



ALTAIR[®] 4XR Multigas Detector

Bid Specifications

Physical Characteristics	
Size	Instrument shall not exceed 4.4" L x 3.0" W x 1.4" D (11.2 cm x 7.6 cm x 3.5 cm).
Weight	8 oz (228 g)
Handling	Instrument shall be a one-hand operation device.
Case material	Rubberized over-mold.
Environmental protection	Instrument shall be approval agency-certified to IP68 protection levels for dust and water ingress. Instrument shall be capable of immersion in up to 6.5 ft (2m) of water for 1 hour.
Impact protection	Instrument shall exceed MIL-STD-810G repeated drop test requirements. Instrument shall be capable of surviving an incidental 25-ft (7.62-m) drop.
Color	Charcoal or phosphorescent (glow-in-the-dark) housing.

User Interfaces	
Display type	Liquid crystal display (LCD) with large, easy-to-read characters and icons.
Backlight	Unit must provide white backlight for low-light viewing. Backlight time-out 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 when users wear gloves.
Data access	Access to data log and event log through infrared link to Windows-ready PCs.
Bluetooth connectivity	Unit shall be capable of transmitting device and alarm data via Bluetooth wireless connection to a gateway device, such as an Android-based cellular phone.

Monitoring Capability																											
Gases	Instrument shall be capable of measuring up to four gases: combustible gas, O ₂ , and either H ₂ S/CO, H ₂ S-LC/CO, H ₂ S-LC/SO ₂ , or CO/NO ₂ .																										
Sensor configuration	Ability to enable/disable individual sensor channels.																										
Sensor missing alarm	All sensor channels provide 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 life monitoring	Instrument shall be able to alert user when a particular sensor nears end of life following instrument calibration.																										
Sensor types	Instrument shall be available with the following gas sensing options: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Gas type</th> <th>Range</th> <th>Resolution</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Combustible</td> <td>0-100% LEL</td> <td>1% LEL</td> </tr> <tr> <td>0-5% Vol CH₄</td> <td>0.05% Vol CH₄</td> </tr> <tr> <td>O₂</td> <td>0-30% Vol</td> <td>0.1% Vol</td> </tr> <tr> <td>CO</td> <td>0-1999 ppm</td> <td>1 ppm</td> </tr> <tr> <td>H₂S</td> <td>0-200 ppm</td> <td>1 ppm</td> </tr> <tr> <td>H₂S Low Concentration</td> <td>0-100 ppm</td> <td>0.1 ppm</td> </tr> <tr> <td>SO₂</td> <td>0-20 ppm</td> <td>0.1 ppm</td> </tr> <tr> <td>NO₂</td> <td>0-50 ppm</td> <td>0.1 ppm</td> </tr> </tbody> </table>	Gas type	Range	Resolution	Combustible	0-100% LEL	1% LEL	0-5% Vol CH ₄	0.05% Vol CH ₄	O ₂	0-30% Vol	0.1% Vol	CO	0-1999 ppm	1 ppm	H ₂ S	0-200 ppm	1 ppm	H ₂ S Low Concentration	0-100 ppm	0.1 ppm	SO ₂	0-20 ppm	0.1 ppm	NO ₂	0-50 ppm	0.1 ppm
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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 lockout	FAS function will not allow unit to zero out hazardous readings.
Confidence signals	Periodic audible and visual signals shall indicate instrument operation. User must be able to disable audible and visual signals.

Bump test status indicators	Instrument shall be capable of indicating its bump test status. <ul style="list-style-type: none"> • Bump PASS: flashing green LED in top right corner and on-screen checkmark. • Bump FAIL or expiration: flashing red LED in top right corner and no checkmark.
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 last successful calibration date.
Instrument power-on	Power-on instrument button must be clearly marked.

Sensor Characteristics and Performance	
Sensor life	Sensors shall have an expected life of four years.
End of life sensor indicator	Instrument shall indicate when sensor is close to and at its end of life following calibration.
Typical t(90) response times	Combustible sensor < 10 seconds (methane); < 15 seconds (pentane) O ₂ sensor < 10 seconds CO, H ₂ S, SO ₂ & NO ₂ sensors < 15 seconds
All sensors	All sensors shall have built-in control circuitry, including drive circuits, memory, microprocessor, and analog to digital converter to all for sensor level control and compensation.
Oxygen sensor	Oxygen sensor shall be lead-free and use non-consumable chemical reaction.
Combustible sensor	Combustible sensor must provide the following poison resistance at minimum: <ul style="list-style-type: none"> • 3000 ppm*hours to H₂S • 90 ppm*hours to silicone
CO/H ₂ S sensor	CO/H ₂ S sensor shall be designed with extremely robust carbon filter for CO channel to block interference. Sensor shall be designed for virtually no cross-channel interference. Sensor shall be designed for two-toxic gas detection in the same physical envelope as a single gas sensor.
CO/NO ₂ sensor	CO/NO ₂ sensor shall be designed with extremely robust carbon filter for CO channel to block interference. Sensor shall be designed for two-toxic gas detection in the same physical envelope as a single gas sensor.
H ₂ S/SO ₂ sensor	H ₂ S/SO ₂ sensor shall be designed to meet the measurement requirements for lowered exposure limit guidelines for H ₂ S. Sensor shall be designed for two-toxic gas detection in the same physical envelope as a single gas sensor.

Advanced Display and Software Options	
Industrial hygiene displays	Instrument shall have 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 calibration gas values, etc.) shall be protected by 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 types of installed gas sensors and measurement units for each gas.

Instrument Alarms	
MotionAlert™ feature	Instrument shall offer MotionAlert feature. When activated, instrument shall go into latch alarm when no instrument movement is detected for 30 seconds.
InstantAlert™ feature	Instrument shall have InstantAlert feature to allow users to manually activate all alarms if 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 @ 1 ft (30 cm).
Vibrating alarm	Unit shall be offered with standard vibrating alarm.
LEL latching alarm	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.
Alarm 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	Instrument shall provide user with 10-minute warning of battery power loss in all environmental conditions. Power consumption alarms shall activate audible, visual and vibrating alarms.

Instrument Power	
Run time	Instrument continuous run time shall be 24 hours; when there is an active Bluetooth connection between the detector and ALTAIR Connect, run time shall be 22 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	Instrument or 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.
Pushbutton calibration	Calibration shall be easily performed using instrument's pushbuttons. Internal instrument access or tools shall not be necessary for calibration.
Calibration cylinder mix	Calibration gas cylinders shall be offered in standard four-gas configurations: <ol style="list-style-type: none"> 1. Combustible, O₂, CO and H₂S 2. Combustible, O₂, H₂S and SO₂ 3. Combustible, O₂, CO and NO₂ Instrument shall be calibrated using one cylinder.
Calibration time	Span calibration shall not exceed 60 seconds.
Automatic calibration	Instrument shall be compatible with optional automated test and calibration system that is 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 the instrument and store records.

Sampling Systems	
Sampling mode	In addition to standard diffusion mode, instrument must be available with external powered pump probe option.
Sampling system filters	Pump must contain user-replaceable filters to prevent liquid and dust ingress.
Sample line length	Instrument must be capable of sample draw from up to 50 ft (15 m) away.
Fluid ingress protection	Sample probe must prevent water and debris from entering instrument.

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 minimum date, time and record of peak and average readings for each gas sensor (oxygen shall be recorded as maximum and minimum 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

Environmental and Durability	
Drop test	Can survive 25+ consecutive 4-ft (1.2 m) drops (MIL-STD-810G drop test). Can survive incidental 25-ft (7.62-m) drop onto concrete.

Temperature	Normal operation: -10° to 40° C Extended:-40° to +60° C
Humidity	15-90% RH (non condensing) continuous 5-95% RH (non condensing) Intermittent

Maintenance & Warranties	
Sensor replacement	Sensors shall be easily accessed and replaced by users if desired by purchaser. No printed circuit boards should require removal to access sensors.
Warranty, consumables	Instrument shall have 4-year warranty on all components, including sensors and battery.
Extended warranty	Optional extended warranty shall be offered for an additional year (five years total).

Certifications	
North America	USA / Canada CSA Class I, Division 1, Groups A, B, C & D Class II, Division 1, Groups E, F & G Class III, Division 1 Ambient temperature: -40°C to +54°C; T4 CAN/CSA C22.2 No. 152 Combustible Gas Detection Instruments C22.2 No. 152 Performance Ambient Temperature: -20°C to +54°C; T4 C22.2 No. 157 Intrinsic Safety Ambient Temperature: -40°C to +54°C; T4
Europe	Directive 2014/34/EU (ATEX): II 1G Ex ia da IIC T4 Ga, -40°C to +60°C, IP68 CE 0080 Directive 2014/30/EU (EMC): EN50270 Type 2, EN61000-6-3
IEC	IECEX Ex ia da IIC T4 Ga, -40°C to +60°C, IP68
Manufacturing system quality approvals	Instrument manufacturer must be certified as compliant with ISO 9001 provisions.