



## **Bid Specifications: Solaris™ Multigas Detector**

<b>Physical Characteristics</b>	
Size	Instrument shall not exceed 4.50" x 2.50" x 1.25" in total size.
Weight	Less than 8.0 ounces (227 grams).
Handling	Unit shall be easily held in one hand.
Case Material	High strength non-corrosive overmolded polycarbonate, will prevent spark generation.
Environmental Protection	Instrument shall be rated to IP65 protection levels for dust and water ingress (heavy waterspray and fine particle dust resistant).
Display Location	Display is viewable from the front.
Protective Jacket	Instrument shall be provided with an optional Cordura® Nylon protective jacket with shoulder strap.

<b>User Interfaces</b>	
Display Type	Liquid crystal display (LCD) with large, easy to read characters.
Gas Readings	All gas readings must be displayed simultaneously.
Backlight	Unit must be provided with backlight for low-light viewing. <ul style="list-style-type: none"> <li>• Backlight must turn off automatically to conserve power.</li> </ul>
Keypad/Switches	Unit must have no more than three pushbuttons to operate. There shall be no requirement to access hidden or internal switches for any instrument operation.
Data Access	Access to the data log shall be non-intrusive using commercially available infrared links to IBM-compatible computers.

<b>Monitoring Capability</b>																
Number of Gases	Instrument shall be capable of measuring four gases, including combustible gas, oxygen, CO, and H <sub>2</sub> S.															
Sensor Configuration	Ability to enable/disable individual sensor channels.															
Sensor Missing Alarm	All sensor channels provide a missing sensor alarm if sensor has been removed and sensor channel has not been disabled.															
Combustible Gas Display	The instrument shall be capable of displaying the combustible gas reading as % Lower Explosive Limit (LEL) or 0-5% CH <sub>4</sub> by volume.															
Pressure Compensation	The instrument oxygen sensor shall have built-in pressure compensation.															
Sensor Types	Instrument shall be available with the following gas sensing capabilities: <table style="margin-left: 40px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Gas Type</u></th> <th style="text-align: left;"><u>Range</u></th> <th style="text-align: left;"><u>Resolution</u></th> </tr> </thead> <tbody> <tr> <td>Combustible Gases</td> <td>0-100% LEL or 0-5%CH<sub>4</sub></td> <td>1% LEL or 0.05% CH<sub>4</sub></td> </tr> <tr> <td>Oxygen</td> <td>0-25%</td> <td>0.1%</td> </tr> <tr> <td>Carbon Monoxide</td> <td>0-500 ppm</td> <td>1 ppm</td> </tr> <tr> <td>Hydrogen Sulfide</td> <td>0-200 pm</td> <td>1 ppm</td> </tr> </tbody> </table>	<u>Gas Type</u>	<u>Range</u>	<u>Resolution</u>	Combustible Gases	0-100% LEL or 0-5%CH <sub>4</sub>	1% LEL or 0.05% CH <sub>4</sub>	Oxygen	0-25%	0.1%	Carbon Monoxide	0-500 ppm	1 ppm	Hydrogen Sulfide	0-200 pm	1 ppm
<u>Gas Type</u>	<u>Range</u>	<u>Resolution</u>														
Combustible Gases	0-100% LEL or 0-5%CH <sub>4</sub>	1% LEL or 0.05% CH <sub>4</sub>														
Oxygen	0-25%	0.1%														
Carbon Monoxide	0-500 ppm	1 ppm														
Hydrogen Sulfide	0-200 pm	1 ppm														

<b>Basic Operational Features</b>	
Instrument Turn-on	Button to turn instrument on must be clearly marked.
Inadvertent Shutoff	The instrument must be designed to protect against accidental shutoff.
Zero Adjustments	The instrument shall provide a Fresh Air Setup (FAS) function at the user's discretion.
Zero Adjustment Safety Lockout	The FAS function will prevent users from zeroing out hazardous readings.
Audible and Visual "Confidence" Indicators	The instrument shall be provided with periodic audible and visual signals indicating the instrument is in operation. The user shall be provided with the option to disable the audible and visual signals if desired.
Time/Date	Instrument must be able to display time and date with the optional datalogging package. User must be able to reset time and date without tools.
Last Calibration Date	Instrument must be able to display the last successful calibration date with the optional datalogging package.

<b>Advanced Display and Software Options</b>	
Industrial Hygiene Displays	The gas detector must have the capability of displaying PEAK, STEL, and TWA at the user's discretion.
Reset of IH Functions	User shall be able to reset STEL, TWA, and PEAK readings.
Measurement Units	The unit shall be capable of displaying both the type of gas sensors installed and the measurement units for each gas.
Instrument Settings	All settable instrument parameters (alarm setpoints, expected cal gas valves, etc.) will be protected by a user-selectable password. Password feature can also be completely disabled by the end user, if desired.

<b>Instrument Alarms</b>	
Visual Alarms	Visual alarms shall consist of bright flashing LEDs and a positive indication on the display as to which gas sensor is in alarm.
Audible Alarm	The audible alarm shall be rated at 100 dB.
Vibrating Alarm	The unit shall be provided with a vibrating alarm in all configurations.
Lockalarm™ Feature	The combustible channel must have a non-resettable, latching alarm when the combustible gas exceeds 100% LEL or 5.00% CH <sub>4</sub> .
Oxygen Alarms	The oxygen channel will have alarm setpoints for both oxygen deficiency and oxygen enrichment.
Alarm Setpoints	Alarm set points must be user-settable.
STEL and TWA Alarm	The instrument shall provide audible, visual, and vibrating alarms if STEL or TWA levels are exceeded. The user will be able to select alarm setpoints for STEL and TWA.
Power Alarms	The monitor will provide a minimum of 10 minutes of warning to user of battery power loss in all environmental conditions. Power consumption alarms shall activate the audible, visual, and vibrating alarms.

<b>Instrument Power</b>	
Power Supply	The instrument shall have a rechargeable battery available.
Battery Life Indication	The monitor shall provide the user with a "gas gauge" depicting estimated remaining battery operation time. <ul style="list-style-type: none"> <li>• Battery gas gauge must always be visible when the instrument is turned on.</li> </ul>
Charger	The charger must be able to fully charge a depleted battery pack in less than 4 hours.
Charger Input Voltages	Chargers must be available for 110VAC/220VAC and 12-24VDC.
Charging Status	Both instrument and charging stand will provide a visual indication of battery charging status.

<b>Calibration</b>	
Calibration Tools	The unit shall require no special tools for calibration other than cylinder, regulator tubing, and calibration cap to supply gas to instrument.
Push-button Calibration	Calibration must be easily accomplished utilizing push buttons on the face of the instrument. Internal instrument access or tools shall not be necessary for calibration.
Calibration Cylinder Mixtures	In a standard four-gas configuration (Combustible, O <sub>2</sub> , CO, and H <sub>2</sub> S), the instrument shall be calibrated from one cylinder.
One-button Calibration	Instrument shall be capable of being calibrated to known gas concentrations with the push of a single button.
Calibration Time	Zero calibration shall not exceed 10 seconds and span calibration shall not exceed 90 seconds.
Automatic Calibration	The instrument shall be compatible with optional automated calibration and data storage systems. This external system shall automatically recognize and calibrate the instrument and retain all calibration records (reference separate system specifications).
Low-Cost Calibration Kit	The instrument shall be available with an optional low-cost gas testing kit to verify performance in field. This kit shall be capable of checking the performance of the standard four-gas instrument (Combustible, O <sub>2</sub> , CO, and H <sub>2</sub> S).

<b>Sampling Systems</b>	
Sampling Modes	In addition to standard diffusion mode, the monitor must be available with an external powered pump probe option.
Sampling System Filters	The pump must contain user-replaceable filters to prevent the ingress of liquids and dust into instrument.
Allowable Sample Line Length	Instrument must be capable of drawing a sample from up to 50 feet away.
Fluid Ingress Protection	A sample probe that has provisions to prevent water and debris from entering the instrument must be available.

<b>Datalogging (Instrument Data Storage)</b>	
Datalogging	Instrument must be available with datalogging as an optional feature.
Datalog Capacity	The datalog shall record and store data for an average of 24 hours (at one minute intervals) without overwriting existing information in normal use.
Gas Record Content	Datalog entries shall contain as a minimum the date, time, and a record of the peak and average readings for each gas sensor (oxygen shall be recorded as maximum and minimum for the intervals).
Atmospheric Record	Datalog shall record at a minimum of 15-minute intervals.
Record Intervals	The time between data records shall be user-selectable (from 15 seconds to 15 minutes).
Data Retention	Instrument data stored in the memory shall not be lost or corrupted in the event of sudden instrument power loss.
Activity Record Content	Instrument datalog shall record and be capable of reporting significant instrument events including: <ul style="list-style-type: none"> <li>• Gas and battery alarms</li> <li>• Fresh Air Setups, sensor re-zeroing, and calibrations</li> <li>• Battery voltage</li> <li>• Elapsed run time</li> <li>• Reset of PEAK, Min, STEL, and TWA values</li> </ul>

<b>Certifications</b>	
Intrinsic Safety Approval	The detector must be approved by: <ul style="list-style-type: none"> <li>• Nationally Recognized Testing Laboratory (NRTL) as intrinsically safe to Class I, Division 1, Groups A, B, C, and D.</li> </ul>
Manufacturing System Quality Approvals	The instrument manufacturer must be certified complaint with ISO 9001 provisions.

<b>Environmental</b>	
Temperature	Normal Operation: 0 to 40°C Extended Range: -20 to 50°C 15 minute intervals: -40 to -20°C
Humidity	15-90% RH (non-condensing) continuous. 5-95% RH (non-condensing) for short periods.

<b>Maintenance, Warranty</b>	
Sensor Replacement	Sensors shall be easily accessed and replaced, if desired, by the purchaser.
Warranty	The instrument shall have a two-year warranty on ALL components.