

PERFORMANCE  
MADE  
SMARTER

Product manual

**5335**

***2-wire transmitter with  
HART protocol***



Segurança  
**I**  
INMETRO



TEMPERATURE | I.S. INTERFACES | COMMUNICATION INTERFACES | MULTIFUNCTIONAL | ISOLATION | DISPLAY

No. 5335V122-UK  
From serial no.: 240902025

**PR**  
electronics

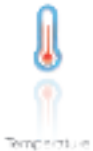


# 6 Product Pillars

## *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.



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.



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.



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, Android and Windows.



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.



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.



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.

# 2-wire transmitter with HART protocol 5335

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# 2-wire transmitter with HART protocol 5335

- RTD, TC, Ohm, or mV input
- Extremely high measurement accuracy
- HART communication
- Galvanic isolation
- For DIN form B sensor head mounting

## Application

- Linearised temperature measurement with Pt100... Pt1000, Ni100...Ni1000, or TC sensor.
- Difference or average temperature measurement of 2 resistance or TC sensors.
- 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.
- Connection of up to 15 transmitters to a digital 2-wire signal with HART communication.

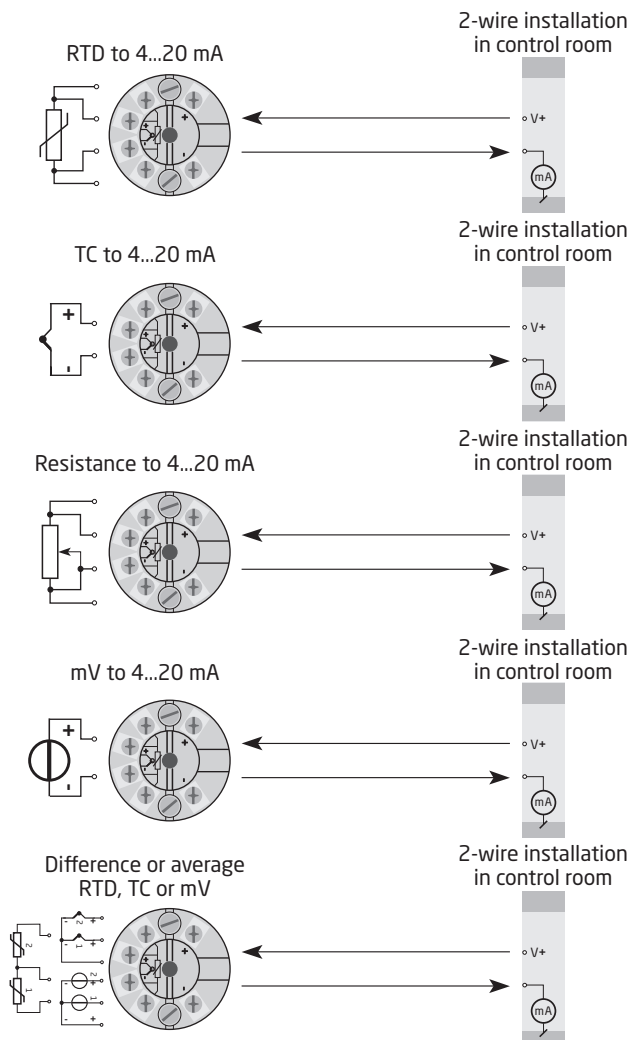
## Technical characteristics

- Within a few seconds the user can program PR5335 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 5335 has been designed according to strict safety requirements and is thus suitable for application in SIL installations.
- Continuous check of vital stored data for safety reasons.
- Sensor error detection according to the guidelines in NAMUR NE 89.

## Mounting / installation

- For DIN form B sensor head mounting. In non-hazardous areas the 5335 can be mounted on a DIN rail with the PR fitting type 8421.

## Applications



## Order

| Type | Version                                       |
|------|-----------------------------------------------|
| 5335 | Zone 2 / Div. 2 : A                           |
|      | Zone 0, 1, 2, 21, 22, M1 / DIV. 1, DIV. 2 : D |

## Accessories

5909 = Loop Link USB interface and PReset Software  
8421 = DIN rail clip

## Electrical specifications

### Environmental conditions:

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

### Mechanical specifications:

Dimensions . . . . . Ø 44 x 20.2 mm  
Weight approx. . . . . 50 g  
Max. wire size. . . . . 1 x1.5 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 voltage, DC  
5335A. . . . . 8.0...35 VDC  
5335D. . . . . 8.0...30 VDC  
Internal power dissipation  
5335A. . . . . 25 mW...0.8 W  
5335D. . . . . 25 mW...0.7 W  
Isolation voltage, test / operation. . . . . 1.5 kVAC / 50 VAC  
Warm-up time. . . . . 30 s  
Programming . . . . . Loop Link & HART  
Signal / noise ratio. . . . . > 60 dB  
Response time (programmable) . . . . . 1...60 s  
EEPROM error check . . . . . < 10 s  
Signal dynamics, input . . . . . 22 bit  
Signal dynamics, output . . . . . 16 bit  
Effect of supply voltage variation. . . . . < 0.005% of span / VDC

Accuracy, the greater of general and basic values:

| General values |                           |                                 |
|----------------|---------------------------|---------------------------------|
| Input type     | Absolute accuracy         | Temperature coefficient         |
| All            | $\leq \pm 0.05\%$ of span | $\leq \pm 0.005\%$ of span / °C |

| Basic values                    |                              |                                                 |
|---------------------------------|------------------------------|-------------------------------------------------|
| Input type                      | Basic accuracy               | Temperature coefficient                         |
| Pt100 & Pt1000                  | $\leq \pm 0.1^\circ\text{C}$ | $\leq \pm 0.005^\circ\text{C}/^\circ\text{C}$   |
| Ni100                           | $\leq \pm 0.2^\circ\text{C}$ | $\leq \pm 0.005^\circ\text{C}/^\circ\text{C}$   |
| Lin. R                          | $\leq \pm 0.1 \Omega$        | $\leq \pm 5 \text{ m}\Omega / ^\circ\text{C}$   |
| Volt                            | $\leq \pm 10 \mu\text{V}$    | $\leq \pm 0.5 \mu\text{V} / ^\circ\text{C}$     |
| TC type:<br>E, J, K, L, N, T, U | $\leq \pm 0.5^\circ\text{C}$ | $\leq \pm 0.025^\circ\text{C} / ^\circ\text{C}$ |
| TC type: B, R, S,<br>W3, W5     | $\leq \pm 1^\circ\text{C}$   | $\leq \pm 0.1^\circ\text{C} / ^\circ\text{C}$   |

|                                                                     |                       |
|---------------------------------------------------------------------|-----------------------|
| EMC - immunity influence. . . . .                                   | $< \pm 0.1\%$ of span |
| Extended EMC immunity:<br>NAMUR NE 21, A criterion, burst . . . . . | $< \pm 1\%$ of span   |

#### Electrical specifications, input:

Max. offset . . . . . 50% of selec. numerical max. value

#### RTD and linear resistance input:

| RTD type | Min. value | Max. value    | Min. span   | Standard  |
|----------|------------|---------------|-------------|-----------|
| Pt100    | -200°C     | +850°C        | 10°C        | IEC 60751 |
| Ni100    | -60°C      | +250°C        | 10°C        | DIN 43760 |
| Lin. R   | 0 $\Omega$ | 7000 $\Omega$ | 25 $\Omega$ | -----     |

Cable resistance per wire (max.). . . . . 5  $\Omega$

(up to 50  $\Omega$  per wire is possible with reduced measurement accuracy)

Sensor current . . . . . Nom. 0.2 mA

Effect of sensor cable resistance (3- / 4-wire) . . . . .  $< 0.002 \Omega/\Omega$

Sensor error detection . . . . . Yes

Short circuit detection. . . . . If 0% > 30  $\Omega$

#### TC input:

| Type | Min. temperature | Max. temperature | Min. span | Standard     |
|------|------------------|------------------|-----------|--------------|
| 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    |
| 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 |

|                                                                |                                           |
|----------------------------------------------------------------|-------------------------------------------|
| Cold junction compensation . . . . .                           | < ±1.0°C                                  |
| External CJC with Ni100 or Pt100 . . . . .                     | -40 ≤ T <sub>amb.</sub> ≤ 135°C           |
| Sensor error detection . . . . .                               | Yes                                       |
| Sensor error current:                                          |                                           |
| When detecting . . . . .                                       | Nom. 33 µA                                |
| Else. . . . .                                                  | 0 µA                                      |
| Short circuit detection. . . . .                               | No                                        |
| <b>Voltage input:</b>                                          |                                           |
| Measurement range . . . . .                                    | -800...+800 mV                            |
| Min. span . . . . .                                            | 2.5 mV                                    |
| Input resistance . . . . .                                     | 10 MΩ                                     |
| <b>Current output:</b>                                         |                                           |
| Signal range. . . . .                                          | 4...20 mA                                 |
| Min. signal range. . . . .                                     | 16 mA                                     |
| Updating time . . . . .                                        | 440 ms                                    |
|                                                                | (660 ms for diff.)                        |
| Fixed output signal . . . . .                                  | Between 4 and 20 mA                       |
| Output signal at EEprom error . . . . .                        | ≤ 3.5 mA                                  |
| Load resistance. . . . .                                       | ≤ (V <sub>supply</sub> - 8.0) / 0.023 [Ω] |
| Load stability . . . . .                                       | < ±0.01% of span / 100 Ω                  |
| <b>Sensor error detection:</b>                                 |                                           |
| Programmable . . . . .                                         | 3.5...23 mA                               |
| (shorted sensor error detection is ignored at TC and mV input) |                                           |
| NAMUR NE43 Upscale . . . . .                                   | 23 mA                                     |
| NAMUR NE43 Downscale. . . . .                                  | 3.5 mA                                    |

of span = of the presently selected range

#### Observed authority requirements:

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

#### Approvals:

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

#### I.S. / Ex approvals:

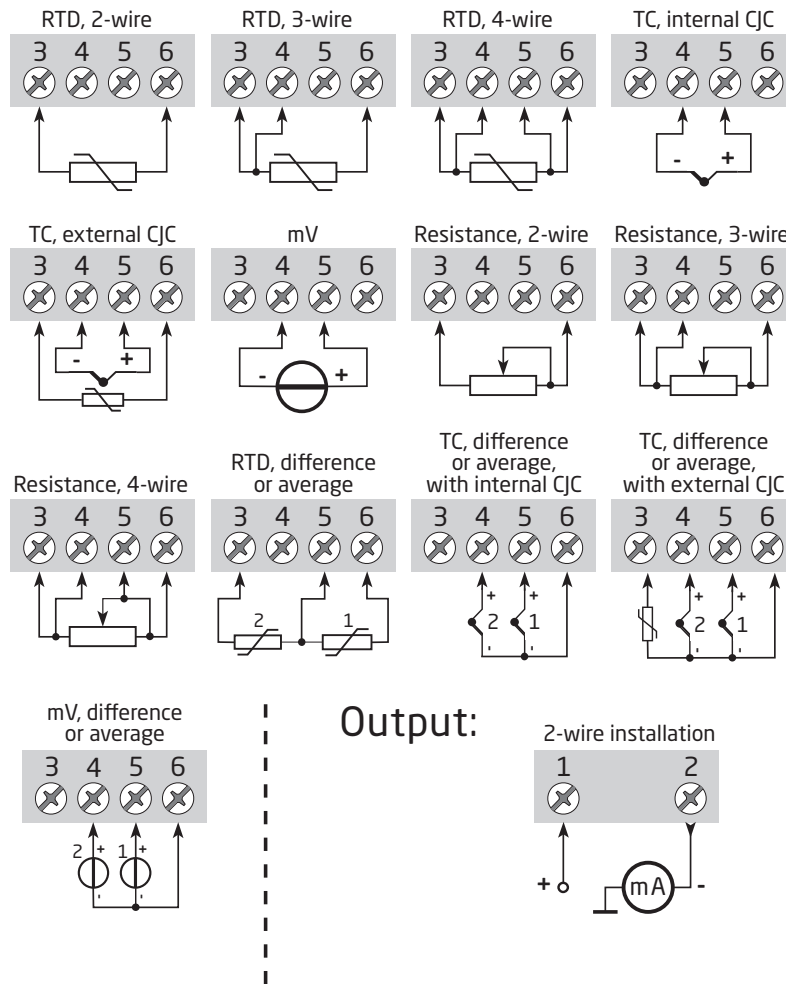
|                   |                         |
|-------------------|-------------------------|
| 5335A:            |                         |
| ATEX. . . . .     | DEKRA 20ATEX0109X       |
| 5335D:            |                         |
| ATEX. . . . .     | DEKRA 20ATEX0108X       |
| FM . . . . .      | FM17US0013X             |
| 5335A & 5335D:    |                         |
| IECEX. . . . .    | DEK 20.0063X            |
| CSA. . . . .      | 1125003                 |
| INMETRO . . . . . | DEKRA 23.0011X          |
| EAC Ex. . . . .   | RU C-DK.HA65.B.00355/19 |

#### Functional Safety:

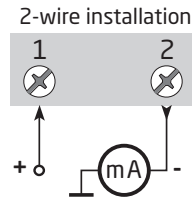
Hardware assessed for use in SIL applications  
 FMEDA report - [www.prelectronics.com](http://www.prelectronics.com)

## Connections

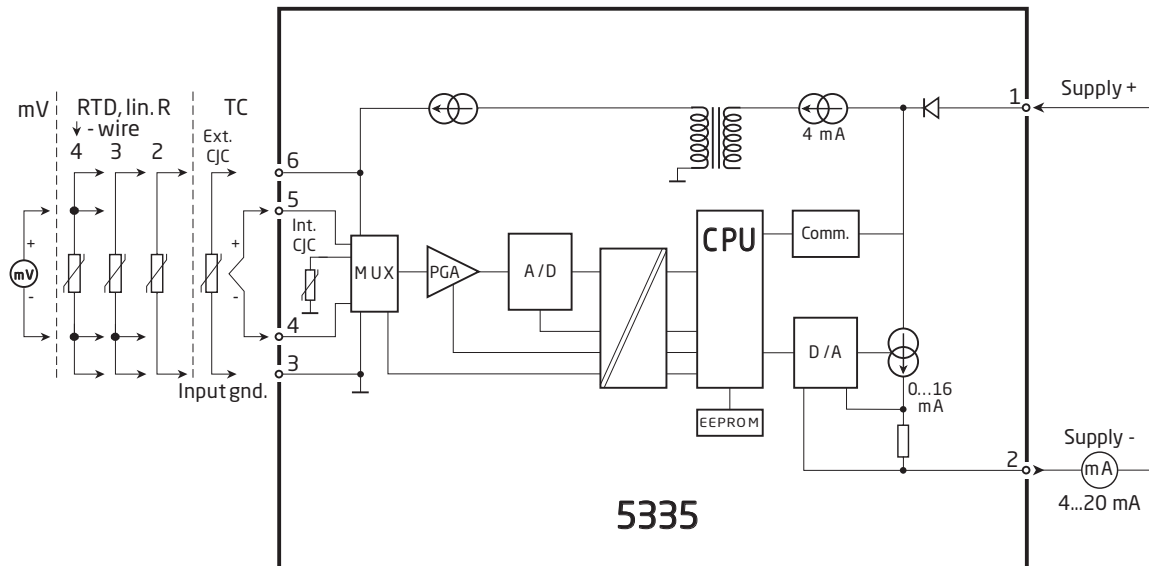
### Input:



### Output:



## Block diagram



# Programming

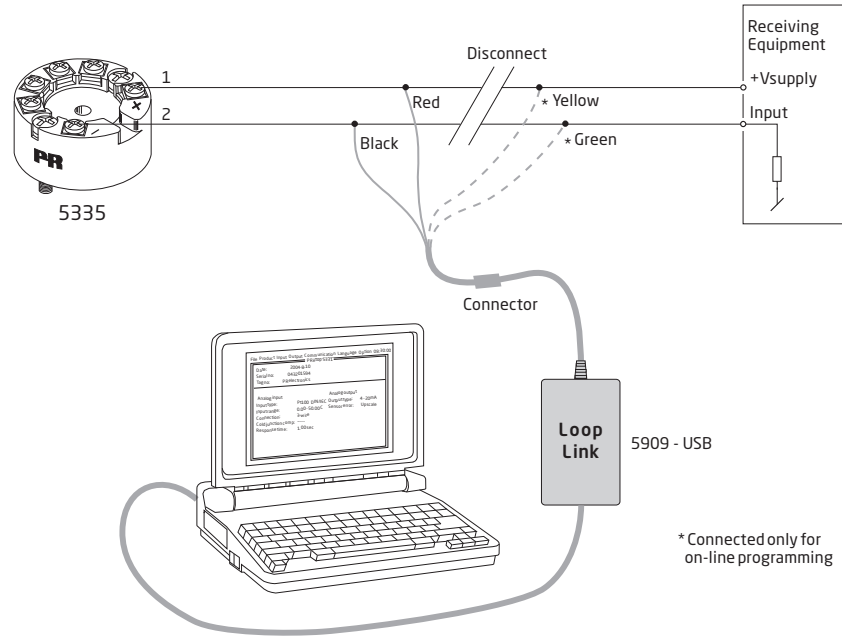
5335 can be configured in the following 3 ways:

1. With PR electronics A/S' communications interface Loop Link and PReset PC configuration software.
2. With a HART modem and PReset PC configuration software.
3. With a HART communicator with PR electronics A/S' DDL driver.

## 1: Loop Link

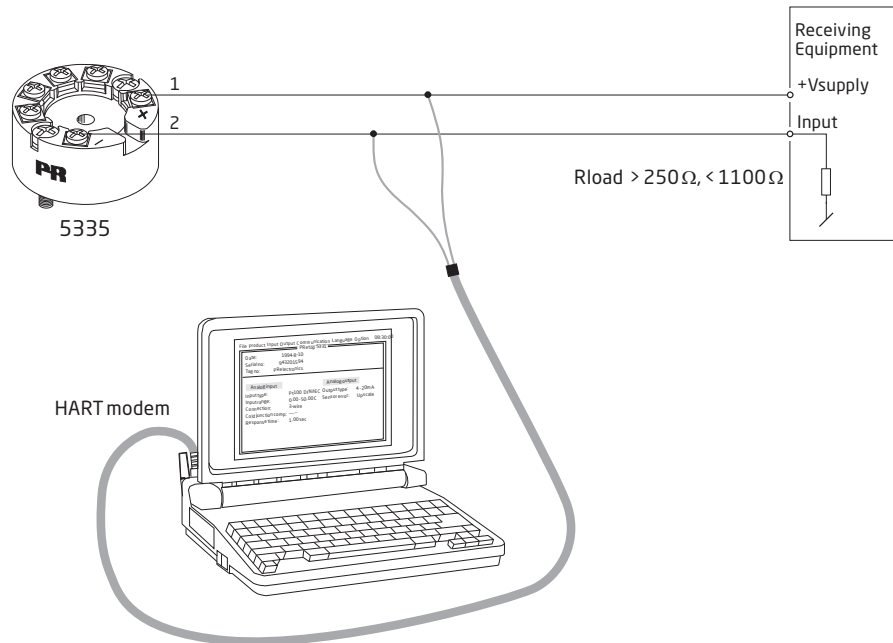
For programming please refer to the drawing below and the help functions in PReset.

Loop Link is not approved for communication with devices installed in hazardous (Ex) area.



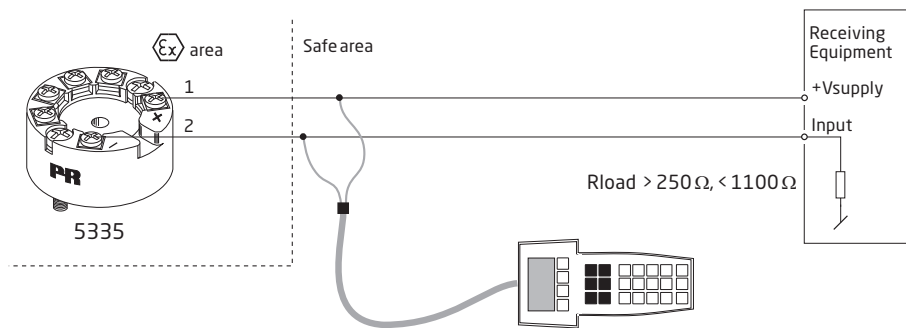
## 2: HART modem

For programming please refer to the drawing below and the help functions in PReset.



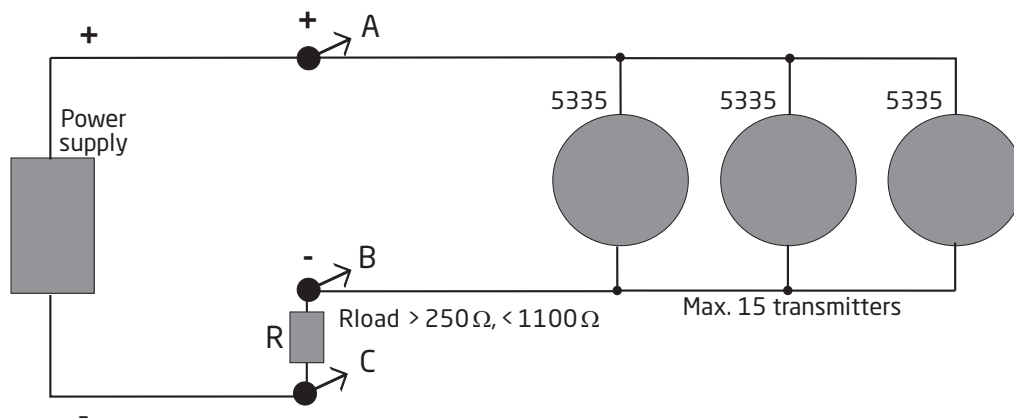
### 3: HART communicator

For programming please refer to the drawing below. To get access to productspecific commands, the HART communicator must be loaded with the PR electronics A/S DDL driver. This can be ordered either at the HART Communication Foundation or PR electronics A/S.



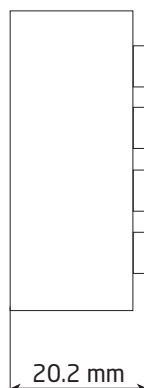
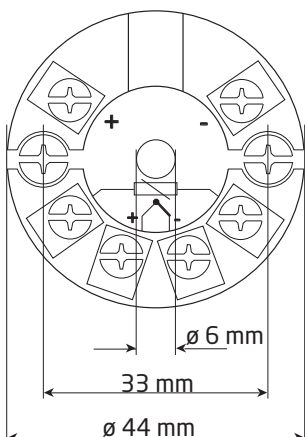
### Connection of transmitters in multidrop mode

- The HART communicator or a PC modem can be connected accross AB or BC.

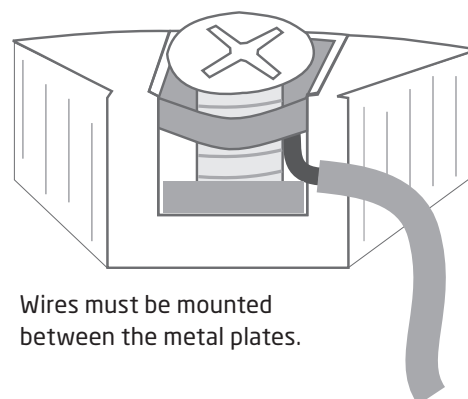


- The outputs of max. 15 transmitters can be conected in parallel for a digital HART communication on 2-wires.
- Before it is connected, each transmitter must be configured with a unique number from 1 to 15. If 2 transmitters are configured with the same number, both will be excluded. The transmitters must be programmed for multidrop mode (with a fixed output signal of 4 mA). Maximum current in the loop is therefore 60 mA.
- The communication is either by means of a HART communicator or a HART modem.
- The PRreset PC configuration software can configure the individual transmitter for multidrop mode and provide it with a unique polling address.

### Mechanical specifications



### Mounting of sensor wires



# ATEX-installation drawing 5335QA02-V5R0

For safe installation of 5335A and 5337A 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 20ATEX0109 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: 28 mA<br>Po: 67 mW<br>Lo: 35 mH<br>Co: 3.5 µF | Ui = 35 V<br>Ii = 110 mA<br>Ci = 1 nF<br>Li = 0 µH | Ui = 24 V<br>Ii = 260 mA<br>Ci = 1 nF<br>Li = 0 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 60259, 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 5335QA01-V5R0



For safe installation of 5335D or 5337D 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 20ATEX0108 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 IEC 60079-0: 2018, EN 60079-11: 2012

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

Non Hazardous Area

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

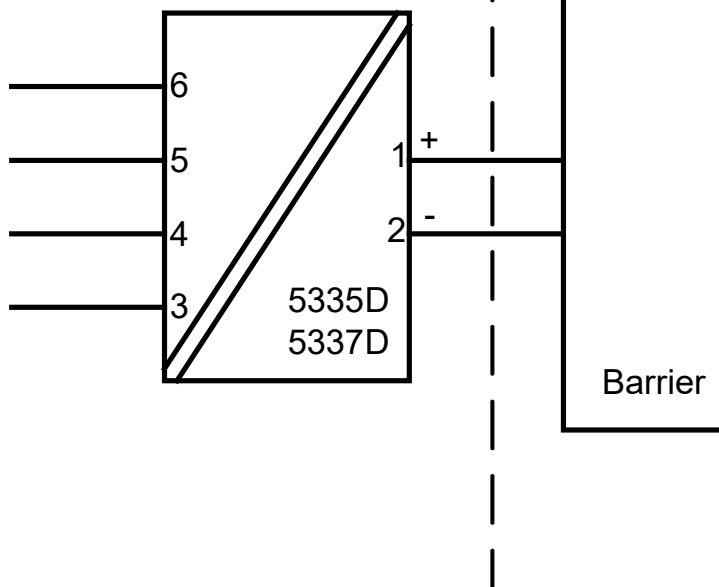
Uo: 9.6 VDC

Io: 28 mA

Po: 67 mW

Lo: 35 mH

Co: 3.5  $\mu$ F



**Terminal: 1,2**

Ui: 30 VDC

Ii: 120 mA

Pi: 0.84 W or Pi: 0.75 W

Li: 0  $\mu$ H

Ci: 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 5335QI02-V5R0

For safe installation of 5335A and 5337A 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 20.0063X

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: 28 mA<br>Po: 67 mW<br>Lo: 35 mH<br>Co: 3.5 $\mu$ F | Ui = 35 V<br>Ii = 110 mA<br>Ci = 1 nF<br>Li = 0 $\mu$ H | Ui = 24 V<br>Ii = 260 mA<br>Ci = 1 nF<br>Li = 0 $\mu$ H | Umax $\leq$ 35 VDC<br>or<br>Umax $\leq$ 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 60259, 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.

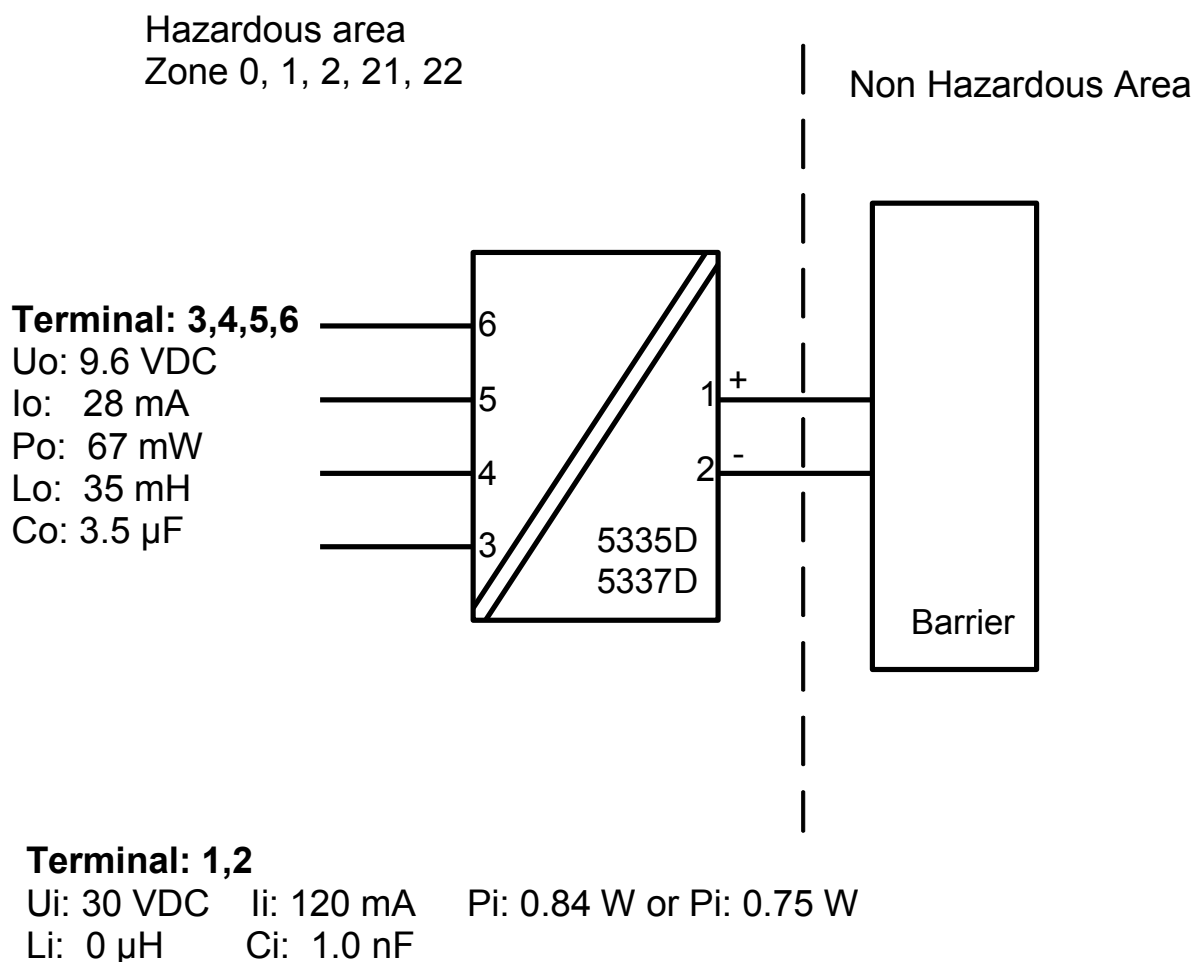
If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Gc and applied in type of protection Ex nA or Ex ec, the equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC 60664-1.

# IECEx-installation drawing 5335QI01-V5R0



For safe installation of 5335D or 5337D 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 20.0063X                                  |
| 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.

For safe installation of the 5335A and 5337A 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**

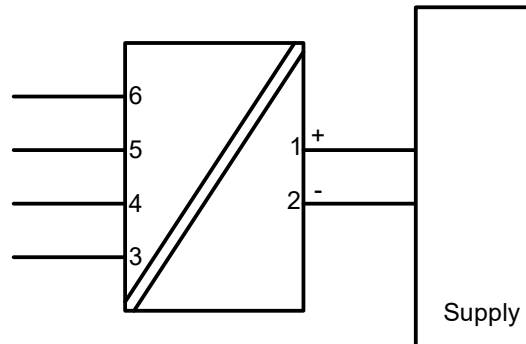
Uo: 9.6 VDC

Io: 28 mA

Po: 67 mW

Lo: 45 mH

Co: 28 µF



**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.

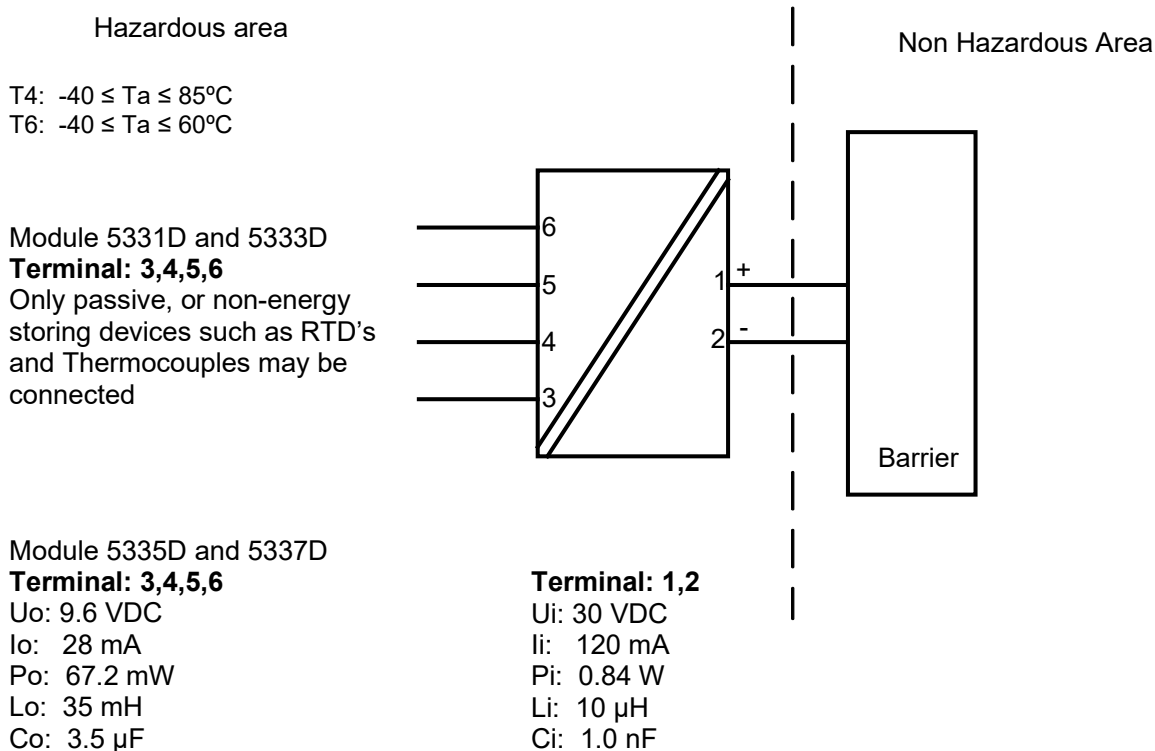
AVERTISSEMENT: Ne débranchez pas l'équipement sauf si l'alimentation a été coupée ou si la zone est connue pour être sûre.

**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).

## FM Installation Drawing

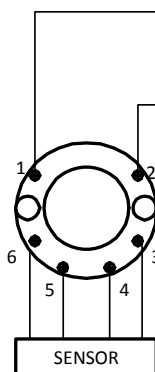
### Model 5331D, 5332D, 5333D and 5343B

#### 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 Ii: 120 mA  
Pmax or Pi: 0.84 W  
Ci: 1 nF  
Li: 10 uH



#### Non Hazardous Location

Associated Apparatus  
or Barrier  
with  
entity Parameters:

$UM \leq 250V$   
 $V_{oc} \text{ or } U_o \leq V_{max} \text{ or } U_i$   
 $I_{sc} \text{ or } I_o \leq I_{max} \text{ or } I_i$   
 $P_o \leq P_i$   
 $Ca \text{ or } Co \geq Ci + C_{cable}$   
 $La \text{ or } Lo \geq Li + L_{cable}$

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

### Model 5335D, 5337D

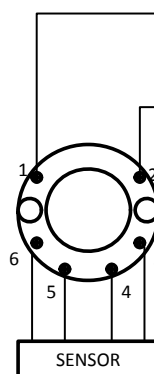
#### Hazardous (Classified) Location

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 Ii: 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:

$UM \leq 250V$   
 $V_{oc} \text{ or } U_o \leq V_{max} \text{ or } U_i$   
 $I_{sc} \text{ or } I_o \leq I_{max} \text{ or } I_i$   
 $P_o \leq P_i$   
 $Ca \text{ or } Co \geq Ci + C_{cable}$   
 $La \text{ or } Lo \geq Li + L_{cable}$

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.

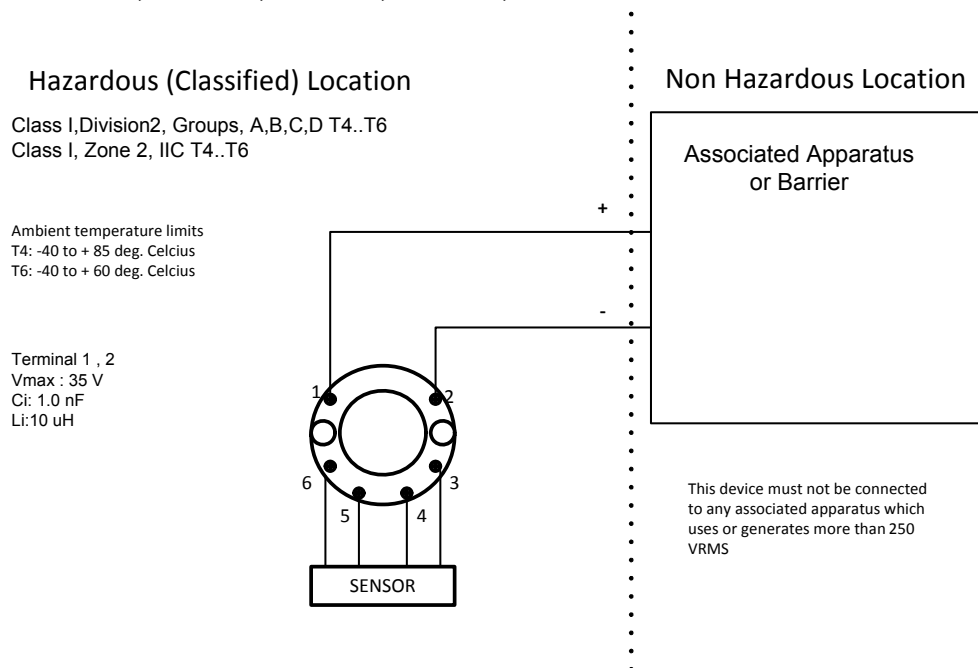
The sum of the maximum unprotected capacitance ( $C_i$ ) for each intrinsically device and the interconnecting wiring must be less than the capacitance ( $C_a$ ) which can be safely connected to the barrier.

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



## Desenho de Instalação INMETRO



Para instalação segura do 5335A ou 5337A 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 23.0011 X

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

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

| 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: 28 mA<br>Po: 67 mW<br>Lo: 35 mH<br>Co: 3,5 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 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 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 5335D ou 5337D 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 23.0011 X                                                                                                   |
| Marcas      | Ex ia IIC T6...T4 Ga<br>Ex ia IIIC Db<br>Ex ia I Ma                                                               |
| Normas      | <b>ABNT NBR IEC 60079-0:2020 Versão Corrigida:2023</b><br><b>ABNT NBR IEC 60079-11:2013 Versão Corrigida:2017</b> |

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

Áreas não  
classificadas

### Terminais:

**3,4,5,6**

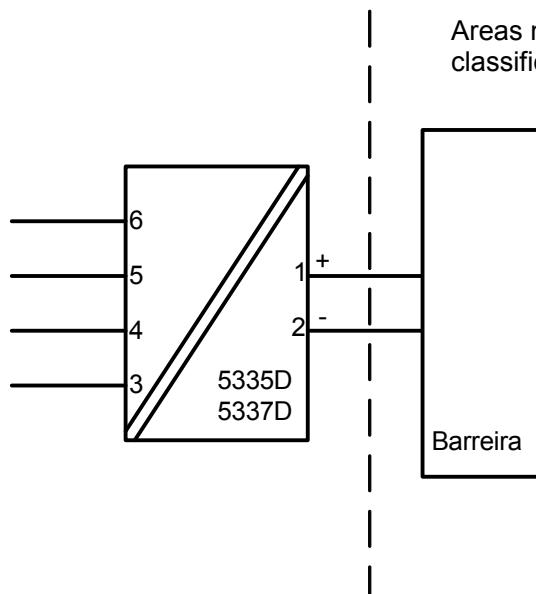
Uo: 9,6 VDC

Io: 28 mA

Po: 67 mW

Lo: 35 mH

Co: 3,5 µF



### Terminais: 1,2

Ui: 30 VDC    li: 120 mA    Pi: 0,84 W or Pi: 0,75 W

Li: 10 µH    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.

## Document history

The following list provides notes concerning revisions of this document.

| <b>Rev. ID</b> | <b>Date</b> | <b>Notes</b>                                                                                                                                                          |
|----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 117            | 1837        | Specifications for internal power dissipation added.<br>INMETRO certification changed to DEKRA.<br>FM certificate number updated.<br>FM installation drawing updated. |
| 118            | 2006        | CSA approval for 5335A received. Installation drawing added.                                                                                                          |
| 119            | 2139        | ATEX and IECEx approvals updated - Ex na changed to Ex ec.                                                                                                            |
| 120            | 2202        | CSA installation drawings updated.                                                                                                                                    |
| 121            | 2245        | UKCA added.                                                                                                                                                           |
| 122            | 2402        | INMETRO approval updated - Ex na changed to Ex ec.                                                                                                                    |

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