
FATEK® Combining HMI and PLC with Example

The following example involves the HMI device and the PLC device undergoing a connection with each other and exchanging/modifying each other's data.

The equipment used includes (but is not limited) the following items:

No.	Device	Number
1.	P5070N1 HMI (Any HMI can be used)	1
2.	FBs-10MAR2-AC (Other PLC devices can also be used)	1
3.	Ethernet Cable	3
4.	Ethernet Hub	1
5.	Computer	1

HMI and PLC wiring settings:

The Ethernet hub should be connected with the computer, HMI device, and PLC device all simultaneously.

To connect with USB, refer to the FvDesigner Software User's Guide.

HMI and FvDesigner settings:

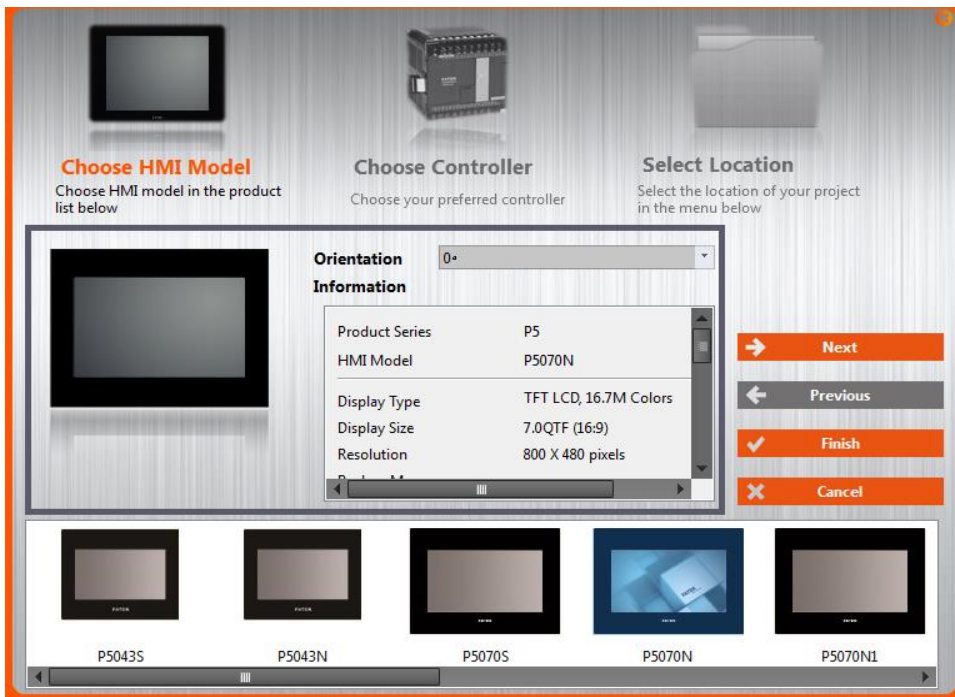
Create a new project, choose the corresponding HMI device, in this case the P5070N1. When selecting the PLC, add a link, go to link settings, then **【Interface Type】**, choose to use Direct Connection (Ethernet), then choose FATEK Automation Corp. for the manufacturer, then select the product series, in this case, FATEK F Bs / B1 / B1z / HB1 (TCP). For the IP Address, you can go to the official website to download the PLC/Ethernet tool, URL:

<http://www.fatek.com/en/technical.php?act=software&catId=12>

If you want to select other connection methods, please refer to the FvDesigner software manual, Chapter 2 – System / 2.3 – Link / 2.3.1 – Device/PLC settings.



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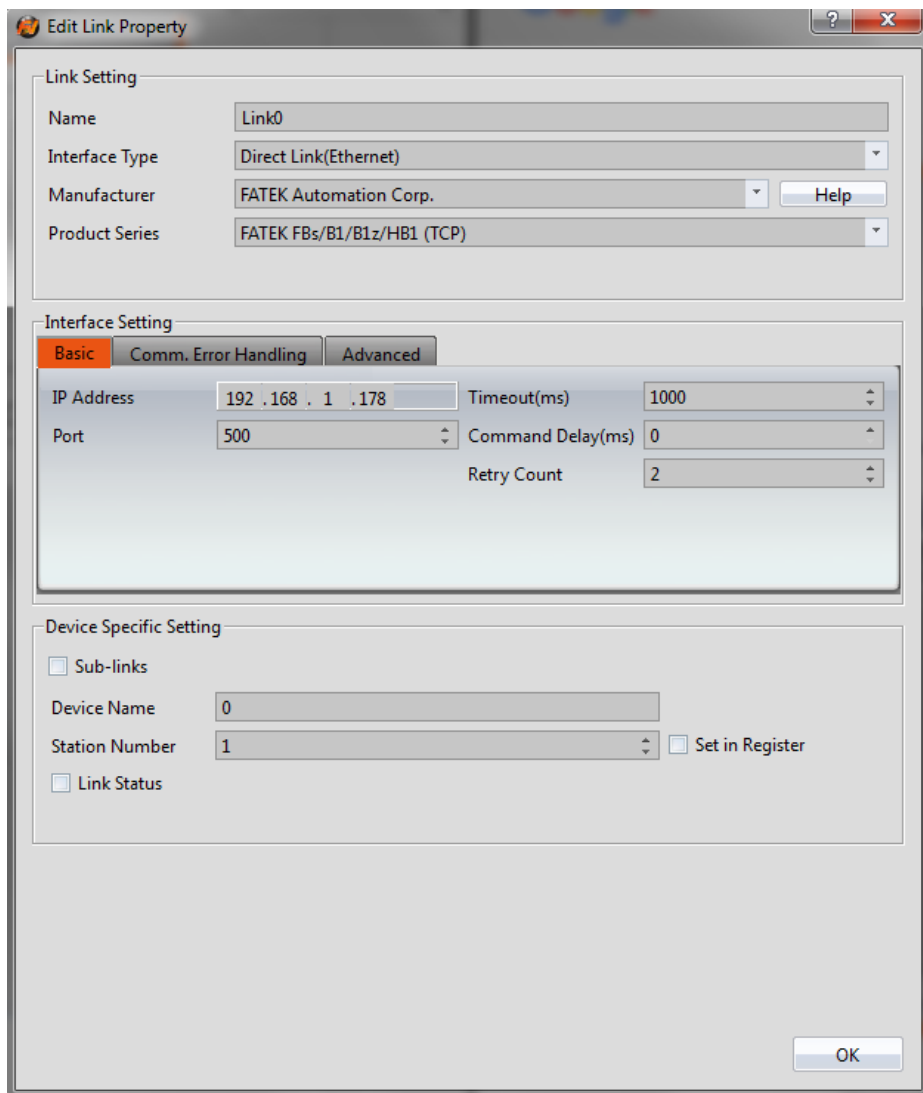
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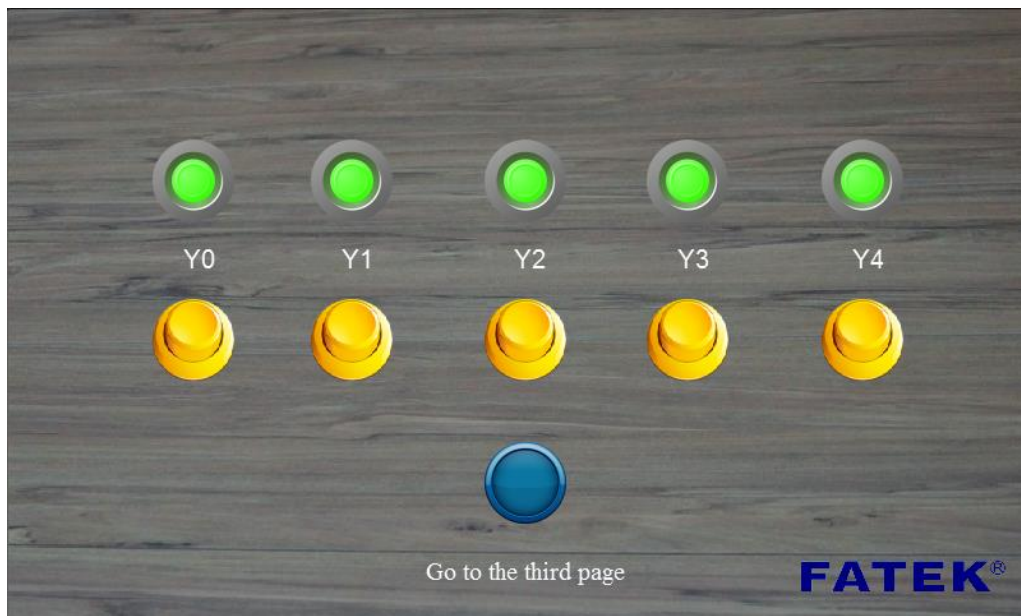
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Images of the demo are shown below:



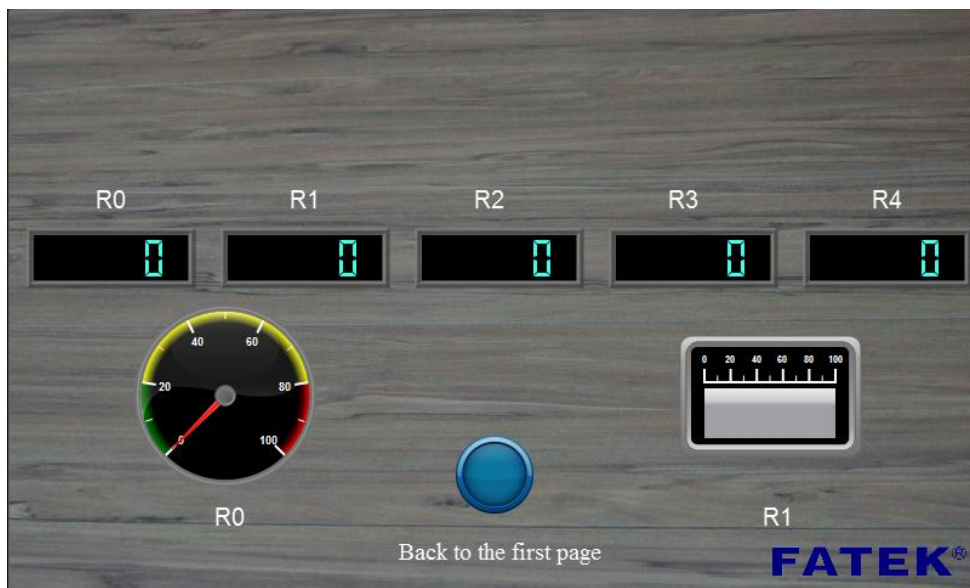
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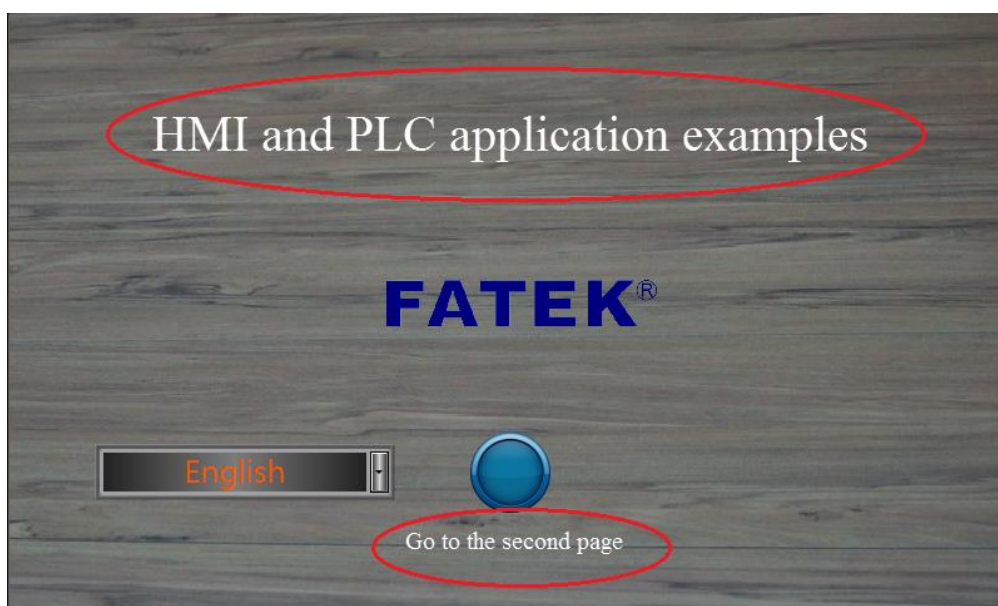


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To create these screens...

- Go to the **【Design】** tab and select **【New Screen】** to add a screen.
- Go to the **【Draw】** tab and select **【Text】** to insert text onto your screen.



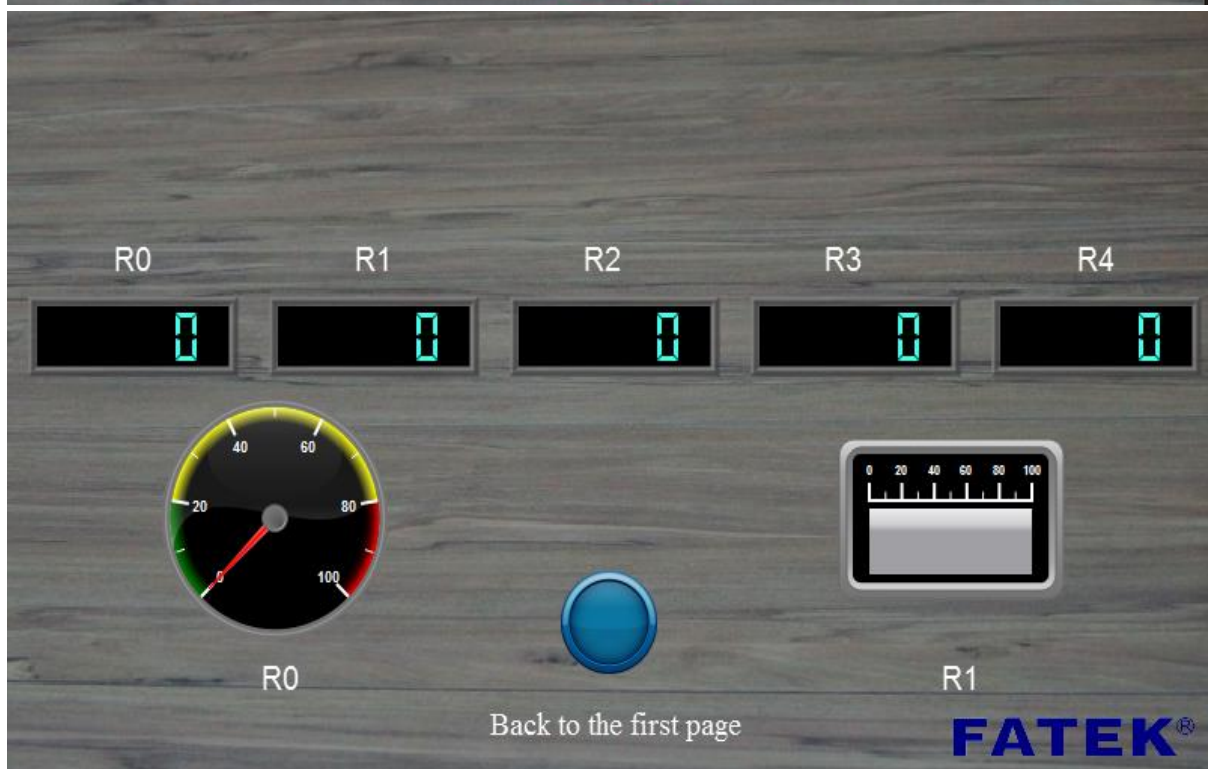
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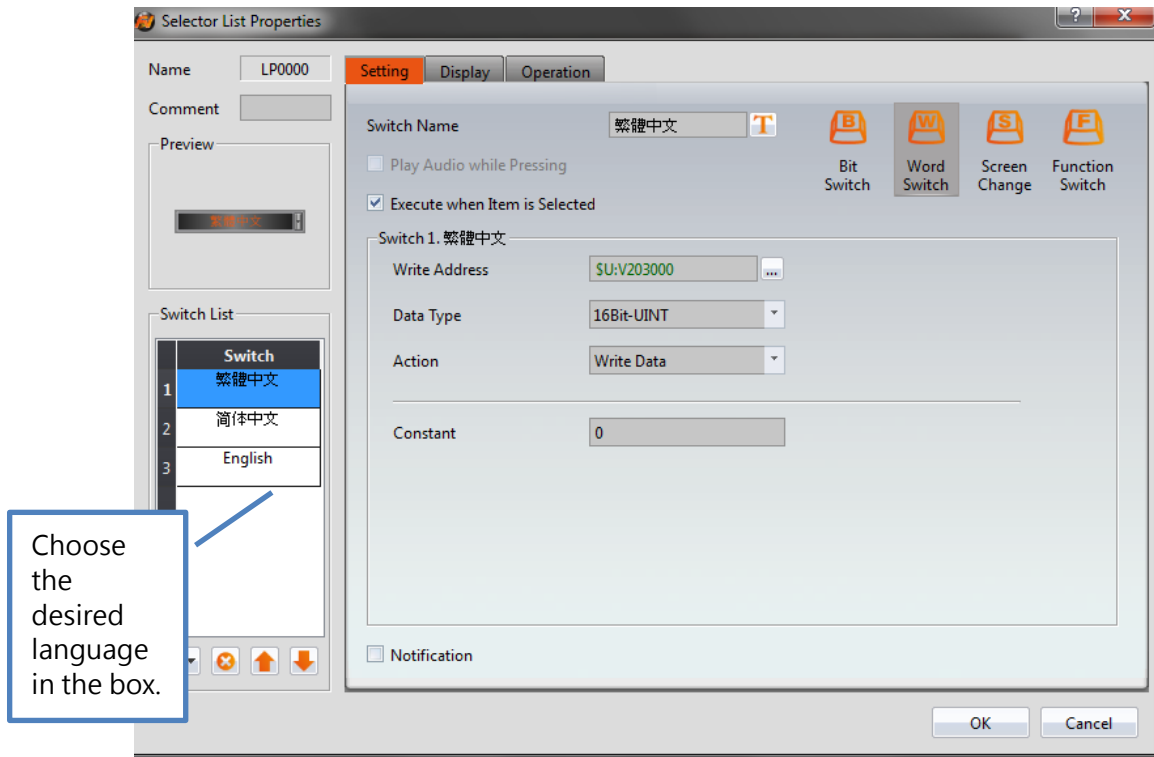
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The following figure shows the settings of the **Selector List**. The different types of text in the **Text Library** will appear in the list. For more details, refer to the FvDesigner Software User's Manual Chapter 13.4

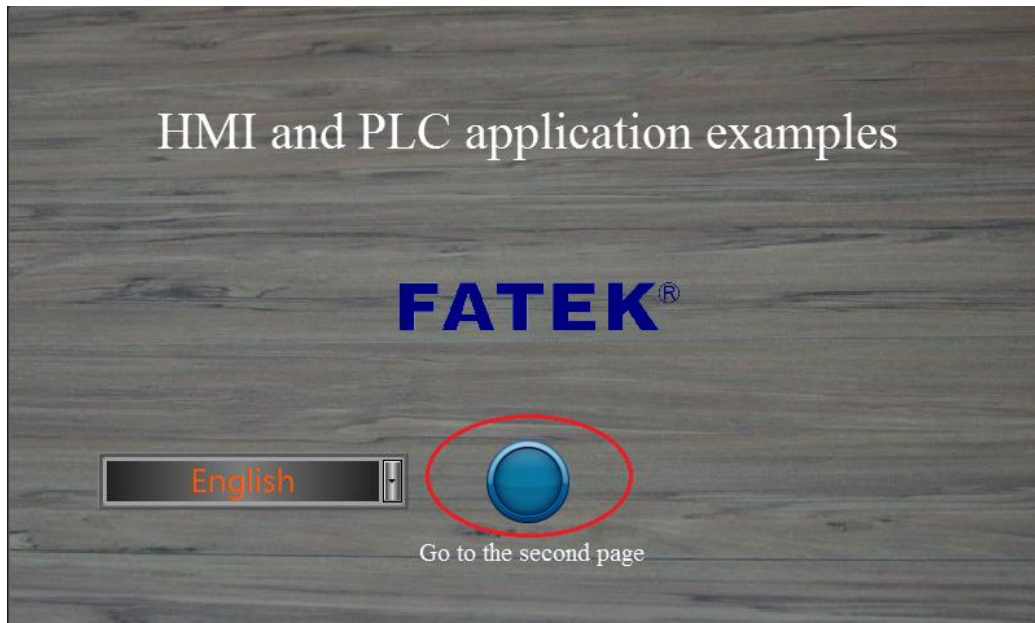
http://www.fatek.com/en/download.php?f=data/ftp/HMI/P5/document/FvDesigner_User_Manual_en.pdf



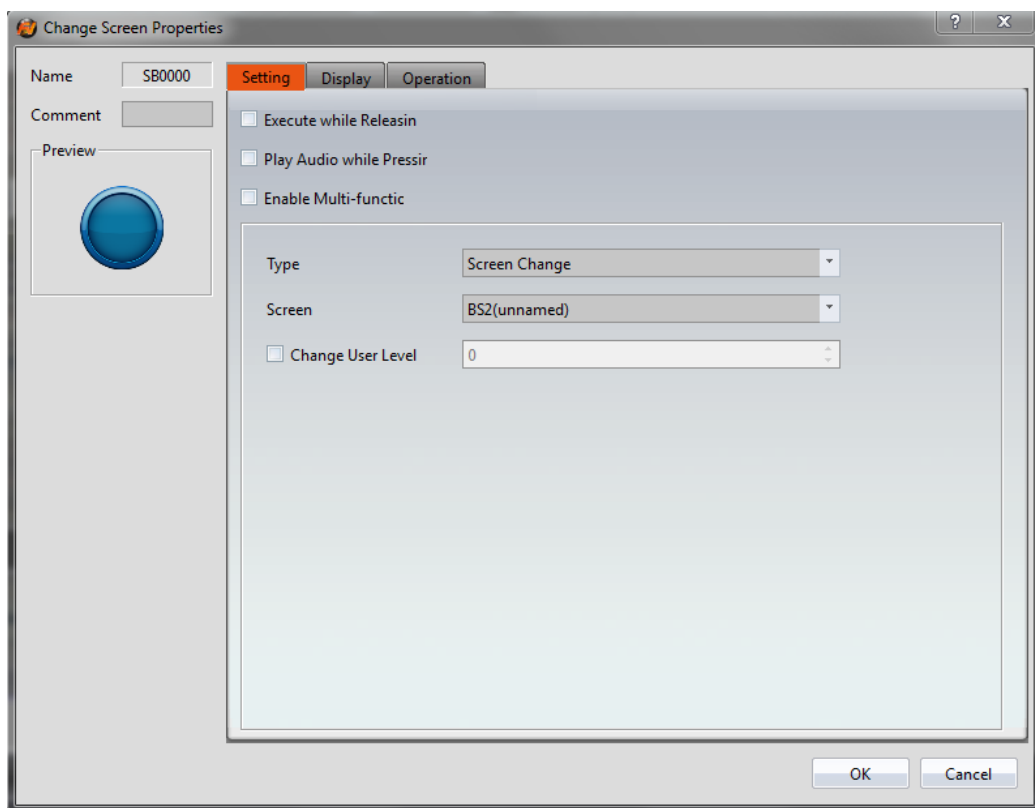
Drag the **Change Screen Switch** in the **Lamp/Switch** section of the toolbox and place it onto your screen. The button used in this example is a button that sends the user to the next page.



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The figure below shows the properties of the Switch Screen switch.



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Select the screen you want to switch to when the button is pressed. In the example, the selected screen is BS2.

Use the **【Bit Switch】** from the **【Lamp/Switch】** section in the Toolbox and create 5 switches ranging from “Y0” to “Y4”.

Instead of placing the switches and lamps one by one, you can use the Multi-Copy function by right clicking the element you want to duplicate and specifying how many and in which direction you want them to be placed.

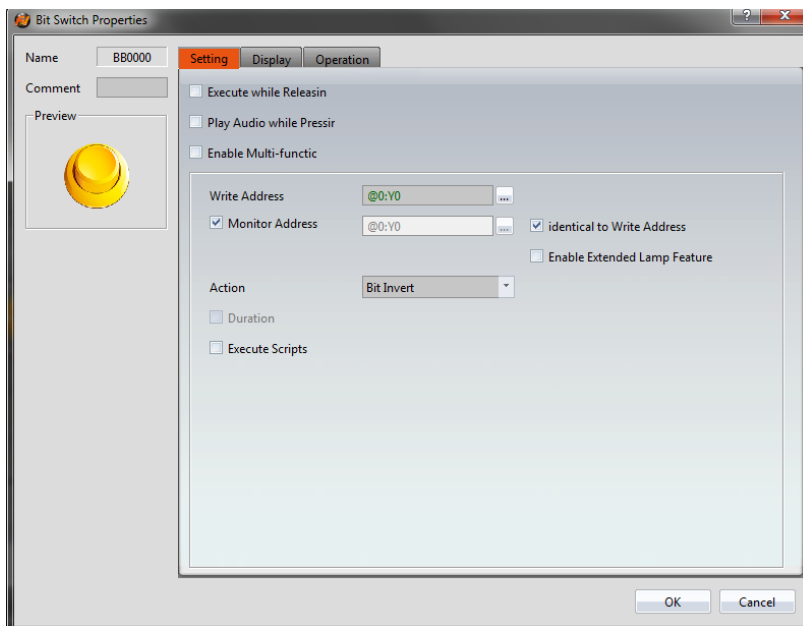


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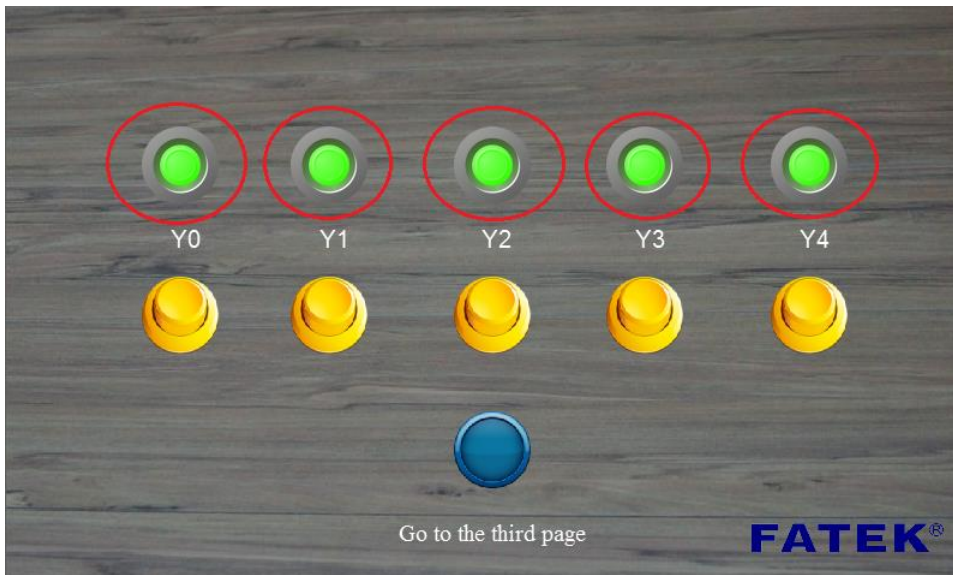


When selecting the address, for device, select the link you created when starting the project.

'Y' is the contact type and the 0 after it differentiates it from other Y's.

In this example for switch "Y0", the address we will be entering is @0:Y0.

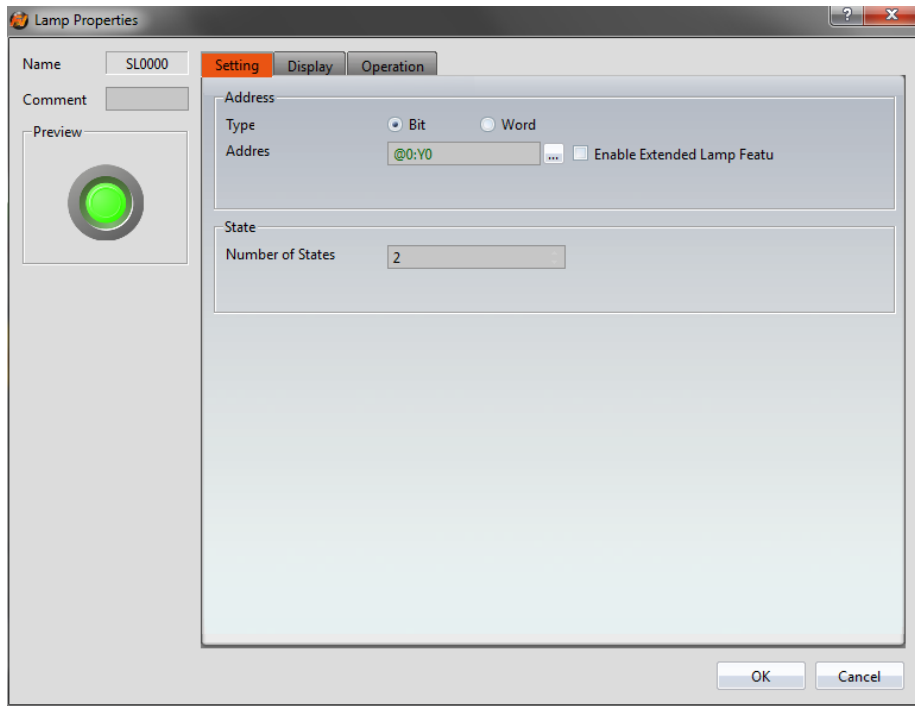
For the action, select "Bit Invert". This will make it so when the switch is not pressed, the value is 1 and when it is pressed, the value is 0.



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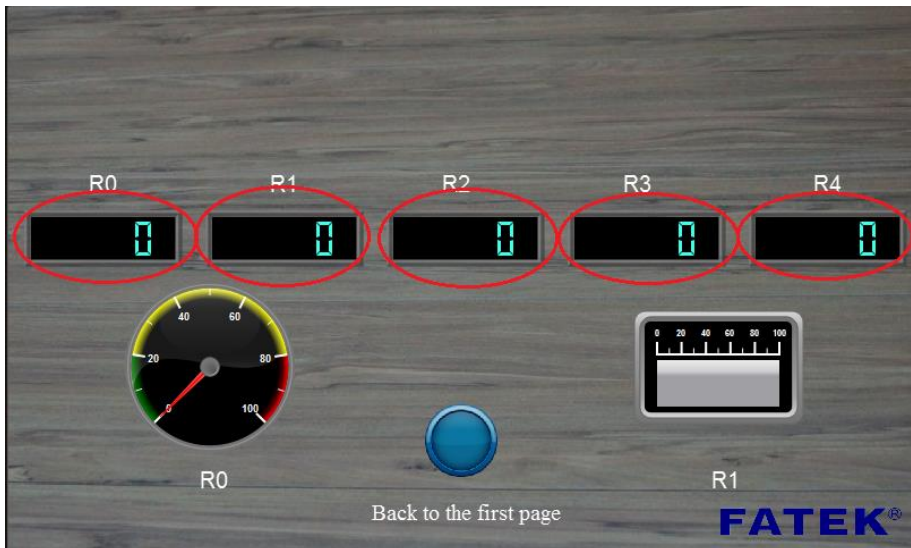
Next, place 5 lamps, one for each bit switch. Again, to save time and effort, you can use the Multi-Copy tool to speed up the process.

For the address, use the same one as the bit switch under the lamp. The lamp is just used as an indicator for whether the switch is pressed down or not. Address is @0.V0 for the first.

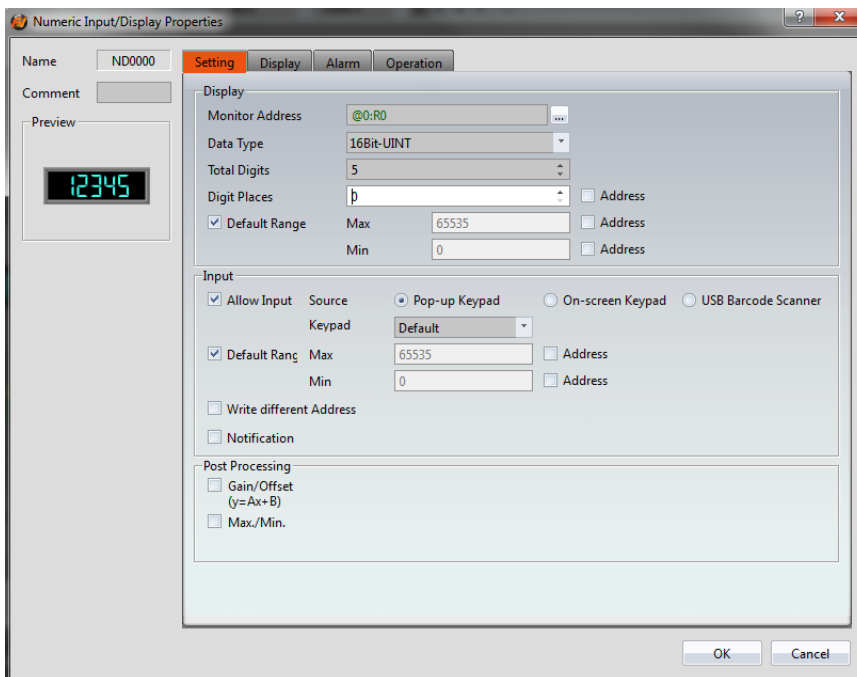


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Use the **Numeric Input/Display** object in the **Numeric/Text** section of the toolbox. Create 5 objects ranging from “R0” to “R4”. Use the Multi-Copy function to save time.



The following image on the right is the Numeric Input/Display properties. For the address, we are going to be using the ‘R’ address. For the first display, the address is @0:R0



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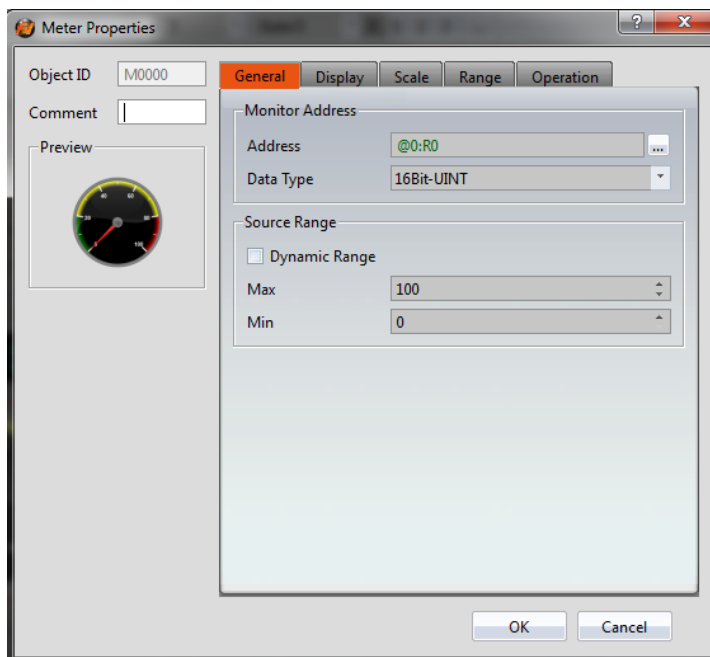
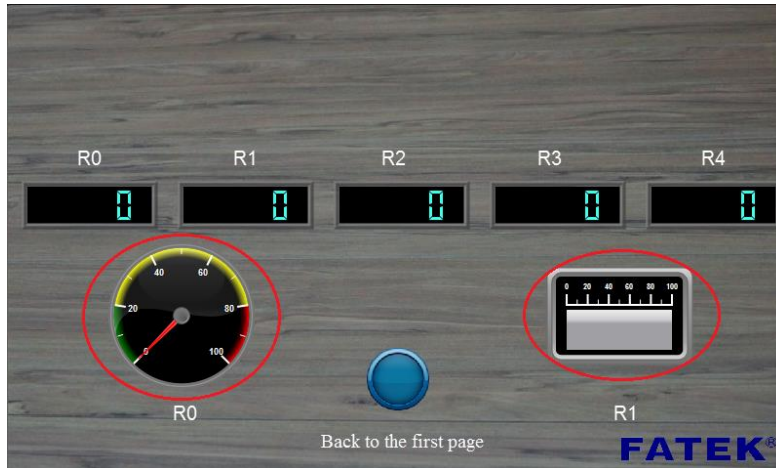
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The following objects shown in the image below on the left are meters. These meters can track a specific address and display the magnitude of the number at the address. They can be found in the **Graph** section in the Toolbox.



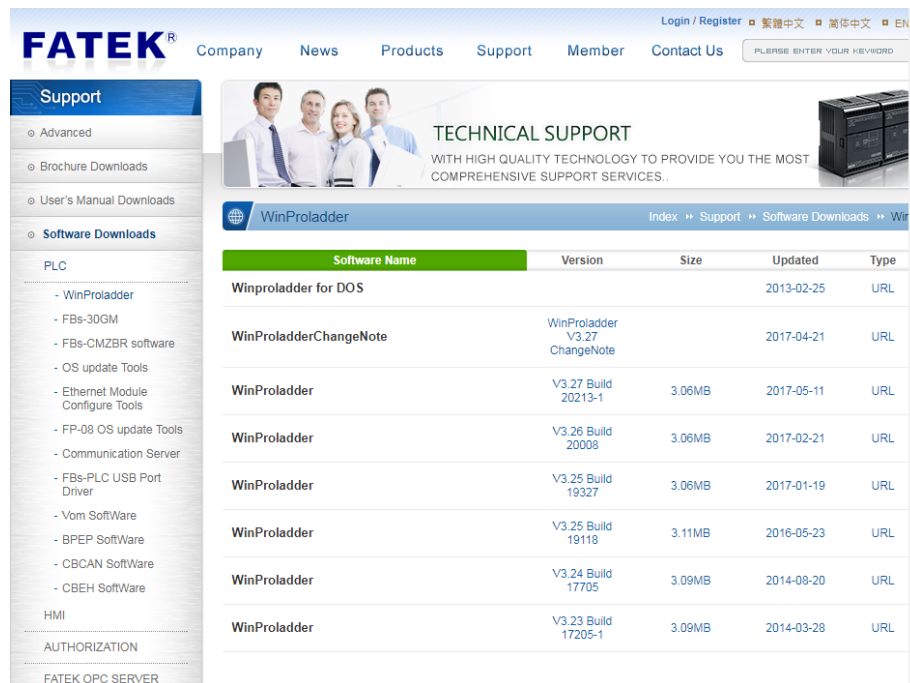
The image above on the right is the properties of the meter object. For this example, we set the meter address to @0:R0 to track the value of that address. When the number changes, the graph will follow it.



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For this next step, you need to first download the WinProLadder program. You can find it by clicking on the URL link here:

<http://fatek.com/en/technical.php?act=software&catId=10>



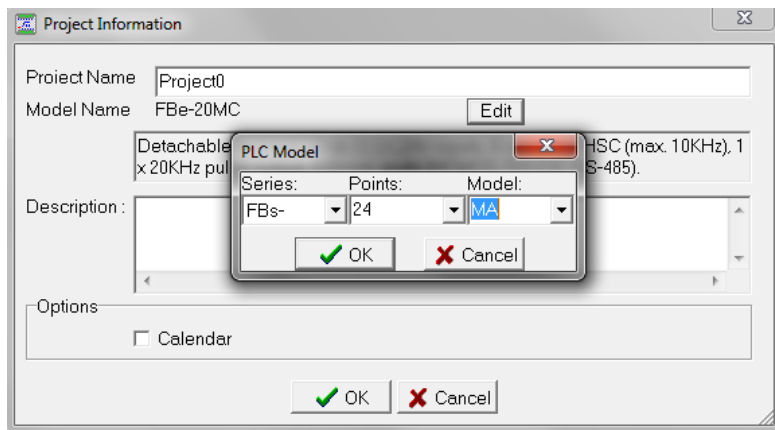
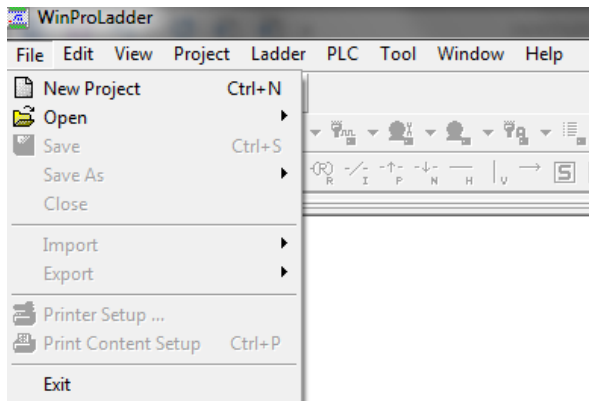
The screenshot shows the FATEK website's technical support page. The page features a navigation menu with options like 'Company', 'News', 'Products', 'Support', 'Member', and 'Contact Us'. A sidebar on the left lists various software categories under 'Software Downloads', including 'PLC' and 'HMI'. The main content area displays a table of WinProLadder software versions with columns for 'Software Name', 'Version', 'Size', 'Updated', and 'Type'. The table lists several versions of WinProLadder, including 'Winproladder for DOS', 'WinProLadderChangeNote', and multiple versions of 'WinProLadder' with different build numbers and update dates.

Software Name	Version	Size	Updated	Type
Winproladder for DOS			2013-02-25	URL
WinProLadderChangeNote	WinProLadder V3.27 ChangeNote		2017-04-21	URL
WinProLadder	V3.27 Build 20213-1	3.06MB	2017-05-11	URL
WinProLadder	V3.26 Build 20008	3.06MB	2017-02-21	URL
WinProLadder	V3.25 Build 19327	3.06MB	2017-01-19	URL
WinProLadder	V3.25 Build 19118	3.11MB	2016-05-23	URL
WinProLadder	V3.24 Build 17705	3.09MB	2014-08-20	URL
WinProLadder	V3.23 Build 17205-1	3.09MB	2014-03-28	URL

When the download is complete, go ahead and open up the WinProLadder program. With the program opened, click file, new project, and select the PLC device you are currently using.



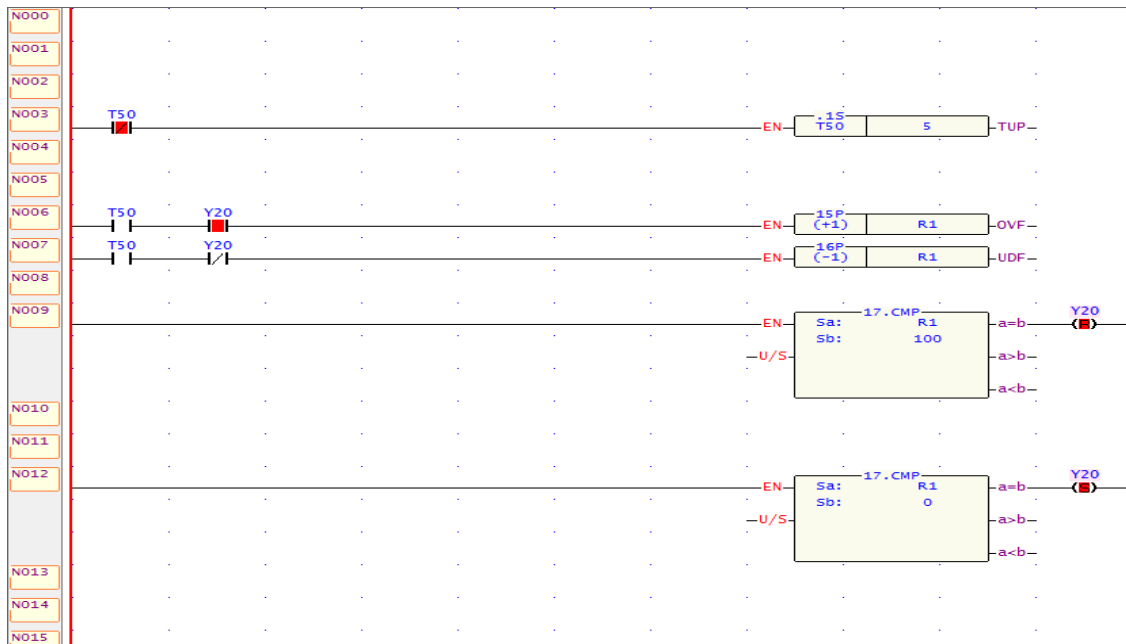
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The ladder program example is shown in the following image.



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Ladder function description:

When the value of R1 is greater than 0, then the value of R1 is incremented by 1 until R1 is equal to 100. When R1 is less than 100, the value is decremented by 1 until R1 is equal to 0.

N003 – The T50 contact is a 0.1s timer. The PV value is 5, so each cycle (every time R1 increases or decreases by 1) takes 0.5 seconds to complete.

N006 – This network uses an incremental function. Whenever T50 and Y20 are closed, the value of R1 will increase by 1 every 0.5 seconds.

N007 – This network uses a descending function. When T50 is closed and Y20 is open, the value of R1 is decremented by 1 every 0.5 seconds.

N009 – This network uses the numeric comparison function. When R1 is equal to 100, Y20 will be open, so the decrement function will start and the incremental function will stop.

N012 – This network also uses the numeric comparison function. When R1 is equal to 0, Y20 will be closed, so the incremental function will start and the decrement function will stop.

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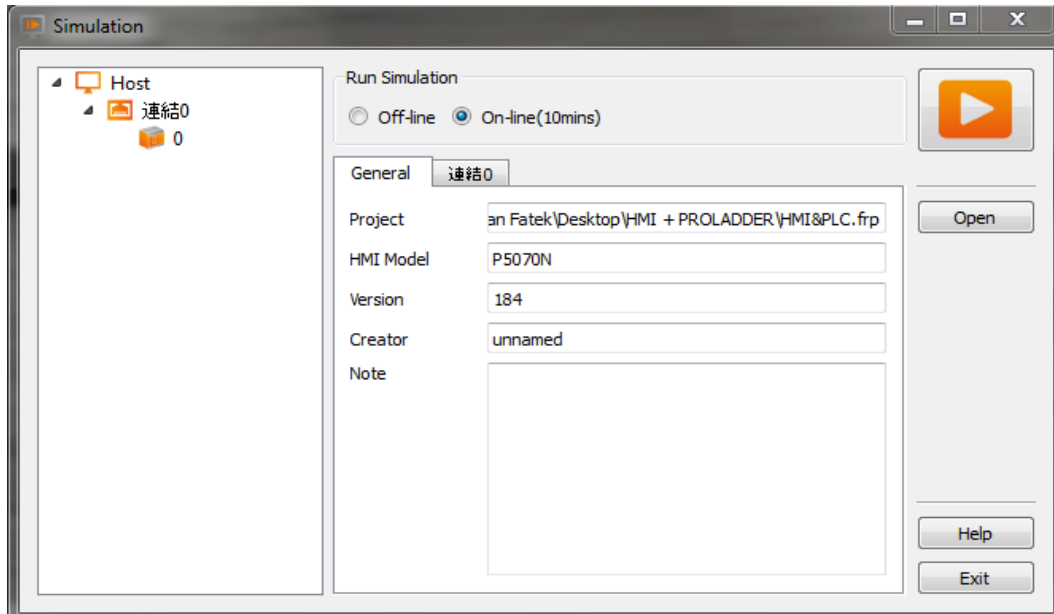
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The simulation test:

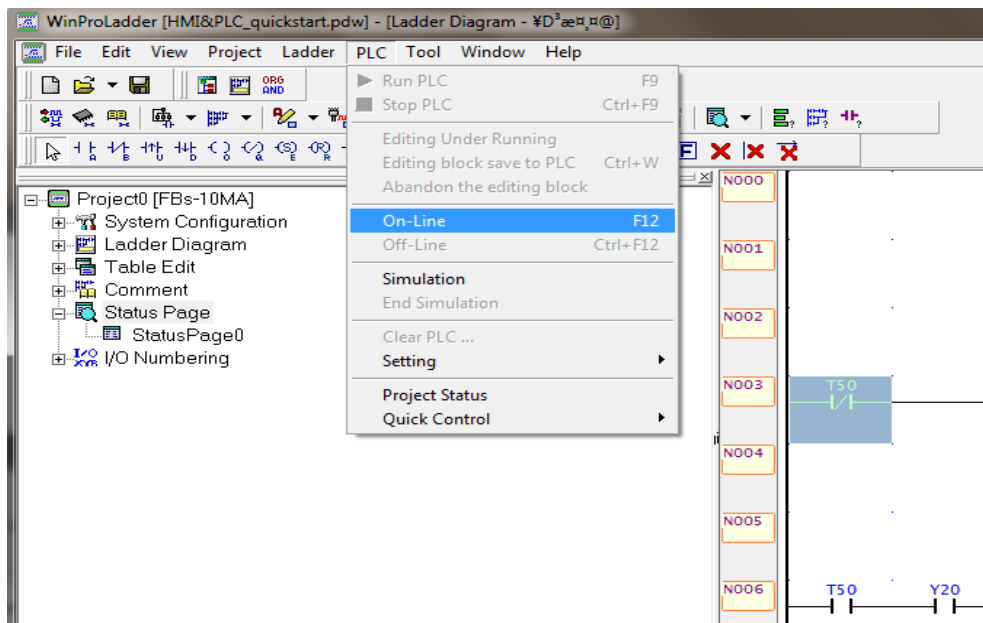
In FvDesigner, go to the Project tab, and press simulation. Make sure to check “On-line (10mins)” before you start the simulation.



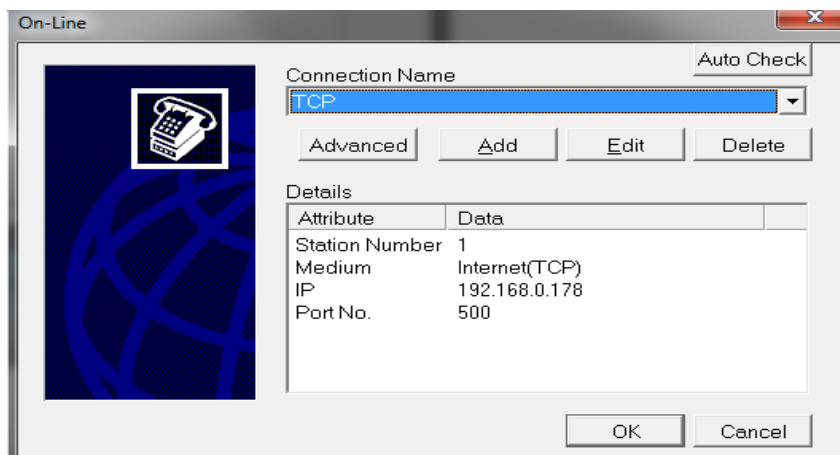
Once the FvDesigner simulation is running, go to WinProLadder, click PLC and then click On-Line.



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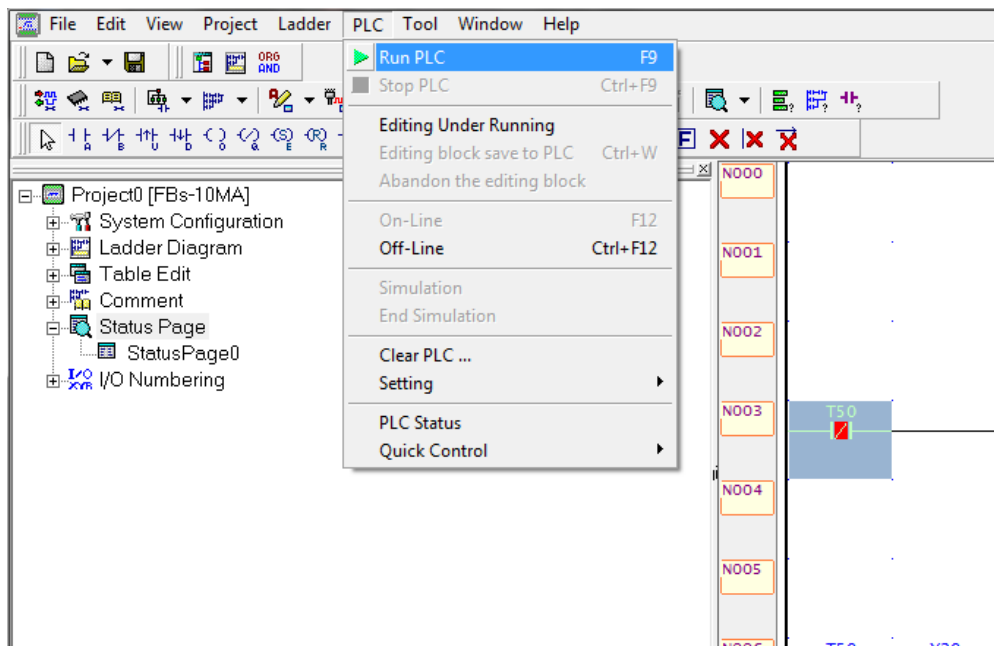


A window will pop up and because the PLC is connected by Ethernet, the connection name will be TCP. Check whether the IP address is correct and press ok. If the IP address is wrong, press edit and type in the right one.

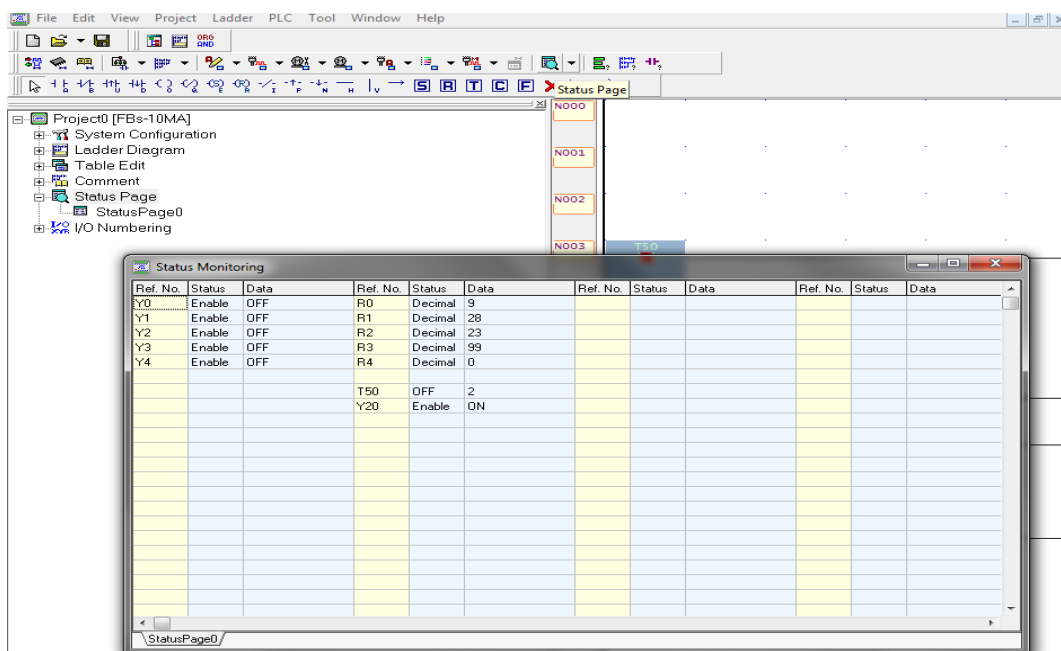


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Once successfully connected, press “Run PLC” to start the program.



Click on the icon with a magnifying glass to add a monitoring page. This page, shown below, shows the value of the contacts and whether they are enabled or not.



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View the simulation screen and the WinProLadder program on your monitor at the same time. Observe what happens to the WinProLadder program when you press buttons Y0 to Y4.

Ref No	Status	Data	Ref. No.	Status	Data
Y0	Enable	ON	R0	Decimal	9
Y1	Enable	OFF	R1	Decimal	28
Y2	Enable	ON	R2	Decimal	23
Y3	Enable	OFF	R3	Decimal	99
Y4	Enable	ON	R4	Decimal	0
			T50	OFF	2
			Y20	Enable	ON

In the HMI simulation screen, try entering a value, such as “23” into one of the numeric input/display objects. Observe the response of the WinProLadder program.

Ref No	Status	Data	Ref. No.	Status	Data
Y0	Enable	ON	R0	Decimal	9
Y1	Enable	OFF	R1	Decimal	28
Y2	Enable	ON	R2	Decimal	23
Y3	Enable	OFF	R3	Decimal	99
Y4	Enable	ON	R4	Decimal	0
			T50	OFF	2
			Y20	Enable	ON

As you can see, once 23 is inputted onto the R2 address, the R2 contact value on the WinProLadder program also changes to 23.

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