LCM SYSTEMS

Solutions in Load Cell Technology

Instruction Manual

Operator Instructions for Cabled ATEX/IECEx Intrinsically Safe (Ex i) Load Pins

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1. OPERATING INSTRUCTIONS

1.1 Introduction

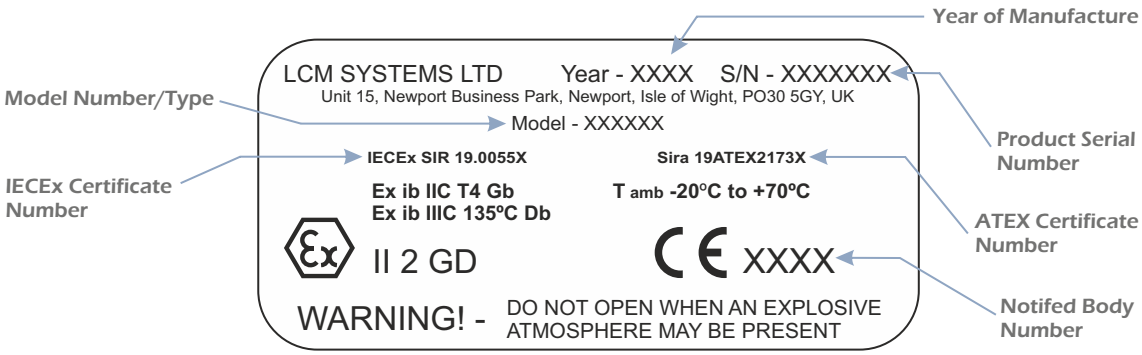
This manual refers to the LCM Systems range of ATEX and IECEx certificated intrinsically safe (Ex i) cabled load pins and shackle load pins. This and any reference documents should be read and understood before installing or operating any LCM systems ATEX/IECEx cabled load pin. All LCM Systems ATEX/IECEx cabled load pins will be accompanied by a general arrangement drawing or datasheet, calibration certificate, declaration of conformity and a copy of LCM Systems ATEX/IECEx certificates.

All LCM System Ex i cabled load pins are available with two analogue output options; a mV/V strain gauge bridge output, or 2-wire 4-20mA output. The 4-20mA output is supplied via an ICA5ATEX miniature load cell amplifier. Both output types are suitable for use in hazardous environments zones 1and 2.

All Ex i cabled load pins 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 pin or load shackle will have the serial number and safe working load (SWL) engraved on the pin. Where applicable a load direction arrow and customer specific markings may also be engraved. see below for label details.



Year: Year the product is manufactured

Product Serial Number: Individual serial number allocated to each product

Model/Type Number: Load pin (all LCM System load pin designs are done in accordance with certification drawing LCM4814-ATEX_SHT1 & SHT2. LCM Systems allocate an individual model number for each new design (i.e. LCMXXXX-ATEX where X=0 to 9, for example LCM5201-ATEX), or a model number (i.e. LMP-88-190-I-ATEX).

Certificate Numbers: IECEx SIR 19.0055X and Sira 19ATEX2173X

Markings: Ex ib IIC T4 Gb
Ex ib IIIC 135ºC Db
T amb-20ºC to +70ºC
II 2 GD

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

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1.3 Checks prior to installation

To ensure safe and problem free installation of the load pin or load shackle, they must be installed and placed into operation by a competent person who is certified to install hazardous area products.

Unpacking
Before removing the load pin or load shackle inspect the packaging for signs of damage and immediately inform the supplier if any damage is found. Unpack the load pin/load shackle 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 pin 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 pin will be operating in does not exceed the certified -20˚C to + 70˚C range.

c) Check that the load pin is suitable for the environment with regards to IP rating (ingress protection) and corrosion resistance (high chloride environments).

d) Verify that the load pin certificate is in accordance with the hazardous area assessment as to EN60079-10-1 (current issue) and EN60079-10-2 (current issue).

e) If the load pin 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 pin is fitted with a connector, check the connector on the pin 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 pins 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 pins fitted with a 2-wire 4-20mA amplifier to remain ATEX compliant, the total amount of capacitance that can be connected to a load pin (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 pin 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

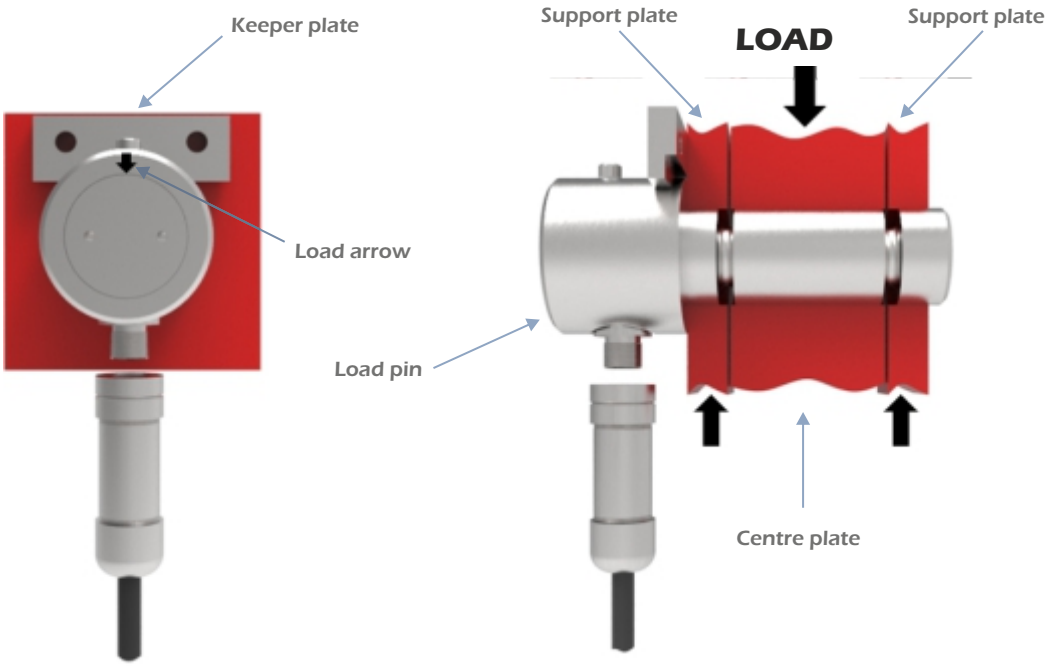
When installing a load pin or shackle various factors need to be considered which can influence the performance or accuracy of the device. The fit of the pin within a structure is important to the overall performance of the load pin. For an optimal performance, a H7, g6 clearance would normally be recommended, however this is not always achievable in the field and some slight loss of repeatability and linearity can normally be tolerated to achieve an "easy to fit" requirement.

If installing a load shackle, because these are normally classified as portable devices, correct installation and use is critical to ensure product accuracy and safety. All load shackles are supplied with the express understanding that the user is thoroughly familiar with best practices for lifting using these devices. See overleaf for some general guidelines. Always refer to the shackle manufacturers instructions for safe use.

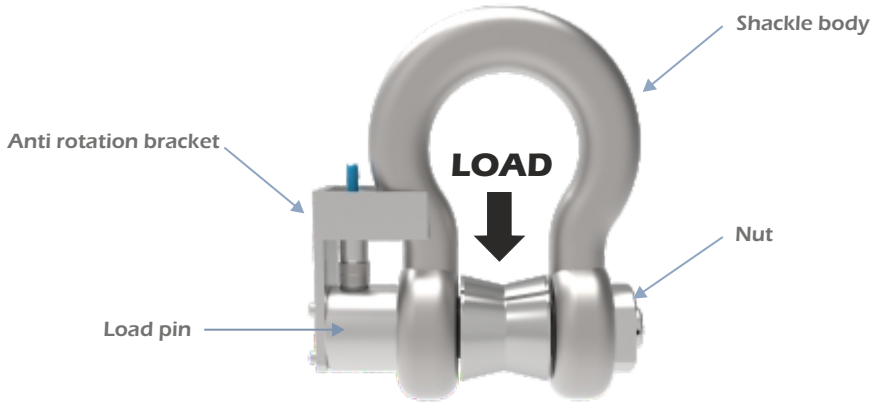
Please Note: All load pin installations in Hazardous areas must be in accordance with the installation standard EN60079-14.

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

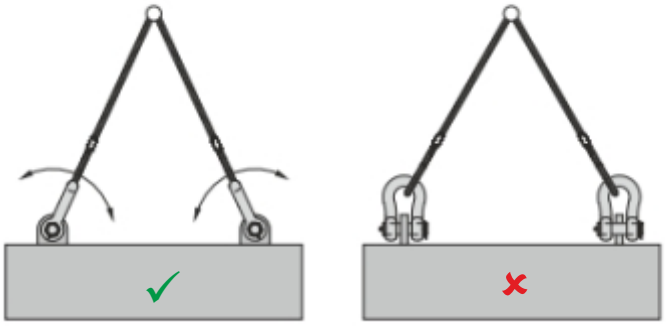
- Ensure the load direction arrow engraved on the load pin is aligned with the direction of load acting on the centre portion of the pin. See the below diagram for details. For shackle load pins the load can only be applied in one direction. See overleaf and section 1.7 for further details.
- Ensure the pin is held captive to prevent movement in use by using a keeper plate/locking system.
- A load measuring pin needs to be securely locked into position in order to fix its orientation with respect to its associated assembly. This needs to be fixed in both the axial and rotation modes to ensure that accurate and repeatable results are obtained from the system. See section 2.1 for examples of how a load pin can be secured in position.
- Ensure that both the support plates/shackle body and the centre plate (or sheave/bobbin) do not bridge the grooves on the load pin. See below for an example of correct positioning. For load shackles, ensure the pin is retained in the shackle body as shown on the products general arrangement (GA) drawing.
- Ensure that the support plates are not miss-aligned, as this will induce bending moments on the load pin which will adversely effect performance.

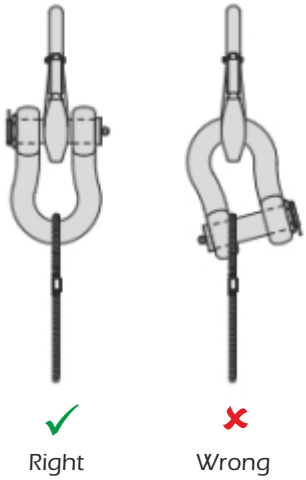


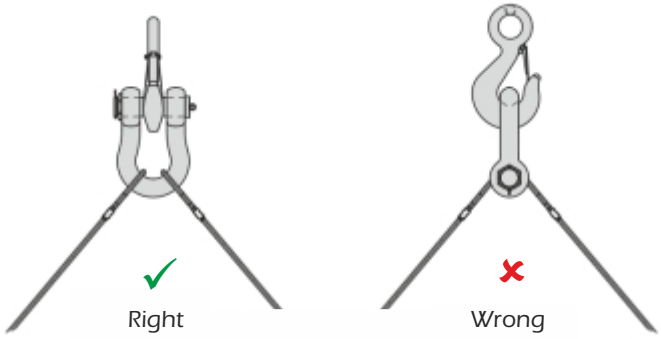
- For shackle load pins, make sure that the shackle is supporting the load correctly (along the axis of the shackle body centerline). Avoid bending loads, unstable loads and do not apply overloads. Stop eccentric loading of the shackle by either using loose spacers or a load centralising bobbin.
- Ensure that the shackle pin does not experience torque or bending forces during operation.



1.5 Correct load shackle installation



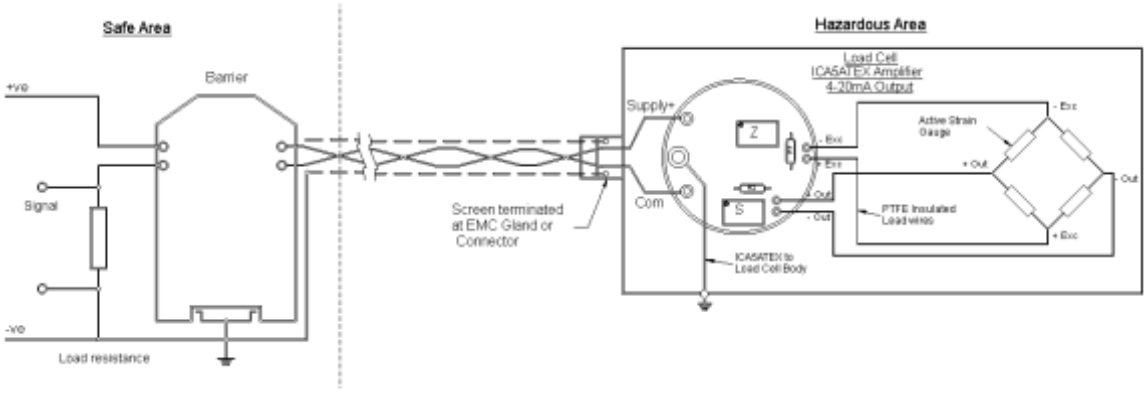




Note:
The forged and hand-made nature of shackles invariably means there are inconsistencies in the finished manufacture (large forgings may have a dimensional tolerance of +/-5%). This can have an effect on the performance/accuracy of the shackle load pin, for example, if the shackle pin is inserted into the opposite side of the shackle to which it was calibrated, or if a different shackle is used.

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 6 - 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.

1.7 Checks after installation

- With the load pin/load shackle installed, check the pin output is not negative, as this may indicate the pin is incorrectly mounted or subject to miss-alignment forces. Refer back to sections 1.4 and 1.5 for details on correct positioning. Use the calibration certificate for reference of correct output at certain loads.
- When applying load to the pin the output should increase. If this is not the case then check the following:

  a. The grooves are not being bridged by either the support plates or the loading plate, sheave, etc.

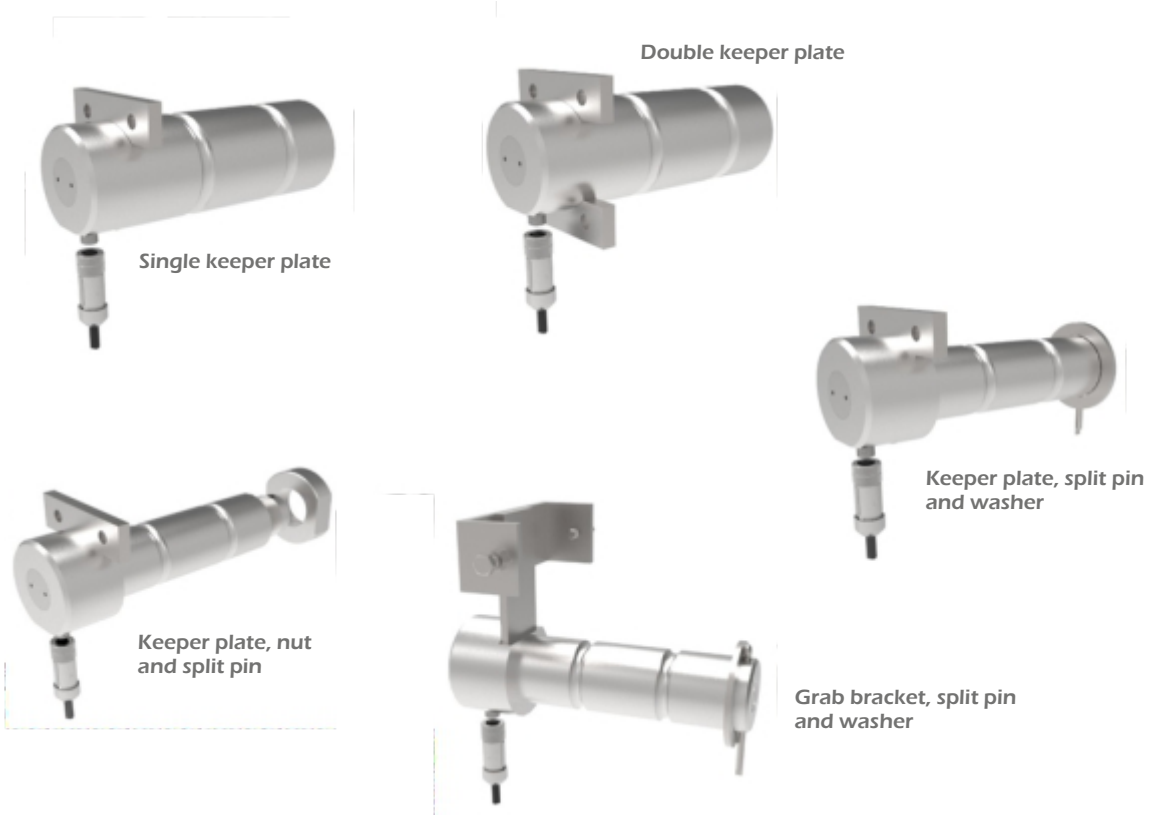
  b. The pin is fitted as calibrated.

  c. The load arrow shown on the pin is aligned in the direction of the load acting on the center of the pin or if a load shackle, that it is correctly loaded along the axis of the shackle body centerline.

2. LOAD PIN ANTI ROTATION

2.1 Load pin locking system configurations

Each load pin is supplied with a locking and anti-rotation system which secures the position and orientation of the load pin in relation to load being applied. This is critical to its correct operation. Locking and anti-rotation examples can be seen below.

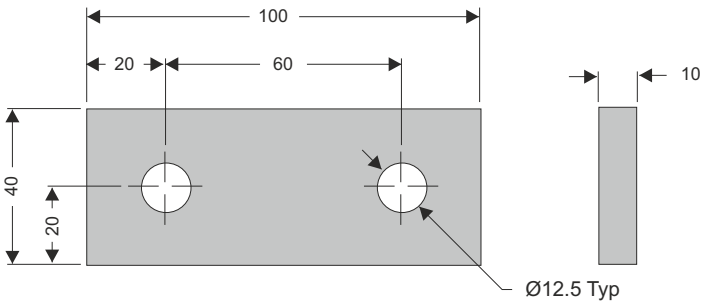


2.2 Installing a locking and anti rotation system

There are numerous variations of locking and anti-rotation methods for a load pin. The examples shown above are the most common methods and show that locking and anti-rotation can be achieved using dual systems (anti-rotation plate, split pin and washer etc.).

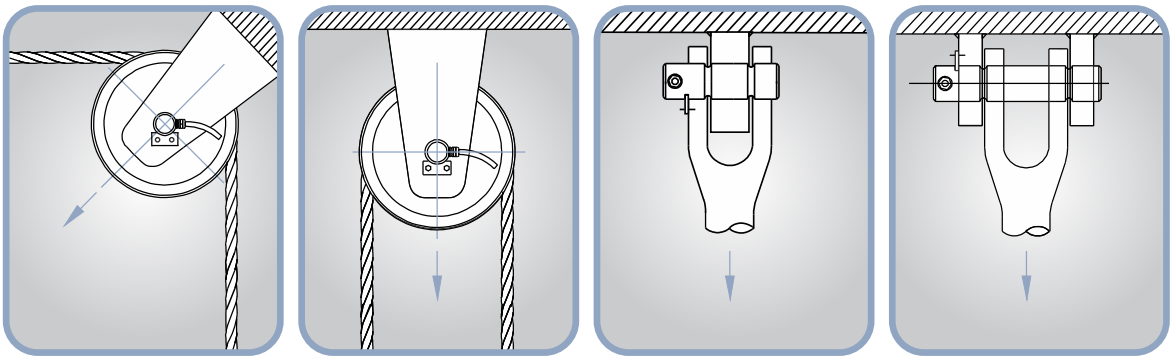
The example shown below shows a common anti-rotation/locking plate system (also known as a keeper plate). To correctly install a keeper plate appropriately sized retaining bolts should be fitted through the holes provided and screwed into tapped holes in the mating assembly.

In this example the holes have been drilled to accommodate M12 bolts. The use of the correct size bolts is critical to ensuring the correct orientation of the load pin.



Please Note: *When a load pin is supplied with a threaded end and retaining nut, the nut should only be finger tight. Overtightening of retaining nuts will impact on the functionality of the load pin. Retaining nuts should be secured in position using either a split pin, locking washer, lock nut or circlip.*

2.3 Typlcal load pin locations



Turning Block | Rope Sheave | Fork & Eye | Fork & Fork

3. CABLE INFORMATION

3.1 Cable details

Load pins 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
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

3.2 Cable gland and connector configurations

Each load pin is fitted with either a cable gland or connector assembly. Cable exits are either axial or radial (see below for examples). All wiring colours and connector pin details are shown on the calibration certificate supplied with each load pin. 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.

Radial Cable Exit

Axial Cable Exit

3.3 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.

4. ONGOING MAINTENANCE AND CARE

4.1 Warnings/Hazards

Load pins 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 pin materials. Where a corrosive environment is present, load pins can often be manufactured from corrosion resistant materials or alternatively, isolation barriers can be employed between the corrosive environment and the load pin. 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!
- Load pins are sealed units which should not be dismantled. Removing the end 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 nonexplosive atmosphere.
- The accuracy of the system is dependent upon correct installation of the load pin.
- Load pins must not be subjected to shock loads, such as using a hammer to force the load pin into position.
- The load pin should never be placed in a potentially explosive environment that the product is not suitably certified for (ATEX and IECEx only).

- Fixing methods – Keeper plates, split pins, washer and nuts must always be correctly installed.
- Load pin material and any applied treatments (heat treatments etc.) should be verified as suitable for the environment before the load pin is installed. Some heat treatments which LCM use are not suitable for marine environments/high chloride (for example, 17-4PH heat treated to H900).

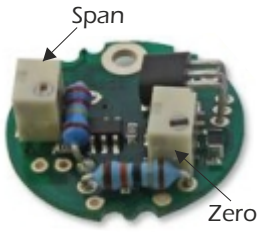
4.2 Calibration

All LCM Systems load pins 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 pin 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 pin is connected to. For load cells fitted with an ICA5ATEX amplifier the following adjustments are also available.

Note: The Load cell should never be opened to perform the following calibration adjustment if an explosive atmosphere may be present.

- When applying the **low** calibration conditions (weight or force) set the output to 4mA, adjusting the **Zero** potentiometer as shown.
- When applying the known **high** calibration conditions (ideally between 75% and full scale), adjust the **Span** potentiometer to give the required output current for the known input. i.e. 16mA for 4-20mA final calibration with 75% input, or 20mA if 100% input as shown.



- The ICA5ATEX 2-wire 4-20mA amplifier is unipolar i.e. zero strain input = 4mA and full range input = 20mA output. For Bidirectional load cells, 4mA = - full range, zero = 12mA and + full range = 20mA output (these are example setups only and actually ranges may vary).

As all load pins 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 pins 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 pin is being used in a particularly harsh environment or arduous operational conditions (high vibration levels, excessive cyclic loading).

4.3 Inspection and repair

Repair – This equipment is certified for use in hazardous locations, therefore no modifications are allowed. Repairs must only be performed by personnel specifically trained for repairs of this equipment.

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

- Perform a complete 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 calibration certificate).
- Check that the labels are still firmly attached and the information is still readable.

- Check for excessive wear on the load pins 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.

4.4 Storage

When not in use load pins should be stored undercover in a dry environment (max humidity 95% non-condensing), at a storage temperature of -20°C to +70°C (max range -40°C to +85°C, depending on cable and cable exit fitted to the load pin).

5. DRAWINGS AND SPECIFICATIONS

Load measuring pins are designed for many diverse applications and as direct replacements for clevis or pivot pins. already in service. Similarly, load measuring shackles can also be substituted for standard shackles already in use. For this reason accuracy can vary from application to application, and so the non-linearity and non-repeatability figures shown on our data sheets and GA drawings are expected values only. For actual figures refer to the calibration certificate.

5.1 Load pin and load shackle datasheets/GA drawings

LCM Systems hazardous area load pins can be supplied with various cable gland and connector arrangements, locking systems and output signals. All hazardous area load pins are supplied as to the specifications shown on the LMP, LPB, LPC, SHK-B & SHK-D datasheets. Alternatively, a general arrangement drawing is supplied to show the specification of non-standard customer designs.

5.2 Typical load pin specifications

Rated load (tonne)	0.5 to 1500+
Proof load	150% of rated load
Ultimate breaking load	>300% of rate load
Output	1.5mV/V at rated load (nominal)
Non-linearity	<±1.0% of rated load (typically)
Non-repeatability	<±0.1% of rated load
Excitation voltage	10vdc recommended, 15vdc maximum
Bridge resistance	350Ω
Insulation resistance	>500MΩ @ 500vdc
Operating temperature range	-20 to +70°C
Compensated temperature range	-10 to +70°C
Zero temperature coefficient	<±0.01% of rated load/°C
Span temperature coefficient	<±0.01% of rated load/°C
ATEX certification details	II 2G Ex ib IIC T4 Gb II 2D Ex ib IIIC T135°c Db
Environmental protection level	IP67
Connection type	5 metre 4-core screened PUR cable

5.3 Typical load shackle specifications

Rated load (tonnes)	1 to 1000 (35 tonne max load rating for SHK-D)
Proof load	150% of rated load
Ultimate breaking load	300% of rated load
Output	Between 1.8mV and 3.6mV
Non-linearity	<±1% of rated load (typically)
Non-repeatablity	<±0.1% of rated load
Excitation voltage	10vdc recommended, 15vdc maximum
Bridge resistance	350Ω
Insulation resistance	>500MΩ @ 500vdc
Operating temperature range	-20 to +70˚C
Compensated temperature range	-10 to +50˚C
Zero temperature coefficient	<±0.01% of rated load/˚C
Span temperature coefficient	<±0.01% of rated load/˚C
ATEX certification details	II 2G Ex ib IIC T4 Gb II 2D Ex ib IIIC T135˚c Db
Environmental protection level	IP67
Connection type	10 metre 4 core screened PUR cable (glanded exit)

6. SPECIAL CONDITIONS FOR SAFE USE

For load pins 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.

Special conditions for safe use (continued)	
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.

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

7. NOTICES

7.1 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 19ATEX2173X**

Equipment: **LCM range of load cells**

Applicant: **LCM Systems Ltd.**

Issue 0

Drawing	Sheets	Rev.	Date	Title
LCM4814-ATEX_SHT1	1 of 1	Initial	10 Jan 20	ATEX LOAD PIN (Radial)
LCM4814-ATEX_SHT2	1 of 1	Initial	10 Jan 20	ATEX LOAD PIN (Axial)
LCM4815-ATEX SHT1	1 of 1	Initial	10 Jan 20	ATEX Load Link, (Radial)
LCM4815-ATEX SHT2	1 of 1	Initial	10 Jan 20	ATEX Load Link, (Axial)
LCM4816-ATEX_SHT1	1 of 1	Initial	10 Jan 20	Column Load Cell (GA),
LCM4817-ATEX_SHT1	1 of 1	Initial	10 Jan 20	Diaphragm Load Cell (tension)
LCM4817-ATEX_SHT2	1 of 1	Initial	10 Jan 20	Diaphragm Load Cell (Compression)
LCM4814-ATEX_SHT4	1 of 1	Initial	10 Jan 20	Ex Label (Intrinsic safety)
4814-ATEX_SHT5	1 of 1	A	28 Jan 20	Cable Exits (connectors)

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

7.2 IECEx Certificates

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 2 of 3

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 Edition:7.0	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-11:2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

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/ExTR20.0014/00

Quality Assessment Report:

GB/SIR/QAR15.0012/04

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.**
Annaratus	**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 4815 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 electrical 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 5mA.

Date: 27 January 2020

Form 9530 Issue 1

Sira Certification Service
Unit 6 Howarden Industrial Park,
Hawarden, CH5 3US, United Kingdom
Tel: +44 (0) 1244 670900
Email: ukinfo@csagroup.org
Web: www.csagroupuk.org

7.3 Copyright

7.4 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.

www.lcmsystems.com

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