



TORONTECH



300KN UTM - UNIVERSAL TESTING MACHINE TTM-300

300kN UTM - Universal Testing Machine TTM-300 is designed for the analysis and research of static property testing, including tensile, compression, bending, shearing, peeling, tearing, loading, relaxation, and reciprocating tests on metal and non-metal materials, including composites. It automatically calculates R_{eH} , R_{eL} , $R_{p0.2}$, F_m , $R_{t0.5}$, $R_{t0.6}$, $R_{t0.65}$, $R_{t0.7}$, R_m , E , and other key testing parameters. The system conducts tests and generates data in compliance with ISO, ASTM, and DIN standards.

APPLICATIONS

1. Calibration of load measurement instruments for uniaxial testing machines
2. Verification and calibration of force-measuring systems in tension/compression testing machines
3. Tensile testing of metallic materials at room temperature
4. Mechanical properties of carbon and alloy steel fasteners (bolts, screws, and studs)
5. Bend test for metallic materials
6. Steel for concrete reinforcement (ribbed bars)
7. Tension testing of metallic materials
8. Mechanical testing of steel products
9. Compression testing of metallic materials at room temperature

FEATURES

Mechanical Framework and Design

The main frame features a sturdy portal structure composed of a base, two fixed beams, a movable crosshead, four columns, and two screws. The transmission and loading system utilizes an AC servo motor with a synchronous cog belt speed reducer, driving a high-precision ball screw to control the movement of the crosshead for precise loading.

Key features include:

- 1. Sleek design with excellent structural stability
- 2. High rigidity for reliable performance
- 3. Precise control and efficient operation
- 4. Low noise and energy-efficient performance
- 5. Environmentally friendly construction

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Mark	A	B	C	D	E	F	G	H	I
Value (mm)	2430	1032	898	447.5	600	470	545	1481	250

Control and Measurement System

This machine features the advanced DSC-10TT full-digital closed-loop control system for precise control and measurement. A computer manages the testing process, dynamically displaying curves and processing data in real time.

After testing, the system allows curve enlargement, reanalysis, and data editing through a graphical processing module. Its performance meets international advanced standards, ensuring accuracy and efficiency.

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1. **Advanced Closed-Loop Control**

1. Enables precise displacement, deformation, and speed control.
2. Allows real-time adjustments to testing speed and methods for greater flexibility.

2. **Comprehensive Multi-Layer Protection**

1. Includes software and hardware safeguards to prevent overloading, overcurrent, overpressure, undervoltage, overspeed, and limit breaches.

3. **High-Resolution Data Processing**

1. Utilizes three high-speed 24-bit A/D switching channels with a resolution of $\pm 1/300,000$.
2. Maintains consistent precision throughout the testing process.

4. **Reliable Data Transmission**

1. Supports USB and serial communication for stable, interference-resistant data transfer.

5. **Enhanced Signal Capture**

1. Features three pulse signal capture channels (one for displacement and two for deformation).
2. Uses advanced quadruple frequency technology to enhance pulse accuracy, with a maximum capture frequency of 5MHz.

6. **Precision Servo Motor Control**

1. Digital-driven servo motor with a PWM output frequency range from 0.01Hz to 5MHz for precise speed and force control.

Key Benefits of the Control and Measurement System

1. **Next-Generation Control Technology**

The DSC-10TT control system is a cutting-edge innovation designed specifically for testing machines. It utilizes the latest servo motor control chips and a multi-channel data collection module, ensuring high-speed sampling, precise control, and system stability. By incorporating hardware-based design, it enhances reliability and operational consistency.

2. **High-Efficiency Professional Control Platform**

The DSC-TT system integrates DSP (Digital Signal Processor) and MCU (Microcontroller Unit), combining DSP's high-speed computing with MCU's superior input/output control. This hybrid approach significantly outperforms standalone DSP or 32-bit microcontrollers. Built-in motor control modules such as PWM (Pulse Width Modulation) and QEI (Quadrature Encoder Interface) ensure stable and precise system performance.

3. **Parallel Sampling for Real-Time Accuracy**

Featuring a specialized ASIC (Application-Specific Integrated Circuit) chip, the system enables synchronous sampling of load cells signals, eliminating the asynchronous loading and deformation errors found in older systems. This marks a breakthrough in hardware-based parallel sampling.

4. **Position Pulse Signal Filtering for Stability**

The optical encoder module incorporates a 24-level hardware filter to refine pulse signal sampling, preventing counting errors caused by interference. This guarantees precise position accuracy, ensuring the pulse capture system operates reliably and smoothly.

5. **Optimized Bottom-Level Control for Faster Response**

The ASIC chip offloads peripheral tasks such as sampling and condition monitoring to dedicated hardware, allowing the DSC-TT system to focus on high-speed PID (Proportional-Integral-Derivative) calculations. This enhances system responsiveness, ensuring real-time closed-loop control at the core level for unmatched precision and efficiency.

Performance Characteristics of DSC-10TT

The user interface is designed for Windows systems, offering real-time curve display and processing with an intuitive graphical visualization. Its modular software structure enhances usability, while data storage and processing rely on an MS-ACCESS database, ensuring secure management and easy retrieval. Additionally, it provides seamless compatibility with Microsoft Office, enabling efficient data export and report generation for streamlined workflow integration.

The system features a graded user authority management mode, allowing users to access specific functions based on their login credentials. The super administrator holds full control and can assign different operational modules to various users. It

also provides a comprehensive testing management function, enabling users to customize test units, create test programs based on standards, and generate reports that meet compliance requirements. The system displays real-time testing processes, equipment status, and program control steps, including extensometer switching.

With advanced curve analysis capabilities, users can visualize load-deformation, load-time, and other curve types in real-time, compare multiple sample curves using different colors, and zoom in on specific sections for detailed analysis. The software supports automatic and manual feature point selection, allowing labeled feature points to be included in test reports. To prevent data loss due to unexpected incidents, the system automatically stores test data and supports fuzzy search for quick retrieval. Users can also merge and analyze data from different test programs and batches, ensuring efficient record management.

Built on an MS-ACCESS database, the DSC-10TT software seamlessly integrates with Microsoft Office, allowing test reports to be saved in Word or Excel format. The software also supports direct database access for raw data analysis, enhancing material research efficiency. With automatic result calculation, the system can determine key test parameters, such as ReH, ReL, Rp0.2, Fm, Rt0.5, Rt0.6, Rt0.65, Rt0.7, Rm, and E, while also allowing users to customize parameter settings and print graphical reports.

The software features an extensometer switching function, automatically notifying users when to remove the extensometer after yield detection. Additionally, the moving crosshead automatically returns to its initial position after testing, improving efficiency. The system offers automatic calibration for load and elongation based on standard references. It also supports a full-range, classification-free measurement mode, allowing for seamless module unit exchange and modular hardware expansion. During testing, the system automatically adjusts the curve display based on test force and deformation, ensuring accurate real-time analysis.

TECHNICAL SPECIFICATIONS

Measurement Parameters	
Maximum test force	300kN / 67442.7 lb.f (can add load cells to extend the force range)

Measurement Parameters

Accuracy class	0.5
Measuring range of test force	0.2%~100%FS (full scale)
Indicating error of test force	Within $\pm 0.5\%$ of indicating value
Resolution of test force	$\pm 1/300000$ of maximum test force, grade unchanged and resolution unchanged in whole process
Measuring range of deformation	0.2%~100%FS
Indicating error of deformation	Within $\pm 0.5\%$ of indicating value
Resolution of deformation	$1/300000$ of maximum deformation
Indicating error of displacement	Within $\pm 0.5\%$ of indicating value
Resolution of displacement	$0.025\mu\text{m}$

Control Parameters

Adjustable range of force control rate	0.005~5%FS/s
Control accuracy of force control rate	When rate is less than 0.05%FS/s, within $\pm 2\%$ of setting value; When rate is no less than 0.05%FS/s, within $\pm 0.5\%$ of setting value.
Adjustable range of deformation rate	0.005~5%FS/s
Control accuracy of deformation rate	When rate is less than 0.05%FS/s, within $\pm 2\%$ of setting value; When rate is no less than 0.05%FS/s, within $\pm 0.5\%$ of setting value.
Adjustable range of displacement rate	0.001~500mm/min
Control accuracy of displacement rate	When rate < 0.5mm/min, within $\pm 1\%$ of setting value; When rate $\geq 0.5\text{mm/min}$, within $\pm 0.2\%$ of setting value

Other Parameters

Measurement Parameters	
Effective testing width	600mm
Effective distance of tension	420mm (including wedge tensile fixture and can be custom-made according to user's requirements)
Removable distance of crosshead	1000mm
Size of Main Unit (length x width x height)	(1070×920×2550) mm
Weight of Main Unit	1500Kg
Voltage	380V, 50Hz, 5kW

Configuration

1. Main Frame: 300kN Door Structure

- 1. Machine Frame: TTM series frame (1 set)
- 2. Ball Screws: High-precision, zero-clearance screws (2 pieces)

2. Control & Measurement System

- 1. Servo Motor & Speed Control System (1 set)
- 2. Synchronous Belt (1 set)
- 3. Load cells: 300kN capacity (1 piece)
- 4. Electronic Extensometer: Gauge length: 50mm, Deformation: 10mm
- 5. DSC-10TT Full Digital Closed-Loop Measuring & Control System (1 set)
 - 1. Load Measuring System
 - 2. Displacement Measuring System
 - 3. Deformation Measuring System

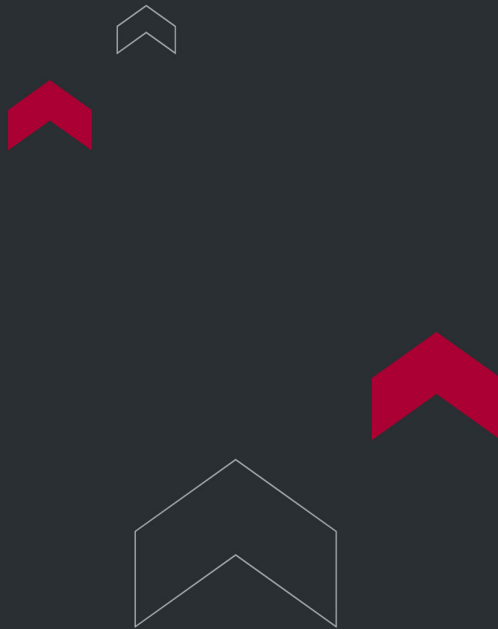
6. DSC-10TT English Software
7. Remote Control Unit: Equipped with an LCD screen for real-time display of machine status, testing force, and displacement. Features a magnetic base for flexible positioning on the frame (1 piece)
8. PC: Lenovo (1 piece)
9. Printer: HP color inkjet, A4 size (1 piece)

3. Manual Grips (Customizable per Customer Requirements)

1. Wedge Tensile Grips: (1 set per size)
 1. Jaw sizes: Flat (0-10mm, 10-20mm, 20-30mm)
 2. V-type: Ø8-Ø16mm, Ø16-Ø26mm, Ø26-Ø36mm
2. Compression Plates:
 1. Plate Diameter: Ø150mm (1 set)

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Remote Control Unit



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