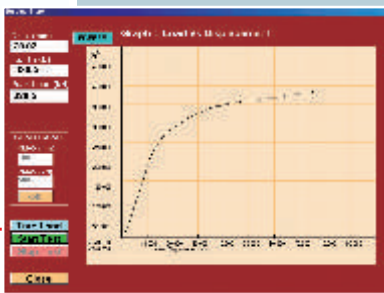




# ELECTRONIC

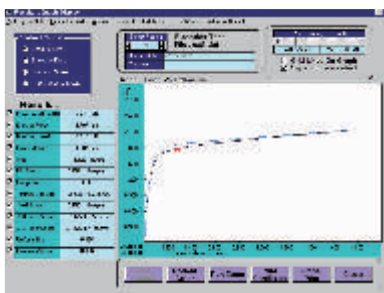
## UNIVERSAL TESTING MACHINE

Model : UTES (Servo)



Real time graph on PC

**\* With PC Interface & Real Time Graph.  
( Panel / PC Controlled )**



Graph comparison & point tracing.



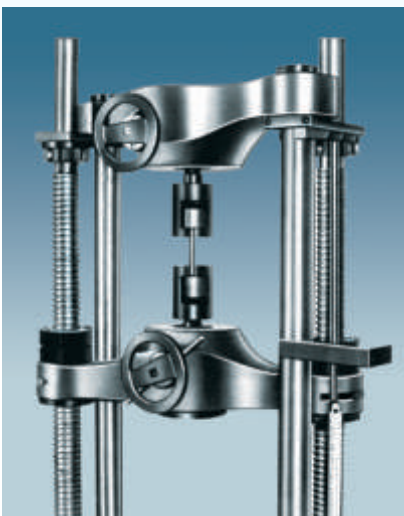
Statistics



Graph with EE2 extensometer.



- Motorised Control Valve.
- Load accuracy as high  $\pm 1\%$ .
- 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 middle crosshead 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 enable testing of standard specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Fully enclosed and protected pressure transducer.
- RS 232 serial port for PC control of m/c.



**ATTACHMENT FOR TENSION TEST FOR SHOULDERED AND THREADED SPECIMENS**

### Application :

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

### Principle of Operation :

Here 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
- 6) Strain Rate Control

Also Auto Start, Potentiometric start & Initial Valve open start options are available for test start to take care of slippage & different specimen types.

Load is applied by 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 digital encoder fitted on the straining unit gives the mechanical displacement.

Machine consists of :

### Straining Unit :

This consists of a cylinder motor with chain & 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, transvers, bending, shear & 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.



**TENSION TEST**

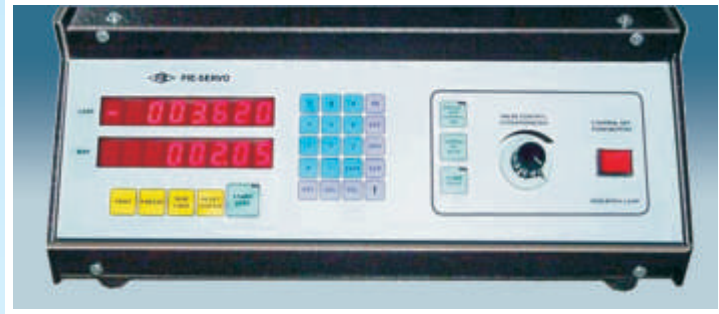


## Hydraulic Controls :

Hand operated Release Valve & motorised 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.

## Electronic Control Panel (FIE-SERVO) :

- In electronic panel 8085 microprocessor is used for basic UTM operation & an 8 bit dedicated microcontroller 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.



## Software :

Windows based basic software for Servo Control is in standard scope of supply.

- Real time graph, User friendly software.
- Extensive graphics on screen for curve plotting, magnification and zooming.
- Software features includes Graph comparison, point tracing facility. Different units selection for load & displacement.
- Statistical evaluation with water fall dig., Mean deviation, frequency distribution, Skew dig., Histogram. Also calculates max. value, min. value, Mean Value, Variance, Standard Deviation. (Other statistical parameters on request). Selectable batch & statistical printouts.
- Evaluation of wide range of user selectable parameters such as % elongation, % reduction in area, young's modulus, yield stress, proof stress etc.
- Optional Software packages for Extensometer, Shear, Bend, Torsion, Rubber, Textile testing etc.

## Accuracy and Calibration :

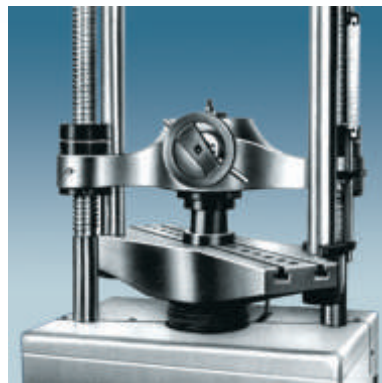
All FIE Electronic Universal Testing Machines are closely controlled for sensitivity, accuracy and calibration during every stage of manufacture. Every machine is then calibrated over each of its measuring ranges in accordance with the procedure laid down in British standards. 1610 : Part 1 : 1992 and IS : 1828 : Part 1 : 1991.

FIE Electronic Universal Testing Machine comply with Grade "A" of BS:1610:Part 1:1992 and class 1 of IS-1828-Part 1:1991. An accuracy of  $\pm 1\%$  is guaranteed from 2% to 100% of the capacity of the machine.

Below 20% of the selected range, the maximum permissible error is 0.2% of the full load reading.



**ATTACHMENT FOR TENSION TEST FOR WIRE ROPES.**



**COMPRESSION TEST**



NATIONAL AWARD FOR



IMPORT SUBSTITUTION

SHRI P. D. KULKARNI OF M. S. FUEL INSTRUMENT & ENGINEERS PVT LTD MAHARASHTRA IS AWARDED THE SILVER SHIELD FOR THE DEVELOPMENT OF UNIVERSAL TESTING MACHINE

MODEL	UNITS	UTES-10	UTES-20	UTES-40	UTES-60	UTES-100
Maximum Capacity	kN	100	200	400	600	1000
Measuring Range	kN	0-100	0-200	0-400	0-600	0-1000
Load Resolution (20,000 counts full scale)	N	5	10	20	30	50
Load Range with Accuracy of measurement $\pm 1.0\%$	kN	2 to 100	4 to 200	8 to 400	12 to 600	20 to 1000
Resolution of piston movement (Displacement)	mm	0.01	0.01	0.01	0.01	0.01
Clearance for tensile at fully descended working piston.	mm	50-700	50-700	50-700	50-800	50-850
Clearance for compression test at fully descended working piston.	mm	0-700	0-700	0-700	0-800	0-850
Clearance between columns.	mm	500	500	500	600	750
Ram Stroke	mm	150	200	200	250	250
Straining/piston speed (at no load)	mm/min	0-300	0-150	0-150	0-100	0-80
<b>CONNECTED LOAD</b>						
Power	kW	1.0	1.0	1.7	1.9	2.6
Voltage	V ac	400-440	400-440	400-440	400-440	400-440
Phase ( $\emptyset$ )		3	3	3	3	3
<b>DIMENSIONS</b>						
LxWxH (approx.)	mm	2032 x 750 x 1960 x	2032 x 750 x 1960 x	2060 x 750 x 2180 x	2265 x 750 x 2534 x	2415 x 815 x 2900 x
WEIGHT (approx.)	kg.	1500	1500	2500	3500	5500
<b>STANDARD ACCESSORIES</b>						
<b>FOR TENSION TEST</b>						
● Clamping jaws for round specimens of Diameters.	mm	10-20 20-30	10-20 20-30	10-25 25-40	10-25 25-40 40-55	10-25 25-45 45-70
● Clamping jaws for flat specimens of thickness.	mm	0-10 10-20	0-10 10-20	0-15 15-30	0-15 15-30	0-22 22-44 44-65
Width	mm	50	50	65	70	70
<b>FOR COMPRESSION TEST</b>						
Pair of compression plates of dia.	mm	120	120	120	120	160
<b>FOR TRANSVERSE TEST</b>						
Table with adjustable rollers width of rollers.	mm	160	160	160	160	160
Diameter of Rollers	mm	30	30	30	50	50
Maximum clearance between supports	mm	500	500	500	600	800
Radius of punch tops.	mm	6,12	6,12	12,16	16,22	16,22

**SPECIAL ACCESSORIES & OPTIONS :**

- Electronic extensometer
- Brinell test attachment
- Printer
- Shear test attachment
- Software packages

- Wide range accessories offered on request at additional cost.
- Due to constant R & D specifications & features are subject to change without notice.
- The dimensions given above are approximate.

\* PC & Printer is not in our standard scope of supply.

Manufactured by :



## Fuel Instruments & Engineers Pvt. Ltd.

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