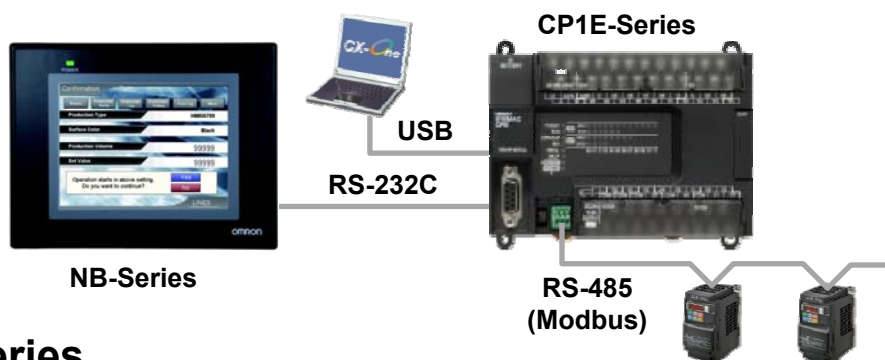


The monthly news, **C&N**

- OMRON Cost-effective Control Devices -

- Vol.1 Complete Lineup of CP1E and NB Series
- Vol.2 New to NB-Designer
- Vol.3 Create Beautiful Screen with NB-Designer 1
- Vol.4 Easy Programming with Smart Input Function
- Vol.5 Quick Screen Creation with NB-Designer
- Vol.6 Create Beautiful Screen with NB-Designer 2
- Vol.7 Specify Offsets for Addresses
- Vol.8 Save Alarm Histories to USB Memory Stick
- Vol.9 Display Labels in Multiple Languages
- Vol.10 Easy Positioning Using Pulse Outputs
- Vol.11 Upload Screen Data from NB
- Vol.12 Problem with Connection
- Vol.13 Scaling Analog I/O Values
- Vol.14 Convenient Use of NB Event
- Vol.15 Input Interrupts for High-speed Processing
- Vol.16 Use NS Components on NB
- Vol.17 Positioning Using High-speed Counter
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- Vol.19 Cam Motion Using High-speed Counter
- Vol.20 Helps Reduce Design Time in NB-Designer
- Vol.21 Create Beautiful Screen with NB-Designer 3
- Vol.22 Use Analog Option Boards

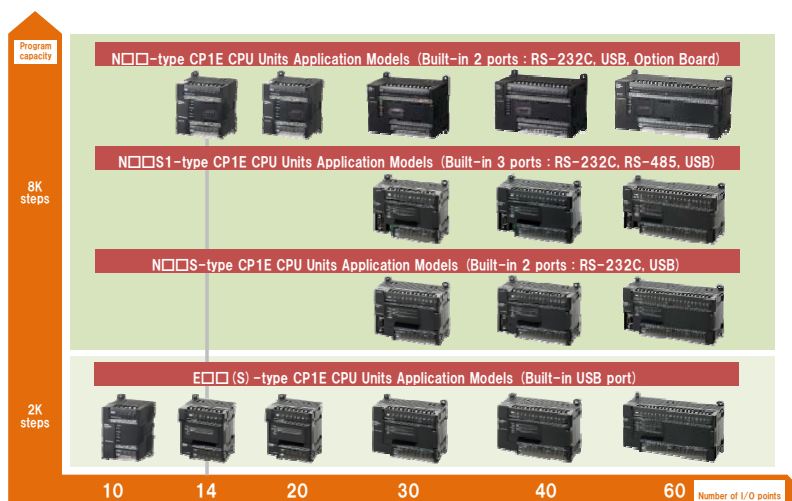
Complete Lineup of CP1E and NB Series



■ CP1E Series

- **Application models including built-in 3 ports types**
RS-232C port, USB port, and RS-485 port are incorporated.
As well as HMI, Inverters and Temperature Controllers can be connected without using Options.
- **Improved built-in 2 ports types**
- **Basic models including CPU Unit with 60 I/O points**

Full range of products, ranging from basic models to application models that enable addition of communications ports, allows you to select the right model to suit your application.



■ NB Series

- More than 65,000 display colors TFT, color touch-screen and Ethernet communication for all models
- Serial port and USB
- USB memory stick support



New to NB-Designer

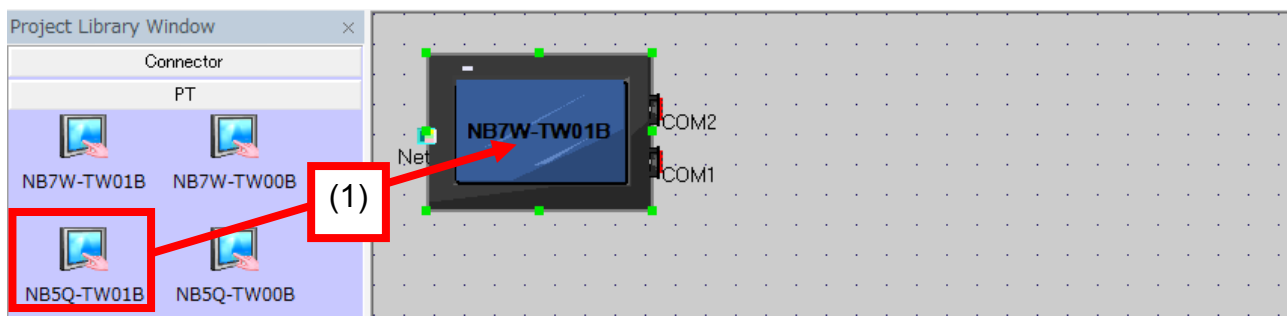


I started the NB-Designer. What should I do next?

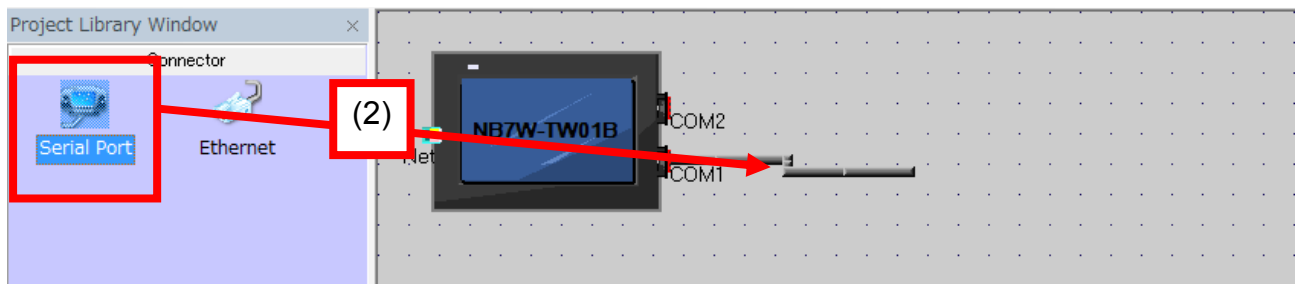
I'm worried about the new software...

Select devices from the Graph Element Window.

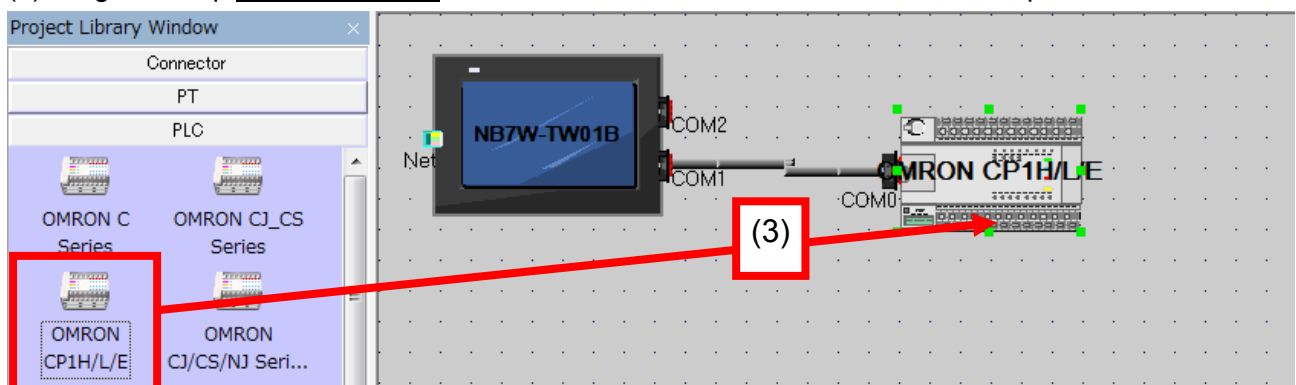
(1) Drag and drop **NB to be used**.



(2) Drag and drop **Connector (communication cable type)** to connect to a communications port of the NB.



(3) Drag and drop **PLC to be used** to connect the connector to a communications port of the PLC.

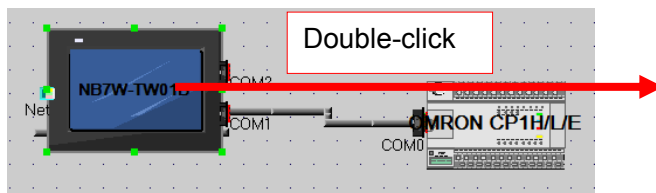




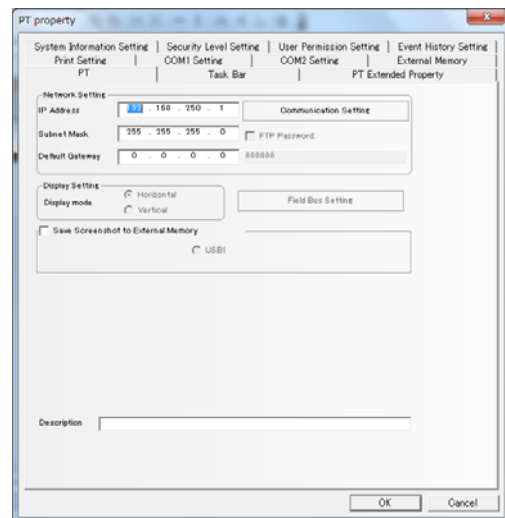
I selected devices.
Do I have to set up the NB?
How to set up?

Set in the HMI Attribute dialog box.

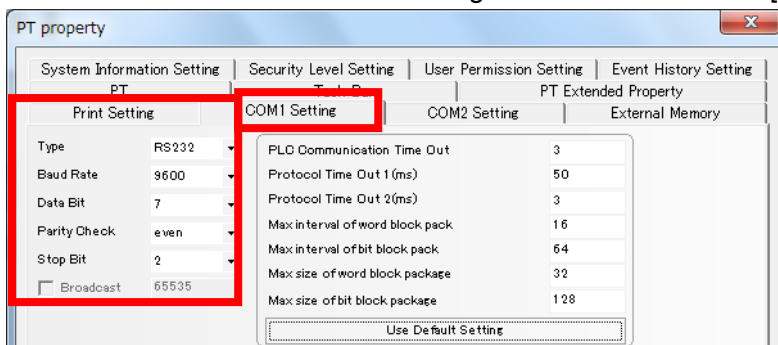
- (1) Double-click the NB to open the [HMI Attribute] dialog box.



In the above example, the PLC is connected with the COM1 of the NB7W.

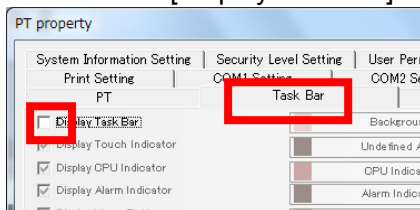


- (2) Make the same communication settings as for the PLC in the [COM1 Setting] tab.



When the COM2 is used,
set in the [COM2 Setting]
tab.

- (3) Uncheck the [Display Task Bar] in the [Task Bar] tab.



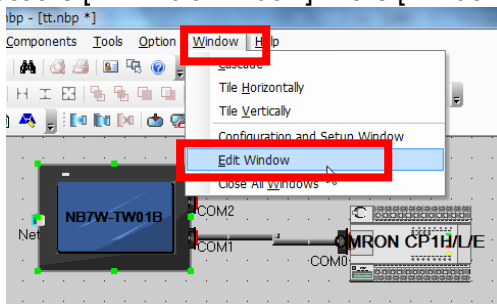
As the default is checking the [Display Task Bar],
uncheck it when the Task Bar is not used.
Refer to 3-10-2 Task Bar in the *Programmable
Terminals NB-Designer Operation Manual* (Cat. No.
V106-E1) for details on the Task Bar.



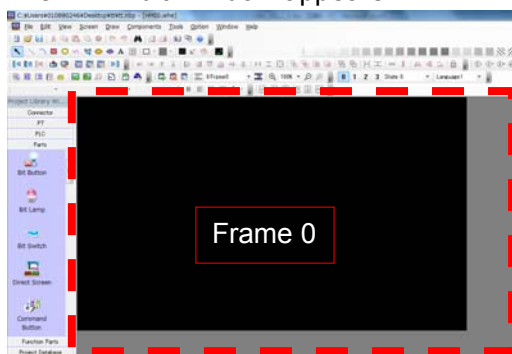
**Settings are completed.
How to start screen creation?**

Open the HMI Edit Window.

(1) Select the [HMI Edit Window] in the [Window] menu.



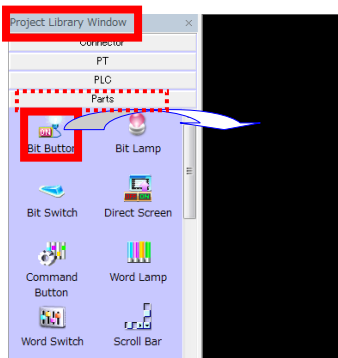
(2) The HMI Edit Window appears.



When the HMI Edit Window appears, [Frame 0] will appear automatically.

Area inside [red dashed box] is called "HMI Edit Window".

(3) Drag and drop a component from the [PLC Parts] or [Function Parts] in the Graph Element Window, which is located to the left of the HMI Edit Window, to the HMI Edit Window. A component is placed on the Window.



Create Beautiful Screen with NB-Designer



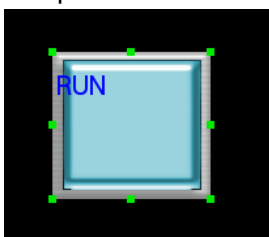
Even if the component is enlarged, the position of the tag does not change. How to move the tag to the center of the component?

Use the Align Tag to Vertical/Horizontal-Center of Component icons.

(1) A component was created.

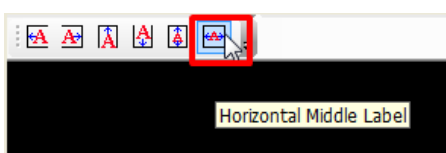


(2) Although the component was enlarged, the tag characters "RUN" were not located at the center of the component.

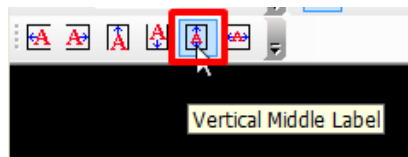


How to move the tag to the center?

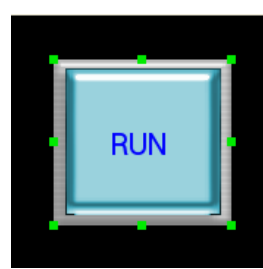
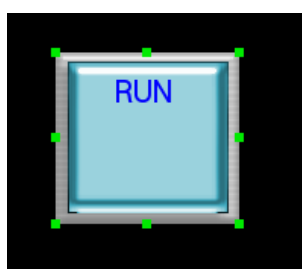
(3) Click the [Horizontal Middle Label] and [Vertical Middle Label] icons to move the tag to the center of the component.



1) Click the [Horizontal Middle Label] icon.



2) Then, click the [Vertical Middle Label] icon.



The tag moved to the horizontal center position.

The tag moved to the vertical center position.

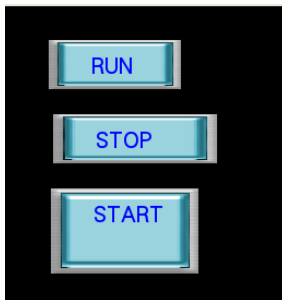


How to make the multiple components with the same size at once?

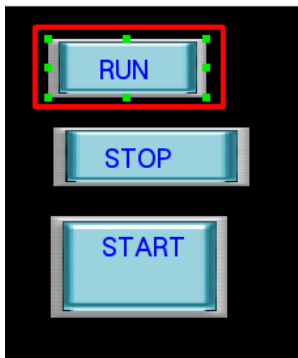
Use the  Make Same Size icon.

Created components are not equal in size...

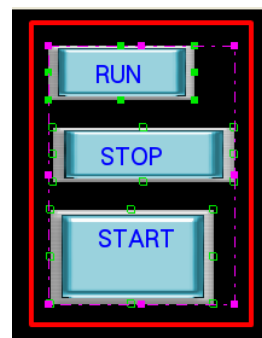
The following process shows how to make all components with the same size at once.



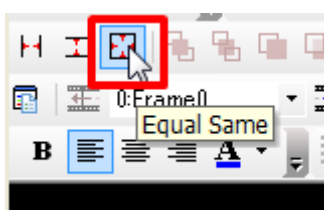
- (1) Select one component as the reference.
(In this example, the "RUN" switch is specified as the reference.)



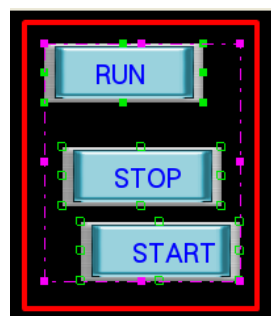
- (2) To select all switches, press and hold the Shift key while selecting the "STOP" and "START" switches. (Selected components are surrounded by a pink frame.)



- (3) Click the "Equal Same" icon or select [Both] under [Size] in the [Edit] menu.



- (4) Now all selected components are the same size.



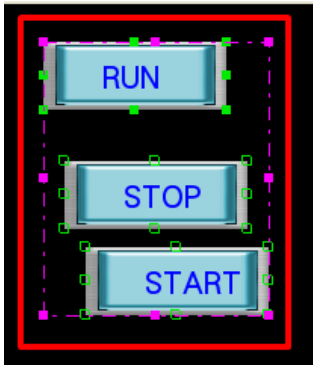
Components become the same size as the component selected in Step (1).



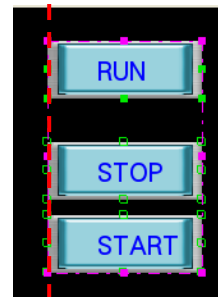
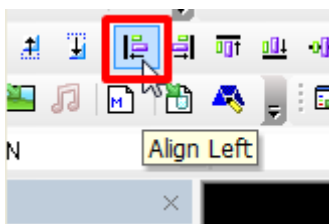
I could make the components with the same size.
How to align the components?

Use the Align function.

- (1) Select one component as the reference, and then press and hold the Shift key while selecting all other components to align. (In this example, the "RUN" switch is the reference.)

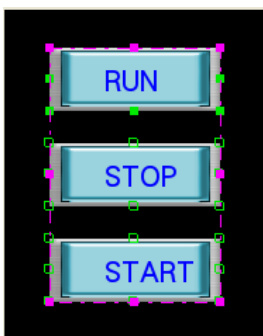


- (2) Click the [Align Left] icon or select [Left] under [Align] in the [Edit] menu.

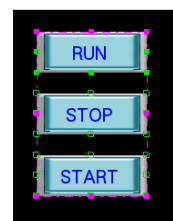
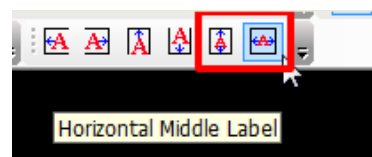


All components are aligned along the left side of the "RUN" switch.

- (3) Select [Vertical Even Spacing] in the [Edit] menu to make the vertical space between the components same while selecting components.



- (4) Then, click the [Horizontal Middle Label / Vertical Middle Label] icons to move the tags to the center of the selected components at once.



Easy Programming with Smart Input Function



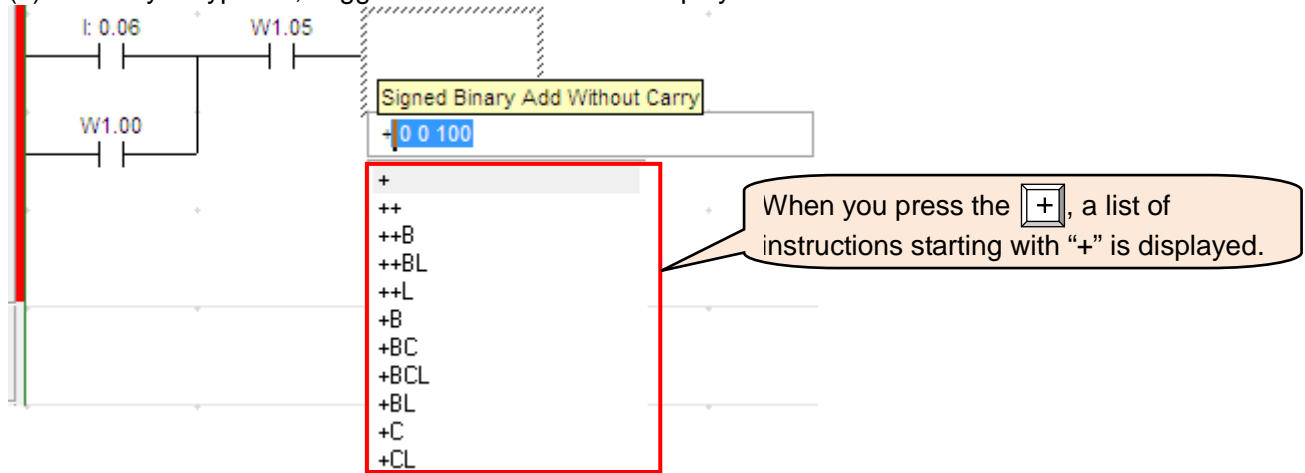
I forgot the mnemonic for the **DOUBLE INCREMENT BINARY** instruction!
I remember it starts with “+”.

CX-Programmer "Smart Input"

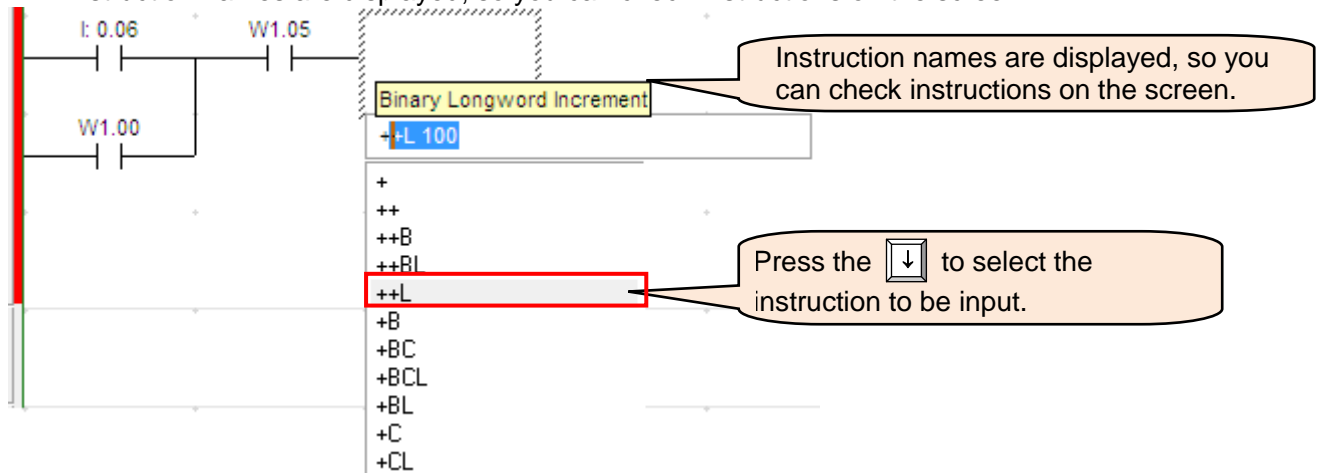
The instruction input assistance function enables programming by selecting instructions from the list.

When you begin typing an instruction from the keyboard while in the Ladder Editor Window, suggested instructions are displayed. All you have to do is select the instruction from the list for easy input even if you do not remember the entire mnemonic.

(1) When you type “+”, suggested instructions are displayed.



(2) Press the “↓” key to select the instruction to be input in the list.
Instruction names are displayed, so you can check instructions on the screen.





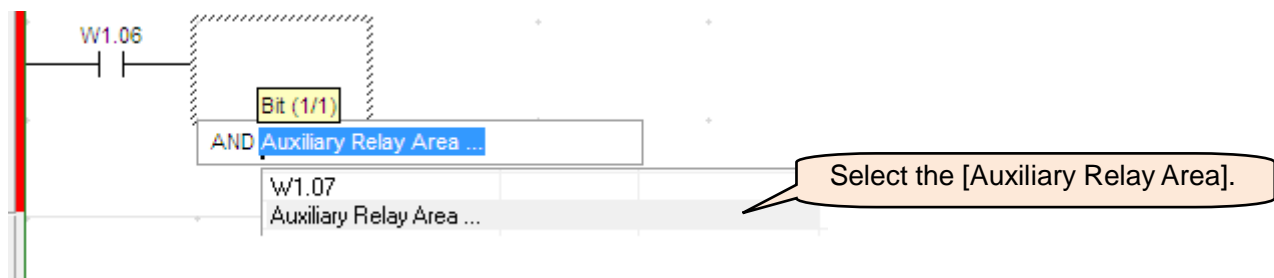
I forgot the bit address of the “Equals Flag”!

CX-Programmer "Smart Input"

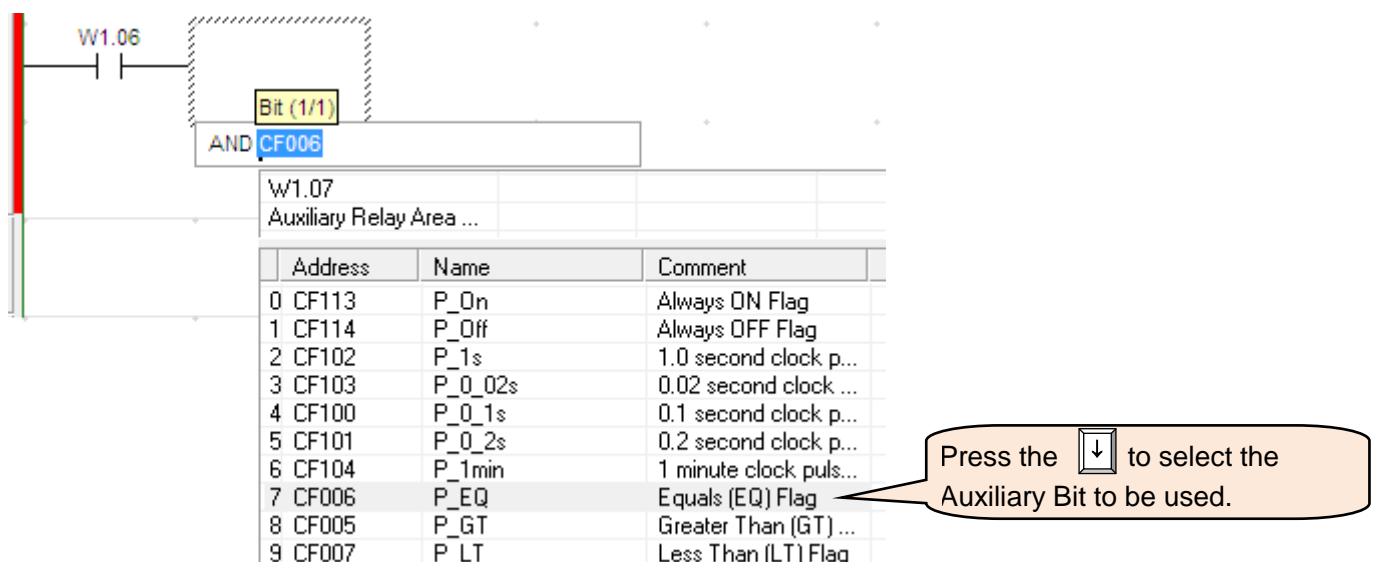
The auxiliary bit input from lists function enables special bits in the Auxiliary to be selected from lists, eliminating the need to remember addresses.

Clock Pulse Flags, Condition Flags, and other special bits in the Auxiliary can be selected from lists.

(1) When an instruction is input, the [Auxiliary Relay Area] is displayed.



(2) If you select the [Auxiliary Relay Area], a list of Auxiliary Bits is displayed. Press the “↓” key to select the Auxiliary Bit to be used.





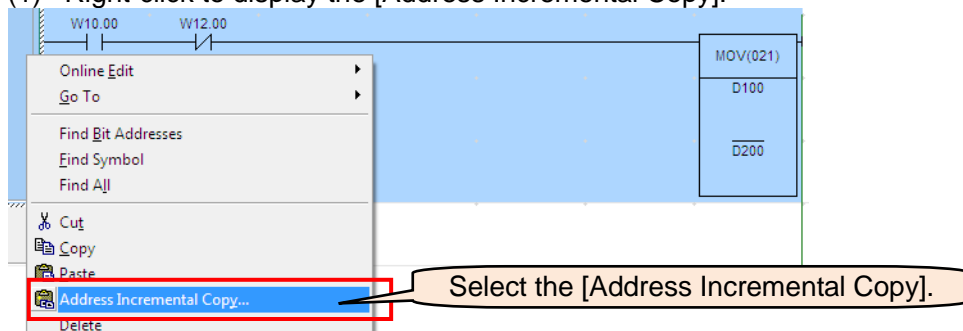
How to easily copy instructions to create the same instructions?

CX-Programmer "Smart Input"

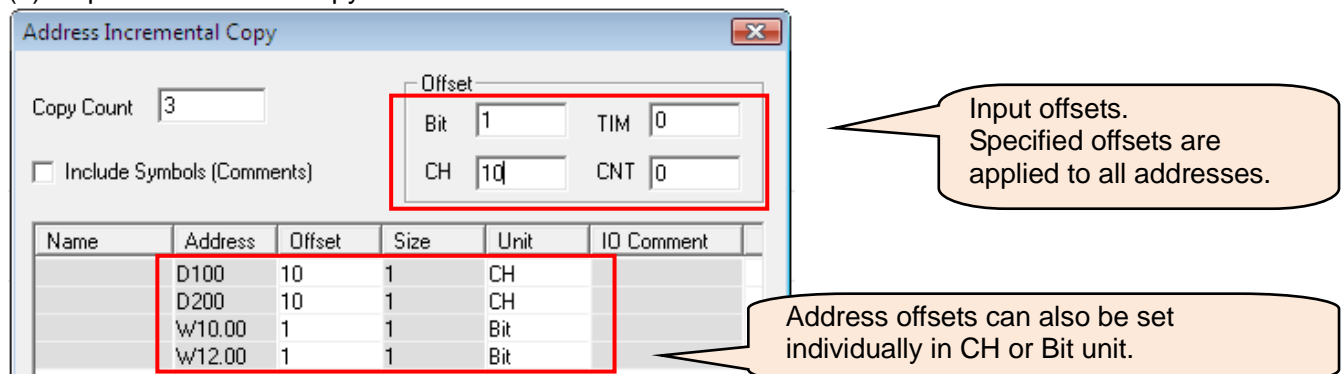
The address incremental copy function can be used to reuse the instructions.

To create the same group of ladder instructions more than once, the address incremental copy function can be used to easily create copies of the instructions with different addresses by inputting an address offset.

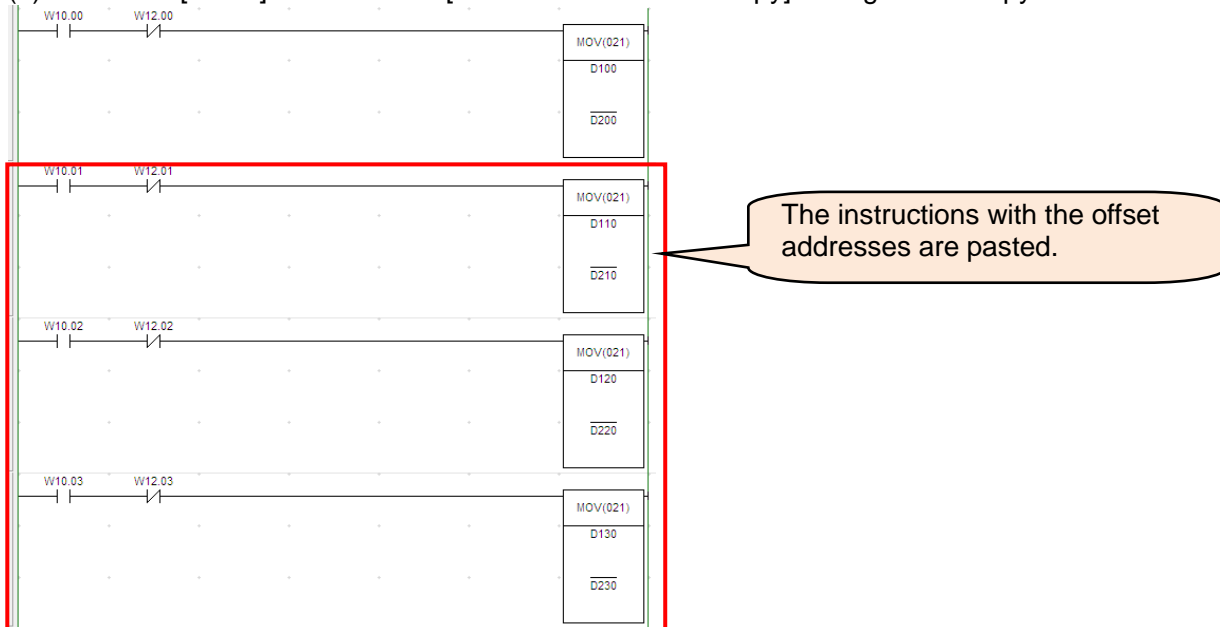
(1) Right-click to display the [Address Incremental Copy].



(2) Input offsets and a copy count.



(3) Click the [Paste] button on the [Address Incremental Copy] Dialog Box to copy the ladder instructions.



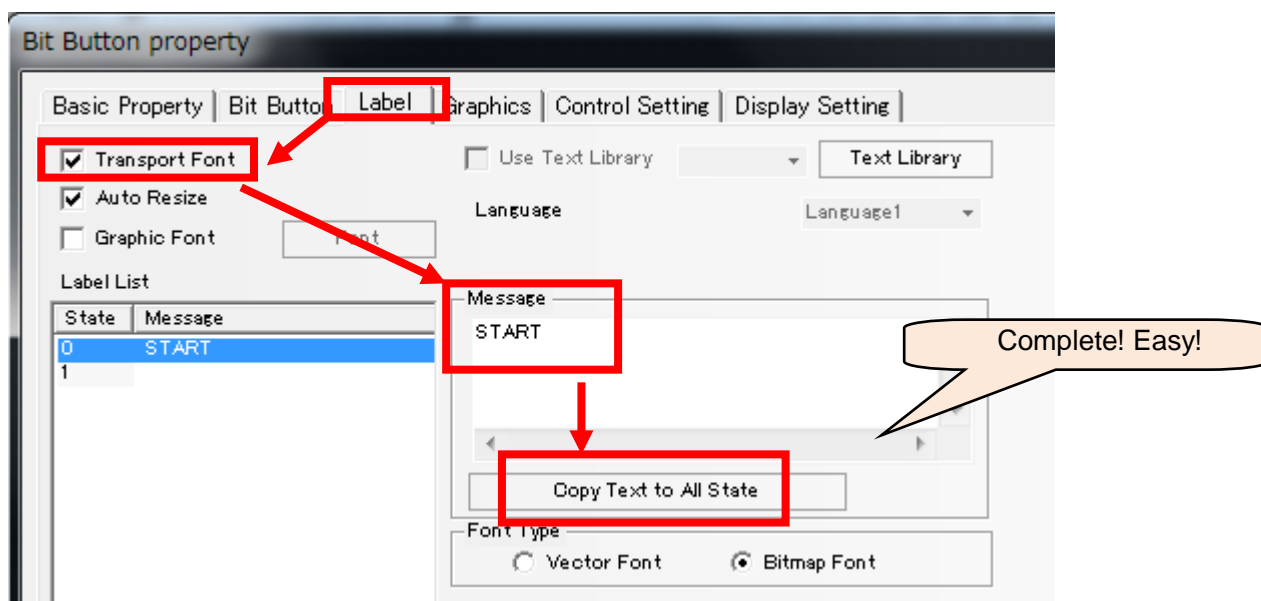
Quick Screen Creation with NB-Designer



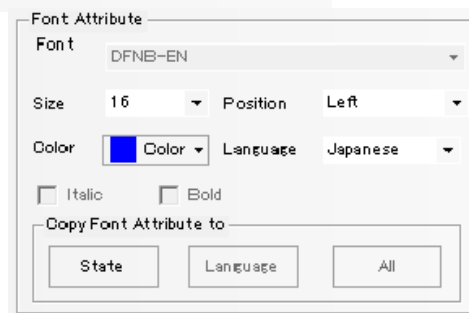
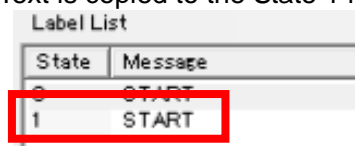
How can I easily input text and attributes of switch and lamp labels for both ON and OFF states?

Use the Copy Text to All State Button in the Label Tab Page to copy.

Select the [Label] Tab of the [Bit Button Property] Dialog Box.
Check the [Transport Font], and input text in the [Message] Field. (Example: START)
Click the [Copy Text to All State] Button.



Text is copied to the State 1 in the Label List.



Click the [State] Button of the [Copy Font Attribute to] in the [Font Attribute] Field in the [Label] Tab Page to copy the font size, color, position, and other attributes of the State 0 to the State 1.

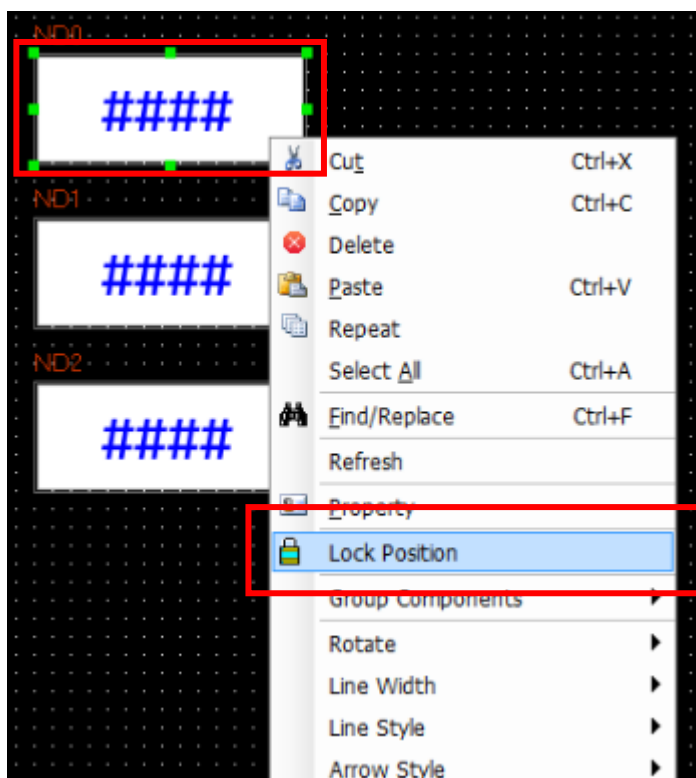
Create Beautiful Screen with NB-Designer



I accidentally move some of aligned components.
Can I lock components?

Use Lock Position to lock components.

(1) Lock a component to prevent the user from accidentally moving the component.



- (1) Select the component to lock.
- (2) Right-click.
- (3) Select the [Lock Position].

(2) A lock-shape mark appears on the component. You can unlock it in the same way.

The component with a lock-shape mark can be edited in the property.



You cannot move the component with the mouse. Lock Position can prevent accidental movement of aligned components.

Specify Offsets for Addresses



What can I do by specifying offsets for addresses?

You can program by specifying offsets for start addresses.

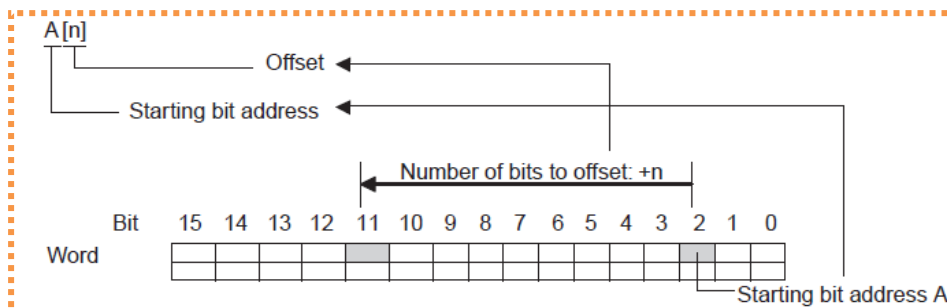
It is possible to dynamically specify the offset by specifying a word address in I/O memory for the offset. The contents of the specified word address will be used as the offset. This makes programming more flexible.

◆ Overview

<< Bit Addresses >>

The bit address is offset by the amount specified by n (number of offset bits) from A (start bit address).

* n (offset) can be specified as a decimal constant or word address (but CIO Area addresses cannot be specified).



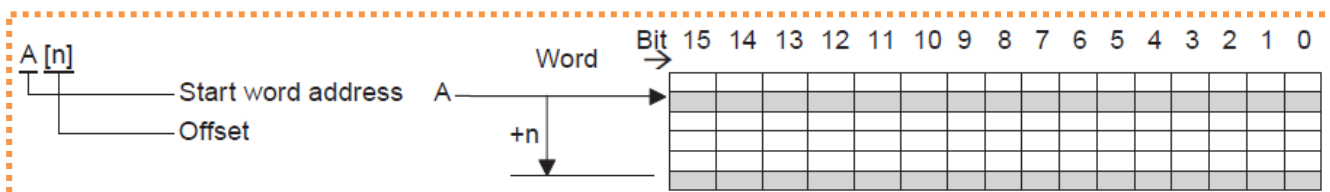
Examples

- 10.00[2] ⇒ 10.02
- 10.00[W0] ⇒ 10.05 (When W0 = &5)

<< Word Addresses >>

The word address is offset by the amount specified by n (number of offset words) from A (start word address).

* n (offset) can be specified as a decimal constant or word address (but CIO Area addresses cannot be specified).



Examples

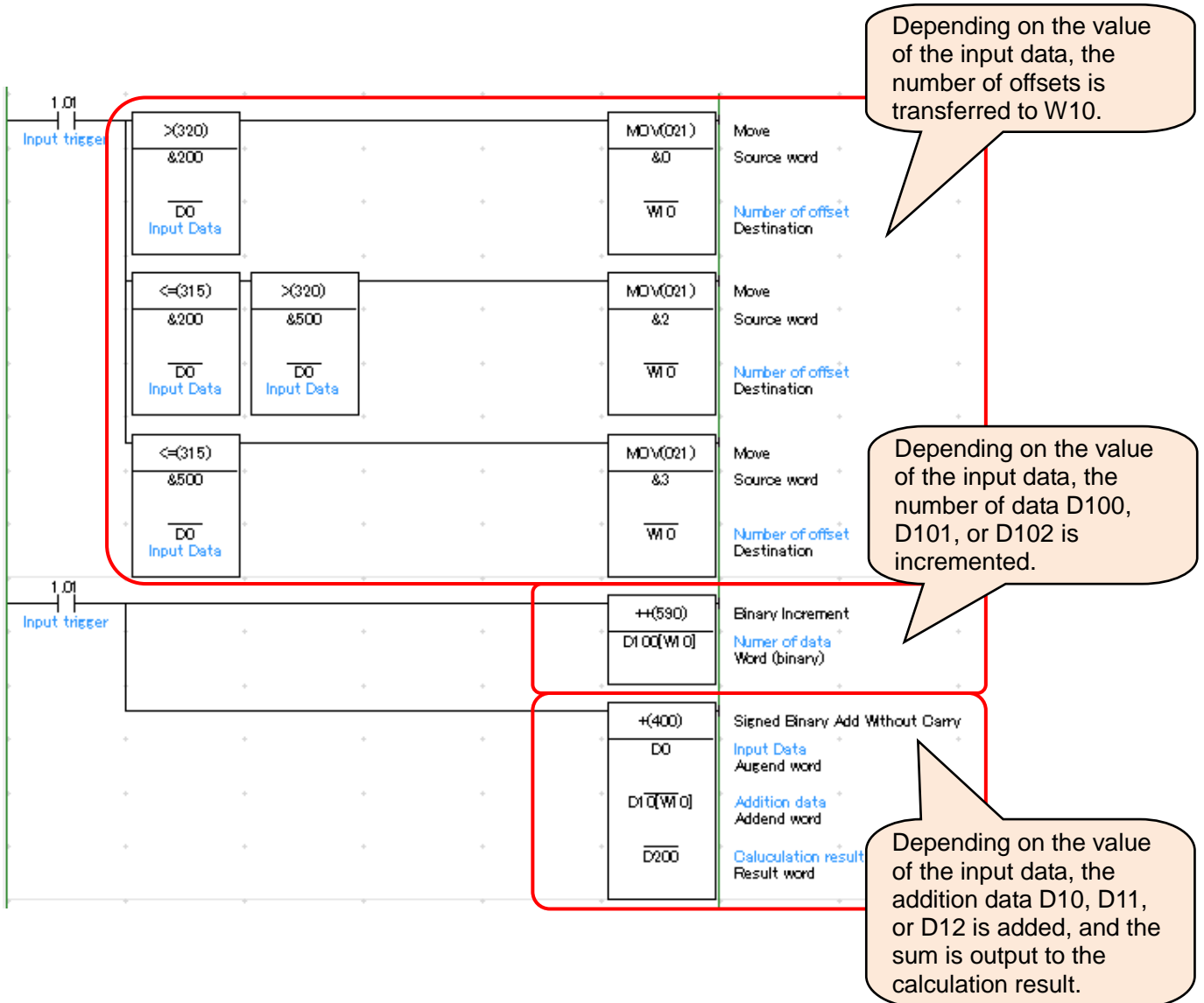
- D100[2] ⇒ D102
- D100[D0] ⇒ D216 (When D0 = &116)

Note. The CP1H and CP1L do not support this function. If you use the CP1H or CP1L, use Index Registers.

◆ Application Example for Address Offsets

The addition data (D10[W10]), which varies depending on the value of the input data (D0) when the input trigger (1.01) turns ON, is added, and the sum is output to the calculation result (D200). The number of data for measurement varies depending on the value of the input data.

Value of input data (D0)	Number of offsets (W10)	Addition data (D10[W10])	Number of data (D100[W10])
$D0 < 200$	&0	D10 (= D10[0])	D100 (=D100[0])
$200 \leq D0 < 500$	&1	D11 (=D10[1])	D101 (=D100[1])
$500 \leq D0$	&2	D12 (=D10[2])	D102 (=D100[2])



Save Alarm Histories to USB Memory Stick



How can I save alarm histories of the NB to a USB memory stick?

Just check the Save to External Memory in the Event History Setting Tab Page!

- (1) Start NB-Designer, and select [Configuration and Setup Window] in the [Window] Menu.
- (2) Double-click the NB (example: NB7W).
- (3) Check the [Save to External Memory] in the [Event History Setting] Tab Page.

The screenshot shows the 'PT properties' dialog box with the 'Event History Setting' tab selected. The 'Save to External Memory' checkbox is checked, and the 'Storage Device' is set to 'USB DISK1'. The 'Save to Recipe Data Field' checkbox is highlighted with a blue border. The 'OK' button is circled in red, and a red callout bubble says 'Complete!' pointing to it. Another red callout bubble says 'Double-click' pointing to the NB7W-TW01B device in the background.

◆ Additional Information

When the [Save to Recipe Data Field] **surrounded by a blue border** is checked, history data can be saved to non-volatile memory (RW) in the NB.

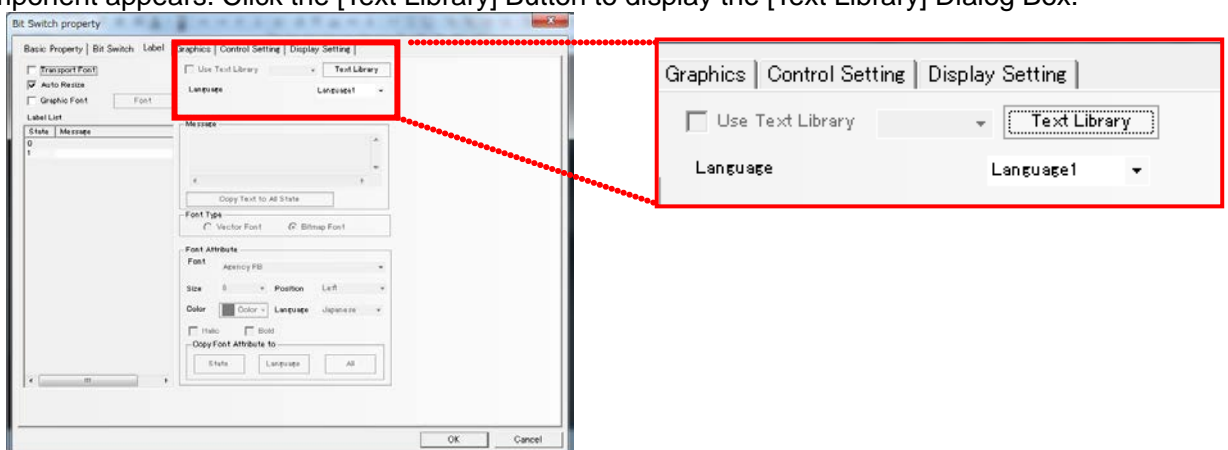
Display Labels in Multiple Languages



How can I display multiple languages on the NB?

Text Library enables up to 8 kinds of languages to be displayed.

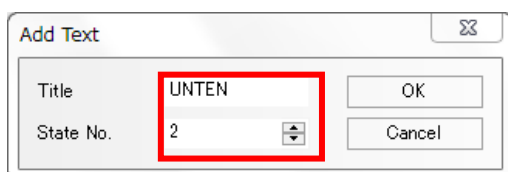
- (1) Place a component (Bit Switch in this example) in the Edit Window. The Property Dialog Box of the component appears. Click the [Text Library] Button to display the [Text Library] Dialog Box.



- (2) Click the [Add] Button in the [Text Library] Dialog Box.

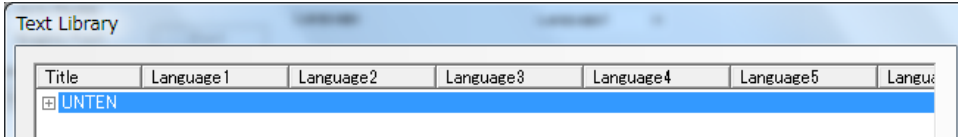


- (3) The [Add Text] Dialog Box appears. Enter the [Title] and [State No.]. Give each label an easy-to-understand Title because the Title is used when a language is selected in the Text Library. Click the [OK] Button.

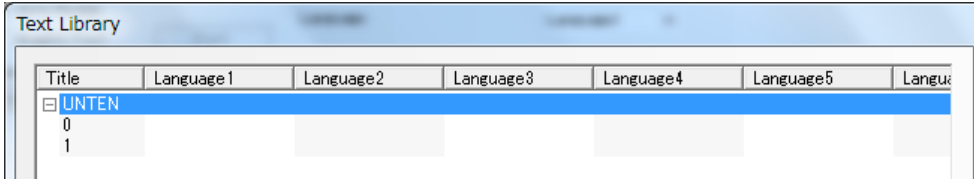


Title:
Enter a Title of the multi-language label ("UNTEN" in this example).
State No.:
Enter "2" (ON and OFF).

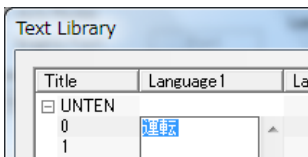
(4) The Title "UNTEN" was added to the Text Library.



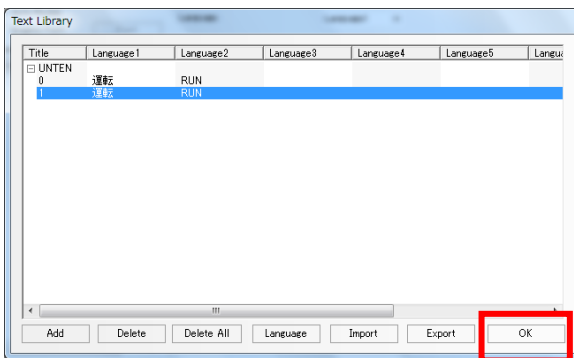
(5) State 0 and 1 are displayed under the Title by clicking the Title "UNTEN".



(6) Enter "運転" in the [Language1] (Japanese) Column for State 0 and 1.

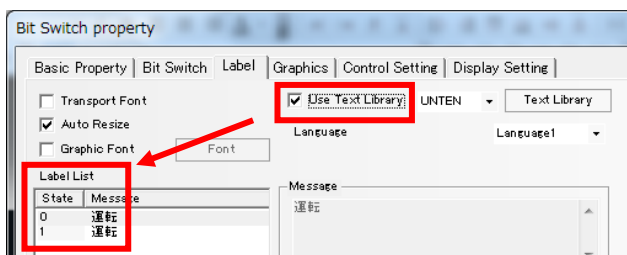


(7) Enter "RUN" in the [Language2] (English) Column for State 0 and 1, and click the [OK] Button.



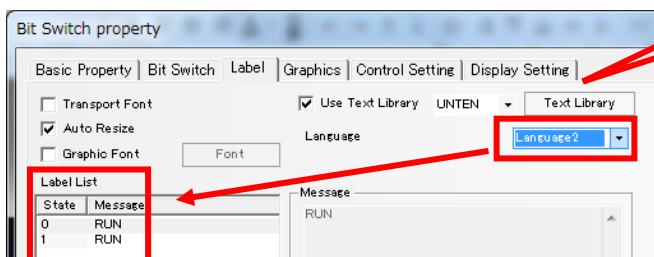
(8) The Property Dialog Box appears. Check the [Use Text Library].

"運転" set in step (6) are displayed in the Label List.



The multi-language label can also be selected by selecting the Title from the list that appears when ▼ of the Title is clicked.

(9) When "Language2" is selected, "RUN" set in step (7) are displayed.



◆ Additional Information

The language displayed on the label can be changed by setting the following values to system memory LW9130.

- 0: Language1
- 1: Language2
- 2: Language3



Easy Positioning Using Pulse Outputs



How can I perform positioning using pulse outputs from the CP1E?

Use the PLS2 instruction for easy positioning!

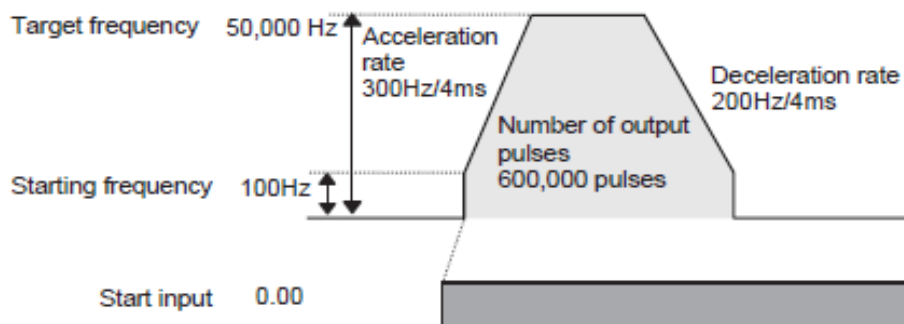
Use the N-type CP1E CPU Unit with transistor outputs when using pulse outputs.

CP1E-N□□DT-□ (Sinking)

CP1E-N□□DT1-□ (Sourcing)

■ Feeding

Create the program to perform trapezoidal control when the input (CIO 0.00) goes ON.



Setting and Programming

(1) PLC Setup

There are no settings that need to be made in the PLC Setup.

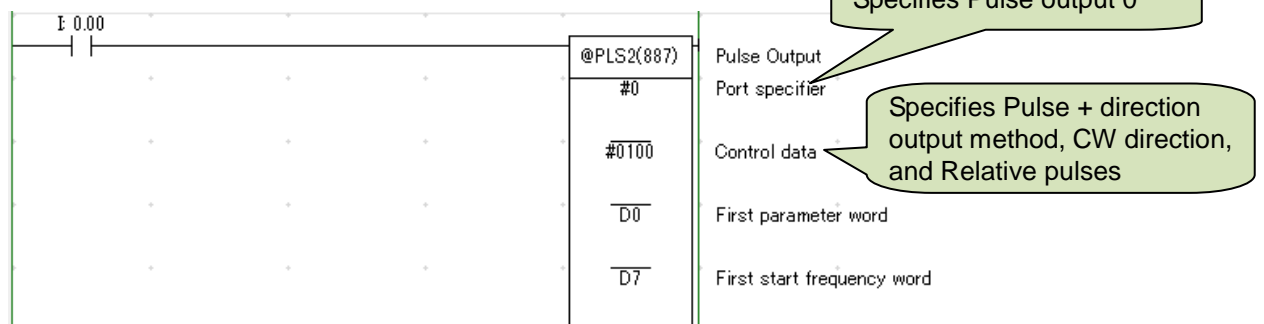
(2) DM Area Settings

Make settings for the PLS2 instruction.

Set the parameters in D0 to D5 and the starting frequency in D6 to D7.

Setting	Address	Data 4-digit hexadecimal
Acceleration ratio: 300 Hz/4 ms	D0	#012C
Deceleration rate: 200 Hz/4 ms	D1	#00C8
Target frequency: 50,000 Hz	D2	#C350
	D3	#0000
Number of output pulses: 600,000 pulses	D4	#27C0
	D5	#0009
Starting frequency: 100 Hz	D6	#0064
	D7	#0000

(3) Ladder Program

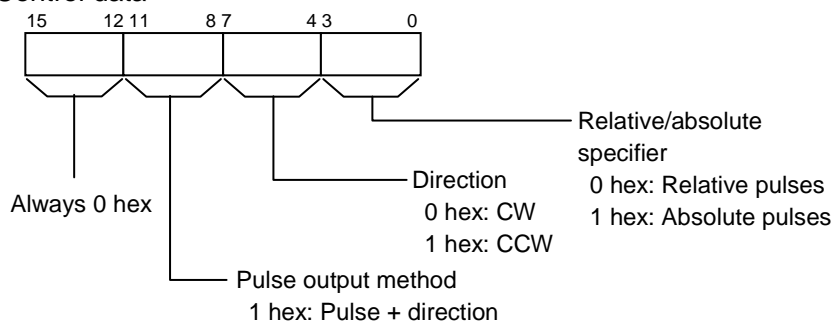


Port specifier and control data settings for the PLS2 instruction are as follows.

•Port specifier

0000 hex: Pulse output 0, 0001 hex: Pulse output1

•Control data



<Application Example>

■ Interrupt Feeding

Speed control is used to feed wrapping material. When the marker sensor detects a mark, fixed-distance positioning is performed before stopping.

High-precision positioning can be achieved by immediately stopping pulse output when an interrupt input is received.

Refer to the *CP1E CPU Unit Software User's Manual* (Cat. No. W480) for details.

NB series



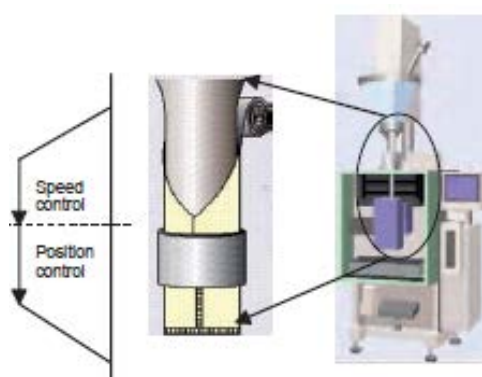
CP1E

Built-in pulse output

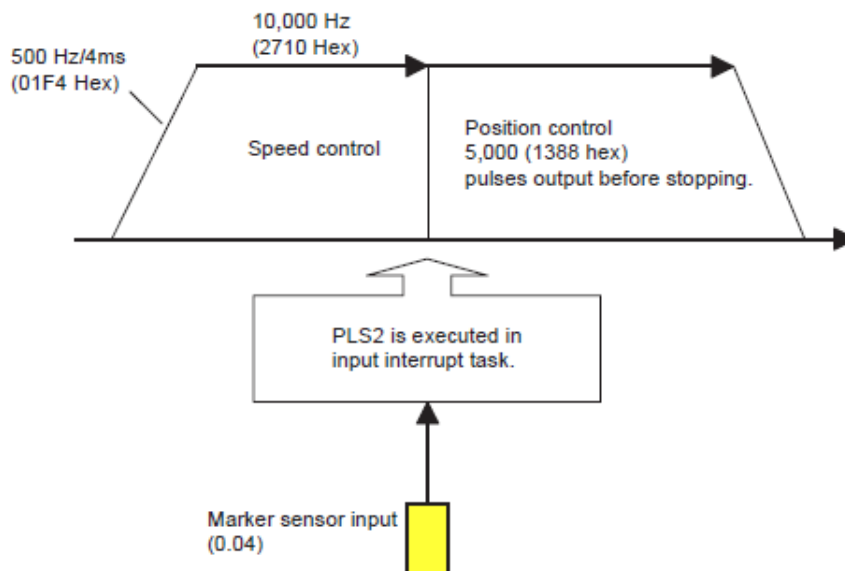
Interrupt input
(0.04)

Marker
sensor

Vertical Pillow Wrapper



Servomotor/Servo Drive G5 Series



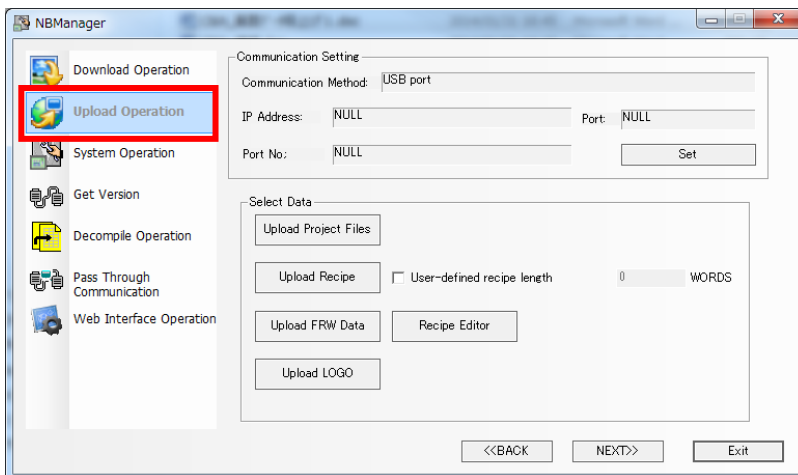
Upload Screen Data from NB



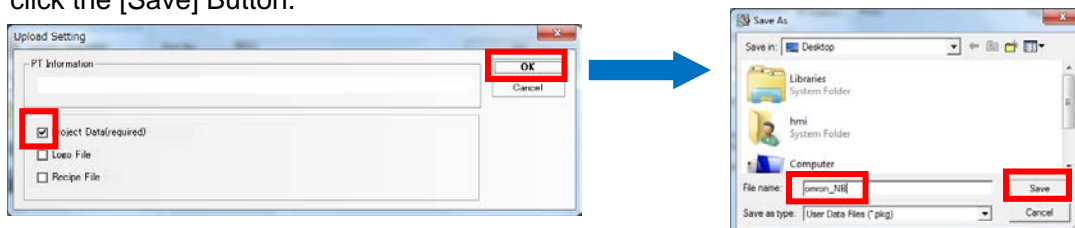
How can I upload the screen data from the NB?

NBManager enables the screen data upload.

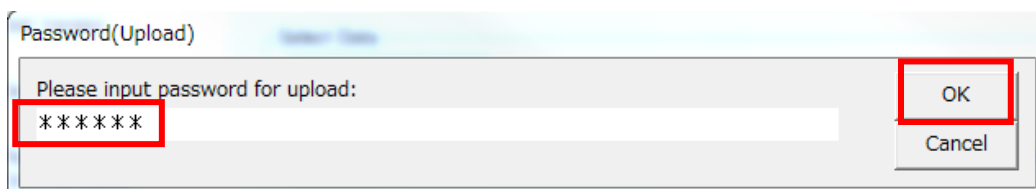
- (1) Connect the NB with a computer using a USB or other cable.
- (2) Start the NBManager, and select the [Upload Operation] Tab on the left of the screen.



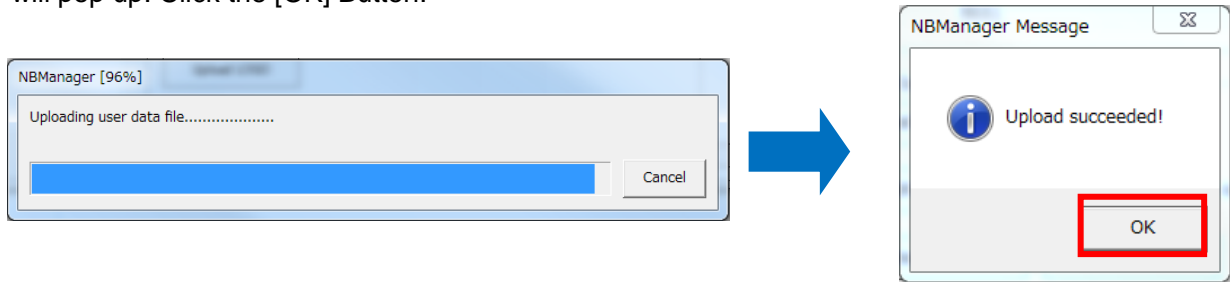
- (3) The [Upload Setting] Dialog Box appears. Check the [Project Data (required)] and click the [OK] Button. After the [Save As] Dialog Box pops up, specify the file name and path to upload and then click the [Save] Button.



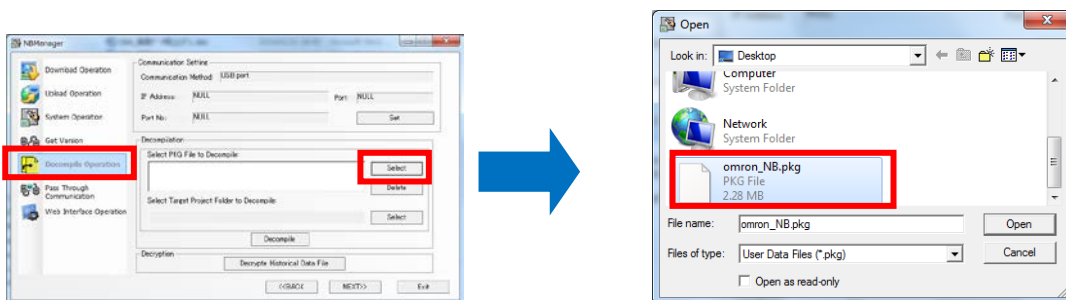
- (4) The [Password (Upload)] Dialog Box appears. Enter the password set for the uploaded screen, and click the [OK] Button. The default password is "888888".



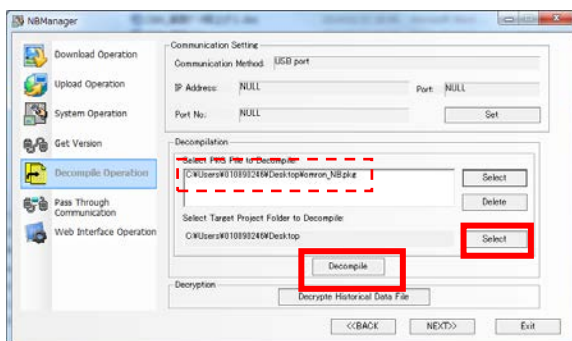
- (5) The screen data upload starts. When the upload is completed, the "Upload succeeded!" Dialog Box will pop up. Click the [OK] Button.



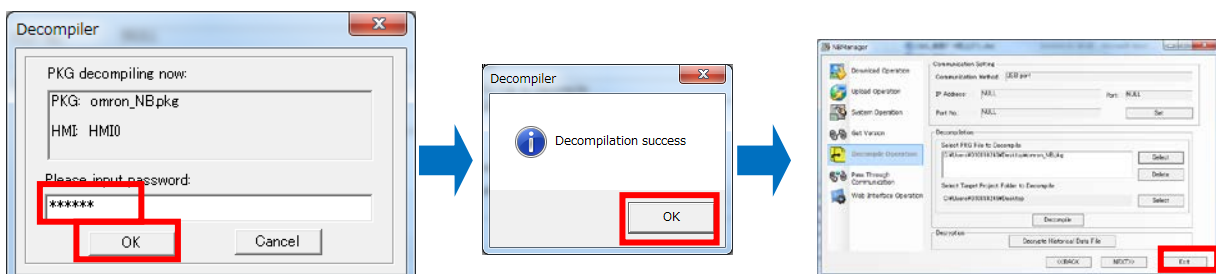
- (6) The uploaded file (file name: Omron_NB.pkg) can be found in the folder specified in step (3). The PLG file is a file that is generated when the NB project data is compiled.
- (7) Convert the PKG file to the format which can be handled with the NB-Designer (decompile).
- (8) Select the [Decompile Operation] Tab. Click the [Select] Button in the [Select PKG File to Decompile:] Field to specify the PKG file uploaded in step (6).



- (9) The PKG file specified in step (8) is displayed at [] in the diagram below. Click the [Select] Button in the [Select Target Project Folder to Decompile] Field to specify the folder to decompile, and then click the [Decompile] Button.



- (10) The [Decompiler] Dialog Box appears. Enter the password entered in step (4), and then click the [OK] Button. Exit the NBManager after the "Decompilation success" Dialog Box pops up.



- (11) The decompiled screen data for the NB-Designer is uploaded to the folder specified in step (9).

◆ Point ◆

NBManager is used to upload the screen data from the NB.
To upload the NB screen data, a PKG file is uploaded and then "decompiled" using the NBManager.

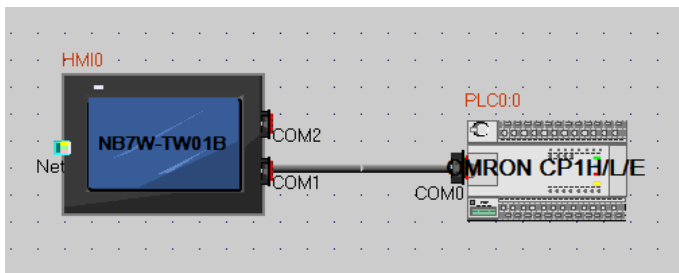
Problem with Connection



Although connection settings between NB and CP1E seem to be correct, I get a connection error. Where should I check?

You can check the connection in the "Configuration and Setup Window".

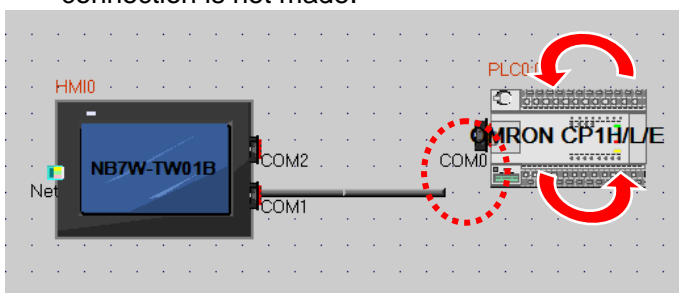
Start the NB-Designer, and select [Configuration and Setup Window] in the [Window] Menu. Although the NB, PLC, and cable seem to be connected, they are sometimes not connected properly.



They seem to be connected.

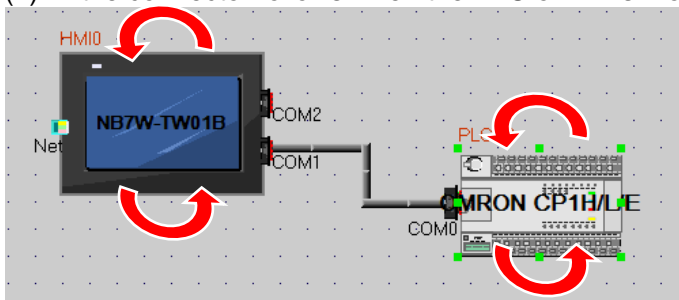
◆ How to check

- (1) Left click and drag the PLC or NB around. If one component is separated from another, the connection is not made.



Move the PLC or NB.

- (2) If the connector follows when the PLC or NB is moved, the connection is made properly.



The connection is OK!

Scaling Analog I/O Values

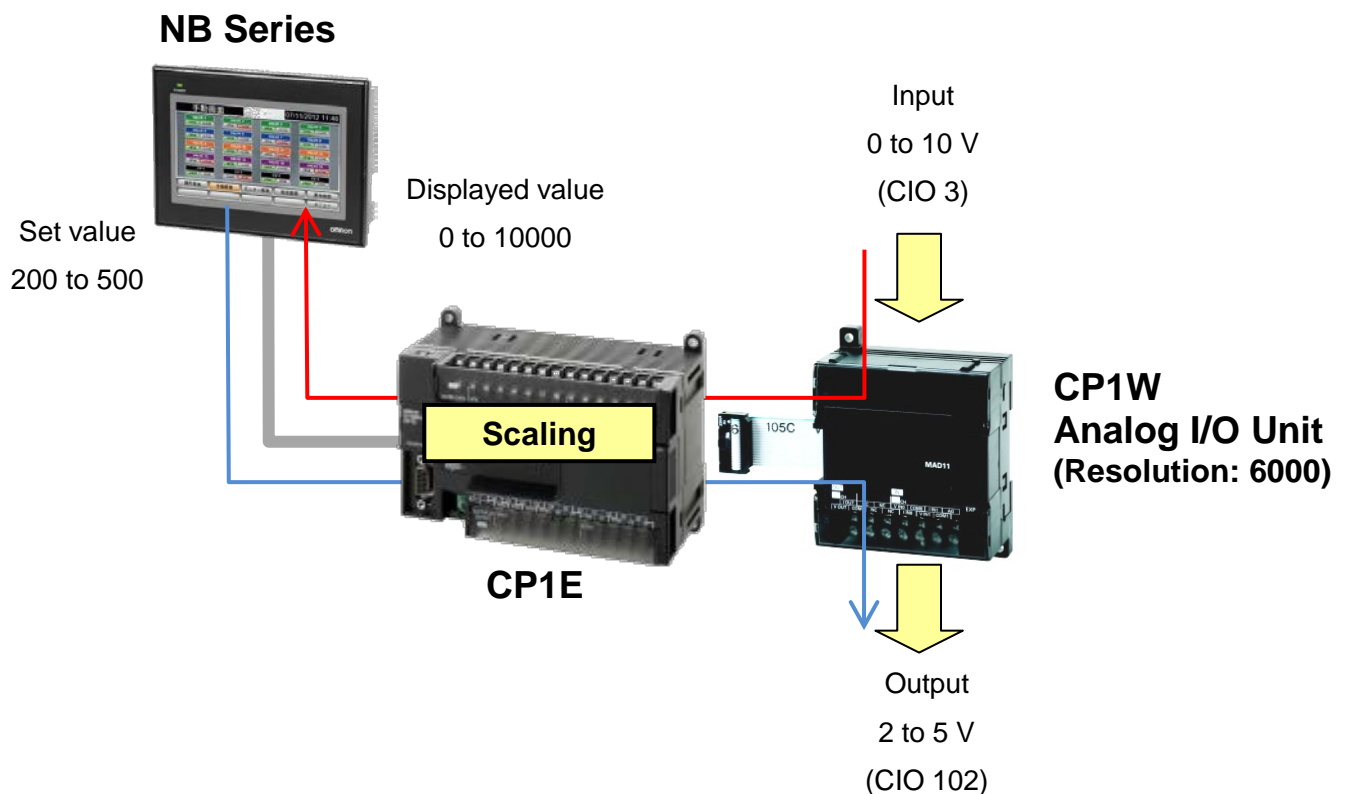


How can I convert analog input voltages into arbitrary values and display the values?
How can I convert arbitrary set values into analog voltages and output voltages?

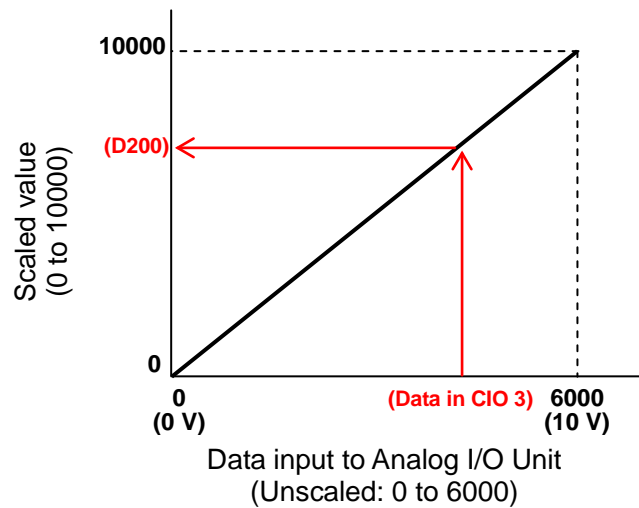
Use the APR instruction for scaling

A CP1E instruction is used to scale.

1. When a 0 to 10-V voltage input to an Analog Input Unit is input to memory as 0 to 6000, convert the value into a value between 0 and 10000.
2. Convert a set value between 200 and 500 to output a voltage between 2 and 5 V.



- When a 0 to 10-V voltage is input to the analog input word (CIO 3) as 0 to 6000, convert the value into a value between 0 and 10000 and output the result to D200.



Setting and Programming

(1) PLC Setup

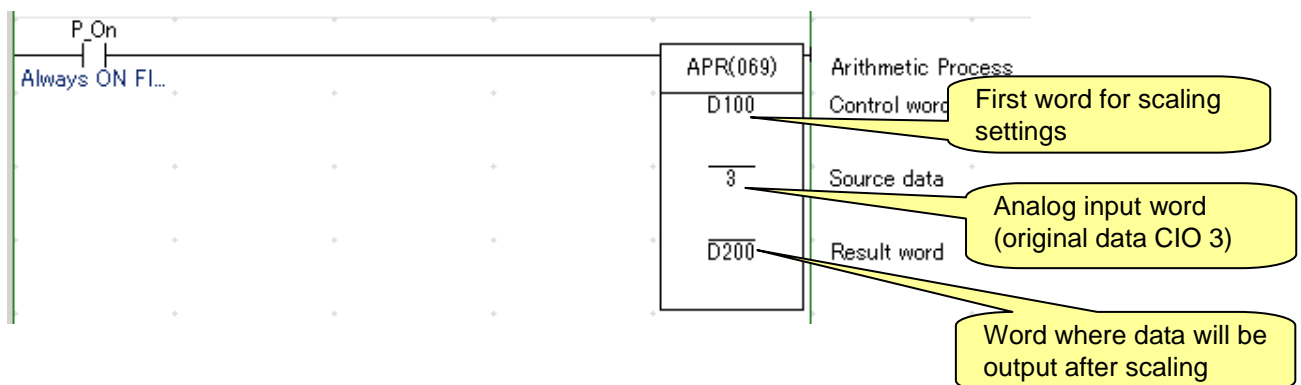
There are no settings that need to be made in the PLC Setup.

(2) DM Area Settings

Setting	Address	Data
Control word *	D100	#0800
Unscaled minimum value (0)	D101	&0
Scaled minimum value (0)	D102	&0
Unscaled maximum value (6000)	D103	&6000
Scaled maximum value (10000)	D104	&10000

(3) Ladder Program

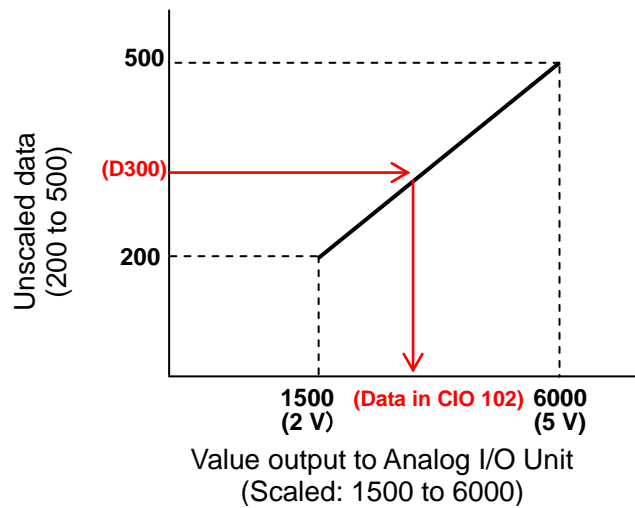
Use the APR instruction.



*: Refer to page 4 for the detail of the APR instruction.

2. Convert a value between 200 and 500 in D300 into 2 to 5 V to output the voltage from the analog output word (CIO 102).

Convert into 2 to 5V (converted data: 1500 to 6000) within the 1 to 5-V output range (converted data: 0 to 6000) of the Analog Output Unit.



Setting and Programming

(1) PLC Setup

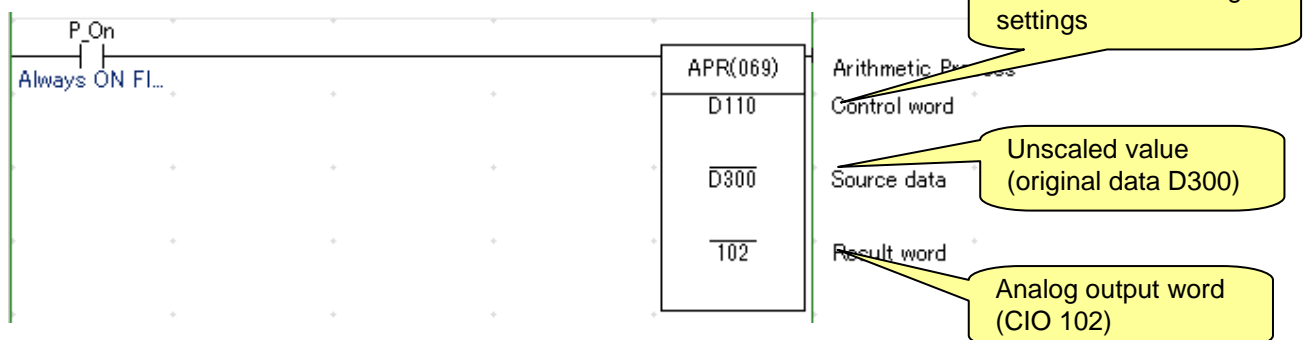
There are no settings that need to be made in the PLC Setup.

(2) DM Area Settings

Setting	Address	Data
Control word *	D110	#0800
Unscaled minimum value (200)	D111	&200
Scaled minimum value (1500)	D112	&1500
Unscaled maximum value (500)	D113	&500
Scaled maximum value (6000)	D114	&6000

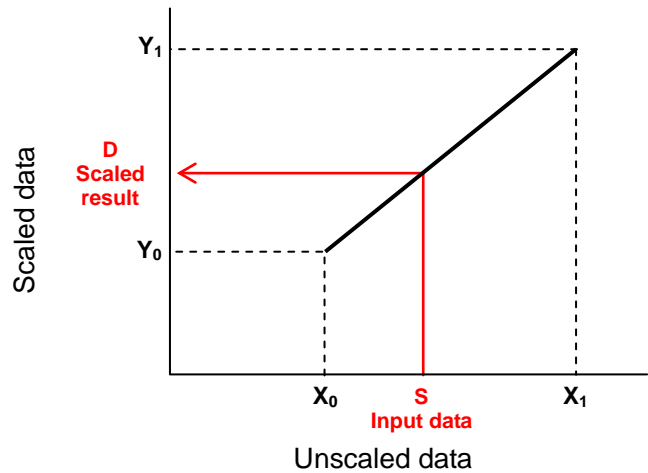
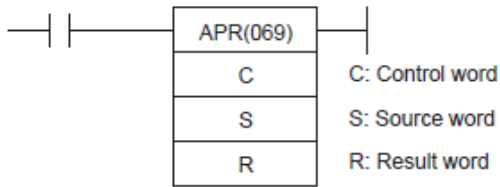
(3) Ladder Program

Use the APR instruction.



*: Refer to page 4 for the detail of the APR instruction.

Reference: Detail of APR instruction

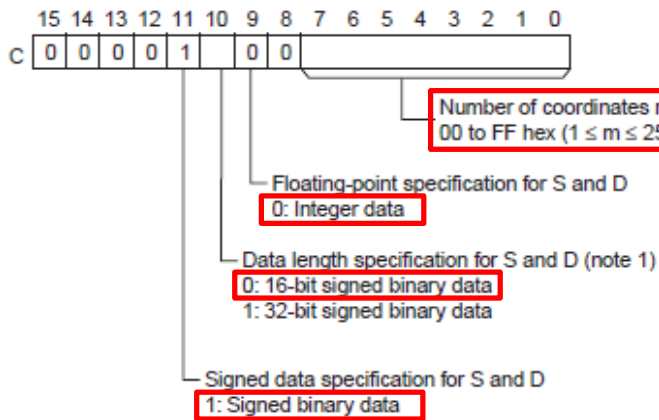


C: Control word

Set for "Signed Integer Data (Binary)".

Control Word Setting

#0800: Binary numeral (0000 1000 0000 0000)



The number of coordinates is 1 ($m=1$), so set bit 0 to 7 to "0" ($=m-1$).

Setting	Address	Data
Control word	C	#0800
Unscaled minimum value (X_0)	C+1	X_0
Scaled minimum value (Y_0)	C+2	Y_0
Unscaled maximum value ($X_m = X_1$)	C+3	X_1
Scaled maximum value ($Y_m = Y_1$)	C+4	Y_1

S: Source data

Specify the word address of the input data before scaling.

R: Result word

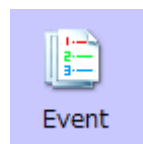
Specify the word address where the data will be output after scaling.

Convenient Use of NB Event



**What is the difference between Event and Alarm?
How can I use them properly?**

Difference between Event and Alarm components

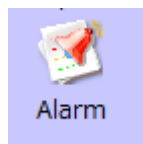


Event

The Event component can **display history** and **time**.

The history can be saved to the recipe memory and USB memory.

The Event component allows you to specify the triggering conditions using values of word addresses and comparison with specified values.



Alarm

The Alarm component cannot display history and time.

The occurred alarm information is displayed in the specified area.

When the bit address which worked as an alarm trigger is released, the alarm display will be removed.

Proper use of Event and Alarm components

< Example >

When there is some information that is required to be stored and some information that is not required to be stored.

There is a limit to the number of logs that can be stored in the NB, so storing unnecessary logs reduces the number of logs that is required to be stored.

Register the information that is required to be kept in history to Event and other information to Alarm, which enables storing as many logs as possible.



How can I use Event Setting more efficiently?

Useful functions of Event

Select [Event Setting] in the [Project Database].



Click this icon!

◆ Classifying events

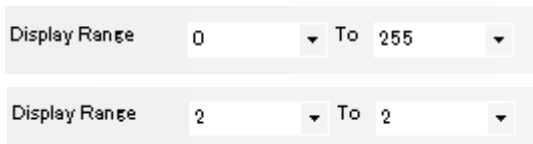
* 256 groups can be selected.

- (1) Select [Event Setting] in the [Project Database]. Set [Type: 0 to 255] to an arbitrary group.



Group 0

- (2) Drag the [Event] component icon from the [Parts] to open the [Event Property] Dialog Box. Set the Display Range in the [Event Setting] Tab Page.

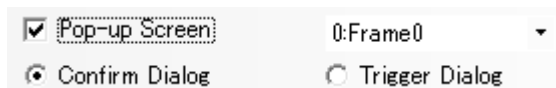


Events set for 0 to 255 are displayed.

Only the event set for 2 is displayed.

◆ Associating with screen displayed when event occurs

Select the [Add] or [Modify] Button in the [Event Setting] Dialog Box, and set the display method.



The specified screen will pop up

Confirm Dialog: when an ongoing event is touched.

Trigger Dialog: when an event occurs.

◆ Editing event settings in CSV file

Select the [Export] Button in the [Event Setting] Dialog Box. Edit the CSV file, and select the [Import] Button.



Input Interrupts for High-speed Processing



How to perform specific control immediately after an input signal is received, without being affected by cyclic processing

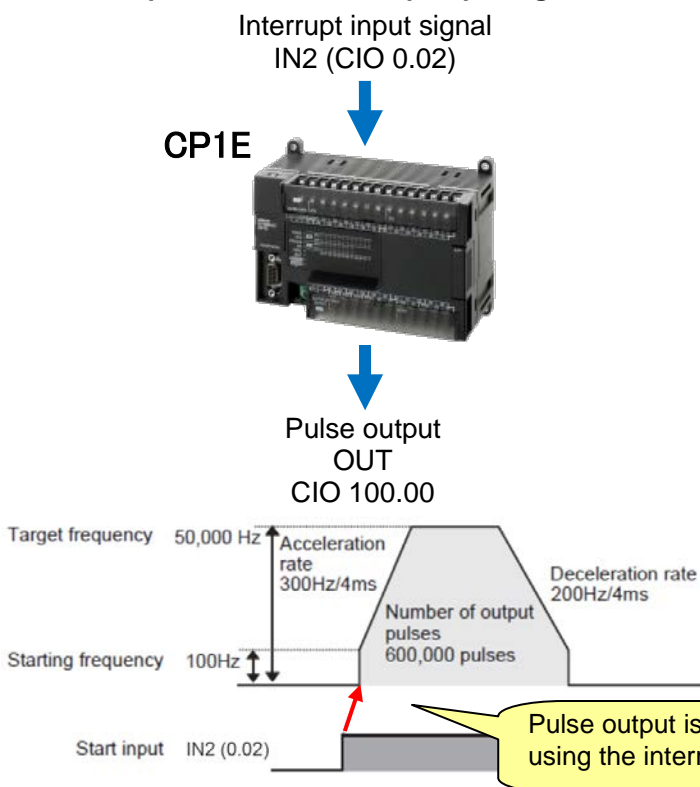
Input interrupts enable high-speed processing that is not restricted by the cycle time

CP1E CPU Units normally repeat processes in the following order: overseeing processes, program execution, I/O refreshing, peripheral servicing. During the program execution stage, cyclic tasks (ladder programs) are executed.

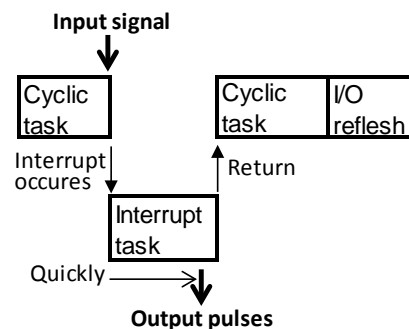
The interrupt function, on the other hand, allows a specified condition to interrupt a cycle and execute a specified program.

Interrupts can thus be used to perform high-speed processing that is not restricted by the cycle time.

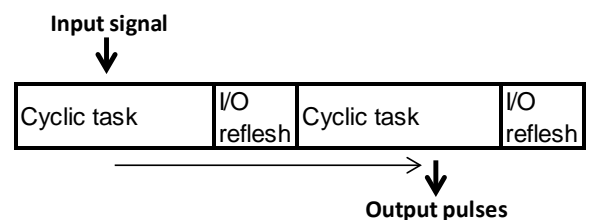
Example: When an interrupt input signal is received, pulses are output.



When using the interrupt function.



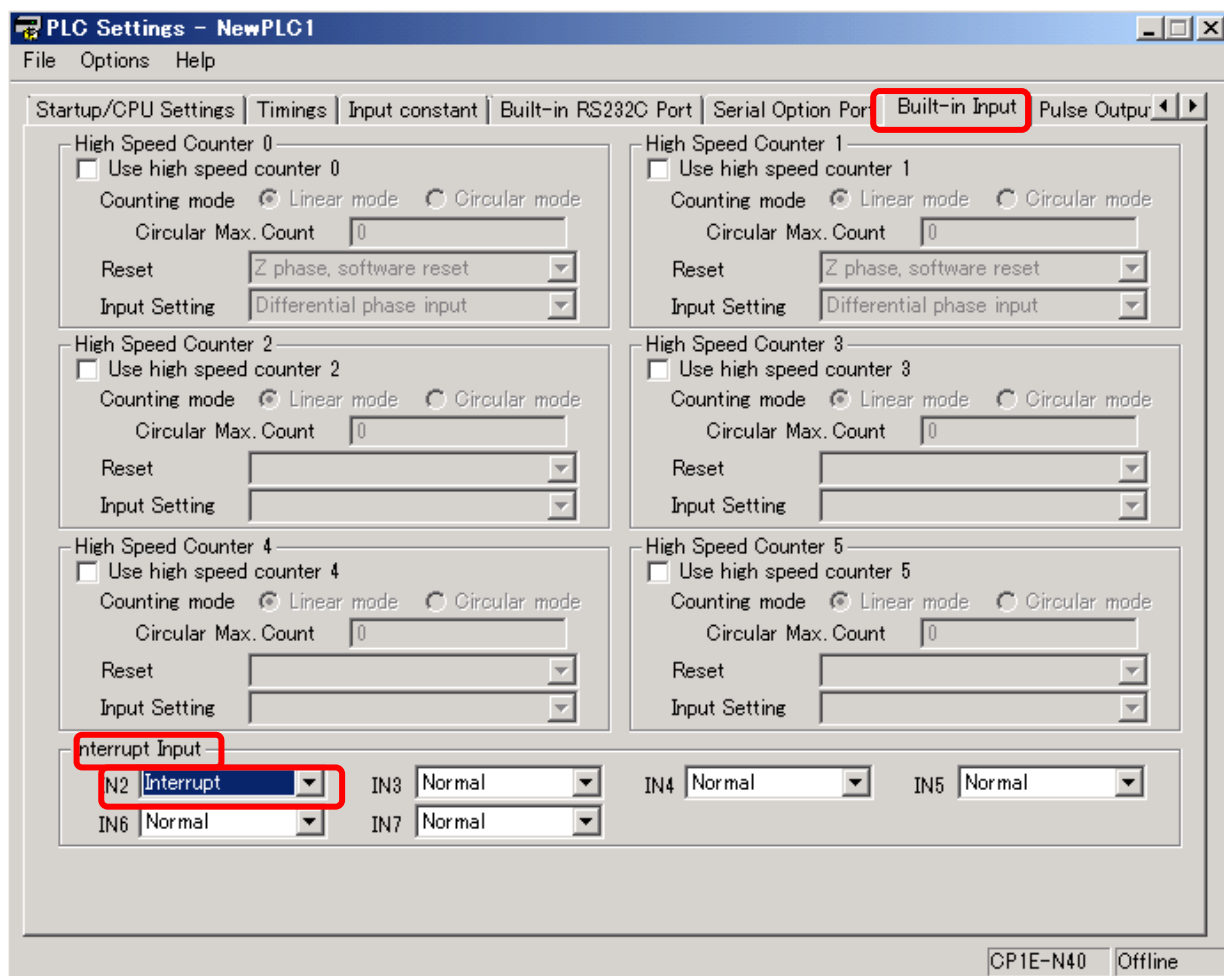
When not using the interrupt function.



1. Set IN2 (CIO 0.02) for an interrupt input in the PLC Setup.
2. Create the ladder program in a cyclic task to enable input interrupt IN2 (CIO 0.02).
3. Create the ladder program in the interrupt task to output pulses.

1. PLC Setup

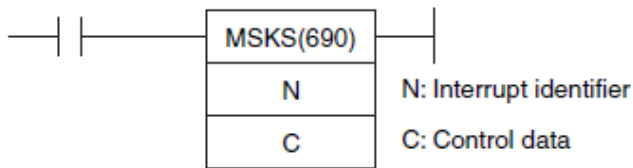
Set IN2 to [Interrupt] in the [Interrupt Input] Field on the [Built-in Input] Tab Page.



2. Create the ladder program in a cyclic task to enable input interrupt IN2 (CIO 0.02).

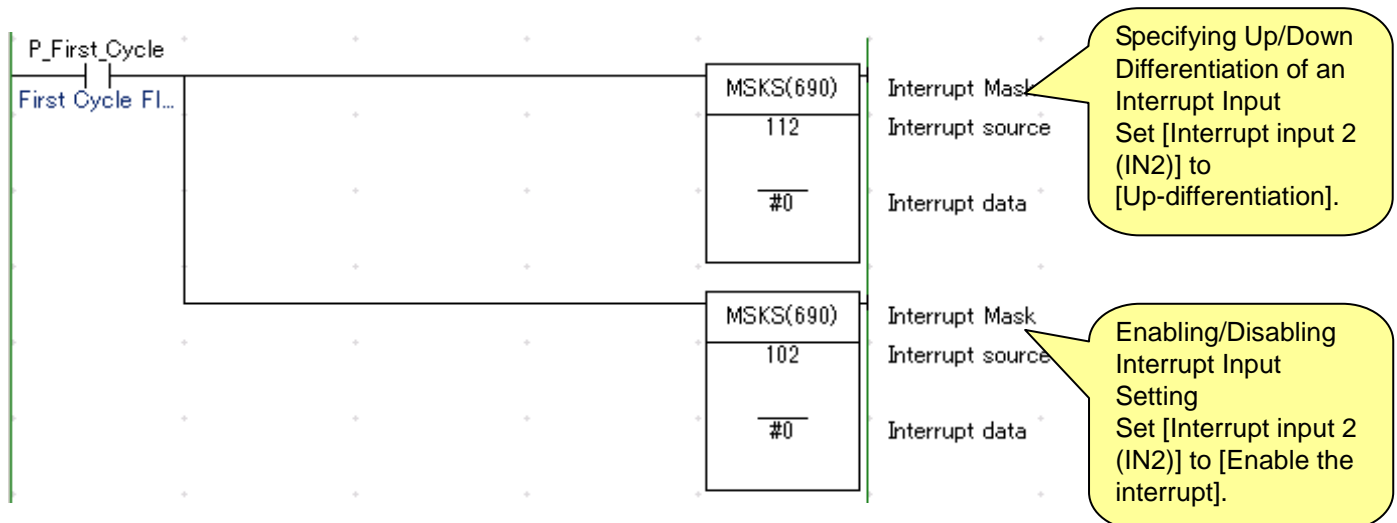
The interrupt function is disabled when the PLC is first turned on.

The MSKS instruction is used to enable and set interrupt inputs.



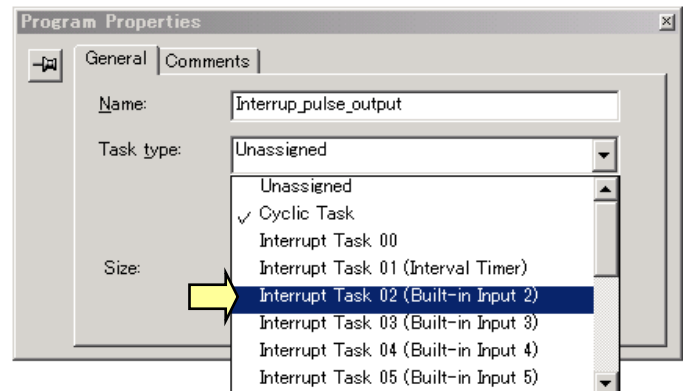
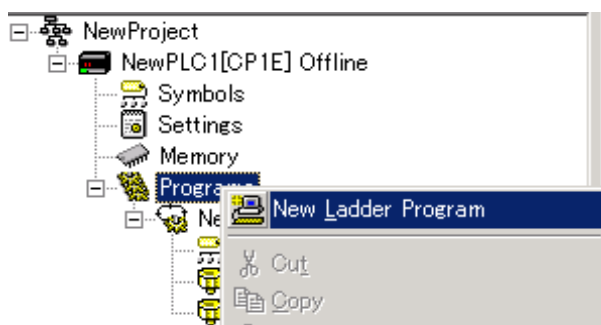
	Specifying Up/Down Differentiation of an Interrupt Input	Enabling/Disabling Interrupt Input Setting
N: Interrupt identifier	I/O Interrupt No. 112: Interrupt input 2 (interrupt task 2) 113: Interrupt input 3 (interrupt task 3) 114: Interrupt input 4 (interrupt task 4) 115: Interrupt input 5 (interrupt task 5) 116: Interrupt input 6 (interrupt task 6) 117: Interrupt input 7 (interrupt task 7)	I/O Interrupt No. 102: Interrupt input 2 (interrupt task 2) 103: Interrupt input 3 (interrupt task 3) 104: Interrupt input 4 (interrupt task 4) 105: Interrupt input 5 (interrupt task 5) 106: Interrupt input 6 (interrupt task 6) 107: Interrupt input 7 (interrupt task 7)
C: Control data	#0000: Up-differentiation #0001: Down-differentiation	#0000: Enable the interrupt #0001: Disable the interrupt

Set IN2 (CIO 0.02) to [Up-differentiation] and enable the interrupt input.



3. Create the ladder program in the interrupt task to output pulses.

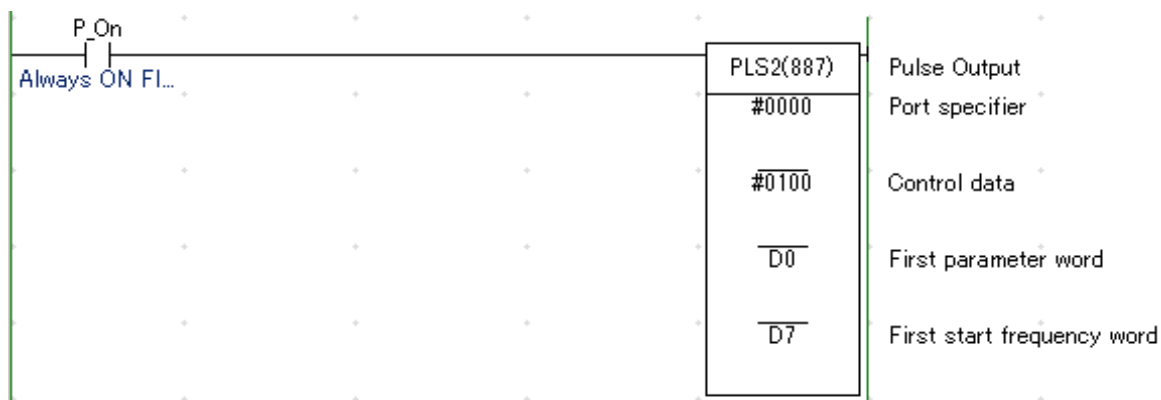
- (1) Add a new ladder program and assign the interrupt task in the [Program Properties] Dialog Box. Select [Interrupt Task 02 (Built-in Input 2)] to use IN2 for the interrupt input.



- (2) Set to output 600,000 pulses at the maximum frequency of 50 kHz.

Set the parameters required for the PLS2 instruction in D0 to D7.

Setting	Address	Data 4-digit hexadecimal
Acceleration rate: 300 Hz/4 ms	D0	#012C
Deceleration rate: 200 Hz/4 ms	D1	#00C8
Target frequency: 50,000 Hz	D2	#C350
	D3	#0000
Number of output pulses: 600,000 pulses	D4	#27C0
	D5	#0009
Starting frequency: 100 Hz	D6	#0064
	D7	#0000



*** Refer to The monthly news, C&N Vol.10 "Easy Positioning Using Pulse Outputs" for pulse output settings.**

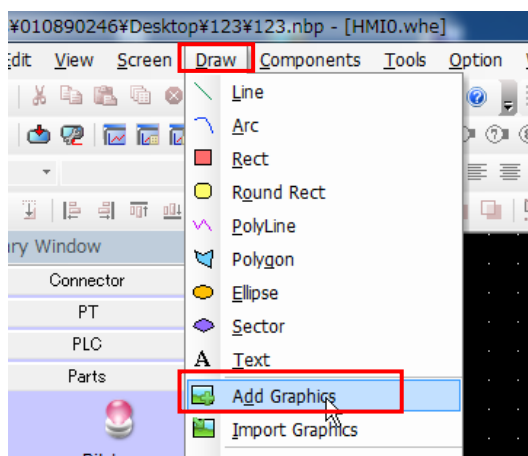
Use NS Components on NB



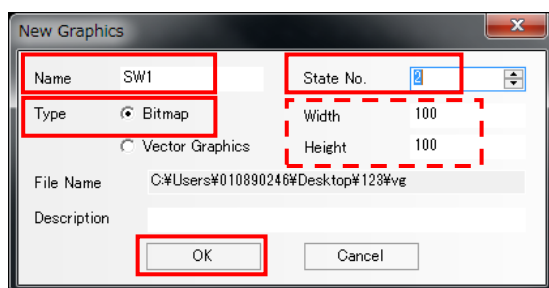
How can I use the beautiful components of the CX-Designer on the NB?

Set in Add Graphics and Load Graphic.

- (1) Select [Add Graphics] in the [Draw] Menu to display the [New Graphics] Dialog Box. Make the following settings.

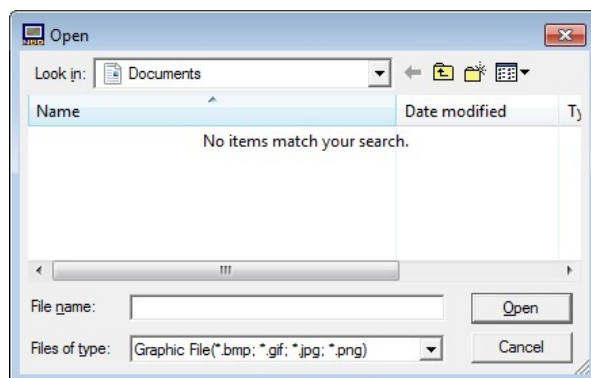
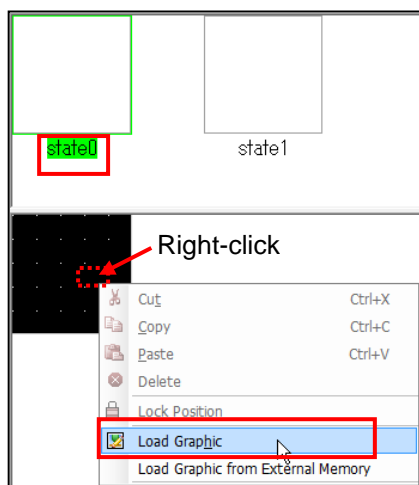


- Name: SW1 (any name)
- State No.: 2 (ON and OFF)
- Type: Select the [Bitmap] Option



Set Width and Height to the width and height displayed in the NB-Designer.
(The above are the default values.)

- (2) Select "state0" in the [State Preview] Window. (The background turns green.) Right-click in the black editing box under "State0" and select [Load Graphic]. The [Open] Dialog Box will appear.

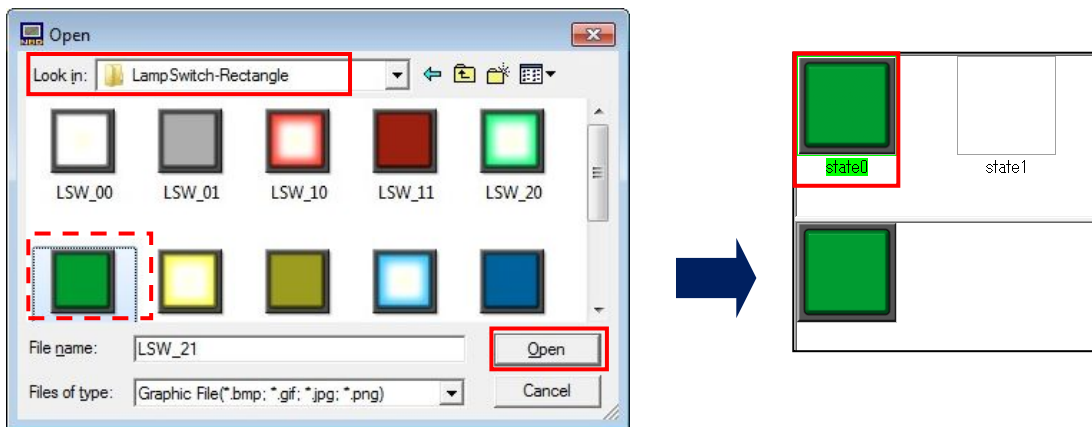


- (3) From the [Look in] Drop-down List, select a folder containing the required image under the [BMPfiles] folder in the installation folder of the CX-Designer. Select an image to use (OFF color), and then click the [Open] Button.

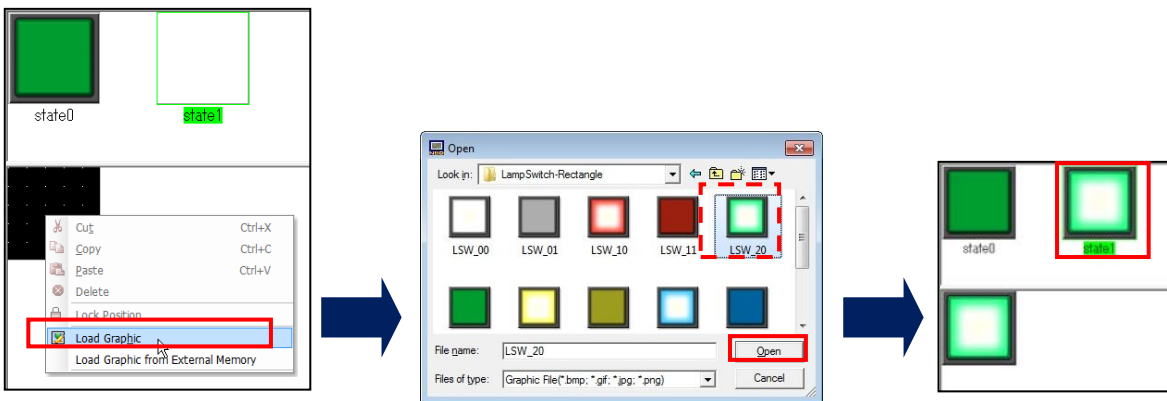
The selected image will be loaded into "state0".

When the CX-one is installed normally, the default path of the [BMPfiles] folder is as follows:

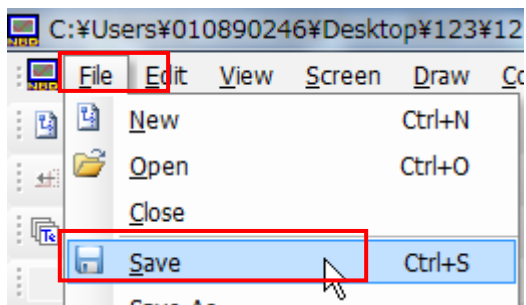
C:\Program Files\OMRON\CX-One\CX-Designer\intaparts\BMPfiles



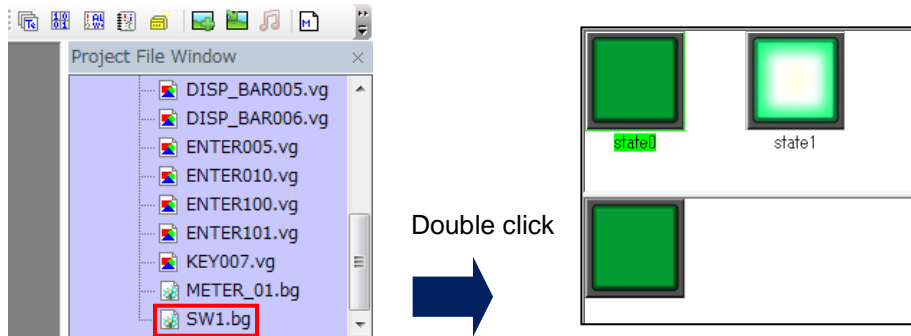
- (4) Select "state1" (green background). Right-click and select [Load Graphic] to load the ON image.



- (5) Select [Save] in the [File] menu to save the project after loading images into "state0" and "state1".

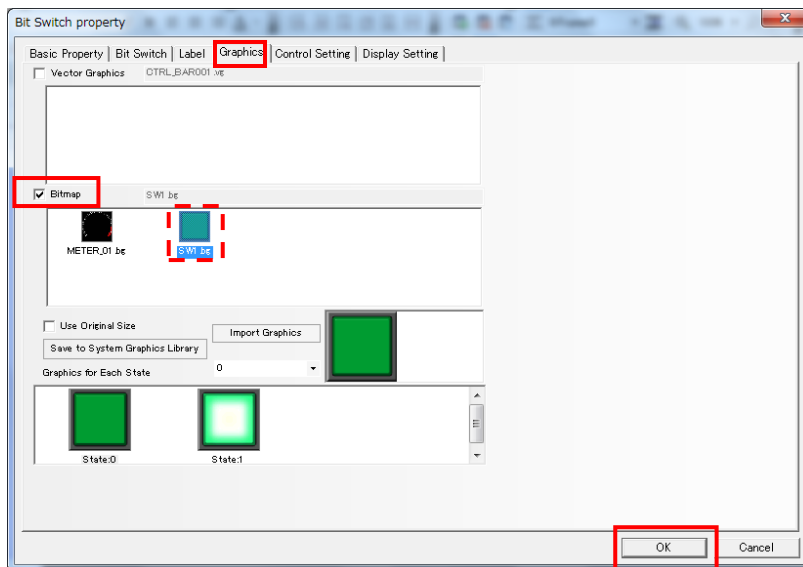


(6) The name of the created bitmap graphic, which is specified in step (1), appears in the [Project File Window]. Double-click the name to show the images loaded in step (3) and (4), as shown below.

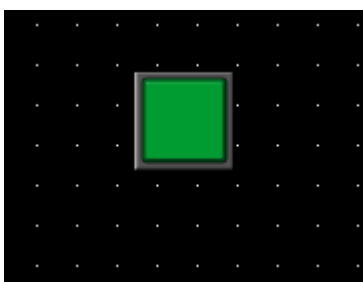


(7) Follow the below steps to use the newly created bitmap graphic as a graphic display for a component in the NB-Designer.

- 1) Place a component in the screen.
- 2) Double-click the component to open the property window.
- 3) Select the [Graphics] Tab, and then select the [Bitmap] Check Box
- 4) The created bitmap graphic appears. (OFF image loaded in step (3) is displayed.)



5) Click the [OK] Button. The component using images loaded in step (3) and (4) appears on the screen.



Positioning Using High-speed Counter

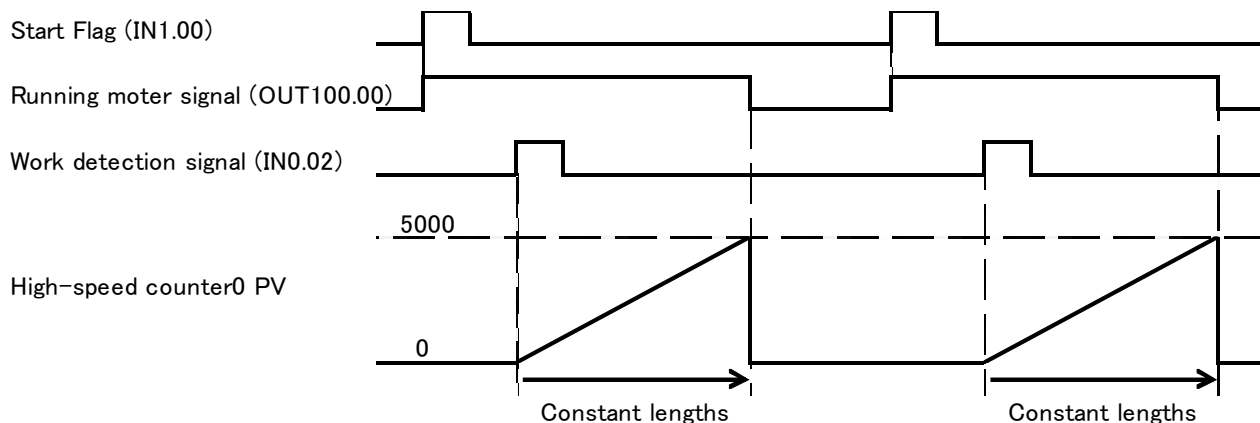
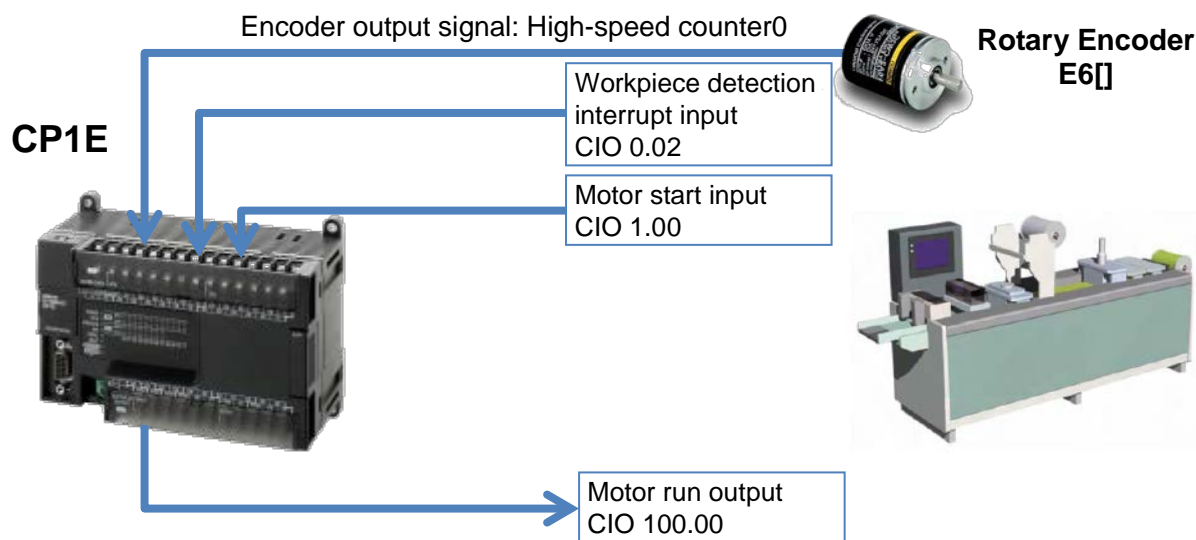


How to perform specified distance positioning

High-speed counter is used to feed specified distance.

After a workpiece is detected, the high-speed counter starts to count the feeding amount. When the present value of the high-speed counter reaches the target value, feeding is stopped.

Target value comparison of the high-speed counter enables high-accuracy positioning by counting rotary encoder outputs.



1. Set High Speed Counter 0 and Interrupt Input IN2 in the PLC Setup.
2. Create the ladder program for target value comparison using the CTBL instruction.

1. PLC Setup

Set High Speed Counter 0 and Interrupt Input in the [Built-in Input] Tab Page.

(1) High Speed Counter 0

- Select the [Use high speed counter 0] Check Box.
- Set Counting mode to [Linear mode].
- Set Reset to [Software reset] (to reset on the ladder diagram).
- Set Input Setting to [Differential phase input]. (Set according to the encoder to use.)

(2) Interrupt Input

- Set IN2 to [Interrupt].

The screenshot displays the 'Built-in Input' configuration window. The 'High Speed Counter 0' section is highlighted with a red box. It shows the following settings:

- Use high speed counter 0
- Counting mode: Linear mode, Circular mode
- Circular Max. Count: 0
- Reset: Software reset
- Input Setting: Differential phase input

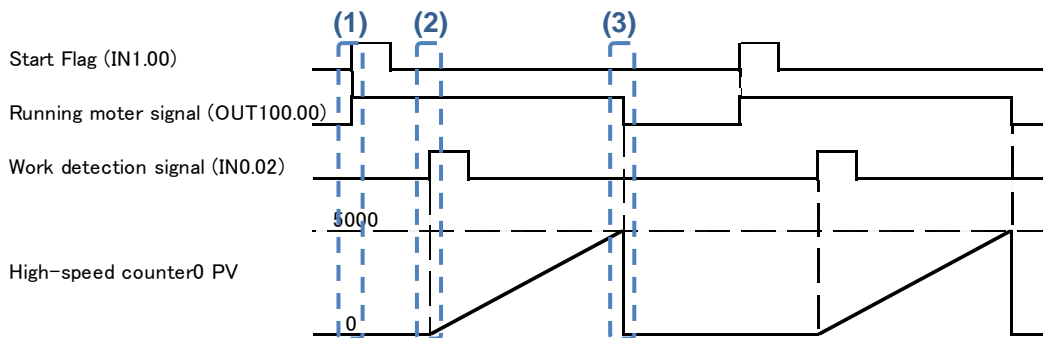
The 'Interrupt Input' section is also highlighted with a red box. It shows the following settings:

- IN2: Interrupt
- IN3: Normal
- IN4: Normal
- IN5: Normal
- IN6: Normal
- IN7: Normal

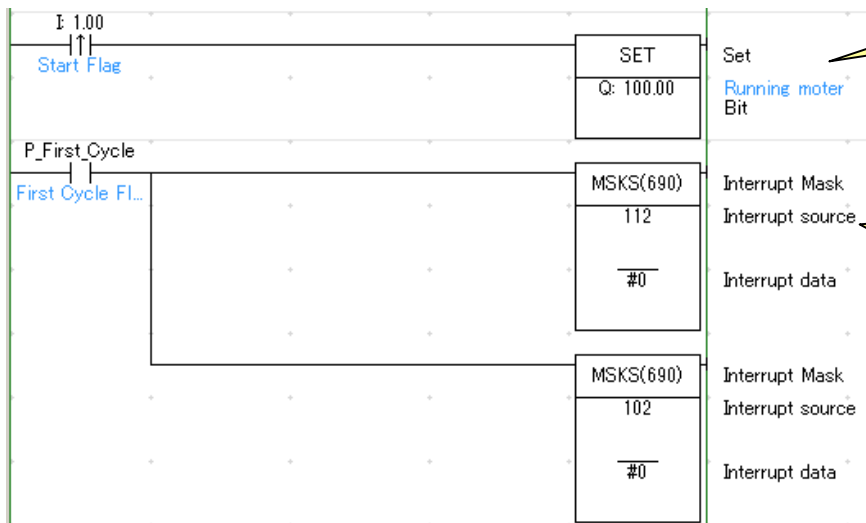
2. Create the ladder program for target value comparison using the CTBL instruction.

Operation overview

- (1) When motor start input (CIO 1.00) turns ON, the motor starts.
- (2) When workpiece detection interrupt input (CIO 0.02) turns ON, the high-speed counter starts to perform target value comparison.
- (3) When the present value of the high-speed counter matches the target value, the motor is stopped and the present value of the high-speed counter is reset.



(1) Cyclic task

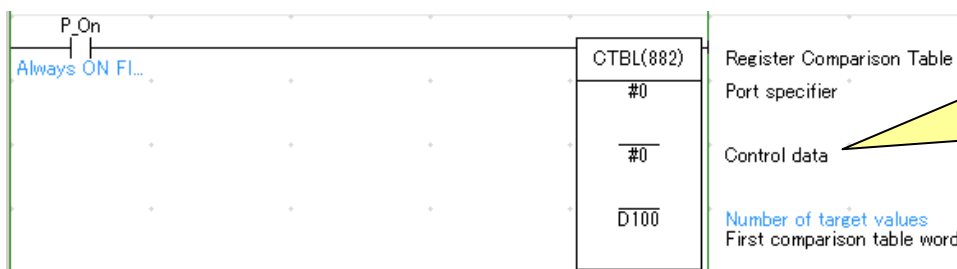


CIO 1.00 is turned ON to start motor.

Setting of workpiece detection interrupt input (CIO 0.02)
Specifying differentiation of interrupt input
Interrupt Input 2 (IN2) is set to [Up-differentiation].

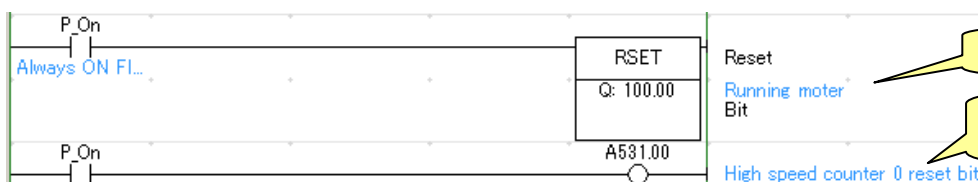
Enabling interrupt input.
Interrupt Input 2 (IN2) is set to [Enable the input].

(2) Interrupt task 2 is executed when a workpiece is detected (Interrupt input: CIO 0.02 turns ON).



CTBL instruction for high-speed counters is used to make target value comparison setting.

(3) Interrupt task 8 is executed when the present value of the high-speed counter reaches 5,000 (target value)

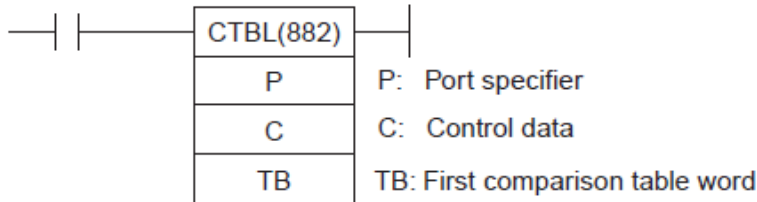


Motor is stopped.

Present value of high-speed counter is reset.

◆ **CTBL Instruction**

The CTBL instruction is used to register a comparison table and perform comparisons for a high-speed counter present value.



Set as follows.

Parameter	Set value
High-speed counter number	High-speed counter 0
Control method	Registers a target value comparison table and starts comparison.
Number of target values	1
Target value	5,000. The target value is valid when the PV is being incremented.
Interrupt task number for target value 1	8

P: Port specifier

P	High-speed counter number
0000 hex	High-speed counter 0
0001 to 0005 hex	High-speed counter 1 to 5

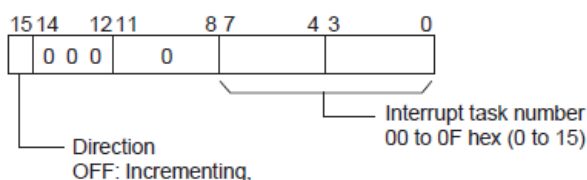
C: Control data

C	Control method
0000 hex	Registers a target value comparison table and starts comparison.
0001 hex	Registers a range comparison table and performs one comparison.
0002 hex	Registers a target value comparison table.
0003 hex	Registers a range comparison table.

TB: First comparison table word

Setting	Address	Data
Number of target values: 1	D100	&1
Target value 1: 5,000	D101 to D102	&5000
Interrupt task number for target value 1: 8	D103	&8

Interrupt task number



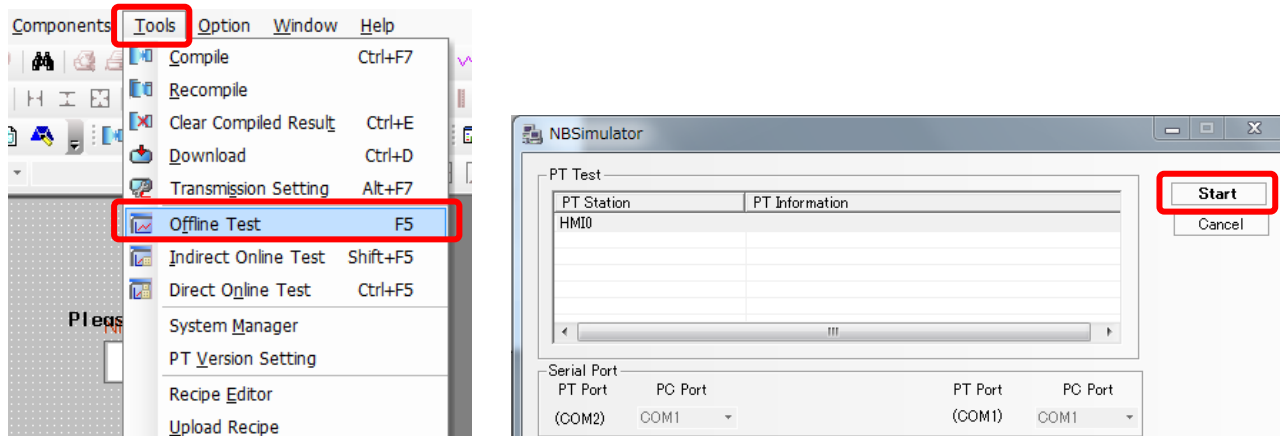
Paste Screenshots into Documents



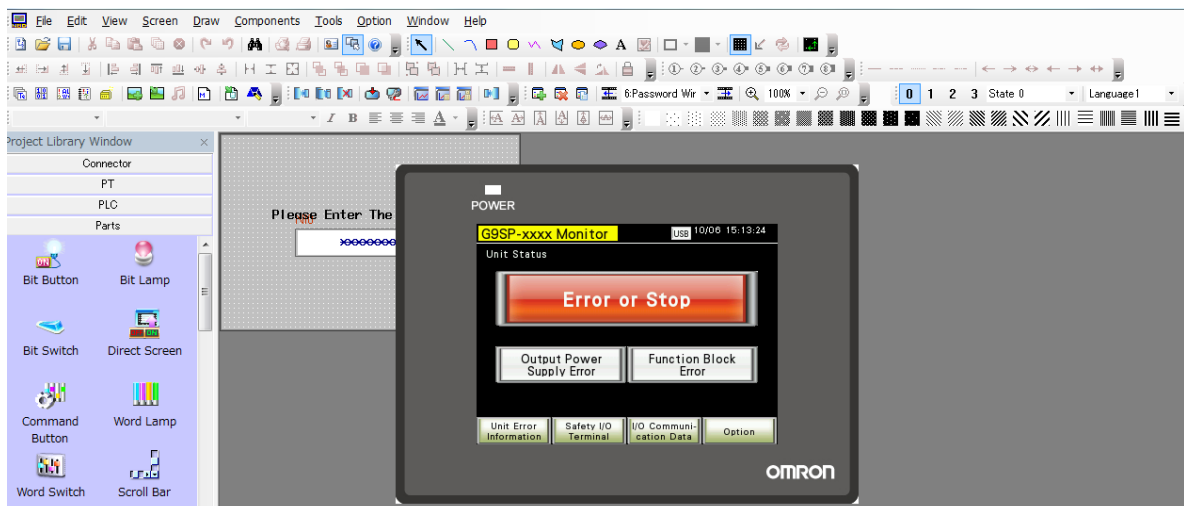
How do I easily copy NB screenshots and paste them into documents when I create machine specifications and manuals?

Now you can copy offline test screens to the Clipboard and paste them.

1. Select [Offline Test] in the [Tools] menu to start the offline test.



2. Display the screen to copy.

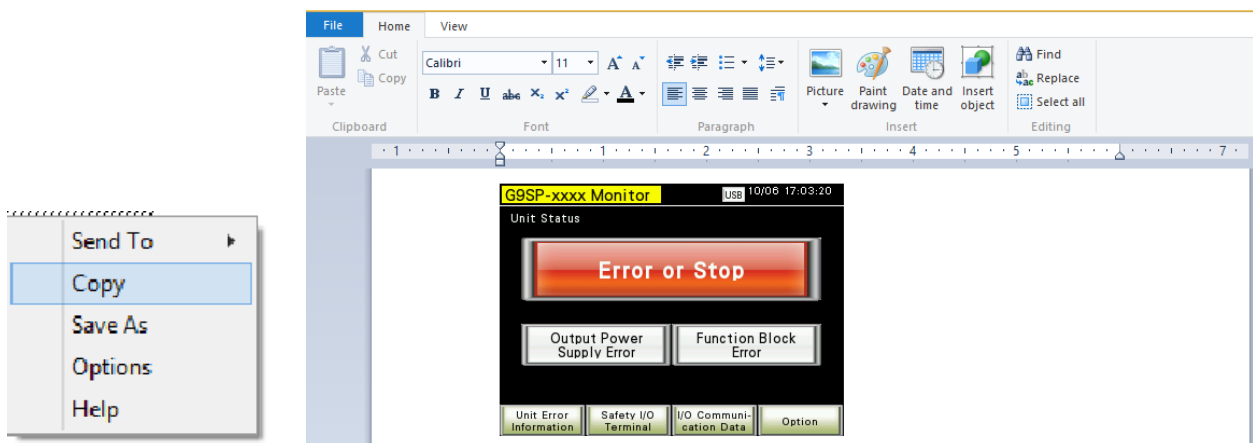


3. Right-click on the screen and select [Screenshot].

The screenshot is copied to the Clipboard.



4. Open the document to paste the screenshot. Use a keyboard shortcut Ctrl + V or right-click then select [Paste] to paste the screenshot into the document.



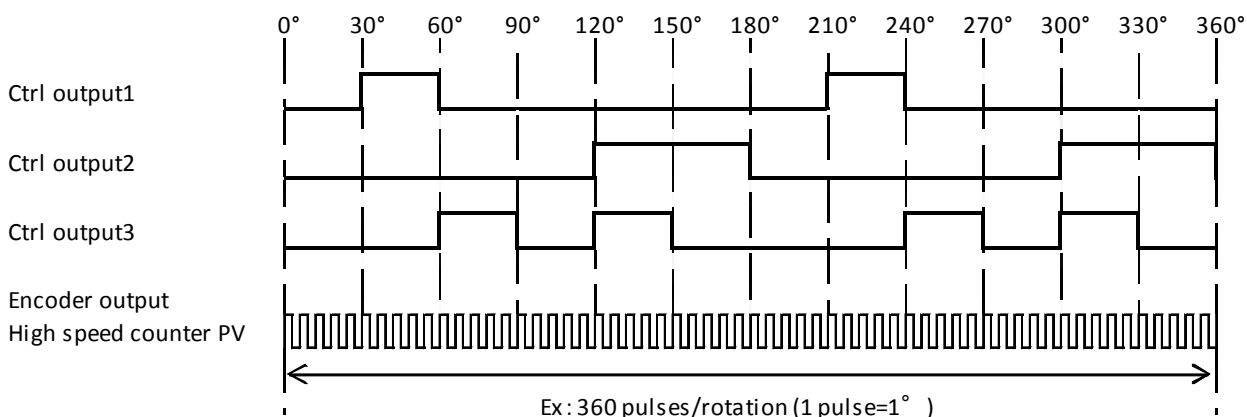
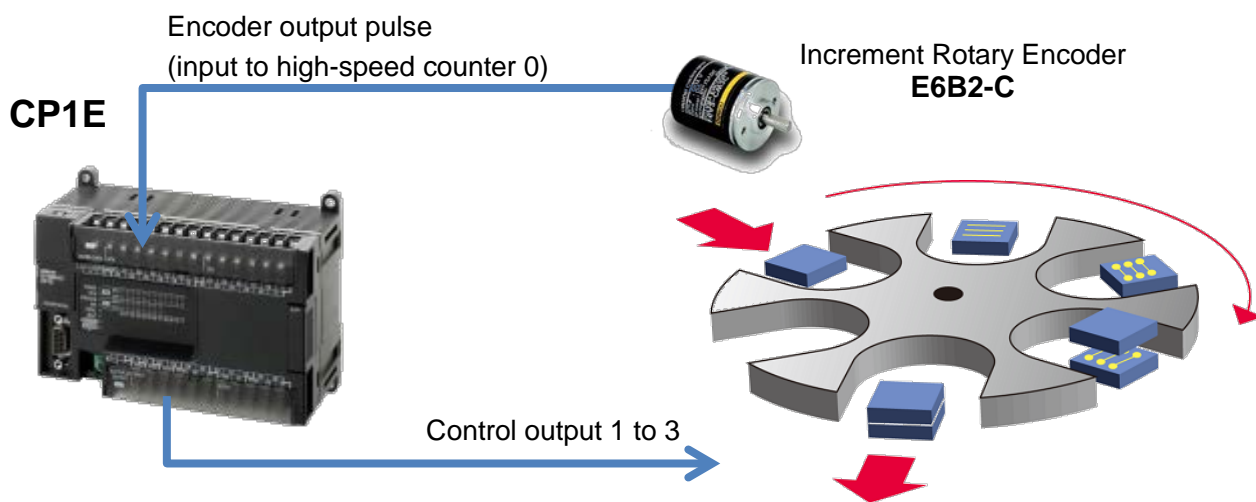
Cam Motion Using High-speed Counter



How to implement angle control of rotating machines

High-speed counter is used for angle control of rotating machines.

The high-speed counter counts pulses output from the Rotary Encoder. When the high-speed counter value is within the specified angle range, output turns ON. Using the high-speed counter, the ladder diagram to turn ON control outputs is created.



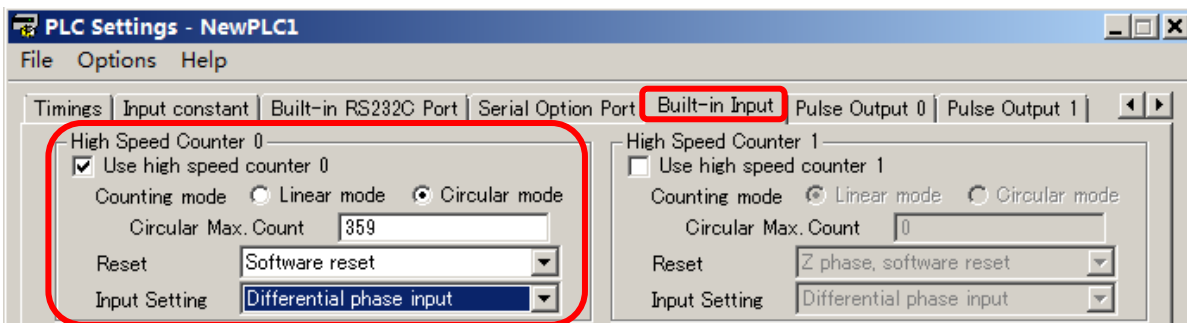
1. Set High Speed Counter 0 in the PLC Setup.

2. Create the ladder program to compare the high-speed counter value and turn ON control outputs.

1. PLC Setup

Set High Speed Counter 0 in the [Built-in Input] Tab Page.

- Select the [Use high speed counter 0] Check Box.
- Set Counting mode to [Circular mode].
- Set Circular Max. Count.
Set according to the encoder resolution to use.
As an Encoder with a resolution of 360 ppr is used in this example, set to [359] (360 ppr: 0 to 359).
- Set Reset to [Software reset] (to reset on the ladder program without using phase Z).
- Set Input Setting.
Set according to the encoder to use.
As the E6B2-C is used in this example, set to [Differential phase input].



The bits and words in the Auxiliary Area related to high-speed counter 0 are as follows.

- High-speed Counter 0 PV

A271	A270
Upper 4 digits	Lower 4 digits

- High-speed Counter Reset Bit 0

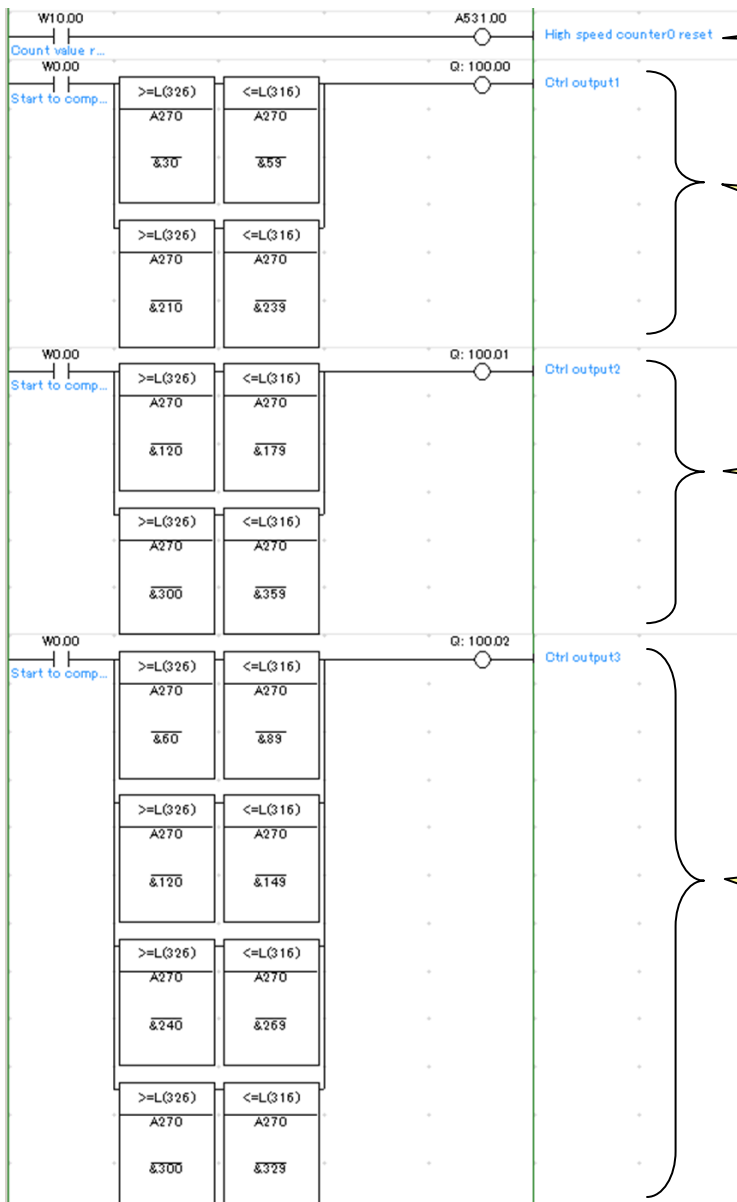
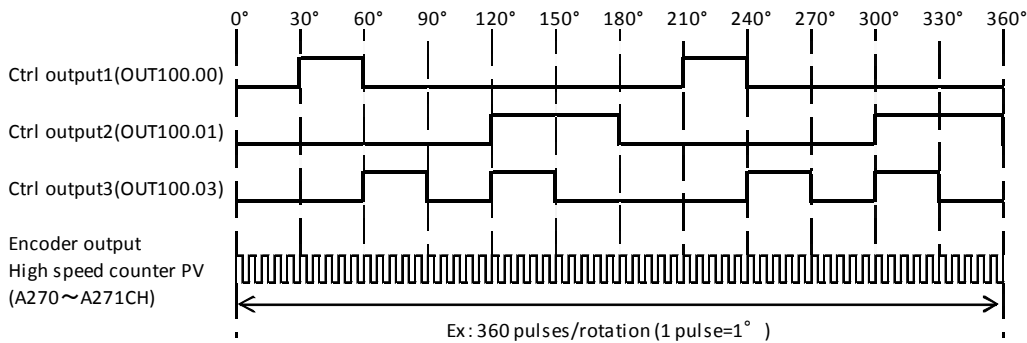
A531.00: When it turns ON, the present value of high-speed counter 0 is reset (set to 0).

2. Create the ladder program to compare the high-speed counter value and turn ON control outputs.

Operation overview

The present value of high-speed counter 0 (A270 and A271) is compared with the specified values using comparison instructions, and control outputs are turned ON.

- When W0.00 turns ON, the comparison starts.
- When W10.00 turns ON, the present value of the high-speed counter is reset (set to 0).



When W10.00 turns ON, high-speed counter 0 PV is reset.

Control output 1 (CIO 100.00) is turned ON when the angle is between 30° and 59° or between 210° and 239°.

Control output 2 (CIO 100.01) is turned ON when the angle is between 120° and 179° or between 300° and 359°.

Control output 3 (CIO 100.02) is turned ON when the angle is between 60° and 89°, between 120° and 149°, between 240° and 269°, or between 300° and 329°.

Helps Reduce Design Time in NB-Designer



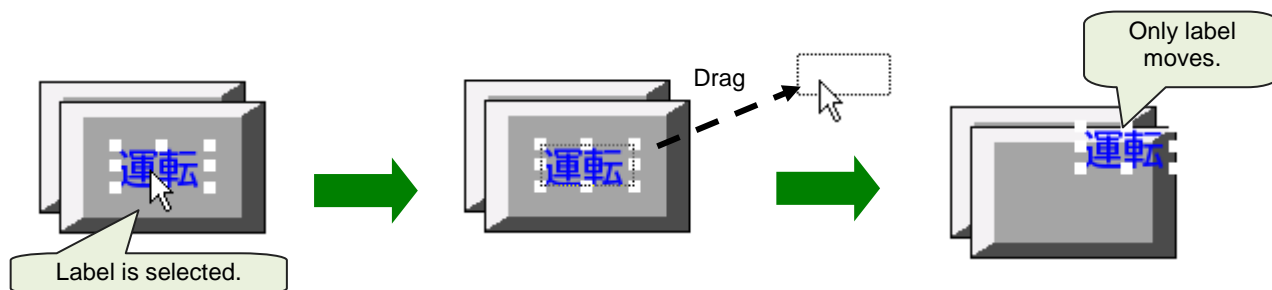
When I select and move a component, only its label is selected and moved.

In Ver. 1.34, the component and label can be moved together even if you click on the label.

Note. The NB-Designer version 1.34 is released in August 2014.

◆ NB-Designer version 1.33 or lower

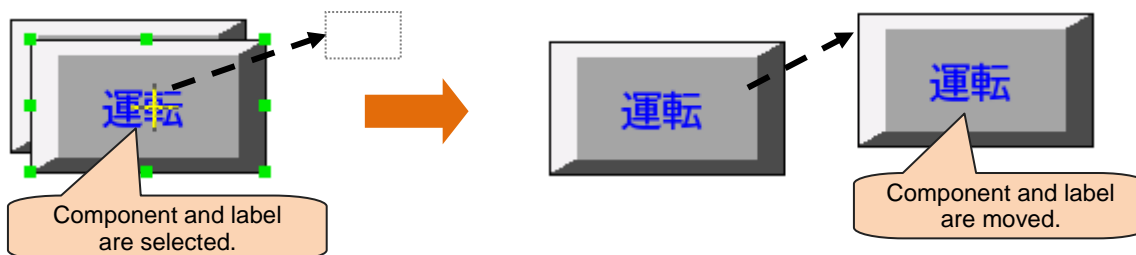
When a component is clicked near its label to move the component, only the label is selected and moved by dragging it, and the component remains in the original position.



◆ NB-Designer version 1.34 or higher

The way to select a label is improved.

Even when a component is clicked near its label, the component and label can be selected and moved together by dragging them.



* When you want to move only a label
When the component and label are selected, click on the label again to select only the label (the label will be surrounded by a white frame) and drag it to the desired position.

Create Beautiful Screen with NB-Designer



The touch panel serves as the face of our machine.
How to create good looking screens easily?

Professionally designed "cool" templates are available.

Just download "cool" templates and objects from the OMRON website and customize them as you like to create good looking screens!

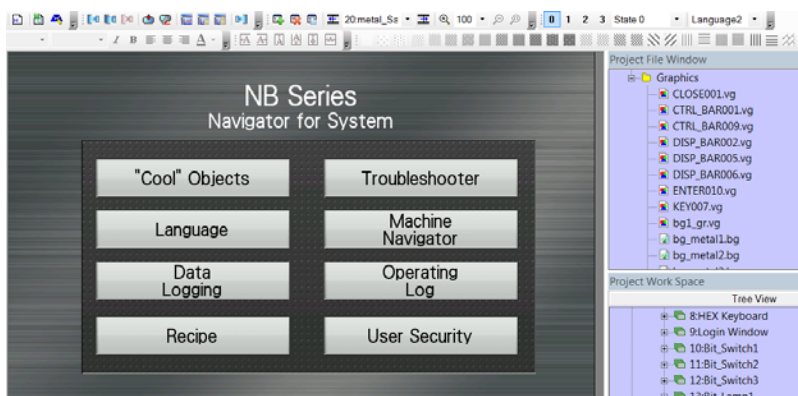
1. Download *Cool objects for NB* from the OMRON JAPAN website:

<http://www.fa.omron.co.jp/products/family/3110/download/software.html>

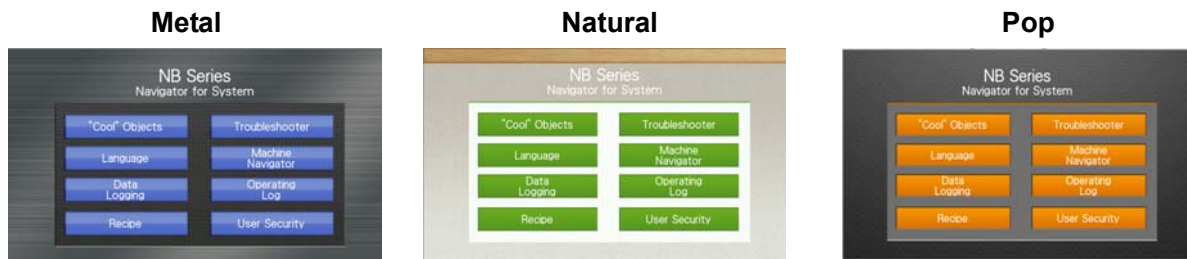
ソフトウェア名称	説明	ダウンロード
サポートツール NB-Designer	NB-Designerは、表示器 NBシリーズ専用の作画ツールです。	▶ 詳細
NB用きれいな部品集	NB-Designerで使用可能な「きれいな部品集」です。	▶ 詳細
NB画面テンプレート	NBシリーズと温度調節器E5εC、インバータMX2シリーズV1タイプ、セーフティコントローラG9SPと簡単接続できる画面テンプレートとご使用ガイドです。	▶ 詳細
アプリでプラス サンプルデータ	マイクロPLC CP1E+表示器NBシリーズを中心として、オムロンの制御機器の組み合わせたアプリケーション例のサンプルデータです。	▶ 詳細
コンパクトな提案 サンプルデータ	マイクロPLC CP1Eと表示器 NBシリーズに、さまざまなオムロン製品を組み合わせ、ムダなく効率的にお客様の機械制御アプリケーションの拡大をお手伝いするサンプルデータです。	▶ 詳細

Click!

2. After downloading *nb-parts_e.zip* and *B150127.pdf*, extract the contents from *nb-parts_e.zip*.
3. Double-click *nb-parts_e.nbp* in the *nb-parts_e* folder to start the NB-Designer.
4. Select Language2 under View - Language to display labels in English.
5. The screen 20 and the following screens contain "cool" templates. See page 12 and the following pages of *B150127.pdf* for details on templates.

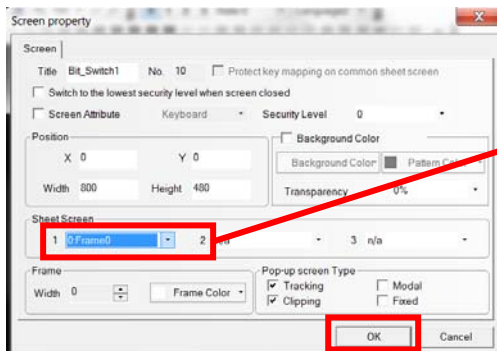


6. Three different types of screen templates are provided.



7. How to use a Metal template is explained below. Create a new project and add the NB7W that uses the template.

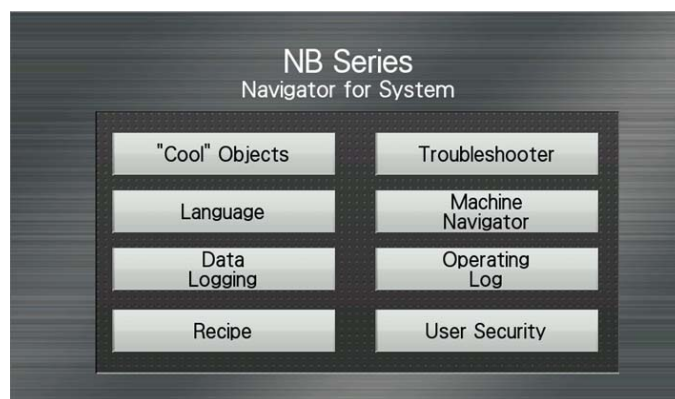
- 1) Copy the screen 32 (background) of *nb-parts_e.nbp* (right-click on the screen and select [Copy]), and then paste it on the screen 0 of the NB7W in the new project (right-click and select [Paste]).
- 2) In the NB7W, select [Add Screen] in the [Screen] menu to add a screen. (The screen 10 is added.)
- 3) Open the screen 20 of *nb-parts_e.nbp*. Copy the objects (right-click, select [Select All], right-click again, and select [Copy]), and then paste them on the screen 10 of the NB7W.
- 4) In the screen 10 of the NB7W, select [Screen Property] in the [Screen] menu to open the [Screen property] Dialog Box. Set Sheet Screen 1 to [0:Frame0] (screen 0), and click the [OK] Button.



Sheet Screen
1 0:Frame0

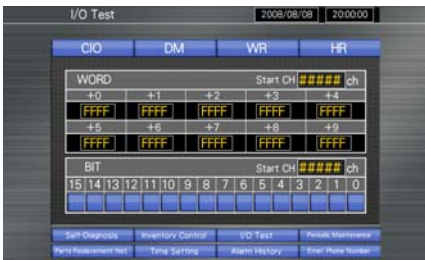
When two or more screens are added, set Sheet Screen 1 to [0:Frame0] in the [Screen property] Dialog box of each screen.

5) The Metal template is pasted on the screen 10 of the NB7W as shown below.



8. The following templates are also included in Metal as well as Natural and Pop.

Screen 24



Screen 27

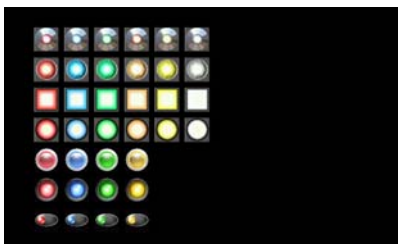
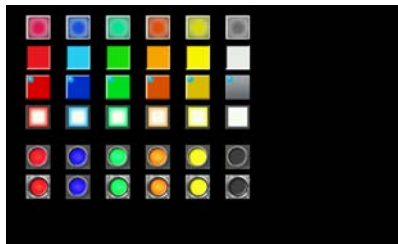
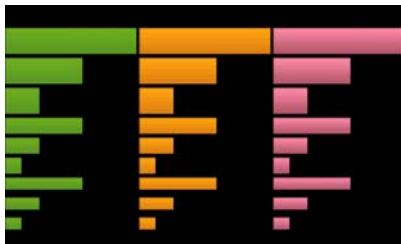


Screen 29



9. The *nb-parts_e.nbp* also includes the following "cool" objects.

Refer to *B150127.pdf* for details on how to use objects.



Use Analog Option Boards



Now an Analog Option Board can be used for the CP1E. How do I install it?

CP1W Analog Option Board can be added to CP1E.

CP1E*



CP1W Analog Option Boards



CP1W-ADB21



CP1W-DAB21V



CP1W-MAB221

* CP1W Analog Option Boards can be mounted to the CP1E-N30/40/60D□-□ CPU Units version 1.2 or later.

They cannot be mounted to the following models:

CP1E-E□□D□-□/E□□SDR-A/N14/20D□-□/N□□SD□-□/□□S1D□-□

Models and Specifications

Product name	Model	Specifications
Analog Input Option Board	CP1W-ADB21	2 analog inputs 0-10 V: Resolution 4,000, 0-20 mA: Resolution 2,000
Analog Output Option Board	CP1W-DAB21V	2 analog outputs 0-10 V: Resolution 4,000
Analog I/O Option Board	CP1W-MAB221	2 analog inputs 0-10 V: Resolution 4,000, 0-20 mA: Resolution 2,000 2 analog outputs 0-10 V: Resolution 4000

Setting

1. PLC Setup

Set in the [Serial Option Port] Tab Page.

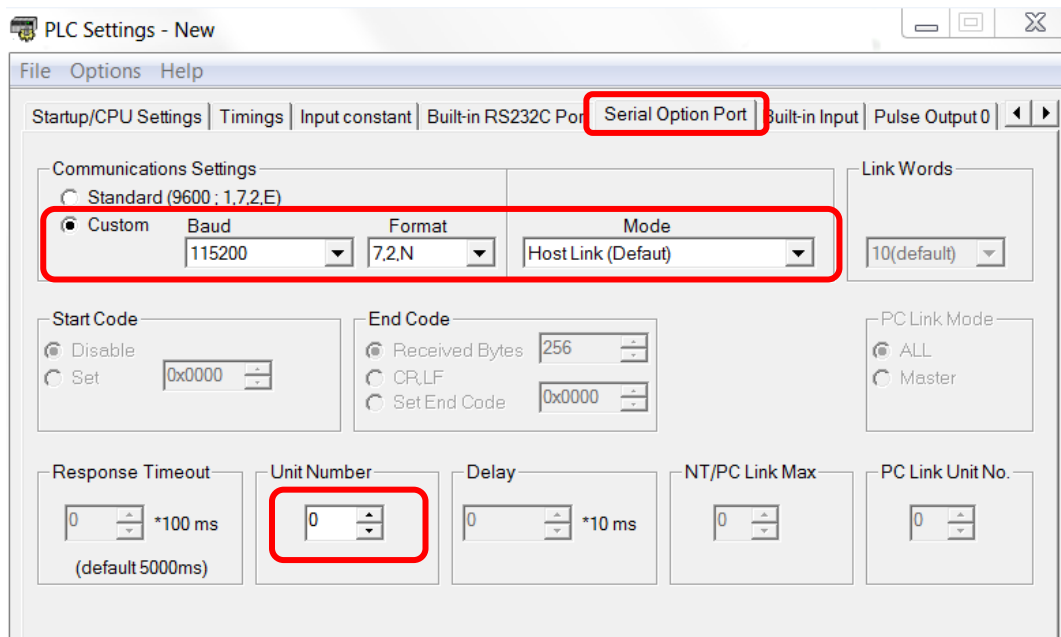
(1) Communications Settings: Select the [Custom] Option.

Set Baud to [115200].

Set Format to [7,2,E].

Set Mode to [Host Link (Default)] or [Host Link].

(2) Unit Number : Set to [0].



2. Enabling PLC Setup

Turn OFF the power, and then turn ON again to enable the PLC Setup.

Memory allocation

Analog input values and analog output set values are allocated to the following words of the CP1E:

Word	CP1W-ADB21	CP1W-DAB21V	CP1W-MAB221
CIO 80	Analog input 1	---	Analog input 1
CIO 81	Analog input 2	---	Analog input 2
CIO 85	---	Analog output 1	Analog output 1
CIO 86	---	Analog output 2	Analog output 2

Refer to the *CP1E CPU Unit Software User's Manual* (Cat. No. W480) for details.

New CP1W Analog I/O Units and Temperature Sensor Units have been added to the line up.

CP1W Expansion Units

Product name	Model	Specifications
Analog Input Unit	CP1W-AD042	4 analog inputs Resolution: 12,000
Analog Output Unit	CP1W-DA042	4 analog outputs Resolution: 12,000
Analog I/O Unit	CP1W-MAD42	4 analog inputs, 2 analog outputs Resolution: 12,000
	CP1W-MAD44	4 analog inputs, 4 analog outputs Resolution: 12,000
Temperature Sensor Unit	CP1W-TS003	4 thermocouple inputs 2 analog inputs* * Two channels can be used for thermocouple or analog input.
	CP1W-TS004	12 thermocouple inputs

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Note: Do not use this document to operate the Unit.

OMRON Corporation Industrial Automation Company

Tokyo, JAPAN

Contact: www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.

Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ELECTRONICS LLC

2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.

No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.

Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

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Cat. No. **R182-E1-09**

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