MB Dynamics
TECHNOLOGY, TEST PROCESSES & ENGINEERING SERVICES

Low-Frequency Calibration and Performance Verification System
MB Win475LF

System Specifications

- MB Dynamics CAL2-300H air bearing exciter for horizontal device under test (DUT) calibrations; 280 mm stroke (300 mm between stops); 1.250 g's pk
- Performs & supports all **Jobs-To-Be-Done** (see below) quickly and accurately, minimizing human error, on calibrations with frequency range of 0.1 to 200 Hz, usable to 0.07 Hz
- Calibrates DUTs, meters, and payloads weighing ≤5 kg
- Complies with ISO 16063-21
- 2,000 mV/g Reference Accelerometer (REF); ±2 g pk optional primary laser calibration for lowest uncertainty; traceable to national standards and ISO17025:2017
- Linear motion air bearing stage under position and acceleration control
- Expanded System Uncertainty (ESU): ≤1.0%, 0.5 to 10 Hz; uncertainty budget per ISO 16063-21
- Accelerates payloads of ≤5 kg under sine vibration
- Platform and air bearing weight: 75 lbs (34 kg)
- Base and slide dimensions: 23" L X 12" W X 8" H (585 mm L X 305 mm W X 204 mm H)

Horizontal Excitation MB CAL2-300H Exciter
for ≤5 kg Payloads with 280 mm Stroke
(300 mm between stops)

Jobs to be Done:

- Measure DUT nominal sensitivity at a single frequency
- Calibrate DUT frequency response across its bandwidth of use
- Compute & display DUT sensitivity deviations from nominal value at all measured frequencies
- Output DUT phase response in comparison to REF
- Measure DUT phase response analog or digital signals vs. traceable Win475 vibration values
- User can adjust, tweak or trim meters, pots & other DUT components to be within ranges and thresholds of DUT specification
- Verify DUT performance vis-a-vis vibration-related parameters / specifications
- Archive results in a DUT database
- Print DUT-specific reports in a variety of end-user formats

Supported Applications:

Calibration and performance verifications of the low-frequency accelerometers, vibration meters and velocity sensors used in:

- Bridge & building structural health monitoring
- Seismic surveys
- Shipboard shock and vibration measurements
- Suspension & ride quality
- Tilt/orientation and motion detection
- Safety systems
- Modal studies
- Train and off-highway equipment
- Rigid body motion, whole body vibration monitoring
- Vibration measurements, where data are integrated to yield velocity or displacement values

MB Dynamics, Inc.
25865 Richmond Road • Cleveland, OH 44146 USA
Tel: +1 216 292 5850 • Fax: +1 216 292 5614
For Sales: sales@mbdynamics.com • For Service: service@mbdynamics.com
www.mbdynamics.com

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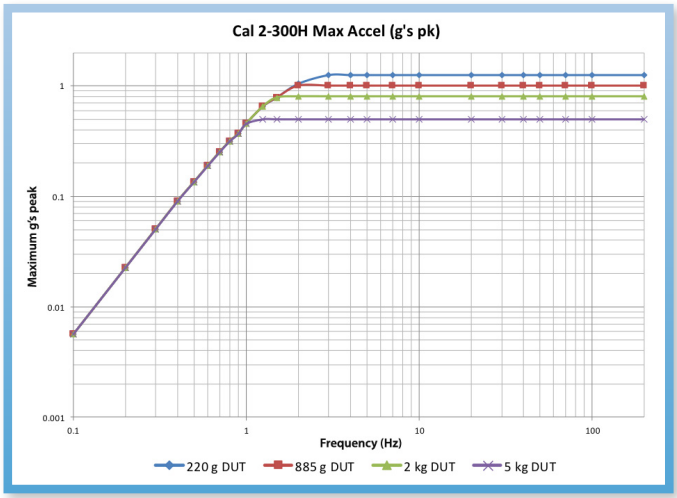
Typical Acceleration, Velocity and Displacement Performance Values for MB Dynamics CAL2-300H Air Bearing Exciters (can achieve 1.250 g's pk ≥5 Hz) with ≤220 gm DUT

Frequency (Hz)	0.1	0.2	0.5	0.8	1	2	5	10	20	50	100	200
Stroke, mm pk-to-pk	280	280	270	270	200	105	25	6.2	1.6	0.25	0.06	0.016
Velocity, m/s pk	0.09	0.18	0.42	0.61	0.71	0.83	0.39	0.2	0.1	0.04	0.02	0.01
Acceleration, g's pk	0.006	0.023	0.126	0.313	0.453	1.039	1.250	1.250	1.250	1.250	1.250	1.250

% ESU by Frequency Range

Frequency Range	ESU
0.5 Hz to 1.0 Hz	±1%
>1.0 Hz to 10 Hz	±1%
>10 Hz to 99 Hz	±1%
100 Hz to 160 Hz	±1%
161 Hz to 200 Hz	±1%

DUT Weight vs. Frequency and G-Level



Pneumatic Requirements for Air Processing Panel

Pressure	100 psi (7 bar)
Flow	5 cfm (140 lpm)
Quality	ISO 8573.1 Quality Class 3 or better
Max Particle Size	5 microns max
Max Dew Point	-4°F @ 100 psig (-20°C @ 7 bar)
Max Oil Content	1 mg/m³ max

Electrical Connection for CAL2-300H Control Box

Voltage	120/240 VAC, 1 Phase @ 50/60 Hz
Current	10A rms MAX

Advantages of Air Bearing Stage Under Position and Acceleration Control:

- Superior signal-to-noise ratio and higher outputs at low frequencies due to long stroke
- Utilizes all available stroke for calibration: no overshoot during ramp-up
- Shortens time to calibration at lowest frequencies
  - o Ramp-up to desired acceleration within 5 seconds

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