



# PPM 2.0

48 Position Positive Pressure Manifold



**OPERATING MANUAL**  
Available online @ [unitedchem.com/ppm](http://unitedchem.com/ppm)





REGULATED FLOW

FULL FLOW/DRY

NO FLOW

PRESSURE ADJUST

PRESSURE ADJUST

MANIFOLD

RAISE  
LOWER

UCT

ROW 1

MAX

MIN

MIN

MAX

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## CONTENTS Positive Pressure Manifold 2.0

- 4 x 12 position PPM unit
- Waste collection rack, stopcock and tubing
- Collection rack (16mm or 13mm collection tubes)
- ¾" 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)

\* Must be purchased as a separate part number (**VMFPPMIK**) with additional purchase of a unit.

## ACCESSORIES Positive Pressure Manifold 2.0

### Manifold Installation Kit (Pre-assembled)

- 25' ¼" 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)
- ¼" compression fitting for attachment to gas source

## THEORY OF OPERATION Positive Pressure Manifold 2.0

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.

- **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.

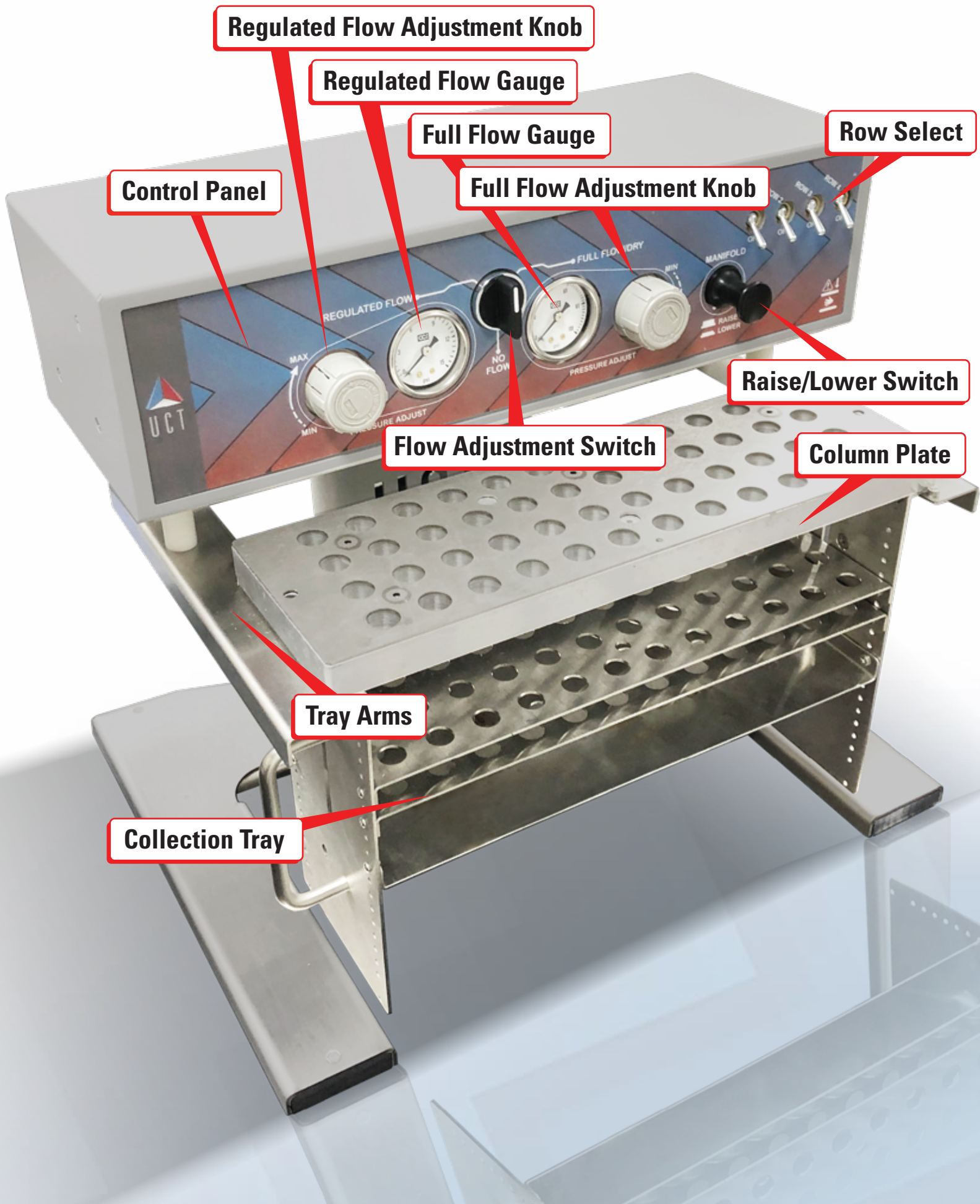


- **Easy to Read Pressure Gauges and Simple Pressure Adjustment Knobs** – Selection and monitoring of optimal test pressures are fast and reliable.

- **Sample Row Selection** – Simply flip a switch to select or de-select 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/removed to allow for use of a variety of extraction columns and sample collection 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.



**Regulated Flow Adjustment Knob**

**Regulated Flow Gauge**

**Full Flow Gauge**

**Row Select**

**Control Panel**

**Full Flow Adjustment Knob**

**Raise/Lower Switch**

**Flow Adjustment Switch**

**Column Plate**

**Tray Arms**

**Collection Tray**

### Regulated/Full Flow Gauge

Shows 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 requires 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 flow during extraction procedure.

### Flow Adjustment Switch

Turns full flow on/off.

To adjust, pull knob out and turn clockwise to increase and counterclockwise to decrease gas flow to desired rate. Push in to lock adjustment knob into position. By turning center toggle switch to 'Regulated Flow' gas will begin to flow at a rate in relation to pressure gauge under the adjustment dial. Recommended: To maximize efficiency, do not exceed 80psi flow from main gas source. Regulated flow should be adjusted to exactly 5 -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 amount of flow through columns when Flow Select Switch is set to "Full Flow/Dry"; set to max flow allowed by application; take care to avoid splashing sample from vials with too forceful of flow. This gauge is used to maximize amount of gas flow through manifold and extraction tubes. There is a wider range flow restrictor associated with this gauge which allows larger volumes of gas to flow through at higher rates. This setting is used during drying step or when higher flow rates are required for samples, due to sample matrix or procedure requirements. To adjust, pull knob out and turn clockwise to increase and counterclockwise to decrease gas flow to desired rate. Push in to lock the adjustment knob into position. By turning the center toggle switch to 'Dry/ Full Flow' gas will begin to flow at rate in relation to pressure gauge under adjustment dial.

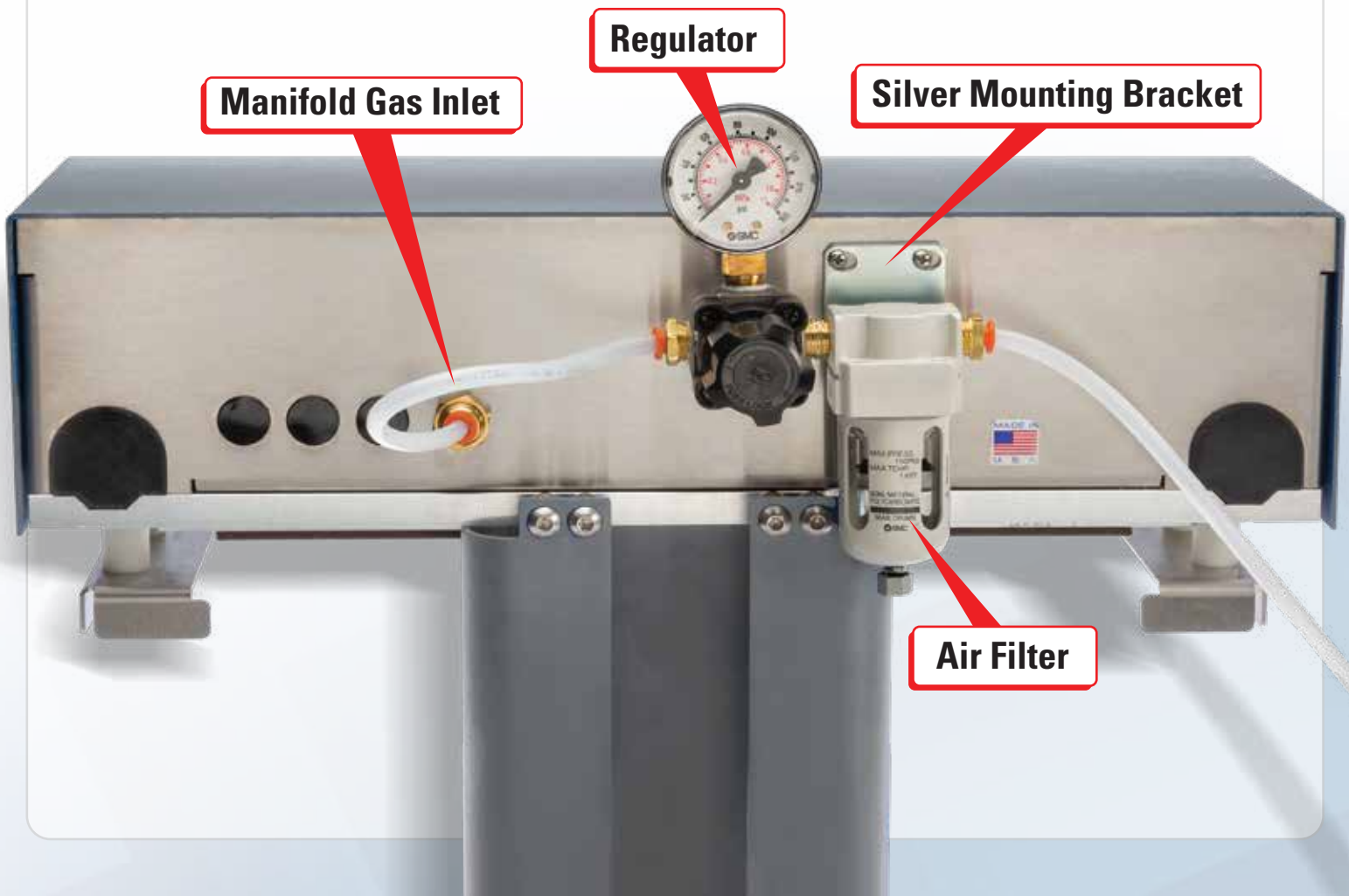
**Raise/Lower Switch** – Use this toggle switch to raise tray up to manifold seals for pressurizing and to lower tray when process is complete. The "Raise and Lower" switch is used to transition extraction rack into proper positioning during sample preparation.

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

**Within provided installation kit,** identify the following components:

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.





- 1 Prior to proper positioning of both manifold racks and corresponding plates, test the 'Raise/Lower' toggle switch. Support arms should raise and lower as the toggle switch is adjusted back and forth. There will be a low hissing sound from pneumatic piston system during this process.
- 2 Manifold waste rack is fitted with a drain and stopcock / hose assembly used to collect waste during the extraction procedure. The rack itself has two pin connects on underside that fit into the two screw tops on manifold rack, ensuring stability during extraction process.
- 3 The column plate (e.g. 3/4" metal plate with 4 x 12 drilled openings) is placed on top portion of the waste rack. These reversible plates are also pre-drilled to fit onto top of either extraction or collection rack with position pins.
- 4 With waste container and top plate in place, position rack on top of support arms, sliding in and out of working manifold position.



- 5 Pressures required for optimal extractions and drying of column will depend upon individual method parameters (ie: Nature of matrix, column packing material, and solvents used.) 5 -15 psi for sample extractions and 80 psi for drying of column are adequate in most cases.

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 (2) two pre-drilled holes for use.

There are handles on either side of extraction / collection rack for positioning and removal. Handle positions must remain forward towards front of manifold to fit properly.

4 x 12 frit openings on underside of chassis will not align properly with the extraction columns if rack is placed incorrectly.

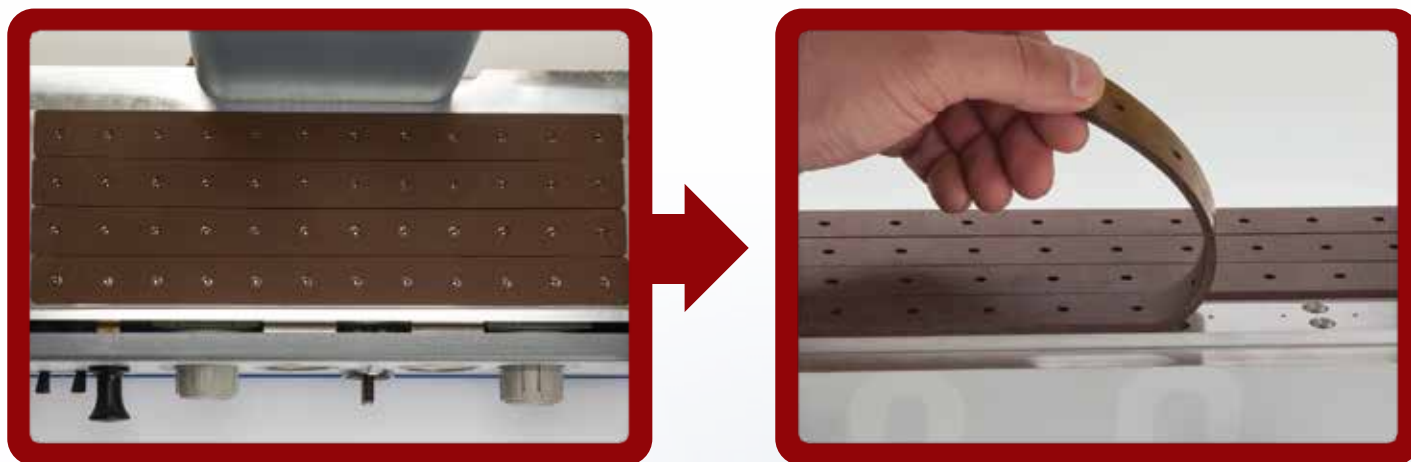


### Cleaning and Gasket Replacement

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 # **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.

To replace brown 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 a better access point for gasket alignment.



**Recommended:** Replace brown rubber gaskets (VMFPPMGSKBL) on the underside of manifold at least 2 times annually. Circular indentations on material are often a good indicator for replacement.

### 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 bar or they can be altogether individually replaced. Steps to remove or replace a frit and/or O-Ring are listed in next section.

# Frit Nut Removal/Replacement

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- In all cases, never over tighten the frit nut upon installation. Plastic and/or tool slot can be damaged.
- In most cases, a poorly functioning frit nut can be removed /replaced without removing the brown gasket.
- In extreme cases, when the frit nut slot has been stripped, it may be necessary to remove the brown gasket or even remove the entire frit plate.
- The frit removal tool (**TT101X**) will be needed to remove any compromised frits or o-rings. Other sizes will not fit the nut correctly.
- The frit nut can be sonicated with water and then methanol in an Ultrasonic cleaner. There is no guarantee that this method will correct the issue.



## Removal / Replacement Steps

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

**Step 2:** Locate frit nut position that requires replacement and determine if the nut can be replaced without removing the gasket. If so, use the TT101X frit removal tool, turn frit nut counterclockwise to remove. (Left Loose / Right Tight)

**Step 3:** Remove tiny o-ring at bottom of frit nut hole, inspecting for tears or deterioration. A small pick may be needed to remove o-ring.

**Step 4:** Reinstall old o-ring if in good condition (after cleaning) or replace if damaged.

**Step 5:** Install new/cleaned frit nut and tighten clockwise until it has made contact with o-ring at bottom of 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.



# Frit Plate Replacement

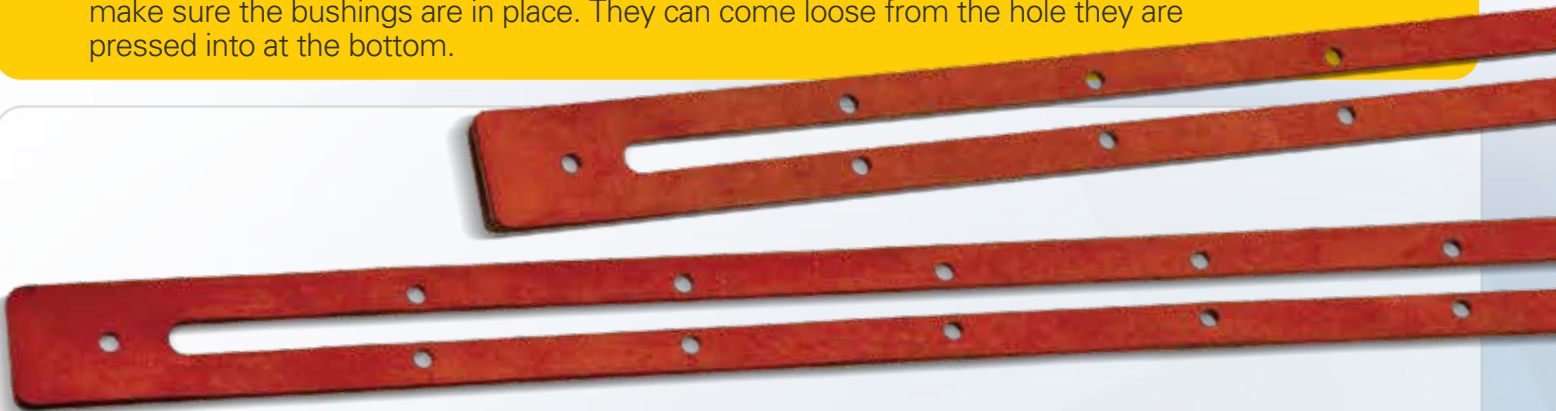
Positive Pressure Manifold 2.0

- To replace frit plate (**VMFPPMCBPLT**), turn manifold upside down. Peel back brown gaskets from frit plate exposing all necessary screws.
- Loosen each of the 48 screws with **TT101X** frit removal tool.
- Remove frit plate by pulling off manifold. (*Note – it may be necessary to use TT101X frit removal tool to pry up plate if not separating from manifold*)
- Replace orange gaskets (**VMFPPMV2GSKOR**) on underside of manifold head. Clean remaining adhesive with a razor for a good seal. Best to attach replacement orange gaskets directly to frit plate before re-securing to manifold.
- Place new frit plate on unit, securing all 48 screws. (Tighten screws from the center, alternating left and right out toward ends. Retighten screws before installing brown foam gasket making sure not to over tighten)
- Replace brown gaskets (**VMFPPMV2GSKBL**) on bottom of frit plate making sure holes on gasket line up with holes on manifold.



## Ensuring Steady Raising & Lowering with the Lift Arms

Lift arms can hesitate raising and lowering. This is often due to the fiber guide that the four guide rods glide up and down on inside of the unit. Keep rods lubricated by applying a light coat of grease from top to bottom. Stop-cock grease or food grade machine oil 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.


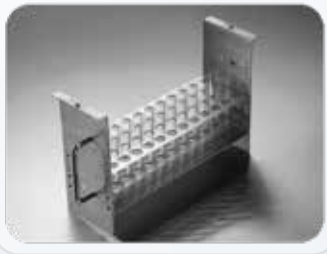




Loose adhesive on the edges of orange rubber gaskets can occur on either row one or row four plates, resulting in a loud /high pitch squeal. In this scenario, the orange rubber gasket must be replaced. Loose adhesive is less likely to occur on inner rows. Make sure the frit plate is tight. Loose screws in the frit plate can damage the orange gaskets under pressure.

# Replacement Parts and Accessories

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Part Number	Description
VMFPPMV2RKA1	Adapter extraction plate to accommodate 1 mL extraction tubes
VMFPPMV2RKA3	Adapter extraction plate to accommodate 3 mL extraction tubes.
VMFPPMV2RKA6	Adapter extraction plate to accommodate 6 mL extraction tubes.
VMFPPMIK	Installation kit ( 25 ft ¼" O.D. tubing, in line air filter, gas regulator, silver attachment bracket and 2 screws)
VMFPPMV2WBND	Waste container (pre-drilled) with draining kit (10 ft tubing and stopcock)
VMFPPMV2CRKG16	16 x 100 mm elution rack.
VMFPPMV2CRKG13	13 x 100 mm elution rack.
VMFPPMRAF	Replacement in line air filter
VMFPPMV2GSKBL	Replacement column sealing gasket (brown)
VMFPPMV2GSKOR	Replacement column sealing gasket (orange)
VMFPPMCBPLT	Frit Plate (combo plate)
VMFPPMWTDK	PPM Waste tray draining kit: 10 ft tubing and stopcock
VMFPPMV2 ON/OFF switch	PPM On/Off Switch
VMFPPMV2 R&L switch	PPM Raise/Lower Switch

## 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. Please call a sales representative for more 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:
  1. 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.
  2. The piston's lubrication will be checked to insure proper operation.
  3. The gaskets will be examined for wear or fracturing.
  4. 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, LLC.



REGULATED FLOW

FULL FLOW/DRY

MANIFOLD

RAISE  
LOWER

NO FLOW

PRESSURE ADJUST

PRESSURE ADJUST

UCT





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