SMART VACPREP™

INTELLIGENT VACUUM SAMPLE PREPARATION SYSTEM

micromeritics®

INSTALLATION INSTRUCTIONS AND CHECKLIST

067-42870-02
Aug 2022
(Rev B)

micromeritics®

TRADEMARKS

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Microsoft and Windows are registered trademarks of Microsoft Corporation.
Smart VacPrep is a trademark of Micromeritics Instrument Corporation.

WARRANTY

MICROMERITICS INSTRUMENT CORPORATION warrants for one year from the date of shipment each instrument it manufactures to be free from defects in material and workmanship impairing its usefulness under normal use and service conditions except as noted herein.

Our liability under this warranty is limited to repair, servicing and adjustment, free of charge at our plant, of any instrument or defective parts when returned prepaid to us and which our examination discloses to have been defective. The purchaser is responsible for all transportation charges involving the shipment of materials for warranty repairs. Failure of any instrument or product due to operator error, improper installation, unauthorized repair or alteration, failure of utilities, or environmental contamination will not constitute a warranty claim. The materials of construction used in MICROMERITICS instruments and other products were chosen after extensive testing and experience for their reliability and durability. However, these materials cannot be totally guaranteed against wear and/or decomposition by chemical action (corrosion) as a result of normal use.

Repair parts are warranted to be free from defects in material and workmanship for 90 days from the date of shipment.

No instrument or product shall be returned to MICROMERITICS prior to notification of alleged defect and authorization to return the instrument or product. All repairs or replacements are made subject to factory inspection of returned parts.

MICROMERITICS shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own authorized service personnel unless such work is authorized in writing by MICROMERITICS.

The obligations of this warranty will be limited under the following conditions:

1. Certain products sold by MICROMERITICS are the products of reputable manufacturers, sold under their respective brand names or trade names. We, therefore, make no express or implied warranty as to such products. We shall use our best efforts to obtain from the manufacturer, in accordance with his customary practice, the repair or replacement of such of his products that may prove defective in workmanship or materials. Service charges made by such manufacturer are the responsibility of the ultimate purchaser. This states our entire liability in respect to such products, except as an authorized person of MICROMERITICS may otherwise agree to in writing.
2. If an instrument or product is found defective during the warranty period, replacement parts may, at the discretion of MICROMERITICS, be sent to be installed by the purchaser, e.g., printed circuit boards, check valves, seals, etc.
3. Expendable items, e.g., sample tubes, detector source lamps, indicator lamps, fuses, valve plugs (rotor) and stems, seals and O-rings, ferrules, etc., are excluded from this warranty except for manufacturing defects. Such items which perform satisfactorily during the first 45 days after the date of shipment are assumed to be free of manufacturing defects.

Purchaser agrees to hold MICROMERITICS harmless from any patent infringement action brought against MICROMERITICS if, at the request of the purchaser, MICROMERITICS modifies a standard product or manufactures a special product to the purchaser's specifications.

MICROMERITICS shall not be liable for consequential or other type damages resulting from the use of any of its products other than the liability stated above. This warranty is in lieu of all other warranties, express or implied, including but not limited to, the implied warranties of merchantability or fitness for use.

CORPORATE PROFILE

Micromeritics Instrument Corporation is the world's leading supplier of high-performance systems to characterize particles, powders and porous materials with a focus on physical properties, chemical activity, and flow properties. Our technology portfolio includes: pycnometry, adsorption, dynamic chemisorption, particle size, intrusion porosimetry, powder rheology, and activity testing of catalysts. The company has R&D and manufacturing sites in the USA, UK, and Spain, and direct sales and service operations throughout the Americas, Europe, and Asia. Micromeritics systems are the instruments-of-choice in more than 10,000 laboratories of the world's most innovative companies and prestigious government and academic institutions. Our world-class scientists and responsive support teams enable customer success by applying Micromeritics technology to the most demanding applications. For more information, please visit www.Micromeritics.com.

CONTACT US

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Fax: 1-770-662-3696
www.Micromeritics.com

Instrument Service or Repair
Phone: 1-770-662-3666
International: Contact your local distributor or call 1-770-662-3666
Service.Helpdesk@Micromeritics.com

Micromeritics Application Support
Support@Micromeritics.com

GENERAL SAFETY

Do not modify this instrument without the authorization of Micromeritics Service Personnel.

Any piece of laboratory equipment can become dangerous to personnel when improperly operated or poorly maintained. All employees operating and maintaining Micromeritics instruments should be familiar with its operation and should be thoroughly trained and instructed on safety.

- Read the operator manual for any special operational instructions for the instrument.
- Know how the instrument functions and understand the operating processes.

- Wear the appropriate personal protective equipment when operating this instrument — such as eye protection, lab coat, protective gloves, etc.
- When lifting or relocating the instrument, use proper lifting and transporting devices for heavy instruments. Ensure that sufficient personnel are available to assist in moving the instrument. The Smart VacPrep weighs approximately 32 kg (70 lb).
- Always pay attention to the safety instructions provided on each label affixed to the instrument and do not alter or remove the labels. When inspecting the instrument, ensure that the safety labels have not become worn or damaged.
- The has a safety shield. Ensure it is in place when operating the instrument.
- Proper maintenance is critical to personnel safety and smooth instrument operation and performance. Instruments require regular maintenance to help promote safety, provide an optimum end test result, and to prevent costly down time. Failure to practice proper maintenance procedures can lead to unsafe conditions and shorten the life of the instrument.
- Improper handling, disposing of, or transporting potentially hazardous materials can cause serious bodily harm or damage to the instrument. Always refer to the MSDS when handling hazardous materials. Safe operation and handling of the instrument, supplies, and accessories is the responsibility of the operator.

INTENDED USE

The Smart VacPrep degasser is an advanced six-port system that utilizes vacuum to prepare samples by heating and evacuation. Each of the ports may be operated independently. Samples may be added or removed from degas ports without disturbing the treatment of other samples undergoing preparation. Degassing automatically terminates when the samples have completed all programmed steps.

The instrument is intended to be operated by trained personnel familiar with the proper operation of the equipment recommended by the manufacturer and as well as relevant hazards involved and prevention methods. Other than what is described in this manual, all use is seen as unintended use and can cause a safety hazard.

The instrument is intended to be used as per applicable local and national regulations.

TRAINING

It is the customer's responsibility to ensure that all personnel operating or maintaining the equipment participate in training and instruction sessions. All personnel operating, inspecting, servicing, or cleaning this instrument must be properly trained in operation and machine safety before operating this instrument.

Environmentally Friendly Use Period

Hazardous Substances Table

Part Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Cover	o	o	o	o	o	o
Power Supplies	x	o	o	o	o	o
Printed Circuit Boards	x	o	o	o	o	o
Cables, Connectors & Transducers	x	o	o	o	o	o

o Hazardous substance is below the specified limits as described in SJ/T11363-2006.

x Hazardous substance is above the specified limits as described in SJ/T11363-2006.

The Environmentally Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here unless otherwise marked. Certain parts may have a different EFUP (for example, battery modules) and are marked to reflect such. The Environmentally Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.

SYMBOLS THAT MAY APPEAR ON YOUR INSTRUMENT

The following symbols or icons indicate safety precautions and/or supplemental information and may appear on your instrument::

Use extreme caution when working on the instrument where one of these symbols may be displayed. These symbols indicate the part may be hot and cause serious burns.

Use the cotton gloves provided in the accessory when handling heated surfaces. These cotton gloves are not intended to protect hands when heated surfaces are above 60 °C.

When working on the instrument where this symbol is displayed, refer to your Micromeritics' instruction manual for additional information.

When this symbol is displayed, toxic or flammable gases require proper venting of exhaust.

This symbol can also indicate the instrument uses mercury which is an extremely toxic substance. Read the Material Safety Data Sheet (MSDS) and be aware of the hazards of mercury and know what to do in the event of a spill or an exposure incident

ABOUT THIS MANUAL

The following can be found on the Micromeritics web page (www.Micromeritics.com).

- Parts and Accessories
- Error Messages
- Vacuum Pump Guide (PDF)

The following symbols or icons indicate safety precautions and/or supplemental information and may appear in this manual:

NOTE — Notes contain important information applicable to the topic.

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.

WARNING - SURFACE MAY BE HOT — Warnings contain information to help prevent actions that may cause personal injury. This symbol indicates that surfaces may be hot and may present dangers if touched.

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1 OVERVIEW

This document contains procedures for installing and verifying the operation of the Smart VacPrep degasser. Use these installation instructions and checklists to ensure that installation procedures are completed properly.

It is recommended that installation procedures be performed in the order presented in this document.

PREPARE FOR INSTALLATION

Before installation, ensure the operator has reviewed thoroughly the analyzer *Pre-installation Instructions and Checklist*. Ensure all required equipment and supplies are unpacked and the required personnel are available.

When the equipment is received, unpack and inspect the contents of the shipping container(s). Use the packing list to verify that all products, accessories, software (if applicable), and documentation are received intact and in the correct quantity. The shipping container(s) and contents should be inspected within a few days of receipt in the event damage or loss has occurred. Sort through all packing material before declaring missing equipment or parts.

Micromeritics recommends saving all shipping containers until installation of the equipment is complete. All shipping containers where equipment is to be declared as damaged or lost must be examined by the claims investigator prior to completion of the inspection report.

SAFE SERVICING

Do not modify this instrument without the authorization of Micromeritics Service Personnel.

To ensure safe servicing and continued safety of the instrument after servicing, service personnel should be aware of the following risks:

Product specific risks that may affect service personnel:

- **Electrical**. Servicing or repair could require opening the outer panels and exposing energized electrical components.
- **Heating stations**. Ensure the heating stations are cool and sample tubes have been removed from all stations. Heating stations can be very hot. Allow the heating stations to cool prior to servicing.

Use caution in the areas where this symbol is displayed on the instrument — such as near the heating stations. These surfaces may be hot and could cause serious burns. Use the gloves supplied in the accessories kit.

Protective measures for these risks:

- **Electrical**. The electrical components operate at low voltage (24V or less) and pose low risk when energized. Maintenance, troubleshooting, and repairs should be performed with the instrument de-energized whenever possible, in accordance with standard electrical safety guidelines.
- **Fuses**. Use of improperly rated fuses could cause damage to the equipment.
- Sample tubes must be removed prior to repair.
- Power off and unplug the degasser from the power outlet prior to servicing.

Verification of the safe state of the instrument after repair:

- Sample tubes must be removed to prevent accidental breakage.
- Gas lines connected and pressurized to normal operating pressure with no leaks.

POWER

The Smart VacPrep is designed to operate with line voltage of 100/120/230/240VAC ±10, 50/60 Hz through a standard wall receptacle. Noise-free power of the correct voltage and frequency, with a safety earth ground, should be available through a standard wall receptacle. There should be a minimum 15A rated breaker @ 100/120 VAC and a minimum 7.5A @ 240 VAC.

The analyzer and peripheral devices **must** be installed on their own dedicated power line. Other devices — such as motors, generators, or ovens — **should not** be placed on the same power line.

Replacement power supply cords must be rated for the specifications stated above.

INSTALL THE VACUUM PUMP

The *Vacuum Pump Guide* contains installation instructions for vacuum pumps and can be found on the Micromeritics web page (www.Micromeritics.com).

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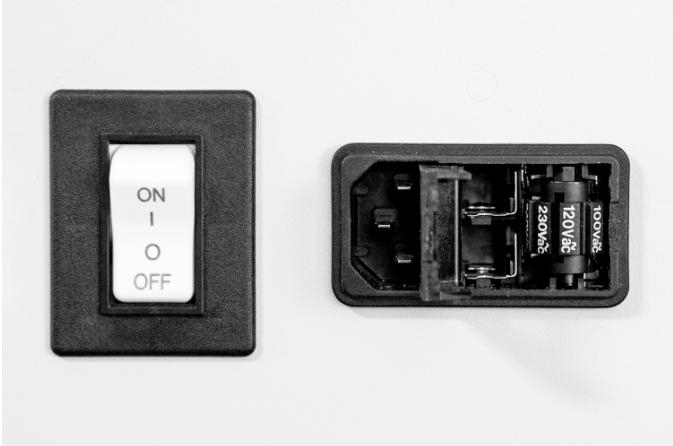
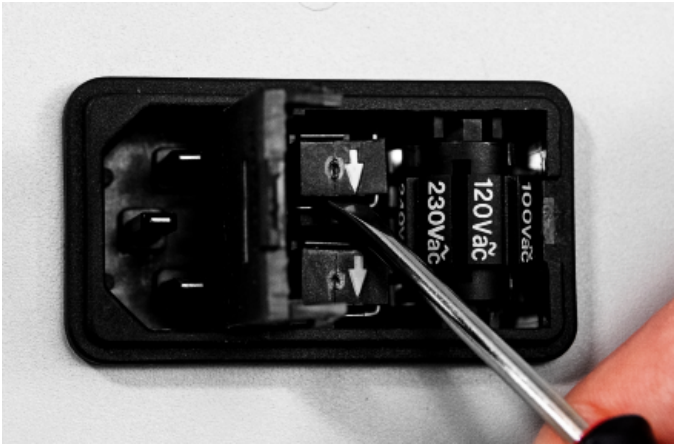
2 SMART VACPREP HARDWARE INSTALLATION

SET THE VOLTAGE AND INSTALL FUSES



The Smart VacPrep voltage setting is housed in a compartment adjacent to the power connector on the back of the unit.

1. Gently pry open the right side of the compartment cover using a small flat head screwdriver.
2. Firmly press down on the voltage indicator and roll the indicator to display the appropriate voltage for your environment. Selections are: 100 Vac, 120 Vac, 230 Vac, and 240 Vac.
3. To install the fuses included in the accessories kit, gently pry out the two fuse holders to the left of the voltage setting using a small flathead screwdriver. The fuse holders have down arrows displayed.



4. Insert a bidirectional fuse into each of the two fuse holders.

5. Replace the two fuse holders ensuring the arrows point downward.
6. Firmly press the compartment cover shut. Ensure it closes securely. The selected voltage will appear in the compartment cover window.

POWER CABLE

A. Voltage display
B. Power cable
C. Ferrite assembly

1. Snap the ferrite component closed around the power cable near the instrument.
2. Insert the power cable with ferrite assembly into the power outlet on the instrument.

CONNECT ETHERNET CABLE

CONNECT ONE ANALYZER

1. Plug one end of the shielded Ethernet cable into the Ethernet port on the analyzer.
2. Plug the other end of the shielded Ethernet cable into the Ethernet port on the computer.

Connectivity for the 067 Smart VacPrep is different. The 067 Smart VacPrep must be connected using an Ethernet switch. To connect the 067 Smart VacPrep to the analyzer, follow the instructions under ***Connect Multiple Analyzers with an Ethernet Switch below***.

CONNECT MULTIPLE ANALYZERS WITH AN ETHERNET SWITCH

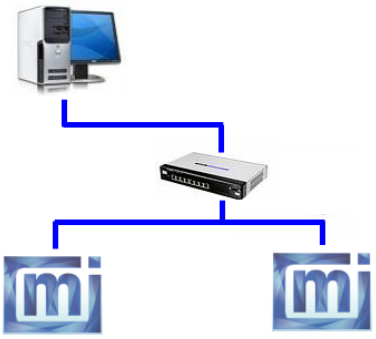
An Ethernet switch is required. The Smart VacPrep unit will be attached to the Ethernet switch. The Ethernet switch will then be connected to the computer using a shielded Ethernet cable.

An Ethernet switch is required to connect:

- Multiple analyzers
- One or more analyzers and one computer

To establish the connection:

1. Connect the power cord of the Ethernet switch to an appropriate power outlet.
2. For each analyzer, connect a shielded Ethernet cable from the Ethernet port of each analyzer to a numbered port on the Ethernet switch taking care not to use the uplink port on the switch.
3. Use a shielded Ethernet cable to connect the computer to the Ethernet switch. Do not use the uplink port.
4. Ensure the computer and the Ethernet switch are powered on.

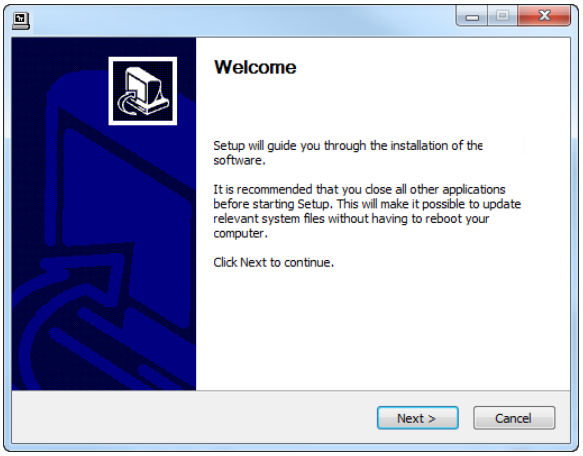


Do not use the uplink port when using an Ethernet switch.

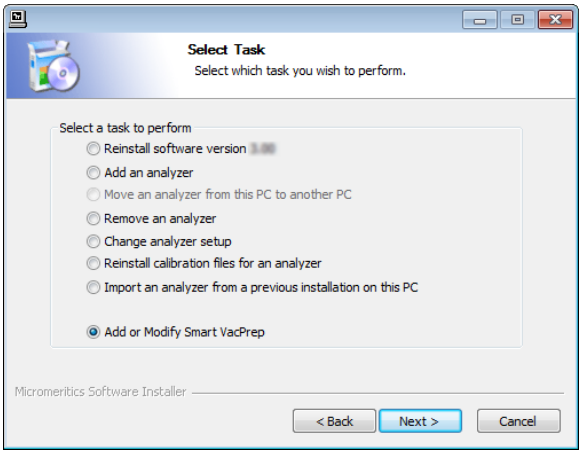
3 SOFTWARE UPDATE

Connect the Ethernet switch to the computer's configured port, connect the Smart VacPrep to the Ethernet switch, then turn the analyzer on.

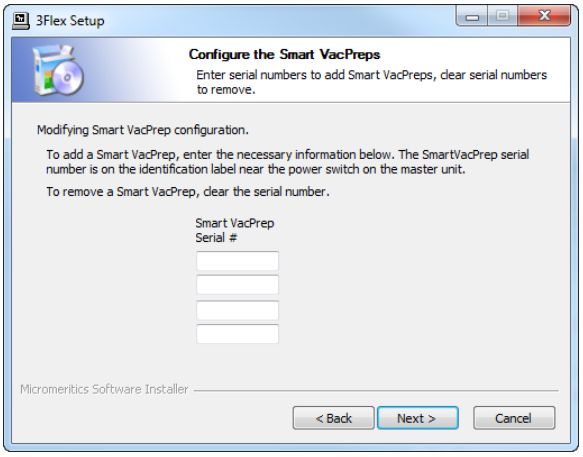
1. Insert the installation media into the drive on the computer. The program automatically starts the installation. If the installation does not immediately start, navigate to the media drive, then locate and double click the *setup.exe* file.
2. Click **Next** on the *Welcome* window.



3. On the *Select Task* window, select *Add or Modify Smart VacPrep*, then click **Next**.



4. On the *Configure the Smart VacPrep* window, enter a serial number for each installed Smart VacPrep unit. The serial number is located on the identification label near the power switch. Click **Next**.



5. On the *Completing the Setup* window, select the *Create a desktop* icon to place a shortcut on the desktop workspace. If there was a shortcut already on the desktop, it is not necessary to select this checkbox. Click **Finish**.

START THE APPLICATION

To start the application, either click the application shortcut on the desktop OR select the application from the Windows program list.

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4 GAS CONNECTIONS

GUIDELINES FOR CONNECTING GASES

These instructions refer to the installation of a gas line, regulator, and gas cylinder for each type of gas used. Expansion kits or other accessories may be used in the lab. If so, special consideration should be given to these configurations when installing the gas lines.

Improper handling, disposing of, or transporting potentially hazardous materials can cause serious bodily harm or damage to the instrument. Always refer to the MSDS when handling hazardous materials. Safe operation and handling of the instrument, supplies, and accessories is the responsibility of the operator.

- Place gas cylinders within 6 feet (2 m) of the gas inlets of the analyzer. Place the cylinders close enough to allow for proper connection at the analyzer inlet.

  Using gas line extenders on gas cylinders located in remote areas may degrade gas quality and reduce pressure. Gas lines are typically five to six feet long.

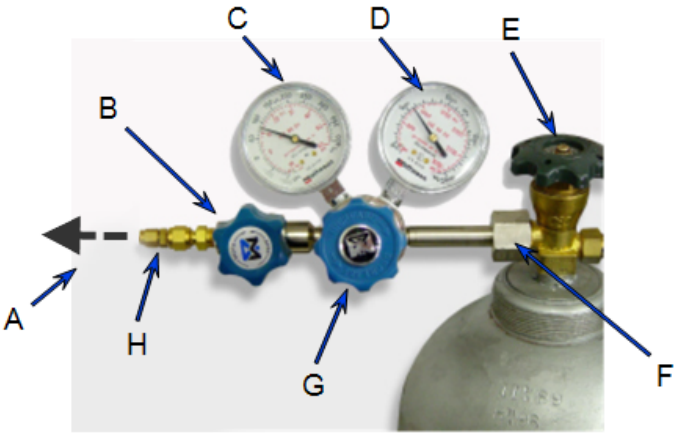
  Long gas lines, such as those used with gas cylinders placed in remote areas, must be evacuated for an extended period of time to remove ambient gases. When possible, avoid placing gas cylinders in remote locations. It is always best to have gas cylinders located near the analyzer.
- Use a retaining strap (or other appropriate tether) to secure the gas cylinder.
- Always use the gas lines provided with the analyzer. It is very important that proper gas lines are used with the analyzer.

  - **Do not use** polymer tubing for the gas line.
  - **Do not use** flexible gas lines. Some flexible lines may appear to be appropriate, such as those with a herringbone covering, but the line may be coated internally with a polymer.

- Carefully route the gas lines from the cylinder to the analyzer avoiding overlapping or entangling gas lines. This will help avoid confusion when maintenance is required.
- Label the gas line at the analyzer inlet for proper identification and maintenance.
- Replace gas cylinders before gas is depleted. It is best to replace a gas cylinder when the pressure reads approximately 500 psi (3500 kPa) on the high-pressure gauge. Contaminants absorbed to the walls of the cylinder will desorb as the pressure decreases.
- Ensure the gas cylinder is closed before connecting to the analyzer.

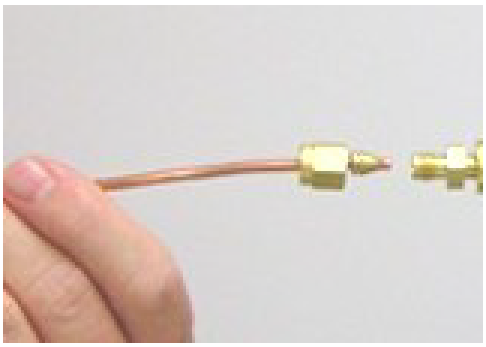
CONNECT A REGULATOR AND A GAS LINE TO A GAS CYLINDER

The equipment images in this topic may differ slightly from your equipment; however, the instructions are the same unless otherwise noted.



A. Gas tubing to instrument
B. Gas regulator shut-off valve
C. Low pressure gauge
D. High pressure gauge
E. Gas cylinder shut-off valve
F. Regulator connecter nut
G. Regulator control knob
H. Brass reducer fitting

1. Move the gas cylinder close to the analyzer.
2. Secure the cylinder in place using straps or chains connected to a wall bracket or other fixed surface, or use a cylinder stand.
3. Use an appropriate cylinder wrench to remove the protective cap from the cylinder by turning the protective cap counterclockwise.
4. Attach the gas regulator to the connector on the gas cylinder. Hand tighten the nut, then use an appropriate wrench to tighten an additional 3/4 turn.
5. Check for leaks at the high pressure side of the regulator and in the connector.
    a. Turn the regulator control knob fully counterclockwise.
    b. Slowly open the gas cylinder shut-off valve, then close it.
    c. Observe the pressure on the high pressure gauge.
    d. If pressure drops, repair the leak.
6. Connect the gas line to the regulator.
    a. Connect the gas line to the regulator connector.



b. Use two 7/16 in. (11 mm) wrenches to tighten the gas line connection — one to hold the fitting steady and one to tighten the connector nut.

7. Purge the air from the gas line.

   a. Open the regulator shut-off valve.
   b. Open the gas cylinder shut-off valve and flow gas for 10 to 30 seconds.
   c. Close the gas cylinder shut-off valve and allow regulator pressure to go to zero.

CONNECT THE BACKFILL GAS AND EVACUATE THE GAS LINE

1. Loosen, then remove the plug from the backfill gas port on the back of the unit.
2. Insert the gas line into the port and hand tighten the connector nut. Use a 7/16 in. (11 mm) wrench to tighten the nut until very snug.
3. Evacuate the gas line using one of the following methods. Either method will evacuate the line and can be used on a 6 ft. or 16 ft. gas line.

After the application is installed, use one of the following methods to complete the process:

Use Service Test Mode:

- Go to ***Options > Service Test Mode*** and enter the service password, then
- Go to ***Prep [n] > Service Test > Open > [gas line leak file]***.

Manually evacuate:

This method should only be used if the gas line is under 20 ft. If the gas line is longer, the line must be purged until the line and the gas are sufficiently clean.

- Go to ***Prep [n] > Enable Manual Control*** then go ***Prep [n] > Show Schematic*** to display the Smart VacPrep schematic.
- Hover the cursor over valve 7, right-click on valve 7 and select *Open*. Valve 7 is the fast evacuation valve and evacuates the main manifold.
- Hover the cursor over valve 9, right-click valve 9 and select *Open* to evacuate the gas line.

Ensure the transducer and vacuum gauge readings come down to 0.00 ± .50. If they don't, ensure the vacuum pump is powered on. If they still don't come down, close the valves and check the pump connections for leaks.

- Evacuate for at least 10 to 15 minutes after a good vacuum is reached. Close valves 7 and 9. Set the regulator pressure to between 10 and 15 psi and open regulator valve.

Do not exceed 5 psi regulator pressure when backfilling sample tubes. If the gas pressure is greater than the recommended maximum of 5 psig (35 kPag), the sample tube could be ejected from the fitting or broken.

5 DEGAS A SAMPLE

A sample can be degassed one of two ways:

1. Create a sample file and setup the degas conditions in the sample file.
2. In the analysis software, go to ***Smart VacPrep > Unit [n] > QuickStart Degas Conditions*** and click **Edit**.
    a. Enter the degas conditions for each degas station to be used.
    b. Click **Save**.
    c. On the Smart VacPrep unit, press the **Select** button for each port then press the **Start** button.

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6 INSTALLATION CHECKLISTS

Use these codes to complete the tables in this section, then initial and date each section. If the table has an *Initial / Date* column, the person completing the procedure should enter their initials and the date.

P	**Pass**. Indicates that this procedure has been successfully completed without error.
F	**Fail**. Indicates that this procedure has been unsuccessful and prevents the analyzer from being installed for use.
N/A	**Not Applicable**. Indicates that this procedure does not apply to your system.

Prepare for Installation

Procedure	Evaluation Code	Initial / Date
Review the *Pre-installation Instructions and Checklist* document and ensure that the laboratory is prepared for installation.	**P F N/A**	
Ensure that the required personnel are available.	**P F N/A**	
Ensure that all equipment has been unpacked and verified using the packing list.	**P F N/A**	

Hardware Setup

Procedure	Evaluation Code	Initial / Date
Voltage was set.	**P F N/A**	
Fuses were installed.	**P F N/A**	
Ferrite component installed on power cable	**P F N/A**	

Connect Cables

Procedure	Evaluation Code	Initial / Date
Ethernet switch was connected and configured.	**P F N/A**	
Power cable connected to Smart VacPrep.	**P F N/A**	

Install the Vacuum Pump

Procedure	Evaluation Code	Initial / Date
Install the components of the vacuum pump.	P F N/A	
Check the pump voltage setting.	P F N/A	
Connect the vacuum pump to analyzer.	P F N/A	
Power ON the vacuum pump switch (if applicable).	P F N/A	
Power ON the analyzer.	P F N/A	

Modify the Analyzer Software

Procedure	Evaluation Code	Initial / Date
Modify the application software.	P F N/A	
Start the application.	P F N/A	
Does the Smart VacPrep operate properly?	P F N/A	

EXCEPTIONS

Explain the procedures that were categorized as **Fail** or **No**.

Procedure	Comment	Initial / Date

SIGNATURES

INSTALLER

Name: _____ Date: _____

Position: _____

Company: _____

Signed: _____

Service Request Order (or FSR#) : _____

CUSTOMER REPRESENTATIVE

Name: _____ Date: _____

Position: _____

Company: _____

Signed: _____

FINAL DOCUMENTATION

In order to provide consistent analyzer service, Micromeritics retains records of installation, operational verification, and calibration data in its Service Support Center in Norcross, GA, USA. After completing the installation process, representatives of Micromeritics who install analyzers are required to send the following documents to Micromeritics for inclusion in the customer's analyzer history:

- Completed Service Request Order or Field Service Report
- Completed and signed Installation Checklist
- Sample Files

Return the completed checklist and forms to:

Micromeritics Instrument Corporation
ATTN: Service Operations Manager
4356 Communications Drive
Norcross, GA / USA / 30093-2901

Email: Service.Helpdesk@Micromeritics.com
Fax: 1-770-662-3604

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EU DECLARATION OF CONFORMITY

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Micromeritics Instrument Corporation
4356 Communications Drive
Norcross, GA 30093, USA

Hereby declares that the product:

Smart VacPrep Sample Preparation Device

is in conformity with the following **EU harmonization legislation**:

2014/35/EU - LVD Directive
2014/30/EU - EMC Directive
2011/65/EU - RoHS Directive

and that the equipment is in conformity with the following harmonized and other appropriate standards;

2014/35/EU (LVD)
IEC 61010-1:2010/A1:2016 - *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements.*
IEC 61010-2-010:2019 - *Particular requirements for laboratory equipment for the heating of materials.*
IEC 61010-2-081:2019 - *Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes*

2014/30/EU (EMC)
IEC 61326-1:2020 - *Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements*
IEC 61000-3-2:2014 - *Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*
IEC N 61000-3-3:2013 - *Part 3-3: Limits — Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection*

2011/65/EU (RoHS)
EN 63000:2018 - *Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances*

Name: John McCaffrey, Ph.D.

Title: Vice President, R & D

Signature:

Date of issue: 06/03/2022

Location: Norcross, GA USA