



MODEL C9110D

# CHARGE MODE ACCELEROMETER PORTABLE CALIBRATOR

- Create Calibration Certificates for Vibration Instrumentation
  - ICP® Accelerometers
  - Moving Coil Velocity Sensors
  - Charge Mode Transducers
  - Piezoresistive Accelerometers
  - Proximity Probes
- Portable, Lightweight Design with Long Battery Life
- Low Frequency Operation to 5 Hz
- Stepped Sine Tests with Pass/Fail Notification After Each Point
- Differential Charge Accelerometer Connection Cable Supplied

## TYPICAL APPLICATIONS

- In-House Calibration of Vibration Instrumentation
- Loop Checks & System Troubleshooting
- Testing Charge Amplifiers Used in Aviation & Energy Applications
- Proximity Probe Testing & Checks for Mismatched Systems

## VIBRATION SYSTEM TROUBLESHOOTING IN A PORTABLE PACKAGE

Similar in operation to Portable Vibration Calibrator, Model 9110D, Model C9110D, is a Portable Vibration Calibrator with charge amplifier input. The C9110D supports the calibration of both single-ended and differential charge accelerometers and is supplied with a 7/16-27 2-pin MIL to BNC cable for the calibration of high temperature turbine vibration sensors that have a differential output.

Model C9110D is also ideal for calibrating ICP accelerometers, velocity transducers, proximity probes, and piezoresistive sensors over a wide operating frequency and amplitude range.

The unit is a compact, battery-powered, and completely self-contained vibration reference source, which can be conveniently used to calibrate individual sensors, vibration switches, and data collectors, as well as to validate the entire measurement channel of a condition monitoring or recording system. An integral precision quartz reference accelerometer and closed-loop level control gives the C9110D enhanced stability and superior vibration calibration over an extended 5 Hz to 10 kHz frequency range. The device is packaged in a rugged Pelican® Storm case.

CALROUTE firmware allows technicians to program repetitive calibration test points and pass/fail tolerances for both frequency response and linearity. The C9110D creates professional, ISO-17025 compliant calibration certificates that are fully customizable.

The C9110D is supplied with an accuracy calibration certificate. Calibration of the C9110D is accredited to the ISO 17025 standard by the American Association of Laboratory Accreditation (A2LA).

SPECIFICATIONS		
<b>Performance</b>		
Frequency Range (operating) <sup>[1]</sup>	5 Hz to 10 kHz	300 to 600k CPM
Maximum Amplitude (50 Hz, 10-gram payload)	20 g pk	196 m/s <sup>2</sup> pk
	20 in/s pk	500 mm/s pk
	150 mils pk-pk	3.8 mm pk-pk
Maximum Amplitude (50 Hz, 500-gram payload)	2.5 g pk	24.5 m/s <sup>2</sup> pk
	3.5 in/s pk	90 mm/s pk
Maximum Payload <sup>[2]</sup>	800 grams	
Test Operation	Manual (Closed Loop) or Semi-Automatic	
Pass/Fail Notification	After Each Test Point (CALROUTE Mode)	
Auto-Payload Calculation	Controlled via Reference Accelerometer, No User Entry Required	
Memory	Stores 500 Calibration Records; 30 Data Points Per Record; Model Number, Serial Number, Mounting Orientation & Notes; Semi-Automated Test Routine	
Programmability	Up to 30 Test Points per Routine with Pass/Fail Upper & Lower Bound Tolerances. Flexible Pass/Fail Based Upon Deviation from Sensitivity at Reference Frequency or Hard Values and Supports Asymmetric Tolerances.	
Accuracy of Readout <sup>[3]</sup>		
Acceleration (10 Hz to 10 kHz)	±3 % <sup>[4]</sup>	
Acceleration (5 Hz to 10 Hz)	±5 % <sup>[4]</sup>	
Velocity (10 Hz to 1000 Hz)	±3 %	
Displacement (30 Hz to 150 Hz)	±3 %	
Accuracy Verification Test	Field Drift Test Procedure Provided <sup>[5]</sup>	
Units of Readout		
Acceleration (pk and RMS)	g	m/s <sup>2</sup>
Velocity (pk and RMS)	in/s	mm/s
Displacement (pk to pk)	mils	µm
Frequency	Hz	CPM
<b>Physical</b>		
Dimensions (H x W x D)	8.5 x 12 x 10 in	22 x 30.5 x 28 cm
Weight	18 lb	8.2 kg
Operating Temperature	32 °F–122 °F	0 °C–50 °C
Sensor Mounting Platform	¼-28 Thread Size	
Battery Life <sup>[6]</sup> - 100 Hz, 1 g pk <sup>[1]</sup>	18 Hours	
Battery Life <sup>[6]</sup> - 100 Hz, 10 g pk <sup>[1]</sup>	1 Hour	
Sensor Under Test Sensitivity	mV/EU, mA/EU, µA/EU or pC/EU	
Sensor Under Test Input	ICP, Voltage, Modulated Current, Charge, PR	
Monitor Reference Out	10 mV/g (nominal) Quartz Reference Accelerometer, BNC Jack Output	
USB Port	Export Calibration Records to Flash Drive (FAT 32), Used for Loading Semi-Automated Test Routines (Model CALROUTE) & provides power for external power supplies	

SPECIFICATIONS (continued)	
<b>Supplied Accessories</b>	
081B20	¼-28 to ¼-28 Adaptor
081A08	10-32 to ¼-28 Adaptor
M081A63	M8 x 1.25 M to ¼-28 M Mounting Stud
PVC-MNT01	M8 x 1.25 F Thru Hole Mounting Pad
081M165	M8 x 1 M to ¼-28 M Mounting Stud
PVC-MNT02	M8 x 1 F Thru Hole Mounting Pad
PVC-HTMNT01 & PVC-HTMNT02	Mounting pads for 3- and 4-bolt high temp differential charge mode accelerometers and magnetic coil vibration sensors. Example models include Endevo series 6222S and 6233C, CEC 4-128 and others within the product line, Dytran 5334 and 5355 <sup>[7]</sup> .
9100-CAL01	NIST Traceable Certificate of Calibration, Accredited to ISO 17025 by A2LA
9110-USB	USB Flash Memory Drive: Loaded with Calibration Report Generation Workbook
045ET005AC	Differential Charge Sensor Mating Cable, 7/16 2-pin MIL to BNC, Model 045ET005AC
Calibration Report Generation Workbook	<b>Certificates Generated Via 9110D Memory:</b> Frequency Response & Linearity for AC Voltage & Current Output Transducers <b>Certificates Generated Via User-Input:</b> Vibration analyzer/meter linearity & frequency response accuracy, linearity for 4-20 mA vibration transmitters, proximity probe curves (gap vs. DC voltage)
Warranty	2 Years, Inclusive of Drift/Accuracy
<b>Optional Accessories</b>	
9100-PPA01	Proximity Probe Adaptor Kit for probes with 5 mm or 8 mm tip diameter. Includes Mitutoyo micrometer scaled in mils and 4140 steel calibration target.
9100-MPPA01	Proximity Probe Adaptor Kit for probes with 5 mm or 8 mm tip diameter. Includes Mitutoyo micrometer scaled in microns and 4140 steel calibration target.
9100-PS02	DC Voltage Power Supply for modulated current and loop-powered 24 VDC Sensors.
9100-PS07-PT	15 VDC Power Supply for Testing Pruftechnik CLD Vibration Sensors and Other Modulated Current Sensors with Same Power Scheme. USB Powered. TNC Input. Plug-and-Play. BNC Output.
9100-PR	Piezoresistive accelerometer calibration option for Portable Vibration Calibrators. Includes Endevo 4418 bridge signal conditioner, connection cable to push terminals and mounting plate.
9155-MNT93	½-20 F to ¼-28 F Mounting Pad
9155-MNT43	¼" NPT F Mounting Adaptor to ¼-28 M
9155-MNT73	¾-24 M to ¼-28 M Mounting Stud
9155-MNT07	Adhesive Mounting Target
9155-MNT03	Right-Angle Triaxial Mounting Block and Support Shim

- [1] 100-gram payload  
 [2] Operating range reduced at higher payloads. Reference manual for full details.  
 [3] Measured with 10-gram quartz reference accelerometer  
 [4] Calculated by measuring the % difference between the known sensitivity of a reference accelerometer as calibrated by laser primary system per ISO 16063-11 and the measured sensitivity of same reference accelerometer when tested at the same points  
 [5] Test is conducted independently of product firmware with calibrated voltmeter  
 [6] As shipped from factory in new condition  
 [7] Mounting plates support sensors listed. Multi-hole mounting plates are convenient but not optimized for the best calibration results. The Modal Shop offers a full line of customized mounting pads validated in our calibration lab for precise results.



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The Modal Shop, Inc. offers structural vibration and acoustic sensing systems and services for various applications in design and test laboratories as well as manufacturing plants. An extensive sound and vibration rental program, precision calibration systems, and both modal and vibration shakers are designed to simplify test phases. Non Destructive Testing Systems help manufacturers provide 100% quality inspection of metal components. The Modal Shop, Inc. is a subsidiary of PCB Piezotronics, Inc., and PCB® is a wholly owned subsidiary of MTS Systems Corporation.

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