Trace Manger Operation Manual

This document explains the various functions and operations of Trace Manager.

Outline

The Trace Manager can collect desired data (trace data) and can be used as a de-bugging tool.

Applicable Products:

Machine Controller: MP2000 Series / MP900 Series / MPE720 Ver. 5.00 or above

Trace Manager includes the following data tracing functions.

- Graph data and List data are linked. Graph cursor position and movement are linked with the cursor position on the List
- Two types of graphs (Trend graph and X-Y graph) are supported, with a wide array of functions such as Zoom In, Zoom Out, and over-lay display with file-data.
- Easy setting with Snap-Shot, Start/Stop button, variables setting screen, and direct trace data setting on the List
- Linked to Motion Programming – motion parameter change in variables setting screen, trace-variable changes from motion/ladder programs and motion parameters.

Trace Manager is an improved version of the old Data Trace function. MPE720, Ver. 5.00 or higher also supports the old Data Trace function. Following installation, the old Data Trace is turned on and the configuration must be changed in order to use the Trace Manager.

Operation sequence for Trace Manager

(1)	Prepare to use Trace Manager	⇒	See: Chapter 1 <Preparation to use Trace Manager
(2)	Start Trace Manager (data trace screen)	⇒	See: Chapter2 <Starting Trace Manager>
(3)	Register variables to be traced as monitor variables	⇒	See Chapter 5, Sec. 2 <Monitor variable registration>, Chap. 5 Sec. 3, Para. 2 <Selection of variables>, and Chap. 6 Sec. 3 <Register comments automatic registration>
(4)	Monitor data with trend graph	⇒	See: Chap. 4 Sec. 1 <Trend Graph>
	Monitor data with X-Y graph	⇒	See: Chap. 4 Sec. 2 <X-Y Graph>
	Operation regarding List	⇒	See: Chap. 5<List>

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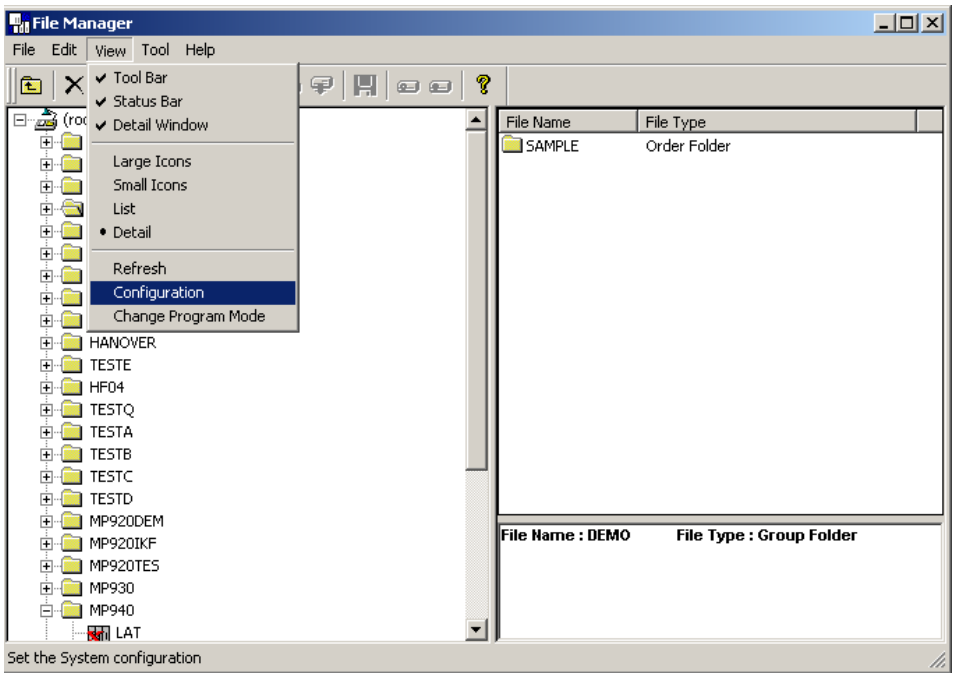
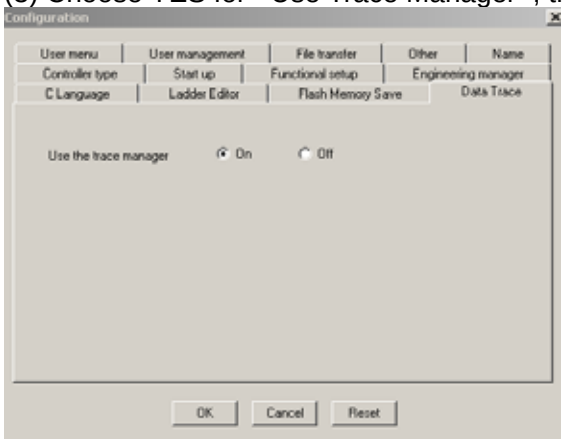
1. Preparation to use Trace Manager

Change the configuration settings as follows in order to use the Trace Manager.

(1) Open <Configuration Window> by pull-down menu > View (V) > Configuration (C)



(2) Select <Data Trace> tab in the configuration window.
(3) Choose YES for <Use Trace Manager>, then click OK.



If Use / Not Use Trace Manager is changed, MPE720 must be restarted. The setting will be retained so restart will not be required for subsequent program use.

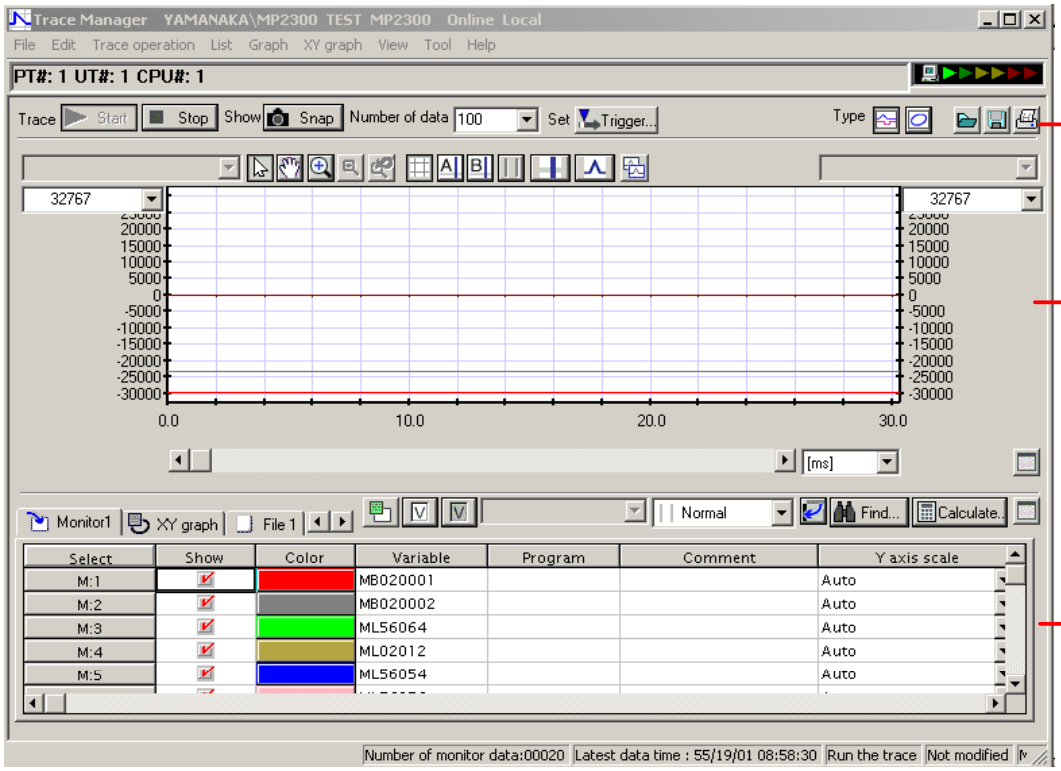
2. Starting Trace Manager

Start Trace Manager by following the steps below. (5 steps)

1) In the tree-view of File Manager, double-click Data Trace of Definition Folder.
2) Select: File (F) > Open (O) > Define (D) > Define Data Trace (D).
3) Click Data Trace Definition icon  from Engineering Manager.
4) Select: Tool (T) > Trace Manager (T) from New Ladder Editor's pull-down menu.
5) Click Trace Manager icon  in New Ladder Editor.

2. 1. Screen structure

Trace Manager window is composed of three areas (Control panel, Graph, and List)



The Control Panel enables general function operations such as trace start/stop and trigger settings. The control panel is always displayed regardless of the display mode in use.

The Graph area displays the trace data according to the settings. Either Trend or X-Y- graph can be selected to be displayed. In Maximized List Display Mode, the graph is not displayed.

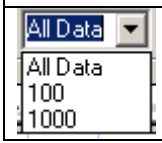
The List area displays monitor variables and registration / un-registration operations. In Maximized Graph View Mode, the List is not displayed.

3. Trace operations

Main operations of data tracing are performed in Control Panel and pull-down menu.

3. 1. Tracing

Trace execution functions are: Trace Start, Trace Stop, Snapshot, and Monitor Data number setting.

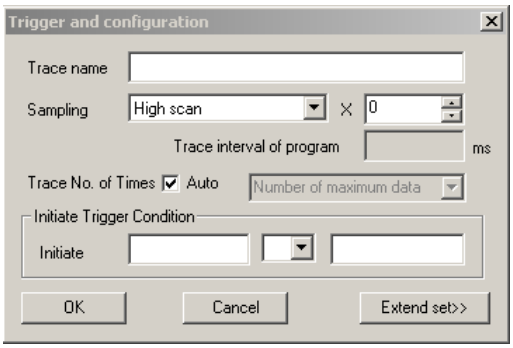
Icon	Name	Function	Notes
	Start Trace	Starts the tracing Stands-by if start trigger is set	Displayed as Disabled when offline
	Stop Trace	Stops tracing Grabs data from all trace buffers when stops	Displayed as Disabled when tracing is stopped, shows as enabled after trace is started.
	Snapshot	Grabs the data in trace buffer. When clicked again the normal trace will resume.	Does not affect the actual tracing – Only stops the monitor.
	# of monitored data	Sets the maximum number of data points to grab when stopped or Snapshot is used. All/100/1000 data points can be selected.	The maximum number which can be input directly is 32158.

3. 2. Trigger Settings

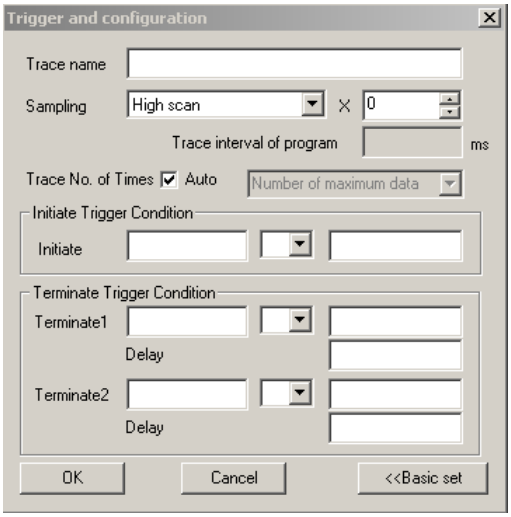
This sets the Data Trace Start / Stop triggers

Icon	Name	Function	Notes
	Trigger / execution environment settings	Displays Trigger / execution environment settings	

This window is set for condensed view when opens. The window can be expanded by clicking [Expanded View >] button.



Condensed View



Expanded View

Item	Condensed	Expanded	Value	Explanation
Trace Name	○	○	Character string	Any character, no restriction on characters, 16 characters max.
Sampling conditions	○	○	High speed scan Low Speed Scan Ultra fast scan Program set	Sets sampling conditions of data tracing. *Ultra fast scan only available on MP940
Sampling interval	○	○	0～32767	Sets the trace data grab interval per actual number of samplings. * When set to 0, trace data is grabbed per every sampling.
Trace interval setting for Programmed sampling	○	○	0.1～999.9	Sets by millisecond. This setting is used as the time axis display. Only valid when the sampling condition is set to <Programmed Sampling>
Number of traces (number of trace data)	○	○	Not specified Max. Data Points/100/1000 1～999999	Sets the number of data trace points. “Not specified” means the tracing continues until stopped or the stop trigger becomes true.
Triggered Start Condition	○	○	[Register Number] [> / < / = / <> / >= / <=] [Numerical Value]	Sets the trace starting trigger. If not specified, tracing will begin when started.
Triggered Stop Condition 1･2		○	[Register Number] [> / < / = / <> / >= / <=] [Numerical Value]	Sets the trace stopping trigger. Up to two triggers can be set. If not specified, tracing will continue until stopped.
Trace stop delay		○	0～65534	Sets how many samples to continue before stopping after stop condition becomes true.

3. 3. Graph Type Select

Selects the type of graph to be displayed in the graph area. Can be selected from Trend or X-Y graphs.

Icon	Name	Function	Notes
	Trend Graph	Sets the trend graph display mode	
	X-Y Graph	Sets the X-Y graph display mode	

3. 4. File Operations

Files can be imported, exported and printed.

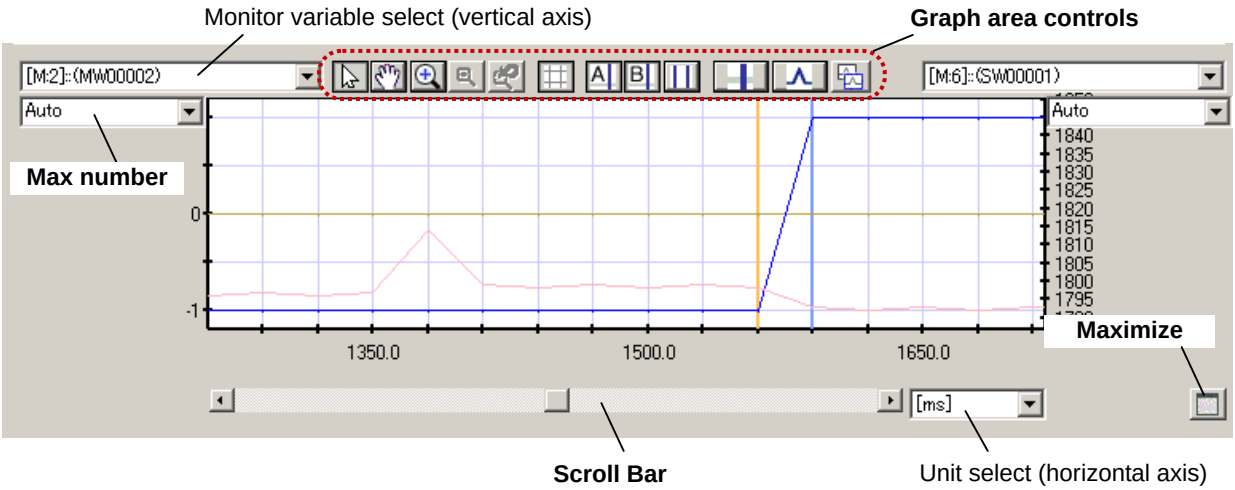
Icon	Name	Function	Notes
	Import	Read trace data and definitions from selected files	
	Export	Write trace data and definitions to selected files	
	Print	Prints trace settings, graphs and lists.	

4. Graph

A graph to be displayed can be selected from Trend or X-Y graphs.

4. 1. Trend Graph

In Trend Graph Mode, monitored variables are displayed on a time scale.



Horizontal axis of the graph is the sampled time of the trace data, and can be selected to use [ms], [sec], [min], or [data]. The graph can be scrolled by the scroll bar or pointer's scroll mode.

Vertical axis of the graph is the trace data value, and the monitored variable name and max. value can be set on right and left sides of the graph. The monitored variable setting can only be changed while trace is stopped or during Snapshot view. The max. value setting can be changed while the tracing is in progress, as well as whilst stopped and during Snapshot modes. The positions of Y1 axis and Y2 axis of Y-Axis Scale* in List display will change as the max. values are changed.
(*Y-Axis scale: see Chap. 5 Sec. 1 Para. 1 – Monitor Page)

It is possible to adjust / change: Pointer settings, Cursor settings, Scale adjustments, and copy graph in the Trend Graph display mode. Operations within the graph area are explained below.

4. 1. 1. Pointer settings

Pointer (mouse cursor) settings can be used to change modes in order to perform graph scrolling and Zoom In / Zoom Out operations.

Icon	Name	Functions	Notes
	Select	Cursor mode is used to adjust offsets by selecting and dragging graphs and cursors.	When Y-Axis Scale is set to <Auto> in the List, graph data cannot be moved by dragging.
	Scroll	Cursor mode to scroll the graph.	
	Zoom In	Cursor mode to zoom in on drag selected areas of the graph.	
	Zoom Out	Cursor mode to zoom out. Clicking on this icon will cause zoom out by one level.	Functional while zoomed in.
	Reset	Resets the current zoom level.	Functional while zoomed in.

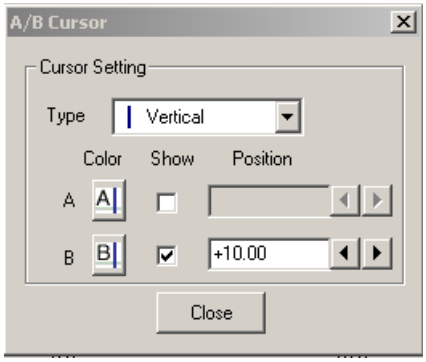
4.1.2. Grid
Turn grids on / off in graphs

Icon	Name	Functions	Notes
	Grid	Grid display On or OFF	

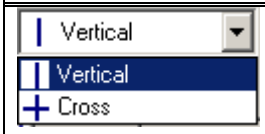
4. 1. 3. Cursor control
Cursor indicates the data at the specified point (sampling time). Two cursors are provided, A and B and their display status can be turned ON and OFF. These two cursors can be moved independently or linked to compare data and make assessments on the waveforms.

Icon	Name	Functions	Notes
	Cursor A	Turns cursor A ON or OFF	
	Cursor B	Turns cursor B ON or OFF	
	Cursor AB linked	Cursor A and B linked at a fixed width and move together	Functional when both cursors are turned ON
	Cursor detail settings	Cursor detail settings window ON or OFF	

Cursor detail settings window



The following setting changes are possible in Cursor Setting Details Window

Icon	Name	Functions	Notes
	Cursor Type	Selects cursor type. Vertical line [I] or cross [+] cursors can be selected	In the cross cursor mode, the cursor turns to a cross when a variable in the List is selected and activated. The center of the cross will move to the selected Monitor Variable.
	Cursor color	Selects cursor color	A color selection window opens when this icon is clicked
	Display check box	Selects cursor ON or OFF	Selected cursor is displayed
	Cursor position display	Adjusts cursors' displayed position. The arrow buttons or direct numerical input can be used.	When a number is input directly, the cursor moves to the specified grid position

When the cursor display is ON, a left mouse click will cause the following cursor movements.

If the cursor A only (or B only) is displayed, the cursor moves to the pointer position where clicked.
If both cursors are ON and linked, the cursor A moves the clicked position and B follows at a fixed width.
If both cursors are ON and not linked*, the cursor A moves to the clicked position when the cursor mode is set to <Not linked> or <A Linked> in the List area, and the cursor B will not move. If the cursor mode is set to <B Linked>, the B moves to the clicked position and A will not move.

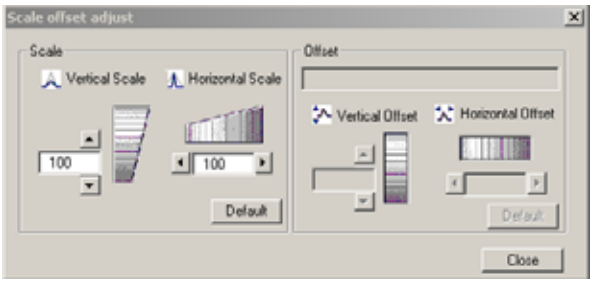
*If <Cursor AB Linked> is not selected, <AB Linked> in the List area cannot be selected. Inversely, if <Cursor AB Linked> is selected, neither <A Linked> or <B Linked> in the List area cannot be selected.

4. 1. 4. Scale / Offset Adjust

Scale and offset can be adjusted for both vertical and horizontal axes of the displayed graph.

Icon	Name	Functions	Notes
	Scale/Offset Adjust	Turns Scale / Offset Adjust window ON or OFF	

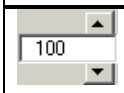
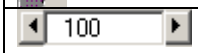
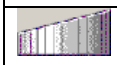
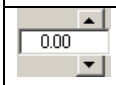
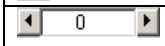
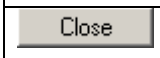
Scale / Offset window display



Offset adjustment can be performed when an offset subject is selected in the List's selection field. This function cannot be used if a target subject is not selected, or deselected after the adjustment window is opened. A target must be reselected and activated in order to use this adjustment function.
*The List selection field is used to select the offset target. In Monitor page and File page, Monitor Variable is the selection target. The offset adjustment horizontal axis is Sampling Time, and the vertical axis is the

selected monitor variable data. In XY Display page, a pair of monitor variables set for the vertical and horizontal axes are the selected target. See Chap. 0 <Switching Pages> regarding Page.

Target selection in not needed for Scale adjustments
The following Scale parameters can be adjusted.

Icon	Name	Functions	Notes
	Vertical axis scale value	Direct value input or use of arrow buttons to change vertical scale	Input range:100～1000
	Vertical scale adjust bar	Adjusts vertical scale by Up / Down mouse drag	
	Horizontal axis scale value	Direct value input or use of arrow buttons to change horizontal scale	Input range:100～1000
	Horizontal scale adjust bar	Adjusts vertical scale by Left/Right mouse drag	
	Offset adjust target variable	Displays offset target variable name	
	Vertical offset position value	Direct value input or use of arrow buttons to change vertical offset	Input range: -100.00～100.00
	Vertical offset adjust bar	Adjusts vertical offset by Up/Down mouse drag	
	Horizontal offset position value	Direct value input or use of arrow buttons to change offset position	Input rage: -99~99 when target (sampling time) selected in Monitor page or File page. -100~100 when target (variable) is selected in XY display page
	Horizontal offset adjust bar	Adjusts horizontal offset by Left/Right mouse drag	
	Default	Returns Scale or Offset to default settings Vertical Scale: 00 Horizontal Scale: 100 Vertical Offset: 0.00 Horizontal Offset: 0	Horizontal offset default value will be 0.00 when target selected in XY display page
	Close	Closes Scale/Offset adjustment window	

4. 1. 5. Graph Copy
Copies the displayed graph to clipboard. The graph image can then be pasted into other Windows applications (MS-Word, Excel, PowerPoint, etc.)

Icon	Name	Functions	Notes
	Graph Copy	Displayed graph image is copied to clipboard	

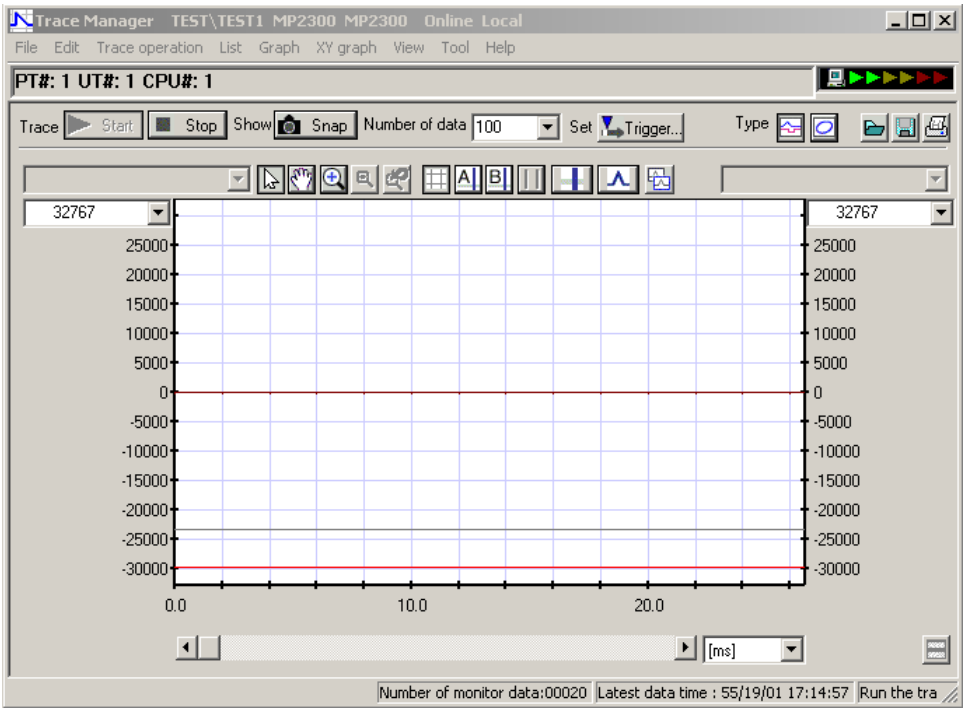
An example of copied and pasted trend graph image is shown below.

4. 1. 6. Maximized graph display

The standard setting of the Data Trace main screen shows the Control Panel, Graph, and List, but the Graph area can be viewed as maximized without showing the List.

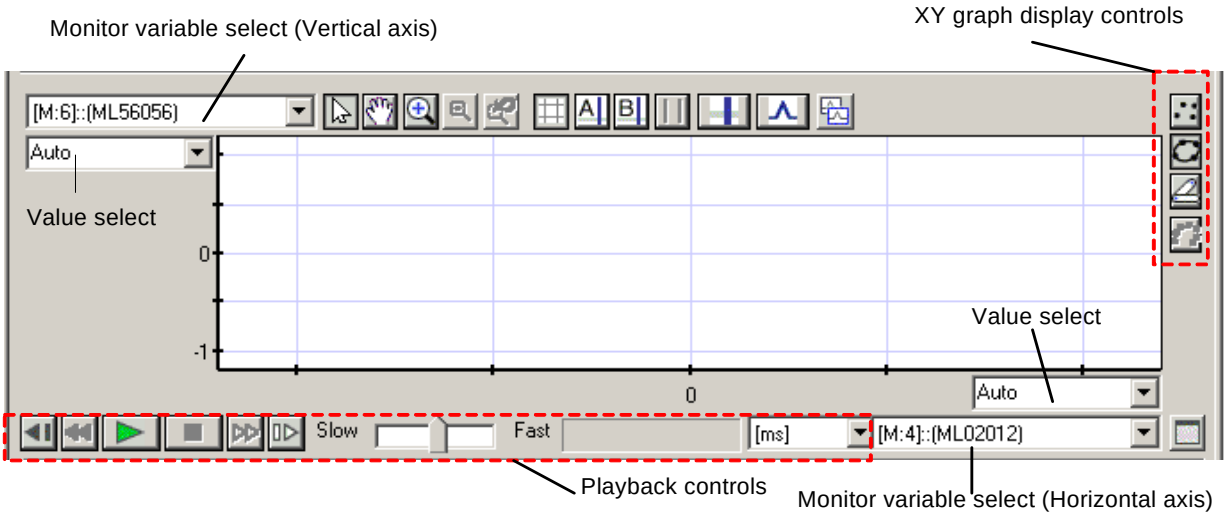
Icon	Name	Functions	Notes
	Maximize Graph ON	Maximizes Graph and turn OFF List	Active when in normal view
	Maximize Graph OFF	Turns List ON and return to normal view	Active when in Graph Maximized view

Graph maximized Data Trace view shown below.



4. 2. XY Graph

XY Graph displays a relationship of two selected monitor variables in a two dimensional representation.



Variable names and max. values can be set for vertical and horizontal axes of the XY Graph.
All operations in Trend Graph mode are also possible in XY Graph display mode. In addition, display settings and playback are possible.

4. 2. 1. Display Settings

The display settings of XY Graph can be changed.

Icon	Name	Functions	Notes
	Dot display	Each coordinate is displayed as a dot	
	Line display	Coordinate points are connected with lines and displayed	
	Model display	Coordinate points are connected with lines and displayed according to connecting point* data	
	Leave trajectory	Selects Leave trajectory/Do not leave trajectory	Active only in dot display mode

*Refer to 5. 1. 2 <XY display page>

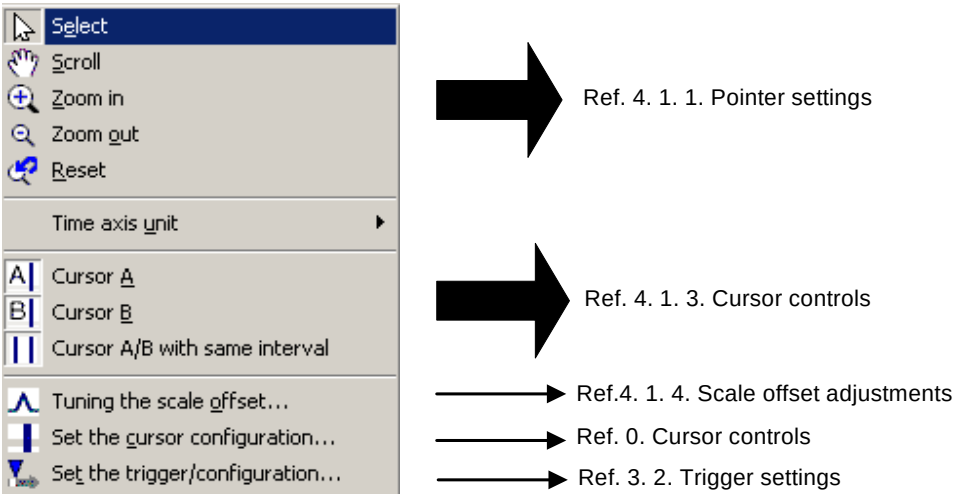
4. 2. 2. Playback Operation

Playback function re-displays the trace data acquired by Snapshot and Stop Tracing operations. In addition to Playback and Stop, the data can be viewed in Fast Forward/Fast Rewind and Frame Forward / Frame Reverse controls.
The Playback function is available in XY Graph mode only. The Playback function was added to this mode to provide “over-time” data since the XY Graph only provides information on relationship of X variables and Y variables at given points in time, and does contain any time based information in itself.

Icon	Name	Functions	Notes
	Playback	Displays the trace data from data starting point	
	Stop	Stops playback at current position	
	Fast forward Fast rewind	Fast forwards or reverses at a specified speed multiplier. Playback will resume when finished	Active only during Playback. The buttons are see-saw type when one is pressed the other is disabled.
	Frame forward Frame reverse	Forwards or reverses one frame at a time. Playback automatically stops if pressed during playback	
	Return to the beginning	Returns to the start point of trace data	From pull-down menu > XY Graph (X) > Return to the beginning (T)
	Go to end	Advances to the end of trace data	From pull-down menu > XY Graph (X) > Go to end (E)
	Multiplier setting	Sets the speed multiplier of Fast forward and reverse	
	Playback duration	Displays the length of playback duration	Can be selected from [ms], [sec], and [min]

4. 3. Pop-up (Context) Menu

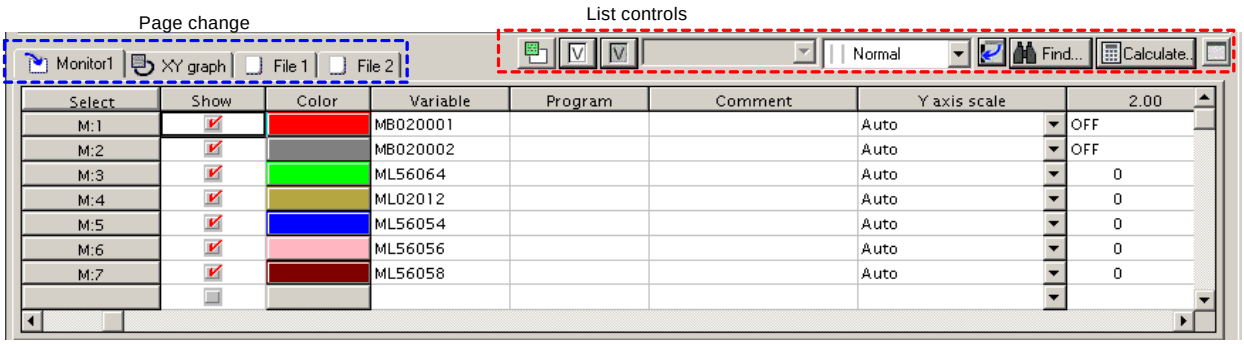
A right click in Graph area will display a Context (Context) Menu.



Controls available from the context menu are the same as the icon buttons. Refer to previously described icon control explanations.

5. List

The List area is used to manage data trace Monitor Variable registration / deletion and for the displaying of trace data in a list format.

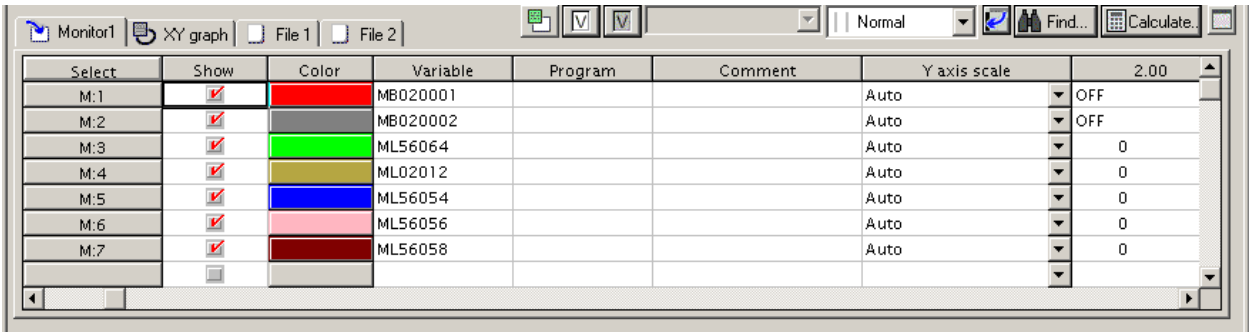


5. 1. Page change (View change)

By selection of tabs, various page views can be shown. Available views are: Monitor, XY display, and Files

5. 1. 1. Monitor Page

The monitor page is used to register, edit and delete the variables to be monitored. The monitor page list is shown below.



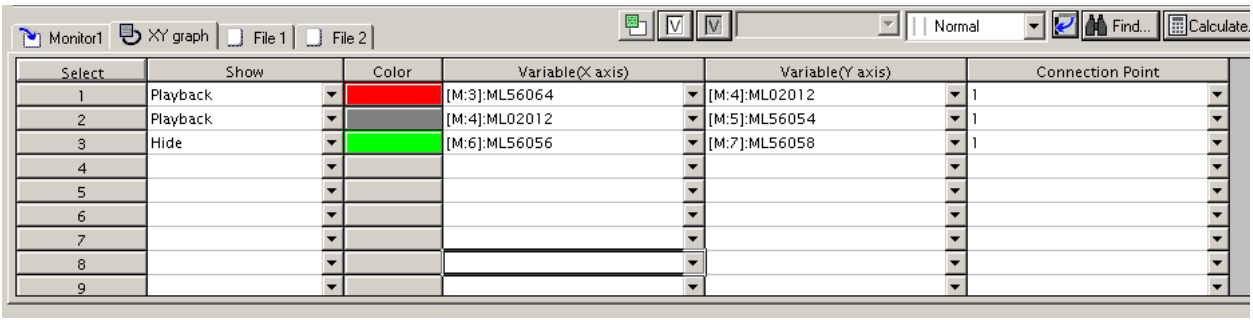
Following items are displayed on the monitor page.

Item (Field)	Content	Edit (Set)	Notes
Select	Used to select target variables to be activated	○	Activating the item enables data display mode changes, search, computations, offset adjustments and cross cursor display. Displayed items are as follows. M:y ： Monitor No.y Fx:y： File x No.y SUB ： Difference of two variables ADD ： Sum of two variables REF ： Lookup variables
Display	Graph display ON or OFF	○	 ： Display graph  ： No graph display
Color	Color selection window opens, enabling graph color selection	○	
Variables	Displays variable names to be shown in graph	○	
Program	Sets the program name which uses the D register when D register is used	○	
Comments	Sets and displays comments	○	Comment display can be turned ON or OFF*
Y Axis scale	Sets Y Axis scale. Selectable from: Auto / Y1axis / Y2axis.	○	When set to AUTO, the Y Axis scale is adjusted automatically. Y1 Axis is on the left and Y2 Axis is on the right of the graph. Display can be turned ON or OFF.*
Max. Value	Displays the max. value of traced variable	×	Display can be turned ON or OFF.*
Min. Value	Displays the min. value of traced variable	×	Display can be turned ON or OFF.*
Cursor A	Displays cursor A value when set to display cursor A	×	Display can be turned ON or OFF.*
Cursor B	Displays cursor B value when set to display cursor B	×	Display can be turned ON or OFF.*
Differential (A-B)	Displays cursor A-B value when set to display cursor AB	×	Display can be turned ON or OFF.*
Unit conversion (xN)	Unit conversion constant to display the variable value as a given machine coordinate unit. Each trace data is displayed as <N x variable value>	○	Display can be turned ON or OFF.*
Data	Displays the trace data value	×	

*Refer to 5. 3. 1. Pop-up Menu (Context Menu) for how to change display settings

5. 1. 2. XY Display Page

The XY display page is used to register, edit and delete monitor variables for XY graph display. The XY list display is shown below.



The XY display page shows the following items

Item (Field)	Content	Edit (Set)	Notes
Selection	Used to select targets to be activated	○	By activating, offset adjustment and cross cursor display are enabled.
Display	Selects graph display modes. Choose from No display/Fixed Display/Playback	○	No display: Data is not shown on the graph. Fixed display: Data is shown on the graph during trace execution. Playback: Data is shown during playback.
Color	Color selection window opens, enabling graph color selection	○	
Variable (X Axis)	Variable name for X Axis (horizontal) is displayed. Can be set by choosing a variable set in the Monitor page.	○	
Variable (Y Axis)	Variable name for Y Axis (vertical) is displayed. Can be set by choosing a variable set in the Monitor page.	○	
Connecting point	Sets connecting point address for Model Display. <None> and <Select> can be set.	○	
Cursor A	Displays cursor A value when set to display cursor A	×	Display can be turned ON or OFF.*
Cursor B	Displays cursor B value when set to display cursor B	×	Display can be turned ON or OFF.*
Differential (A-B)	Displays cursor A-B value when set to display cursor AB	×	Display can be turned ON or OFF.*

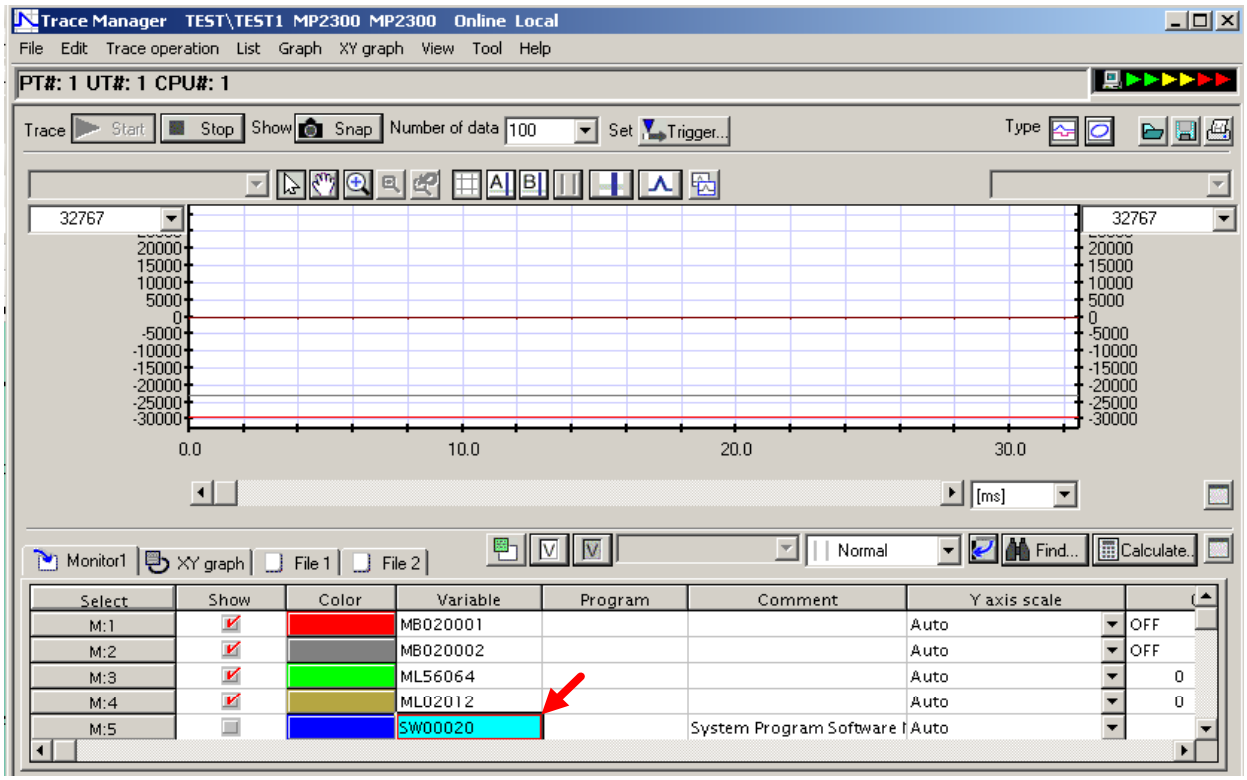
*Refer to 5. 3. 1. Pop-up Menu (Context Menu) for how to change display settings

5. 1. 3. File Page
The file page displays the monitor variable data by importing from files. File information can be displayed by changing to File Page and importing the file.
The same items are displayed in the file page. However, variables, program and comments are not editable since they are displayed based on the imported file information. The default number of file pages are set to two but a maximum of eight pages can be set-up.*
*See 6. 2. for Default file page display settings.

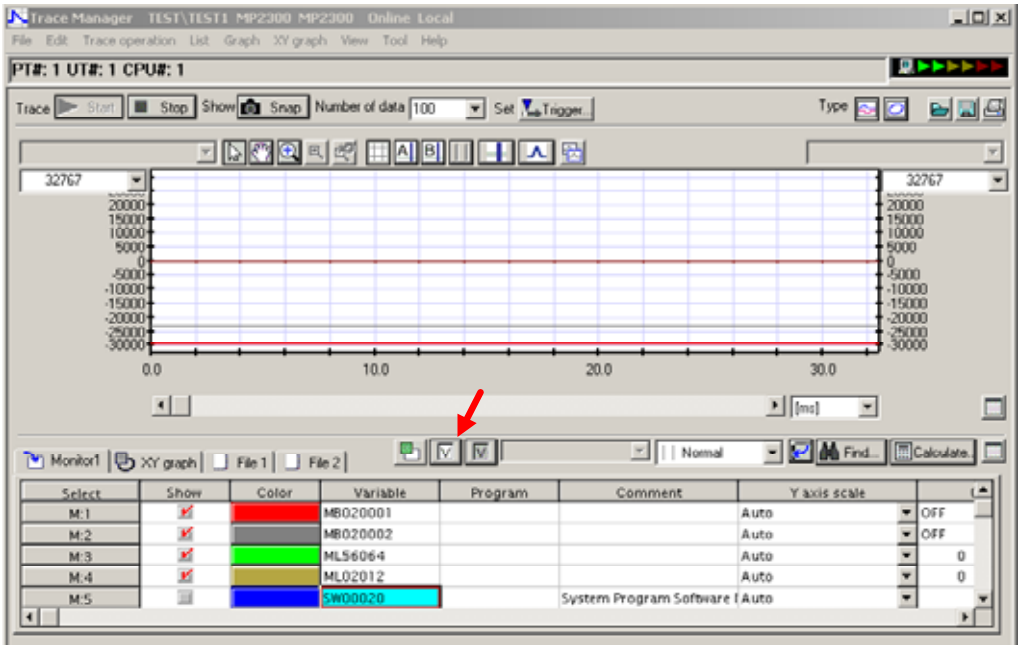
5. 2. Monitor variable registration
Monitor variables must be registered in order to perform data tracing. Maximum of 16 monitor variables can be registered.*
*By changing Monitor Settings, a maximum of 64 variables can be registered. However, only 16 can be displayed at one time. See 5. 3. 1. for <Monitor Settings>.

Monitor variables can be registered in Trace Manager window by using the following method.

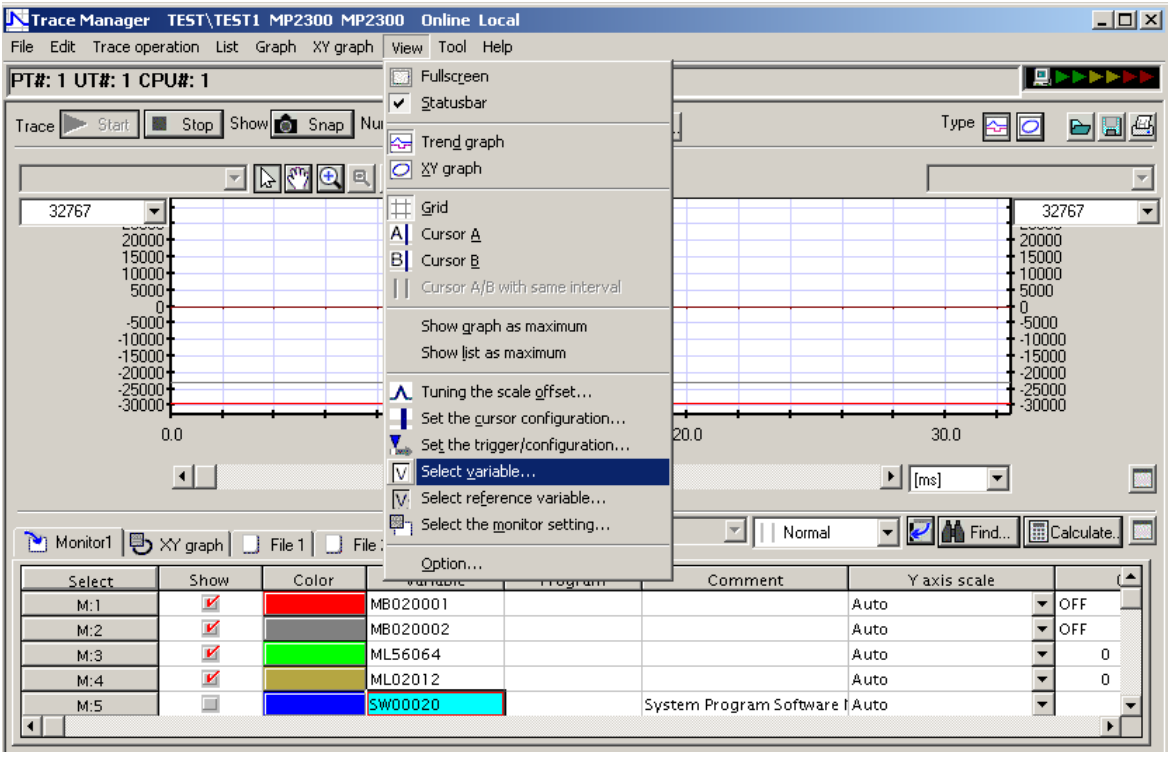
1) Registration can be done by directly inputting variable (register) name into Variable Fields of the monitor page.



2) Open Variable Selection window of Trace Manager by clicking  icon and input required information to register.



3) Use Trace Manager pull-down menu View (V) > Select variables (V) to open Variable Selection window to register.



By performing 2) or 3) above, Variable Selection window opens. For monitor variable setting details, see 5. 3. 2. <Selecting variables>

The monitor variable registration can also be performed by the following methods.

4) By right-clicking a variable name in Motion Program, a pop-up menu opens. Selecting <Register to trace> will register the selected variable into Trace Manager.

5) By right-clicking a variable name in Motion Parameter, a pop-up menu opens. Selecting <Register to trace> will register the selected variable into Trace Manager.

6) By right-clicking a variable name in New Ladder Editor, a pop-up menu opens. Selecting <Register to trace> will register the selected variable into Trace Manager.

7) By right-clicking a variable name in Old Ladder Editor, a pop-up menu opens. Selecting <Register to trace> will register the selected variable into Trace Manager.

When variables are registered by methods other than 1) above, variables will be registered to rows of the selected cells. If there are existing variables in the applicable cells, they will be over-written.

5. 3. List Operations

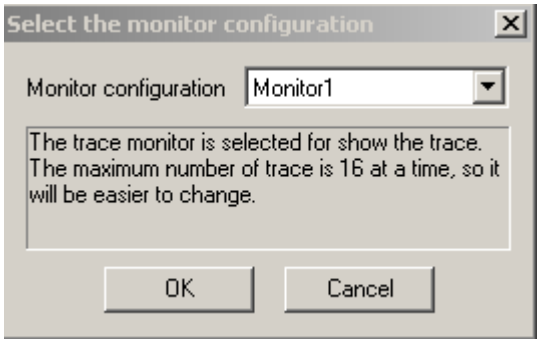
It is possible to perform monitor setting, variable selection, lookup variable selection, data display setting, cursor mode, list vertical/horizontal display switch, search, computation, and list maximized view in the List area. All operations are possible in any list display modes.

5. 3. 1. Monitor settings

This function is for selecting the monitor to display the Trace. Since the maximum number of traces is 16, multiple settings here will enable easy switching between the traces.

Icon	Name	Functions	Notes
	Monitor setting	Opens Monitor Setting window	

A window shown below opens by clicking the icon. The monitor setting can be selected from <Monitor 1>, <Monitor 2>, <Monitor 3>, or <Monitor 4>.



5. 3. 2. Variable Selection
This function is used to register variables to the monitor page by selecting of monitor variables.

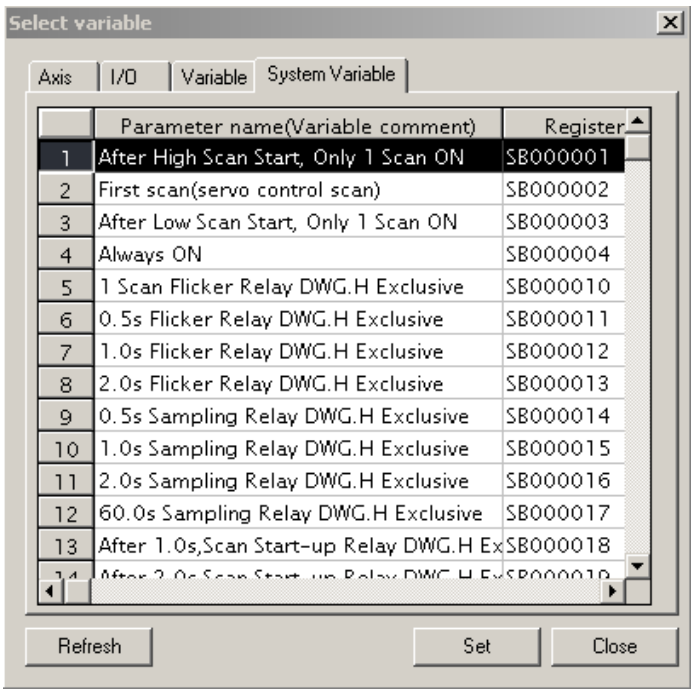
Icon	Name	Functions	Notes
	Variable Settings	Opens Variable Selection window	

Variable selection window opens by clicking the icon. By selection of tabs, axis, I/O, variable, and system variables can be registered as monitor variables.

In order to register the monitor variables from Variable Settings window, registers' parameter names (variable comments and register comments) need to be set.* In the Variable settings window, only the registers that are assigned to the module with comments are displayed and can be registered.

> *By setting the register comments, the comments will be automatically entered when the register number is entered directly in List area.

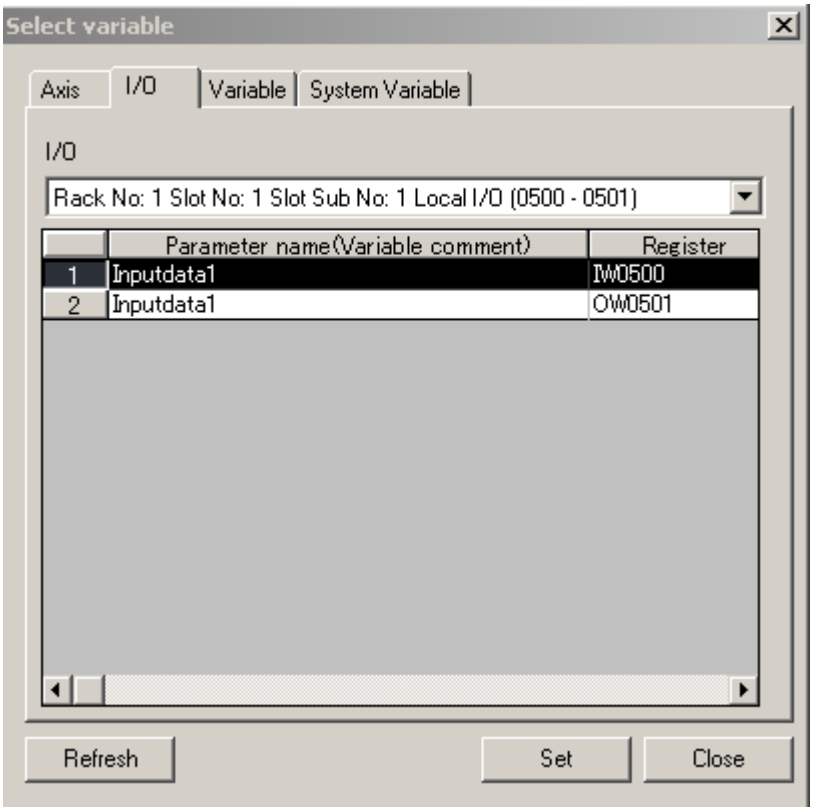
Only the System Variables are given with default comments. The view below shows when the System Variable tab is selected.



To register the System Variable as Monitor Variable, select the system variable from the list and click Select (S). Other non-System Variables such as Axes, I/O, and variable registers do not have any comments by default, and can not be displayed and can not be selected / set from within the Variable Settings window. In order to set-up these monitor variables in the Variable Settings window, the register comments must be set-up separately.
The comments are manually entered for each register in Engineering Manager (comment list and Quick Reference, etc.). However, the Axis Registers (only) can be automatically set-up by Register Comment Auto Setting function.*

> *Refer to Engineering Manager related documentation on how to input your comments manually. Also see: 6. .3 <Register comments automatic registration> for automatically registering the comments.

The screen shot below shows a window with some comments entered. As can be seen, the registers with comments IW0500 and OW0501 are displayed.
A register without a comment is never displayed.



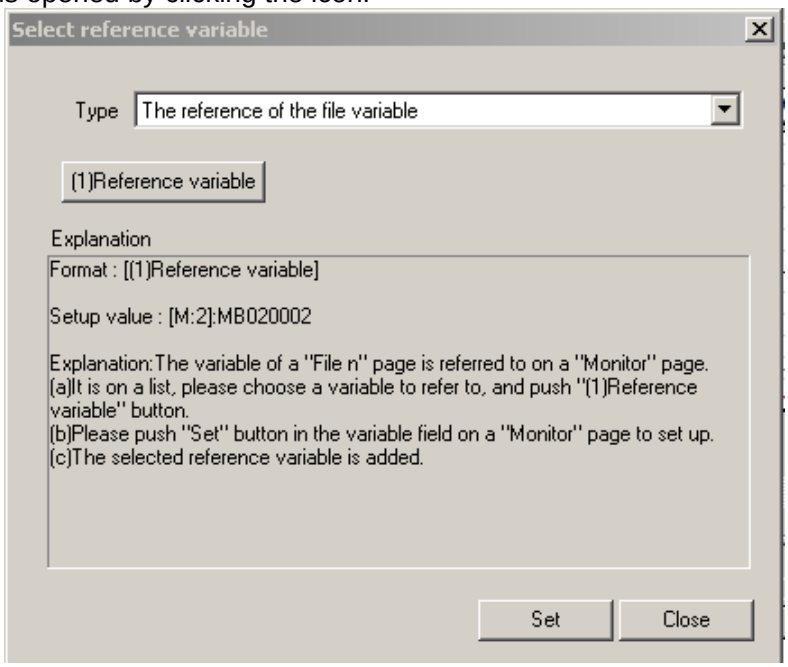
The common functions for this window are as follows.

Icon	Name	Functions	Notes
Refresh	Refresh	Updates the displayed data	
Set	Select	Selects/sets the variable	Becomes active when a variable is selected. Valid only in Monitor Page
Close	Close	Closes the window	

5. 3. 3. Lookup Variable Selection
Lookup Variable Selection is used to lookup <File n> page variable in Monitor Page.

Icon	Name	Functions	Notes
V	Lookup Variable Select	Opens Lookup Variable Settings window.	

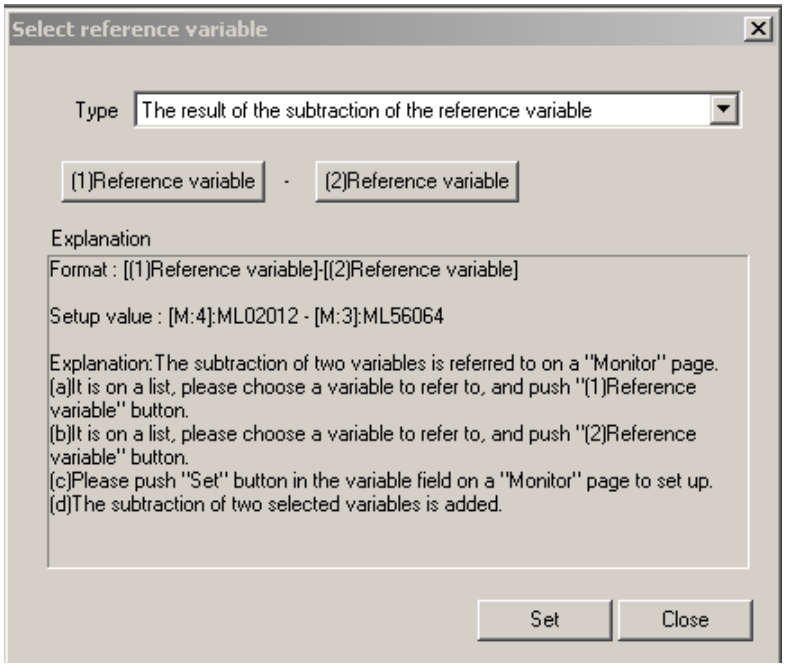
Following window is opened by clicking the icon.



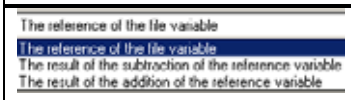
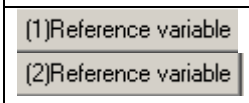
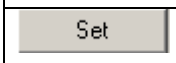
Setting up of Lookup Variable is performed as follows.

1) Choose the desired variable for lookup and click (1) Lookup Variable Select button. Selected variable name appears in Selected Value area.
2) Select a desired variable field from Monitor Page list, and click Select (S) button.
3) Operations above 1 and 2) will add a lookup variable to selected variable field.

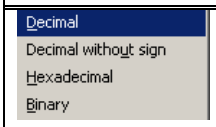
Differentials and sums of the lookup variables can also be selected. The view below shows when a difference is chosen as the type. In addition to the operation 1) <(1) Lookup Variable Select> above, <(2) Lookup Variable Select> must also be performed. The same is used for selecting a “Sum”.



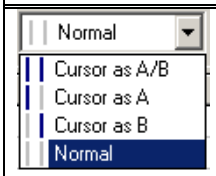
The tables below summarize the operations in the Lookup Variable Settings window.

Icon	Name	Functions	Notes
	Lookup variable type	Sets the desired lookup variable type. Select from: File variable lookup, Difference of lookup variables, and Sum of lookup variables.	
	Lookup variable select	Sets the selected lookup variable into the list.	The selected lookup variable is retained after the window is closed.
	Lookup variable select	Set the selected lookup variable on the list.	Becomes active when the required lookup variables and fields are selected
	Close	Closes the window	

5. 3. 4. Data Display
Changes the data type to be displayed on the list.

Icon	Name	Functions	Notes
	Data Display	Change the type of selected data displayed on the list. Can be selected from: decimal / un-signed decimal / hexadecimal / and binary formats.	Shows as disabled when no variable is selected.

5. 3. 5. Cursor Mode
This function is used to scroll the data display position of the list linked to cursor A and B on the graph.

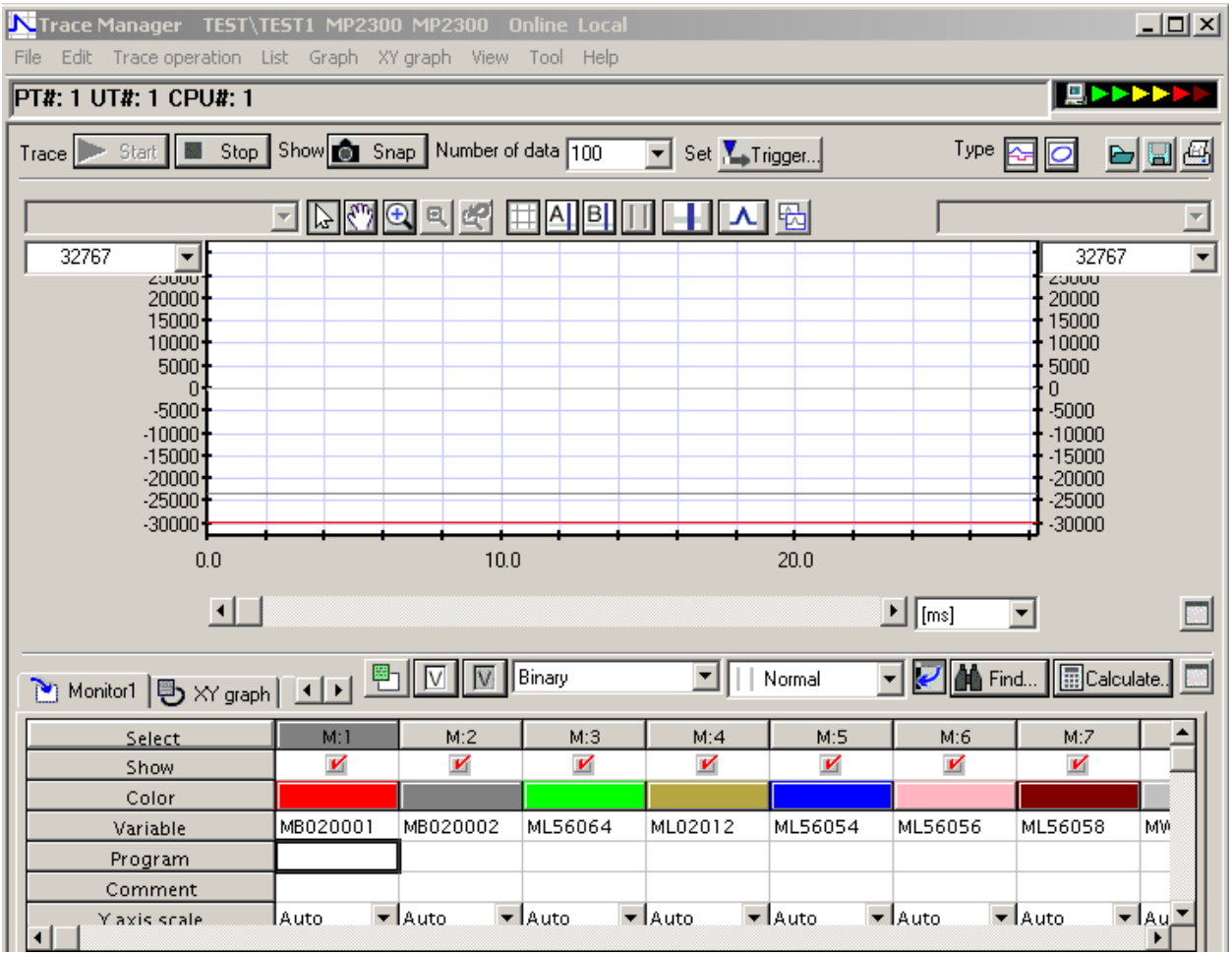
Icon	Name	Functions	Notes
	Cursor Mode	Selects the cursor to be linked to data display position. Select from <AB Linked>, <A Linked>, <B Linked>, and <Not Linked>. When <A Linked> is selected, the list data will scroll in-link with the cursor A of the graph.	If cursor A (or B) is not displayed, linking cannot be selected. If <Cursor AB Linked> is not specified in the graph, AB linking is not possible. No change will occur if unavailable selection is made.

When the cursor mode is set to the Linked Mode, the data display of Monitor Page and File Page will follow the movement of the linked cursor. Inversely, the cursor will move to a location where clicked in File Page or Monitor Page.

5. 3. 6. List Vertical Display
This function is used to inverse vertical and horizontal of list display.

Icon	Name	Functions	Notes
	Display List Vertically	Inverses lists vertical and horizontal.	When OFF, variable data are displayed horizontally When ON, variable data are displayed vertically.

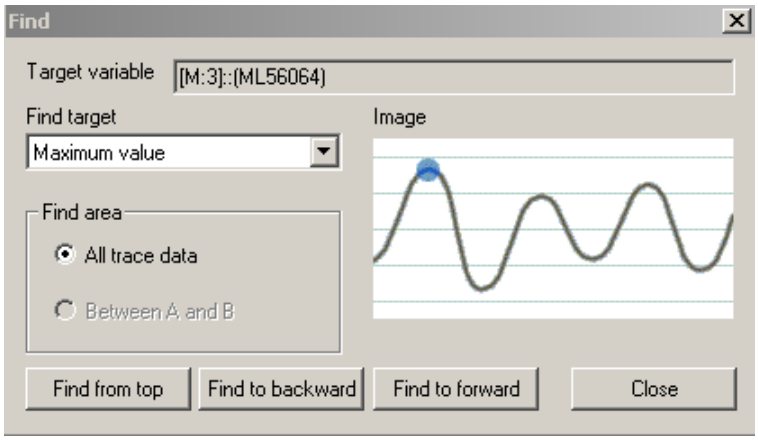
The data trace view when inverted.



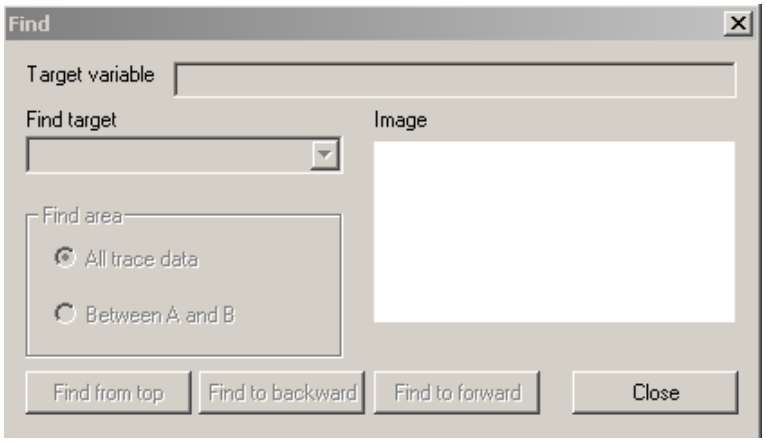
5. 3. 7. Search
This function will cause search and jump to selected (active) variable.

Icon	Name	Functions	Notes
	Search	Opens Search window	

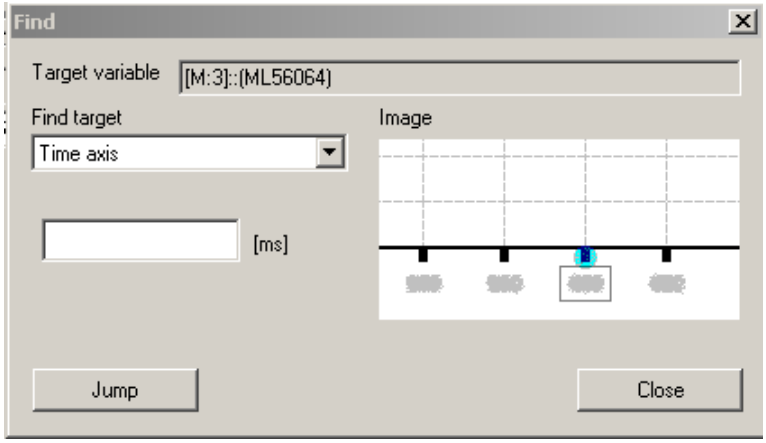
When a monitor variable is selected and activated in the List and the icon is clicked, a Search window opens as shown below.



If this icon is clicked without selecting a monitor variable, or deselected after clicking the icon, the Search window will show as below, and the Search function becomes unavailable. The Search function becomes available when a monitor variable is selected and activated again in the List.



When Time Axis is selected as a search target, the window display will change as shown below.



The following operations can be performed in the Search window.

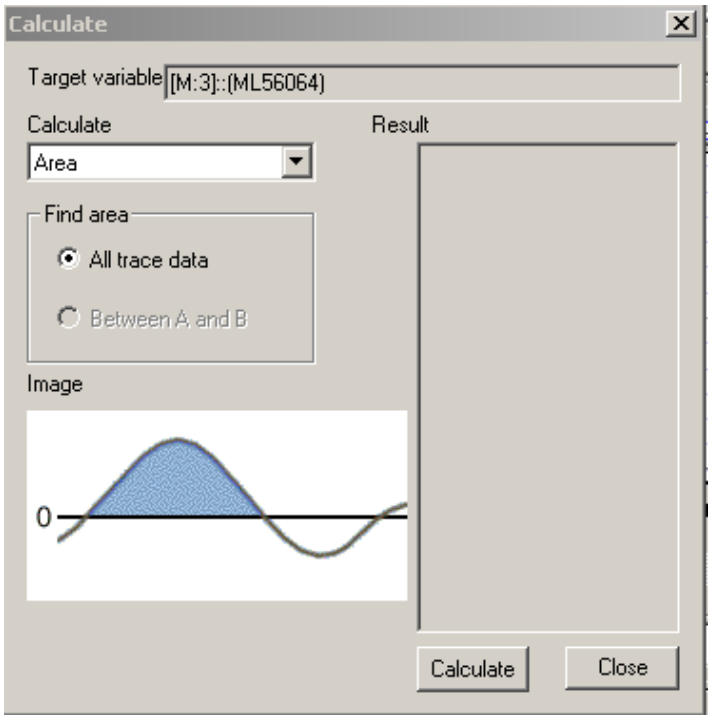
Icon	Name	Functions	Notes
[M:1]::(MW00001)	Variable to be searched	Selected variable name is displayed	
Maximum value Maximum value Minimum value Maximum value in an area Minimum value in an area Time axis	Search Parameter	Selects parameter of the search. Select from: Max. Value / Min. Value / Local Max. Value / Local Min. Value / Time Axis	
Find area All trace data Between A and B	Search Range	Select <All trace data> or <Data between cursor A and B>	<Data between cursor A and B> cannot be selected if cursors are not displayed
Find from top	Search from beginning	Execute search from the beginning of range	
Find to backward	Search previous	Searches backwards from current position	
Find to forward	Search Next	Searches forward from current position	
Close	Close	Closes the window	
[ms]	Time set	Sets jump (search) interval in [ms]	Only active when Search is set to Time Axis
Jump	Jump	Jumps to the data at (near) specified time position.	Only active when Search is set to Time Axis

5. 3. 8. Computation

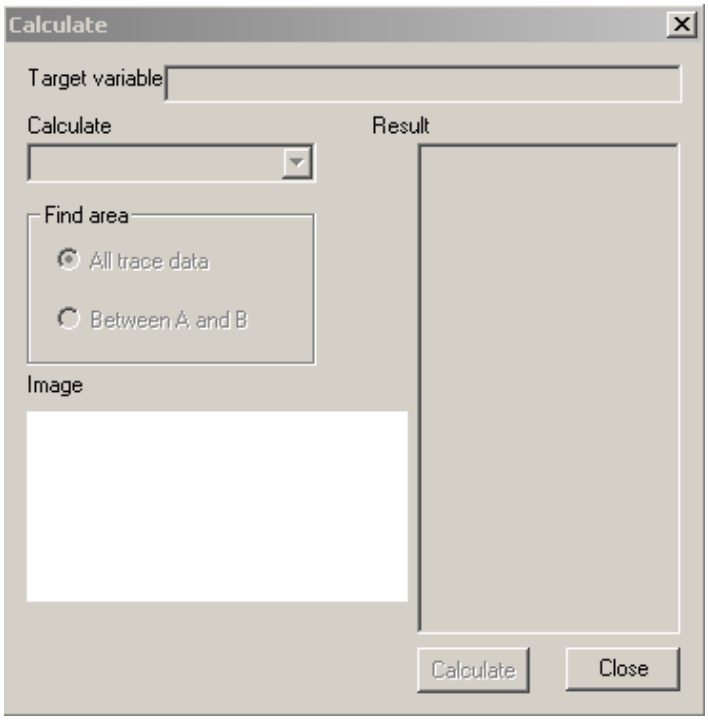
This function performs computations on areas and averages for selected (active) variables.

Icon	Name	Functions	Notes
Calculate..	Compute	Opens Computation window	

A window shown below opens by selecting a monitor variable and clicking the icon.



If this icon is clicked without selecting a monitor variable, or deselected after clicking the icon, the Computation window will show as below, and the Compute function becomes unavailable. The Compute function becomes available when a monitor variable is selected and activated again in the List.



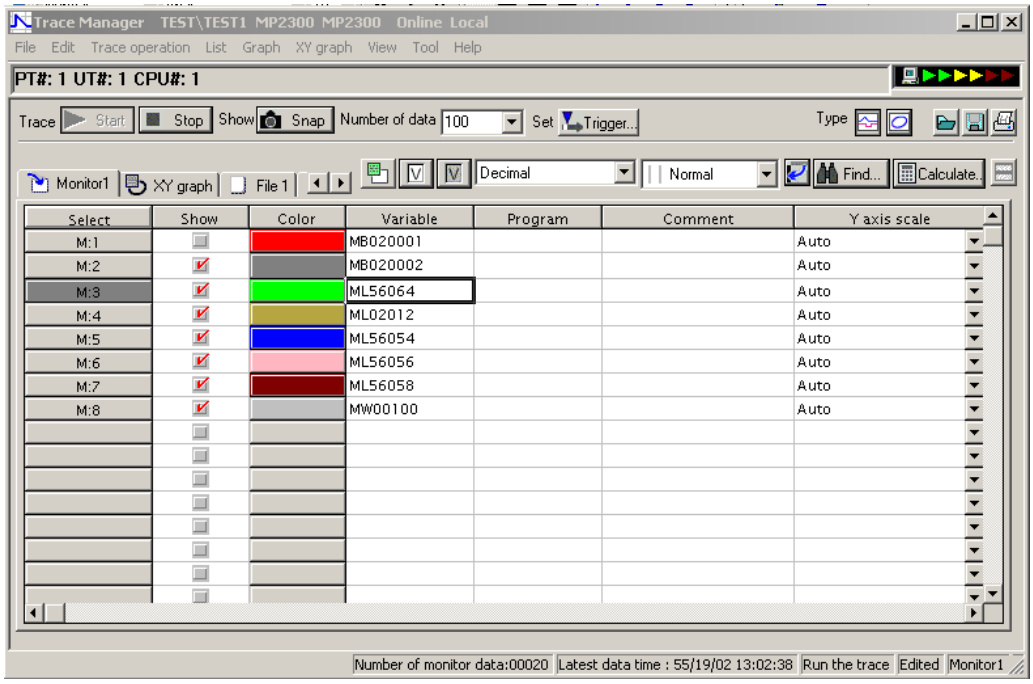
Following operations can be performed in the Computation window.

Icon	Name	Functions	Notes
[M:1]::(MW00001)	Variable to be computed	A variable name to be computed is displayed	
Average Area Average Absolute average	Computation Type	Selects the type of computation to be performed. Area / Average / Absolute average can be selected	
Find area All trace data Between A and B	Search Range	Select <All trace data> or <Data between cursor A and B>	<Data between cursor A and B> cannot selected if cursors are not displayed
Calculate	Calculate	Execute calculation	Result is displayed in “Result” area
Close	Close	Closes the window	

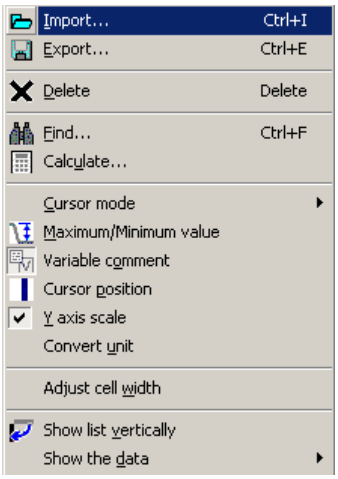
5. 3. 9. List Maximized View
Maximizes the List and turns OFF the graph

Icon	Name	Functions	Notes
	Maximize List ON	Maximizes the List and turns OFF the graph	Valid only in normal display mode
	Maximize List OFF	Cancels “Maximize List” and returns to normal view by displaying the graph	Valid only in Maximized List mode

The data trace view in Maximized List mode shown below. List display is in normal mode (horizontal).



5. 3. 10. Pop-up (Context) Menu
A right click in the List Display Area will cause the following pop-up menu to open.



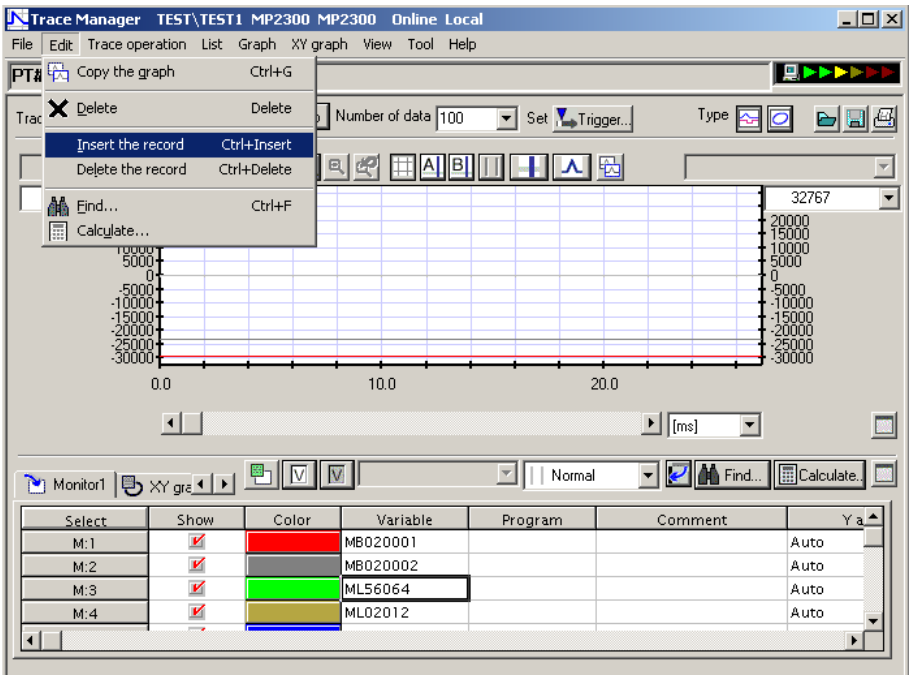
The pop-up menu in the list area contains functions unavailable in icon form. The table below shows the functions available outside the icon explanations from above.

Icon	Name	Functions	Notes
	Delete (D)	Deletes selected variables from monitor variable list	Active when a variable field is selected in Monitor or XY display pages. When deletion is executed in the monitor page, the results will also be reflected in the XY display page.
	Max. / Min. Value (M)	Turns max. / min. value display ON/OFF in the List area	
	Variable Comments (O)	Turns Comments display ON / OFF in the List area	
	Cursor Position (P)	Turns cursor A, B and A-B display ON/OFF in the List area	
	Unit conversion (U)	Turns Unit Conversion display ON / OFF in the List area	
	Cell Width	Equalizes cell width of trace data display	

5. 3. 11. Record Operation

Function used to insert / delete* records. Only active in Menu Page, and unavailable in XY display page and File page. It can be accessed from Edit of pull-down menu.

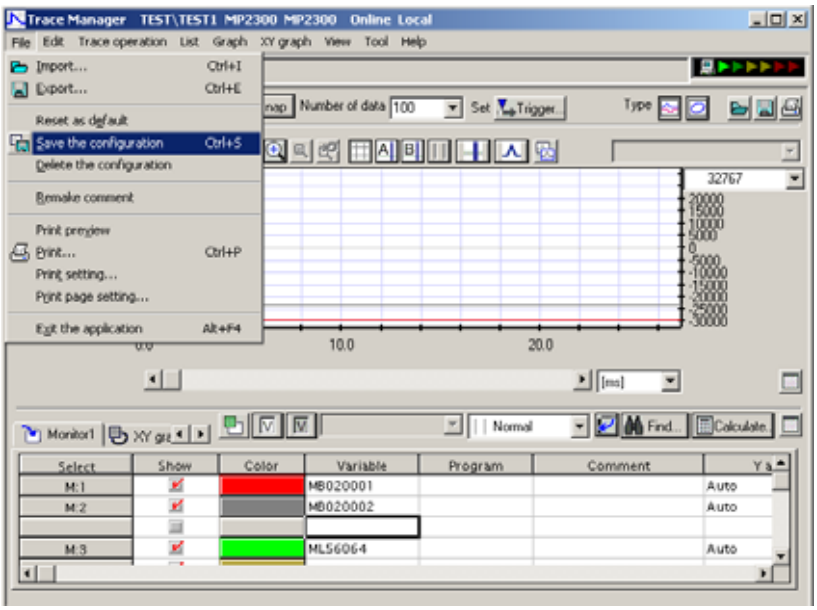
*Difference between Delete and Delete Record: Delete will only delete selected variables. Delete Record deletes variables and the empty cell will be filled by next cell moving up.



Item	Operation	Content	Notes
Insert Record	Edit (E) > Insert Record (I)	Inserts an empty record into selected position	
Delete Record	Edit (E) > Delete Record (L)	Deletes selected record	

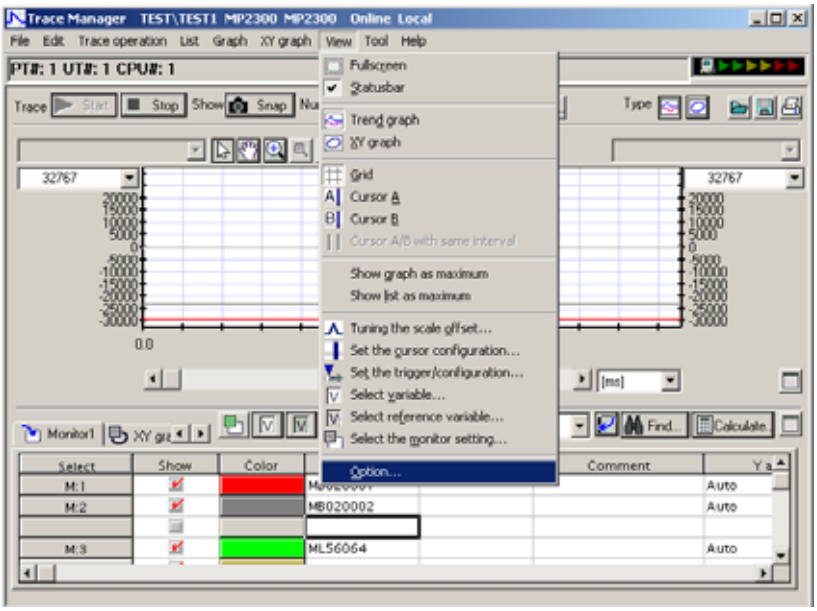
6. Other Functions
Other functions available only through the pull-down menu are explained below.

6. 1. Trace Definitions
Save and Delete trace definitions. Execute from File menu.



Item	Operations	Contents	Notes
Default Setting	File (F) > Reset to default (F)	Resets the trace definitions to default settings	All registered monitor variables will be deleted
Save	File (F) > Save settings (S)	Saves trace definitions	
Delete	File (F) > Delete settings (D)	Deletes trace definitions	

6. 2. Optional Functions
Optional functions can be accessed from View menu.



Item	Operation	Content	Notes
Options	View (V) > Options (O)…	Opens Options window	

In the Options window, Settings, Graph, XY Graph, List and Printing options can be set.

<Settings> tab view is used to select a default directory for CSV file import/export.

<Graph> tab is used to perform following graph display settings.

Items	Settings
Background	Background color
X Axis	Default unit, Scale graduation width, Graduation interval, Line type, Line weight, Color, Font (type, size, style)
Y Axis, Y1 Axis, Y2 Axis	Graduation interval, Line type, Line weight, Color, Font (type, size, style)
File conversion	Line type, Weight, Color
Point	Size, Color
Cursor A, B	Line type, Weight, Color
Grid	Line type, Weight, Color
Lookup variable, Monitor variable	Line type, Weight, Color *Maximum of 16 monitor variables can be set

<XY Graph> tab is used to change settings for XY Graph display Playback speed (Normal, Fastest, Slowest), Fast Forward Multiplier and the Default Unit.

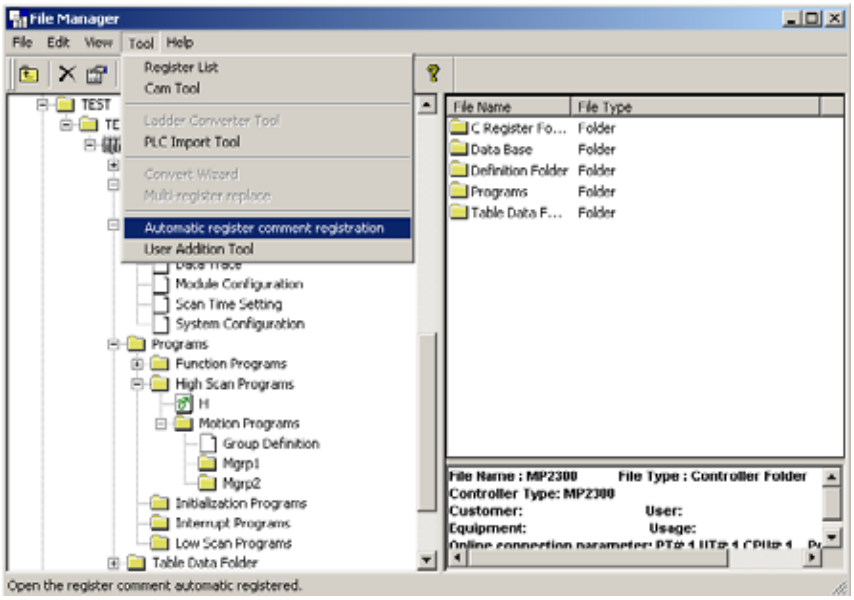
<List> tab is used for List display settings such as Number of File Pages. The default is 2, and maximum of 8 can be set. Additionally, there are display related items such as Font (type, size, style), Background, Editing, Error item, various colors for broken link variables, and number of monitor data.

<Print> tab contains settings on print functions for data trace such as Print: Trace Settings, Graph, or List.

6. 3. Register Comment Auto-Register

This function automatically assigns the monitor parameter comments and settings for Servo Axes. This is done by the following procedure.

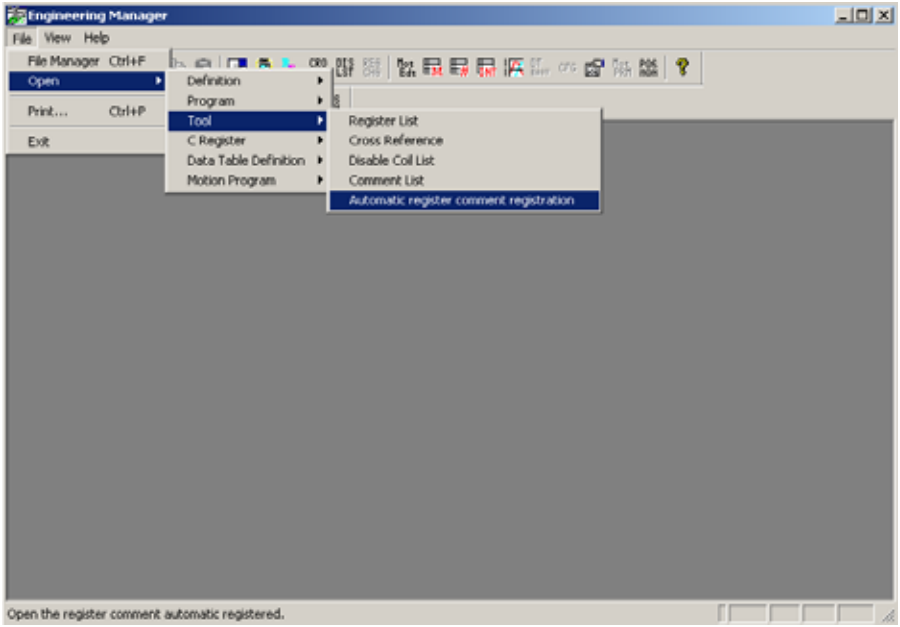
1) From File Manager pull-down menu, select Tools (T) > Register comment auto register (A)



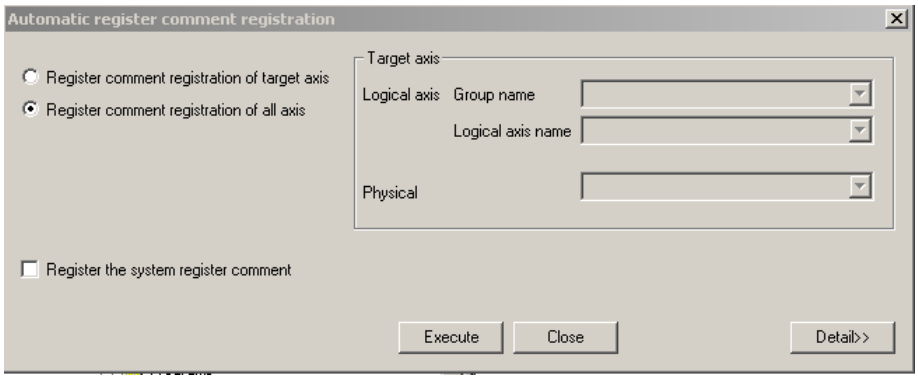
2) Select <PLC Folder> from the tree or list area and right click to open context menu and select <Register Comment Auto-Register (A)>.

*In MP920, start from CPU Folder. Since MP920 is capable of the specifying of multiple CPU Modules, the specific CPU subject to auto-registering must be first assigned. If the PLC Folder is selected, right-clicked, <Register Comment Auto-Register (A)> will be shown as disabled.

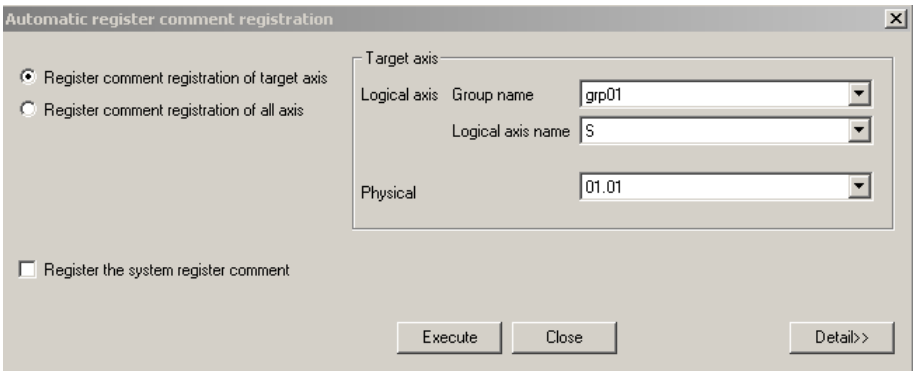
3) From Engineering Manager's pull-down menu, select: File (F) > Open (O) > Tools (T) > <Register Comment Auto-Register (A)>



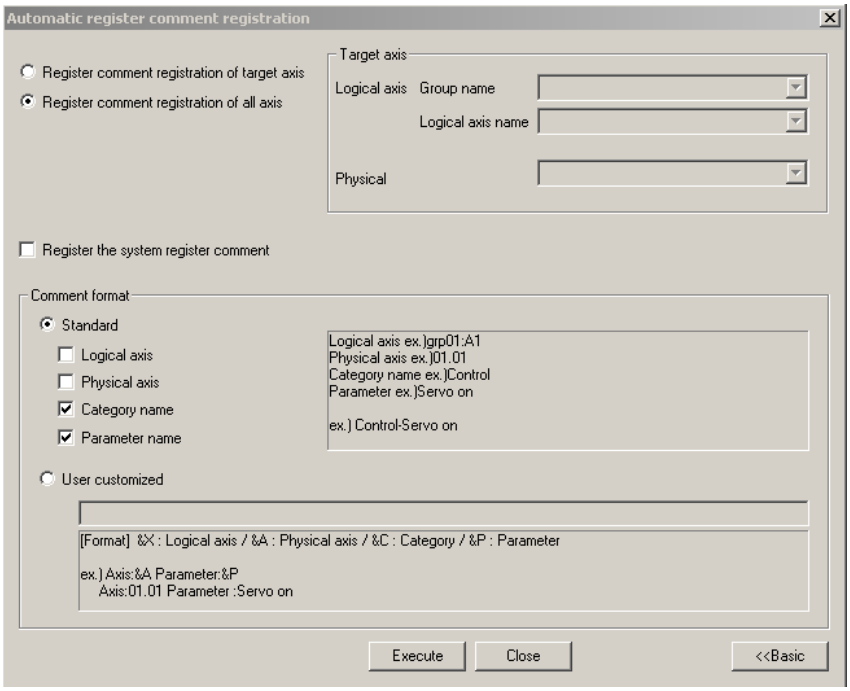
Register Comment Auto-Register is only valid while using the Trace Manager. When executed, the following window opens.



In this window, it is possible to register only the specified axis register comment by using the check boxes.



In addition, by clicking on the Details button the window will display the details where comment format can be changed.



When the Apply button is clicked in this window, the servo settings / monitor parameters for all or selected axes will be assigned as register comments.
Before and after the auto-registration, the Variable Selection window display will change as shown below when selected to display. And the Axis register can now be registered as a monitor variable within the Variable Select window.