

COMPUTERISED UNIVERSAL TESTING MACHINE

APPLICATION:-

Universal Testing Machines have a wide range of applications. A number of materials and metals in different forms and shapes can be tested for a variety of tests like Tension, Compression, Transverse, Bend, Shear, Brinell Hardness, etc.

Special attachments are also available for testing of flat belts, chain links, wire ropes, etc.

CONSTRUCTION:-

Loading frame

The base has a hydraulic cylinder at its center, 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 cylinder piston assembly ensure smooth transfer of force with minimum friction.

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 provided 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.

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 to stop the hydraulic pump motor if the load increases beyond the machine capacity or if the piston stroke is exceeded.

COMPUTERISED CONTROL PANEL :-

Load measuring system

The oil pressure in the main cylinder is also transferred to an electronic

pressure transducer which gives a proportionate signal to the Data Acquisition Unit. Both, the motor for hydraulic operation and cross head motion, are controlled by push buttons and they have interlocks to prevent simultaneous working of the Rotary Encoder. Encoder signal is fed to the Data Acquisition Panel to get displacement in mm.

Features of Data Acquisition Unit

- A Microcontroller based data acquisition system for data acquisition & indication.
- Two 16 characters * 2 lines LCD displays for displaying load & crosshead travel value.
- Auto-detection of over-load, over travel & specimen break. On detection of any of the above conditions, the machine is automatically switched off.
- Load is indicated with resolution of 0.01% of machine capacity for the entire measurement range (in other words with resolution of 0.04kN for TUE-C-400 Model)
- Tare load & reset elongation facilities available.
- Elongation is indicated with a resolution 0.1 mm.
- Storage space to store data of 1 off-line test.

Features of Win UTM Software

- The Win UTM software can run a variety of mechanical tests, recall data from previous test & prepare test report.
- Menu driven software for easy of use.
- Test Reports & Graphs can be sent directly to the printer via parallel port or USB Port.
- Storage & retrieval of test parameters.
- Display of load elongation (stress & strain are optional) at any instant through out the test.
- On line display of load Vs elongation or Stress Vs Stain characteristics during conduction of test. The plot is auto scaled & displayed.
- Selectable units (kN, kgf, mm, inch)
- Variable sample break detection.
- Load is indicated with a resolution of 0.01% of machine capacity for the entire measurement range of 2% to 100% of machine capacity.
- Elongation is indicated with a resolution of 0.1mm.
- Provision of auto-Zeroing of Elongation at set pre-load.
- Tare load and Reset elongation facilities available.

- Auto-Detection of over load, over travel and specimen break. On detection of any of these conditions, the machine is automatically switched OFF.
- High precision sensors and encoders used for load and elongation measurement.
- Large storage capacity for storing data (upto 50,000 sets) on the computer.
- Provision for calculations of parameters such as load and elongation at yield, peak load and load at break. Yield stress, Ultimate stress etc. The Parameters to be calculated are user selectable.
- Test conditions, test data and test results are stored in a specific file based on a unique file structure.
- Built in facility for printing the test results are test graph from PC. A printer copy of consolidated test results conducted on a particular date can also be obtained. Graphs of Load Vs Crosshead travel, Load Vs Time, Crosshead travel Vs Time, Load Vs Extension, and Stress Vs Strain etc. are available.
- Specific software for tensile, compression, Shear, Bend, TOR-Steel and other tests.
- If an Electronic Extensometer* is used, then proof stress values (from 0.1% to 1.0%) can be determined.
- If an Electronic Extensometer* is used, software prompts the user to remove Extensometer as soon as proof load is crossed. After removal of Extensometer, measurement of crosshead travel by the encoder commences and proceeds till completion of test. A combined auto scaled graph using Extensometer and encoder is available.
- The on-line plot shows the graph of load Vs extension (using Extensometer) and the plot is continued when measurement is through rotary encoder. The extension Vs elongation axis is appropriately scaled automatically.

Accuracy and calibration

Every machine is calibrated in accordance with procedure laid down in BS 1610-1964 and IS 1824-1991. "FSA" make Computerized Universal Testing Machines comply with Grade A of BS 1610-1964 and Grade 1 of IS 1828-1991. An accuracy of $\pm 1\%$ guaranteed from 2% to 100% of capacity of the machine.

The Computerized Universal Testing Machine is supplied without the necessary computer, its Operating system and the printer; but is supplied with requisite

software, conditioning system and the interfaces.

Machine ordered with the computer are supplied with computer and its operating system (Windows-98SE)

The computer is just an add -on feature. This puts a lot of power and versatility into the hands of the operator and makes the system much more "self contained" than usual, as it includes many functions usually only available as additional (often expensive) optional features.

MINIMUM COMPUTER SPECIFICATION

Intel Pentium IV processor, 2.26 GHz, 128 MB DDR RAM, 40 GB HDD, Intel 845 GV chipset mother board, 1.44 MB FDD Multimedia Key board, 15" CRT color monitor, CD ROM drive, Mouse (PS2 or Optical), 1 serial and 1 parallel port.

LORD RATE CONTROL :-

Servo based automatic programmable load rate control which will load the sample at a defined rate upto specified load, Keep it constant upto set time and unload at a preset rate.

Operating Range: 5% to 100% of full scale load per minute.