

**APPLICATION**

The Det-Tronics line of electrochemical gas sensors is designed to provide continuous monitoring of the atmosphere for potentially hazardous gas leaks or oxygen depletion. Models are available for detecting a variety of gas types in various concentration ranges. Transmitter circuitry contained within the sensor housing generates a 4 to 20 ma output signal that is proportional to the concentration of the target gas. These sensors are compatible with R8471 Series Gas Controllers, Infiniti Transmitters, Eagle Digital Communication Units (DCUs), or any other monitoring devices that have the ability to monitor a 4 to 20 ma dc input and provide calibration capabilities. Sensors are designed for use in hazardous environments and are furnished as either explosion-proof or intrinsically safe devices.

**FEATURES**

- Electrochemical sensor cell for increased accuracy, stability and reliability.
- Highly specific response reduces the chance of false alarms resulting from the presence of other gases.
- Self-contained transmitter circuitry.
- Temperature compensated to ensure consistent performance over entire operating temperature range.
- Easily replaceable hydrophobic filter provides additional protection for the sensing element and enables operation in wet environments.
- Quick, easy field replacement of sensor cell and hydrophobic filter.
- EMI/RFI hardened.
- FM, CSA and CENELEC models available.

**DESCRIPTION**

The electrochemical sensor consists of a field replaceable sensor cell, mounted inside a sensor housing that also contains the transmitter circuitry for generating the 4 to 20 ma output. See Figure 1 for sensor dimensions.

**SENSOR CELL**

The electrochemical sensor cell uses capillary diffusion barrier technology for monitoring gas concentrations in



ambient air. When compared to solid state type sensors, the electrochemical sensing element provides improved accuracy, stability and reliability, and can also extend calibration intervals. This results in superior performance and reliability, as well as reduced maintenance.

**OUTPUT**

The sensor output is a 4 to 20 ma signal that is generated by transmitter circuitry contained within the sensor housing. The sensor output directly corresponds to 0 to 100 % full scale (full operating range).

**SENSOR RATINGS**

Depending on model, the sensor is furnished as either an explosion-proof or intrinsically safe device.

Explosion-proof sensors are designed for use in Class I, Division 1, Groups C and D and EEx d IIB plus hydrogen T6 hazardous locations.

Intrinsically safe sensors are designed for use in Class I, Division 1, Groups A, B, C, and D and EEx ia IIC T6 hazardous locations. (Intrinsically safe sensors must be powered through an approved I.S. barrier.)

**SENSOR WIRING**

Three wire cable (power, signal and ground) is used for connecting the sensor to its associated transmitter, controller or monitoring device. The use of shielded cable is highly recommended. See Figure 2.

## Electrochemical Gas Sensors - Model Comparison

Model	C7064C	C7064E	C7065E	C7066E
<b>Gas</b>	Hydrogen Sulfide (H <sub>2</sub> S)	Hydrogen Sulfide (H <sub>2</sub> S)	Oxygen (O <sub>2</sub> )	Carbon Monoxide (CO)
<b>Type<sup>1</sup></b>	IS <sup>2</sup>	EP	EP	EP
<b>Range</b>	0 to 100 PPM	0 to 20 PPM 0 to 50 PPM 0 to 100 PPM	0 to 25%	0 to 100 PPM 0 to 500 PPM 0 to 1000 PPM
<b>Response Time<sup>3</sup></b>	T20 in ≤ 12 seconds T50 in ≤ 30 seconds	T20 in ≤ 17 seconds <sup>5</sup> T50 in ≤ 35 seconds <sup>5</sup> T20 in ≤ 12 seconds <sup>6</sup> T50 in ≤ 30 seconds <sup>6</sup>	T20 in ≤ 4 seconds T50 in ≤ 9 seconds	T20 in ≤ 18 seconds T50 in ≤ 30 seconds
<b>Accuracy</b>	±10% or ±3 PPM, whichever is greater	±10% or ±3 PPM, whichever is greater	±5% of O <sub>2</sub> conc. or ±0.5%, whichever is greater	±10% or ±3 PPM, whichever is greater
<b>Zero Stability</b>	< 1 PPM / Mo.	< 1 PPM / Mo.	< 1 PPM / Mo.	< 1 PPM / Mo.
<b>Span Stability</b>	< 1% FS / Mo.	< 1% FS / Mo.	< 1% FS / Mo.	< 1% FS / Mo.
<b>Temperature Range</b>	-40°F to +122°F -40°C to +50°C	-40°F to +122°F -40°C to +50°C <sup>7</sup>	-4°F to +122°F -20°C to +50°C	-4°F to +122°F -20°C to +50°C
<b>Recommended Storage Temperature</b>	+32°F to +68°F 0 to +20°C	+32°F to +68°F 0 to +20°C	+32°F to +68°F 0 to +20°C	+32°F to +68°F 0 to +20°C
<b>Humidity Range</b>	15 to 90% RH	15 to 90% RH	0 to 99% RH	15 to 90% RH
<b>Pressure Range</b>	Atmospheric ±10%	Atmospheric ±10%	Atmospheric ±10%	Atmospheric ±10%
<b>Enclosure Material</b>	Stainless Steel	Stainless Steel	Aluminum	Aluminum
<b>Certifications<sup>4</sup></b>	FM <sup>2</sup> CSA <sup>2</sup> CENELEC <sup>2</sup>	FM CSA CENELEC/ATEX	CSA	CSA
<b>Voltage Requirements</b>	(Across sensor) 12 to 32 vdc, 24 vdc nominal			
<b>Power Requirements</b>	(At full scale output) 0.25 to 0.8 watt, 0.5 watt nominal			
<b>Maximum Loop Resistance</b>	300 ohms at 18 vdc, 600 ohms at 24 vdc, 1000 ohms at 32 vdc			

<sup>1</sup> IS = Intrinsically Safe, EP = Explosion Proof  
Intrinsically Safe sensors are designed to meet FM and CSA intrinsic safety requirements for Class I, Division 1, Groups A, B, C, and D; and CENELEC EEx ia IIC T6. Explosion Proof sensors are designed to meet FM and CSA requirements for Class I, Division 1, Groups C and D and CENELEC EEx d IIB plus hydrogen T6.

<sup>2</sup> In order to maintain the intrinsically safe rating of the sensor, the device must be powered through an approved I.S. barrier.

<sup>3</sup> Time to reach percentage of final reading when gas concentration equal to full scale is applied to sensor.

<sup>4</sup> Always ensure sensor hazardous (classified) location rating is applicable for the intended use.

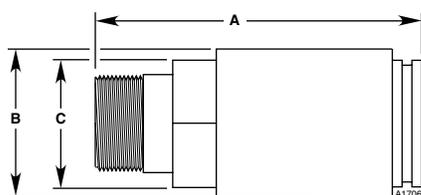
<sup>5</sup> With hydrophobic filter.

<sup>6</sup> Without hydrophobic filter.

<sup>7</sup> The C7064E has successfully completed Hazardous Location testing from -40°C to +75°C; however, the label will indicate -40°C to +50°C.

## Electrochemical Gas Sensors - Model Comparison

C7067E	C7068E	C7069E	Model
Chlorine (Cl <sub>2</sub> )	Sulfur Dioxide (SO <sub>2</sub> )	Nitrogen Dioxide (NO <sub>2</sub> )	Gas
IS <sup>2</sup>	EP	EP	Type <sup>1</sup>
0 to 10 PPM	0 to 100 PPM	0 to 20 PPM	Range
T20 in ≤ 0.9 minutes T50 in ≤ 2.2 minutes	T20 in ≤ 30 seconds T50 in ≤ 5 minutes	T20 in ≤ 11 seconds T50 in ≤ 28 seconds	Response Time <sup>3</sup>
NA	NA	±10% of full scale	Accuracy
< 1 PPM / Mo.	< 1 PPM / Mo.	< 1 PPM / Mo.	Zero Stability
NA	NA	< 1% FS / Mo.	Span Stability
-4°F to +122°F -20°C to +50°C	-4°F to +122°F -20°C to +50°C	-4°F to +122°F -20°C to +50°C	Temperature Range
+32°F to +68°F 0 to +20°C	+32°F to +68°F 0 to +20°C	+32°F to +68°F 0 to +20°C	Recommended Storage Temperature
15 to 90% RH	15 to 90% RH	15 to 90% RH	Humidity Range
Atmospheric ±10%	Atmospheric ±10%	Atmospheric ±10%	Pressure Range
Aluminum	Stainless Steel	Stainless Steel	Enclosure Material
CSA <sup>2</sup>	CSA	CSA	Certifications <sup>4</sup>
(Across sensor) 12 to 32 vdc, 24 vdc nominal			Voltage Requirements
(At full scale output) 0.25 to 0.8 watt, 0.5 watt nominal			Power Requirements
300 ohms at 18 vdc, 600 ohms at 24 vdc, 1000 ohms at 32 vdc			Maximum Loop Resistance



Sensor	A	B	C
H <sub>2</sub> S	3.75 (9.6)	2.0 (5.0)	1.75 (4.5)
O <sub>2</sub>	6.1 (15.5)	2.2 (5.6)	1.1 (2.8)
CO	5.0 (12.7)	2.2 (5.6)	1.1 (2.8)
Cl <sub>2</sub>	5.0 (12.7)	2.2 (5.6)	1.1 (2.8)
SO <sub>2</sub>	3.75 (9.6)	2.0 (5.0)	1.75 (4.5)
NO <sub>2</sub>	3.75 (9.6)	2.0 (5.0)	1.75 (4.5)
Available thread sizes = 3/4 inch NPT or 20 mm			

Figure 1—Sensor Dimensions in Inches (Centimeters)

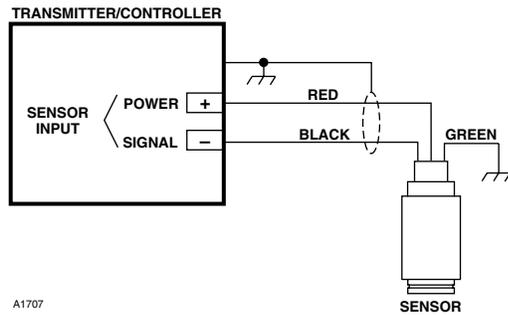


Figure 2—Sensor Wiring

## ORDERING INFORMATION

Sensor cells and sensor housings must be ordered separately. When multiple gas ranges are available, order matching sensor cells and housings.

### SENSOR HOUSINGS

Specify:

C7064C Intrinsically Safe H<sub>2</sub>S Sensor Housing  
 C7064E Explosion-proof H<sub>2</sub>S Sensor Housing  
 C7065E Explosion-proof O<sub>2</sub> Sensor Housing  
 C7066E Explosion-proof CO Sensor Housing  
 Specify: 0 to 100, 0 to 500, or 0 to 1000 ppm  
 C7067E Intrinsically Safe Cl<sub>2</sub> Sensor Housing  
 C7068E Explosion-proof SO<sub>2</sub> Sensor Housing  
 C7069E Explosion-proof NO<sub>2</sub> Sensor Housing

Specify 3/4 inch NPT or 20 mm threads.

### SENSOR CELLS

Specify type of gas to be detected and operating range (where applicable).

### ACCESSORIES

Explosion-proof aluminum sensor junction box with connectors.  
 Specify 3/4 inch NPT or 20 mm conduit entries to match sensor housing threads.

## Calibration Equipment

Calibration Kits include regulator, hose, calibration cup, and two cylinders of calibration gas in carrying case.

H<sub>2</sub>S Calibration Kit — 50 ppm  
 O<sub>2</sub> Calibration Kit — clean air (20.9% oxygen)  
 CO Calibration Kit — Specify 50, 250, or 500 ppm.  
 Cl<sub>2</sub> Calibration Kit — 5 ppm  
 SO<sub>2</sub> Calibration Kit — 50 ppm  
 NO<sub>2</sub> Calibration Kit — 10 ppm

## Sensor Separation Kit

Allows the transmitter to be mounted remotely from the sensor to enable remote calibration or to provide more convenient viewing of the transmitter display.

## Remote Calibration Cup

Designed for permanent connection to the sensor. Enables one man remote calibration in applications using a sensor separation kit.

## Rain Shield

Protects the sensor from rain and snow. Accepts stainless steel and porex dust covers.

## Dust Covers

Protects sensors against dust, oil or high wind conditions. Stainless steel or Porex. Can not be used if hydrophobic filter is used.

## Duct Mount Assembly

Allows the sensor to be mounted on a heating or air conditioning duct or flue.

## Q81X Duct Mount Enclosure Assembly

Draws a sample across a high velocity duct, resulting in a more representative sample.

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