# CS81

## Intrinsically Safe Low Pressure Transducer

### FEATURES

- Pressures from 1PSI up to 49 PSI
- Media isolated
- Wide variety of configurations available
- IP65 minimum rated

### APPROVALS/CERTIFICATIONS

- CSA Class I, Division 1 Groups C,D T4
- Class I, Zone 0 AEx ia IIB T4 Ga (Ex ia IIB T4 Ga)
- ABS (American Bureau of Shipping)
- CE

*Note: Must use an approved barrier to maintain listed certifications.
See page 4 for entity parameters.

### GREAT FOR....

- Natural gas compression
- Oil exploration
- Process controls

C US ABS CE RoHS COMPLIANT Assembled in USA


## About the CS81

The **CS81 Intrinsically Safe Low Pressure Transducer** is a high strength sensor designed for low pressure measurements in Class I, Division 1 intrinsically safe locations. The CS81 features an all welded stainless steel construction for a minimum IP65 rating. A wide range of configurable options makes the CS81 a versatile pressure transducer that can be designed to operate in some of the harshest conditions. Low power outputs are available which can operate off of 3-5VDC of unregulated power to extend battery life in remote applications. The CS81 is an excellent solution for applications such as external fuel tank monitoring, vapor recovery and natural gas compression.

## Versatile Configurations - Certified Safe

The CS81 Intrinsically Safe Low Pressure Transducer is **certified by CSA to operate safely in Class I, Division 1 Intrinsically Safe rated locations** when used with an approved current limiting barrier. The CS81 features a configurable design, allowing Core Sensors to tailor the transducer to your applications operating requirements. Have a limited voltage supply at your installation? No problem! The CS81 is offered in a low power configuration, capable of operating from an unregulated power supply of 3-5VDC and consuming 3mA or less of current. Need a specific electrical connection for plug and play installation? No problem! Core Sensors offers a wide variety of electrical connectors and integral cable to ensure quick and easy installation in your existing application.

# SPECIFICATIONS

## Performance

| | |
|---|---|
| **Accuracy @ 25°C:*** | ≤ ± 0.25% BFSL<br>≤ ± 0.5% BFSL (2 PSI & below)<br>≤ ± 1% BFSL (Millivolt output signal) |
| **Stability (1 Year):** | ≤ ±0.25% of FS |
| **Pressure Cycles:** | 100 million |
| **Overpressure:** | 2X minimum |
| **Burst Pressure:** | 5X or 245 PSI, whichever is less |

** Accuracy includes non-linearity, hysteresis and non-repeatability*

## Thermal

| | |
|---|---|
| **Operating Temperature:** | -40 to +80°C |
| **Operating Temperature:**<br>**(Electrical Connection "F", DIN 43650-A)** | -20 to +80°C |
| **Media Temperature:** | -40 to +125°C |
| **Media Temperature:**<br>**(Electrical Connection "F", DIN 43650-A)** | -40 to +105°C |
| **Compensated Temperature:** | 0 to +55°C |
| **Storage Temperature:** | -40 to +125°C |
| **TC Zero:** | ≤ ± 1% of FS<br>≤ ± 2% of FS (2 PSI & below) |
| **TC Span:** | ≤ ± 1% of FS<br>≤ ± 2% of FS (2 PSI & below) |

## Environmental

| | |
|---|---|
| **EMI/RFI Protection:** | Yes |
| **IP Rating:*** | IP65 minimum |
| **Vibration:** | 10g, 20 to 2000Hz |
| **Shock:** | 100g, 11msec, 1/2 sine |

** IP Rating is dependent on electrical termination selected. Contact factory for more information.*

** IP Rating applies when electrical connector is attached with the appropriate ingress protection.*

## Electrical (Current)

| | |
|---|---|
| **Outputs:** | 4-20mA |
| **Excitation:** | 10-28VDC |
| **Current Consumption:** | 20mA, typical |
| **Output Load:** | 0-800 Ohms @ 10-28VDC |
| **Frequency Response (min):** | ~250Hz |
| **Zero Offset (of FS):** | ≤ ± 0.5% typical<br>± 1% max |
| **Span Tolerance (of FS):** | ≤ ± 0.5% typical<br>± 1% max |

For wiring information, visit core-sensors.com/wiring

## Electrical (Voltage)

| | |
|---|---|
| **Outputs:** | 1-5V<br>1-6V |
| **Excitation:** | 10-28VDC |
| **Current Consumption:** | <10mA |
| **Output Load:** | 5K Ohms, min |
| **Frequency Response (min):** | ~1kHz |
| **Zero Offset (of FS):** | ≤ ± 0.5% typical<br>± 1% max |
| **Span Tolerance (of FS):** | ≤ ± 0.5% typical<br>± 1% max |

## Electrical (Ratiometric Voltage)

| | |
|---|---|
| **Outputs:** | 0.5-4.5V ratiometric |
| **Excitation:** | 5VDC +/- 0.5V |
| **Current Consumption:** | <10mA |
| **Output Load:** | 5K Ohms, min |
| **Frequency Response (min):** | ~1kHz |
| **Zero Offset (of FS):** | ≤ ± 0.5% typical<br>± 1% max |
| **Span Tolerance (of FS):** | ≤ ± 0.5% typical<br>± 1% max |

## Electrical (Low Power Voltage)

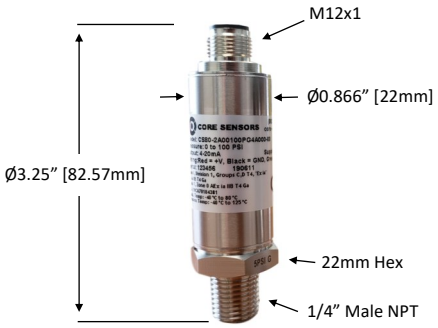
| | |
|---|---|
| **Outputs:** | 0.5-2.5V non-ratiometric |
| **Excitation:** | 3-5VDC unregulated |
| **Current Consumption:** | ≤ 3mA |
| **Output Load:** | 5K Ohms, min |
| **Frequency Response (min):** | ~1kHz |
| **Zero Offset (of FS):** | ≤ ± 0.5% typical<br>± 1% max |
| **Span Tolerance (of FS):** | ≤ ± 0.5% typical<br>± 1% max |

## Electrical (Millivolt)

| | |
|---|---|
| **Outputs:** | 10mV/V |
| **Excitation:** | 5VDC, typical |
| **Current Consumption:** | < 5mA |
| **Output Load:** | > 1M Ohms |
| **Frequency Response (min):** | ~5kHz |
| **Zero Offset (of FS):** | ≤ ± 2% |
| **Span Tolerance (of FS):** | ≤ ± 2% |

# DIMENSIONS

*Dimensions are for reference only



# MODEL NUMBER CONFIGURATION

**CS81 - X X XXXXX X X X X 000 - XX**

**Wetted Material**
**A** = 316L SS
**C** = Hastelloy C276 (special order item)

**Pressure Unit**
**P** = PSI
**B** = Bar
**W**= Inches of H2O

**Output**
**1** = 1-5V
**2** = 0.5-4.5V ratiometric
**3** = 1-6V
**4** = 4-20mA
**8** = 0.5-2.5V non-ratiometric
**9** = 10mV/V

**Options**
**000** = No special options

**Process Connection**
**1** = 1/2" Male NPT
**2** = 1/4" Male NPT
**4** = 7/16-20 Male UNF
**C** = G1/4 Male, Form E

**Pressure Range**
Insert 5-digit pressure code, max 49 PSI
i.e. 00049 = 49 PSI

**Pressure Reference**
**A** = Absolute
**B** = Bi-directional (gauge)
**G** = Gauge
**V** = Vacuum (gauge)

**Electrical**
**A** = M12x1
**B** = Deutsch DT04-4P
**C** = Packard 3-Pin
**D** = Mini-DIN, Form C
**E** = Deutsch DT04-3P
**F** = DIN 43650, Form A
**L** = Cable (See "Cable Length")
**Z** = 1/2" MNPT conduit w/ strain relief (See "Cable Length")

**Cable Length (Meters)**
**00** = No cable
**01** = 1 meter
**02** = 2 meters
**03** = 3 meters
* Longer lengths available

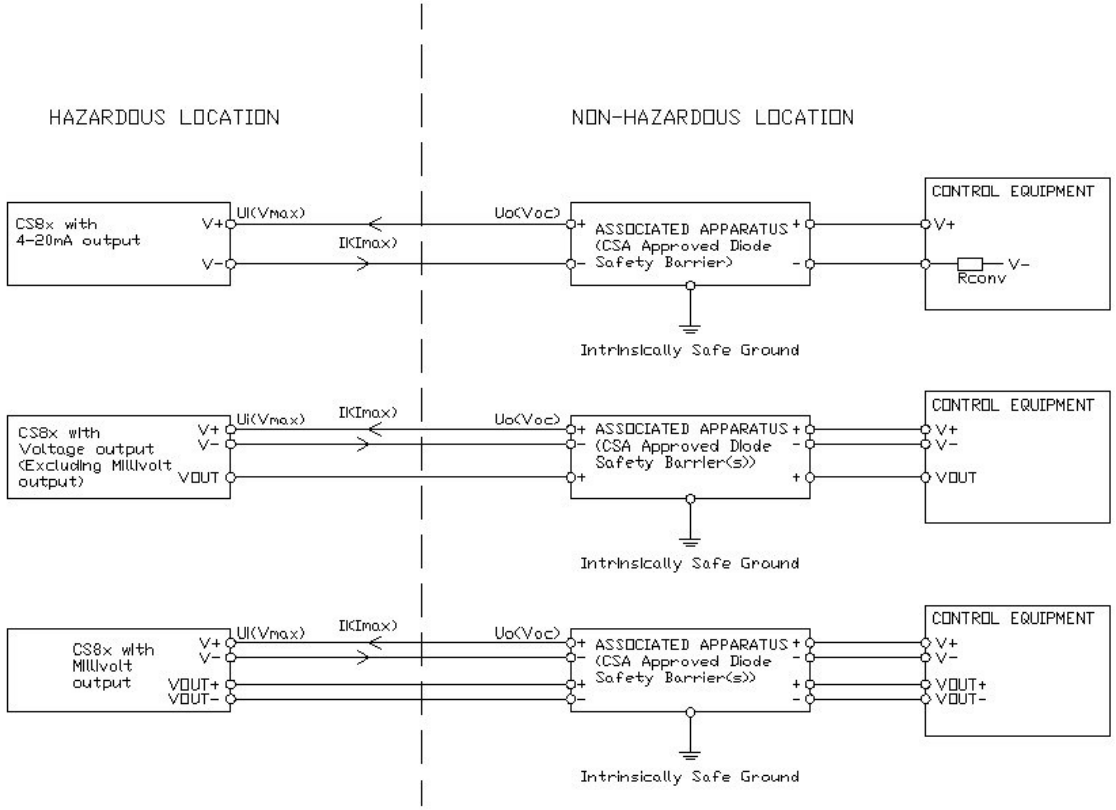
**Ordering Example:** CS81-2A00010PG4D000-00 (1/4" Male NPT, 316L SS, 0-10 PSI gauge, 4-20mA, Mini-DIN Form C)
Not all configurations are available. Our sales team can recommend the closest available configuration based on your requirements.
Contact Core Sensors for configurations not shown.
Visit our How To Buy page or contact us for a quote.

**Disclaimer:** Unless otherwise agreed in writing, Core Sensors products are not authorized for use in applications including medical devices, life support systems, in-flight aerospace, nuclear or any other application where the product failure could result in personal injury or death.

Caution must be taken when installing and operating the CS81 in known Class I, Division 1 hazardous locations. **Please review the Intrinsically Safe Operating Instructions prior to installation. Call Core Sensors at (862) 245-2673** if you are unsure about any of the instructions or to request a copy. Operating Instructions and Certificates of Compliance can be downloaded from the CS81 product web page at core-sensors.com.

Warranty information can be found online at core-sensors.com.

# ENTITIY PARAMETERS




| Applicable Markings for the Listed Models | IS Entity Parameters | Notes |
|---|---|---|
| Cl I Div 1, Grps C, D, "Ex ia" Cl I, Zn 0, AEx ia IIB Model CS8x with 4-20mA Output | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.25uF, Li = 0 uH | with Integral Connector |
| | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.292uF, Li = 155 uH | with Cable, up to 1000 ft |
| Cl I Div 1, Grps C, D, "Ex ia" Cl I, Zn 0, AEx ia IIB Model CS8x with Voltage Output (Excludes 0-xV, Ratiometric, Millvolt) | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.591uF, Li = 0 uH | with Integral Connector |
| | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.598uF, Li = 23.25 uH | with Cable, up to 150 ft |
| Cl I Div 1, Grps C, D, "Ex ia" Cl I Zn 0, AEx ia IIB Model CS8x with 0-xV Output | Ui = 22 V Ii = 73mA, Pi = 400mW, Ci = 0.811uF, Li = 0 uH | with Integral Connector |
| | Ui = 22V, Ii = 73mA, Pi = 400mW, Ci = 0.818uF, Li = 23.25 uH | with Cable, up to 150 ft |
| Cl I Div 1, Grps C, D, "Ex ia" Cl I Zn 0, AEx ia IIB Model CS8x with Ratiometric Output or 0.5V - 2.5V Non-Ratiometric | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.239uF, Li = 0 uH | with Integral Connector |
| | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.245uF, Li = 23.25 uH | with Cable, up to 150 ft |
| Cl I Div 1, Grps C, D, "Ex ia" Cl I, Zn 0, AEx ia IIB Model CS8x with Millivolt (regulated) Output | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.357uF, Li = 0 uH | with Integral Connector |
| | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.364uF, Li = 23.25 uH | with Cable, up to 150 ft |
| Cl I Div 1, Grps A, B, C, D, "Ex ia" Cl I Zn 0, AEx ia IIC Model CS8x with MilliVolt (unregulated) Output | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 48pF, Li = 0 uH | with Integral Connector |
| | Ui = 28V, Ii = 93mA, Pi = 650mW, Ci = 0.007uF, Li = 23.25 uH | with Cable, up to 150 ft |

NOTE:

1. US installations must be in accordance with National Electrical Code (ANSI/NFPA 70, Article 504 and 505) and ANSI/ISA RP12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations". Canadian Installations must be in accordance with Canadian Electrical Code Part I.
2. Maximum non-hazardous location voltage supplied to the Associated Apparatus must not be more than 250 Vac or 250 Vdc.
3. Revisions to this drawing must be approved by CSA prior to release.
4. The Associated Apparatus must be a CSA certified barrier and must be installed according to the barrier's installation instructions.
5. The Associated Apparatus must meet all the following requirements:
   Uo(Voc) ≤ Ui(Vmax); Isc(Io) ≤ Ii(Imax); Po ≤ Pi; Ca(Co) ≥ Ci + Ccable; La(Lo) ≥ Li + Lcable
6. Special Condition of Safe Use: Potential
   - 6.1. Under certain extreme circumstances, exposed plastic and unearthed metal parts of the enclosure of models CS8x may store an ignition capable of an electrostatic charge. Therefore, the user/installer shall implement provisions to prevent the buildup of electrostatic charge, i.e. locate the equipment where a charge-generating mechanism is unlikely to be present, and clean with a damp cloth.
   - 6.2. Because the enclosure of CS8x is made from light metal, in rare cases, ignition sources due to impact and friction sparks could occur. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during installation and operation. Use care not to cause impacts or scrapes with other metal objects during installation.
   - 6.3. The end user shall ensure appropriate earthing of the metallic accessories upon installation.
   - 6.4. The final installation of the device in Hazardous area shall meet the requirements of CEC (for Canada) and NEC (for USA) for wiring method that is subject to acceptance of local authority having jurisdiction.
   - 6.5. The equipment is for use under atmospheric conditions only, the permissible pressure range is 0.8 to 1.1 bar (80 to 110 kPa) and the permissible normal oxygen content is typically 21 % v/v.