



ElectroPuls™ | All Electric Dynamic Test Systems



# ElectroPuls™ – All Electric Dynamic Test Systems

With more than ten years of running tests over billions of cycles, ElectroPuls systems are the established materials testing machines using patented linear motor technology. With model capacities up to 10 kN, ElectroPuls systems offer slow-speed static testing and high-frequency dynamic fatigue testing with hundreds of hertz capability. The Linear-Torsion models feature a patented actuator for bi-axial tests on materials and components.

With only a single-phase electrical connection to the wall, ElectroPuls systems are dynamic testing machines of the future that do not have the environmental impact of conventional servohydraulic technologies. That means no oil, no three-phase electrical power, no water-cooling supplies, no external acoustic attenuation systems, and no costly, complex maintenance routines. Take a tour through the product and see how you can plug ElectroPuls into your laboratory wall and start testing.



No Oil



Low Energy



Low Noise



Small Footprint



## A System to Suit Your Needs

The ElectroPuls™ family includes systems ranging from 1000 N up to 10,000 N. The Linear-Torsion models feature a patented actuator in the upper crosshead and a bi-axial Dynacell™ load cell.

### E1000

Tabletop Instrument | Force Capacity  $\pm 1000$  N

Shown fitted with a short-height 600 series Environmental Chamber for low and high-temperature testing.

### E3000

Tabletop Instrument | Force Capacity  $\pm 3000$  N

Common applications include testing components and biomedical implants in fatigue.

### E3000 Linear-Torsion

Tabletop Instrument | Force Capacity  $\pm 3000$  N

Torque Capacity  $\pm 25$  Nm

Shown fitted with fatigue-rated mechanical grips and AVE2 for non-contacting dynamic strain measurement.



### E10000

Floor Instrument | Force Capacity  $\pm 10000$  N

Shown fitted with hardened platens for compression fatigue testing.

### E10000 Linear-Torsion

Floor Instrument | Force Capacity  $\pm 10000$  N

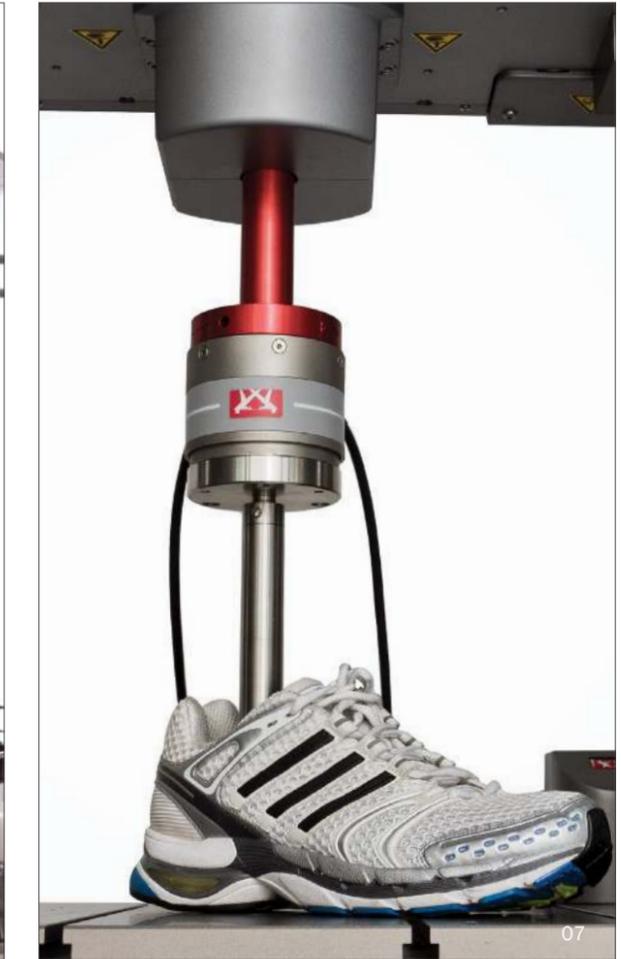
Torque Capacity  $\pm 100$  Nm

Shown fitted with fatigue-rated pneumatic wedge grips and a CE-certified safety guard for bi-axial fatigue testing.



# Expanding Horizons

- 01. Fatigue Tests of Plastics using non-contacting extensometry
- 02. 3 Point Flexure Fatigue of Small Animal Bone
- 03. Durability Testing of Hip Implants to ISO 7206
- 04. Durability Testing of Spinal Constructs to ASTM F1717
- 05. Simulation Testing of Consumer Electronics
- 06. Durability Testing of Dental Implants to ISO 14801
- 07. Durability and Impulse Testing of Athletic Footwear



ElectroPuls™ systems allow scientists and researchers to cross new boundaries in the research and development of materials and components technologies.

## Alive With Technology

### Innovative Linear Motors - Extensive Dynamic and Static Testing Capability

Instron® established patented linear motors at the heart of ElectroPuls™ systems over ten years ago, and has successfully demonstrated its superior technology in tests over billions of cycles. With an ultra-low friction design and powered from only a single-phase electrical supply, ElectroPuls systems have an extensive performance envelope with the ability to run conventional slow-speed static tests to high-frequency dynamic and fatigue tests. The linear motor technology gives the systems a dynamic testing capability of hundreds of hertz with low noise and without the use of hydraulic oil.

### Advanced Bearing System: High-Lateral Stiffness Maintains Alignment

Testing components or asymmetrical specimens can generate off-axis and lateral loads that lead to uncertainty in results. ElectroPuls features an advanced actuator bearing system that maintains load string alignment.



No Oil



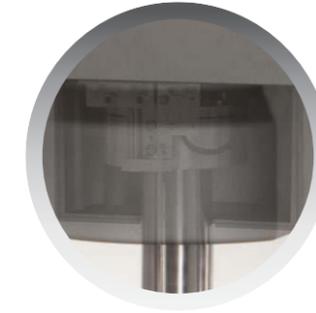
Low Noise



- 01. E1000: Horizontal Mounting
- 02. Cable Management
- 03. Corrosion Resistant Materials

### Optical Encoder for Noise-Free Digital Control

ElectroPuls™ systems use optical encoder technologies for precise extension control and a dedicated position channel for set up and end of test.



### High System Accuracies Give Confidence in Results

Using precision transducers with the advanced digital controller, ElectroPuls systems ensure the highest accuracy of measurements. This includes a load weighing accuracy of  $\pm 0.005\%$  of load cell capacity, or  $\pm 0.5\%$  of indicated load.



### Dynacell™ - Improved Accuracy and Faster Testing

The Instron® advanced fatigue-rated load cell, Dynacell, can reduce inertial errors caused by grips and fixtures. Improving the accuracy of load data across the entire frequency range, it allows tests to run at higher frequencies within ASTM and ISO tolerances. On the Linear-Torsion models, inertia compensation also works on the torsional axis.

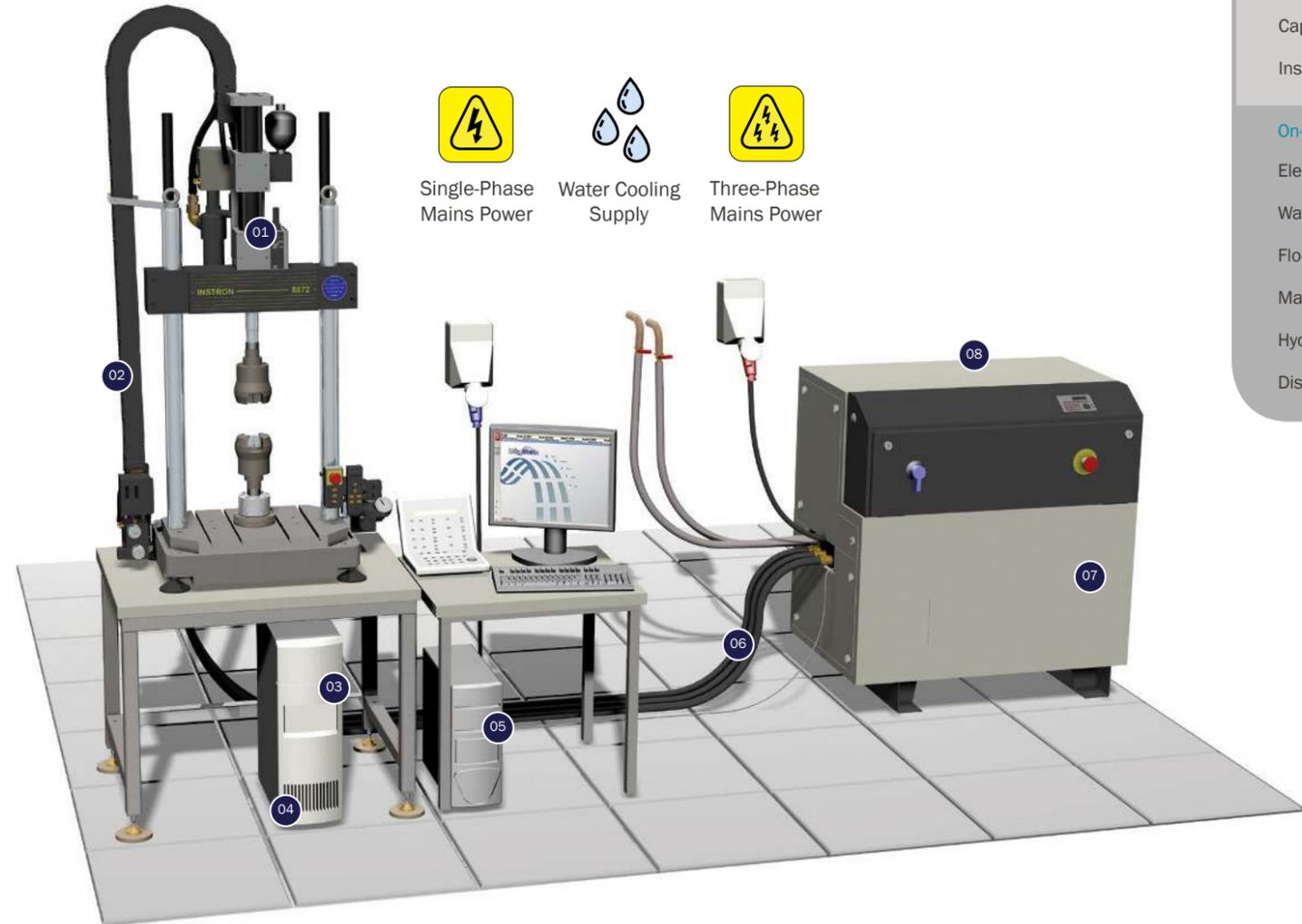
### Patented Stiffness Tuning: We've Taken the Hassle Out of System Optimization

Whether you are new to testing or already familiar with dynamic testing instruments, tuning is essential for system optimization. Using patented algorithms, the Instron Console Software allows you to automatically establish tuning parameters based on specimen stiffness. Fast, simple, and effective.



# Footprint - The Choice is Yours

Servo-hydraulic systems have previously been the only choice for lower-force, high-frequency dynamic testing. These systems require a high-pressure hydraulic power supply, three-phase electrical power, a high-flow water supply to cool the pump, and extensive annual maintenance to ensure the system is always performing.



## Cost of Ownership: Servo-hydraulic Test System

| One-Time Costs               |            |
|------------------------------|------------|
| Capital purchase             | \$\$\$\$   |
| Installation of utilities    | \$\$\$\$   |
| On-Going Costs               |            |
| Electrical Power             | \$\$\$\$\$ |
| Water Cooling                | \$\$\$\$\$ |
| Floor Space                  | \$\$\$\$\$ |
| Machine maintenance          | \$\$\$\$\$ |
| Hydraulic supply maintenance | \$\$\$\$\$ |
| Disposal of consumables      | \$\$\$\$\$ |

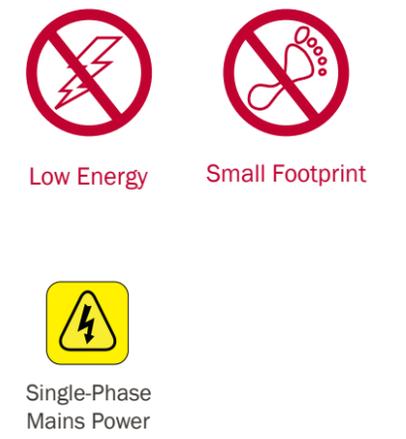
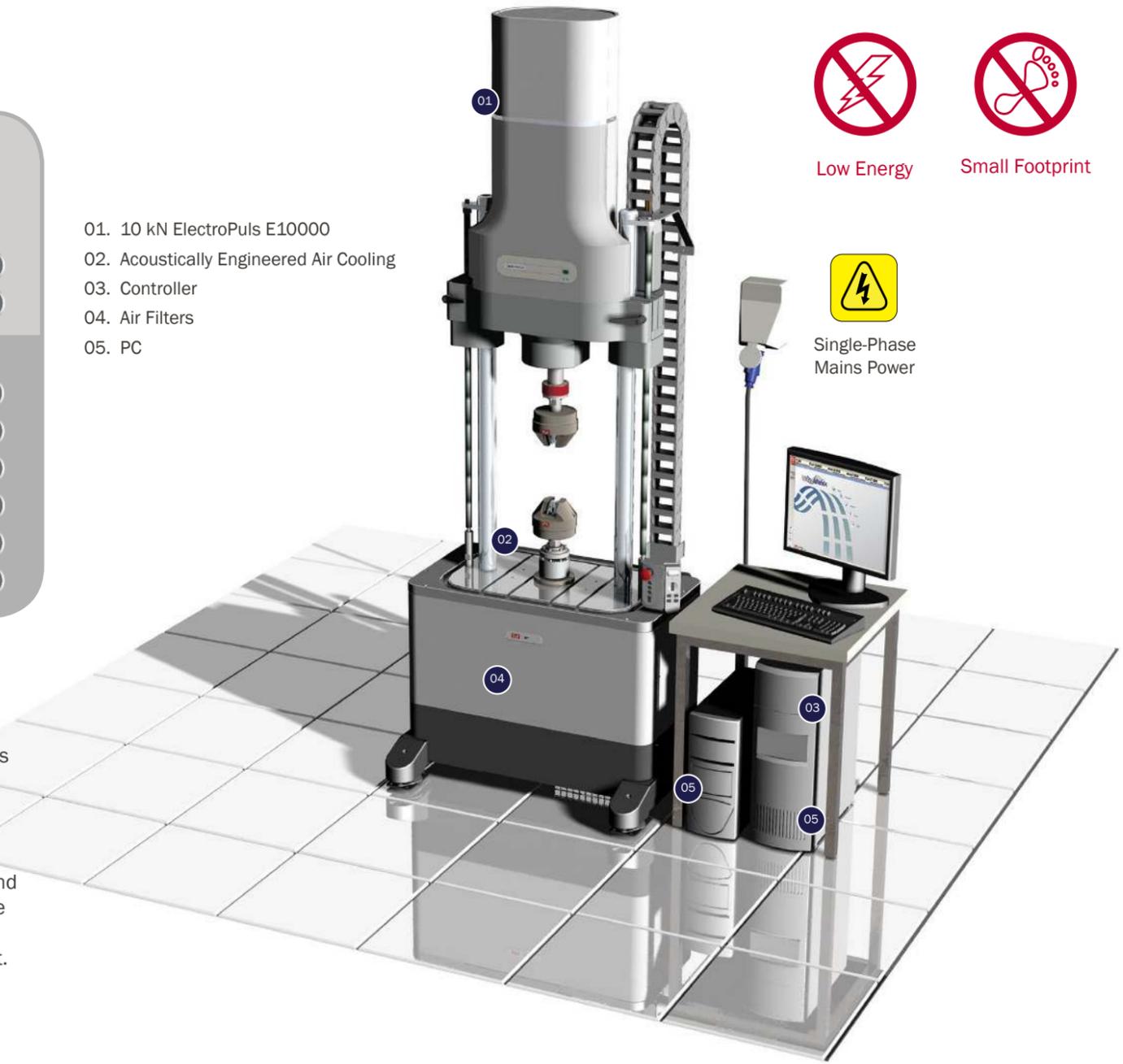
01. Servo Valve Maintenance, Seal Replacement, Filter Change
02. 10 kN Servo-hydraulic System
03. Controller
04. Air Filter
05. PC
06. Hoses to replace every 5 years
07. Oil and Air Filters, Oil Change, Oil Disposal
08. Hydraulic Power Supply

## Cost of Ownership: ElectroPuls™ Test System

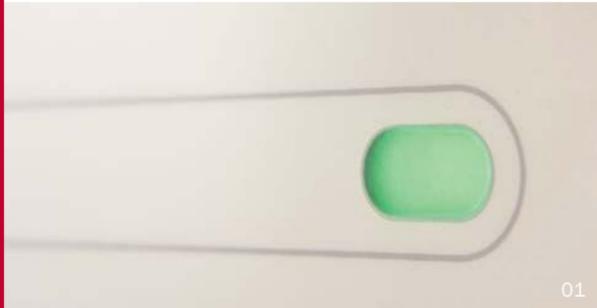
| One-Time Costs               |              |
|------------------------------|--------------|
| Capital purchase             | \$\$\$\$\$   |
| Installation of utilities    | \$\$\$\$\$   |
| On-Going Costs               |              |
| Electrical Power             | \$\$\$\$\$   |
| Water Cooling                | \$\$\$\$\$   |
| Floor Space                  | \$\$\$\$\$\$ |
| Machine maintenance          | \$\$\$\$\$\$ |
| Hydraulic supply maintenance | \$\$\$\$\$   |
| Disposal of consumables      | \$\$\$\$\$\$ |

With ease of installation and exceptional low cost of ownership, ElectroPuls systems are the ideal choice for dynamic testing in today's environmentally-friendly laboratories. These innovative systems require no three-phase electrical power, no water-cooling supplies, no space for hydraulic power supplies, no costly and complex maintenance routines, and no oil to dispose. ElectroPuls systems are the dynamic testing machines of the future that leave servo-hydraulic technologies in the past.

01. 10 kN ElectroPuls E10000
02. Acoustically Engineered Air Cooling
03. Controller
04. Air Filters
05. PC



# Take Control



## 01. Get Instant Status with System Indicator

A quick glimpse at the System Indicator provides instant status whether it's in Test mode, Setup Mode, or Off.

## 02. Ensure the Crosshead is Clamped With Status Indicators

Clamp status indicators on the E10000 systems help to ensure that the minimum amount of clamping force is applied to the crosshead before starting a test.

## 03. Adjustable Test Space Without Additional Hassle

TWIST the lever clamps, PUSH the button to move the crosshead to the desired position, and then twist the levers to LOCK the crosshead. No tools to lose, costly pneumatic air supplies to run or time-consuming training required.

## 04. Safety First: Controls at Your Fingertips

Critical switches and controls for emergency stop, power, and crosshead adjustment are rigidly mounted for ease of access. The commonly used actuator jog and grip controls are located on the removable handset and allow users to adjust the actuator position precisely and rapidly, without repeat visits to the system workstation. Restricted force and velocity in Setup Mode help to minimize the risk of accidental damage during set up.

## Dynamic Stability Controls Manage Unexpected Events



### Break Detect

Monitors the system to determine specimen break and manages the energy released at failure.



### Stability Control

With acceleration sensing to manage unexpected events, such as frame movement or power failure.



### Specimen Protect

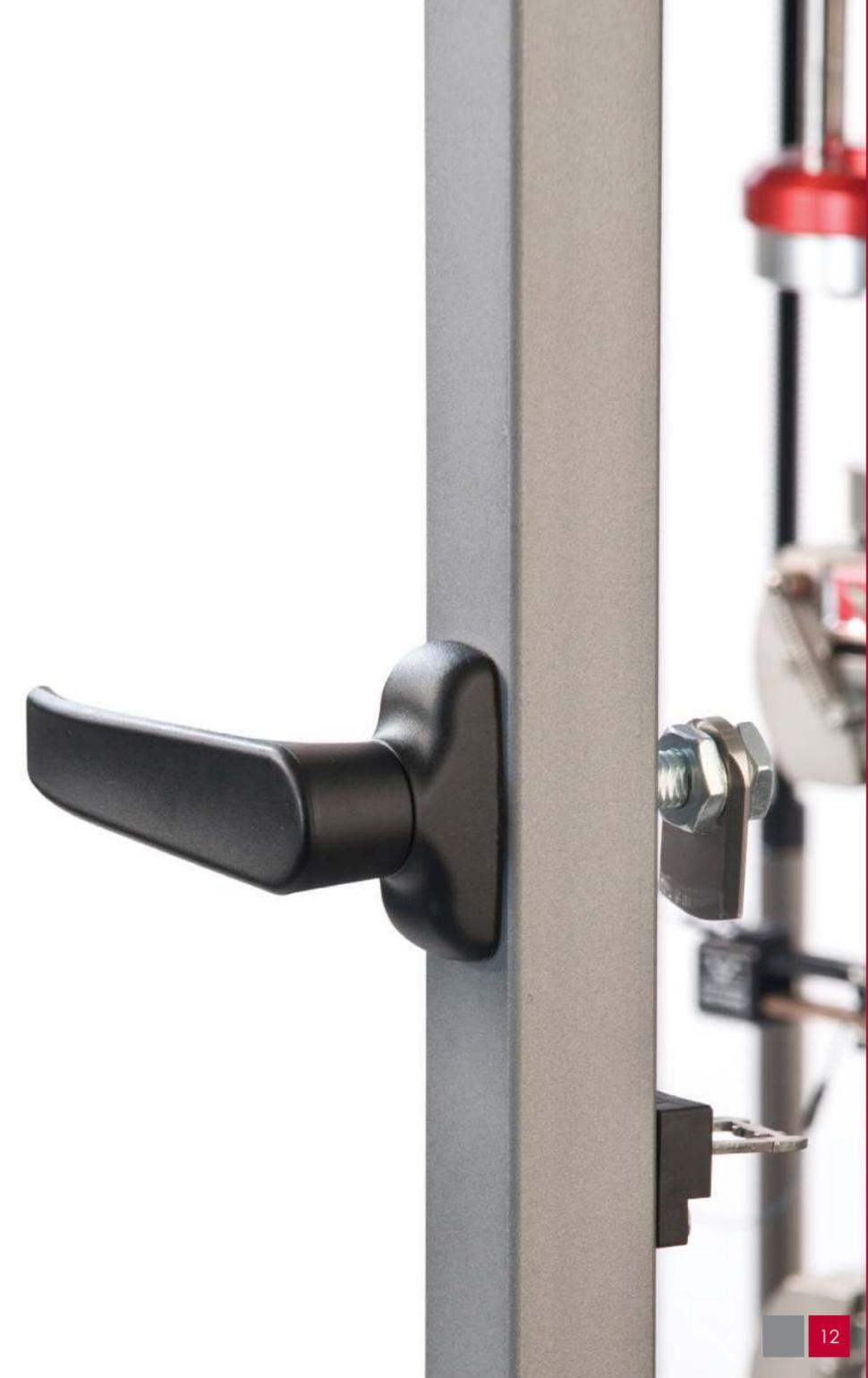
Monitors the load from exceeding a threshold and prevents overloading and damage to the specimen during set up and end of test.

## A Software Interface Designed to Put You in Control

ElectroPuls systems feature an intuitive software console that provides instant access to critical control features, limits, tuning, and machine status, and allows users to get tests running in seconds.

## Safety First: Test Space Access Control

ElectroPuls systems can be supplied with a CE-certified safety guard to prevent operator access to the test space when at high power and help minimize damage from flying specimen debris.



# Exceptional Versatility



## Static Testing

Configure an ElectroPuls™ system with Instron® Bluehill Universal® Software and any range of grips or fixtures, to run a variety of static tests.

### State-of-the-Art Software to Suit Your Static Applications

Bluehill Universal sets the standard for power and simplicity for tensile, compressive, flexural, peel, tear, and friction testing.

### Large Speed Range to Simulate Real Life Conditions

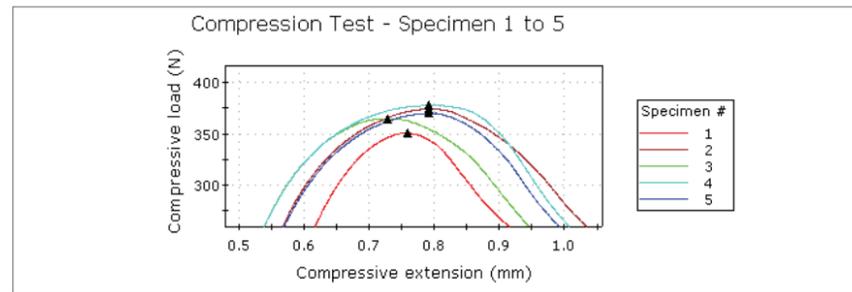
ElectroPuls has a speed range more than 100 times greater than that of a conventional screw-driven machine.

### Long Stroke for a Wide Range of Tests

60 mm of test extension covers a wide range of static and dynamic tests without running out of stroke.

### Non-Contacting Strain Measurement Prevents Specimen Damage

Instron Video Extensometer accessories can provide micron-level strain measurement without specimen contact. Ideal for static applications requiring high throughput or those applications with contact-sensitive materials.



## Dynamic Testing

Coupled with the latest WaveMatrix 2™ Software, the high dynamic bandwidth of the ElectroPuls™ linear motor permits a variety of low-force tests.

### WaveMatrix 2 Software Delivers Flexibility

The highly visual WaveMatrix 2 Software environment simplifies the set up and running of the majority of dynamic tests with user-set features including data collection, waveform generation, and step programming.

### Dynamic Performance to Meet Your Applications

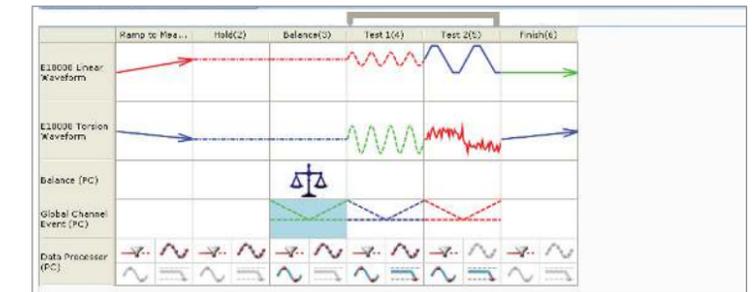
ElectroPuls systems can perform tests ranging from quasi-static through to test frequencies greater than 100 Hz.

### T-Slot Table: Test Almost Anything!

The corrosion-resistant T-slot table has the flexibility to accept a wide range of grips, fixtures, saline baths, environmental chambers, accessories, and components.

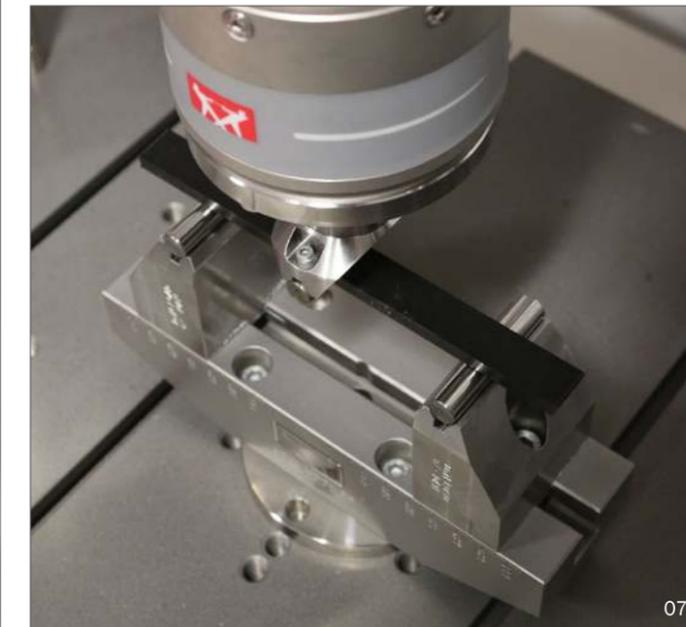
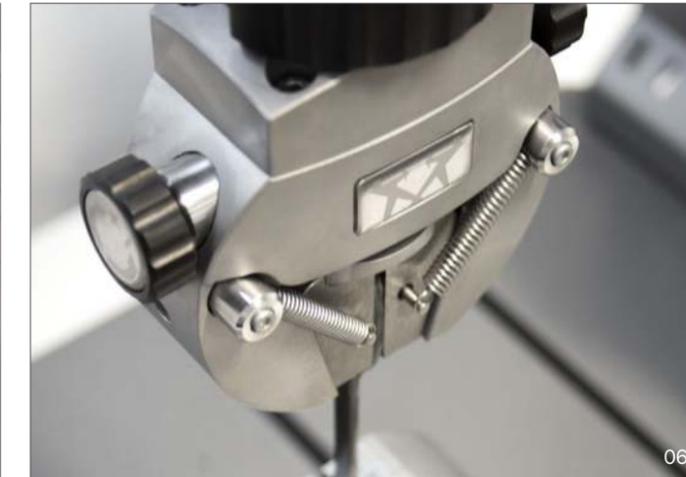
### Application Specific Software Expands Dynamic Capability

Using Application Specific software modules and suitable grips and fixtures, you can configure ElectroPuls systems to run more traditional materials tests, such as fracture mechanics and low-cycle fatigue.



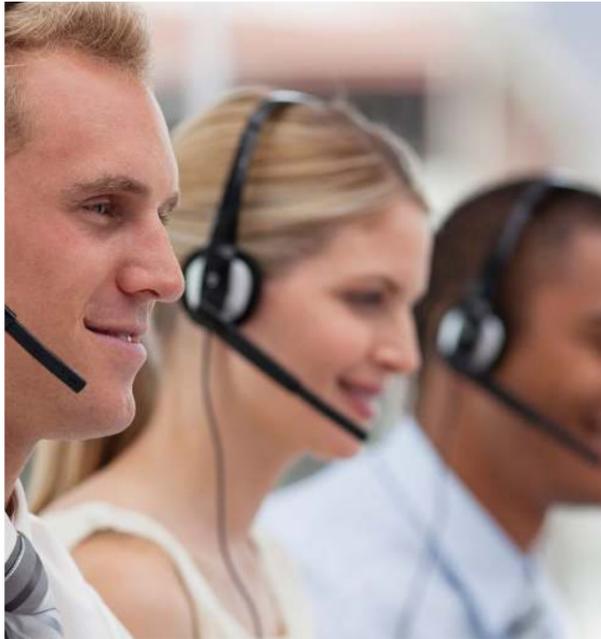
## Accessories Extend the Life of Your System

ElectroPuls™ systems can be extended with various accessories to meet the changing needs of your laboratory. Fit everyday accessories, such as mechanical or pneumatic grips, to perform standardized materials tests; or fit the Dynacell™ load cell to the upper moving motor and utilize customized fixtures to take advantage of the corrosion-resistant T-slot table.



- 01. 10 kN Compression Platens
- 02. 10 kN Bi-axial Pneumatic Wedge Grips
- 03. Pullrod kit for low and high temperature testing on E3000 and E10000
- 04. 1 kN Pneumatic Wedge Grips
- 05. 1 kN Mechanical Wedge Grips
- 06. 3 kN Bi-axial Mechanical Wedge Grips
- 07. 10 kN 3-Point Bend Fixture
- 08. Low capacity Dynacell™
- 09. 600 Series Environmental chamber and Pullrod kit

## Global Presence, Local to You



### When You Need Us, We're There

Founded in 1946, Instron® has established itself as a leading supplier of materials testing equipment and solutions. Operating with 25 offices in 18 countries and more than 1200 employees, we have a global infrastructure that is local to you and remain committed to advancing materials and components testing techniques.

### Maximize Uptime

The Instron world-class service organization is committed to deliver high-quality installation, calibration, training, maintenance, and technical support throughout the life of your system. We help ensure that your systems are there when you need them.

### Quality Standards You Can Trust

Operating under ISO 9001 quality standards and with an extensive list of accreditations, Instron employs a product design philosophy where our customers' data integrity, safety, and protection of investment are paramount. We strive to ensure that our customer satisfaction is second to none.

## Technical Highlights



|                               |     | E1000                                 | E3000           | E3000 Linear-Torsion                                    | E10000          | E10000 Linear-Torsion                                   |
|-------------------------------|-----|---------------------------------------|-----------------|---|-----------------|---|
| Dynamic Linear Force Capacity | ±N  | 1000                                  | 3000            | 3000  | 10000           | 10000   |
| Torque Capacity               | ±Nm | -                                     | -               | 25  | -               | 100   |
| Linear Stroke                 | mm  | 60                                    | 60              | 60  | 60              | 60  |
| Torsional Rotation            |     | -                                     | -               | ±135° as standard, user configurable to ±16 revolutions | -               | ±135° as standard, user configurable to ±16 revolutions |
| Mounting                      |     | Table: Vertical (optional horizontal) | Table: Vertical | Table: Vertical   | Floor: Vertical | Floor: Vertical   |



**Drive System:**  
Advanced linear motor technology



**Frequency Range:**  
Greater than 100 Hz



**Cooling:**  
Temperature-controlled air-cooling



**Force Sensor:**  
Advanced Dynacell™ technology



**Crosshead Adjustment:**  
Electric lift, manual clamps with no tools required



**Safety:**  
CE-certified safety guards available



**Displacement Sensor:**  
Optical Encoder for precise extension control



**Load Weighing Accuracy:**  
±0.5% of reading or ±0.005% of load cell capacity (1-100%), whichever is greater



**User Interface:**  
PC with Console and application software



**Controller:**  
Advanced Digital Controller with 19-bit sensor resolution and 5 kHz loop update rate on load and strain channels



**Electrical Power:**  
Single-Phase



**Bi-axial Variants:**  
E3000 and E10000 models

## Americas

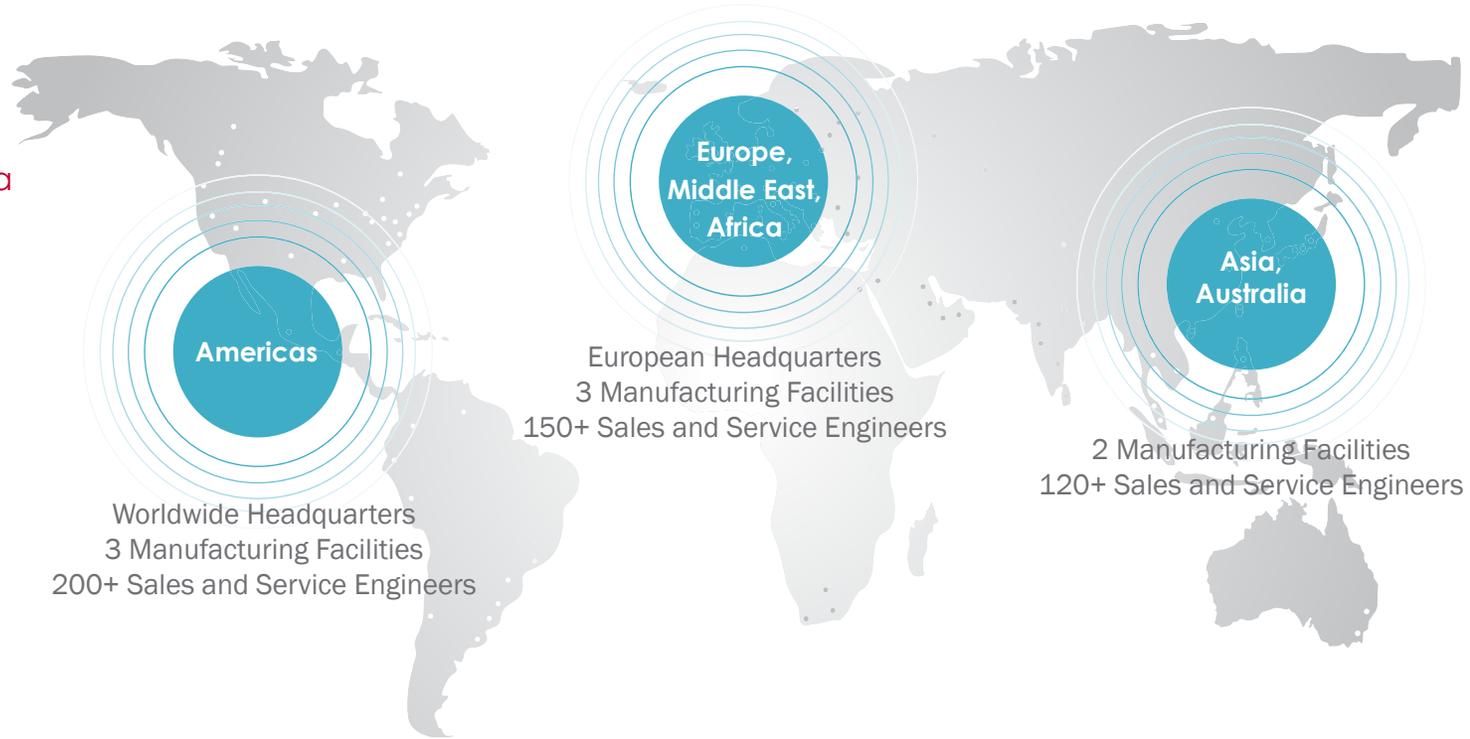
Brazil +55 41 3035 9400  
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Central America +1 781 575 5000  
Mexico +1 781 575 5000  
South America +1 781 575 5000  
United States +1 800 877 6674/1 781 575 5000

## Europe, Middle East, Africa

Africa +44 1494 456815  
Belgium +31 6 108 982 86  
France +33 1 39 30 66 30  
Germany +49 6151 3917 457  
Ireland +44 1494 456815  
Italy +39 011 9685 511  
Luxembourg +31 6 108 982 86  
Middle East +44 1494 456815  
Netherlands +31 6 108 982 86  
Nordic Region +44 1494 456815  
Spain +34 93 594 7560  
Switzerland +33 1 3930 6655  
Turkey +90 216 562 10 52  
United Kingdom +44 1494 456815

## Asia, Australia

Australia +61 3 9720 3477  
China +86 21 6215 8568  
India +91 44 2 829 3888  
Japan +81 44 853 8530  
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# Global Support that is Local to You

Instron® has a global infrastructure that is local to you and remains committed to being the leader in mechanical testing instrumentation.

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Worldwide Headquarters  
825 University Avenue, Norwood, MA 02062-2643 USA  
+1 800 564 8378 • +1 781 575 5000

European Headquarters  
Coronation Road, High Wycombe, Bucks, HP12 3SY UK  
+44 1494 464646

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