

# Chemical Duty Vacuum/Pressure Pump

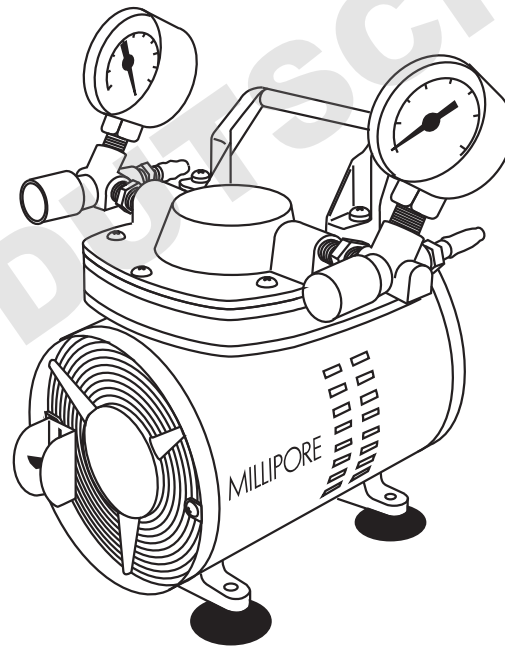
## User Guide

### Catalogue Numbers:

WP61 115 60 (115 V, 60 Hz)

WP61 220 50 (230 V, 50 Hz, 1.7 A)

WP61 100 60 (100 V, 50/60 Hz)



## Notice

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## Introduction

The Millipore vacuum/pressure pump is a continuously running constant air flow type unit for use with laboratory equipment. This vacuum/pressure pump combines all the advantages of lower pressure pumps with the perfect uniformity of diaphragm type operation. It compresses air by means of a long-life diaphragm, which flexes within the compressor. This pump is intended for filtration of liquids or gases, or for other continuous or intermittent use, with all types of filter holders.

**CAUTION:** Always use the supplied hydrophobic vent filter or a vacuum-flask water trap in conjunction with the pump (see Figures 1 and 2). Never pump or draw liquids through the pump, as this will damage it.

The pump has these features:

- The motor and pump are permanently lubricated.
- A thermal overload switch with automatic reset protects the motor.
- Low operating noise is further minimized by rubber feet.
- All internal surfaces (except the stainless steel leaf valves) are coated with PTFE polymer, to prevent corrosion.
- The diaphragm is PTFE-lined to prevent attack by chemicals or solvent vapors.
- A Millex<sup>®</sup>-FA<sub>50</sub> hydrophobic vent filter and 27 in. (69 cm) of 1/4 in. (6 mm) I.D. silicone vacuum tubing are supplied with the pump.

## Rules for Safe Operation



The motor is thermally protected and will automatically restart unexpectedly when the overload device resets. Do NOT pump flammable or explosive gases or vapors or operate this pump in an atmosphere containing flammable or explosive gases or vapors.

Use of this pump in a manner not specifically stated in this user guide may result in severe bodily injury.

Read and understand the information in this owner's manual before operating the vacuum/pressure pump.

- The vacuum/pressure pump should be operated in a dry clean and well ventilated area.

**NOTE: To ensure proper cooling, the vacuum/pressure pump cooling fan must not be blocked and should be a minimum of 1 in. (2.5 cm) away from any wall or obstruction.**

- When the unit is not in use, wrap the power cord around the vacuum/pressure pump and store in a dry place. Do not abuse the cord.
- Replace the Millex-FA<sub>50</sub> vent filter (SLFA 050 10) if necessary.
- Inspect hose, plug, and cord for signs of damage before use. Do not use if a deficiency is found. Never operate a damaged unit. Contact Millipore for replacement parts; see Technical Assistance section for details.
- This vacuum/pressure pump needs no lubrication. Applying oil to any part may result in polluted air delivery to the air-handling equipment and will damage the pump.
- To operate at maximum efficiency, the pump system must be thoroughly clean. Refer to the Maintenance section for details on properly cleaning the pump.
- Compressed air blast must never be aimed at anyone because it can cause serious injury. Keep children away.
- All vacuum/pressure pumps generate heat, even under normal operating conditions. To avoid serious burns, never touch the head parts or tubing during and immediately after operation.
- If higher vacuum or pressure is required, use the Millipore High Output Vacuum/Pressure Pump (WP62 115 60, WP62 220 50, WP62 100 60).

## Usage Guidelines

- Always use the Millex-FA<sub>50</sub> vent filter and 1/4 inch silicone tubing included with the pump when applying vacuum. This will prevent liquids or vapors from entering the pump. A properly attached Millex-FA<sub>50</sub> vent filter is illustrated in Figure 1.
- For maximum protection of the pump, use the Millex-FA<sub>50</sub> vent filter AND a vacuum trap to protect the pump from vapors and gases. The vacuum trap consists of a 1 liter filtering flask (Millipore cat. no. XX10 047 05), No. 8 stopper (XX10 047 08) and silicone tubing. Additional tubing is available as Millipore cat. no. XX71 000 04. This assembly is illustrated in Figure 2.
- Never pump or draw liquids through the pump. This will damage the pump. The filter flask and vacuum trap should be emptied after each use.

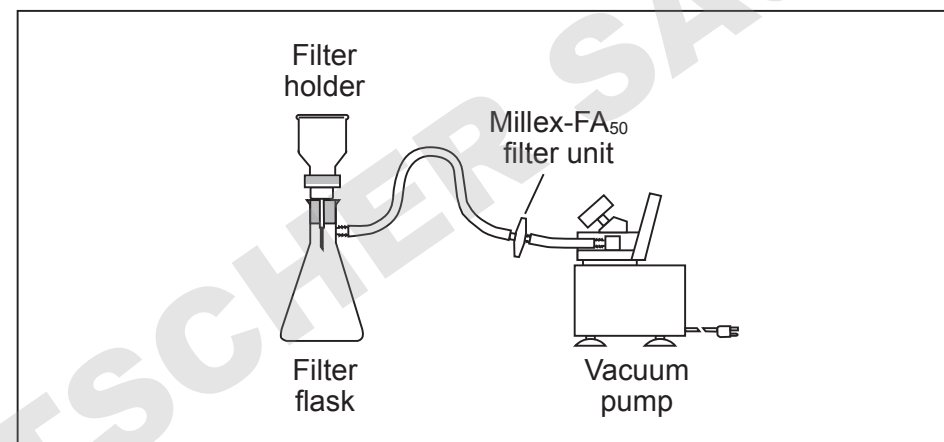


Figure 1. Proper use of Millex-FA<sub>50</sub> filter

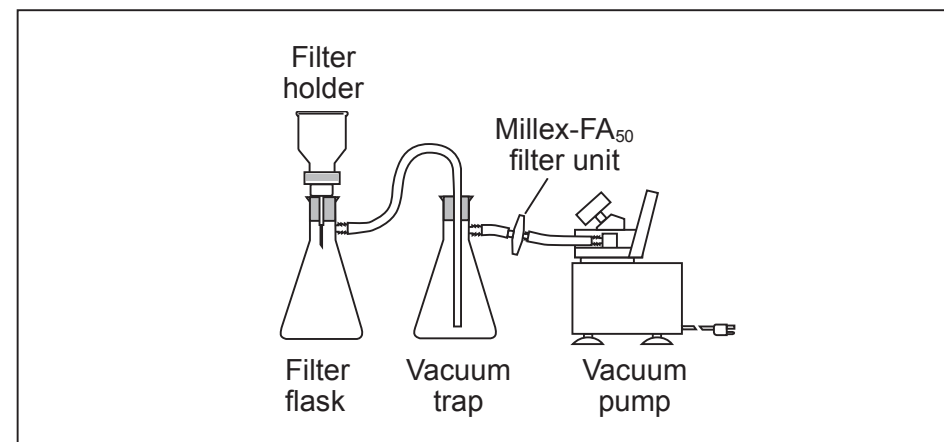
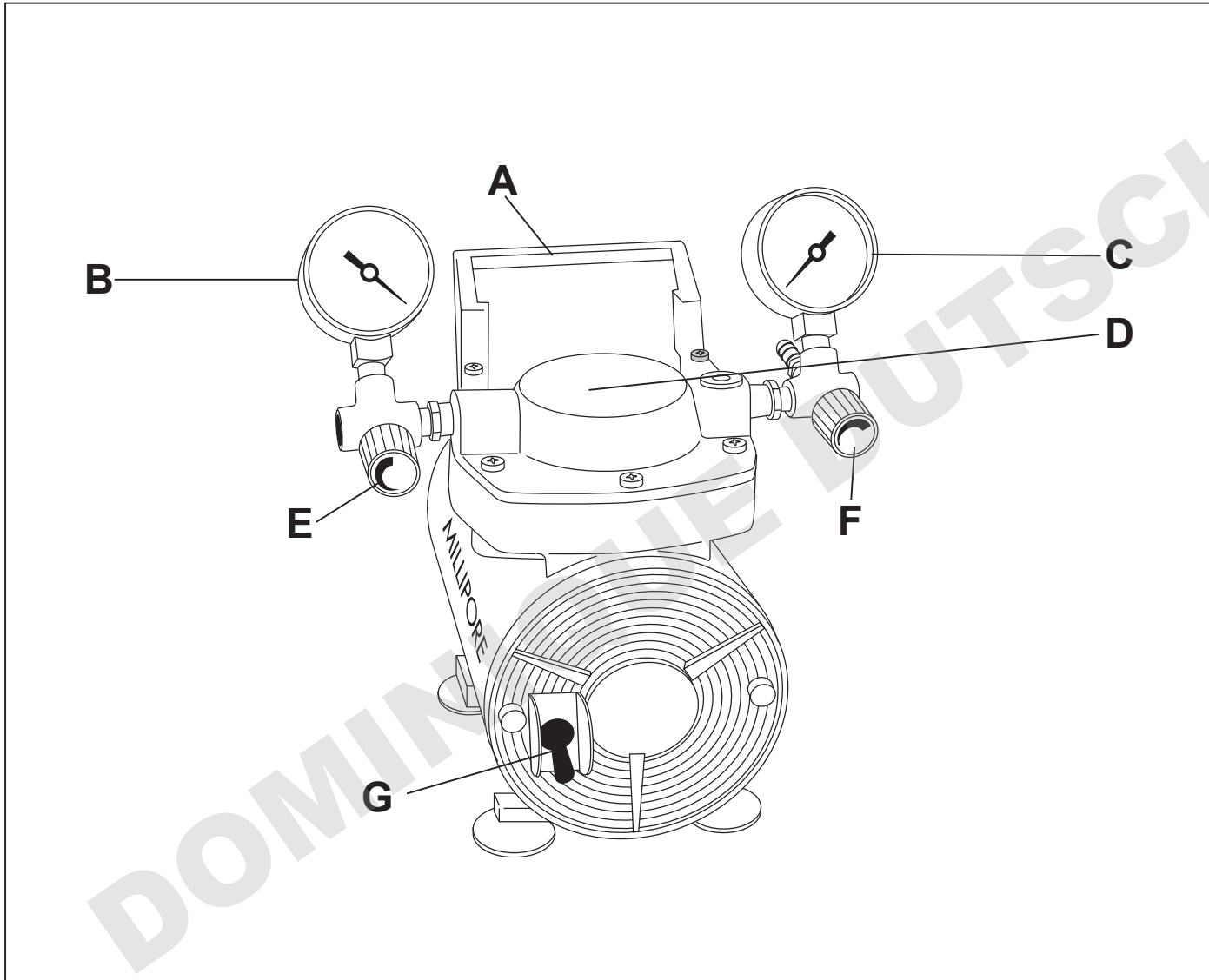


Figure 2. Proper use of vacuum trap and Millex-FA<sub>50</sub> filter

## Pump Components



| Letter | Description    |
|--------|----------------|
| A      | Handle         |
| B      | Vacuum gauge   |
| C      | Pressure gauge |
| D      | Pump head      |
| E      | Vacuum valve   |
| F      | Pressure valve |
| G      | On/off switch  |

### Identification Symbols

|   |  |
|---|--|
| <b>WARNING</b>                                |  |
| <b>ON (Power)</b>                             |  |
| <b>OFF (Power)</b>                            |  |
| <b>Direction of Pressure Control (Valves)</b> |  |
| <b>Hot Surface</b>                            |  |
| <b>Protective Conductor Terminal</b>          |  |

## How to Use the Chemical Duty Vacuum/Pressure Pump

The Millipore Vacuum/Pressure Pump is shipped ready for use. See the Specifications section for required operating conditions.

**CAUTION:** The pump is rated for indoor use only.

**CAUTION:** Be sure available power matches unit requirements. A grounded three-conductor AC electrical source is required. Units are available for 115 VAC 60 Hz or 230 VAC 50 Hz. See the Specifications section for details of electrical supply options available.

1. Unpack the unit and retain all packing material until you verify proper product operation.
2. The unit rests on four vibration isolator pads. Place the unit on a suitable surface, such as a bench, desk, or table. Be sure not to block the ventilation holes located on the motor housing.
3. Select appropriately-sized tubing, according to your application. Use approximately 1/4 in. I.D. tubing to withstand the anticipated pressure or vacuum.

**CAUTION:** During vacuum filtration, use the supplied Millex-FA<sub>50</sub> hydrophobic vent filter, to prevent excessive amounts of liquids or mist from entering the pump (figure 1). For maximum protection, use a vacuum-flask water trap (figure 2).

4. Prepare the necessary equipment or filter holder and connect the tubing to the equipment. Do not connect the tubing to the pump.

5. Plug the power cord into an appropriate electrical source.

**CAUTION:** Do not turn the pump on with equipment or filter holder already attached.

If the pump is inadvertently turned on with the tubing fully connected and it does not run, turn off the pump and disconnect the tubing. Restart the pump and then reconnect the tubing. If the pump's thermal overload switch automatically shuts off the motor, disconnect the tubing and allow the pump to cool for at least 10 minutes before restarting. Reconnect the tubing only after the pump is operating.

6. Turn on the pump, using the toggle switch located on the front of the pump.
7. Connect the tubing from the filter holder or other equipment to the pump and begin your procedure.
8. **If using the pump for vacuum:** Adjust the vacuum by closing the pressure regulator and opening the vacuum regulator fully (counter-clockwise). Slowly tighten down (clockwise) the vacuum regulator until you obtain the desired vacuum reading.

**If using the pump for pressure:** Adjust the pressure by turning the vacuum regulator down fully and opening the pressure fully. Slowly tighten down the pressure regulator until you obtain the desired pressure reading.

9. Turn off the pump when you are finished. Disconnect the tubing first from the pump and then from the filter holder or other equipment.

## Maintenance

Under normal operating conditions, and using proper handling procedures, the chemical duty vacuum/pressure pump should provide many hours of trouble-free operation.

Millipore dry vacuum/pressure pumps are 100% oil-free. The pump employs a non-lube piston and cylinder. No maintenance is necessary for the bearings. All bearings are sealed and permanently lubricated. Lubrication should not be attempted. The units are built for continuous duty operation with quietness and durability.

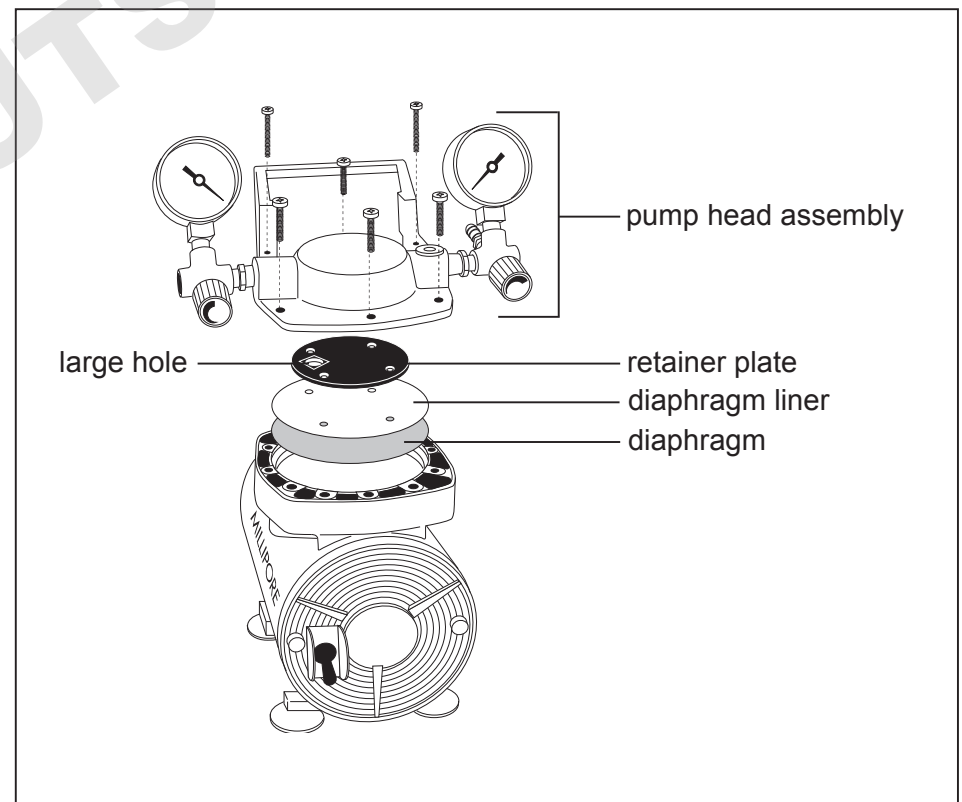
**CAUTION:** Do not lubricate any of the parts with oil, grease or petroleum products. Do not clean with acids, caustics or chlorinated solvents. Do not replace the connecting rod or motor bearings.

### Replacing the Diaphragm

1. Unscrew the four socket-cap screws from the pump head and unscrew the two screws from the pump handle. Remove the pump head assembly from the top of the pump.
2. Unscrew the four Phillips-head screws, then remove the retainer plate, the diaphragm liner, and the diaphragm.
3. Replace the diaphragm (the number printed on it should be facing up), aligning the holes in the diaphragm with the screw holes in the top of the pump.
4. Replace the diaphragm liner, lining up holes in the liner with the screw holes in the top of the pump.
5. Replace the retainer plate, aligning the four small holes with the screw holes and orienting the large hole to the left as shown. Replace and tighten the Phillips-head screws.

**CAUTION:** Take care not to nick the heads of the screws; burrs can damage the inlet valve.

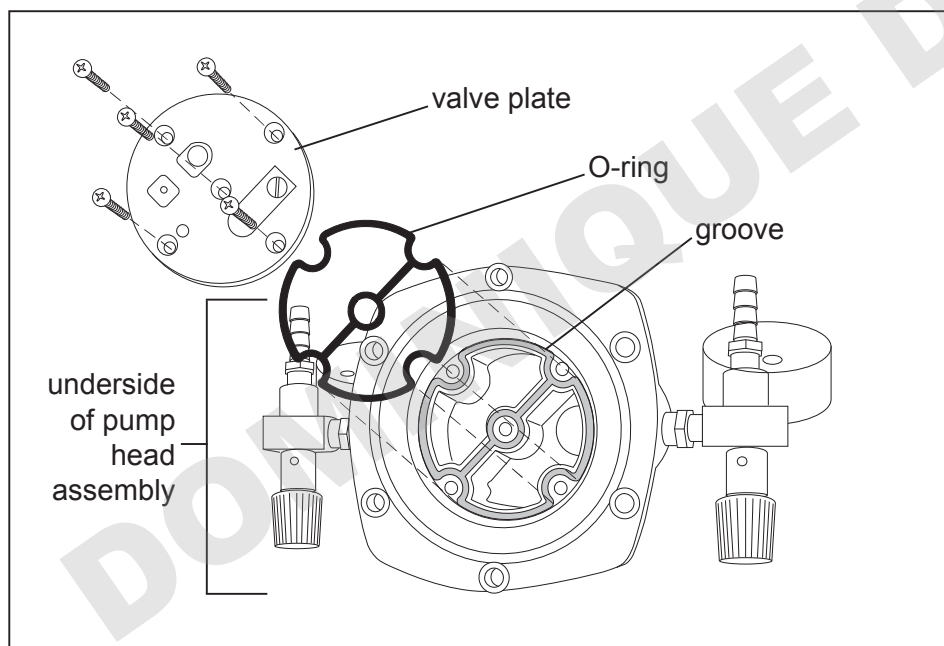
6. Replace the pump head assembly and tighten the six screws to hold it in place.





## Replacing the O-ring

1. Unscrew the four socket-cap screws from the pump head and unscrew the two screws from the pump handle. Remove the pump head assembly from the top of the pump.
2. Remove the five Phillips-head screws that hold the valve plate assembly to the underside of the pump head assembly.
3. Remove the O-ring and replace it by pressing the new O-ring into the groove.
4. Replace the valve plate assembly with the recessed screw holes facing out and tighten the five Phillips-head screws.
5. Replace the pump head assembly and tighten the socket head screws.



## Troubleshooting

### Vacuum Problems

Leakage, contamination and unusual out-gassing are the general causes of problems associated with poor vacuum. To operate at maximum efficiency, a system must be thoroughly clean. If the system is completely clean and free from leaks, and unwarranted vacuum problems still exist, the pump should be checked. A simple criterion for the condition of the pump is the determination of its maximum vacuum capability. This can be accomplished by blocking the intake and reading the vacuum level on the gauge.

### Pressure Problems

Leakage and contamination are the general causes of problems associated with poor pressure. To operate at maximum efficiency, a system must be thoroughly clean. If the system is completely clean and free from leaks, and unwarranted pressure problems still exist, the pump/compressor should be checked by a service technician.

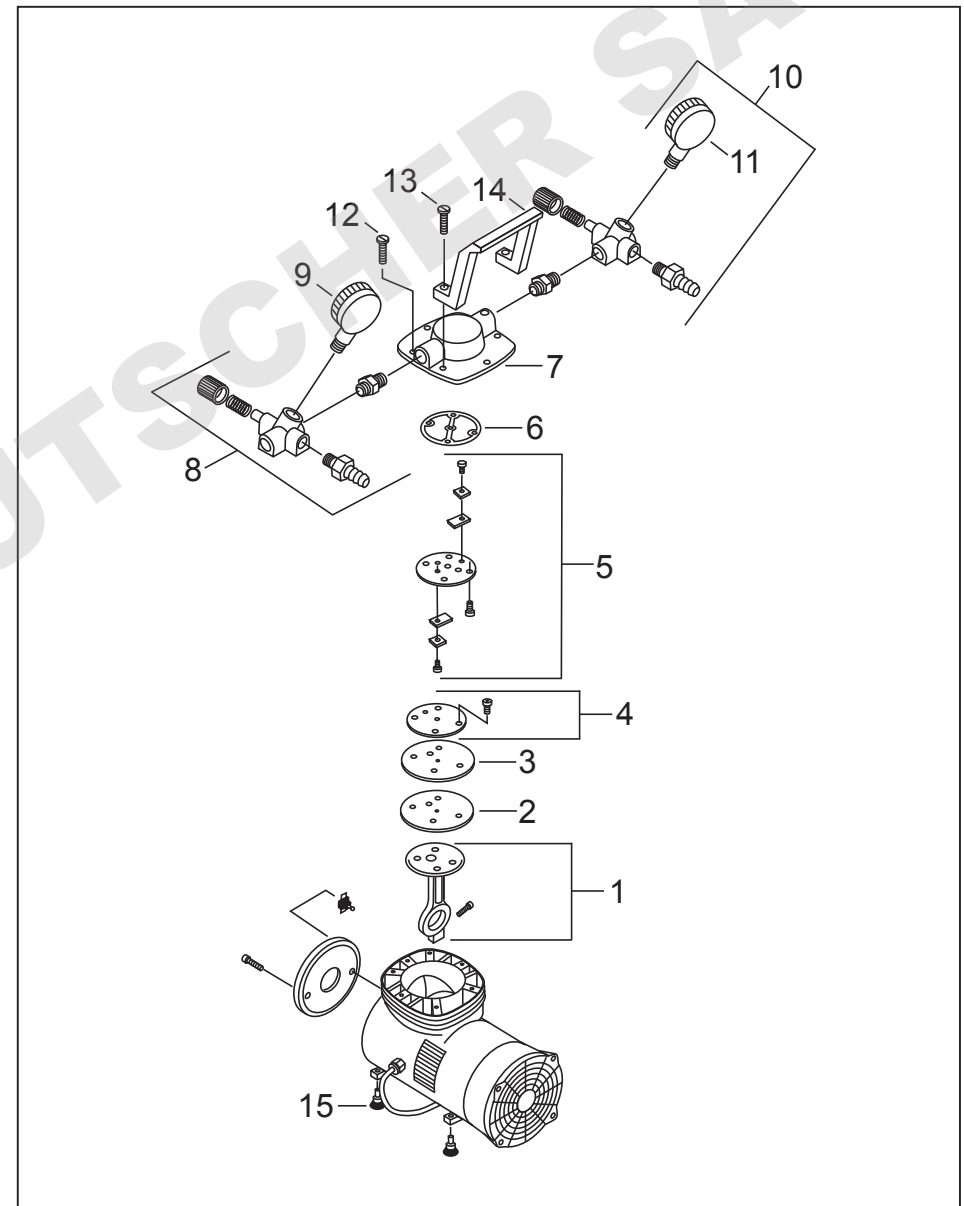
### Troubleshooting Guide

| Poor Pumping Speed | Poor Pressure | Loud Unit | Possible Cause    | Corrective Action                        |
|--------------------|---------------|-----------|-------------------|--|
| ■                  | ■             | ■         | Damaged valves    | Replace flapper valves                   |
| ■                  | ■             | ■         | Debris in valves  | Remove debris and check for valve damage |
| ■                  | ■             | ■         | Damaged O-rings   | Replace O-rings                          |
| ■                  | ■             | ■         | Loose head screws | Tighten head screws                      |
| ■                  | ■             |           | Loose fittings    | Tighten fittings                         |

## Repair

Two replacement part kits are available for the chemical duty vacuum/pressure pump. The accompanying drawing outlines the contents of each of the kits. For further information or for help ordering the correct kit, please contact Millipore Technical Service.

| Key | Description   | Maintenance Kit | Rebuild Kit |
|-----|---|-----------------|-------------|
| 1   | Connecting rod assembly                               | —               | —           |
| 2   | Diaphragm, Buna-N                                     | 1               | —           |
| 3   | Diaphragm liner, PTFE                                 | 1               | —           |
| 4   | Diaphragm hold-down plate assembly                    | —               | 1           |
| 5   | Valve plate assembly (includes flapper [leaf] valves) | —               | 1           |
| 6   | O-ring gasket, head                                   | 1               | —           |
| 7   | Pump head   | —               | 1           |
| 8   | Vacuum regulator assembly                             | —               | —           |
| 9   | Vacuum gauge  | —               | 1           |
| 10  | Pressure regulator assembly                           | —               | —           |
| 11  | Pressure gauge  | —               | 1           |
| 12  | Head screws   | 4               | 4           |
| 13  | Handle screws   | 2               | 2           |
| 14  | Handle  | —               | —           |
| 15  | Rubber suction feet                                   | —               | —           |



## Specifications

### Performance

|          |   |
|----------|---|
| Vacuum   | 24.0 inches of Hg   |
| Pressure | 20 psi continuous, 35 psi intermittent<br>(230 V pump duty cycle: 15 minutes on,<br>15 minutes off) |

|                       |   |
|-----------------------|---|
| Regulatory Compliance | 115 V UL/CSA recognized;<br>230 V CE compliant<br>2004/108/EC<br>2006/95/EC<br>98/37/EC |
|-----------------------|---|

|             |                    |
|-------------|--------------------|
| Sound Level | Less than 60 dB(A) |
|-------------|--------------------|

### Dimensions

|                      | WP61 115 60, WP61 100 60  | WP61 220 50        |
|----------------------|---------------------------|--------------------|
| Length               | 7.5 in. (19.1 cm)         | 10.5 in. (26.7 cm) |
| Width                | 7 in. (17.8 cm)           | 9.4 in. (23.9 cm)  |
| Height               | 8 in. (20.3 cm)           | 9.7 in. (24.6 cm)  |
| Weight (approximate) | 9 lbs (4.1 kg)            | 12 lbs (5.4 kg)    |
| Tubing connectors    | Stepped 1/4 in. hose barb |                    |

### Materials of Construction

|                        |                            |
|------------------------|----------------------------|
| Body and pump head     | Die-cast aluminum          |
| Diaphragm              | Buna-N with PTFE lining    |
| Head gasket            | Buna-N                     |
| Leaf valves            | High grade stainless steel |
| Internal pump surfaces | PTFE-coated                |

### Electrical Specifications

|  |                                    |
|--|------------------------------------|
| Shaded-pole, single phase, 1/15 HP motor |                                    |
| 115 V, 60 Hz <i>or</i>                   |                                    |
| 100 V, 50/60 Hz AC                       | 3-pronged, grounded cord and plug  |
| 230 V, 50 Hz AC                          | HAR cordage, CEE 7/7 (Schuko) plug |
| Line voltage limits                      | ±10% of supply voltage             |

### Environmental Conditions

|                         |  |
|-------------------------|--|
| Temperature             | 5 °C (41 °F) to 40 °C (104 °F)   |
| Relative Humidity, Max. | 80% for temperatures up to 31 °C,<br>decreasing to 50% at 40 °C        |
| Altitude, Max.          | 2,000 meters   |
| Pollution Degree        | 2, per IEC 664 (indoor usage: lab, office, etc.)                       |
| Installation Category   | II, per IEC 624 (local level: appliances,<br>portable equipment, etc.) |

### Air Flow Rates

Air flow rates at different vacuum and pressure settings are shown in the following table. For vacuum operation, pump exit pressure is 1 atmosphere (14.7 psi). To obtain the indicated performance, the specified electrical and environmental specifications must be met.

| Vacuum |        | Flow Rate |      | Pressure |      | Flow Rate |      |
|--------|--------|-----------|------|----------|------|-----------|------|
| mbar   | in. Hg | L/min     | CFM  | bar      | PSIG | L/min     | CFM  |
| 0      | 0      | 37        | 1.31 | 0        | 0    | 37        | 1.31 |
| 840    | 5      | 25        | 0.88 | 0.3      | 5    | 32        | 1.13 |
| 670    | 10     | 18        | 0.64 | 0.7      | 10   | 27        | 0.95 |
| 510    | 15     | 10        | 0.35 | 1.0      | 15   | 21        | 0.74 |
| 340    | 20     | 4         | 0.14 | 1.4      | 20   | 16        | 0.57 |
| 200    | 24     | 0         | 0    | 1.7      | 25   | 12        | 0.42 |
| —      | —      | —         | —    | 2.4      | 35   | 4         | 0.14 |

## Product Ordering Information

This section lists the catalogue numbers for the Chemical Duty Vacuum/Pressure Pump. See the Technical Assistance Section for information about contacting Millipore. You can also buy Millipore products on-line at [www.millipore.com](http://www.millipore.com).

| Vacuum/Pressure Pump  | Catalogue Number |
|---|------------------|
| 115V, 60 Hz   | WP61 115 60      |
| 230V, 50 Hz   | WP61 220 50      |
| 100V, 50/60 Hz  | WP61 100 60      |
| <b>Replacement Parts</b>  |                  |
| Pump Maintenance Kit<br>includes diaphragm, diaphragm liner,<br>O-ring gasket, head screws, and<br>handle screws  | WP61 MNT 00      |
| Pump Rebuild Kit<br>includes hold-down plate assembly,<br>valve plate assembly, pump head,<br>vacuum gauge, pressure gauge,<br>head screws, and handle screws | WP61 RBD 00      |
| Millex-FA <sub>50</sub> filter, 10/pk   | SLFA 050 10      |
| Pressure tubing, silicone, 25 ft  | XX80 000 25      |
| Vacuum tubing, silicone, 4 ft   | XX71 000 04      |

## Technical Assistance

For more information, contact the Millipore office nearest you. In the U.S., call **1-800-MILLIPORE** (1-800-645-5476). Outside the U.S., see your Millipore catalogue for the phone number of the office nearest you or go to our web site at [www.millipore.com/offices](http://www.millipore.com/offices) for up-to-date world-wide contact information. You can also visit the tech service page on our web site at [www.millipore.com/techservice](http://www.millipore.com/techservice).

## Declaration of Conformity

Model WP61 220 50 is in conformity with the following directives:

Electromagnetic Compatibility (EMC) Directive 2004/108/EC

Low Voltage Directive 2006/95/EC

Machinery Directive 98/37/EC

## Warranty

The applicable Millipore Warranty and limited liability for products listed in this publication may be found at [www.millipore.com](http://www.millipore.com) (search on "Terms and Conditions of Sale").

