

ElectroForce® Test Instruments

Versatility, Exceptional Performance and very Lab-Friendly

ElectroForce® test instruments incorporate proprietary Bose® linear motion technologies and WinTest® controls to provide a revolutionary approach to mechanical fatigue and dynamic characterization. The ElectroForce family of test instruments provides a full range of force and performance capabilities for a variety of test applications.

ElectroForce test instruments are controlled by the WinTest digital control system. WinTest software features an intuitive design that enables the user to quickly set up tests with little training. ElectroForce test instruments are also very lab-friendly thanks to their practically maintenance-free operation. As a result, they have set a new standard for performance, simplicity and versatility in a single test system.

Important Features and Benefits of ElectroForce Instruments:

- Simple and durable moving-magnet motor design that provides excellent dynamic performance.
- Efficient, direct electromagnetic conversion to force, resulting in great acceleration, high frequencies and high velocities.
- Powered from a standard electrical outlet, requiring no additional infrastructure, air conditioning or water cooling.
- Air-cooled, clean-room compatible and whisper-quiet operation in compact, space-saving packages.
- Proprietary linear motor operates without friction, an important feature for high resolution, low-force testing.
- Intuitive software design to simplify test setup and a flexible hardware platform for changing test needs.
- A wide range of instruments, from 20 N maximum force to 15 kN maximum force to provide the proper choice for a wide variety of test applications.



ElectroForce® Table-Top Test Instruments

ElectroForce 3200 Configuration

The 3200 test instrument features a 225 N (450 N optional) maximum force. With the versatility of static to 200 Hz frequency response, the table-top configuration is adaptable to a variety of biomedical research and engineered materials test applications, including torsion testing, creep under dynamic loading and special environments (hot/cold chambers).

Typical test applications:

- Biomaterials
- Medical devices
- Elastomers
- Compliant bio-tissues
- Microelectronics
- Films
- Fibers
- Small components
- Foods and fluids (rheology)



3200 Test Instrument with Saline Bath

ElectroForce 3330 Table-top Configuration

The ElectroForce 3330 test instrument is well-suited for long term durability studies. It provides static to 100 Hz performance with a load envelope of ± 3000 N and versatility for a variety of fatigue test applications.

Applications include durability testing of orthopaedic implant devices as well as dynamic characterization of engineered materials and components.

The table-top configuration can be integrated with a variety of environmental chambers and specimen fixtures to meet specific test applications.

The ElectroForce 3330 table-top configuration is a clean stand-alone package.



Table-top 3330 Test Instrument

ElectroForce TestBench Instruments

TestBench configurations were designed with component testing in mind, and thanks to their modular approach, a wide array of configurations and performance capabilities are possible.



ElectroForce 200 N Motor with Reaction Bracket

TestBench systems can be multi-channel and multi-axis. The WinTest® PCI controller can provide control for up to eight channels at a time. Reaction brackets are pre-designed to allow attachment of components or the test specimen to the mounting baseplate. In addition, a saline bath can be provided as an environmental option. By selecting the proper baseplate and ElectroForce® motor packages, a variety of testing needs can be addressed.

ElectroForce 3100 Test Instrument for the Laboratory, Office or Classroom

Measuring less than 50.8 cm (20 inches) tall, the ElectroForce 3100 test instrument is the smallest in the ElectroForce product family. The 3100 will fit on a desk or table-top, and it is extremely lab friendly thanks to its practically maintenance-free operation. The 3100 instrument is well-suited for micro-characterization of materials and devices because of its exceptional control resolution up to 22 N static maximum force.



ElectroForce 3100 Test Instrument

ElectroForce® Floor-Standing Test Instruments

ElectroForce 3330 Floor-Standing Configuration

The ElectroForce® 3330 test instrument is available as a table-top configuration or a floor-standing model. The floor-standing model provides additional versatility, such as the ability to add accessories or to incorporate a torsional motor for multiaxial test applications. It provides 100 Hz performance with a static and dynamic load envelope of ± 3000 N, and the capability to add an optional ± 28 N-m or ± 70 N-m torsional package.

The robust load frame was designed with versatility in mind. The spacious 406 mm wide by 500 mm high test space is easily adjusted using an integrated pneumatic lift. The only utilities needed to operate the system are a wall outlet and compressed air to operate the crosshead lifts.

In addition, the axial-torsion test instrument can be integrated with a hot/cold environmental chamber, thereby providing advanced test capabilities for a variety of engineered materials under realistic service conditions.

Typical test applications:

- Automotive components
- Fracture mechanics
- Component durability
- Orthopaedic implants
- Consumer products
- Prosthetics
- Cyclic fatigue studies

Floor-standing Axial/Torsion 3330 Instrument
with Hot/Cold Chamber



ElectroForce 3500 Configuration

The ElectroForce 3500 test instrument features a dynamic force capability up to 15 kN (3,370 lb), and 50 mm (2 in) displacement. The test system can perform tests over a frequency range from 1 cycle per day to 100 Hz, and is well-suited for a variety of mechanical fatigue and durability tests. Optional torsional motors can be mounted on the same instrument for multiaxial test applications. Dynamic performance is dependent on test specimen characteristics, fixtures and the test configuration.

Typical test applications:

- Orthopaedic materials and implants
- Engineered materials, including reinforced plastics and composites
- Automotive and aerospace components
- Elastomeric components and materials
- Consumer products, including sports equipment, household items and electronics

ElectroForce 3510 Test
Instrument (7.5 kN model shown)

ElectroForce® Test Instrument Specifications

Instrument Model:	3100	3200	3330	3500
Electromagnetic Load Capacity:				
Peak/max sine	± 22 N (5 lb)	± 225 N (50 lb)	± 3000 N (675 lb)	± 7500 N (1685 lb)
High force option	NA	± 450 N (100 lb)	NA	± 15000 N (3370 lb)
Static or RMS (continuous)	± 22 N (5 lb)	± 160 N (35 lb)	± 2100 N (475 lb)	± 6000 N (1350 lb)
High force option	NA	± 320 N (70 lb)	NA	± 10600 N (2400 lb)
Displacement:				
	5 mm (0.20 in)	12.5 mm (0.49 in)	25 mm (0.98 in)	50 mm (1.96 in)
Electromechanical Option:				
	NA	50 mm (2.0 in)	150 mm (6.0 in)	NA
<i>Note: Electromechanical actuator provides static test capability, slack/creep compensation and ease of test setup.</i>				
Linear Velocity:				
Minimum*:	0.0025 micron/s (0.024 micro in/s)	0.006 micron/s (0.024 micro in/s)	0.012 micron/s (0.048 micro in/s)	0.025 micron/s (0.048 micro in/s)
Maximum**:	1.0 m/s (40 in/s)	3.2 m/s (125 in/s)	2.0 m/s (80 in/s)	1.5 m/s (60 in/s)
Frequency:				
Minimum:	0.00001 Hz	0.00001 Hz	0.00001 Hz	0.00001 Hz
Maximum**:	100 Hz	200 Hz	100 Hz	100 Hz 50 Hz (15000 N)
<i>Note: Performance curves available.</i>				
Dimensions (H/W/D)**:				
Height	52.1 cm (20.5 in)	81.3 cm (32 in)	122 cm (48 in)	278 cm (108 in)
Width	30.5 cm (12 in)	49.5 cm (19.50 in)	61 cm (24 in)	99 cm (39 in)
Depth	17.8 cm (7 in)	48.3 cm (19 in)	56 cm (22 in)	82 cm (32 in)
Weight:				
	18 kg (40 lb)	80 kg (176 lb)	118 kg (260 lb)	1050 kg (2300 lb)
Test Space Size:				
	0 to 152 mm (0-6 in)	0 to 450 mm (0 - 18 in)	0 to 500 mm (0 - 20 in)	0 to 750 mm (0 - 30 in) 1000 mm optional
Torsional Motor Option:				
Standard	NA	± 2.8 N-m (25 in-lb)	± 28 N-m (250 in-lb)	± 70 N-m (620 in-lb)
High torque option	NA	± 5.6 N-m (50 in-lb)	± 70 N-m (620 in-lb)	
Rotation	NA	Multi-turn (± 10 revolutions max)	Multi-turn (± 10 revolutions max)	Multi-turn (± 10 revolutions max)

* Slower velocities attainable with higher resolution displacement transducers.

** Varies depending on fixture mass and specimen stiffness.

*** Dimensions can vary with optional features.

Specifications are subject to change

Applications and Fixtures

Bose carries an extensive line of test equipment accessories. ElectroForce test instruments can be integrated with a variety of specimen fixtures, measurement transducers, environmental chambers and saline baths. Contact the ElectroForce Systems Group for test frame options and accessory packages to meet your specific testing needs.

