

**ENMET Corporation**  
**PO Box 979**  
**Ann Arbor, MI 48106-0979**

**Instruction Manual**  
**Gas Sampling Unit**  
**DC Operation**

**80003-141**  
**February 1999**  
**MCN-248, 01/22/01**  
**MCN-291, 10/21/03**



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### Reference information:

**NOTE:** [important information about use of instrument – if not followed may have to redo some steps.]

**CAUTION:** [affects equipment – if not followed may cause damage to instrument, sensor etc...]

**WARNING:** [affects personnel safety – if not followed may cause bodily injury or death.]



## 1.0 Introduction

The **ENMET** gas sampling unit is used in applications requiring air sample draw to a sensor. It is designed to be used in conjunction with **ENMET** sensor/transmitters. If used with other manufactures' sensor/transmitters, contact your local **ENMET** representative or **ENMET**

**NOTE:** *All specifications stated in this manual may change without notice.*

### 1.1 Unpack

Unpack the Gas Sampling Unit and examine it for shipping damage. If such damage is observed, notify both **ENMET** customer service personnel and the commercial carrier involved immediately.

#### Regarding Damaged Shipments

**NOTE: It is your responsibility to follow these instructions. If they are not followed, the carrier will not honor any claims for damage.**

- This shipment was carefully inspected, verified and properly packaged at our company and delivered to the carrier in good condition.
- When it was picked up by the carrier at **ENMET**, it legally became your company's property.
- If your shipment arrives damaged:
  - Keep the items, packing material, and carton "As Is." Within 5 days of receipt, notify the carrier's local office and request immediate inspection of the carton and the contents.
  - After the inspection and after you have received written acknowledgment of the damage from the carrier, contact **ENMET** Customer Service for return authorization and further instructions. Have your Purchase Order and Sales Order numbers available.
- ENMET** either repairs or replaces damaged equipment and invoices the carrier to the extent of the liability coverage, usually \$100.00. Repair or replacement charges above that value are your company's responsibility.
- The shipping company may offer optional insurance coverage. **ENMET** only insures shipments with the shipping company when asked to do so in writing by our customer. If you need your shipments insured, please forward a written request to **ENMET** Customer Service.

#### Regarding Shortages

If there are any shortages or questions regarding this shipment, please notify **ENMET** Customer Service within 5 days of receipt at the following address:

**ENMET Corporation**  
680 Fairfield Court  
Ann Arbor, MI 48108  
734-761-1270 734-761-3220 Fax

### 1.2 Check Order

Check, against the purchase order. Verify that the Gas Sampling Unit is received as ordered. If there are accessories on the order, ascertain that they are present. Notify **ENMET** customer service personnel of any discrepancy immediately.

### 1.3 Serial Numbers

Each Gas Sampling Unit is serialized. These numbers are on tags on the equipment and are on record in an **ENMET** database.

## 2.0 Specifications

Power Requirement	10 - 30 VDC
Suction Flow Rate	0.3 Liter/min. (adjustable after installation)
Sampling distance	100 ft maximum
Suction Pump	Electromagnetic diaphragm pump
Piping Material	Polypropylene, non toxic vinyl tubing
External Piping Connections	Compress fitting for ¼O.D. tubing
Installation Method	Wall mounting
Dimensions	11(w) X 6.5(H) X 5(D) inches
Weight	2 lbs
Operating Temperature Range	+32°F (0° C) to +104°F (40° C)

**NOTE:** All specifications stated in this manual may change without notice.

## 3.0 Features and Function

Refer to Figure 1 for component layout diagram.

Feature	Function
Power Terminal	This terminal connects the DC power (10 - 30 VDC) supplied from external power source
Flowmeter	This Flowmeter allows the user to verify and monitor the flow rate of the air sample. Proper flow rate, approximately 0.5 ℓpm (liter per minute).
Flowmeter Valve	This valve is used to control the flow rate. Adjust flow to proper flow rate, approximately 0.5 ℓpm (liter per minute).
Flow Sensing Device	This flow sensing device is to monitor for loss of air flow. Activation upon loss of air flow results in relay activation.
Low Flow Alarm Light (Optional with some installations)	This light when green indicates flow rate is sufficient. When light is red, flow rate is inadequate.
Sampling Pump	This electromagnetic diaphragm pump draws the air sample from the test area to the sensor.
Exhaust Outlet	This port expels the air sample after it passes the sensor. For external piping, use ¼" O.D. tubing.
Sampling Inlet	This port draws the air sample from the test area. For external piping, use ¼" O.D. tubing.
Gas Sensing Chamber	This chamber directs the air sample to the gas sensor. Varies, depending on type of sensor/transmitter

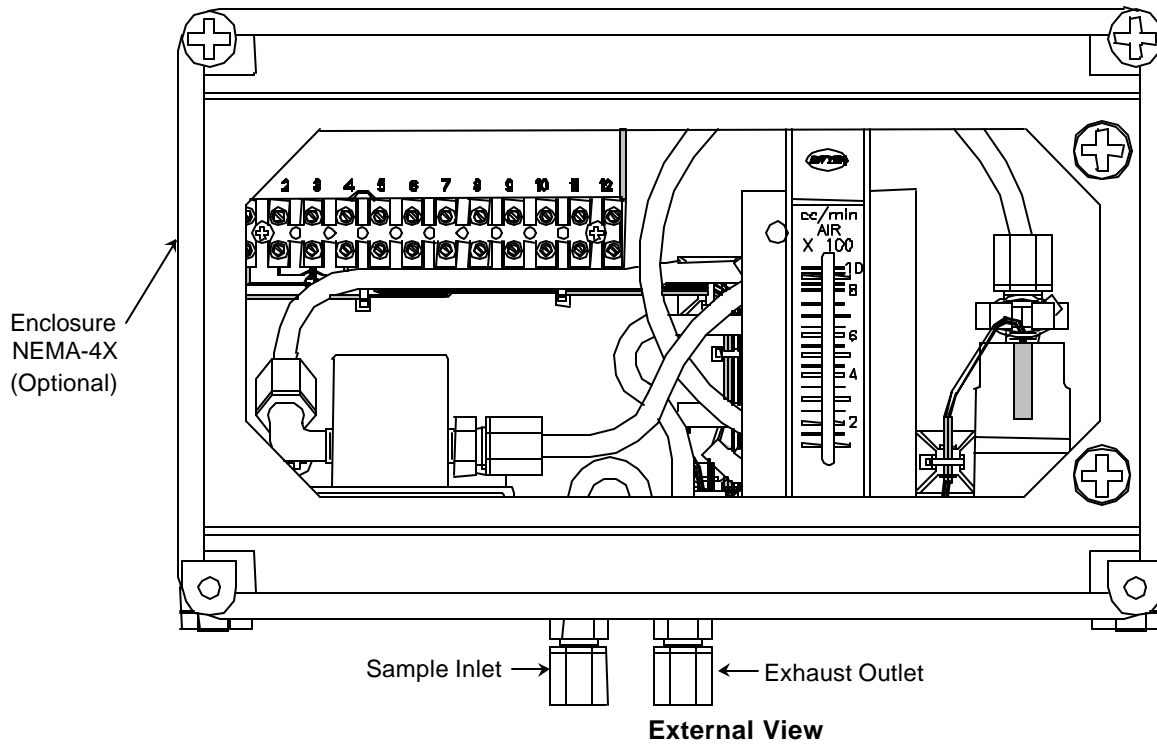
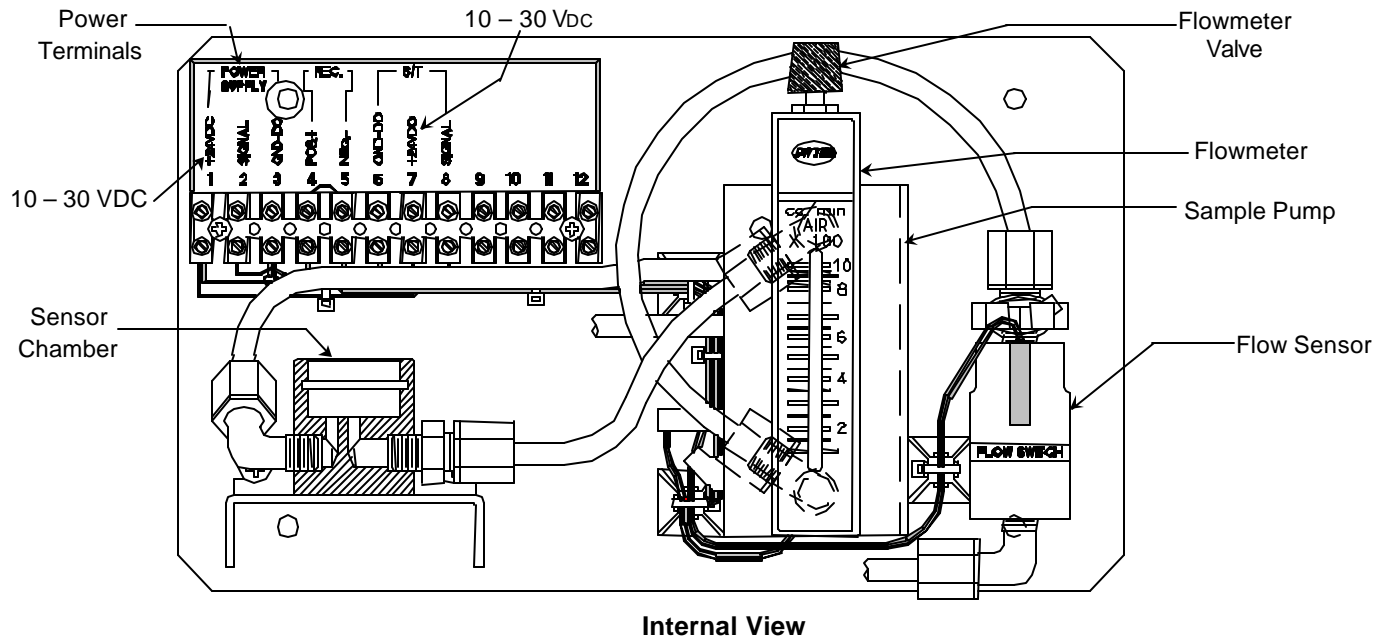


Figure 1: Gas Sampling Unit Features

## 4.0 Installation

The Gas Sampling Unit needs to be level and as close to the area to be monitored as possible, to reduce transport time to the sensor/transmitter.

- Refer to Figure 2 for mounting dimensional diagram.
- Sensor/Transmitters can be located within the Gas Sampling Unit or remotely. Refer to Figures 3,4 and 5
- Inlet tubing must be compatible with the target gas.
- Caution should be used to insure that fluids do not enter the inlet tubing.
- Some types of gases require that the sample gas be removed from the area. This is accomplished with the outlet port. Figures 7 and 8 show typical use of gas bag and exhaust line from the outlet port.
- Power is supplied from an external source. Refer to Figures 4 and 5 for wiring diagram. Connect 10 – 30 VDC to terminal block positions 1 and 3.
- After installing all the tubing and the sensor/transmitter, verify that there are no leaks in the system. Verification should be done by plugging the inlet tube. If the system is correct the flow meter reads zero and the flow sensor activates. If this does not happen, check all fittings and seals.

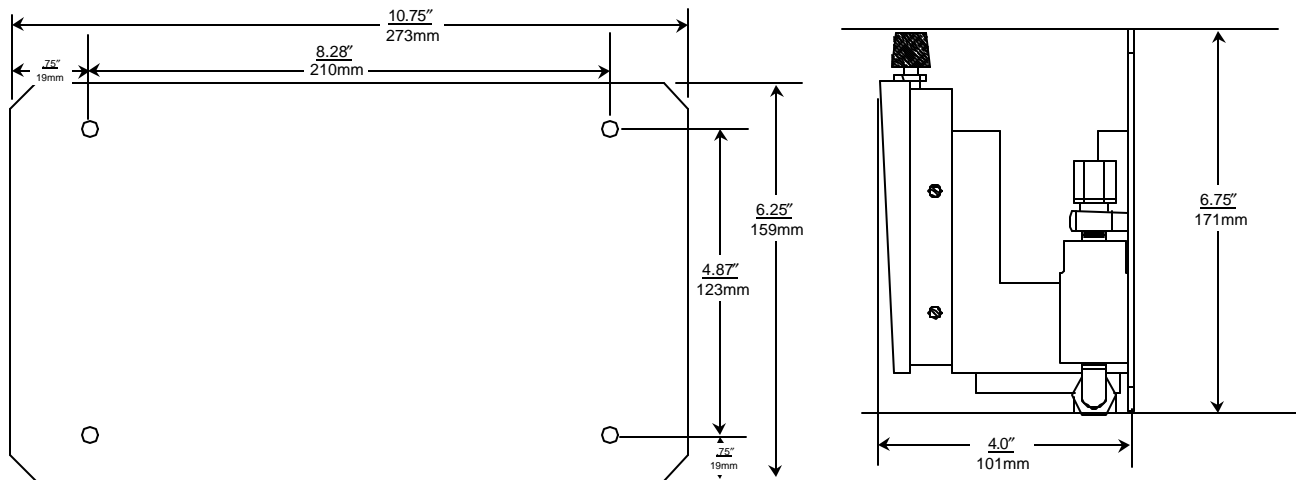


Figure 2: Dimensional Diagram

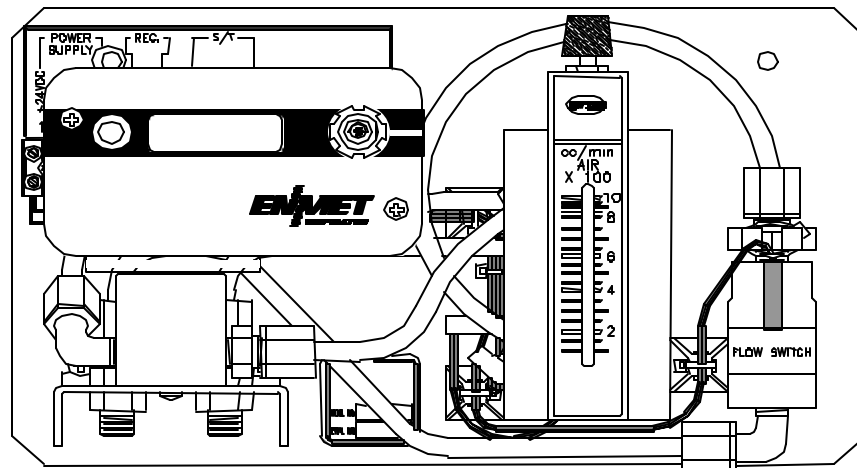
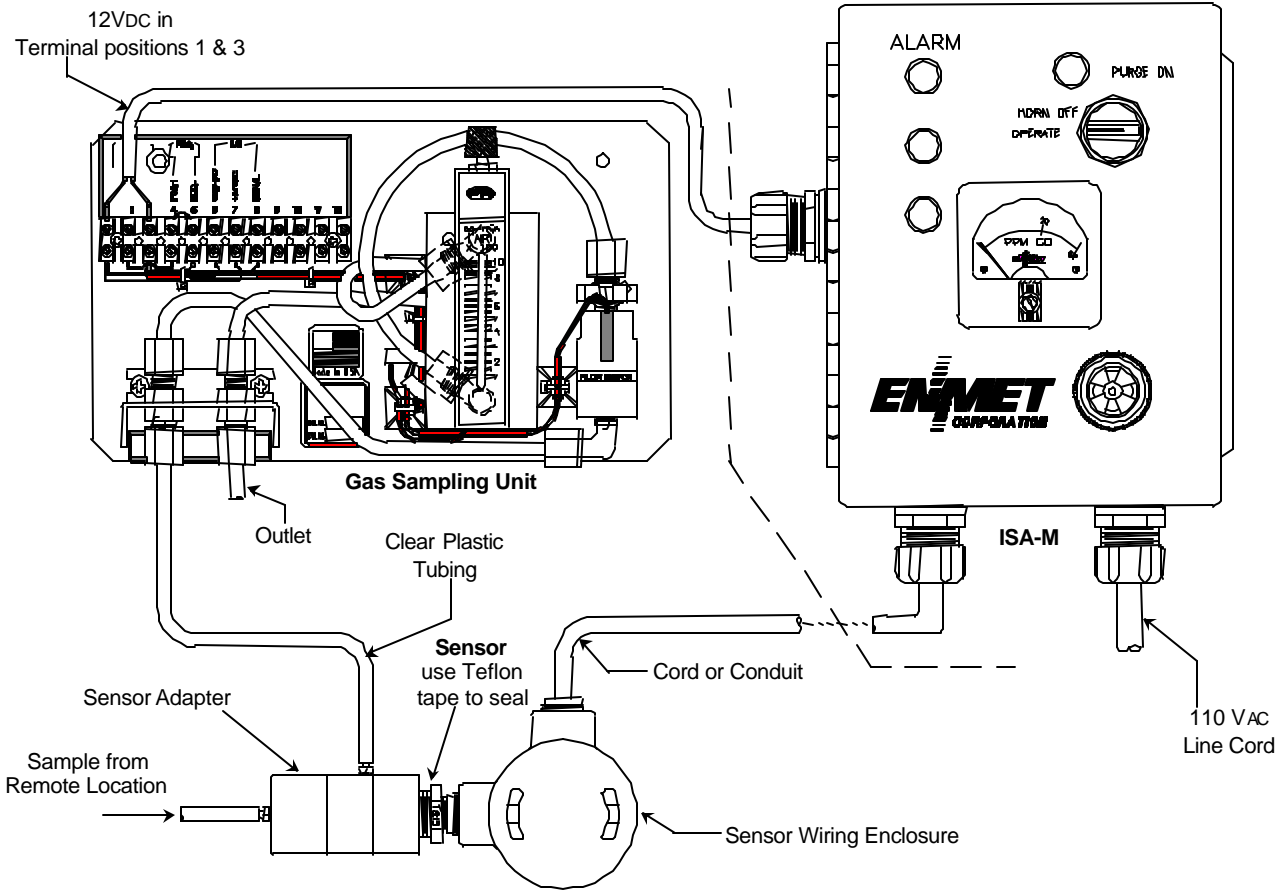
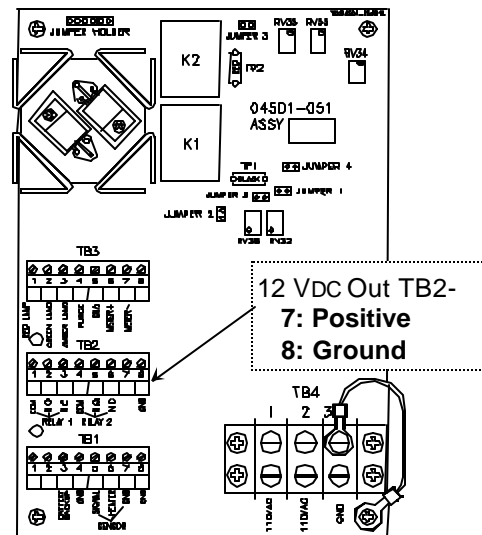


Figure 3: Gas Sampling Unit with Sensor/Transmitter mounted Internally



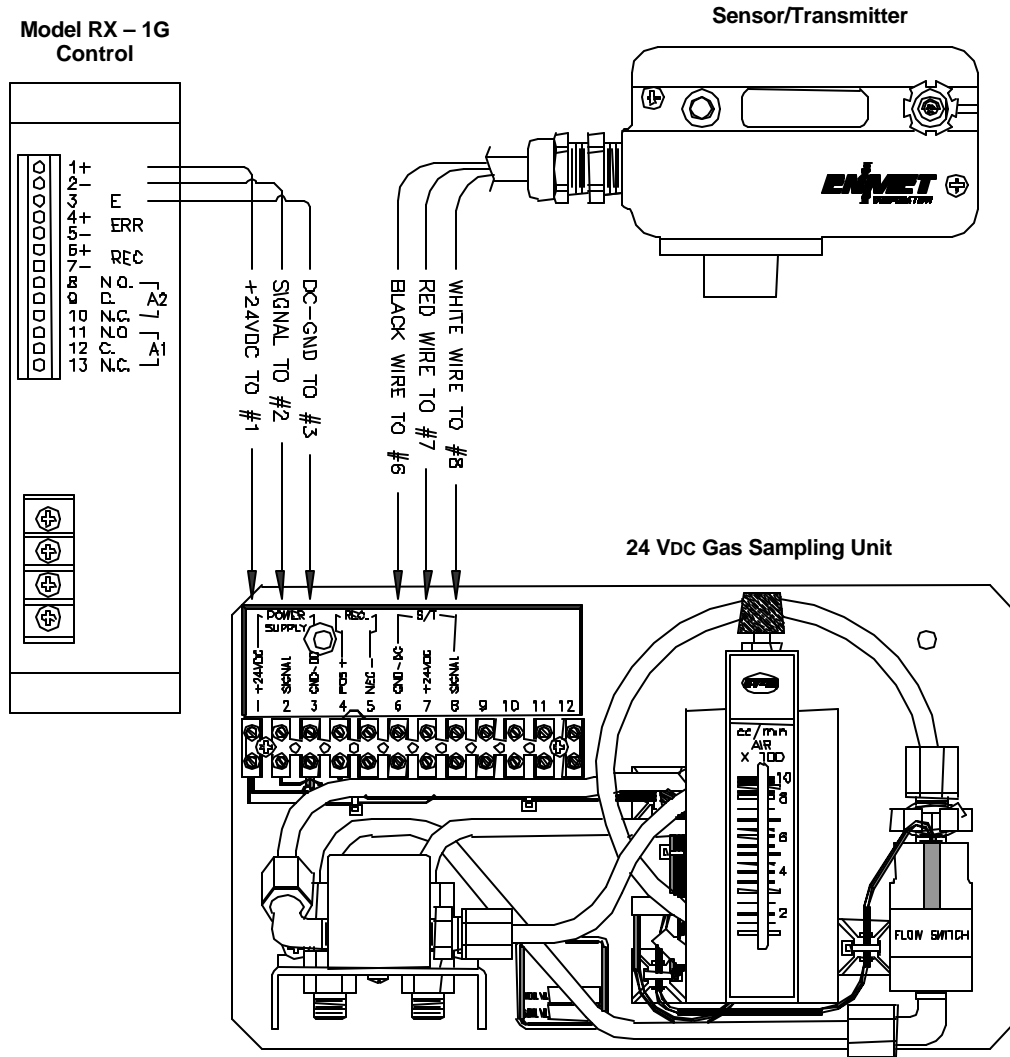


**Using 12 VDC source ISA-M**  
**From:** ISA-M terminal TB2-positions 7&8  
**To:** Gas Sampling Unit terminal positions 1 & 3



View of Internal PCB in ISA-M

Figure 4: Application, Remote Sensor, Motorized Sample Draw System



**Figure 5: Wiring Diagram Gas Sampling Unit with RX-1G Control**

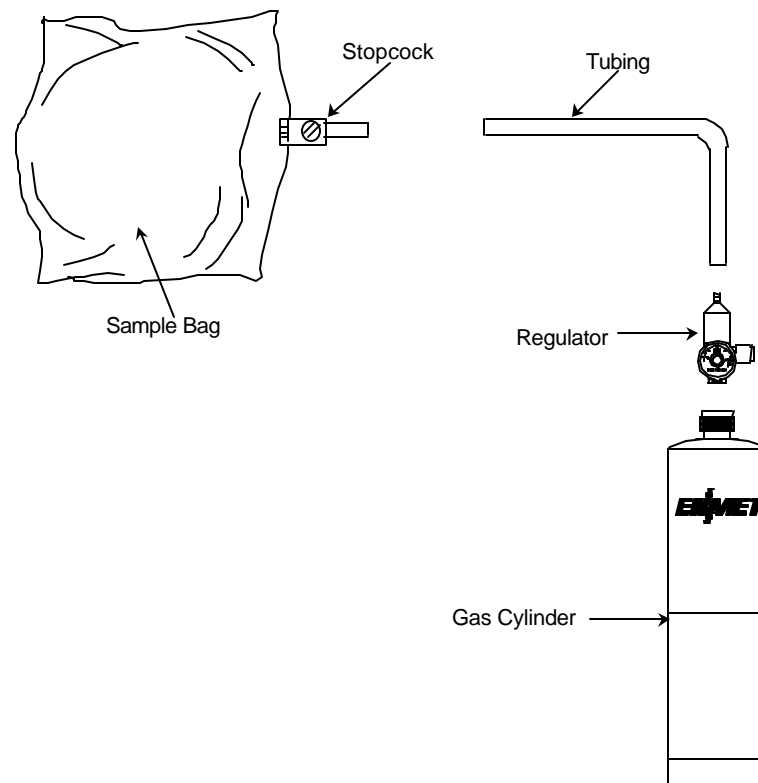
NOTE: On some installations, the 4-20mA signal may be wired through the flow switch, so that the 4-20mA signal is interrupted when low flow conditions occur.

## 5.0 Operation

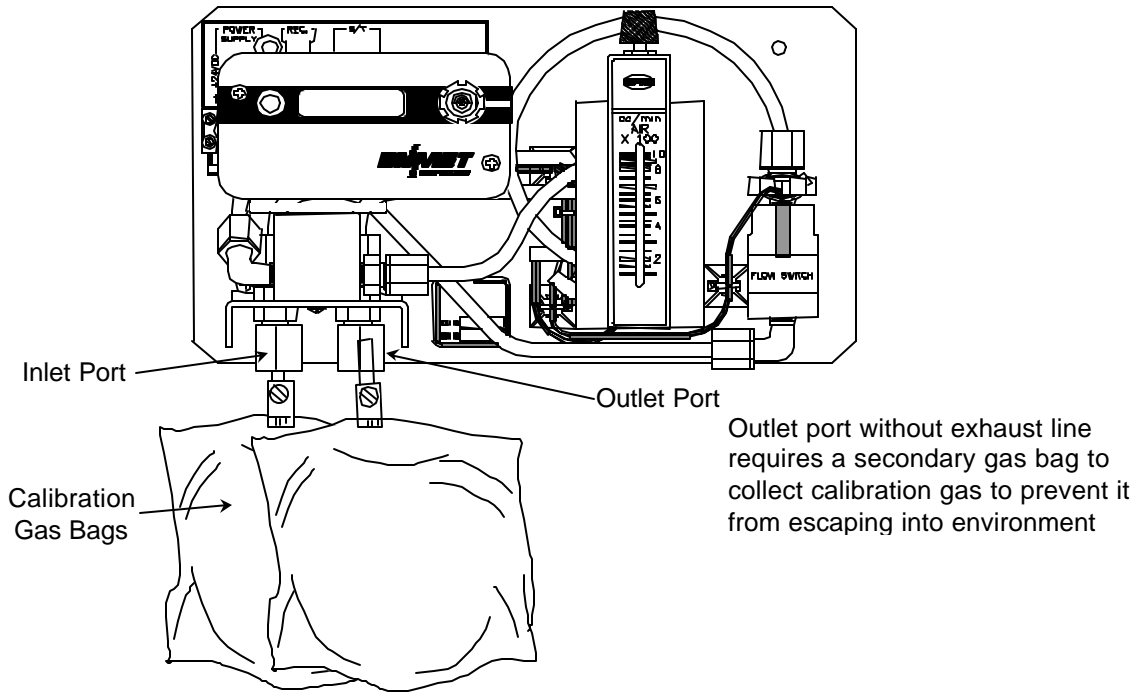
The Gas Sampling Unit requires no calibration itself, however any sensor/transmitter or instrument associated with it does. Follow the instructions associated with the sensor/transmitter or instrument. To insure that the calibration is accurate with the sample draw system, you need to fill a sample bag with calibration gas.

### 5.1 Procedure for Sampling from Gas Bag

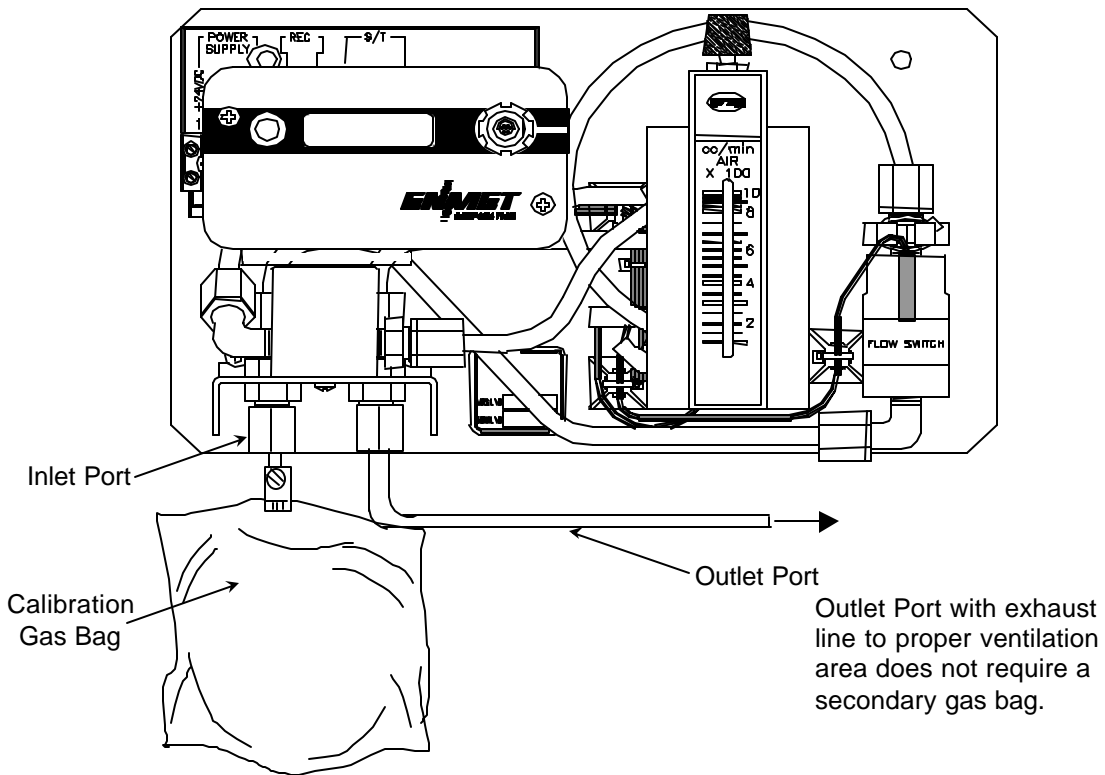
- Refer to Figures 6,7 and 8 for filling gas bag and attaching to Gas Sampling Unit.
- Attach the regulator to the gas cylinder. Refer to Figure 6. Use only the regulator supplied with the calibration kit.
- Attach a completely deflated gas bag (5 liter tedlar bag) to the output port of the regulator with appropriate tubing.
- Turn on the gas cylinder by rotating the knob on the regulator so gas flows into the bag. Fill the gas bag until it is approximately 75% inflated. Close the stopcock and turn off the regulator. Remove the gas cylinder regulator and tubing.
- Open the stopcock on the gas bag; connect the gas bag to the gas inlet port located on the Gas Sampler Unit, or the entrance to the sensor adapter. Refer to Figures 7 and 8 for venting of calibration gas.
- Allow gas to flow for the time required for calibration of the sensor/transmitter instrument.



**Figure 6: Filling Sample Bag from Gas Cylinder**



**Figure 7: Venting Calibration Gas to a Gas Bag**



**Figure 8: Venting Calibration Gas to an Exhaust Line**

## 6.0 Maintenance

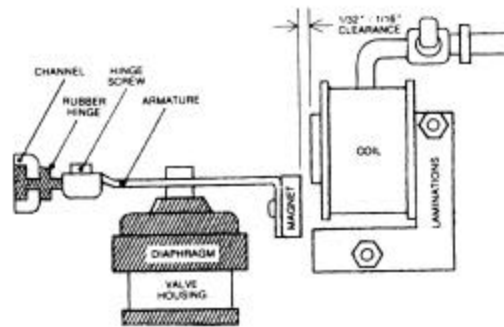
The flow rate of the sampling pump should be checked occasionally. The sampling pump has a diaphragm, which may wear out. Wear on the diaphragm has a direct influence of flow rate. If the flow rate decreases, and there is no restriction in the air line, the diaphragm may need replacing. There are two styles of diaphragm pump that have been used in the Gas Sampling Unit. See illustrations in sections 6.1 and 6.2 to determine the replacement part numbers and procedures for maintenance.

### 6.1 Pump Maintenance for Pump 04018-018

Instructions for replacing diaphragm of **ENMET** pump part number 04018-018

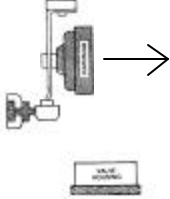

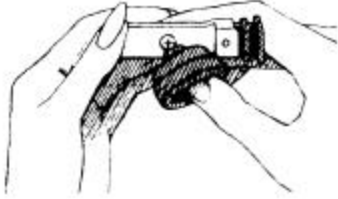
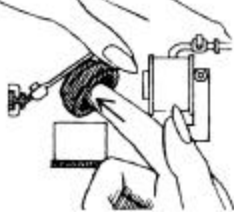

If the diaphragm becomes damaged or torn, it can be replaced.

Replacement diaphragm **ENMET** part number 04018-017.



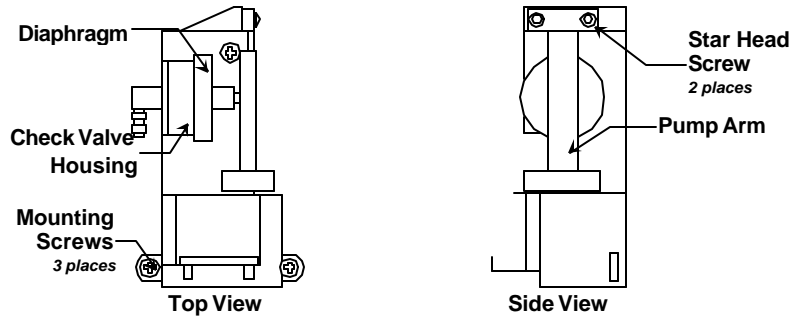
**Figure 9: 04018-018 Pump Features**

<p>1. Before proceeding, see if diaphragm is torn. Stretch diaphragm by lifting armature. This will expose a torn spot.</p>	
<p>2. Free armature assembly and diaphragm. Pop-off diaphragm using thumbs.</p>	
<p>3. Swing armature up to allow removal of diaphragm.</p>	

<p>4. Remove diaphragm from armature by pulling it over the retaining screw.</p>	
<p>5. Replace diaphragm. –Wet new diaphragm hole liberally with water.</p>	
<p>6. Pop new diaphragm onto armature screw post.</p>	
<p>7. Wet with water inside wall and lip of diaphragm.</p>	
<p>8. Press diaphragm onto valve housing by pressing armature down.</p>	

## 6.2 Pump Maintenance for Pump 04018-118

For the maintenance of **ENMET** part number 04018-118.

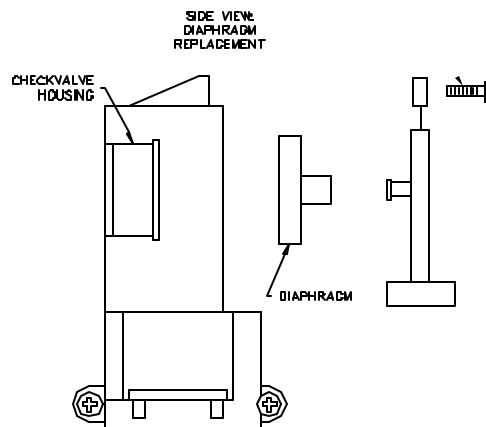


**Figure 10: 04018-118 Pump Features**

### 6.2.1 Pump Diaphragm Replacement

If the diaphragm becomes damaged or torn, it can be replaced.

Replacement diaphragm **ENMET** part number 04018-117.



**Figure 11: Diaphragm Details**

Remove 2 star head screws and pump arm. See figures 10 and 11.

Remove damaged diaphragm from pump arm and replace with new diaphragm.

Reattach pump arm and verify diaphragm is properly sealed to check valve housing.

### 6.2.2 Check Valve Housing Replacement

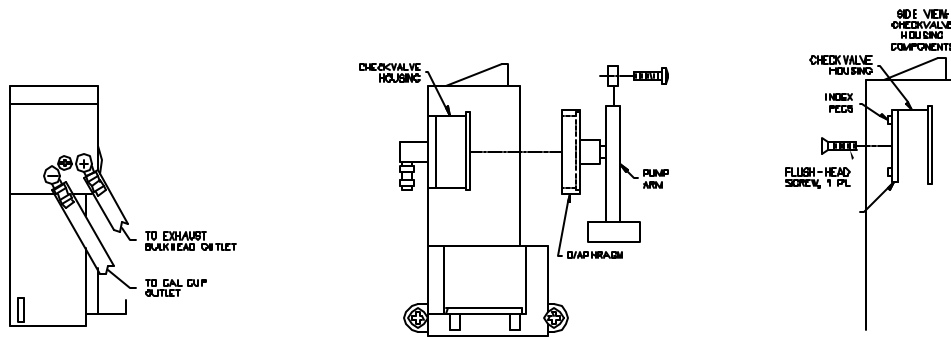
If the check valve becomes damaged or to warn to operate correctly it can be replaced.

Pump repair kit **ENMET** part number 04018-116.

**WARNING:** The check valve housing and associated gasket must be installed in the proper position for the pump to operate correctly. If they are installed improperly the pump will flow in the wrong direction.

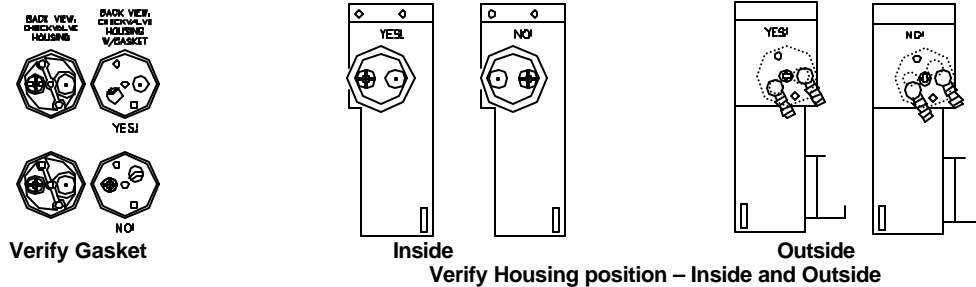
Remove the outlet fittings, pump arm with diaphragm and note the orientation of the check valve housing and gasket. See figures 12 and 13.

Remove flat-head screw and check valve housing.



**Figure 12: Check Valve Housing Replacement Details**

Verify that gasket and housing are in the proper position.



**Figure 13: Proper Orientation of Check Valve Housing and Gasket**

Replace check valve housing with flat head screw.

Verify proper position of check valve housing.

Reattach pump arm and reseal diaphragm

Reattach outlet fittings.



## 7.0 Warranty

**ENMET** warrants new instruments to be free from defects in workmanship and material under normal use for a period of one year from date of shipment from **ENMET**. The warranty covers both parts and labor excluding instrument calibration and expendable parts such as calibration gas, filters, batteries, etc... Equipment believed to be defective should be returned to **ENMET** within the warranty period (transportation prepaid) for inspection. If the evaluation by **ENMET** confirms that the product is defective, it will be repaired or replaced at no charge, within the stated limitations, and returned prepaid to any location in the United States by the most economical means, e.g. Surface UPS/FedEx Ground. If an expedient means of transportation is requested during the warranty period, the customer is responsible for the difference between the most economical means and the expedient mode. **ENMET** shall not be liable for any loss or damage caused by the improper use of the product. The purchaser indemnifies and saves harmless the company with respect to any loss or damages that may arise through the use by the purchaser or others of this equipment.

This warranty is expressly given in lieu of all other warranties, either expressed or implied, including that of merchantability, and all other obligations or liabilities of **ENMET** which may arise in connection with this equipment. **ENMET** neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than that which is set forth herein.

NOTE: When returning an instrument to the factory for service:

- Be sure to include paperwork.
- A purchase order, return address and telephone number will assist in the expedient repair and return of your unit.
- Include any specific instructions.
- For warranty service, include date of purchase.
- If you require an estimate, please contact **ENMET**.

There are Return for Repair Instructions and Form on the last pages of this manual. This Form can be copied or used as needed.

**Notes:**



PO Box 979  
680 Fairfield Court  
Ann Arbor, Michigan 48106-0979  
734.761.1270 Fax 734.761.3220

# Returning an Instrument for Repair

**ENMET** instruments may be returned to the factory or any one of our Field Service Centers for regular repair service or calibration. The **ENMET** Repair Department and Field Service Centers also perform warranty service work.

When returning an instrument to the factory or service center for service, paperwork must be included which contains the following information:

- A purchase order number or reference number.
- A contact name with return address, telephone and fax numbers
- Specific instructions regarding desired service or description of the problems being encountered.
- Date of original purchase and copy of packing slip or invoice for warranty consideration.
- If a price estimate is required, please note it accordingly *and be sure to include a fax number.*

Providing the above information assists in the expedient repair and return of your unit.

**Failure to provide this information can result in processing delays.**

**ENMET** charges a one hour minimum billing for all approved repairs with additional time billed to the closest tenth of an hour. All instruments sent to **ENMET** are subject to a minimum \$30 evaluation fee, even if returned unrepaired. Unclaimed instruments that **ENMET** has received without appropriate paperwork or attempts to advise repair costs that have been unanswered, after a period of 60 days, may be disposed of or returned unrepaired COD with the evaluation fee.

Service centers may have different rates or terms. Be sure to contact them for this information.

**Repaired instruments are returned by UPS/FedEx Ground and are not insured unless otherwise specified. If expedited shipping methods or insurance is required, it must be stated in your paperwork.**

**Note:** Warranty of customer installed components.

If a component is purchased and installed in the field, and fails within the warranty term, it can be returned to **ENMET** and will be replaced, free of charge, per **ENMET**'s returned goods procedure. If the entire instrument is returned to **ENMET** Corporation with the defective item installed, the item will be replaced at no cost, but the instrument will be subject to labor charges at half of the standard rate.





