



1 **EU-TYPE EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 99ATEX1121U** Issue: **16**

4 Component: **'IR-Series Gas Sensors'**

5 Applicant: **SGX Europe Sp. z o.o.**

6 Address: **Ligocka 103
40-568 Katowice
Poland**

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

8 CSA Group Netherlands B.V. notified body number 2813 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 component has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of a component 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 IEC 60079-1: 2014 Ed. 7

10 The sign 'U' is placed after the certificate number to indicate that the product assessed is a component and may be subject to further assessment when incorporated into equipment. Any limitations of use are listed in the schedule to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified component. If applicable, further requirements of this Directive apply to the manufacture and supply of this component.

12 The marking of the component shall include the following:

IR1nGJS and INIR-GG Series



II 2G
Ex db IIC Gb
Ta -40°C to +75°C

IRI5TT-A - Series

Ex db IIC Gb
Ta -25°C to +75°C

All other Series



II 2G
Ex db IIC Gb
Ta -20°C to +55°C

Project Number 80065177

Signed: J A May

Title: Director of Operations

CSA Group Netherlands B.V.
Utrechtseweg 310, Building B42,
6812AR, Netherlands



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13 DESCRIPTION OF COMPONENT

Type IR Gas Sensing Heads comprise of a cylindrical stainless steel body housing an infra-red emitter and one or more detectors. Electrical connections are made via pins that pass through a potting compound at the rear of the device. Gas enters the device via two wire meshes, one of which is brazed into the inside of the front face of the enclosure, the second retained by the internal components. The meshes offer a protection against dust ingress of IP5X.

The detector is a pyroelectric type and may be varied to detect a number of different gases. The single detector versions have six or seven pins, the twin-detector builds have eight. If required, all versions of the IR Gas sensors apart from the models excluded in the Special Condition for Safe Use may be used in intrinsically safe circuits as a galvanically isolating device with infallible separations between the lamp and detector circuits up to 10 V. The maximum input power is 2.5 W.

Variation 1 - This variation permitted the following changes:

- i. The introduction of an 8-pin twin-gas version, incorporating an additional receiver and consequential changes to the PCB layout
- ii. The modification to the special condition for safe use relating to the thermal resistance of the enclosure.
- iii. An increase in the maximum power from 1.0 W to 2.5 W
- iv. The ambient temperature range became -20°C to +55°C (formerly -20°C to +44°C)
- v. The Applicant's name was changed from 'Marconi Applied Technologies' to 'e2v Technologies Ltd'

Variation 2 - This variation permitted the following changes:

- i. The introduction of an alternative method of retaining the wire mesh.
- ii. The introduction of an alternative re-routed PCB to take TO5 or TO39 Dual Package Detectors.
- iii. The introduction of optional thermistor or temperature sensor components.

Variation 3 - This variation permitted the following changes:

- i. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments A1 to A2), and EN 50018:2000, were replaced by those currently listed, the markings in section 12 were updated accordingly. This re-assessment also endorsed the modifications listed below:
 - The removal of option to fit TO-5 in single and dual channel detectors for carbon dioxide
 - The removal of option to fit "6-Pin, one TO-5 or TO-39 detector" minisensor PCB
 - The removal of surface mount PCB option
 - The option to utilise two alternative 7-Pin PCB track layouts
 - The inclusion of a hand painted conformal coating
- ii. The recognition of minor drawing modifications; these changes are administrative and do not affect the aspects of the product that are relevant to explosion safety.
- iii. The component description and special conditions for safe use were amended.

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Variation 4 - This variation permitted the following changes:

- i. The artwork drawings were changed to omit the reference to the supplier of the FR4 board material and specify another (non-certification) drawing.
- ii. An alternative lamp with a filament support was introduced to improve mechanical robustness.
- iii. The inclusion of mesh support and glass perform items to the main assembly.
- iv. An alternative PCB was added to the IR1xxxxxxx-series; this places the sensor closer to the incandescent lamp for improved response.

Variation 5 - This variation introduced the following changes:

- i. The label drawing N25541R was withdrawn and replaced with drawing N30088A, revision 3 which includes a new product identity for the end user and an optional bar code.
- ii. The product title was changed from IR1xxx to IR1xxxxxxx, the previous references in the description and variations being modified accordingly.

Variation 6 - This variation introduced the following changes:

- i. The introduction of a solder resist (mask) layer was approved.
- ii. The introduction of alternative sourced Pyroelectric detectors was endorsed.
- iii. The correction of minor typographical errors on drawings was accepted.

Variation 7 - This variation introduced the following change:

- i. The Applicant's name and address was changed from e2v Technologies (UK) Limited, 106 Waterhouse Lane, Chelmsford, Essex CM1 2QU, UK to SGX Sensortech (IS) Ltd 2 Hanbury Road, Widford Industrial Estate, Chelmsford, Essex CM1 3AE.

Variation 8 - This variation introduced the following change:

- i. The introduction of the IR1nGJS Series which is rated at 1.5 W and operates in an ambient temperature range of -40°C to +75°C.
- ii. The addition of Ci and Li values and the clarification of the excluded models in the Special Condition for Safe Use dealing with the intrinsically safe applications.

Variation 9 - This variation introduced the following change:

- i. The introduction of Gas Sensor model numbers INIR-GG (Integrated IR) and IR15TT-A (Dual with amplifier) and the removal of the generic model references IR1-xFx and IR1-xHx. As a result, the Component title was changed from IR1xxxxxxx-Series Gas Sensing Head to Type IR-Series Gas Sensors. (Note: the following table clarifies the references of all the models currently in production). The Special Conditions for Safe Use were reviewed and revised to recognise this change and the ambient temperature ranges and safety parameters that are applicable to all models.

Previous generic model references	Current generic model references
IR1nBD	IR1nBD
IR1nBR	IR1nBR
IR1-xTx	IR15TT
IR1-xTx	IR15TT-R
IR1-xEx,	IR1nEM

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Previous generic model references	Current generic model references
IR1-xEx,	IR1nEJ
IR1-xGx	IR1nGM
IR1-xGx	IR1nGJ
IR1nGJS	IR1nGJS
INIR-GG	INIR-GG
IR15TTA.	IR15TT-A

- ii. The recognition of minor drawing/typographical modifications to drawing numbers PAD-0118; these changes are administrative and do not affect the aspects of the product relevant to explosion safety.
- iii. The drawings were reviewed and rationalised to produce a list of documents that are currently used in support of production.
- iv. The inclusion of drawing number H545535A that confirms the dimensional and electrical ratings of the incandescent lamp.

Variation 10 - This variation introduced the following change:

- i. Following appropriate re-assessment to demonstrate compliance with the requirements of the latest technical knowledge, EN 60079-0: 2006 and EN 60079-1:2007, were replaced by EN 60079-0:2012 and IEC 60079-1: 2014 Ed. 7.

Variation 11 - This variation introduced the following change:

- i. The Applicant's name and address was changed from SGX Sensortech (IS) Ltd 2 Hanbury Road, Widford Industrial Estate, Chelmsford, Essex CM1 3AE, UK to SGX Europe Sp. z o.o, Ligocka 103, 40-568 Katowice, Poland.

Variation 12 - This variation introduced the following change:

- i. To update the drawing PAD-0118 to allow the use of an "identical" detector from an alternative supplier for some of the sensors' range for certificates.

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 February 2000	R51A4986A	The release of the prime certificate.
1	13 March 2000	R51A4986B	The prime certificate was re-issued to permit report number R51A4986B to replace number R51A4986A.
2	11 July 2002	R52A7947A	The prime certificate was re-issued to permit the removal of the Group I coding.
3	12 May 2004	R52V9860A	The prime certificate was re-issued to permit the product to be re-branded in the name of e2v Technologies Ltd.
4	12 November 2004	R52A10469A	The introduction of Variation 1.

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Issue	Date	Report number	Comment
5	3 May 2007	R51A16599A	The introduction of Variation 2.
6	18 June 2008	R51A16683D	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 introduction of Variation 3.
7	23 February 2009	R52L18828A	The introduction of Variation 4.
8	28 January 2011	R24261A/00	The introduction of Variation 5.
9	18 April 2012	R25570A/00	The introduction of Variation 6.
10	13 November 2012	R29090A/00	The introduction of Variation 7.
11	27 September 2013	R30229A/00	The introduction of Variation 8.
12	20 October 2014	R70006963A	The introduction of Variation 9.
13	10 March 2015	R70004681A R70004681B	The introduction of Variation 10.
14	12 February 2016	R70050289A	The introduction of Variation 11.
15	09 August 2016	R70075622A	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.
16	22 December 2020	R80065177A	Transfer of certificate Sira 99ATEX1121U from Sira Certification Service to CSA Group Netherlands B.V..

15 SCHEDULE OF LIMITATIONS

15.1 These Gas Sensing Heads shall be installed/used in accordance with the following restrictions:

Reference	Safety description when used in an IS circuit			Power	Ambient temp.
	Lamp	Detector	Lamp+detector		
IR1nBD	U _i = 7.2 V, C _i = 0, L _i = 0	U _j = 10 V, C _i = 0, L _i = 0	P _i = 2.5 W	2.5 W	-20°C to +55°C
IR1nBR	U _i = 7.2 V, C _i = 0, L _i = 0	U _j = 10 V, C _i = 0, L _i = 0	P _i = 2.5 W	2.5 W	-20°C to +55°C
IR15TT	Not IS			2.5 W	-20°C to +55°C
IR15TT-R	Not IS			2.5 W	-20°C to +55°C
IR1nEM	Not IS			2.5 W	-20°C to +55°C
IR1nEJ	Not IS			2.5 W	-20°C to +55°C
IR1nGM	Not IS			2.5 W	-20°C to +55°C
IR1nGJ	Not IS			2.5 W	-20°C to +55°C

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Reference	Safety description when used in an IS circuit			Power	Ambient temp.
	Lamp	Detector	Lamp+detector		
IR1nGJS	Not IS			1.5 W	-40°C to +75°C
INIR-GG	Not IS			1.5 W	-40°C to +75°C
IR15TT-A	Not IS			1.5 W	-25°C to +75°C

- 15.2 The IR1nGJS Series shall not be used with the following active detectors:
- H545579A (carbon dioxide)
 - H545580A (methane)
 - H545581A (reference)
 - H548533A (hydrocarbon)
 - H549098A (acetylene)
 - H773980-series (various TO18 detectors)
- 15.3 The thermal resistance of the Gas Sensing Heads do not exceed 25 K/W. This shall be taken into account when considering its surface temperature and the temperature classification of the equipment into which it is to be incorporated. Tests indicated that an internal ignition raises the temperature of the mesh by a further 4.2 K (including a 1.2 safety factor).
- 15.4 The Gas Sensing Heads shall be protected from impact in service. The Sensing Head shall be mounted in a protective enclosure such that an impact of 7 J in accordance with IEC 60079-0:2007 clause 26.4.2 from any direction shall not cause the impact head to make contact with the Sensing Head.
- 15.5 The Gas Sensing Heads are dust-proof (IP5X) but offers no protection against the ingress of water. Where protection in excess of IP50 is required, then the apparatus into which the IR1xxxxxxx is installed shall provide the necessary ingress protection (for example by fitting an external semi-permeable membrane).
- 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 CSA 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.

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Certificate Annexe

Certificate Number: Sira 99ATEX1121U
Component: 'IR-Series Gas Sensors'
Applicant: SGX Europe Sp. z o.o.



Issue 0 and Issue 1

Drawing	Sheet	Rev	Date	Description
DAS546577BA	1 of 1	2	19 Jan 00	IR1xxx Series Certification Drawing
N25541R	1 of 1	2	19 Jan 00	Label

Issue 2

Drawing	Sheet	Rev	Date	Description
DAS546577BA	1 of 1	3	08 Jul 02	IR1xxx Series Certification Drawing
N25541R	1 of 1	4	10 Dec 01	Label

Issue 3

Drawing	Sheet	Rev	Date	Description
DAS546577BA	1 of 1	4	21 Mar 03	IR1xxx Series Certification Drawing
N25541R	1 of 1	5	28 Mar 03	Label

Issue 4

Drawing	Sheet	Rev	Date	Description
DAS546577BA	1 to 2	5	07 Jul 03	IR1xxx general assembly
N25541R	1 to 2	8	05 Oct 04	Label

Issue 5

Drawing	Sheet	Rev	Date (Sira stamp)	Description
DAS546577BA	1 of 3	8	27 Apr 07	IR1 Series Gas Sensor General Assembly
DAS546577BA	2 of 3	8	27 Apr 07	IR1 Series Gas Sensor General Assembly
DAS546577BA	3 of 3	8	27 Apr 07	IR1 Series Gas Sensor General Assembly

Issue 6

Drawing	Sheet	Rev	Date	Description
N25541R	1 of 1	10	11 Jun 08	Label
DAS546577BA	1 to 4	9	06 Jun 08	IR1 Series Gas Sensor General Assembly

Issue 7

Drawing	Sheet	Rev	Date (Sira stamp)	Description
DAS546577BA	1 to 4	10	23 Feb 09	IR1 Series Gas Sensor General Assy
H766212A	1 of 1	1	23 Feb 09	T-1 Incandescent Lamp with Filament Support

Issue 8

Drawing	Sheets	Rev	Date (Sira stamp)	Description
N30088A	2 of 2	3	26 Jan 11	Label

Note – Drawing N25541R withdrawn at Variation 5.

Issue 9

Drawing	Sheets	Rev	Date (Sira stamp)	Description
das 546577BA	1 to 4	11	17 Apr 12	IR1 series Gas sensor

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Certificate Annexe

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Issue 10

Drawing	Sheets	Rev	Date (Sira stamp)	Description
LBL - 0008	1 to 2	2	13 Nov 12	IR1 Label

Issue 11

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
LBL-0100	1 to 2	1	30 Jul 13	IR1nGJS ATEX & IEC Certified Label
PAD-0118	1 to 4	1	30 Jul 13	IR1 Series Gas sensor General Assembly

Note - Drawing PAD-0118 replaces drawing DAS546577BA.

Issue 12

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
COM-0183	1 of 1	1	06 Oct 14	Infrared Gas Sensor Lamps
H545535A	1 of 1	4	06 Oct 14	T-1 Incandescent lamp
LBL - 0008	1 to 2	3	06 Oct 14	IR1 Series and INIR Series ATEX & IEC Certified Label
LBL - 0100	1 to 2	2	06 Oct 14	IR1nGJS ATEX & IEC Certified Label
PAD-0118	1 to 7	2	06 Oct 14	IR Series Gas sensors ATEX & IECEx General Assembly
H766212A	1 of 1	1	23 Feb 09	T-1 Incandescent Lamp with Filament Support

Issue 13

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
LBL-0008	1 to 2	4	25 Feb 15	IR1 Series and INIR Series ATEX & IEC Certified Label
LBL-0100	1 to 2	3	25 Feb 15	IR1nGJS ATEX & IEC Certified Label

Issue 14

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
LBL-0008	1 to 3	5	03 Dec 15	IR1 Series and INIR Series ATEX & IEC Certified Label
LBL-0100	1 to 2	4	03 Dec 15	IR1nGJS ATEX & IEC Certified Label

Issue 15

Drawing	Sheets	Rev.	Date (Sira Stamp)	Title
PAD-0118	1 to 7	3	10 Jun 16	IR Series Gas sensors ATEX & IECEx General Assembly

Issue 16 – No new drawings were introduced.

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