

PERFORMANCE  
MADE  
SMARTER

# Manual do produto

## 5331

### Transmissor programável 2 fios



Segurança  
INMETRO



TEMPERATURA | INTERFACES INTRÍNSECAS | INTERFACE DE COMUNICAÇÃO | MULTIFUNCIONAL | ISOLAÇÃO | DISPLAY

No. 5331V121-BR  
De número de serial: 232249025

**PR**  
electronics

# 6 Product Pillars

## *to meet your every need*

### Individually outstanding, unrivalled in combination

With our innovative, patented technologies, we make signal conditioning smarter and simpler. Our portfolio is composed of six product areas, where we offer a wide range of analog and digital devices covering over a thousand applications in industrial and factory automation. All our products comply with or surpass the highest industry standards, ensuring reliability in even the harshest of environments and have a 5-year warranty for greater peace of mind.



Temperature

Our range of temperature transmitters and sensors provides the highest level of signal integrity from the measurement point to your control system. You can convert industrial process temperature signals to analog, bus or digital communications using a highly reliable point-to-point solution with a fast response time, automatic self-calibration, sensor error detection, low drift, and top EMC performance in any environment.



I.S. Interface

We deliver the safest signals by validating our products against the toughest safety standards. Through our commitment to innovation, we have made pioneering achievements in developing I.S. interfaces with SIL 2 Full Assessment that are both efficient and cost-effective. Our comprehensive range of analog and digital intrinsically safe isolation barriers offers multifunctional inputs and outputs, making PR an easy-to-implement site standard. Our backplanes further simplify large installations and provide seamless integration to standard DCS systems.



Communication

We provide inexpensive, easy-to-use, future-ready communication interfaces that can access your PR installed base of products. All the interfaces are detachable, have a built-in display for readout of process values and diagnostics, and can be configured via push-buttons. Product specific functionality includes communication via Modbus and Bluetooth and remote access using our PR Process Supervisor (PPS) application, available for iOS and Android.



Multifunction

Our unique range of single devices covering multiple applications is easily deployable as your site standard. Having one variant that applies to a broad range of applications can reduce your installation time and training, and greatly simplify spare parts management at your facilities. Our devices are designed for long-term signal accuracy, low power consumption, immunity to electrical noise and simple programming.



Isolation

Our compact, fast, high-quality 6 mm isolators are based on microprocessor technology to provide exceptional performance and EMC-immunity for dedicated applications at a very low total cost of ownership. They can be stacked both vertically and horizontally with no air gap separation between units required.



Display

Our display range is characterized by its flexibility and stability. The devices meet nearly every demand for display readout of process signals, and have universal input and power supply capabilities. They provide a real-time measurement of your process value no matter the industry, and are engineered to provide a user-friendly and reliable relay of information, even in demanding environments.

# Transmissor programável 2 fios 5331

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# Transmissor programável 2 fios 5331

- Entrada RTD, TC, Ohm, ou mV
- Precisão de medição extremamente alta
- 1,5 kVAC de isolamento galvânica
- Valor de erro de sensor programável
- Montagem do sensor tipo cabeçote para trilho DIN B

## Aplicação

- Medição de temperatura linearizada com Pt100...Pt1000, Ni100...Ni1000, ou sensor TC.
- Conversão de variação de resistência linear para um sinal de corrente analógico padrão, por exemplo válvulas ou sensor de nível Ohmico.
- Amplificação de sinal mV bipolar para o sinal de corrente padrão 4...20 mA.

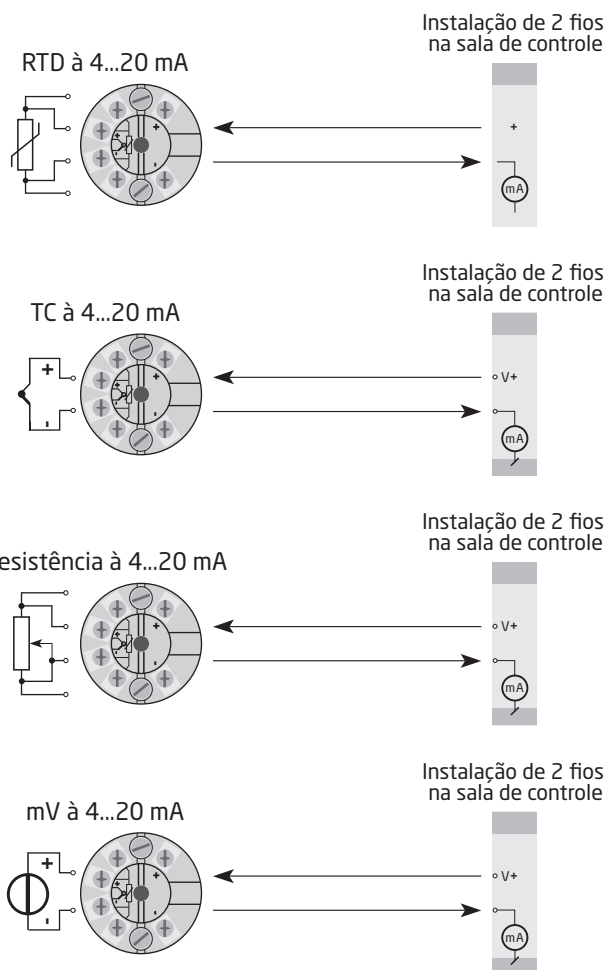
## Características técnicas

- Em poucos segundos o usuário pode programa o PR5331 para medição de temperaturas com todos os ranges definidos pelas normas.
- As entradas de RTD e resistência possuem cabo de compensação para 2-, 3- e 4-fios de conexão.
- Verificação contínua de dados armazenados vitais por razões de segurança.

## Montagem / instalação

- Para sensor tipo cabeçote de montagem em DIN B. Em áreas não perigosas o 5331 pode ser montado em trilho DIN com o acessório da PR tipo 8421.

## Aplicações



## Ordem

| Tipo | Versão  | Temperatura ambiente | Isolação galvânica |
|------|---|----------------------|--------------------|
| 5331 | Zona 2 / Div. 2 : A                           | -40°C...+85°C : 3    | 1500 VAC : B       |
|      | Zona 0, 1, 2, 21, 22, M1 / Div. 1, Div. 2 : D |                      |                    |

### Especificações elétricas

#### Condições ambientais:

|  |                      |
|--|----------------------|
| Especificações de range                    | -40°C a +85°C        |
| Temperatura de calibração                  | 20...28°C            |
| Umidade de relativa                        | < 95% RH (non-cond.) |
| Grau de proteção (enclausurado / terminal) | IP68 / IP00          |

#### Especificações mecânicas:

|                                |                                      |
|--------------------------------|--------------------------------------|
| Dimensões                      | Ø 44 x 20,2 mm                       |
| Peso                           | 50 g                                 |
| Tamanho máximo do fio          | 1 x 1,5 mm <sup>2</sup> fio flexível |
| Torque de terminal de parafuso | 0,4 Nm                               |
| Vibração                       | IEC 60068-2-6                        |
| 2...25 Hz                      | ±1,6 mm                              |
| 25...100 Hz                    | ±4 g                                 |

#### Especificações elétricas comuns:

##### Tensão de alimentação, DC:

|         |              |
|---------|--------------|
| 5331A3B | 7,2...35 VDC |
| 5331D3B | 7,2...30 VDC |

##### Dissipação de potência

|         |               |
|---------|---------------|
| 5331A3B | 25 mW...0,8 W |
| 5331D3B | 25 mW...0,7 W |

|   |                        |
|---|------------------------|
| Queda de tensão                             | 7,2 VDC                |
| Tensão de isolação, teste / operação        | 1,5 kVAC / 50 VAC      |
| Tempo de aquecimento                        | 5 min.                 |
| Da inicialização à saída estável            | 4,5 s                  |
| Programação                                 | Loop Link              |
| Sinal / ruído                               | Min. 60 dB             |
| Tempo de resposta (programável)             | 1...60 s               |
| Verificação de erro EEprom                  | < 3,5 s                |
| Dinâmicas de sinal, entrada                 | 20 bit                 |
| Dinâmicas de sinal, saída                   | 16 bit                 |
| Efeito de variação de tensão de alimentação | < 0,005% de span / VDC |

Precisão, a melhor para valores gerais e básicos:

| Valores gerais  |                   |                             |
|-----------------|-------------------|-----------------------------|
| Tipo de entrada | Precisão absoluta | Coefficiente de temperatura |
| Todas           | ≤ ±0,05% de span  | ≤ ±0,01% de span / °C       |

| Valores básicos                 |                                |  |
|---------------------------------|--------------------------------|--|
| Tipo de entrada                 | Precisão básica                | Coefficiente de temperatura                        |
| RTD                             | $\leq \pm 0,2^{\circ}\text{C}$ | $\leq \pm 0,01^{\circ}\text{C}/^{\circ}\text{C}$   |
| R lin.                          | $\leq \pm 0,1 \Omega$          | $\leq \pm 10 \text{ m}\Omega / ^{\circ}\text{C}$   |
| Volt                            | $\leq \pm 10 \mu\text{V}$      | $\leq \pm 1 \mu\text{V} / ^{\circ}\text{C}$        |
| Tipo TC:<br>E, J, K, L, N, T, U | $\leq \pm 1^{\circ}\text{C}$   | $\leq \pm 0,05^{\circ}\text{C} / ^{\circ}\text{C}$ |
| Tipo TC: B, R, S,<br>W3, W5, Lr | $\leq \pm 2^{\circ}\text{C}$   | $\leq \pm 0,2^{\circ}\text{C} / ^{\circ}\text{C}$  |

|   |                       |
|---|-----------------------|
| Influência de imunidade EMC. . . . .                                    | $< \pm 0,5\%$ de span |
| Imunidade EMC estendida:<br>NAMUR NE 21, critério A, explosão . . . . . | $< \pm 1\%$ de span   |

**Especificações elétricas, entradas:**

**Entrada RTD e resistência linear:**

| Tipo RTD       | Valor mín. | Valor máx.    | Span mín.   | Padrão    |
|----------------|------------|---------------|-------------|-----------|
| Pt100...Pt1000 | -200°C     | +850°C        | 25°C        | IEC 60751 |
| Ni100...Ni1000 | -60°C      | +250°C        | 25°C        | DIN 43760 |
| Resist. lin.   | 0 $\Omega$ | 5000 $\Omega$ | 30 $\Omega$ | ----      |

Compensação máx. . . . . 50% do valor máx. selecionado  
 Resistência do cabo por fio (max.) . . . . . 5  $\Omega$   
 Corrente do sensor. . . . . Nom. 0,2 mA  
 Efeito de resistência de cabo do sensor (3- / 4-fios). . . . .  $< 0,002 \Omega / \Omega$   
 Detecção de erro de sensor . . . . . Sim

**Entrada TC:**

| Tipo | Temperatura mín. | Temperatura máx. | Span mín. | Padrão       |
|------|------------------|------------------|-----------|--------------|
| B    | +400°C           | +1820°C          | 100°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    |
| Lr   | -200°C           | +800°C           | 50°C      | GOST 3044-84 |
| N    | -180°C           | +1300°C          | 50°C      | IEC584       |
| R    | -50°C            | +1760°C          | 100°C     | IEC584       |
| S    | -50°C            | +1760°C          | 100°C     | IEC584       |
| T    | -200°C           | +400°C           | 50°C      | IEC584       |
| U    | -200°C           | +600°C           | 50°C      | DIN 43710    |
| W3   | 0°C              | +2300°C          | 100°C     | ASTM E988-90 |
| W5   | 0°C              | +2300°C          | 100°C     | ASTM E988-90 |

Compensação máx. . . . . 50% do valor máx. selecionado  
 Compensação de junta fria . . . . .  $< \pm 1,0^{\circ}\text{C}$   
 Detecção de erro de sensor . . . . . Sim  
 Erro de corrente do sensor:  
 Quando detectado. . . . . Nom. 33  $\mu\text{A}$   
 Não . . . . . 0  $\mu\text{A}$

**Entrada de tensão:**

|                                  |                               |
|----------------------------------|-------------------------------|
| Range de medição . . . . .       | -12...800 mV                  |
| Span mín. . . . .                | 5 mV                          |
| Compensação máx. . . . .         | 50% do valor máx. selecionado |
| Resistência de entrada . . . . . | 10 MΩ                         |

**Saída de corrente:**

|  |                                   |
|--|-----------------------------------|
| Range de sinal . . . . .               | 4...20 mA                         |
| Range de sinal mín. . . . .            | 16 mA                             |
| Tempo de atualização . . . . .         | 440 ms                            |
| Sinal de saída em erro EEprom. . . . . | ≤ 3,5 mA                          |
| Resistência de carga. . . . .          | ≤ (Valimentação- 7,2) / 0,023 [Ω] |
| Estabilidade de carga . . . . .        | < ±0,01% de span / 100 Ω          |

**Detecção de erro de sensor:**

|                                       |             |
|---------------------------------------|-------------|
| Programável. . . . .                  | 3.5...23 mA |
| NAMUR NE43 Acima de escala . . . . .  | 23 mA       |
| NAMUR NE43 Abaixo de escala . . . . . | 3,5 mA      |

De span = De range presentemente selecionado

**Determinações das autoridades observados:**

|                  |                              |
|------------------|------------------------------|
| EMC. . . . .     | 2014/30/UE & UK SI 2016/1091 |
| ATEX . . . . .   | 2014/34/UE & UK SI 2016/1107 |
| RoHS . . . . .   | 2011/65/UE & UK SI 2012/3032 |
| EAC . . . . .    | TR-CU 020/2011               |
| EAC Ex . . . . . | TR-CU 012/2011               |

**Aprovação marinha:**

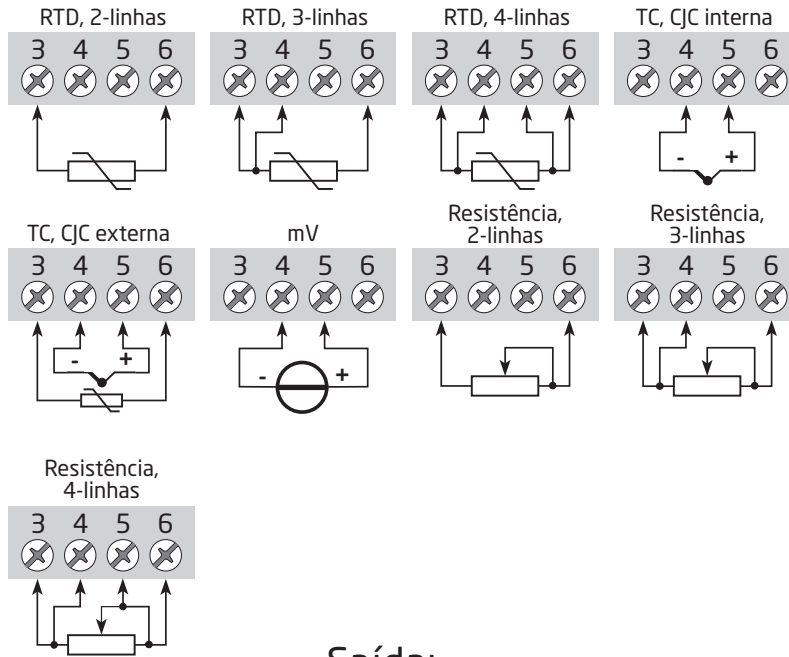
|                                |            |
|--------------------------------|------------|
| DNV, Ships & Offshore. . . . . | TAA0000101 |
|--------------------------------|------------|

**Aprovações I.S. / Ex:**

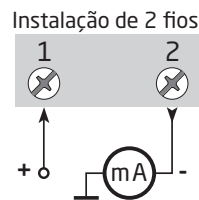
|                   |                         |
|-------------------|-------------------------|
| 5331A:            |                         |
| ATEX . . . . .    | DEKRA 20ATEX0096X       |
| 5331D:            |                         |
| ATEX . . . . .    | DEKRA 20ATEX0095X       |
| FM . . . . .      | FM17US0013X             |
| 5331A & 5331D:    |                         |
| IECEX. . . . .    | DEK 20.0059X            |
| CSA. . . . .      | 1125003                 |
| INMETRO . . . . . | DEKRA 23.0009X          |
| EAC Ex. . . . .   | RU C-DK.HA65.B.00355/19 |

# Conexões

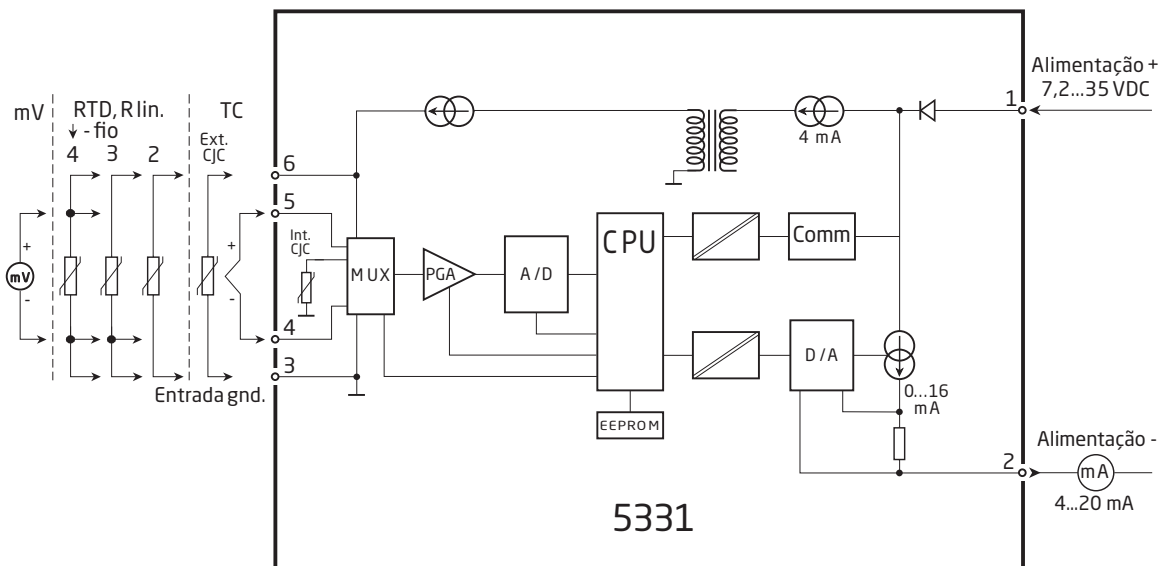
## Entrada:



## Saída:



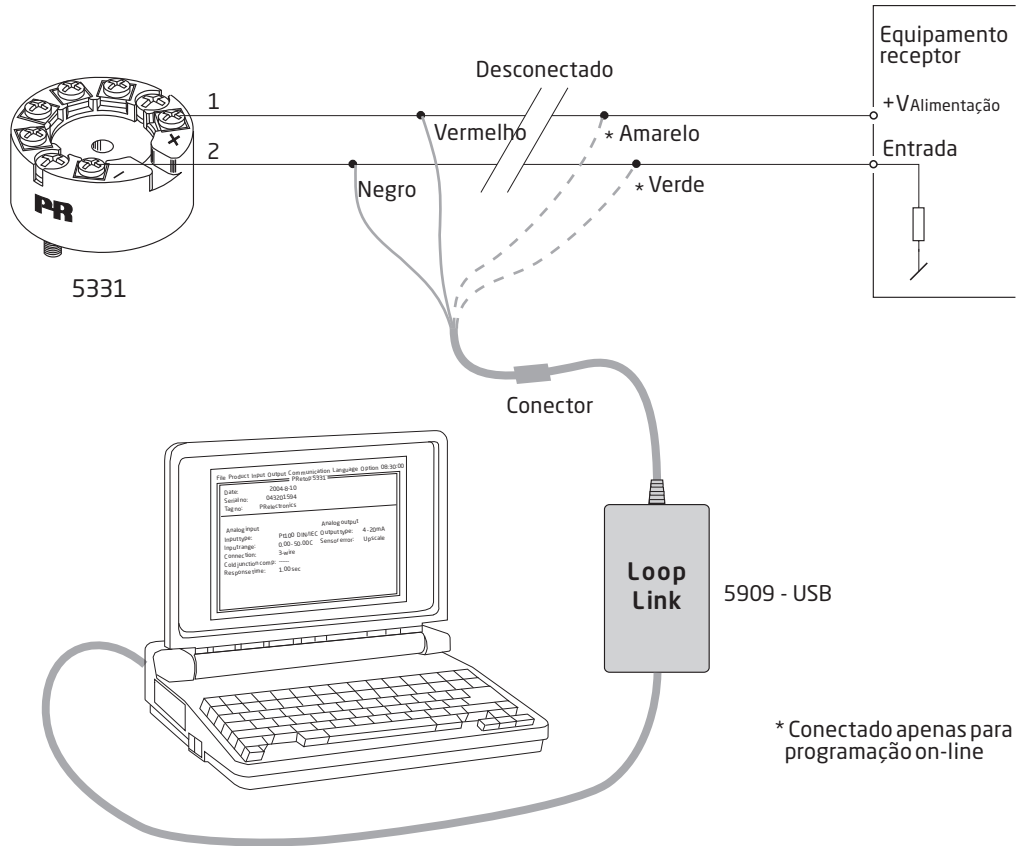
## Diagrama de bloco



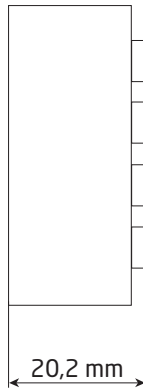
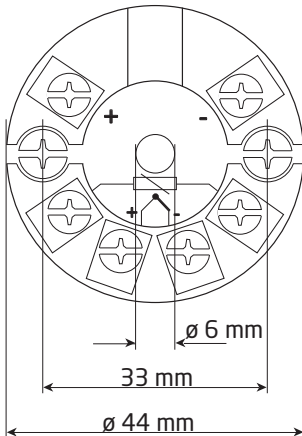


# Programação

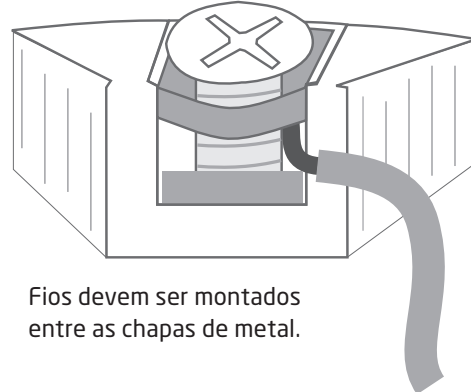
- Loop Link é uma interface de comunicações que é necessário para programar o 5331.
- Para programar favor consultar o desenho a seguir e as funções de ajuda no PReset.
- Loop Link não é aprovado para comunicação com módulos instalados em áreas perigosas (Ex).



## Especificações mecânicas



## Montagem dos fios do sensor



# ATEX-installation drawing 5331QA02-V3R0

For safe installation of 5331A or 5334A the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area. Year of manufacture can be taken from the first two digits in the serial number.

ATEX Certificate      DEKRA 20ATEX0096 X

Marking



II 3 G Ex nA [ic] IIC T6 ... T4 Gc  
 II 3 G Ex ec [ic] IIC T6 ... T4 Gc  
 II 3 G Ex ic IIC T6 ... T4 Gc  
 II 3 D Ex ic IIIC Dc

Standards

EN 60079-0: 2018, EN 60079-11: 2012,  
 EN 60079-15: 2010, EN 60079-7:2015 +A1: 2018

|  |   |   |                                      |
|--|---|---|--------------------------------------|
| Terminal 3,4,5,6   | Terminal 1,2  | Terminal 1,2  | Terminal 1,2                         |
| Ex ic IIC, Ex ic IIIC  | Ex ic IIC, Ex ic IIIC                               | Ex ic IIC, Ex ic IIIC                               | Ex nA, Ex ec                         |
| Uo: 9.6 V<br>Io: 25 mA<br>Po: 60 mW<br>Lo: 33 mH<br>Co: 2.4 µF | Ui = 35 V<br>Ii = 110 mA<br>Ci = 1 nF<br>Li = 10 µH | Ui = 24 V<br>Ii = 260 mA<br>Ci = 1 nF<br>Li = 10 µH | Umax ≤ 35 VDC<br>or<br>Umax ≤ 24 VDC |

| Ex ic IIC, Ex ic IIIC<br>Temperature<br>Class | Ambient temperature range |                |
|---|---------------------------|----------------|
|   | Ui=35 V                   | Ui=24 V        |
| <b>T6</b>                                     | -40°C to +54°C            | -40°C to +63°C |
| <b>T5</b>                                     | -40°C to +69°C            | -40°C to +78°C |
| <b>T4</b>                                     | -40°C to +85°C            | -40°C to +85°C |

| Ex ec, Ex nA<br>Temperature<br>Class | Ambient temperature range |                |
|--------------------------------------|---------------------------|----------------|
|                                      | Vmax=35 V                 | Vmax=24 V      |
| <b>T6</b>                            | -40°C to +43°C            | -40°C to +55°C |
| <b>T5</b>                            | -40°C to +85°C            | -40°C to +85°C |
| <b>T4</b>                            | -40°C to +85°C            | -40°C to +85°C |

## **Installation notes**

If the enclosure is made of non-metallic plastic materials, electrostatic charges on the transmitter enclosure shall be avoided.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex ic, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to EN 60529, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Dc, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP5X according to EN 60079-0, and that is suitable for the application and correctly installed. The surface temperature of the outer enclosure is +20 K above the ambient temperature, determined without a dust layer. Ambient temperature range: -40°C to +85°C.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex nA or Ex ec, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP54 according to EN 60079-0, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex nA or Ex ec, the equipment shall only be used in an area of not more than pollution degree 2, as defined in EN 60664-1.

# ATEX-installation drawing 5331QA01-V3R0



For safe installation of 5331D or 5334B the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area. Year of manufacture can be taken from the first two digits in the serial number.

ATEX Certificate      DEKRA 20ATEX0095 X

Marking



II 1 G Ex ia IIC T6...T4 Ga  
 II 2 D Ex ia IIIC Db  
 I M1 Ex ia I Ma

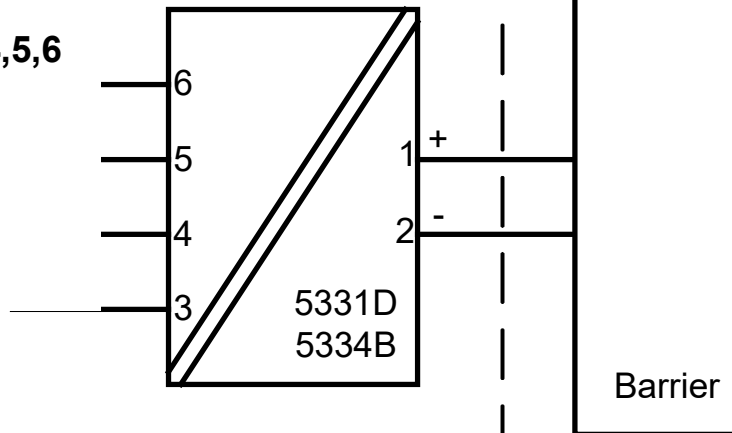
Standards              EN 60079-0: 2018, EN 60079-11: 2012

Hazardous area  
 Zone 0, 1, 2, 21, 22

Non Hazardous Area

**Terminal: 3,4,5,6**

U<sub>o</sub>: 9.6 VDC  
 I<sub>o</sub>: 25 mA  
 P<sub>o</sub>: 60 mW  
 L<sub>o</sub>: 33 mH  
 C<sub>o</sub>: 2.4 μF



**Terminal: 1,2**

U<sub>i</sub>: 30 VDC  
 I<sub>i</sub>: 120 mA  
 P<sub>i</sub>: 0.84 W or 0.75 W  
 L<sub>i</sub>: 10 μH  
 C<sub>i</sub>: 1.0 nF

| Temperature Class | Ambient temperature range |                |
|-------------------|---------------------------|----------------|
|                   | Pi: 0.84 W                | Pi: 0.75 W     |
| <b>T6</b>         | -40°C to +47°C            | -40°C to +50°C |
| <b>T5</b>         | -40°C to +62°C            | -40°C to +65°C |
| <b>T4</b>         | -40°C to +85°C            | -40°C to +85°C |

## Installation notes

If the enclosure is made of non-metallic plastic materials, electrostatic charges on the transmitter enclosure shall be avoided.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to EN 60529, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga or Ma, and if the enclosure is made of aluminum, it must be installed such, that ignition sources due to impact and friction sparks are excluded.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Db, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP5X according to EN 60079-0, and that is suitable for the application and correctly installed. The surface temperature of the outer enclosure is +20 K above the ambient temperature, determined without a dust layer.  
Ambient temperature range: -40°C to +85°C.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ma, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP54 according to EN 60529, and that is suitable for the application and correctly installed.  
Ambient temperature range: -40°C to +85°C.

Cable entries and blanking elements shall be used that are suitable for the application and correctly installed.

For an ambient temperature  $\geq 60^\circ\text{C}$ , heat resistant cables shall be used with a rating of at least 20 K above the ambient temperature.

The sensor circuit is not infallibly galvanically isolated from the input circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500 VAC for 1 minute.

# IECEx-installation drawing 5331QI02-V2R0

For safe installation of 5331A and 5334A the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area. Year of manufacture can be taken from the first two digits in the serial number.

Certificate IECEx DEK 20.0059X

Marking Ex nA [ic] IIC T6 ... T4 Gc  
Ex ec [ic] IIC T6 ... T4 Gc  
Ex ic IIC T6 ... T4 Gc  
Ex ic IIIC Dc

Standards IEC 60079-0: 2017, IEC 60079-11: 2011,  
IEC 60079-15: 2010, IEC 60079-7:2017

|  |   |   |                                      |
|--|---|---|--------------------------------------|
| Terminal 3,4,5,6   | Terminal 1,2  | Terminal 1,2  | Terminal 1,2                         |
| Ex ic IIC, Ex ic IIIC  | Ex ic IIC, Ex ic IIIC                               | Ex ic IIC, Ex ic IIIC                               | Ex nA, Ex ec                         |
| Uo: 9.6 V<br>Io: 25 mA<br>Po: 60 mW<br>Lo: 33 mH<br>Co: 2.4 µF | Ui = 35 V<br>Ii = 110 mA<br>Ci = 1 nF<br>Li = 10 µH | Ui = 24 V<br>Ii = 260 mA<br>Ci = 1 nF<br>Li = 10 µH | Umax ≤ 35 VDC<br>or<br>Umax ≤ 24 VDC |

| Ex ic IIC, Ex ic IIIC<br>Temperature<br>Class | Ambient temperature range |                |
|---|---------------------------|----------------|
|   | Ui=35 V                   | Ui=24 V        |
| <b>T6</b>                                     | -40°C to +54°C            | -40°C to +63°C |
| <b>T5</b>                                     | -40°C to +69°C            | -40°C to +78°C |
| <b>T4</b>                                     | -40°C to +85°C            | -40°C to +85°C |

| Ex ec, Ex nA<br>Temperature<br>Class | Ambient temperature range |                |
|--------------------------------------|---------------------------|----------------|
|                                      | Vmax=35 V                 | Vmax=24 V      |
| <b>T6</b>                            | -40°C to +43°C            | -40°C to +55°C |
| <b>T5</b>                            | -40°C to +85°C            | -40°C to +85°C |
| <b>T4</b>                            | -40°C to +85°C            | -40°C to +85°C |

## **Installation notes**

If the enclosure is made of non-metallic plastic materials, electrostatic charges on the transmitter enclosure shall be avoided.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex ic, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to IEC 60529, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Dc, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP5X according to IEC 60079-0, and that is suitable for the application and correctly installed. The surface temperature of the outer enclosure is +20 K above the ambient temperature, determined without a dust layer.  
Ambient temperature range: -40°C to +85°C.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex nA or Ex ec, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP54 according to IEC 60079-0, and that is suitable for the application and correctly installed.

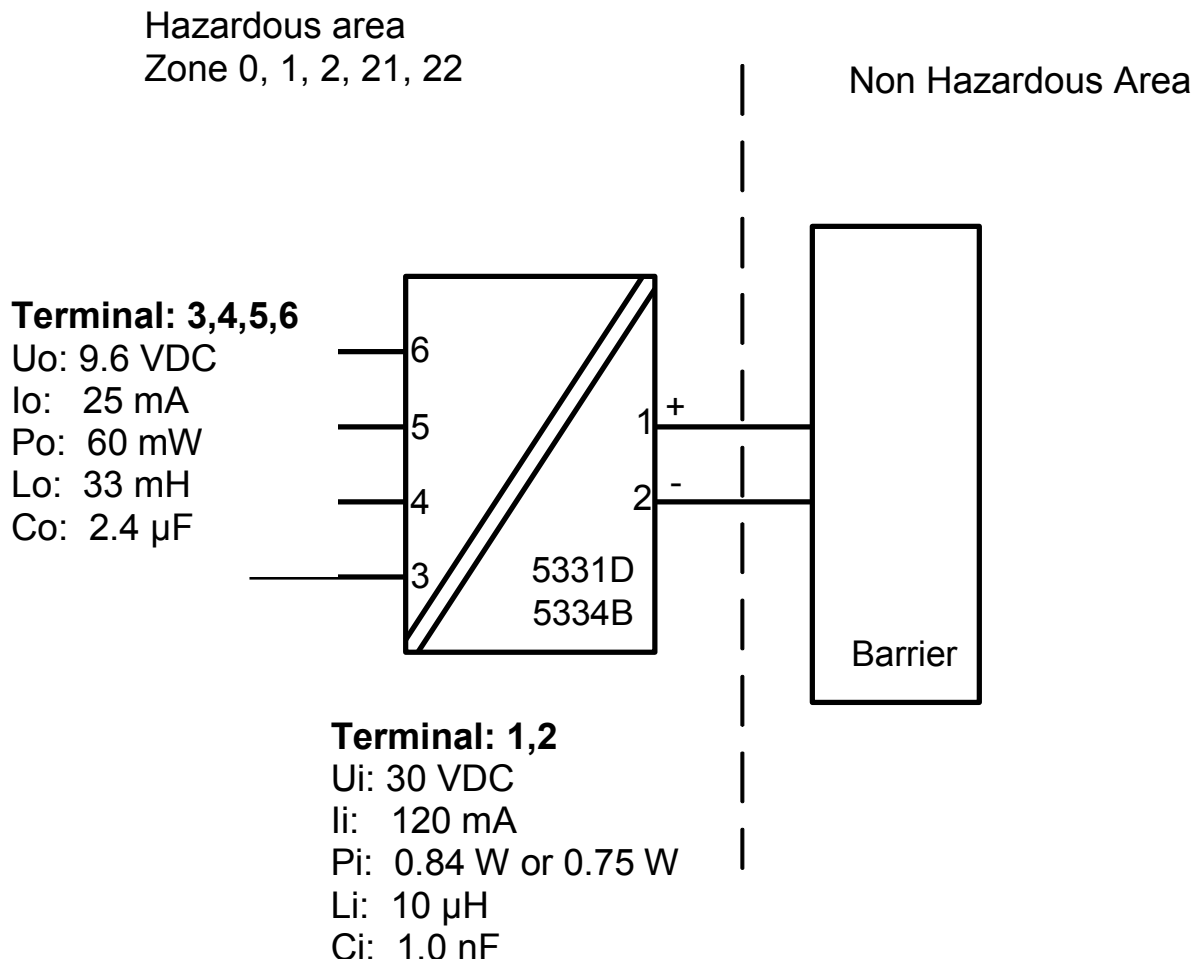
If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex nA or Ex ec, the equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC 60664-1.

# IECEX-installation drawing 5331QI01-V2R0



For safe installation of 5331D or 5334B the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area. Year of manufacture can be taken from the first two digits in the serial number.

|             |   |
|-------------|---|
| Certificate | IECEX DEK 20.0059X                                  |
| Marking     | Ex ia IIC T6...T4 Ga<br>Ex ia IIIC Db<br>Ex ia I Ma |
| Standards   | IEC 60079-0: 2017, IEC 60079-11: 2011               |





| Temperature Class | Ambient temperature range |                |
|-------------------|---------------------------|----------------|
|                   | Pi: 0.84 W                | Pi: 0.75 W     |
| <b>T6</b>         | -40°C to +47°C            | -40°C to +50°C |
| <b>T5</b>         | -40°C to +62°C            | -40°C to +65°C |
| <b>T4</b>         | -40°C to +85°C            | -40°C to +85°C |

## Installation notes

If the enclosure is made of non-metallic plastic materials, electrostatic charges on the transmitter enclosure shall be avoided.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to IEC 60529, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga or Ma, and if the enclosure is made of aluminum, it must be installed such, that ignition sources due to impact and friction sparks are excluded.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Db, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP5X according to IEC 60079-0, and that is suitable for the application and correctly installed. The surface temperature of the outer enclosure is +20 K above the ambient temperature, determined without a dust layer.  
Ambient temperature range: -40°C to +85°C.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ma, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP54 according to IEC 60529, and that is suitable for the application and correctly installed.  
Ambient temperature range: -40°C to +85°C.

Cable entries and blanking elements shall be used that are suitable for the application and correctly installed.

For an ambient temperature  $\geq 60^\circ\text{C}$ , heat resistant cables shall be used with a rating of at least 20 K above the ambient temperature.

The sensor circuit is not infallibly galvanically isolated from the input circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500 VAC for 1 minute.

## FM Installation Drawing

### Model 5331D, 5332D, 5333D and 5343B

#### Hazardous (Classified) Location

Class I, Division 1, Groups, A, B, C, D T4..T6  
Class I, Zone 0, AEx ia IIC T4..T6

Ambient temperature limits  
T4: -40 to +85 deg. Celcius  
T6: -40 to +60 deg. Celcius

Terminal 1 , 2  
Vmax or Ui: 30 V  
Imax or li: 120 mA  
Pmax or Pi: 0.84 W  
Ci: 1 nF  
Li: 10 uH



#### Non Hazardous Location

Associated Apparatus  
or Barrier  
with  
entity Parameters:

$UM \leq 250V$   
 $Voc \text{ or } Uo \leq Vmax \text{ or } Ui$   
 $Isc \text{ or } Io \leq Imax \text{ or } li$   
 $Po \leq Pi$   
 $Ca \text{ or } Co \geq Ci + Ccable$   
 $La \text{ or } Lo \geq Li + Lcable$

This device must not be connected  
to any associated apparatus which  
uses or generates more than 250  
VRMS

### Model 5335D, 5337D

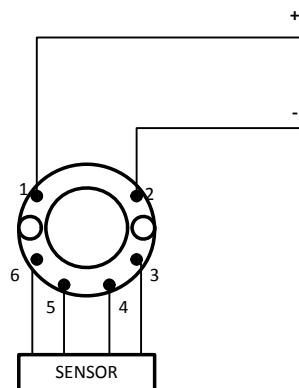
#### Hazardous (Classified) Location

Class I, Division 1, Groups, A, B, C, D T4..T6  
Class I, Zone 0, AEx ia IIC T4..T6

Ambient temperature limits  
T4: -40 to +85 deg. Celcius  
T6: -40 to +60 deg. Celcius

Terminal 1 , 2  
Vmax or Ui: 30 V  
Imax or li: 120 mA  
Pmax or Pi: 0.84 W  
Ci: 1 nF  
Li: 10 uH

Terminal 3,4,5,6  
Vt or Uo: 9.6 V  
It or Io: 28 mA  
Pt or Po: 67.2 mW  
Ca or Co: 3.5 uF  
La or Lo: 35 mH



#### Non Hazardous Location

Associated Apparatus  
or Barrier  
with  
entity Parameters:

$UM \leq 250V$   
 $Voc \text{ or } Uo \leq Vmax \text{ or } Ui$   
 $Isc \text{ or } Io \leq Imax \text{ or } li$   
 $Po \leq Pi$   
 $Ca \text{ or } Co \geq Ci + Ccable$   
 $La \text{ or } Lo \geq Li + Lcable$

This device must not be connected  
to any associated apparatus which  
uses or generates more than 250  
VRMS

**The entity concept**

The Transmitter must be installed according to National Electrical Code (ANSI-NFPA 70) and shall be installed with the enclosure, mounting, and spacing segregation requirement of the ultimate application.

Equipment that is FM-approved for intrinsic safety may be connected to barriers based on the ENTITY CONCEPT. This concept permits interconnection of approved transmitters, meters and other devices in combinations which have not been specifically examined by FM, provided that the agency's criteria are met. The combination is then intrinsically safe, if the entity concept is acceptable to the authority having jurisdiction over the installation.

The entity concept criteria are as follows:

The intrinsically safe devices, other than barriers, must not be a source of power.

The maximum voltage  $U_i(V_{MAX})$  and current  $I_i(I_{MAX})$ , and maximum power  $P_i(P_{max})$ , which the device can receive and remain intrinsically safe, must be equal to or greater than the voltage ( $U_o$  or  $V_{OC}$  or  $V_t$ ) and current ( $I_o$  or  $I_{SC}$  or  $I_t$ ) and the power  $P_o$  which can be delivered by the barrier.

The sum of the maximum unprotected capacitance ( $C_i$ ) for each intrinsically device and the interconnecting wiring must be less than the capacitance ( $C_a$ ) which can be safely connected to the barrier.

The sum of the maximum unprotected inductance ( $L_i$ ) for each intrinsically device and the interconnecting wiring must be less than the inductance ( $L_a$ ) which can be safely connected to the barrier.

The entity parameters  $U_o, V_{OC}$  or  $V_t$  and  $I_o, I_{SC}$  or  $I_t$ , and  $C_a$  and  $L_a$  for barriers are provided by the barrier manufacturer.

**NI Field Circuit Parameters**

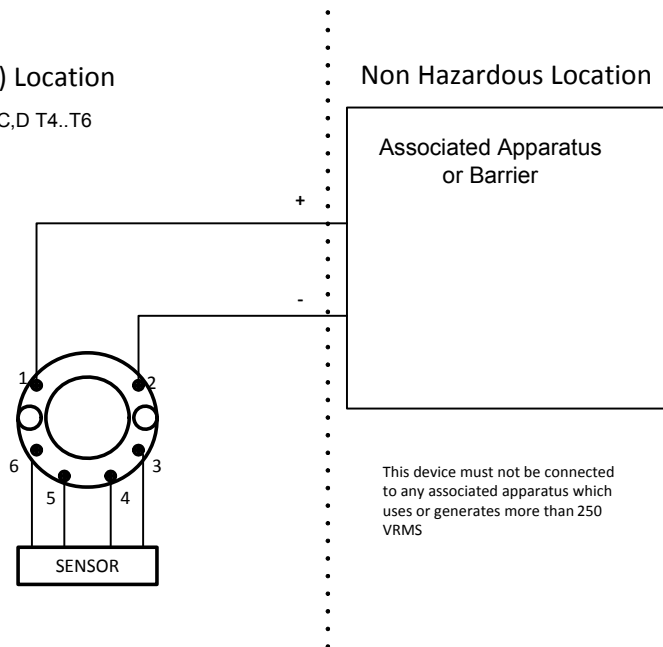
**Model 5331D, 5332D, 5333D, 5335D, 5337D and 5343B**

**Hazardous (Classified) Location**

Class I, Division 2, Groups, A, B, C, D T4..T6  
Class I, Zone 2, IIC T4..T6

Ambient temperature limits  
T4: -40 to + 85 deg. Celcius  
T6: -40 to + 60 deg. Celcius

Terminal 1 , 2  
 $V_{max}$  : 35 V  
 $C_i$ : 1.0 nF  
 $L_i$ : 10 uH



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For safe installation of the 5331A and 5332A the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

### Marking

Class I, Division 2, Group A,B,C,D T6...T4  
 Ex nA[ic] IIC T6...T4  
 Class I Zone 2 AEx nA[ic] IIC T6...T4

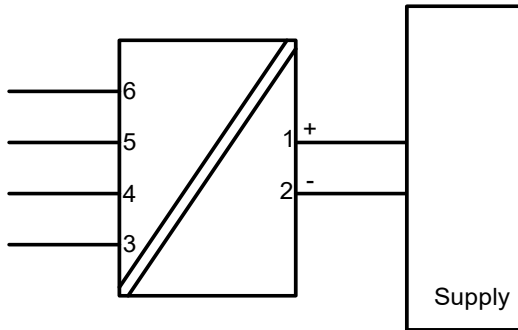
### Hazardous Area

CL I, Div 2, GP ABCD  
 CL I, Zone 2, IIC

T4: -40°C to 85 °C  
 T6: -40°C to 60 °C

### Terminal:

**3,4,5,6**  
 Uo: 9.6 VDC  
 Io: 25 mA  
 Po: 60 mW  
 Lo: 33 mH  
 Co: 2.4µF



### Terminal:

**1-2**  
 Functional Ratings:  
 U nominal ≤ 35 VDC;  
 I nominal ≤ 3.5 - 23 mA

## NI Installation instructions

The transmitter must be installed in an enclosure providing a degree of protection of at least IP54 according to IEC60529 that is suitable for the application and is correctly installed. Cable entry devices and blanking elements shall fulfill the same requirements.

If the enclosure is made of non-metallic materials or of painted metal, electrostatic charging shall be avoided.

Use supply wires with a rating of at least 5 K above the ambient temperature.  
 Supply from a Class 2 Power Supply with Transient protection or equivalent.

WARNING: Substitution of components may impair suitability for Class I, Division 2

AVERTISSEMENT: la substitution de composants peut nuire à l'aptitude à la Classe I, Division 2.

WARNING: Do not disconnect equipment unless power has been switched off or the area is known to be safe.

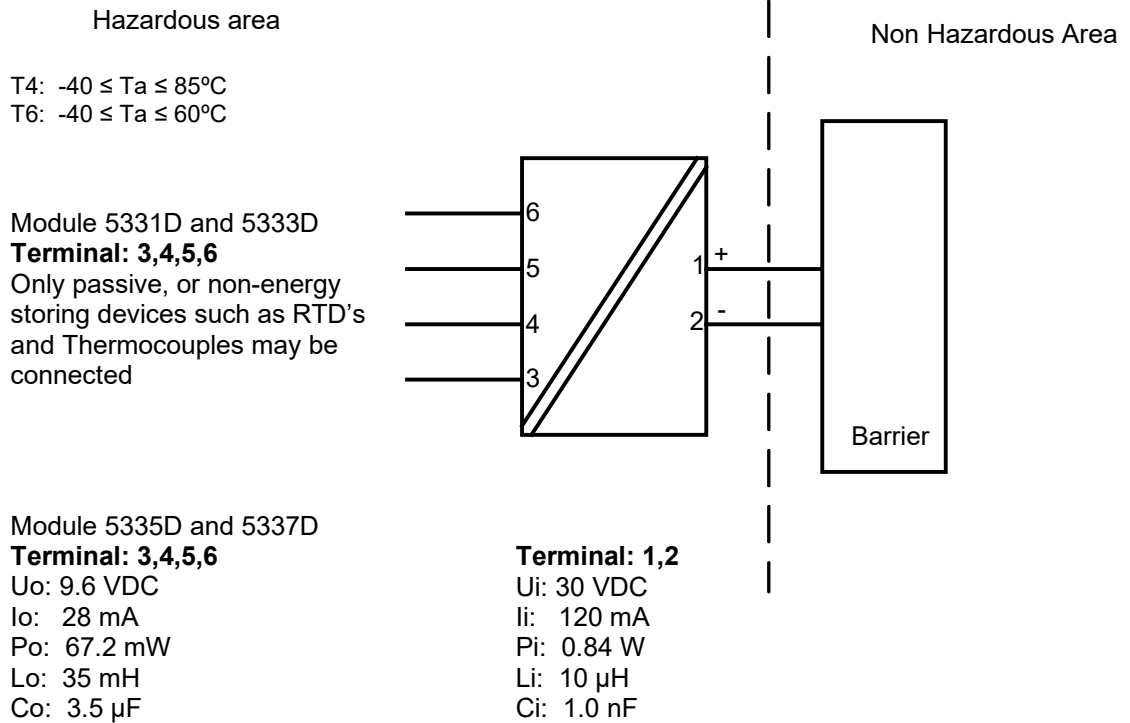
AVERTISSEMENT: Ne débranchez pas l'équipement sauf si l'alimentation a été coupée ou si la zone est connue pour être sûre.

### Non Incendive field wiring installation

The non incendive field Wiring Circuit concept allows interconnection of Nonincendive Field wiring Apparatus with Associated Nonincendive Field Wiring Apparatus or Associated Intrinsically Safe Apparatus or Associated Apparatus not specially examined in combination as a system using any of the wiring methods permitted for unclassified locations,

$V_{oc} < V_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$ .

## CSA Installation drawing 533XQC03



**CLASS 2258 04 - PROCESS CONTROL EQUIPMENT** - Intrinsically Safe Entity - For Hazardous Locations

**CLASS 2258 84 - PROCESS CONTROL EQUIPMENT** - Intrinsically Safe Entity - For Hazardous Locations - Certified to US Standards

Class I, Division 1, Groups A, B, C and D T6...T4

Ex ia IIC T6...T4 Ga

Class I, Zone 0, AEx ia IIC Ga

**Warning:**

Substitution of components may impair intrinsic safety.

The transmitters must be installed in a suitable enclosure to meet installation codes stipulated in the Canadian Electrical Code (CEC) or for US the National Electrical Code (NEC).

## Desenho de Instalação INMETRO



Para instalação segura do 5331A ou 5334A o seguinte deve ser observado. O modelo deve apenas ser instalado por pessoas qualificadas que são familiarizadas com as leis nacionais e internacionais, diretrizes e padrões que se aplicam a esta área.

O ano de fabricação pode ser pego dos dois primeiros dígitos do número de série.

|             |   |
|-------------|---|
| Certificado | DEKRA 23.0009 X   |
| Marcas      | Ex ec [ic] IIC T4..T6 Gc<br>Ex ic IIC T4..T6 Gc<br>Ex ic IIIC Dc  |
| Normas      | <b>ABNT NBR IEC 60079-0:2020 Versão Corrigida:2023</b><br><b>ABNT NBR IEC 60079-7:2018 Versão Corrigida:2022</b><br><b>ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017</b> |

|  |   |   |                                      |
|--|---|---|--------------------------------------|
| Terminais 3,4,5,6  | Terminais 1,2                                       | Terminais 1,2                                       | Terminais 1,2                        |
| Ex ic IIC, Ex ic IIIC  | Ex ic IIC, Ex ic IIIC                               | Ex ic IIC, Ex ic IIIC                               | Ex ec                                |
| Uo: 9,6 V<br>Io: 25 mA<br>Po: 60 mW<br>Lo: 33 mH<br>Co: 2,4 µF | Ui = 35 V<br>Ii = 110 mA<br>Ci = 1 nF<br>Li = 10 µH | Ui = 24 V<br>Ii = 260 mA<br>Ci = 1 nF<br>Li = 10 µH | Umax ≤ 35 Vdc<br>or<br>Umax ≤ 24 Vdc |

| Ex ic IIC, Ex ic IIIC<br>Classe de temperatura | Faixa de temperatura ambiente |                  |
|--|-------------------------------|------------------|
|  | Ui=35V                        | Ui=24V           |
| <b>T6</b>                                      | -40 °C to +54 °C              | -40 °C to +63 °C |
| <b>T5</b>                                      | -40 °C to +69 °C              | -40 °C to +78 °C |
| <b>T4</b>                                      | -40 °C to +85 °C              | -40 °C to +85 °C |

| Ex ec<br>Classe de temperatura | Faixa de temperatura ambiente |                  |
|--------------------------------|-------------------------------|------------------|
|                                | Umax=35V                      | Umax=24V         |
| <b>T6</b>                      | -40 °C to +43 °C              | -40 °C to +55 °C |
| <b>T5</b>                      | -40 °C to +85 °C              | -40 °C to +85 °C |
| <b>T4</b>                      | -40 °C to +85 °C              | -40 °C to +85 °C |

**Notas para instalação**

Se o invólucro for feito de materiais plásticos não metálicos, devem ser evitadas cargas eletrostáticas no invólucro do transmissor.

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Gc e aplicado no tipo de proteção Ex ic, o transmissor deverá ser montado em um gabinete que forneça um grau de proteção de pelo menos IP20 de acordo com ABNT NBR IEC 60529, e adequado à aplicação e instalado corretamente.

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Dc, o transmissor deverá ser montado em um invólucro certificado separadamente que forneça um grau de proteção de pelo menos IP5X de acordo com a ABNT NBR IEC 60079-0, e que seja adequado para o aplicativo e instalado corretamente. A temperatura da superfície do invólucro externo é +20 K acima da temperatura ambiente, determinada sem camada de poeira.  
Faixa de temperatura ambiente: -40 °C a +85 °C

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Gc e aplicado no tipo de proteção Ex ec, o transmissor deverá ser montado em um invólucro certificado separadamente que forneça um grau de proteção de pelo menos IP54 de acordo com conforme ABNT NBR IEC 60079-0, e que seja adequado à aplicação e instalado corretamente.

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Gc e aplicado no tipo de proteção Ex ec, o equipamento deverá ser usado somente em uma área com grau de poluição não superior a 2, conforme definido na IEC 60664-1.

## Desenho de Instalação INMETRO



Para instalação segura do 5331D ou 5334B o seguinte deve ser observado. O modelo deve apenas ser instalado por pessoas qualificadas que são familiarizadas com as leis nacionais e internacionais, diretrizes e padrões que se aplicam a esta área.  
O ano de fabricação pode ser pego dos dois primeiros dígitos do número de série.

Certificado .....DEKRA 23.0009 X

Marcas  
Ex ia IIC T6...T4 Ga  
Ex ia IIIC Db  
Ex ia I Ma

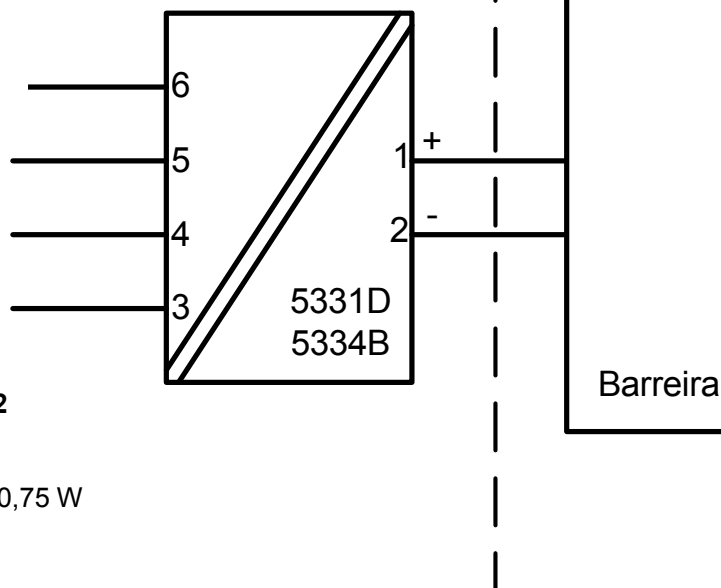
Normas  
**ABNT NBR IEC 60079-0:2020 Versão Corrigida:2023**  
**ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017**

Áreas classificadas  
Zona 0, 1, 2, 21, 22

Área não classificada

### Terminais 3,4,5,6

Uo: 9,6 VDC  
Io: 25 mA  
Po: 60 mW  
Lo: 33 mH  
Co: 2,4µF



### Terminais: 1,2

Ui: 30 VDC  
Ii: 120 mA  
Pi: 0,84 W or 0,75 W  
Li: 10µH  
Ci: 1,0nF



| Classe de temperatura | Faixa de temperatura ambiente |                  |
|-----------------------|-------------------------------|------------------|
|                       | Pi: 0,84W                     | Pi: 0,75W        |
| <b>T6</b>             | -40 °C to +47 °C              | -40 °C to +50 °C |
| <b>T5</b>             | -40 °C to +62 °C              | -40 °C to +65 °C |
| <b>T4</b>             | -40 °C to +85 °C              | -40 °C to +85 °C |

**Notas de instalação**

Se o invólucro for feito de materiais plásticos não metálicos, devem ser evitadas cargas eletrostáticas no invólucro do transmissor.

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Ga, o transmissor deverá ser montado em um invólucro que forneça um grau de proteção de pelo menos IP20 de acordo com a ABNT NBR IEC 60529, e que seja adequado para a aplicação e corretamente instalado.

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de equipamento de nível de proteção Ga ou Ma, e se o invólucro for feito de alumínio, ele deverá ser instalado de forma que fontes de ignição devido a faíscas de impacto e fricção sejam excluídas.

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Db, o transmissor deverá ser montado em um invólucro certificado separadamente que forneça um grau de proteção de pelo menos IP5X de acordo com a ABNT NBR IEC 60079-0, e que seja adequado para o aplicativo e instalado corretamente. A temperatura da superfície do invólucro externo é +20 K acima da temperatura ambiente, determinada sem camada de poeira. Faixa de temperatura ambiente: -40 °C a +85 °C

Se o transmissor for instalado em uma atmosfera explosiva que exija o uso de nível de proteção de equipamento Ma, o transmissor deverá ser montado em um invólucro que forneça um grau de proteção de pelo menos IP54 de acordo com a ABNT NBR IEC 60529, e que seja adequado para a aplicação e corretamente instalado. Faixa de temperatura ambiente: -40 °C a +85 °C

Devem ser utilizadas entradas de cabos e elementos de obturação adequados à aplicação e instalados corretamente.

Para uma temperatura ambiente  $\geq 60^{\circ}\text{C}$ , devem ser utilizados cabos resistentes ao calor com uma classificação de pelo menos 20 K acima da temperatura ambiente.

O circuito do sensor não é infalivelmente isolado galvânicamente do circuito de entrada. Porém, o isolamento galvânico entre os circuitos é capaz de suportar uma tensão de teste de 500Vac por 1 minuto.

## História do documento

A lista a seguir fornece notas sobre as revisões deste documento.

| <b>ID de rev.</b> | <b>Data</b> | <b>Notas Rev.</b>   |
|-------------------|-------------|---|
| 113               | 1345        | Aprovações IECEX e INMETRO adicionadas.   |
| 114               | 1510        | Aprovação de PESO/CCOE adicionada.  |
| 115               | 1707        | Aprovação GOST substituída pela aprovação da EAC.<br>Desenho de instalação FM atualizado.<br>Desenho de instalação INMETRO atualizado.                  |
| 116               | 1848        | Desenho de instalação FM atualizado.  |
| 117               | 2004        | Aprovação CSA para 5331A recebida. Desenho de instalação atualizado.<br>Aprovação PESO/CCOE descontinuada.<br>Desenho de instalação INMETRO atualizado. |
| 118               | 2145        | Aprovações ATEX e IECEX atualizadas - Ex na alterado para Ex ec.  |
| 119               | 2202        | Desenhos de instalação CSA atualizados.   |
| 120               | 2245        | UKCA adicionada.  |
| 121               | 2402        | Aprovação INMETRO atualizada - Ex na alterado para Ex ec.   |

Todos os clientes poderão declarar uma reclamação através do telefone 0XX19-3429-7890 ou email suporte@tsie.com.br ou pelo site: <http://technosupply.com.br/suporte-tecnico>

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