FIE GROUP

*Over 60 years of consistent excellence*

# Analogue Cum Electronic Universal Testing Machine

## Model : UTNE

Micro Controller Based Panel, Front Panel Touch Screen Display

Loading accuracy as high as ± 1%

Motor driven threaded columns for quick & effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen

Over 60 years of consistent excellence

# Analogue cum Electronic Universal Testing Machine Model : UTNE

## Features :

- Loading accuracy as high as ± 1%
- Suitable at variable speeds to suit a wide range of materials.
- Continuous roll autographic recorder supplied as standard to enable study of the behavior of materials.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- High reading accuracy due to large size and design of dial.
- Wide range of standard and special accessories, including Servo control mode, Hydraulic grip front loading, Touch screen control panel & load stabilizer.
- 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 pendulum.
- Directional control valve provided to change the testing for analogue to digital mode.
- RS 232 serial port to transfer data to computer for analysis/storage evaluation etc.
- Printer & PC graphs enable study the behavior of the material.
- Simplicity in reading because of digital readouts.
- 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/cm2. The hydraulic pump provides continuously non-pulsating oil flow.

Hence the load application is very smooth.

## Hydraulic Controls :

Hand operated wheels 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 - (Digital Mode)

## Model : UTNE

Operation of machine is by hydraulic transmission of load from the test specimen through pressure transducer to a separately housed load indicator. The system is ideal since it replaces transmission of load through levers and knife edges, which are prone to wear and damage due to shock on rupture of test pieces. 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 to the electronic display unit. Both the signals are processed by the microprocessor and load and displacement is displayed on the digital readouts simultaneously.

**Principle of Operation for - (Analogue Mode)**

## Model : UTNE

Operation of machine is by hydraulic transmission of load from the test specimen to a separately housed load indicator.

The hydraulic system is ideal since it replaces transmission of load through levers and knife edges, which are prone to wear and damage due to shock on rupture of test pieces.

Load is applied by a historically lubricated ram. Main cylinder pressure is transmitted to the cylinder of the pendulum dynamometer system housed in the control panel.

The cylinder of the dynamometer is also of self-lubricating design. The load transmitted to the cylinder of the dynamometer is transferred through a lever system to a pendulum.

Displacement of the pendulum actuates the rack and pinion mechanism which operates the load indicator pointer and the autographic recorder.

The deflection of the pendulum represents the absolute load applied on the test specimen.

Return movement of the pendulum is effectively damped to absorb energy in the event of sudden breakage of a specimen.

## Load indicator System :

This system consists of a large dial and a pointer. A dummy pointer is provided to register the maximum load reached during the test.

Different measuring ranges can be selected by operating the range selection knob. An overload trip switch is incorporated which, automatically cuts out the pump motor when the load range in use is exceeded.

## Displacement :

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

## Pendulum Dynamometer :

This unit permits selection of favorable hydraulic ratios producing relatively small frictional forces.

Pressurized oil in the loading cylinder pushes up the measuring piston proportionately and actuates the special dynamometer system.

The piston is constantly rotated to eliminate friction. The dynamometer system is also provided with an integral damper and ensures high reliability of operation.

The load transmitted to the dynamometer is transferred through a pendulum to the load indicator.

## 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 -
# Analogue cum Electronic Universal Testing Machines
# Model – UTNE

| MODEL | UNIT | UTN 10 | UTN 20 | UTN 40 | UTN60 | UTN 100 |
|---|---|---|---|---|---|---|
| Maximum Capacity | kN | 100 | 200 | 400 | 600 | 1000 |
| **FOR ANALOGUE MODE** | | | | | | |
| 1st Measuring range | kN | 0-100 | 0-200 | 0-400 | 0-600 | 0-1000 |
| Minimum Graduations | kN | 0.2 | 0.4 | 1 | 1 | 2 |
| 2nd Measuring range | kN | 0-50 | 0-100 | 0-200 | 0-300 | 0-500 |
| Minimum Graduations | kN | 0.1 | 0.2 | 0.5 | 0.5 | 1 |
| 3rd Measuring range | kN | 0-25 | 0-50 | 0-100 | 0-120 | 0-250 |
| Minimum Graduations | kN | 0.05 | 0.1 | 0.25 | 0.2 | 0.5 |
| 4th Measuring range | kN | 0-10 | 0-20 | 0-40 | 0-60 | 0-100 |
| Minimum Graduations | kN | 0.02 | 0.04 | 0.1 | 0.1 | 0.2 |
| **FOR DIGITAL MODE** | | | | | | |
| Measuring range | kN | 0-100 | 0-200 | 0-400 | 0-600 | 0-1000 |
| Load resolution (20000 counts full scale) | N | 5 | 10 | 20 | 30 | 50 |
| Load range with accuracy of Measurement +/-1% | kN | 2 to 100 | 4 to 200 | 8 to 400 | 12 to 600 | 20 to 1000 |
| 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 |
| **CONNECTED LOAD** | | | | | | |
| Power for UTNE | HP | 1.3 | 1.3 | 2.3 | 2.5 | 3.5 |
| V | | 400-440 | 400-440 | 400-440 | 400-440 | 400-440 |
| Φ | | 3 | 3 | 3 | 3 | 3 |
| **STANDARD ACCESSORIES** | | | | | | |
| **FOR TENSION TEST** | | | | | | |
| Clamping jaws for round specimens of diameter (Optional) | mm | 10-20 | 10-20 | 10-25 | 10-25 | 10-25 |
| | | 20-30 | 20-30 | 25-40 | 25-40 | 25-45 |
| | | ..... | ..... | ..... | 40-55 | 45-65 |
| Clamping jaws for flat specimens of thickness | mm | 0-10 | 0-10 | 0-15 | 0-15 | 0-22 |
| | | 10-20 | 10-20 | 15-30 | 15-30 | 22-44 |
| | | ..... | ..... | ..... | .... | 44-65 |
| Clamping jaws for flat specimens of thickness | mm | 0-10 | 0-10 | 0-10 | 0-10 | 0-10 |
| | | 10-20 | 10-20 | 10-20 | 10-20 | 10-20 |
| | | ..... | ..... | 20-30 | 20-30 | 20-30 |
| | | ..... | ..... | ..... | ..... | 30-40 |
| Width | mm | 50 | 50 | 65 | 70 | 70 |
| **FOR COMPRESSION TEST** | | | | | | |
| Pair of Compression Plates of Dia. | mm | 120 | 120 | 120 | 120 | 160 |
| **FOR TRANSVERSE TEST** | | | | | | |
| 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 |

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

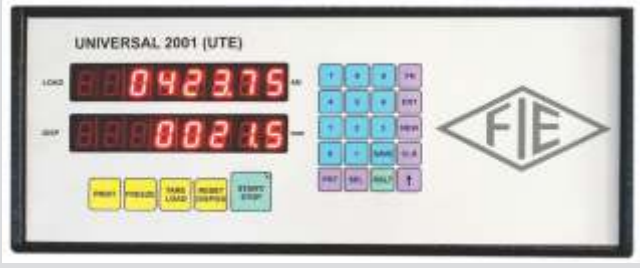
Over 60 years of consistent excellence

# Analogue cum Electronic Universal Testing Machine Model : UTNE

## Electronic Control Panel (Series Universal 2001-UTE) :

Microprocessor based panel incorporating state of art technology with following features -

- Front panel membrane type key board for machine operation with numeric keys for data entry.
- 7 segment display.
- Data entry with numeric key board of test parameters including speeds, rupture % peak, pre-load, modulus data, test data & specimen data etc.
- 20 input data set storage, 50 result storage, maintains data and results during power off.




## Optional : Computerized Touch Screen Control Panel Series : UT 2018-TS

Micro Controller based panel incorporating state of art technology with following features -

- Front panel touch screen display
- Data entry of test parameters including pre-load, rupture %, Safe Load & Specimen data etc.
- Online graph of load Vs Displacement directly on screen.
- USB Printer port for printer interface with graph & result print out.
- Facility to export the result/ Data to PDF, EXCEL & CSV formats.
- Windows based software available for Online graph on PC, Data analysis, Statistics, Point tracing, superimposing graphs to compare with standard, zooming graph etc.


Over 60 years of consistent excellence

Manufactured By :

Fuel Instruments & Engineers Pvt. Ltd.

**Sold And Serviced By : SUZUKI INSTRUMENTS**

**Cell : 9594084085/8000976140 , E-mail : sales@simaterialtestingservices.com**

Web : www.simaterialtestingservices.com