



Positive Pressure Manifold 2.0



Operating Manual

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Shipping Contents

- 4 x 12 position Positive Pressure Manifold
- Waste collection rack, stopcock and tubing
- Collection rack (16mm or 13mm collection tubes)
- $\frac{3}{4}$ " 4 x 12 position Solid Phase Extraction plate (Standard 10 mL/15 mL rack included with each system. Additional adaptor plates to accommodate smaller tube volumes can be purchased separately.
- Manifold Installation kit (See below for parts included)



Accessories Required For Operation

- Manifold Installation Kit (Pre-assembled)
- 25' $\frac{1}{4}$ " O.D. plastic rigid tubing rated for a minimum of 80 to 100 psi
- Silver Attachment Bracket
- In-line Gas Filter
- Gas Regulator
- Gas source (Nitrogen or Air)
- $\frac{1}{4}$ " compression fitting for attachment to gas source



Positive Pressure Extraction Manifold

Theory of Operation

The Positive Pressure Extraction Manifold (PPM) is a mechanical workstation that is used to facilitate the process of sample preparation using solid phase extraction (SPE) cartridges. The PPM utilizes pressurized gas (i.e. compressed nitrogen or air) to move sample solvent through SPE cartridges at a controlled rate of flow. The PPM has two (2) adjustable regulators designed with restrictors to allow for a fine (Regulated Flow) and a higher (Full Flow/Dry) adjustment during the extraction procedure.



Manifold Features

- **Easy Manifold Set-Up** – simply quick-connect the manifold to an air source and testing can begin almost instantly.
 - **Installation Kit** – available as a separate part number for purchase with complete units, this includes 25' x ¼" O.D. tubing, an in-line air along with a regulator and gauge for instrument installation. This ensures a clean, regulated air source to the manifold and avoids any sample contamination.
- **Small Footprint and Light Frame** – a small and highly mobile instrument which can be set up almost anywhere that an air or nitrogen gas source is available.
- **Uniformed Pressure from Port-to-Port** – Regardless of batch size present in the sample tray, each of the individual 48 positions will receive uniformed pressure during the extraction/drying process, ensuring for an overall efficient extraction.
- **Easy to Read Pressure Gauges and Simple Pressure Adjustment Knobs** – Selection and monitoring of optimal test pressures are fast and reliable
- **Sample Row Selection** – Simply flip a switch to select or deselect a sample row for testing. This helps to conserve on compressed air/nitrogen usage when extraction rows are not needed.
- **Configurable Column and Sample Collection Racks** – Adaptor plates can easily be attached and removed to allow for use of a variety of column and sample tube sizes.
- **Convenient Waste Removal** – A waste valve with stopcock for opening and closing is located at the base of sample tray and can be connected to any waste collection container for easy disposal.

Manifold Controls & Descriptions



Regulated/Full Flow Gauge - Shows the flow pressure when using regulated/full flow; pressure is set using the Regulated/Full Flow Adjustment Knob; regulated flow is used during sample addition, wash, and elution which require a precise flow rate; full flow is used during column drying.

Regulated Flow Adjustment Knob - This control is considered a 'fine adjustment' because it has a restrictor, which will not allow excessive flow through the manifold plate. The adjustment knob is used to regulate the flow during the extraction procedure.

To adjust, pull the knob out and turn clockwise to increase and counterclockwise to decrease the gas flow to the desired rate. Push the knob in to lock the adjustment knob into position. By turning the center toggle switch to Regulated Flow' the gas will begin to flow at the rate in relation to the pressure gauge under the adjustment dial. It is recommended to use no higher than 80psi gas flow from the main gas source to maximize the manifold's efficiency. The regulated flow should be adjusted to approximately 10 psi to obtain a desired flow rate of 1-2 ml/ minute.

Note: This is a guideline; an actual flow setting must be selected since the rates through the columns could change based on source gas pressure, sorbent type, sorbent amount, extraction fluid, sample matrix, etc.

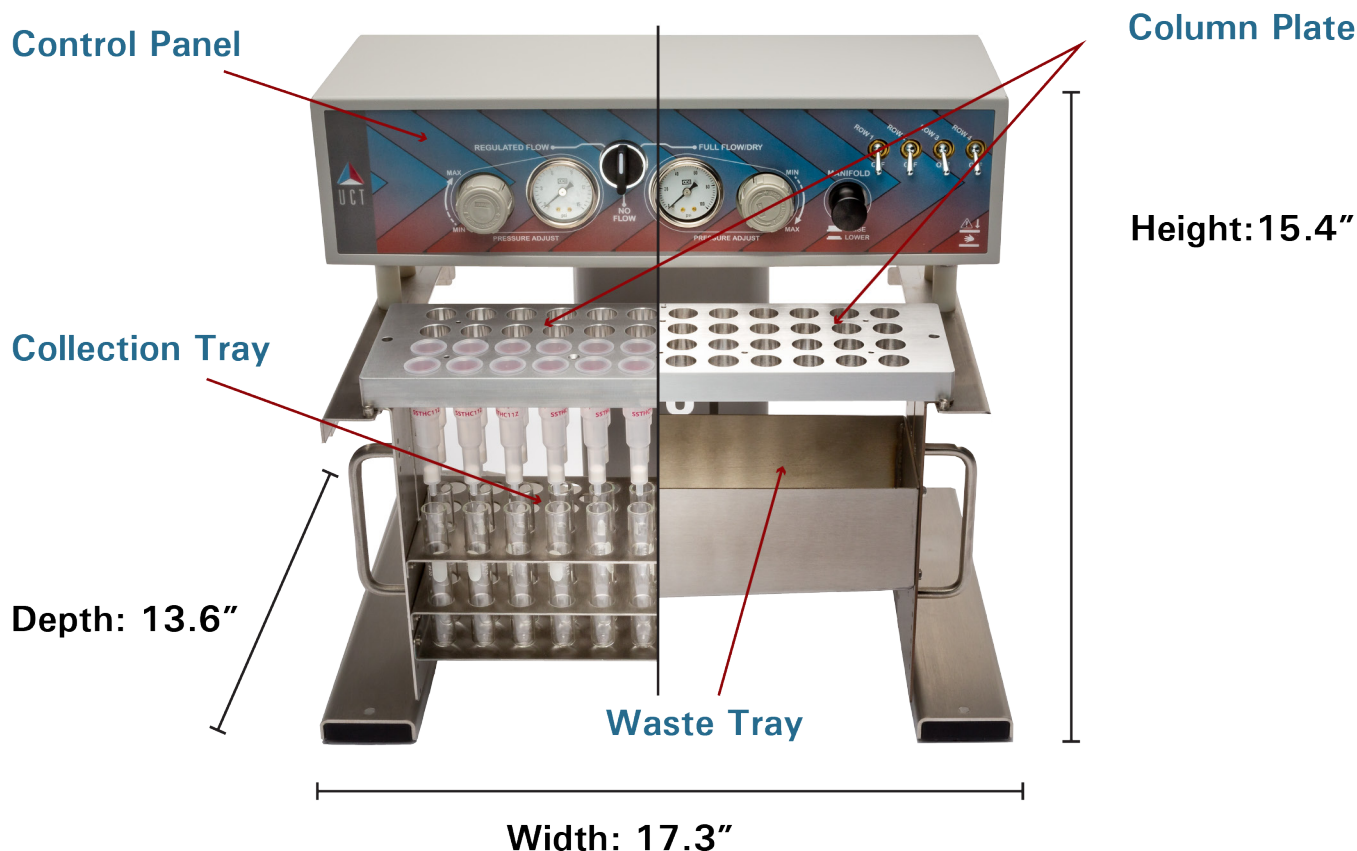
Full Flow/Dry Adjustment Knob - Adjusts the amount of flow through the columns when the Flow Select Switch is set to "Full Flow/Dry"; set to the max flow allowed by the application; take care to avoid splashing sample from vials with too forceful of flow. This gauge is used to maximize the amount of gas flow through the manifold itself and extraction tubes. There is a wider

range flow restrictor associated with this gauge that allows a larger volume of gas to flow through at a higher rate. This setting is used during the drying step or when higher flow rates are required for samples due to sample matrix or procedure requirements. To adjust, pull the knob out and turn clockwise to increase and counterclockwise to decrease the gas flow to the desired rate. Push the knob in to lock the adjustment knob into position. By turning the center toggle switch to 'Dry/ Full Flow' the gas will begin to flow at the rate in relation to the pressure gauge under the adjustment dial.

Full Flow On/Off Switch – Turns full flow on and off.

Raise/Lower Switch – Use this toggle switch to raise the tray up to the manifold seals for pressurizing and to lower the tray down when the process is complete. The "Raise and Lower" switch is used to transition the extraction rack into proper positioning during sample preparation.

Tray Arms – Support the extraction holder when being pressurized and hold it in place during sample and solvent additions.

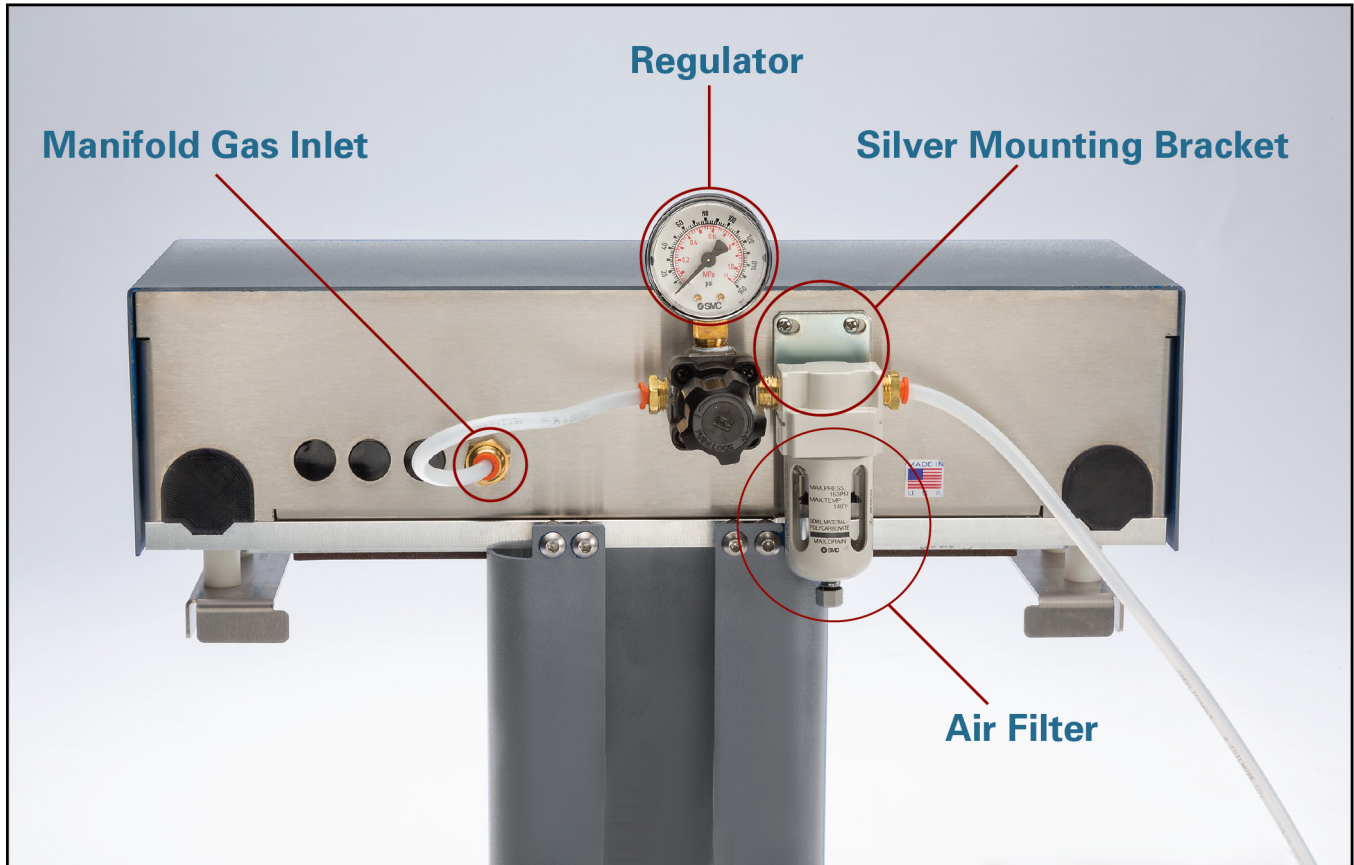


Manifold Preparation and Operation

Installation Kit Attachment

Within the provided installation kit, identify the following: 25 feet of 1/4" Polyethylene tubing and one 5um air filter/regulator assembly with 1/4" press-in tubing connections and silver-colored bracket. The assembly comes as one unit and only requires attachment to the manifold and air source.

1. Attach the silver mounting bracket (pre-affixed with filter/regulator assembly) to the back of the manifold using the two screws provided. When attached, the regulator should be on the left of the assembly and the filter on the right.



Tubing to connect the regulator to the inlet of the manifold is provided and is already inserted into the regulator's orange quick-connect fitting. Take the other end of the tubing and connect to the inlet of the manifold by pushing it securely into its orange fitting. Apply moderate pressure to ensure the tubing is snug.

2. Attach the remaining loose tubing to the compressed air or Nitrogen source.
3. After connecting both lines, adjust the incoming pressure from the gas source to no higher than 80 psi.

Preparing The Manifold For Extraction

1. Prior to proper positioning of both manifold racks and corresponding plates, test the 'Raise/Lower' toggle switch. The support arms should raise and lower as the toggle switch is adjusted back and forth. There will be a low hissing sound from the pneumatic piston system while this is occurring.

2. The manifold waste rack is fitted with a drain and stopcock / hose assembly to be used to collect waste during the extraction procedure. The rack itself has two pin connects on the underside that fit into the two screw tops on the manifold rack. This will ensure its stability during the extraction process.



3. The column plate (e.g. $\frac{3}{4}$ " metal plate with 4 x 12 drilled openings) is placed on the top portion of the waste rack. These reversible plates are also pre-drilled to fit onto the top of either the extraction or collection rack with the position pins.

Note: The two pins lie underneath Teflon strips that aid in proper placement of the sample rack/waste tray assembly. These need to be peeled back to expose the two pre-drilled holes for use.



4. With the waste container and top plate in place, position the rack on top of the support arms and easily slide into and out of the working manifold position. An important point regarding the manifold rack: There are handles on either side of the extraction / collection rack for gripping the racks for positioning and removal. These racks will only fit properly into the working manifold if the handle positions are forward to the front of the manifold. It becomes obvious if it is incorrectly placed on the support arms because the 4 x 12 frit openings on the underside of the chassis will not align properly with the extraction columns.



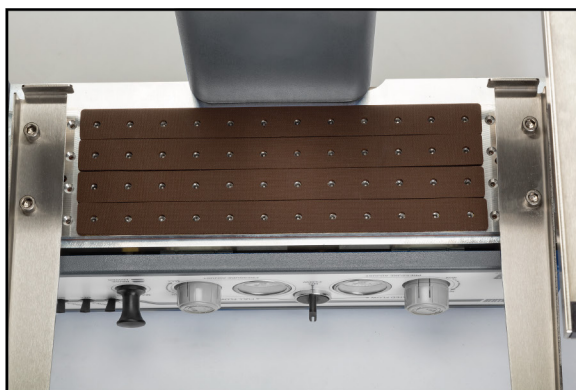
5. Pressures required for optimal extractions and drying of the column will depend upon individual method parameters such as the nature of the matrix, packing material of the column, and solvents used. However, pressures of 8-15 psi for sample extractions and about 80 psi for drying of the column are adequate in most cases.

Maintenance of Manifold

Cleaning and Gasket Replacement

The manifold requires regular upkeep to preserve the full functionality of the unit. Daily cleaning of any solvent or spills (as needed) on any of the manifold surfaces is suggested. Use solvents such as Methanol, Water, or Iso-propanol to wash the surface of the manifold. It is recommended to use water first followed by an alcohol to help dry the unit.

Ensuring clean air (free of oil, water, and particulates) is important to the manifold's proper function. The in-line air filter (Part Number VMFPPMRAF) attached to the back of the manifold should be monitored for condensation or other contamination issues. If the filter looks worn or filled with water, replacement may be required.



The brown rubber gaskets (VMFPPMGSKBL) on the underside of the manifold are recommended to be replaced at least two (2) times per year. Circular column indentations remaining in the material are often a sign to replace the gaskets.

To replace these gaskets, simply peel back the old gasket from the bottom of the manifold. Then continue by removing the plastic peel from the bottom of the new gasket and attaching the gasket to the bottom of the frit plate. Be sure to align the holes in the gaskets to the holes in the restrictor plates for optimal, unobstructed flow from port to port. For optimal replacement, turn the unit upside down to provide a better access point for gasket alignment.



Rectifying Inconsistent Flow Rates

Over time, customers can sometimes encounter one or more positions on the frit plate flowing slower than normal or simply with no flow at all. Often attributed to a foreign particulate from the air supply obstructing the passageway to the columns, this can be prevented by utilizing the provided air filter. To remedy the flow issues, the compromised frit and/or O-ring can either be cleaned by forcing IPA or acetone through the opposing side of the frit or they can be altogether replaced. Steps to remove or replace a frit and/or O-Ring are listed below.

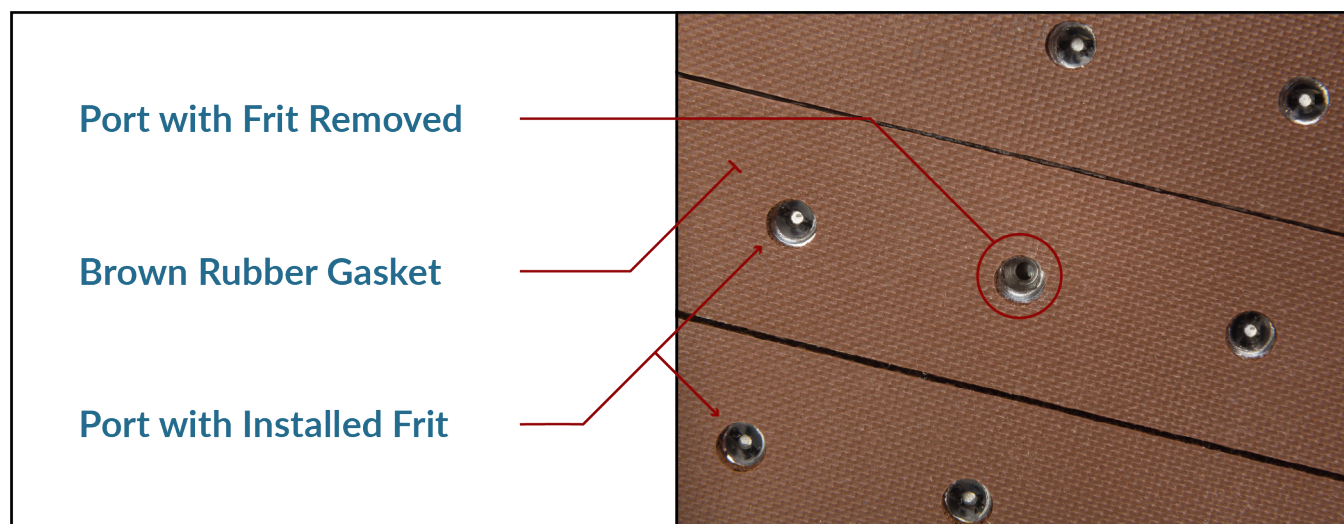
Frit Nut Removal/Replacement

Important Notes before beginning Frit Nut Removal or Replacement:

- In all cases, remember to never over tighten the Frit Nut upon installation. The Nut that contains the frit is made of plastic and can be very easily cross threaded and the screwdriver slot can be stripped as well.

- In most cases a poorly functioning Frit Nut can be removed and a new one installed without removing the Brown Gasket.
- In extreme cases where the Frit Nut slot has been stripped it may be necessary to remove the gasket or even remove the Frit Plate.
- A Flat Tip screwdriver with a 5/32 blade width will be needed. Any larger or smaller and the tip will not fit the nut correctly. An overall short screwdriver will also help to prevent over tightening.
- A Frit Nut can also be sonicated with water and then Methanol in an Ultrasonic cleaner.
- There is no guarantee that this will work and can only be tested by reinstalling in a plate to test.

Step 1: Turn the unit upside down on a sturdy table / work surface. This will give you a better view of the work area. Removing the line from the air source to filter may make this easier.

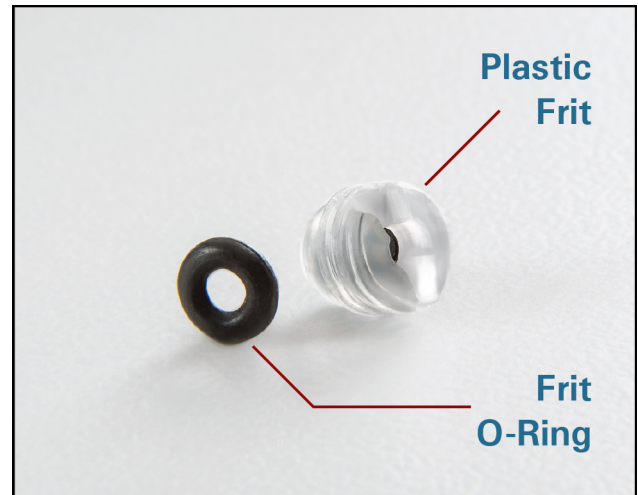


Step 2: Locate the frit nut position that requires replacement and determine if the nut can be replaced without removing the gasket. If so, using the 5/32 screwdriver suggested, turn the frit nut counterclockwise to remove. (Left Loose / Right Tight)

Step 3: Remove the tiny O-Ring at the bottom of the frit nut hole and inspect it for tares or deterioration. A small pick may be needed to remove the O-Ring.

Step 4: Reinstall the old O-Ring if it is in good condition (after cleaning) or replace with a new one.

Step 5: Install the new or cleaned frit nut and tighten clockwise until it feels like it has made contact with the O-Ring at the bottom of the hole. Tighten very lightly, approximately 1/8 to 1/4 turn. The top surface of the frit nut should be below the surface of the plate.

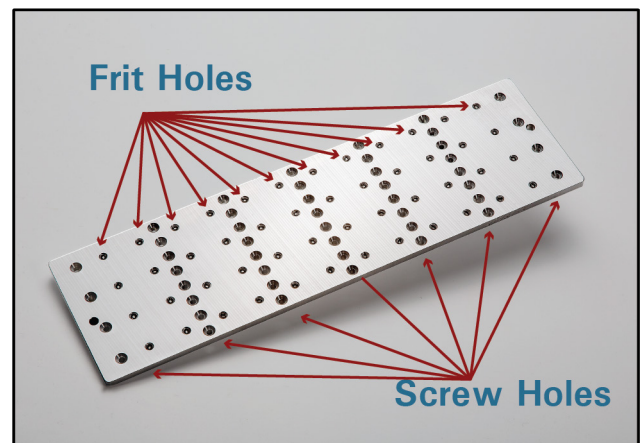


Note: If no improvement in flow is noted following the above steps, a new frit plate is needed.

Frit Plate Replacement

To replace, turn the manifold upside down. Peel back the brown gaskets from the frit plate exposing all necessary screws.

- Loosen each of the 48 screws with a Phillips screw driver or power drill.
- Remove the frit plate by simply pulling it off the manifold. (Note – it may be necessary to use a flat head screw driver to pry up the plate if it is not separating from the manifold).



- Replace the orange gasket on the top of the new frit plate. Clean as much of the remaining adhesive with a razor to get a good seal of the orange gasket. It is best to attach this directly to the frit plate before re-securing it to the manifold.

- Place the frit plate back on the unit by replacing all 48 screws (Do not over tighten screws).

Replace the brown rubber gaskets on the bottom of the frit plate making sure the holes on the gasket line up with the holes on the manifold.

When replacing a plate, start tightening the screws from the center and alternate left and right out to the ends. Go back over them again before installing the brown foam gasket to make sure they are tight. Do not over tighten to the point of stripping the Phillips head on the screw when replacing a frit.

Another problem that occurs from time to time is related to the loose adhesive on the edges of the orange rubber gaskets. This problem usually occurs with either the row one plate or the row four plate on the outside edges where it will blow out from underneath the frit plate, resulting in a loud or high pitch squeal. In this case the orange rubber gasket will need to be replaced. This can happen on row two & three as well but is less likely. Make sure the frit plate is as tight as with the previous frit plate before the gasket was replaced. Loose screws in the frit plates can cause the orange gasket to blow out under pressure.

Ensuring Steady Raising & Lowering with the Lift Arms

Lift arms can begin to hesitate when raising and lowering. This is often due to the fiber guide rush that the four guide rods glide up and down on inside of the unit. Keep the rods lubricated by applying a light coat of grease from top to bottom. Stop-cock grease works for this application. Check to make sure the bushings are in place. They can come loose from the hole they are pressed into at the bottom.

Ordering Information

Replacement Parts and Accessories

Description	Part Number
Adapter extraction plate to accommodate 1 mL extraction tubes	VMFPPMRKA1
Adapter extraction plate to accommodate 3 mL extraction tubes.	VMFPPMRKA3
Adapter extraction plate to accommodate 6 mL extraction tubes.	VMFPPMRKA6
Installation kit (25 ft ¼" O.D. tubing, in line air filter, gas regulator, silver attachment bracket and 2 screws)	VMFPPMIK
Waste container (pre-drilled) with draining kit (10 ft tubing and stopcock)	VMFPPMWBND
16 x 100 mm elution rack	VMFPPMCRKG16
13 x 100 mm elution rack.	VMFPPMCRKG13
Replacement in line air filter	VMFPPMRAF
Replacement column sealing gasket (brown)	VMFPPMGSKBL
Replacement column sealing gasket (orange)	VMFPPMGSKOR
Restrictor Plate (combo plate)	VMFPPMCBPLT
PPM Waste tray draining kit: 10 ft tubing and stopcock	VMFPPMWTDK
PPM On/Off Switch	VMFPPMV2-ON/OFF switch
PPM Raise/Lower Switch	VMFPPMV2-R&L switch

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Prices And Terms

Our prices are subject to change without notice. The price in effect when we receive your order will apply. All prices are in US Dollars and are F.O.B. Lewistown, PA 17044. Terms of payment are net 30 days.

Minimum Orders

We welcome all orders; therefore, we do not have a minimum order requirement. When ordering, please include your purchase order number, complete "Ship To" and "Bill To" address, catalog number, quantity, and description of product(s). Also include your name and a phone number where you can be reached should we have any questions concerning your order.

Shipments

Normal processing is within 24 hours after receipt of an order. Unless special shipping requests have been made, our trained staff will send all orders by UPS Ground service. The appropriate shipping charges (freight & insurance costs) will be added to the invoice, unless otherwise instructed by the customer.

Special Pricing

We offer special pricing for volume purchases and standing orders. These discounts apply to bonded phase extraction column purchases only. Call a sales representative for information on special pricing qualifications.

Return Policy

Our Quality Manager will handle all returns. Before returning merchandise, please call to obtain a return authorization number from the quality manager. We will need to know the reason for the return, date of purchase, purchase order number and invoice number to issue a return authorization number. Return merchandise must be received before a credit can be issued. Returns will not be accepted after 90 days. A restocking fee of 25% of the price paid, or a minimum of \$25.00 (whichever is greater) will be charged on all returns.

Safety

This equipment, when used properly, is safe. Proper PPE, as determined by your organization, should always be worn while using this equipment. Proper handling techniques for chemicals and biological agents should always be followed.

Compressed gas or nitrogen is used to operate the equipment. Compressed gas or nitrogen tubing should be securely fitted and locked into the equipment to prevent the compressed gas or nitrogen tubing from loosening and potentially striking the operator. Compressed gasses and equipment should be handled under proper ventilation to prevent oxygen displacement or toxic atmospheres.

Operators of this equipment must be aware of the possible pinch points. Pinch points are located on the restrictor plate, as it is raised and lowered and on the waste tray and extraction plate points of connection.

Warranty Program

After the initial 90-day period, a service agreement with UCT can be arranged. The service agreement will entail the following:

Upon the need for repair, the owner of the manifold will submit an open PO to UCT for repair. UCT will ship a 'temporary loaner' manifold (at no charge) to the customer to be used until their manifold can be repaired.

The total cost of shipping to and from UCT's facility for the customer's manifold will be the responsibility of the customer. The total cost of parts needed to repair manifold(s) will be the responsibility of the customer. The total cost of shipping of the loaner manifold will be incurred by UCT. UCT will perform a thorough inspection of the manifold which at minimum will include:

Each position of the individual (4) plates of the PPM will be checked for flow through. If there is significant restricted flow to any of the sample positions, the plate will be cleaned and re-tested. The piston's lubrication will be checked to ensure proper operation. The gaskets will be examined for wear or fracturing. The individual plates will be inspected for any loose screws holding the plates to the body of the manifold. Any additional maintenance or repair beyond the scope of this agreement will be charged at the discretion of UCT, Inc.

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