CorDEX

# INSTRUCTIONS FOR SAFE USE

## EXIS™ LITHIUM 7.4V
INTRINSICALLY SAFE
BATTERY PACK


RUGGED AUTHORITY

www.cord-ex.com

# CONTENTS



# SAFETY INFORMATION

Read and understand all warnings and cautions before using this product.

### Overview

The CorDEX Instruments EXIS Battery Pack is an intrinsically safe battery pack. The EXIS Battery Pack is designed to be used in hand-held devices as an Ex Component. The battery pack includes the safety critical components that limit the output parameters.

A protector is provided for mechanical protection and to maintain IP54 rating when the battery pack is not assembled in a host device.

### Safety Information

This instruction manual contains information and warnings that must be observed for safe operation under the conditions described.

### Faults and Damage

If there are any grounds to believe the unit is no longer safe to use, it must be taken out of service and measures taken to prevent its further unintentional use.

The safety of the device may be impaired if for example:

- External damage to the unit is visible.
- The device has not been stored correctly.
- The unit has suffered transport damage.

### Safety Regulations

When using the EXIS Intrinsically Safe Battery Pack the appropriate regulations must be observed to avoid incorrect operation of the device.

**ATTENTION! ENSURE THAT THE BATTERY PACK IS PROPERLY ATTACHED WHEN IN USE.**

### Special Conditions of Safe Use

- The EXIS Battery Pack cannot be used in hazardous areas except with a certified host device.
- In hazardous areas the protector should be in place when the battery pack is not attached to a host device.
- Only CorDEX approved accessories are permitted to be used in the EXIS battery pack.
- Only LG ICR18650D1 Lithium cells are approved to be used within this Ex Component as follows:

  Operating temperature: -10˚C to 40˚C
  Charging temperature: 0˚C to 45˚C

# SAFETY INFORMATION

**Installation and Setting to Work**

For the installation, maintenance and cleaning of the units observe the applicable regulations and provisions concerned with explosion protection (EN 60079-0, EN 60079-14).

**Transportation and Storage**

Transport and store without imposing excessive mechanical stresses.
Store in a cool dry place.

**Cleaning and Maintenance**

The EXIS Battery Pack and accessories require no maintenance. For safety critical maintenance, please refer to EN60079-17.

**Safety Precautions**

For the installation, maintenance and cleaning of the units observe the applicable regulations and provisions concerned with explosion protection (EN 60079-0, EN 60079-14).

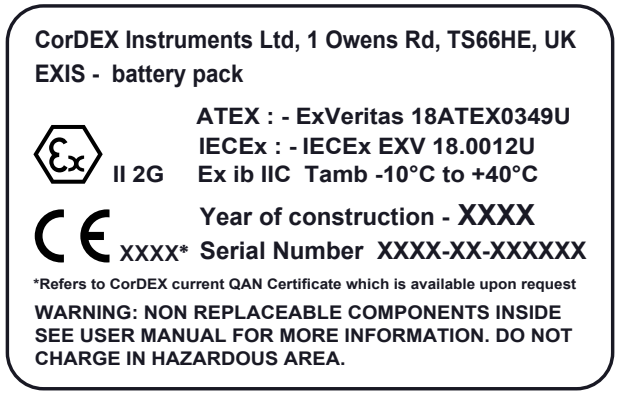
**Aggressive Substances and Environments**

Consideration shall be given to the risk of degradation of the camera due to aggressive substances. Additional protection may be required.

**Exposure to External Stresses**

The EXIS Battery Pack is not intended for use with vibration, impact and heat stresses beyond its design capability. Additional protection may be required.

# LABELLING




**Manufacturer Contact Information**

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Fax: +44 (0)1642 424737

CorDEX Instruments Limited
Unit 1 Owens Road
Skippers Lane Industrial Estate
Middlesbrough
TS6 6HE

# EC DECLARATION OF CONFORMITY

CorDEX

CorDEX Instruments Ltd
1 Owens Road
Skippers Lane Industrial Estate
Middlesbrough
TS6 6HE

Declaration No. SO17 Rev. A

**EC Declaration of Conformity**
**In accordance with EEC ATEX Directive 2014/34/EU**

We
CorDEX Instruments Ltd
Hereby declare that the products described below;

Product: EXIS Battery
Model: EXIS 740 Battery

are in conformity with the essential health and safety requirements of Council Directive 2014/34/EU relating to equipment intended for use in potentially explosive atmospheres (ATEX Directive) Ex II 2G Ex ib IIC (Ta = -10°C to +40°C) equipment, by the application of the following Standards:-

| | |
|---|---|
| BS EN 60079-0:2012 + A11:2013 | Explosive atmospheres - Part 0: Equipment – General requirements |
| BS EN 60079-11:2012 | Explosive atmospheres. Equipment protection by intrinsic safety "i" |

and are subject to the procedure set out in Annex VII of Directive 2014/34/EU and these procedures are in conformity with the requirements of EN 80079-34 under the supervision of Notified Body Number 0518, SIRA Certification Ltd. Unit 6, Hawarden Industrial Park, Hawarden, Deeside, CH5 3US.

It is ensured through internal measures that the products conform at all times to the requirements of EU Directive 2011/65/EU on the restriction of certain hazardous substances in electrical and electronic equipment (ROHS Directive) and other current EEC Directives and relevant standards

Signature: Authorised Person

Position: Managing Director on behalf of CorDEX Instruments Ltd

Date: 18/05/2018

RUGGED AUTHORITY Form Revision Date 28/04/2016 www.cord-ex.com

# EU TYPE EXAMINATION CERTIFICATE

ExVeritas®

1 **EU - Type Examination Certificate**

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

3 Certificate Number: ExVeritas 18 ATEX 0349U Issue: 0

4 Equipment: Intrinsically Safe Battery Pack EXIS

5 Manufacturer: CorDEX Instruments Limited

6 Address: Unit 1 Owens Road, Skippers Lane Industrial Estate
Middlesbrough, Cleveland
TS6 6HE, United Kingdom

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

8 ExVeritas, Notified Body number 2585 in accordance with Article 9 of the Council Directive 2014/34/EU of 26 February 2014, certifies that this component has been found to comply with the Essential Health and Safety Requirements relating to design and construction of equipment and protective systems for use in potentially explosive atmospheres given in Annex II to the Directive

9 Compliance with the applicable Essential Health and Safety Requirements has been assured by compliance with the following Standards and section 18 of this report:

EN 60079-0:2012+A11:2013
EN 60079-11:2012

10 If the sign "U" placed after the certificate number indicates that this certificate must not be mistaken for a certificate intended for an equipment or protective system. This partial certification may be used as the basis for certification of an equipment or protective system.

11 This EU-Type Examination Certificate relates only to the design, construction, examination and tests of the specified component in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this component. These are not covered by this certificate.

12 The marking of the equipment shall include the following:

Ex II 2G Ex ib IIC Ta = -10°C to +40°C

UKAS PRODUCT CERTIFICATION
No. 8613

On behalf of ExVeritas
S D'Henin
Certification Manager

This certificate may only be reproduced in its entirety and without any change, schedule included.
The certificate is only valid when it carries an original signature.
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**Schedule**

13 Description of Equipment or Protective System

The intrinsically safe battery pack EXIS is designed to be used in hand-held devices as an Ex Component. It is comprised of two LG ICR18650D1 Lithium cells connected in series and a board that includes the safety critical components that limit the output parameters. The cells and the board are encapsulated and housed in a suitable enclosure, this enclosure includes an external connector that is covered by a cap to provide mechanical protection and IP54 rating when not assembled in a host device.

Electrical Output Parameters

Host equipment provided with infallible galvanic insulation:

| Terminals combination | $U_o$ | $I_o$ | $P_o$ | $U_{constant}$ | $P_{constant}$ | $C_i$ and $L_i$ |
|---|---|---|---|---|---|---|
| PWR_EXIS_DSP vs PWR_0V | 8.4 V | 750 mA | 1.6 W | 7.6 V | 1.2 W | Negligible |
| PWR_EXIS_LCD vs PWR_0V | 8.4 V | 750 mA | 1.6 W | 7.6 V | 1.2 W | Negligible |
| PWR_EXIS_SENSOR vs PWR_0V | 8.4 V | 750 mA | 1.6 W | 7.6 V | 1.2 W | Negligible |
| PWR_EXIS_VRAIL1 vs PWR_0V | 8.4 V | 657 mA | 1.4 W | 7.6 V | 920 mW | Negligible |
| PWR_EXIS_VRAIL2 vs PWR_0V | 8.4 V | 657 mA | 1.4 W | 7.6 V | 920 mW | Negligible |
| EXIS_CONTROL vs PWR_0V | 8.4 V | 18 mA | 40 mW | 7.6 V | 31 mW | Negligible |

NOTES:

- Each power circuit has the same PWR_0V potential, because all the lines are connected to the negative pole of the cells series association. However, each circuit has a PWR_0V line infallible segregated of the others, which assure that the combination of the currents at only one PWR_0V line is not possible to the output.
- Constant Power and Voltage shall be considered for thermal evaluations.

When the host equipment is provided without galvanic insulation and the different IS circuits can be combined, the following parameters apply:

$U_o$ = 8.4 V
$I_o$ = 3.6 A
$P_o$ = 7.5 W

Constant parameters:

| | |
|---|---|
| PWR_EXIS_DSP: | U = 7.6 V @ I = 425 mA @ P = 1.2 W |
| PWR_EXIS_LCD: | U = 7.6 V @ I = 425 mA @ P = 1.2 W |
| PWR_EXIS_SENSOR: | U = 7.6 V @ I = 425 mA @ P = 1.2 W |
| PWR_EXIS_VRAIL1: | U = 7.6 V @ I = 425 mA @ P = 920 mW |
| PWR_EXIS_VRAIL2: | U = 7.6 V @ I = 425 mA @ P = 920 mW |
| EXIS_CONTROL: | U = 7.6 V @ I = 16 mA @ P = 31 mW |
| PWR_0V under fault: | I = 2.14 A |

Charger rating shall be according to the following:
Um = 8.4 V







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**Schedule**

14 Descriptive Documents

14.1 Associated Report and Certificate History:

| Report Number | Cert Issue Date | Issue | Comment |
|---|---|---|---|
| R1525/A/1 | 06/06/2018 | 0 | Initial issue of the Prime Certificate |

14.2 Compliance Drawings:

**Issue 0**

| Title: | Drawing No.: | Rev. Level: | Date: |
|---|---|---|---|
| EXIS BatteryPack System | CDX1000-200 | 1.3d | 2015/05/21 |
| CorDEX EXIS-740 BatteryPack System Schematic BOM | CDX1000-201 | 1.3d | 2015/05/21 |
| Instructions for Safe Use Intrinsically Safe Battery Pack | EE740SOM | C | 2018/03/21 |
| EXIS BatteryPack schematic | CDX1000-220 | 1.3 | 2015/04/30 |
| EXIS BatteryPack BOM (Certification) | CDX1000-222 | 1.3 | 2015/05/21 |
| EXIS BatteryPack PCB fabrication drawing | CDX1000-223 | 1.3 | 2015/05/01 |
| EXIS BatteryPack PCB assembly drawing | CDX1000-224 | 1.3 | 2015/05/01 |
| EXIS BatteryPack RS274 (gerbers) | CDX1000_EXISBatteryPack | 1.3 | 2015/05/01 |
| EXIS PackConn schematic | CDX1000-240 | 1.4 | 2016/03/07 |
| EXIS PackConn BOM (Certification) | CDX1000-242 | 1.4 | 2016/03/11 |
| EXIS PackConn PCB fabrication drawing | CDX1000-243 | 1.4 | 2016/03/10 |
| EXIS PackConn PCB assembly drawing | CDX1000-244 | 1.4 | 2016/03/10 |
| EXIS PackConn RS274 (gerbers) | CDX1000_EXISPackConn | 1.4 | 2016/03/07 |
| EXIS BatteryPack General Assembly | CDX1000-019 | D | 2018/04/06 |
| EXIS BatteryPack encapsulation | CDX1000-025 | D | 2015/07/25 |
| EXIS BatteryPack clip General Assembly | CDX1000-030 | D | 2018/04/06 |
| EXIS BatteryPack rating plate | CDX1000-441 | E | 2018/04/06 |

15 Conditions of Certification

# IECEx CERTIFICATE OF CONFORMITY

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**Schedule**

15.1 Schedule of Limitations:

- *This an Ex Component and cannot be used in explosive atmospheres if not certified with a host device.*
- *Only LG ICR18650D1 Lithium cells are approved to be used on this Ex Component.*
- *The capacitance and inductance of the host device shall be assessed in accordance with the maximum parameters provided in the specifications.*

15.2 Conditions for Use
*(Routine Tests)*

N/A

16 Essential Health and Safety Requirements

Essential Health and Safety Requirements are addressed by the standards listed in section 9 and where required the report listed in section 14.1

The manufacturer shall inform the Notified Body of any modifications to the design of the product described by this schedule.

ExVeritas 18 ATEX 0349U Issue 0

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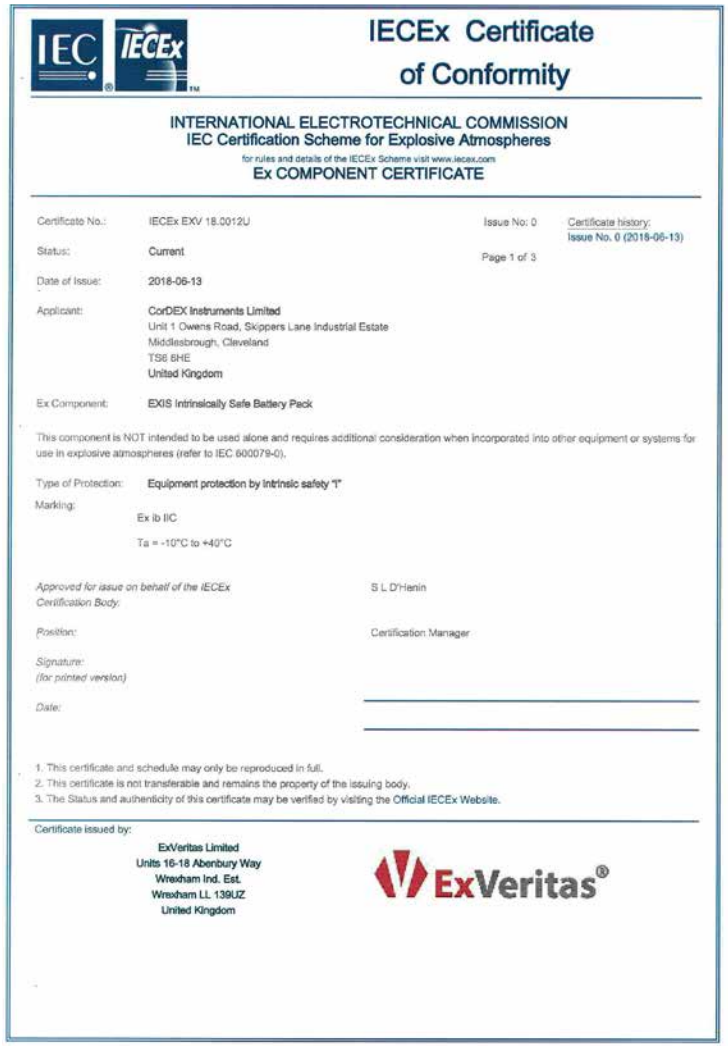

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com
Ex COMPONENT CERTIFICATE

Certificate No.: IECEx EXV 18.0012U Issue No: 0 Certificate history: Issue No. 0 (2018-06-13)

Status: Current Page 1 of 3

Date of Issue: 2018-06-13

Applicant: CorDEX Instruments Limited
Unit 1 Owens Road, Skippers Lane Industrial Estate
Middlesbrough, Cleveland
TS6 6HE
United Kingdom

Ex Component: EXIS Intrinsically Safe Battery Pack

This component is NOT intended to be used alone and requires additional consideration when incorporated into other equipment or systems for use in explosive atmospheres (refer to IEC 600079-0).

Type of Protection: Equipment protection by intrinsic safety "i"

Marking: Ex ib IIC
Ta = -10°C to +40°C

*Approved for issue on behalf of the IECEx Certification Body:* S L D'Henin

*Position:* Certification Manager

*Signature: (for printed version)*

*Date:*

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

ExVeritas Limited
Units 16-18 Abenbury Way
Wrexham Ind. Est.
Wrexham LL 139UZ
United Kingdom

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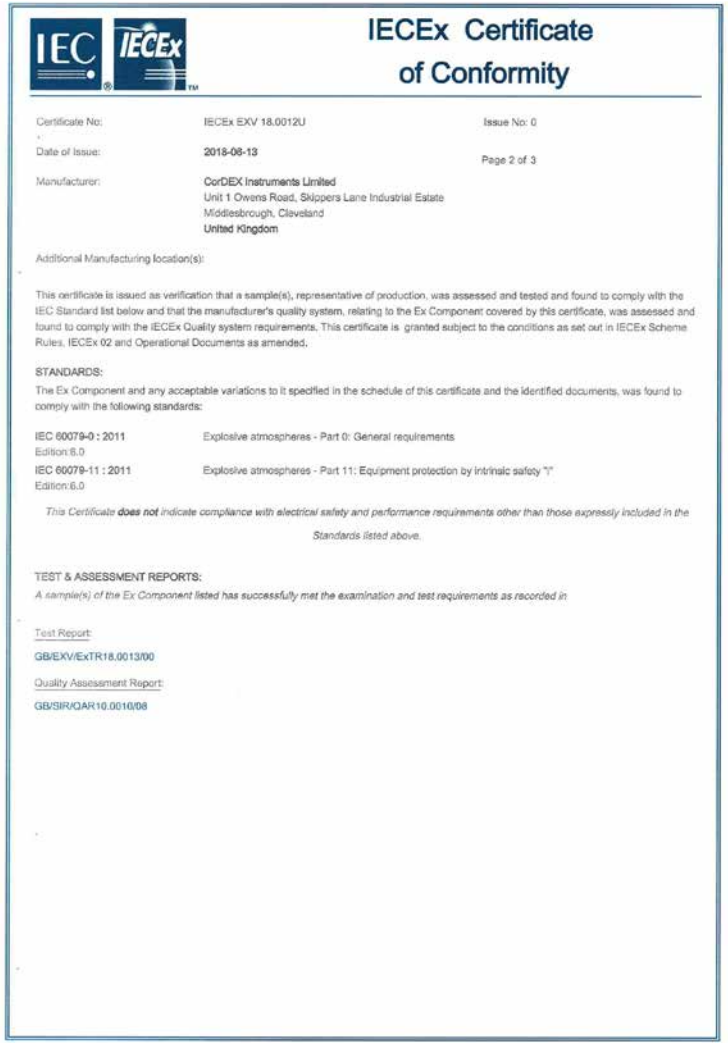

# IECEx Certificate of Conformity

Certificate No: IECEx EXV 18.0012U Issue No: 0

Date of Issue: 2018-08-13 Page 2 of 3

Manufacturer: CorDEX Instruments Limited
Unit 1 Owens Road, Skippers Lane Industrial Estate
Middlesbrough, Cleveland
United Kingdom

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex Component covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The Ex Component and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Explosive atmospheres - Part 0: General requirements
Edition:6.0

IEC 60079-11 : 2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

*A sample(s) of the Ex Component listed has successfully met the examination and test requirements as recorded in*

Test Report:

GB/EXV/ExTR18.0013/00

Quality Assessment Report:

GB/SIR/QAR10.0010/08

# IECEx Certificate of Conformity

Certificate No: IECEx EXV 18.0012U Issue No: 0

Date of Issue: 2018-08-13 Page 3 of 3

Schedule

Ex Component(s) covered by this certificate is described below:

The intrinsically safe battery pack EXIS is designed to be used in hand-held devices as an Ex Component. It is comprised of two LG ICR18650D1 Lithium cells connected in series and a board that includes the safety critical components that limit the output parameters. The cells and the board are encapsulated and housed in a suitable enclosure, this enclosure includes an external connector that is covered by a cap to provide mechanical protection and IP54 rating when not assembled in a host device.

Refer to attachment for further details.

SCHEDULE OF LIMITATIONS:

1. This is an Ex Component and cannot be used in an explosive atmospheres if not certified with a host device.
2. Only LG ICR18650D1 Lithium cells are approved to be used in this Ex Component.
3. The capacitance and inductance of the host device shall be assessed in accordance with the maximum parameters provided in the specifications.

Annex:

Annex - IECEx EXV 18.0012U.pdf

Annex to: IECEx EXV 18.0012U Issue 0

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**Description Continued:**

Electrical Output Parameters

Host equipment provided with infallible galvanic insulation:

| Terminals combination | $U_o$ | $I_o$ | $P_o$ | $U_{external}$ | $P_{external}$ | $C_o$ and $L_o$ |
|---|---|---|---|---|---|---|
| PWR_EXIS_DSP vs PWR_0V | 8.4 V | 750 mA | 1.6 W | 7.6 V | 1.2 W | Negligible |
| PWR_EXIS_LCD vs PWR_0V | 8.4 V | 750 mA | 1.6 W | 7.6 V | 1.2 W | Negligible |
| PWR_EXIS_SENSOR vs PWR_0V | 8.4 V | 750 mA | 1.6 W | 7.6 V | 1.2 W | Negligible |
| PWR_EXIS_VRAIL1 vs PWR_0V | 8.4 V | 667 mA | 1.4 W | 7.6 V | 920 mW | Negligible |
| PWR_EXIS_VRAIL2 vs PWR_0V | 8.4 V | 667 mA | 1.4 W | 7.6 V | 920 mW | Negligible |
| EXIS_CONTROL vs PWR_0V | 8.4 V | 18 mA | 40 mW | 7.6 V | 31 mW | Negligible |

NOTES:

- Each power circuit has the same PWR_0V potential, because all the lines are connected to the negative pole of the cells series association. However, each circuit has a PWR_0V line infallible segregated of the others, which assure that the combination of the currents at only one PWR_0V line is not possible to the output.
- Constant Power and Voltage shall be considered for thermal evaluations.

When the host equipment is provided without galvanic insulation and the different IS circuits can be combined, the following parameters apply:

$U_o$ = 8.4 V
$I_o$ = 3.6 A
$P_o$ = 7.5 W

Constant parameters:

| | |
|---|---|
| PWR_EXIS_DSP: | U = 7.6 V @ I = 425 mA @ P = 1.2 W |
| PWR_EXIS_LCD: | U = 7.6 V @ I = 425 mA @ P = 1.2 W |
| PWR_EXIS_SENSOR: | U = 7.6 V @ I = 425 mA @ P = 1.2 W |
| PWR_EXIS_VRAIL1: | U = 7.6 V @ I = 425 mA @ P = 920 mW |
| PWR_EXIS_VRAIL2: | U = 7.6 V @ I = 425 mA @ P = 920 mW |
| EXIS_CONTROL: | U = 7.6 V @ I = 16 mA @ P = 31 mW |
| PWR_0V under fault: | I = 2.14 A |

Charger rating shall be according to the following:
Um = 8.4 V

**Routine Tests:**

N/A

**Schedule of Limitations:**

1. This is an Ex Component and cannot be used in an explosive atmospheres if not certified with a host device.
2. Only LG ICR18650D1 Lithium cells are approved to be used in this Ex Component.
3. The capacitance and inductance of the host device shall be assessed in accordance with the maximum parameters provided in the specifications.



Annex to: IECEx EXV 18.0012U Issue 0

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**Manufacturer's documents:**

| Title: | Drawing No.: | Rev: | Date: |
|---|---|---|---|
| EXIS BatteryPack System | CDX1000-200 | 1.3d | 2015/05/21 |
| CorDEX EXIS-740 BatteryPack System Schematic BOM | CDX1000-201 | 1.3d | 2015/05/21 |
| Instructions for Safe Use Intrinsically Safe Battery Pack | EE740SOM | C | 2018/03/21 |
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| EXIS PackConn PCB assembly drawing | CDX1000-244 | 1.4 | 2016/03/10 |
| EXIS PackConn RS274 (gerbers) | CDX1000_EXISPackConn | 1.4 | 2016/03/07 |
| EXIS BatteryPack General Assembly | CDX1000-019 | D | 2018/04/06 |
| EXIS BatteryPack encapsulation | CDX1000-025 | D | 2015/07/25 |
| EXIS BatteryPack clip General Assembly | CDX1000-030 | D | 2018/04/06 |
| EXIS BatteryPack rating plate | CDX1000-441 | E | 2018/04/06 |

Document Reference EXISSOM Rev. C