



EU-TYPE EXAMINATION CERTIFICATE

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

Certificate Number: **Sira 17ATEX2083X**

Issue: **6**

Equipment: **Model G7c Portable Safety Monitor and Gas Detection Equipment**

Applicant: **Blackline Safety**

Address: Suite 101, 1215 – 13 St SE, Calgary, Alberta, T2G 3J4, Canada

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

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.

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 60079-11:2012

EN 60079-1:2014

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.

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.

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.

The marking of the equipment shall include the following:

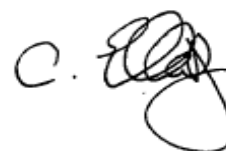
Base unit with a standard cartridge, Base unit with a single-gas cartridge or Base unit with a multi-gas cartridge that uses digital sensors and pellistor sensors:



II 1 G

Ex da ia IIC T4 Ga

-20°C to +55°C



Project Number 70186240

C Ellaby
Deputy Certification Manager

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13 DESCRIPTION OF EQUIPMENT

The G7c is a worker monitoring and gas detection instrument that collects real-time information, such as, surrounding environmental conditions, the worker's location and their movement to detect falls and no-motion, any of which could trigger an alert when reported back to a central server through the cellular network. Location information is calculated using a combination of GPS, proprietary indoor beacons and cellular triangulation. The G7c is a body-worn device powered by a 3.8 V, lithium polymer battery. There are three, basic versions of the G7c, all of which use a common, main base unit fitted with any one of the following, interchangeable cartridges:



- a standard cartridge with no-gas module
- a single-gas cartridge (the type of gas sensor can be selected according to application)
- a Multi-gas cartridge (the types of gas sensor can be selected according to application)

The G7c main unit fitted with a multi-gas cartridge incorporates a component certified pellistor sensor. The following lists the pellistor sensor certification information,

Model no:	VQ548MP-DA
Manufacturer:	SGX Sensortech
Approval information:	OBAC 18 ATEX 0024U
Ex Rating:	Ex da IIC Ga
Ambient range:	-40°C to +60°C
Maximum external surface temperature:	88°C

Variation 1 - This variation introduced the following changes:

- The Marking applicable to each of the G7c versions was clearly defined, thus allowing the Specific Condition of Use associated with marking to be removed. (Note: the type of sensors used in the construction the quad-gas cartridges affects the overall marking attributed to the equipment, a new Condition of Manufacture ensures that the products will not be marked with conflicting information.)
- The Description of Equipment was amended to make the association of the main base unit with the interchangeable cartridges clearer and to recognise throughout that the product name is G7c.
- The value of current in the Specific Condition of Use that defines the requirements for charging was increased from 1 A to 2 A.
- The 100 pF capacitors C815, C816 and C817 were removed.
- A 1 µF capacitor, C115, was added.
- U81 was renamed as U801.
- Ri114, Ri124, Ri134, Ri152, Ri316, Ri317, and Ri318 are now on a range of 300 Ω to 350 Ω. Ri120, Ri122, Ri130, Ri132, Ri140, and Ri142 were adjusted to set the current clamp shut-off value to match the calculated value.
- Uncontrolled resistors R815, R816 and R817 were removed.
- The PCB layout was modified to remove conformal coating requirements.

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- x. The standard cartridge with no-gas module was modified to move the crystal on the microcontroller and to address a mechanical interference issue.
- xi. The single-gas cartridge PCBA was modified by adding one footprint for a small decoupling capacitor to increase RF immunity.
- xii. The requirement to routinely test the RF Shutoff Circuit active current limiter is no longer needed, therefore, the Condition of Manufacture was removed.

Variation 2 - This variation introduced the following changes:

- i. The introduction of the quint-gas cartridge, the quad and quint gas cartridges are generically known as a multi-gas cartridge.
- ii. The introduction of a new single gas cartridge that is used PID and CO₂ sensors only; the previous model supports electrochemical sensors.

Variation 3 - This variation introduced the following changes:

- i. Revision to Quint-gas Cartridge Module to add components C201, C218, R111, R214, R215 and R216.
- ii. Revision to Single-Gas PID Cartridge Module to add components C201, C218, R214, R216 and to remove components iR200, iR204, iR206, R201, R202, R203, R204, R205, R207, R211, R212, R213, C209, C216, C217, U201.

Variation 4 - This variation introduced the following changes:

- i. Replacement of the existing component certified pellistor sensor VQ548MP with the new component certified Catalytic gas sensor type VQ548MP-DA., resulting in EN 60079-1:2014 being added to the list of standards with the relevant change to the marking.
- ii. Addition of an alternative non-metallic front label material.
- iii. The manufacturer documents were updated incorporating editorial changes.
- iv. The product description is changed to address the change in the terminology "quad and Quint-gas" to "Multi-gas" and to include the component certification details of pellistor sensor that is fitted with the multi-gas cartridge.
- v. The marking section is changed to address the removal of marking "Ex ia IIB and Group II Category 2 Ex ib IIC" and add "da" protection level to "Ex ia IIC" based on modification i above.

Variation 5 - This variation introduced the following change:

- i. The addition of new capacitors and resistors in the G7c multi-gas cartridge module.

Variation 6 - This variation introduced the following changes:

- i. Addition of pump board (two designs) to the quint gas module.
- ii. Update to the main board.
- iii. Update to the single gas module.
- iv. Update to the G7 speaker board.
- v. Update to the Manufacturer's documentation based on the above modifications.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

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14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	07 April 2017	R70106936A	The release of the prime certificate.
1	27 July 2017	R70131436A	The introduction of Variation 1.
2	05 December 2017	R70151733A	The introduction of Variation 2.
3	10 January 2018	R70165246A	The introduction of Variation 3.
4	23 May 2018	R70172236A	The introduction of Variation 4.
5	25 May 2018	R70175996A	The introduction of Variation 5.
6	18 October 2018	R70186240A	The introduction of Variation 6.

15 **SPECIFIC CONDITIONS OF USE** (denoted by X after the certificate number)

- 15.1 The equipment shall only be charged when in the non-hazardous area using a charger specifically supplied for use with the unit (for example part number SAW06D-050-1000xx, manufactured by Shenzhen Shi Ying Yuan Electronics Co., Ltd.), approved as SELV or Class 2 equipment against IEC 60950, IEC 61010-1 or an equivalent IEC standard. The maximum voltage and current from the charger shall not exceed 5.625 Vdc and 2 A respectively.

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 G7c incorporates a previously certified combustible gas sensor. It is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with this device. The manufacturer shall inform Sira of any modifications to the device that may impinge upon the explosion safety design of the G7c.

Certificate Annexe



Certificate Number: Sira 17ATEX2083X

Equipment: Model G7c Portable Safety Monitor and Gas Detection Equipment

Applicant: Blackline Safety

Issue 0

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Description
01329-21257	1 to 7	H	09 Mar 17	Front Shell
01329-A6959	1 to 7	F	09 Mar 17	Back Shell
01329-21261	1 to 4	C	09 Mar 17	Latch
01329-24672	1 to 6	E	09 Mar 17	No Gas Front Shell
01329-24673	1 to 6	F	09 Mar 17	No Gas Back shell
01329-21259	1 to 6	F	09 Mar 17	Single Module Front Shell
01329-21260	1 to 6	F	09 Mar 17	Single Module Back Shell
01329-24836	1 to 6	B	09 Mar 17	Quad Module Front Shell
01329-24837	1 to 6	D	09 Mar 17	Quad Module Back Shell
00842-L117	1 of 1	A	09 Mar 17	Belt Clip
01329-A7200	1 of 1	H	09 Mar 17	Membrane Assy
01329-21819	1 of 1	B	09 Mar 17	Back Label
01329-24839	1 of 1	A	09 Mar 17	Quad Module Label
01329-A6931	1 of 1	A	09 Mar 17	Main PCB Potting Bottom
01329-A6931	1 of 1	A	09 Mar 17	Main PCB Potting Top
CC G7C	1 to 2	1.0	22 Mar 17	Main PCB Conformal Coat
SCH 101983	1 to 12	04	09 Mar 17	SCH Main Board
SCH 102105	1 of 1	00	09 Mar 17	SCH Microphone
SCH 102106	1 of 1	01	09 Mar 17	SCH Speaker
SCH 102148	1 of 1	01	09 Mar 17	SCH No Gas
SCH 102260	1 of 1	04	22 Mar 17	SCH Single Gas
SCH 102261	1 to 7	02	22 Mar 17	SCH 4 Gas Digital
SCH 102317	1 to 7	02	22 Mar 17	SCH 4 Gas Pellistor
BOM 101983	1 to 3	04	09 Mar 17	BOM Main Board
BOM 102105	1 of 1	00	09 Mar 17	BOM Microphone
BOM 102106	1 of 1	01	09 Mar 17	BOM Speaker
BOM 102148	1 of 1	01	09 Mar 17	BOM No Gas
BOM 102260	1 to 2	04	09 Mar 17	BOM Single Gas
BOM 102261	1 to 2	02	09 Mar 17	BOM 4 Gas Digital
BOM 102317	1 to 2	02	22 Mar 17	BOM 4 Gas Pellistor
PCB 101970	1 to 28	02	09 Mar 17	PCB Main Board
PCB 102103	1 to 20	00	09 Mar 17	PCB Microphone
PCB 102104	1 to 20	01	09 Mar 17	PCB Speaker
PCB 102144	1 to 20	01	09 Mar 17	PCB No Gas
PCB 101989	1 to 20	04	09 Mar 17	PCB Single Gas
PCB 102146	1 to 22	02	09 Mar 17	PCB 4 Gas Digital
PCB 102145	1 to 22	02	09 Mar 17	PCB 4 Gas Pellistor
PCB G7PCM	1 to 20	00	09 Mar 17	PCB G7CPCM
L-A8189	1 to 2	A	09 Mar 17	Narada G7C Battery pack
0186_SA_MD	1 of 1	1	28 Mar 17	G7 Product Label
0279_SA_MD	1 of 1	2	05 Apr 17	G7 Quad Gas Cartridge Product Label

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Sira Certification Service

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Certificate Annexe



Certificate Number: Sira 17ATEX2083X

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Applicant: Blackline Safety

Issue 1

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Description
SCH 101983	1 to 12	05	09 Jun 17	SCH Main Board
BOM 101983	1 to 3	05	09 Jun 17	BOM Main Board
PCB 101970	1 to 28	03	09 Jun 17	PCB Main Board
SCH 102148	1 of 1	02	12 Jul 17	SCH No Gas
SCH 102260	1 of 1	05	12 Jul 17	SCH Single Gas
BOM 102148	1 of 1	02	12 Jul 17	BOM No Gas
BOM 102260	1 to 2	05	12 Jul 17	BOM Single Gas
PCB 102144	1 to 20	02	12 Jul 17	PCB No Gas
PCB 101989	1 to 20	05	12 Jul 17	PCB Single Gas

Issue 2

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Description
BOM_102433	1 to 1	01	06 Oct 17	G7 Single-Gas Cartridge (PID, CO2)
BOM_102414	1 to 2	01	06 Oct 17	G7 Quint-Gas Cartridge (LEL - IR, PEL; COSH; O2; AG, PID, CO2)
PCB_102413	1 to 15	01	29 Sep 17	G7QGCTG-01-xx
PCB_102432	1 to 15	01	29 Sep 17	G7PIDCTG-01-xx
PCB_102449	1 to 15	01	29 Sep 17	G7QGCTG-01-xx (S2-PID)
SCH_102433	1 to 4	01	29 Sep 17	G7 Quint-Gas Cartridge Block Diagram (Single Gas)
SCH_102414	1 to 7	01	29 Sep 17	G7 Quint-Gas Cartridge Block Diagram (Quint Gas)
0279_SA_MD	1 of 1	2	28 Nov 17	G7 Quad Gas Cartridge Product Label

Issue 3

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
SCH_102414	1 to 7	03	21 Dec 17	G7 Quint-Gas Cartridge Block Diagram (Quint Gas)
BOM_102414	1 to 1	03	21 Dec 17	G7 Quint-Gas Cartridge (LEL - IR, PEL; COSH; O2; AG, PID, CO2)
PCB_102449	1 to 15	03	21 Dec 17	G7QGCTG-03-xx (S2-PID)
PCB_102413	1 to 15	03	21 Dec 17	G7QGCTG-03-xx
SCH_102433	1 to 4	02	21 Dec 17	G7 Quint-Gas Cartridge Block Diagram (Single Gas)
BOM_102433	1 to 1	02	21 Dec 17	G7 Single-Gas Cartridge (PID, CO2)
PCB_102432	1 to 15	02	21 Dec 17	G7PIDCTG-01-xx

Issue 4

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
0186_SA_MD	1 of 1	3	16 Mar 18	G7 Product label
01329-A11824	1 of 1	A	08 Feb 18	Front label (alternate material)
20180308	1 of 1	1	09 Mar 18	Multi-Gas Mechanical Capture of sensors

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Certificate Annexe



Certificate Number: Sira 17ATEX2083X

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Issue 5

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
BOM_102414	1 to 1	04	06 Mar 18	G7 Quint-Gas Cartridge (LEL - IR, PEL; COSH; O2; AG, PID, CO2)
SCH_102414	1 to 7	04	06 Mar 18	G7 Quint-Gas Cartridge Block Diagram (Quint Gas)
PCB_102413	1 to 15	04	06 Mar 18	G7QGCTG-04-xx
PCB_102449	1 to 15	04	06 Mar 18	G7QGCTG-04-xx (S2-PID)

Issue 6

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
01568-34328	1 of 1	B	11 Sep 18	Loner M7 Quad pump label
01568-34835	1 to 3	C	11 Sep 18	Valve Cap
01568-A12202	1 to 6	B	11 Sep 18	Loner M7 Quad pump back shell w-inserts
01568-A12297	1 to 6	B	11 Sep 18	Loner M7 Quad pump back cover w-insert
BOM_101983	1 to 2	10	11 Sep 18	G7c Main board
BOM_102106	1 of 1	02	11 Sep 18	G7 Speaker board
BOM_102260	1 of 1	07	11 Sep 18	Single Electrochemical Sensor cartridge
BOM_102618	1 of 1	04	11 Sep 18	G7 Pump board
BOM_102618a	1 of 1	05	11 Sep 18	G7 Pump board
PCB_101970	1 to 26	06	11 Sep 18	GasEx (Main Board)
PCB_101989	1 to 20	06	11 Sep 18	LGASCTG-06-xx (Single gas board)
PCB_102104	1 to 20	02	11 Sep 18	G7SPKR-02-xx (Speaker board)
PCB_102596	1 to 15	04	11 Sep 18	G7QGCTG-04-xx(S2-PID,PUMP) (Quint gas board)
PCB_102597	1 to 15	04	11 Sep 18	G7QGCTG-04-xx(S2-EC,PUMP) (Quint gas board)
PCB_102619	1 to 13	04	11 Sep 18	G7PUMP-04-xx (Pump board)
PCB_102619a	1 to 13	05	11 Sep 18	G7PUMP-05-xx (Pump board)
SCH_101983	1 to 12	10	17 Oct 18	Main board
SCH_102106	1 of 1	02	12 Sep 18	LATEX Speaker (Speaker board)
SCH_102260	1 of 1	07	17 Oct 18	Single gas cartridge
SCH_102618	1 of 1	04	12 Sep 18	Pump test (Pump board)
SCH_102618a	1 of 1	05	12 Sep 18	Pump test (Pump board)

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