Instruction Manual for Using Products

1. Introduction
These Instruction Manual refer to ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD. load cells for potentially explosive atmospheres. These load cells are certified according to ATEX Directive 94/9/EC. Please read the whole instruction before taking load cells into service. Never work on load cells for potentially explosive atmospheres if you do not have the knowledge, competence or authorization to do so. Load cells may only be used for their intended purpose and in the circumstances specified. ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD. cannot be held liable for damage and injuries resulting from use other than those intended. Load cells must only be used in their correct technical condition and whilst conforming to the instructions of relevant application notes.

1.1 Product Description
Load cells convert mechanical force into an electrical signal. The element deforms elastically when subjected to a weight or force. ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD. has load cells which are certified for use in a potentially explosive atmosphere. These load cells have a special mark:

1.2 Products Labelling

1.2.1 Internal Label in English:

Note1: Model and Capacity and Class.
Note2: ZEMIC is the trademark of ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD.
Note3: Customer should mark the zone of use on the Atex product label by means of the checkboxes.

The available ATEX designations Zemic can offer are:

Il 1G Ex ia IIC T4
Il 1D Ex iaD 20 IP6X T73°C
Il 3G Ex nL IIC T4
Il 3D Ex tc IIIC T73°C Dc
1.2.2 External Label in English:

**Zemic Load Cell**

Model:

Barcode

Made in China

Note1: Model.
Note2: Bar code.

1.2.3 FM and ATEX and CSA Labeling
A more elaborate explanation of the label can be found in attachment 1.

1.3 Product identification and technical Specifications
Load cell specific information is printed on the Calibration Certificate. If this certificate is not included, contact your supplier. Cable colour codes should be checked against the Calibration Certificate.

2. Specific conditions for safe use
If a load cell is used as EEx ia or EEx ib, then it must be connected to certified intrinsically safe circuits. Terminals used in between, must comply to EN 60079-11. For EEx nA, 1D, 2D, or 3D use of load cells the free end of the permanently connected cable must be connected outside the hazardous area or, when inside the hazardous area, in an enclosure with a suitable type of explosion protection and in accordance with the requirements of the type of protection applied. For the parameters of the intrinsically safe circuits, refer to the electrical data at the installing drawing 521302. This installation drawing can be found in attachment 2.

3. Installation
Install in hazardous (classified) locations / explosive atmospheres per drawing 521302.

**Rick to life!** Never use load cells in a potentially explosive atmosphere which are not correctly certified. Use shunt-diode barriers for load cell installation in potentially explosive atmospheres. When using more than one barrier channel in a circuit, ensure that the combination of voltages and currents can be safely applied in that particular hazardous area. Install load cells in accordance with the applicable EU regulations. The circuit is to be considered as being connected to earth due to surge protection.

To prevent load cells from being damaged during installation, it is strongly recommended to use dummy load cells or mounting assemblies that can be “locked”. Load cells should be handled with care, especially those with a low rated capacity or with metal bellows construction. When connecting polarized shunt-diode barriers, do not connect the wrong polarity. It will destroy the barrier! Cables used must always be suitable for the environment in which they are to be used. Many indicators compensate for line voltage losses by increasing their voltage output. Do not pass the compensation limit of the indicator! Never carry load cells by their cables.

Avoided electric welding after installation of load cells. If welding is necessary and the load cells cannot be removed then disconnect each individual load cell cable from the junction box or measuring device. In order to avoid a current path through the load cells, place an earthing clamp in the close proximity of the weld. Furthermore, connect a flexible copper lead over each load cell.
Never use mounting bolts to pull uneven surfaces together-use shims to even surfaces. Never use excessive force when fitting or tightening mounting bolts or hardware, especially on low capacity cells. Do not twist “S” cells when tightening threaded fittings.

4. Use and Maintenance

4.1 Please note that load cells may be damaged because of (shock) overloading, lightning strikes or heavy surges. Also current, chemical or moisture ingress, mishandling (dropping, lifting with cable, etc), vibration, seismic events or internal component malfunction, may cause the loadcell to be damaged. Inspect the loadcells before and after every season. Give special attention to critical areas of the load cell such as metal bellows, seals etc. Regularly inspect for corrosion damage to the load cell and mounting hardware. If practically possible, carry out cleaning and perform remedial work (paint or other protective coating). Do not allow build-up of debris around load cells or mounts.

4.2 Maintenance and Service Proceedings

In order to ensure the instruments and the scales to be functioning normal and correctly and to prolong their lifetime, we must obey to the following rules:

- Do not use indicators under strong sunlight.
- The placing area should be flat.
- When the load cell is put in a place full of dust, please remove dust firmly.
- Weight (including tare weight) is not allowed to exceed the maximum rated capacity.
- If the machine can’t or will not be used for a long time, then disconnect the load cells or complete weighing system from the power supply.
- It is forbidden to use a strong solvent to clean the surface of the load cells.
- It is forbidden to spill water inside the indicator or cause a short circuit.
- If there is some problem occurring in the process of using, please cut power supply off and call a professional in order to fix the problem.
- Don’t change circuit breakers or some electronic parts of an apparatus while connected to power circuit. First unplug the weighing system.

4.3 Repairmen and maintaining service

1. Our company provides a one year warranty for all sold products and for stainless steel hermetically sealed load cells even three years. The guarantee service begins from the day we invoiced and shipped the unit.
2. If during the guarantee service time our products show any problems which are not caused by, customers, wrong operation, excessive forces or natural disaster, our company will have the responsibility to repair or replace the faulty unit.
3. Our company doesn’t allow customers to repair by themselves. If customers try to repair the load cells by themselves it will void the guarantee.
4. Generally speaking, when non-load cells customers or non-weighing instrument customers use our products and a problem occurs, the product should be sent back to ZEMIC or inform ZEMICs engineers’ about the problem. ZEMIC will do its best to solve the problem in the shortest time and in accordance to the correct methods.
## 5. Failure Analysis and guidance on potential misuse

<table>
<thead>
<tr>
<th>5.1 Failure Phenomenon</th>
<th>5.2 Cause analysis</th>
<th>5.3 Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>After assembly of a scale, the reading of empty load is big and hard to set to zero.</td>
<td>The Load Cell might have been overloaded and plastically deformed due to shock load or impact load. The mounting and load introduction might not be correct and influence the free deflection of the load cell.</td>
<td>Disconnect all load cells from electronics. Re-connect one by one and check the individual zero readings. If one with exceptional high or low reading than replace that unit. Check all installations if no external factors are influencing the free deflection of the load cell.</td>
</tr>
<tr>
<td>Unstable readings and/or random changes in zero point</td>
<td></td>
<td>Check all installations if no external factors are influencing the free deflection of the load cell. Disconnect the load cell from the electronics and check the insulation resistance between bridge and load cell element and between bridge and shield of the cable. Both values should be above 5000 MO. If Insulation resistance is OK than check the junction box if applicable.</td>
</tr>
<tr>
<td>Scale reads overload, incorrect or not at all.</td>
<td>Load cell signal might be interrupted due to broken part in the load cell or broken conductor in the cable. Or there is an internal shortage in the load cell. Most common reason for this happening is electrical overload.</td>
<td>Disconnect the load cell from electronics and check the input, output and symmetry resistances. The values should comply with the information on the calibration certificate. If everything is OK than check also insulation resistance between bridge and load cell element.</td>
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</tbody>
</table>

**Rick to life!** Under no circumstances should fault location and trouble-shooting be attempted in a hazardous area where there is danger of explosion. ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD. authorized personnel may only carry out trouble-shooting and repair. Should a load cell cease to function, do not just reconnect: Mechanical failure may have catastrophic effects. Never use a Megohmmeter to measure input or output resistance, as they normally operate at voltages far in excess of maximum load cell excitation voltages!
### 6. The standards

<table>
<thead>
<tr>
<th>Title</th>
<th>Standard No.</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirements</td>
<td>FM - 3600</td>
<td>November 1998</td>
</tr>
<tr>
<td>Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, &amp; III, Division 1 and Class I, Zone 0 &amp; 1 Hazardous (Classified) Locations</td>
<td>FM - 3610</td>
<td>January 2007</td>
</tr>
<tr>
<td>Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Division 1 and 2 Hazardous (Classified) Locations</td>
<td>FM - 3611</td>
<td>December 2004</td>
</tr>
<tr>
<td>Electrical and Electronic Test, Measuring and Process Control Equipment</td>
<td>FM - 3810</td>
<td>January 2005</td>
</tr>
<tr>
<td>Degrees of protection provided by enclosures (IP code)</td>
<td>ANSI/IEC 2004</td>
<td></td>
</tr>
<tr>
<td>Nonincendive Electrical Equipment for use in Class I, Division 2 Hazardous Locations</td>
<td>CSA C22.2 No. 213</td>
<td>1987 (Reaffirmed 2004)</td>
</tr>
<tr>
<td>Safety Requirement for Electrical Equipment for Measurement, Control and Laboratory use – Part 1 General Requirements</td>
<td>CSA C22.2 No.1010.1</td>
<td>July 2004</td>
</tr>
<tr>
<td>Degrees of protection provided by enclosures (IP code)</td>
<td>CSA C22.2 No. 60519</td>
<td>July 2005</td>
</tr>
<tr>
<td>Electrical Apparatus for Explosive Gas Atmospheres – Part 0: General Requirements</td>
<td>CSA-E60079-0</td>
<td>2002 (Reaffirmed 2006)</td>
</tr>
<tr>
<td>Electrical Apparatus for Explosive Gas Atmosphere Type of Protection “n”</td>
<td>CSA E60079-15</td>
<td>2002</td>
</tr>
<tr>
<td>Electrical apparatus for explosive gas atmospheres – Part 0: General requirements</td>
<td>EN 60079-0</td>
<td>July 2006</td>
</tr>
<tr>
<td>Explosive atmospheres – Part 11: Equipment protection by intrinsic safety ‘i’</td>
<td>EN 60079-11</td>
<td>January 2007</td>
</tr>
<tr>
<td>Electrical apparatus for use in the Presence of combustible dust – Part 0: general requirements</td>
<td>EN 61241-0</td>
<td>2004</td>
</tr>
<tr>
<td>Electrical apparatus for use in the presence of combustible dust – Part 11: protection by Intrinsic Safety ‘ID’</td>
<td>EN 61241-11</td>
<td>2005</td>
</tr>
<tr>
<td>Degrees of protection provided by enclosures (IP code)</td>
<td>EN 60529</td>
<td>October 1991 Amendment 1 February 2000</td>
</tr>
</tbody>
</table>
Attachment 1:

<table>
<thead>
<tr>
<th>Drawing no.</th>
<th>Nameplate</th>
<th>BP</th>
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Specifications and dimensions are subject to change without notice and do not constitute any liability whatsoever.

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Leerlooierstraat B  
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The Netherlands  
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info@zemic.nl  
www.zemiceurope.com
Atex Load Cell Instruction Manual

Attachment 2:

Specifications and dimensions are subject to change without notice and do not constitute any liability whatsoever.

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DIVISION 2 OR ZONE 2 HAZARDOUS LOCATION

Class I, Division 2, Group ABCD
Class II, III, Division 2, Group FG
Class I, Zone 2, Group IIC
Zone 2, Group IIC,
T4, Ta = 40° C

LOAD CELL NONINCENDIVE AND ENERGY-LIMITED FIELD WIRING CONNECTIONS

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Notes for Division 2 and Zone 2 installations:

1. The associated nonincendive / energy-limited field wiring apparatus shall be a single Approved/Certified device with outputs that are Approved/Certified for parallel connection of field wiring within the applicable hazardous location / explosive atmosphere. Within the United States, the voltage and current parameters of such associated apparatus are commonly identified using the parameters Vt (voltage, total) and It (current, total). The use of multiple associated nonincendive / energy-limited field wiring apparatus that are not Approved/Certified for use in combination with one other as a system is only permitted as specified in Note 2.

2. The use of multiple associated apparatus which have not been Approved/Certified in combination with one another is restricted to the following conditions:
   - The associated apparatus shall all have DC outputs of the same polarity.
   - The associated apparatus shall have an open-circuit voltage (Voc, Vt or U0) not exceeding 20V.
   - The sum of the output current (Iso, It or Io) of all of the associated apparatus shall not exceed 309 mA.
   - The sum of the available power (Po) of all of the associated apparatus shall not exceed 0W.
   - Ci + Coble (total) shall not exceed the lowest Ca or Co for the associated apparatus.
   - Li + Loble (total) shall not exceed the lowest La or Lo for the associated apparatus.
   - The outputs of all associated apparatus/barriers shall be linear if necessary, contact barrier manufacturer for confirmation of linearity.

3. US installation shall be in accordance with the National Electrical Code, and applicable local codes.

4. Associated nonincendive/energy-limited field wiring apparatus shall be Approved/Certified with nonincendive/energy-limited field wiring parameters. They shall be FM Approved, Canadian Certified or ATEX Certified as applicable.

5. The resistance between all safety ground connections and the system grounding electrode shall not exceed 1 ohm.

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Attachement 3:

EC-Declaration of Conformity

EC-Declaration of conformity of a sub-assembly with ATEX-Directive 94/9/EC

We, the manufacturer,

Zhonghang Electronic Measuring Instruments Co., Ltd. Xibudadao road 166, 710000 Xi’an.

Hereby declare that the load cells described below:


Serial numbers can be found in calibration certificate added to the shipment.

With markings:

II 1G Ex ia IIC T4 or
II 1D Ex iaD 20 IP6X T73°C or
II 3G Ex nl IIC T4 or
II 3D Ex tc IIIC T73°C Dc.


The loadcells mentioned, received a certificate after exam of conformity by notified body 1725 FM Approvals, 1 Windsor Dials, Windsor, Berkshire, UK. The certificate number: FM07ATEX0017X – Issue 2.

This declaration is issued under the sole responsibility of the manufacturer.

This document is signed for and on behalf of:

Zhonghang Electronic Measuring Instruments Co., Ltd.

Place and date of issue: 12-09-2019, Etten-Leur
Name and Function: Sander Fiere, Technical Manager
Signature:

Specifications and dimensions are subject to change without notice and do not constitute any liability whatsoever.
Manufacturing Declaration
Herstellungserklärung

no: 2014/26 rev.3

Manufacturer
Hersteller
Zemic Europe BV
Leerlooierstraat 8
4871 EN Etten-Leur
The Netherlands

Product description
Produktbezeichnung


We hereby declare that above mentioned products in the form as delivered is in conformity
with the provisions of the following European Directive:
Wir erklären hiermit das oben bezeichnete Produkten stimmen in der von uns in Verkehr
gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinie überein:

ATEX Directive 2014/34/EC
EN 60079-0/A11 ::2013
EN 60079-15:2010
EN 60079-31:2014

Conformity to the directives 2014/34/EC is assured through the application of the above
standards.
Die Konformität zur 2014/34/EC wird nachgewiesen durch die Enthaltung oben angeführten
Normen.
We believe we make you stronger!

Atex Marking / Atex Zündschutzart

Ex III D Ex te IIC T73°C Dc
Ex II 3G Ex nA IIC T4 Gc

Permitted ambient temperature range / zulässiger Umgebungstemperaturbereich

-20°C ≤ Ta ≤ +40°C

Electrical Data / Elektrische Daten
Powersupply / Stromversorgung

Un = 20V

Special conditions for Safe Use in Zone 2 and Zone 22
Besondere Bedingungen zum Einsatz in Zone 2 und Zone 22

1. Steps must be taken to ensure that the rated voltage through transients cannot be exceeded by more than 40%. This criterion is fulfilled, if supplies are derived from SELV (safety Extra Low Voltage) only in accordance with IEC 950/EN 60950 /VDE 0805. Es müssen Maßnahmen getroffen werden, dass die Nennspannung durch Transienten um nicht mehr als 40% überschritten werden kann. Dies ist der Fall, wenn die Geräte ausschließlich mit SELV (Safety Extra Low Voltage) betrieben werden. (gemäß IEC 950/EN 60950 /VDE 0805).

2. Do not disconnect equipment when a flammable combustible atmosphere is present. Die elektrischen Verbindungen dürfen unter Spannung nicht aufgetrennt werden solange nicht sicher ist, dass der Bereich nicht explosiv ist.

Zemic Europe BV

Erik van Wijk
Managing Director