

# PR



## 5 3 3 7

**2-wire Transmitter  
with HART® Protocol**

No. 5337V100-UK  
From ser. no. 120917007



**SIGNALS THE BEST**

- DK** ▶ PR electronics A/S tilbyder et bredt program af analoge og digitale signalbehandlingsmoduler til industriel automation. Programmet består af Isolatorer, Displays, Ex-barrierer, Temperaturtransmittere, Universaltransmittere mfl. Vi har modulerne, du kan stole på i selv barske miljøer med elektrisk støj, vibrationer og temperaturudsving, og alle produkter opfylder de strengeste internationale standarder. Vores motto »Signals the Best« er indbegrebet af denne filosofi – og din garanti for kvalitet.
- UK** ▶ PR electronics A/S offers a wide range of analogue and digital signal conditioning devices for industrial automation. The product range includes Isolators, Displays, Ex Interfaces, Temperature Transmitters, and Universal Devices. You can trust our products in the most extreme environments with electrical noise, vibrations and temperature fluctuations, and all products comply with the most exacting international standards. »Signals the Best« is the epitome of our philosophy – and your guarantee for quality.
- FR** ▶ PR electronics A/S offre une large gamme de produits pour le traitement des signaux analogiques et numériques dans tous les domaines industriels. La gamme de produits s'étend des transmetteurs de température aux afficheurs, des isolateurs aux interfaces SI, jusqu'aux modules universels. Vous pouvez compter sur nos produits même dans les conditions d'utilisation sévères, p.ex. bruit électrique, vibrations et fluctuations de température. Tous nos produits sont conformes aux normes internationales les plus strictes. Notre devise »SIGNALS the BEST« c'est notre ligne de conduite - et pour vous l'assurance de la meilleure qualité.
- DE** ▶ PR electronics A/S verfügt über ein breites Produktprogramm an analogen und digitalen Signalverarbeitungsmodulen für die industrielle Automatisierung. Dieses Programm umfasst Displays, Temperaturtransmitter, Ex- und galvanische Signaltrenner, und Universalgeräte. Sie können unsere Geräte auch unter extremen Einsatzbedingungen wie elektrisches Rauschen, Erschütterungen und Temperaturschwingungen vertrauen, und alle Produkte von PR electronics werden in Übereinstimmung mit den strengsten internationalen Normen produziert. »Signals the Best« ist Ihre Garantie für Qualität!

# 2-WIRE TRANSMITTER WITH HART® PROTOCOL

## PRetop 5337

### CONTENTS

EC declaration of conformity .....	2
Application .....	3
Technical characteristics .....	3
Mounting / installation / programming.....	4
Applications.....	5
Accessories .....	6
Ordering codes for 5337 .....	6
Technical data .....	6
Switching HART® protocol revision.....	9
Connections .....	11
Block diagram .....	12
Programming.....	13
Connection of transmitters in multidrop mode.....	15
Mechanical specifications .....	15
Mounting of sensor wires.....	15
Appendix .....	16
ATEX Installation Drawing - 5337A.....	17
IECEX Installation Drawing - 5337A .....	18
ATEX Installation Drawing - 5337D .....	19
IECEX Installation Drawing - 5337D .....	21
FM Installation Drawing - 5337D.....	23
CSA Installation Drawing - 5337D.....	25

# EC DECLARATION OF CONFORMITY

As manufacturer

**PR electronics A/S**  
**Lerbakken 10**  
**DK-8410 Rønde**

hererby declares that the following product:

**Type: 5337**

**Name: 2-wire transmitter with HART® protocol**

is in conformity with the following directives and standards:

The EMC Directive 2004/108/EC and later amendments

**EN 61326-1 : 2006**

For specification of the acceptable EMC performance level, refer to the electrical specifications for the device.

The ATEX Directive 94/9/EC and later amendments

**EN 60079-0 : 2009, EN 60079-11 : 2007,**

**EN 60079-15 : 2010, EN 60079-26 : 2007**

**and EN 61241-11 : 2006.**

**ATEX certificate: KEMA 03ATEX1508 X (5337A)**

**ATEX certificate: KEMA 03ATEX1537 (5337D)**

Notified body

**DEKRA Certification B.V. (0344)**  
**Utrechtseweg 310, 6812 AR Arnhem**  
**P.O. Box 5185, 6802 ED Arnhem**  
**The Netherlands**

Rønde, 23 March 2012



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Kim Rasmussen  
Manufacturer's signature

# **PRetop 5337**

## **2-WIRE TRANSMITTER WITH HART® PROTOCOL**

- *RTD, TC, Ohm, or mV input*
- *2 analogue inputs and 5 device variables with status available*
- *HART® protocol revision selectable from HART® 5 or HART® 7*
- *Hardware assessed for use in SIL applications*
- *Mounting on a DIN rail in safe area or hazardous gas and dust area*

### **Application**

- Linearised temperature measurement with TC and RTD sensors like e.g. Pt100 and Ni100.
- HART® communication and 4...20 mA analogue PV output for individual, difference or average temperature measurement of up to two RTD or TC input sensors.
- Conversion of linear resistance variation to a standard analogue current signal, for instance from valves or Ohmic level sensors.
- Amplification of a bipolar mV signal to a standard 4...20 mA current signal.
- Up to 63 transmitters can be connected in a multidrop communication setup (HART® 7).

### **Technical characteristics**

- The HART® protocol revision can be changed by user configuration to either HART® 5 or HART® 7 protocol.
- HART® 7 protocol offers:
  - Long tag supported (up to 32 characters).
  - Enhanced Burst Mode and Event Notification with time stamping possibility.
  - Device variables with status, can be mapped individually to any dynamic variable PV, SV, TV or QV.

- Measuring of trending in the process signal.
- Automatic event notification with time stamps.
- Command aggregation for higher communication efficiency.
- 5337 is designed according to strict safety requirements and is thus suitable for applications in SIL installations.
- Continuous check of vital stored data.
- Sensor error detection according to the guidelines in NAMUR NE 89.

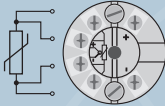
### **Mounting / installation / programming**

- For DIN form B sensor head or DIN rail mounting via the PR fitting type 8421.
- Configuration via HART<sup>®</sup> tool or by PR 5909 Loop Link.
- NB: As Ex barrier for 5337D we recommend 5106B and 9106B

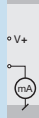


## APPLICATIONS

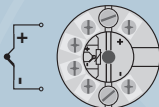
RTD to 4...20 mA



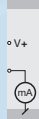
2-wire installation  
in control room



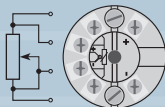
TC to 4...20 mA



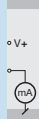
2-wire installation  
in control room



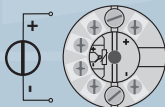
Resistance to 4...20 mA



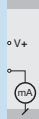
2-wire installation  
in control room



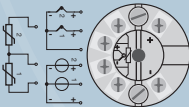
mV to 4...20 mA



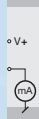
2-wire installation  
in control room



Difference or average  
RTD, TC or mV



2-wire installation  
in control room



## Ordering codes for 5337

Type	Version
5337	Standard: ..... : A CSA, FM, ATEX, IECEX & INMETRO ..... : D

### Accessories

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

### Technical data

#### Environmental conditions:

Specifications range..... -40°C to +85°C  
Calibration temperature..... 20...28°C  
Relative humidity..... < 95% RH (non-cond.)  
Protection degree..... IP68/IP00  
Vibration ..... IEC 60068-2-6 Test FC  
Lloyd's specification no. 1..... 4 g / 2...100 Hz

#### Mechanical specifications:

Dimensions ..... Ø 44 x 20.2 mm  
Weight approx. .... 50 g  
Max. wire size..... 1 x 1.5 mm<sup>2</sup> stranded wire  
Screw terminal torque..... 0.4 Nm

#### Common electrical specifications:

Supply voltage, DC:  
Standard..... 8.0...35 V  
ATEX, CSA, FM, IECEX & INMETRO.... 8.0...30 V  
Voltage drop ..... 8.0 V  
Isolation - test / working ..... 1.5 kVAC / 50 VAC  
Signal / noise ratio ..... > 60 dB  
Communications interface ..... Loop Link & HART®  
Response time (programmable)..... 1...60 s



Accuracy, the greater of general and basic values:

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

<b>Basic values</b>		
Input type	Basic accuracy	Temperature coefficient
Pt50 - Pt1000	$\leq \pm 0.1^\circ\text{C}$	$\leq \pm 0.005^\circ\text{C}/^\circ\text{C}$
Ni50 - Ni1000	$\leq \pm 0.2^\circ\text{C}$	$\leq \pm 0.005^\circ\text{C}/^\circ\text{C}$
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: 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 <sup>1</sup> , Lr, R, S, W3, W5	$\leq \pm 1^\circ\text{C}$	$\leq \pm 0.1^\circ\text{C} / ^\circ\text{C}$
TC type: B <sup>2</sup>	$\leq \pm 3^\circ\text{C}$	$\leq \pm 0.3^\circ\text{C} / ^\circ\text{C}$
TC type: B <sup>3</sup>	$\leq \pm 8^\circ\text{C}$	$\leq \pm 0.8^\circ\text{C} / ^\circ\text{C}$
TC type: B <sup>4</sup>	not specified	not specified

TC B<sup>1</sup> accuracy specification range..... > 400°C

TC B<sup>2</sup> accuracy specification range..... > 160°C < 400°C

TC B<sup>3</sup> accuracy specification range ..... > 85°C < 160°C

TC B<sup>4</sup> accuracy specification range ..... < 85°C

TC cold junction compensation ..... <  $\pm 1.0^\circ\text{C}$

Max. offset on input signal..... 50% of selec. max. value

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

**Input specifications:**

RTD input types:

Pt50, Pt100, Pt200, Pt500, Pt1000, Ni50, Ni100, Ni120, Ni1000

Cable resistance per wire (max.)..... 50  $\Omega$ 

Sensor current..... Nom. 0.2 mA

RTD type	Min. value	Max. values	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 $\Omega$	-----

**TC input types:**

Type	Min. temperature	Max. temperature	Min. span	Standard
B	0°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	-200°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

Cold junction compensation (CJC):

Constant, internal or external via a Pt100 or Ni100 sensor

Voltage input range ..... -800...+800 mV

Min. span..... 2.5 mV

Input resistance..... 10 M $\Omega$

## Output specifications and HART®:

Signal range .....	4...20 mA
Min. signal range.....	16 mA
Updating time.....	440 ms
Load resistance.....	$\leq (V_{\text{supply}} - 8) / 0.023 [\Omega]$
Sensor error detection, programmable.....	3.5...23mA
HART® protocol revisions .....	HART® 5 and HART® 7

## Switching HART® protocol revision

It is possible to change the HART® protocol revision by using the PReset software and a PR 5909 Loop Link interface or a HART® compatible modem. Other HART® configuration tools like a handheld terminal can also be used.

### Switching from HART® 7 to HART® 5:

Procedure when using the PR PReset Software:

Enter the PReset tab "HART" and open the folder "Methods".

Press the "Device Password / Write Protection / Protocol..." line and select "change protocol to HART5" - acknowledge by pressing OK.

### Procedure when using alternative HART® tools:

Write-protect the device and set the new password to "HARTREV5".

Write-enable the device by using the password "-CHANGE-".

**Please note that this will change the 5337 device to a 5335 HART device.**

### Switching from HART® 5 to HART® 7:

Write-protect the device and set the new password to "HARTREV7".

Write-enable the device by using the password "-CHANGE-"

**Please note that this is only possible if the transmitter is marked "5337".**

This will reset the password to the default active password ("\*\*\*\*\*") and restart the device in the updated mode with write protection disabled.

**Please note** that the configuration changed flags and configuration changed counter are **not** updated by this command.

**Approvals:**

EMC 2004/108/EC ..... EN 61326-1  
GOST R

**Ex / I.S.:**

5337A:

ATEX 94/9/EC..... KEMA 03ATEX1508 X  
IECEX ..... KEM 10.0083 X

5337D:

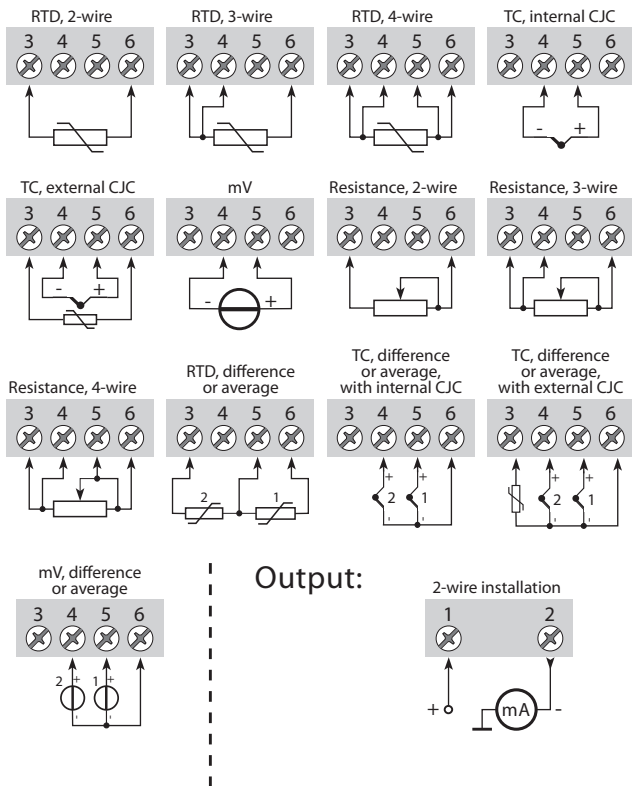
ATEX 94/9/EC..... KEMA 03ATEX1537 X  
IECEX ..... KEM 10.0083 X  
FM certificate ..... 2D5A7  
CSA certificate ..... 1125003  
INMETRO certificate ..... 09/UL-BRCO-0002  
GOST Ex

**Functional Safety:**

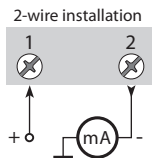
Hardware assessed for use in SIL applications  
FMEDA report - [www.prelectronics.com](http://www.prelectronics.com)

# CONNECTIONS

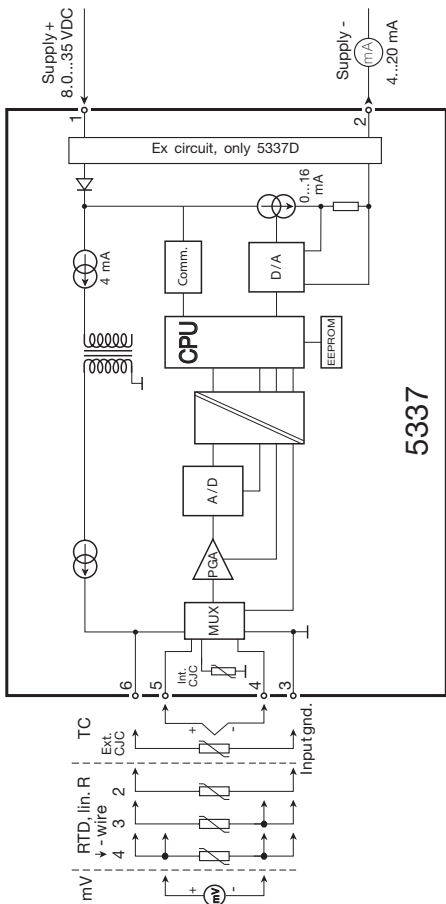
## Input:



## Output:



# BLOCK DIAGRAM



# PROGRAMMING

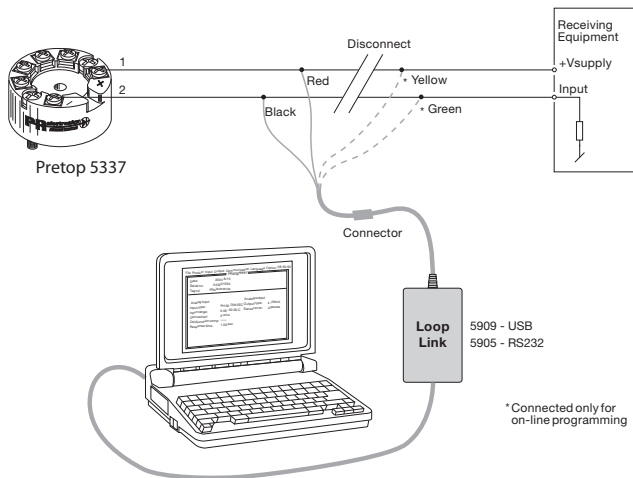
## 5337 can be configured in the following 3 ways:

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

### 1: Loop Link

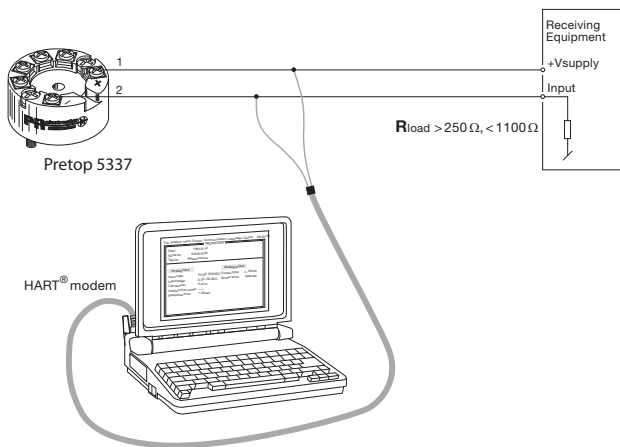
For programming please refer to the drawing below and the help functions in PRreset.

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



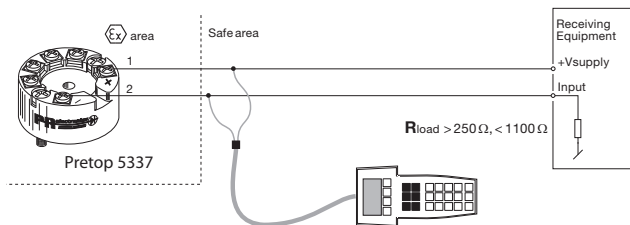
## 2: HART® modem

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



## 3: HART® communicator

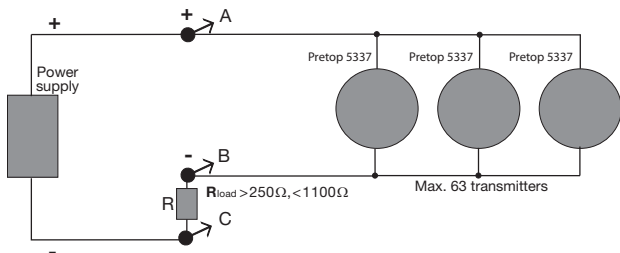
For programming please refer to the drawing below. To gain access to product-specific commands, a suitable HART® communicator must be loaded with the PR electronics A/S DDL driver. This can be ordered either at the HART® Communication Foundation or at PR electronics A/S.





## CONNECTION OF TRANSMITTERS IN MULTIDROP MODE

The HART® communicator or a PC modem can be connected across AB or BC.

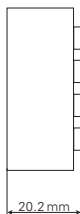
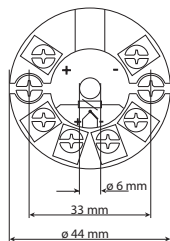


The outputs of max. 63 transmitters can be connected in parallel for a digital HART® 7 communication on 2-wires.

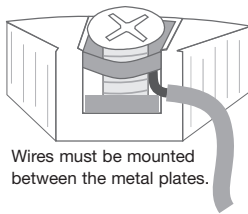
Before it is connected, each transmitter must be configured with a unique number from 1 to 63. If 2 transmitters are configured with the same number, both will be excluded. The transmitters must be programmed for multidrop mode (with a fixed output signal of 4 mA). Maximum current in the loop is therefore 252 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



# APPENDIX

**ATEX Installation Drawing - 5337A**

**IECEX installation drawing - 5337A**

**ATEX Installation Drawing - 5337D**

**IECEX installation drawing - 5337D**

**FM Installation Drawing No. 5300Q502**

**CSA Installation Drawing No. 533XQC03**

## ATEX Installation drawing

For safe installation of 5335A, 5336A or 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 KEMA 03ATEX 1508X

Marking



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

Standards EN60079-0:2009, EN60079-11:2007, EN60079-15:2010 EN61241-11:2006

T4: $-40 \leq T_a \leq 85^\circ\text{C}$	<b>Terminal: 3,4,5,6</b>	<b>Terminal: 1,2</b>	<b>Terminal: 1,2</b>
T6: $-40 \leq T_a \leq 60^\circ\text{C}$	Ex nA [ic]	Ex nA	Ex ic
	Uo: 9.6 V	U $\leq$ 35 VDC	Ui = 35 VDC
	Io: 28 mA	I = 4 - 20 mA	Li = 10 $\mu\text{H}$
	Po: 67 mW		Ci = 1.0 nF
	Lo: 45 mH		
	Co: 28 $\mu\text{F}$		

### Installation note:

For use in an explosive dust atmosphere, the transmitter shall be mounted in an enclosure providing a degree of protection of at least IP6X in accordance with EN60529, eg. a form B enclosure according to DIN 43729. The surface of the enclosure is equal to the ambient temperature + 20K, for a dust layer with a maximum thickness of 5 mm.

### Special conditions for safe use:

For use in an explosive gas atmosphere, the transmitter shall be mounted in an enclosure providing a degree of protection of at least IP54 in accordance with EN60529.

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

## IECEx Installation drawing



For safe installation of 5335A, 5336A or 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.

IECEx Certificate	IECEx KEM 10.0083X		
Marking	Ex nA [ic] IIC T6..T4 Gc Ex ic IIC T6..T4 Gc Ex ic IIC Dc		
Standards	IEC 60079-0 : 2007, IEC 60079-11 : 2006, EN 60079-15 : 2010		

T4: $-40 \leq T_a \leq 85^\circ\text{C}$	<b>Terminal: 3,4,5,6</b>	<b>Terminal: 1,2</b>	<b>Terminal: 1,2</b>
T6: $-40 \leq T_a \leq 60^\circ\text{C}$	Ex nA [ic]	Ex nA	Ex ic
	Uo: 9.6 V	U $\leq$ 35 VDC	Uj = 35 VDC
	Io: 28 mA	I = 4 - 20 mA	Li = 10 $\mu\text{H}$
	Po: 67 mW		Ci = 1.0 nF
	Lo: 45 mH		
	Co: 28 $\mu\text{F}$		

### Installation note:

For installation in a potentially explosive gas atmosphere, the following instructions apply:  
The transmitter shall be installed in an enclosure providing a degree of protection of at least IP54 according to IEC60529 or in an enclosure with type of protection Ex n or Ex e.  
Cable entry devices and blanking elements shall fulfill the same requirements  
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.

For installation in a potentially explosive dust atmosphere, the following instructions apply:  
If the transmitter is supplied with an intrinsically safe signal "ic" and interfaces an intrinsically safe signal "ic" (e.g. a passive device), the transmitter shall be mounted in a metal enclosure form B according to DIN 43729 that provides a degree of protection of at least IP6X according to IEC60529, and that is suitable for the application. Cable entry devices and blanking elements shall fulfill the same requirements.

If the transmitter is supplied with a non-sparking signal "nA", or interfaces a non-sparking signal, the transmitter shall be mounted in a metal enclosure form B according to DIN 43729 providing a degree of protection of at least IP6X according to IEC60529, and in conformance with type of protection Ex tD and suitable for the application. Cable entry devices and blanking elements shall fulfill the same requirements.

## ATEX Installation drawing



For safe installation of 5335D, 5336D 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 KEMA 03ATEX 1537

Marking  II 1 G Ex ia IIC T6 ...T4 Ga  
II 1 D Ex ia IIIC Da  
I M1 Ex ia I Ma

Standards EN 60079-0 : 2009, EN 60079-11 : 2007,  
EN 60079-26 : 2007, EN 61241-11: 2006

### Hazardous area

Zone 0, 1, 2, 20, 21, 22, and Coal mining

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

T6:  $-40 \leq T_a \leq 60^\circ\text{C}$

### Terminal: 3,4,5,6

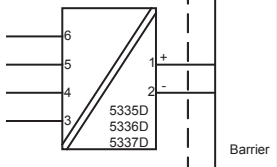
U<sub>o</sub>: 9.6 VDC

I<sub>o</sub>: 28 mA

P<sub>o</sub>: 67 mW

L<sub>o</sub>: 35 mH

C<sub>o</sub>: 3.5µF



### Terminal: 1,2

U<sub>i</sub>: 30 VDC

I<sub>i</sub>: 120 mA

P<sub>i</sub>: 0.84 W

L<sub>i</sub>: 10µH

C<sub>i</sub>: 1.0nF

**Installation notes.**

For installation in a potentially explosive gas atmosphere, the following instructions apply:

The sensor circuit is not infallibly galvanic isolated from the supply output circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500Vac during 1 minute.

The transmitter shall be mounted in an enclosure form B according to DIN43729 or equivalent that is providing a degree of protection of at least IP20 according to EN60529 that is suitable for the application and correctly installed.

If the enclosure is made of aluminium, it must be installed such, that even in the event of rare incidents, ignition sources due to impact and friction, sparks are excluded.

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

For installation in a potentially explosive dust atmosphere, the following instructions apply:

The transmitter shall be mounted in a metal enclosure form B according to DIN43729 or equivalent, that is providing a degree of protection of at least IP6X according to EN60529 that is suitable for the application and correctly installed.

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.

For installation in mines the following instructions apply:

The transmitter shall be mounted in a metal enclosure that is providing a degree of protection of at least IP6X according to EN60529, and is suitable for the application and correctly installed.

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

The enclosure shall not contain by mass more than

- a) 15 % in total of aluminium, magnesium, titanium and zirconium, and
- b) 7,5 % in total of magnesium, titanium and zirconium.

## IECEX Installation drawing



For safe installation of 5335D, 5336D 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.

IECEX Certificate	IECEX KEM.10.0083X
Marking	Ex ia IIC T6..T4 Ga Ex ia IIIC Da Ex ia I Ma
Standards	IEC60079-11:2006, IEC60079-0: 2007 IEC60079-26:2006, IEC61241-11:2005

### Hazardous area

Zone 0, 1, 2, 20, 21, 22 and Coal mining

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

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

Non Hazardous Area

### Terminal: 3,4,5,6

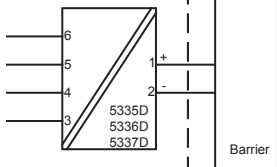
U<sub>o</sub>: 9.6 VDC

I<sub>o</sub>: 28 mA

P<sub>o</sub>: 67 mW

L<sub>o</sub>: 35 mH

C<sub>o</sub>: 3.5µF



### Terminal: 1,2

U<sub>i</sub>: 30 VDC

I<sub>i</sub>: 120 mA

P<sub>i</sub>: 0.84 W

L<sub>i</sub>: 10µH

C<sub>i</sub>: 1.0nF

**Installation notes.**

For installation in a potentially explosive gas atmosphere, the following instructions apply:

The sensor circuit is not infallibly galvanic isolated from the supply output circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500Vac during 1 minute.

The transmitter shall be mounted in an enclosure form B according to DIN43729 or equivalent that is providing a degree of protection of at least IP20 according to IEC 60529 that is suitable for the application and correctly installed.

If the enclosure is made of aluminium, it must be installed such, that even in the event of rare incidents, ignition sources due to impact and friction, sparks are excluded.

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

For installation in a potentially explosive dust atmosphere, the following instructions apply:

The transmitter shall be mounted in a metal enclosure form B according to DIN43729 or equivalent, that is providing a degree of protection of at least IP6X according to IEC 60529 that is suitable for the application and correctly installed.

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.

For installation in mines the following instructions apply:

The transmitter shall be mounted in a metal enclosure that is providing a degree of protection of at least IP6X according to IEC 60529, and is suitable for the application and correctly installed.

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

The enclosure shall not contain by mass more than

- a) 15 % in total of aluminium, magnesium, titanium and zirconium, and
- b) 7,5 % in total of magnesium, titanium and zirconium.



## FM Installation Drawing 5300Q502 Rev AG

### Model 5331C, 5331D, 5333C and 5333D

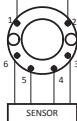
#### Hazardous (Classified) Location

Class I, Division 1, Groups, A, B, C, D  
Class I, Zone 0, IIC

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

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  
Only passive, or non-energy storing devices such as RTD's and Thermocouples may be connected.



#### Non Hazardous Location

Associated Apparatus or Barrier with entity Parameters:

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

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

### Model 5335C, 5335D, 5336D, 5337D.

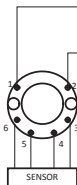
#### Hazardous (Classified) Location

Class I, Division 1, Groups, A, B, C, D  
Class I, Zone 0, IIC

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

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  
Vi or Uo: 9.8 V  
Ii or Io: 28 mA  
Pi 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:

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

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 ( $U_0$  or  $V_{OC}$  or  $V_i$ ) and current ( $I_0$  or  $I_{SC}$  or  $I_i$ ) and the power  $P_0$  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.

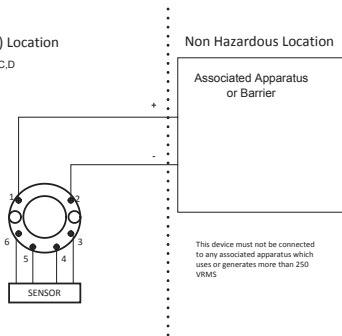
The entity parameters  $U_0, V_{OC}$  or  $V_i$  and  $I_0, I_{SC}$  or  $I_i$ , and  $C_a$  and  $L_a$  for barriers are provided by the barrier manufacturer.

**NI Field Circuit Parameters**
**Model 5331C, 5331D, 5333C, 5333D, 5335C, 5335D, 5336D, 5337D**
**Hazardous (Classified) Location**

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

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

Terminal 1, 2  
 $V_{max}$ : 35 V  
 $C_i$ : 0  $\mu$  F  
 $L_i$ : 10  $\mu$  H

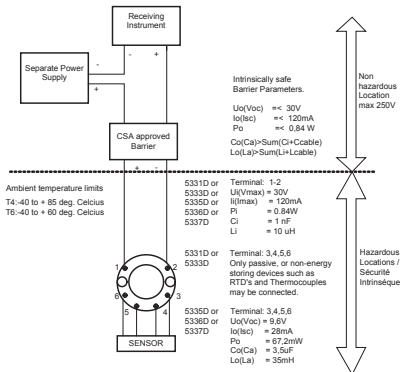


## CSA Installation Drawing 533XQC03.

5331D, 5333D, 5335D, 5336D and 5337D transmitters are intrinsically safe in Zone 0 Group IIC or Class I, Division 1, Group A, B, C, D when installed according to Installation Drawing.

### 1. Connections with separate power supply and receiver.

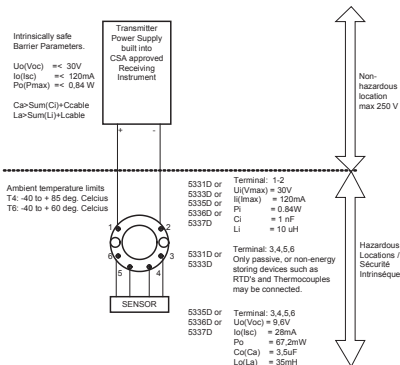
**Output:** Standard 4 - 20mA loop



### 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).

**2. Connection with power supply and barrier built into receiver.**
**Output: Standard 4 - 20mA loop**

**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).



**Displays** Programmable displays with a wide selection of inputs and outputs for display of temperature, volume and weight, etc. Feature linearisation, scaling, and difference measurement functions for programming via PReset software.



**Ex interfaces** Interfaces for analogue and digital signals as well as HART® signals between sensors / I/P converters / frequency signals and control systems in Ex zone 0, 1 & 2 and for some modules in zone 20, 21 & 22.



**Isolation** Galvanic isolators for analogue and digital signals as well as HART® signals. A wide product range with both loop-powered and universal isolators featuring linearisation, inversion, and scaling of output signals.



**Temperature** A wide selection of transmitters for DIN form B mounting and DIN rail modules with analogue and digital bus communication ranging from application-specific to universal transmitters.



**Universal** PC or front programmable modules with universal options for input, output and supply. This range offers a number of advanced features such as process calibration, linearisation and auto-diagnosis.



  [www.preelectronics.fr](http://www.preelectronics.fr)  
 [sales@preelectronics.fr](mailto:sales@preelectronics.fr)

  [www.preelectronics.de](http://www.preelectronics.de)  
 [sales@preelectronics.de](mailto:sales@preelectronics.de)

  [www.preelectronics.es](http://www.preelectronics.es)  
 [sales@preelectronics.es](mailto:sales@preelectronics.es)

  [www.preelectronics.it](http://www.preelectronics.it)  
 [sales@preelectronics.it](mailto:sales@preelectronics.it)

  [www.preelectronics.se](http://www.preelectronics.se)  
 [sales@preelectronics.se](mailto:sales@preelectronics.se)

  [www.preelectronics.co.uk](http://www.preelectronics.co.uk)  
 [sales@preelectronics.co.uk](mailto:sales@preelectronics.co.uk)

  [www.preelectronics.com](http://www.preelectronics.com)  
 [sales@preelectronics.com](mailto:sales@preelectronics.com)

  [www.preelectronics.cn](http://www.preelectronics.cn)  
 [sales@preelectronics.cn](mailto:sales@preelectronics.cn)

## Head office

Denmark  
PR electronics A/S  
Lerbakken 10  
DK-8410 Rønne

[www.preelectronics.com](http://www.preelectronics.com)  
[sales@preelectronics.dk](mailto:sales@preelectronics.dk)  
tel. +45 86 37 26 77  
fax +45 86 37 30 85



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DS/EN ISO 9001  
DS/EN ISO 14001

