Reference Manual
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SC310 Catalytic Bead Combustible Sensor

EMERSON
Process Management

Important Instructions

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⚠WARNING

Installing, operating or maintaining a Net Safety Product improperly could lead to serious injury or death from explosion or exposure to dangerous substances. Comply with all information on the product, in this manual, and in any local and national codes that apply to the product. Do not allow untrained personnel to work with this product. Use Net Safety parts and work procedures specified in this manual.

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Contents

Section 1: Introduction

1.1 Models covered

The SC310 catalytic bead combustible gas sensor is designed specifically for use with the Millennium II Transmitter (models M21, M22, or M2B). This sensor is both versatile and reliable for fast, accurate, and continuous monitoring of gases in extreme environments.

The sensor assembly consists of an explosion proof enclosure (housing) rated for hazardous locations and a replaceable sensor module. This sensor must only be used with a Millennium II series transmitter. If the sensor is connected to any other model of transmitter, it will not function and may result in the sensor or transmitter being damaged.

1.2 Service support

Technical support for this product can be provided by contacting your local Emerson Process Management representative or by contacting the Technical Support department at +1 866 347 3427 (toll free) or Safety.CSC@Emerson.com.

1.3 Return of material

To expedite the return of this product, proper communication between the customer and the factory is important. Before returning a product, call +1 866 347 3427 (toll free) or e-mail Safety.CSC@Emerson.com for a Return Material Authorization (RMA) number.

On the return of the equipment, include the following information:

1. RMA number provided to you by Rosemount
2. Company name and contact information
3. Ship all equipment, prepaid to:
   Rosemount
   6021 Innovation Boulevard
   Shakopee, MN 55379
4. Mark all packages with the **RMA number** and type of return (e.g. return for evaluation**)**

Pack items to protect them from damage and use anti-static bags or aluminum-backed cardboard as protection from electrostatic damage.

All equipment must be shipped prepaid. Collect shipments will not be accepted.

1.4 Product recycling/disposal

Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislations/regulations.

Section 2: Installation

2.1 Unpacking and inspection

Carefully remove all of the components from the packaging and verify them against the enclosed packing list. Inspect all components for any obvious damage such as broken or loose parts. If you find any components missing or damaged, notify your local Emerson Process Management representative or the factory immediately.

Recycling of packaging should be taken into consideration and disposed of in accordance with local and national legislations/regulations.

2.2 Locate sensor

Prior to installing the sensor, a plan should be developed for placement of the sensor. Although there are no absolute rules for determining the quantity of detectors or location of a sensor, the following points should be considered when planning the installation.

- Carefully locate the sensor in an area where gases may potentially accumulate, considering that light gases tend to rise and heavy gases tend to fall and accumulate in low areas.
- Use redundant systems to enhance protection and reliability.
- Consider air movement patterns in the facility.
- Consider the construction of the facility such as trenches where heavy gases or peaks where light gases may accumulate.
- Seek advice from experts knowledgeable about the target gas to be detected.
- Refer to the regulatory publications that discuss guidelines for your industry.

⚠WARNING

Avoid placing the sensor where it may be exposed to splashing or direct water sprays. To protect the sensor a splashguard may be required.

2.3 Direct mount or sensor separation

2.3.1 Sensor direct mount

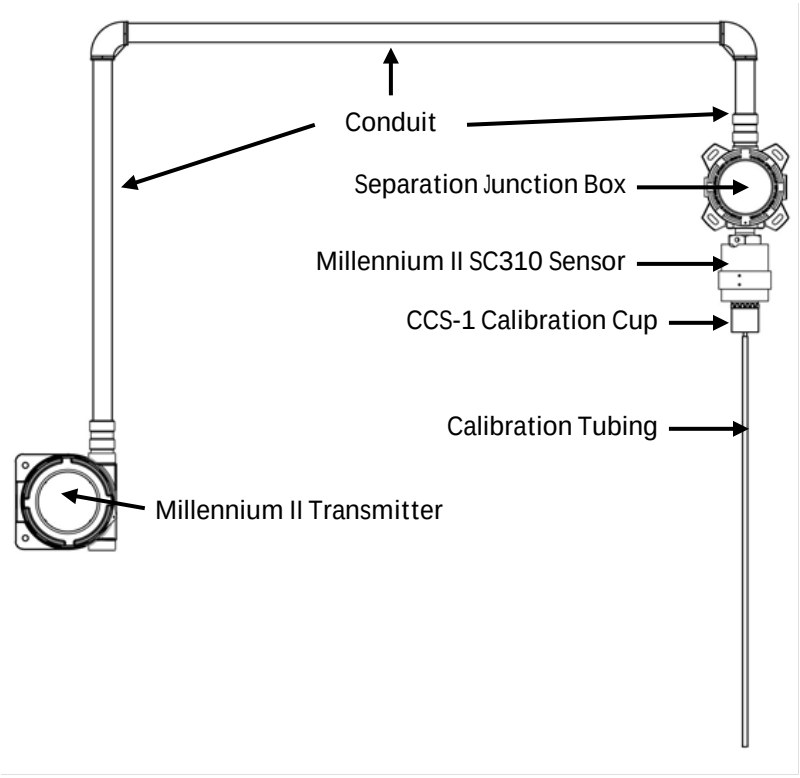
The sensor can be directly attached to a Millennium II transmitter and placed in an appropriate location for detecting the target gas, or the sensor can be separated and remotely mounted away from the Millennium II transmitter. The sensor should be accessible for calibration and maintenance purposes. The transmitter should be located where it is accessible and visible.

2.3.2 Sensor separation

If the sensor is to be remotely mounted from the transmitter, the sensor must be connected to a certified junction box. In this case, the transmitter is typically located near eye-level for easy access and the sensor is mounted where the gas is likely to accumulate.

In order to ease the calibration process a calibration cup (CCS-1) can be attached to the bottom of the sensor housing and calibration tubing run from the calibration cup to a convenient place for applying the calibration gas, eliminating the need to access the sensor directly. In this case, to compensate for the effect of distance, consider decreasing the calibration tubing length to some length where the end of the tubing to the gas canister is still accessible or increase the calibration gas flow rate between the calibration gas cylinder and sensor. Refer to Figure 2-1 for an example of the sensor separation. For tubing lengths less than 10 feet (3 meters), use a 0.5 LPM regulator and for lengths greater than 10 feet (3 meters) use a 1.0 LPM regulator. On initial install, always confirm readings directly at the transmitter by applying a known gas concentration to the sensor and compare the output from the transmitter. Readings should be accurate to the gas concentration applied taking into account the sensor accuracy specifications in Section 7.1.2.

Figure 2-1 Sensor separation example



2.4 Dimensions

The following tables outline the dimensions of the sensor when connected to either the Millennium II Transmitter (Figure 2-2) or the Millennium II Basic Transmitter/Junction Box (Figure 2-3). Both the transmitter and sensor enclosures are offered in stainless steel and aluminum.

Figure 2-2 Millennium II (M21 or M22) enclosure and sensor dimensions

	A		B		C		D		E		F		G		H	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Stainless Steel	5.9	150	5.1	130	4.6	117	8.9	226	6.0	152	5.8	147	2.6	66	2.9	74
Aluminum	6.3	160	5.6	142	5.4	137	9.7	246	6.0	152	5.7	145	2.6	66	2.9	74

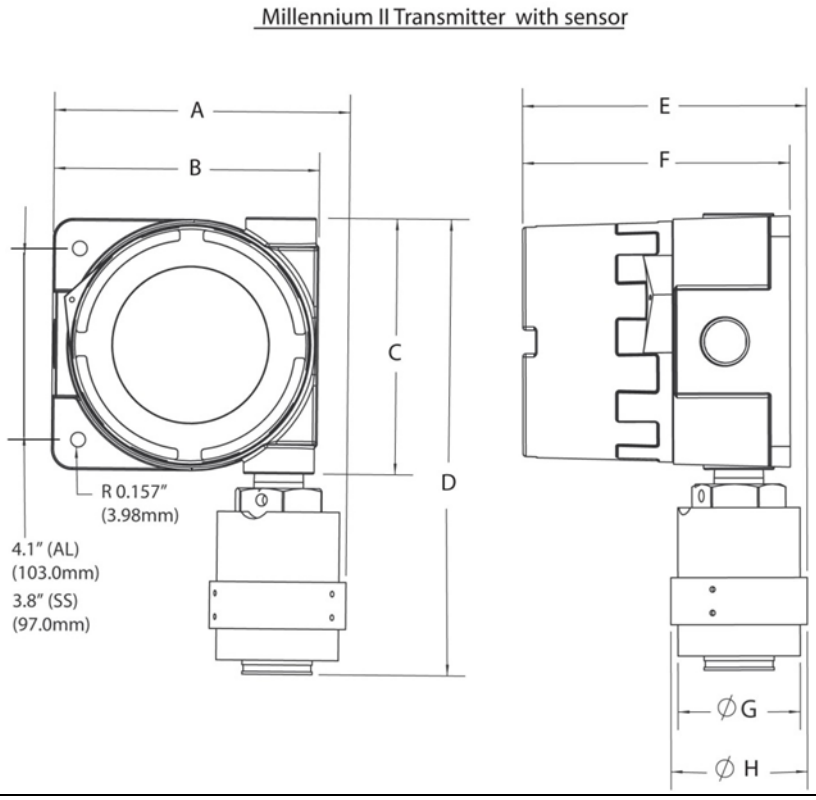
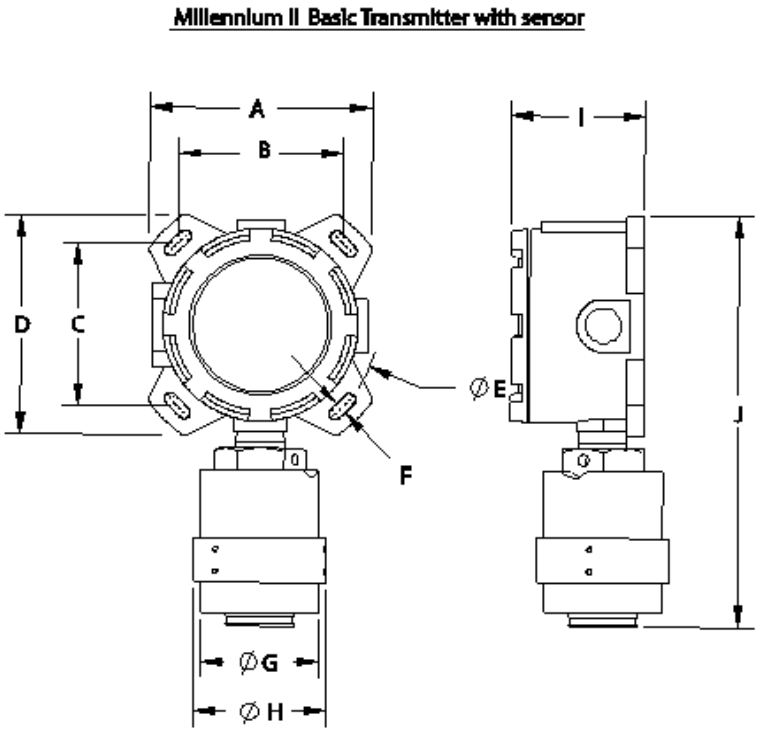


Figure 2-3 Millennium II Basic (M2B) or junction box (JB) enclosure and sensor dimensions

	A		B		C		D		E		F		G		H		I		J	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	In	mm	in	mm	in	mm
Stainless Steel	4.7	119	3.6	91	3.6	91	4.7	119	5.1	130	0.3	7.6	2.6	66	2.9	74	2.8	71	8.9	226
Aluminum	4.8	122	3.6	91	3.6	91	4.8	122	5.1	130	0.3	7.6	2.6	66	2.9	74	3.0	76	9.0	229



2.5 Mounting

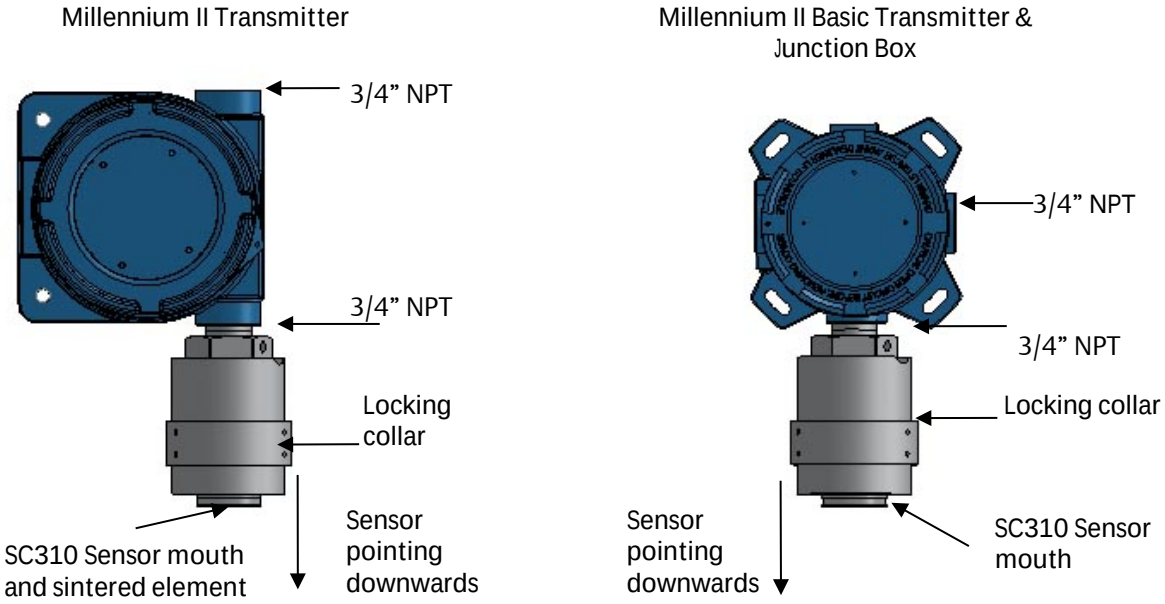
Prior to mounting the sensor to the transmitter or junction box enclosure apply suitable silicone-free lubricant to the threading of the 3/4" FNPT (female NPT) conduit entry of the enclosure as well as the threading on the sensor 3/4" MNPT (male NPT) fitting. This aids in protecting the enclosures from water ingress. After the lubricant has been applied properly, fit and tighten the sensor to the transmitter or junction box enclosure by using appropriate tools.

The transmitter and junction box have mounting holes to allow mounting to a flat surface or pole as desired. Mounting kit accessories are available to aid in mounting the detector to a flat surface or a pole. Contact your local Emerson Process Management representative for detailed information.

NOTICE

The sensor must always be mounted vertically such that its mouth is pointed in the downward position as shown in Figure 2-4.

Figure 2-4 SC310 Sensor mounted to Millennium II series transmitters



2.6 Wiring

2.6.1 Field installation

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury. Ensure that only qualified personnel perform the installation.

Electrical shock could cause death or serious injury. Use extreme caution when making contact with the leads and terminals.

Do not open the transmitter, sensor, or junction box enclosure when in a classified area or when an explosive atmosphere may be present unless the power to the transmitter and sensor has been removed.

NOTICE

Wiring codes and regulations may vary. Wiring must comply with all applicable regulations relating to the installation of electrical equipment in a hazardous area and is the responsibility of the installer. If in doubt, consult a qualified official before wiring the system.

When separating the sensor from the transmitter, the use of shielded cable is highly recommended to protect against interference caused by extraneous electrical or electromagnetic noise. In applications where the wiring is installed in conduit, the conduit must not be used for wiring to other equipment.

2.6.2 Sensor separation distance

The maximum separation distance between the sensor and the transmitter is limited by the resistance of the connecting wiring, which is a function of the gauge of the wire being used. It is recommended that sensor separation must not exceed 2000 feet (610 meters) while using 16AWG (1.31mm^2) wire. Refer to Section 6 for wire gauges and resistance values.

2.6.3 Installation to transmitter or junction box

The SC310 sensor is supplied with a 3/4" NPT male conduit connection and is intended to be mounted directly to an available 3/4" NPT conduit entry on a Millennium II Transmitter or remotely using a certified junction box. There is an available offering of certified junction boxes designed specifically to work with this sensor. Please contact your local Emerson Process Management representative for further information.

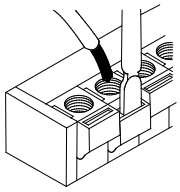
2.6.4 Sensor wiring

⚠WARNING

Do not open the transmitter, sensor, or junction box enclosure when in a classified area or when an explosive atmosphere may be present unless the power to the sensor has been removed.

When connecting cable wires, use a small flathead screwdriver to gently press down and hold the spring connector open. Insert the appropriate wire into the open connector hole, releasing the screwdriver to secure the wire. Refer to Figure 2-5 below.

Figure 2-5 Terminal connection

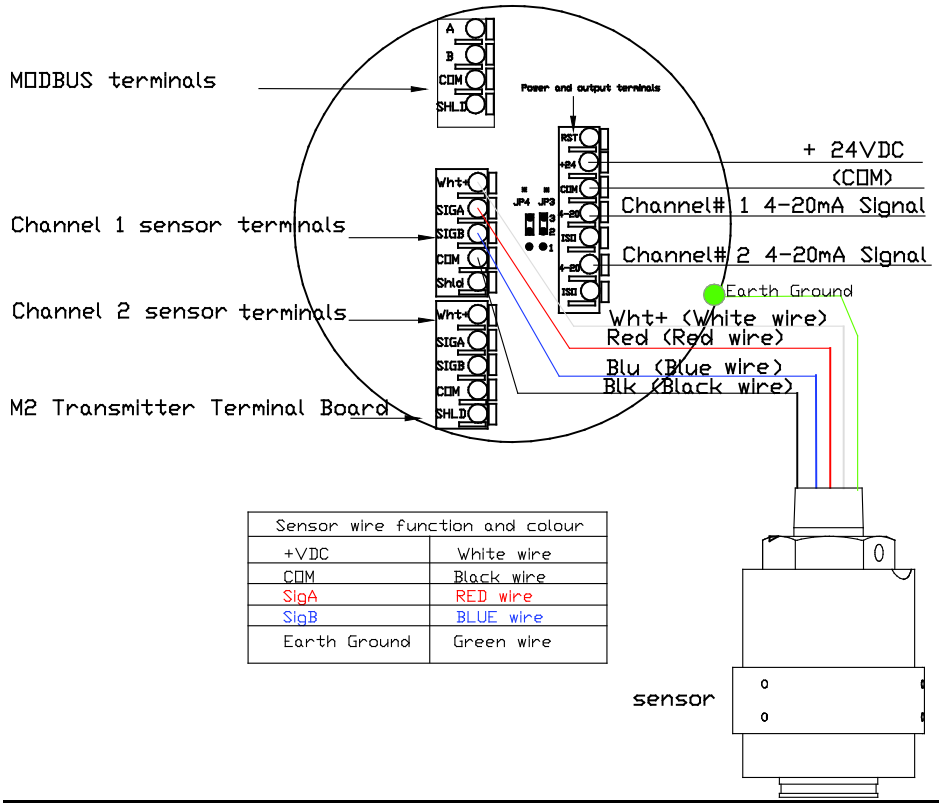


Connect the sensor wires to the Millennium II Transmitter or junction box as per the appropriate transmitter or junction box manual. Figure 2-6 outlines the connections to a M21 Millennium II transmitter. Table 2-1 outlines the wire colors and their purpose.

Table 2-1 Sensor wire colors and terminal definition

Wire color	White	Red	Blue	Black	Green
Marking	+Vdc	Sig A	Sig B	COM	
Function	10.5-32 Vdc Connection	Communication signal A	Communication signal B	Common / supply ground	Earth ground

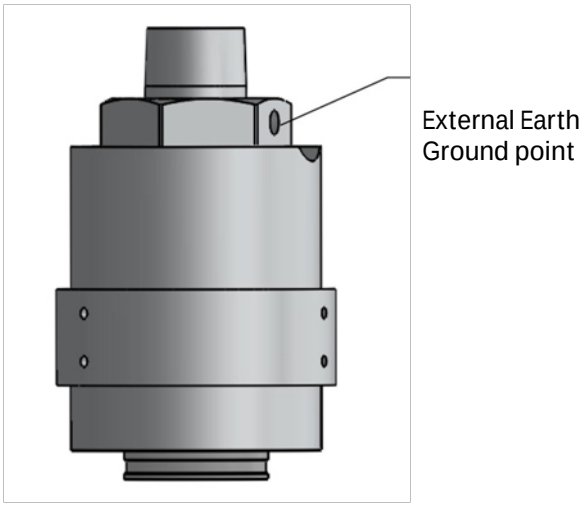
Figure 2-6 Millennium II M21 sensor wiring



2.6.5 External ground

In order to ensure proper operation of the sensor, an external ground is required. The external ground must be connected to the grounding point on the enclosure according to IECEx requirements. Refer to Figure 2-7 for grounding connection location.

Figure 2-7 External grounding point



2.7 Calibration

NOTICE

The SC310 sensor should be powered up for at least twenty-four (24 hours) prior to completing the first calibration.

The calibration of the catalytic sensor requires the presence of oxygen, as a result, air balanced calibration gas must be used for calibration, otherwise these sensors will not calibrate properly.

Due to the nature of catalytic bead sensor technology, calibration of the SC310 should be completed every three (3) months. In environments where the sensor may be routinely exposed to gas concentrations or airborne contaminants, the sensor should be verified or calibrated on a more frequent basis.

Since external factors can affect the SC310 sensor's ability to properly detect gas, it is highly recommended that quarterly inspections and bump tests be completed to ensure proper operation of the gas detection system.

If accessories are used on the SC310, calibrations must be completed with these accessories in place.

There are specific steps to be followed when calibrating with a Millennium II Transmitter. Refer to the appropriate transmitter manual that the sensor is connected to for calibration procedures. These steps should be followed if accurate results are to be obtained.

2.7.1 K-factor

If methane calibration gas is only available, then a specific correction factor (k-factor) relating to the target gas (non-methane) can be manually entered in the Millennium II transmitter (M21 or M22). When using Millennium II Basic analog/HART transmitters (M2B-AH), the k-factor can be set using a HART Communicator. For non-HART versions, the k-factor will need to be set in the factory or by using the display on a Millennium II transmitter (M21 or M22).

The appropriate k-factor is dependent on the lower explosive limit (LEL) of the desired target gas as specified by the performance standard(s) applicable at the installation site. Table 2-2 and Table 2-3 provide k-factors for common gases and their respective LEL values. Use 50% methane calibration gas with the appropriate % by volume as indicated below.

The following tables outline the primary detectable gases of the sensor; however, multiple other gases are detectable. Please contact your Emerson Process Management representative for further information.

Table 2-2 K-Factors for ISO (North American) LEL values (Calibrate with 2.5% by volume Methane)

Gas	LEL	Correction Factor
Propane	2.1% Volume	1.8
n-Butane	1.8% Volume	2.0
Isobutylene	1.8% Volume	2.1
Hydrogen	4.0% Volume	1.2
Ethane	3.0% Volume	1.4
Pentane	1.4% Volume	2.2
Hexane	1.2% Volume	2.3
Heptane	1.1% Volume	2.7
Ethylene	2.7% Volume	1.5
Propylene	2.4% Volume	1.5
Methanol	6.7% Volume	1.2
Ethanol	3.3% Volume	1.7

Table 2-3 K-Factors for IEC (European) LEL values (Calibrate with 2.2% by volume Methane)

Gas	LEL	Correction Factor
Propane	1.7% Volume	2.0
n-Butane	1.4% Volume	1.9
Isobutylene	1.8% Volume	1.7
Hydrogen	4.0% Volume	1.2
Ethane	2.5% Volume	1.5
Pentane	1.4% Volume	1.9
Hexane	1.0% Volume	2.5
Heptane	1.1% Volume	2.4
Ethylene	2.3% Volume	1.6
Propylene	2.0% Volume	1.6
Methanol	5.5% Volume	1.3
Ethanol	3.1% Volume	1.6

2.8 Installation checklist

Review the following checklist prior to turning the power on to the sensor after installation has been completed:

- ☐ Ensure that the transmitter and sensor are properly and firmly mounted
- ☐ Ensure that stopping plugs are securely tightened on any unused conduit entries
- ☐ Ensure that the transmitter and sensor are not obstructed such that they are accessible and the target gas is not inhibited from reaching the sensor
- ☐ Remove the red protective plastic cap/cover from the sensor mouth
- ☐ If calibration cups or splash guards are fitted to the sensor, ensure that they are properly fitted
- ☐ Ensure adherence to applicable local guidelines and requirements on wiring and sealing of equipment in hazardous and non-hazardous areas
- ☐ Ensure that proper shielding and grounding practices are adhered to and local codes are being followed
- ☐ Check system operational voltage and conditions and ensure that they are within the applicable specifications of the sensor
- ☐ Verify wiring at all termination and junction points (transmitter, junction box, and power supply)
- ☐ If the sensor housing has been opened, ensure that the sensor module is properly seated and making a good connection. Refer to Section 4.3 for more details.
- ☐ Perform initial calibration as per Section 2.7.

Section 3: Operation

3.1 Sensor configuration settings

All configuration settings for the SC310 sensor are accessed through the Millennium II series of transmitters. When using the Millennium II Transmitter, configuration settings are accessed by selecting menu options through the main display.

Tip

Refer to the relevant transmitter manual prior to attempting a calibration.

3.2 Sensor power up

When power is applied to the sensor by the transmitter, a warm-up routine will begin and the sensor will be automatically tested to ensure proper functioning. The warm-up time for the SC310 sensor is typically thirty (30) seconds. Refer to the Millennium II transmitter manual (MAN-0076) or the Millennium II Basic transmitter manual (MAN-0082) for status indicators during this period.

3.3 Sensor communication

The SC310 sensor uses a proprietary protocol to communicate with the Millennium II series of transmitters. This sensor should never be connected to any device other than the Millennium II series of transmitters. Selected DIP switches and menu options allow communication between the transmitter and sensor. Configuration settings are stored in the memory of the sensor. Incorrect settings will cause the sensor to not communicate properly with the transmitter. If any problems develop, please refer to the troubleshooting section of this manual.

3.4 Millennium II Basic transmitter configuration

When using the SC310 sensor with the Millennium II Basic transmitter, DIP switch on the transmitter should be set up as follows:

Table 3-1 Millennium II Basic transmitter DIP switch 2 positions

Position 1	Position 2	Position 3	Position 4
ON	OFF	OFF	OFF

3.5 Fault conditions

The SC310 sensor will provide a number of fault conditions that the Millennium II transmitter will translate into an analog or fault relay output. These fault conditions are outlined in the following table.

Table 3-2 Fault conditions

Fault condition	Analog output	Fault relay output
Span calibration failure	2.5mA	Fault
Zero calibration failure	2.5mA	Fault
Sensor over-range	2.5mA	Fault
Low temperature	2.5mA	Fault
High temperature	2.5mA	Fault
Low voltage	2.5mA	Fault
High voltage	2.5mA	Fault
Replace sensor (during calibration cycle)	Momentary 2.5mA	Momentary Fault
Memory fault	2.5mA	Fault
Power supply fault	2.5mA	Fault
Sensor nearing end of life (during calibration cycle)	Momentary 2.5mA	Momentary Fault
Sensor weak signal (during calibration cycle)	Momentary 2.5mA	Momentary Fault

3.6 SensorGuard

SensorGuard is a proprietary firmware feature that protects the catalytic bead sensor from the damage and/or response shift commonly caused by exposure to high concentrations of combustible gas. With this feature, repeated or lengthy exposure to high gas concentrations has negligible effect on sensor performance. Sensor life is prolonged and the calibration frequency is reduced. This does not eliminate the necessity of periodic sensor response checks which should be performed as part of an effective maintenance schedule.

If a gas signal exceeds 100% LEL, the Millennium II series transmitters will latch the output of the sensor at 20 mA and the display of the Millennium II Transmitter will flash '100% LEL' continually until power is recycled or a manual reset is initiated. Refer to 'manual reset' in the Millennium II Transmitter manual (MAN-0076) or the Millennium II Basic Transmitter manual (MAN-0082).

If the gas signal exceeds 105% LEL, the sensor will deactivate the sensing element to protect it from extreme drift or damage caused by high gas concentrations. This protective feature extends the useful lifetime of the sensor and reduces or eliminates disruption of its calibration. As an extra safety precaution, the sensor should be checked for accuracy after an over-range exposure and if necessary re-calibrated. The sensor will need to be reset to clear the latched output.

Section 4: Maintenance

4.1 Sensor poisoning

⚠WARNING

Paints, silicone, silicon-containing compounds and other volatile compounds pose a hazard to catalytic bead sensors. Activities involving these compounds should be limited if not removed from around the sensor.

Certain compounds, including halogen-containing hydrocarbons, can reduce sensor response. In some instances this reduction in response is reversible and the sensor will operate normally when such a compound or gas is removed. Exposure to organic phosphates, esters, and silicon-containing compounds will poison the sensor, resulting in an irreversible loss in sensitivity. This loss in sensitivity is because the poisoning compound will coat the active catalytic bead, limiting the necessary reaction required to detect the presence of hydrocarbon gases. Because of this, routine bump tests, outlined in 4.3, and calibrations, outlined in 2.7, need to be completed on a routine basis.

4.2 Cross sensitivities

Catalytic bead sensors react to airborne materials that burn in oxygen atmospheres, such as gaseous hydrocarbons; therefore, the SC310 sensor will be cross sensitive to all combustible gases. The response given by the sensor is dependent upon the k-factor setting and the hydrocarbon gas that has come in contact with the sensor.

4.3 Routine inspections

The Millennium II SC310 sensor should be inspected on a routine basis to ensure that external obstructions such as water, mud, snow, plastic bags, or other materials are not blocking the sintered element of the sensor. If the sintered element is sprayed with water, the sintered element must be allowed to dry to ensure specified performance.

⚠WARNING

A blocked sinter impairs sensor performance. If a sinter element is blocked, please dislodge the material blocking the sensor to ensure sensor performance as specified.

4.4 Bump testing

As part of the site preventative maintenance program It is recommended that a bump test of the sensor be completed every three (3) months. Bump testing consists of a visual inspection of the sensor, applying a known gas concentration to the sensor verifying the accuracy of the response to the specifications of the sensor, and alarm system simulation. If the response is outside of the specifications of the sensor a calibration should be completed. Refer to 2.7 for more information. After a calibration has been completed, it is recommended that a bump test be completed to verify accuracy and response of the sensor.

4.5 Sensor replacement procedure

Sensors are pre-calibrated at the factory; however, field calibration must be performed as a part of commissioning. When a calibration can no longer be performed or the sensor is not operating properly, the sensor module may need to be replaced. Refer to steps below for replacing the sensor module.

⚠WARNING

Do not open the transmitter, sensor, or junction box enclosure when in a classified area or when an explosive atmosphere may be present unless the power to the sensor has been removed.

Avoid touching any electronic components, as they may be susceptible to electrostatic discharge (ESD). Refer to Section 5 for further information and proper handling instructions of electronic components.

1. Remove power from the sensor.
2. Remove the locking ring by loosening the set crews with 1.5 mm Allen Key tool.
3. Remove the bottom part of the sensor enclosure by turning it in a counter clockwise rotation to expose the sensor module.
4. Carefully remove the sensor module from the sensor housing by pulling on the Teflon pull tab until the sensor module has been fully removed from the housing. NOTE: DO NOT TWIST THE SENSOR MODULE.
5. Properly dispose of the old sensor module as per local guidelines and regulations.
6. Remove the replacement sensor module from its packaging ensuring not to touch any electronic components as this may cause problems due to an unwanted electrostatic discharge (ESD).
7. Align replacement sensor module with pins inside top section of the enclosure base and push on the outer plastic ring until sensor is seated properly. DO NOT PUSH ON CENTER ELEMENT.
8. Install and hand-tighten the bottom part of the sensor enclosure by turning it in a clockwise direction.
9. Install the locking ring by tightening the set screws with 1.5 mm Allen Key tool.
10. Restore power to sensor via the transmitter.

4.6 Troubleshooting

Sensors and transmitters are not designed to be repaired in the field. If problems should develop, first check for faulty wiring, confirm proper voltage to sensor, and attempt a calibration. If problems persist, please contact the Flame and Gas Detection customer care team first by phone to try and resolve any issues. If issues cannot be resolved, please follow the procedure in Section 1.3.

4.7 Storage

The sensor and its electronic components/parts should be stored in locations free from dust, liquid spills, contaminants, and moisture. The storage temperature should be well within the limits of the certified temperatures of the equipment. See Section 7 for certified temperatures.

4.8 Spare parts and accessories

Description	Part Number
Calibration cup/splash guard	CCS-1
Calibration Kit	CAL-KIT-1
Calibration Gas	CAL-CYL-AIR (103L Air) CAL-CYL-BUT (103L Butane) CAL-CYL-ETH-A-50 (103L Ethylene) CAL-CYL-HYD (103L Hydrogen) CAL-CYL-METH (103L Methane) CAL-CYL-PEN (103L Pentane) CAL-CYL-PRO (103L Propane)
Ingress protection filter	IPF-001
Separation kit	JB-MPD-A - aluminum JB-MPD-S - stainless steel
Replacement sensor module	SC310-100

NOTICE

The SC310 sensor is not certified for performance when the calibration cup, ingress protection filter, or dust guard is attached.

Section 5: Electrostatic sensitive device

Definition: Electrostatic discharge (ESD) is the transfer, between bodies, of an electrostatic charge caused by direct contact or induced by an electrostatic field.

The most common cause of ESD is physical contact. Touching an object can cause a discharge of electrostatic energy (ESD). If the charge is sufficient and occurs near electronic components, it can damage or destroy those components. In some cases, damage is instantaneous and an immediate malfunction occurs. However, symptoms are not always immediate—performance may be marginal or seemingly normal for an indefinite period of time, followed by a sudden failure.

To eliminate potential ESD damage, review the following guidelines:

- Handle boards by metal shields—taking care not to touch electronic components.
- Wear grounded wrist or foot straps, ESD shoes or heel grounders to dissipate unwanted static energy.
- Prior to handling boards, dispel any charge in your body or equipment.
- Ensure all components are transported and stored in static safe packaging
- When returning boards, carefully package in the original carton and static protective wrapping
- Ensure ALL personnel are educated and trained in ESD Control Procedures

In general, exercise accepted and proven precautions normally observed when handling electrostatic sensitive devices. A warning label is placed on the packaging, identifying product using electrostatic sensitive semiconductor devices.

Section 6: Wire resistance table

Distance Feet (Meters)	AWG #20 0.5mm²	AWG #18 0.8mm²	AWG #16 1.3mm²	AWG #14 2.0mm²
100 (30.5)	1.02	0.64	0.40	0.25
200 (61)	2.03	1.28	0.80	0.51
300 (91.4)	3.05	1.92	1.20	0.76
400 (121.9)	4.06	2.55	1.61	1.01
500 (152.4)	5.08	3.20	2.01	1.26
600 (182.9)	6.09	3.83	2.41	1.52
700 (213.4)	7.11	4.47	2.81	1.77
800 (243.8)	8.12	5.11	3.21	2.02
900 (274.3)	9.14	5.75	3.61	2.27
1000 (304.8)	10.20	6.39	4.02	2.53
1250 (381)	12.70	7.99	5.03	3.16
1500 (457.2)	15.20	9.58	6.02	3.79
1750 (533.4)	17.80	11.20	7.03	4.42
2000 (609.6)	20.30	12.80	8.03	5.05
2250 (685.8)	22.80	14.40	9.03	5.68
2500 (762)	25.40	16.00	10.00	6.31
3000 (914.4)	30.50	19.20	12.00	7.58
3500 (1066.8)	35.50	22.40	14.10	8.84
4000 (1219.2)	40.60	25.50	16.10	10.00
4500 (1371.6)	45.70	28.70	18.10	11.40
5000 (1524)	50.10	32.00	20.10	12.60
5500 (1676.4)	55.80	35.10	22.10	13.91
6000 (1828.8)	61.00	38.30	24.10	15.20
6500 (1981.2)	66.00	41.50	26.10	16.40
7000 (2133.6)	71.10	44.70	28.10	17.70
7500 (2286)	76.10	47.90	30.10	19.00
8000 (2438.4)	81.20	51.10	23.10	20.20
9000 (2743.2)	91.40	57.50	36.10	22.70
10000 (3048)	102.00	63.90	40.20	25.30

Resistance shown is one way. This figure must be doubled when determining closed loop resistance.

Section 7: Specifications

7.1 Electrical

7.1.1 Voltage range

10.5 to 32 Vdc

7.1.2 Power consumption

(10.5 – 32 Vdc) < 1.5 W

7.2 Performance

7.2.1 Response time*

- T50 ≤ 5.5 seconds
- T60 ≤ 6 seconds
- T90 ≤ 12 seconds

* Methane at room temperature

7.2.2 Accuracy

±3% < 50% | ±5% > 50%

7.2.3 Zero Drift

± 2% per month

7.2.4 Repeatability

± 1% LEL full scale

7.2.5 Detection Range

0-100% LEL

7.2.6 Calibration Frequency

Three (3) months

7.2.7 Storage temperature

-40°F to +158°F (-40°C to +70°C)

7.2.8 Operating temperature

-40°F to +167°F (-40°C to +75°C)

7.2.9 Relative humidity

0-95% relative humidity, non-condensing

7.2.10 Metallurgy (housing)

316 Stainless steel and 6061 aluminum

7.2.11 Ingress protection

IP64

7.2.12 Weight

Stainless steel: 3.5 lbs, 1.4 kg
Aluminum: 1 lb, 0.4 kg

7.3 Separation

Up to 2000 feet (610 meters) with 16 AWG (1.31 mm^2) wire.

7.4 Warranty

Five (5) years

Section 8: Certifications

8.1 North America

8.1.1 Hazardous locations

Class I, Division 1, Groups BCD T5
Class I, Zone 1, AEx/Ex d IIB +H_2 T5
-40 °C ≤ Ta ≤ +75 °C

8.1.2 Performance

CSA C22.2 No. 152:2006
FM Class 6310, 6320:2001
ANSI/ISA 12.13.01:2000

8.2 IECEx

Ex d IIB+H_2 T5 Gb
IECEx FMG 12.0007X
-40 °C ≤ Ta ≤ +75 °C

Special conditions for safe use:

- Consult the manufacturer if dimensional information on the flameproof joints is necessary.
- The flying leads of the Millennium II sensor shall be suitably protected against mechanical damage and terminated within a terminal or junction facility suitable for the conditions of use.

8.3 FC Models

SC310 catalytic bead sensors, models SC310x-100-ASSY-FC, when used with wireless capable Millennium II transmitters, carry the following certifications. All certifications outlined above do not pertain to these models.

8.3.1 North America (-FC models)

Class I, Division 1, Groups BCD T5
Class I, Zone 1, AEx/Ex d IIB+ H_2 T5
-40 °C ≤ Ta ≤ +75 °C
CSA C22.2 No. 152, FM6320

8.3.2 IECEx (-FC models)

Ex d IIB+H_2 T5 Gb
-40 °C ≤ Ta ≤ +75 °C
IECEx FMG 12.007X

8.3.3 Special conditions for safe use

Consult the manufacturer if dimensional information on the flameproof joints is necessary.

The flying leads of the Millennium II sensor shall be suitably protected against mechanical damage and terminated within a terminal or junction facility suitable for the conditions of use.

Section 9: Ordering information

Model	Description
SC310	Millennium II Catalytic Bead Combustible Sensor

Housing	Description
-A	Aluminum
-S	Stainless Steel

Range	Description
-100-ASSY	100% LEL

Wireless	Description
-FC	When used with wireless capable Millennium II transmitters

Notes

MAN-0084
Revision 8
June 2016

EmersonProcess.com/FlameGasDetection

AnalyticExpert.com

twitter.com/Rosemount_News

youtube.com/user/RosemountMeasurement

facebook.com/Rosemount

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