Model WDW-600S Superior Series Computer Control Electromechanical Universal Testing Machine

P.S: Above picture is for reference, load frame will be with single test space, both tensile, compression, bending test up to 600kN will be done in single lower test space, optional lateral test space up to 50kN is especially suitable for smaller capacity tensile test with more accurate test result

Applications & Characters:

Model WDW-600S computer control electromechanical universal testing machine is strictly designed according to ASTM, ISO, DIN, EN, JIS, GB, GOST standards. It is computer-controlled precise testing machine & suitable for all kinds of metallic & nonmetallic materials for tension, compression, bending, shearing and low cycle test etc. It features as high accuracy, high stability as well as high reliability. Equipped with PC system & printer, graph, test result display, data processing and printing can be done easily. It can be configured with the specified hardware & software modulus for metal, spring, textile, rubber, plastic, paper and other applications. It is widely used in many fields such as industrial enterprises, R&D test institutes, materials laboratories and universities etc.

WDW material testing machine adopts extremely robust load frame, highly precise load weighting system, cutting-edge measuring & control system and intuitive modular application software. Configured with extensive range of accessories for various applications, it can provide the optimal testing solutions for your individual test requirements. With more than 20 years experiences involving in materials testing industry & based on the abundant application knowledge accumulated from all kinds of sectors, TE is completely capable of configuring the exactly suitable & affordable solutions & more accurate test systems to customer involving the choice of load frame, core measuring & control elements, software package, grip/fixtures etc. according to their specified test applications and any demanding requirements.

Applied Standards:

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, 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.

Load Frame:

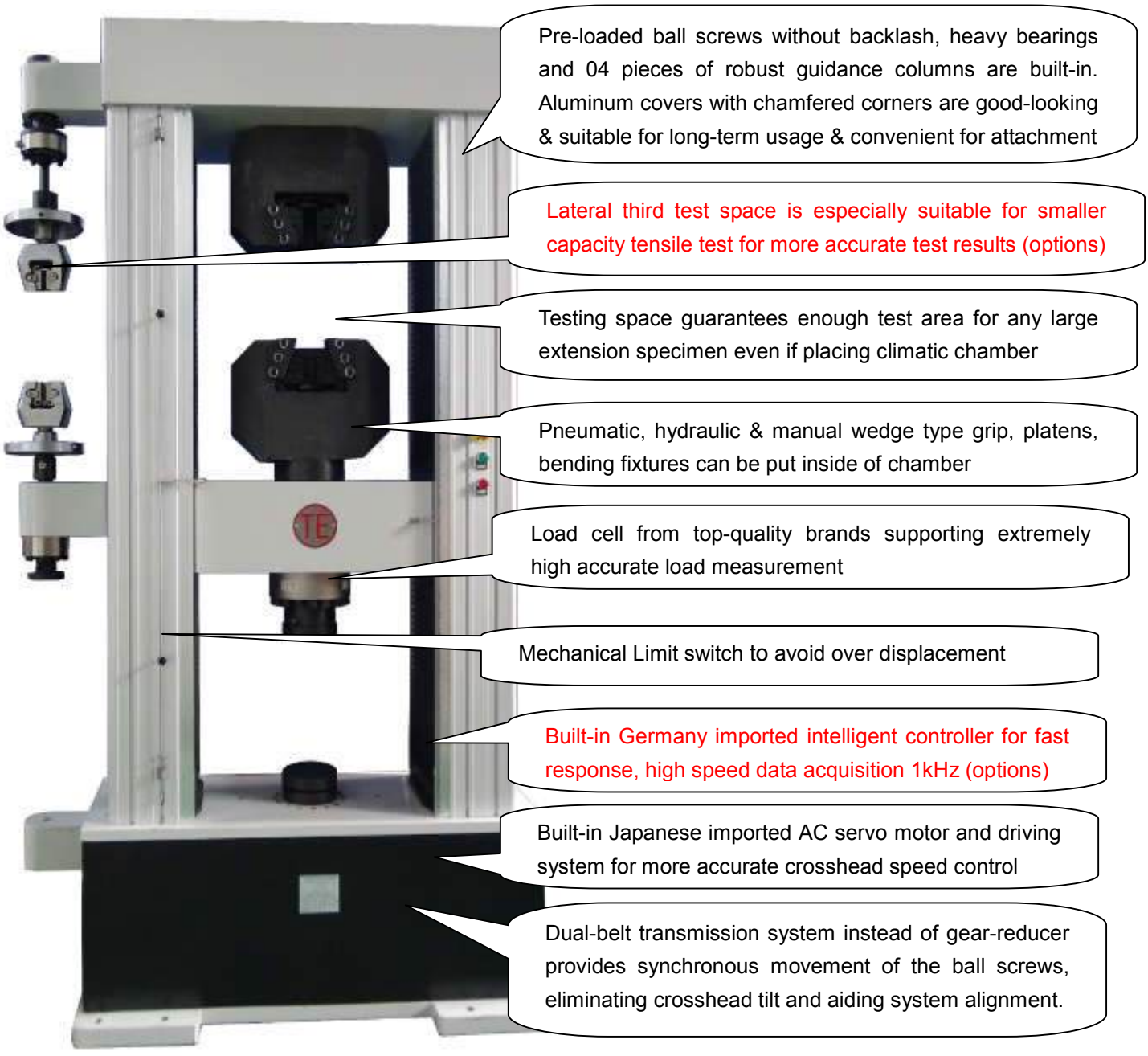
Floor models are frequently the choice of those in the composites and metals industries where specimen size and strength require higher load capabilities. The design of frames takes human factors into considerations to ensure safety, reduce operator fatigue and provide the highest level of flexibility. Robust guidance column, high precise lead screw with pre-loaded bearings, thicker crosshead and bench base contribute to an extremely high lateral stiffness and superior precise alignment, which ensures to achieve repeatable test conditions and reliable results.

High accuracy: The preloaded precision ball-screw with high speed low noise ensures high speed and position measurement accuracy and less noise.

High stiffness: The load frame is built with 4 pieces of robust crosshead guidance columns & 2 pieces of pre-loaded high precision ball lead screws, which delivery a very higher stiffness.

Over-stroke limiter: The range of the crosshead movement mechanically limited.

Comfortable working area: wide legroom under the load unit provides a comfortable working area for attaching and removing jigs.



Load weighting system: (600kN & 50kN (options with lateral space))

Load weighting system is the most critical aspect of mechanical testing. 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.

Load cell is from **Interface or Celtron, USA** on request.

With Doli EDC220 controller (WDW-600S), the readability can be from 0.2% (1/500) to 100% of the rated capacity, for 600kN & 50kN load cell, effective measuring range can be down to 1.2kN & 0.1kN. While with advanced PCIE card (WDW-600), the readability can be from 0.4% to 100% of rated capacity, for 600kN & 50kN load cell, effective measuring range can be down to 2.4kN & 0.2kN. Also, **self identification and auto-calibration function can be applied in this system (if with Doli Controller).** 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.

Electronics and Control Part for WDW-600S (Superior type):

A. EDC 220 Advanced Controller from Doli, Germay

This superior series machine are essentially configured with **intelligent & powerful EDC 220 controller** from Germany for data acquisition and close loop control with features of stable control, fast response, high speed acquisition and exceptional reliability. This controller is with measuring channels for synchronous acquisition of load, position and strain from transducers like load cell, encoder and extensometer and supports additional channels for future expansion(maximum is 4 channels). Communicated with intuitive software for all machine control & data acquisition, and **data capture rate up to 1kHz with EDC220** ensures to obtain more accurate & repeatable test results. With special plug stored sensor data, it can be automatic recognition and calibration of sensors for load & extensometers configured with testing system. Up to now, it is most reliable device to be used extensively for static and dynamic testing machines.

EDC 220 Intelligent Controller from Doli Germany with sampling rate 1000Hz

Specifications:

- **Sampling rate: 1000Hz**
- Communication Processor, 100MHz

- ✧ Load resolution 180,000 steps, two ranges 2mV/V and 4mV/V
- ✧ RS485 Interface for external keyboard/Display supports only one device
- ✧ Drive Interface ±10V (16bit) analogue command output OR, digital command output
- ✧ Safety functions like 4DI
- ✧ Two Option slots for second analogue channel for strain gauge extensometer OR, two encoder channels for extensometer with one or two encoder.
- ✧ **PC communication via USB or Ethernet**
- ✧ Internal socket for serial Sensors (COM 1)
- ✧ Internal socket for Debug (COM 2)

B. Sensor plugs for automatic recognition and calibration

To identify and calibrate transducers as load cells, extensometers etc., a small PCB within a plug case (15 pin SUB-D) is available. The advantage here is the use of not calibrated e.g. load cells, because the calibration has to be done in house anyway. The calibration along with other data is stored in the plug. The EDC reads the data at switch on or at request. The features are:

- ✧ Reference bridge to adjust the transducer sensitivity
- ✧ EEPROM to store transducer data

C. Handheld Unit RMC-7 Remote Machine Control (optional)

It is a handheld unit (cable 3m) connected directly to above EDC controllers. With a magnetic foil on its back, it can be placed at an ergonomic position. Emergency stop button can easily stop process in case of needed. It provides to control and monitor test speed adjustment, grips position control, active crosshead control (up-down movement speed), load/deformation, extension, real-time & extension. It automatically stops when the piston reaches to maximum displacement point etc. Meanwhile, it can perform several simple predefined tests without need of a computer or additional software like: tensile of metallic materials; general tension/compression test, bending, shear, cycles etc.

- ➢ Dimensions: L 26 x W 120 x H 200 mm
- ➢ Display: LCD-graphics display 128x64 Pixel
- ➢ Grips opening and closing: with upper/lower grips independent operation
- ➢ Keys: UP, DOWN and STOP (machine control); numerical and function keys (value input, programming) emergency stop
- ➢ Digi-poti: crosshead-cylinder positioning; scroll of display and positioning of data input; Fine position by Jog(refers to catalog of RMC7)

Electronics and Control Part for WDW-600 common type:

A. PCIE measuring & control card

Self-developed & most advanced PCIE measuring & control card for testing machine has functions of real time data collection, communication, measuring and control etc. according to related ASTM, ISO standards. It can be inserted in the PCIE slot of computer and connected with testing machine by data cable, then above functions can be realized easily. Effective sampling rate can be up to 50Hz, in addition, the different versions for sampling rate of 200Hz, 500Hz and higher are available as options to meet special test requirements. Besides applying for static tests, such card with related configuration is also able to be utilized for low cycle & other basic fatigue tests.

B. Handheld control unit

Maxpad handheld control unit is magnetically attached to the load frame to provide crosshead moving control through in three adjustable speeds for easier operation when install/dismantle the specimen, LED screen shows the position in real time and functional keys for test start & stop, moving crosshead up & down, control mode switching, clear zero etc.

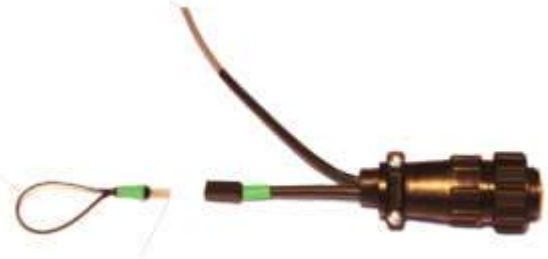
C. Patent technology of TE---Electric Calibration Modulus:

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).

Main Specification

- Load capacity: 600kN, 50kN(options)
- Load accuracy: ≤±0.5% of indicated load down to 1/500(for WDW-600S) or 1/250(for WDW-600) of load cell capacity (Less than 0.5% from 1.2kN-600kN for WDW-600S & from 2.4kN-600kN for WDW-600)
- Deformation accuracy: ≤±0.5%
- Position control resolution: 0.006μm (WDW-600S)
- Position control resolution: 0.025um (WDW-600)
- Position accuracy: ±0.01mm or 0.05% of displacement (whichever is greater) (WDW-600S)
- Position accuracy: ±0.02mm or 0.1% of displacement (whichever is greater) (WDW-600)
- Test speed range: 0.001-250mm/min
- Crosshead return speed: 250mm/min

- Speed accuracy: ±0.1% of set speed
- Max force at full speed: 500kN
- Max speed at full load: 250mm/min
- Total crosshead travel: 1215mm
- Vertical test space: 1375mm
- Max. test width: 650mm
- Data sampling rate: 1000Hz simultaneous on load, extension and strain channels **(for WDW-600S)**
- Double ball screws driven with close-loop and servo motor control.
- Power supply: 380VAC, 3 phase, 50/60Hz, 6kW
- Weight of load frame: 4500kg, with hydraulic grip: 5000kg

Standard Accessories:

- **Hydraulic wedge tensile grip with power pack 600kN capacity:**

Inserts for round specimen: Φ12-26, 26~40mm

Inserts for flat specimen: 0~30mm

Hydraulic power pack:

Dimension: 590x560x880mm (WxDxH)

Power supply: 380V, 3ph, 50Hz, 2kW

Hydraulic hoses: 2 hoses with 3meters to lower grips and 2 hoses with 4 meters to upper grip

Option 2:

Pneumatic tensile grip with air source for 600kN capacity:

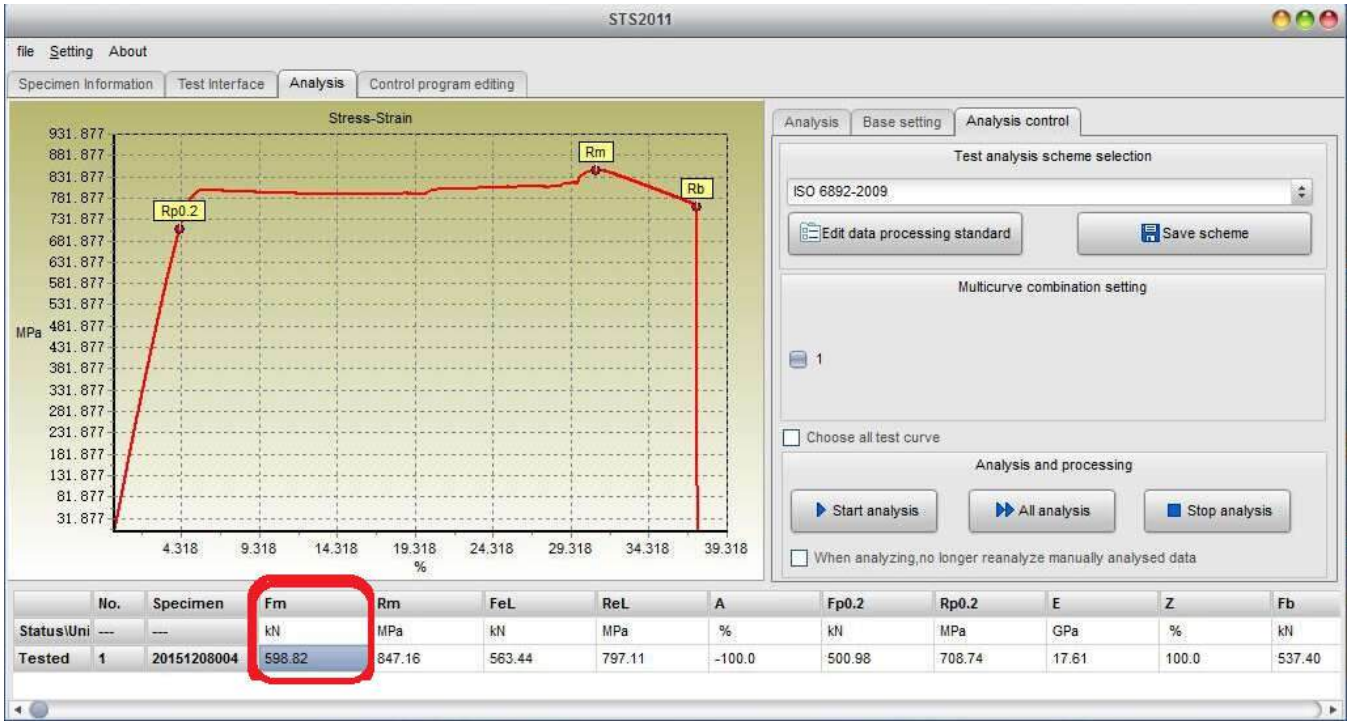
Inserts for round specimen: Φ12-26mm, 26~40mm

Inserts for flat specimen 0~30mm

Grip body

Foot Switch

Air source



Tensile a specimen dia. 30mm, peak/fracture load is 598.82kN, broken is in middle position; a cup of water was put on the crosshead during test, when specimen is broken, no water is shook out due to no vibration, which proved our machine has very rigid stiffness (approx. weight of load frame is 4500kg)

- **Compression test fixture over 600kN** **1 set**

Diameter platens: 100mm & ball seating assembly for lower platen, it will be installed between two hydraulic grips

- Servo Control system 1 set

Imported from Japan with larger power capacity

- 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 & customized language versions are available**

(For details, please refer **Annex-1**) Printer can be bought locally.

Optional accessories:

- **Mechanical wedge tensile fixtures with capacity over 50kN (options)**

It is used on the lateral test space for smaller capacity tensile test with more accurate test results

Jaws for round specimen: Φ4-9mm, 9-14mm, 14-20mm 1 set

Jaws for flat specimen 0-7mm, 7-14mm, 14-21mm 1 set

Grip jaw width x height: 40x55mm

- **3-point bending test fixture**

Bending span: 30-450mm, lower supporting roller: dia. 30mm, bending width: 140mm

- **Tensile grip for wire/cable 50kN capacity for dia. 0.8 to 6.5mm**

- **Webbing type tensile grip for belt 50kN capacity**

- **Nail head pull-through test as per ASTM D1037; specimen size: 150x50x50mm**

- **Tensile strength perpendicular to surface as per ASTM D1037; Specimen size: 50x50mm**

- **Screw side action Parallel grip for plastics, rubber with 5kN capacity**

- **Tensile grip for textile tensile or tear test**

- **Safety shield**

It is installed in the front of working area with sideways to the left on rollers with electrical interlocking.

Load frame with safety sheild

- **Axial Extensometer Model 3542-050M-020-ST (Optional) 1 set**

Gauge Length 50mm; Measuring range: +20%/-10%

Strain measurement meets or exceeds requirements for calibrations according to ASTM E83, class B1 and ISO 9513 Class 0.5 standards. Working temperature from -40C to +100C

- **MFL-300B Full-automatic extensometer with bi-directional & adjustable gauge length 10-300mm**

Application: From MF, Germany

It is suitable for almost all samples of an initial gauge length (L0) from 10 mm (variable gauge length up to 300mm). Its low clamping forces combined with high measurement accuracy makes it highly suitable even for small, notch sensitive test samples. The MFL can be connected to partly or fully automatic testing machines with hydraulic grips. The strain can be measured from the elastic range to fracture for almost all types of samples. Some advantages of the MFL are as following,

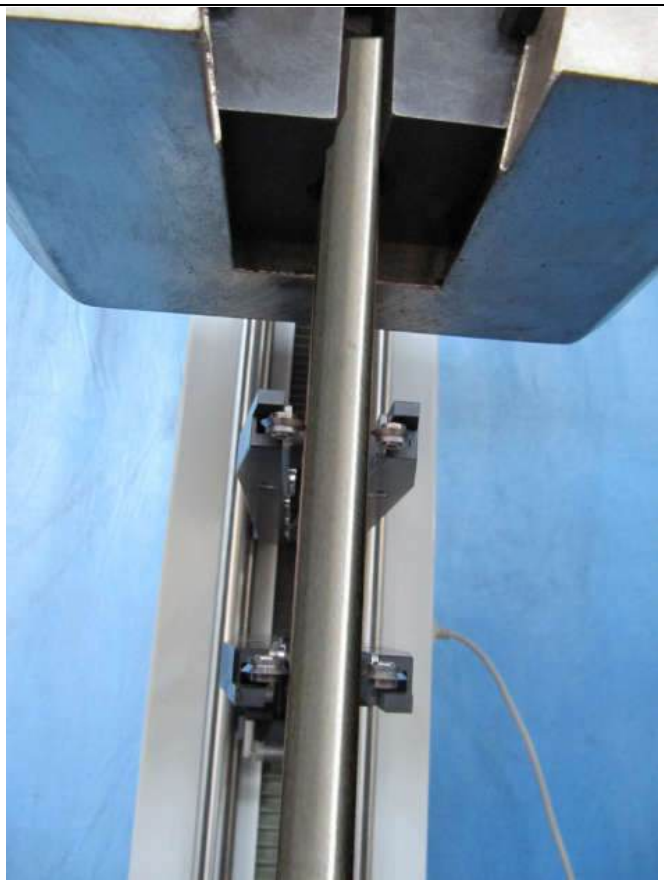
- Two-sided measurement by means of 4 measuring sensors.
- Very high resolution up to 0.1 µm is possible over the complete measuring range.
- Very low clamping forces even allow testing of foils and thin wires
- The L0 position (symmetrically placed measuring arms with respect to the sample centre) and L0 value can be exactly set under computer control.
- The round knife edges can be utilized along their entire perimeter by turning them.

Specification:

- Accuracy class EN 10002: 0.5
- Travel: 300 mm min. L0
- Gauge length (L0) 10~300mm
- Indication error (rel.) 0.5 %
- Indication error 1.5 µm
- Error in full range value 0.005 %
- Error in linearity 0.005 %
- Error in gauge length (L0) ± 0.5 %
- Resolution 1µm
- Activating force: < 1 cN
- Clamping force: 25 cN
- Operating temperature range 0 - 50 °C
- Weight approx. 26 kg

Example: MFL full-automatic extensometer used with our machine

MF with 10kN Mechanical wedge type tensile grip

MFL with 250kN capacity mechanical wedge type grip



MFL with 150kN hydraulic wedge type grip

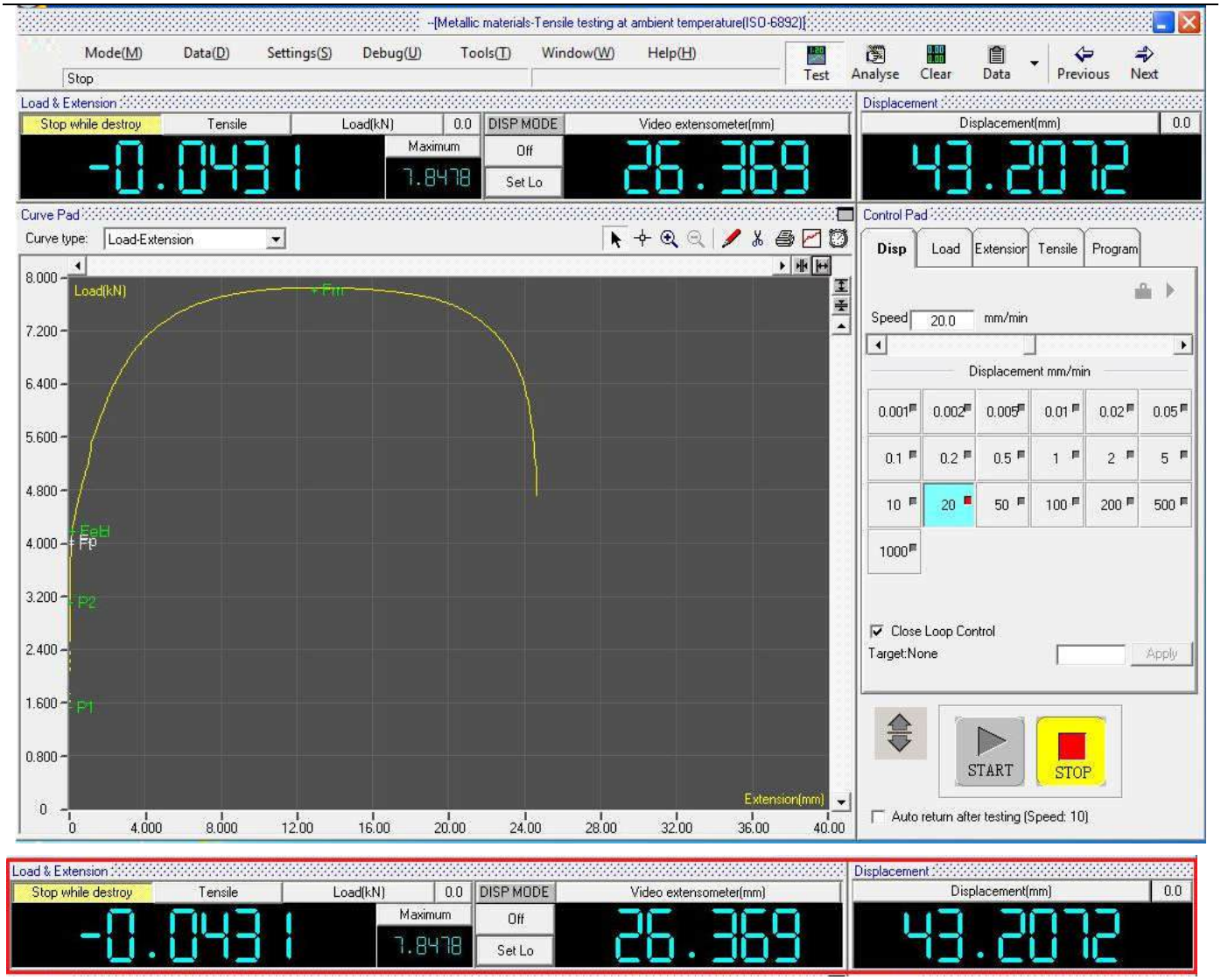
MF is installed on the back of machine with rotary device to move in and out of test area

Operating environment:

- Operating temperature: -10°C to +35°C
- Storage temperature: -20°C to +45°C
- Humidity range: +10% to +90%, non-condensing
- Atmosphere: Designed for use under normal laboratory conditions. Protective measures may be required if excessive dust, corrosive fumes, electromagnetic field or hazardous conditions are encountered.

Features of Measuring & Control software

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. Optimized software structure makes the testing operation easy, convenient and powerful. Main interface as following,



5-digit display for load, peak value and displacement values at least, 4-digit display for extension value at least;

Features:

1. Full digital control

The whole measuring and control system adopts the special controller, which can achieve the digital adjustment of zero point and gain of load, deformation and displacement, and it's easy to operate and possesses the high reliability.

2. Possess the functions of storage, setting and loading for various kinds of parameters, which make it convenient to connect multiple transducers with one load frame.

3. Realize the close-loop control, and show the reference curve during the executive operator adjusting the close-loop parameters, so the user can observe the close-loop effect caused by the parameters.

4. Perfect intelligent expert system of control mode to offer the automatic programming function. The user can set control mode during the test or each step of the test as the regulation according to the user's actual needs to compile the program, which can meet the test requests of various kinds of materials and test standards at home and abroad.

5. Perfect graphic function to complete the functions of the reappearance, amplification, reduction, self-adaptation, lapping of the curves, display and print the curve at the appointed range, observe the coordinate of the test point.

6. Data processing supports automatic analysis and graphic man-machine mutual processing, which is convenient to check and compare the test results.

7. The user can self-define the output of the test reports, which has the utmost flexibility.

8. Perform the automatic inspection of the operation system,; real-time acquisition and control under the platform of Win2000、WinXP, etc. NT mode; accurate timing and high-speed sampling;

9. Multilevel identity management integrates the flexible function of the testing machine with easy operation, which

not only makes the operation easy by ordinary operator but also protect the system effectively.

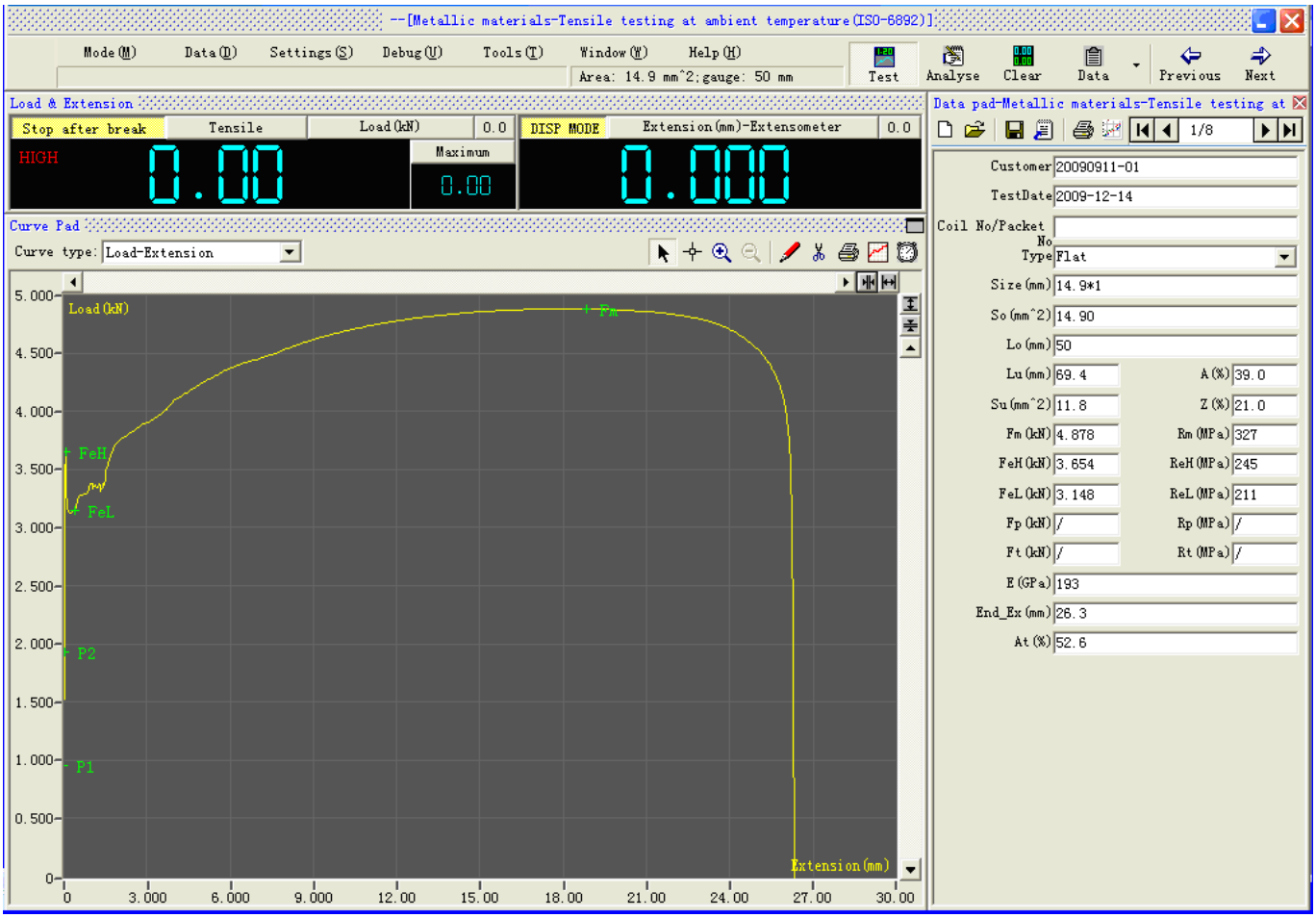
10. Framework type design concept and open type program structure make it easy to extend the function of the machine and further exploitation for the user. It can also connect externally internet program module to complete the requests of data connecting internet.

11. Based on the database, test data is stored by form of text file, which is convenient for the user to inquire about and utilize the various kinds of commercial report forms to reprocess the test data, meanwhile transfer the data to the internet conveniently.

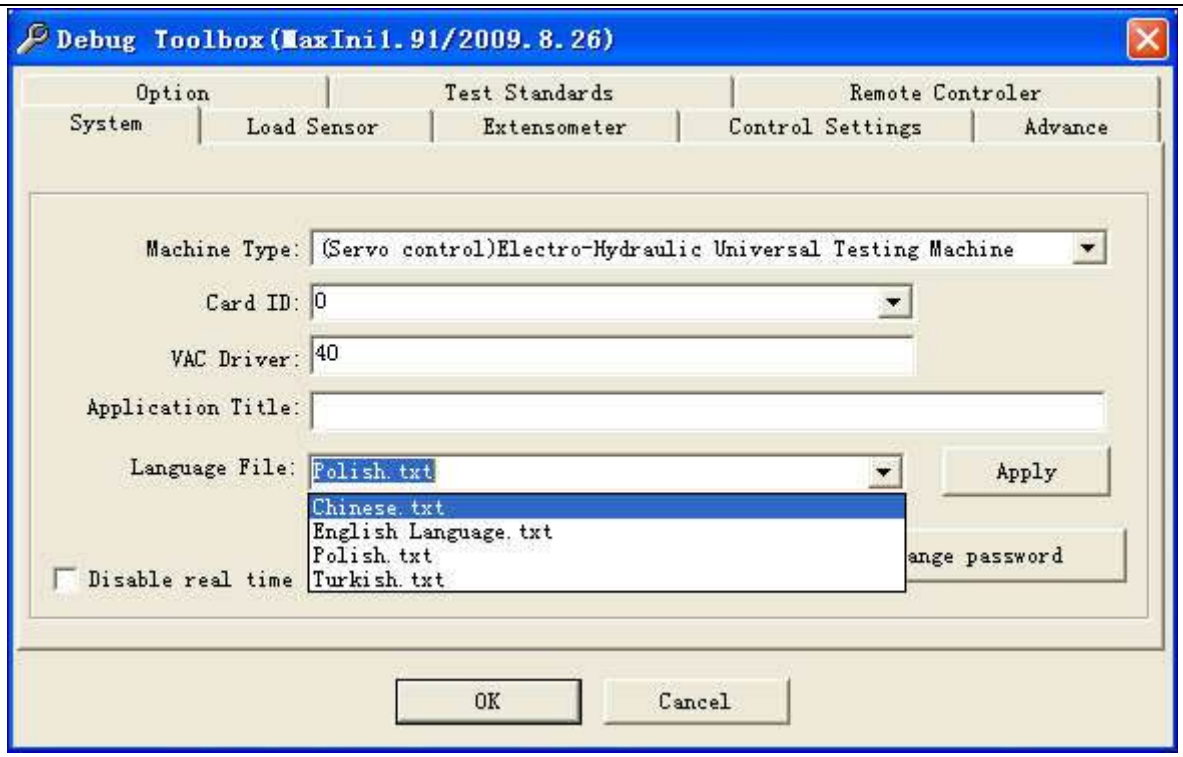
12. Multilevel identity management

Multilevel identity management, different identity has different functions, which not only makes the operation quick by ordinary operator, but also protect the system effectively.

Please see more information with some pictures:



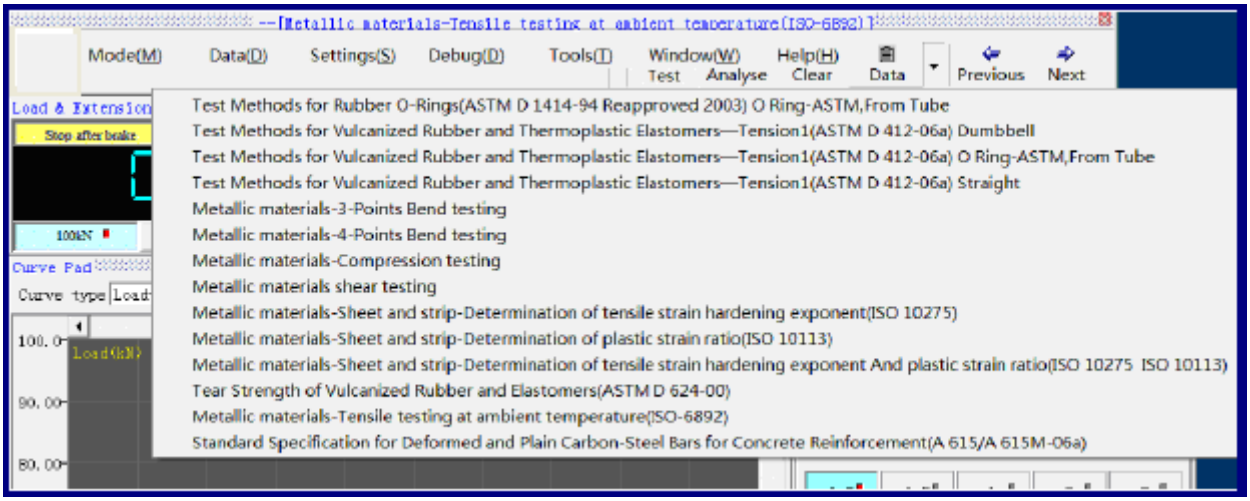
The control modes, test data and curves can be displayed in real time in the main interface and can be shifted at any time.



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

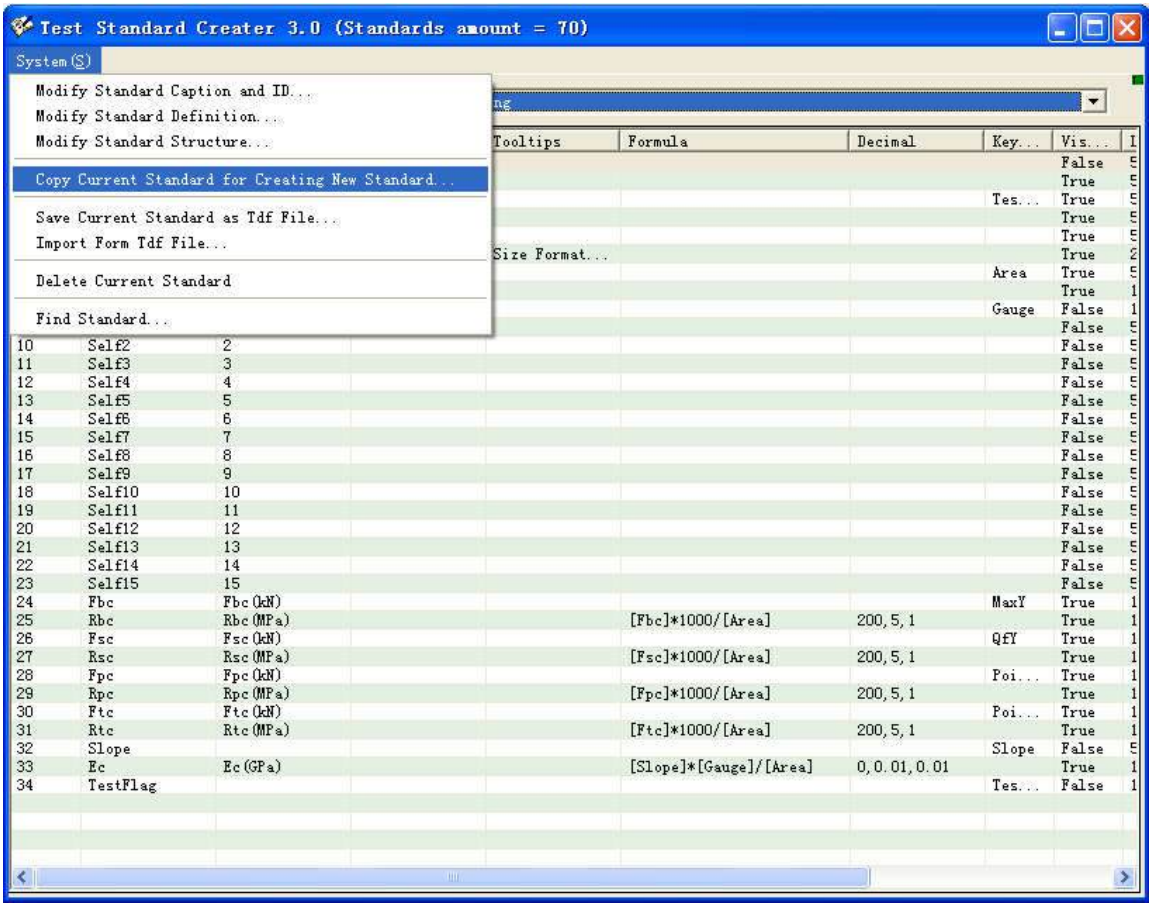
Multi-language function:

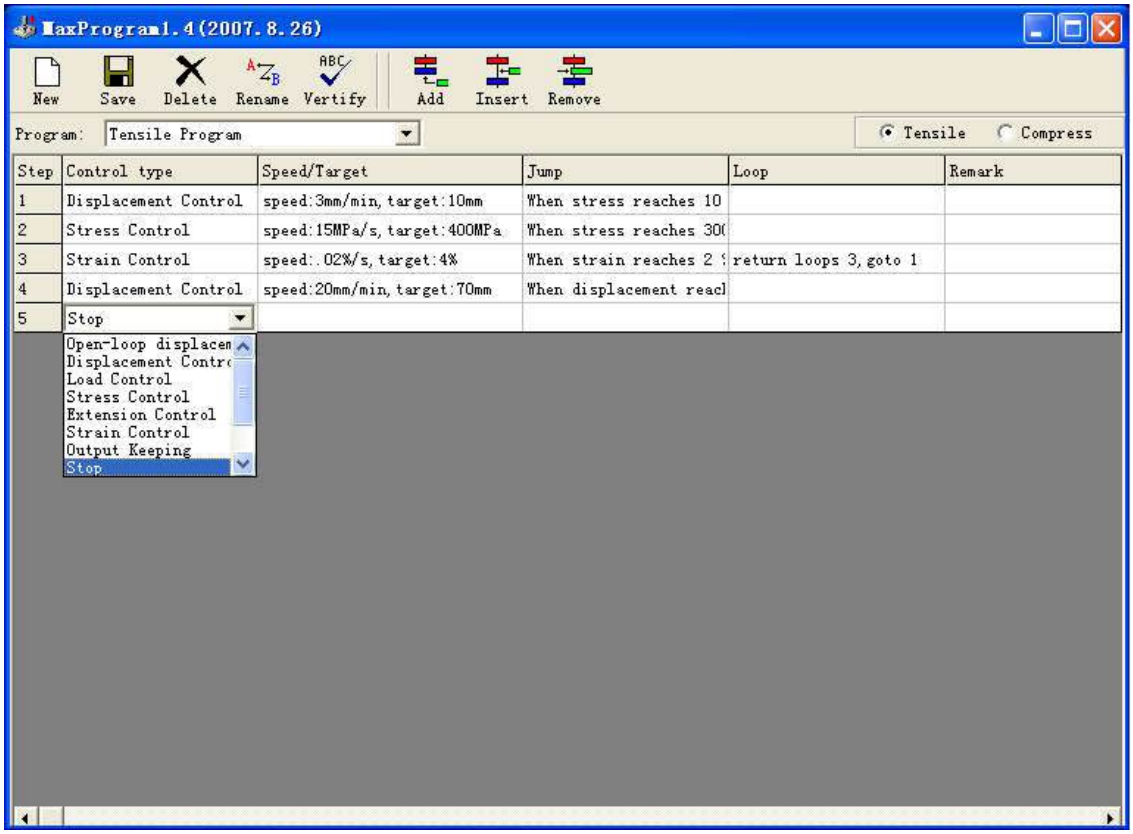
With the flexible language edited function, it can support multi-language such as English, Chinese etc. and you can translate the software language into the native language by yourself.



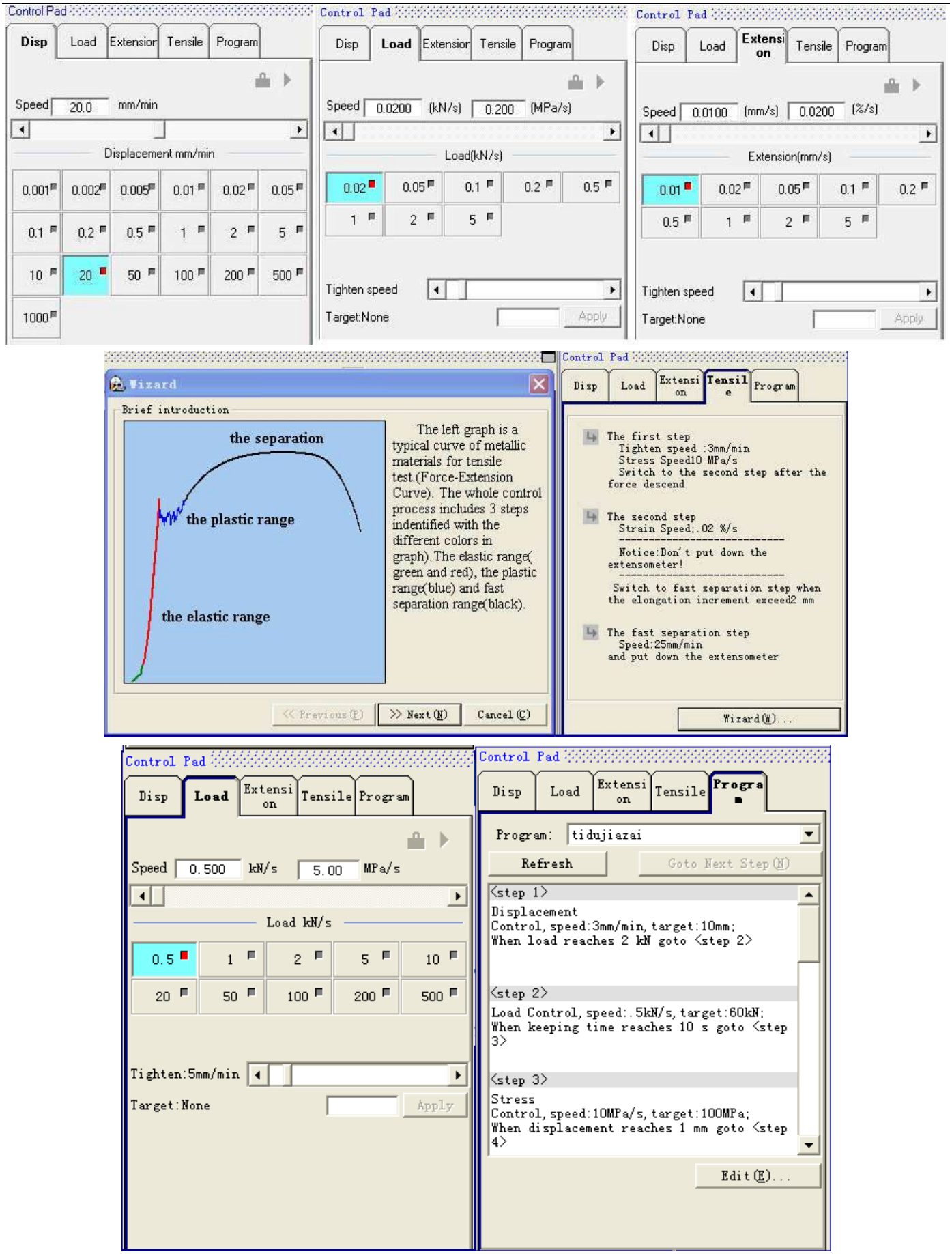
Software supports all kinds of popular testing standards i.e. ISO, ASTM, BS EN, DIN, JIS, GB etc.

Users can modify and add own testing standards and methods.

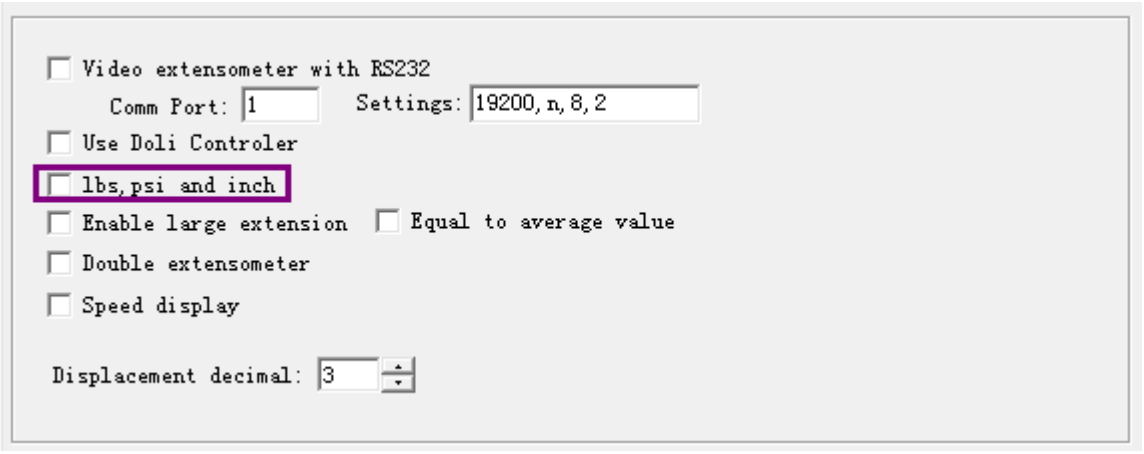




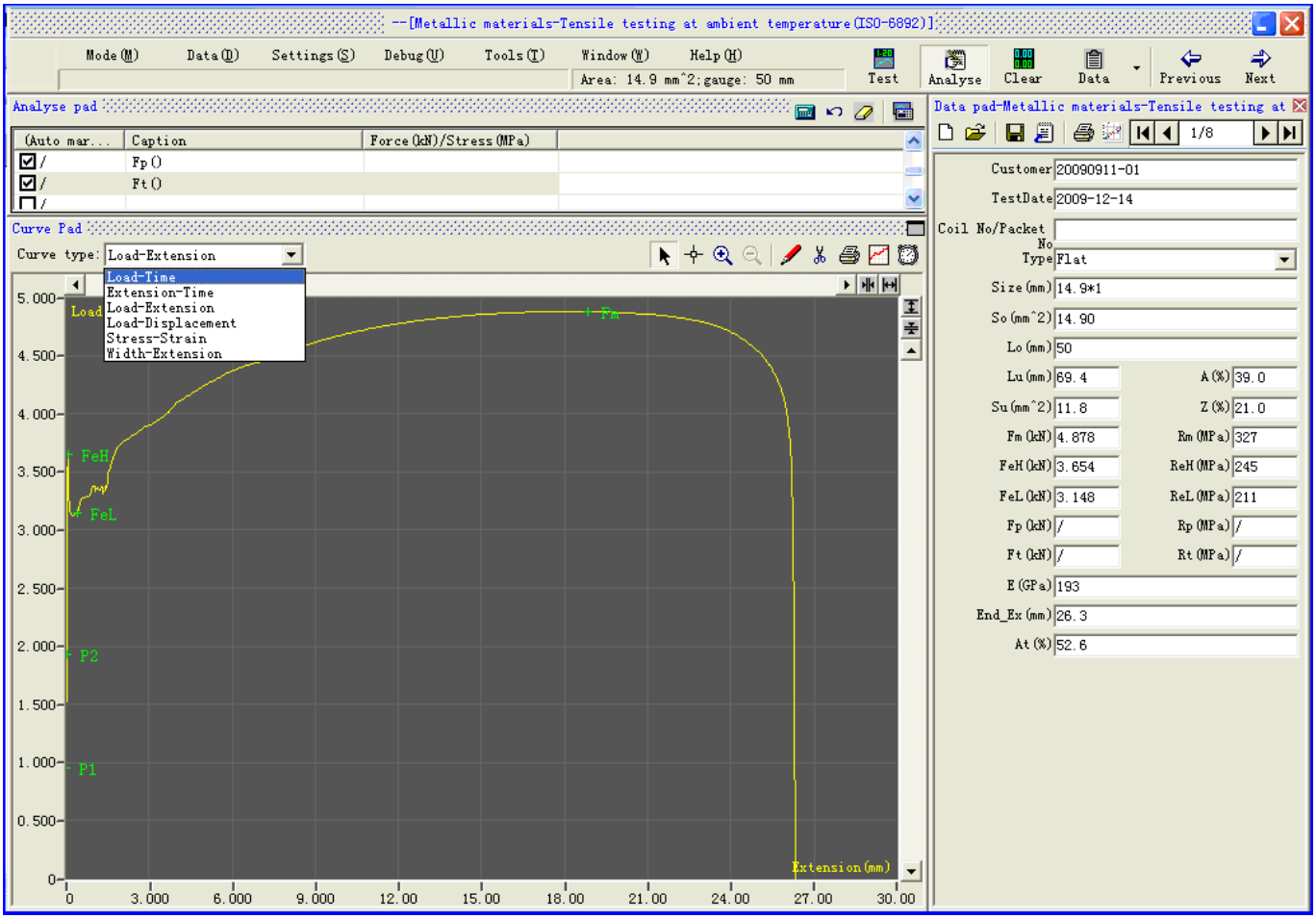
MaxProgram Editor possesses of multiple full digital control modes, i.e Displacement control, Stress (Load) control, Strain (Deformation) control, Low cycle control. User can edit the most complex and logical procedure by MaxProgram Editor. The combination of above functions can meet all kinds of routine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



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



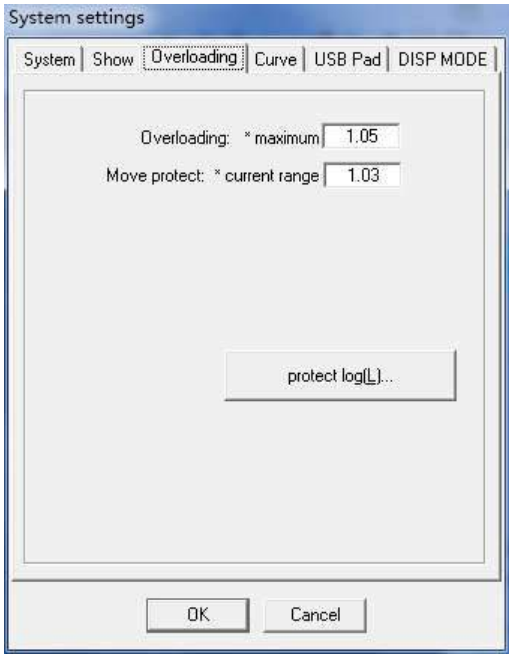
Software supports the functions to exchange the units between SI, Metric, US Customary etc.

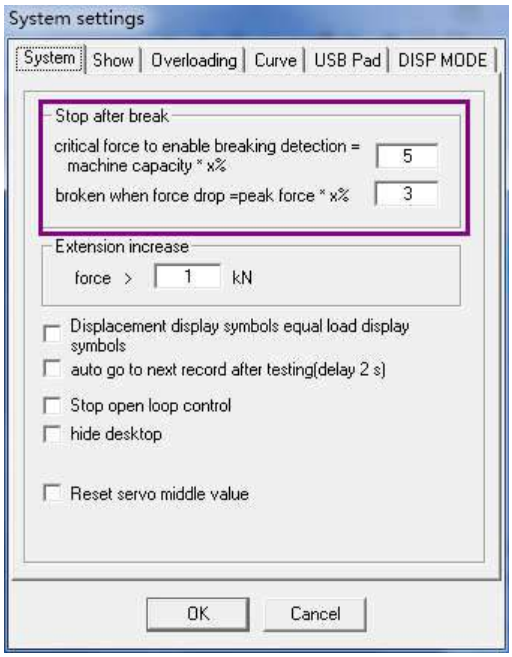


Multiple curves function in real time display including Load-Extension, Load-Displacement, Stress-Strain, Load-Time, Extension-Time, and Width-Extension.

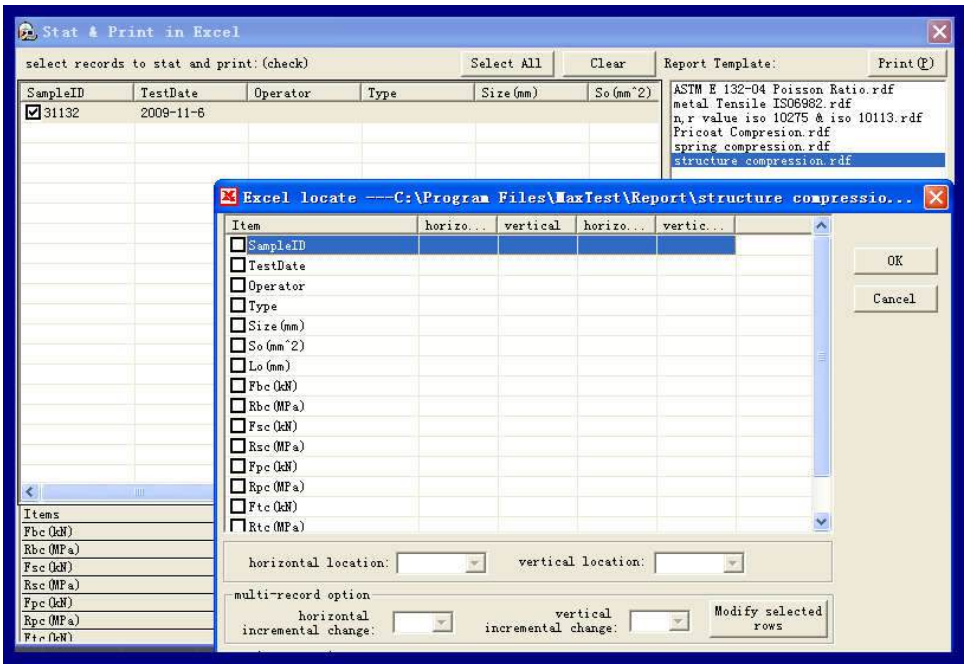
Characteristic points such as Elastic Modulus, Yield points, Rp, Rm etc. can be marked on the curves, for a highlighted and visual observation.

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





Overload protection function & Break detection functions can be set through software



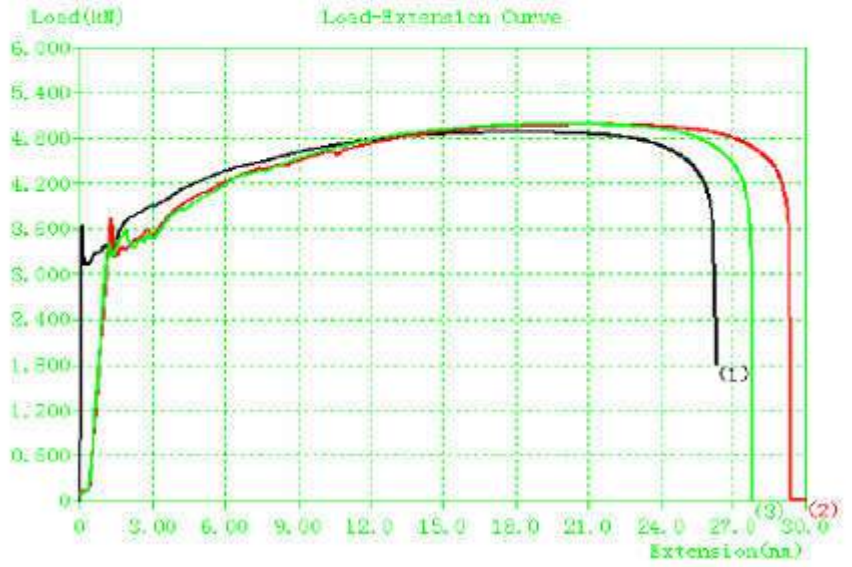
TE software contains all kinds of Report Templates. Customer can design various testing reports according to the requirements. Test result and curve can be converted to ASCII or spread sheet or Excel or the auto-creating report template.

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



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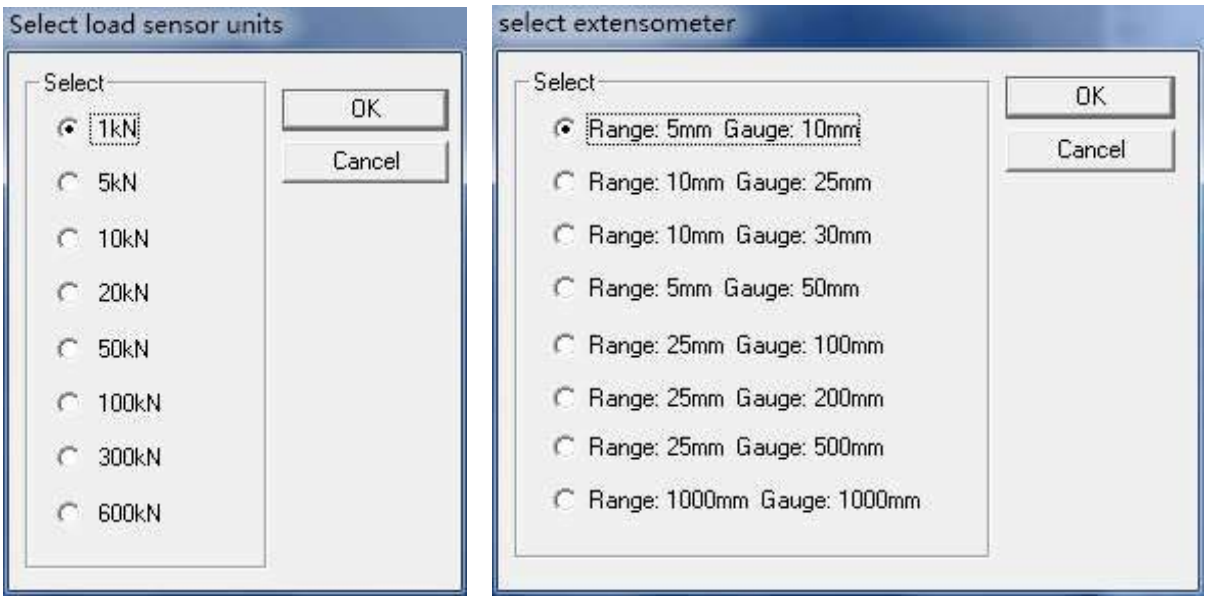
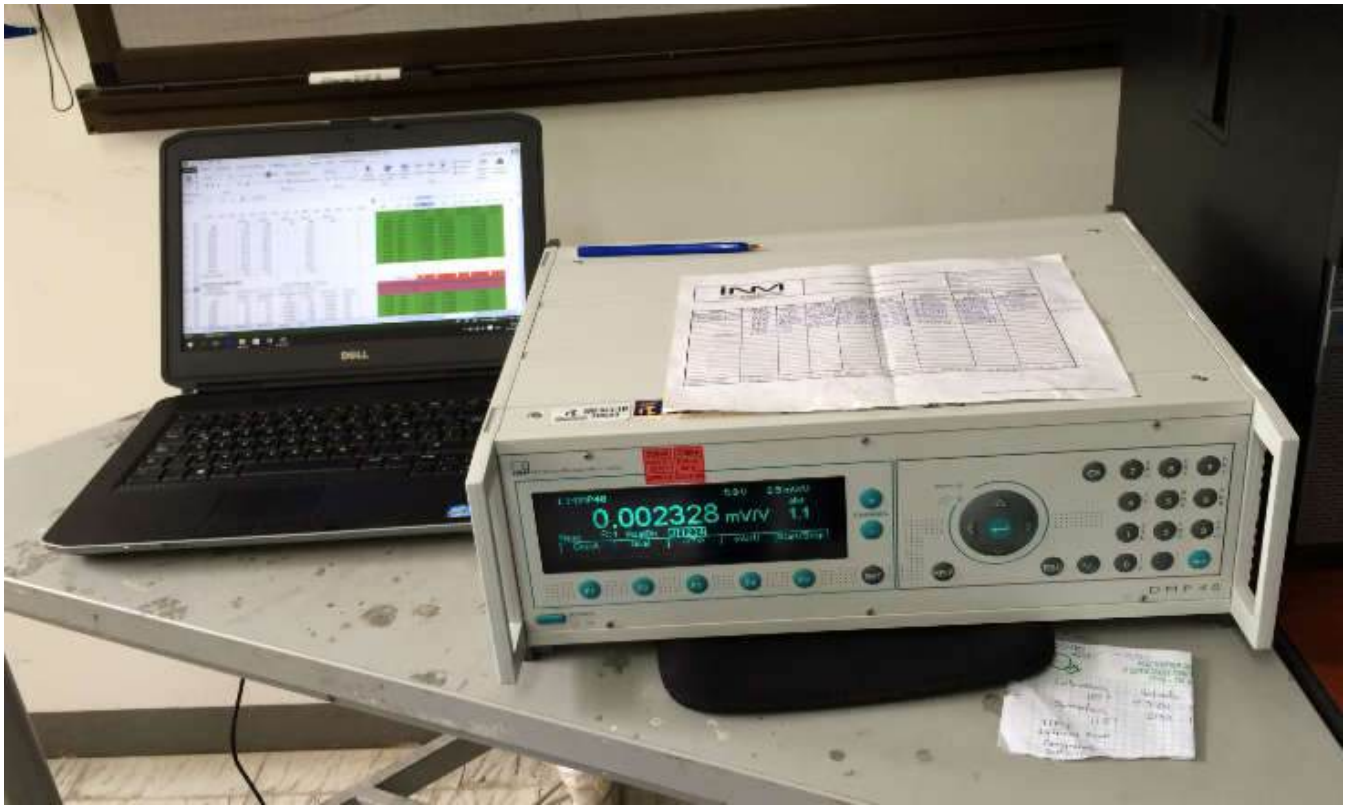


Except the clip-on Extensometer, TE software supports Long Travel Extensometer, Full Automatic Extensometer, video Extensometer, laser Extensometer, and it can be added eight pieces of Extensometers & eight pieces of load cells at most.

Annex-2 Newsletter

WDW-600S Superior UTM passes Calibration of INM with extremely high accuracy

TE won the tender of 600kN **WDW-600S superior electromechanical universal testing machine** when competed with top brands in the world. This kind of the high capacity of the screw machine is only produced by TE in China. After delivered to customer, Third Party Calibration from NATIONAL INSTITUTE OF METROLOGY (INSTITUTO NACIONAL DE METROLOGÍA) was carried out by using calibration instrument from **HBM, Germany** as per ISO7500-1. WDW-600S was proved to have load accuracy 0.3% for both compression calibration and tension calibration and load accuracy 0.1% in the third testing space for tension calibration, which is excellent in the world.



Calibration Instruments from HBM, Germany

Main testing space compression calibration 60kN-600kN and 20kN-60kN

Main testing space tension calibration

Third testing space tension calibration