

# CERTIFICATE

## (1) EC-Type Examination

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **KEMA 10ATEX0053 X** Issue Number: **2**

(4) Equipment: **Universal Converter, Type 9116B1 and Type 9116B2**

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

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

(7) This equipment 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 9 of the Council Directive 94/9/EC of 23 March 1994, 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 to the directive.

The examination and test results are recorded in confidential test report no. NL/KEM/ ExTR10.0020/\*\*.

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

**EN 60079-0 : 2009**  
**EN 60079-26 : 2007**

**EN 60079-11 : 2012**

**EN 60079-15 : 2005**

(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 schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

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



**II (1) G [Ex ia Ga] IIC/IIB/IIA**  
**II (1) D [Ex ia Da] IIIC**  
**I (M1) [Ex ia Ma] I**

This certificate is issued on 24 July 2012 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

DEKRA Certification B.V.

C.G. van Es  
Certification Manager

Page 1/4

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(13) **SCHEDULE**

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

Issue No. 2

(15) **Description**

Universal Converter, 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.

**Marking**

The equipment marking may additionally include the code II 3 G Ex nA nC IIC T4 Gc.

**Electrical data**

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.

If the Universal Converter is installed outside the hazardous area, the following data for the Relay output apply:  $U \leq 30$  Vdc or 250 Vac,  $I \leq 2$  Adc or  $I \leq 2$  Aac 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.

If the Universal Converter is installed outside the hazardous area, the following data for the relay contacts apply:  $U \leq 110$  Vdc or 125 Vac,  $I \leq 0.3$  Adc or  $I \leq 0.5$  Aac 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;  $C_o = 7$   $\mu$ F (IIC) or 73  $\mu$ F (IIB) or 1000  $\mu$ F (IIA);

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

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

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

For Universal Converter, Type 9116B1:

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

For Universal Converter, Type 9116B2:

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

(13) **SCHEDULE**

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

Issue No. 2

Loop input circuit (terminals 51-53):

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

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

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

$L_o/R_o = 4 \text{ mH}/\Omega$  (IIC),  $17 \text{ mH}/\Omega$  (IIB) or  $35 \text{ mH}/\Omega$  (IIA);

For Universal Converter, Type 9116B1:

$U_o = 28 \text{ V}$ ;  $C_o = 80 \text{ nF}$  (IIC) or  $640 \text{ nF}$  (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);

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  $16 \text{ mH}$  (IIB) or  $32 \text{ mH}$  (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  $640 \text{ nF}$  (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 equipment shall be followed in detail to assure safe operation.

(16) **Test Report**

No. NL/KEM/ ExTR10.0020/\*\*.

(13) **SCHEDULE**

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

Issue No. 2

(17) **Special conditions for safe 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 EN60664-1.

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

The Universal Converter shall be installed in an enclosure in type of protection Ex n or Ex e, providing a degree of protection of at least IP54. 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 (9).

(19) **Test documentation**

As listed in Test Report No. NL/KEM/ExTR10.0020/\*\*.