

ENMET

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ENMET
Creative Gas Detection Solutions



RECON/4a
Portable Multi-Gas Detector
Operation and Maintenance Manual

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Reference Information:

NOTE: [important information about use of instrument]

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.]



Attention / Warning



Earth Ground

1.0 Introduction

The RECON/4a is a direct reading portable multi-gas detector designed to monitor continuously up to 8 hours for hazardous atmospheric conditions.

Safety information:

NEVER ignore an alarm condition

Please first read the below safety information carefully before using and then operating this device.

- Please don't use a defective device.
- It is suggested that the user perform a "Bump Test" before using the device as described by ISEA standard. Periodic Bump testing will check the response feature of the sensor. Please make sure that the visual, audible and vibration alarm signals are functioning properly.
- Only the charger which is specified for RECON/4a can be used. Do Not charge the device in a hazardous location.
- Long term or repeated exposure to toxic and combustible gases above the range of the sensors may influence the performance or damage the sensors.
- Exposing the RECON/4a to environments consisting of leaded compound, sulfocompound, organic phosphorus compound or silicon, will cause the combustible gas sensor to be poisoned.
- Do not expose the device to electric shock, a strong magnetic field or serious continuous mechanic shocking.
- There is a lithium battery inside the device. Please do not discard a defective battery in the regular garbage disposal. The defective battery should be recycled per your local regulations.
- Avoid dropping or seriously shocking the instrument.

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

1.1 Unpack

Unpack the **RECON/4a** 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 **ENMET** 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. Please 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

Items to be included with the RECON/4a:	<ul style="list-style-type: none">• Instrument• Charger• Calibration Cover• Alligator Clip• Manual
--	--

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
680 Fairfield Court
Ann Arbor, MI 48108
734-761-1270 Fax 734-761-3220
Toll Free: 800-521-2978

1.2 Check Order

Check the contents of the shipment against the purchase order. Verify that the **RECON/4a** 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 **RECON/4a** is serialized. These numbers are on tags on the equipment and are on record in an *ENMET* database.

2.0 Features

2.1 RECON/4a Elements

See Figure 1 for location of features:

ITEM	FEATURE	DESCRIPTION
1	Visual Alarm	Red indicators are clearly visible on 3 sides and located at the top of the RECON/4a. LED's activate when the alarm thresholds are exceeded.
2	Pushbutton	Turns the RECON/4a Power On/Off and accesses operational menu functions.
3	Sensors	Detection area
4	Display	The Liquid Crystal Display (LCD) allows messages to be read clearly.
5	Audio Alarm	The audio alarm is located on the front of the RECON/4a. The audio alarm will sound when the unit alarm levels are reached.
6	Calibration Cover	Hold calibration cover in place during calibration procedure.
7	D-Ring	Attached to alligator clip
8	Alligator-Type Clip	To clip to outside of clothing for hands-free operation
9	Label	Instrument serial number and gases
10	Connection Point	Connection point for battery charger or computer connection.

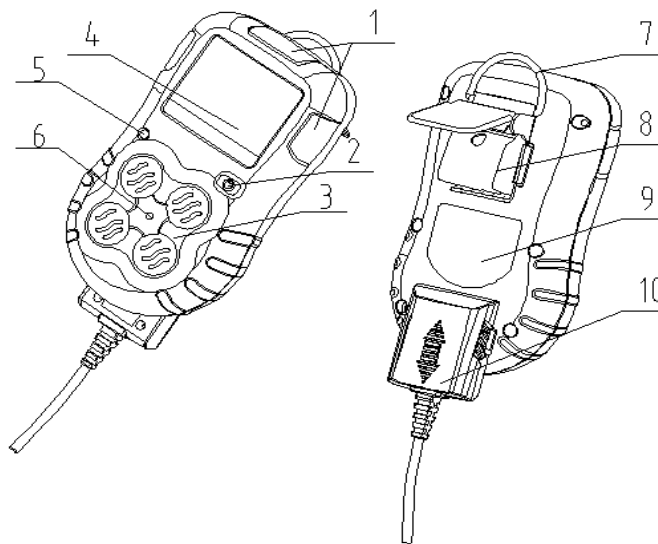


Figure 1: RECON/4a Features

2.2 RECON/4a Display Features

See Figure 2 for location of display features.

Color LCD, Display		Item	Function
		1	Battery status
		2	Audio Alarm
		3	Vibrator Indication
		4	Alarm Indication
		5	TWA Alarm Indication
		6	High Alarm Indication
		7	STEL Alarm Indication
		8	Low Alarm Indication
		9	Gas Name
		10	Unit of Measure, each quadrant
		11	Gas Concentration

Figure 2: FECON/4a Display


2.3 RECON/4a Pushbutton Function

Pushbutton	Function
	Turn on and off the instrument Activate the Backlight Silence the Audio alarm Stop the Vibratory alarm RECON/4a Status Calibration Menu: <i>operation</i>

2.4 Sensor Detection Information

Gas	Detection Range	Preset Low Alarm	Preset High Alarm	TWA	STEL
O ₂	0-30% vol	19.5% vol	23.5% vol	/	/
H ₂ S	0-100ppm	10ppm	15ppm	10ppm	15ppm
CO	0-1000ppm	35ppm	200ppm	35ppm	200ppm
LEL	0-100%LEL	20%LEL	50%LEL	/	/

3.0 Operation RECON/4a

 **CAUTION:** RECON/4a is set to auto zero calibrate after turning on. Turn on the RECON/4a in clean air. Incorrect readings will occur if the RECON/4a is turned on in contaminated air.

3.0.1 Bump Test

It is recommended that every day before using the device, the user carry out a bump test as described by ISEA standard before using the device to check if the device is working normally.

Test method:

When the device is powered on, expose it to a level of gas greater than the lower level alarm points. This should be done for each of the active sensors in the instrument. If all the device's functions are ok, then device can be used in the working area.

NOTE: If any reading on the active channels failed to responded please follow section 4.0 of this manual to recalibrate the instrument.

3.1 Power On RECON/4a

Press and hold the push button for 3 seconds until the RECON/4a displays lights and one short audio tone is generated. The RECON/4a is now on.

The following tests will run: Alarm, Vibrator, "High alarm", "Low alarm", "STEL" and "TWA". Following this, the instrument will enter operation status. Now, the instrument displays the concentration of the target gases in the environment. An LED flash will activate approximately every 15 seconds to indicate that the RECON/4a is active.

3.1.1 Battery Conservation

Following the warm up, to conserve battery life, the backlight will turn off within 30 seconds.

NOTE: Pressing the push button or any gas level alarm reactivates the backlight

3.2 Power Off RECON/4a

To turn the RECON/4a off, press and hold the push button for 3 seconds (there will be a count down on the screen), the audio alarm will give a long sound 3 times and a short sound twice. The RECON/4a should now be off.

3.3 RECON/4a Alarm

Never ignore an alarm condition.

(1) When the gas concentration reaches the preset alarm levels, the RECON/4a will activate relative alarms:

The LED lights flash, audio alarm sounds and vibrator alarm activates.

The user can cancel audio and vibrator alarm by pressing and releasing the push button: The first press will cancel audio alarm, and the second will cancel vibration.

(2) When the RECON/4a is kept in an environment with the target toxic gas, assuming the gas concentration is more than the maximum average level of TWA or STEL, the RECON/4a will give the TWA or STEL alert. Now, the user can also cancel the audio and vibrating alarms by pressing the pushbutton.

Additionally, Alarms sound when the respective sensor faults or if the battery is at a low level. Please refer to the LCD display for indications.

3.4 RECON/4a Status Check

When the RECON/4a is on and in a non-alarm state, press and release the push button, the LCD screen will display max gas level and min level*, STEL**, TWA**, current time, serial number(SN) and version number(VER) in turn.

NOTE: *Only O2 sensor has such indication.

**Only toxic gas sensors have STEL and TWA alert.

3.5 RECON/4a Battery Charging

When the battery voltage is low, the **RECON/4a** will not function properly. To recharge the battery: The **RECON/4a** must be *Off*. Connect the charger to an 110VAC or 220VAC outlet and plug the charging cable into the **RECON/4a**. When the charging cycle is completed, the display will indicate full charge.



CAUTION: Do NOT start the battery charge process with the **RECON/4a** power on; otherwise the charge speed will be adversely affected. Always charge the battery in normal ambient air. Do not charge the **RECON/4a** in a hazardous area to avoid fire or explosion. Disconnect the charger after 24 hours, failure to do so may damage the battery. Charging the instrument in an environment that is below temperature 0°C may possibly damage the battery as well.


It is recommended to charge the instrument every 3 months if it is not in regular use.

4.0 Calibration

It is recommended that every day before using the device, the user perform a bump test, to verify that the device is working properly.

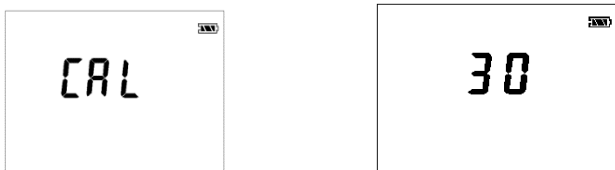
Test method:


When the device is powered on, expose it to a level of gas greater than the lower level alarm points. This should be done for each of the active sensors in the instrument. If all the device's functions are ok, then the device can be used in the working area.

-  **CAUTION:** The **RECON/4a** will Auto Zero when you enter the calibration menu. Please fully charge the **RECON/4a** and put the instrument into a clean air environment before beginning this procedure.

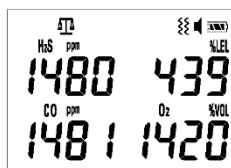
The **RECON/4a** is capable of calibrating multiple channels at the same time. However, you may elect to calibrate individual gas sensors. During calibration, the **RECON/4a** automatically determines if a single gas or multi gas is being applied.


With the **RECON/4a** ON, Press and *hold* the push button, the **RECON/4a** will turn OFF. Continue to press the push button until the instrument restarts, the display indicates CAL and the instrument beeps twice. The Display will show **Cal**-followed by a countdown from 30.



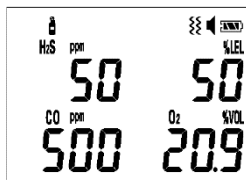
- After the countdown, the RECON/4a begins Zero calibration (Zero Cal). The icon, , indicating the zero-calibration process will start. Calibration time is approximately 1 minute.

Example:



- When Zero Cal is complete, the icon, , will be displayed indicating that the RECON/4a is in Span Calibration. The active sensors with their associated reference calibration gas levels will be displayed.

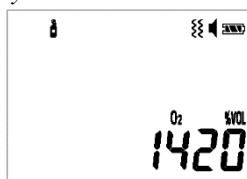
Example:



- Connect the cylinder of calibration gas to the regulator and attach the calibration cover to the RECON/4a and open the valve on the regulator, reference figure 3. The **RECON/4a** display will change to indicate the sensor response.

NOTE: You will only see calibration numbers for the gas/gases that are being applied; the remaining sensors are not affected

Example:

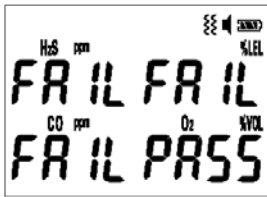


Oxygen

- (1 to 4 minutes) The RECON/4a is comparing internal data to the sensor numbers listed in the display. Note the sensor reference numbers. When They are stable (not changing), the calibration process will automatically finish.

- After calibration, the screen will display the calibrated gas(es) name(s) and relative data. **RECON/4a** will automatically turn off.

Example:



NOTE: The **RECON/4a** automatically determines if a single or multi gas is applied. You will only see calibration numbers for the gas/gases that are being applied; the remaining sensors are not affected.

- If you are calibrating individual sensors repeat the above process.
- If the calibration was unsuccessful wait one hour and repeat the calibration procedure.

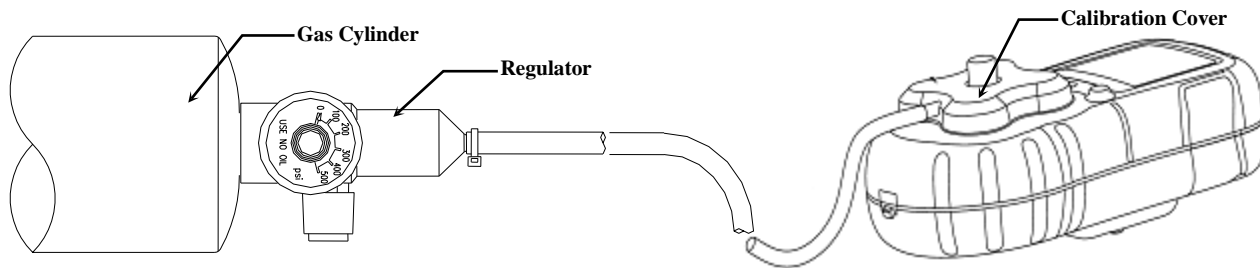


Figure 3: Calibration of RECON/4a

4.1 Calibration Equipment

ENMET part numbers

Description of Part	Part Number
Sensor Cover Assembly RECON/4a	02615-025
Regulator Assembly for 34 liters, aluminum cylinders	02506-002
<i>Use with the following:</i>	
Gas Cylinder, aluminum 40ppm H2S, 34 liters	03314-040
Gas Cylinder, Mixed Gas, aluminum 34 liter 500ppm CO, 40ppm H2S, 50%LEL CH4, 20.9%O2, balance N2	03388-001
Regulator Assembly for 34-liter steel cylinders	02506-004
<i>Use with the following:</i>	
Gas Cylinder, steel 50%LEL Methane, 34liter	03220-050
Gas Cylinder, steel 20.9% O2, 34 liters	03296-209
Gas Cylinder, steel 500ppm CO, 34 liters	03219-500

5.0 Sensor Replacement

When the sensor module fails bump test or calibration, please replace it with a new one.

To guarantee the device's accuracy, it's suggested to re-calibrate the sensor modules at least once every 6 months.



CAUTION: Sensor replacement should only be done by a qualified maintenance person. After installing the new sensor module into the device, calibration must be done before using.

6.0 Trouble Shooting Guide

Normal Problem	Possible Reasons	Solution
Will not power on	Battery Discharged	Charge unit
	Battery Defect	Change Battery
	Circuit fault	Contact ENMET / Distributor
Time display is not correct	Battery Discharged	Charge the battery and reset the time and date
	Time Zone Difference	Reset the time and date
Display “-0” in normal detection status	Sensor drift	Perform zero calibration
Zero Calibration function not available	Too much sensor drift	Recalibrate or replace the sensor module
Reading of gas level not accurate	Sensor drift	Recalibrate
	Sensor depleted	Replace Sensor
No response to gas	Warming up not completed	Wait till it finishes
	Circuit fault	Contact ENMET / Distributor

7.0 Technical Data and Specifications

Electrical Power	Working Voltage	3.7 VDC, Lithium battery, rechargeable
	Operation Time	Approximate 8 hours, continuous, non-alarm condition
	Charge Time	Approximately 6 hours
Operation	Temperature Range	-20°C to +50°C
	Relative Humidity	5 to 95% RH, non-condensing
Mechanical	Dimensions	2.7 x 4.8 x 1.2 inches (68 x 120 x 30 mm)
	Weight	7.8 ounce (220g)
	Explosion Proof Ingress Protection	Exia IICT3 IP 65
	Approval	Designed to be Intrinsically Safe

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

Notes:

8.0 Terms and Conditions

8.1 Ordering Information

Address orders to:

ENMET
Attention: Customer Service Department
680 Fairfield Court
Ann Arbor, MI 48108

Email Orders: orderentry@enmet.com

Phone: 734-761-1270

Fax: 734-761-3220

You may also contact our customer service department by email info@enmet.com. MINIMUM ORDER IS \$50.00.

8.2 Delivery

Unless Seller otherwise specifies, delivery will be made: FOB Ann Arbor, MI and/or FOB Bowling Green, KY. Title and risk of loss shall pass to Buyer at that point. Shipping and handling charges will be Prepaid and Added to Buyer's invoice. Buyer may request shipping be charged to their own account with a preferred carrier. Seller shall have the right to choose means of transportation and to route shipment when specific instructions are not included with Buyer's order. Seller agrees to deliver the goods and services, within the time, in accordance with specifications, at the prices specified on the face hereof. Buyer's orders to this quotation are not subject to cancellation or deferment of delivery without indemnification of loss to the Seller resulting therefrom. Seller shall not be liable to Buyer for any loss or damage sustained on account of this delay or nonperformance due to causes beyond Seller's control and without his fault or negligence. Where performance of the terms here is contingent upon timely delivery of goods or services by the Buyer and such delivery is in default, Seller shall be indemnified for any damage or loss resulting therefrom, and/or by extension of Seller's delivery commitment, as applicable.

8.3 Payment Terms

Payment Terms are Net 30 Days from the date of shipment from Seller unless otherwise noted. All shipping and handling costs will be charged to Buyer on a Prepaid and Add basis. Buyer has the option of paying for shipping by charging its own account with a carrier

8.4 Warranty Information and Guidelines

The Seller 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. The warrant covers both parts and labor excluding calibration and expendable parts such as filters, detector tubes, batteries, etc. If the inspection by the Seller 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. The Seller shall not be liable for any loss or damage caused by the improper use or installation of the product. The Buyer indemnifies and saves harmless the Seller with respect to any loss or damages that may arise through the use by the Buyer or others of this equipment. This warranty is expressly given in lieu of all other warranties, either expressed, implied or statutory, including that of merchantability, and all other obligations, or liabilities of ENMET, LLC for damages arising out of or in connection with the use or repair or performance of the product. In no event shall ENMET, LLC, be liable for any indirect, incidental, special or consequential damages or for any delay in the performance by ENMET, LLC, which may arise in connection with this equipment. ENMET neither assumes nor authorizes any representatives or other persons to assume for it any obligation or liability other than that which is set forth herein. Buyer agrees to indemnify and save harmless Seller for any damage or loss from lawsuits against Seller by reason of manufacture of sale of materials, parts, or use of processes resulting from Buyer's design specifications. Any patent, design, pattern, tool, die, jig, fixture, drawing, test equipment, or process furnished by Seller; whether possessed by the Seller before the date of this quotation, or devised or acquired by Seller during performance of the terms of this quotation, shall remain the property of the Seller except by specific stipulation on the face hereof. Seller reserves the right, without liability, for damage or loss, to destroy Buyer's drawings, specifications, patterns and special tools supplied by Buyer for performance of the terms on the face hereof, unless Buyer gives notice of the disposition of such items.

8.5 Return Policy

All returns for credit must be approved in advance by ENMET, LLC. Such returns are subject to a minimum \$50.00 or 20% restocking charge, whichever is greater. **Approval of equipment for return is totally at the discretion of ENMET, LLC.** All requests for return/exchange must be made no later 30 days of the original shipping date from ENMET. The actual amount of any resulting credit will not be determined prior to a complete inspection of the equipment by ENMET. Calibration gas cylinders cannot be returned or restocked.

9.0 Instructions for Returning an Instrument for Service

Contact the ENMET Service Department for all service requests.

Phone: 734-761-1270

Email: repair@enmet.com

Fill out the “Service Request Form” found at the end of this manual and return with your instrument for all needs. Please send your instrument for service to the site in which the product was purchased. A new “Service Request Form” may be requested if the one found in the manual is not available. All instruments should be shipped prepaid to ENMET.

Address for Service:

Michigan Location:

ENMET
Attention: Service Department
680 Fairfield Court
Ann Arbor, MI 48108

Kentucky Location:

ENMET
62 Corporate Court
Bowling Green, KY 42103

Providing the “Service Request Form” assists in the expedient service and return of your unit and 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 evaluation fee, even if returned unrepared. 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 unrepared COD and the customer will be expected to pay the evaluation fee. Serviced 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.*

For Warranty Repairs, please reference **ENMET's** “Warranty Information and Guidelines” (found earlier in this section).

Mailing/Shipping Address:

ENMET
680 Fairfield Court
Ann Arbor, MI 48108
repair@enmet.com



Phone: 734.761.1270
Fax: 734.761.3220

Service Request Form

Product Name or Number:

Product Serial Number:

Describe Problem or Needed Service:

Warranty Claim? Yes No

CUSTOMER INFORMATION

Billing Address:

Shipping Address:

Contact Name: _____

Phone #: _____

Email: _____

Fax #: _____

PO/Reference

#: _____

PAYMENT METHOD

- COD VISA/MasterCard American Express

Card Number

Exp. Date

Security Code:

Name as it Appears on

Card: _____

RETURN SHIPPING METHOD

- UPS Ground UPS 3 Day Select UPS Next Day Air UPS ND Air Saver UPS 2 Day Air

UPS Account #: _____

- FedEx Ground FedEx Air Express Saver FedEx Air Overnight Std. FedEx Air 2 Day FedEx Air Overnight P-1

FedEx Account #: _____

Insure Shipment: Yes No

Insurance \$
Amount: _____