

Computerized Hydraulic Digital Control Universal Testing Machine



Introduction:

EI-XLC-D series is computerized hydraulic digital control universal testing machine. The space adjusting & test processes could be controlled by the software and the test result could be transferred to the software in the computer for further analysis.

It is ideal for tension and compression applications for tests up 1000 kN, and provides simplicity, reliability, and affordability for Quality Control (QC) labs, Scientific research labs, training centers etc. There are multiple test modes including tension, compression, bending test, etc., which are applicable for wide range of materials, such as metal, rebar, and components testing.

The oil cylinder is at the bottom of the load frame. Tension space is at the upside and compression & bending spaces are between lower crosshead and working table. It is adopting oil hydraulic power to push the piston in the oil cylinder to provide loading force. The lower crosshead is driven by motor through decelerator, chain transmission device and screw pair to realize the adjustment of testing space.

Features:

- Full computer control of testing process.
- Stable and reliable high intensity 4 columns and 2 reeling screw columns structure load frame.
- Adopt oil-hydraulic automatic clamping
- Finish test, the system automatically analysis, statistical test results.
- Overload protection will secure operators.

Corresponding Standard:

ISO 6892, BS 4449, ISO75001, ASTM C39, ASTM A370, ASTM E4, ASTM E8 and BS EN

Main body:

1. Introduction of structure:

There are two supports fixed on the base by nuts, whose upper ends are fixed on the upper beam. And another two supports are fixed on the middle beam and operating platform separately, which support together a space for fixing specimen to perform tests of tension, compression and bending. When the oil output from oil pump lifts piston, operating platform will rise and then it brings the two supports and upper beam to rise. The upper jaw and middle jaw are on the upper beam and middle beam respectively. The lifting of the middle beam is mainly through the running of the screw on the two supports. The running of the screw drives the beam moving. On the lift control button are *up* and *down* signs.

Oil cylinder and piston are the most important parts of main body. Its touching surface is precision finishing, and with appropriate space and oil film, so that the piston can move freely to minimalism the friction to the fullest extent. When the Oil from oil pump flows into the oil cylinder, which make piston along with beam and operating platform rise until load acts on the specimen. So in the 6 process of operation, oil must be kept pure, and should not be polluted by impurities, iron dust in case they will enter into the oil cylinder through oil pump, oil valve and damage the roughness of oil cylinder and piston touching surface, so it will affect the accuracy of the test results.

In the process of installation, if there are any impurities or soil on the upper touching surface of oil cylinder and piston, they must be cleaned firstly.

2. Accessories there are some tensile and compression accessories along with the machine.

Dynamometer:

1. Concept:

This machine is composed of digital display controller, sensor, high pressure oil pump and other operating components. It is a comprehensive structure, which are all closed in the simple, smooth and pleasing steel shell. There is a door outside of each shell surface so that we can open the door to check its internal structure and make some adjustment and maintenance, as well as it can keep the bearings and precision parts in clean and good working condition.

2. High pressure oil pump and motor

High pressure oil pump and its motor is connected on oil tank cover through Flange connection. High pressure oil pump adopts plunger pump, which is an axial plunger pump, composed of 7

sets of pistons. The piston and sleeve in the oil pump has high surface roughness and cooperated well, ensuring that the possibility of a high-pressure and the least oil leakage.

3. Operating part

The button of high pressure pump motor, power button and indicator lights are all installed on panel of the ergometer. The feeding oil valve, also known as pressure regulating valve, by which we can transfer the oil from oil pumps into oil cylinder, meanwhile it can control the loading speed. The reflux valve can unload to make the oil in the working oil cylinder return to oil tanks.

4. Hydraulic drive System After the oil in the oil tank go into the oil pump through oil strainer, it will be delivered into feeding valve by oil pump pipeline. At this time, if the feeding oil handwheel is closed, the piston will be pushed open because of the oil pressure, and the oil will return to the oil tank; if the feeding oil handwheel is open, the oil will enter the working oil cylinder through pipeline, then through pressure pipeline and reflux valve body, the oil will be back to oil tank.

4. Hydraulic drive System

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Main Technical Specifications:

Model EI-XLC	2000D	1000D	600D	300D
Structure	Four Column with Two Reeling Screws Load Frame			
Force capacity	200 T	100 T	60 T	30 T
Force Range	2% ~ 100% FS			
Force Accuracy	±1%			
Resolution	1/500000 FS			
Adjustment Range of Stress Rate Control	1MPa/s ~ 60MPa/s			
Deformation Accuracy	±1%			
Deformation Resolution	1/500000 of Max Extension			
Adjustment Range of	0.00025/s-0.0025/s			

Strain Rate Control				
Accuracy of Strain Rate Control	±2%			
Displacement Resolution	0.001 mm			
Adjustment Range of Displacement Rate Control	0.00025/s-0.0025/s			
Accuracy of Displacement Rate Control	±2%			
Range of Holding Control of Stress, Strain and Displacement	0.3% ~ 100%FS			
Accuracy of Holding Control of Stress	±1%			
Tensile Space (mm)	1300	700	650	650
Compression Space	1000	550	550	550
Column Space (mm)	450	550	450	450
Round Specimen Clamping Range (mm)	Ø20 ~ Ø65	Ø6 ~ Ø50	Ø6 ~ Ø40	Ø6 ~ Ø26
Flat Specimen Clamping Thickness (mm)	0 ~ 50	0 ~ 50	0 ~ 40	0 ~ 40
Maximum Width of Flat Specimen Clamping (mm)	140	75		
Pressure Plate Dimension (mm)	Ø300	Ø160		
Rate Voltage	AC415V 50Hz			
Frame Dimension (mm)	1200 x 880 x 3300mm	910 x 830 x 2300mm	840 x 700 x 2200mm	840 x 700 x 2200mm
Oil Source Console Dimension	1150 x 800 x 1000mm	1150 x 800 x 1000mm	1150 x 800 x 1000mm	1150 x 800 x 1000mm

Weight (kg)	Approx. 9000	Approx. 3200	Approx. 2300	Approx. 2000
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Brief Introduction to the Software:

TestMaster3 is the testing and control software applicable to Electric-Type Universal Testing Machine, Electro Hydraulic Servo Universal Testing Machine and Hydraulic OSD Universal Testing Machine and other types extended from the above three. The software can be used for regular testing including drawing, compressing, curving, cutting and twisting all materials (metal, rubber, plastic, cement concrete, rock and compound materials, etc.). It has high expansibility and can be expanded for special machine types, special materials and special testing. TestMaster3 features easy operation, beautiful interface, powerful function and convenient expansion.

1. Powerful Function:

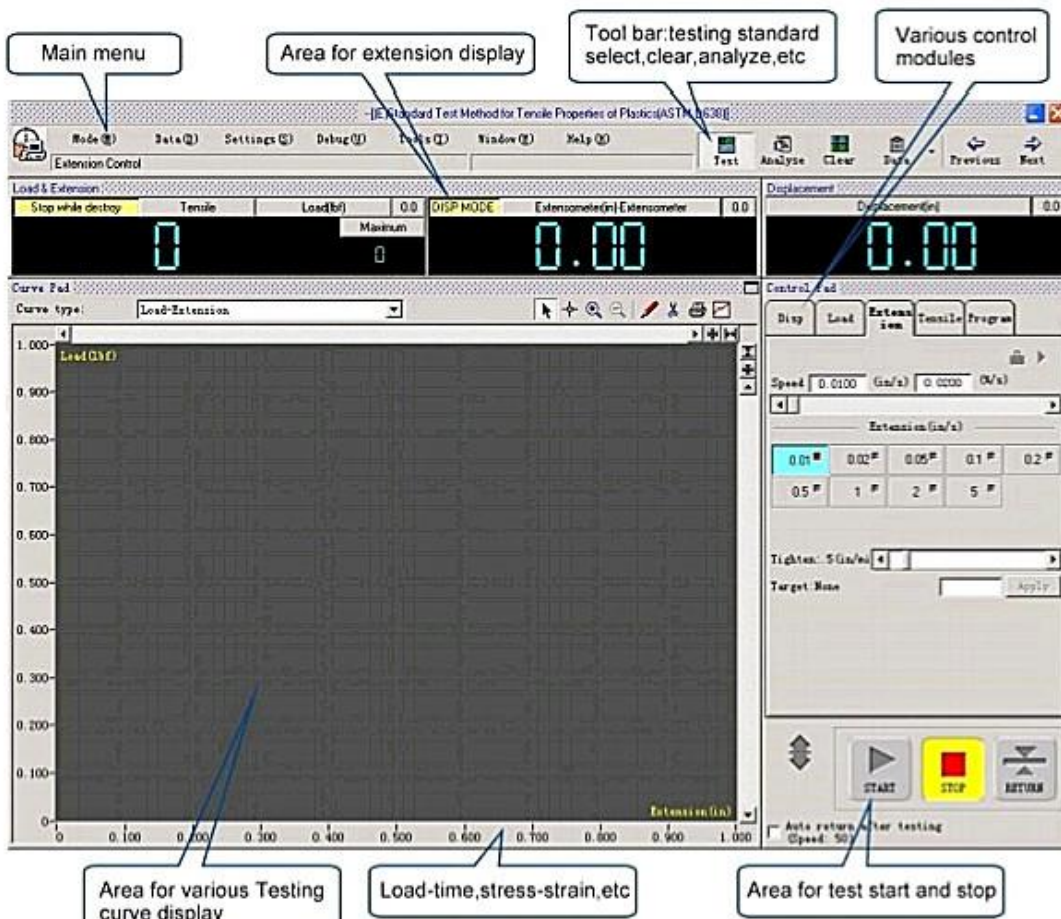
- 1.1 Testing can be clarified based on types and you can record the latest 10 tests for convenient looking-up.
- 1.2 You can freely configure value- indicating display bar. The content, unit and format of the display field can be configured.
- 1.3 Unit of measurement system can be customized to configure the unit of measurement you need.
- 1.4 Two-level Rights Management. Different rights for the administrator and test clerks are default.
- 1.5 Testing is carried out in groups. Continuous testing can be conducted within a group for data evaluation.
- 1.6 Layout of the interface can be customized, and the number of graphs can be chosen from 1 to 3. You can also freely switchover layouts and export pictures separately to make a picture file.
- 1.7 Support test analysis, display feature points for single curve, support on-line modification and multiple curves comparison within groups.
- 1.8 Support single print and group print. Report templates can be separately setup.
- 1.9 The two-way calibration scale of the sensor can be calibrated and verified in two ways; the direction of calibration scale can be automatically chosen when in testing.
- 1.10 The sensor can be calibrated / verified in two ways in manual, semi-automatic or full-automatic way.
- 1.11 Frequency and points of calibration / verification can be set; support automatic sub-file and back calibration / verification; you can choose to display information including indicating value, code value, mean value and error.
- 1.12 Incorrect calibrating spots / verifying spot can be cancelled during calibration / verification.

- 1.13 Support Excel and MasterReport for report and you can set easily report form and connect data.
- 1.14 The guiding editing report model of MasterReport simplifies to the maximum extent the procedure of making report.

2. Convenient Expansion:

- 2.1 It adopts communication protocol of high reliability, and supports mechanisms of response, verification and time-out; the bottom communication method can be seamlessly transferred into serial communication and Ethernet.
- 2.2 It is applicable to various machine types, supporting hydraulic, electric and heterotype testing machines. Every channel support sensors of various types and switchover between them.
- 2.3 Support universal mode, drawing mode and special mode for testing.
- 2.4 Special mode is completely customized for test specification to meet the requirements to the maximum extent.
- 2.5 Universal mode adopts open type setup, supporting customizing name of parameters, symbol, rounding and formula; testing can be divided into three stages which are preloading, formal loading and post processing; each stage can be customized and the testing procedures of formal load can be edited.

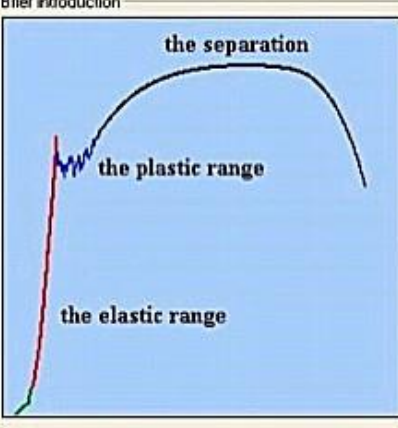
Software Interface:



Tensile control Brief introduction

Wizard

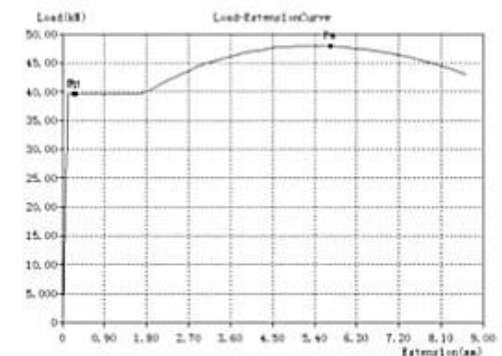
Brief introduction



The left graph is a typical curve of metallic materials for tensile test (Force-Extension Curve). The whole control process includes 3 steps identified with the different colors in graph). The elastic range (green and red), the plastic range (blue) and fast separation range (black).

Eco Instrument

SampleID	1	TestDate	2014-6-4
Operator		Type	Circle
DI (mm)	12	As (mm ²)	113.10
Lo (mm)	50	Lo (mm)	51
KS (mm)	2.0	As (mm ²)	103
Z (mm)	6.0	F _u (kN)	48.00
E _s (MPa)	425	F _{0.2} (kN)	/
DTY (MPa)	/	F _{0.1} (kN)	29.60
LYT (MPa)	350	F _p (kN)	29.60
F _p (MPa)	350	F _{0.5} (kN)	29.60
R _t (MPa)	350	R _{0.2} (MPa)	179.01



Displacement control module

Control Pad

Disp Load Extension Tensile Program

Speed 0.257 mm/min

Displacement mm/min

0.2	0.5	1	2	5
10	20	50		

Close Loop Control
Target None

Load control module

Control Pad

Disp Load Extension Tensile Program

Speed 0.100 kN/s 0.318 MPa/s

Load kN/s

0.1	0.2	0.5	1	2
5	10	20		

Tighten: 5mm/min

Target None

Extension control module

Control Pad

Disp Load Extension Tensile Program

Speed 0.0124 mm/s 0.0248 %/s

Extension mm/s

0.01	0.02	0.05	0.1	0.2
0.5	1	2	5	

Tighten: 5mm/min

Target None

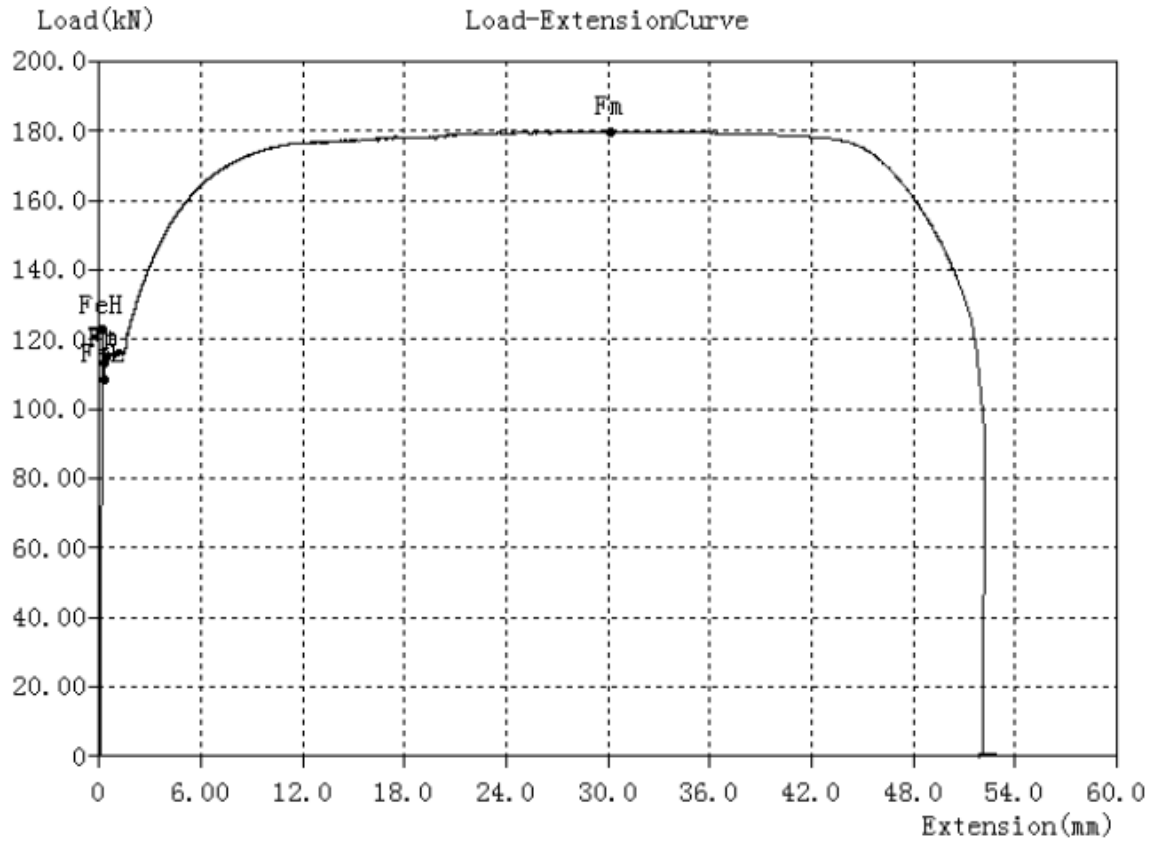
Tensile Control module

Control Pad

Disp Load Extension Tensile Program

- The first step
Tighten speed: 5mm/min
Stress Speed: 10 MPa/s
Switch to the second step after the force descend
- The second step
Strain Speed: 2 %/s
Notice Don't put down the extensometer
Switch to fast separation step when the elongation increment exceed 3 mm
- The fast separation step
Speed: 25mm/min
and put down the extensometer

Sample Report:



Standard Main Configuration:

Item	Description	Quantity
High strength main unit	Four columns Two reeling screws	1 set
Load Sensor		1 set
Compression Fixtures		1 set
Tensile fixture (Round Jaw)		Each 1 set
Tensile fixture (Flat Jaw)		Each 1 set
Bending Fixtures	3 points & 4 points	Each 1 set

		
Hydraulic oil pump		1 set
Transformer	Step down	1 nos
Protection Cover		1 nos
Control System		
Software Test System	Professional	1 set
Displacement Sensor		1 set
Electrical Apparatus Control System		1 set
2 Points Extensometer	 Gauge length 50mm	1 set
Branded High performance Computer System	 OS: Window 10 CPU: Intel Pentium Processor RAM: 4GB DDR4 Memory HDD: 1TB Hard Drive	1 set

	Video: Intel HD Graphics 610 Networking: Integrates LAN 10/100/1000 WLAN: 802.11ac Wireless Networking 802.11a/b/g/n Compatible Keyboard: USB Keyboard Mouse: USB Optical Mouse Speaker: None BIOS: R02-A4 19.5" Color LED Monitor A4 Color Inkjet Printer	
Operation Manual / Packing List / Warranty Certificate	-	Each 1 set



Main Unit



Control Unit



Hydraulic Clamp



Operation training