

Document No.: 244415-B003-C002-F001

Rev. 1

Presented Client

Adress



Project No.:

Description: Intrinsically Safe Calculation

Intrinsically Safe Calculation

Report on the Calculation of Intrinsically Safe Circuits, Including Certificates Underlying the Calculations.

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Foreword

This document focuses on the intrinsically safe installation, designed to limit circuit energy to prevent ignition from sparking or heating. It includes calculations for Intrinsically Safe circuits, ensuring energy limitation and establishing the relationship between the barrier, cable, and field equipment. The report also verifies this relationship and calculates the maximum permissible cable length without risking sparking.

Terms and definitions

U_o	Barrier max voltage output
I_o	Barrier max current output
P_o	Barrier max power output
C_o	Barrier max capacitance (external connection)
L_o	Barrier max inductance (external connection)
U_i	Field equipment max permissible input voltage
I_i	Field equipment max permissible input current
P_i	Field equipment max permissible input power
C_i	Field equipment max internal capacitance
L_i	Field equipment max internal inductance
$C_{i(cab)}$	Cable capacitance (full length)
$L_{i(cab)}$	Cable inductance (full length)
$C_{i(tot)}$	Field total capacitance (Field equipment + cable)
$L_{i(tot)}$	Field total inductance (Field equipment + cable)

Intrinsically Safe circuits calculation

Standard: IEC 60079-14:2024
Gas Group: IIC

Barrier EX data:

Manufacturer: Endress +Hauser 27,3 U_o [V]
Product: Type RN22 87,6 I_o [mA]
Certificate: EPS 19 ATEX 1 231 X, Revision 1 597,0 P_o [mW]
Loop description: 2-Wire (active) 311,6 R_o [Ω]
88,0 C_o [nF]
5,2 L_o [mH]

Cable data: Max cable length : 430 m

Manufacturer: according to IEC 60079-14:2024, 6.2.2.2
Product: Standard shielded cable.

Capacitive: 200 nF/km, pF/m
Inductive: 1 mH/km, μ H/m

Field equipment Ex data:

Manufacturer: PR electronics A/S 30,0 U_i [V]
Product: TYPE 7501A.... 2 120,0 I_i [mA]
Certificate: DEKRA 15ATEX0058 X, issue no. 5 840,0 P_i [mW]
Loop description: 2-wire TC temperature Transmitter 250,0 R_i [Ω]
2,0 C_i [nF]
0,0 L_i [mH]

Conclusion:

Safe area	Cable	Hazardous areas (EX)		
Barrier		Field equipment		
27,3 U_o [V]		30,0 U_i [V]	$U_o \leq U_i$	Ok
87,6 I_o [mA]		120,0 I_i [mA]	$I_o \leq I_i$	Ok
597,0 P_o [mW]		840,0 P_i [mW]	$P_o \leq P_i$	Ok
88,0 C_o [nF]	86,0 $C_{i(cab)}$ [nF]	2,0 C_i [nF]	Field (tot) $88,0 C_{i(tot)}$ [nF]	$C_o \geq C_{i(cab)} + C_{i(F.eq)}$ Ok
5,2 L_o [mH]	0,4 $L_{i(cab)}$ [mH]	0,0 L_i [mH]	0,4 $L_{i(tot)}$ [mH]	$L_o \geq L_{i(cab)} + L_{i(F.eq)}$ Ok

The inductive and capacitance relationship between Barrier and the Field equipment.

Barrier	Field equipment	
88,0 C_o [nF]	2,0 C_i [nF]	2,27 %
5,2 L_o [mH]	0,0 L_i [mH]	0,00 %

The 1% rule is not relevant in this situation.

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Rev.	1	Issued for construction



EU - Type Examination Certificate

(1)

(2) Equipment and protective systems intended for use in potentially explosive atmospheres – **Directive 2014/34/EU**

(3) EU - Type Examination Certificate Number

EPS 19 ATEX 1 231 X

Revision 1

(4) Equipment: active barrier, type RN22 and RN42

(5) Manufacturer: Endress+Hauser Wetzler GmbH + Co. KG

(6) Address: Obere Wank 1
87484 Nesselwang
Germany

(7) This equipment and any acceptable variation thereto are specified in the annex to this certificate and the documentation therein referred to.

(8) Bureau Veritas Consumer Products Services Germany GmbH, notified body No. 2004 in accordance with Article 21 given in the Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II of the Directive. The examination and test results are recorded in the confidential documentation under the reference number 19TH0372.

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN IEC 60079-0:2018

EN 60079-11:2012

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the annex to this certificate.

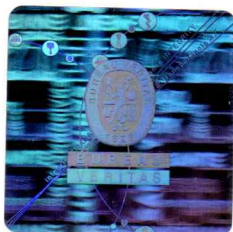
(11) This EU - Type Examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 2014/34/EU. Further requirements of this Directive apply to the manufacture of this equipment and its placing on the market. Those requirements are not covered by this certificate.

(12) The marking of the equipment shall include the following:



II(1)G [Ex ia Ga] IIC

II(1)D [Ex ia Da] IIIC



Certification department of explosion protection

Hamburg, 2022-02-11



(13)

Annex

(14) **EU - Type Examination Certificate EPS 19 ATEX 1 231 X**

Revision 1

(15) Description of equipment:

The active barrier, type RN22, is used for the transmission and galvanic isolation of 0/4 to 20 mA signals. The device has an active/passive current input to which an intrinsically 2- or 4-wire transmitter can be directly connected. HART communication signals are transmitted bidirectionally by the device. A two-channel version of the barrier can optionally be provided. With a signal doppler option, the active barrier is used for the galvanic isolation of a 0/4 to 20 mA signal, which is transmitted to two galvanically isolated outputs.

The active barrier, type RN42, is used for the transmission and galvanic isolation of 0/4 to 20 mA signals. The device has an active/passive current input to which an intrinsically 2- or 4-wire transmitter can be directly connected. HART communication signals are transmitted bidirectionally by the device.

Electrical data:

Supply RN22:

terminal 1.1 (+), 1.2 (-)

U = 24 V DC (-20 % / +25 %)
Um = 250 V

Supply RN42:

terminal 1.1 (L/+), 1.2 (N/-)

U = 24 to 230 V DC (-20 % / +10 %)
Um = 250 V 50/60 Hz

Output circuit:

terminal 3.1 (+), 3.2 (-)

U = 30 V DC
I = 0/4-20 mA
Um = 30 V

terminal 2.1 (+), 2.2 (-)

Input circuit:

Connection 2-wire (active)

RN22:

terminal 4.1 (+), 4.2 (-)

Uo ≤ 27.3 V DC

terminal 6.1 (+), 6.2 (-)

Io ≤ 87.6 mA

Po = 597 mW

RN42:

terminal 4.1 (+), 4.2 (-)

Ci = negligibly small

Li = negligibly small

Max. connection values

Single values:

Ex ia IIC	Lo = 5.2 mH	Co = 0.088 µF
Ex ia IIB	Lo = 20.8 mH	Co = 0.683 µF
Ex ia IIA	Lo = 44.8 mH	Co = 2.28 µF

Combined values:

Ex ia IIC:	Lo/ Co	1.3 mH 0.047 µF	1 mH 0.052 µF	0.5 mH 0.065 µF		
Ex ia IIB:	Lo/ Co	26 mH 0.39 µF	2 mH 0.44 µF	1 mH 0.53 µF	0.5 mH 0.64 µF	0.2 mH 0.683 µF
Ex ia IIA:	Lo/ Co	49 mH 1.3 µF	20 mH 1.6 µF	1 mH 1.8 µF	0.5 mH 2.2 µF	0.2 mH 2.28 µF

EU - Type Examination Certificate EPS 19 ATEX 1 231 X

Revision 1

Connection 4-wire (passive)

RN22:	$U_o \leq 27.3 \text{ V DC}$
terminal 4.2 (+), 5.1 (-)	$I_o \leq 10 \text{ mA}$
terminal 6.2 (+), 5.2 (-)	$P_o = 68 \text{ mW}$
RN42:	$C_i = \text{negligibly small}$
terminal 4.2 (+), 4.3 (-)	$L_i = \text{negligibly small}$

Max. connection values (combined)

Ex ia IIC:	Lo/ Co	100 mH 0.065 μF	2 mH 0.072 μF	1 mH 0.081 μF	0.5 mH 0.088 μF
Ex ia IIB:	Lo/ Co	100 mH 0.48 μF	2 mH 0.52 μF	1 mH 0.59 μF	0.5 mH 0.683 μF
Ex ia IIA:	Lo/ Co	100 mH 1.7 μF		1 mH 1.9 μF	0.5 mH 2.28 μF

Connection 4-wire (passive)

RN22:	$U_i \leq 30 \text{ V DC}$
terminal 4.2 (+), 5.1 (-)	I_i not applicable when keeping U_i
terminal 6.2 (+), 5.2 (-)	P_i not applicable when keeping U_i
RN42:	$C_i = \text{negligibly small}$
terminal 4.2 (+), 4.3 (-)	$L_i = \text{negligibly small}$

Maximum ambient temperature range: $-40^\circ\text{C} \leq T_a \leq +60^\circ\text{C}$

(16) Reference number: 19TH0372

(17) Special conditions for safe use:

If several devices are installed side by side, it is important to ensure that the maximum side wall temperature of the individual device of 80°C (176°F) is not exceeded. If this cannot be guaranteed, the devices have to be mounted at a distance from one another or sufficient cooling must be ensured.

(18) Essential health and safety requirements:

Met by compliance with standards.



Certification department of explosion protection

Hamburg, 2022-02-11

(1) **EU - Baumusterprüfbescheinigung**

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen –
Richtlinie 2014/34/EU

(3) EU - Baumusterprüfbescheinigungsnummer

EPS 19 ATEX 1 231 X

Revision 1

(4) Gerät: Aktive Barriere, Typ RN22 und RN42

(5) Hersteller: Endress+Hauser Wetzler GmbH + Co. KG

(6) Anschrift: Obere Wank 1
87484 Nesselwang
Deutschland

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser EU - Baumusterprüfbescheinigung festgelegt.

(8) Bureau Veritas Consumer Products Services Germany GmbH bescheinigt als benannte Stelle Nr. 2004 nach Artikel 21 der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie. Die Ergebnisse der Prüfung sind in der vertraulichen Dokumentation unter der Referenznummer 19TH0372 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit:

EN IEC 60079-0:2018

EN 60079-11:2012

(10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EU - Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 2014/34/EU. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:



II(1)G [Ex ia Ga] IIC

II(1)D [Ex ia Da] IIIC



Hamburg, 11.02.2022

Seite 1 von 3

Bescheinigungen ohne Unterschrift und Siegel haben keine Gültigkeit. Diese Bescheinigung darf nur unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung von Bureau Veritas Consumer Products Services Germany GmbH. EPS 19 ATEX 1 231 X, Revision 1.

(13)

Anlage

(14) **EU - Baumusterprüfbescheinigung EPS 19 ATEX 1 231 X**

Revision 1

(15) Beschreibung des Gerätes:

Der Speisetrenner, Typ RN22, dient zur Übertragung und galvanischen Trennung von 0/4 ... 20 mA Signalen. Das Gerät besitzt einen aktiven / passiven Stromeingang, an den ein 2- oder 4-Leiter Messumformer direkt angeschlossen werden kann.

HART-Kommunikationssignale werden vom Gerät bidirektional übertragen.

Eine zwei-kanalige Version ist optional erhältlich.

In der Option Signaldoppler dient der Speisetrenner zur galvanischen Trennung von einem 0/4...20 mA Signal, welches an zwei galvanisch getrennte Ausgänge übertragen wird.

Der Speisetrenner, Typ RN42, dient zur Übertragung und galvanischen Trennung von 0/4...20 mA Signalen.

Das Gerät besitzt einen aktiven / passiven Stromeingang, an den ein 2- oder 4-Leiter Messumformer direkt angeschlossen werden kann.

HART-Kommunikationssignale werden vom Gerät bidirektional übertragen.

Elektrische Daten:

Versorgung RN22:

Klemme 1.1 (+), 1.2 (-) U = 24 V DC (-20 % / +25 %)
Um = 250 V

Versorgung RN42:

Klemme 1.1 (L/+), 1.2 (N/-) U = 24 bis 230 V DC (-20 % / +10 %) 50/60 Hz
Um = 250 V

Ausgang:

Klemme 3.1 (+), 3.2 (-) U = 30 V DC
Klemme 2.1 (+), 2.2 (-) I = 0/4-20 mA
Um = 30 V

Eingang:

2-Leiter Anschluss (aktiv)

RN22: Uo ≤ 27,3 V DC
Klemme 4.1 (+), 4.2 (-) Io ≤ 87,6 mA
Klemme 6.1 (+), 6.2 (-) Po = 597 mW
RN42: Ci = vernachlässigbar
Klemme 4.2 (+), 4.3 (-) Li = vernachlässigbar

Max. Anschlusswerte

Einzelwerte:

Ex ia IIC	Lo = 5,2 mH	Co = 0,088 µF
Ex ia IIB	Lo = 20,8 mH	Co = 0,683 µF
Ex ia IIA	Lo = 44,8 mH	Co = 2,28 µF

Kombinierte Werte:

Ex ia IIC:	Lo/ Co	1,3 mH 0,047 µF	1 mH 0,052 µF	0,5 mH 0,065 µF		
Ex ia IIB:	Lo/ Co	26 mH 0,39 µF	2 mH 0,44 µF	1 mH 0,53 µF	0,5 mH 0,64 µF	0,2 mH 0,683 µF
Ex ia IIA:	Lo/ Co	49 mH 1,3 µF	20 mH 1,6 µF	1 mH 1,8 µF	0,5 mH 2,2 µF	0,2 mH 2,28 µF

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**BUREAU
VERITAS**



4-Leiter Anschluss (passiv)

RN22:	$U_o \leq 27,3 \text{ V DC}$
Klemme 4.2 (+), 5.1 (-)	$I_o \leq 10 \text{ mA}$
Klemme 6.2 (+), 5.2 (-)	$P_o = 68 \text{ mW}$
RN42:	$C_i = \text{vernachlässigbar}$
Klemme 4.2 (+), 4.3 (-)	$L_i = \text{vernachlässigbar}$

Max. Anschlusswerte (kombiniert)

Ex ia IIC:	Lo/ Co	100 mH 0,065 μF	2 mH 0,072 μF	1 mH 0,081 μF	0,5 mH 0,088 μF
Ex ia IIB:	Lo/ Co	100 mH 0,48 μF	2 mH 0,52 μF	1 mH 0,59 μF	0,5 mH 0,683 μF
Ex ia IIA:	Lo/ Co	100 mH 1,7 μF		1 mH 1,9 μF	0,5 mH 2,28 μF

4-Leiter Anschluss (passiv)

RN22:	$U_i \leq 30 \text{ V DC}$
Klemme 4.2 (+), 5.1 (-)	I_i nicht anwendbar bei Einhaltung von U_i
Klemme 6.2 (+), 5.2 (-)	P_i nicht anwendbar bei Einhaltung von U_i
RN42:	$C_i = \text{vernachlässigbar}$
Klemme 4.2 (+), 4.3 (-)	$L_i = \text{vernachlässigbar}$

Maximaler Umgebungstemperaturbereich: $-40^\circ\text{C} \leq T_a \leq +60^\circ\text{C}$

(16) Referenznummer: 19TH0372

(17) Besondere Bedingungen:

Wenn mehrere Geräte nebeneinander montiert werden, ist darauf zu achten, dass die maximale Seitenwandtemperatur der einzelnen Geräte von 80°C nicht überschritten wird. Wenn dies nicht gewährleistet werden kann, müssen die Geräte mit hinreichendem Abstand montiert werden oder es ist auf andere Weise für eine hinreichende Kühlung zu sorgen.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen:

Durch Übereinstimmung mit Normen abgedeckt.



Hamburg, 11.02.2022

CERTIFICATE

(1) EU-Type Examination

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 15ATEX0058 X** Issue Number: **5**

(4) Product: **Field mounted HART Temperature Transmitter, Type 7501A.....2. and Type 7501B.....2.**

(5) Manufacturer: **PRelectronics A/S**

(6) Address: **Lerbakken 10, 8410 Rønde, Denmark**

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR15.0050/06.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN IEC 60079-0 : 2018
EN 60079-11 : 2012**

**EN 60079-1 : 2014
EN 60079-31 : 2014**

EN 60079-7 : 2015 + A1 : 2018

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:



**II 2 G Ex db IIC T6...T4 Gb or
II 2 D Ex tb IIIC T85 °C...T100 °C Db or
II 3 G Ex ec IIC T6...T4 Gc or
II 1 G Ex ia IIC T6...T4 Ga or
II 2 D Ex ia IIIC T60 °C...T100 °C Db or
I M1 Ex ia I Ma (7501B.....2. only) or
II 3 G Ex ic IIC T6...T4 Gc or
II 3 D Ex ic IIIC T85 °C...T100 °C Dc**

Date of certification: 20 April 2021

DEKRA Certification B.V.

R. Schuller
Certification Manager

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(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 15ATEX0058 X**

Issue No. 5

(15) **Description**

The Field mounted HART Temperature Transmitter, Type 7501A.....2. and Type 7501B.....2., convert a temperature measurement signal into a 4 to 20 mA current signal, with digital communication (HART).

The transmitter, Type 7501A.....2., consists of an aluminium enclosure and Type 7501B.....2. consists out of a stainless steel enclosure, both with an internal temperature transmitter.

When delivered as a connection kit, the installer can build in his own transmitter, that is predefined by PR Electronics A/S.

The transmitter is optionally supplied with an associated blanking element, Type 8550-... (M20) or Type 8551-... (1/2 NPT).

Optionally the transmitter has a glass window, a display and optical buttons to enable local interfacing.

The transmitter is intended, either to be connected via a cable, or to be mounted directly onto a temperature sensing probe that is suitable for the application and correctly installed.

For type of protection flameproof 'db', and dust ignition protection by enclosure 'tb', only ATEX equipment certified sensors, suitable for the application and correctly installed, may be mounted directly onto the Transmitter without additional certification of the combination.

If the transmitter is physically connected to a possible source of heating or cooling, e.g. by mounting to a process pipe or a temperature sensor, the temperature at the point of connection shall be within the ambient temperature range as given in this certificate.

For more information see Annex 1 to Report No. NL/DEK/ExTR15.0050/06

Installation instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

(16) **Report Number**

No. NL/DEK/ExTR15.0050/06.

(17) **Specific conditions of use**

For installation of Transmitter, Type 7501A.....2., as EPL Ga equipment, the transmitter must be installed such, that even in the event of rare incidents, ignition sources due to impact and friction, sparks are excluded.

For Ex ec use in a pollution degree 2 environment the module must be installed with a minimum protection degree of IP54.

For Ex ec use in an uncontrolled environment:

- the module must be installed with a minimum protection of IP68,
- installation of the equipment shall take place under dry and clean conditions and
- the equipment may not be opened for maintenance in an uncontrolled environment.

Flame proof joints are not intended to be repaired.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 15ATEX0058 X**

Issue No. 5

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/DEK/ExTR15.0050/06.

(20) **Certificate history**

Issue 1 -	218299900	initial certificate
Issue 2 -	510004900	addition of type of protection Ex ia I Ma and stainless steel enclosure
Issue 3 -	218828100	minor changes to electronics
Issue 4 -	223963500	minor changes to components and PCB layout
Issue 5 -	225175900	assessed per EN IEC 60079-1 : 2018, EN 60079-1 : 2014, EN 60079-7 : 2015 + A1 : 2018

Thermal and Electrical data

Type of protection Ex db:

U_{max} = 35 V.

Ambient temperature range:

- 40 °C to +70 °C for temperature class T6;
- 40 °C to +80 °C for temperature class T4 and T5 for Type 7501 B;
- 40 °C to +85 °C for temperature class T4 and T5 for Type 7501 A.

Type of protection Ex tb:

U_{max} = 35 V.

Ambient temperature range for Silicone rubber sealing-rings:

- 40 °C to +70 °C for maximum surface temperature T85 °C;
- 40 °C to +80 °C for maximum surface temperature T100 °C for Type 7501 B;
- 40 °C to +85 °C for maximum surface temperature T100 °C for Type 7501 A.

Ambient temperature range for FKM rubber sealing-rings:

- 20 °C to +70 °C for maximum surface temperature T85 °C;
- 20 °C to +80 °C for maximum surface temperature T100 °C for Type 7501 B;
- 20 °C to +85 °C for maximum surface temperature T100 °C for Type 7501 A.

Type of protection Ex ia and Ex ic:

Supply and output circuit (terminals 1, 2):

in type of protection intrinsic safety Ex ia I, Ex ia IIC, Ex ia IIIC, or Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

U_i = 30 V; I_i = 120 mA; P_i = 0.84 W; C_i = 2 nF; L_i = 0 µH.

Sensor circuit (terminals 3...6):

in type of protection intrinsic safety Ex ia I, Ex ia IIC, Ex ia IIIC, or Ex ic IIC, with following maximum values:

U_o = 9.6 V; I_o = 28 mA; P_o = 67.2 mW; C_o = 3.5 µF; L_o = 35 mH.

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

Ambient temperature range for Ex ia:

- 40 °C to +45 °C for temperature class T6 or maximum surface temperature T60 °C;
- 40 °C to +60 °C for temperature class T5 or maximum surface temperature T75 °C;
- 40 °C to +80 °C for temperature class T4, maximum surface temperature T100 °C and Group I, for Type 7501 B;
- 40 °C to +85 °C for temperature class T4, maximum surface temperature T100 °C and Group I, for Type 7501 A.

Ambient temperature range for Ex ic:

- 40 °C to +60 °C for temperature class T6 or maximum surface temperature T85 °C;
- 40 °C to +80 °C for temperature class T4 and maximum surface temperature T100 °C, for Type 7501 B;
- 40 °C to +85 °C for temperature class T4 and maximum surface temperature T100 °C, for Type 7501 A.

Type of protection Ex ec:

U_{max} = 35 V (24 V).

Ambient temperature range for Silicone rubber sealing-rings:

- 40 °C to +43 °C (+55 °C) for temperature class T6;
- 40 °C to +80 °C for temperature class T4 for Type 7501 B;
- 40 °C to +85 °C for temperature class T4 for Type 7501 A.

Ambient temperature range for FKM rubber sealing-rings:

- 20 °C to +43 °C (+55 °C) for temperature class T6;
- 20 °C to +80 °C for temperature class T4 for Type 7501 B;
- 20 °C to +85 °C for temperature class T4 for Type 7501 A.

Nomenclature

7501	-	-	-	-	-	-	-	-
Type								
Housing A: Low copper Aluminium B: Stainless Steel								
Keypad Display 1: no no (window) 2: no yes 3: yes yes								
Sealing A: -40°C-+85°C silicone rubber B: -20°C-+85°C FKM rubber								
Conduit Threads 1: M20x1.5 6H 2: ½NPT mod								
Paint A: Epoxy B: Epoxy+Polyurethane N: None								
Transmitter 1: Yes 2: None (comes with a connection kit)								
Approvals 1: General purpose 2: Hazardous area								
Xtra None: standard X: Special edition The color of the front is normally Signal-Red but may be changed to any other color								