3MNDH CiTiceL®

Nitrogen Dioxide (NO_2) Gas Sensor with mV Output

Key Features & Benefits:

- **Robust 3-Series packaging**
- **Factory calibrated mV output**

Technical Specifications

MEASUREMENT

Sensor Type Used	3NDH
Maximum Range	200 ppm NO_2
Sensitivity	
Standard	1 mV/ppm ± 5%
High	10 mV/ppm ± 5%
Filter	None
Baseline Offset (Clean Air)	±1 mV
Response Time (T_{90})	<35 Seconds at 20°C
Resolution	0.1 ppm
Zero Shift (-20°C to +40°C)	<0.2 ppm equivalent
Repeatability	2% of signal
Linearity	Linear

ELECTRICAL

Power Supply Required	7 to 18 VDC single-ended or ±3.5 to ±9 VDC dual
Power Consumption	250 µA @ 9 VDC
Calibration	Via built-in span and zero potentiometers (Refer to OP14)

MECHANICAL

Weight	38 g (with connector)
Body Material	Polycarbonate
Position Sensitivty	None

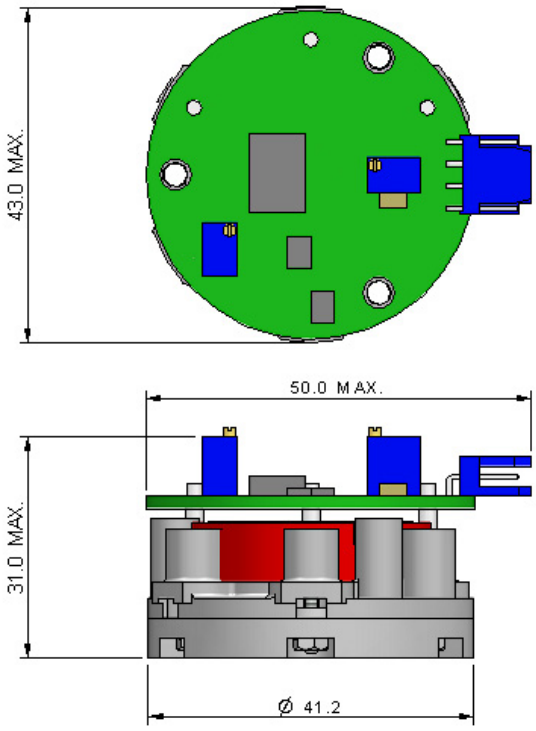
ENVIRONMENTAL

Operating Temperature Range	-20°C to +50°C
Recommended Storage Temp	0°C to 20°C
Temperature Compensation	None
Operating Pressure Range	Atmospheric ± 10%
Operating Humidity Range	15 to 90% RH non-condensing

LIFETIME

Long Term Sensitivity Drift	<2% signal loss/month
Expected Operating Life	Two years in air
Storage Life	6 months in CTL container
Standard Warranty	12 months from date of despatch

Product Dimensions



All dimensions in mm
All tolerances ±0.15 mm unless otherwise stated

IMPORTANT NOTE:

All performance data is based on conditions at 20°C, 50% RH and 1013 mBar. For further information on the operation and calibration of City Technology mV output sensors, please refer to OP14.

RANGES AVAILABLE

3MNDH is available with the following precalibrated sensitivities.

Sensitivity	Order Code
1 mV/ppm	MGH60-014
10 mV/ppm	MGH60-024

Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.
When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

Cross Sensitivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various other gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react. The figures are expressed as a percentage of the primary sensitivity (i.e. NO_2 = 100%).

Gas	Concentration Used (ppm)	3MNDH (%)
Carbon Monoxide, CO	300	0
Hydrogen Sulfide, H_2S	15	-10 < x < 0
Sulfur Dioxide, SO_2	5	-10 < x < 0
Nitric Oxide, NO	35	0
Chlorine, Cl_2	1	~ 100
Hydrogen, H_2	100	0
Hydrogen Cyanide, HCN	10	0
Hydrogen Chloride, HCl	5	0
Ethylene, C_2H_4	100	0

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.

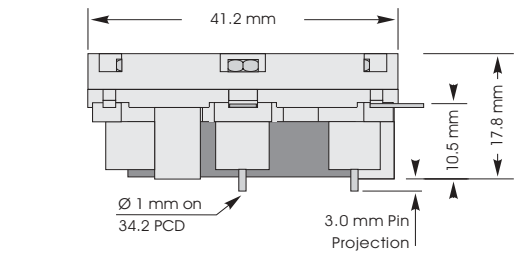
3ND CiTiceL®

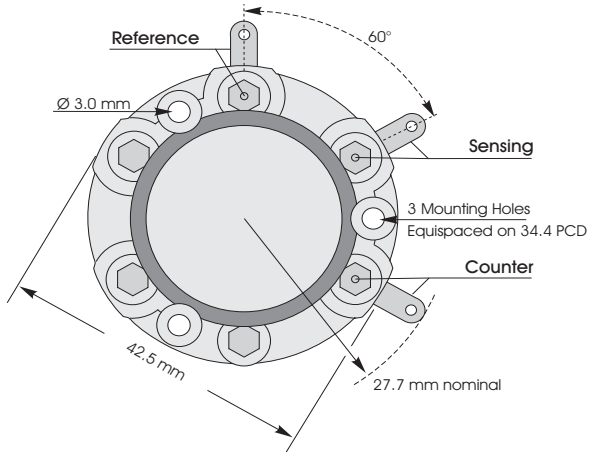
Performance Characteristics

Nominal Range	0-100ppm
Maximum Overload	1000ppm
Expected Operating Life	Two years in air
Output Signal	0.37 ± 0.07 µA/ppm
Resolution at 20°C	0.5ppm
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	0.037% signal/mBar
T_{90} Response Time	<35 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	0 to 0.2ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	-1ppm equivalent
Long Term Output Drift	<2% signal loss/month
Recommended Load Resistor	33 Ω
Bias Voltage	Not required
Repeatability	2% of signal
Output Linearity	Linear

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

Outline Dimensions

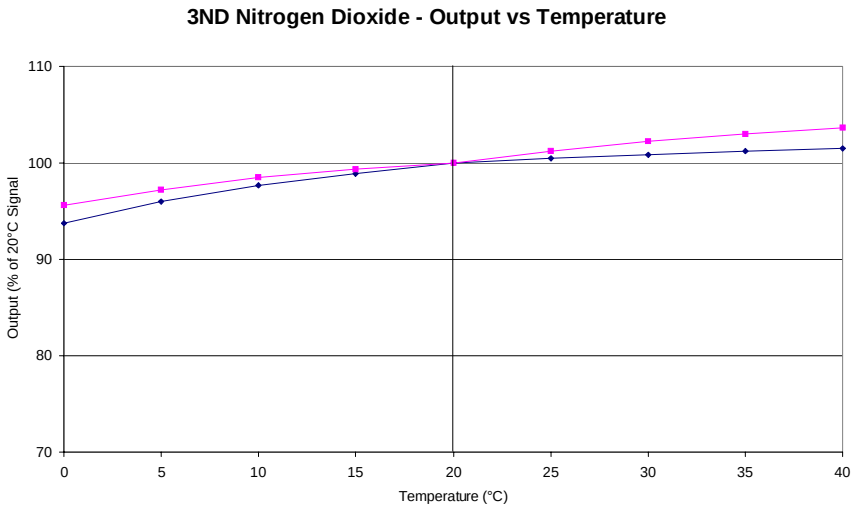




All tolerances ±0.15mm unless otherwise stated.
3ND shown with side tags and tin pins.
Do not solder to pin connections

Physical Characteristics

Weight	22g
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch



Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. The table below shows the typical response of 3ND CiTiceLs to a number of common cross-interfering gases. The figures are expressed as a percentage of the primary sensitivity (i.e. nitrogen dioxide = 100%).

Gas	Response	Gas	Response
Carbon monoxide:	<1%	**Hydrogen:**	< -1%
Hydrogen sulphide:	-40<x<0%	**Hydrogen chloride:**	< -1%
Sulphur dioxide:	-4<x<0%	**Ethylene:**	n/d
Nitric oxide:	< 1%		

** For details of other possible cross-interfering gases contact City Technology.**

n/d: No data, under investigation

Ordering Information

The 3ND Nitrogen Dioxide CiTiceL is available with side tags, gold-plated PCB pins, or both PCB pins and side tags. To ensure the appropriate option is supplied care must be taken to provide the correct code when ordering.

Type 3ND:-	With side tag and PCB pin connections - **3ND** With side tag connection - **3ND(S)** With gold-plated PCB pin connection - **3ND(G)**

Performance Characteristics

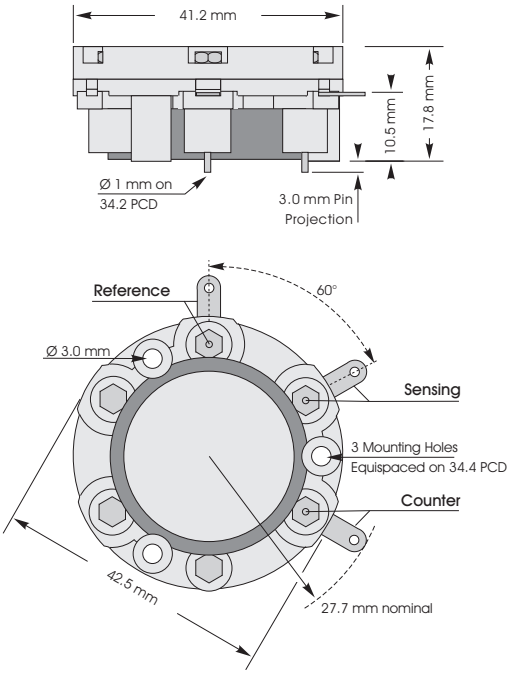
Nominal Range	0-20ppm
Maximum Overload	300ppm
Expected Operating Life	2 years in air
Output Signal	1.40 ± 0.30 µA/ppm
Resolution	0.1ppm
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
T_{90} Response Time	<40 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	-0.1 to 0.1ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	0.2ppm equivalent
Long Term Output Drift	<2% signal loss/month
Recommended Load Resistor	33Ω
Bias Voltage	Not required
Repeatability	2% of signal
Output Linearity	Linear

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

Physical Characteristics

Weight	22g
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch

Product Dimensions



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

Ordering Information

The 3NDH Nitrogen Dioxide CiTiceL is available with side tags, gold-plated PCB pins, or both PCB pins and side tags. To ensure the appropriate option is supplied care must be taken to provide the correct code when ordering.

Type 3NDH:
With side tag and PCB pin connections - **3NDH**
With side tag connection - **3NDH(S)**
With gold-plated PCB pin connection - **3NDH(G)**

Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. 3NDH 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.	3NDH	Gas	Conc.	3NDH
Carbon monoxide:	300ppm	0ppm	**Hydrogen:**	100ppm	0ppm
Hydrogen sulphide:	15ppm	-1.5≤ x ≤0ppm	**Hydrogen cyanide:**	10ppm	0ppm
Sulphur dioxide:	5ppm	-0.05≤ x ≤0ppm	**Hydrogen chloride:**	5ppm	0ppm
Nitric oxide:	35ppm	0ppm	**Ethylene:**	100ppm	0ppm
Chlorine:	1ppm	≈1ppm			

For details of other possible cross-interfering gases 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.

4ND CiTiceL®

Performance Characteristics

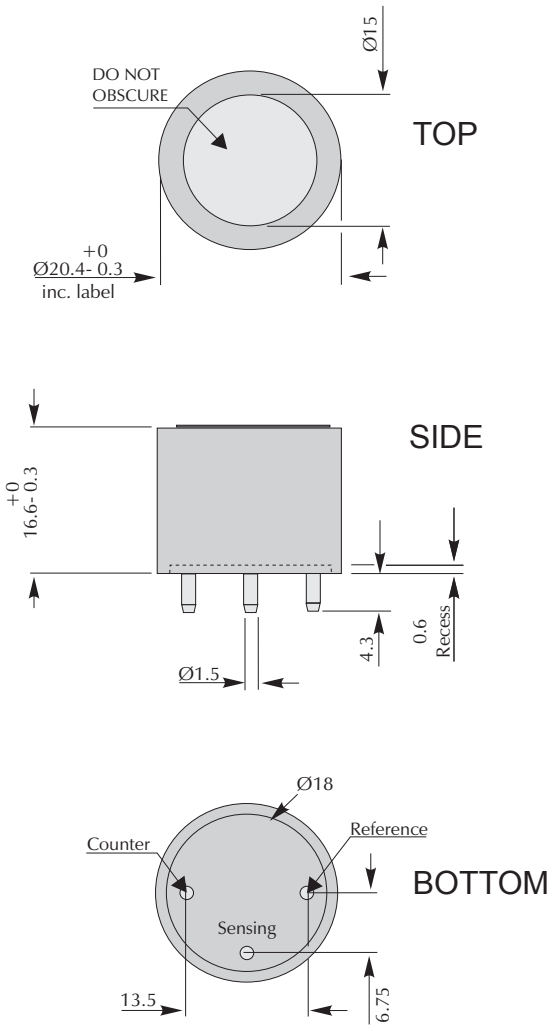
Nominal Range	0-20 ppm
Maximum Overload	150 ppm
Expected Operating Life	Two years in air
Output Signal	0.6 ± 0.15 µA/ppm
Resolution	0.1 ppm
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
T_{90} Response Time	<25 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	-0.2 to +0.2 ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	0.2 ppm equivalent
Long Term Output Drift	<2% signal loss/month
Recommended Load Resistor	33 Ω
Bias Voltage	Not required
Repeatability	<2% 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	5 g (approx.)
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch

Outline Dimensions

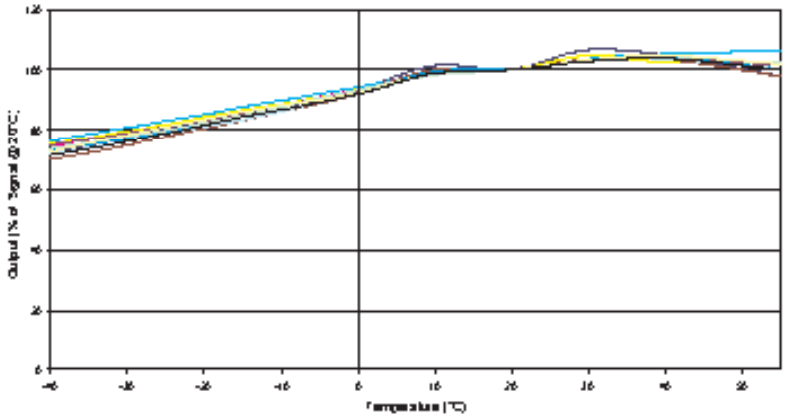


All dimensions in mm
All tolerances ±0.15 mm unless otherwise stated

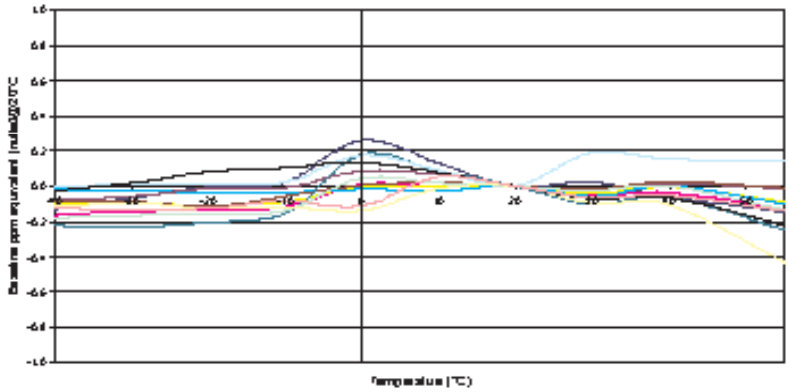
IMPORTANT NOTE: Connection should be made via PCB sockets only. Soldering to the pins will seriously damage your sensor.

Nitrogen Dioxide CiTiceL® Specification

4ND Nitrogen Dioxide CiTiceL - Output vs Temperature



4ND Nitrogen Dioxide CiTiceL - Baseline vs Temperature



Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. 4ND 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.	4ND	Gas	Conc.	4ND
Carbon monoxide:	300ppm	0ppm	**Nitric oxide:**	35ppm	0ppm
Hydrogen sulphide	15ppm	~-1.2ppm	**Chlorine:**	1ppm	~1ppm
Sulphur dioxide:	5ppm	0ppm			

For details of other possible cross-interfering gases 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.

5ND CiTiceL®

Performance Characteristics

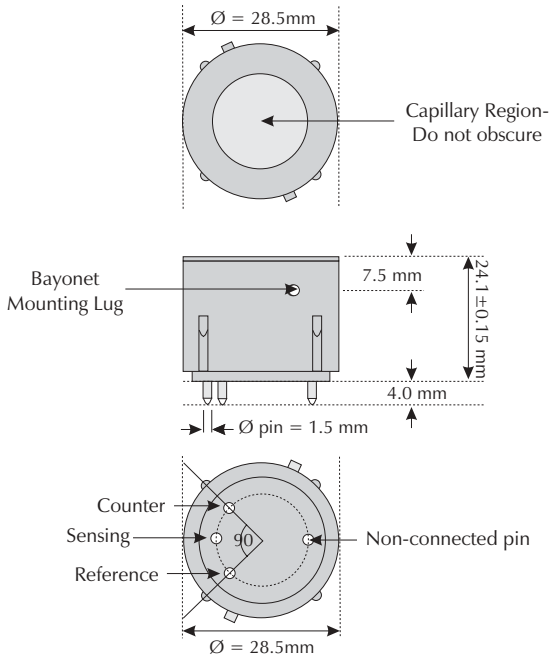
Nominal Range	0-200ppm
Maximum Overload	1000ppm
Expected Operating Life	Two years in air
Output Signal	0.37 ± 0.07 µA/ppm
Resolution at 20°C	0.5ppm
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	0.037% signal/mBar
T_{90} Response Time	<60 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	±0.5ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	-1ppm equivalent
Long Term Output Drift	<2% signal loss/month
Recommended Load Resistor	33 Ω
Bias Voltage	Not required
Repeatability	2% of signal
Output Linearity	Linear

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

Physical Characteristics

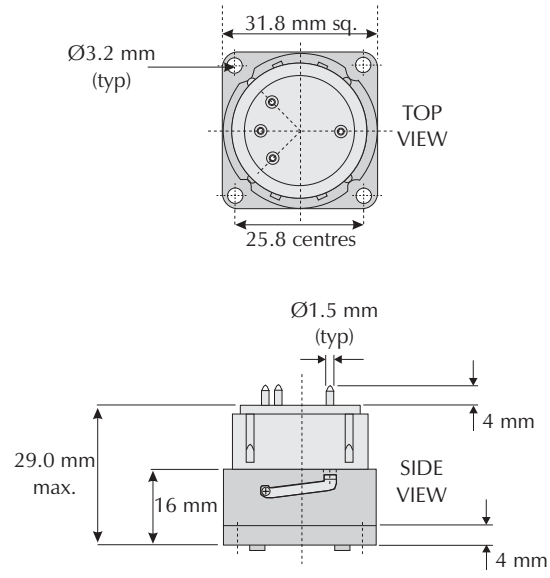
Colour Coding	Black
Weight	10 g
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch

Outline Sensor Dimensions



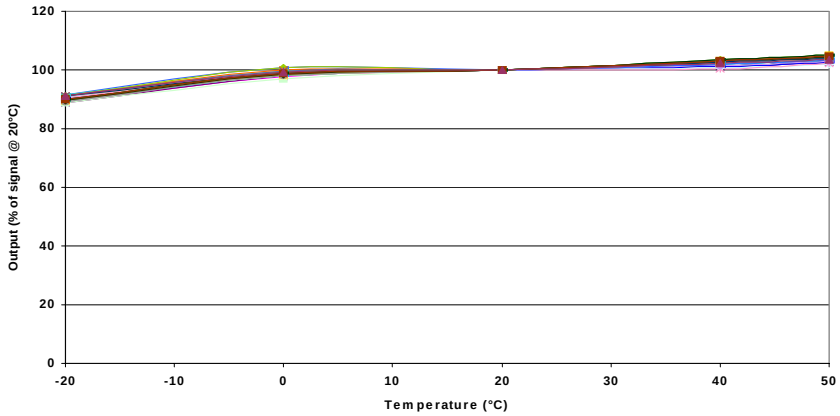
(Four pins on 17.0 mm PCD)

With Bayonet Fitting

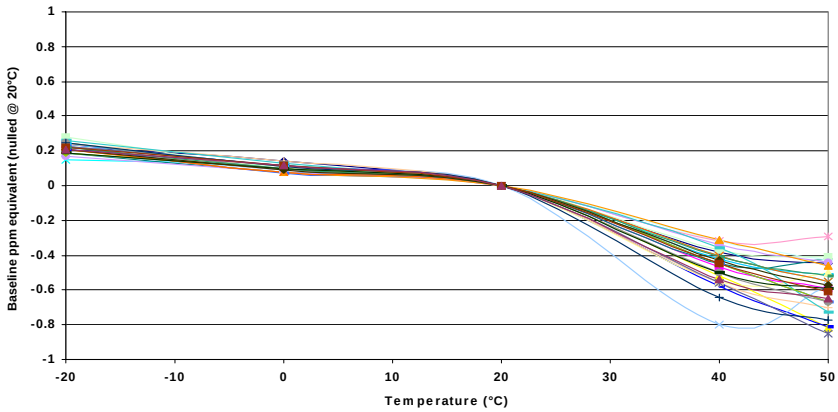


All tolerances ±0.15mm unless otherwise stated

5ND Nitrogen Dioxide CiTiceL - Typical Output vs Temperature



5ND Nitrogen Dioxide CiTiceL - Typical Baseline vs Temperature



Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. The table below shows the typical response of 5ND sensors to a number of common cross-interfering gases. The figures are expressed as a percentage of the primary sensitivity (i.e. nitrogen dioxide = 100%).

Gas	Response	Gas	Response
Hydrogen sulphide:	≈-25%	**Hydrogen:**	<-1%
Sulphur dioxide:	≈-3%	**Hydrogen chloride:**	<-1%
Nitric oxide:	<1%	**Carbon monoxide:**	<-1%

** For details of other possible cross-interfering gases contact City Technology.**

7NDH CiTiceL®

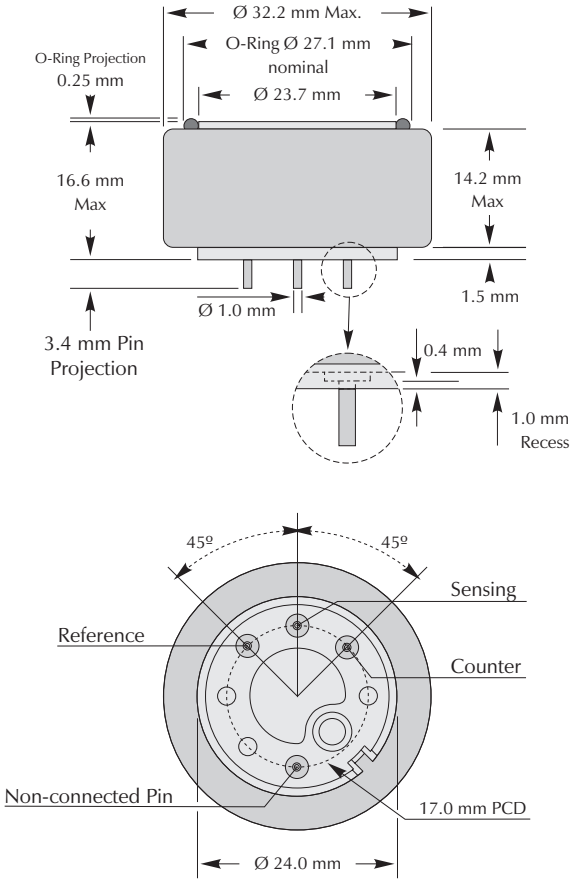
Performance Characteristics

Nominal Range	0-20 ppm
Maximum Overload	200 ppm
Expected Operating Life	Two years in air
Output Signal	1.40 ± 0.30 µA/ppm
Resolution	0.1 ppm
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
T_{90} Response Time	T_{90}<40 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	-0.1 to 0.1 ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	0.2 ppm equivalent
Long Term Output Drift	<2% signal loss/month
Recommended Load Resistor	33 Ω
Bias Voltage	Not required
Repeatability	2% of signal
Output Linearity	Linear

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

Physical Characteristics

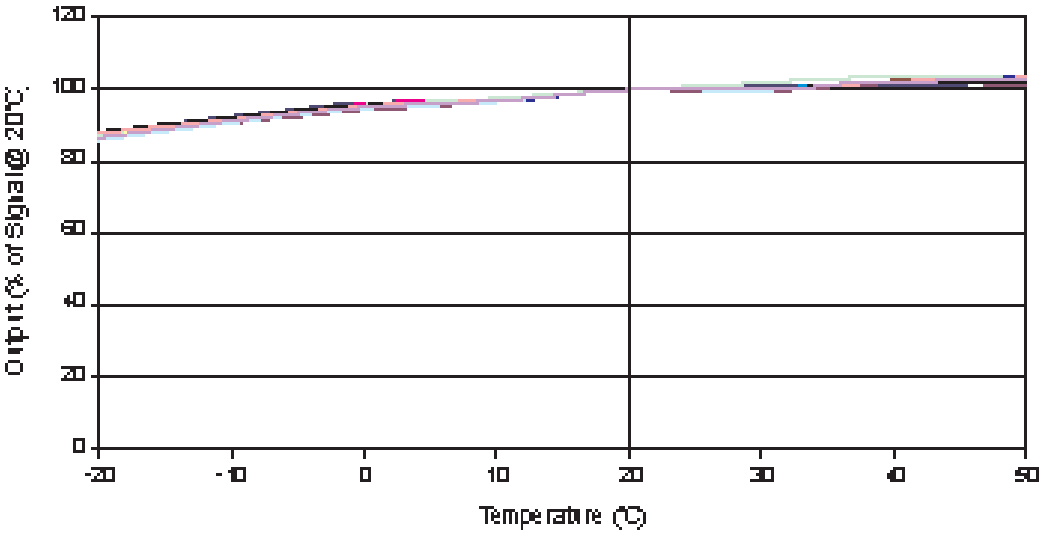
Weight	17 g
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch



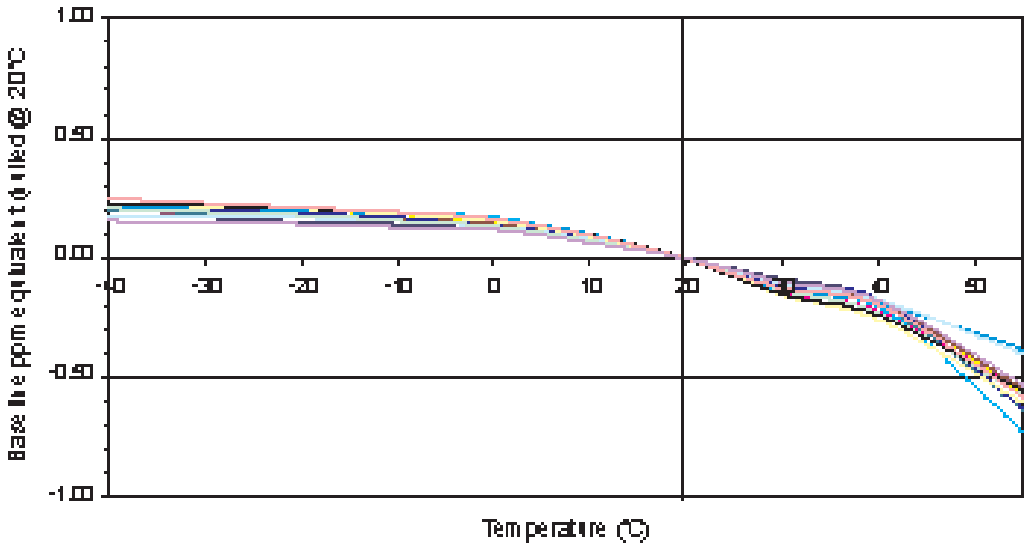
All tolerances ±0.15mm unless otherwise stated.
Do not solder to pin connections

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

7ND H Nitrogen dioxide CiTiceL- Output vs Temperature



7NDH Nitrogen dioxide CiTiceL- Baseline vs Temperature



Cross-sensitivity Data

CiTiceLs may exhibit a response to certain gases in a sample other than the target gas. 7NDH 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.	7NDH	Gas	Conc.	7NDH
Carbon monoxide:	300ppm	0ppm	**Hydrogen:**	100ppm	0ppm
Hydrogen sulphide:	15ppm	-1.5≤ x ≤0ppm	**Hydrogen cyanide:**	10ppm	0ppm
Sulphur dioxide:	5ppm	-0.05 ≤x ≤0ppm	**Hydrogen chloride:**	5ppm	0ppm
Nitric oxide:	35ppm	0ppm	**Ethylene:**	100ppm	0ppm
Chlorine:	1ppm	≈1ppm			

For details of other possible cross-interfering gases 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.

EZT3NDH CiTiceL®

Nitrogen Dioxide (NO_2) Gas Sensor with EasyCal Transmitter

Key Features & Benefits:

- **Robust 3-Series packaging**
- **Industry standard 4-20 mA output**

Technical Specifications

MEASUREMENT

Sensor Type Used	3NDH
Filter	None
Output	4-20 mA d.c., two wire loop powered
Response Time (T_{90})	<40 Seconds at 20°C
Resolution	0.1 ppm
Zero Shift (-20°C to +40°C)	< 0.2 ppm equivalent
Repeatability	2% of signal
Linearity	Linear

ELECTRICAL

Power Supply Required	10 - 35 VDC single-ended
Calibration	Via built-in push buttons

MECHANICAL

Mounting	Via mounting nose supplied
Weight	58 g including mounting accessory
Position Sensitivty	None

ENVIRONMENTAL

Operating Temperature Range	-20°C to +50°C
Recommended Storage Temp	0°C to 20°C
Temperature Compensation	None
Operating Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
Operating Humidity Range	15 - 90% RH non-condensing

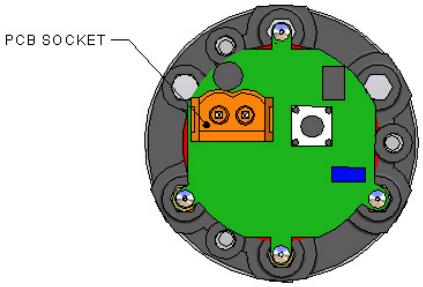
LIFETIME

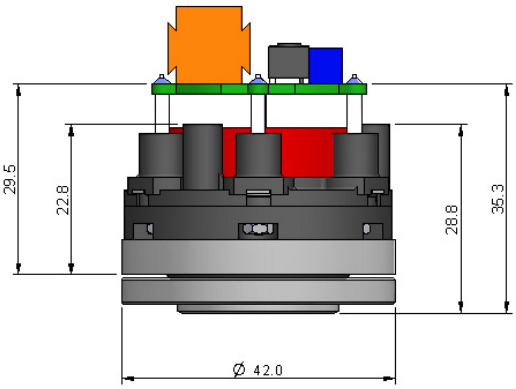
Long Term Sensitivity Drift	<2% signal loss/month
Expected Operating Life	Two years in air
Storage Life	6 months in CTL container
Standard Warranty	12 months from date of despatch

IMPORTANT NOTE:

All performance data is based on conditions at 20°C, 50% RH and 1013 mBar. For further information on the operation and calibration of City Technology EasyCal 4-20mA transmitters, please refer to OP-13.

Product Dimensions





All dimensions in mm
All tolerances ±0.15 mm unless otherwise stated

RANGES AVAILABLE

3NDH CiTiceL 4-20 mA EasyCal Transmitters are available with the following precalibrated ranges, and can be recalibrated to intermediate ranges.

Range	Order Code
0-5 ppm	2TG3A-1A
0-10 ppm	2TG3B-1A
0-20 ppm	2TG3C-1A
0-50 ppm	2TG3D-1A

Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.
When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

Cross Sensitivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various other gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react.

Gas	Concentration Used (ppm)	3NDH (ppm NO_2)
Carbon Monoxide, CO	300	0
Hydrogen Sulfide, H_2S	15	-1.5 < x < 0
Sulfur Dioxide, SO_2	5	-0.05 < x < 0
Nitric Oxide, NO	35	0
Chlorine, Cl_2	1	≈1
Hydrogen, H_2	100	0
Hydrogen Cyanide, HCN	10	0
Hydrogen Chloride, HCl	5	0
Ethylene, C_2H_4	100	0

The cross-sensitivity values quoted are based on tests conducted on a small number of sensors. They are intended to indicate sensor response to gases other than the target gas. Sensors may behave differently with changes in ambient conditions and any batch may show significant variation from the values quoted.

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.

MND-1S MediceL®

Nitrogen Dioxide (NO_2) Gas Sensor
Part Number: AG010-H00

Key Features & Benefits:

- Capable of continuous measurement
- 4th electrode for additional temperature stability

Technical Specifications

MEASUREMENT

Operating Principle	4-electrode electrochemical
Measurement Range	0-50 ppm NO_2
Maximum Overlaod	200 ppm
Ouput Signal	0.5 ± 0.1 µA/ppm
Response Time (T_{90})	< 50 seconds
Typical Baseline Offset (clean air)	-0.75 to +0.75 ppm equivalent
Repeatability	2% of signal
Linearity	Linear

ELECTRICAL

Recommended Load Resistor	10 Ω
Bias Voltage	Not Required
Recommended Gain	0.8

MECHANICAL

Weight	21 g (nominal)
Housing Material	20% glass-filled polypropylene
Colour Coded Ring	Black
Orientation	Any

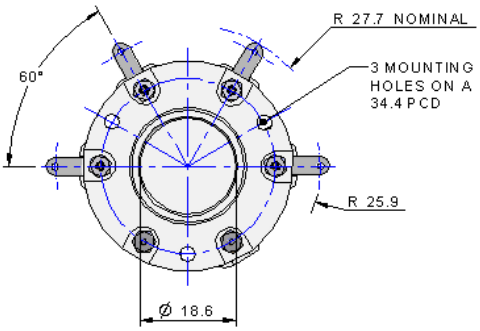
ENVIRONMENTAL

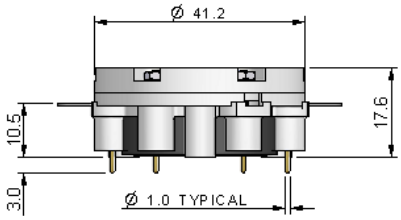
Typical Applications	Inhaled Nitric Oxide Therapy
Operating Temperature Range	-20°C to +50°C
Recommended Storage Temp	0°C to +20°C
Operating Pressure Range	800 - 1200 mBar
Differential Pressure Range	±100 mBar
Storage Temperature Range	800 - 1200 mBar
Operating Humidity Range	15% to 90% RH non-condensing

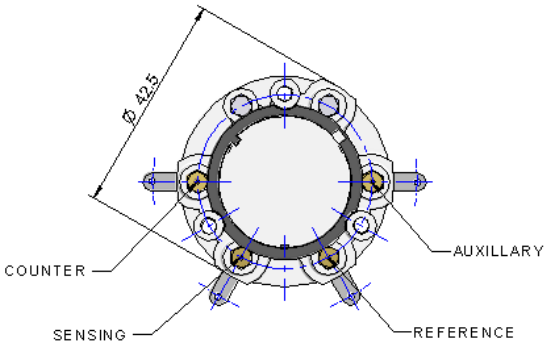
LIFETIME

Typical Long Term Ouput Drift	2% signal loss/month
Expected Operating Life	1 year
Standard Warranty	12 months from date of despatch

Product Dimensions







All dimensions in mm
All tolerances ±0.15 mm
unless othewise stated

IMPORTANT NOTE:

Connection should be made via recommended mating parts only. Soldering to the sensor will damage it and invalidate the warranty.

All performance data is based on measurements made with cylinder gases using a flow rate of 100 mls/min. Conditions at 20°C, 50% RH and 1013 mBar, using City Technology recommended circuitry. For sensor performance data under other conditions, contact City Technology.

Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions, however it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.
When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

Cross Sensitivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react.

Gas	Response
Carbon Monoxide (CO)	None
Nitrous Oxide (N_2O)	None
Nitric Oxide (NO)	None
Desflurane	None
Isoflurane	None
Halothane	None

The cross-sensitivity values quoted are based on tests conducted on a small mumber of sensors. They are intended to indicate sensor response to gases other than the target gas. Sensors may behave differently with changes in ambient conditions and any batch may show significant variation from the values quoted.

N.B. Unaffected by operation in 100% oxygen

WARNING: By the nature of the technology used, any electrochemical or catalytic bead sensor can potentially fail to meet specification without warning. Although City Technology makes every effort to ensure the reliability of our products of this type, where life safety is a performance requirement of the product, and we recommend that all sensors and all instruments using these sensors are checked for response to gas before use.

MND-2 MediceL®

Nitrogen Dioxide (NO_2) Gas Sensor
Part Number: AG7F4-400

Key Features & Benefits:

- Capable of continuous measurement
- 4th electrode for additional temperature stability

Technical Specifications

MEASUREMENT

Operating Principle	4-electrode electrochemical
Measurement Range	0-50 ppm NO_2
Maximum Overlaod	200 ppm
Ouput Signal	0.5 ± 0.1 µA/ppm
Response Time (T_{90})	< 40 seconds
Typical Baseline Offset (clean air)	-0.75 to +0.75 ppm equivalent
Repeatability	2% of signal
Linearity	Linear

ELECTRICAL

Recommended Load Resistor	10 Ω
Bias Voltage	Not Required
Recommended Gain	0.8

MECHANICAL

Weight	16 g (nominal)
Housing Material	20% glass-filled polypropylene
Orientation	Any

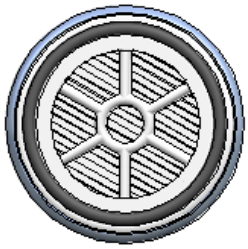
ENVIRONMENTAL

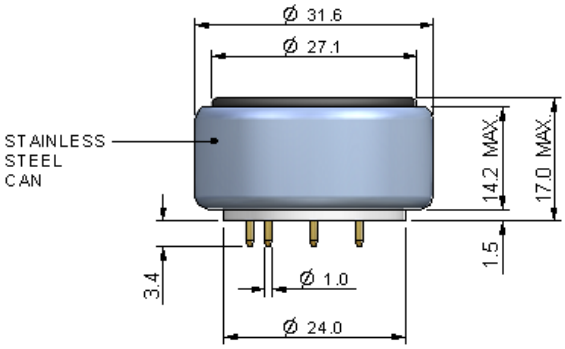
Typical Applications	Inhaled Nitric Oxide Therapy
Operating Temperature Range	-20°C to +50°C
Recommended Storage Temp	0°C to +20°C
Operating Pressure Range	800 - 1200 mBar
Differential Pressure Range	±100 mBar
Operating Humidity Range	15% to 90% RH non-condensing

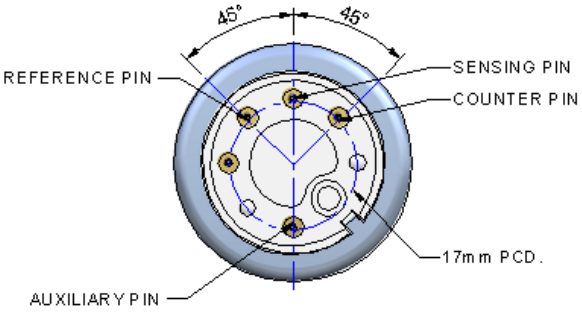
LIFETIME

Typical Long Term Ouput Drift	2% signal loss/month
Expected Operating Life	1 year
Standard Warranty	12 months from date of despatch

Product Dimensions







All dimensions in mm
All tolerances ±0.15 mm
unless othewise stated

IMPORTANT NOTE:

Connection should be made via recommended mating parts only. Soldering to the sensor will damage it and invalidate the warranty.

All performance data is based on measurements made with cylinder gases using a flow rate of 100 mls/min. Conditions at 20°C, 50% RH and 1013 mBar, using City Technology recommended circuitry. For sensor performance data under other conditions, contact City Technology.

Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions, however it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.
When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

Cross Sensitivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react.

Gas	Response
Carbon Monoxide (CO)	None
Nitrous Oxide (N_2O)	None
Nitric Oxide (NO)	None
Desflurane	None
Isoflurane	None
Halothane	None

The cross-sensitivity values quoted are based on tests conducted on a small mumber of sensors. They are intended to indicate sensor response to gases other than the target gas. Sensors may behave differently with changes in ambient conditions and any batch may show significant variation from the values quoted.

N.B. Unaffected by operation in 100% oxygen

WARNING: By the nature of the technology used, any electrochemical or catalytic bead sensor can potentially fail to meet specification without warning. Although City Technology makes every effort to ensure the reliability of our products of this type, where life safety is a performance requirement of the product, and we recommend that all sensors and all instruments using these sensors are checked for response to gas before use.

T3ND CiTiceL®

Nitrogen Dioxide (NO_2) Gas Sensor with Transmitter

Key Features & Benefits:

- **Robust 3-Series packaging**
- **Industry standard 4-20 mA output**

Technical Specifications

MEASUREMENT

Sensor Type Used	3ND
Filter	None
Output	4-20 mA d.c.
Response Time (T_{90})	<35 Seconds at 20°C
Resolution	0.1 ppm
Zero Shift (-20°C to +40°C)	<0.2 ppm equivalent
Repeatability	2% of signal
Linearity	Linear

ELECTRICAL

Power Supply Required	10 - 35 VDC single-ended
Output Impedance	4 MΩ
Calibration	Via built-in span and zero potentiometers

MECHANICAL

Mounting	Via mounting nose supplied
Weight	58 g including mounting accessory
Position Sensitivty	None

ENVIRONMENTAL

Operating Temperature Range	-20°C to +50°C
Recommended Storage Temp	0°C to 20°C
Temperature Compensation	None
Operating Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
Operating Humidity Range	15 - 90% RH non-condensing

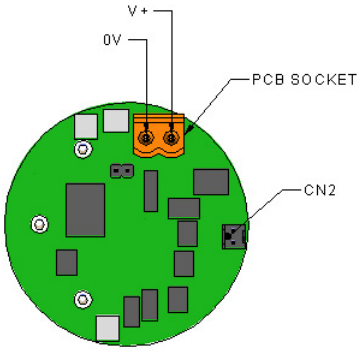
LIFETIME

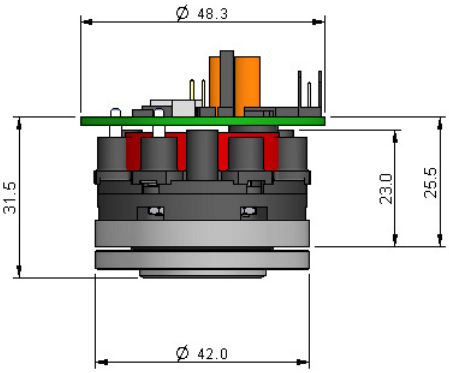
Long Term Sensitivity Drift	<2% signal loss/month
Expected Operating Life	Two years in air
Storage Life	6 months in CTL container
Standard Warranty	12 months from date of despatch

IMPORTANT NOTE:

All performance data is based on conditions at 20°C, 50% RH and 1013 mBar. For further information on the operation and calibration of City Technology 4-20mA transmitters, please refer to OP-12.

Product Dimensions





All dimensions in mm
All tolerances ±0.15 mm unless otherwise stated

RANGES AVAILABLE

The 3ND CiTiceL 4-20 mA Transmitter is available with one precalibrated range, but can be recalibrated to intermediate ranges.

Range	Order Code
0-300 ppm	TG2H-1A

Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.
When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

Cross Sensitivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various other gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react. The figures are expressed as a percentage of the primary sensitivity (i.e. NO_2 = 100%).

Gas	3ND (%)
Nitrogen Dioxide, NO_2	100
Carbon Monoxide, CO	<1
Hydrogen Sulfide, H_2S	-40 < x < 0
Sulfur Dioxide, SO_2	-4 < x < 0
Nitric Oxide, NO	<1
Hydrogen, H_2	< -1

The cross-sensitivity values quoted are based on tests conducted on a small number of sensors. They are intended to indicate sensor response to gases other than the target gas. Sensors may behave differently with changes in ambient conditions and any batch may show significant variation from the values quoted.

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.

T3NDH CiTiceL®

Nitrogen Dioxide (NO_2) Gas Sensor with Transmitter

Key Features & Benefits:

- **Robust 3-Series packaging**
- **Industry standard 4-20 mA output**

Technical Specifications

MEASUREMENT

Sensor Type Used	3NDH
Filter	None
Output	4-20 mA d.c.
Response Time (T_{90})	<35 Seconds at 20°C
Resolution	0.1 ppm
Zero Shift (-20°C to +40°C)	< 0.2 ppm equivalent
Repeatability	2% of signal
Linearity	Linear

ELECTRICAL

Power Supply Required	10 - 35 VDC single-ended
Output Impedance	4 MΩ
Calibration	Via built-in span and zero potentiometers

MECHANICAL

Mounting	Via mounting nose supplied
Weight	58 g including mounting accessory
Position Sensitivty	None

ENVIRONMENTAL

Operating Temperature Range	-20°C to +50°C
Recommended Storage Temp	0°C to 20°C
Temperature Compensation	None
Operating Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
Operating Humidity Range	15 - 90% RH non-condensing

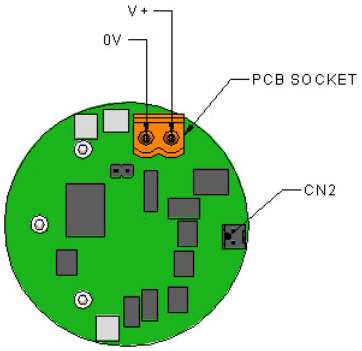
LIFETIME

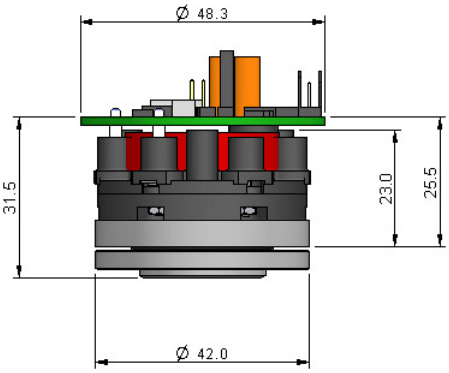
Long Term Sensitivity Drift	<2% signal loss/month
Expected Operating Life	Two years in air
Storage Life	6 months in CTL container
Standard Warranty	12 months from date of despatch

IMPORTANT NOTE:

All performance data is based on conditions at 20°C, 50% RH and 1013 mBar. For further information on the operation and calibration of City Technology 4-20mA transmitters, please refer to OP-12.

Product Dimensions





All dimensions in mm
All tolerances ±0.15 mm unless otherwise stated

RANGES AVAILABLE

3NDH CiTiceL 4-20 mA Transmitters are available with the following precalibrated ranges, and can be recalibrated to intermediate ranges.`

Range	Order Code
0-5 ppm	TG3A-1A
0-10 ppm	TG3B-1A
0-20 ppm	TG3C-1A
0-30 ppm	TG3D-1A
0-50 ppm	TG3E-1A
0-100 ppm	TG3F-1A
0-200 ppm	TG3G-1A
0-300 ppm	TG3H-1A

Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.
When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

Cross Sensitivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various other gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react.

Gas	Concentration Used (ppm)	3NDH (ppm NO_2)
Carbon Monoxide, CO	300	0
Hydrogen Sulfide, H_2S	15	$-1.5 < x < 0$
Sulfur Dioxide, SO_2	5	$-0.05 < x < 0$
Nitric Oxide, NO	35	0
Chlorine, Cl_2	1	≈ 1
Hydrogen , H_2	100	0
Hydrogen Cyanide, HCN	10	0
Hydrogen Chloride, HCl	5	0
Ethylene, C_2H_4	100	0

The cross-sensitivity values quoted are based on tests conducted on a small number of sensors. They are intended to indicate sensor response to gases other than the target gas. Sensors may behave differently with changes in ambient conditions and any batch may show significant variation from the values quoted.

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.

二氧化氮电化学传感器 *0 ~ 2000 ppm*

特性指标

产品型号	CLE-0323-400
正常检测范围	0-2000 ppm
灵敏度	0.02± 0.01 μA/ppm
底电流（20 °C）	< ± 0.4 μA
基线漂移(-20 ~ 50 °C)	相当于 0 ~-20ppm NO_2
分辨率	5 ppm
响应时间(T_{90})	≤60 秒
线性度	线性
长期稳定性	<2% 信号值/月

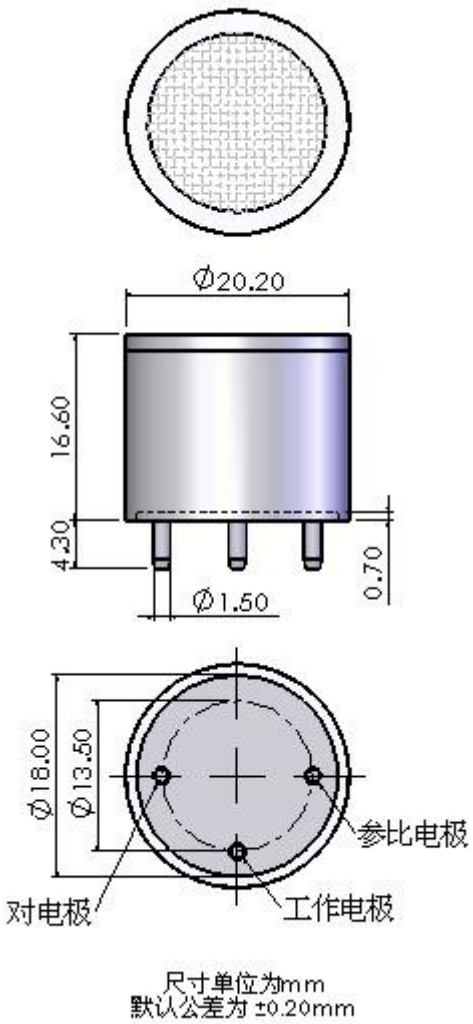
工作条件

工作温度	-20 ~ 50°C
工作湿度	15 ~ 90%RH （无冷凝）
工作压力	91 ~ 111 kPa
偏压	0 mV
储存时间	6 个月 （专用包装盒中）
储存温度	0 ~ 20°C
使用寿命	2 年
质保期	交货后 12 个月

物理指标

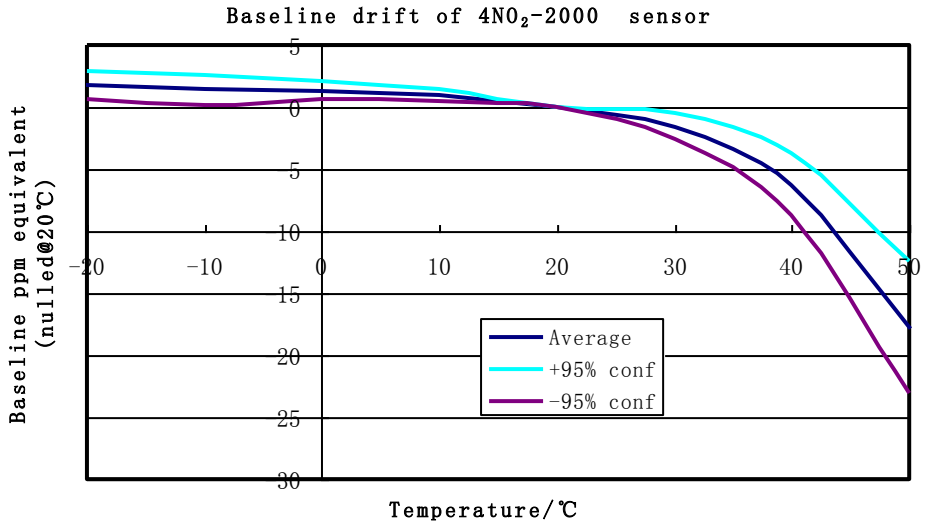
重量	约 5 克
方位要求	无

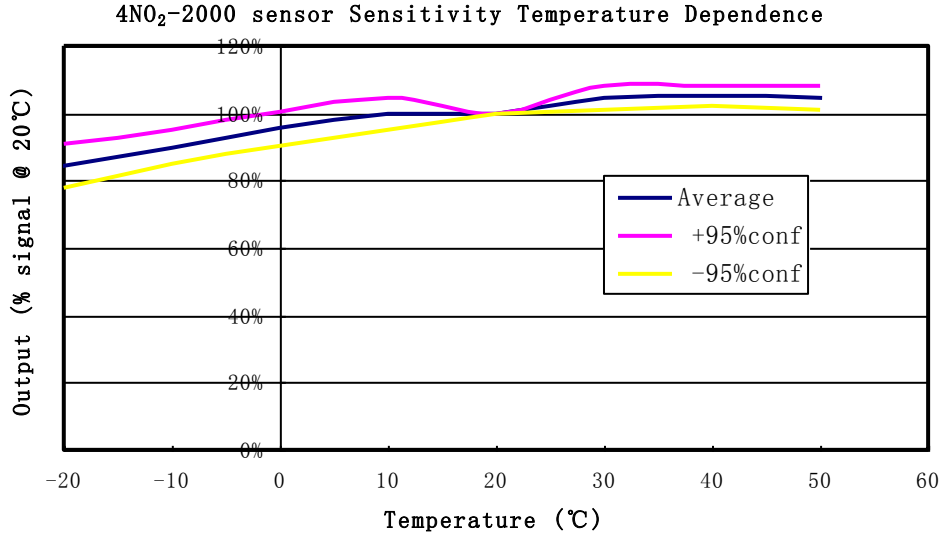
外形尺寸



尺寸单位为mm
默认公差为 ±0.20mm

温度影响





交叉灵敏度

气体种类	浓度 (ppm)	输出信号 (相当于 NO_2 浓度，ppm)
一氧化碳	300	0
硫化氢	15	0
二氧化硫	5	-5
一氧化氮	35	-5
氯气	1	0

Classic Line 4-NO_2-20 Sensor

SolidsenSe Gas Sensors

二氧化氮传感器 0-20 ppm

性能表征

产品型	CLE-0321-400
量程	0 to 20 ppm
最大荷载	250 ppm
灵敏度	0.60 ± 0.15 μA/ppm
基线（20 °C）	< ± 0.4 μA
基线漂移 (-20 to 40 °C)	相当于 0 to -0.5 ppm
分辨率	0.1 ppm
响应时间 (T_{90})	≤ 30 秒
线性度	线性
长期稳定性	< 2% 信号值/月

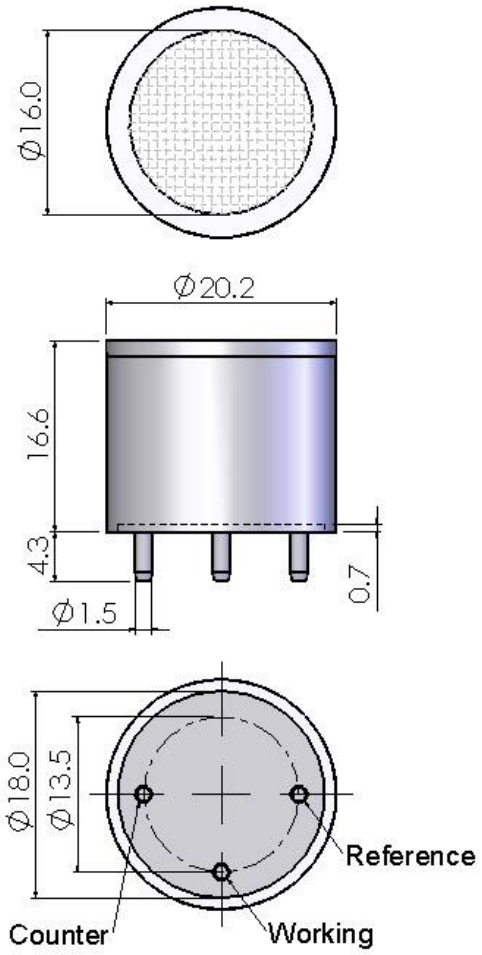
工作条件

工作温度	-20 °C to 50 °C
工作湿度	15 to 90%RH（无冷凝）
工作压力	90 to 110 kPa
偏压	0 mV
储存时间	6 个月（专用包装盒中）
储存温度	0 °C to 20 °C
使用寿命	空气中 2 年
质保期	交货后 12 个月

物理性能

重量	约 5 克
方位要求	无

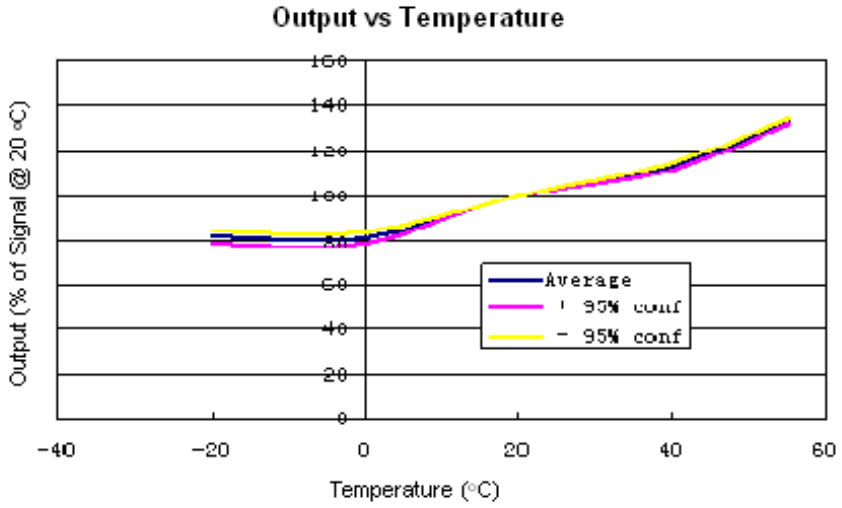
Outline Dimensions

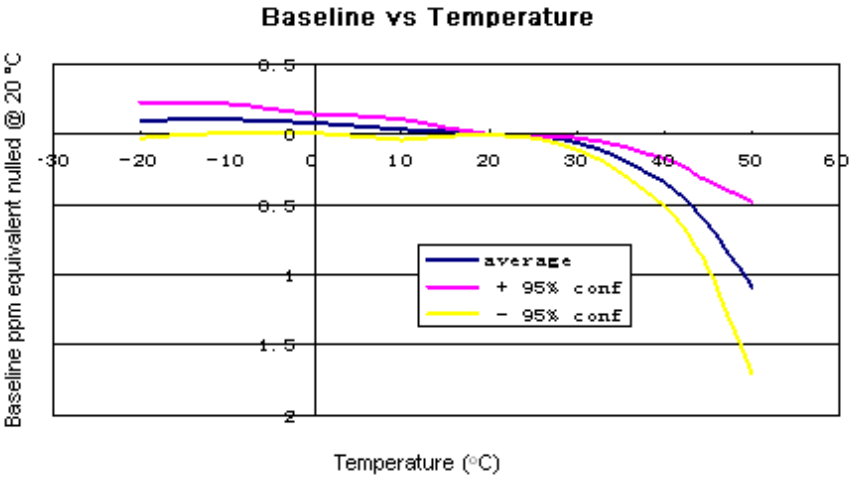


All dimensions are in millimeters.
All tolerances are ±0.2mm.

Note: 推荐使用 PCB 插座来连接传感器，焊接会损害传感器。

温度影响





交叉灵敏度

气体	浓度(ppm)	输出信号 (相当于 ppm NO_2)
一氧化碳	300	0
硫化氢	15	-1.2
二氧化硫	5	-5
一氧化氮	35	0
氯 气	1	-1

使用须知

1. 以上所有性能规格都是在环境条件：温度 20 ℃, 相对湿度 50% RH，一个大气压（100 kPa 或环境压力）下测得。
2. 推荐用目标气体进行标定。如果用交叉敏感气体进行标定，我们不保证其标定和测量的准确度。
3. 交叉灵敏度会有+/- 30%的浮动，并且可能随着传感器的生产批次不同和传感器的寿命而变化。
4. 上述交叉灵敏度包括但不限于上述气体，该传感器有可能对其他气体有响应。

二氧化氮传感器 0-20 ppm

性能表征

产品型号	CLE-0321-700
量程	0 to 20 ppm
最大荷载	250 ppm
灵敏度	0.60 ± 0.15 μA/ppm
基线（20 °C）	< ± 0.4 μA
基线漂移 (-20 to 50 °C)	相当于 0 to -0.5 ppm
分辨率	0.1 ppm
响应时间 (T_{90})	≤ 30 秒
线性度	线性
长期稳定性	< 2% 信号值/月

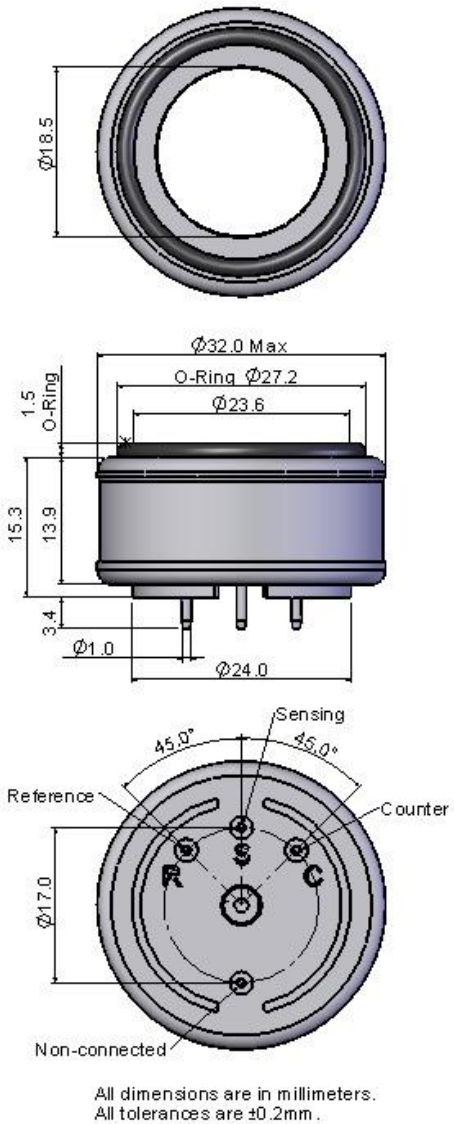
工作条件

工作温度	-20 °C to 50 °C
工作湿度	15 to 90%RH（无冷凝）
工作压力	90 to 110 kPa
偏压	0 mV
储存时间	6 个月（专用包装盒中）
储存温度	0 °C to 20 °C
使用寿命	空气中 2 年
质保期	交货后 12 个月

物理性能

重量	约 8 克
方位要求	无

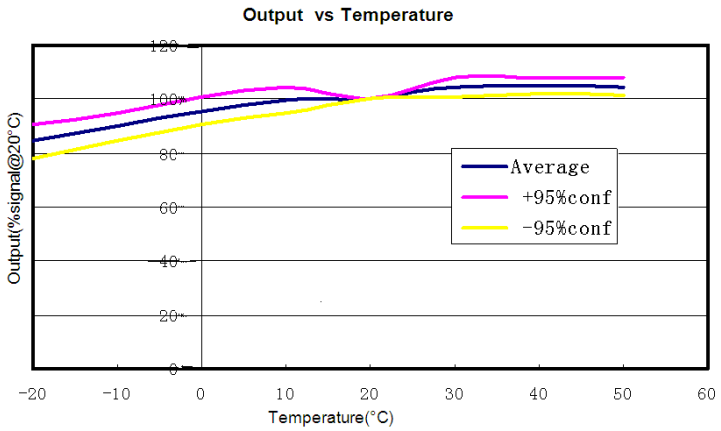
Outline Dimensions

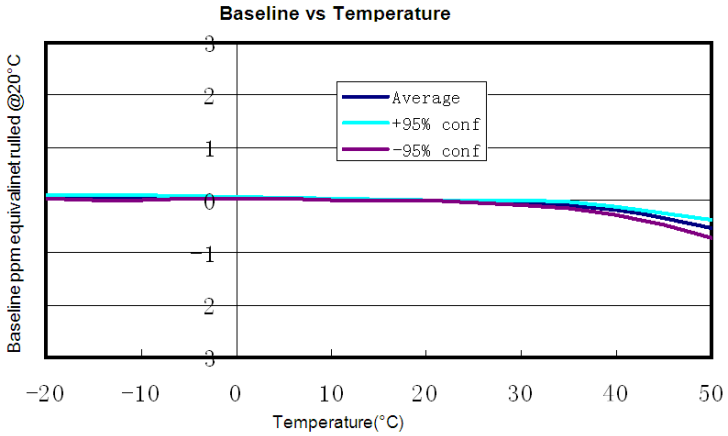


All dimensions are in millimeters.
All tolerances are ±0.2mm.

Note: 推荐使用 PCB 插座来连接传感器，焊接会损害传感器。

温度影响





交叉灵敏度（20 º C）

气体	浓度(ppm)	输出信号(相当于 ppm NO_2)
一氧化碳	300	0
二氧化硫	5	-5
一氧化氮	35	0
硫化氢	15	5
氯 气	1	0
氢 气	100	0
氰化氢	10	0
氯化氢	5	0
乙 烯	100	0

使用须知

1. 以上所有性能规格都是在环境条件：温度 20 ℃, 相对湿度 50% RH，一个大气压（100 kPa 或环境压力）下测得。
2. 推荐用目标气体进行标定。如果用交叉敏感气体进行标定，我们不保证其标定和测量的准确度。
3. 交叉灵敏度会有+/- 30%的浮动，并且可能随着传感器的生产批次不同和传感器的寿命而变化。
4. 上述交叉灵敏度包括但不限于上述气体，该传感器有可能对其他气体有响应。

Nitrogen Dioxide

Sensoric NO2 3E 50

Rev. 11/2011

Sensoric NO2 3E 50

FEATURES

Amperometric 3 electrode sensor cell
Good zero stability
Fast response
High resolution

TYPICAL APPLICATIONS

TLV monitoring, parking garages

PART NUMBER INFORMATION

MINI	2241-032-30009
SENSORIC CLASSIC	2241-032-30069
CTL 4 series adaptation	2241-032-30049
CTL 7 series adaptation	2241-032-30079

Rev. 11/2011

Sensoric NO2 3E 50

TECHNICAL SPECIFICATIONS

Measuring Range	0–50 ppm
Sensitivity Range	200 nA/ppm ± 40 nA/ppm (negative signal)
Zero Current at 20 °C	< ± 20 nA
Resolution at 20 °C	< 0.1 ppm
Bias Potential	0 mV
Linearity	< 5% full scale
Response Time at 20 °C	
t50	< 10 s calculated from 4 min. exposure time
t90	< 30 s calculated from 4 min. exposure time
Long Term Sensitivity Drift	< 5% per month
Operation Conditions	
Temperature Range	-20 °C to +40 °C
Humidity Range	15–90% r.H, non–condensing
Effect of Humidity	an abrupt change of r.H. will cause a short term drift of zero reading
Sensor Life Expectancy	> 24 months in air
Warranty	12 months

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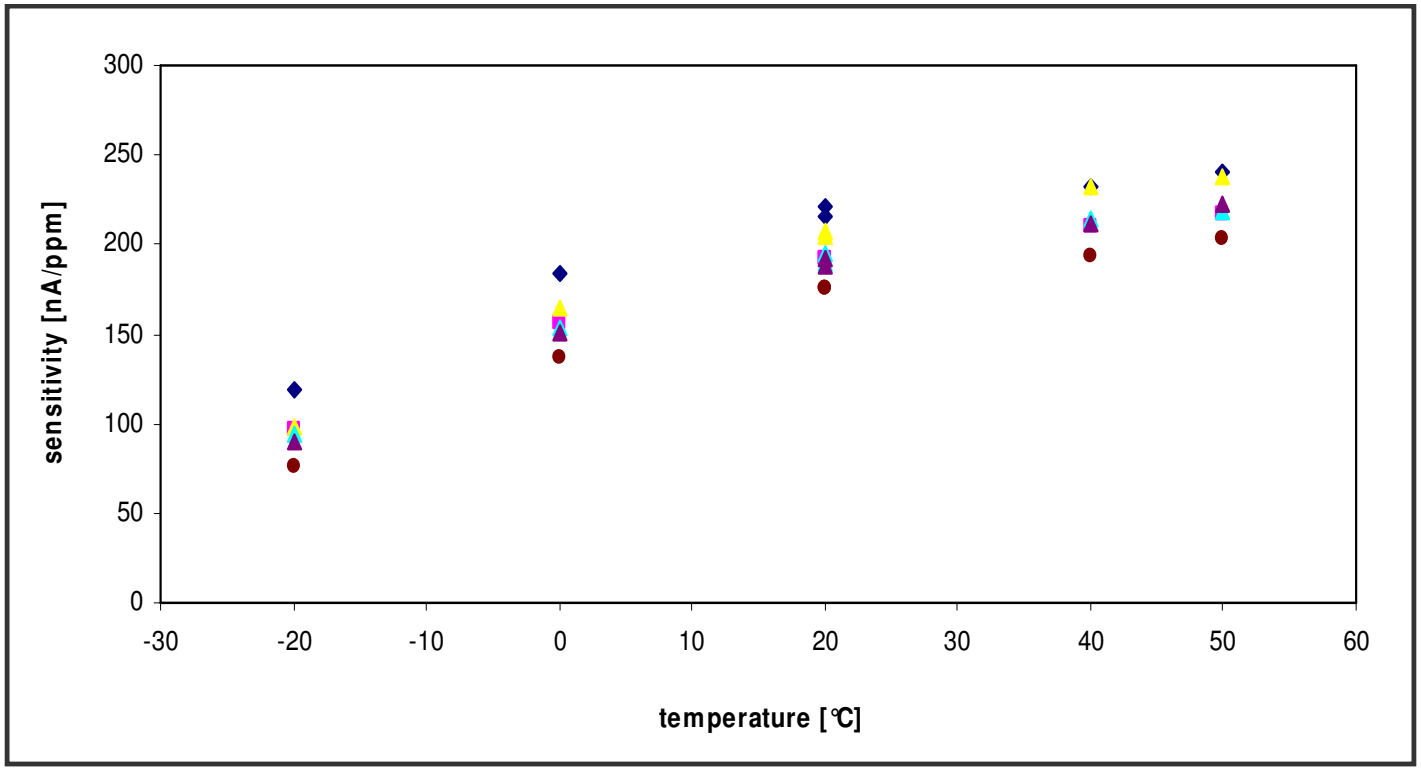
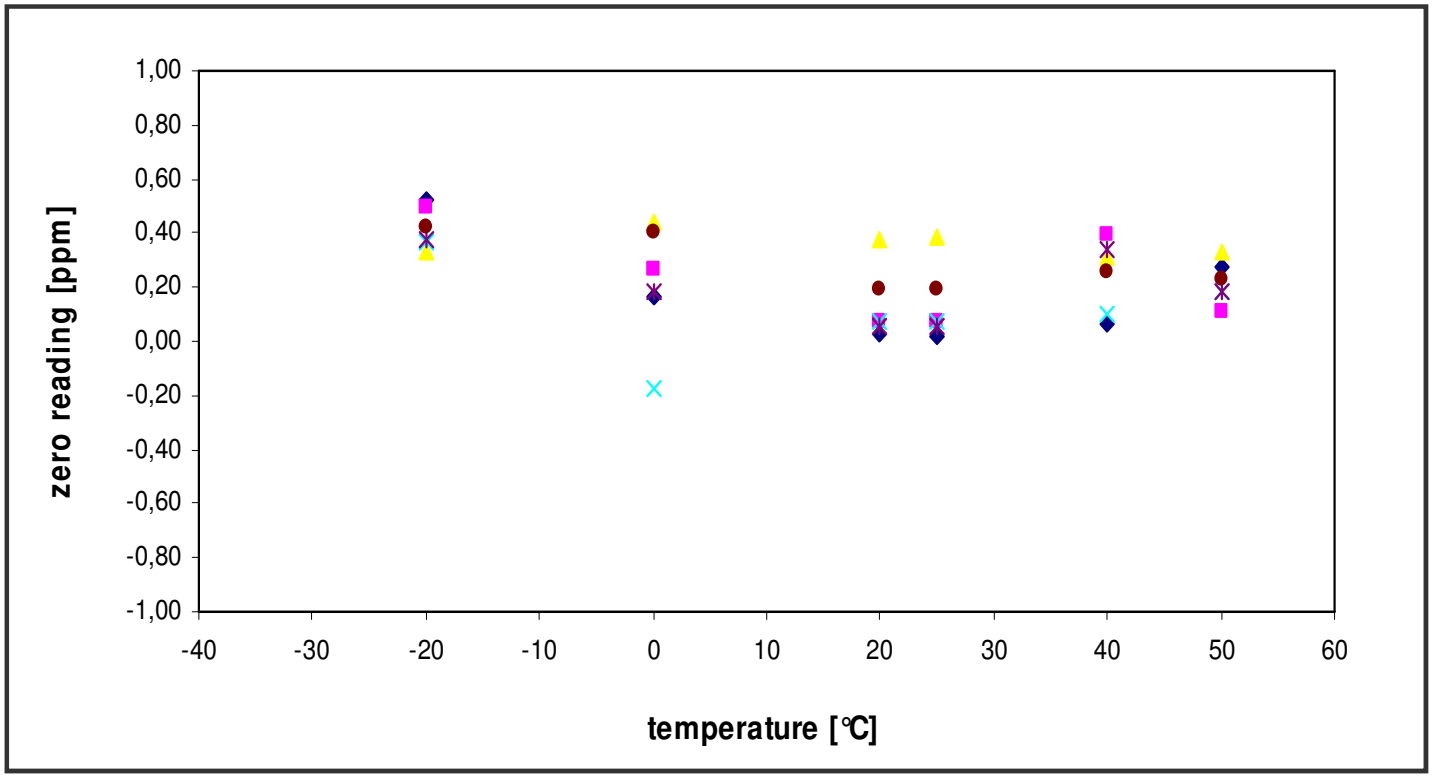
Sensoric NO2 3E 50

OUTPUT vs. TEMPERATURE:



Sensoric NO2 3E 50

ZERO READING vs. TEMPERATURE:



Sensoric NO2 3E 50

CROSS SENSITIVITIES AT 20 °C

Gas	Concentration	Reading [ppm]
Alcohols	1000 ppm	0
Carbon Dioxide	5000 ppm	0
Chlorine	1 ppm	1
Nitric Oxide	100 ppm	0.4
Sulfur Dioxide	20 ppm	-5
Hydrogen	3000 ppm	0

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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 www.citytech.com under the heading '*Support' -> 'Product Safety Datasheets'*

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