Materials Testing Instrumentation

A critical element in any materials testing environment is the accurate capture, display, analysis and presentation of test data. United offers a complete line of materials testing instrumentation that provides a vast array of options designed to fit your testing requirements.

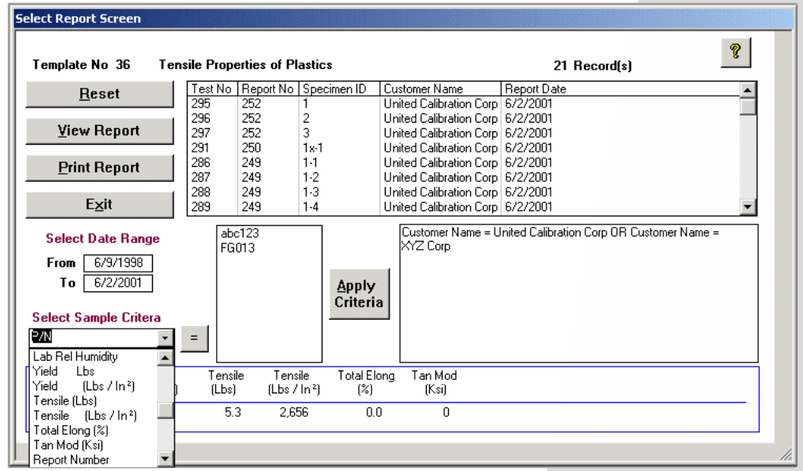
UNITED TESTING SYSTEMS

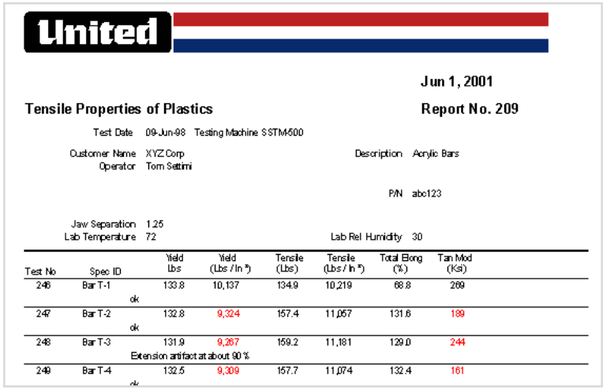
DATA ACQUISITION & CONTROL

The United “SMART” series testing systems use a PC-compatible computer for data acquisition as well as controlling the test machine. Because what is the “best” PC available is a constantly moving target, United regularly reviews the marketplace to ensure customers receive the greatest value consistent with our goals of high reliability, availability and cost. United’s leadership in the development of computerized testing systems coupled with this techno-logy review policy, gives our customers the added advantage of constantly increasing computer performance while offering stable pricing.

United DATUM Software

This Windows-based software provides precise control of the testing process, accurate data recording and flexible analysis. Microsoft AccessÒ database outputs presentation-quality test reports that can be customized as needed. To make maintenance or changes easy for users of the test systems, the source code is included with the application.





MODEL DIG-7000 SA SMART DIGITAL

United's Model DIG-5000 Smart Digital is a revolutionary approach to the presentation of alphanumeric test data. This unique precision data acquisition system is designed for ease of use while providing the user with a variety of options usually available only with computer-controlled test machines. Test data, such as Load Range, Peak, and Instant Load, is displayed simultaneously on an easy-to-read cool blue alphanumeric display. Simple push-button operation allows quick selection of any desired measurement unit including pounds, kilograms, newtons, and placement of the decimal point at any desired location on the scale. The panel can be locked out to prevent unauthorized changes to the setup.

Digital Readout Specifications

Display range	20 digits
Update rate	20 readings per second (avg.)
Display face	4 lines, 20 characters per line
Character size	¼" high
Operating power	115/230 Volt, 50/60 Hz, 20 A
Operating temperature	+10°C to +50°C
Dimensions (overall)	5" High x 5" Wide x 8" Deep
Weight	5.5 pounds
Accuracy	Meets ASTM-E4 requirements with United load cells, exceeds ASTM E4 requirements down to 1% of range
Data display (automatic)	Set load range, Peak load, Instant load
User selectable functions	Sample break detect sensitivity Time-set/display Measurement units – select Decimal point location – select Send data – via RS-232 port Load rate display
Options	Automatic proof loading Overload-detect

The DIG-7000 SA is included as standard equipment on selected United testing machines such as the LCH Speedy Tester

LOAD CELLS

Load cells are technically known as "precision electronic force measurement units." United load cells are designed to meet ASTM-E4 requirements along with the operation requirements of most United testing machines. The specific function of the load cell is to precisely measure the amount of force (load) applied to the specimen being tested. The unit is also compatible with any of United readout or data acquisition systems. United offers a variety of load cells designed to fit any testing need. Each load cell is constructed of the highest quality materials with applied, permanently bonded and seal strain gages to measure force in one of three categories: tension only, compression only, or both tension and compression. Standard load cell capacities range from one pound to 120,000 pounds with two different load cell types depending on capacity: those with up to 500 pounds use a double a cantilever beam design, while those over 500 pounds are of the shear member type. All United load cells under 3,000 pounds capacity are equipped with automatic overload protection, and every cell is factorycalibrated and internally standardized at 2.000 millivolts/volt output to facilitate interchanging without the need for recalibration. With a standard accuracy of ±0.5% (from 1% to 100% of rated value), United load cells can also be manufactured with accuracy up to ±0.25% (from 1% to 100% of rated value) for applications requiring such functions. Available in single or dual bridge units, load cells offer the flexibility to use two readouts simultaneously, if desired. United load cells are also available in optional "self-identifying" version. Cell capacity, calibration capacity, and serial number are automatically sensed and input into the computer system without operator intervention. **Special load cells with a capacity less than one pound or greater than 120,000 pounds are available on request.**

Low Profile – for added crosshead travel and off-center loading applications

Flanged Mechanical – fits pre-1987 United electromechanical test machines

Quick Release – with ½ " pin joint for quick and easy removal

MODEL EZ EXTENSOMETERS

Easy, quick, one-handed placement is the key to United Model EZ Extensometer strain gage device. Designed with a minimum number of moving parts and a “snap-on” mechanism, the unit combines simple operation with reliable and efficient performance. The automatic gage length setting also ensures a high degree of consistency between users and samples.

Each unit is factory-calibrated and requires annual recalibration to maintain measuring accuracy. When necessary, an “EZ” replacement of the knife-edges may be accomplished in a matter of minutes without adversely affecting calibration or balance. With the versatility to be used on round or flat samples, the EZ Extensometer is equipped with built-in overload protection and is available in several gage lengths to accommodate most testing requirements. All United extensometers meet the accuracy requirements of ASTM E-83, Class B-1. Special gage-length and optional “self-identifying” versions are available upon request. Range and gage length are automatically sensed by the computer attached to the test system without input from the operator

EZ-.1-1

EZ-.2-2

AVERAGING EXTENSOMETER

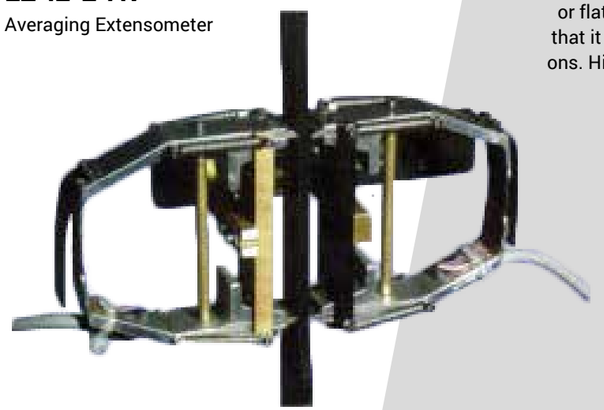
- Measures from both sides of sample and averages the results.
- Available in gage lengths of 0.5”, 1”, 1.4” or 2”.
- Built-in overload protection.
- Automatic gage length setting.
- Class B-1 extensometers.
- High temperature version (up to 350°F) is also available.

BIAXIAL EXTENSOMETER

Specifically designed to determine Poisson’s ratio. Unit weighs only 40 grams. Meets ASTM E-83, Class B-1 and B-2 specifications. High temperature version (up to 350°F) also available.

EZ-.2-2-AV

Averaging Extensometer



BREAKAWAY EXTENSOMETER

Ideally suited for materials with high elongation characteristics. Available in gage lengths of 0.5”, 1” and 2”. Accurately measures up to 50% elongation.

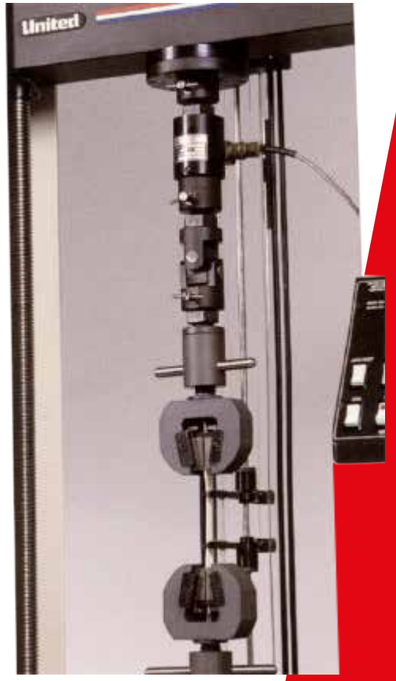
HIGH ELONGATION CLIP-ON EXTENSOMETER

Designed for easy, clip-on attachment. Available in gage lengths of 0.5”, 1”, or 2”. With measurement capabilities to 100% sample elongation, the unique extensometers also features built-in overload protection. These extensometers can be configured for use on either round or flat samples. Each unit is factory-calibrated to ensure that it meets ASTM E-83, Class B-2 accuracy specifications. High temperature version is also available.

WEBBING EXTENSOMETER

Used exclusively to measure the elongation of webbing material, United Webbing Extensometer can accommodate a measuring range of 1 to 2 inches, and a gage length of 8 to 10 inches. Designed with clothespin type clamps that contain small needles to penetrate the webbing, the gage length is automatically set when these clamps lock onto the sample.

EXT-69-EL-20



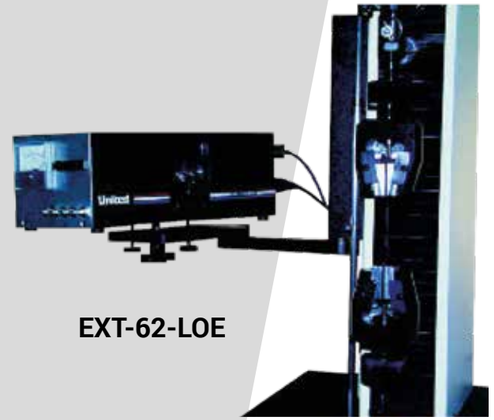
HIGH ELONGATION EXTENSOMETER

To cover the needs of high elongation elastometric samples testing, United offers the High Elongation Extensometer. Mounted on the load frame column cover via two articulating arms, the extensometer can be moved up or down, or swung completely out of the way during non-use periods. Along with a resolution of 0.005", accuracy of ±0.01" or 0.5%, whichever is greater, and a usable range of 20 inches, the extensometer also features quick release adjustable clamps easily changed from 1 to 2-inch gage lengths, and a unique air dampening counterbalance system. Designed for use in a room temperature environment, the extensometer can be used in conjunction with any of a variety of strain measuring recording instrumentation.

LASER EXTENSOMETER

Using a laser scanning approach, this unique extensometer permits accurate non-contact extension measurement from the start of the test through sample failure without interruption. Designed to provide accurate extension measurements from less than 1% to greater than 1000% strain, this optical scanning device performs equally well for sample testing at high, normal, or very low test temperatures.

The laser extensometer can be used to measure a broad range of materials including ultra-high modulus carbon composites, ceramics, steel and non-ferrous metals, paper, wood products, and most varieties of elastomers.



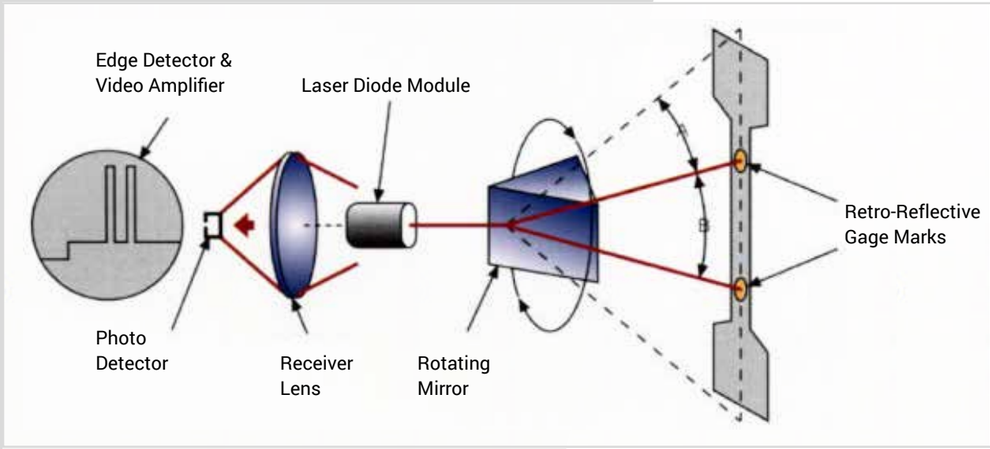
EXT-62-LOE

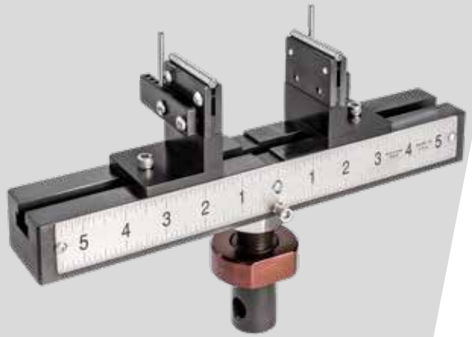
LASER EXTENSOMETER THEORY OF OPERATION

A visible-light laser diode transmits a low-power laser beam to a rotating mirror that scans the sample material along the testing axis. A pair of retro-reflective gage targets affixed to the sample prior to the test returns the laser light to the rotating mirror and then to a laser receiver. The system computer measures the scan time between targets and continuously calculates the varying distance between targets trigonometrically.

TARGET APPLICATION DEVICE (TAD)

Used in conjunction with United Laser Extensometer, TAD applies retro-reflective gage mark material (laser targets) to the test sample. Adjustable gage length.



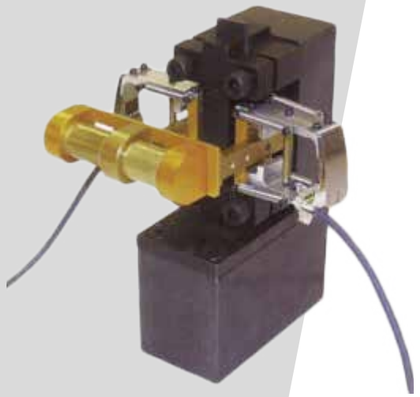


TRANSVERSE FLEXURE UNITS

Determining the flexural properties of materials such as plastics and high-modulus composites requires equipment capable of functioning accurately in varying temperatures without compromising efficiency or test results. United offers a variety of Transverse Flexure Units in both long beam and short beam configurations with a choice of three or four point loading to accommodate virtually any flexural testing requirement. The LVDT coil push rod senses deflection directly on the sample, precisely opposite the load point. The unit is configured so as to keep the LVDT coil outside the harsh temperature environment when testing at other than room temperature. The sturdy load supports are locked in place with Allen-type bolts through a T-slot. Deeply grooved into steel, the numbers and graduations are easily readable and long lasting.

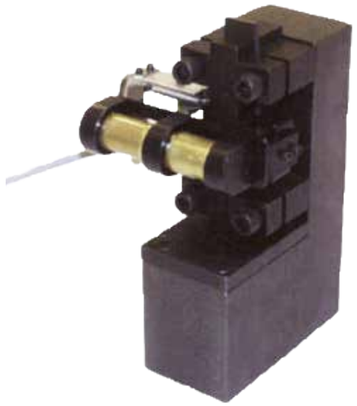
AVERAGING COMPRESSOMETER

In accordance with ASTM D-695, the United Averaging Compressometer is designed to measure the compressive properties of rigid plastics. Functioning in the opposite mode of the extensometer, the compressometer takes measurements on both sides of the sample. Available in English or metric measurements, the unit also has a builtin overload protection, automatic gage length setting, easy snap-on attachment, and accuracy of up to ±0.0001 (class B1). Variations on gage lengths are available.



STANDARD COMPRESSOMETER

United Standard Compressometer is designed to measure compressive strain on rigid test samples. Including many of the same benefits of the EZ “Snapon” Extensometer, the compressometer allows for easy use with quick one-hand placement, automatic gage length setting and built-in overload protection. The unit is available in gage lengths of 1 inch and 2 inches. It can be used for testing round as well as flat samples. Metric standard and high temperature units are also available. Standard Compressometer combines versatility with simplicity in order to ensure consistent and accurate results for any user.



MEASURING UNITS

Accurate test data input is the foundation for any material testing. United has maximized this accuracy by offering a wide variety of easy to use sample measuring devices. Designed to eliminate the potential of transcribing errors, the units send the sample measurements directly to the data acquisition system before any material testing takes place. Whatever the sample, United has a measuring unite that can accommodate any size, any composition.

- The Caliper Model: used mostly with rigid sample material, has a 6” range with a resolution of 0.0005”.
- The Micrometer Model: also used to measure rigid materials with a 1-inch span and a resolution of 0.00005”. Larger capacity calipers and micrometers are also available.
- The One-Inch Digital Indicator: provides the best results on rubber or flexible samples and has a resolution of 0.0001”.
- Other models are available for special requirements including thin materials that measure to ±0.00001”.

STRAIN GAGE COMPENSATION UNIT (EXT-230)

The job of plotting strain directly from strain gages belongs to United Strain Gage Compensation Unit. A ten-turn precision potentiometer and counter allow he setting gage to factor quickly and accurately. Single or dual averaging gage configurations are accommodated. Incorporating the highest reliability and solid state components, these units are accurate to ±1% of measuring range both by English and metric standards.

INDIVIDUAL STRAIN GAGE ADAPTER (DAT-280)

As the most reliable means for tracking individual strain gages, the four separate channels of United Individual Strain Gage Adapter allow simultaneous data input from up to four strain gages. This unit is ideally suited for use in test situations requiring the computation of Poisson’s Ratio, Young’s Modulus of Elasticity, and to measure the uniformity of the applied strain. Signals generated by the unit are sent directly to the data acquisition system for accurate computation. The included software allows digital plotting of: individual strain gage readings, average of multiple gages, different between gages to show bending strain, and Poisson’s Ratio.

STANDARDIZATION UNIT (PLT-30-SU)

Vital to the standardization of Unite plotters, digital readout units, and data acquisition systems are the United Standardization Units. Designed for accuracy and easy use, the unit provides standard calibration points at 1, 2, 5, 10, 20, 50, and 100% of full scale. Though simple in appearance and operation, the unit enables the user to verify the performance of all United readout devices.

DAT-280

UNITED TESTING SYSTEMS

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