PCB PIEZOTRONICS INC.
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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.