



Multigas Detector

[Bid Specifications]

| Physical Characteristics | |
|--------------------------|---|
| Size | Instrument shall not exceed 4.4" L x 3.0" W x 1.34" D in total size. |
| Weight | Less than 7.4 oz. |
| Handling | Unit shall be a one-hand operation device. |
| Case material | Rubberized over mold. |
| Environmental protection | Instrument shall be third-party rated to IP67 protection levels for dust and water ingress. |
| Display location | Display is viewable from the front. |

| User Interfaces | |
|-----------------|---|
| Display type | Liquid crystal display [LCD] with large, easy to read characters and icons. |
| Backlight | Unit must be provided with backlight for low-light viewing. Backlight time-out to conserve power must be user adjustable. |
| Keypad/switches | Unit must have no more than three switches or pushbuttons to operate. There shall be no requirement to access hidden or internal switches for any instrument operations. Buttons must be easy to operate with gloves on. |
| Data access | Access to the data log shall be non-intrusive using infrared links to Windows-ready PCs. |

| Monitoring Capability | | | | | | | | | | | | | | | | |
|-------------------------|---|------------|-------|------------|-------------|------------|--------|--------|-----------|----------|-----------------|-----------|-------|------------------|-----------|-------|
| Gases | Instrument shall be capable of measuring four gases: combustible gas, oxygen, CO, and H ₂ 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 | Instrument shall be capable of displaying combustible gas reading as % Lower Explosive Limit [LEL] or 0-5% CH ₄ by volume. | | | | | | | | | | | | | | | |
| Pressure compensation | Instrument oxygen sensor shall have built-in pressure compensation. | | | | | | | | | | | | | | | |
| Sensor types | Instrument shall be available with the following gas sensing options: <table border="1" data-bbox="464 1570 1177 1733"> <thead> <tr> <th>Gas type</th> <th>Range</th> <th>Resolution</th> </tr> </thead> <tbody> <tr> <td>combustible</td> <td>0-100% LEL</td> <td>1% LEL</td> </tr> <tr> <td>oxygen</td> <td>0-25% Vol</td> <td>0.1% Vol</td> </tr> <tr> <td>carbon monoxide</td> <td>0-999 ppm</td> <td>1 ppm</td> </tr> <tr> <td>hydrogen sulfide</td> <td>0-200 ppm</td> <td>1 ppm</td> </tr> </tbody> </table> | Gas type | Range | Resolution | combustible | 0-100% LEL | 1% LEL | oxygen | 0-25% Vol | 0.1% Vol | carbon monoxide | 0-999 ppm | 1 ppm | hydrogen sulfide | 0-200 ppm | 1 ppm |
| Gas type | Range | Resolution | | | | | | | | | | | | | | |
| combustible | 0-100% LEL | 1% LEL | | | | | | | | | | | | | | |
| oxygen | 0-25% Vol | 0.1% Vol | | | | | | | | | | | | | | |
| carbon monoxide | 0-999 ppm | 1 ppm | | | | | | | | | | | | | | |
| hydrogen sulfide | 0-200 ppm | 1 ppm | | | | | | | | | | | | | | |

| Basic Operational Features | |
|--------------------------------|--|
| Instrument buttons | Buttons on instrument must be clearly marked and intuitive. |
| Inadvertent shutoff | Instrument shall be designed to protect against accidental shutoff. |
| Zero adjustments | Instrument shall provide Fresh Air Setup [FAS] function at user's discretion. |
| Zero adjustment safety lockout | FAS function will not allow unit to zero out hazardous readings. |
| Confidence signals | Instrument shall provide periodic audible and visual signals indicating instrument operation. User shall have option of disabling audible and visual signals if desired. |

| | |
|-----------------------|--|
| Time/date | Instrument must be able to display time and date. 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. |
| Instrument power-on | Power-on instrument button must be clearly marked. |
| Inadvertent shutoff | Instrument must be designed to protect against accidental shutoff. |
| Zero adjustments | Instrument shall provide Fresh Air Setup [FAS] function at user's discretion. |

Advanced Display and Software Options

| | |
|-----------------------------|--|
| Industrial hygiene displays | Instrument shall have the capability of displaying PEAK, STEL, and TWA at user's discretion. User shall have ability to enable/disable STEL and TWA functions. |
| Instrument settings | All settable instrument parameters [alarm set points, expected cal gas values, etc.] shall be protected by a user-selectable password. |
| Reset of functions | User shall be provided with capability of resetting PEAK, STEL and TWA readings in the field. |
| Measurement units | Unit shall be capable of displaying both type of gas sensors installed, and measurement units for each gas. |

Instrument Alarms

| | |
|-----------------------|---|
| MotionAlert™ feature | Instrument shall offer an optional MotionAlert feature. When activated, instrument shall eventually go into latch alarm when no instrument movement is detected for 30 seconds. |
| InstantAlert™ feature | Instrument shall have an InstantAlert feature to allow users to manually activate all alarms if the situation requires. |
| Visual alarms | Visual alarms shall consist of bright, flashing LEDs on top and bottom of instrument and positive indication on unit's display for alarm type identification. |
| Audible alarm | Audible alarm shall be rated at >95 dB @ 1ft. |
| Vibrating alarm | Unit shall be offered with standard vibrating alarm. |
| Lockalarm™ feature | Combustible channel shall have non-resettable latching alarm when combustible gas level exceeds 100% LEL or 5.00% CH ₄ . |
| Oxygen alarms | Oxygen channel shall have alarm set points for both oxygen deficiency and oxygen enrichment. |
| Alarms set points | Alarm set points must be user-settable. |
| STEL and TWA alarm | Instrument shall provide audible, visual, and vibrating alarms if STEL or TWA levels are exceeded. User shall be able to select alarm set points for STEL and TWA. |
| Battery alarms | The monitor will provide user with 10-minutes warning of battery power loss in all environmental conditions. Power consumption alarms shall activate audible, visual, and vibrating alarms. |

Instrument Power

| | |
|-------------------------|---|
| Run time | Instruments run time shall exceed 16 hours. |
| Power supply | Instrument shall be equipped with a rechargeable battery. |
| Battery life indication | Monitor shall provide icon depicting estimated remaining battery operation time. Battery icon must always be visible when instrument is powered on. |
| Charging cradle | Optional charging cradle shall be offered. |
| Charger Input voltages | Chargers shall be available for 110VAC/220VAC and 12-24VDC. |
| Charging status | Both instrument and charging cradle shall provide visual indication of battery charging status. |

Calibration

| | |
|------------------------|--|
| Calibration tools | Unit shall require no special tools for calibration other than calibration cap, cylinder, regulator, and tubing to supply gas to instrument. |
| Calibration access | Calibration access can be hidden behind password when desired. |
| Pushbutton calibration | Calibration shall be easily performed using instrument's push buttons. |

| | |
|--------------------------|---|
| | Internal instrument access or tools shall not be necessary for calibration. |
| Calibration cylinder mix | Calibration gas shall be offered in a standard 4-gas configuration [combustible, O ₂ , CO, and H ₂ S] cylinder. Instrument shall be calibrated from one cylinder. |
| Calibration time | Zero calibration shall not exceed 10 seconds and span calibration shall not exceed 90 seconds. |
| Automatic calibration | Instrument shall be compatible with optional automated test and with calibration system able to store data. External system shall automatically recognize and calibrate instrument and retain all calibration records. |
| Bump test station | Economical bump test station shall be offered to verify field performance. Test station shall be capable of checking performance of standard 4-gas instrument [combustible, O ₂ , CO, and H ₂ S] and store records. |

Sampling Systems

| | |
|------------------------------|--|
| Sampling modes | In addition to standard diffusion mode, monitor must be available with external powered pump probe option. |
| Sampling system filters | Pump must contain user-replaceable filters to prevent liquids and dust ingress. |
| Allowable sample line length | Instrument must be capable of sample draw from up to 50 feet away. |
| Fluid ingress protection | Sample probe designed to prevent water and debris from entering instrument shall be offered. |

Data logging [Instrument Data Storage]

| | |
|---------------------------------|---|
| Data logging | Instrument must be available with standard data logging. |
| Event log | Instrument shall record at least 500 events. |
| Data log capacity | Data log shall record and store data for an average of 50 hours [at one-minute intervals] without overwriting existing information in normal use. |
| Gas record content | Data log entries shall contain as a minimum date, time, and record of peak and average readings for each gas sensor [oxygen shall be recorded as maximum and minimum for the intervals]. |
| Atmospheric record | Instrument shall have provisions to record atmospheric temperature changes. |
| Record intervals | Time span between data records shall be user-selectable from 15 seconds to 15 minutes. |
| Data retention | Instrument data stored in memory shall not be lost or corrupted in event of sudden instrument power loss. |
| Activity record Content page | Instrument data log shall record and be capable of reporting significant instrument events including: <ul style="list-style-type: none"> • Gas and battery alarms • Fresh air setups, sensor re-zeroing, and calibrations • Battery voltage and elapsed run time • Reset of PEAK, Min, STEL, and TWA values |

Certifications

| | |
|--|--|
| Intrinsic safety approval | Detector must be approved by : <ul style="list-style-type: none"> ▪ Europe: ATEX II 2 G EEx ia d IIC T4, Tamb= -20 to 50°C, EN 60079-0, EN 60079-1, & EN 50020 ▪ US: Class I, Div. 1, Groups A B, C, D, Class II, Div.1 Groups F & G. T4, Tamb= -20 to 50°C ▪ Canada: CSA C22.2, No. 157 for Class I, Div. 1, Groups A, B, C and D, Tamb=-20°C to + 50°C ▪ Australian & New Zealand: IEC Ex ia d I/IIC T4, ANZEx ia s I/IIC T4 (Zone 0), AS/NZS 60079.11:2005; AS/NZS 60079.0:2005; AS/NZS 1826; IEC 60079-11 ED 5; IEC 60079-0 ED 4 |
| Manufacturing system quality approvals | Instrument manufacturer must be certified compliant with ISO 9001 provisions. |

Environmental

| | |
|-------------|---|
| Temperature | Normal operation: 0 to 40° C Extended: -20 to 50° C Short periods [15 minutes]: -40 to -20° C |
| Humidity | 15-90% RH [non condensing] continuous 5-95% RH [non condensing] for short periods |

Maintenance & Warranties

| | |
|-----------------------|--|
| Sensor replacement | Sensors shall be easily accessed and replaced by users if desired by the purchaser. |
| Warranty, consumables | Instrument shall have a two-year warranty on all components. |
| Extended Warranty | Optional extended warranty shall be offered for an additional 1 or 2 years (4 year maximum). |