



UNITED KINGDOM CONFORMITY ASSESSMENT

1 **UK TYPE EXAMINATION CERTIFICATE**

2 Equipment Intended for use in Potentially Explosive Atmospheres
UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

3 Certificate Number: **CSAE 21UKEX2218X** Issue: **3**

4 Product: **G7 EXO model numbers G7EXO-AZ2, G7EXO-EU2, G7EXO-NA2**

5 Manufacturer: **Blackline Safety**

6 Address: **Unit 100, 803 - 24 Ave SE
Calgary
Alberta T2G 1P5
Canada**

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

8 CSA Group Testing UK Limited, Approved Body number 0518, in accordance with Regulation 42 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations. 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 has been assured by compliance with:


EN IEC 60079-0:2018 EN 60079-11:2012 EN 60079-26:2014-10 Ed. 3.0

Except in respect of those requirements listed at Section 16 of the schedule to this certificate. The above standards may not appear on the UKAS Scope of Accreditation, but have been added through flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the product is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This UK TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of this product shall be in accordance with Regulation 41 and include the following:

 II 1 G
Ex ia IIC T3 Ga
Ta = -20°C to +50°C

Name:
Title: Director of Operations



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13 DESCRIPTION OF PRODUCT

Transportable long-term area gas monitor instrument G7 EXO Models G7EXO-AZ2, G7EXO-EU2 and G7EXO-NA2 are 3 models of multi-gas monitor which continuously monitor toxic and combustible gas concentrations using a variety of sensors types using various measuring principles. All combustible sensor types are compatible with G7EXO, including IR, electrochemical, MPS™, and catalytic bead pellistor LEL sensors. The G7 EXO Models is equipped with with integrated cellular modules supporting several forms of connectivity. The G7 EXO Models are intended for automated long-term area gas monitor.

The models G7EXO-AZ2, G7EXO-EU2 and G7EXO-NA2 share the same enclosure and firmware. Besides the different model designation on the nameplates, the differences between the models G7EXO-AZ2, G7EXO-EU2 and G7EXO-NA2 follow:

Country Dependent Cell Radio Modules

G7EXO-NA2:

MOD300 (cellular):

LTE: Band 12 (700 MHz), Band 5 (850 MHz), Band 4 (1700 MHz), Band 2 (1900 MHz)
3G: Band 5 (850 MHz), Band 2 (1900 MHz)

G7EXO-EU2:

MOD300 (cellular):

LTE: Band 20 (800 MHz), Band 3 (1800 MHz), Band 7 (2600 MHz),
2G: E-GSM 900 MHz, DCS 1800 MHz

G7EXO-AZ2:

MOD300 (cellular):

LTE: Band 28 (700 MHz), Band 8 (900 MHz), Band 3 (1800 MHz)
3G: Band 1 (2100 MHz)

All models also contain the following communications modules on the main board (EXO Main):

U400: receive only radio module, no transmission capabilities
U501: 2.4GHz BT/BLE/WiFi

The housing is constructed of Aluminum (ANSI 380.0-F). The front of the monitor has an LCD Display, with buttons to change menu items. There is also an Alarm Reset switch. All models are powered by a rechargeable Lithium polymer battery. The Lithium polymer battery must be replaced and charged outside the hazardous area.

Product overview:

Input Entity Parameters, Group IIC (Zone 0):

Parameters	EXO – Input Power Port for Solar Panel Input / Trickle Charger gas application
Terminals	External Side Connector Pin 1 – Input Power Pin 2 – GND Pin 3 – Debug Port Pin 4 – Debug Port

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Parameters	EXO – Input Power Port for Solar Panel Input / Trickle Charger gas application
Voltage U_i	16Vdc
Current I_i	687mA
Power P_i	5.3W
Effective internal capacitance C_i	0nF
Effective internal inductance L_i	12.48uH

Output Entity Parameters, Group IIC (Zone 0):

Parameters	EXO – Relay Outputs 1 & 2 gas application
Terminals	External Side Connector Pin 1 – Input for Low Side Switch Pin 2 – GND Pin 3 – Output(20V) Pin 4 – Output(5V)

Pin 1 Input Entity Parameters	
Voltage U_i	24VDC
Current I_i	3.33A
Power P_i	1.25W
Effective internal capacitance C_i	0μF
Effective internal inductance L_i	0H

Pin 3 Entity Parameters - high output models (G7EXO-NA2 serial# 35880xxxxx, G7EXO-EU2 serial# 35882xxxxx, G7EXO-AZ2 serial# 35884xxxxx)	
U_o	20.76VDC
I_o	268mA
P_o	1.39W
C_o	0.194μF
R_o	77.46Ω
L_o	495μH
L_o/R_o	6.39 μH/Ω

Pin 3 Entity Parameters - low output models (G7EXO-NA2 serial# 35881xxxxx, G7EXO-EU2 serial# 35883xxxxx, G7EXO-AZ2 serial# 35885xxxxx)	
U_o	20.76VDC
I_o	93mA
P_o	0.479W
C_o	0.194μF
R_o	226Ω
L_o	4.1mH
L_o/R_o	18.2μH/Ω

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Pin 4 Entity Parameters - high output models (G7EXO-NA2 serial# 35880xxxxx, G7EXO-EU2 serial# 35882xxxxx, G7EXO-AZ2 serial# 35884xxxxx)	
U _o	4.94VDC
I _o	0.108A
P _o	97mW
C _o	100µF
U _o /I _o	33.25Ω
L _o	3.05mH
L _o /R _o	91.7µH/Ω
Pin 4 Entity Parameters - low output models (G7EXO-NA2 serial# 35881xxxxx, G7EXO-EU2 serial# 35883xxxxx, G7EXO-AZ2 serial# 35885xxxxx)	
U _o	3.6VDC
I _o	1.21A
P _o	3.0W
C _o	1000µF
U _o /I _o	1.1Ω
L _o	24.28µH
L _o /R _o	21.9µH/Ω

Incorporating the following changes:

- i. Addition of 3 components: Rmod1, Rmod2, Dmod1 impacting power control.
- ii. The introduction of Satellite Module PCB, PUMP Module PCB, Addition of Single cell battery, Reduction of entity parameters for High Voltage Output, Review of conditions of manufacture and EXO G7 Hardware Implementation of approved modifications; per the content from CSA Letter of Attestation Project 80063121.
- iii. The introduction of City Tech 4P75C Pellistor Sensor for use with EXO G7; per the content from CSA Letter of Attestation Project 80067121.
- iv. The introduction of Custom Testing of Piezo with modified enclosure; per the content from CSA Custom Test Project 80061640, WO8582.
- v. The introduction of revised Enclosure drawings updates for Front Enclosure, Back Enclosure, Battery Back Enclosure and Battery Front Enclosure.
- vi. The introduction of High Output Models and Low Output Models; with revised and new Entity Parameters; the Equipment Description was amended to include the new Serial # description which has been appended to the Existing Models.

Variation 1 - This variation introduced the following changes:

- i. Evaluation to include a new pump model.
- ii. Define maximum pump parameters.

Variation 2 - This variation introduced the following changes:

- i. Update to G7EXO (Schematic, BOM, PCB)
 - incorporate alternates for current clamp (TIS Project: 80109743)
 - Cell Zone: R312, R313
 - GPS - DIG1 Zone: Q402, R415, C416, C417

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- DIG1 Zone: Change flash(U202,U204) to 104027 (IC FLASH 128MBIT SPI 8WPDFN) and 104052 (IC FLASH 1GBIT SPI 133MHZ 8WPDFN)
- Minor Mechanical updates to enclosure
- ii. Update to EXOSAT(Schematic, BOM, PCB)
 - update EXOSAT (SCH, BOM, PCB)
 - mechanical change to board outline
- iii. Addition of CSA Letter of Attestation
 - Project 80070938(Alternate Potting Material)
 - Project 80097624(Alternate Potting Material)
 - Project 80125461(Alternate Potting Material)
- iv. Addition of IEC 60079-26:2014-10 Ed. 3.0
 - Equipment with Equipment Protection Level (EPL) Ga

Variation 3 - This variation introduced the following changes:

- i. The introduction of mono solar panel model JYG-5W-M as an approved accessory for use with G7EXO based on update to equipment input entity parameters.
- ii. Addition of drawing listing all approved potting materials for use with G7 EXO.
- iii. The recognition of new potting material.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Reports and Certificate History

Issue	Date	Report number	Comment
0	29 June 2021	R80086699A	The release of the prime certificate.
1	07 March 2022	R80107410A	The introduction of Variation 1.
2	24 August 2022	R80118391A	The introduction of Variation 2.
3	Inserted when issued	R80157605A	The introduction of Variation 3.

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

- 15.1 The enclosure is manufactured from Aluminium, magnesium, titanium or zirconium which may be used at the accessible surface of the equipment. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered when the EXO is being installed in Zone 0 locations for group II level of protection Ga.

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS (REGULATIONS SCHEDULE 1)

In addition to the Essential Health and Safety Requirements covered by the standards listed in Section 9, all other requirements are demonstrated in the relevant reports.

17 PRODUCTION CONTROL

- 17.1 Holders of this certificate are required to comply with production control requirements defined in Schedule 3A, as applicable, and CSA Group Testing UK Regulations for Certificate Holders



Certificate Annexe

Certificate Number: CSAE 21UKEX2218X

Product: G7 EXO model numbers G7EXO-AZ2, G7EXO-EU2, G7EXO-NA2

Manufacturer: Blackline Safety

Issue 0

Drawing	Sheets	Rev.	Date (Stamp)	Title
LBL_103418	1 of 1	6a	22 Jun 21	EXO Product Label

Issue 1 – No new drawings were introduced.

Issue 2

Drawing	Sheets	Rev.	Date (Stamp)	Title
BOM_102873r	1 of 1	12	03 Aug 22	EXO main
PCB_102872	1 to 6	6	03 Aug 22	EXO main
SCH_102873	1 to 17	12	03 Aug 22	EXO main
BOM_103049	1 of 1	5	03 Aug 22	EXO satellite
PCB_103048	1 to 6	4	03 Aug 22	EXO satellite
SCH_103049	1 of 1	5	03 Aug 22	EXO satellite
MAN_103635	1 to 26	9	03 Aug 22	EXO technical user manual
01696-38547	1 to 9	H	03 Aug 22	Front enclosure
01696-38557	1 to 4	C	03 Aug 22	Right pump cover
01696-38558	1 to 3	C	03 Aug 22	Left pump cover
01696-38562	1 to 5	D	03 Aug 22	Right bumper
01696-38563	1 of 1	D	03 Aug 22	Left bumper
01696-41977	1 to 3	E	03 Aug 22	Keypad
01696-42130	1 of 1	F	03 Aug 22	Tripod plate
01696-42271	1 to 2	K	03 Aug 22	Window
01696-42328	1 to 3	C	03 Aug 22	Handle bumper
01696-43709	1 of 1	B	03 Aug 22	Speaker Grill
01696-49269	1 to 2	C	03 Aug 22	Absorber Pad
01696-65089	1 to 4	C	03 Aug 22	Diffusion Ventilated Door
01696-65108	1 to 3	D	03 Aug 22	Diffusion Door Gas Channel
01696-A16222	1 to 2	H	03 Aug 22	Antenna & Speaker Sub-Assembly

Issue 3

Drawing	Sheets	Rev.	Date (Stamp)	Title
01696-A18940	1 of 1	C	03 May 23	MAIN PCB Potting Procedure
01696-A19146	1 of 1	C	03 May 23	BATTERY PCB Potting Procedure
06196-A19148	1 of 1	B	03 May 23	SAT MODULE PCB Potting Procedure
106164	1 of 1	0	03 May 23	G7 EXO Approved Potting Materials



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