29 Tips for Faster Communication

This chapter describes how to shorten the communication time and achieve efficient communication.

1 First, get to know the present performance!

☞"29.1 Getting to Know the Performance of the Configured System"

2 Improve communication efficiency by controlling symbols proficiently!

☞"29.2 Grouping Symbols"
☞"29.3 Array of Symbols"

3 Improve communication efficiency by stocking the data of Device/PLC to the PC!

☞"29.4 Cache Registration of Frequently Used Devices"

4 Which device do you often use?

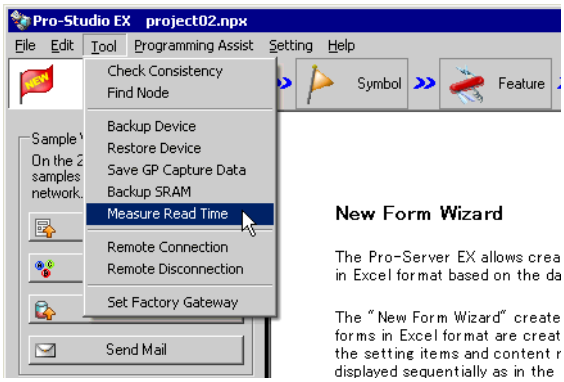
☞"29.5 Device Access Log"

29.1 Getting to Know the Performance of the Configured System

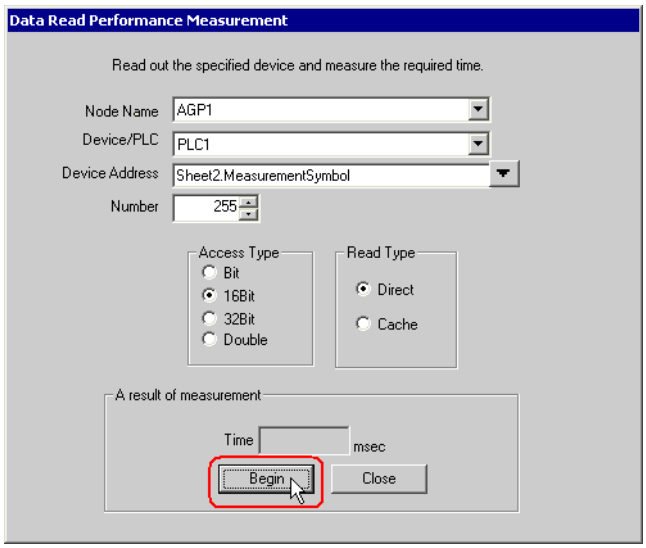
This feature allows you to measure the reading time of device data from the specified node.

29.1.1 Measuring Reading Time

1 Click [Measure Read Time] from [Tools] on the menu bar.

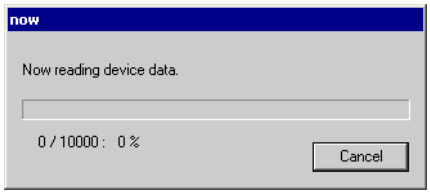


2 Set each item on the "Data Read Performance Measurement" screen.

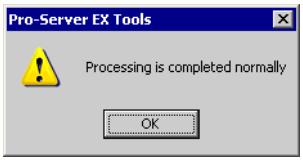


NOTE • For details about the setting items, please refer to "29.1.2 Setting Guide".

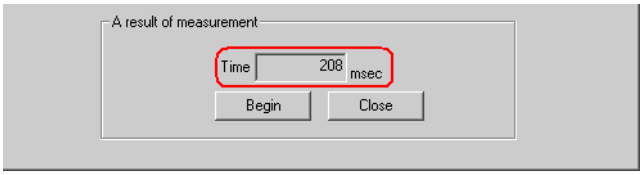
The "now" screen is displayed, indicating the measurement progress of reading performance.



After reading, the following dialog box will appear.



The measurement result (ms) is displayed in [Time] after processing.

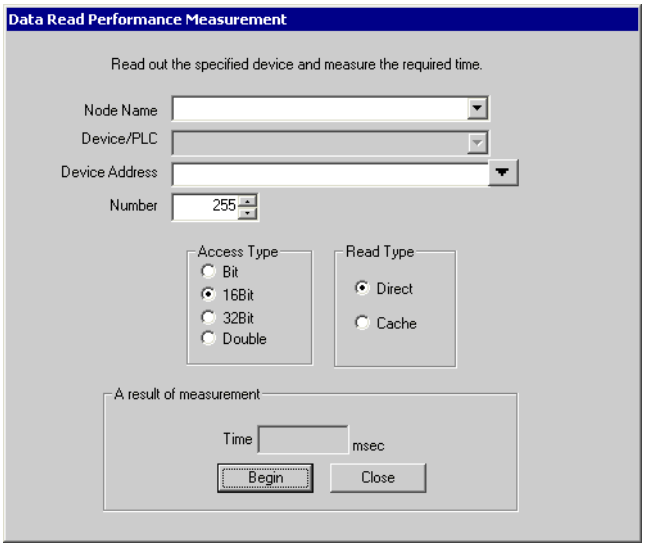


NOTE

- Measurement results may vary according to the environmental conditions (number of tags on the screen, PLC connection style, application programs running on Windows at the same time and so on).
- If the set contents are incorrect, the following screen will appear.

Message	Required action
You cannot specify a BIT symbol for measurement other than in BIT format	If you have specified a BIT symbol in the [Device Address] field, you cannot set an access type other than BIT to measure reading time. Reset the access type to [Bit], and then execute measurement.
You cannot specify a symbol other than BIT for measurement in BIT format	If you have specified a symbol in formats other than BIT in the [Device Address] field, you cannot set [Bit] as an access type to measure reading time. Reset the access type to other than [Bit], and then execute measurement.

29.1.2 Setting Guide



Setting item	Setting content
Node Name	Select the node name that you wish to measure.
Device/PLC	Select the Device/PLC having the device you wish to measure.
Device Address	Enter the device address directly or select the symbol by clicking the list button.
Number	Enter the number of devices. The maximum number is 65535 although it changes depending on the device type and the access type.
Access Type	Select an access type.
Read Type	Select a read type. • [Direct] Read device values directly. • [Cache] Read cached device data.

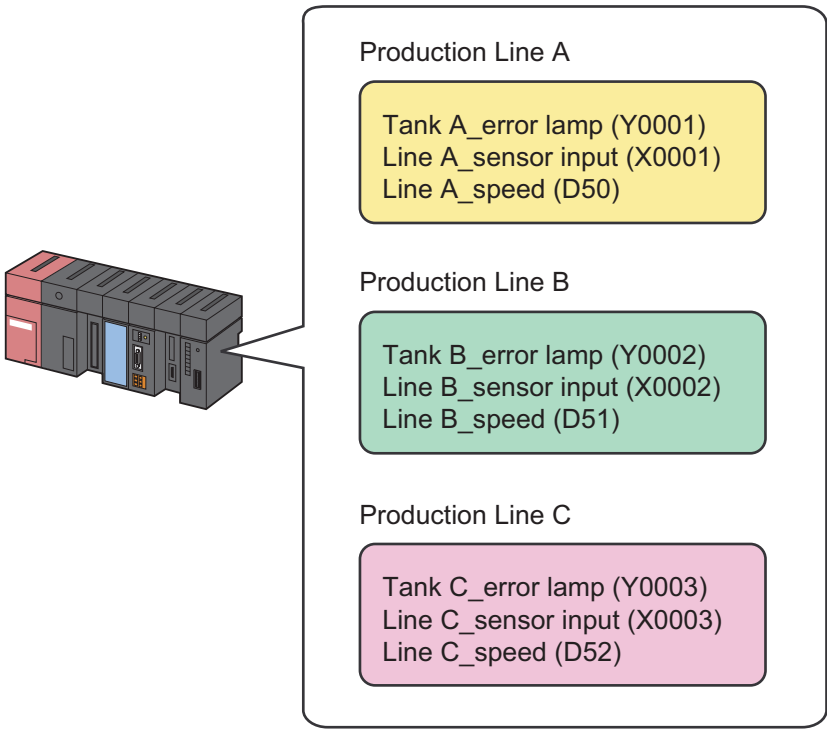
29.2 Grouping Symbols

29.2.1 Grouping Symbols

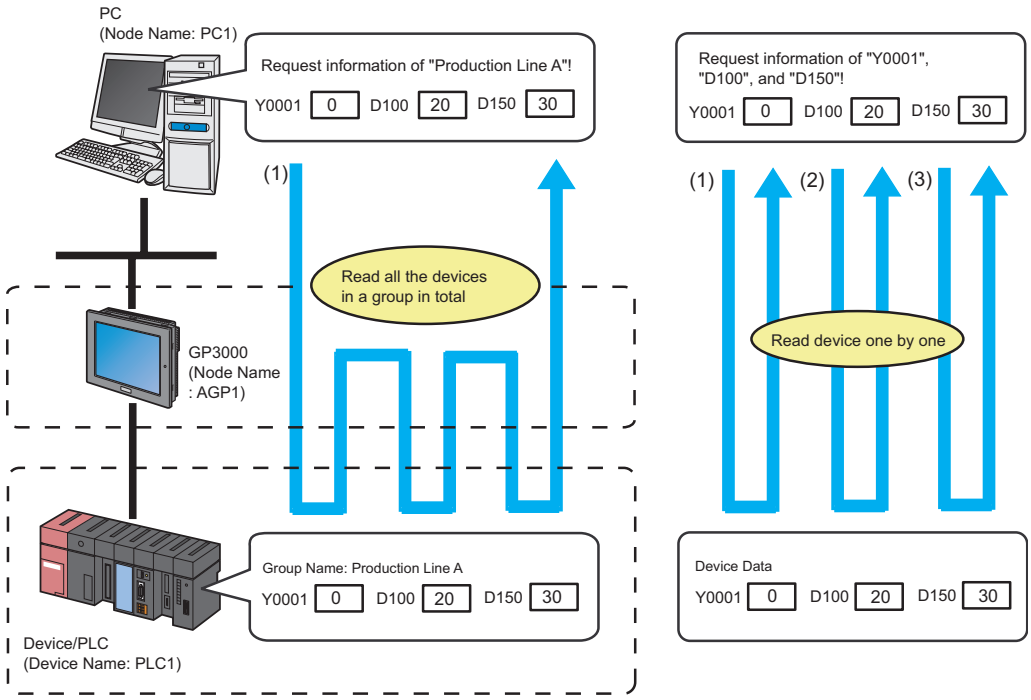
This feature allows you to collect and group multiple symbols.

Within the same Device/PLC, symbol grouping is available regardless of sequential/non-sequential addresses or data type to establish efficient communication at data transfer and access from API.

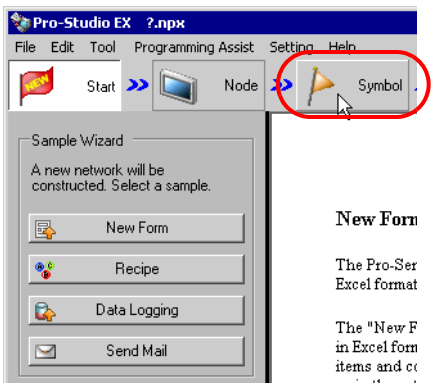
In addition, grouping makes symbol control easier.



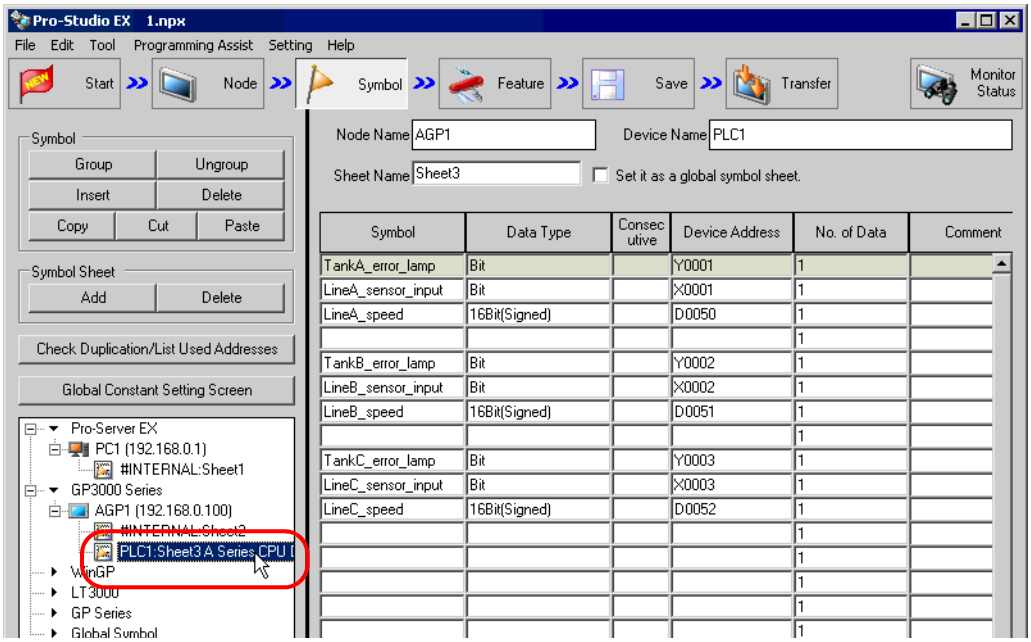
■ Communication Example Using Grouping



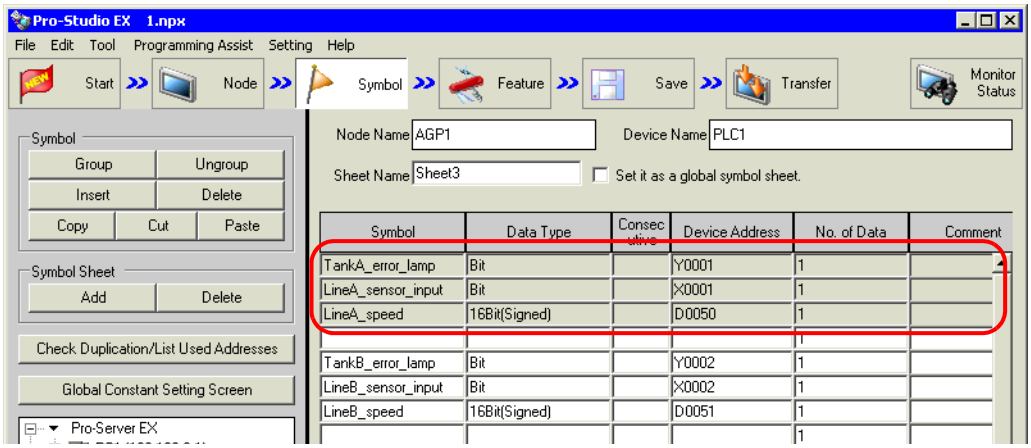
1 Click the [Symbol] icon on the status bar.



2 Select the symbol sheet where the symbols you wish to group are registered.



3 Click the symbols you wish to group on the symbol sheet.

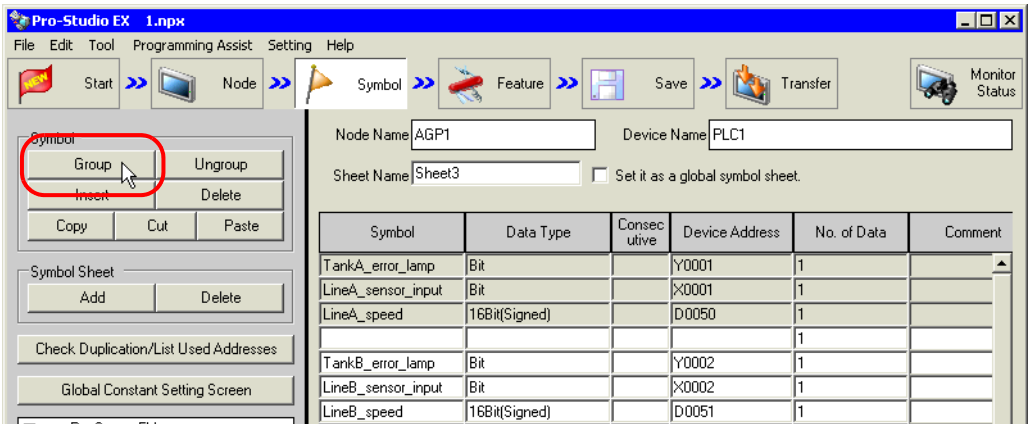


The selected symbol row turns gray.

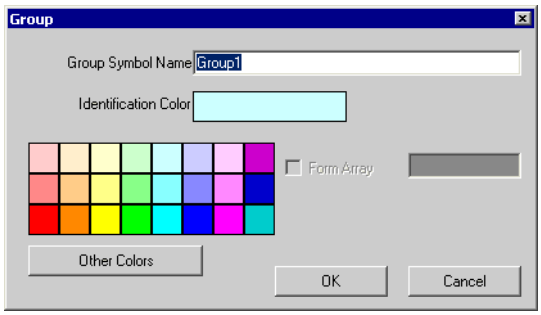
NOTE

- To select sequential multiple symbols at a time, click the first symbol row to be selected and drag the mouse over the last symbol row.

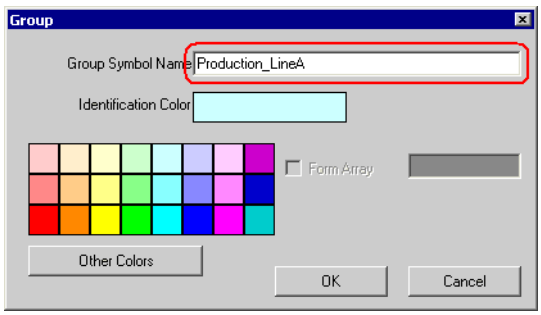
4 Click the [Group] button.



The "Group" screen appears.



5 Enter a group symbol name in [Group Symbol Name] and click a color that you wish to use from the color palette for distinguishing the group symbol.



NOTE

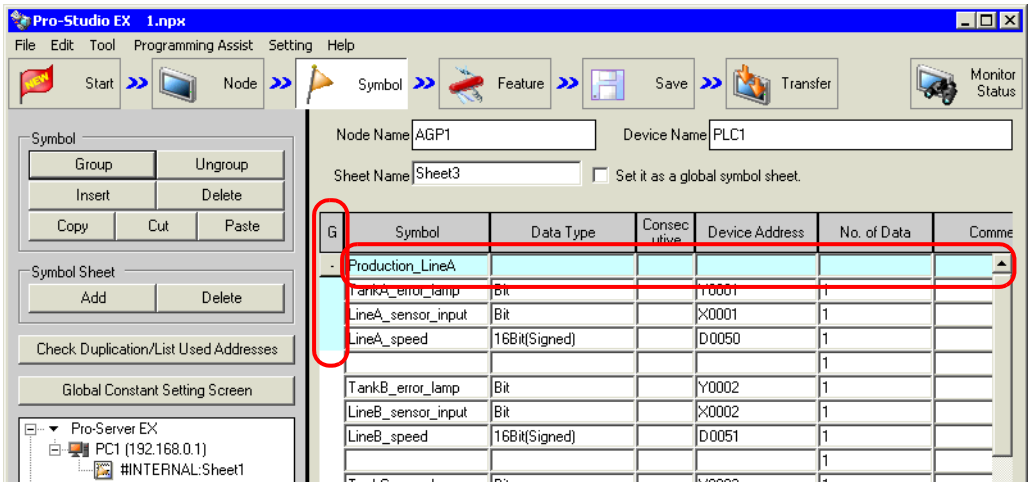
- If you do not find one you wish to use on the palette, click the [Other Colors] button. This displays the "Color Setup" screen, where you can set the color.

☞ "32.2 Registering Symbols on a Symbol Sheet"

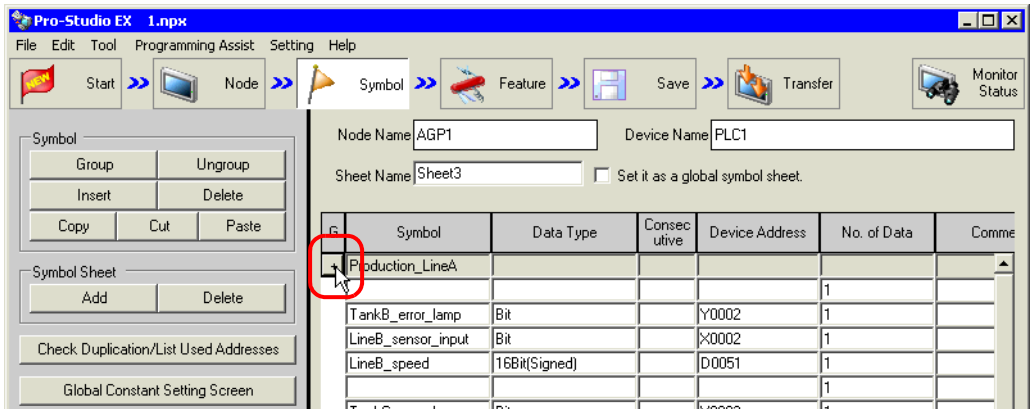
6 Click the [OK] button.

A group display column (indicated as "G") is created on the left of the symbol display window. The set group name is displayed in the top row of the symbols.

Additionally, the group display column of the grouped symbols shows the identifying color set above.



With the group configuration symbols displayed, the [-] button is placed in the column displaying the group name. Clicking the [-] button hides the configuration symbols and displays only the group name. (The [-] button changes to the [+] button.)

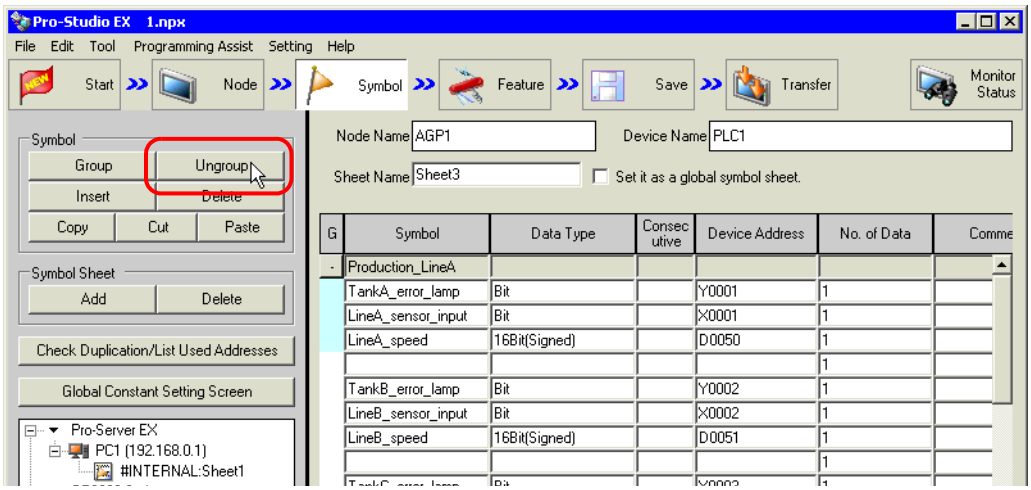


NOTE

- When clicking the [OK] button, the group names are checked whether they are duplicated or not. Reset the same names to be different ones.

Ungrouping

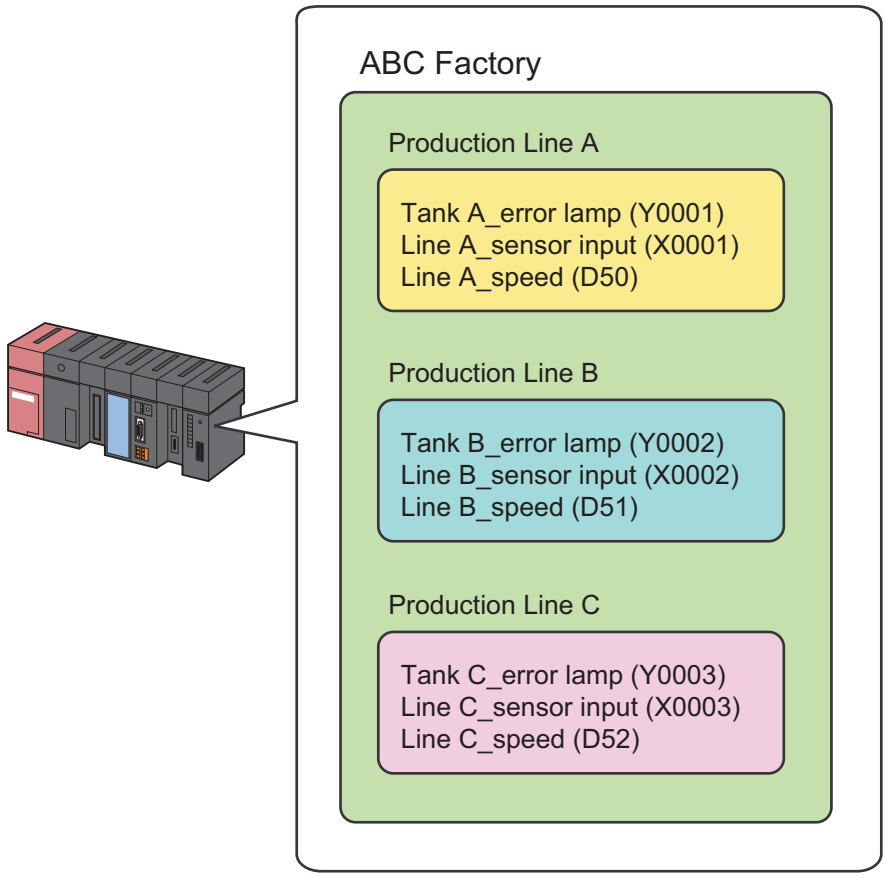
Click the column displaying the group name, and then click the [Ungroup] button.



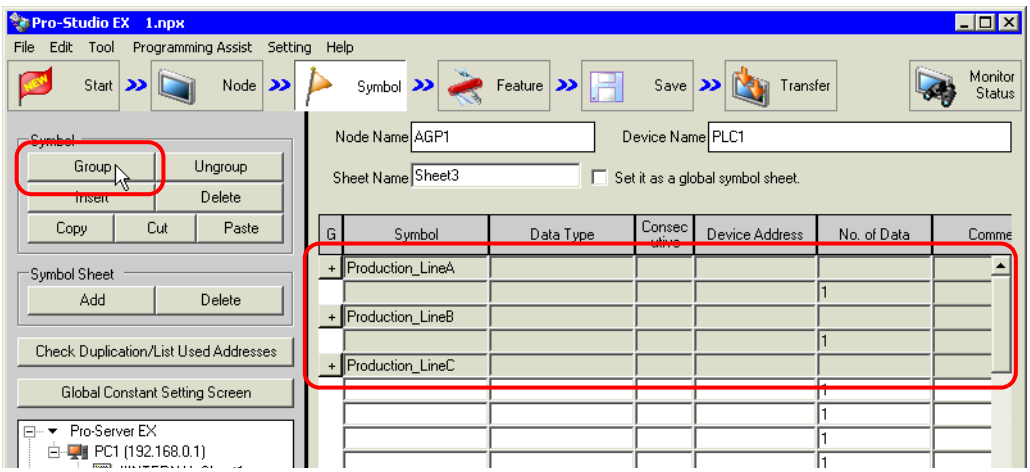
Symbols are ungrouped.

29.2.2 Grouping Groups/Symbols Together

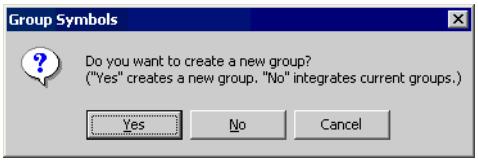
Grouping is available up to 2 hierarchies. You can create a new group by gathering two different groups, or a group and symbols.



1 Select the groups or symbols you wish to group from the symbol sheet, and then click the [Group] button.



The "Group Symbols" screen appears.

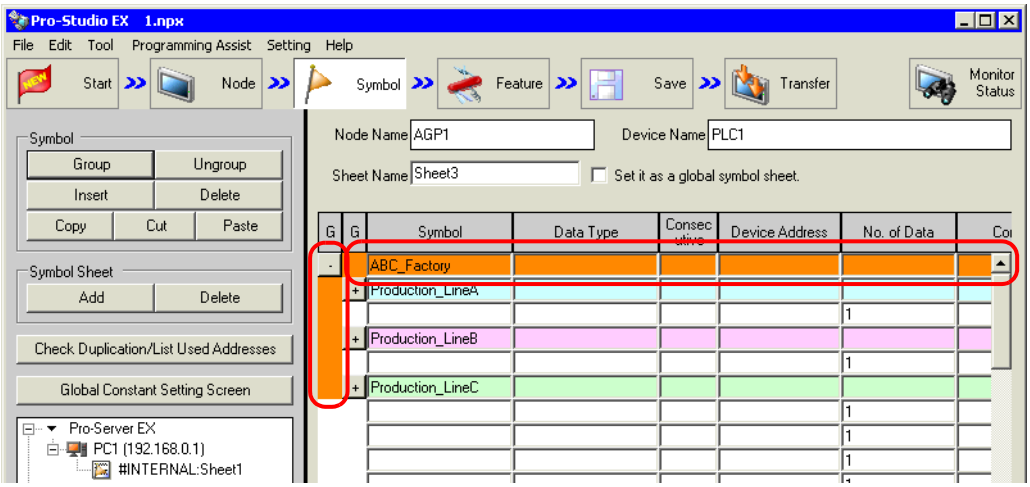


- When you click the [Yes] button:

The "Group" screen appears.

Set [Group Symbol Name] and [Identification Color] for the group in the second hierarchy, and then click the [OK] button.

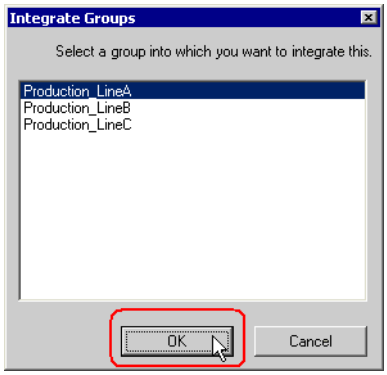
The second hierarchy group is now created, and the groups or the group and symbols selected above are registered as a new group.



- When you click the [No] button:

According to the combination of the groups or symbols selected, either (1) or (2) given below will be performed.

(1) Combination of a group and symbols: The selected symbols are integrated (added) into the existing group to be selected.
(2) Combination of two different groups: The selected group is added into the other group.
Select the group name to be integrated on the "Integrate Groups" screen, and then click the [OK] button.
The other group will be added into the group selected here.

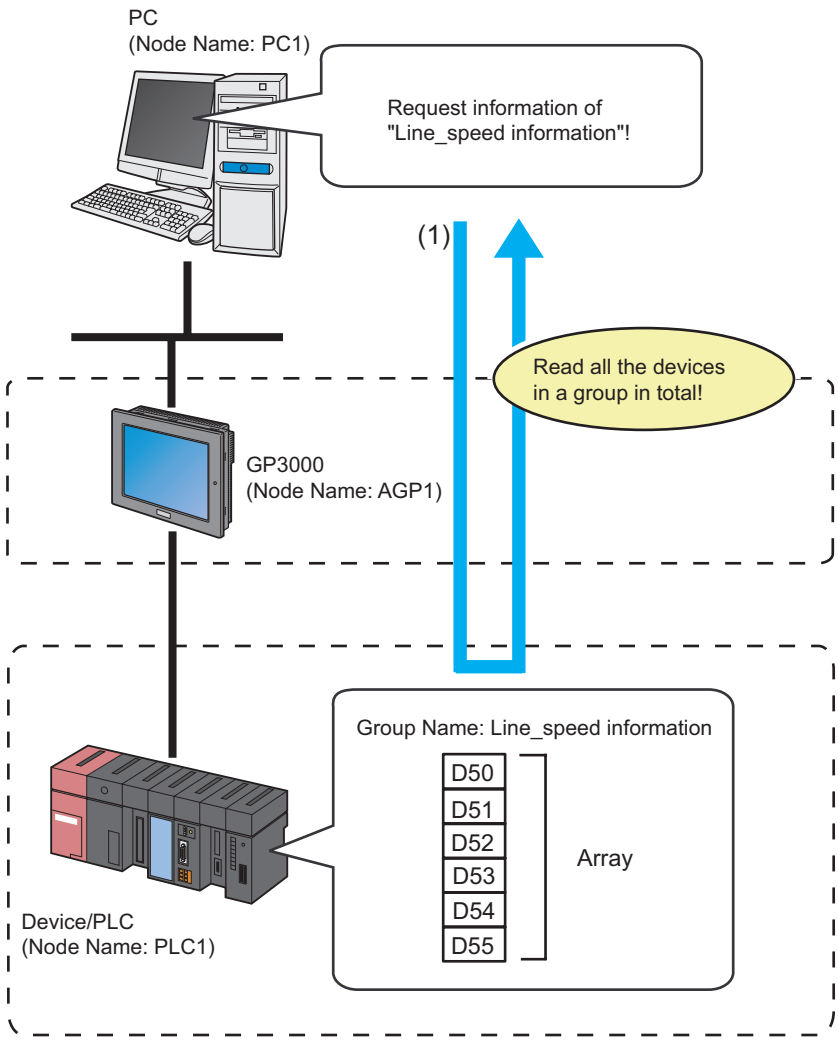


29.3 Array of Symbols

29.3.1 Advantages of Symbol Array

'Pro-Server EX' offers efficient communication by storing data to be read or written in sequential devices. Moreover, array symbols allows you to save the effort of registering sequential devices as symbols respectively, making symbol control easier.

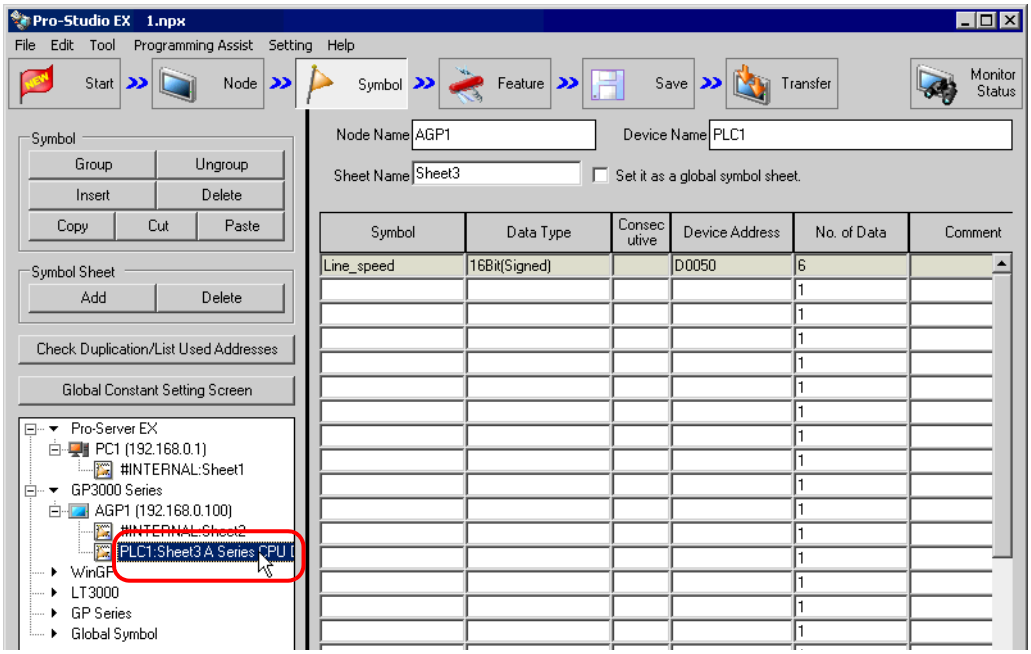
You can register sequential devices on a symbol sheet as "Array".



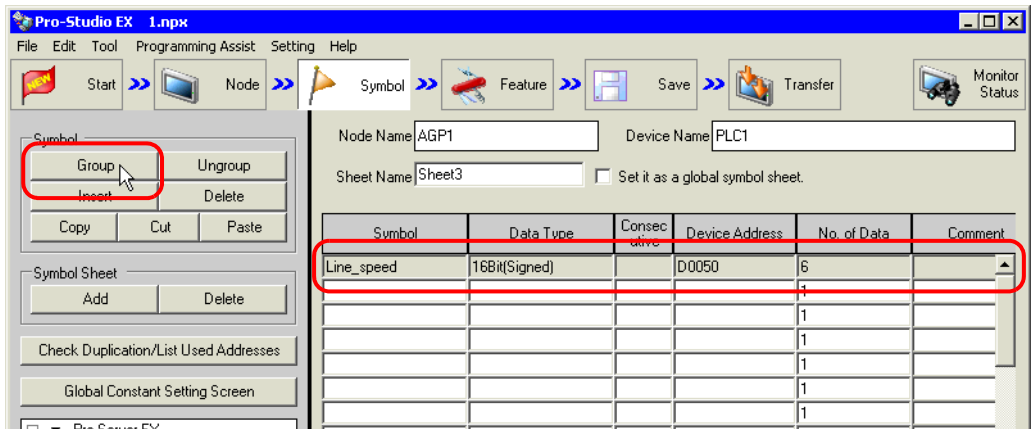
NOTE

- Data types should be integrated into Word or Bit type.
- As for the Word type, you can add Bit offset symbols into an array. However, it is impossible to place these symbols at the first address of the array.

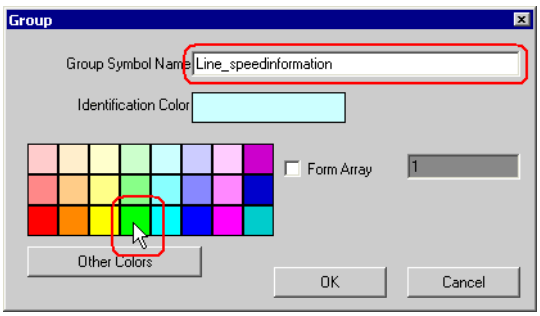
1 Click the [Symbol] icon on the status bar, and select the symbol sheet where the symbol you wish to array are registered.



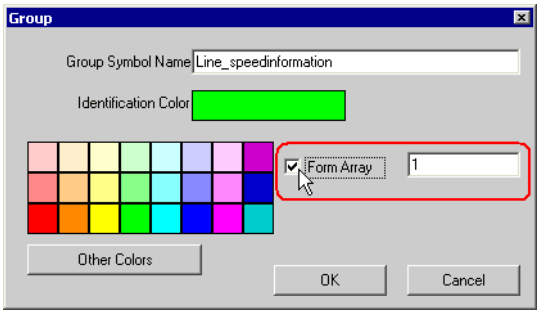
2 Click the symbol you wish to align, and click the [Group] button of [Symbol] on the symbol sheet.



3 Set the group symbol name and identification color.



4 Check the [Form Array] check box, and enter the number of array (elements).

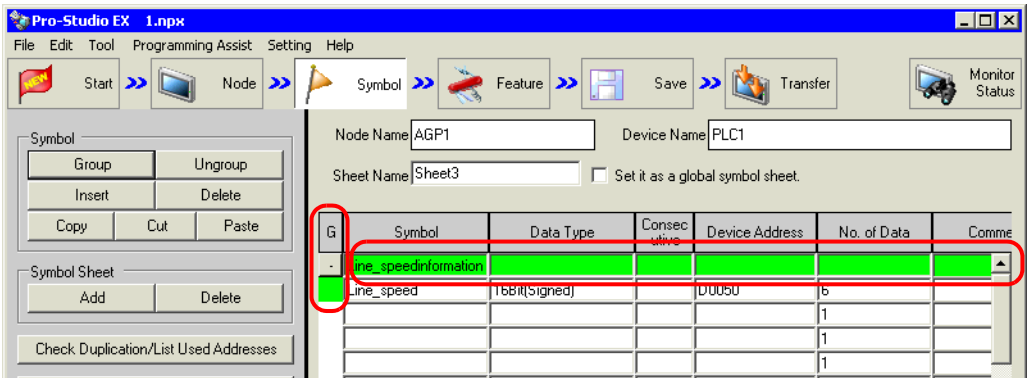


NOTE

- You can select the number of alignments with global constants.
  ☞ "32.6.3 Global Constant Setting"
- When multiple values are set for the element number, sequential groups from the original device address are created by the number of elements.

5 Click the [OK] button.

A group display column (indicated as "G") is created on the left of the symbol display window. The top row of the symbols shows the group name, array type (Word type or Bit type) and the number of array (elements).

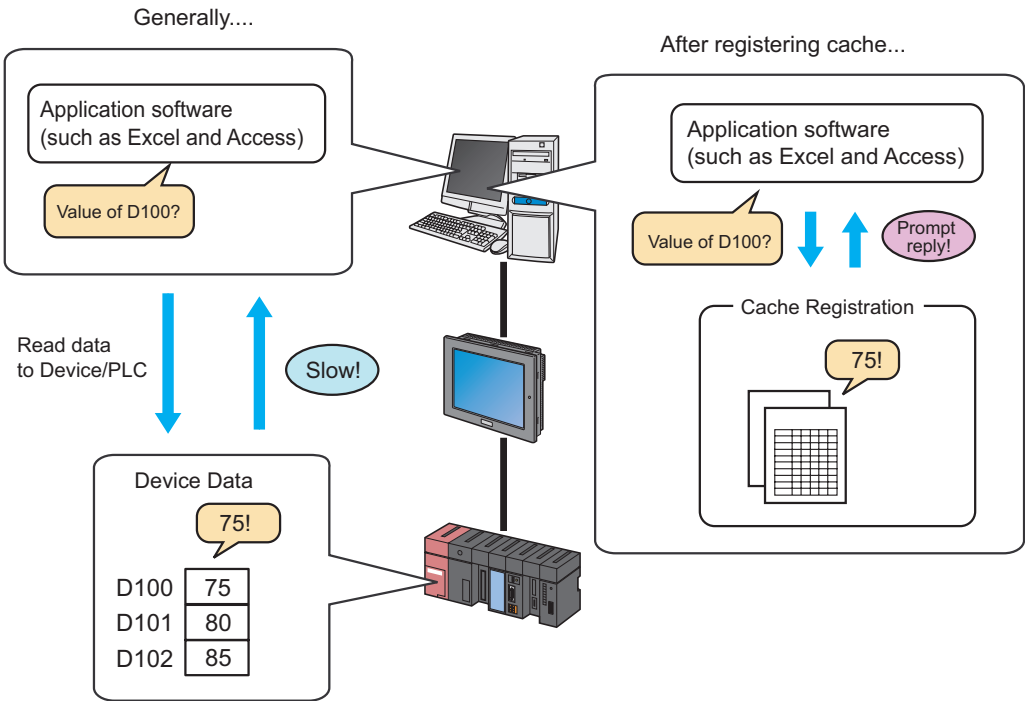


29.4 Cache Registration of Frequently Used Devices

Device cache makes 'Pro-Server EX' automatically access a device and temporarily save the values into the memory in a PC.

When a device receives the access request from the application, 'Pro-Server EX' replies promptly by returning cached data temporarily stored in the memory of a PC if the device has been already cached. If there is no cached data, 'Pro-Server EX' is to read to the Device/PLC via a GP.
Using device cache minimizes delay of data transfer or disruption on the line due to access concentration.

To utilize the device cache function, the specified device should be registered on the network project in advance.



There are two methods to register device cache as follows:

- Register manually."29.4.1 Manual Registration"
- Register by importing from device access log. "29.4.2 Import Registration from Device Access Log"

NOTE

- To utilize the device cache function, the specified device should be registered on the network project in advance.

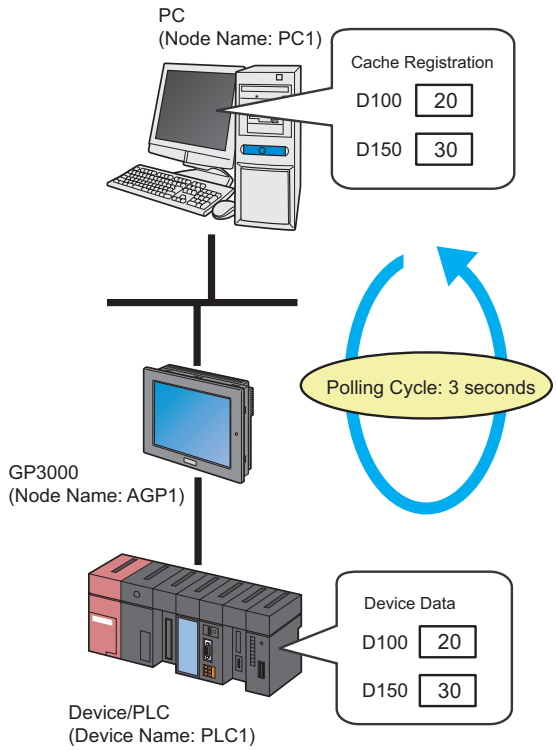
29.4.1 Manual Registration

The following describes how to cache-register the device manually.

NOTE

- You can register devices of multiple nodes in one device cache, but cannot start polling to the other nodes if any of the nodes cannot establish communication. Therefore, it is recommended to register a device for each node as a separate device cache as much as possible.

■ Manual Cache Registration of Devices



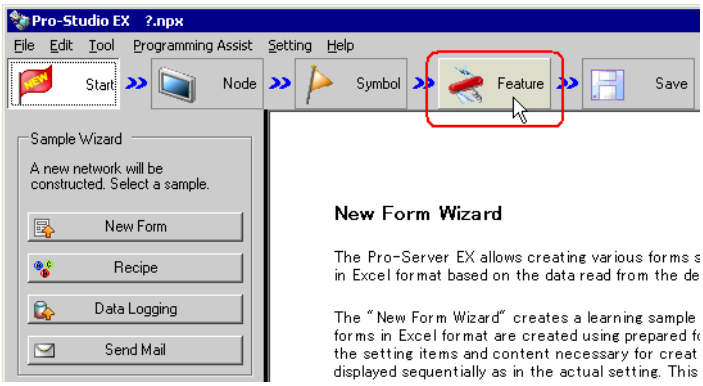
NOTE

- A polling cycle means a time cycle to update the device value that is cache-registered.

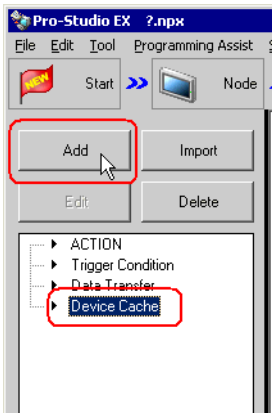
Ex.

Setting item	Setting content
Device Cache Name	Cache Registration
Polling Cycle	3 seconds
Polling Start Timing	At Pro-Server EX Startup
Cache Subject Device	"D100" to "D150" of Device/PLC (PLC1)

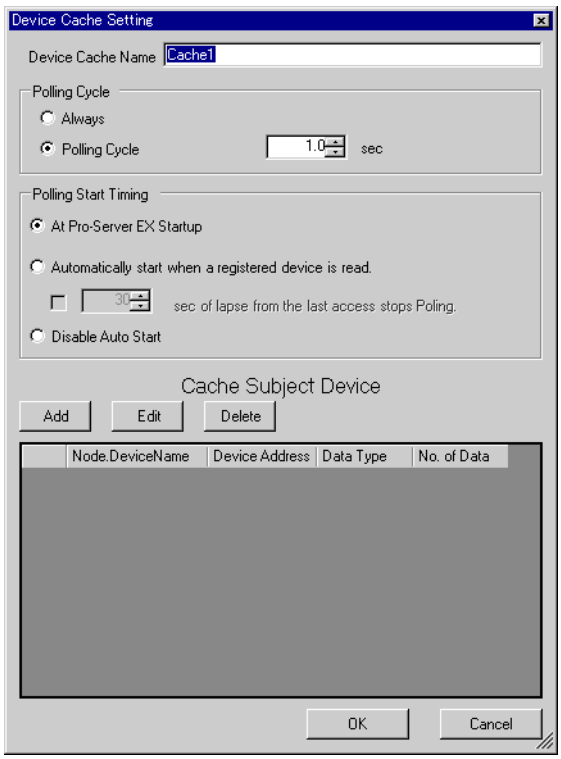
1 Click the [Feature] icon on the status bar.



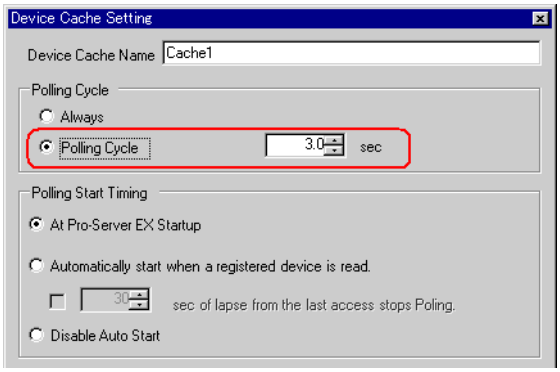
2 Select [Device Cache] from the tree display on the left of the screen, then click the [Add] button.



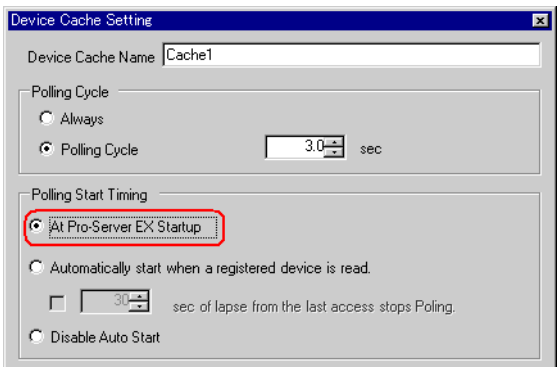
3 Enter "Cache 1" in [Device Cache Name] as a device cache name to be registered.



4 Check [Polling Cycle] and set "3.0 seconds".

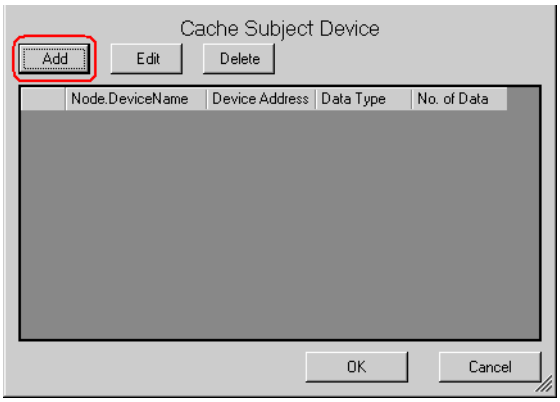


5 Check [At Pro-Server EX Startup] of [Polling Start Timing].

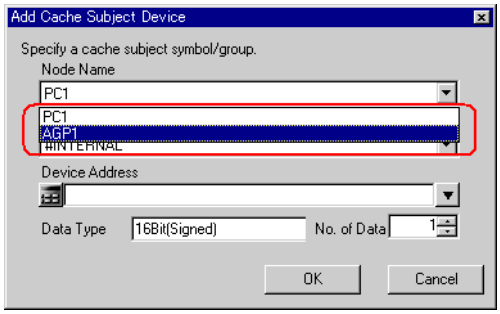


6 Register a device to be cached.

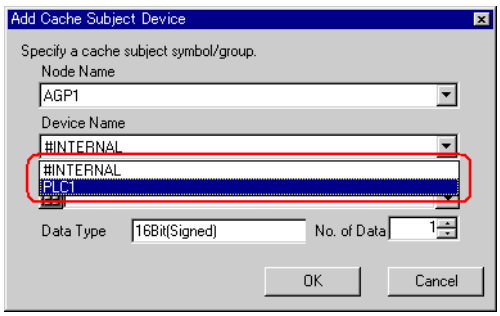
1) Click the [Add] button.



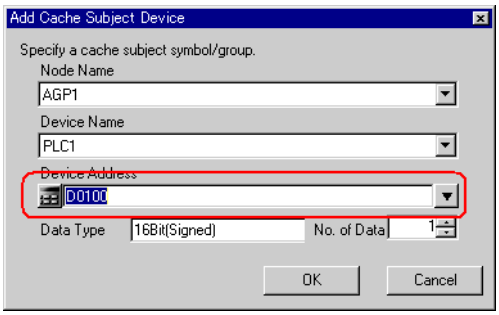
2) Select the node name "AGP1" in [Node Name] which has a device to be cached.



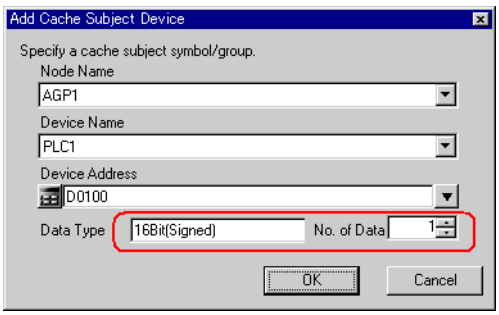
3) Select "PLC1" in [Device Name].



4) Set "D100" in [Device Address] as a device to be cached.



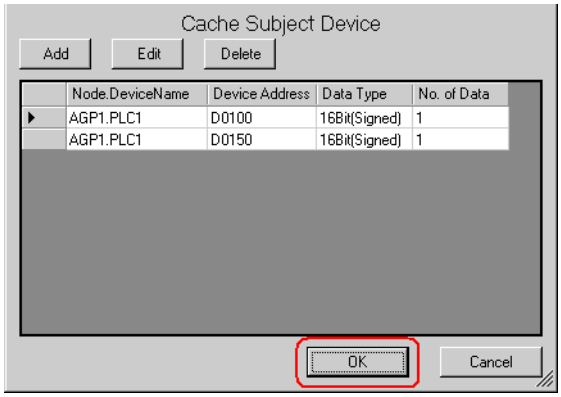
5) Set "16Bit(Signed)" in [Data Type] as a device data type and "1" in [No. of Data] as the number of devices, then click the [OK] button.



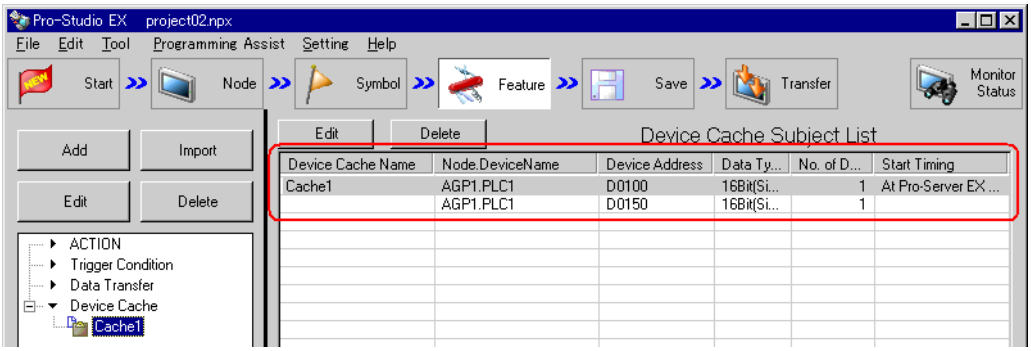
"D100" has now been registered as a device to be cached.

Register the device "D150" in the same manner as "D100".

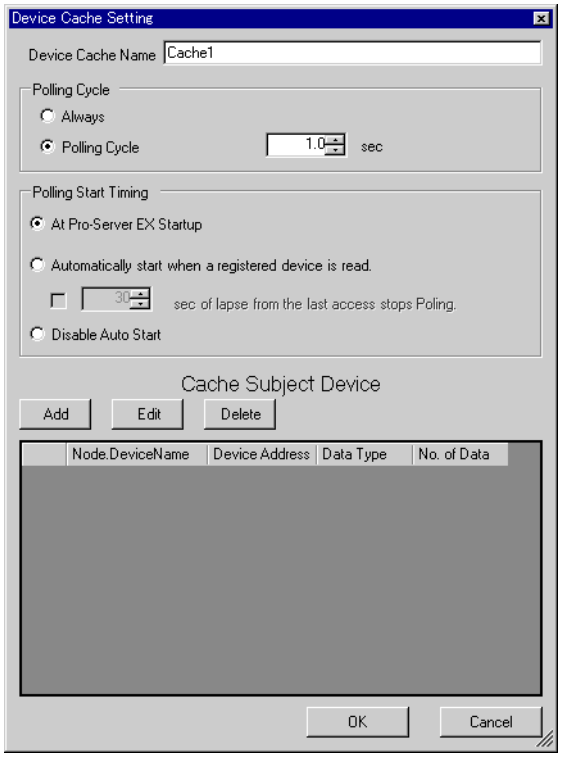
7 Click the [OK] button.



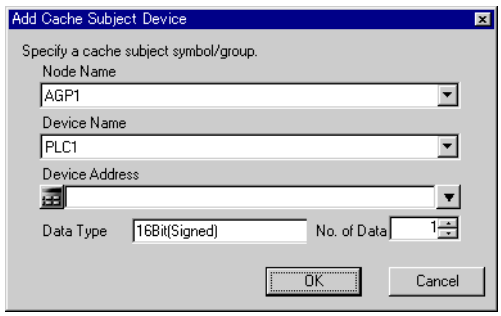
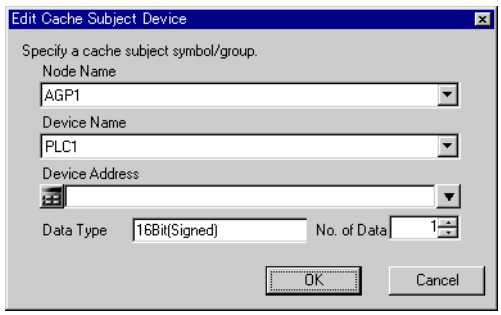
Now you can see the device cache name specified above in the tree display on the left of the screen and "Device Cache Subject List" on the right.



■ Setting Guide



Setting item	Setting content
Device Cache Name	Enter a device cache name. **NOTE** • Device cache names will be used in the case of control from API.
Polling Cycle	Sets the polling time (data update cycle) of the device to be registered. • [Always] Check this when updating device data regularly. • [Polling Cycle] Check this when updating device data at a particular interval, which can be set in increments of 100ms (0.1sec). **NOTE** • If a Pro-Server EX node or a GP Series node is included in a cached record, you cannot specify [Always].

<table>
<tr><th colspan="2">Setting item</th><th>Setting content</th></tr>
<tr><td colspan="2">Polling Start Timing</td><td>Selects the timing to start polling.
• [At Pro-Server EX Startup]
When 'Pro-Server EX' starts, polling is executed. And when 'Pro-Server EX' exits, polling is stopped.
• [Automatically start when a registered device is read.]
Polling starts when any registered device is accessed.
If checked, the item [* sec of lapse from the last access stops polling] becomes active, and polling stops if no read access is given for the period specified here.
If not checked, polling does not stop until 'Pro-Server EX' exits.
• [Disable Auto Start]
Polling starts according to the request not from 'Pro-Server EX' but from API.</td></tr>
<tr><td rowspan="3">Cache Subject Device</td><td>Add</td><td>Set [Node Name], [Device Name], [Device Address] (or symbol), [Data Type] and [No. of Data] on the "Add Cache Subject Device" screen. Then, click the [OK] button to register.
 
</td></tr>
<tr><td>Edit</td><td>Specify the device you wish to edit, and edit the contents on the "Edit Cache Subject Device" screen. Then, click the [OK] button.
 
</td></tr>
<tr><td>Delete</td><td>Specify the device you wish to delete, and click the [Yes] button on the "Delete Device Cache" screen.
 
</td></tr>
</table>

29.4.2 Import Registration from Device Access Log

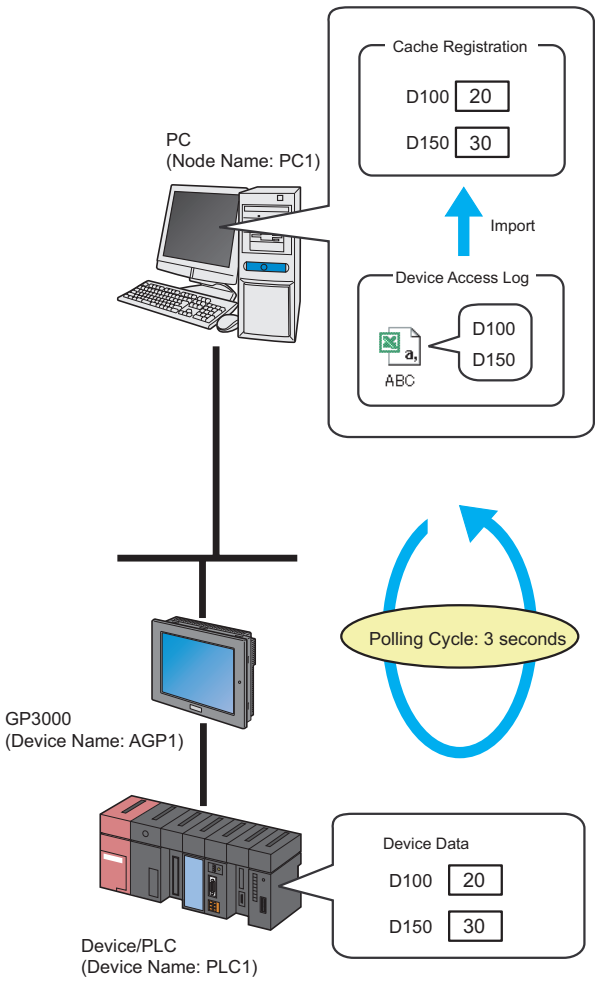
Cache registration is available from the output results of "Device Access Log".

On [Device Access Log], you can output device access logs into a CSV-format file, and then import that file for cache registration.

NOTE

- Refer to "29.5 Device Access Log" about creating device access logs.
- For better performance, it is recommended to open the device access log file before importing it, by means of an application like Excel or Notepad, and to follow the actions below:
  (1) Delete the devices that do not require device cache.
  (2) Register the devices that can be arranged in sequence as one sequential device as much as possible.

■ Import Registration



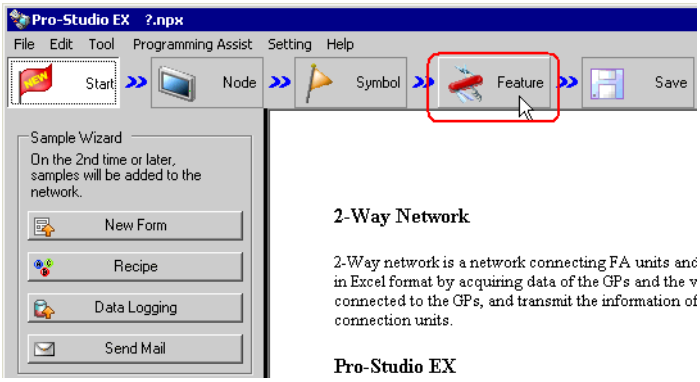
NOTE

- A polling cycle means a time cycle to update the device value that is cache-registered.

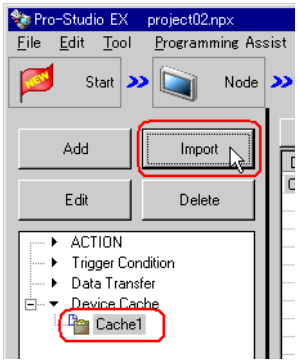
Ex.

Setting item	Setting content
Polling Cycle	3 seconds
Polling Start Timing	At Pro-Server EX Startup
Output file of device access logs to be cached	C:\Desktop\ABC.csv

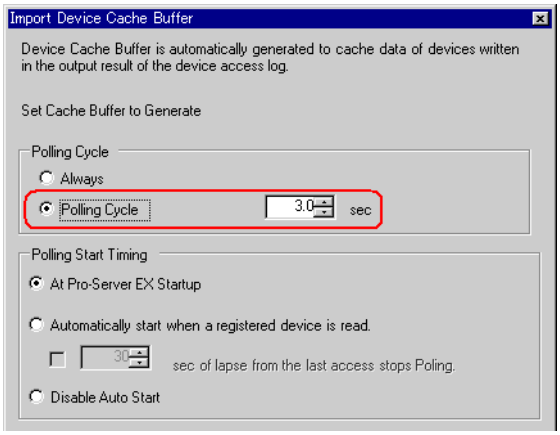
1 Click the [Feature] icon on the status bar.



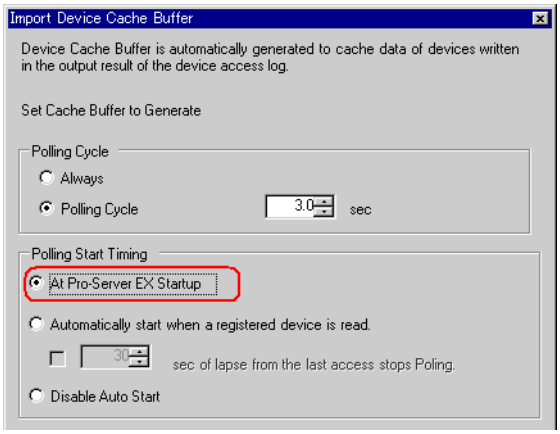
2 Select [Cache1] from the tree display on the left of the screen, then click the [Import] button.



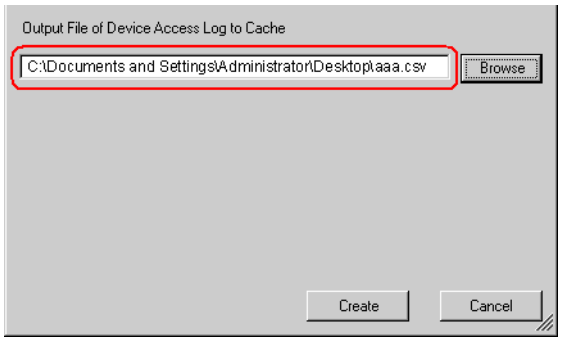
3 Check [Polling Cycle] and set "3.0 seconds".



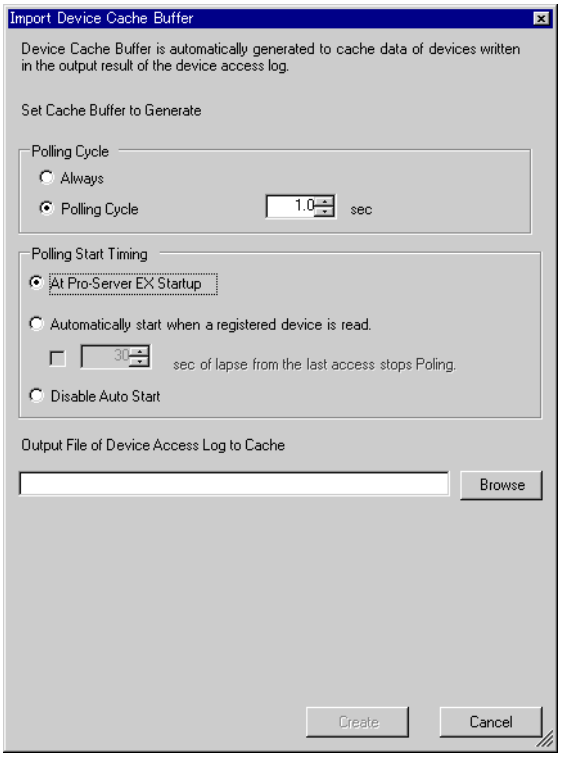
4 Check [At Pro-Server EX Startup] of [Polling Start Timing].



5 Set the file name "aaa.csv" in [Output File of Device Access Logs to Cache], and then click the [Create] button.



■ Setting Guide



Setting item	Setting content
Polling Cycle	Sets the polling time (data update cycle) of the device to be registered. • [Always] Check this when updating device data regularly. • [Polling Cycle] Check this when updating device data at a particular interval, which can be set in increments of 100ms (0.1sec). **NOTE** • When you import the output file including a WindowsPC node or a GP Series node with [Always] selected, the setting will be automatically changed to [Polling Cycle 1.0 second]. After importing, check it again.
Polling Start Timing	Selects the timing to start polling. • [At Pro-Server EX Startup] When 'Pro-Server EX' starts, polling is executed. And when 'Pro-Server EX' exits, polling is stopped. • [Automatically start when a registered device is read.] Polling starts when any registered device is accessed. If checked, the item [* sec of lapse from the last access stops polling] becomes active, and polling stops if no read access is given for the period specified here. If not checked, polling does not stop until 'Pro-Server EX' exits. • [Disable Auto Start] Polling starts according to the request not from 'Pro-Server EX' but from API.

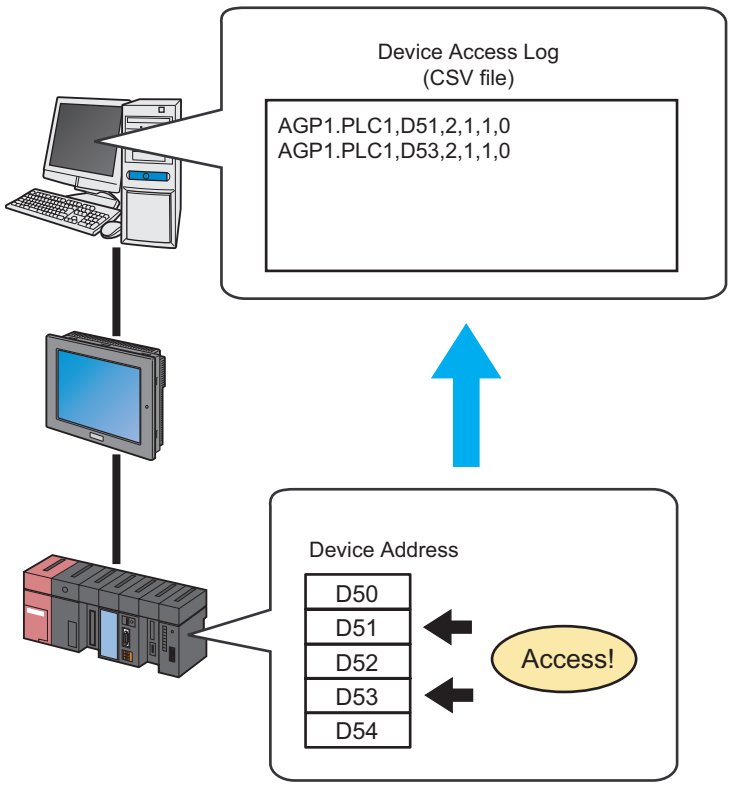
Setting item	Setting content
Output File of Device Access Logs to Cache	Click the [Browse] button, and select a device access log file (CSV file) on the "Save As" screen.

29.5 Device Access Log

'Pro-Server EX' records accessed devices as needed basis, and allows you to output this record (Device access log) to a CSV file.

NOTE

- You can cache-register a device more easily by importing a CSV file.



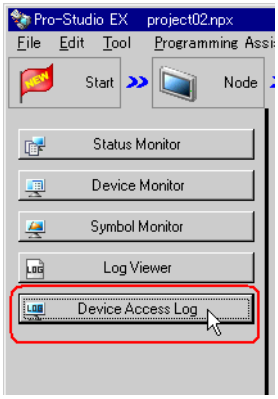
This section describes a series of actions to collect, save and clear device access logs.

1 Click the [Status Monitoring] icon on the status bar.

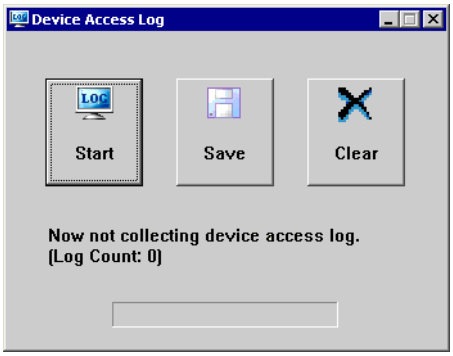
The status monitor screen appears to indicate the ongoing status of 'Pro-Server EX'.

For details about the screen, see "28 Simply Confirming On-site Status".

2 Click the [Device Access Log] button.



The "Device Access Log" screen appears.



29.5.1 Collecting Device Access Log

1 Click the [Start] button.

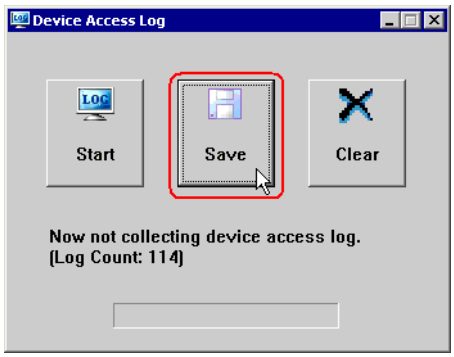
Collection of device access logs starts with the [Now collecting device access log] message displayed.

When the collection finishes, csv file appears to indicate the collected log number.

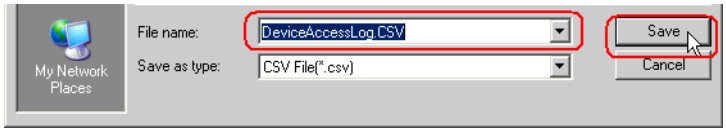
Click the [Stop] button when you want to stop the collection.

29.5.2 Saving Device Access Log After Collecting

1 Click the [Save] button.



2 Enter a file name and click the [Save] button.



The Save Completed message now appears, and the collected device access logs are saved.

NOTE

- You can collect at maximum 1000 logs.
- If 'Pro-Server EX' is closed with Device Access Log running, Device Access Log is also closed and the collected logs are to be broken.
- If 'Pro-Server EX' reloads a network project file during the Device Access Log operation, the collected logs are to be broken and the "Now collecting" message will turn to "Under suspension".

■ Formats of Device Access Log to Be Saved

Formats of device access logs (CSV file) to be saved are as follows:

"Node Name. Device Name", "Group Name/Device Address", "Access Mode*", "Access Point", "Access Count" and "0"

(Example)

AGP1.PLC1,D100,2,5,2,0

AGP2,LS200,6,10,1,0

* "Access Mode" is indicated as the numbers in the table below.

Mode	Value
Bit Access	1
16-bit Access (excluding BCD)	2
16-bit BCD Access	5
32-bit Access (excluding BCD)	6
32-bit BCD Access	9
64-bit Access Float Access	10
Double Access	11
Character String Access	12
Group	32768 (0x8000)

■ Order of Display

Device access logs are output to a CSV file and sorted in the following sequence:

(1) Node Name. Device Name

(2) Group Name/Device Address

(3) Access Mode*

(4) Access Point

(Example)

AGP1.PLC1,D100,2,5,2,0

AGP1.PLC2,D100,2,5,2,0

AGP2.PLC1,D100,2,5,2,0

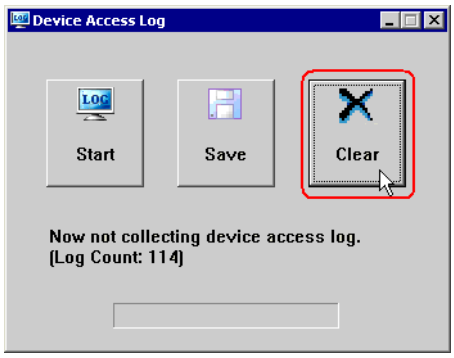
AGP2.PLC1,D101,2,5,2,0

AGP2.PLC1,D101,5,5,2,0

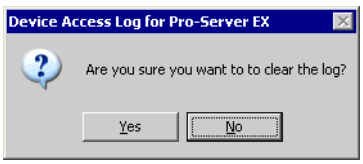
AGP2.PLC1,D101,5,10,2,0

29.5.3 Clearing Device Access Log After Collecting

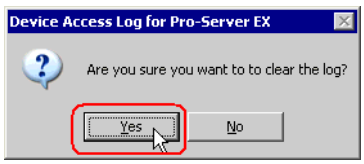
1 Click the [Clear] button.



The "Are you sure you want to clear logs?" message appears.



2 Select the [Yes] button.



The collected device access logs are cleared.

29.5.4 Restrictions

Conditions for collecting device access logs

Whether collecting device access logs or not is determined by the following conditions:

- If a device gives a read-request to the device of another node, device data are collected as logs. When a read-request is received from another node, these data are not collected as logs.
- Access frequency is counted despite whether a request is via a network or not (whether cache read or not).
- Data is collected as logs despite whether actually accessed to devices or not (whether connected on the network or not).
- In the case of data transfer, data is not collected. (excluding a transfer source device when the transfer type is "Collection-type data transfer")

Conditions for access to the same device

Whether accessing the same device or not (whether access frequency is counted or not) is determined by the following conditions:

- The first address of the device is the same.
- The access mode is the same.
- The access point is the same.

If any of the above conditions are not satisfied, the access is judged as an access to another device.

(Example) These examples are the cases judged as different:
16-bit access x 1 point to LS100 and 32-bit access x 1 point to LS100
16-bit access x 2 points to LS100 and 32-bit access x 1 point to LS100
Bit access x 16 points to LS100:00 and 16-bit access x 1 point to LS100

When the same device is specified, moreover, the case specifying the device directly and that accessing the group where just one device is registered are judged as different. However, the case accessing by specifying the symbol or device inside of the group (excluding the nest group) is judged as an access by specifying the device directly.

Allowance of log collection

You can collect at maximum 1000 logs, and the logs exceeding this limit are not collected. In this case, it is not required to make the [Start] button on the "Device Access Log" screen invalid.
When the access frequency exceeds the maximum number (4294967295), the exceeding access is not counted.

Other restrictions

- If 'Pro-Server EX' is closed with Device Access Log running, Device Access Log is also closed (and the collected logs are to be broken).
- If 'Pro-Server EX' reloads a network project file during the Device Access Log operation, the collected logs are to be broken and the [Now collecting] message will turn to [Under suspension].