...	Then...
do not have a high-vacuum pump installed	<ol style="list-style-type: none"> 1. Align the two threaded holes with the ones on the analyzer. 2. Insert two 6-32 × 1/4 screws through the analyzer into the bracket. Tighten with a screwdriver.
have a high-vacuum pump installed	<ol style="list-style-type: none"> 1. Remove the two retaining screws for the high-vacuum pump. 2. Align the two unthreaded holes of the bracket with the through holes on the analyzer. 3. Insert the screws up through the bracket into the analyzer; tighten with a screwdriver.

Self-adhesive cable mounts are included in the accessories kit. If needed, place them on the inside of the cabinetry to secure the cable.

11. Replace the rear panel and the instrument cover.

TEMPERATURE CONTROLLER FUSES

Power Source	Required Fuses
100-120 VAC	Use one 5 Amp, slow-blow
200-240 VAC	Use two 3.15 Amp, 5 × 20 mm, slow-blow



The fuses used in the temperature controller must be identical in type and rating to those specified. Use of other fuses could result in electrical shock and / or damage to the unit.

1. Remove the cover of the power entrance module.
2. Insert the appropriate fuse(s) into the power entrance on the rear panel of the temperature controller.
3. Set the appropriate voltage on the voltage card.
4. Replace the cover of the power entrance module.

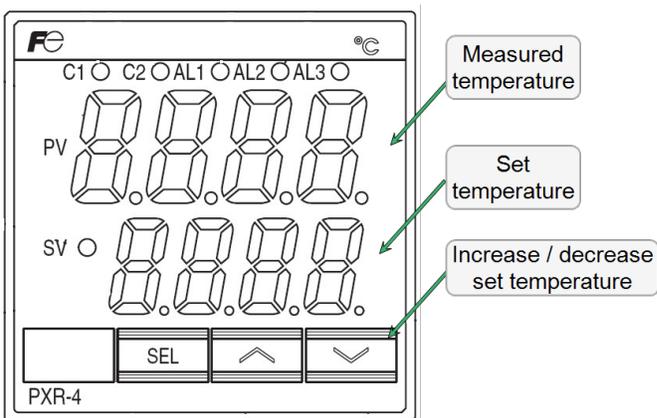
CABLES

The accessories kit contains a 15-pin cable and a 25-pin cable.

1. Connect one end of the 15-pin cable to the connector on the rear panel of the temperature controller and the other end to the connector on the back of the vapor source enclosure.
2. Connect one end of the 25-pin cable to the connector on the rear panel of the temperature controller and the other end to the manifold wiring connector.
3. Connect the power cord to the temperature controller and plug into an appropriate power source.
4. Power on the temperature controller and the analyzer.
5. Start the analyzer application.

TEMPERATURE CONTROLLER SETTING

The front panel of the Temperature Controller has two displays, one for the vapor source enclosure and one for the manifold.



Use the **Up** and / or **Down** arrows to set the temperature as follows:

- Vapor source** 40 °C
- Heated manifold** 57 °C (usually attains a 45 to 47 °C range)

The vapor source will attain its set temperature within minutes. The heated manifold will take up to 24 hours to attain its set temperature.

The manifold temperature reading on the instrument schematic will differ because the controller gives the temperature of the air under the manifold cover and the schematic reading is from a sensor in the manifold block. If the schematic reading is not between 45 °C and 47 °C, use the **Up** and **Down** arrow keys to adjust the temperature. Adjust a few degrees at a time, allowing stabilization between adjustments. Stabilization after temperature adjustment may take three to four hours.

TRANSUCERS AND SYSTEM VOLUME CALIBRATION

After the manifold temperature has stabilized between 45 °C and 46 °C, transducers and system volume will require recalibrating. Follow the calibration instructions in the Service Appendix of the ASAP 2020 Product Calibration Procedure (part number 202-34000-76).

SAMPLE PORT INSULATOR



Ensure calibrations have been completed prior to installing the sample port insulator.



1. Remove the sample port connector nut.
2. Slide the foam sample port insulator onto the port.
3. Replace the nut and tighten.

VAPOR SOURCE PREPARATION



Clean glassware and high-purity liquids should be used for the vapor source. It is very important to use high purity, properly degassed liquids as vapor sources.

CLEAN THE VAPOR TUBE

1. Preheat a drying oven to 110 °C.
2. Check the ultrasonic cleaning unit bowl to ensure it is clean.
3. Use five grams of Alconox (or other suitable laboratory detergent) per 500 ml of warm water and fill the reservoir of the ultrasonic unit with enough water to cover the vapor tube. Ensure the detergent is dissolved before placing the vapor tube into the water. If too much detergent is used, it may be difficult to rinse from the tube.
4. Fill the vapor tube with warm water and place it in the ultrasonic cleaning unit. Turn on the ultrasonic cleaning unit for approximately 15 minutes.
5. Wear latex gloves to remove the vapor tube from the reservoir.
6. Clean the interior of the tube with a sample tube brush.
7. Rinse the vapor tube with hot water, then with isopropyl alcohol.



If isopropyl alcohol is not available, deionized water may be used to rinse the tube.

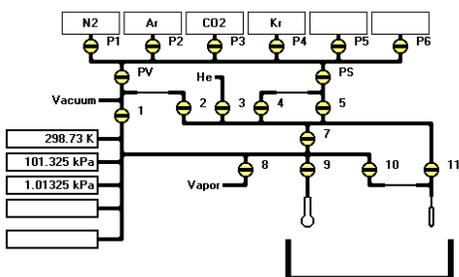
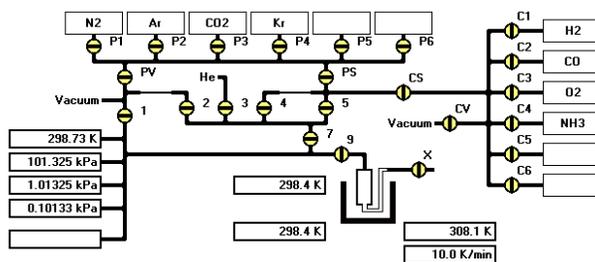
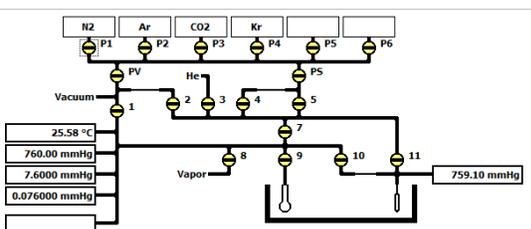
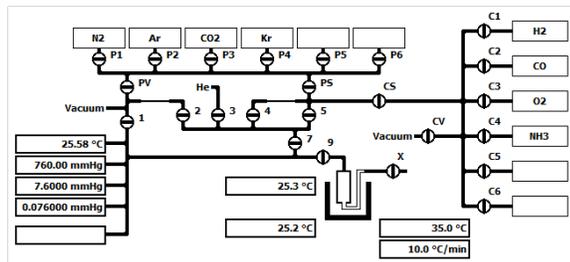
8. Stand the vapor tube on a sample tube rack and place the rack in the preheated drying oven for two hours.
9. Remove the tube from the oven and allow to cool.

INSTALL AND DEGAS THE VAPOR TUBE



These instructions assume water is being used as the vapor source.

1. Remove the cold trap dewar from the analyzer to prevent water vapor from freezing in the cold trap.
2. Pour approximately 5 ml of distilled or deionized water into the clean glass bottle.
3. Screw the bottle onto the Teflon nut. Securely tighten the nut.
4. Display the instrument schematic and enable manual control.


ASAP 2020 Physisorption

ASAP 2020 Chemisorption

ASAP 2020 Plus Physisorption

ASAP 2020 Plus Chemisorption

5. For the purification process:



Do not open valves 1 and 8 concurrently. Doing so may damage the instrument.

- Ensure valve 8 is closed.
- Open valves 1 and 7. Wait approximately 5 minutes until the vacuum gauge reading is below 10 μmHg .
- Close valve 1, leave valve 7 open.
- Open valve 8, wait approximately 2 minutes.
- Close valve 8.
- Open valve 1, wait approximately 2 minutes.
- Repeat steps c through f six times to thoroughly degas the vapor source. The vapor source is thoroughly degassed when the 1000 μmHg transducer reads between 40 and 45 μmHg for water at 35 °C in the vapor source.



If using a vapor other than water at 35 °C, the pressure in the manifold will vary. Consult a saturation pressure vs. temperature table to determine what the appropriate pressure is.