1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 99ATEX3180** Issue: **6**

4 Equipment: **S4100C and S4100T Smart Sensors**

5 Applicant: **General Monitors Ireland Ltd**

6 Address: Ballybrit Business Park
Galway
Republic of Ireland

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

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of 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 intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2009 EN 60079-7:2007 EN 60079-18:2009 EN 60079-29-1:2007 (Model S4100C only)

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

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 and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 2 G
Ex emd IIC T5 Gb (T_a = -40°C to +55°C)
Ex emd IIC T4 Gb (T_a = -40°C to +70°C)

Project Number 70004674

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13 **DESCRIPTION OF EQUIPMENT**

The Model S4100 Smart Sensors units provide a control and interface function between gas sensors and external apparatus. A gas sensor may be fitted into a cable entry in the Smart Sensor or remotely connected to the Smart Sensor by a cable. There are two versions of the Smart Sensor as follows:

- Model S4100C is for use with a General Monitors hydrocarbon sensor head.
- Model S4100T is for use with a General Monitors H_2S sensor head.

Each Smart Sensor consists of control electronics encapsulated in a plastics box and housed within a Hawke ZPL615 Enclosure. Flying leads from the encapsulation are terminated in two Weidmuller terminal blocks. The cover of the enclosure is machined to accept a polycarbonate window, which is retained by the encapsulant. The two smart Sensors use very similar electronic circuits with the S4100C model having the most facilities.

Variation 1 - This variation introduced the following changes:

i. The replacement of some of the through hole, discrete, component resistors with surface mount technology (SMT) types.
ii. The introduction of minor changes that alter the tolerances of certain electrical components that are not safety-critical; these changes do not affect the operation of the equipment and have no effect on its properties that are relevant to explosion safety.
iii. The removal or replacement of a number of electrical components.
iv. The recognition of minor design modifications; these changes do not affect the properties of the product that are relevant to explosion safety.
v. The above changes i to iv may be used on the converter board, part number 31110A, that is utilised in the Model S4100C, S4100E and S4100T Smart Sensors and to recognise that the modified board is part number 31215A.
vi. The above changes 1 to 4 to be used on the control board, part number 31116B, that is utilised in the Model S4100C, S4100E and S4100T Smart Sensors and to recognise that the modified board is part number 31206B.
vii. The list of descriptive documents include parts lists that clarify the differences between the builds of the S4100C, S4100E and S4100T Smart Sensors.

Variation 2 - This variation introduced the following changes:

i. The sensors may be used as a safety related device as defined by Directive 94/9/EC Annex II clauses 1.5 and 1.6 with applicable sub-clauses, when used with type 11159-1, 11159-2, 11159-4, 11159-5, 11159-6, 11159-7 and 11159-1L, 11159-2L, 11159-4L, 11159-5L, 11159-6L, 11159-7L sensors.
ii. The inclusion of the following standards in the list of documents used to assure Compliance with the Essential Health and Safety Requirements with exception to those listed in the schedule to this certificate:
    - EN 61779-1
    - EN 61779-4

Variation 3 - This variation introduced the following changes:

i. The use of a threaded stopping plug and the introduction of an additional condition of certification that relates to this device were recognised.

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ii. **Variation 4** - This variation introduced the following changes:

i. The use of a replacement enclosure was allowed; this enclosure is a Type ZPL6**, manufactured by Hawke Cable Glands Limited, coded EEx e II and covered by certificate number BAS01ATEX2101U.
ii. The addition of an ATEX certified gas sensing head to the models S4100T and S4100C; this sensing head is coded EEx d IIC and covered by certificate number Sira 00ATEX1039U. These models therefore bear the following marking:
EEx emd IIC T5 (Tamb -40°C to +55°C)
EEx emd IIC T4 (Tamb -40°C to +70°C)
iii. The addition of an ATEX certified gas sensing head to the model S4100E; this sensing head is coded EEx d IIB + H_2 and covered by certificate number Demko 01ATEX130840. This model therefore bears the following marking:
EEx emd IIB + H_2 T5 (Tamb -40°C to +55°C)
iv. The option to use Weidmuller Type MK6 terminal blocks; these are coded EEx e II and covered by certificate numbers Sira 01ATEX3247U or BAS98ATEX3084U.
v. The use of alternative nameplate materials, anodised aluminium or stainless steel, both of which use the same adhesive backing as the original.
vi. The title description and Bill of Materials (BOM) list descriptions was changed.
vii. The amendment of clause 17.3 in the Conditions of Certification.

Variation 5 - This variation introduced the following changes:

i. The replacement of an SMT capacitor with a through-hole version having identical values, BOM 31216-1 and BOM 31216-2 refer.
ii. The A/D converter board to be changed to allow two common-mode chokes (L2 and L3) to be fitted, if these are not used, then the circuit may be by-passed by zero ohm links (R60 and R61).
iii. The introduction of the BOMs that incorporate the common-mode chokes.
iv. The introduction of extra options of the Smart Sensor to cover BV Approval.

Variation 6 - This variation introduced the following changes:

i. Following appropriate assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents previously listed in section 9 of the certificate, EN 50014:1997 (amendments A1 to A2), EN 50019:1994, EN 50028:1987, EN 61779-1:2000 and EN 61779-4:2000 were replaced by those currently listed; the markings in section 12 were updated accordingly and the conditions were modified to recognise the requirements of the latest standards.
ii. The following items were removed from the certification documentation:
- alternative terminals certified on certificate numbers BAS Ex 813094U and BAS 98ATEX3084U.
- alternative junction box certified on certificate number BAS Ex 94C3333.
- alternative junction box certified on certificate number BAS 01ATEX2101U.
- alternative gas sensing head on certificate number Demko 01ATEX130840.

iii. The list of certified documents was revised to recognise that the model S4100E Smart Sensor is no longer manufactured and has been removed from the drawings, in addition, the drawing list was rationalised to define only those currently used to manufacture the products.
iv. The description was modified to remove obsolete information; therefore, the reader is directed to the previous issues of this certificate to access this information.
v. The Conditions of Certification were reviewed and revised to;
- retrospectively recognise the certification associated with the stopping plugs used in the construction of these devices;
- list the new certificate that covers the Hawke ZPL615 Enclosure.
- introduce two new Conditions that recognise the need for routine testing;

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- add a new Condition to ensure that the end user is aware that the devices incorporate parts that are previously certified with Special Conditions for Safe Use.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	27 January 2000	R51X6412A	The release of the prime certificate.
1	30 April 2002	R53A8687A	The introduction of Variation 1; this document was revised 26 October 2004 by File no. 52V12440 to recognise the removal of some drawings associated with the prime certificate.
2	9 January 2003	R53A9621A	The introduction of Variation 2.
3	24 March 2003	53V9954	The introduction of Variation 3; this document was revised 15 May 2003 to correct a typographical error.
4	15 May 2003	53V9306	The introduction of Variation 4.
5	26 May 2006	R51A14863A	The introduction of Variation 5.
6	21 May 2014	R70004674A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 6, Issues 0 to 5 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 6.

15 SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

None

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 CONDITIONS OF CERTIFICATION

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

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17.3 The products covered by this certificate incorporate the following, previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of their products.

Product	Certificate Number	Key Attributes
Gas Sensing Head	Sira 00ATEX1039U (Iss 4)	Ex d IIC
Hawke ZPL615 Enclosure	BAS 06ATEX0116U	Ex e II
Weidmuller, BK4/E & BK 12/E Terminal Blocks	Sira 01ATEX3247U	Ex e II
General Monitors earth/stopping plug stainless steel with silicone gasket)	Epsilon 08ATEX2214X	Ex e II
Ex Innovations Limited stopping plug stainless steel with Fluorosilicone gasket	Sira 00ATEX1094X	Ex e IIC Gb

17.4 The manufacturer shall take all reasonable steps to ensure that the user/installer complies with the special conditions for certification associated with the equipment. In addition, the manufacturer shall provide the user/installer with an appropriate copy of the certificate for each certified device that is fitted in the equipment.

17.5 A visual inspection of the encapsulation shall be completed; no damage such as cracks, exposure of encapsulated parts, flaking, inadmissible shrinkage, swelling, decomposition failure of adhesion or softening shall be evident.

17.6 The dielectric strength test according to EN 60079-18:2009 clause 8.2.4 shall be applied between each circuit and earth, and between each circuit and encapsulant, for at least 1 second on the power supply, the test voltage shall be at least 500 V r.m.s. or 700 V d.c., alternatively, a test voltage multiplied by 1.2 may be applied and maintained for at least 100 ms.

17.7 The potting compound shall be General Electric type number RTV 615A with RTV 615B in a ratio of 10:1 by weight, as detailed in General Monitors specification number ES 108.

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