

## Comprehensive Machines for Materials Testing



# Material Testing

## Brief Introduction of UMI

**UMI** is a well known brand globally in manufacturing & supply of Complete Range of Material Testing Machines, Soil & Concrete Testing Equipment, Petroleum Testing Equipment, Educational Training Equipment and Laboratory & Metallography Equipment.

The combination of technology developed, and the quality employed in its products, results in products that can most closely meet its customers' needs, giving them neither more nor less than what they actually need.

**UMI** with the experience that it has acquired since 1998 has supplied many of machines in the Domestic & International Market. Now it is introducing its products, technology and updated quality, to satisfy the world market at very competitive prices and services.

**UMI** and its experienced team, made up of specialized professionals, is always looking for new ways to better meet the demands of the Domestic and Overseas Markets. The company offers exclusive machines the mechanical test field, which are essential for quality control, product and material development and research in industries, technical educational institutions, research institutes and mechanical test laboratories.

## About Us

**UMI** machines are designed with the objective to conciliate the real needs of the market and the resources and materials available for production.

**UMI** always has the ideal equipment for the market.

**UMI** has always worked hard to optimise the cost-efficiency of its products.

As a result of these efforts, UMI offers its products for extremely competitive prices, which are unbeatable by its renowned competitors.

**UMI** is aware of its technological contribution with every machine that it delivers. Therefore it is also aware of the importance of its responsibility.

**UMI** technicians are trained to render customized services, in an ethical and responsible manner.

## Why We

Much more than just selling equipment, UMI desires to meet the needs of its customers. With this purpose in mind, UMI does its best to understand their problems and present the maximum number possible of solutions. UMI staff is highly concerned about the equipment application, norms and procedures to be followed, types of tests, operation of machine etc., in order to guarantee its customers' satisfaction with equipment and services.

**Model UNISIX-100S**

**Automatic Servo Control Universal Testing Machine**

**Automatic Servo Control Universal Testing Machine  
6 Pillar Design Loading Frame**



Note : Due to constant R&D, specifications are subject to change without prior notice.



**UMI Make UNISIX-100S** is Automatic Servo Control Universal Testing Machine, fully automated system capable of performing both stress-controlled and strain-controlled tests on various materials, including metals, polymers, and concrete. The supplied equipment and accessories shall be designed to conduct tests in accordance with international standards such as ASTM, ISO, and EN specifications, ensuring high accuracy and repeatability. The system support tensile, compression, flexural, and shear testing with precise load application and displacement measurement. UNISIX-100S equipped with advanced data acquisition and control software for real-time monitoring and analysis of test results.

## **General Technical Details:**

The machine is fully Computerized Hydraulic Universal Testing Machine. The machine will be supplied with Hydraulic Gripping System for easy sample fitment and sample testing.

This Machine is consist of a loading frame with heavy base which house a hydraulic cylinder at its centre and two main screws at both ends to adjust the tension/compression clearance i.e. up and down movement of middle cross head by chain transmission and geared motor.

Hydraulic circuit consisting of hydraulic power pack which has a pump to give continuous non-pulsating flow of oil.

The load shall be applied through hydraulic power pack and shall be transmitted through ram. This hydraulic pressure shall be transmitted to the pressure transducer for display on Computer. The transducer will give signal to computer which will display corresponding online load exerted by the main ram.

- The machine shall have facility to operate manually as well as through computer control.
- The machine shall have safety features like Over load protection and Over travel protection

## **Extensometer:**

The LAN CARD based extensometer will give signal to computer which will display online deformation of specimen on computer screen corresponding to the applied load on load-deformation graph.

## **Electronic Panel:**

- Electronic control unit will be based on suitable processor with a built in interface for personal computer, which shows variation in parameters online.
- Processor speed will be such that the online load deformation curve, when shown on full screen of computer, is smooth.
- Storage of data and retrievable of data tests either in unit itself or in computer
- Control for test set up for data entry, initialization and termination of test, peak hold, tare load and reset elongation facilities etc.
- Facilities for preload selection to take care of initial slippage
- Serial port for communication with PC / AT etc, printer port.
- Machine will be automatically switched off on overload or over travel or specimen break or manual termination of test or at pre-defined load/extension.

## AUTOMATIC SERVO CONTROL UNIVERSAL TESTING MACHINE

Model	UNISIX-100S
Load Capacity	1000 kN
Frame Structure (Pillars and Jaws)	6 pillar structure with hydraulic jaw grips
Load ranges with accuracy of measurement	±1%
Load Resolution	0.01 kN
Elongation Scale Resolution	0.01 mm
Extensometer Resolution	0.001 mm
Clearance Tensile	50-850 mm clearance for tensile jaws at fully descended working piston
Clearance compression	850 mm clearance for compression jaws at fully descended working piston
Clearance between columns	750 mm
Starting speed at no load	0- 80 mm/min
Ram stroke	250 mm
Power supply	AC 3 Phase, 400-440 Volt, 50 Hz
Display	Both Digital Display and Computer display with Electronic real-time display of load & displacement.
Mode of Operation	Computerized software load controlled control Range: 0.5 kN/sec to 15 kN/sec Displacement: 0.01 to 2.0 mm/sec
Finishing surface paint	Powder coated with very fine finish.
Gross Weight	4500 Kg
Certification and standards	ISO 9001, ISO 14001, ISO 45001, CE certificate With Calibration certificate from Authorized NABL Accreditation Lab.
Load and displacement measurement	Precision load cell / pressure cell for load measurement; rotary encoder for crosshead displacement indication
Electronic control system	Micro process Electronic control unit based on suitable processors with a built-in interface for personal computers which can show variation in parameters online.
Processor speed	Sufficient to show smooth load versus deformation curve
Test control	Test control for set up for data entry, initialization and termination of test, peak hold and reset elongation facilities, etc.

Note : Due to constant R&D, specifications are subject to change without prior notice.

# Universal Testing Machines



## AUTOMATIC SERVO CONTROL UNIVERSAL TESTING MACHINE

Communication port	Serial port for communication with PC and printer
Automatic stopping mode	Machine can stop automatically switched off on overload or over travel or specimen break or manual termination of test or at pre-defined load/extension.
Safety features	<ul style="list-style-type: none"> <li>•Upper and lower stroke limit provided.</li> <li>one emergency stop switch button placed on the loading frame or Power pack with easy access.</li> <li>•Overload limiter where system stops automatically.</li> <li>•Overload protection and over travel protection.</li> </ul>
Storage of data	Software / Computer SSD can store.
Testing procedure	All tensile, compression, bending and bend-rebend and other test provided through run by computer using software.
<b>Computer Configuration :</b>	
Processor	Intel i7 / as per requirement by customer
Computer details	Desktop computer with RAM 16 GB, GPU, SSD 512GB, Standard USB Keyboard, optical mouse, 24" TFT screen, genuine Windows compatible to UTM software, USB 3.0 or newer ports for faster data transfer, HDMI or Display Port if connecting to multiple monitors. CPU case for protection in open lab area and can be locked by key, and a monitor cover. WIFI/Network card for wireless transfer of data. / or any other Computer as per requirement by customer.
<b>UTM Software :</b>	
Platform with inbuilt software features	Microsoft Windows platform software includes test features: Tensile Test; Compression Test; Bend and Re-bend test,
Date and Time of Testing	System date and time stamp in reports automatic
Specimen Type Selection	Standard specimen included in software: TMT, round solid, round hollow, cylinder, cube, rectangular, metal beam, brick, flats, etc.

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## AUTOMATIC SERVO CONTROL UNIVERSAL TESTING MACHINE

Header & Footer Customization	System generated reports are sufficient to present as test report; customer allowed to print company logo and name in report header.
Plotting of test data	Facility for online curve plotting of load v/s deformation and stress vs strain on computer screen
Storage of data	More than 3000 test data storage, facility for data storage and report printing
Report	Display & evaluation of physical parameters of the test like Young's modulus (Extensometer Test), percentage elongation, breaking load, % area reduction, ultimate tensile strength, proof stress, yield load, yield stress, simultaneous display of stress/time, stress/elongation %, elongation/time and stress/elongation, etc.
Additional Software function	<ul style="list-style-type: none"> <li>• Multiple zoom-in function for curve magnified purpose must be available.</li> <li>• Event log function that automatically records all operations carried out with capability of statistical analysis.</li> <li>• Latest update of at least 2024 or above and no update necessary for future use once system is run.</li> <li>• Curve overlay function for easy data evaluation.</li> <li>• Results must export directly to PDF, HTML, MS-Word, and MS-Excel without third party software.</li> <li>• Automatic load detection failure and storage.</li> <li>• Unit selection as per international code of engineering materials.</li> <li>• Zeroing, test initiation based on chosen test type.</li> </ul>
<b>Standard Accessories :</b>	
Tension test-Clamping jaws	<ul style="list-style-type: none"> <li>• For round specimens: Min. 8-18 mm, 19-30 mm and 31-40 mm diameter ranges can vary.</li> <li>• Flat specimens: Thickness of sizes 0 to 40 mm and width of at least 100 mm size or steps as per company standard.</li> </ul>
Compression Test	Pair of compression plates of at least 220 mm diameter .
Extensometer	Electronic extensometer strain gauge type with 2.5 mm extension and gauge length 25 and 50 mm, TMT

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## AUTOMATIC SERVO CONTROL UNIVERSAL TESTING MACHINE

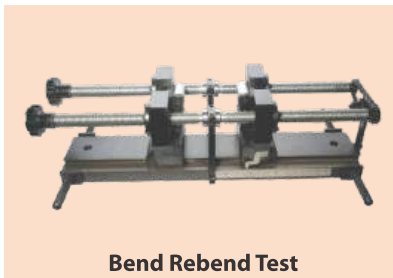
	attachment and 0.001 mm resolution. Compatible with any Universal Testing Machine.
Transverse Test	Table with adjustable rollers width of rollers : 160 mm Diameter of Rollers : 50 mm Maximum clearance between supports : 800 mm Radius of punch tops.
<b>Hydraulics :</b>	
Hydraulic port or connection of test frames	Flexible hose pipe connections with operating pressure 2 times greater than working pressure.
Operating temperature range for servo valve	From -25°C to 110°C
External leakage	There is no external leakage.
Supply pressure	Constant
Power pack pump and motor	Gear/Piston/vane pump capable of attaining the required pressure for breaking any big specimen with electric motor of 3 phase 2 hp or above as per requirement.
Overload protection	Stops test if predefined sets exceed the limit by opening the safety release valve with control device.
Certificate	NABL Authorized Lab Calibration Certificate will be provided.
<b>Optional Consumables and necessary consumables required :</b>	
Safety items (at additional cost)	2 sets of safety apron, glove, glasses, and machine dust cover
Lubricant (included)	1 litre of hydraulic oil and 1 litre of grease <b>Its better to procure locally by customer.</b>
Video Extensometer (At additional cost)	Class B2 with software integrated in UTM software.
Shear Test Attachment (at additional cost)	5-20, 25-40 mm
<b>Note :</b> Many other accessories available at additional cost as per customer required. We also modify technical specification if any special required by customer.	

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## Special Accessories & Options :

- Load Stabilizer
- Printer / Computer
- Plotter
- Brinell test attachment
- Double Shear test attachment
- USB communication port with evaluation software package
- Mechanical / Electronic extensometer
- Load full scale of 20,000 or 50,000 counts
- Piston movement resolution of 0.01 mm
- Wide range of accessories offered on request at additional cost.

Note : MUTC models are computerised Universal Testing Machines and MUTM is Dial type Universal Testing Machine.



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## STATISTICAL ANALYSIS :

This powerful tool enables the user to compare and study the results in statistical format. Most useful in places where the Batch Reports are studied for the production.

This extraordinary feature has been designed keeping in mind the ever changing needs of the industry to achieve higher standards. This flexibility can be achieved with the UMI software with an assurance of lifetime quality service and updates as per the latest industry standards.

The test data can be analysed for following graphical interpretations :

- I Water Fall Diagram
- II Mean Deviation
- III Frequency Distribution
- IV Skew Diagram
- V Histogram

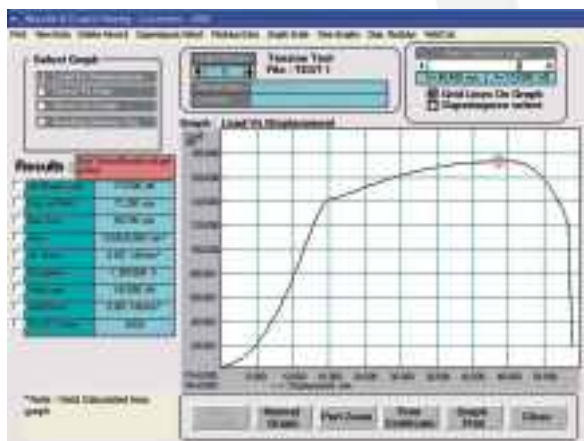


Statistical Analysis

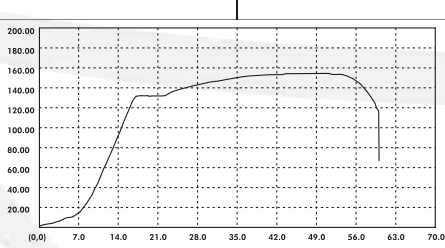
## ● Security Manager :

This helps the user to protect and save the test data of all the previous tests with the help of Password Protection feature.

- **Graph Tracing** : The resultant graph can be traced in various resolution of displacement with special zoom mode for time related behavior of the specimen.
- **Additional Features** include the facility to incorporate the Company Logo of the users at site on the Test Report and wide variety of customization of the software features as per the needs of the customer.



Result Analysis Screen

TEST CERTIFICATE		Test Date : 7/2/2008
Certificate issued by :		
Customer Name and Details :		
<b>Input Parameters</b>	<b>Results</b>	
Serial No.	demo.36	Ult Load (kN) : 153.90
Specimen Weight (g)	992.00	U. T. S. (N/mm <sup>2</sup> ) : 736.822
Original Gauge Length (mm)	100.00	Yield Load (kN) : 0.000
Final Gauge Length (mm)	111.00	Yield Stress (N/mm <sup>2</sup> ) : 0.000
Specimen Length (mm)	605.00	Elongation (%) : 11.00
C/S Area (mm <sup>2</sup> )	208.87	
 <p style="text-align: center;">Load (kN) Y-Axis Vs Displacement (mm) X-Axis</p>		
Remark :	Operator :	
Witness :	Inspector :	
Print Date : 2/7/2008		

Test Report

## Specifications for Servo Control Universal Testing Machine

### Electronic Servo Control Panel For UTM:

It contains all features of standard UTM Electronic panel & software with following additional things

- 1) Keyboard contains 1 additional pushbutton with (lamp/led's) and 1 potentiometer for servo control
- 2) Servo control card for Motorized Valve (stepper motor) movement with closed loop control either with load or Elongation.
- 3) System works in close loop mode, i.e. actual rate is measured, it will get compared with set rate and Loading control valve will get adjusted gradually as per error.

### Control Valve:

Here standard UTM Load control valve is coupled with stepper motor to operate it automatically from panel. One micro switch assembly is fitted to sense control valve close condition.

### Encoder:

This also incorporates **0.01 mm resolution** for elongation to get proper elongation rate control. (i.e. it requires 1000 PPR encoder)

## Advantages of Servo Control Panel over standard UTM Electronic Panel

- 1) Now there are specifications to test materials with specified load Rate (kN/min), or Elongation Rate (mm/min), Standard panel will not meet these requirements. You have to switch for servo panel which controls the rate of either load or elongation.
- 2) Also while testing same type of specimen with different rates (especially very low & very high), you can observe difference in results. This differs from operator to operator. Also same operator cannot maintain same rates for 2 tests. This can be avoided using Servo Control Panel. You can maintain same rates of testing as rate is auto controlled. So you can get better Result repeatability
- 3) 3 'Start As' options provided to avoid specimen slippage, To achieve desired rate in minimum time.
- 4) Also Manual (As per standard UTM) and Potentiometric control (Throughout the test you can control valve with potentiometer movement) modes are provided. Potentiometer control is better than manual control.
- 5) 8 Test Modes viz.
  - i) Manual Control
  - ii) Potentiometric Control
  - iii) Load Rate Control
  - iv) Load Hold
  - v) Stress Rate Control
  - vi) Strain Rate Control
  - vii) Elongation Rate Control
  - viii) Elongation Hold

**Note: Achievable rates and control tolerance depends on specimen & its material.**

**(e. g. For highly elastic materials such as rubber / springs, it is difficult to get high load rates & for brittle / hard materials like castings / concrete it is difficult to test with low load rates)**



**Universal Testing Machine Software Inclusive** of following:-

- a) Stepper Motor Based Servo Motor system to control testing speed (All speed are material dependent)
- b) Input Channel: Force, Machine Displacement & Extensometer

• **Graphical Features:**

- Real time curve on screen during test along with the display of loading rate bar graph and percentage of valve opening with option to switch to manual mode at any time during the test.
- Load, max load, test time and displacement numerical display.
- Graph grid select
- Graph annotations
- Zoom and print view
- Curve analysis with moving cursor
- Auto –scaling
- Graph re-scales

• **Test Features:**

- User defined products and batch headers
- Input specimen dimensions
- Input specimen label and edit
- Unit based or specific unit can be changed at any time

• **Results:**

- Smart database
- Format custom test report with company logo
- Object oriented design



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