Introduction

Outline

Introduction Outline

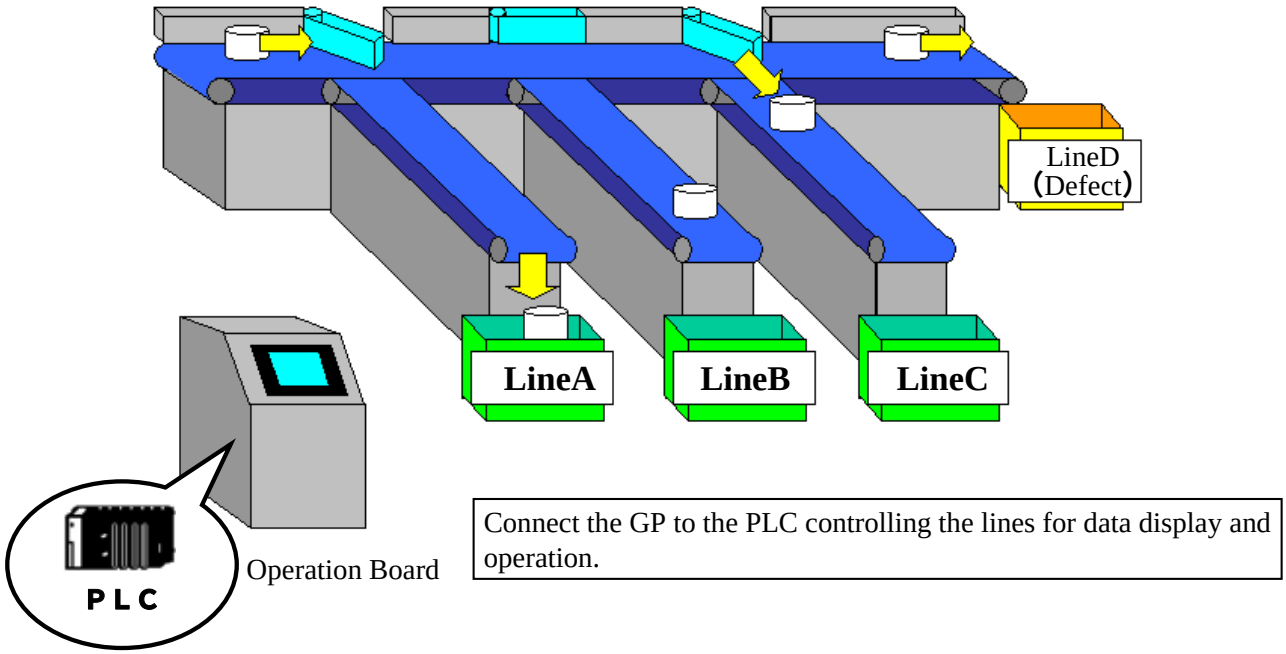
Intr.1

About this book

Outline

This is the textbook for drawing practice for GP3000 series.
Using the supposed general sorting line operation board, you will draw 10 kinds of screens for each use.

Sort Line Image



Hint!

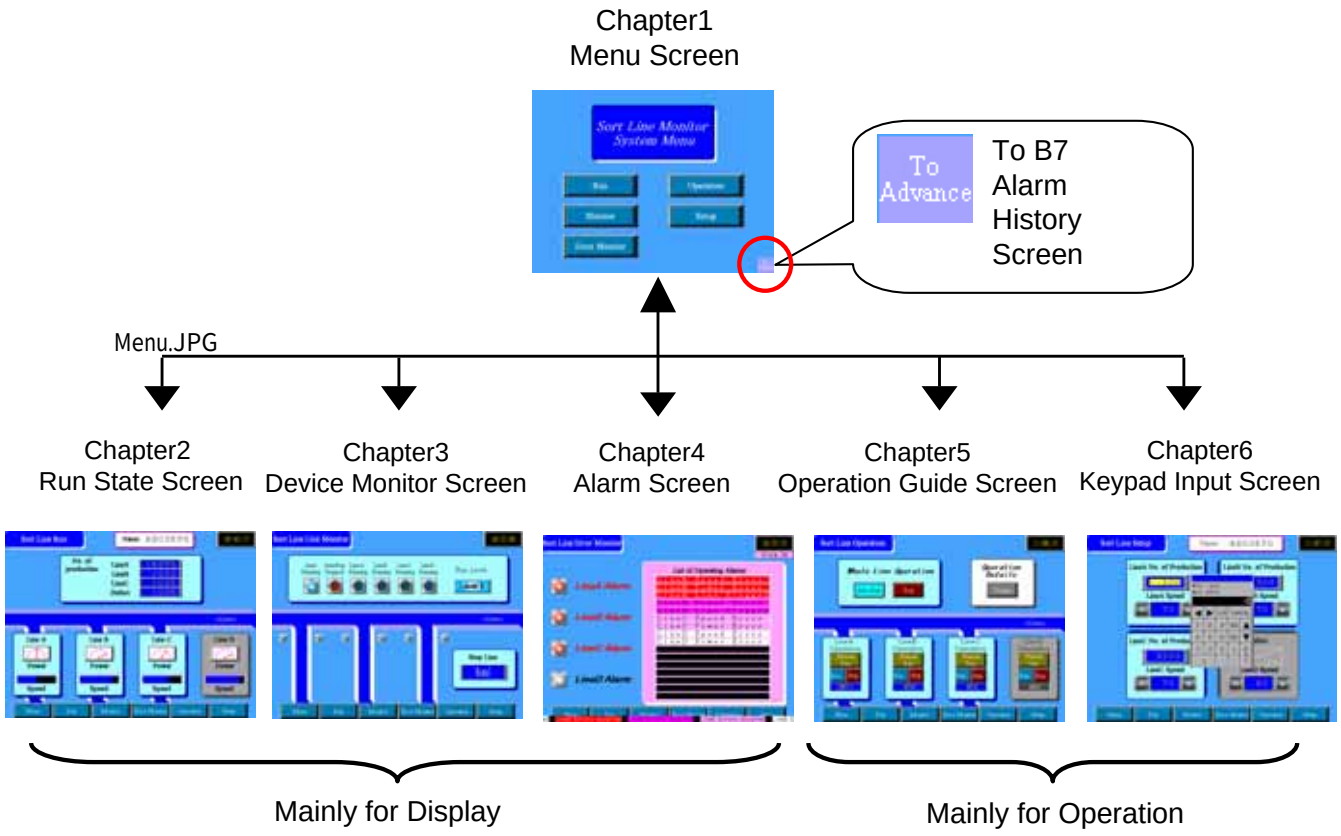
The materials used for this practice are as follows;

- Windows PC
- Drawing Software, [GP-PRO EX]
- GP3000 series (Resolution 640 x 480 dots or more)
- Mitsubishi Electric PLC Melsec A1SJ
  Link Unit A1SJ71UC24-R2
- Screen Transfer Cable or Ethernet Cable

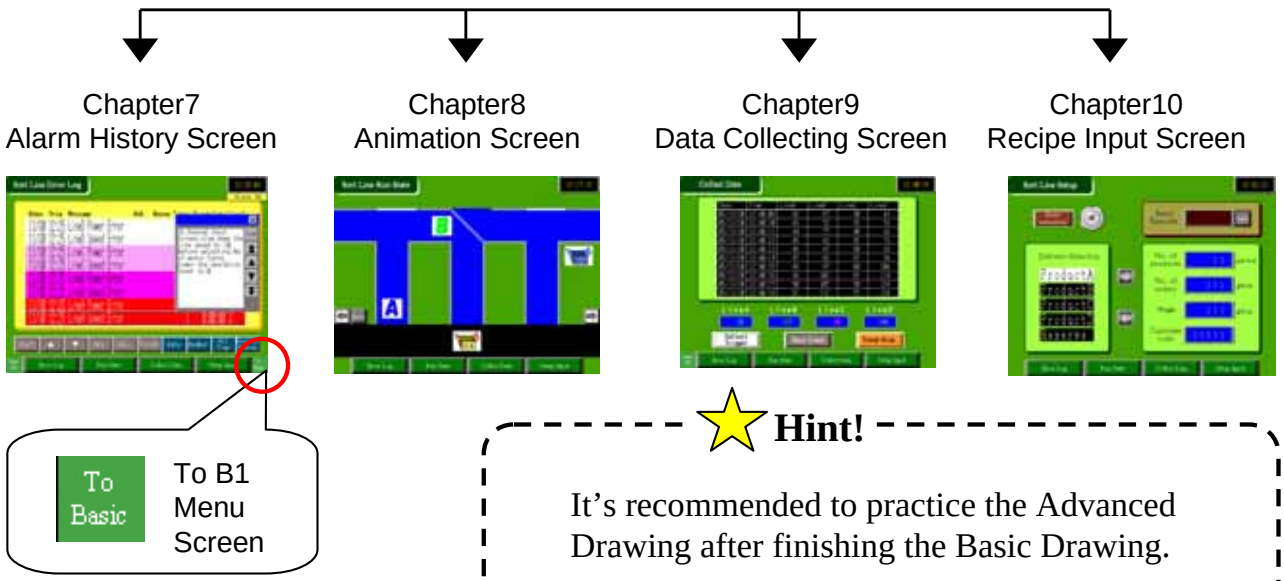
The data contained in the attached CD-ROM is used for the practice. For details, refer to the readme.txt file.

Structure of Practice Screen

Basic Drawing : From Chapter1 to 6, you will practice basic drawing to replace the operation board with the display.



Advanced Drawing: From Chapter 7 to 10, you will draw using the settings of Memory Feature or Animation Feature, peculiar features of programmable displays.



Hint!

It's recommended to practice the Advanced Drawing after finishing the Basic Drawing.

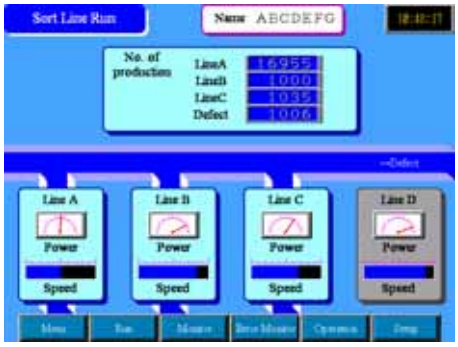
Details of Basic Screen

Chapter 1 Menu Screen (B1)

The title text of the device and the switch to change to another screen are placed. It's the initial screen displayed when the GP starts.

Chapter 2 Run State Screen (B2)

It's the screen for displaying actions of data of the device in various ways.
Time, No. of Production, values of the power, the speed are displayed using values, meter, and graphs.



Chapter 3 Device Monitor Screen (B3)

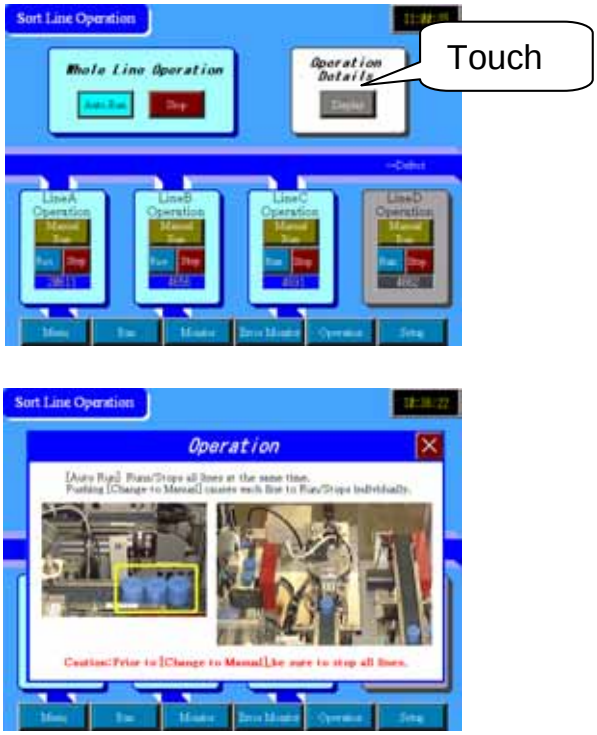
It's the screen for monitoring I/O state of the device. It shows the operating line with the lamp lighting and displays simple messages.

Chapter 4 Alarm Screen (B4)

It's the screen for displaying the state of the triggered alarm. It displays the working alarms in the message list and displays them at the bottom of the screen as a message banner.

Chapter 5 Operation/Guidance Screen (B5)

It's the screen for operating the device with switches. Bit switches are used for Run/Stop. If you push the display switch of Operation Details, the window that describes the operation method will appear.



Chapter 6 Keypad Input Screen (B6)

It's the screen for inputting the setting values of the device. From the keypad that pops up automatically, an arbitrary value can be input and data can be increased/decreased for delicate adjustment with Word Switches.

Details of Advanced Screens

Chapter 7 Alarm History Screen (B7)

It's the screen for displaying the history of the triggered alarms. It saves the alarm messages as well as the Trigger/Recovery time in the GP and displays them in the list. Details of each message or recovery methods can be also sub-displayed.

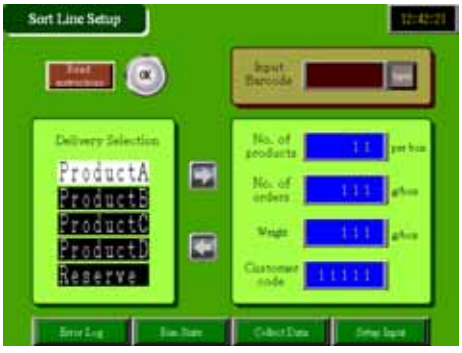
Chapter 8 Animation Screen (B8)

It's the screen for displaying the state of the whole device easily using Animation. According to action of data, an object moves and a picture changes. That situation is displayed.

Chapter 9 Data Collecting Screen (B9)

It's the screen for displaying the data that the GP collects from the PLC. With both the List Display and the Trend Display, the data in the past can be traced.

Chapter 10 Recipe Screen (B10)



It's the screen for writing multiple setting values in block from the GP. (Filing Feature) Multiple data groups that have been already registered for each selection item are written in block.

Intr.2

Drawing Software

Development Environment

(1) Things required for development

Prepare the following things for developing GP screens.

Drawing Software
GP-Pro EX
(CD-ROM)

Windows
PC

Screen Transfer Cable
CA3-USBCB-01

GP3000
series

Installing drawing software to your PC and transferring the created project file (*.PRX) to the GP allows the GP to communicate with PLC and display/operate data.

(2) Operating Environment for the drawing software

Editor

PC	Models on which Windows runs normally Pentium III 800MHz or above (Pentium 4 1.3GHz or above is recommended.)
Resolution	SVGA 800×600 or above A display of 256 or more colors is required.
Hard Disk Space	420 MB or more (100 MB is required for each increase of a language.) as of 30/9/2005 *Space required for installation
Memory	512MB or more (1GB or more is recommended.)
programs and their version	.NET Framework 1.1 SP1 or more

Transfer Tool

PC	Models on which Windows runs normally Pentium II 266MHz or above is recommended.
Hard Disk Space	60MB or more

Converter Tool

Hard Disk Space	60MB or more

*The drawing software and the screen transfer tool are separately installed.

*The environment above is effective as of Sept. 2005 and it's subject to change.

Drawing Procedures

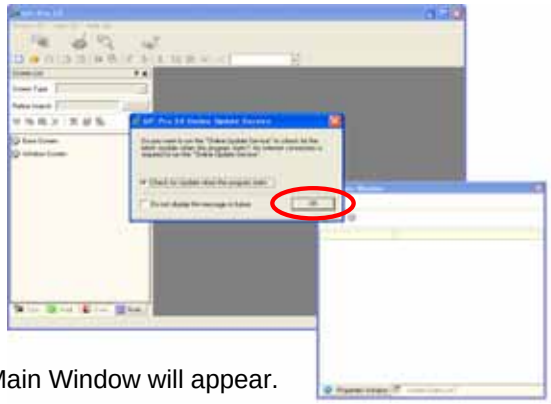
(1) Starting the drawing software

Double-click the short-cut icon on the desktop.

Or from the Windows [Start] menu, select [Program]->[Pro-face]->[GP-Pro EX V1]->[GP-Pro EX] to start the software.

Double-click the shortcut icon.

Logo Mark is displayed.

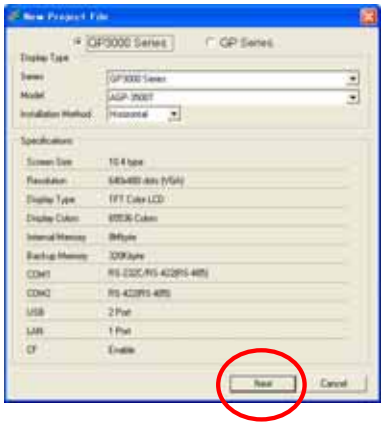


Main Window will appear.

Select Yes or No to run Online Update Service and click [OK].

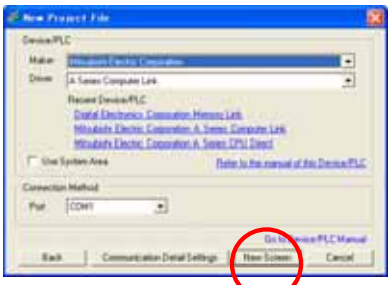
(2) Creating a new project file

Click the [New]icon on the upper left of the Main Window.



GP3000series

Select GP Model and Installation Method and click [OK].



Connected device

Next, set the connected device. When multiple units are connected, set them all.

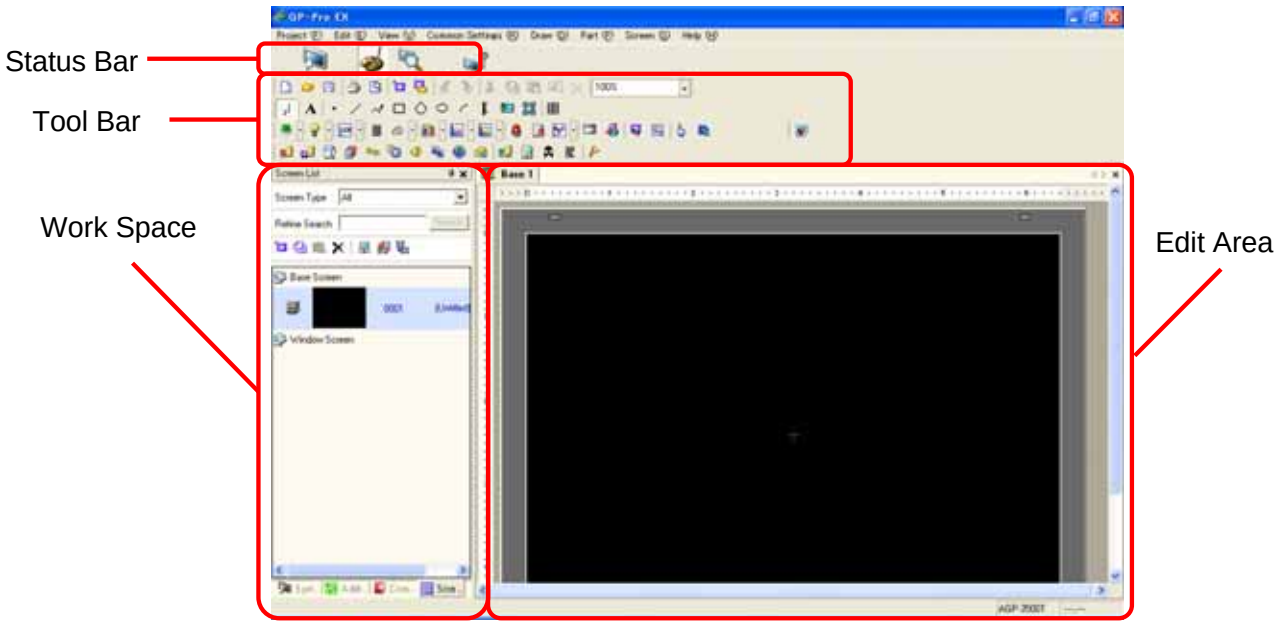
To start drawing, click [New Screen].

Notes

- For drawing a display in GP2000 series or before, GP-PRO/PB3 is required.
- After data is transferred with wrong selection of device connection, a communication error is displayed on the screen of the display.

Main Window

Main features on the Main Window will be introduced.



(1) Status Bar

System Settings, Edit, Preview,Transfer Project are lining from left to right in the order of development.

System Settings:Displays the list of connected devices in the edit area.

Edit:Edits screens

Preview:Confirms display status after transfer

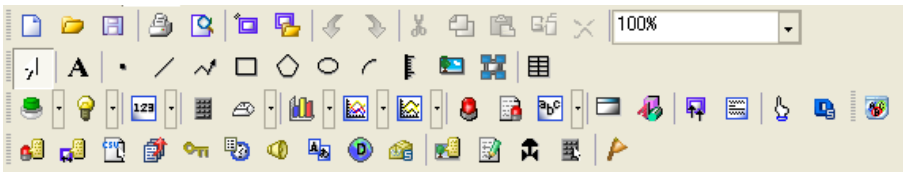
Transfer Project:Starts Transfer Tool and transfers screens

*The Status Bar cannot be scaled down or non-display.

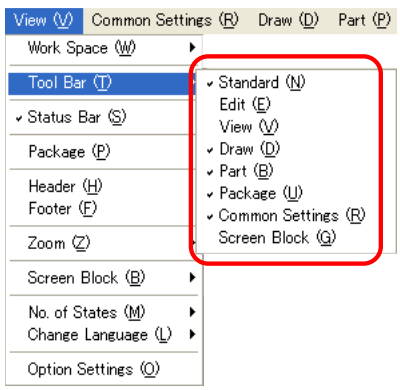
(2) Tool Bar

Icons of frequently used features and objects are grouped. It's possible to select the bar to display from the menu's [View]->[Tool Bar].

Tool Bar display at default

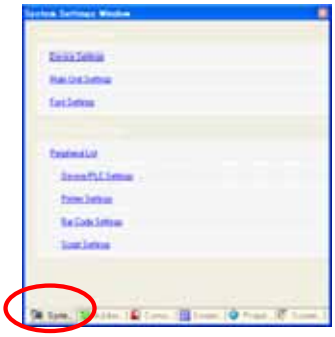


Selecting from the menu

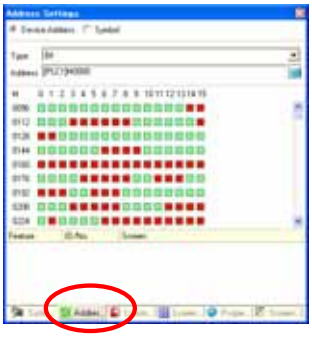


(3) Work Space

It's possible to check/edit information of the whole project in 6 kinds of windows.



System Settings Window
Sets environments for GP, connected devices,peripheral devices.

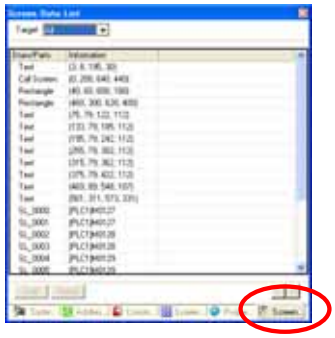


Address Settings Window
Displays the address map used in the project.

Common Setting Window
Displays information common to the whole project in a list.

Screen List Window
Displays the created base screens, window screens via Thumb Nail in a list.

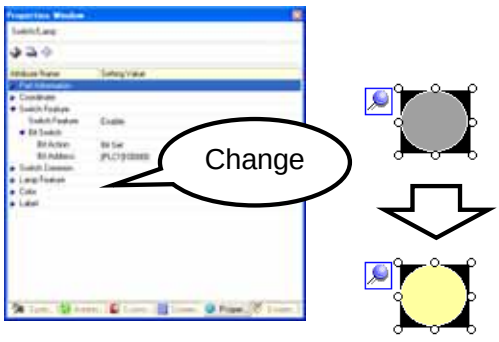
Properties Window
Displays attributes of the selected screens and parts in a list.It's possible to change the attributes here.



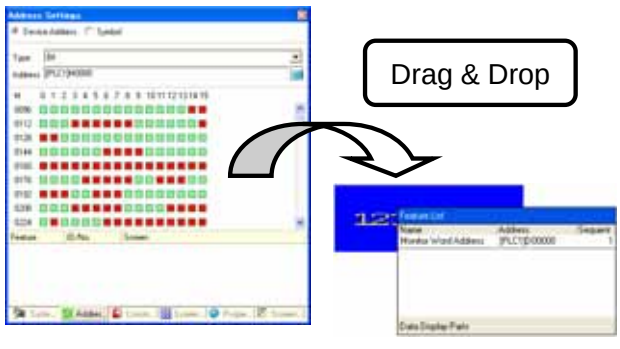
Screen Data List
Displays the parts and drawings placed on the screen in a list.

Hint!

It's possible to change the attributes via [Properties Window] and allocate addresses with drag & drop via [Address Settings] after placing parts on the screen.



Properties Window

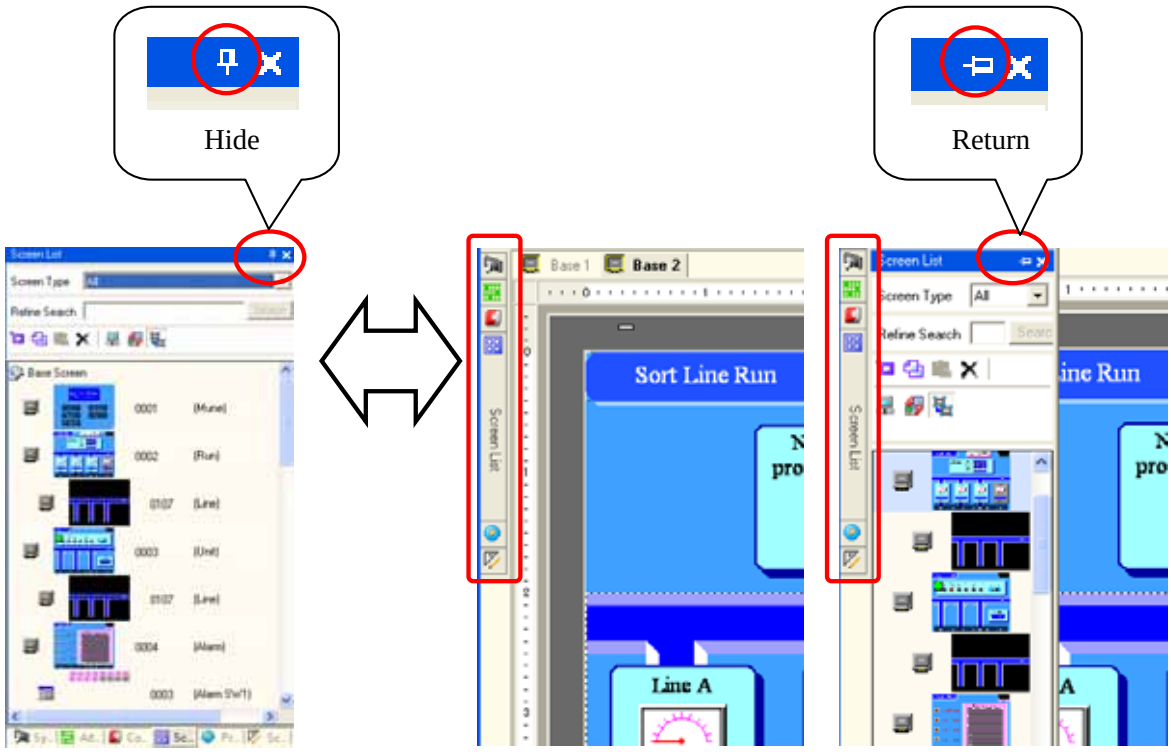


Address Settings

Hint!

Auto Hide Feature

Clicking the icon of the drawing pin on the upper right of the work space causes the whole work space to hide in the left end of the Main Window as an icon and therefore the edit area can be widely kept. Click again for re-display.



Technique of drawing efficiently

To display the same parts and drawings in multiple screens, Call Screen,Header Footer Features are convenient. As for these features, comparing to Copy & Paste, a change in one place is reflected to the whole and therefore the edit speed gets faster. Also, the size of the whole project becomes small and memory consumption can be saved.

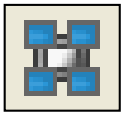
(1) Call Screen

It's possible to call the parts or drawings created in a screen to other multiple screens and share them.

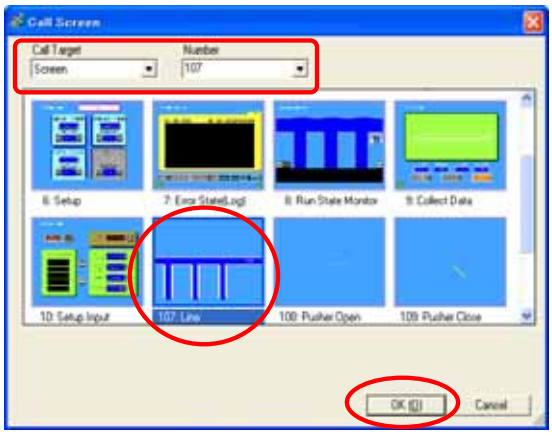
Ex.

① Create a screen at source and save it.

② Open the base screen at destination and click the [Call Screen] icon.

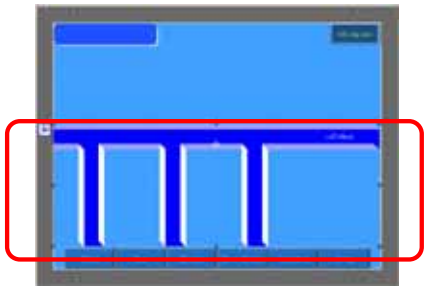


③ Select the type and the number of the screen at source and click [OK].



④ Place it.

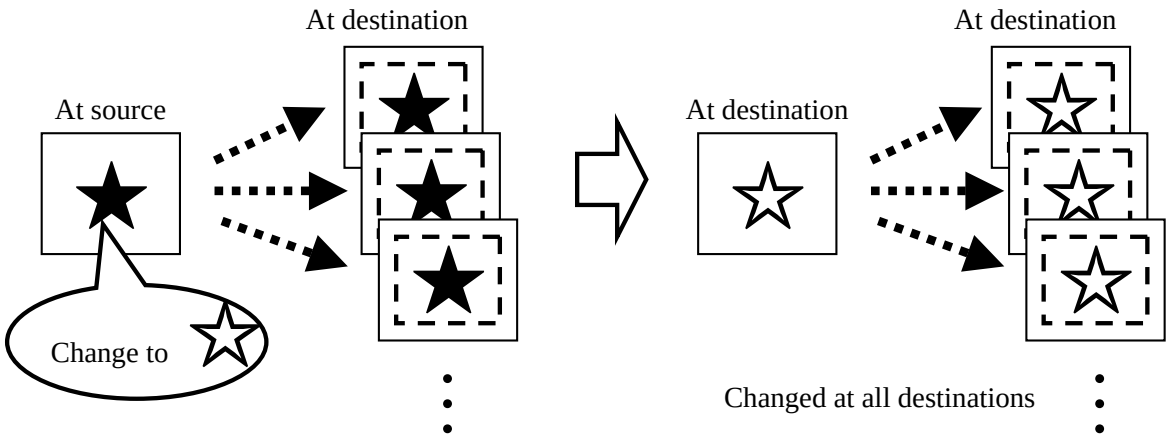
It's possible to call one screen at source to multiple screens.



Hint!

1. Merit of saving edit work

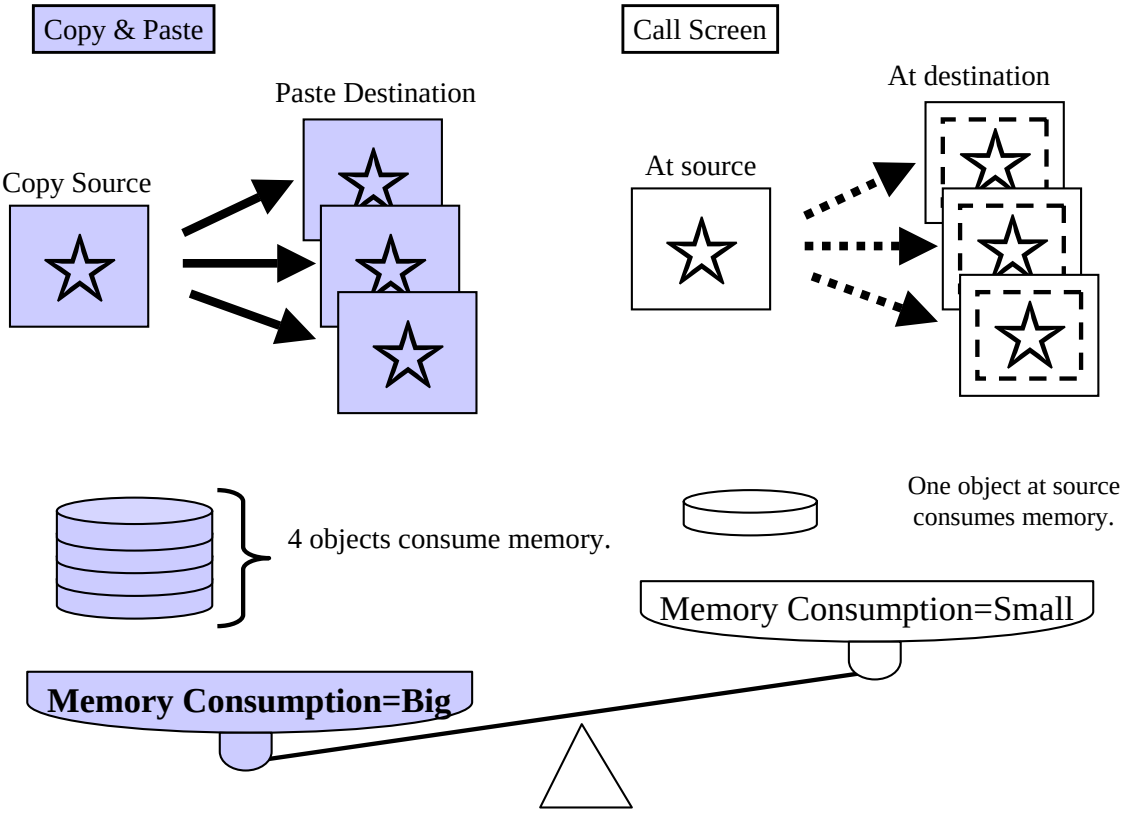
The edit of one screen is reflected to the whole.



2. Merit of saving the screen size

Comparing Copy & Paste, memory consumption can be saved.

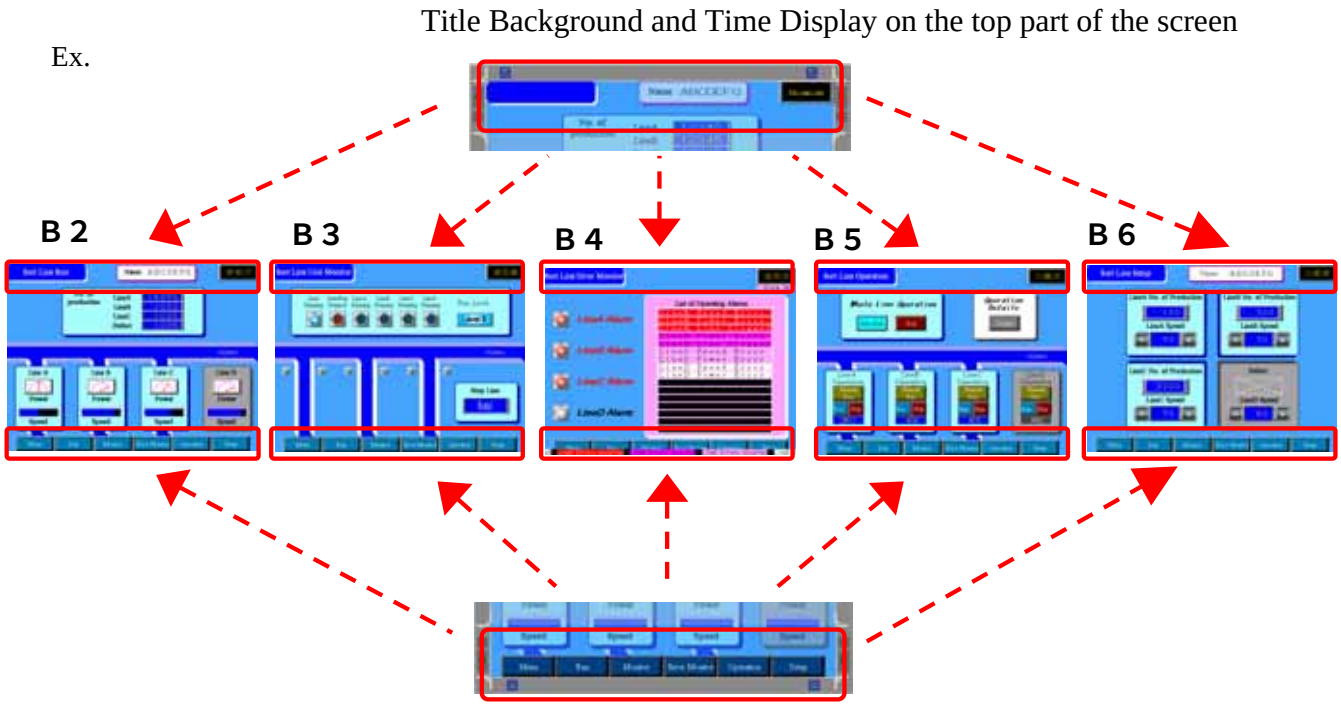
Ex) When displaying the same object in 4 screens,



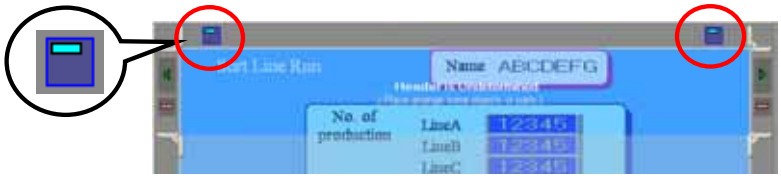
(2) Header Footer

If the parts and drawings placed around top or bottom part of the screen are registered as Header/Footer, they can be used for multiple screens.

Ex.

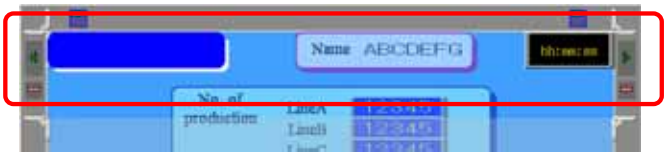


① Click the Header Display button on the top part of the screen.

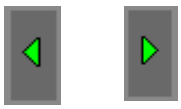


② Place the object to share.

*Create the Footer in the same way, too.



③ Change multiple headers and footers with the direction buttons on the left and the right ends. They can be deleted with the Delete Buttons.

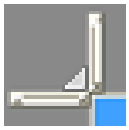


Change Buttons

Delete Button

Hint!

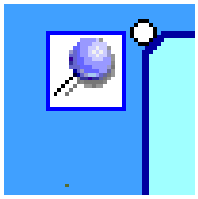
To scale up/down the area of the header or the footer, drag the frame of four corners.



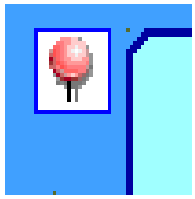
Hint!

***Fixing Pin**

It's possible to individually fix the position of the picture that you wish to fix on the screen. When the object is selected, the blue or red pin appears on the upper left corner. If you click the blue pin, it will become the red pin and the position of the picture will be fixed. If you double-click the fixed picture, the red pin will appear. Click the red pin to release it.



Normally Blue Pin (Oblique)
Possible to edit/move it



Red Pin when fixed (Vertical)
The lock is displayed beside the cursor.
Impossible to edit/move it.

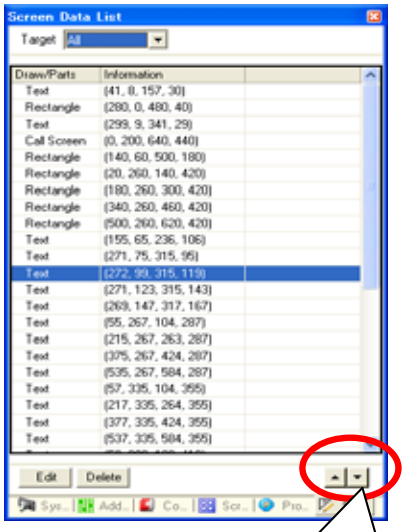
Caution

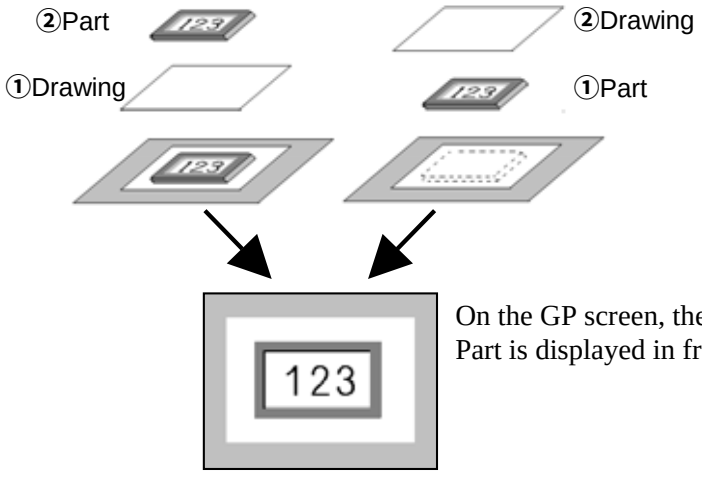
Order of overlapping objects

The objects (parts or drawings) on the base screen overlap in the order of placement, the one placed last is displayed in front. In Preview, they are displayed in this order and the display on the GP after transfer is the same. This order can be checked or changed in the Screen Data List Window.

However, when parts and drawings overlap, the parts are displayed in front prior to drawings. If the drawings are placed after the parts, in Preview the drawings are displayed in front, but after transferring the data, the display will change.
It's the same when using Call Screen or Header/Footer.

Screen Data List Window





On the GP screen, the Part is displayed in front.

Use the buttons here to change the order of the overlapping objects.

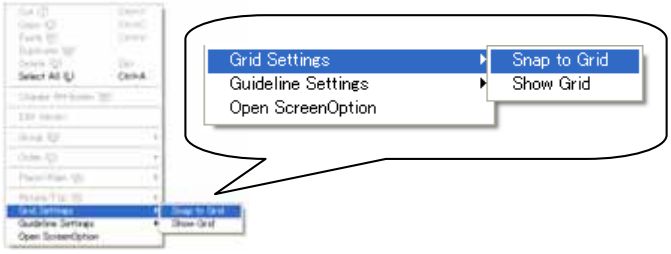
Technique for clear drawing

It's the technique of creating an object in the shape you like and laying multiple objects neatly and placing them. It will be introduced how to select the pictures of neat switches and lamps and how to display characters.

(1) Grid Settings

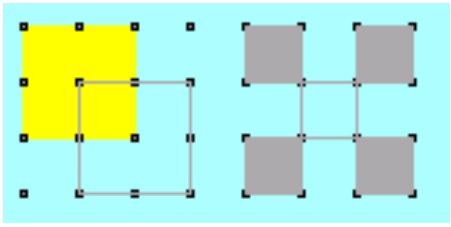
If you right-click on the base screen, the short-cut menu will appear.

If you select the lower, [Grid Settings]->[Snap to Grid], when placing parts or drawings, they will catch the grids on the screen (dots in vertical and horizontal directions with equal space between them). Therefore they can be placed in order. The space between the grids can be set in [Open ScreenOption].



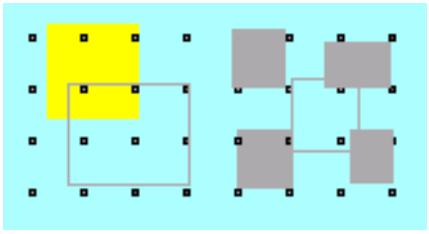
*Display or Non-Display of grids can be selected.

[Snap to Grid] is checked



Since the vertexes of the switches catch the grids, they can be placed in order with the space in vertical/horizontal direction matched.

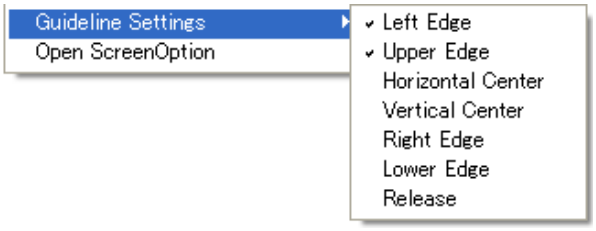
Not checked



The grids are ignored and the placement is disorder.

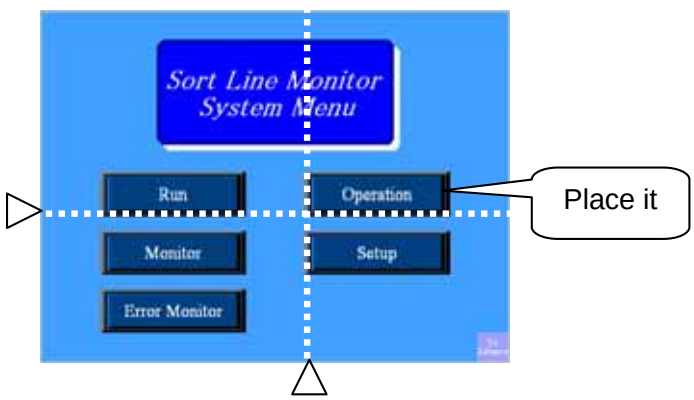
(2) Guideline Settings

With [Guideline Settings], when placing an object on the screen after the first, the guideline is displayed and therefore it's possible to place it matching the position in vertical and horizontal directions to the already placed object.



The default is a left side and a top side. It can be changed with [Open ScreenOption].

Display Example of Guideline

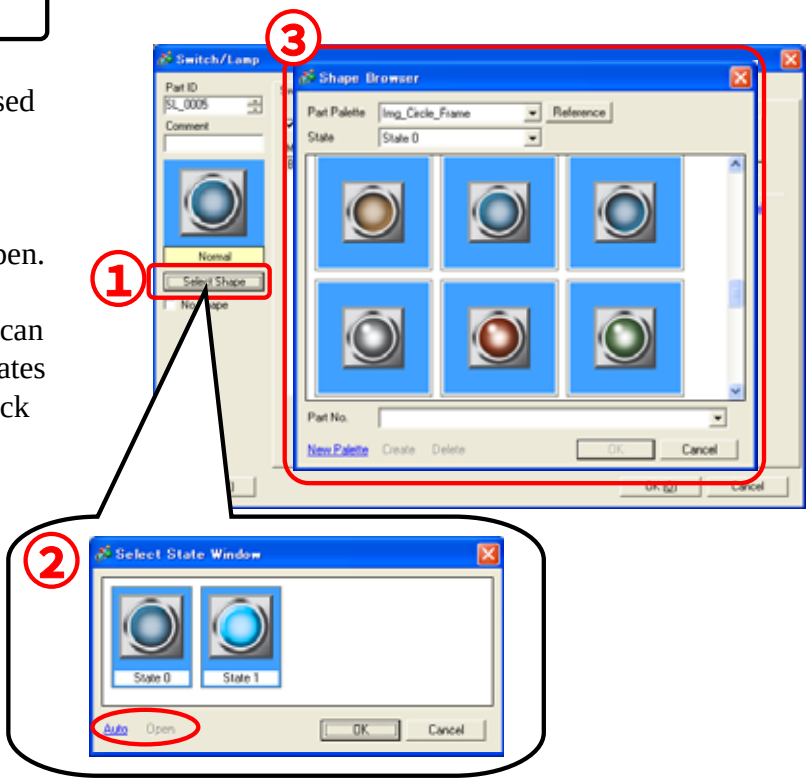


(3) High quality illustration parts

Clear pictures and illustrations can be used on the surface of switches and lamps.

Click [Open] from [Select Shape] in the dialog box, and [Shape Browser] will open.

From [Part Palette], the palette you like can be selected and from [State], multiple states can be selected. After selecting each, click [OK].



① Select Shape Button

② Select Shape Window

③ Shape Browser

Ex.)

(4) Text Font

The text, switches, lamp's labels, data displays on the screen can be shown clearly.
The following fonts as well as the standard font can be selected.

Stroke Font
Smooth size adjustment by dot is possible. It can be used in Taiwanese, Chinese, and Korean.*

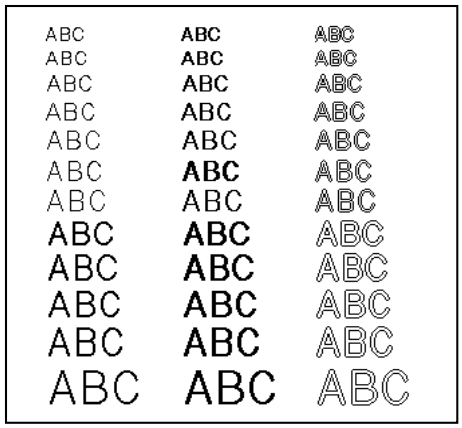


Image Font
The fonts that Windows have can be used on drawing software.

*Select the font to use in [Font Settings] of [System Settings].

解説

Transferring screen data

(1) Transfer Method

For Transfer method of screen data, an Ethernet Cable as well as a serial transfer cable can be used.

Transfer exclusive cable（USB）

型式：CA3-USBCB-01

Ethernet Cable

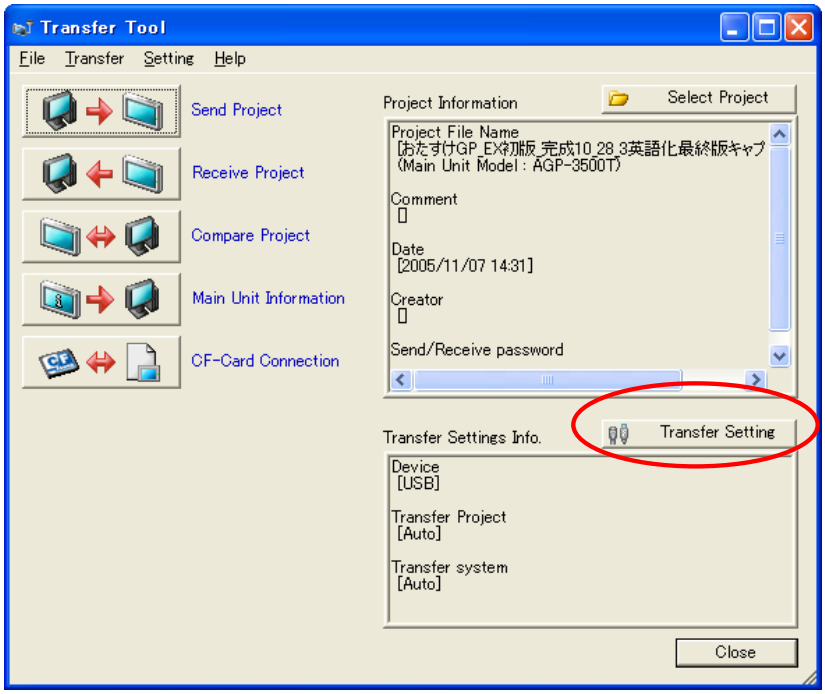
(2) Starting Transfer Tool

① Click [Transfer Project] on the Status Bar to start the Transfer Tool.

② Save the project file.

③ The Transfer Tool will start.

Click [Transfer Setting] on the right bottom.

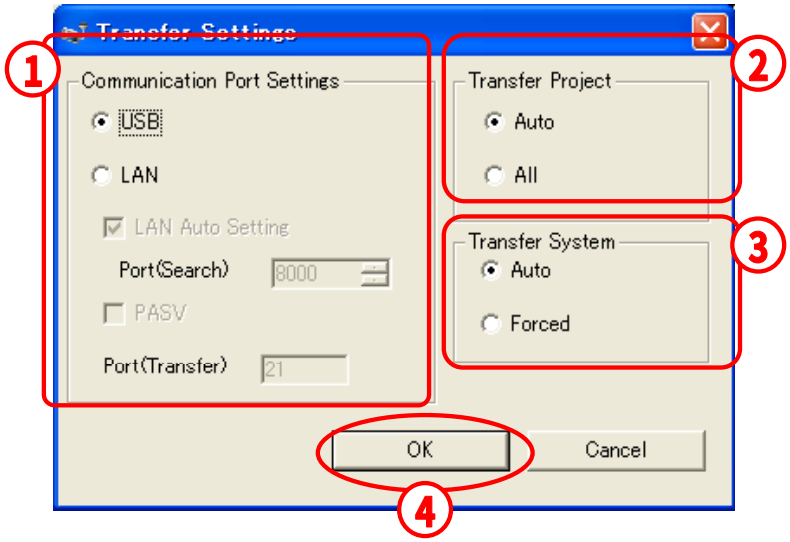


(3) Transfer Settings

① Select either a Transfer Cable (USB) or Ethernet (LAN).

② Select either automatic discerning of changed screens or transferring all screens.

③ Select either automatic transfer of a system or forced transfer.

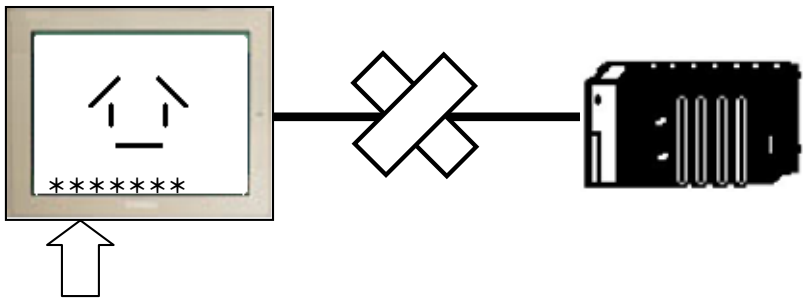


④ Click [OK] to close the Transfer Settings.
Click [Send Project], and transfer to GP will start.

Hint!

Communication Errors

If something is wrong with communication after transfer, the error code and message will appear on the GP's screen.



The error code appears on the screen.

Display example of error messages
RHAA070-PLC1:The cable has been disconnected or the target has been powered off.

Main Unit Settings

(1) What are Main Unit Settings?

It's the setup for the GP's operational environment.

Make the following settings via [System Settings] on the left end on the status bar or [System Settings Window].

Status Bar

System Settings Window

Display Settings:Screen Settings Initial Screen No. , Standby Mode Settings etc.

Display Settings Color Settings, Dark Blink etc.

Menu and Error Setting System Language Settings,Show Error Online etc.

Operation Settings: System Password Settings, Touch Buzzer Sound etc.

Action Settings:Window Settings Enabling/Disabling Global Window Operation

Backup Internal Device Enabling/Disabling Backup of LS,USR area, No. of addresses etc.

Screen Capture Settings Enabling/Disabling Capture's Action, Control Address etc.

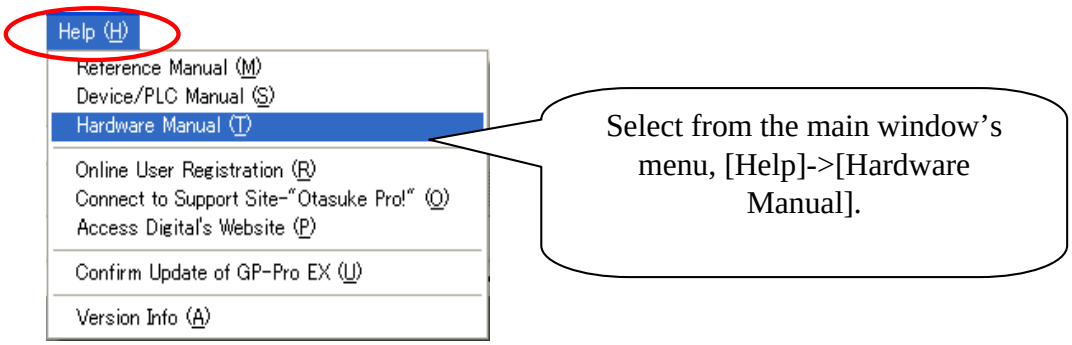
CF-Card Settings Control Word Address, Free Space Storage Address etc.

System Area Settings: Select a start address or an allocation address etc.

Hint!

The system settings can be changed via the GP's Offline Mode.

For how to enter the Offline Mode and the details, refer to GP3000 series Users Manual.

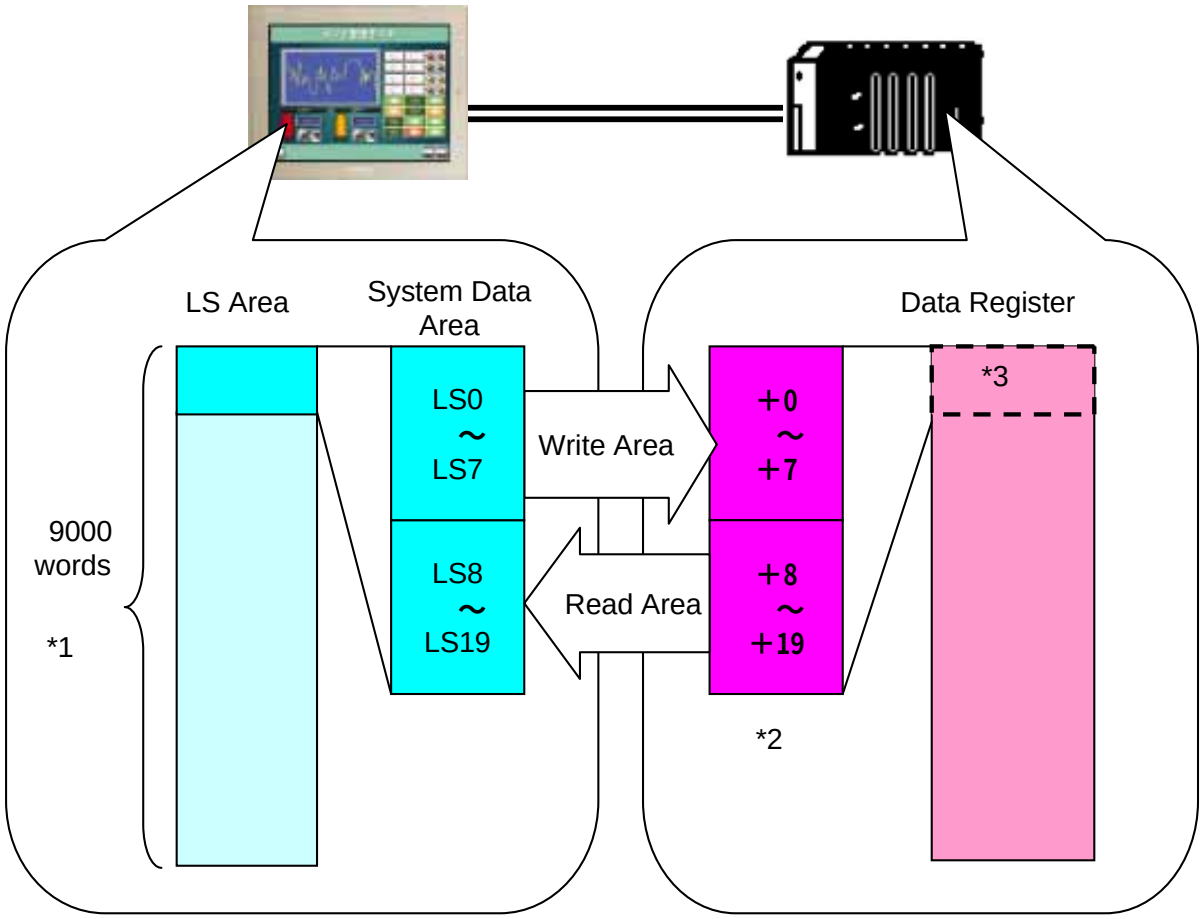


(3) System Data Area

GP has an internal memory area with 9000 words, which is called LS Area. The 20 words from the start of this LS Area are called System Data Area.

The System Data Area treats GP's operational environment and each address decides each action. Allocating this area to PLC's data register allows you to control GP from the PLC side. GP reads PLC's data to make indirect actions.

(Ex.:Automatic Change Screen, Backlight ON/OFF, Time Data correction etc.)



*1 For GP3000 series, beyond the LS Area, the user's area with 30000 words is equipped.

*2 In the 20 words, addresses to be allocated to PLC can be selected. The parts that are not used are closed up to the smaller on the PLC side.

*3 The start address at allocation destination can be set optionally. The value at default is (0) of PLC1's data register.

Notes

When connecting multiple devices to the GP, the system data area can be allocated to only one of them.

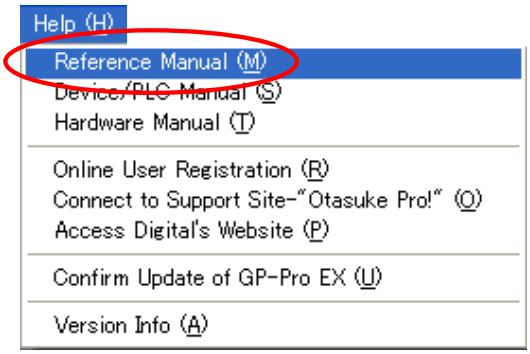
(4) Action of each address in the System Data Area

<Write exclusive area>

It's the area for the GP's informing the PLC of its status.

	GP's Address	Word Address	Description	Bit	Details
Write Area GP to PLC	LS0000	+0	Current Screen No.	—	1 to 9999 (BIN) 1 to 7999 (BCD)
	LS0001	+1	Error Status	0 to 2	Unused
				3	Screen Memory Check Sum
				4	SIO Framing
				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	Clock's current "Year" value	—	Last 2 digits of year (2 BCD digits)
	LS0003	+3	Clock's current "Month" value	—	01 to 12 (2 BCD digits)
	LS0004	+4	Clock's current "Day" value	—	01 to 31 (2 BCD digits)
	LS0005	+5	Clock's current "Time" value	—	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	Expired backlight detected
				11 to 15	Reserved
	LS0007	+7	Reserved	—	Reserved

For details of each address, from the main window's menu, [Help], open [Reference Manual]->[Communicating with the Peripheral Devices]->[Communication] and refer to [Appendix 1.4 LS Area](Direct Access Method].



<Read exclusive area>

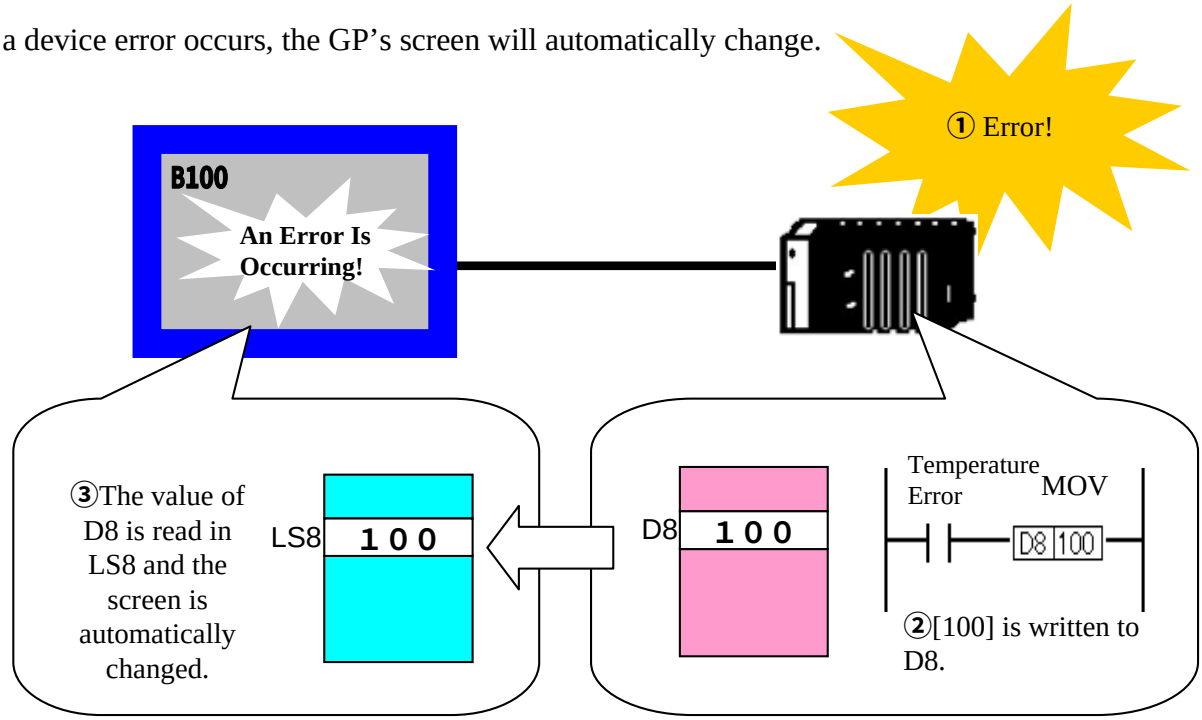
It's the area for the GP's reading the PLC's data and making actions.

	GP's Address	Word Address	Description	Bit	Details
Read Area GP to PLC	LS0008	+8	Change - To Screen No.	—	When reflecting Change-To Screen No. in the device/PLC 1 to 9999 (BIN) 1 to 7999 (BCD)
	LS0009	+9	Screen Display ON/OFF	—	Turn Screen Display OFF with FFFFh Display screen with 0h
	LS0010	+10	Clock's "Year" setting value	—	Last 2 digits of year (2 BCD digits) (Bit 15 is the clock data's rewrite flag)
	LS0011	+11	Clock's "Month" setting value	—	01 to 12 (2 BCD digits)
	LS0012	+12	Clock's "Day" setting value	—	01 to 31 (2 BCD digits)
	LS0013	+13	Clock's "Time" setting value	—	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 Cancelled
				12 to 15	Reserved
	LS0015	+15	Reserved	—	Reserved
	LS0016	+16	Window Control	0	Show Window 0: OFF, 1: ON
				1	Change Window overlap order 0: Permitted, 1: Not permitted
				2 to 15	Reserved
	LS0017	+17	Window Screen No.	—	Global Window's registration number selected by indirect designation 1 to 2000 (BIN/BCD)
	LS0018	+18	Window Display Position (X Coordinate)	—	Global Window's top-left display position, selected by indirect designation (Bin/BCD)
	LS0019	+19	Window Display Position (Y Coordinate)	—	

For details of each address, from the main window's menu, [Help], open [Reference Manual]->[Communicating with the Peripheral Devices]->[Communication] and refer to [Appendix 1.4 LS Area](Direct Access Method].

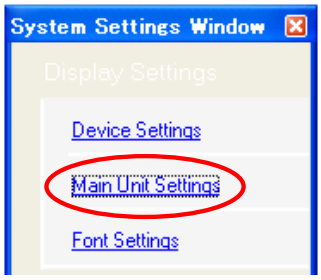
(5) Example for use of the System Data Area (LS 8 Automatic Change Screen)

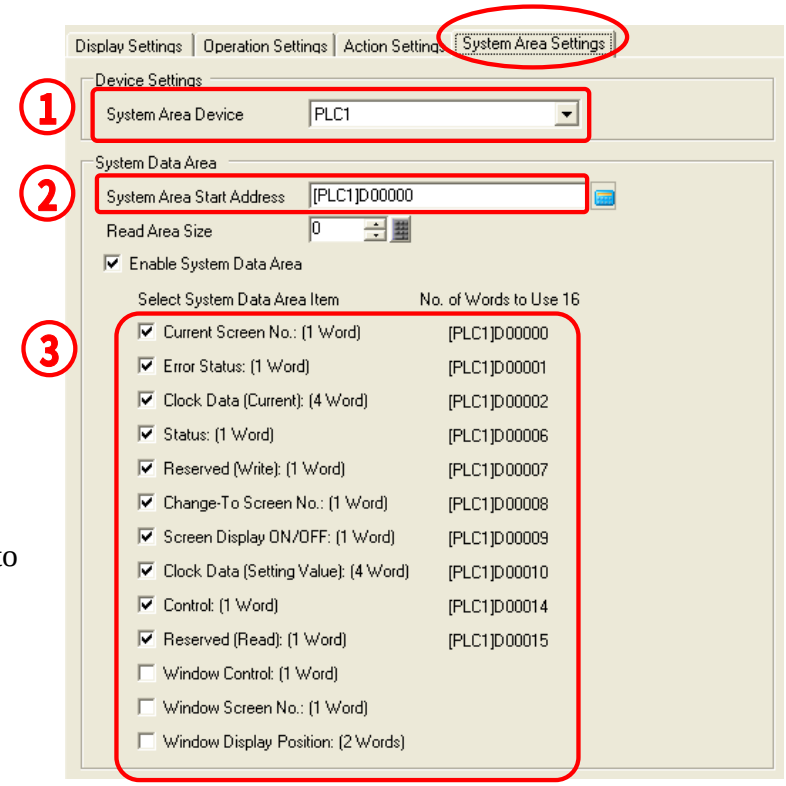
If a device error occurs, the GP's screen will automatically change.



(6) System Data Area Settings (System Area Settings)

From System Settings Window, select [Main Unit Settings]->[System Area Settings].





① **System Area Device**

Select which device the system area is allocated to, when connecting multiple devices.

② **System Area Start Address**

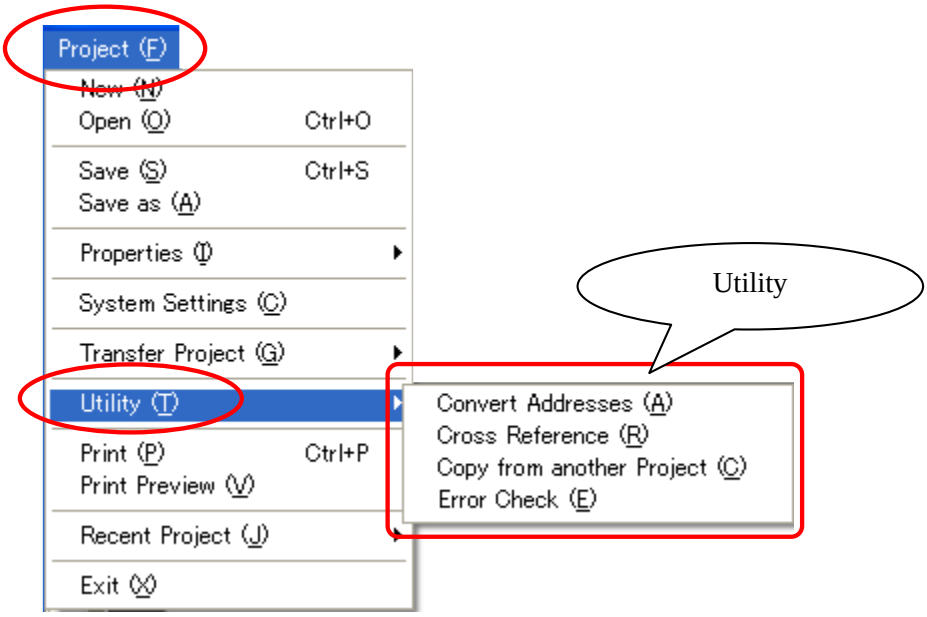
Set the start address of the system area to allocate to PLC.

③ **Select System Data Area Item**

On the lower part of ①, select the item of the system data area to allocate to PLC.

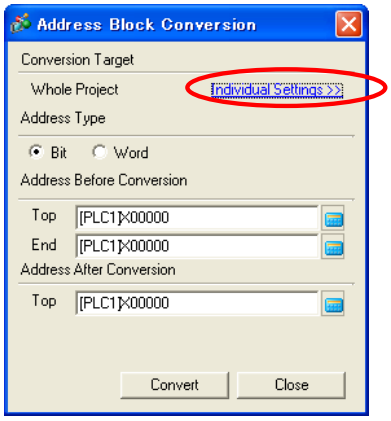
Utility

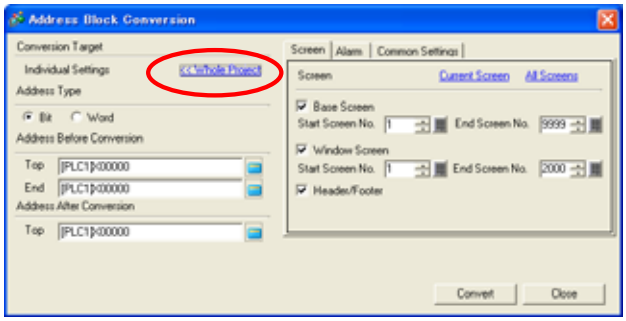
From the menu, [Project]->[Utility], the following tools can be used.



(1) Address Block Conversion

The arbitrary address range you use can be designated and converted in block.

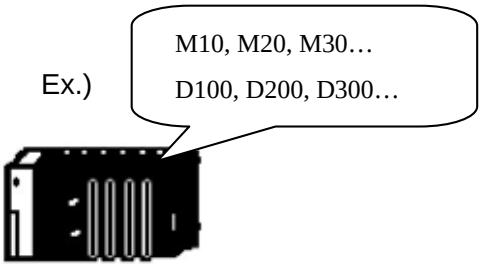


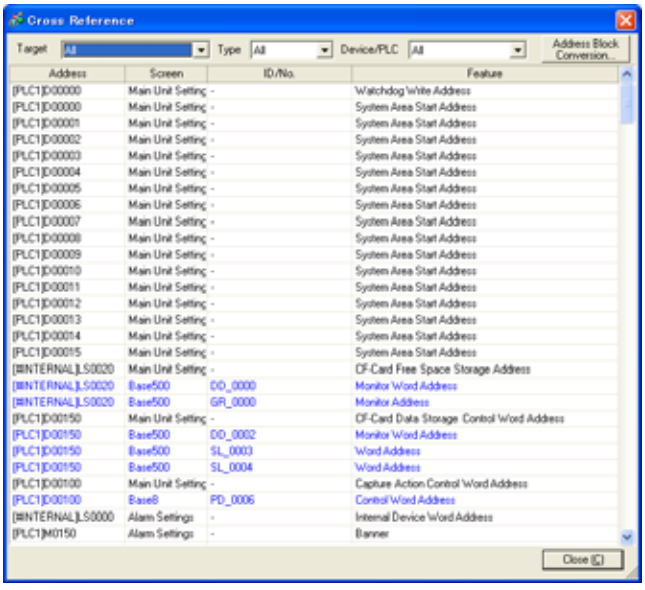


Conversion with a condition like a unit of a screen is possible.

(2) Cross Reference

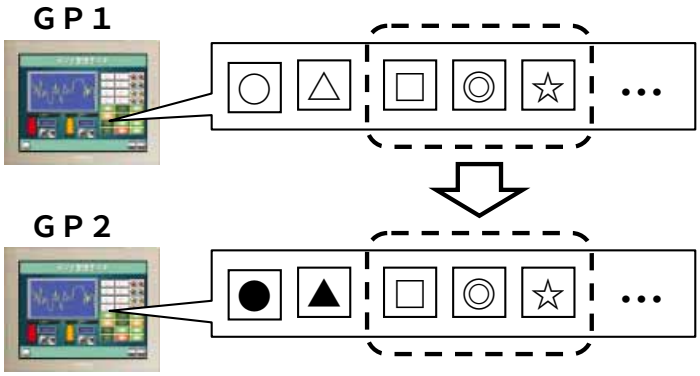
All addresses the display uses can be confirmed with conditions.
For each category of Screens, Bit, Word, Multiple Connections, the used addresses can be confirmed for each PLC individually.

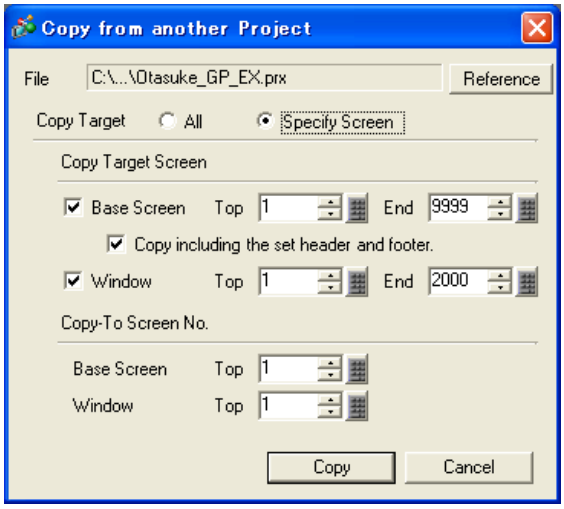




(3) Copying a screen from another project

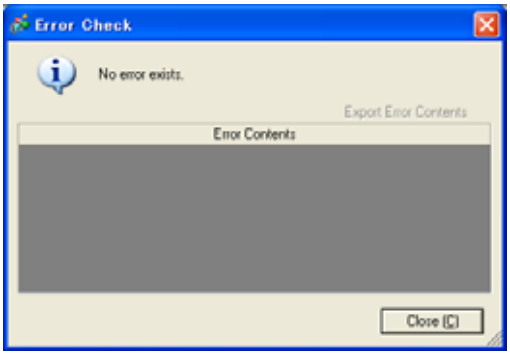
Copy the screen from another project on the PC.





(4) Error Check

Check consistency of the screen data. If there's an error, the data cannot be transferred to the GP.



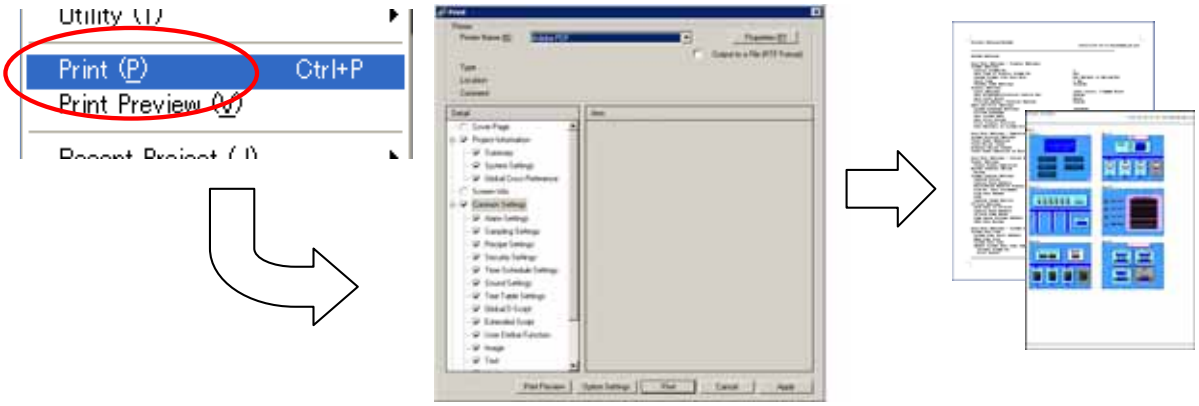
When there's no error,

For countermeasures for error messages, refer to [Chapter 30 Error Messages] of the Reference Manual.

Hint!

Print Feature

It's possible to create screen specs. Automatically.
Select the Project File's information and output it to the printer.
It can be saved on the PC as a RTF file and edited.



Memorandum (Feel free to use this space)