

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: **KEMA 10ATEX0053 X** Issue Number: **5**

(4) Product: **Universal Converter, Type 9116A1, Type 9116A2, Type 9116B1 and Type 9116B2**

(5) Manufacturer: **PR electronics A/S**

(6) Address: **Lerbakken 10, 8410 Rønede, 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/KEM/ExTR10.0020/04.

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

EN IEC 60079-0 : 2018
EN IEC 60079-15 : 2019

EN 60079-11 : 2012
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 (1) G	[Ex ia Ga] IIC/IIB/IIA	(type 9116B...)
II (1) D	[Ex ia Da] IIIC	(type 9116B...)
I (M1)	[Ex ia Ma] I	(type 9116B...)
II 3 G	Ex ec nC IIC T4 Gc	(type 9116A... and type 9116B...)

Date of certification: 21 April 2022

DEKRA Certification B.V.

R. Schuller
Certification Manager



(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate KEMA 10ATEX0053 X**

Issue No. 5

(15) **Description**

Universal Converter, Type 9116A1, Type 9116A2, Type 9116B1 and Type 9116B2, for rail mounting are 24 V powered isolating barriers, interfacing temperature sensors and loop supplied transmitters located in an explosive atmosphere.

The output to safe area is a 0/4 ... 20 mA signal together with a normally open relay contact.

The Universal Converter is supplied via terminals at the front of the module, or via Power Rail Type 9400. Removable display module 4501 can be used for programming of the Converter.

Ambient temperature range -20 °C to +60 °C.

Electrical data

If the Universal Converter is installed in an explosive atmosphere where the use of apparatus of equipment category 3 G is required, the following electrical data applies:

Supply (terminals 31, 32 and rear contacts): $U = 19,2 \dots 31,2$ Vdc.

Outputs (terminals 11, 12): $I = 0/4 \dots 20$ mA.

Relay output (terminals 13, 14): $U \leq 32$ Vac or 30 Vdc, $I \leq 2$ Aac or $I \leq 2$ Adc respectively.

Status-Relay output (terminals 33, 34): $U \leq 32$ Vac or 32 Vdc, $I \leq 0,5$ Aac or $I \leq 1$ Adc respectively.

For all circuits above: $U_m = 253$ Vac (max. frequency 400 Hz).

Sensor circuit (terminals 41 ... 44):

in type of protection intrinsic safety Ex ia IIC/IIB/IIA/IIIC/I, with following maximum values:

$U_o = 8,3$ V; $I_o = 13,1$ mA; $P_o = 27,3$ mW; $C_o = 7$ μ F (IIC) or 73 μ F (IIB) or 1000 μ F (IIA);

$L_o = 207$ mH (IIC) or 828 mH (IIB) or 1000 mH (IIA);

$L_o/R_o = 1$ mH/ Ω (IIC), 5 mH/ Ω (IIB) or 10 mH/ Ω (IIA);

Loop supply circuit (terminals 51-54, 52-54):

in type of protection intrinsic safety Ex ia IIC/IIB/IIA/IIIC/I, with following maximum values:

$I_o = 93$ mA; $P_o = 650$ mW; $L_o = 4$ mH (IIC) or 16 mH (IIB) or 32 mH (IIA);

$L_o/R_o = 54$ μ H/ Ω (IIC), 218 μ H/ Ω (IIB) or 436 μ H/ Ω (IIA);

For Universal Converter, Type 9116B1:

$U_o = 28$ V; $C_o = 80$ nF (IIC) or 640 nF (IIB) or 2,1 μ F (IIA);

For Universal Converter, Type 9116B2:

$U_o = 21,4$ V; $C_o = 0,16$ μ F (IIC) or 1,13 μ F (IIB) or 4,15 μ F (IIA).

Loop input circuit (terminals 51-53):

in type of protection intrinsic safety Ex ia IIC/IIB/IIA/IIIC/I, with following maximum values:

$U_i = 30$ V; $I_i = 120$ mA; $P_i = 900$ mW; $C_i = 3$ nF; $L_i = 1$ μ H;

$I_o = 1,1$ mA; $P_o = 8$ mW; $L_o = 1000$ mH (all groups);

$L_o/R_o = 4$ mH/ Ω (IIC), 17 mH/ Ω (IIB) or 35 mH/ Ω (IIA);

For Universal Converter, Type 9116B1:

$U_o = 28$ V; $C_o = 80$ nF (IIC) or 640 nF (IIB) or 2,1 μ F (IIA);

For Universal Converter, Type 9116B2:

$U_o = 21,4$ V; $C_o = 0,16$ μ F (IIC) or 1,13 μ F (IIB) or 4,15 μ F (IIA);

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Loop input supply circuit (terminals 51-52):

in type of protection intrinsic safety Ex ia IIC/IIB/IIA/IIIC/I, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 120 \text{ mA}$; $P_i = 900 \text{ mW}$; $C_i = 3 \text{ nF}$; $L_i = 1 \text{ }\mu\text{H}$;

$U_o = 8,3 \text{ V}$; $I_o = 0,2 \text{ mA}$; $P_o = 0,4 \text{ mW}$; $C_o = 7 \text{ }\mu\text{F}$ (IIC) or $73 \text{ }\mu\text{F}$ (IIB) or $1000 \text{ }\mu\text{F}$ (IIA);

$L_o = 1000 \text{ mH}$ (all groups); $L_o/R_o = 100 \text{ mH}/\Omega$ (IIC), $400 \text{ mH}/\Omega$ (IIB) or $800 \text{ mH}/\Omega$ (IIA).

Combination of the loop supply circuit (terminals 52-54) of one Universal Converter with the loop input circuit (terminals 51-52) of a second Universal Converter (where terminal 52 of the first Universal Converter is connected with terminal 51 of the second Universal converter):

in type of protection intrinsic safety Ex ia IIC/IIB/IIA/IIIC/I, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 120 \text{ mA}$; $P_i = 900 \text{ mW}$; $C_i = 3 \text{ nF}$; $L_i = 2 \text{ }\mu\text{H}$;

$I_o = 93 \text{ mA}$; $P_o = 650 \text{ mW}$; $L_o = 4 \text{ mH}$ (IIC) or 16 mH (IIB) or 32 mH (IIA);

$L_o/R_o = 54 \text{ }\mu\text{H}/\Omega$ (IIC), $218 \text{ }\mu\text{H}/\Omega$ (IIB) or $436 \text{ }\mu\text{H}/\Omega$ (IIA);

For Universal Converter, Type 9116B1:

$U_o = 28 \text{ V}$; $C_o = 80 \text{ nF}$ (IIC) or 640 nF (IIB) or $2,1 \text{ }\mu\text{F}$ (IIA);

For Universal Converter, Type 9116B2:

$U_o = 21,4 \text{ V}$; $C_o = 0,16 \text{ }\mu\text{F}$ (IIC) or $1,13 \text{ }\mu\text{F}$ (IIB) or $4,15 \text{ }\mu\text{F}$ (IIA).

Combination of the loop input circuit (terminals 51-52) of one Universal Converter in series with the loop input circuit (terminals 51-52) of a second Universal Converter:

in type of protection intrinsic safety Ex ia IIC/IIB/IIA/IIIC/I, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 120 \text{ mA}$; $P_i = 900 \text{ mW}$; $C_i = 6 \text{ nF}$; $L_i = 2 \text{ }\mu\text{H}$;

$U_o = 16,6 \text{ V}$; $I_o = 0,2 \text{ mA}$; $P_o = 0,8 \text{ mW}$; $C_o = 0,4 \text{ }\mu\text{F}$ (IIC) or $2,3 \text{ }\mu\text{F}$ (IIB) or $9,5 \text{ }\mu\text{F}$ (IIA);

$L_o = 1000 \text{ mH}$ (all groups); $L_o/R_o = 25 \text{ mH}/\Omega$ (IIC), $100 \text{ mH}/\Omega$ (IIB) or $200 \text{ mH}/\Omega$ (IIA);

For Ex ia IIIC, the parameters of group IIB apply;

For Ex ia I, the parameters of group IIA apply.

Installation instructions

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

(16) **Report Number**

No. NL/KEM/ExTR10.0020/04.

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(17) **Specific conditions of use**

The Universal Converter shall be installed in a controlled environment with suitably reduced pollution, limited to pollution degree 2 or better.

The non-intrinsically safe circuits may only be connected to an overvoltage category I or II power source, as defined in EN 60664-1.

If the Universal Converter is installed in an explosive atmosphere where the use of apparatus of equipment category 3 G is required, the following specific conditions of use additionally apply:

The Universal Converter shall be installed in an enclosure in type of protection Ex e, providing a degree of protection of at least IP54 according to EN 60079-0. Cable entry devices and blanking elements shall fulfill the same requirements.

Removable Display Module 4501, when connected to the Universal Converter, may not be damaged and shall be free of dust and moisture.

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

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/KEM/ExTR10.0020/04.

(20) **Certificate history**

Issue 1 - 213252900	initial certificate.
Issue 2 - 215495200	assessment for mines susceptible to firedamp; Assessed per EN 60079-0: 2012 and EN 60079-11: 2012.
Issue 3 - 219204500	update to EN 60079-15: 2010; remove EN 60079-26; addition of Ex nA version '9116A*'. minor editorial changes which are not Ex-relevant.
Issue 4 - 222636500	
Issue 5 - 225761800	assessed per EN IEC 60079-0: 2018, EN 60079-7: 2015 and EN IEC 60079-15: 2019.