OUR MISSION YOUR SAFETY

MSA
The Safety Company

TOUGHEST OF ALL!

MSA's ALTAIR® 4
Multigas Detector

The first portable gas monitor with optional MotionAlert™ feature to signal "man down".

- Most rugged & durable portable instrument available
- Third party IP67-rated
- Surpasses 10' drop test
- Extra-large display
- Easy to use with intuitive 3-button operation
- Data logging standard at competitive price

MSA link READY

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Understanding Environmental Surveillance

Battery-powered, direct-reading instruments are classified as two groups—single-gas instruments or multiple-gas instruments—typically monitoring one or a combination of the following atmospheric conditions:

1. oxygen deficiency or enrichment;
2. the presence of combustible gas; and
3. the presence of certain toxic gases.

Depending on the capabilities of the instrument, monitoring can be conducted simultaneously for oxygen and combustible gas, or for oxygen, combustible gas and toxic gases. These devices are commonly referred to as 2-in-1, 3-in-1, 4-in-1 or 5-in-1 alarms.

No matter which type of instrument is used to check environmental gas concentrations, regular monitoring should be performed because a contaminant's level of combustibility or toxicity might increase even if it initially appears to be low or non-existent. In addition, oxygen deficiency can occur unexpectedly.

Atmospheric Composition

To determine the composition of an atmosphere, reliable instruments should be used to draw air samples. If possible, do not open the entry portal to the confined space before this step has been completed. Sudden changes in atmospheric composition within the confined space could cause violent reactions, or dilute the contaminants in the confined space, giving a false low initial gas concentration.

When testing permit-required spaces for acceptable entry conditions, always test in the following order:

1. oxygen content
2. flammable gases and vapors
3. potential toxic air contaminants

Figure 1

Comprehensive testing should be conducted in various locations within the work area. Some gases are heavier than air, and tend to collect at the bottom of a confined space. Others are lighter, and are usually in higher concentrations near the top of the confined space. Still others are the same molecular weight as air, so they can be found in varying concentrations throughout the space. This is why test samples should be drawn at the top, middle and bottom of the space to pinpoint varying concentrations of gases or vapors (see ***Figure 1***). The results of the atmospheric testing will have a direct impact on the selection of protective equipment necessary for the tasks in the area. It may also dictate the duration of worker exposure to the environment of the space, or whether an entry will be made at all. Substance-specific detectors should be used whenever actual contaminants have been identified.

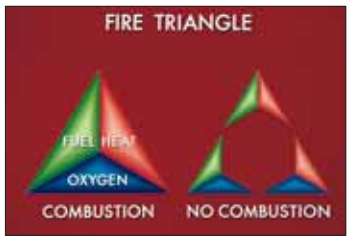

Figure 2

Figure 3

Combustible Gases

In order for combustion to occur, there must be three elements:

1. fuel
2. oxygen to support combustion
3. heat or a source of ignition

This is known as the fire triangle, but if you remove any one of the legs, combustion will not occur (see ***Figure 2***).

The percentage of combustible gas in the air is important, too. For example, a manhole filled with fresh air is gradually filled by a leak of combustible gas such as methane or natural gas, mixing with the fresh air. As the ratio of gas to air changes, the sample passes through three ranges: lean, explosive and rich (see Figure 3). In the lean range, there isn't enough gas in the air to burn. On the other hand, the rich range has too much gas and not enough air. However, the explosive range has just the right combination of gas and air to form an explosive mixture. Care must be taken, however, when a mixture is too rich, because dilution with fresh air could bring the mixture into the flammable or explosive range. An analogy is the automobile that won't start on a cold morning (a lean atmosphere because the liquid gasoline has not vaporized sufficiently), but can be flooded with too much gasoline (a rich atmosphere with too much vaporization). Eventually, when the right mixture of gas and air finally exists (explosive), the car starts.

How Combustible Gas Monitors Work

To understand how portable combustible gas detection instruments work, it is first important to understand what is meant by the Lower Explosive Limit (LEL) and Upper Explosive Limit (UEL). When certain proportions of combustible vapors are mixed with air and a source of ignition is present, an explosion can occur. The range of concentrations over which this reaction can occur is called the explosive range. This range includes all concentrations in which a flash will occur or a flame will travel if the mixture is ignited (see ***Figure 3***). The lowest percentage at which this can happen is the LEL; the highest percentage is the UEL.

Most combustible instruments display gas concentrations as a percentage of the LEL. Some models have gas readouts as a percentage by volume and others display both percent of LEL and percent combustible gas by volume. What's the difference? For example, the LEL of methane (the major component in natural gas) is 5 percent by volume, and the UEL is 15 percent by volume. If we slowly fill a room with methane, when the concentration reaches 2.5 percent by volume, it is 50 percent of the LEL; at 5 percent by volume it is 100 percent of the LEL. Between 5 and 15 percent by volume, a spark could set off an explosion.

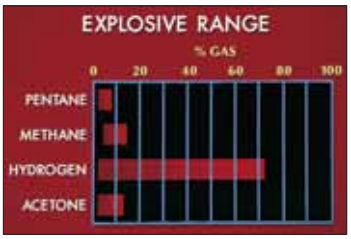

Figure 4

Different gases need different percent by volume concentrations to reach 100 percent of the LEL (see ***Figure 4***). Pentane, for example, has an LEL of 1.5 percent. Instruments that measure in percent of the LEL are easy to use because, regardless of the gas, you are most concerned with how close the concentration is to the LEL.

Single-Gas Monitors for Oxygen Deficiency

Oxygen indicators measure atmospheric concentrations of oxygen. Concentrations are generally measured over a range of 0 to 25 percent oxygen in air, with readings being displayed on either digital readout or an analog meter.

Oxygen indicators are calibrated with uncontaminated fresh air containing a minimum of 20.8 percent oxygen. With some models, an alarm is activated when oxygen levels drop below 19.5 percent.

Single-Gas Monitors for Combustible Gases

Figure 5

Single-gas instruments for monitoring combustible gases and vapors are generally calibrated on pentane and are designed for general-purpose monitoring of hydrocarbon vapors. Such instruments operate by the catalytic action of a heated platinum filament in contact with combustible gases (see ***Figure 5***). The filament is heated to operating temperature by an electric current. When the gas sample contacts the heated filament, combustion on its surface raises the temperature in proportion to the quantity of combustibles in the sample. A Wheatstone bridge circuit, incorporating the filament as one arm, measures the change in electrical resistance due to the temperature increases. This change indicates the percentage of combustible gas present in the sample.

Single-Gas Monitors for Toxic Gases

Compact, battery-powered devices can be used to measure levels of such gases as carbon monoxide (CO) or hydrogen sulfide (H_2S), depending on the model selected. Toxic gas monitors use electrochemical cells (see ***Figure 6***). If the gas of interest enters the cell, the reaction produces a current output proportional to the amount of gas in the sample. With these instruments, audible and visible alarms sound if the gas concentration exceeds a preset level. These devices are well suited for use in confined spaces containing motors or engines, which can generate large quantities of CO, as well as in sewers, waste treatment plants and "sour crude" processing stations which tend to have hazardous volumes of H_2S.

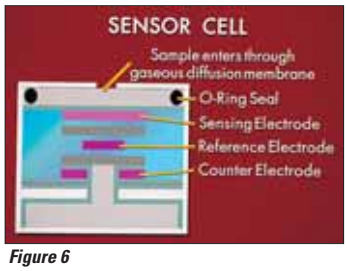

Figure 6

Multiple-Gas Monitors for Oxygen and Combustible Gas

In applications where it is necessary to determine oxygen and combustible gas levels simultaneously, 2-in-1 diffusion-type devices can be used. Sensors measure 0 to 100 percent of the LEL and oxygen from 0 to 25 percent. Remote sampling requires either a pump module or an aspirator bulb adapter.

Multiple-Gas Monitors for Oxygen, Combustible and Toxic Gases

Toxic gases and vapors, which can be inhaled or absorbed through the skin, are frequently found in confined spaces. Sometimes, these atmospheric hazards can also displace oxygen and may incapacitate the body's ability to maintain respiration. Some toxic gases and vapors can also cause long-term physical damage to the body in cases of repeated exposure.

A number of instruments are available to assist in detecting toxic gas. Pocket-size monitors operate by diffusion or an aspirator bulb. Larger instruments with built-in pumps draw samples from the immediate area or from outside the confined space work area when used with sampling lines.

Diffusion-type instruments are available for simultaneously measuring the LEL of combustible gases, oxygen levels and toxic levels (in parts per million) of H2S, CO and other toxic gases. Alarms also alert the user to low and high oxygen levels. Remote sampling pump adapters are available to convert these diffusion-type instruments into pump-style instruments.

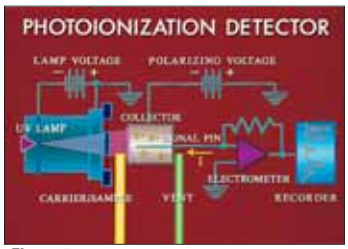

Figure 7

Photoionization Devices for Toxic Gases and Vapors

A photoionization detector, featuring microprocessor technology, uses ultraviolet light to ionize molecules of chemical substances in a gaseous or vaporous state (see ***Figure 7***). A real-time digital readout allows the user to make an immediate determination of gas and vapor concentrations. Depending upon calibration input, gas and vapors are measured over a 0.1 to 10,000 ppm scale. Some instruments automatically compensate for signal loss due to humidity, which is inherent in all PID detectors.

Detector Tube Sampling Systems

Detector tube-type devices are recommended for conducting quick evaluations of potential hazards that cannot otherwise be measured. With detector tubes, a known volume of air is drawn through the tube, using a manually operated or battery-powered sampling pump. If gas or vapor is present in the air, chemically treated granules in the tube are stained a different color. By measuring the length of the color stain within the tube, users can determine concentration levels.

Most tubes available today are made of glass, have break-off tips, and are filled with treated chemical granules. They generally have a shelf life of 24 to 30 months.

One type of pump frequently used with a detector tube is a compact, bellows-type device. Accurate and repeatable sample flows can be assured by a shaft that guides the bellows during compression. Some models feature an end-of-stroke indicator that lets the user know when a full air sample has been drawn. Models with an integral stroke counter eliminate the tedious recording of multiple pump strokes.

Personal Sampling

Personal sampling is used to determine the concentration of airborne contaminants. Personal sampling pumps are designed to measure individual workers' exposures, so they typically are lightweight, belt-mounted, battery-powered devices.

The process of sampling entails drawing a predetermined volume of air through a filter designed to trap contaminants. The filter is contained in a plastic cassette, which is attached by plastic tubing to a sampling pump calibrated to draw a specific, known volume of air into the filter. After air samples are drawn, the filters are sent to a laboratory where they are examined to determine the level of exposure.

Personal sampling determines the concentration found in the "breathing zone" or the area near the worker's face, which is usually measured at or near the collar or lapel.

Calibration

To ensure the accuracy of all monitoring and detection equipment, calibration should be performed regularly. If the instrument reading differs significantly from the values of the known standard, the instrument should not be used until it has been adjusted or, if necessary, repaired.

Solaris® Multigas Detectors

The Solaris Multigas Detector is an affordable, durable, reliable, easy-to-use portable instrument for detecting the presence of O_2, H_2S, CO and combustible gas. The Solaris Detector is designed to withstand rough handling in harsh environments. Best of all, it delivers MSA's commitment to quality at the smallest size and, even smaller price.

Features

- **Ergonomic Design**—For maximum comfort.
- **Alarm System**—World-class triple alarm system with 100+ decibel audible alarm, multiple high-intensity visual alarm and strong vibrating alarm.
- **Display Features**—Superior display features simultaneous gas concentration display, backlighting for easy reading and alphanumeric message bar for easy use.
- **Lightweight**—Under 8 oz., compact size that makes it easy to wear.
- **Durable**—Case with rubberized armor provides superior protection against liquid and dust ingress (IP 65 rated).
- **Long-life Battery**—Rechargeable lithium ion battery provides 14+ hours of continuous run time and delivers best-in-class performance in extreme conditions.
- **Galaxy Compatible**—Compatibility for computer automated calibration and record-keeping.
- **Sampling Pump Option**—Optional powered sampling pump with extensive contaminant filtering system.
- **Warranty**—Outstanding 2-year, all-inclusive warranty.

Solaris and Solaris FX Kits	
Standard Kits (includes datalogging option)*	
	Solaris Part No.
4-Gas Instrument	10048147
3-Gas (LEL, O_2, CO)	10048149
2-Gas (LEL, O_2)	10048214
Deluxe Kits (includes Econo-cal calibration kit, datalogging & sampling pump)*	
	Solaris Part No.
4-Gas Instrument	10049297
3-Gas (LEL, O_2, CO)	10049298
2-Gas (LEL, O_2)	10049300

All of the above kits include a UL approved Solaris, battery charger, calibration cap assembly and instruction manual in CD-rom.

* To download the Solaris data the MSA data docking module (P/N 710946) must also be purchased—see p. 80.

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom order" the Solaris Detector, configured exactly the way you want it. You can choose from an extensive line of base instrument components and accessories. See the ATO chart on the following page to make your selections.

For accessories, please refer to page 80.

See pages 98–103 for calibration accessories.

MSA STELLAR® Series Gas Detection Instruments

Solaris® and Solaris FX Multigas Detector Assemble-to-Order (ATO) Options

- To create your instrument configuration, select the instrument option code and mark them in the boxes to the right.

A. Datalog Options

The datalog option enables the Solaris Multigas Detector to store exposure data for easy retrieval at a later time. To download the Solaris data the MSA datalog kit (p/n 710946) must also be purchased. Datalog option is now standard.

Datalog Options	Code	Selection
Standard rechargeable instrument (includes Datalogging)	D	
Standard Alkaline instrument (includes Datalogging)	B	

B. Combustible Sensor Options

If a combustible gas sensor is desired, two options are available: 0-100% LEL or 0-5% CH_4.

Combustible Sensor Options	Code	Selection
None	0	
0-100% LEL	L	
0-5% CH_4	M	

C. Oxygen Sensor Options

To choose to have an oxygen sensor installed in your new Solaris Multigas Detector, choose selection 1.

For no oxygen sensor, enter a "0".

Oxygen Sensor Options	Code	Selection
None	0	
O_2 Sensor	1	

D. Toxic Sensor 1 Options

To choose to have an carbon monoxide sensor installed in your new Solaris Multigas Detector, choose selection 1.

For no oxygen sensor, enter a "0".

Toxic Sensor 1 Options	Code	Selection
None	0	
CO Sensor	1	

E. ToxicSensor 2 Options

To choose to have a hydrogen sulfide sensor installed in your new Solaris Multigas Detector, choose selection 1.
For no hydrogen sulfide sensor, enter a "0".

To choose to have a NO_2 sensor installed, choose 3.
For no NO_2 sensor, choose 2.

Toxic Sensor 2 Options	Code	Selection
None (H_2S Sensor not installed)	0	
H_2S Sensor	1	
None (NO_2 Sensor not installed)	2	
NO_2 Sensor	3	

F. Battery Charging Options

A Solaris-specific battery charger must be used to recharge the batteries in the Solaris unit. Global battery charger comes with several international plug outlet configurations for countries outside of North America. For the Solaris with alkaline batteries, choose option "O".

Battery Charging Options	Code	Selection
None	0	
North American outlet-compatible	N	
Global outlet-compatible	G	

G. Instrument Approvals

It is now possible to select the specific type of approval that a Solaris instrument possesses. The Solaris UL approval is recommended for the United States and Mexico. The Solaris CSA approval label is recommended for Canada.For the Solaris with alkaline batteries, choose option "A" for United States, Canada and Mexico.

Instrument Approvals	Code	Selection
Underwriters Laboratory (UL)	U	
CSA	C	
CSA/US (Alkaline Version)	A	

H. Sampling Pump

It is now possible to combine the sampling pump and probe for the Solaris unit into one easy-to-use accessory. The pump probe is very versatile and can be attached to the Solaris instrument in seconds. The built-in Water Stop filter helps to ensure the sampling system is not contaminated with dirt and debris during use.

Sampling Pump	Code	Selection
None	0	
Universal pump probe	1	

I. Calibration Kits

MSA provides two options for performing instrument calibration. The cost-effective Econo-Cal (34 liter) cylinder and fixed flow regulator provides an economical means to calibrate the Solaris instrument. The Model RP calibration kit also has a fixed flow 0.25 lpm regulator and provides the user with a larger capacity (58 liter) calibration gas cylinder.

Calibration Kit Options	Code	Selection
None	0	
Econo-Cal Calibration Kit	1	
Model RP Calibration Kit	2	

Your Model Part Number

Please write in numbers from selections above in appropriate boxes and contact your Safety Products Distributor to place your order.

Selection …		A	B	C	D	E	F	G	H	I
A-SOLARIS-			–		–		–		–		–		–	

Sirius® PID Multigas Detector

The Sirius Multigas Detector unit with PID Sensor gives users all they are looking for in a reliable, easy-to-use, durable package to detect volatile organic compounds, while measuring for combustible, toxic and oxygen deficient atmospheres.

Tremendous Flexibility—One PID and four gases in one instrument allows for detection of hundreds of chemicals.

Reliable PID Performance—MSA's own proprietary PID sensor design (patent-pending) provides users with excellent PID performance including humidity resistance, stable zero readings, and fast response and clear times to enable users to get their jobs done dependably.

User-Friendly Software—Easy-to-use software allows users to focus on their tasks at hand!

Superior, Proprietary PID Sensor Design—Reduces maintenance time and cost.

Flexible Configurations—This design combines two instruments into one the Sirius unit can be used with or without the PID sensor mode.

Loud, Attention-Grabbing Alarm—The Sirius Multigas Detector provides outstanding alarms to clearly warn users of a hazardous situation. A piercing alarm horn, resonating through a specially designed horn chamber, is designed into the Sirius unit to give users an audible warning in the event of an alarm condition. Multidirectional bright LED lights give users visible warning of alarm conditions that can be easily seen from any direction the Sirius unit is facing. A "Safe LED" light gives users confidence the unit is actively detecting gas by flashing every 15 seconds.

Interchangeable Lithium-ion and Alkaline Battery Packs—Allows for quick battery turn to keep users continually charged and ready to take action.

Easy Calibration and Compatibility with Galaxy Automated Test System—One-button calibration makes calibration simple for any user. Intelligent software frees users from complicated calibration adjustments.

Long-Term Storage Kit—Provides all the tools necessary to keep the Sirius Multigas Detector running if the unit has not been frequently used.

For accessories, please refer to page 80.

See pages 98–103 for calibration accessories.

Sirius Multigas Detector Kits (LEL)	Part #	10.6 eV	LEL	02	CO	H2S	Li Ion	Alka Bat	10 ft line	1 ft probe	Ret Line	Bl Boot	Cor Jac	Cal Kit	Data Log	Blk Cas	Std Cap	Lamp Cl Kit
Deluxe LEL 4-Gas Lithium Ion PID	10051141	•	•	•	•	•	•		•	•	•	•	•	•		•	•	
Deluxe LEL 3-Gas H2S Lithium Ion PID	10051142	•	•	•		•	•		•	•	•	•	•	•		•	•	
Deluxe LEL 3-Gas CO Lithium Ion PID	10051143	•	•	•	•		•		•	•	•	•	•	•		•	•	
Deluxe LEL 4-Gas Lithium Ion PID Datalog	10051144	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	
Deluxe LEL 4-Gas Lithium Ion PID less bt/jac	10051117	•	•	•	•	•	•		•	•	•			•		•	•	•
Industrial LEL 4-Gas Lithium Ion PID	10051146	•	•	•	•	•	•		•	•	•	•	•				•	
Industrial LEL 3-Gas H2S Lithium Ion PID	10051147	•	•	•		•	•		•	•	•	•	•				•	
Industrial LEL 3-Gas CO Lithium Ion PID	10051148	•	•	•	•		•		•	•	•	•	•				•	
Industrial LEL 4-Gas Lithium Ion PID no jackt	10051149	•	•	•	•	•	•		•	•	•	•					•	
Industrial LEL 4-Gas Lithium Ion PID with cal	10051150	•	•	•	•	•	•		•	•	•			•	•	•	•	
Economy LEL 4-Gas Alkaline PID	10051151	•	•	•	•	•		•									•	
Economy LEL 3-Gas H2S Alkaline PID	10051152	•	•	•		•		•									•	
Economy LEL 3-Gas CO Alkaline PID	10051153	•	•	•	•			•									•	
Economy LEL 4-Gas Lithium Ion PID	10051154	•	•	•	•	•	•										•	
Sirius Multigas Detector Kits (CH_4)																		
Deluxe CH4 4-Gas Lithium Ion PID	10051177	•	•	•	•	•	•		•	•	•	•	•	•		•	•	
Deluxe CH4 3-Gas H2S Lithium Ion PID	10051178	•	•	•		•	•		•	•	•	•	•	•		•	•	
Deluxe CH4 3-Gas CO Lithium Ion PID	10051179	•	•	•	•		•		•	•	•	•	•	•	•	•	•	
Deluxe CH4 4-Gas Lithium Ion PID Datalog	10052511	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•
Industrial CH4 4-Gas Lithium Ion PID	10051181	•	•	•	•	•	•		•	•	•	•	•				•	
Industrial CH4 3-Gas H2S Lithium Ion PID	10051182	•	•	•		•	•		•	•	•	•	•				•	
Industrial CH4 3-Gas CO Lithium Ion PID	10051183	•	•	•	•		•		•	•	•	•	•				•	
Industrial CH4 4-Gas Lithium Ion PID no jac	10051184	•	•	•	•	•	•		•	•	•	•					•	
Economy CH4 4-Gas Alkaline PID	10051185	•	•	•	•	•		•									•	
Economy CH4 3-Gas H2S Alkaline PID	10051186	•	•	•		•		•									•	
Economy CH4 3-Gas CO Alkaline PID	10051187	•	•	•	•			•									•	
Economy CH4 4-Gas Lithium Ion PID	10051188	•	•	•	•	•	•										•	

Sirius® PID Multigas Detector Assemble-to-Order (ATO) Options

- To create your instrument configuration, select the instrument option code and mark them in the boxes to the right.

A. Photoionization Detector Lamp Option

To choose the standard 10.6 eV lamp for most VOC's, choose selection A. For the low energy 9.8 eV lamp with the most VOC discrimination, enter selection B.

PID Lamp	Code	Selection
None	0	
PID with 10.6 eV Lamp(0-2000 ppm)	A	
PID with 9.8 eV Lamp	B	

B. Combustible Sensor Option

To choose to have your MSA 20L combustible sensor reading set to be displayed as 0-100% LEL, enter selection "L". For a display of 0-5% methane, enter an "M".

Combustible Sensor	Code	Selection
None	0	
0-100% LEL	L	
0-5% Methane	M	

C. Oxygen Sensor Options

To choose to have an oxygen sensor installed in your new Sirius Multigas Detector, enter selection 1. For no oxygen sensor, enter a "0".

Oxygen Sensor	Code	Selection
None	0	
Oxygen (0-25%)	1	

D. Carbon Monoxide Sensor Option

To choose to have a carbon monoxide sensor installed in your new Sirius Multigas Detector, enter selection 1. For no carbon monoxide sensor, enter a "0".

Carbon Monoxide Sensor	Code	Selection
None	0	
Carbon Monoxide (0-500 ppm)	1	

E. Hydrogen Sulfide Sensor Option

To choose to have a hydrogen sulfide sensor installed in your new Sirius Multigas Detector, enter selection 1. For no hydrogen sulfide sensor, enter a "0".

Hydrogen Sulfide Sensor	Code	Selection
None	0	
Hydrogen Sulfide (0-100 ppm)	1	

F. Battery Pack & Charger Options

You may choose between MSA's lithium ion battery pack which includes a standard lithium ion battery charger, or the convenience of an alkaline battery pack. You may also choose to have both battery pack types included with your new Sirius Multigas Detector.

Battery Pack/Charger	Code	Selection
None	0	
Lithium ion, includes charger & cord	A	
Replaceable alkaline	B	
Both Lithium ion and replaceable alkaline battery packs	C	

G. Vehicle Charger Option

If you would like to order the vehicle charger for your new Sirius Multigas Detector, enter selection 1.

Vehicle Charger	Code	Selection
None	0	
Vehicle Charger	1	

H. Sampling Lines

MSA's Quick-Connect sampling lines are of the highest quality materials, guaranteed to provide accurate sampling concentrations. Sirius Multigas Detector sampling lines all includes a Quick-Connect air-line fitting for easy attachment and tight seal. For sampling jet fuel, enter selection 3 for the 10' teflon sampling line option, or selection 4 for the 25' sampling line option.

Sampling Lines	Code	Selection
None	0	
10-foot polyurethane	1	
25-foot polyurethane	2	
10-foot teflon (for jet fuel sampling)	3	
25-foot teflon (for jet fuel sampling)	4	
3-foot polyurethane coiled	5	

I. Sampling Probes

MSA's sampling probes are durable & comfortable to use. The built in Water-Stop filter ensures that your sampling system is not contaminated with dirt and debris if the probe tip is dipped in water. You must order a probe if you order a sampling line, as we strongly recommend that you operate the instrument with this filter in place.

Sampling Probes	Code	Selection
None	0	
1-foot Probe	1	
3-foot Probe	2	
8-inch Probe	3	

J. Carrying Attachments

While a high-strength stainless steel D-Ring is offered with this instrument at no extra charge, there are three other options for handling the instrument: the retractable carrying line for use with the D-Ring, the shoulder harness and the wrist harness to be used on the user's arm with a Level A suit.

Carrying Attachments	Code	Selection
None	0	
Retractable Carrying Line with Belt Clip	1	
Shoulder Harness	2	
Wrist Harness	3	

K. Instrument Jackets and Boots

To offer the highest level of of instrument protection, you may choose a protective black rubber boot and harness, or a cordura jacket. You may also order both options by choosing selection C.

Instrument Jacket/Boot	Code	Selection
None	0	
Black Boot with Harness	B	
Cordura Jacket with Harness	C	
Black Boot, Cordura Jacket and Harness	D	

L. Calibration Kits

You may choose one of two calibration options for your Sirius Multigas Detector. The fixed-flow .25 lpm regulator includes a multigas calibration cylinder and also an isobutylene calibration gas cylinder if a PID selection is chosen. You may also order just the isobutylene calibration kit with gas cylinder.

Calibration Kits	Code	Selection
None	0	
Econo-Cal Fixed-Flow Regulator Calibration Kit (includes multigas and isobutylene cylinders)	1	
Model RP Fixed-Flow Regulator Calibration Kit (includes multigas and isobutylene cylinders)	2	
Isobutylene Calibration Kit (includes gas cylinder)	3	

M. Data Communications Kit

If you need to track the readings and operations of your Sirius Multigas Detector, consider ordering the instrument with the optional built-in datalogging module. The option also provides TWA and STEL capabilities.

Data Communications	Code	Selection
None	0	
Data Link Module	1	
Data Link Module and Software Kit	2	

N. Packaging

Your new Sirius Multigas Detector may be protected by a standard black plastic case, or by a black premium field case. You may also choose the option of a long-term storage kit case for emergency response, large enough to hold the Sirius Multigas Detector, calibration cylinders, spare sensors, spare PID lamp and lithium ion battery pack with charger, spare alkaline battery pack, lamp cleaning kit and simple-to-read and understand refresher instructions.

Packaging	Code	Selection
Standard shipping carton	0	
Standard black PVC case	1	
Premium black field case	2	
Long-term storage kit case	4	
Long-term storage kit basic includes PID lamp, add $180 each sensor	5	

O. PID Lamp Cap

The standard easy-access lamp cap is included with your Sirius Multigas Detector at no extra charge. You may also choose a tamper-proof lamp cap.

PID Lamp Cap	Code	Selection
None	0	
Standard easy-access lamp cap	S	
Alternative tamper-proof lamp cap	T	

Your Model Part Number

Please write in numbers from selections above in appropriate boxes and contact your Safety Products Distributor to place your order.

Selection …	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
A-SIRIUS-															

Orion® Multigas Detector

The Orion Multigas Detectors is a low-cost, reliable, and easy-to-use portable instruments for detecting the presence of O_2, H_2S, CO and combustible gas. The Orion Multigas Detector features MSA's long-life 20L combustible sensor and will stand up to the roughest handling in even the toughest environments.

Features

- One-button calibration
- Long-life battery
- Carbon-filled nylon case
- Tough, durable construction
- Built-in pump
- Galaxy compatibility
- Large, easy-to-read display
- Durable sensors
- Link™ Software compatibility

Approvals

The Orion Multigas Detectors has been designed to meet intrinsic safety testing requirements in certain hazardous atmospheres. The Orion Multigas Detector has been approved by UL and cUL for use in Class I, Division I, Groups A, B, C, and D.

Orion Multigas Detector Kits

	LEL	O_2	CO	H_2S	NiMH Battery & Charger	Alkaline Battery	Calibration Cap	Internal Pump	10ft Line	1ft Probe	Orange Cordura Case	Calibration Kit	Black Economy Case	Boot	Orion Part No.
Deluxe 4-gas, datalog	•	•	•	•	•			•	•	•	•	•	•	•	10030399
Deluxe 4-gas	•	•	•	•	•			•	•	•	•	•	•	•	10025932
Deluxe 3-gas H_2S	•	•		•	•			•	•	•	•	•	•	•	10025935
Deluxe 3-gas CO	•	•	•		•			•	•	•	•	•	•	•	10025938
Industrial 4-gas	•	•	•	•	•			•	•	•	•			•	10025931
Industrial 4-gas, less jacket	•	•	•	•	•			•	•	•				•	10030420
Industrial 3-gas H_2S	•	•		•	•			•	•	•	•			•	10025934
Industrial 3-gas CO	•	•	•		•			•	•	•	•			•	10025937
Economy 4-gas, NiMH	•	•	•	•	•		•								10030398
Economy 4-gas	•	•	•	•		•	•								10025930
Economy 3-gas H_2S	•	•		•		•	•								10025933
Economy 3-gas CO	•	•	•			•	•								10025936

MSA STELLAR® Series Gas Detection Instruments

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom order" the Orion Multigas Detector or the Orion FX Multigas Detector, configured exactly the way you want it. You can choose from an extensive line of base instrument components and accessories. See the ATO chart on the following page to make your selections.

For accessories, please refer to page 81.

See pages 98–103 for calibration accessories.

Orion® Multigas Detector Assemble-to-Order (ATO) Options

- To create your instrument configuration, select the instrument option code and mark them in the boxes to the right.

			Code	Selection
A. Combustible Sensor Options	To choose to have MSA's own long-life 20L combustible sensor installed in your instrument (Orion Multigas Detector only), choose selection 1. For no combustible sensor, enter a "0."	**Combustible Sensor**		
		None	0	
		% LEL (Pentane, 0–100%) **Orion** Multigas Detector only	1	
B. Oxygen Sensor Options	To choose to have an oxygen sensor installed in your new Orion Multigas Detector, choose selection 1. For no oxygen sensor, enter a "0."	**Oxygen Sensor**		
		None	0	
		Oxygen (0–25%)	1	
C. Carbon Monoxide Sensor Options	To choose to have a carbon monoxide sensor installed in your new Orion Multigas Detector, choose selection 1. For no carbon monoxide sensor, enter a "0."	**Carbon Monoxide Sensor**		
		None	0	
		Carbon Monoxide (0–999 ppm)	1	
D. Hydrogen Sulfide Sensor Options	To choose to have a hydrogen sulfide sensor installed in your new Orion Multigas Detector, choose selection 1. For no hydrogen sulfide sensor, enter a "0."	**Hydrogen Sulfide Sensor**		
		None	0	
		Hydrogen sulfide (0–200 ppm)	1	
E. Battery Pack Options	You can choose between MSA's NiMH rechargeable batteries which will run your Orion Multigas Detector for up to 16 hours in pump mode and 20 hours in diffusion mode, or you can choose the convenience of alkaline batteries. For ultimate flexibility, choose "both!"	**Battery Pack**		
		Standard NiCd Rechargeable (comes with standard AC charger)	A	
		Replaceable alkaline	B	
		Both NiMH and alkaline	C	
F. Battery Charger Options	If you order your Orion Multigas Detector with a rechargeable battery pack, the charger is included in the price. If you want the optional vehicular charger adapter, choose selection "1."	**Battery Charger**		
		None/Standard AC charger	0	
		Vehicular charger	1	
G. Sampling Methods	The Orion Multigas Detector's patented Pulsecheck™ pump technology leads the industry. If you chose the built-in pump, operating directly off the instrument batteries, you are assured of an audible pump fault alarm and you do not need to maintain a second set of batteries. If you are ordering diffusion instruments, a calibration cap will be included to calibrate your instruments.	**Sampling/Calibration Methods**		
		None	0	
		Integral, Pulsecheck pump	P	
		Manual aspirator model	A	
H. Sampling Lines	MSA's high-speed sampling lines are of the highest quality materials guaranteed to not alter sample concentration. Screw fittings with O-Ring couplings at each end ensure there are no leaks when the system is operating.	**Sampling Lines**		
		None	0	
		3-foot coiled	1	
		5-foot coiled	2	
		10-foot	3	
		15-foot	4	
		25-foot	5	
I. Sampling Probes	MSA's sampling probes are durable and comfortable to use. The built-in Water Stop filter ensures your sampling system is not contaminated with dirt and debris if the probe tip is dipped in water. You must order a probe if you order a sampling line as we strongly recommend you operate the instrument with this filter in place.	**Sampling Probes**		
		None	0	
		1-foot straight	1	
		3-foot straight	2	
		3-foot, holes near tip	3	
		3-foot, holes near handle	4	
		Hot-gas sampling probe	5	
J. Carrying Attachments	While a high-strength, nylon clip is offered with the instrument at no extra charge, a swivel belt loop kit, which allows quick release from your belt with a half turn, is also available.	**Belt Clip**		
		Standard nylon	0	
		Swivel belt loop	1	
K. Instrument Jacket	For the highest levels of environmental and rough handling protection, you can order from a variety of jackets and boots for your Orion Multigas Detector.	**Instrument Jacket**		
		None	0	
		Black rubber boot	B	
		Black leather case	L	
		Orange cordora jacket	C	
		Black rubber boot/Orange cordora	D	
		Red rubber boot	R	
L. Calibration Kits	You can choose one of two calibration options for your Orion Multigas Detector. The flexible RP kit provides a constant flow regulator that is reused and provides the greatest accuracy. The squirt gas test kit provides a very economical means to verify instrument calibration.	**Calibration Kit Options**		
		None	0	
		RP Calibration Kit (includes gas)	1	
		Squirt Gas Check Kit (includes gas)	2	
		(Only available in ATO for Combustible, O_2, CO, H_2S—other gases must be purchased separately.)		
M. Data Communications Options	If you need to track the readings and operation of your Orion Multigas Detectors, consider ordering them with the optional built-in datalogging module. This option also provides STEL and TWA capabilities. This option required for Galaxy operation.	**Data Communications**		
		None	0	
		Orion link module	1	
		Module and download software	2	
N. Packaging Options and Carrying Cases	You can further protect your Orion Multigas Detector with optional carrying cases. For ease of transport and handling, these cases can be even be ordered to accommodate calibration accessories. With the premium cases, a simple-to-understand training videotape is included at no extra charge.	**Packaging & Carrying Cases**		
		Standard shipping container only	0	
		Black plastic case w/ space for cylinder, with video	1	
		Heavy-duty case with video	2	
		Large, heavy-duty case with video and space for 2 cylinders	3	
		Orange plastic case w/ space for cylinder, with video	4	

Your Model Part Number Please write in numbers from selections above in appropriate boxes and contact your Safety Products Distributor to place your order.

Selection …	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A-ORION-														

Orion®*plus* Multigas Detectors

Compact. Durable. Ingenious. Versatile and rugged, the updated Orion plus IR Detector offers five gases with infrared and a wide range of sensor options. Our newly developed array of IR sensors will detect CO_2 or hydrocarbons in LEL range or up to 100% by volume. MSA's 20L catalytic combustion sensors are "best in class" silicon-resistant and will reliably detect up to 100% LEL. Available toxic sensors include ammonia, chlorine and many other choices. Simply choose your IR sensor, add two toxic sensors and finish your unit with an oxygen and an LEL sensor.

Features

Updated!

- Large, fully-graphic back-lit display
- Data-logging standard using ORIONLINK® software
- Carbon-filled nylon case protectsagainst RFI and corrosive gases
- Long-life battery with three-hour recharge
- Built-in pump with electrical PermaCheck™ function standard
- Two-year warranty on case, sensors, electronics and mechanical components

MSA STELLAR® Series Gas Detection Instruments

Orion*plus* Multigas Detector Kits

All kits are standard equipped with datalog, internal pump and comes with rechargeable battery pack, charger, protective rubber boot, PTFE sampling probe with 5ft line and software (p/n 655505 is needed to read data).

Part #	O_2	LEL	CO	H_2S	NH_3	Cl_2	PH_3	SO_2
10074944	•	•	•		•			
10074943	•	•	•			•		
10074949	•	•		•	•			
10074946	•	•		•		•		
10074951	•	•			•		•	
10074950	•	•		•				•
10074945	•	•	•					•

Infra Red Versions

Part #	IR	O_2	LEL	CO	H_2S
10074947	IR CO_2 (0-10% Vol)	•	•	•	•
10074941	IR CH_4 (0-100% Vol)	•	•	•	•
10074942	IR HC butane (0-25% Vol)	•	•	•	•

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to custom order the Orion plus Multigas Detector configured exactly the way you want it. See the ATO chart on the following page to make your selections.

Orion*plus* Multigas Detector for the Fire Service Assemble-to-Order (ATO) Options

A. Combustible Sensor Option
Choose your sensor calibration with MSA's long-life 20L combustible sensor. Choose selection "L" for a pentane calibration or "M" for a methane calibration. For no combustible sensor, enter a "0".

Combustible Sensor	Code
without combustible sensor	0
0–100% LEL Pentane (1.4 vol%)	L
0–100% LEL methane (5.0 vol%)	M

B. Oxygen Sensor Option
To choose to have an oxygen sensor installed in your new Orion plus IR Detector, choose selection 1. For no oxygen sensor, enter a "0".

Oxygen Sensor	Code
without oxygen sensor	0
0–25% Vol. O_2	1

C. Toxic 1 Sensor Option
Choose your first toxic gas sensor from this extensive list to configure your new Orion plus IR Detector for your application; for no toxic sensor, enter an "0".

Toxic 1 Sensor	Code
None	0
0–999 ppm carbon monoxide (CO)	B
0–200 ppm hydrogen sulfide (H_2S)	C
0–30 ppm hydrogen cyanide (HCN)	E
0–10 ppm chlorine (Cl_2)	F
0–100 ppm ammonia (NH_3)	G
0–20 ppm sulfur dioxide (SO_2)	H
0–20 ppm nitrogen dioxide (NO_2)	I
0–1 ppm chlorine dioxide (ClO_2)	J
0–5 ppm phosphine (PH_3)	K
0–1 ppm ozone (O_3)	L
0–1 ppm phosgene ($COCl_2$)	M

D. Toxic 2 Sensor Option
Choose your second toxic gas sensor from this list to configure your new Orion plus IR Detector for your application; for no toxic sensor, enter an "0".

Toxic 2 Sensor	Code
None	0
0–999 ppm carbon monoxide (CO)	B
0–200 ppm hydrogen sulfide (H_2S)	C
0–30 ppm hydrogen cyanide (HCN)	E
0–10 ppm chlorine (Cl_2)	F
0–100 ppm ammonia (NH_3)	G
0–20 ppm sulfur dioxide (SO_2)	H
0–20 ppm nitrogen dioxide (NO_2)	I
0–1 ppm chlorine dioxide (ClO_2)	J
0–5 ppm phosphine (PH_3)	K
0–1 ppm ozone (O_3)	L
0–1 ppm phosgene ($COCl_2$)	M

E. Advanced IR Sensor Options
MSA offers a range of advanced IR options which will operate in the absence of background oxygen for inert applications. If your application require an IR sensor for %CO2 or inert %LEL, choose "H" for 0-100% vol methane. For general hydrocarbon monitoring (0-25% vol), choose "J". When no IR sensor is required, enter an "0". Contact MSA for other IR sensors options.

IR Sensor	Code
None	0
0–10 vol % carbon dioxide (CO_2)	C
0–50 vol % carbon dioxide (CO_2)	D
0–100 % LEL propane (C_3H_8)	E
0–100 % vol propane (C_3H_8)	F
0–100 % vol methane (CH_4)	H
0–25 % vol hydrocarbon (butane)	J

F. Battery Pack Options
You can choose between MSA's NiMH rechargeable batteries, or you can choose the convenience of alkaline batteries. For ultimate flexibility, choose both!

Battery Pack	Code
NiMH battery with PCBA & charger with cradle	A
Alkaline battery pack	B
NiMH & alkaline pack (A & B)	C

G. Battery Charger Options
If you order your Orion Multigas Detector with a rechargeable battery pack, the charger is included in the price. If you want the optional vehicular charger adapter, choose selection "1."

Vehicle Charger	Code
None/Standard AC charger	0
Vehiclular charger	1

H. Sample Line
MSA does not recommend sampling reactive gases; however if necessary, MSA's high-speed PTFE sampling line is of the highest quality material, guaranteed to minimize altering of the sample concentration.

Sample Line	Code
None	0
Customized 5' PTFE line for Orionplus	1

I. Sample Probe
A 1' PTFE sampling probe with built-in water-stop filter ensures that your sampling system is not contaminated with dirt and debris if the probe tip is dipped in water. You must order a probe if ordering a sampling line. We strongly recommend operating the instrument with this filter in place.

Carrying Attachments	Code
None	0
Sampling PTFE probe	1

J. Carrying Attachments
While a high-strength, nylon clip is o ffered with the instrument at no charge, a swivel belt loop kit allowing quick release with a half turn, is also available.

Belt Clip	Code
Unbreakable nylon	0
Swivel belt loop	1

K. Instrument Jacket
For environmental and rough handling protection, a variety of jackets and boots is available for your Orionplus IR Detector.

Instrument Jacket	Code
None	0
Black rubber boot	B
Leather case	L
Orange cordura jacket	C
Red rubber boot	R

L. Calibration
Use a minimal length (1-2 ") of the PU tubing to connect to your designated regulators for reactive gases to your instrument.

Calibration	Code
2-ft PU tubing	0

M. Data Communications Kit
To track readings and operation of your Orionplus IR Detector, this unit is standard-equipped with datalogging and STEL/TWA capabilities. To conveniently track stored records, order the IR Receiver, as software comes standard with each unit.

Data Communications	Code
None	0
IR receiver (JetEye)	1

N. Packaging Options & Carrying Cases
You can further protect your Orionplus IR Detector with optional carrying cases. For ease of transport and handling, these cases can be ordered to accommodate calibration accessories.

Packaging & Carrying Cases	Code
Standard carton	0
Economy plastic case	1
Hard plastic with space for 2 cylinders	2
Red economy plastic	3

Your Model Part Number

Please write in numbers from selections above in appropriate boxes and contact your MSA Fire Service distributor to place your order.

Selection . . .		A	B	C	D	E	F	G	H	I	J	K	L	M	N
A-ORION*plus*-			-		-				-	-				-	

ALTAIR® 4 Multigas Detector

MSA STELLAR® Series Gas Detection Instruments

The ALTAIR 4 Multigas Detector for LEL, CO, H_2S, and O_2 is a super-durable, competitively-priced, personal multigas detector. The ALTAIR 4 Multigas Detector is the only portable gas detector with an optional MotionAlert™ feature if a user should become disabled due to unforeseen hazards. When enabled, the MotionAlert feature will activate if the instrument does not detect motion for 30 seconds, and is ideal for confined space entry applications. This unique gas detector function is easily turned off by the user if desired.

Features

- MotionAlert feature plus audible, visual, and vibrating alarms
- Most rugged instrument available
- Large buttons for easy operation
- 20-hour battery run time when fully charged
- Tested to IP67
- Galaxy® System compatible
- Global approvals
- Economically priced
- MSA Link™ Software-ready
- QuickCheck™ Test Station available for fast, easy bump testing

ALTAIR® 4 Multigas Detector		
ALTAIR 4 Multigas Detector (UL approved), with data logging feature, charger, calibration cap and tubing, CD manual		
UL Approval	**CSA Approval**	**Description**
10085981	10089091	ALTAIR 4 Multigas Detector (LEL, O_2, CO, H_2S)
10085989	10089094	ALTAIR 4 Multigas Detector with MotionAlert feature (LEL, O_2, CO, H_2S)
10089103	10089092	ALTAIR 4 Multigas Detector (LEL, O_2, CO)
10089105	10089095	ALTAIR 4 Multigas Detector with MotionAlert feature (LEL, O_2, CO)
10089104	10089093	ALTAIR 4 Multigas Detector (LEL, O_2)
10089106	10089096	ALTAIR 4 Multigas Detector with MotionAlert feature (LEL, O_2)

Accessories	
10069894	SS Suspender clip
10089322	Belt clip
10048280	34L quad gas mix (1.45% CH_4, 15% O_2, 60 ppm CO, 20 ppm H_2S)
10045035	58L quad gas mix (1.45% CH_4, 15% O_2, 60 ppm CO, 20 ppm H_2S)
10047596	Universal pump probe (UL)
10055576	Universal pump probe (CSA)
10089321	Calibration assembly (cap, tube, connector)
10082834	JetEye IR adapter with USB connector
10088099	MSA Link Software CD-ROM
10086639	Charger cradle assembly
10087913	North American power supply
Sensors	
10089116	Combustible sensor
10046946	O_2 sensor
10089117	CO/H_2S duo-tox sensor
10089118	Sensor replacement kit (duo-tox, O_2, combustible)

Specifications		
Gas	**Range**	**Resolution**
LEL	0–100%	1%
O_2	0–25% vol	0.1% vol
CO	0–999 ppm	1 ppm
H_2S	0–200 ppm	1 ppm

ALTAIR® 4 Multigas Detector Assemble-to-Order (ATO) Options

- To create your instrument configuration, select the instrument option code and mark them in the boxes to the right.

1. Instrument Type	Choose your instrument type. For 'standard' choose "S". To have your Altair 4 equipped with the MotionAlert feature to indicate 'man-down' please choose "A".	**Instrument Type** Standard MotionAlert Feature	**Code** S A	**Selection**
2. Combustible Sensor Options	Choose your combustible sensor calibration. To select 0-100% LEL Pentane please choose "L"; for 0-5% Vol Methane choose "M". For no combustible sensor select "0" for none.	**Combustible Sensor Options** None LEL 0-100% Pentane 0-5% Vol Methane	**Code** 0 L M	**Selection**
3. Oxygen Sensor Options	To choose to have an oxygen sensor installed in your new Altair 4 Multigas Detector, please select "1". For no oxygen sensor please select "0".	**Oxygen Sensor Options** None 0-25% Vol	**Code** 0 1	**Selection**
4. Toxic Sensor Options	To confugure your new Altair 4 Multigas Detector for your application choose "1" for both CO and H_2S sensors. For no toxic sensor, enter a "0".	**Toxic Sensor Options** None 0–999 ppm CO and 0–200 ppm H_2S 0–999 ppm CO 0–200 ppm H_2S	**Code** 0 1 2 3	**Selection**
5. Power Supply	Select your power supply for your region, and add an instrument cradle to firmly sucure your instrument while charging on the shelf or in your Fire Truck.	**Power Supply** None North American North American w/cradle	**Code** 0 N M	**Selection**
6. Approval Label	Choose the applicable approval label for your area. For USA choose "U". For Canada choose "C".	**Approval Label** UL/CUL CSA	**Code** U C	**Selection**
7. Extended Warranty	MSA offers a 'back-to-back' full warranty. Choose "0" for the standard 2 year warranty. Choose "1" for an additional year warranty (3 years total) or "2" for 2 additional years warranty (4 years total), including case, electronics, batteries & sensor replacement.	**Extended Warranty** 2 years standard 3 years total 4 years total	**Code** 0 1 2	**Selection**
8. Packaging	To order a 10-unit bulk package, choose "1" (1 instrument version per package). To order the standard single unit carton choose "0".	**Packaging** Single carton 10-unit bulk package	**Code** 0 1	**Selection**

Your Model Part Number Please write in numbers from selections above in appropriate boxes and contact your Safety Products Distributor to place your order.

Selection …	1	2	3	4	5	6	7	8
A-ALT4-	☐	– ☐	– ☐	– ☐	– ☐	– ☐	– ☐	– ☐

Coming Soon!

ALTAIR® 5 Multigas Detector

The ALTAIR 5 Multigas Detector is MSA's latest portable instrument for detection of many toxic gases. This innovative unit offers these exclusive portable instrument features:

- Logo Express® Service option for customized instruments
- Standard MotionAlert™ feature to indicate "man-down"
- Great impact durability
- Excellent dust and water ingress protection
- Multilingual at no extra cost
- Standard graphical display
- Optional high-resolution color display
- Diffusion mode or internal pump
- Rechargeable or alkaline battery options

Contact MSA for more details and for ordering information.

Watchman® Multigas Monitor

The Watchman Multigas Monitor is a durable, portable instrument used to detect and monitor combustible gases, oxygen, and toxic gases in workplace atmospheres, especially in confined spaces such as manholes, storage tanks, tank cars, vaults, mines, and sewers. Designed for rugged handling, the monitor incorporates the state-of-the-art technology in a strong aluminum housing. The Watchman Monitor is ideal for long jobs in heavy industrial environments, as the instrument will run up to 16 hours on a single charge.

For more complete information, see Data Sheet 08-02-39.

Approvals

The Watchman Multigas Monitor meets intrinsic safety testing requirements for use in Class I Division 1, Groups A, B, C and D; Class II Division 1, Groups E, F, G; and Class III hazardous locations.

Watchman Multigas Monitor Kits

	LEL Display	O_2	CO	H_2S	Peak	STEL/TWA/Tag	AC Charger	10ft Line	Probe	Water Stop	Line Trap	Part No.	Notes
Industrial 4-Gas	•	•	•	•	•		•	•	•		•	711132	
Industrial 4-Gas	•	•	•	•	•	•	•	•	•	•		711406	
Industrial 3-Gas	•	•	•		•	•	•	•	•	•		711407	Replaces Model 360
Industrial 3-Gas	•	•		•	•	•	•	•	•	•		711408	Replaces Model 361
Industrial 2-Gas	•	•			•	•	•	•	•	•		711409	Replaces Model 260

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom order" the Watchman Multigas Monitor, configured exactly the way you want it. You can choose from an extensive line of base instrument components and accessories. See the ATO chart on the following page to make your selections.

For accessories, please refer to page 81.

See pages 98–103 for calibration accessories.

Watchman® Multigas Monitor Assemble-to-Order (ATO) Options

- To create your instrument configuration, select the instrument option code and mark them in the boxes to the right.
- To calculate your instrument price, write in the price for each option in the space provided to the right and add to the base price of $1,339.88 below.

A. Electrochemical Sensor Configuration Options

Please list the code number for the toxic gas sensors desired in the spaces to the right. In order to properly process your order, list them in descending numerical order. Use zeros to complete any of the four selections where no sensor is desired (e.g. 2100). Add the price of each sensor to obtain the sensor sub-total pricing.

Sensors (Select 4)	Code
Sulfur Dioxide (0-100 ppm)	6
Nitrogen Dioxide (0-100 ppm)	5
Nitric Oxide (0-100 ppm)	4
Hydrogen Sulfide (0-200 ppm)	3
Carbon Monoxide (0-2000 ppm)	2
Oxygen (0-25%)	1
None	0

Selection: Toxic 1 ☐ Toxic 2 ☐ Toxic 3 ☐ Toxic 4 ☐

B. Combustible Gas Sensor Options

If a combustible gas sensor is desired, select type of display. There are two options available: 0°100% Lower Explosive Limit (%LEL Pentane) or 0–5% Methane (%CH_4).

Sensors	Code
None	0
0–100% LEL Pentane	L
0–5% %CH_4 Methane	M

Selection: ☐

C. Peak Page

Allows user to view the peak gas readings for the entire time the instrument is running. The user can access this page by pressing simply the "PAGE" button on the tester keypad.

Peak Display Page	Code
Not enabled	0
Peak display enabled	1

Selection: ☐

D. STEL Page

Enables page and alarms for 15-minute-weighted-average gas exposures. To enable the STEL page, enter a "1" in the box to the right, otherwise, enter a "0".

STEL Display Page	Code
Not enabled	0
STEL display enabled	1

Selection: ☐

E. TWA Page

Enables page and alarms for 8-hour-weighted-average gas exposures. To enable the TWA page, enter a "1" in the box to the right, otherwise, enter a "0".

TWA Display Page	Code
Not enabled	0
TWA display enabled	1

Selection: ☐

F. Datatagging Page

Allows user to enter a text "tag" using the keypad to denote a location or note with a time stamp. To enable the datatagging page, enter a "1" in the box to the right, otherwise, enter a "0".

Datatagging Entry Pages	Code
Not enabled	0
Datatagging pages enabled	1

Selection: ☐

G. Battery Charger Options

From wall adapters to vehicular chargers, you can recharge your batteries wherever you need. Once recharged, your Watchman monitor is ready to provide you with up to 15 hours of continuous gas monitoring.

Battery Charger	Code
None	0
Vehicle, 8–24 VDC	1
Single-unit 110V	2
Single-unit 220V	3
Five-unit, 110/220V	5

Selection: ☐

H. Sampling Lines

The Watchman Monitor's sampling lines are of the highest quality materials guaranteed to not alter sample concentration. The heavy-duty synthetic rubber material is ideally suited to industrial applications where heat and chemical resistance are crucial to instrument performance. Screw fittings with O-Ring couplings at each end help reduce the possibility of leaks when the monitor is operating.

Sampling Lines	Code
None	0
5-foot	1
10-foot	2
15-foot	3
25-foot	4
50-foot	5

Selection: ☐

I. Sampling Probes

MSA's sampling probes are durable and easy to use. An assortment of probe types is available to suit your applications. You can select between heavy-duty nickel plated brass probes or phenolic plastic probes where electrical conductivity might be a concern.

Sampling Probes	Code
None	0
18-inch plastic	1
3-foot brass	2
3-foot plastic	3
4-foot solid brass	4

Selection: ☐

J. Line Traps

The Watchman Monitor is offered with two types of sample line protection from water ingress: a water stop filter and a water trap. The convenient, easy-to-use in-line water stop filter is a membrane filter that will prevent liquids from being drawn into the instrument.
The water trap provides a water collection bulb with a stop to automatically cut off the pump flow when the bulb fills. The water trap provides a visual indication you are drawing water into your sampling lines.

Line Traps	Code
None	0
Water Stop Assembly	1
Line Trap Assembly	2
Both	3

Selection: ☐

K. Remote Alarms

The Watchman Monitor's remote alarms provide an additional level of audible and visual alerts to your gas monitoring program. Available in low- and high-sound output and with an optional 15-foot extension cable, the remote alarms ensure your team is notified in high-noise areas.

Remote Alarms	Code
None	0
90-dB horn / 3-foot cable	1
90-dB horn / 15-foot cable	2
105-dB horn / 3-foot cable	3
105-dB horn / 15-foot cable	4

Selection: ☐

L. Packaging Options

You can further protect your Watchman Monitor with a high-strength, weatherproof carrying case. For ease of transport and handling, the premium case accommodates the instrument along with its sampling and calibration accessories. A simple-to-understand training videotape is included at no extra charge.

Packaging Options	Code
Standard Packaging	0
Premium Field Case with compartments for calibration accessories and bonus training viseo	1

Selection: ☐

Your Model Part Number

Please write in numbers from selections above in appropriate boxes.

Selection … A-WTM- [A][A][A][A] [B][C][D][E][F] [G] [H][I][J] [K] [L]

List sensors in descending numerical order.

Multigas Instrument Accessories

Solaris and Solaris Alkaline Multigas Detector Accessories

Sensors	Part No.
Replacement CO Sensor	10046944
Replacement H_2S Sensor	10046945
Replacement O_2 Sensor	10046946
Replacement Combustible Sensor	10046947
Carrying Cases	**Part No.**
Cordura Jacket (Orange)	10049053
Cordura Jacket (Black w/velcro jacket)	10054586
Cordura Jacket for Solaris Alkaline	10070855
Leather Case	10064766
Replacement Parts	**Part No.**
Calibration Cap	10044994
Horn Chamber Protective Insert	10046042
Horn Cap Repair Kit	10068059
Sampling Accessories	**Part No.**
Universal Pump Probe, UL Approval	10046528
Universal Pump Probe, MSHA Approval	10047595
Universal Pump Probe, CSA Approval	10055576
Solaris Aspirator Assembly	10050333
Datalogging	**Part No.**
Datalog Kit (Software / Infrared reader)	710946
Datalogging Software Only	710988
Operational Videos	**Part No.**
Solaris Overview - VHS	10049318
Solaris Overview - CD ROM	10049319
Replacement instruction manual, CD ROM	10048654
Replacement Instruction Manual, paper copy	10046201
Power Supply	**Part No.**
Charger Cradle Assembly	10048185
North American Power Supply	10047342
Global Power Supply	10047343
Vehicle Charger	10049410
Multi-unit Power Survey	10069498
Multi-unit Charge Station (no cradles)	10069856
Multi-unit Charge Station (with cradles)	10069857

Sirius Multigas Detector Accessories

Battery Packs	Part No.
Standard Rechargeable Lithium Ion Battery Pack	10050347
Lithium Ion Battery Charger, consists of power supply and charge adapter	10052512
Replaceable Alkaline Battery Pack	10049412
Replaceable Alkaline Battery Pack less door	10049098
Vehicle Charger (includes charge adapter)	10052513
Sampling Accessories	**Part No.**
Sampling Line w/Quick-Connect, 10-foot footolyurethane	10040665
Sampling Line with Quick-Connect, 25-foot polyurethane	10040664
Sampling Line with Quick-Connect, 10-foot teflon	10049058
Sampling Line with Quick-Connect, 25-foot teflon	10049057
Sampling Line with Quick-Connect, 3-ft polyurethane coiled	10040667
Probe, 1-foot	10042621
Probe, 3-foot	10042622
Probe, 8-inch	10040589
Protective Jackets, Boots and Carrying Attachments	**Part No.**
Black Rubber Boot (includes harness)	10052514
Cordura Jacket (includes harness)	10050122
Shoulder Harness only	474555
Retractable Carrying Line with Belt Clip	10050976
Wrist Harness	10051803
Long-Term Storage Kit	**Part No.**
Includes 4-Gas PID, Lithium Ion and Alkaline Battery Packs, Vehicle Charger, 10' sampling line w/1' probe, retractable carrying line w/belt clip, Cordura jacket & black boot, Econo-Cal kit, Data Link w/software, 4 replacement sensors & PID Lamp, lamp cleaning kit, standard lamp cover & case	10051176
Replacement Lamps and Sensors	**Part No.**
10.6 eV Lamp	10049692
9.8 eV Lamp	10052298
4 Sensor Kit (LEL, O_2, CO, H_2S)	10051717
Combustible Sensor (both LEL and CH_4)	10049808
Oxygen	10049806
Carbon Monoxide	10049804
Hydrogen Sulfide	10049805
Long-Term Storage Oxygen Sensor (hermetically sealed for 2-year storage)	10049807
Accessories	**Part No.**
Disposable Ionization Chamber	10047463
Lamp Cleaning Kit	10049691
Filter Replacement Kit with O rings and replacement dust filters	10049680
Standard Lamp Cover	10050841
Tamper-Proof Lamp Cover	10050750
Sirius Multigas Detector Screwdriver	636913
Sirius Multigas Detector Instructional CD Rom	10054667
Sirius Multigas Detector Instructional Video	10050856
Instruction Manual	10048887
Carrying Cases	**Part No.**
Standard Black Plastic Case	710948
Premium Black Field Case w/foam insert	10052515
Standard Red Plastic Case	10020541
Long-Term Storage Kit Case with labeled foam insert	10051539

Orion and OrionPlus Multigas Detector Accessories

Battery Packs & Chargers	Part No.
Rechargeable NiMH	10031091
NiMH battery charger	10020551
Alkaline	10031092
Vehicle charger	10034276
Battery pack jack cover	10030910
Replacement Sensors	**Part No.**
Combustible	10024247
Oxygen	10025940
Carbon Monoxide	711306
Hydrogen Sulfide	711307
Sampling Accessories	**Part No.**
Sample line, 3-foot coiled	10018118
Sample line, 5-foot coiled	710465
Sample line, 10-foot	497333
Sample line, 15-foot	497334
Sample line, 25-foot	497335
Probe, 1-foot	800332
Probe, 3-foot	800333
Protective Jackets	**Part No.**
Orange Cordura	10020486
Black Leather	10020485
Belt Clips	**Part No.**
Swivel Belt Loop Kit	710962
Protective Boots	**Part No.**
Black Rubber	10022036
Red Rubber (for Fire Service)	10025665
Video	**Part No.**
Care and Use Video	10020489
Data Communication	**Part No.**
Orion Link Module	655505
Orion Plus Link Kit	10059058

Watchman Multigas Detector Accessories

Battery Packs	Part No.
Heavy Duty NiCad	814127
Battery Charging	**Part No.**
Standard 120 VAC	494716
Standard 220 VAC	495965
Vehicular, 8–24 VDC	710423
Five-unit Charger	801759
Datalogging	**Part No.**
Data docking modules	804679
Sampling Accessories	**Part No.**
Sample Line, 5-foot	011354
Sample Line, 10-foot	011955
Sample Line, 15-foot	011912
Sample Line, 25-foot	011913
Sample Line, 50-foot	011958
Probe, 18-inch Plastic	486934
Probe, 3-foot Brass	011961
Probe, 3-foot Plastic	073743
Probe, 4-foot Brass, barhole	011960
Water Stop Assembly	711257
Line Trap Assembly	710459
Replacement Sensors	**Part No.**
Combustible Sensor	478537
Oxygen Sensor	480566
Carbon Monoxide Sensor	636240
Hydrogen Sulfide Sensor	636241
Nitric Oxide Sensor	808350
Nitrogen Dioxide Sensor	807477
Sulfur Dioxide Sensor	807476
Remote Alarm	**Part No.**
90 dB Remote Alarm	800992
105 dB Remote Alarm	800991
15-foot Extension Cable	800365

ALTAIR® Pro Single-Gas Detector

The ALTAIR Pro Single-Gas Detector has a wide range of features, including simple intuitive operation, small rugged design, and dependable technology that is there when you need it. These innovative toxic gas and oxygen detectors are based upon the design of the popular ALTAIR Single-Gas Detector, but with added features and functionality.

- Tough rubberized housing
- One-button operation
- Accurately measures the gas concentration or percent oxygen
- Displays information on a large, clear, backlit LCD.
- Superior dust and water protection (rated IP67 except O_2-R)
- Event-logging and data-logging
- Excellent impact resistance
- Versions available for CO, H_2S, O_2, NH_3, Cl_2, ClO_2, NO_2, SO_2, HCN and PH_3
- Great RFI performance
- Adjustable alarm set points are offered for LOW, HIGH, TWA and STEL
- Alarms are indicated by flashing LEDs, an audible alarm, and an internal vibrating alarm.
- Replaceable battery and sensor

The ALTAIR Pro Single-Gas Detector will provide worry-free performance and stand up to the roughest handling in even the toughest industrial environments. The sensors and battery can easily be replaced to keep the unit performing for years. The ALTAIR Pro Single-Gas Detector is designed and built with MSA's superior quality and is part of the MSA STELLAR® Series, which features a varied selection of single-gas and multigas instruments.

Some of the available ALTAIR Gas Detectors

ALTAIR Pro Single-Gas Detectors

Instrument Type	Part No.	Low Alarm	High Alarm	STEL	TWA
Oxygen (O_2)	10074137	19.50%	23.00%	N/A	N/A
Carbon Monoxide (CO)	10074135	25 ppm	100 ppm	100 ppm	25 ppm
Carbon Monoxide (CO) Fire	10076723	25 ppm	100 ppm	100 ppm	25 ppm
Carbon Monoxide (CO) Steel	10076724	75 ppm	200 ppm	200 ppm	75 ppm
Hydrogen Sulfide (H_2S)	10074136	10 ppm	15 ppm	15 ppm	10 ppm
Hydrogen Cyanide (HCN)	10076729	4.7 ppm	10 ppm	10 ppm	4.7 ppm
Chlorine (CL_2)	10076716	0.5 ppm	1.0 ppm	1.0 ppm	0.5 ppm
Chlorine Dioxide (CLO_2)	10076717	0.1 ppm	0.3 ppm	0.3 ppm	0.1 ppm
Sulfur Dioxide (SO_2)	10076736	2.0 ppm	5.0 ppm	5.0 ppm	2.0 ppm
Nitrogen Dioxide (NO_2)	10076731	2.0 ppm	5.0 ppm	5.0 ppm	2.0 ppm
Ammonia (NH_3)	10076730	25 ppm	50 ppm	35 ppm	25 ppm
Phosphine (PH_3)	10076735	0.3 ppm	1.0 ppm	1.0 ppm	0.3 ppm
Oxygen Remote (O_2-R)	10076733	19.50%	23.00%	N/A	N/A
Alternate Set Point Models	**Part No.**	**Low Alarm**	**High Alarm**	**STEL**	**TWA**
Oxygen (O_2)	10076732	18.00%	19.50%	N/A	N/A
Carbon Monoxide (CO)	10076718	30 ppm	60 ppm	60 ppm	30 ppm
Carbon Monoxide (CO)	10076719	35 ppm	100 ppm	100 ppm	35 ppm
Carbon Monoxide (CO)	10076720	35 ppm	400 ppm	400 ppm	35 ppm
Carbon Monoxide (CO)	10076721	50 ppm	200 ppm	200 ppm	50 ppm
Carbon Monoxide (CO)	10076722	100 ppm	300 ppm	300 ppm	100 ppm
Carbon Monoxide (CO) Steel	10080532	199 ppm	200 ppm	200 ppm	35 ppm
Hydrogen Sulfide (H_2S)	10076728	10 ppm	20 ppm	20 ppm	10 ppm
Hydrogen Sulfide (H_2S)	10076725	5 ppm	10 ppm	10 ppm	5 ppm
Hydrogen Sulfide (H_2S)	10076727	8 ppm	12 ppm	12 ppm	8 ppm
Hydrogen Sulfide (H_2S)	10076726	7 ppm	14 ppm	14 ppm	7 ppm

Accessories and Parts

467895	Regulator, 0.25 lpm	10041105	Cellphone clip
10030325	Tubing, 16" (do not use with NH_3, Cl_2, and ClO_2)	10041107	Lanyard clip
10080534	Tubing, 16" Teflon-lined (NH_3, Cl_2, and ClO_2)	10073346	Hardhat clip
10074132	3V CR2 battery	10040002	Clip, suspender (standard)
10069894	Clip, stainless steel	710946	FiveStar Link with IR

ALTAIR® Maintenance-Free Single-Gas Detector

The ALTAIR Single-Gas Detector features sensor options for carbon monoxide, hydrogen sulfide and oxygen and will operate for **over** two years maintenance free. This long lifespan, coupled with the unit's high performance, results in one of the most cost-effective single-gas detectors on the market. Advanced design offers superior dust and water protection and high resistance to RFI. Rubberized housing and one-button operation provide the durability and ease of use users expect from MSA instruments.

Alarm System

The triple-alarm system featuring two bright flashing LEDs, a piercing audible alarm, and a vibrating alarm ensures that no alarm condition goes unnoticed.

- 95 dB audible alarm (distinct sounds for High and Low alarms)
- Dual LEDs positioned to be seen from all angles
- Standard vibrating alarm and standard event logging

Durability Features

- Hard polycarbonate case, encapsulated in a thick rubberized shell
- Extremely resistant to drops and impacts
- Rated to IP67 protection levels for dust/water ingress

Warranty

Two years or 18 hours of alarm (1080 minutes)

ALTAIR Single-Gas Detectors

Instrument Type	Part No.	Low Alarm	High Alarm
Carbon Monoxide (CO)	10070750	25 ppm	100 ppm
Hydrogen Sulfide (H_2S)	10070749	10 ppm	15 ppm
Oxygen (O_2)	10070791	19.5% Vol	23% Vol
Alternate Set Point Models	**Part No.**	**Low Alarm**	**High Alarm**
Carbon Monoxide (CO)	10071334	30 ppm	60 ppm
Carbon Monoxide (CO)	10071335	35 ppm	100 ppm
Carbon Monoxide (CO)	10071336	35 ppm	400 ppm
Carbon Monoxide (CO)	10071337	50 ppm	200 ppm
Carbon Monoxide (CO)	10071338	100 ppm	300 ppm
Hydrogen Sulfide (H_2S)	10071340	10 ppm	200 ppm
Hydrogen Sulfide (H_2S)	10071361	5 ppm	10 ppm
Hydrogen Sulfide (H_2S)	10071362	8 ppm	12 ppm
Hydrogen Sulfide (H_2S)	10071363	7 ppm	14 ppm
Oxygen (O_2)	10071364	19.5% Vol	18% Vol

Accessories and Parts

710882	Cylinder, 60 ppm CO
473180	Cylinder, 300 ppm CO
467897	Cylinder, 40 ppm H_2S, RP
711062	Cylinder, 40 ppm H_2S, Econo-Cal
467895	Regulator, 0.25 lpm
10040002	Clip, suspender (standard)
10069894	Clip, stainless steel
10041105	Cellphone clip
10041107	Lanyard kit
710946	FiveStar® Link® with IR (for event log)
10030325	Tubing, 16"
10073346	Hardhat clip

ALTAIR® QuickCheck™ Station

- Fast, easy bump tests
- Maintenance free
- Checks instrument's visual, audible, and vibrating alarms
- Easy-to-understand LEDs show tests in progress and pass/fail status
- Compatible with most ALTAIR and ALTAIR Pro Detectors

ALTAIR® QuickCheck™ Station

Manual Regulator	Automatic Regulator	Gas Type
10076692	10076704	O_2/CO/H_2S/SO_2/NO_2
10076701	10076713	Cl_2/ClO_2
10076695	10076707	NH_3
10076698	10076710	HCN

Replacement and Accessory Parts

10047342	North American Power Supply
10049410	Vehicle Power Supply
10077384	Regulator Tubing
10077385	Front Housing Assembly
10075893	Automatic Gas Regulator
467895	Manual Regulator
710386	Single Cylinder Holder

Combustible Gas Detectors

Titan® Combustible Gas Detector

The Titan Combustible Gas Detector is a hand-held instrument used for the detection of combustible gases and vapors in air. The unit is equipped with an 85 dB audible alarm and one of the biggest displays available. The intuitive one-button operation allows simplicity of use. Simply switch on, and the Titan warns you of the presence of dangerous levels of combustible gases or vapors. It will stand up to the roughest handling in even the toughest environments. And, it is part of the MSA Stellar series of portable gas detection instruments.

Gascope® Combustible Gas Indicators and Tankscope® Combustible Gas Indicator, Model 62T

Gascope Combustible Gas Indicators are portable instruments for use in detecting, measuring, and pinpointing leaks of combustible gases and vapors. Each unit is easily carried with integral neck and waist straps, leaving hands free for climbing, operating the instrument, or carrying additional equipment.

Three Gascope Combustible Gas Indicator models are available. The Model 60 is designed for use by gas utility companies in routine testing for methane-in-air concentrations in manholes, sewers, curb boxes, and other street openings. The Model 62S, also suitable for use by gas utility companies, is designed for reading 0–100% LEL methane-in-air and 0–100% by volume methane-in-air. The Model 62 is for general industrial use and is designed for reading 0–100% LEL pentane-in-air. For more complete information, see Data Sheet 08-01-04.

The Tankscope Combustible Gas Indicator, Model 62T, is a portable instrument specifically designed to detect combustible gas leaks in inerted shipboard oil holds. Based on the highly successful Gascope Combustible Gas Indicator, the portable Tankscope Indicator has an easy-to-read analog display and is very simple to use.

Approvals

Gascope Combustible Gas Indicators are listed by MET for use in Class I, Division 1, Groups C and D hazardous locations defined by the National Electric Code.

Explosimeter® Combustible Gas Indicator

The Explosimeter Combustible Gas Indicator detects and measures concentrations of combustible gases or vapors in the air. The instrument can be used in the immediate environment or, with sampling lines and probes, it can draw samples from remote areas. The unit is housed in a cast aluminum case. For more complete information, see Data Sheet 08-00-03.

Approvals

Model 2A is listed by Underwriters' Laboratories (UL) for use in hazardous locations as defined by the National Electrical Code. UL approval is for Class I, Group D, Divisions 1 and 2; and Class I, Groups A, B and C, Division 2 (Division 1 excluded), hazardous atmospheres.

Titan Combustible Gas Indicator

Gascope Combustible Gas Indicator

Explosimeter Combustible Gas Indicator

TITAN Combustible Gas Detector			
	with alkaline batteries	**with NiMH batteries**	**with vibrating battery pack**
Pentane-calibrated	10033144	10033387	10033388
Methane-calibrated	10039414	10039415	10039416
Propane-calibrated	10042385	10042386	10042387
Accessories			**Part No.**
Battery charger and stand			10040783
Carrying case with strap			10035638
Model RP cylinder, pentane			804532
Model RP cylinder, methane			491041

Gascope/Tankscope Indicators	
Complete with carrying straps and batteries, less sampling line.	
Utility Model 60	465475
Model 62	465681
Utility Model 62S	468410
Model 62T, Tankscope	711258

Explosimeter Combustible Gas Indicator		
Comes complete with carrying straps, less sampling line.		
Description	**Applications**	**Part No.**
Model 2A	General testing for combustible gases or vapors in the air	89220

Detector Tube Pumps

Toximeter™ II Automatic Detector Tube Pump

The Toximeter II Automatic Detector Tube Pump makes the sampling process easier, allowing the user to preset the number of pump strokes from 1 to 250. Intrinsically safe, the automatic pump works with all MSA detector tubes. It can also be used as a sampling pump.

Toximeter™ II Automatic Detector Tube Pump	
655585	Toximeter II Automatic Detector Tube Pump

For more complete information on all Detector Tube Pumps, see Data Sheet 08-01-02.

Kwik-Draw® Detector Tube Pumps

MSA's Kwik-Draw and Kwik-Draw Deluxe Pumps can be used with an assortment of MSA's detector tubes to spot-test atmospheres for a wide variety of toxic substances. They are designed for one-hand operation and consistent delivery of a sample draw volume of 100 milliliters (ml).

Kwik-Draw Detector Tube Pumps	
488543	Kwik-Draw Basic Pump, with remote sampling adapter and carrying pouch
487500	Kwik-Draw Deluxe Pump, with remote sampling adapter, carrying pouch and end-of-stroke indicator
Accessories	
73067	Sampling line, 10 ft
73068	Sampling line, 25 ft
73069	Sampling line, 50 ft
87970	Remote Sampling Adapter, required for above sampling line
488780	Solvent-Resistant Sampling Line, 25 ft, with reel
488872	Tube Holder, required for 488780 line above
470321	Flue Gas Kit

Gas-Tester™ II H Detector Tube Pump

The Gas-Tester II H Pump is set for action by compressing the bellows. A pump stroke is started by pressing the release button. When the sample (100ml) is drawn through the tube, the end-of-stroke indicator changes color. An accurate measurement is obtained because the sample draw procedure itself is controlled only by the specifications of the pump and the flow resistance of the detector tube.

Gas-Tester II H Detector Tube Pump	
696944	Gas Tester II H Detector Tube Pump

Detector Tube Handbook

Detector Tube Handbook	
813929	Detector Tube Handbook

Detector Tube Industry Action Sets

Agricultural Set
4 x Phosphine
2 x Sulfur Dioxide
4 x Methyl Bromide
2 x Hydrogen Cyanide

Pulp & Paper Set
3 x Chlorine Dioxide
2 x Sulfur Dioxide
3 x Hydrogen Sulfide
2 x Chlorine
2 x Ozone

Indoor Air Quality Set
2 x Carbon Monoxide
2 x Carbon Dioxide
2 x Formaldehyde
2 x Ozone
2 x H_2O (relative humidity)

Pharmaceutical Set
3 x Acetic Acid
3 x Aromatic HC
3 x Qualitest
3 x Hydrogen Cyanide

Petroleum Set
2 x Hydrogen Sulfide
2 x Carbon Monoxide
2 x Qualitest
4 x Benzene
2 x Hexane

Mining Set
3 x Carbon Monoxide
2 x Nitrogen Dioxide
3 x Nitrous fumes
4 x Natural Gas/Methane

Synthetics Manufacturing Set
2 x Toluene
4 x Qualitest
2 x Ethanol
2 x Vinyl Chloride
2 x Trichloroethylene

Semiconductor Sets

Chemical Vapor Deposition Process
3 x Ammonia tubes
3 x CO_2 tubes
3 x Nitrous fumes tubes
3 x H_2S tubes

Etching Process
4 x Ammonia tubes
4 x Chlorine tubes
4 x Hydrogen Chloride tubes

Epitaxy Process
3 x CO tubes
3 x Hydrogen Chloride tubes
3 x Phosphine tubes
3 x Phosgene tubes

Crystal Growth Process
6 x Phosgene tubes
6 x Phosphine tubes

Note: All sets are boxes of 12 tubes.

Detector Tube Industry Action Sets	
Agricultural Set	655864
Pulp and Paper Set	655868
Indoor Air Quality Set	710981
Pharmaceutical Set	655869
Petroleum Set	655865
Mining Set	655867
Synthetics Manufacturing Set	655866
Chemical Vapor Deposition Process Set	655933
Etching Process Set	655934
Epitaxy Process Set	655935
Crystal Growth Process Set	655931

Chemical Warfare Agent Detector Tubes

Detect a wide range of nerve, blister, blood, and choking agents.

- Quick, simple to use, easy to interpret results
- "Go/No Go" style
- Can be used with MSA's full line of pumps
- All sold in boxes of 10 tubes
- Important: Sold only in the U.S.

Chemical Warfare Agent Detector Tubes	
10007654	Nerve (Sarin, VX, GA, GD, etc.)
10007653	Blister (Mustard Gas)
10007650	Blister (Lewisite)
10007652	Blister (variety, including Mustard Gas)
10007651	Blood and Choking (CG, DP, AC, CK)

Chemical Warfare Agent Detector Tube Kits

Chemical Warfare Kits are available in a Single CWA Tube Sampler and a Multi CWA Tube Sampler. The Single CWA Tube Sampler will only sample one CWA tube at a time. The Multi CWA Tube Sampler allows the user to simultaneously sample up to four CWA tubes at the same time without making adjustments. The kit is supplied with an MSA Escort ELF pump, which maintains constant flow with a built-in "Run/Hold" feature that allows the user to start/stop the pump and still maintain an accurate sampling timer. The four-port manifold tube holder is pre-set for the proper flow rate for CWA tube sampling.

Multi CWA Tube Sampler

Single CWA Tube Sampler

Chemical Warfare Agent Detector Tube Kits	
10049765	Multi CWA Tube Sampler with Escort ELF Pump
10044998	Single CWA Tube Sampler with Kwik-Draw Pump

Detector Tubes

Substance Measured	Detector Tube applicable	Part No. (1 box of 10 tubes)	Measuring range (ppm)	Threshold Limit Value 1998 ACGIH (ppm)
Acetaldehyde	Formaldehyde-0.1	497649	5–50	25 (ceiling)
Acetic Acid	Acetic Acid-1	804138	1–80	10
Acetone	Acetone-100	804141	100-10,000	500
	Qualitest QL	497665	n/a	
Acetylene dichloride, cis and trans (1,2 Dichloroethylene)	Trichloroethane-5	487343	10–500	200
	Qualitest QL	497665	n/a	
Acetylene tetrabromide (1,1,2,2-Tetrabromoethane)	Trichloroethane-5	487343	5–200	1
	Qualitest QL	497665	n/a	
Acetylene tetrachloride (1,1,2,2-Tetrachloroethane)	Trichloroethane-5	487343	50–1000	1
	Qualitest QL	497665	n/a	
Ammonia	NH3–2	804405	2–500	25
	NH3–20	800300	20–1000	
	NH3–0.1%	804406	0.1–10 Vol.-%	
n-Amyl chloride (1-Chloropentane)	Trichloroethane-5	487343	5–550	–
Benzene	Aromatic HC	804132	5–500	.5
	C6H6-1	807024	1–100	
	C6H6-5	804411	5–100	
	Qualitest QL	497665	n/a	
	C6H6-0.5	655837*	0.5–10	
Bromine	C12-0.2	803944	0.2–3	0.1
Bromobenzene	Aromatic HC	804132	30–720	–
Bromoethane (Ethyl bromide)	Trichloroethane-5	487343	15–400	5
Bromoform (Tribromomethane)	Trichloroethane-5	487343	7–200	0.5
Bromomethane (Methyl bromide)	Trichloroethane-5	487343	20–270	1
1,3-Butadiene	Ethylene-50	804428	100–1200	2
	Qualitest QL	497665	n/a	
n-Butane	Propane-200	804418	200–3800	800
	Qualitest QL	497665	n/a	
n-Butanol (Butyl Alcohol)	Ethanol-100	804136	100–3900	50 (ceiling)
sec. Butanol (sec-Butyl Alcohol)	Ethanol-100	804136	300–5100	100
1-Butene (1-Butylene)	Ethylene-50	804428	100–5000	–
	Qualitest QL	497665	n/a	
2-Butylene, cis and trans	Ethylene-50	804428	200–5000	–
(2-Butylene)	Qualitest QL	497665	n/a	
Butyl Alcohol (n-Butanol)	Ethanol-100	804136	100–3900	50 (ceiling)
sec-Butyl Alcohol (sec-Butanol)	Ethanol-100	804136	300–5100	100
n-Butylamine	Triethylamine-5	804134	2–28	5 (ceiling)
iso-Butylamine	Triethylamine-5	804134	3–36	–
sec-Butylamine	Triethylamine-5	804134	2–18	–
t-Butylamine	Triethylamine-5	804134	2–14	–
n-Butylchloride (1-Chlorobutane)	Trichloroethane-5	487343	5–170	–
	Qualitest QL	497665	n/a	
1-Butylene (1-Butene)	Ethylene-50	804428	100–5000	–
	Qualitest QL	497665	n/a	
2-Butylene (2-Butene, cis and trans)	Ethylene-50	804428	200–5000	–
	Qualitest QL	497665	n/a	
n-Butyl mercaptan	Ethylmercaptan-0.5	804589	1.5–15	0.5
t-Butyl mercaptan	Ethylmercaptan-0.5	804589	0.8–5	–
Carbon Dioxide	CO2-100	497606	100–3000	5000
	CO2-0.1%	487333	0.1–7.0 Vol.-%	
	CO2-1%	804419	1–20 Vol.-%	
Carbon Disulfide	CS2-2	492514	2–300	10
	Qualitest QL	497665	n/a	
Carbon Monoxide	CO-0.001 %	804421	0.001–0.3 Vol.-%	25
	CO-5	803943	5–1000	
	CO-10	487334	10–3000	
	CO-3000	815507	3000–70000	
	CO-0.1%	804423	0.1–1.0 Vol.-%	
	CO-0.3%	487335	0.3–7.0 Vol.-%	
	CO-10/color	47134	10–1000	
	(special orifice assembly for CO-10/color)	497652		
	Qualitest QL	497665	n/a	
Chlorine	Cl2-0.2	803944	0.2–30	0.5
	ClO2-0.05	804133	1–46	
	Cl2-50	655862	50–500	

Substance Measured	Detector Tube applicable	Part No. (1 box of 10 tubes)	Measuring range (ppm)	Threshold Limit Value 1998 ACGIH (ppm)
Chlorine dioxide	ClO2-0.05	804133	0.05–15	0.1
Chlorobenzene	Aromatic HC	804132	40–610	10
Chlorobromomethane	Trichloroethane-5	487343	5–180	200
1-Chlorobutane (n-Butylchloride)	Trichloroethane-5	487343	5–170	–
	Qualitest QL	497665	n/a	
Chloroethane(Ethyl chloride)	Trichloroethane-5	487343	50–800	100
Chloroethylene (Vinyl chloride)	VC-1	803950	1–70	5
	Trichloroethane-5	487343	20–550	
Chloroform (Trichloromethane)	Trichloroethane-5	487343	8–100	10
1-Chloropentane (n-Amylchloride)	Trichloroethane-5	487343	5–550	–
1-Chloropropane (l-Propylchloride)	Trichloroethane-5	487343	5–220	–
2-Chloropropane (2-Propylchloride)	Trichloroethane-5	487343	8–1700	–
Cycloheptane	Hexane-20	497664	80–3300	–
Cyclohexane	Hexane-20	497664	20–3400	300
	Qualitest QL	497665	n/a	
Cyclohexylamine	Triethylamine-5	804134	7–38	10
Cyclooctane	Hexane-20	497664	20–2100	–
Cyclopentane	Hexane-20	497664	80–2700	600
n-Decane	Hexane-20	497664	50–500	–
1,2-Dibromoethane (Ethylene dibromide)	Trichloroethane-5	487343	25–700	–
Dibromomethane (Methylene dibromide)	Trichloroethane-5	487343	9–200	–
1,1-Dichloroethane (Ethylidene chloride)	Trichloroethane-5	487343	8–300	100
1,2-Dichloroethane (Ethylene dichloride)	CH_2Cl_2-50	804416	30–720	10
1,1-Dichloroethylene (Vinylidene chloride)	Trichloroethane-5	487343	10–600	5
1,2-Dichloroethylene (Acetylene dichloride, cis and trans)	Trichloroethane-5	487343	10–500	200
Dichloromethane (Methylene chloride)	CH_2Cl_2-50	804416	50–1000	50
1,2-Dichloropropane (Propylene dichloride)	Trichloroethane-5	487343	5–440	75
1,3-Dichloropropane (Trimethylene dichloride)	Trichloroethane-5	487343	5–220	–
Diesel Oil	Qualitest QL	497665	n/a	
Diethylamine	Triethylamine-5	804134	3–27	5
Dimethylamine	Triethylamine-5	804134	3–27	5
2,2-Dimethylbutane	Hexane-20	497664	100–4900	–
Ethanol (Ethyl Alcohol)	Ethanol-100	804136	100–6000	1000
	Qualitest QL	497665	n/a	
Ethene (Ethylene)	Ethylene-50	804428	50–5000	–
	Qualitest QL	497665	n/a	
Ethyl Alcohol (Ethanol)	Ethanol-100	804136	100–6000	1000
	Qualitest QL	497665	n/a	
Ethylamine	Triethylamine-5	804134	4–55	5
Ethyl benzene	Tol.-5	803947	5–1800	100
Ethyl bromide (Bromoethane)	Trichloroethane-5	487343	15–400	5
Ethyl chloride (Chloroethane)	Trichloroethane-5	487343	50–8000	100
Ethylenediamine	Triethylamine-5	804134	5–27	10
Ethylene dibromide (1,2-Dibromoethane)	Trichloroethane-5	487343	25–700	–
Ethylene dichloride (1,2-Dichloroethane)	CH_2Cl_2-50	804416	30–720	10
Ethylidene chloride (1,1-Dichloroethane)	Trichloroethane-5	487343	8–300	100
Ethyl mercaptan	Ethylmercaptan-0.5	804589	0.5–80	0.5
Formaldehyde	Formaldehyde-0.1	497649	0.1–55	0.3 (ceiling)
Formic Acid	Qualitest QL	497665	n/a	5
	Acetic Acid-1	804138	2–160	
Furfuryl alcohol	Phenol-1	813778	on request	10
Gasoline	Gasoline-30	492870	30–6000	300
	Qualitest QL	497665	n/a	
n-Heptane	Hexane-20	497664	20–2600	400
n-Hexane	Hexane-20	497664	20–3200	50
Hydrogen Chloride	HCl-1	803948	1–30	5 (ceiling)
	Qualitest QL	497665	n/a	
Hydrogen Cyanide	HCN-2	803945	2–50	4.7 (ceiling)
Hydrogen Fluoride	HF-1	804142	1–50	3 (ceiling)

Substance Measured	Detector Tube applicable	Part No. (1 box of 10 tubes)	Measuring range (ppm)	Threshold Limit Value 1998 ACGIH (ppm)
Hydrogen Sulfide	H_2S-1	487339	1–200	10
	H_2S-100	487340	0100–4000	
	H_2S-0.1%	655932	0.1–4 Vol. %	
	Qualitest QL	497665	n/a	
Isobutane (Methylpropane)	Propane-200	804418	200–4200	–
Isobutanol (Isobutyl Alcohol, 2-Methylpropyl Alcohol)	Ethanol-100	804136	100–2900	50
Isobutene (Isobutylene, Methylpropene)	Ethylene-50	804428	400–2600	–
Iso-Butylamine	Triethylamine-5	804134	3–36	–
Isobutylene (Isobutene, Methylpropene)	Ethylene-50	804428	400–2600	–
Isobutyl Alcohol (Isobutanol, 2-Methylpropyl Alcohol)	Ethanol-100	804136	150–2900	50
Isobutyl Methyl Ketone	MEK-50	813334	50–6500	–
Iso Octane	Hexane-20	497664	100–3000	–
Isopropanol (Isopropyl Alcohol, 2-Propanol)	Ethanol-100	804136	200–5000	400
	Qualitest QL	497665	n/a	
Isopropyl Alcohol (Isopropanol, 2-Propanol)	Ethanol-100	804136	200–5000	400
	Qualitest QL	497665	n/a	
Isopropylamine	Triethylamine-5	804134	5–30	5
Isopropyl mercaptan	Ethylmercaptan-0.5	804589	0.5–5.5	–
Kerosene	Qualitest QL	497665	n/a	–
Ketones	Qualitest QL	497665	n/a	–
Liquified Petroleum Gases	Gasoline-30	492870	Semiquantitative	–
	Qualitest QL	497665	n/a	
Mercury	Hg–0.1 mg/m³	497663	0.1–0.8 mg/m³ (0.01–0.08 ppm)	0.025 mg/m³ (inorganic)
Methane	Natural Gas	655789	Semiquant. 5000+	–
Methanol (Methyl Alcoho1)	Ethanol-100	804136	100–2350	200
Methyl Alcohol (Methanol)	Ethanol-100	804136	100–2350	200
Methylamine	Triethylamine-5	804134	4–55	5
Methyl benzene (Toluene)	Tol.-5	803947	5–1000	50
Methyl bromide (Bromomethane)	Trichloroethane-5	487343	9–200	5
	MeBr-200	710544	200–8000 ppm	
	MeBr-2	710391	2–100 ppm	
2-Methyl butane	Hexane-20	497664	50–3000	–
Methyl chloroform (1,1,1-Trichloroethane)	Trichloroethane-5	487343	5–1500	350
	Qualitest QL	497665	n/a	
Methylcyclohexane	Hexane-20	497664	80–4900	400
Methylcyclopentane	Hexane-20	497664	150–3700	–
Methylene chloride (Dichloromethane)	CH_2Cl_2-50	804416	50–1000	50
Methylene dibromide (Dibromomethane)	Trichloroethane-5	487343	9–200	–
Methyl Ethyl Ketone (MEK)	MEK-50	813334	50–4000	200
	Qualitest QL	497665	n/a	
Methyl mercaptan	Ethylmercaptan-0.5	804589	0.5–5	0.5
2-Methyl pentane	Hexane-20	497664	150–4500	–
3-Methyl pentane	Hexane-20	497664	100–3700	–
Methylpropane (Isobutane)	Propane-200	804418	200–4200	–
Methylpropene (Isobutylene, Isobutene)	Ethylene-50	804428	400–2600	–
2-Methylpropyl Alcohol (Isobutanol, Isobutyl Alcohol)	Ethanol-100	804136	150–2900	50
Nitrogen Dioxide	NO_2-0.5	487341	0.5–50	3
	NO_2-2	804435	2 –140	
Nitrous Fumes	Nitr.-0.5	487336	0.5–50	–
	Nitr.-2	804425	2–140	
	Nitr.-10	803946	10–300	
	Nitr.-50	804426	50–3000	
n-Nonane	Hexane-20	497664	50–2800	200
n-Octane	Hexane-20	497664	50–3000	300
Ozone	Ozone-0.05	804140	0.05–5	0.05 (ceiling)
Pentachloroethane	Trichloroethane-5	487343	10–300	–
n-Pentane	Hexane-20	497664	50–3900	600
	Qualitest QL	497665	n/a	

Substance Measured	Detector Tube applicable	Part No. (1 box of 10 tubes)	Measuring range (ppm)	Threshold Limit Value 1998 ACGIH (ppm)
Perchloroethylene (Tetrachloroethylene)	Per-5	804429	5–200	25
	Per-10	487337	10–500	
	Qualitest QL	497665	n/a	
Phenol	Phenol-1	813778	1–25	5
	Qualitest QL	497665	n/a	
Phosgene	Phosgene-0.1	803949	0.1–20	0.1
Phosphine	PH_3-0.05	497101	0.05–3	0.3
	PH_3-0 1	485680	0.1–100	
	PH_3-50	489119	50–2000	
Propane	Propane-200	804418	200–4000	2500
	Qualitest QL	497665	n/a	
n-Propanol (Propyl Alcohol)	Ethanol-100	804136	100–3000	200
	Qualitest QL	497665	n/a	
2-Propanol (Isopropanol, Isopropyl Alcohol)	Ethanol-100	804136	200–5000	400
	Qualitest QL	497665	n/a	
Propene (Propylene)	Ethylene-50	804428	20–5000	–
	Qualitest QL	497665	n/a	
Propyl Alcohol (n-Propanol)	Ethanol-100	804136	100-3000	200
	Qualitest QL	497665	n/a	
n-Propylamine	Triethylamine-5	804134	2–28	–
1-Propylchloride (1-Chloropropane)	Trichloroethane-5	487343	5–220	–
2-Propylchloride (2-Chloropropane)	Trichloroethane-5	487343	8–1700	–
Propylene (Propene)	Ethylene-50	804428	20–5000	–
	Qualitest QL	497665	n/a	
Propylene dichloride (1,2-Dichloropropane)	Trichloroethane-5	487343	5–440	75
n-Propyl mercaptan	Ethylmercaptan-0.5	804589	0.7–8.0	–
Styrene	Styrene-10	804135	10–300	20
	Qualitest QL	497665	n/a	
Sulfur Dioxide	SO_2-1	487338	0.5–25	2
	SO_2-5	497662	5–120	
	SO_2-100	497661	100–4000	
Sulfur Hexaflouride decomposition products	SF_6 Decomposition Products	804433	0.5–15	1000
1,1,2,2-Tetrabromoethane (Acetylene tetrabromide)	Trichloroethane-5	487343	5–200	1
1,1,2,2-Tetrachloroethane	Trichloroethane-5	487343	50–1000	1
Tetrachloroethylene (Perchloroethylene)	Per-5	804429	5–200	25
	Per-10	487337	10–500	
	Qualitest QL	497665	n/a	
Tetrahydrofuran	Ethanol-100	804136	Semi-quant	200
Toluene (Methyl benzene)	Tol.-5	803947	5–1000	50
	Qualitest QL	497665	n/a	
Tribromomethane (Bromoform)	Trichloroethane-5	487343	7–200	0.5
1,1,1-Trichloroethane (Methyl chloroform)	Trichloroethane-5	487343	5–1500	350
	Qualitest QL	497665	n/a	
1,1,2-Trichloroethane (Vinyltrichloride)	Trichloroethane-5	487343	10–170	10
Trichloroethene (Trichloroethylene)	Tri-5	487342	5–250	50
Trichloroethylene (Trichloroethene)	Tri-5	487342	5–250	50
Trichloromethane (Chloroform)	Trichloroethane-5	487343	8–100	10
1,2,3-Trichloropropane	Trichloroethane-5	487343	10–1200	10
Triethylamine	Triethylamine-5	804134	5–30	1
Trimethylamine	Triethylamine-5	804134	5–30	5
Trimethylene dichloride (1,3-Dichloropropane)	Trichloroethane-5	487343	5–220	–
2,2,4-Trimethylpentane	Hexane-20	497664	100–3000	–
Vinyl Chloride (Chloroethylene)	VC-1	803950	1–70	5
	Qualitest QL	497665	n/a	
Vinylidene chloride (1,1-Dichloroethylene)	Trichloroethane-5	487343	10–600	5
Vinyltrichloride (1,1,2-Trichloroethane)	Trichloroethane-5	487343	10–170	10
Water Vapor	H_2O-10	655863	10–100% RH	–
0-Xylene (1,2-Xylene)	Tol.-5	803947	5–2500	100
	Qualitest QL	497665	n/a	
m-Xylene (1,3-Xylene)	Tol.-5	803947	5–2500	100

HAZMATCAD™ and HAZMATCAD Plus Hazardous Material Chemical Agent Detectors

HAZMATCAD Detector

The HAZMATCAD Hazardous Material Chemical Agent Detector is a handheld instrument that detects and classifies Chemical Warfare Agents (CWA). When compared to other technologies, the HAZMATCAD Detector offers more capabilities and greater reliability at a lower cost.

Features

- Compact, light-weight and portable
- Self-diagnostic check during rapid warm-up
- Alphanumeric display with LED alarms
- Dual-Mode SAW Operation—Fast or High Sensitivity
- Operates between 8 and 12 hours on rechargeable Li-Ion batteries
- Vapor-diffusion check source verifies system performance
- Unit can be hand-carried or worn on belt
- RS-232 and IrDA communication ports; stores up to 8 hours of data
- Inlet design protects against dust and particulates

HAZMATCAD Plus Detector

The HAZMATCAD Plus Detector detects for Chemical Warfare Agents (CWA) and selected Toxic Industrial Chemicals (TICs). It is a portable instrument designed for one-hand operation. It is very easy to operate and requires limited training for effective use.

Features

- Self-diagnostic check during rapid warm-up
- Alphanumeric display with LED alarms
- Dual-Mode SAW Operation – Fast or High Sensitivity
- Electrochemical Cells – Real time analysis
- Operates between 8 and 12 hours on rechargeable Li-Ion batteries
- Vapor-diffusion check source verifies system performance
- RS-232 and IrDA communication ports; stores up to 8 hours of data
- Inlet design protects against dust and particulates

HAZMATCAD Detector Kits

Kits include: HAZMATCAD Detector; battery charger; belt clip; two Sony rechargeable batteries; hard, water-resistant carrying case; operating manual; vapor check source

Part No.	Instrument	Chemical Agents Detected
10055094	HAZMATCAD Detector	Nerve and Blister
10055095	HAZMATCAD Detector	Nerve, Blister and Hydrogen Cyanide
10055096	HAZMATCAD Detector	Nerve, Blister and Phosgene
10055097	HAZMATCAD Plus Detector	Nerve and Blister agents and TICs (phosgene, hydrogen cyanide, halogen and hydride gas)

HazMat Response Kit

The HazMat Response Detector Tube Kit can be used by firefighters, HazMat Response Teams and other workers to help classify unknown chemical gases and vapors at accident or spill sites. A Quad-Port Sampler allows four chemical classes to be tested simultaneously. The portable kit contains 12 types of Detector Tubes (each with sufficient tubes for 10 complete tests), a Kwik-Draw Pump to draw the sample through the tubes, the multiple tube holder and a convenient, easy-to-follow interpretation guide.

HazMat Response Kit

807472	Includes 12 types of detector tubes, multiple tube holder, Kwik-Draw Pump and interpretation guide
485233	Extra Quad-Port Sampler

Features & Benefits

- Quickly classifies unknown chemical gases and vapors
- Quad-Port Sampler allows simultaneous testing with four detector tubes, meaning less time in IDLH atmosphere
- Flow-limiting orifices ensure even sample flow
- Portable and easy to handle
- Includes simple interpretation guide

SafeSite® Multi-Threat Detection System

The SAFESITE Multi-Threat Detection System simultaneously monitors and wirelessly communicates six potential threats: CWAs, VOCs, TICs, gamma radiation, combustible gas and oxygen deficiency.

The SAFESITE System combines state-of-the-art detection technology with advanced wireless communication capabilities to provide superior preventative and counter-measure solutions for:

- Homeland Security
- Emergency Response
- Public Events
- Building Protection
- Mass Transportation Centers
- Perimeter Monitoring
- Hazardous Response
- Port Surveillance
- Confined Space Monitoring

SAFESITE System components consist of the SAFEMTX™ Multi-Threat Detector, the SAFECOM™ Command Center and the SAFECONNECT™ Belt-Bridge with Sirius wireless interface. The system can be installed permanently (wired or wireless) for continual monitoring or deployed as a portable system.

The SAFEMTX Multi-Threat Detector utilizes multi-sensing technologies to detect up to six potential threats; helping first responders, law enforcement and government agents reduce the risk of exposure and facilitate consequence management.

The SAFECOM™ Command Center receives mission-critical information from the SAFEMTX™ Detectors and permits this crucial and wide-ranging data to be converted quickly into practical information for rapid decision-making through an uncomplicated graphical user interface. The SAFECOM Command Center can manage up to four systems with 16 SAFEMTX Detectors per system, integrating SAFEMTX data, including:

- Gas readings
- Relative CWA threat level
- Radiation dose rate
- Alarm status
- GPS location
- Battery run time
- RF signal strength
- Fault conditions
- SAFEMTX min, max, and average values

Through the SAFECOM Command Center, alarms are identified with both visual and audible alarms. Alarms can then be acknowledged and silenced, detectors can be enabled and disabled, event logs and event log history can be viewed, plus units can be customized to suit the specific deployment scenario.

1 **Threat Readings** – scrolling readings of up to 16 MTX Detectors per channel. Unit is identified by large iconto the left of the readings. In alarm condition, display snaps to unit in alarm.

2 **MTX Icons** – identify number of units enabled in current network. Users may view specific unit reading by double-clicking on icon.

3 **Map** – option for map view or uploaded image view.

4 **Signal Strength** – communication status from SAFEMTX™ Detector to SAFECOM™ Command Center.

5 **Power** – status of battery life of SAFEMTX Detecors.

6 **System Status** – alerts user to alarm, warning or fault within a particular system.

7 **Action Buttons** – allow user to select address, cycle units, acknowledge alarms and enable or disable units from the system.

Wireless Technology

The SAFESITE® System provides up to two miles of wireless communication between any SAFEMTX Detector, SAFECONNECT Belt-Bridge and SAFECOM Command Center. SAFECONFIG™ Software works with the SAFECOM Command Center or SAFECONNECT Belt-Bridge, enabling configuration of any SAFEMTX Detector as a repeater. This added capability maximizes deployment range and ensures maximum signal strength and reliable deployment without the need to move units.

SAFEPAC™ Perimeter Area Command Kit

SAFESITE® SAFEPAC Perimeter Area Command Kit provides a basic kit for quick deployment and monitoring of an event or a location. The kit includes two Pelican cases with an internal battery charger, 4 SAFEMTX™ Multi-Threat Detectors, 1 SAFECOM™ Command Center, all necessary PC interface software, and 4 extra batteries. A laptop PC is also available as an option, or an existing PC can be used.

The SAFESITE Multi-Threat Detection System can be ordered using MSA's Assemble-To-Order System. Please refer to Bulletins 07-2114-MC and 07-2115-MC.

Threat	Technology	Benefit
Chemical warfare agents	Surface acoustic wave (SAW)	Low false positives and false alarms, differentiates nerve & blister agents
Gamma radiation	Cadmium zinc telluride (CZT)	Sensitive with adjustable threshold and 2 ranges. (0-100 mR/hr, 0.1 mR/hr resolution & 0-1000 mR/hr, 1 mR/hr resolution)
Volatile organic compounds	Photo-ionization (PID)	10.6 eV lamp provides ppm readings for broadband toxics and VOC detection
Toxic industrial chemicals	Electrochemical	Detects many specific toxic gases such as chlorine, ammonia, hydrogen cyanide and hydrogen chloride
Oxygen deficiency/ enrichment	Electrochemical	Oxygen monitoring for confined space
Combustible gas	Catalytic bead	Wide range detection for hydrocarbons

BIOSENSOR™ 2200R Biological Agent Detector

The new BIOSENSOR 2200R Biological Agent Detector from MSA is a handheld, portable, on-site instrument for rapid detection, analysis, and identification of biological agents. Unique bioassay technology offers excellent sensitivity and low false positives while offering ease of use during white powder response calls. This highly accurate detection method provides rapid measurement of biohazards such as anthrax, ricin, botulism, SEB, and plague.

Exclusive five minute time-to-answer allows first responders to make informed critical decisions more rapidly than any other biological agent detector. The BIOSENSOR 2200R employs dynamic surface generation, a patent pending type of immunoassay detection technology. This technology offers significant advantages over other field-based assay methods by combining the benefits of both the free solution and lateral flow types. The result is more rapid analysis, a user-friendly format, and detector stability within a wide range of climates.

Both wet and dry samples may be tested and results are displayed with a simple red (target present) or green (no target present) indication. As tests are nondestructive, samples may be retained as evidence. Single-test, disposable cartridges with on-board reagents have a 12-month shelf life. This instrument is permanently housed in a sturdy, lightweight Pelican case.

Instrument Features and Benefits

- 5 minute time-to-answer
- Uses positive and negative control cartridges
- Battery-operated with ability to run 50 tests on a single charge
- Fully deconable housing; IP67 rated
- Visual and audible alarms provide clear indication of status
- Extremely easy to use with a training time of one hour
- Integrated RFID (radio frequency identification) for automatic cartridge recognition

Targets

- Anthrax/ricin duplex—one test, two agents
- Anthrax
- Ricin
- SEB (staphylococcal enterotoxin B)
- Botulism*
- Plague*
- Smallpox*
- Tularemia*
- Cholera*
- West Nile virus*

*additional agents in development

BIOSENSOR 2200R Biological Agent Detector	
10084834	MSA BIOSENSOR 2200R Biological Agent Detector Kit*, includes carry case, charger, cartridge starter kit (10084758), instruction manual, and quick start guide.
BIOSENSOR Cartridge Plans	
10084758	MSA BIOSENSOR cartridge starter kit includes 3 Anthrax/Ricin dual kits**, 1 Anthrax, 1 Ricin, 3 positive control, 2 negative control cartridges, and 2 wet sample kits
10084753	MSA BIOSENSOR Low volume cartridge plan includes 6 Anthrax/Ricin dual kits**, 2 Anthrax, 2 Ricin, 6 positive control, 2 negative control cartridges, and 2 wet sample kits
10084754	MSA BIOSENSOR Medium volume cartridge plan includes 24 Anthrax/Ricin dual kits**, 6 Anthrax, 6 Ricin, 24 positive control, 6 negative control cartridges, and 4 wet sample kits
10084755	MSA BIOSENSOR High volume cartridge plan includes 60 Anthrax/Ricin dual kits**, 8 Anthrax, 8 Ricin, 60 positive control, 8 negative control cartridges, and 6 wet sample kits.

* Extended warranties available.

** Each biohazard cartridge test kit includes a dry sample kit. Please contact your local MSA rep for more information.

Escort ELF® and Escort® LC Sampling Pumps

Escort ELF Sampling Pumps

The patented Escort ELF Sampling Pump can be used for personal and area sampling. The state-of-the-art electronic laminar flow sensor, consisting of a laminar flow element and pressure sensor, provides constant flow (volume) control, with ± 2.5% regulation of flow rate (from 1 to 3 lpm) and automatic compensation for changes in battery voltage, temperature, altitude, and sample load.

An internal secondary standard calibrates the pump continuously and needs to be checked against a primary standard only once a month (or every 200 hours for coal mine dust sampling).

Approvals

Escort ELF Sampling Pumps are UL approved as intrinsically safe for use in hazardous locations—Class 1, Groups A, B, C, D; Class II, Groups E, F, and G; and Class III, Division I locations. NIOSH-certified for coal mine dust sampling (TC-74-030). MSHA certified as intrinsically safe for underground use (Approval No. 2G-3924-1).

Escort ELF® Sampling Pump

Escort LC Sampling Pumps

The Escort LC Sampling Pump can be used with a variety of personal and area sampling devices to collect such airborne contaminants as asbestos fibers, toxic gases, vapors, particulates, fumes, and mists. It can also be used to sample silica dust, coal dust, and organic vapors.

The Escort pump is exceptionally compact, lightweight, and quiet in operation. Engineered for use in "hostile" environments, the unit can be sprayed with water while it is operating without being damaged.

Approvals

Escort LC Sampling Pumps are UL approved as intrinsically safe for use in hazardous locations—Class I, Groups A, B, C, D; Class II, Groups E, F, and G; and Class III, Division I locations.

Escort® LC Sampling Pump

Battery Chargers

Sampling Equipment

MSA Sampling Pump Accessories

MSA sampling pump accessories and air sampling equiment allow monitoring of many different contaminants in various applications. Sampling pump accessories can be used in personal and area sampling for a wide variety of airborne contaminants such as asbestos fibers, toxic gases, vapors, particulates, mists, and fumes.

Accessories for MSA sampling pumps include filter media, a cyclone assembly, preweighed filter cassettes, filter holder assemblies, impingers, the Gemini® Twin-Port Sampler, sorbent tubes, and calibrators.

For more information, see Data Sheet 08-09-01.

Leather Jacket

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom-order" Escort Pumps, configured exactly the way you want them.

You can choose from an extensive line of base instrument components and accessories. See the ATO Chart on the following page.

To obtain a copy of the ATO via FAX, call MSA QuickLit Information Service at 1-800-672-9010. At the prompt, request QuickLit Document #2346 (ATO for Escort and Escort ELF and Escort LC Sampling Pumps).

Escort ELF and LC Kits	
Escort ELF Pump with flow fault indicator, 110V single-unit charger, Gemini® Twin Port Sampler, and standard packaging	805559
Escort ELF Pump with flow fault indicator, 110V single-unit charger, sampling line, and standard packaging	805560
Escort LC Pump with 110V single-unit charger, sampling line and standard packaging	711400
Replacement Parts and Accessories	
Battery Pack with O-ring	497702
One Replacement Inlet Water Stop Filter	802897
Escort Pump Overhaul Kit—common components for routine maintenance	802922
Inlet Dust Filter (pkg of 5)	808935
Battery Chargers—MSA Omega® Chargers	
120 VAC 50/60 Hz	494716
220 VAC 50/60 Hz	495965
120/240 VAC 50/60 Hz (five-unit)	801759
Sampling Equipment	
Sampling line only	456226
10mm Cyclone Assembly to separate respirable dust from non-respirable dust	456243
Gemini Twin-Port Sampler for sorbent tubes	497697
10mm Cyclone Assembly to separate respirable dust from non-respirable dust, for use with 37 mm non-MSA cassettes	10044015
Carrying Accessories—Jacket	
Leather jacket	811741

Escort ELF® and Escort® LC Sampling Pump Assemble-to-Order (ATO) Options

- To create your instrument configuration, select the instrument option code and mark them in the boxes to the right.

A. Number of Pumps	It's your choice: You can order one pump at a time, or the convenient "5-Pump Kit," which includes a durable PVC carrying case and bonus training video. NOTE: When you order the 5-Pump Kit through this ATO Ordering Selection Matrix, any accessories (such as single-unit chargers, Gemini Twin-Port Samplers, cyclones or instrument jackets) you order will also be provided in five-packs.	**Number of Pumps**	**Code**	**Selection**
		One	1	
		Five	5	
B. Pump Type	No matter whether you choose the Single-Pump Option or the 5-Pump Kit Option in Section A, you have a choice of three different types of pumps: •The Escort ELF Pump with 90-second Flow-Fault Indicator. In the event that a flow blockage occurs, the Flow-Fault Indicator circuitry illuminates an LED to alert the user. Within 90 seconds, the pump automatically shuts off, but the cumulative elapsed time remains on the display. To select this option, write "ELF1" in the box at right. • The Escort ELF Pump without Flow-Fault Indicator. To select this option, write "ELF2" in the box at right. • The Escort LC Pump. To select this option, mark "ESLC" at right.	**Pump Type**	**Code**	**Selection**
		Escort ELF Pump with 90-second Flow-Fault Indicator	ELF1	
		Escort ELF Pump without 90-second Flow-Fault Indicator	ELF2	
		Escort LC Pump	ELFLC	
C. Battery Chargers	Which type of battery charger do you want? Select from the following choices and mark your selection in the box at right (all operate from 50/60 Hz): "0" for no battery charger, "1" for 120-Volt charger, "2" for 220-Volt charger, or "5" for the 5-Unit charger.	**Battery Chargers**	**Code**	**Selection**
		No battery charger	0	
		120-Volt charger 50/60 Hz	1	
		220-Volt charger 50/60 Hz	2	
		5-Unit charger 120/240 V, 50/60 Hz	5	
D. Sampling Accessories	Sampling Accessories include the following: • Sample Line • 10 mm Cyclone Assembly, which separates respirable dust particles from non-respirable particles • The Gemini® Twin-Port Sampler, which streamlines sampling with sorbent tubes by enabling collection of two or more samples simultaneously from a single sampling pump.	**Sampling Accessories**	**Code**	**Selection**
		Sample Line only	1	
		10 mm Cyclone Assembly* (P/N 456243)	2	
		Gemini Twin-Port Sampler	3	
		No Sampling Line	4	
		10 mm Cyclone Assembly IH* (P/N 10044015)	5	
E. Protective Jackets	A protective leather jacket is offered as an option to protect the instrument from everyday wear, tear and scuff marks. To select the jacket, mark "1" in the box at right.	**Protective Leather Jacket**	**Code**	**Selection**
		None	0	
		Protective Leather Jacket for Sampling Pump	1	

Your Model Part Number Please write in numbers from selections above in appropriate boxes and contact your Safety Products Distributor to place your order.

Selection … A B C D E

A-PMP- [ ] – [ ] – [ ] – [ ] – [ ]

* Cyclone Assembly 456243 is for use with MSA pre-weighed cassettes (MSHA); Cyclone Assembly 10044015 is for use with non-MSA cassettes.

42 CFR Oil-Mist Sampling Kits

The NIOSH respirator certification standard, 42 CFR Part 84, has introduced new ways to select non-powered air-purifying particulate filter respirators. One of the primary concerns of the standard is oil-mist exposure. According to this NIOSH standard, there are 3 levels of respiratory protection: N = Not resistant to oil; R = Resistant to oil; P = Oil-Proof. But how do you know whether oil mist is present in the workplace? MSA's 42 CFR Sampling Pump Kits can help you answer this question by providing convenience and flexibility in oil-mist sampling.

Kit includes:

- Sampling Pump (Escort ELF or LC)
- 3-piece 37-mm MCE filter cassette, 0.8 micron pore size, 10 filters per kit
- 110V charger
- Sampling line
- Garment clip
- Instruction manual

Escort ELF® Kit

42 CFR Oil-Mist Sampling Kits	
Escort ELF 42 CFR Sampling Pump Kit	711585
Escort LC 42 CFR Sampling Pump Kit	711586

General-Purpose Cassette

The general-purpose cassette is a 5-µ pore size PVC sample cassette that can be used for silica sampling. This cassette can also be used for all airborne particulate collection not limited to quartz or silica.

General-Purpose Cassette	
General-Purpose Cassette	711361

This cassette is individually packaged in a sealed plastic bag. Each cassette is weighed by a robot to .01 mg at 70°F +/- 5° and 45 RH +/- 10%. Each cassette is attached to a Dust Data Card which includes the cassette serial number and actual weight. The cassette inlet contains a tamper-proof deflector plate, and the outlet contains an anti-blow-back check valve. Both the inlet and outlet openings are capped (sealed) to ensure cleanness. The perimeter of the cassette housing is sealed with tamper-proof sealing tape.

Because of the extreme accuracy of the MSA weighing process, users of this cassette can sample the atmosphere for dust particulate and have the analytical analysis performed with complete confidence in its accuracy.

Sampling Pump Accessories

Gemini® Twin-Port Sampler

For low-flow control when sorbent tubes are used, the patented Gemini Twin-Port Sampler is a valved mechanism that allows flow adjustment down to 1 mlpm (0.001 lpm to 500 mlpm total between both tubes). U.S. Patent No. 5,370,004.
As an added benefit, the Gemini accessory permits simultaneous sampling from sorbent tubes, with independently controlled flow rates of each. Dual sampling means two like sorbent tubes can be attached for simultaneous sampling at different flow rates, or two different tubes can be used to sample two types of substances at once.

Filter Media

Asbestos Sampling Filter Cassettes

General Purpose Filter Cassettes

Coal Dust Cassettes - P/N 803462

Gas Sampling Bag

Couplers and Supplementary Parts Kit

Impinger assemblies and accessories

Sorbent Tube Sampling

Gemini Twin-Port Sampling Kit—includes Gemini Sampler, tube protectors, Y-connector, clips and carrying case	497697
Charcoal Sampling Tubes (150mg), 50 tubes	697169
Charcoal Sampling Tubes (600mg), 50 tubes	697170
Silica Tubes (225 mg), 50 tubes	697171
Silica Tubes (600 mg), 50 tubes	697172
Amberlite XAD-2, 50 tubes	697175
Hopcalite, 50 tubes	697176
Carbotrap, 25 tubes	697174
Carbosieve, 25 tubes	697173
Tenax/CMS	491165

Cassette Sampling

General Purpose Filter Cassettes

Fifty complete 3-piece preloaded filter cassettes with MCE filters.

With 25mm, 0.8-µ pore size	695677
With 37mm, 0.8-µ pore size	695676

Filter Discs for Nuisance Dust Sampling

Used with 37mm cassettes.

PVC, 0.5-µ pore size, 50/pack	459733
PVC, 0.8-µ pore size, 50/pack	812805
PVC, 5.0-µ pore size, 50/pack	625413
Glass Fiber	463784

MCE Filter Discs for Asbestos and Nuisance Dust

25mm, 0.8-µ pore size, 100/pack	695674
37mm, 0.8-µ pore size, 50/pack	463797
37mm, 0.45-µ pore size, 50/pack	463796

Silver Membrane Filters for Silica, Coke Oven Emissions & Carbon Black

Silver Membrane, 0.8-µ pore size, 50/pack	464324

Asbestos Sampling Filter Cassette

All units include 50 complete filter cassettes preloaded with 25mm MCE filters.

With 0.8-µ pore size and 50mm anti-static cowl	695679
With 0.45-µ pore size and 5.0-µ pore size and 50mm anti-static cowl	696172

Coal Dust and Silica Filter Cassette

Preweighed filter cassette with 5-µ pore size PVC filter and Mine Data Card - Coal Dust	803462
Preweighed filter cassette with 5-µ pore size PVC filter and Data Card - Silica	711361

Respirable Dust Sampling w/Cyclone Assembly

10mm Cyclone Assembly, used with MSHA pre-weighed cassettes	456243
10mm Cyclone Assembly, IH version used with 37mm cassettes	10044015

Gas Sampling Bags

Teflon Sample Bag Assembly	471677
Tedlar Sample Bag Assembly	472992

Miscellaneous Accessories

MSA's complete line allows users to load sampling cassette cases and select your own combinations of sampling media. Your MSA distributor can help you select the accessories that best suit your application requirements.

Filter Cassette Cases, 2-piece, 25mm, pack of 50	695681
Filter Cassette Cases, 2-piece, 37mm, pack of 12	625412
Filter Cassette Cases, 3-piece, 37mm, pack of 10	449347
50mm-long Cowl for 25mm Filter Cassette Case, pack of 5	695683
25mm Support Pad (felt backup disc), pack of 100	695684
37mm Support Pad (felt backup disc), pack of 25	449375
25mm Cellulose Bands, jar of 60	484683
37mm Cellulose Bands, jar of 60	625415
37mm Stainless Steel Coupler for 3-piece filter cassette case used with Cyclone Assembly	457392
Plastic Coupler for preweighed filter cassette sampling used with Cyclone Assembly	457391
Sampling Line Assembly (used with all pumps and filter cassette cases)	456226
25mm Filter Cassette Case Sampling Line Coupler, package of 10	695685
37mm Filter Cassette Case Sampling Line Coupler, package of 3	459743
Charcoal Filter Tubes—for use in in-line sampling to protect pumps from vapor damage	804403
Supplementary Parts Kit—includes 3 stainless steel support screens, small brush, tweezers, and press/pry tool	456246
All-Glass Impinger Assembly—includes fritted-glass flask, inlet cap, nozzle, and cap	10008396
Bubbler for Fritted-glass Flask	10008397
Flask Holster	10008398
Tubing for Flask	93495

Sampling Pump Calibration Check Devices

A primary calibration device, the DigiCal™ Calibrator provides instantaneous calibration for instruments like the MSA Escort LC or the secondary flow standard inside the Escort ELF Sampling Pumps. Just press the plunger and the DigiCal Calibrator does the work. Its unique flow cell replaces conventional bubble tubes and makes calibration easier.

The DigiCal Calibrator achieves extreme accuracy by utilizing a computerized flow meter that provides instantaneous flow readouts on a digital display. Accurate measurements are possible within ±0.5 percent at any altitude.

The DigiCal Calibrator makes sampling pump calibration a stress-free, one-step procedure.

For more complete information, see Bulletin 0810-34-MC.

Sampling Pump Calibration Check Devices	
Primary Calibration Devices	
DigiCal Calibrator	655101
Air Inlet Caps, pkg of 2	655102
110V Charger with A/C Adapter	655112
Bubble Solution, 4-oz bottle	655273
Sub C Battery Pack	655169
Secondary Calibration Devices	
Flowmeter for use with Flow-Lite and Escort Sampling Pumps, 0.2 to 4 lpm	490197
Flowmeter for use with Flow-Lite and Escort Sampling Pump with Gemini Twin-Port Sampler, 30 to 370 mlpm	490198

Ventilation Smoke Tube Kits

MSA's Ventilation Smoke Tube Kits are for use where controlled generation of a visible smoke is desired in order to determine the velocity of slow-moving air currents and establish their direction and flow patterns in shafts, mines and tunnels. They can also be used in commercial buildings and industrial processing plants to determine velocity and flow patterns of heating, ventilating, and air-conditioning systems.

For more complete information, see Data Sheet 08-00-20.

Ventilation Smoke Tube Kits	
Ventilation Smoke Kit, including aspirator bulb, two rubber plugs, and six smoke-producing tubes contained in plastic carrying case	458481
Ventilation Smoke Kit, including aspirator bulb, six tube caps, and two glass smoke-producing tubes contained in plastic carrying case	5607
Ventilation smoke tubes, box of 12	458480
Glass smoke tubes, box of 10	5645

Airborne Compounds Sampling Chart

This MSA/SupelCo guide to sorbent tube sampling lists MSA part numbers. It is a very comprehensive guide to all types of air sampling using personal sampling pumps.

Airborne Compounds Sampling Chart	
MSA/SupelCo Sampling Chart	814473

Calibration

Galaxy® Automated Test System

Extremely Easy to Use

- Standard web browser accessibility for data retrieval and reporting
- Industry-standard memory card available for simple data retention
- System does not require a computer or network interface
- Works without the touch of a single button
- Minimal training needed

Versatile and Expandable

- Up to 10 systems can be interconnected
- Instrument charging option available
- Optional battery pack available for remote use

Durable, Innovative Design

- Wireless- or wired-network interface available
- Inventive system door also functions as dust cover
- Guaranteed to work in the harshest environments
- In-line gas cylinder holster available; keeps the work area clean and orderly

Value-Driven Performance

- All-inclusive, 2-year warranty
- High quality, cost-effective solution
- Very low total cost of ownership

For Assemble-to-Order information, see the Galaxy ATO Chart on p. 99.

Galaxy System Kits

	Solaris Galaxy Kits	Sirius Galaxy Kits	Orion Galaxy Kits	Altair Galaxy Kits	Orion*plus* Galaxy Kits
Basic Standalone Kit					
Basic System	10061051	10061050	10061824	10078252	10082571
Standard Standalone Kit (Includes Regulator)					
Standard System	10061783	10061810	10061825	10078253	10082577
Standard System + Charging	10061784	10061811	10061826	—	10082582
Standard System + Cylinder Holder	10061785	10061812	10061827	10078259	10082585
Standard System + Charging, Cylinder Holder	10061786	10061813	10061828	—	10082592
Smart Standalone Kit (Includes Regulator, Memory Card)					
Smart System	10061787	10061814	10061829	10078255	10082580
Smart System + Charging	10061788	10061815	10061830	—	10082583
Smart System + Cylinder Holder	10061789	10061816	10061841	10078256	10082586
Smart System + Charging, Cylinder Holder	10061790	10061817	10061842	—	10082595
Portable Kits (Includes Regulator, Battery Pack)**					
Portable System	10061802	10061818	10061843	10078257	10082512
Portable System + Memory Card, Cylinder Holder	10061801	10061819	10061844	10078258	10082584
Network Kits (Includes Regulator, Wired Ethernet Access)					
Wired Network System	10061803	10061820	10061845	10078259	10082578
Wired Network System + Charging, Cylinder Holder	10061804	10061821	10061847	—	10082593

Accessories

710288	Demand Flow Regulator
10047342	North American Power Supply
10047343	Global Power Supply

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom order" the Galaxy Automated Test System, configured exactly the way you want it. You can choose from an extensive line of base components and accessories. See the ATO chart below to make your selections.

Galaxy Automated Test System Assemble-to-Order (ATO) Options

A. Test Stand Instrument Type Each Galaxy test stand has a dedicated instrument type. Up to 10 specific systems can be mixed and matched; however, different instruments types will not work in the same test stand. The Solaris® and Orion® Instruments must have datalogging installed to operate with the Galaxy test stand. ***Note:*** *The Altair Galaxy test stand should only be used with CO, H_2S and O_2 versions of the Altair and Altair Pro Single-Gas Detectors.*	**Test Stand Options**	**Code**
	Solaris, Solaris with ALkaline Battery	A
	Sirius	B
	Orion	C
	Altair/Altair Pro	D
	Orion*plus*	E
B. Calibration Cylinders The Solaris, Orion and Altair Galaxy test stand, by default will operate with 1 calibration gas cylinder. The Sirius Galaxy test stand, by default, will operate with 2 calibration gas cylinders. If your system configuration requires 3 cylinders for calibration, select option "1". ***Note:*** *If ordering the Orion*plus* *test stand, option 1 must be selected.*	**Calibration Cylinder Options**	**Code**
	No	0
	Yes	1
C. Regulator At least 1 demand flow regulator is required for either the Solaris, Orion or Altair Galaxy Test Stands. At least 2 demand flow regulators are required for the Sirius Galaxy Test Stand. The number of regulators you need equals the number of gas cylinders required for an instruments calibration.	**Regulator Options**	**Code**
	1 Regulator	1
	2 Regulators	2
	3 Regulators	3
	None	0
D. Cylinder Holder The number of cylinder holders should match the number of gas cylinders required for an instruments calibration. Included in this option is the ability to order either 1, 2, or 3 cylinder holders.	**Cylinder Holder Options**	**Code**
	1 Cylinder Holder	1
	2 Cylinder Holders	2
	3 Cylinder Holders	3
	None	0
E. Instrument Charging If you'd like to have your new Galaxy system installed with the ability to charge your instrument, select "1" for this option. (Requires instrument with rechargeable batteries). *Not compatible with Solaris with alkaline batteries, ALTAIR, and ALTAIR Pro instruments.*	**Charging Options**	**Code**
	No	0
	Yes	1
F. Power Supply A power supply is required to power each Galaxy test stand. The global power supply comes with several international plug outlet configurations for countries outside of North America, for this option select "G". Select the battery pack option "B" for locations (includes North American supply) where AC power may not be easily accessible. If you choose the instrument charging option, the battery pack option is not available.	**Power Supply Options**	**Code**
	North American Supply	N
	Global Supply	G
	Battery Pack & North American	B
	Battery Pack & Global Supply	X
G. Memory Card If you'd like to have a removable memory card installed in your new Galaxy System, select option "1". A memory card reading device is required to read the memory card, this must be entered as a different line item on your order. Only 1 memory card is needed per Galaxy System.	**Memory Card Options**	**Code**
	No	0
	Yes	1
H. Network Interface Module For wired (ethernet) connectivity to your internal network, select option "A". For wireless (802.11b) connectivity to your internal network, select optioin "B". The location where the Galaxy will be installed must have the capability for this option to operate properly. Only 1 network interface module is needed per Galaxy system.	**Network Interface Module Options**	**Code**
	None	0
	Wired Web Interface	A

Your Model Part Number

Please write in numbers from selections above in appropriate boxes and contact your Safety Products Distributor to place your order.

Selection …		A		B		C		D		E		F		G		H			
A-GALAXY-			-		-		-		-		-		-		-			0	0

Regulators

Gas Miser® Demand Regulator: The Intelligent Regulator

Gas Miser ® Model RP

Gas Miser® Model BD-20

The Gas Miser Regulator is the most advanced, yet simple-to-use calibration gas delivery system available. Made of nickel-plated brass and polished aluminum (especially important for reactive gases), the Gas Miser Regulator can supply gas flow from 0.1 lpm to 3.0 lpm. But that's only the beginning. Designed for use with any MSA Model RP Calibration Cylinder except chlorine and ammonia*, the Gas Miser Regulator features an automatic ON/OFF valve that releases gas only on demand. So only the amount of gas needed to calibrate your MSA instrument is delivered accurately. When the calibration is complete, the Gas Miser Regulator shuts off automatically. And, for user convenience, the regulator can stay connected to the cylinder where it remains in a ready state—making it ideal for such fixed installations as work benches and calibration stations.

The Gas Miser Regulator also eliminates the need to change regulators to accommodate different instruments or flow rates. It's not only intelligent, it's cost-efficient. Supplied with calibration tubing and special fitting.

* A Gas Miser Regulator for chlorine and ammonia is available for Model RP cylinders —P/N 10034391

Natural Gas Demand Regulator

This low-pressure Demand Regulator is designed to be used with MSA Instrument Calibration Systems to supply 100% natural gas. The Demand Regulator will automatically supply 100% natural gas to the calibrator as required. No adjustments are necessary or provided. Like the Gas Miser Regulator, the Natural Gas Regulator features an automatic ON/OFF valve that releases gas only on demand. Comes complete with (barb type) outlet fitting and easily connects to natural gas supply with W" NPT thread. Recommended for use with pressure of 0.3 to 5.0 psig.

Model RP Combination Regulators

Two regulators in one. Trigger activation allows a bump test or calibration check in the "SQUEEZE" mode or fixed-flow calibration in the up or "LOCKED" position. Designed for use with all Model RP and Econo-Cal calibration cylinders. Supplied with calibration tubing and special fitting.

Gas Miser® Manifold

The Gas Miser Manifold is not only a cylinder holder but it also incorporates a 4-station "bump test" or calibration manifold. It works with Model RP and Econo-Cal cylinders and Gas Miser regulator on any pumped or aspirated instrument. The manifold will supply the correct amount of gas required and will bump test or calibrate up to four instruments simultaneously. Gas Miser regulator sold separately.

Regulators	
.25/1.5 LPM Flow Control	
Model RP Cylinder .25 lpm*	467895
Model RP Cylinder 1.5 lpm	467896
Gas Miser Demand Regulator:	
Model RP	710288
Model RP, Chlorine and Ammonia	10034391
Model BD-20, with CGA 590 fitting	710289
Natural Gas Demand Regulator	
Natural Gas Demand Regulator	710545
Model RP Combination Regulator	
Model RP Combination Regulator, .25 lpm	711175
Model RP Combination Regulator, 1.5 lpm	711174
Gas Miser Manifold	
4-station Manifold	710274
Model RP Calibration Check Kits	
Check Kit, Model RP, with 1.5 lpm regulator—complete	477150
Check Kit, Model RP, with 0.25 lpm regulator—complete	477149

* Can be used with chlorine and ammonia; replaces P/N 809945.

.25/1.5 LPM Flow Control Model RP

Model RP Calibration Check Kits

Model RP Check Kits consist of a regulating valve which includes a gauge to measure container pressure, an adapter hose, sensor adapter (where applicable), instructions, and a case fitted with room for two Model RP cylinders of calibration check gas.

Calibration Gas

Each MSA Calibration Gas Cylinder is shipped with an individual copy of a material safety data sheet (MSDS) and an individual copy of a certificate of analysis.

MSA certifies that the gas mixture in calibration gas cylinders was prepared gravimetrically, using NIST traceable weights. The lot number and nominal value of the gas constituents in percent by volume, percent by mass, PPM, or volume are specified on the cylinder. The uncertainty statement of the specified nominal value is also listed.

Model RP and Model R Calibration Cylinders—Non-Reactive Gases, Steel Cylinder, 100 Liters

			100 LTRS 1000 PSI	*19 LTRS 300 PSI*	*34 LTRS 500 PSI*
Gas Fill	**Gas Mixture**	**Background**	**Model RP**	**Model R**	**Econo-Cal**
Air	air zero (THC < 1 ppm)	—	801050	—	—
Carbon Monoxide	400 ppm carbon monoxide	air	806255	—	—
	300 ppm carbon monoxide	air	473180	461769	—
	200 ppm carbon monoxide	air	809243	—	—
	100 ppm carbon monoxide	air	809242	—	—
	50 ppm carbon monoxide	air	809241	—	—
	100 ppm carbon monoxide	nitrogen	806734	—	—
Hydrogen	0.8% hydrogen	air	803102	—	—
Isobutylene	100 ppm isobutylene	air	494450	—	10048279
Methane	2.5% methane	air	491041	459942	—
	6.6% methane	nitrogen	801049	—	—
Oxygen	20.8% oxygen	nitrogen	479857	468248	—
	5.0% oxygen	nitrogen	493580	476302	—
Nitrogen	100% nitrogen	—	481317	—	—
Nitrous Oxide	10 ppm nitrous oxide	nitrogen	806736	—	—
Pentane	0.75% pentane (50% LEL)	air	804532	—	—
Propane	0.6% propane	air	493579	—	—
Combination Gas Cylinders	0.35% pentane, 19.0% oxygen, 100 ppm carbon monoxide	nitrogen	10007047	—	—
	0.6% propane, 15% oxygen, 60 ppm carbon monoxide	nitrogen	801051	—	—
	1.45% methane, 300 ppm carbon monoxide, 15% oxygen	nitrogen	10010162	—	—
	2.5% methane, 60 ppm carbon monoxide, 15% oxygen	nitrogen	813718	—	—
	2.5% methane, 300 ppm carbon monoxide, 15% oxygen	nitrogen	10040791	—	—
	1.45% methane, 15% oxygen	nitrogen	478192	—	—

Model RP

Model RP Cylinder

Contents: Pressure 1000 psig; approximately 100 liters at atmospheric pressure
Size: 13-3/4" x 3"
Weight: 2 lb 13 oz
Material: Steel

Model RP and Econo-Cal Calibration Cylinders—Reactive Gases, Aluminum Cylinders, 58 & 34 Liters

			58 LTRS 500 PSI	
Gas Fill	**Gas Mixture**	**Background**	**Model RP**	**Econo-Cal**
Ammonia	25 ppm ammonia	nitrogen	814866	711078
Chlorine	10 ppm chlorine	nitrogen	806740	711066
Hydrogen Sulfide	40 ppm hydrogen sulfide	nitrogen	467897	711062
	15 ppm hydrogen sulfide	nitrogen	806253	711064
	10 ppm hydrogen sulfide	nitrogen	467898	711060
Nitric Oxide	50 ppm nitric oxide	air	812144	711074
Nitrogen Dioxide	10 ppm nitrogen dioxide	air	808977	711068
Phosphine	0.5 ppm phosphine	nitrogen	710533	711088
Hydrogen Chloride	40 ppm hydrogen chloride	nitrogen	710210	711080
Hydrogen Cyanide	10 ppm hydrogen cyanide	nitrogen	809351	711072
Sulfur Dioxide	10 ppm sulfur dioxide	air	808978	711070
Combination Gas Cylinders	1.45% methane, 15% oxygen, 300 ppm carbon monoxide, 10 ppm hydrogen sulfide	nitrogen	804770	711058
	1.45% methane, 15% oxygen, 20 ppm hydrogen sulfide	nitrogen	10048788	10048790
	1.45% methane, 15% oxygen, 300 ppm carbon monoxide, 2.5% carbon dioxide	nitrogen	—	10058023
	1.45% methane, 15% oxygen, 60 ppm carbon monoxide, 20 ppm hydrogen sulfide	nitrogen	10045035	10048280
	1.45% methane, 15% oxygen, 10 ppm hydrogen sulfide	nitrogen	804769	711056
	2.5% methane, 15% oxygen, 300 ppm carbon monoxide, 10 ppm hydrogen sulfide	nitrogen	813720	711076
	2.5% methane, 15% oxygen, 60 ppm carbon monoxide, 20 ppm hydrogen sulfide	nitrogen	10048890	10048981
	1.45% methane, 15% oxygen, 20 ppm hydrogen sulfide	nitrogen	10048889	10048888
	1.45% methane, 15% oxygen, 10 ppm hydrogen sulfide, 300 ppm carbon monoxide, 2.5% carbon dioxide	nitrogen	10050744	10058022
	0.35% pentane, 19% oxygen, 100 ppm carbon monoxide, 35 ppm hydrogen sulfide	nitrogen	10007049	—
	1.45% methane, 15% oxygen, 300 ppm carbon monoxide, 2.5% carbon dioxide	nitrogen	10058021	

Note: Reactive gases have an expiration date listed on each cylinder. This is to ensure the highest quality and accuracy for instrument calibration. Most cylinders have an expiration date of 12 months. Check with MSA Customer Service for the exact shelf life of a particular calibration cylinder.

Model RP

Econo-Cal

Model RP Cylinder

Contents: Pressure 500 psig; approximately 58 liters at atmospheric pressure
Size: 13-3/4" x 3"
Weight: 1 lb 11 oz
Material: Aluminum

Econo-Cal Cylinder

Contents: Pressure 500 psig; approximately 34 liters at atmospheric pressure
Size: 13-3/4" x 3"
Weight: 1 lb 1 oz
Material: Aluminum

Model RP Calibration Cylinder—Steel, 100% Methane

Contents:	Pressure 1000 psig; approximately 58 liters of pure methane with odorant added to smell like natural gas in all commercial gas lines	
Size: 8-1/2" x 3"	**Weight:** 1 lb 13 oz	**Material:** Steel
Gas Fill	**Gas Mixture**	**Part No.**
Methane	100% Methane	711014

Model BD-20 Calibration Cylinders

Contents:	Pressure 2200 psig; approximately 552 liters (20 cu ft) of gas at atmospheric pressure		
Size: 25" x 4-1/4"	**Weight:** 10 lb 9 oz	**Material:** Steel	
Gas Fill	**Gas Mixture**	**Background**	**Part No.**
Methane	2.5% Methane, 15% Oxygen, 60 ppm Carbon Monoxide,	Nitrogen	710566
	1.45% Methane, 15% Oxygen, 60 ppm Carbon Monoxide	Nitrogen	710565
Air, zero	Air, zero, THC<1 ppm	—	710776

Model BD-20 Calibration Cylinders

Squirt Gas Bump Tester

Squirt Gas Bump Test Kit, less cylinder, but with required fittings and adapters, complete with instructions	813411

Cylinders for Squirt Gas

		Combustible						
Instrument	**Squirt Gas Cylinder**	**Methane**	**Pentane Simulant**	**Oxygen**	**Carbon Monoxide**	**Hydrogen Sulfide**	**Isobutylene**	**Balance**
Explosimeter	815307	2.5%	See cylinder	—	—	—	—	Air
Gasport	814350	2.5%	—	15% O_2	60 ppm CO	—	—	Nitrogen
Gasport	814349	2.5%	—	15% O_2	300 ppm CO	35 ppm H_2S	—	Nitrogen
Passport, FiveStar	814497	1.3%	50% LEL	15% O_2	60 ppm CO	—	—	Nitrogen
Passport, FiveStar	814559	1.3%	50% LEL	15% O_2	300 ppm CO	35 ppm H_2S	—	Nitrogen
MiniCO** Responder	814978	—	—	—	60 ppm CO	—	—	Air
MiniH2S*Responder	814979	—	—	—	—	35 ppm H_2S	—	Nitrogen
MicroGard**	815308	1.3%	52% LEL	15% O_2	—	—	—	Nitrogen
Passport PID II	815704	—	—	—	—	—	100 ppm	Air

* Shelf life item. See note page 102. ** Requires calibration adapter.

Contents: Pressure 155 psig; approximately 11 liters at 70°F

Cylinder Holders

Single Portable Cylinder Holder

The Single Portable Cylinder Holder is designed for use with all MSA Model R and Model RP cylinders. It fits neatly on a workbench or shelf, and its unique design ensures that the calibration cylinder (with the regulator attached) always stays where you put it.

Double Cylinder Holder, Wall-Mounted

The Wall-Mounted Double Cylinder-Holder holds all MSA Model R and Model RP cylinders. A molded base and holding straps keep the cylinders securely in position, yet both cylinders and/or regulators can be easily changed. The holder is ideal for field station calibrations and can be easily mounted for workbench applications.

Cylinder Holders	
Single Cylinder Holder, 6" wide x 13" long x 4" high	710386
Double Cylinder Holder, 17" high, 10" wide, 3V" deep at base	710483

Calibration Cylinders Are Recyclable!

MSA has affiliated with the Association of Retarded Citizens, Butler County—a nonprofit organization that employs mentally retarded citizens—and established a Cylinder Recycling Center. The calibration cylinders are not refilled, but salvaged for scrap. All money generated from selling the scrap cylinders is placed in the ARC operating fund for salaries and operating costs.

Calibration cylinders are considered hazardous unless the cylinders are empty. MSA has developed special devalving tools that will ensure the cylinder is empty and render the cylinder non-fillable. For your convenience, MSA also offers a specially pre-addressed shipping box (also recyclable) which helps you pay the lowest shipping costs available.

The MSA Recycling Center limits the return of calibration cylinders to MSA-logoed cylinders only. Non-MSA cylinders will be rejected. Contact the Customer Service Center for additional details at 1-800-MSA-2222.

Recycling Accessories	
Devalving Tool, Model "RP" & Econo-Cal Cylinders	711228
Devalving Tool, Model "R" cylinders	711229
Shipping Box, Special, Pre-addressed	711227