

Human Machine Interface (HMI) GOT

GT Works3 (GT Designer3) Basics (Elementary Screen Design (Simulator))

This online training system (e-learning) is intended for those who operate the GOT2000 series (GT27) and the screen design software GT Designer3 for the first time.

In this course, we will learn how to create a project and how to configure the GOT's basic function settings using the screen design software GT Designer3.

As prerequisites for this course, you should have already completed the following courses or possess the equivalent knowledge in:

- FA Equipment for Beginners (HMIs)
- GOT2000 Basics (GOT Introduction)
- GT Works3 (GT Designer3) Basics (Screen Design Introduction)
- FA Equipment for Beginners (PLCs)
- PLC MELSEC iQ-R Series Basics
- PLC Programming Basic (Ladder)

The contents of this course are as follows.
We recommend that you start from Chapter 1.

Chapter 1 Learning Equipment Preparation

We will prepare equipment and software used for learning.

Chapter 2 Creating an Objects and Figures

We will learn how to create and place objects and figures.

Chapter 3 Checking the Display of the Created Objects and Figures

We will check the display of the created objects and figures on a personal computer.





Chapter 4 Checking the Operation of the Created Objects

We will perform operation check using a simulator such as GX Simulator3 and GT Simulator3.

Final Test

Passing grade: 60% or higher.

Following is an explanation of how to use the graphical user interface.

Go to the next page		Go to the next page.
Back to the previous page		Back to the previous page.
Move to the desired page		"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning		Exit the learning. Window such as "Contents" screen and the learning will be closed.

Safety precautions

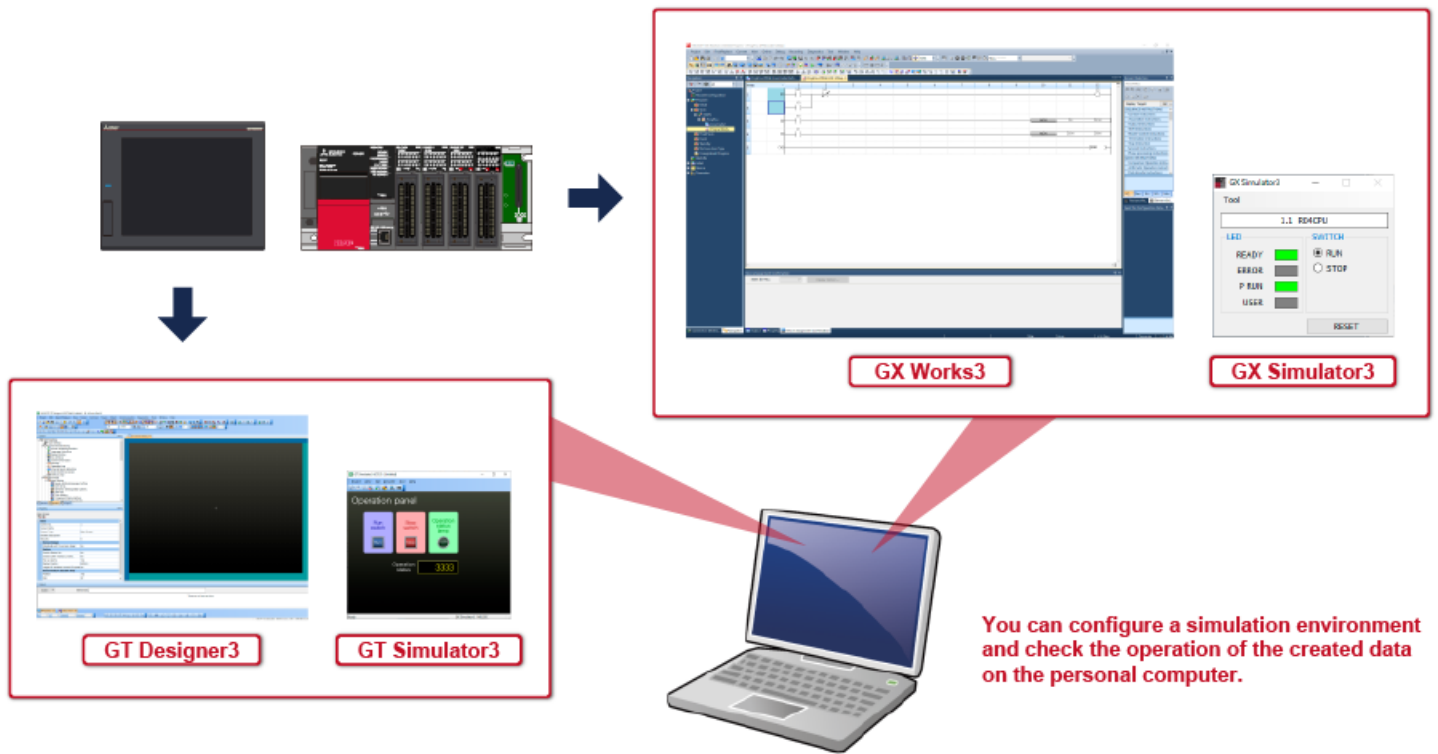
When you learn based on using actual products, please carefully read the safety precautions in the corresponding manuals.




In this chapter, we will prepare equipment and software used for learning.

- 1.1 Configuration of the learning equipment
- 1.2 Learning equipment list
- 1.3 Functions used for learning

In this course, we will learn the procedure from creating project data for the GOT using the screen design software GT Designer3 to checking the operation of the data. We will check the operation of the created data in a simulation environment. The simulation environment can be configured on a personal computer. You can check the operation of the created data without a GOT or PLC.

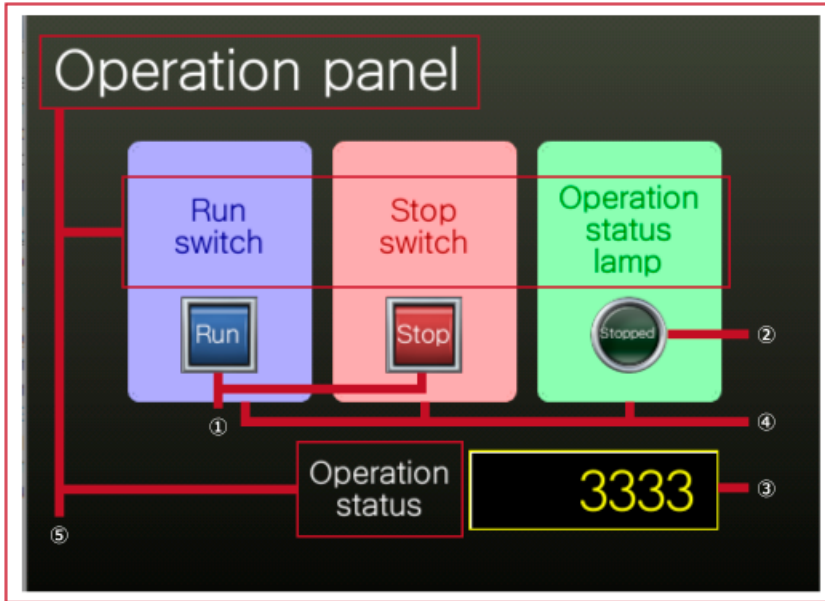
Configure the simulation environment using the following software products.



	Name	Application/setting
	Personal computer	Used to create GOT project data. Perform operation check using GT Simulator3 that simulates the GOT and GX Simulator3 that simulates the PLC.
	GOT Screen Design Software MELSOFT GT Works3	Includes GT Designer3 (software for creating project data) and GT Simulator3 (software for simulating the GOT) Install GT Designer3 and GT Simulator3 on the personal computer. (Model: SW1DND-GTWK3-E)
	Programmable Controller Engineering Software MELSOFT GX Works3	Includes GX Works3 (engineering tool for configuring settings, programming, debugging, and maintenance for PLCs including the MELSEC iQ-R/MELSEC iQ-F series) and GX Simulator3 (PLC simulator). Install GX Work3 and GX Simulator3 on the personal computer. (Model: SW1DND-GXW3-E)

In this course, we will create the following screen.

	Name	Object/figure	Description
①	Run switch Stop switch	Switch	Touch to turn on or off the bit device.
②	Operation status lamp	Lamp	Turns on or off according to the on or off state of the bit device.
③	Operation status display	Numerical display	Displays the data stored in the PLC CPU device.
④	Figure (rectangle)	Figure (rectangle)	Place rectangles to highlight the switches and the lamp.
⑤	Figure (text)	Figure (text)	Displays the title/text that explains the screen, switch, lamp, or others.
⑥	-	Base screen	Screen on which objects and figures 1 to 5 are placed.



In this chapter, we will learn how to create and place an object.

(To create an object, you need to create a new project. For how to create and save a project, refer to "GT Works3 (GT Designer3) Basics (Screen Design Introduction)".)

2.1 Creating a bit switch

2.2 Creating a bit lamp

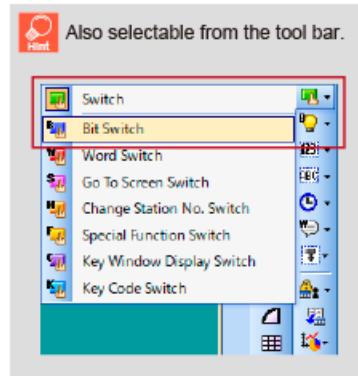
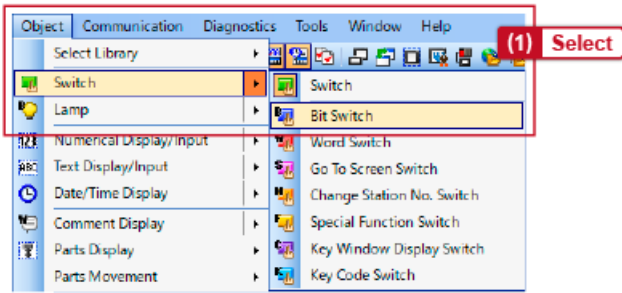
2.3 Creating a numerical display

2.4 Creating a figure (rectangle)

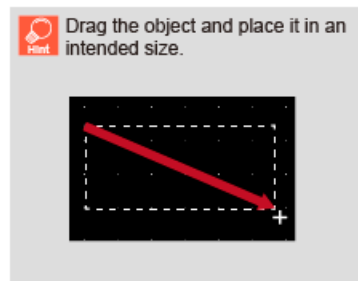
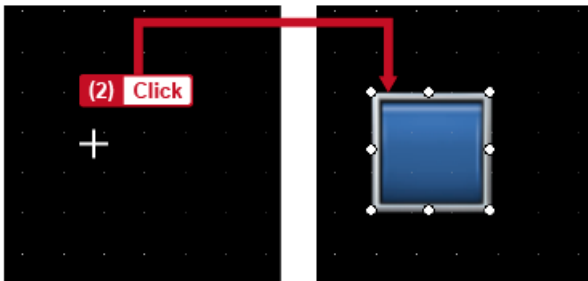
2.5 Creating a figure (text)

Create a run switch.

(1) Select [Object] → [Switch] → [Bit Switch] from the menu.

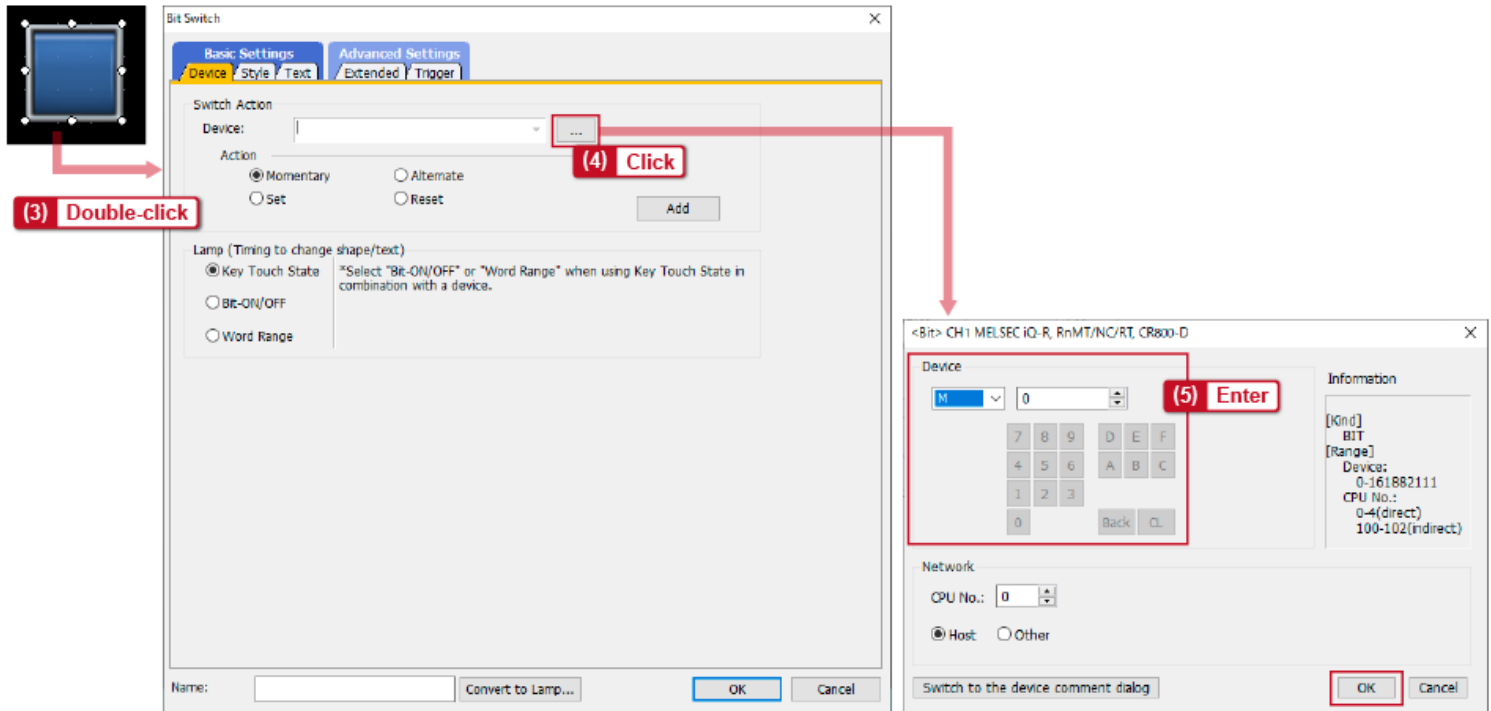


(2) The cursor becomes a plus sign (+). Click anywhere to place the bit switch.

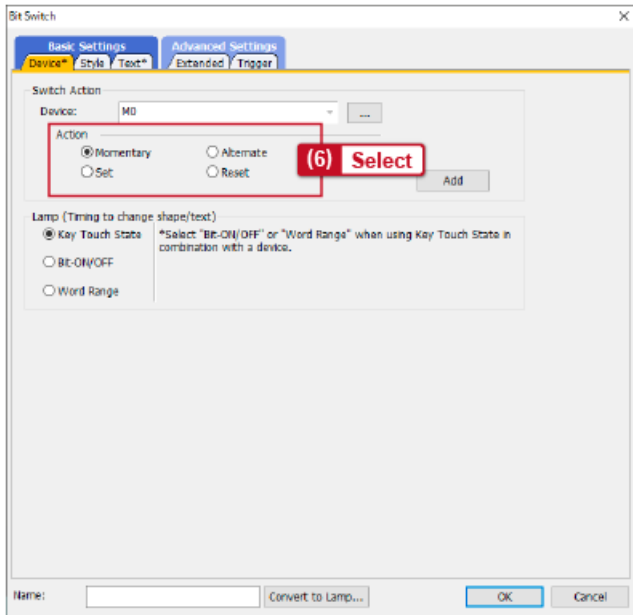


Set a device and the action in the [Device] tab.

- (3) Double-click the placed switch to display the setting dialog.
- (4) Click [...] to open the device setting dialog.
- (5) Enter a device and click [OK]. (Setting example: M0)



(6) Select an action for the bit switch. (Setting example: Momentary)



Glossary: "Actions" in the action setting

Momentary

Keeps the specified bit device on only while the switch is being touched.
The device turns off when the touch is released.

Alternate

Reverses the status (ON ↔ OFF) of the specified bit device when the switch is touched.

Set

Turns on the specified bit device when the switch is touched.

Reset

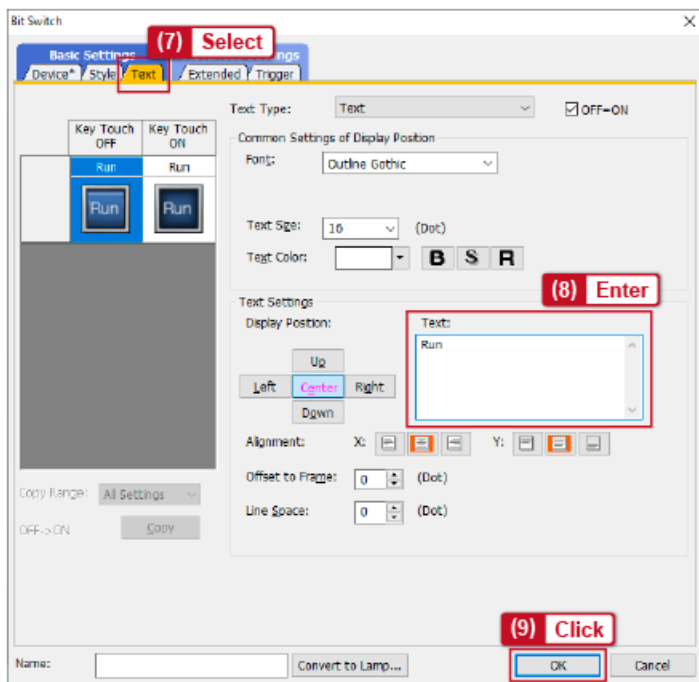
Turns off the specified bit device when the switch is touched.

Set a text to be displayed on the bit switch in the [Text] tab.

(7) Select the [Text] tab.

(8) Enter a text to be displayed on the bit switch in [Text]. (Setting example: Run)

(9) Click [OK].



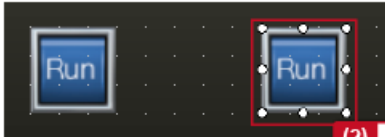
Create a stop switch.

(1) Select the run switch. Hold down "Ctrl" and drag the switch to be copied.



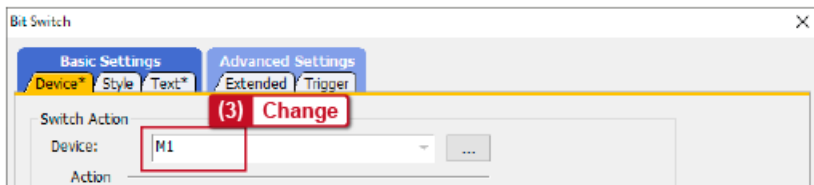
(1) Hold down the Ctrl key and drag the switch.

(2) Double-click the copied switch to open the setting dialog.

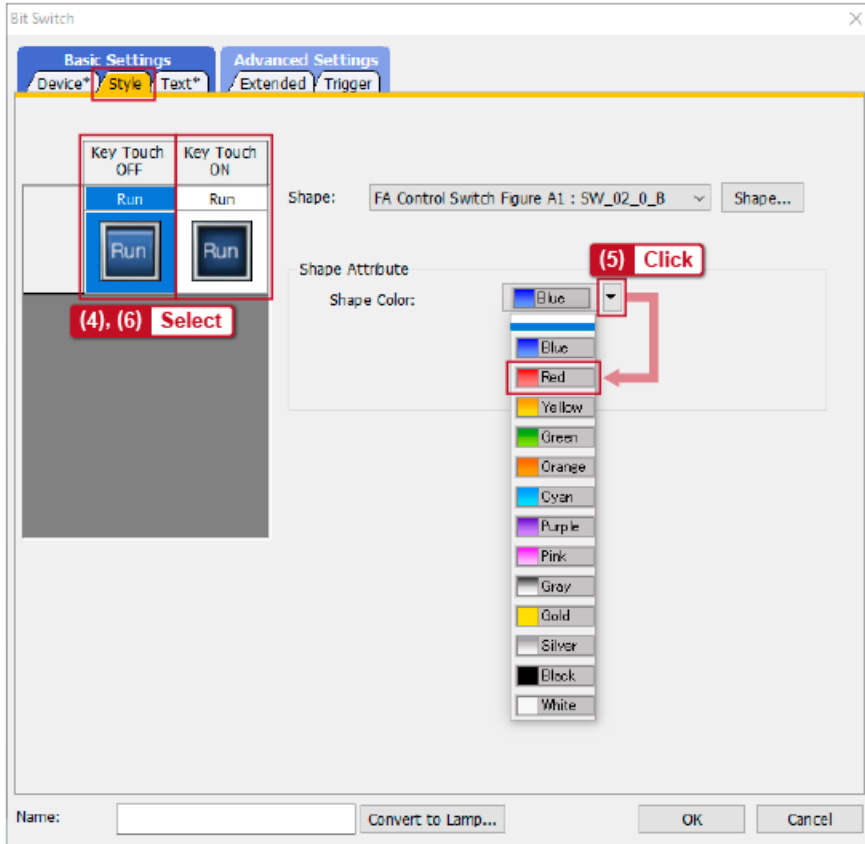


(2) Double-click

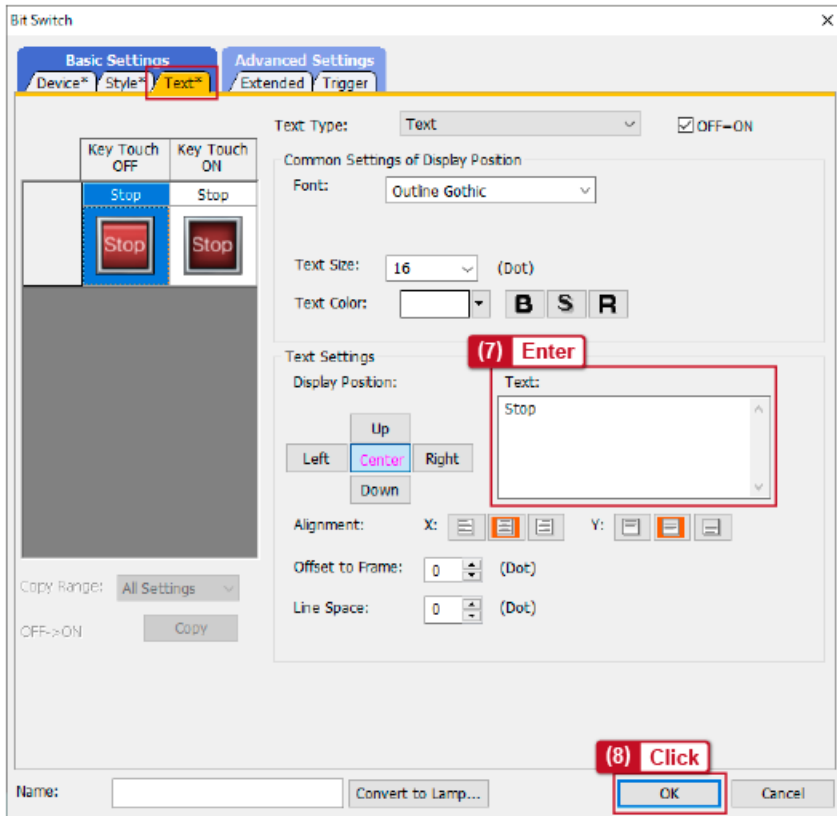
(3) Change the device to the value for the stop switch in the [Device] tab. (Setting example: M1)



- (4) Select the [Style] tab and select [Key Touch OFF].
- (5) Set [Shape Color] for [Key Touch OFF]. (Setting example: Red)
- (6) Set [Shape Color] for [Key Touch ON] as well. (Setting example: Red)

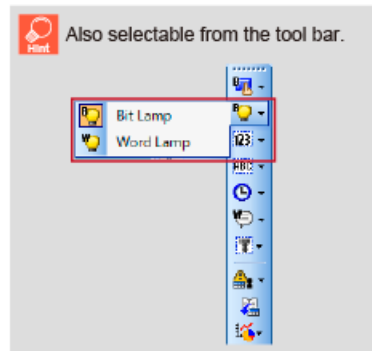
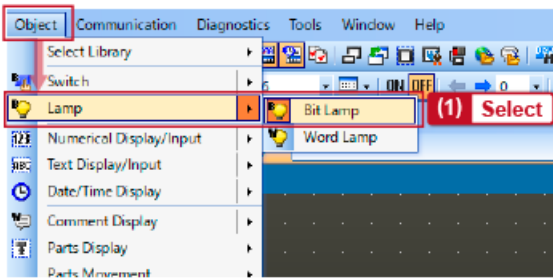


- (7) Select the [Text] tab and enter a text to be displayed on the bit switch in [Text]. (Setting example: Stop)
- (8) Click [OK].

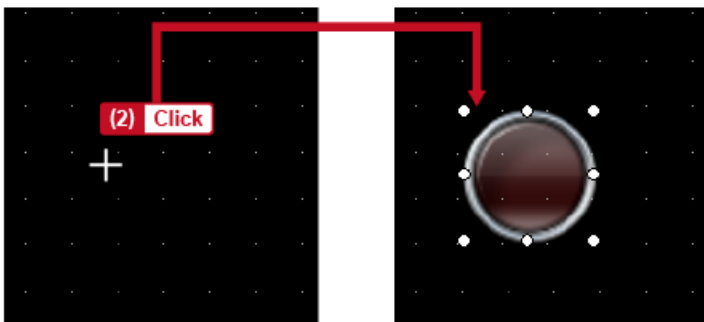


Create an operation status lamp.

(1) Select [Object] → [Lamp] → [Bit Lamp] from the menu.

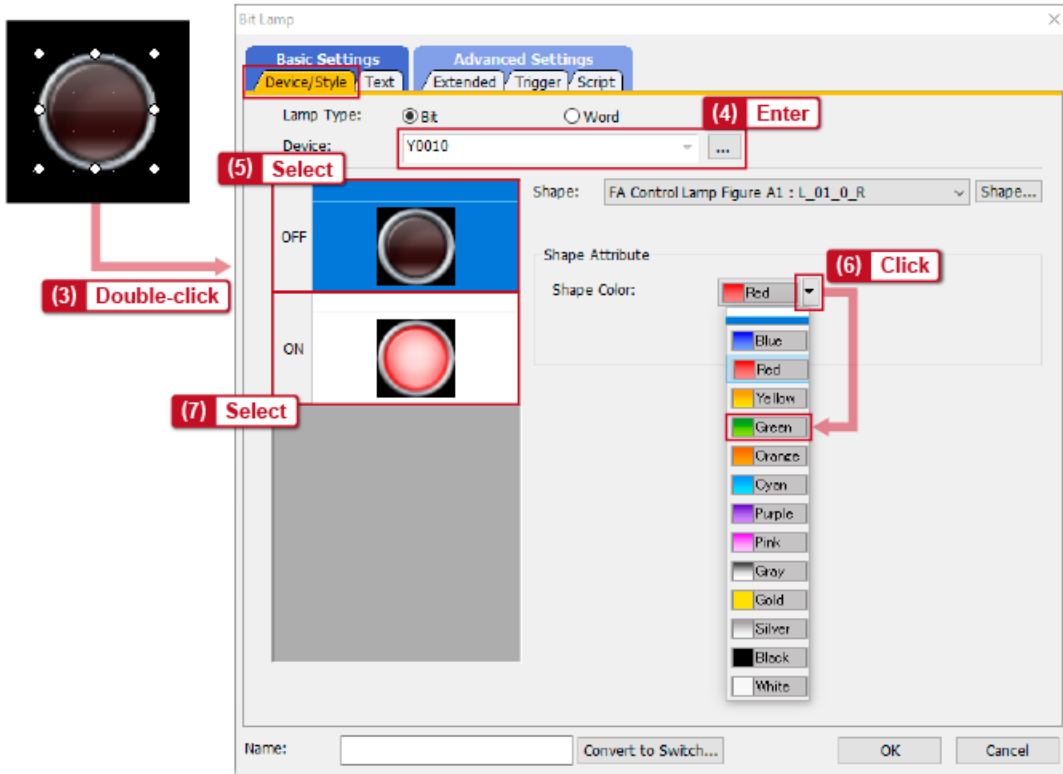


(2) The cursor becomes a plus sign (+). Click anywhere to place the bit lamp.



Set a device and a shape color in the [Device/Style] tab.

- (3) Double-click the placed lamp to display the setting dialog.
- (4) Set a device. (Setting example: Y0010)
- (5) Select [OFF].
- (6) Set [Shape Color]. (Setting example: Green)
- (7) Set [Shape Color] for [ON]. (Setting example: Green)

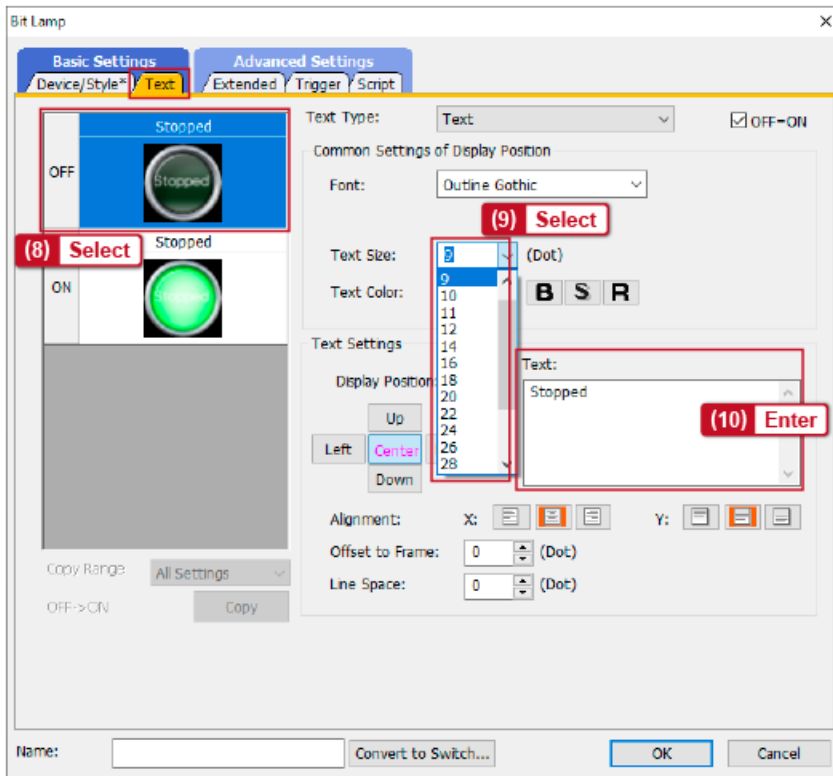


Set a text to be displayed on the bit lamp in the [Text] tab.

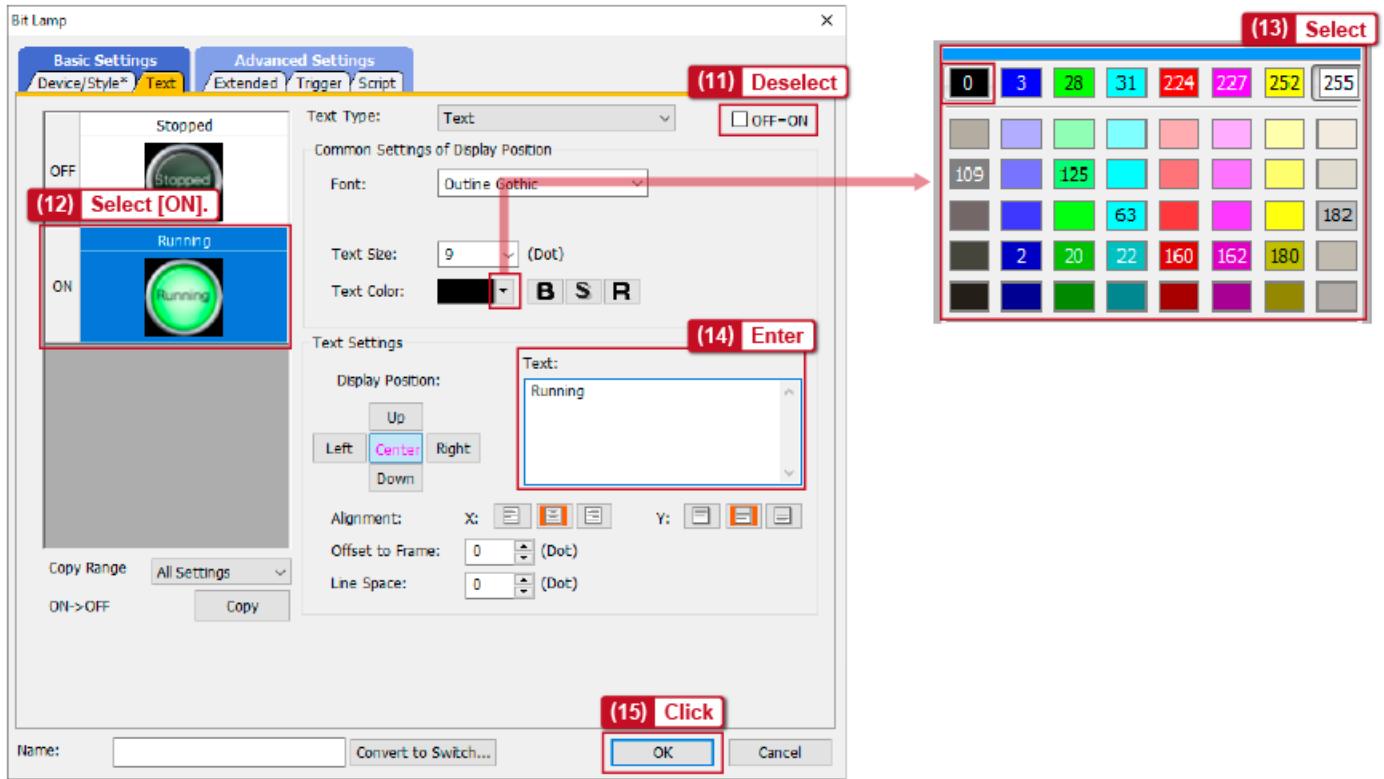
(8) Select [OFF].

(9) Set [Text Size]. (Setting example: 9)

(10) Enter a text to be displayed in [Text]. (Setting example: Stopped)

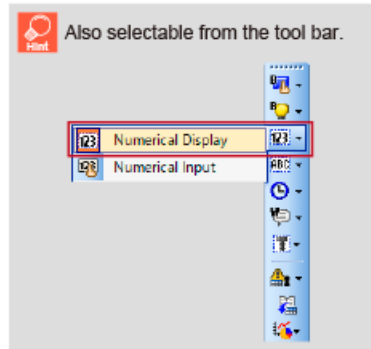
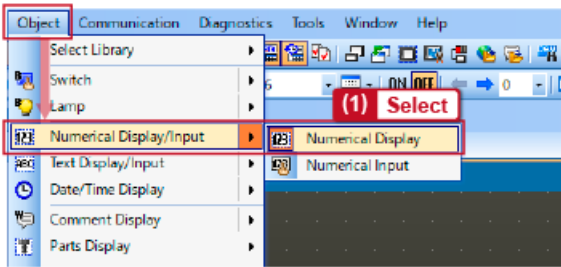


- (11) Deselect [OFF=ON].
- (12) Select [ON].
- (13) Set [Text Color]. (Setting example: Black)
- (14) Enter a text to be displayed in [Text]. (Setting example: Running)
- (15) Click [OK].

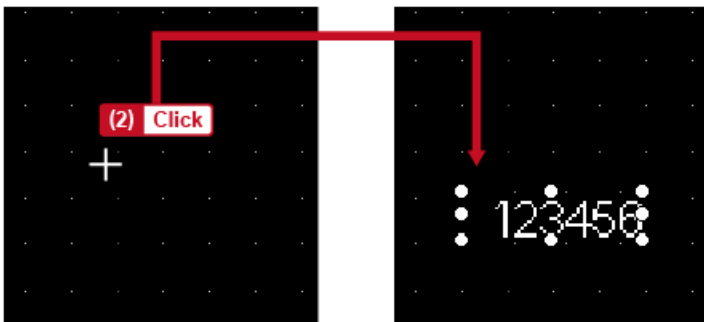


Create an operation status display.

(1) Select [Object] → [Numerical Display/Input] → [Numerical Display] from the menu.

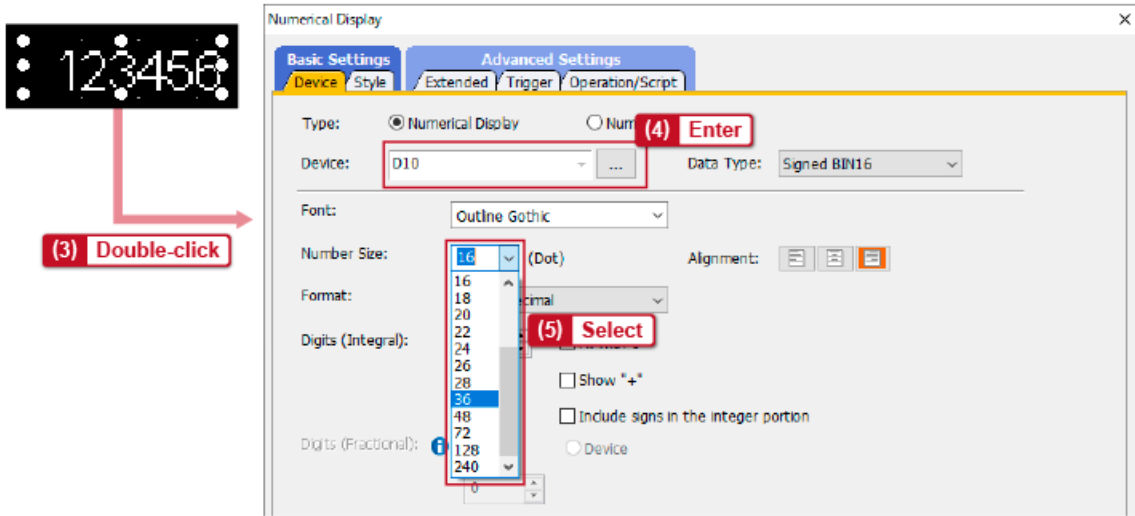


(2) The cursor becomes a plus sign (+). Click anywhere to place the numerical display.



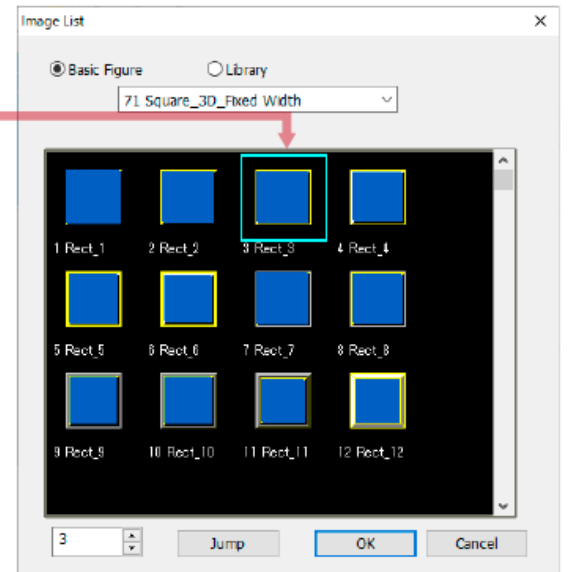
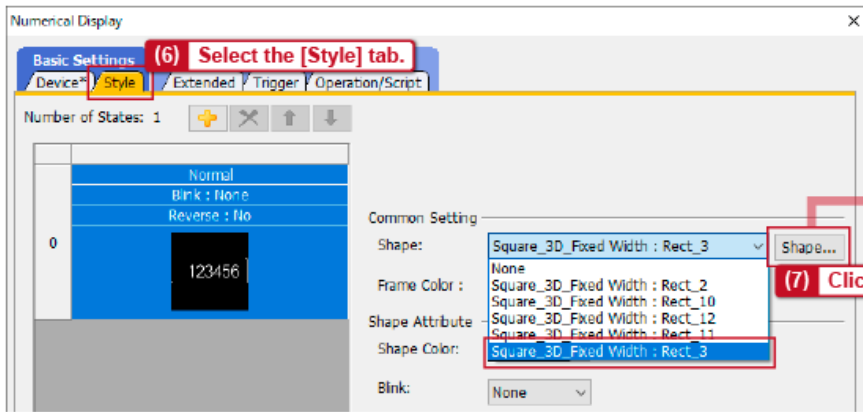
Configure the device and style settings in the [Device] tab and [Style] tab.

- (3) Double-click the placed numerical display to display the setting dialog.
- (4) Set a device. (Setting example: D10)
- (5) Set a numerical size. (Setting example: 36)



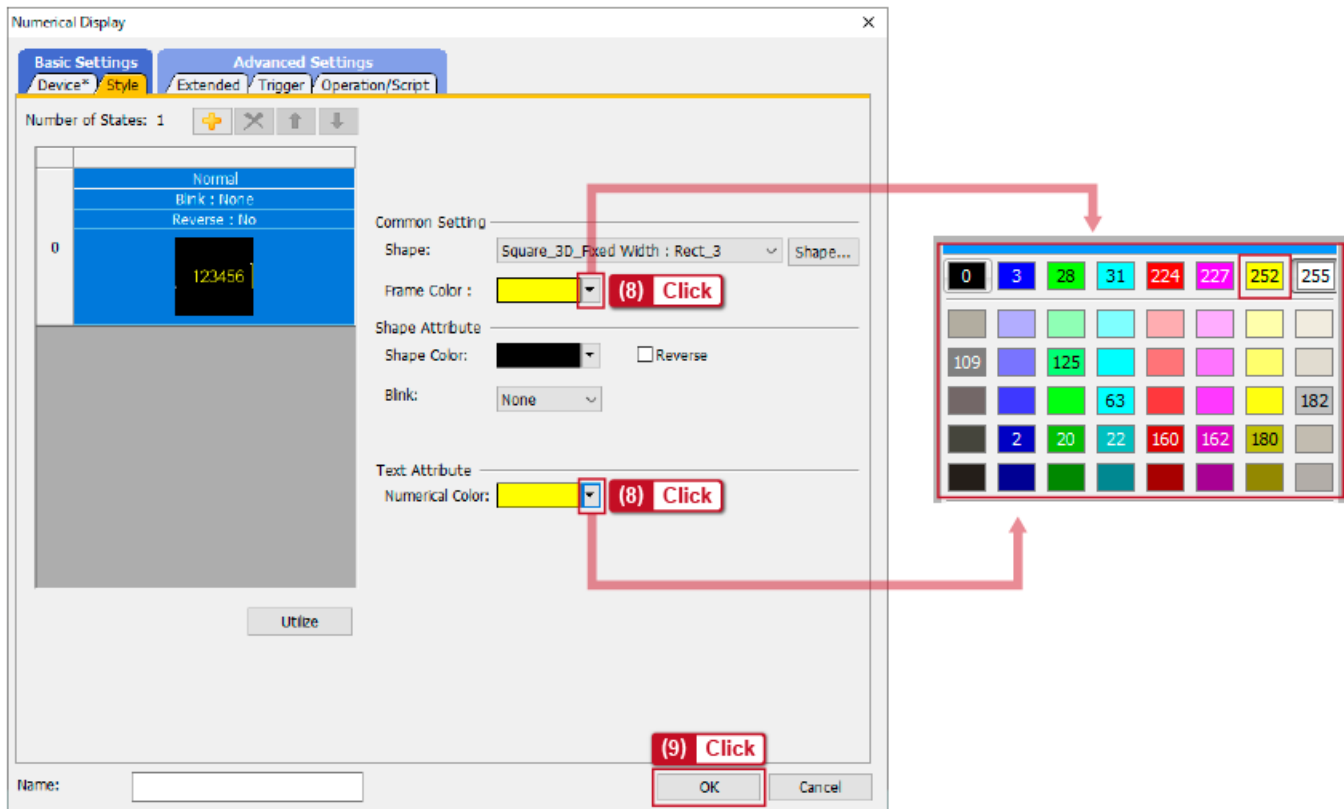
(6) Select the [Style] tab.

(7) Select a frame of the numerical display. (Setting example: Square_3D_Fixed Width: Rect_3)



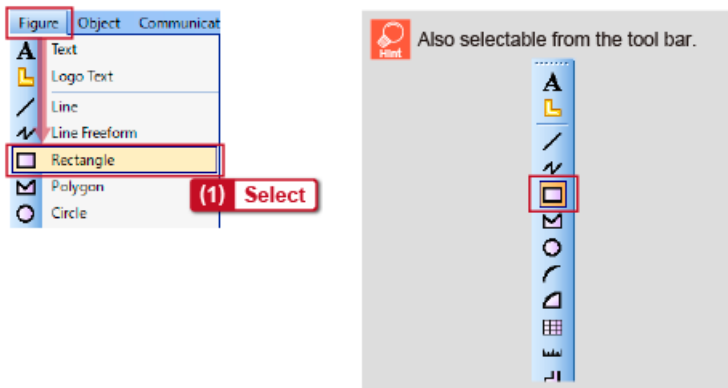
(8) Set [Frame Color] and [Numerical Color]. (Setting example: Yellow)

(9) Click [OK].



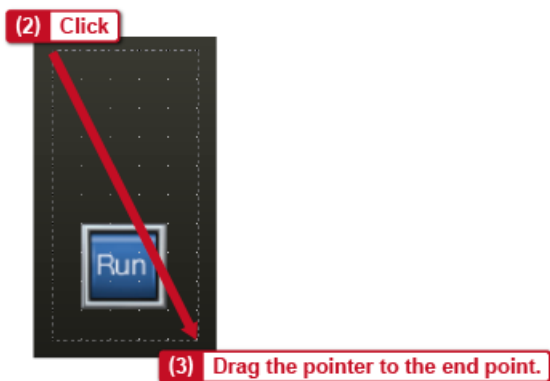
Create a figure (rectangle). Place the created figure behind a switch or lamp.

(1) Select [Figure] → [Rectangle] from the menu.

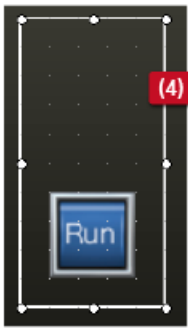


(2) Press and hold the start point with a mouse.

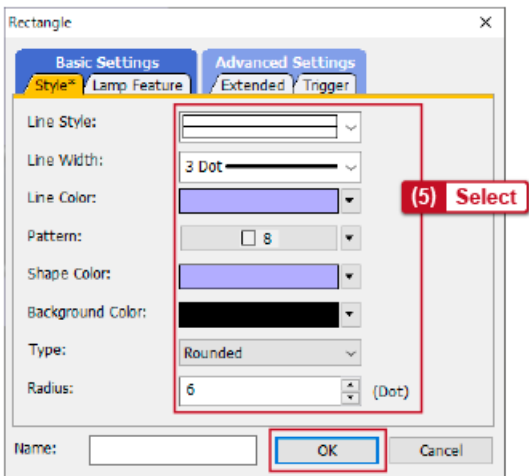
(3) Drag the pointer to the end point.

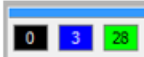



(4) Double-click anywhere on the line of the placed figure to open the setting dialog.



(5) Configure the style settings. Then, click [OK].



Item	Setting example
Line style	—————
Line width	3 Dot
Pattern	□ 8
Type	Rounded
Radius	6
Line color	
Shape color	

Place rectangles behind the stop switch and operation status lamp.

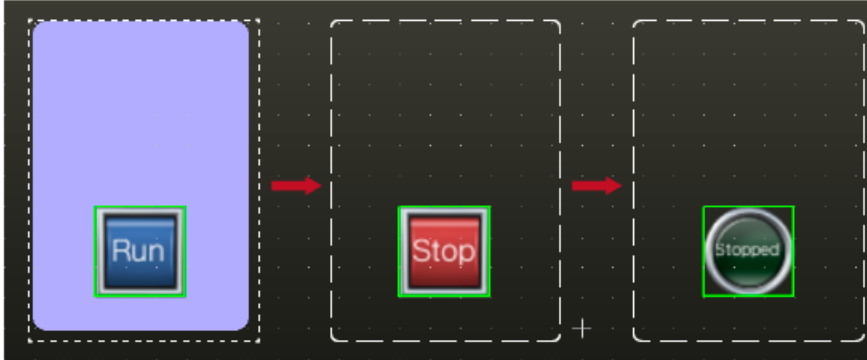
(6) Press and hold the rectangle.

(7) Press and hold the Ctrl key and drag the rectangle to be copied. Place the copy behind the stop switch.

(8) Place another copy behind the operation status lamp.

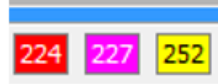

(6) Click

(7), (8) Make copies of the rectangle (Ctrl + drag).

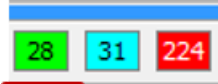



(9) Change the background colors of the stop switch and operation status lamp.

Background color of the stop switch

Item	Setting example
Line color	
Shape color	

Background color of the operation status lamp


Item	Setting example
Line color	
Shape color	

(10) Align the objects.

(10) Align the figures and objects.



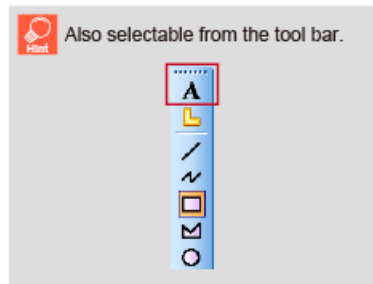
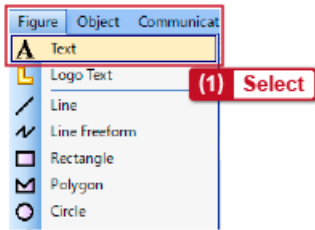
The [Align] toolbar helps align the objects.



- 1 Left
- 2 Center (horizontal)
- 3 Right
- 4 Top
- 5 Center (vertical)
- 6 Bottom
- 7 Align sideways
- 8 Align lengthways

Create a figure (text). Place a text on the run switch, stop switch, operation status lamp, and operation status display.

(1) Select [Figure] → [Text] from the menu.

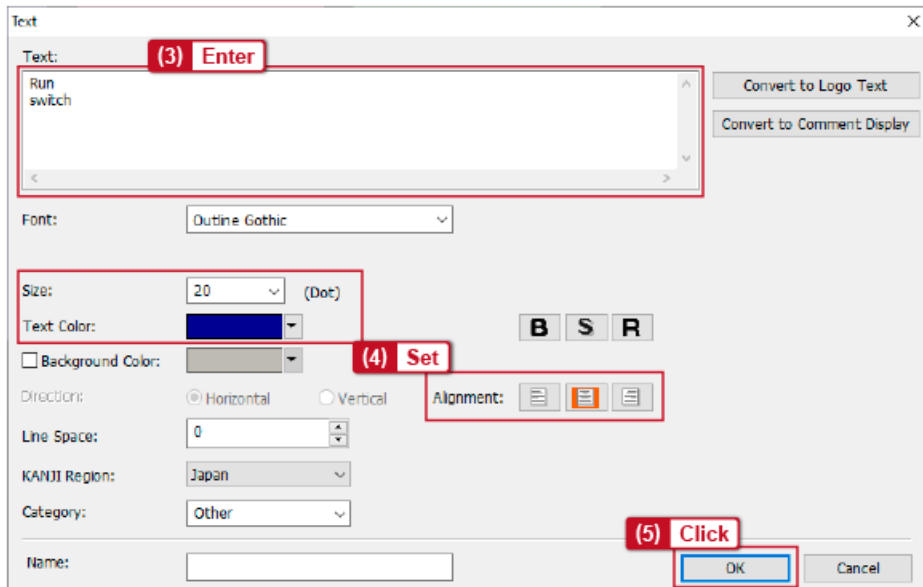



(2) Click the place intended to enter a text to open the text entry dialog.



Set a text to be displayed and the style in the dialog.

- (3) Enter a text to be displayed in [Text]. (Setting example: Run switch)
- (4) Set [Size], [Text Color], and [Alignment].
- (5) Click [OK].

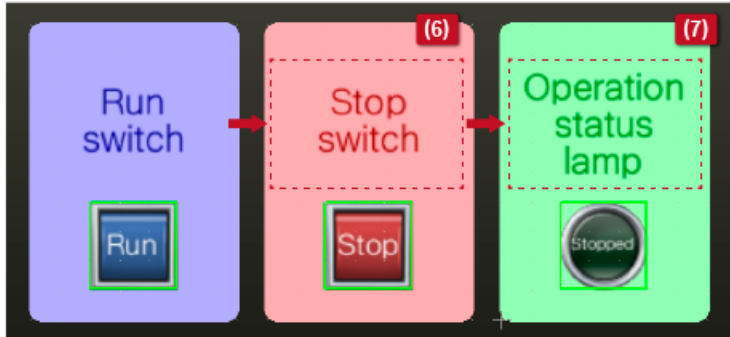


Item	Setting example
Size	20
Text color	
Alignment	Center

Place a text also on the stop switch and operation status lamp as shown below.

(6) Copy "Run switch", double-click the other switch to open its dialog, paste the copied text in [Text], and rewrite the text to "Stop switch".

(7) Copy "Stop switch", double-click the lamp to open its dialog, paste the copied text in [Text], and rewrite the text to "Operation status lamp".



Stop switch

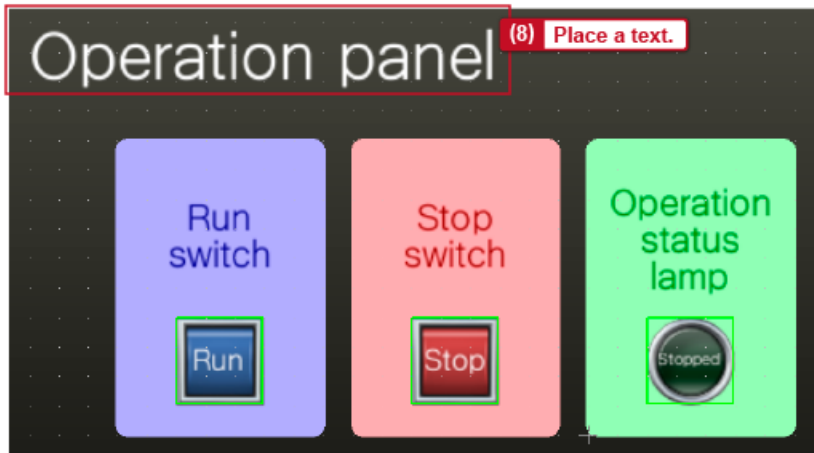
Item	Setting example						
Text color	<table border="1"> <tr> <td>160</td> <td>162</td> <td>180</td> </tr> <tr> <td style="border: 2px solid red;"></td> <td style="background-color: purple;"></td> <td style="background-color: olive;"></td> </tr> </table>	160	162	180			
160	162	180					

Operation status lamp

Item	Setting example						
Text color	<table border="1"> <tr> <td>20</td> <td>22</td> <td>160</td> </tr> <tr> <td style="border: 2px solid red; background-color: green;"></td> <td style="background-color: cyan;"></td> <td style="background-color: red;"></td> </tr> </table>	20	22	160			
20	22	160					

(8) Place a text "Operation panel" on the upper left of the screen as shown below.

If there is not enough space to place the text, select the objects and move them down.



(9) Place a text "Operation status" on the left of the numerical display as shown below.



In this chapter, we will check for incorrect settings or errors on the created screen.

3.1 Checking the display of the created objects and figures

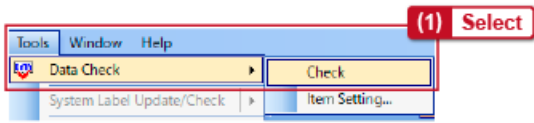
3.2 Checking the display in the screen preview

3.2.1 Checking the style

3.2.2 Exiting the preview

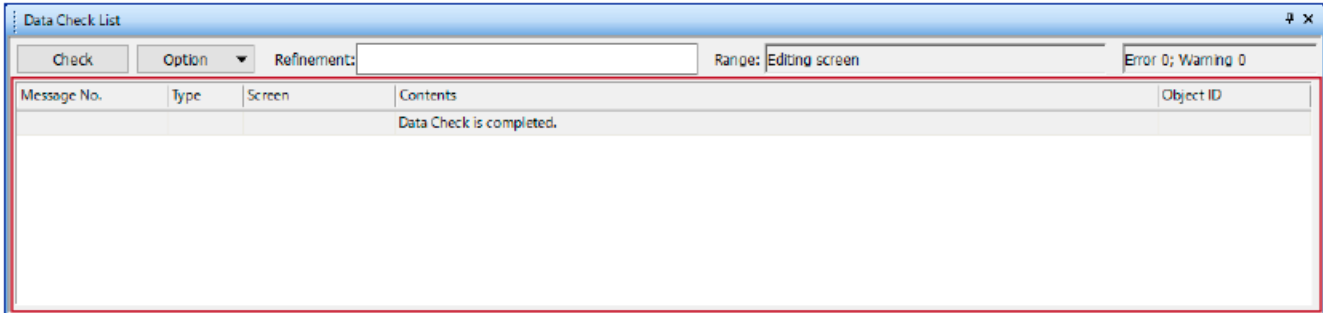
Check for errors in the created project by performing data check.

(1) Select [Tools] → [Data Check] → [Check] from the menu.

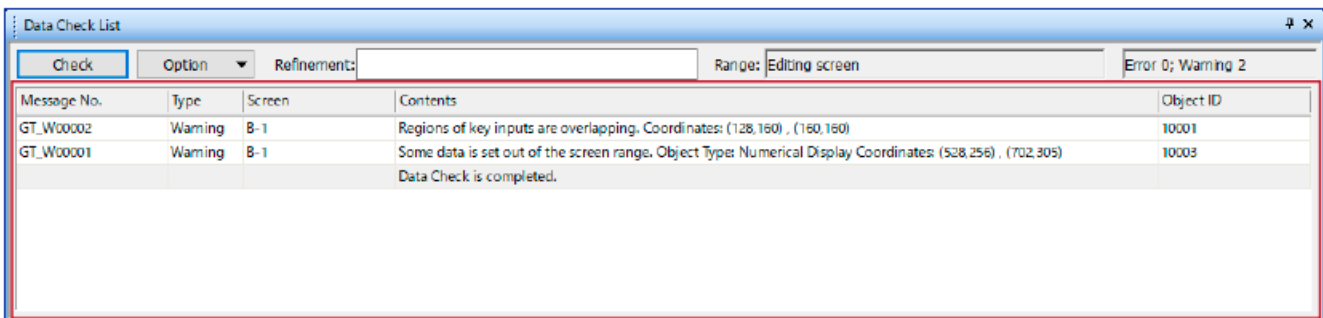


(2) "Data Check is completed" is displayed in the data check list window.

(Example) Free of errors

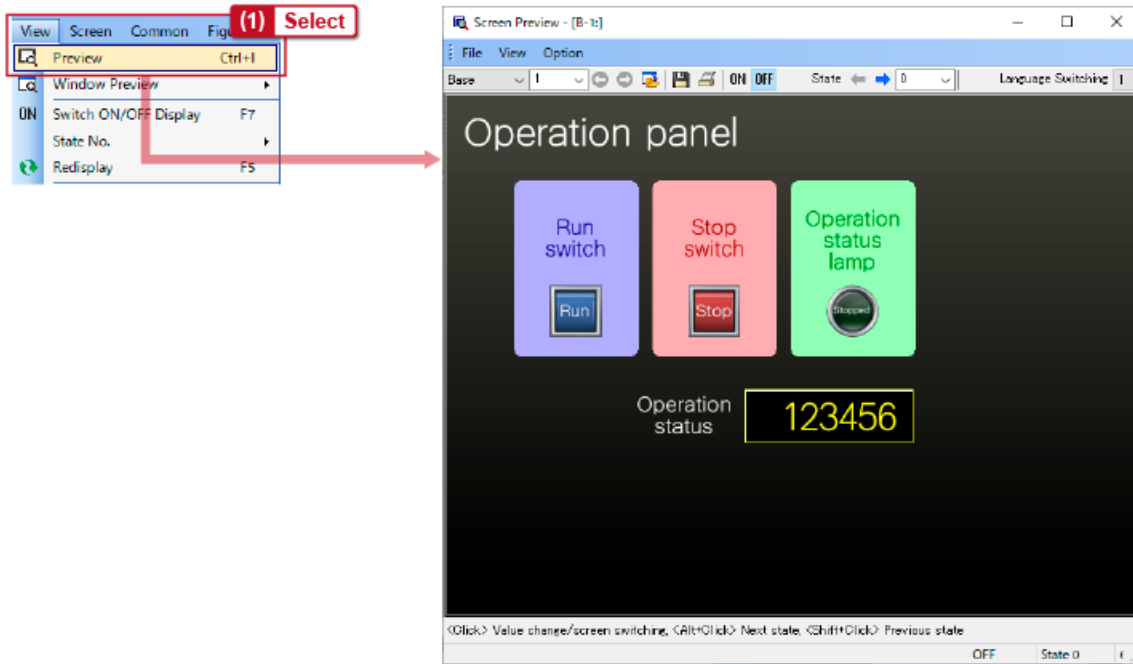


(Example) Errors found



Check the ON/OFF display of a bit switch or bit lamp on the created screen in the screen preview.

(1) Select [View] → [Preview] from the menu. The screen preview window appears.

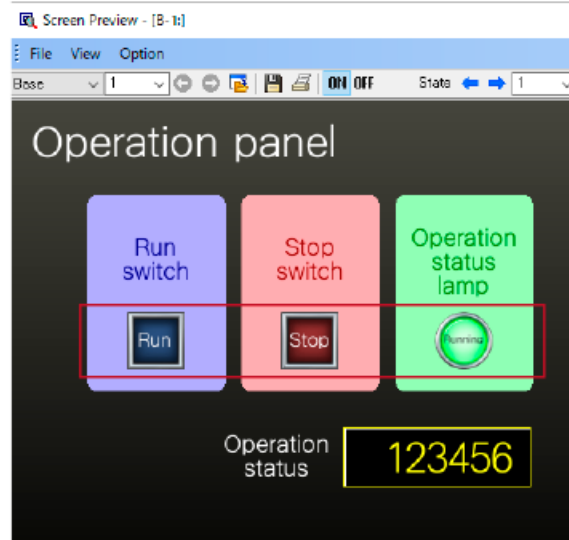
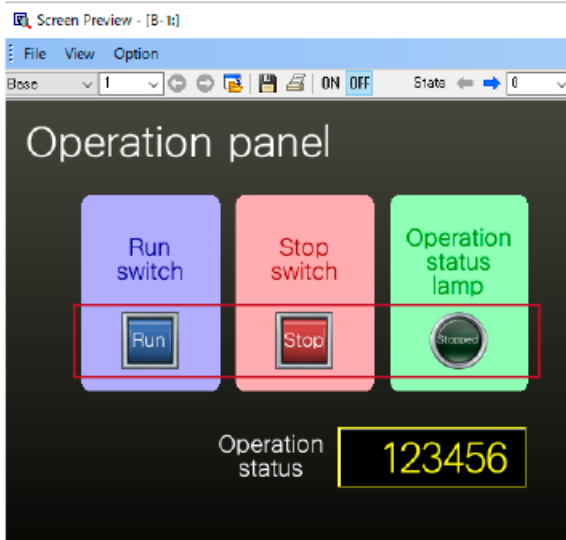


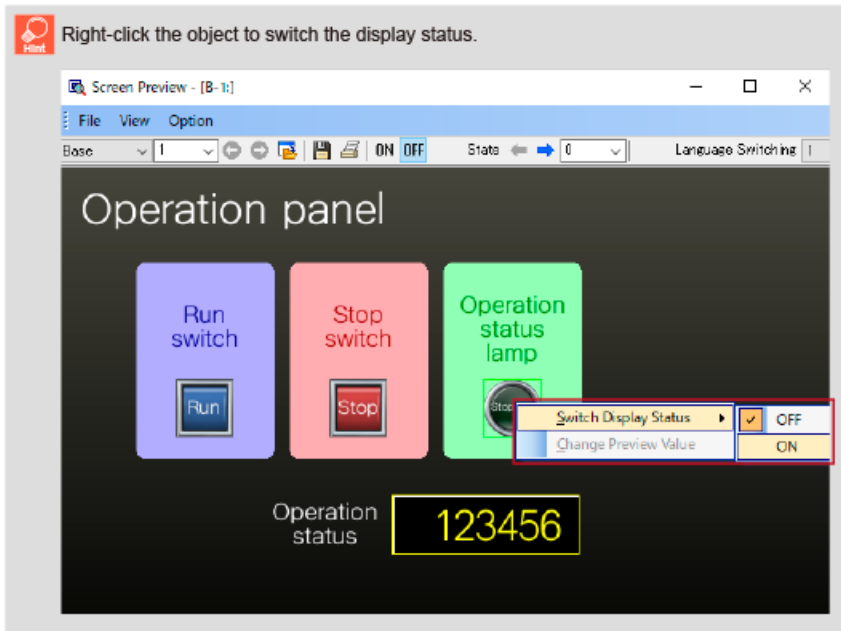
(2) Select [ON] or [OFF] and ensure that the style of the bit switch or bit lamp is as intended.



When [OFF] is selected

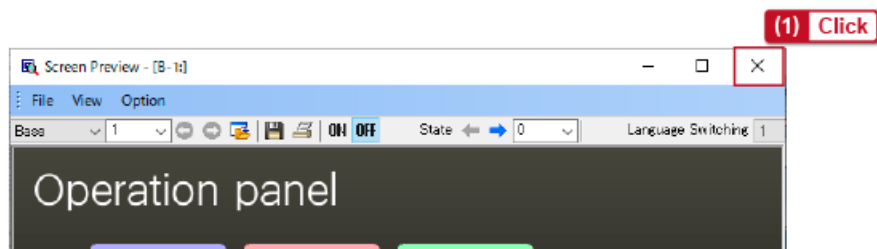
When [ON] is selected





After checking, close the screen preview window.

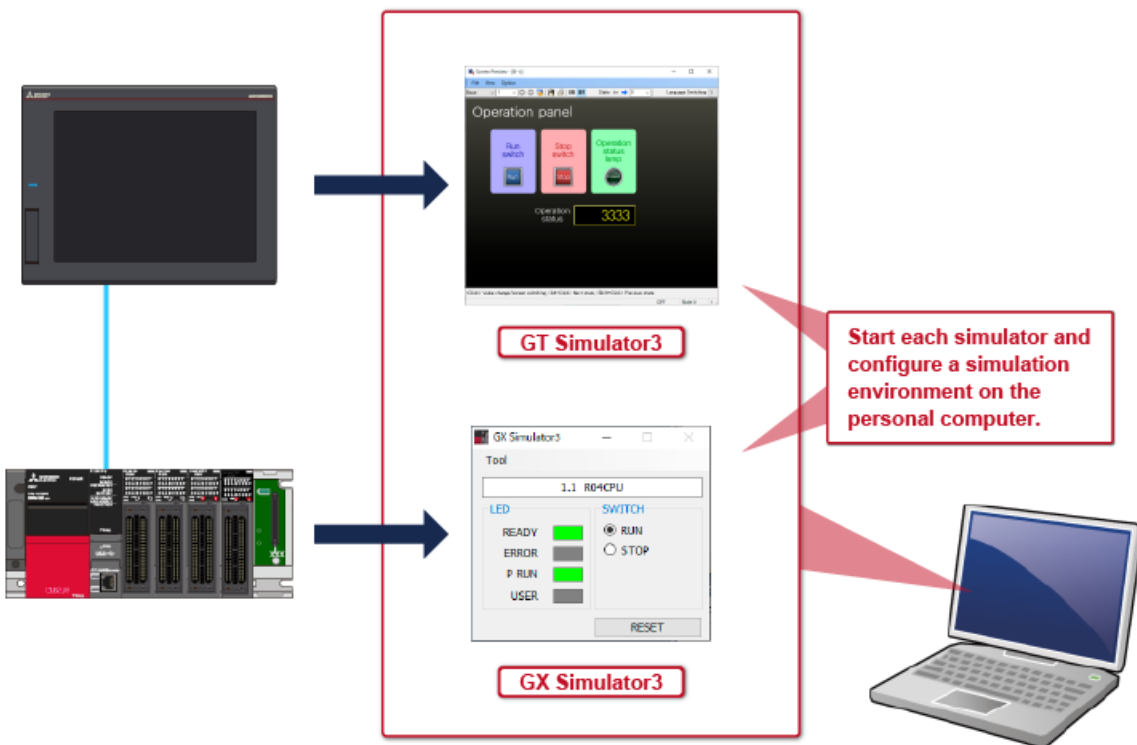
(1) Click the [×] button.



In this chapter, we will check the operation of the project data created in Chapters 2 and 3 by combining the data with a sequence program in the simulation environment on a personal computer.

- 4.1 Mechanism of operation check
- 4.2 Preparing a sequence program
- 4.3 Starting the PLC simulator
- 4.4 Starting the GOT simulator
- 4.5 Checking the operation using the GOT simulator
- 4.6 Exiting the GOT simulator
- 4.7 Stopping the PLC simulator

Perform a simulation using the GOT simulator and PLC simulator on a personal computer as shown below.

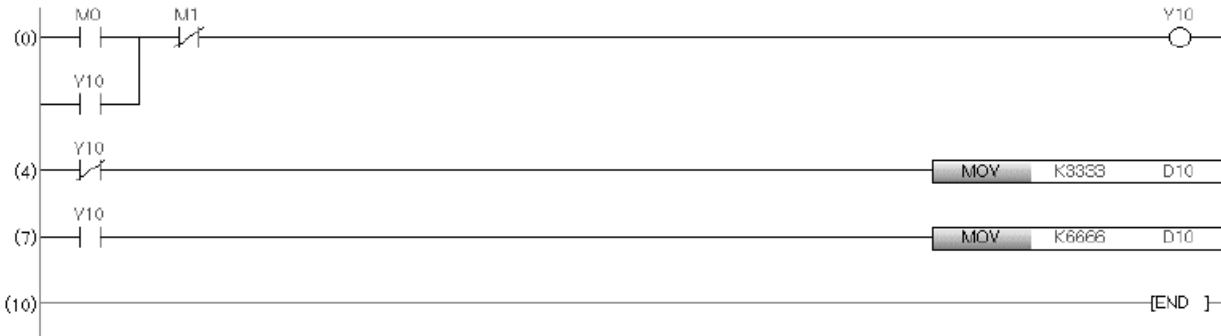


Prepare a sequence program used for the PLC simulator.

The following shows the sequence program used in this course. Create a program with GX Works3 and write the program to the PLC.

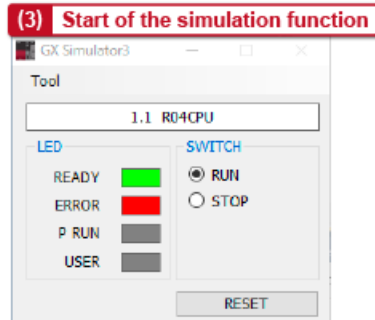
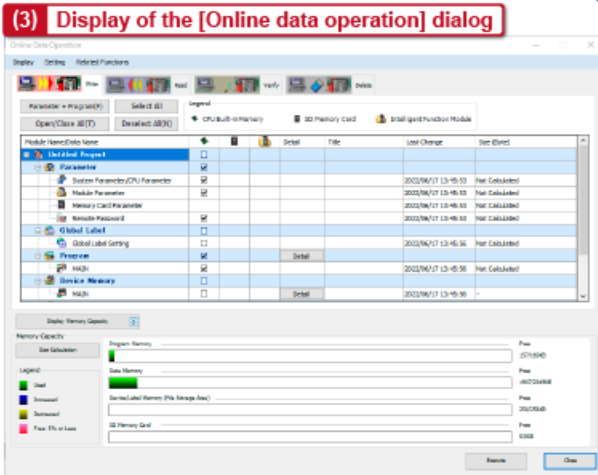
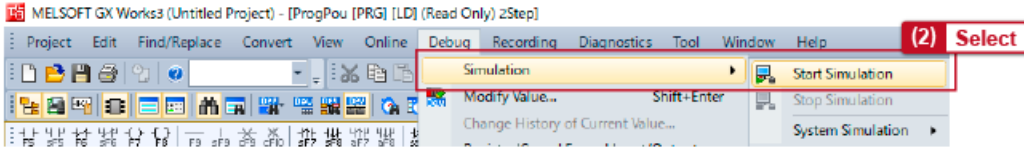
For how to operate GX Works3, how to create and write a sequence program to a PLC, take the course "GX Works3 (Ladder Logic)".

- Series : MELSEC iQ-R
- Model : R04CPU
- Program language : Ladder

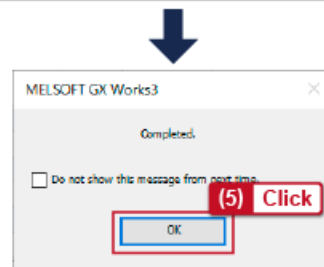
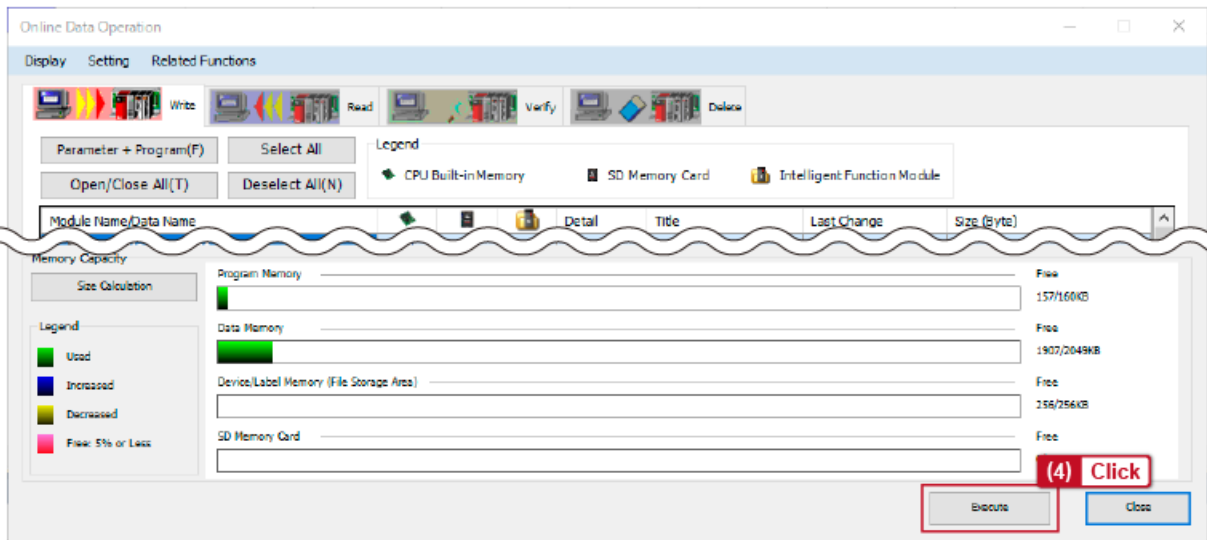
GX Works3

We need to start both the PLC simulator (GX Simulator3) and the GOT simulator (GT Simulator3) to perform a simulation. First, start the PLC simulator (GX Simulator3).

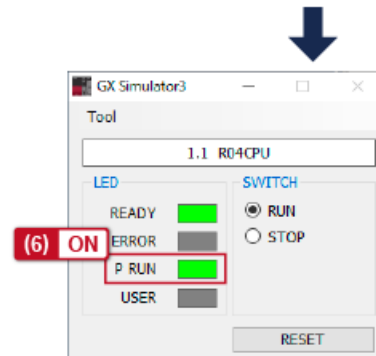
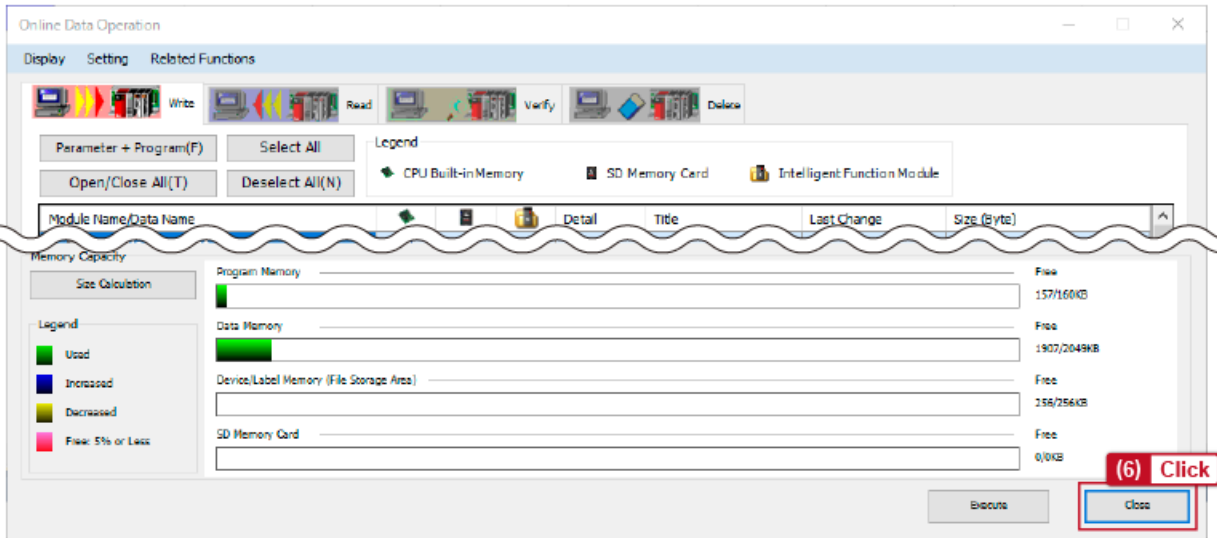
- (1) In GX Works3, open a sequence program (described on the previous page).
- (2) In GX Works3, select [Debug] → [Start Simulation] from the menu.
- (3) The [Online Data Operation] dialog appears and the simulator (GX Simulator3) starts.



- (4) Click [Execute] in the [Online Data Operation] dialog so that the PLC program is written to the PLC to be simulated.
- (5) When the writing completes, the completion dialog appears. Click [OK] to close the dialog.

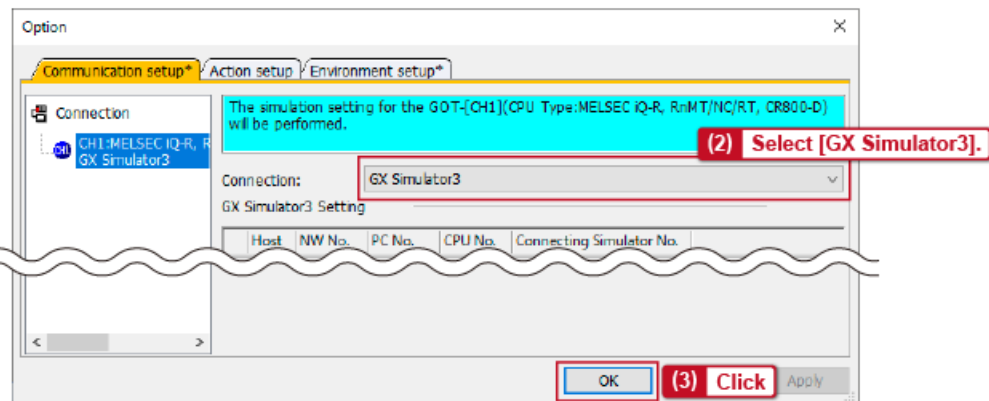
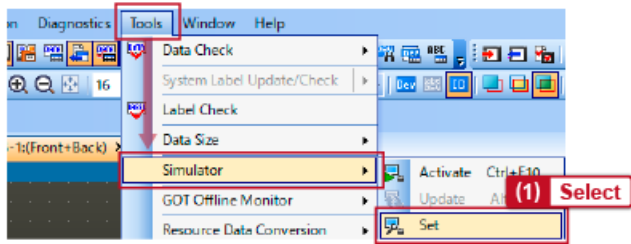


(6) Click [Close] in the [Online Data Operation] dialog to close the dialog. The LED of [P RUN] on the simulator (GX Simulator3) lights up.

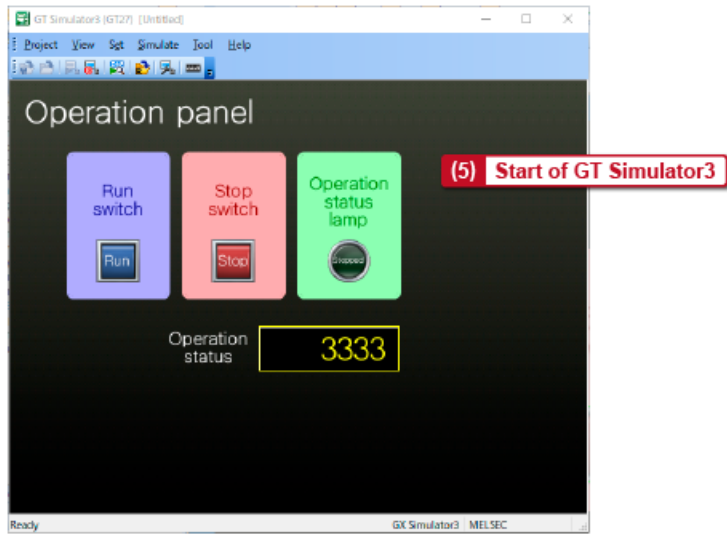
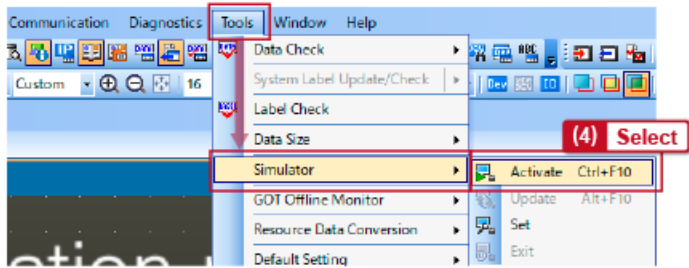


Next, we will start the GOT simulator (GT Simulator3).

- (1) Open the created project. In GT Designer3, select [Tools] → [Simulator] → [Set] from the menu to open the [Option] dialog.
- (2) Select the PLC simulator [GX Simulator3].
- (3) Click the [OK] button.



- (4) Return to GT Designer3. Select [Activate] from the menu.
- (5) The simulator (GT Simulator3) will start.



(1) Touch the run switch on the simulator, and (a) to (f) will occur in the GOT and the PLC being simulated.

(a) GOT : Changes its display to the display of when the run switch is in the ON state.

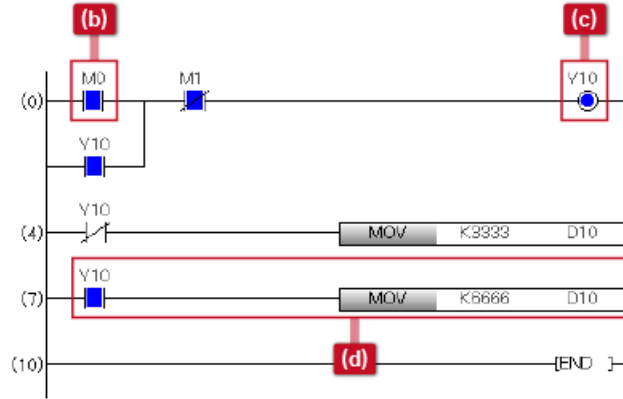
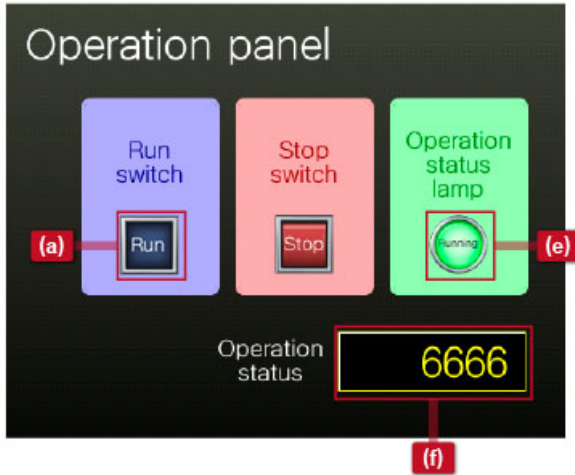
(b) PLC : The M0 device turns on.

(c) PLC : The Y10 device turns on.

(d) PLC : The D10 device stores a value "6666".

(e) GOT : Changes its display to the display and text of when the operation status lamp is in the ON state.

(f) GOT : Displays a value "6666" on the numerical display which represents the operation status with a numerical value.



(2) Touch the stop switch on the simulator, and (a) to (f) will occur in the GOT and the PLC being simulated.

(a) GOT : Changes its display to the display of when the stop switch is in the ON state.

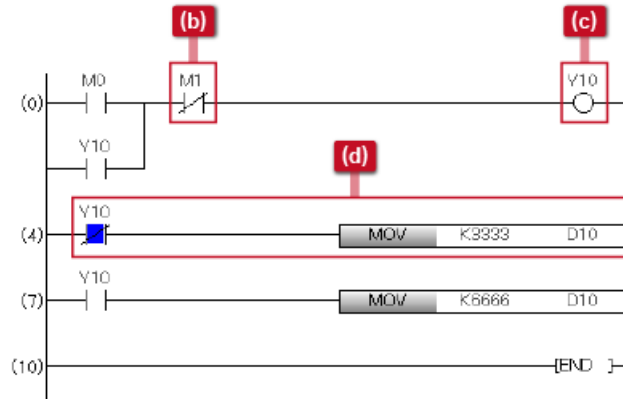
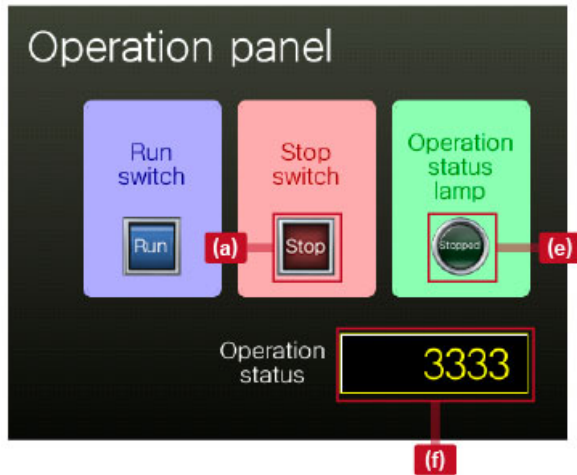
(b) PLC : The M1 device turns on. The input is a command of an NC contact in the sequence program; therefore, the input condition is unsatisfied.

(c) PLC : The Y10 device turns off.

(d) PLC : The D10 device stores a value "3333".

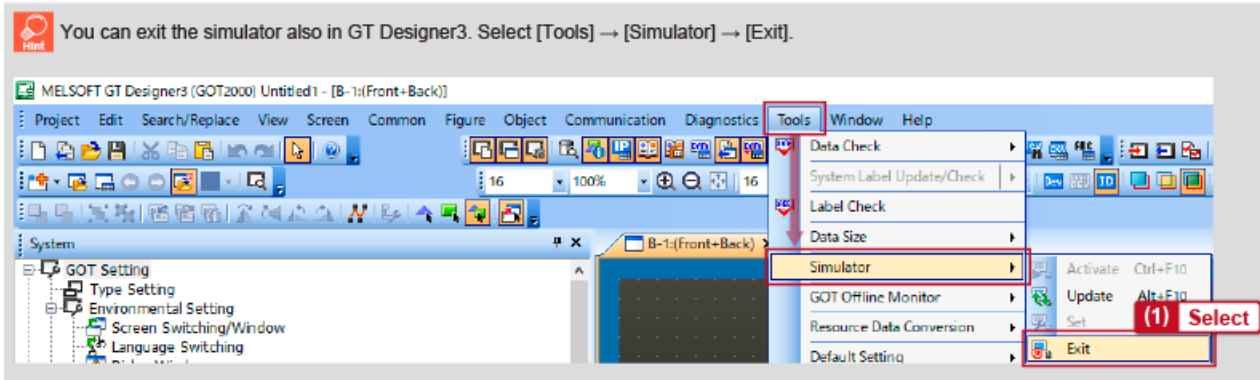
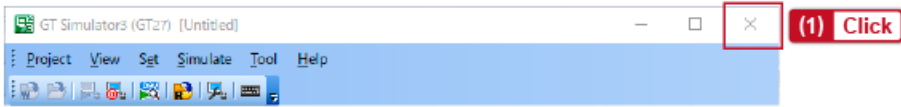
(e) GOT : Changes its display to the display and text of when the operation status lamp is in the OFF state.

(f) GOT : Displays a value "3333" on the numerical display which represents the operation status with a numerical value.



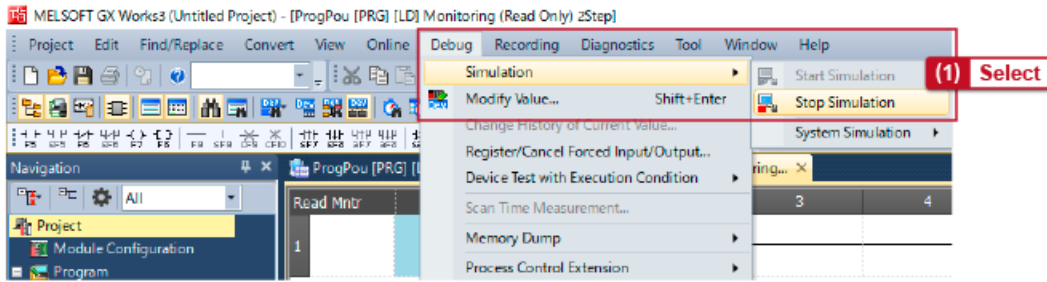
After the operation check, exit the GOT simulator (GT Simulator3).

(1) Click the [×] button.



Stop the PLC simulator (GX Simulator3).

(1) In GX Works3, select [Debug] → [Simulation] → [Stop Simulation] from the menu.



Hint If you stop GX Simulator3 before exiting GT Simulator3, a communication error occurs in GT Simulator3. Even so, you can exit the simulator normally.

Refers to software used to create screens for the Human Machine Interface (HMI) GOT2000 series.

Q1

GT Designer3

GT Simulator3

GX Works3

MT Works3

Refers to the software used to create sequence programs for the MELSEC iQ-R series PLCs.

Q1

GT Designer3

GT Simulator3

GX Works3

MT Works3

Refers to an object used to turn on or off the bit device of the relevant PLC on the GOT.

Q1

Bit switch

Word switch

Bit lamp

Numerical display

Refers to an object used to monitor the device value of the relevant PLC on the GOT.

Q1

Bit switch

Word switch

Bit lamp

Numerical display

There are four touch switch actions as shown below. Select the name of each action.

■[Q1]: Keeps the specified bit device on only while the switch is being touched. The device turns off when the touch is released.

■[Q2]: Reverses the status (ON \leftrightarrow OFF) of the specified bit device when the switch is touched.

Q1

Bit momentary



Q2

Bit alternate



Q3

Bit set



Q4

Bit reset



We will configure a simulation environment on a personal computer and simulate the operation on the GOT and the corresponding action of the PLC on the personal computer. We will perform a simulation using the GOT simulator [Q1] and the PLC simulator [Q2].

Q1

GT Simulator3



Q2

GX Simulator3



You have completed the Final Test. Your results are as follows.
To end the Final Test, proceed to the next page

	1	2	3	4	5	6	7	8	9	10
Final Test 1	✓									
Final Test 2	✓									
Final Test 3	✓									
Final Test 4	✓									
Final Test 5	✓	✓	✓	✓						
Final Test 6	✓	✓								

Total questions: **10**
Correct answers: **10**
Percentage: **100 %**

Clear

You have completed the **GT Works3 (GT Designer3) Basics (Elementary Screen Design (Simulator)) course.**

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course will be useful in the future.

You can review the course as many times as you want.

Review

Close