

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

ENG – 97D STAND-ALONE
MANUAL

Manual Part Number
80003-035
MCN-389, 01/21/08

Table of Contents

1.0 Introduction	1
1.1 Unpack.....	1
1.2 Check Order	1
1.3 Serial Numbers.....	1
2.0 Features	2
3.0 Installation	4
3.1 Mounting Control	4
3.1.1 ENG-97D STAND-ALONE in standard enclosure	4
3.1.2 ENG-97D STAND-ALONE in NEMA-4X enclosure	4
3.2 Wiring Control	5
4.0 Calibration	6
4.2 Automatic Zeroing	7
4.3 Automatic Calibration	7
5.0 WARRANTY	8

List of Illustrations

Figure 1: ENG-97D STAND-ALONE Features External View.....	3
Figure 1A: ENG-97D STAND-ALONE NEMA-4X enclosure External View	3
Figure 2: Installation Diagram, Rear View	4
Figure 2A: Installation Diagram, Internal View	4
Figure 4: ENG-97D STAND-ALONE Power Supply Circuit Board	5
Table 1: ENG-97D STAND-ALONE Terminal Connections.....	5
Table 2: Stipulated Calibration Gases for ENG-97D STAND-ALONE.....	6
Figure 5: Calibration with Gas.....	7

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 **ENG-97D STAND-ALONE** is a single channel monitor designed to operate as a stand-alone toxic gas detector.

- Wiring must be in accordance with the NEC and any local codes. This is the responsibility of the installer.
- Do not overload the internal power supply by using it as an inappropriate source of power through the relay contacts.
- The 0-5 VDC alarm signals are suitable for computer input, transistor switching, etc., not for heavy electrical loads.
- Observe temperature limitations. Do not locate the Control where solar radiation can raise the internal temperature on a hot day.
- Do not place the instrument in a high velocity air stream.
- RFI: do not operate a radio closer than one meter from the monitor.

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

1.1 Unpack

Unpack the **ENG-97D STAND-ALONE** 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 the contents of the shipment against the purchase order. Verify that the **ENG-97D STAND-ALONE** is received as ordered. If there are accessories on the order, ascertain that they are present. Check the contents of calibration kits. Notify **ENMET** customer service personnel of any discrepancy immediately.

1.3 Serial Numbers

Each **ENG-97D STAND-ALONE** is serialized. These numbers are on tags on the equipment and are on record in an **ENMET** database.

2.0 Features

See figures 1 and 1A.

Feature	Description
Enclosure	Polycarbonate, IP 65 (Shown in Figure 1) <ul style="list-style-type: none"> ▪ Size: 6.3 inches x 6.5 inches wide x 5.2 inches deep ▪ Weight: 3 pounds ▪ Mounting: Wall
Enclosure (optional)	NEMA-4X, certifiable (Shown in Figure 1A) <ul style="list-style-type: none"> ▪ Size: 4.5 inches x 8.0 inches wide x 5.5 inches deep ▪ Weight: 3 pounds ▪ Mounting: Wall
Input Power	Supplied with a 110 VAC line cord 85-265 VAC, 24 VDC
Display	LCD: 1x8, Hitachi 44780 compatible
Power LED	Power On: Green LED
Audio Alarm	A Sonalert horn, with on-off switch and red indicator LED.
Visual Alarm	Alarm Levels: Three programmable levels, a red LED for each alarm level
Pushbutton Switch	For automatic zeroing and calibration
Specifications	Description
Output	4-20 mA Alarms: One of the three alarms, selectable by jumper, operates the horn and relay Alarm signals: 0 or 5 VDC are available for limited application, such as computer inputs
Temperature	-20C to +50C. Observe limitation on the sensor of the associated sensor/transmitter.
Programming	Programmed per order
Humidity	Generally 0-95% RH, noncondensing
Relays	2 Amp at 120 VAC, at one alarm level in conjunction with horn, contacts available on terminal strip

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

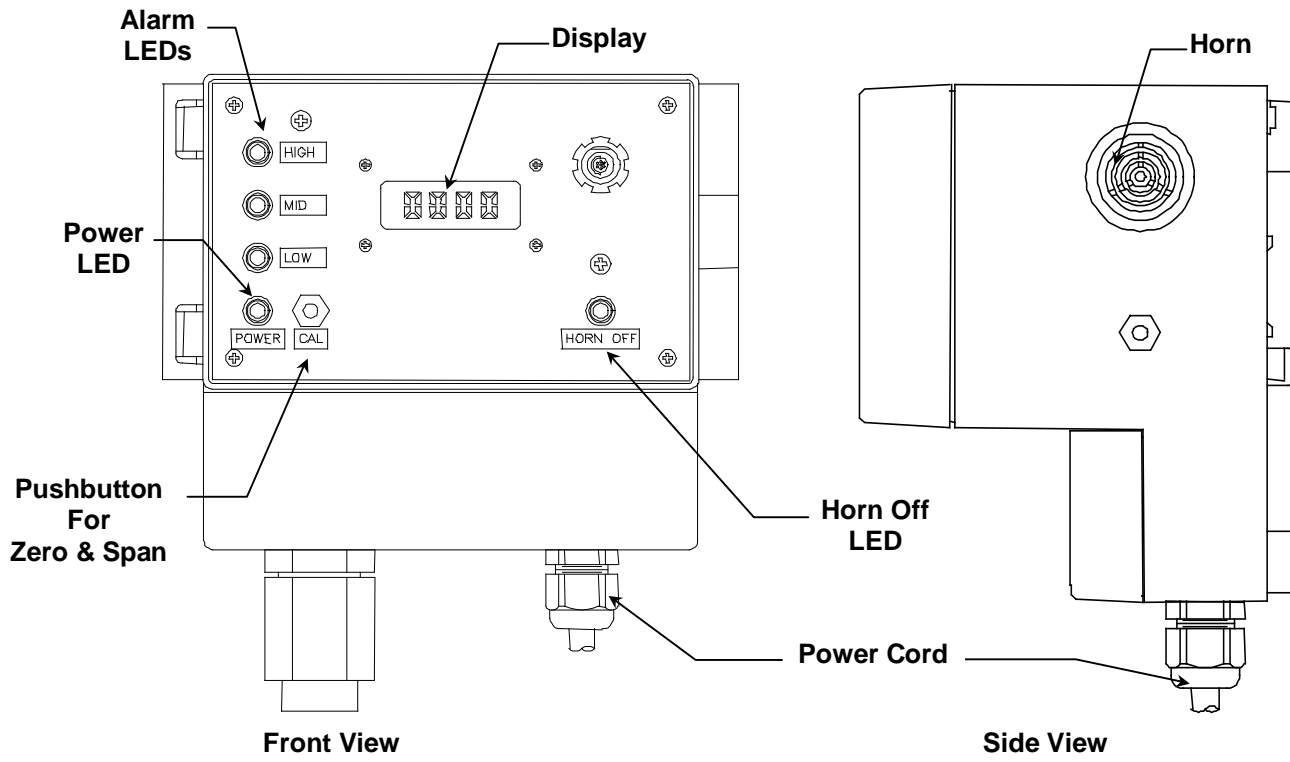


Figure 1: ENG-97D STAND-ALONE Features External View

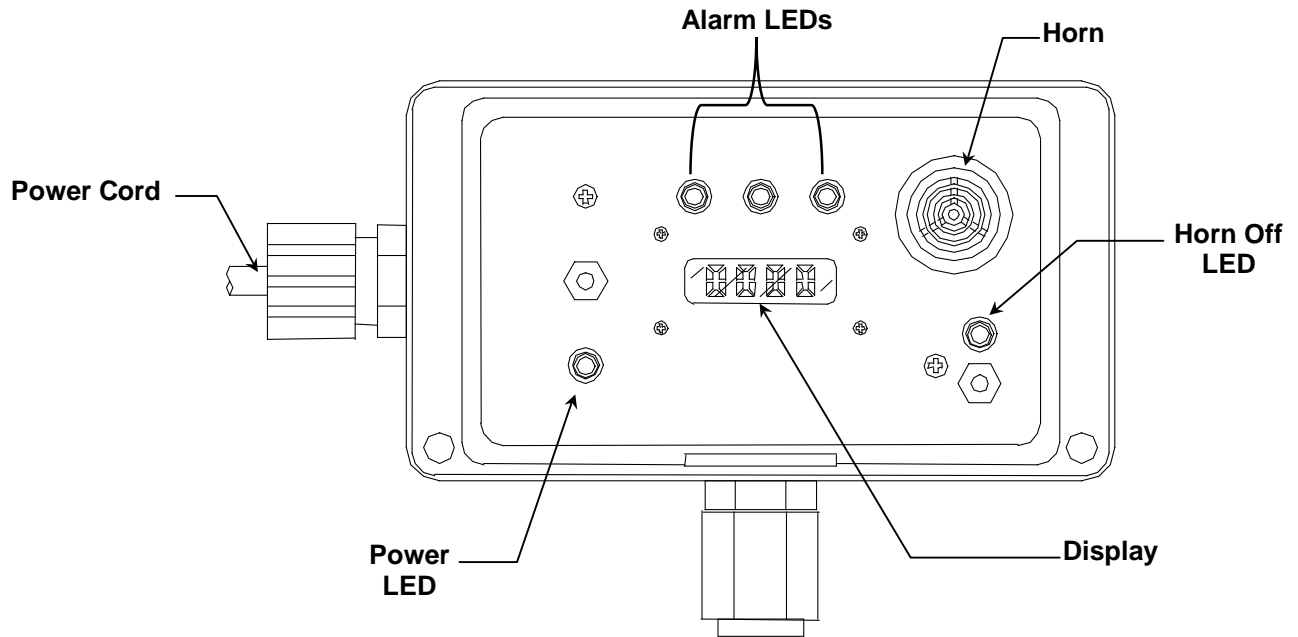


Figure 1A: ENG-97D STAND-ALONE NEMA-4X enclosure External View

3.0 Installation

3.1 Mounting Control

Open the cover and mount the instrument where desired as a **CONTROL** for the associated sensor/transmitter, using appropriate mounting screws and the rubber seal washers supplied. See **Precautions** in introduction, regarding selection of the location. See Figures 2 and 2A for mounting dimensions.

3.1.1 ENG-97D STAND-ALONE in standard enclosure

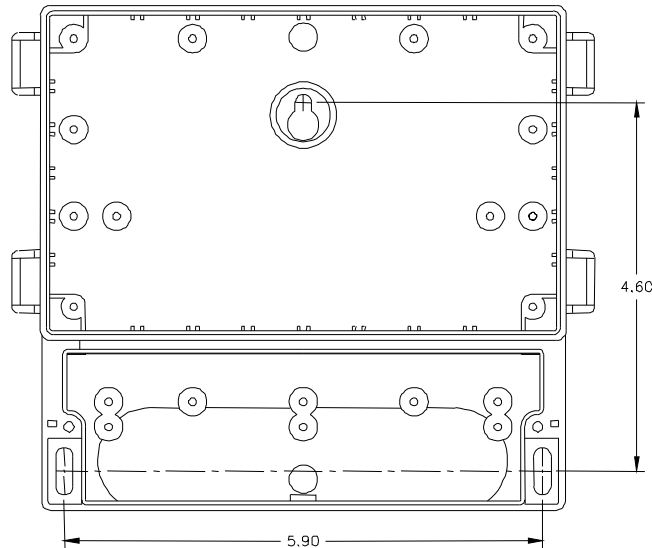


Figure 2: Installation Diagram, Rear View

NOTE: Allow at least 3 inches at the bottom of the closed enclosure for cable fittings and cable.

3.1.2 ENG-97D STAND-ALONE in NEMA-4X enclosure

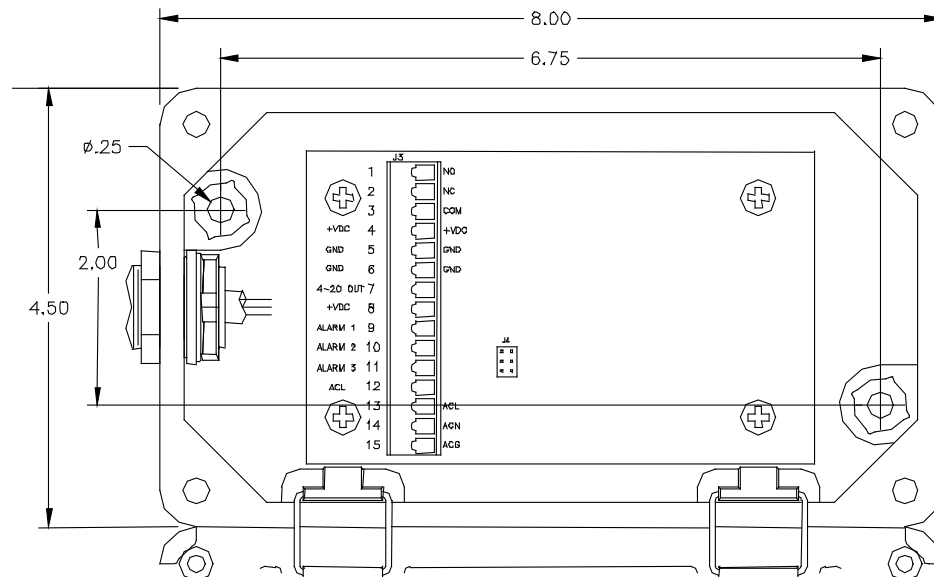


Figure 2A: Installation Diagram, Internal View

NOTE: Allow at least 3 inches at the bottom and to the left of the closed enclosure for cable fittings and cable.

3.2 Wiring Control

The **CONTROL** is supplied with a 110 VAC line cord. This may be detached and discarded if it is desired to run conduit to the instrument. In this case, supply an appropriate sealed conduit fitting, and supply 85-265 VAC power to the correct positions on the terminal strip located on the power supply circuit board. See Figure 4 and Table 1.

The outputs are also available on the terminal strip. For the 4-20mA loop output, use shielded cable and the sealed fitting supplied, or conduit and an appropriate fitting, for the output wires.

NOTE: The output fitting is supplied with a short length of cable in it, to assure that the enclosure remains sealed if the fitting is retained but not used.

A jumper on the power supply board is used to select the alarm level that activates the horn and relay; see Figure 4 and Table 1.

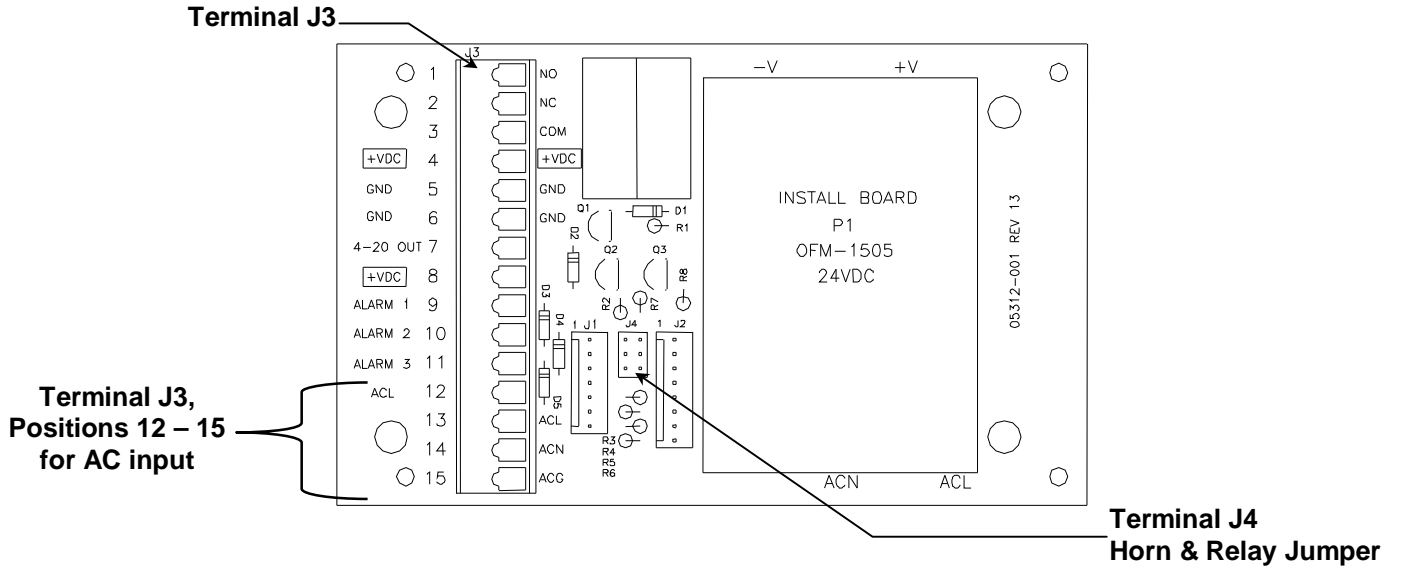


Figure 4: ENG-97D STAND-ALONE Power Supply Circuit Board

WARNING: Continuous gas detection and alarm systems (110VAC/220VAC / 24VDC/12VDC powered) become inoperative upon loss of primary power. Contact factory for specifications and pricing of backup battery systems.

Auxiliary alarms should be powered from an independent power source separate from the instrument power to avoid alarm failure due to controller malfunction.

Table 1: ENG-97D STAND-ALONE Terminal Connections

Connection	Terminal position
AC Input	85 – 265 VAC, 50 – 60 Hz AC Line (High): J3 Positions 12 & 13, in parallel AC Neutral: J3 Position 14 AC Ground: J3 Position 15
Relay contacts	J3 Positions 1 – 3
4-20mA Output	J3 Positions 6 – 7 <ul style="list-style-type: none"> • 6 is ground • 7 is 4-20mA output
Horn & Relay Jumper	J4, top to bottom (gray block indicates jumper position) Jumper location: Low alarm Mid alarm High alarm

4.0 Calibration

CAUTION: The **ENG-97D STAND-ALONE** must be calibrated with the stipulated calibration gas. Although safeguards are provided, it is possible to miscalibrate a sensor/transmitter by using the incorrect gas.

Calibration is the process of aligning the preset instrument electronics to the installed sensors, making the instrument read accurately. It consists of a zero reading which tells the instrument what it should read in uncontaminated (clean) air, and a span reading that tells the instrument what it should read in the presence of its target gas. Calibration, including the zero and span adjustments should be performed on a quarterly basis.

The **ENG-97D STAND-ALONE** is equipped with a pushbutton switch, located on the left side of the front surface. Never push this switch unless zero or span gas is being applied to the sensor (see caution). This switch facilitates automatic zeroing and automatic calibration with appropriate gas. The parameters described; stipulated calibration gas, response to calibration gas and the **ENMET** part number for a cylinder of calibration gas are given for various sensor types in Table 2.

Table 2: Stipulated Calibration Gases for ENG-97D STAND-ALONE

S/T for Gas	Calibration Gas	Response	Cal Gas P/N
Ammonia	50ppm NH3	50 ppm	03318-050
Arsine	0.5 ppm PH3	0.5 ppm	03305-005
Boron Trichloride	10 ppm HCL	10 ppm	03302-010
Carbon Monoxide	100 ppm CO	100 ppm	03219-100
Chlorine	5 ppm CL2	5 ppm	03331-005
Chlorine Dioxide	Consult ENMET		
Chlorine Trifluoride	Consult ENMET		
Dichlorosilane	10 ppm HCL	3 ppm	03302-010
Ethylene Oxide	5 ppm ETO	5 ppm	03332-005
Fluorine	Consult ENMET		
Hydrogen	800 ppm H2	800 ppm	03227-800
Hydrogen Bromide	5 ppm HCL	25 ppm	03302-005
Hydrogen Chloride	10 ppm HCL	10 ppm	03302-010
Hydrogen Cyanide	10 ppm HCN	10 ppm	03303-010
Hydrogen Fluoride	5 ppm CL2	3 ppm	03331-005
Hydrogen Sulfide	20 ppm H2S	20 ppm	03314-020
Nitrogen Dioxide	5 ppm NO2	5 ppm	03333-005
Nitric Oxide	25 ppm NO	25 ppm	03334-025
Oxygen *see note 2	20.9 % O2	20.9 %	03296-209
Ozone	0.3 ppm O3	0.3 ppm	Use Ozone generator
Ozone	0.5 ppm Cl2	0.3 ppm O3	Use Cl2 Test generator
Phosphine	0.5 ppm PH3	0.5 ppm	03205-005
Silane	5 ppm SiH4	5 ppm	03306-005
Silicon Tetrachloride	5 ppm HCL	25 ppm	03302-005
Sulfur Dioxide	10 ppm SO2	10 ppm	03315-010

NOTE 1: All specifications stated in this manual may change without notice.

NOTE 2: * Oxygen Monitor with a 0 – 30% range are zero set at the factory. 20.9% by volume O2/78.1% by volume N2 is the calibration gas. If zeroing of an Oxygen Monitor should be needed 100% by volume N2 (0% by volume O2) is the zero gas.

Toxic Monitor 20.9% by volume Oxygen /78.1% by volume N2 may be used for (clean air) zero gas, see section 4.3 automatic zeroing.

4.2 Automatic Zeroing

OXYGEN MONITOR: Oxygen Monitor, 0 – 30% by volume, do not require the automatic zeroing step, proceed to section 4.3 automatic calibration.

TOXIC MONITOR: If the air around the Monitor contains significant levels of the target gas or interference gases, the sensor must be exposed to a source of fresh, clean air to perform an automatic zeroing procedure. Kits are available from **ENMET** Corporation that includes a cylinder of 20.9% oxygen, free of contaminants. The recommended flow rate of air from a cylinder is 0.5 liters per minute.

Expose the sensor to fresh clean air for at least 30 seconds. Press and release the **Calibration & Zeroing Pushbutton Switch**. After the switch is released, if the signal from the sensor is within the established Zero (clean) range, the Monitor display is forced to zero. If the sensor reading is too high or too low, zeroing will not take place.

NOTE: Under certain conditions, the display may be off 1 display unit.

If the Monitor does not read zero and continues to read more than several display units above zero, expose the sensor to clean air from a cylinder of 20.9% oxygen for 2 minutes. After 2 minutes, press and release the **Calibration & Zeroing Pushbutton Switch** again. If the display still does not zero, the sensor may need to be replaced.

4.3 Automatic Calibration

ENMET Corporation makes available a calibration kit that contains the stipulated calibration gas and a calibration adapter. With reactive gases it is imperative that the proper regulator, tubing and calibration cover be used. Failure to do so, may cause inaccurate and/or failed calibrations. Contact your local distributor or **ENMET** for more information. See Table 2 for calibration gas values and replacement cylinder part numbers.

Screw the regulator valve of the calibration adapter onto the calibration gas cylinder, and open the flow control valve. Put the cup over the sensor. See Figure 5.

After 1-3 minutes, when the display stops changing, press the calibration switch. If the sensor output is within the calibration range, the display changes to the value of the contents of the calibration gas.

Example: If calibrating with 50 PPM CO, the display changes to “0050”.

NOTE: Alternative calibration gas sources, such as permeation tube or gas generator. Follow instruction supplied with that equipment

NOTE: Under certain conditions, the display may be off ± 1 display unit, Hydrogen may be off ± 20 ppm.

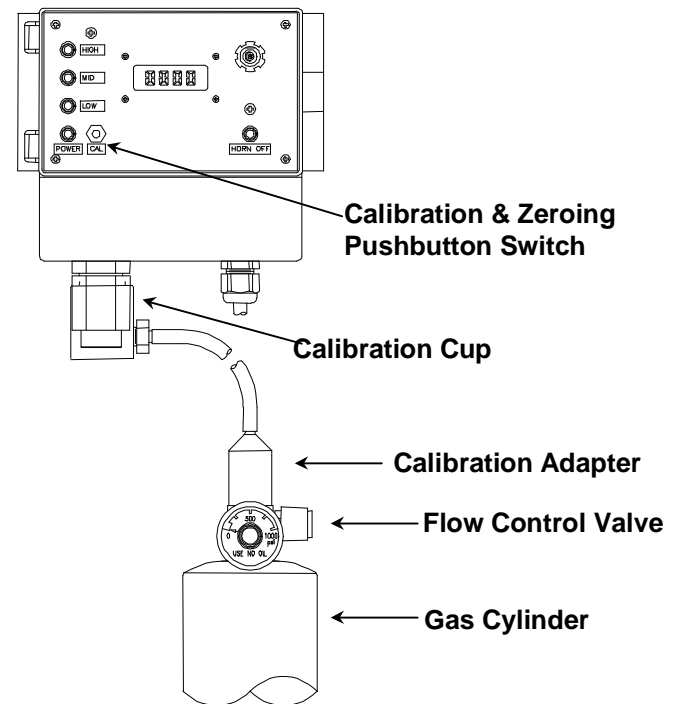


Figure 5: Calibration with Gas

WARNING: If at this point the display does not change, calibration has not been accomplished. Check the following:

- ◆ Be sure that the proper calibration adapter is being used. Reactive gases can be absorbed by standard tubing. Special non-reactive tubing should be used for reactive gases. **ENMET** calibration kits are supplied with appropriate tubing for the gas in the kit.
- ◆ Be sure that the gas is not outdated. The shelf life or manufacture date is on the gas cylinder label.
- ◆ If sufficient fresh calibration gas is being used, try the calibration again. If the same result is obtained, the most probable cause is a sensor with low output. Such a sensor is nearing the end of its useful life. Install a new sensor, and recalibrate.

5.0 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** Corporation.

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

Manual Part Number
80003-035
August 2000
MCN-288, 10/15/02
MCN-389, 01/21/08



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/RPS surface 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.



Repair Return Form

Mailing Address:

ENMET Corporation
PO Box 979
Ann Arbor, Michigan 48106

Shipping Address:

ENMET Corporation
Attn: Repair Department
680 Fairfield Court
Ann Arbor, Michigan 48108

Phone Number: 734.761.1270

FAX Number: 734.761.3220

Your Mailing Address:

Your Shipping Address:

Contact Name: _____ **Your Phone:** _____

Your PO/Reference Number: _____ **Your FAX:** _____

Payment Terms: **COD**

(check one)

VISA / MasterCard

_____ Card number

_____ Expiration

Return Shipping Method:

UPS/RPS Surface: 3 day 2nd Day Air Next Day Air

Federal Express: Next Day Morning Next Day Afternoon Standard

FedEx Account number: _____

Would you like ENMET to insure the return shipment?

No

Yes

Insurance Amount: \$ _____