



GROUP

# Servo Controlled Electronic Universal Testing Machine

**Model - UTES**



*Over **60** years of consistent excellence*



Over **60** years of consistent excellence

# Servo Controlled Electronic Universal Testing Machine

## Model : UTES

### Features :

- Loading accuracy as high as  $\pm 1\%$   
Servo controlled Motorized Valve incorporating of control modes - Standard manual control, Potentiometric control, Load rate control, Elongation rate control, Load hold mode, Auto start & initial valve open start.
- Straining at variable speeds to suit a wide range of materials. Printer & PC graphs enable study the behavior of the material.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- Simplicity in reading because of digital readouts.
- Wide range of standard and special accessories.
- Easy change from plain to threaded and screwed specimens.
- Large effective clearance between columns enables testing of standards specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured by means of safety devices.
- Fully enclosed and protected pressure transducer.
- RS 232 serial port for PC control of Machine.
- Load Capacity : 100 kN, 200 kN, 400 kN, 600 kN & 1000 kN.

### Application :

'FIE' Electronic Universal Testing Machine is designed for testing materials and other materials under tension, compression bending, transverse and shear loads. Hardness test on metals can also conducted.

### Machine Consists of-

#### Straining unit :

This consists of a cylinder motor with chain and sprocket drive and a table coupled with the ram of the hydraulic cylinder, mounted on to a robust base.

The cylinder and the ram are individually lapped to eliminate friction. The upper cross-head is rigidly fixed to the table by two strengthened columns.

The lower cross-head is connected to two screwed columns which are driven by a motor. Axial loading of the ram is ensured by relieving the cylinder and ram of any possible side loading by the provision of ball seating.

An displacement scale, with a minimum graduation of 1mm, is provided to measure the deformation of the specimen.

Tension test is conducted by gripping the test specimen between the upper and lower cross-heads.

Compression, transverse, bending, shear and hardness tests are conducted between the lower cross-head and the table.

The lower cross-head can be raised or lowered rapidly by operating the screwed columns, thus facilitating ease of fixing of the test specimen.

#### Control Panel :

The Control Panel consists of a power pack complete with drive motor and an oil tank, control valves and electronic display unit.

#### Power Pack :

The power pack generates the maximum pressure of 200 kgf/cm<sup>2</sup>. The hydraulic pump provides continuously non-pulsating oil flow. Hence the load application is very smooth.

#### Hydraulic Controls :

Hand operated release valve & motorized control valve are used to control the flow to and from the hydraulic cylinder. The regulation of the oil flow is infinitely variable. Incorporated in the hydraulic system is a regulating valve, which maintains a practically constant rate of piston movement.

Control by this valve allows extensometer reading to be taken.

### Principle of Operation for -

#### Model : UTES

UTM right control valve is Servo Controlled in close loop mode as per mode selection. Following control modes available :

- 1) Standard Manual control
- 2) Potentiometric control
- 3) Load rate control
- 4) Elongation rate control
- 5) Load hold mode

Also Auto start, Potentiometric start & initial value open start options are available for test start to take care of slippage & different specimen types. Load is applied by a hydrostatically lubricated ram.

Main cylinder pressure is transmitted to the pressure transducer housed in the control panel.

The transducer gives the signal to the electronic display unit, corresponding to the load exerted by the main ram.

Simultaneously the encoder fitted on the straining unit gives the mechanical displacement.

### Electronic Control Panel

#### (FIE SERVO) :



- In electronic panel 8085 microprocessor is used for basic UTM operation & an 8 bit dedicated micro controller is used for close loop & Servo control.
- Panel is having parallel printer port.
- RS 232 C serial port for PC interface.
- 2 lines x 8 digits 7 segment display & membrane keyboard for data entry.
- 20 data sets and 50 results storage.

### Accuracy and Calibration :

FIE Electronic Universal testing machine is closely controlled for sensitivity, accuracy and calibration during every stage of manufacture.

Machine is calibrated over each of its measuring range in accordance with the procedure laid down in British standards 1610: Part1: 1992 and IS 1828: Part1: 1991.

FIE Electronic Universal Testing Machine complies with Grade "A" of BS: 1610:Part1:1992 and class 1 of IS-1828-Part1:1991.



Technical Specifications for -  
Servo Controlled Electronic Universal Testing Machines  
Model – UTES

MODEL	UNIT	UTES 10	UTES 20	UTES 40	UTES 60	UTE 100	UTES 120	UTES 150	UTES 200
Maximum Capacity	kN	100	200	400	600	1000	1200	1500	2000
Measuring range	kN	0-100	0-200	0-400	0-600	0-1000	0 – 1200	0 – 1500	0-2000
Load resolution (20000 counts full scale)	N	5	10	20	30	50	60	75	100
Load range with accuracy of Measurement +/-1%	kN	2 to 100	4 to 200	8 to 400	12 to 600	20 to 1000	24-1200	30-1500	40-2000
Resolution of piston movement (Displacement)	mm	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Clearance for tensile test (At fully descended working piston)	mm	50-700	50-700	50-700	50-800	50-850	50-850	50-850	50-850
Clearance for compression test (At fully descended working piston)	mm	0-700	0-700	0-700	0-800	0-850	0-850	0-850	0-850
Clearance between columns	mm	500	500	500	600	750	750	750	750
Ram Stroke	mm	150	200	200	250	250	250	250	250
Straining/ Piston Speed (at no load)	mm/min	0-300	0-150	0-150	0-100	0-80	0-65	0-50	0-45
<b>CONNECTED LOAD</b>									
Power	HP	1.33	1.33	2.33	2.5	3.5	3.5	5	6
V		400-440	400-440	400-440	400-440	400-440	400-440	400-440	400-440
Φ		3	3	3	3	3	3	3	3
<b>STANDARD ACCESSORIES</b>									
<b>FOR TENSION TEST</b>									
Clamping jaws for round specimens of diameter	mm	10-20	10-20	10-25	10-25	10-25	10-25	10-25	10-25
		20-30	20-30	25-40	25-40	25-45	25-45	25-45	25-45
Clamping jaws for flat specimens of thickness	mm	0-10	0-10	0-15	0-15	0-22	0-20	0-20	0-20
		10-20	10-20	15-30	15-30	22-44	20-40	20-40	20-40
Width	mm	50	50	65	70	70	70	70	70
<b>FOR COMPRESSION TEST</b>									
Pair of Compression Plates of Dia.	mm	120	120	120	120	160	160	160	160
<b>FOR TRANSVERSE TEST</b>									
Table with adjustable rollers									
Width of rollers	mm	160	160	160	160	160	160	200	200
Diameter of Rollers	mm	30	30	30	50	50	50	50	50
Maximum clearance between supports	mm	500	500	500	600	800	800	800	800
Radius of punch tops	mm	6,12	6,12	12,16	16,22	16,22	16, 22	16, 22	16, 22

- Due to constant R& D specifications & features are subject to change without notice.
- Colour scheme subject to confirm at the time of order.

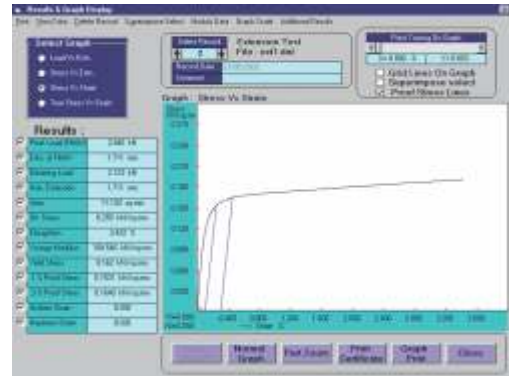
Optional Software Package -  
'FIE' Tension & Compression test Software package for Model : UTES

Input Data



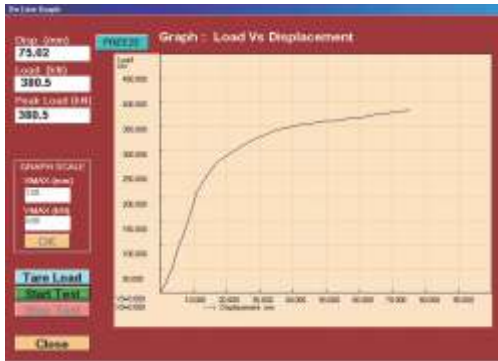
Wide range of Control Modes with Input Data entry.

Load Vs Extension



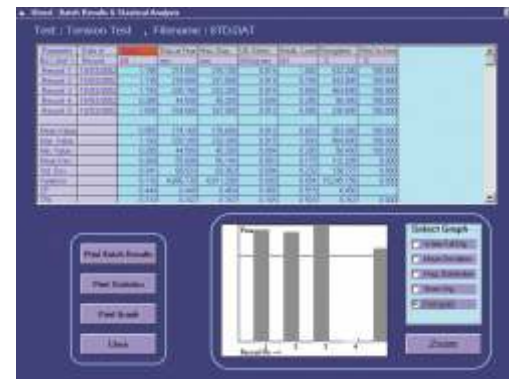
Displays graph for extensometer readings against load with proof lines for proof stress.

Real Time Graph



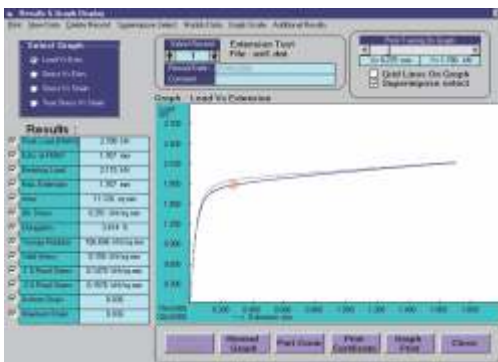
Real time values of load & displacement/extension used for plotting its graph & can be seen real time during testing.

Statistics



Batch test reports with statistics for batch sample results.

Graph Superimpose with Point Tracing



Graph comparison, superimpose of batch sample tests with point tracing facility.

**Windows based software available for -**  
Online graph on PC, Data analysis, Statistics,  
Point tracing, superimposing graphs to compare  
with standard, zooming graph etc.

Manufactured By :

**Fuel Instruments & Engineers Pvt. Ltd.**

Plot No. 68 & 89, Parvati Co-op Industrial Estate, YADRAV-416 145 (Ichalkaranji),  
Tal : Shirol, Dist : Kolhapur, Maharashtra State, INDIA.

Tel : +91 2322 252137, Cell : +91 98223 94981, Fax : +91 2322 252397  
E-mail : mrk@fietest.com, Web : www.fietest.com, www.fuelinstrument.com