

PR
electronics



BURNS[®]
ENGINEERING

Burns T50 (PR 5350B)

5 3 5 0

**PROFIBUS PA / FOUNDATION
Fieldbus Transmitter**

No. 5350V112-UK
From ser. no. 1520188436



Segurança
INMETRO



Burns FORM-161220-A

PROFIBUS PA / FOUNDATION FIELDBUS TRANSMITTER

Burns T50 (PR 5350B)

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PROFIBUS PA / FOUNDATION FIELDBUS TRANSMITTER - 5350

- *PROFIBUS PA ver. 3.0*
- *FOUNDATION Fieldbus ver. ITK 4.6*
- *Automatic switch between protocols*
- *FISCO-certified*
- *Basic capability with F.F.*

Application

- Linearised temperature measurement with RTD or TC sensor.
- Difference, average or redundancy temperature measurement with RTD or TC sensor.
- Linear resistance, potentiometer and bipolar mV measurement.

Technical characteristics

- Bus transmitter with both PROFIBUS PA and FOUNDATION Fieldbus communication. A unique switch function ensures automatic shift between the two protocols.
- Set-up for PROFIBUS PA can be done via Siemens Simatic PDM, ABB Melody / Harmony and Metso DNA software and for FOUNDATION Fieldbus via Emerson DeltaV, Yokogawa CS 1000 / CS 3000, ABB Melody / Harmony and Honeywell Experion software.
- The simulation mode function can be activated by way of a magnet.
- Polarity-independent bus connection.
- 24 bit A/D converter ensures high resolution.
- PROFIBUS PA function blocks: 2 analogue.
- FOUNDATION Fieldbus function blocks: 2 analog and 1 PID.
- FOUNDATION Fieldbus capability: Basic or LAS.

Mounting / installation

- For DIN form B sensor head mounting. In non-hazardous areas the 5350 can be mounted on a DIN rail with the PR fitting type 8421.

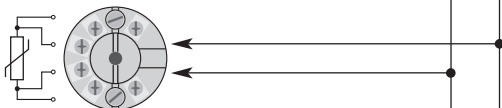
APPLICATIONS



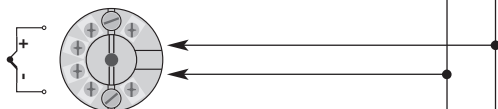
or



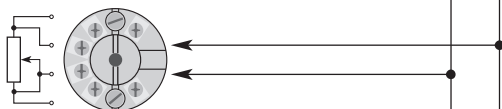
RTD to bus communication



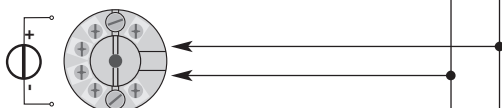
TC to bus communication



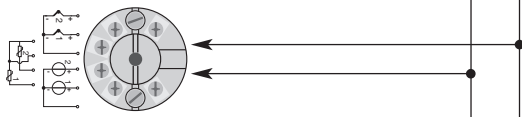
Resistance to bus communication



mV to bus communication



Difference, redundancy or average; RTD, TC or mV



Model T50:

- Head Mount Transmitter
- RTD & Thermocouple Capable
- PROFIBUS® PA ver. 3.0
- FOUNDATION® Fieldbus ver. ITK 4.60
- Hazardous Location Approvals:
 - ATEX, IECEx, FM, CSA, NEPSI, INMETRO

Electrical specifications

Specifications range:

-40°C to +85°C

Common specifications:

Supply voltage, DC

Standard.....	9.0...32 V
ATEX, IECEx, FM, CSA, INMETRO & NEPSI.....	9.0...30 V
In FISCO installations.....	9.0...17.5 V
Max. required power.....	< 350 mW
Max. current increase in the event of an error	< 7 mA
Isolation voltage, test.....	1.5 kVAC for 60 s
Isolation voltage, operation.....	50 VRMS / 75 VDC
Warm-up time.....	30 s
Signal / noise ratio	Min. 60 dB
Response time (programmable).....	1...60 s
Updating time	< 400 ms
Execution time, analogue input.....	< 50 ms
Signal dynamics, input.....	24 bit
Calibration temperature	20...28°C

Accuracy, the greater of general and basic values:

General values		
Input type	Absolute accuracy	Temperature coefficient
All	$\leq \pm 0.05\%$ of reading	$\leq \pm 0.002\%$ of reading / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
Pt100 and Pt1000	$\leq \pm 0.1^{\circ}\text{C}$	$\leq \pm 0.002^{\circ}\text{C} / ^{\circ}\text{C}$
Ni100	$\leq \pm 0.15^{\circ}\text{C}$	$\leq \pm 0.002^{\circ}\text{C} / ^{\circ}\text{C}$
Cu10	$\leq \pm 1.3^{\circ}\text{C}$	$\leq \pm 0.02^{\circ}\text{C} / ^{\circ}\text{C}$
Lin. R	$\leq \pm 0.05 \Omega$	$\leq \pm 0.002 \Omega / ^{\circ}\text{C}$
Volt	$\leq \pm 10 \mu\text{V}$	$\leq \pm 0.2 \mu\text{V} / ^{\circ}\text{C}$
TC type: E, J, K, L, N, T, U	$\leq \pm 0.5^{\circ}\text{C}$	$\leq \pm 0.010^{\circ}\text{C} / ^{\circ}\text{C}$
TC type: B, R, S, W3, W5	$\leq \pm 1^{\circ}\text{C}$	$\leq \pm 0.025^{\circ}\text{C} / ^{\circ}\text{C}$

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

Vibration.....	IEC 60068-2-6 : 2007
2...25 Hz.....	$\pm 1.6 \text{ mm}$
25...100 Hz.....	$\pm 4 \text{ g}$
Humidity.....	$< 95\% \text{ RH (non cond.)}$
Dimensions.....	$\varnothing 44 \times 20.2 \text{ mm}$
Protection degree (enclosure / terminal).....	IP68 / IP00
Weight.....	55 g

Electrical specifications, input:

RTD and linear resistance input:

RTD type	Min. value	Max. value	Standard
Pt25...Pt1000	-200°C	$+850^{\circ}\text{C}$	IEC60751/JIS C 1604
Ni25...Ni1000	-60°C	$+250^{\circ}\text{C}$	DIN 43760
Cu10...Cu1000	-50°C	$+200^{\circ}\text{C}$	$\alpha = 0.00427$
Lin. resistance	0Ω	$10 \text{ k}\Omega$	-
Potentiometer	0Ω	$100 \text{ k}\Omega$	-

Cable resistance per wire.....	50Ω
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..... < 15 Ω

TC input:

Type	Min. value	Max. value	Standard
B	+400°C	+1820°C	IEC584
E	-100°C	+1000°C	IEC584
J	-100°C	+1200°C	IEC584
K	-180°C	+1372°C	IEC584
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC584
R	-50°C	+1760°C	IEC584
S	-50°C	+1760°C	IEC584
T	-200°C	+400°C	IEC584
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
Ext. CJC	-40°C	+135°C	IEC6075

Cold junction compensation (CJC)..... < ± 0.5 °C

Sensor error detection..... Yes

Sensor error current:

when detecting..... Nom. 4 μ A

else 0 μ A

Short circuit detection..... < 3 mV

Voltage input:

Measurement range..... -800...+800 mV

Input resistance..... 10 M Ω

Output:

PROFIBUS PA connection:

PROFIBUS PA protocol Profile A&B, ver. 3.0

PROFIBUS PA protocol standard..... EN 50170 vol. 2

PROFIBUS PA address (at delivery)..... 126

PROFIBUS PA function blocks 2 analog

FOUNDATION Fieldbus connection:

FOUNDATION Fieldbus protocol FF protocol

FOUNDATION Fieldbus protocol standard..... FF design specifications

FOUNDATION Fieldbus capability Basic or LAS

FOUNDATION Fieldbus version ITK 4.6

FOUNDATION Fieldbus function blocks..... 2 analogue and 1 PID

Ex / I.S. approvals:

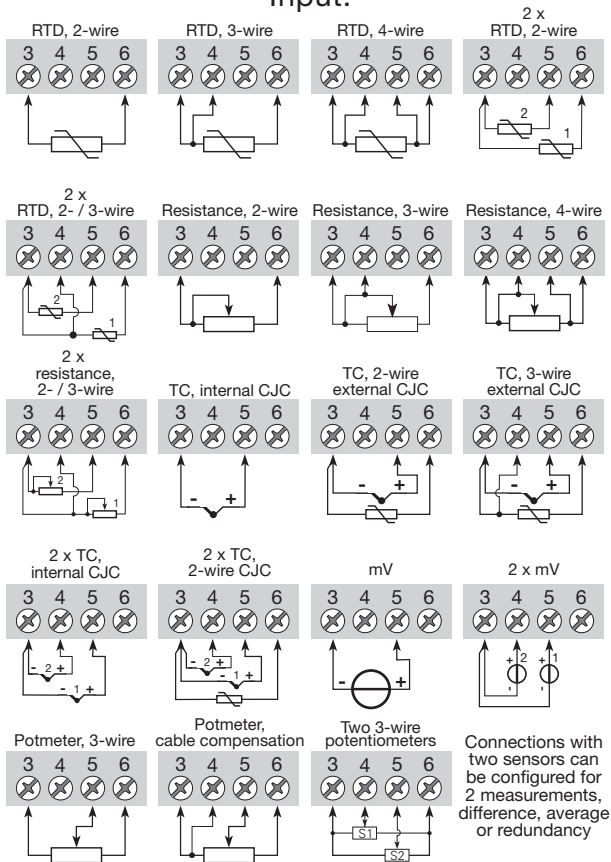
ATEX 2014/34/EU.....	KEMA 02ATEX1318 X
IECEX.....	IECEX BVS 12.0035 X
FM.....	FM-3015609
c CSA us.....	CSA-1418937
INMETRO.....	NCC 12.1009 X
NEPSI	
5350A.....	GYJ14.1100U
5350B.....	GYJ14.1101X
EAC Ex TR-CU 012/2011.....	RU C-DK.GB08.V.00410

Observed authority requirements:

EMC.....	2014/30/EU
RoHS.....	2011/65/EU
EAC.....	TR-CU 020/2011

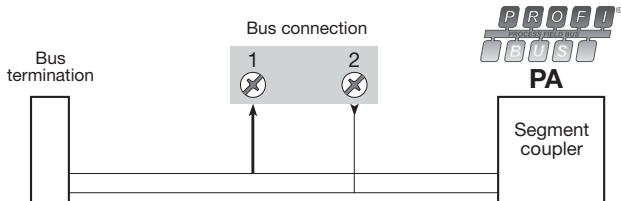
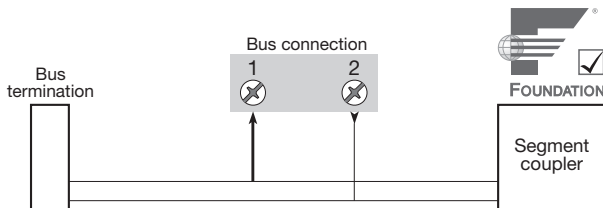
INPUT CONNECTIONS

Input:

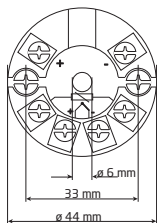


OUTPUT CONNECTIONS

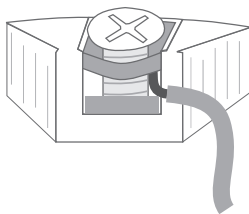
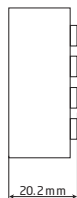
Output:



Mechanical specifications

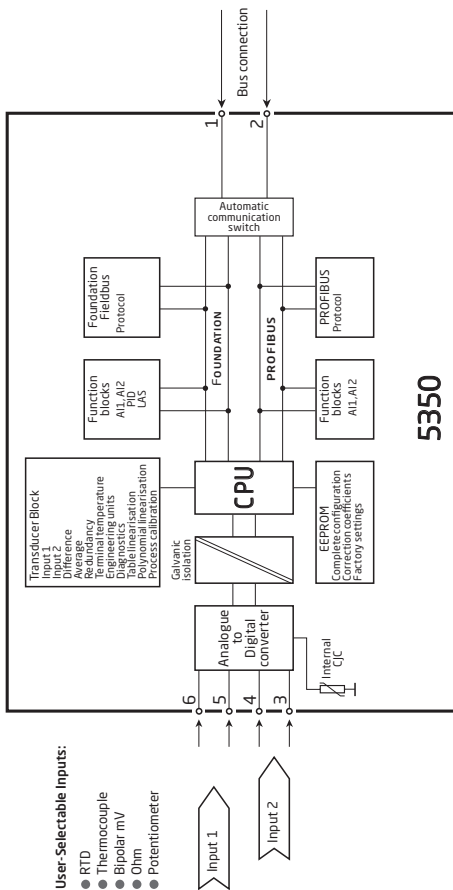


Mounting of sensor wires

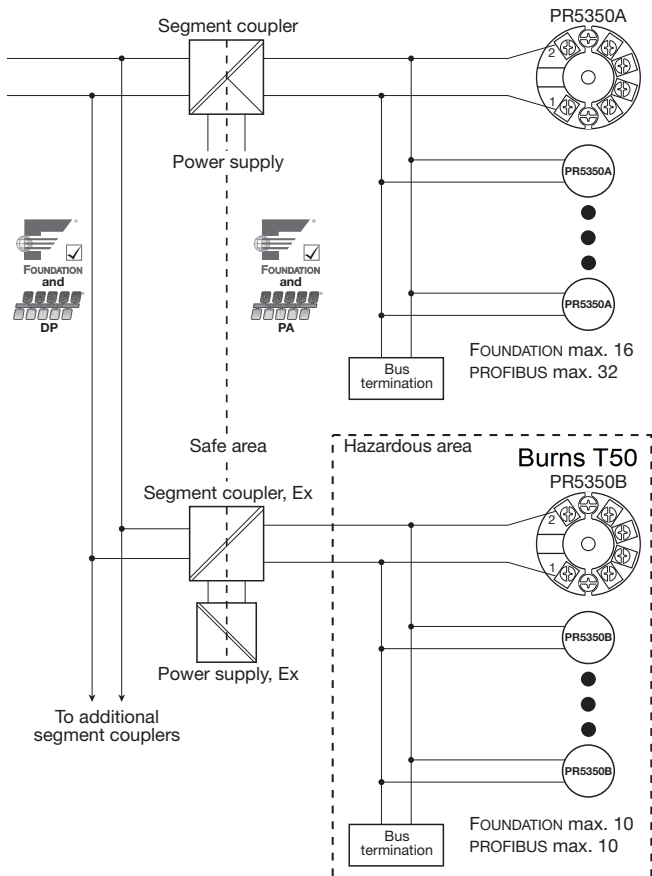


Wires must be mounted between the metal plates.

BLOCK DIAGRAM



BUS INSTALLATION



APPENDIX

ATEX Installation Drawing

FM & CSA Installation Drawing No. 5350QE01

NEPSI Installation Drawing

IECEX Installation Drawing

INMETRO Instruções de Segurança

ATEX Installation drawing 5350QA01-V3R0



5350B

For safe installation 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 02ATEX 1318X

Marking



II 1 G Ex ia IIC T6...T4 Ga
II 2 (1) G Ex ib [ia Ga] IIC T6..T4 Gb
II 1 D Ex ia IIC Da
I M 1 Ex ia I Ma

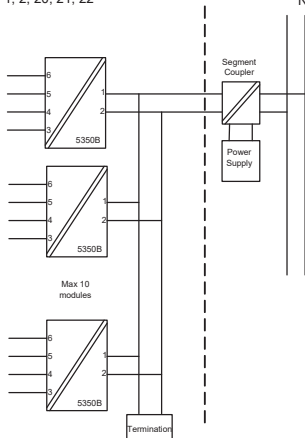
Standards

EN 60079-0 : 2012+A11, EN 60079-11 : 2012

Hazardous area

Zone 0, 1, 2, 20, 21, 22

Non Hazardous Area



Supply, terminal 1,2 for Ex ia IIC					Supply, terminal 1,2 for Ex ib IIC		
Unit	Barrier where $P_o < 0.84 \text{ W}$	Barrier where $P_o < 1.3 \text{ W}$	Suitable for FISCO systems	Suitable for FISCO systems	Unit	Barrier where $P_o < 5.32 \text{ W}$	FISCO segment coupler
U_i	30 VDC	30 VDC	17.5 VDC	15 VDC	U_i	30 VDC	17.5 VDC
I_i	120 mA DC	300 mA DC	250 mA DC	900 mA DC	I_i	250 mA DC	any
P_i	0.84 W	1.3 W	2.0 W	5.32 W	P_i	5.32 W	any
L_i	1 μH	1 μH	1 μH	1 μH	L_i	1 μH	1 μH
C_i	2 nF	2 nF	2 nF	2 nF	C_i	2 nF	2 nF
T1..T4	$T_{amb.} < 85^\circ\text{C}$	$T_{amb.} < 75^\circ\text{C}$	$T_{amb.} < 85^\circ\text{C}$	$T_{amb.} < 85^\circ\text{C}$	T1..T4	$T_{amb.} < 85^\circ\text{C}$	$T_{amb.} < 85^\circ\text{C}$
T5	$T_{amb.} < 70^\circ\text{C}$	$T_{amb.} < 65^\circ\text{C}$	$T_{amb.} < 60^\circ\text{C}$	$T_{amb.} < 60^\circ\text{C}$	T5	$T_{amb.} < 75^\circ\text{C}$	$T_{amb.} < 75^\circ\text{C}$
T6	$T_{amb.} < 60^\circ\text{C}$	$T_{amb.} < 45^\circ\text{C}$	$T_{amb.} < 45^\circ\text{C}$	$T_{amb.} < 45^\circ\text{C}$	T6	$T_{amb.} < 60^\circ\text{C}$	$T_{amb.} < 60^\circ\text{C}$

Sensor input, terminal 3,4,5 and 6

U_o	: 5.7 VDC
I_o	: 8.4 mA
P_o	: 12 mW
L_o	: 200 mH
C_o	: 40 μF

General installation instructions

The Sensor Circuit is not infallibly galvanic isolated from the Fieldbus circuit. However, the galvanic isolation is capable of withstanding a test voltage of 500Vac during 1 minute.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment of category 1G, 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 enclosure is made of non-metallic material or of metal having a paint layer thicker of more than 0.2mm (group IIC) or 2mm for (group IIB, IIA, I), electrostatic charging shall be avoided.

For installation in a potential explosive gas atmosphere:

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

For installation in a potential explosive dust atmosphere:

The transmitter shall be mounted in an enclosure form B according to DIN43729 or equivalent that provides a degree of protection of at least IP6X according to EN/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. The surface temperature of the enclosure is equal to the ambient temperature +20 K.

If the enclosure is made of non-metallic material or of metal having a paint layer, electrostatic charging shall be avoided.

For installation in mines:

The transmitter shall be mounted in a steel or non-metallic enclosure that provides a degree of protection of at least IP6X according to EN/IEC 60529, and 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. If the enclosure is made of non-metallic materials or painted metals electrostatic charging shall be avoided.

- 5350A:** For safe installation 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.

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

T4: $-40 \leq T_a \leq 85^\circ\text{C}$
 T5: $-40 \leq T_a \leq 75^\circ\text{C}$
 T6: $-40 \leq T_a \leq 60^\circ\text{C}$

Standards EN 60079-0 : 2012+A11, EN 60079-11 : 2012, EN 60079-15 : 2010

Terminal: 3,4,5,6	Terminal: 1,2 Ex nA	Terminal: 1,2 Ex ic	Terminal: 1,2 FISCO
Uo: 5.7 V	U ≤ 32 VDC	Ui = 32 VDC	Ui = 17.5 VDC
Io: 8.4 mA		Li = 1 μH	Li = 1 μH
Po: 12 mW		Ci = 2.0 nF	Ci = 2.0 nF
Lo: 200 mH			
Co: 40 μF			

General installation instructions:

The Sensor Circuit is not infallibly galvanic isolated from the Fieldbus circuit. However, the galvanic isolation is capable of withstanding a test voltage of 500Vac during 1 minute.
 If the enclosure is made of non-metallic material or of metal having a paint layer thicker of more than 0.2mm (group IIC) or 2mm for (group IIB, IIA), electrostatic charging shall be avoided.
 For an ambient temperature above 60°C, heat resistant cables shall be used with a rating of at least 20K above the ambient temperature.

For installation in a potential explosive gas atmosphere:

For Ex ic installation, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to EN/IEC 60529 and that is suitable for the application and correctly installed.
 For Ex nA installation the transmitter shall be installed in an enclosure providing a degree of protection of at least IP54, according to EN/IEC 50529 that is suitable for the application and correctly installed, e.g. an enclosure with protection Ex n or Ex e. Cable entry devices and blanking elements shall fulfill the same requirements.

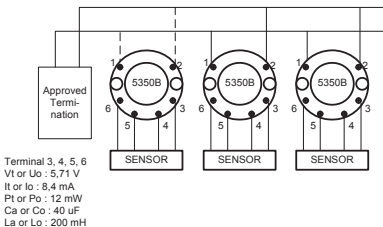
For installation in a potential explosive dust atmosphere:

For Ex ic installation interfacing intrinsically safe signal "ic" (e.g. a passive device), the transmitter shall be mounted in a metal enclosure form B according to DIN 43729 or equivalent, that provides a degree of protection of at least IP6X according to EN/IEC 60529, that is suitable for the application. Cable entry devices and blanking elements shall fulfill the same requirements.
 For non intrinsically safe installation the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP6X according to EN/IEC 60529, and in conformance with type of protection EX t that is suitable for the application and correctly installed. Cable entry devices and blanking elements shall fulfill the same requirements.
 If the enclosure is made of non-metallic material or of metal having a paint layer, electrostatic charging shall be avoided.
 The surface temperature of the enclosure is equal to the ambient temperature +20 K.

FM/CSA Installation drawing

Hazardous (Classified) Location

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



Unclassified Location

Associated Apparatus
Barrier or
FISCO Supply
with
entity Parameters:

UM ≤ 250V
Voc or Uo ≤ Vmax or Ui
Isc or Io ≤ Imax or Ii
Po ≤ Pi
Ca or Co ≥ Ci + Ccable
La or Lo ≥ Li + Lcable

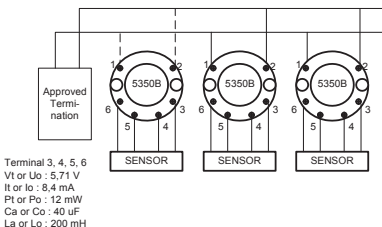
This device must not be
connected to any
associated apparatus
which uses or generates
more than 250 VRMS

Terminal 1,2				
Class I, Zone 0, Ex ia IIC, Entity / FISCO				
IS, Class I, Division 1, Group A, B, C, D Entity / FISCO				
Barrier type:	Linear barrier	Trapezoid barrier	Suitable for FISCO systems	Suitable for FISCO systems
T1..T4:	Ta ≤ +85°C	Ta ≤ +75°C	Ta ≤ +85°C	Ta ≤ +85°C
T5:	Ta ≤ +70°C	Ta ≤ +65°C	Ta ≤ +60°C	Ta ≤ +60°C
T6:	Ta ≤ +65°C	Ta ≤ +60°C	Ta ≤ +60°C	Ta ≤ +60°C
Vmax or Ui	30 V	30 V	17.5 V	15 V
Imax or Ii	120 mA	300 mA	250 mA	900 mA
Pi	0.84 W	1.3 W	2.0 W	5.32W
CI	2.0 nF	2.0 nF	2.0 nF	2.0 nF
Li	1 μH	1 μH	1 μH	1 μH

See Installation notes.

Hazardous (Classified) Location

Class I, Division 2, Groups, A, B, C, D
OR
Class I, Zone 1, IIC



Terminal 3, 4, 5, 6
Vt or Uo : 5,71 V
It or Io : 8,4 mA
Pt or Po : 12 mW
Ca or Co : 40 uF
La or Lo : 200 mH

Unclassified Location

Associated Apparatus
Barrier with
entity Parameters:

UM ≤ 250V
Voc or Uo ≤ Vmax or Ui
Isc or Io ≤ Imax or Ii
Pi ≤ Pj
Ca or Co ≥ Ci + Ccable
La or Lo ≥ Li + Lcable
or
FISCO Supply

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

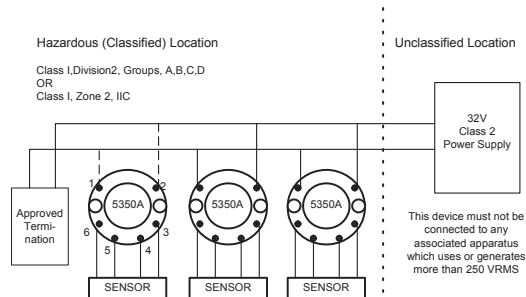
Entity Parameters		
Terminal 1, 2		
Class I, Zone 1, Ex ib IIC Entity / FISCO		
Barrier type:	Rectangular barrier	FISCO Segment coupler
T1..T4:	Ta ≤ +85°C	Ta ≤ +85°C
T5:	Ta ≤ +75°C	Ta ≤ +75°C
T6:	Ta ≤ +60°C	Ta ≤ +60°C
Vmax / Ui	30 V	17.5 V
Imax or Ii	250 mA	any
Pi	5.32 W	any
Ci	2.0 nF	2.0 nF
Li	1 μH	1 μH

See

Installation notes.

Nonincendive Field Wiring parameters		
Terminal 1, 2		
NI, Class I, Division 2, Group A, B, C, D NIFW/ FNICO		
T1..T4:	Ta ≤ +85°C	Ta ≤ +85°C
T5:	Ta ≤ +75°C	Ta ≤ +75°C
T6:	Ta ≤ +60°C	Ta ≤ +60°C
Vmax / Ui	30 V	17.5 V
Pi	5.32 W	any
Ci	2.0 nF	2.0 nF
Li	1 μH	1 μH

For a current-controlled circuit the parameter Imax is not required and is not aligned with the parameter Isc or It of the barrier or associated nonincendive field wiring apparatus.



Terminal 3, 4, 5, 6

Vt or Uo : 5.71 V

It or Io : 8.4 mA

Pt or Po : 12 mW

Ca or Co : 40 μ F

La or Lo : 200 mH

Terminal 1,2

Ci : 2.0 nF

Li : 1 μ H

T1..T4	$-40^{\circ}\text{C} \leq T_a \leq +85^{\circ}\text{C}$
T5	$-40^{\circ}\text{C} \leq T_a \leq +75^{\circ}\text{C}$
T6	$-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

See installation notes:

Installation notes:**FM / CSA:**

For installation in the US the 5350 shall be installed according to the National Electrical Code (ANSI-NFPA 70).

For installation in Canada the transmitter shall be installed in a suitable enclosure to meet installation codes stipulated in the Canadian Electrical Code (CEC).

The entity concept:

Equipment that is FM / CSA-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 / CSA, provided that the agency's criteria are met. The combination is 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.

FISCO/FNICO rules:

The FISCO Concept allows the interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criterion for such interconnection is that the voltage (V_{max}), the current (I_{max}) and the power (P_i) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (U_o , V_{oc} , V_t), the current (I_o , I_{sc} , I_t) and the power (P_o) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (C_i) and inductance (L_i) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to:

FISCO: 5 nF and 10 μ H.

FNICO: 5 nF and 20 μ H

The Nonincendive Field Wiring concept allows the interconnection of nonincendive field wiring apparatus using any of the wiring methods permitted for unclassified locations.
 $V_{max} \geq V_{oc}$ or V_t , $C_a \geq C_i + C_{cable}$, $L_a \geq L_i + L_{cable}$ "

The Nonincendive Field Wiring concept allows the interconnection of FM-approved nonincendive devices with FNICO parameters not specifically examined in combination as a system when: U_o or V_{oc} or $V_t \leq V_{max}$, $P_o \leq P_i$

In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed voltage (U_o , V_{oc} , V_t) of the associated apparatus used to supply the bus must be limited to the range of 14V d.c. to 24V d.c. All other equipment connected to the bus cable has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50 μ A for each connected device. Separately powered equipment needs a galvanic isolation to insure that the intrinsically safe Fieldbus circuit remains passive.

The cable used to interconnect the devices needs to comply with the following parameters:

Loop resistance R' : 15 ...150 Ω /Km
Inductance per unit length L' : 0.4 ...1mH/km
Capacitance per unit length C' : 80 ...200 nF/km
 $C' = C' \text{ line/line} + 0.5 C' \text{ line/screen}$, if both lines are floating
or
 $C' = C' \text{ line/line} + C' \text{ line/screen}$, if the screen is connected to one line
Length of spur Cable: max. 30 m
Length of trunk cable: max. 1 Km
Length of splice: max. 1 m

Terminators

At each end of the trunk cable an approved line terminator with the following parameters is suitable:

$R = 90 \dots 100 \Omega$
 $C = 0 \dots 2.2 \mu\text{F}$.

System evaluation

The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to I.S. or N.I. reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not to be considered and will not impair the intrinsic safety or nonincendive safety of the installation as applicable. The sensor circuit is not infallibly galvanically isolated from the Fieldbus input circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500 Vac during 1 minute.

Nonincendive Field Wiring Concept:

The Nonincendive Field Wiring concept allows for the interconnection of nonincendive field wiring apparatus using any of the wiring methods permitted for unclassified locations.

$V_{max} \geq V_{oc}$ or V_t , $C_a \geq C_i + C_{cable}$, $L_a \geq L_i + L_{cable}$ "

Installation Notes For FISCO and Entity Concepts:

1. The Intrinsic Safety Entity concept allows the interconnection of FM / UL / CSA-approved intrinsically safe devices (Div. 1 or Zone 0 or Zone1), with entity parameters not specifically examined in combination as a system when: U_o or V_{oc} or $V_t \leq V_{max}$, I_o or I_{sc} or $I_t \leq I_{max}$, $P_o \leq P_i$.
 C_a or $C_o \geq \Sigma C_i + \Sigma C_{cable}$, L_a or $L_o \geq \Sigma L_i + \Sigma L_{cable}$, $P_o \leq P_i$.
2. The Intrinsic Safety FISCO concept allows the interconnection of FM / UL / CSA-approved intrinsically safe devices with FISCO parameters not specifically examined in combination as a system when:
 U_o or V_{oc} or $V_t \leq V_{max}$, I_o or I_{sc} or $I_t \leq I_{max}$, $P_o \leq P_i$.
3. Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
4. Intrinsically Safe Installation should be in accordance with ANSI/ISA RP12.6.01 (except chapter 5 for FISCO Installations) "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code® (ANSI/NFPA 70) Sections 504 and 505.
5. The configuration of associated Apparatus must be FM Approvals or UL / CSA Approved under the associated concept.
6. Associated Apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. The 5350B is approved for Class I, Zone 0, applications. If connecting AEx[ib] associated Apparatus or AEx ib I.S. Apparatus to the 5350B the I.S. circuit is only suitable for Class I, Zone 1, or Class I, Zone 2, and is not suitable for Class I, Zone 0 or Class I, Division 1, Hazardous (Classified) Locations".
8. No revision to drawing without prior FM / UL / CSA Approval.
9. Simple Apparatus is defined as a device that neither generates nor stores more than 1.5 V, 0.1 A or 25 mW.
10. The termination must be NRTL-approved, and the resistor must be infallible.
11. **Warning:**
For applications in Div. 2 or Zone 2 (Classified Locations) Explosion hazard: Except for nonincendive field circuits, do not disconnect the apparatus unless the area is known to be non hazardous.
12. **Warning:**
Substitution of Components May Impair Safety.

NEPSI Installation drawing

Transmitter with Bus technology of Series 5350A manufactured by PR electronics A/S via the test made by NEPSI (National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation) have been proved that they are fulfilling the General Requirements according to Article I, GB3836.1-2010 "Electrical equipment using in the Explosive gas Environment" and the specified requirements for "n" series in Article IX, GB3836.8-2003. The symbol of explosive protection applied should be Ex nA(L) II C T4~T6 while the Certificate No. is GYJ14.1100U.

Firstly, Note for the use of the products

- The Symbol U applied after the Cert. No., indicates that this transmitter cannot be applied in explosive environment of danget until the Protection Grade of the box where the transmitter will later on be placed is not lower than IP54 (GB4208), and has been approved by the National Authorized Inspection Body.
- The rated Voltage for the transmitter should be 32Vd.c. Proper measures should be applied to protect the working voltage from instantaneously jumping up to 40% of the rated Voltage caused by disturbance.
- The relationship between the temperature Code and ambient temperature is indicated as follows:

Temperature Code	Ambient Temperature
T4	-40~+85
T5	-40~+75
T6	-40~+60

- the parameters of the transmitter output which will be connected with the inputs of the Sensor (X3, X4, X5, X6) are as follows:
 $U_o=5.7V$ $I_o=8.4V$ $P_o=12mW$ $C_o=40 \mu F$ $I_O=200 mH$
- Only when the transmitter is combined with other power-restraint devices which have also been tested and approved by the National Authorized Inspection Body and met the requirements of GB3836.1-2000 and GB3836.8-2000 can the explosion protection system be applied in the explosive environment.
 $U_o < U_i$ $I_o < I_i$ $P_o \leq P_i$ $C_o \leq C_c + C_i$ $L_o \geq L_c + L_i$
 Note: Cc, Lc indicated the parameters of distributed electric capacity of connecting cable.
 U_i, I_i, P_i indicated the parameters of the output of other power-restraint devices; C_i, L_i indicated the maximum of the external parameter of the power-restraint devices.
- Users are not allowed to replace the inner electrical parts with permission.
- The installation, implementation and maintenance of the transmitter should strictly conform to the Regulation of "Design Code for electricity Equipment used in explosive and flammable environment" in GB50058-1992 and "installation of Electrical Equipment in Dangerous Environment" the Article 15, Electrical Equipment of explosive gas Environment of GB3836.15-2000.

Transmitter with Bus technology of Series 5350B manufactured by PR electronics A/S via the test made by NEPSI (National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation) have been proved that they are fulfilling the General Requirements according to, GB 3836.1-2010, GB3836.4-2010, GB3836.20-2010. The symbol of explosive protection are EX ia IIC T4~T6 or Ex ib(ia) IIC T4~T6 while the Certificate No. is GYJ14.1101X.

Note for the use of transmitter:

1. The Symbol "X" applied after the Cert. No., indicates that this transmitter cannot be applied in explosive environment of danger until the Protection Grade of the box where the transmitter will later on be placed is not lower than IP20 (GB4208), and has been approved by the National Authorized Inspection Body. The metallic case must accord to item 8, GB3836.1-2010; the nonmetallic case must accord to item 7.3, GB3836.1-2010.

2. The relationship of the explosive protection ingress, the temperature Code, ambient temperature and max. output parameter is indicated as follows:

	Ex ia IIC			Ex ib(ia) II C
T4:	-40°C~+85°C	-40°C~+75°C	-40°C~+85°C	-40°C~+85°C
T5	-40°C~+70°C	-40°C~+65°C	-40°C~+60°C	-40°C~+75°C
T6:	-40°C~+60°C	-40°C~+45°C	-40°C~+45°C	-40°C~+60°C
Ui	30V	30V	17.5V	30V
Li	120mA	300mA	250mA	250mA
Pi	0.84W	1.3W	2.0W	5.32W
Ci= 2nF, Li=1μH				

IECEx Installation drawing



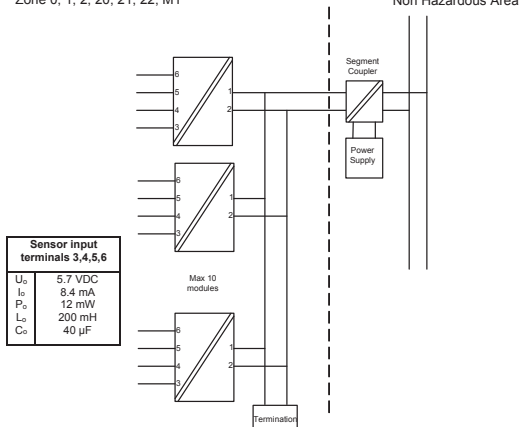
For safe installation of 5350 the following must be observed. The module shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.

IECEx Certificate	BVS 12.0035X
Marking	Ex ia IIC T6..T4 Ga Ex ib [Ia Ga] IIC T6..T4 Gb Ex ia IIIC T135°C Da Ex ia I Ma Ex nA [Ic] IIC T6..T4 Gc Ex ic IIC T6..T4 Gc
Standards	IEC60079-11:2011, IEC60079-0: 2011, IEC60079-15: 2010

Hazardous area
Zone 0, 1, 2, 20, 21, 22, M1

Non Hazardous Area



Supply, terminal 1,2 Ex ia IIC T6..T4 Ga or Ex ia IIC Da or Ex ia I Ma					Supply, terminal 1,2 Ex ib [Ia Ga] IIC T6..T4 Gb		
Unit	Barrier where P _o < 0.84 W	Barrier where P _o < 1.3 W	Suitable for FISCO systems	Suitable for FISCO systems	Unit	Barrier where P _o < 5.32 W	FISCO segment coupler
U _i	30 VDC	30 VDC	17.5 VDC	15 VDC	U _i	30 VDC	17.5 VDC
I _i	120 mADC	300 mADC	250 mADC	900 mADC	I _i	250 mADC	any
P _i	0.84 W	1.3 W	2.0 W	5.32 W	P _i	5.32 W	any
L _i	1 µH	1 µH	1 µH	1 µH	L _i	1 µH	1 µH
C _i	2 nF	2 nF	2 nF	2 nF	C _i	2 nF	2 nF
T1..T4	T _{amb.} < 85°C	T _{amb.} < 75°C	T _{amb.} < 85°C	T _{amb.} < 85°C	T1..T4	T _{amb.} < 85°C	T _{amb.} < 85°C
T5	T _{amb.} < 70°C	T _{amb.} < 65°C	T _{amb.} < 60°C	T _{amb.} < 60°C	T5	T _{amb.} < 75°C	T _{amb.} < 75°C
T6	T _{amb.} < 60°C	T _{amb.} < 45°C	T _{amb.} < 45°C	T _{amb.} < 45°C	T6	T _{amb.} < 60°C	T _{amb.} < 60°C

Supply, terminal 1,2 Ex nA [Ic] IIC T6..T4 Gc or Ex Ic IIC T6..T4 Gc	
U _i	Max 32 VDC
L _i	1 µH
C _i	2 nF
T1..T4	T _{amb.} < 85°C
T5	T _{amb.} < 75°C
T6	T _{amb.} < 60°C

Installation notes.

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

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 requiring EPL Ga or EPL Gb, the following instructions apply:

The transmitter shall be mounted in an enclosure that is providing a degree of protection of at least IP54 according to IEC 60529 that is suitable for the application and correctly installed.

For installation in a potentially explosive dust atmosphere requiring EPL Da or EPL Db, the following instructions apply:

The transmitter shall be mounted in an Form B enclosure according to DIN 43729, that is providing a degree of protection of at least IP6X according to IEC 60079-0 and IEC 60079-31' Equipment dust ignition protection by enclosure ID* 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. Maximum surface temperature with a 5 mm layer of dust is T 135°C.

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

For installation in a potentially explosive gas atmosphere requiring EPL Gc the following instructions apply:

The transmitter shall be mounted in an enclosure according to IEC 60079-15, that is suitable for the application and correctly installed.

INMETRO Instruções de Segurança.

Dados Ex:

Ex ia IIC T6...T4 Ga
Ex ib [ia Ga] IIC T6...T4 Gb
Ex ia IIIc T 135 °C Da
Ex ia I Ma
Ex nA [ic] T6 ... T4 Gc
Ex ic IIC T6...T4 Gc

Certificado:: NCC 12.1009 X

Instalação Ex:

Para a instalação segura do transmissor 5350B 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 500Vac 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.

Sinal de saída / alimentação , terminal 1 e 2				
Ex ia IIC T6 ... T4 Ga FISCO				
Temp. ambiente max. depende de Po da barreira conectada.				
Unidade	Barreira onde $P_o < 0.85 W$	Barreira onde $P_o < 1.3 W$	Adequado parasistemas FISCO	Adequado parasistemas FISCO
U_i	30 VDC	30 VDC	17.5 VDC	15 VDC
I_i	120 mADC	300 mADC	250 mADC	900 mADC
P_i	0.84 W	1.3 W	2.0 W	5.32 W
L_i	1 μH	1 μH	1 μH	1 μH
C_i	2 nF	2 nF	2 nF	2 nF
T1..T4	$T_{amb.} < 85^\circ C$	$T_{amb.} < 75^\circ C$	$T_{amb.} < 85^\circ C$	$T_{amb.} < 85^\circ C$
T5	$T_{amb.} < 70^\circ C$	$T_{amb.} < 65^\circ C$	$T_{amb.} < 60^\circ C$	$T_{amb.} < 60^\circ C$
T6	$T_{amb.} < 60^\circ C$	$T_{amb.} < 45^\circ C$	$T_{amb.} < 45^\circ C$	$T_{amb.} < 45^\circ C$
Group I	$T_{amb.} < 85^\circ C$	$T_{amb.} < 85^\circ C$	$T_{amb.} < 85^\circ C$	$T_{amb.} < 85^\circ C$

Sinal de saída / alimentação , terminal 1 e 2		
Ex ib [ia Ga] IIC T6 ... T4 Gb FISCO		
Temp. ambiente max. depende de Po da barreira conectada.		
Unidade	Barrier where $P_o < 5.32 W$	FISCO segment coupler
U_i	30 VDC	17.5 VDC
I_i	250 mADC	Qualquer
P_i	5.32 W	Qualquer
L_i	1 μH	1 μH
C_i	2 nF	2 nF
T1..T4	$T_{amb.} < 85^\circ C$	$T_{amb.} < 85^\circ C$
T5	$T_{amb.} < 75^\circ C$	$T_{amb.} < 75^\circ C$
T6	$T_{amb.} < 60^\circ C$	$T_{amb.} < 60^\circ C$
Group I	$T_{amb.} < 85^\circ C$	$T_{amb.} < 85^\circ C$

Sinal de saída / alimentação , terminal 1 e 2		
Ex ic IIC T6 ... T4 Gc FISCO		
Temp. ambiente max. depende de Po da barreira conectada.		
Unidade		
U_i	32 VDC	
I_i	Qualquer	
P_i	Qualquer	
L_i	1 μH	
C_i	2 nF	
T1..T4	$T_{amb.} < 85^\circ C$	
T5	$T_{amb.} < 75^\circ C$	
T6	$T_{amb.} < 60^\circ C$	
Group I	$T_{amb.} < 85^\circ C$	

Entrada do sensor, terminais 3, 4, 5 e 6:
 U_o : 5,7 VDC
 I_o : 8,4 mA
 P_o : 12 mW
 L_o : 200 mH
 C_o : 40 μF

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