



1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 03ATEX1295X** Issue: **15**

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 Ballybrit Business Park
Lake Forest Galway
California 92630 USA 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 Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, 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 60079-0:2012 + A11:2013 EN 60079-1:2014 EN 60079-29-1:2007 EN 60079-31:2014

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

11 This EU-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 GD
Ex db IIB+H₂ T4 Gb
Ex tb IIIC T135°C Db
(Ta -40°C to +70°C)
EN 60079-29-1

Model S4000TH



II 2 GD
Ex db IIB+H₂ T4 Gb
Ex tb IIIC T135°C Db
(Ta -40°C to +70°C)

Model TS4000H



II 2 GD
Ex db IIB+H₂ T5 Gb
Ex tb IIIC T100°C Db
(Ta -40°C to +70°C)

Project Number 70176777


R A Craig for
C Ellaby
Deputy Certification Manager

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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 $\frac{3}{4}$ " - 14 NPT cable entry holes tapped into its side walls; the $\frac{3}{4}$ " 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 H₂S 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 μ m 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 $\frac{3}{4}$ " 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 $\frac{3}{4}$ " 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; P_i : 3 W; Rated voltage: 24 V dc



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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; P_i : 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 ₂ S		20 ppm	
H ₂ S		50 ppm	
H ₂ S		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+H₂ 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.



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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: H₂S @ 20 ppm, H₂S @ 50 ppm, H₂S @ 100 ppm, SO₂ @ 100 ppm and H₂ @ 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.

Variation 9 - This variation introduced the following changes:

- i. Alternative colour configurations were approved.
- ii. The recognition of minor drawing modifications; the addition of a warning to the products' nameplates, the addition of note 10 in Drawing 30380, the addition of note 4 in drawing 31178; 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.

Variation 10 - This variation introduced the following changes:

- i. As a result of additional temperature rise testing, temperature limitations regarding cable selection and temperature rating of the cables were amended from 110°C to 80°C on the equipment marking label.
- ii. The property class of the screws used was added to the Conditions of Certification.
- iii. Following appropriate assessment to demonstrate compliance with the latest technical knowledge, EN 60079-0:2009 and EN 60079-1:2007 were replaced by EN 60079-0:2012 +A11 and EN 60079-1:2014, the products were also assessed against the requirements of EN 60079-31:2014 to verify suitability for Group IIIC applications, the markings in section 12 were updated accordingly.

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Variation 11 - This variation introduced the following changes:

- i. The specification of the cover screws was reviewed and revised as detailed below:
 - It was retrospectively recognised that carbon steel cover screws having a property class 8.8 have not been used on these products and that they were originally specified as 303 stainless steel with a property class A2-70; consequently, any reference to property class 8.8 has therefore been removed. In addition, the screw material has now been changed from 303 stainless steel with a property class A2-70 to 316 stainless steel with a property class A4-70.
 - The tolerance of the cover screw's combined shank and thread length was changed to align with ISO 4762/DIN 912.
 - The Special Condition for Safe Use associated with cover screws was modified; this is to ensure that any replacement screws are made from the correct material and constructed in accordance with the manufacturer's specification.

Variation 12 - This variation introduced the following changes:

- i. Incorporation of the temperature rise associated with the schedule of limitations/specific conditions of use previously certified component (Universal Gas Sensor Head), requiring a modification in temperature classification/maximum surface temperature marking, for the S4000CH and S4000TH only;
- ii. Perform a gap analysis for the Universal Gas Sensor Head to the requirements of EN 60079-1:2014 (previously certified to EN 60079-1:2007).
- iii. Modification of the manufacturer's company logo/trademark on the label drawings.

Variation 13 - This variation introduced the following changes:

- i. A full rationalisation of the scheduled drawings including the removal of obsolete drawings together with the recognition of minor drawing modifications which are administrative or involve changes to the design that do not affect the types of protection provided by the equipment. Significant changes include:
 - Added passivation process standard reference;
 - Added clarification as to which assemblies utilise the equipment enclosure;
 - Added/removed non-ATEX/IECEX related certification markings to the product nameplates;
 - Added details relevant to INMETRO certification requirements;
 - Added assembly configurations that utilise the cover and enclosure components intended to be marked with newly introduced ATEX/IECEX and INMETRO combined nameplates;
 - Removal of configuration options 31 to 38 inclusive currently specified on drawing number 32424.
- ii. Recognition of the optional use of the window O-ring gasket, and the bonded enclosure cover O-ring gasket.
- iii. To permit the full manufacturing address options to be applied to the name plates of models S4000CH & S4000TH.
- iv. The introduction of alternative product name plates that combine existing ATEX/IECEX related certification markings and INMETRO required certification markings.
- v. The introduction of a stainless steel cover assembly to be yellow TGIC or ADMA colour coated.
- vi. Recognition that model numbers S4000T, S4000C and TS4000 are no longer manufactured, this resulted in a change to the Specific Conditions of Use and Conditions of Manufacture.
- vii. Amendment to Specific Conditions of Use with regards to gas performance measurement.

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14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	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: <ul style="list-style-type: none">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.
11	16 March 2015	R70024073A	The introduction of Variation 9.
12	26 October 2015	R70034010A	The introduction of Variation 10
13	04 April 2016	R70056808A	The introduction of Variation 11.
14	22 June 2016	R70079585A	This Issue covers the following changes: <ul style="list-style-type: none">EC Type-Examination Certificate in accordance with 94/9/EC updated to EU Type-Examination Certificate in accordance with Directive 2014/34/EU. (<i>In accordance with Article 41 of Directive 2014/34/EU, EC Type-Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variations to such EC Type-Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.</i>)The introduction of Variation 12.
15	05 September 2018	R70176777A	The introduction of Variation 13.

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- 15 **SPECIFIC CONDITIONS OF USE** (denoted by X after the certificate number)
 - 15.1 The Model S4000TH Intelligent Gas Sensor and the Intelligent Sensors, Toxic Gas Model TS4000H shall not be used as a Safety Related Device as defined by Directive ATEX 2014/34/EU.
 - 15.2 The S4000CH Intelligent Gas Sensor has 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 for methane in accordance with EN 60079-29-1:2007. Therefore, it may be used as a safety related device as defined by Directive ATEX 2014/34/EU Annex II clause 1.5; this shall be considered when the S4000CH Intelligent Gas Sensor is 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 3/4" thread form.
 - 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	0.1 mm	11.30 mm
Between the glass and the cover	Flange	0.1 mm	13.49 mm

- 15.5 Only screw fasteners that have been supplied by the manufacturer shall be used as replacements, in addition, they shall be tightened to a torque value of 5.7 Nm (50 inch-pound).
- 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 MANUFACTURE**
 - 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
 - 17.2 Holders of EU-Type Examination Certificates are required to comply with the conformity to type requirements defined in Article 13 of Directive 2014/34/EU.
 - 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 Type TS4000H shall be limited to 1 W.
 - 17.6 Powder coating, when applied, is not to be applied to joint surfaces.

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