Performance Characteristics		
Nominal Range	0-2ppm	
Maximum Overload	5ppm	
Expected Operating Life	Two years in air	
Output Signal	7.2µA/ppm ± 20%	
Resolution	20ppb	
Temperature Range	-20°C to +50°C	
Pressure Range	Atmospheric ± 10%	
Pressure Coefficient	No data	
T ₉₀ Response Time	≤150 seconds	
Relative Humidity Range	15 to 90% non-condensing	
Typical Baseline Range (pure air)	0 to +120ppb equivalent	
Maximum Baseline Shift (+20°C to +40°C)	+36ppb equivalent	
Long Term Output Drift	<4% signal loss/month	
Recommended Load Resistor	33Ω	
Bias Voltage	Not required	
Repeatability	5% of signal	
Output Linearity	Linear	

Product Dimensions





All tolerances ±0.15mm unless otherwise stated. Sensor shown with side tags and gold pins.

Ordering Information

N.B. All performance data is based on conditions at 20°C, 50%RH, and 1013mBar

Physical Characteristics

None

Weight 22g

Position Sensitivity

Storage Life

Recommended Storage

Temperature

Warranty Period

Six months in CTL container

0-20°C

12 months from date of despatch

The 3OZ Ozone CiTiceL is available with both goldplated PCB pins and side tags.

Type 3OZ

With side tag and PCB pin connections - 30Z

Temperature Dependence

The output of a CiTiceL can vary with temperature. A programme of data acquisition is currently underway at City Technology to establish a statistically based relationship for 3OZ sensors. For applications where accurate data is required please contact City Technology.

Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. 3OZ CiTiceLs have been tested with a number of commonly cross-interfering gases and the results are given below. The table shows the typical response to be expected from a sensor when exposed to a given test gas concentration (relevant to safety, e.g. TLV levels). The results are based on the chlorine sensitivity and assume the response of the sensor to ozone is 120% of the chlorine response.

Gas	Conc.	30Z	Gas	Conc.	<u> 30Z</u>
Carbon monoxide:	300ppm	0ppm	Chlorine:	1ppm	0.5 ppm ≤ x\$ ≤ 1ppm
Hydrogen sulphide:	15ppm	≈-2ppm	Hydrogen:	100ppm	Oppm
Sulphur dioxide:	5ppm	0ppm	Hydrogen cyanide:	10ppm	0ppm
Nitric oxide:	35ppm	0ppm	Hydrogen chloride:	5ppm	0ppm
Nitrogen dioxide:	5ppm	≈3.5ppm	Ethylene:	100ppm	0ppm

For information on other possible cross-interferents please contact City Technology.

SAFETY NOTE

This sensor is designed to be used in safety critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

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70Z CiTiceL®



Performance Characteristics

Nominal Range	0-2 ppm
Maximum Overload	5 ppm
Expected Operating Life	Two years in air
Output Signal	7.2 ± 2.3 µA/ppm
Resolution	20 ppb
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
T ₉₀ Response Time	≤150 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	0 to +120 ppb equivalent
Maximum Baseline Shift (+20°C to +40°C)	+36 ppb equivalent
Long Term Output Drift	<4% signal loss/month
Recommended Load Resistor	33 Ω
Bias Voltage	Not required
Repeatability	5% of signal
Output Linearity	Linear

N.B. All performance data is based on conditions at 20°C, 50%RH, and 1013 mBar

Physical Characteristics

Weight	17 g
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch



IMPORTANT NOTE: Connection should be made via PCB sockets only. Soldering to the pins will render your warranty void.



Temperature Dependence

The output of a CiTiceL can vary with temperature. A programme of data acquisition is currently underway at City Technology to establish a statistically based relationship for 7OZ sensors. For applications where accurate data is required please contact City Technology.

Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. 7OZ CiTiceLs have been tested with a number of commonly cross-interfering gases and the results are given below. The table shows the typical response to be expected from a sensor when exposed to a given test gas concentration (relevant to safety, e.g. TLV levels).

Gas	Conc.	70Z	Gas	Conc.	70 <u>Z</u>
Carbon monoxide:	300ppm	0ppm	Chlorine:	1ppm	<1ppm
Hydrogen sulphide:	15ppm	≈–2ppm	Hydrogen:	100ppm	0ppm
Sulphur dioxide:	5ppm	0ppm	Hydrogen cyanide:	10ppm	0ppm
Nitric oxide:	35ppm	0ppm	Hydrogen chloride:	5ppm	0ppm
Nitrogen dioxide:	5ppm	≈3.5ppm	Ethylene:	100ppm	0ppm
For information on other possible cross-interferents please contact City Technology.					

SAFETY NOTE

This sensor is designed to be used in safety critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

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Performance characteristics on this data sheet outline the performance of newly supplied sensors. Output signal can drift below the lower limit over time.

Ozone

Sensoric O3 3E 1

Sensoric O3 3E 1

FEATURES

Amperometric 3 electrode sensor cell Long life time High reliability High resolution Fast response time Fixed organic gel electrolyte

TYPICAL APPLICATIONS

Environmental monitoring Indoor Air Quality, water treatment plants

PART NUMBER INFORMATION

MINI	1531-031-30009
SENSORIC CLASSIC	1531-031-30069
CTL 4 series adaptation	1531-031-30049
CTL 7 series adaptation	1531-031-30079

Sensoric O3 3E 1

TECHNICAL SPECIFICATIONS

1000 - 2000 nA/ppm (negative signal) < ± 20 nA < 0.02 ppm 0 mV < 10% full scale
< 15 s calculated from 3 min. exposure time ¹⁾ < 60 s calculated from 3 min. exposure time ¹⁾
< 10% per 6 months ²⁾
-20 ℃ to +40 ℃ 15–90% r.H., non–condensing
abrupt changes will cause a short term drift
> 18 months 12 months

1) At approx. 30 ccm/ min. (tolerance range to t₉₀: 30 to 60 sec.; depend on air velocity; minimum gas flow 5 l/h)

2) At 20 °C and 30-50% r.H.; Sensitivity might increase over life time depending on application; high air flow conditions might effect life time.

Sensoric O3 3E 1

Temperature dependence on zero reading:



Sensoric O3 3E 1

RELATIVE OUTPUT vs. TEMPERATURE: (normalized to the output at 20 °C)



Sensoric O3 3E 1

CROSS SENSITIVITIES AT 20 °C

Gas	Concentration	Reading [ppm]
Bromine, Iodine Carbon Dioxide Carbon Monoxide Chlorine Chlorine Dioxide Hydrazine Hydrogen Hydrogen Sulfide	5000 ppm 100 ppm 1 ppm 1 ppm 3 ppm 3000 ppm 20 ppm	yes; n/d 0 1.2 1.5 -3 0 -1.6 ¹⁾
Nitrogen Nitrogen Dioxide	100 % 10 ppm	0
	i o ppin	0

1) Continuous exposure at ppm level over more than 30 min. might blind the sensor.

Notes:

1. Interference factors may differ from sensor to sensor and with life time. It is not adviseable to calibrate with interference gases.

2. This table does not claim to be complete. The sensor might also be sensitive to other gases.

Safety Note

This sensor is designed to be used in safety critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

Attention

Use of the Sensoric range sensors requires complete understanding of the instructions. Before using Sensoric range sensors please carefully read 'Application Notes' which can be found at www.citytech.com under the heading '*Support' -> 'Application Notes' -> 'Sensoric'*

Product Safety Data Sheets (PSDS) can be obtained at <u>www.citytech.com</u> under the heading '*Support' -> 'Product Safety Datasheets'*

For further assistance on sensor selection and use, please contact a member of the Technical Sales team.

Sensoric deems the data contained herein as factual, and the opinions expressed are those of qualified experts based on the results of tests conducted. The above data can not be used as a warranty provision or representation for which Sensoric assumes legal responsibility. The data are offered solely for consideration, investigation and verification. Any use of this information is subject to federal, state and local laws and regulations.

Ozone

Sensoric O3 3E 1 F

Sensoric O3 3E 1 F

FEATURES

Amperometric 3 electrode sensor cell Long life time High reliability Fast response Fixed organic gel electrolyte

TYPICAL APPLICATIONS

Environmental monitoring Indoor Air Quality, water treatment plants

PART NUMBER INFORMATION

MINI	1531-231-30009
SENSORIC CLASSIC	1531-231-30069
CTL 4 series adaptation	1531-231-30049
CTL 7 series adaptation	1531-231-30079

Sensoric O3 3E 1 F

TECHNICAL SPECIFICATIONS

Measuring Range Sensitivity Range Zero Current at 20 °C Resolution at 20 °C Bias Potential Linearity	0–1 ppm 450 +/- 150 nA/ppm (negative signal) < ± 10 nA < 0.03 ppm 0 mV < 10% full scale
Response Time at 20 °C t50 t90	< 15 s calculated from 3 min. exposure time ¹⁾ < 60 s calculated from 3 min. exposure time ¹⁾
Long Term Sensitivity Drift	< 5% per month ²⁾
Operation Conditions Temperature Range Humidity Range	-20 ℃ to +40 ℃ 15–90% r.H., non–condensing
Effect of Humidity	abrupt changes will cause a short term drift
Sensor Life Expectancy Warranty	> 18 months 12 months
1) At approx, 200 app/min (talarappa range to t , 20 to 6	0 and 1 depend on air valaaitu minimum aad flaw E l/b)

1) At approx. 200 ccm/ min. (tolerance range to t₉₀ : 30 to 60 sec.; depend on air velocity; minimum gas flow 5 l/h)

2) At 20 ℃ and 30-50% r.H.; Sensitivity might increase over life time depending on application; high air flow conditions might effect life time

Sensoric O3 3E 1 F

OUTPUT vs. TEMPERATURE:



ZERO READING vs. TEMPERATURE:

no effect

Sensoric O3 3E 1 F

CROSS SENSITIVITIES AT 20 °C

Gas	Concentration	Reading [ppm]
Bromine, Iodine Carbon Dioxide Carbon Monoxide Chlorine Chlorine Dioxide Hydrazine Hydrogen Hydrogen Sulfide Nitrogen	5000 ppm 100 ppm 1 ppm 3 ppm 3000 ppm 20 ppm 100 %	yes; n/d 0 1.2 1.5 -3 0 -1.6 ¹⁾ 0
	io ppin	0

1) Continuous exposure at ppm level over more than 30 min. might blind the sensor.

Notes:

- 1. Interference factors may differ from sensor to sensor and with life time. It is not adviseable to calibrate with interference gases.
- 2. This table does not claim to be complete. The sensor might also be sensitive to other gases.

Safety Note

This sensor is designed to be used in safety critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

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Ozone/Nitrogen dioxide EnviroceL® Specification



17.8 mm шШ 10.5 ٨

Sensing

Counter

3 Mounting Holes Equispaced on 34.4 PCD

A3OZ EnviroceL[®]

This sensor is one of a range for monitoring gases at levels found in the environment. It is designed to give accurate readings of O₃ or NO₂ in ambient air.

Performance Characteristics

Nominal Range	0-10ppm
Maximum Overload	100ppm
Expected Operating Life	Twoyears
Output Signal	2.2 ± 0.5 μA/ppm
Resolution at 20°C	20ppb
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
$T_{_{90}}$ Response Time	<40 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	0 to 0.1ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	0.1ppm equivalent
Typical Long Term Output Drift	<10% signal loss/year in air
Recommended Load Resistor	33Ω
Bias Voltage	Notrequired
Repeatability	1% of signal
Output Linearity	Linear

N.B. All performance data is based on conditions at 20°C, 50%RH, and 1013mBar

Physical Characteristics

Material	Polycarbonate	Carbon monoxid Nitrogen Dioxid Chlorin
Weight	22g	
Position Sensitivity	None	
Storage Life	Six months in CTL container	Sulphur Dioxid
Recommended Storage Temperature	0-20°C	Hydrogen Sulphid
Warranty Period	12 months from date of despatch	

Cross-Sensitivity Data

All tolerances ±0.15mm unless otherwise stated. A3OZ shown with side tags and gold pins. Do not solder to pin connections

Outline Dimensions

41.2 mm

6

]

3.0 mm Pin

Projection

27.7 mm

nominal

60°

<u>ө</u>

۵

Reference

42.5 MM

Ø 3.0 mm

Ø 1 mm on

34.2 PCD

Auxiliary

pin

Non-connected

None е 100% e 100% е None e e None



Circuitry required

The A3OZ EnviroceL differs from standard three electrode sensors by the introduction of a second working electrode, known as the **Auxiliary**. A suitable operating circuit is shown below.

Figure 1. A3OZ Operating Circuit

IC1 - This amplifier should have either a low offset or have its offset nulled out. The PMI OP-77, OP-90, Intersil or Teledyne 7650, and Linear Technology LT1078 are all suitable.

IC2, IC3 - This amplifier acts as a current to voltage converter and its offset performance is less critical. The OP-77 or similar is a suitable choice

Recommended value of **R**_{load} is given in the specification overleaf.



When no gas is present, there is a small zero gas (baseline) signal from each electrode. Upon exposure to nitrogen dioxide/ozone, the *sensing* electrode produces a signal proportional to the concentration of gas. Virtually all the gas is reacted on contact with this electrode, so the *auxiliary* electrode remains largely unaffected and hence the signal remains at its baseline level. It can therefore be assumed the *auxiliary* signal is wholly attributed to the baseline.

The baseline signal of both electrodes is slightly affected by changes in atmospheric conditions (e.g. temperature). However as both are subject to the same conditions, any shift in baseline on the *sensing* electrode will be followed by a similar shift in the *auxiliary*. Hence by comparing the two signals any baseline changes may be compensated.

Evaluating the nitrogen dioxide/ozone concentration of a sample from the two signals is a straightforward subtraction:-.



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