Computerized Front Open Universal Testing Machine with Hydraulic Grips & Servo System

This is hydraulically controlled servo Universal Testing Machine. The main advantage of this servo system is a test can be conducted by giving a specific load rate or elongation rate. The oil flow is controlled by the close loop feedback from the load elongation system. Test with specific load steps can also be conducted.

Features

Universal Testing Machines have a wide range of applications and number of materials, metals in different form and shapes can be tested for 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.

Loading Frame

The base has a hydraulic cylinder center 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. Inside base of machine, hydraulic cylinder is tested in which piston is placed on the piston, rests an assembly of upper, lower cross head and two columns. The individually lapped cylinder piston assembly ensures smooth axial force with minimum friction.

Control panel

Hydraulic circuit – it consists of hydraulic power pact which has a directly driven radial plunger pump which gives continuous non pulsating flow of oil pressure up to 250bar a pressure compensated needle type floe control valve is obtained with help of valves. Optionally this can be controlled form electronic system.

Loading Rate / Straining Rate Control

This is superfine controlling system which controls loading rate / straining rate as per commands from electronic machine control system. With UP/ DOWN Keys on electronic control system loading rate / straining rate is adjusted. FINE UTM Software can send loading rate / straining rate to electronic system for fully automatic testing.

Load Measurement System

The oil pressure in the main cylinder is also transferred to an electronic pressure transducer which gives proportionate signal to electronic unit. Both the motors for hydraulic operation and cross head motion are controlled by buttons on electronic control system and they have interlocked to prevent simultaneous working of motors. The electrical panel is housed in control panel.

Displacement measurement is carried out by means of a rack and pinion on rotary encoder. Encoder signal is fed to electronic system to get displacement.

Operation

Tension test is conducted by griping the test specimen in the upper and middle cross head. Compression, Bending, transverse, Shear and Hardness tests are conducted between the middle and lower cross head by using appropriate fixtures. The rapid adjustment of middle crosshead facilitates easy fixing of tensile / Compression specimens of different lengths.

Hydraulic controls are through hand operated valve, ergonomically places for ease of control. Optionally valves can be controlled form electronic control system. Adequate safeties for over load and ove travel are incorporated and emergency switch is provided.

Accuracy & Calibration

Every machine is calibrated in accordance with procedure laid down in BS-1610-1964 IS 1828-1991. 'FMI' Computerized Universal Testing Machines comply with grade A of BS 1610-1964 and Grade 1.0 of IS 1828-1991. An accuracy of ± 1% guaranteed from 2% to 100% of capacity of the machine. In the computerized UTM, the computer is an integral part of the entire system and not just on 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.

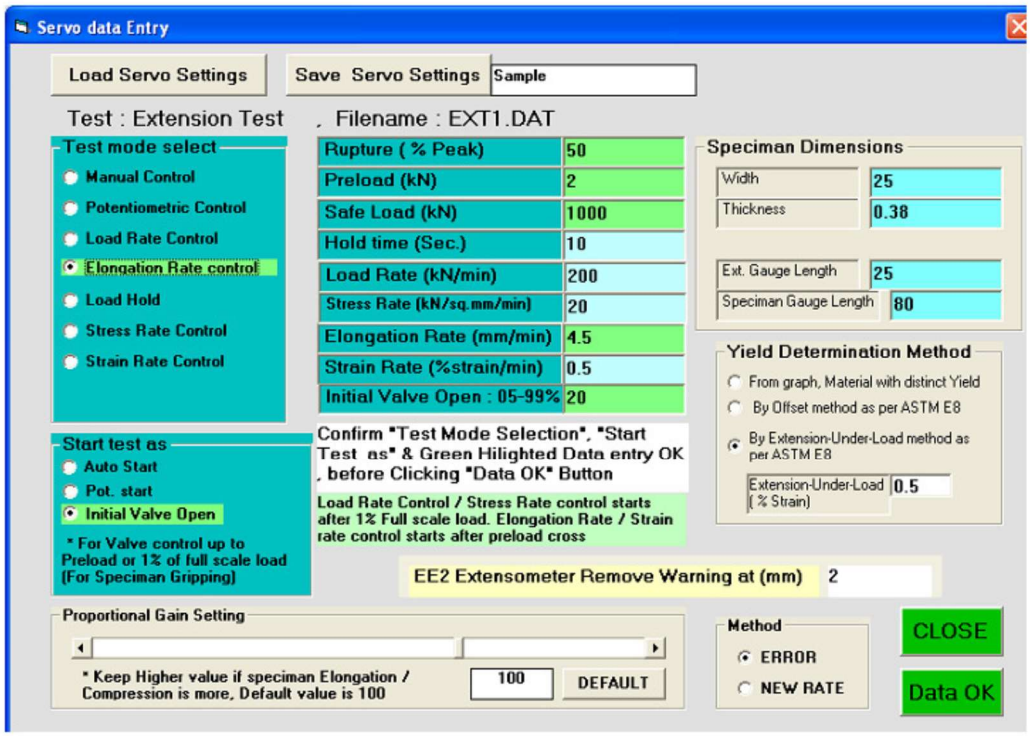
Software features :

- Menu driven form system with colour graphs to compare sample test results.
- Test details and reports are stored in database
- User programmable master test templates
- User can select test from master test Templates and can start similar test
- Load and Elongation is continuously displayed on screen
- Overload protection for machine by electronic control
- Tare Load and Reset Elongation facility available
- User selectable sample break detect condition
- Load rate and strain rate are also displayed while testing
- Unlimited Load rate and strain rate control steps *
- With Load rate controller, user can hold the load on specimen for unlimited time *
- With Load rate control, user can specify positive or negative Rate of Loading *
- User selectable units for load and displacement (kg, kN,N, Ibf, mm, cm, inch etc.) Results and graphs are automatically displayed accordingly.
- On line display of Load and Displacement (Stress, Extension, Strain) etc. while test is conducted
- Provision of auto zeroing of Elongation at preload set by user
- User Programmable Reports. User can select Header, Footer, Specimen information, Dimensions, Testinformation, Test results, Stastical analysis as per his need.
- Generated reports can be exported to PDF file and can be e-mailed
- If electronic extensometer is used then proof stress values from 0.1% to1%can be determined
- Software will give alert to user to remove extensometer when load crosses .2% of Gauge length selected then proof load value is calculated. (With extensometer)
- Separate graph of extensometer and encoder is displayed
- Provision of calculation of Load and Elongation at yield, Peak load and Load at break, Yield stress, Ultimate stress etc.
- Special software for tensile, compression, bend, TOR steel and other test software as per customer requirements.

A Micro controller based machine control system

- Full fledged sealed membrane alpha numeric keyboard for data entry
- 16 x 2 Lines LCD Graphics display with backlit for displaying Load and Elongation of crosshead with bigger font size.
- Load indicated with resolution of 0.01% of machine capacity for entire range.
- Elongation is measured with resolution of 0.01 mm.
- Controller for load rate and strains rate control
- Auto detection of overload and over travel and specimen break. On detection of any condition hydraulic system is automatically turned off.
- Tare load and Reset Elongation facility Peak Load and Elongation at Peak, Load at break,
- Elongation at break, UTS, %Elongation, %reduction in area ,Yield load etc. results for offline test.
- RS232C interface for computer connectivity
- Built in centronics parallel port / Serial Port for printer interface.

SERVO TEST START , DATA ENTRY



This screen opens when you start "Servo Test" from main menu. (For Servo Controlled m/c)

Test Related data Entries :
Safe Load (kN), Preload (kN) , Rupture % Peak (15 - 85) entries same as standard test

Speciman Dimensions :
entries same as standard test

You can select Yield determination Method same as standard test

Servo Data Entry :
First You have to select Servo control Mode. (Load Rate / Elongation rate etc.).
"Start test as" option is for initial gripping purpose. After preload control starts with selected rate.
Keep Initial Valve Open entry sufficient so that loading must start with this much valve open, as control will not start till preload.
After selecting "Servo control mode" , You have to fill green hilighted entries in given units.
You can save all Servo Data entry as some descriptive name , So as to recall same entries again.
(With "Save Servo settings" & "Load Servo settings")

If required you can change Proportional Gain settings , or Method (ERROR / NEW RATE).
Default Gain & Method settings will work for about all specimans.

Click on "Data OK" to go for Test Start with Online Graph.

Technical specification :						
Specifications	**Models**					
	TFUC-100-HG-SERVO	**TFUC-200-HG-SERVO**	**TFUC-400-HG-SERVO**	**TFUC-600-HG-SERVO**	**TFUC-1000-HG-SERVO**	**TFUC-2000-HG-SERVO**
Measuring Cap. (kN)	100	200	400	600	1000	2000
Measuring Range. (kN)	0-100	0-200	0-400	0-600	0-1000	0-2000
Least Count (kN)	0.005	0.01	0.016	0.024	0.04	0.08
Load Range in kN with accuracy of Measurement ± 1%	2 to 100	4 to 200	8 to 400	12 to 600	20 to 1000	40 to 2000
Resolution of Piston movement (mm)	0.01	0.01	0.01	0.01	0.01	0.01
Max. tensile clearance at fully descended piston position	50 to 700	50 to 700	50 to 700	50 to 800	50 to 850	50 to 900
Maximum clearance for Compression test (mm)	0 - 700	0-700	0-700	0-800	0-850	0-900
Distance between columns (mm)	450	500	500	600	750	850
Piston Stroke (mm)	150	200	200	250	250	300
Maximum straining speed at no load (mm/min)	300	150	150	100	80	45
Power Supply	3 phase 415V 50 / 60 Hz A.c.					
H. P. (Total)	1.5	1.5	2.5	2.5	4.0	6.5
Overall dimensions (Approx) (mm L x W x H)	1950 x 800 x 1850	2000 x 800 x 1900	2100 x 800 x 2060	2200 x 800 x 2400	2350 x 800 x 2700	3000 x 800 x 3600
Weight (Approx in kg)	1300	1400	2000	3000	4200	10000
Standard accessories :						
TENSION TEST JAWS FOR						
Round specimen Ø dia (mm)	10 - 20	10-20	10-25	10-25	10-25	20-40
Round specimen Ø dia (mm)	20-30	20-30	25-40	25-40	25-45	40-60
Round specimen Ø dia (mm)	-	-	-	40-55	45-70	60-80
Flat specimen Thickness (mm)	0 - 10	0-10	0-15	0-15	0-22	0-22
Flat specimen Thickness (mm)	10 - 20	10-20	15-30	15-30	22-44	22-45
Flat specimen Thickness (mm)	-	-	-	-	44-65	45-70
Max. width for Flat specimen (mm)	50	50	65	70	70	90
FOR COMPRESSION TEST						
Pair of Compress Plates dia Ø(mm)	120	120	120	120	160	220
FOR TRANSVERSE TEST						
Adjustment roller supports width (mm)	150	150	150	160	160	200
Diameter Ø (mm)	30	30	30	50	50	70
With Max. adjustable clearance (mm)	450	500	500	600	800	900
Punch Taps of Radius (mm)	6	6	6	16	16	30
Radius (mm)	12	12	12	22	22	40

FMI Reserves the rights of change in the above specification due to constant improvements in design.

Manufactured By : **Fine Manufacturing Industries**
B-7/12, M.I.D.C. Area, MIRAJ - 416410. (Maharashtra), India.
Phone : +9503874245
e-mail : response@finemanufacturing.com
Web Site : www.finemanufacturing.com