MULTISCAN (SOFTWARE) MANUAL FOR DYNAMIC AND STATIC DATALOGGER

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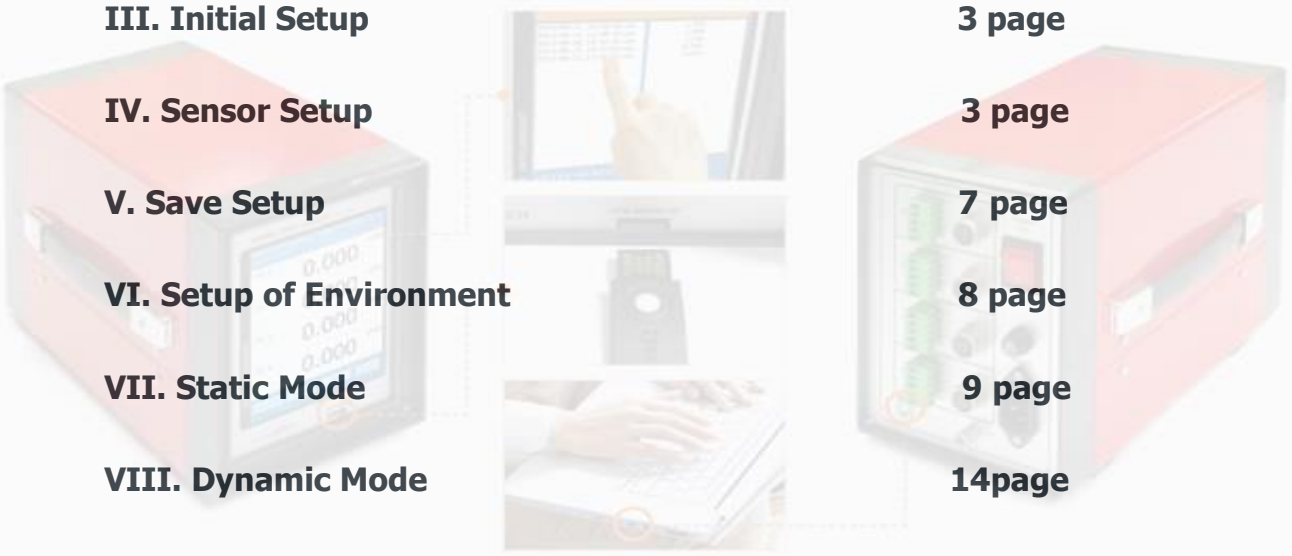

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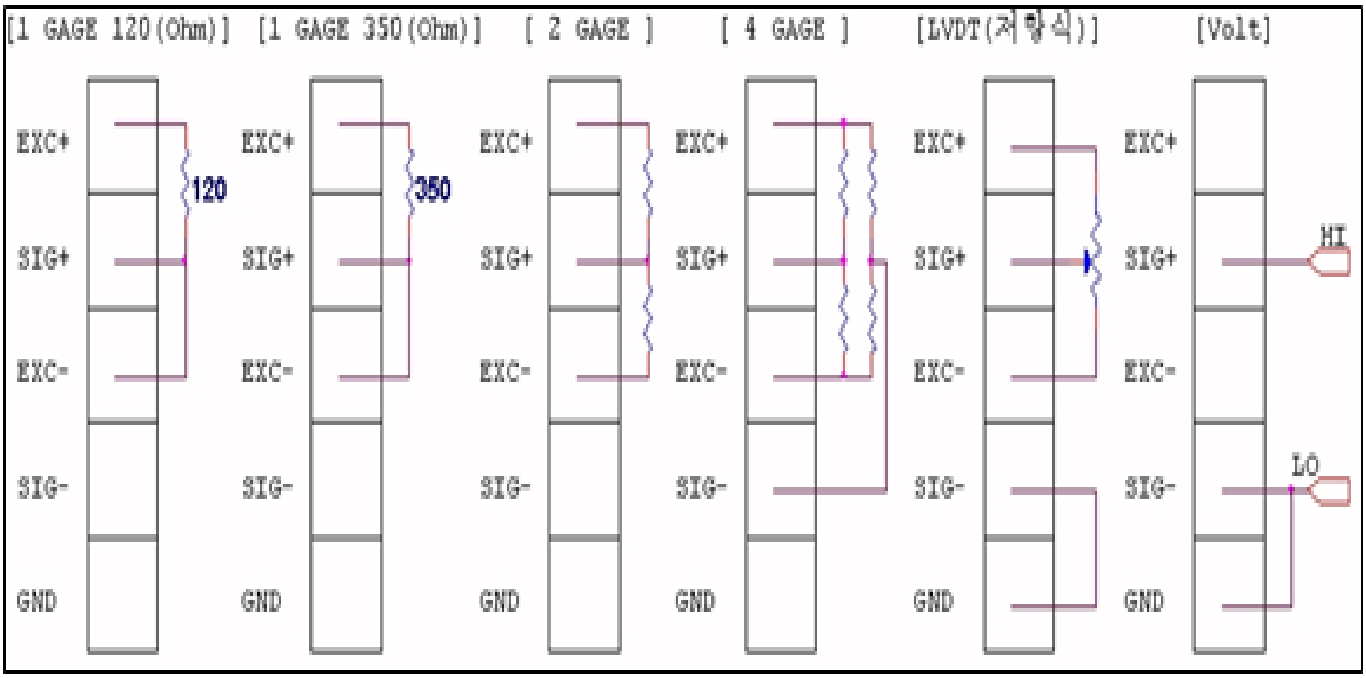
Ⅰ. Wiring

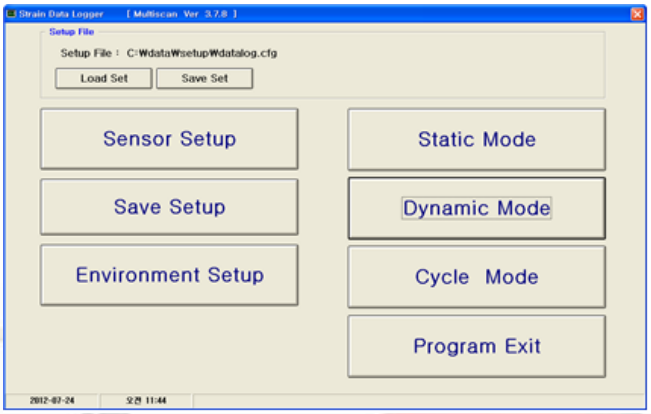


1. Strain Gage : 3 wire connection
2. 4Gage : Cables of bridge type sensor as like load cell and pressure transducer, acceleration transducer and torque transducer, etc, shall be connected with each ports of EXC+,SIG+,EXC-,SIG-,GND.
3. Potentiometer : For potentiometer type sensor(POT), refer to LVDT wiring in the above picture.
4. Voltage : Voltage output type sensors shall be connected with voltage signal port (± 10 Volt). Thermocouple(J,K,T,E,R,S type)

Ⅱ. Sequence of Installation

1. Run CDM_Setup.exe program in CD for installation of USB drive.
2. Run multiscan_setup.exe program for installation of measurement program.
3. Connect cable of USB.
4. Turn on power of data logger. LED(ST1) of the front side blinks.
5. Click on Multiscan icon.

Ⅲ. Initial Setup Screen



1. Setup file: Check setup file. (Available to save or load for all environments setup as like sensor setup, graph setup)
   * Load Set : Load saved setup file
   * Save Set : Save setup file to "save as"
2. Sensor Setup : Set each channels to meet sensor type.
3. Save Setup : Set save interval of static mode or dynamic mode.
4. Environment Setup : Set Environment
5. Static Mode : Run it at the static test. Static test can be measured10points/sec(each channel).
6. Dynamic Mode : Run it at the dynamic test. Dynamic test can be measured 200points/sec(2000Hz).
7. Cycle Mode : Run cycle mode for fatigue test or endurance test.
8. Program Exit : Exit program.

Ⅳ. Sensor Setup

Channel Setup

CH SELECT: ◉ CH 1 ~ 32 ○ E1,CH 1 ~ 16 ○ E2,CH 1 ~ 16 ○ E3,CH 1 ~ 16 ○ E4,CH 1 ~ 16 — Datalog Setup

Chan	Infomation	Status	Sensor type	Dec.point	Unit	Mode	Capacity	R.O (mv/v)	G.F	Graph Axis	L.P.Filter	Adj.A	Adj.B
01	CH 1	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
02	CH 2	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
03	CH 3	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
04	CH 4	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
05	CH 5	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
06	CH 6	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
07	CH 7	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
08	CH 8	ON	4Gage (Sensor)	000.00	tf	Measure	50	2		Load	10Hz	1	0
09	CH 9	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
10	CH 10	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
11	CH 11	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
12	CH 12	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
13	CH 13	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
14	CH 14	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
15	CH 15	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0
16	CH 16	ON	1Gage 120Ω	00000.	uSt	Measure			2	Strain	10Hz	1	0

Group Set — Graph Channel Select — Save & Exit

1). Chan : Setup channel No.
2). Information : Input channel information.
3). Status : Set ON or OFF , if check ON, the checked channel start measurement.
4). Sensor type :
 * 1Gage 120 => Select for measurement of 120ohm one gage.
 * 1Gage 350 => Select for measurement of 350ohm one gage.
 * 4Gage(strain) => Select for 4 strain gage type sensor as like load cell, pressure transducer, displacement transducer and acceleration transducer. (display as strain, gage factor setup)
 * 4Gage(sensor) => Select for 4 strain gage type sensor as like load cell, pressure transducer, displacement transducer and acceleration transducer. (rated output or gage factor setup)
 * Lvdt(pot.) => Select for potentiometer type displacement sensor.
 * Volt => Select input signal from amplifier (±10Volt)
5). Dec. point : Select decimal point.
6). Unit : Select unit. It is available to direct typing.
7). Mode : Select automatic zero.
 * If select mode of "Measure", the value is changed to zero at the moment of selection.
 * If select mode of "Direct", the value is not changed.
8). Capacity , R.O (Rated output, mv/v) , G.F
 * Strain gage : G.F (gagae factor) shall be inputted for measurement of strain gage.
 * 4gage type sensors : Capacity and Rated output shall be inputted for measurement of 4 gage type sensors by mV/V. Refer data sheet of sensor.
 * Pot(potentiometer type) : Capacity and rated output of sensors shall be inputted for measurement of potentiometer type sensors. Generally, R.O of potentiometers is 1 but some potentiometers which have dead zone, is less 1. Refer data sheet of sensor.
 * Volt type sensor : Capacity of sensor at the 10 V shall be inputted.
 As an example, if data sheet of load cell show that capacity is 10,000kg at the 10V output, input 10,000 in capacity.
9). Graph Axis : Select value of Y axis for display as graph.
10). L.P filter : Set low pass filter
 * Select one in 10Hz, 100Hz, 1Khz, 10Khz.
 * Operator shall 2times frequency filter higher than test frequency.
 * As an example, operator will perform less 5Hz fatigue test, shall input 10Hz.
 * If operator find noise due to high filter, shall connect system with ground.
 * Terminal of ground connection is installed at the back side and aside of power of system.
11). D/A : This function is analog output setup for module which has analog output function(option).
 * Operator shall input capacity at the 10V.

* If capacity of load cell is ±100kg at the ±10V, operator input 100 to D/A.
* If operator input 10, 10Kg is outputted at the ±10V.

12). Adj.A , Adj, B : This function is used to calibrate output of sensor.

*Measure = measure X A + B (Generally A=1, B=0)

*If operator input 0 to the "A", measure is 0.

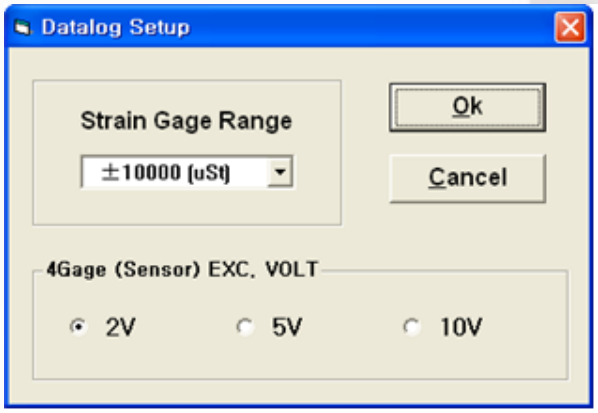
So operator sets it with care.

1. Group Setup : Set other channels setup as same with base channel.

Ex) No. 10,11,12,13,14,15,16,17,18 and 19 channels are settled as same with No. 9 channel.

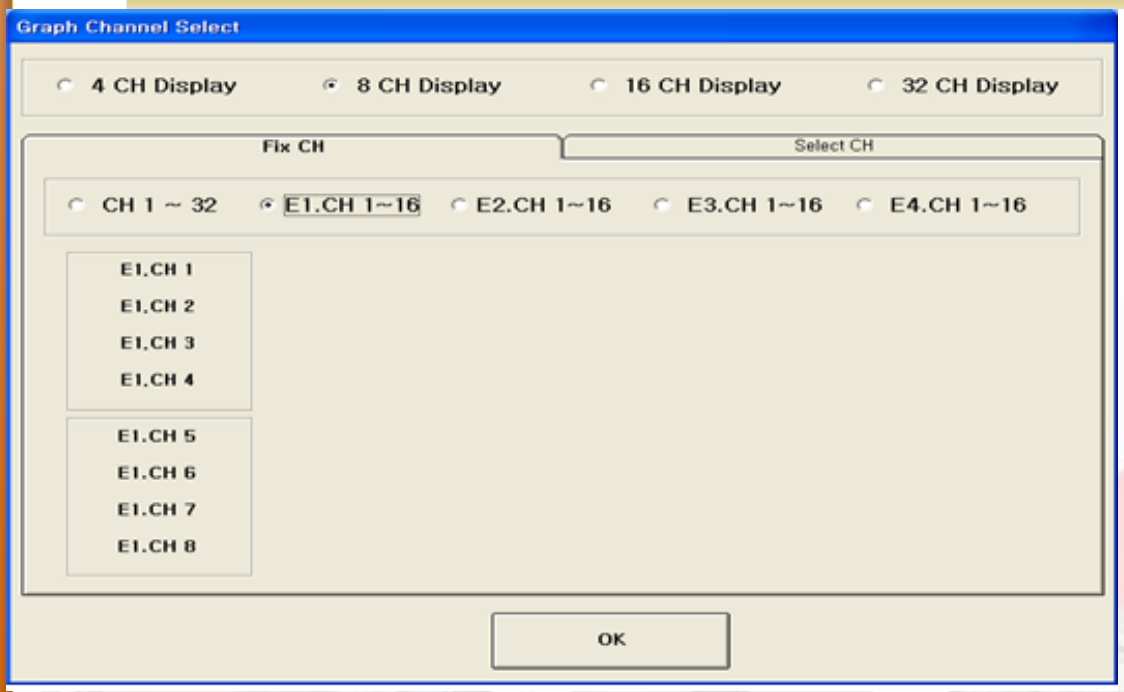
2. Data Logger Setup

1) Strain Gage Range : Set strain gage range.

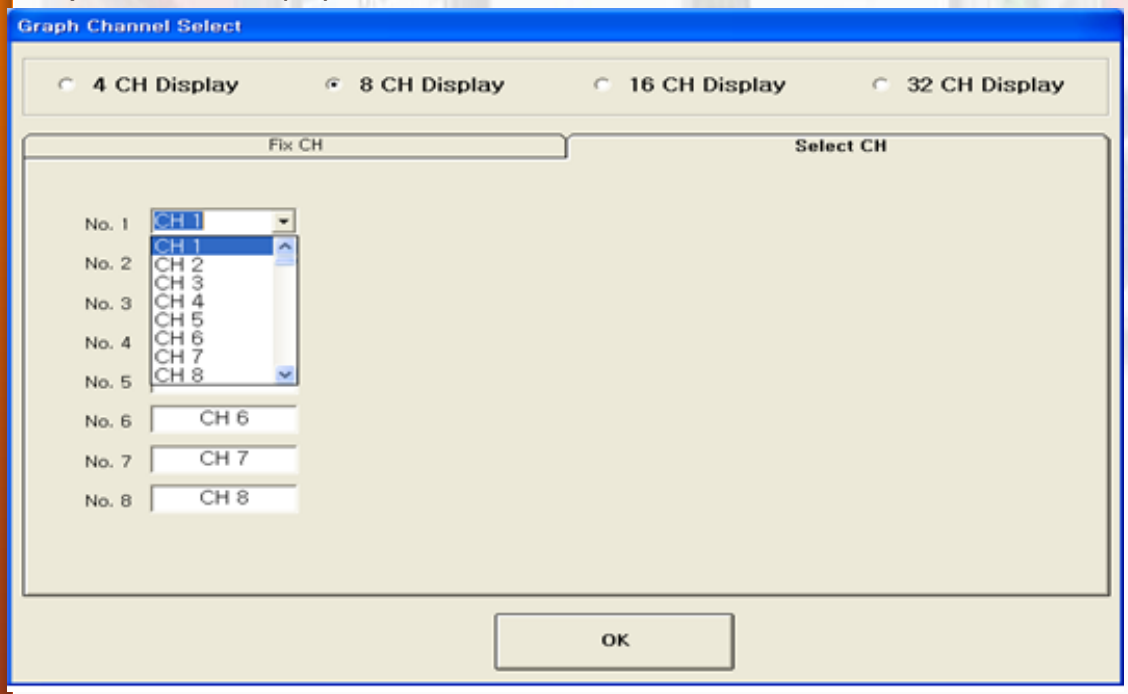


2) 4Gage (sensor) EXC. VOLT : Set output voltage for 4gage type sensor.

3. Graph Channel Select : Set channel and cannel numbers to display graph.

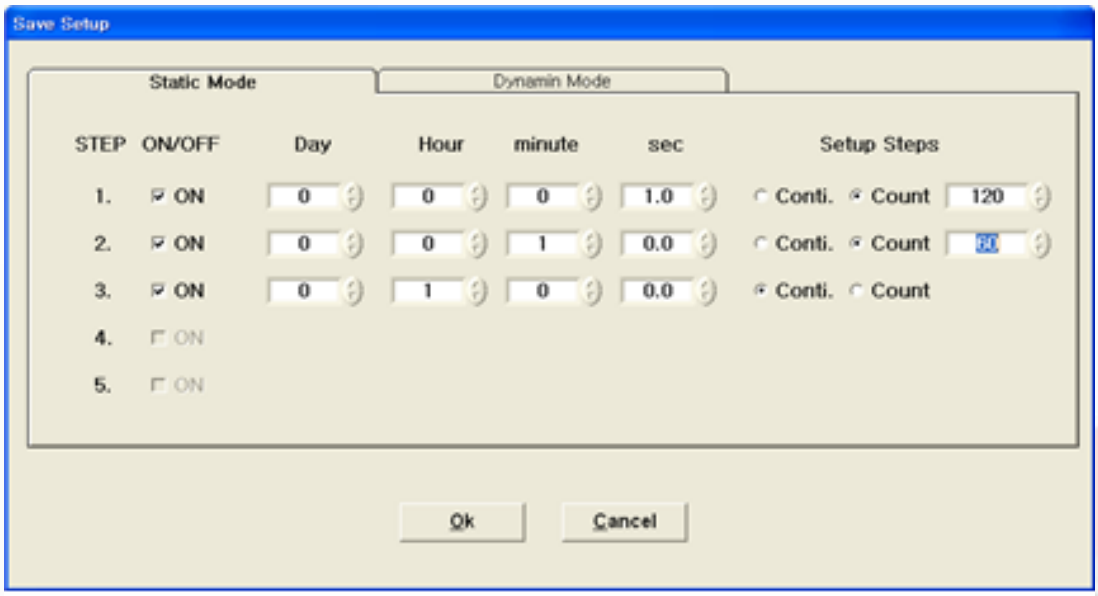


1) Fix CH : Display channel in order
2) Select CH : Display selected cannel



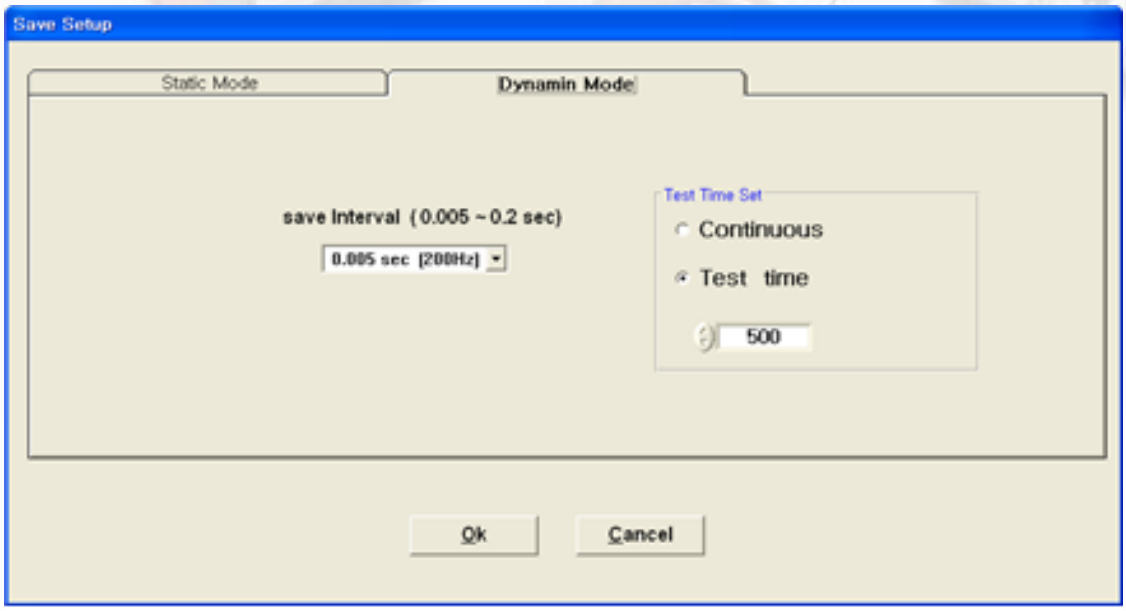
V. Save Setup

1. Static mode



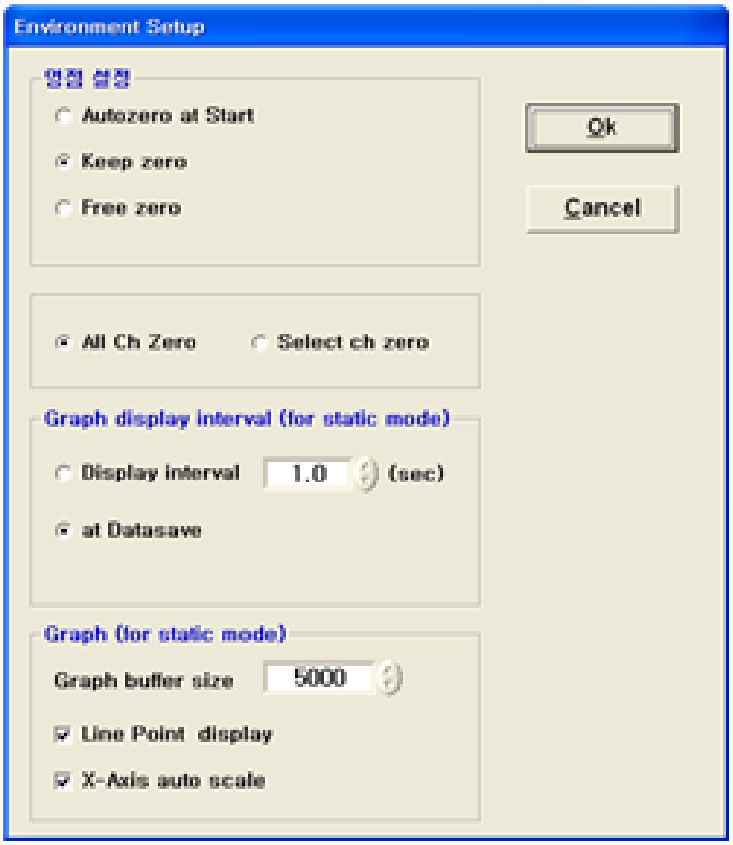
1). Setup of save interval in static mode
2). Save interval is classified by 5 steps.
3). Select On/Off and input interval (day, hour, minute, sec).
4). Select continuous mode or count mode.
5). Example of the above screen, data are saved 3600times (one data/sec) for the first one hour and then data are saved 60times (one data/min) for the next one hour and then data saved 5time for the third one hour and then data saved one time /sec continuously. Data can be saved by the minimum 0.1 sec (10 times/sec – all channels).

2. Dynamic mode



1). Setup of save interval in dynamic mode
2). Data of all channels in dynamic mode can be measured and saved from 200hz to 5hz.
3). If operator select continuous mode in test time, data are saved continuously.
4). If operator set test time, data are saved for setting times and stop automatically.
5). Operator can stop by button of Stop during measurement.

VI. Setup of Environment



1. Setup of zero
   * Autozero at Start : Measured value at the start is balanced as zero point automatically.
   * Keep zero : Keep value of zero point in the last measurement
   * Free Zero : Start measurement without zero balance.

2. All Ch Zero(All channel zero) / Select Ch Zero (Selected channel zero)
   * If operator selects "All CH Zero", Measurement screen set all channels as zero automatically without confirmation window.

*If operator selects "Select Ch Zero", Confirmation window is opened for zero channel selection.

3. Graph Display Interval (for static mode)

*Display Interval : Set interval of data to display graph.

*At Datasave : If operator select this button to display graph same with interval of data save

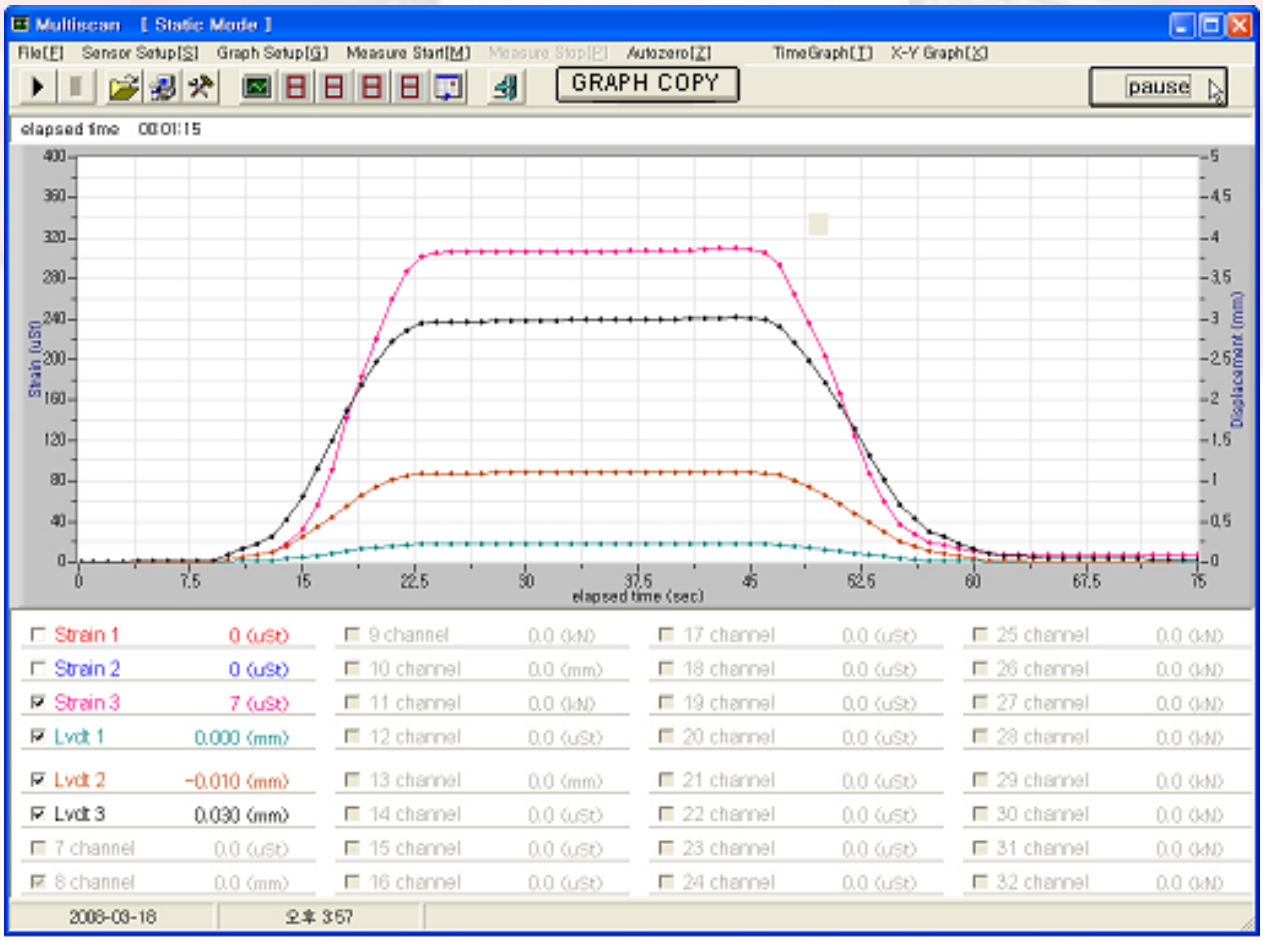
4. Graph (for static mode)

* Graph buffer size : At the static mode, graph is displayed with buffering by buffer memory. Set 5000 generally, but in case of a highly efficient system can set to 20000 The higher buffer size, the more graph is display.

* Line Point Display : Select display of graph points in the static mode.

* X-axis Auto scale : Select auto scale of X-axis

Ⅶ. Static Mode Test



1). After setup of the above step, move to main screen to measure and display data.

2). If click menu of "Measure Start", data is recorded and graph is displayed.

3). Click "Graph Setup" and set graph ranges.

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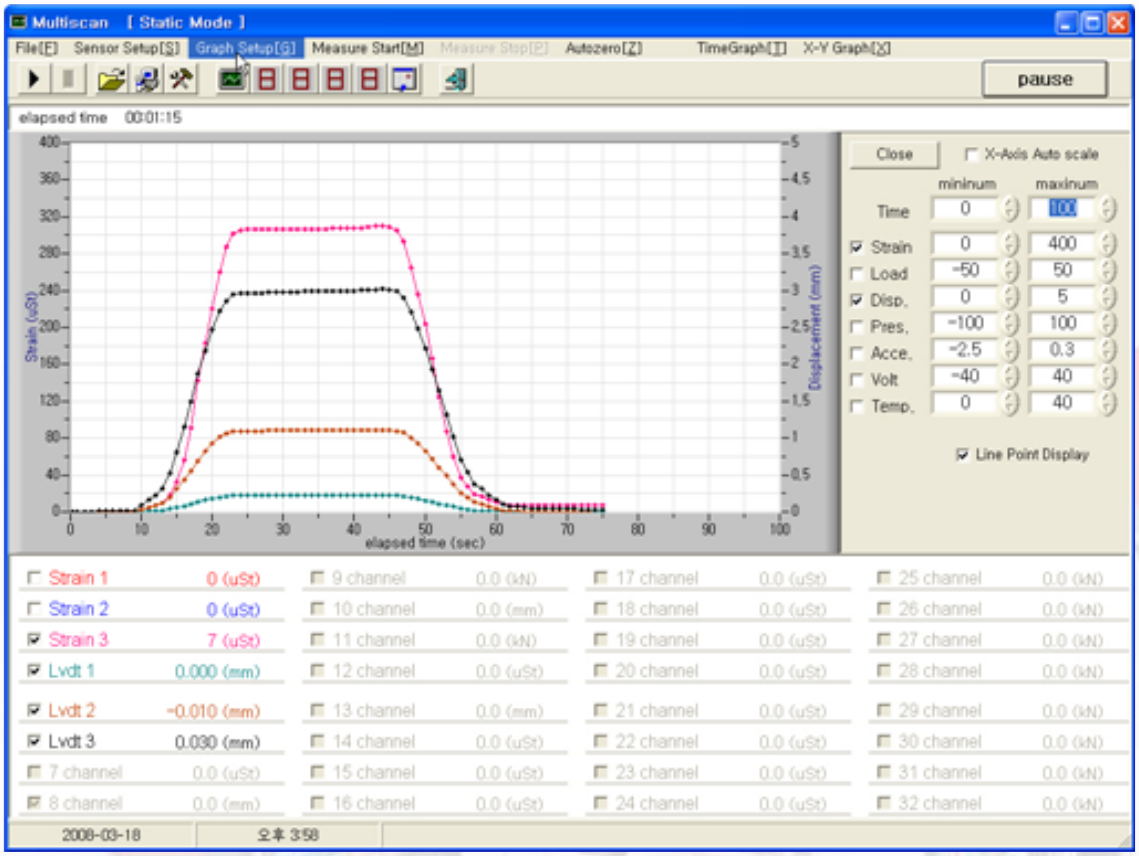
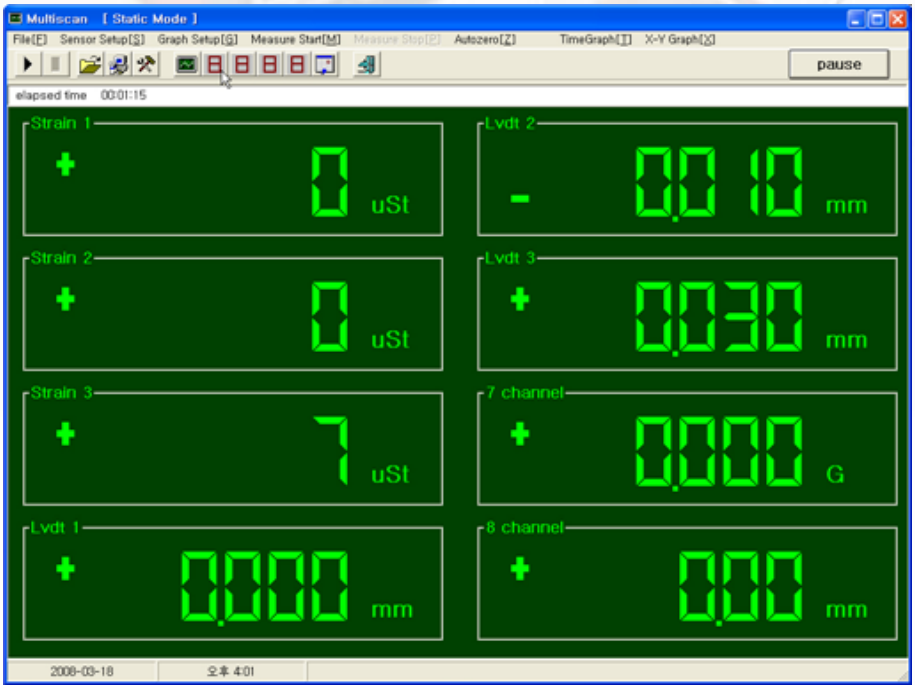
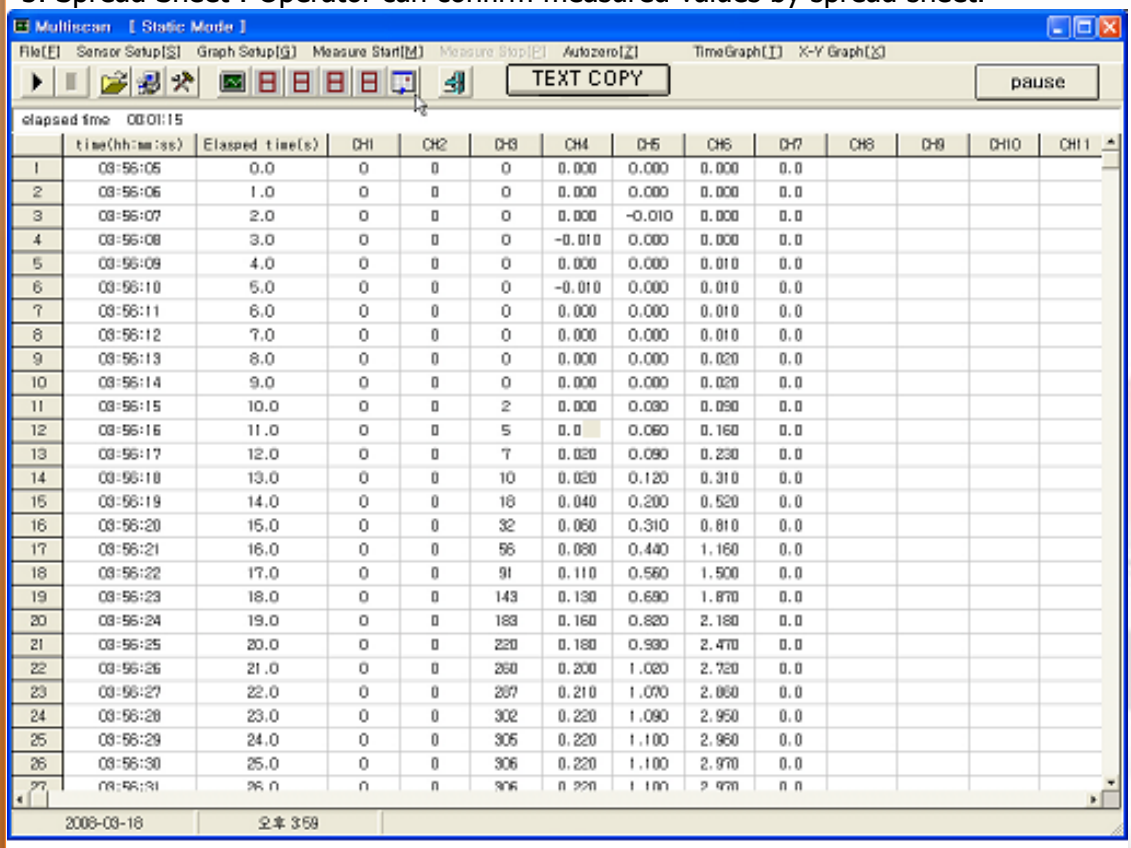
1. Graph Setup



2. Digital Display.

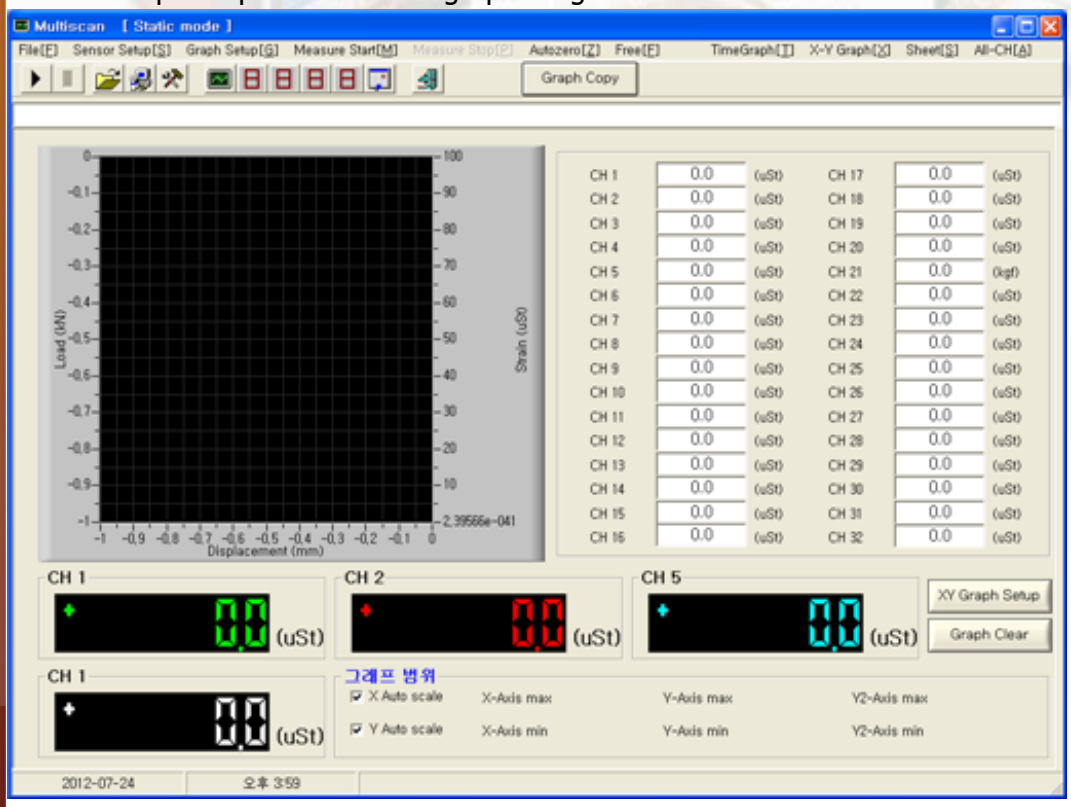


3. Spread Sheet : Operator can confirm measured values by spread sheet.



	time(hh:mm:ss)	Elasped time(s)	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11
1	08:56:05	0.0	0	0	0	0.000	0.000	0.000	0.0				
2	08:56:06	1.0	0	0	0	0.000	0.000	0.000	0.0				
3	08:56:07	2.0	0	0	0	0.000	-0.010	0.000	0.0				
4	08:56:08	3.0	0	0	0	-0.010	0.000	0.000	0.0				
5	08:56:09	4.0	0	0	0	0.000	0.000	0.010	0.0				
6	08:56:10	5.0	0	0	0	-0.010	0.000	0.010	0.0				
7	08:56:11	6.0	0	0	0	0.000	0.000	0.010	0.0				
8	08:56:12	7.0	0	0	0	0.000	0.000	0.010	0.0				
9	08:56:13	8.0	0	0	0	0.000	0.000	0.020	0.0				
10	08:56:14	9.0	0	0	0	0.000	0.000	0.020	0.0				
11	08:56:15	10.0	0	0	2	0.000	0.030	0.050	0.0				
12	08:56:16	11.0	0	0	5	0.0	0.060	0.160	0.0				
13	08:56:17	12.0	0	0	7	0.020	0.090	0.230	0.0				
14	08:56:18	13.0	0	0	10	0.020	0.120	0.310	0.0				
15	08:56:19	14.0	0	0	18	0.040	0.200	0.520	0.0				
16	08:56:20	15.0	0	0	32	0.060	0.310	0.810	0.0				
17	08:56:21	16.0	0	0	56	0.080	0.440	1.160	0.0				
18	08:56:22	17.0	0	0	91	0.110	0.560	1.500	0.0				
19	08:56:23	18.0	0	0	143	0.130	0.690	1.870	0.0				
20	08:56:24	19.0	0	0	183	0.160	0.820	2.180	0.0				
21	08:56:25	20.0	0	0	220	0.180	0.930	2.470	0.0				
22	08:56:26	21.0	0	0	260	0.200	1.020	2.720	0.0				
23	08:56:27	22.0	0	0	287	0.210	1.070	2.860	0.0				
24	08:56:28	23.0	0	0	302	0.220	1.090	2.950	0.0				
25	08:56:29	24.0	0	0	305	0.220	1.100	2.960	0.0				
26	08:56:30	25.0	0	0	306	0.220	1.100	2.970	0.0				
27	08:56:31	26.0	0	0	306	0.220	1.100	2.970	0.0				

4. X-Y Graph : Operator can set graph range in real time.



CH 1	0.0	(uSt)	CH 17	0.0	(uSt)
CH 2	0.0	(uSt)	CH 18	0.0	(uSt)
CH 3	0.0	(uSt)	CH 19	0.0	(uSt)
CH 4	0.0	(uSt)	CH 20	0.0	(uSt)
CH 5	0.0	(uSt)	CH 21	0.0	(kgf)
CH 6	0.0	(uSt)	CH 22	0.0	(uSt)
CH 7	0.0	(uSt)	CH 23	0.0	(uSt)
CH 8	0.0	(uSt)	CH 24	0.0	(uSt)
CH 9	0.0	(uSt)	CH 25	0.0	(uSt)
CH 10	0.0	(uSt)	CH 26	0.0	(uSt)
CH 11	0.0	(uSt)	CH 27	0.0	(uSt)
CH 12	0.0	(uSt)	CH 28	0.0	(uSt)
CH 13	0.0	(uSt)	CH 29	0.0	(uSt)
CH 14	0.0	(uSt)	CH 30	0.0	(uSt)
CH 15	0.0	(uSt)	CH 31	0.0	(uSt)
CH 16	0.0	(uSt)	CH 32	0.0	(uSt)

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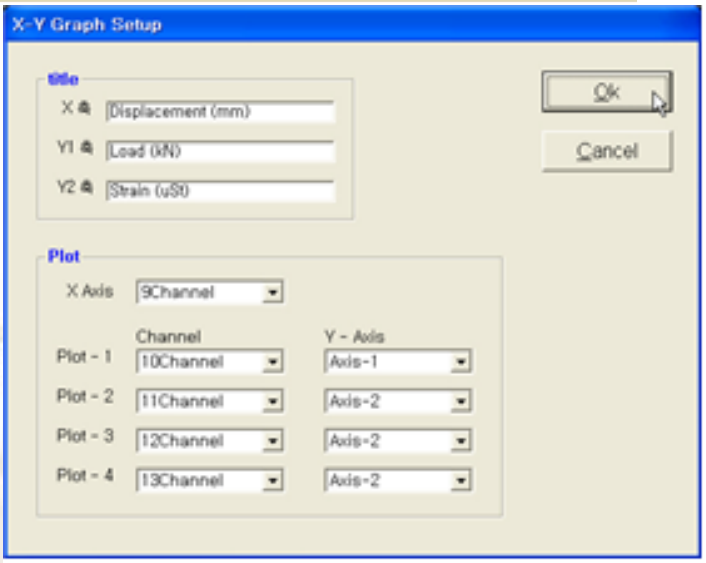
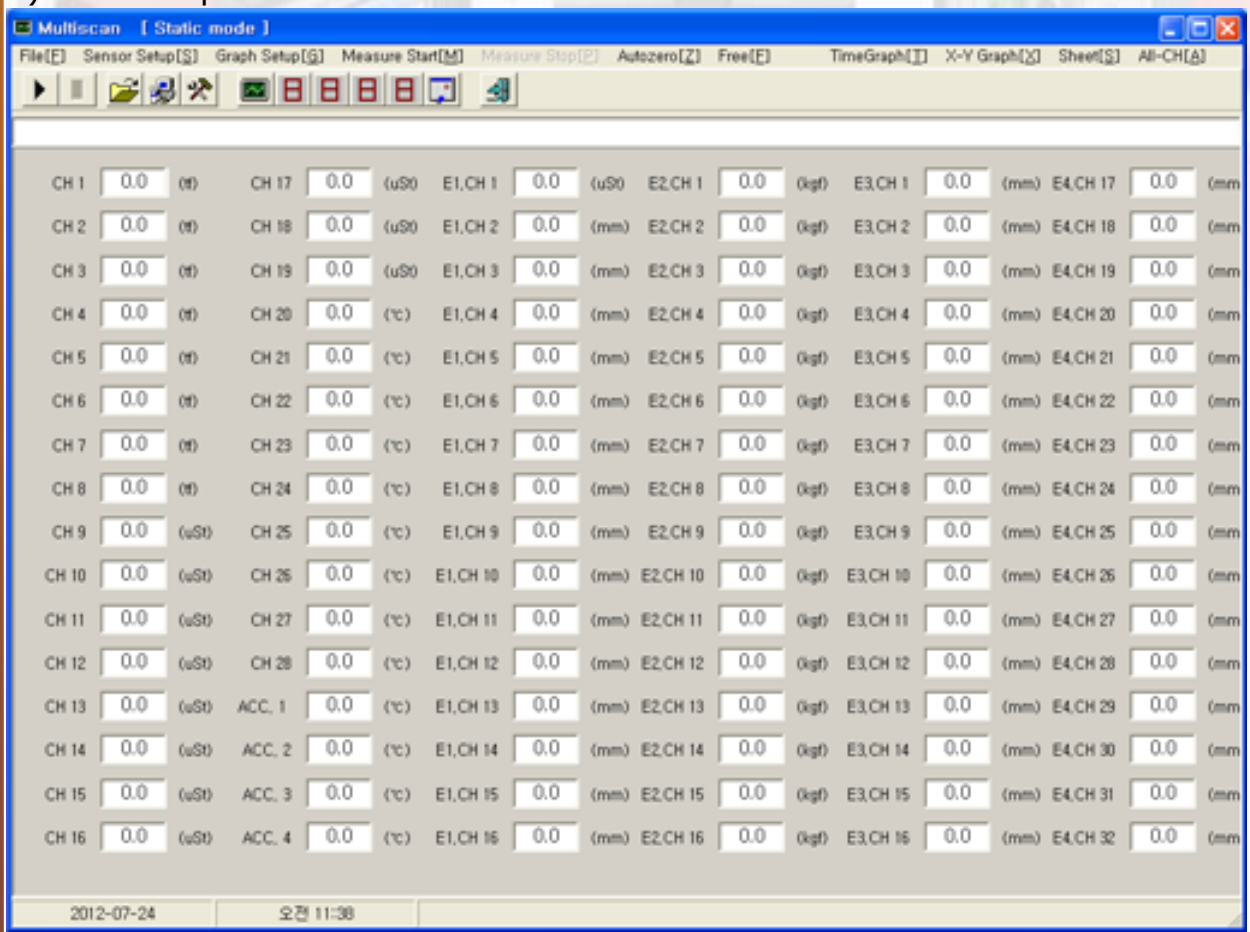
1) XY graph setup

* Tile : Input titles of X-axis, Y1-axis, Y2-axis.
* Plot : Select channel of X-axis and Y-axis.

Plot-1 : Channel : Select channel of graph1.
Y – Axis : Select axis of graph1.
Plot-2 : Channel : Select channel of graph2.
Y – Axis : Select axis of graph2.
Plot-3.4 : Same as the above and if operator select "none", graph is not displayed.
Axis-1 is Y1, and Axis-2 is Y2.

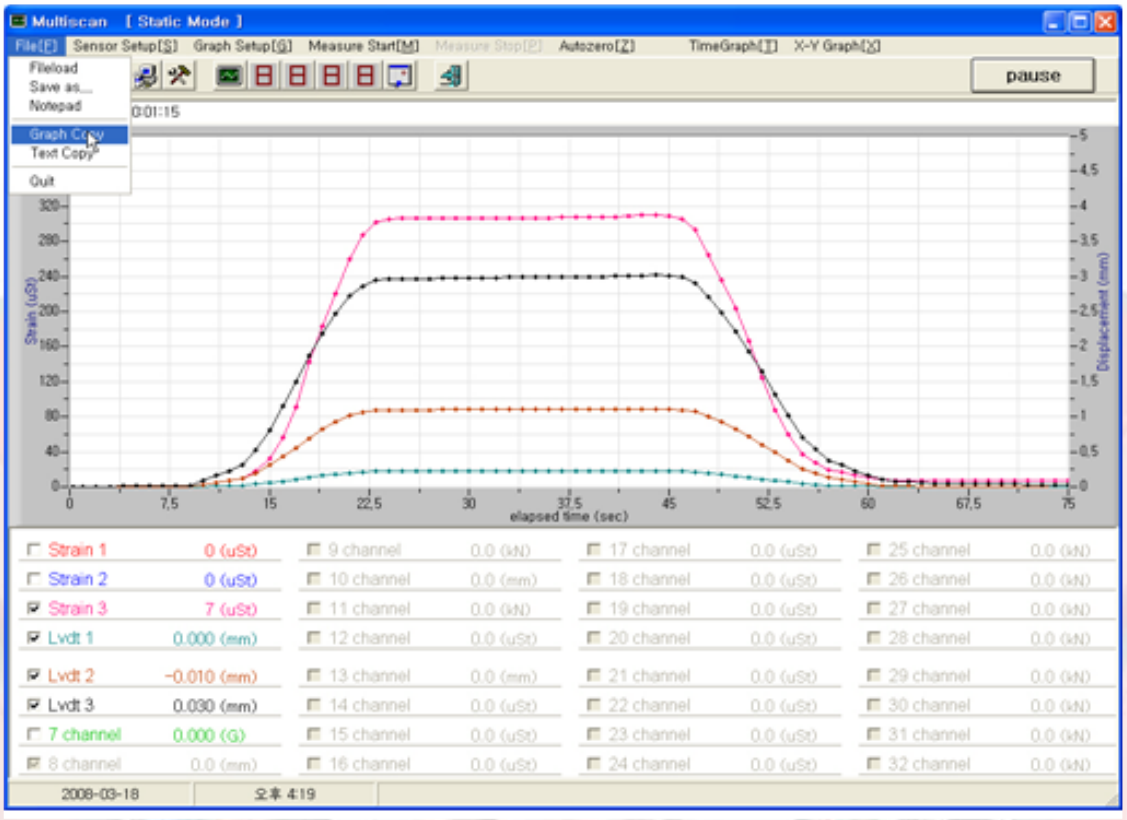


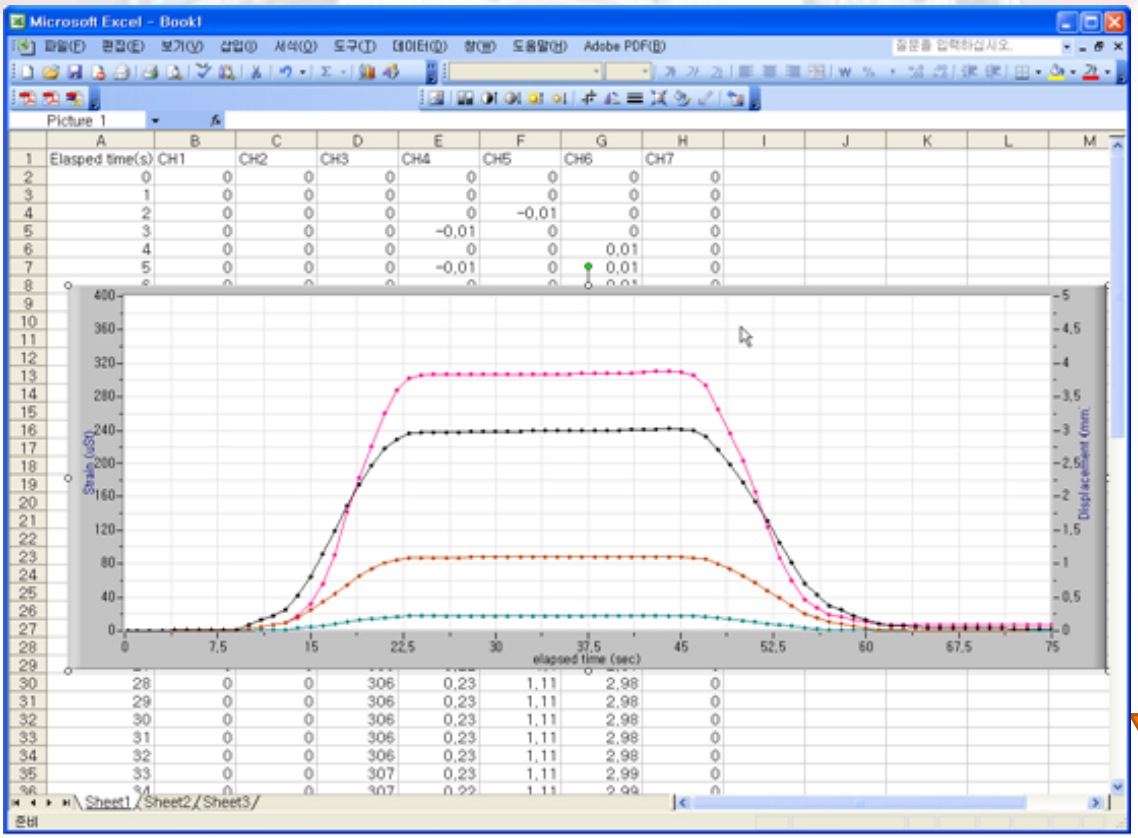
2). All-CH : Operator can check values of all channels.

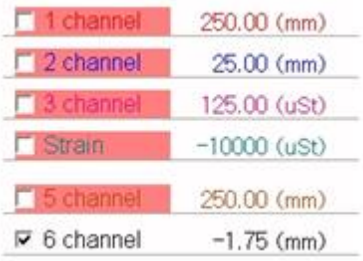


- After test, operator can save all data by " Save as" menu as CVS file.

5. Graph copy : Operator can copy graph or text by "Graph copy" or "Text Copy" in file menu to clipboard and paste it Excel program.





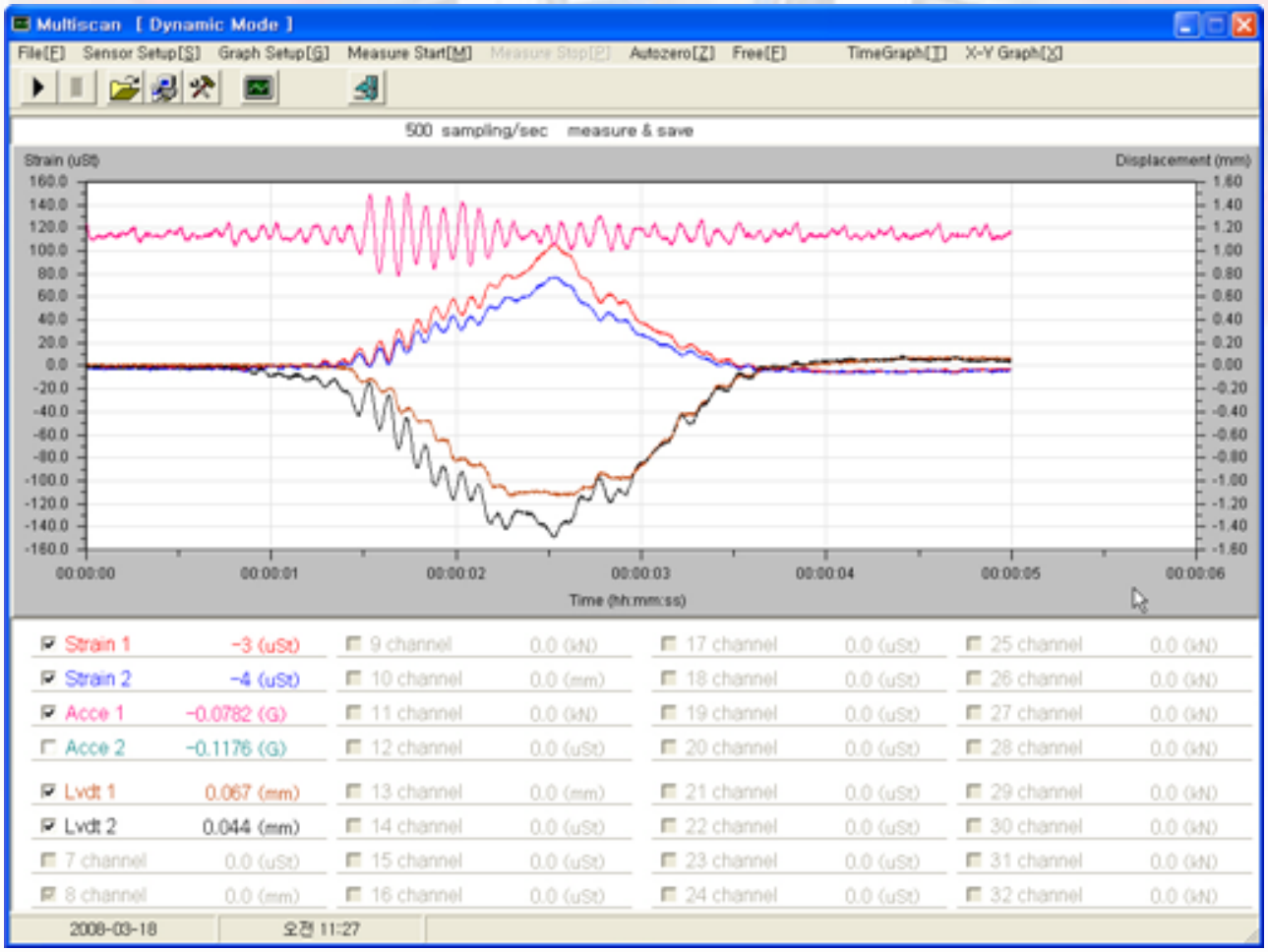


If channel change to red color, it means errors as like something wrong of sensor or setup error of sensor, etc.

6. pause : Stop measurement temporarily .
7. autozero : by this menu, zero point is balanced during testing.

* If power is down suddenly during test, back up data can be saved by "Save as" menu after reboot of program.

Ⅷ. Dynamic Mode Test



1). After setup of the above step, move to main screen to measure and display data.

2). If click menu of "Measure Start", data is recorded and graph is displayed.

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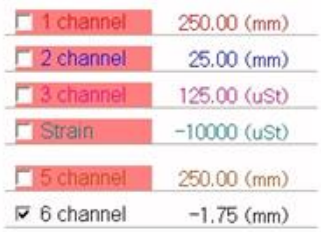
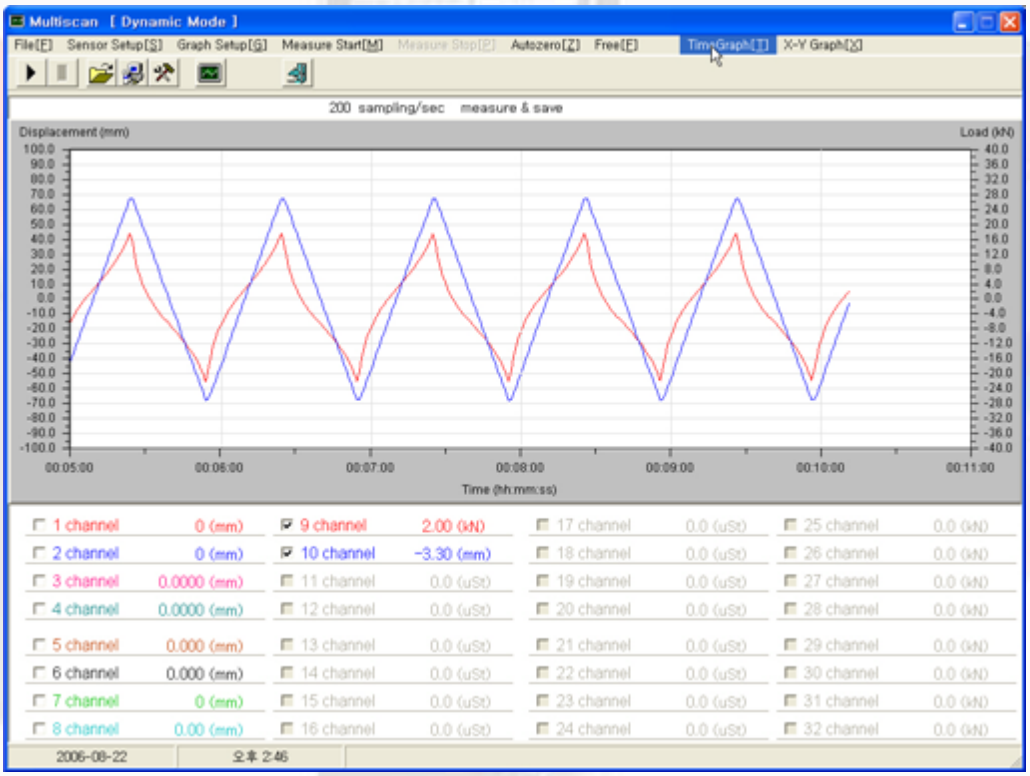
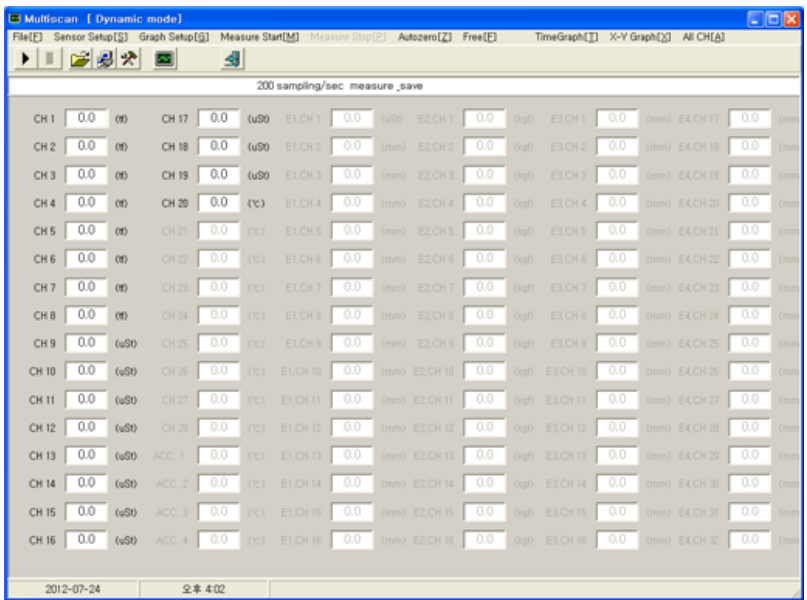


*If channel change to red color, it means errors as like something wrong of sensor or setup error of sensor, etc.

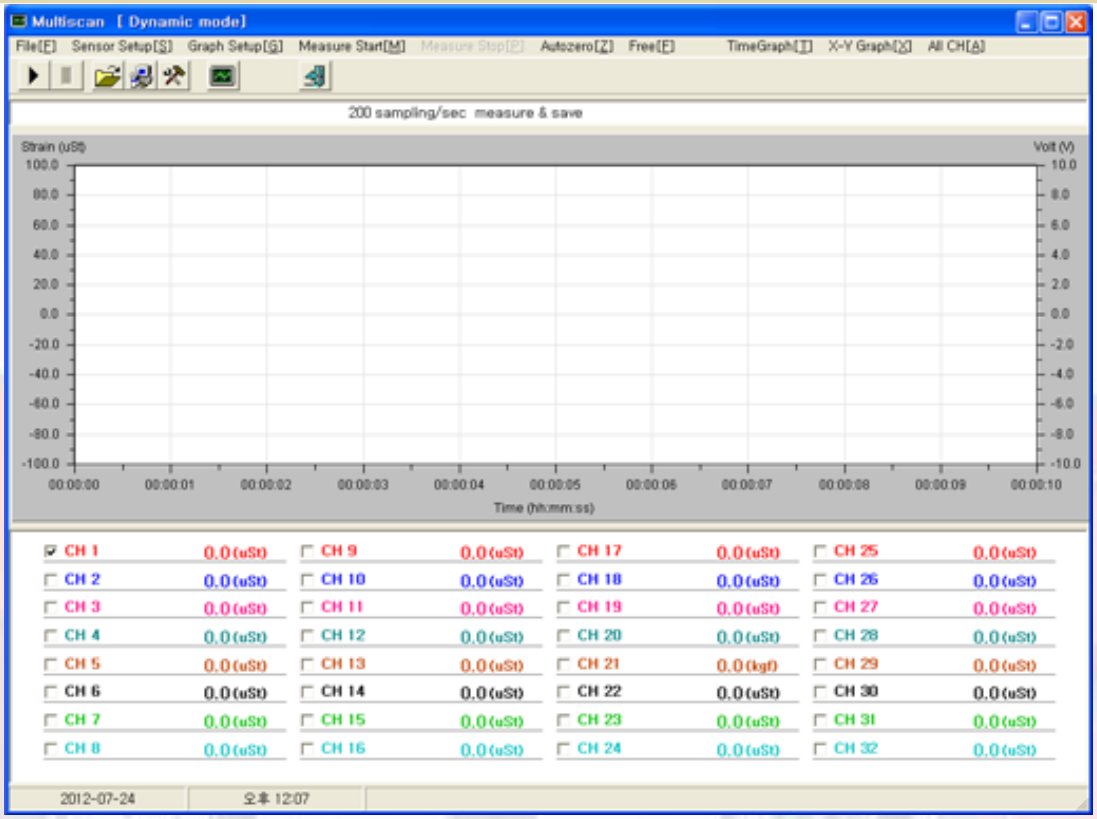
1. Autozero : by this menu, zero point is balanced during testing.
2. Free : Remove zero balance.
3. Time Graph



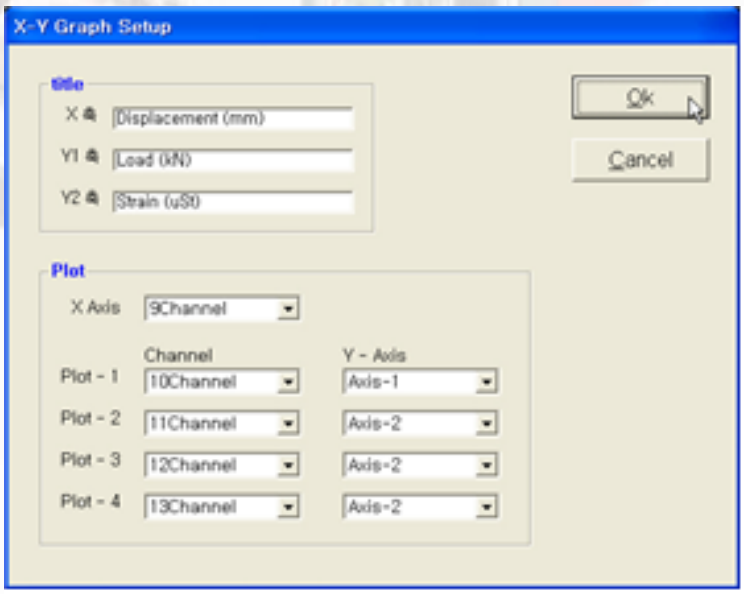
4. All-CH : Operator can see measured values of all channels.



5. X-Y Graph



1). X-Axis Auto Scale : Set X-axis range automatically.
2). Y-Axis Auto Scale : Set Y-axis range automatically.
3). Set graph range in real time.
4). X-Y Graph Setup

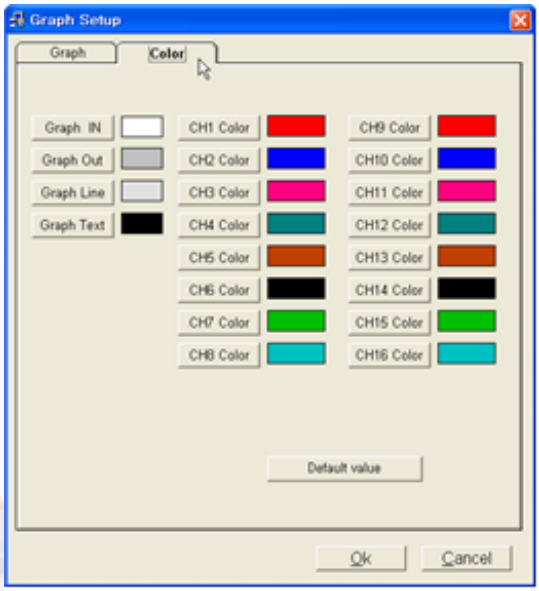


*Title : Input titles of X axis, Y1 axis, Y2 axis.
*Plot : Select channel of X axis and Y axis.

*Plot-1 : Channel : Select No.1 graph.
*Y-Axis : Select Y axis of No1 graph.
*Plot-2 : Channel : Select No.2 graph.
*Y-Axis : Select Y axis of No2 graph.
*Setup of Plot-3,4 is same with the setup and if select "none", this No. channel is not displayed.
*Axis-1is axis of Y1, Axis-2 is axis of Y2.

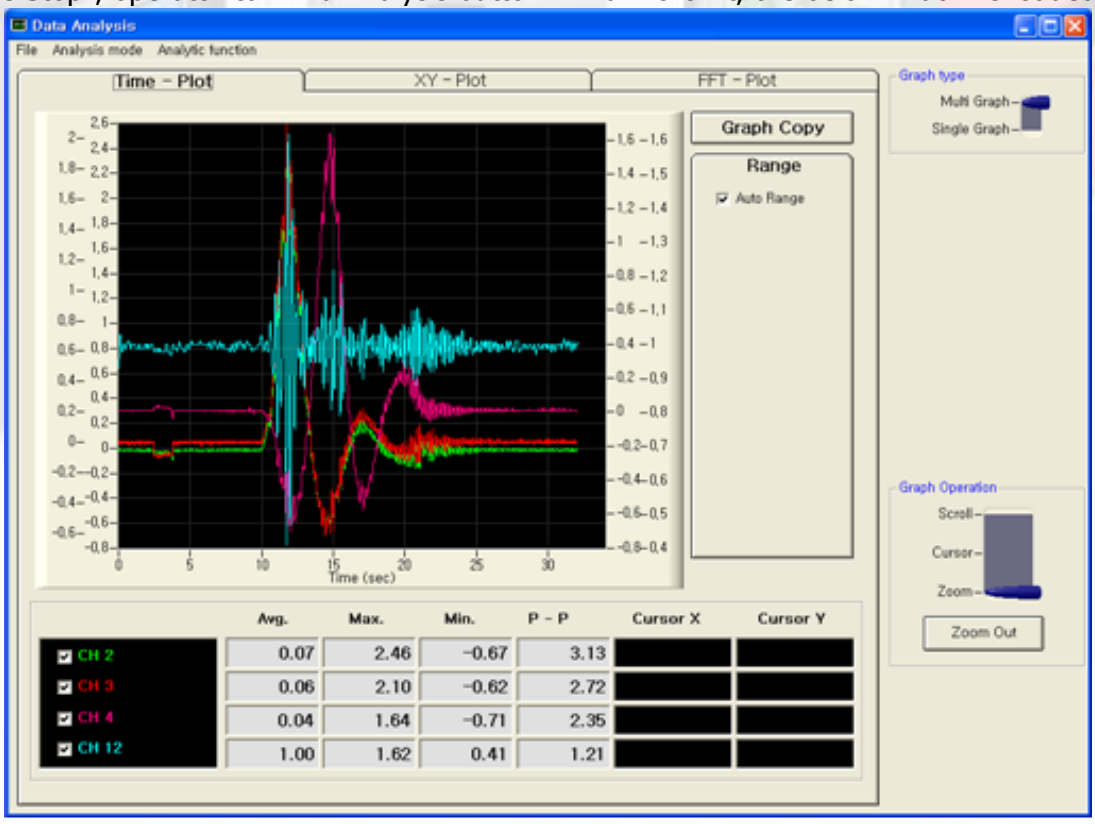
6. Graph Setup -> Color

1). Select color of graph.



IX. Analysis Mode

* After "Measure Stop", operator can find Analysis button. And if click it, the below widow is loaded.



1. Menu

* File : Exit : Exit analysis mode
* Analysis mode

Time – Plot : Display time graph

XY – Plot : Display XY graph

FFT –Plot : Display FFT graph

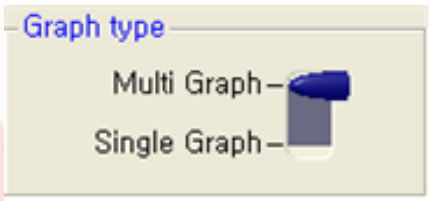
* Analytic function

Digital filtering : Set digital filter frequency(Low Pass Filter) to remove noise

N point average : Calculate average of measured values.

2. Time-Plot

* Graph type



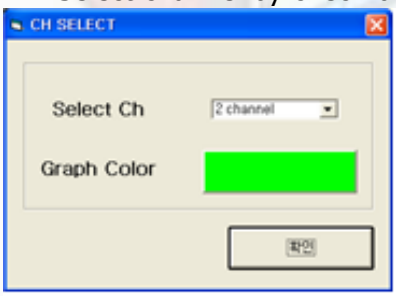
* Multi graph - Display 4 channels in a graph.
* Single graph – Display 1 channel in a graph.

3. Graph Copy : copy graph to clipbord.

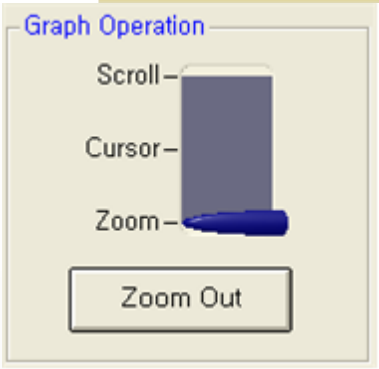
4. Channel select and graph display

	Avg.	Max.	Min.	P - P	Cursor X	Cursor Y
CH 2	0.07	2.46	-0.67	3.13		
CH 3	0.06	2.10	-0.62	2.72		
CH 4	0.04	1.64	-0.71	2.35		
CH 12	1.00	1.62	0.41	1.21		

Select channel by check box to display graph.

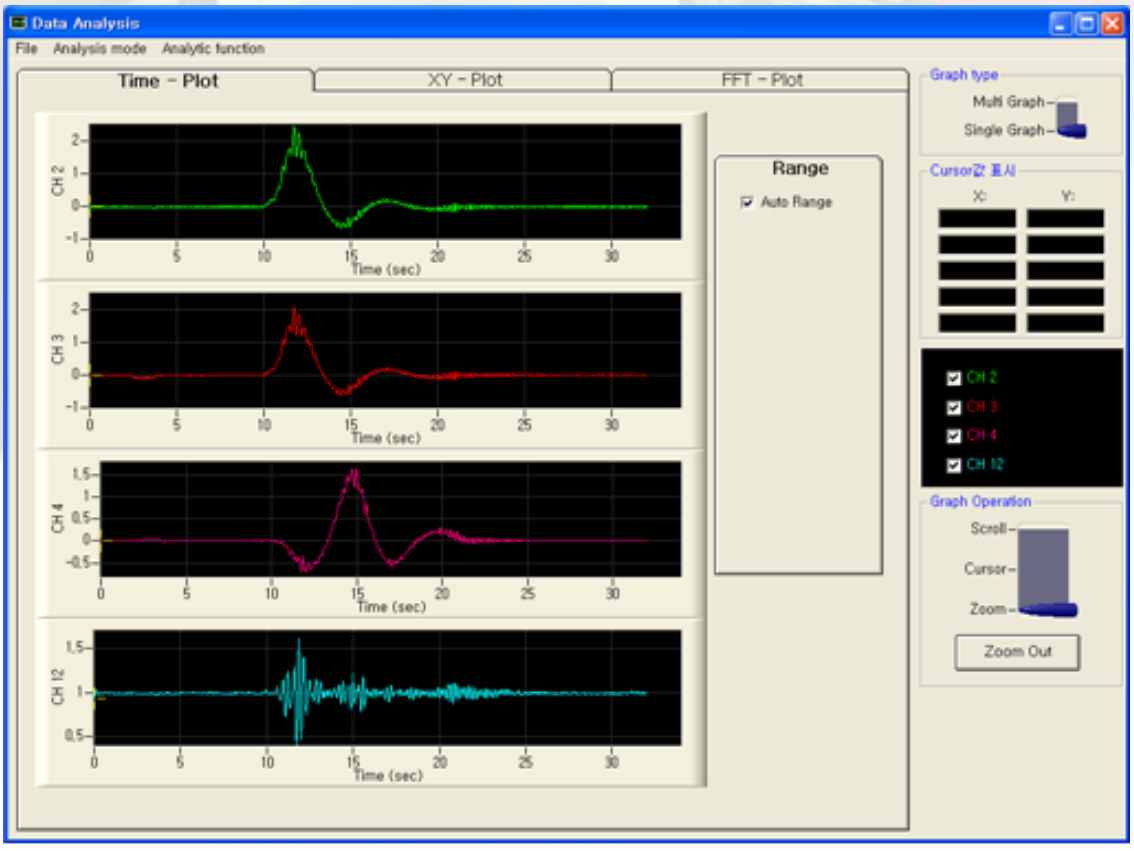


* Ch select : Select channel for display.
* Graph color : Select line color of graph
* "OK" button : Click after setup.
* Avg : Display average value.
* Max. : Display maximum value.
* Min. : Display minimum value.
* P-P : Display maximum value – minimum value
* Cursor X : Display X axis value in cursor mode.
* Cursor Y : Display Y axis value in cursor mode.



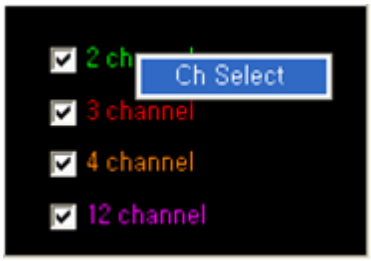
5. Graph Operation
   - Scroll : Operator can set graph range by mouse drag roll.
   - Cursor : If operator drag cursor by mouse, X and Y value is displayed.
   - Zoom : Zoom selected parts by mouse drag.
   - Zoom out : Zoomed part return to original size.

6. Single Graph

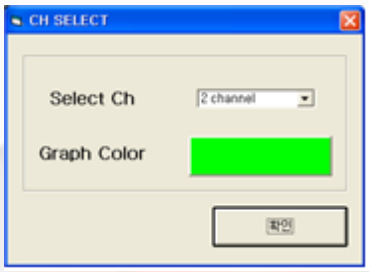


[Time – Plot : Single graph]

* Ch select : Select channel for display.

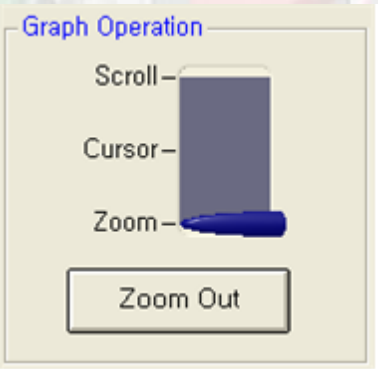


*Select channel by check box to display graph.
* Display number of graph same with numbers of selected channel.

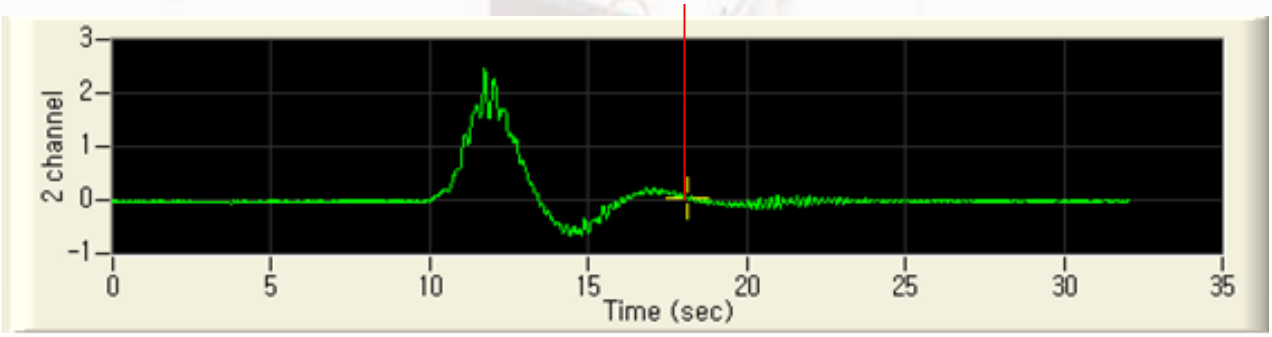


* Ch select : Select channel for display.
* Graph color : Select line color of graph
* "OK" button : Click after setup.

7. Graph Operation
* Scroll : Operator can set graph range by mouse drag roll.
* Cursor : If operator drag cursor by mouse, X and Y value is displayed.
* Zoom : Zoom selected parts by mouse drag.
* Zoom out : Zoomed part return to original size.

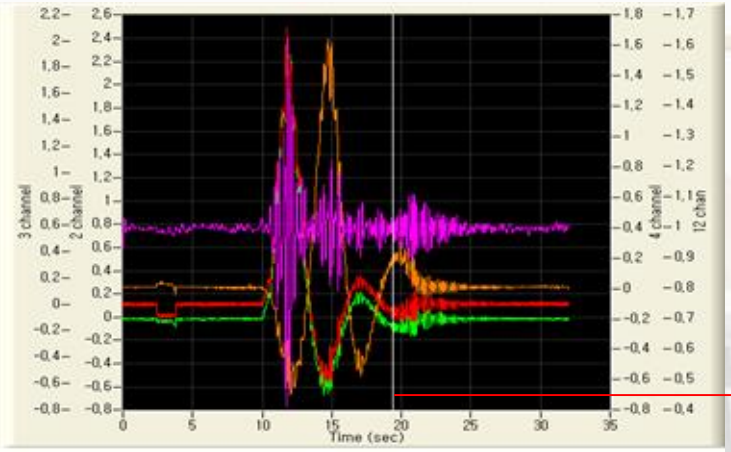


[Cursor]



[Time - Plot : Single Graph - Cursor Mode]

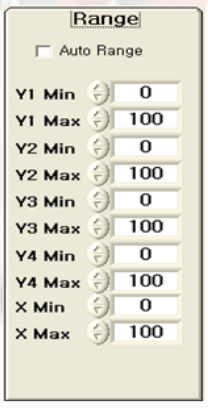
Display values at the point of cursor.



[Cursor]

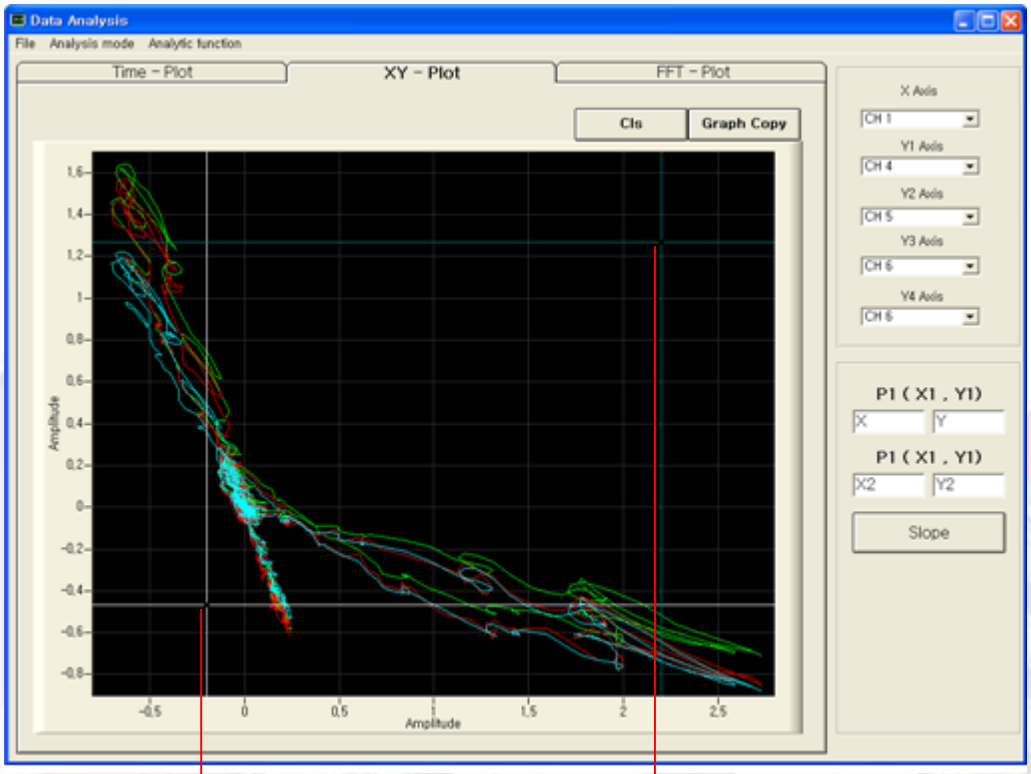
[Time - Plot : Multi Graph - Cursor Mode]

8. Range : Auto Range : Select On/Off by check box.



* Auto Range : Set and display graph range automatically. Auto Range On / Auto Range Off
* Y1 min : Display Y axis minimum value of the first channel.
* Y1 max : Display Y axis maximum value of the first channel.
* Y2 min : Display Y axis minimum value of the second channel.
* Y2 max : Display Y axis maximum value of the second channel.
* Y3 min : Display Y axis minimum value of the third channel.
* Y3 max : Display Y axis maximum value of the third channel.
* Y4 min : Display Y axis minimum value of the fourth channel.
* Y4 max : Display Y axis maximum value of the fourth channel.
* X min : Display x axis minimum value.
* X max : Display X axis maximum value.

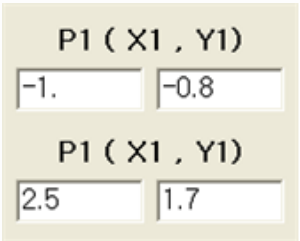
9. XY – Plot



Cursor [P1] Cursor [P2]

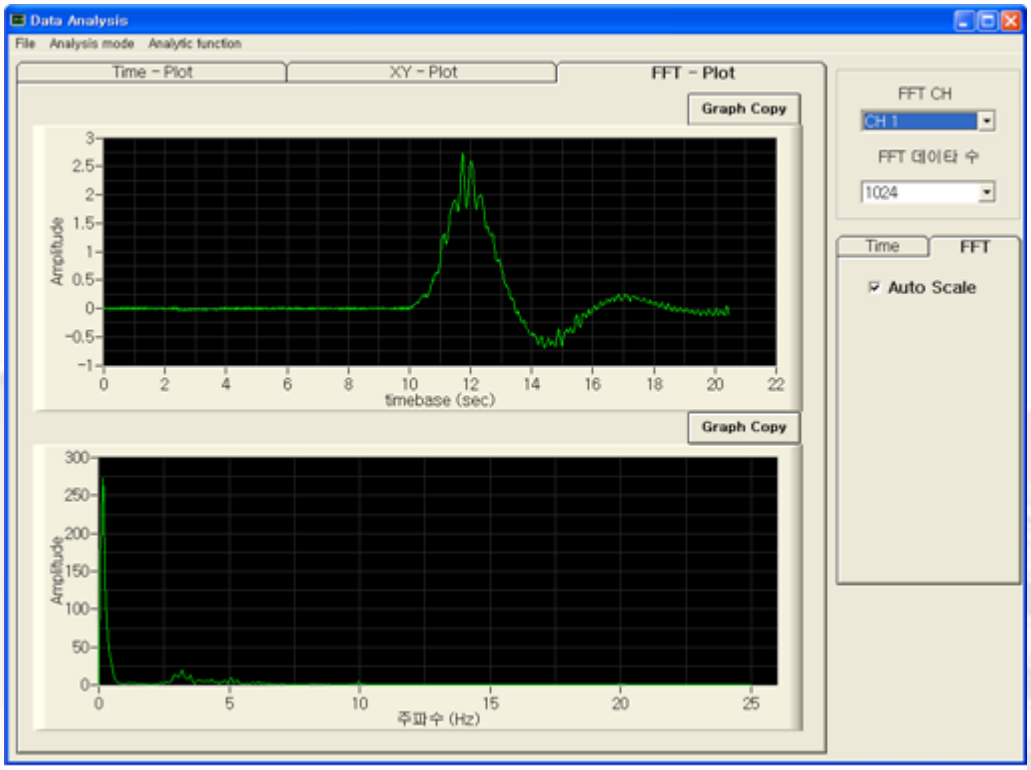
* Cls : Clear XY graph.
* Graph Copy : Copy XY graph to clipboard.
* Operator can paste it to the excel program by [Ctrl + V].
* Slope : Display slope value between the 2points (P1 ,P2).

* X axis : Select X axis channel.
* Y1 axis : Select Y1 axis channel.
* Y2 axis : Select Y2 axis channel.
* Y3 axis : Select Y3 axis channel.
* Y4 axis : Select Y4 axis channel.



* P1 (X1 , Y1) : Display X1 value and Y1 value
* P2 (X2 , Y2) : Display X2 value and Y2 value.

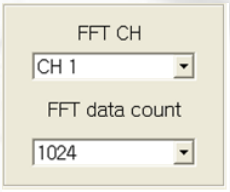
10. FFT – Plot



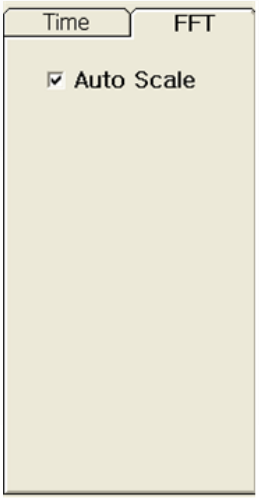
- FFT -Plot –

* The upper is time graph
*The lower is FFT Graph

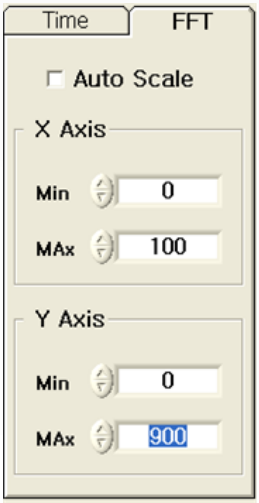
11. Graph Copy : Copy XY graph to clipboard.
* Operator can paste it to the excel program by [Ctrl + V].
* FFT CH : Set display channel..
* FFT data acount : Set number of display.
* Range : Set graph range.



- Auto Setup -

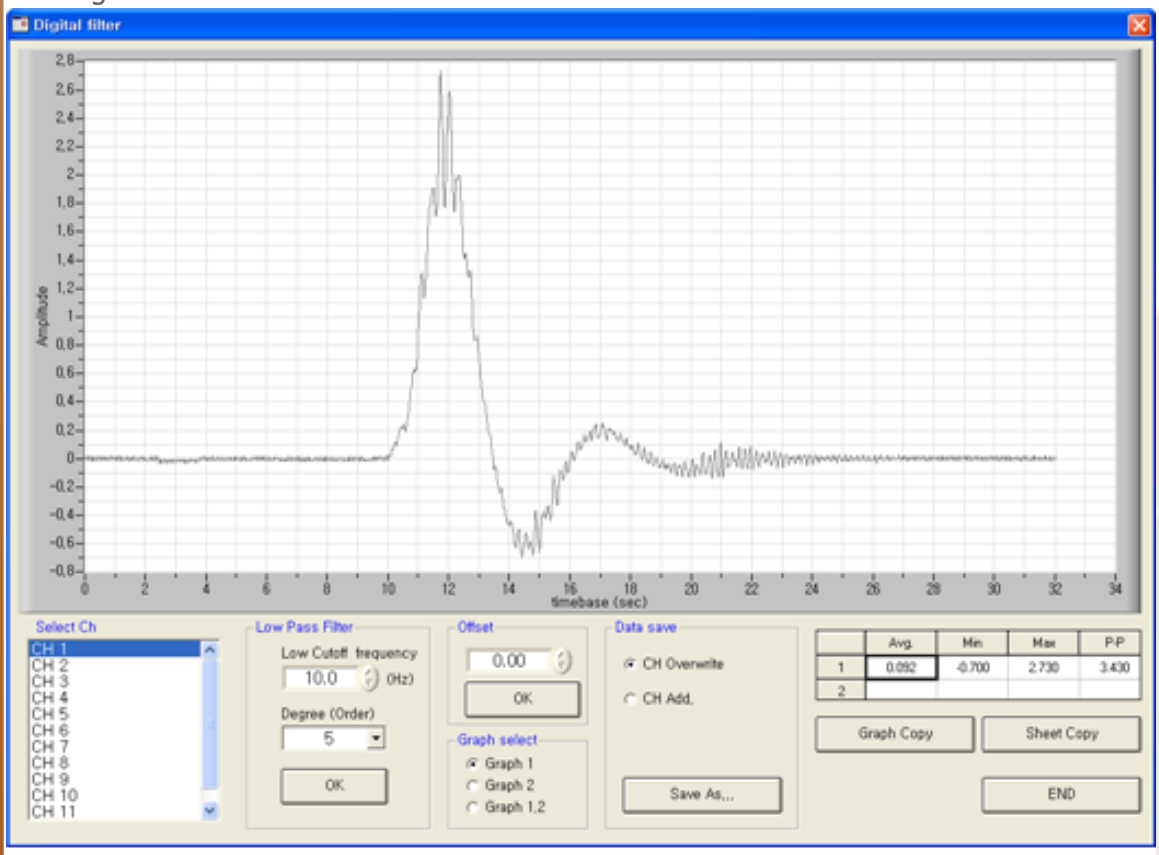


- Manual Setup -



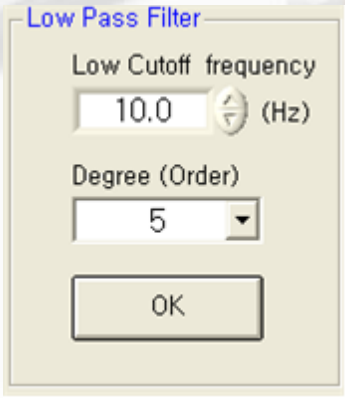
12. Analytic function

* Digital filter

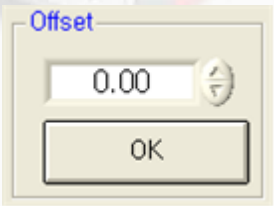


* Select CH : Select channels in the list.

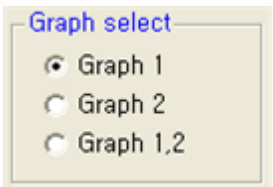
* Low Pass Filter



* Offset : Set offset value.
[O K] – Apply offset value to graph.

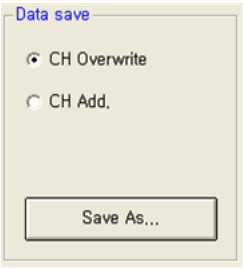


* Graph select



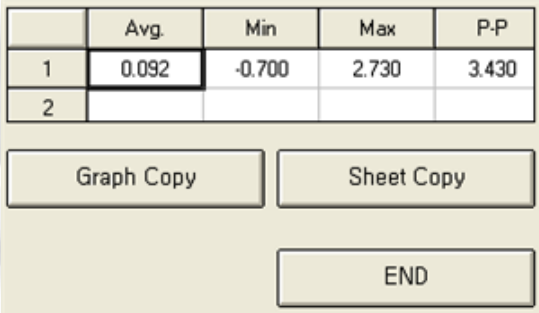
* Graph 1 : Display graph1.

* Graph 2 : Display graph2.
* Graph 1,2 : Display graph1 and 2 at once.

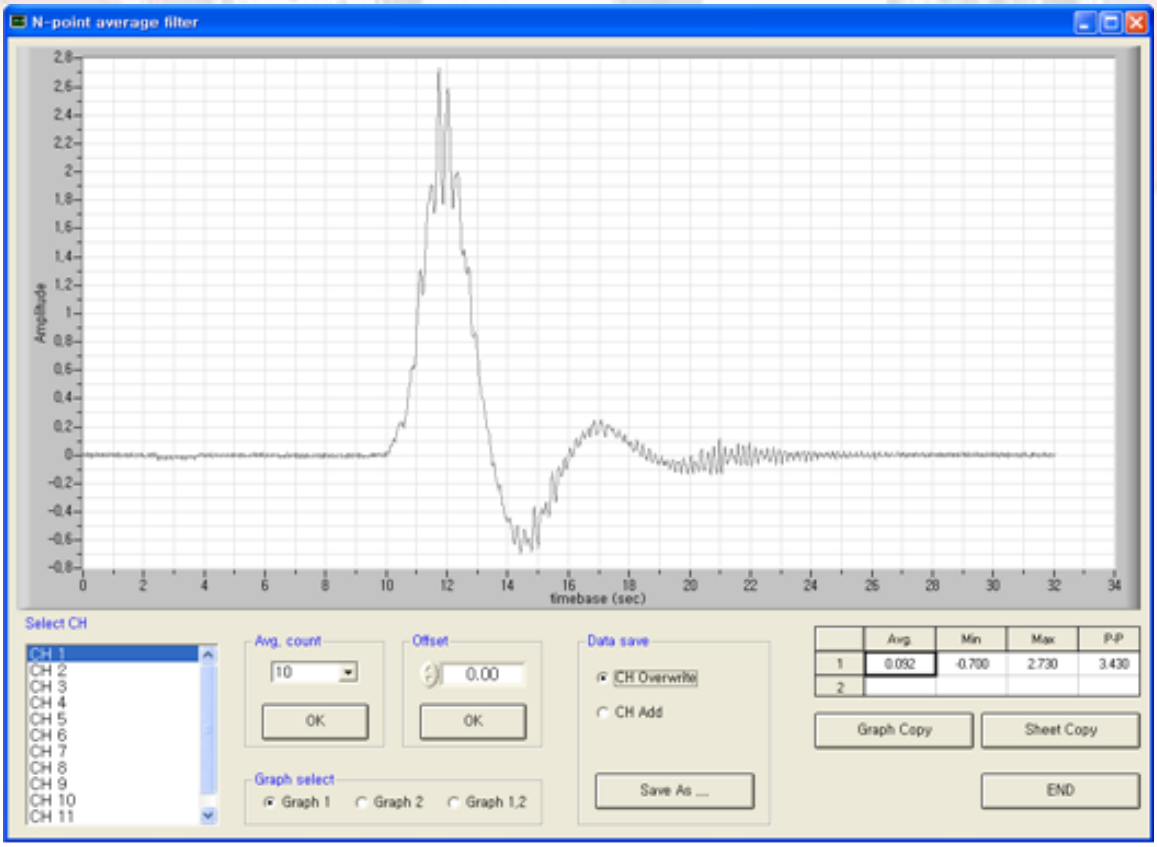


* CH Overwrite : Change graph1 to graph2.
* CH Add : Display graph2 to new channel.
* Save As : Save data file as selected setup.

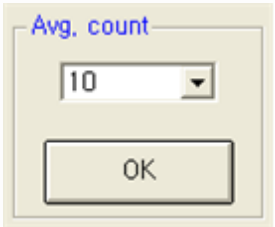
* Display average value, minimum value, maximum value P-P value of selected channel.
* Display average value, minimum value, maximum value P-P value of averaged value.
* Graph Copy - Copy graph to clipboard.
 - Operator can paste it to the excel program by [Ctrl + V].
* Sheet Copy - Copy sheet to clipboard.
 - Operator can paste it to the excel program by [Ctrl + V].
* END – Out digital filter.



* N-point average filter

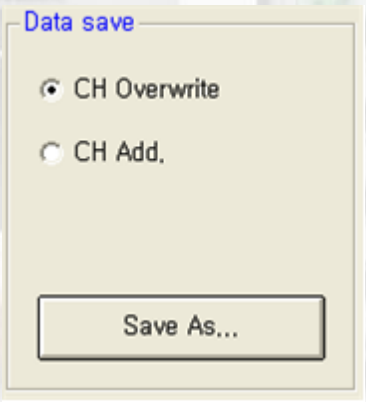


* Select CH : Select channels in the list.
* Avg. count : Set average numbers
* OK : Display averaged values on graph.
  Display it by red color on graph2.



* Offset : Set offset value.
* [OK] – Apply offset value and display graph.

* Graph 1 : Display graph1 (original graph).
* Graph 2 : Display graph2 (averaged graph).
* Graph 1,2 : Display graph1 and 2 at once.



* CH Overwrite : Change graph1 to graph2.
* CH Add : Display graph2 to new channel.
* [Save As] : Save data file as selected setup.

* Display average value, minimum value, maximum value P-P value of selected channel.
* Display average value, minimum value, maximum value P-P value of averaged value.
*[Graph Copy] - Copy graph to clipboard.
 - Operator can paste it to the excel program by [Ctrl + V].
*[Sheet Copy] - Copy sheet to clipboard.
 - Operator can paste it to the excel program by [Ctrl + V].
* [END] – Out N-point filter.