

COMPUTERISED UNIVERSAL TESTING MACHINE

With Load Rate and Strain Rate Controls and with Front open Cross Heads and Hydraulic Grips
1200 KN Capacity (SERVO)



Computerized Universal Testing Machine

APPLICATION

Universal testing machine have a wide range of application. A number of material and metals in different forms and shapes can be tested for a variety of tension, compression, transverse, bend, shear, brinell hardness, etc. special attachments are also available for testing of flat belts, chain links, wire ropes, etc.

CONSTRUCTION

1) Loading Frame

The base has a hydraulic cylinder at its centre, and two main screws at both ends. The middle cross head is mounted on screws through main nuts. The middle cross head can be moved up or down through chain transmission and geared motor to adjust the initial tensile / compression clearance. On the piston rests an assembly of upper, lower crosshead and two columns. The individually lapped cylindrical piston assembly ensures smooth transfer of force with minimum friction.

2) Hydraulic System

Hydraulic circuit consists of hydraulic power pack having a directly driven radial plunger pump which gives a continuous non pulsating flow of oil pressure upto 250 bar. Oil filter, oil strainer, air breather, oil level indicator, drain plug are on the power pack. A pressure compensated needle type flow control valve is provided to control the oil flow to cylinder thereby achieving desired piston speed. Infinitely variable speeds can be obtained with the help of valves.

3) Electrical System

A separate switch box and electrical panels are provided. Both the hydraulic pump motor and the geared motor have interlocks. Limit switches are provided are to stop the hydraulic pump motor if the load increases beyond the machine capacity or if piston stroke is exceeded.

Front Open Crossheads :

This is extremely useful especially for heavy specimens and bigger capacity machines. In this type of machine the jaws and the inserts also can be easily removed by just pulling from the front. When the jaws and inserts are heavy, it is very difficult to remove them from the machine from upper or lower side. Hence this is an important feature from the point of view of easy operation.

Hydraulic grips :

Normally for standard Universal Testing Machines the jaw opening and specimen clamping is effected manually. But this becomes more and more difficult for the operator for higher capacity machines. Also the specimen clamping becomes operator specific in this case. Hence it is a better choice to go for hydraulic operation of jaws (closing and opening). In this hydraulic gripping method, separate double acting hydraulic cylinders operate the jaws and the cylinder operation is just by pressing a push button. So the operator has to operate only push buttons, which are conveniently located on the machine, to operate the jaws. A power pack with oil tank, pump, motor oil filler cum breather, oil level indicator, filter, relief valve is provided alongwith an electric motor to drive the hydraulic pump.

Salient Features

Electronically controlled sophisticated imported pressure and flow control valves along with their dedicated controller are used and they are controlled in closed loop with PID looping.

Load accuracy as high as $\pm 1\%$ of indicated load value.

Variable load rates and strain rates can be selected through computer to suit the wide range of materials.

On line graph and user defined printable reports enables the study of behaviour of the material.

Simplicity in reading because of digital (LCD) Display.

Wide range of standards.

Special Optional Accessories can be used like : Bend Re bend fixture, Nut Bolt Testing fixture, Pull out Test (1 Sensor or 3 Sensors) attachments, etc. to cover the complete range of materials.

Easy change from plain to threaded and screwed specimens.

Fully protected and enclosed pressure transducer and rotary encoder capable to work in dusty environment.

The Data Acquisition system (DAS) supplied with the machine can be connected to any new generation computer (PC or Laptop) using USB serial port.

Principle of Operation

Here Pressure Control Valve and Flow Control Valve are controlled by electronic circuitry in closed loop system to get the desired Loading Rate and Straining Rate.

Following control modes are available : Standard Manual Control, Load Rate Control Mode, Strain Rate Control Mode, Load Hold Mode, Load Rate and Strain Rate in single test (one at a time).

Control Range : As per the table. **Control Tolerance** : $\pm 5\%$

Load is applied by hydrostatically lubricated Ram. Main cylinder pressure is transmitted to the Pressure Transducer housed in control panel. The Pressure Transducer generates the proportional signal corresponding to Load created by Ram and is given to Electronic Display Unit (DAS Panel). Simultaneously the Optical Digital Rotary Encoder fitted on the straining unit (Lower cross head) gives the mechanical displacement (Cross head travel).

Electronic Control Panel (DAS System)

It is equipped with 32 bit Micro controller for basic Universal Testing Machine operation and close loop servo control for controlling and executing the LOAD RATE and STRAIN RATE Control Operations.

Panel is having USB Port for interfacing with PC.

4 Lines x 20 character LCD display and Membrane Keyboard for data entry.

100 No of tests can be stored.

Attractive and Elegant Aluminium Panel is provided for heat dissipation.

Maximum of $\pm 5,00,000$ counts resolution (optional) can be provided to display the load value.

Software

.NET based software suitable for Win XP Service Pack 2 or higher version, Windows 7 - 32 bit.

Real time graphs like : Load – Elongation, Load – Extension, Stress – Strain, Load – Time.

User friendly software.

Zooming and magnification of required portion of graph is available.

Graph super imposition, Graph comparison, Point tracing facility are available as added features.

User configurable Test Report generation and printing.

Special Reports as per customers requirement can also be generated at an extra cost.

Different units can be selected for Load and Elongation -

Load : kN, kg, lb. **Displacement** : mm, inch.

Statistical Analysis –

Calculates : Minimum value, Maximum value, Mean value, Variance, Standard Deviation

Statistical Graphs : Water fall diagram, Mean Deviation, Frequency Distribution, Skew Diagram,

Histogram.

Evaluation of wide range of user selectable parameters -

% elongation, % reduction in area, Young's Modulus, Yield Stress, Proof stress.

Different specimen shapes can be tested such as -

Round, Rectangular, Hollow round, Hollow rectangular, TMT bars (Torr Steel).

Complete Test Data and Test Results can be transferred to Excel Sheet for further analysis.

Optional software packages for -

Extensometer, Shear Test, Bend Test, Rubber Testing, Textile product Testing, Wire Mesh Testing.

Accuracy and Calibration

All our Electronic Universal Testing Machines are closely controlled for sensitivity, accuracy, repeatability and calibration during every stage of manufacturing.

Every Machine is then calibrated over each of its measuring ranges in accordance with the procedure laid down in BS :1610 : Part 1 : 1992 and IS : 1828 : Part 1 : 1991.

All our machines comply with Grade “A” of BS : 1610 : Part 1 : 1992 and Class I of IS : 1828 : Part 1 : 1991.

An accuracy of $\pm 1\%$ of indicated load value is guaranteed from 2% to 100% of the maximum load capacity of the machine.

Loading Rate

Control Range : As Below. **Accuracy** : $\pm 5\%$ of Loading rate selected

Minimum . 1.009 kN/sec. Maximum 40kN/Sec Capacity 1200 kN

Straining Rate

Control Range : As Below. **Accuracy** : $\pm 5\%$ of Loading rate selected

Minimum 0.5 mm/min Maximum 80 mm/min Capacity 1200kN

Technical Specifications

Measuring Capacity (kN)	0 - 1200
Least Count (kN)	0.01
Resolution of Piston movement (mm)	0.01
Load Range in kN with accuracy of measurement $\pm 1\%$	24 - 1200
Maximum tensile clearance at fully descended piston position (mm)	50 - 650
Maximum clearance for Compression Test (mm)	0 - 650
Distance between columns (mm)	750
Piston stroke (mm)	250
Maximum straining speed at no load (mm/min)	80
Power supply	3 Phase, 415 Volts, 50 Hz, AC
H.P. (Total)	7
Standard Accessories	
Pair of Compression plate dia (mm)	180
Tension Test Jaws –	
Four round specimen dia (mm)	10 - 30
Four round specimen dia (mm)	30 - 50
Four round specimen dia (mm)	50 - 60
For flat specimen thickness (mm)	0 - 15
For flat specimen thickness (mm)	15 - 30
For flat specimen thickness (mm)	30 - 45
For flat specimen thickness (mm)	45 - 60
Traverse Test –	
Adjustable roller support of width (mm)	160
Diameter (mm)	50
With Maximum adjustable clearance (mm)	800
Punch tops of radius (mm)	16
Punch tops of radius (mm)	22
Machine weight approx (kg)	7500
Overall dimensions approx (mm)	2500 x 1000 x 3000

Optional Accessories

Pull out test sensors can be connected (1 No or 3 Nos).

Digital Vernier or Digital Micrometer can be directly connected to the system for measurement of Diameter, Width, Thickness etc.

Servo Computerized Universal Testing Machine is supplied without Computer, UPS and Printer. It is to be procured by Customer. But we supply with requisite software, conditioning system and the interfaces. Machine ordered with the computer are supplied with computer and its operating system at an extra cost. **Minimum Computer Specifications required** : Any Latest Generation Computer which should be Branded (Make : HP, Dell, etc) and Preloaded with Genuine Windows Operating System (Windows-XP Service pack-2 OR Higher Version, Windows 7- 32 bit) with minimum 2 Nos of USB Ports. All the Drivers of the Mother Board (for Eg : USB drivers, Display drivers, etc) should be preloaded before installation of Win UTM Software supplied with the machine. Computer should be preloaded with Genuine Antivirus software. For loading the UTM software the computer should be equipped with CD drive also.

We can also supply Analogue & Computerised Universal Testing Machines, Hardness Testers (Rockwell, Brinell, Vickers), Spring Testing Machines, Compression Testing Machines, Tensile Testing machines, Dynamic Balancing Machines & Custom Built Testing Machines.

GATHA Enterprises

An ISO 9001 -2008 Company

3,Snehdeep Apts, Chintamaninagar, Sahakarnagar No.2,Pune 411 009 INDIA

Tel : 91-20-24227847 Mobile : 91-99 700 65875 Fax: 91-20-24215087

email: gatha@vsnl.net, gathaent@gmail.com

Website : www.gatha.com