



## MODEL 2060E

# 60 LBF MODAL SHAKER

- Through-hole armature with chuck and collet attachment provides simple set-up with modal stingers.
- Lightweight and portable – weighing just 37 lb (17 kg)
- Trunnion base provides flexibility and easy set-up when aligning the shaker and choosing best exciter location(s)
- 1.4" extended stroke for low frequency and broad frequency range supply adequate input energy for most modal applications
- Forced air cooling sufficient to meet full shaker performance (60 lbf/133N) specifications

## MODAL TESTING

For many experimental modal test applications, an electrodynamic shaker system is best suited for creating an appropriate input forcing function. Distributing adequate input force energy across the test structure and obtaining accurate and reliable input force measurements is critical for successful modal and structural testing. This requires a shaker that is highly portable, rugged and easy to setup in order to position in the best exciter location while minimizing any unwanted interaction between the exciter and test structure.

The Modal Shop's Modal Shaker Model 2060E, a lightweight electrodynamic modal exciter, is capable of providing up to 60 lbf (267 N) of peak force excitation in a small footprint weighing just 37 pounds (17 kg). With an extended 1.4" (36 mm) stroke enhancing input levels at low frequencies and useful frequency range beyond 6 kHz, the 2060E is suitable for structural testing and experimental modal analysis applications, including single and multiple inputs (SIMO and MIMO) using random, burst random, sine dwell or chirp excitation signals.

The 2060E modal exciter is supplied in a trunnion base allowing full rotation for easy setup. The through-hole armature design with chuck and collet attachment is ideal for use with either traditional modal stinger rods or piano wire stingers. These stingers greatly simplify test setup with an easy connection to the force sensor and test structure, and help decouple cross-axis force inputs, minimizing input force measurement errors while using the modal shaker. For horizontal force inputs, the 2060E adapts directly to The Modal Shop's Lateral Excitation Shaker Stand Model 2050A.

Light

Heavy



2004E, 2007E

2025E

2060E

2100E11

| SPECIFICATIONS                             |                                                          |
|--------------------------------------------|----------------------------------------------------------|
| <b>Performance</b>                         |                                                          |
| Output Force, sine pk, ambient air cooling | 30 lb (133 N)                                            |
| Output Force, sine pk, forced air cooling  | 60 lb (267 N) <sup>[1]</sup>                             |
| Stroke Length, pk-pk                       | 1.4 in (36 mm) <sup>[2]</sup>                            |
| Frequency Range, nominal                   | DC - 6000 Hz <sup>[3][4]</sup>                           |
| First Resonance Frequency, nominal         | > 4000 Hz <sup>[4]</sup>                                 |
| Maximum Acceleration, bare table           | 100 g (1000 m/s <sup>2</sup> ) pk                        |
| Maximum Velocity                           | 120 ips (3 m/s) pk                                       |
| Protection Features                        | Mechanical stops                                         |
|                                            | Over-current (in-line fuse)                              |
| <b>Physical</b>                            |                                                          |
| Maximum Current, ambient air cooling       | 9 A rms                                                  |
| Maximum Current, forced air cooling        | 18 A rms                                                 |
| DC Resistance, armature, nominal           | 1 Ω <sup>[5]</sup>                                       |
| Armature Suspension System                 | 8 pcs carbon fiber composite flexures                    |
| Effective Armature Mass                    | 0.6 lb (0.272 kg)                                        |
| Dimensions (H x W x D), nominal            | 10.8 x 12.6 x 6.5 in (273 x 319 x 165 mm) <sup>[6]</sup> |
| Weight, nominal                            | 37 lb (17 kg)                                            |
| Operating Range                            | 40 – 100 °F (4 – 38 °C), < 85% RH                        |

| Supplied Accessories                                                            |                                                                            |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Trunnion base with EasyTurn™ handles                                            |                                                                            |
| Shaker cable 10 ft (3 m)                                                        |                                                                            |
| Chuck with collets                                                              |                                                                            |
| 10-32 mounting adaptor                                                          |                                                                            |
| Variety of rod and piano wire stinger kits (Models 2150G12, 2155G12 and K2160G) |                                                                            |
| Suggested Accessories                                                           |                                                                            |
| <b>2100E21</b>                                                                  | SmartAmp™ Power Amplifier 400 W, 92% efficient, continuous gain adjustment |
| <b>PCB 288D01</b>                                                               | ICP® impedance head driving point sensor                                   |
| <b>PCB 208</b>                                                                  | PCB 208 series ICP® force sensors                                          |
| <b>2050A</b>                                                                    | Lateral Excitation Stand                                                   |
| <b>2100E13</b>                                                                  | Modal Accessory Kit, for use with 2050A excitation stand                   |

- [1] Full force range requires optional forced air cooling with appropriate power amplifier
  - [2] Mechanical stops at 0.75" (19 mm)
  - [3] Frequency range based upon ISO 5344 recommended useful range of 1.5 times first resonance frequency
  - [4] Load dependent
  - [5] Room temperature, 68 °F (20 °C)
  - [6] Reference outline drawing for exact dimensions
- Front left photo taken in cooperation with Belgian Defense

# THE MODAL SHOP

AN MTS COMPANY

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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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