

# Introduction Summary

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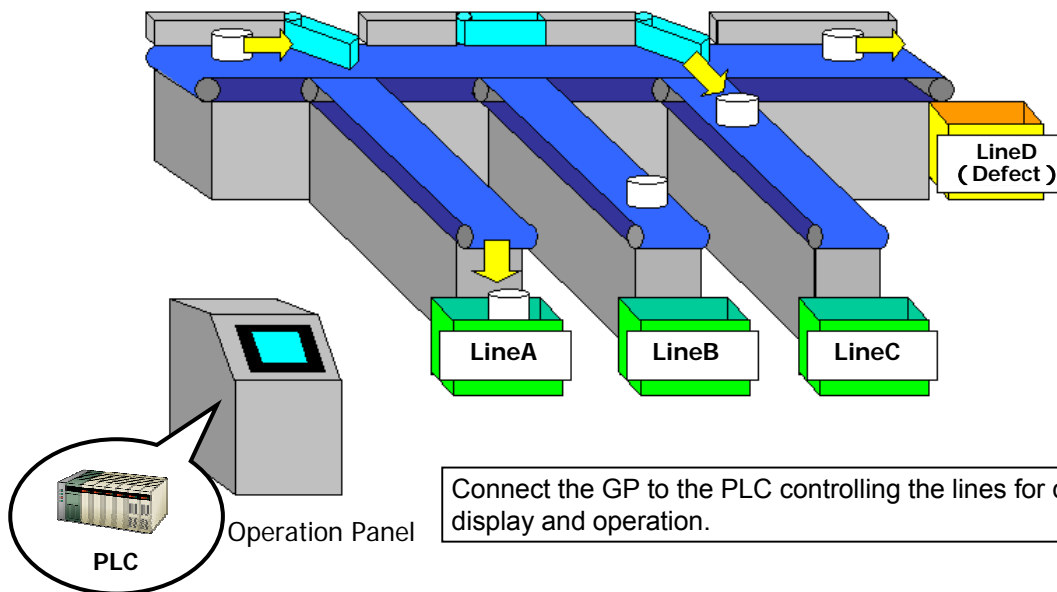
Instruction

## Summary

This textbook is for GP-EX Basic Course, GP-EX Advanced Course, GP-EX Logic Feature Course, and GP-EX Computer Linking Feature Course.

In GP-EX Basic Course and GP-EX Advanced Course, create screens by use assuming an operation panel of general sort lines.

Sort line image



### ★ One Point

Equipments that are used in practice of GP-EX Basic Course and GP-EX Advanced Course are as follows:

- Windows Personal Computer
- Screen Creation Software GP-Pro EX
- GP3000 Series (resolution: 640 × 480 pixels or more)
- MELSEC AnN Series by Mitsubishi Electric Corporation
 

CPU	A1SJ
Link Unit	A1SJ71UC24-R2
- Screen Transfer Cable or Ethernet Cable

Use attached data for practice on creating screen.  
Please refer to the readme.txt file for details.

Screens of GP-EX Basic Course GP-EX Advanced Course

GP-EX Basic Course: Create basic screens that can be substitutes of the control panel in Chapter 1 through 5.

Chapter 1  
Menu Screen



Chapter 2  
Run State Screen



Chapter 3  
Device Monitor Screen



Chapter 4  
Operation / Guide Screen



Chapter 5  
Set Value Input Screen



for Displays

for Operations

GP-EX Advanced Course: Create screens using the settings of the memory features and the movie features, which are particular features of the programmable display units, in Chapter 6 through 8.

Chapter 6  
Alarm History Screen



Chapter 7  
Data Sampling Screen



Chapter 8  
Recipe Input Screen

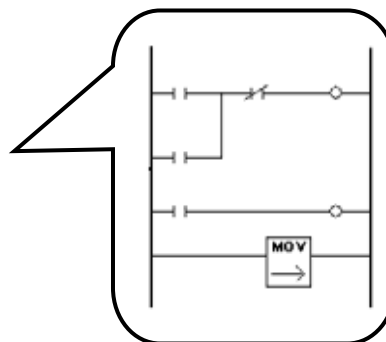


**One Point**

We recommend you practice basic screens before advanced screens.

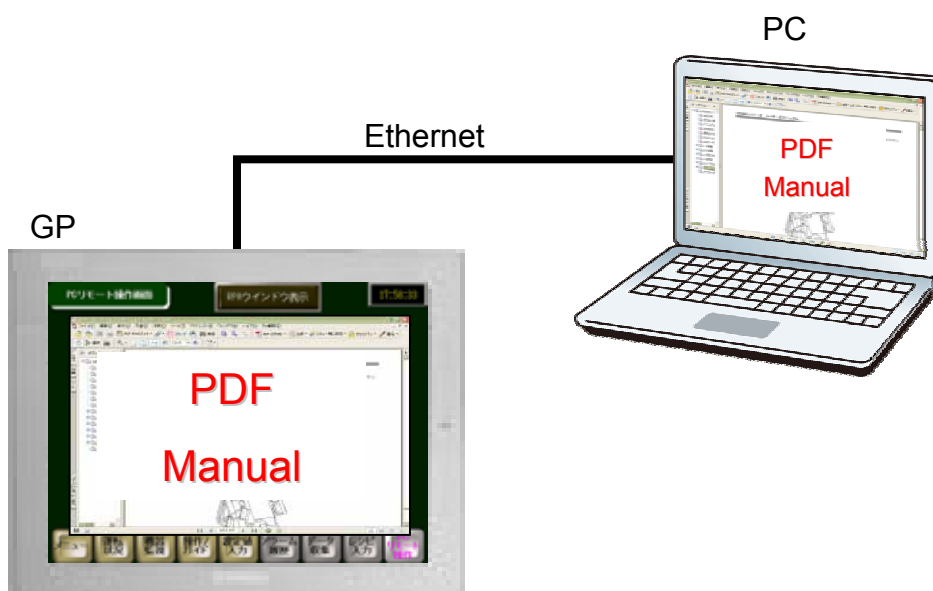
Screens of GP-EX Logic Feature Course

Create preventive maintenance screen and ecology air conditioning system screens using the logic program.



Screens of GP-EX Computer Interaction Feature Course

In GP-EX Computer Interaction Feature Course, let's practice the "Remote PC Access" feature with which you can operate a computer screen from a GP unit, the "GP-Viewer EX" feature with which you can operate data in a GP from a computer, and "WinGP" which enables the GP functions on our panel computer screens by interacting with a computer.



RPA (Remote PC Access)



Instruction

## Development Environment

### (1) Requirements for Development

To develop GP screens, please prepare the followings:



Screen Creation Software  
GP-Pro EX  
(CD-ROM)



Windows  
PC



Transfer Cable  
CA3-USBCB-01,  
Ethernet Cable, CF Card,  
or USB Memory



GP3000  
Series

By installing the screen creation software on your computer and transferring the created project file ( \* .prx ) to the GP unit, the GP can communicate with a device/PLC and displays/operates data.

### (2) Operating Environment

#### Operation Environment for GP-Pro EX

	Required Specification	Remark
<b>PC</b>	PC/AT compatible machine on which Windows operates normally.	Pentium4 1.3GHz or faster is recommended.
<b>Resolution</b>	SVGA 800 × 600 or above is recommended Display with 256 or more colors is required.	
<b>Hard Disk Space</b>	720 MB or more	Free space required for installation
<b>Memory</b>	512 MB or more	1 GB or more is recommended.
<b>OS</b>	Windows2000(Service Pack3 or later), Windows XP (Home Edition or Professional), Windows Vista (*)	The Remote Printer Server, Movie Converter, Remote PC Access, and Pass-Through features are not available if your operating systems is Windows Vista.
<b>Other</b>	Internet Explorer Ver.6.0 or later .NET Framework Ver.2.0 or later Acrobat Reader Ver.6.02 or later	To install GP-Pro EX, .NET Framework Ver.2.0 or later is required to be installed in the PC.

#### Operation Environment for Transfer Tool

	Required Specification	Remark
<b>PC</b>	PC/AT compatible machine on which Windows operates normally.	Pentium 266MHz or faster is recommended.
<b>Hard Disk Space</b>	135 MB or more	
<b>Memory</b>	128 MB or more	512 MB or more is recommended.
<b>OS</b>	Windows98 Second Edition or higher, Windows ME, Windows 2000 Service Pack3 or higher, Windows XP Home Edition or Professional Edition, Windows Vista *	Supports Japanese and English

\* An environment recommended for Windows Vista is required.



## Procedures of Creating New Screen

Instruction

### (1) Start up Screen Creation Software

Double-click the shortcut icon on the desktop.

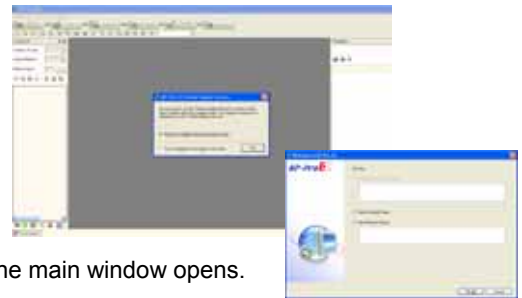
Or click Window's [Start] menu, select [All Programs] → [Pro-face] → [GP-Pro EX 2.51] → [GP-Pro EX] to start up the screen creation software.



Double-click the shortcut icon.



The logo mark appears.



The main window opens.

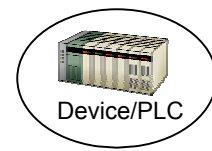
Select if you want to run the "Online Update Service" or not and click [OK]. → Select [New].

### (2) Create New Project File

Click the [New] icon on the main window.



Select GP Series, Model, and Orientation. Click [Next].



Configure Device/PLC.

To start creating a screen, click [New Screen].



### One Point

#### Create and transfer screen data

Transferring a project file which has been created on a computer to a GP unit, the GP communicates with a device/PLC, displays and operates data in the device/PLC.

\* A project file is created using screen creation software. When the project file created with screen creation software is saved in a computer, the extension, ".prx" is allocated to the file.

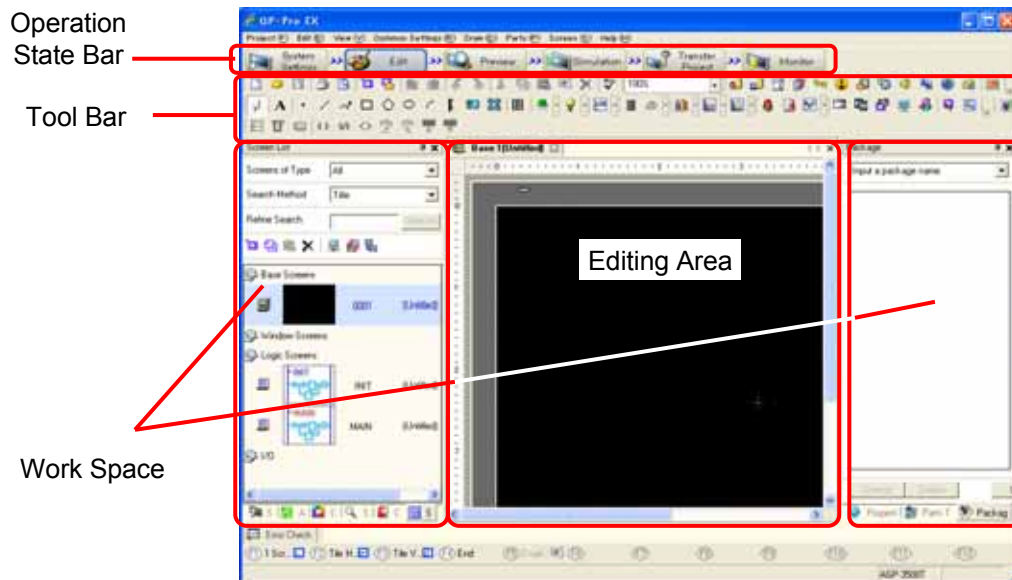
Project file = a pack of data to transfer to a GP unit.



Instruction

# Main Window

This section introduces the major features on the main window.



## (1) Operation State Bar

Icons line up in order of development, [System Settings] → [Edit] → [Preview] → [Simulation] → [Transfer Project] → [Monitor].



- System Settings:** Displays a System Settings window such as the Display Unit settings and the Device/PLC settings in the editing area.
- Edit:** Displays a screen editor to edit or create a screen.
- Preview:** Displays a preview screen to check the display state.
- Simulation:** Allows you to check the performance without connecting a device/PLC.
- Transfer Project:** Launches the Transfer Tool and transfers screens.
- Monitor:** Allows you to check the states of the transferred logic program on a computer by connecting to a GP unit. .

\* The Operation State Bar can be reduced its size, but cannot be hidden.

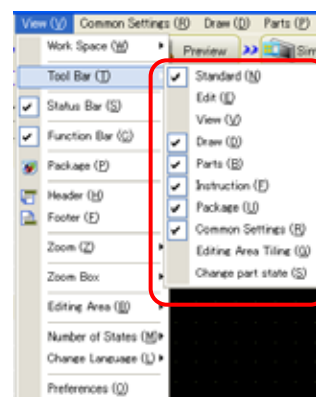
## (2) Tool Bar

Icons of frequently used features and objects are assorted. You can select bars to be displayed with the [View] → [Tool Bar] menu.

Default Tool Bar

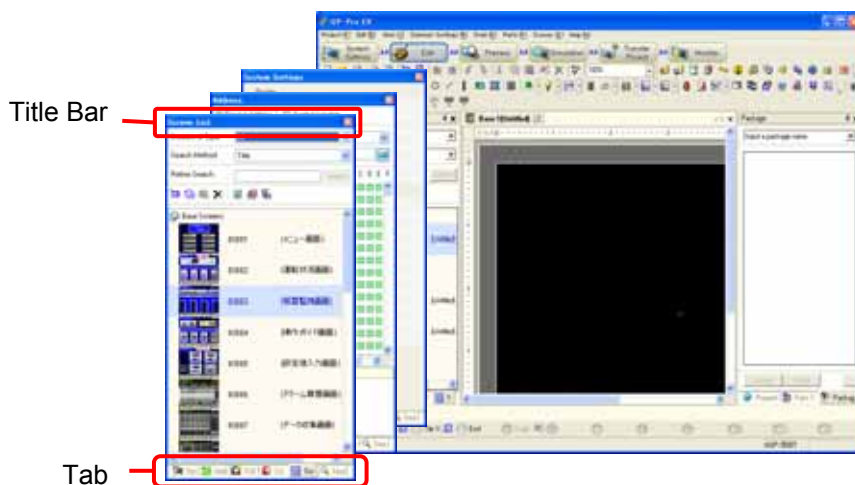


Select from the menu.



**(3) Work Space**

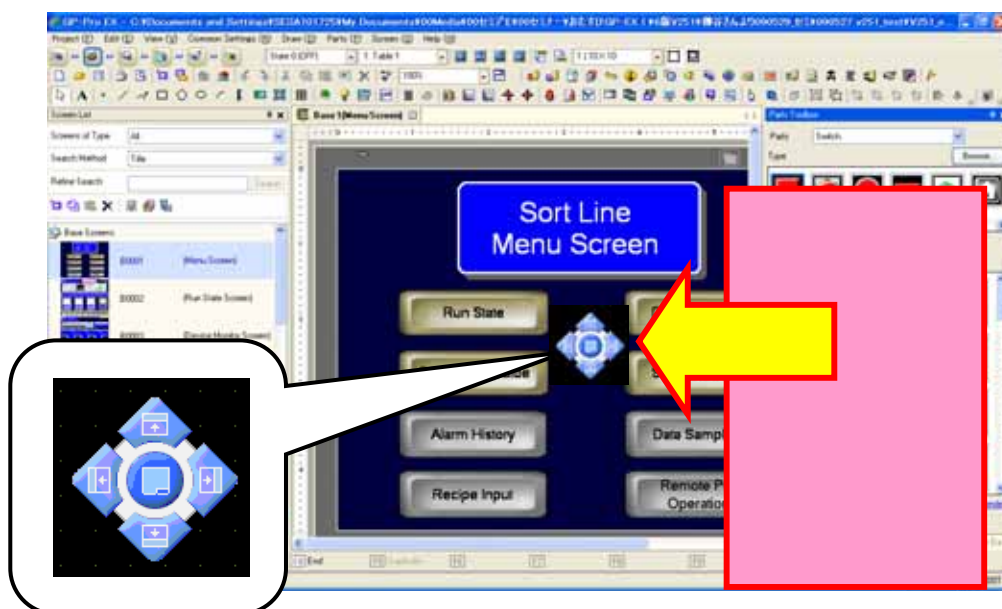
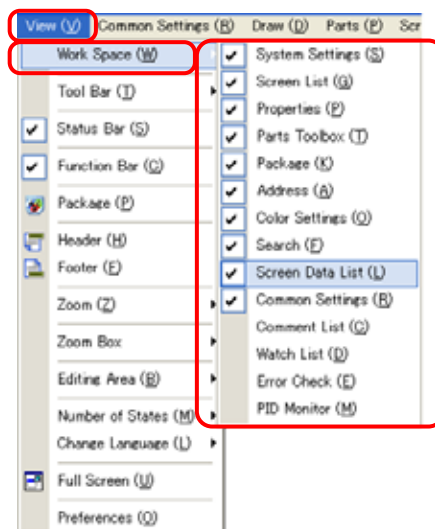
Using the Work Space windows enables efficient editing. Each Work Space is movable to the left, right, top, and bottom of the editing area.



To show each Work Space, select the View menu -> Work Space and then check a desired Work Space. (See the right figure.)

To move a Work Space, drag its tab or title bar. If you point the cursor on an icon on the cross switch displayed on the middle of the screen while dragging, the Work Space will be fixed into each position and placed. (See the below figure.)

For the details of each Work Space window, see “Tips for man-hours reduction.”



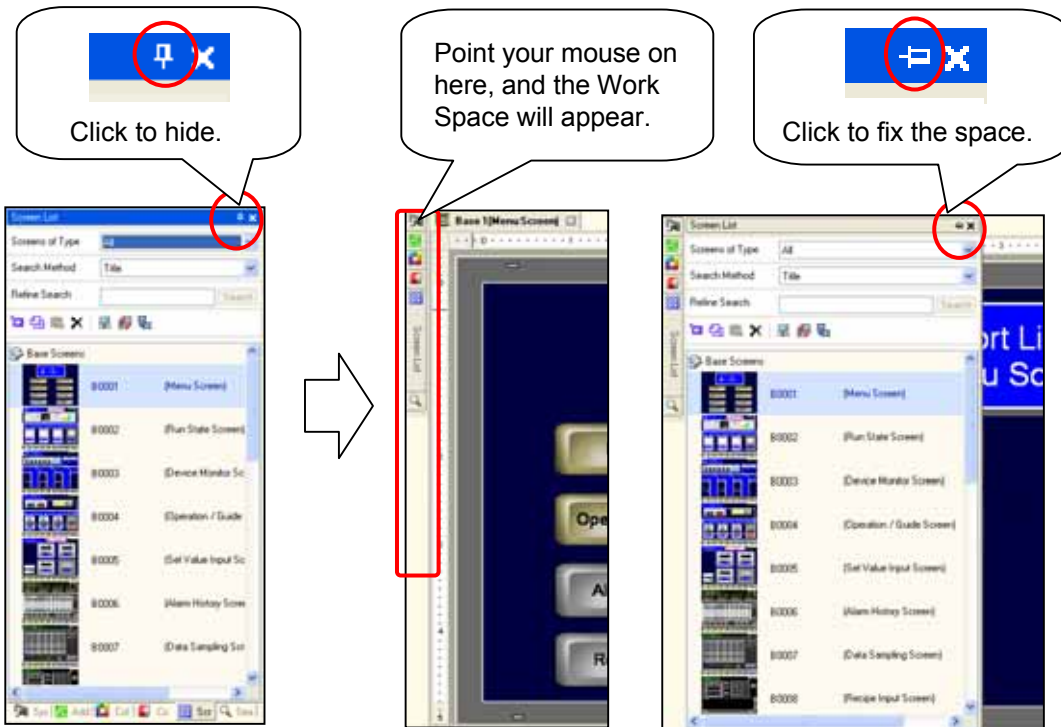


**★ One Point**

**Use the screen editing area wider (Auto-hide feature and Full Screen feature)**

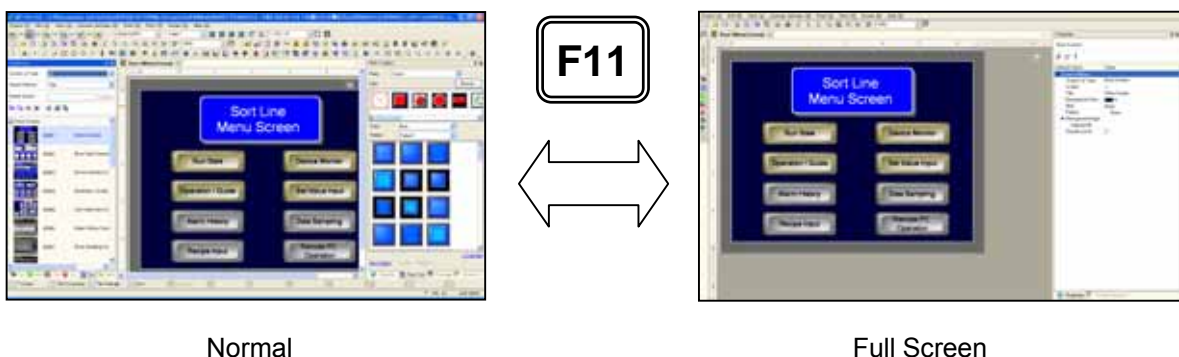
**Auto-hide feature**

Clicking the push pin icon right above in the Work Space, the whole Work Space will be iconized on the left and you keep the editing area wide. If you click the icon, the work space will be displayed.



**Full Screen feature**

To expand the editing area as widely as possible, press the F11 key. The editing area will be expanded and if you press the F11 key again, the editor will show normally.



★ One Point

Utility of an existing project file

1) Dual editor startups

You can start up 2 project files of the same version and copy and paste data from/to each other.



2) Copy from another project file

By selecting Project menu  
 -> Utility  
 -> Copy from Another Project,  
 you can copy various information including base screens to the currently opened project file.



You can select screens to copy from the thumbnail list of screens in another project.

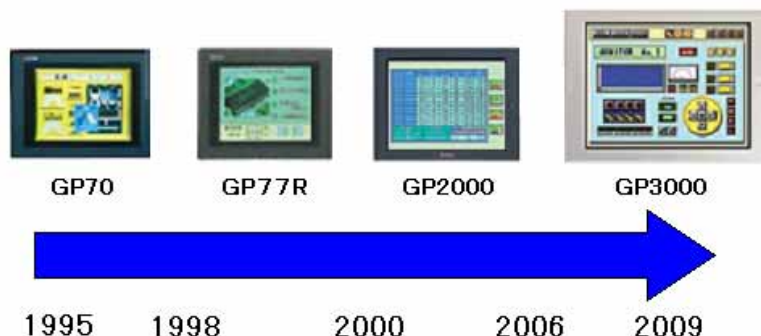
3) Share parts in the Package

By registering your original parts to the Package of the Work Space, you can use them in other project files. Also, you can share the registered Package with other PCs by exporting.



4) Project Converter

The Project Converter is a tool to convert a project file created in GP-PRO/PB3 into the file format (\*.prx) for GP-Pro EX. To use this tool, a separate installation is required.





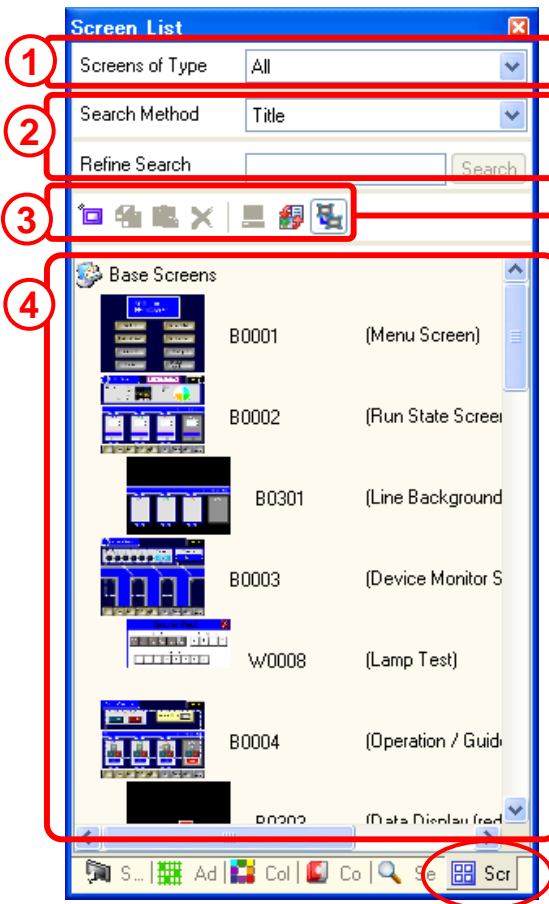
Instruction

# Tips for man-hours reduction ~Full use of Work Space~

## (1) Selecting/Creating a Screen ~Screen List Window~

The Screen List window allows you not only to select a created screen intuitively from the thumbnailled list, but also to recognize at glance which window calls another screen or window screen, or has a header/ footer set on it. You can narrow down your search with the following procedures:

Default Position



1 Select the type: Base Screens, Window Screens, etc.

2 Search a screen by the title or screen number.

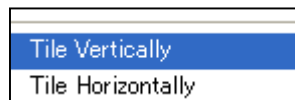
- New Screen**  
Creates a new screen.
- Copy**  
Copies a selected screen.
- Paste**  
Pastes a copied screen.
- Delete**  
Deletes a selected screen.
- Change Attributes**  
Changes the attribute of a selected screen.
- Change Display Mode**  
Changes the display mode between the list and the thumbnail display.
- Nesting**  
Displays screens hierarchically.

Select a screen and double-click it to open.

Display Example



You can change screens, which are open already, using their tabs. By right-clicking a tab, you can tile windows vertically or horizontally.



**(2) Selecting/Placing a Part ~Parts Toolbox~**

The Parts Toolbox allows you to intuitively select a shape of a part and place it on a screen by a drag and drop operation. You can narrow down your search with the following procedures:

Default Position



1 Select a Part type.

2 Select an image.

3 Select the Part color and specify the ON/OFF state.

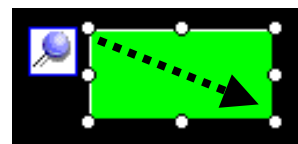
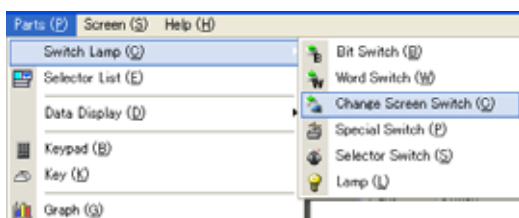
4 Select the number of colors from All, 65535 colors, 64 colors, etc. The ID of the selected part shows here.

5 Select a shape from the list and drag and drop it on the screen.

If you click "Extended," you can also select the Colors and the Part Picture ID.

You can also place a part from the Menu bar and with an icon on the Tool Bar.

Example: Place a Switch Lamp



Designate the size of the switch by dragging.

★ One Point

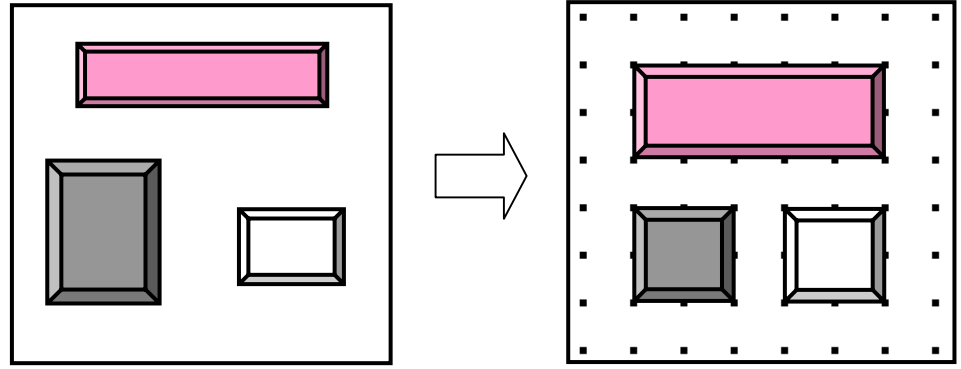
Place objects neatly

The Grid and Guideline features are helpful to place objects neatly on a screen.

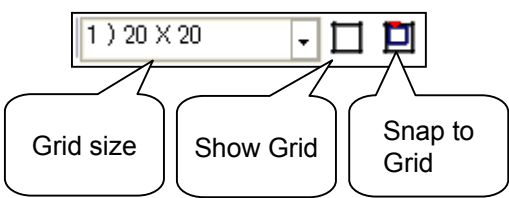
Grid

The Grid feature automatically arranges the top left coordinate of an object on a dot (grid) showing on a screen when you adjust the size of the object or the interval with other objects. Selecting "Open Screen Option" from the right-click menu on the base screen allows you to change the settings for the screen edit style such as the intervals and the color of the grid.

Example



View Tool Bar



Right-click shortcut menu

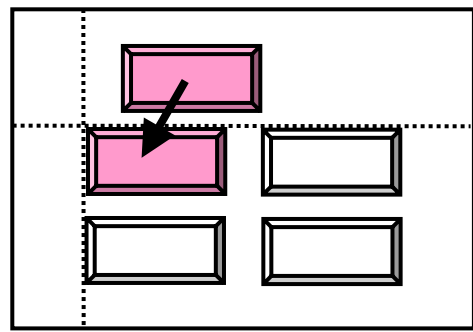


If you move an object with pressing the Alt key on the PC keyboard, you can place it on the grid. Also, arrow keys can move an object by 1 dot.

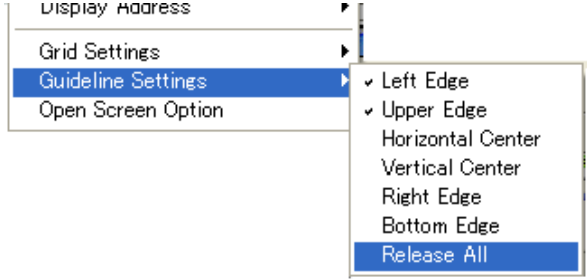
Guideline

The Guideline feature automatically arranges the coordinates of an object aligning with other objects when you place the object or move it.

Example



Right-click shortcut menu

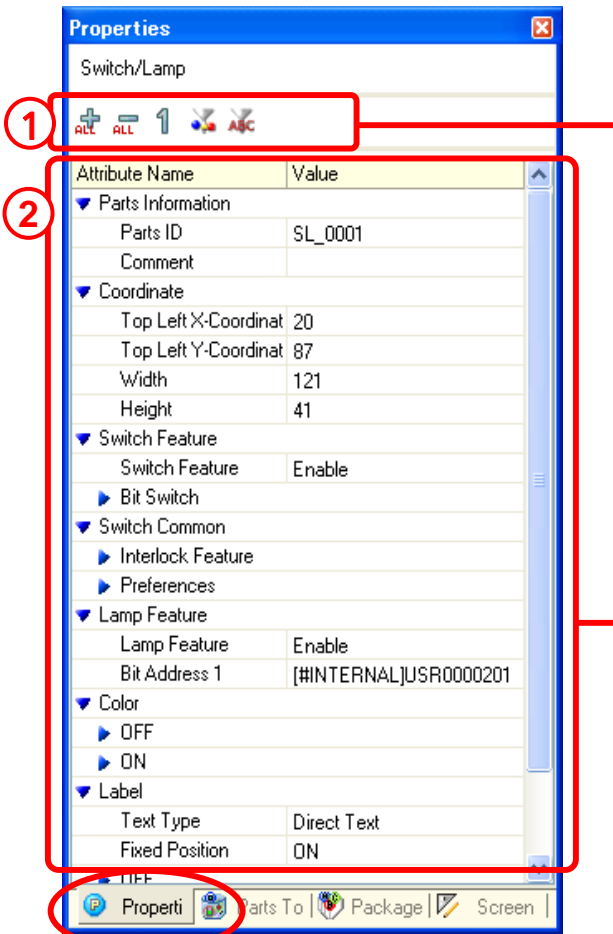


The guiding line will be displayed on the checked location.

**(3) Changing a Part's Attribute ~Properties Window~**

The Properties window allows you to change the attribute of an object seeing it.

Default Position



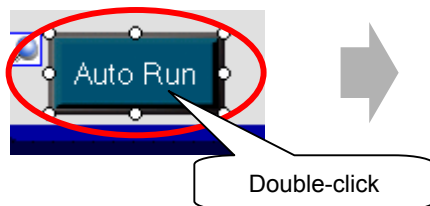
- Expand All**  
Expands and displays all categories.
- Collapse All**  
Reduces and hides all categories.
- Expand to 1st Level**  
Expands and displays only top level categories.
- Display shape information**  
Displays a selected part's shape information.
- Display text information**  
Displays a selected part's text information.

The displayed items vary depending on the selected object.  
(The left figure is an example for a Switch.)

- Good points of the Properties window
- You can check changes after each operation seeing the object.
  - You can change attributes of the same type of objects at once.

You can also edit the attribute of an object in the dialog box by double-clicking the object.

Example: Edit a Switch



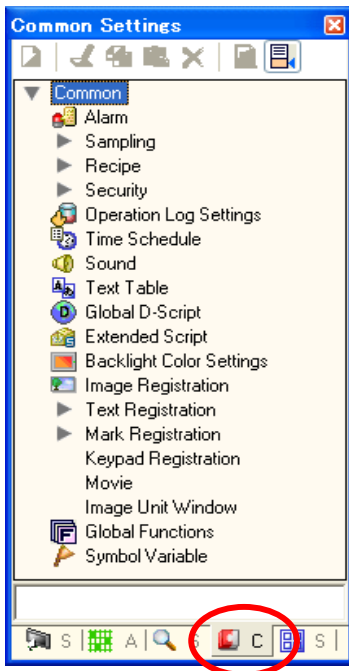
Good points of the dialog box

- You can select each object intuitively.
- Items are categorized on each tab.
- It uses user-friendly interfaces including buttons, check boxes, radio buttons, etc.

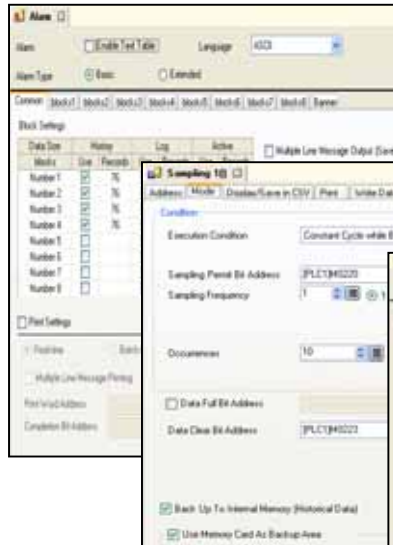
**(4) Setting Common Information ~Common Settings Window~**

The Common Settings window allows you to create or edit information in common to the whole project. The selected setting item shows in the editing area.

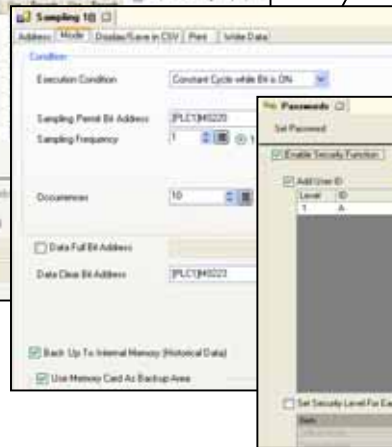
Default Position



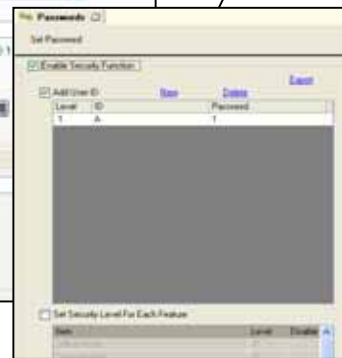
Alarm Settings (Chapter 6)



Sampling Settings (Chapter 7)



Security Settings (Chapter 8)



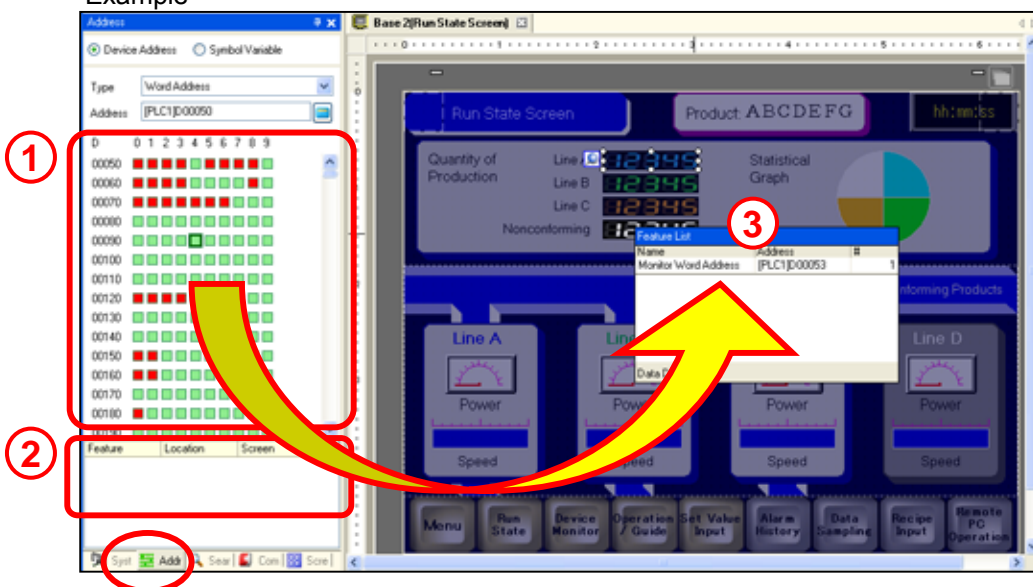
**(5) Checking/Setting Addresses ~Address Window~**

The Address window allows you to check whether addresses are used or not and where they are used. Also, you can allocate an address by dragging and dropping it from the Address window onto a part on a screen.

Default Position



Example



- 1) Cells of currently used addresses are displayed in red.
- 2) Click an address, and objects that use the address are displayed below the address map.
- 3) Select a cell of an address and drag and drop it into a part to allocate the address.

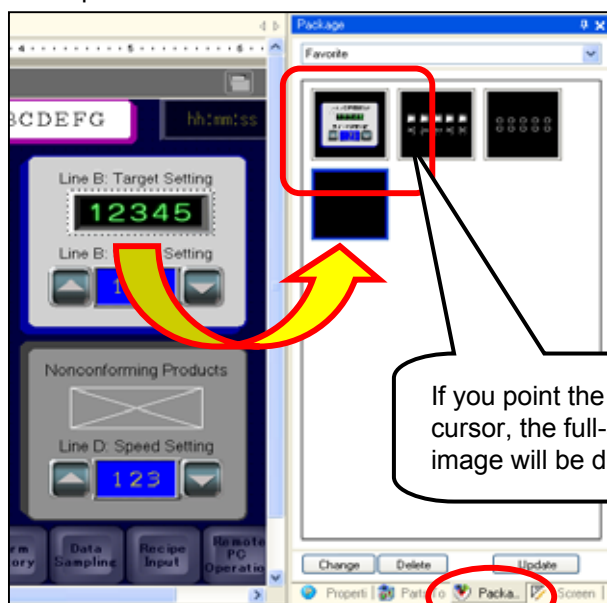
**(6) Reuse of Original Parts ~Package Window~**

Default Position



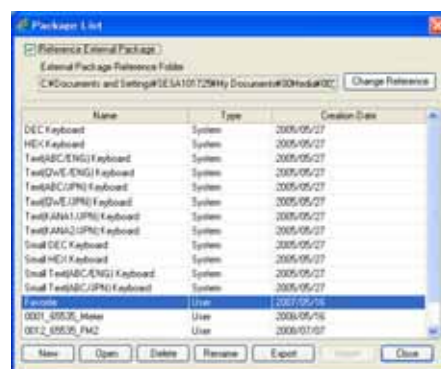
The Package window allows you to register your originally-created parts with a drag and drop operation and use them in other project files or share with other PCs.

Example



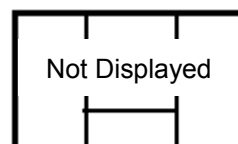
- 1) Select a part to be registered and drag and drop to the Package window.
- 2) To use the part on the screen, drag and drop it to the screen.

The Package List, which you can open from the View menu -> Package, allows you to export/import a created Package.



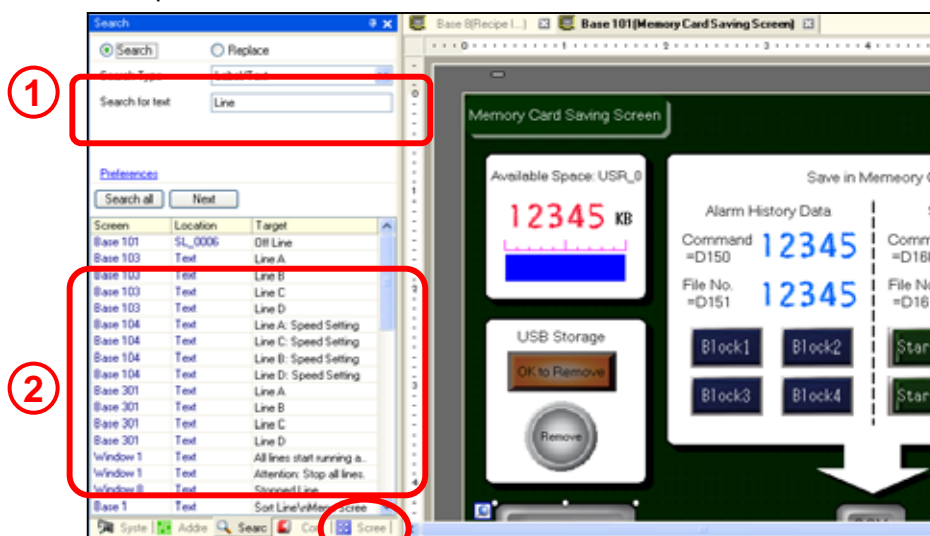
**(7) Searching Information ~Search Window~**

Default Position



The Search window allows you not only to search a text, address, or variable used in the project file quickly but also to replace. Go to the View menu -> Work Space and check "Search," and then the Search window will show on the left of the editor.

Example



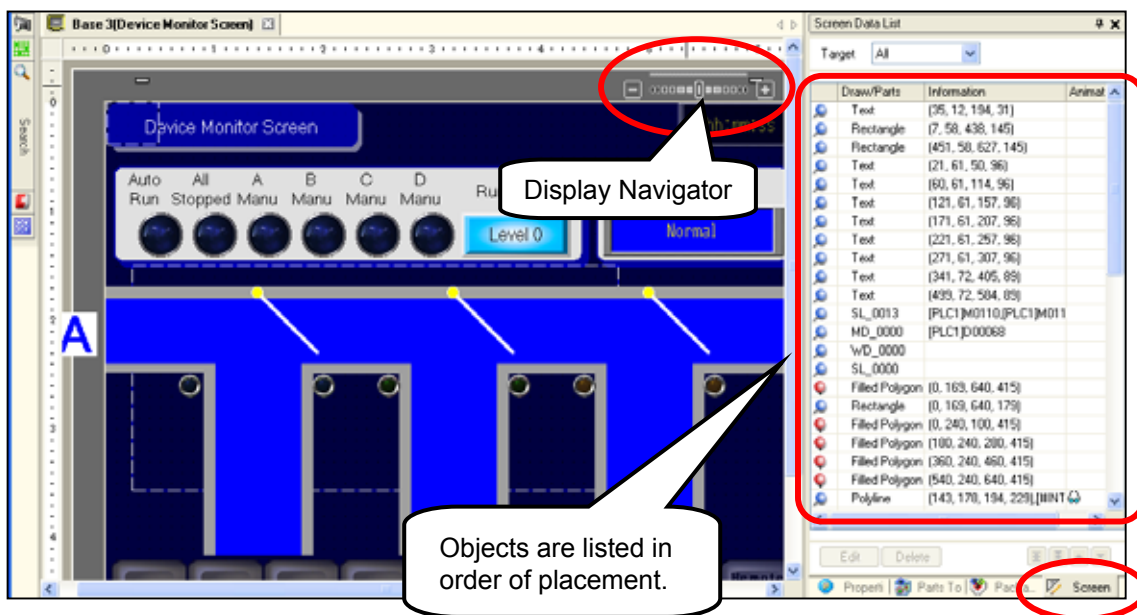
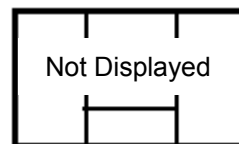
- 1) Enter a search target.
- 2) Search results appears in the list. You can replace one or all.



**(8) Checking/Changing Order of Placement ~Screen Data List Window~**

The Screen Data List window lists parts, drawings, and other objects placed on the screen. It allows you to select an object which is hard to select on the screen or to change the order of placement. Go to the View menu -> Work Space and check "Screen Data list," and then the Screen Data List window will show on the right of the editor.

Default Position



Display Navigator

Objects are listed in order of placement.

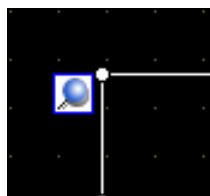


The Display Navigator allows you to remove overlapping parts one by one and edit the desired object.

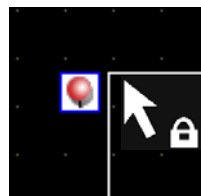
**★ One Point**

**Fixing Pin**

The Fixing Pin fixes the object that you don't want to move on the screen and locks the object's coordinates and attributes not to be changed. When you select an object, a blue pin shows on the left top corner, and if you click the blue pin, it will turn red and the object will be fixed. When you double-click the fixed object, the red pin shows, and if you click the red pin, it will be released.



Blue pin (tilted) when not fixed  
The object can be edited and moved.



Red pin (vertical) when fixed  
A lock shows next to the object and it cannot be edited or moved.



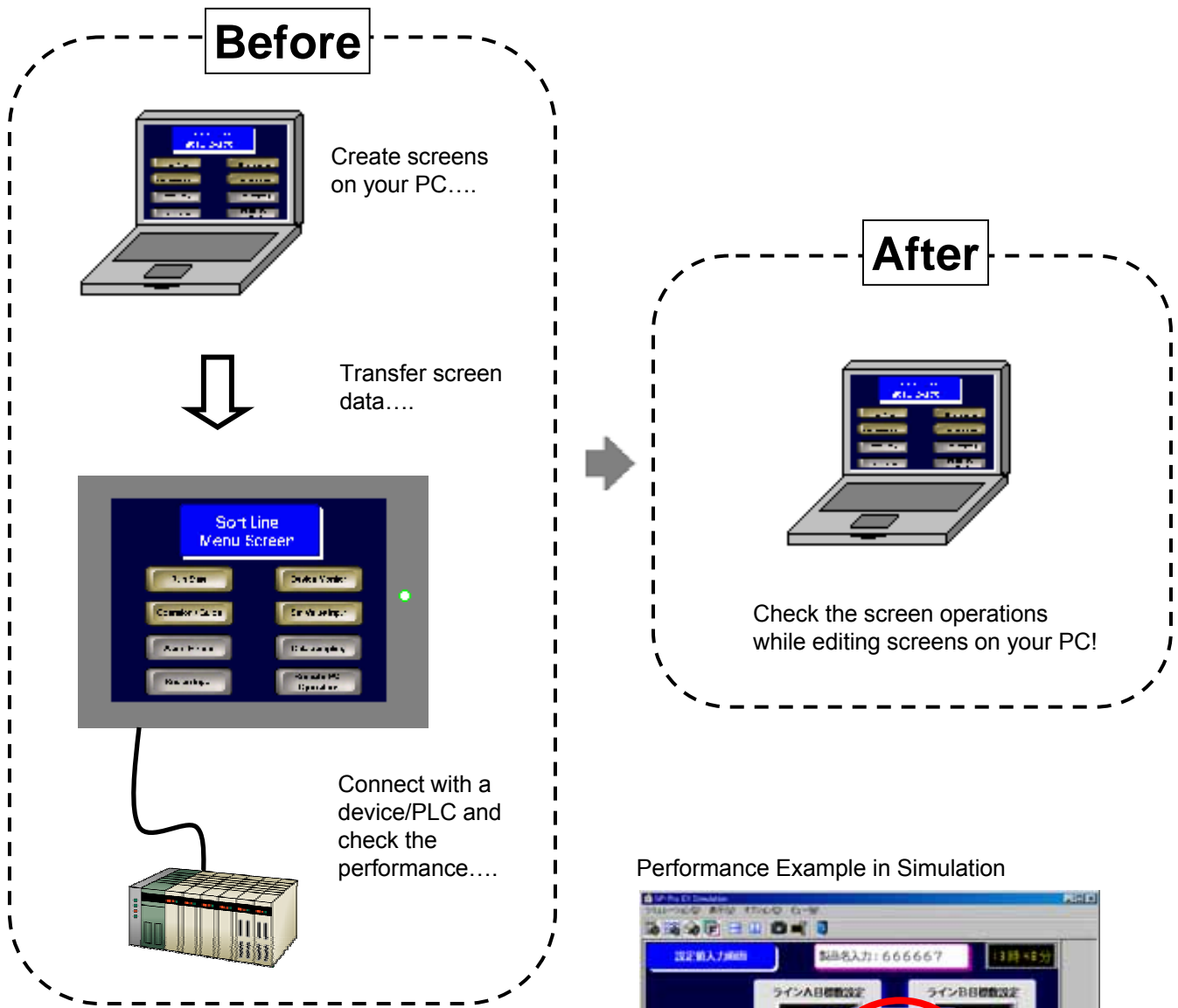
# Simulation

Instruction

## (1) What is Simulation?

Simulation is a feature that allows you to check performance of GP screens on a computer.

It is unnecessary to use a GP unit or a device/PLC. You can check simulated operation or display easily at anytime, even during creating screens.



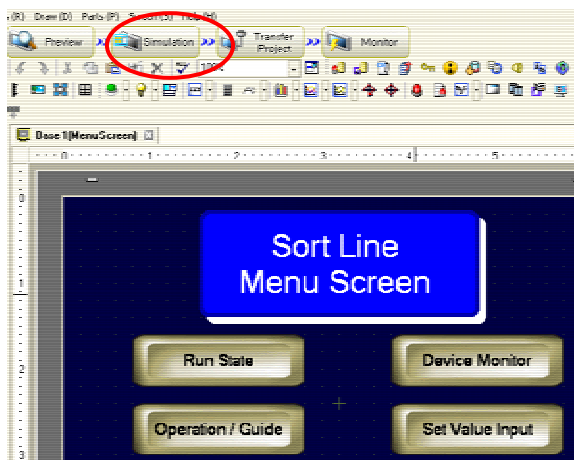
Performance Example in Simulation



Click the data display (Allow Input checked) and enter a value with the keypad. If you enter a value out of the range, an alarm beeps.

**(2) Simulation Settings**

Clicking the  Simulation icon on the state bar, the Simulation window will appear.



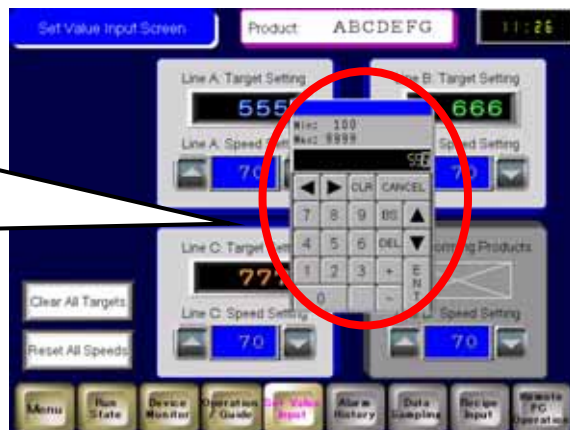
**★ One Point**

You can enter the Simulation mode with the F12 key on the keyboard.

F12

Sample operation of the Simulation feature

Open the "Set Value Input" screen and click the data display of a "Target Setting", and a numeric keypad will pop up. Enter a value with the mouse cursor. If the value is out of the range, it alerts you by beeping.



Click the Close button on the top right of the window or click the Exit icon to close the window.



**★ One Point**


**View of Simulation**

The Address View allows you to check data, turn on/off a bit, and enter a value.

It is also allows you to check the performance in the logic program.

To display/hide each View window, use the icon on the Tool Bar.



 You can capture screen images with the Save Screen feature and use them on documents.





# Transferring Screen Data

Instruction

## (1) Transfer Method

For transferring screen data, an Ethernet cable is available as well as a USB transfer cable.

### USB Transfer Cable (1m)



Type: CA3-USBCB-01

### Ethernet Cable



### CF Card



### USB Memory



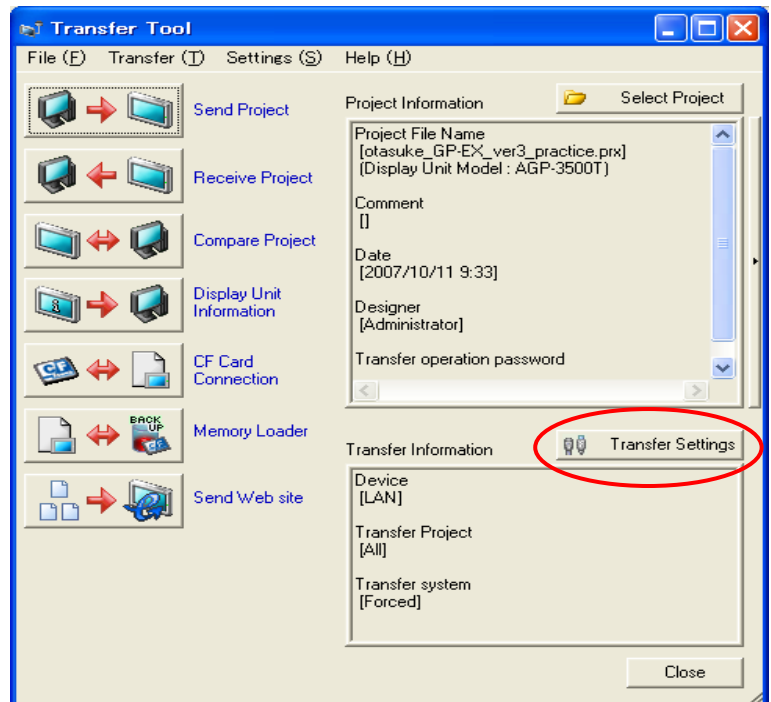
\* Some types of USB memories may be unavailable for screen data transfer.

## (2) Starting Transfer Tool

- 1) Click the "Transfer Project" icon on the state bar and start the Transfer Tool.

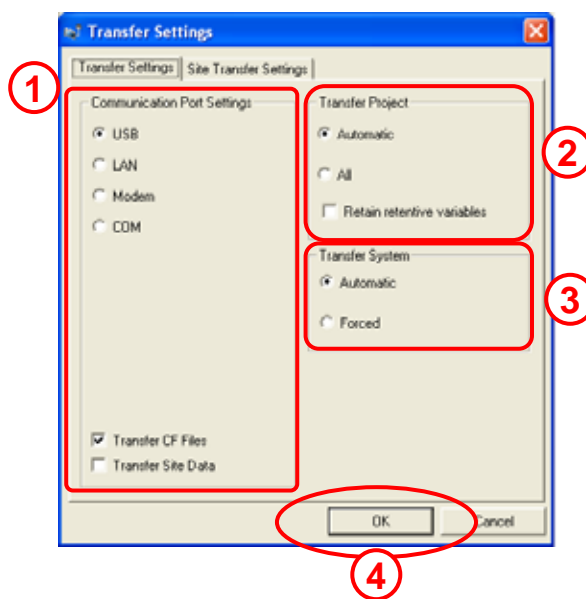


- 2) The Transfer Tool opens. Click [Transfer Settings].



**(3) Transfer Settings**

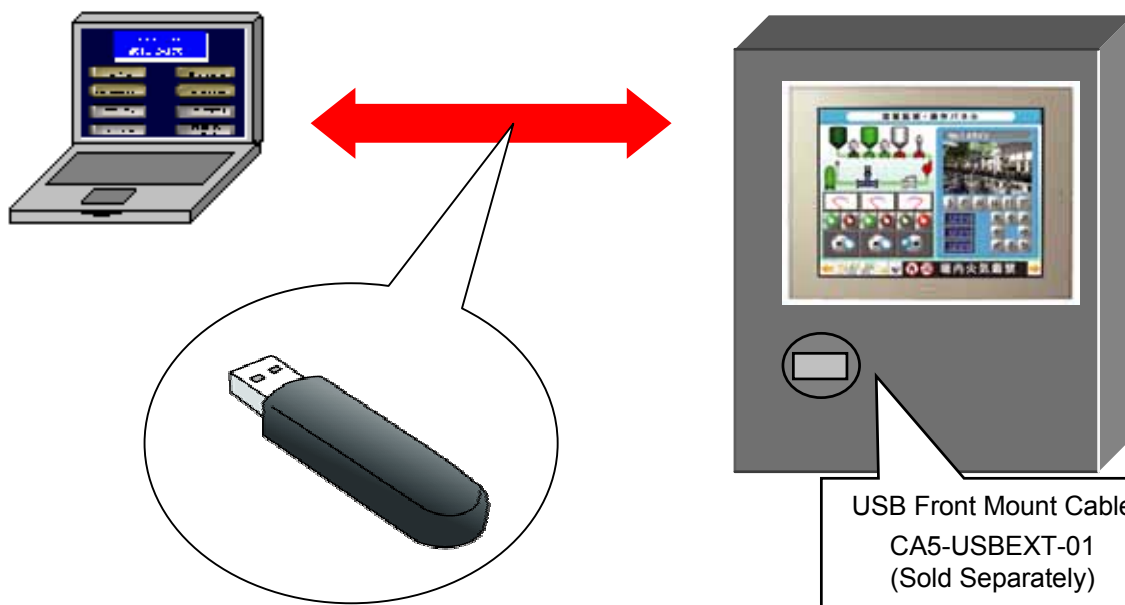
- 1) Select either a transfer cable (USB) or an Ethernet cable (LAN).
- 2) Select either transferring the changed screens automatically or transferring all screens.
- 3) Select either transferring the system automatically or forcing to transfer the system.
- 4) Click [OK] to close the Transfer Settings window.  
Clicking "Send Project" starts transferring the project to the GP unit.
- 5) Click [Send Project], and transfer to the GP will start.



★ **One Point**

**USB Memory Transfer**

Using a USB memory allows you to transfer a project file between a GP and a computer. Also you can copy a project file from a GP to another GP by using a USB memory.





# Display Unit Settings

Instruction

## (1) Display Unit Settings

Display Unit settings are for operating environment of the GP unit. Make following settings with the System Settings icon on the state bar or the System Settings window in the work space.

System Settings Window



State Bar



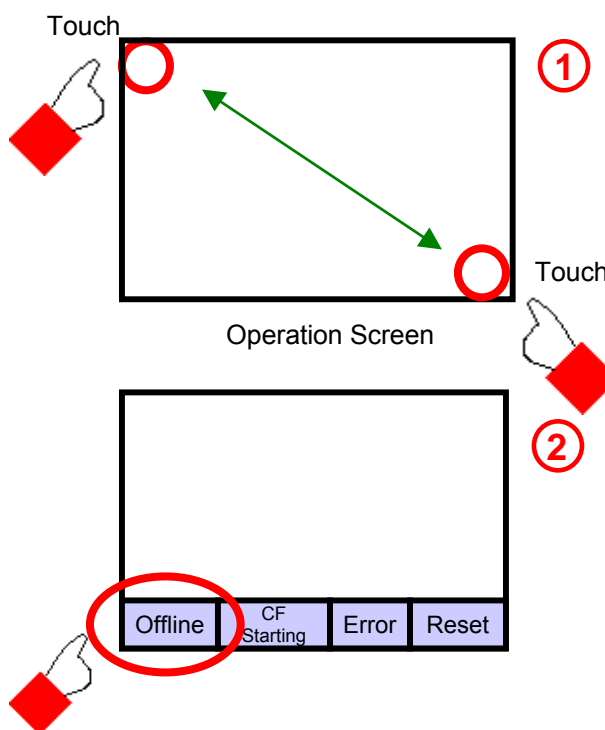
- Display:**
  - Screen Settings** Initial Screen Number, Standby Mode, etc.
  - Display Settings** Color, Faded Color Blink, etc.
  - Menu and Error Settings** System Language, Show Error Online, etc.
- Operation:** System Password, Touch Buzzer Sound, etc.
- Mode:**
  - Window Settings** Global Window Operation
  - Backup Internal Device** Backup, Backup Area Size, etc.
  - Screen Capture Settings** Capture Action, Control Word Address, etc.
  - Memory Card Settings** Control Word Address, Free Space Storage Address, etc.
- System Area:** System Area Start Address, System Data Area Items, etc.

### ★ One Point

Offline Mode of the GP unit also allows you to change the system settings.

<< How to Enter Offline Screen >>

- 1) Touch the two corners which are diagonal (the upper left and bottom right, or the upper right and bottom left) of the screen alternately.
- 2) Touch [Offline] when the gray bar appears.

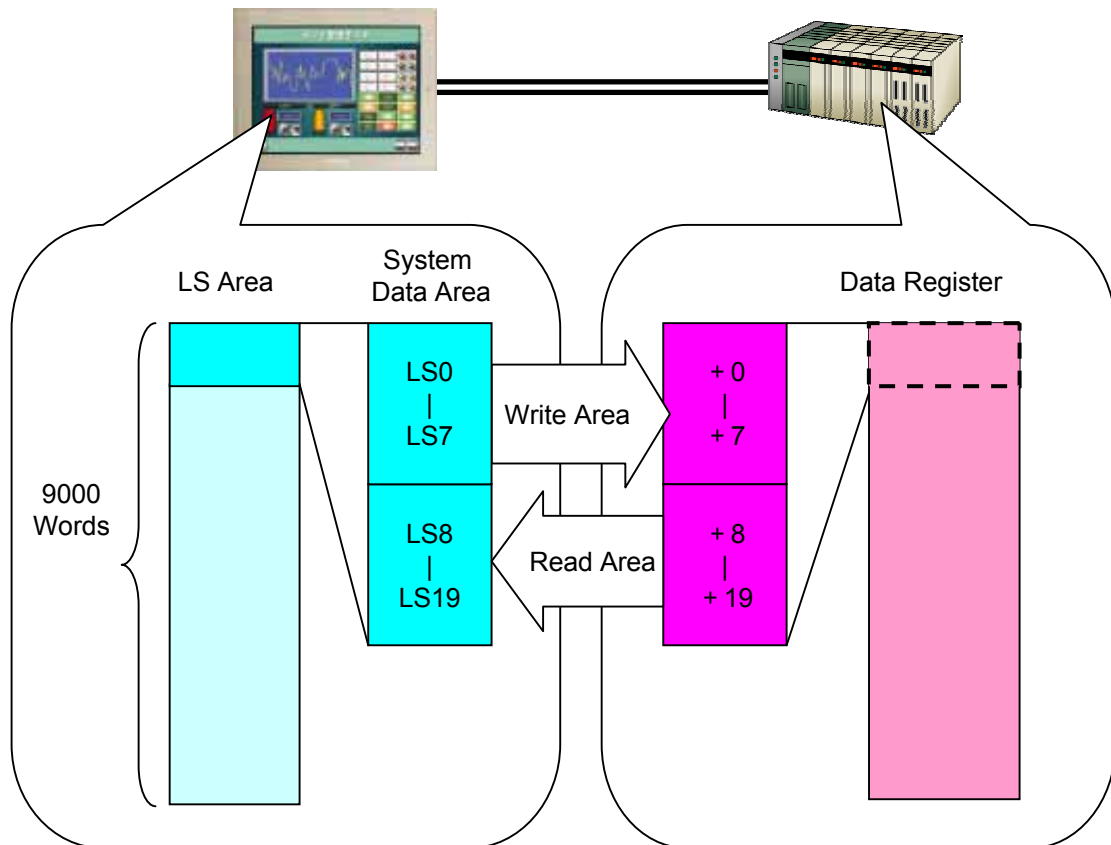


Please see GP3000 Maintenance/Troubleshooting Manual for details of Offline Mode.

**(2) System Data Area**

A GP has an internal memory area of 9000 words, which is called LS Area. The area of the first 20 words in LS Area is called System Data Area.

System Data Area is an area to deal operating environment of a GP and each address in it has own function. By allocating this area to the data register in a device/PLC, a GP can be controlled by the PLC. System Data Area lets the GP read data in the PLC and performs, for example, Auto-screen change, Backlight On/Off, Clock calibration, etc. directly.

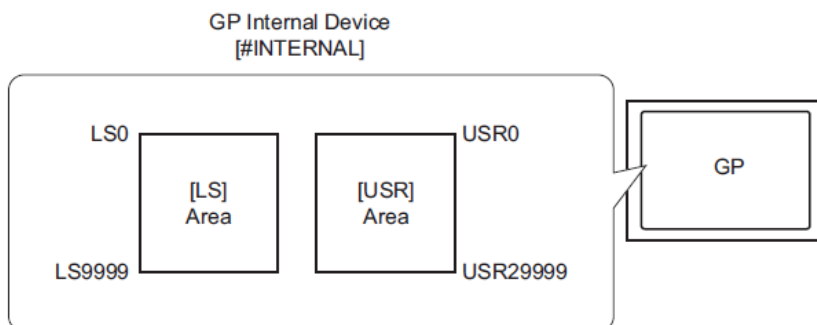


★ **One Point**

**GP Internal Device**

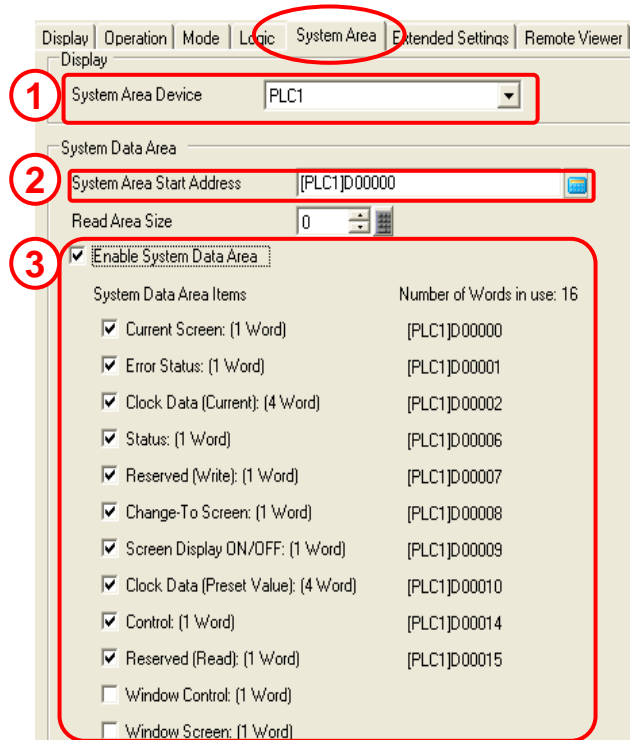
GP has an internal device called USR Area as well as LS Area.

For details of these internal devices, refer to Appendix 1-2 Communicating with a Device/PLC Using the Direct Access Method A-4 in Reference Manual.



### (3) System Data Area Settings

On the System Settings window, select “Display Unit” and then the “System Area” tab.



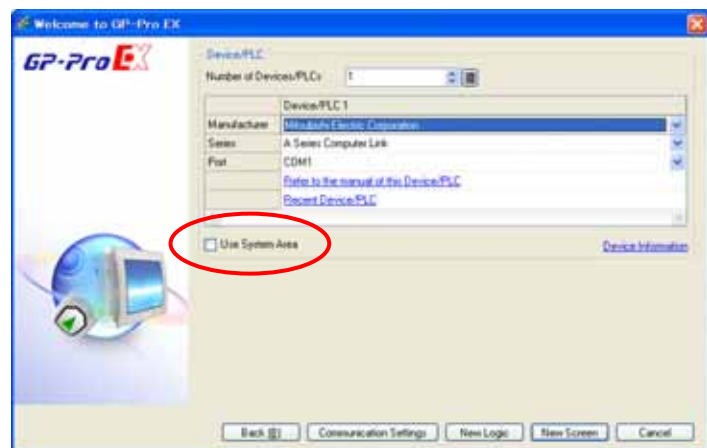
- 1) System Area Device**  
Select which device to allocate the System Area to when connecting multiple devices.
- 2) System Area Start Address**  
Set the System Area Start Address to allocate to the device/PLC.
- 3) System Area Address Items**  
Select items of System Data Area to allocate to the device/PLC.

#### NOTE

When you create a new project, you cannot use the System Area because it's disabled at default.

When you use the System Area for a project, please check the check box of [Use System Area] on the Device/PLC Settings or the System Settings as shown on the right.

When connecting multiple devices/PLC to a GP unit, you can allocate the System Area to one of them.





**(3) Actions of Each Address in System Data Area**

&lt;Write-only Area&gt;

Area that a GP informs status of GP itself to a device/PLC.

	GP Internal Address	Word Address	Description	Bit	Detail
Write-only Area GP → PLC	LS0000	+ 0	Current Screen Number	-	1 to 9999 ( BIN ) 1 to 7999 ( BCD )
	LS0001	+ 1	Error Status	0 to 2	Unused
				3	Screen Memory Checksum
				4	SIO Flaming
				5	SIO Parity
				6	SIO Overrun
				7 to 9	Unused
				10	Backup Battery Low Voltage
				11	PLC Communication Error
	12 to 15	Unused			
	LS0002	+ 2	Current Value of "Year" in Clock	-	Last 2 digits of year (2 BCD digits)
	LS0003	+ 3	Current Value of "Month" in Clock	-	01 to 12 (2 BCD digits)
	LS0004	+ 4	Current Value of "Day" in Clock	-	01 to 31 (2 BCD digits)
	LS0005	+ 5	Current Value of "Time" in Clock	-	Hour: 00 to 23, Minute: 00 to 59 (4 BCD digits)
	LS0006	+ 6	Status	0 to 1	Reserved
				2	Printing
				3	Data Display Part Write Setting Value
4 to 7				Reserved	
8				Data Display Part Input Error	
9				Display On/Off 0: On, 1: Off	
10				Backlight Burnout Detection	
11 to 15	Reserved				
LS0007	+ 7	Reserved	-	Reserved	

See GP-Pro EX Reference Manual "Appendix 1.4 LS Area (Direct Access Method)" for details of each address. You can open the manual with the [Help] menu -> [Reference Manual] -> [Preface] -> [Basic Operation/Settings] -> [Communicating with Connection Device/PLCs] .

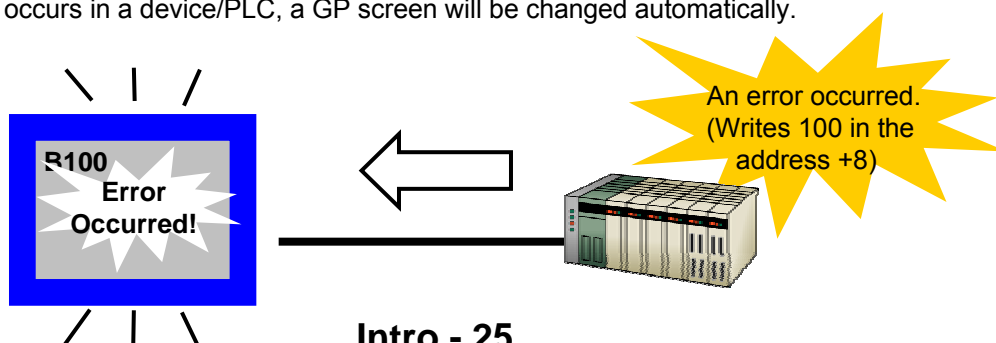
< Read-only Area >

Area that a GP reads data in a device/PLC and performs actions.

	GP Internal Address	Word Address	Description	Bit	Detail
Read-only Area GP ← PLC	LS0008	+8	Change-to Screen	-	<When reflecting the change-screen number to the device/PLC> 1 to 9999 ( BIN ) 1 to 7999 ( BCD )
	LS0009	+9	Screen Display On/Off	-	Not Display Screen with FFFFh Display Screen with 0h
	LS0010	+10	Set Value of "Year" in Clock	-	Last 2 digit of year (2 BCD digits) (Bit 15 is a click data rewrite flag)
	LS0011	+11	Set Value of "Month" in Clock	-	01 to 12 (2 BCD digits)
	LS0012	+12	Set Value of "Day" in Clock	-	01 to 31 (2 BCD digits)
	LS0013	+13	Set Value of "Time" in Clock	-	Hour: 00 to 23, Minute: 00 to 59 (4 BCD digits)
	LS0014	+14	Control	0	Backlight Off
				1	Buzzer On
				2	Print Started
				3	Reserved
				4	Buzzer
				5	AUX Output
				6 to 10	Reserved
				11	Print Canceled
	12 to 15	Reserved			
	LS0015	+15	Reserved	-	Reserved
LS0016	+16	Window Control	0	Window Display 0: Off, 1: On	
			1	Window Overlap Order Change 0: Permitted, 1: Not Permitted	
			2 to 15	Reserved	
LS0017	+17	Window Screens	-	Global Window Registration Number selected indirectly: 1 to 2000 (BIN/BCD)	
LS0018	+18	Window Display Position (X Coordinate)	-	Top left of Global Window (BIN/BCD)	
LS0019	+19	Window Display Position (Y Coordinate)	-		

LS8 example

When an error occurs in a device/PLC, a GP screen will be changed automatically.



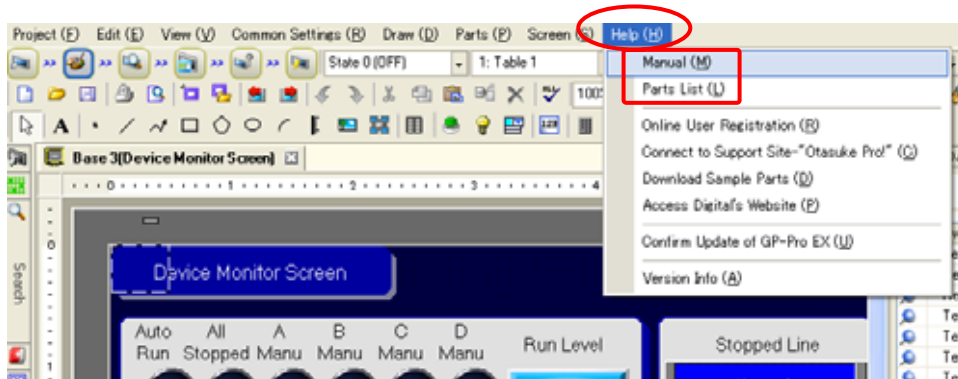


## Manuals

Instruction

### (1) Manual

The Help menu allows you to open manuals.



Reference Manual:

Device/PLC Manual:

Hardware Manual:

Maintenance/Troubleshooting:

Parts List:

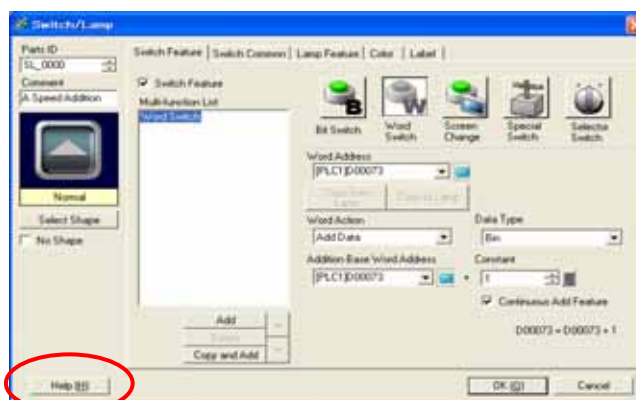
for operating GP-Pro EX, each feature and function  
for system structure and communication settings of each  
device

for names, functions, features and specifications of each  
display unit

for countermeasures toward errors and troubles that occur  
during using GP-Pro EX

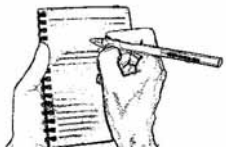
a list of part shapes that are available for switches and lamps

### (2) Help in Dialog Box



Click the [Help] button in each dialog box, and the corresponding page of GP-Pro EX Reference Manual will open.

The F1 key also opens manuals.



MEMO