

# Chapter 7

## Data Sampling Screen

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# 7.1

## Data Sampling Screen



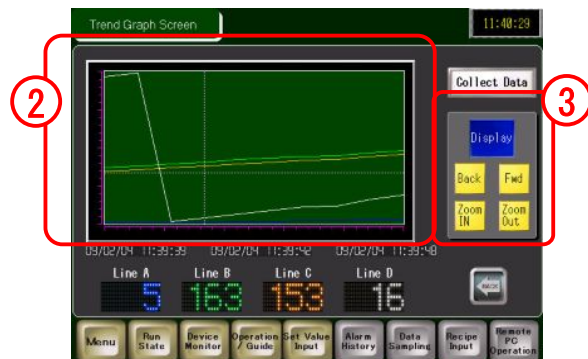
Instruction

## Data Sampling Screen

The data sampling screen is used to manage/control production by collecting and displaying data in a device/PLC on the GP screen at a specified timing. The collected data can be printed out or saved in a CF card and moved to a computer.



List Display



Trend Graph Display

- 1) Display sampled data in a list .

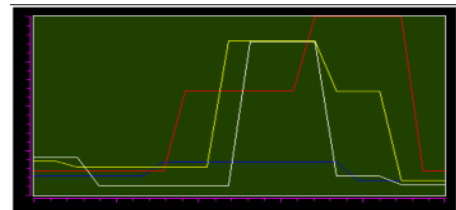
Touching  starts sampling data.

Touching  deletes data.

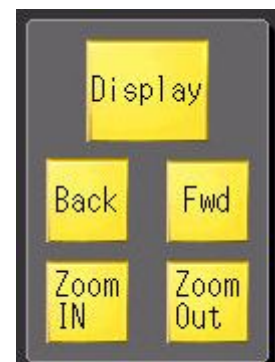
(→ See page 7-9.)

Date	Time	Line A	Line B	Line C	Line D
07/12/03	19:09:23	0	0	0	0
07/12/03	19:09:33	1	23	34	34
07/12/03	19:09:34	1	23	34	34
07/12/03	19:09:43	1	0	555	43
07/12/03	19:09:44	1	0	555	43
07/12/03	19:09:54	11	3454	555	43
07/12/03	19:09:55	11	3454	555	43
07/12/03	19:09:56	11	3454	555	43
07/12/03	19:09:57	11	3454	555	43
07/12/03	19:09:58	11	3454	555	43

- 2) Display sampled data in a trend graph.  
(→ See page 7-15.)



- 3) Display historical data in a trend graph.  
(→ See page 7-19.)



# 7.2

## Sampling Data Display



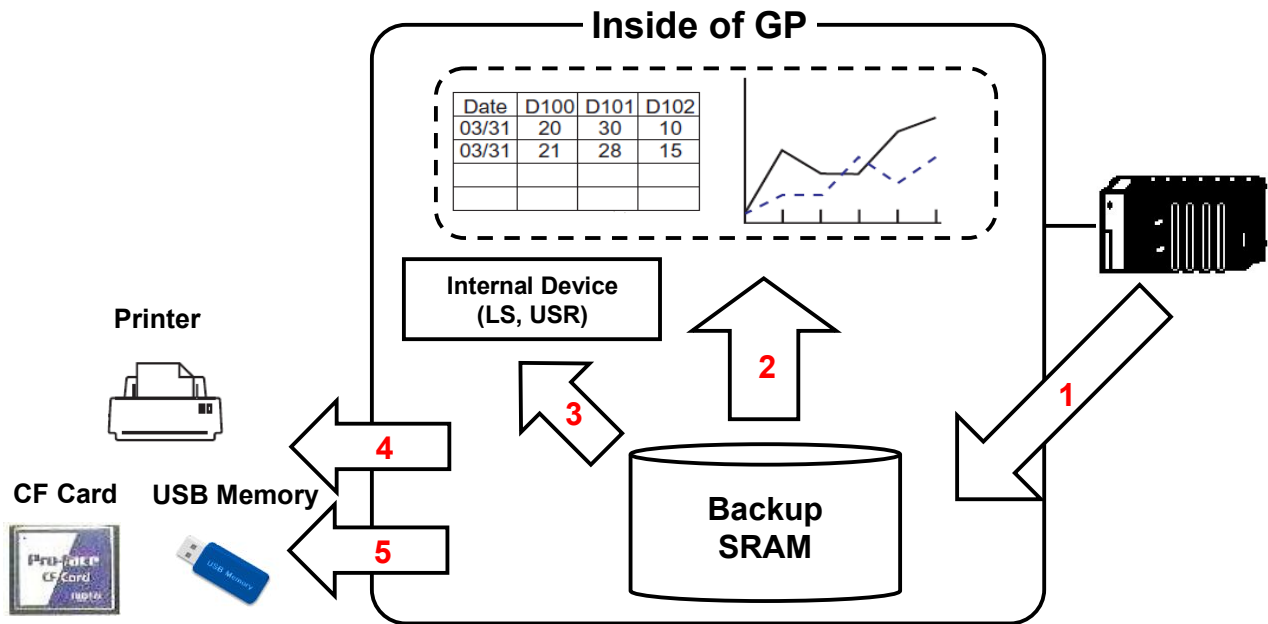
## Collect Data

Instruction

To collect or save data in a device/PLC into a GP unit, use the Sampling feature.

This feature allows you to save data in the GP backup SRAM at a specified time or cycle and display the saved data in a list or a trend graph on the screen. Also the data can be printed out or saved in a CF card.

### Image of Sampling Feature

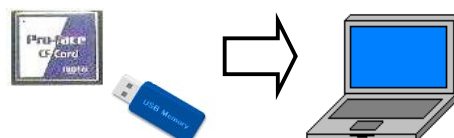


- 1) **Address Settings/Action Settings:** Collects or saves data in a device/PLC at a specified time or cycle.
- 2) **SRAM → Screen Display:** Displays data in the SRAM on the screen.  
\* Use Sampling Data Display and Historical Trend Graph.
- 3) **Write Data:** Allows data to be edited or displayed in a bar graph or trend graph by writing sampling data into the LS area in the GP.
- 4) **Print:** Prints out sampling data from the GP.
- 5) **Save in CSV:** Saves sampling data from the SRAM to a memory card in CSV format.

### ★ One Point

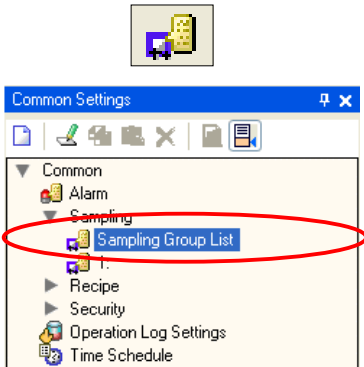
Data backed up from SRAM to a memory card is saved in CSV format. You can edit the data on your computer easily.

#### Memory Card

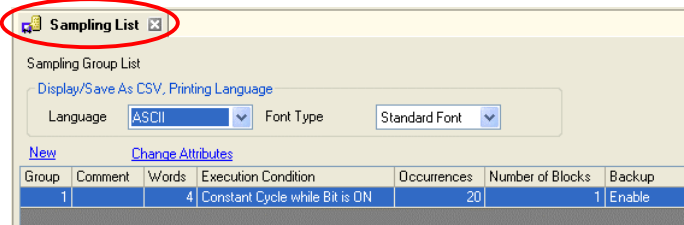


Setup Procedures of Data Sampling 1

1) Set the Sampling Group

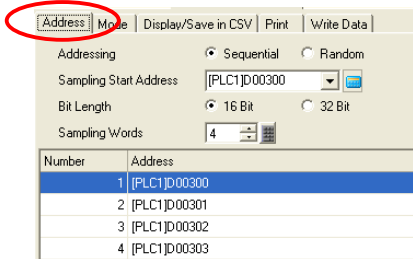


Sampling List

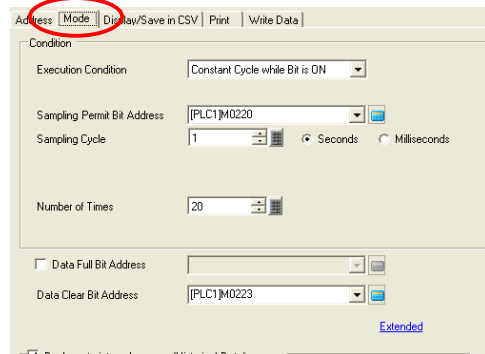


Make the Address settings, the Mode settings, and the Display/Save in CSV settings for each sampling group.

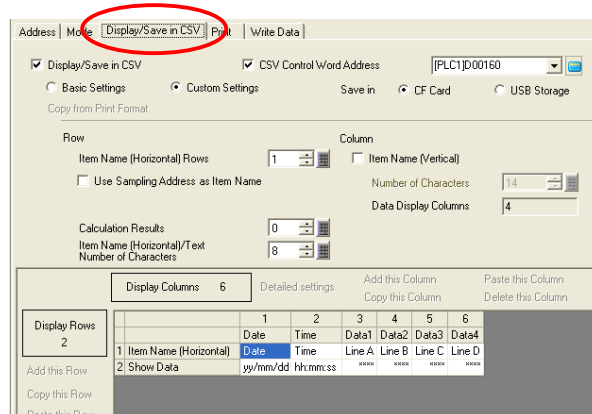
**<Address>**  
Specify an address to collect data in.



**<Mode>**  
Set the timing to collect data.



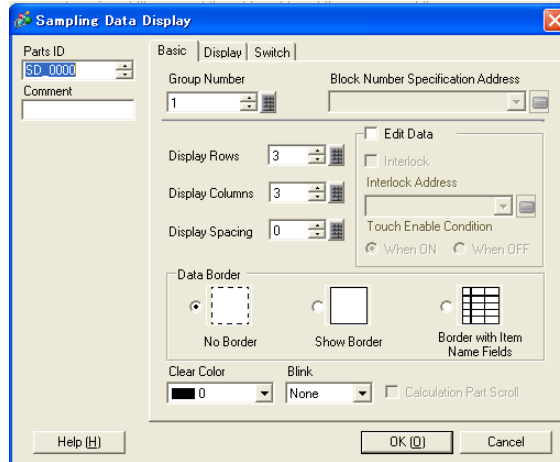
**<Display/Save in CSV>**  
Set display formats for CSV data saving.



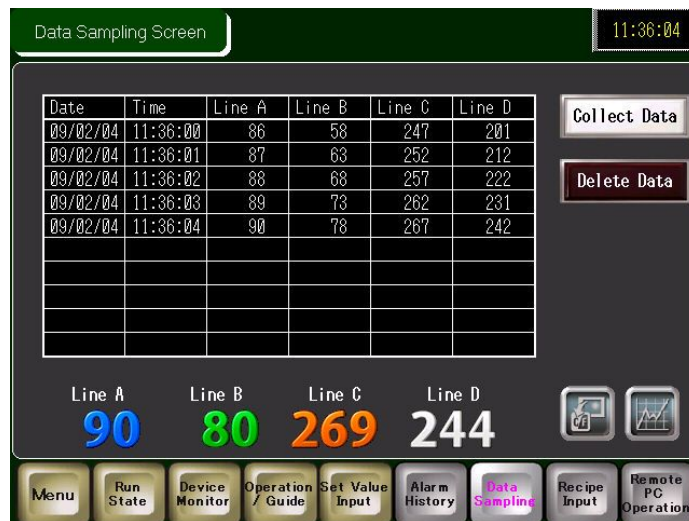
To the next page ->

Setup Procedures of Data Sampling 2

- Place a [Sampling Data Display] on the screen.  
It shows the sampled data numerically in the list.



- Save the project file and transfer it to the GP unit.



✓ Practice **Let's Display Sampled Data in List**

Let's collect data and display them in a list!

[Setup Procedure]

1. In the Sampling settings, create a Sampling Group.
2. Place the Sampling Data Display on the base screen "7".

<Practice Screen>

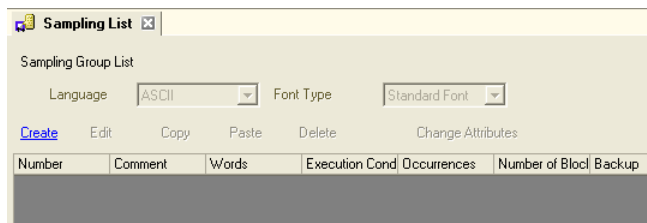
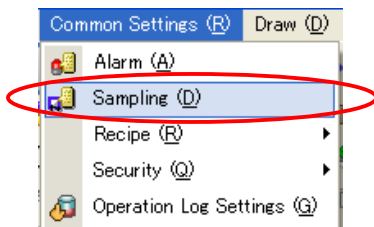


<Completed Screen>



**(1) Select Sampling**

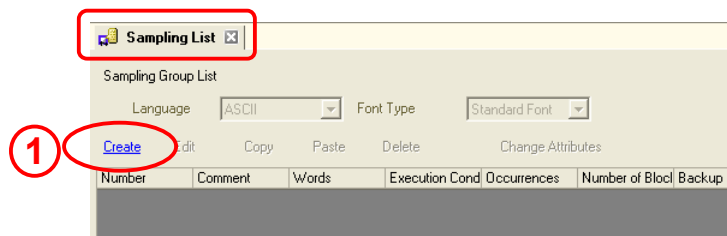
On the [Common Settings] menu, select [Sampling]. Or click the [Sampling] icon on the tool bar.



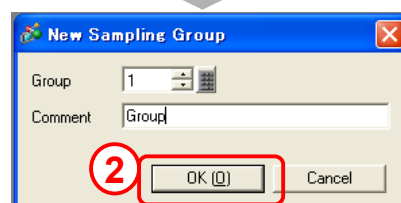
The Sampling Group List will open.

**(2) Create Sampling Group**

1) Click [Create].



2) Set [Group] to "1" and [Comment] to "Group". Click [OK].

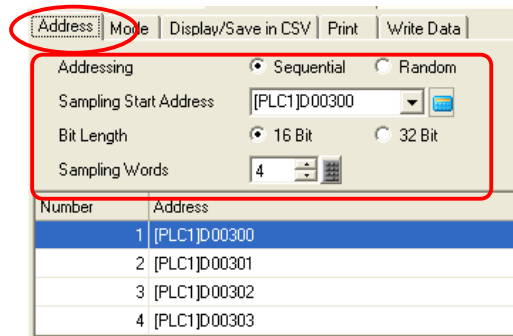


**(3) Address Settings**

Set an address in which sampling data are stored.

Here, make settings as below.

Addressing: Sequential  
 Sampling Start Address: USR02300  
 Bit Length: 16 Bit  
 Sampling Words: 4



**(4) Mode Settings**

**Execution Condition:**

Set a timing to collect data at.  
 (→ See page 7-10.)

Here, select [Constant Cycle while Bit is ON].

**Sampling Permit Bit Address:**

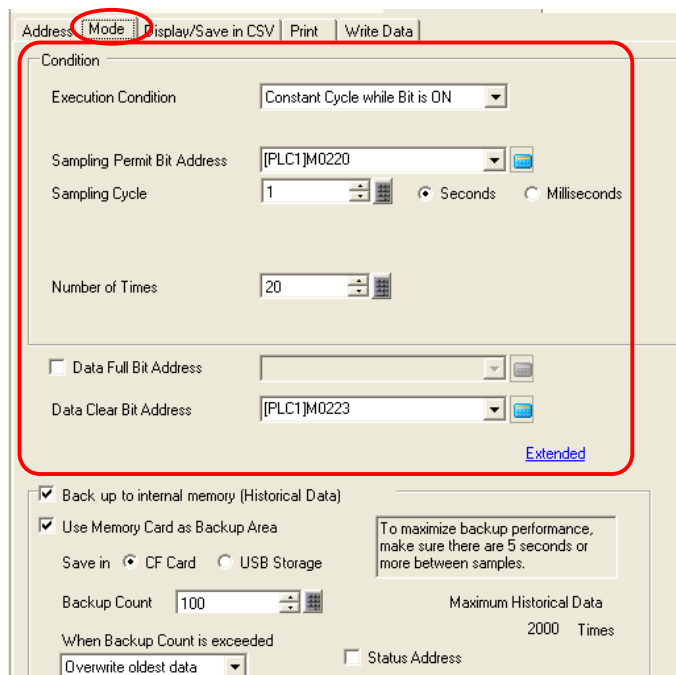
Set a bit address which is a trigger to start sampling.

**Sampling Cycle:**

Set the time of the sampling cycle.

**Number of Times:**

Select the number of times sampling will occur.  
 \* The setting range is from 1 to 65535.



**Data Full Bit Address:**

Set a bit address that turns on when the specified number of data samplings are completed.

**Data Clear Bit Address:**

Set a bit address to control to clear sampled data.  
 When this address turns on, sampled data will be cleared. After clearing is completed, the address turns off.

**< Settings >**

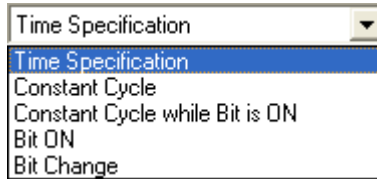
Here, make settings as below.

Sampling Permit Bit Address: USR0003200  
 Sampling Cycle: 1 Second  
 Number of Times: 10  
 Data Full Bit Address: Not Checked  
 Data Clear Bit Address: USR0003203

★ One Point

**Sampling Execution Condition**

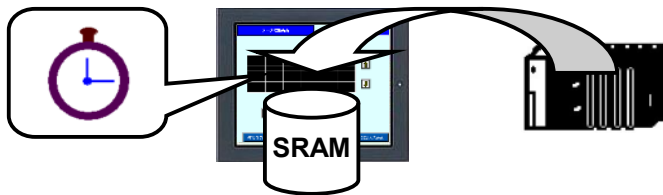
Specify the timing to collect data.



**Set Time, Constant Cycle:**

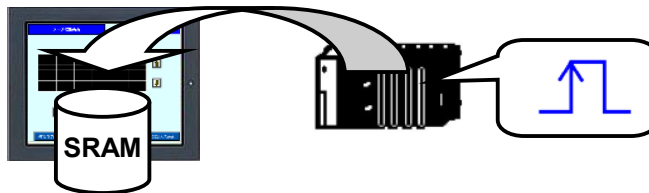
Data are collected at a specified timing or cycle.

\* The internal timer of the GP unit monitors the set time or cycle.



**Bit ON, Bit Change:**

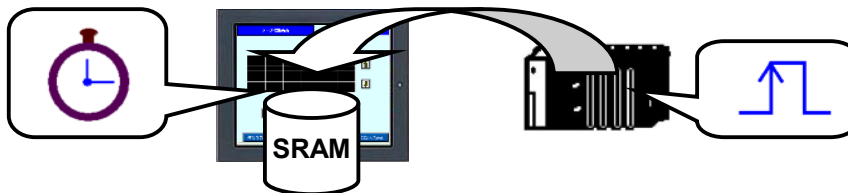
Data are collected when a specified bit turns on or changes.



**Constant Cycle while Bit is ON:**

Data are collected at a specified cycle while a specified bit is on.

\* The internal timer of the GP unit monitors the cycle.



**(5) Display/Save in CSV Settings**

**1) Display/Save in CSV:**

Specify whether to display sampling data on the GP screen or to save the data in a memory card.

When you display data on the screen or save data in a memory card, you must check and set the format.

**Basic Settings/Custom Settings:**

Select a format setting mode.

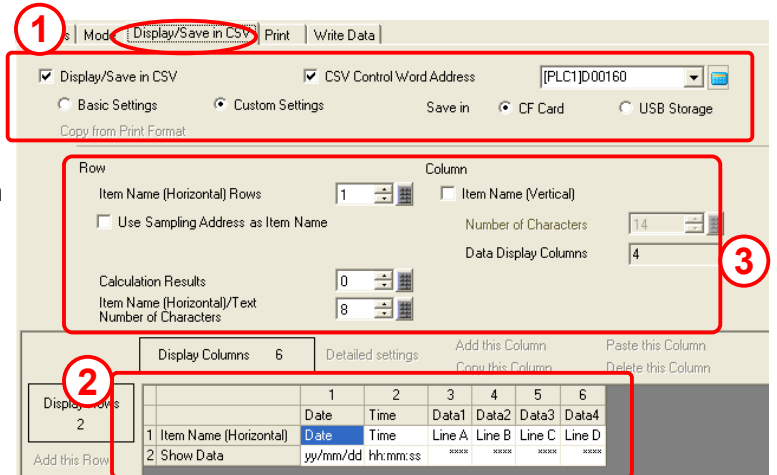
**[Basic Settings]**

Allows you to configure settings easily by using a preset format.

**[Custom Settings]**

Allows you to set a customized format.

Here, check [Display/Save in CSV] and select [Custom Settings].



**CSV Control Word Address:**

Specify whether or not to save sampling data in a memory card. If save, set a control address to write data to a CF card.

Here, set it to "USR02160".

**Save in:**

Select either [CF Card] or [USB Storage] to save data in.

**2) Enter "Line A", "Line B", "Line C", and "Line D" in Item Name (Horizontal) from Data 1 to Data 4 respectively.**

	1	2	3	4	5	6	7
	Item Name (Vertical)	Date	Time	Data1	Data2	Data3	Data4
1	Item Name (Horizontal)	Date	Time	[PLC1]D00300	[PLC1]D00301	[PLC1]D00302	[PLC1]D00303
2	Show Data	yy/mm/dd	hh:mm	xxxx	xxxx	xxxx	xxxx



	1	2	3	4	5	6
	Date	Time	Data1	Data2	Data3	Data4
1	Item Name (Horizontal)	Date	Time	Line A	Line B	Line C
2	Show Data	yy/mm/dd	hh:mm:ss	xxxx	xxxx	xxxx

**3) Row:** Set rows in the format.

Set [Item Name (Horizontal) Rows] to "1", check off [Use Sampling Address as Item Name], set [Calculation Results] to "0" and [Item Name (Horizontal)/Text Number of Characters] to "8".

- \* Please be sure to enter item names (Procedure 2) before setting [Item Name (Horizontal) / Text Number of Characters]. If the number of characters of [Item Name (Horizontal)] is 9 or more, you can not set "8".

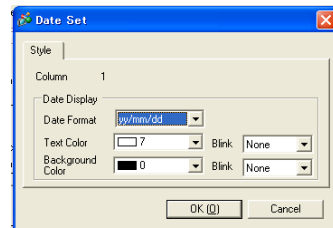
**Column:** Set columns in the format.

Check off [Item Name (Vertical)].

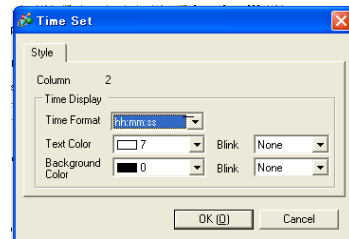
- \* [Data Display Column] is set automatically depending on the number of data to be collected at once.

- 3) Specify each column of “Date” and “Time”. Set a format and a color by opening [Detailed Settings].

Display Columns	6	Detailed settings		Add this Column	Paste this Column		
		1	2	3	4	5	6
		Date	Time	Data1	Data2	Data3	Data4
1	Item Name (Horizontal)	Date	Time	Line A	Line B	Line C	Line D
2	Show Data	yy/mm/dd	hh:mm:ss	xxxx	xxxx	xxxx	xxxx



Display Columns	6	Detailed settings		Add this Column	Paste this Column		
		1	2	3	4	5	6
		Date	Time	Data1	Data2	Data3	Data4
1	Item Name (Horizontal)	Date	Time	Line A	Line B	Line C	Line D
2	Show Data	yy/mm/dd	hh:mm:ss	xxxx	xxxx	xxxx	xxxx



**(6) Select/Place Sampling Data Display**

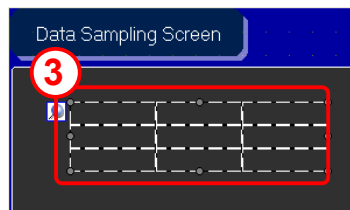
- 1) Open the base screen “7”.



- 2) Click the [Sampling Data Display] icon on the tool bar.



- 3) Click the screen where to place the sampling data display.

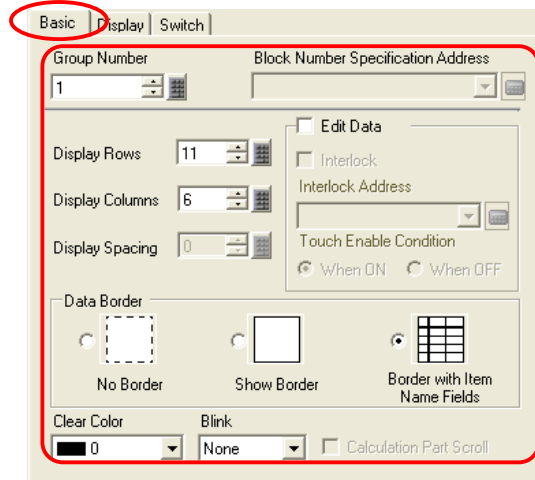


**(7) Basic Settings**

**Group Number:**

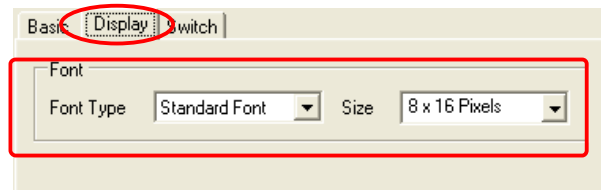
Specify the group number, which has been created in the sampling settings.

- Group Number: 1
- Display Rows: 11
- Display Columns: 6
- Edit Data: Not Checked
- Data Border / Clear Color: Set as you like.



**(8) Display Settings**

Select "Standard Font" for [Font Type] and "8 x 16 Pixels" for [Size].

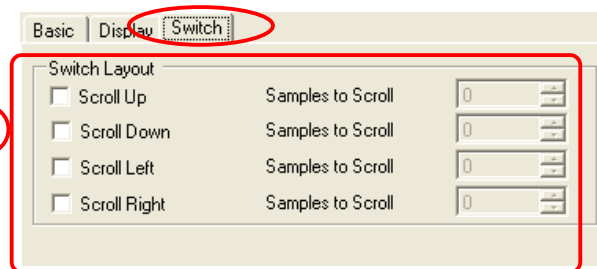


**(9) Switch Settings**

1) Set scroll switches.

No settings of scroll switch placement are required with this practice project data.

1



2) Click [OK] and adjust the position of the sampling data display.



2



# 7.3

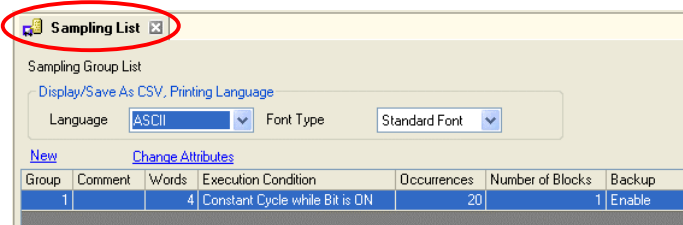
## Trend Graph Display

Setup Trend Graph

1) Set the Sampling Group



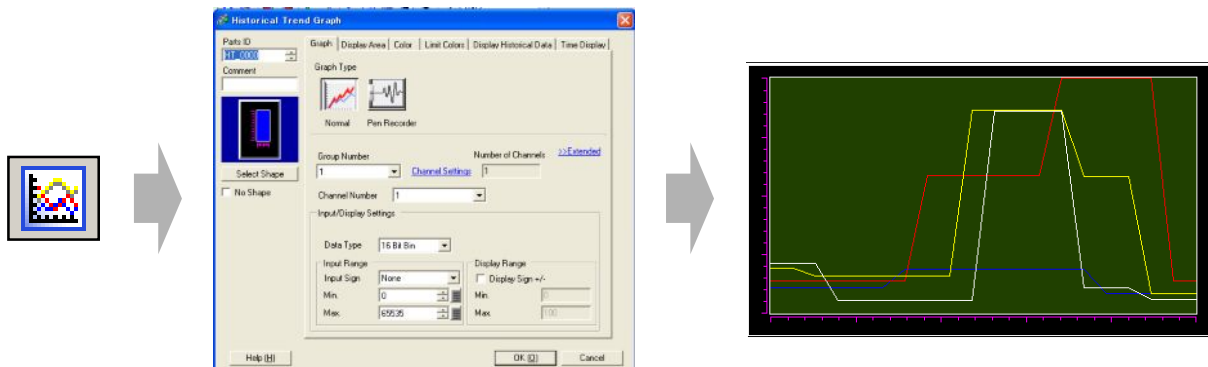
Sampling List



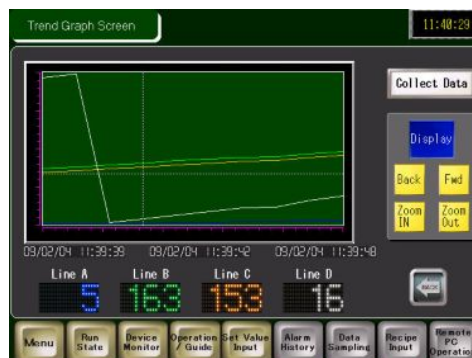
Make the Address settings, the Mode settings, and the Display/Save in CSV settings for each sampling group.

(→ See page 7-6.)

2) Place a [Historical Trend Graph] on the screen.  
It shows the sampled data graphically.



3) Save the project file and transfer it to the GP unit.



**Practice** Let's Display Sampled Data in Trend Graph

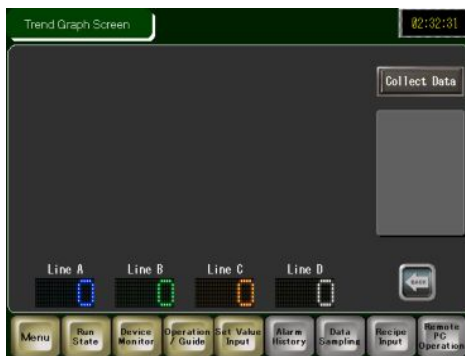
Let's collect data and display the data in a trend graph!

[Setup Procedure]

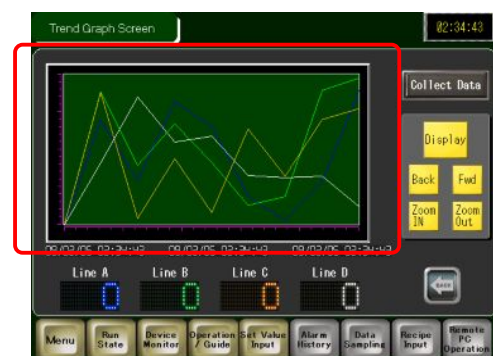
1. Place a Historical Trend Graph on the base screen "105".

Open the base screen "103".

<Practice Screen>



<Completed Screen>

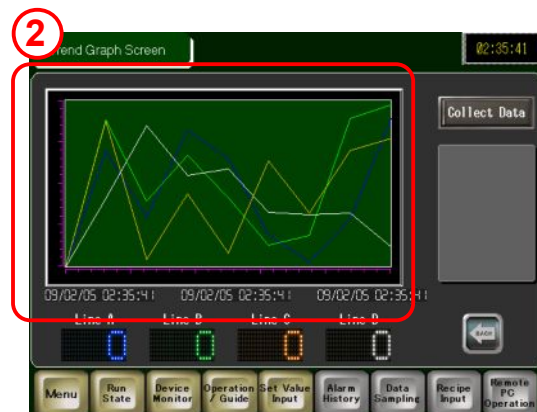


**(1) Place Historical Trend Graph**

- 1) Click the [Historical Trend Graph] icon on the tool bar.

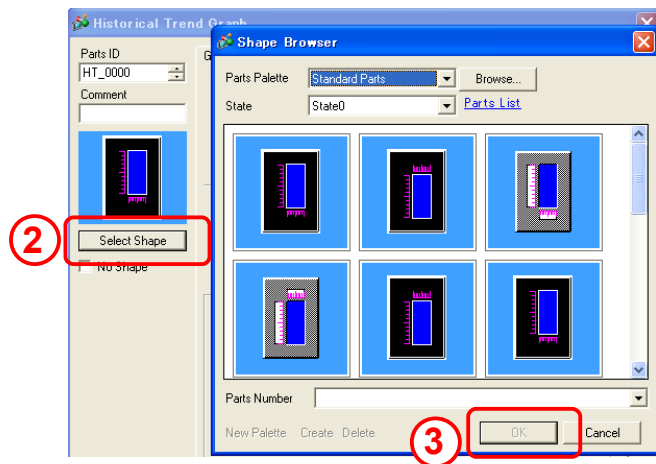


- 2) Click the screen where to place the historical trend graph.



**(2) Select Shape**

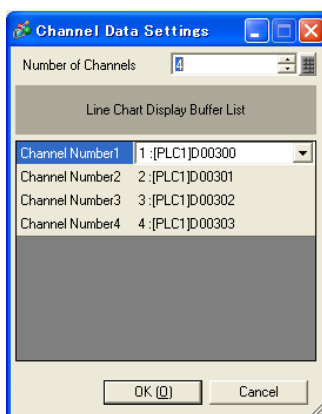
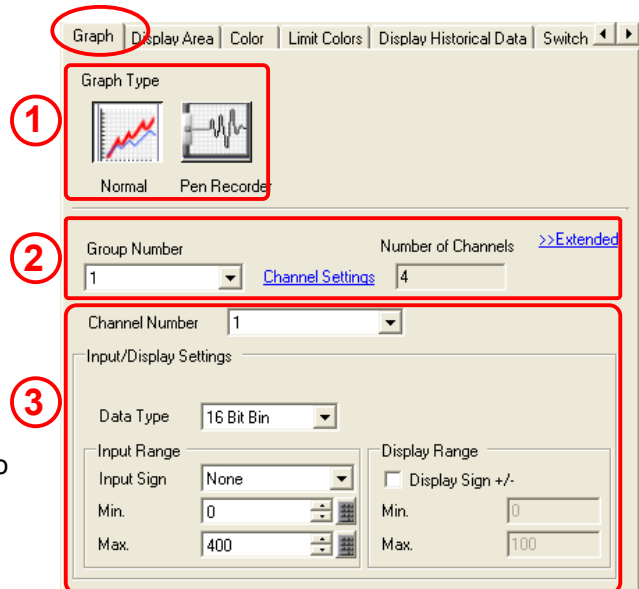
- 1) Double-click the placed historical trend graph.
- 2) Click [Select Shape] and select a shape of the graph.
- 3) After selecting a shape, click [OK].



**(3) Graph Settings**

- 1) Select the “Normal” graph type.
- 2) **Group Number:**  
Specify the sampling group number to display in a graph.  
\* Please be sure to make the data sampling settings in the Sampling settings beforehand.

**Channel Number:**  
From the specified sampling groups, specify the number of addresses of lines to display and their addresses.



Here, set [Group Number] to “1”. Click [Channel Settings] and set [Number of Channels] to “4”. Make settings for [Channel Number] as below.

- Channel Number 1: [#INTERNAL]02300
- Channel Number 2: [#INTERNAL]02301
- Channel Number 3: [#INTERNAL]02302
- Channel Number 4: [#INTERNAL]02303

**3) Channel Number:**

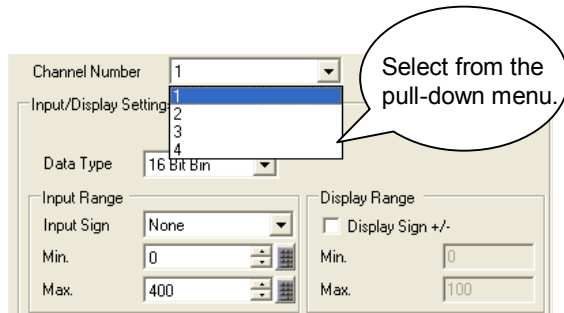
Specify a channel number to set up the Input/Display Settings for.

**Input Range:**

Set the input range of data to display in a trend graph.

Here, make settings as below.

Data Type: 16 Bit Bin  
 Input Sign: None  
 Min.: 0  
 Max.: 400



**(4) Display Area Settings**

**Display Direction:**

Select a graph display direction.

**Data Samples:**

Set the number of data samples to be displayed on a single line.

\* The range of data samples depends on the number of displaying dots of the set model.

**Samples to Scroll:**

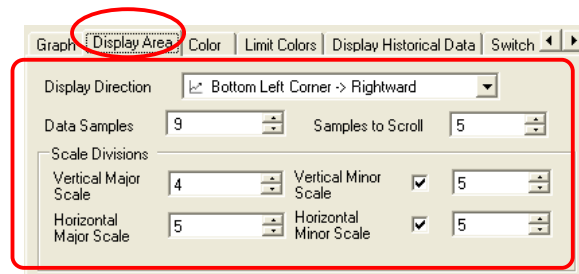
Set the number of sets of data to scroll when the graph fills the display area.

**Scale Divisions:**

Set scale display.

Here, make settings as below.

Display Direction: Bottom Left Corner -> Rightward  
 Data Samples: 9  
 Samples to Scroll: 5  
 Scale Divisions: Set as you like.

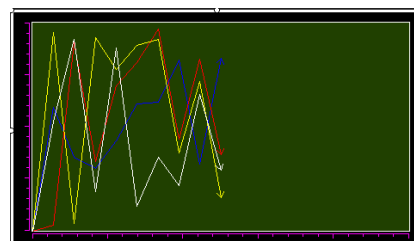
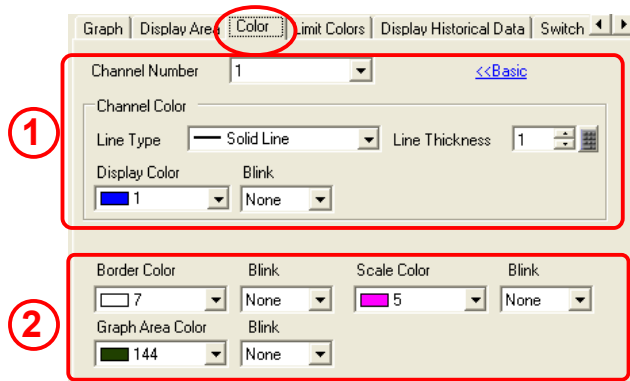


**(5) Color Settings**

1) Select each channel from 1 to 4, set [Line Type], [Line Thickness], and [Display Color] as you like.

2) Set [Border Color], [Scale Color], and [Graph Area Color] as you like.

3) Click [OK] and adjust the position of the graph.



✓ Practice **Let's Display Historical Data in Trend Graph**

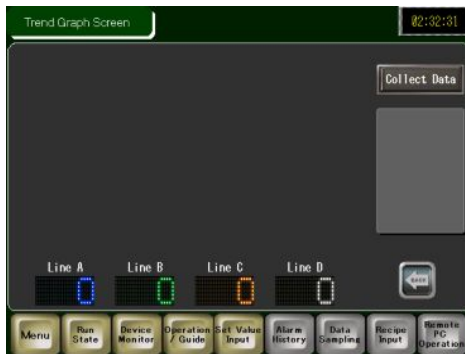
Let's display older data than currently displayed data in a trend graph.

[Setup Procedure]

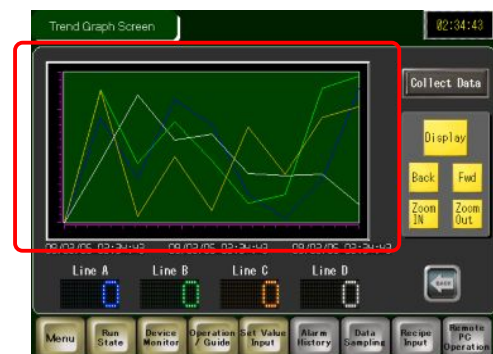
1. Open the base screen "105".
2. Set the Historical Trend Graph.

Open the base screen "103".

<Practice Screen>



<Completed Screen>



**(1) Display Historical Data**

Double-click the placed graph.  
Open the [Display Historical Data] tab.

**Display Historical Data:**

Specify whether or not to display historical data.  
If you check the box, the [Switch] tab will be added.

**Show Cursor:**

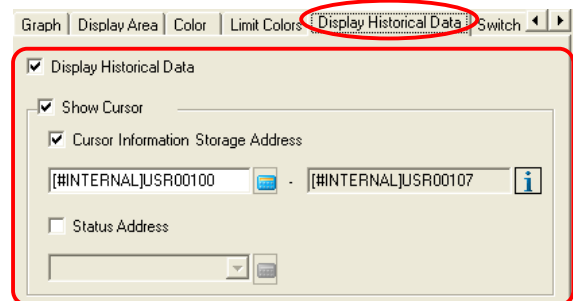
Specify whether or not to show a cursor on the graph display.

**Cursor Information Storage Address:**

Specify whether or not to store graph data on which the cursor points into an address.  
Data to be stored uses words for date and time (four words) and the number of channels from the set address.

**Status Address:**

Specify whether or not to store the operating conditions or error information of the historical display mode into a specified address.

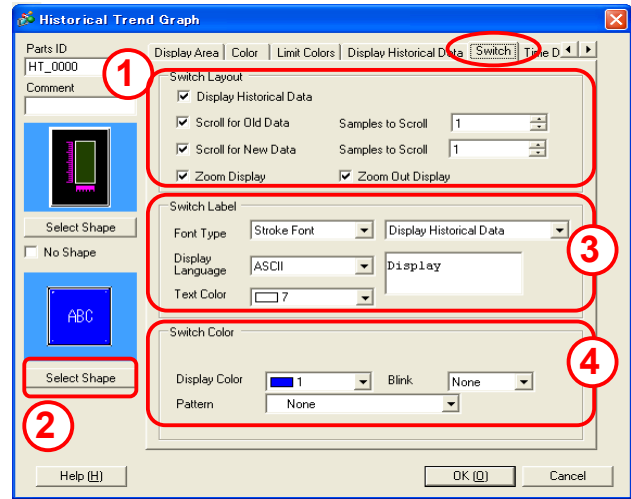


**<Settings>**

Here, check [Display Historical Data] and [Show Cursor]. Check [Cursor Information Storage Address] and set it to "USR100". Check off [Status Address].

**(2) Switch Settings**

- 1) Select whether or not to place each switch.  
Check all and set [Samples to Scroll].  
**Display Historical Data:**  
Places a switch to change to the mode to display historical data.  
**Scroll for Old Data:**  
Places a switch to scroll backward from the currently displayed data to the older data.  
Set "1" for [Samples to Scroll].  
**Scroll for New Data:**  
Places a switch to scroll forward from the currently displayed data to the newer data.  
Set "1" for [Samples to Scroll].



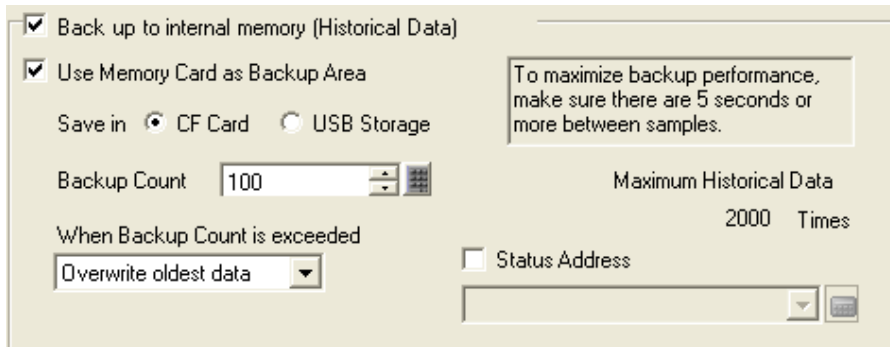
- Zoom Display:** Places a switch to zoom in 2 times, 4 times, and 8 times every time it is touched.
- Zoom Out Display:** Places a switch to zoom out the zoomed display to 1/2, 1/4, and 1/8.

- 2) Click [Select Shape] and select a shape for switches.
- 3) Select a font type and a text color for switches.  
Set labels as below.
 

Display Historical Data:	Display
Scroll for Old Data:	Back
Scroll for New Data:	Fwd
Zoom Display:	Zoom In
Zoom Out Display:	Zoom Out
- 4) Select a switch color.

**★ One Point**

In the Sampling settings, check [Use Memory Card as Backup Area].  
If it is not checked, [Zoom In] and [Zoom Out] features will not work.



**(3) Time Display Settings**

1) You can add date and time to be displayed in graph data by these settings. The date and time are displayed under the graph display.

**Most Recent Time:** Displays the most recent time.

**Oldest Time:** Displays the oldest time.

Here, check both [Most Resent Time] and [Oldest Time].

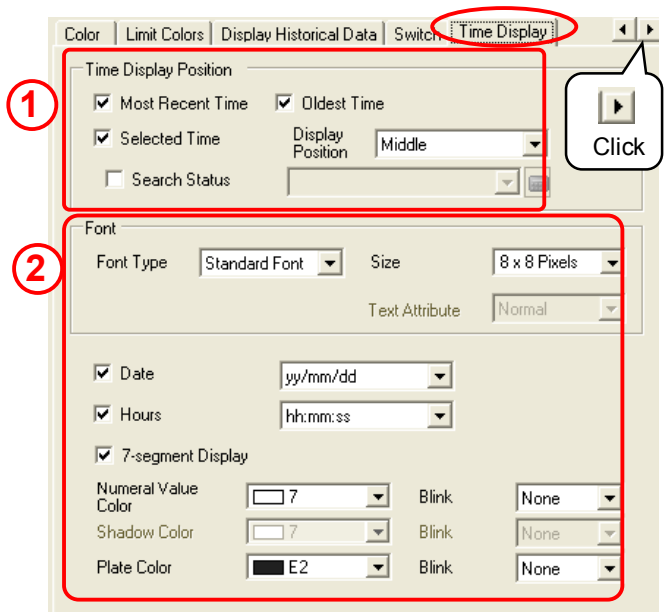
**Selected Time:** Displays the time on which the cursor points while the cursor is shown.

**Display Position:** Select a reference point from [Right Axis], [Middle], and [Left Axis].

**Search Status:** Specify whether or not to set an address to check the search status of Selected Time.

Here, make settings as below.

- Selected Time: Checked
- Display Position: Middle
- Search Status: Not Checked



2) Set [Font].

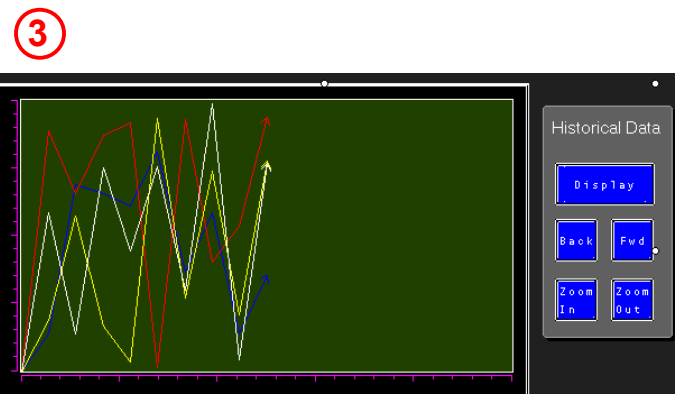
Check [Date], [Hours], and [7-segment Display]. Select display formats for [Date] and [Hours].

Set colors as you like.

3) Click [OK] and adjust the position of the graph.



Switches and Date/Time Displays can be also created individually and placed on the base screen.



**(4) Mode Settings of Sampling Settings**

Open [Common Settings] -> [Sampling]

**Back up to internal memory (Historical Data):**

Select whether or not to save sampled data to the backup SRAM. If data is not saved, the data will be deleted when the power of the GP unit is turned off or reset.

**Use Memory Card as Backup Area:**

Select whether or not to write data saved in the backup SRAM to the location specified in [Save in]. Data is saved in Bin format.

**Save in:**

Select either [CF Card] or [USB Storage] to save data in.

**Backup Count:**

Specify the number of times (the number of files to be created) to write the backup data from 1 to 500.

**When Backup Count is exceeded:**

Select an action when the number of backup files exceeds the value set in the Backup Count.

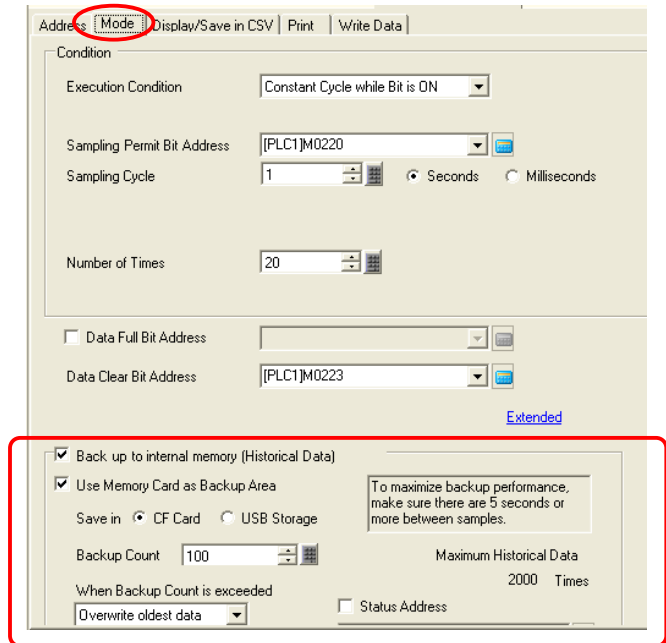
**Status Address:**

Specify whether or not to store the saved operation status and error information in a specified address.

**< Settings >**

Here, make settings as below.

- Back up to internal memory: Checked
- Use Memory Card as Backup Area: Checked
- Save in: CF Card
- Backup Count: 100
- When Backup Count is exceeded: Overwrite oldest data
- Status Address: Not Checked



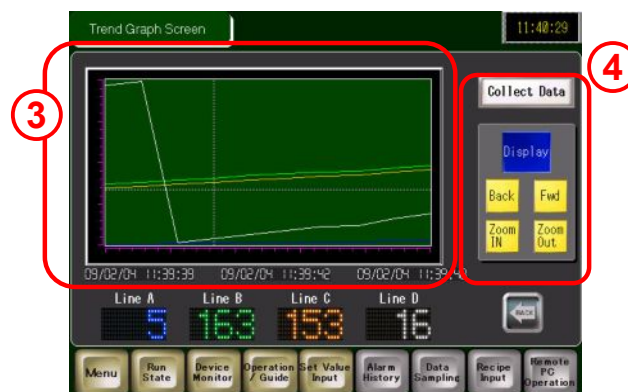


## Let's Transfer Data to GP and Check Performance

<Completed Screen>



- 1) Touch the Collect Data switch. Data will be collected every second and be displayed in a list. Touch the Delete Data switch to delete data.
- 2) If you touch the graph switch, the Trend Graph Screen will open.



- 3) Collected data are displayed in a trend graph.
- 4) Historical data can be displayed by switches.