1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 03ATEX1295X** Issue: **10**

4 Equipment: **Model S4000C,S4000CH, S4000T, S4000TH, TS4000 and TS4000H Intelligent Gas Sensors**

5 Applicant: **General Monitors Inc.** **General Monitors Ireland Limited**

6 Address: 26776 Simpatica Circle
Lake Forest
California 92630
USA

Ballybrit Business Park
Galway
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 60079-1:2007 EN 60079-29-1:2007

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:

Model S4000CH

II 2 G
Ex d IIB+H_2 T5 Gb
(Ta -40°C to +70°C)
EN 60079-29-1

Model S4000TH

II 2 G
Ex d IIB+H_2 T5 Gb
(Ta -40°C to +70°C)

Model TS4000H

II 2 G
Ex d IIB+H_2 T5 Gb
(Ta -40°C to +70°C)

Note Models S4000C, S4000T and TS4000 were removed from the marking at Issue 9 as they are no longer manufactured and therefore are not included in the upgrade.

Project Number 70011827

C Ellaby
Deputy Certification Manager

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

13 **DESCRIPTION OF EQUIPMENT**

The Model S4000CH and S4000TH Intelligent Gas Sensor is intended to detect the presence of hydrocarbon or hydrogen sulphide gases in air. It comprises a two-part rectangular enclosure and a Universal Gas Sensor manufactured by General Monitors as detailed in Certificate No. Sira 00ATEX1039U. The main enclosure is manufactured from Stainless Steel or cast aluminium alloy and consists of a base, with mounting lugs on its two longer sides, and a flanged cover, these may be powder coated. The main enclosure contains the equipment electronics and a seven-segment display. The cover is attached to the base by four M6 recessed socket head cap screws and contains a glass window to allow the display to be viewed. The base has four female ¾" - 14 NPT cable entry holes tapped into its side walls; the ¾" containing the Universal Gas Sensor. All variants of the Model S4000 Intelligent Gas Sensor use the same main enclosure and have the following electrical parameters:

U_{nom} 24 V dc; U_i 36 V dc; P_i 7 W.

The Universal Gas Sensor has two forms, the HC Head and the H_2S Head. Both options use the same enclosure with only the internal arrangement differing. They are manufactured from stainless steel and are cylindrical in shape with a hexagonal shoulder in the middle. One end has a 250 μm sinter fused into the enclosure to allow gas penetration to be detected by the internal equipment, the other end contains a setting compound through which the equipment wiring passes. A ¾" thread form allows it to be mounted into the main enclosure.

The products are fitted with O-rings for the prevention of water and dust ingress and have been independently tested according to the requirements of EN 60529 to meet IP 66.

Design options:

- Other certified detector elements may be used, but only at remote locations via a suitable cable entry device and when mounted in accordance with the requirements detailed in their respective certificates and local installation requirements.
- The cover may be manufactured without the viewing window.
- The cable entry threadforms ¾" NPT are included.

The Toxic Gas Base Unit Model TS4000H comprises of a base unit fitted with an Intelligent Sensor Toxic Gas Interface Module Type TS4000(H) to Certificate No. Sira 04ATEX1383U. The TS4000H is intended to detect the presence of toxic gases or the amount of oxygen present in the atmosphere. All TS4000H models have the following electrical parameters:

U_m: 30 V dc; Pi: 3 W; Rated voltage: 24 V dc

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 03ATEX1295X**
Issue 10

Variation 1 - This variation introduced the following changes:

i. The base enclosure of the Model S4000 Intelligent Gas Sensor was fitted with an Intelligent Sensor Toxic Gas Interface Module Type TS4000 to Certificate No. Sira 04ATEX1383U, thus creating an Intelligent Sensor, Toxic Gas Base Unit Model TS4000.

The Intelligent Sensor, Toxic Gas Base Unit Model TS4000, is intended to detect the presence of toxic gases or the amount of oxygen present in the atmosphere. All TS4000 Intelligent Gas Sensor models have the following electrical parameters:

U_m: 30 V dc; Pi: 3 W; Rated voltage: 24 V dc

The Intelligent Sensor Toxic Gas Interface Module Type TS4000 may be fitted with one of the following electro-chemical cells:

CO	-	100 ppm	
CO	-	500 ppm	
Cl_2	-	10 ppm	
Cl_2	-	20 ppm	
ClO_2	-	3 ppm	
HCl	-	20 ppm	
NO	-	100 ppm	
NO_2	-	20 ppm	
NH_3	-	50 ppm	
NH_3	-	100 ppm	
O_3	-	1 ppm	
O_2	-	25%	(limited to less than 21%)
SO_2	-	20 ppm	
H_2S		20 ppm	
H_2S		50 ppm	
H_2S		100 ppm	
SO_2		100 ppm	
H_2		500 ppm	

Variation 2 - This variation introduced the following change:

i. The addition of an agency title block to a schedule drawing.

Variation 3 - This variation introduced the following change:

i. The Gas Sensor to be used in atmospheres containing hydrogen; the following certification code is therefore applicable:

EEx d IIB T5 (Ta -40°C to +70°C) replaced by EEx d IIB+H_2 T5 (Ta -40°C to +70°C)

Variation 4 - This variation introduced the following changes:

i. Model number S4000C part number 31140-** may be alternatively labelled with the HART registered trademark, the new model number and part number being S4000CH and 32425-** respectively.
ii. The type enclosure base machined design options to be removed from drawing 30380.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

Variation 5 - This variation introduced the following changes:

i. The introduction of model number S4000TH part number 32426-, this model is similar to the existing model number S4000T part number 31180-, but uses a modified display, control PCB and relay PCB.
ii. In retrospect, it is recognised that the existing model number S4000CH part number 3242- uses modified parts as detailed above, in addition, the HART registered trademark was removed from its product label.

Variation 6 - This variation introduced the following change:

i. The model TS4000 was allowed to be fitted with modified circuitry to accommodate HART protocol communication; the new model is identified as TS4000H.

Variation 7 - This variation introduced the following changes:

i. The use of stainless steel 316 as an alternative material of manufacture was endorsed.
ii. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents previously listed in section 9, EN 50014:1997 (amendments A1 to A2), EN 50018:2000 (amendment A1), 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 special condition for safe use was amended to recognise the new standard.
iii. The option to powder coat the enclosures was approved, the description has been amended accordingly.
iv. The following gases/values were added to the list: H_2S @ 20 ppm, H_2S @50 ppm, H_2S @ 100 ppm, SO_2 @ 100 ppm and H_2 @ 500 ppm. These additions do not affect the aspects of the product that are relevant to explosion safety

Variation 8 - This variation introduced the following changes:

i. The prevention of water and dust ingress and have been independently tested according to the requirements of EN 60529 to meet IP 66, having been IP65 previously. The description was amended to show the new Ingress Protection rating.
ii. The recognition of minor drawing modifications; Additional colour configurations and notes; 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.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	7 August 2003	R51A10293A	The release of the prime certificate.
1	18 December 2003	R51A10730A	Re-issued to permit the Model S4000 Intelligent Gas Sensor to 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.
2	7 October 2004	R52V12441A	Re-issued to include the changes detailed in report R52V12441A.
3	27 May 2005	R52A11671B	The introduction of Variation 1.
4	25 October 2005	R51A14003A	The introduction of Variation 2.
5	21 July 2006	R51A14411A	The introduction of Variation 3.
6	24 January 2008	R51A17754A	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 certificate conditions were reviewed. • The introduction of Variation 4.
7	8 September 2008	R51A18732A	The introduction of Variation 5.
8	14 April 2009	R51A20215A	The introduction of Variation 6.
9	12 December 2012	R25875A/00	The introduction of Variation 7.
10	19 December 2014	R70011827A	The introduction of Variation 8.

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

15.1 The Models S4000T and S4000TH Intelligent Gas Sensor and the Intelligent Sensors, Toxic Gas Models TS4000 nor TS4000H shall not be used as a Safety Related Device as defined by Directive 94/9/EC.

15.2 The S4000C and S4000CH Intelligent Gas Sensors have been subjected to performance testing, assuming an ambient temperature range of -25°C to +60°C, for Group II equipment indicating a volume fraction up to 100% lower explosive limit in accordance with EN 60079-29-1:2007 (S4000CH only). Therefore, they may be used as a safety related device as defined by Directive 94/9/EC Annex II clauses 1.5; this shall be considered when the S4000C and S4000CH Intelligent Gas Sensors are being installed and used.

15.3 When alternative detector elements are utilised, they shall only be mounted remotely in a suitably certified enclosure in accordance with the requirements of their respective certificates and relevant local requirements. The associated cable shall be connected to the Intelligent Gas Sensors using a suitably certified, cable entry device with a ¾" thread form.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

15.4 The maximum constructional gap (ic) is less than that required by Table 1 of EN 60079-1 and hence is as detailed below:

Description	Form	Maximum Gap (ic)	Minimum Length (L)
Between the main body and cover	Flange	0.1mm	11.30mm
Between the glass and the cover	Flange	0.1mm	13.49mm

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.

17.3 The products covered by this certificate incorporate 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.

17.4 Any non-isometric entries shall be clearly marked with their threadform.

17.5 The input power to the component approved Intelligent Sensor Toxic Gas Interface Module Types TS4000 and TS4000H shall be limited to 1 W.

17.6 Powder coating, when applied, is not to be applied to joint surfaces.

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com