



1 **TYPE EXAMINATION CERTIFICATE**

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

3 Certificate Number: **CSACa 24ATEX1004X** Issue: **0**

4 Equipment: **AC93*-***, AC94*-***, AC95*-***, LP82*-***, LP92*-***, TA93*-***, VE80*-*** Series Transducer Sensors.**

5 Applicant: **CTC - Connection Technology Center, Inc.**

6 Address: 7939 Rae Blvd.
Victor, NY 14564, USA

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 Testing & Certification Inc., certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design of Category 3 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 60079-31:2014 EN IEC 60079-7:2015/A1:2018

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 Type Examination Certificate relates only to the design of the specified equipment, and not to specific items of equipment subsequently manufactured. 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 3 GD

Ex ec IIC T*°C Gc

Ex tc IIIC T135°C Dc

T4 for ambient range of -40°C to +80°C

T3 for ambient range of -40°C to +121°C

*Temperature Class depends on the ambient temperature

Project Number 80042040

Signed:

Title: Sr. Director Operations

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13 DESCRIPTION OF EQUIPMENT

General Product Description:

Vibration sensors which are used for acceleration measurement by means of piezo-electric device. The piezoelectric 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 produce 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, Low power 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.

In terms of connectors and cables, there could be 3 wiring configurations:

Model types	Connector type		
	Connector with 2 pins and 2 wire cables	Connector with 3 pins and 3 wire cables	Connector with 4 pins and 4 wire cables
AC93*-** Series - Low Capacitance Accelerometer (schematic INS10053) AC94*-** Series - Compact Accelerometer (schematic INS10048) LP82*-** Series - Loop Power Velocity Sensor (schematic INS10026) LP92*-** Series - Loop Power Accelerometer (schematic INS10026) VE80* Series - Velocity Sensor (schematic INS10074)	1 wire is for the sensing element and 1 common/ground.	N/A	N/A
AC949-XR Biaxial Accelerometer (schematic INS10048)	N/A	2 wires are for the different sensing elements and 1 common.	N/A

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Model types	Connector type		
	Connector with 2 pins and 2 wire cables	Connector with 3 pins and 3 wire cables	Connector with 4 pins and 4 wire cables
TA93* Series - Dual Output Accelerometer with Temperature INS10049+ INS10053	N/A	1 wire is for signal, 1 for temperature, 1 shared common	N/A
AC950-XR Triaxial Accelerometer (schematic INS10048)	N/A	N/A	3 wires are for the different sensing elements and 1 common.

Construction:



Critical aspects of the equipment are described below:

1. Enclosure: Welded 316/316L (molybdenum-bearing austenitic Stainless Steel), measured 52mm (L) with 22mm (diameter) for vertical mounting sensor or 53mm (L) by 25mm (W) by 27mm (H) for horizontal mounting sensor, 39.53mm (L) by 14mm (O.D.) for the compact sensor, the biaxial dimensions and the triaxial dimensions can be found under INS10013 and INS10014 drawings. Minimum thickness 1.5mm. The sensor is hermetically sealed with melted glass also at the pins as indicated in INS10013 and INS10014. The melted glass could be of type Corning 9013, Glass AB89 or Elan 13 manufactured Material Research Group with a Softening Temperature of 655°C.

Various enclosure configurations available for single axial, biaxial and triaxial, vertical or horizontal mounting, see drawing INS10013.

2. Printed Circuit Board: FR4 with dimensions as shown in their schematic drawing are encapsulated with encapsulant as described below.

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3. Schematics: Seven schematics are available:

INS10026 – LP sensors
INS10048 – AC small series schematic
INS10049 – Temperature board
INS10053 – Low Capacitance sensors
INS10074 – Velocity sensors
INS10076 – Low power sensors

4. Encapsulation: The following types are utilized:

Detail	Details			
Manufacturer	Epoxy Technology	Dow Corning	Dow Corning	Resin Lab
Generic name:	Two component, optically opaque epoxy.	Silicone Elastomer	Silicone Elastomer	Black casting resin
Type designation	EPO-TEK 509FM-1	SLYGARD 170 Fast Cure	SLYGARD 170 with Catalyst 9	EP1350-T1
COT	-55°C to +200 °C	-45°C to +200°C	-45°C to +200°C	-55°C to +230°C

5. Piezo-electric: Navy Type Equivalent: Navy II.

6. Cables: For models specified with integral cables the following list has to be utilised, as per drwg. INS 10120.

The size of the cables inside of the sensors are 32AWG.

The size of the conductors inside of the cable are 22AWG.

The construction of the cables with their assembly are shown on INS10120 connectors.

Part Number	Conductor Count	Cable Jacketing	Temperature Range
CB102	Two (2) Conductors	FEP Jacket	150
CB111	Two (2) Conductors	FEP Jacket	150
CB190	Two (2) Conductors	TPE Jacket	105
CB206	Two (2) Conductors	FEP Jacket with SS Armor	150
CB212	Three (3) Conductors	FEP Jacket with SS Armor	150
CB191	Three (3) Conductors	TPE Jacket	105
CB192	Four (4) Conductors	TPE Jacket	105
CB218	Four (4) Conductors	FEP Jacket with SS Armor	200
CB296	Two (2) Conductors	FEP Jacket with SS Armor	200
CB298	Four (4) Conductors	FEP Jacket with SS Armor	200

For models without integral cables, a cable should be used as per INS10120, item 9 with a temperature rating of at least 105°C.

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7. Connector P/N Q Series Q** where the first asterisk "*" is the number of pins (2 or 3) and the second asterisk is the type of the moulding material which is "R" is Polyphenylene Sulphide, (PPS). There is another 4 pins connector P/N JQ4R as described in drawing INS10120 with cable type CB191 manufactured by CTC, temperature ratings 105°C or CB218, CB298 manufactured by CTC, temperature ratings 200°C containing a S500 -70 Silicone compound made O-ring, manufactured by Boyd Corp. ID: 7/16 by OD: 9/16 inch, 70A durometer, -50 to +240°C operation temperature

The insulator material use in the Cable Connector is Ryton R-4-230 which is a Polyphenylene Sulphide (PPS) material mentioned on the INS10120 connector drawing. It has an RTI (Imp and Elec) of 200°C for the material thickness of 0.71mm which in this case is thicker than that.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated CSA Reports and Certificate History

Issue	Date	Report number	Comment
0	11 December 2024	R80042038A	The release of the prime certificate.

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

15.1 Cables of the following CTC part numbers CB190, CB191 and CB192 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 Temperature code depends on the ambient range: T4 for ambient range of -40°C to +80°C and T3 for ambient range of -40°C to +121°C The sensors have to be used with the cables, offered and sold by the manufacturer.

15.2 For applications in explosive dust atmospheres the equipment must not be exposed to charge generating mechanisms as flow of particles, charge spraying or strong electrostatic fields.

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.

17 CONDITIONS OF MANUFACTURE

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of CSA Certificates.

17.2 Holders of Type Examination Certificates are required to comply with the conformity to type requirements defined in Article 13 of Directive 2014/34/EU.

17.3 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 mA r.m.s. at any time. Refer to IEC 60079-7:2017 Ed. 5.1 clause 7.1.

17.4 Cables of the following CTC part numbers CB190, CB191 and CB192 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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Certificate Annexe



Certificate Number: CSACa 24ATEX1004X

Equipment: AC93*-***, AC94*-***, AC95*-***, LP82*-***, LP92*-***, TA93*-***, VE80*-*** Series Transducer Sensors.

Applicant: CTC - Connection Technology Center, Inc.

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Drawing	Sheets	Rev.	Date (stamp)	Title
INS10013	1 to 5	N	07 Nov 24	SENSORS, PIN CONNECTOR, HAZARDOUS AREA AC/LP/VE Series, TA Series, Triaxial, LP800/LP900
INS10014	1 to 8	H	07 Nov 24	SENSORS, ACCELEROMETERS, WITH INTEGRAL CABLE, HAZARDOUS AREA
INS10015	1 to 1	A	07 Nov 24	Labelling, Hazardous Locations
INS10149	1 to 5	E	07 Nov 24	Markings
INS10026	1 to 3	E	07 Nov 24	LP 4-20mA Schematic, BOM and Layout1
INS10048	1 to 3	D	07 Nov 24	AC Small series Schematic, BOM and Layout
INS10049	1 to 2	B	07 Nov 24	IS Temp Board Schematic
INS10053	1 to 3	E	07 Nov 24	New Low Cap IS sensor board
INS10074	1 to 3	C	07 Nov 24	Velocity Amp schematic, BOM and Layout
INS10076	1 to 3	B	07 Nov 24	Ultra Low Power Amp schematic, BOM and Layout
INS10120	1 to 9	G	07 Nov 24	Cross section drawing of hazardous rated connectors
INS10125	1 of 1	B	07 Nov 24	Cable Temperature Ratings chart
INS10129	1 to 2	A	07 Nov 24	Labeling Matrix, IECEx Zone 2

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