

# Load cell Instruction Manual

**ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO. LTD.**

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**ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO. LTD.**

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

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1/12

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## 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.

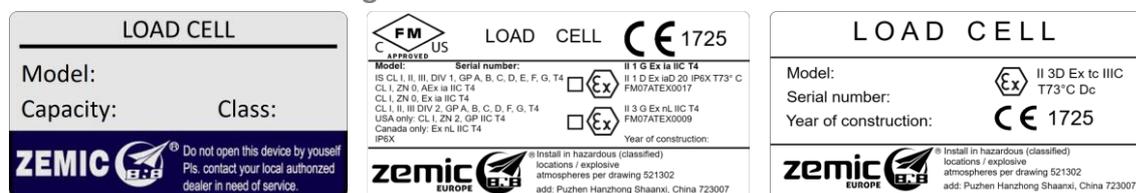
### 1.1 Product Description

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:



Standard product label (Sample)

Atex product label (Sample)

Note1: Model and Capacity and Class.

Note2: ZEMIC is the trademark of ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD.

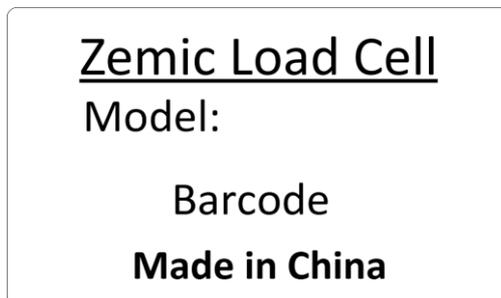
Note3: Customer should mark the zone of use on the Atex product label by means of the checkboxes.

The available ATEX designations Zemic can offer are:

- II 1G Ex ia IIC T4
- II 1D Ex iaD 20 IP6X T73°C
- II 3G Ex nL IIC T4
- II 3D Ex tc IIIC T73°C Dc

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## 1.2.2 External Label in English:



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.

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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.

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## 5. Failure Analysis and guidance on potential misuse

5.1 Failure Phenomenon	5.2 Cause analysis	5.3 Guidance
After assembly of a scale, the reading of empty load is big and hard to set to zero.	<p>The Load Cell might have been overloaded and plastically deformed due to shock load or impact load.</p> <p>The mounting and load introduction might not be correct and influence the free deflection of the load cell.</p>	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.
Unstable readings and / or random changes in zero point	The mounting and load introduction might not be correct and influence the free deflection of the load cell. The Load Cell might have an insulation resistance problem.	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 MΩ. If Insulation resistance is OK than check the junction box if applicable.
Scale reads overload, incorrect or not at all.	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.	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.

**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!

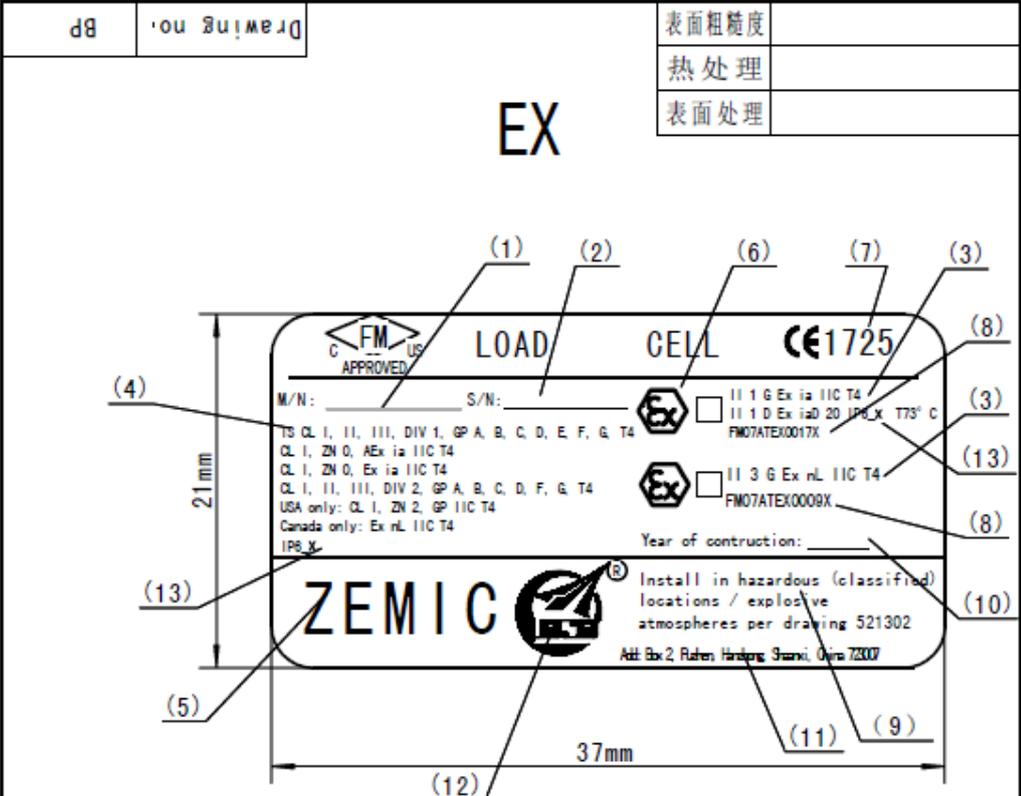
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## 6. The standards

Title	Standard No.	Date
Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirements	FM - 3600	November 1998
Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, & III, Division 1 and Class I, Zone 0 & 1 Hazardous (Classified) Locations	FM - 3610	January 2007
Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Division 1 and 2 Hazardous (Classified) Locations	FM - 3611	December 2004
Electrical and Electronic Test, Measuring and Process Control Equipment	FM - 3810	January 2005
Degrees of protection provided by enclosures (IP code)	ANSI/IEC	2004
Intrinsically Safe and Nonincendive Equipment for use in Hazardous Locations	CSA C22.2 No.157	1992 (Reaffirmed 2006)
Nonincendive Electrical Equipment for use in Class I, Division 2 Hazardous Locations	CSA C22.2 No. 213	1987 (Reaffirmed 2004)
Safety Requirement for Electrical Equipment for Measurement, Control and Laboratory use – Part 1 General Requirements	CSA C22.2 No.1010.1	July 2004
Degrees of protection provided by enclosures (IP code)	CSA C22.2 No. 60519	July 2005
Electrical Apparatus for Explosive Gas Atmospheres – Part 11: Intrinsic safety “i”	CSA-E60079-11	2002 (Reaffirmed 2006)
Electrical Apparatus for Explosive Gas Atmospheres – Part 0: General Requirements	CSA-E60079-0	2002 (Reaffirmed 2006)
Electrical Apparatus for Explosive Gas Atmosphere Type of Protection “n”	CSA E60079-15	2002
Electrical apparatus for explosive gas atmospheres – Part 0: General requirements	EN 60079-0	July 2006
Explosive atmospheres – Part 11: Equipment protection by intrinsic safety ‘i’	EN 60079-11	January 2007
Electrical apparatus for explosive gas atmospheres – Part 15: Construction, test and marking of type of protection ‘n’ electrical apparatus (IEC 60079-15: 2005)	EN 60079-15	2005
Electrical apparatus for use in the Presence of combustibile dust – Part 0: general requirements	EN 61241-0	2004
Electrical apparatus for use in the presence of combustibile dust – Part 11: protection by Intrinsic Safety ‘iD’	EN 61241-11	2005
Degrees of protection provided by enclosures (IP code)	EN 60529	October 1991 Amendment 1 February 2000

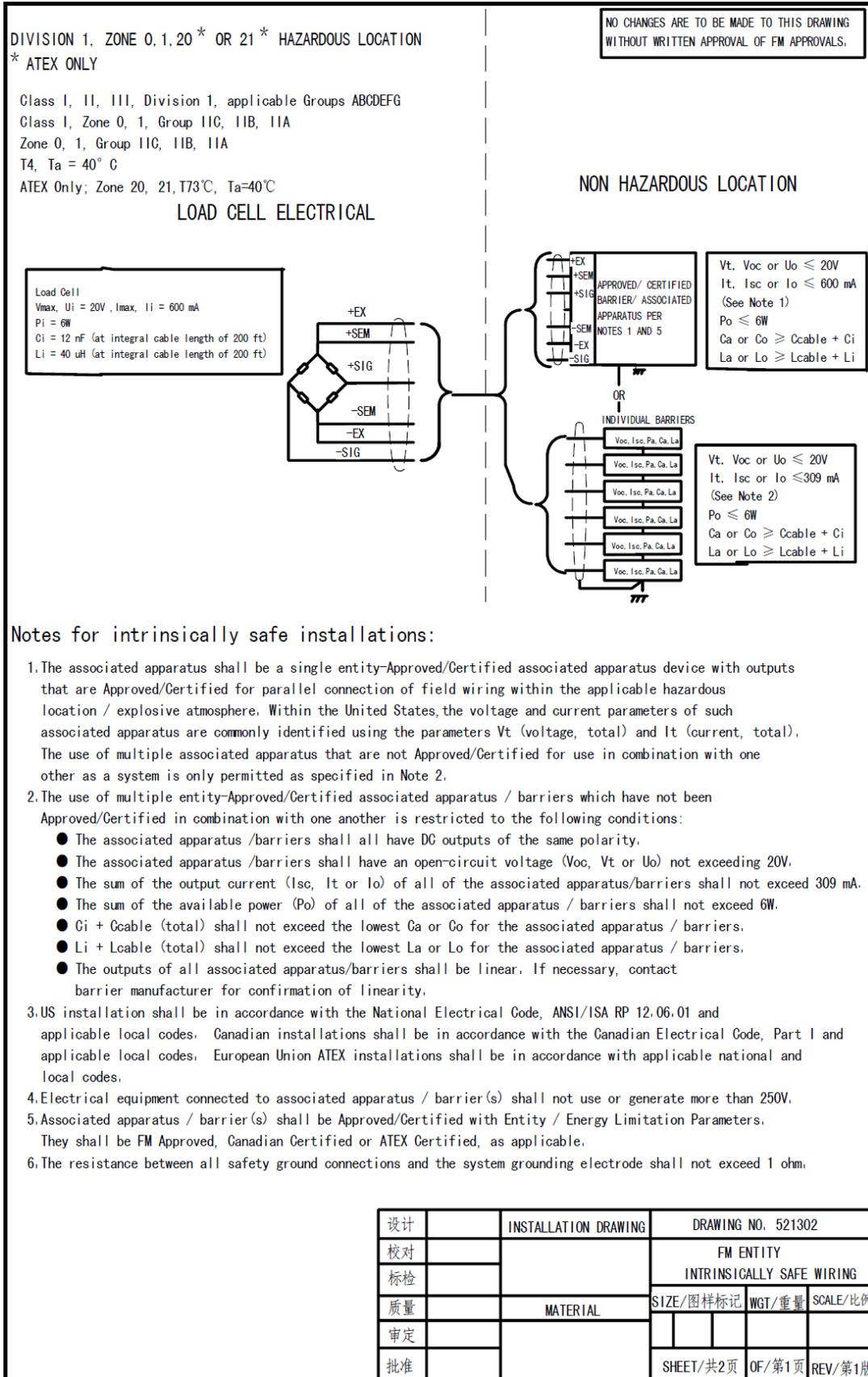
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## Attachment 1:

BP	Drawing no.	表面粗糙度		热处理	
EX		表面处理			
					
<p>(1) .ZEMIC'S TYPE IDENTIFICATION                  (2) .ZEMIC'S SERIAL NUMBER                  (3) .ATEX CLASS                  (4) .FM CLASS                  (5) .THE ZHONGHANG ELECTRONIC MEASURING INSTRUMENTS CO., LTD                  (6) .TARGET DIRECTIVE MARKING                  (7) .THE NAME OR MARK FO THE ISSUER OF THE CERTIFICATE                  (8) .FM AND ATEX CERTIFICATION NUMBRE                  (9) .INSTALLATION DRAWING                  (10) .YEAR OF CONSTRUCTION                  (11) .ZEMIC'S ADDRESS                  (12) .REGISTERED TRADEMARK OF ZEMIC                  (13) .INSERT THE APPROPRIATE IP CODE BY ZEMIC'S MODEL</p>					
日期					
签					
会	金 礼				
原图号	底图号	更改标记	更改单号	签名	日期
		Name		Drawing no.	
		Nameplate		BP	
		材 料		图样标记	重量比例
				共 页	第 页 第 版
				(B)	

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## Attachment 2:

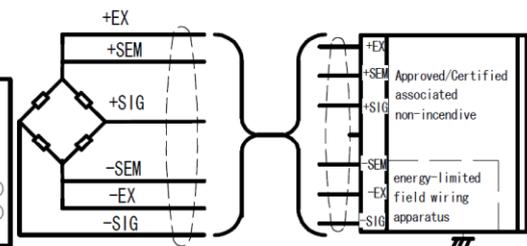


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## DIVISION 2 OR ZONE 2 HAZARDOUS LOCATION

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**



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN APPROVAL OF FM APPROVALS.

Load Cell

V<sub>max</sub>, U<sub>i</sub> = 20V, I<sub>max</sub>, I<sub>i</sub> = 600 mA

P<sub>i</sub> = 6W

C<sub>i</sub> = 12nF(at integral cable length of 200 ft)

L<sub>i</sub> = 40uH(at integral cable length of 200 ft)

V<sub>t</sub>, V<sub>oc</sub> or U<sub>o</sub> ≤ 20V

I<sub>t</sub>, I<sub>sc</sub> or I<sub>o</sub> ≤ 600 mA

(See Notes 1 and 2)

P<sub>o</sub> ≤ 6W

C<sub>a</sub> or C<sub>o</sub> ≥ C<sub>cable</sub> + C<sub>i</sub>

L<sub>a</sub> or L<sub>o</sub> ≥ L<sub>cable</sub> + L<sub>i</sub>

**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 V<sub>t</sub> (voltage, total) and I<sub>t</sub> (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 (V<sub>oc</sub>, V<sub>t</sub> or U<sub>o</sub>) not exceeding 20V.
  - The sum of the output current (I<sub>sc</sub>, I<sub>t</sub> or I<sub>o</sub>) of all of the associated apparatus shall not exceed 309 mA.
  - The sum of the available power (P<sub>o</sub>) of all of the associated apparatus shall not exceed 6W.
  - C<sub>i</sub> + C<sub>cable</sub> (total) shall not exceed the lowest C<sub>a</sub> or C<sub>o</sub> for the associated apparatus.
  - L<sub>i</sub> + L<sub>cable</sub> (total) shall not exceed the lowest L<sub>a</sub> or L<sub>o</sub> 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. Canadian installations shall be in accordance with the Canadian Electrical Code, Part I and applicable local codes. European Union ATEX installations shall be in accordance with applicable national and 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.

设计		INSTALLATION DRAWING	DRAWING NO. 521302		
校对			FM ENTITY		
标检			INTRINSICALLY SAFE WIRING		
质量		MATERIAL	SIZE/图样标记	WGT/重量	SCALE/比例
审定					
批准			SHEET/共2页	OF/第2页	REV/第1版

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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:

**2H3, B3G, H3G, BM3, H3, H3C, H3A, H3E, H3F, H3J, B8D, B8K, BM8D, BM8F, BM8H, H8, H8B, H8C, H8E, H8K, HM8, HM8C, B6E, B6F, B6G, B6N, B6Q, BM6A, BM6G, H6B, H6E, H6E3, H6F, H6G, H6G5, B9C, B9D, B9E, B9F, B9H, B9J, B9K, H9B, H9C, H9D, H9N, HM9B, HM9C, HM9E, BM11, HM11, BM14A, BM14C, BM14D, BM14G4, BM14K, HM14C.**

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.

And corresponds to the production model described in the EU type-approval certificate and to the requirements of the Council Directive 2014/34/EU:  
EN60079-0:2006, EN60079-11:2007, EN60079-15:2005, EN60079-26:2007, EN61241-0:2006, EN61241-11:2006 and EN60529:1991 + A1:2000.

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:	

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Atex Marking / Atex Zündschutzart

 II 3D Ex tc IIIC T73°C Dc

 II 3G Ex nA IIC T4 Gc

Permitted ambient temperature range / zulässiger Umgebungstemperaturbereich

$-20^{\circ}\text{C} \leq T_{a} \leq +40^{\circ}\text{C}$

Electrical Data / Elektrische Daten

Powersupply / Stromversorgung

$U_n = 20\text{V}$

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.*

Etten-Leur, 16.12.2016

Zemic Europe BV



Erik van Wijk

Managing Director