



10KN UTM - UNIVERSAL TESTING MACHINE TTM-10

10kN UTM - Universal Testing Machine TTM-10 is designed for the analysis and evaluation of static properties in tensile, compression, bending, shearing, peeling, tearing, loading, relaxation, and reciprocating tests on metal, non-metal, and composite materials.

It automatically calculates parameters such as ReH, ReL, Rp0.2, Fm, Rt0.5, Rt0.6, Rt0.65, Rt0.7, Rm, and E. 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. Determination of tensile properties of plastics
5. Test methods for ceramic tile adhesives and grouts
6. 180° peel test for flexible-to-rigid bonded assemblies
7. Shear impact strength test for adhesive bonds
8. Tensile stress-strain properties of vulcanized or thermoplastic rubber

This machine ensures precise and reliable testing, meeting international industry standards for quality and performance.

FEATURES

Mechanical Framework and Design

The main frame consists of a base, two fixed beams, a movable crosshead, four columns, and two screws, forming a durable door-frame structure.

The transmission loading system features an AC servo motor and a synchronous cog belt speed reducer, which drive a high-precision ball screw to control the movement of the crosshead for precise loading.

This system offers a sleek design, excellent stability, high rigidity, precise control, superior efficiency, low noise, and energy-efficient operation.

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Mark	A	B	C	D	E	F	G	H	I	J
Value (mm)	1555	690	471	855	150	400	200	150	185.5	1240

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 test curves and processing data in real time.

After testing, users can enlarge the curve for detailed reanalysis and edit data using the figure processing module. The system delivers performance that meets international standards.

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1. Enables precise closed-loop control for displacement, deformation, and speed. The testing speed and method can be adjusted in real time, allowing for greater flexibility in testing.

2. Multi-layer protection system includes both software and hardware safeguards, preventing overloading, over-current, overpressure, under-voltage, overspeed, and other potential risks.
3. Features three high-speed 24-bit A/D conversion channels with an effective resolution of $\pm 1/300,000$, ensuring consistent accuracy throughout the testing process.
4. Utilizes USB or serial communication for stable and reliable data transmission with strong anti-interference capability.
5. Incorporates three pulse signal capture channels—one for displacement and two for large deformation—along with advanced quadruple frequency technology, enhancing pulse resolution by four times. The maximum capture frequency reaches 5MHz.
6. Includes a servo motor digital drive with a PWM output frequency range from 0.01Hz to a maximum of 5MHz, ensuring precise control.

Key Benefits of the Control and Measurement System

1. DSC-10TT Full-Digital Closed-Loop Control System

The DSC-10TT is our latest-generation control system, specifically developed for testing machines. It features advanced servo motor control chips and a multi-channel data acquisition and processing module, ensuring synchronized sampling, high-speed performance, and precise control. The system is primarily hardware-based, enhancing stability and reliability.

2. High-Efficiency, Professional Control Platform

The DSC-TT system integrates DSP (Digital Signal Processor) and MCU (Microcontroller Unit), combining DSP's high-speed computation with MCU's strong I/O control capabilities. This hybrid approach outperforms single DSP or 32-bit microcontroller solutions. Built-in motor control modules like PWM and QEI ensure key system functions are hardware-driven, guaranteeing safety and stability.

3. Parallel Sampling for Synchronized Data Acquisition

The system incorporates a specialized ASIC chip for real-time, synchronized sampling of load cells signals. This parallel sampling method eliminates loading and deformation inconsistencies that can occur with sequential sampling, ensuring accurate test results.

4. Hardware-Based Signal Filtering for Precision

The optical encoder module includes a 24-level hardware filter that refines sampling pulse signals, preventing errors caused by signal interference. This enhances positional accuracy and ensures stable, reliable performance of the pulse capture system.

5. Low-Level Hardware Control for Faster Response

ASIC chips handle essential tasks like sampling and condition monitoring, allowing the DSC-TT system to focus on precise PID calculations. This hardware-based approach improves reliability and significantly enhances control response speed. By executing PID adjustments and control output at the system's core, it enables highly accurate closed-loop control at the lowest level.

Performance Characteristics of DSC-10TT

The user interface is designed for Windows, featuring real-time curve display and processing with a graphical, intuitive layout. Its modular software structure enhances usability, while data storage and management are handled through an MS-ACCESS database, ensuring seamless integration with Microsoft Office applications.

1. User Authorization Management

The system provides role-based access control, granting users different operational permissions upon login. A super administrator holds full control, managing user roles and assigning specific modules to operators.

2. Advanced Testing Management

Users can configure testing parameters based on specific needs and create custom test programs aligned with various standards. The system executes tests according to selected standards and generates compliant reports. It also displays equipment status, operational steps, and extensometer activation.

3. Comprehensive Curve Analysis

Supports multiple curve types, including load-deformation and load-time, with real-time display options. Curves from the same sample group can be compared using different colors. Users can zoom in on any curve section for detailed analysis, label key points, and select them automatically or manually. Labeled curves can be included in test reports.

4. Secure Data Storage and Retrieval

Test data is saved automatically to prevent loss from unexpected incidents. A fuzzy query function enables quick searches based on various conditions. Users can reopen and compare datasets from different test sessions for in-depth analysis. A backup function ensures data security and accessibility.

5. MS-ACCESS Database & Software Integration

The DSC-10TT software is built on an MS-ACCESS database, allowing seamless integration with Microsoft Office. Reports can be saved in Word or Excel format, and raw data can be accessed for further material research and analysis.

6. Automated Test Result Calculation

With an extensometer, the system automatically calculates parameters such as ReH, ReL, Rp0.2, Fm, Rt0.5, Rt0.6, Rt0.65, Rt0.7, Rm, and E. Parameters can be customized, and test results, including graphical data, can be printed.

7. Automatic Extensometer Switch After Yield Point

The DSC-10TT software automatically detects yield completion and switches from deformation to displacement measurement. A notification alerts users that the extensometer can be removed.

8. Automatic Return

The moving crosshead returns to the initial testing position automatically after completing a test.

9. Automatic Calibration

The system calibrates load and elongation based on standard inputs, ensuring accuracy.

10. Flexible Measuring Range & Modular Design

- 1. **Full-Range Measurement:** Operates across the entire range without classification.
- 2. **Modular Design:** Supports easy accessory exchange and hardware extensions for enhanced functionality and simplified maintenance.
- 3. **Automatic Range Switching:** Adjusts display curves based on test force and deformation changes in real time.

TECHNICAL SPECIFICATIONS

Measurement Parameters	
Maximum test force	10kN / 2248.09 lb.f (can add load cells to extend the force range)
Accuracy class	0.5
Measuring range of test force	0.2%~100%FS (full scale)
Indicating error of test force	Within ±0.5% of indicating value
Resolution of test force	±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 ±0.5% of indicating value
Resolution of deformation	1/300000 of maximum deformation
Indicating error of displacement	Within ±0.5% of indicating value

Measurement Parameters**Resolution of displacement**

0.025μm

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 ±2% of setting value; When rate is no less than 0.05%FS/s, within ±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 ±2% of setting value; When rate is no less than 0.05%FS/s, within ±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 ±1% of setting value; When rate ≥ 0.5mm/min, within ±0.2% of setting value

Other Parameters**Effective testing width**

400mm

Effective distance of tension

700mm (including wedge tensile fixture and can be custom-made according to user's requirements)

Removable distance of crosshead

970mm

Size of Main Unit (length x width x height)

(715 × 500 × 1680) mm

Weight of Main Unit

230Kg

Voltage

220V, 50Hz, 0.5kW (110V is also available)

Configuration

1. Main Unit: 10kN Door Frame Structure

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

2. Control & Measurement System

1. Servo System: Servo motor with speed regulation and control (1 set)
2. Synchronous Belt (1 set)
3. Load cells: 10kN high-precision load cells (1 piece)
4. DSC-10TT Full Digital Closed-Loop Control System (1 set)
 1. Load measurement system
 2. Displacement measurement system
 3. Deformation measurement system
5. DSC-10TT Software (English Version)
6. Remote Control Unit: LCD screen with real-time display of equipment status, testing force, and displacement. Magnetic base allows flexible positioning on the frame. (1 piece)
7. PC: Lenovo (1 piece)
8. Printer: HP Color Inkjet (A4) (1 piece)

3. Grips (Customizable Based on Customer Requirements)

1. Wedge Tensile Grips: Jaw size: Flat 0-7mm, V-Type: Ø4-Ø9mm (1 set)
2. Compression Plates: Plate diameter: Ø100mm (1 set)

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Remote Control Unit



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