

PERFORMANCE  
MADE  
SMARTER

产品手册

5331

二线制可编程变送器



Segurança  
INMETRO



温度 | 安全栅 | 通讯接口 | 多功能 | 隔离器 | 数显表

No. 5331V119-CN  
自此序列号始: 212020194

**PR**  
electronics

# 6 大特色产品

## 满足您的一切需求

### 单品出色·组合无敌

凭借创新型专利技术·信号调节更加简单·智能·产品组合由六大产品类组成·具备多种模拟量和数字量模块·涵盖上千种工业自动化应用·所有产品都符合甚至高于行业的最高标准·这可确保产品即便在最恶劣的环境条件下仍能可靠运行·5 年产品保修期·让您使用更安心·



Temperature

温度变送器和温度传感器系列产品·提供从温度测量点到系统控制一站式信号解决方案·从而在最大程度上保证信号的完整性·仅需一套点对点解决方案·您就可以在任何环境中将工业过程中的温度信号转换为模拟量信号·总线信号或数字通讯信号·该方案具备响应时间短·自动校准·传感器故障检测·低漂移和卓越 EMC 性能等诸多优点·



I.S. Interface

我们采用最严格的安全标准来检验产品·以期提供最安全的信号·秉承创新精神·我们已经在 SIL 2 全面评估本质安全型接口方面取得了开创性成就·其既高效又经济·效果卓著·成效斐然·模拟量和数字量本质安全栅种类齐全·同时提供多种输入输出·这使得 PR 标准成为一项易于实施的现场检验标准·在大型项目安装过程中·新背板方案大大简化安装和布线·且能与标准 DCS 系统无缝集成·



Communication

我们提供经济实惠·使用方便·面向未来的通讯接口·以便您能够访问所安装的 PR 产品·所有接口均可拆卸·并带有屏幕和按钮·可以显示过程值/诊断值和对参数进行配置·产品特定功能包括通过 Modbus 和蓝牙进行通讯·以及使用我们的便携式设备主管 (PPS) 应用程序进行远程访问·可用于 iOS 和 Android·



Multifunction

单品为多功能系列产品·可涵盖大量现场应用·可轻而易举按照您的现场标准进行配置·此种单品可适用多种应用方式·既节省安装和培训时间·又大大简化库存备件管理·该设备专为长期信号精度高·功耗低·抗电噪声优异·编程简单而设计·



Isolation

基于微处理器技术研发的 6 mm 隔离器·小巧精致·响应迅速·品质一流·以极低的总拥有成本为专用应用提供卓越性能和抗电磁干扰·可水平或垂直安装·装置间无需间隙·



Display

数显表系列以其灵活性和稳定性著称·该设备系列几乎满足过程信号读数显示的所有需求·并具有通用的输入和供电能力·无论哪种行业·无论环境条件何其苛刻·该设备均能实时测量过程值并提供用户友好型界面和值得信赖的继电器信号·

# 二线制可编程变送器

## 5331

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# 二线制可编程变送器 5331

- RTD·TC·Ohm 或 mV 信号输入
- 超高测量精度
- 1.5 kVAC 电气隔离性能
- 可设定传感器故障状态
- 标准 DIN B型传感器头部安装s

## 应用

- Pt100...Pt1000·Ni100...Ni1000 或 TC 传感器线性化温度测量。
- 转换线性电阻阻值变化为标准模拟量电流信号·例如: 阀信号·或欧姆输出液位计。
- 转换双极性 mV 信号为标准 4...20 mA 电流信号。

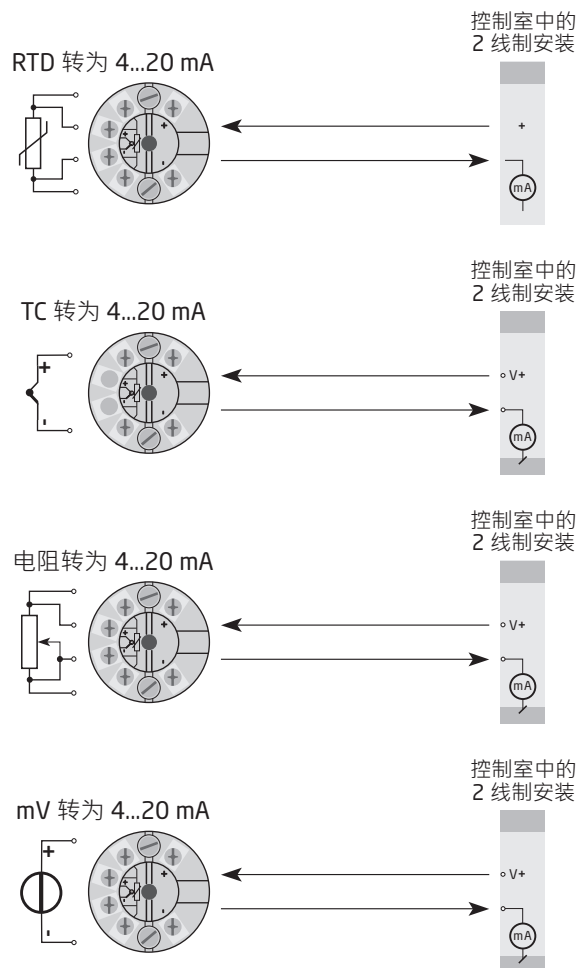
## 技术特点

- 参数设定简单方便。
- 2-·3- 和 4-线 RTD 和电阻输入电缆自动补偿。
- 持续监测重要数据·保障使用安全

## 安装调试

- 标准 DIN B型传感器头部安装。在非危险区域内·5331 可通过型号为 PR 8421 的配件安装在 DIN 导轨之上。

## 应用



订购

| 型号   | 版本   | 环境温度              | 电气隔离         |
|------|--|-------------------|--------------|
| 5331 | Zone 2 / Div. 2 : A<br>Zone 0 · 1 · 2 · 21 · 22 · M1 / DIV.1 · DIV.2 : D | -40°C...+85°C : 3 | 1500 VAC : B |

电气规格

环境条件:

|              |                |
|--------------|----------------|
| 工作温度         | -40°C 至 +85°C  |
| 标定温度         | 20...28°C      |
| 湿度           | < 95% RH (无冷凝) |
| 防护等级 · 外壳/端子 | IP68 / IP00    |

机械规格:

|             |                            |
|-------------|----------------------------|
| 结构尺寸        | Ø 44 x 20.2 mm             |
| 重量          | 50 g                       |
| 最大导线规格      | 1 x 1.5 mm <sup>2</sup> 绞线 |
| 螺丝端子力矩      | 0,4 Nm                     |
| 抗振规格        | IEC 60068-2-6              |
| 2...25 Hz   | ±1.6 mm                    |
| 25...100 Hz | ±4 g                       |

常用规格:

|              |                   |
|--------------|-------------------|
| 电源电压 · DC    |                   |
| 5331A3B      | 7.2...35 VDC      |
| 5331D3B      | 7.2...30 VDC      |
| 内部功率耗散       |                   |
| 5331A3B      | 25 mW...0.8 W     |
| 5331D3B      | 25 mW...0.7 W     |
| 电压降          | 7.2 VDC           |
| 隔离电压 · 测试/工作 | 1.5 kVAC / 50 VAC |
| 预热时间         | 5 分钟              |
| 上电后至稳定输出     | 4.5 s             |
| 设置参数         | Loop Link         |
| 信噪比          | 最低 60 dB          |
| 响应时间 (可设定)   | 1...60 s          |
| EEPROM 错误校验  | < 3.5 s           |
| 信号动态范围 · 输入  | 20 位              |
| 信号动态范围 · 输出  | 16 位              |
| 电源电压变化的影响    | < 0.005% 量程 / VDC |

精度 · 一般值和基本值中较大的一个:

| 一般值  |               |                  |
|------|---------------|------------------|
| 输入类型 | 绝对精度          | 温度系数             |
| 所有   | ≤ ±0.05% 所设量程 | ≤ ±0.01% 所设量程/°C |

| 基本值                         |                                |  |
|-----------------------------|--------------------------------|--|
| 输入类型                        | 基本精度                           | 温度系数   |
| RTD                         | $\leq \pm 0.2^{\circ}\text{C}$ | $\leq \pm 0.01^{\circ}\text{C}/^{\circ}\text{C}$   |
| 线性电阻                        | $\leq \pm 0.1 \Omega$          | $\leq \pm 10 \text{ m}\Omega / ^{\circ}\text{C}$   |
| 电压                          | $\leq \pm 10 \mu\text{V}$      | $\leq \pm 1 \mu\text{V} / ^{\circ}\text{C}$        |
| TC 型号：<br>E、J、K、L、N、T、U     | $\leq \pm 1^{\circ}\text{C}$   | $\leq \pm 0.05^{\circ}\text{C} / ^{\circ}\text{C}$ |
| TC 型号：B、R、S、W3<br>· W5 · Lr | $\leq \pm 2^{\circ}\text{C}$   | $\leq \pm 0.2^{\circ}\text{C} / ^{\circ}\text{C}$  |

|   |                    |
|---|--------------------|
| EMC – 抗扰性影响 . . . . .                                     | < $\pm 0.5\%$ 所设量程 |
| 扩展的 EMC 电磁兼容：<br>NAMUR NE 21, A criterion, burst. . . . . | < $\pm 1\%$ 所设量程   |

电气规格·输入：

RTD 和线性电阻输入：

| RTD 类型         | 最小值        | 最大值           | 最小量程        | 标准        |
|----------------|------------|---------------|-------------|-----------|
| Pt100...Pt1000 | -200°C     | +850°C        | 25°C        | IEC 60751 |
| Ni100...Ni1000 | -60°C      | +250°C        | 25°C        | DIN 43760 |
| 线性电阻           | 0 $\Omega$ | 5000 $\Omega$ | 30 $\Omega$ | -----     |

|                                  |                         |
|----------------------------------|-------------------------|
| 最大偏移量 . . . . .                  | 量程高值的 50%               |
| 电缆电阻 (单根导线；最大) . . . . .         | 5 $\Omega$              |
| 传感器电流 . . . . .                  | 额定 0.2 mA               |
| 传感器电缆电阻对精度的影响 (3/4 线制) . . . . . | < 0.002 $\Omega/\Omega$ |
| 传感器故障检测 . . . . .                | 是                       |

TC 输入：

| 型号 | 最低温度   | 最高温度    | 最小量程  | 标准           |
|----|--------|---------|-------|--------------|
| 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 |

|                   |                             |
|-------------------|-----------------------------|
| 最大偏移量 . . . . .   | 量程高值的 50%                   |
| 冷端补偿 . . . . .    | < $\pm 1.0^{\circ}\text{C}$ |
| 传感器故障检测 . . . . . | 是                           |
| 传感器故障电流：          |                             |
| 检测时 . . . . .     | 额定 33 $\mu\text{A}$         |
| 其他 . . . . .      | 0 $\mu\text{A}$             |

**电压输入：**

|       |              |
|-------|--------------|
| 测量范围  | -12...800 mV |
| 最小量程  | 5 mV         |
| 最大偏移量 | 量程高值的 50%    |
| 输入电阻  | 10 MΩ        |

**输出：****电流输出：**

|                  |                            |
|------------------|----------------------------|
| 信号范围             | 4...20 mA                  |
| 最小信号范围           | 16 mA                      |
| 更新时间             | 440 ms                     |
| EEeprom 错误时的输出信号 | ≤ 3.5 mA                   |
| 负载电阻             | ≤ (V 电源 - 7.2) / 0.023 [Ω] |
| 负载稳定性            | < ±0.01% 所设量程 / 100 Ω      |

**传感器故障检测：**

|               |             |
|---------------|-------------|
| 可设定           | 3.5...23 mA |
| NAMUR NE43 上限 | 23 mA       |
| NAMUR NE43 下限 | 3.5 mA      |

所设量程 = 当前设定的量程范围

**遵守主管机关要求：**

|        |                |
|--------|----------------|
| EMC    | 2014/30/EU     |
| RoHS   | 2011/65/EU     |
| ATEX   | 2014/34/EU     |
| EAC    | TR-CU 020/2011 |
| EAC Ex | TR-CU 012/2011 |

**海洋船舶认证：**

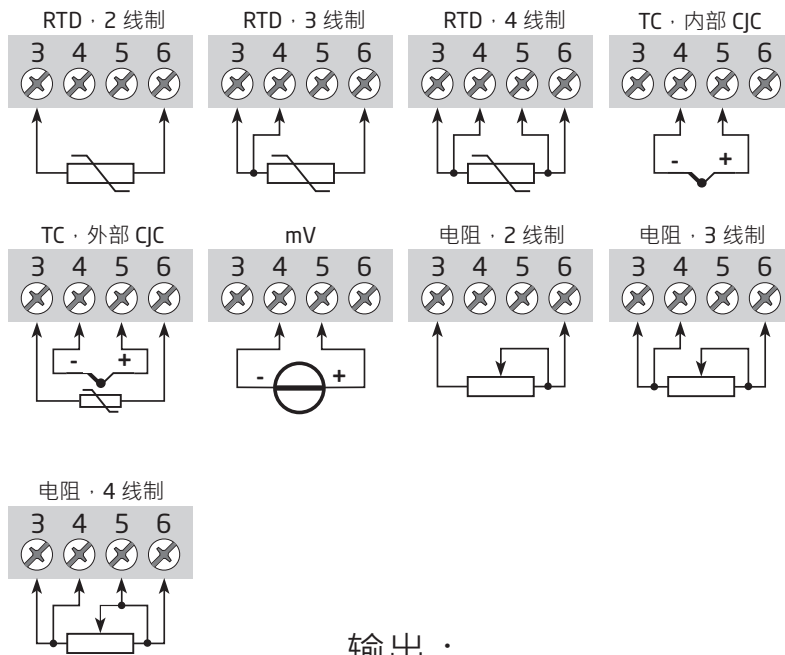
|             |            |
|-------------|------------|
| DNV · 船舶和近海 | TAA0000101 |
|-------------|------------|

**Ex / I.S. 认证：**

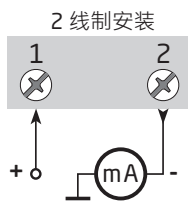
|                 |                         |
|-----------------|-------------------------|
| 5331A :         |                         |
| ATEX            | DEKRA 20ATEX0096 X      |
| 5331D :         |                         |
| ATEX            | DEKRA 20ATEX0095 X      |
| FM              | FM17US0013X             |
| 5331A 和 5331D : |                         |
| IECEX           | DEK 20.0059 X           |
| CSA             | 1125003                 |
| INMETRO         | DEKRA 16.0013 X         |
| EAC Ex          | RU C-DK.HA65.B.00355/19 |

# 接线方式

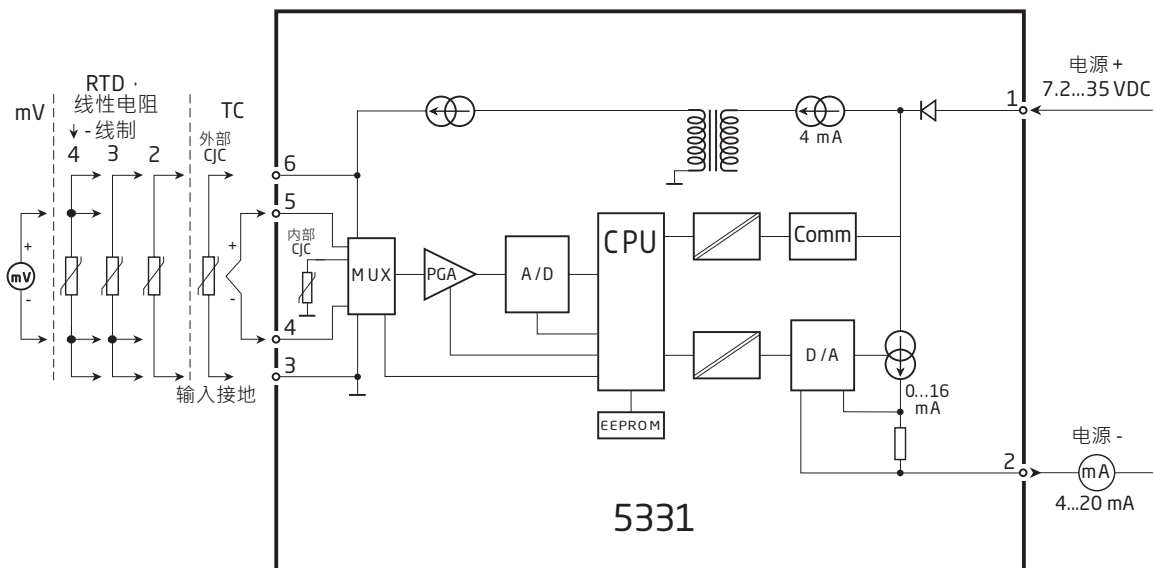
输入：



输出：



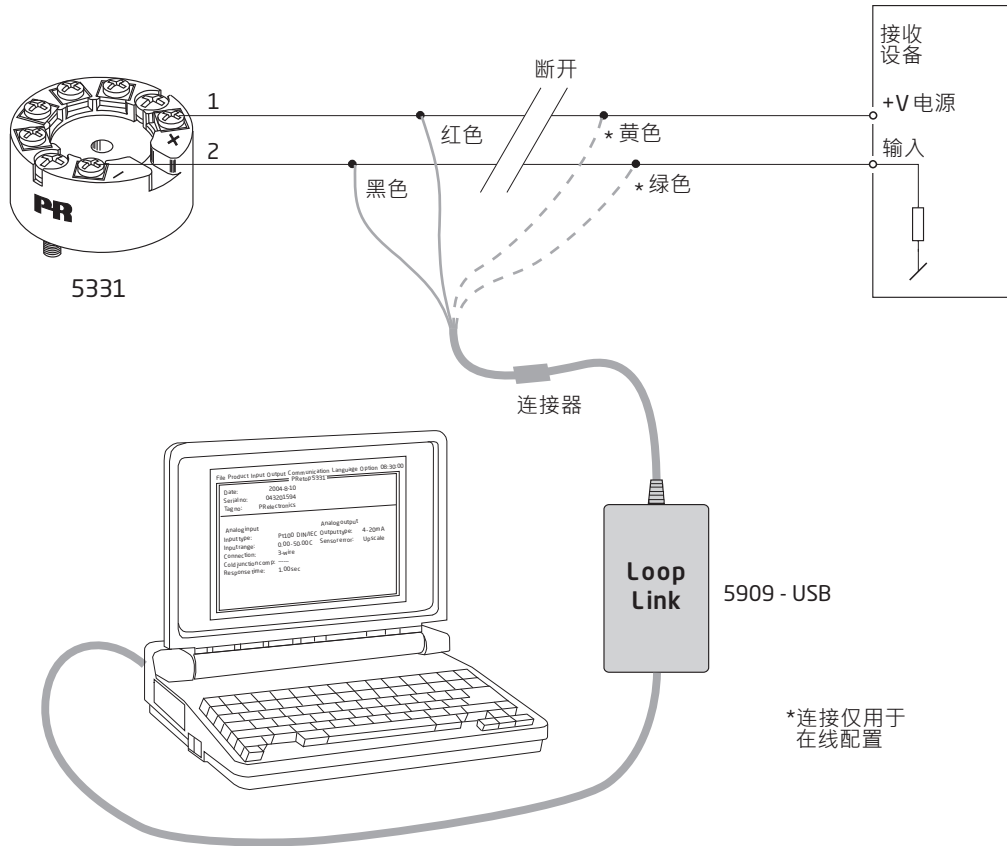
# 方框图



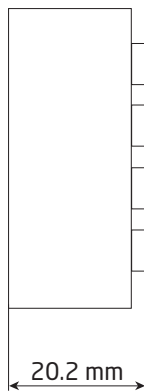
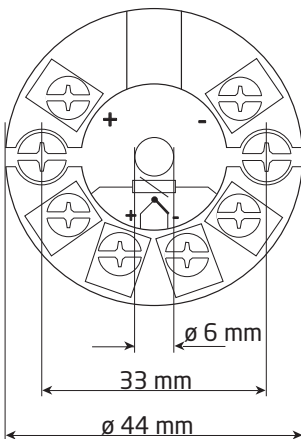


## 设置参数

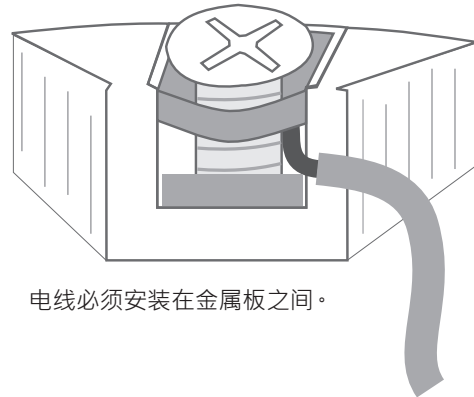
- Loop Link 是 5331 配置所需的通信接口。
- 有关配置，请参考下图和 PReset 中的帮助功能。
- Loop link 不允许与安装在危险 (Ex) 区域中的装置进行通信。



### 机械规格




### 传感器电缆的连接



# ATEX 安装图 5331QA02-V3R0

为安全安装 5331A 或 5334A，必须遵守以下规定。该模块仅由熟悉适用于该地区国家和国际法律、指令和标准的合格专业人员安装。设备制造年份由序列号的前两位数字指示。

ATEX 认证                      DEKRA 20ATEX0096 X

标记牌                      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

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

|   |  |  |                                     |
|---|--|--|-------------------------------------|
| 端子 3,4,5,6  | 端子 1,2   | 端子 1,2   | 端子 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 μ F | Ui = 35 V<br>Ii = 110 mA<br>Ci = 1 nF<br>Li = 10 μ H | Ui = 24 V<br>Ii = 260 mA<br>Ci = 1 nF<br>Li = 10 μ H | Umax ≤ 35 VDC<br>或<br>Umax ≤ 24 VDC |

| Ex ic IIC, Ex ic IIIC<br>温度等级 | 环境温度范围        |               |
|-------------------------------|---------------|---------------|
|                               | Ui=35 V       | Ui=24 V       |
| T6                            | -40°C 至 +54°C | -40°C 至 +63°C |
| T5                            | -40°C 至 +69°C | -40°C 至 +78°C |
| T4                            | -40°C 至 +85°C | -40°C 至 +85°C |

| Ex ec, Ex nA<br>温度等级 | 环境温度范围        |               |
|----------------------|---------------|---------------|
|                      | Vmax=35 V     | Vmax=24 V     |
| T6                   | -40°C 至 +43°C | -40°C 至 +55°C |
| T5                   | -40°C 至 +85°C | -40°C 至 +85°C |
| T4                   | -40°C 至 +85°C | -40°C 至 +85°C |

## 安装说明

如果外壳由非金属塑料材料制成，应避免变压器外壳上的静电荷。

如果变压器安装在需要使用设备保护级别 Gc 的爆炸性环境中并应用 Ex ic 保护类型，则变压器应安装在可根据 EN 60529 提供至少 IP20 防护等级的外壳中，并且适合应用并正确安装。

如果变压器安装在需要使用设备保护等级 Dc 的爆炸性环境中，则变压器应安装在单独认证的外壳中，该外壳可根据 EN 60079-0 提供至少 IP5X 的防护等级，并且适合应用并正确安装。外壳的表面温度比环境温度高 +20 K，确定没有灰尘层。

环境温度范围: -40°C 至 +85°C.

如果变压器安装在需要使用设备保护级别 Gc 的爆炸性环境中并应用 Ex nA 或 Ex ec 保护类型，则变压器应安装在单独认证的外壳中，该外壳可根据 EN 60079-0 提供至少 IP54 的防护等级，并且适合应用并正确安装。

如果变压器安装在需要使用设备保护级别 Gc 的爆炸性环境中并应用 Ex nA 或 Ex ec 保护类型，则该设备只能在不超过 EN 60664-1 中定义的污染等级 2 的区域中使用。

# ATEX 安装图 5331QA01-V3R0



为安全安装 5331D 或 5334B，必须遵守以下规定。该模块仅由熟悉适用于该地区国家和国际法律、指令和标准的合格专业人员安装。设备制造年份由序列号的前两位数字指示。

ATEX 认证

DEKRA 20ATEX0095 X

标记牌



II 1 G Ex ia IIC T6...T4 Ga

II 2 D Ex ia IIIC Db

I M1 Ex ia I Ma

标准

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

危险区

Zone 0, 1, 2, 21, 22

非危险区

端子：3,4,5,6

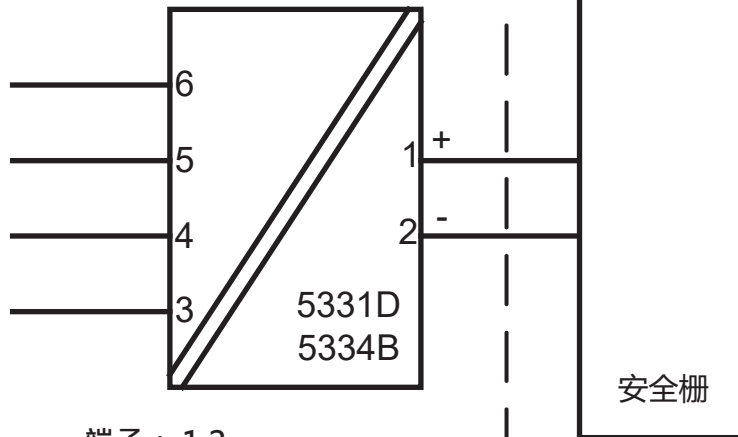
$U_o$ : 9.6 VDC

$I_o$ : 25 mA

$P_o$ : 60 mW

$L_o$ : 33 mH

$C_o$ : 2.4  $\mu$ F



端子：1,2

$U_i$ : 30 VDC

$I_i$ : 120 mA

$P_i$ : 0.84 W 或 0.75 W

$L_i$ : 10  $\mu$ H

$C_i$ : 1.0 nF

| 温度等级 | 环境温度范围        |               |
|------|---------------|---------------|
|      | Pi: 0.84 W    | Pi: 0.75 W    |
| T6   | -40°C 至 +47°C | -40°C 至 +50°C |
| T5   | -40°C 至 +62°C | -40°C 至 +65°C |
| T4   | -40°C 至 +85°C | -40°C 至 +85°C |

## 安装说明

如果外壳由非金属塑料材料制成，应避免变送器外壳上的静电荷。

如果变送器安装在需要使用设备保护级别 Ga 的爆炸性环境中，则变送器应安装在可根据 EN 60529 提供至少 IP20 防护等级的外壳中，并且适合应用并正确安装。

如果变送器安装在需要使用设备防护等级 Ga 或 Ma 的爆炸性环境中，并且如果外壳是铝制的，则必须将其安装在能避免因冲击和摩擦火花而形成点火源的位置。

如果变送器安装在需要使用设备保护等级 Db 的爆炸性环境中，则变送器应安装在单独认证的外壳中，该外壳可根据 EN 60079-0 提供至少 IP5X 的防护等级，并且适合应用并正确安装。外壳的表面温度比环境温度高 +20 K，确定没有灰尘层。

环境温度范围: -40°C 至 +85°C.

如果变送器安装在需要使用设备保护等级 Ma 的爆炸性环境中，则变送器应安装在可根据 EN 60529 提供至少 IP54 防护等级的外壳中，并且适合应用并正确安装。

环境温度范围: -40°C 至 +85°C.

应使用适用于相关应用和正确安装的电缆封口和堵封件。

若环境温度  $\geq 60^\circ\text{C}$ ，则应使用耐热电缆，其额定耐热温度至少应比环境温度高出 20 K。

传感器电路与输入电路并非绝对电气隔离。然而，电路间的电气隔离能够承受 1 分钟交流 500V 的测试电压。

# 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

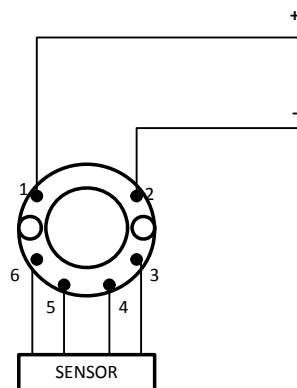
#### Hazardous (Classified) Location

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**

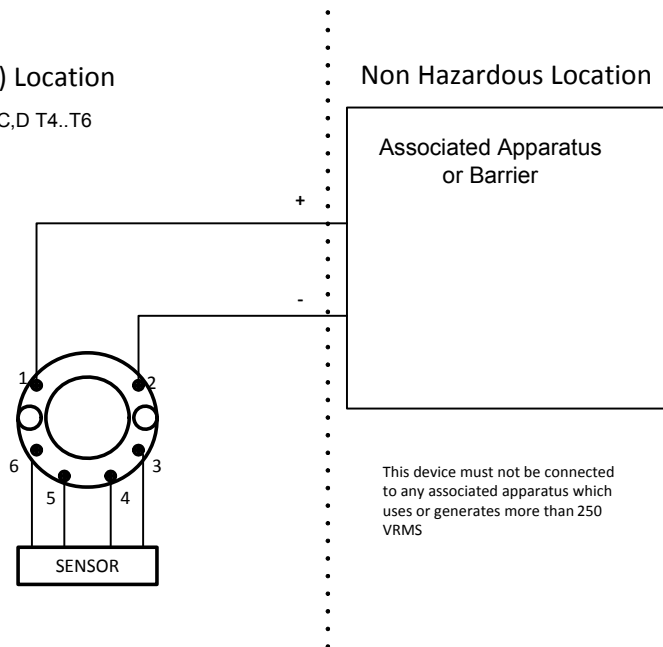
**Model 5331D, 5332D, 5333D, 5335D, 5337D and 5343B**

**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  
 $V_{max} : 35 V$   
 $C_i : 1.0 nF$   
 $L_i : 10 uH$



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

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

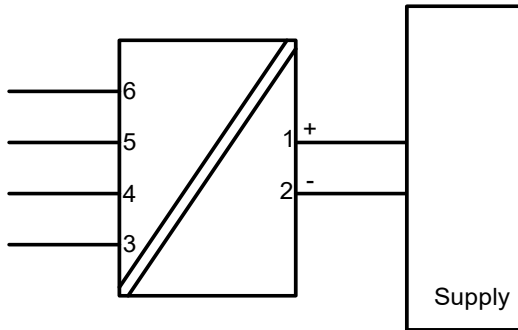
### Hazardous Area

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.

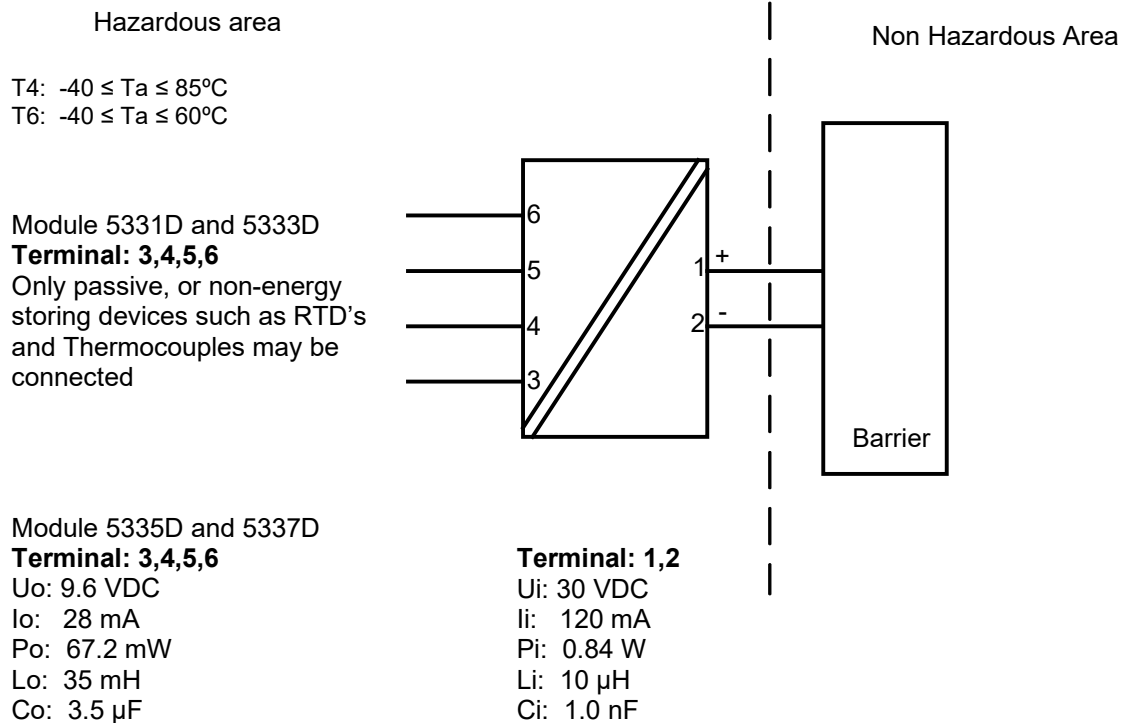
AVERTISSEMENT: Ne débranchez pas l'équipement sauf si l'alimentation a été coupée ou si la zone est connue pour être sûre.

### 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 16.0013 X

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

Normas    ABNT NBR IEC 60079-0 : 2013; ABNT NBR IEC 60079-11 : 2013  
              ABNT NBR IEC60079-15 : 2012

|  |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|
| T4: $-40 \leq T_a \leq 85^\circ\text{C}$ | <b>Terminais:</b>     | <b>Terminais: 1,2</b> | <b>Terminais: 1,2</b> |
| T6: $-40 \leq T_a \leq 60^\circ\text{C}$ | <b>3,4,5,6</b>        | Ex nA                 | Ex ic                 |
|  | Uo: 9,6 V             | U $\leq 35$ VDC       | Ui = 35 VDC           |
|  | Io: 25 mA             |                       | Ii = 110 mA           |
|  | Po: 60 mW             |                       | Li = 10 $\mu\text{H}$ |
|  | Lo: 33 mH             |                       | Ci = 1,0 nF           |
|  | Co: 2,4 $\mu\text{F}$ |                       |                       |

### Notas para instalação

Para a instalação em uma atmosfera de gás potencialmente explosivo, aplicam-se as instruções a seguir:

Para a instalação nA o transmissor deve ser instalado em um invólucro de metal, por exemplo, gabinete em forma B que forneça um grau de proteção de pelo menos IP54 de acordo com ABNT NBR IEC60529 ou em um invólucro com tipo de proteção Ex n ou Ex e.

Para a instalação Ex ic o transmissor deve ser instalado em um invólucro proporcionando um grau de proteção IP20 de acordo com a norma ABNT NBR IEC60529. E o invólucro deve, pelo menos, ser adequado para a aplicação e corretamente instalado.

Dispositivos de entrada de cabos e elementos de supressão devem cumprir os mesmos requisitos.

Para temperatura ambiente  $\geq 60^\circ\text{C}$ , fios de resistência ao calor devem ser usados com uma faixa de pelo menos 20K acima da temperatura ambiente.

Para a instalação em uma atmosfera de poeira potencialmente explosiva, aplicam-se as instruções a seguir:

O transmissor deve ser montado em invólucro de metal forma B de acordo com DIN43729 que está fornecendo pelo menos um grau de proteção IP6X de acordo com ABNT NBR IEC60529.

O invólucro deve ser adequado para aplicação e instalado corretamente.

As entradas dos cabos e os elementos de obturação que podem ser utilizados devem ser adequados à aplicação pretendida e corretamente instalados.

A temperatura da superfície do invólucro é igual à temperatura ambiente mais 20 K, para uma camada de pó, com uma espessura de até 5 mm.

## 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 16.0013 X

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

Normas ABNT NBR IEC 60079-0: 2013; ABNT NBR IEC 60079-11: 2013

Áreas classificadas

Zona 0, 1, 2, 20, 21, 22,

T4:  $-40 \leq T_a \leq 85^\circ\text{C}$

T5:  $-40 \leq T_a \leq 60^\circ\text{C}$

T6:  $-40 \leq T_a \leq 45^\circ\text{C}$

**Terminais 3,4,5,6**

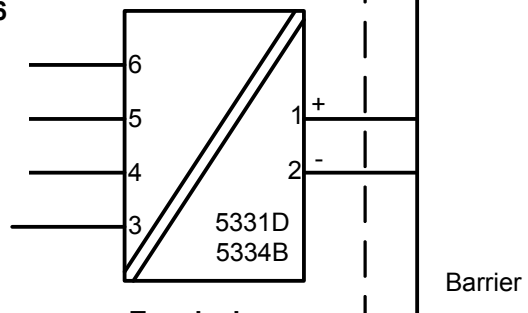
Uo: 9,6 VDC

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

Li: 10µH

Ci: 1,0nF

**Notas de instalação**

O circuito do sensor não é isolado galvanicamente do circuito de entrada de forma infalível. Contudo, a isolamento galvânica entre os circuitos é capaz de resistir a um ensaio de tensão de 500Vac durante 1 minuto.

Em uma atmosfera de gás potencialmente explosiva, o transmissor deve ser montado em um invólucro a fim de garantir um grau de proteção de no mínimo IP20 de acordo com a ABNT NBR IEC60529. Se contudo, o ambiente necessitar de um nível de proteção maior, isso deve ser levado em consideração.

Se o transmissor é instalado em uma atmosfera explosiva exigindo o uso de equipamento de proteção de nível Ga e se o invólucro é feito de alumínio, ele deve ser instalado de modo que, mesmo em caso remoto de avaria, fontes de ignição devido ao impacto e fricção, faíscas são eliminadas.

Se o invólucro é feito de materiais não metálicos, cargas eletroestáticas devem ser evitadas.

Para instalação em atmosfera de poeira potencialmente explosiva, as instruções a seguir são aplicáveis:

O transmissor deve ser montado em invólucro de metal forma B de acordo com DIN43729 que está fornecendo um grau de proteção de pelo menos IP6X de acordo com ABNT NBR IEC60529. O invólucro deve ser adequado para aplicação pretendida e instalado corretamente.

As entradas dos cabos e os elementos de obturação que podem ser utilizados devem ser adequados à aplicação pretendida e corretamente instalados.

Para temperatura ambiente  $\geq 60^{\circ}\text{C}$ , fios de resistência ao calor devem ser usados com uma faixa de pelo menos 20K acima da temperatura ambiente.

A temperatura da superfície do invólucro é igual à temperatura ambiente mais 20 K, por uma camada de pó, com espessura de até 5 mm.



## 文档更新记录

以下列表提供了有关本文档修订的说明。

| 版本号 | 日期   | 说明  |
|-----|------|---|
| 113 | 1345 | 添加 IECEx 和 INMETRO 认证。  |
| 114 | 1510 | 添加 PESO/CCOE 认证。<br>GOST 认证替换为 EAC 认证。                        |
| 115 | 1707 | 更新 FM 安装图。<br>更新 INMETRO 安装图。                                 |
| 116 | 1848 | 更新 FM 安装图。  |
| 117 | 2004 | 获得 5331A 的 CSA 认证。添加安装图<br>PESO/CCOE 认证中断。<br>更新 INMETRO 安装图。 |
| 118 | 2145 | ATEX和IECEx认证已更新 - Ex na 更改为 Ex ec。                            |
| 119 | 2202 | 更新 CSA 安装图。   |

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