

PR
electronics



5 3 3 5

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

No. 5335V116-UK
From ser. no. 120917001

ATEX



- 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 analog and digital signal conditioning devices for industrial automation. The product range includes Isolators, Displays, I.S. 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 Signalverarbeitungsgeräte 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

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 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.
- Connection of up to 15 transmitters to a digital 2-wire signal with HART[®] communication.

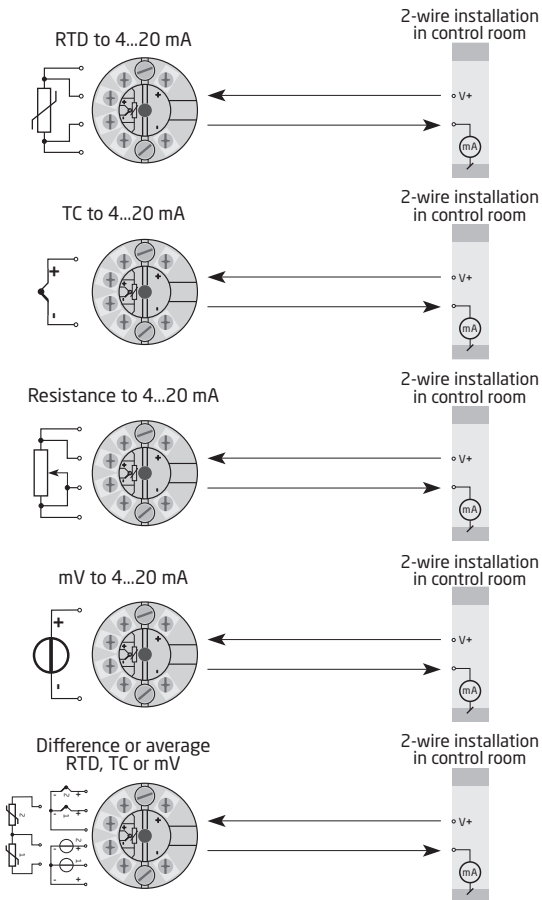
Technical characteristics

- 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 2 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: 5335

Type	Version
5335	Standard : A CSA, FM, ATEX, IECEx & INMETRO : D

Accessories

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

Electrical specifications

Specifications range:

-40°C to +85°C

Common specifications:

Supply voltage, DC

Standard 8.0...35 V

CSA, FM, ATEX, IECEx & INMETRO 8.0...30 V

Isolation voltage, test / operation 1.5 kVAC / 50 VAC

Warm-up time 30 s

Communications interface HART® and Loop Link

Signal / noise ratio Min. 60 dB

Response time (programmable) 1...60 s

EEProm error check < 10 s

Signal dynamics, input 22 bit

Signal dynamics, output 16 bit

Calibration temperature 20...28°C

Accuracy, the greater of general and basic values:

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤ ±0.05% of span	≤ ±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: 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, 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: NAMUR NE 21, A criterion, burst	$< \pm 1\%$ of span

Effect of supply voltage variation	$< 0.005\%$ of span / VDC
Vibration	IEC 60068-2-6 T: 2007
2...25 Hz	$\pm 1.6 \text{ mm}$
25...100 Hz	$\pm 4 \text{ g}$
Max. wire size	1 x 1.5 mm ² stranded wire
Screw terminal torque	0.4 Nm
Relative humidity	$< 95\%$ RH (non-cond.)
Dimensions	$\varnothing 44 \times 20.2 \text{ mm}$
Protection degree (enclosure / terminals)....	IP68 / IP00
Weight	50 g

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 Ω	7000 Ω	25 Ω	-----

Cable resistance per wire (max.) 5 Ω

(up to 50 Ω per wire is possible with reduced measurement accuracy)

Sensor current Nom. 0.2 mA

Effect of sensor cable resistance (3- / 4-wire) < 0.002 Ω/Ω

Sensor error detection Yes

Short circuit detection If 0% > 30 Ω

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_{amb.} ≤ 135°C

Sensor error detection Yes

Sensor error current:

When detecting Nom. 33 μA

Else 0 μA

Short circuit detection No

Voltage input:

Measurement range.....	-800...+800 mV
Min. span.....	2.5 mV
Input resistance.....	10 M Ω

Current output:

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.....	$\leq (V_{\text{supply}} - 8) / 0.023$ [Ω]
Load stability.....	$< \pm 0.01\%$ of span / 100 Ω

Sensor error detection:

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

Approvals:

EMC 2004/108/EC.....	EN 61326-1
EAC TR-CU 020/2011.....	EN 61326-1

Marine approval:

Det Norske Veritas, Ships & Offshore.....	Stand. for Certific. No. 2.4
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Ex / I.S.:**5335A:**

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

5335D:

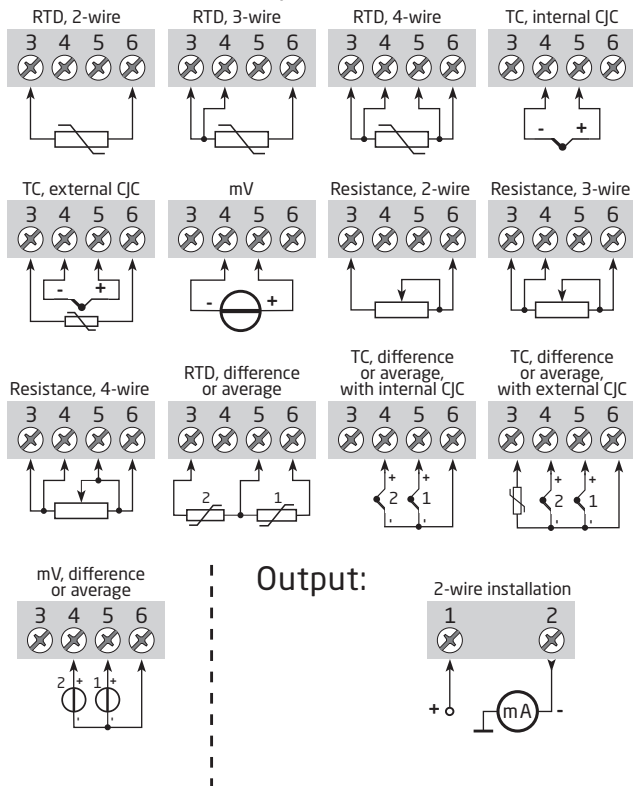
ATEX 94/9/EC.....	KEMA 03ATEX1537
IECEX.....	KEM 10.0083 X
FM.....	2D5A7
CSA.....	1125003
INMETRO.....	NCC 12.0844 X
EAC Ex TR-CU 012/2011.....	RU C-DK.GB08.V.00410

Functional Safety:

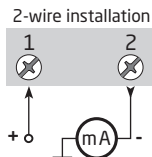
Hardware assessed for use in SIL applications
 FMEDA report - www.prelectronics.com

CONNECTIONS

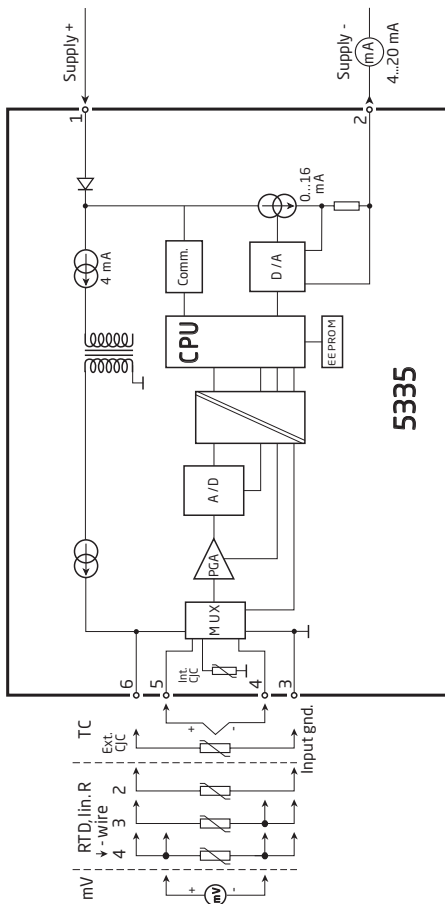
Input:



Output:



BLOCK DIAGRAM



PROGRAMMING

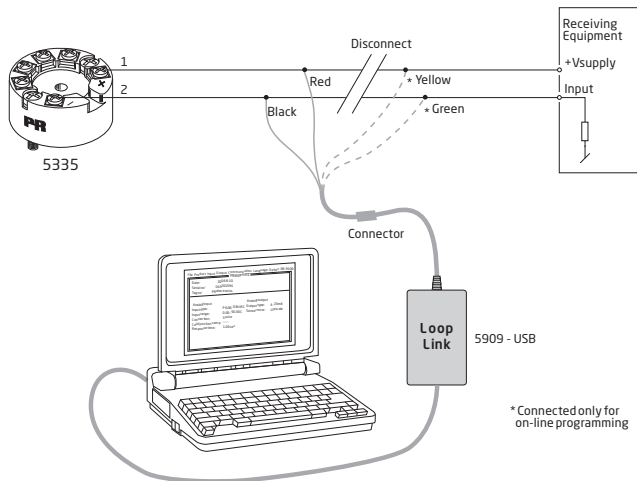
5335 can be configured in the following 3 ways:

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

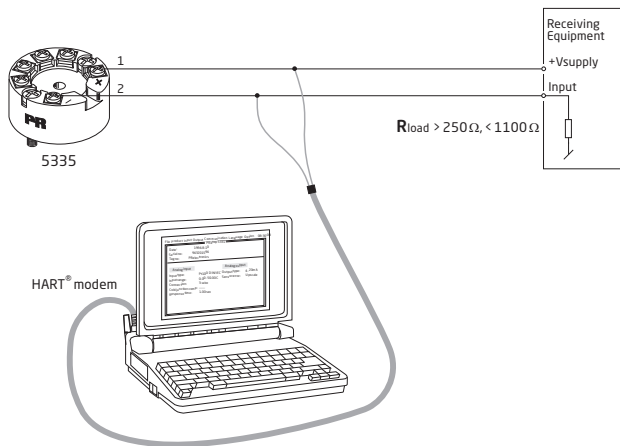
For programming please refer to the drawing below and the help functions in PReset.

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



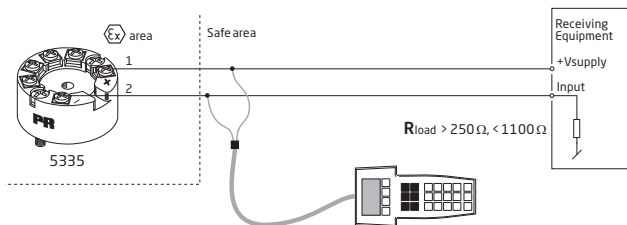
2: HART® modem

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



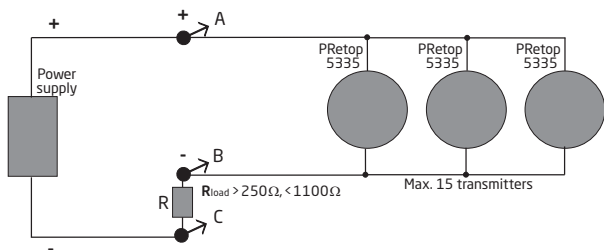
3: HART® communicator

For programming please refer to the drawing below. To gain access to product-specific 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 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.

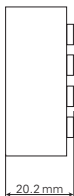
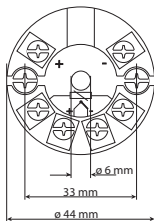


The outputs of max. 15 transmitters can be connected in parallel for a digital HART® communication on 2-wires.

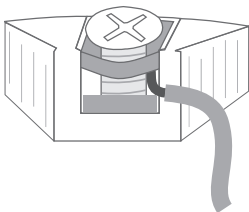
Before it is connected, each transmitter must be configured with a unique number from 1 to 15. If 2 transmitters are configured with the same number, both will be excluded. The transmitters must be programmed for multidrop mode (with a fixed output signal of 4 mA). Maximum current in the loop is therefore 60 mA. The communication is either by means of a HART® communicator or a HART® modem.

The PReset 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



Wires must be mounted between the metal plates.

APPENDIX

ATEX Installation Drawing - 5335A

ATEX Installation Drawing - 5335D

IECEX installation drawing - 5335A

IECEX installation drawing - 5335D

FM Installation Drawing - 5335D

CSA Installation Drawing - 5335D

INMETRO Instruções de Segurança - 5335D

ATEX Installation drawing 5335QA02



For safe installation of 5335A, 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 IIIC Dc

Standards

EN 60079-0:2012, EN 60079-11:2012, EN 60079-15:2010

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

Ex nA [ic]

Terminal: 1,2

Ex nA

Terminal: 1,2

Ex ic

Uo: 9.6 V

Io: 28 mA

Po: 67 mW

Lo: 45 mH

Co: 28 μF

U \leq 35 VDC

I = 4 - 20 mA

Ui = 35 VDC

Li = 10 μH

Ci = 1.0 nF

General installation instructions

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

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 gas atmosphere, the following instructions apply:

For "Ex ic" the transmitter must be installed in an enclosure providing a degree of protection of at least IP20 according to EN60529 that is suitable for the application and is correctly installed.

For "Ex nA" the transmitter must be installed in an enclosure providing a degree of protection of at least IP54 according to EN60529 that is suitable for the application and is correctly installed, 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 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 EN60529, 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 EN60529, 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.

IECEx Installation drawing 5335QI02



For safe installation of 5335A 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 IIIC Dc

Standards IEC 60079-0 : 2011, IEC 60079-11 : 2011, EN 60079-15 : 2010

T4: -40 ≤ Ta ≤ 85°C	Terminal: 3,4,5,6	Terminal: 1,2	Terminal: 1,2
T6: -40 ≤ Ta ≤ 60°C	Ex nA [ic]	Ex nA	Ex ic
	Uo: 9.6 V	U ≤ 35 VDC	Ui = 35 VDC
	Io: 28 mA	I = 4 - 20 mA	Li = 10 μH
	Po: 67 mW		Ci = 1.0 nF
	Lo: 45 mH		
	Co: 28 μF		

General installation instructions

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

For an ambient temperature ≥ 60°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 gas atmosphere, the following instructions apply:

For "Ex ic" the transmitter must be installed in an enclosure providing a degree of protection of at least IP20 according to IEC60529 that is suitable for the application and is correctly installed.

For "Ex nA" 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, 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 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 5335QA01



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 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 : 2012, EN 60079-11 : 2012, EN 60079-26 : 2007

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

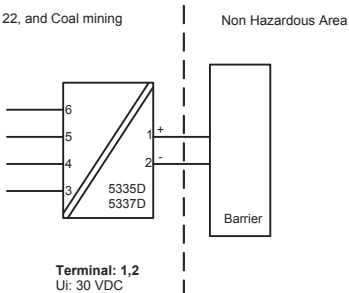
Uo: 9.6 VDC

Io: 28 mA

Po: 67 mW

Lo: 35 mH

Co: 3.5 μF



Terminal: 1,2

Ui: 30 VDC

Ii: 120 mA

Pi: 0.84 W

Li: 10 μH

Ci: 1.0 nF

Installation notes.

General installation instructions

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.

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 or painted metals electrostatic charging shall be avoided.

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

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.

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 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

If the enclosure is made of aluminum, 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 or painted metals electrostatic charging shall be avoided.

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 5335QI01



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.

IECEX Certificate IECEX KEM.10.0083X

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

Standards IEC60079-11:2011, IEC60079-0: 2011, IEC60079-26:2006

Hazardous area

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

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

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

Terminal: 3,4,5,6

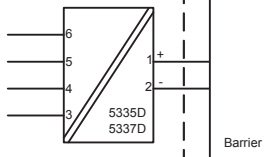
U_o: 9.6 VDC

I_o: 28 mA

P_o: 67 mW

L_o: 35 mH

C_o: 3.5 μF



Terminal: 1,2

U_i: 30 VDC

I_i: 120 mA

P_i: 0.84 W

L_i: 10 μH

C_i: 1.0 nF

Installation notes.

General installation instructions

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.

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 or painted metals electrostatic charging shall be avoided

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

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.

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 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

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 or painted metals electrostatic charging shall be avoided.

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 AH

Model 5331C, 5331D, 5333C, 5333D and 5343B

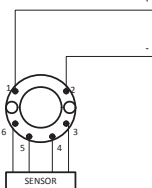
Hazardous (Classified) Location

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. 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
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:

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

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

Model 5335C, 5335D, 5336D, 5337D

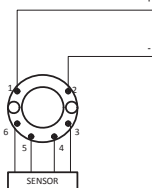
Hazardous (Classified) Location

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

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
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:

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

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_o or V_{OC} or V_i) and current (I_o or I_{SC} or I_i) 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_i and I_o, I_{SC} or I_i , and C_a and L_a for barriers are provided by the barrier manufacturer.

NI Field Circuit Parameters

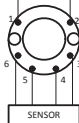
Model 5331C, 5331D, 5333C, 5333D, 5335C, 5335D, 5336D, 5337D and 5343B

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. Celsius
T6: -40 to +60 deg. Celsius

Terminal 1, 2
 V_{max} : 35 V
C: 1.0 nF
L: 10 uH

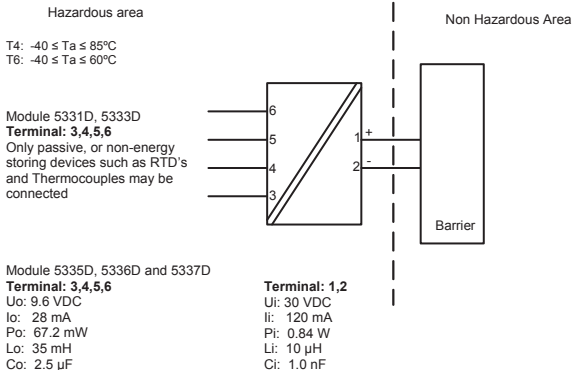


Non Hazardous Location

Associated Apparatus
or Barrier

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

CSA Installation drawing 533XQC03



CLASS 2258 04 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe Entity - For Hazardous Locations
Class I, Division 1, Groups A, B, C and D
Ex ia IIC, Ga

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
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).

Instruções de Segurança 5335QB01

5335D, 5337D: Instalação Ex:

ATENÇÃO - RISCO POTENCIAL DE CARGA ELETROSTÁTICA - VER INSTRUÇÕES

Para a instalação segura do transmissor 5335D, 5337D em áreas classificadas, deve-se observar o seguinte:

O módulo necessita ser instalado somente por pessoal qualificado e que tenham familiaridade com normas internacionais, diretivas e normalização aplicadas à estas áreas.

O ano de fabricação do instrumento pode ser obtido, observando-se os primeiros dois dígitos do seu número de série.

O circuito do sensor não está com isolamento galvânica total em relação ao circuito de entrada. Todavia a isolamento galvânica entre os circuitos é capaz de suportar teste de voltagem de 500 Vac durante 1 minuto.

O transmissor precisa ser montado em um invólucro com um grau de proteção pelo menos IP-20.

Em atmosferas explosivas compostas por misturas de ar / poeira:

O transmissor somente poderá ser instalado em uma atmosfera potencialmente explosiva composta por poeira combustível se estiver montado no interior de um invólucro metálico forma B de acordo com a norma DIN 43729 com um grau de proteção pelo menos IP-6X de acordo com a norma IEC 60529, que seja adequado para esta aplicação e corretamente instalado.

As entradas dos cabos e outras barreiras a serem utilizadas devem ser adequadas e corretamente instaladas.

Onde a temperatura ambiente for $\geq 60^{\circ}\text{C}$, devem ser utilizados cabos resistentes ao calor que resistam pelo menos 20K acima da temperatura ambiente.

Se o invólucro onde o transmissor está montado for feito de alumínio e instalado em Zona 0, 1 ou Zona 20,21 ou 22, este não deve conter mais do que 6% do seu peso total de magnésio e titânio.

Acessórios adicionais ao invólucro devem ser projetados e/ou instalados de tal modo que até mesmo eventos de rara incidência, fontes de ignição causadas por impactos e faíscas por fricção sejam excluídas.

Ex ia IIC T6...T4 Ga
Ex ia I Ma
Certificado:: NCC 12.0844 X

Temp. amb. máxima T1...T4 85°C
Temp. amb. máxima T5 e T6 45°C
Aplicável em Zona 0, 1, 2

Sinal de saída / alimentação , terminal 1 e 2:

Ui..... : 30 VDC
Ii : 120 mADC
Pi..... : 0,84 W
Li..... : 10 µH
Ci..... : 1,0 nF

Entrada do sensor, terminais 3, 4, 5 e 6:

Uo : 9,6 VDC
Io : 28 mA
Po..... : 67 mW
Lo : 35 mH
Co : 3,5 µF

5335A, 5337A: Instalação Ex:

ATENÇÃO - RISCO POTENCIAL DE CARGA ELETROSTÁTICA - VER INSTRUÇÕES

Montado no interior de um invólucro metálico forma B de acordo com a norma DIN 43729 com um grau de proteção pelo menos IP-54 de acordo com a norma IEC 60529, que seja adequado para esta aplicação e corretamente instalado.

Ex nA [ic] IIC T6...T4 Gc
Ex ic IIC T6...T4 Gc
Certificado:: NCC 12.0844 X

Temp. amb. máxima T1...T4 85°C
Temp. amb. máxima T5 e T6 60°C
Aplicável em Zona 2

Sinal de saída / alimentação , terminal 1 e 2:

Ui..... : 35 VDC

Entrada do sensor, terminais 3, 4, 5 e 6:

Uo : 9,6 VDC
Io : 28 mA
Po..... : 67 mW
Lo : 35 mH
Co : 3,5 µF



Displays

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



Ex interfaces

Interfaces for analog 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 devices in zone 20, 21 & 22.



Isolation

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



Temperature




























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



Universal

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



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QUALITY SYSTEM AND ENVIRONMENTAL MANAGEMENT SYSTEM
 DS/EN ISO 9001
 DS/EN ISO 14001

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