Chlorine 'Easy Cal' CiTiceL® Specification

# EZT3CLH 'Easy Cal' CiTiceL®

### Ambient monitoring 4-20mA Microprocessor Transmitter

## Performance Characteristics

| | |
|---|---|
| **Sensor Type Used** | 3CLH |
| **Expected Operating Life** | Two years in air |
| **Resolution** | 0.1ppm |
| **Temperature Range** | -20°C to +50°C |
| **Pressure Range** | Atmospheric ± 10% |
| **Pressure Coefficient** | No data |
| **$T_{90}$ Response Time** | ≤60 seconds |
| **Relative Humidity Range** | 15 to 90% non-condensing |
| **Maximum Zero Shift (+20°C to +40°C)** | -0.2ppm equivalent |
| **Long Term Output Drift** | <2% signal loss/year |
| **Repeatability** | 2% of signal |
| **Output Linearity** | Linear |

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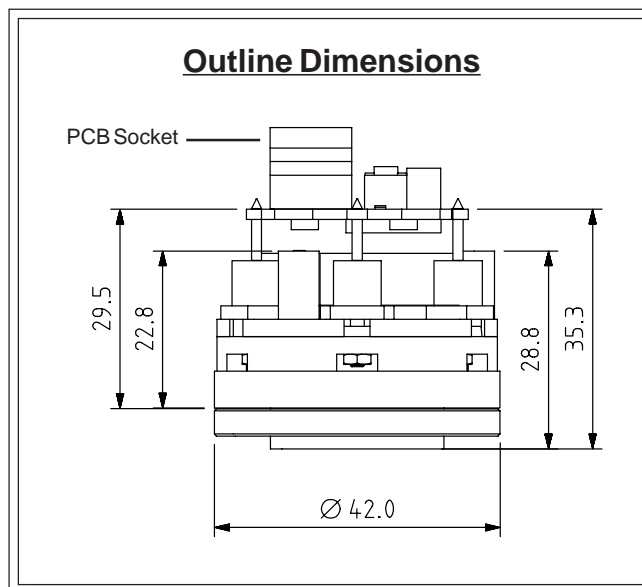
## Electrical Properties

| | |
|---|---|
| **Minimum Input Span** | 5uA |
| **Maximum Input Span** | ±100uA |
| **Linearity @ 25°C** | 0.01% Full Scale |
| **Thermal Drift (Input)** | 0.02% per °C |
| **Linearisation** | Linear Response |
| **Output** | 4/20mA, 2 wire loop powered |
| **Max Output Range** | 3.8 to 21mA |
| **Operating Voltage** | 10 to 30VDC |
| **Thermal Drift (Output)** | 2uA per °C |
| **Output Accuracy** | ±5uA |
| **Protection** | Reverse Polarity Protected |
| **Maximum Loop Load** | $R_{LOAD} = (V_{supply}-10)*50$ eg 700Ω at 24V |

## Outline Dimensions



PCB Socket

29.5
22.8
35.3
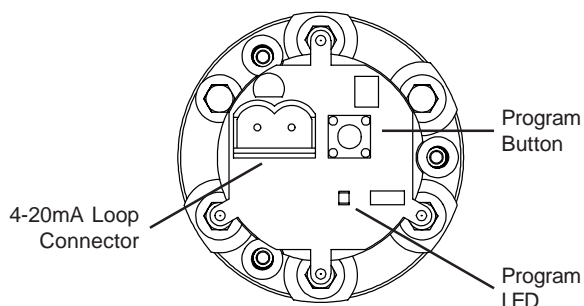28.8
Ø 42.0

## Ranges Available

3CLH CiTiceL 'Easy Cal' 4-20mA Transmitters are available with the following precalibrated ranges:

| Range | Order Code |
|---|---|
| 0-5ppm | 2TH3A-1A |
| 0-10ppm | 2TH3B-1A |
| 0-20ppm | 2TH3C-1A |
| 0-30ppm | 2TH3D-1A |
| 0-50ppm | 2TH3E-1A |
| 0-100ppm | 2TH3F-1A |

## Physical Characteristics

| | |
|---|---|
| **Weight** | 58g (incl. mounting accessory) |
| **Position Sensitivity** | None |
| **Storage Life** | Six months in CTL container |
| **Recommended Storage Temperature** | 0-20°C |
| **Warranty Period** | 12 months from date of despatch |

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4-20mA Loop Connector

Program Button

Program LED

## Calibration notes

Recalibration is only possible if the output of the sensor at full scale is greater than 50% of the original factory calibration. Failure can occur if:

1. Attempts to recalibrate to a range less than 50% of the original factory calibrated range

2. The output of the sensor has fallen by more than 50% (replace sensor)

3. Incorrect span gas used (use correct span gas)

4. Insufficient time for output to settle after exposing sensor to span gas (apply span gas for 2-5 mins before setting 20mA level)

## Transmitter Error Condition

Any time the error condition is set the output will be forced to 21mA and the LED will be held on. Carry out the Reset function to reset the error.

## Reset to Factory Calibration

1. Remove loop power from transmitter.

2. Hold down push button and connect loop power to transmitter.

3. LED will blink as soon as power is applied (approx. 2Hz).

4. Transmitter output set to 21mA.

5. Releasing button will start an 8 second timout period.

6. After 8 seconds the factory calibration will overwrite user calibration.

7. LED cleares and transmitter goes back into normal mode.

## User Calibration Method
(Span gas = 20mA signal)

1. Connect loop power to the transmitter.

2. Apply required zero gas/air to transmitter for 2 minutes.

3. Hold down button until LED flashes at approx. 1Hz. (4mA level now set)

4. Apply required span gas to transmitter for 2 to 5 minutes.

5. Press and release button (20mA level now set)

6. There will be an 8-second timeout period and flashing LED approx. 8Hz.

7. Calibration is complete, LED clears and returns to normal mode.

## Non Standard Span Gas Calibration
(Span gas ±5% full range)

1. Calculate the mA signal expected for span gas.
   *Example:*
   Required 4-20mA range is 0-500ppm
   Available span gas is 480ppm
   Dynamic range is 16mA
   Therefore 1mA = 31.25ppm
   Expected signal at 480ppm = (15.36mA + 4mA) = 19.36mA
   Each time button is pressed signal increases by 40uA. When the output reaches 20.8mA the next button press will take the output to 19.2mA. Further button presses will again increase the output by 40uA.
   The output range availiable is 19.2mA to 20.8mA.

2. Carry out steps 1-4 of User Calibration Method

3. Press and release button to set 20mA level.

4. Continued momentary pressing of the button within an eight second period will trim the output by 40uA. When the required output is reached, allow the transmitter to timeout.

5. Calibration is complete, LED clears and returns to normal mode.

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## Non Standard Span Gas Calibration

(Span gas not within ±5% of full range)
(current source required)

1. Measure the current of the sensor with a known gas concentration. This can then be used to calculate the µA/ppm for the specific sensor.

2. Now calculate the expected current when the sensor is exposed to the full scale of target gas.
   *Example:*
   Required 4-20mA range is 0-500ppm
   Available span gas is 300ppm
   Current from sensor when exposed to span gas = 33uA
   Therefore sensitivity = 0.11 uA/ppm
   Expected sensor output at 500ppm = 55uA

3. Connect current loop power to the transmitter.

4. Connect a current source to the transmitter. For oxidising sensors (CO, $H_2S$, $SO_2$, NO, ...) connect the negative to 'SEN' and positive to 'CNT'. For reducing sensors ($Cl_2$ or $NO_2$) connect the positive to 'SEN' and negative to 'CNT'. 'CNT' and 'REF' terminals on the transmitter board should be connected.

5. Set the current source to zero.

6. Hold down button until LED flashes at approx. 1Hz. (4mA level now set in RAM)

7. Set the current source to the value calculated for the full scale of target gas.

8. Press and release button (20mA level now set into RAM)

9. There will be an 8-second timeout period and flashing LED approx. 8Hz.

10. Calibration is complete, LED clears and returns to normal mode.

## Mounting

A diffusion mounting assembly, the "nose" adaptor, is supplied with CiTiceL transmitters for convenient mounting in a wide range of weatherproof housings. The nose adaptor requires a 25mm diameter hole in the outside wall of the housing to allow installation. The assembly is shown below.
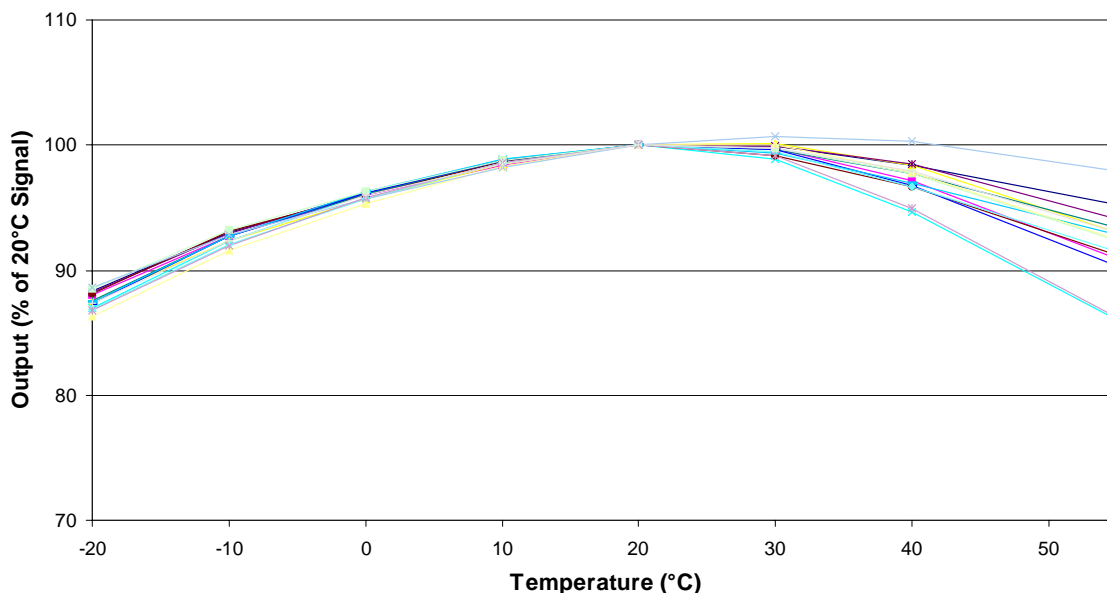
The Mounting Nose also features a plug for easy zeroing and exposure to gas during calibration. A bonded membrane and mesh is included to prevent the ingress of dirt and dust particles to the CiTiceL.

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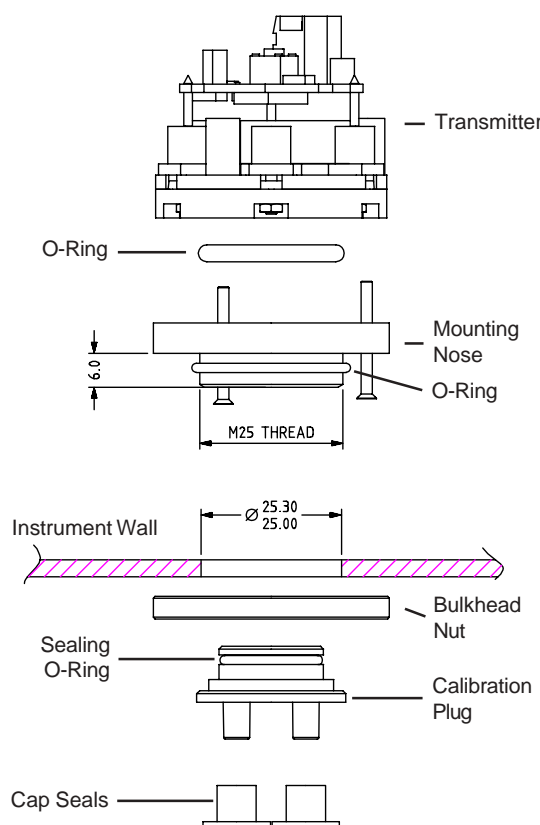
### 3CLH Chlorine - Output vs Temperature



## Cross-sensitivity Data

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

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

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