MSA PrimaX™ Series Gas Monitor Specification

PRODUCT SPECIFICATION

1 This specification details MSA PrimaX Series Gas Monitors attributes and operating characteristics. The following table can be used to identify and document gas sensing requirements:

Gas Type	Range/ Full Scale	No. of Points	PrimaX I (IS or GP)	PrimaX P (XP)	HART	Relays	Isolated Output
Ammonia (NH_3)	0-100 PPM						
Ammonia (NH_3)	0-500 PPM						
Carbon Monoxide (CO)	0-200 PPM						
Chlorine (Cl_2)	0-50 PPM						
Combustible Gas	0-100% LEL						
Hydrogen (H_2)	0-1000 PPM						
Hydrogen Chloride (HCL)	0-30 PPM						
Hydrogen Cyanide (HCN)	0-30 PPM						
Hydrogen Sulfide (H_2S)	0-50 PPM						
Nitric Oxide (NO)	0-100 PPM						
Nitrogen Dioxide (NO_2)	10PPM						
Oxygen (O_2)	0-25%						
Sulfur Dioxide (SO_2)	0-50 PPM						

1.1. PrimaX I Gas Monitor Intrinsically-Safe Version

Gas Type	**Ranges**
Oxygen	0-25% Vol.
Carbon monoxide (CO)	200 ppm
Hydrogen sulfide (H_2S)	50 ppm
Sulfur dioxide (SO_2)	50 ppm
Chlorine (Cl_2)	50 ppm
Ammonia (NH_3)	100 & 500 ppm
Nitrogen dioxide (NO_2)	10 ppm
Hydrogen cyanide (HCN)	30 ppm
Hydrogen chloride (HCl)	30 ppm
Nitric oxide (NO)	100 ppm
Hydrogen (H_2)	1000 ppm

1.2. PrimaX P Gas Monitor Explosion-proof Version

Gas Type	Ranges
Combustible	0-100%LEL
Oxygen	0-25% Vol.
Carbon monoxide (CO)	200 ppm
Hydrogen sulfide (H_2S)	50 ppm
Sulfur dioxide (SO_2)	50 ppm
Chlorine (Cl_2)	50 ppm
Ammonia (NH_3)	100, 500 ppm
Nitrogen dioxide (NO_2)	10 ppm
Hydrogen cyanide (HCN)	30 ppm
Hydrogen chloride (HCl)	30 ppm
Nitric oxide (NO)	100 ppm
Hydrogen (H_2)	1000 ppm

2 PrimaX Series Gas Monitors consist of series models XI and XP. The PrimaX I Gas Monitor is contained in an anti-static reinforced nylon, intrinsically safe, general purpose enclosure. PrimaX P Gas Monitor is contained in a powder-coated aluminum explosion-proof enclosure. Both models have common electronics, software and optional features.

3 Gas Monitor Requirements
    3.1. Catalytic Bead-Type Combustible Gas Monitor
        3.1.1. Catalytic bead-type combustible sensor must have demonstrated resistance to degradation of silicones and reduced sulfur gases.
        3.1.2. Catalytic combustible sensor shall detect for an above 100% LEL condition (over-range). This condition must be indicated on LCD front panel.
    3.2. Electrochemical (toxic and oxygen) Sensors
        3.2.1. Electrochemical sensor shall not require periodic reagent addition.
    3.3. Gas Monitor Operating Requirements
        3.3.1. Operating voltage - gas monitor can operate between 10-28 VDC.
        3.3.2. Gas monitor shall require the following wiring configurations:
        3.3.3. One 2-wire cable for electrochemical (toxic and oxygen sensors) units configured without relay option.
        3.3.4. 3-wire cable for electrochemical (toxic and oxygen sensors) units configured with or without relay option.
        3.3.5. 3-wire cable for all combustible units (configured with or without relay option).
        4-wire isolated output option is to be available on explosion-proof product.
        3.3.6. Gas monitor setup and startup will be so that enclosures need not be opened during this process.
        3.3.7. Gas monitor shall be factory calibrated, ready for use out-of-box. A gas check is all that is required to ensure proper operation.
        3.3.8. Gas monitor shall contain no pots, jumpers or switches.
        3.3.9. Gas monitor output signal shall be 4 to 20mA with HART (Highway Addressable Remote Transducer) option. Combustible sensor version will be of sourcing signal type capable of operating into 300-ohm load. Toxic gas or oxygen sensor versions will operate on 2-wire or 3-wire current loop.
    3.4. Gas Monitor Display
        3.4.1. There will be a local liquid crystal display indicating concentration of gas present. Display will be integral part of gas monitor enclosure. Display will be visible from minimum of 5 feet, will be present always, and will not require being turned on or off.
        3.4.2. Gas monitor display shall indicate all diagnostic check/fault conditions with message detailing present condition.
        3.4.3. Gas monitor will display 2 alarm levels. Alarm levels will be adjustable by means of pushbutton keypad or HART hand-held communicator.
    3.5. Smart Sensor Technology
        3.5.1. Sensors shall be contained in sensor modules mounted external to main enclosure.

3.5.2. Transmitter shall store all calibration data so that module may be calibrated off-site and field-installed without recalibration necessity. Sensor module shall not require battery or power source to store this data.

3.6. Relay Option
3.6.1. Explosion-proof gas monitor shall have LEDs viewable from 50-ft minimum. LEDs shall operate as follows:
      Red – alarm condition
      Yellow – fault condition
      Green – normal operation
3.6.2. Gas monitor shall have option for 2 relays. Relays shall be rated at 2 amp @ 30VDC, single-pole, single-throw, and consist of 1 alarm level and 1 for fault. All relay contact activation will be monitored. If relay cannot activate for any reason, fault relay will change state. All relays shall be field-selectable through keypad or HART hand-held communicator. Selectable features include:
3.6.2.1. Alarm level
3.6.2.2. Latching/non-latching
3.6.2.3. Upscale/downscale
3.6.2.4. Normally-opened/normally-closed
3.6.2.5. Energized/de-energized
3.7. Other Features
3.7.1. Gas monitor shall allow for full-range scaling of 4-20mA output signal.
3.8. Sensing Element Warranty
3.8.1. All electrochemical and catalytic bead sensing elements (sensors) will have minimum useful life of 1 year. Supplier will provide replacement sensors at no charge for any sensor that does not meet minimum requirement.

4 Sensor Enclosure Parameters
4.1. General-purpose gas monitor
4.1.1. Sensor/transmitter will be within plastic enclosure designed to meet IP66 requirements.
4.2. Explosion-proof gas monitor
4.2.1. Sensor/transmitter will be within powder-coated enclosure suitable for location in Class I, Division 1 & 2, Groups B, C & D classified areas.
4.2.2. Enclosure shall offer means to mount without using entryway.
4.2.3. Sensor/transmitter readout portion shall display present gas concentration. Display will be visible from minimum 5 feet and will be present at all times. Display will not be required to be turned on or off. Readout will be liquid crystal display (LCD).

5 Installation and Mounting Hardware
5.1. Detachable back plate shall be used to mount sensor/transmitter to wall or similar structure.
5.2. Optional pipe mount shall be product option.

6 Approvals
6.1. General-purpose monitor shall have CE approval.
6.2. Explosion-proof monitor shall have Class I, Division 1 & 2, Groups B, C, and D; Class II, Division 1, Groups F & G; Class III approval.
6.2.1. Toxic, oxygen and catalytic combustible gas monitors shall be certified to SIL requirements as per IEC 61508. Random Integrity SIL 2 @ HFT=0.

7 Non-intrusive Calibration Capability
7.1. All sensor/transmitters can be calibrated without opening any enclosures.
7.2. By means of 4-button keypad or HART hand-held communicator, sensor/transmitter will enter calibration mode. Sensor/transmitter display will instruct users as to when to apply zero and span gas. Sensor/transmitter will automatically adjust internal settings to proper calibration values without further user intervention. Upon successful calibration completion, sensor

transmitter will exit calibration mode. If calibration is unsuccessful for any reason, display must show unsuccessful calibration attempt and revert to previous calibration settings.

    7.3. Use of flashlight-type devices, magnets, or clamp-on devices to achieve calibration is not acceptable.

8   **Manufacturer Capability Requirements -** As minimum, gas monitoring equipment manufacturer must meet the following requirements.

    8.1. Manufacturer must be capable of supplying all equipment used to check or calibrate gas monitor units.

    8.2. Manufacturer must be capable of providing on-site service with factory trained personnel.

    8.3. Manufacturer must be capable of providing on-site training for owner/operator.

9   **Sensor/transmitter shall be MSA PrimaX Series Gas Monitor or equal.**