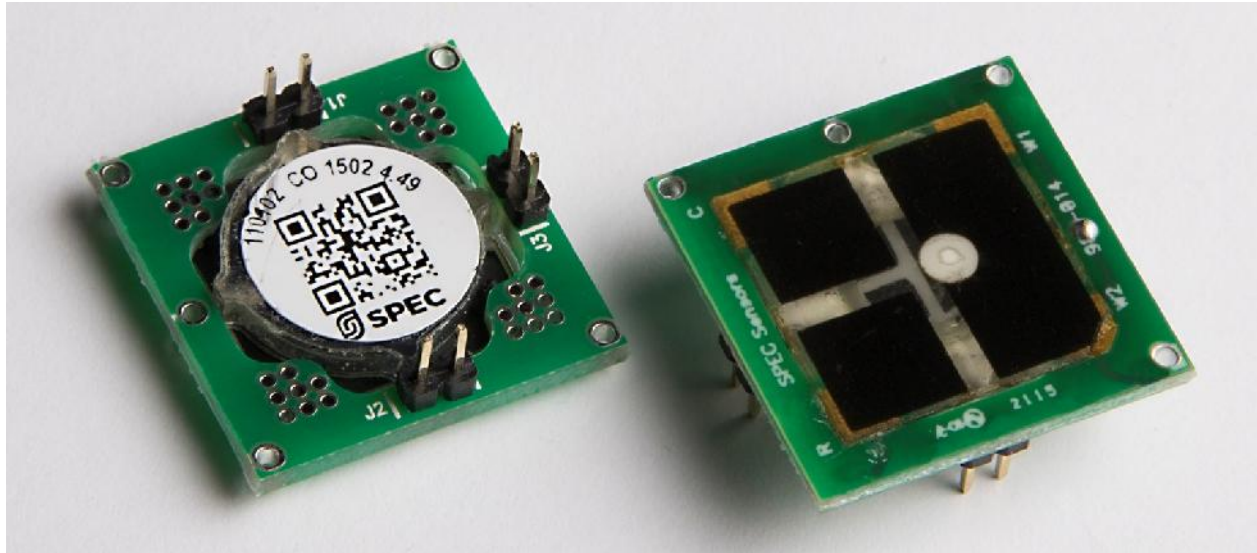


## 15x15 Respiratory Irritant Sensor 20 ppm P Package 110-901



### DESCRIPTION

SPEC Sensors' RESP\_IRR\_20 is a Screen Printed ElectroChemical sensor component specifically designed for the broad detection of respiratory irritant gases: NO<sub>2</sub>, Ozone, Chlorines, SO<sub>2</sub>, H<sub>2</sub>S and odorous gases.

### BENEFITS

- Zero Power Sensor
  - Sensor Circuit - < 10 uW max
- Sensitive - In the ppb range
- Cold operation - No Heating required
- Stable Response– Not affected by humidity, CO<sub>2</sub>, N<sub>2</sub>, Ar, most saturated hydrocarbons, hexane, ammonia,
- Small Size & Low Profile - 20x20x3 mm
- Easy to Use - Linear Response
- Long Life - 10 years expected life
- Fast Response - < 60 seconds
- ROHS Compliant

### APPLICATIONS

- Bad Air Quality Detection
- Indoor Air Monitor
- Air Purifier Controls
- Weather Stations
- Internet of Things
- Smart Homes
- Leak Detection
- HVAC Ventilation Control
- Telemedicine Equipment

## SPECIFICATIONS

<b>Measurement Range</b>	0 to 20 ppm (calibrated as NO <sub>2</sub> equivalents)
<b>Response Time to 90%</b>	< 60 seconds typical
<b>Sensitivity</b>	-50 +/- 25 nA/ppm (NO <sub>2</sub> equivalents)
<b>Expected Operating Life</b>	> 5 years (10 years @ 23+/-3C; 40+/-10% RH)
<b>Operating Temperature Range</b>	-10 to 40 C (0 to 40 C continuous)
<b>Operating Humidity – non-condensing</b>	0 to 100% RH (15 to 95% continuous)
<b>Power Consumption</b>	< 50 uW circuit & ambient gas dependent
<b>Zero Drift (Over Temperature Range)</b>	+/-0.3 ppm (NO <sub>2</sub> equivalents)
<b>Resolution</b>	20 ppb NO <sub>2</sub> (depends on the gas & electronics)

## CROSS SENSITIVITY

This sensor exhibits sensitivity to a wide range of gases. The following table lists the relative response of common gases tested at levels to measure interference.

Gas	ppm	Typical Response (as ppm NO <sub>2</sub> )
Carbon Monoxide	10	0
Hydrogen Sulfide	10	27
Ozone	10	8
Nitrogen Dioxide	10	10
Sulfur Dioxide	10	-7
Ethanol	10	1
Nitric Oxide (NO)	10	0
Chlorine	10	6.5
n-Heptane	10	0
Ammonia	10	0
Methane	10	0
Saturated Hydrocarbons	10	0

## IMPORTANT PRECAUTIONS

All sensor designs are made for air monitoring @ 1 atm +/- 0.2 atm. Because applications of use and device implementation are outside our control, SPEC Sensors cannot guarantee performance in a given device or application, and disclaims any and all liability therefore. **Customers should test under their own conditions to ensure the sensors are suitable for their requirements.**

Contact the factory to discuss specific concerns that might damage the sensor performance or life.

- Condensation and Water (1)
- Salt Water Contamination (1)
- High Temperature Operation (> 70C) for more than 1 month
- Low Humidity Operation (< 15% RH) for more than 3 months
- High Bias voltage
- Highly contaminated air over a prolonged period
- High levels of particles or soot (unless proper filtering is provided)

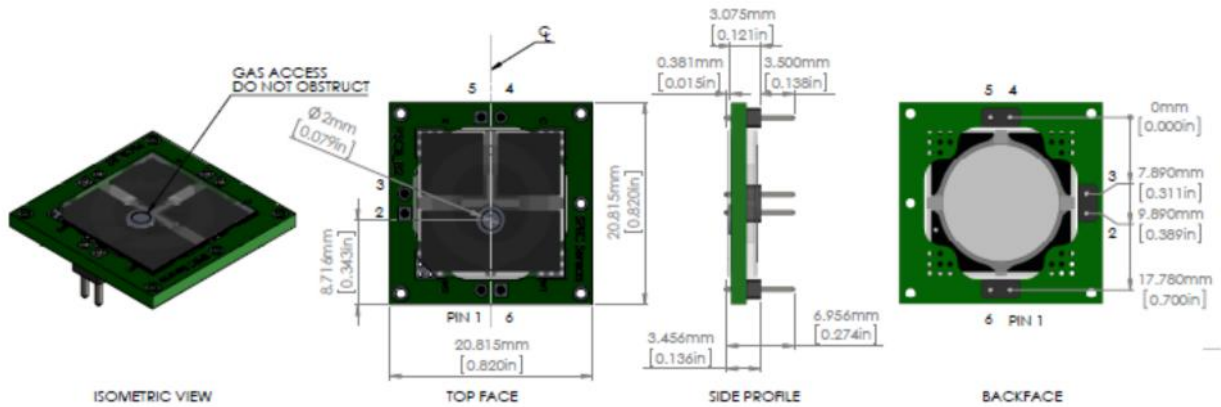
(1) Use of porous PTFE membrane or filter cap may address this concern)

## MARKING INFORMATION

All gas sensors are tested and marked at the SPEC Sensors factory. Sensors include a label with an alpha-numeric code and a two-dimensional bar code. The codes include the information indicated in the table below.

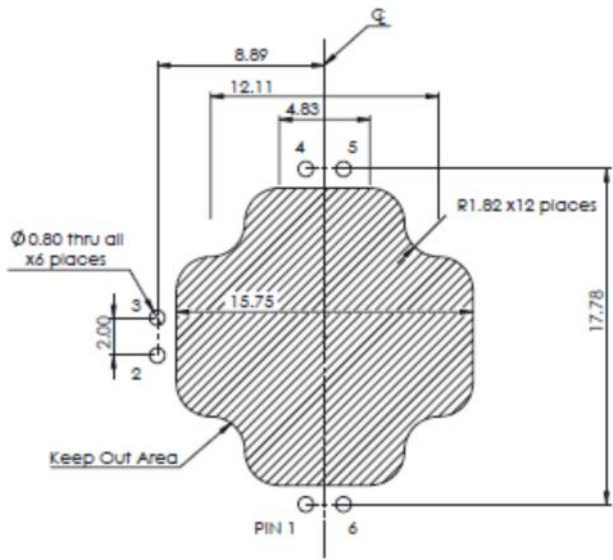
	Unique Serial Number	Sensor Part Number	Target Gas	Date Code (YYMM)	Sensitivity Code (nA/ppm)
Alpha-Numeric Code:	110201 CO 1501 5.57				
2D Code:	010715010101 110201 CO 1501 5.57				

## DIMENSIONS



PIN	CONNECTION
1	WORKING
2	N/A
3	N/A
4	REFERENCE
5	COUNTER
6	WORKING

## PCB LAYOUT GUIDELINES



PIN	CONNECTION
1	WORKING
2	NC
3	NC
4	REFERENCE
5	COUNTER
6	WORKING

Notes:  
 -(6) 0.8 mm drilled diameter Holes  
 -Recommended Socket  
 (for removable sensor option)  
 PN: 3M 950502-60102-AR  
 -If using socket, keep out area  
 may not be required. Use caution.

## SENSOR STORAGE, HANDLING AND SOLDERING

This information embodies various general recommendations concerning the storage, handling, and manual soldering conditions for SPEC SENSORS CSPEC Modules. It is only applicable for modules guaranteed by SPEC SENSORS stated in SPEC SENSORS Sensor Specification Sheet. Moreover, SPEC SENSORS' modules are NOT warranted and should NOT be used in high temperature soldering (reflow) or pre-tinning baths.

### Sensor & Module Handling

Handle sensors with care. Take precautions, including but not limited to the following:

- A. DO NOT apply excessive pressure to the top or bottom of the sensor module.
- B. Whenever possible, handle or make contact with the sensor module from the sides of the PCB or substrate.
- C. Light vacuum pressure is possible during handling, DO NOT apply vacuum over gas sensor port.
- D. If the sealed sensor package is opened, DO NOT re-seal using vacuum or nitrogen gas. DO NOT reseal with desiccant.
- E. DO NOT obstruct the gas sensor port by making direct contact with any tape, apparatus, weights, etc.
- F. DO NOT use silicone or other conformal coatings around the sensor or gas port-holes.
- G. Operators are requested to wear powder free antistatic gloves.

### Manufacturing Assembly Floor Environment

SPEC SENSORS recommends that the manufacturing assembly floor environment be maintained at controlled conditions:

- A. Temperature: 18 - 26°C
- B. Relative Humidity: 40 to 60%
- C. Pressure: 1.0 ± 0.2 atm

### Sensor & Module Storage Conditions

The shelf life for sealed, packaged components is 12 months from the pack seal date, when stored in the factory-sealed bag under the following conditions:

- A. Temperature: 5 to 25 °C
- B. Relative Humidity: 20 to 80%
- C. Pressure: 1.0 ± 0.2 atm
- D. Storage Time: 12 months

When moving from Storage Conditions to the Manufacturing Assembly Floor Environment, the sensors should be allowed to equilibrate at the new conditions for at least 24 hours prior to manufacturing.

### Module Attach Soldering Process

Hand solder only. Keep the soldering iron or solder process tool away from the sensor. The sensor should not see pre-heat temperatures above 70 °C. There have been suggested cases where a heat sink cover over the sensor may be applicable to protect the sensor during processing. No Application notes to this approach available. Only to be used as reference only.

- A. DO NOT heat sensor above 70 °C
- B. Hand or peripheral process type approach
- C. Use solder wire alloy with the lowest possible eutectic temperature
- D. Use lowest possible soldering iron temperature
- E. Contact the host board with the soldering iron at a 45° angle on the solder pad
- F. Keep the soldering iron away from the top and bottom of the sensor module
- G. DO NOT place in reflow, wave or IR reflow type processes
- H. DO NOT place mounted board in a wash