

XCell® Catalytic Combustible Sensor



Technical Data Sheet

The information contained within this document is a supplement to gas monitor user manuals.

PRODUCT SPECIFICATIONS		
APPLICABLE PRODUCT	ULTIMA® X5000 / GENERAL MONITORS S5000	
COMBUSTIBLE GAS SENSOR TYPE	Catalytic Bead	
MATERIAL	316 Stainless Steel	
SENSOR DESIGN	XCell Catalytic Bead with Support Post	
HOT SAFESWAP	Sensor can be changed under power (MSA patent)	
MEASURING RANGES	Default: 0-100% LEL Selectable Full Scale Range: 20-100% LEL	
STANDARD GAS CODE	X5000	S5000
	60 – Methane 5,0 Vol% 61 – Propane 2,1 Vol% 62 – Heptane 1,05% Vol% 63 – Nonane 0,8% Vol% 64 – Hydrogen 4,0% Vol% (ATEX) 65 – Methane 4,4 Vol% (ATEX) 66 – Propane 1,7 Vol% (ATEX) 67 – Heptane 0,85 Vol% (ATEX) 68 – Nonane 0,7 Vol% (ATEX) Other gases : field calibration ⁴	D60 – Methane 5,0 Vol% D61 – Propane 2,1 Vol% D62 – Heptane 1,05% Vol% D63 – Nonane 0,8% Vol% D64 – Hydrogen 4,0% Vol% (ATEX) D65 – Methane 4,4 Vol% (ATEX) D66 – Propane 1,7 Vol% (ATEX) D67 – Heptane 0,85 Vol% (ATEX) D68 – Nonane 0,7 Vol% (ATEX) Other gases : field calibration ⁴
DEFAULT ALARMS SETTINGS	Alarm 1: 10% LEL Alarm 2: 30% LEL	
WARRANTY/SHELF LIFE	3 years	
TYPICAL SENSOR LIFE ²	5 years	
CALIBRATION	For greatest accuracy and zero stability, allow powered sensor 24 hours to acclimate before performing first calibration Frequency: Every 6 months Regulator: 1LPM Zero Gas: Recommended Cylinder Balance: Air	

PERFORMANCE SPECIFICATIONS ¹	
RESPONSE TIME T50	< 10 Sec
RESPONSE TIME T90	< 22 Sec
RESOLUTION	1% LEL
REPEATABILITY	< ±3% LEL
ACCURACY ³	+3% LEL up to 50% LEL +5% LEL > 51% LEL
LINEARITY	< ±2% of measured value
ZERO DRIFT (PER YEAR)	<5% LEL / Year
SPAN DRIFT	<5% LEL / Year
NOISE	1% LEL
WARM-UP TIME	≤ 2 minutes

ENVIRONMENTAL SPECIFICATIONS	
OPERATING TEMPERATURE RANGE	-40°C to +60°C (-40°F to +140°F)
STORAGE TEMPERATURE RANGE	-40°C to +60°C (-40°F to +140°F)
OPERATING HUMIDITY RANGE	10% to 95% r.h. non-condensing

APPROVALS		
CERTIFICATION	CSA, FM, ATEX, IECEx, INMETRO, Marine, CE	
CLASSIFICATION	Zones (Global)	Division (US/CAN)
	Ex db IIC T5 Gb (Class I, Zone 1/Zone2) Ex tb IIIC T85°C Db (Class II, Zone 21)	Class I, Division 1 & 2, Groups A, B, C, D; T5 Class II, Division 1 & 2 Groups E, F, G; Class III; T5
PERFORMANCE	ANSI/ISA/EN EN60079-29-1, CSA 22.2 No 152, FM6320	

¹ All performance values are typical as applied to new sensors in ambient laboratory conditions.

² Individual results may vary based on individual sensor environmental exposure conditions.

³ Does not account for variances in calibration gas accuracy.

⁴ Calibration guide available for field configuration and calibration.

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Why MSA XCell® Catalytic Bead Sensors?

MSA's XCell catalytic bead gas sensors are based on field proven General Monitors sensors. They are well known for their sensitivity, reliability and longevity coming from excellence in mechanical design which is now enhanced through digital signal processing and control.



Design specifics

The catalytic sensor forms one half of a Wheatstone Bridge circuit where the change in resistance of a platinum coil within a catalyst-impregnated ceramic bead indicates the presence of flammable gas. It achieves the measurement by a proportional change in the resistance of the coil as the coil temperature rises. The other arm of the Bridge circuit is part of the control electronics; so it is important that the two arms be carefully matched.



Every component of our catalytic sensors is manufactured in-house to ensure optimum performance. Careful matching of the active and reference elements ("beads") result in a sensor that has negligible zero drift with respect to changes in humidity, pressure and temperature. Consequently this sensor maintains base-line stability over wide temperature range with minimal zero drift.

The key design features, with the corresponding benefits, are summarized below.

Features

- Extra Strong Support Post
- Active Bead Surface Area - significantly larger than industry standard
- Precious Metals Used for All Components Mounted in Teflon Body
- Active and Reference Beads Matched by Size and Resistance
- Teflon Barrier Protects Active and Reference Beads
- Ultra Poison Resistant Active Bead
- Glass Coated Reference Bead

Benefits

- Protects beads from shock and vibration, avoiding damage
- Large signal-to-noise ratio for stable performance and long sensor life
- Functions well in corrosive and aggressive environments
- Eliminates signal drift due to temperature and humidity changes
- Eliminates heat transfer maximizing output signal
- Long sensor life in poisonous atmospheres
- Eliminates open drift due to reference bead detecting gas

Digitalized sensor benefits

All of above benefits come from decades of in-house sensor expertise in designing best-in-class sensors for our customers as well as recent integration of our own custom ASIC to drive XCell sensors.

An ASIC is an acronym for Application Specific Integrated Circuit, which is a custom microchip that contains a set of electronics on a single package. Specifically designed to operate our sensors in an optimal manner provide better performance and environmental compensation.

Using a custom designed set of electronics on an ASIC, MSA is able to match the sensor elements and the electronics to create sensors with lower electrical noise, higher sensitivity and more accurate compensation. Besides being long lasting and durable thanks to mechanical design, the XCell EX sensor is also setting a new standard for performance. The on-board ASIC adjusts and digitizes the signal inside of the sensor. This results in a standard digital output that is more immune to Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI). In addition to this, the control of the integrated ASIC also results in more accurate and stable results over a very wide range of temperatures and humidity.

