Model 176A07

Differential charge output pressure sensor with UHT-12™ element, 6.0 pC/psi

Installation and Operating Manual

**For assistance with the operation of this product,
contact the PCB Piezotronics, Inc.**

Toll-free: 716-684-0001
24-hour SensorLine: 716-684-0001
Fax: 716-684-0987
E-mail: info@pcb.com
Web: www.pcb.com

Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its "Lifetime Warranty Plus" on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty**.

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY14043 USA
Toll-free: (800) 828-8840
24-hour SensorLine: (716) 684-0001
General inquiries: info@pcb.com
Repair inquiries: rma@pcb.com

For a complete list of distributors, global offices and sales representatives, visit our website, www.pcb.com.

Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

Definition of Terms and Symbols

The following symbols may be used in this manual:

DANGER
Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

CAUTION
Refers to hazards that could damage the instrument.

NOTE
Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

The following symbols may be found on the equipment described in this manual:

This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.

This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.

This symbol indicates safety, earth ground.

PCB工业监视和测量设备 - 中国RoHS2公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
住房	O	O	O	O	O	O
PCB板	X	O	O	O	O	O
电气连接器	O	O	O	O	O	O
压电晶体	X	O	O	O	O	O
环氧	O	O	O	O	O	O
铁氟龙	O	O	O	O	O	O
电子	O	O	O	O	O	O
厚膜基板	O	O	X	O	O	O
电线	O	O	O	O	O	O
电缆	X	O	O	O	O	O
塑料	O	O	O	O	O	O
焊接	X	O	O	O	O	O
铜合金/黄铜	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。

O： 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

X： 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。

CHINA RoHS COMPLIANCE

Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	O	O	O
Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
Solder	X	O	O	O	O	O
Copper Alloy/Brass	X	O	O	O	O	O

This table is prepared in accordance with the provisions of SJ/T 11364.

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement of GB/T 26572.
Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.

1.0 INTRODUCTION

Charge mode pressure sensors offer high performance for precise pressure measurements over a wide range of near-static and dynamic pressures. The sensors use piezoelectric properties to convert an applied pressure into an analogous electrical charge.

The internal design of a sensor incorporates a sensing element that provides high sensitivity over a wide range of pressures. As pressure is applied to the diaphragm of the sensor, a charge is generated in the crystals. The high-impedance electrostatic charge is then conditioned externally by either a laboratory-style charge amplifier or in-line charge converter prior to being sent to a readout or recording device.

Charge mode sensors are ideally suited for applications where wide dynamic range is needed. Such applications include compressors, engines, blast, ballistic, pneumatic, hydraulic, and fluid pressures. Enclosed is a Specification Sheet that lists the complete performance characteristics of the sensor purchased.

2.0 Series 176 High Temperature Differential Output Sensor

The Series 176 High temperature differential output sensor is a special- purpose high temperature charge mode pressure sensor designed specifically to measure low-level pressures in severe environments. The unit is most frequently used in engines, hydraulic and pneumatic devices, compressors and turbines. Ideal for sound pressure measurements, microphones and small pressure agitations, its maximum dynamic pressure range is 100 psi (689 kPa). It is acceleration compensated to minimize vibration sensitivity and is capable of a five-microsecond rise time.

This sensor measures transient or repetitive phenomena relative to the initial or average pressure level, over a wide amplitude range and a usable frequency range near DC to 10 000 Hz; the resonant frequency is 50 000 Hz. The operating temperature for the Series 176 ranges from 0°F to 1000°F. This hermetically sealed sensor contains extremely rigid compression-mode crystals with an integral acceleration compensating crystal to reduce vibration sensitivity and partially suppress internal resonance effects.

Manual Number: 30737
Revision: A
ECR Number: 24690

3.0 Installation

3.1 Overview

When choosing an installation method, the advantages and disadvantages of each method must be carefully weighed. Characteristics like location, ruggedness, amplitude range, accessibility, temperature and portability may be greatly affected by the installation configuration and technique. Often, the most important and overlooked consideration is the affect the mounting technique has on the frequency of the pressure being measured by the sensor.

Two basic mounting techniques are recommended for pressure sensors: the recess mount and the flush mount. The technique used is determined by the specifics of the individual application. See the Installation Drawing in this manual for additional details on the individual sensor series.

3.2 Recess Mount

A recess mount protects the sensor diaphragm from the effect of high flash temperature and particle impingement. This method is often selected because it can prolong sensor life and increase data integrity by reducing thermal effects. See Figure 3.1.

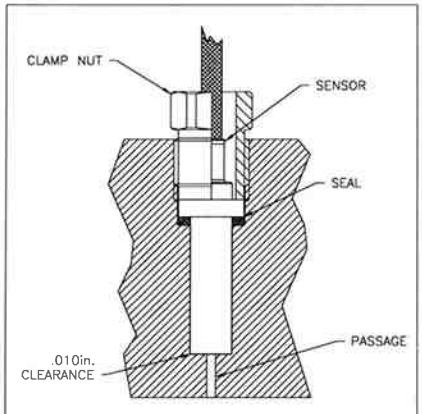


Figure 3.1 Recess Mount

When using a recess mount, note that the length of the passage may limit the frequency range of the measurement. The effect the passage has is similar to that of an under-damped second order system, with the resonant frequency determined by passage length. The passage length thus limits pressure pulse rise time and may also cause passage ringing.

The function is described by the following equation:

$$F_r = \frac{V}{4L}$$

Where: Fr = resonant frequency passage (Hz)
V = velocity of sound in air (feet/second)
L = length of column (feet)

For air at room temperature, the equation becomes:

$$F_r = \frac{3300}{L}$$

Where: L = passage length (inches)

The natural frequency and approximately fastest pressure step rise time for various length passages are shown in the following chart, using a medium of air at 77°F (25°C).

Selected Values for 77°F (25°C)

Passage length (inches)	Passage resonance (kHz)	Approx. fastest pulse rise time (microseconds)
.050	66	5
.100	33	10
.200	16.5	20
.50	6.6	50
1.0	3.3	100

Measured resonant frequencies may differ slightly from the chart values due to variations in the velocity of sound in the air from changes in temperature and pressure of the air in the passage.

To ensure diaphragm integrity, maintain .006 inches (.153 mm) of clearance ahead of the diaphragm as shown in Figure 3.1.

3.3 Flush Mount

In a flush mount installation, there is no reduced area passage from the sensor diaphragm to the test chamber. Instead, the sensor diaphragm is mounted flush with, or slightly recessed from, the inside surface of the test chamber. See Figure 3.2.

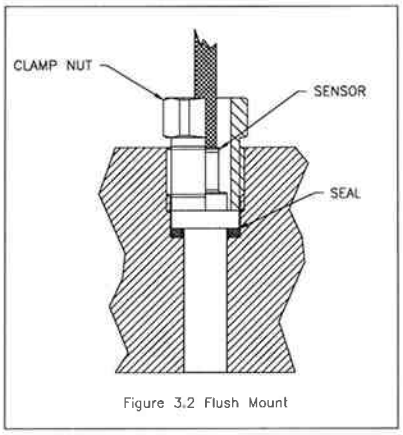


Figure 3.2 Flush Mount

If thermal transients or diaphragm impingement are concerns, use the flush mount technique only when space or frequency response considerations preclude the use of the recess mount installation.

In severe or pyrotechnic environments, sensor life may be seriously curtailed when using this mounting method.

3.4 Cabling

Care and attention to cable attachment is essential, as the reliability and accuracy of your system is no better than that of the output cable. First, check that you have ordered the correct cable type. As with sensors, no cable can satisfy all applications. Special low-noise cabling shielded twisted pair should be used with high-impedance, charge output devices.

Plug the connector on the cable into the mating connector on the sensor. Then, holding the sensor stationary, secure the connector in place by tightening down the attached cable sleeve.

Route the cable to a charge amplifier or in-line charge converter, making certain to strain relieve the sensor/cable connection and minimize motion by clamping the cable at regular intervals. Common sense must be used to avoid physical damage and minimize electrical noise. Avoid routing cables near high voltage wires. Do not route cables along floors or walkways where they may be stepped on or become contaminated. Shielded cable should have the shield grounded at one end only.

To dissipate any charge that may have accumulated in the cable, short the pins to ground prior to attachment to the charge amplifier or charge converter.

4.0 CALIBRATION

These sensors may be calibrated using static hydraulic techniques, such as dead-weight testers, or by comparison with a reference gage.

When calibrating with a laboratory-style charge amplifier, set the charge amplifier to LONG, for the time constant setting, and allow the sensor to stabilize before applying pressure. If slow drift is apparent, apply the pressure to the desired level, and immediately take a reading. Release the pressure and take another reading at zero pressure to obtain the difference between the readings at the desired present level and zero pressure. If the drift is too fast to take a reading, clean the cable connections according to the procedures out-lined in Section 7.0, Maintenance.

NOTE: Do not attempt to use a charge amplifier which, in the long time constant position, has less than a 5 000-second time constant for quasi-static calibration of charge sensors. Any drift may cause error.

A factory-supplied, NIST-traceable calibration graph is provided with each sensor, certifying its charge sensitivity in pC/psi, or when used with an in-line amplifier, in mV/psi.

5.0 Normal Operation

The high impedance signal generated by a charge output sensor is usually conditioned with a laboratory-style charge amplifier. The charge amplifier converts the high-impedance charge signal generated by the sensor into a low-impedance voltage signal. This signal may then be transmitted to a readout or recording device for analysis. See Figure 5.1 for a drawing of a typical system connection.

NOTE: When using charge-amplified systems, the noise floor of the system is dependent on the input capacitance to the charge amplifier. To minimize noise, keep the cable length between the pressure sensor and the charge amplifier to a minimum. Cable length does not affect the system sensitivity.

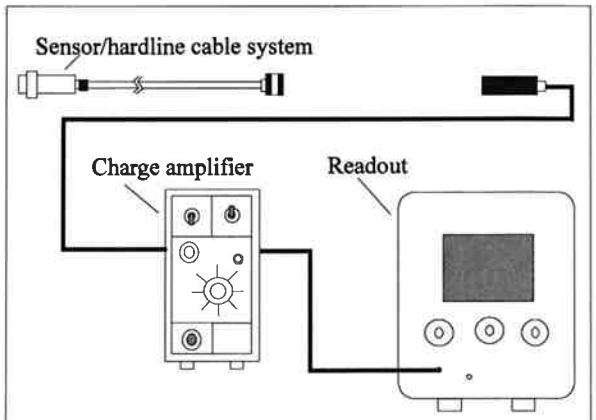


Figure 5.1 Typical System Connection

Before connecting the low-noise cable from the pressure sensor to the charge amplifier, be certain to ground the charge amplifier. This ensures that any excessive accumulated static charges across the sensor/cable combination are harmlessly discharged. If this precaution is not observed, the input FET of certain amplifiers may be destroyed. Press the ground button of the charge amplifier and adjust electrical zero if necessary.

Once system components are connected, wait a few minutes for the system to thermally stabilize. Place the switch in the OPR (operate) position and proceed with the measurement. Refer to the charge amplifier operating manual for further operating details.

For fixed sensitivity in-line charge amplifiers, the system sensitivity (mV/psi) is determined as the product of the charge amplifier sensitivity (mV/pC) and the sensor sensitivity (pC/psi).

6.0 HIGH-TEMPERATURE OPERATION

6.1 Introduction

When subjected to elevated temperature, all piezoelectric sensors/hardline cable systems exhibit decreased insulation resistance, due in part to the piezoelectric element, but due mostly to the hardline cable necessary to withstand the high temperatures. This situation can cause serious voltage offset problems in direct-coupled charge amplifiers. To solve this problem, the user must AC couple (capacitor) the charge amplifier

to the sensor/cable system. See Section 6.3, Solution to Reduced Resistance, for complete details, or use different amplifiers.

6.2 Reduced Resistance at Charge Amplifier Input

Figure 6.1 illustrates a simplified schematic of a typical direct-coupled charge amplifier where:

R_f = Feedback resistor (ohms)
R_i = Input leakage resistance (ohms)
E_o = Steady-state output voltage (volts)
e_i = Offset voltage: FET leakage (volts)
C_f = Feedback capacitor (farads)

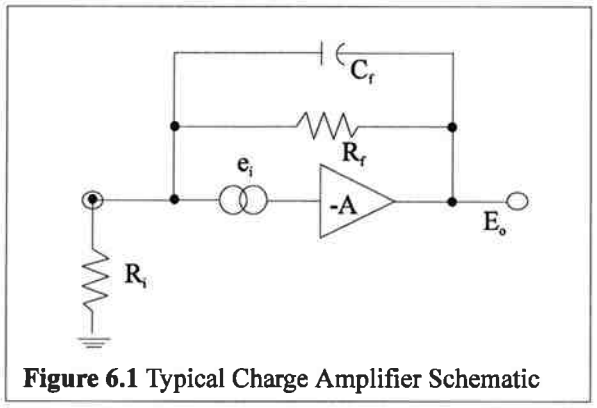


Figure 6.1 Typical Charge Amplifier Schematic

The feedback capacitor C_f comes into play only in the dynamic situation and its influence does not affect the steady-state situation. The voltage e_i is a DC offset voltage, usually very tiny (microvolts), that exists at the input gate of the MOSFET circuit. This minute leakage current exists in all real devices.

As demonstrated in Equation 1, the steady-state (DC) output voltage E_o is:

Equation 1

$$E_o = e_i\left(1+\frac{R_f}{R_i}\right)$$

This equation shows that if the input (leakage) resistance at the charge amplifier is extremely high (approaching infinity), the output DC voltage approaches e_i, usually a very tiny voltage. However, as R_i decreases, the term

$$1+\frac{R_f}{R_i}$$

increases, such that the output voltage can, with large ratios of R_f / R_i, become large enough to result in a large E_o, perhaps large enough to be outside the normal output voltage range of the charge amplifier.

Because of the feedback capacitor C_f, this output voltage change usually does not occur rapidly but rather, it manifests itself as a slow drift in the output voltage level. If R_i is low enough with respect to R_f, the voltage drift may continue until saturation of the charge amplifier occurs.

6.3 Solution to Reduced Resistance

Since the drift or offset problem is caused by a static or steady-state imbalance at the input of the charge amplifier, the solution involves blocking this steady-state effect while allowing the desired dynamic phenomena to pass. This may be accomplished by installing a series capacitor at the input of the charge amplifier, between the offending sensor (or low-impedance hardline) and the input.

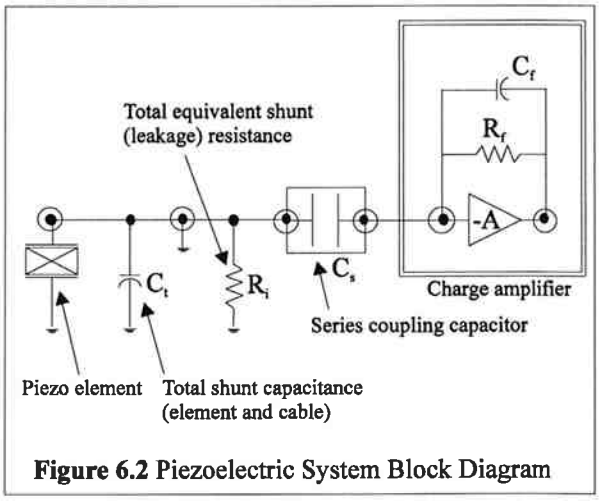


Figure 6.2 Piezoelectric System Block Diagram

Figure 6.2 illustrates a block diagram of the piezo-electric system where:

C_t = Shunt capacitor
C_s = Series blocking capacitor

With the series blocking capacitor C_s in place as shown, the dynamic charge (Q) generated by the sensor element is distributed across the two capacitors, C_t and C_s, in proportion to the size (capacitance) of each. If C_s, for example, is equal to 100 times C_t, 99% of the charge appears at the input of the charge amplifier, while 1% is

across the shunt capacitor C_t. This results in a 1% decrease in apparent sensitivity of the system.

This therefore demonstrates the importance of selecting the series blocking capacitor at least two orders of magnitude higher than the total shunt capacitance C_t across the input of the charge amplifier.

It is also important that this capacitor be of high quality, with a leakage resistance of greater that 10^{12} ohms, to avoid the DC offset discussed previously in 6.1, Introduction.

6.4 Low-Frequency Response Limitations

In a normal charge amplifier, the low-frequency response is set by the RC time constant, as established by the product of C_f and R_f. The system acts like a high-pass first order RC filter with a -3 dB frequency established by the relationship:

Equation 2

$$f_o = \frac{.16}{R_f C_f}$$

where:

f_o = -3 dB Frequency (Hz)
R_f = Feedback resistor (ohms)
C_t = Feedback capacitor (farads)

However, after the addition of the series blocking capacitor C_s, the system becomes the equivalent of two high-pass filters in series, one as previously mentioned and one comprised of series capacitor C_s and total equivalent shunt resistance R_i. This new cutoff frequency is:

Equation 3

$$f_o = \frac{.16}{R_i C_s}$$

To avoid compromise of the low-frequency response established by the charge amplifier parameters and illustrated by Equation 2, the product of R_iC_s should be several orders of magnitude higher than R_fC_f.

The approximate final system discharge time constant becomes:

Equation 4a

$$TC = \frac{1}{\frac{1}{R_i C_s} + \frac{1}{R_f C_f}} \quad \text{seconds}$$

If the input coupling time constant (R_iC_s) is very much greater than the discharge time constant of the charge amplifier (R_fC_f), Equation 4a then becomes:

Equation 4b

$$\frac{1}{R_i C_s} \Rightarrow 0 \text{ Seconds}$$

Equation 5

$$TC = R_f C_f$$

With the product R_iC_s chosen to be much greater than R_fC_f, the system discharge time constant is simply R_fC_f (seconds). The feedback parameters of the charge amplifier establish the low frequency characteristics of the system, unaffected by the degraded input resistance parameters of the test sensor and/or cable.

6.5 Other Precautions

Always remember to keep the OPR-GND switch on the charge amplifier in the GND position while connecting or disconnecting sensors, cable, or capacitor to the input connector. Stray or accumulated electrostatic charges may build to the point that they may saturate or even damage the input circuitry of the charge amplifier.

Operate the charge amplifier in the SHORT time constant while the sensor is subject to elevated or changing temperatures.

If it is not necessary to procure data during the transition from room temperature to operating temperature, place the OPR-GND switch in the GND position to keep spurious, thermally generated charges grounded.

It is prudent to momentarily switch to the GND position even during the measurement period to ensure that excess charges do not accumulate at the input of the charge amplifier.

7.0 MAINTENANCE

The only maintenance required on the pressure sensor is to keep the connector clean. If it is operating in a dirty environment, protect the cable connections with heat-shrink tubing or similar material.

In the event that the electrical connection of the pressure sensor becomes contaminated with dirt or moisture, the insulation resistance degrades. This may cause a reduction of sensitivity or excessive drifting when connected to the charge amplifier. If this happens, brush off the connector with no-residue solvent or other approved cleaning solutions. To restore insulation, bake the sensor in a vacuum oven at 250°F for about four hours. If the condition persists even after cleaning and/or baking, please contact a PCB applications engineer for further assistance. The sensor is hermetically sealed; it must therefore be returned to the factory if the aforementioned measures fail to restore performance.

PCB PIEZOTRONICS INC.
3425 WALDEN AVE.
DEPEW, NEW YORK 14043

INSTRUCTIONS FOR USE - 176 Series

Model(s)	176AXX Series, 176MXX Series
Markings	PCB Depew, NY S/N xxxxxx MM/YYYY LCIE 08 ATEX 6102 X Ex ia IIC T6 to T530°C Ga, II 1G Ex ia IIC T6 to T660°C Ga, II 1G LCIE 06 ATEX 6041 X Ex nA IIC T6 to T530°C Gc, II 3G Ex nA IIC T6 to T660°C Gc, II 3G IECEx LCIE 12.0025 X IECEx LCIE 12.0026 X Ui: 30V, Ii: 300 mA, Pi: 1W, Ci: 5nF, Li: 0.5mH
Putting Into Service	When choosing an installation method, the advantages and disadvantages of each method must be carefully weighed. Characteristics like location, ruggedness, amplitude range, accessibility, temperature and portability may be greatly affected by the installation configuration and technique. Often, the most important and overlooked consideration is the affect the mounting technique has on the frequency of the pressure being measured by the sensor. Two basic mounting techniques are recommended for pressure sensors: the recess mount and the flush mount. The technique used is determined by the specifics of the individual application. See the Installation Drawing in this manual for additional details on the individual sensor series. The high impedance signal generated by a charge output sensor is usually conditioned with a laboratory-style charge amplifier. The charge amplifier converts the high-impedance charge signal generated by the sensor into a low-impedance voltage signal. This signal may then be transmitted to a readout or recording device for analysis.
Safe Use	Before connecting the low-noise cable from the pressure sensor to the charge amplifier, be certain to ground the charge amplifier. This ensures that any excessive accumulated static charges across the sensor/cable combination are harmlessly discharged. If this precaution is not observed, the input FET of certain amplifiers may be destroyed. Press the ground button of the charge amplifier and adjust electrical zero if necessary. Once system components are connected, wait a few minutes for the system to thermally stabilize. Place the switch in the OPR (operate) position and proceed with the measurement. Refer to the charge amplifier operating manual for further operating details. When subjected to elevated temperature, all piezoelectric sensors/hardline cable systems exhibit decreased insulation resistance, due in part to the piezoelectric element, but due mostly to the hardline cable necessary to withstand the high temperatures. This situation can cause serious voltage offset problems in direct-coupled charge amplifiers. To solve this problem, the user must AC couple (capacitor) the charge amplifier to the sensor/cable system.
Assembling	The 176 Series pressure have a hermetically sealed Nickle Alloy housing, with a sealed integral cable, and do not require any assembly. Only mounting to the machine being monitored using standard mounting accessories.
Dismantling	Other than removal from the mounting, there is no disassembly of the sensor required to take it out of service.

Maintenance	Routine maintenance, such as the cleaning of electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the physical material of construction, is acceptable.
Servicing	Due to the sophisticated nature of the sensors and associated instrumentation provided by PCB Piezotronics, user servicing or repair is not recommended and, if attempted, may void the factory warranty. However, routine calibration of sensors and associated instrumentation is recommended as this helps build confidence in measurement accuracy and acquired data.
Repair	In the event that equipment becomes damaged or ceases to operate, arrangements should be made to return the equipment to PCB Piezotronics for repair. User servicing or repair is not recommended and, if attempted, may void the factory warranty.
Installation	Overview: Sensor must be mounted in order to be put into service. When choosing a mounting method, consider closely both the advantages and disadvantages of each technique. Characteristics like location, ruggedness, amplitude range, accessibility, temperature, and portability are extremely critical. However, the most important and often overlooked consideration is the effect the mounting technique has on the high-frequency performance of the accelerometer. Mounting methods include: Recess Mount or Flush Mount. Cabling: Care and attention to cable attachment is essential, as the reliability and accuracy of your system is no better than that of the output cable. First, check that you have ordered the correct cable type. As with sensors, no cable can satisfy all applications. Special low-noise cabling shielded twisted pair should be used with high-impedance, charge output devices. Plug the connector on the cable into the mating connector on the sensor. Then, holding the sensor stationary, secure the connector in place by tightening down the attached cable sleeve. Route the cable to a charge amplifier or in-line charge converter, making certain to strain relieve the sensor/cable connection and minimize motion by clamping the cable at regular intervals. Common sense must be used to avoid physical damage and minimize electrical noise. Avoid routing cables near high voltage wires. Do not route cables along floors or walkways where they may be stepped on or become contaminated. Shielded cable should have the shield grounded at one end only.
Adjustment	The sensor is a sealed device and no user adjustments are possible. However, routine calibration of sensors by the manufacturer is recommended as this helps build confidence in measurement accuracy and acquired data.
Danger Areas (for pressure-relief devices)	N/A – not a pressure relief device.
Training Instructions	Industrial sensors must be installed in Hazardous Locations by trained professionals according to EN/IEC 60079-14 requirements.
Details on Safety of Protection Category	Ex ia is “intrinsic safety”, which limits the energy of sparks and surface temperatures to safe levels. Ex nA is “increased safety – non-sparking”, which eliminates arcs, sparks, and hot surfaces.
Entity Parameters and Limits (Values)	Temperature Range: -70°C to +650°C Ui: 30V, Ii: 300 mA, Pi: 1W, Ci: 5nF, Li: 0.5mH

Special Conditions of Use	The "ia" protected apparatus must only be connected to certified associated intrinsically safe equipment and this combination must be compatible regarding intrinsic safety rules (see electrical parameters listed above). The "nA" protected apparatus (transducer) must be only connected to equipment whose electrical parameters do not exceed the following values: U: 30V, I: 300 mA Operating ambient temperature: -70°C to +650°C Temperature Classification: T6 to Ta ≤ +80°C T5 to Ta ≤ +95°C T4 to Ta ≤ +130°C T3 to Ta ≤ +195°C T2 to Ta ≤ +290°C T1 to Ta ≤ +440°C T530°C to Ta ≤ +520°C T660°C to Ta ≤ +650°C The apparatus must be installed per installation drawing N° 54210 Rev B.
Essential Characteristics of tools fitted to the system (if any).	N/A – No tools are fitted to the system.
Drawings and Diagrams	41428 (Etching Drawing), 54210 (Installation Guidelines), 32141 (Descriptive Notice nA), 32339 (Element Assembly), 40677 (Descriptive Notice ia), 35030 (Instructions for Use), 66533 (Outline Drawing)
Other	LCIE 06 ATEX 6041 X Certificate, LCIE 08 ATEX 6102 X Certification, Directive 2014/34/EU, ATEX Standards: EN 60079-0:2012+A11:2013, EN60079-11:2012

Note: Literature (such as the manual or marketing materials) describing the equipment or protective system must not contradict the instructions with regard to safety aspects.

54210

SCHEDULE DRAWING

NO MODIFICATIONS PERMITTED WITHOUT REFERENCE TO THE NOTIFIED BODY

REVISIONS		
REV	DESCRIPTION	DIN
B	UPDATED NOTES	44160

5.) INSTALL PER EN/IEC 60079-14 AND ALL LOCAL ELECTRICAL LAWS.

4.) MODEL NUMBER 176XYY/MZZZ-AA CERTIFICATE LCIE 08 ATEX 6102X.
MODEL NUMBER 176XYY/MZZZ-AA CERTIFICATE IECEx LCIE 12.0025X.

3.) SHIELDS TO BE EARTHED AT BARRIER ENDS.

2 BARRIER WILL BE MOUNTED IN AN ENCLOSURE THE SUITABILITY OF WHICH WILL BE DETERMINED BY LOCAL AUTHORITIES.

1 ENTITY APPLICATION

BARRIER		I.S. APPARATUS
Voc/Uo	≤	V_{MAX} / UI
Isc/Io	≤	I_{MAX}/ II
Ca/Co	>	CI + C_{CABLE}
La/Lo	>	LI + L_{CABLE}
Po	≤	PI (CENELEC ONLY)

BARRIERS WITHIN THE SPECIFIED LIMITATIONS ARE PERMITTED

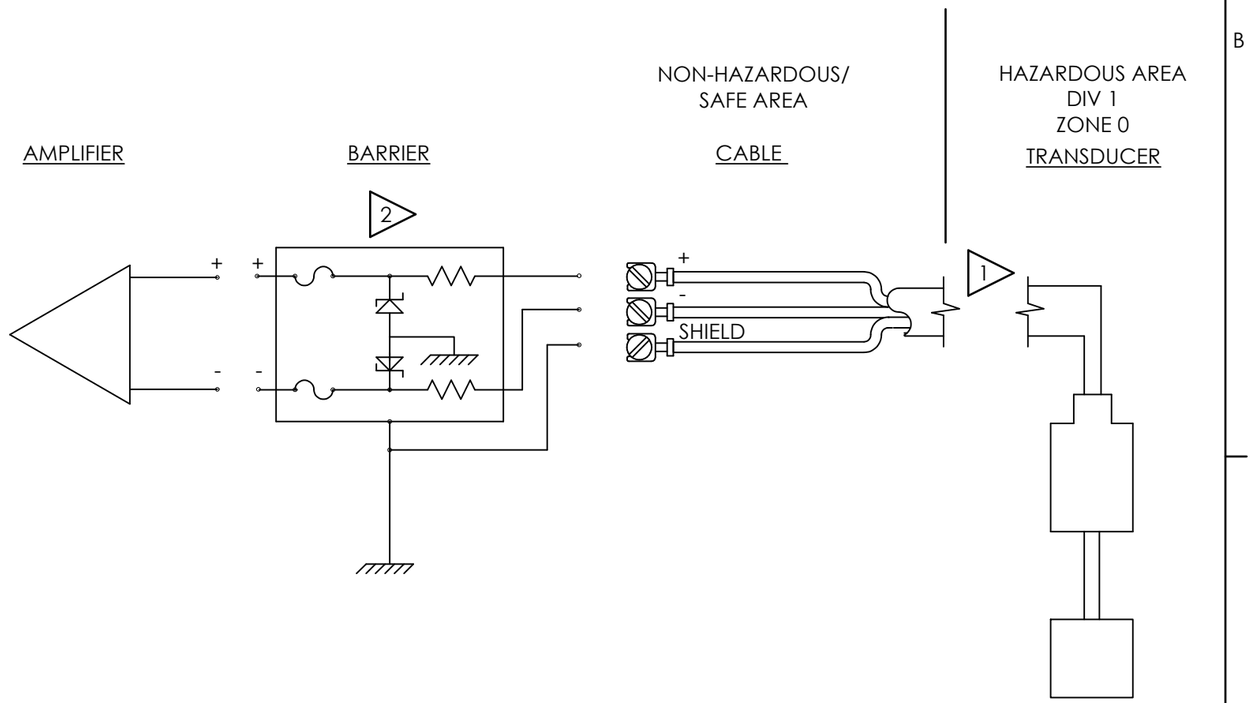
ENTITY PARAMETERS

OPTION 1
Ui = 30V
Ii = 300 mA
Pi = 1 W
Ci = 5 nF
Li = 500 µH

CERTIFIED BY THE APPROPRIATE APPROVAL AUTHORITY FOR CONNECTION TO THE FOLLOWING AREAS:

ZONE 0
Ex ia IIC Ga
Ta ≤ 650°C T660°C*
Ta ≤ 520°C T530°C*
Ta ≤ 440°C T1
Ta ≤ 290°C T2
Ta ≤ 195°C T3
Ta ≤ 130°C T4
Ta ≤ 95°C T5
Ta ≤ 80°C T6
*REFERENCE ETCHING ON SENSOR FOR MAXIMUM AMBIENT TEMPERATURE AND ASSOCIATED TEMPERATURE CLASS.

NOTES: Ci IS SPECIFIED AT A MAXIMUM CABLE LENGTH OF 200 FT. [61 METERS] FOR SHORTER CABLE LENGTHS, Ci IS DECREASED BY 20 pF/FT. [65.6 pF/METER.]



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
DECIMALS X ± .05
XX ± .01
XXX ± .005
XXXX ± .0005
ANGLES ± 2 DEGREES
FILLETS AND RADII .003 - .005
HEX DIMENSIONS ARE:
≤ .5 + .000 / - .003
> .5 + .000 / - .005
INTERNAL THREAD DEPTH MIN.
REMOVE ALL BURRS
SHARP = R.000 - R.003

CAUTION
ELECTROSTATIC DISCHARGE SENSITIVE

DRAWN		CHECKED		ENGINEER	
BB	11/18/15	ECB	11/18/15	EDB	11/18/15

TITLE
APPROVAL
INTERCONNECTION

PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0002 E-MAIL: sales@pcb.com

CODE IDENT. NO. 52681
DWG. NO. 54210
SCALE: NONE
SHEET 1 OF 2

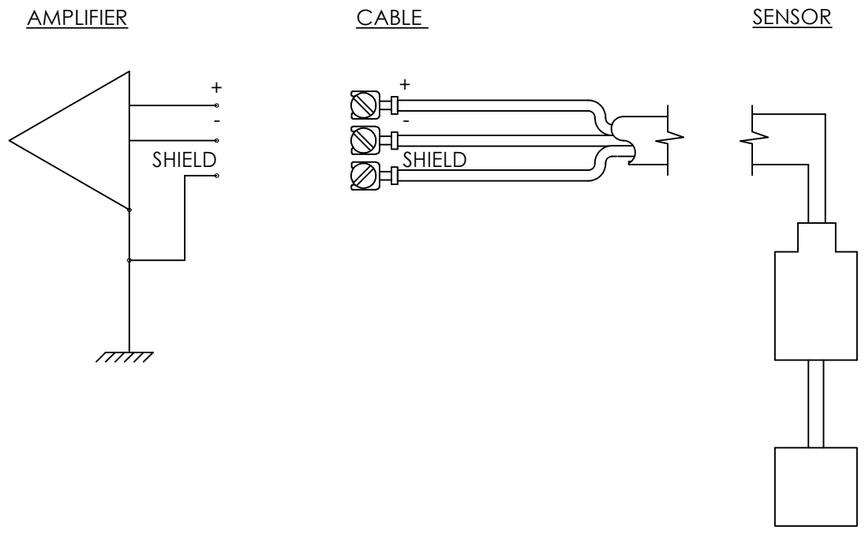
54210

SCHEDULE DRAWING

NO MODIFICATIONS PERMITTED WITHOUT REFERENCE TO THE NOTIFIED BODY

REVISIONS		
REV	DESCRIPTION	DIN
	-SEE SHEET 1-	

NON-HAZARDOUS/ SAFE AREA
OR DIV 2/ ZONE 2



5.) INSTALL PER EN/IEC 60079-14 AND ALL LOCAL ELECTRICAL LAWS.

4.) MODEL NUMBER 176XYY/MZZZ-AA CERTIFICATE LCIE 06 ATEX 6041X.
MODEL NUMBER 176XYY/MZZZ-AA CERTIFICATE IECEx LCIE 12.0026X.

3.) FOR ZONE 2 INSTALLATION, POWER SUPPLY MUST BE CERTIFIED WITH ENTITY OUTPUT PARAMETERS (SEE PAGE 1 FOR POWER SUPPLY OUTPUT PARAMETERS.)

2.) MAXIMUM VOLTAGE OF POWER SUPPLY/SIGNAL CONDITIONER NEVER TO EXCEED 250 Vrms.

1.) CERTIFIED BY THE APPROPRIATE APPROVAL AUTHORITY FOR CONNECTION TO THE FOLLOWING AREAS:
ZONE 2
Ex nA IIC Gc
Ta ≤ 650°C T660°C*
Ta ≤ 520°C T530°C*
Ta ≤ 440°C T1
Ta ≤ 290°C T2
Ta ≤ 195°C T3
Ta ≤ 130°C T4
Ta ≤ 95°C T5
Ta ≤ 80°C T6
*REFERENCE ETCHING ON SENSOR FOR MAXIMUM AMBIENT TEMPERATURE AND ASSOCIATED TEMPERATURE CLASS.

DIV 2
CLASS I, GROUPS A,B,C,D

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
DECIMALS X ± .05
XX ± .01
XXX ± .005
XXXX ± .0005
ANGLES ± 2 DEGREES
FILLETS AND RADII .003 - .005
HEX DIMENSIONS ARE:
≤ .5 + .000 / - .003
> .5 + .000 / - .005
INTERNAL THREAD DEPTH MIN.
REMOVE ALL BURRS
SHARP = R.000 - R.003

CAUTION
ELECTROSTATIC DISCHARGE SENSITIVE

DRAWN		CHECKED		ENGINEER	
BB	11/18/15	ECB	11/18/15	EDB	11/18/15

TITLE
APPROVAL INTERCONNECTION

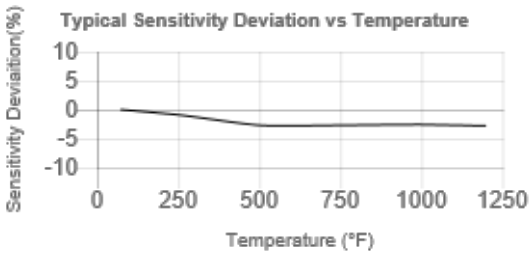
PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0002 E-MAIL: sales@pcb.com

CODE IDENT. NO. 52681
DWG. NO. 54210
SCALE: NONE
SHEET 2 OF 2

Model Number 176A07	CHARGE OUTPUT PRESSURE SENSOR	Revision: A ECN #: 53807

Performance	ENGLISH	SI	
Sensitivity(+/- 20 %)	7 pC/psi	101.5 pC/bar	
Measurement Range	725 psi	50 bar	
Maximum Pressure(Total)	4,000 psi	275.8 bar	
Resonant Frequency	≥ 100 kHz	≥ 100 kHz	
Transverse Resonance	> 15 kHz	> 15 kHz	
Frequency Response(± 5.0 %)	20,000 Hz	20,000 Hz	[1]
Non-Linearity	≤ 1 % FS	≤ 1 % FS	[2]
Environmental			
Acceleration Sensitivity	≤ 0.01 psi/g	≤ 0.007 kPa/(m/s²)	
Acceleration Sensitivity	0.004 psi/g	0.0028 kPa/(m/s²)	[3]
Temperature Range(Continuous)	-94 to 1,200 °F	-70 to 650 °C	
Temperature Range(Receptacle)	-76 to 900 °F	-60 to 483 °C	
Temperature Response	See Graph	See Graph	[3]
Radiation Exposure Limit(Integrated Neutron Flux)	1E10 N/cm²	1E10 N/cm²	
Radiation Exposure Limit(Integrated Gamma Flux)	1E8 rad	1E8 rad	
Electrical			
Output Polarity(Positive Pressure)	Positive	Positive	
Capacitance(with cable)	250 pF	250 pF	[3]
Internal Resistance(room temp)	≥ 10^{12} Ohm	≥ 10^{12} Ohm	
Insulation Resistance(room temp)	≥ 10^{12} Ohm	≥ 10^{12} Ohm	
Internal Resistance(1200°F/650°C)	≥ 50 kohm	≥ 50 kohm	
Insulation Resistance(1200°F/650°C)	≥ 50 kohm	≥ 50 kohm	
Physical			
Sensing Element	UHT-12™	UHT-12™	
Sensing Geometry	Compression	Compression	
Housing Material	Nickel Alloy	Nickel Alloy	
Sealing	Welded Hermetic	Welded Hermetic	
Cable Type	Hardline	Hardline	
Cable Length	3.0 ft	0.91 m	
Weight(with cable)	2.0 oz	57 gm	[3]

CE[4]



Ex C SP US

All specifications are at room temperature unless otherwise specified.
In the interest of constant product improvement, we reserve the right to change specifications without notice.

OPTIONAL VERSIONS

Optional versions have identical specifications and accessories as listed for the standard model except where noted below. More than one option may be used.

NOTES:

[1]Upper frequency response is calculated from Resonant Frequency.
[2]Zero-based, least-squares line method.
[3]Typical.
[4]See PCB Declaration of Conformance PS058 for details.

SUPPLIED ACCESSORIES:

Model 060A25 Clamp Nut (1)
Model 40890-04 Silver Plate, SS, Seal (3)

Entered: ND	Engineer: NJL	Sales: MV	Approved: RPF	Spec Number:
Date: 04/13/2023	Date: 04/13/2023	Date: 04/13/2023	Date: 04/13/2023	75188

PCB PIEZOTRONICS
AN AMPHENOL COMPANY
Phone: 716-684-0001
Fax: 716-684-0987
E-Mail: info@pcb.com
3425 Walden Avenue, Depew, NY 14043

57723

SCHEDULE DRAWING

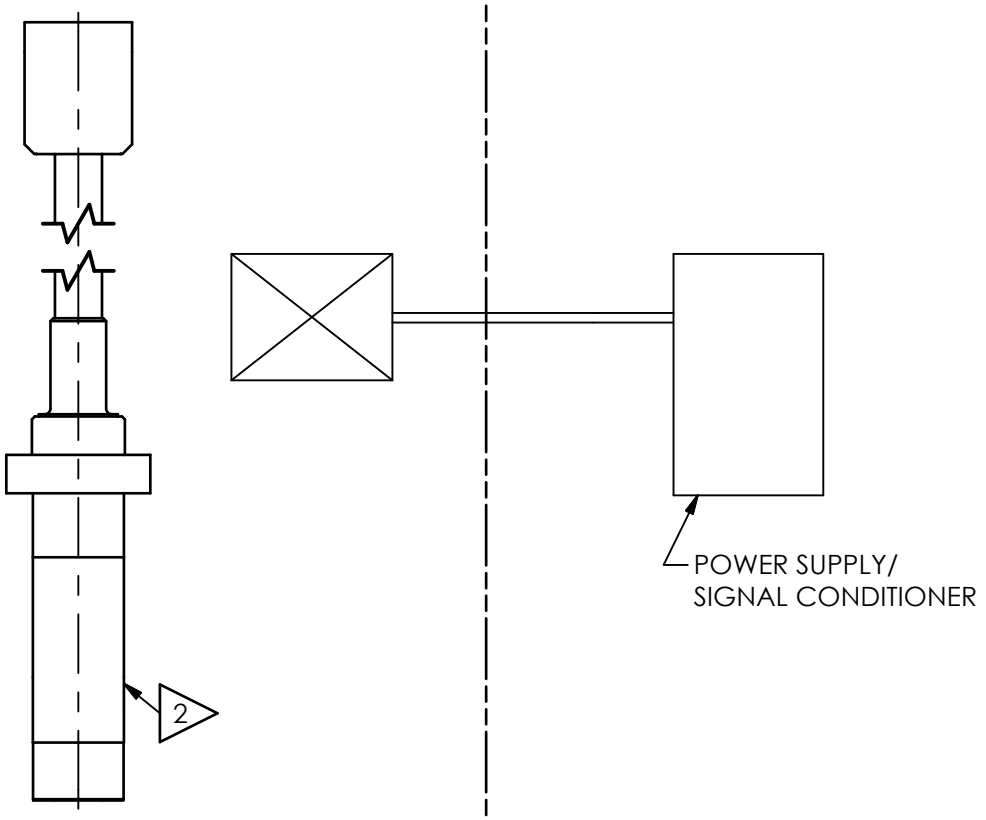
NO MODIFICATIONS PERMITTED WITHOUT REFERENCE TO THE NOTIFIED BODY

REVISIONS		
REV	DESCRIPTION	DIN
A	UPDATE T CODES	44160

ENTITY PARAMETER
Ui = 30V
Ii = 300 mA
Pi = 1W
C(ELEMENT)=1000pF(MAX)
C(HARDLINE)= 4000pF(MAX)
L(ELEMENT)=0µH
L(HARDLINE)= 500µH(MAX)
Ci = C(ELEMENT)+C(HARDLINE)
Li = L(ELEMENT)+L(HARDLINE)
Ci ≤ 5000 pF
Li ≤ 500 µH

HAZARDOUS LOCATION
Cl. 1, Div. 2, Gp. A,B,C,D
Cl. 1, Zn. 2, AEx nA/Ex nA IIC
T6 to T660°C
T6 to T530°C

T1: Ta<440°C
T2: Ta<290°C
T3: Ta<195°C
T4: Ta<130°C
T5: Ta<95°C
T6: Ta<80°C
T660°C: Ta<650°C
T530°C: Ta<520°C



NON HAZARDOUS LOCATION

5.) FIELD WIRING MUST BE 26 AWG MINIMUM.

4.) HARDLINE CABLE 200 [61 m] FEET MAX.

3.) FOR CANADIAN, DIVISION 2 ZONE 2 INSTALLATION, POWER SUPPLY MUST BE CSA CERTIFIED WITH ENTITY OUTPUT PARAMETERS.
FOR U.S., DIVISION 2 AND ZONE 2 INSTALLATION, POWER SUPPLY MUST BE APPROVED BY NRTL WITH ENTITY OUTPUT PARAMETERS.

2 PHYSICAL CHARACTERISTICS(DIMENSIONS,ETC) MAY NOT BE ACCURATELY REPRESENTED

1.) MAXIMUM VOLTAGE OF POWER SUPPLY/SIGNAL CONDITIONER NEVER TO EXCEED 250 Vrms.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES DECIMALS X ± .05 XX ± .01 XXX ± .005 XXXX ± .0005 ANGLES ± 2 DEGREES FILLETS AND RADII .003 - .005
HEX DIMENSIONS ARE: ≤ .5 + .000 / - .003 > .5 + .000 / - .005
INTERNAL THREAD DEPTH MIN. REMOVE ALL BURRS SHARP = R.000 - R.003

DRAWN		CHECKED		ENGINEER	
BB	11/18/15	ECB	11/18/15	EDB	11/18/15

TITLE

SPECIFICATION CONTROL DRAWING

PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0002 E-MAIL: sales@pcb.com

CODE IDENT. NO.	DWG. NO.	
52681	57723	
SCALE: NONE	SHEET	1 OF 2

REVISIONS		
REV	DESCRIPTION	DIN
	-SEE SHEET 1-	

57723

SCHEDULE DRAWING

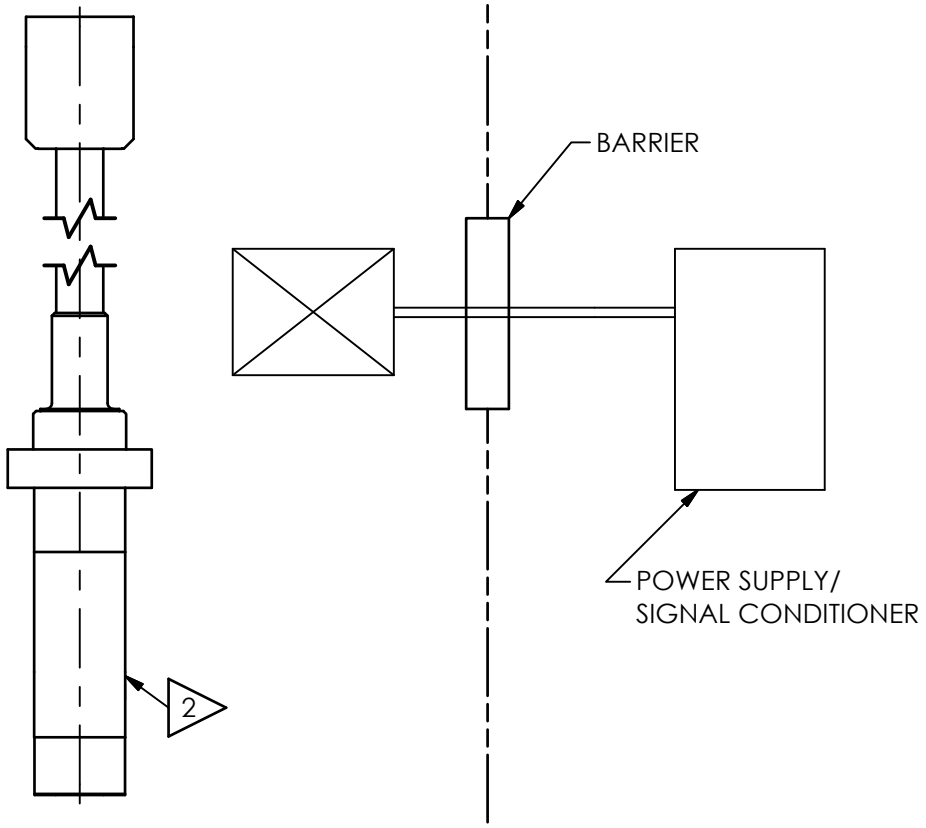
NO MODIFICATIONS PERMITTED WITHOUT REFERENCE TO THE NOTIFIED BODY

ENTITY PARAMETER
Ui = 30V
Ii = 300 mA
Pi = 1W
C(ELEMENT)=1000pF(MAX)
C(HARDLINE)= 4000pF(MAX)
L(ELEMENT)=0µH
L(HARDLINE)= 500µH(MAX)
Ci = C(ELEMENT)+C(HARDLINE)
Li = L(ELEMENT)+L(HARDLINE)
Ci ≤ 5000 pF
Li ≤ 500 µH

HAZARDOUS LOCATION
Cl. 1, Div. 1, Gp. A,B,C,D
Cl .1, Zn. 0, AEx/Ex ia IIC

T6 to T660°C
T6 to T530°C

T1: Ta<440°C
T2: Ta<290°C
T3: Ta<195°C
T4: Ta<130°C
T5: Ta<95°C
T6: Ta<80°C
T660°C: Ta<650°C
T530°C: Ta<520°C



NON HAZARDOUS LOCATION

5.) FIELD WIRING MUST BE 26 AWG MINIMUM.

4.) HARDLINE CABLE 200 [61 m] FEET MAX.

3.) FOR CANADIAN, DIVISION 1 ZONE 0 INSTALLATION, POWER SUPPLY MUST BE CSA CERTIFIED WITH ENTITY OUTPUT PARAMETERS.
FOR U.S., DIVISION 1 AND ZONE 0 INSTALLATION, POWER SUPPLY MUST BE APPROVED BY NRTL WITH ENTITY OUTPUT PARAMETERS.

2 PHYSICAL CHARACTERISTICS(DIMENSIONS,ETC) MAY NOT BE ACCURATELY REPRESENTED

1.) MAXIMUM VOLTAGE OF POWER SUPPLY/SIGNAL CONDITIONER NEVER TO EXCEED 250 Vrms.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES DECIMALS X ± .05 XX ± .01 XXX ± .005 XXXX ± .0005 ANGLES ± 2 DEGREES FILLETS AND RADII .003 - .005
HEX DIMENSIONS ARE: ≤ .5 + .000 / - .003 > .5 + .000 / - .005
INTERNAL THREAD DEPTH MIN. REMOVE ALL BURRS SHARP = R.000 - R.003

	DRAWN	CHECKED	ENGINEER
	BB 11/18/15	ECB 11/18/15	EDB 11/18/15

TITLE

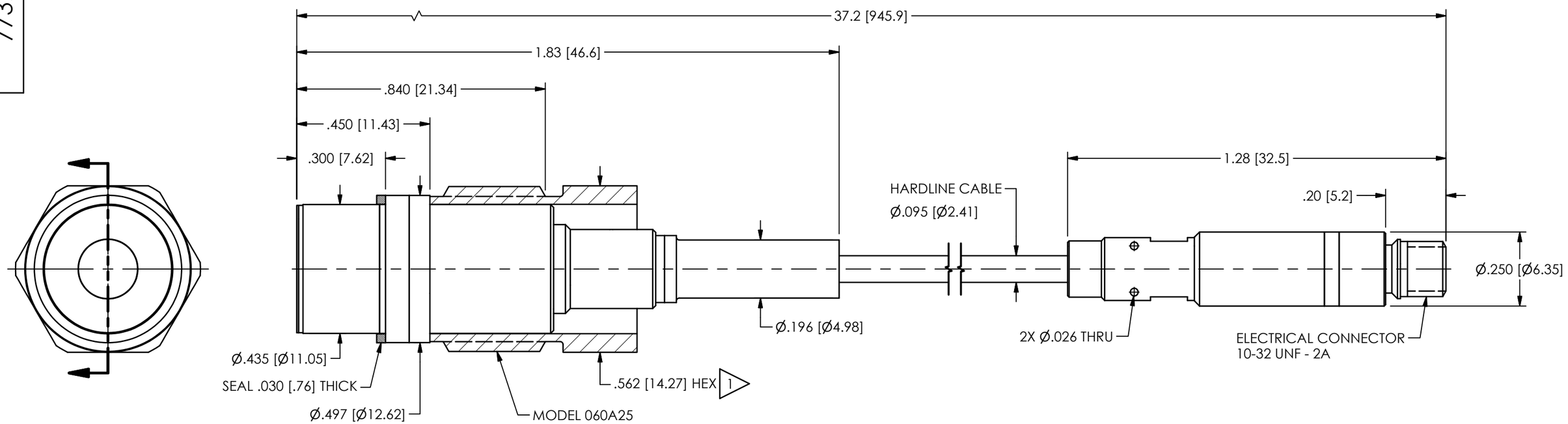
SPECIFICATION CONTROL DRAWING

PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0002 E-MAIL: sales@pcb.com

CODE IDENT. NO. 52681	DWG. NO. 57723
SCALE: NONE	SHEET 2 OF 2

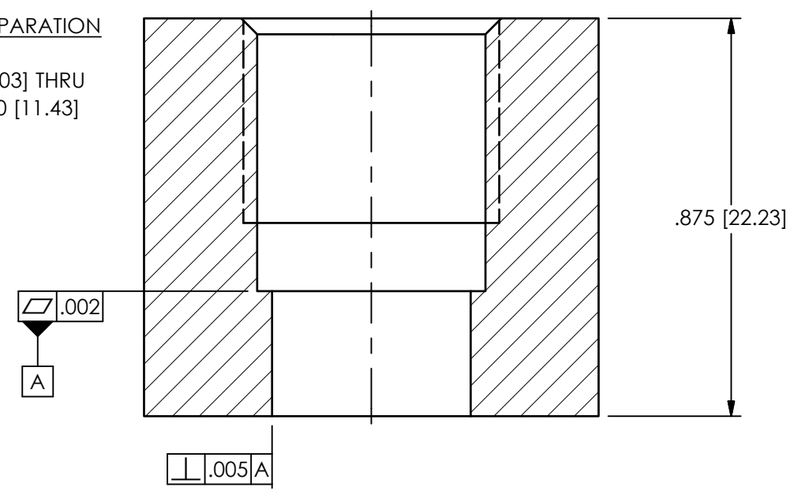
77376

REVISIONS		
REV	DESCRIPTION	DIN
NR	RELEASED TO DRAFTING	53712



1 MOUNTING HOLE PREPARATION

Ø.437 ± .001 [11.10 ± .03] THRU
9/16-18 UNF - 2B ↧.450 [11.43]



1 RECOMMENDED MOUNTING TORQUE: 5.0 - 6.0 FT-LBS [7 - 8 Nm]

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	
DIMENSIONS IN INCHES DECIMALS XX ±.01 XXX ±.005 ANGLES ± 2 DEGREES	DIMENSIONS IN MILLIMETERS [IN BRACKETS] DECIMALS X ± 0.3 XX ± 0.13 ANGLES ± 2 DEGREES
CABLE TOLERANCES IN ENGLISH 1"≤ LENGTH < 1' = +1"/ - 0 1'≤ LENGTH < 5' = +2"/ - 0 5'≤ LENGTH < 100' = +6"/ - 0 100'≤ LENGTH = +1'/ - 0	CABLE TOLERANCES IN METRIC 2.54cm ≤ LENGTH < 30.5cm = +2.54cm/ - 0 30.5cm ≤ LENGTH < 1.5m = +5.1cm/ - 0 1.5m ≤ LENGTH < 30.5m = +15.2cm/ - 0 30.5m ≤ LENGTH = +30.5cm/ - 0
FILLETS AND RADII .003 - .005	FILLETS AND RADII 0.07 - 0.13

DRAWN		CHECKED		ENGINEER	
NJF	03/27/23	JJF	03/27/23	NJL	03/27/23

TITLE

INSTALLATION DRAWING
MODEL 176A07 HIGH
TEMPERATURE PRESSURE SENSOR

PCB PIEZOTRONICS
AN AMPHENOL COMPANY
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0001 E-MAIL: sales@pcb.com

CODE IDENT. NO.	DWG. NO.
52681	77376
SCALE: 3X	SHEET 1 OF 1

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 LCIE 12.0025X**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 5	Issue 4 (2021-09-30) Issue 3 (2017-02-21) Issue 2 (2015-11-09) Issue 1 (2015-08-04) Issue 0 (2012-10-25)
Date of Issue:	2022-09-09		
Applicant:	**PCB Piezotronics Inc.** 3425 Walden Avenue Depew, New York 14043 **United States of America**		
Equipment:	**High temperature pressure transducer - Type: 176XYY/MZZZ-AA series.**		
Optional accessory:			
Type of Protection:	**Ex ia**		
Marking:	Ex ia IIC T6...T770°C Ga (Refer to attachment for full marking).		

Approved for issue on behalf of the IECEx Certification Body:

Julien GAUTHIER

Position:

Certification Officer

Signature:
(for printed version)

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33 avenue du Général Leclerc
F - 92266 FONTENAY AUX ROSES

Date:
(for printed version)

2022-09-09

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:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses

IECEx Certificate of Conformity

Certificate No.: **IECEx LCIE 12.0025X**

Issue No: 5

Date of issue: 2022-09-09

Manufacturer: **PCB Piezotronics Inc.**
3424 Walden Avenue
Depew, New York 14043
United States of America

Manufacturing locations: **PCB Piezotronics of North Carolina Inc.**
10869 Hwy 903
Halifax, NC 27839
United States of America

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:

FR/LCIE/ExTR12.0028/00
FR/LCIE/ExTR15.0069/00
FR/LCIE/ExTR15.0117/00
FR/LCIE/ExTR16.0088/00
FR/LCIE/ExTR21.0053/00
FR/LCIE/ExTR22.0065/00

Quality Assessment Report:

NL/DEK/QAR14.0004/05

IECEx Certificate of Conformity

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The sensor is made of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

Designation of the model : 176XYY/MZZZ-A ((Refer to attachment for full detail).

SPECIFIC CONDITIONS OF USE: YES as shown below:

- The apparatus can be only connected to certified intrinsically safe equipment. This combination must be compatible as regards intrinsic safety rules (see electrical parameters),
- The mounting of the apparatus into an installation must be carried out in such a way that metallic body of the sensor and cable shield are reliably connected to the system earth.
- The equipment must be mounted in such a way that it is not subjected to mechanical shocks on the sensor.
- Temperature classification (Refer to attachment for full details).

IECEx Certificate of Conformity

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
Issue 05:

- Expansion of the Temperature range of the 176 Series to include up to Ta ≤ 760°C T770°C,
- Adding a variation with integral connector option (instead of cable),
- Normative update according to IEC 60079-0:Ed.7.0,
- Modification of IS parameters.

Annex:

Annex 01 to Certificate IECEx LCIE 12.0025X.pdf

Annex 01 to Certificate
IECEx LCIE 12.0025X issue 05

FULL EQUIPMENT DESCRIPTION

The sensor is made of an hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

MARKING

PCB Piezotronics Inc.
Address : .....
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
Ex ia IIC T6...T770°C* Ga
IECEx LCIE 12.0025X
*See Temperature classification
U_i : 30V, I_i : 300mA, P_i : 1W, C_i : 5nF, Li : 0,3 mH

Reduced marking :
PCB
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
Ex ia IIC T6...T770°C* Ga
IECEx LCIE 12.0025X

RANGE DETAILS

Designation model : 176XYY/MZZZ-AA :

X = A to Z for family code
YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations
M = optional to indicate metric cable length
ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)
AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

RATINGS

U_i : 30V, I_i : 300mA, P_i : 1W, C_i : 5nF, L_i : 0,3 mH

FULL CONDITIONS OF CERTIFICATION

- The apparatus can be only connected to certified intrinsically safe equipment. This combination must be compatible as regards intrinsic safety rules (see electrical parameters),
- The mounting of the apparatus into an installation must be carried out in such a way that metallic body of the sensor and cable shield are reliably connected to the system earth.
- The equipment must be mounted in such a way that it is not subjected to mechanical shocks on the sensor.
- Temperature classification :

Temperature classification	Ambient temperature
T6	-70°C ≤ T_{amb} ≤ +80°C
T5	-70°C ≤ T_{amb} ≤ +95°C
T4	-70°C ≤ T_{amb} ≤ +130°C
T3	-70°C ≤ T_{amb} ≤ +195°C
T2	-70°C ≤ T_{amb} ≤ +290°C
T1	-70°C ≤ T_{amb} ≤ +440°C
T530°C	-70°C ≤ T_{amb} ≤ +520°C
T660°C	-70°C ≤ T_{amb} ≤ +650°C
T770°C	-70°C ≤ T_{amb} ≤ +760°C

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0025X	Issue No: 3	Certificate history:
Status:	**Current**	Page 1 of 4	Issue No. 3 (2017-02-21) Issue No. 2 (2015-11-09) Issue No. 1 (2015-08-04) Issue No. 0 (2012-10-25)
Date of Issue:	**2017-02-21**		

Applicant: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Equipment: **High temperature pressure transducer (Type 176XYY/MZZZ-AA series)**
Optional accessory:

Type of Protection: **Ex ia**

Marking:
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
See complete marking in annex

Approved for issue on behalf of the IECEx Certification Body: Didier BOURGES

Position: Manager of Certification Operations

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 the Official IECEx Website.

Certificate issued by:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

IECEx Certificate of Conformity

Certificate No:	IECEx LCIE 12.0025X	Issue No: 3
Date of Issue:	**2017-02-21**	Page 2 of 4
Manufacturer:	**PCB Piezotronics Inc.** 3424 Walden Avenue Depew, New York 14043 **United States of America**	

Additional Manufacturing location(s):

PCB Piezotronics of North Carolina Inc.
10869 Hwy 903
Halifax, NC 27839
United States of America

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 electrical apparatus 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 : 2011 Edition:6.0	Explosive atmospheres - Part 0: 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 electrical 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:

FR/LCIE/ExTR12.0028/00 FR/LCIE/ExTR15.0069/00 FR/LCIE/ExTR15.0117/00
FR/LCIE/ExTR16.0088/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The sensor is made of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

Designation of the model : 176XYY/MZZZ-AA :

X = A to Z for family code

YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations

M = optional to indicate metric cable length

ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)

AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

SPECIFIC CONDITIONS OF USE: YES as shown below:

Temperature classification :

Temperature classification	Ambient temperature
T6	$-70°C \leq T_{amb} \leq +80°C$
T5	$-70°C \leq T_{amb} \leq +95°C$
T4	$-70°C \leq T_{amb} \leq +130°C$
T3	$-70°C \leq T_{amb} \leq +195°C$
T2	$-70°C \leq T_{amb} \leq +290°C$
T1	$-70°C \leq T_{amb} \leq +440°C$
T530°C	$-70°C \leq T_{amb} \leq +520°C$
T660°C	$-70°C \leq T_{amb} \leq +650°C$

The equipement must be only connected to a certified intrinsically safe equipment. This combination must be compatible regarding intrinsic safety rules (see electric parameters).

IECEx Certificate of Conformity

Certificate No:	IECEx LCIE 12.0025X	Issue No: 3
Date of Issue:	**2017-02-21**	Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 00 :

Initial issue

Issue 01 :

Modification of the piezoelectric element,

Modification of the marking for the temperature classification,

Modification of the temperature classification in the clause “Conditions of certification”.

Issue 02 :

Addition of a manufacturing site.

Issue 03 :

Update of the lower ambient temperature from 0°C to -70°C.

Annex:

IECEx LCIE 12.0025X issue No.3Annex 01-ia.pdf

Annex 01 to Certificate
IECEx LCIE 12.0025X issue 3

FULL EQUIPMENT DESCRIPTION

The sensor is made of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

MARKING

PCB Piezotronics
Address : .....
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
IECEx LCIE 12.0025X
Ui : 30V, *Ii* : 300mA, *Pi* : 1W, *Ci* : 5nF, *Li* : 0,5mH

Reduced marking :
PCB
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
IECEx LCIE 12.0025X

RANGE DETAILS

X = A to Z for family code
YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations
M = optional to indicate metric cable length
ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)
AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

RATINGS

Ui : 30V, *Ii* : 300mA, *Pi* : 1W, *Ci* : 5nF, *Li* : 0.5mH

FULL CONDITIONS OF CERTIFICATION

The apparatus can be only connected to certifed intrinsically safe equipment. This combination must be compatible as regards intrinsic safety rules (see electric parameters).

Temperature classification :

Temperature classification	Ambient temperature
T6	-70°C ≤ T_{amb} ≤ +80°C
T5	-70°C ≤ T_{amb} ≤ +95°C
T4	-70°C ≤ T_{amb} ≤ +130°C
T3	-70°C ≤ T_{amb} ≤ +195°C
T2	-70°C ≤ T_{amb} ≤ +290°C
T1	-70°C ≤ T_{amb} ≤ +440°C
T530°C	-70°C ≤ T_{amb} ≤ +520°C
T660°C	-70°C ≤ T_{amb} ≤ +650°C

ROUTINE TESTS

None

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx LCIE 12.0025X issue No.:2

Status: **Current**

Date of Issue: **2015-11-09** Page 1 of 4

Certificate history:
Issue No. 2 (2015-11-9)
Issue No. 1 (2015-8-4)
Issue No. 0 (2012-10-25)

Applicant:
PCB Piezotronics
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer**
Optional accessory: Type 176XYY/MZZZ-AA series

Type of Protection: **Ex ia**

Marking:
PCB Piezotronics
Address : ...
Type : 176XYY/MZZZ-AA *(completed with the model)*
Serial number : ... Year of construction : .....
Ex ia IIC T6...T530°C Ga, Ex ia IIC T6...T660°C Ga
IECEx LCIE 12.0025 X
Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li : 0,5mH

Approved for issue on behalf of the IECEx Certification Body: Julien GAUTHIER

Position: Certification Officer

Signature:
(for printed version)

Date: 2015-11-09

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 the Official IECEx Website.

Certificate issued by:
Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France
Documents relative to LCIE certification activites (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2015-11-09** Issue No.: **2**

Manufacturer:

PCB Piezotronics
3424 Walden Avenue
Depew, New York 14043
United States of America

Additional Manufacturing location (s):

PCB Piezotronics of North Carolina Inc.
10869 Hwy 903
Halifax, NC 27839
United States of America

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: 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 electrical 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:
FR/LCIE/ExTR12.0028/00 FR/LCIE/ExTR15.0069/00 FR/LCIE/ExTR15.0117/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2015-11-09** Issue No.: **2**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The sensor is made of an hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

Designation of the model : 176XYY/MZZZ-AA :
X = A through Z for family code
YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
M is optional to indicate metric cable length
ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

Electrical parameters :
Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li : 0,5mH

CONDITIONS OF CERTIFICATION: YES as shown below:

Operating ambient temperature : 0℃ to +660℃.

Temperature classification :
Ex ia IIC T6 Ga (Tamb ≤ +80℃),
Ex ia IIC T5 Ga (Tamb ≤ +95℃),
Ex ia IIC T4 Ga (Tamb ≤ +130℃),
Ex ia IIC T3 Ga (Tamb ≤ +195℃),
Ex ia IIC T2 Ga (Tamb ≤ +290℃),
Ex ia IIC T1 Ga (Tamb ≤ +440℃),
Ex ia IIC T530℃ Ga (Tamb ≤ +520℃),
Ex ia IIC T660℃ Ga (Tamb ≤ +650℃)

The equipement must be only connected to a certified intrinsically safe equipment. This combination must be compatible regarding intrinsic safety rules.

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2015-11-09** Issue No.: **2**

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 01 :
Modification of the piezoelectric element,
Modification of the marking for the temperature classification,
Modification of the temperature classification in the clause "Conditions of certification".

Issue 02 :
Addition of a manufacturing site

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0025X issue No.:1	Certificate history: Issue No. 1 (2015-8-4) Issue No. 0 (2012-10-25)
Status:	**Current**	
Date of Issue:	**2015-08-04**	Page 1 of 4

Applicant:

PCB Piezotronics Inc.
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer type 176XYY/MZZZ-AA series**
Optional accessory:

Type of Protection: **ia**

Marking:

PCB Address : ...
Type : 176XYY/MZZZ-AA (completed with the model)
Serial number : ... Year of construction : .....
Ex ia IIC T6...T530°C Ga, Ex ia IIC T6...T660°C Ga
IECEx LCIE 12.0025 X
Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li : 0,5mH

Approved for issue on behalf of the IECEx Certification Body: Rémi Hanot

Position: Certification Officer

Signature:
(for printed version)

Date: 2015/08/04

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 the Official IECEx Website.

Certificate issued by:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

Documents relative to LCIE certification activites (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2015-08-04** Issue No.: **1**

Manufacturer: **PCB Piezotronics Inc.**
3424 Walden Avenue
Depew, New York 14043
United States of America

Additional Manufacturing location (s):

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: 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 electrical 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:
FR/LCIE/ExTR12.0028/00 FR/LCIE/ExTR15.0069/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2015-08-04** Issue No.: **1**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The sensor is made of an hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).
Designation of the model : 176XYY/MZZZ-AA :
X = A through Z for family code
YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
M is optional to indicate metric cable length
ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

Electrical parameters :
Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li : 0,5mH

CONDITIONS OF CERTIFICATION: YES as shown below:

Operating ambient temperature : 0°C to +660°C.
Temperature classification :
Ex ia IIC T6 Ga (Tamb ≤ +80°C),
Ex ia IIC T5 Ga (Tamb ≤ +95°C),
Ex ia IIC T4 Ga (Tamb ≤ +130°C),
Ex ia IIC T3 Ga (Tamb ≤ +195°C),
Ex ia IIC T2 Ga (Tamb ≤ +290°C),
Ex ia IIC T1 Ga (Tamb ≤ +440°C),
Ex ia IIC T530°C Ga (Tamb ≤ +520°C),
Ex ia IIC T660°C Ga (Tamb ≤ +650°C)
The equipement must be only connected to a certified intrinsically safe equipment. This combination must be compatible regarding intrinsic safety rules.

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2015-08-04** Issue No.: **1**

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 : modification of the piezoelectric element, modification of the marking for the temperature classification, modification of the temperature classification in the clause "Conditions of certification".

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0025X issue No.:0	Certificate history:
Status:	**Current**	
Date of Issue:	**2012-10-25**	Page 1 of 3

Applicant: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer type 176 series**
Optional accessory:

Type of Protection: **ia**

Marking:
PCB Address : ...
Type : 176...
Serial number : ... Year of construction : .....
Ex ia IIC T4 Ga (0℃ ≤ Tamb ≤ +125℃),
Ex ia IIC T3 Ga (-20℃ ≤ Tamb ≤ +190℃),
Ex ia IIC T1 Ga (0℃ ≤ Tamb ≤ +440℃)
IECEx LCIE 12.0025 X
Ui ≤ 30V, Ii ≤ 300mA, Pi ≤ 1W, Ci ≤ 5nF, Li ≤ 0,5mH

Approved for issue on behalf of the IECEx Certification Body: Julien Gauthier

Position: Certification Officer

Signature:
(for printed version)

Date: 2012-10-25

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 the Official IECEx Website.

Certificate issued by:
Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France
Documents relative to LCIE certification activites (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2012-10-25** Issue No.: **0**

Manufacturer: **PCB Piezotronics Inc.**
3424 Walden Avenue
Depew, New York 14043
United States of America

Manufacturing location(s):

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011-06 Edition: 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0028/00

Quality Assessment Report:

CA/CSA/QAR09.0018/00 CA/CSA/QAR09.0018/01 CA/CSA/QAR09.0018/02

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0025X

Date of Issue: **2012-10-25** Issue No.: **0**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The sensor is made of an hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

Electrical parameters :
Ui ≤ 30V, Ii ≤ 300mA, Pi ≤ 1W, Ci ≤ 5nF, Li ≤ 0,5mH

CONDITIONS OF CERTIFICATION: YES as shown below:

Temperature classification :
Ex ia IIC T4 Ga (0℃ ≤ Tamb ≤ +125℃),
Ex ia IIC T3 Ga (-20℃ ≤ Tamb ≤ +190℃),
Ex ia IIC T1 Ga (0℃ ≤ Tamb ≤ +440℃)
The equipement must be only connected to a certified intrinsically safe equipment. This combination must be compatible regarding intrinsic safety rules.

제2019-018373-01-1호

안 전 인 증 서

PCB Piezotronics Inc.
3425 Walden Avenue, Depew, New York 14043, USA

위 사업장에서 제조하는 아래의 품목이 「산업안전보건법」 제34조 및 같은 법 시행규칙 제58조의4제4항에 따른 안전인증 심사 결과 안전·보건기준에 적합하므로 안전인증표시의 사용을 인증합니다.

품 목

High Temperature Pressure Transducer

형식 · 모델(용량 · 등급) / 인증번호

176***/****-**(Ex ia IIC T6...T530 ℃,T660 ℃) / 15-KA4BO-0201X

인 증 기 준

고용노동부고시 제2018-53호

인 증 조 건

1. 제조공장
·본 인증서는 '3425 Walden Avenue, Depew, New York 14043, USA'에서 생산하는 제품에 한함.

2. 제품개요
·압전소자를 이용하여, 높은 온도의 가스터빈 등에 대한 상태점검 및 분석을 위한 압력을 측정하는 센서
·본질안전을 위한 전기적 파라미터
$-U_i$ = 30 V, I_i = 300 mA, P_i = 1 W, C_i = 5 nF, L_i = 0.5 mH
·사용주위온도: -70 ℃ ≤ T_a ≤ +80 ℃ (T6) / +95 ℃ (T5) / +130 ℃ (T4) / +195 ℃ (T3) / +290 ℃ (T2) / +440 ℃ (T1) / +520 ℃ (T530 ℃) / +650 ℃ (T660 ℃)

3. 인증범위: 본 인증서는 아래의 형식번호에 한하여 유효함
·176***/****-**
*: 방폭 성능에 영향을 주지 않는 제품코드임.

4. 안전한 사용을 위한 조건
·관련 IECEx 인증서(IECEx LCIE 12.0025X issue No.3) 3페이지 SPECIFIC CONDITIONS OF USE참조

5. 인증(변경)사항
·1차 변경(2019.04.29.): 기존 제2015-021904-01호에서 부품 변경 및 온도 등급 변경에 따른 최신 인증서 갱신으로 인한 문서변경

6. 그 밖의 사항
·사용자 설명서 참조
·안전인증품의 품질관리, 확인심사 수검, 변경사항 신고 등 인증 받은 자의 의무 준수
·본 안전인증서는 반드시 관련 IECEx 인증서(IECEx LCIE 12.0025X issue No.3)와 함께 사용

2015 년 6 월 5 일

한국산업기술시험원장

(08389) 서울시 구로구 디지털로 26길 87(구로동) http://www.ktl.re.kr
(52852) 경상남도 진주시 충의로 10(충무공동)

EU Declaration of Conformity PS058

In Accordance with ISO/IEC 17050

Manufacturer:
PCB Piezotronics, Inc.
3425 Walden Avenue
Depew, New York 14043
USA

Authorized European Representative:
PCB Piezotronics Europe GmbH
Porschestrasse 20-30
41836 Hückelhoven
Germany

Certifies that type of equipment: **Charge Output Sensor(s)**

Whose Product Models Include: **176 Series**

This declaration is applicable to all Sensor(s) of the above series, which have the CE, & (EX) ATEX mark on their data sheets and where those data sheets refer to this declaration of conformity. The data sheets for all model numbers referenced above, which include the CE & (EX) ATEX mark on such data sheets and refer to this Declaration of Conformity are hereby incorporated by reference into this Declaration.

Conform to the following EU Directive(s) when installed per product documentation:	2014/34/EU 2011/65/EU w/2015/863/EU	ATEX Directive RoHS Directive

Harmonized Standards to which Conformity is Declared:

Harmonized Standards	EN 60079-0:2018 EN 60079-11:2012 EN 63000:2018	Explosive atmospheres - Part 0: Equipment - General requirements Explosive atmospheres - Part 11: Equipment protection by intrinsic safety, i Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EC Type Examination	ATEX Certifications	LCIE 08 ATEX 6102 X / 04 Ex ia IIC T530^{0}C Ga, II 1 G Ex ia IIC T660^{0}C Ga, II 1 G Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li: 0,5mH
Voluntary Certification (EN 60079-15:2010)	Voluntary Type Examination Certificate	LCIE 06 ATEX 6041 X / 04 Ex nA IIC 530^{0}C Gc, II 3 G Ex nA IIC 660^{0}C Gc, II 3 G
Other International Certifications (IEC 60079-0, IEC 60079-11, and IEC 60079-15)	IECEx Certifications	IECEx LCIE 12.0025 X Ex ia IIC T530^{0}C Ga Ex ia IIC T660^{0}C Ga Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li: 0,5mH IECEx LCIE 12.0026 X Ex nA IIC 530^{0}C Gc Ex nA IIC 660^{0}C Gc
Notified Body Name		Laboratoire Central des Industries Electriques (0081)
Notified Body's Address		**FONTENAY-AUX-ROSES (Head Office)** 33, avenue du Général Leclerc FR- 92260 Fontenay-aux-Roses Tel. : + 33 1 40 95 60 60 Fax : + 33 1 40 95 86 56

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) Standard(s)

Place: Depew, NY **Date:** 03/24/2023

Signature:	
Name:	Wendy Willard
Title:	Regulatory Affairs and Product Certification Specialist

UK Declaration of Conformity PS058UK

In Accordance with ISO/IEC 17050

Manufacturer:
PCB Piezotronics, Inc.
3425 Walden Avenue
Depew, New York 14043
USA

Authorized UK Representative:
PCB Piezotronics Ltd
Business and Technology Center
Bessemer Drive
Stevenage
Hertfordshire, SG1 2DX
United Kingdom

Certifies that type of equipment: **Charge Output Sensor(s)**

Whose Product Models Include: **176 Series**

This declaration is applicable to all Sensor(s) of the above series, which have the UKCA, & (EX) ATEX mark on their data sheets and where those data sheets refer to this declaration of conformity. The data sheets for all model numbers referenced above, which include the UKCA & (EX) ATEX mark on such data sheets and refer to this Declaration of Conformity are hereby incorporated by reference into this Declaration.

Conform to the following UK Statutory Requirements when installed per product documentation:

Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (SI 2012 No. 3032)

Designated Standards to which Conformity is Declared:

Designated Standards	EN 60079-0:2018 EN 60079-11:2012 EN 63000:2018	Explosive atmospheres - Part 0: Equipment - General requirements Explosive atmospheres - Part 11: Equipment protection by intrinsic safety, i Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EC Type Examination	ATEX Certifications	LCIE 08 ATEX 6102 X / 04 Ex ia IIC T530^{0}C Ga, II 1 G Ex ia IIC T660^{0}C Ga, II 1 G Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li: 0,5mH
Voluntary Certification (EN 60079-15:2010)	Voluntary Type Examination Certificate	LCIE 06 ATEX 6041 X / 04 Ex nA IIC 530^{0}C Gc, II 3 G Ex nA IIC 660^{0}C Gc, II 3 G
Other International Certifications (IEC 60079-0, IEC 60079-11, and IEC 60079-15)	IECEx Certifications	IECEx LCIE 12.0025 X Ex ia IIC T530^{0}C Ga Ex ia IIC T660^{0}C Ga Ui : 30V, Ii : 300mA, Pi : 1W, Ci : 5nF, Li: 0,5mH IECEx LCIE 12.0026 X Ex nA IIC 530^{0}C Gc Ex nA IIC 660^{0}C Gc
Notified Body Name		Laboratoire Central des Industries Electriques (0081)
Notified Body's Address		**FONTENAY-AUX-ROSES (Head Office)** 33, avenue du Général Leclerc FR- 92260 Fontenay-aux-Roses Tel. : + 33 1 40 95 60 60 Fax : + 33 1 40 95 86 56

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) Standard(s)

Signature:	
Name:	Wendy Willard
Title:	Regulatory Affairs and Product Certification Specialist

ATTESTATION D'EXAMEN UE DE TYPE
EU TYPE EXAMINATION CERTIFICATE

1 **Version : 05** — **LCIE 08 ATEX 6102 X** — **Issue : 05**

	Directive 2014/34/UE	**Directive 2014/34/EU**
2	Appareil ou Système de Protection destiné à être utilisé en Atmosphères Explosibles	Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
3	Produit : **Capteur de pression haute température**	Product : **High temperature pressure transducer**

Type: 176XYY/MZZZ-AA series

4	Fabricant :	Manufacturer :
	PCB Piezotronics Inc.	
5	Adresse :	Address :
	3425 Walden Avenue Depew, New York 14043 USA	

6 Ce produit et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.

This product any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

7 Le LCIE, Organisme Notifié sous la référence 0081 conformément à l'article 17 de la directive 2014/34/UE du Parlement européen et du Conseil du 26 février 2014, certifie que ce produit est conforme aux Exigences Essentielles de Sécurité et de Santé pour la conception et la construction de produits destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la Directive.
Les résultats des vérifications et essais figurent dans le(s) rapport(s) confidentiel(s) N° :

LCIE, Notified Body number 0081 in accordance with article 17 of the Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014 certifies that product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in confidential report(s) N°:

84489/575164, 88358/579638/1, 114468-627759-1, 124381-650043, 134494-670162, 142170-686669

8 Le respect des Exigences Essentielles de Sécurité et de Santé est assuré par la conformité à :

Compliance with the Essential Health and Safety Requirements has been assured by compliance with :

EN 60079-0:2012 + A11:2013,
EN 60079-11:2012

9 Le signe « X » lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil est soumis aux conditions particulières d'utilisation, mentionnées dans l'annexe de cette attestation.

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

10 Cette Attestation d'Examen UE de Type concerne uniquement la conception et la construction du produit spécifié.
Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture du produit. Ces dernières ne sont pas couvertes par la présente attestation.

This EU Type Examination Certificate relates only to the design and construction of the specified product.
Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

11 Le marquage du produit est mentionné dans l'annexe de cette attestation.

The marking of the product is specified in the schedule to this certificate.

Fontenay-aux-Roses, le 21 février 2017

Responsable des Opérations de Certification
Manager of Certification Operations
Didier BOURGES

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33 Avenue du Général Leclerc
F – 92266 FONTENAY AUX ROSES

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Une société de Bureau Veritas

33 Avenue du Général Leclerc
92260 Fontenay-aux-Roses
FRANCE

WWW.LCIE.FR

1 Version : 05 **LCIE 08 ATEX 6102 X** Issue : 05

12 DESCRIPTION DU PRODUIT

Le capteur est composé d'une enveloppe métallique hermétiquement scellée contenant un ensemble piézo-cristal et connecté à un câble intégré (longueur maximale 61m).

DETAIL DE LA GAMME

X = A à Z code de la famille
YY = 01 à 99, pour indiquer le montage, le câblage, le diaphragme ou le connecteur
M = option pour indiquer la longueur métrique du câble
ZZZ = 001 à 999, en option pour indiquer la longueur métrique (≤ 61m) ou en pied (≤ 200 pieds) du câble
AA = 01 à 99, en option pour indiquer la longueur du câble en pouces ou en centimètres

MARQUAGE

Le marquage du produit doit comprendre :

PCB Piezotronics Inc.
Adresse :...
Type : 176XYY/MZZZ-AA series
N° de fabrication : ...
Année de fabrication : ...
II 1 G
Ex ia IIC T6...T530°C* Ga
Ex ia IIC T6...T660°C* Ga
*Voir classement en température
LCIE 08 ATEX 6102 X
U_i : 30V, I_i : 300mA, P_i : 1W, C_i : 5nF, L_i : 0,5mH

Marquage réduit :
PCB
Type : 176XYY/MZZZ-AA series
N° de fabrication : ...
Année de fabrication : ...
II 1 G
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
LCIE 08 ATEX 6102 X

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concernent sous la responsabilité du fabricant.

DESCRIPTION OF PRODUCT

The sensor is made of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

RANGE DETAILS

X = A to Z for family code
YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations
M = optional to indicate metric cable length
ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)
AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

MARKING

The marking of the product shall include the following :

PCB Piezotronics Inc.
Address : .....
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
II 1 G
Ex ia IIC T6...T530°C* Ga
Ex ia IIC T6...T660°C* Ga
*See Temperature classification
LCIE 08 ATEX 6102 X
U_i : 30V, I_i : 300mA, P_i : 1W, C_i : 5nF, L_i : 0,5mH

Reduced marking :
PCB
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
II 1 G
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
LCIE 08 ATEX 6102 X

The equipment shall also bear the usual marking required by the product standards applying to such equipment under the manufacturer responsibility.

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FRANCE
WWW.LCIE.FR

1 **Version : 05** **LCIE 08 ATEX 6102 X** **Issue : 05**

13 CONDITIONS PARTICULIERES D'UTILISATION

a. L'appareil ne peut être raccordé qu'à un matériel certifié de sécurité intrinsèque. Cette association doit être conforme vis-à-vis de la sécurité intrinsèque (voir les paramètres électriques au paragraphe 12).

b.

SPECIFIC CONDITIONS OF USE

The apparatus can be only connected to certified intrinsically safe equipment. This combination must be compatible as regards intrinsic safety rules (see electric parameters clause 12).

Classement en température / *Temperature classification*	Température ambiante / *Ambient temperature*
T6	-70°C ≤ T_{amb} ≤ +80°C
T5	-70°C ≤ T_{amb} ≤ +95°C
T4	-70°C ≤ T_{amb} ≤ +130°C
T3	-70°C ≤ T_{amb} ≤ +195°C
T2	-70°C ≤ T_{amb} ≤ +290°C
T1	-70°C ≤ T_{amb} ≤ +440°C
T530°C	-70°C ≤ T_{amb} ≤ +520°C
T660°C	-70°C ≤ T_{amb} ≤ +650°C

14 EXIGENCES ESSENTIELLES DE SANTE ET DE SECURITE

Couvertes par les normes listées au point 8.

ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Covered by standards listed at 8.

15 DOCUMENTS DESCRIPTIFS

DESCRIPTIVE DOCUMENTS

N°	Description	Reference	Rev.	Date	Page(s)
1.	Technical file	40678	D	2017/02/02	14
2.	Instructions	35030	H	2016/10/13	3

16 INFORMATIONS COMPLEMENTAIRES

Essais individuels

Néant

Conditions de certification

Les détenteurs d'attestations d'examen UE de type doivent également satisfaire les exigences de contrôle de production telles que définies à l'article 13 de la Directive 2014/34/UE.

En accord avec l'Article 41 de la Directive 2014/34/UE, les attestations d'examen CE de type mentionnant la Directive 94/9/CE émises avant la date d'application de la Directive 2014/34/UE (20 avril 2016) peuvent être considérées comme émises en accord avec la Directive 2014/34/UE. Les nouvelles versions de ces attestations peuvent conserver le numéro de l'attestation d'origine émise avant le 20 avril 2016.

ADDITIONAL INFORMATIONS

Routine tests

None

Conditions of certification

Holders of UE type examination certificates are also required to comply with the production control requirements defined in article 13 of Directive 2014/34/UE.

In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to Directive 94/9/EC that were in existence prior to the date of application of Directive 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. New issues of such certificates may continue to bear the original certificate number issued prior to 20 April 2016.

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1 **Version : 05** **LCIE 08 ATEX 6102 X** **Issue : 05**

17 **DETAILS DES MODIFICATIONS**

Version 00 : Version initiale
03/09/2008 : certification selon les normes EN 60079-0:2004 et EN 60079-11:2007.

Variation 01 :
27/02/2009 : mise à jour des documents, correction du type en français : 176 séries

Variation 02 :
07/07/2012 : mise à jour normative selon les normes EN 60079-0:2009 et EN 60079-11:2012, modification des paramètres électriques d'alimentation.

Variation 03 :
31/08/2014 : mise à jour normative selon la norme EN 60079-0:2012, modification de la classification de température, définition des modèles certifiés.

Variation 04 :
29/07/2015 : mise à jour normative selon la norme EN 60079-0:2012 + A11:2013, modification de l'élément piézo-électrique, modification du marquage pour la classification de température, modification de la classification de la température dans la clause «Conditions spéciales pour une utilisation sûre ».

Variation 05 :
Mise à jour de la température ambiante inférieure de 0°C à -70°C.

DETAILS OF CHANGES

Issue 00 : Initial issue
2008/09/03 : certification according to EN 60079-0:2004 and EN 60079-11:2007 standards.

Variation 01 :
2009/02/27 : update of documents, correction of the type in French : 176 series

Variation 02 :
2012/07/07 : normative update according to EN 60079-0:2009 and EN 60079-11:2012 standards, modification of the power supply electrical parameters.

Variation 03 :
2014/08/31 : normative update according to EN 60079-0:2012 standard, modification temperature classification, definition of certified models.

Variation 04 :
2015/07/29 : normative update according to EN 60079-0:2012 + A11:2013 standard, modification of the piezoelectric element, modification of the marking for the temperature classification, modification of the temperature classification in the clause "Special conditions for safe use".

Variation 05 :
Update of the lower ambient temperature from 0°C to -70°C.

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L C I E

1 **AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE**

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 08 ATEX 6102 X / 04

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176XYY/MZZZ-AA series

5 Demandeur : PCB Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour normative suivant la norme EN 60079-0:2012 + A11 :2013.
Modification de l'élément piézoélectrique.
Modification du marquage pour le classement en température.
Modification du classement en température au paragraphe « Conditions spéciales pour une utilisation sûre ».

Les résultats des vérifications et essais figurent dans le rapport confidentiel N°134494-670162.

Paramètres spécifiques du ou des modes de protection concerné(s) :
Inchangés.

Le marquage doit être :
Modifié comme suit :
PCB Piezotronics
Adresse :...
Type : 176XYY/MZZZ-AA (1)
N° de fabrication : ...
Année de fabrication : ...
Ⓔx II 1 G
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
LCIE 08 ATEX 6102 X
Ui : 30V, *Ii* : 300mA, *Pi* : 1W, *Ci* : 5nF, *Li* : 0,5mH
(1)complété en fonction du modèle

16 **DOCUMENTS DESCRIPTIFS**

Dossier technique N°40678 rév.D du 24/02/2015.
Ce dossier comprend 5 rubriques (10 pages).

1 **SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE**

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 08 ATEX 6102 X / 04

4 Equipment or protective system :
High temperature pressure transducer
Type : 176XYY/MZZZ-AA series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**

Normative update according to EN60079-0:2012 + A11:2013 standard.
Modification of the piezoelectric element.
Modification of the marking for the temperature classification.
Modification of the temperature classification in the clause "Special conditions for safe use".

The examination and test results are recorded in confidential report N°134494-670162.

Specific parameters of the concerned protection mode :
Unchanged.

The marking shall be :
Modified as follows :
PCB Piezotronics
Address : .....
Type : 176XYY/MZZZ-AA (1)
Serial number : ...
Year of construction : ...
Ⓔx II 1 G
Ex ia IIC T6...T530°C Ga
Ex ia IIC T6...T660°C Ga
LCIE 08 ATEX 6102 X
Ui : 30V, *Ii* : 300mA, *Pi* : 1W, *Ci* : 5nF, *Li* : 0,5mH
(1)completed with the model

16 **DESCRIPTIVE DOCUMENTS**

Technical file N°40678 rev.D dated 2015/02/24.
This file includes 5 items (10 pages).

Fontenay-aux-Roses, le 0 4 AOUT 2015

Le responsable de certification ATEX
ATEX Certification Officer

Rémi HANOT

EXPLOSIVE ATMOSPHERES EXPLOSIBLES BUREAU VERITAS 1828 L C I E

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au capital de 15 745 984 €
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13 **ANNEXE**

14 **AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE**

LCIE 08 ATEX 6102 X / 04

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SURE**

L'appareil ne peut être raccordé qu'à un matériel certifié de sécurité intrinsèque. Cette association doit être conforme vis-à-vis de la sécurité intrinsèque (voir les paramètres électriques au paragraphe 15).

Température ambiante d'utilisation : 0°C ≤ Tamb ≤ +650°C

Classement en température :
Ex ia IIC T6 Ga (Tamb ≤ +80°C)
Ex ia IIC T5 Ga (Tamb ≤ +95°C)
Ex ia IIC T4 Ga (Tamb ≤ +130°C)
Ex ia IIC T3 Ga (Tamb ≤ +195°C)
Ex ia IIC T2 Ga (Tamb ≤ +290°C)
Ex ia IIC T1 Ga (Tamb ≤ +440°C)
Ex ia IIC T530°C Ga (Tamb ≤ +520°C)
Ex ia IIC T660°C Ga (Tamb ≤ +650°C)

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**

Couvertes par les normes EN 60079-0:2012 + A11:2013 et EN 60079-11:2012.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**

Néant.

<u>Désignation du modèle</u> : 176XYY/MZZZ-AA :

- X = A à Z, code de la famille
- YY = 01 à 99, pour indiquer le montage, le câblage, le diaphragme ou le connecteur
- M : en option pour indiquer la longueur métrique du câble
- ZZZ = 001 à 999, en option pour indiquer la longueur métrique (≤ 61m) ou en pied (≤ 200 pieds) du câble
- AA = 01 à 99, en option pour indiquer la longueur du câble en pouces ou en centimètres

13 **SCHEDULE**

14 **SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE**

LCIE 08 ATEX 6102 X / 04

17 **SPECIAL CONDITIONS FOR SAFE USE**

The apparatus can be only connected to certified intrinsically safe equipment. This combination must be compatible as regards intrinsic safety rules (see electric parameters clause 15).

Operating ambient temperature : 0°C ≤ Tamb ≤ +650°C

Temperature classification :
Ex ia IIC T6 Ga (Tamb ≤ +80°C)
Ex ia IIC T5 Ga (Tamb ≤ +95°C)
Ex ia IIC T4 Ga (Tamb ≤ +130°C)
Ex ia IIC T3 Ga (Tamb ≤ +195°C)
Ex ia IIC T2 Ga (Tamb ≤ +290°C)
Ex ia IIC T1 Ga (Tamb ≤ +440°C)
Ex ia IIC T530°C Ga (Tamb ≤ +520°C)
Ex ia IIC T660°C Ga (Tamb ≤ +650°C)

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by the EN 60079-0:2012 + A11:2013 and EN 60079-11:2012 standards.

19 **ROUTINE VERIFICATIONS AND TESTS**

None.

<u>Designation model</u> : 176XYY/MZZZ-AA :

- X = A through Z for family code
- YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
- M is optional to indicate metric cable length
- ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
- AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

1 **AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE**

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 08 ATEX 6102 X / 03

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176XYY/MZZZ-AA series

5 Demandeur : PCB Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour normative suivant la norme EN 60079-0:2012.
Modification du classement en température.
Définitions des modèles certifiés.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N°124381-650043.

Paramètres spécifiques du ou des modes de protection concerné(s) :
Inchangés.

Le marquage doit être :
Modifié comme suit :
PCB Piezotronics
Adresse :...
Type : 176XYY/MZZZ-AA (1)
N° de fabrication : ...
Année de fabrication : ...
Ex II 1 G
Ex ia IIC T4 Ga (Tamb ≤ +130°C)
Ex ia IIC T3 Ga (Tamb ≤ +195°C)
Ex ia IIC T2 Ga (Tamb ≤ +290°C)
Ex ia IIC T1 Ga (Tamb ≤ +440°C)
Ex ia IIC 530°C Ga (Tamb ≤ +520°C)
Ex ia IIC 660°C Ga (Tamb ≤ +650°C)
LCIE 08 ATEX 6102 X
Ui ≤ 30V, *Ii* ≤ 300mA, *Ci* ≤ 5nF, *Li* ≤ 0,5mH
(1)complété en fonction du modèle

16 **DOCUMENTS DESCRIPTIFS**

Dossier technique N°40678 rév.C du 23/12/2013.
Ce dossier comprend 5 rubriques (10 pages).

1 **SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE**

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 08 ATEX 6102 X / 03

4 Equipment or protective system :
High temperature pressure transducer
Type : 176XYY/MZZZ-AA series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**

Normative update according to EN60079-0:2012 standard.
Modification temperature classification.
Definition of certified models.

The examination and test results are recorded in confidential report N°124381-650043.

Specific parameters of the concerned protection mode :
Unchanged.

The marking shall be :
Modified as follows :
PCB Piezotronics
Address : .....
Type : 176XYY/MZZZ-AA (1)
Serial number : ...
Year of construction : ...
Ex II 1 G
Ex ia IIC T4 Ga (Tamb ≤ +130°C)
Ex ia IIC T3 Ga (Tamb ≤ +195°C)
Ex ia IIC T2 Ga (Tamb ≤ +290°C)
Ex ia IIC T1 Ga (Tamb ≤ +440°C)
Ex ia IIC 530°C Ga (Tamb ≤ +520°C)
Ex ia IIC 660°C Ga (Tamb ≤ +650°C)
LCIE 08 ATEX 6102 X
Ui ≤ 30V, *Ii* ≤ 300mA, *Ci* ≤ 5nF, *Li* ≤ 0,5mH
(1)completed with the model

16 **DESCRIPTIVE DOCUMENTS**

Technical file N°40678 rev.C dated 2013/12/23.
This file includes 5 items (10 pages).

Fontenay-aux-Roses, le 3 octobre 2014

Le responsable de certification ATEX
ATEX Certification Officer
Julien GAUTHIER

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13 **ANNEXE**

14 **AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE**

LCIE 08 ATEX 6102 X / 03

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SURE**

L'appareil ne peut être raccordé qu'à un matériel certifié de sécurité intrinsèque. Cette association doit être conforme vis-à-vis de la sécurité intrinsèque (voir les paramètres électriques au paragraphe 15).

Classement en température :
Ex ia IIC T4 Ga (Tamb ≤ +130°C)
Ex ia IIC T3 Ga (Tamb ≤ +195°C)
Ex ia IIC T2 Ga (Tamb ≤ +290°C)
Ex ia IIC T1 Ga (Tamb ≤ +440°C)
Ex ia IIC 530°C Ga (Tamb ≤ +520°C)
Ex ia IIC 660°C Ga (Tamb ≤ +650°C)

Température ambiante d'utilisation : 0°C ≤ Tamb ≤ +650°C

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**

Couvertes par les normes EN 60079-0:2012 et EN 60079-11:2012.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**

Néant.

Désignation du modèle : 176XYY/MZZZ-AA :

- X = A à Z, code de la famille
- YY = 01 à 99, pour indiquer le montage, le câblage, le diaphragme ou le connecteur
- M : en option pour indiquer la longueur métrique du câble
- ZZZ = 001 à 999, en option pour indiquer la longueur métrique (≤ 61m) ou en pied (≤ 200 pieds) du câble
- AA = 01 à 99, en option pour indiquer la longueur du câble en pouces ou en centimètres

13 **SCHEDULE**

14 **SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE**

LCIE 08 ATEX 6102 X / 03

17 **SPECIAL CONDITIONS FOR SAFE USE**

The apparatus can be only connected to certified intrinsically safe equipment. This combination must be compatible as regards intrinsic safety rules (see electric parameters clause 15).

Temperature classification :
Ex ia IIC T4 Ga (Tamb ≤ +130°C)
Ex ia IIC T3 Ga (Tamb ≤ +195°C)
Ex ia IIC T2 Ga (Tamb ≤ +290°C)
Ex ia IIC T1 Ga (Tamb ≤ +440°C)
Ex ia IIC 530°C Ga (Tamb ≤ +520°C)
Ex ia IIC 660°C Ga (Tamb ≤ +650°C)

Operating ambient temperature : 0°C ≤ Tamb ≤ +650°C

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by the standards EN 60079-0:2012 and EN 60079-11:2012.

19 **ROUTINE VERIFICATIONS AND TESTS**

None.

Designation model : 176XYY/MZZZ-AA :

- X = A through Z for family code
- YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
- M is optional to indicate metric cable length
- ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
- AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

LB-01

1 **AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE**

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 08 ATEX 6102 X / 02

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176 series

5 Demandeur : PCB Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour normative selon les normes EN 60079-0:2009 et EN 60079-11:2012.
Modification des paramètres électriques d'alimentation.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N°114468-627759-1.

Paramètres spécifiques du ou des modes de protection concerné(s) :
Modifiés comme suit : Ui ≤ 30V, Ii ≤ 300mA
Avec un câble de 61m : Ci ≤ 5nF, Li ≤ 0,5mH

Le marquage doit être :
Modifié comme suit :
PCB Adresse :...
Type : 176... (complété avec le modèle)
N° de fabrication : ... Année de fabrication : ...
Ⓔx II 1 G
Ex ia IIC T4 Ga (0°C ≤ Tamb ≤ +135°C)
Ex ia IIC T1 Ga (0°C ≤ Tamb ≤ +450°C)
LCIE 08 ATEX 6102 X
Ui ≤ 30V, Ii ≤ 300mA, Ci ≤ 5nF, Li ≤ 0,5mH

16 **DOCUMENTS DESCRIPTIFS**

Dossier technique n°40678 rev.B du 11/06/2012.
Ce dossier comprend 4 rubriques (5 pages).

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SURE**
Inchangées.

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**
Couvertes par les normes EN 60079-0:2009 et EN 60079-11:2012.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**
Néant.

Fontenay-aux-Roses, le 17 juillet 2012

1 **SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE**

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 08 ATEX 6102 X / 02

4 Equipment or protective system :
High temperature pressure transducer
Type : 176 series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**

Normative update according to standards EN 60079-0:2009 and EN 60079-11:2012.
Modification of the power supply electrical parameters.

The examination and test results are recorded in confidential report N°114468-627759-1.

Specific parameters of the concerned protection mode:

Modified as follow : Ui ≤ 30V, Ii ≤ 300mA
With 61m of cable : Ci ≤ 5nF, Li ≤ 0,5mH

The marking shall be :
Modified as follow :
PCB Address : ...
Type : 176... (completed with the model)
Serial number : ... Year of construction : ...
Ⓔx II 1 G
Ex ia IIC T4 Ga (0°C ≤ Tamb ≤ +135°C)
Ex ia IIC T1 Ga (0°C ≤ Tamb ≤ +450°C)
LCIE 08 ATEX 6102 X
Ui ≤ 30V, Ii ≤ 300mA, Ci ≤ 5nF, Li ≤ 0,5mH

16 **DESCRIPTIVE DOCUMENTS**

Technical file n°40678 rev.B dated 2012/06/11.
This file includes 4 items (5 pages).

17 **SPECIAL CONDITIONS FOR SAFE USE**

Unchanged.

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by standards EN 60079-0:2009 and EN 60079-11:2012.

19 **ROUTINE VERIFICATIONS AND TESTS**
None.

Le Responsable de Certification ATEX
ATEX Certification Officer
Julien GAUTHIER

LCIE Laboratoire Central des Industries Electriques Une société de Bureau Veritas
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Société par Actions Simplifiée
au capital de 15 745 984 €
RCS Nanterre B 408 363 174

1 **AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE**

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 08 ATEX 6102 X / 01

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176 series

5 Demandeur : PCB Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour de documents.
Correction du type en Français : 176 series.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 88358/579638/1.

Paramètres spécifiques du ou des modes de protection concerné(s) :
Inchangés.

Le marquage doit être : Inchangé.

16 **DOCUMENTS DESCRIPTIFS**

Dossier de certification N° 40678 rev.A du 04/02/09.
Ce dossier comprend 4 rubriques (5 pages).

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SURE**

Inchangées.

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**

Inchangées.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**

Néant.

Fontenay-aux-Roses, le 27 février 2009

1 **SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE**

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 08 ATEX 6102 X / 01

4 Equipment or protective system :
High temperature pressure transducer
Type : 176 series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**
Update of documents.
Correction of the type in French : 176 series

The examination and test results are recorded in confidential report N° 88358/579638/1.

Specific parameters of the mode(s) of protection concerned:

Unchanged.

The marking shall be : Unchanged.

16 **DESCRIPTIVE DOCUMENTS**

Certification file N° 40678 rev.A dated 04/02/09.
This file includes 4 items (5 pages).

17 **SPECIAL CONDITIONS FOR SAFE USE**

Unchanged.

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Unchanged.

19 **ROUTINE VERIFICATIONS AND TESTS**

None.

Le responsable de certification ATEX
ATEX certification manager

Marc GILLAUX

LCIE
Laboratoire Central
des Industries Electriques
Une société de Bureau Veritas

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L C I E

1 ATTESTATION D'EXAMEN CE DE TYPE

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'attestation d'examen CE de type
LCIE 08 ATEX 6102 X

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176...

5 Demandeur : PCB Piezotronics Inc.
Adresse : 3425 Walden Avenue,
Depew, New York 14043 USA

6 Fabricant : PCB Piezotronics Inc.
Adresse : 3425 Walden Avenue,
Depew, New York 14043 USA

7 Cet appareil ou système de protection et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.

8 Le LCIE, organisme notifié sous la référence 0081 conformément à l'article 9 de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994, certifie que cet appareil ou système de protection est conforme aux exigences essentielles de sécurité et de santé pour la conception et la construction d'appareils et de systèmes de protection destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive.
Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 84489/575164.

9 Le respect des exigences essentielles de sécurité et de santé est assuré par la conformité à :
- EN 60079-0 (2004)
- EN 60079-11 (2007)

10 Le signe X lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil ou système de protection est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe de la présente attestation.

11 Cette attestation d'examen CE de type concerne uniquement la conception et la construction de l'appareil ou du système de protection spécifié, conformément à l'annexe III de la directive 94/9/CE.
Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture de l'appareil ou du système de protection. Ces dernières ne sont pas couvertes par la présente attestation.

12 Le marquage de l'appareil ou du système de protection doit comporter les informations détaillées au point 15.

Fontenay-aux-Roses, le 3 septembre 2008

1 EC TYPE EXAMINATION CERTIFICATE

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 EC type examination certificate number
LCIE 08 ATEX 6102 X

4 Equipment or protective system :
High temperature pressure transducer
Type : 176 series

5 Applicant : PCB Piezotronics Inc.
Address : 3425 Walden Avenue,
Depew, New York 14043 USA

6 Manufacturer : PCB Piezotronics Inc.
Address : 3425 Walden Avenue,
Depew, New York 14043 USA

7 This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 LCIE, notified body number 0081 in accordance with article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994. certifies that this equipment or protective system has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in confidential report N° 84489/575164.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with :
- EN 60079-0 (2004)
- EN 60079-11 (2007)

10 If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type examination certificate relates only to the design and construction of this specified equipment or protective system in accordance with annex III to the directive 94/9/EC.
Further requirements of the directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include informations as detailed at 15.

Le responsable de certification ATEX
ATEX certification manager

Henri CERVELLO

NOTIFIED BODY 0081 LCIE

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L-01

13 **ANNEXE**

14 **ATTESTATION D'EXAMEN CE DE TYPE**

LCIE 08 ATEX 6102 X

15 **DESCRIPTION DE L'APPAREIL OU DU SYSTEME DE PROTECTION**

Capteur de pression haute température
Type : 176...

Le capteur est composé d'une enveloppe métallique hermétiquement scellée contenant un ensemble piezo-cristal et connecté à un câble intégré (longueur maximale 61m).

Paramètres spécifiques du ou des modes de protection concernés :
Ui ≤ 30V, Ii ≤ 100mA, Pi ≤ 1W,
Ci ≤ 5nF et Li ≤ 0,5mH (avec un câble de 61m)

Le marquage doit être :
PCB Adresse : ...
Type : 176... (1)
N° de fabrication : ...
Année de fabrication : ...
Ex II 1G
Ex ia IIC T4 (0°C ≤ Ta ≤ +135°C)
Ex ia IIC T1 (0°C ≤ Ta ≤ +450°C)
LCIE 08 ATEX 6102 X
(1)complété avec le modèle

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concerne.

16 **DOCUMENTS DESCRIPTIFS**
Dossier de certification N° 40678 du 29/08/08.
Ce document comprend 4 rubriques (5 pages).

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE**
Classement en température :
T4 : 0°C ≤ Ta ≤ +135°C
T1 : 0°C ≤ Ta ≤ +450°C

L'accéléromètre ne doit être raccordé qu'à un matériel certifié de sécurité intrinsèque. Cette association doit être conforme vis-à-vis de la sécurité intrinsèque (voir les paramètres électriques au paragraphe 15).

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**

Couvertes par les normes listées au point 9.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**
Néant.

13 **SCHEDULE**

14 **EC TYPE EXAMINATION CERTIFICATE**

LCIE 08 ATEX 6102 X

15 **DESCRIPTION OF EQUIPMENT OR PROTECTIVE SYSTEM**

High temperature pressure transducer
Type : 176 series

The sensor is made of an hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable (maximum length 61m).

Specific parameters of the mode(s) of protection concerned :

Ui ≤ 30V, Ii ≤ 100mA, Pi ≤ 1W,
Ci ≤ 5nF and Li ≤ 0,5mH (with 61m of cable)

The marking shall be :
PCB Address : ...
Type : 176... (1)
Serial number : ...
Year of construction : ...
Ex II 1G
Ex ia IIC T4 (0°C ≤ Ta ≤ +135°C)
Ex ia IIC T1 (0°C ≤ Ta ≤ +450°C)
LCIE 08 ATEX 6102 X
(1)completed with the model

The equipment shall also bear the usual marking required by the manufacturing standards applying to such equipment.

16 **DESCRIPTIVE DOCUMENTS**
Certification file N° 40678 dated 29/08/08.
This file includes 4 items (5 pages).

17 **SPECIAL CONDITIONS FOR SAFE USE**

Temperature classification :
T4 : 0°C ≤ Ta ≤ +135°C
T1 : 0°C ≤ Ta ≤ +450°C

The accelerometer must be only connected to a certified intrinsically safe equipment. This combination must be compatible regarding intrinsic safety rules (see electrical parameters clause 15).

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by standards listed at 9.

19 **ROUTINE VERIFICATIONS AND TESTS**
None.

Certificate of Compliance

Certificate: 1742175 **Master Contract:** 184981

Project: 70068556 **Date Issued:** 2016-05-06

Issued to: **Industrial Monitoring Instr. (IMI) A Div. of PCB Piezotronics, Inc.**
3425 Walden Ave
Depew, New York 14043
USA
Attention: Carrie Termin

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Issued by: *Behzad Nejad*
Behzad Nejad, P.Eng.

PRODUCTS
CLASS - C225803 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems - For Hazardous Locations
CLASS - C225883 - PROCESS CONTROL EQUIPMENT-Intrinsically Safe and Non-Incendive-Systems-For Hazardous Locations-Certified to U.S. Standards

Ex nA IIC TX:
AEx nA IIC TX:
Class I, Division 2, Groups A, B, C, D:

Models 176XYY/MZZZ-AA High Temperature Pressure Transducer; non-incendive with entity parameters as shown below; must be installed per installation drawing 57723; temperature code as shown below.

Entity Parameters	Temperature Code
Ui / Vmax = 30V Ii / Imax = 100mA Pi / Pmax = 1W Ci = 5nF Li = 500µH	T6 (-70°C to 80°C) T5 (-70°C to 95°C) T4 (-70°C to 130°C) T3 (-70°C to 195°C) T2 (-70°C to 290°C) T1 (-70°C to 440°C) T530 (-70°C to 530°C)

35029 REV. C
ECO 48141
05/17/18

	T660 (-70°C to 650°C)

Notes:
1. For Canadian Installations, sensor case must be bonded to ground according to Section 18-182 of the CEC, Part 1.
2. For US Installations, sensor case must be bonded to ground according to Article 501.16 of the NEC.

CLASS - C225804 - PROCESS CONTROL EQUIPMENT-Intrinsically Safe, Entity - For Hazardous Locations-
CLASS - C225884 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity-- For Hazardous Locations - Certified to US Standards

Ex ia IIC TX:
AEx ia IIC TX:
Class I, Division 1, Groups A, B, C, D:

Models 176XYY/MZZZ-AA High Temperature Pressure Transducer; intrinsically safe with entity parameters as shown below; must be installed as per installation drawing 57723; temperature code as shown below; MWP 2000 psi.

Entity Parameters	Temperature Code
Ui / Vmax = 30V Ii / Imax = 100mA Pi / Pmax = 1W Ci = 5nF Li = 500µH	T6 (-70°C to 80°C) T5 (-70°C to 95°C) T4 (-70°C to 130°C) T3 (-70°C to 195°C) T2 (-70°C to 290°C) T1 (-70°C to 440°C) T530 (-70°C to 530°C) T660 (-70°C to 650°C)

Notes:
1. For Canadian Installations, sensor case must be bonded to ground according to Section 18-182 of the CEC, Part 1.
2. For US Installations, sensor case must be bonded to ground according to Article 501.16 of the NEC.

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-M91 (R2001)	General Requirements – Canadian Electrical Code, Part II
C22.2 No. 142-M1987 (R2009)	Process Control Equipment
CAN/CSA-C22.2 No. 157-92 (R2006)	Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations
C22.2 No. 213-M1987 (R2008)	Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
CAN/CSA-E60079-0:02	Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic Safety "i"

35029 REV. C
ECO 48141
05/17/18

Certificate: 1742175 **Master Contract:** 184981
Project: 70068556 **Date Issued:** 2016-05-06

CAN/CSA-C22.2 No. 60079-11:11	Explosive Atmospheres – Part 11: Equipment protection by intrinsic safety "i"
CAN/CSA-E60079-15:02	Electrical apparatus for explosive gas atmospheres - Part 15: Type of Protection "n"
UL 916 (4th Ed.)	Energy Management Equipment
UL 913 (8th Ed.)	Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II and III, Division 1, Hazardous Locations
FM Std. No. 3600-1998	Electrical Equipment for Use in Hazardous (Classified) Locations – General Requirements
FM Std. No. 3611-1999	Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2, Hazardous (Classified) Locations
ANSI/UL 60079-15:02	Electrical Apparatus for Explosive Gas Atmospheres - Part 15: Type of Protection "n".
ANSI/UL 60079-0:13	Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements
ANSI/UL 60079-11:13	Electrical apparatus for Explosive Gas Atmospheres - Part 11: Intrinsic Safety "i"

MARKINGS

Markings are etched directly into the Sensor enclosure body. The following marking details appear:

- CSA Monogram with C-US indicator.
- Submittor Identification
- Certificate reference CSA 06.1742175
- Model Number
- Serial Number, Date Code or Month and Year of Manufacture
- Electrical Rating
- Hazardous Location Designation
- The term 'Class I, Zone 0' adjacent to the AEx ia IIC T6...T660 marking
- The term 'Class I, Zone 2' adjacent to the AEx nA IIC T6...T660 marking
- Ambient temperature range as per product listing
- Maximum Working Pressure Rating (ie. MWP 2KPSI)

CSA Group

Supplement to Certificate of Compliance

Certificate: 1742175 **Master Contract:** 184981

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
70068556	2016-05-06	Update to the Reprot 1742475 for model 176XYY/MZZZ-AA High Temperature Pressure Transducer to change the lower ambient limit to -70°C. No other changes to the assembly or wiring methods.
70028573	2015-06-22	Update to the Report 1742175 for Model 176XYY/MZZ construction with alternative type of piezo crystal and additional temperature ranges.
2692514	2014-05-23	Update to add Class I, Div. 1, Groups A, B, C, and D and AEx/Ex ia IIC T4...T1 markings.
1742175	2006-05-04	Model 176Mxx High Temperature Pressure Transducer for Div. 2/Zone 2 Hazardous Locations.

35029 REV. C
ECO 48141
05/17/18

ATTESTATION D'EXAMEN DE TYPE
TYPE EXAMINATION CERTIFICATE

1 **Version : 05** — **LCIE 06 ATEX 6041 X** — **Issue : 05**

Directive 2014/34/UE / **Directive 2014/34/EU**

2 Appareil ou Système de Protection destiné à être utilisé en Atmosphères Explosibles / Equipment or Protective System Intended for use in Potentially Explosive Atmospheres

3 Produit : **Capteur de pression haute température** / Product : **High temperature pressure transducer**

Type: 176XYY/MZZZ-AA series

4 Fabricant : / Manufacturer :

PCB Piezotronics Inc.

5 Adresse : / Address :

3425 Walden Avenue
Depew, New York 14043 USA

6 Ce produit et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence. / This product any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

7 Le LCIE certifie que ce produit est conforme aux Exigences Essentielles de Sécurité et de Santé pour la conception et la construction de produits destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la Directive.
Les résultats des vérifications et essais figurent dans le(s) rapport(s) confidentiel(s) N° : / LCIE certifies that product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in confidential report(s) N°:

60046217/546313, 88358/579638/2, 114468-627759-2, 124381-650043, 134494-670162, 142170-686669

8 Le respect des Exigences Essentielles de Sécurité et de Santé est assuré par la conformité à : / Compliance with the Essential Health and Safety Requirements has been assured by compliance with :

EN 60079-0:2012 + A11:2013,
EN 60079-15:2010

9 Le signe « X » lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil est soumis aux conditions particulières d'utilisation, mentionnées dans l'annexe de cette attestation. / If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

10 Cette Attestation d'Examen de Type concerne uniquement la conception et la construction du produit spécifié.
Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture du produit. Ces dernières ne sont pas couvertes par la présente attestation. / This Type Examination Certificate relates only to the design and construction of the specified product.
Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

11 Le marquage du produit est mentionné dans l'annexe de cette attestation. / The marking of the product is specified in the schedule to this certificate.

Fontenay-aux-Roses, le 21 février 2017

Responsable des Opérations de Certification
Manager of Certification Operations
Didier BOURGES

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33 Avenue du Général Leclerc
F – 92266 FONTENAY AUX ROSES

LCIE
Laboratoire Central des Industries Electriques
Une société de Bureau Veritas

33 Avenue du Général Leclerc
92260 Fontenay-aux-Roses
FRANCE

WWW.LCIE.FR

1 Version : 05 **LCIE 06 ATEX 6041 X** Issue : 05

12 DESCRIPTION DU PRODUIT

Le capteur est composé d'une enveloppe métallique hermétiquement scellée contenant un ensemble piézo-cristal et connecté à un câble intégré.

DETAIL DE LA GAMME

X = A à Z code de la famille
YY = 01 à 99, pour indiquer le montage, le câblage, le diaphragme ou le connecteur
M = option pour indiquer la longueur métrique du câble
ZZZ = 001 à 999, en option pour indiquer la longueur métrique (≤ 61m) ou en pied (≤ 200 pieds) du câble
AA = 01 à 99, en option pour indiquer la longueur du câble en pouces ou en centimètres

MARQUAGE

Le marquage du produit doit comprendre :

PCB Piezotronics Inc.
Adresse :...
Type : 176XYY/MZZZ-AA series
N° de fabrication : ...
Année de fabrication : ...
II 3 G
Ex nA IIC T6...T530°C* Gc
Ex nA IIC T6...T660°C* Gc
*Voir classement en température
LCIE 06 ATEX 6041 X
AVERTISSEMENT - NE PAS SEPARER SOUS TENSION

Marquage reduit :
PCB
Type : 176XYY/MZZZ-AA series
N° de fabrication : ...
Année de fabrication : ...
II 3 G
Ex nA IIC T6...T530°C Gc
Ex nA IIC T6...T660°C Gc
LCIE 06 ATEX 6041 X

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concernent sous la responsabilité du fabricant.

DESCRIPTION OF PRODUCT

The sensor is made of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

RANGE DETAILS

X = A to Z for family code
YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations
M = optional to indicate metric cable length
ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)
AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

MARKING

The marking of the product shall include the following :

PCB Piezotronics Inc.
Address : .....
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
II 3 G
Ex nA IIC T6...T530°C* Gc
Ex nA IIC T6...T660°C* Gc
*See Température classification
LCIE 06 ATEX 6041 X
WARNING - DO NOT SEPARATE WHEN ENERGIZED

Reduced marking :
PCB
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
II 3 G
Ex nA IIC T6...T530°C Gc
Ex nA IIC T6...T660°C Gc
LCIE 06 ATEX 6041 X

The equipment shall also bear the usual marking required by the product standards applying to such equipment under the manufacturer responsibility.

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1 Version : 05 **LCIE 06 ATEX 6041 X** Issue : 05

13 CONDITIONS PARTICULIERES D'UTILISATION

a. Le capteur ne peut être raccordé qu'à un équipement dont les paramètres électriques n'excèdent pas les valeurs suivantes : U : 30V, I : 300mA.
b. L'utilisateur final devra prendre toutes les précautions nécessaires pour maintenir le degré de protection minimum IP54 de la connexion du capteur lors de son raccordement selon les préconisations de la norme EN 60079-14.
c.

SPECIFIC CONDITIONS OF USE

The transducer must be only connected to an equipment whose electrical parameters do not exceed the following values: U: 30V, I: 300 mA.
For final installation, the device shall be connected in compliance with EN 60079-14 requirements, providing and maintaining degree of protection at last IP54.

Classement en température / *Temperature classification*	Température ambiante / *Ambient temperature*
T6	$-70°C \leq T_{amb} \leq +80°C$
T5	$-70°C \leq T_{amb} \leq +95°C$
T4	$-70°C \leq T_{amb} \leq +130°C$
T3	$-70°C \leq T_{amb} \leq +195°C$
T2	$-70°C \leq T_{amb} \leq +290°C$
T1	$-70°C \leq T_{amb} \leq +440°C$
T530°C	$-70°C \leq T_{amb} \leq +520°C$
T660°C	$-70°C \leq T_{amb} \leq +650°C$

14 EXIGENCES ESSENTIELLES DE SANTE ET DE SECURITE

Couvertes par les normes listées au point 8.

ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Covered by standards listed at 8.

15 DOCUMENTS DESCRIPTIFS

DESCRIPTIVE DOCUMENTS

N°	Description	Reference	Rev.	Date	Page(s)
1.	Technical file	32142	E	2017/02/02	14
2.	Instructions	35030	H	2016/10/13	3

16 INFORMATIONS COMPLEMENTAIRES

Essais individuels

Conformément au paragraphe 23.2.1 de la norme EN 60079-15, chaque exemplaire de l'équipement doit être soumis à un essai de rigidité diélectrique sous 600 volts pendant 100ms.

Conditions de certification

Les détenteurs d'attestations d'examen UE de type doivent également satisfaire les exigences de contrôle de production telles que définies à l'article 13 de la Directive 2014/34/UE.

En accord avec l'Article 41 de la Directive 2014/34/UE, les attestations d'examen de type mentionnant la Directive 94/9/CE émises avant la date d'application de la Directive 2014/34/UE (20 avril 2016) peuvent être considérées comme émises en accord avec la Directive 2014/34/UE. Les nouvelles versions de ces attestations peuvent conserver le numéro de l'attestation d'origine émise avant le 20 avril 2016.

ADDITIONAL INFORMATIONS

Routine tests

According to clause 23.2.1 of EN 60079-15 standard each apparatus shall be submitted to a dielectric strength test under 600 Volts during 100ms.

Conditions of certification

Holders of UE type examination certificates are also required to comply with the production control requirements defined in article 13 of Directive 2014/34/UE.

In accordance with Article 41 of Directive 2014/34/EU, Type Examination Certificates referring to Directive 94/9/EC that were in existence prior to the date of application of Directive 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. New issues of such certificates may continue to bear the original certificate number issued prior to 20 April 2016.

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1 **Version : 05** **LCIE 06 ATEX 6041 X** **Issue : 05**

17 DETAILS DES MODIFICATIONS

Version 00 : Version initiale

Variation 01: 27/02/2009 : correction du type : 176 séries, mise à jour des documents, mise à jour normative (ajout de la norme EN 60079-0:2006).

Variation 02 : 07/07/2012 : mise à jour normative selon les normes EN 60079-0:2009 et EN 60079-15:2010, la modification des paramètres électriques d'alimentation.

Variation 03 : 31/08/2014 : Mise à jour normative selon la norme EN 60079-0:2012, modification de la classification de la température, définition des modèles certifiés.

Variation 04 : 29/07/2015 : mise à jour normative selon la norme EN 60079-0:2012 + A11:2013, modification de l'élément piézo-électrique, modification du marquage pour la classification de température, modification de la classification de la température dans la clause «Conditions spéciales pour une utilisation sûre ».

Variation 05 : Mise à jour de la température ambiante inférieure de 0°C à -70°C.

DETAILS OF CHANGES

Issue 00 : Initial issue

Variation 01 : 2009/02/27: correction of the type: 176 series, update of documents, normative update (adding EN 60079-0:2006 standard).

Variation 02 : 2012/07/07: normative update according to EN 60079-0:2009 and EN 60079-15:2010 standards, modification of the power supply electrical parameters.

Variation 03 : 2014/08/31: Normative update according to EN 60079-0:2012 standard, modification temperature classification, definition of certified models.

Variation 04 : 2015/07/29: normative update according to EN 60079-0:2012 + A11:2013 standard, modification of the piezoelectric element, modification of the marking for the temperature classification, modification of the temperature classification in the clause "Special conditions for safe use".

Variation 05 : Update of the lower ambient temperature from 0°C to -70°C.

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L C I E

1 **AVENANT D'ATTESTATION D'EXAMEN DE TYPE VOLONTAIRE**

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 06 ATEX 6041 X / 04

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176XYY/MZZZ-AA series

5 Demandeur : PCB Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour normative suivant la norme EN 60079-0:2012 + A11:2013.
Modification de l'élément piézoélectrique.
Modification du marquage pour le classement en température.
Modification du classement en température au paragraphe « Conditions spéciales pour une utilisation sûre ».

Les résultats des vérifications et essais figurent dans le rapport confidentiel N°134494-670162.

Paramètres spécifiques du ou des modes de protection concerné(s) : Inchangés.

Le marquage doit être : Modifié comme suit :
PCB Piezotronics
Adresse :...
Type : 176XYY/MZZZ-AA (complété en fonction du modèle)
N° de fabrication : ...
Année de fabrication : ...
Ex II 3 G
Ex nA IIC T6...T530°C Gc
Ex nA IIC T6...T660°C Gc
LCIE 06 ATEX 6041 X

16 **DOCUMENTS DESCRIPTIFS**

Dossier technique n°32142 rev.D du 24/02/2015.
Ce dossier comprend 5 rubriques (10 pages).

1 **SUPPLEMENTARY VOLUNTARY TYPE EXAMINATION CERTIFICATE**

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 06 ATEX 6041 X / 04

4 Equipment or protective system :
High temperature pressure transducer
Type : 176XYY/MZZZ-AA series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**

Normative update according to EN60079-0:2012 + A11:2013 standard.
Modification of the piezoelectric element.
Modification of the marking for the temperature classification.
Modification of the temperature classification in the clause "Special conditions for safe use".

The examination and test results are recorded in confidential report N°134494-670162.

Specific parameters of the concerned protection mode : Unchanged.

The marking shall be : Modified as follows :
PCB Piezotronics
Address : .....
Type : 176XYY/MZZZ-AA (completed with the model)
Serial number : ...
Year of construction : ...
Ex II 3 G
Ex nA IIC T6...T530°C Gc
Ex nA IIC T6...T660°C Gc
LCIE 06 ATEX 6041 X

16 **DESCRIPTIVE DOCUMENTS**

Technical file n°32142 rev.D dated 2015/02/24.
This file includes 5 items (10 pages).

Fontenay-aux-Roses, le 0 4 AOUT 2015

Le responsable de certification ATEX
ATEX Certification Officer

Rémi HANOT

EXPLOSIVE ATMOSPHERES EXPLOSIBLES BUREAU VERITAS 1828 L C I E

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13 **ANNEXE**

14 **AVENANT D'ATTESTATION D'EXAMEN DE TYPE VOLONTAIRE**

LCIE 06 ATEX 6041 X / 04

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SURE**
Modifiées comme suit :

Le capteur ne peut être raccordé qu'à un équipement dont les paramètres électriques n'excèdent pas les valeurs suivantes : U : 30V, I : 300mA.

Température ambiante d'utilisation : 0°C ≤ Tamb ≤ +650°C.

Classement en température :
Ex nA IIC T6 Gc (Tamb ≤ +80°C)
Ex nA IIC T5 Gc (Tamb ≤ +95°C)
Ex nA IIC T4 Gc (Tamb ≤ +130°C)
Ex nA IIC T3 Gc (Tamb ≤ +195°C)
Ex nA IIC T2 Gc (Tamb ≤ +290°C)
Ex nA IIC T1 Gc (Tamb ≤ +440°C)
Ex nA IIC T530°C Gc (Tamb ≤ +520°C)
Ex nA IIC T660°C Gc (Tamb ≤ +650°C)

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**
Couvertes par les normes EN 60079-0:2012 +A11:2013 et EN 60079-15:2010.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**
Néant.

Désignation du modèle : 176XYY/MZZZ-AA :

- X = A à Z, code de la famille
- YY = 01 à 99, pour indiquer le montage, le câblage, le diaphragme ou le connecteur
- M : en option pour indiquer la longueur métrique du câble
- ZZZ = 001 à 999, en option pour indiquer la longueur métrique (≤ 61m) ou en pied (≤ 200 pieds) du câble
- AA = 01 à 99, en option pour indiquer la longueur du câble en pouces ou en centimètres

13 **SCHEDULE**

14 **SUPPLEMENTARY VOLUNTARY TYPE EXAMINATION CERTIFICATE**

LCIE 06 ATEX 6041 X / 04

17 **SPECIAL CONDITIONS FOR SAFE USE**

Modified as follows :

The transducer must be only connected to an equipment whose electrical parameters do not exceed the following values : U : 30V, I : 300 mA.

Operating ambient temperature : 0°C ≤ Tamb ≤ +650°C.

Temperature classification :
Ex nA IIC T6 Gc (Tamb ≤ +80°C)
Ex nA IIC T5 Gc (Tamb ≤ +95°C)
Ex nA IIC T4 Gc (Tamb ≤ +130°C)
Ex nA IIC T3 Gc (Tamb ≤ +195°C)
Ex nA IIC T2 Gc (Tamb ≤ +290°C)
Ex nA IIC T1 Gc (Tamb ≤ +440°C)
Ex nA IIC T530°C Gc (Tamb ≤ +520°C)
Ex nA IIC T660°C Gc (Tamb ≤ +650°C)

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by the EN 60079-0:2012 + A11:2013 and EN 60079-15:2010 standards.

19 **ROUTINE VERIFICATIONS AND TESTS**
None.

Designation model : 176XYY/MZZZ-AA :

- X = A through Z for family code
- YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
- M is optional to indicate metric cable length
- ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
- AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

1 **AVENANT D'ATTESTATION D'EXAMEN DE TYPE VOLONTAIRE**

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 06 ATEX 6041 X / 03

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176XYY/MZZZ-AA series

5 Demandeur : PCB Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour normative suivant la norme EN 60079-0:2012.
Modification du classement en température.
Définitions des modèles certifiés.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N°124381-650043.

Paramètres spécifiques du ou des modes de protection concerné(s) : Inchangés.

Le marquage doit être : Modifié comme suit :
PCB Piezotronics Adresse :...
Type : 176XYY/MZZZ-AA (complété en fonction du modèle)
N° de fabrication : ... Année de fabrication : ...
Ex II 3 G
Ex nA IIC T4 Gc (Tamb ≤ +130°C)
Ex nA IIC T3 Gc (Tamb ≤ +195°C)
Ex nA IIC T2 Gc (Tamb ≤ +290°C)
Ex nA IIC T1 Gc (Tamb ≤ +440°C)
Ex nA IIC 530°C Gc (Tamb ≤ +520°C)
Ex nA IIC 660°C Gc (Tamb ≤ +650°C)
LCIE 06 ATEX 6041 X

16 **DOCUMENTS DESCRIPTIFS**

Dossier technique n°32142 rev.C du 23/12/2013.
Ce dossier comprend 5 rubriques (10 pages).

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SURE**

Le capteur ne peut être raccordé qu'à un équipement dont les paramètres électriques n'excèdent pas les valeurs suivantes : U ≤ 30V, I ≤ 300mA
Classement en température :
T4 : Tamb ≤ +130°C
T3 : Tamb ≤ +195°C
T2 : Tamb ≤ +290°C
T1 : Tamb ≤ +440°C
530°: Tamb ≤ +520°C
660°C : Tamb ≤ +650°C
Température ambiante d'utilisation : 0°C ≤ Tamb ≤ +650°C

Fontenay-aux-Roses, le 3 octobre 2014

1 **SUPPLEMENTARY VOLUNTARY TYPE EXAMINATION CERTIFICATE**

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 06 ATEX 6041 X / 03

4 Equipment or protective system :
High temperature pressure transducer
Type : 176XYY/MZZZ-AA series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**

Normative update according to EN60079-0:2012 standard.
Modification temperature classification.
Definition of certified models.

The examination and test results are recorded in confidential report N°124381-650043.

Specific parameters of the concerned protection mode : Unchanged.

The marking shall be : Modified as follows :
PCB Piezotronics Address : .....
Type : 176XYY/MZZZ-AA (completed by the model)
Serial number : ... Year of construction : ...
Ex II 3 G
Ex nA IIC T4 Gc (Tamb ≤ +130°C)
Ex nA IIC T3 Gc (Tamb ≤ +195°C)
Ex nA IIC T2 Gc (Tamb ≤ +290°C)
Ex nA IIC T1 Gc (Tamb ≤ +440°C)
Ex nA IIC 530°C Gc (Tamb ≤ +520°C)
Ex nA IIC 660°C Gc (Tamb ≤ +650°C)
LCIE 06 ATEX 6041 X

16 **DESCRIPTIVE DOCUMENTS**

Technical file n°32142 rev.C dated 2013/12/23.
This file includes 5 items (10 pages).

17 **SPECIAL CONDITIONS FOR SAFE USE**

The transducer must be only connected to an equipment whose electrical parameters do not exceed the following values : U ≤ 30V, I ≤ 300mA .
Temperature classification :
T4 : Tamb ≤ +130°C
T3 : Tamb ≤ +195°C
T2 : Tamb ≤ +290°C
T1 : Tamb ≤ +440°C
530°: Tamb ≤ +520°C
660°C : Tamb ≤ +650°C
Operating ambient temperature : 0°C ≤ Tamb ≤ +650°C

Le responsable de certification ATEX
ATEX Certification Officer
Julien GAUTHIER

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13 **ANNEXE**

14 **AVENANT D'ATTESTATION D'EXAMEN DE TYPE VOLONTAIRE**

LCIE 06 ATEX 6041 X / 03

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**
Couvertes par les normes EN 60079-0:2012 et EN 60079-15:2010.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**
Néant.

Désignation du modèle : 176XYY/MZZZ-AA :

- X = A à Z, code de la famille
- YY = 01 à 99, pour indiquer le montage, le câblage, le diaphragme ou le connecteur
- M : en option pour indiquer la longueur métrique du câble
- ZZZ = 001 à 999, en option pour indiquer la longueur métrique (≤ 61m) ou en pied (≤ 200 pieds) du câble
- AA = 01 à 99, en option pour indiquer la longueur du câble en pouces ou en centimètres

13 **SCHEDULE**

14 **SUPPLEMENTARY VOLUNTARY TYPE EXAMINATION CERTIFICATE**

LCIE 06 ATEX 6041 X / 03

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by the standards EN 60079-0:2012 and EN 60079-15:2010.

19 **ROUTINE VERIFICATIONS AND TESTS**
None.

Designation model : 176XYY/MZZZ-AA :

- X = A through Z for family code
- YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
- M is optional to indicate metric cable length
- ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
- AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

1 **AVENANT D'ATTESTATION D'EXAMEN DE TYPE VOLONTAIRE**

2 **Appareil** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 06 ATEX 6041 X / 02

4 Appareil

Capteur de pression haute température
Type : 176 series

5 Demandeur : PCB Pizotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Mise à jour selon les normes EN 60079-0:2009 et EN 60079-15:2010.
Modification des paramètres électriques d'alimentation.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N°114468-627759-2.

Paramètres spécifiques du ou des modes de protection concerné(s) :
Modifié comme suit : U ≤ 30V, I ≤ 300mA

Le marquage doit être :
Modifié comme suit :
PCB Adresse :...
Type : 176... (complété avec le modèle)
N° de fabrication : ... Année de fabrication : ...
Ⓔx II 3 G
Ex nA IIC T4 Gc (0°C ≤ Tamb ≤ +135°C)
Ex nA IIC T1 Gc (0°C ≤ Tamb ≤ +450°C)
LCIE 06 ATEX 6041 X

16 **DOCUMENTS DESCRIPTIFS**
Dossier technique n°32142 rév.B du 11/06/2012.
Ce document comprend 4 rubriques (5 pages).

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE**
Inchangées.

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**
Couvertes par les normes EN 60079-0:2009 et EN 60079-15:2010.

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**
Néant.

1 **VOLUNTARY SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE**

2 **Equipment** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 06 ATEX 6041 X / 02

4 Equipment

High temperature pressure transducer
Type : 176 series

5 Applicant : PCB Pizotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**
Normative update according to standards EN 60079-0:2009 and EN 60079-15:2010.
Modification of the power supply electrical parameters.

The examination and test results are recorded in confidential report N°114468-627759-2.

Specific parameters of the concerned protection mode :

Modified as follow : U ≤ 30V, I ≤ 300mA

The marking shall be :
Modified as follow :
PCB Address : ...
Type : 176... (completed with the model)
Serial number : ... Year of construction : ...
Ⓔx II 3 G
Ex nA IIC T4 Gc (0°C ≤ Tamb ≤ +135°C)
Ex nA IIC T1 Gc (0°C ≤ Tamb ≤ +450°C)
LCIE 06 ATEX 6041 X

16 **DESCRIPTIVE DOCUMENTS**
Certification file n°32142 rev.B dated 2012/06/11.
This file includes 4 items (5 pages).

17 **SPECIAL CONDITIONS FOR SAFE USE**
Unchanged.

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by the standards EN 60079-0:2009 and EN 60079-15:2010.

19 **ROUTINE VERIFICATIONS AND TESTS**
None.

Fontenay-aux-Roses, le 17 juillet 2012

Le Responsable de Certification ATEX
ATEX Certification Officer
Julien GAUTHIER

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1 **AVENANT D'ATTESTATION D'EXAMEN DE TYPE VOLONTAIRE**

2 **Appareil** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'avenant :
LCIE 06 ATEX 6041 X / 01

4 Appareil
Capteur de pression haute température
Type : 176 series

5 demandeur : PBC Piezotronics Inc.

15 **DESCRIPTION DE L'AVENANT**

Correction du type : 176 series.
Mise à jour de documents.
Mise à jour normative (adjonction de la norme EN 60079-0 (2006).

Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 88358/579638/2.

Paramètres spécifiques du ou des modes de protection concerné(s) :
Inchangés.

Le marquage doit être :
Inchangé, excepté pour :
- le type : 176 series
- le code : Ex nL IIC T1 Tamb : 0°C à + 450°C
Ex nL IIC T4 Tamb : 0°C à + 135°C

16 **DOCUMENTS DESCRIPTIFS**
Dossier de certification n° 32142 rev.A du 04/02/09.
Ce document comprend 4 rubriques (4 pages).

17 **CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE**
Inchangées.

18 **EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**
Couvertes par les normes EN 60079-0 (2006) et EN 60079-15 (2005).

19 **VERIFICATIONS ET ESSAIS INDIVIDUELS**
Néant.

Fontenay-aux-Roses, le 27 février 2009

1 **VOLUNTARY SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE**

2 **Equipment** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Supplementary certificate number :
LCIE 06 ATEX 6041 X / 01

4 Equipment
High temperature pressure transducer
Type : 176 series

5 Applicant : PCB Piezotronics Inc.

15 **DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE**
Correction of the type : 176 series.
Update of documents.
Normative update (adding EN 60079-0 (2006) standard).

The examination and test results are recorded in confidential report N° 88358/579638/2.

Specific parameters of the mode(s) of protection concerned:

Unchanged.

The marking shall be :
Unchanged, excepted for :
- the type : 176 series
- the code : Ex nL IIC T1 Tamb : 0°C to + 450°C
Ex nL IIC T4 Tamb : 0°C to + 135°C

16 **DESCRIPTIVE DOCUMENTS**
Certification file n° 32142 rev.A dated 04/02/09.
This file includes 4 items (4 pages).

17 **SPECIAL CONDITIONS FOR SAFE USE**
Unchanged.

18 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by standards EN 60079-0 (2006) and EN 60079-15 (2005).

19 **ROUTINE VERIFICATIONS AND TESTS**
None.

Le responsable de certification ATEX
ATEX certification manager

Marc GILLAUX

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au capital de 15 745 984 €
RCS Nanterre B 408 363 174

L C I E

1 ATTESTATION D'EXAMEN DE TYPE

2 **Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles **(Directive 94/9/CE)**

3 Numéro de l'attestation d'examen de type
LCIE 06 ATEX 6041 X

4 Appareil ou système de protection :
Capteur de pression haute température
Type : 176Mxx

5 Demandeur : PCB Piezotronics Div.
Adresse : 3425 Walden Avenue
Depew, New York 14043 USA

7 Cet appareil ou système de protection et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.

8 Le LCIE certifie que cet appareil ou système de protection est conforme aux exigences essentielles de sécurité et de santé pour la conception et la construction d'appareils et de systèmes de protection destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 60046217/546313.

9 Le respect des exigences essentielles de sécurité et de santé est assuré par la conformité à :
- EN 60075-15 (2005)

10 Le signe X lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil ou système de protection est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe de la présente attestation.

11 Cette attestation d'examen de type concerne uniquement la conception et la construction de l'appareil ou du système de protection spécifié, conformément à l'annexe III de la directive 94/9/CE.
Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture de l'appareil ou du système de protection. Ces dernières ne sont pas couvertes par la présente attestation.

12 Le marquage de l'appareil ou du système de protection doit comporter les informations détaillées au point 15.

1 TYPE EXAMINATION CERTIFICATE

2 **Equipment or protective system** intended for use in potentially explosive atmospheres **(Directive 94/9/EC)**

3 Type Examination Certificate number
LCIE 06 ATEX 6041 X

4 Equipment or protective system :
High temperature pressure transducer
Type : 176Mxx

5 applicant : PCB Piezotronics Div.
Address : 3425 Walden Avenue
Depew, New York 14043 USA

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 LCIE certifies that this equipment or protective system has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective system intended for use in potentially explosive atmospheres, given in Annex II of the Directive 94/9/EC of the European Parliament and Council of 23 March 1994.

The examination and test results are recorded in confidential report N° 60046217/546313.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with :
- EN 60079-15 (2005)

10 If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This type examination certificate relates only to the design and construction of this specified equipment or protective system in accordance with annex III to the directive 94/9/EC.

Further requirements of the Directive apply to the manufacture and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include informations as detailed at 15.

Fontenay-aux-Roses, le 5 juin 2006

Le responsable de certification ATEX
ATEX certification manager

Henri CERVELLO

L C I E

13 ANNEXE

14 ATTESTATION D'EXAMEN DE TYPE

LCIE 06 ATEX 6041 X

15 DESCRIPTION DE L'APPAREIL OU DU SYSTEME DE PROTECTION

Capteurs de pression haute température

Type : 176Mxx

Ce capteur est composé d'un boîtier métallique hermétiquement scellé contenant un ensemble piezo-cristal et connecté à un câble intégré.

Paramètres spécifiques du ou des modes de protection concernés :

Ui ≤ 30V, Ii ≤ 100mA, Pi ≤ 1W, Ci = 5 nF, Li = 500 µH

Le marquage doit être :

PCB Adresse : .....

Type : 176Mxx

N° de fabrication : .....Année de fabrication :.....

Ex II 3G

EEx nL IIC T1 T amb. : 0°C à + 450°C

EEx nL IIC T4 T amb. : 0°C à + 135°C

LCIE 06 ATEX 6041X

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concerne.

16 DOCUMENTS DESCRIPTIFS

Dossier de certification N° 32142 du 25/10/2005.

Ce document comprend 4 rubriques (5 pages).

17 CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE

Ce matériel ne peut être placé qu'en atmosphère explosible zone 2.

Le matériel ne doit être raccordé qu'à un équipement dont les paramètres électriques sont compatibles aux valeurs mentionnées au paragraphe 15.

Température ambiante d'utilisation :
0°C à + 450°C ou 0°C à + 135°C

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE

Couvertes par les normes listées au point 9.

19 VERIFICATIONS ET ESSAIS INDIVIDUELS

Néant.

13 SCHEDULE

14 TYPE EXAMINATION CERTIFICATE

LCIE 06 ATEX 6041 X

15 DESCRIPTION OF EQUIPMENT OR PROTECTIVE SYSTEM

High temperature pressure transducer

Type : 176Mxx

This apparatus is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

Specific parameters of the modes(s) of protection concerned :

Ui ≤ 30V, Ii ≤ 100mA, Pi ≤ 1W, Ci = 5 nF, Li = 500 µH

The marking shall be :

PCB Address : .....

Type : 176Mxx

Serial number : .....Year of construction : .....

Ex II 3G

EEx nL IIC T1 T amb. : 0°C à + 450°C

EEx nL IIC T4 T amb. : 0°C à + 135°C

LCIE 06 ATEX 6041X

The equipment shall also bear the usual marking required by the manufacturing standards applying to such equipment.

16 DESCRIPTIVE DOCUMENTS

Certification file N° 32142 dated 25/10/2005.

This file includes 4 items (5 pages).

17 SPECIAL CONDITIONS FOR SAFE USE

This equipment can be only mounted in explosive atmosphere zone 2.

The apparatus must be only connected to an equipment whose electrical parameters are compatible with the values mentioned clause 15.

Operating ambient temperature :
0°C to + 450°C or 0°C to + 135°C.

18 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Covered by standards listed at 9.

19 ROUTINE VERIFICATIONS AND TESTS

None.

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 LCIE 12.0026X**

Page 1 of 4

Certificate history:

Status: **Current**

Issue No: 4

Issue 3 (2017-02-21)
Issue 2 (2015-11-09)
Issue 1 (2015-08-04)
Issue 0 (2012-10-25)

Date of Issue: 2023-01-11

Applicant: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Equipment: **High temperature pressure transducers - Type: 176XYY/MZZZ-AA series**

Optional accessory:

Type of Protection: **Ex ec**

Marking: Ex ec IIC T6...T770 °C Gc

(refer to Annex for full marking)

Approved for issue on behalf of the IECEx Certification Body: **Julien GAUTHIER**

Position: **Certification Officer**

Signature: (for printed version)

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33 avenue du Général Leclerc
F - 92266 FONTENAY AUX ROSES

Date: (for printed version) 2023-01-11

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:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses

IECEx Certificate of Conformity

Certificate No.: **IECEx LCIE 12.0026X**

Date of issue: 2023-01-11

Issue No: 4

Manufacturer: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Manufacturing locations: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

PCB Piezotronics of North Carolina Inc.
10869 Hwy 903
Halifax, NC 27839
United States of America

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 60079-7:2017 Edition:5.1 — Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

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:

FR/LCIE/ExTR12.0029/00
FR/LCIE/ExTR15.0070/00
FR/LCIE/ExTR16.0088/00
FR/LCIE/ExTR23.0002/00

Quality Assessment Report:

NL/DEK/QAR14.0004/06

IECEx Certificate of Conformity

Certificate No.: **IECEx LCIE 12.0026X**

Date of issue: 2023-01-11

Issue No: 4

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The pressure transducer consists of a metallic hermetically sealed housing, containing only a piezoelectric sensing element assembly, with an integral cable fitted with a connector at its end.
The transducer can also be manufactured with an integral connector (without cable) welded on the transducer's housing.

Instructions for Use: document No. 35030.

Range details: Refer to the Annex

Ratings: Refer to the Annex

SPECIFIC CONDITIONS OF USE: YES as shown below:
Refer to the Annex for full Specific Conditions of Use.

IECEx Certificate of Conformity

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Issue 1:
- Modification of the piezoelectric element.
- Modification of the marking for the temperature classifcation.
- Modification of the temperature classification in the Specific Conditions of Use.

Issue 2:
- Addition of a manufacturing location.

Issue 3:
- Update of the lower ambient temperature from 0 °C to -70 °C.

Issue 4:
- Normative update according to IEC 60079-0 Ed. 7.0 and IEC 60079-7 Ed. 5.1.
- Expansion of the ambient operating temperature range up to $T_{amb} \leq +760$ °C.
- Adding of a variant with integral connector (instead of the cable).
- Update of Specific Conditions of Use.

Annex:

Annex 01 to Certificate IECEx LCIE 12.0026X issue 4_1.pdf

Annex 01 to Certificate
IECEx LCIE 12.0026X issue 4

MARKING

Complete marking:
PCB Piezotronics Inc. or IMI Sensors or IMI
Address: ...
Type: 176XYY/MZZZ-AA (1)
Serial number: ...
Year of construction: ...

Ex ec IIC T6...T770 °C Gc (2)

IECEx LCIE 12.0026X

-70 °C ≤ T_{amb} ≤ +... °C (2)

WARNING – DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED

Reduced marking:
PCB Piezotronics Inc. or IMI Sensors or IMI
Type: 176XYY/MZZZ-AA (1)
Serial number: ...
Year of construction: ...

Ex ec IIC T6...T770 °C Gc (2)

IECEx LCIE 12.0026X

(1) Completed as per the type
(2) See the Specific Conditions of Use (the temperature class depends on T_{amb} max.)

RANGE DETAILS

176 X YY / M ZZZ - AA

Option 6
AA = A number from 01 to 99 which indicates the cable length in inch or cm

Option 5
- = Denotes additional cable length is required

Option 4
ZZZ = A number from 001 to 999 which indicates the cable length in feet or meters

Option 3
M = Metric units (meter)
Blank = English units (feet)

Option 2
/ = Denotes special cable length to follow

Option 1
YY = A number from 01 to 99 which indicates mounting, diaphragm, cabling or connector variations

Family of Sensors:
X = A letter from A to Z

Product Type
176 = High Temperature Pressure Transducer

Annex 01 to Certificate
IECEx LCIE 12.0026X issue 4

FULL CONDITIONS OF CERTIFICATION

a. Ambient operating temperature range & Temperature classification:

Ambient operating temperature range	Temperature classification
-70 °C ≤ T_{amb} ≤ +80 °C	T6
-70 °C ≤ T_{amb} ≤ +95 °C	T5
-70 °C ≤ T_{amb} ≤ +130 °C	T4
-70 °C ≤ T_{amb} ≤ +195 °C	T3
-70 °C ≤ T_{amb} ≤ +290 °C	T2
-70 °C ≤ T_{amb} ≤ +440 °C	T1
-70 °C ≤ T_{amb} ≤ +520 °C	T530 °C
-70 °C ≤ T_{amb} ≤ +650 °C	T660 °C
-70 °C ≤ T_{amb} ≤ +760 °C	T770 °C

b. The mounting of the transducer into an installation must be carried out in such a way that transducer metallic body and cable shield are reliably connected to the system earth.

c. The transducer shall be connected to an external power supply delivering a maximum of 30 V and 300 mA.

d. The mating connector provided by the end user shall be in accordance with all applicable clauses of IEC 60079-0 and IEC 60079-7 for a zone 2 application. A minimum degree of protection IP54 according to IEC 60079-0 shall be ensured.
The mating connector shall not be connected or disconnected when energized.

e. WARNING – DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED

RATINGS

Ambient operating temperature range: -70 °C ≤ T_{amb} ≤ +760 °C
Maximum input voltage U_{max} : 30 V d.c.
Maximum input current I_{max} : 300 mA

ROUTINE TESTS

In accordance with clause 7.1 of standard IEC 60079-7, each product manufactured shall be subjected to a dielectric strength test at 500 V a.c. for 1 minute. Alternatively the test may be carried out at 600 V a.c. for 100 ms. No breakdown shall occur.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0026X	Issue No: 3	Certificate history:
Status:	**Current**	Page 1 of 4	Issue No. 3 (2017-02-21) Issue No. 2 (2015-11-09) Issue No. 1 (2015-08-04) Issue No. 0 (2012-10-25)
Date of Issue:	**2017-02-21**		
Applicant:	**PCB Piezotronics Inc.** 3425 Walden Avenue Depew, New York 14043 **United States of America**		
Equipment:	**High temperature pressure transducer (Type 176XYY/MZZZ-AA series)**		
Optional accessory:			
Type of Protection:	**Ex nA**		
Marking:	Ex nA IIC T6...T530°C Gc Ex nA IIC T6...T660°C Gc See complete marking in annex		

Approved for issue on behalf of the IECEx Certification Body: Didier BOURGES

Position: Manager of Certification Operations

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 the Official IECEx Website.

Certificate issued by:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

IECEx Certificate of Conformity

Certificate No:	IECEx LCIE 12.0026X	Issue No: 3
Date of Issue:	**2017-02-21**	Page 2 of 4
Manufacturer:	**PCB Piezotronics Inc.** 3425 Walden Avenue Depew, New York 14043 **United States of America**	

Additional Manufacturing location(s):

PCB Piezotronics of North Carolina Inc.
10869 Hwy 903
Halifax, NC 27839
United States of America

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 electrical apparatus 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 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition:4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:

FR/LCIE/ExTR12.0029/00 FR/LCIE/ExTR15.0070/00 FR/LCIE/ExTR16.0088/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No: IECEx LCIE 12.0026X Issue No: 3

Date of Issue: **2017-02-21**

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

Designation of the model : 176XYY/MZZZ-AA :

X = A to Z for family code

YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations

M = optional to indicate metric cable length

ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)

AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

SPECIFIC CONDITIONS OF USE: YES as shown below:

The transducer must be only connected to an equipment whose electrical parameters do not exceed the following values : U : 30V, I : 300 mA.

Temperature classification :

Temperature classification	Ambient temperature
T6	$-70°C \leq T_{amb} \leq +80°C$
T5	$-70°C \leq T_{amb} \leq +95°C$
T4	$-70°C \leq T_{amb} \leq +130°C$
T3	$-70°C \leq T_{amb} \leq +195°C$
T2	$-70°C \leq T_{amb} \leq +290°C$
T1	$-70°C \leq T_{amb} \leq +440°C$
T530°C	$-70°C \leq T_{amb} \leq +520°C$
T660°C	$-70°C \leq T_{amb} \leq +650°C$

For final installation, the device shall be connected in compliance with IEC 60079-14 requirements, providing and maintaining degree of protection at last IP54.

IECEx Certificate of Conformity

Certificate No: IECEx LCIE 12.0026X Issue No: 3

Date of Issue: **2017-02-21** Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 00 :

Initial issue

Issue 01 :

Modification of the piezoelectric element,

modification of the marking for the temperature classifcation,

modification of the temperature classification in the clause "Conditions of certification".

Issue 02 :

Addition of a manufacturing site.

Issue 03 :

Update of the lower ambient temperature from 0°C to -70°C.

Annex:

IECEx LCIE 12.0026X issue No.3 Annex 01-na.pdf

Annex 01 to Certificate
IECEx LCIE 12.0026X issue 3

FULL EQUIPMENT DESCRIPTION

The sensor is made of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

MARKING

PCB Piezotronics
Address : .....
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
Ex nA IIC T6...T530°C* Gc
Ex nA IIC T6...T660°C* Gc
*See Temperature classification
IECEx LCIE 12.0026X
WARNING - DO NOT SEPARATE WHEN ENERGIZED

Reduced marking :
PCB
Type : 176XYY/MZZZ-AA series
Serial number : ...
Year of construction : ...
Ex nA IIC T6...T530°C Gc
Ex nA IIC T6...T660°C Gc
IECEx LCIE 12.0026X

RANGE DETAILS

X = A to Z for family code
YY = 01 to 99 for indicate mounting, diaphragm, cabling or connector variations
M = optional to indicate metric cable length
ZZZ = 001 to 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m)
AA = 01 to 99 is optional to indicate fractional length of cable in inches or centimeters

RATINGS

U : 30V, I : 300 mA

FULL CONDITIONS OF CERTIFICATION

The transducer must be only connected to an equipment whose electrical parameters do not exceed the following values:
U: 30V, I: 300 mA.
Temperature classification :

Temperature classification	Ambient temperature
T6	$-70°C \leq T_{amb} \leq +80°C$
T5	$-70°C \leq T_{amb} \leq +95°C$
T4	$-70°C \leq T_{amb} \leq +130°C$
T3	$-70°C \leq T_{amb} \leq +195°C$
T2	$-70°C \leq T_{amb} \leq +290°C$
T1	$-70°C \leq T_{amb} \leq +440°C$
T530°C	$-70°C \leq T_{amb} \leq +520°C$
T660°C	$-70°C \leq T_{amb} \leq +650°C$

For final installation, the device shall be connected in compliance with IEC 60079-14 requirements, providing and maintaining degree of protection at last IP54.

ROUTINE TESTS

According to clause 23.2.1 of standard IEC 60079-15 each apparatus shall be submitted to a dielectric strength test under 600 Volts during 100ms.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0026X issue No.:2
Status:	Current
Date of Issue:	2015-11-09

Certificate history:
Issue No. 2 (2015-11-9)
Issue No. 1 (2015-8-4)
Issue No. 0 (2012-10-25)

Applicant:
PCB Piezotronics
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer**
Optional accessory: Type 176XYY/MZZZ-AA series

Type of Protection: **Ex nA**

Marking:
PCB Piezotronics
Address : ...
Type : 176XYY/MZZZ-AA *(completed with the model)*
Serial number : ...
Year of construction : ....
Ex nA IIC T6...T530℃ Gc,
Ex nA IIC T6...T660℃ Gc
IECEx LCIE 12.0026 X

Approved for issue on behalf of the IECEx Certification Body: Julien GAUTHIER

Position: Certification Officer

Signature:
(for printed version)

Date: 2015-11-09

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 the Official IECEx Website.

Certificate issued by:
Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

Documents relative to LCIE certification activites (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-11-09** Issue No.: **2**

Manufacturer:

PCB Piezotronics
3425 Walden Avenue
Depew, New York 14043
United States of America

Additional Manufacturing location (s):

PCB Piezotronics of North Carolina Inc.
10869 Hwy 903
Halifax, NC 27839
United States of America

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0029/00 FR/LCIE/ExTR15.0070/00 FR/LCIE/ExTR15.0118/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-11-09** Issue No.: **2**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

Designation of the model : 176XYY/MZZZ-AA :
X = A through Z for family code
YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
M is optional to indicate metric cable length
ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

CONDITIONS OF CERTIFICATION: YES as shown below:

Operating ambient temperature : 0℃ to +660℃.

Temperature classification :
Ex nA IIC T6 Gc (Tamb ≤ +80℃),
Ex nA IIC T5 Gc (Tamb ≤ +95℃),
Ex nA IIC T4 Gc (Tamb ≤ +130℃),
Ex nA IIC T3 Gc (Tamb ≤ +195℃),
Ex nA IIC T2 Gc (Tamb ≤ +290℃),
Ex nA IIC T1 Gc (Tamb ≤ +440℃),
Ex nA IIC T530℃ Gc (Tamb ≤ +520℃),
Ex nA IIC T660℃ Gc (Tamb ≤ +650℃)

The equipment must be only connected to an equipment whose electrical parameters are compatible with the following values : U : 30V, I : 300mA.

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-11-09** Issue No.: **2**

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 01 :
Modification of the piezoelectric element,
modification of the marking for the temperature classifcation,
modification of the temperature classification in the clause "Conditions of certification".

Issue 02 :
Addition of a manufacturing site

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0026X issue No.:1	Certificate history: Issue No. 1 (2015-8-4) Issue No. 0 (2012-10-25)
Status:	**Current**	
Date of Issue:	**2015-08-04**	Page 1 of 4

Applicant: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer type 176XYY/MZZZ-AA series**
Optional accessory:

Type of Protection: **nA**

Marking: PCB Address : ...
Type : 176XYY/MZZZ-AA (completed with the model)
Serial number : ... Year of construction : ....
Ex nA IIC T6...T530°C Gc, Ex nA IIC T6...T660°C Gc
IECEx LCIE 12.0026 X

Approved for issue on behalf of the IECEx Certification Body: Rémi Hanot

Position: Certification Officer

Signature: (for printed version)

Date: 2015/08/04

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 the Official IECEx Website.

Certificate issued by:
Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

Documents relative to LCIE certification activites (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".

IE-01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-08-04** Issue No.: **1**

Manufacturer: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Additional Manufacturing location (s):

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0029/00 FR/LCIE/ExTR15.0070/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-08-04** Issue No.: **1**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.
Designation of the model : 176XYY/MZZZ-AA :
X = A through Z for family code
YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
M is optional to indicate metric cable length
ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

CONDITIONS OF CERTIFICATION: YES as shown below:

Operating ambient temperature : 0°C to +660°C.
Temperature classification :
Ex nA IIC T6 Gc (Tamb ≤ +80°C),
Ex nA IIC T5 Gc (Tamb ≤ +95°C),
Ex nA IIC T4 Gc (Tamb ≤ +130°C),
Ex nA IIC T3 Gc (Tamb ≤ +195°C),
Ex nA IIC T2 Gc (Tamb ≤ +290°C),
Ex nA IIC T1 Gc (Tamb ≤ +440°C),
Ex nA IIC T530°C Gc (Tamb ≤ +520°C),
Ex nA IIC T660°C Gc (Tamb ≤ +650°C)
The equipment must be only connected to an equipment whose electrical parameters are compatible with the following values : U : 30V, I : 300mA.

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-08-04** Issue No.: **1**

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 : modification of the piezoelectric element, modification of the marking for the temperature classifcation, modification of the temperature classification in the clause "Conditions of certification".

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0026X issue No.:0	Certificate history:
Status:	Current	
Date of Issue:	2012-10-25	Page 1 of 3

Applicant:

PCB Piezotronics Inc.
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer type 176 series**
Optional accessory:

Type of Protection: **nA**

Marking:

PCB Address : ...
Type : 176...
Serial number : ... Year of construction : ....
Ex nA IIC T4 Gc (0℃ ≤ Tamb ≤ + 125℃), Ex nA IIC T3 Gc (-20℃ ≤ Tamb ≤ + 190° C), Ex nA IIC T1 Gc (0℃ ≤ Tamb ≤ +440℃)
IECEx LCIE 12.0026 X

Approved for issue on behalf of the IECEx Certification Body: Julien Gauthier

Position: Certification Officer

Signature: (for printed version)

Date: 2012-10-25

1. This certificate and schedule may only be reproduced in full.
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3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

Documents relative to LCIE certification activites (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2012-10-25** Issue No.: **0**

Manufacturer: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Manufacturing location(s):

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0029/00

Quality Assessment Report:

CA/CSA/QAR09.0018/00 CA/CSA/QAR09.0018/01 CA/CSA/QAR09.0018/02

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2012-10-25** Issue No.: **0**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

CONDITIONS OF CERTIFICATION: YES as shown below:

Temperature classification :
Ex nA IIC T4 Gc (0℃ ≤ Tamb ≤ + 125℃)
Ex nA IIC T3 Gc (-20℃ ≤ Tamb ≤ + 190℃)
Ex nA IIC T1 Gc (0℃ ≤ Tamb ≤ +440℃)
The equipment must be only connected to an equipment whose electrical parameters are compatible with the following values : U ≤ 30V, I ≤ 300mA.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCIE 12.0026X issue No.:2
Status:	**Current**
Date of Issue:	**2015-11-09**

Certificate history:
Issue No. 2 (2015-11-9)
Issue No. 1 (2015-8-4)
Issue No. 0 (2012-10-25)

Applicant:
PCB Piezotronics
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer**
Optional accessory: Type 176XYY/MZZZ-AA series

Type of Protection: **Ex nA**

Marking:
PCB Piezotronics
Address : ...
Type : 176XYY/MZZZ-AA *(completed with the model)*
Serial number : ...
Year of construction : ....
Ex nA IIC T6...T530℃ Gc,
Ex nA IIC T6...T660℃ Gc
IECEx LCIE 12.0026 X

Approved for issue on behalf of the IECEx Certification Body: Julien GAUTHIER

Position: Certification Officer

Signature:
(for printed version)

Date: 2015-11-09

1. This certificate and schedule may only be reproduced in full.
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3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France
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IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-11-09** Issue No.: **2**

Manufacturer: **PCB Piezotronics**
3425 Walden Avenue
Depew, New York 14043
United States of America

Additional Manufacturing location (s):
PCB Piezotronics of North Carolina Inc.
10869 Hwy 903
Halifax, NC 27839
United States of America

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0029/00 FR/LCIE/ExTR15.0070/00 FR/LCIE/ExTR15.0118/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-11-09** Issue No.: **2**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

Designation of the model : 176XYY/MZZZ-AA :
X = A through Z for family code
YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
M is optional to indicate metric cable length
ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

CONDITIONS OF CERTIFICATION: YES as shown below:

Operating ambient temperature : 0℃ to +660℃.

Temperature classification :
Ex nA IIC T6 Gc (Tamb ≤ +80℃),
Ex nA IIC T5 Gc (Tamb ≤ +95℃),
Ex nA IIC T4 Gc (Tamb ≤ +130℃),
Ex nA IIC T3 Gc (Tamb ≤ +195℃),
Ex nA IIC T2 Gc (Tamb ≤ +290℃),
Ex nA IIC T1 Gc (Tamb ≤ +440℃),
Ex nA IIC T530℃ Gc (Tamb ≤ +520℃),
Ex nA IIC T660℃ Gc (Tamb ≤ +650℃)

The equipment must be only connected to an equipment whose electrical parameters are compatible with the following values : U : 30V, I : 300mA.

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-11-09** Issue No.: **2**

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 01 :
Modification of the piezoelectric element,
modification of the marking for the temperature classifcation,
modification of the temperature classification in the clause "Conditions of certification".

Issue 02 :
Addition of a manufacturing site

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx LCIE 12.0026X issue No.:1

Certificate history: Issue No. 1 (2015-8-4) Issue No. 0 (2012-10-25)

Status: **Current**

Date of Issue: **2015-08-04**

Applicant: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer type 176XYY/MZZZ-AA series**
Optional accessory:

Type of Protection: **nA**

Marking: PCB Address : ...
Type : 176XYY/MZZZ-AA (completed with the model)
Serial number : ... Year of construction : ....
Ex nA IIC T6...T530°C Gc, Ex nA IIC T6...T660°C Gc
IECEx LCIE 12.0026 X

Approved for issue on behalf of the IECEx Certification Body: Rémi Hanot

Position: Certification Officer

Signature:
(for printed version)

Date: 2015/08/04

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Certificate issued by:
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33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France

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IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-08-04** Issue No.: **1**

Manufacturer: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Additional Manufacturing location (s):

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0029/00 FR/LCIE/ExTR15.0070/00

Quality Assessment Report:

NL/DEK/QAR14.0004/01

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-08-04** Issue No.: **1**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.
Designation of the model : 176XYY/MZZZ-AA :
X = A through Z for family code
YY = 01 through 99 for indicate mounting, diaphragm, cabling or connector variations
M is optional to indicate metric cable length
ZZZ = 001 through 999 is optional to indicate cable length in feet (≤ 200 feet) or meters (≤ 61m).
AA = 01 through 99 is optional to indicate fractional length of cable in inches or centimeters

CONDITIONS OF CERTIFICATION: YES as shown below:

Operating ambient temperature : 0°C to +660°C.
Temperature classification :
Ex nA IIC T6 Gc (Tamb ≤ +80°C),
Ex nA IIC T5 Gc (Tamb ≤ +95°C),
Ex nA IIC T4 Gc (Tamb ≤ +130°C),
Ex nA IIC T3 Gc (Tamb ≤ +195°C),
Ex nA IIC T2 Gc (Tamb ≤ +290°C),
Ex nA IIC T1 Gc (Tamb ≤ +440°C),
Ex nA IIC T530°C Gc (Tamb ≤ +520°C),
Ex nA IIC T660°C Gc (Tamb ≤ +650°C)
The equipment must be only connected to an equipment whose electrical parameters are compatible with the following values : U : 30V, I : 300mA.

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2015-08-04** Issue No.: **1**

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 : modification of the piezoelectric element, modification of the marking for the temperature classifcation, modification of the temperature classification in the clause "Conditions of certification".

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx LCIE 12.0026X issue No.:0 Certificate history:

Status: **Current**

Date of Issue: **2012-10-25** Page 1 of 3

Applicant: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Electrical Apparatus: **High temperature pressure transducer type 176 series**
Optional accessory:

Type of Protection: **nA**

Marking: PCB Address : ...
Type : 176...
Serial number : ... Year of construction : ....
Ex nA IIC T4 Gc (0℃ ≤ Tamb ≤ + 125℃), Ex nA IIC T3 Gc (-20℃ ≤ Tamb ≤ + 190° C), Ex nA IIC T1 Gc (0℃ ≤ Tamb ≤ +440℃)
IECEx LCIE 12.0026 X

Approved for issue on behalf of the IECEx Certification Body: Julien Gauthier

Position: Certification Officer

Signature:
(for printed version)

Date: 2012-10-25

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Certificate issued by:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France
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IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2012-10-25** Issue No.: **0**

Manufacturer: **PCB Piezotronics Inc.**
3425 Walden Avenue
Depew, New York 14043
United States of America

Manufacturing location(s):

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 electrical apparatus 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 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-15 : 2010 Edition: 4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*This Certificate **does not** indicate compliance with electrical 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:
FR/LCIE/ExTR12.0029/00

Quality Assessment Report:

CA/CSA/QAR09.0018/00 CA/CSA/QAR09.0018/01 CA/CSA/QAR09.0018/02

IECEx Certificate of Conformity

Certificate No.: IECEx LCIE 12.0026X

Date of Issue: **2012-10-25** Issue No.: **0**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The equipment is formed of a hermetically sealed metal housing containing only a piezo-crystal assembly connected to an integral cable.

CONDITIONS OF CERTIFICATION: YES as shown below:

Temperature classification :
Ex nA IIC T4 Gc (0℃ ≤ Tamb ≤ + 125℃)
Ex nA IIC T3 Gc (-20℃ ≤ Tamb ≤ + 190℃)
Ex nA IIC T1 Gc (0℃ ≤ Tamb ≤ +440℃)
The equipment must be only connected to an equipment whose electrical parameters are compatible with the following values : U ≤ 30V, I ≤ 300mA.