User's
Manual

Models LL100/LL200
Multi-monitoring Function
User's Manual

IM 05G01B12-02E

YOKOGAWA
Yokogawa Electric Corporation

IM 05G01B12-02E
1st Edition

Introduction

This Multi-monitoring function of the LL100 PC-based Parameters Setting Tool and the LL200 PC-based Custom Computation Building Tool is a software package used to monitor data of two or more GREEN Series controllers.

This user's manual describes how to operate the Multi-monitoring function.

For explanations other than the Multi-monitoring function, see LL100 PC-based Parameters Setting Tool or LL200 PC-based Custom Computation Building Tool User's Manual of GREEN Series User's Manual (Reference) (CD-ROM).

The LL100 PC-based Parameters Setting Tool and the LL200 PC-based Custom Computation Building Tool can be used with Windows 98/2000/XP or Windows NT4.0 (Service Pack 3 or later). For how to use a personal computer and Windows, refer to each user's manual.

■ Controllers Covered by LL100 and LL200

For information about the GREEN Series controllers covered by LL100 and LL200, see the user's manual of each controller or GREEN Series User's Manual (Reference) (CD-ROM).

■ Intended Readers

This manual is intended for people familiar with the functions of the GREEN Series controllers and capable of working with Windows 98/2000/XP or Windows NT 4.0 (Service Pack 3 or later), such as control engineers and personnel in charge of the maintenance of instrumentation and control equipment.

-■ Trademarks

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Visual Inspection and Check of Accessories

Visually inspect the product upon delivery to make sure it is not damaged in any way. Store the box and inner packing material of the package in a safe place - they may be needed if there is a problem with the product and it needs to be sent back for repair.

■ Check of Model and Suffix Codes

Refer to the following table to make sure the model and suffix codes of the tool are as were specified with your order.

Model code	Suffix code	Description
LL100		PC-based Parameters Setting Tool for GREEN Series controllers
	-E10	Model for use with IBM PC/AT-compatible personal computer (English version)

Model code	Suffix code	Description
LL200		PC-based Custom Computation Building Tool for GREEN Series controllers
	-E10	Model for use with IBM PC/AT-compatible personal computer (English version)

■ Confirmation of the Package Contents

Make sure the delivered package contains all of the following items. If any item is missing or found to be damaged, immediately contact the sales office or dealership from which you purchased the product.

(1) 3.5-inch floppy disks (4 disks)

(2) Dedicated adapter, supplied with two AAA-size batteries (one unit)

(3) Dedicated cable (one cable)

(4) GREEN Series User’s Manual (Reference) (CD-ROM version)

(5) User’s manual for Multi-monitoring Function (This manual)

Documentation Conventions

■ Symbols

WARNING

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

NOTE

Draws attention to information that is essential for understanding the operation and/or features of the product.

TIP

Gives additional information to complement the present topic.

See Also

Gives reference locations for further information on the topic.

■ Description of Displays

(1) Some of the representations of product displays shown in this manual may be exaggerated, simplified, or partially omitted for reasons of convenience when explaining them.

(2) Figures and illustrations representing the controller's displays may differ from the real displays in regard to the position and/or indicated characters (upper-case or lower-case, for example), to the extent that they do not impair a correct understanding of the functions and the proper operation and monitoring of the system.

Notices

■ Regarding This User's Manual

(1) This manual should be passed on to the end user. Keep at least one extra copy of the manual in a safe place.

(2) Read this manual carefully to gain a thorough understanding of how to operate this product before you start using it.

(3) This manual is intended to describe the functions of this product. Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa) does not guarantee that these functions are suited to the particular purpose of the user.

(4) Under absolutely no circumstance may the contents of this manual, in part or in whole, be transcribed or copied without permission.

(5) The contents of this manual are subject to change without prior notice.

(6) Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please contact your nearest Yokogawa representative or our sales office.

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(1) In order to protect the product and the system controlled by it against damage and ensure its safe use, make certain that all of the instructions and precautions relating to safety contained in this document are strictly adhered to. Yokogawa does not guarantee safety if products are not handled according to these instructions.

(2) Modification of the product is strictly prohibited.

(3) Reverse engineering such as the disassembly or decompilation of software is strictly prohibited.

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(1) Yokogawa assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

(2) No portion of the software supplied by Yokogawa may be transferred, exchanged, leased or sublet for use by any third party without the prior permission of Yokogawa.

(3) Be sure to use the spare parts approved by Yokogawa when replacing parts or consumables.

(4) Use this software with one specified computer only. You must purchase another copy of the software for use on each additional computer.

(5) Copying this software for purposes other than backup is strictly prohibited.

(6) Store the floppy disk(s) (original medium or media) containing this software in a secure place.

Models LL100/LL200
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IM 05G01B12-02E 1st Edition

CONTENTS

1. Overview

- The Multi-monitoring function allows users to display and collect “measured input value”, “current setpoint”, “control output” and “alarm generating state” of GREEN Series controller as trend data. The GREEN Series controllers connected to the personal computer can be detected automatically by Automatic scan, and the trend data is displayed on a personal computer screen. The data of a maximum of 16 loops (*1) can be collected at the same time.
  A maximum of 16 trend data can be displayed on a chart screen.
  Trend display cycle: 1 to 3600 sec (variable)
  Trend display times: 65000 times (fixed regardless of a trend display cycle)
- The Panel view shows measured input value, current setpoint, control output and alarm generating state of the connected loop.
- The collected trend data can be outputted as a CSV format so that commercial spreadsheet software like Microsoft Excel can treat.
- The saved trend data can be read out and displayed as trend graph.
- Tuning can be carried out for every connected loop. Auto-tuning, change of PID parameters, change of operation mode and the like can be carried out.

*1: One unit of the following controllers uses two loops: UT750/UP750 cascade control, dual-loop control, temperature and humidity control and cascade control with two universal inputs, UT550/UT551/UT520/UP550 cascade control.

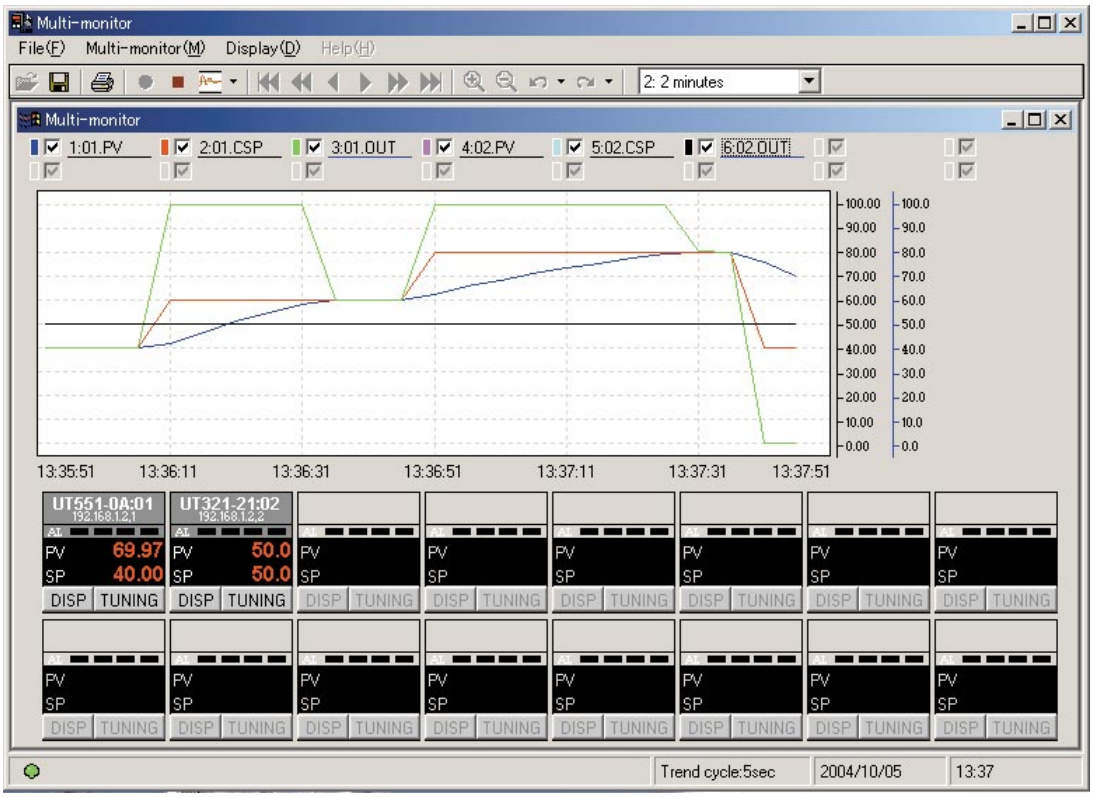

Figure 1.1.1 Multi-monitor Display

See Also

LL100 PC-based Parameter Setting Tool or LL200 PC-based Custom Computation Building Tool User’s Manual of GREEN Series User’s Manual (Reference) (CD-ROM) for information about operating conditions of personal computer, hardware specification, how to install, maintenance, troubleshooting and the like.

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2. Starting and Quitting the Multi-monitor Tool

This chapter describes how to start and quit the Multi-monitor tool.

2.1 Starting the Multi-monitor Tool

● Operation Procedure

(1) Start Windows.

(2) From the **Start** menu of Windows, choose **Programs**, then **Green Series**, and click **Green Series LL100 or Green Series LL200**.
The tool then starts and the Tool Selection dialog box (Figure 2.1.1) appears.
(For LL200, “Custom Computation Building Tool” appears at the top of dialog box.)

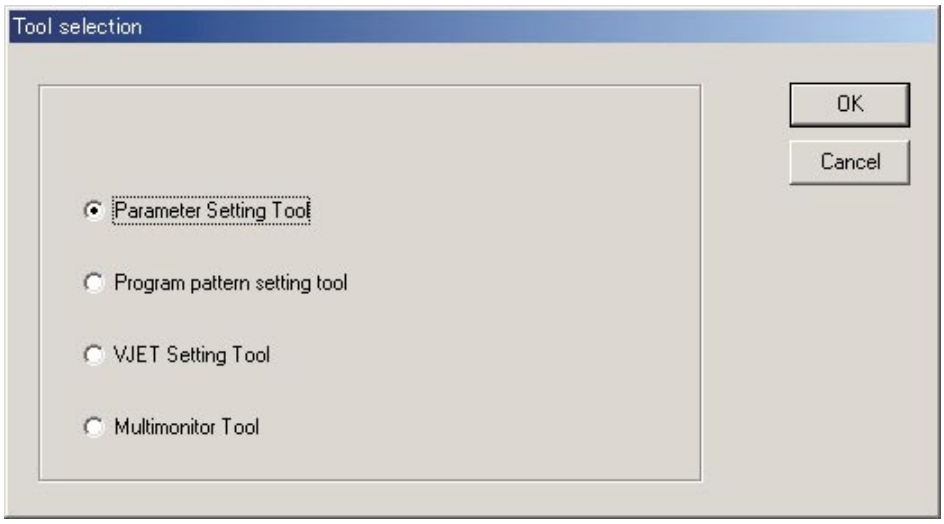

Figure 2.1.1 Tool Selection Dialog Box

(3) Select **Multi-monitor Tool**.

(4) Click **OK**.

(5) The Multi-monitor Starting dialog box (Figure 2.1.2) appears.

Figure 2.1.2 Multi-monitor Starting Dialog Box

(6) See Chapter 4, “Setting the Multi-monitoring Function” when **Start monitor** is selected.
See Chapter 7, “Trend Data File” when **Open trend data** is selected.

■ Operation from the Menu Bar

LL100: From the menu bar, choose **Parameter setting**, then **Run Multi-monitor tool**. The Automatic Scan dialog box (Figure 4.1.1) appears.

LL200: From the menu bar, choose **Custom Computation**, then **Run Multi-monitor tool**. The Automatic Scan dialog box (Figure 4.1.1) appears.

2.2 Quitting the Multi-monitor Tool

● Operation Procedure

(1) From the menu bar, choose **File**, then **Exit**.

(2) The following message box (Figure 2.2.1) appears when the tool is under operation. The following message box (Figure 2.2.2) appears when the tool is not under operation.

- To quit after saving the current trend data, click **YES**. See Section 5.3, “Saving Trend Data.”
- To quit without saving the trend data, click **NO**.
- To cancel quitting, click **CANCEL**.

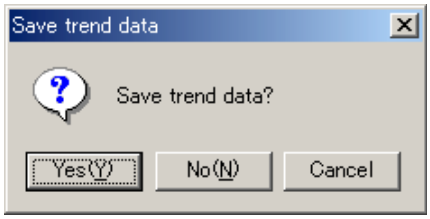

Figure 2.2.1 Save Trend Data Confirming Message Box

(3) The message box (Figure 2.2.2) appears for confirmation.

- To quit, click **YES**.
- To cancel quitting, click **NO**.

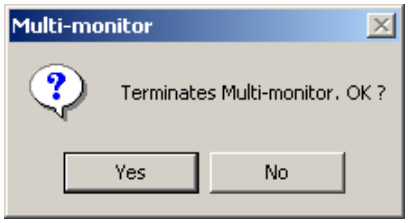

Figure 2.2.2 Close Message Box

3. Work Flow of Multi-monitoring Function

This chapter describes the work flow of Multi-monitoring function.

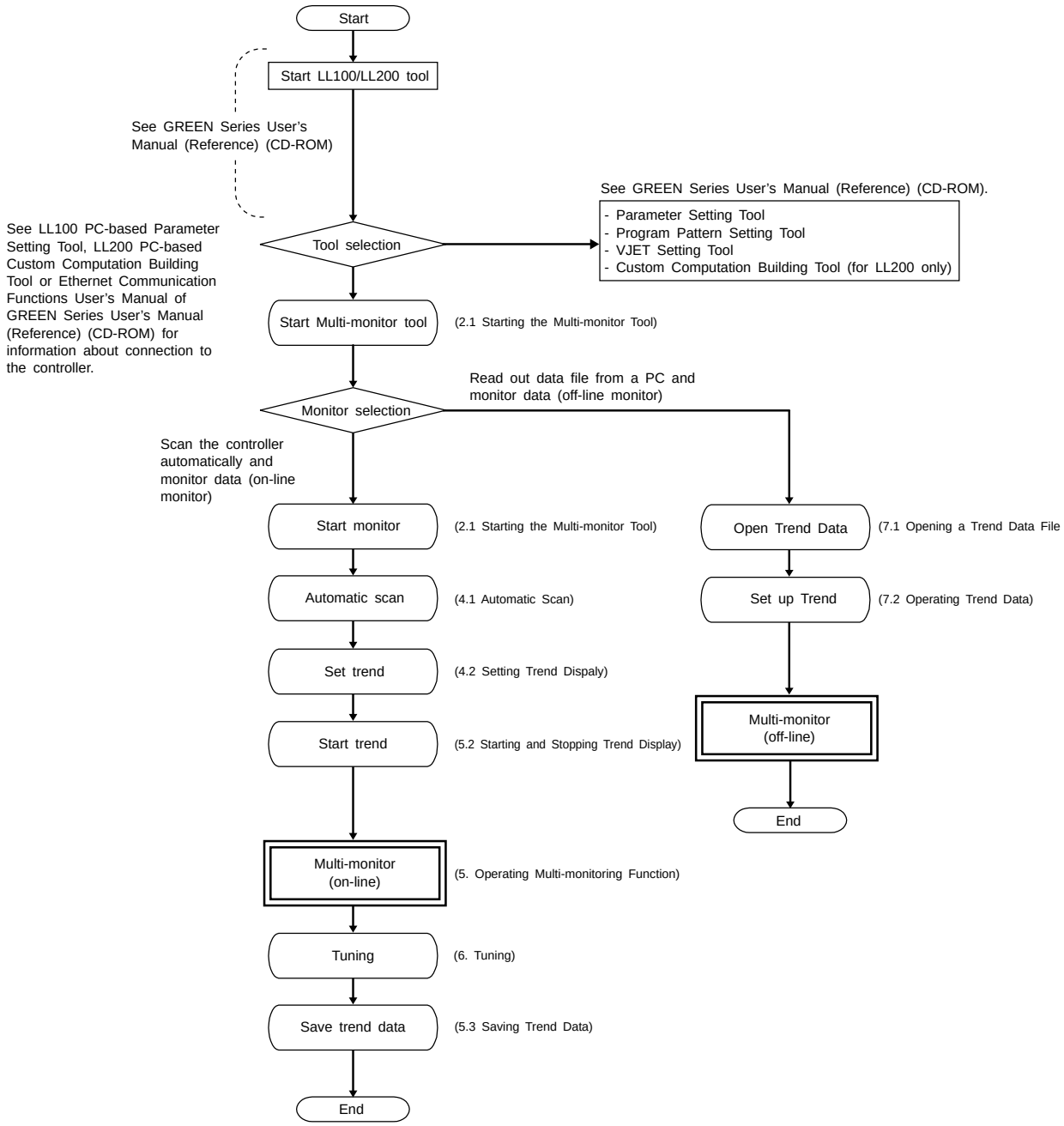

Figure 3.0.1 Work Flow of Multi-monitoring Function

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4. Setting the Multi-monitoring Function

This chapter describes how to set the Multi-monitoring function.

4.1 Automatic Scan

This function allows to detect the GREEN Series controllers connected to the personal computer automatically.

After you choose **Start Monitor** in the Multi-monitor Starting dialog box (Figure 2.1.2), the Automatic Scan dialog box (Figure 4.1.1) appears.

The following three ways can be used for communication.

- Front communication (Optical communication adapter)
- Terminal communication (Serial communication)
- Terminal communication (Ethernet communication)

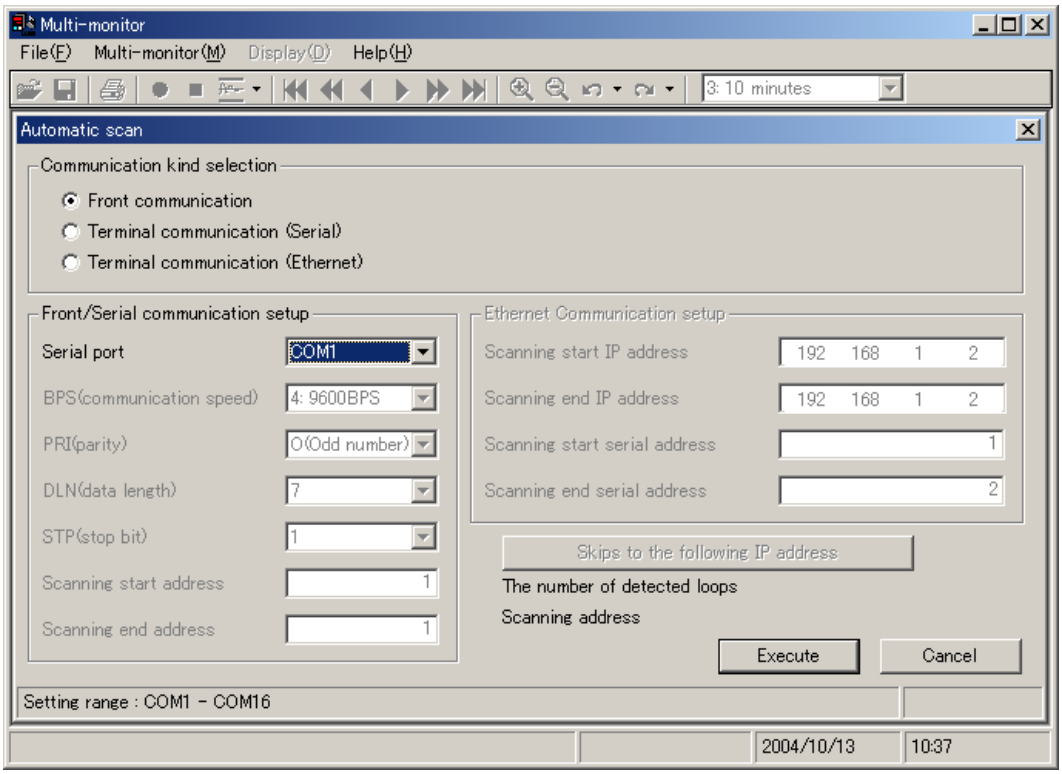


Figure 4.1.1 Automatic Scan Dialog Box

NOTE

Front communication (Optical communication adapter), Terminal communication (Serial communication) and Terminal communication (Ethernet communication) cannot be used for communication (monitoring) at the same time.

■ To Monitor via Supplied Optical Communication Adapter

● Operation Procedure

(1) Click **Front communication**.

(2) From the **Serial port** list, select the communication port of the personal computer from COM1 to COM16.

(3) Connect the controller to the personal computer, and then click **Execute**.

(4) The Trend Setup dialog box (Figure 4.2.1) appears after Automatic scan is completed.

● Connection

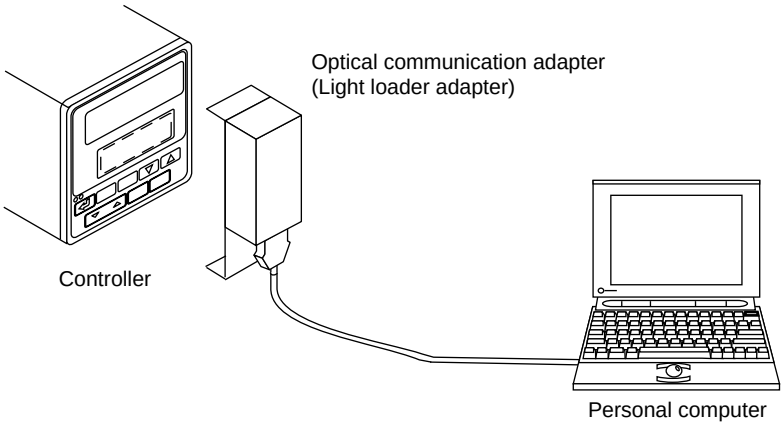


Figure 4.1.2 Connection via Optical Communication Adapter (Light Loader Adapter)

See Also

Section 2.3, “Connecting Controller to Personal Computer” of LL100 PC-based Parameter Setting Tool or LL200 PC-based Custom Computation Building Tool User’s Manual of GREEN Series User’s Manual (Reference) (CD-ROM) for details how to connect the optical communication adapter.

■ To Monitor via Serial Communication Terminals

● Operation Procedure

(1) Click **Terminal communication (Serial)**.

(2) From the **Serial port** list, select the communication port of the personal computer from COM1 to COM16.

(3) Set the RS485 communication parameters.
Select communication speed, parity, data length and stop bit from the drop-down lists. Make the same RS485 communication settings in the target controller.

(4) Set the Scanning start address and Scanning end address

(5) Connect the controller to the personal computer, and then click **Execute**.

(6) The Scanning address and the Number of detected loops are displayed during Automatic scan.

(7) When the 16 loops are detected after starting scanning, the scanning to the Scanning end serial address is completed or **Cancel** is clicked, Automatic scan stops and the Trend Setup dialog box (Figure 4.2.1) appears. When interrupted on the way, the loops already detected by that time can be monitored.

● Example of Connection

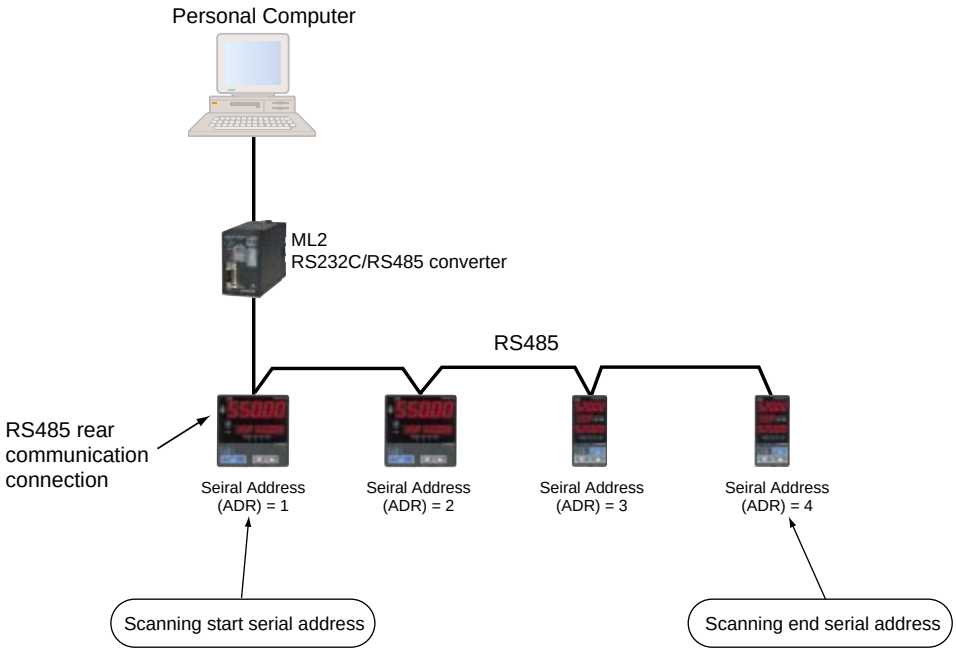


Figure 4.1.3 Example of Serial Communication Connection

● Setting Example of Automatic Scan Dialog Box

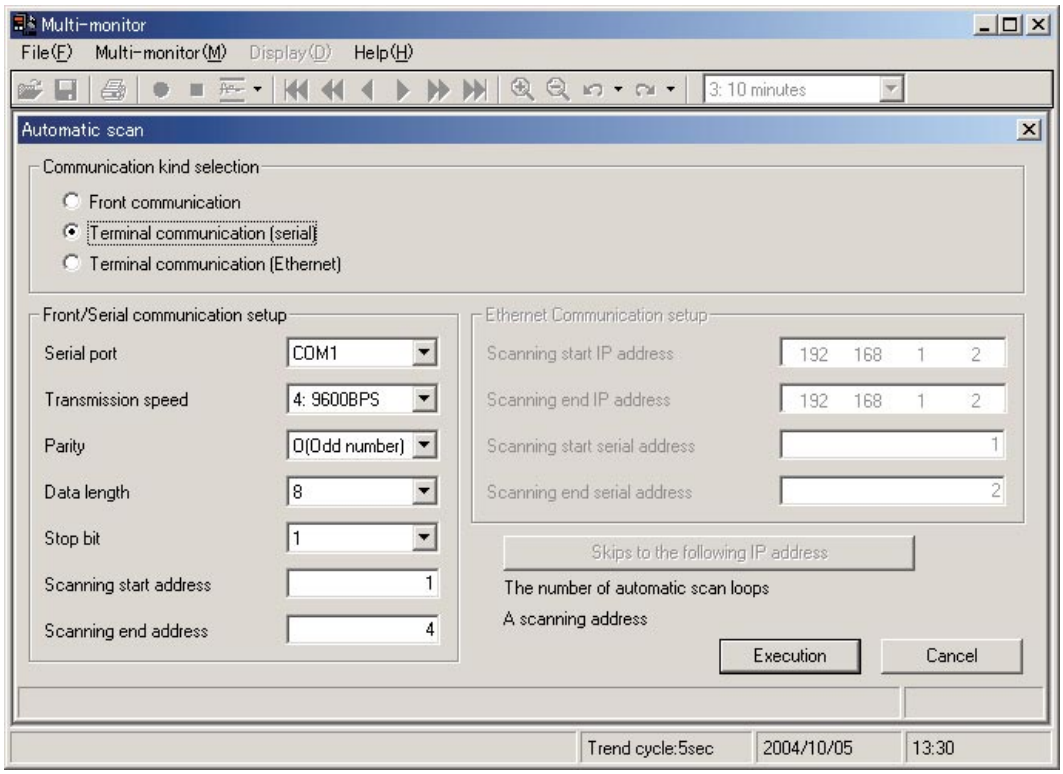


Figure 4.1.4 Setting Example of Serial Communication

NOTE

Discontinuous values like 1, 3, and 5 can be set for each controller as serial address. However, continuous values can shorten time required for Automatic scan.

NOTE

One unit of the following controllers uses two loops:

UT750/UP750 cascade control, dual-loop control, temperature and humidity control and cascade control with two universal inputs

UT550/UT551/UT520/UP550 cascade control.

If the controller above is connected to the 16th loop for Automatic scan, the 16th loop is judged that it does not exist, and Automatic scan stops. The detected 15 loops can be monitored.

NOTE

Communication via serial terminal communication is possible only for GREEN Series controllers with RS485 communication (optional function). For controllers without RS485 communication, always select Front communication.

To communicate via serial terminal communication, set the target controller's RS485 communication protocol to PC-link communication. With other protocol, the serial terminal communication is unavailable. In addition, the RS485 communication parameters (communication speed, parity, stop bit and data length) of both the target controller and the personal computer must be the same.

For the 300 series of old GREEN Series, communication via serial terminal communication is possible only for the controllers with the communication function.

For the 300 series of GREEN Series, select Front communication or Serial terminal communication using the LL operating parameter. To select Serial terminal communication, set the LL parameter to OFF.

See Also

Chapter 2, "Setup" of GREEN Series Communication Functions (IM 05G01B02-01E) of GREEN Series User's Manual (Reference) (CD-ROM) for information about connection for terminal communication.

■ To Monitor via Ethernet Terminal Communication

● Operation Procedure

(1) Click **Terminal communication (Ethernet)**.

(2) Set the target controller's IP address (Scanning start IP address and Scanning end IP address), and RS485 communication address (Scanning start serial address and Scanning end serial address) in the text box.

(3) Connect the controller to the personal computer, and then click **Execute**.

(4) The Scanning address and the Number of detected loops are displayed during Automatic scan.

(5) Automatic scan starts at the Scanning start serial address of the Scanning start IP address. After scanning the Scanning end serial address, the scanning of the next IP address is started. Clicking **Skips to the following IP address** during scanning transfers to the next IP address regardless of the serial address at that time.

(6) When the 16 loops are detected after starting scanning, the scanning to the Scanning end serial address is completed or **Cancel** is clicked, Automatic scan stops and the Trend Setup dialog box (Figure 4.2.1) appears. When interrupted on the way, the loops already detected by that time can be monitored.

NOTE

Consult your network administrator on routing settings.

● Example of Connection

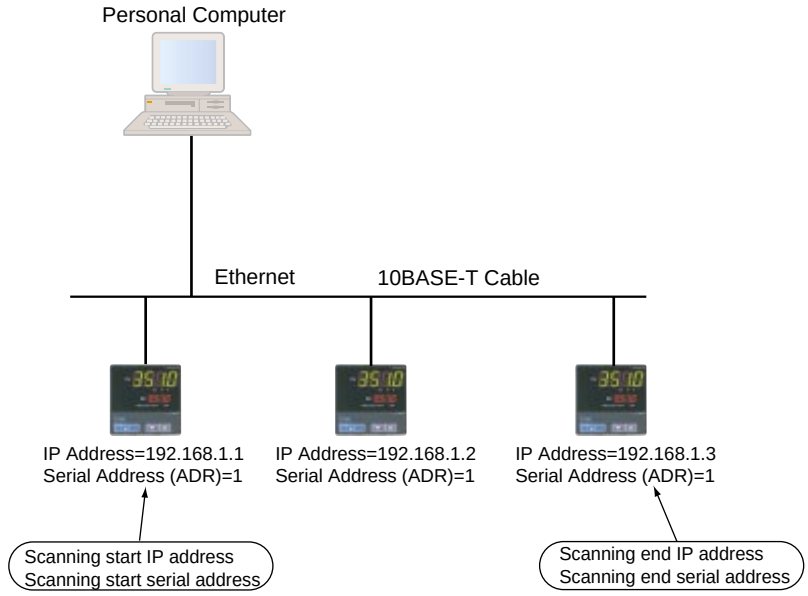


Figure 4.1.5 Example of Ethernet Communication Connection

● Setting Example of Automatic Scan Dialog Box

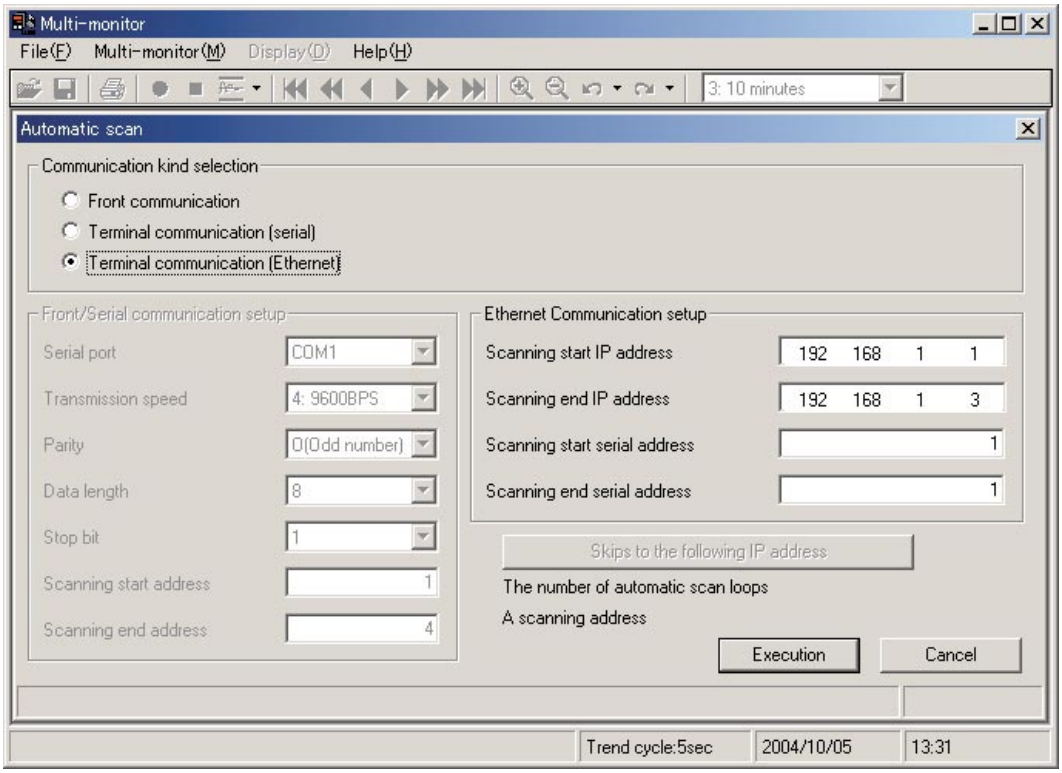
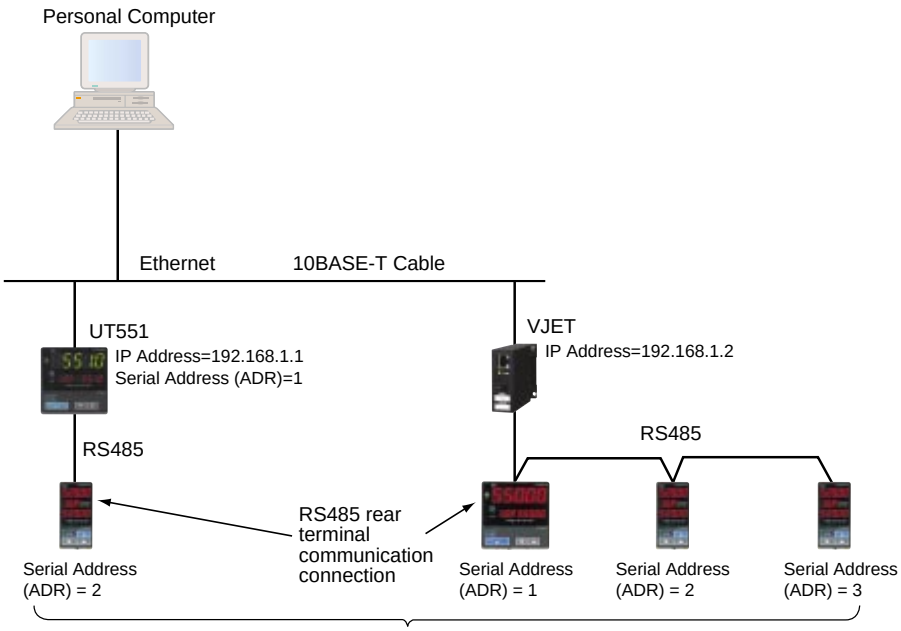


Figure 4.1.6 Setting Example of Ethernet Communication

● Example of Connection when Gateway Function is Used



Scanning start serial address:
The minimum serial address of the connected controllers.
In the example above, Serial address (ADR) = 1 connected to the VJET is the Scanning start serial address.

Scanning end serial address:
The maximum serial address of the connected controllers.
In the example above, Serial address (ADR) = 3 connected to the VJET is the Scanning end serial address.

Figure 4.1.7 Example of Ethernet Communication (Gateway Function) Connection

● Setting Example of Automatic Scan Dialog Box

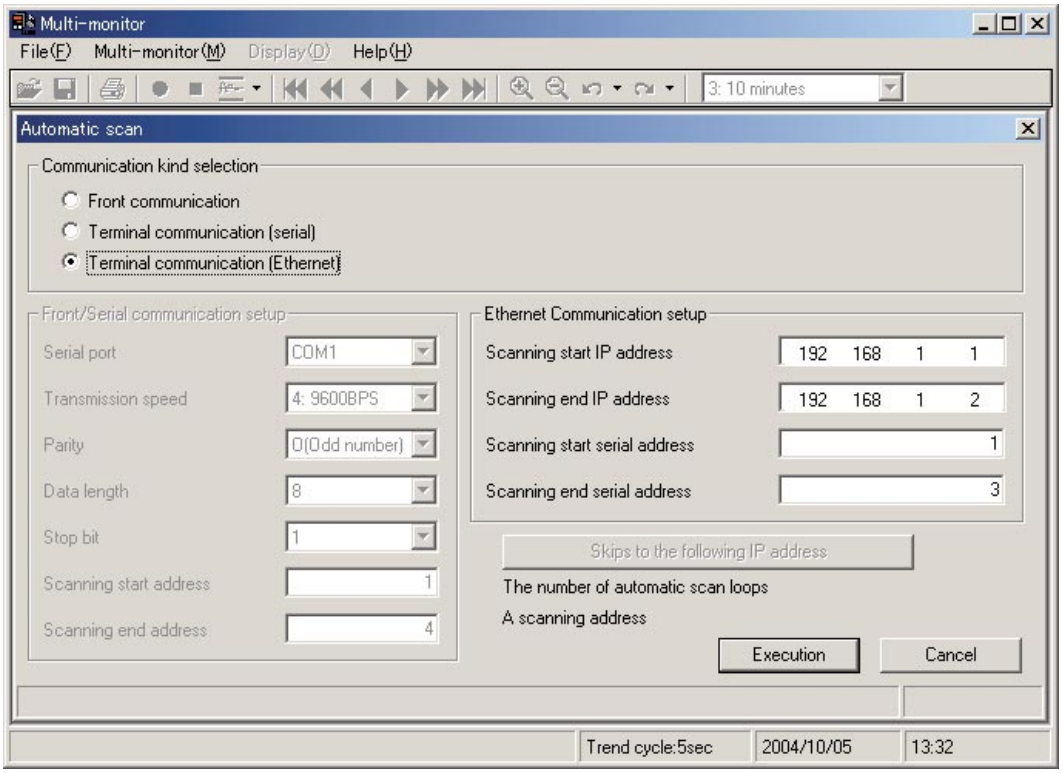


Figure 4.1.8 Setting Example of Ethernet Communication (Gateway Function)

NOTE

Set the minimum serial address of all serial instruments as the Scanning start serial address.

Set the maximum serial address of all serial instruments as the Scanning end serial address.

NOTE

One unit of the following controllers uses two loops:

UT750/UP750 cascade control, dual-loop control, temperature and humidity control and cascade control with two universal inputs

UT550/UT551/UT520/UP550 cascade control.

If the controller above is connected to the 16th loop for Automatic scan, the 16th loop is judged that it does not exist, and Automatic scan stops. The detected 15 loops can be monitored.

See Also

Chapter 2, “Setup” of Ethernet Communication Functions (IM 05G01B52-01E) of GREEN Series User’s Manual (Reference) (CD-ROM) for information about connection for terminal communicaiton.

4.2 Setting Trend Display

● Operation Procedure at the time of the Multi-monitor Start

(1) The Trend Setup dialog box (Figure 4.2.1) appears after Automatic scan is completed.

● Operation Procedure on the Menu Bar

(1) From the menu bar, choose **Multi-monitor**, then **Set trend display**. The scale of trend display can be changed by the operation from the menu bar.

NOTE

The Trend Setup dialog box appears when the operation in Section 7.1, “Opening a Trend Data File” is carried out.

Select the trend data item to be displayed in the Multi-monitor display, scale type and display color in the Trend Setup dialog box.

The figure below shows the setting example of trend display for measured input value (PV), current setpoint (CSP) and control output (OUT) of the controller with Serial gateway function and the controller connected to it.

The connection for the setting example below is shown on the next page.

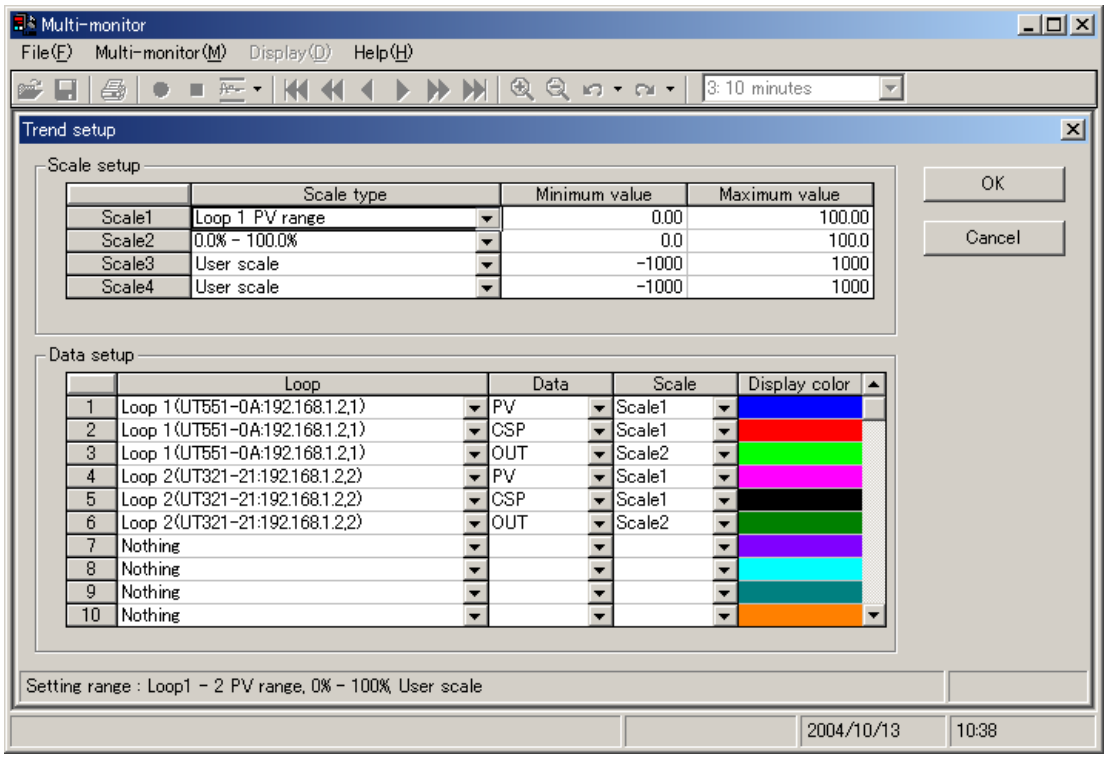


Figure 4.2.1 Trend Setup Dialog Box

Double-clicking the Display color displays the Color Setup dialog box (Figure 4.2.2).

Figure 4.2.2 Color Setup Dialog Box

● Example of Connection

The connection for the setting example of the Trend Setup dialog box (Figure 4.2.1) is shown below. A maximum of 16 data items can be displayed in the Multi-monitor display. In this example, the 6 data items of measured input value (PV), current setpoint (CSP) and control output (OUT) of two controllers are displayed.

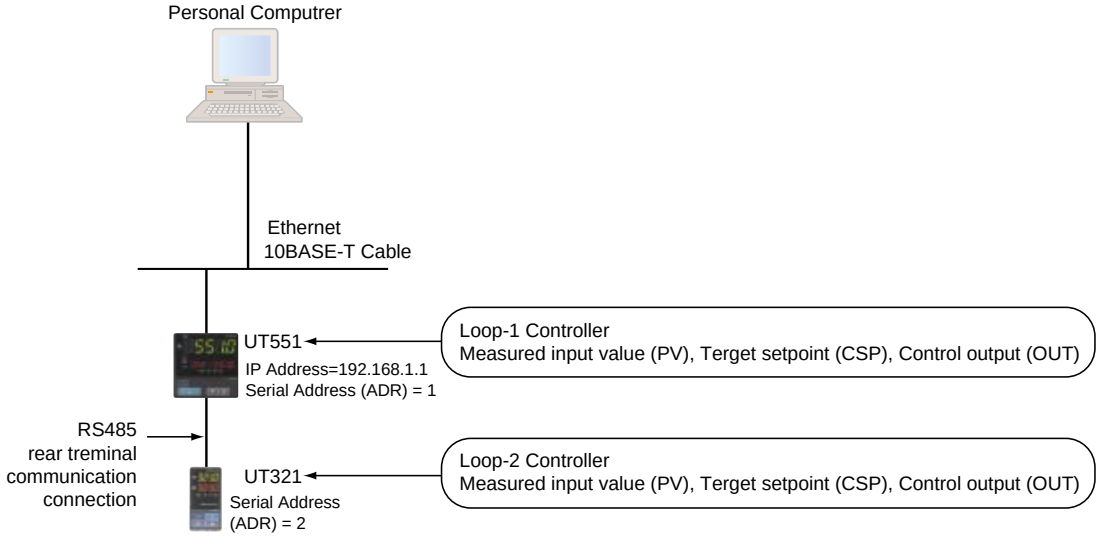


Figure 4.2.3 Example of Connection

4.2.1 Setting Scale

Set the Y-axis scale of the trend data to be displayed in the Multi-monitor display in the Scale Setup.

Select either of “PV range of the loop detected automatically”, “0.0% - 100.0%” or “User scale”. Up to four scale types can be registered.

The maximum value and minimum value can be changed only when the scale type is set to “User scale.”

The maximum value and minimum value for each scale type are as follows.

Table 4.2.1 Scale Type

Scale type	Minimum value	Maximum value	Remarks
PV range of loop1 to loop16	Lower limit of the PV input range of the corresponding loop	Upper limit of the PV input range of the corresponding loop	Upper and lower limits cannot be changed.
0 to 100%	0	100	Upper and lower limits cannot be changed.
User scale	User scale	User scale	Upper and lower limits can be changed on condition that lower limit < upper limit.

Scale setup becomes effective when **OK** is clicked in the Trend Setup dialog box.

4.2.2 Setting Data

Select the trend data item to be displayed in the Multi-monitor display in the Data Setup. A maximum of 16 data item can be displayed.

The trend data items are measured input value (PV), current setpoint (CSP), (heating-side) control output (OUT) and cooling-side control output (OUTc) of the loop detected automatically.

Two or more same data items cannot be registered.

Table 4.2.2 Data Setup

Loop	Data	Scale	Display color
Select loops from loop 1 to loop 16.	Select data item from measured input value (PV), current setpoint (CSP), (heating-side) control output (OUT) and cooling-side control output (OUTc) of the controller of the corresponding loop.	Select the type set in the Scale Setup.	Select the display color for each data item.

NOTE

Measured input value (PV), current setpoint (CSP), (heating-side) control output (OUT), cooling-side control output (OUTc) and alarm generating state of all the loops detected automatically by Automatic scan are collected while the trend display is working.

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5. Operating the Multi-monitoring Function

This chapter describes how to operate the Multi-monitoring function.

5.1 Multi-monitor Display

The followings can be carried out in the Multi-monitor display.

- **Showing / hiding, scrolling, zooming in and zooming out of trend data**
- **Start / stop of trend display and saving of trend data**
- **Display in the Panel view of measured input value (PV), current setpoint (CSP), (heating-side) control output (OUT), cooling-side control output (OUTc) and alarm generating state of the connected loop**
- **Tuning of the controller of connected loop**
- **Pop-up display of tuning data on a chart**

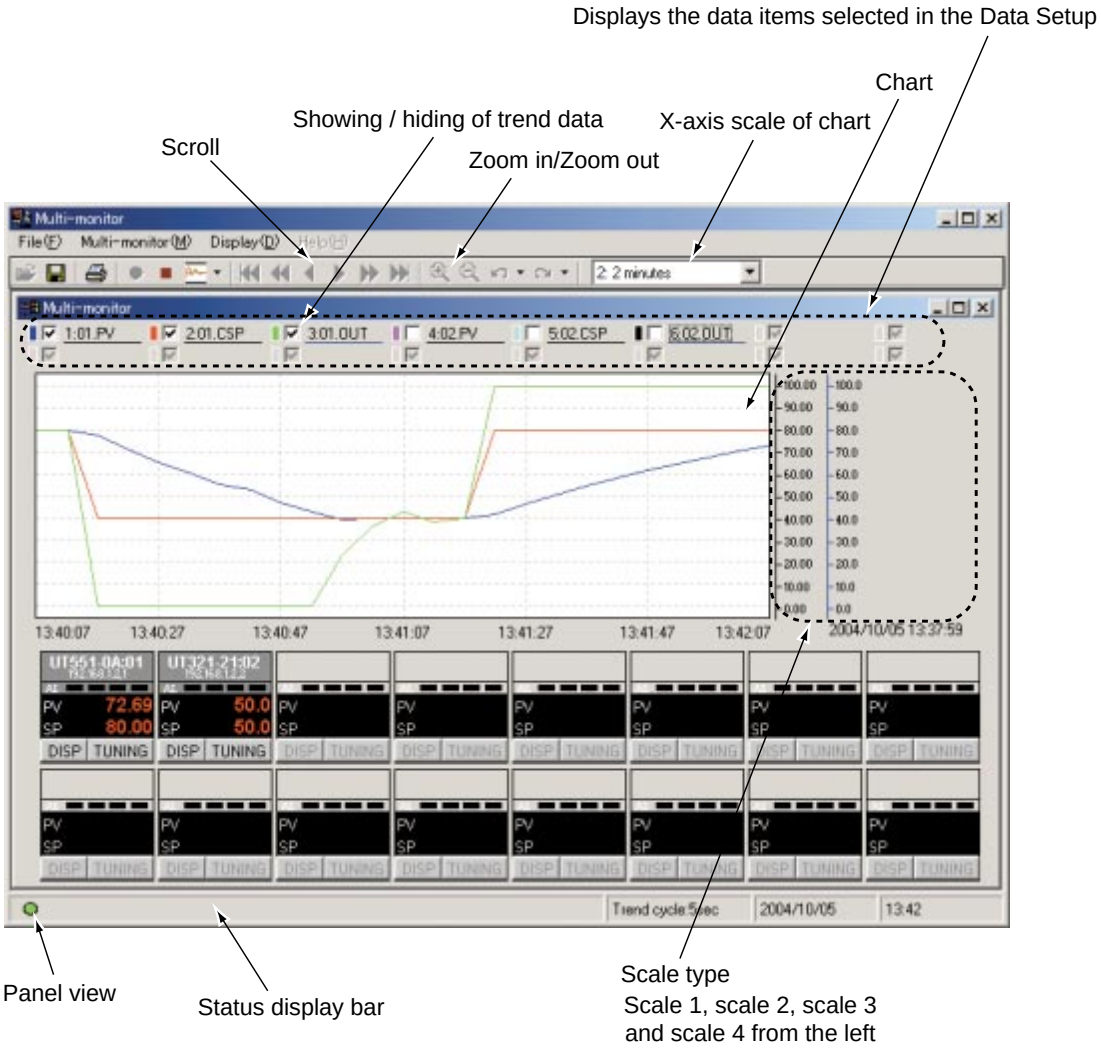


Figure 5.1.1 Multi-monitor Display while Trend Display is Stopped

5.2 Starting and Stopping Trend Display

■ Starting Trend Display

● Operation Procedure

(1) From the toolbar, click the [●] shortcut, or from the menu bar, choose **Multi-monitor**, then **Start trend display** while the trend display is stopped.

(2) Trend display starts.

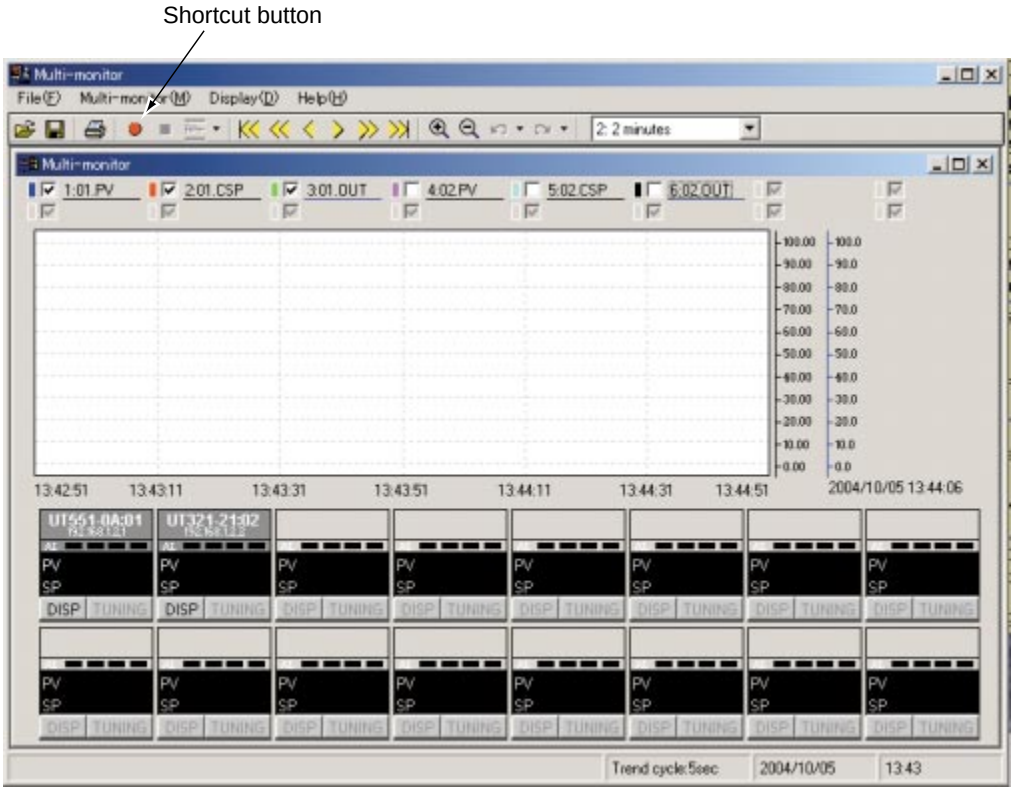


Figure 5.2.1 Multi-monitor Display while Trend Display is Working

■ Stopping Trend Display

● Operation Procedure

(1) From the toolbar, click the [■] shortcut, or from the menu bar, choose **Multi-monitor**, then choose **Stop trend display** while the trend display is working.

(2) The following message box (Figure 5.2.2) appears for confirmation.

- To stop trend display after saving the current trend data, click **YES**. See Section 5.3, “Saving Trend Data.”
- To stop trend display without saving the trend data, click **NO**.
- To cancel stopping trend display, click **CANCEL**.

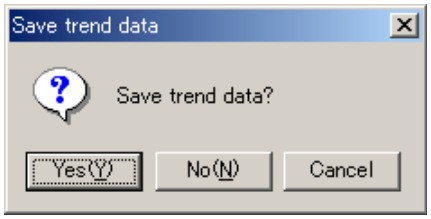


Figure 5.2.2 Save Trend Data Confirming Message Box

NOTE

By stopping the trend display, it will be in a trend display stop state. In this manual, the state where the trend display is not performed and the trend data file is opened is named generically “The trend display is stopped.”

NOTE

If opening a saved trend data file while the trend display is stopped, and then starting the trend display again, the Automatic Scan dialog box appears. Trend display can be started after Automatic scan and the setup for trend display are completed.

NOTE

The Multi-monitor tool can hold a maximum of 65000 times of trend data regardless of a trend cycle. When exceeds 65000 times, trend data is discarded from old data. Periodical saving of monitored data as a file is recommended. The saved data is the trend data of the time of data saving. If the trend cycle is 5 seconds (data acquisition per 5 seconds), data saving of about 90 hours is continuously possible.

5.3 Saving Trend Data

Trend data can be saved while trend display is working or stopped.

Measured input value (PV), current setpoint (CSP), (heating-side) control output (OUT), cooling-side control output (OUTc), alarm generating state and tuning data (if recorded in the Tuning display) of all the loops detected automatically can be saved as a CSV file.

● Operation Procedure

(1) From the toolbar, click the [ ] shortcut, or from the menu bar, choose **File**, and then **Save trend data**.

(2) The Save Trend Data dialog box (Figure 5.3.1 or Figure 5.3.2) appears. In the **File name** text box, enter a file name then click **Save**.

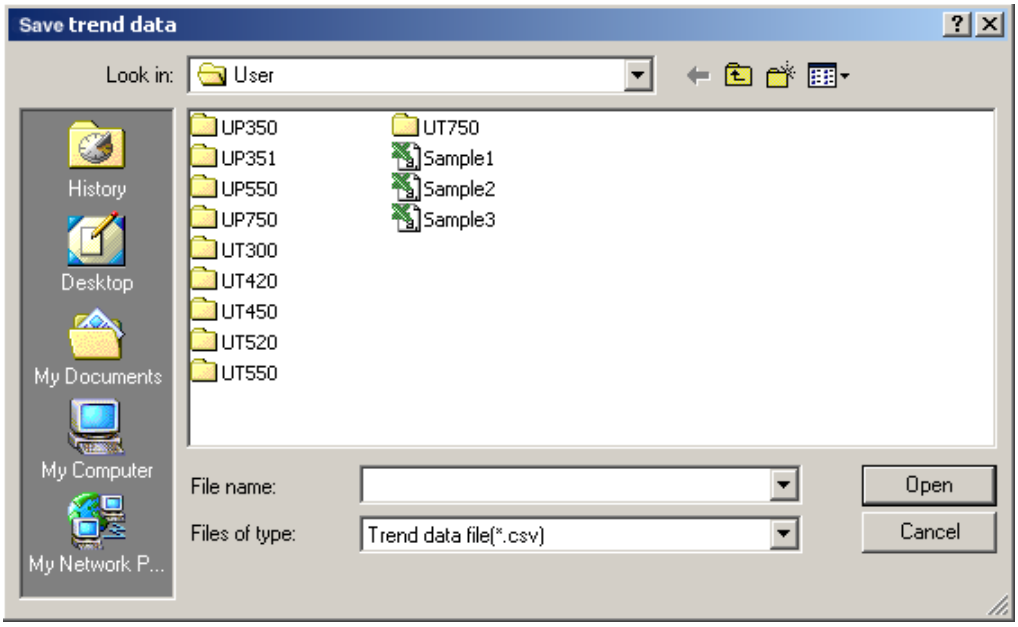


Figure 5.3.1 Save Trend Data Dialog Box while Trend Display is Stopped

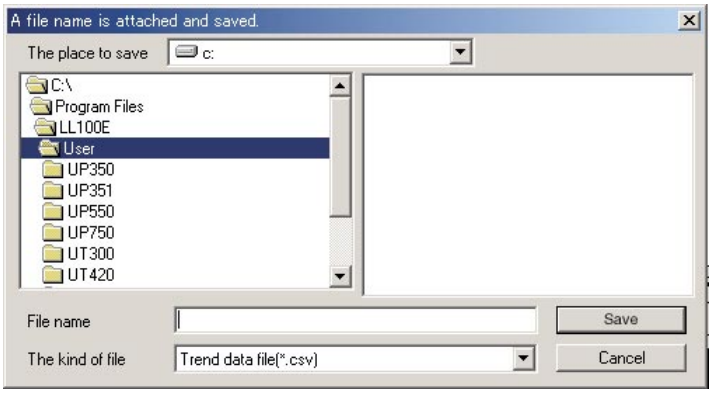


Figure 5.3.2 Save Trend Data Dialog Box while Trend Display is Working

NOTE

If stopping the trend display, and then starting it again without saving the current trend data, the trend data is discarded.

5.4 Setting Trend Display Cycle

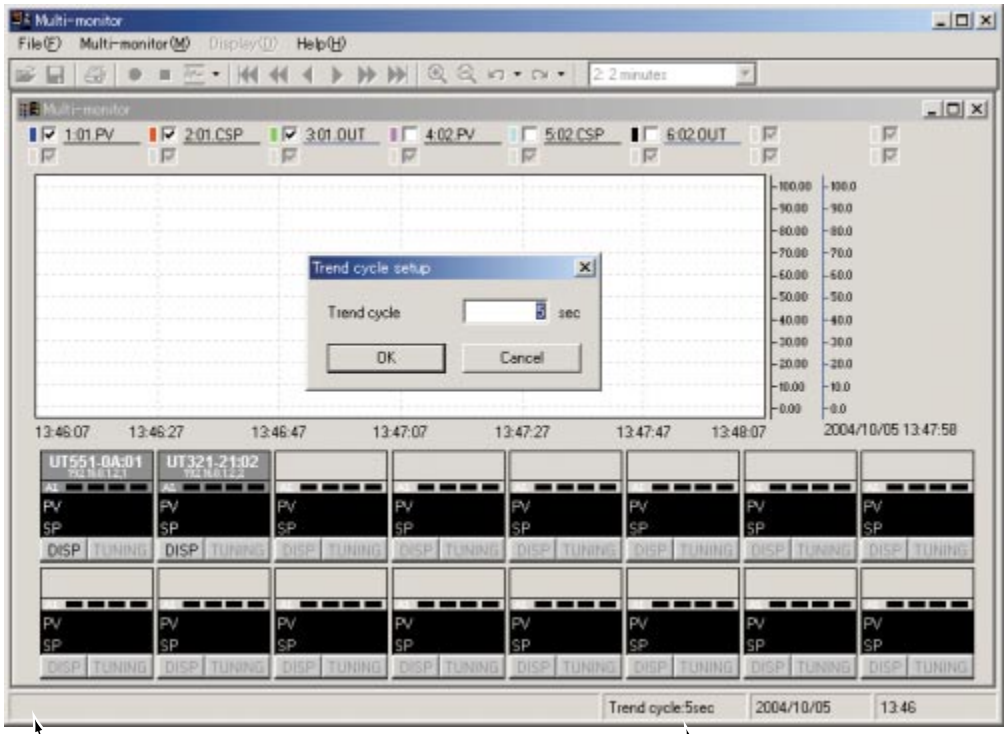
Trend display cycle can be changed while trend display is working or stopped.

● Operation Procedure

(1) From the status display bar, double-click **Trend cycle**, or from the menu bar, choose **Multi-monitor**, then **Change trend cycle** while trend display is working or stopped.

(2) The Trend Cycle dialog box (Figure 5.4.1) appears. The setting range is 1 to 3600 sec. The initial value is 5 sec.

(3) Change the trend display cycle, and then click **OK**.



Communication status lamp
Green: Data acquisition state is good.
Red: Data acquisition state is bad.

Status display bar

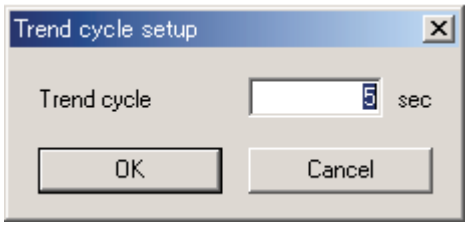


Figure 5.4.1 Trend Data Cycle Dialog Box

NOTE

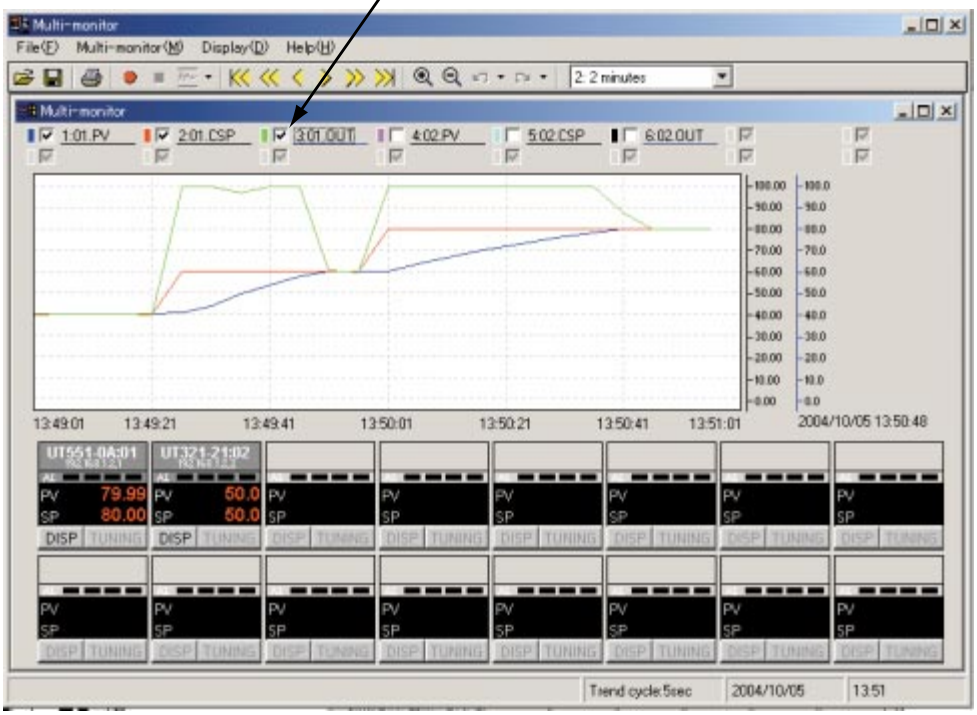
If trend display cycle is shortened, data acquisition may not be completed within the trend display cycle when many loops are connected. The communication status lamp on the status display bar becomes red. In this case, set a longer trend display cycle to complete data acquisition within the trend display cycle.

5.5 Operating Trend Display Function

5.5.1 Showing / Hiding Trend Data

Showing / hiding of trend data to be displayed in the Multi-monitor display can be switched while trend display is working or stopped.

Checked: Shows trend data
Control output trend of loop 1 is displayed.



Blank: Hides trend data
Control output trend of loop 1 is not displayed.

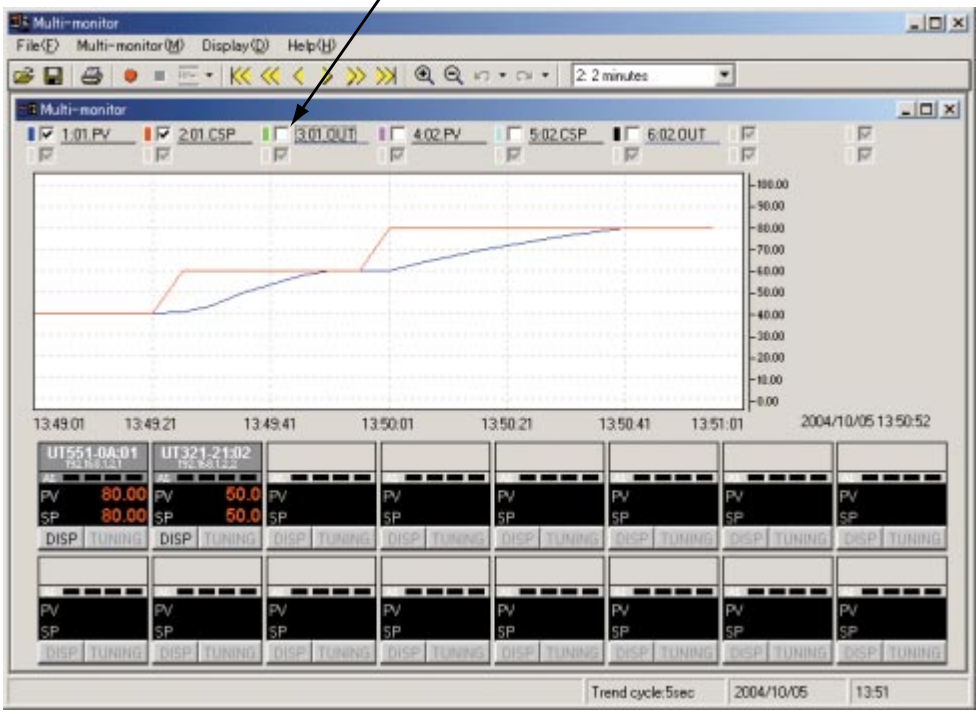


Figure 5.5.1 Showing / Hiding of Trend Data

5.5.2 Scrolling Trend Display

The displayed trend data can be scrolled while the trend display is stopped. click the shortcut button from the toolbar, or operate from the menu bar (Table 5.5.1).

Table 5.5.1 Scroll of Trend Display

Function Name	Shortcut Button	Menu Bar Operation	Remarks
Start		[Display(D)]-[Move(M)]-[Start]	The left end of a chart is displayed as start data.
-1/2 scrolling		[Display(D)]-[Move(M)]-[-1/2 scrolling]	On the present X-axis scale, it scrolls 1/2 of the X-axis scale to the past.
-1/4 scrolling		[Display(D)]-[Move(M)]-[-1/4 scrolling]	On the present X-axis scale, it scrolls 1/4 of the X-axis scale to the past.
1/4 scrolling		[Display(D)]-[Move(M)]-[1/4 scrolling]	On the present X-axis scale, it scrolls 1/4 of the X-axis scale to the future.
1/2 scrolling		[Display(D)]-[Move(M)]-[1/2 scrolling]	On the present X-axis scale, it scrolls 1/2 of the X-axis scale to the future.
Newest		[Display(D)]-[Move(M)]-[Newest]	The right end of a chart is displayed as the newest data.

5.5.3 Changing X-axis Scale

The X-axis to be displayed in the Multi-monitor display can be changed while the trend display is working or stopped. Select from the drop-down list on the toolbar (Figure 5.5.2) or operate from the menu bar (Table 5.5.2).

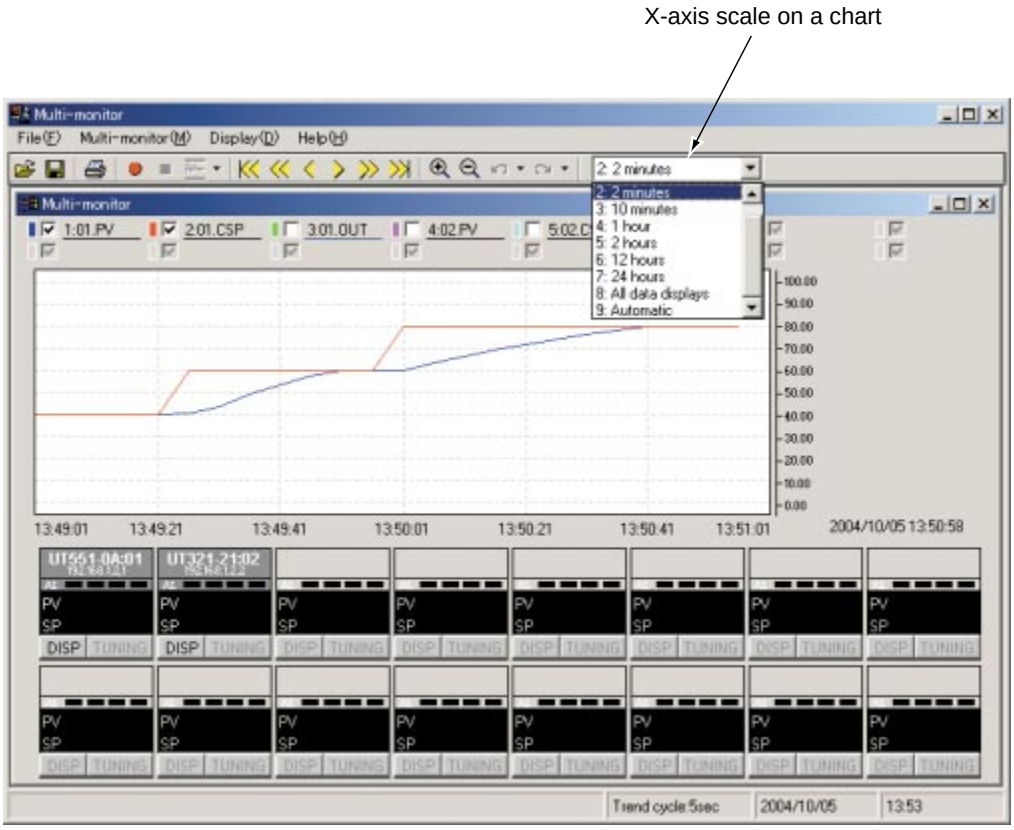


Figure 5.5.2 X-axis Scale

Table 5.5.2 X-axis Scale

Function Name	Menu Bar Operation	Remarks
1-minute display	[Display(D)]-[X-axis scale(X)]-[1:1 minute]	The X-axis scale to be displayed on a chart is 1 minute.
2-minute diplay	[Display(D)]-[X-axis scale(X)]-[2:2 minutes]	The X-axis scale to be displayed on a chart is 2 minutes.
10-minute diplay	[Display(D)]-[X-axis scale(X)]-[3:10 minutes]	The X-axis scale to be displayed on a chart is 10 minutes.
1-hour display	[Display(D)]-[X-axis scale(X)]-[4:1 hour]	The X-axis scale to be displayed on a chart is 1 hour.
2-hour diplay	[Display(D)]-[X-axis scale(X)]-[5:2 hours]	The X-axis scale to be displayed on a chart is 2 hours.
12-hour diplay	[Display(D)]-[X-axis scale(X)]-[6:12 hours]	The X-axis scale to be displayed on a chart is 12 hours.
24-hour diplay	[Display(D)]-[X-axis scale(X)]-[7:24 housrs]	The X-axis scale to be displayed on a chart is 24 hours.
All data display	[Display(D)]-[X-axis scale(X)]-[8:All data]	All data is displayed. The left end of a chart is displayed as the start time, the right end as the newest time.
Automatic	None	Automatic is selected automatically when the scale is changed by Zoom in or Zoom out. (Cannot be changed)

5.5.4 Zooming in and Zooming out Trend Display

Trend display can be zoomed in or zoomed out while the trend display is stopped.

● Toolbar Shortcut Operation or Menu Bar Operation

Table 5.5.3 Zoom in and Zoom out

Function Name	Shortcut Button	Menu Bar Operation	Remarks
Zoom in		[Display(D)]-[Zoom(Z)]-[Zoom in(I)]	Trend display is zoomed in by changing the scale of the X-axis nX% and Y-axis nY%.
Zoom out		[Display(D)]-[Zoom(Z)]-[Zoom out(O)]	

● Mouse Operation

Mouse operaiton is described in Figure 5.5.3 and Figure 5.5.4.

Table 5.5.4 Zoom in and Zoom out

Function Name	Operation
Zoom in	On a chart, move a mouse to the right with the left click of the mouse carried out, and then cancel the left click.
Zoom out	On a chart, move a mouse to the left with the left click of the mouse carried out, and then cancel the left click.

● Operation to Reset Display Scale

To reset the zoomed in or zoomed out display, on the toolbar, choose **Display**, **Zoom**, then **Reset**. In this case, X-axis is set to 10 minutes. Change it as necessary.

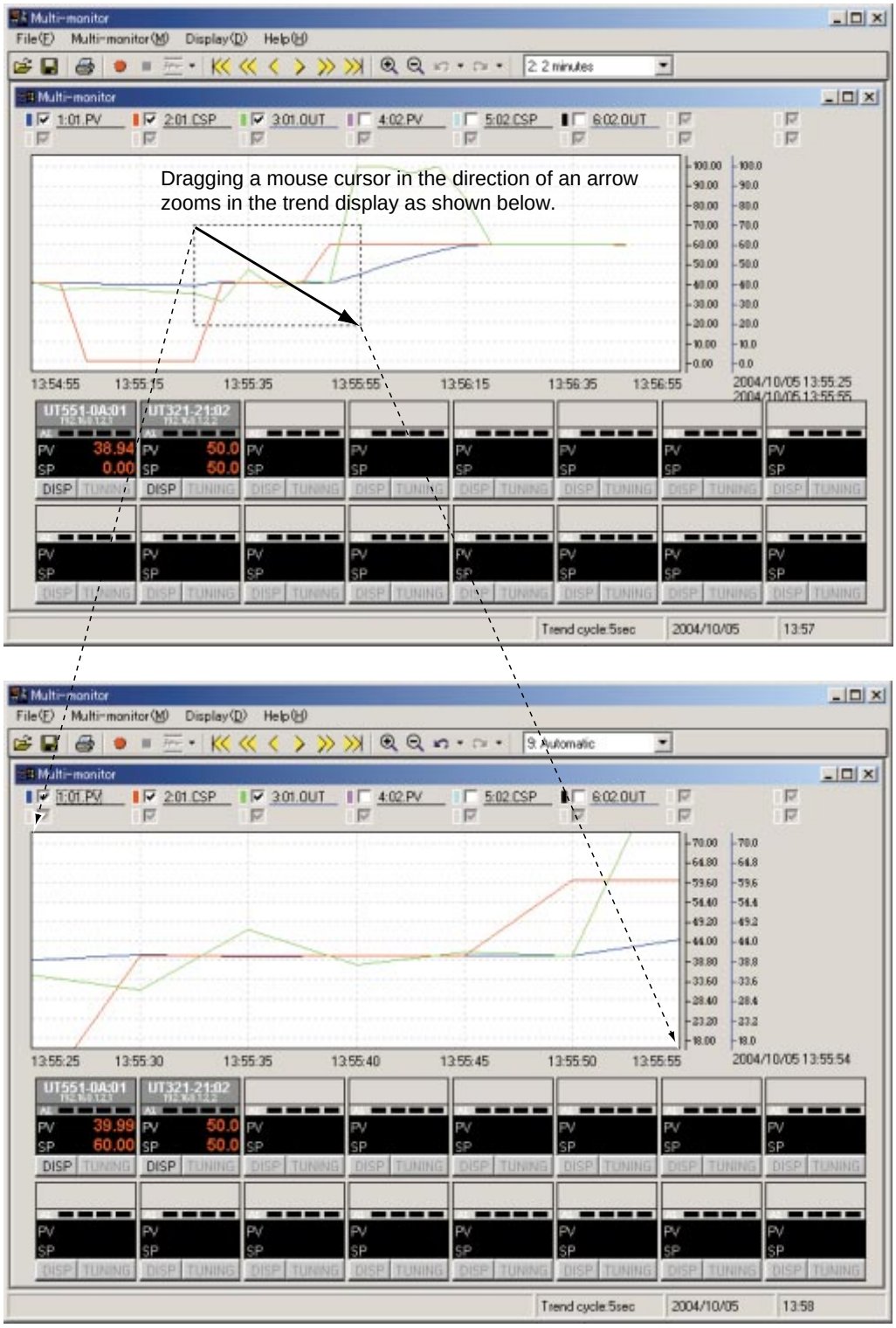


Figure 5.5.3 Zoom in

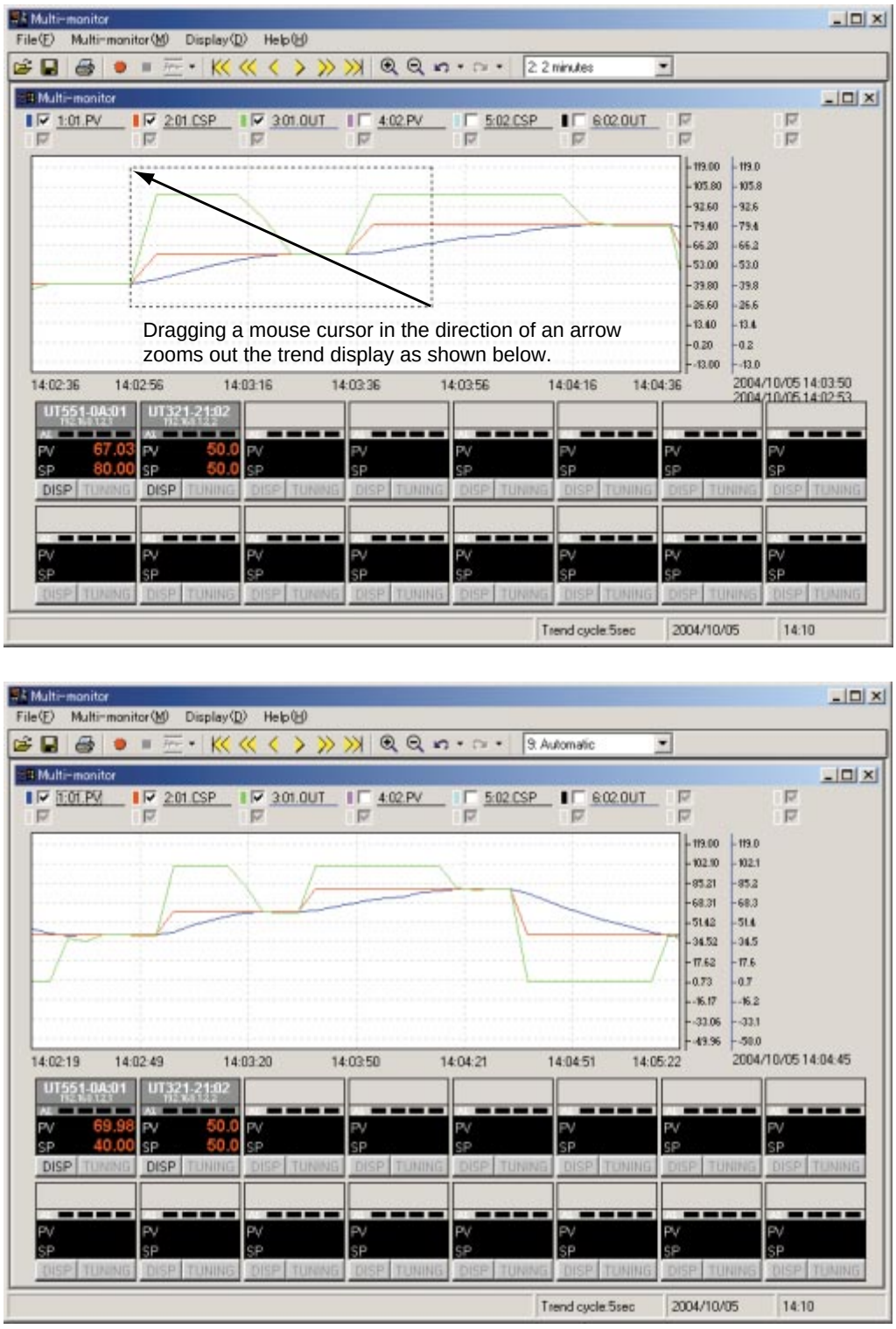


Figure 5.5.4 Zoom out

5.6 Panel View

Data of each loop are displayed in the Panel view (Figure 5.6.1) on the lower part of Multi-monitor display.

While the trend display is working: Displays the newest data.

While the trend display is stopped: Displays the data of the position where a mouse cursor is placed.

All data of X-axis where a mouse cursor is placed are displayed.

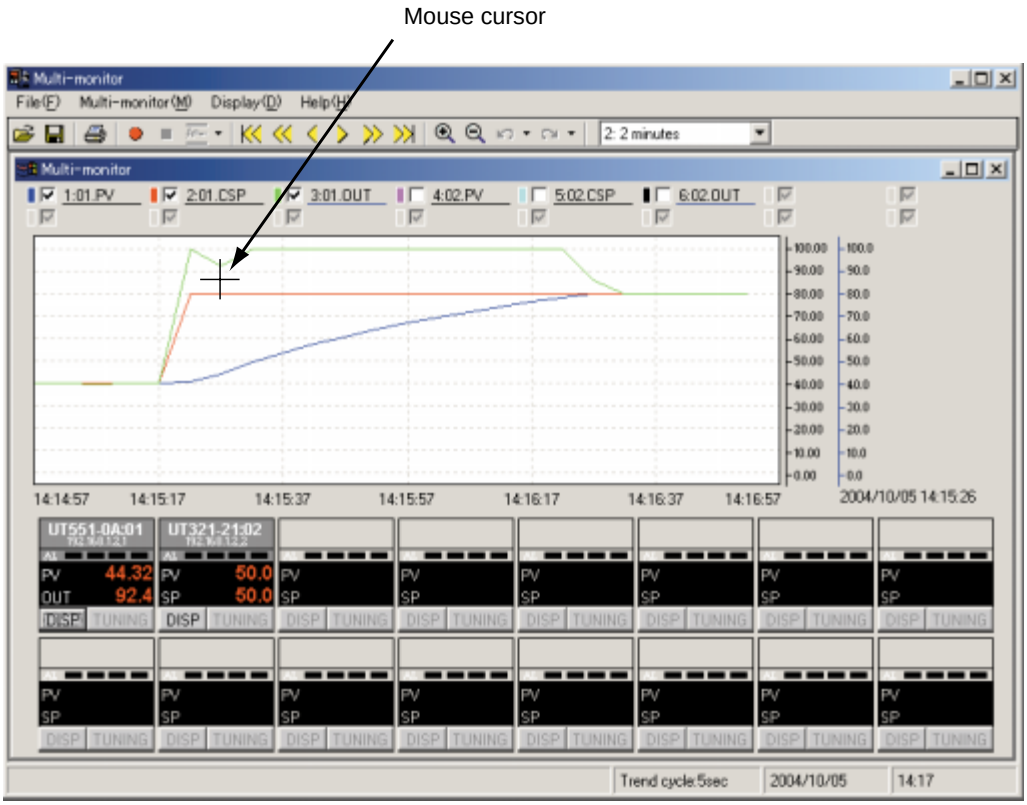


Figure 5.6.1 Confirmation of Trend Data

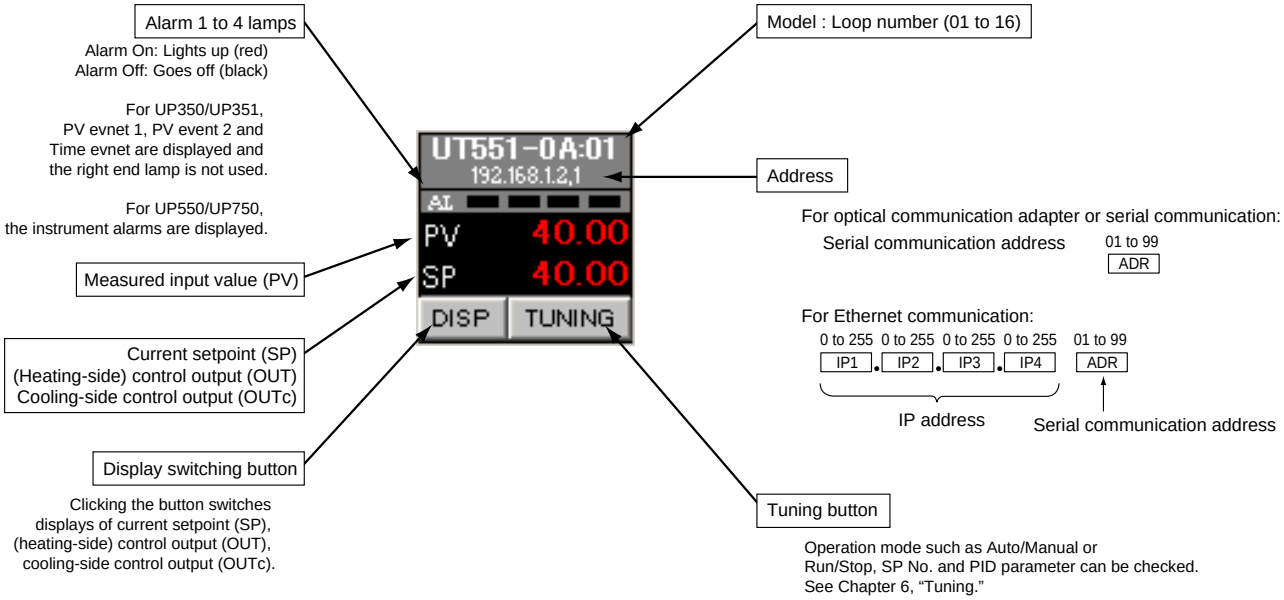


Figure 5.6.2 Panel View

NOTE

For UP350 and UP351, alarm status lamps indicate PV event 1, PV event 2 and Time event. The right end lamp is always off.

For UT550, alarms 5 to 8 are not displayed when eight alarms are used.

5.7 Status Display

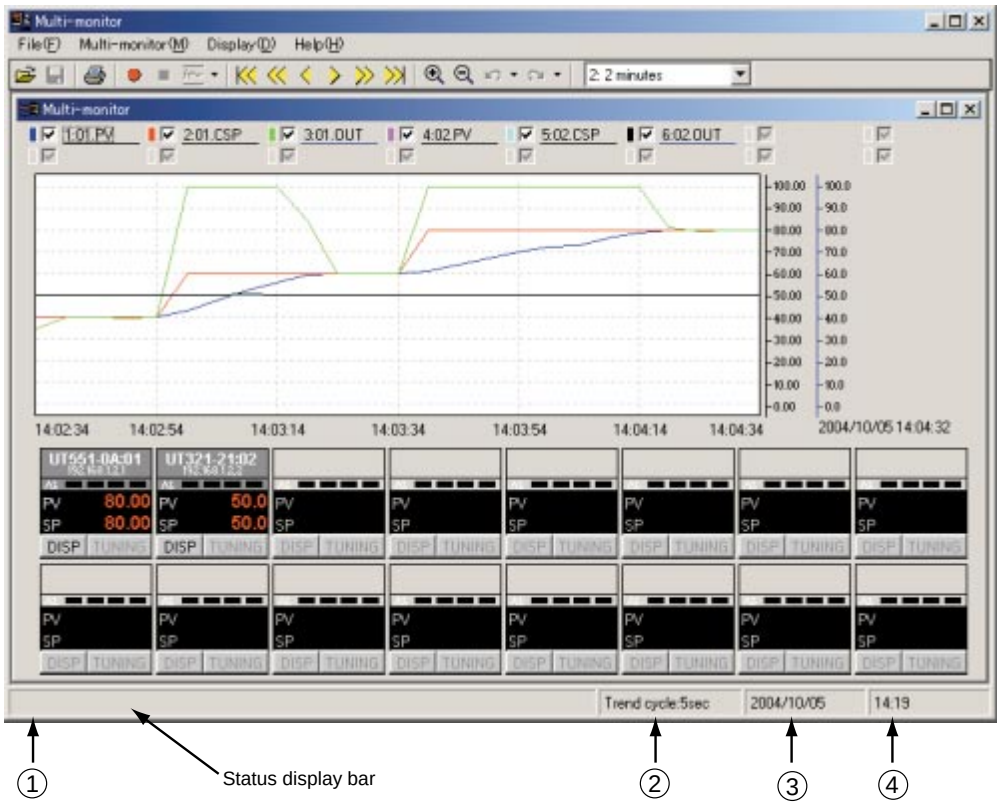


Figure 5.7.1 Status Display

Table 5.7.1 Status Display

Display Position	Status	Display	Remarks
①	Under communication	Green lamp lights up	Blinks for every trend cycle
①	Communication delay occurs	Red lamp lights up	Blinks for every trend cycle
②	Trend cycle	Trend cycle	Double-clicking displays the Trend Cycle dialog box by pop-up one.
①	Progress	Progress bar display	Rate of Progress is displayed when processing takes time.
③	Date	PC system date	Year/month/day
④	Time	PC system time	Time: minute

5.8 Printing Function

The Multi-monitor display (Figure 5.8.1) can be printed or copied to a cliploard.

Print: On the menu bar, click **File**, and then choose **Print**.

Hard copy: On the menu bar, click **File**, and then choose **Copy to clipboard**.

● Operation Procedure for Printing

(1) On the menu bar, Click **File**, and then choose **Print**.

(2) The Printer Selection dialog box appears. However, not appears while trend data is working.

(3) The Multi-monitor display is printed.

● Operation Procedure for Copying to Clipboard

(1) From the menu bar, choose **File**, then **Copy to clipboard**.

(2) The Multi-monitor display can be pasted on drawing software and the like.

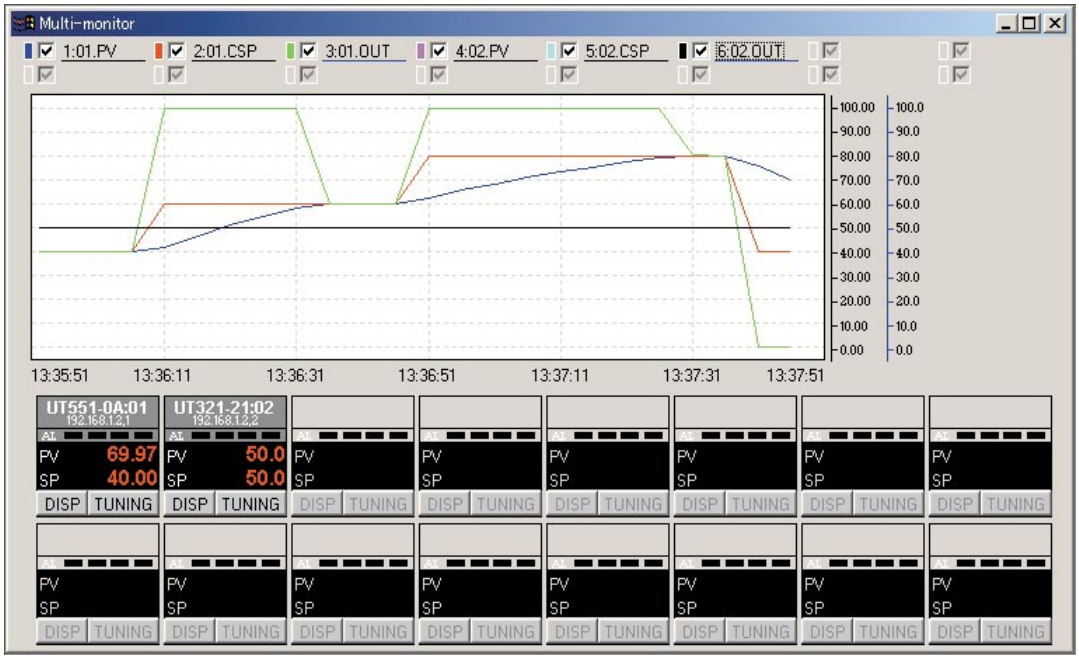


Figure 5.8.1 Example of Hard Copy

6. Tuning

This chapter describes how to tune the Multi-monitoring function.

6.1 Tuning

Tuning of the loop detected automatically by Automatic scan can be tuned.

● Operation Procedure

(1) Click **TUNING** button in the Panel view of the loop to be tuned, or select the loop to be tuned from the [ ] drop-down list on the toolbar while trend display is working.

(2) The Tuning dialog box of the corresponding loop appears (Figure 6.1.1).

(3) The current setpoint is displayed. Select the value of the parameter to be changed from the drop-down list, or double-click the text box to enter the required value.

(4) Data change of the controller is activated when ENTER key is pressed.

(5) Refer to Section 6.2, “Saving Tuning Data” when saving the tuning data. Click **Close** when not saving the tuning data.

NOTE

Tuning can be carried out only when trend display is working. Tuning cannot be carried out for the saved data opened by selecting **Open trend data**.

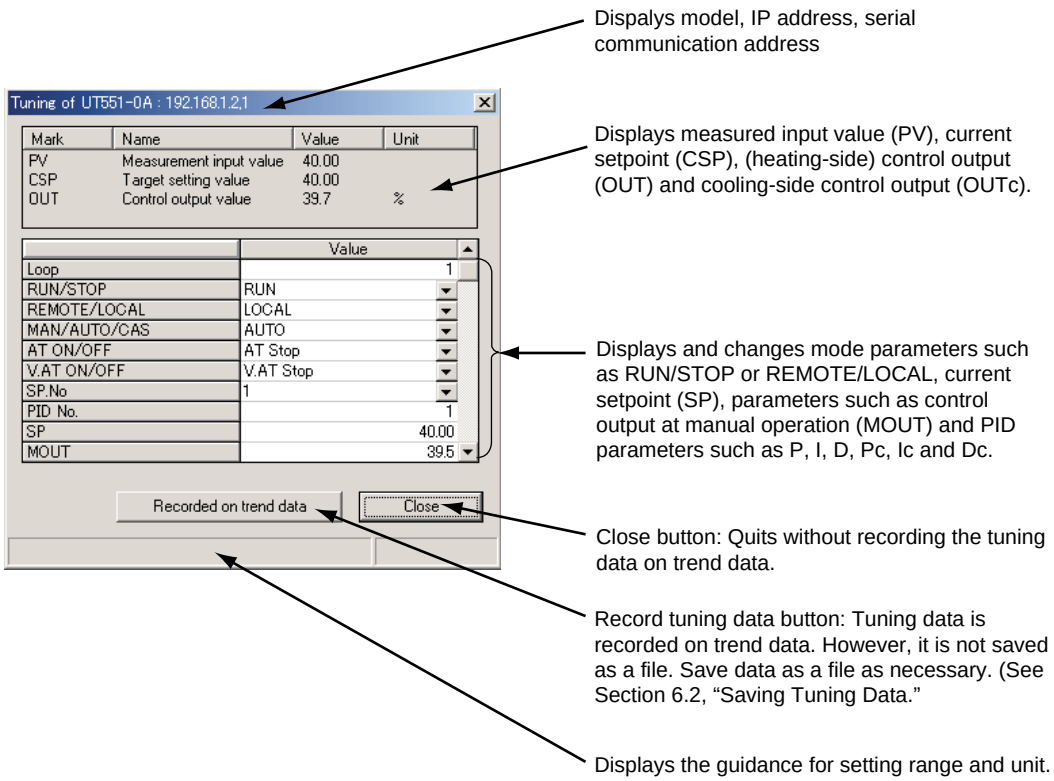


Figure 6.1.1 Tuning Dialog Box

■ Displaying and Setting Modes

Select a value from the drop-down list for the following mode.

Loop 1/2: Displays the loop when the controller is in dual-loop control, temperature and humidity control or cascade control.

RUN/STOP: Displays and changes the RUN/STOP status of the controller

REMOTE/LOCAL: Displays and changes the Remote/Local mode of the controller

MAN/AUTO/CAS: Displays and changes the Manual/Auto (/Cascade) mode of the controller. (CAS is not provided for UT450/UT420.)

AT ON/OFF: Starts and stops auto-tuning. After you start auto-tuning, optimized PID parameter values are set in the controller.

V.AT ON/OFF: Starts and stops automatic valve tuning. (Only for position proportional type controllers)

RESET/PROG1/PROG2: Displays and changes the Program 1 start/Program 2 start/ Operation stop of the controller.

RESET/PROG/LOCAL: Displays and changes the Program operation start/Local operation start/Operation stop of the controller.

■ Displaying and Setting Parameters

Enter a value in the text box for the following data.

See the User's Manual of each controller for the setting contents of parameters.

SP No: Displays and changes the SP number.

PID No.: Displays the PID group number.

SP: Displays and changes the current setpoint.

LSP: Displays and changes the local setpoint.

LPID: Displays and changes the PID number in LOCAL mode.

PTN: Displays the program pattern number.

PID No.: Displays the PID number.

MOUT: Displays and changes the control output (heating-side control output) in Manual mode.

MOUTc: Displays and changes the cooling-side control output in Manual mode.

P: Displays and changes the (heating-side) proportional band.

I: Displays and changes the (heating-side) integral time.

D: Displays and changes the (heating-side) derivative time.

Pc: Displays and changes the cooling-side proportional band.

I: Displays and changes the cooling-side integral time.

D: Displays and changes the cooling-side derivative time.

Table 6.1.1 Tuning Parameter

Function	UT350/UT320/UT351/UT321	UT450/UT420	UT550/UT520/UT551/UT750
Run / Stop switching	-	RUN/STOP	RUN/STOP
Remote / Local switching	-	REMOTE/LOCAL	REMOTE/LOCAL
Manual / Automatic (/ Cascade) switching	MAN/AUTO	MAN/AUTO	MAN/AUTO/CAS
Auto-tuning	AT ON/OFF	AT ON/OFF	AT ON/OFF
Automatic valve tuning	-	V.AT ON/OFF	V.AT ON/OFF
SP No.	SP. No	SP. No	SP. No
PID No.	PID No. (display only)	PID No. (display only)	PID No. (display only)
Target (Current) Setpoint	SP	SP	SP
(Heating-side) control output	MOUT	MOUT	MOUT
Cooling-side control output	MOUTc	MOUTc	MOUTc
(Heating-side) Proportional band	P	P	P
(Heagting-side) Integral time	I	I	I
(Heating-side) Derivative time	D	D	D
Cooling-side proportional band	Pc	Pc	Pc
Cooling-side integral time	Ic	Ic	Ic
Cooling-side derivative time	Dc	Dc	Dc

Function	UP350/UP351	UP550/UP750
Program start / stop switching	RESET/PROG1/PROG2	RESET/PROG/LOCAL
Manual / Automatic switching	-	MAN/AUTO
Auto-tuning	AT ON/OFF	AT ON/OFF
Automatic valve tuning	-	V.AT ON/OFF(UP550 only)
Local setpoint	-	LSP
Local PID No.	-	LPID
Program pattern No.	-	PTN (display only)
PID No.	PID No. (display only)	PID No. (display only)
(Heating-side) control output	-	MOUT
Cooling-side control output	-	MOUTc
(Heating-side) Proportional band	P	P
(Heagting-side) Integral time	I	I
(Heating-side) Derivative time	D	D
Cooling-side proportional band	-	Pc
Cooling-side integral time	-	Ic
Cooling-side derivative time	-	Dc

6.2 Saving Tuning Data

■ Recording Tuning Data on Trend Data

The tuning data can be recorded on trend data. The data to be recorded are RUN/STOP, RESET/PROG1/PROG2, RESET/PROG/LOCAL, MAN/AUTO/CAS, REMOTE/LOCAL, SP No., PID No., LSP, P, I, D, Pc, Ic, Dc, MOUT and MOUTc.

When the tuning data is recorded, a tuning mark appears on a chart. Pointing a mouse to the tuning mark displays the tuning data by pop-up one.

NOTE

Clicking **Record tuning data** records the tuning data on the trend data on a memory. However, it is not saved as a file. Save the trend data when stopping the trend display or as necessary.

● Operation Procedure

(1) After tuning is completed, click **Recorded tuning data** in the Tuning dialog box (Figure 6.1.1) of the corresponding loop.

(2) The Record Tuning Data message box (Figure 6.2.1) appears, and the tuning mark appears in the trend display.

Figure 6.2.1 Record Tuning Data Dialog Box

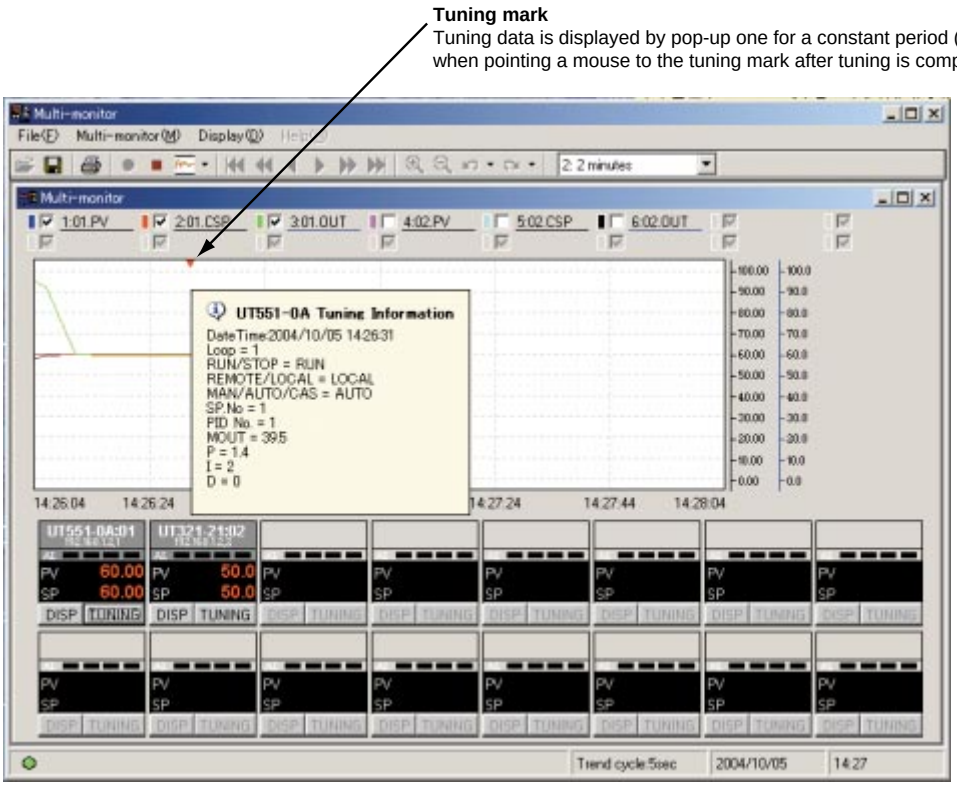


Figure 6.2.2 Tuning Mark

(3) Click **OK**.

(4) From the toolbar, click the [ ] shortcut, or from the menu bar, choose **File**, then **Save trend data**.

(5) The Save Trend Data dialog box (Figure 6.2.3) appears. In the **File name** text box, enter a file name then click **Save**.

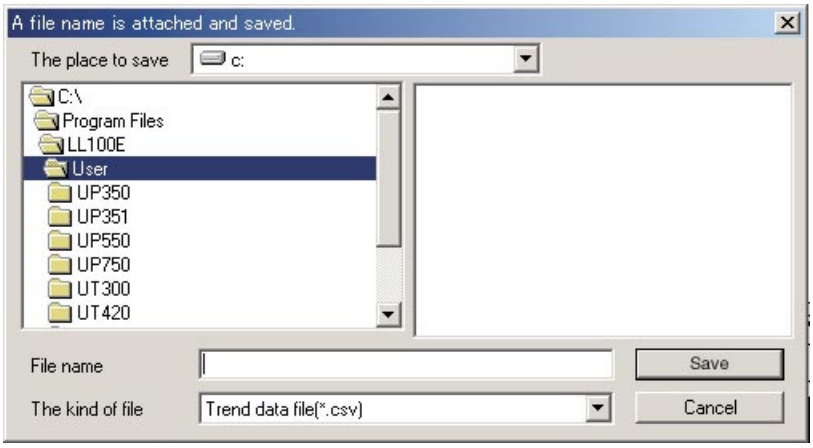


Figure 6.2.3 Save Trend Data Dialog Box

Blank Page

7. Trend Data File

This chapter describes how to operate a trend data file of Multi-monitoring function.

7.1 Opening a Trend Data File

A trend data file saved to a PC can be read out and displayed in the Multi-monitor display while the trend display is stopped.

● Operation Procedure

(1) Select **Open trend data** in the Start Multi-monitor starting dialog box, or from the Menu bar, choose **File**, then **Open trend data** while the trend display is stopped

(2) The Open Trend Data dialog box (Figure 7.1.1) appears.

(3) Select a trend data file and click **Open**. The Trend Setup dialog box appears. See Section 4.2, “Setting Trend Display.”

(4) Select the trend data item to be displayed in the Multi-monitor display, scale and display color, and then click **OK**. The Multi-monitor display appears. See Section 5.5, “Operating Trend Display Function” for how to operate in the Multi-monitor display.

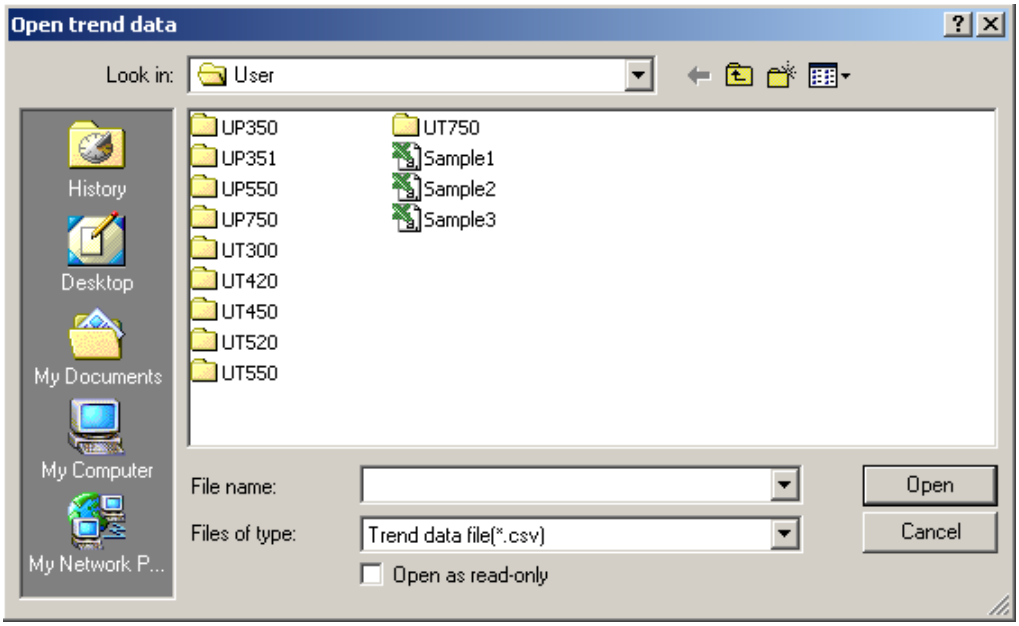


Figure 7.1.1 Open Trend Data Dialog Box

NOTE

If starting the trend display after opening a saved trend data file, the Automatic Scan dialog box appears. Trend display can be started after Automatic scan and the setup for trend display are completed.

7.2 Operating Trend Data

The trend display function at the time of off-line is same as that when the trend display is working at the time of on-line. However, trend cycle cannot be set and tuning cannot be carried out. See Section 5.5, “Operating Trend Display Function.”

7.3 Example of Trend Data Saved as a CSV File

The example when reading a CSV file to Excel is shown below. As for actual CSV data, each data is divided by “ , .”

1. Connection Information, Scale Setup and Trend Setup

Connection Information

Green Series Multiple Trend Monitor Data									
[Auto Scan Information]									
No.	Model	Address	PRH	PRL	PDP	Model Type	Loop	OT1	OT2
No.1	UT551-0A	192.168.1.2	10000	0	2	0	1	2	0
No.2	UT321-21	192.168.1.2	5000	1000	1	0	1	2	0
No.3									
No.4									
No.5									
No.6									
No.7									
No.8									
No.9									
No.10									
No.11									
No.12									
No.13									
No.14									
No.15									
No.16									

Scale Setup

[Scale Setting Information]									
No.	Scale Type	Minimum V	Maximum Value						
Scale1	Loop 1 top	0	100						
Scale2	0.0% - 100	0	100						
Scale3	User scale	-1000	1000						
Scale4	User scale	-1000	1000						

Trend Setup

[Trend Setting Information]									
No.	Loop	Data	Scale	Display Color					
No.1	Loop1	PV	Scale 1	16711680					
No.2	Loop1	CSP	Scale 1	255					
No.3	Loop1	OUT	Scale 2	65280					
No.4	Loop2	PV	Scale 1	16711935					
No.5	Loop2	CSP	Scale 1	16776960					
No.6	Loop2	OUT	Scale 2	0					
No.7									
No.8									
No.9									
No.10									
No.11									
No.12									
No.13									
No.14									
No.15									
No.16									

2. Trend Data

[Trend Data]												
Date	Time	1.PV	1.CSP	1.OUT	1.OUTc	1.Alarm1	1.Alarm2	1.Alarm3	1.Alarm4	2.PV	2.CSP	2.OUT
2004/10/5	13:59:04	60	60	59.7		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:09	60	60	59.7		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:14	56.09	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:19	51.62	40	0		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	13:59:24	47.67	40	0		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	13:59:29	43.87	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:34	40.38	40	1.7		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:39	40.11	40	46.7		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:44	39.91	40	41.8		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	13:59:49	40.02	40	38.2		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	13:59:54	39.98	40	40		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	13:59:59	40	60	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:04	44.51	60	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:09	48.95	60	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:14	53.06	60	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:19	56.81	60	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:24	59.34	60	88.7		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:00:29	60	60	59.8		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:00:34	60	60	59.7		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:39	60	60	59.7		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:44	61.88	80	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:49	64.97	80	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:54	67.8	80	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:00:59	70.51	80	100		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:01:04	72.91	80	100		OFF	OFF	OFF	OFF	50	50	49.5
2004/10/5	14:01:09	75.11	80	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:14	77.14	80	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:19	79	80	100		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:24	79.97	80	80.4		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:29	80	80	79.8		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:01:34	80	80	79.5		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:01:39	80	80	79.6		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:44	80	40	79.6		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:49	74.28	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:54	68.37	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:01:59	65.7	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:04	57.71	40	0		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:02:09	53.12	40	0		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:02:14	48.89	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:19	44.99	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:24	41.41	40	0		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:29	39.56	40	37.2		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:34	39.99	40	34.8		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:39	40.03	40	40.2		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:02:44	39.98	40	40.2		OFF	OFF	OFF	OFF	50	50	50.1
2004/10/5	14:02:49	40	40	39.5		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:54	40	40	39.8		OFF	OFF	OFF	OFF	50	50	50
2004/10/5	14:02:59	42.81	60	100		OFF	OFF	OFF	OFF	50	50	50

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