158M9258-01 Portable Vibration Calibrator

Datasheet

Bently Nevada Machinery Condition Monitoring

173M1055 Rev. A

Description

The Portable Vibration Calibrator provides a field tested method for on-the-spot dynamic verification of accelerometers, and velocity pickups.

The Portable Vibration Calibrator incorporates a built-in sine wave oscillator, power amplifier, electrodynamic shaker, NIST traceable reference accelerometer, digital display, charge amplifier, and internal memory. The Portable Vibration Calibrator is completely self-contained and operates on battery or AC power.

The built-in reference accelerometer is attached permanently to the shaker armature, maximizing the accuracy between the reference accelerometer and the test transducer. The Portable Vibration Calibrator is designed to provide long-term reliable performance over the frequency range of 5 Hz to 10 kHz. The Portable Vibration Calibrator can be used for a variety of applications that include:

- Verification of vibration transducers and related vibration test systems.
- Verification of connector and cabling integrity.
- Confirming machine vibration alarm trip points are set properly and ensure end-to-end functionality of vibration monitoring systems.

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Specifications

General

Operating Frequency Range (100 g payload)	5 Hz to 10 kHz	300 k CPM to 600 k CPM
Maximum Amplitude (50 Hz, 10 g payload	20 g pk 20 in/s pk 150 mils pk-pk	196 m/s² pk 500 mm/s pk 3.8 mm pk-pk
Maximum Amplitude (50 Hz, 500 g payload)	2.5 g pk 3.5 in/s pk	24.5 m/s² pk 90 mm/s pk
Maximum Payload	800 g (Operating range reduced at higher payloads. Reference manual for full details.)	
Test Operation	Manual (Closed Loop) or Semi-Automatic	
Auto-Payload Calculation	Controlled via Reference Accelerometer, No User Entry Required	
Memory	Stores 500 Calibration Records Stores 30 Data Points per Calibration Record Stores Model Number, Serial Number, Mounting Orientation & Notes for each Record	
Non-Volatile Memory	Storage of Calibration Settings for Accuracy Stores 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. Supports asymmetric tolerances.	

Physical

Dimensions (H x W x D)	22 cm x 30.5 cm x 28 cm	8.5 in x 12 in x 10 in
Weight	8.2 kg	18 lbs
Operating Temperature	0°C to 50°C	32°F to 122°F
Sensor Mounting Platform	1/4-28 Thread Size	
Internal Battery (sealed solid gel lead acid)	12 Vdc, 4 amp-hours, commercially available	
AC Power (for recharging battery)	110 Vac to 240 Vac, 50–60 Hz	
Input Power Rating from Charger	18 Vdc, 1 A	
Battery Life (100 Hz, 1 g pk)	18 hours (100 g payload, new condition)	
Battery Life (100 Hz, 10 g pk)	1 hour (100 g payload, new condition)	

Units of Readout

Acceleration (pk and RMS)	g	m/s^2
Velocity (pk and RMS)	in/s	mm/s
Displacement (pk to pk)	mils	µm
Frequency	Hz	CPM
Sensor Under Test Sensitivity	mV/EU, mA/EU, µA/EU, or pC/EU	
Pass/Fail Notification	After Each Test Point (CALROUTE Mode)	

Accuracy of Readout

Acceleration (10 Hz to 10 kHz)	± 3%*
Acceleration (5 Hz to 10 Hz)	± 5%*
Velocity (10 Hz to 1000 Hz)	± 3%
Displacement (30 Hz to 150 Hz)	± 3%
Amplitude Linearity (100 Hz, 100 g payload)	< 1% up to 10 g pk
Waveform Distortion (30 Hz to 2 kHz, 100 g payload)	< 5% THD (typical) up to 5 g pk
Accuracy Verification Test	Independent of Product Firmware Utilizes Internal Quartz Reference Accelerometer Performed On-Site, Procedure Provided Recommended but not Required After Battery Replacement
Factory Calibration Accuracy Stability	Survives Loss of Power, Battery Replacement
Self Test	Confirms correct shaker alignment & structure, reference accelerometer connection, battery life

** 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*

Input/Output

Sensor Under Test Input	ICP® Voltage Modulated Current Piezoresistive Single-ended Charge (external charge amplifier required) Differential Charge (external charge amplifier required)
Bias Fault Indication (ICP®)	Yes
Monitor Reference Out	10 mV/g (nominal) Quartz Reference Accelerometer Hermetic BNC Jack Output
USB Port	Export calibration records to flash drive used for loading semi-automated test routines (Model CALROUTE) [also provides power for external power supplies] Direct computer control through SCPI
Export File Format	CSV (comma-separated values)

Calibration Report Generation Workbook

Certificates Generated Via Memory	Frequency Response & Linearity for AC Voltage and Current Output Transducers such as Accelerometers, Moving Coil Vibration Sensors, and Dynamic Velocity Sensors.
Certificates Generated Via User-Input	Vibration Analyzer/Meter Linearity & Frequency Response Accuracy, and Linearity for 4-20 mA Vibration Transmitters

Compliance and Certifications

This section applies only to the Data Collector, not the handheld device.

This device complies with Industry Canada license-exempt RSS standard(s) and complies with part 15 of the FCC Rules, Class A device. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Bently Nevada could void the user's authority to operate the equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

RED/EMC	EN 61000-6-2 EN 61000-6-4 EN 61326-1 EN 300 328 EN 301 489-1 EN 301 489-17 2014/53/EU 2014/30/EU
ROHS	2011/65/EU

Supplied Accessories

Mounting Wrench
Power Supply and Plug Adaptors
1/4-28 to 1/4-28 Mounting Stud
10-32 to 1/4-28 Mounting Stud
M8 x 1.25 M to 1/4-28 M & F Mounting Stud/Pad
M8 x 1 M to 1/4-28 M & F Mounting Stud/Pad
*Mounting Plate, 3- & 4-Hole High-Temp Vibration Sensors
3/8-24 to 1/4-28 Mounting Stud
Shaker lock (prevents damage to shaker armature during transport due to overshock events)
NIST Traceable Certificate of Calibration, Metric & English Units, Accredited to ISO 17025 by A2LA, 18-point Certificate of Calibration, Published Uncertainties on www.a2la.org, Reference Accelerometer Calibrated via ISO 16063-11 Laser Primary Method
USB Flash Memory Drive: Loaded with Microsoft Excel® Macro-Enabled Calibration Report Generation & CALROUTE Semi-Automated Test Programming Workbook
Bently Nevada offers a standard product warranty of 3 years

**Mounting plates support sensors listed. Multi-hole mounting plates are convenient but not optimized for the best calibration results. We offer a full line of customized mounting pads validated in our calibration lab for precise results. Contact us for more information.*

Optional Accessories

Refer to The Modal Shop for ordering information and additional details about these accessories.

Proximity Probe Calibration
Proximity probe adapter kit for 3300 XL probes. Includes Mitutoyo micrometer scaled in mils and microns and 4140 steel calibration target.
Proximity probe adapter kit for probes with 11 mm tip diameter with standard 1/2" diameter probe bridge hole. Includes Mitutoyo micrometer scaled in mils and microns and 4140 steel calibration target.
Proximity probe adapter kit for probes with 11 mm tip diameter with wider probe bridge hole to accommodate larger case threads in the series. Includes Mitutoyo micrometer scaled in mils and microns and 4140 steel calibration target.
Proximity probe adapter kit for testing probes mounted inside a probe holder. Includes Mitutoyo micrometer scaled in mils and microns. Fine adjustment via positional micrometer.

Power / Charge Mode
High-temp charge mode accelerometer calibration accessories kit. Includes 7/16-27 2-socket MIL cable 2 ft. BNC plug termination, 10 mV/pC charge amplifier, BNC M to BNC M cable 3 ft, 10-32 plug to BNC jack scope input adapter.

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