

United

UNITED "SMART" TEST SYSTEMS

Available in both floor and table model configurations, these test systems incorporate advanced computer technology and user-friendly software providing an extremely efficient, reliable approach to any materials testing need.

Well-known for their rugged construction and versatile performance, the "SMART" test systems are designed to accommodate a wide range of materials and applications meet the most demanding test requirements.



SFM "SMART - 1" TEST SYSTEM

Self-Checking Facility

To help ensure the integrity of every test, United "SMART" machines automatically perform a series of self-diagnostics prior to the start of each test. Analog to Digital converters for load and strain measurements are calibrated and various PC components are also subjected to diagnostic tests. The PC system powers down its monitor and enters sleep mode after a short time of inactivity.

Digital Signal Processor (DSP) Technology

Each United "SMART" test machine incorporates analog-to-digital converters and servo controller that are equipped with digital signal processors. Operating under computer control, the digital signal processor provides high-precision data conversion and motion control. Analog-to-digital conversions are synchronous and capable of performing at a rate of up to 8192 conversions per second at 20 bits. The motion control update rate is 3300.



SMART Loadframe Features

- Single or Twin Column loadframe
- Twin ball screw drive with closed-loop servo and motor controls
- Crosshead Guidance System: Uses heavy channel shape steel columns. Maximum lateral motion $\pm 0.25\text{mm}$ over full crosshead travel
- Anti-backlash system: standard on floor models, optional on table models
- Emergency Stop Control: via rocker and mechanical limit switches
 - Interchangeable electronic loadcell weighing system is standard
 - Electronic self-identifying loadcell & extensometer are optional
 - Automatic overload protection
 - Quick-Disconnect loadcell & fixture system
 - Controlled release of load in the event of power failure
 - Special colors optionally available.





United SSTM "SMART"
Table Model, Single Column shown
with optional United Lazer Extensometer



United SSTM "SMART"
Table Model



United STM "SMART"
Table Model

“SMART” TEST SYSTEMS

OPTIONAL EQUIPMENT AND FEATURES

- Sample measuring units for quick, accurate measurement:
 - Micrometer type, reading to 0.001mm (0.00005 in)
 - Caliper type, reading to 0.01mm (0.0005 in). Can also be used for elongation measurement.
 - Dial indicator type, reading to 0.025, 0.0025 or 0.00025mm (0.001, 0.0001 or 0.00001 in).
- Upgrades for computer system: per customer request.
- Automated testing software systems:
 - Makes the testing process fully automatic.
 - Automatic program control of load rate, strain rate, and crosshead speed.
- Do repetitive cycling:
 - Position, strain or load.
 - Count cycles.
 - Record limit values.
 - Auto shutdown on failure or over-limit values.
- Compatible test programs for every application.
- Wide variety of grips and fixtures to accommodate all standard testing applications.
- Customized grips and fixtures for special testing applications.
- Choice of contact or non-contact style extensometer for most any material and strain measurement application.
- Environmental chambers for high or low temperature testing applications.
- Extra load frame height and/or width for special applications.

Additional Control Features Include:

- Preload, Test, Stop and Return operations initiated with one keystroke.
- Preload Force, Test Speed and Return Speed may be preset.
- Jog controls allow fast and accurate crosshead setup.
- Automatic Stop or Return following sample break.
- Real-time graphic display of Load (or Stress) vs. Extension.
- Load measurement accuracy: $\pm 0.5\%$ of reading from 1% to 100% of rated capacity.
- Extension from crosshead: Resolution = 0.63 micron/jaw separation, Accuracy = ± 83 micron/meter of travel. Optional high-resolution encoder makes Resolution = 0.063 micron/jaw separation.
- Extension from extensometer: Resolution = 1/262144 of full range, Accuracy per extensometer specifications.
- Standard system supports one load and one extensometer input channel. Additional channels are optional. Resolution of 20 bits binary. DSP filter standard. Conversion rate 4096 Hz (standard) or 8192 Hz (optional).
- Operator-selectable measurement units: English, Metric, SI, or mixed.
- Operator may set any test speed within the capacity of the machine using keyboard entry.
- Operator can program up to twenty preset speeds.
- Speeds may be selected “on the fly” with instant crosshead response.
- Limits programmable-position, load or strain.
- Cycle functions programmable-position, load or strain control.
- Area compensation on/off.
- Digital servo control system – optional encoder, digital signal processor, solid state amplifier. Optional upgrades, customized or “specific-brand” computer systems can also be provided to meet special application requirements or customer preference.

Loadframe & Drive System Specifications Common to All SMART Models:

- Lateral Motion: $\pm 0.25\text{mm}$ (0.01 in.) maximum over full crosshead travel.
- Speed Accuracy: $\pm 0.1\%$ of set speed for all forces within the capacity of the machine when averaged over the larger of 15 seconds or 50mm (2 inches).
- Position Resolution: $0.6\mu\text{m}$ (25 micro inches) standard. $0.06\mu\text{m}$ is optional with highresolution encoder.
- Position Accuracy: The greater of 0.025mm (0.001 in.) or 0.025% of movement.
- Position Repeatability: $\pm 0.005\text{mm}$ (0.0002 in.).
- Drive Resolution: Same as Position Resolution.

Force Measurement System:

- Accuracy: \pm the larger of 0.5% of reading or 0.01% of capacity.
- Repeatability: \pm the larger of 0.25% of reading or 0.005% of capacity. United SMART series machines together with United selfidentifying load cells meet or exceed the following industry standards:

Document Grade/Class	Range Limits
ASTM E4	None
BS 1610	0.5
DIN 51221	1
AFNOR A03-501	0
ISO 7500/1	0
EN 10002-2	0.5
JIS B7721	0.5

United self-identifying load cell specifications for Load
Range 0% to 110%

Linearity: 0.02%	Reversibility: 0.15%
Resolution: 0.0004%	Repeatability: 0.02%
Zero Stability: 0.001%/hr	Hysteresis: 0.15%

Strain Measurement System:

United SMART series testing machines together with the United EZ self-ID extensometers meet or exceed the following industry standards:

Document Grade/Class	Range Limits
ASTM E83	B1
BS 3846	A
ISO 9513	0.5
EN 10002-4	0.5

0% - 100% of range

System specifications for strain measurements using United SMART series testing machines with the type EX self-identifying extensometers.

Accuracy:	0.5 μm
Repeatability:	0.25 μm
Discrimination:	0.0004% of range
Resolution:	0.0004% of range
Bias Error:	0.25% of reading

*SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE!

SMART LOAD FRAME SPECIFICATIONS

Floor Model Machines							
MODEL	SSTM- 2.5KN	SSTM- 5KN	SSTM- 10KN	SSTM- 20KN	STM- 20KN	STM- 50KN	STM- 100KN
Capacity							
KN	2.5	5	10	20	20	50	100
LBF	562	1125	2250	4500	4500	11250	22500
KGF	255	510	1020	2040	2040	5100	10200
Full & Return Speeds (Note 1)							
inch/min	40	40	40	20	20	20	20
mm/min	1016	1016	1016	508	508	508	508
Minimum Speed (Note 1)							
inch/min	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007	0.00007
mm/min	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017
Maximum Force at Full Speed (Note 1)							
LBF	450	1125	2250	4500	6750	11250	22500
KN	2	5	10	20	30	50	100
Maximum Speed at Full Speed (Note 1)							
inch/min	40	40	40	20	20	20	20
mm/min	1016	1016	1016	508	508	508	508
Total Crosshead Travel (Note 2)							
inch	30	42	42	42	42	42	42
mm	762	1067	1067	1067	1067	1067	1067
Total Vertical Test Space (Notes 2)							
inch	30	42	42	42	41	41	41
mm	762	1067	1067	1067	1041	1041	1041
Clearance Between Columns (Note 3)							
inch	n/a	16	16	16	22	22	22
mm	n/a	406	406	406	560	560	560
Frame Stiffness							
KLBF/in	5	200	200	200	800	800	800
KN/mm	0.14	35	35	35	140	140	140
Approximate Dimensions & Weights							
Height							
inch	54	63	63	63	64	64	64
mm	1372	1600	1600	1600	1625	1625	1625
Width							
inch	12	25	25	25	35	35	35
mm	305	635	635	635	889	889	889
Depth							
inch	24	15	15	15	26	26	26
mm	610	381	381	381	660	660	660
Weight							
Kg	68	160	160	160	364	364	364
Lbs	150	350	350	350	800	800	800

Floor Model Machines					
MODEL	SFM- 50KN	SFM- 100KN	SFM- 150KN	SFM- 300KN	SFM- 600KN
Capacity					
KN	50	100	150	300	600
LBF	11250	22500	33750	67500	135000
KGF	5100	10200	15300	30600	61200
Full & Return Speeds (Note 1)					
inch/min	20	20	20	20	20
mm/min	508	508	508	508	508
Minimum Speed (Note 1)					
inch/min	0.00007	0.00007	0.00007	0.00007	0.00007
mm/min	0.0017	0.0017	0.0017	0.0017	0.0017
Maximum Force at Full Speed Low Gear (Note 1)					
LBF		22500	33750	67500	121500
KN		100	150	300	540
High Gear (Note 1)					
LBF	11250	11250	11250	11250	11250
KN	50	50	50	50	50
Total Crosshead Travel (Note 2 & 3)					
inch	60	60	60	60	60
mm	1525	1525	1525	1525	1525
Total Vertical Test Space (Notes 2 & 3)					
inch	60	60	60	60	60
mm	1525	1525	1525	1525	1525
Clearance Between Columns (Note 3)					
inch	22	22	22	22	28
mm	560	560	560	560	710
Frame Stiffness					
KLBF/in	800	800	800	1500	3000
KN/mm	140	140	140	260	525
Approximate Dimensions & Weights					
Height					
inch	94	94	94	105	109
mm	2388	2388	2388	2667	2769
Width					
inch	36	36	36	39	47
mm	914	914	914	991	1194
Depth					
inch	27	27	27	42	44
mm	686	686	686	1067	1118
Weight					
Kg	432	432	432	818	2160
Lbs	950	950	950	1800	4750

- Notes:
1. Special speeds are available
 2. Excluding load cell and fixtures
 3. Extra width and/or height loadframes available. Consult your United representative for further information.

UNITED SOFTWARE OPTIONS FOR MATERIALS TESTING

Standard

Every "SMART" testing machine comes with United's "EZMan" software which allows the user to perform any test at any selected crosshead travel rate. A wide selection of force and linear units are provided along with both numeric and graphical results. Data may be saved to an ASCII disk file for later recovery.

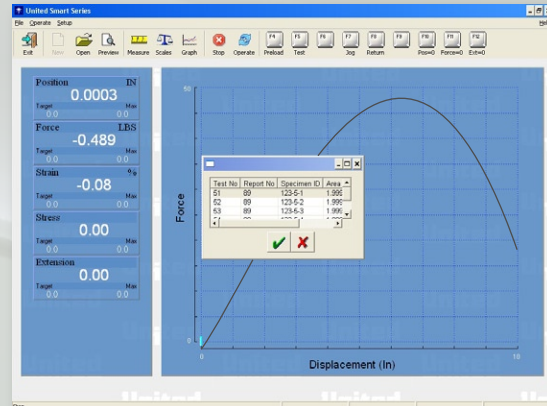
User Definable Test Procedures for Windows®

United's DATUM materials testing software operates under Microsoft Windows® and provides a high level of "Office® compatibility" by allowing test results to be sent to Microsoft Access or Excel.

Access® is a very powerful relational database and report generator. It can also share data with other Microsoft Office® applications. The report generator allows preparation of presentation-quality test reports, complete with graphs. The relational database lets the user construct queries to obtain statistical data summaries based on any material description information recorded at test time.

*SEE SOFTWARE BROCHURE FOR INFORMATION.

United's DATUM materials
Testing Control Program Screen



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