

**TEMPERATURE TRANSMITTER**

Type: Ex for zone 0, 1 or 2, EEx ia IIC  
 T1...T6, programmable  
 Input: RTD, TC, Ohm, mV

**Type:**  
**TT-5331D**

Sheet No.  
 6-3 V2.1

10122-E010818V2.1

**Application:**

- Linearized temperature measurement with Pt100...Pt1000,
- Ni100... Ni1000, or TC-sensor.
- Conversion of linear resistance variation to a standard analogue current signal, for instance from valves or Ohmic level sensors.
- Amplification of a bipolar mV signal to a standard 4...20 mA current signal.

**Properties:**

- Within a few seconds the user can program PR5331D to measure temperatures within all ranges defined by the norms.
- The RTD and resistance inputs have cable compensation for 2-, 3- and 4-wire connection.
- The 5331D has been designed according to strict safety requirements and is therefore suitable for application in SIL 2 installations.
- Continuous check of vital stored data for safety reasons.
- Sensor error detection according to the guidelines in NAMUR NE89.

**TECHNICAL DATA:****INPUT:**

Type	Min temp.	Max temp.	Min span	Norm
Pt100	-200°C	+850°C	25°C	DIN IEC 751
Ni100	-60°C	+250°C	25°C	
Lin. R	0Ω	10000ohm	30ohm	
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	DIN43710
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	DIN4370
W3	0°C	+2300°C	200°C	ASTM E988-90
W5	0°C	+2300°C	200°C	ASTM E988-90

**COMMUNICATION INTERFACE:**

Loop link 5905

**MECHANICAL DATA:**

Measurements: Ø 44 x 20,2 mm  
 Degree of protection (case/clamp): IP68/ IP100

**ENVIRONMENTAL CONDITIONS:**

Operating temperature: -40°C to +85°C  
 Humidity: < 95% RH (non-cond.)

**TECHNICAL DATA:****OUTPUT:**

Signal range: ..... 4 - 20 mA

**ACCURACY:**

Type:	Basic accuracy:	Temperature coefficient:
RTD	≤±0,2°C	≤±0,01°C/°C
LIN R	≤±0,1ohm	≤±10mohm/°C
Volt	≤±10µV	≤±1µV/°C
TC Type: E, J, K, L, N, T, UB	≤±1°C	≤±0,05°C/°C
TC Type: B, R, S, W3, W5E	≤±2°C	≤±0,2°C/°C

**COMMON SPECIFICATIONS:**

Supply voltage: DC: 7,2...35 V

Voltage drop: 7,2 VDC

Reaction time (programmable): 0,33...60 s

**SENSOR TROUBLE SHOOTING:**

Programmable: 3.5...23 mA

NAMUR NE43 Upscale: 23 mA

NAMUR NE43 Downscale: 3,5 mA

**Ordering details:** Please state if the transmitter should be programmed

Transmitter Input Type:	
4 mA =	20 mA =
C°	C°



## 2-wire programmable transmitter

### 5331D

- RTD, TC, Ohm, or mV input
- Extremely high measurement accuracy
- 1.5 kVAC galvanic isolation
- Programmable sensor error value
- For DIN form B sensor head mounting



#### Application

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

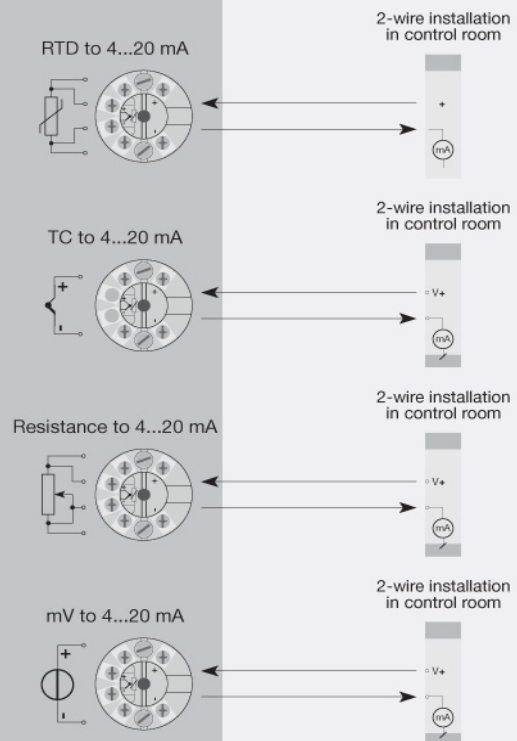
#### Technical characteristics

- Within a few seconds the user can program PR5331D to measure temperatures within all ranges defined by the norms.
- The RTD and resistance inputs have cable compensation for 2-, 3- and 4-wire connection.
- Continuous check of vital stored data for safety reasons.

#### Mounting / installation

- For DIN form B sensor head mounting.

#### Applications



Order:

Type	Ambient temperature	Galvanic isolation
5331D	-40°C...+85°C : 3	1500 VAC : B

### Environmental Conditions

Operating temperature.....	-40°C to +85°C
Calibration temperature.....	20...28°C
Relative humidity.....	< 95% RH (non-cond.)
Protection degree (encl./terminal).....	IP68 / IP00

### Mechanical specifications

Dimensions.....	Ø 44 x 20.2 mm
Weight approx.....	50 g
Wire size.....	1 x 1.5 mm <sup>2</sup> stranded wire
Screw terminal torque.....	0.4 Nm
Vibration.....	IEC 60068-2-6
2...25 Hz.....	±1.6 mm
25...100 Hz.....	±4 g

### Common specifications

#### Supply

Supply voltage.....	7.2...30 VDC
Internal power dissipation.....	25 mW...0.7 W

#### Isolation voltage

Isolation voltage, test / working.....	1.5 kVAC / 50 VAC
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#### Response time

Response time (programmable).....	1...60 s
Voltage drop.....	7.2 VDC
Warm-up time.....	5 min.
Programming.....	Loop Link
Signal / noise ratio.....	Min. 60 dB
EEPROM error check.....	< 3.5 s
Accuracy.....	Better than 0.05% of selected range
Signal dynamics, input.....	20 bit
Signal dynamics, output.....	16 bit
Effect of supply voltage change.....	< 0.005% of span / VDC
EMC immunity influence.....	< ±0.5% of span
Extended EMC immunity: NAMUR NE21, A criterion, burst.....	< ±1% of span

### Input specifications

#### Common input specifications

Max. offset.....	50% of selected max. value
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#### RTD input

RTD type.....	Pt100, Ni100, lin. R
Cable resistance per wire.....	5 Ω (max.)
Sensor current.....	Nom. 0.2 mA
Effect of sensor cable resistance (3-/4-wire).....	< 0.002 Ω / Ω
Sensor error detection.....	Yes

#### Linear resistance input

Linear resistance min...max.....	0 Ω...5000 Ω
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#### TC input

Thermocouple type.....	B, E, J, K, L, N, R, S, T, U, W3, W5, LR
Cold junction compensation (CJC).....	< ±1.0°C
Sensor error detection.....	Yes
Sensor error current: When detecting / else.....	Nom. 33 µA / 0 µA

#### Voltage input

Measurement range.....	-12...800 mV
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Min. measurement range (span).....	5 mV
Input resistance.....	10 MΩ

### Output specifications

#### Current output

Signal range.....	4...20 mA
Min. signal range.....	16 mA
Load (@ current output).....	≤ (Vsupply - 7.2) / 0.023 [Ω]
Load stability.....	≤ 0.01% of span / 100 Ω
Sensor error indication.....	Programmable 3.5...23 mA
NAMUR NE43 Upscale/Downscale.....	23 mA / 3.5 mA

#### Common output specifications

Updating time.....	440 ms
of span.....	= of the presently selected range

### I.S. / Ex marking

ATEX.....	II 1 G Ex ia IIC T4...T6 Ga, II 1 D Ex ia IIIC Da, I M1 Ex ia Ma
IECEx.....	Ex ia IIC T4...T6 Ga, Ex ia IIIC Da, Ex ia I Ma
FM, US.....	Cl. I, Div. 1, Gp. A, B, C, D T4/T6; Cl. I Zone 0, AEx ia IIC T4/T6; Cl. 1, Div. 2, Gp. A, B, C, D, T4/T6
CSA.....	Cl. I, Div. 1, Gp. A, B, C, D Ex ia IIC, Ga
INMETRO.....	Ex ia IIC T6...T4 Ga, Ex ia IIIC Da

### Observed authority requirements

EMC.....	2014/30/EU
RoHS.....	2011/65/EU
EAC.....	TR-CU 020/2011

### Approvals

DNV-GL Marine.....	Stand. f. Certific. No. 2.4
ATEX.....	KEMA 06ATEX0062X
IECEx.....	DEK 13.0035X
FM.....	FM17US0013X
CSA.....	1125003
INMETRO.....	DEKRA 16.0013 X
EAC Ex.....	RU C-DK.GB08.V.00410