# CTE9000 / CTU9000 Series

## OEM pressure transmitters for industrial media

### FEATURES

- **100 mbar to 35 bar, 1.5 to 500 psi gage[1] or absolute[10] pressure**
- **0...5 V, 0...10 V, 0.5...4.5 V, 1...6 V or 4...20 mA output**
- **Field interchangeable**
- **All welded stainless steel diaphragm construction**
- **EMC according to EN 61326-1[8]**

### MEDIA COMPATIBILITY

Wetted materials:
Stainless steel 1.4404 (316L)[9]

Housing:
Stainless steel 1.4404 (316L), protection class IP 67 (according to DIN EN 60529, NEMA 6)[1]

### SPECIFICATIONS[11,12]

**Maximum ratings**

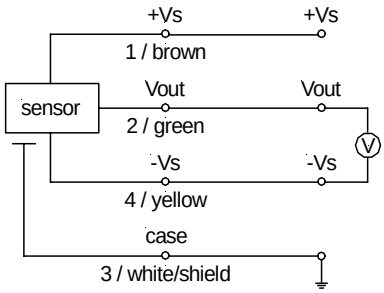
| | |
|---|---|
| Supply voltage (reverse polarity protection) | |
| CTE(M)/CTU9...0 | 12...32 V |
| CTE(M)/CTU9...1 | 9...32 V |
| CTE(M)/CTU9...6, ...7 | 8...32 V |
| CTE(M)/CTU9...4[2] | 7...32 V |
| Maximum load current (source) | |
| CTE(M)/CTU9...0, ...1, ...6, ...7 | 1 mA |
| Proof pressure[3] | 2 x rated pressure |

**Environmental**

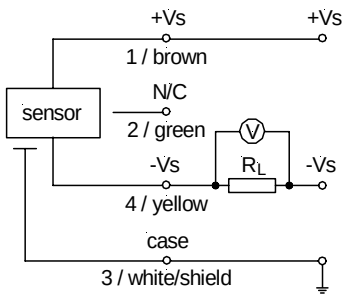
| | |
|---|---|
| Temperature limits | |
| Storage | -40...85 °C |
| Operating (media) | -40...85 °C |
| Electronic (ambient) | -40...85 °C |
| Compensated | 0...50 °C |
| Vibration (5 to 2000 Hz)[13] | 10 $g_{RMS}$ |
| Mechanical shock[14] | 50 g (11 ms) |

### ELECTRICAL CONNECTION

**Voltage output device**




**Current output device**






First Sensor

## COMMON PERFORMANCE CHARACTERISTICS

($V_S$=15 V ±0.1 V, $T_A$=25 °C, RH=50 %)

| Characteristics | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Thermal effects (0...50 °C)[4] | Offset | 100 mbar/1.5 psi devices | | ±0.04 | ±0.08 | %FSO/°C |
| | | all others | | ±0.02 | ±0.05 | |
| | Span | 100 mbar/1.5 psi devices | | ±0.04 | ±0.08 | |
| | | all others | | ±0.02 | ±0.05 | |
| Thermal effects (-20...0 °C, 50...70 °C)[4] | Offset | 100 mbar/1.5 psi devices | | ±0.04 | | |
| | | all others | | ±0.02 | | |
| | Span | 100 mbar/1.5 psi devices | | ±0.04 | | |
| | | all others | | ±0.02 | | |
| Non-linearity (BSL) and hysteresis[5] | | | | ±0.1 | ±0.3 | %FSO |
| Repeatability | | | | ±0.1 | | |
| Long term stability[6] | | | | ±0.1 | | |
| Output noise (0 < f < 1 kHz) | | | | ±0.1 | | |
| Response time (10 to 90 %) | | | | 5 | | ms |
| D/A resolution | | | | | 11 | bit |
| Power supply rejection | | Offset | | ±0.01 | | %FSO/V |
| | | Span | | ±0.02 | | |

## INDIVIDUAL PERFORMANCE CHARACTERISTICS

($V_S$=15 V ±0.1 V, $T_A$=25 °C, RH=50 %)

**0...10 V output** ($R_L$ > 100 kΩ)

| Characteristics | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Zero pressure offset | CT...9N... | 4.9 | 5 | 5.1 | V |
| | all others | | 0 | 0.1 | |
| Full scale span[7] | CT...9N... | 4.9 | 5 | 5.1 | |
| | all others | 9.9 | 10 | 10.1 | |
| Output impedance | | | | 25 | Ω |
| Current consumption (no load) | | | 4 | | mA |

**0.5...4.5 V output** ($R_L$ > 100 kΩ)

| Characteristics | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Zero pressure offset | CT...9N... | 2.45 | 2.5 | 2.55 | V |
| | all others | 0.45 | 0.5 | 0.55 | |
| Full scale span[7] | CT...9N... | 1.95 | 2 | 2.05 | |
| | all others | 3.95 | 4 | 4.05 | |
| Output impedance | | | | 25 | Ω |
| Current consumption (no load) | | | 4 | | mA |

## INDIVIDUAL PERFORMANCE CHARACTERISTICS (cont.)

($V_S$=15 V ±0.1 V, $T_A$=25 °C, RH=50 %)

**0...5 V output** ($R_L$ > 100 kΩ)

| Characteristics | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Zero pressure offset | CT...9N... | 2.45 | 2.5 | 2.55 | V |
| | all others | | 0 | 0.05 | |
| Full scale span[7] | CT...9N... | 2.45 | 2.5 | 2.55 | |
| | all others | 4.95 | 5.0 | 5.05 | |
| Output impedance | | | | 25 | Ω |
| Current consumption (no load) | | | 4 | | mA |

**1...6 V output** ($R_L$ > 100 kΩ)

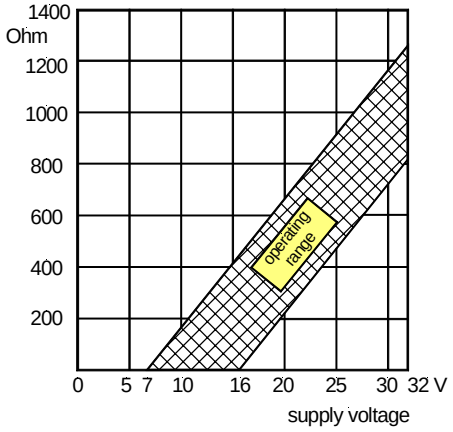
| Characteristics | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Zero pressure offset | CT...9N... | 3.45 | 3.5 | 3.55 | V |
| | all others | 0.95 | 1 | 1.05 | |
| Full scale span[7] | CT...9N... | 2.45 | 2.5 | 2.55 | |
| | all others | 4.95 | 5.0 | 5.05 | |
| Output impedance | | | | 25 | Ω |
| Current consumption (no load) | | | 4 | | mA |

**4...20 mA output** ($R_L$ = 100 Ω)

| Characteristics | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Zero pressure offset | CT...9N... | 11.8 | 12.0 | 12.2 | mA |
| | all others | 3.8 | 4.0 | 4.2 | |
| Full scale span[7] | CT...9N... | 7.8 | 8.0 | 8.2 | |
| | all others | 15.8 | 16.0 | 16.2 | |
| Power consumption ($I_L$ = 20 mA) | | | 250 | | mW |

## LOAD LIMITATION

**4...20 mA output version**

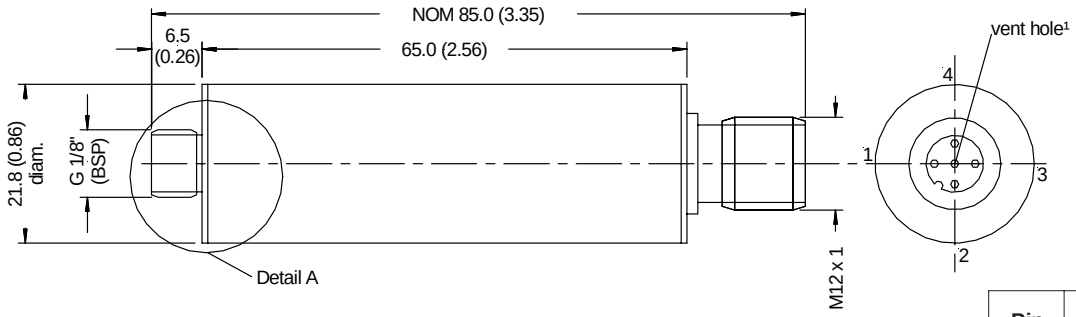





First Sensor

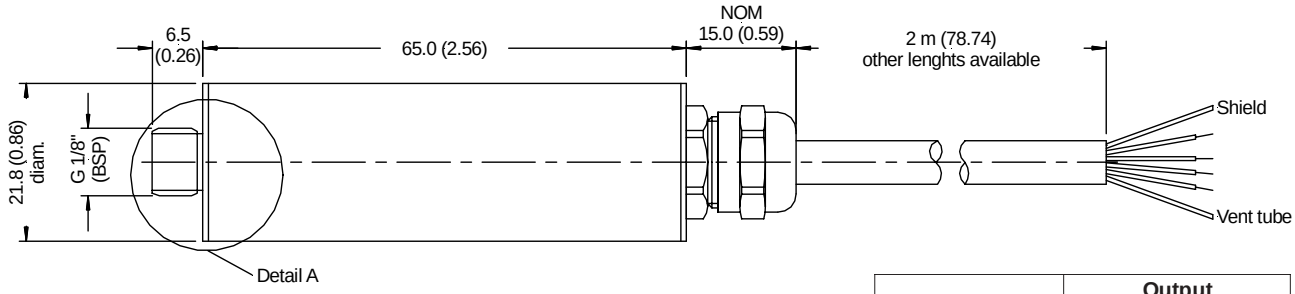
## OUTLINE DRAWING

### Connector version

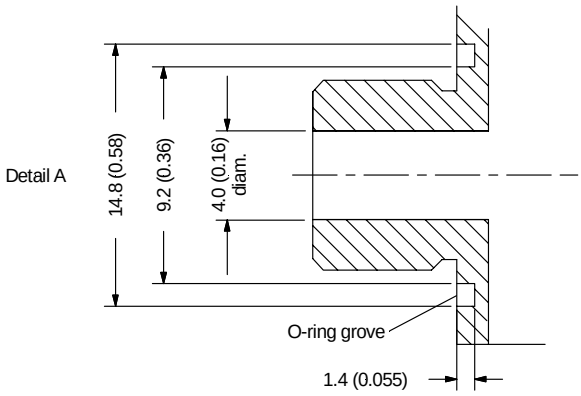



| Pin | Output | |
|---|---|---|
| | Voltage | Current |
| 1 | +Vs | +Vs |
| 2 | Vout | N/C |
| 3 | Case | Case |
| 4 | -Vs | -Vs |

### Cable version




| Flying lead end | Output | |
|---|---|---|
| | Voltage | Current |
| Brown | +Vs | +Vs |
| Green | Vout | N/C |
| White and shield | Case | Case |
| Yellow | -Vs | -Vs |



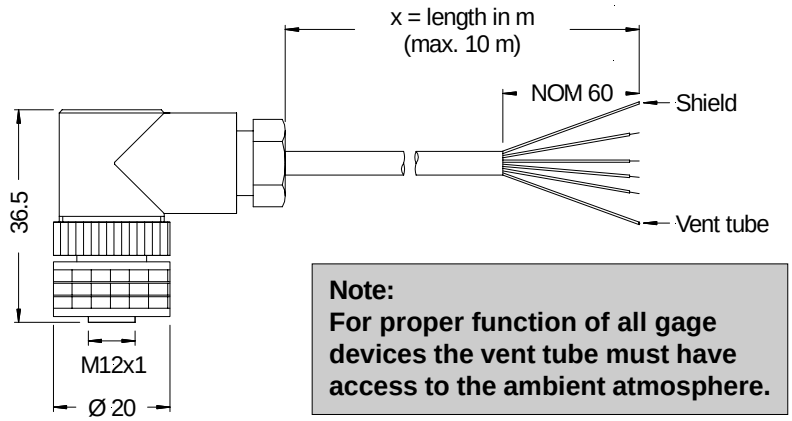

**mass:** approx. 82 g

**Note: O-ring included in delivery**

dimensions in mm (inches)

## RECOMMENDED ACCESSORY (not included in delivery)

**ZP000112-B:** **Mating Connector** (without cable)
**ZK000101-x:** **Connector/cable assembly** (x=cable lenghts in m, max. 10 m)



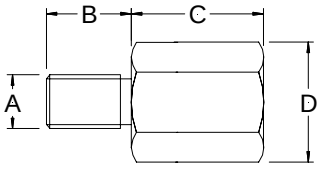

**Note:**
**For proper function of all gage devices the vent tube must have access to the ambient atmosphere.**

| PIN CONNECTION | |
|---|---|
| **Pin** | **Flying lead end** |
| 1 | Brown |
| 2 | Green |
| 3 | White and shield |
| 4 | Yellow |

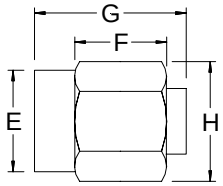
dimensions in mm

## OPTIONAL PRESSURE FITTINGS (brass, nickel plated)

**Male fittings**




**Female fittings**




| Dimensions in mm (inches) | | | |
|---|---|---|---|
| A | B | C | D (Hex.) |
| 1/8" BSPT | 8 (0.315) | 13 (0.512) | 14 (9/16") |
| 1/4" BSPT | 12 (0.472) | 5.5 (0.217) | 14 (9/18") |
| 3/8" BSPT | 11.5 (0.453) | 5 (0.197) | 17 (11/16") |
| 1/2" BSPT | 16 (0.630) | 7 (0.276) | 22 (7/8") |
| 1/8" BSP | 12.5 (0.492) | 11 (0.433) | 14 (9/16") |
| 1/4" BSP | 8.5 (0.335) | 5 (0.197) | 19 (3/4") |
| 3/8" BSP | 12.5 (0.492) | 7 (0.276) | 22 (7/8") |
| 1/8" NPT | 10 (0.394) | 13 (0.512) | 17 (11/16") |
| 1/4" NPT | 14 (0.551) | 6 (0.236) | 22 (7/8") |

| Dimensions in mm (inches) | | | |
|---|---|---|---|
| E | F | G | H (Hex.) |
| 1/8" BSP | 5 (0.197) | 15 (0.591) | 14 (9/16") |
| 1/4" BSP | 7 (0.276) | 20 (0.787) | 17 (11/16") |
| 3/8" BSP | 6 (0.236) | 20 (0.787) | 22 (7/8") |
| 1/2" BSP | 18 (0.707) | 23 (0.906) | 24 (15/16") |

**Specification notes:**

1. IP 67 protection is given when the connector is locked. For proper function the gage port is vented to the atmosphere through the connector/cable assembly. Thus the cable end must have access to the ambient pressure.
2. The minimum supply voltage is directly proportional to the load resistance seen by the transmitter. For more details see the load limitation diagram.
3. Proof pressure is the maximum pressure which may be applied without causing damage to the sensing element.
4. Thermal effects are relative to 25 °C. Signal is clamped at 0 V.
5. Non-linearity refers to **B**est **S**traight **L**ine fit. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
6. Long term stability over 1 year.
7. Span is the arithmetic difference in transmitter output signal measured at zero pressure and the maximum operating pressure.
8. Surge immunity according to EN 61000-4-5 on request for current output devices.
9. When using devices with optional nickel plated fittings, consider the media compatibility of the fittings also.
10. Available for pressure ranges from 1 bar (15 psi) absolute upwards only.
11. CE-labelling is in accordance with 2004/108/EC.
12. The pressure transmitters must not be used as safety accessories according to article 1, 2.1.3 of the directive 97/23/EC.
13. According to IEC 60068-2-64.
14. According to IEC 60068-2-27.

## ORDERING INFORMATION

**CTx (M) 9xxx x x x (C x)**

**Calibration**
E: bar calibration
U: psi calibration

**For mbar ranges only**

**Pressure range**

| CTE9000 series | | CTU9000 series | |
|---|---|---|---|
| 100: | 0...100 mbar | 1x5: | 0...1.5 psi |
| 200: | 0...200 mbar | 003: | 0...3 psi |
| 350: | 0...350 mbar | 005: | 0...5 psi |
| 001: | 0...1 bar | 015: | 0...15 psi |
| N01: | -1...+1 bar | N15: | -15...15 psi |
| P01: | 0...-1 bar | P15: | 0...-15 psi |
| 002: | 0...2 bar | 030: | 0...30 psi |
| 003: | 0...3 bar | 050: | 0...50 psi |
| 005: | 0...5 bar | 100: | 0...100 psi |
| 010: | 0...10 bar | 300: | 0...300 psi |
| 016: | 0...16 bar | 500: | 0...500 psi |
| 020: | 0...20 bar | | |
| 035: | 0...35 bar | | |

**Pressure mode**
G: gage pressure[1]
A: absolute pressure
*(from 1 bar/15 psi only)*

**Other pressure ranges and options are widely available. Please contact First Sensor.**

**Cable lenght in m**
**Cable version (optional)**

**Output signal**
0: 0...10 V
1: 1...6 V
4: 4...20 mA
6: 0.5...4.5 V
7: 0...5 V

**Pressure connection**
Standard thread
Y: G 1/8" (BSP) male, SS 1.4404 (316L)
Optional pressure fittings
D: 1/8" BSPT male, brass, nickel plated
E: 1/4" BSPT male, brass, nickel plated
F: 3/8" BSPT male, brass, nickel plated
G: 1/2" BSPT male, brass, nickel plated
K: 1/8" NPT male, brass
L: 1/4" NPT male, brass
M: 1/8" NPT male, SS 1.4404 (316L)
N: 1/4" NPT male, SS 1.4404 (316L)
P: G 1/8" (BSP) male, brass, nickel plated
Q: G 1/4" (BSP) male, brass, nickel plated
R: G 3/8" (BSP) male, brass, nickel plated
S: G 1/2" (BSP) male, brass, nickel plated
U: G 1/8" (BSP) female, brass, nickel plated
V: G 1/4" (BSP) female, brass, nickel plated
W: G 3/8" (BSP) female, brass, nickel plated
X: G 1/2" (BSP) female, brass, nickel plated