MSAT-Lite / DBsearchLite

Data Processing Software

Instruction Manual



A&D Company, Limited

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1. Greeting

Thank you for purchasing MSAT-Lite series of A&D Company Ltd. This is the Data Processing Software for MCT series. Be sure to read the Instruction Manual to help ensure correct operation of the device.

After reading the manual, keep it in a safe place so that it can be accessed at any time.

2. Operation Specifications

Requirements for guaranteed operation	
OS	Windows8/8.1Pro、7Pro、VistaBiz、XPPro （Compatible only to 32bit）
CPU	1GHz or more
Memory	1GB or more
Hard disk or SSD	100MB or more free space is required
CD/DVD Driver	CD/DVD Internal driver for reading
Display	1024×768（XGA）or higher resolution
USB	USB port for connection to the measuring device
Printer	A4 Printer（※Not necessary）

3. Software Specifications

Data Processing software specifications

Specifications of software for the MCT-2150		
Icon	Software	Specification
	MSAT-Lite	Process the signal data from MCT, draw a graph, analyze peak, break points etc.
	DBsearchLite	Shows the data measured by MSAT-Lite, able to search, browse, print and export the test results to a CSV file.

Specifications of software for the MCT-1150		
Icon	Software	Specification
	MCTLogger	Process the signal data from MCT, draw a graph, analyze peak and break point.
	DBSearchMCT	Shows the data measured by MCTLogger, able to search, browse, print and export the test results to a CSV file.

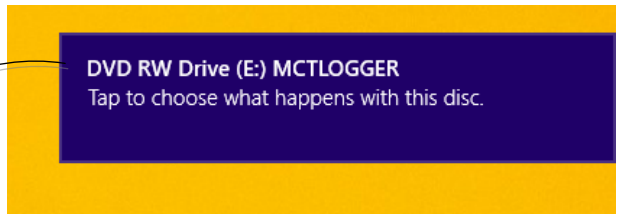
MCT-Logger (Recording software) and MSAT-Lite (Data Processing software) specifications

Function	Description	MCT-Logger	MSAT-Lite
Setting the test conditions	Sets the test condition for the sample.	○	○
Saving the test conditions	Can save the test conditions as a template.	○	○
Operations of the measuring device	The measuring device provides operations like Start、Stop、Manual operation.	○	○
Saving the result	Can save the test results.	○	○
Lot management	Can manage and save test results as lot units.	×	○
CSV output	Outputs test result in CSV file format.	○	○
Analyze of the measured values	Can display in a table the results of optional calculation equations, calculation of the stress and elongation derived from load and extension.	×	○
Analyze of the identical lots	Displays calculations of lot units` average and standard deviation in a table.	×	○
Display of the load graph	Displays the load-extension and load-time graph.	○	○
Display of the stress graph	Displays the stress-elongation and stress-time graph.	×	○
Display of elongation graph	Displays the load-elongation and stress-elongation graph.	×	○
Display of maximum value	Displays the test result`s maximum value graph.	○	○
Graph overlay	Displays the graph overlay and graph overlay with inching.	×	○
Printing the results	Can print out the results of the graphs and tables.	×	○

4. MSAT-Lite setup

MSAT-Lite installation description

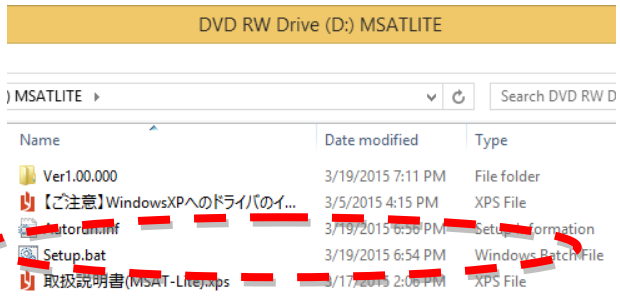
① Insert the Installation CD into the CD/DVD driver of your PC.



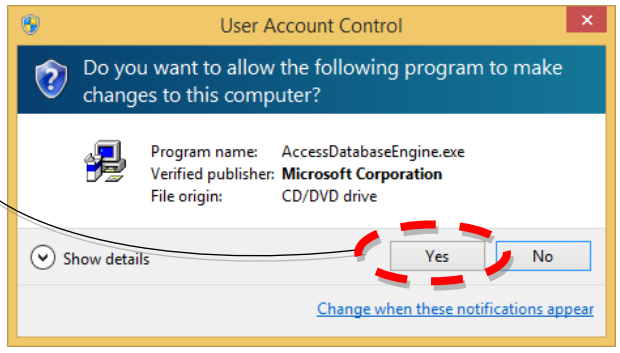
② Wait till the window on the right appears and tap on the window.
When the next window appears double-click the [Setup.bat] file in the CD driver.



③ If it does not appear automatically, please run the [Setup.bat] file directly, by double-clicking.



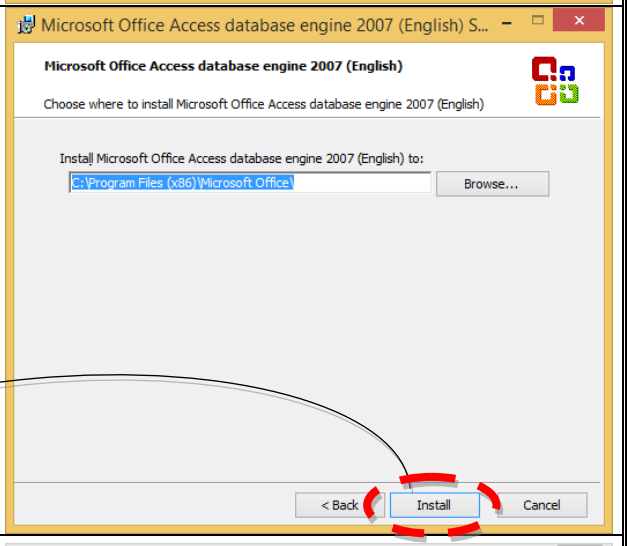
④ If the window on the right appears, continue by pressing [Yes] button.



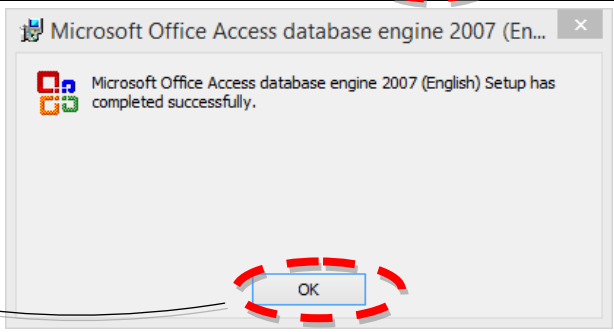
⑤ Check in the checkbox and continue by pressing [Next] button.



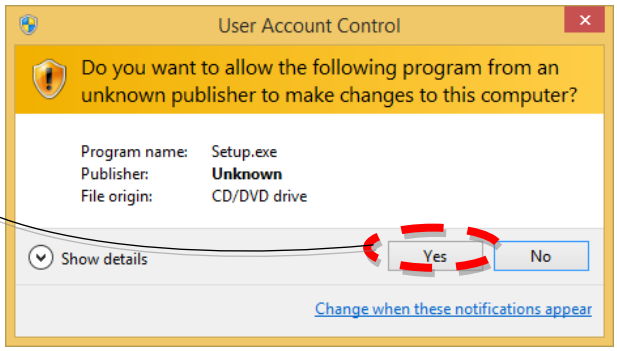
⑥ Continue by pressing [Install] button.



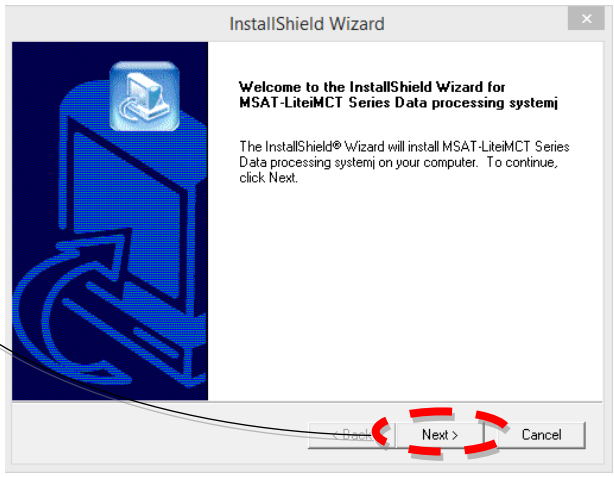
⑦ Press the [OK] button.



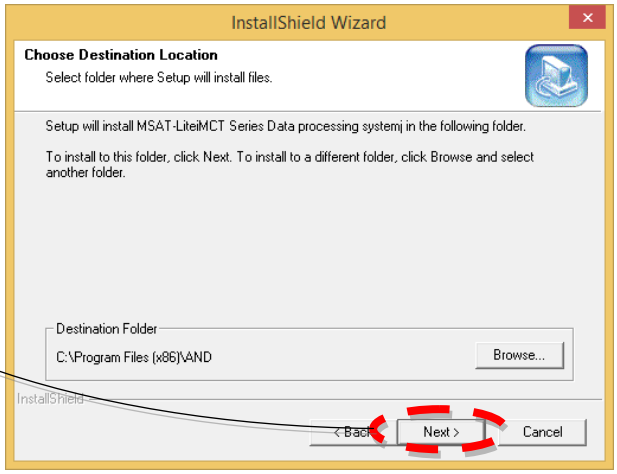
⑧ If the window on the right appears, continue by pressing [Yes] button.



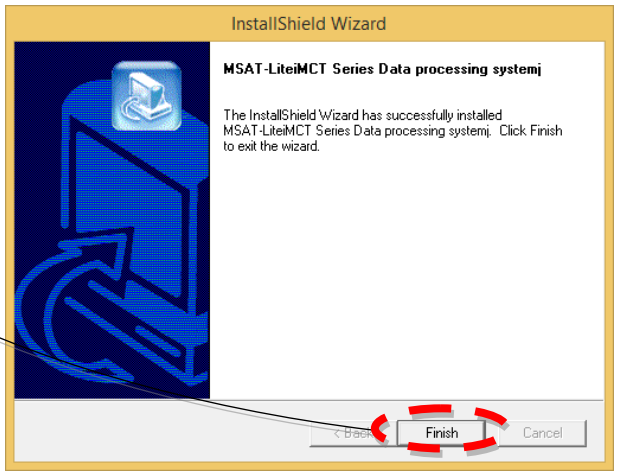
⑨ Follow instructions on the screen and continue by pressing [Next] button.



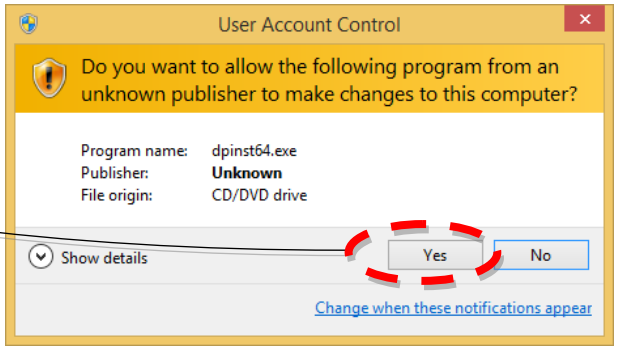
⑩ Follow instructions on the screen and continue by pressing [Next] button.



⑪ Press the [Finish] button.



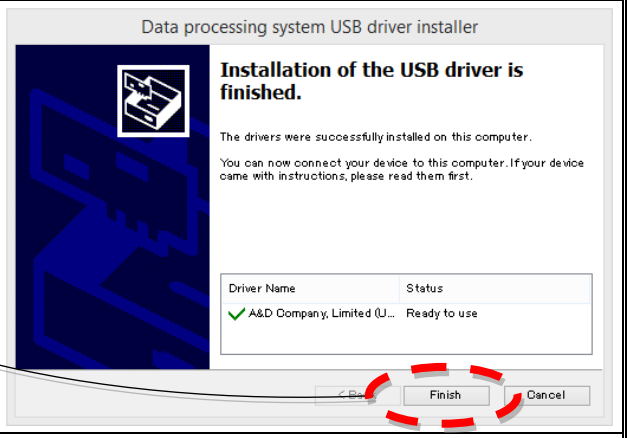
⑫ If the window on the right appears, continue by pressing [Yes] button.



⑬ When the window on the right appears, continue by pressing [Next] button.



⑭ When the window on the right appears, close the window by pressing [Finish] button.

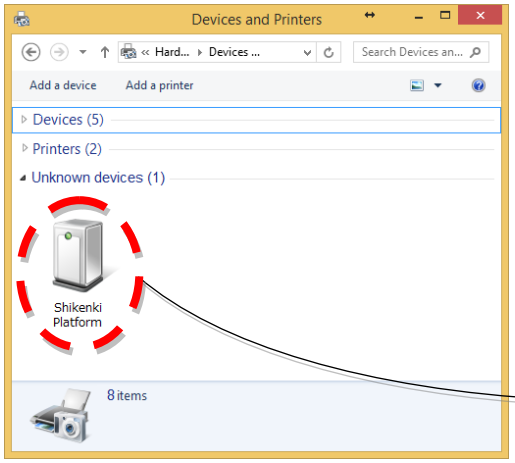


⑮ Switch off the measuring device.

⑯ Connect the measuring device and PC through USB cable.

⑰ Switch on the measuring device.

⑱ The PC will automatically recognize the measuring device. When PC ricognizes the measuring device, the [Shikenki Platform] appears in the [Control Panel] →[Devices and Printers] window.



That icon appears when the equipment is recognized.

The Setup is complete.

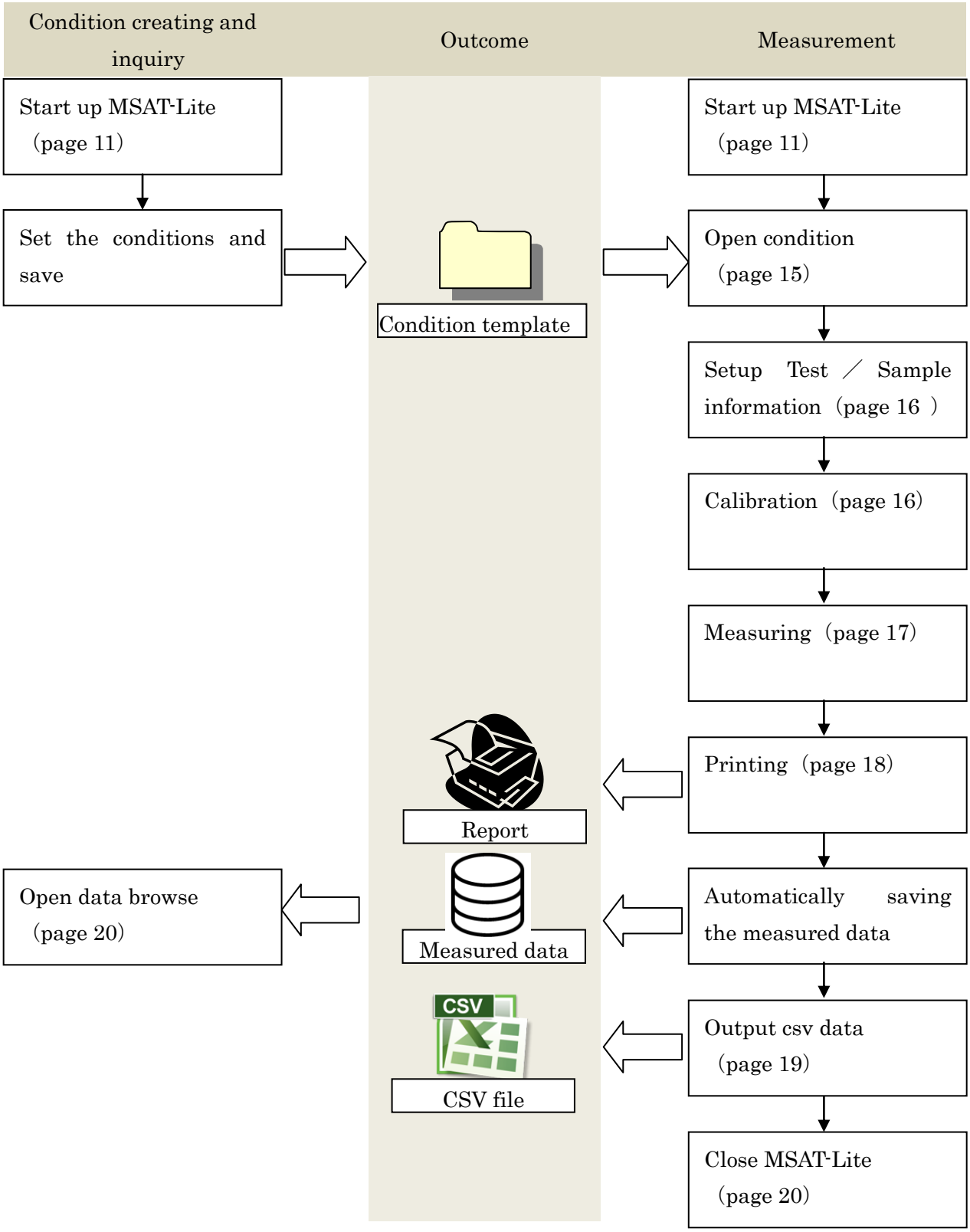
For the specific information about the software, please refer to 『5.Setting test methods and conditions P.10』.

5. Setting test methods and conditions

This section describes the operational flow from software start up to result output for the efficient use of software.

Standard test

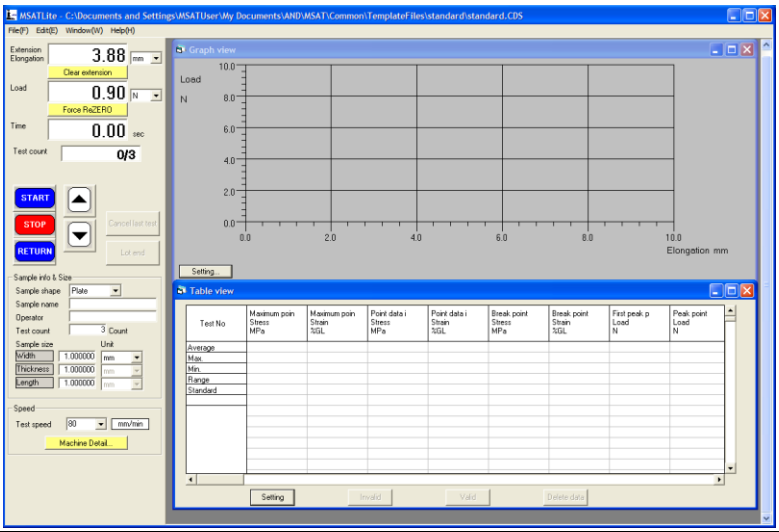
The flow of standard test is shown below.



① Start up MSAT-Lite

Switch on MCT series.

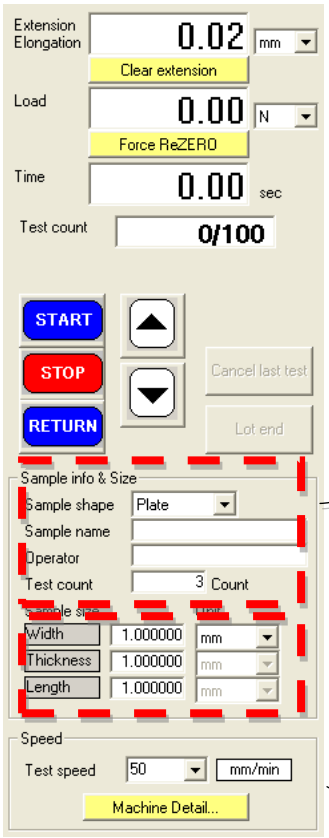
Start the MSAT-Lite by double-clicking MSAT-Lite icon on the desktop.



② Set the conditions and save

Set the operations

In the sample below set to provide Tension test 3 times with the Test speed 50mm/min.



Input test information.

For example: provide [Plate] shape test 3 times.

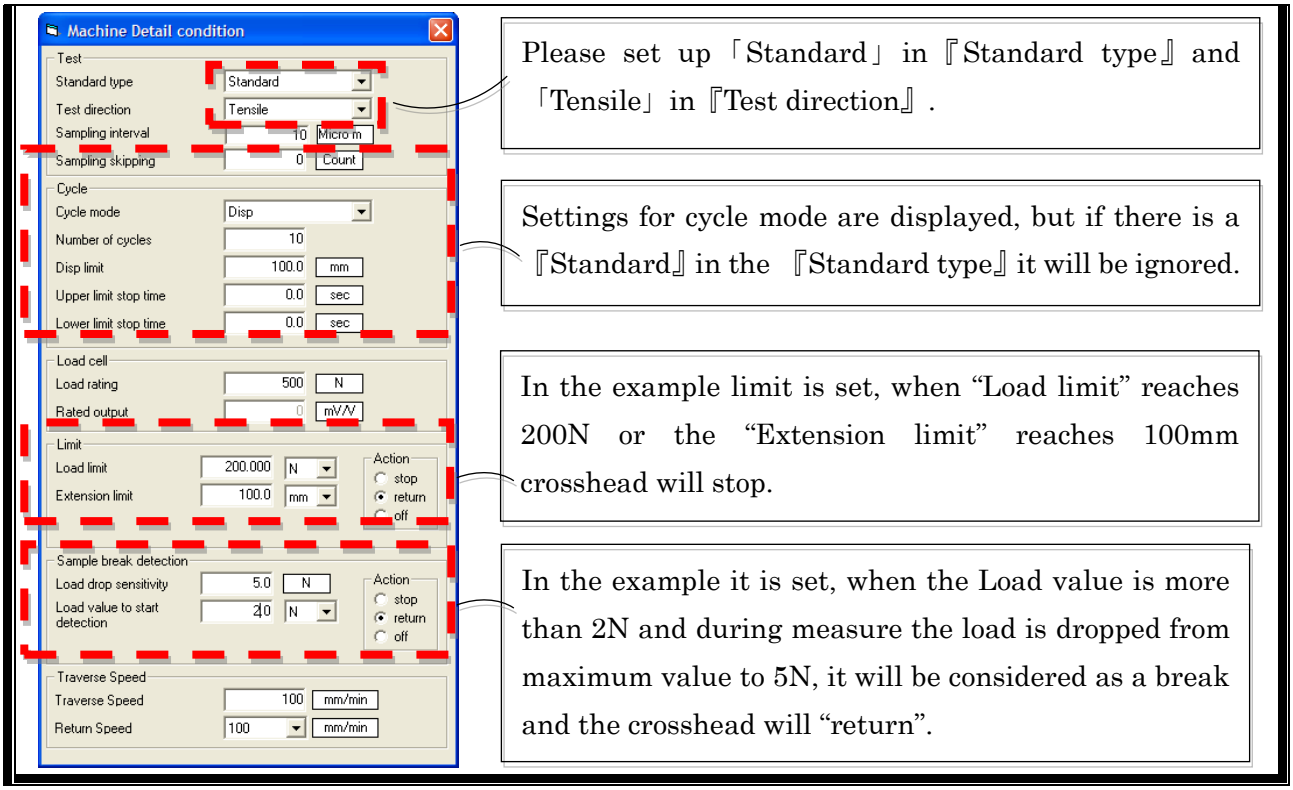
Calculation formula for stress/elongation will change according to the「Sample shape」.

Once measuring starts it is impossible to change size till the end of the lot.

Please set up the size before the measuring lot begins or set it up in advance and save as condition.

Set『Test speed』as 50mm/min.

To open 『Machine Detail Condition』window, please click on 『Machine Detail...』button.



Graph settings

Set the drawing methods for the graph.

In the example below Stress【MPa】is set for the Y axis、Strain【%GL】is set for the X axis.

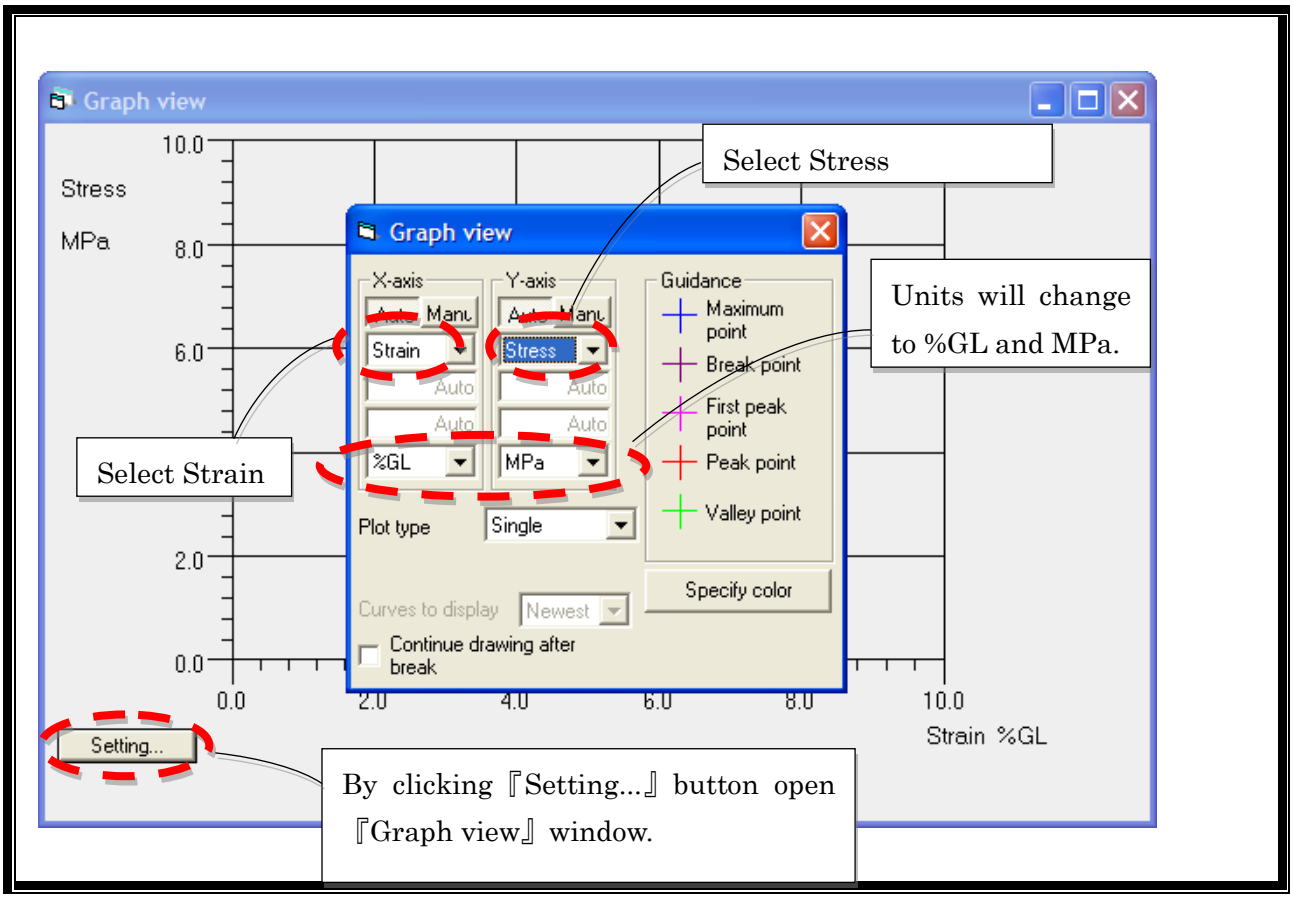
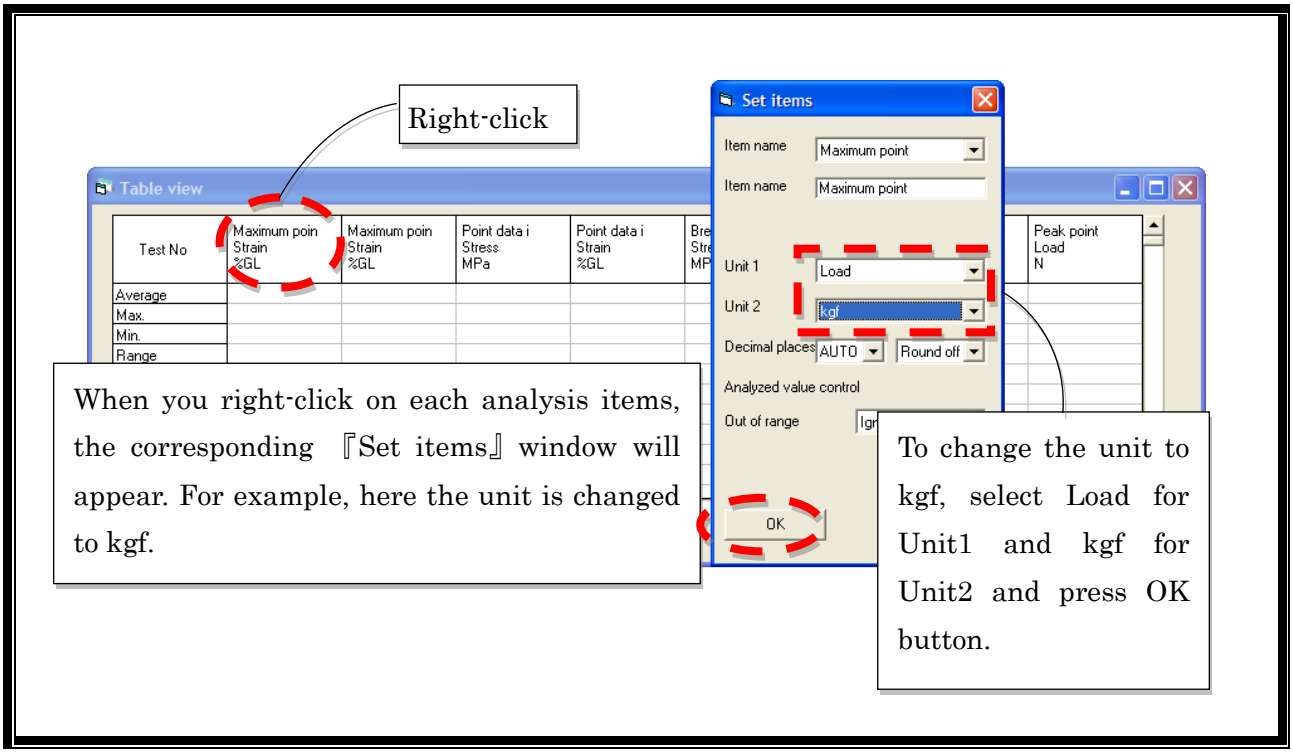


Table view

Setup name and unit for the analysis result.

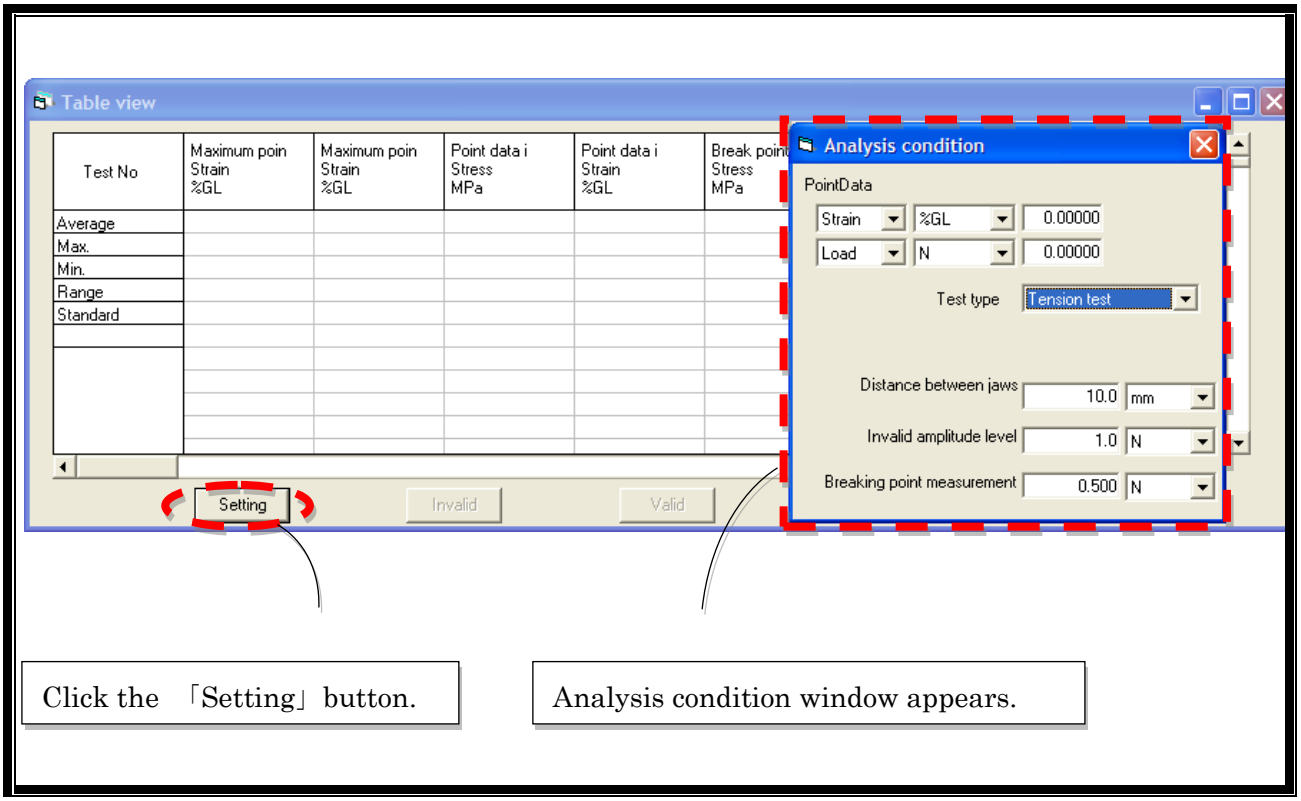
In the example below for the first raw maximum point unit is set to Load【kgf】.



Analysis condition

Change the analysis condition.

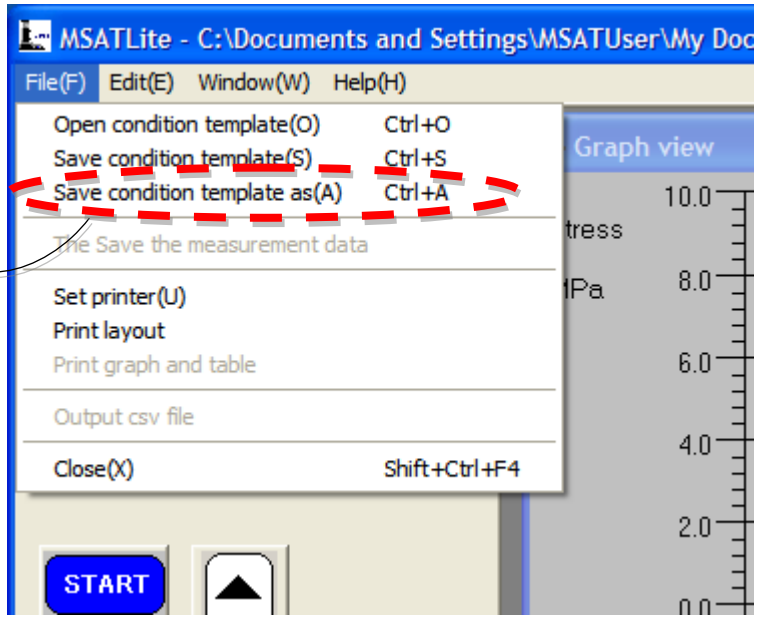
In the example below to provide tension test set the「Test type」to「Tension test」.



Save condition

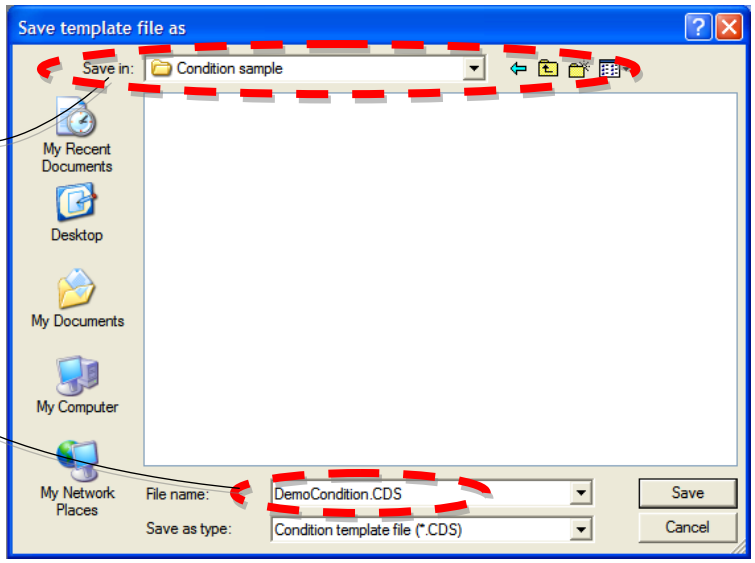
Save the set conditions as 「Condition template」.

Select the 「File」menu in the upper left corner of the window.
In the appeared menu select 『Save condition template as(A) 』.

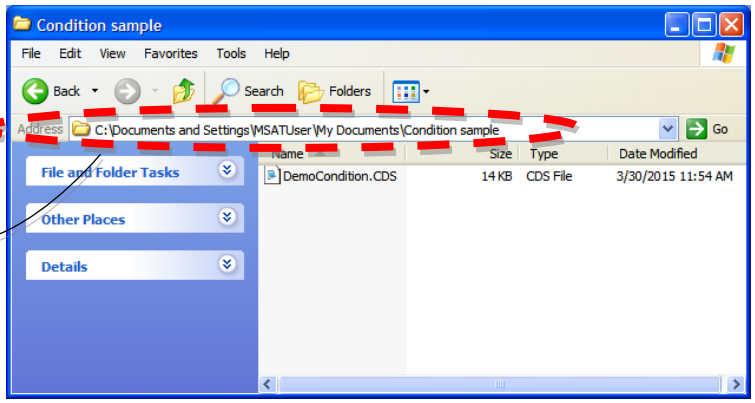


Select desired location.

Insert desired file name and save.



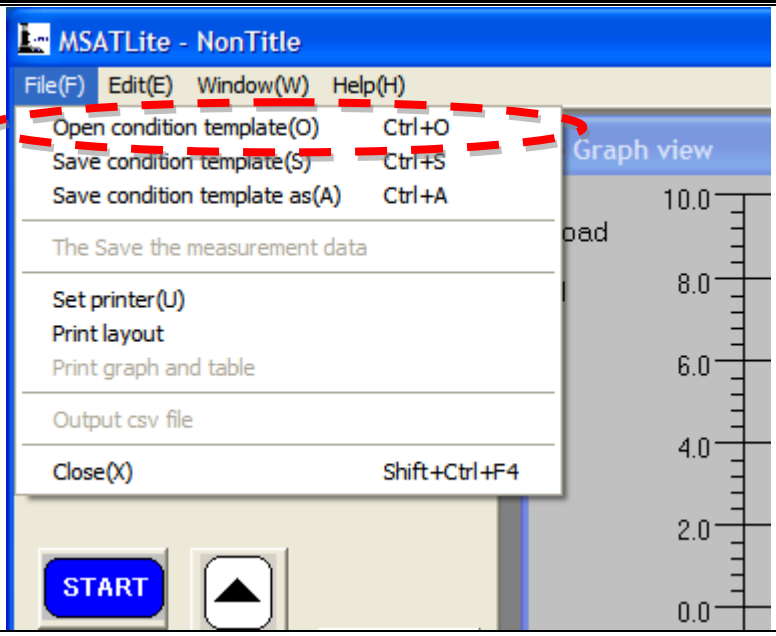
For the confirmation go to the folder and check if the 「Condition template」file is saved properly as shown on the right.



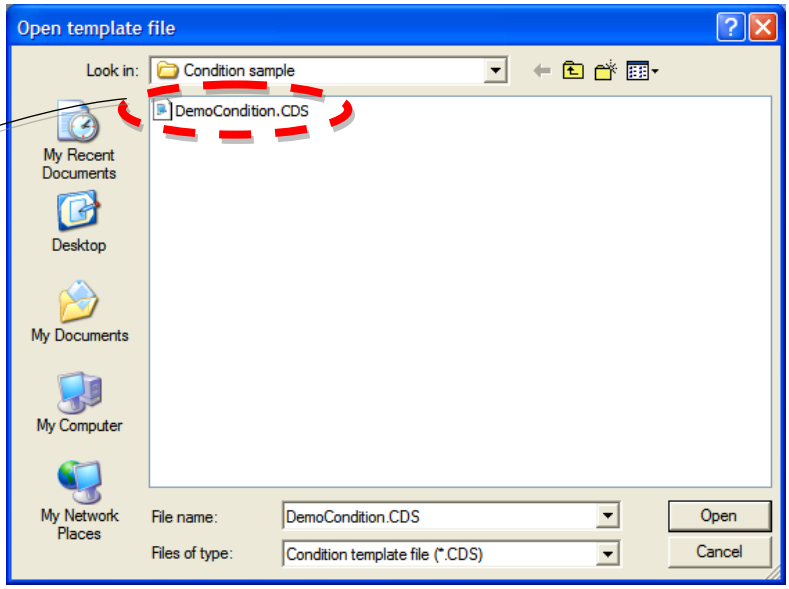
③ Open condition

Open saved 「Condition template」file.

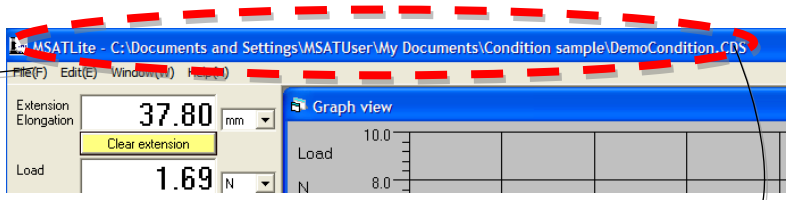
Select the 「File」menu in the upper left corner of the window. In the appeared menu select 『Open condition template(O) 』



Select the 「 Condition template」 file and press the Open button.



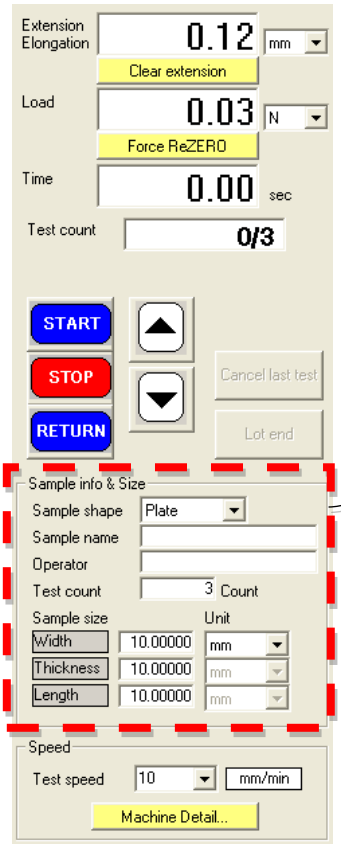
The saved conditions can be reproduced.



In the title will be shown path to the current「Condition template」file.

④ Setup Test／Sample information

Confirm the Sample info and input Operator`s name, etc.

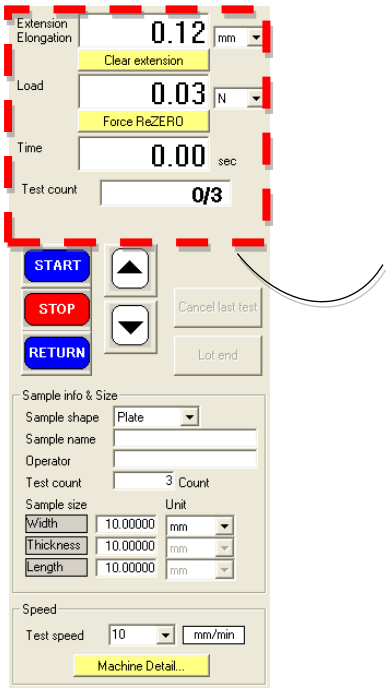


Confirm test info.
Edit, if you need to change.

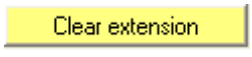
Check carefully the size before starting measurement, once the measurement starts you can`t change it.

⑤ Calibration

Provide a calibration.



After installing the test jig, regulate the crosshead position by pressing traverse up/down buttons. 

When the test starting point is determined press 

button and reset extension value to zero.

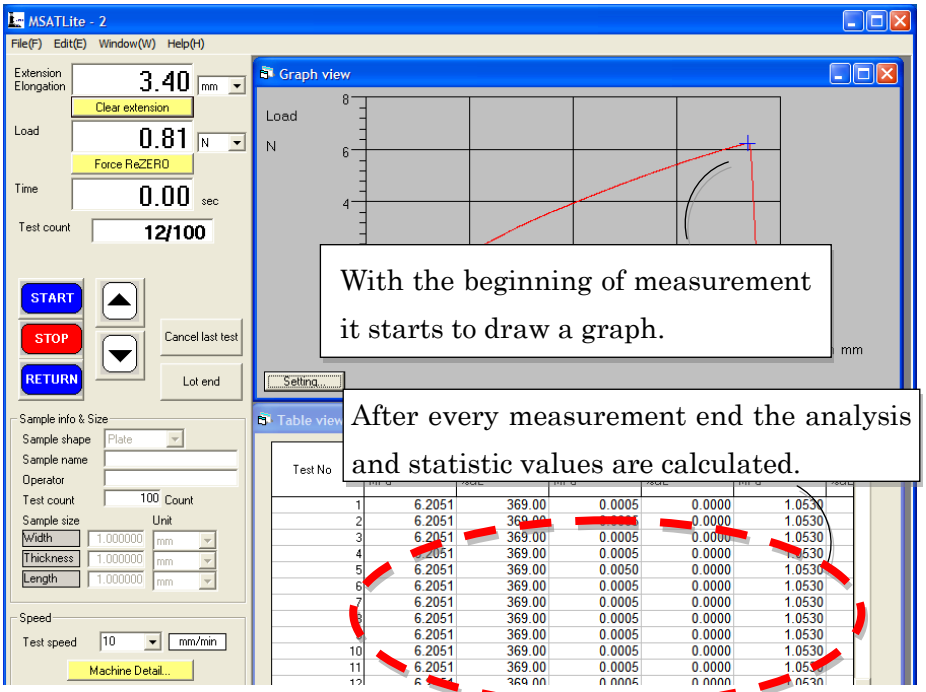
By pressing 

button reset load value to zero.

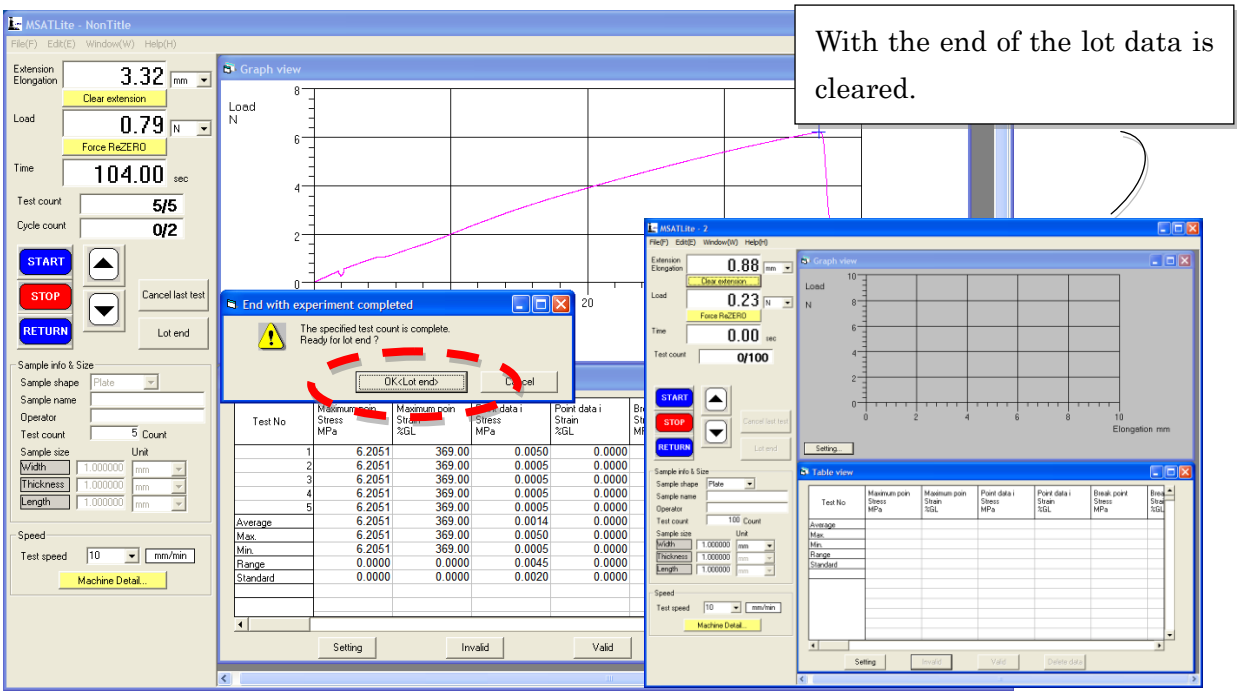
⑥ Measuring

Start measuring.

Install sample to the jig, when it is ready for test press START button and start measuring.



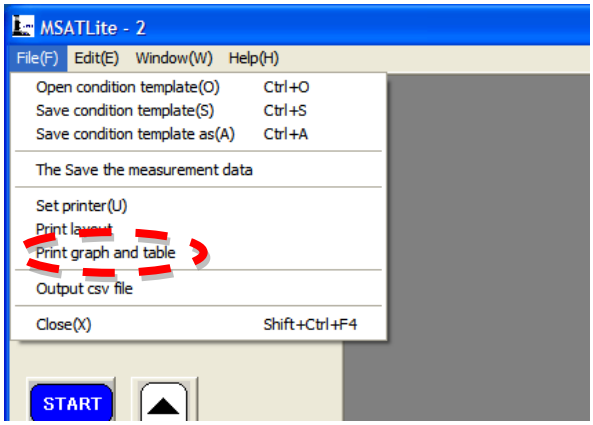
For example, when test count is set to 5, it provides a test 5 times and shows「Lot end」confirmation window. When you press OK<Lot end> button, it saves current data and ready for the new test.



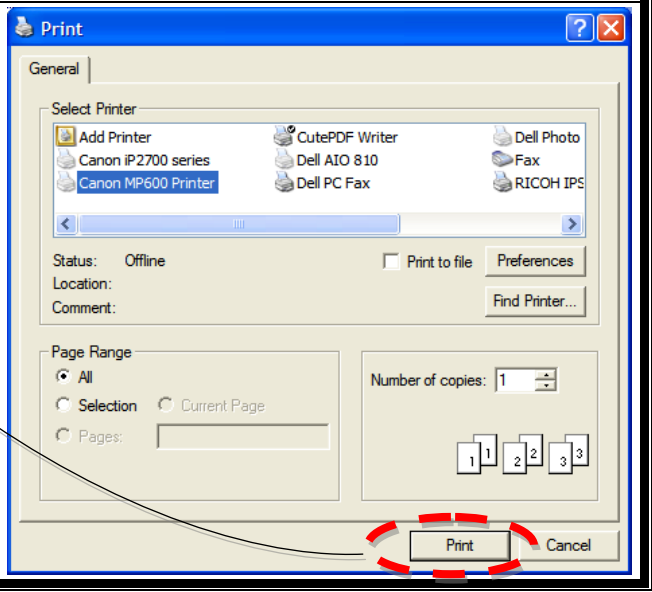
⑦ Printing

To print test result report provide following operations.

Select the 「File」menu in the upper left corner of the window.
In the appeared menu select『Print graph and table 』.



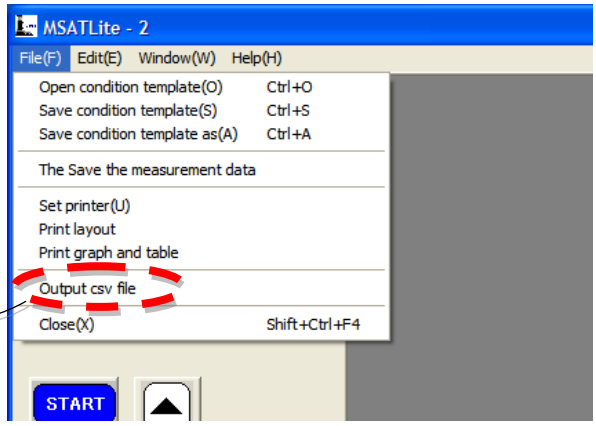
Select the printer and press「Print」button.



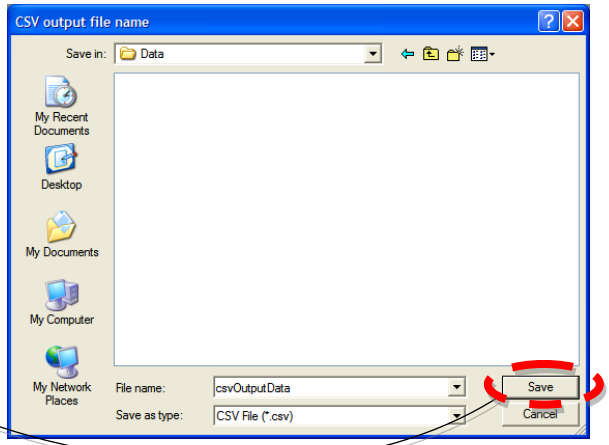
⑧ Output csv data

To output test data into csv file provide following operations.

Select the 「File」 menu in the upper left corner of the window.
In the appeared menu select『Output csv file 』.



Select the desired folder and save csv file.



⑨ Open data browse

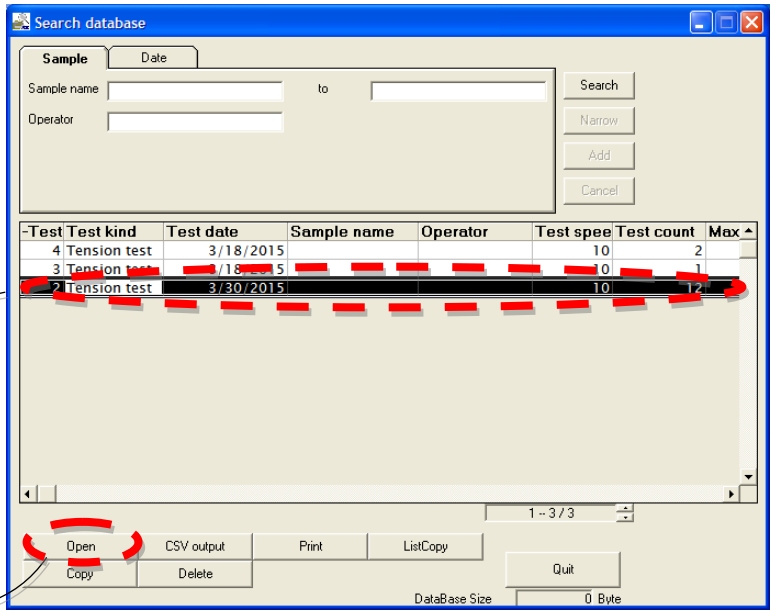
To open, browse and reanalyze data from previous tests provide following operations.

Run the「DBSearchLite」on the desktop by double clicking.

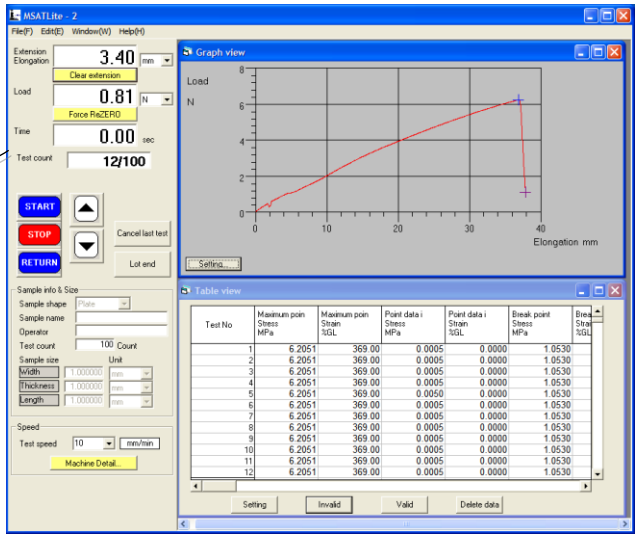


Data list from previous tests will be displayed.
Select desired data.

Open data by pressing Open button.
※Only one data can be opened at a time.



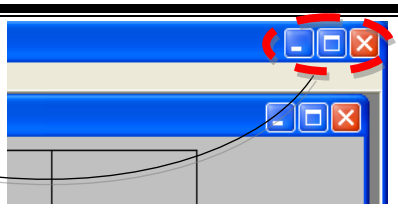
The data will be loaded.



⑩ Close MSAT-Lite

To close MSAT-Lite provide following operations.

To close MSAT-Lite click on the × button on the upper right corner.
The job is well done.



6. Display description

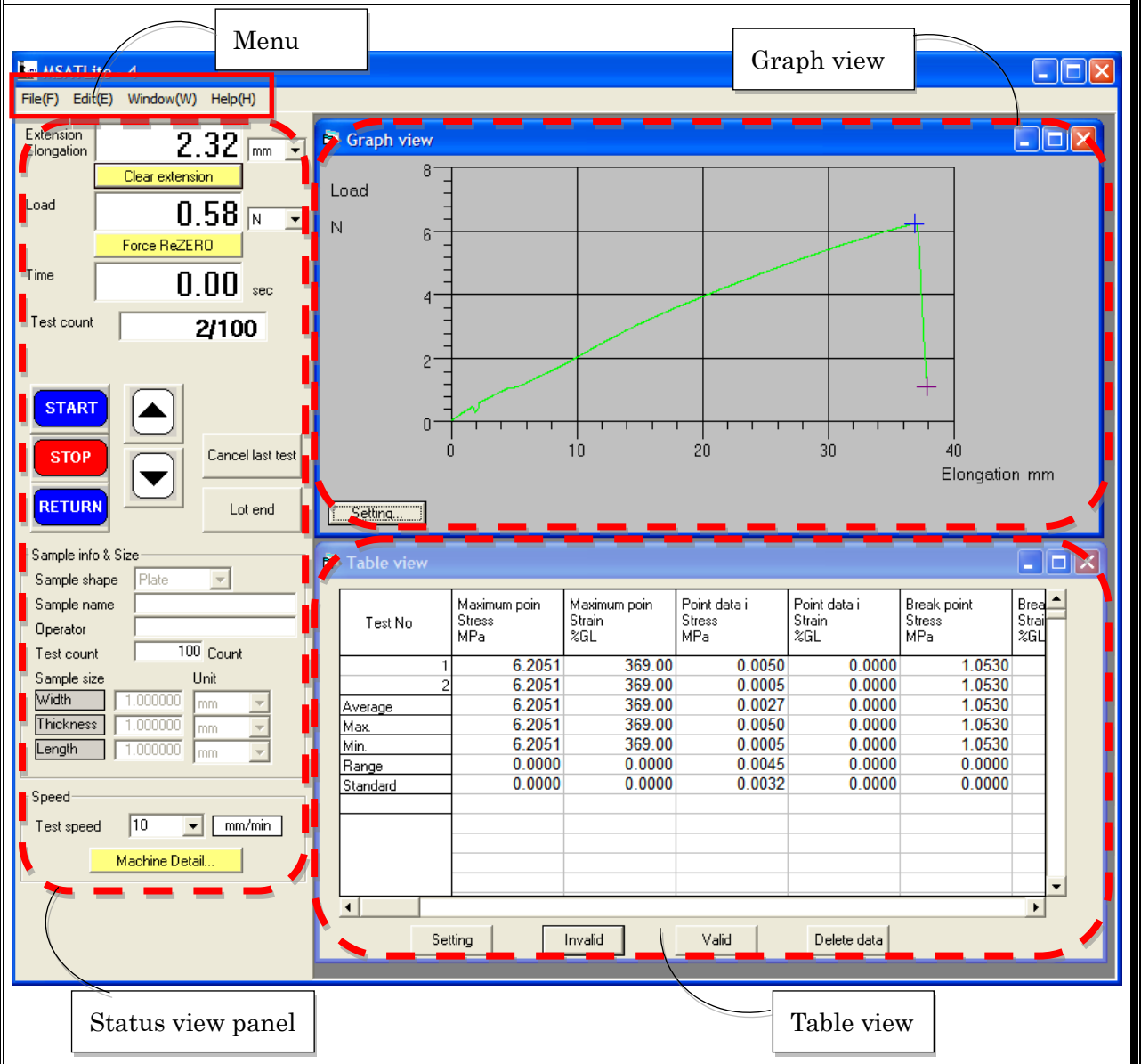
Window name	Page No.
Main window	P. 22
Main menu	P. 23
Status view panel	P. 24
Machine Detail condition	P. 26
Graph view setting	P. 28
Curve color setting	P. 29
Table view	P. 29
Set items	P. 31
Set statistical value	P. 33
Analysis condition	P. 34
Table print condition	P. 36

Main window

It is a first window when start MSAT-Lite.

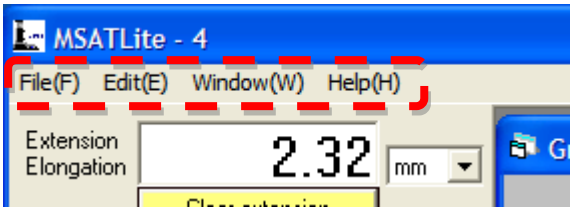
When start MSAT-Lite, it loads「Initial condition」. That is the condition of the previous test at the time of closing MSAT-Lite.

The names of every part are shown on the image.



Main menu

Shown on the upper left side of the main window. Contains various commands.



File(F)	Edit(E)	Window(W)	Help(H)
Open condition template(O)		Displays a window for「Condition template file」. Start operations here to open saved condition template file.	
Save condition template(S)		Overwrites current conditions of currently opened file. If there is no file loaded, woks as a「Save condition template as(A)」.	
Save condition template as(A)		Gives name and saves current condition as a「Condition template file」to the desired location. Saved condition files can be opened from「Open template file」.	
Save the measurement data		Overwrites current loaded data to the Data base.	
Set printer(U)		Shows system dialog of the printer. Changes printer setting.	
Print layout		Opens a layout setting window for printing report.	
Print graph and table		Opens printer dialog window. Select printer if necessary. Prints currently opened test data as a report.	

File(F)	Edit(E)	Window(W)	Help(H)
Delete data		Deletes data of the selected test number in the「Table view」window.	
Invalid data		Marks as invalid data of the selected test number in the「Table view」window.「Invalid」data is excluded from statistic calculation.	
Valid data		Marks as valid data of the selected test number in the「Table view」window.「Valid」data is included in statistic calculation.	

File(F)	Edit(E)	Window(W)	Help(H)
Show graph		Activate「Graph view」window.	
Show table		Activate「Table view」window.	
Tester info		Shows measuring device and software version information, etc.	

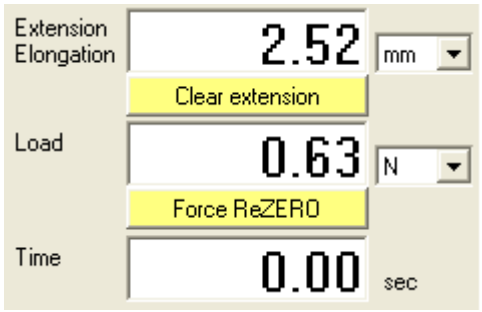
File(F)	Edit(E)	Window(W)	Help(H)
Version information(A)		Shows MSAT-Lite version information.	

Status view panel

Shown on the left side of the window.

Shows load and extension values, sends commands to the measuring device.

Monitor



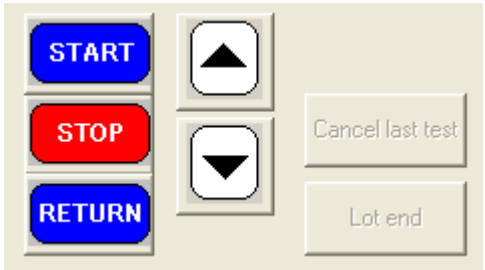
Extension monitor	Shows crosshead position.
Extension unit monitor	Changes extension units. mm//cm//in//ft)
Clear extension	Resets extension value to zero.
Load monitor	Shows load of the load cell.
Load unit monitor	Changes load units.
Force ReZERO	Resets load value to zero.
Time monitor	Shows test duration time.

Count monitor

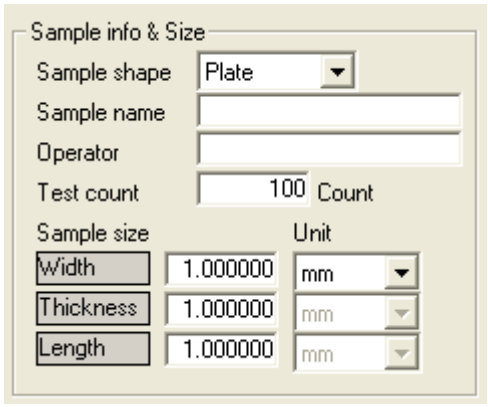
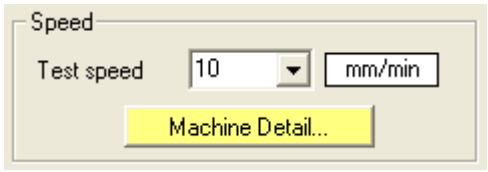


Test count	Shows「Current test count／Test count of 1 lot」. Current test count starts to count from the beginning of the test.
Cycle count	Shows「Current cycle count／Cycle count of 1 lot」. Current cycle count starts to count from the beginning of each cycle.

Operation



	Starts test. Measuring device starts to move according to the set condition.
	Stops test. Crosshead stops if it was moving.
	Returns crosshead to the extension value`s zero position.
	If press and hold it, crosshead will continue to move up. When released crosshead stops.
	If press and hold it, crosshead will continue to move down. When released crosshead stops.
	Deletes newest measurement data. Once the data deleted it can`t be

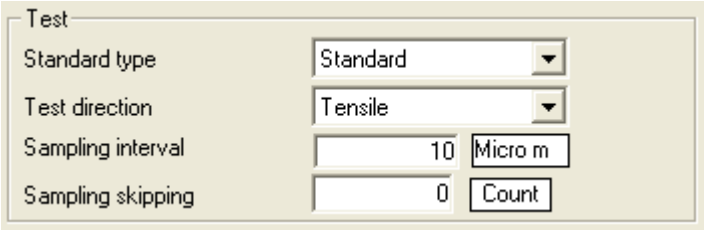
		restored, please check carefully before deleting.
		Ends current lot and prepares to the beginning of next measurement.
Sample info & Size		
	Sample shape	Select from Plate/Rod/Tube/Yarn and Others. Stress calculation will vary in accordance to the selected sample shape.
	Sample name	For the memo. Listed in the data reference software DBsearchLite 「Sample name」「Operator」fields.
	Operator	
	Test count	Setup test count.
	Sample size	Setup size. Used for the calculation of stress. Items vary according to the sample shape.
Motion setting		
	Test speed	Selects machine crosshead test speed.
		Shows「Machine Detail condition」window.

Machine Detail condition

Setup action condition of measuring device.

When condition is changed, setting goes directly to measuring device and reflects.

Test setting



Standard type

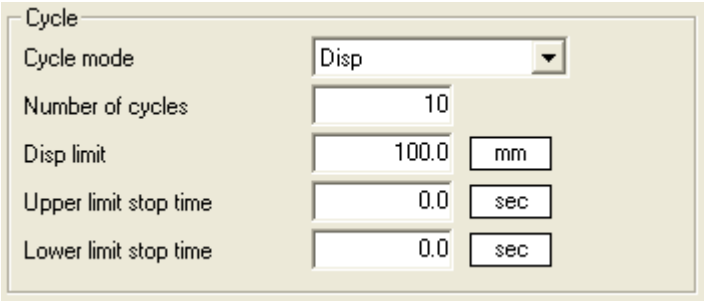
Standard	A test that continues to move crosshead up/down.
Cycle	Selects for cycle test.

Test direction

Tensile	When the test starts moves crosshead up.
Compression	When the test starts moves crosshead down.

Sampling interval	It is valid if『Standard type』is set as「Standard」. It provides a data sampling within interval, where crosshead extension is set to standard. For more detailed data reduce this value.
Sampling skipping	If this value is more than 1, the data for saving will be reduced. If it is set as 1, one of two data will be selected, so data will be reduced twice. If it is set as 4, one of five data will be selected, so data will be reduced 5 times.

Cycle test setting

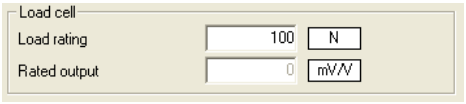


Cycle mode

Disp	Reaching point set as displacement. Set target value to「Disp limit」.
Load	Reaching point set as load. Set target value to「Load limit」.

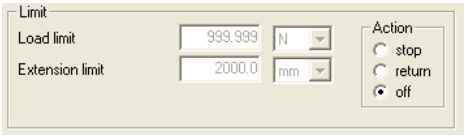
Number of cycles	Sets cycle operation`s repeat count.
Disp／Load limit	Sets target value for cycle test.
Upper limit stop time	Sets stop time if「Disp／Load」is reached during cycle test.
Lower limit stop time	Sets stop time if initial point is reached during cycle test.

Load cell rating setting



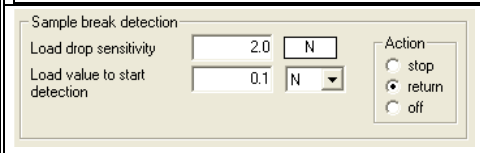
Load rating	Setup load rating for the connected load cell.

Limit setting



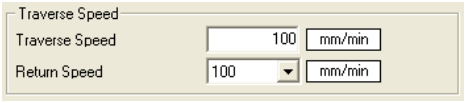
Load limit	Setup load limit value. It is invalid to set『Action』as「off」.
Extension limit	Setup extension`s limit value. It is invalid to set『Action』as「off」.
Action	
stop	When the limit is reached stops crosshead.
return	When the limit is reached returns crosshead to the initial point.
off	Disables limit control.

Break detection control setting



Load drop sensitivity	Sets minimum load value for break detection. Set as drop value, when load falls below the maximum load during measurement.
Load value to start detection	Sets load value for starting break detection. As long as this value is not exceeded, break will not be detected.
Action	
stop	When break is detected stops crosshead.
return	When break is detected returns crosshead to the initial point.
off	Disables break control.

Traverse speed setting

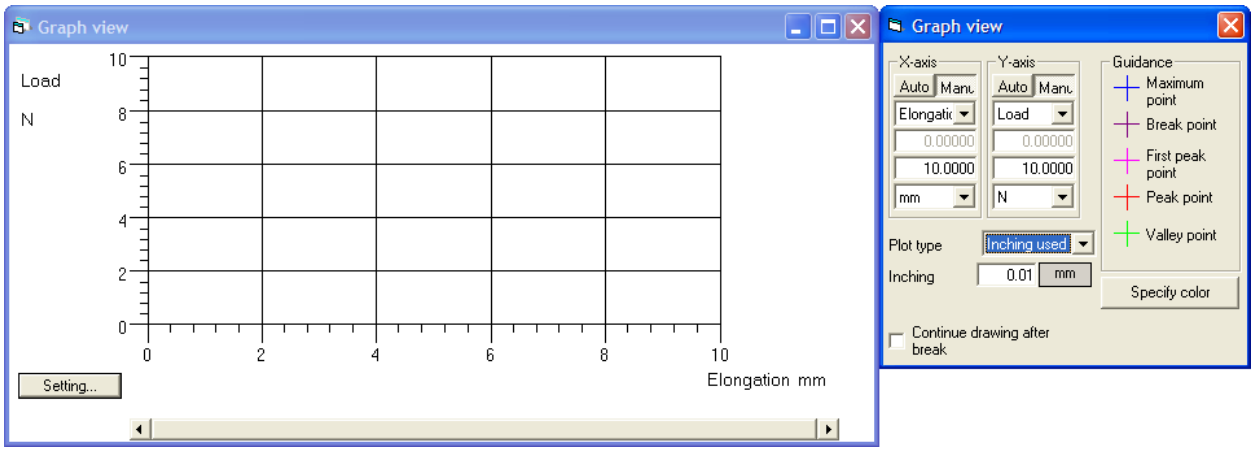


Traverse speed	Sets speed for manual operation of crosshead.
Return speed	Sets speed for returning crosshead to initial point.

Graph view setting

By clicking 

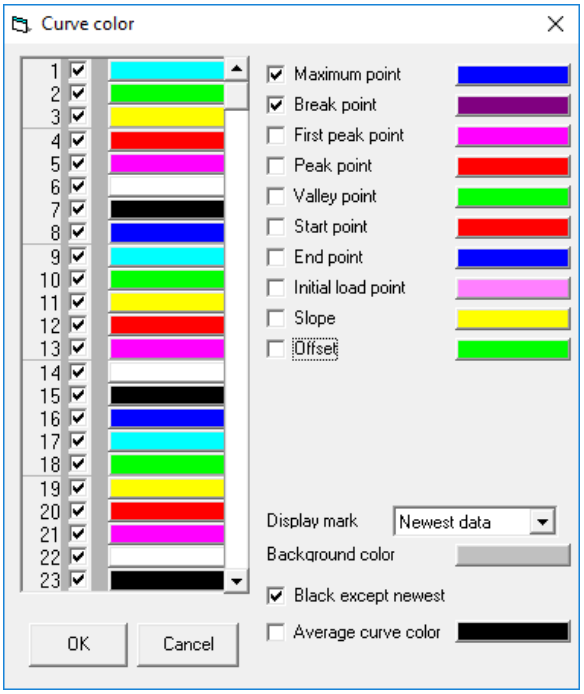
button opens「Graph view」setting window.



Auto/Manu	If Auto button is pressed, graph scale will be regulated automatically. If Manu button is pressed, have to insert graph scale maximum value. Minimum is fixed as 0.	
Elongation ／ Strain ／ Time	Graph X axis`s physical quantity, select from Elongation／Strain／Time.	
Load／Stress	Graph Y axis`s physical quantity, select from Load／Stress.	
Plot type		
Inching used	Move graph for every measurement. Moving interval is set in『Inching』.	
Overwrite	Overdraw graph.	
Single	Draw only one graph. Graph is set in「Curves to display」.	
Inching	When『Plot type』is「Inching used」, have to set an interval to draw a graph.	
Curves to display	Shown when『Plot type』is「Single」. Select graph for drawing from list by test number.	
Continue drawing after break	ON	Draw graph after break point is calculated.
	OFF	Don`t draw graph after break point is calculated.
Specify color	Opens window for curve color setting.	

Curve color setting

Sets graph curve color, marking color, displaying or not.



Graph display setting



Number	Shows measurement numbers.
Checkbox	
ON	Displays corresponding measurement number graph.
OFF	Don`t display corresponding measurement number graph.
Color buttons	Shows curve colors. Displays color setting window by clicking it.

Marking setting



Checkbox	
ON	Displays corresponding mark.
OFF	Doesn`t display corresponding mark.
Color buttons	Shows colors of corresponding marks. Displays color setting window by clicking it.
Display mark	
All data	Marks all graphs.
Newest data	Marks only newest graph.
No display	Does not mark.

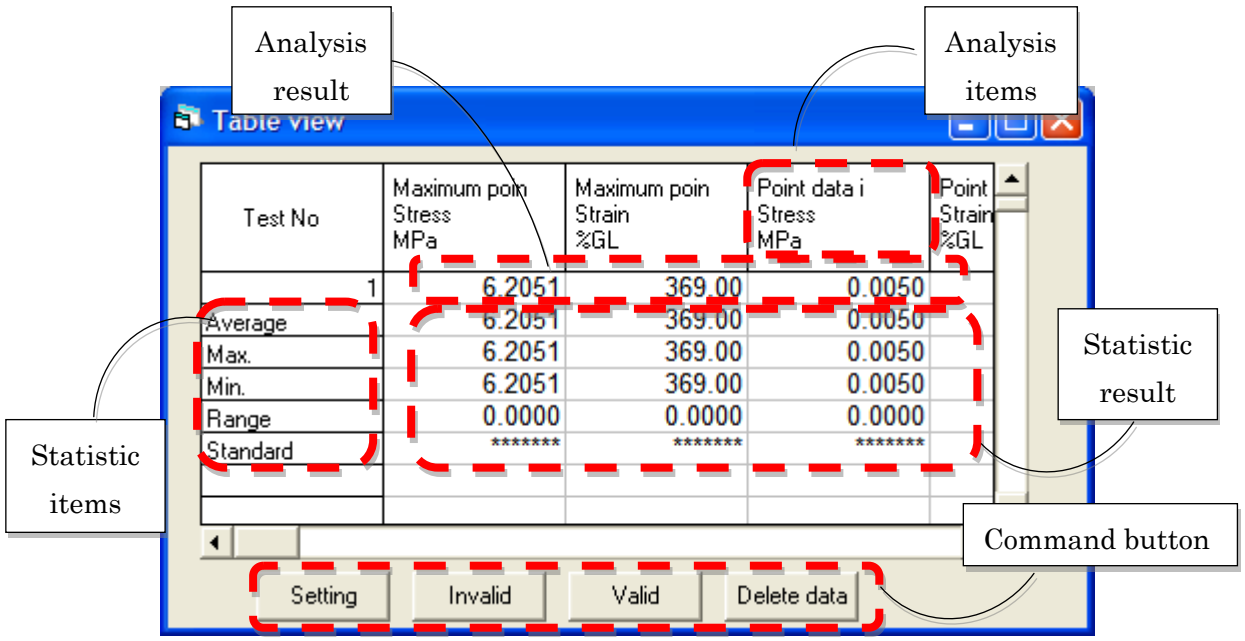
Other settings



Background color	Shows background color. Displays color setting window by clicking it.
Black except newest	If checked, all graphs except newest one are drawn in black color.
Average curve Color	If checked, draws average curve. Color button shows average curve color. Displays color setting window by clicking it.

Table view

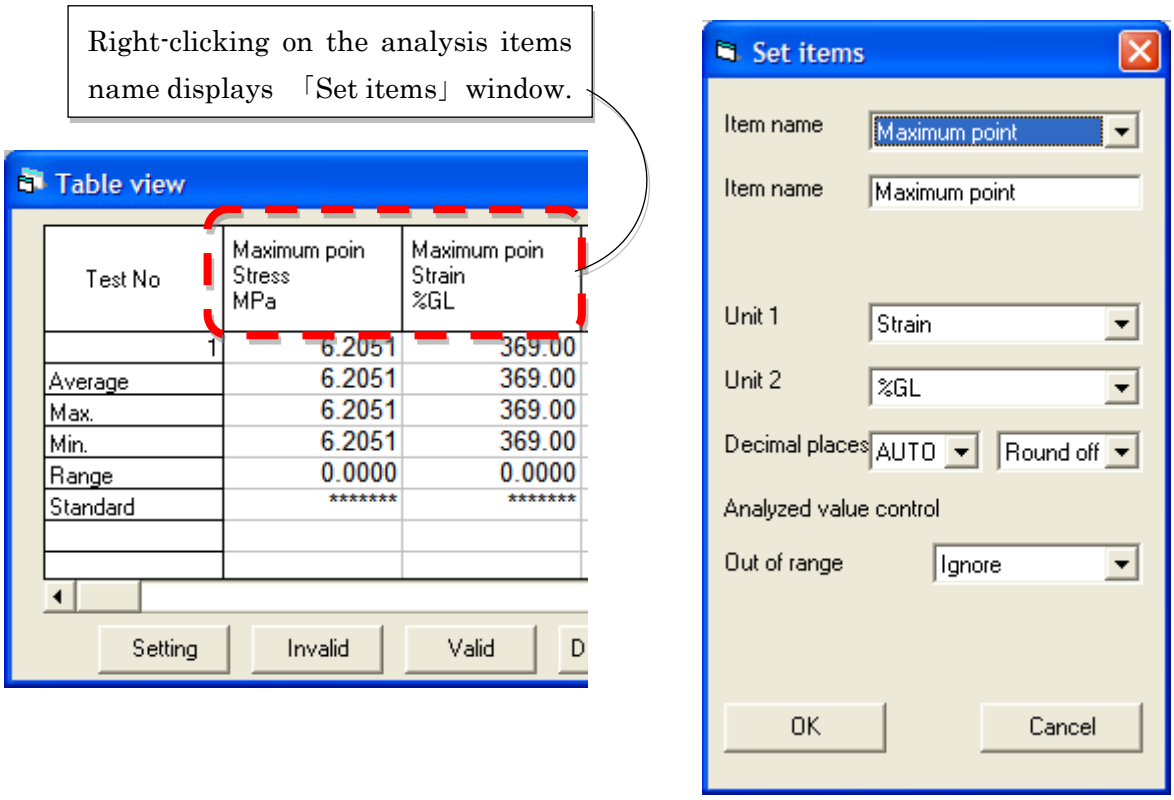
Displays analysis result, statistic result and analysis admission decisions.



Analysis items	Shows analysis items. Right-clicking on the analysis items name displays 「Set items」 window for name and unit setting.
Statistic items	Shows statisic items. Right-clicking on the statistic items name displays 「Set statistical value」 window for name and rounding method settings.
Analysis result	Every time when measurement finish adds analysis result.
Statistic result	Every time when measurement finish statistic results are renewed.
Setting	Shows「Analysis condition」 window.
Invalid data	Selected test number data is set as invalid. Invalid datas are excluded from calculation of statistic values.
Valid data	Selected test number data is set as valid。Included to the calculation of statistic values.
Delete data	Delete selected test number data. Once the data deleted it can`t be restored, please check carefully before deleting.

Set items

Changes settings for each analysis items.

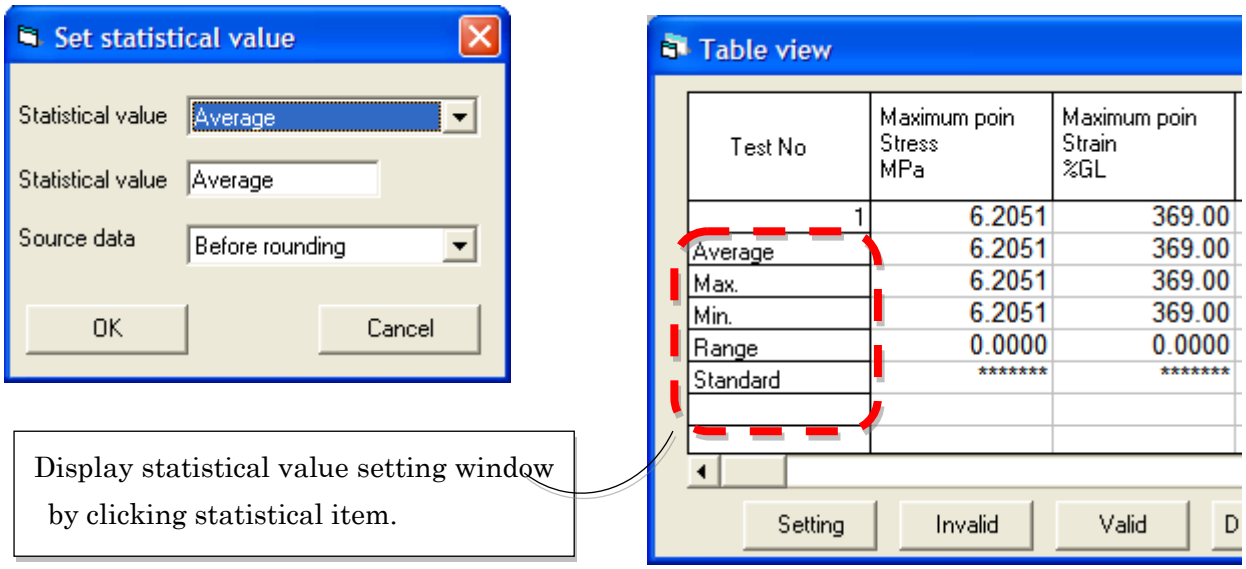


Item name	Select analysis item. ※Available analysis items are Maximum point/Break point/ Point data in Elongation1/Point data in Load1/ First peak point/Peak point/Valley point/Integral average/Optional equations
Item name	Sets name to display.
Statistic	Shown if analysis item is Peak point/Valley point.
Peaks1	Display maximum among detected peak points.
Peaks2	Display average of 2 maximums among detected peak points.
Peaks3	Display average of 3 maximums among detected peak points.
Valleys1	Display minimum among detected peak points.
Valleys2	Display average of 2 minimums among detected peak points.
Valleys3	Display average of 3 minimums among detected peak points.
Unit1	Selects physical quantity.
Unit2	Selects corresponding unit to the physical quantity.
Decimal places	Selects number of decimal places from 1～5 and Auto. If Auto is selected displays number with total number of integral part and fractional parts are 5.
Rounding method	Selects from Round down/Round up/Round off/JIS rounding.
Out of range	Makes acceptance decisions. Also decides to exclude or include statistics

		results, which are marked as NG.
	Ignore	Provide usual statistics.
	Exclude Statistics	If analysis report is not within「Control lower」and「Control upper」interval, exclude it from statistics calculation and don't count corresponding test number.
	Include Statistics	Even if analysis report is not within「Control lower」and「Control upper」interval, include it to statistics calculation, but mark test number as NG and show in red letters corresponding raw.
Control upper ／ Control lower		For acceptance deciding analysis value sets upper and lower limits. If analysis report is not within lower limit and upper limit interval, provide operations as set in「Out of range」.

Set statistical value

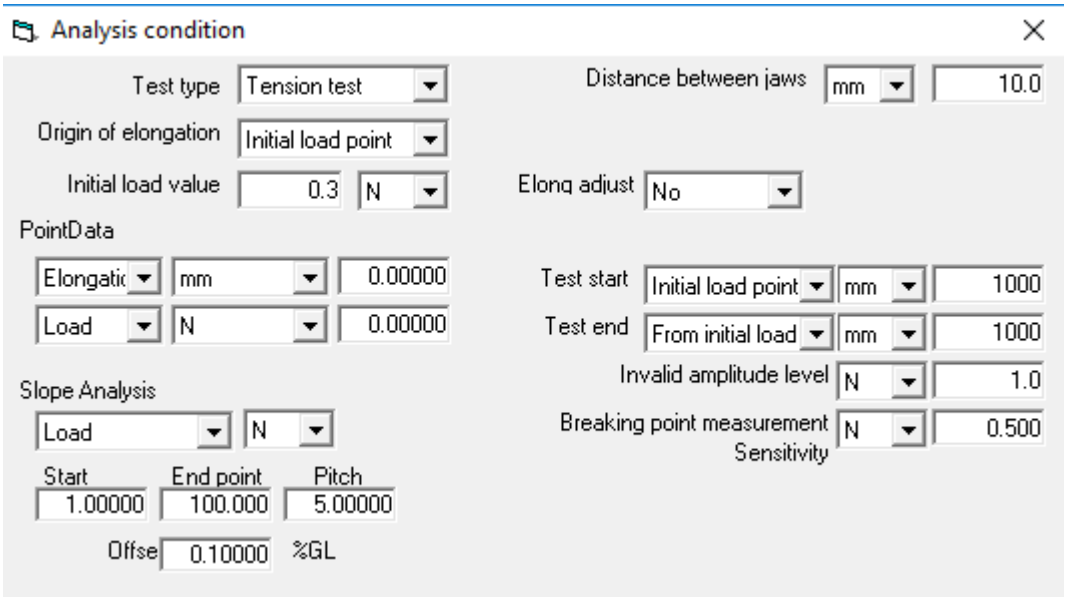
Change settings for statistical values.



Statistical value		Select statistical item. ※※Available statistical items Average/ Maximum/ Minimum/ Range/Standard Deviation.
Statistical value(name)		Set name for displaying.
Source data	Rounded	Provide statistical processing of analysis results after rounding.
	Before rounding	Provide statistical processing of analysis results before rounding.

Analysis condition

When settings of analysis condition window are changed and closed analysis is recalculated again. So that after measurement you can edit data end recalculate again.



Test type	Strain/Stress calculation will differ according to the choices. Once the test is started it can`t be changed.
Tensile test	Selects when provide usual tensile test.
Compression test	・Physical quantity will change from「Strain」to「Deformation」. ・Stress/Deformation calculation deformation equation will not differ from「Tensile test」.
3 point bending test	・Physical quantity will change from「Strain」to「Deformation」. ・In the Analysis condition window will appear a field for inserting 「Edge span width」. ・Calculate according to the 3 point bending test Stress/Deformation calculation equation.
4 point bending test	・Physical quantity will change from「Strain」to「Deformation」. ・ In the Analysis condition window will appear fields for inserting「Upper/Lower edge span width」. ・Calculate according to the 4 point bending test Stress/Deformation calculation equation.
Origine of elongation	
Initial load point	The point where a test starts and load reaches the set initial value
Return point	The point where the tangent to evaluate the elastic modulus intersects the X-axis.
Test start point	The point where a test starts (No elongation adjustment)

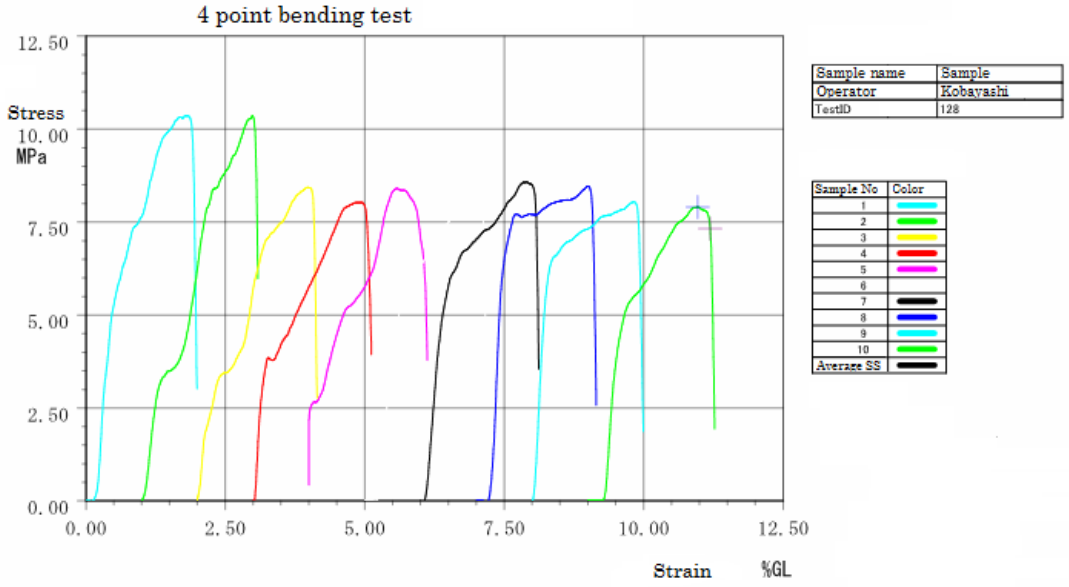
Point data		
	Elongation	Set analysis item「Point data in Elongation1」extraction point.
	Load	Set analysis item「Point data in Load1」extraction point.
Slope Analysis		
	start	Specify the start points.
	end	Specify the end points.
	pitch	Specify the pitch to calculate the slope in the specified range.
	offset	Specify the value how much the tangent to evaluate the elastic modulus is moved horizontally.
Distance between compression device		Shown when「Test type」is「Tensile test」「Compression test」. For the strain calculation need to insert distance between jaws and pressure receiving plate. Used for strain calculation.
Edge span		Shown when「Test type」is「3 point bending test」. Inserts edge span width of the 3 point bending jig. Used for strain calculation.
Upper／Lower edge span		Shown when「Test type」is「4 point bending test」. Inserts upper and lower edge spans width of the 4 point bending jig. Used for strain calculation.
Elongation adjustment		
	Yes	Calculates the strain by adding (or subtracting) the elongation up to the origin to (or from) the initial sample length.
	No	Calculates the strain using the initial sample length.
Test Start		
	Initial load point	The point where a test starts and the load reaches the set initial value
	First valley point	The first valley point
	Specified distance	The point where the displacement value exceeds the specified distance
Test end		
	From initial load point	The point where the displacement value starting at the initial load point exceeds the specified distance.
	From test start point	The point where the displacement value starting at the test starting point exceeds the specified distance.
	Break point	The point where the load becomes less than the specified break detecting load.
Invalid amplitude level		Specify the amplitude level excluded from analyzing the peak and valley points and select the unit.
Breaking point measurement Sensitivity		Specify the level to detect the breaking point.

Table print condition

Setup layout for the print report.

Go to the upper left corner menu「File」→「Print layout」.

Print image



4 point bending test result

Measuring device	STC series	Test type	4 point bending
Load cell rating load	500 N	Test speed	300.0 mm/min
Point data (Stress)	2 MPa	Point data (Strain)	11 %GL
Lower edge span width	81 mm	Upper edge span width	50 mm
Break point measurement	0.5 N		

Sample name	Sample	Operator	Kobayashi

TestID=128 Test No	MaxPoint Stress MPa	MaxPoint Strain %GL	MaxPoint Load N	MaxPoint Extention mm	BreakPoi Stress MPa	BreakPoi Strain %GL	BreakPoi Load N	BreakPoi Strain %GL	BreakPoi Energy J
1	10.350	1.8243	26.709	17.060	9.9386	1.9045	25.648	1.9045	0.3124
2	10.351	1.9875	26.711	18.586	10.070	2.0249	25.988	2.0249	0.2983
3	8.4271	1.9765	21.747	18.483	8.1213	2.0727	20.958	2.0727	0.2727
4	8.0201	1.9305	20.697	18.053	7.4884	2.0374	19.325	2.0374	0.2778
5	8.4003	1.5801	21.678	14.777	6.3627	2.0613	16.420	2.0613	0.2946
6	8.1338	2.0445	20.990	19.120	7.7120	2.1140	19.902	2.1140	0.2780
7	8.5680	1.9062	22.111	17.826	8.1111	2.0559	20.932	2.0559	0.3136
8	8.4576	2.0025	21.826	18.726	8.1324	2.0666	20.987	2.0666	0.3195
9	8.0349	1.8257	20.735	17.073	7.6413	1.9005	19.720	1.9005	0.3079
10	7.8959	1.9679	20.376	18.403	7.3134	2.1921	18.873	2.1921	0.2786

Print table setting

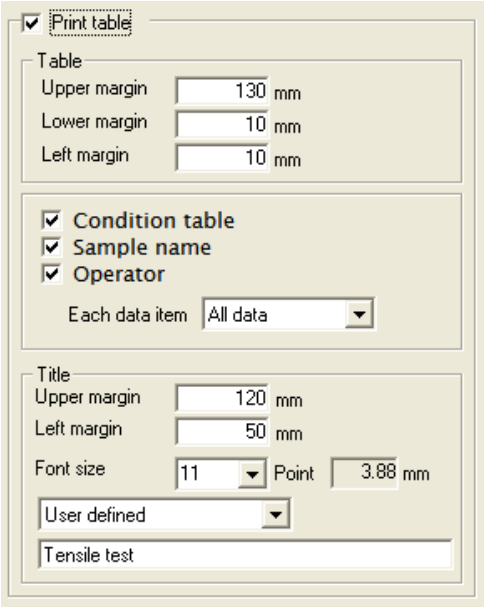


Table position

Print table	Can`t print table if checkbox is off.
Upper margin	Sets up printing positions.
Lower margin	
Left margin	
Condition table / Sample name / Operator	Prints checked items.

Each data item

Statistical data only	Doesn`t print analysis result, prints only statistical data
All data	Prints analysis result and statistical data

Title

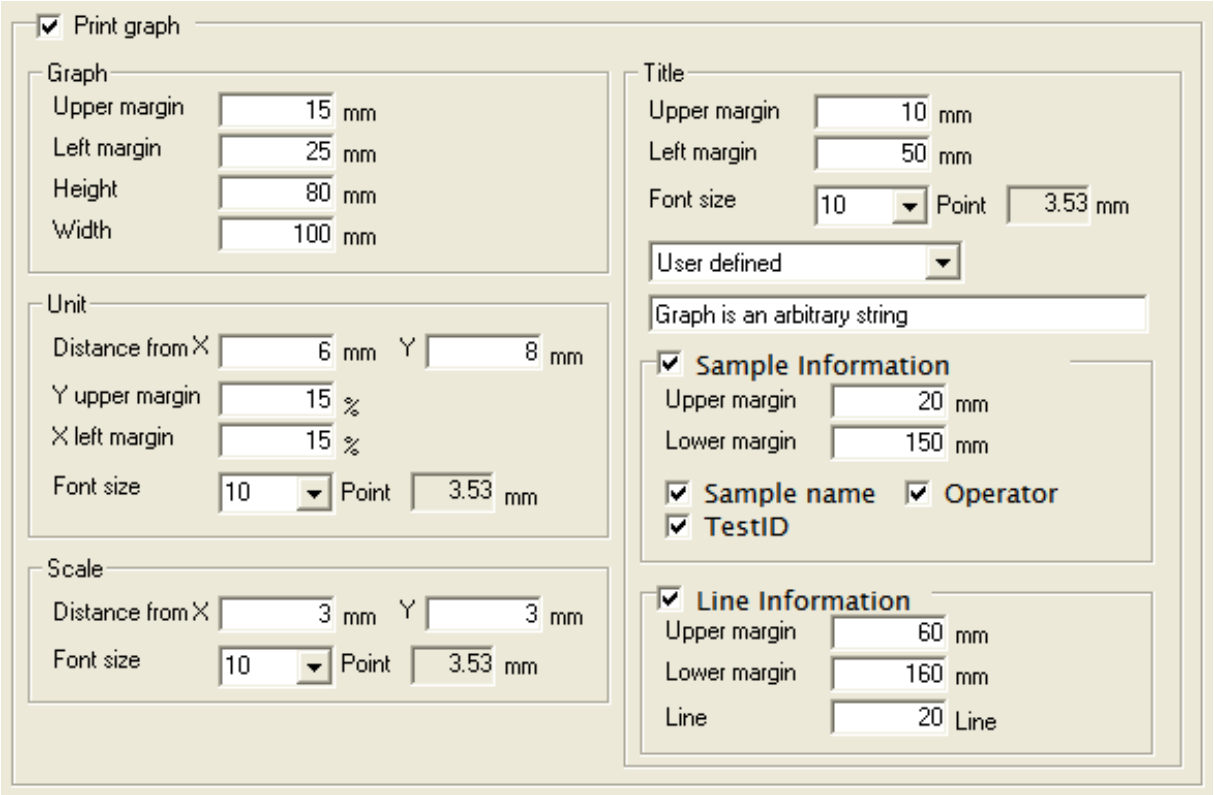
Upper margin	Sets title`s printing position
Left margin	
Font size	Sets font size for the table title.

Arbitrary character string

Automatic determination	Sets title automatically in relevance to the「Test type」.
User defined	Sets arbitrary title character strings.

Test type	Automatic character strings
Tensile test	Tensile test result
Compression test	Compression test result
3 point bending test	3 point bending test result
4 point bending test	4 point bending test result

Print graph setting



Graph position

Upper/Left margin	Sets graph printing positions.
Height/Width	Insert graph height/width for printing.

Axis unit

Distance from X/Y	Sets distance from graph`s X/Y axis units.
Y upper/X left margin	Sets position for the X/Y axis units.
Font size	Sets printing font size for the X/Y axis units.

Scale

Distance from X/Y axis	Sets printing positions for scale numbers of X/Y axis.
Font size	Sets font size for scale numbers of X/Y axis.

Title

Upper/Left margin	Sets printing positions for graph title.
Font size	Sets font size for graph title.
Automatic determination	Sets title automatically relevant to the「Test type」.
User defined	Sets title character strings arbitrary.

Test type	Automatic character strings
Tensile test	Tensile test result
Compression test	Compression test result
3 point bending test	3 point bending test result
4 point bending test	4 point bending test result

Legend (Sample Information)		
	Upper/Left margin	Sets printing positions for legend (Sample Information).
	Sample Name / Operator / TestID	Prints checked items.
Legend (Line Information)		
	Upper / Left margin	Sets printing positions for legend (Line Information).
	Line	Sets a number of lines in one column. For example if it is set as 10, the 11th line will be printed in first line of second column.

7. Data saving location and database

Measurement or test results are automatically saved in to the database at the end of measurement.

But, graph curve data is saved as binary data in different folder than database.

Data saved in database can be opened by the database searching application  「DBsearchLite」.

Database location and backup

Database is saved in following location.

※User name below is the Windows login user name.

Windows8/8.1、7、Vista

Data base location

C:¥Users¥User name¥Documents¥AND¥MSAT-DB¥UniTest.accdb

Graph data location

C:¥Users¥User name¥Documents¥AND¥MSAT-DB¥bindata

WindowsXP

Data base location

C:¥Documents and Settings¥User name¥My Documents¥AND¥MSAT-DB¥UniTest.accdb

Graph data location

C:¥Documents and Settings¥User name¥My Documents¥AND¥MSAT-DB¥bindata

For the data backup, please backup 「Unitest.accdb」and「bindata」files, located in above mentioned folders.

How to empty the database

Empty database is saved in the location below

Windows8/8.1、7、Vista

C:¥Users¥User name¥Documents¥AND¥MSAT-DB¥newdatabase¥ UniTest.accdb

WindowsXP

C:¥Documents and Settings¥User name¥My Documents¥AND¥MSAT-DB¥newdatabase ¥ UniTest.accdb

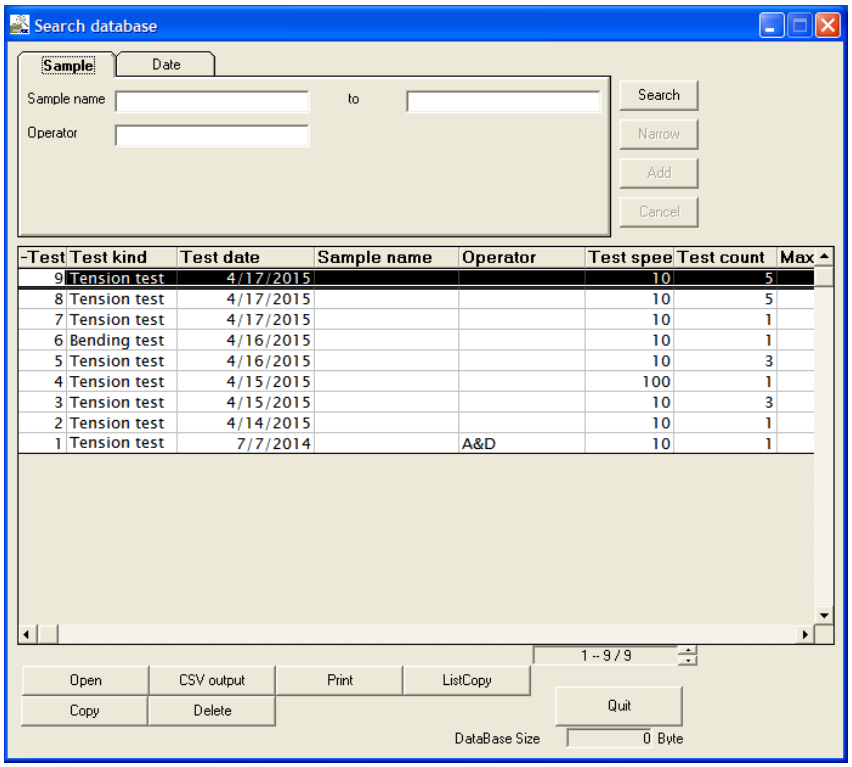
To empty the existing database, overwrite above mentioned empty database in to the database location.

8. Database searching application

To browse again measured data use database searching application.

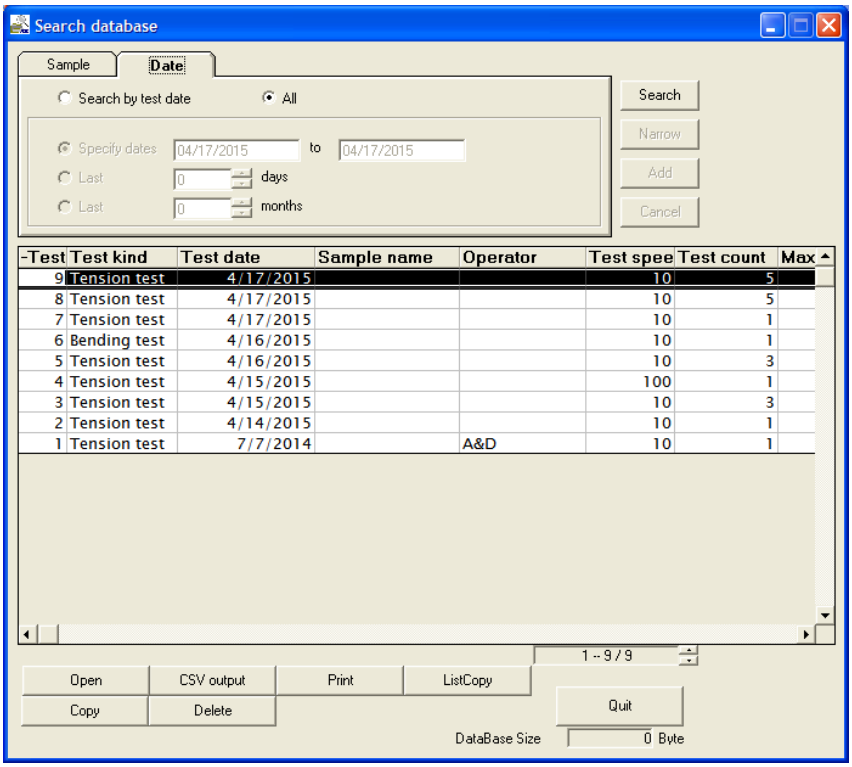
Search for data

To run DBsearchLite, double-click  icon on the desktop.



Search	Lists all data that meets search conditions.
Narrow	Narrows list adding more search conditions to the current target search result.
Add	Adds list with new search conditions to the current search result.
Cancel	Cancels all search conditions and renews data list.
Sample	Date
Sample name	Insert「Sample name」to search. If it is empty, lists all data. Also in addition to the sample name able to search by lot numbers, which enables search data from 00001 to 00010.
Operator	Insert「Operator」to search. If it is empty, lists all data.
Open	Opens data selected from the list. Only one data can be opened at a time. If the other data is opened in the background close that window first and press the「Open」button.
CSV output	Data selected from the list is saved as csv file. Define csv file location and save it.
Print	Prints currently displayed list.
ListCopy	Copies currently displayed list to the clipboard.

Copy	Copies currently selected data. When press the button data is copied with newest measuring number. Only one data raw can be copied at a time.
Delete	Deletes data selected from the list. Confirmation window is appears when the button is pressed. Once the data deleted it can`t be restored, please check carefully before deleting.
DataBase Size	Shows current database size.
Sample	Date



Search by test date

Specify dates	It becomes available when the「Search by test date」is checked. Please insert period of measurement date and search.
Last	It becomes available when the「Search by test date」is checked. Searches data for the last designated days and months.

All	Shown all tests.

9. Analysis points calculation methods

Analysis points are calculated by the following methods.

Strain(Deformation) calculation

Strain (Deformation) calculation equation will vary in accordance to the test type, sample shape and looseness adjustment. Calculation equations are shown in the table below.

Strain(deformation)[nondimensional]＝ a ×Elongation(Displacement)[m]

Test type	Sample shape	a calculation equation Elongation no adjustment	a calculation equation Elongation adjustment
Tensile	All	$a=\frac{1}{GL}$	$a=\frac{1}{GL+\Delta Lo}$
Compression			$a=\frac{1}{GL-\Delta Lo}$
3 point bend	Plate	$a=\frac{6h}{Lv^2}$	
	Rod･Tube	$a=\frac{6D}{Lv^2}$	
	Yarn	Not measurable	
	Others	$a=\frac{12I}{Lv^2Z}$	
4 point bend	Plate	$a=\frac{6h}{(Lv-Lvu)(2Lv+Lvu)}$	
	Rod	$a=\frac{6D}{(Lv-Lvu)(2Lv+Lvu)}$	
	Tube	$a=\frac{6Do}{(Lv-Lvu)(2Lv+Lvu)}$	
	Yarn	Not measurable	
	Others	$a=\frac{12I}{(Lv-Lvu)(2Lv+Lvu)Z}$	

Symbols denote the following:

α : gradient of straight line portion(N/m)　A: specimen cross-sectional area(m^2)　GL: specimen initial length(m)

I : moment of inertia of section(m^4)　Z: section modulus(m^3)

d: specimen fineness (tex) W:specimen width(m)　h: specimen height(m)　D: specimen diameter or outer diameter(m)　Do: specimen outer diameter(m)　Di: specimen inner diameter(m)

σ : stress(Pa)　P: each load(N)　ΔL: each displacement(m)　ρ : specimen density (kg/m^3)

Lv: edge span width(m)　Lvu: upper edge span width(m)

Stress calculation

The calculation equation for strain (deformation) varies with the test type, sample shape, and looseness correction. Calculation equations are shown in the table below.

Stress[Pa]＝ b ×Load[N]

Test type	Sample shape	b calculation formula
Tensile Compression	Plate・Rod・Tube Others	$b=\frac{1}{A}$
	Yarn	$b=\frac{1}{d}$
3 point bend	Plate	$b=\frac{3Lv}{2Wh^2}$
	Rod	$b=\frac{8Lv}{\pi D^3}$
	Tube	$b=\frac{8LvDo}{\pi(Do^4-Di^4)}$
	Yarn	Not measurable
	Others	$b=\frac{Lv}{4Z}$
4 point bend	Plate	$b=\frac{3(Lv-Lvu)}{2Wh^2}$
	Rod	$b=\frac{8(Lv-Lvu)}{\pi D^3}$
	Tube	$b=\frac{8(Lv-Lvu)Do}{\pi(Do^4-Di^4)}$
	Yarn	Not measurable
	Others	$b=\frac{(Lv-Lvu)}{4Z}$

Analysis items units

(Select) Units of physical quantities of the analysis items are shown below

Physical quantity	Unit
Width, Thickness, Height, Depth	mm ／ cm ／ in ／ ft
Denier	D ／ tex
Density	kg/m^3 ／g/cm^3 ／ lb/in^3 ／lb/ft^3
Load	N／mN／kN／kgf／gf／tf／lbf
Cross-section area	mm^2 ／ cm^2 ／ inch^2 ／ feet^2
Section modulus	mm^3 ／ cm^3 ／ inch^3 ／feet^3
Second moment of area	mm^4 ／ cm^4 ／ inch^4 ／ feet^4
Stress (yarn)	N/tex／ mN/tex ／ cN/dtex ／ gf/d ／ kgf/d ／ tf/d ／ lbf/d
Strain (deformation)	%GL ／ nondimensional
Energy	J ／N・m ／N･mm ／mN･m ／mN･mm ／kN･m／kN･mm ／kgf･mm ／ kgf･cm ／kgf･m ／gf･mm ／gf･cm ／gf･m ／tf･mm ／tf･cm ／ tf･m ／ ft･lbf ／lbf･in

Analysis items

Point data in load/strain

The nearest point on the right, starting from the specified load/extension data, will be taken as the point data in load/extension. If test finished before reaching specified load/extension it will be determined as immeasurable data.

Break point

There 3 items for break condition.

①when break is detected by detection sensitivity

②go to the just previous load sampling point and compare it, if the decreasing amount is more that specified value, take it as break point.

③when test stopping signal is detected

Take as a break point the point that occurred first from ①～③ above mentioned conditions.

Maximum point

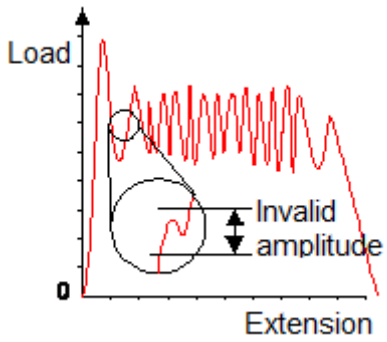
It is a Maximum load point within one test. If there are several maximum load points detected, point with minimum extension will be taken as maximum point.

Energy

Integrated value of load within sampling interval for every extension from initial point till analysis point is called energy.

Peak point analysis

The part of the peel test SS curve that has higher amplitude value than the set invalid amplitude is called peak point.
The points with the amplitude lower that invalid amplitude as shown on the graph in the right will not be taken as peak point or valley point, points with higher value than invalid amplitude will be stored and analyzed as statistic data.



The detailed information is shown below.

Valley point analysis

Let denote " i " as a sampling number at a sampling point, and "K_i" denote as load value for " i "

（1）For　k＝1．．　m

$0 <$ （$K_{i-k} - K_i$）≦　Specified value for invalid amplitude level

（$K_{i-m-1} - K_i$）＞　Specified value for invalid amplitude level

Where valid sampling number is within　i －m－1　．．　i , and　i －m－1≧1 .

（2）For　j＝1．．　n

0≦（$K_{i+j} - K_i$）≦　Specified value for invalid amplitude level

（$K_{i+n+1} - K_i$）＞　Specified value for invalid amplitude level

Where valid sampling number is within　i　．．　i＋n＋1 , and　i＋n＋1≦N_T.

The sampling point with the sampling number　i　that satisfies both above mentioned criterias （1）（2）will be taken as the maximum valley point.

Peak point analysis

Let denote " i " as a sampling number at a sampling point, and "K_i" denote as load value for " i "

（1）For　k＝1．．　m

$0 <$ （$K_i - K_{i-k}$）≦　Specified value for invalid amplitude level

（$K_i - K_{i-m-1}$）＞　Specified value for invalid amplitude level

Where valid sampling number is within　i －m－1　．．　i ,　and　i －m－1≧1 .

（2）For　j＝1．．　n

0≦（$K_i - K_{i+j}$）≦　Specified value for invalid amplitude level

（$K_i - K_{i+n+1}$）＞　Specified value for invalid amplitude level

Where valid sampling number is within i　．．　i＋n＋1　, and i＋n＋1≦N_T.

The sampling point with the sampling number　i　that satisfies both above mentioned criterias （1）（2）will be taken as the maximum peak point.

First peak point

It is similar to the extreme-point analysis, but it ignores the analysis range and uses the SS curve derived from peel test. It is the first extreme point found in a part, where amplitude is greater than the specified invalid amplitude.

Load integral average analysis

It is an average of all load value within measurement range.

Origin of elongation

There are three ways to determine the origin. Elongation at the origin of elongation is zero. And the elongation up to the origin is saved as the elongation adjustment value.

Test start point The point where a test starts

Initial load point The point where a test starts and the load reaches the set initial value

Return point The point where the tangent to evaluate the elastic modulus intersects the X-axis

Elongation adjustment

When initial load point or return point is selected as the origin, set whether the moving amount (elongation) up to the origin will be adjusted or not.

No Calculates the strain using the initial sample length.

Yes Calculates the strain by adding (or subtracting) the elongation up to the origin to (or from) the initial sample length.

Offset point

The point in a test where the S-S curve intersects the line containing the point offset from the return point by the specified value and having the same slope with the line for determining the elastic modulus.

Slope

All of these values are obtained using the slope of the S-S curve linear portion (α).

How to obtain α

In the specified range, the slopes are calculated by the specified pitch. Among them the greatest three values, but the greatest will be calculated by least square method.

10. Statistical value calculation methods

Average value

$$\overline{X} = \frac{\sum Xi}{N}$$

Maximum value Maximum value within the statistics target.

Minimum value Minimum value within the statistics target.

Standard deviation (N-1)

$$\sigma = \frac{\sqrt{\sum (Xi - \overline{X})}}{N - 1}$$

Deviation (r) Determined as “maximum value-minimum value”

Calculation of the average SS curve

Processing the average of the SS curve for every test lot.

Average is calculated in following order.

For every SS curve calculate the average of all sampling that has equal extension or closest extension.

Repeat this process till the SS curve lowest point.

Here, for the final data, ignore interval and calculate average of all data closest to the final data.

Take above calculated average values as load・extension initial data and define average accumulation load-extension data.

Rounding methods

There are 4 types of rounding methods『Round down』、『Round up』、『Rounding』、『JIS rounding』, where JIS rounding is refers to JIS　Z8401 and rounded to desired significant digits.

The formats of rounding methods are shown in the table below. For the negative numbers rounding of absolute numbers is applicable.

<table>
<tr><td rowspan="2">Rounding method</td><td colspan="3">Digit placed lower that last rounding digit (first digit to truncate)</td></tr>
<tr><td>Equal to 0,1,2,3,4</td><td>Equal to 5</td><td>Equal to 6,7,8,9</td></tr>
<tr><td>Rounding</td><td>Round down</td><td colspan="2">Round up</td></tr>
<tr><td rowspan="3">J I S</td><td rowspan="3">Round down</td><td colspan="2">Last rounding digit</td><td rowspan="3">Round up</td></tr>
<tr><td>Even numbers
{0,2,4,6,8}</td><td>Odd numbers
{1,3,5,7,9}</td></tr>
<tr><td>Round down</td><td>Round up</td></tr>
</table>

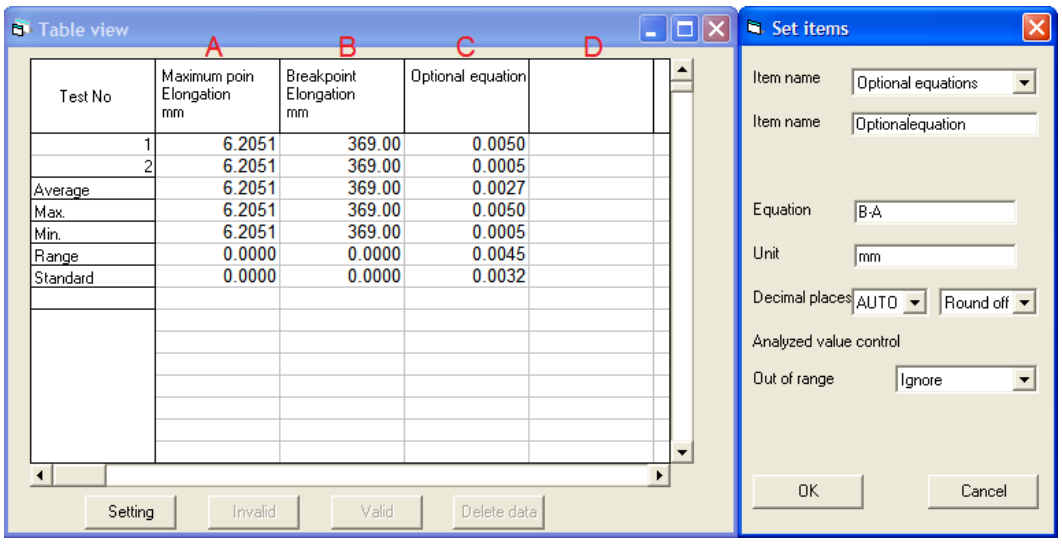
Round down：leave last rounding digit as it was and truncate lower decimal place digits

Round up　：increase by 1 last rounding digit and truncate lower decimal place digits

Note：「Digit placed 1digit lower that last digit to round」and「Last digit to round」samples are shown in the table below.

Sample number	Round 3 digits after decimal point ab.cdefgh…	Round (-1) digit after decimal point abcdef.ghi…
Digit placed 1digit lower that last digit to round	f	f
Last digit to round	e	e

Optional equations



For the equation use alphabets fixed to the items and calculate. Calculation input symbols are assigned to the items from the left to the right as A,B,C… as shown on the table.

11. Software installation

For those, who already finished installation shown in『4.MSAT-Lite setup P.6』, following procedures does not required. Those, who are installing applications separately, please follow next instructions.

Software for the installation	Description	Page
USB driver	Necessary for the connection with the MCT series equipments.	P.50
AccessDataBaseEngine	Software for browsing measurement data.	P.54
MSAT-Lite／DBsearchLite	MSAT-Lite and DBsearchLite are the main programs. Each one is used for operating, searching and browsing MCT series data.	P.55

Install USB driver

There is a description of the USB driver installation.

※Attention

・Please check OS of your current computer and follow the corresponding description.

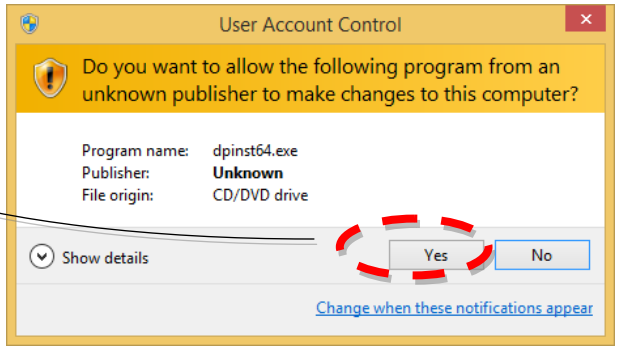
For Windows8/8.1Pro

① Connect the measuring device and PC through USB cable and swithc ON the measuring device.

② Start the 「Drivers¥SETUP.vbs」 on the installation CD by double clicking.



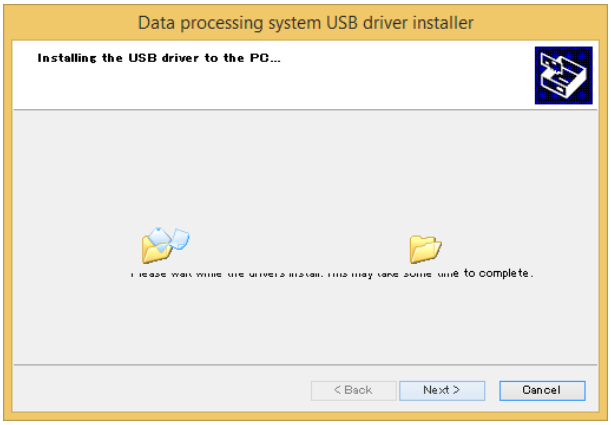
③ If the window on the right appears, continue by pressing [Yes] button.



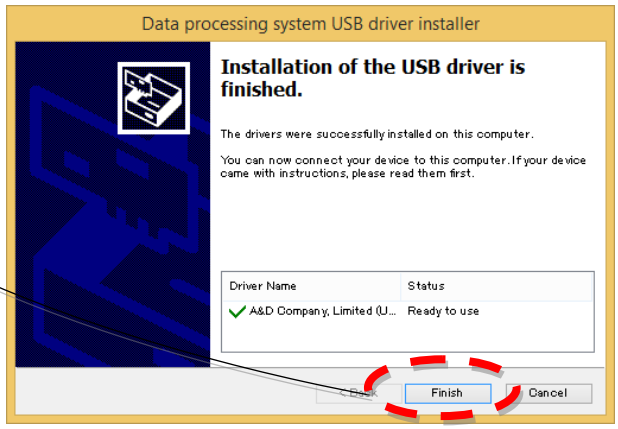
④ When the window on the right appears, continue by pressing [Next] button.



⑤ Please wait for a while, when the window on the right appears.



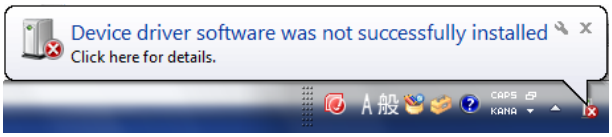
⑥ When the window on the right appears, close window by pressing [Finish] button.
The driver is installed successfully.



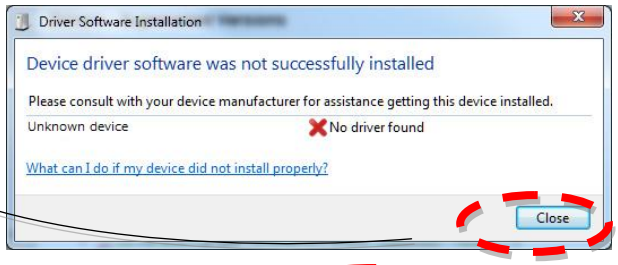
For Windows7Pro

① Connect the measuring device and PC through USB cable and swithc ON the measuring device.

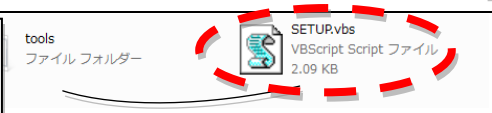




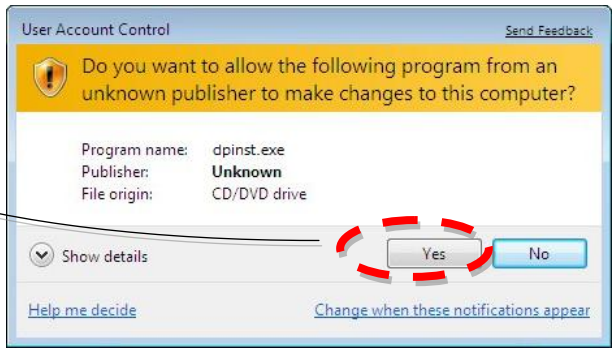
② Wait for a while till the window on the right appears and close window by pressing [Close] button.



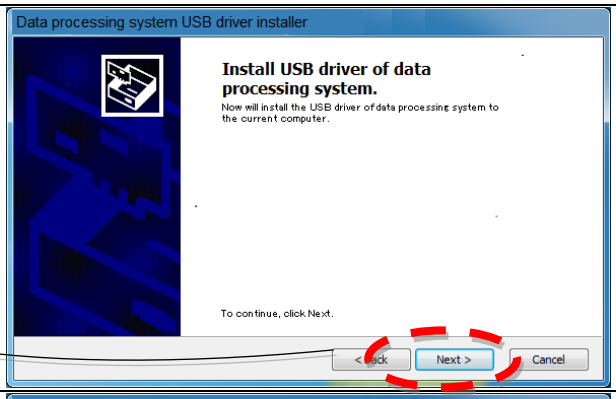
③ Start the 「Drivers¥SETUP.vbs」 on the installation CD by double clicking.



④ If the window on the right appears, continue by pressing [Yes] button.



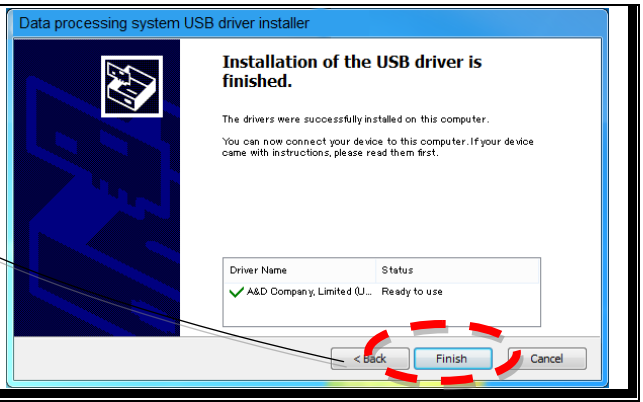
⑤ When the window on the right appears, continue by pressing [Next] button.



⑥ Please wait for a while, when the window on the right appears.

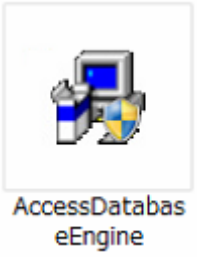


⑦ When the window on the right appears, close window by pressing [Finish] button.
The driver is installed successfully.

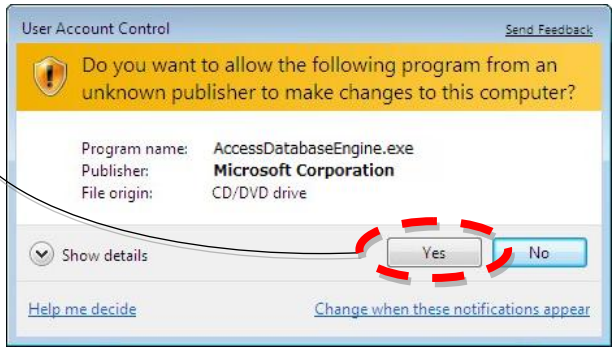


Installation of the AccessDataBaseEngine

① Start the 「AccessDatabaseEngine.exe」 on the installation CD by double clicking.



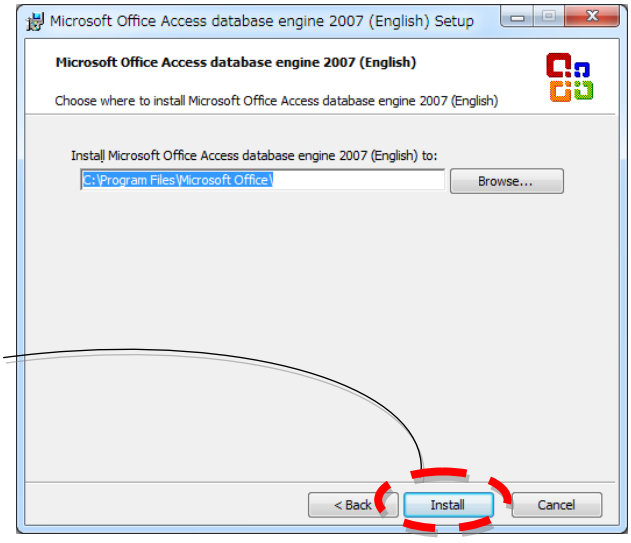
② If the window on the right appears, continue by pressing [Yes] button.



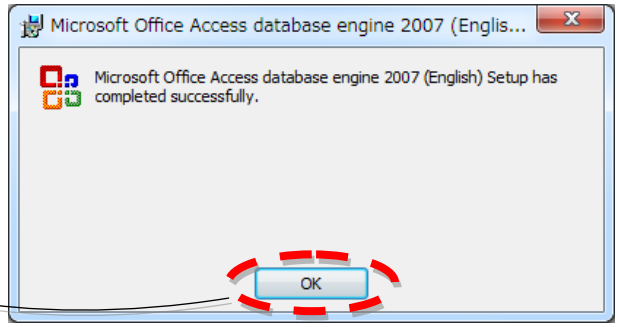
③ Check in the checkbox and continue by pressing [Next] button.



④ Continue by pressing [Install] button.

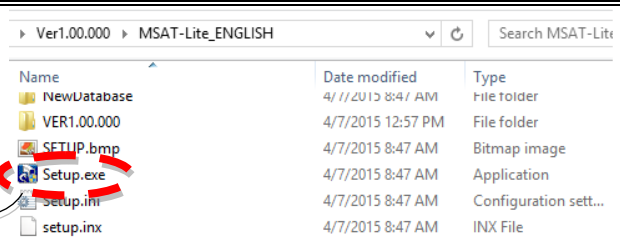


⑤ Finish the installation of the AccessDataBaseEngine by pressing [OK] button.



Installation of MSAT-Lite／DBsearchLite

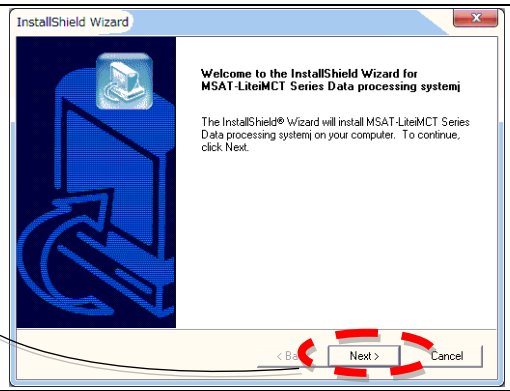
① Start the「Setup.exe」on the installation CD by double clicking.



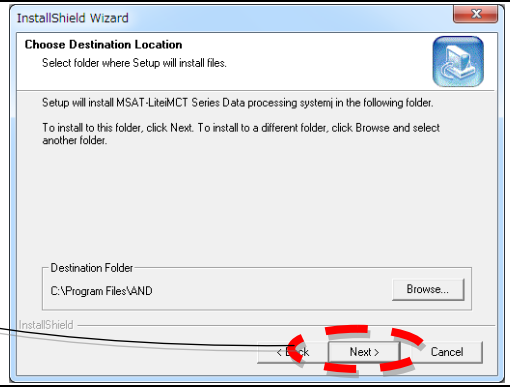
② If the window on the right appears, continue by pressing [Yes] button.



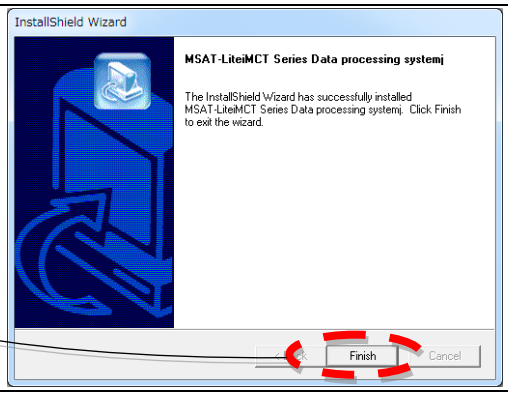
③ Follow instructions on the screen and continue by pressing [Next] button.



④ Follow instructions on the screen and continue by pressing [Next] button.



⑤ Press the [Finish] button.



⑥ Restart the PC, double click MCT-Lite／DBsearchMCT icons and confirm in the MCT series measuring device is connected properly, and measured data can be browsed.

