ULTIMA® **MOS-5**

Gas Detector

Intelligent Sensor for H$_2$S Gas Detection

Description

The ULTIMA MOS-5 Intelligent Sensor is a micro-processor-based transmitter designed for use with MSA's Metal Oxide Semiconductor (MOS) sensor. This unit features one person calibration and can virtually self-calibrate through activation of a magnetic switch and the application of gas. It is designed to detect hydrogen sulfide in parts per million (ppm) levels and provide status indication and alarm outputs.

All of the ULTIMA MOS-5 Detector electronics are contained within an explosion-proof housing so that sensor information can be processed at the sensor site. It provides a 4–20 mA signal which is proportional to 0 to 100% of the detection range at the sensor. In addition, the ULTIMA MOS-5 Detector includes warning, alarm and fault relay contacts that can be used to indicate an alarm or fault condition, and dual redundant ModBus or HART communications. Configurations with relays, ModBus and HART are available to meet many needs.

The ULTIMA MOS-5 Detector includes a three (3) digit LED display. This local digital display continuously indicates gas concentrations during normal operation and in the calibration check mode, calibration prompts during calibration mode, display codes during the setup mode and eight fault codes.

The ULTIMA MOS-5 Detector has four different operating modes. The first is the normal operating mode in which alarms are active and the display and 4–20 mA readings are proportional to the gas concentration at the sensor. In the second mode, gas check mode, the user can apply a gas and check the sensor response while alarm outputs are inhibited. The third mode, calibration mode, enables gas to be applied to the sensor to calibrate the unit. Finally, a set-up mode allows the user to review or change setup options such as relay settings, sensor range, and ModBus parameters.

Selecting Setup Mode on the ULTIMA MOS-5 Detector is accomplished by using the magnetic switch, HART or ModBus command.

Features & Benefits

- Event logging stores fault, gas check, calibration, and alarm event history
- 4–20 mA output is the industry standard for remote alarm and fault indication
- HART and ModBus communication provides complete status and control capability in the control room
- Detection ranges: 0–20 ppm, 0–50 ppm and 0–100 ppm enable a wide range of applications
- Warning, Alarm & Fault Relays provide local alarm capability
- Calibration, Calibration Check, and Set-up Modes simplify operation and maintenance
- Remaining Sensor Life Indication reduces downtime by providing an estimate of remaining sensor life
- Wireless capability is compatible with ELPRO Technologies wireless devices

Options

- Sensor Range (0–20 ppm, 0–50 ppm, 0–100 ppm)
- Energized/de-energized relays
- Latching/non-latching relays
- Alarm setpoints for relays
- Baud rate, data format, and address for each ModBus channel

Specifications

System Specifications

Sensor Type	Continuous diffusion, adsorption type Metal Oxide Semiconductor (MOS)
Sensor Life	3 to 5 years typical
Repeatability	±2 ppm or 10% of the applied gas, whichever is greater
Response Time	T_{50}: 5–10 seconds (nominal) of full scale with full scale gas applied
Measuring Ranges	0–20 ppm, 0–50 ppm, 0–100 ppm
Modes	Calibration, calibration check, setup
Classification	EEx d IIB+H_2, T5 II2G, IP66 (T_{amb} = −40°C to +70°C) Class I, Division 1, Groups B, C & D; Class I, Zone 1 IIB+H_2 , T6. Type 4X (T_{amb} = −40°C to +60°C)
Warranty	Two years
Approvals	ATEX, CE Marking CSA, FM HART registered SIL 2 and 3 suitable* FM certified to IEC 61508

Mechanical Specifications

Length	161 mm (6.4 inches)
Height	86 mm (3.4 inches)
Width	104 mm (4.1 inches)
Weight	2.5 kg (5.5 lbs.)
Mounting Holes	127 mm (5.0 inches) (center to center)

*   Use in typical environments has a lower safety rating than in clean environments.
** Under HART, current values can be either 3.5 mA or 1.25 mA, depending on user selection.
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Environmental Specifications

Operating Temperature Range	Electronics −40 °C to +75 °C (−40 °F to +167 °F) Std. Sensor (ATEX)−40 °C to +70 °C (−40 °F to +158 °F) Std. Sensor (FM) −40 °C to +75 °C (−40 °F to +167 °F)
Storage Temperature Range	−50°C to 85°C (−58°F to 185°F)
Operating Humidity Range	5% to 100% RH, non-condensing

Electrical Specifications

Input Power	24 VDC nominal, 20 to 36 VDC, 350 mA max.
Analog Signal	0–20 mA (600 Ohms maximum) Malfunction 0 mA** Gas Check/Cal 1.5 mA*** Setup mode 1.5 mA*** Zero reading 4 mA+0.2 mA 0–100% scale 4–20 mA Over-range 20–22 mA
Relay Ratings (optional)	8A @ 250 VAC, 8A @ 30 VDC resistive maximum (3x) SPDT - Warning, Alarm & Fault
RFI/EMI Protection	Complies with EN 50270, EN 61000-3-2, EN 61000-3-3
Status Indicators	Three-digit LED display with gas concentration, Warn and Alarm; LEDs, calibration prompts, fault codes, and setup options
RS-485 Output (optional)	ModBus RTU, suitable for linking up to 128 units or up to 247 units with repeaters
Baud Rate	2400, 4800, 9600, or 19200 bit/s
HART (optional)	HART 6, HART Device Description Language available
Wireless Communication	Available with ELPRO Technologies wireless devices
Fault Monitoring	Calibration error, sensor heater error, low DC supply, EEPROM, EPROM, setup error, gas check time exceeded, switch input error, internal errors
Cable Requirements	3-wire shielded cable. Max. distance between ULTIMA MOS-5 Detector and power source or remote sensor @ 24 VDC nominal (20 Ohm loop): 14 AWG –824 m (2,240 ft.) Max. distance for analog output (600 Ohms max): 14 AWG – 2,400 m (8,000 ft.)

Ordering Information

ULTIMA MOS-5			
Measuring Range	**0–20 ppm**	**0–50 ppm**	**0–100 ppm**
4 –20 mA	MOS5-10131	MOS5-10121	MOS5-10111
4 –20 mA, Dual ModBus, Non-latched Warn, latched Alarm, Energized relays	MOS5-22131	MOS5-22121	MOS5-22111
4 –20 mA, HART	MOS5-50131	MOS5-50121	MOS5-50111
4 –20 mA, Dual ModBus, Non-latched Warn, latched Alarm, Energized relays, HART	MOS5-62131	MOS5-62121	MOS5-62111

Subject to change without notice
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For contact details of your local MSA affiliate, please visit our website.

MSAsafety.com/detection