The Accelerometer Calibration Workstation Model 9155 features accurate back-to-back comparison calibration of ICP® (IEPE), and charge mode piezoelectric accelerometers in accordance with ISO 16063-21 (2003). The 9155 system can also calibrate piezoresistive, capacitive, and velocity sensors via available options. Other configurations offer automated TEDS sensor updating, linearity checking, low frequency calibration down to 0.1 Hz, shock calibration, and a host of shaker options.


The automation afforded by the easy-to-use Windows software provides for simplified calibration procedures, as test parameters are stored and recalled automatically for each accelerometer. This makes for 'hands-off' operation once the sensor is mounted.

The 9155's use of a dedicated exciter provides a high quality vibration environment for accurate calibrations. ISO 16063-21 outlines the back-to-back configuration in which the Sensor Under Test (SUT) and the Standard Reference Accelerometer are subjected to identical input accelerations. Consequently, the ratio of the two transducers' sensitivities is simply the ratio of their measured outputs. A comparison is performed by the control software, while obtaining the measured outputs at every frequency.

The 9155 system is a turnkey solution, providing all necessary components 'out-of-the-box'. Principal components of the 9155D system are the Windows PC controller, automated user software, printer, and data acquisition hardware. Additional options configure the system with proper accelerometer signal conditioning, calibration grade shaker, power amplifier and reference accelerometer.

**Benefits:**

- Assures accurate, NIST and/or PTB traceable calibrations
- Calibration typically performed in under a minute per axis
- Turnkey system includes all necessary components
- Windows PC supplies familiar, intuitive user interface
- Setup tests, acquire data, save results, and print reports quickly with precision and automation
- Define multiple pass/fail criteria for each test and automatically recall them from the internal database
- Prints customizable ISO compliant certificates
- Automates calibration procedures
- Customizable system fits any application or need
- Calibrates up to 200 frequencies
As a crucial part of the Model 9155 Accelerometer Calibration Workstation, the Windows XP® or Vista® compatible control software has been designed to provide accurate calibrations and an easy-to-use graphical user interface, based on the 40+ years of accelerometer manufacturing experience and over 1,000,000 calibrations performed at PCB Piezotronics.

**Features:**

- Clearly defines Pass/Fail criteria for each sensor type
- Database of sensor specifications and test requirements automate system setup
- Printed calibration certificates comply with ISO 17025 and ISO 16063-21 requirements and can be customized to user's requirements
- Software automatically updates TEDS sensors with new calibration data (option 9155D-400)
- Phase measurement calibration provides additional confidence in sensors
- Retrieve and archive calibration data in SQL compliant database
- Export calibration data for third party systems (MET/TRACK, etc.)
- Reports calibration data in English or metric units
- User definable reference frequencies

**State-of-the-art calibration exciter: Option 9155D-830/831**

- Ensures conformance to ISO 16063 recommendations on transverse motion
- Reduces uncertainty due to transverse resonance
- Many flexure based exciters add 2% additional uncertainty at resonance
- Drastically improves over calibration shakers with flexure designs
- Simplifies sensor mounting & increases reliability over competitive air bearing designs
OPTIONS AVAILABLE

Air-bearing Exciter MODEL 9155D-830/831
- Porous ceramic air-bearing eliminates transverse motion
- Internal reference accelerometer mounted resonance > 70 kHz
- 9155D-830 5 Hz to 15 kHz, 9155D-831 5 Hz to 20 kHz

Ultra-low Frequency MODEL 9155D-779
- Extends low frequency calibration data to 0.1 Hz
- Adds precision air-bearing long stroke shaker

Resonance Test MODEL 9155D-550
- Accurate, automated resonance search testing up to 50 kHz
- Requires either 9155D-830 or 9155D-831 air-bearing shaker

Linearity Check MODEL 9155D-501
- Up to 40 gpk with air-bearing shaker
- Seamless and efficient transition from frequency sweep to linearity check

Shock Calibration MODEL 9155D-525
- Provides calibration and linearity check from 20 g to 10,000 gpk
- Pneumatically actuated exciter provides controlled and consistent impacts
- Stand-alone version available as Model 9525C PneuShock™

Laser Primary Calibration MODEL 9155D-575
- Provides primary calibration capability meeting the performance requirements specified in ISO 16063-11(1999) Method 3
- Direct demodulation of doppler laser signal assures low measurement uncertainty

SENSOR SIGNAL CONDITIONING OPTIONS

TEDS Sensor Support MODEL 9155D-400
- Provides seamless, automatic updates to TEDS sensor upon calibration, supporting both IEEE 1451.4 and P1451.4 formats (requires 91555D-443)

Basic ICP Signal Conditioning MODEL 9155D-442
- Integrates PCB model 442A102 ICP® sensor signal conditioner

Dual-mode Charge Amplifier MODEL 9155D-443
- Integrates PCB model 443B101, laboratory-style precision charge amplifier for automated computer controlled gain

Capacitive Sensor Signal Conditioning MODEL 9155D-445
- Integrates PCB Model 445A101 capacitive sensor signal conditioner with selectable gain of x1, x10 and x100

Piezoresistive Signal Conditioning MODEL 9155D-478
- Integrates PCB Model 478A30 with simple push button controls to support 1/4, 1/2 and full bridge piezoresistive accelerometers
**9155 SPECIFICATIONS:**

Frequency Range
- 5 Hz - 15 kHz with 9155D-830 Air-Bearing Shaker Option
- 5 Hz - 20 kHz with 9155D-831 Air-Bearing Shaker Option
- 0.5 Hz - 500 Hz with 9155D-771 Low Frequency Shaker Option
- 0.1 Hz - 500 Hz with 9155D-779 Low Frequency Shaker Option

Typical Measurement Uncertainty
- 2.0% (5 Hz - 10 Hz)
- 1.2% (10 Hz - 100 Hz)
- 0.8% (100 Hz)
- 1.0% (100 Hz - 1,000 Hz)
- 1.4% (1,000 Hz - 5,000 Hz)
- 1.9% (5,000 Hz - 10,000 Hz)
- 2.2% (10,000 Hz - 15,000 Hz)
- 2.8% (15,000 Hz - 20,000 Hz)

Calibration Run Time
- <90 seconds

Calibration Method
- Back-to-back comparison per ISO 16063-21

Measurements
- Sensitivity, Amplitude, Phase, Bias, Resonance
- DC Offset, Bridge Resistance, DC Sensitivity

Accelerometers Supported

Sensors Supported

TEDS Sensor Support

Excitation Type

Acceleration Levels

Calibration Data Management
- Yes

Automatic pass/fail Classification
- Yes

Measurement Units
- English, Metric

Input Power
- 100 V - 120 V or 220 V - 240 V at 48 Hz to 62 Hz

**CALIBRATION OPTIONS:**

**REFERENCE ACCELEROMETER:**

<table>
<thead>
<tr>
<th>Option</th>
<th>ICP®</th>
<th>ICP®</th>
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<tbody>
<tr>
<td>Type</td>
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<tr>
<td>Sensitivity</td>
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<td>Frequency Range</td>
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<td>5 Hz - 20 kHz</td>
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<td>Resonant Frequency</td>
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<td>&gt; 70 kHz</td>
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<td>Test Sensor Mounting Hole</td>
<td>1/4-28 UNF (10-32 optional)</td>
<td>1/4-28 UNF (10-32 optional)</td>
</tr>
</tbody>
</table>

**-830 AIR-BEARING SHAKER OPTION**

- Piezoresistive sensors supported in base s/w. Signal conditioning available as -478 option
- Optional features
- Shaker dependent, limited by stroke and load capacity. -501 option supports 40 g pk sinusoid, -525 option with PneuShock actuator supports impulse to 10 kg.

**-831 AIR-BEARING SHAKER OPTION**

**SUPPLIED ACCESSORIES:**

9155 Calibration software

Data acquisition hardware

PC w/ keyboard, mouse, monitor, printer

Various mounting adapters & cables

System verification sensor

Database software

Onsite installations and training

Uncertainty budget procedure

**OTHER OPTIONS AVAILABLE:**

9155D-100 19" Rack Integration. Approx. 36.5"H x 21.75"W x 26.7"D [91 cm x 55 cm x 66 cm]. Integrates components in 19" rack.

9155D-120 Shaker Mount. Provides wood pedestal to support calibration shaker. Requires user to fill with sand (not included).

9155D-160 Tool Kit. Includes torque wrench, screwdrivers, crescent wrenches, toolbox, etc.

9155D-350 Calibration Label Printing. Provides automatic calibration label printing using a Zebra thermal transfer label printer.


9155D-442 Basic ICP Signal Conditioning. Adds signal conditioner for ICP and charge mode sensors.

9155D-443 Dual-mode Charge Amplifier. Computer control and automated switching between ICP and charge mode sensors.


9155D-501 Linearity. Provides for multipoint sensor linearity checks via sinusoidal vibration up to 40 g.

9155D-525 Shock Calibration. Provides for verification of shock accelerometers from 20 g to 10,000 g.

9155D-530 Resonance Check. Provides for resonance check of accelerometers up to 50 kHz.


9155D-771 Low Frequency (0.5Hz-500Hz). Long stroke shaker with SmartStoke™ technology and accelerometer reference sensor.

9155D-779 Low Frequency (0.1Hz-500Hz). Long stroke shaker with SmartStoke™ technology, accelerometer and optical reference sensors.


9155D-831 K394B31 Air-Bearing Shaker. Adds precision high-frequency air-bearing shaker 5 Hz - 20 kHz.

9155D-913 Impulse Calibration. Allows dynamic impulse calibration of pressure transducers from 200 to 15 kpsi.

9155D-961 Hammer Calibration. Allows calibration of instrumented impact hammers, includes 9961C cal fixture.

9155D-SC Service Contract. Provides 1 year software upgrades & on-site system component calibration.

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