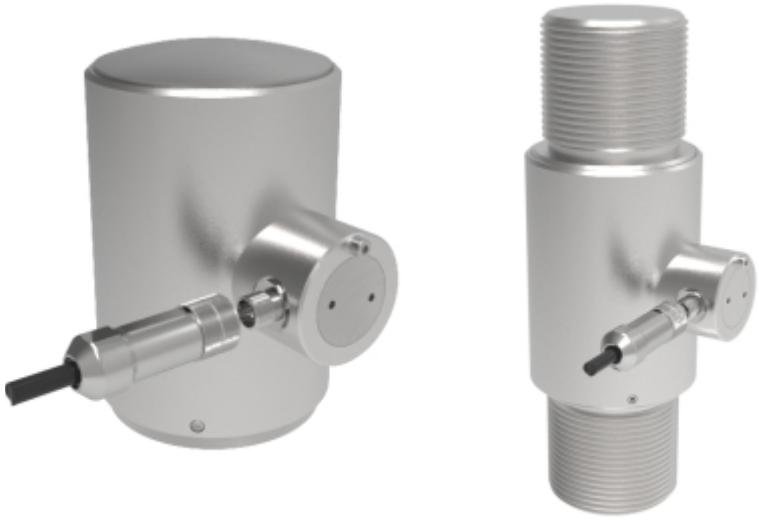
LCM SYSTEMS

Solutions in Load Cell Technology

Instruction Manual

Operator Instructions for Cabled ATEX/IECEx Intrinsically Safe Tension & Compression Load Cells



LCM Systems Ltd
Unit 15, Newport Business Park
Barry Way, Newport
Isle of Wight PO30 5GY UK
Tel: +44 (0)1983 249264
Fax: +44 (0)1983 249266
sales@lcmsystems.com
www.lcmsystems.com

CONTENTS

1. OPERATING INSTRUCTIONS

1.1 Introduction

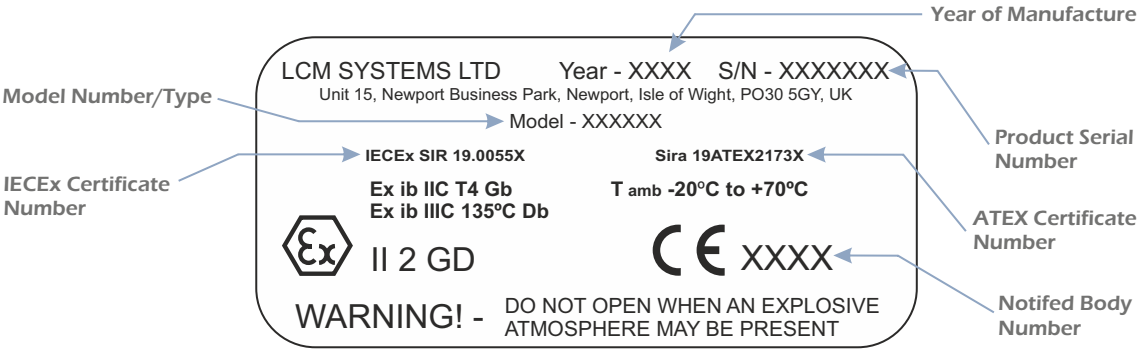
This manual refers to the LCM Systems range of ATEX and IECEx certificated Intrinsically Safe (Ex i) cabled tension and compression load cells. This and any reference documents should be read and understood before installing or operating any LCM systems ATEX/IECEx cabled load cell. All LCM Systems ATEX/IECEx cabled 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 Ex i tension and compression cabled load cells are available with two analogue output options; a mV/V strain gauge bridge output or a 2-wire, 4-20mA output. The 4-20mA output is supplied via an ICA5ATEX miniature load cell amplifier. Both output types are suitable for us in hazardous environments zones 1 and 2.

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

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. 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 cabled column type tension and compression designs are done in accordance with certification drawing LCM4814-ATEX_SHT1.

All cabled diaphragm type tension and compression designs are done in accordance with certification drawing LCM4815-ATEX-SHT1 or SHT2.

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 19.0055X and Sira 19ATEX2173X

Markings:
II 2G
Ex ib IIC T4 Gb
Ex ib IIIC T135ºC Db
T amb -20ºC to +70ºC

Warnings: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT

Supplier:
LCM Systems Ltd
Unit 15, Newport Business Park,
Barry Way, Newport
Isle of Wight PO30 5GY
United Kingdom

Service: (REPAIR, SUPPORT)
LCM Systems Ltd
Tel: +44(0)1983 249264
Fax: +44(0)1983 249266
e-mail: sales@lcmsystems.com

1.3 Checks prior to installation

To ensure safe and problem free installation, the load cell should 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 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 load cell 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 EN60079-10-1 and EN60079-10-2 (current issue).

e) If the load cell is fitted with a cable and gland, check that the gland has not come loose during transit or storage and that the cable is still securely held in place.

f) If the load cell is fitted with a connector, check the connector on the load cell has not come loose during transit or storage, check the plug and socket for any damage and check that the connector mates correctly.

g) For all load cells check the cable for damage, such as cuts or abrasions, especially where the cable enters the gland or connector assembly.

IMPORTANT NOTE:
In order for load cells fitted with a 2-wire 4-20mA amplifier to remain ATEX compliant, the total amount of capacitance that can be connected to a load cell (Co) must not exceed 33nF (0.033uF). This value must include the total cable capacitance and the Ci value of the barrier supplying the unit. If the installation includes any ATEX junction boxes their Ci values must also be included.

The Total capacitance of the load cell with the attached cable will be shown on the general arrangement drawing and will also be included on the declaration of conformity.

When installing in a hazardous zone, the load cell must be connected via an approved ATEX Barrier with the following parameters: Uo = 28V, Io = 100mA, Po = 0.7W, Barrier Impedance = 300Ω.

These are maximum values; actual barrier parameters will vary. However, the barrier impedance is not permitted to change.

The maximum capacitance, Cc, can be taken as the capacitance between all cores connected together and the screen. See Annex C of the installations standard EN60079-14 for details. A safety margin of +10% has been added.

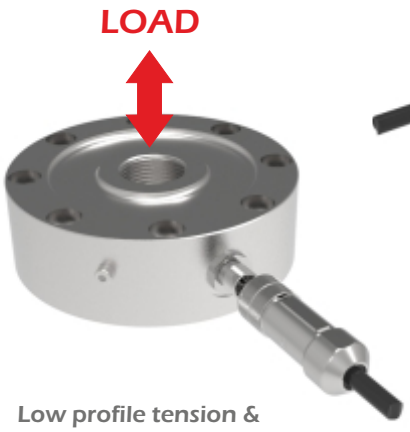
1.4 Installation & operation

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 devises 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.
- 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 tension & compression load cell

Compression load cell

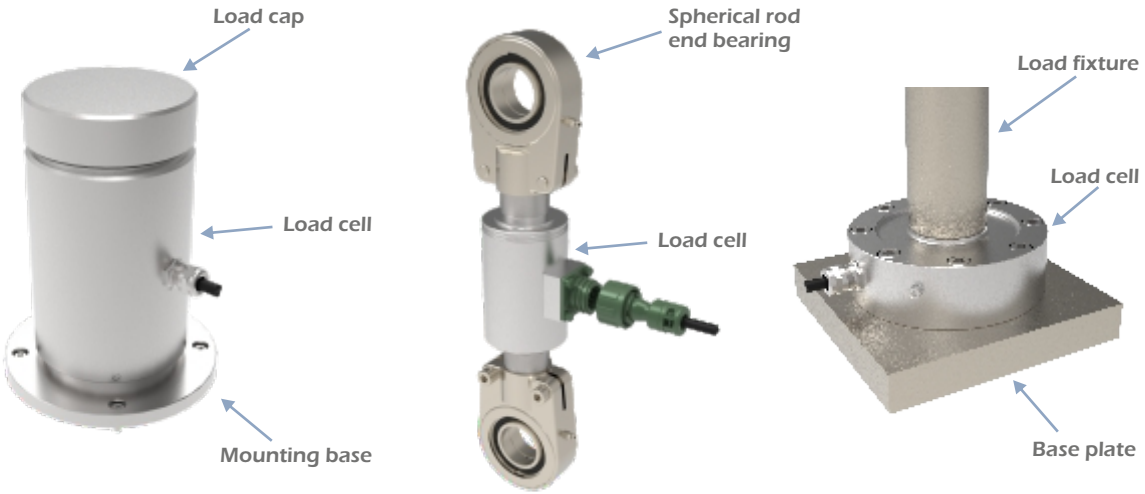
Tension & compression load cell

- Low profile load 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.

- Cable should be supported by cleats cable ties or in hose or conduit to avoid flexing where possible. Ensure the cable is anchored on the 'earth' side of the load cell to prevent the cable being part of the measurement loop.

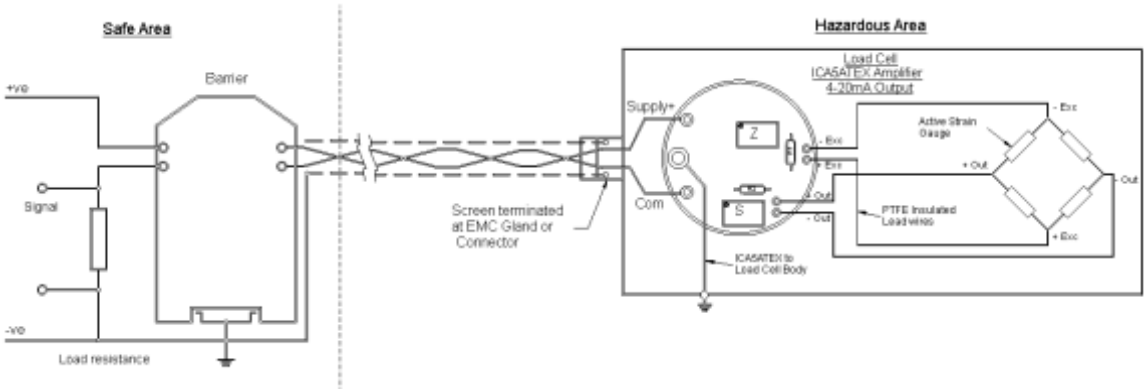
1.5 Fixtures & Fittings

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.



1.6 Connection details (4-20mA outputs)

Cable connections details are dependent on the cable used and must be compliant with the installation standard EN60079-14. Below shows the standard connection detail for a 4-20mA connection to a barrier. See below and the product general arrangement drawing for full connection details.



The barrier shown above limits the amount of electrical energy that can be transferred into the hazardous area, thereby preventing the ignition of a flammable atmosphere in the event of a fault condition occurring.

A simple passive barrier is shown in this illustration, but this can be replaced by an isolated barrier to avoid ground loops that may affect measurement accuracy and stability. These devices provide three-way isolation between power, input and output. Please refer to section 4 - Special conditions of safe use.

Two examples of suitable barriers are:

- MTL7706+ (passive zener diode type with active current limit) manufactured by MTL Instruments
- KFD2-STC4-EX1/2 (3-way isolated type) manufactured by Pepperl and Fuchs.

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

1.7 Checks after installation

- With the load cell installed, check that when a load is applied the output is in the correct direction in accordance with the calibration certificate. Incorrect positive or negative outputs could be a result of incorrect load cell orientation or incorrect electrical connections.
- When applying load to the load cell check that the displayed output readings match the actual load being applied. Use the figures shown on the calibration certificate to verify the output at certain loads.

2. CABLE INFORMATION

2.1 Cable details

Load cells using intrinsic safety as a protection method have a restricted current and voltage supply. These restrictions limit the length of cable and number of other passive products which can be included in an intrinsically safe system. Please refer to section 6 - Special conditions of safe use.

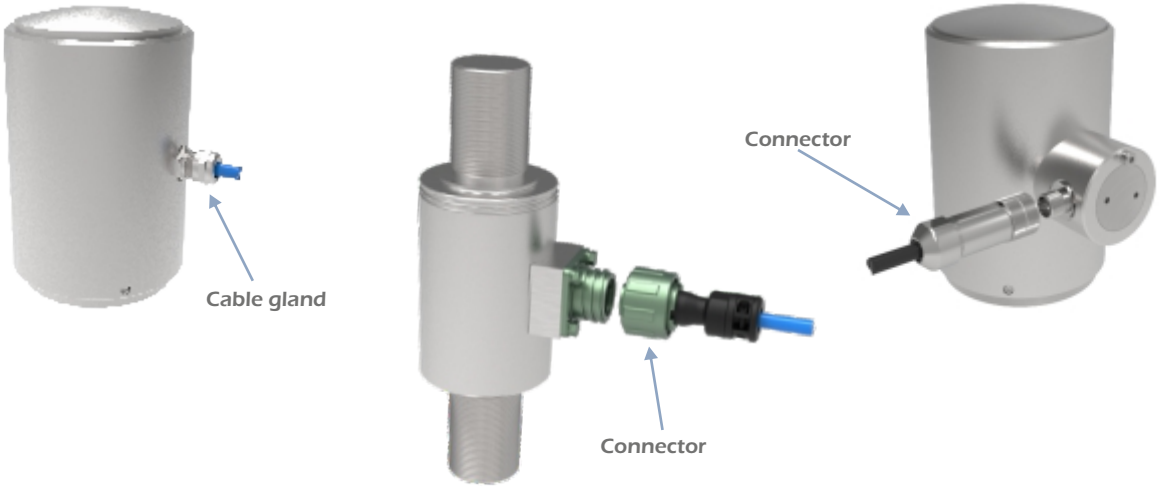
Using the ÖLFLEX® EB CY cable shown in the table below as an example, the maximum length for the output cable would be: 33nF/250pF = 132m (multiply the pF/m figure given in the table by the length in metres to obtain the total capacitance of each cable).

Cable	Specifications
ÖLFLEX® EB CY - PVC screened control cable	Cores and mm² per conductor: 4 x 0.75 Outer diameter: 7mm Mutual capacitance: core/core approximately 160pF/m core/screen: approximately 250pF/m Fixed installation: 6 x outer diameter Nominal voltage: U0/U: 300/500V Test voltage: 3000V Temperature range: occasional flexing -5°C to +70°C Fixed installation: -40°C to +80°C

Cable	Specifications
LiYC11Y - PUR screened control cable	Cores and mm² per conductor: 4 x 0.22 Outer diameter: 7mm Mutual capacitance: core/core approximately 95±5pF/m core/screen: approximately 210±20pF/m Fixed installation: 10 x outer diameter Nominal voltage: U0/U: 300V Test voltage: 2500V Temperature range: occasional flexing -40°C to +105°C Fixed installation: -40°C to +105°C

2.2 Cable gland and connector configurations

Each load cell is fitted with either a cable gland or connector assembly. Cable exits are either perpendicular to the load direction or mounted radially from a boss. See below for examples. All wiring colours and connector pin details are shown on the calibration certificate supplied with each load cell. The removal or replacing of the cable gland or bulkhead connector is strictly prohibited, and any adjustment or repair must either be preformed by LCM systems or by a suitably qualified engineer.



2.3 Mating and de-mating a connector assembly

- Check both halves of the connector for any damage or obstructions.
- Align the connector assembly and mate the two halves. Press firmly to ensure they are fully engaged.
- Tighten the locking sleeve (finger tight only) to complete the mating process.
- Always fully disengage the locking sleeve before attempting to un-mate the connector.

3. ONGOING MAINTENANCE AND CARE

3.1 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.
- The load cell should **never** be opened when an explosive atmosphere may be present!
- Check for excessive wear on the load cell which could compromise performance or the IP rating.
- Tension and compression load cells are sealed units which should not be dismantled. When an amplifier is fitted, removing the cap is permitted, but only to adjust the span and zero when performing a calibration. This should only be done by a competent person in a non-explosive atmosphere.
- The accuracy of the system is dependent upon correct installation of the load cell.
- Tension and compression 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 -20 to +70ºC or -4 to 158ºF.

3.2 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 to 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).

3.3 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 and 1.4.
- 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 cable and the cable connector or gland for any signs of damage or excessive wear.

3.4 Storage

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

4. SPECIAL CONDITIONS FOR SAFE USE

For load cells fitted with a 2-wire 4-20mA output, the output shall not exceed the sum of uncertainties when subjected to an electric field of 10V/m over the frequency range 80 to 600MHz.

CE Approvals European EMC Directive 2004/108/EC
BS EN 61326-1:2006
BS EN 61326-2-3:2006

Special conditions of safe use	
1	The apparatus must be supplied by an approved ATEX Barrier with the following parameters: Uo = 28V, Io = 100mA, Po = 0.7W, Barrier Impedance 300Ω. These are maximum values; actual barrier parameters will vary. However, the barrier impedance is not permitted to change.
2	External inductance connected shall take into account the electrical parameters of the cable, Lc, and the combined amount shall be less than or equal to 3mH.
3	External capacitance connected shall take into account the electrical parameters of the cable, Cc, and the combined amount shall be less than or equal to 33nF.
4	The enclosure used to house the ICA5ATEX must be metallic and not contain, by mass, more than 10% in total of aluminum, magnesium, titanium and zirconium or 7.5% in total of aluminum, magnesium or zirconium and <65% copper.
5	The ICA5ATEX PCB must be mounted completely within an ATEX approved metallic apparatus enclosure as per the manufacturer's instructions.
6	Cable glands used for entry to an enclosure must be metallic and rated to maintain a minimum IP54 level of protection. Alternatively, ATEX approved glands in both metallic and non-metallic material are permitted.
7	Each ICA5ATEX PCB must be subjected to and pass a 500Vrms or 700Vdc dielectric strength test from live parts to earth when disconnected from the earth stud.
8	PCB tracks must maintain a minimum 0.2mm separation distance to the enclosure wall.
9	PCB tracks must maintain a minimum separation distance to the enclosure wall as required by the amplifier ATEX approval.

5. CERTIFICATION

5.1 ATEX Certificates

1 **EU-TYPE EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 19ATEX2173X** Issue: **0**

4 Equipment: **LCM range of load cells**

5 Applicant: **LCM Systems Ltd.**

6 Address: Unit 15,
Newport Business Park,
Barry Way,
Newport PO30 5GY
United Kingdom

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 2 GD
Ex ib IIC T4 Gb
Ex ib IIIC T135°C Db
Ta = -20°C to +70°C

Project Number 70095218

Signed: J A May

Title: Director of Operations

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

SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 19ATEX2173X**
Issue 0

13 **DESCRIPTION OF EQUIPMENT**

The range of load cells is designed to convert an applied load into a proportional output signal.

The load cells in the range are comprised of a stainless steel body containing a strain gauge bridge and an optional Ex component certified signal conditioning unit on a single printed circuit board (ICA5ATEX). Electrical connections are made via cable gland or multi-pin bulkhead connector. The internal access to the enclosures may be via threaded cap, or bolted cap, both types are fitted with elastomeric sealing rings.

The range consists of the following types:

- **a. Type LCM4814 Load Pin**
  - i. Radial with the option of using a ICA5ATEX conditioning PCB
  - ii. Axial with the option of using a ICA5ATEX conditioning PCB
- **b. Type LCM4815 Load Link**
  - i. Axial with the option of using a ICA5ATEX conditioning PCB
  - ii. Radial with the option of using a ICA5ATEX conditioning PCB
- **c. Type LCM4816 Column Load Cell**
  - i. Radial with the option of using a ICA5ATEX conditioning PCB
- **d. Type LCM4817 Diaphragm Load Cell**
  - i. Compression with the option of using a ICA5ATEX conditioning PCB
  - ii. Tension/compression with the option of using a ICA5ATEX conditioning PCB

a. The LCM 4814 Load Pins comprise a stainless steel body containing a strain gauge bridge and an optional Ex component certified signal conditioning unit printed circuit board. Electrical connections are made via a cable gland.
b. LCM 4815 Load Links comprise a stainless steel body upon which is mounted a strain gauge bridge and an optional Ex component certified signal conditioning unit, printed circuit board. Electrical connections are made via a cable gland.
c. LCM 4816 Compression load cells comprise a stainless steel body upon which is mounted a strain gauge bridge and an optional Ex component certified signal conditioning unit printed circuit board. Electrical connections are made via a cable gland or a bulkhead connector.
d. LCM4817 Tension/compression load cells comprise a stainless steel body upon which is mounted a strain gauge bridge and an optional Ex component certified signal conditioning unit printed circuit board. Electrical connections are made via a cable gland or a bulkhead connector.

The electrical parameters for all types in the range are:

Ui = 28V, Ii = 100mA, Pi = 0.7W, Ci = 49.39nF, Li=20µH

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

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

SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 19ATEX2173X**
Issue 0

14.2 **Associated Reports and Certificate History**

Issue	Date	Report number	Comment
0	27 January 2020	R70095218A	The release of the prime certificate.

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

15.1 When fitted with a Mantracourt type ICA5ATEX PCB strain gauge amplifier PCB the LCM range of load cells must be supplied by an Ex certified barrier with a minimum source resistance of 300Ω.

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.

CSA Group Netherlands B.V.
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)

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

5.2 IECEx Certificate

IECEx Certificate of Conformity

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

Certificate No.:	IECEx SIR 19.0055X	Page 1 of 3	Certificate history:
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:	LCM range of load cells		
Optional accessory:			
Type of Protection:	Intrinsically Safe		
Marking:	Ex ib IIC T4 Gb Ex ib IIIC T135°C Db Ta = -20°C to +70°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 19.0055X	Page 3 of 3
Date of issue:	2020-01-27	Issue No: 0

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The range of load cells is designed to convert an applied load into a proportional output signal.

The load cells in the range are comprised of a stainless steel body containing a strain gauge bridge and an optional Ex component certified signal conditioning unit on a single printed circuit board (ICA5ATEX). Electrical connections are made via cable gland or multi-pin bulkhead connector. The internal access to the enclosures may be via threaded cap, or bolted cap, both types are fitted with elastomeric sealing rings.

The electrical parameters for all types in the range are:

Ui = 28V, Ii = 100mA, Pi = 0.7W, Ci = 49.39nF, Li=20µH

Refer to the Annexe for additional information.

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. When fitted with a Mantracourt type ICA5ATEX PCB strain gauge amplifier PCB the LCM range of load cells must be supplied by an Ex certified barrier with a minimum source resistance of 300Ω.

Annex:

IECEx SIR 19.0055X Annexe Issue 0.pdf

Annexe to: **IECEx SIR 19.0055X Issue 0**

Applicant: **LCM Systems Ltd.**

Apparatus: **LCM range of load cells**

The range consists of the following types:

- **a. Type LCM4814 Load Pin**
  - i. Radial with the option of using a ICA5ATEX conditioning PCB
  - ii. Axial with the option of using a ICA5ATEX conditioning PCB
- **b. Type LCM4815 Load Link**
  - i. Axial with the option of using a ICA5ATEX conditioning PCB
  - ii. Radial with the option of using a ICA5ATEX conditioning PCB
- **c. Type LCM4816 Column Load Cell**
  - i. Radial with the option of using a ICA5ATEX conditioning PCB
- **d. Type LCM4817 Diaphragm Load Cell**
  - i. Compression with the option of using a ICA5ATEX conditioning PCB
  - ii. Tension/compression with the option of using a ICA5ATEX conditioning PCB

a. The LCM 4814 Load Pins comprise a stainless steel body containing a strain gauge bridge and an optional Ex component certified signal conditioning unit printed circuit board. Electrical connections are made via a cable gland.

b. LCM 4815 Load Links comprise a stainless steel body upon which is mounted a strain gauge bridge and an optional Ex component certified signal conditioning unit, printed circuit board. Electrical connections are made via a cable gland.

c. LCM 4816 Compression load cells comprise a stainless steel body upon which is mounted a strain gauge bridge and an optional Ex component certified signal conditioning unit printed circuit board. Electrical connections are made via a cable gland or a bulkhead connector.

d. LCM4817 Tension/compression load cells comprise a stainless steel body upon which is mounted a strain gauge bridge and an optional Ex component certified signal conditioning unit printed circuit board. Electrical connections are made via a cable gland or a bulkhead connector.

The electrical parameters for all types in the range are:

Ui = 28V, Ii = 100mA, Pi = 0.7W

Conditions of Manufacture

I. The LCM range of load cells may incorporate a previously Ex component certified ICA5ATEX strain gauge amplifier (TRAC10ATEX11248U). 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 LCM range of load cells.

ii. In accordance with IEC 60079-11:2011 clause 10.3, each manufactured sample of the equipment shall be subjected to a routine electric strength test using a test voltage of 500 Vac applied between the circuit and enclosure. There shall be no evidence of flashover or breakdown and the maximum current flowing shall not exceed 5 mA.

Date: **27 January 2020**

Form 9530 Issue 1

Sira Certification Service
Unit 6 Hawarden Industrial Park,
Hawarden, CH5 3US, United Kingdom

Tel: +44 (0) 1244 670900
Email: ukinfo@csagroup.org
Web: www.csagroupuk.org

5.3 Copyright

5.4 About

LCM Systems is a specialist provider of standard and bespoke load cells, load pins, load shackles, load links and associated instrumentation, with over 30 years' experience in supplying innovative load measurement solutions to many different industries worldwide. Whatever the application and however demanding the environment, we can provide a system to meet your needs.

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

www.lcmsystems.com

LCM Systems Ltd
Unit 15, Newport Business Park
Barry Way, Newport
Isle of Wight PO30 5GY UK
Tel: +44 (0)1983 249264
Fax: +44 (0)1983 249266
sales@lcmsystems.com
www.lcmsystems.com

Issue 1
Issue date: 17/06/2021
APPROVED
(Unapproved if printed)