



# 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](http://www.iecex.com)

Certificate No.: **IECEX SIR 15.0060X** Page 1 of 4 [Certificate history:](#)  
Issue 0 (2015-06-17)

Status: **Current** Issue No: 1

Date of Issue: 2019-11-05

Applicant: **CTC - Connection Technology Center, Inc.**  
7939 Rae Blvd.  
Victor  
New York 14564  
**United States of America**

Equipment: **Transducer Sensors/AC9\*\* Series and TA9\*\* Series**

Optional accessory:

Type of Protection: **Intrinsically Safe**

Marking: Ex ia IIC T3 -T4 Ga  
T3: Ta - -40°C to +121°C  
T4: Ta - -40°C to +80°C

Approved for issue on behalf of the IECEx  
Certification Body:

**Neil Jones**

Position:

**Certification Manager**

Signature:  
(for printed version)

Date:

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CERTIFICATION





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Manufacturer: **CTC - Connection Technology Center, Inc.**  
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Victor  
New York 14564  
**United States of America**

Additional  
manufacturing  
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

#### STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

**IEC 60079-0:2017** Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0

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

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

#### TEST & ASSESSMENT REPORTS:

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

Test Reports:

[GB/SIR/ExTR15.0171/00](#)

[GB/SIR/ExTR19.0258/00](#)

Quality Assessment Report:

[CA/CSA/QAR08.0011/08](#)



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## **EQUIPMENT:**

Equipment and systems covered by this Certificate are as follows:

Vibration sensors are used for acceleration measurement by means of piezo-electric device. The piezo-electric is subjected to compression pressure from a mass which produce a voltage in proportion to the acceleration. The voltage is then amplified by internal electronic circuitry. This can also be integrated within the amplifier board to product a velocity output, referred to with a VE prefix. For the Loop Power series (LP prefix), the output is converted to a 4-20 mA. These sensors can be used in conjunction with a temperature board to provide the temperature of the environment the sensor is contained within this configuration is referred to with a TA prefix. For the negative voltage and LP series sensor, an external power source is required necessitating an extra conductor wire. The sensors are mounted to the surface of the desired surface via a threaded bolt or by other means to be approved of by the authority having jurisdiction.

Refer to the Annexe for additional information.

## **SPECIFIC CONDITIONS OF USE: YES as shown below:**

Refer to the Annexe for the Specific Conditions of Use.



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## **DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**

**This issue, Issue 1, recognises the following changes: refer to the certificate annexe to view a comprehensive history:**

1. Assessment of new accelerometers' added models. The description was amended to recognise these new models. The Special Conditions of Use and Conditions of Manufacture were also amended.
2. Addition of the full nomenclature for all accelerometers' models to the report.
3. Following appropriate assessment to demonstrate compliance with the latest technical knowledge, IEC 60079-0:2011 Ed. 6 was replaced by IEC 60079-0:2017 Ed. 7
4. Changing all accelerometers assessed models' entity parameters to match corresponding Schematics.
5. Updating Schematics to reflect applied changes, updating nameplates and instruction manual.
6. Excluding accelerometers' obsolete models and those of different marking.
7. The ambient temperature range was corrected to include the T4 marking which had previously been omitted.

## **Annex:**

[IECEX SIR 15.0060X Annexe Issue 1.pdf](#)

Annexe to: IECEx SIR 15.0060X Issue 1  
 Applicant: CTC - Connection Technology Center, Inc.  
 Apparatus: Transducer Sensors/AC9\*\* Series and TA9\*\* Series



In terms of connectors and cables, involved models overlap slightly as shown below:

A- Refer to DWG INS10012 for connections' details:

2 Pin Vibration Sensors Connected to 1 Single Channel Barrier	3 Pin Vibration Sensors - Connected to 1 Dual Channel Barrier - or 2 Single Channel barrier	4 Pin Vibration Sensors - Connected to 1 Dual Channel Barrier & 1 Single Channel barrier - or 3 Single Channel barrier		
AC91 Series	TA91 Series	AC957 Series		
LP81 Series	AC979 Series	AC972 Series		
LP91 Series	AC82 Series	AC980 Series		
VE9 Series	AC86 Series	AC981 Series		
AC83 Series		TA82 Series		
AC90 Series				
LP80 Series				
LP90 Series				
AC970 Series				
AC974 Series				
AC976 Series				

- Standard accelerometers and velocity sensors have 2 pins and uses 2 wire cable, 1 wire is for the sensing element and 1 common.
- The Biaxial, designated sensors have 3 pins and uses 3 wire cables. For the biaxial sensor 2 wires are for the different sensing elements and 1 common. For temperature, 1 wire is for signal, 1 for temperature, 1 shared common. For negative voltage and low power, 1 wire is for signal, 1 for power, and 1 for ground.
- The Triaxial designated sensors have 4 pins and a 4 wire cable. For Triaxial 1 wire for each of the 3 sensing elements and 1 for common. For low power with temperature, 1 wire is for signal, 1 for temperature, 1 for power and 1 for shared common.

B- For each model maximum allowable integral cable length as shown below:

- 1- For models utilising blocking diodes the maximum cable length would be 1600 ft (488 m)
- 2- For models not utilising blocking diodes the maximum cable length would be 200 ft (61 m)

Models With Integral Cables	Maximum Integral Cable Length
AC901-XR, AC902-XR	200 ft (61 m)
AC903-XR, AC904-XR	200 ft (61 m)
AC905-XR, AC906-XR	200 ft (61 m)

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Models With Integral Cables	Maximum Integral Cable Length
AC970-XR THROUGH AC979-XR AC980-XR THROUGH AC989-XR	200 ft (61 m)
AC812-XR, AC814-XR AC822-XR, AC824-XR	200 ft (61 m)
AC865-XR, AC866-XR	200 ft (61 m)
TA81-XR, TA82-XR	200 ft (61 m)
AC911-XR, AC912-XR, AC913-XR, AC914-XR, AC915-XR, AC916-XR, AC917-XR, AC918-XR	1600 ft (488 m)
AC961-XR, AC952-XR, AC963-XR, AC964-XR, AC965-XR, AC966-XR, AC967-XR, AC968-XR	1600 ft (488 m)
TA91*-XR	1600 ft (488 m)
LP80*-XR, LP81*-XR, LP90*-XR, LP91*-XR	1600 ft (488 m)
LP85*-XR, LP86*-XR, LP95*-XR, LP96*-XR	1600 ft (488 m)
VE901-XR, VE902-XR	1600 ft (488 m)

C- For models specified with integral cables the following list to be utilised:

Part Number	Capacitance	Resistance	Inductance
CB102	48.0 pF/ft	10.0Ω/1000ft	0.081μH/ft
CB103*	49 pF/ft	9.7Ω/1000ft	0.047μH/ft
CB193*	49 pF/ft	9.7Ω/1000ft	0.047μH/ft
CB111	45.0 pF/ft	10.0Ω/1000ft	0.084μH/ft
CB190*	36 pF/ft	9.5Ω/1000ft	0.19μH/ft
CB206	35 pF/ft	42Ω/1000ft	0.062μH/ft
CB212	41 pF/ft	13.0Ω/1000ft	0.092μH/ft
CB191*	44.13 pF/ft	11.9Ω/1000ft	0.18μH/ft
CB192*	37.15 pF/ft	16.41Ω/1000ft	0.20μH/ft
CB218	27.9 pF/ft	15.4Ω/1000ft	0.21μH/ft

Accelerometers' nomenclature have been adjusted to present the distinguished type of enclosure and PCB enclosed.

A- Previously assessed accelerometers models taking into consideration the new designations:  
 (Used for Class I Division 1, Zone 0 and Zone 1)

Item number	Model Nomenclature	Entity Parameters
<b>AC Series with and without Integral Cables (DWG INS 10106)</b>		
1- Without integral cable	AC901-1R, AC902-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 11.51 nF Li = 0 μH

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Item number	Model Nomenclature	Entity Parameters
2- With integral cable	AC901-XR, AC902-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 51.7 nF Li = 336 µH
3- Without integral cable	AC903-1R, AC904-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 24.02 nF Li = 0 µH
4- With integral cable	AC903-XR, AC904-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 64.02nF Li = 336 µH
5- Without integral cable	AC905-1R, AC906-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 64.02nF Li = 336 µH
6- With integral cable	AC905-XR, AC906-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 80.85nF Li = 336 µH
7- Without integral cable	AC911-1R, AC912-1R, AC913-1R, AC914-1R, AC915-1R, AC916-1R, AC917-1R, AC918-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 28nF Li = 0µH
8- With integral cable	AC911-XR, AC912-XR, AC913-XR, AC914-XR, AC915-XR, AC916-XR, AC917-XR, AC918-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 80.4nF Li = 336µH
9- Without integral cable	AC961-1R, AC952-1R, AC963-1R, AC964-1R, AC965-1R, AC966-1R, AC967-1R, AC968-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 0nF Li = 0µH
10- With integral cable	AC961-XR, AC952-XR, AC963-XR, AC964-XR, AC965-XR, AC966-XR, AC967-XR, AC968-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 80.4nF Li = 336µH

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Item number	Model Nomenclature	Entity Parameters
11- Without integral cable	AC970-1R THROUGH AC979-1R AC980-1R THROUGH AC989-1R	U <sub>i</sub> = 28VDC I <sub>i</sub> = 120mA P <sub>i</sub> = 1W C <sub>i</sub> = 28nF L <sub>i</sub> = 0μH
12- With integral cable	AC970-1R THROUGH AC979-1R AC980-1R THROUGH AC989-1R	U <sub>i</sub> = 28VDC I <sub>i</sub> = 120mA P <sub>i</sub> = 1W C <sub>i</sub> = 40nF L <sub>i</sub> = 40.2μH
<b>TA Series with and without Integral Cables (DWG INS 10109)</b>		
13- Without integral cable	TA91*-1R	U <sub>i</sub> = 28VDC I <sub>i</sub> = 120mA P <sub>i</sub> = 1W C <sub>i</sub> = 1.5nF L <sub>i</sub> = 40.2μH
14- With integral cable	TA91*-XR	U <sub>i</sub> = 28VDC I <sub>i</sub> = 120mA P <sub>i</sub> = 1W C <sub>i</sub> = 82nF L <sub>i</sub> = 336μH

B- New added and assessed accelerometers models including the new designations:  
 (Used for Class I Division 1, Zone 0 and Zone 1)

Item number	Model Nomenclature	Entity Parameters
<b>AC Series with and without Integral Cables (DWG INS 10106)</b>		
1- Without integral cable	AC812-1R, AC814-1R AC822-1R, AC824-1R	U <sub>i</sub> = 6VDC I <sub>i</sub> = 0.5A P <sub>i</sub> = 1W C <sub>i</sub> = 266nF L <sub>i</sub> = 0μH
2- With integral cable	AC812-XR, AC814-XR AC822-XR, AC824-XR	U <sub>i</sub> = 6VDC I <sub>i</sub> = 0.5A P <sub>i</sub> = 1W C <sub>i</sub> = 278.2nF L <sub>i</sub> = 42μH
3- Without integral cable	AC865-1R, AC866-1R	U <sub>i</sub> = -28VDC I <sub>i</sub> = 120mA P <sub>i</sub> = 1W C <sub>i</sub> = 46nF L <sub>i</sub> = 0μH
4- With integral cable	AC865-XR, AC866-XR	U <sub>i</sub> = -28VDC I <sub>i</sub> = 120mA P <sub>i</sub> = 1W C <sub>i</sub> = 58.2nF L <sub>i</sub> = 42μH
<b>TA Series with and without Integral Cables (DWG INS 10109)</b>		



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Item number	Model Nomenclature	Entity Parameters
5- Without integral cable	TA81*-1R, TA82-1R	Ui = 6VDC Ii = 0.5A Pi = 100mW Ci = 268.5nF Li = 0μH
6- With integral cable	TA81-XR, TA82-XR	Ui = 6VDC Ii = 0.5A Pi = 100mW Ci = 268.5nF Li = 0μH
<b>LP Series with and without Integral Cables (DWG INS 10107)</b>		
7- Without integral cable	LP80*-1R, LP81*-1R, LP90*-XR, LP91*-1X	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 0nF Li = 0μH
8- With integral cable	LP80*-XR, LP81*-XR, LP90*-XR, LP91*-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 80.4nF Li = 336μH
9- Without integral cable	LP85*-1R, LP86*-1R, LP95*-1R, LP96*-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 0nF Li = 0μH
10- With integral cable	LP85*-XR, LP86*-XR, LP95*-XR, LP96*-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 80.4nF Li = 336μH
<b>VE Series with and without Integral Cables (DWG INS 10108)</b>		
11- Without integral cable	VE901-1R, VE902-1R	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 0nF Li = 0μH
12- With integral cable	VE901-XR, VE902-XR	Ui = 28VDC Ii = 120mA Pi = 1W Ci = 80.4nF Li = 336μH

**Specific Conditions of Use**

- i. All models of the assessed equipment are required to be connected to a properly rated I.S. barrier as per DWG INS10012. The Ui & Ii parameters are the worst case voltage and current from the combination of these barriers, but they cannot appear at the same time. It is the end-users' responsibility to ensure

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that the combined voltage and current of the connected barriers does not exceed the values of Table A.1 of IEC 60079-11:2011 Ed6.

ii. Cables of the following part numbers are restricted only for use with sensors of a maximum ambient temperature of + 80 °C, The manufacturer shall ensure that the product is marked accordingly:

- CB103
- CB190
- CB191
- CB192
- CB193

iii. Maximum Cable lengths are specified and these maximum values shall not be exceeded as per the following list:

Models With Integral Cables	Maximum Integral Cable Length
AC901-XR, AC902-XR	200 ft (61 m)
AC903-XR, AC904-XR	200 ft (61 m)
AC905-XR, AC906-XR	200 ft (61 m)
AC970-1R THROUGH AC979-1R AC980-1R THROUGH AC989-1R	200 ft (61 m)
AC812-XR, AC814-XR AC822-XR, AC824-XR	200 ft (61 m)
AC865-XR, AC866-XR	200 ft (61 m)
TA81-XR, TA82-XR	200 ft (61 m)
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AC961-XR, AC952-XR, AC963-XR, AC964-XR, AC965-XR, AC966-XR, AC967-XR, AC968-XR	1600 ft (488 m)
TA91*-XR	1600 ft (488 m)
LP80*-XR, LP81*-XR, LP90*-XR, LP91*-XR	1600 ft (488 m)
LP85*-XR, LP86*-XR, LP95*-XR, LP96*-XR	1600 ft (488 m)
VE901-XR, VE902-XR	1600 ft (488 m)

iv. The entity parameters of the vibration sensors and integrated cables shall not be exceeded as per the marked nameplates. Refer to the following controlled documents for details:

- INS10106
- INS10107
- INS10108
- INS10109

### Conditions of Manufacture

- i. The equipment shall be subjected to dielectric strength test using test voltage of 500 VAC applied between circuit and earth for 60 seconds. Alternatively a voltage of 20% higher may be applied for 1 second. There shall be no evidence of flashover or breakdown and the maximum current flowing during the test shall not exceed 5 m A r.m.s. at any time. . Refer to IEC 60079-11:2011 Ed. 6 clause 6.3.13.
- ii. Cables of the following part numbers are restricted only for use with sensors of a maximum ambient temperature of + 80 °C, The manufacturer shall ensure that the product is marked accordingly:

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i. CB103    ii. CB190    iii. CB191    iv. CB192    v. CB193

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## Full certificate change history

This issue, Issue 1, recognises the following changes; refer to the certificate annexe to view a comprehensive history:

1. Assessment of new accelerometers' added models. The description was amended to recognise these new models. The Special Conditions of Use and Conditions of Manufacture were also amended.
2. Addition of the full nomenclature for all accelerometers' models to the report.
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