

## FEATURES

- State-of-the-art Surface Mount Device (SMD) electronics
- Seven audible/visual alarms
- Rugged housing
- Easy to use membrane keypad controls
- Rechargeable or primary (alkaline) battery
- Optional pump module
- Optional aspirator bulb sampling adapter
- RFI and static-resistant case

## DESCRIPTION

MicroGard Portable Alarms are new generation pocket-sized instruments for simultaneously monitoring combustible gas and oxygen concentrations in workplace atmospheres and confined spaces, such as manholes, storage tanks, tank cars and shipyards. The MicroGard Alarm features state-of-the-art, compact SMD circuitry coupled with proven MSA combustible gas and oxygen sensors for reliable protection. In the diffusion mode, the instrument is ideal for hand-held, pocket, or belt-pouch use.

The MicroGard Alarm is very compact, and fits comfortably in most shirt pockets. Other modes of use include optional wrist strap and belt pouch. The rugged case is made of flame-resistant Noryl plastic.



An ON/OFF switch, located on the front of the instrument behind a weather-resistant rubber boot, activates the unit. All other front-panel controls are contained within a sealed, membrane-switch keypad, and include SELECT, RESET, LIGHT, and BATT VOLTS.

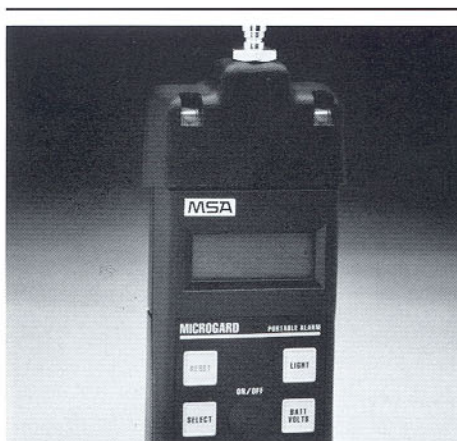
MicroGard combustible gas circuitry features either one of two combustible gas calibrations and readouts, depending upon model: 0 to 100% LEL (Lower Explosive Limit) with a general-purpose Pentane calibration, and 0 to 5% Methane-by-volume calibration; the latter model is primarily suited for gas utility and mining applications.

If the level of combustible gas concentrations in air exceeds the factory-set limit of 10% LEL (0.5% CH<sub>4</sub> on Methane-calibrated model), a blinking red LED and buzzer will activate, signifying an alarm condition. If the combustible gas indication reaches approximately 100% LEL (5% CH<sub>4</sub> on Methane model), the alarms latch and the display blinks to signify a possible over-range condition due to gas concentrations in the UEL range. This Lock-Alarm™ feature prevents the ambiguous combustible gas readings which can occur above 100% LEL. An additional combustible alarm sounds if the sensor indicates a moderate below-zero signal, signifying one type of sensor failure.

MicroGard oxygen circuitry monitors the atmosphere for both oxygen-deficient and oxygen-enriched conditions. If oxygen concentrations, as measured by the partial pressure of oxygen, rise above the factory setpoints of 23% or below 19.5%, the oxygen alarm LED and buzzer will sound. Both the combustible gas and oxygen alarm circuits are latching, requiring activation of the RESET button to silence alarms. However, as a protective feature, all combustible gas and oxygen alarms cannot be reset until conditions have returned to levels within alarm setpoints.

MicroGard combustible gas and oxygen sensors are easily replaceable too, due to their plug-in design. The circuitry is designed for RFI resistance.

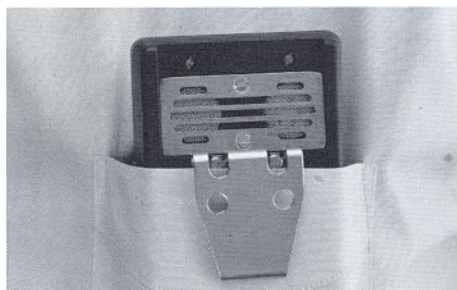
Battery condition of the MicroGard Alarm is monitored at all times, and



MicroGard Alarm with Sampling and Calibration Adapter (P/N 478530).

low battery condition is communicated via two-stage alarm. In the first stage, "BATT" appears in the display, to warn of impending battery shutdown. When battery condition falls below levels to properly operate the instrument, audible and visual alarms activate and the display blanks.

For high-noise applications, an earphone is provided with the instrument. An optional external alarm module can also be used. This alarm module is powered by its own battery and can be clipped to a user's shoulder. Remote sampling with the MicroGard Alarm can be achieved via a Pump Module. The Pump Module is fully integrating, providing a uniquely compact device; the MicroGard Alarm battery pack is removed, the Pump Module is then inserted between the MicroGard Alarm and the existing battery pack. The Pump Module's battery pack (rechargeable NiCad or alkaline) will power both the pump and instrument for full-shift (8-hour) operation. MSA Probe Tubes and standard Sampling Lines, in lengths from 5 to 50 feet, connect directly to the Pump Module.



Pocket clip and protective screen covering sensors.



MicroGard Alarm with integral pump module (P/N 802830).

Manual Aspirator Bulb remote sampling is accomplished via simple, slip-on adapter. MSA Probe Tubes and Sampling Lines attach to the flow-through aspirator bulb.

#### **⚠ CAUTION**

The combustible gas portion of the MicroGard Alarm has been designed to detect combustible gases and vapors in air. It is not capable of measuring the percentage of vapors in steam or inert atmospheres because of a lack of oxygen which is necessary to support combustion in the filament chamber. Neither will the instrument indicate the presence of explosive or combustible mists or sprays formed, as for example, by lubrication oils, or explosive dusts formed by grain or coal. The MicroGard Alarm is designed for use in air and is not to be used for the measurement of combustibles in atmospheres containing more than 25% or less than 10% oxygen by volume.

**Limitations:** Silanes, silicones, and other compounds containing silicon in the tested atmosphere may seriously impair response of this instrument. Some of these materials rapidly "poison" the detector filament so that it will not function properly. When there is even a suspicion that such materials are in the atmosphere being tested, the instrument must be checked frequently (at least after each five tests). A calibration kit is available to conduct this test. Leaded gasoline vapors can also poison the detector filament of this instrument. Oxygen-deficient (less than 10%) atmospheres may not indicate the true concentrations of combustible gas.

## APPROVALS & STANDARDS

All MicroGard Portable Alarms are Classified by Underwriters' Laboratories, Inc. as to intrinsic safety only for use in hazardous locations, Class I, Groups A, B, C, and D. They will perform within basic performance specifications when exposed to an RF field at the limits of acceptable human exposure as defined in ANSI C95.1.

All MicroGard Alarms (except LEL-only versions) are CSA Approved, Class I, Groups A, B, C, and D. The single-unit 120-volt charger, P/N 633548, is listed with Underwriters' Laboratories and CSA.

Methane versions of the MicroGard Portable Alarms are approved by MSHA (Title 30 CFR Part 22) and Pennsylvania DER (Article III Act 339) for use in underground coal mines.

## SPECIFICATIONS

### Performance Characteristics:

(at 25°C ambient temperature after a 15-minute warm-up period)

#### Accuracy:

*Oxygen:* ±0.3% oxygen at constant temperature and atmospheric pressure. ±0.5% oxygen with temperature changes from calibration temperature over the range 0° to 40°C.

*Combustible Gas:* ±3% LEL for 0 to 50% LEL and ±5% LEL for 50 to 100% LEL for Pentane-calibrated models. ±0.2% CH<sub>4</sub> for 0 to 2.5% CH<sub>4</sub> and ±0.3% CH<sub>4</sub> for 2.5 to 5.0% CH<sub>4</sub> for methane-calibrated models.

#### Ranges:

*Oxygen:* 1 to 25%

*Combustible Gas:* 0 to 100% LEL in air for Pentane models; 0 to 5% CH<sub>4</sub> in air for Methane models.

#### Response Time (Aspirator Mode):

*Oxygen:* 90% of final reading in 10 seconds at 32° to 104°F (0° to 40°C); 90% of final reading in 3 minutes at 0°F (-18°C).

*Combustible Gas:* 90% of final reading in 8 seconds.

#### Oxygen Sensor Life:

One year warranty when used at atmospheric pressure containing 20.8% oxygen or less without the presence of poisoning agents.

### Operating Temperature Range:

*Oxygen:* 32° to 104°F (0° to 40°C) normal; Low limit is 0°F (-18°C) when calibrated at temperature of use. High limit is 122°F (50°C) when calibrated at temperature of use; however, service life may be reduced with prolonged exposure to this temperature.

*Combustible Gas:* 32° to 122°F (0° to 50°C); Low limit 0°F (-18°C) if calibrated at temperature of use.

### Operating Characteristics:

#### Power Supply:

*NiCad:* Sealed, rechargeable 2.4 volt, 2.0 ampere-hour nickel-cadmium battery pack.

*Operating Time:* 8 to 10 hours nominal continuous usage at normal ambient temperature, with fully charged NiCad battery pack. 8 hours at 32°F (0°C), with fully charged NiCad battery pack, depending upon battery condition.

*Alkaline:* 3-volt alkaline battery pack with two-user replaceable "C" cells (Duracell MN 1400 only).

*Operating Time:* Up to 24 hours continuous usage at normal operating temperature, with alkaline batteries. 8+ hours nominal continuous usage at 32°F (0°C) with fresh alkaline batteries.

#### Readout:

Liquid Crystal Display (LCD) with 0.5" high digits.

### Physical Characteristics:

#### Case Construction:

Flame, RFI and static-resistant Noryl plastic filled with stainless steel fibers.

#### Dimensions:

5-3/4" high x 2-3/4" wide x 1-3/8" deep (Instrument only)

8-1/4" high x 2-3/4" wide x 2-1/2" deep (Instrument in Pump Module)

#### Weight:

14.3 ounces (0.41 kg) (Instrument only)

27.9 ounces (0.79 kg) (Instrument in Pump Module)

#### Supplied Accessories:

Wrist Strap

Earphone

## ORDERING INFORMATION

MicroGard Model Identification				
Portable Alarm Mode of Operation/ Supplied Battery Pack	Gas Calibration			
	0-25% Oxygen 0-100% LEL	0-25% Oxygen 0-5.0% CH <sub>4</sub>	0-5.0% CH <sub>4</sub>	0-100% LEL
Diffusion/ Rechargeable NiCad Battery Pack (478510)	Part No. 478500	Part No. 482250	Part No. 482260	Part No. 492501
Diffusion/Alkaline Battery Pack (482245)	485360	485359	485361	492502

### Charging Accessories:

Part No.	Description
633548	Charger, 120 volt, Single-Unit
635628	Charger, 220 volt, 50 Hz, Single-Unit
478490	Charger, 12 volt, Single-Unit, for auto use
478540	Charger, 120/240 volt, Five-Unit

Part No.	Description
800961	MicroGard Kit including:
478500	MicroGard O <sub>2</sub> /LEL
633548	Charger
486934	Probe
478530	Sample Cal Adapter
485800	Aspirator Assembly
459949	Regulator
11912	Sample Line
449482	Adapter Hose
801135	Video Tape

**Sampling Accessories:**

Part No.	Description
802830	Pump Module, (new style)
497600	Probe, 1 ft Teflon
800332	Probe, 1 ft
800333	Probe, 3 ft
803561	Probe, 3 ft Side Sampling
803962	Probe, 3 ft Handle Sampling
497332	Sampling Line, 5 ft
497333	Sampling Line, 10 ft
497334	Sampling Line, 15 ft
497335	Sampling Line, 25 ft
636244	Probe Filter, pkg of 3

**Replacement Parts:**

Part No.	Description
474407	Wrist Strap
633722	Earphone
633748	Dust Plug for Earphone Jack
482248	Pocket Clip
478538	Instruction Manual
478510	Battery Pack, NiCad Rechargeable, for Instrument
482245	Battery Pack, Alkaline, for Instrument
633546	Battery, Alkaline, "C", Duracell MN 1400
473840	Push-button Boot, rubber
629250	Alarm Buzzer
480566	Oxygen Sensor
478537	Combustible Sensor
478538	Instruction Manual

**Calibration Accessories:**

Part No.	Description
<b>For diffusion MicroGard use:</b>	
477149	Calibration Check Kit, Model RP, with 0.25 lpm Flow Control Regulator, complete (less calibration gas), including:
467895	Flow Control, 0.25 lpm
485030	Adapter Hose

**Select appropriate Gas:**

478192	Calibration Check Gas, 60% LEL Pentane simulant and 15% Oxygen, for Pentane-calibrated MicroGard
491041	Calibration Check Gas, 2.5% Methane-in-Air, for Methane-Calibrated MicroGard
478530	Calibration Adapter for Diffusion only MicroGard Alarms

**Miscellaneous Accessories:**

Part No.	Description
478533	Carrying Case for Instrument
805283	Carrying Case for Pump Module P/N 802830
800363	Remote Alarm Module, approximately 90db at 1 ft
496809	Remote Alarm Module, approximately 105db at 1 ft

*Carrying Case for MicroGard***Service**

Product modification or repair by anyone other than certified MSA personnel may void warranties and approvals. For the location of your nearest MSA Service Center, call toll-free at 1-800-MSA-2222.

NOTE: This Data Sheet contains only a general description of MSA's MicroGard Portable Alarms for Combustible Gas and Oxygen. While uses and performance capabilities are described, under no circumstances should this product be used except by qualified, trained personnel, and not until the instructions, labels or other literature accompanying the product have been carefully read and understood and the precautions therein set forth followed. Only they contain the complete and detailed information concerning this product.



Offices and representatives in principal cities worldwide.

**In U.S. call nearest stocking location toll free at 1-800-MSA-2222. For MSA International, call (412) 967-3249 or Fax (412) 967-3451.**

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