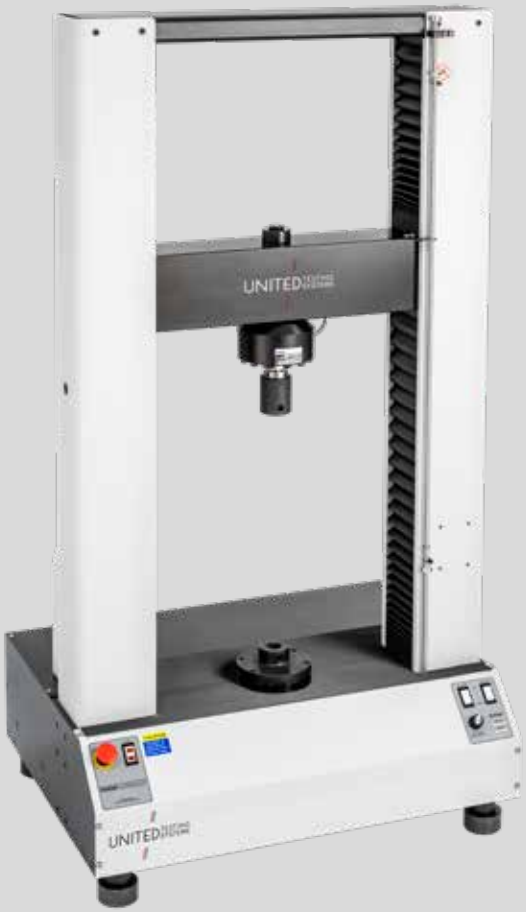
United “Smart” Test Systems

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.



UNITED TESTING SYSTEMS

SELF-CHECKING FACILITY

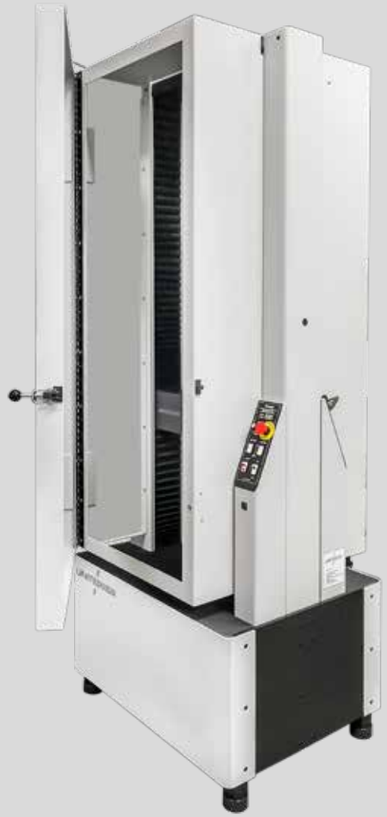
To help ensure the integrity of every test, United "SMART" machines automatically perform a series of self-diagnostics prior to the start of each test. Analog to Digital converters for load and strain measurements are calibrated and various PC components are also subjected to diagnostic tests. The PC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

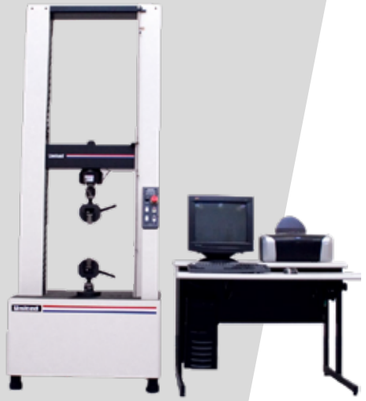
DIGITAL SIGNAL PROCESSOR (DSP) TECHNOLOGY

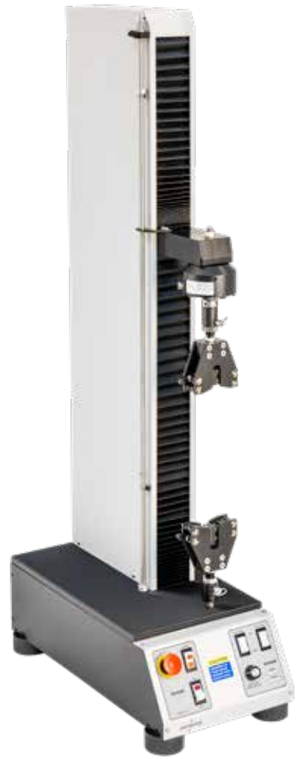
Each United "SMART" test machine incorporates analog-to-digital converters and servo controller that are equipped with digital signal processors. Operating under computer control, the digital signal processor provides high-precision data conversion and motion control. Analog-to-digital conversions are synchronous and capable of performing at a rate of up to 8192 conversions per second at 24 bits. The motion control update rate is 3300.

SMART LOADFRAME FEATURES

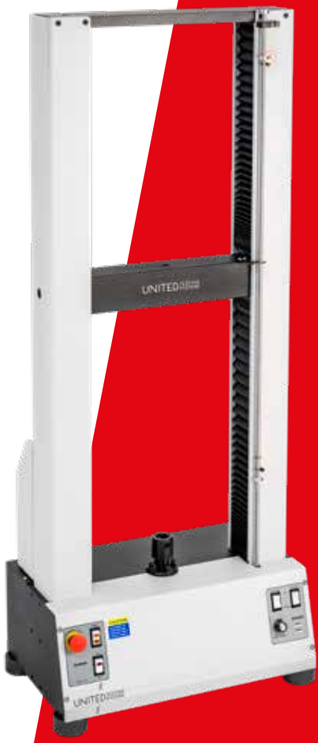
- Single or Twin Column loadframe
- Twin ball screw drive with closed-loop servo and motor controls
- Crosshead Guidance System: Uses heavy channel shape steel columns. Maximum lateral motion ±0.25mm over full crosshead travel
- Anti-backlash system: standard on floor models, optional on table models
- Emergency Stop Control: via mushroom switch 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.



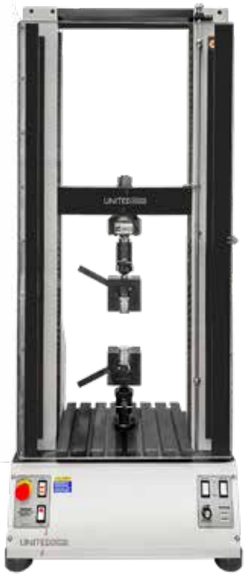




UNITED DSTM 2.5 KN "SMART" TABLE MODEL



UNITED DSTM "SMART" TABLE MODEL



UNITED DTM "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: ±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 24 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: ±0.25mm (0.01 in.) maximum over full crosshead travel.
- Speed Accuracy: ±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: 0.6µm (25 micro inches) standard. 0.06 µm is optional with highresolution encoder.
- Position Accuracy: The greater of 0.025mm (0.001 in.) or 0.025% of movement
- Position Repeatability: ±0.005mm (0.0002 in.).
- Drive Resolution: Same as Position Resolution.

FORCE MEASUREMENT SYSTEM:

- Accuracy: ± the larger of 0.5% of reading or 0.01% of capacity.
- Repeatability: ± 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	1% - 110% of capacity
BS 1610	0.5	1% - 110% of capacity
DIN 51221	1	1% - 110% of capacity
AFNOR A03-501	0	1% - 110% of capacity
ISO 7500/1	0	1% - 110% of capacity
EN 10002-2	0.5	1% - 110% of capacity
JIS B7721		1% - 110% of capacity

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	0% - 100% of range
BS 3846	A	0% - 100% of range
ISO 9513	0.5	0% - 100% of range
EN 10002-4		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

Smart Load Frame Specifications

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

Smart Load Frame Specifications

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

User Definable Test Procedures for Windows®

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

UNITED TESTING SYSTEMS

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