Model WAW-600E Computer Control Electro-Hydraulic Servo Universal Testing Machine

Applications:

Model WAW-600E computer control electro-hydraulic servo universal testing machine is a superior version UTM. It is suitable to test various metallic & non-metallic materials for tension, compression, bending and shearing strength. It can be capable of testing the characters of materials on physical & technology properties. Equipped with the computer & Software & printer, it can display, record, process and print the test results, and control test procedures as the set program and can draw test curves automatically in real time. The machine complies with ASTM, DIN, ISO standards. It is simple, easy to operate and widely used in works, laboratories and high schools for material properties research and quality control.

Applied Standard:

- Load meets or exceeds the following standards: ASTM E4, ISO7500-1, EN 10002-2, BS1610, DIN 51221.
- Strain measurement meets or exceeds the following standards: ASTM E83, ISO 9513, BS 3846 and EN 10002-4
- Safety: This machine shall conform to all relevant European CE Health and Safety Directives EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1
- ISO6892: DIN EN 10002-1, JIS Z2241, BS-18, ASTM E8: Metallic Material-Tensile Testing at Ambient Temperature.
- ASTM A370: Standard Test Methods and Definitions for Mechanical Testing of Steel Products

Load Frame

- Compact design with rigid four-column & two-lead screw construction.
- Dual workspace design: upper for tension test (expandable for peel & tear test etc), lower for compression, bending and shearing tests, which is quite convenient for different kinds of tests.
- The frames all incorporate human factor consideration in the design to ensure safety, improve testing efficiency, and reduce operator weariness.
- Cylinder mounted at the bottom of the machine to guarantee the working gravity.
- Test space can be extended according to the length & elongation of specimen and related test requirements.

Crosshead

The design of open front hydraulic wedge grips makes the exchange of inserts and specimen loading easier. Tensile grips are embedded into upper fixed and lower movable crosshead to keep maximum strength. Lower movable crosshead motor-driven by roller chain provides the exceptional ease of operation.

Safeguard

- ✧ Overload protection: When the testing load is over 2%-5% of Max. Load, the system will unload.
- ✧ Stroke protection: When the ram arrives at the upper limited position, the motor of oil pump will stop.
- ✧ Multiple protection functions: oil actuator overflow protection, oil pump over-current protection, hydraulic oil overheat protection, overload protection and filter protection.
- ✧ **Safety cover with metal sheet to protect the operator from any damage (optional).**

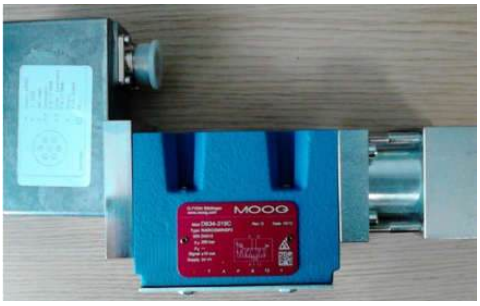
Hydraulic power pack

- Variable pressure hydraulic power supply provides pressure on demand, reducing heat generation, increasing oil life & eliminating the need for water cooling.
- Double control mode, manual control & PC servo control model. For manual control model, hydraulic pack is for manually loading and clamping specimen hydraulically for high efficiency of test, While test data & curves can displayed on PC, manual control mode is especially suitable for the batch broken load tests on the large scale of specimens; For PC servo control mode, all can be controlled & processed by PC automatically, closed-loop servo control of position, load, stress & strain increasing test efficiency & meeting the data consistency between collection and analysis.
- The pumping units are designed to be located in the lab with lower noise level within 65dBa.
- The oil pump, as the core heart of the oil source, is the power source of the hydraulic system. MARZOCCHI pumps from Italy and the NACHI pumps from Japan are commonly used. The two oil pumps are high pressure gear pump, with low noise and steady performance.
- Air cooling system can be offered upon request to cool down the oil when needed.

Servo valve

The servo valve is an important core part, whose flow rate can be controlled through measuring & control system to realize the precise closed loop control for loading and unloading;

Servo valve from Moog, USA can be offered upon request.



Load measurement:

TE has accumulated great experience in selection of superior core loading weight system in terms of materials, design, construction technology and especially performance & accuracy. Cooperating with top-quality brands from Germany & USA, TE made a special customs design with shielding function so that it can be optimized match with measuring & control system for most accurate test results.

The readability can be from 0.4% to 100% of the rated capacity. Calibration within 0.5% accuracy can be carried out as per ASTM E4, ISO7500-1, EN 10002-2, BS1610, DIN 51221 standards.

This special load cell provides excellent immunity to impact and side forces, rugged & low-profile measuring body with strictly symmetrical design is optimally suited to ensure high endurance strength. Excellent linearity guarantees highly precise measurement, additional mechanical protection of the strain gage area. It can be set for protections of 105% over range protection, over load capacity of 150% without permanent zero shift and over load projection of 300% of the rated capacity without mechanical damage. This meets the stringent Weights and Measures requirements throughout Europe and the USA.

Load cell from Celtron, USA can be ordered upon request

Position measurement

Wire drawing type encoder is used for measuring the displacement of actuator. High precision encoder is applied corresponding with controller request.

Deformation measurement:

High precision electrical strain gauged extensometer will be applied for deformation measurement. Also, being the exclusive agent of Epsilon extensometers in China, we are also experienced in providing suitable clip-on deformation measurement solutions and non-contact deformation measurement solutions like video extensometer and laser extensometer even under special environment such as furnace, environment chamber etc.

		
Standard configuration 50/10	**Model 3542-050M-020-ST(Optional)**	**3543 Optional**

Electronics and Control Part:

Self-developed & most advanced PCIE card for testing machine realizes the functions of real time data collection, communication, measuring and control etc. according to related ASTM, ISO standards. It can be inserted PCI slot of computer and connected with testing machine by data cable, then above functions can be done easily. Effective sampling rate can be up to 50Hz, in addition, the different versions for sampling rate of 200Hz, 500Hz and 10 kHz are available as options to meet special test requirements.

- Remote control box is attached on the column for operating in hands for close/open of grip and up/down movement of crosshead. Both TE remote controller & Germany imported RMC7 can be available.

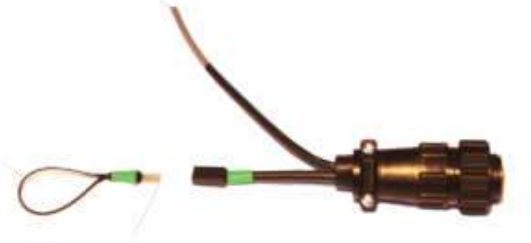
Patent technology of TE---Electric Calibration Modulus:

Application:

The electrical calibration module is designed to allow TE's calibration of load cell and extensometers to be easily transferred to our testing machine electronics. These are available for any strain gauged load cells and extensometers.

Why choose it?

It is used for the Calibration of Load cell and Extensometers by electrical method, which will make great benefits, partially listed as below



- Simple, fast and accurate calibration of the strain gauge load cells and extensometers;
- Quick means to check that the machine electronics (load cells & extensometers) is properly set and has not shifted, or damaged.
- The calibration can be done by electrical method, rather than the mechanical calibrators. Most of the end users do not have the mechanical calibrators; they have to apply for third party calibration. But now the electrical calibration module provides a more convenient way;
- If the machine is for internal QC, this module means that you do not need mechanical calibration any more.
- You do not have to apply for the third party calibration. The module can ensure the accuracy, it will greatly save the cost and the time.
- The calibration can be done whenever needed without mechanical calibrators;
  Machine accuracy is particularly important for precise tests; the calibration can be done before each test.
- Before a third party calibration, pre-calibration can be performed to ensure the system can pass the mechanical calibration (load cell by load cell calibrator and extensometer by extensometer calibrator).

Technical specification:

Model	WAW-600E
Max. Load(kN)	600
Load measuring range	0.4~100%F.S.
Load accuracy (%)	±0.5/±1
Deformation measuring range	0.4~100%F.S.
Deformation accuracy (%)	±0.5/±1
Displacement position(mm)	0.01
Test loading speed(mm/min)	0.5-50 (0.01-50 if with EDC220 controller & Moog servo valve)
Max. Crosshead moving speed (mm/min)	200
Stress control range	1~60(N/mm2)S^{-1}
Strain control range	0.00025/s~0.0025/s
Tensile space(mm) (Including piston stroke)	750
Compression space(mm)	620
Piston stroke(mm)	250
Column Distance(mm)	480
Column Diameter(mm)	75
Working table size(mm)	600x670
Flat jaw (mm)	0-30

Round jaw(mm)	Φ13-Φ40
Jaw length(mm)	90
Jaw width(mm)	90
Platen size(mm)	Φ128x40
Bending span(mm)	30-500
Roller diameter (mm)	Φ30
Roller length (mm)	120
Bending depth (mm)	100
Net weight (kg)	2650
Max. height[2](mm)	2550
Dimension of load frame[3](mm)	770X600X2300
Size of power pack(mm)	550x550x1410
Footprint (L x W)	1350x1350
Gross weight (kg)	2800
Shipping dimension (mm)	3000x1130x1260/980x860x1800
Power supply	3PH, 380VAC, 50H, 3kW

Standard Accessories:

1. Hydraulic tensile fixture for round sample dia. 13-26, 26-40mm, flat sample: thickness 0-30mm



2. Flexure/Bending fixture 1 set

Bending span: 30-500mm, roller dia. 30mm, upper punching head/mandrel: dia. 30mm,

Other dimensions on request

3. Compression fixture dia.128x30mm 1 set

4. Computer & software 1 set

Computer: Dell, with the following configuration: Dell, Intel Pentium G3250 Dual-core (2 Core) 3.20 GHz, 3MB processor, 2GB, DDR3 1600MHz, SATA 7200RPM, HD 500G, 16X DVD-ROM Drive, Windows 8.1 basic system 64bit with license; 19inch screen LED monitor, photoelectrical mouse, and multiple keyboard;

Software: **English & Spanish** Version (For details, please refer **Annex-1**)

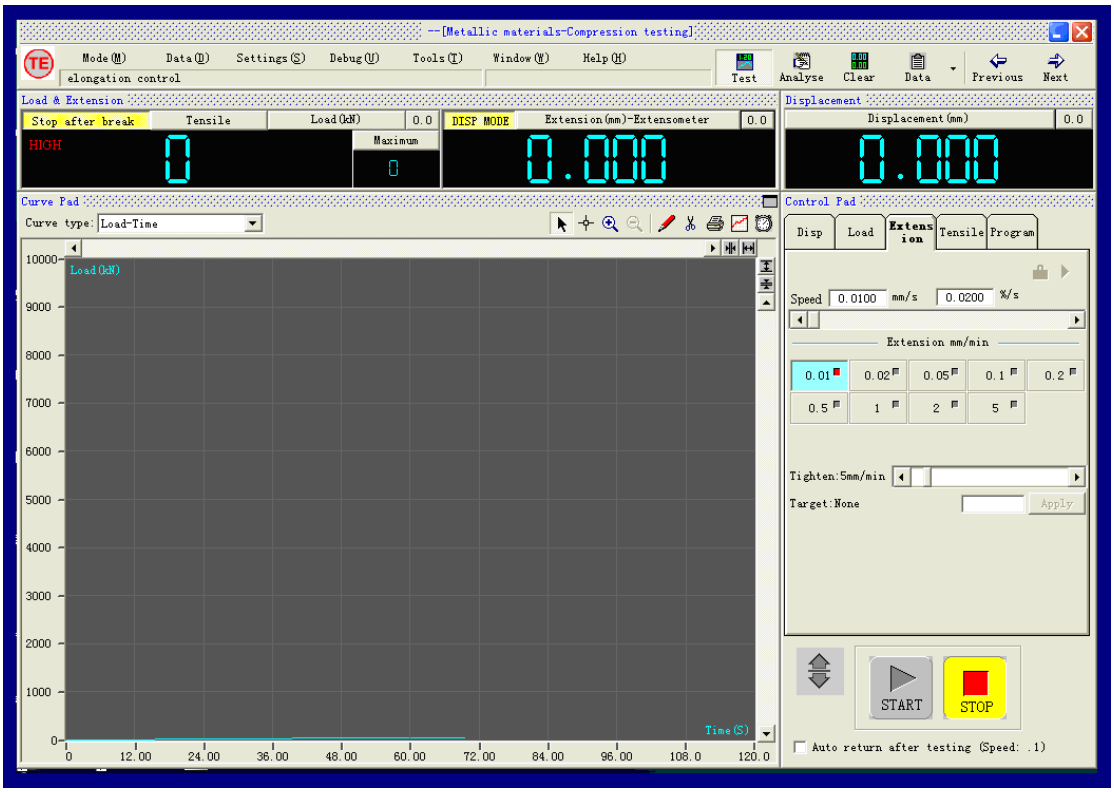
ANNEX-1: Software Introduction

Features of Measuring & Control Software

1. Application & Features:

TE software refers to the software characteristics of the top manufacturers of testing machine in the world and proposals of various testing requirements from the end users, and combines all the advantages of former

versions of software with lots of new features as following. Optimized software structure makes the testing operation easy, convenient and powerful.



- ✧ Integrated full digital electro-hydraulic servo close-loop control, data processing with data analysis
- ✧ Possess multi kinds of full digital close-loop control modes, such as test load, displacement, stress and strain. Different control modes can be switched each other freely and smoothly.
- ✧ Enjoy strong “programming” function of integrated test procedures, programmable steps can be up to 100 steps, and it can be also extended to complete the compilation of arbitrary complicated and control mode switch test procedures.
- ✧ Software design aims to rapidity and convenience of test operation. Also adopt special design method to meet batch technology tests.
- ✧ Software is managed by multi levels, and expert user can use all system parameters, which combined the flexibility of software usage and safety & reliability of the system.
- ✧ Automatic data processing, processing method complies with multi international standards, such as ISO6892-1998, EN10002-1:2001 and ASTM
- ✧ Multi international units are adopted, such as SI, metric system unit and British measurement, etc.
- ✧ Maintain multi language conversion interface, so the system can be applied under conditions of various kinds of languages conveniently (Customized)
- ✧ Possess function of manual data processing, which fits to various kinds of complicated data processing for customer.
- ✧ Offer test reports, which can be stored, printed and re-analyzed.
- ✧ Test data is stored as the form of “text mode”, and any general commercial data processing software can reprocess test data.
- ✧ Rich & perfect assorted test curves
- ✧ Possess the function of integrated document operating system, for example, test report, test parameter,

system parameters can be stored as the form of “text mode”.

- ✧ Compatible with different commercial printers
- ✧ Control system is based on software system, so upgrade is easy.

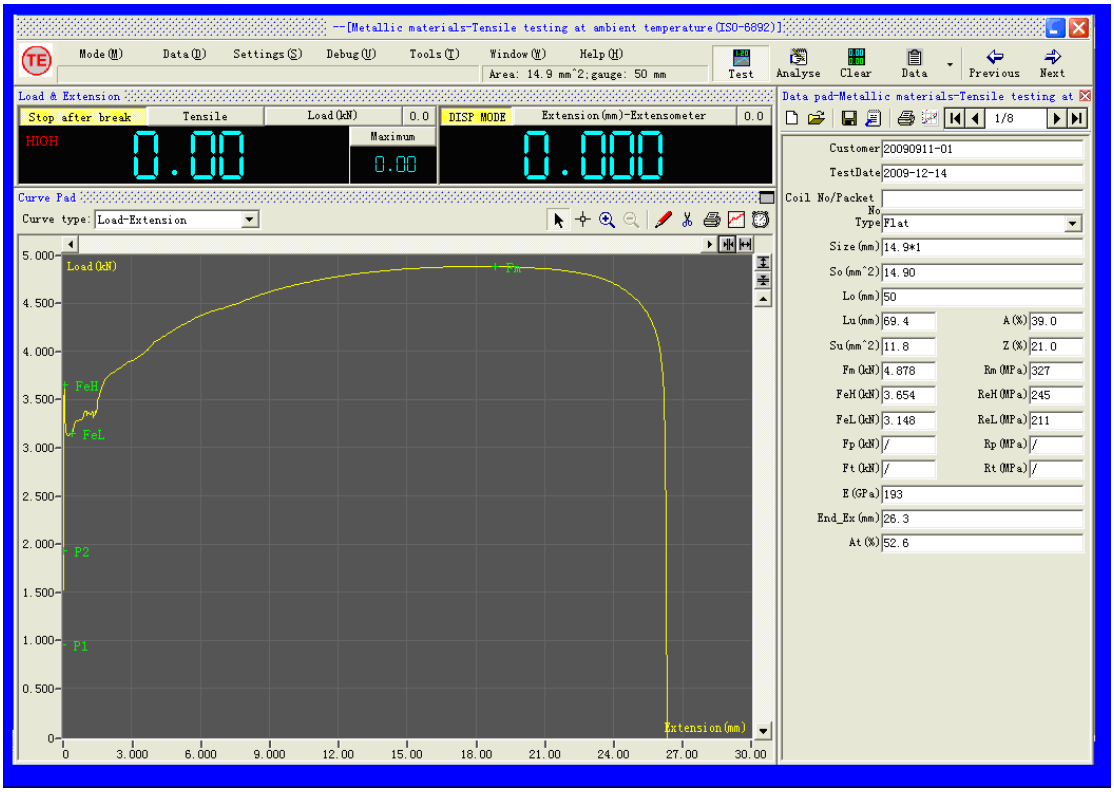
2. Software & hardware configuration

This software is used along with special PCI/ISA electro-hydraulic servo measuring & control card.

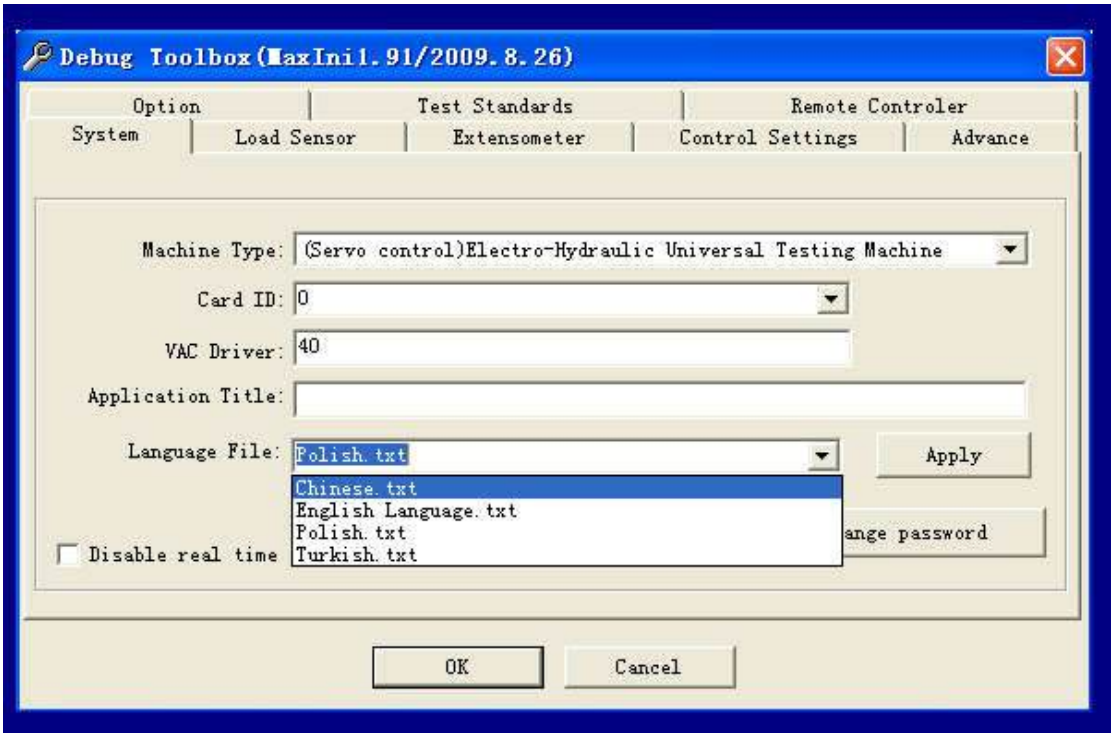
Various kinds of commercial printer and driving programs

3. Interfaces of software:

Various kinds of hydraulic universal testing machine



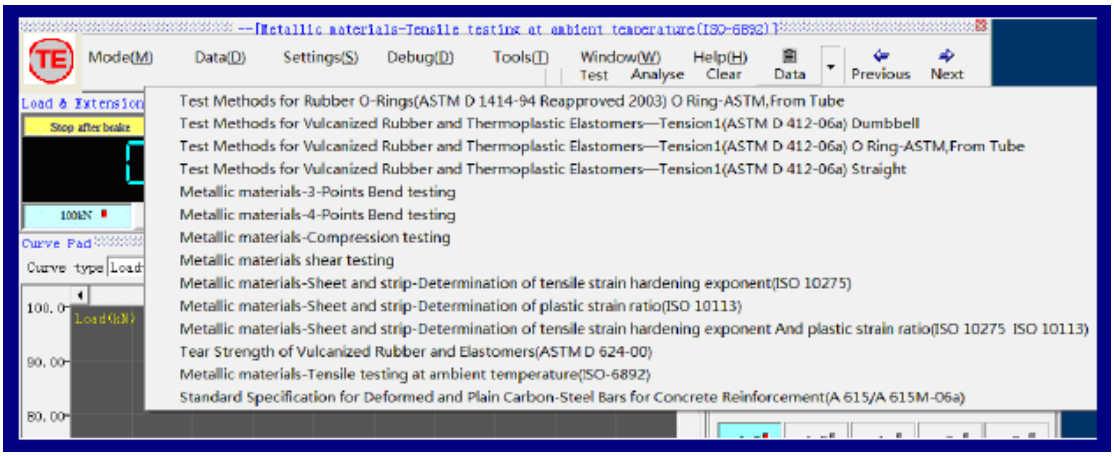
The control modes, test data and curves can be displayed in real time in the main interface and can be shifted at any time.



The deep-seated parameters of software are contained in Debug Toolbox

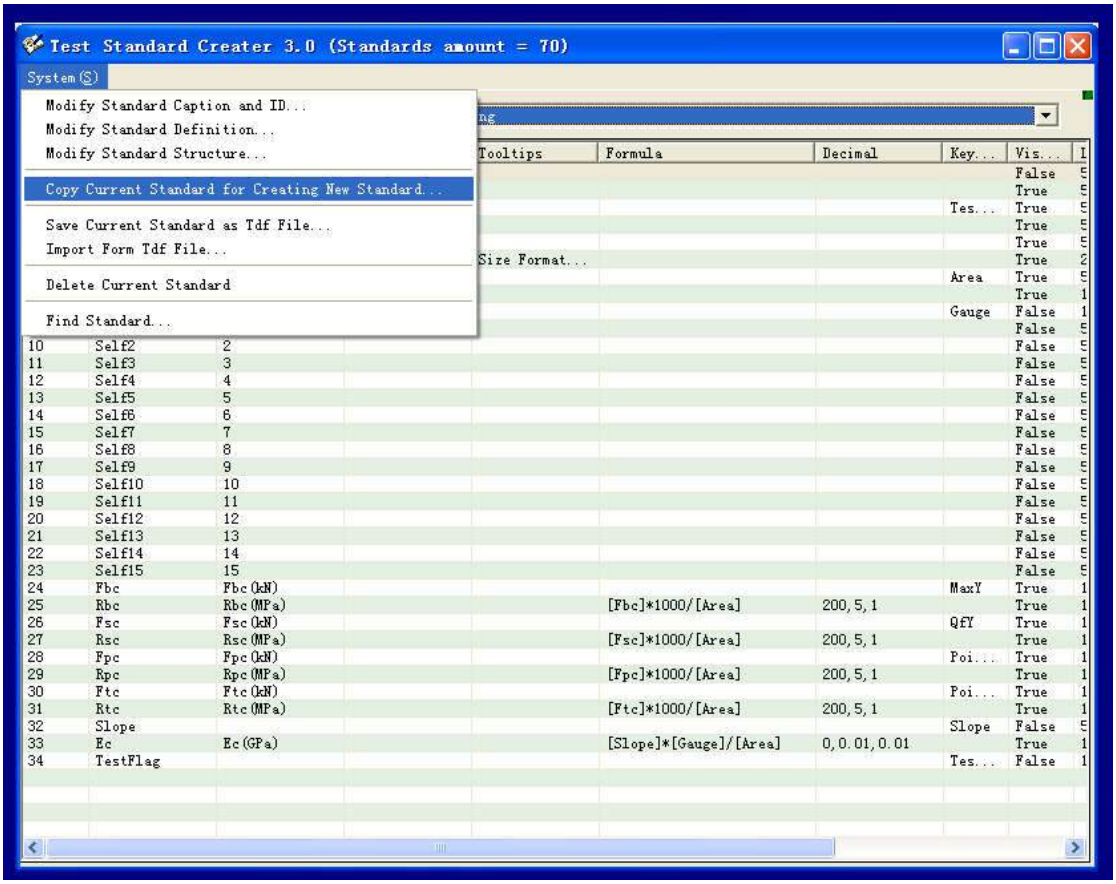
Multi-language function:

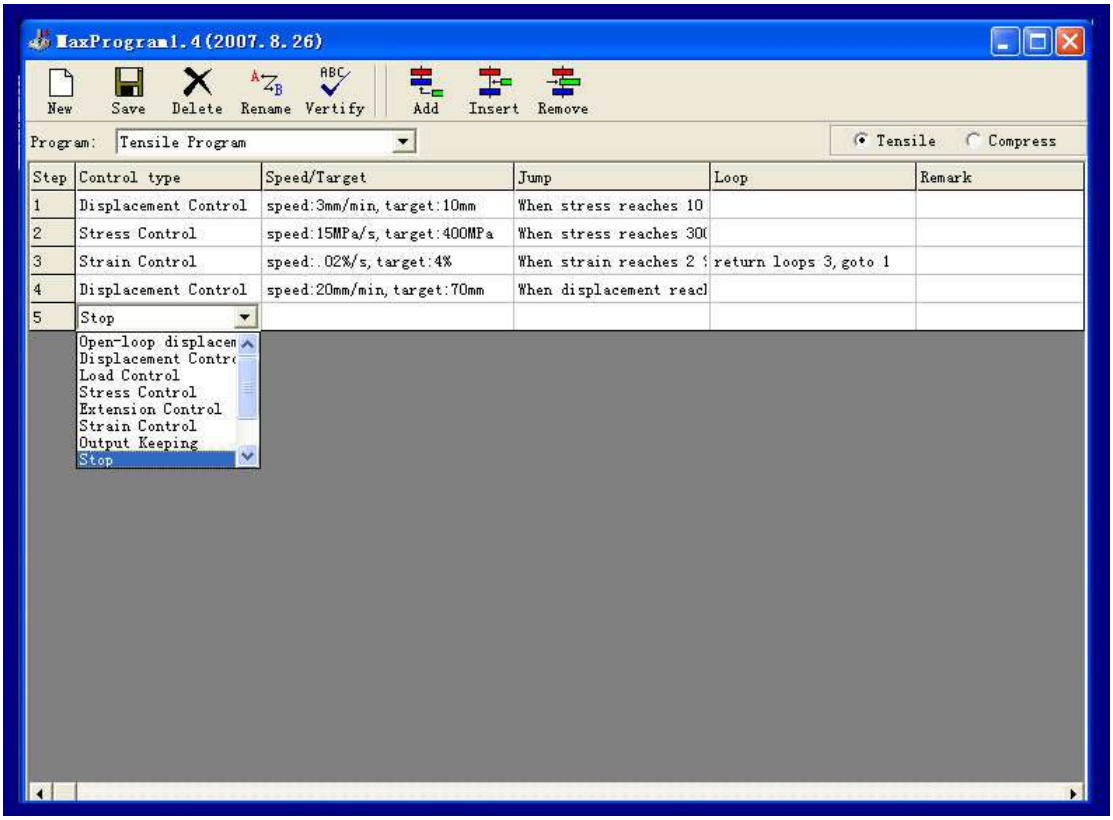
With the flexible language edited function, it can support multi-language such as English, Chinese etc. and you can translate the software language into the native language by yourself.



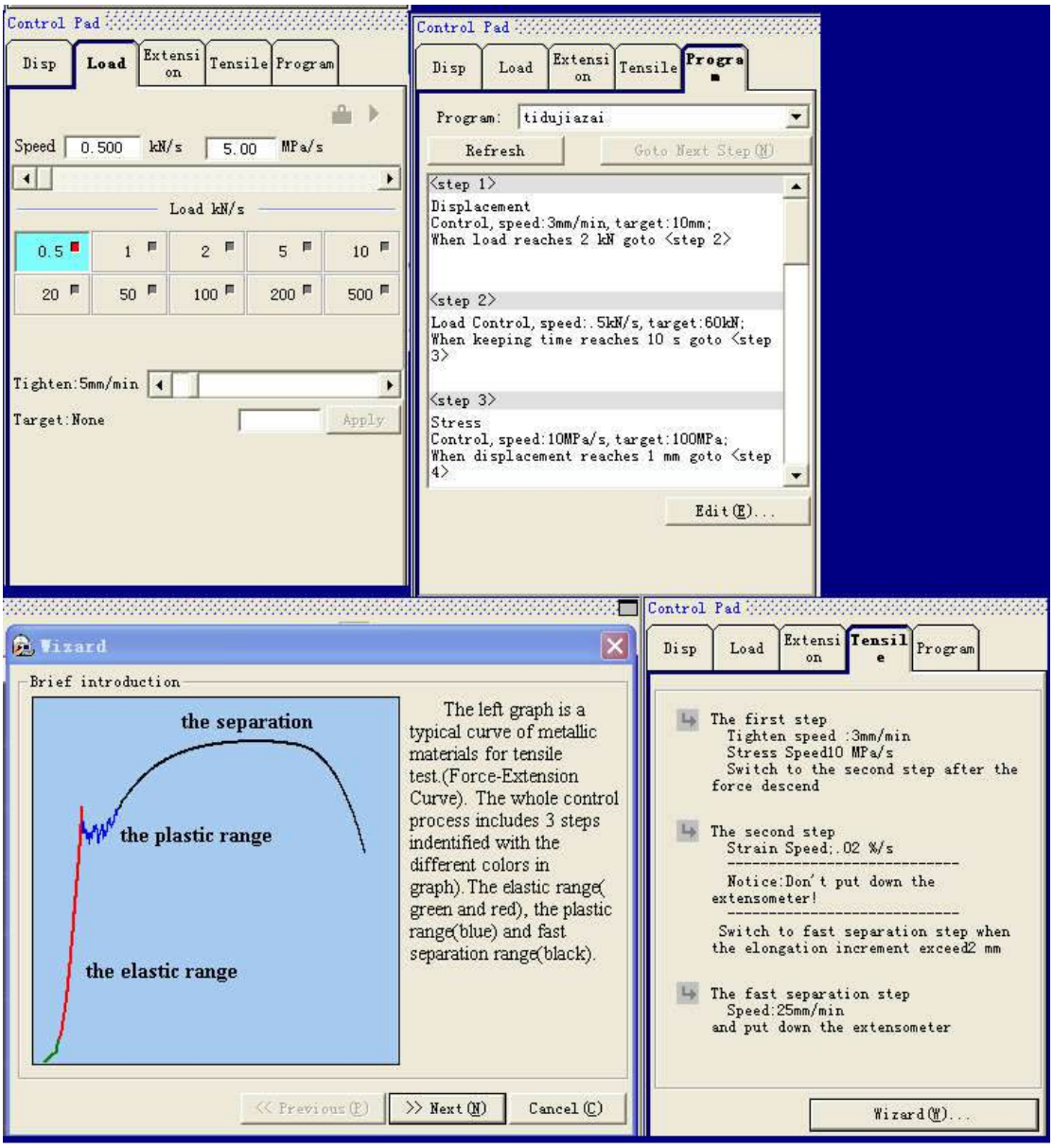
Software supports all kinds of popular testing standards i.e. ISO, ASTM, BS EN, DIN, JIS, GB etc.

Users can modify and add own testing standards and methods.

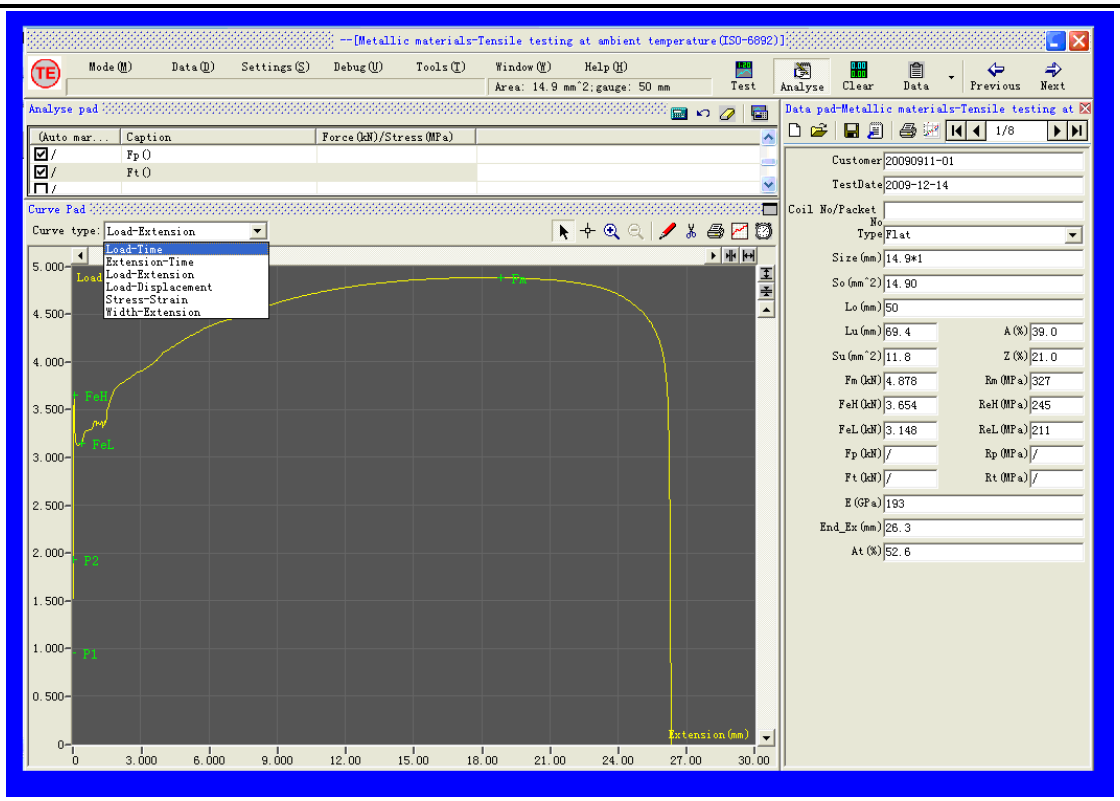

Test Standard Creater 3.0 (Standards amount = 70)
System(S)
Modify Standard Caption and ID...
Modify Standard Definition...
Modify Standard Structure...
Copy Current Standard for Creating New Standard...
Save Current Standard as Tdf File...
Import Form Tdf File...
Delete Current Standard
Find Standard...
Tooltips
Formula
Decimal
Key...
Vis...
10 Self2 2
11 Self3 3
12 Self4 4
13 Self5 5
14 Self6 6
15 Self7 7
16 Self8 8
17 Self9 9
18 Self10 10
19 Self11 11
20 Self12 12
21 Self13 13
22 Self14 14
23 Self15 15
24 Fbc Fbc(kN) MaxY True 1
25 Rbc Rbc(MPa) [Fbc]*1000/[Area] 200,5,1 True 1
26 Fsc Fsc(kN) QfY True 1
27 Rsc Rsc(MPa) [Fsc]*1000/[Area] 200,5,1 True 1
28 Fpc Fpc(kN) True 1
29 Rpc Rpc(MPa) [Fpc]*1000/[Area] 200,5,1 True 1
30 Ftc Ftc(kN) True 1
31 Rtc Rtc(MPa) [Ftc]*1000/[Area] 200,5,1 True 1
32 Slope Slope False 5
33 Ec Ec(GPa) [Slope]*[Gauge]/[Area] 0,0.01,0.01 True 1
34 TestFlag False 1


MaxProgram1.4(2007.8.26)
New
Save
Delete
Rename
Vertify
Add
Insert
Remove
Program: Tensile Program
Tensile
Compress
Step
Control type
Speed/Target
Jump
Loop
Remark
1 Displacement Control speed:3mm/min,target:10mm When stress reaches 10
2 Stress Control speed:15MPa/s,target:400MPa When stress reaches 30
3 Strain Control speed:.02%/s,target:4% When strain reaches 2 return loops 3,goto 1
4 Displacement Control speed:20mm/min,target:70mm When displacement reacl
5 Stop
Open-loop displacem
Displacement Contr
Load Control
Stress Control
Extension Control
Strain Control
Output Keeping
Stop

MaxProgram Editor possesses of multiple full digital control modes, i.e Displacement control, Stress (Load) control, Strain (Deformation) control, Low cycle control. User can edit the most complex and logical procedure by MaxProgram Editor. The combination of above functions can meet all kinds of routine test purpose.



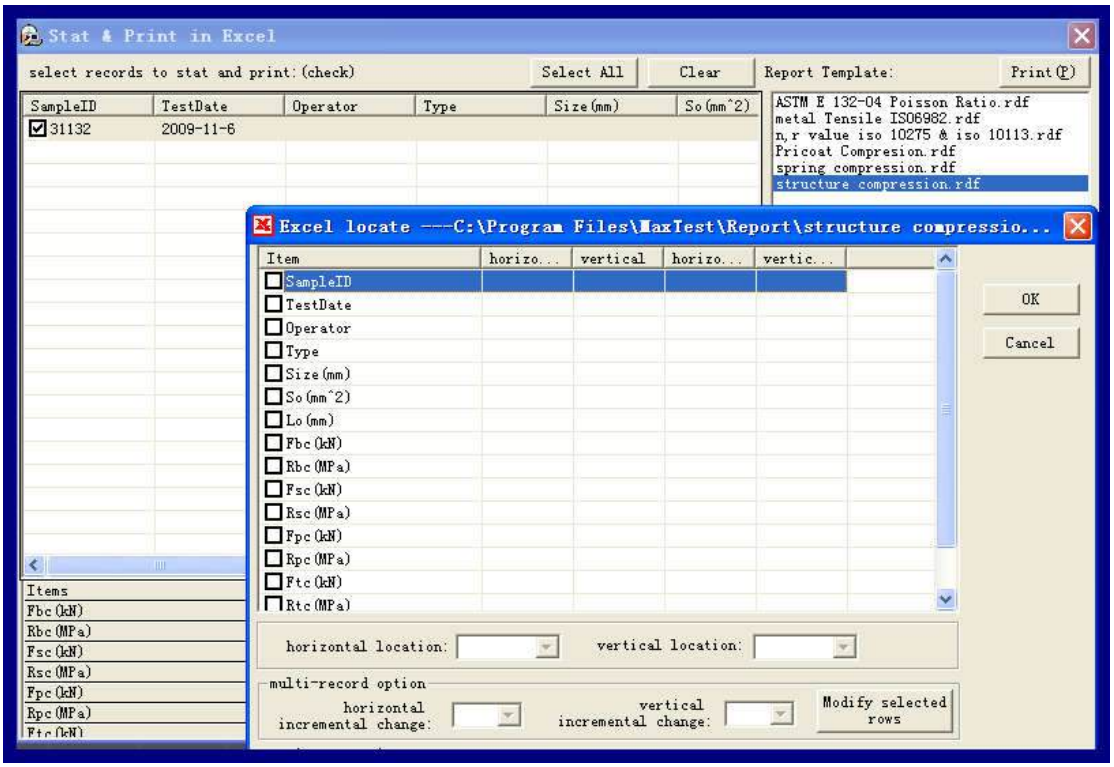
Through the Tensile Program Editor, user can setup test steps according to the requirements of standards.



Multiple curves function in real time display including Load-Extension, Load-Displacement, Stress-Strain, Load-Time, Extension-Time, and Width-Extension.

Characteristic points such as Elastic Modulus, Yield points, Rp, Rm etc. can be marked on the curves, for a highlighted and visual observation.

Test result can be obtained automatically and also it can be got from the test curves manually.



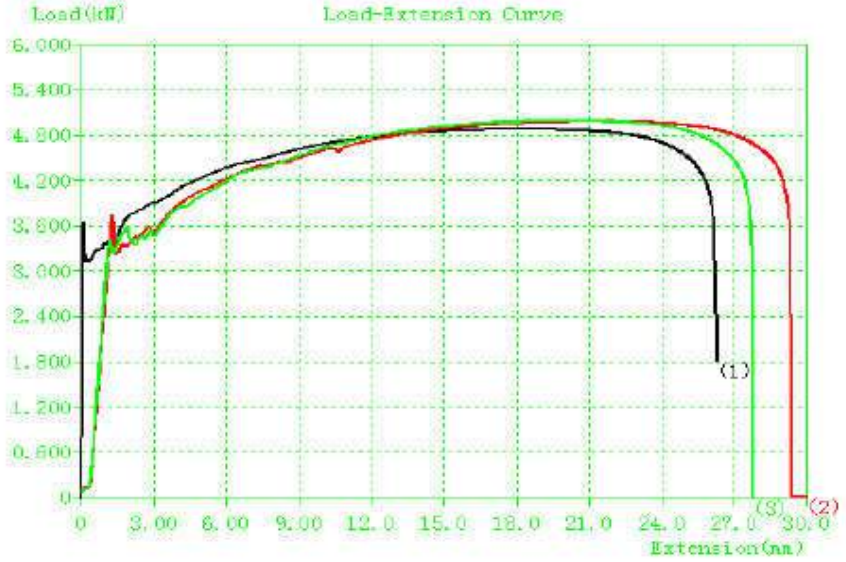
TE software contains all kinds of Report Templates. Customer can design various testing reports according to the requirements. Test result and curve can be printed in Excel or the auto-creating report template.

Metallic materials -- Tensile testing at ambient temperature

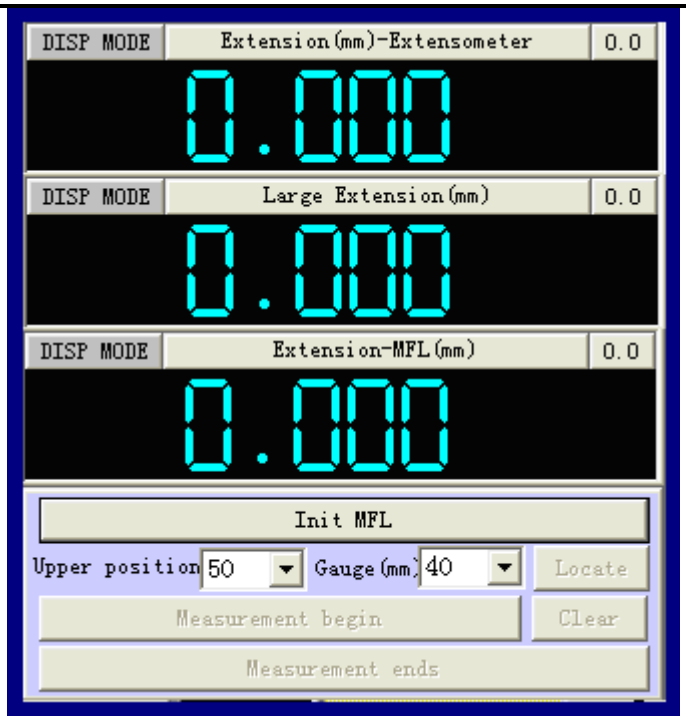
ISO 6892 : 1998

TestDate	2009-9-11	Operator	LW
Temperature	20℃	Size(mm)	14.9*1
Lo(mm)	50	So(mm^2)	14.9

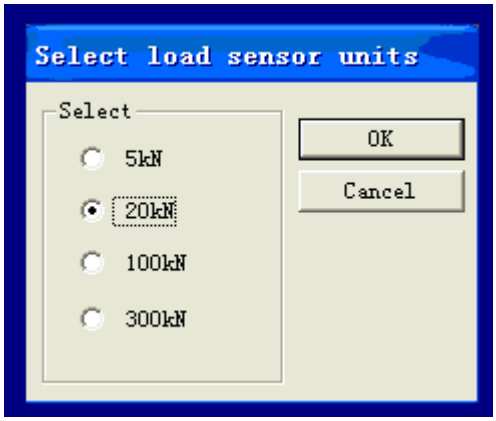
PrintID	SampleID	Rm(MPa)	ReH(Mpa)	ReL(MPa)	Rp(MPa)	E(GPa)	A(%)	Z(%)
1	QD01	327	245	210	233	193	39	21
2	QD02	334	251	223	234	198	42	23
3	QD03	335	240	229	228	205	38	27
4								
Max value		335	251	229	234	205	42	27
Min value		327	240	210	228	193	38	21
Average value		332	245.3333	220.6667	231.6667	198.6667	39.6667	23.667



Print Date: 2009-12-8



Beside the clip-on Extensometer, TE software supports Long Travel Extensometer, Full Automatic Extensometer, video Extensometer, laser Extensometer, and it can be added eight Extensometers at most.



TE software supports four load cells.