[1] # TYPE EXAMINATION CERTIFICATE

[2] Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

[3] Type Examination Certificate Number: **EXA 13 ATEX 0037X** Issue: **1**

[4] Equipment or Protective System: **Input Module "LB1009 *" for Remote I/O-System "LB"**

Type: **LB1009 ***

[5] Manufacturer: **Pepperl + Fuchs GmbH**

[6] Address: **Lilienthalstrasse 200, 68307 Mannheim, Germany**

[7] This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

[8] Ex-Agencija certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment or protective system intended for use in potentially explosive atmospheres given in Annex II of the Directive.

The examination and test results are recorded in confidential report number: **EXA 13CR056**

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

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

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 equipment or protective system is subject to specific conditions for safe use specified in the schedule to this certificate.

[11] This Type Examination Certificate relates only to the design, examination and test of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

[12] The marking of the equipment or protective system shall include the following:

 **II 3 G Ex nA [ic] IIC T4 Gc** or alternatively **II 3 G Ex nAc [ic] IIC T4**

Date: 19.12.2013. PB.13.TC.1307/TM

Ex-Agencija
Department of equipment certification

Prepared: Approved:

T. Mlinac, dipl. ing. S. Đerek, dipl. ing.

Ex-Agencija, HR, 10001 Zagreb, p.p. 304, Baštijanova bb, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr

[13] **SCHEDULE**

[14] **TYPE EXAMINATION CERTIFICATE No.: EXA 13 ATEX 0037X**

[15] **Description of Equipment or Protective System**

The Input Module "LB1009 *" for Remote I/O-System "LB" is an 8-channel digital input device designed for use in the safe area or areas requiring category 3G equipment and has 8 intrinsically safe digital inputs in type of protection Ex ic for gas explosion group IIC. The galvanic isolation between the intrinsically safe circuits and the non-intrinsically safe circuits is achieved by two transformers. The modules are only permitted to operate in connection with backplanes, power supplies and gateways which are an integral part of the LB Remote I/O System. A SELV/PELV power supply is required to supply the LB System.

Non-intrinsically safe circuits:

Rear-side (to backplane)	U_n	U_m	Function
X01:B/O → X01:C/N	12 V ± 3%	60 V_{DC}	Power supply
X01:E → X01:L	± 2.5 V (Manchester Signal)	30 V_{AC}	Communication

The non-intrinsically safe circuits are galvanically isolated from the intrinsically safe circuits up to a peak value of 375 V of the nominal voltage.

Intrinsically safe circuits:

Between Pin 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16

Maximum output voltage U_o = 10 V
Maximum output current I_o = 13 mA
Maximum output power P_o = 33 mW
Maximum internal capacitance C_i negligible
Maximum internal inductance L_i negligible

The capacitance and either the inductance of the load connected to each intrinsically safe circuit must not exceed the following values:

Group	IIA	IIB	IIC
maximum external capacity C_0	1000 µF	450 µF	20 µF
maximum external inductivity L_0	100 mH	100 mH	100 mH

The table is only applicable when the internal inductance Li or the internal capacitance Ci of the connected equipment is ≤1% of the above specified tabular values. If Li as well as Ci of the connected equipment are >1% of the tabular values, all values specified in the table shall be reduced to 50%. At this, the capacitance of the external circuit (capacitance of the cable + internal capacitance Ci of the connected equipment) shall not exceed 1 µF for groups IIA, IIB and 600 nF for IIC.

Additional parameters: Ambient temperature range T_a = -20 °C to +60 °C.

Ex-Agencija, HR, 10001 Zagreb, p.p. 304, Baštijanova bb, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr

[15.1] Documentation

Title:	Drawing No.:	Rev. level:	Date:
Overview (1 sheet)	16-0999EX	-	2013-Dec-02
Description (19 sheets)	16-0999EX-00	-	2013-Dec-16
Schematic drawing (4 sheets)	16-0999EX-01	-	2013-Jul-03
Safety relevant components (8 sheets)	16-0999EX-02	-	2013-Nov-27
Assembly plan (2 sheets)	16-0999EX-03	-	2013-Jul-03
Layer drawing (2 sheets)	16-0999EX-04	-	2013-Sep-12
PCB Layout (4 sheets)	16-0999EX-05	-	2013-Jul-03
Transformer drawing (5 sheets)	16-0999EX-06	-	2013-Sep-12
Safety Instructions (2 sheets)	16-0999EX-09	-	2013-Nov-26
Type Label (2 sheets)	16-0999EX-10	-	2013-Dec-06

[16] Confidential Report No. EXA 13CR056

[16.1] Routine testing

The manufacturer shall carry out the following routine tests:
- dielectric strength test between input and output windings of the transformers T01 and T02 with voltage at least 1500 V for a period of 60 s or with 1800 V with duration of at least 1 s.

[17] Specific Conditions for Safe Use 'X'

17.1. The devices must only be used together with the respective backplanes.

17.2. Installation in safe area:

The devices must be installed:
- in an enclosure providing a degree of IP protection at least IP 54 according to EN 60529, or
- in a controlled environment providing pollution degree 2 according to EN 60664-1.

17.3. Installation in areas requiring 3G / EPL Gc equipment (Zone 2):

The device must be installed in an enclosure providing a degree of protection at least IP54 according to EN 60529 and satisfying the safety requirements for a category 3G / EPL Gc enclosure according to EN 60079-0.

[18] Essential Health and Safety Requirements

Covered by the standards listed at item 9.

Ex-Agencija, HR, 10001 Zagreb, p.p. 304, Baštijanova bb, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr

[1] # TYPE EXAMINATION CERTIFICATE

[2] Equipment or Protective Systems Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU.

[3] Type Examination Certificate Number: **EXA 13 ATEX 0037X** Issue: **2**

[4] Product: **Input Module "LB1009 *" for Remote I/O-System "LB"**

Type: **LB1009 ***

[5] Manufacturer: **Pepperl + Fuchs GmbH**

[6] Address: **Lilienthalstrasse 200, 68307 Mannheim, Germany**

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

[8] Ex-Agencija 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 of the Directive 2014/34/EU.

The examination and test results are recorded in confidential Report No.: **EXA 18CR006**

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012/A11:2013 **EN 60079-11:2012** **EN 60079-15:2010**

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 Specific Conditions of Use specified in the schedule to this certificate.

[11] This Type Examination Certificate relates only to the design, examination and test of the specified product in accordance with Annex III.

[12] The marking of the product shall include the following:

II 3 G Ex nA [ic] IIC T4 Gc or alternatively **II 3 G Ex nAc [ic] IIC T4**

Date: 01.03.2018.

PB.18.TC.258/ISt

Ex-Agencija
Department of equipment certification
Approved by:

S. Đerek, dipl. ing.

Ex-Agencija, Industrijska 25, HR-10431 Sveta Nedelja, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr

[13] **SCHEDULE**

[14] **EU - TYPE EXAMINATION CERTIFICATE No.: EXA 13 ATEX 0037X**

[15] **Description of product**

The Input Module "LB1009 *" for Remote I/O-System "LB" is an 8-channel digital input device designed for use in the safe area or areas requiring category 3G equipment and has 8 intrinsically safe digital inputs in type of protection Ex ic for gas explosion group IIC. The galvanic isolation between the intrinsically safe circuits and the non-intrinsically safe circuits is achieved by two transformers. The modules are only permitted to operate in connection with backplanes, power supplies and gateways which are an integral part of the LB Remote I/O System. A SELV/PELV power supply is required to supply the LB System.

Non-intrinsically safe circuits:

Value	**X01:B/O → X01:C/N**
Nominal voltage (U_n)	12 V_{DC} (-2/+4%), SELV/PELV
Rated voltage (U_r)	12.48 V_{DC}
Maximum common mode voltage (U_m)	60 V_{DC}

Value	**X01:E → X01:L**
Nominal voltage (U_n)	± 2.5 V signal with reference level 2.5 V_{DC} (Manchester - Signal)
Rated voltage (U_r)	12.48 V_{DC} (SELV/PELV, same GND reference as power supply)
Maximum common mode voltage (U_m)	60 V_{DC}

The non-intrinsically safe circuits are galvanically isolated from the intrinsically safe circuits up to a peak value of 375 V of the nominal voltage.

Intrinsically safe circuits:

Between Pin 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-16

Maximum output voltage U_o = 10 V
Maximum output current I_o = 13 mA
Maximum output power P_o = 33 mW
Maximum internal capacitance C_i negligible
Maximum internal inductance L_i negligible

The capacitance and either the inductance of the load connected to each intrinsically safe circuit must not exceed the following values:

Group	IIA	IIB / IIIC	IIC
maximum external capacity C_0	1000 µF	450 µF	20 µF
maximum external inductivity L_0	100 mH	100 mH	100 mH
L_0/R_0	8.752 mH/Ω	4.376 mH/Ω	1.094 mH/Ω

Ex-Agencija, Industrijska 25, HR-10431 Sveta Nedelja, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr

The table is only applicable when the internal inductance Li or the internal capacitance Ci of the connected equipment is ≤1% of the above specified tabular values. If Li as well as Ci of the connected equipment are >1% of the tabular values, all values specified in the table shall be reduced to 50%. At this, the capacitance of the external circuit (capacitance of the cable + internal capacitance Ci of the connected equipment) shall not exceed 1 µF for groups IIA, IIB and 600 nF for IIC.

Additional parameters: Ambient temperature range T_a = -40 °C to +60 °C.

[16] Confidential Report No. EXA 18CR006

[16.1] Routine testing

The manufacturer shall carry out the following routine tests:

- dielectric strength test between input and output windings of the transformers T01 and T02 with voltage at least 1500 V for a period of 60 s or with 1800 V with duration of at least 1 s.

[17] Specific Conditions of Use

- All circuits connected to the device must comply with overvoltage category II (or better) according to EN 60664-1
- SELV/PELV power supply is required to supply the LB-system
- The device must only be used together with the respective backplanes
- The device must be installed and operated only in an environment that ensures a pollution degree 2 (or better) according to EN 60664-1

Installation in safe area:

The device must be installed:

- in an enclosure with a degree of protection at least IP54 according to EN 60529 and fulfilling requirements of EN 60079-0 for enclosures or
- in a controlled environment providing pollution degree 2, or better

Installation in areas requiring category equipment 3G:

- The equipment shall be installed in an enclosure that fulfill the requirements of EN 60079-15 / EN 60079-0 for the zone of installation and provide a degree of protection not less than IP 54 in accordance to EN 60529

[18] Essential Health and Safety Requirements

Covered by the standards listed at item 9.

Ex-Agencija, Industrijska 25, HR-10431 Sveta Nedelja, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr

[19] Drawings and Documents

Title:	Drawing No.:	Rev. level:	Date:
Overview (1 sheet)	16-0999EX	-	2013-Dec-02
Description (19 sheets)	16-0999EX-00	-	2013-Dec-16
Schematic drawing (4 sheets)	16-0999EX-01	-	2013-Jul-03
Safety relevant components (8 sheets)	16-0999EX-02	-	2013-Nov-27
Assembly plan (2 sheets)	16-0999EX-03	-	2013-Jul-03
Layer drawing (2 sheets)	16-0999EX-04	-	2013-Sep-12
PCB Layout (4 sheets)	16-0999EX-05	-	2013-Jul-03
Transformer drawing (5 sheets)	16-0999EX-06	-	2013-Sep-12
Safety Instructions (2 sheets)	16-0999EX-09	-	2013-Nov-26
Type Label (2 sheets)	16-0999EX-10	-	2013-Dec-06
Overview (1 sheet)	16-0999EX_A	-	2018-Feb-15
Description (4 sheets)	16-0999EX-00A	-	2018-Feb-15
Marking (2 sheets)	16-0999EX-10A	-	2018-Feb-15

Ex-Agencija, Industrijska 25, HR-10431 Sveta Nedelja, Phone: +385 1 3667-260, Fax.: + 385 1 3667-262
www.ex-agencija.hr ex-agencija@ex-agencija.hr