Operating Manual Addendum

SMC 4501-5100 Models

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WARNING!

Read this manual carefully before using or maintaining the device. The device will perform as designed only if it is used and maintained in accordance with the manufacturer's instructions. Otherwise, it could fail to perform as designed, and persons who rely on this device could sustain serious injury or death.

Use only genuine MSA replacement parts when performing any maintenance procedures provided in this manual. Failure to do so may seriously impair sensor and gas monitoring performance, alter flameproof/explosion proof characteristics or void agency approvals.

Failure to follow this warning can result in serious personal injury or death.

NOTICE

Information in this manual is supplemental to the full product manuals, please read and understand the full user manual for the relevant product noted below:

5100-XX-IT Toxic Gas Detector Module Manual T12020

4501-XX Toxic Gas Sensor Module Manual T13022

5100-28-IT Infrared Combustible Gas Sensor Module Manual T12013

5100-02-IT Combustible Gas Sensor Module Manual T12019

Manufacture: MSA THE SAFETY COMPANY

Address: 1000 Cranberry Woods Drive, Cranberry Township, PA 16066 USA

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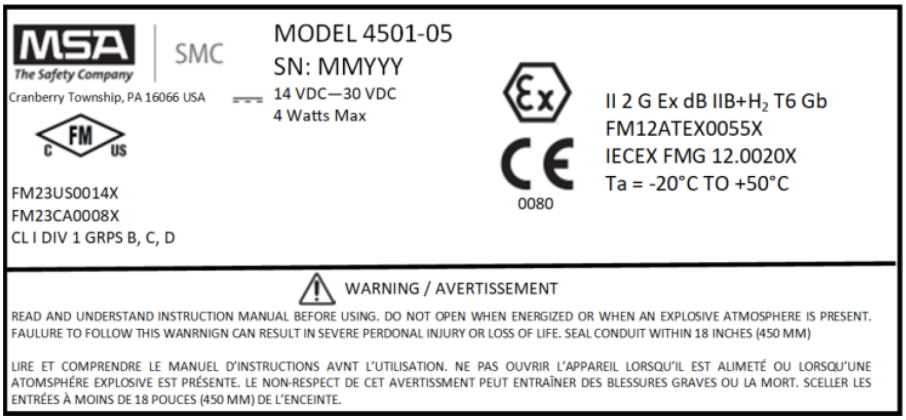
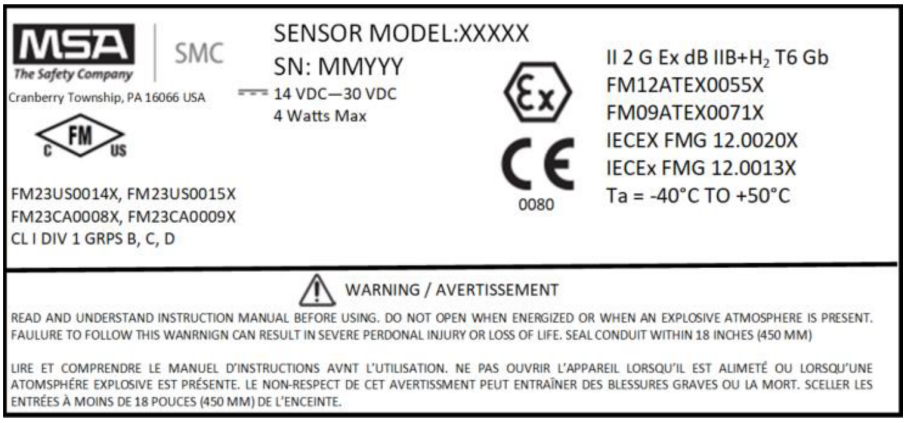
1.1 4501 Approval Marking Information

Transmitter Label

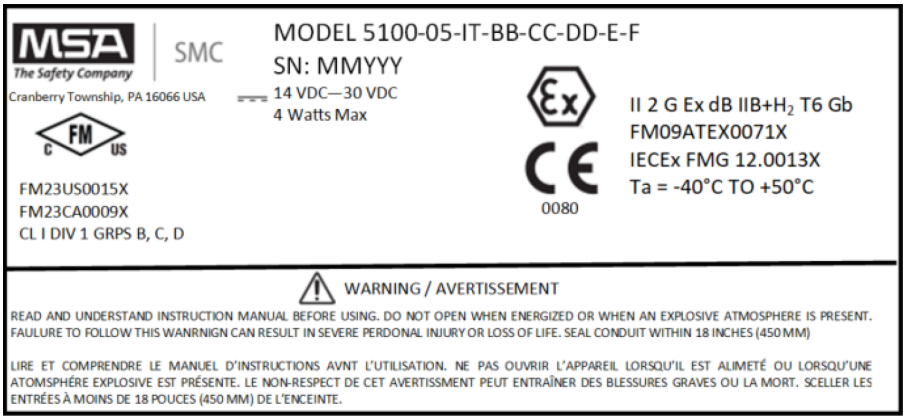


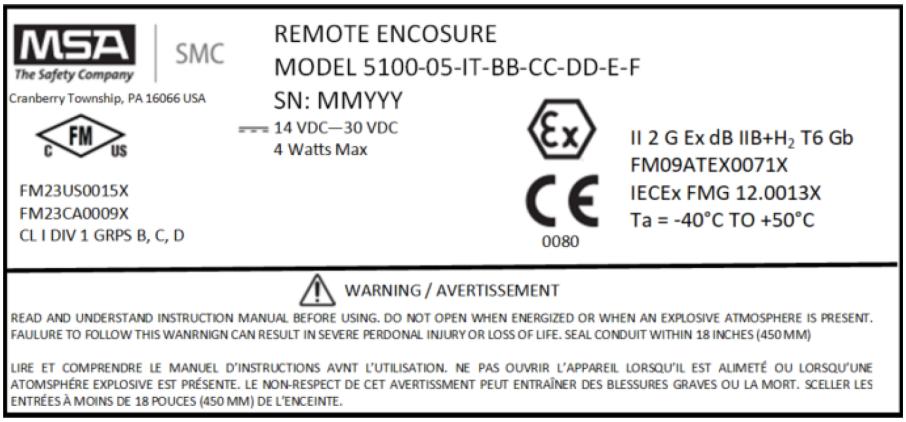
Sensor Label



1.2 5100-05 Approval Marking Information

Transmitter and Remote Enclosure Marking





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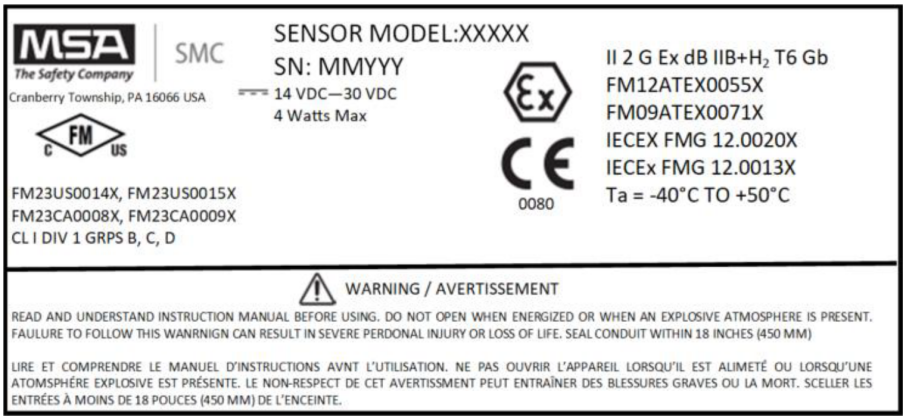
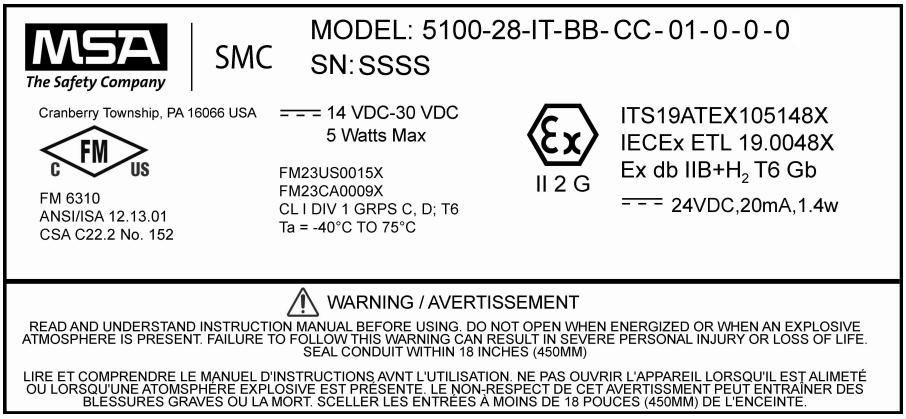
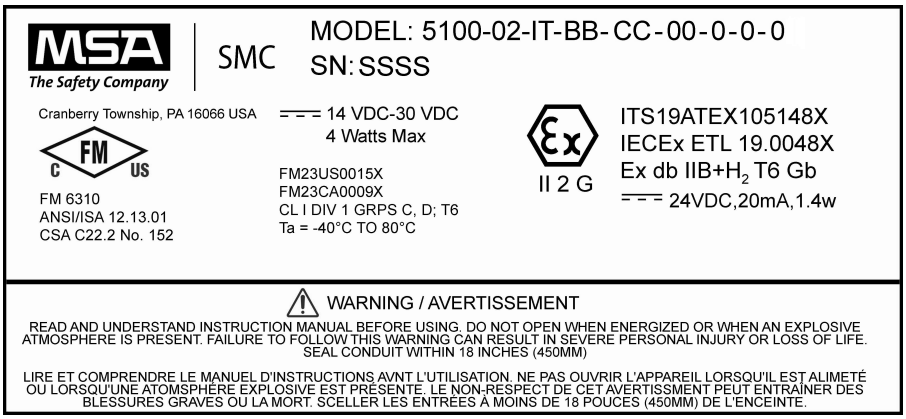


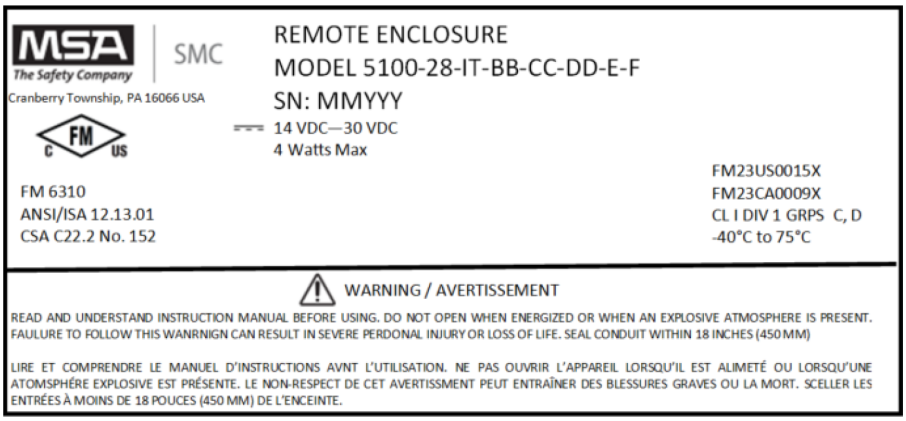
1.3 5100-02 and 5100-28 Approval Marking Information

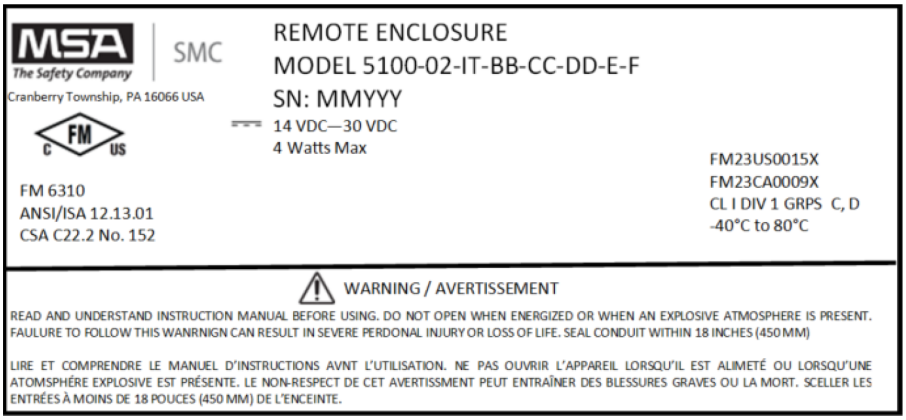
Transmitter and Enclosure Marking



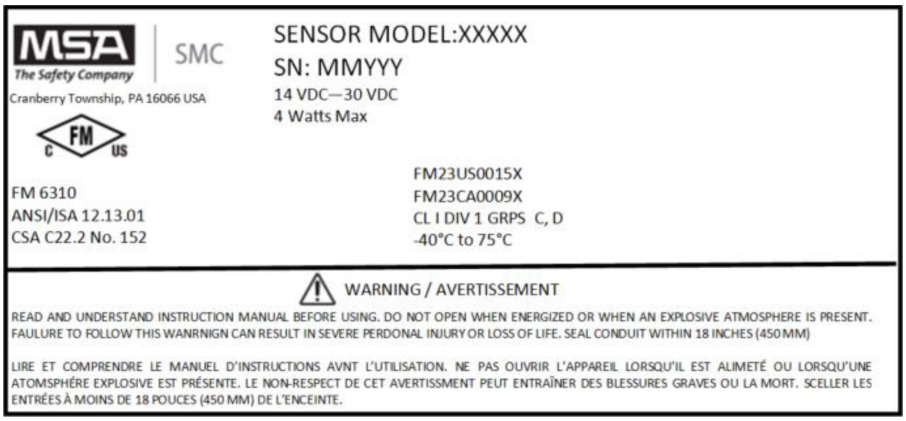


Remote Enclosure Marking





Sensor Marking



2 Product Overview

2.1 Intended Use of the Equipment

The 4501 and 5100 models of gas detectors are gas monitors for measuring toxic gases. Using sensors, the device tests the ambient air and provides a 4-20 mA signal corresponding to the concentration of gas and can be used to trigger alarm as soon as the gas exceeds a specific concentration level.

For technical support please contact MSA Safety at 1-800-672-4678 or at 1000 Cranberry Woods Drive Cranberry Township, PA 16066.

2.2 Technical Specification

Model 5100-02-IT

Accuracy: +/- 3% for 0-100% LEL range

Response Time: T90 < 17.9 sec.

Input voltage: 24 VDC nominal: 10-30VDC

Ambient Temperature Range: -4°F to 140°F (-20°C to +60°C)

Storage Temperature: -4°F to 140°F (-20°C to +60°C)

Relative Humidity: 0-99% (Non-condensing)

Firmware Version: 3.08bA

Model 5100-28-IT

Accuracy: +/- 3% for 0-100% LEL range

Response Time: T90<17.9 sec.

Input voltage: 24 VDC nominal: 10-30VDC

Ambient Temperature Range: -4°F to 140°F (-20°C to +60°C)

Storage Temperature: -4°F to 140°F (-20°C to +60°C)

Relative Humidity: 0-99% (Non-condensing)

Firmware Version: 3.08bA

Model 5100-05-IT

Accuracy: +/- 3 PPM for 0-100 PPM LEL range

Response Time: T90 < 44 sec.

Input voltage: 24 VDC nominal: 10-30VDC

Ambient Temperature Range: -4°F to 140°F (-20°C to +60°

Storage Temperature: -4°F to 140°F (-20°C to +60°C)

Relative Humidity: 0-99% (Non-condensing)

Firmware Version: 3.08bA

Model 4501-05

Model 4501-05 Hydrogen Sulfide

Accuracy: +/- 3 PPM for 0-100 PPM H2S range

Response Time: T90 < 44 sec.

Input voltage: 24VDC nominal: 10-30VDC

Ambient Temperature Range: -4°F to 140°F (-20°C to +60°C)

Storage Temperature: -4°F to 140°F (-20°C to +60°C)

Relative Humidity: 0-99% (Non-condensing)

Firmware Version: 3.08bA

3 Installation

3.1 General Installation Instructions

NOTE: Review the full user manual for complete installation instructions.

The gas sensor module utilizes a diffusion type sensor which should be located close to either the expected source or destination of the gas hazard. If the gas is heavier than air, the sensor module should be installed within 24 inches of the ground or floor. If it is lighter than air, move it above 6’.

After optimum locations are determined based on the above recommendations, consideration should be given to placing the sensor modules in locations which are accessible for calibration service. Slight adjustments to the location of the sensor module may have little impact on effectiveness but major effect on accessibility.

- Modules should be placed in areas accessible for calibration.
- The cover should face out from the wall for easy access.
- Protect the device from extreme vibration.
- Sensors should be pointed down and the conduit should include an inverse trap to reduce moisture (condensation) from accumulating in the electronics enclosure. (Conduit seal fitting within 18" for hazardous areas).

3.2 Enclosure Installation Instructions

To protect the transmitter and sensor assembly they should be removed from the enclosure and preserved until final installation and wiring termination.

Prior to installation and wiring:

1. Remove the transmitter from the module housing.
    a. Unscrew the two captive panel screws on the faceplate.
    b. Lift the transmitter out of the enclosure.
    c. Unplug the sensor cable from transmitter connector.
    d. Remove the sensor assembly from the enclosure hub.
2. Install the module enclosure onto the end of the supply conduit and/or bolt into position as required.
3. For Class 1 Division 1 installations, a proper Explosion-proof seal fitting must be installed, withing 18" of the detector.

NOTE: When enclosure earth grounding is required for the installation a grounding lug is located in the base of the enclosure. Install the earth ground under the green ground screw.

3.3 Wiring Installation Information

WARNING!

- Before wiring the product, disconnect the power source supplying the transmitter and ensure no hazardous atmosphere present; otherwise, electrical shock or ignition of a hazardous atmosphere could occur.
- Install wiring in accordance with the electrical code of the country in use, the local authority having jurisdiction and these installation instructions, as applicable.
- Do not make any connections to main board or junction box input, output, and relay connections while under power. Making connections under power could lead to electrical shock or ignition of a hazardous atmosphere.
- Ensure that water and dirt are not able to enter the unit via the wire or conduit. If the unit is installed in a location known to be wet or damp, it is good practice to loop or bend the entry into the unit that prevents water incursion.
- The internal grounding terminal located in the base of the transmitter enclosure must be used for equipment grounding. The external grounding terminal is only to be used as a supplemental bonding connection where local authorities permit or require such a connection.
- Wire should be 18 AWG minimum at a maximum distance is 5,000 feet. Install conduit as required by local code or construction specifications.

3.3.1 Power Requirements

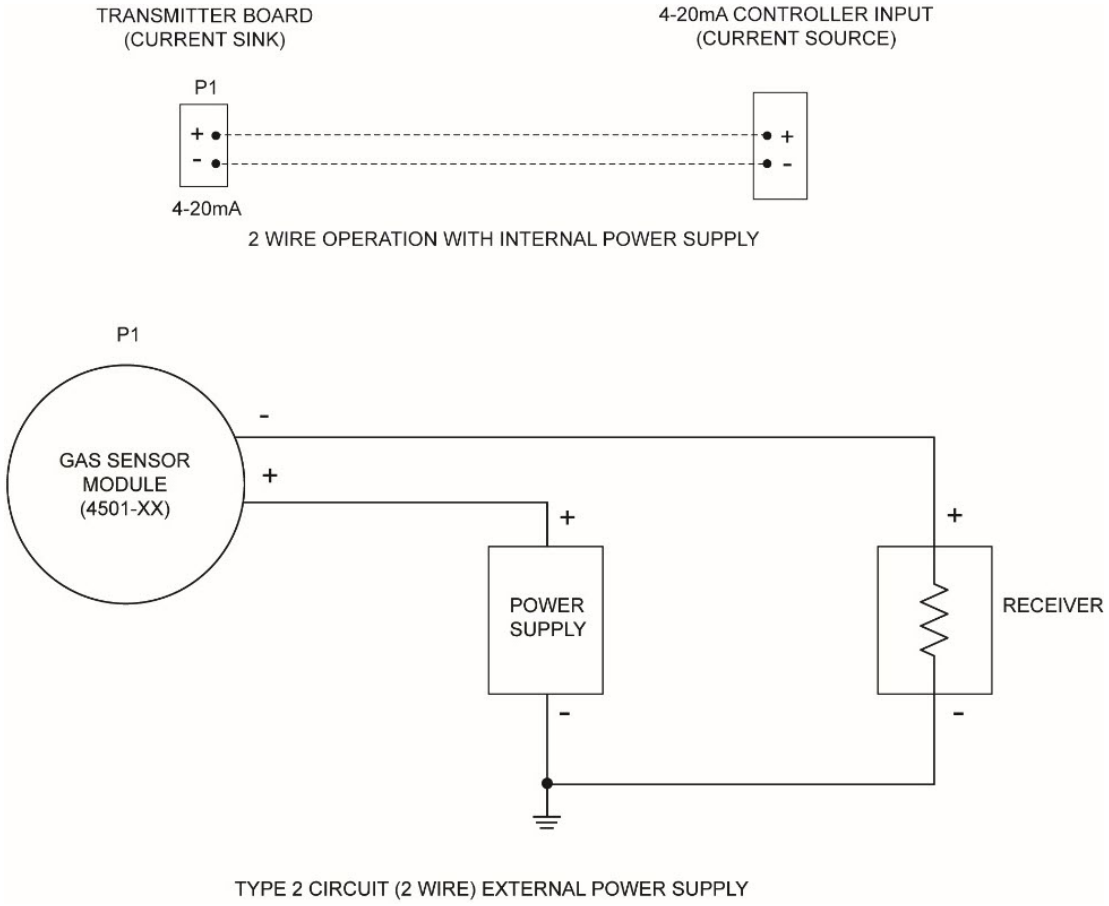
The 4501 and 5100 models are powered with a 14 to 30 VDC separately supply, power consumption is 2 Watts max. Use a minimum of 18 AWG twisted/shielded pair cable.

Specific versions of 5100 model have optional low voltage relays for Trouble, Alarm, and Warning. The relays are 5-30 VDC 2 Amp non inductive limit. Read the full product manual for full information on the use and set up of optional relays.

NOTE: For model 5100-05-IT-A1-02, 5100-05-IT-A2-02, 5100-05-IT-S1-02, and 5100-05-IT-S2-02 with optional relays, the performance of the relay has not been included in the performance approval and may not be used for safety critical functions.

Review the wiring diagrams below for intended model installation.

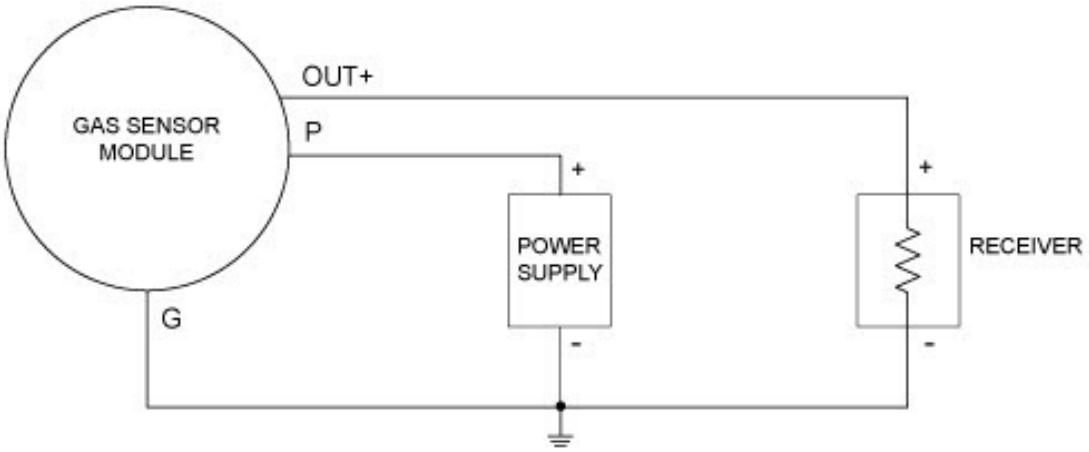
3.3.2 4501 Wiring Diagram



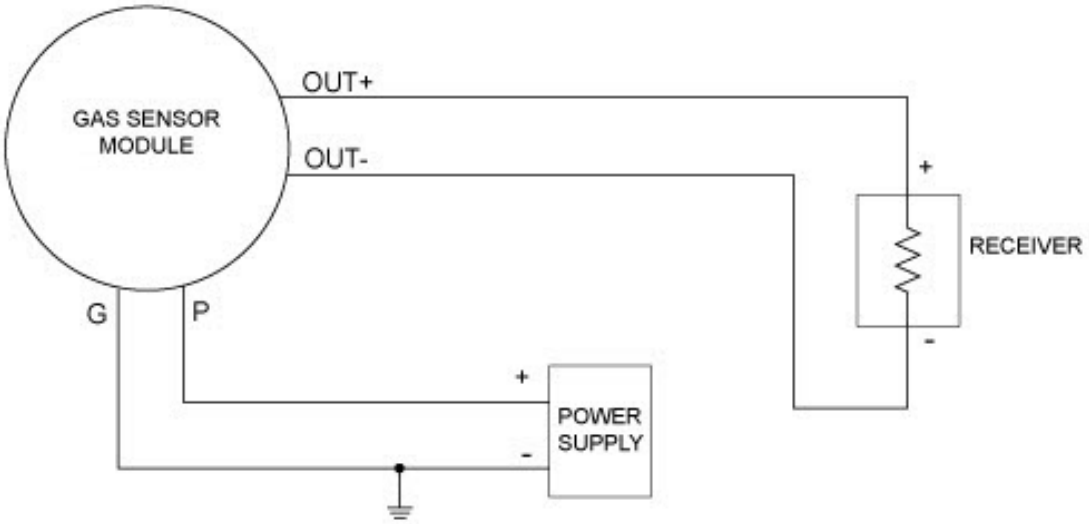
TYPE 2 CIRCUIT (2 WIRE) EXTERNAL POWER SUPPLY

3.3.3 5100 Wiring Diagram

TYPE 3 CIRCUIT (3 WIRE NON-ISOLATED)



TYPE 4 CIRCUIT (4 WIRE ISOLATED)



4 Operation

4.1 Use and Set up

NOTE: Review the full user manual noted on page 2 for full use and set up information.

4.1.1 Environmental Considerations

Review approval marking above and ensure that the intended product meets the requirements for the area that the 4501 products will be installed.

NOTE: Review certificates for full list of approval standards which are approved with the 4501 models as needed.

- Product can be used indoors or outdoors
- Product must be installed at altitudes below 2000 meters
- Overvoltage category II equipment
- Equipment can be installed in wet locations
- Pollution Degree II

Ambient Temperature Limits

4501-05: -20°C to +50°C

5100-05-IT: -40°C to +50°C

5100-02-IT: -40°C to +80°C

5100-28-IT: -40°C to +75°C

Relative Humidity Limits

4501-05: 15 – 90 %

5100-05-IT: 15 – 90 %

5100-02-IT: 15 – 90 %

5100-28-IT: 15 – 90 %

Pressure Limits

4501-05: 86 kPa – 108 kPa

5100-05-IT: 86 kPa – 108 kPa

5100-02-IT: 86 kPa – 108 kPa

5100-28-IT: 86 kPa – 108 kPa

4.1.2 Maintenance

NOTE: Review the full user manual for complete installation instructions.

4.1.2.1 Cleaning

When required use a damp cloth, ensure that the frit on sensor housing is not blocked and free of dirt.

4.1.2.2 Calibration

Calibration is required after first installation and when prompted by the transmitter. Review the full user manual for full sensor calibration procedures and frequency.

4.1.2.3 Troubleshooting

Trouble codes are listed in the full user manual, see list on page 2 of this manual for the specific manual required.

4.1.3 Repair

WARNING!

Use only genuine MSA replacement parts when performing any maintenance procedures provided in this manual. Failure to do so may seriously impair sensor and gas monitoring performance, alter flame-proof/explosionproof characteristics or void agency approvals. Failure to follow this warning could cause the product to fail to perform as designed and persons who rely on this product for their safety could sustain serious personal injury or loss of life.

Repair or alteration of the 4501 or 5100 Gas Monitor, beyond the scope of the maintenance procedures provided in this manual or by anyone other than authorized MSA service personnel, could cause the product to fail to perform as designed and persons who rely on this product for their safety could sustain serious personal injury or loss of life.

4.1.3.1 Replacement Parts

See full user manual for replacement parts when required.

5 Specifications

NOTE: Read and understand local installation codes and requirements including IEC 60079-29-2.

5.1 Measuring Gas

H2S selectable ranges:

0-10 PPM

0-50 PPM

0-100 PPM

5.2 Cross Sensitivity

Review the specific user manual for the intended model for a full list of gases which may affect the sensor.

5.3 Time of Response

4501-05: t(90) < 44 Seconds

5100-05-IT: t(90) < 44 Seconds

5100-02-IT: t(90) < 25 Seconds

5100-28-IT: t(90) < 12 Seconds

5.4 Warmup Time

4501-05: 60 Seconds

5100-05-IT: 60 Seconds

5100-02-IT: 5 to 10 Minutes

5100-28-IT: 5 to 10 Minutes

5.5 Test Gas and Calibration Time

Read specific user manual for a list of calibration gases and concentrations and full calibration procedures for the specific model.

Apply calibration gas for at least 3 minutes before proceeding to the next step in the calibration process.

5.6 Electro-Magnetic Compatibility

Use shielded cable such as Alpha wire 1454 or equivalent and bond shielding to metallic enclosure.

6 Specific Conditions of Use

- Do not open the enclosure in the presence of an explosive atmosphere.
- Cable to be used for installation is to be selected with a temperature rating of greater than 77 °F (25 °C) above the maximum ambient temperature. The metric cable entries are fitted with an internal stop. This will result in threads of the cable gland being visible. Do not over tighten.
- This equipment is certified and intended for use in potentially hazardous areas. Install and use the equipment in accordance with the latest regulations. The end user shall close any unused entries using suitably certified blanking elements to maintain the housing's type of protection.
- The equipment is not intended to be repaired by the user. Repair of this equipment shall be carried out by the manufacturer in accordance with the applicable code of practice.
- Consult the original manufacturer for information on the dimensions of the flameproof joints.
- The flame paths are not intended for repair. Contact the manufacturer if the flame paths are damaged.
- Appropriate certified cable glands for direct entry must be used.
- The external earthing connection consists of cable lug with a stainless-steel screw, the terminals is suitable for connection of a wire of at least 4mm2 / 12 AWG.
- The internal terminals are suitable for connection of a wire equal to or greater than the power input wiring and at a minimum of 1mm2 / 17 AWG conductor.