

MINIATURE ELECTRODYNAMIC INERTIAL SHAKER MODEL 2002E



The 2002E Miniature Electrodynamic Inertial Shaker is a compact and lightweight force generator whose construction makes it well-suited for modal testing as well as a variety of general vibration testing applications.

The generator has a single 0.141 in (3.6 mm) diameter mounting through-hole and a rugged internal suspension system that eliminates test fixture requirements for most testing applications. Miscellaneous mounting screws are supplied to facilitate installation of the unit, either directly to the test

structure or through a force sensor. The 2002E can be operated in any orientation and is therefore easily positioned for modal or general excitation applications offering optimal force performance over a wide 20 Hz to 3000 Hz frequency range.

A unique inverted armature coil design and the latest composite materials combine to offer excellent axial compliance and high lateral stiffness, ensuring reliability and robustness. When the 2002E is combined with a power amplifier and a piezoelectric force sensor (or impedance head) from PCB Piezotronics, Inc., the system becomes an ideal, compact force generator for driving point modal excitation or general purpose vibration excitation with unmatched reliability, performance and cost.

BENEFITS:

- Compact size allows easy set-up for difficult-to-access locations
- 2 lbf (9 N) sine force excitation
- Direct mounting requires no special fixturing support or manual alignment
- In-line fuse for overcurrent protection
- Wide frequency range from 20 Hz to 3000 Hz
- Compatible with piezoelectric force transducers and shaker amplifiers

APPLICATIONS:

- General vibration testing and structural excitation
- Impedance measurements
- Experimental modal analysis
- Educational laboratory research



MODEL 2002E

The compact design and portability make the 2002E Miniature Electrodynamical Inertial Shaker a very versatile, accessible and popular solution for test and instrumentation engineers. It is ideally suited for general purpose vibration testing for experimental modal, academic, biomedical or laboratory research.

SPECIFICATIONS:

ENGLISH

SI

PERFORMANCE

Sine Force

| | | |
|---------------------|----------|--------|
| Natural Air Cooling | 2 lbf pk | 9 N pk |
|---------------------|----------|--------|

| | | |
|-----------------------------------|----------|---------|
| Forced Air Cooling ^[1] | 4 lbf pk | 18 N pk |
|-----------------------------------|----------|---------|

Random Force

| | | |
|---------------------|-------------|-----------|
| Natural Air Cooling | 1.4 lbf RMS | 6.2 N RMS |
|---------------------|-------------|-----------|

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|-----------------------------------|-------------|------------|
| Forced Air Cooling ^[1] | 2.8 lbf RMS | 12.5 N RMS |
|-----------------------------------|-------------|------------|

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|---------------------|------------|-----------|
| Shock Force (20 ms) | 4.5 lbf pk | 20.0 N pk |
|---------------------|------------|-----------|

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|------------------------------------|---------------------------------|--|
| Low Frequency Force ^[2] | 0.012 f ² (0.35 – d) | |
|------------------------------------|---------------------------------|--|

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|----------------------|-----------------|----------------|
| Maximum Displacement | 0.35 in (pk-pk) | 8.9 mm (pk-pk) |
|----------------------|-----------------|----------------|

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|------------------|------------|-------------|
| Maximum Velocity | 20 in/s pk | 508 mm/s pk |
|------------------|------------|-------------|

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|-----------------|-----------------|-----------------|
| Frequency Range | 20 Hz – 3000 Hz | 20 Hz – 3000 Hz |
|-----------------|-----------------|-----------------|

| | | |
|-----------------------------------|-------|-------|
| Reaction Mass Resonance (Nominal) | 10 Hz | 10 Hz |
|-----------------------------------|-------|-------|

| | | |
|----------------------|-------------------|-------------------|
| Structural Resonance | 3500 Hz – 4500 Hz | 3500 Hz – 4500 Hz |
|----------------------|-------------------|-------------------|

PHYSICAL

| | | |
|------------------------|---------|---------|
| Dynamic Element Weight | 0.33 lb | 0.15 kg |
|------------------------|---------|---------|

| | | |
|--------------|---------|---------|
| Total Weight | 0.56 lb | 0.25 kg |
|--------------|---------|---------|

Maximum Rated Armature Current

| | | |
|---------------------|-----------|-----------|
| Natural Air Cooling | 1.1 A RMS | 1.1 A RMS |
|---------------------|-----------|-----------|

| | | |
|--------------------|-----------|-----------|
| Forced Air Cooling | 2.2 A RMS | 2.2 A RMS |
|--------------------|-----------|-----------|

| | | |
|-----------------------------|----------------|--------------|
| Temperature Operating Range | 40 °F – 100 °F | 4 °C – 38 °C |
|-----------------------------|----------------|--------------|

Stray Magnetic Field

| | | |
|---------------------------------------|------------|------------|
| Measured at 1.0 in (2.54 cm) distance | < 10 gauss | < 10 gauss |
|---------------------------------------|------------|------------|

| | | |
|------------------------------------|------------------|----------------------|
| Cooling (> 2.0 lbf or > 9 N force) | 3.5 CFM at 5 psi | 99 L/min at 0.34 bar |
|------------------------------------|------------------|----------------------|

| | | |
|--------------------------------|-----------------|-------------------|
| Dimensions (diameter x length) | 2.0 in x 1.5 in | 50.8 mm x 38.1 mm |
|--------------------------------|-----------------|-------------------|

| | | |
|---------------|-------------------|------------------|
| Mounting Hole | 0.141 in x 1.5 in | 3.6 mm x 38.1 mm |
|---------------|-------------------|------------------|

[1] Forced air cooling required for operation above 2 lbf (9 N)

[2] f=freq [Hz], d=disp. [in] pk-pk

SUPPLIED ACCESSORIES

3 ft (90 cm) cable with in-line fuse

Spare fuses: 1 A and 2 A

Miscellaneous mounting screws and washers

Heavy duty case

RELATED PRODUCTS

| | |
|-------------|--|
| 2100E21-100 | SmartAmp™ Power Amplifier 100 W, 92% efficient, continuous gain adjustment |
|-------------|--|

| | |
|--------|---|
| 208C01 | Multi-purpose, ICP® force sensor, 10 lbf (45 N) compression and tension, 500 mV/lbf (112.41 mV/N) |
|--------|---|

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|--------|---|
| 288D01 | ICP® impedance head, force/accel: Force: 100 mV/lbf (22.4 mV/N) ; Accel: 100 mV/g (10.2 mV/(m/s ²)) |
|--------|---|



The Modal Shop 3149 E Kemper Road, Cincinnati, OH 45241, USA
Toll free 800-860-4867 / **Phone** 513-351-9919 / **Fax** 513-458-2172
E-mail info@modalshop.com **Website** www.modalshop.com

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