IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx SIR 10.0021X	Issue No: 5	Certificate history:
			Issue No. 5 (2014-01-14)
Status:	**Current**	Page 1 of 4	Issue No. 4 (2012-05-17)
			Issue No. 3 (2012-02-21)
Date of Issue:	**2014-01-14**		Issue No. 2 (2011-01-04)
			Issue No. 1 (2010-09-02)
Applicant:	**Azonix Corporation** 101 Billerica Ave Building #4 North Billerica Massachusetts 01862 **United States of America**		Issue No. 0 (2010-08-04)
Electrical Apparatus:	**IB IL EX-IS AIO 4/EF-PAC Module and IB IL EX-IS DIO 4/NAM-PAC Module and IB IL EX-IS TEMP 4 RTD/TC-PAC Module**		
Optional accessory:			
Type of Protection:	**Type n with Intrinsically Safe outputs**		
Marking:	Ex nA [ia Ga Da] IIC T4 Gc Ta = -25°C to +60°C		

Approved for issue on behalf of the IECEx Certification Body: C Ellaby

Position: Deputy Certification Manager

Signature:
(for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

SIRA Certification Service
Rake Lane
Eccleston
Chester
CH4 9JN
United Kingdom

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Manufacturer: **Azonix Corporation**
101 Billerica Ave
Building #4
North Billerica
Massachusetts 01862
United States of America

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2004 Edition:4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-0 : 2007-10 Edition:5	Explosive atmospheres - Part 0:Equipment - General requirements
IEC 60079-11 : 2006 Edition:5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-15 : 2010 Edition:4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

GB/SIR/ExTR10.0137/00 GB/SIR/ExTR10.0209/00 GB/SIR/ExTR10.0319/00
GB/SIR/ExTR11.0239/00 GB/SIR/ExTR11.0291/00 GB/SIR/ExTR11.0292/00
GB/SIR/ExTR13.0342/00

Quality Assessment Report:

GB/SIR/QAR10.0020/00 GB/SIR/QAR10.0020/01 GB/SIR/QAR10.0020/02
GB/SIR/QAR10.0020/03

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

AIO Module

The IB IL EX-IS AIO 4/EF-PAC Module is an Analog Input-Output (AIO) device. It is designed to be powered from a PWR Module, which has a voltage limited to 28 V in accordance with the requirements of intrinsic safety, but without current limiting. The AIO Module converts the supply into to four isolated intrinsically safe outputs that are individually resistively safe for IIC gases and vapours. Each of the four channels shall be treated as separate intrinsically safe circuits

DIO Module

The IB IL EX-IS DIO 4/NAM-PAC Module is a Digital Input-Output (DIO) device. It is designed to be powered from a PWR Module, which has a voltage limited to 28 V in accordance with the requirements of intrinsic safety, but without current limiting. The DIO Module converts the supply to four isolated intrinsically safe outputs and four inputs. Each of the eight channels shall be treated as separate intrinsically safe circuits

For the description of the TEMP module, Safety descriptions, and Conditions of Manufacture refer to the Annexe

CONDITIONS OF CERTIFICATION: YES as shown below:

Refer to the Annexe

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 – this Issue introduced the following change:

1. The recognition of minor drawing modifications; these amendments are administrative or involve changes to the design that do not affect the aspects of the product that are relevant to explosion safety.

Issue 2 – this Issue introduced the following change:

1. The introduction of a TEMP Module was recognised, the description is amended to include this and the notes are similarly modified.

Issue 3 – this Issue introduced the following change:

1. The recognition of the following changes to the TEMP Modules:
   - The introduction of a new CJC riser board.
   - Minor component and artwork changes to the main board were permitted.
   - Typographical changes to the Conditions of Certification were made.

Issue 4 – this Issue introduced the following changes:

1. The correction of the Io value from 108 mA to 109 mA and the Po value from 750 mW to 757 mW was approved; these values are corrected in the relevant table at the annexe
2. The addition of blocking diodes D805-813, requiring revision to the schematic, critical parts list and artwork were endorsed
3. The provision of additional insulation around safety resistors R106, R113, R120 & R127 was acknowledged.

Issue 5 – this Issue introduced the following change:

1. Drawing number P19-101874 was modified to:
   - Change the value of fuse F1 from 62 mA to 100 mA.
   - Add a note on the lead length of D26, D27, D811 and D812.
   - Introduce F2.
2. The values of non-critical component FB2, R97 and R98 were changed.
3. The Applicant's Manufacturing address was changed from 900 Middlesex Turnpike, Billerica, MA 01821 to 101 Billerica Ave, Building #4, North Billerica, Massachusetts 01862.

Annex:

IECEx SIR 10.0021X Issue 5 Annexe.pdf

AIO Module

The safety description is as follows:

	Input from PWR Module		
Um	28 Vdc		
	Intrinsically safe output per channel		
Uo	28 Vdc		
Io	109 mA		
Po	757 mW		
	Cable parameters (see note)		
	IIC	IIB	IIA
Co	82 nF	649 nF	2149 nF
Lo	1.015 mH	3.045 mH	8.12 mH

DIO Module

The safety description is as follows:

	Input from PWR Module					
Um	28 Vdc					
	Intrinsically safe output at CN2 & CN3 (per channel)			Intrinsically safe input at CN2 & CN3 (per channel)		
Ui	0			0		
Uo	28 Vdc			11.76 Vdc		
Io	109 mA			137 mA		
Po	757 mW			401 mW		
	Cable parameters (see note)			Cable parameters (see note)		
	IIC	IIB	IIA	IIC	IIB	IIA
Co	0.083 µF	0.625 µF	2.15 µF	1.5 µF	9.9 µF	39 µF
Lo	1.015 mH	3.045 mH	8.12 mH	1.52 mH	4.56 mH	21.1 mH

TEMP Module

The IB IL EX-IS TEMP 4 RTD/TC-PAC Module is a four channel temperature measurement device. It is designed to be powered from a PWR Module, which has a voltage limited to 28 V in accordance with the requirements of intrinsic safety, but without current limiting. The TEMP Module converts the supply into to four isolated intrinsically safe inputs that are individually resistively safe for IIC gases and vapours. Each of the four channels shall be treated as separate intrinsically safe circuits.

The safety description is as follows:

	Input from PWR Module		
Um	28 Vdc		
	Intrinsically safe output per channel		
Uo	5.88 Vdc		
Io	0.095 A		
Po	0.139 W		
	Cable parameters (see note)		
	IIC	IIB	IIA
Co	42 µF	999 µF	999 µF
Lo	0.984 mH	2.9 mH	7.8 mH

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Note: the quoted entity parameters of Co and Lo are applicable for the distributed capacitance and inductance in cable. Where there is lumped circuit capacitance or inductance in the connected equipment (represented by Ci and Li respectively), then lumped capacitance shall be limited to a maximum value of 1 µF for Group IIB and 600 nF for Group IIC and lumped inductance shall not exceed 50% of the quoted Lo.

Conditions of Certification:

1. The module shall only be supplied from the IB IL EX-IS PWR IN-PAC Module
2. If the module is installed in a zone 2 hazardous area, it shall be housed in an enclosure that is coded Ex nA, Ex e, Ex d or Ex p. If the module is installed in a zone 22 or 21 hazardous area, it shall be housed in an enclosure that is coded Ex tD or Ex t. The enclosure shall provide an ingress protection suitable for the environment, with a minimum of IP54. For some types of enclosure, additional certification will be required to permit the installation of the module within the enclosure. Reference should be made to the enclosure certificate. The installer shall ensure that the maximum ambient temperature of the module when installed is not exceeded.
3. If the module is installed in a non-hazardous area, the enclosure or location shall provide suitable protection. This may either be by the use of an enclosure approved for use in zones 1, 2, 21 or 22 or otherwise meet the following requirements
   * Non-metallic enclosures must be capable of withstanding the thermal endurance requirements of IEC 60079-0, prior to impact and IP54 testing.
   * Any enclosure must be capable of withstanding an impact of 7J or the module otherwise protected from impact.
   * The enclosure or location must provide an ingress protection of at least IP54.
   * If exposed to sunlight, non-metallic enclosures must be capable of meeting the requirements of IEC 60079-0 clause 26.10 regarding resistance to light
4. The installer is responsible for ensuring that the mounting of the module does not reduce the segregation distances between different modules. There shall be a minimum of 6 mm between any intrinsically safe terminals and other conductors or earthed metal, in accordance with IEC 60079-14:2007 clause 12.2.3. In addition, there shall be a minimum of 50 mm between the intrinsically safe terminals of the module and any non-intrinsically safe terminals.
5. When the module is *installed* in a *hazardous* area, 'live' connection and disconnection of the module from the rail is only permitted if the potentially explosive atmosphere is shown to be absent.
6. Each of the four channels, for the AIO or TEMP, or eight channels for the DIO, shall be treated as a separate intrinsically safe circuit
7. Each channel shares a common zero volts with the other channels in the module but is isolated from the zero volts of other modules. If the field devices do not maintain 500 Vac isolation from plant earth, then all the devices from a single module shall be installed in a location (such as the same vessel) where a difference in plant earth potential is unlikely to occur. If the field devices maintain 500 Vac isolation from plant earth, there is no such limitation
8. The quoted entity parameters of Co and Lo are applicable for the distributed capacitance and inductance in cable. Where there is lumped circuit capacitance or inductance in the connected equipment (represented by Ci and Li respectively), then lumped capacitance shall be limited to a maximum value of 1 µF for Group IIB and 600 nF for Group IIC and lumped inductance shall not exceed 50% of the quoted Lo

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Condition of Manufacture:

1. 100% of manufactured samples of transformers shall be subjected to a routine dielectric strength test in accordance with IEC 60079-11:2006 clause 11.2 as follows: 500 Vac shall be applied for a minimum of 60 s between the following
   * primary to secondary
   * primary to core
   * secondary to core

   Alternatively, a voltage of 600 Vac shall be applied for a minimum of 1 s. The current flowing shall not exceed that expected from the design and shall not exceed 5 mA at any time

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