# 2-Wire Programmable Transmitter

Model 5331D

- RTD, TC, Ohm, or mV Input
- Extremely High Measurement Accuracy
- 1.5 kVAC Galvanic Isolation
- Programmable Sensor Error Value
- Complies with European ATEX and CSA/FM Requirements for Hazardous Location Installation

**Application:**

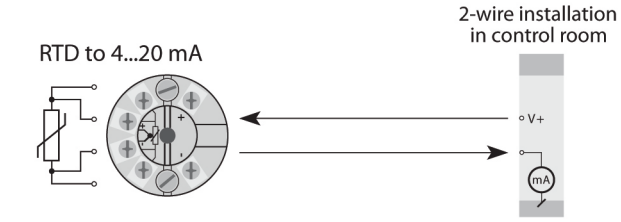
- Linearized temperature measurement with Pt100...Pt1000, Ni100...Ni1000, or TC sensor.
- Conversion of linear resistance variation to a standard analog current signal.
- Amplification of a bipolar mV signal to a standard 4...20 mA current signal.

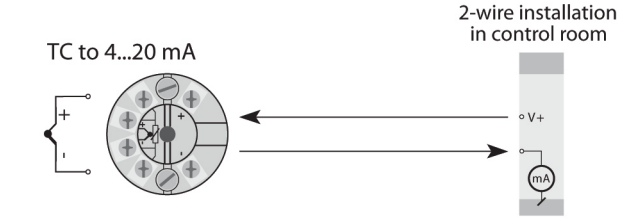
**Technical Characteristics:**

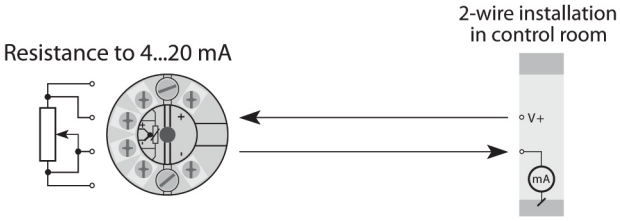
- Within seconds the user can program a 5331D to measure temperatures within all standard sensor ranges.
- The RTD and resistance inputs have cable compensation for 2-, 3- and 4-wire connection.

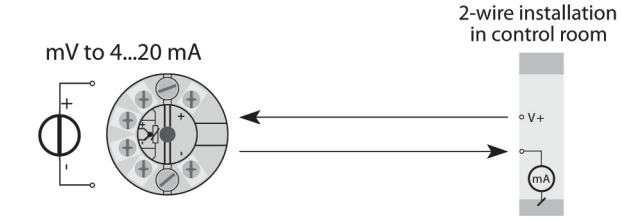
**Mounting/Installation:**

- DIN Form B sensor head compatible.
- Supplied with 2 x M4 screws on a 33 mm (1.3") BC (optional 6-32 screws available).

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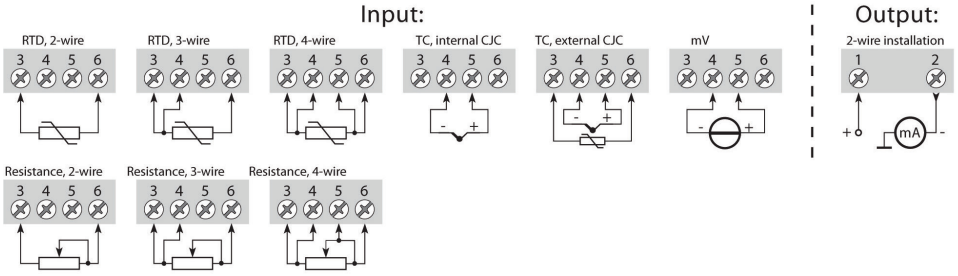
## Specifications

**Order: 5331D3B**




## Electrical Specifications

### Specifications Range:

-40°C to +85°C

### Common Specifications:

Supply voltage, DC ..... 7.2...30 V
Voltage drop ..... 7.2 VDC
Isolation voltage, test / operation ..... 1.5 kVAC / 50 VAC
Communications interface ..... Loop Link
Signal / noise ratio ..... Min. 60 dB
Signal dynamics, input ..... 20 bit
Signal dynamics, output ..... 16 bit

Accuracy, the greater of general and basic values:

| General Values | | |
|---|---|---|
| Input Type | Absolute Accuracy | Temperature Coefficient |
| All | ≤ ±0.05% of span | ≤ ±0.01% of span / °C |

| Basic Values | | |
|---|---|---|
| Input Type | Basic Accuracy | Temperature Coefficient |
| RTD | ≤ ±0.2°C | ≤ ±0.01°C/°C |
| Lin. R | ≤ ±0.1 Ω | ≤ ±10 mΩ/°C |
| Volt | ≤ ±10 µV | ≤ ±1 µV/°C |
| TC type: E, J, K, L, N, T, U | ≤ ±1°C | ≤ ±0.05°C/°C |
| TC type: B, R, S, W3, W5, LR | ≤ ±2°C | ≤ ±0.2°C/°C |

EMC immunity influence ..... < ±0.5% of span
Extended EMC immunity:
NAMUR NE 21, A criterion, burst ... < ±1% of span

Vibration ..... IEC 60068-2-6 Test FC
Lloyd's specification no. 1 ..... 4 g / 2...100 Hz
Max wire size ..... 1 x 1.5mm² (16 AWG) stranded wire
Humidity ..... < 95% RH (non-cond.)
Dimensions ..... Ø 44 x 20.2 mm
Protection degree (encl/terminal) ..... IP68 / IP00

### Electrical Specifications, Input:

Max. offset ..... 50% of selected max. value

### T/C Input:

| Type | Min. Temperature | Max. Temperature | Min. Span | Standard |
|---|---|---|---|---|
| B | +400°C | +1820°C | 200°C | IEC584 |
| E | -100°C | +1000°C | 50°C | IEC584 |
| J | -100°C | +1200°C | 50°C | IEC584 |
| K | -180°C | +1372°C | 50°C | IEC584 |
| L | -100°C | +900°C | 50°C | DIN 43710 |
| N | -180°C | +1300°C | 100°C | IEC584 |
| R | -50°C | +1760°C | 200°C | IEC584 |
| S | -50°C | +1760°C | 200°C | IEC584 |
| T | -200°C | +400°C | 50°C | IEC584 |
| U | -200°C | +600°C | 75°C | DIN 43710 |
| W3 | 0°C | +2300°C | 200°C | ASTM E988-90 |
| W5 | 0°C | +2300°C | 200°C | ASTM E988-90 |
| LR | -200°C | +800°C | 50°C | GOST 3044-84 |

Cold junction compensation ..... < ±1.0°C

**RTD and Linear Resistance Input:**

| RTD Type | Min. Value | Max. Value | Min. Span | Standard |
|---|---|---|---|---|
| Pt100 | -200°C | +850°C | 25°C | IEC 60751 |
| Ni100 | -60°C | +250°C | 25°C | DIN 43760 |
| Lin. R | 0 Ω | 5000 Ω | 30 Ω | ------ |

Cable resistance per wire (max.) ..... 5Ω
Sensor current ..... Nom. 0.2 mA

### Voltage Input:

Measurement range ..... -12...800 mV
Min. span ..... 5 mV

### Current Output:

Signal range ..... 4...20 mA
Min. signal range ..... 16 mA
Updating time ..... 440 ms
Load resistance ..... ≤ (Vsupply - 7.2) / 0.023 [Ω]

### Sensor Error Detection:

Programmable ..... 3.5...23 mA

### EEx/I.S. Approval*:

KEMA 06ATEX0062 X ..... Ex II 1 GD, T80°C...T105°C
EEx ia IIC T6 / T4
Max. amb temperature for T1...T4 ..... 85°C
Max. amb. temperature for T5 and T6 ..... 60°C
ATEX, applicable in zone ..... 0, 1, 2, 20, 21 or 22

### Ex/I.S. Data*:

Signal output / supply, terminal 1 to 2:
$U_i$ ..... :30 VDC
$I_i$ ..... :120 mADC
$P_i$ ..... :0.84 W
$L_i$ ..... :10 µH
$C_i$ ..... :1.0 nF
Sensor input /supply, terminal 3, 4, 5 and 6:
$U_o$ ..... :9.6 VDC
$I_o$ ..... :25 mADC
$P_o$ ..... :60 mW
$L_o$ ..... :33 mH
$C_o$ ..... :2.4 µF
FM, applicable in* ..... IS, Cl. I, Div.1, Gr. A, B, C, D, IS, Cl. I, Zone 0, AEx ia IIC
FM, Installation Drawing No ..... 5300Q502
CSA, applicable in* ..... IS, Cl. I, Div. 1, Gr. A, B, C, D, IS, Cl. I, Zone 0, Ex ia IIC
CSA Installation Drawing No ..... 533XQC03

### Marine Approval*:

Det Norske Veritas, Ships & Offshore ..... Stand. for Certific. No. 2.4

### GOST R Approval*: ..... Certificate available upon request.

| Observed Authority Requirements: | Standard: |
|---|---|
| EMC 2004/108/EC | EN 61326-1 |
| ATEX 94/9/EC | EN 50014, EN 50020, EN 50284, IEC 61241-0 and IEC 61241-11 |
| FM | 3600, 3611, 3610 |
| CSA, CAN/CSA | C22.2 No. 157 E60079-11, UL913 |

**Of Span** = Of the presently selected range
**Loop Link** = PC compatible programming software.
**IS** = Intrinsically Safe

*The transmitter is manufactured by PR electronics. All approvals listed are recognized under the PR name.

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