

# 5. Technical Specifications/Certifications

## 5.1 Technical Specifications

<b>WEIGHT</b>	1 lb. (0.45 kg) for instrument with battery and clip (ALTAIR 5X unit)			
<b>WEIGHT (WITH IR SENSOR)</b>	1.15 lb. (0.52 kg)			
<b>DIMENSIONS</b>	6.69" H x 3.49" W x 1.79" D without belt clip (ALTAIR 5X unit)			
<b>DIMENSIONS WITH IR SENSOR</b>	6.68" H x 3.52" W x 1.92" D			
<b>ALARMS</b>	LEDs, audible alarm, vibrating alarm			
<b>ACOUSTIC ALARM VOLUME</b>	95 dB typical			
<b>DISPLAYS</b>	Monochrome or color			
<b>BATTERY TYPES</b>	Rechargeable Li ION battery Replaceable AA alkaline (ALTAIR 5X unit only)			
<b>CHARGING TIME</b>	≤ 6 hours. Maximum safe area charging voltage; Um = 6.7 Volts DC			
<b>NORMAL TEMP RANGE</b>	14°F to 104°F (-10°C to 40°C)			
<b>EXTENDED TEMP RANGE</b>	-4°F to 122°F (-20°C to 50°C) MONOCHROME DISPLAY 14°F to 122°F (-10°C to 50°C) COLOR DISPLAY - 4°F to 104°F (-20°C to 40°C) for instruments with ClO <sub>2</sub> sensors			
<b>SHORT TERM OPERATIONS (15 MINUTES) TEMP RANGE</b>	-40°F to 122°F (-40°C to 50°C)			
<b>HUMIDITY RANGE</b>	15 - 90% relative humidity, non-condensing; 5 - 95% RH intermittent			
<b>ATMOSPHERIC PRESSURE RANGE</b>	11.6 to 17.4 PSIA (80 to 120 kPa)			
<b>DUST &amp; SPRAY PROTECTION</b>	IP 65			
<b>MEASURING METHODS</b>	<b>Combustible gas:</b>	Catalytic or Infrared sensor		
	<b>O<sub>2</sub> and Toxic gas:</b>	Electrochemical or Infrared sensor		
<b>WARRANTY</b>	See Section 1.3			
<b>MEASURING RANGE</b>	<b>H<sub>2</sub>S</b> 0-200 ppm	<b>CO</b> 0-2000 ppm	<b>O<sub>2</sub></b> 0-30 % Vol.	<b>Combustible</b> 0-100% LEL 0-5.00% CH <sub>4</sub>
	<b>SO<sub>2</sub></b> 0-20 ppm	<b>NO<sub>2</sub></b> 0-20 ppm	<b>NH<sub>3</sub></b> 0-100 ppm	<b>PH<sub>3</sub></b> 0-5 ppm
	<b>Cl<sub>2</sub></b> 0-10 ppm	<b>ClO<sub>2</sub></b> 0-1 ppm	<b>HCN</b> 0-100 ppm	<b>NO</b> 0-250 ppm

## 5.2 Factory-set Alarm Thresholds

SENSOR	LOW ALARM	HIGH ALARM	SETPOINT		STEL	TWA
			MIN	MAX		
COMB	10% LEL	20% LEL	5% LEL	60% LEL	-- <sup>1</sup>	-- <sup>1</sup>
CO	25 ppm	100 ppm	10 ppm	1700 ppm	100 ppm	25 ppm
H <sub>2</sub> S	10 ppm	15 ppm	5 ppm	175 ppm	15 ppm	10 ppm
O <sub>2</sub>	19.5%	23.0%	5.0%	24.0%	-- <sup>1</sup>	-- <sup>1</sup>
SO <sub>2</sub>	2.0 ppm	5.0 ppm	2.0 ppm	17.5 ppm	5 ppm	2.0 ppm
NO	25	100	10	200	25	25
NO <sub>2</sub>	2.0 ppm	5.0 ppm	1.0 ppm	17.5 ppm	5.0 ppm	2.0 ppm
NH <sub>3</sub>	25 ppm	50 ppm	10 ppm	75 ppm	35 ppm	25 ppm
PH <sub>3</sub>	0.3 ppm	1.0 ppm	0.3 ppm	3.75 ppm	1.0 ppm	0.3 ppm
Cl <sub>2</sub>	0.5 ppm	1.0 ppm	0.3 ppm	7.5 ppm	1.0 ppm	0.5 ppm
ClO <sub>2</sub>	0.1 ppm	0.3 ppm	0.1 ppm	0.9 ppm	0.3 ppm	0.1 ppm
HCN	4.5 ppm	10.0 ppm	2.0 ppm	20.0 ppm	10 ppm	4.5 ppm
IR - CO <sub>2</sub> (10% Vol)	0.5% Vol	1.5% Vol	0.2% Vol	8% Vol	0.5% Vol	1.5% Vol
IR Propane (100% Vol)	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>1</sup>	-- <sup>1</sup>
IR Butane (25% Vol)	8% Vol	15% Vol	5% Vol	25% Vol	-- <sup>1</sup>	-- <sup>1</sup>
IR Methane (100% Vol)	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>2</sup>	-- <sup>1</sup>	-- <sup>1</sup>

<sup>1</sup>STEL and TWA not applicable for combustible and oxygen gases.

<sup>2</sup>No alarm thresholds are possible for the 0-100% Vol Methane and Propane IR sensors. In environments with >100% LEL combustible gas present, units with a catalytic combustible LEL sensor will be in a latching over-range alarm, and the 100% Vol IR sensors will display the % Vol gas reading.

## 5.3 Sensor Performance Specifications

### PRIMARY SENSORS

	RANGE	RESOLUTION	REPRODUCIBILITY	RESPONSE TIME
Com-bustible (LEL)	0-100% LEL or 0-5% CH <sub>4</sub>	1% LEL or 0.05% Vol CH <sub>4</sub>	Normal temp. range: <50% LEL: 3% LEL 50-100% LEL: 5% LEL <2.5% CH <sub>4</sub> : 0.15% CH <sub>4</sub> 2.5-5.00% CH <sub>4</sub> : 0.25% CH <sub>4</sub>  Extended temp. range: <50% LEL: 5% LEL 50-100% LEL: 8% LEL <2.5% CH <sub>4</sub> : 0.25% CH <sub>4</sub> 2.5-5.00% CH <sub>4</sub> : 0.40% CH <sub>4</sub>	t(90) <15 sec (Pentane) (normal temp.)  t(90) <10 sec (Methane) (normal temp.)
Oxygen	0-30% O <sub>2</sub>	0.1% O <sub>2</sub>	0.7% O <sub>2</sub> for 0 - 30% O <sub>2</sub>	t(90) <10 sec (normal temp.)
Carbon Mon-oxide	0-2000 ppm CO	1 ppm CO,	Normal temp. range: ±5 ppm or 10% of reading, whichever is greater;  Extended temp. range: ±10 ppm or 20% of reading, whichever is greater	t(90) <15 sec (normal temp.)
Hydro-gen Sulfide	0-200 ppm H <sub>2</sub> S	1 ppm H <sub>2</sub> S, 3-200 ppm H <sub>2</sub> S	Normal temp. range: ±2 ppm H <sub>2</sub> S or 10 % of reading, whichever is greater;  Extended temp. range: ±20 ppm or 20% of reading, whichever is greater	t(90) <15 sec (normal temp.)

**IR SENSORS**

	RANGE	RESOLUTION	REPRO-DUCIBILITY OF THE ZERO	REPRO-DUCIBILITY OF THE MSD. VALUE	RESPONSE TIME AT 20°C T90
Carbon Dioxide	0 - 10% Vol	0.01% Vol	≤ ± 0.1 % Vol	≤ ±4%	≤35
Methane	0 - 100% Vol	1% Vol	≤ ± 5 % Vol	≤ ±10%	≤34
Propane	0 - 100% Vol	1% Vol	≤ ± 3 % Vol	≤ ±8%	≤36
Butane	0 - 25 % Vol	0.1% Vol	≤ ± 0.5 % Vol	≤ ±4%	≤35

**ADDITIONAL TOXIC SENSORS**

	RANGE (PPM)	RESOLUTION (PPM)	REPRODUCABILITY NORMAL TEMP. RANGE	EXTENDED TEMP. RANGE	NOMINAL RESPONSE TIME *
Cl <sub>2</sub> Chlorine	0-10	0.05	±0.2 ppm or 10% of reading (whichever is greater)	±0.5 ppm or 20% of reading (whichever is greater)	t(90) < 30 secs
NH <sub>3</sub> Amonia	0-100	1	±2 ppm or 10% of reading (whichever is greater)	±5 ppm or 20% of reading (whichever is greater)	t(90) < 40 secs
HCN Hydrogen Cyanide	0-30	0.5	±1 ppm or 10% of reading (whichever is greater)	±2 ppm or 20% of reading (whichever is greater)	t(90) < 30 secs
SO <sub>2</sub> Sulphur Dioxide	0-20	0.1	±2 ppm or 10% of reading (whichever is greater)	±3 ppm or 20% of reading (whichever is greater)	t(90) < 20 secs
ClO <sub>2</sub> Chlorine Dioxide	0-1	0.01	±0.1 ppm or 10% of reading (whichever is greater)	±0.2 ppm or 20% of reading (whichever is greater)	t(90) < 2 mins
NO Nitric Oxide	0-100	1			
NO <sub>2</sub> Nitrogen Dioxide	0-20	0.1	±2 ppm or 10% of reading (whichever is greater)	±3 ppm or 20% of reading (whichever is greater)	t(90) < 40 secs
PH <sub>3</sub> Phosphine	0 - 5	0.05	±2 ppm or 10% of reading (whichever is greater)	±0.25 ppm or 20% of reading (whichever is greater)	t(90) < 30 secs

\* Response time is for normal temperature range with sensor in position #3.

## 5.4 Calibration Specifications

See Section 6.1 for MSA gas cylinder part numbers.

SENSOR	ZERO GAS	ZERO CAL VALUE ***	SPAN CAL GAS	SPAN CAL	
				VALUE	TIME (min-utes)
COMB PENTANE	FRESH AIR	0	1.45% METHANE	58 LEL	1
COMB METHANE (0-5% V)	FRESH AIR	0	2.5% METHANE	2.5%	1
COMB METHANE (4.4% V)	FRESH AIR	0	1.45% METHANE	33 LEL	1
*COMB PROPANE (1.7% V)	FRESH AIR	0	1.45% METHANE	58 LEL	1
*COMB PROPANE (2.1% V)	FRESH AIR	0	1.45% METHANE	46 LEL	1
*COMB BUTANE (1.4% V)	FRESH AIR	0	1.45% METHANE	58 LEL	1
*COMB METHANE (5.0% V)	FRESH AIR	0	1.45% METHANE	29 LEL	1
COMB HYDROGEN	FRESH AIR	0	1.45% METHANE	29 LEL	1
O <sub>2</sub>	FRESH AIR	20.8%	15% O <sub>2</sub>	15.0%	1
CO	FRESH AIR	0	60 PPM CO	60 PPM	1
H <sub>2</sub> S	FRESH AIR	0	20 PPM H <sub>2</sub> S	20 PPM	1
SO <sub>2</sub>	FRESH AIR	0	10 PPM SO <sub>2</sub>	10 PPM	1
Cl <sub>2</sub>	FRESH AIR	0	10 PPM Cl <sub>2</sub>	10 PPM	2
NO	FRESH AIR	0	50 PPM NO	50 PPM	4
NO <sub>2</sub>	FRESH AIR	0	10 PPM NO <sub>2</sub>	10 PPM	4
NH <sub>3</sub>	FRESH AIR	0	25 PPM NH <sub>3</sub>	25 PPM	2
PH <sub>3</sub>	FRESH AIR	0	0.5 PPM PH <sub>3</sub>	0.5 PPM	1
HCN	FRESH AIR	0	10 PPM HCN	10 PPM	4
**ClO <sub>2</sub>	FRESH AIR	0	2 PPM Cl <sub>2</sub>	0.8 PPM	6
IR CO <sub>2</sub> (10% V)	FRESH AIR	0.03%	2.5% CO <sub>2</sub>	2.50%	2
IR BUTANE (25% V)	FRESH AIR	0	8% BUTANE	8%	2
IR PROPANE (100% V)	FRESH AIR	0	50% PROPANE	50%	2
IR METHANE (100% V)	FRESH AIR	0	50% METHANE	50%	2

Span values can be changed if using different gas cylinders than those listed. Changes can be made using MSA Link software.

\*See Section 5.6.

\*\*For most accurate results, calibration with ClO<sub>2</sub> is recommended.

\*\*\*Zero cal time is one minute if a catalytic combustible or an IR sensor is installed - 30 seconds if not.

## 5.5 Certifications

See instrument label for the certifications that apply to your specific unit.

<b>USA / NRTL (Intrinsic Safety, Non-Mining)</b>	UL913 for Class I, Div. 1, Groups A, B, C and D, Class II, Div. 1, -40°C to +50°C, T4 (See instrument label for additional certification marks.)
<b>Canada / CSA (Intrinsic Safety, Combustible Performance, Non-Mining)</b>	CSA C22.2 No. 157 for Class I, Div. 1, Groups A, B, C and D CSA C22.2 No. 152 M1984 Combustible Performance Tamb = -40°C to +50°C, T4 for Intrinsic Safety Tamb = -20°C to +50°C, T4 for Combustible Performance
<b>European Union / ATEX - FTZU (Intrinsic Safety, Industrial and Mining)</b>	<p>ALTAIR5X (with XCell™ Ex sensor not installed) ATEX I M1 Ex ia I Ma ATEX II 1G Ex ia IIC T3/T4 Ga, Tamb = -40°C to +50°C</p> <p>ALTAIR5X (with XCell™ Ex sensor installed) ATEX I M1 Ex ia I Ma ATEX II 2G Ex d ia mb IIC T3/T4 Gb, Tamb = -40°C to +50°C</p> <p>ALTAIR5XiR ATEX I M2 Ex ia e I Mb ATEX II 2G Ex ia d e mb IIC T4 Gb, Tamb = -40°C to +50°C</p> <p>EN60079-0, EN60079-1, EN60079-7, EN60079-11, EN60079-18, EN60079-26, EN50271</p> <p>CE 0080</p>
<b>IECEx (Intrinsic Safety, Industrial and Mining - TestSafe)</b>	<p>ALTAIR5X (with XCell™ Ex sensor not installed) Ex ia I IP65 Ex ia IIC T4 IP65, Tamb = -40°C to +50°C</p> <p>ALTAIR5X (with XCell™ Ex sensor installed) Ex d ia I IP65 Ex d ia IIC T4 IP65, Tamb = -40°C to +50°C</p> <p>ALTAIR5XiR Ex d ia I IP65 Ex d ia IIC T4 IP65, Tamb = -40°C to +50°C</p> <p>IEC60079-0, IEC60079-1, IEC60079-7, IEC60079-11, IEC60079-18, IEC60079-26</p>
<b>Australia (Intrinsic Safety, Industrial and Mining - TestSafe)</b>	<p>ALTAIR5X / ALTAIR5XiR Ex ia s Zone 0 I IP65 Ex ia s Zone 0 IIC T4 IP65, Tamb = -40°C to +50°C</p> <p>IEC60079-0, IEC60079-1, IEC60079-11, AS-1826</p>