



Instruction Manual

Operator Instructions for Wireless ATEX/IECEX Intrinsically Safe Tension & Compression Load Cells



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1. OPERATING INSTRUCTIONS

1.1 Introduction

This manual refers to the LCM Systems range of ATEX and IECEx certificated Intrinsically Safe (Ex i) wireless tension and compression load cells. This and any reference documents should be read and understood before installing or operating any LCM systems ATEX/IECEx wireless load cell. All LCM Systems ATEX/IECEx wireless load cells will be accompanied by a general arrangement drawing or datasheet, calibration certificate, declaration of conformity and a copy of LCM Systems ATEX/IECEx certificates.

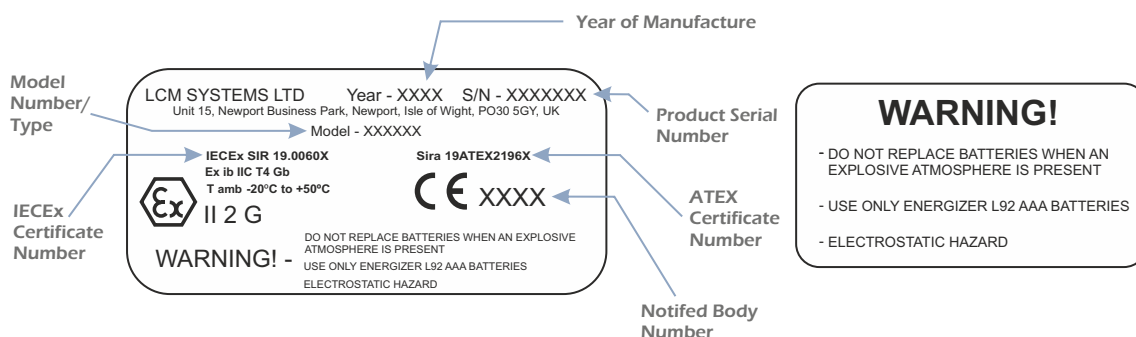
Our range of tension and compression wireless products have been designed for hazardous area wireless communication between an Ex i wireless load cell and X24-HD wireless handheld display. The Ex i wireless range of load cells can also be combined to communicate with safe area wireless systems via the standard (non hazardous area) T24 range of products. All standard T24 products can only be used in a safe area.

The Ex i wireless products operate on the licence free 2.4 GHz band and are approved for FCC, IC and European use. The flexible transmission rates and low power usage allows for long battery life for remote modules. Free toolkit software provides simplified configuration of modules and other free software provides logging and visualisation functionality for Windows.

All Ex i load cells are designed and manufactured in accordance with Directive 2014/34/EU and the following standards: IEC 60079-0, IEC 60079-11 and BS EN 60079-0.

1.2 Markings and labels

Each load cell will be engraved with the serial number and the safe working load (SWL). Customer specific markings may also be engraved if required. ATEX/IECEx labels and additional warning labels are attached to the telemetry enclosure. See below for label details.



Year: Year the product is manufactured

Product Serial Number: Individual serial number allocated to each product

Model/Type Number: Column or diaphragm load cell (all LCM System wireless load cell designs are done in accordance with certification drawing LCM4816-ATEX_SHT3. LCM Systems allocate an individual model number for each new design i.e. LCMXXXX-ATEX (where X=0 to 9), example LCM5201-ATEX).

Certificate Numbers: IECEx SIR 19.0060X and Sira 19ATEX2196X

Markings: II 2G
Ex ib IIC T4 Gb
T amb -20°C to +50°C

Warnings: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT
USE ONLY ENERGIZER L92 AAA BATTERIES
ELECTROSTATIC HAZARD



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1.3 Checks prior to installation

To ensure safe and problem free installation, the load cell should be properly transported/stored and must be installed and placed into operation by a competent person who is certified to install hazardous area products.

Unpacking

Before removing the load cell inspect the packaging for signs of damage and immediately inform the supplier if any damage is found. Unpack the load cell carefully, taking care with larger load cells not to damage the cable, cable gland or connector. Please ensure that calibration and instruction data is not inadvertently discarded with packing material.

- a) Inspect the wireless housing for signs of damage including any marks which may obscure the information on the labels.
- b) Check the ambient temperature of the environment the load cell will be operating in does not exceed the certified -20°C to + 70°C range.
- c) Check that the load cell is suitable for the environment with regards to IP rating (ingress protection) and corrosion resistance (high chloride environments).
- d) Verify that the load cell certificate is in accordance with the hazardous area assessment as to EN60079-15 (current issue).
- e) Check that the two Energizer L92 AAA batteries are correctly installed and that the two yellow clips on the wireless housing are closed and the battery cover is secure (batteries and battery holder has clearly marked (+) positive and (-) negative ends).
- f) Check that the white silicone o-ring that forms the seal between the wireless housing and the battery is present and free of any foreign materials.



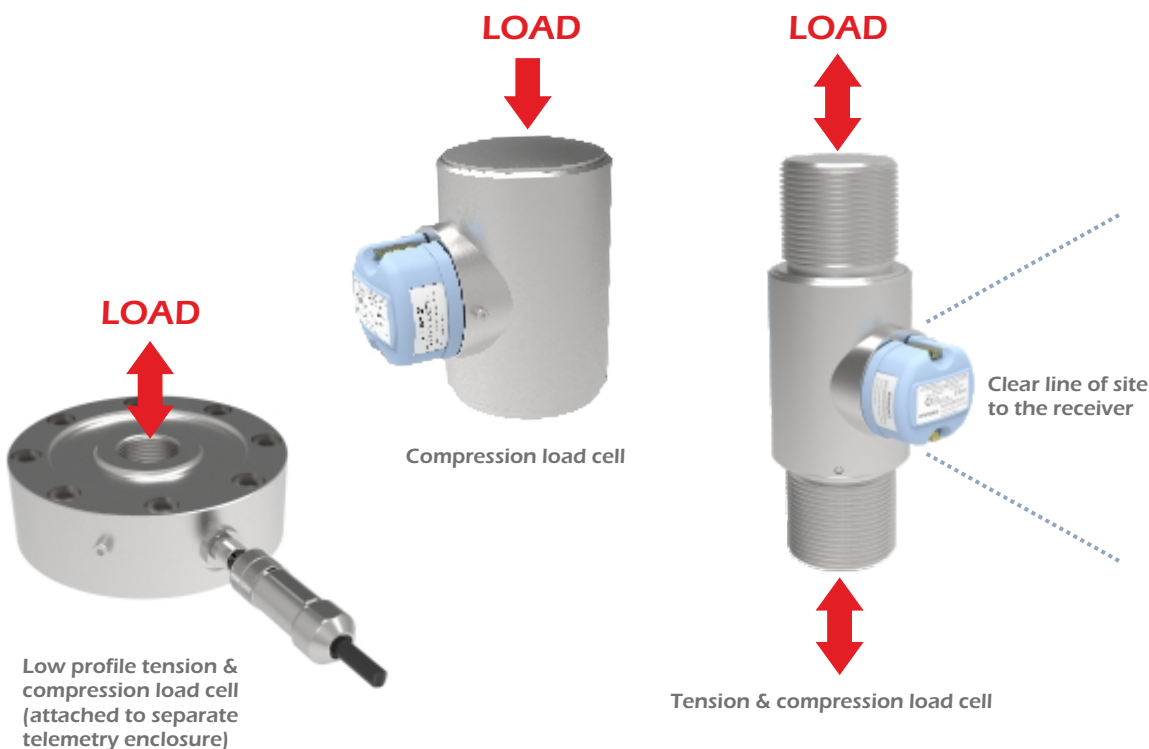
1.4 Installation & operation

When installing a load cell, various factors need to be considered which can influence the performance and accuracy of the load cell.

Tension and compression load cells are generally installed using threads or threaded fasteners, although some compression only devices can be left free standing. Generally the load cell accuracy is not affected by the tightening torque on the fasteners, but torque loading either during installation or use should be avoided. Where specific torque value on fixings are required, these will be shown on the products general arrangement drawing.

To avoid loss of accuracy during installation, the following point should be followed:

- ⦿ When installing using threaded fasteners, always make use of any spanner flats provided to ensure that the transducer sensing element is not subject to torsion, as this may result in irreparable damage being caused.
- ⦿ Ensure that the direction of load acting on the load cell is constant. In the case of compression cells ensure that the load is applied centrally. Convex load buttons and caps are a convenient way of ensuring this. In the case of tension load cells, swivel eyebolts at each end take out misalignment during installation and service. The use of long loading rods in compression should be avoided, as bending moment errors are magnified due to the long moment arm.
- ⦿ Tension and compression load cells should be loaded as shown below. In dynamic applications the load cell rating should be de-rated by a factor of two, and care taken that bending is not imposed on the transducer.
- ⦿ All tension and compression load cell should be installed so that side load is eliminated and generally should not exceed 5% of the rated capacity, regardless of the rated maximum permissible value. Depending on the design of the load cell, greater misalignments than this may lead to unacceptable errors or damage to the load cell.
- ⦿ To maintain the specified transmitter range, a clear line of sight between the transmitter and receiver is needed, and objects or structures should be kept a least one metre away from the antenna (housed in the wireless enclosure) whenever possible. The installer should also first read the T24 Telemetry User Manual, which can be found at the following web address: <http://www.lcmsystems.com/T24>.



- ⦿ When installing tension load cells where vibration may be present, the use of thread locking compounds or sprung vibration proofing devices (such as spring washers) is recommended.
- ⦿ Low profile cells can be affected by both fastener torque and the quality and mechanical stiffness of the mounting surface. For best results, the mounting surface should be flat to better than 0.03mm and be manufactured from hardened steel with a minimum hardness of 300 BHN. When fixings are required, high tensile hexagon headed or socket cap bolts should be used, Grade 12.9.

Please note that all load cell installations in hazardous areas must be in accordance with installation standard EN60079-14.

1.5 Separately mounted telemetry enclosure

Where the physical dimensions of a load cell are too small to accommodate the telemetry enclosure, or where the location of the load cell means a clear line of site to the receiver is not possible, then a separately mounted Ex telemetry enclosure can be used. The attached load cell must be Ex i certified and comply with the requirements on the Ex telemetry enclosure certification drawing LCM4818-ATEX_SHT1. Maximum permissible cable length between the load cell and the Ex telemetry enclosure is **2.5 metres**.

Checks to the cable gland or connector supplied with the telemetry enclosure should be performed in accordance with the operator instructions for cabled ATEX/IEEx intrinsically safe (Ex i) load cells.

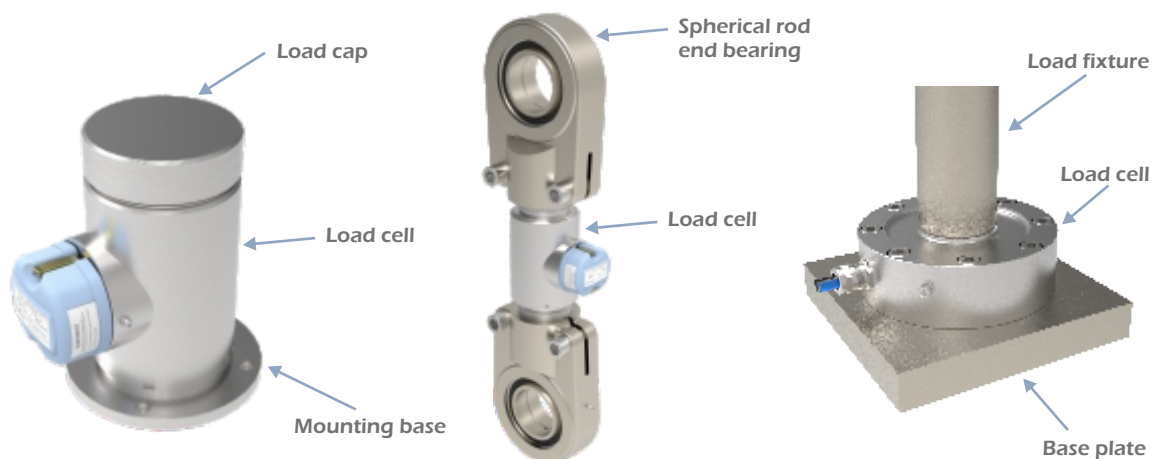
1.6 Telemetry unit set up and communication

The ATEX wireless product range uses high performance two-way radio communication. Each load cell fitted with the wireless module requires either an X24-HD handheld display for hazardous area use or a base station and PC to communicate with (base station and PC must be located in the safe area). See the X24-HD user manual and the T24 user manual for further details on LCM wireless products.

- ⦿ www.lcmsystems.com/t24-telemetry-instruction-manual
- ⦿ www.lcmsystems.com/X24-HD-instruction-manual

1.7 Fixtures & Fittings

Each type of load cell can be supplied with a variety of fixtures and fittings that can be used to aid installation. All fixtures and fittings should only be used in accordance with this manual, the load cells general arrangement drawing (GA) and the manufacturers instructions.



1.8 Checks after installation

- ⦿ With the load cell installed, check the receiver communicates with the load cell at the desired operating range. Signal obstruction or reflection can significantly reduce transmission range and

1.8 Checks after installation

even cause signal loss. For further information on correct installation, refer to the X24 telemetry user manual.

- ⦿ When using the receiver, check that only the desired load cell is being communicated with. Each radio channel (1-15) has a finite ability to carry information. When modules do not need to communicate with each other they can be configured on separate radio channels that do not affect each other.

2. ONGOING MAINTENANCE AND CARE

2.1 Warnings/Hazards

Tension and compression load cells are highly stressed devices and commonly have safety factors between three and five times the rated capacity under static conditions. Fatigue applications and environmental factors can contribute to reducing this margin.

The user should determine media effects on the exposed load cell materials. Where a corrosive environment is present, load cells can often be manufactured from corrosion resistant materials or alternatively, isolation barriers can be employed between the corrosive environment and the load cell. The following points should be followed to avoid potentially hazardous situations:

- ⦿ During installation and maintenance appropriate PPE must be used to avoid the potential of a spark caused by electrostatic discharge.
- ⦿ Load cells are sealed units which should not be dismantled. Removing any parts (except for when changing the batteries) will affect the sealing of the load cell and therefore invalidate the hazardous area certification.
- ⦿ The accuracy of the system is dependent upon correct installation of the load cell.
- ⦿ Load cells must not be subjected to shock loads, such as using a hammer to force the load cell into position.
- ⦿ The load cell should never be placed in a potentially explosive environment that the product is not suitably certified for (ATEX and IECEx only).
- ⦿ Load cell material and any applied treatments (heat treatments etc.) should be verified as suitable for the environment before the load cell is installed. Some heat treatments which LCM use are not suitable for marine environments/high chloride (for example, 17-4PH heat treated to H900).
- ⦿ Fixing methods (high tensile bolts, rod end fittings or mounting bases) must always be installed as to the general arrangement (GA) drawing or to the manufacturers instructions.
- ⦿ Avoid use within 20 to 30 minutes of rapid changes in temperature, for example moving the device from a cold vehicle to a warm room. The change in temperature can affect the accuracy of the device. The operating temperature is -10 to +50°C or 14 to 122°F.

2.2 Calibration

All LCM Systems load cells are calibrated in UKAS traceable test machines to best simulate normal loading conditions.

LCM Systems endeavour to match the loading conditions that would be experienced in service, but it is not possible to totally simulate the on-site structure for every load cell manufactured. It is for this reason that for optimum system accuracy, a calibration in the final assembly is recommended. On-site calibration should be performed in accordance with the manual for the instrument the load cell is connected to.

Note:

As all load cells are subject to deterioration due to use, mistreatment, drift or ageing, calibration at regular intervals should be carried out to establish how the load cell is currently performing. Load cells can also



become less reliable due to electrical influence, mechanical effects and instrumentation faults. Unless calibrations are routinely carried out, load measurement readings can become less accurate, with the user potentially being unaware that they are using compromised data.

Annual calibration is recommended as the standard interval to ensure that measurements are always as accurate as possible, which is particularly important if being used for safety critical applications. However, more frequently than one year may be advisable if the load cell is being used in a particularly harsh environment or arduous operational conditions (high vibration levels, excessive cyclic loading).

2.3 Inspection and repair

Repair: This equipment is certified for use in hazardous locations, therefore no modifications are allowed. Repairs must only be performed by LCM Systems personnel.

Inspection: All LCM System load cells should be subject to periodic inspection which should include, but is not exclusive to, the follow checks.

- ⦿ Perform a run through of the installation and operation section of this manual, sections 1.3 to 1.5.
- ⦿ Check output at zero load (check for a shift in zero offset. Verify against the calibration certificate).
- ⦿ Check that the labels are still firmly attached, and the information is still readable.
- ⦿ Check for excessive wear on the load cell which could compromise performance or the IP rating.
- ⦿ Inspect the batteries to ensure they are the correct type and have been installed correctly. The battery holder shows pictorially the correct orientation.
- ⦿ Check for any signs of water ingress in the battery compartment and for any signs of battery corrosion.

2.4 Storage

When not in use load links should be stored undercover in a dry environment (max humidity 95% non-condensing) at a storage temperature of -40°C to +85°C.

3. SPECIFICATIONS AND COPYRIGHT

3.1 Load cell specifications

Ex i wireless load cells are supplied to the specifications shown on our DCE, CPW, TCA and WAS data sheets. Alternatively, a general arrangement drawing is supplied to show the specification of non standard designs.

3.2 Copyright

The copyright and all rights of a like nature in respect of this document in any part of the world are the property of LCM Systems Ltd.

No part of this document may be reproduced or transmitted in any form or by any means, whether electronic, mechanical, photocopying, recording or otherwise, nor used for tendering or manufacturing, nor communicated to any other person without the written permission of LCM Systems Ltd.

The recipient of this document, as its registered holder, must exercise due diligence in ensuring that the above conditions are observed. (errors and omissions excepted). Any enquires relating to this document or its contents should be addressed, in writing, in the first instance to LCM Systems Ltd.

LCM Systems Ltd reserve the right to make changes to its products and specifications without notice.

IF IN DOUBT ABOUT ANY ASPECT OF THE SELECTION, INSTALLATION
OR USE OF AN INTRINSICALLY SAFE WIRELESS LOAD CELL, PLEASE
CONTACT LCM SYSTEMS FOR ADVICE BEFORE INSTALLING

4. CERTIFICATION

4.1 ATEX Certificates



1 EU-TYPE EXAMINATION CERTIFICATE

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

3 Certificate Number: **Sira 19ATEX2196X** Issue: **0**

4 Equipment: **LCM4092 Wireless Telemetry Unit**

5 Applicant: **LCM Systems Ltd.**

6 Address: Unit 15,
Newport Business Park,
Barry Way,
Newport, Isle of Wight
PO30 5GY

7 This equipment and any acceptable variation thereto is 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 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 IEC 60079-0:2018 EN 60079-11:2012

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:



II 2G
Ex ib IIC T4 Gb
Ta = -20°C to +50°C

Project Number 80005303

Signed: J A May

Title: Director of Operations

This certificate and its schedules may only be reproduced in its entirety and without change

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





SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE

**Sira 19ATEX2196X
Issue 0**

13 DESCRIPTION OF EQUIPMENT

The LCM4092 Wireless Telemetry Unit is used in fixed installations for the wireless transmission of data from strain gauges. The equipment enclosure is comprised of an epoxy coated non-metallic enclosure, which is either connected directly to a load cell or via a metallic mounting disc or link cap. Within the enclosure is an Ex component certified telemetry transmitter module (Sira 15ATEX2334U). The module is powered by two series connected Ex ia certified AAA size cells (Baseefa 14ATEX0107U). Strain gauge connection is to a screw terminal block in the component certified module.

The use of the metallic mounting disc or link cap is dependent on the size and type of load cell. An alternative base plate may also be used for remote installation of the Telemetry Unit, with wired connection to the load cell strain gauges.

Output parameters at the strain gauge connections.

Uo = 5.5V Io = 2.25A Po = 1.25W Co = 15µF Lo = 1.38µH

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Reports and Certificate History

Issue	Date	Report number	Comment
0	27 January 2020	R80005303A	The release of the prime certificate.

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

15.1 Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of the LCM4092 Wireless Telemetry Unit may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.

15.2 The batteries in the LCM4092 Wireless Telemetry Unit must not be changed when an explosive atmosphere is present.

15.3 Only Energizer L92 AAA size batteries are permitted for use in the LCM4092 Wireless Telemetry Unit.

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.

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Utrechtseweg 310, Building B42,
6812AR, Netherlands

Certificate Annexe



Certificate Number: Sira 19ATEX2196X
Equipment: LCM4092 Wireless Telemetry Unit
Applicant: LCM Systems Ltd.

Issue 0

Drawing	Sheets	Rev.	Date (Stamp Date)	Title
LCM4092-ATEX_SHT1	1 of 2	-Initial	10 Jan 20	General assembly
LCM4092-ATEX_SHT2	2 of 2	-Initial	10 Jan 20	Marking, IECEX/ATEX
LCM4814-ATEX_SHT3	1 of 1	-Initial	10 Jan 20	ATEX Telemetry load Pin versions A & B
LCM4815-ATEX_SHT3	1 of 1	-Initial	10 Jan 20	ATEX Telemetry load Link
LCM4816-ATEX_SHT2	1 of 1	-Initial	10 Jan 20	Column Load Cell
LCM4818-ATEX	1 of 1	-Initial	10 Jan 20	ATEX Telemetry Enclosure
LCM4814-ATEX_SHT4	1 of 1	-Initial	10 Jan 20	Ex Label (Intrinsic safety)

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6812AR, Netherlands



4.2 IECEx Certificate

		<h2 style="margin: 0;">IECEX Certificate of Conformity</h2>	
<p>INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres <small>for rules and details of the IECEx Scheme visit www.iecex.com</small></p>			
Certificate No.:	IECEX SIR 19.0060X	Page 1 of 4	<u>Certificate history:</u>
Status:	Current	Issue No: 0	
Date of Issue:	2020-01-27		
Applicant:	LCM Systems Ltd Unit 15, Newport Business park Barry way, Newport Isle of Wight PO30 5G United Kingdom		
Equipment:	LCM4092 Wireless Telemetry Unit		
Optional accessory:			
Type of Protection:	Intrinsically Safe		
Marking:	Ex ib IIC T4 Gb Ta = -20°C to +50°C		
Approved for issue on behalf of the IECEx Certification Body:		Neil Jones	
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 www.iecex.com or use of this QR Code.			
Certificate issued by: SIRA Certification Service CSA Group Unit 6, Hawarden Industrial Park Hawarden, Deeside, CH5 3US United Kingdom			



IECEX Certificate of Conformity

Certificate No.: IECEx SIR 19.0060X

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Date of issue: 2020-01-27

Issue No: 0

Manufacturer: LCM Systems Ltd
Unit 15, Newport Business park
Barry way, Newport
Isle of Wight
PO30 5G
United Kingdom

Additional
manufacturing
locations:

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 products 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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

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

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

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

[GB/SIR/ExTR20.0013/00](#)

Quality Assessment Report:

[GB/SIR/QAR15.0012/04](#)





IECEX Certificate of Conformity

Certificate No.: **IECEX SIR 19.0060X**

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Date of issue: 2020-01-27

Issue No: 0

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The LCM4092 Wireless Telemetry Unit is used in fixed installations for the wireless transmission of data from strain gauges. The equipment enclosure is comprised of an epoxy coated non-metallic enclosure, which is either connected directly to a load cell or via a metallic mounting disc or link cap. Within the enclosure is an Ex component certified telemetry transmitter module (Sira 15ATEX2334U). The module is powered by two series connected Ex ia certified AAA size cells (Baseefa 14ATEX0107U). Strain gauge connection is to a screw terminal block in the component certified module.

The use of the metallic mounting disc or link cap is dependent on the size and type of load cell. An alternative base plate may also be used for remote installation of the Telemetry Unit, with wired connection to the load cell strain gauges.

Output parameters at the strain gauge connections.

Uo = 5.5V
 Io = 2.25A
 Po = 1.25W
 Co = 15µF
 Lo = 1.38µH

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of the LCM4092 Wireless Telemetry Unit may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.
2. The batteries in the LCM4092 Wireless Telemetry Unit must not be changed when an explosive atmosphere is present.
3. Only Energizer L92 AAA size batteries are permitted for use in the LCM4092 Wireless Telemetry Unit.



IECEX Certificate of Conformity

Certificate No.: **IECEX SIR 19.0060X**

Page 4 of 4

Date of issue: 2020-01-27

Issue No: 0

Equipment (continued):

Conditions of Manufacture

1. The LCM4092 Wireless Telemetry Unit incorporates a previously component certified telemetry module (IECEX SIR 15.0123U). 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 LCM4092 Wireless Telemetry Unit.
2. The LCM4092 Wireless Telemetry Unit may only be supplied by component certified AAA size cells (Baseefa 14ATEX0107U) It is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with this cell type. The manufacturer shall inform Sira of any modifications to the cell certification that may impinge upon the explosion safety design of the LCM4092 Wireless Telemetry Unit.





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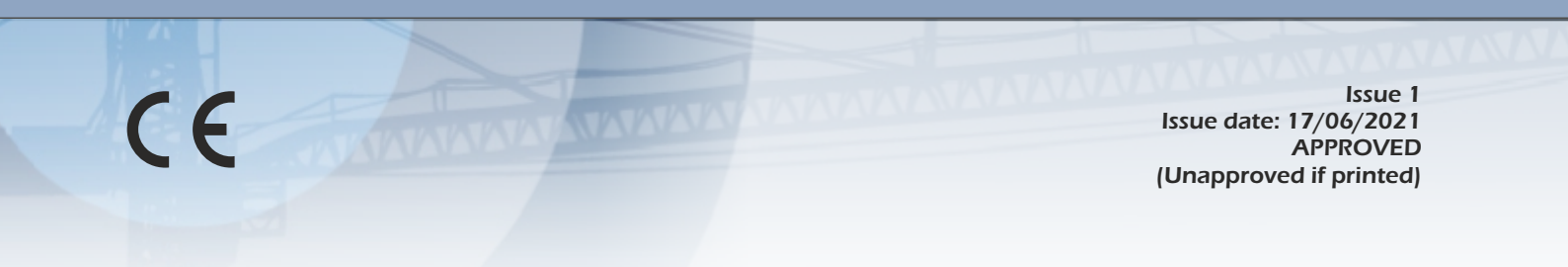
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APPROVED
(Unapproved if printed)