



ELECTROFORCE
TEST SYSTEMS

BILLIONS
of
CYCLES

100's of
CONFIGURATIONS

300 Hz
Frequency

Industry Leading
Performance,
Versatility
and
Durability

NANOMETER
LEVEL
RESOLUTION

15 kN
of
Force

10
YEAR
MOTOR
warranty

ElectroForce® test instruments featuring patented linear motion technologies and WinTest® controls, provide a revolutionary approach to mechanical fatigue and dynamic characterization. The ElectroForce family of test instruments includes a full range of force and performance capabilities for a wide variety of test applications based on the most unique motor design in the industry. The end result to the customer is billions of cycles of unmatched reliable performance in a dynamic test instrument with precision, accuracy and ease of use for a wide range of applications.

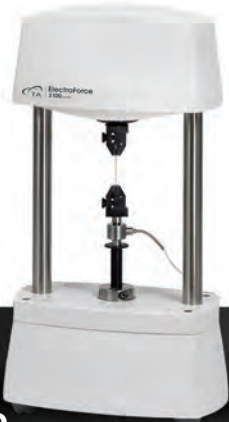
ElectroForce Load Frames

22 N

200 N

225 N
or
450 N

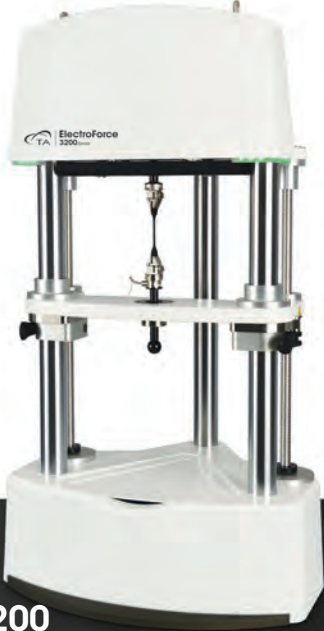
1000 N
or
3000 N



3100



5500

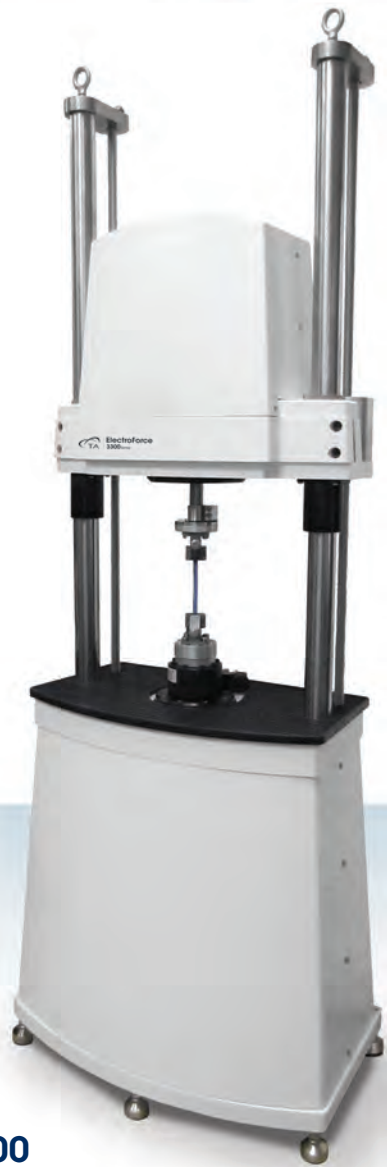


3200



3300

1000 N
or
3000 N



3300
Floor Standing

7500 N



3510

7500 N
or
15000 N



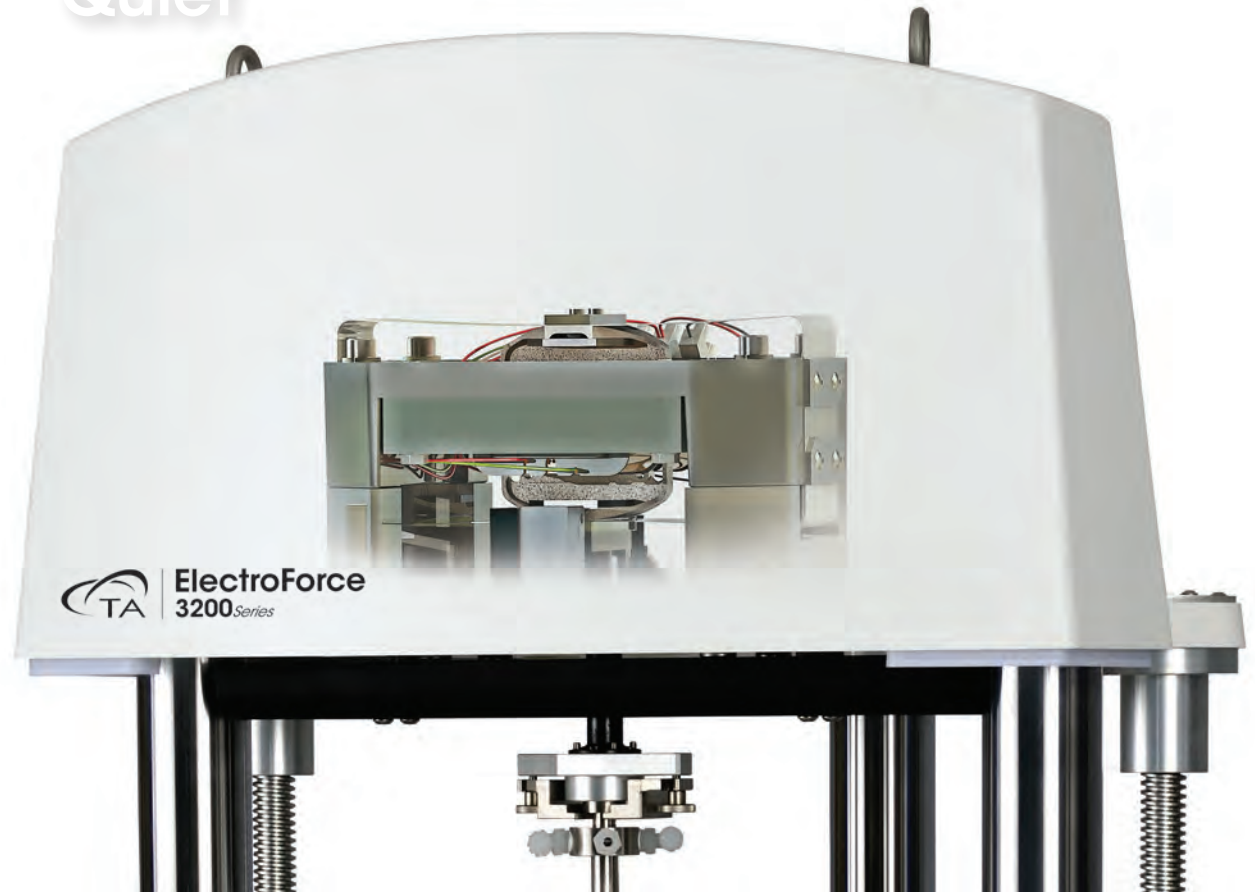
3520/3550

ElectroForce System Features

Dynamic
Reliable
Energy Efficient
Frictionless
Patented
Clean
Environmentally Friendly
Maintenance-Free
Quiet

Successfully utilized in a variety of testing and motion control applications for over 20 years.

- Patented linear motor operates without friction, an important feature for high resolution, low-force testing
- Efficient, direct electromagnetic conversion to force, resulting in greater acceleration, high frequencies and high velocities
- Intuitive software design to simplify test setup and a flexible hardware platform for changing test needs
- 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 a compact, space-saving package
- Energy efficient and environmentally friendly by using pollution-free, non-toxic technologies and oil-free design



Frequency to
300 Hz...

Forces
to 15 kN

 **ElectroForce**
3300 Series



ElectroForce
3500 Series

the
Industry's
ONLY
10 YEAR
MOTOR
warranty

Reliability that won't let you down

The flexural suspension is engineered to guide the magnet assembly without contact or lubrication. The magnet, coil and stators are designed to control temperatures to eliminate performance degradation over decades of use and deliver maintenance-free operation that you can count on for your longest running tests.

Unmatched waveform control and fidelity

Without the friction of rolling or sliding bearings, the ElectroForce motor design provides the control required for the most sensitive of tests. The motor converts even the smallest of increments of waveform change precisely to specimen force, displacement or pressure. This means applied forces can be controlled to gram force ranges and displacements can be controlled to a micron.

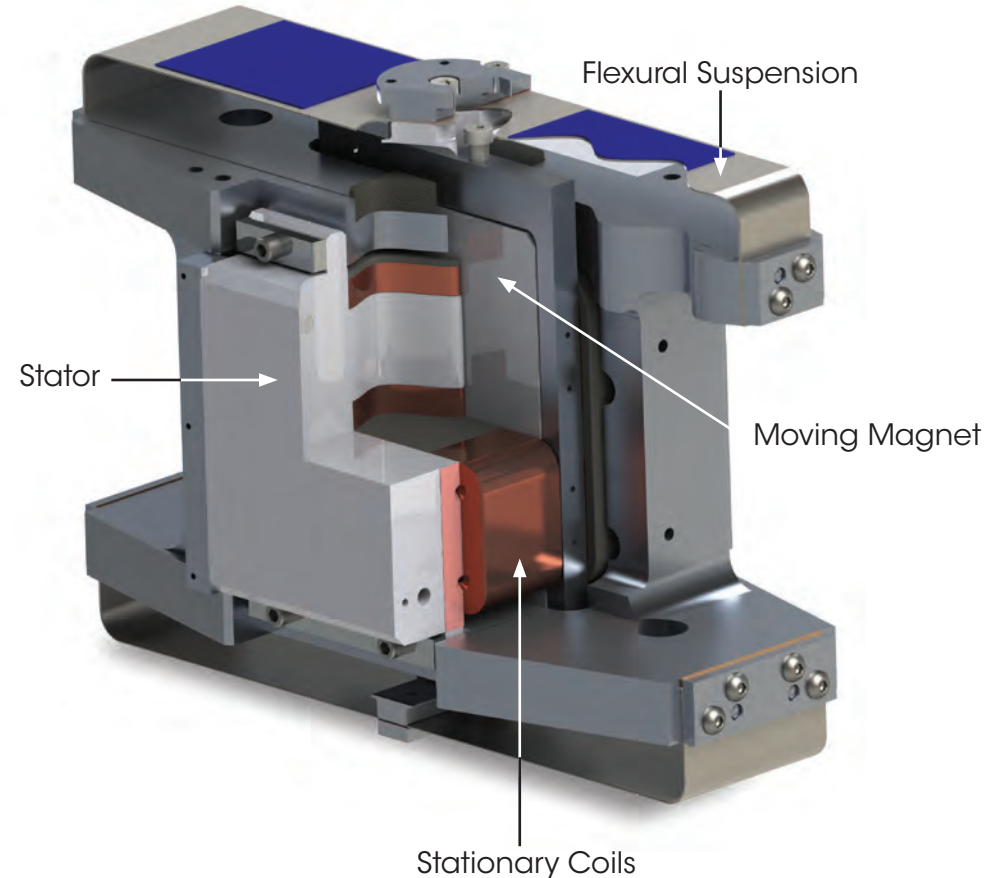
Testing in a variety of environmental conditions

With its efficient, quiet and bearing-free design, the ElectroForce motor is engineered for use in a variety of diverse and challenging environments, including clean rooms, humidity chambers and even hot cells.

Sized to meet your requirements

The architecture of the ElectroForce motor can be scaled to accommodate a wide range of forces and displacements:

- Maximum forces ranging from 22 N up to 15 kN
- Maximum displacements ranging from 5 mm up to 50 mm.



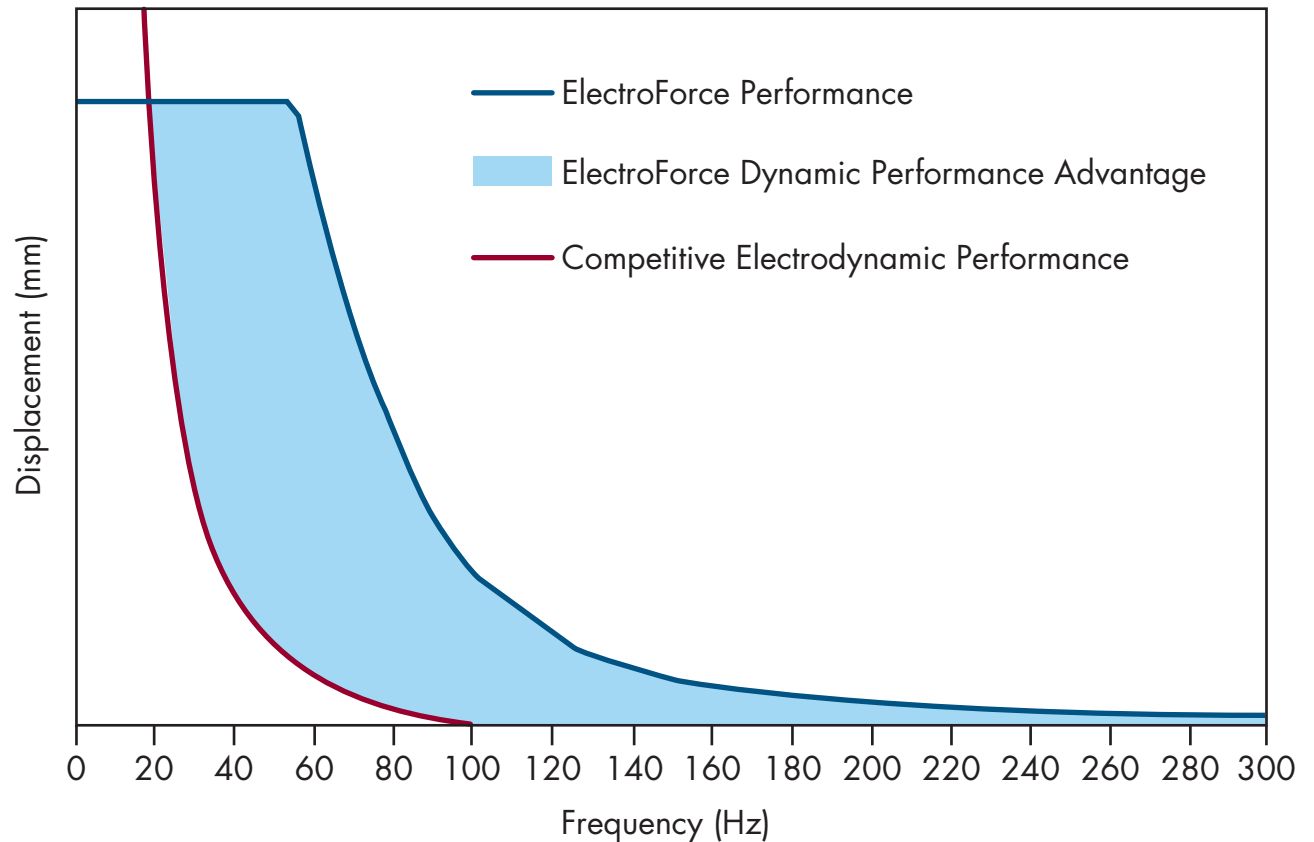
**Design simplicity provides
unmatched performance & billions
of maintenance-free cycles**

The Most Dynamic & Controllable Linear Motor in the Industry

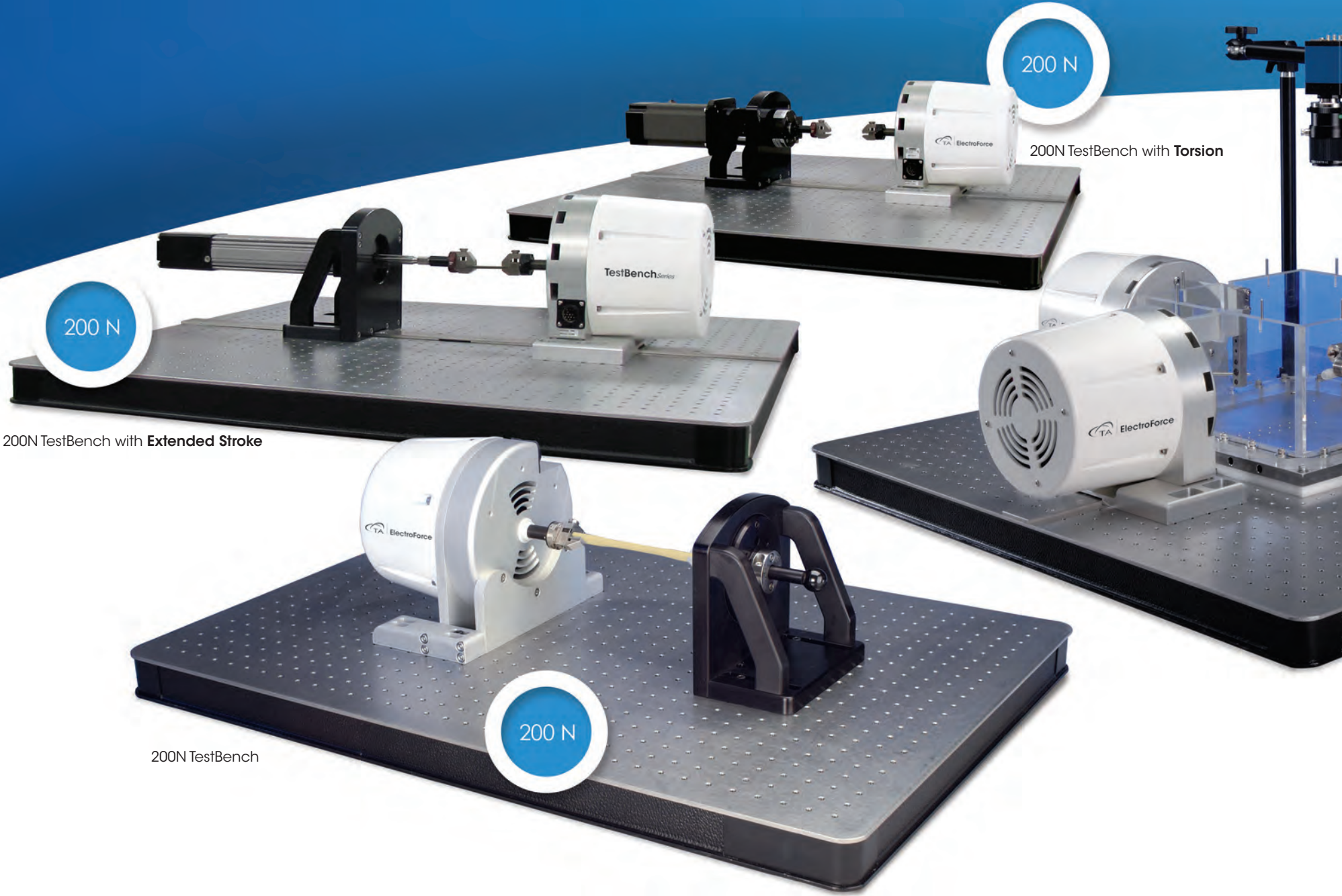
Bandwidth for any Test: Fast or Slow

ElectroForce motors excel at the full spectrum of testing speeds, due to the low mass of the rare earth moving magnet and stationary coil design. Testing speeds can range from static tests, to one cycle per day, and up to frequencies of 300 Hz.

Performance Comparison



The Widest Array of TestBench Configurations



200 N

200N TestBench with **Extended Stroke**

200 N

200N TestBench with **Torsion**

200 N

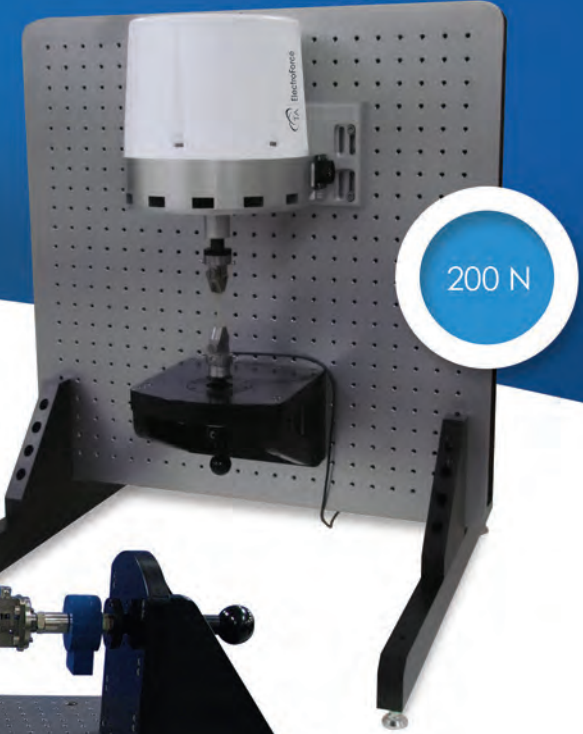
200N TestBench



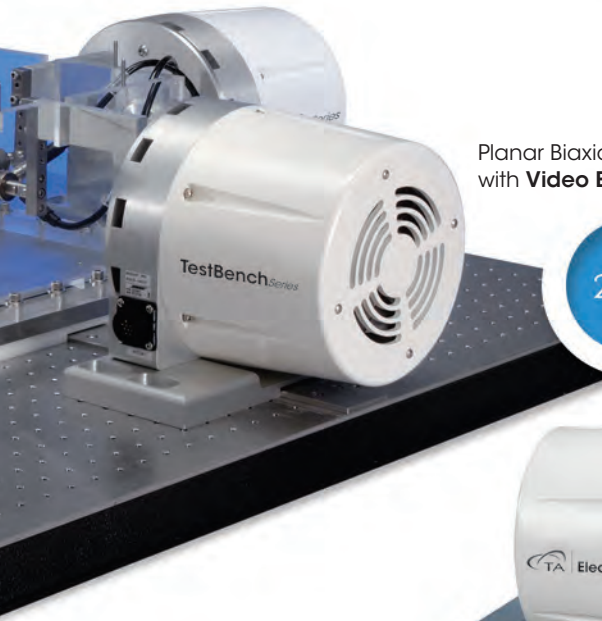
Dual 3kN TestBench

3000 N

Vertical TestBench

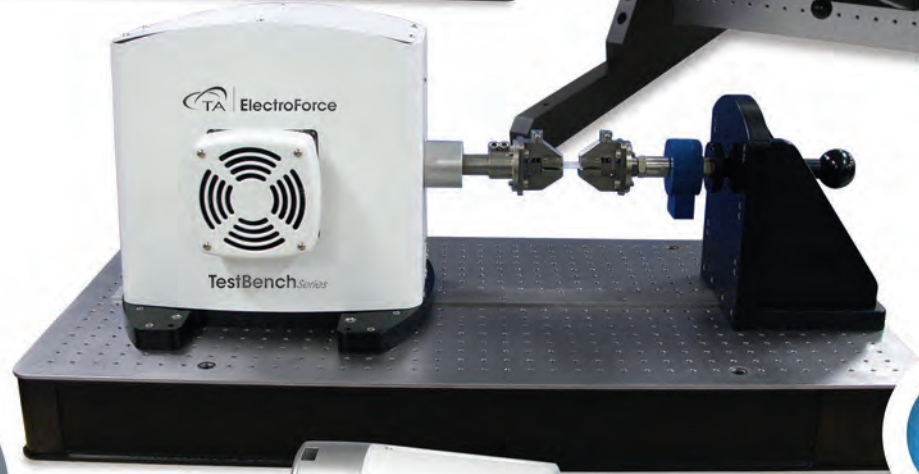


200 N



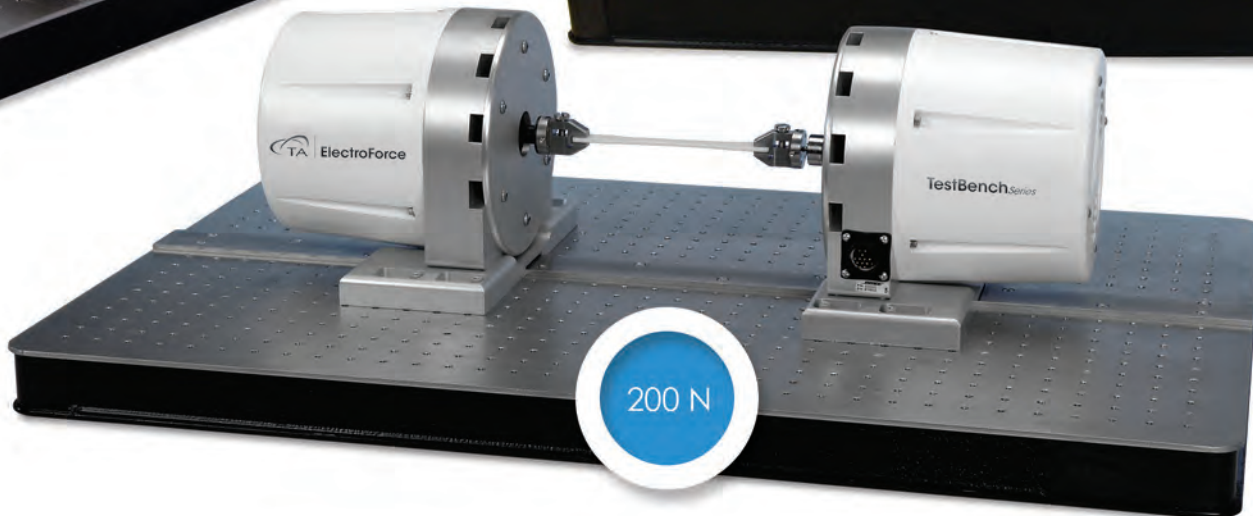
Planar Biaxial TestBench
with Video Extensometer

200 N



3000 N

3000 N TestBench



200 N

Dual 200N TestBench

The Most Flexible Control System Available

Single comprehensive package that provides data acquisition, waveform controls and user interface in an easy to use package:

- Advanced controls including multi-channel synchronization of phase and amplitude, and cross-channel compensation
- Calculated channels to provide real-time mathematical calculations for measurement channels
- Powerful waveform generation tools to quickly create periodic waveforms for fatigue tests and block grouping to create more complex tests
- Integrated data acquisition algorithms so a variety of data collection techniques can be utilized, including timed data acquisition, peak/valley capture, level-crossing and additional techniques
- Additional options include:
 - Dynamic Mechanical Analysis
 - External Waveform Input
 - Dynamic Link Libraries

WinTest® 7 Tune IQ

The Most Accurate Closed Loop Control Algorithms

Tune IQ software uses advanced proprietary algorithms to simplify the tuning process

- Provides excellent re-creation of system program waveforms, allowing for improved test control and ultimately better test results
- **Advanced methods that analyze the dynamic response of the system, sensor and sample for optimal control, superior to a single-point measurement that doesn't factor in sample dynamics**

WinTest 7 DMA (Dynamic Mechanical Analysis)

A flexible platform for advanced viscoelastic property measurements, including:

- E'
- E''
- Tan Delta
- Glass Transition

TRIOS

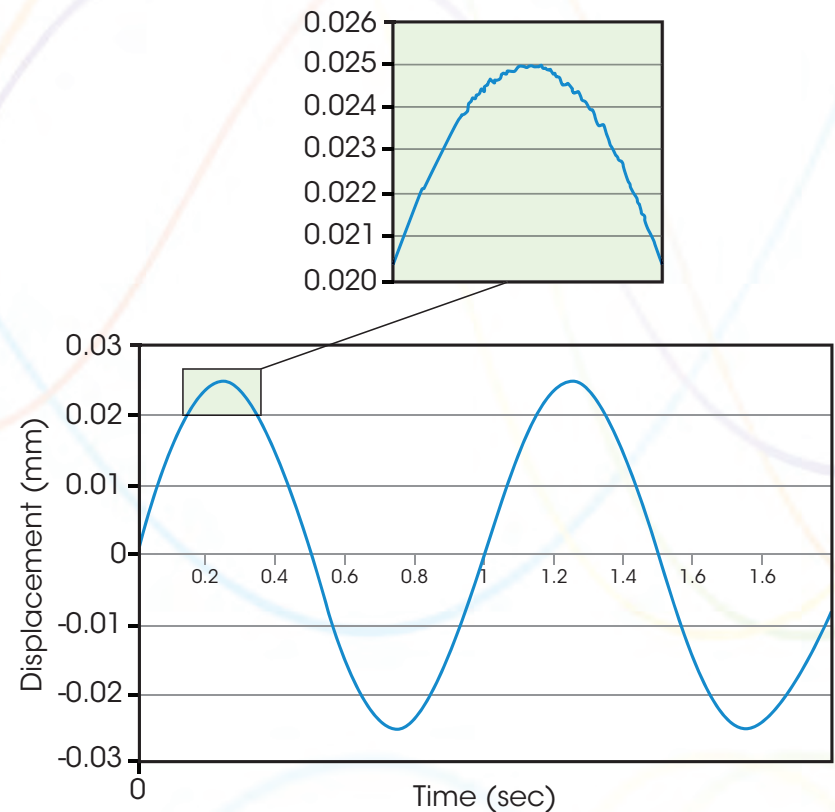
The Most Versatile Analysis Package available for Mechanical Testing:

- Time Temperature Superposition (TTS)
- Peak analysis
- Onset point analysis
- Peak integration
- Continuous and discrete relaxation spectrum

HADS (High Accuracy Displacement Sensor)

The Most Accurate and Precise Displacement Sensor on the Market

- Up to 1nm resolution and micron level of accuracy
- Class A, ASTM E2309 calibrated accuracy
- Extremely low noise to eliminate the need to filter data
- High responsiveness extends the dynamic performance of system
- Single displacement channel to provide both absolute and high resolution measurements



Applications

FATIGUE, DURABILITY & MATERIAL CHARACTERIZATION

Medical
Devices

Electronics

Elastomers

Aerospace

Biomaterials

Composites

Polymers

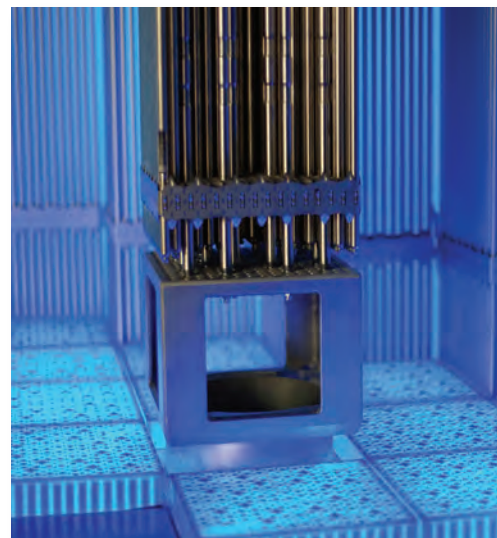
Automotive

Tissue Engineering

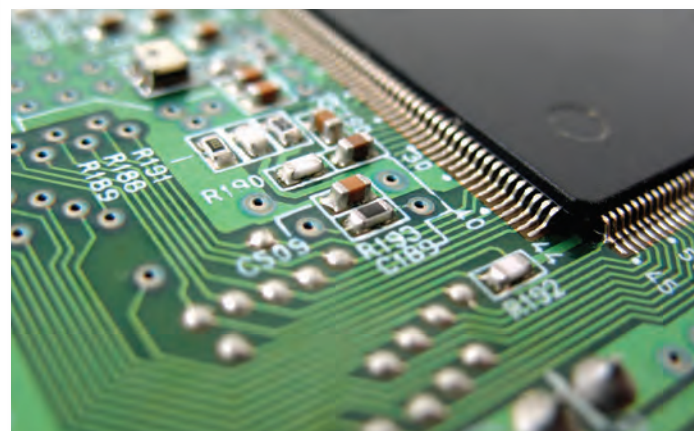


The design of new materials and products requires a thorough assessment of material properties and complete performance evaluation within the customer's intended end-use. A variety of basic and advanced testing techniques are available to meet this need.

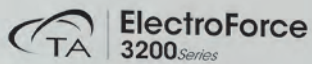
- Tension/Compression
- Bending
- Torsion
- Shear
- Pulsatile
- Multi-axial
- Failure Testing
- Fatigue
- Dynamic Characterization
- Creep
- Stress Relaxation
- Accelerated Life Testing



Your **Success**
our **Mission™**



Accessories

 TA ElectroForce
3200 Series

ElectroForce® test instruments can be integrated with a variety of specimen fixtures, measurement transducers, environmental chambers, saline baths and optional software.

Grips/Platens

Tension/Torsion Grips

Wedge Grips

DMA Grips

Tissue Grips:

- Thermal-Electrically Cooled
- BioDynamic® Tensile Grips

Compression Platens

BioDynamic Compression Platens

3 and 4 Point Bend

Sensors

Force/Torque

Displacement/Rotation

Strain

Pressure

Chemical

Accelerometer

Submersible Load Cells

Fixtures and Chambers

Multi-specimen Fixture

Saline Baths

BioDynamic Chambers

Hot/Cold Chambers

Furnaces

24-well Plate Fixture

T-Slot

Upgrade Options

Axial

Axial/Torsion

Extended Stroke

Pulsatile

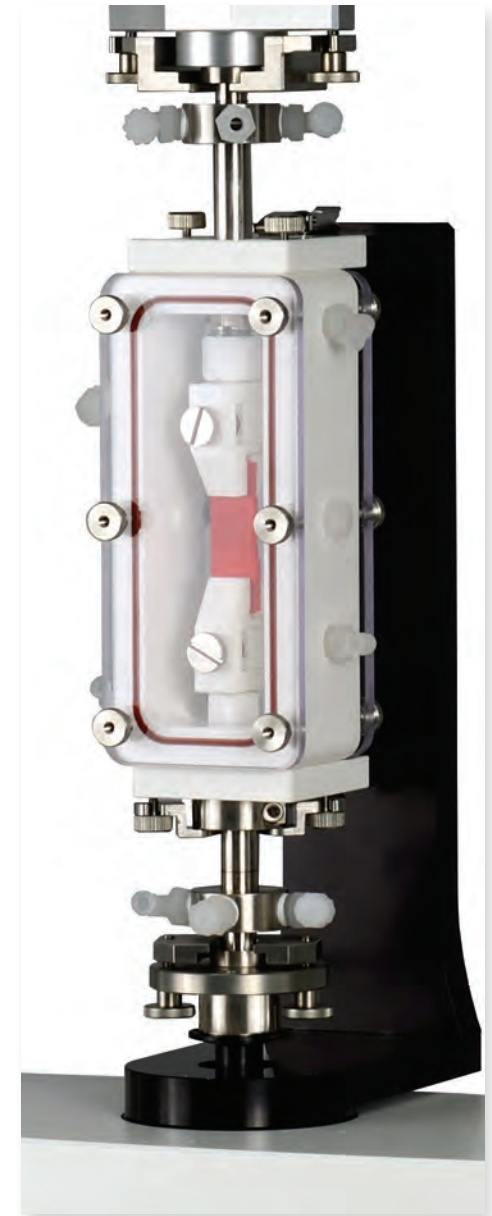
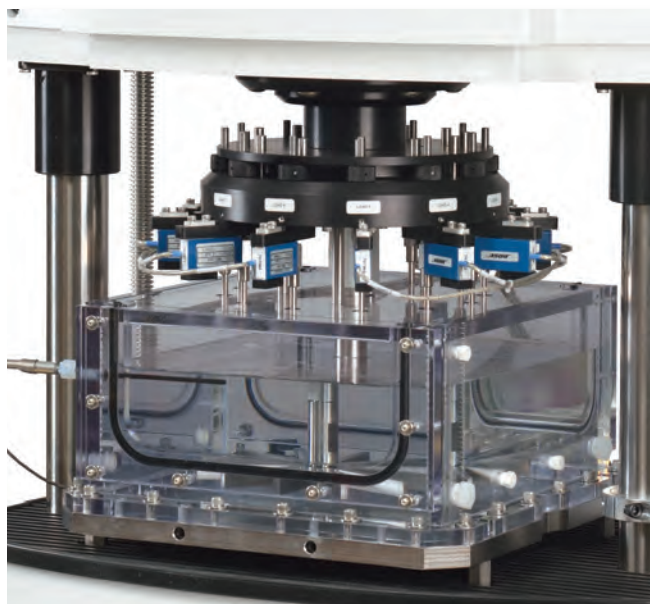
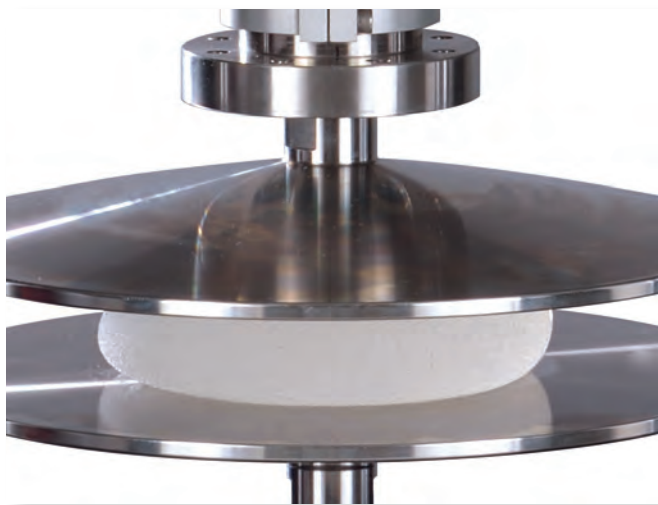
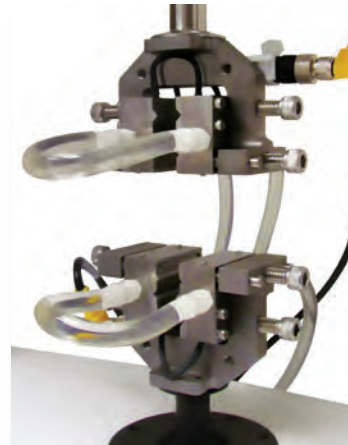
Table top

Verical Mount

System Status Indicator (SSI) Lights

Battery Backup





Industry-Leading Sales & Support

TA Instruments' leadership position results from the fact that we offer the best overall product in terms of technology, performance, quality, and customer support. While each is important, our demonstrated commitment to after-sales support is a primary reason for the continued loyalty of our customers. To provide this level of support, TA Instruments has assembled the largest worldwide team of field technical and service professionals in the industry. Others promise good service. Talk to our customers and learn how TA Instruments consistently delivers on our promise to provide exceptional service.

With direct support staff in **23 countries** and **5 continents**, TA Instruments can extend its exceptional support to you, wherever you are.





Specifications

	3100	5500	3200
Linear Motor			
Standard			
Peak/Max Sine	± 22 N	± 200 N	± 225 N
Static or RMS (continuous)	± 22 N	± 140 N	± 160 N
High Force Option			
Peak/Max Sine	—	—	± 450 N
Static or RMS (continuous)	—	—	± 320 N
Displacement	5 mm	13 mm	13 mm
Extended Stroke Option	—	—	150 mm
Linear Velocity	0.0025 µm/s – 1.0 m/s	0.0065 µm/s – 0.80m/s	0.0065 µm/s – 3.2 m/s
Frequency	0.00001 Hz – 100 Hz	0.00001 Hz – 20 Hz	0.00001 Hz – 300 Hz
Torsional Motor Option			
Standard			
Peak/Max	—	—	± 5.6 N-m
Static or RMS (continuous)	—	—	± 5.6 N-m
High Torque Option			
Peak/Max	—	—	—
Static or RMS (continuous)	—	—	—
Rotation	—	—	Multi-turn (± 10 revolutions Standard)

— Not Available

	3300	3510	3520/3550
Linear Motor			
Standard			
Peak/Max Sine	± 1000 N	± 7500 N	± 7500 N - Model 3520
Static or RMS (continuous)	± 700 N	± 5300 N	± 5300 N - Model 3520
High Force Option			
Peak/Max Sine	± 3000 N	—	± 15000 N - Model 3550
Static or RMS (continuous)	± 2100 N	—	± 10600 N - Model 3550
Displacement			
Standard	25 mm	50 mm	50 mm
Extended Stroke Option	150 mm	—	—
Linear Velocity			
	0.013 µm/s – 1.5 m/s ^[1] 0.013 µm/s – 2.0 m/s ^[2]	0.025 µm/s – 1.5 m/s	0.025 µm/s – 1.5 m/s
Frequency			
	0.00001 Hz – 100 Hz	0.00001 Hz – 100 Hz	0.00001 Hz – 50 Hz
Torsional Motor Option			
Standard			
Peak/Max	± 14 N-m ^[3] / ± 24 N-m ^[4]	± 49 N-m	± 49 N-m
Static or RMS (continuous)	± 14 N-m ^[3] / ± 24 N-m ^[4]	± 42 N-m	± 42 N-m
High Torque Option			
Peak/Max	± 49 N-m ^[5]	—	± 70 N-m
Static or RMS (continuous)	± 42 N-m ^[5]	—	± 50 N-m
Rotation			
	Multi-turn (± 10 revolutions Standard)	Multi-turn (± 10 revolutions Standard)	Multi-turn (± 10 revolutions Standard)

Notes:

^[1] Linear Velocity on ElectroForce 3310

^[2] Linear Velocity on ElectroForce 3330

^[3] Standard torque capacity on ElectroForce 3310

^[4] Standard torque capacity on ElectroForce 3330

^[5] High torque option only available on ElectroForce 3330

Series II and Series III systems include the ElectroForce® High Accuracy Displacement Sensor and are calibrated to ASTM E-2309.

Specifications are subject to change

Expert Training

Expert Support



WORLDWIDE

AMERICAS

New Castle, DE USA
Lindon, UT USA
Saugus, MA USA
Eden Prairie, MN USA
Chicago, IL USA
Montreal, Canada
Toronto, Canada
Mexico City, Mexico
São Paulo, Brazil

EUROPE

Hüllhorst, Germany
Eschborn, Germany
Wetzlar, Germany
Elstree, United Kingdom
Brussels, Belgium
Eftten-Leur, Netherlands
Paris, France
Barcelona, Spain
Milano, Italy
Warsaw, Poland
Prague, Czech Republic
Sollentuna, Sweden
Copenhagen, Denmark

ASIA & AUSTRALIA

Shanghai, China
Beijing, China
Tokyo, Japan
Seoul, South Korea
Taipei, Taiwan
Guangzhou, China
Petaling Jaya, Malaysia
Singapore
Bangalore, India
Sydney, Australia



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