SiO-Programmer

PC Software for the SiO Controller

Instruction Manual

Rev. 3.10

For *SiO-Programmer* Ver. 3.10

SiO-Programmer License Agreement

Thank you for choosing ***SiO-Programmer***.

You must accept the following terms and conditions to use ***SiO-Programmer***, a software program developed by SUS Corporation (hereinafter referred to as "SUS"). If you do not accept these terms and conditions, please remove ***SiO-Programmer*** from your computer immediately.

1. This agreement comes into effect when you start using ***SiO-Programmer***.
2. The copyright on ***SiO-Programmer*** is held by SUS.
3. You are the only person entitled to use ***SiO-Programmer***. In addition, you may only use it for your own business purposes with SUS's ***SiO controller***.
4. No part of ***SiO-Programmer*** or the accompanying documentation may be reproduced, modified, or transcribed without the prior written consent of SUS.
5. SUS assumes no liability for the consequences of your use of ***SiO-Programmer*** (see "***SiO-Programmer*** Disclaimer"). No compensation may be claimed against SUS for any damage resulting from the use of ***SiO-Programmer***.
6. If you breach any of these terms, or if there are serious circumstances that make it difficult to continue this agreement, SUS may immediately terminate the license.
7. SUS may change the specifications of ***SiO-Programmer*** without prior notice. In addition, SUS does not provide any warranty for ***SiO-Programmer***.

SiO-Programmer Disclaimer

SUS shall not be liable for any problems with or damage to your computer, peripheral devices, data, or other property resulting from your use of ***SiO-Programmer***. Please be aware of this before using ***SiO-Programmer***.

Trademarks

1. The Windows logo is a registered trademark of Microsoft Corporation in the United States and other countries.
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Table of Contents

Introduction

SiO-Programmer is PC software that supports SUS Corporation's *SiO controller*.

SiO-Programmer allows you to write program data and parameters to the *SiO controller* easily and efficiently. You can also save your edited data to a file or print it.

You will find that this software makes the *SiO controller* easier to use.

This instruction manual covers *SiO-Programmer* version 3.00.
The version number of *SiO-Programmer* you are using can be found in the upper-left corner of the *SiO-Programmer* screen. (→ Page 13)
If you are using *SiO-Programmer* version 2.00 or earlier, refer to SiO-Programmer Instruction Manual Rev. 1.xx.

The information in this manual is subject to change without notice due to product improvement.
For the latest information, please visit our website at:
http://www.sus.co.jp/

Precautions for use

- Be sure to turn off the *SiO controller* before connecting a communication cable to or disconnecting it from your computer with *SiO-Programmer* installed.
- To transmit data between the *SiO controller* and your computer, use the USB cable specified by SUS.
- Do not turn off the *SiO controller* during data communication between the controller and your computer. Also, be sure to connect the USB cable securely to prevent it from coming off during data communication.
- If you are using a USB flash drive to save data, **do not unplug it while the software is running.**
- Do not press any button repeatedly fast when writing program data, forcing output via the I/O monitor, or performing other tasks. Doing so may stop the communication.

Overview

Here is a brief overview of the features supported by *SiO-Programmer*:

◆Editing programs

You can edit program data.
Your edited data can be saved to a file or printed.

In addition, the data can be read, written, or collated via communication.

◆Setting parameters

You can edit the maximum values of hardware timers, ON/OFF cycle settings, and other parameters.

◆Monitoring

You can monitor the I/O status. The output status can be forced on or off.
In addition, changes in the I/O status can be saved to a CSV file.

◆Simulator

The program data you enter can be simulated on your computer.
The simulator allows you to check inputs and outputs before connecting your computer to the SiO controller.

System requirements

The following environment is required to run *SiO-Programmer*.

◆ Supported computer models

This software has been verified to run on computers installed with any of the following operating systems:

Windows 7 (32/64-bit version)
Windows 8 (32/64-bit version)
Windows 8.1 (32/64-bit version)
Windows 10 (32/64-bit version)

*: Even on these operating systems, ***SiO-Programmer*** may not work properly, depending on your computer model.

◆ CPU and memory

800 MHz or faster CPU, 512 MB or more of system memory recommended
512 MB or more of extended memory recommended

◆ Hard disk space

10 MB or more of free space

◆ Display

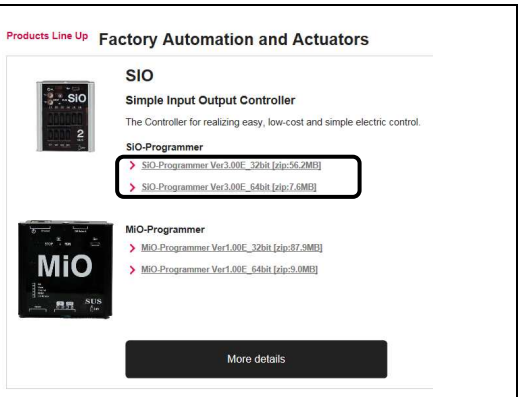
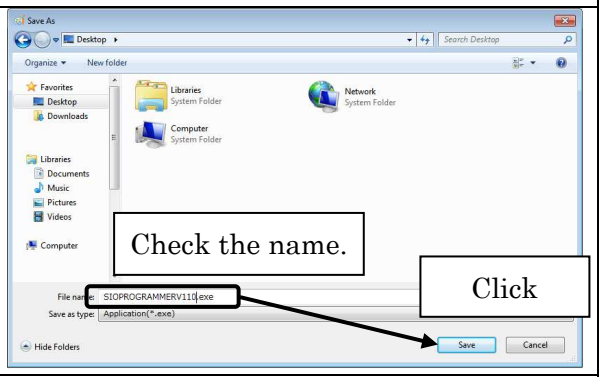
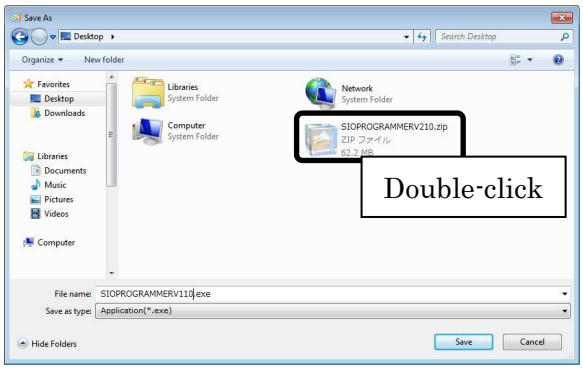
Resolution: 1280 × 768 or more
Colors: 256 or more

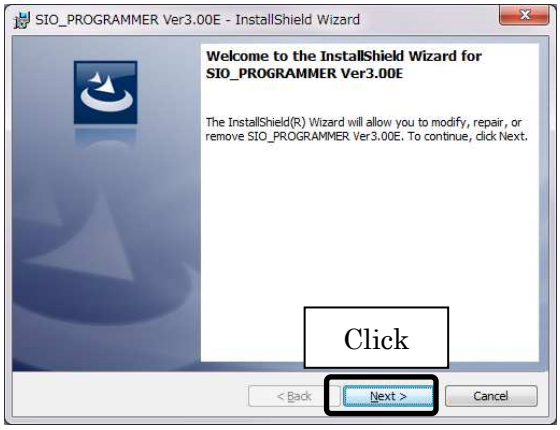
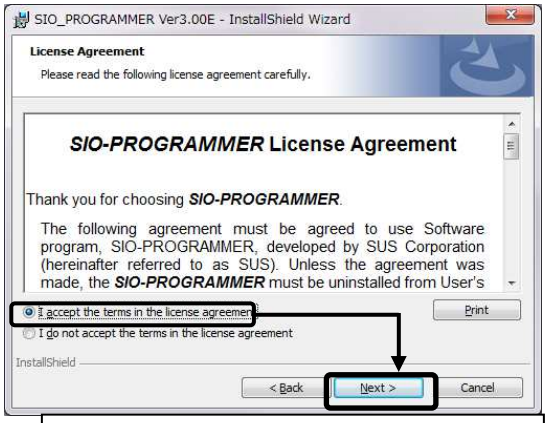
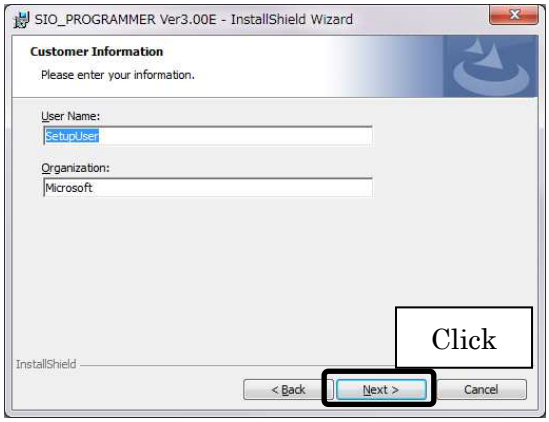
◆ Other

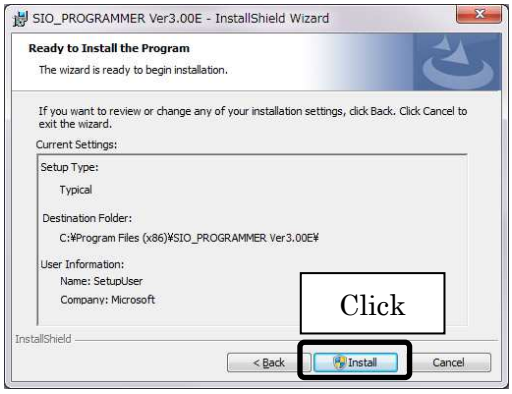
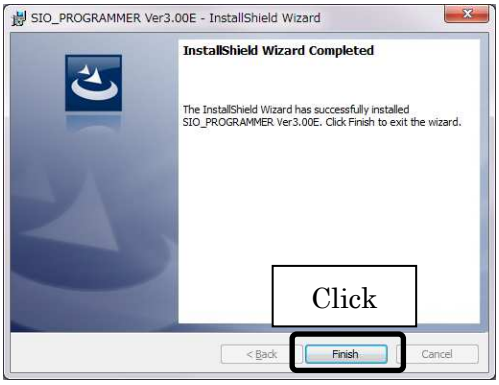
USB 2.0 port

Installing SiO-Programmer

You need to install ***SiO-Programmer*** on your computer's hard disk before you can use it.
Quit all other applications before installing SiO-Programmer.
If your computer already has ***SiO-Programmer*** **version 2.xx**, you can update it simply by running Setup.exe.
Here is how to install ***SiO-Programmer***:

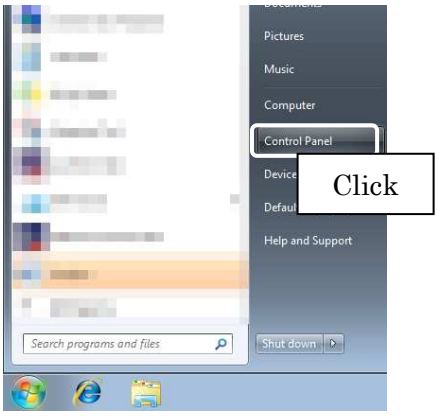
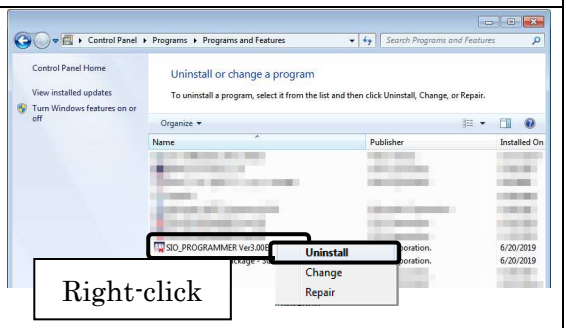
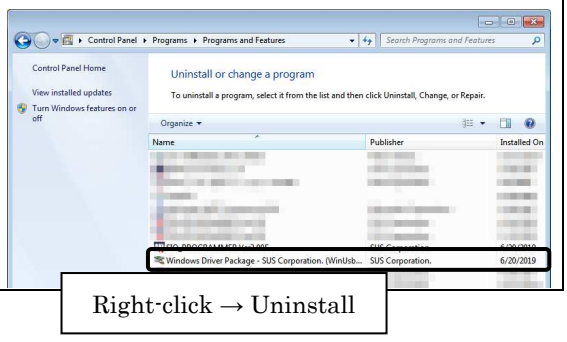
1	Download (and save) the ***SiO-Programmer*** setup program to your computer. A zipped file for download is available. The file name is **"SiO-Programmer_###E.zip".** * The "###" represents the version number.	
2	Specify a folder into which to download the file. Click the **[Save]** button to save the file.	
3	Open My Computer or Explorer to navigate to the file you downloaded (and saved) from our website, and then double-click it. When you double-click the file, you are prompted to specify the folder where you want to unzip the file.	
4	Double-click "**setup.exe**" to start installation.	

5	When the setup wizard appears, click the **[Next]** button.	
6	**Read the *SiO-Programmer* license agreement and accept the terms and conditions.** Then click **[Next]**. * If you do not accept the terms and conditions, you cannot proceed with the installation.	 Accept the terms and conditions, and then click the **[Next]** button.
7	Enter your user name and organization name, and then click the **[Next]** button.	
	By default, a folder named "SIO_PROGRAMMER###" is created in the "Program Files" folder as the installation location, where the program is installed. To use the default folder, click the **[Next]** button. To use a different folder, click the **[Change]** button and specify the desired folder. * The "###" represents the version number.	

8	Verify that the installation location and the user and organization (company) names you entered are correct. Then click the **[Install]** button.	
9	The Device Driver Installation Wizard appears. Click **[Next]**.	
10	When a dialog box like the one shown on the right appears, click **[Install]**.	
11	When the device driver has been installed, click **[Finish]**.	
	The SiO-Programmer installation wizard switches to the Installation Complete window. Click **[Finish]**.	

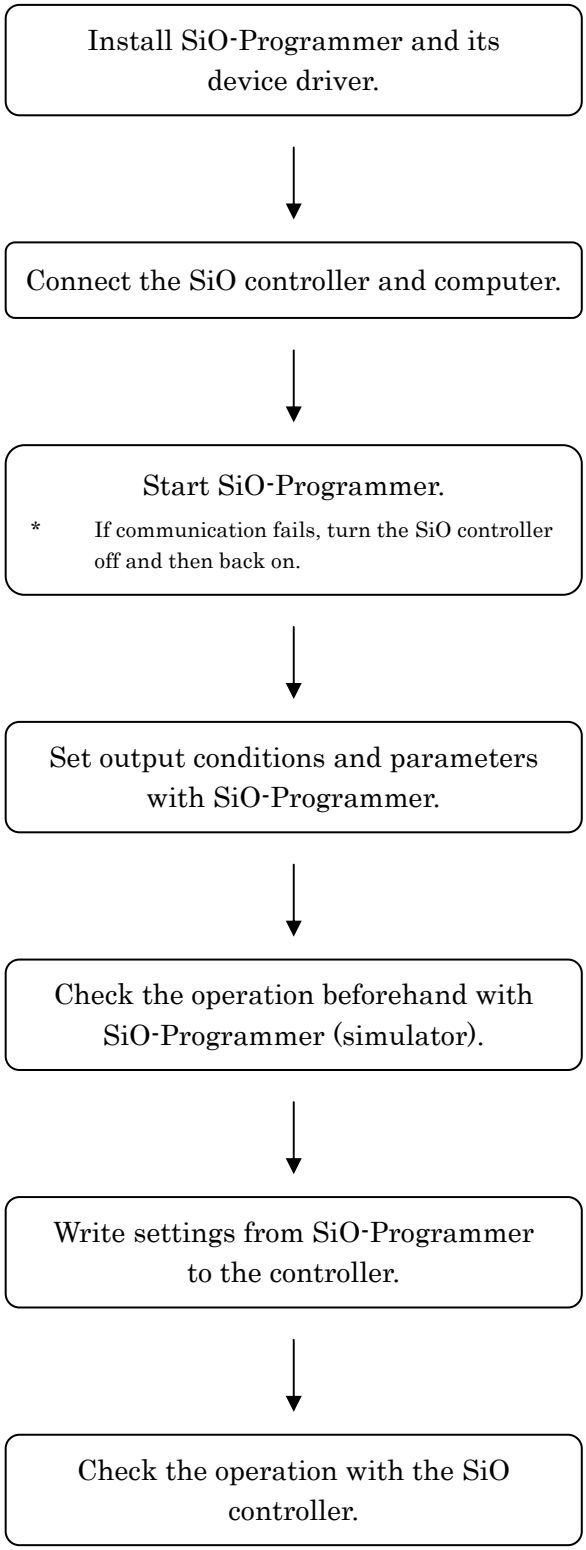
Uninstalling SiO-Programmer

The process of removing files and other data from a computer's hard disk is called uninstallation. Here is how to uninstall ***SiO-Programmer*** from your computer's hard disk:

1	Click the Start button > [Control Panel] to open the Control Panel.	
2	Click **[Uninstall a program]**.	
3	Select "***SiO-Programmer***", right-click it, and then select **[Uninstall]**.	
4	Uninstall the device driver. To do so, select "***Windows Driver Package - SUS Corporation. (WinUSB) SiOController***", right-click it, and then select **[Uninstall]**. * If the above driver is not displayed and "***Windows Driver Package D:Frontia (WinUSB) USBTMCd***" exists, uninstall this driver instead.	

Setting up the SiO controller

Follow the steps below to set up the SiO controller.



Connecting a USB cable

Computer side

Install SiO-Programmer and its software driver before connecting the controller to your computer. (→ Page 7)
After installing them, connect the Type A connector of the USB cable to the USB port on your computer.

* Only one SiO controller can be used with one computer.

Controller side

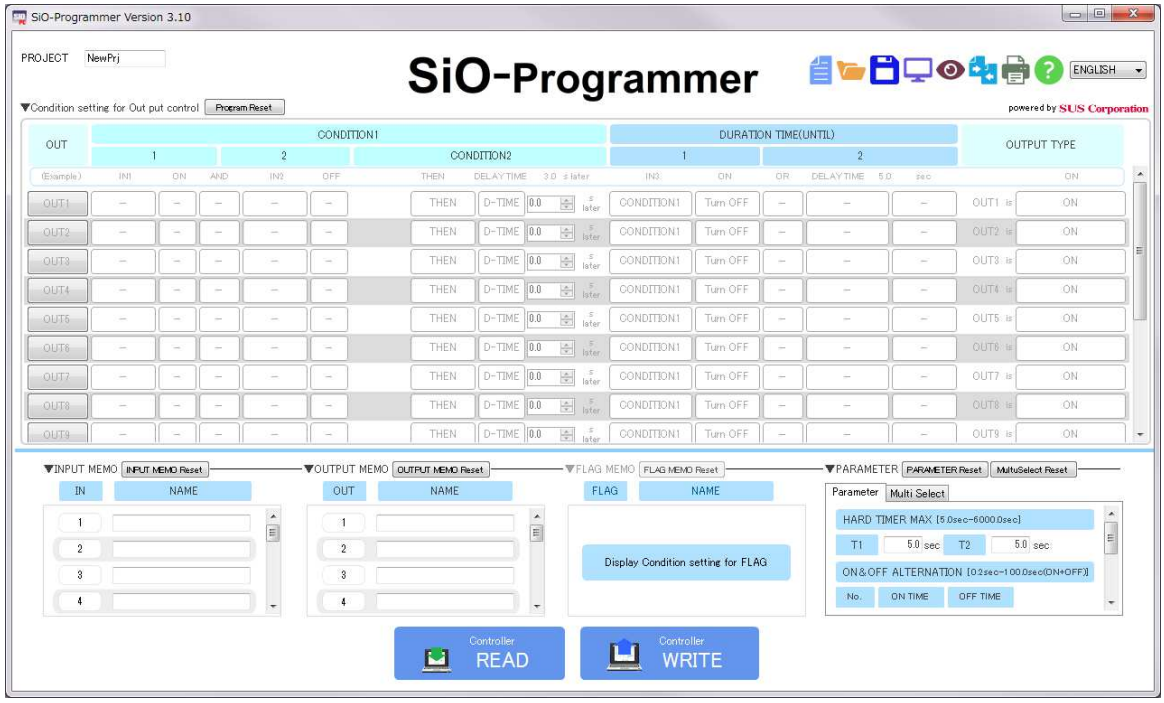
Connect the micro-USB connector of the USB cable to the SiO controller.
Be sure to gently insert the connector while holding the controller with your hand.

If the cable is connected correctly, the device driver is installed properly, making your computer and the controller ready to communicate with each other.

Starting SiO-Programmer

Once the installation is complete, a shortcut icon for ***SiO-Programmer*** is created in the Start menu. Click the icon to start ***SiO-Programmer***.

If you used the default folder during installation, the icon is stored in the following location:
[Start Menu] > [Programs] > [SIO_PROGRAMMER]



Program Window

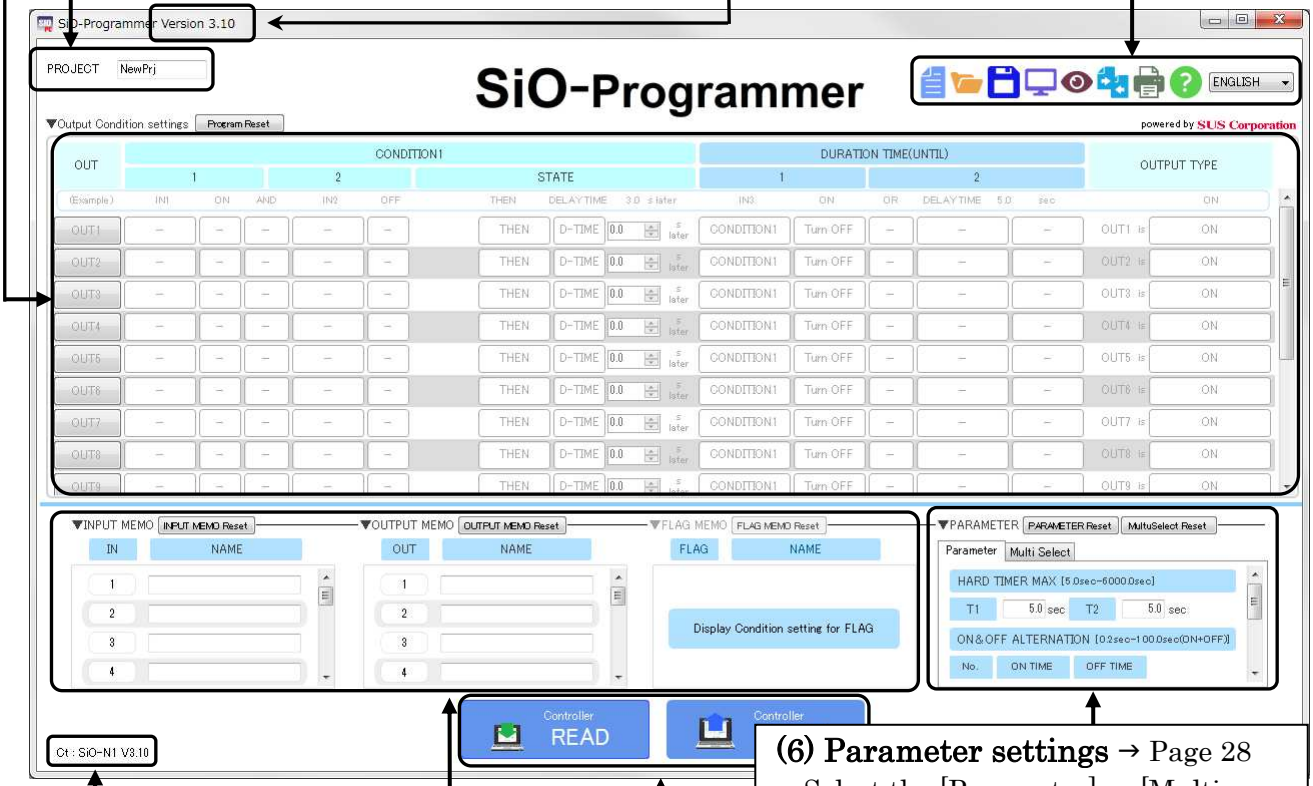
- This section shows the names of the screen elements and describes their functions.

(1) Output condition settings → Page 19
Specify input, time, and output settings to set up the SiO controller. The [Reset Program] button allows you to reset only the program.

(3) Tool icons → Page 16
These icons allow you to compare data, use the I/O monitor, save configuration files, and perform other tasks.

(2) Project name
A project name is a comment you can save to the controller. The name can contain up to eight alphanumeric characters.

(4) Version number
Indicates the version number of SiO-Programmer.



(6) Parameter settings → Page 28
Select the [Paramater] or [Multi Select] tab.

(8) CT version number
Indicates the version number of the controller used for communication.

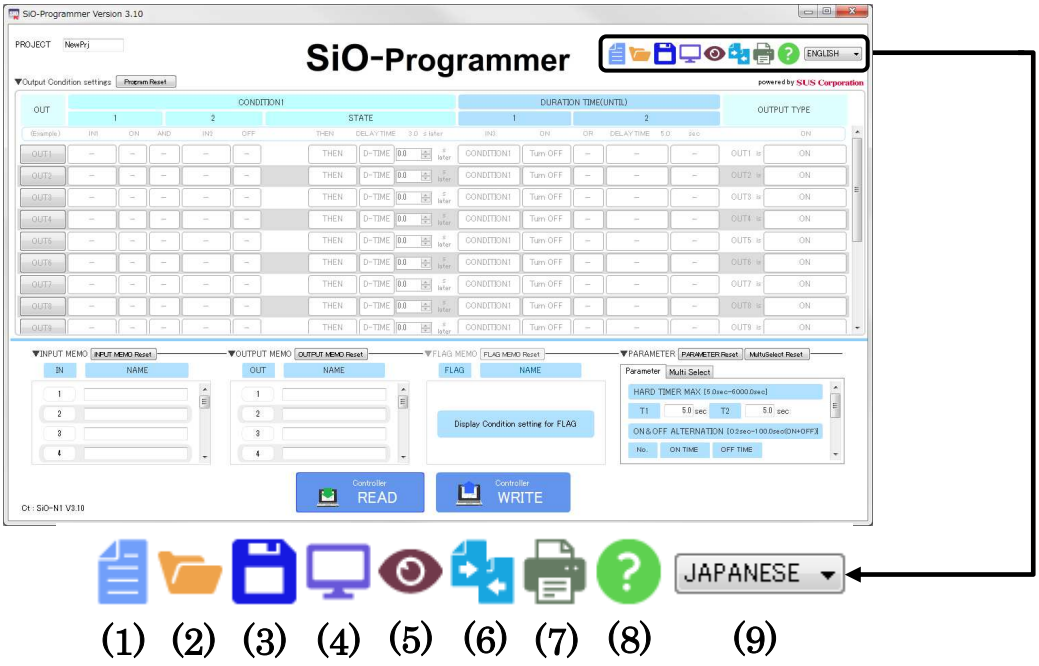
(7) [Read] and [Write] buttons
Use these buttons to read settings from or write them to the controller.

(5) Notes → Page 27
The note fields allow you to take notes about inputs and outputs. (You can enter notes for multiple-selection conditions in the [PARAMETER] area.) The notes you enter here are reflected in the program, I/O monitor, and simulator windows. A note can contain up to 16 alphanumeric characters or up to nine double-byte characters. → Pages 33 and 35

* **Notes will not be saved to the controller. You need to save notes to an sio file.** → Page 16

* **The note fields for internal outputs are hidden when you start creating a program. Click the [Display Condition ...] button to enter notes for inputs and select FLAGs in the [Output condition settings] area.**

Tool Icons



(1) New

Discards the current program, notes, parameters, and other settings, and restores the default settings.

It is recommended to save your settings to a file before clicking this icon, as discarded settings cannot be restored.

(2) Open

Opens a saved configuration file. Selecting a configuration data file (*.sio) reflects the settings saved in the file on the window.

* You can also open an SiO file by dragging and dropping it.
* An SiO file saved in a different version of SiO-Programmer may not open.
  See page 18 for more details.

(3) Save

Saves the current settings. The extension of the configuration file is ".sio".

If you name the file "sample", it is saved under the name "sample.sio".

(4) Simulator

Starts the simulator (→ Page 35).

The simulator allows you to check how the program you created works.

* You can use the simulator without connecting your computer and the SiO controller.

(5) I/O monitor

Starts the I/O monitor (→Page 33).

You can check the I/O status and switch the output status on or off.

In addition, changes in the I/O status can be saved to a CSV file.

* To use the I/O monitor, you need to connect your computer and the SiO controller.

(6) Compare 

Compares the current settings in SiO-Programmer with the settings on the connected SiO controller or in an sio data file.

Any differences are highlighted in red.

* To compare the current settings with the settings on the SiO controller, connect your computer and the controller to allow communication between them.

(7) Print 

Prints the settings window.

(8) Help 

Displays this manual in PDF format. To view the manual, you must have Adobe Reader installed on your computer. Install it if necessary.

(9) Language selection 

Change the language as needed. Japanese and English are supported.

SiO Controller/SiO-Programmer Compatibility Table

■ How to check the version of the SiO controller ■

The version of the SiO controller can be found on the back of the controller.

Note that the version of SiO-Programmer you can use differs depending on the controller to be used.

		SiO-C Controller			SiO2, SiO3, and SiO-N1 Controllers	
		Ver1.xx	Ver2.xx	Ver3.xx	Ver1.xx	Ver3.xx
SiO-Programmer	Ver1.xx	○	×	×	×	×
	Ver2.00-2.50	×	○	×	○	×
	Ver2.60	×	○	×	○	×
	Ver3.xx	×	○	○	○	○

Compatibility of saved files between different versions of SiO-Programmer

Note that you cannot open saved files depending on the version of SiO-Programmer you are using, as shown below.

SiO-Programmer		Version that was used to create data files			
		Ver1.xx	Ver2.00-2.10	Ver2.20-2.60	Ver3.xx
Your version	Ver1.xx	○	×	×	×
	Ver2.00-2.10	○	○	×	×
	Ver2.20-2.60	○	○	○	×
	Ver3.xx	○	○	○	○

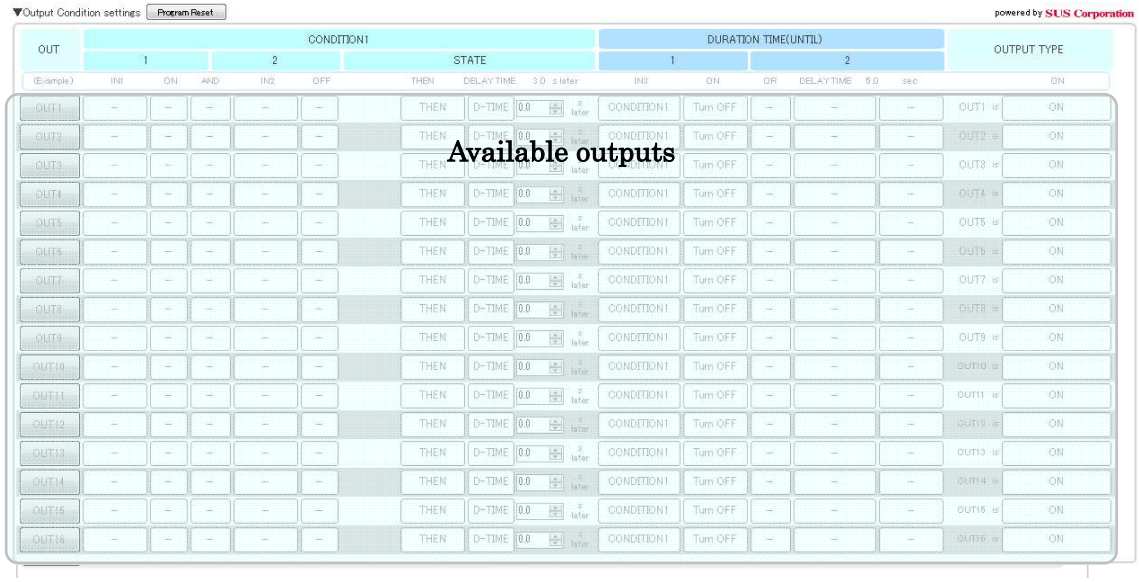
Editing Data

Window for creating programs

The [Output condition settings] area allows you to program the SiO controller.
You can read program data from a file or the controller as well as create it.

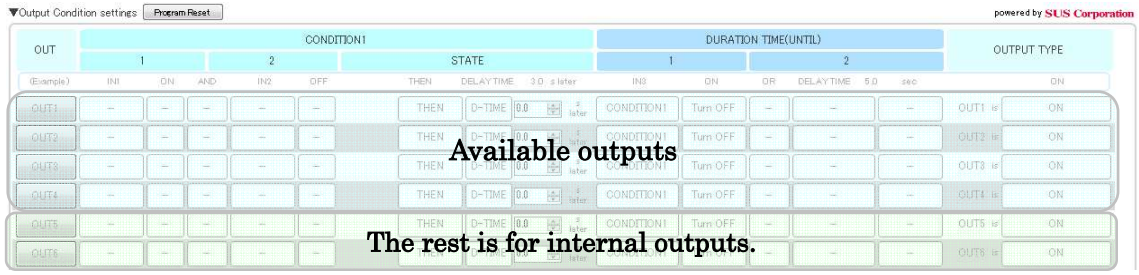
The number of available outputs varies depending on the controller model.

・ SiO3: 16 outputs



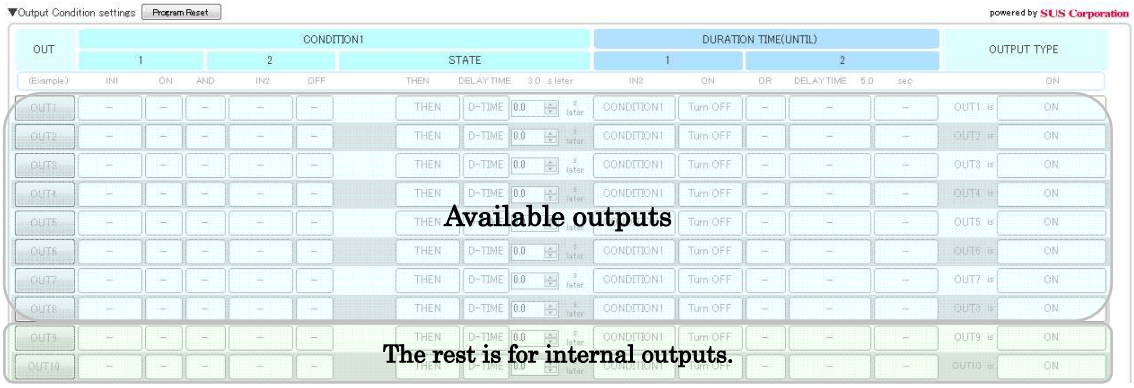
⋮

・ SiO2: 4 outputs



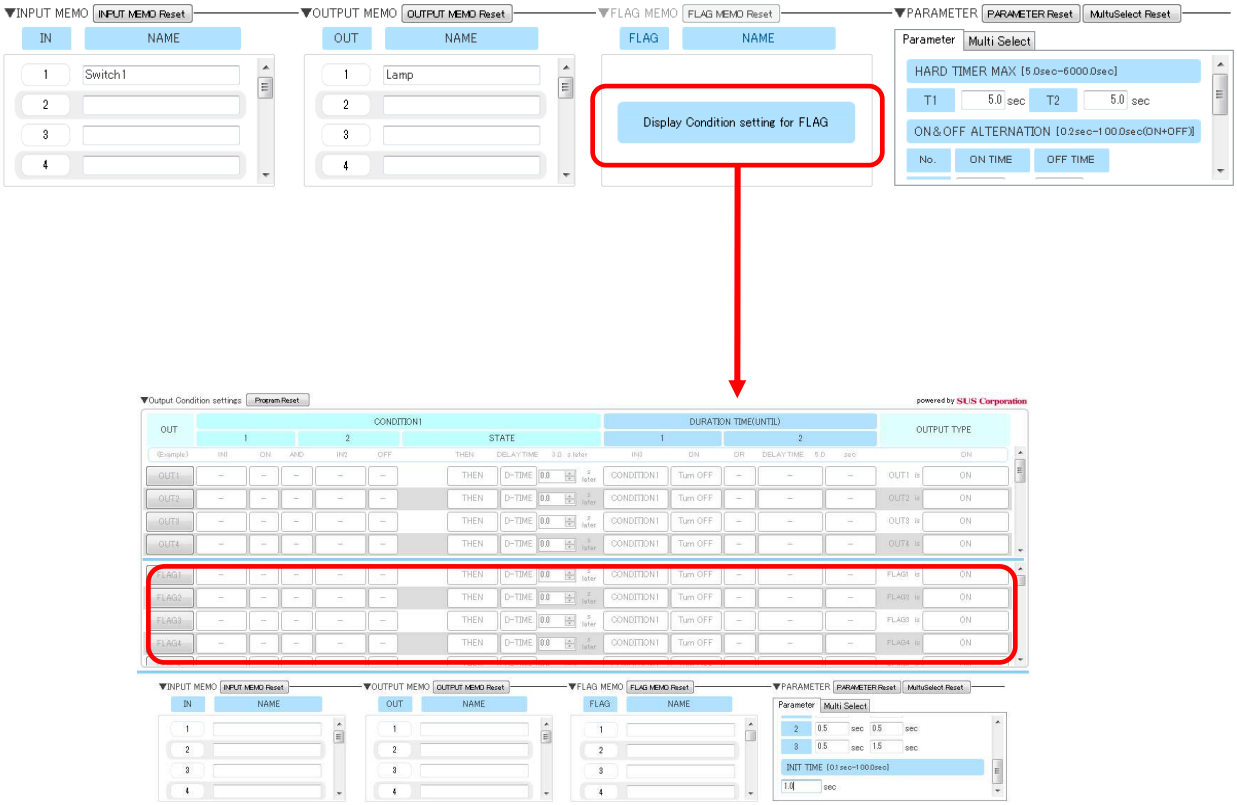
⋮

・ SiO-C/SiO-N1: 8 outputs

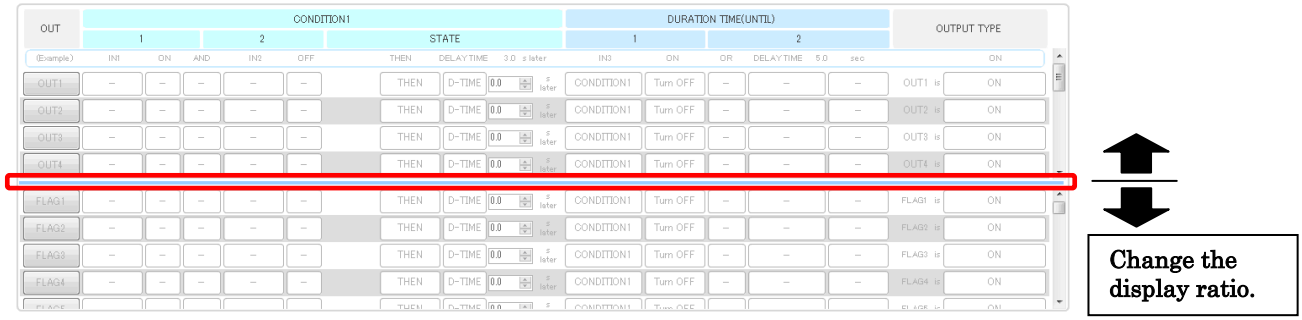


⋮

The outputs listed below the available outputs can be used as internal outputs. (→ Page 32) FLAG1 to FLAG48 are used specifically for internal output. Once you click the button in the [FLAG MEMO] area, you can enter notes for internal outputs and set output conditions for FLAG1 to FLAG48.



You can change the display ratio between the OUT pane (OUT1 to OUT16) and FLAG pane (FLAG1 to FLAG48) by dragging the blue bar between the two panes up or down.

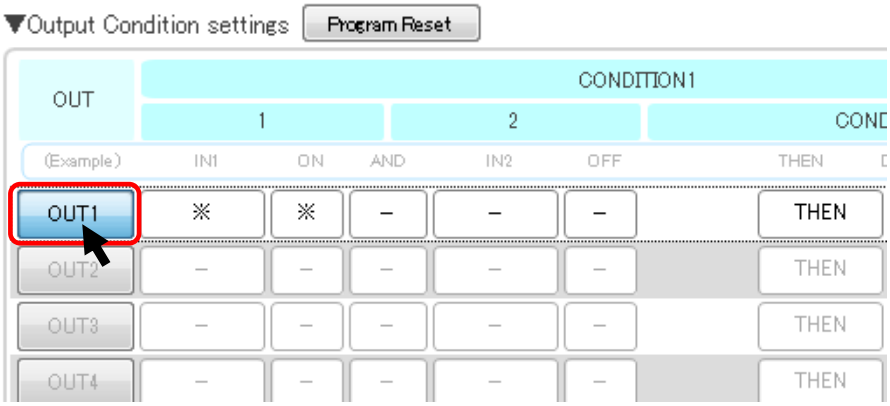


Creating an I/O program

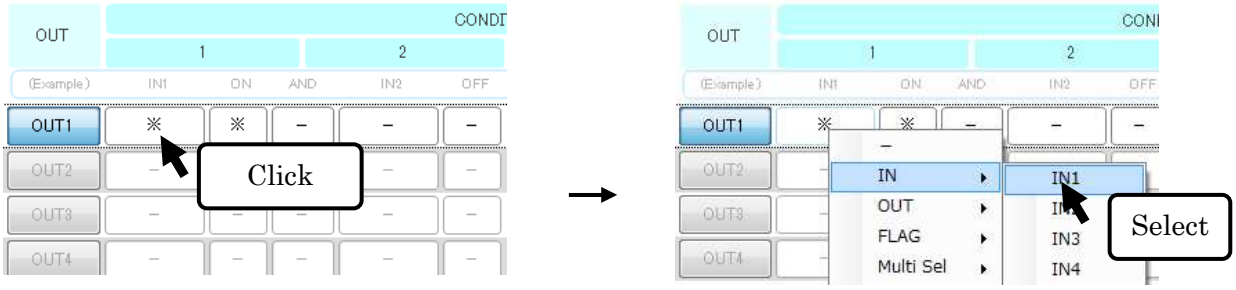
1. Click the desired numbered output button to enable it.

   Doing so turns the button blue and allows you to edit the output settings for the selected number.

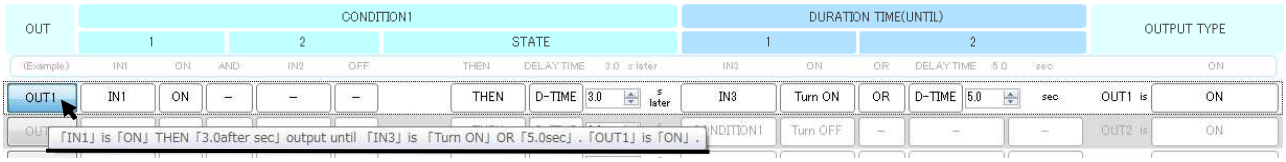
   * **The outputs that have not been clicked (OUT2 and subsequent outputs, shown below) are dimmed.**
   These outputs are disabled and do not work, although their settings can be written to the controller.



2. Set each item.

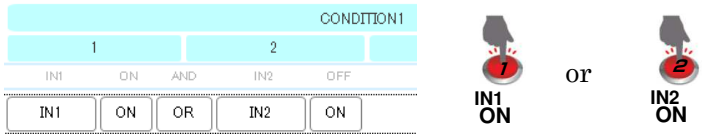
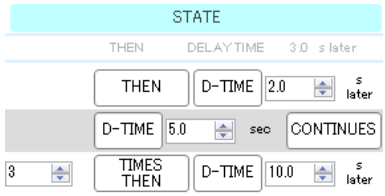


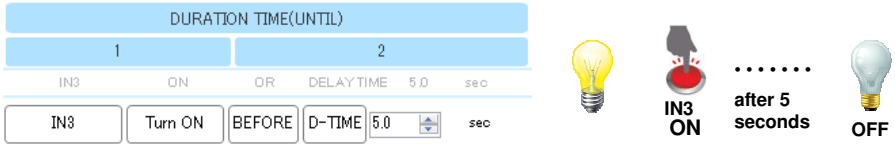
* **Position the cursor over the desired numbered output button to see a sentence that describes the settings.**



Specify settings for each output. For more details, see **"Details of each item"** (→ Page 22).

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>OUT</td><td>Indicates the destination to which a signal is output when set conditions are met.
For OUT1, you can specify settings for output 1.</td></tr>
<tr><td>CONDITION1

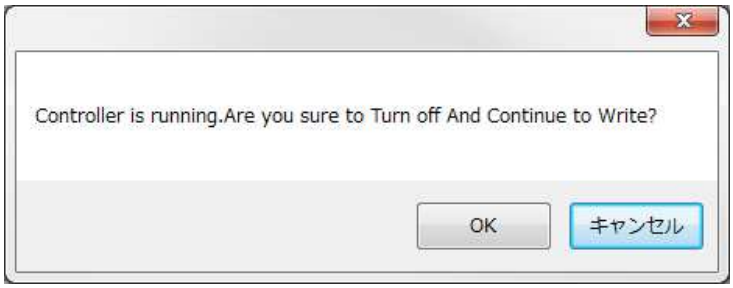
(1 and 2)</td><td>Specify conditions for enabling output.
You can set two conditions and associate them using the [And] or [Or] option. If you want to set only one condition, select "–" for the third to fifth buttons.
Example: To enable output when IN1 (input 1) or IN2 (input 2) turns on
 
</td></tr>
<tr><td rowspan="4">STATE</td><td>Specify the state after which to enable output if the ON conditions are met.
Select [THEN], [CONTINUES], or [TIMES THEN], and specify the time period after which to enable output.
For [CONTINUES], set the number of counts as well.
* The count value will be reset when the OFF conditions are met.
 
</td></tr>
<tr><td>THEN | TIMES THEN</td><td>CONTINUES</td></tr>
<tr><td>Specify how long to wait before output is enabled after the conditions are met.
Example 1: "0.0" → Enables output at the moment the conditions are met.
Example 2: "2.0" → Enables output 2 seconds after the conditions are met.</td><td>This is a condition for turning on output. Specify how long the conditions should be met before output is enabled.
Example: "3.0" → Enables output if the conditions are met for 3.0 seconds.</td></tr>
<tr><td colspan="2">* You can set values D-Times or via hardware timers T1 and T2.
→ See "Timer settings" on page 25.</td></tr>
<tr><td>DURATION TIMES (UNTIL)

(1 and 2)</td><td>Set conditions for turning off the output that was enabled when the conditions set above were met.
You can set two conditions and associate them using the [And], [Or], or [Before] option.
If you want to set only one condition, select "–" for the third to fifth buttons.
* If you specify how long to wait before output is turned off ([Before]), you cannot select [And] to combine two conditions.
Example: To turn off output 5 seconds after IN3 turns on
 
</td></tr>
<tr><td>OUTPUT TYPE</td><td>Set the type of output. For ON/OFF cycles, you can select from three options.</td></tr>
</table>

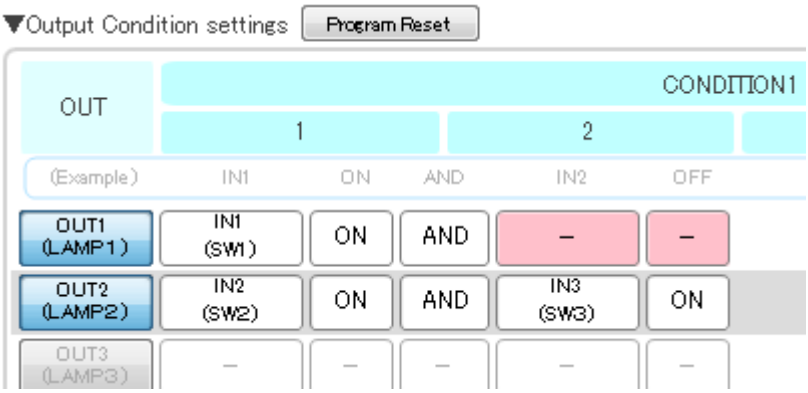
3. Write the settings to the controller.

   If not, the settings will not be applied to the controller.

   * **Make sure that the controller is in the STOP state before writing the settings to the controller.**
   If the controller is in the RUN state, a message like the one shown below appears.
   Click the [OK] button to force the controller off to start writing.



   If there are invalid settings, a window like the one shown below appears.
   Check and correct the invalid output condition settings, which are highlighted in red.



Details of each item

This section details the items you can select in the program window.

(1) CONDITION1

ON conditions are used to turn on output. When set conditions are met, the output turns on. You can specify two conditions. You can set three or more conditions by using the multiple selection option (→ Page 28) or by specifying an unused output or internal output as a condition. (→ Page 32)

Item	Description
RUN	Indicates that the controller is in the RUN state. If you select [RUN] and [ON], this condition is always met when the controller is used. Do not select [RUN] and [OFF], as this will disable output.
INIT	This signal stays on for a specified number of seconds after the controller goes into the RUN state. You can set the number of seconds in the [PARAMETER] area. See page 27 for more details. [INIT] + [ON]: Turns on output when the controller goes into the RUN state, and turns off output after a specified number of seconds. [INIT] + [OFF]: Turns off output when the controller goes into the RUN state, and turns on output after a specified number of seconds.
IN1 to IN16 OUT1 to OUT16 FLAG1 to FLAG48	Set conditions using [IN] (input), [OUT] (output), and [FLAG] (internal output). [IN1] + [ON]: Enables output when IN1 turns on. [OUT1] + [ON]: Enables output when OUT1 turns on. [FLAG1] + [ON]: Enables output when FLAG1 turns on.
Multi sel	Allows you to group multiple inputs and outputs into one condition. You can configure settings for the multiple selection option in the [PARAMETER] area (→ Page 28).
AND OR	Used to specify a second condition. [And] enables output when both the first and second conditions are met. [Or] enables output when either the first or second condition is met.

(2) STATE

The [STATE] area allows you to set a time period as a condition or specify how long to wait before the operation starts.

Item	Description
THEN	Specify how long to wait from the moment the ON conditions are met until output is enabled. Once the conditions are met, the output stays on even if the conditions are no longer met during the wait time. You can specify up to 6,000.0 seconds.
CONTINUES	Selecting this option enables output only when the ON conditions are met for a certain period of time. You can specify up to 6,000.0 seconds.
TIMES THEN	This option enables output when the ON conditions are met a specified number of times. Set the number of counts and specify how long to wait before output is enabled after the set count is reached. The count is incremented **each time the ON conditions are met**. You can specify up to 50,000 times. Example: If the ON condition is [IN1] + [ON], and when IN1 turns on, off, and then back on, the number of counts is two. The count is reset when the OFF conditions are met. If you select [CONDITION1] + [OFF] as an OFF condition, the count is reset and output is disabled.

(3) DURATION TIMES(UNTIL)

Specify conditions for turning off the output set in the [OUTPUT TYPE] area. You can specify two OFF conditions.

You can set three or more conditions by using the multiple selection option (→ Page 28) or by specifying an unused output or internal output as a condition. (→ Page 32)

Item	Description
CONDITION1	Indicates the conditions set in the [CONDITION1] area. Selecting [CONDITION1] + [OFF] disables output when the ON conditions are no longer met. If you select [CONDITION1] + [ON], output is not enabled even if the ON conditions are met.
D-Time	Dalay Time.Turns off output when a specified time period has elapsed after output is enabled. You can enter a value directly. You can specify up to 6,000.0 seconds.
T1, T2	Turns off output when a specified time period has elapsed after output is enabled. You can set hardware timers. (→ Page 25)

RUN	Indicates that the controller is in the RUN state. If you specify [RUN] and [OFF] and once output is enabled, it continues until the RUN switch on the controller is turned off. Note that if you set [RUN] to [ON], no output occurs.
IN1 to IN16 OUT1 to OUT16 FLAG1 to FLAG48	Set conditions using [IN] (input), [OUT] (output), and [FLAG] (internal output). Selecting [IN1] + [ON] turns off output when IN1 turns on. Selecting [OUT1] + [ON] turns off output when OUT1 turns on. Selecting [FLAG1] + [ON] turns off output when FLAG1 turns on.
Multi sel	Allows you to group multiple inputs and outputs into one condition. You can configure settings for the multiple selection option in the [PARAMETER] area (→ Page 27).
AND OR AFTER	Used to specify a second condition. [AND] disables output when both the first and second conditions are met. [OR] disables output when either the first or second condition is met. [BEFORE] disables output when the first condition is met and then the second condition is met. * If you select [AND], you cannot specify [D-TIME], [T1], or [T2].

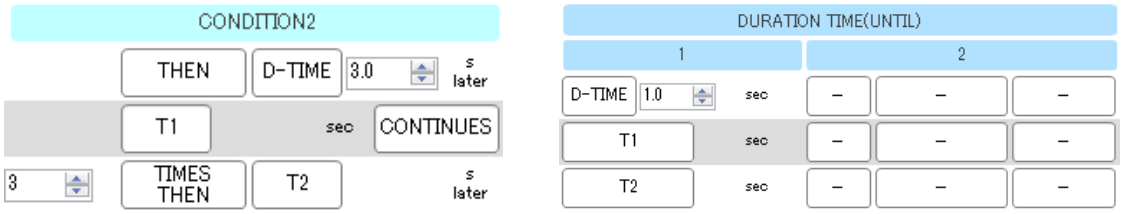
(4) OUTPUT TYPE

You can set the type of output.

Item	Description
ON	Causes the output to stay on. A light would stay lit.
ONOFF ALT	Turns output on and off alternately. A light would blink. You can specify three ON/OFF cycle settings and can change the ON and OFF time periods in the [PARAMETER] area.

Timer settings

When setting a timer in the [STATE] or [DURATION TIMES(UNTIL)] area, you can choose to enter D-TIME or use a hardware timer.



1. D-TIME(Dalay Time)

   Enter a time period directly. You can specify up to 6,000.0 seconds in 0.1-second increments.

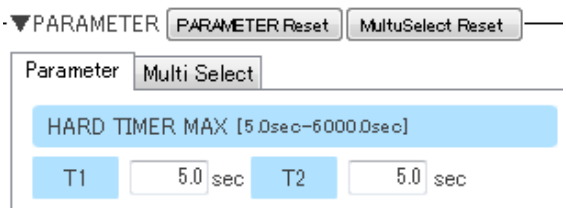
2. Hardware timers

   [T1] and [T2] indicate that the hardware timers are being used. These timers are especially useful when the same value is used repeatedly or if you may need to change timer settings without using the computer.

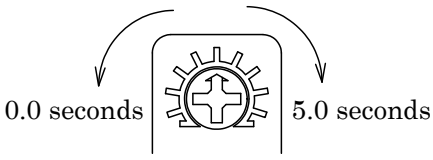
   The maximum values of the hardware timers can be set as that for the analog timers on the controller. You can set the maximum values of the hardware timers in the [HARD TIMER MAX] area in the PC software. You can specify maximum values from 5.0 and 6000.0 seconds in 0.1-second increments.

   Once you enter maximum values, set the analog timers relative to the maximum values.

Example



(1) Set the maximum values of the hardware timers to 5.0 seconds.

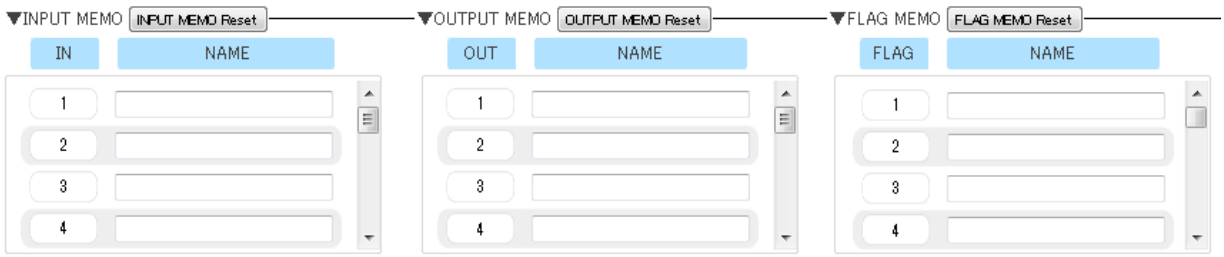


(2) Set the analog timers with a maximum of 5.0 seconds.

* **Timer settings are accurate to within ±0.1% of actual time.**

I/O notes

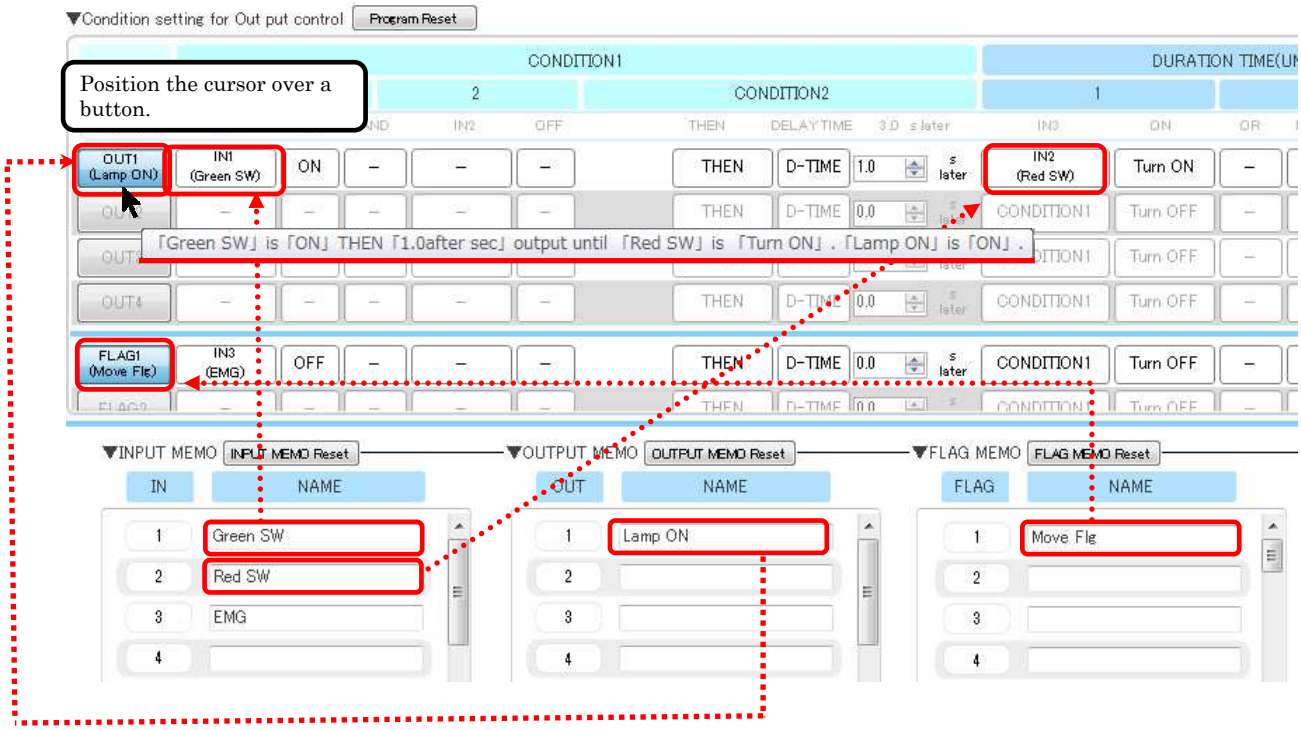
I/O notes help you create a program by giving you an idea of how input and output devices will operate.



I/O notes can contain up to nine full-width characters or 16 alphanumeric characters.

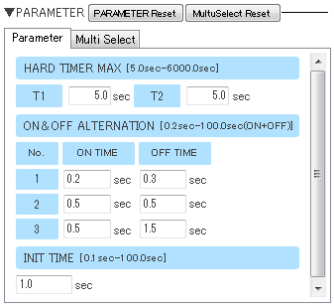
Enter the names of the input and output devices that are actually connected, and you will see those names in messages (displayed when you position the mouse cursor over output buttons) and on items set in the program window. This allows you to check how the devices operate.

The notes you enter are also reflected in the I/O monitor and simulator windows.

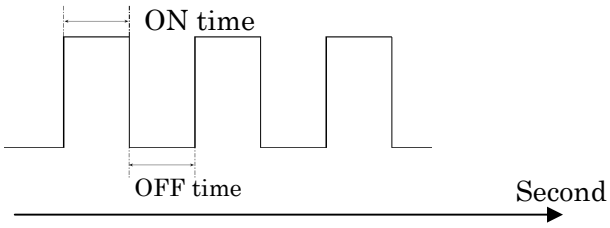
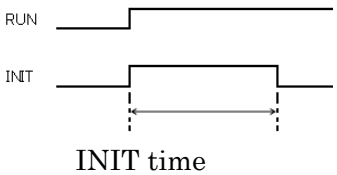


Parameter settings

The [Parameter settings] area allows you to change parameters or set multiple selections.



◆ Parameters

Item	Description
HARD TIMER MAX	Set the maximum values of the hardware timers. See page 25 for details on the hardware timers. You can specify maximum values from 5.0 to 6000.0 seconds separately for T1 and T2.
ON/OFF ALTERNATION	These settings are related to [ONOFF ALT No. 1], [ONOFF ALT No. 2], and [ONOFF ALT No. 3] in the [OUTPUT TYPE] area of the program window. You can set when to switch the output on and off alternately. ON TIME: The time period during which the output is ON. Specify a value from 0.1 to 99.9 seconds. OFF TIME: The time period during which the output is OFF. Specify a value from 0.1 to 99.9 seconds. Make sure that the total time (ON time + OFF time) is in the range of 0.2 to 100.0 seconds. You cannot set values outside this range. 
INIT TIME	This is the time period for the [INIT] option, which can be used in the [CONDITION1] area of the program window. When you put the controller into the RUN state, the INIT signal turns on internally, and then turns off after a specified number of seconds. You can use the INIT signal to enable output for a certain number of seconds after the controller enters the RUN state. This option is useful when you want to reset all settings or perform origin return of all output devices at once. 

◆ Multi Sel(Multiple selections)

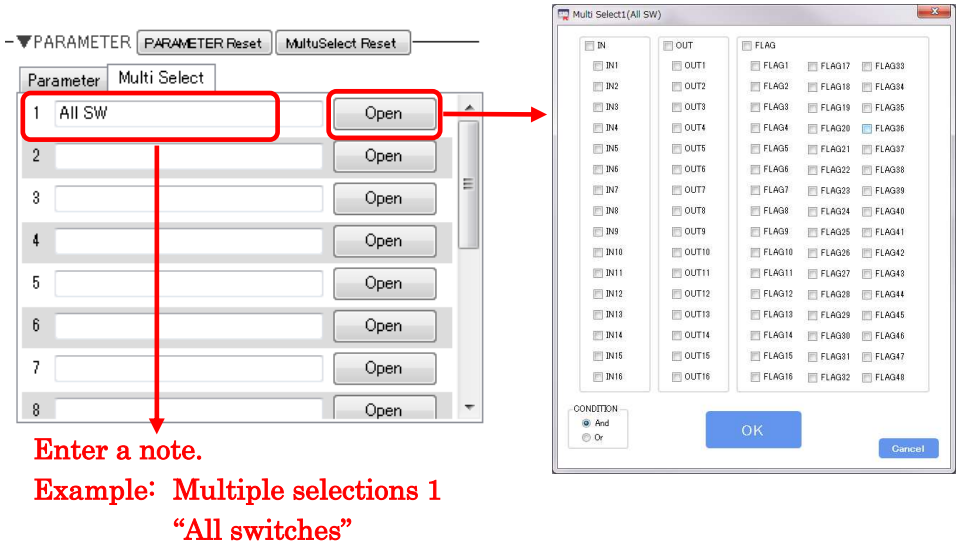
You can display multiple-selection conditions by selecting the [Multi Sel] tab in the [PARAMETER] area.

The multiple selection option allows you to group multiple inputs and outputs.

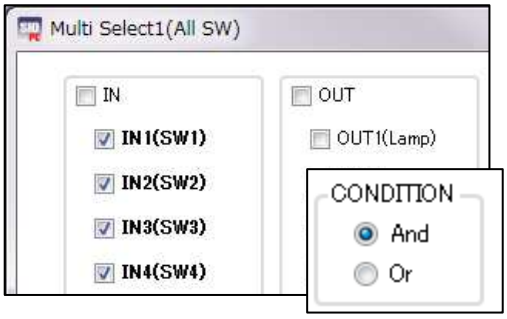
Although you can only specify up to two I/O devices as ON or OFF conditions, this option enables you to use multiple inputs and outputs as one condition.

You can create 16 multiple-selection conditions.

Clicking [Open] opens a separate window where you can configure settings.

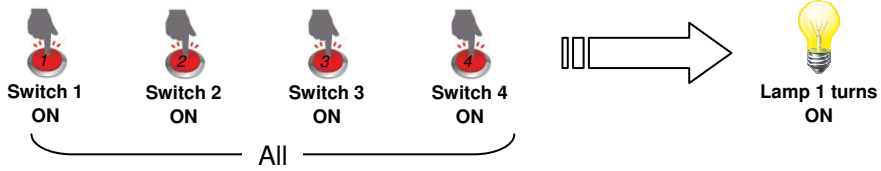


Example: In the [Multi select 1] window, select the [IN1] (switch 1) to [IN4] (switch 4) check boxes and select [And].



Create the following program:

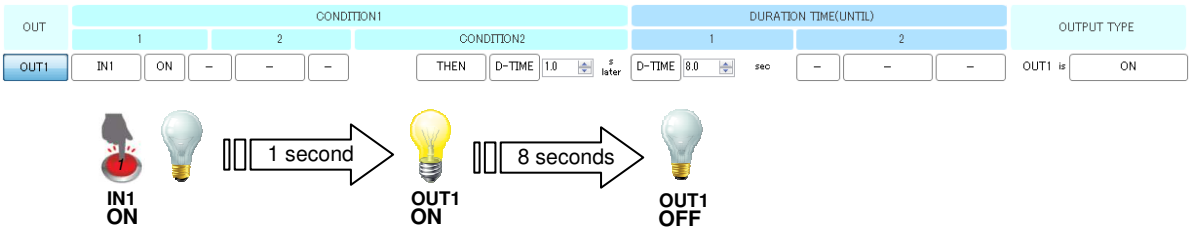
This program causes a lamp to light up when all switches (1 to 4) are turned on.



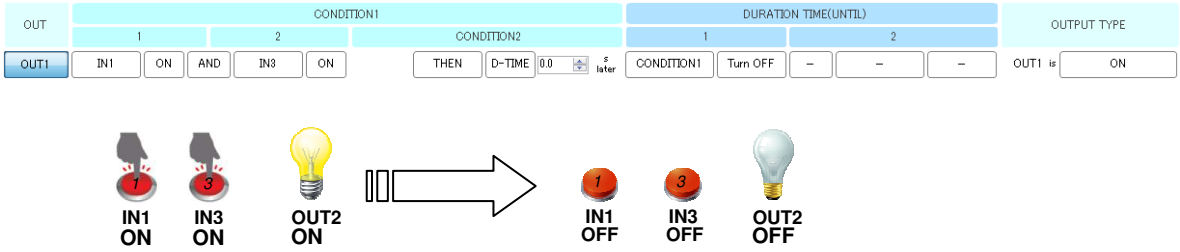
Setting examples

... Input ... Output

Example 1: If input 1 stays on for 1 second, output 1 turns on and then turns off after 8 sec.

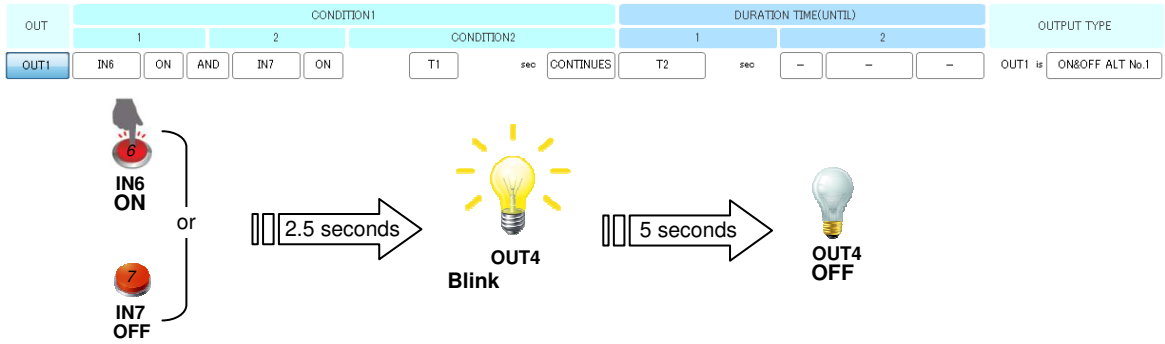


Example 2: When inputs 1 and 3 are turned on, output 2 turns on.
When input 1 or 3 or both are turned off, output 2 turns off.

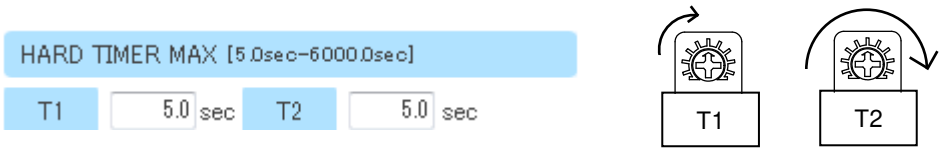


Example 3: If input 6 stays on or input 7 stays off for 2.5 seconds, output 4 blinks for 5 seconds and then turns off.

* This example uses the hardware timers.

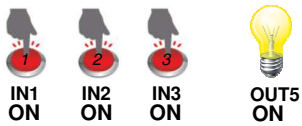


In the [HARD TIMER MAX] area, set T1 and T2 to 5.0 seconds.
Turn analog timer T1 halfway, and turn analog timer T2 to the maximum.



Example 4: If inputs 1, 2, and 3 are turned on, output 5 turns on.

OUT	CONDITION1					CONDITION2			DURATION TIME(UNTIL)				OUTPUT TYPE	
	1		2						1		2			
OUT1	FLAG1	ON	AND	IN3	ON	THEN	D-TIME	0.0 s later	CONDITION1	Turn OFF	–	–	–	OUT1 is ON
FLAG1	IN1	ON	AND	IN2	ON	THEN	D-TIME	0.0 s later	CONDITION1	Turn OFF	–	–	–	FLAG1 is ON



Specify inputs 1 and 2 as the conditions for internal output 1 (FLAG1), and specify internal output 1 and input 3 as the conditions for output 5. In this way, you can specify three or more conditions.

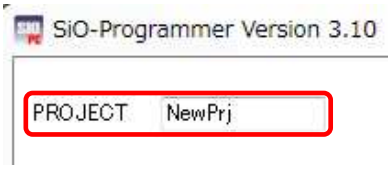
See page 32 for more details on internal outputs.

Useful features

Here are some useful features of SiO-Programmer:

(1) Saving project names

You can save project names to the controller. Use project names as notes on what programs are stored on the controller. When you save your settings to a file, the project name is saved separately from the file name. This means that you can simply read the project name from the file and write it to the controller.

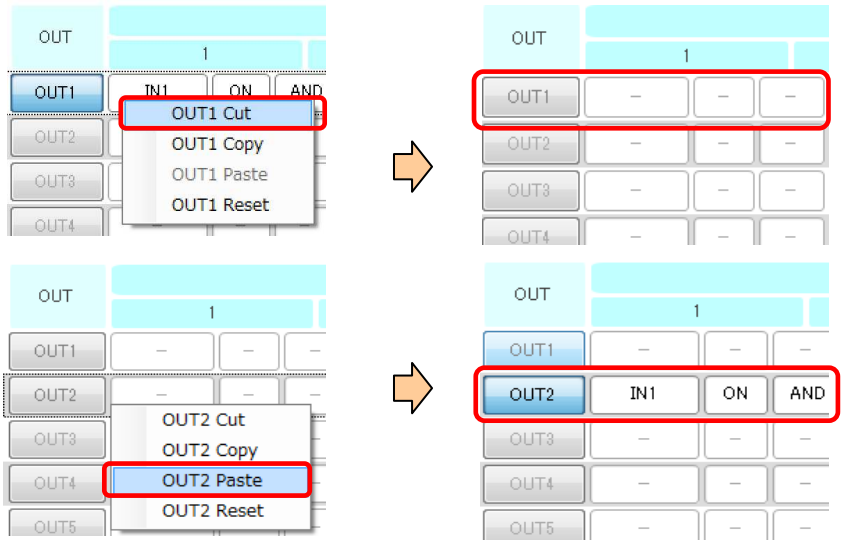


(2) Cut, copy, paste, and reset

In the program window, **right-click** in a row and click [OUT X Reset], [OUT X Cut], [OUT X Copy], or [OUT X Paste] to reset, cut, or copy the output settings in the row where you right-clicked or to paste settings to that row.

Shortcuts are available for some commands.

- Cut: Ctrl + X
- Copy: Ctrl + C
- Paste: Ctrl + V



(3) Checking programs

Position the cursor over the desired numbered output button to see a sentence that describes the output settings.

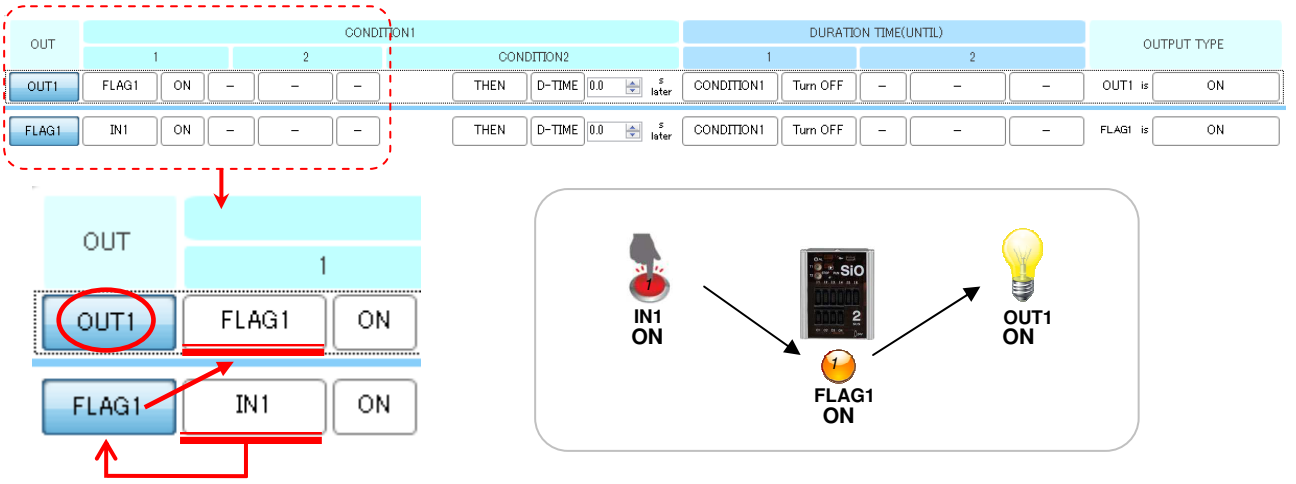
The sentence also includes I/O notes, making it easy to understand how the program works.

* A sentence appears only when the output is enabled.

(4) Internal outputs (FLAGs)

Internal outputs (FLAGs) or the outputs exceeding the available number of outputs (e.g., OUT5 and subsequent outputs in the case of SiO2) cannot be used to output external signals. However, these outputs, which work inside the controller, can be used as conditions.

Take the following program as an example:

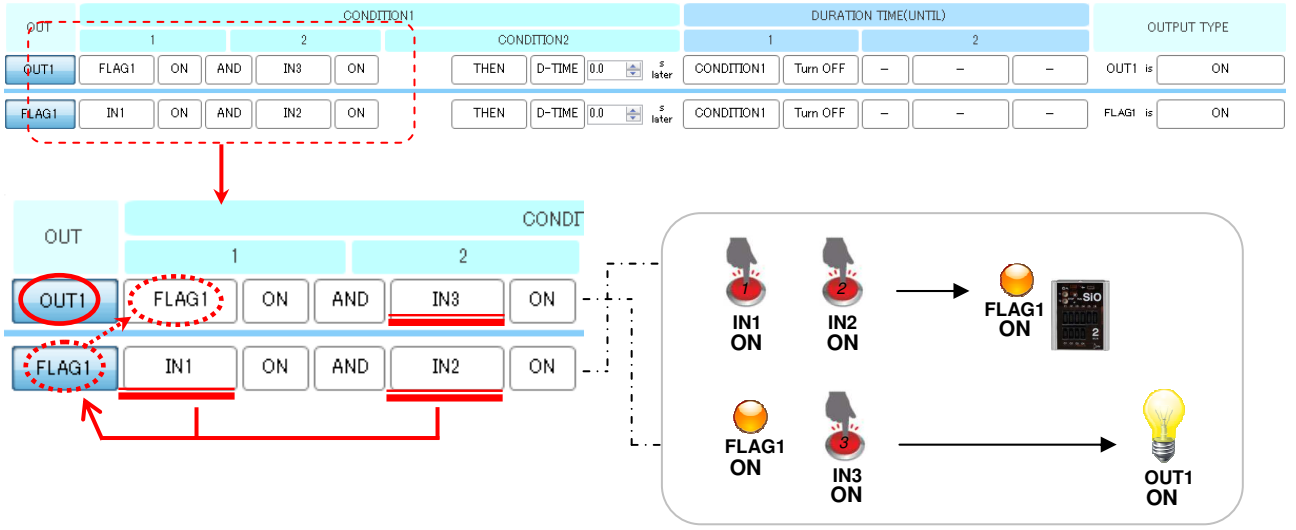


In this program, turning on IN1 causes OUT1 to turn on.

When IN1 is turned on, the condition for FLAG1 is met and FLAG1 turns on.
When FLAG1 turns on, the FLAG1 signal turns on inside the SiO controller, although the controller shows no change.

This, in turn, meets the ON condition for OUT1 (FLAG1 is ON), causing OUT1 to turn on.

Although normally you can only specify up to two ON conditions, you can specify three ON conditions using the above internal output, as follows:



In this program, turning on IN1, IN2, and IN3 causes OUT1 to turn on.

Specify IN1 and IN2 as the ON conditions for FLAG1, and FLAG1 and IN3 as the ON conditions for OUT1.
OUT1 turns on when IN1, IN2, and IN3 are all turned on.
Although turning on IN1 and IN2 causes FLAG1 to turn on, only OUT1 appears to turn on, because the controller shows no change.

I/O Monitor

The I/O monitor enables you to monitor the I/O status. You can display the I/O monitor by clicking the monitor icon at the top right of the window. The I/O monitor can be used only when the controller and your computer are connected.

On the I/O monitor, you can check whether the controller is in the RUN state, check the ON/OFF status of the inputs and outputs, or force OUTs or FLAGs to turn on. You can also save changes in the I/O status to a CSV file. The names of inputs and outputs will be replaced with the notes you enter in the program window. At the bottom of the monitor window is an I/O monitor that looks similar to the program window.

(1) Monitor controls

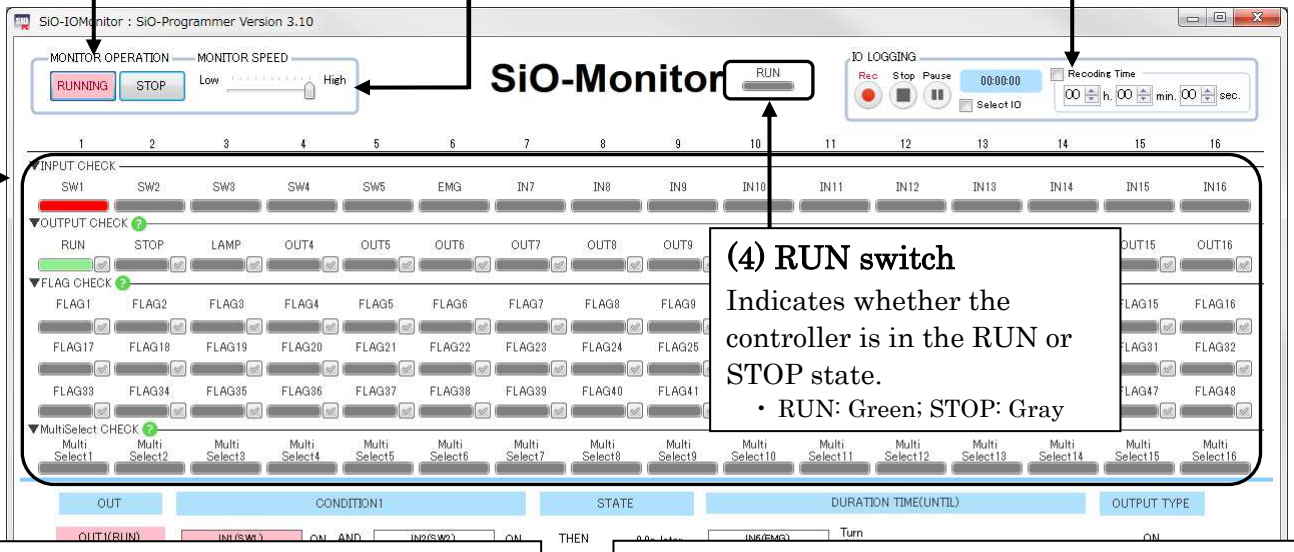
Click [START] to start monitoring. Click [STOP] to stop monitoring.

(2) Monitor speed

Set the communication speed. Reduce the speed if your computer becomes slow due to its specifications or other reasons.

(3) I/O logging

Records changes in the I/O status to a CSV file. → Page 34



(4) RUN switch

Indicates whether the controller is in the RUN or STOP state.

- RUN: Green; STOP: Gray

(5) I/O status check

Shows the I/O status.

ON: Red for IN indicators, green for OUT, FLAG, and multiple-selection indicators

OFF: Gray

CheckOFF: Click an output indicator to invert them on during Clicking.

CheckOn: Click an output indicator to invert them.

Click a multiple-selection indicator to see its settings.

(6) Program window monitor

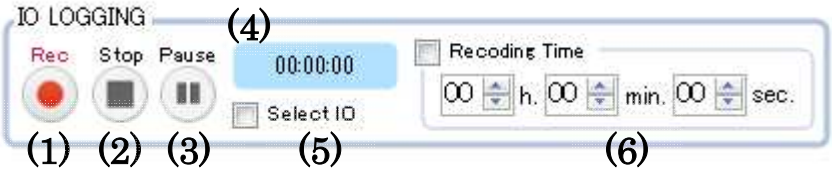
Allows you to monitor the I/O status in the layout of the program window.

- ON: Red; OFF: White

If the number of seconds or counts is set, the number of seconds or counts on the controller appears circled in blue.

I/O logging

IO LOGGING allows you to record changes in the I/O status.



(1) Record 

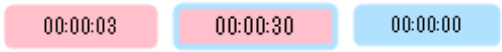
Click this button and enter a file name to start logging.
During logging, any changes in the I/O status are written to a CSV file in real time. Note that you cannot edit the file during logging.
You can also use this button to resume logging after clicking the [Pause] button.

(2) Stop 

This button stops logging.
Once you stop logging, you can edit or move the CSV file.

(3) Pause 

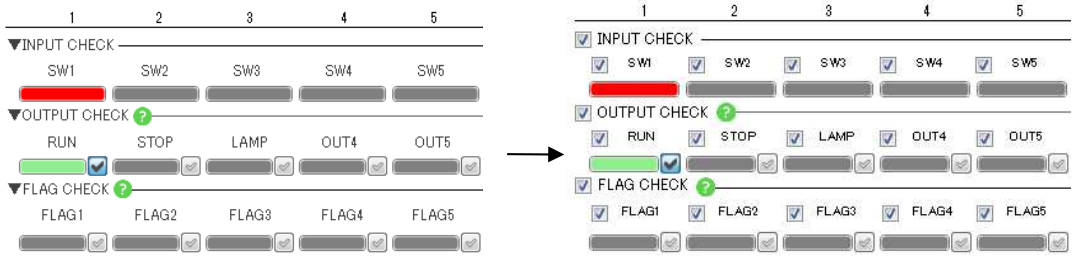
This button pauses logging. Click the [Rec] button again to resume logging, or click the [Stop] button to stop logging.

(4) Elapsed time display 

This area displays the elapsed time during logging, or shows the remaining time if you select the [Set recording time] check box.
The area is shown in red during logging, in red with a blue border during a pause, and in blue when recording is stopped.

(5) I/O selection check box

Use this check box when you want to record changes only in inputs and outputs of your choice. By default, the status of all inputs and outputs is recorded. When you select the check box, the display will change as follows:



Select the check boxes for the inputs and outputs whose status you want to record.

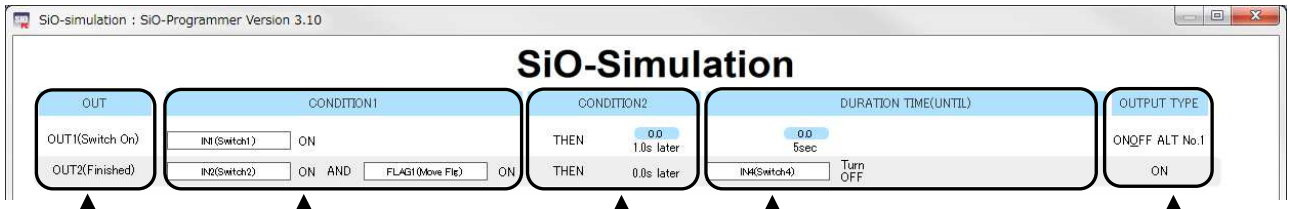
(6) Set recording t

Select this check box to automatically stop recording after the time period you specify.
Even if you set a time period, this option is disabled until you select the check box.

Simulator

The simulator shows how the settings you configured in SiO-Programmer work. Use the simulator to check whether your settings work as intended before actually using the controller. Since the simulator runs on your computer, **you can use it without connecting the SiO controller**.

Clicking the simulator icon at the upper right of the program window displays simulation windows—an I/O display window and input box.
In the input box, click [RUN] and any of the inputs (IN1 to IN16) to start simulation.



(1) Output display

Shows the output status.

- ON: Red,
  OFF: White

(3) State display

Shows state settings and the number of counts or elapsed seconds based on simulation. The number of counts or elapsed seconds is shown in a blue circle.

- ON: Red, OFF: White

(5) Output type display

Shows output type settings.

(2) ON conditions display

Shows the status of the inputs and outputs you specified for ON conditions. You can click [複数選択 Multiple selections] to see its settings.

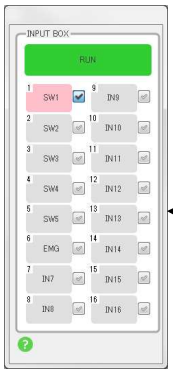
- ON: Red, OFF: White

(4) OFF conditions display

Shows the status of the inputs and outputs you specified for OFF conditions and the number of elapsed seconds based on simulation.

- ON: Red, OFF: White

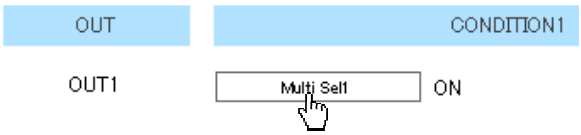
The number of elapsed seconds is shown in a blue circle.

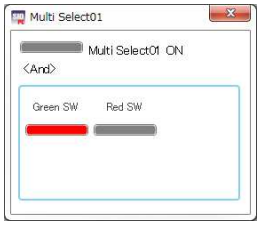


(7) Input box

In the input box, click [RUN] and any of the inputs (IN1 to IN16) to start simulation.
RUN: Green for ON, and gray for OFF
IN1 to IN16: Red for ON, and gray for OFF

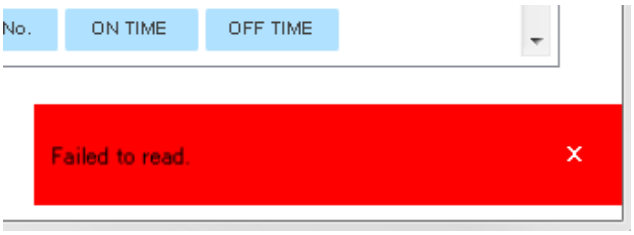
*** If a multiple-selection condition is set, click [Multi sel] to see which inputs and outputs are selected.**





Onscreen Messages

A message like the one shown below appears if an error occurs, such as when a program is incorrect or the SiO controller is not connected.



If an error message appears, check the following and eliminate the cause.

Message	Description
A read error has occurred. Failed to read. Failed to write. Failed to communicate. Unknown command SIO Controller is not connected.	Your computer has failed to communicate with the SiO controller. 1. Check that the SiO controller and your computer are connected and that the SiO controller is turned on. If they are connected, make sure that the USB cable is not damaged. 2. You may be using an older version of the PC software or device driver. Uninstall **both the device driver and PC software** (page 10), and download the latest installer from SUS's website.
No driver is installed.	Your computer does not recognize the SiO controller because no device driver is installed or because the device driver is not working properly. Uninstall **both the device driver and PC software**, and download the latest versions of the software and device driver from SUS's website.
Cannot write during RUN.	When the SiO controller is in the RUN state, you cannot write a program to the controller. Turn off the RUN switch on the controller before writing a program.
Check the Red data then setting.	You cannot write the program to the controller because the program is not configured correctly. Check and correct the settings for the items highlighted in red.
Cannot force output during RUN.	When the SiO controller is in the RUN state, you cannot force output via the I/O monitor. Turn off the RUN switch on the controller before attempting to force output.

Message	Description
Version x.xx and later of the SiO controller are not supported. Download the latest version of SiO-Programmer from SUS's website.	Your version of SiO-Programmer is not supported by the connected controller. Install the latest version of SiO-Programmer that works with the controller.
Failed to force output.	The SiO controller may be turned off, or the USB cable may be disconnected or damaged.
Failed to obtain the I/O status.	
Install Adobe Reader.	Clicking the Help button displays this manual in PDF format. You cannot view the manual on a computer that does not have Adobe Reader installed.
The language file is corrupted.	The help file or language file for SiO-Programmer is corrupted and cannot be read. Uninstall SiO-Programmer and reinstall it.
The help file is corrupted.	
Do you want to write this program?	This message appears if you click the [登録 Write] button when the program is not configured.
Cannot run multiple instances of SiO-Programmer.	You cannot run multiple instances of SiO-Programmer at once.

Inquiring about *SiO-Programmer*

If you have any problems with or questions about ***SiO-Programmer***, please e-mail us at:

sus-sales@sus.co.jp

Revision History

Version	Date	Description	Revised Pages
1.00	Jun. 1, 2016	Initial release	
1.01	Aug. 30, 2016	Setting examples — Corrected the T1 setting in Example 3.	25
		Useful settings — Corrected the description in "(4) Internal outputs".	27
1.10	Dec. 15, 2016	General — Replaced images with those from SiO-Programmer version 1.10.	7 and later
		Various settings — Changed "Interval/ON time" to "ON time/OFF time".	24
		Useful settings — Added cut, copy, and paste.	26
		I/O monitor — Updated the information to indicate that the settings window monitor is displayed from the beginning.	28
		Messages — Added "Driver installation".	29
1.11	Jan. 10, 2017	System requirements — Changed the display resolution from 1024 × 768 to 1280 × 768.	6
2.00	Mar. 1, 2017	Updated the information to cover the features added to SiO-Programmer version 2.00:	
		• Added the counter feature.	21, 23
		• Added the simulation feature.	5, 13, 16, 32
		• Increased the number of OFF conditions from 1 to 2.	21, 24
		• Improved ease of use.	15, 19, 23, 24, 30, 31
		General — Replaced images with those from SiO-Programmer version 2.00.	14 and later
		System requirements — Changed the display resolution from 1280 × 768 to 1366 × 768.	6
2.10	Apr. 27, 2017	Introduction — Changed the revision number from 1.11 to 1.xx.	4
		Program window — Added information about CT version number.	15
		Tool icons — Added "File", "Print", and notes.	16 and 17
		SiO controller/SiO-Programmer compatibility table — Added	18
		Editing data — Added descriptions of internal outputs and SiO2.	19–21
		Other settings — Added a diagram of INIT time.	28
		Useful features — Added commands. Changed the description of internal outputs.	30 and 31

2.20	Jun. 30, 2017	Installing SiO-Programmer — Added a description of how to update SiO-Programmer. I/O logging — Added Onscreen messages — Added	7 33 36
2.30	Sep. 1, 2017	General — Changed the number of internal outputs from 16 to 32.	19 and later
2.40	Jan. 5, 2018	System requirements — Changed the display resolution from 1366 × 768 to 1280 × 768.	6
2.50	Jun. 26, 2018	System requirements — Added 64-bit versions and Windows 8.1 and 10 to the computer models. Editing data — Added a description of SiO-N1.	6 P19
3.00	Jan. 28, 2019	Various settings — Added a description of the multiple selection option. Changed the number of counts. Changed the timers. General — Changed the number of internal outputs from 32 to 48. I/O monitor — Added a description of monitoring controls.	29 and later 19 and later 33
3.10	Jun. 28, 2019	I/O monitor — force output.	33