Digitized Automation for a Changing World

Starter Kit Manual

PLC-DVP Series

UT-14SS2-A

UT-12SE-A1

DELTA PLC Starter Kit Manual
UT-14SS2-A
UT-12SE-A1

Revision History

Version	Revision	Date
1st	The first version was published.	2018/11/26
2nd	1. Chapter 1: Remove USB flash drive images and introduction. Update the official download center link. 2. Chapter 2: Remove the software installation instructions related to USB. Update the official download center link.	2024/07/09

Starter Kit Manual

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1.1 General Information about UT Series Starter Kits

This UT series starter kit simplifies users' entry into the world of Delta PLCs and HMIs, and helps the users get familiar with programming software.

For that purpose, this manual explains how to connect the components of a starter kit, and how to program the PLC and HMI by means of several simple examples.

Components of UT series starter kits:

There are two types of starter kits. Users can select a type of starter kit according to their needs.

1. UT-14SS2-A: For learning PLC and HMI programming

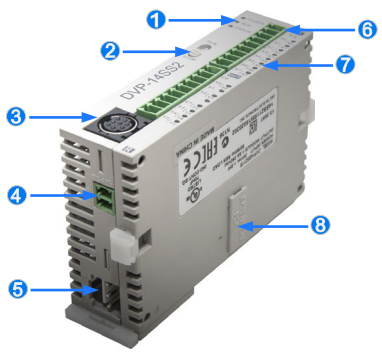
   - Components of the UT-14SS2-A starter kit:



Item	Model name	Description
A	Starter Kit Manual	User manual
B	DVP-PS01	Power supply module, 24 V DC output
C	DVP14SS211R	CPU with 14 built-in I/O points

Item	Model name	Description
D	DOP-107BV	HMI, 7" TFT LCD
E	UC-MS020-06A (2 m)	Communication cable for connecting an HMI to a PLC
F	UC-PRG020-12A (2 m)	Programming cable for a PLC
G	UC-PRG015-02A (1.5 m)	Programming cable for an HMI
H	3865259300	DC power cable
I	3081419700	RS-485 cable for connecting a PLC to an HMI
J	3534435700	Four screw locks for an HMI
K	5502577100	I/O simulator board

- DVP14SS211R:



❶ POWER indicator, RUN indicator, ERROR LED indicator	❷ RUN/STOP switch
❸ COM1 (RS-232 port)	❹ COM2 (RS-485 port)
❺ DC power input	❻ Input/Output terminals
❼ Input/Output point indicators	❽ Extension port

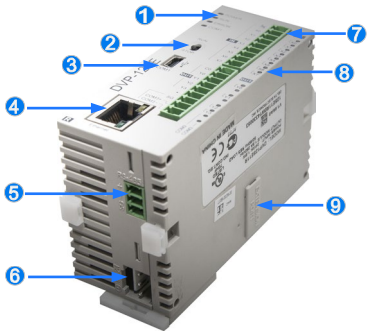
2. UT-12SE-A1: For learning PLC and HMI programming and Ethernet connection

- Components of the UT-12SE-A1 starter kit:



Item	Model name	Description
A	Starter Kit Manual	User manual
B	DVP-PS01	Power supply module, 24 V DC output
C	DVP12SE11R	CPU with 12 built-in I/O pints
D	DOP-107EV	HMI, 7” TFT LCD, support Ethernet
E	UC-PRG030-20A (3 m)	Ethernet cable
F	UC-PRG015-01A (1.5 m)	Programming cable for a PLC
G	UC-PRG015-02A (1.5 m)	Programming cable for an HMI
H	3865259300	DC power cable
I	3081419700	RS-485 cable for connecting a PLC to an HMI
J	3534435700	Four screw locks for an HMI
K	5502577101	I/O simulator board

- DVP12SE11R:



❶ POWER indicator, RUN indicator, ERROR indicator, COM1 indicator	❷ RUN/STOP switch
❸ COM1 (Mini USB)	❹ Ethernet port
❺ COM2 (RS-485)	❻ DC power input
❼ Input/Output terminals, COM3 (RS-485)	❽ Input/Output point indicators, COM2 indicator, COM3 indicator
❾ Right-side extension port	

- Please download the following items on the official download center.

Item	Contents
Software	1. ISPSoft 2. COMMGR 3. DOPSoft 4. DCISoft 5. UC-PRG020-12A driver
Manual	1. Starter Kit Manual 2. ISPSoft User Manual 3. DOPSoft User Manual 4. DVP-ES2/EX2/SS2/SA2/SX2/SE&TP Operation Manual - Programming 5. Starter Kit Application Examples 6. Instruction Sheet (DVPPS01/02/05) 7. Instruction Sheet (DVP-SS2) 8. Instruction Sheet (DVP-SE) 9. Instruction Sheet (UC-PRG020-12A) 10. Instruction Sheet (DOP-107BV) 11. Instruction Sheet (DOP-107EV)
Program	1. HMI Element Example 2. Examples (UT-14SS2-A) 3. Examples (UT-12SE-A1) 4. DVP PLC Application Examples

1.2 System Requirements for a Starter Kit

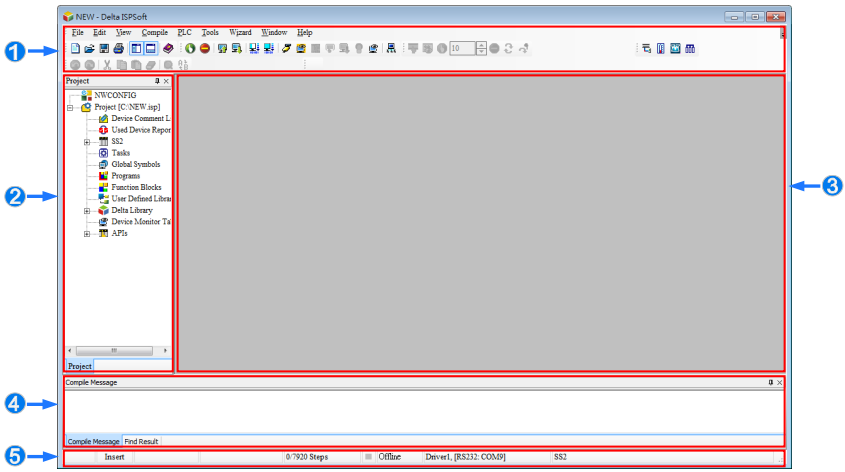
Before using a starter kit, users have to make sure that an operating system meets the requirements below.

Item	System requirement
Operating system	Windows 2000/NT/Me/XP/Vista/7/8/10
CPU/Memory	Pentium 1.6 G or above/2 GB or above
Hard disk drive	Capacity : 2 GB or above
Monitor	Full-color display supporting a resolution higher than 1024 x 768 pixels
Keyboard/Mouse	General keyboard/mouse, or device compatible with Windows
Printer	Printer with a driver for Windows (It is used to print projects, and is optionally required.)
Communication software	COMMGR, a communication manager, must be installed on a computer. (*1)

***1. Please refer to ISPSoft User Manual for more information about COMMGR. ISPSoft needs to be connected to a PLC by means of COMMGR.**

1.3 Description of ISPSoft-Programming Tool for PLCs

ISPSoft is a programming tool that realizes high-level to IEC 61131-3 standard programming concept for PLCs, and enables genuine structured design.



The interface of ISPSoft is described below.

❶ **Function area:** The main functions of ISPSoft are included. The functions which are used more frequently are on the toolbars, and the functions which are used less frequently are on the menu bar.

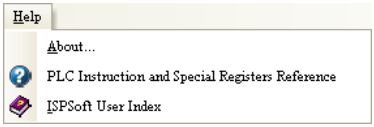
❷ **Project management area:** The framework of a project is displayed in this area. Users can understand the relation among the objects in the project by means of the tree structure. The efficiency in managing the project is also increased.

❸ **Working area:** Users can edit a project in this area.

❹ **Output area:** The execution of some functions generates information. The information is displayed in this area.

❺ **Status area:** The information about a project and communication is displayed in this area.

When using ISPSoft, the users can click an item on the **Help** menu to get help.



Item	Description
About…	Users can get the information about the version of the software, and the date when the software is released.
ISPSoft User Index	Users can get the usage of the software. (Alternatively, the users can click  on the file toolbar to get the usage of the software.)
PLC Instruction and Special Registers Reference	Users can get the information about instructions and registers. If the users click an instruction in the program editing area and press F1 on the keyboard, they can get the information about the instruction.

The features of ISPSoft are listed below.

1. Enhancement of structured development

   Based on the IEC 61131-3 standard, basic program units are called “program organization units” (POUs). The management of a group of POUs by means of a tree structure is added. This function can provide hierarchical management.

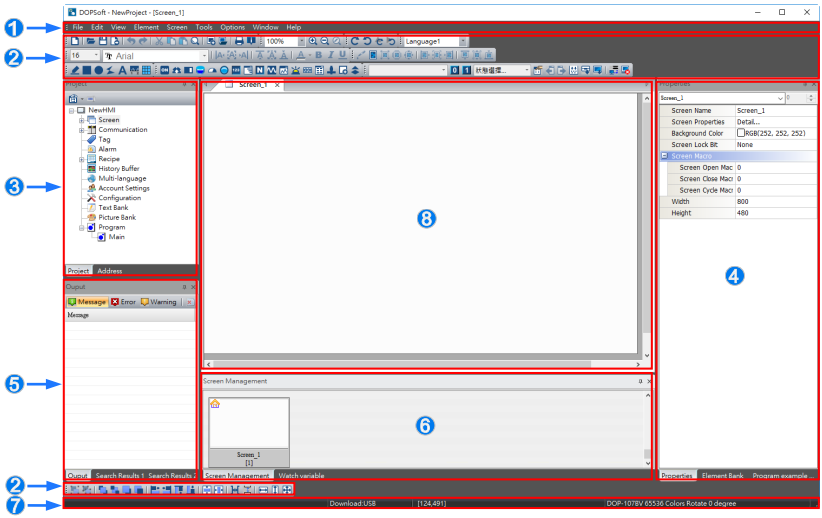
2. Supporting Large-scale project development

   With the trend that the size of application software increases, it is getting common for several developers to work together on a program. ISPSoft manages projects by means of integrating tasks. The efficient and convenient development environment that ISPSoft provides enables users to apply PLCs to more complex control systems as well as to small control systems.

3. Enhanced variable management

   Variable programming that does not depend on PLC memory addresses is a fundamental concept of the ISPSoft to improve program modularization and re-usability. ISPSoft supports the function of importing and exporting data from and to Microsoft Excel. With above functions, the tasks of defining and managing variables can be implemented with greater efficiency.

1.4 Description of DOPSoft-Programming Tool for HMIs



DOPSoft is powerful easy-to-use HMI configuration software for DOP series HMIs. With DOPSoft, users can create functional touchscreen applications for industrial processes such as automation, process control, and OEM applications.

The interface of DOPSoft is described below.

❶ Menu bar: DOPSoft provides nine menus.

❷ Toolbars: DOPSoft provides eight toolbars.

❸ **Project management area**: The project structure is displayed in the area. Users can learn about the relationship of objects via the tree structure for enhanced efficiency in project management.

❹ **Property** window: The properties of the elements on the present screen are displayed in the **Property** window.

❺ **Output** window: The editing actions of users, and the output messages about the compiling of a program are recorded in the Output window.

❻ **Screen Manager** window: If users create several screens, they can preview the screens by means of the **Screen Manager** window. The users can know the elements on a screen in the **Screen Manager** window without having to switch to that screen. If the users double-click a screen in the **Screen Manager** window, they can switch to that screen rapidly.

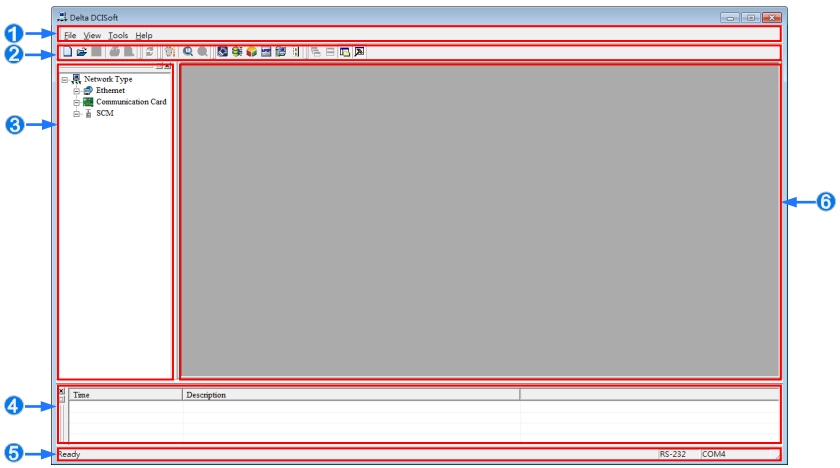
❼ **Status bar:** It displays the present editing status.

❽ **Editing area:** A proper editing area is provided according to the HMI type selected by users.

DOPSoft allows users to create a project by using features such as animated screens, alarms, trend graphs, recipes, and reports. DOPSoft and DOP series HMIs make touchscreen application more visually functional.

1.5 Description of DCISoft

DCISoft is integrated configuration software for Delta network modules.



The interface of DCISoft is described below.

❶ Menu bar: DCISoft provides four menus.

❷ Toolbars: DCISoft provides five toolbars.

❸ Workspace: Network types and models are displayed in this area.

❹ Output area: Messages are displayed in this area.

❺ Status bar: It displays information about the present states of the program edited and the communication executed.

❻ Operation area: This area is an interface for setting network modules.

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2.4 Installing DOPSoft 2-14

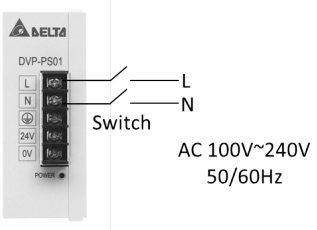
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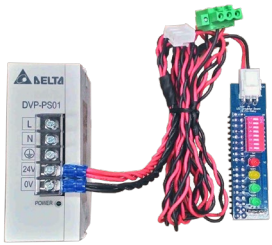
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2.1 Installing Hardware

2.1.1 Connecting a PLC to an I/O Simulator Board and a Power Supply Module

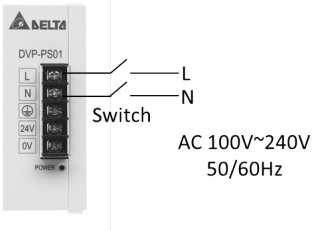
- Assembling the UT-14SS2-A starter kit:

	1. Install the digital I/O simulator board. Please refer to section 4.5.1 for more information about the equivalent circuit of the I/O simulator board.
	2. Connect a single-phase 110/220 V cable to the L and N terminals. Note: To prevent staff from being hurt, the external AC power which is used should be switched off before hardware is wired.
	3. Use the DC power cable to connect DVP-PS01 to DVP14SS211R.

	4. Use the DC power cable to connect the digital I/O simulator board to DVP-PS01.
	5. Use the DC power cable to connect DVP-PS01 to DC power input terminals on DOP-107BV.
	6. The assembly of the UT-14SS2-A starter kit is complete.

- Assembling the UT-12SE-A1 starter kit:

	1. Install the digital I/O simulator board. Please refer to section 4.5.2 for more information about the equivalent circuit of the I/O simulator board.

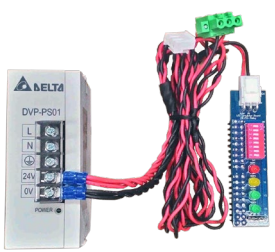


2. Connect a single-phase 110/220 V cable to the L and N terminals.

Note: To prevent staff from being hurt, the external AC power which is used should be switched off before hardware is wired.



3. Use the DC power cable to connect DVP-PS01 to DVP12SE11R.



4. Use the DC power cable to connect the digital I/O simulator board to DVP-PS01.

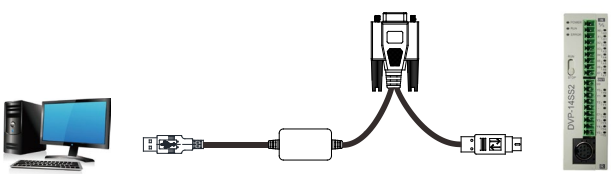


5. Use the DC power cable to connect DVP-PS01 to DC power input terminals on DOP-107EV

	6. The assembly of the UT-12SE-A1 starter kit is complete.

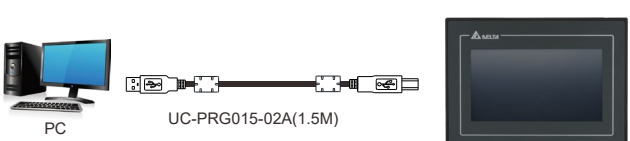
2.1.2 Connecting a Personal Computer to DVP14SS211R

Users have to connect a personal computer to DVP14SS211R by means of UC-RRG020-12A.



2.1.3 Connecting a Personal Computer to DOP-107BV

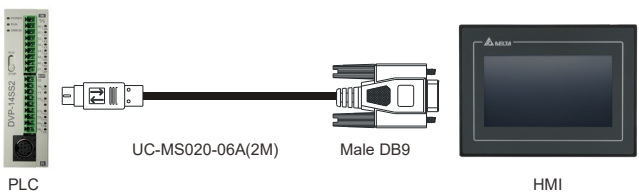
Users have to connect a personal computer to DOP-107BV by means of UC-PRG015-02A.



2.1.4 Connecting DVP14SS211R to DOP-107BV

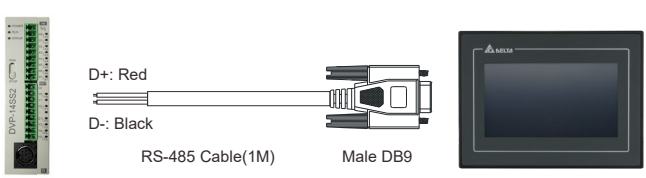
- RS-232

UC-MS020-06A is used to connect DVP14SS211R to DOP-107BV, and a male-to male DB9 adapter is used to connect UC-MS020-06A to DOP-107BV.

Model	DVP14SS211R	DOP-107BV
COM port	COM1 (RS-232)	COM (RS-232)
Wiring diagram		

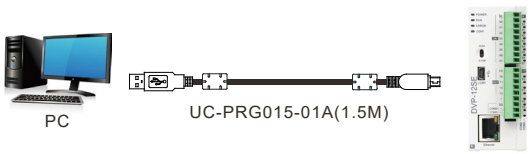
- RS-485

An RS-485 cable can be used to connect the COM port on DOP-107BV to DVP12SS211R.

Model	DVP14SS211R	DOP-107BV
COM port	COM2 (RS-485)	COM (RS-485)
Wiring diagram		

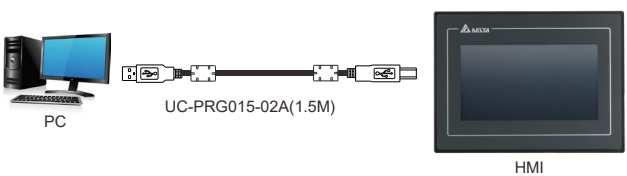
2.1.5 Connecting a Personal Computer to DVP12SE11R

Users have to connect a personal computer to DVP12SE11R by means of UC-PRG015-01A.



2.1.6 Connecting a Personal Computer to DOP-107EV

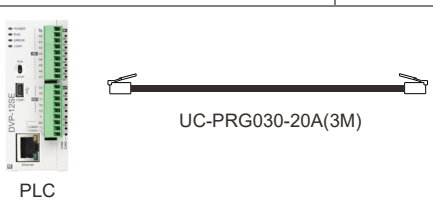
Users have to connect a personal computer to DOP-107EV by means of UC-PRG015-02A.



2.1.7 Connecting DVP12SE11R to DOP-107EV

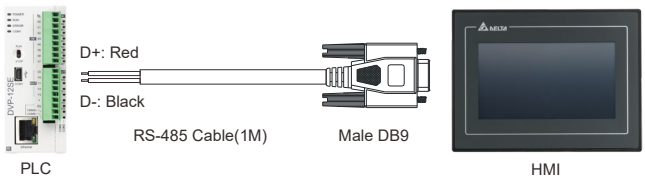
- RJ45

The Ethernet cable UC-PRG030-20A is used to connect DVP12SE11R to DOP-107EV.

Model	DVP12SE11R	DOP-107EV
COM port	RJ45	RJ45
Wiring diagram		

- RS-485

An RS-485 cable can be used to connect COM2/COM3 on DOP-107EV to DVP12SE11R.

Model	DVP12SE11R	DOP-107EV
COM port	COM2 (RS-485)	COM2/COM3 (RS-485)
Wiring diagram		

2.2 Installing ISPSoft

If an older version of ISPSoft has been installed on a computer, users have to uninstall it before installing ISPSoft.

Graphic representations

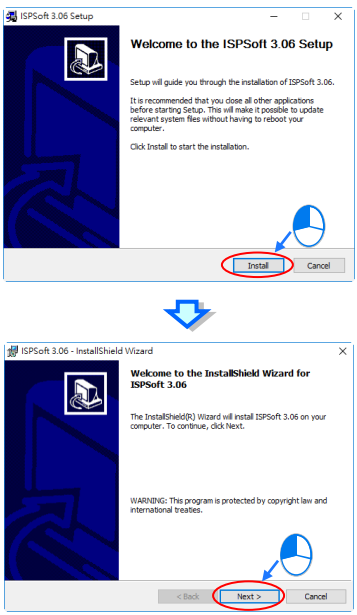
Graphic representation	Description
	Clicking the left mouse button
	Clicking the right mouse button
	Clicking the left mouse button two times in quick succession
	Pressing and holding the left mouse button, and then moving the mouse without releasing the button
	Typing with a keyboard
①	Operating sequence (The graphic representation is used when an operating sequence is mentioned, e.g. ① and ②.)
①	Number used to describe a figure

Installing ISPSoft:

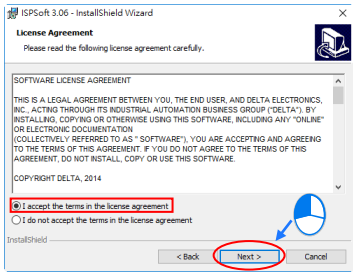
(1) Start the operating system installed on a computer. Users have to log on to the system as a system administrator before they install ISPSoft.

(2) Click **Install ISPSoft**. (Users can download the installation program from the official website of Delta. Before the installation program downloaded from the website is installed, it needs to be decompressed.)

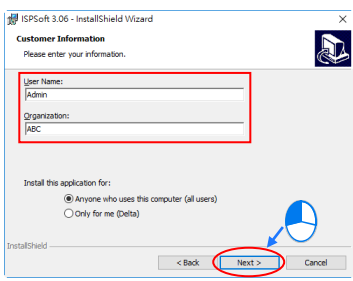
(3) Click **Next** in the **ISPSoft - InstallShield Wizard** window.



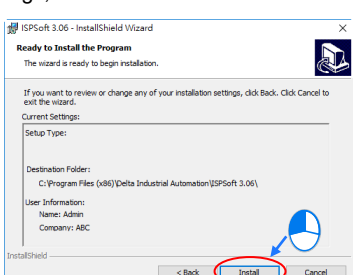
(4) Select the **I accept the terms in the license agreement** option button, and then click **Next**.



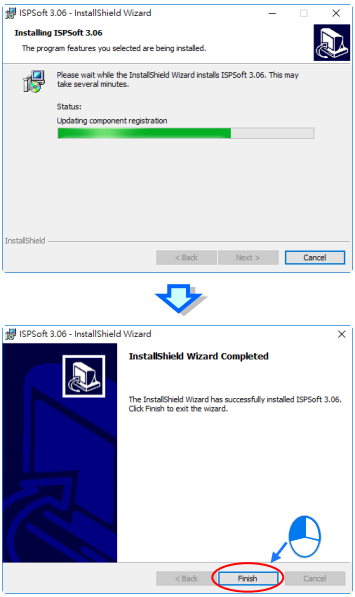
(5) Type related information in the **User Name** box and the **Organization** box, and then click **Next**.



(6) Check installation settings, and then click **Install**.



(7) After ISPSoft is installed, shortcuts to the program will be created on the desktop and the **Start** menu. Click **Finish** to complete the installation.



(8) Start ISPSoft. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **PLC** → **ISPSoft** → **ISPSoft**, or click on the desktop.)

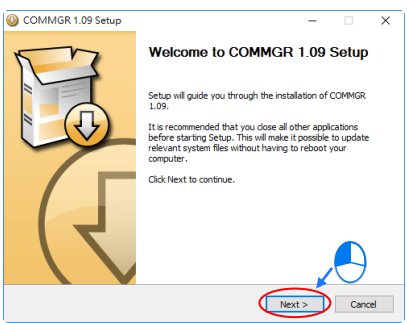
2.3 Installing COMMGR

COMMGR is software independent of ISPSoft. It must be installed and uninstalled separately. If an older version of COMMGR has been installed on a computer, users have to uninstall it before installing COMMGR.

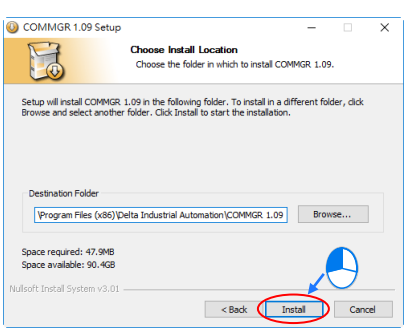
(1) Start the operating system installed on a computer. Users have to log on to the system as a system administrator before they install ISPSoft.

(2) Click **Install COMMGR**. (Users can download the installation program from the official website of Delta. Before the installation program downloaded from the website is installed, it needs to be decompressed.)

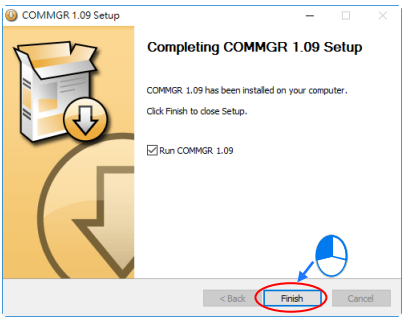
(3) Click **Next** in the **COMMGR - InstallShield Wizard** window.



(4) Check the settings and click **Install**.



(5) After COMMGR is installed, a shortcut to the program will be created on the **Start** menu. Click **Finish** to complete the installation.

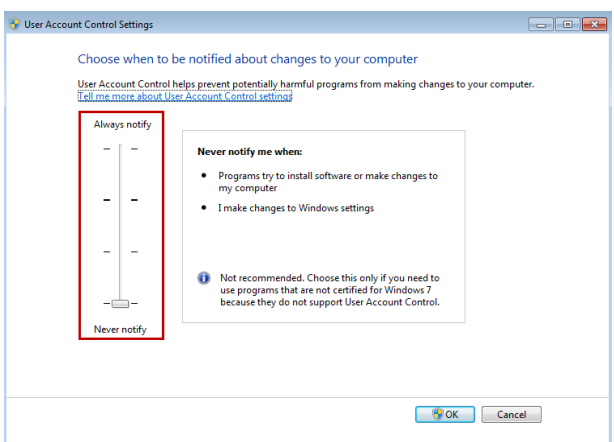


(6) Start COMMGR. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **Communication** → **COMMGR** → **COMMGR**.)

2.4 Installing DOPSoft

Users have to boot a computer and log on to Windows 7 as a system administrator. Before they install DOPSoft, they have to click **Control Panel**, click **User Accounts and Family Safety**, click **User Accounts**, click **Change User Account Control settings**, move the slider all the way down to **Never Notify**, and click **OK**.

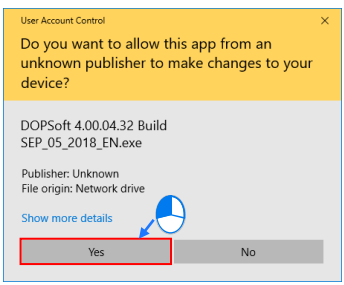




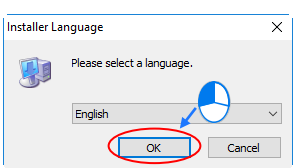
After the users finish changing User Account Control settings, they can install DOPSoft by following the instructions below.

(1) Click **Install DOPSoft** (Users can download the installation program from the official website. Before the installation program downloaded from the website is installed, it needs to be decompressed.)

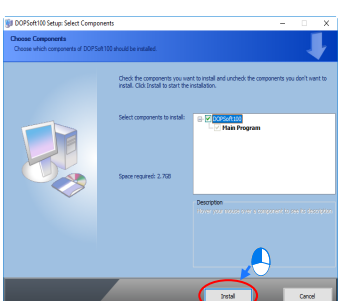
(2) A dialog box with message of “Do you want to allow this app from an unknown publisher to make changes to your device?” Click **Yes**.



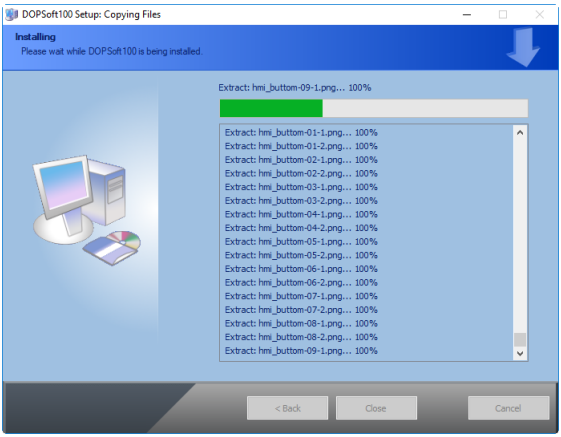
(3) Please select a language. The software provides three languages. They are traditional Chinese, simplified Chinese, and English. The users have to click **OK** after they select a language.



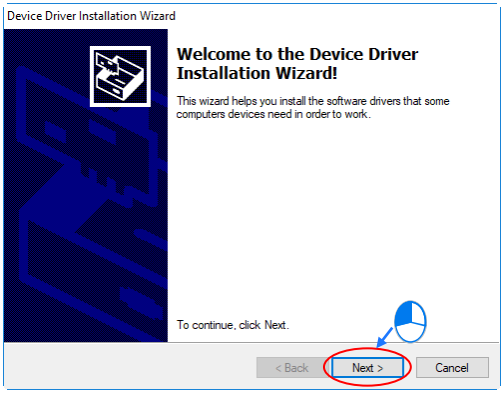
(4) Please check whether the **DOPSoft** checkbox is selected, and then click **Install**.



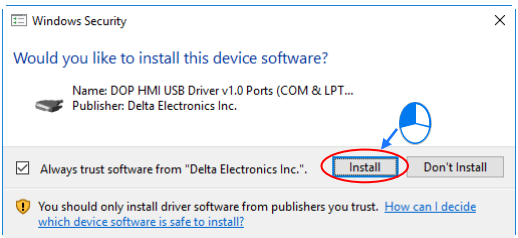
(5) After **Install** is selected, the progress bar which is used to visualize the progression of the installation of DOPSoft will be displayed.



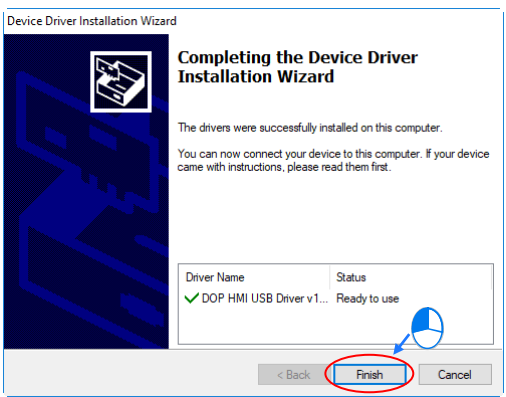
(6) Click **Next** in the **Device Driver Installation Wizard** window.



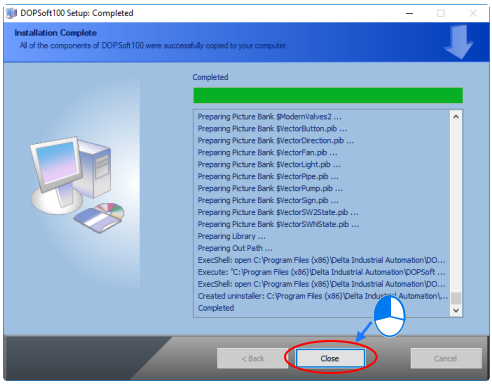
(7) The **Windows Security** dialog box appears when the device driver needed is installed. Please click **Install**.



(8) Click **Finish** after the installation of the device driver is complete.



(9) After the installation of DOPSoft is complete, the progress bar will indicate that the installation of the software is complete. Please click **Close** to close the installation screen.



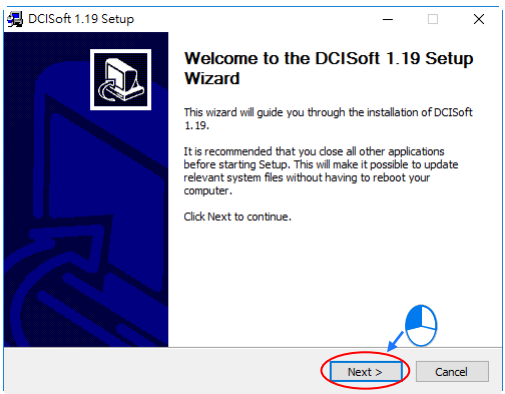
(10) Start DOPSoft. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **HMI** → **DOPSoft** → **DOPSoft**, or click 

on the desktop.)

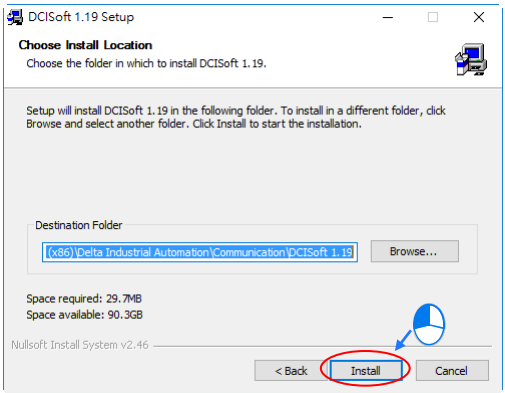
2.5 Installing DCISoft

(1) Click **Install DCISoft (UT-12SE-A1)**. (Users can download the installation program from the official website. Before the installation program downloaded from the website is installed, it needs to be decompressed.)

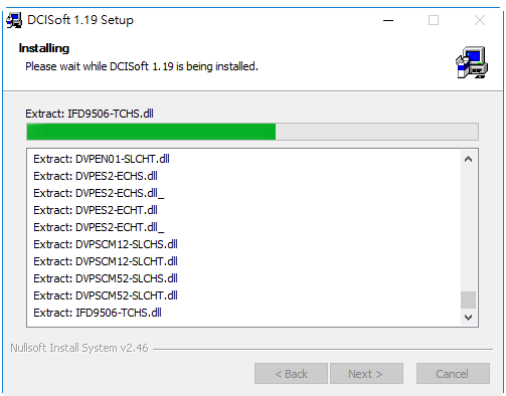
(2) Click **Next** in the **DCISoft Setup** window.

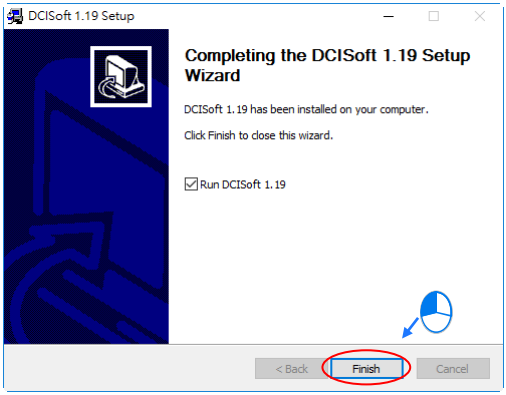


(3) If the users want to install DCISoft in a different folder, they have to click **Browse**, and select another folder. If the users want to install DCISoft in the default folder, they have to click **Install**.



(4) After DCISoft is installed, shortcuts to the program will be created on the desktop and the **Start** menu. Click **Finish** to complete the installation.





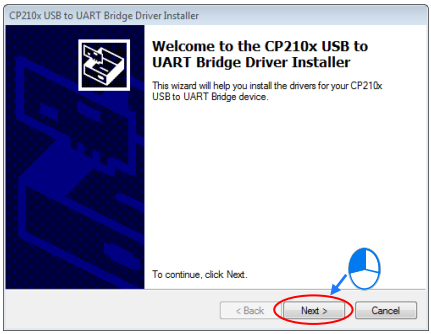
(5) Start DCISoft. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **Communication** → **DCISoft** → **DCISoft** , or click  on the desktop.)

2.6 Installing the UC-PRG020-12A Driver

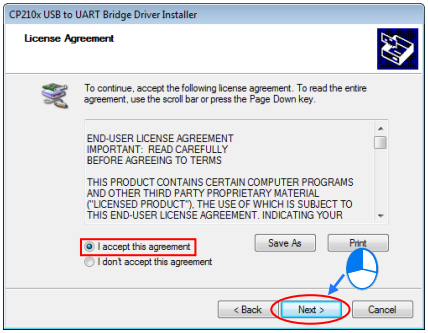
(1) Click **Install UC-PRG020-12A Driver (UT-14SS2-A) (**Users can download the installation program from the official website. Before the installation program downloaded from the website is installed, it needs to be decompressed.)

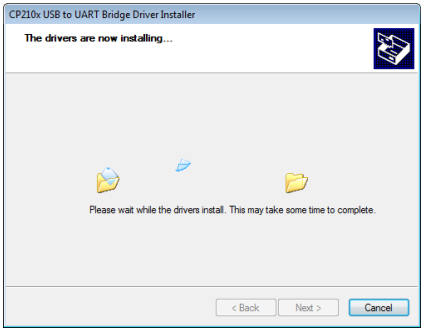
(2) **UC-PRG020-12A Driver (32-Bit)** or **UC-PRG020-12A Driver (64-Bit)** according to the Windows operating system used.

(3) Click **Next**.

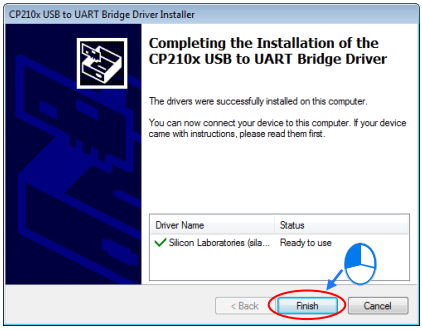


(4) Select the **I accept this agreement** option button, and then click **Next**.





(5) Click **Finish**.



(6) After UC-PRG020-12A is connected to the computer, **Silicon Labs CP210x USB to UART Bridge (COMx)** will appear in the **Device Manager** window. **COMx** represents the communication port connected to UC-PRG020-12A.

3

Chapter 3 Example Programs

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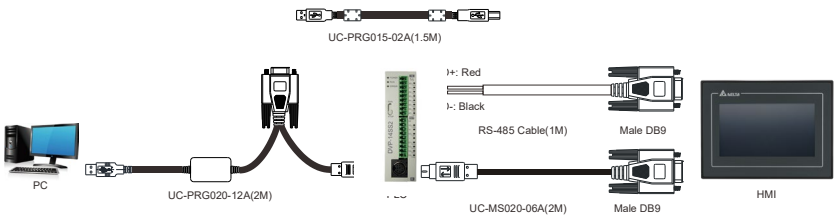
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3.1 Example 1

The steps of writing programs in ISPSoft and DOPSoft are described below. After users follow the steps introduced below, they will know how to write programs for a PLC and an HMI. The example below is applicable to UT series starter kits. The starter kit used in the example is UT-14SS2-A.



3.1.1 Creating a Project for a PLC

After the users install hardware and understand the control logic in the example, they can prepare to write a program.

In the example, the PLC used is DVP14SS211R.

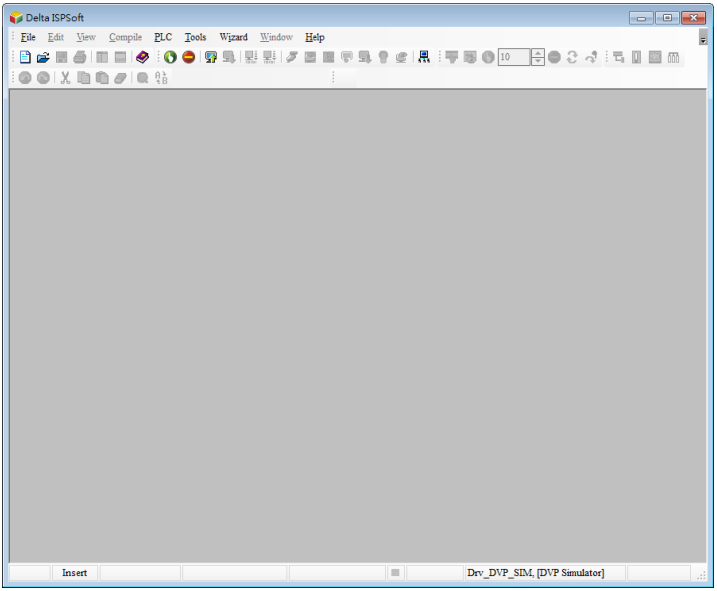
Please complete the step in section 2.1.2 before writing the example program shown below.

Step 1: Start ISPSoft. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **PLC** → **ISPSoft** → **ISPSoft**, or click  on the desktop.)

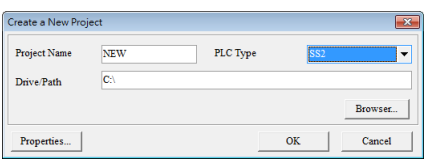
Welcome screen



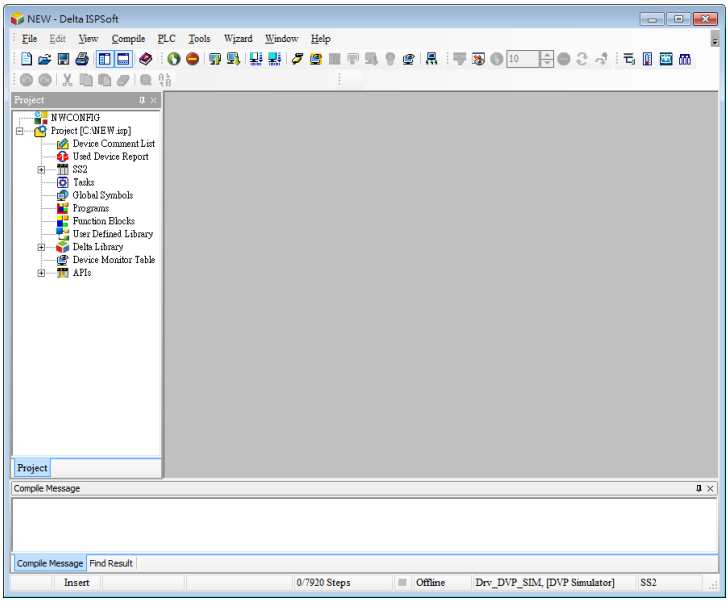
Main screen



Step 2: After  is clicked, a new project will be added. The project name typed in the **Project Name** box is “NEW”. Select **SS2** in the **PLC Type** drop-down list box, leave the default path in the **Drive/Path** box unchanged, and click **OK**.



After **OK** in the **Create a New Project** window is clicked, a project environment will be displayed (the project name “NEW” will appear in the upper left corner of the project environment).

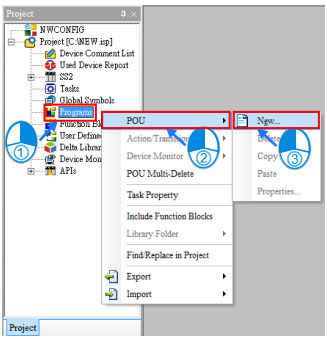


3.1.2 Creating a Main Program

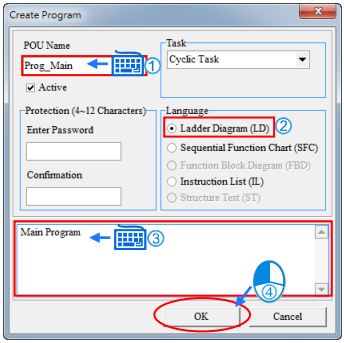
Step 1: Creating a POU

Creating a main program. Right-click Programs in the project management area in ISPSoft to add a new POU.

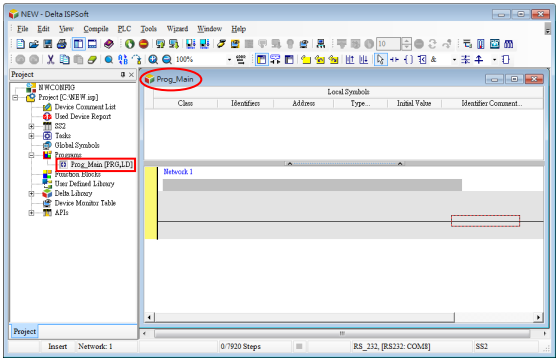
Note: Please refer to Chapter 5 in ISPSoft User Manual for more information about creating a POU.



Type “Prog_Main” in the **POU Name** box, select **Ladder Diagram (LD)** in the **Language** section, type “Main Program” in the **POU Comment** box, ,and click **OK**.

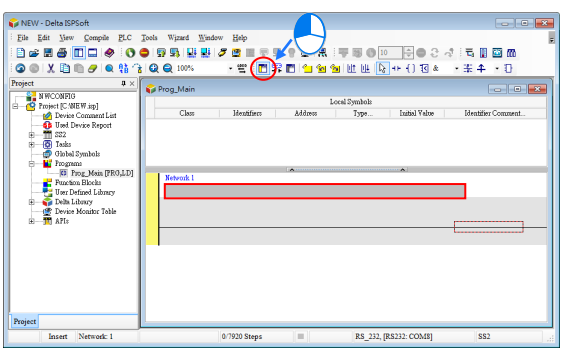


The users can see the **Prog_Main** window on the main screen.

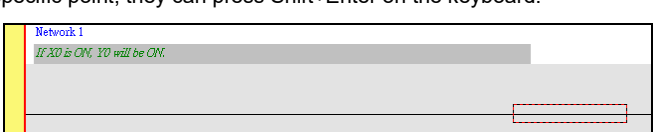


Step 2: Writing a program

The users can prepare to write a main program. In order to scan a program conveniently, the users can develop the habit of writing comments. If the users want to write network comments, they have to click .

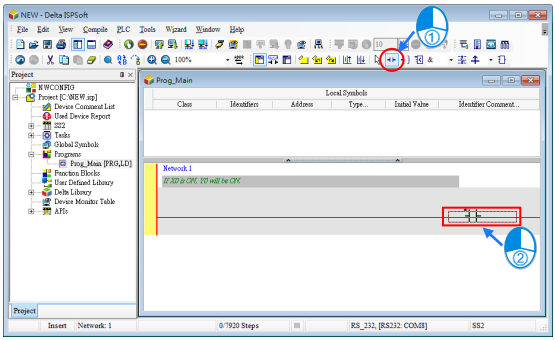


Type a comment in the comment box for network 1. If the users want to start a new line of text at a specific point, they can press Shift+Enter on the keyboard.

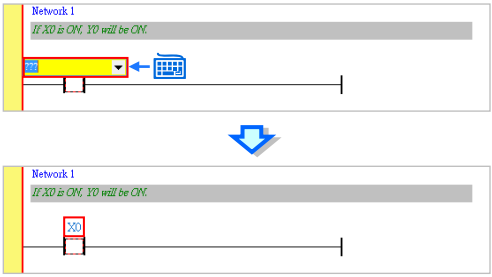


The users can begin to edit program code. The programming language used here is a

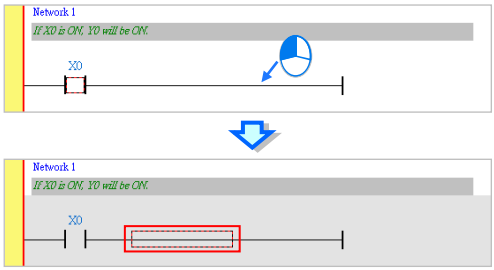
ladder diagram. Please click , and then move the mouse cursor to the red frame. If the mouse cursor becomes , the users can click the left mouse button.



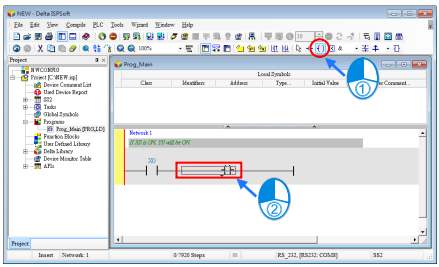
Click ???, and type “X0”.



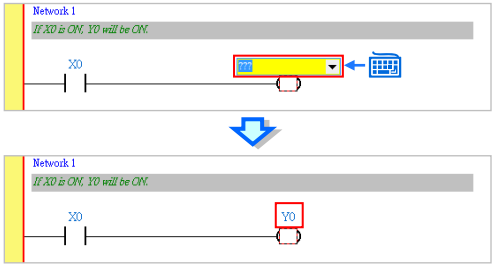
After the users click the line at the right side of the X0 contact, the red frame on the X0 contact will move to the line.



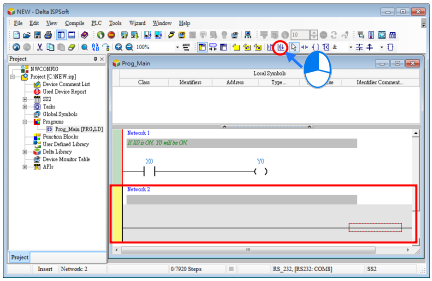
Click [ ], move the mouse cursor to the red frame, and click the left mouse button.



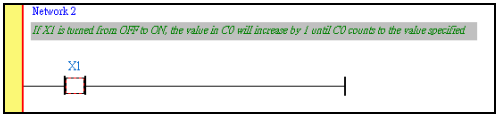
Click ???, and type “Y0”.



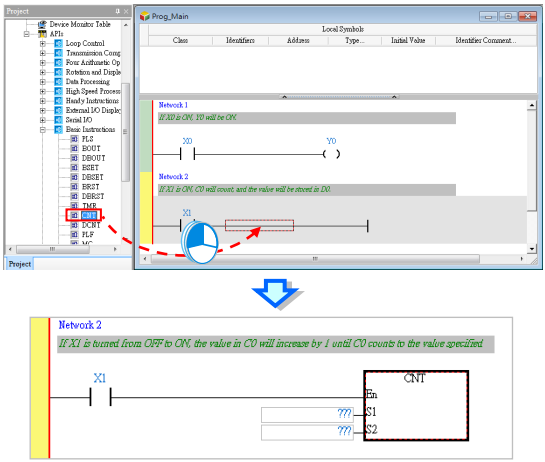
Click [ ] to add a new network.



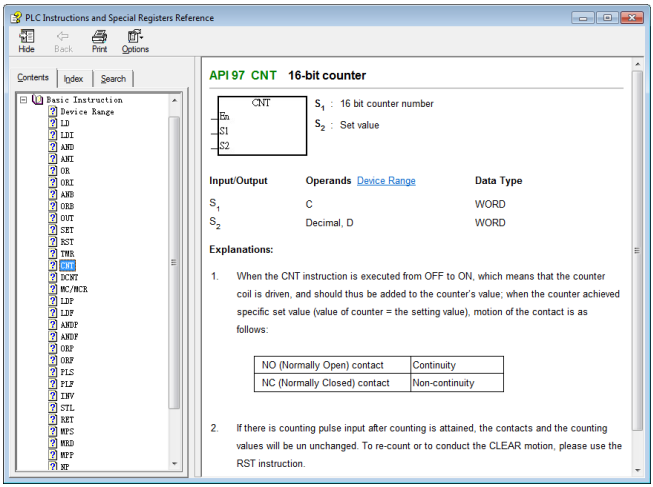
Create the following program in the same way.



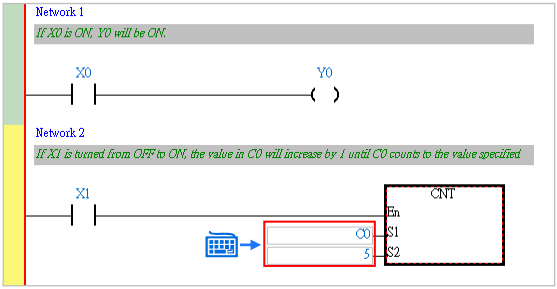
Click APIs in the project management area in ISPSoft, click **Basic Instructions**, and drag **CNT** to the red frame.



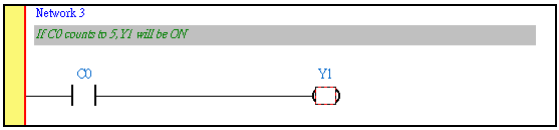
If the users do not know the usage of CNT, they can click the CNT instruction block, press F1 on the keyboard, and refer to the information in the **PLC Instructions and Special Registers Reference** window.



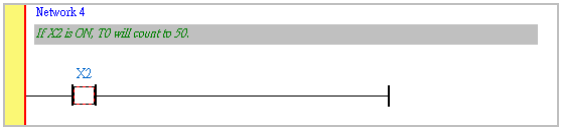
Click ??? in the box at the left side of S1, and type “C0”. Click ??? in the box at the left side of S2, and type “5”.



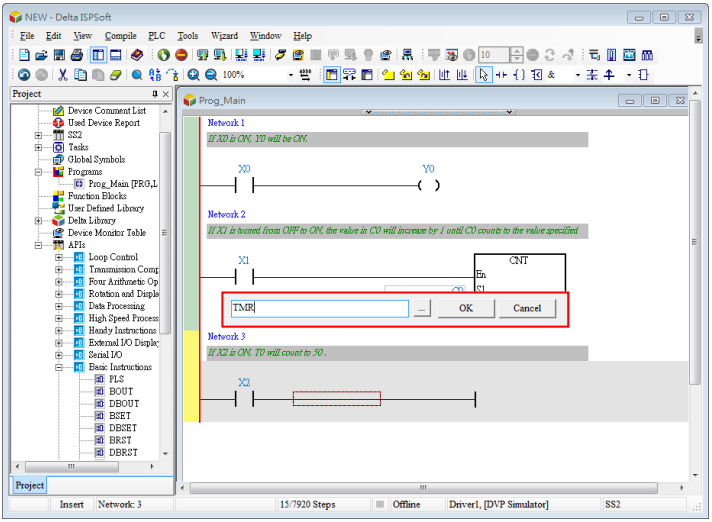
Click to add a new network, the input contact C0, and the output coil Y1.



Click to add a new network, and the input contact X2.

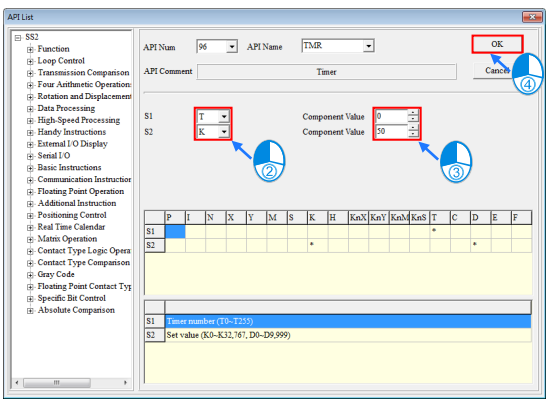


Type “TMR” directly.

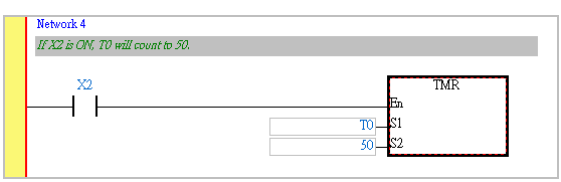


Click ... to open the **API List** window. The **API List** window helps the users edit the parameters of TMR easily. In the **API List** window, select **T** in the **S1** drop-down list box, select **K** in the **S2** drop-donw list box, select **0** in the upper **Component Value** box, select **50** in the lower **Component Value** box, and click **OK**.

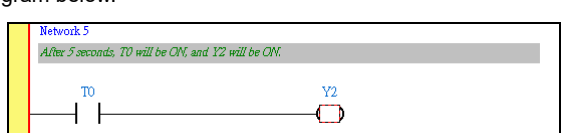




After the setting of the parameters of TMR is complete, the program shown below will appear.



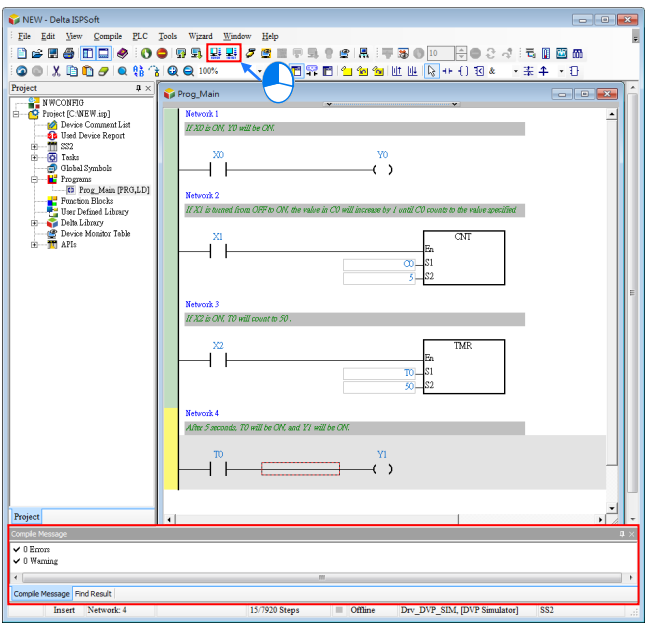
Create the program below.



Step 3: Compiling the program created

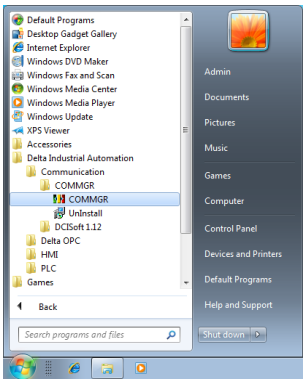
The writing of the program will be complete after the users save the file.

The users can click  to check the syntax of the program, and click  to compile the project. The compiling of a project is different from the checking of the syntax of a program in that it is composed of the checking of syntax, and the compiling of all programs and function blocks.

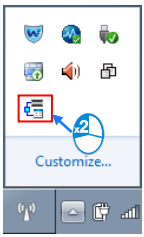


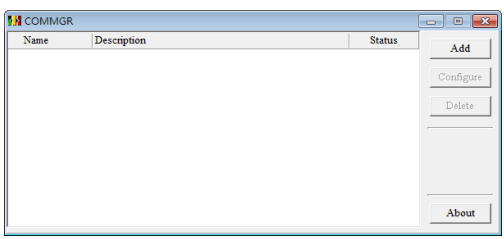
3.1.3 Setting COMMGR for UT-14SS2-A

Step 1: Start COMMGR. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **Communication** → **COMMGR** → **COMMGR**.)

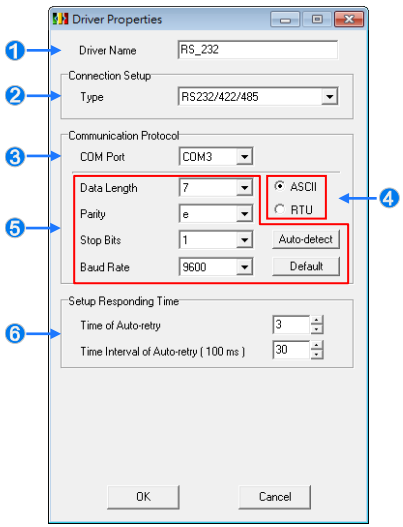


Step 2: After COMMGR is started, the icon representing COMMGR will appear in the notification area. Double-click the icon representing COMMGR to open the **COMMGR** window.





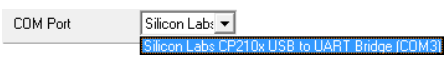
Step 3: After the **COMMGR** window is opened, users can begin to set a driver. UC-RRG020-12A cable is used to connect the computer and a PLC here, and therefore an RS-232 driver needs to be created. First, click **Add**. Then, set an RS-232 driver in the way shown below.



❶Users can type a driver name in the **Driver Name** box. Special marks can not be used except _.

❷Select **RS232** in the **Type** drop-down list box in the **Connection Setup** section.

❸Select an RS- 232 communication port in the **COM Port** drop-down list box. Each item in the **COM Port** drop-down list box is composed of a device name and a communication port number. The communication ports in the **COM Port** drop-down list box are the same as the communication ports in the **Device Manager** window.



❹The communication format can be **ASCII** or **RTU**.

❺The communication protocol for exchanging data through a communication port selected must be the same as the communication protocol for exchanging data through

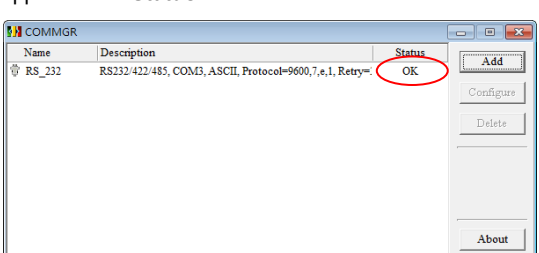
a communication port on a device connected. If users click **Default**, all communication parameters will return to the default values.

If users do not know the communication protocol for exchanging data through a communication port on a device connected, the users can connect the device to an RS-232 communication port selected with an RS-232 cable, and click **Auto-detect** to automatically detect the communication protocol. If the communication protocol is detected successfully, the related communication parameters in the **Driver Properties** window are set. However, when the communication protocol is detected automatically, the **COM Port** parameter and the **ASCII/RTU** parameter are not detected. As a result, the users have to set the **COM Port** parameter and the **ASCII/RTU** parameter before clicking **Auto-detect**.

❻ Users can select the number of times the sending of a command is retried if a connection error occurs in the **Time of Auto-retry** box, and select an interval of retrying the sending of a command in the **Time Interval of Auto-retry** box.

*. When the **Driver Properties** window is opened, the information about the communication ports in the **Device Manager** window is retrieved once. However, the information in the **COM Port** drop-down list box will not be updated. If a device is added to the computer system after the **Driver Properties** window is opened, the device will not be displayed in the **COM Port** drop-down list box. Users have to close the **Driver Properties** window, and open it again.

Step 4: After the setting of an RS-232 driver is complete, the RS-232 driver will appear in the **COMMGR** window. If the computer is normally connected to the PLC used, **OK** will appear in the **Status** column.

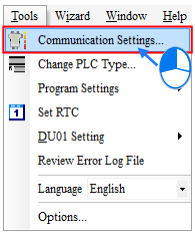


If the users click  or  in the **COMMGR** window, the **COMMGR** window will disappear from the desktop, and will be visible only as an icon in the notification area.

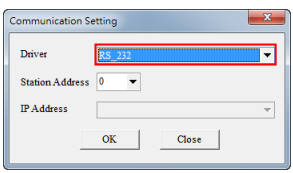
3.1.4 Downloading a PLC Project

- **Setting communication**

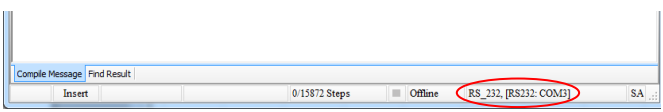
After the setting of COMMGR is complete, users can set communication in ISPSoft. First, click **Communication Settings…** on the **Tools** menu to open the **Communication Setting** window.



In the **Communication Setting** window, select **RS-232** in the **Driver** drop-down list box, and click **OK**.

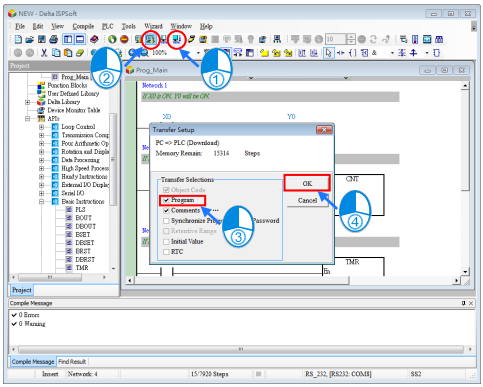


The users can see the information about the driver which is connected on the lower right corner of the status bar.

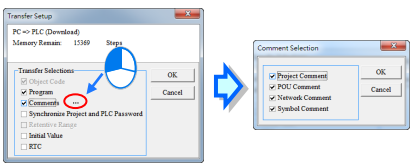


- **Downloading a PLC program**

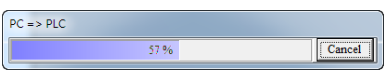
After users write a PLC program, they can prepare to download the program. The program created here has been compiled. If the program is modified, the users can click  to check the program. After the compiling of the program is successful, the users can click  to download the program.



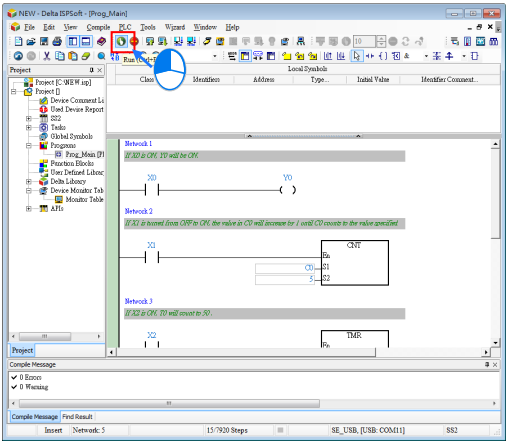
There are several checkboxes in the **Transfer Setup** window. Object code is a necessary condition for the operation of a PLC, and therefore the **Object Code** checkbox is selected. In order to maintain the program conveniently, the **Program** checkbox and the **Comments** checkbox are selected in this example. The project will be backed up onto the PLC connected, and the program will not be lost. Besides, if the users want to modify the program, and forget to bring the program, they can upload the program from the PLC to the computer to modify the program.



After the users click **OK** in the **Transfer Setup** window, the downloading of the program will be complete.



After the program is downloaded, the users can click  if they want to run the PLC.



Alternatively, the users can move the RUN/STOP swithc on the PLC to the RUN position.

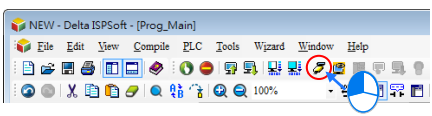


3.1.5 Monitoring a Program

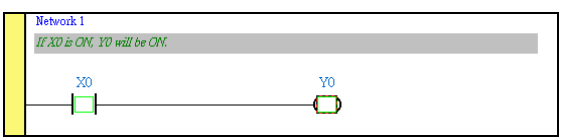
When a program is executed, users can monitor the program to understand the current logical control state of the system, or modify the values in some devices to test the system. The monitoring of a program is described below.

- **Monitoring a program**

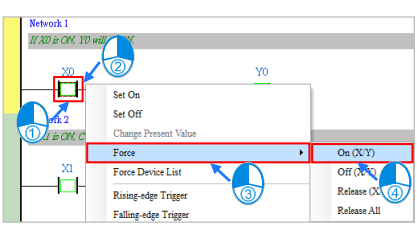
  Open the **Prog_Main** window, and click .



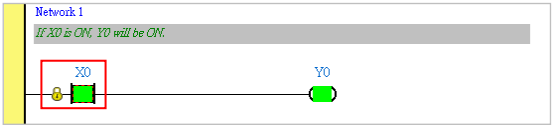
  After users click , the program will be monitored. The program is composed of a logic program, and the information about devices. (The states of Boolean devices are indicated by green backgrounds (On) or white backgrounds (Off), and the information about other devices is indicated by values or text.)



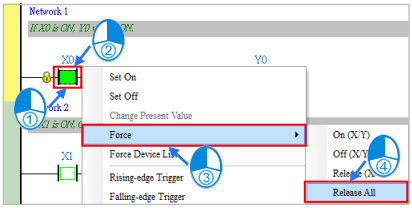
  If a device corresponds to an actual I/O device, **Set On** and **Set Off** can not be used to change the state of the device because the state of the actual I/O device immediately overwrites the value which is set, and **Force On** and **Force Off** can be used instead. X0 is forced to be On here.



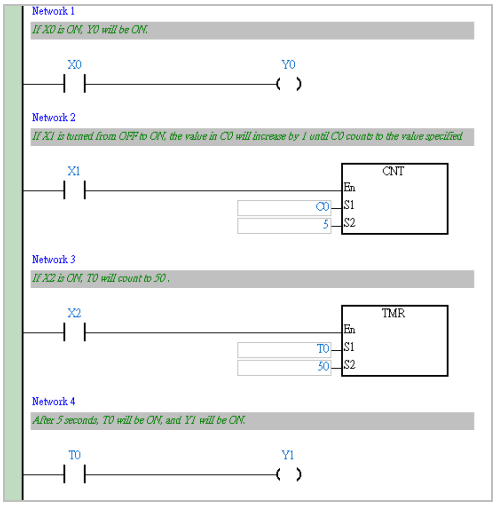
The state of X0 is changed, and a lock symbol indicating that the device is forced to be On appears.



After the system is tested, the users have to cancel the forced state of the device so that the PLC can return to normal.



3.1.6 Using a PLC with an I/O Simulator Board





1. If X0 is turned from Off to On, Y0 will be On, and the red light on the I/O simulator board will be turned On.
2. If X0 is turned from On to Off, Y0 will be Off, and the red light on the I/O simulator board will be turned Off.
3. If X1 is turned from Off to On five times, C0 will be turned from Off to On, Y1 will be turned from Off to On, and the yellow light on the I/O simulator board will be turned On.
4. If X2 is turned from Off to On, T0 will begin to measure time. After the time that T0 measures reaches 5 seconds, T0 will be turned from Off to On, Y2 will be turned from Off to On, and the green light on the I/O simulator board will be turned On.
5. If X2 is turned from On to Off, T0 will be Off, Y2 will be Off, and the green light on the I/O simulator board will be tunred Off.

3.1.7 Writing a Program for an HMI

The Delta software which supports DOP-107BV is DOPSoft. Please refer to DOPSoft User Manual for more information about the usage of DOPSoft.

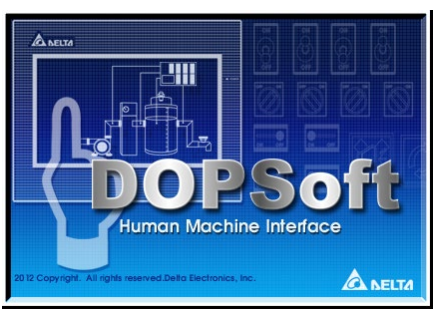
In the example, the HMI used is DOP-107BV.

Please complete the step in section 2.1.3 before writing the example program shown below.

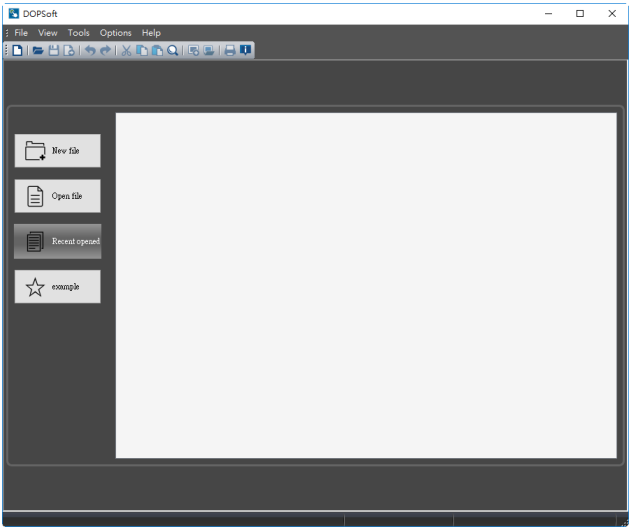
Step 1: Start DOPSoft. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **HMI** → **DOPSoft** → **DOPSoft**, or click 

on the desktop.)

Welcome screen

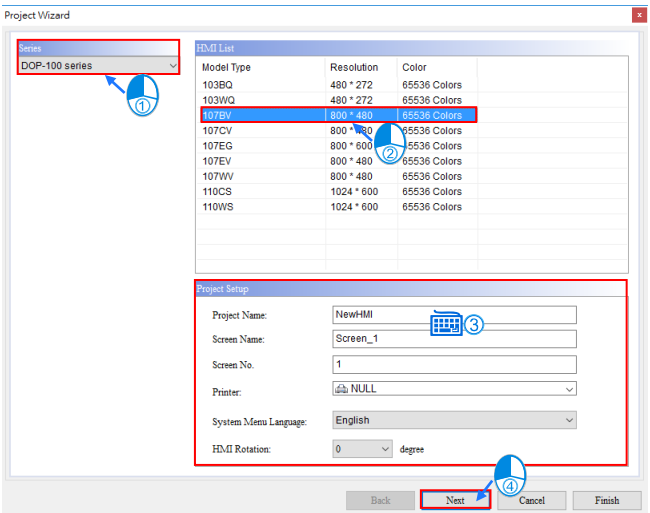


Main screen


DOPSoft
File View Tools Options Help
New file
Open file
Recent opened
example

Step 2: After  or 

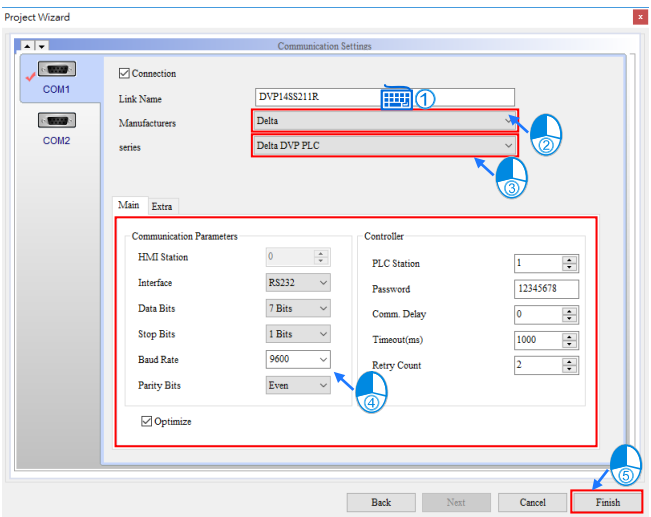
is clicked, a new project will be added. Select **DOP-100 series** in the **Series** drop-down list box, click **107BV** on the HMI list, leave the default project name in the **Project Name** box unchanged, and click **Next**.



Step 3: The setting of RS-232 communication and RS-485 communication is described below.

- **RS-232 communication**

1. In the **Project Wizard** window, type “DVP14SS211R” in the **Link Name** box, select **Delta** in the **Manufacturers** drop-down list box, select **Delta DVP PLC** in the **Controller** drop-down list box, select **RS232** in the **Interface** drop-down list box, select **7 Bits** in the **Data Bits** drop-down list box, select **1 Bit** in the **Stop Bits** drop-down list box, select **9600** in the **Baud Rate** drop-down list box, select **Even** in the **Parity** drop-down list box, select **1** in the **PLC Station** box, and click **Finish**.



2. Setting a communication format for DVP14SS211R:

   COM1 is an RS-232 port. The default communication format of COM1 is described below.

   Baud rate: 9600 bps

   Data length: 7 data bits

   Parity: Even

   Stop bit: 1 stop bit

Transmission mode: ASCII

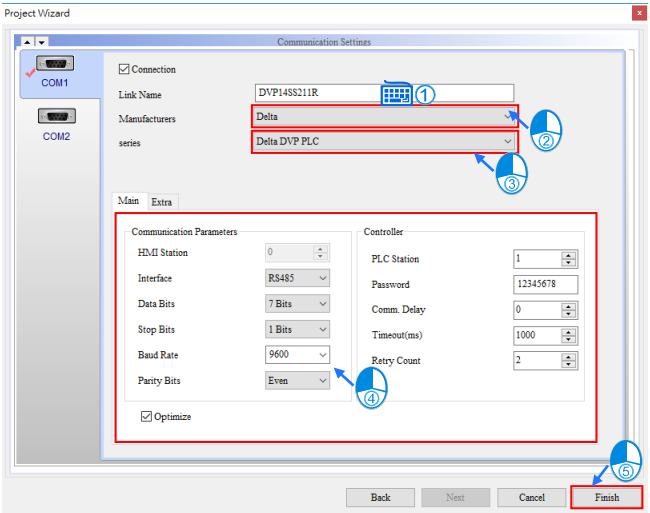
Please refer to section 4.4.3 for more information about setting a communicaiton format.

Note: If users want to change the default communication format of COM1 on DVP14SS211R, they have to add the program above to the main program in DVP14SS211R, and move the RUN/STOP switch on DVP14SS211R to the RUN position. If the users want to connect a PC to COM1 on DVP14SS211R, the communication format set in COMMGR needs to be the same as the communicaiton format of COM1.

3. Please refer to section 2.1.4 for more information about using an RS-232 cable to connect DVP14SS211R to DOP-107BV.

- **RS-485 communication**

1. In the **Project Wizard** window, type “DVP14SS211R” in the **Link Name** box, select **Delta** in the **Manufacturers** drop-down list box, select **Delta DVP PLC** in the **Controller** drop-down list box, select **RS485** in the **Interface** drop-down list box, select **7 Bits** in the **Data Bits** drop-down list box, select **1 Bit** in the **Stop Bits** drop-down list box, select **9600** in the **Baud Rate** drop-down list box, select **Even** in the **Parity** drop-down list box, select **1** in the **PLC Station** box, and click **Finish**.



2. Setting a communication format for DVP14SS211R:

   COM2 is an RS-485 port. The default communication format of COM2 is described below. If users want to modify the communication format of COM2, they can refer to section 4.4.3 for more information.

   Baud rate: 9600 bps

   Data length: 7 data bits

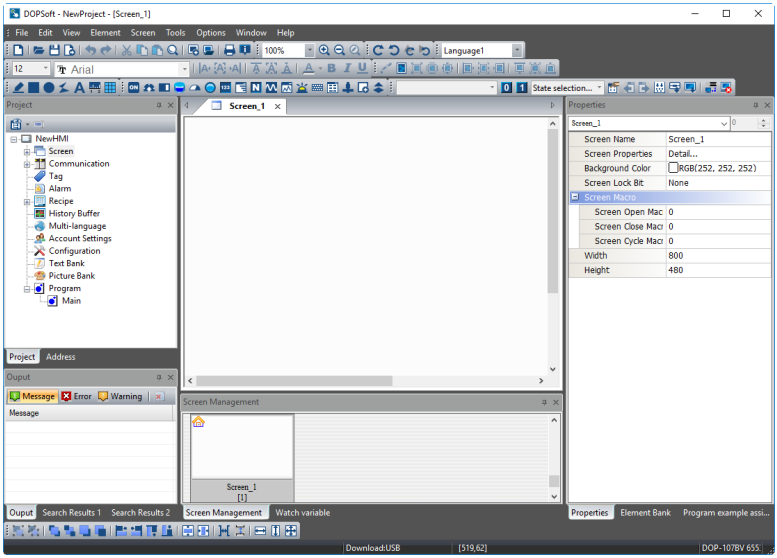
   Parity: Even

   Stop bit: 1 stop bit

   Transmission mode: ASCII

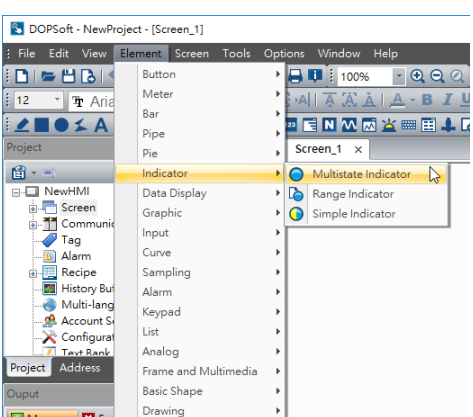
3. Please refer to section 2.1.4 for more information about using an RS-485 cable to connecting DVP14SS211R to DOP-107BV.

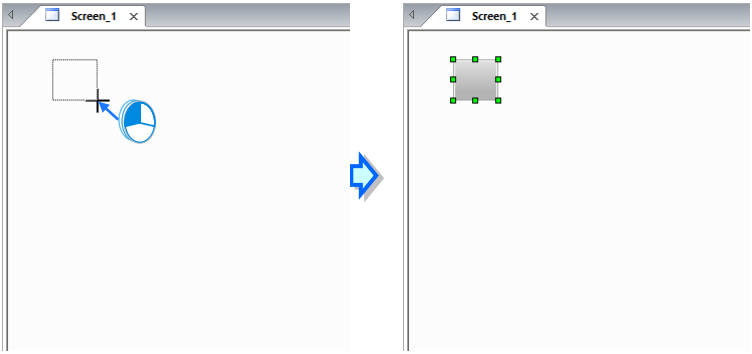
After **Finish** in the **Project Wizard** window is clicked, a project environment will be displayed.



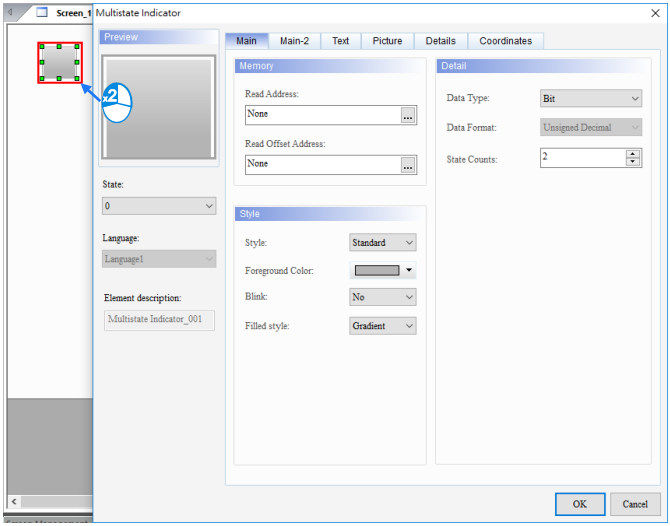
The steps of editing an HMI screen are described below.

Choose **Element** > **Indicator** > **Multistate Indicator** and left-click the mouse to drag and drop the picture for editing.

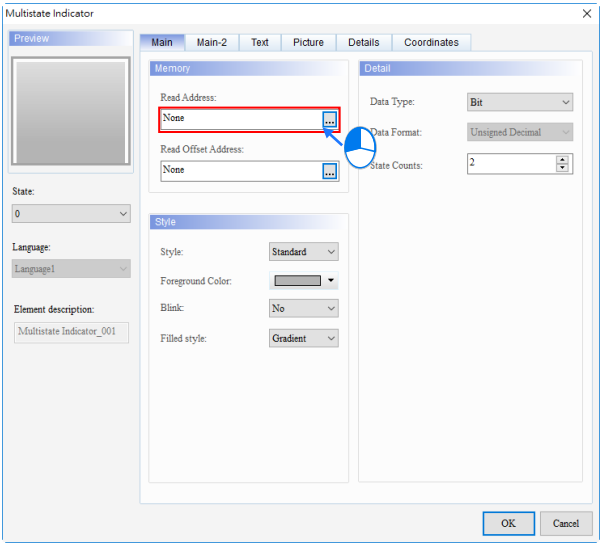


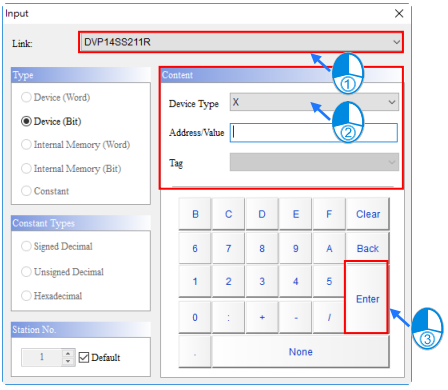


Double-click the element to open the **Multistate Indicator** window.

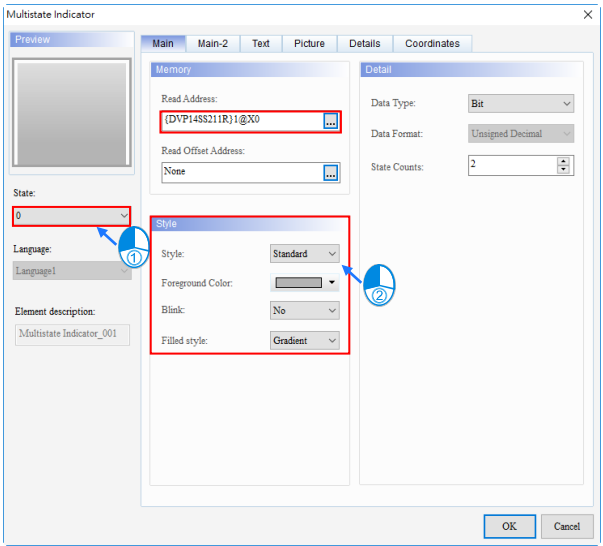


Set the parameter in the **Memory** section.

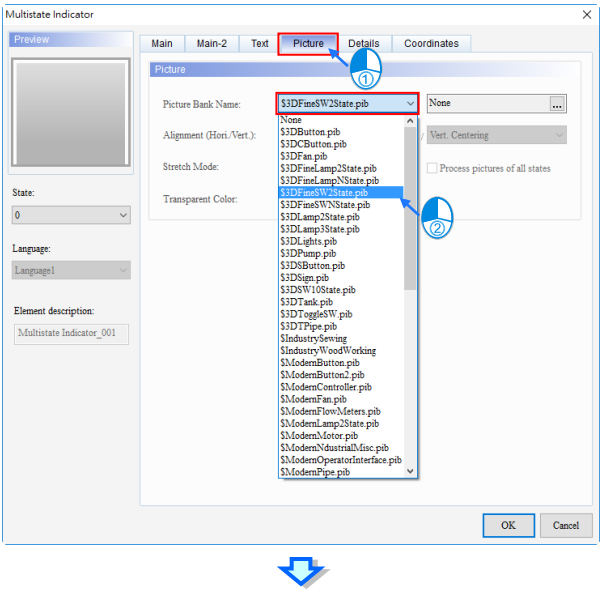

Multistate Indicator
Preview
Main
Main-2
Text
Picture
Details
Coordinates
Memory
Read Address:
None
Read Offset Address:
None
Detail
Data Type:
Bit
Data Format:
Unsigned Decimal
State Counts:
2
State:
0
Language:
Language1
Element description:
Multistate Indicator_001
Style
Style:
Standard
Foreground Color:
Blink:
No
Filled style:
Gradient
OK
Cancel

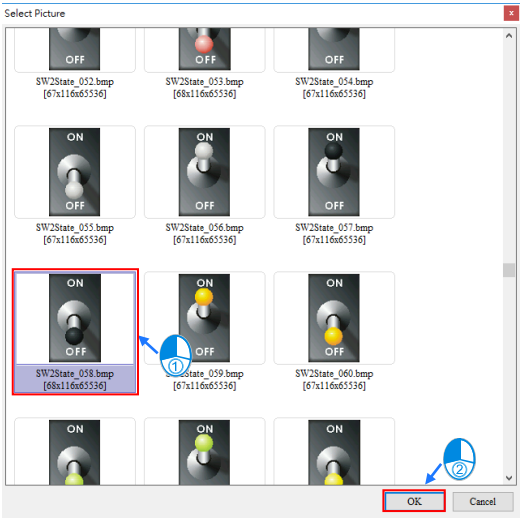

Input
Link:
DVP14SS211R
Type
Device (Word)
Device (Bit)
Internal Memory (Word)
Internal Memory (Bit)
Constant
Content
Device Type
X
Address/Value
Tag
Constant Types
Signed Decimal
Unsigned Decimal
Hexadecimal
Station No.
1
Default
B
C
D
E
F
Clear
6
7
8
9
A
Back
1
2
3
4
5
Enter
0
:
+
-
/
None
①
②
③

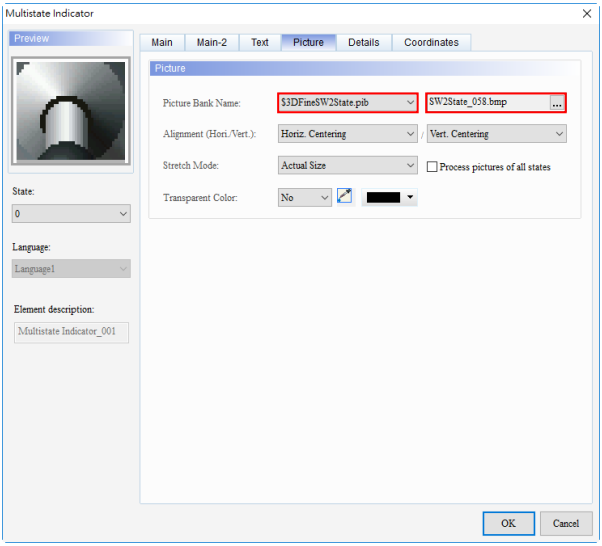
Select **0** in the **State** drop-down list box, and then set the parameters in the **Style** section.



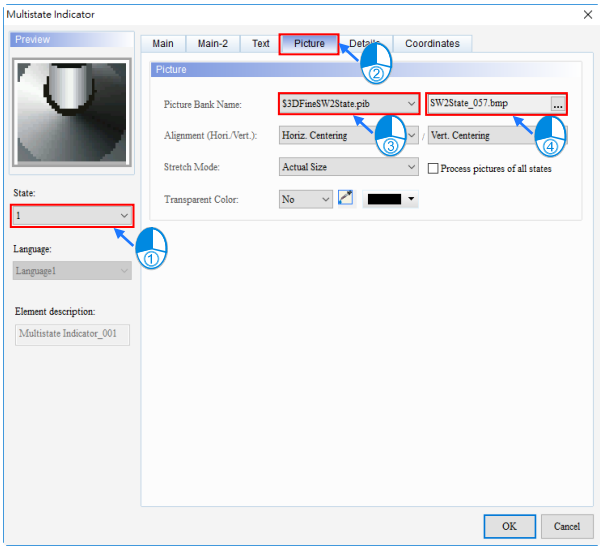
Click the **Picture** tab, select **$3DFineSW2State.pib** in the **Picture Bank Name** drop-down list box, and click **SW2State_058.bmp** in the **Select Picture** window.



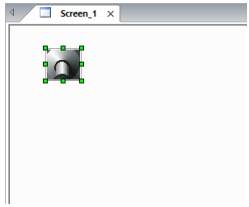

Select Picture
SW2State_052.bmp
[67x116x65536]
SW2State_053.bmp
[68x116x65536]
SW2State_054.bmp
[67x116x65536]
SW2State_055.bmp
[67x116x65536]
SW2State_056.bmp
[67x116x65536]
SW2State_057.bmp
[67x116x65536]
SW2State_058.bmp
[68x116x65536]
SW2State_059.bmp
[67x116x65536]
SW2State_060.bmp
[67x116x65536]
OK
Cancel


Multistate Indicator
Preview
Main
Main-2
Text
Picture
Details
Coordinates
Picture
Picture Bank Name:
$3DFineSW2State.pib
SW2State_058.bmp
Alignment (Hori./Vert.):
Horiz. Centering
Vert. Centering
Stretch Mode:
Actual Size
Process pictures of all states
Transparent Color:
No
State:
0
Language:
Language1
Element description:
Multistate Indicator_001
OK
Cancel

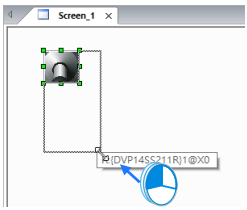
Select **1** in the **State** drop-down list box, and then set the parameters in the **Picture** section.



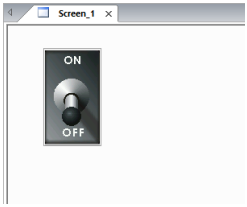
After **OK** in the **Multistate Indicator** window is clicked, the screen shown below will appear.



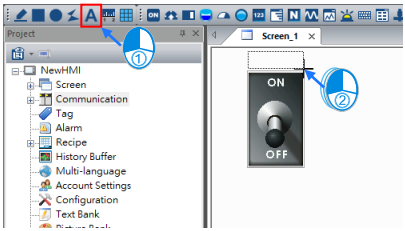
Adjust the size of the element.



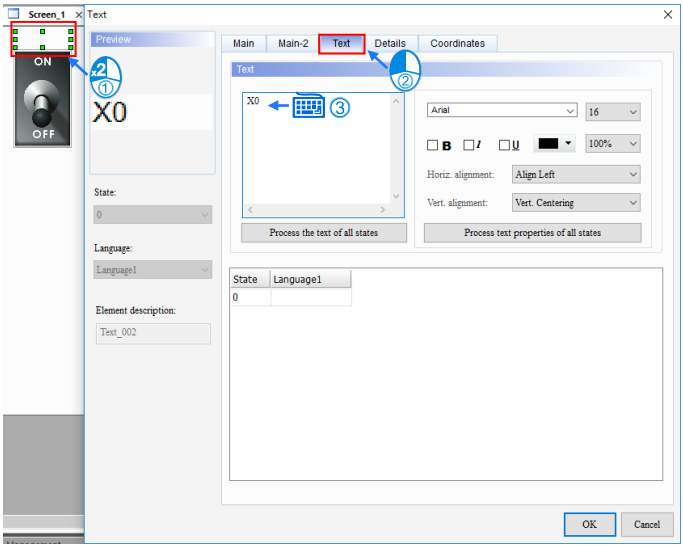
The editing of the element is complete.

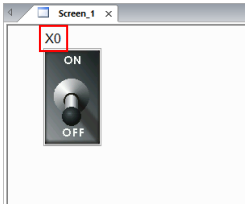


Create a text box.

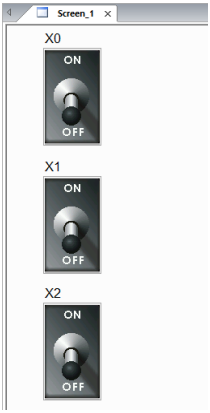


Double-click the text box to open the **Text** window. In the **Text** window, click the **Text** tab, and type “X0” in the **Text** section.

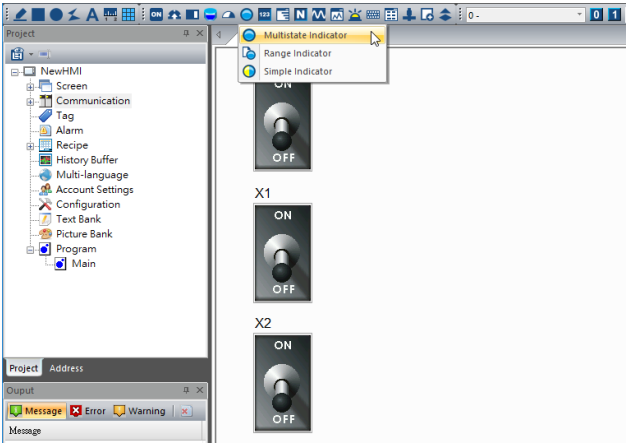


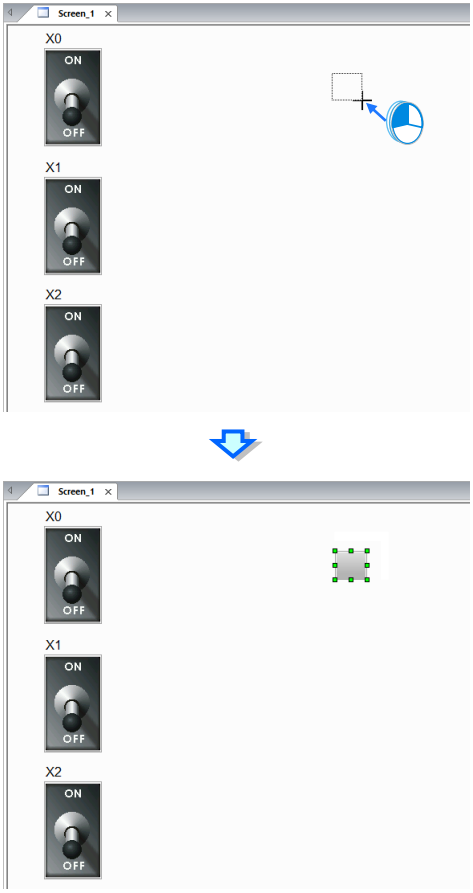


Create the X1 indicator and the X2 indicator shown below in the same way.

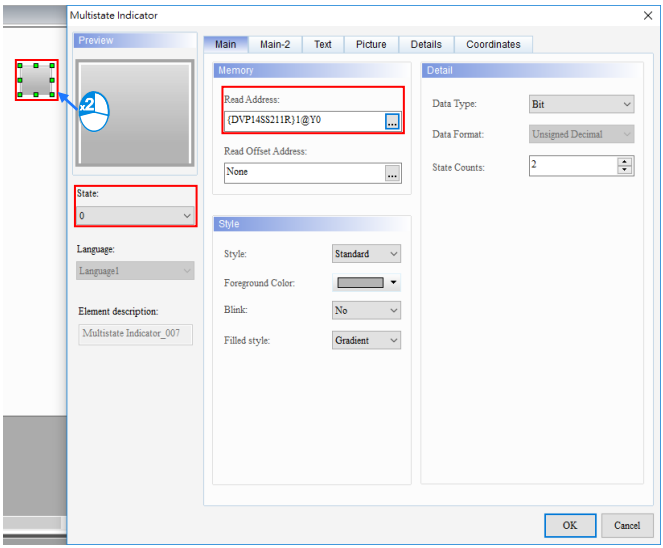


Choose **Element** > **Indicator** > **Multistate Indicator** and left-click the mouse to drag and drop the picture for editing.

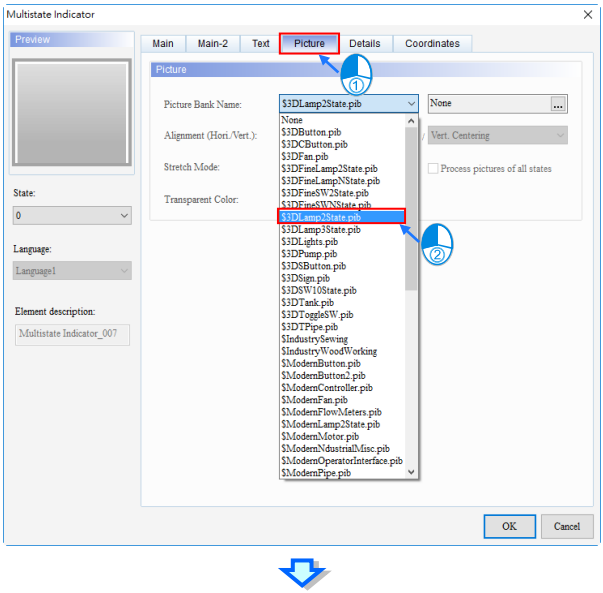


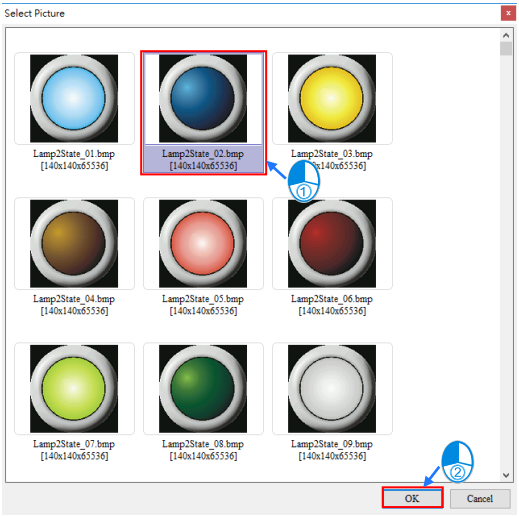

Screen_1
X0
ON
OFF
X1
ON
OFF
X2
ON
OFF
Screen_1
X0
ON
OFF
X1
ON
OFF
X2
ON
OFF

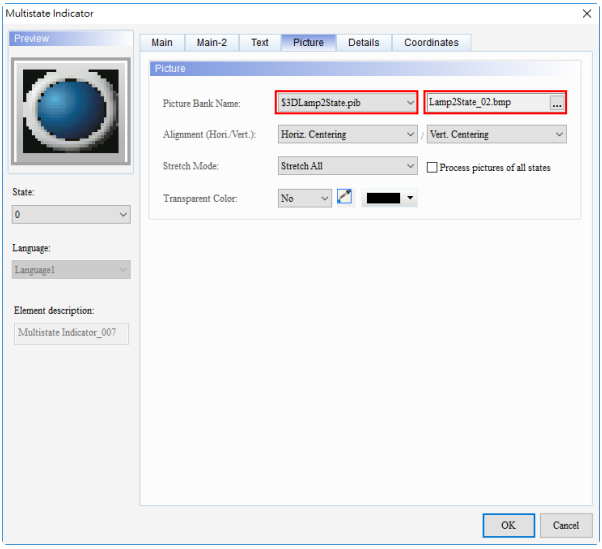
Double-click the element to open the **Multistate Indicator** window. Set the parameter in the **Memmory** section in the **Multistate Indicator** window.



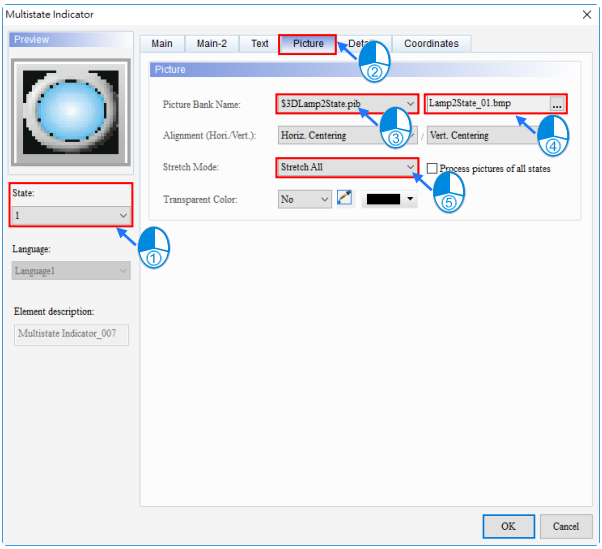
Click the **Picture** tab, select **$3DLamp2State.pib** in the **Picture Bank Name** drop-down list box, and click **Lamp2State_02.bmp** in the **Select Picture** window.



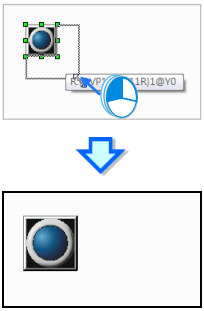

Select Picture
Lamp2State_01.bmp
[140x140x65536]
Lamp2State_02.bmp
[140x140x65536]
Lamp2State_03.bmp
[140x140x65536]
Lamp2State_04.bmp
[140x140x65536]
Lamp2State_05.bmp
[140x140x65536]
Lamp2State_06.bmp
[140x140x65536]
Lamp2State_07.bmp
[140x140x65536]
Lamp2State_08.bmp
[140x140x65536]
Lamp2State_09.bmp
[140x140x65536]
①
②
OK
Cancel


Multistate Indicator
Preview
Main
Main-2
Text
Picture
Details
Coordinates
Picture
Picture Bank Name:
$3DLamp2State.pib
Lamp2State_02.bmp
Alignment (Hori./Vert.):
Horiz. Centering
Vert. Centering
Stretch Mode:
Stretch All
Process pictures of all states
Transparent Color:
No
State:
0
Language:
Language1
Element description:
Multistate Indicator_007
OK
Cancel

Select **1** in the **State** drop-down list box, click the **Picture** tab, and set the parameters in the **Picture** section.



Adjust the size of the element.



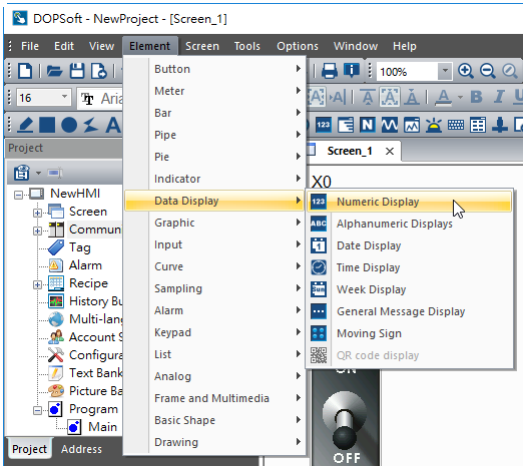
Create the text “Y0”.

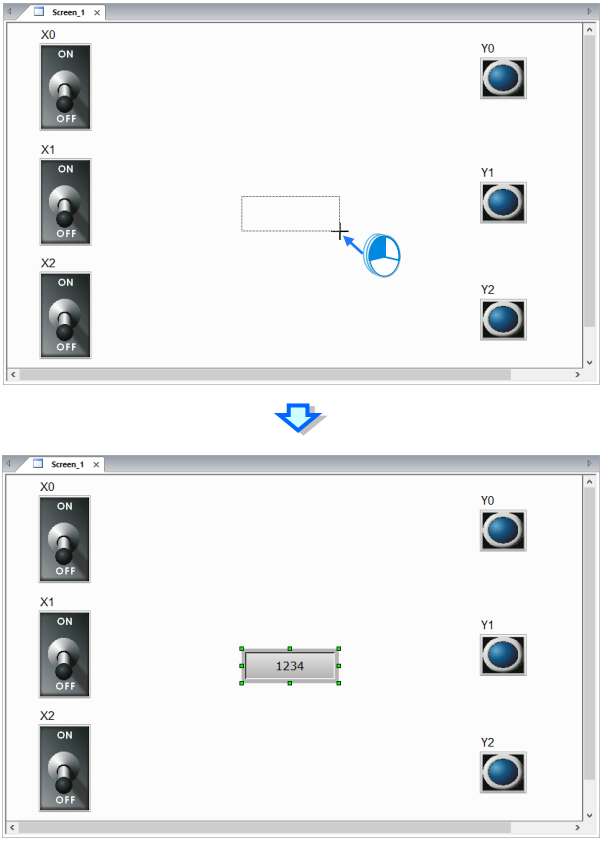


Create the Y1 indicator and the Y2 indicator shown below in the same way.

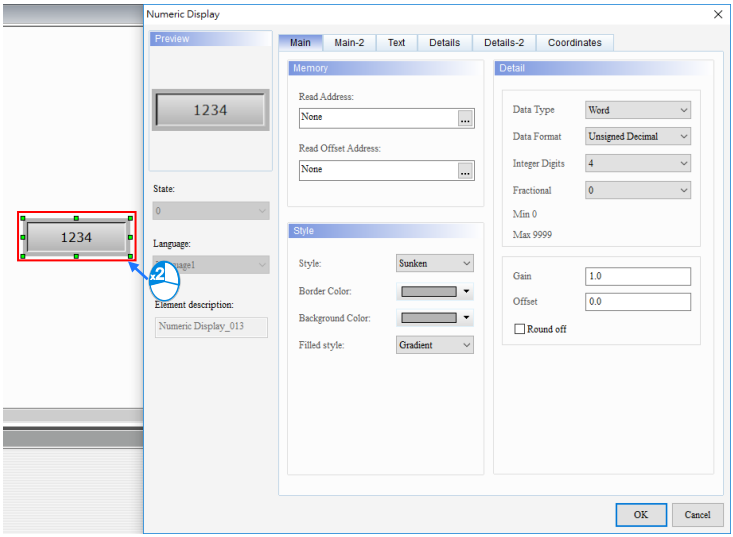


Choose **Element** > **Data Display** > **Numeric Display** and left-click the mouse to drag and drop the picture for editing.

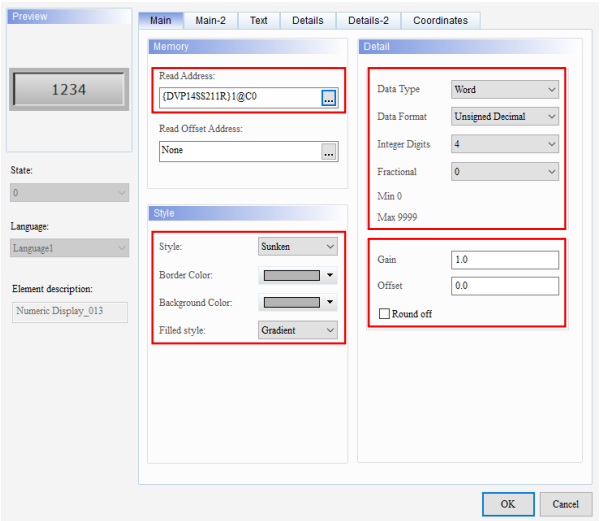



Screen_1
X0
ON
OFF
X1
ON
OFF
X2
ON
OFF
Y0
Y1
Y2
Screen_1
X0
ON
OFF
X1
ON
OFF
1234
X2
ON
OFF
Y0
Y1
Y2

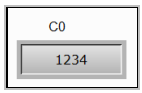
Double-click the element to open the **Numeric Display** window.



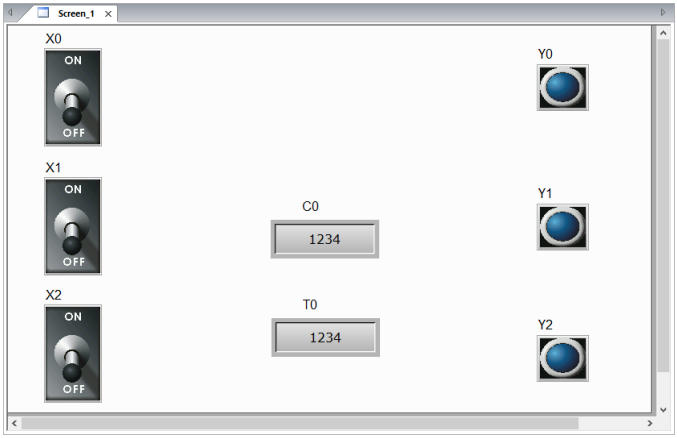
Set the parameters in the **Memmory** section, the **Style** section, and the **Detail** section.



Create the text “C0”.



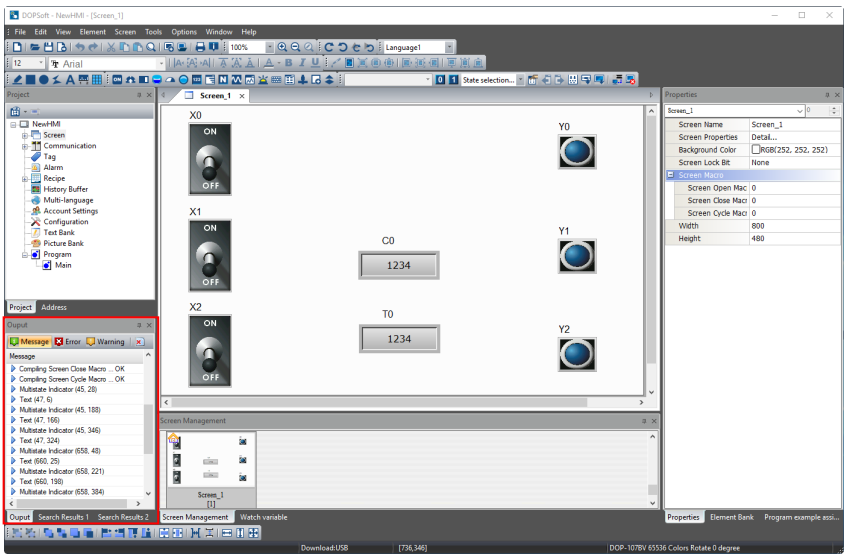
Create a numeric display which represents T0 in the same way.



The writing of the program will be complete after the users save the file.

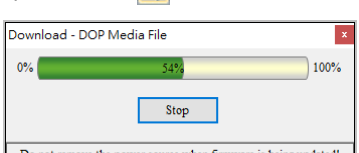
3.1.8 Compiling and Downloading an HMI Program

After the HMI program above is created, users can download it to DOP-107BV. Before the HMI program created above is downloaded, the users have to compile it. After the users click **Compile** on the **Tools** menu, or click , the HMI program created above will be compiled, and the information about the result of the compiling of the program will be displayed in the **Output** window.

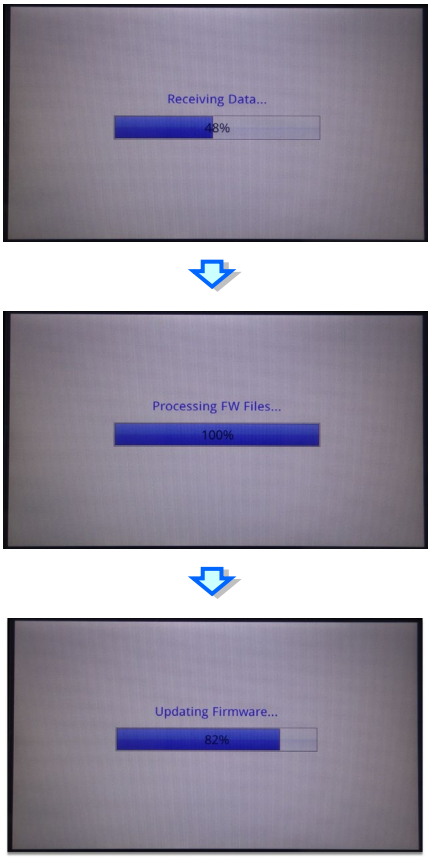


After the users compile the HMI program created above, they can click  to donwload the screen and the recipes in the program.

If the HMI is used for the first time or the firmware of the HMI is old, the firmware of the HMI will be automatically updated after  is clicked. Please see the figure below.



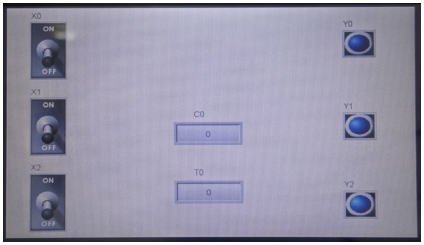
A progress bar appears on the screen of the HMI when the firmware of the HMI is updated.



After the firmware of the HMI is updated, the HMI will read the data which needs to be downloaded.



After the downloading of the program is complete, the screen shown below will appear.



3.1.9 Using an HMI with an I/O Simulator Board



1. If X0 is turned from Off to On, Y0 will be On. If X0 is turned from On to Off, Y0 will be Off.


DELTA

2. If X1 is turned from Off to On five times, C0 will be turned from Off to On, abd Y1 will be turned from Off to On.



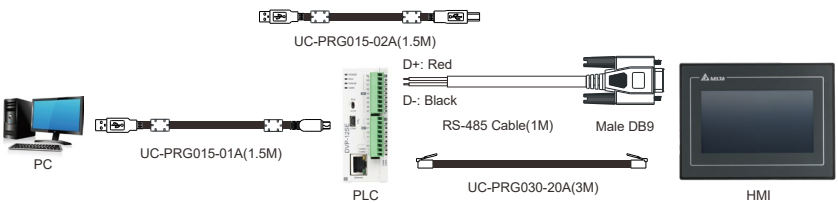
3. If X2 is turned from Off to On, T0 will begin to measure time. After the time that T0 measures reaches 5 seconds, T0 will be turned from Off to On, and Y2 will be turned from Off to On. If X2 is turned from On to Off, T0 will be Off, and Y2 will be Off.



3.2 Example 2

Generally speaking, there are programmers who are responsible for writing a PLC program and an HMI program during the process of developing a project. They work together to meet the requirements of the project.

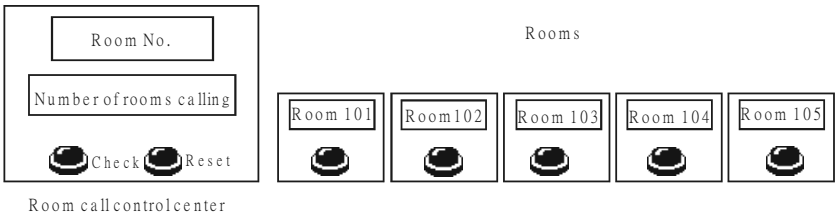
The example below helps users understand how to write a PLC program and an HMI program during the process of developing a project. The starter kit used in the following example is UT-12SE-A1.



3.2.1 Project Requirements

1. There are five rooms, and they are numbered from 101 to 105. If a customer in a room needs service, the customer can press the call button in the room to call an attendant. After a call button is pressed, the number of rooms calling will increase by one.
2. If several rooms call, the display on the service counter will show the number of rooms calling, and the order in which the rooms call.
3. If an attendant checks a room, and then presses the check button on the display, the number of rooms calling will decrease by one, and the next room number will be shown on the display.
4. After all the rooms calling are checked, the number of rooms calling shown on the display will be 0.
5. After an attendant presses the reset button on the display, all data will be cleared.

Please see the figure below for more information.



3

3.2.2 Project Development

After users understand project requirements, they need to discuss and plan a project. The project needs to be composed of a PLC program and an HMI program. Besides, the users have to select PLC devices and HMI elements.

- **PLC**

  1. There are five rooms and five call buttons.
  2. The rooms are numbered from 101~105.
  3. If an attendant checks a room, and then presses the check button on the display on the service counter, the number of rooms calling will decrease by one, and the next room number will be shown on the display.
  4. After all the rooms calling are checked, the number of rooms calling shown on the display on the service counter will be 0.
  5. After an attendant presses the reset button on the display, all data will be cleared.
  6. Default Ethernet IP address: 192.168.1.5

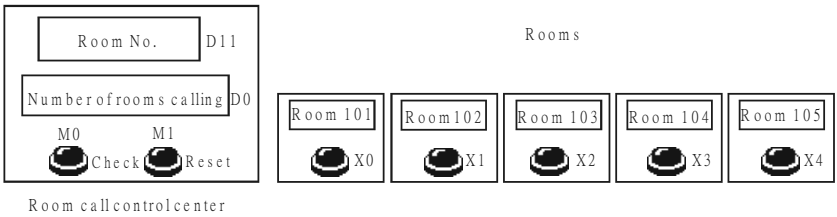
- **HMI**

  1. The display on the service counter shows a room number.
  2. The display on the service counter shows the number of rooms calling.
  3. There is one check button.
  4. There is one reset button.
  5. Default Ethernet IP address: 192.168.1.2

- **Devices**

PLC device	Function	HMI element
X0	X0 corresponds to the call button in room 101. X0 will be On if the call button in room 101 is pressed.	-
X1	X1 corresponds to the call button in room 102. X1 will be On if the call button in room 102 is pressed.	-
X2	X2 corresponds to the call button in room 103. X2 will be On if the call button in room 103 is pressed.	-
X3	X3 corresponds to the call button in room 104. X3 will be On if the call button in room 104 is pressed.	-
X4	X4 corresponds to the call button in room 105. X4 will be On if the call button in room 105 is pressed.	-
M0	M0 corresponds to the check button on the display on the service counter. M0 will be On if the check button is pressed.	Button
M1	M1 corresponds to the reset button on the display on the service counter. M1 will be On if the reset button is pressed.	Button
D0	The value in D0 indicates the number of rooms calling.	Numeric display
D1~D5	The values in D1~D5 indicate the rooms which have not been checked.	-
D10	The value in D10 is a room number stored temporarily.	-
D11	The value in D11 indicates the room which is being checked. (First in, first out)	Numeric display

- **The relation between PLC devices and HMI elements is shown below.**



3.2.3 Writing a Program for an HMI

In the example, the HMI used is DOP-107EV.

After users discuss device requirements, they have to edit HMI elements.

Please complete the step in section 2.1.6 before writing the example program shown below.

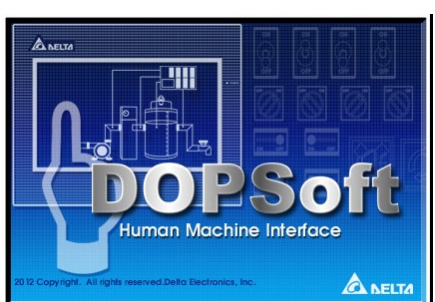
Planning elements:

- M0: Check button
- M1: Reset button
- D0: The value in D0 indicates the number of rooms calling.
- D11: The value in D11 indicates the room which is being checked.

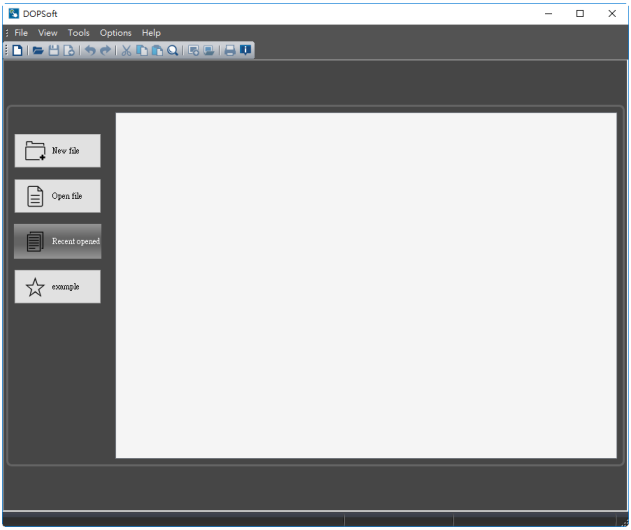
Step 1: Start DOPSoft. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **HMI** → **DOPSoft** → **DOPSoft**, or click 

on the desktop.)

Welcome screen

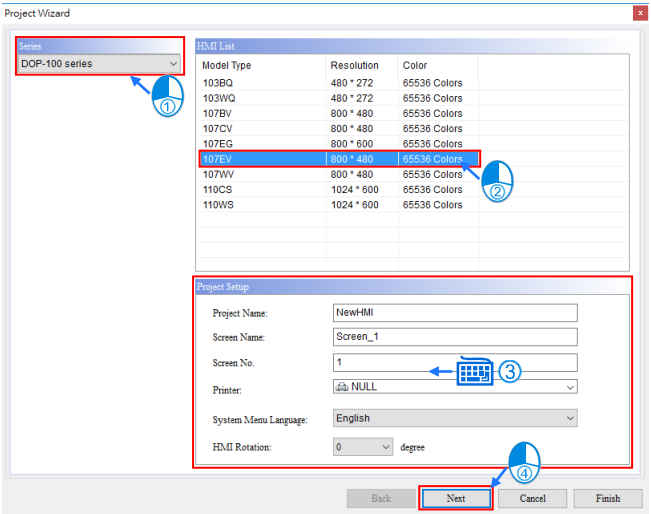


Main screen



Step 2: After  or 

is clicked, a new project will be added. Select **DOP-100 series** in the **Series** drop-down list box, click **107EV** on the HMI list, leave the default project name in the **Project Name** box unchanged, and click **Next**.

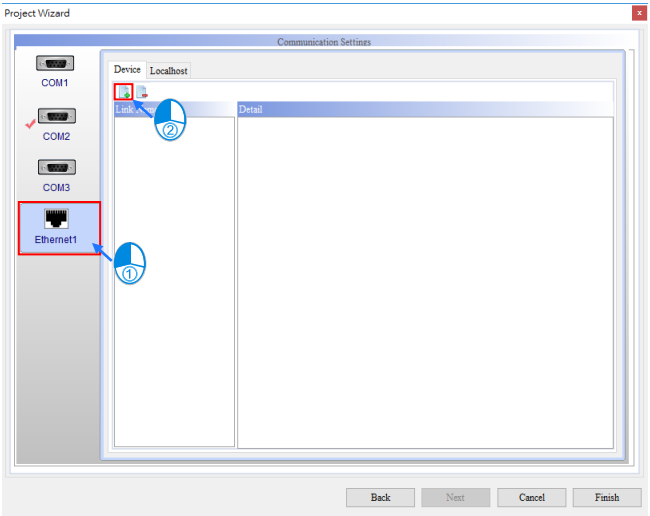


Step 3: The setting of Ethernet communication and RS-485 communication is described below.

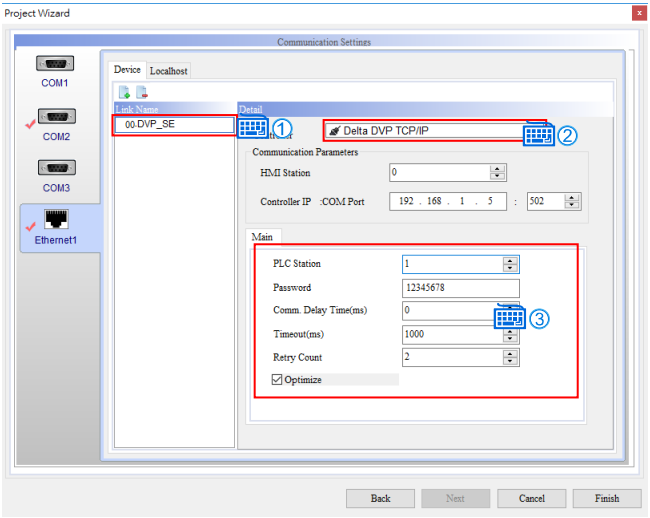
- **Ethernet communication**

  1. Setting a communication format for DOP-107EV:

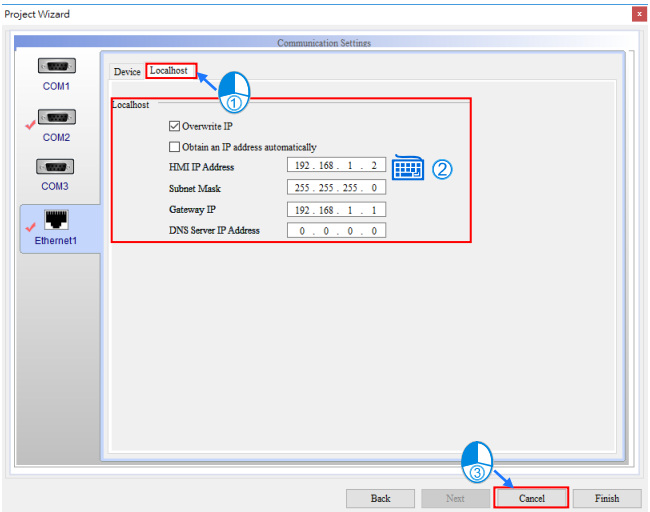
     Click **Ethernet**, and then create a connection.



Type the link name “DVP_SE”, type “192.168.1.5 in the **Controller IP** box, select **502** in the **Port** box, and set the parameters in the **Main** section.

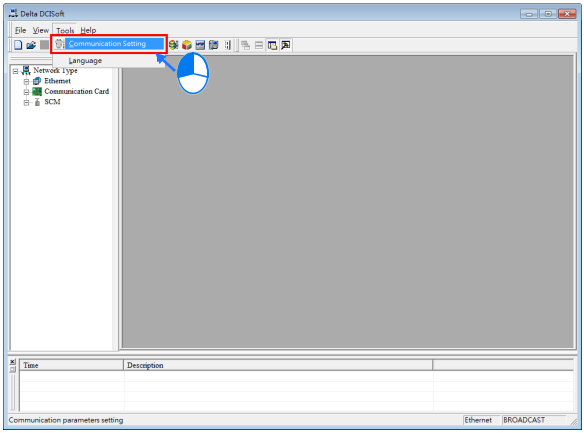


Click the **Local Host** tab, type “192.168.1.2” in the **HMI IP Address** box, type “255.255.255.0” in the **Subnet Mask** box, type “192.168.1.1” in the **Gateway IP** box, and click **Finish**.



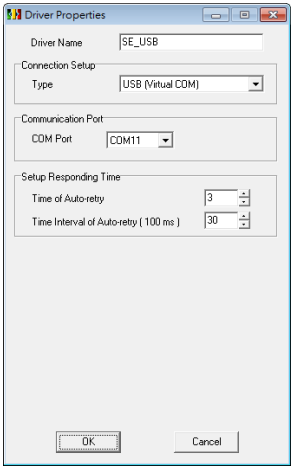
2. Setting a communication format for DVP-12SE11R:

   Start DCISoft, and click **Communication Setting** on the **Tools** menu to open the **Communication Setting** window. Users can select **RS232** or **Ethernet** in the **Communication Type** drop-down list in the **Communication Setting** window.



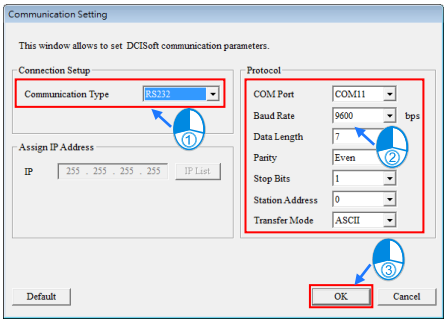
A. Using the USB port on DVP12SE11R

Before users use UC-PRG015-01A to connect the USB port on DVP12SE11R to a USB port on a PC, they have to select a COM port for the USB driver created for DVP12SE11R in COMMGR.



Then, the users have to select **RS232** in the **Communication Type** drop-down list in the **Communication Setting** window in DCISoft. The COM

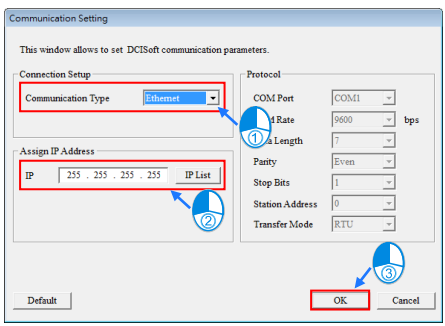
port selected in the **COM Port** drop-down list box in the **Protocol** section needs to be the same as the COM port selected for the USB driver created for DVP12SE11R in COMMGR.



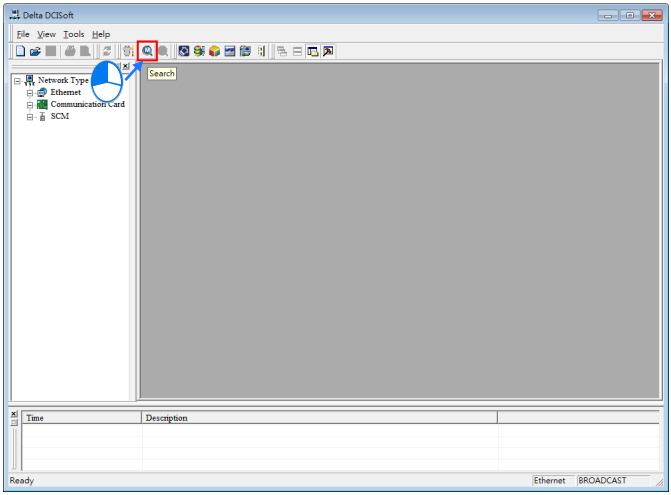
B. Using the Ethernet port on DVP12SE11R

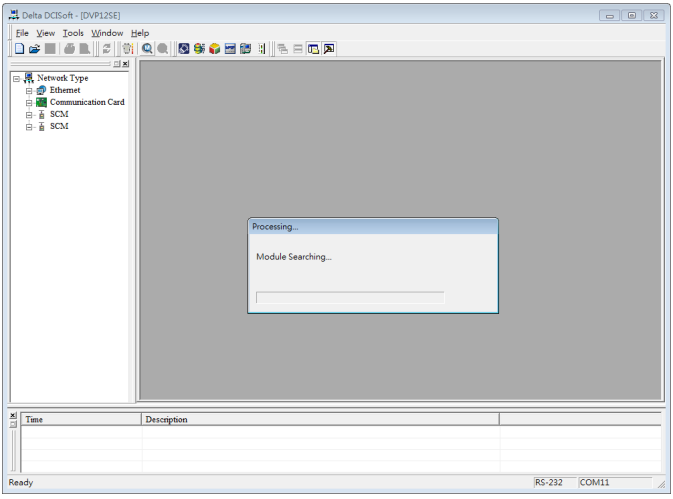
UC-PRG030-20A can be used to connect the Ethernet port on DVP12SE11R to an Ethernet port on a PC.

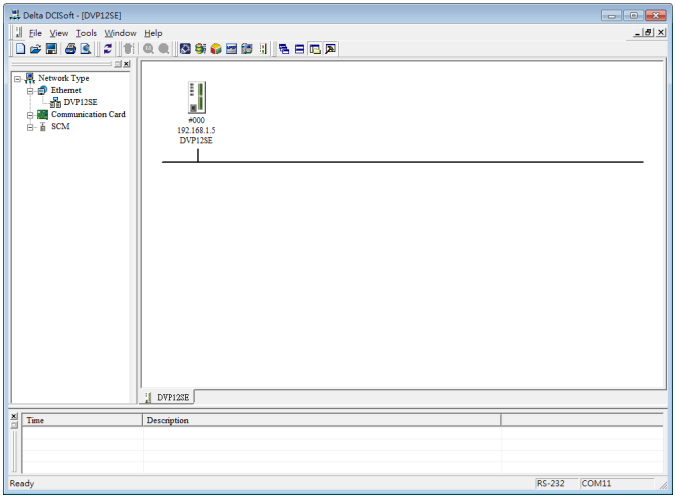
In the **Communication Setting** window in DCISoft, select **Ethernet** in the **Communication Type** drop-down list box, leave the default IP address in the **Assign IP Address** section unchanged, and click **OK**.



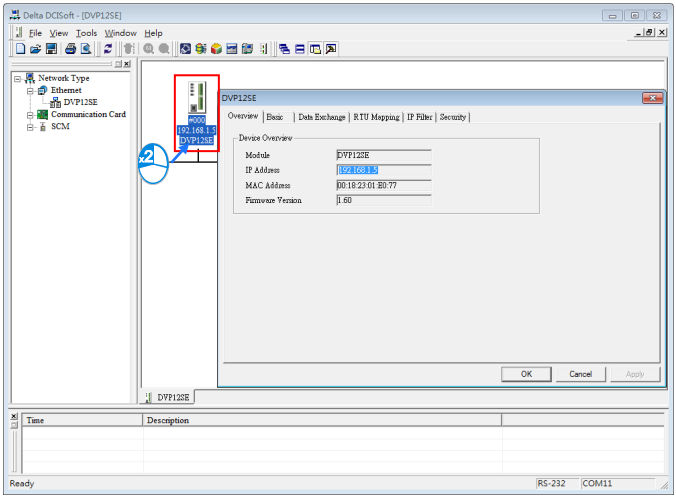
Click  after the setting of the parameters in the **Communication Setting** window is complete.


Delta DCISoft
File View Tools Help
Search
Network Type
Ethernet
Communication Card
SCM
Time
Description
Ready
Ethernet
BROADCAST

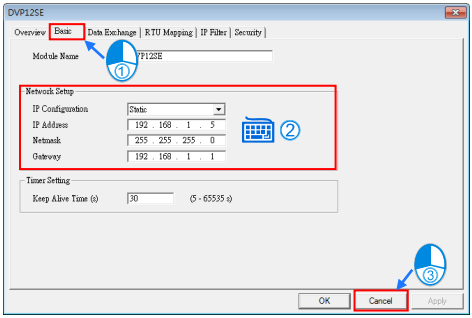

Delta DCISoft - [DVP12SE]
File View Tools Window Help
Network Type
Ethernet
Communication Card
SCM
SCM
Processing...
Module Searching...
Time
Description
Ready
RS-232
COM11



Double-click the module in DCISoft to open the **DVP12SE** window.



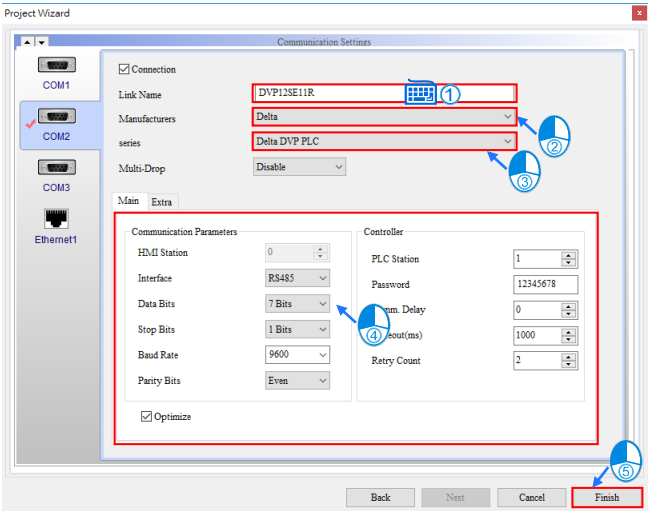
Click the **Basic** tab in the **DVP12SE** window, set the parameters in the **Network Setup** section, and click **OK**.



3. Please refer to section 2.1.7 for more information about using the Ethernet cable UC-PRG030-20A to connec DVP12SE11R to DOP-107EV.

- **RS-485 communication**

1. In the **Project Wizard** window, type “DVP12SE11R” in the **Link Name** box, select **Delta** in the **Manufacturers** drop-down list box, select **Delta DVP PLC** in the **Controller** drop-down list box, select **RS485** in the **Interface** drop-down list box, select **7 Bits** in the **Data Bits** drop-down list box, select **1 Bit** in the **Stop Bits** drop-down list box, select **9600** in the **Baud Rate** drop-down list box, select **Even** in the **Parity** drop-down list box, select **1** in the **PLC Station** box, and click **Finish**.



Setting a communication format for DVP12SE11R:

COM2 and COM3 on DVP12SE11R are RS-485 ports. The default communication formats of COM2 and COM3 are described below.

Baud rate: 9600 bps

Data length: 7 data bits

Parity: Even

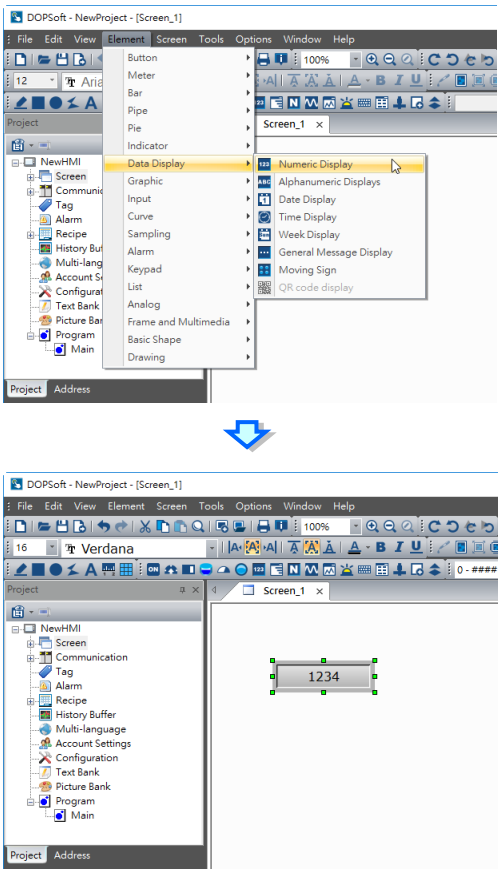
Stop bit: 1 stop bit

Transmission mode: ASCII

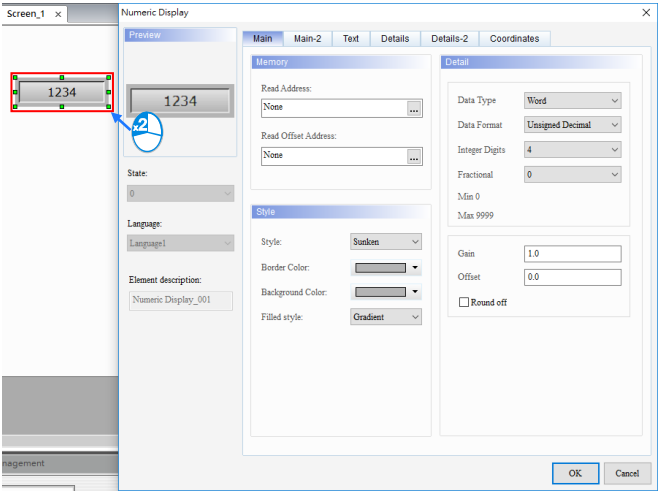
2. Please refer to section 2.1.7 for more information about using an RS-485 cable to connect DVP12SE11R to DOP-107EV.

Editing a screen:

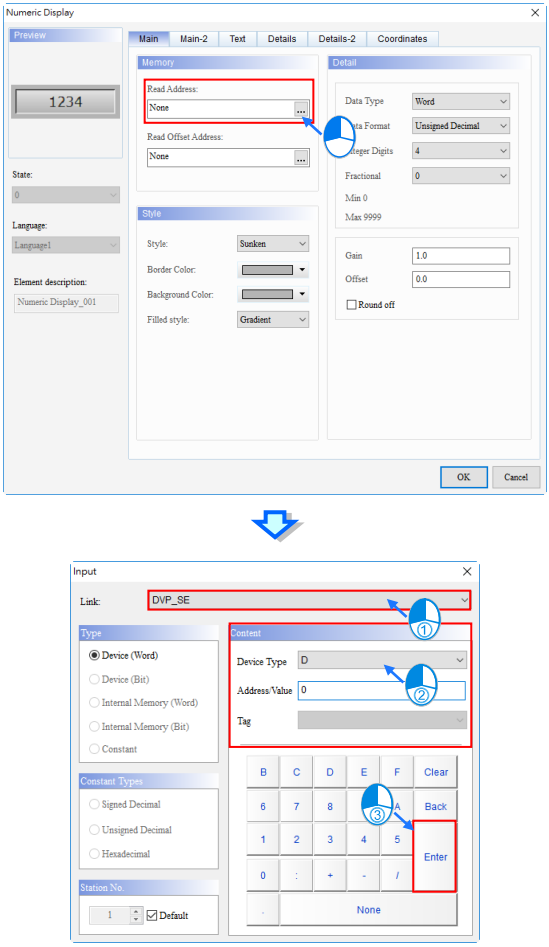
Choose **Element** > **Data Display** > **Numeric Display** and left-click the mouse to drag and drop the picture for editing.



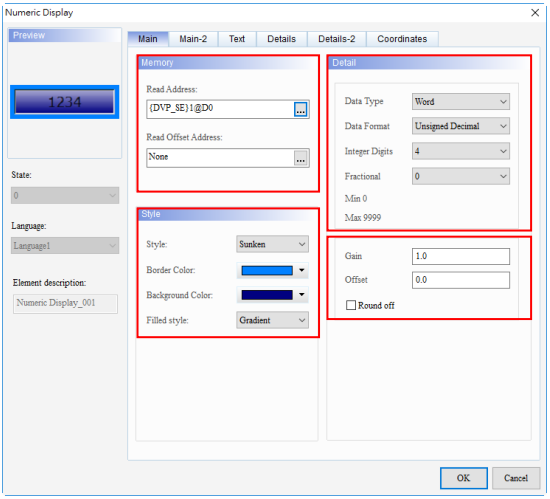
Double-click the element to open the **Numeric Display** window.


Screen_1
1234
Numeric Display
Preview
1234
State:
0
Language:
Language1
Element description:
Numeric Display_001
Main
Main-2
Text
Details
Details-2
Coordinates
Memory
Read Address:
None
Read Offset Address:
None
Style
Style:
Sunken
Border Color:
Background Color:
Filled style:
Gradient
Detail
Data Type
Word
Data Format
Unsigned Decimal
Integer Digits
4
Fractional
0
Min 0
Max 9999
Gain
1.0
Offset
0.0
Round off
OK
Cancel

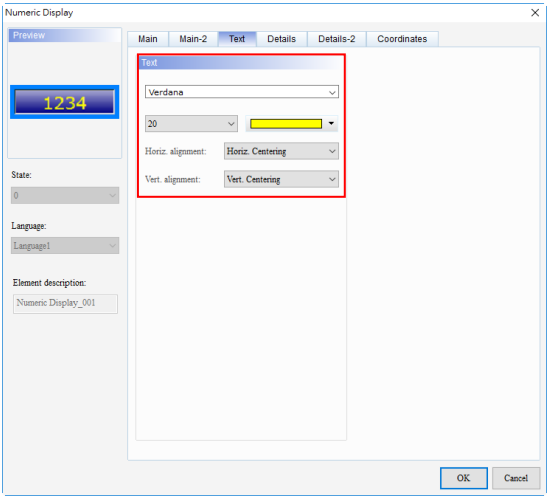
Set the parameter in the **Memory** section in the **Numeric Display** window.



Set the parameters in the **Style** section and the **Detail** section.



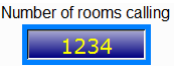
Click the **Text** tab, and then set the parameters in the **Text** section.



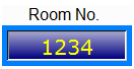
After **OK** in the **Numeric Display** window is clicked, the numeric display shown below will appear.



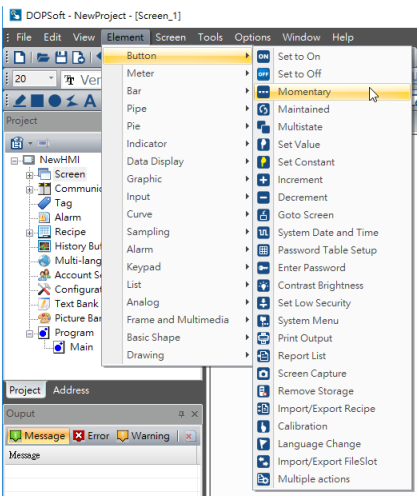
Create the text “Number of rooms calling”.



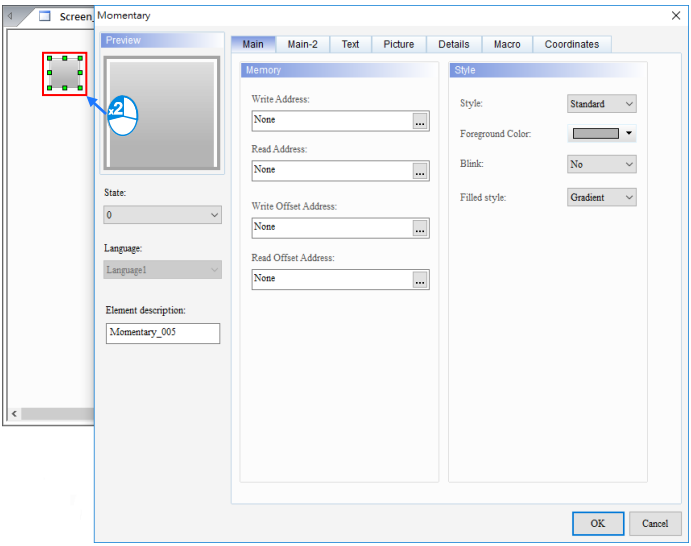
Create a numeric display correpsonding to D11.



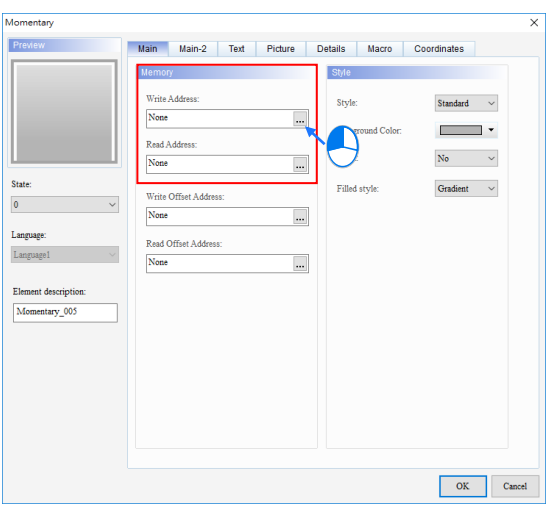
Choose **Element** > **Button** > **Momentary** and left-click the mouse to drag and drop the picture for editing.

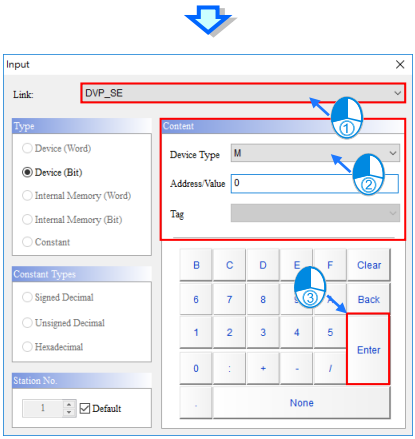


Double-click the element to open the **Momentary** window.

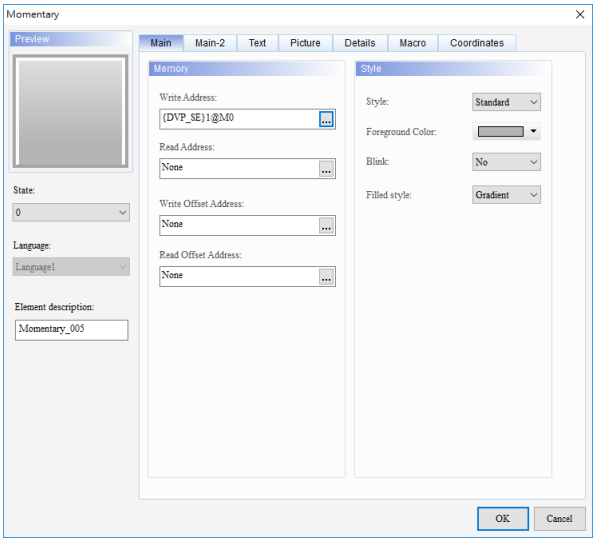


Set a write address in the **Memory** section.

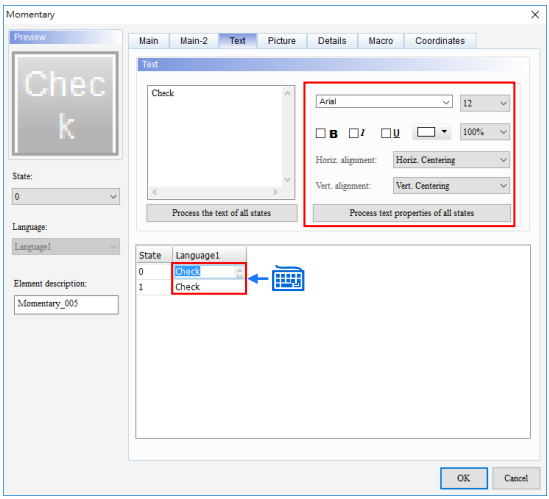




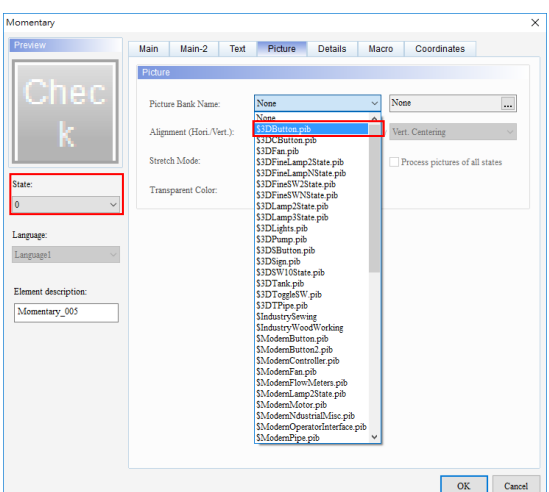
Set a read address in the **Memory** section in the same way.

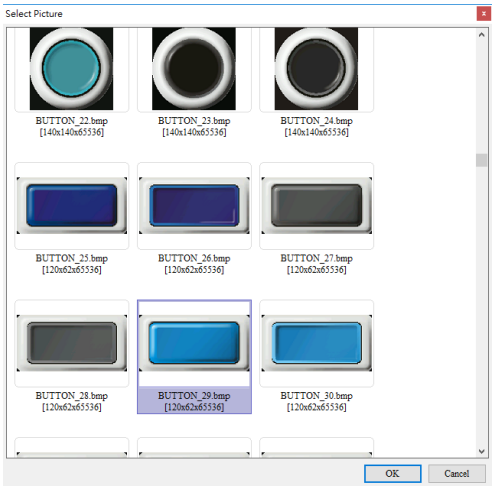


Click the **Text** tab, type “Check” in the **Language 1** cells, and set a text format.

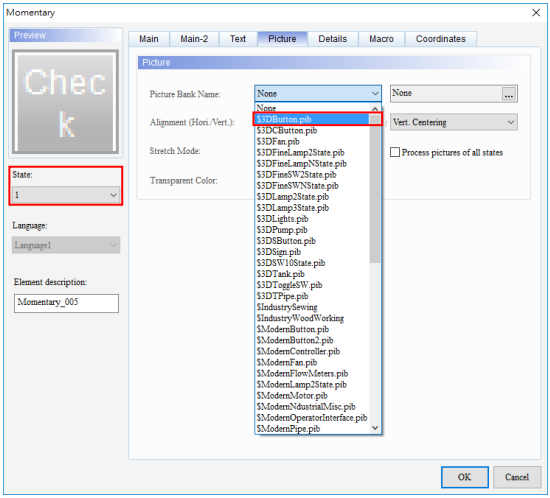


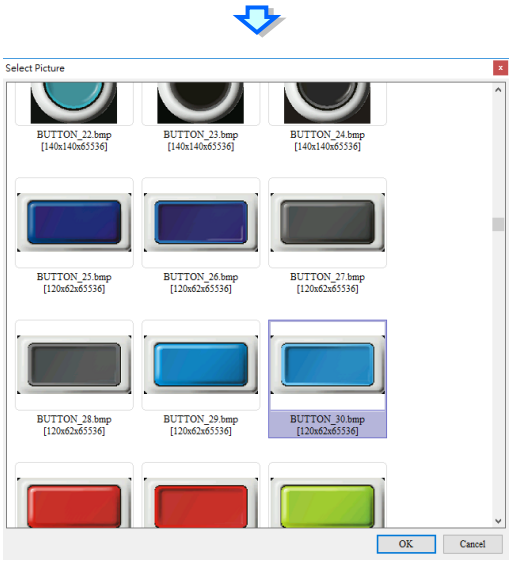
Select **0** in the **State** drop-down list box, click the **Picture** tab, and set the parameters in the **Picture** section.



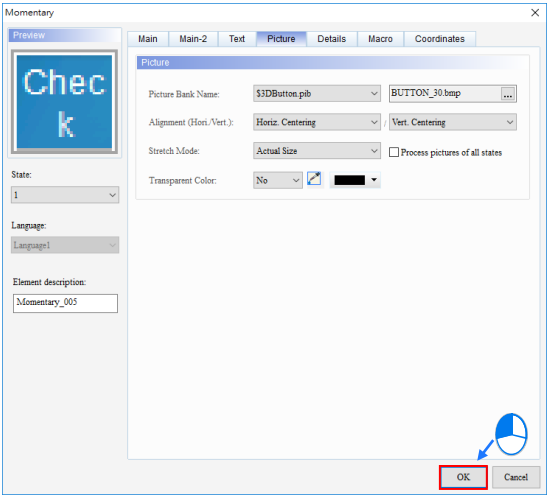


Select **1** in the **State** drop-down list box, and set the parameters in the **Picture** section.

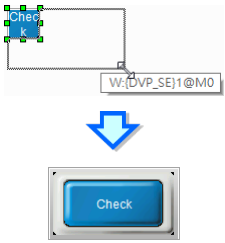




Click **OK** in the **Momentary** window.



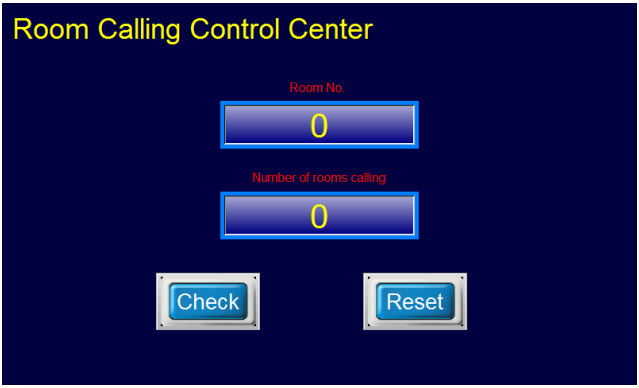
Adjust the size of the element.



Create a reset button in the same way.



After the screen is beautified, the users can get the screen shown below.



3.2.4 Creating a Project for a PLC

In the example, the PLC used is DVP12SE11R.

Please complete the step in section 2.1.5 before writing the example program shown below.

After users discuss control requirements, they have to write a PLC program.

Planning hardware

After a project is created, the users can plan hardware. The hardware which needs to be planned for the example is described below.

- Call button in room 101~room 105 → X0~X4
- Check button → M0
- Reset button → M1
- Indicating the number of rooms calling → D0
- Indicating the rooms which have not been checked → D1~D5
- Room number stored temporarily → D10
- Indicating the room which is being checked (First in, first out) → D11
- X0~X4 can be used with the I/O simulator board.

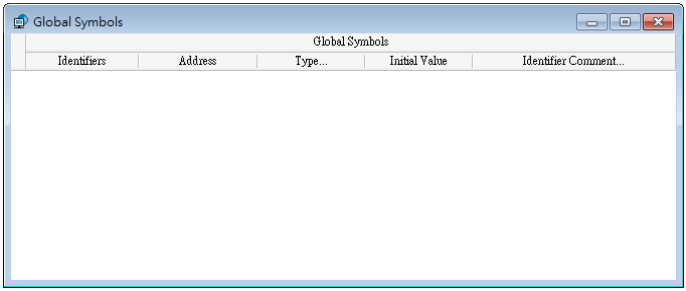
Creating global symbols

In order to make a program more readable and the connection to a SCADA system more convenient, I/O addresses are generally assigned global symbols. Users can use symbols when they write a program. Besides, a global symbol table can be imported/exported. If a medium-sized/large-sized system which is equipped with many inputs and outputs is used, users can use Microsoft Excel to make the editing of a program for the system more convenient.

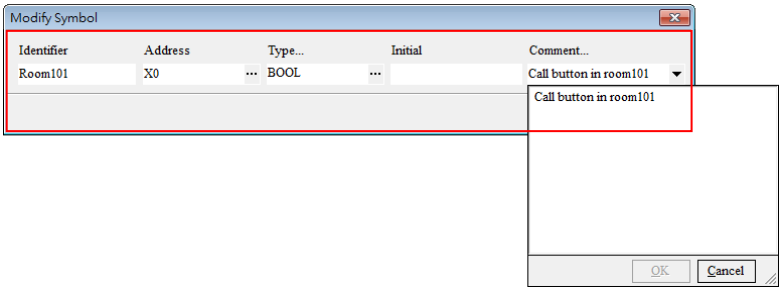
The global symbols which need to be created for the example are listed below.

Global symbol table		
Hardware points (for inputs/outputs in a PLC)		
Address	**Identifier**	**Data type**
X0	Room101	BOOL
X1	Room102	BOOL
X2	Room103	BOOL
X3	Room104	BOOL
X4	Room105	BOOL
M0	Check_Button	BOOL
M1	Reset_Button	BOOL
D0	Number_of_Rooms_Calling	WORD
D11	Displaying_Room_Number	WORD

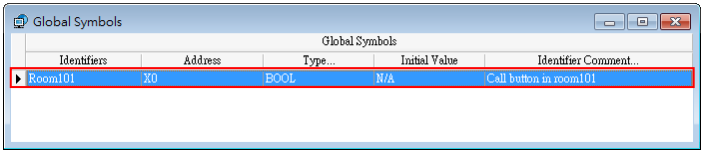
Double-click Global Symbols in the project management area in ISPSoft to open the **Global Symbols** window.



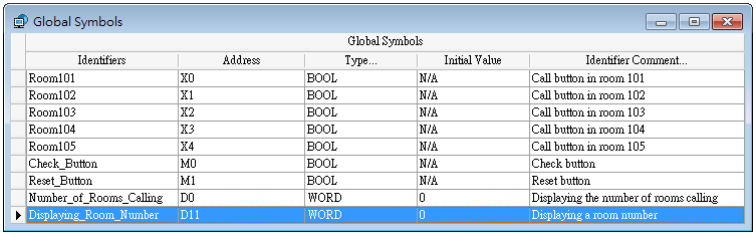
Double-click the blank to open the **Add Symbol** window. Type “Room101” in the **Identifier** box, type “X0” in the **Address** box, type a comment in the **Comment…** box, leave the default values in the **Type…** box and the **Initial** box unchanged, and click **OK**.



The users can see a new piece of data in the **Global Symbols** window.

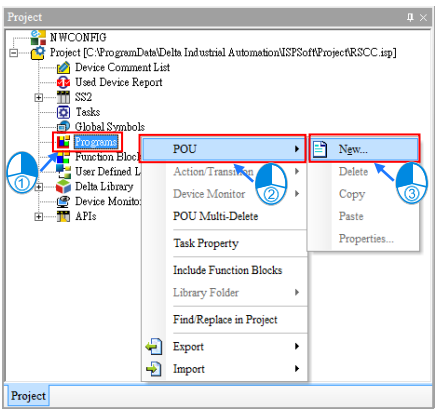


The users can create the data in the global symbol table above in the **Global Symbols** window in the same way.

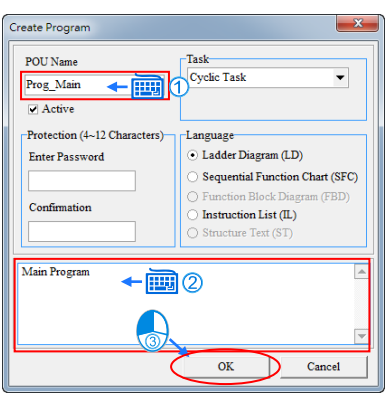


Creating a main program

After users create global symbols, they can create a main program. Right-click Programs in the project management area in ISPSoft to add a new POU.

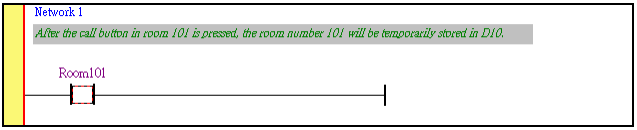


Type “Prog_Main” in the **POU Name** box, type “Main Program” in the **POU Comment** box, and click **OK**.

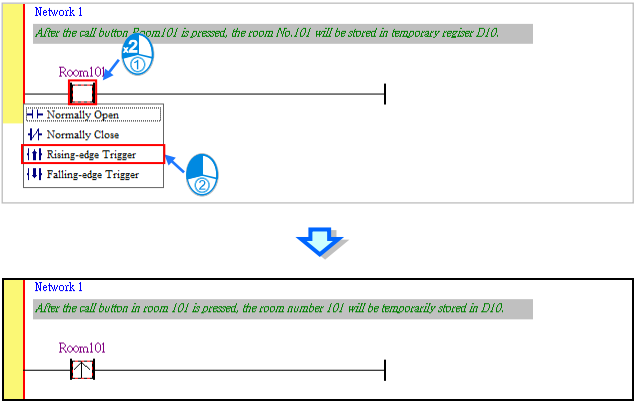


Step 1: Edit call buttons and corresponding room numbers. The number corresponding to the room which calls is stored in D10 temporarily.

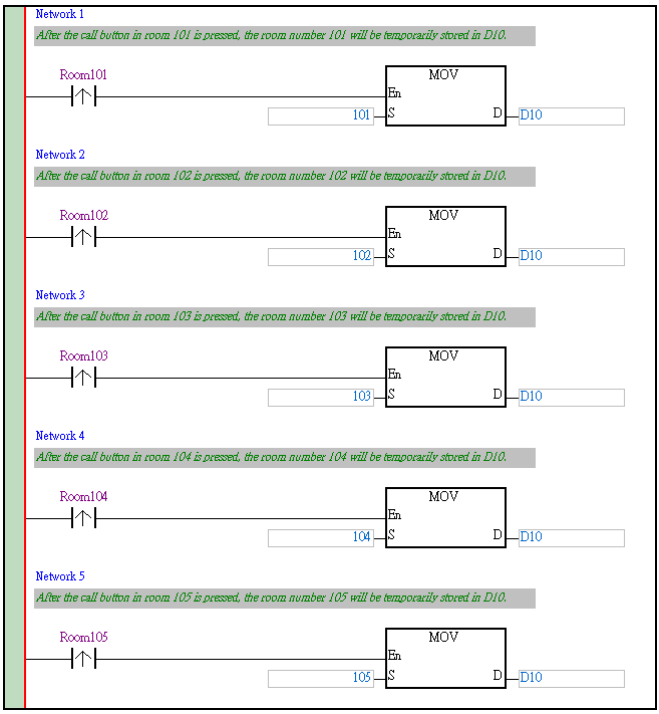
Create a call button corresponding to room 101.



After the call button is pressed, the room number corresponding to the button will be sent to the service counter instantly. Therefore, the contact created is rising edge-triggered.



Write the program shown below.



Step 2: Room numbers are stored in D1~D5 according to the order in which the rooms corresponding to the room numbers call.

The instructions SFWR and SFRD are used to implement FIFO. In this project, the room which calls first is checked first. FIFO is an acronym for First In, First Out.

Notes:

- The usage of SFWR is described below.



S: Source device

D: Head address of a data stack

n: Length of a data stack

1. The value in a source device **S** is written to a FIFO data stack. The position of insertion into the stack is automatically calculated by the PLC used.

2. The instruction defines the values in the n word devices starting from **D** as a FIFO data stack, and designate **D** as a pointer.

3. If SFWR is executed, the value in the pointer **D** will increase by one, and the value in **S** will be written to the device designated by the pointer **D**. If the value in the pointer **D** exceeds **n**-1, the execution of the instruction will stop, and the carry flag M1022 will be On.

4. This instruction can be used with SFRD for the reading/writing of a FIFO data stack.

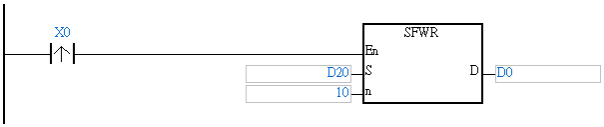
5. Example:

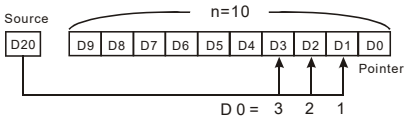
   - After X0 is turned from Off to On, the value in the pointer D0 will become 1, and the value in D20 will be written to D1. If the value in D20 is changed, and X0 is turned from Off to On again, the value in the pointer D0 will become 2, and the value in D20 will be written to D2.

   - If SFWR is executed once, the writing of a value will follow the steps ❶~❷.

     ❶ The value in D20 is sent to D1.

     ❷ The value in D0 becomes 1.





- The usage of SFRD is described below.



S: Head address of a data stack

D: Destination device

n: Length of a data stack

1. The source device **S** is the head address of a FIFO data stack. Its value indicates the last entry added to a FIFO data stack.
2. If SFRD is executed, the value in **S**+1 will be moved to **D**, the values in **S**+**n**-1~**S**+2 will be moved to **S**+**n**-2~**S**+1, and the value in **S** will decrease by one.
3. If the value in the pointer **S** is 0, the execution of the instruction will stop, and the carry flag M1022 will be On.
4. Example:

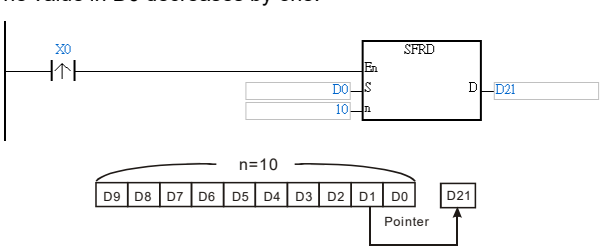
   ◆ After X0 is turned from Off to On, the value in D1 will be sent to D21, the values in D9~D2 will be moved to D8~D1 (the value in D9 will be unchanged), and the value in D0 will decrease by one.

   ◆ If SFRD is executed once, the reading of a value will follow the steps ❶~❸.

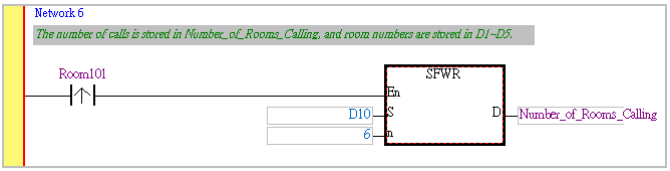
   ❶ The value in D1 is sent to D21.

   ❷ The values in D9~D2 are moved to D8~D1.

   ❸ The value in D0 decreases by one.

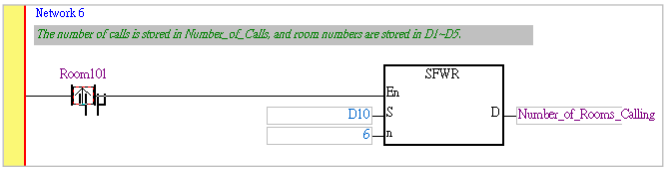


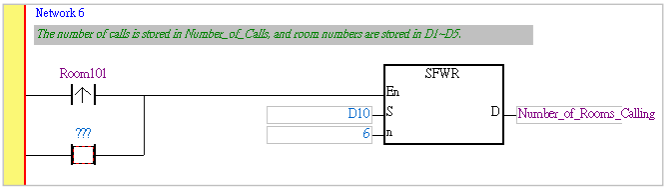
After Room101 is turned from Off to On, SFWR will be used to send the room number 101 to Number_of_Rooms_Calling. (D0 functions as a pointer. After SFWR is executed, the value in D0 will become 1, and the value in D10 (the value 101) will be written to D1.)

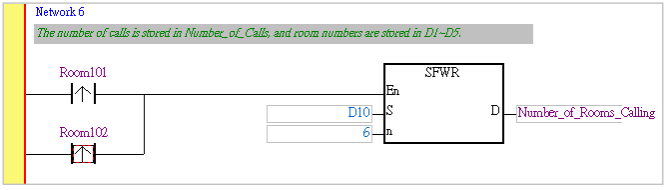


3

Click , and move the mouse cursor to the position under the contact marked with "Room101". After the mouse cursor becomes , the users have to click the left mouse button, type "Room102" in ???, and change the contact added into a rising edge-triggered contact.

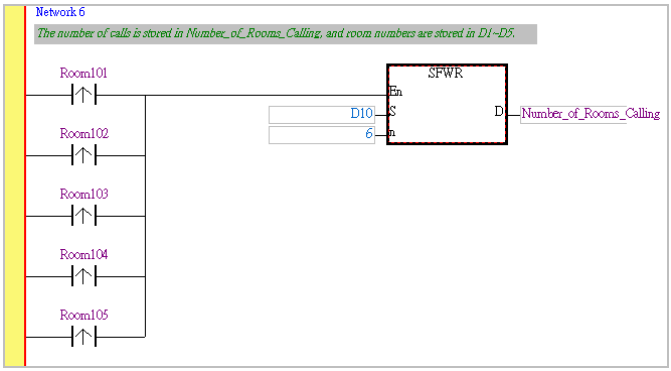






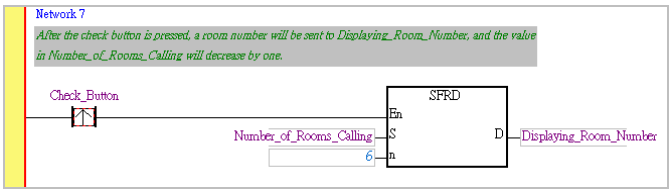
After Room102 is turned from Off to On, SFWR will be used to send the room number 102 to Number_of_Rooms_Calling. (D0 functions as a pointer. After SFWR is executed, the value in D0 will become 2, and the value in D10 (the value 102) will be written to D2.)

Write the following program. Room numbers are stored in D1~D5 according to the order in which the rooms corresponding to the room numbers call, and the number of rooms calling is stored in Number_of_Rooms_Calling.



Step 3: Use SFRD to display a room number.

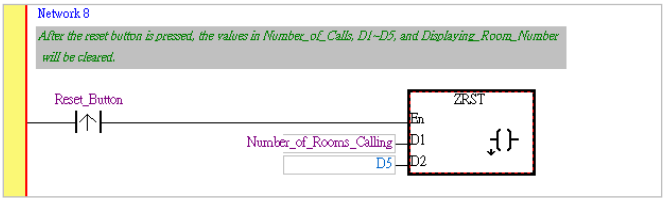
After an attendant presses the check button on the display on the service counter, a room number will be sent to Displaying_Room_Number, and the value in Number_of_Rooms_Calling will decrease by one.

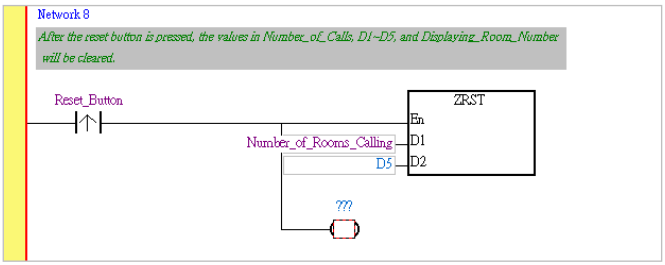


Step 4: Create a reset button.

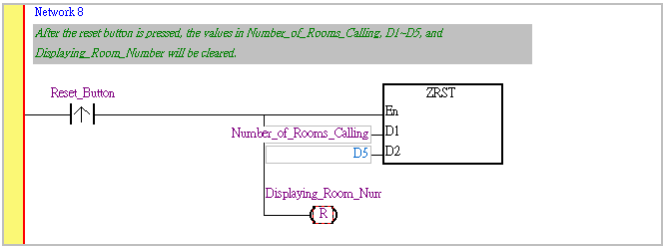
After the reset button on the display on the service counter is pressed, the values in Number_of_Rooms_Calling, D1~D5, and Displaying_Room_Number will be cleared.

Click [ ], move the mouse cursor to the red frame, and click the left mouse button.

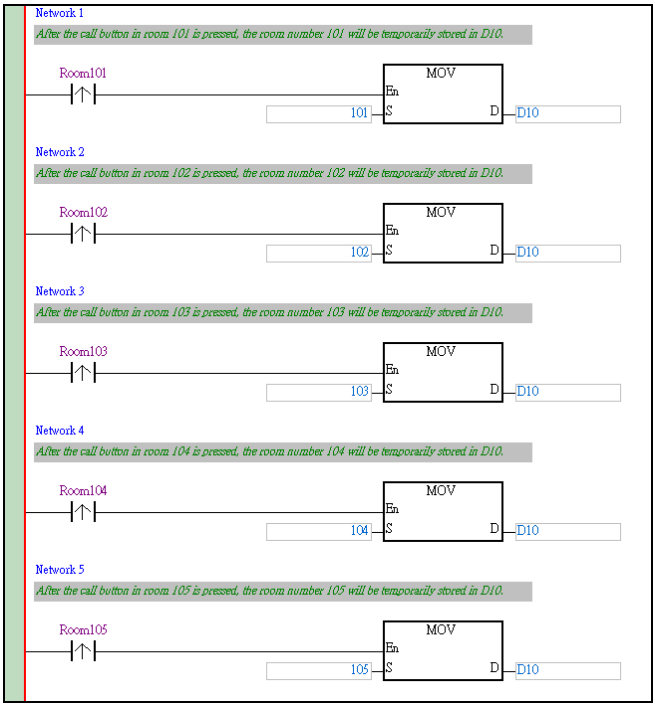


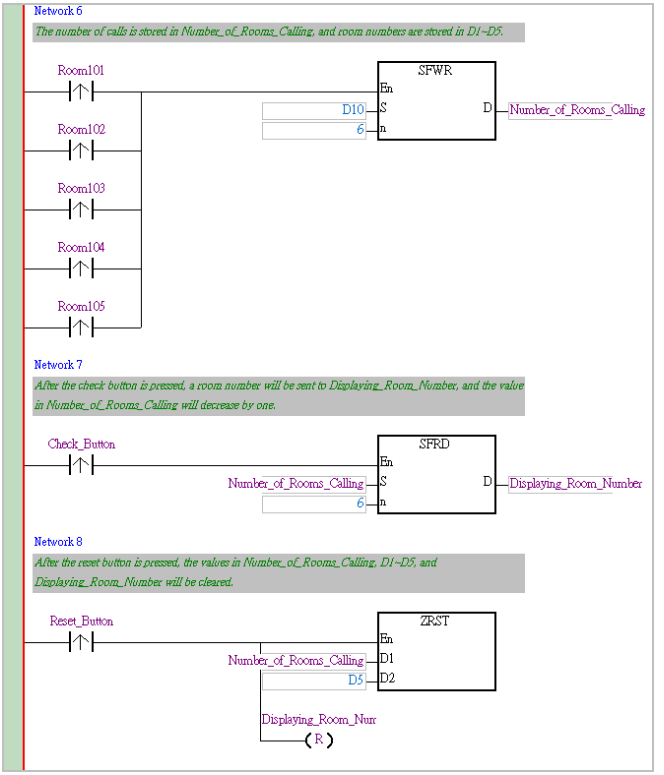


Type “Displaying_Room_Number” in ???, and change the output coil into a reset coil.



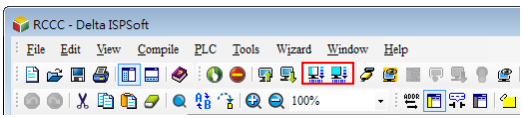
The complete program is shown below.

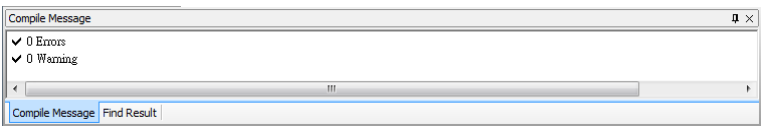



Network 6
The number of calls is stored in Number_of_Rooms_Calling, and room numbers are stored in D1~D5.
Room101
Room102
Room103
Room104
Room105
SFWR
En
S
n
D
D10
6
Number_of_Rooms_Calling
Network 7
After the check button is pressed, a room number will be sent to Displaying_Room_Number, and the value in Number_of_Rooms_Calling will decrease by one.
Check_Button
SFRD
En
S
n
D
Number_of_Rooms_Calling
6
Displaying_Room_Number
Network 8
After the reset button is pressed, the values in Number_of_Rooms_Calling, D1~D5, and Displaying_Room_Number will be cleared.
Reset_Button
ZRST
En
D1
D2
Number_of_Rooms_Calling
D5
Displaying_Room_Numr
R

The writing of the program will be complete after the users save the file.

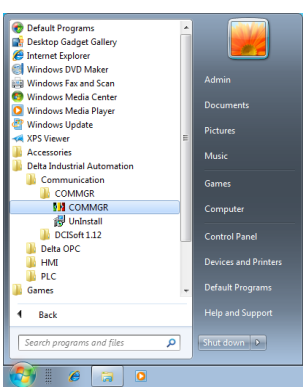
The users can click  to check the syntax of the program, and click  to compile the project. The compiling of a project is different from the checking of the syntax of a program in that it is composed of the checking of syntax, and the compiling of all programs and function blocks.



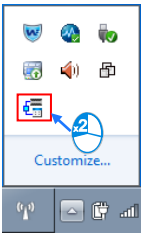


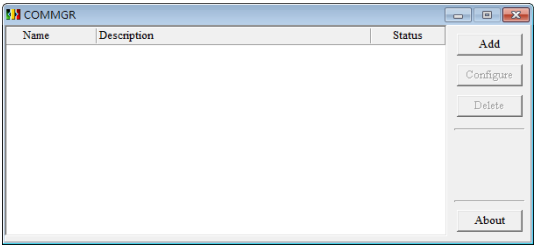
3.2.5 Setting COMMGR for UT-12SE-A1

Step 1: Start COMMGR. (Click the **Start** button → **All Programs** → **Delta Industrial Automation** → **Communication** → **COMMGR** → **COMMGR**.)

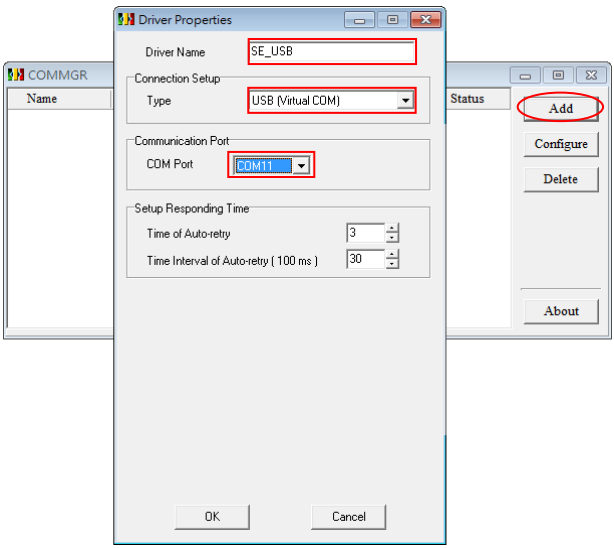


Step 2: After COMMGR is started, the icon representing COMMGR will appear in the notification area. Double-click the icon representing COMMGR to open the **COMMGR** window.

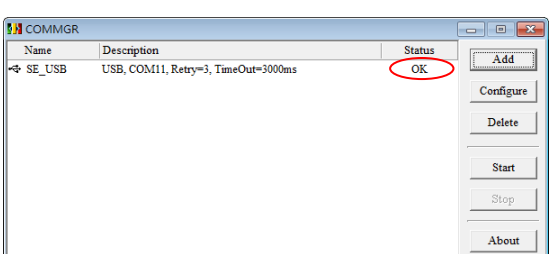




Step 3: After the **COMMGR** window is opened, users can begin to set a driver. A USB cable is used to connect the computer and DVP12SE11R here, and therefore a USB driver needs to be created. First, click **Add**. Then, create a USB driver in the way shown below.



Step 4: After a USB driver is created, it will appear in the **COMMGR** window. If the computer is normally connected to DVP12SE11R, **OK** will appear in the **Status** column.

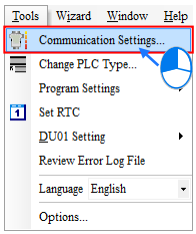


If the users click  or  in the **COMMGR** window, the **COMMGR** window will disappear from the desktop, and will be visible only as an icon in the notification area.

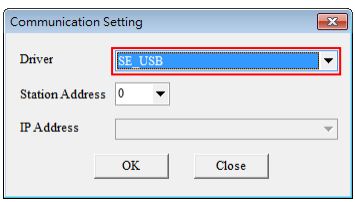
3.2.6 Downloading a PLC Project

- **Setting communication**

After the setting of COMMGR is complete, users can set communication in ISPSoft. First, click **Communication Settings…** on the **Tools** menu to open the **Communication Setting** window.



In the **Communication Setting** window, select **SE_USB** in the **Driver** drop-down list box, and click **OK**.

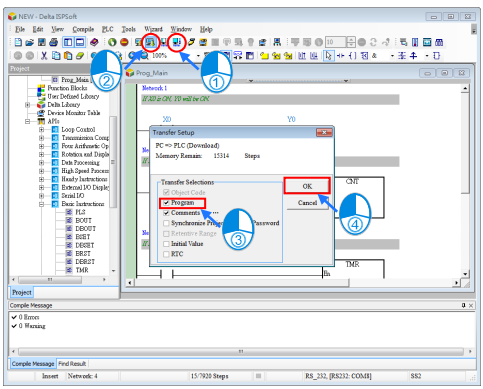


The users can see the information about the driver which is connected on the lower right corner of the status bar.

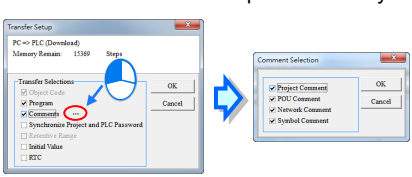


- **Downloading a PLC program**

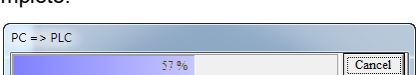
After users write a PLC program, they can prepare to download the program. The program created here has been compiled. If the program is modified, the users can click  to check the program. After the compiling of the program is successful, the users can click  to download the program.



There are several checkboxes in the **Transfer Setup** window. Object code is a necessary condition for the operation of a PLC, and therefore the **Object Code** checkbox is selected. In order to maintain the program conveniently, the **Program** checkbox and the **Comments** checkbox are selected in this example. The project will be backed up onto the PLC connected, and the program will not be lost. Besides, if the users want to modify the program, and forget to bring the program, they can upload the program from the PLC to the computer to modify the program.



After the users click **OK** in the **Transfer Setup** window, the downloading of the program will be complete.

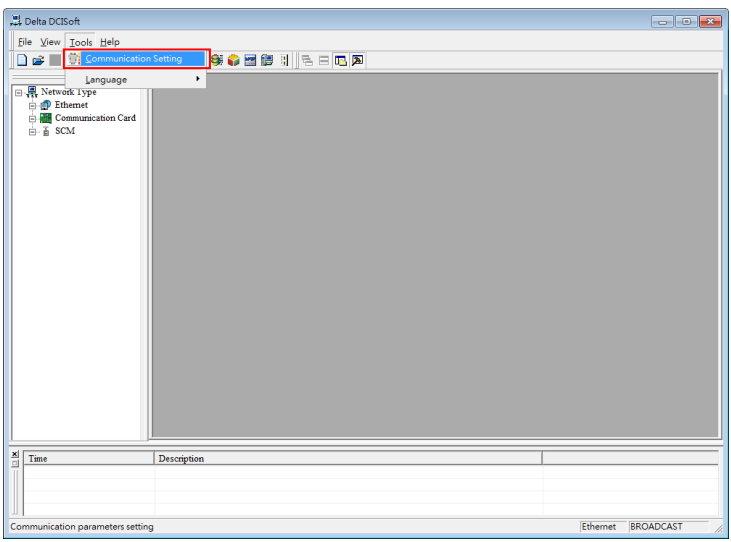


3.2.7 Setting Ethernet Parameters for DVP12SE11R

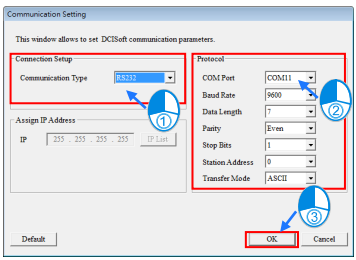
After programs are created, DVP12SE11R can communicate with DOP-107EV through Ethernet. Users have to set Ethernet parameters for DVP12SE11R. The use of DCISoft to set Ethernet parameters for DVP12SE11R is described below.

UC-PRG015-01A is used to connect a PC to DVP12SE11R, and DCISoft is used to set Ethernet parameters.

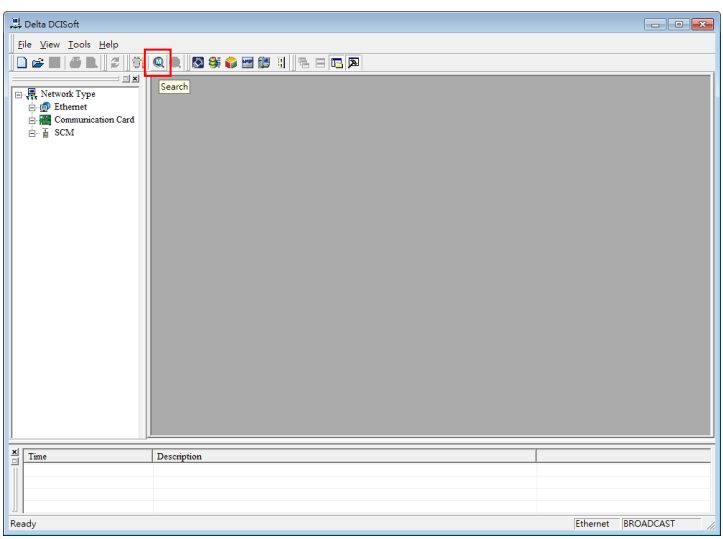
Step 1: Start DCISoft, and click **Communication Setting** on the **Tools** menu to open the **Communication Setting** window.

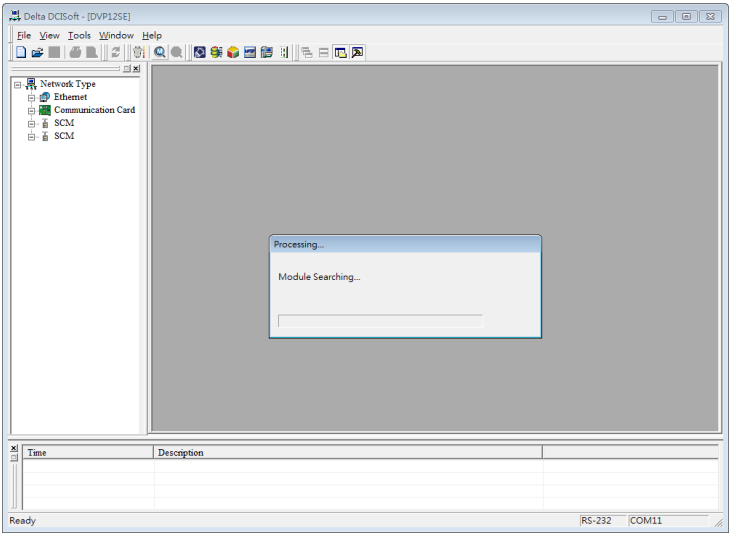


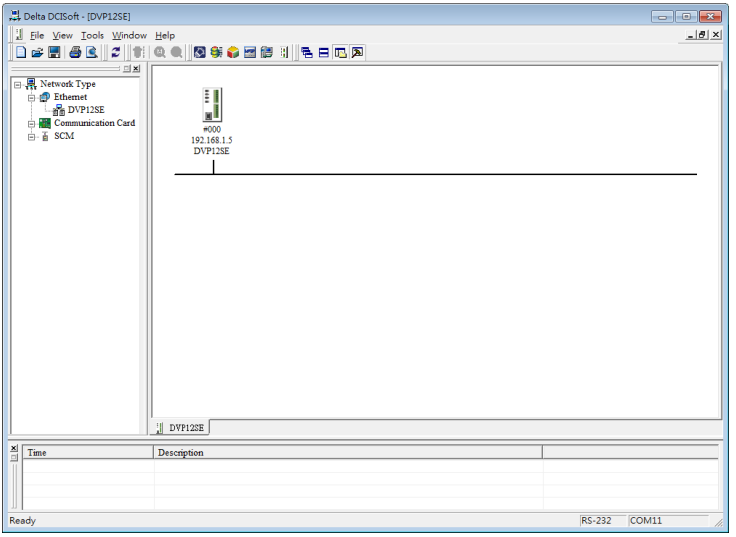
Step 2: The driver created for DVP12SE11R in COMMGR is a USB driver, but the communication type selected in the **Communication Type** drop-down list box in the **Communication Setting** window needs to be **RS232**. The COM port selected in the **COM Port** drop-down list box needs to be the same as the COM port selected for the USB driver created for DVP12SE11R in COMMGR.



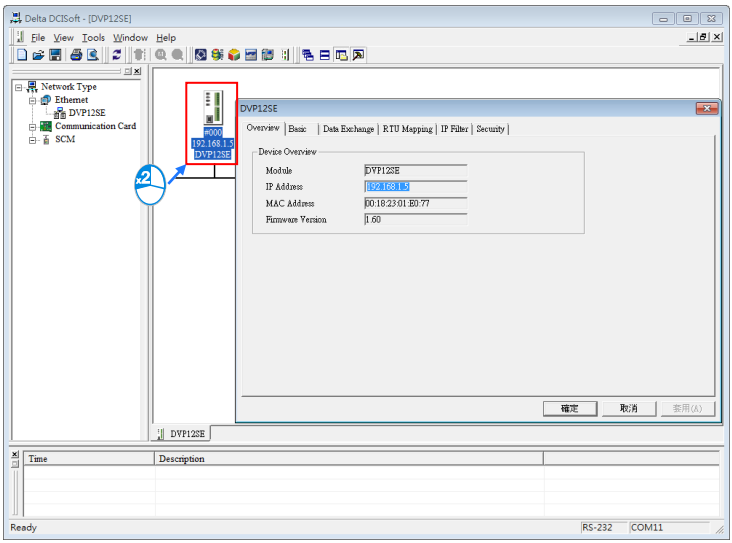
Step 3: Click  after the setting of the parameters in the **Communication Setting** window is complete.



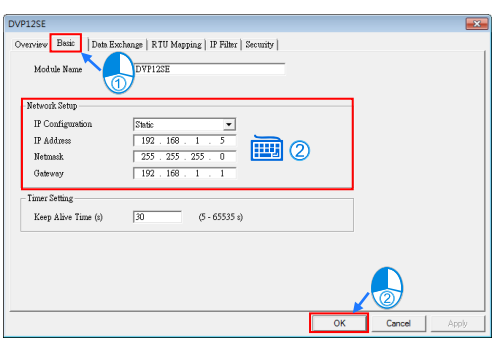

Delta DCISoft - [DVP12SE]
File View Tools Window Help
Network Type
Ethernet
Communication Card
SCM
SCM
Processing...
Module Searching...
Time
Description
Ready
RS-232
COM11


Delta DCISoft - [DVP12SE]
File View Tools Window Help
Network Type
Ethernet
DVP12SE
Communication Card
SCM
#000
192.168.1.5
DVP12SE
DVP12SE
Time
Description
Ready
RS-232
COM11

Step 4: Double-click the module in DCISoft to open the **DVP12SE** window.



Step 5: Click the **Basic** tab in the **DVP12SE** window, set the parameters in the **Network Setup** section, and click **OK**.



3.2.8 Testing a Project

After users write a PLC program and an HMI program, they can use UC-PRG030-20A to connect DVP12SE211R to DOP-107EV, and then test the system.



The functions which need to be tested are as follows.

1. Checking whether the room number dipslayed is correct
2. Checking whether the number of rooms calling is correct
3. Checking whether the the funciton of the check button is correct
4. Checking whether the function of the reset button is correct

After the functions listed above are tested, the programs created will be complete.

4

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4.1 Introduction of Hardware

4.1.1 DVPPS01

DVPPS01 is the best choice for DVP series PLCs. It supplies offer users 24VDC and 24W power with enhanced safety and efficiency.



4.1.2 DVP14SS211R

DVP14SS211R is a PLC equipped with eight digital inputs and six digital outputs. It offers various instructions. The size of the program memory in it is 8K steps. DVP14SS211R is small in size, and can be installed easily. It has an RS-232 port and an RS-485 port.

DVP14SS211R can be applied to spinning machines, conveyor belts (rotational speed control), and winding machines (tension control).



4.1.3 DVP12SE11R

DVP12SE11R is a PLC equipped with eight digital inputs and four digital outputs. It offers various instructions. The program memory in it is 16K steps. DVP12SE11R has a mini USB port, an Ethernet port, and two RS-485 ports. It supports DVP-S series left-side and right-side modules.

DVP12SE11R can be applied to remote device monitoring, production line monitoring, building automation, printing machines, and container fillers (recipe application).



4.1.4 DOP-107BV

Specifications:



- 7-inch TFT LCD (800×480 pixels and 65536 colors)
- There is one COM port. It supports RS-232, RS-422, and RS-485.
- Data can be transmitted/downloaded by means of RS-232 or USB.
- Degree of resistance to water: IP65/NEMA4

4.1.5 DOP-107EV

Specifications:

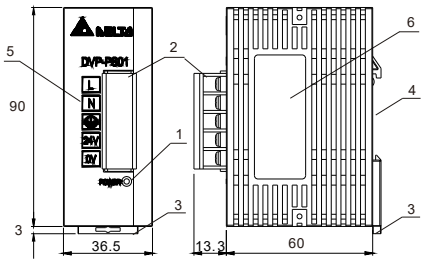


- 7-inch TFT LCD (800×480 pixels and 65536 colors)
- There are two COM ports. They support RS-232, RS-422, and RS-485.
- Data can be transmitted/downloaded by means of RS-232, USB, or Ethernet.
- It has a USB host, and can be directly connected to a USB disk, a printer, or a mouse.
- It supports Ethernet.
- Degree of resistance to water: IP65 / NEMA4 / UL TYPE 4X
- It supports horizontal/vertical display.

4.2 Profiles and Dimensions

4.2.1 DVPPS01

- Profile

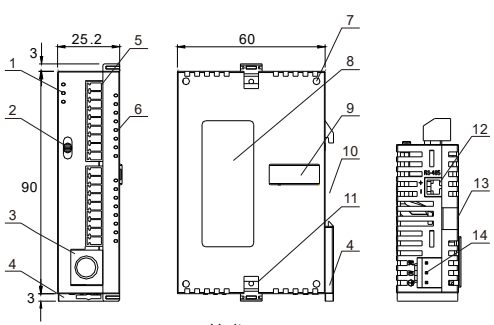


Unit: mm

1. POWER LED indicator	2. Input/Output terminals (Fixed terminal block)
3. DIN rail clip	4. DIN rail groove (35 mm)
5. Input/Output terminal names	6. Nameplate

4.2.2 DVP14SS211R

- Profile

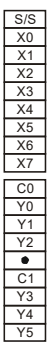


Unit: mm

1. POWER LED indicator, RUN LED indicator, and ERROR LED indicator	2. RUN/STOP switch

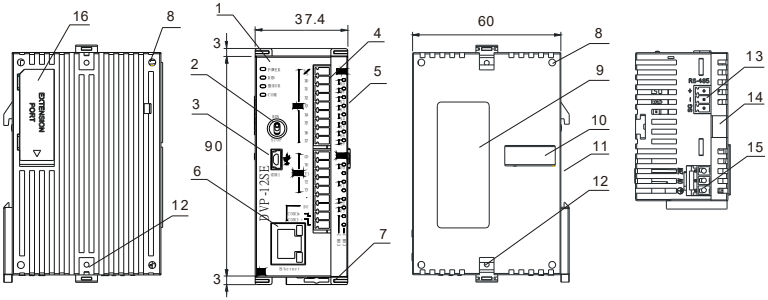
3. COM1 (RS-232 port)	4. DIN rail clip
5. Input/Output terminals	6. Input/Output point indicators
7. Mounting hole	8. Nameplate
9. Extension port	10. DIN rail groove (35 mm)
11. I/O module clip	12. COM2 (RS-485 port)
13. I/O module groove	14. DC power input

➢ I/O configuration

Model	Input		Output		I/O configuration
	Point	Type	Point	Type	Relay
DVP14SS211R	8	DC (Sink or source)	6	Relay	

4.2.3 DVP12SE11R

- Profile



Unit: mm

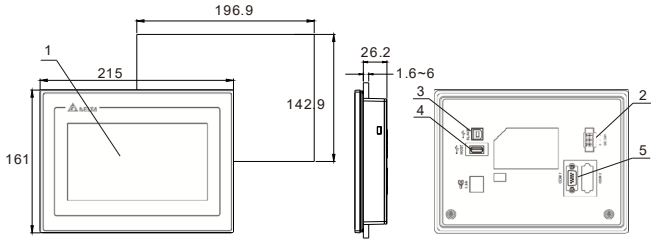
1. POWER indicator, RUN indicator, ERROR indicator, COM1 indicator	2. RUN/STOP switch
3. COM1 (Mini USB)	4. Input/Output terminals, COM3 (RS-485)
5. Input/Output point indicators, COM2 indicator, COM3 indicator	6. Ethernet port
7. DIN rail clip	8. Mounting hole
9. Nameplate	10. Right-side extension port
11. DIN rail groove (35 mm)	12. I/O module clip
13. COM2 (RS-485)	14. I/O module groove
15. DC power input	16. Left-side extension port

➢ I/O configuration

Model	Input		Output		I/O configuration
	Point	Type	Point	Type	Relay
DVP12SE11R	8	DC (Sink or source)	4	Relay	S/S X0 X1 X2 X3 X4 X5 X6 X7 C0 Y0 Y1 Y2 Y3 SG COM3+ COM3-

4.2.4 DOP-107BV

- Profile

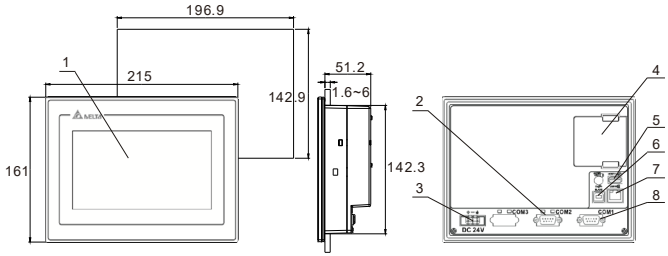


Unit: mm

1. Touchscreen/Display	2. Power input terminals
3. USB slave	4. USB host
5. COM port	

4.2.5 DOP-107EV

- Profile



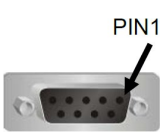
Unit: mm

1. Touchscreen/Display	2. COM2
3. Power input terminals	4. Battery Case
5. USB host	6. USB slave
7. Ethernet interface (LAN)	8. COM1

4.3 Connecting Communication Cables

4.3.1 Pin Definitions of Serial Communication

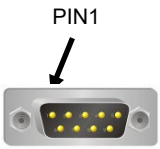
- Definitions of the pins in the COM port on DOP-107BV

COM2	Pin	Mode 1		Mode 2		Mode 3	
		COM1	COM2	COM1	COM2	COM1	COM2
		RS-232	RS-485	RS-485	RS-485	RS-232	RS-422
	1			D+			TXD+
	2	RXD				RXD	
	3	TXD				TXD	
	4		D+		D+		RXD+
	5	GND		GND		GND	
	6			D-			TXD-
	7	RTS				RTS	
	8	CTS				CTS	
	9		D-		D-		RXD-

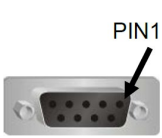
Note: Blank = No Connection.

- Definitions of the pins in the COM ports on DOP-107EV

1. Definitions of the pins in COM1 (supporting flow control)

COM1	Pin	RS-232
	1	
	2	RXD
	3	TXD
	4	
	5	GND
	6	
	7	RTS
	8	CTS
	9	

2. Definitions of the pins in COM2

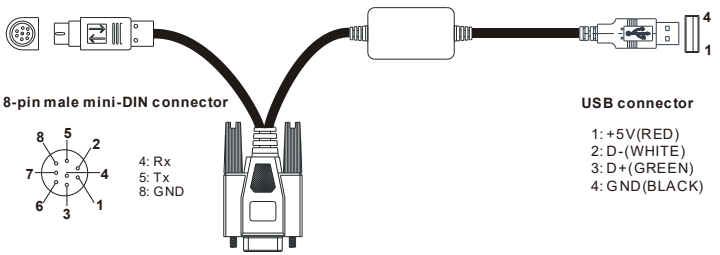
COM2	Pin	Mode 1		Mode 2		Mode 3	
		COM2	COM3	COM2	COM3	COM2	COM3
		RS-232	RS-485	RS-485	RS-485	RS-232	RS-422
	1			D+			TXD+
	2	RXD				RXD	
	3	TXD				TXD	
	4		D+		D+		RXD+
	5	GND		GND		GND	
	6			D-			TXD-
	7	RTS				RTS	
	8	CTS				CTS	
	9		D-		D-		RXD-

Note: Blank = No Connection.

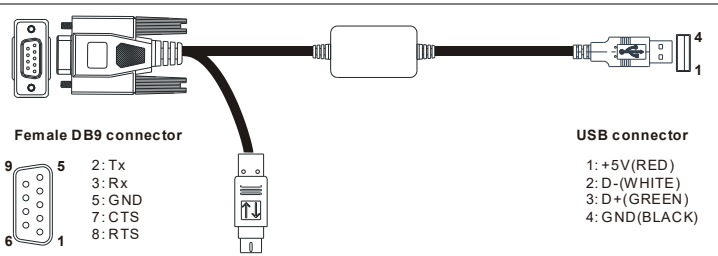
4.3.2 Introduction of Communication Cables

- UC-PRG020-12A (3 m): (Accessory: Male-to-male DB9 adapter)

8-pin male mini-DIN connector ↔ USB connector

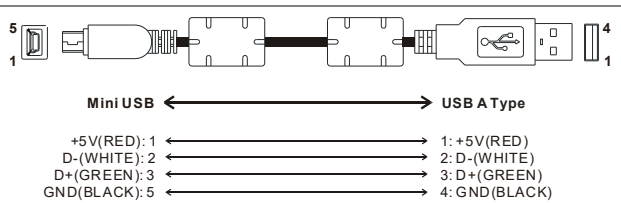


Female DB9 connector ↔ USB connector



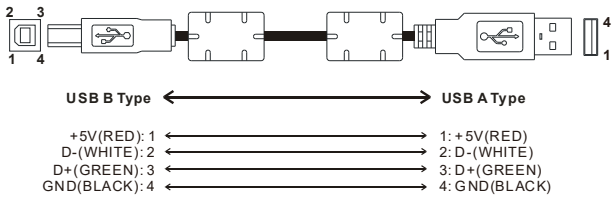
- UC-PRG015-01A (1.5 m)

Mini USB ↔ USB A Type



- UC-PRG015-02A (1.5 m)

USB B Type ↔ USB A Type



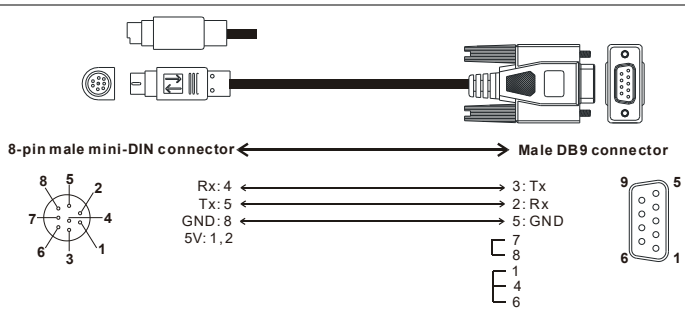
- UC-PRG030-20A (3 m)

RJ45 ↔ RJ45

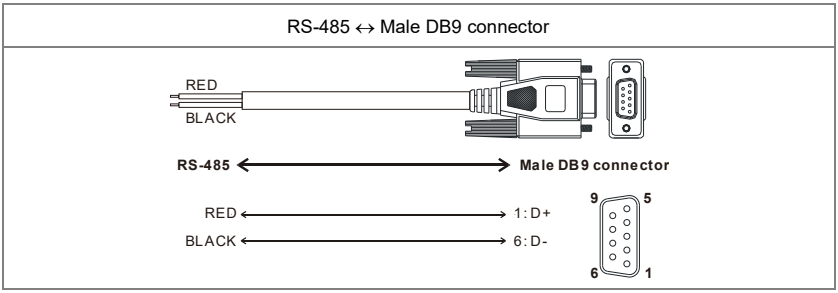


- UC-MS020-06A (2M)

8-pin male mini-DIN connector ↔ Male DB9 connector



- RS-485 cable (1 m)



4.4 Communication between a PLC and an HMI

4.4.1 Wiring a Controller

- **RS-232**

DOP series 9-pin male D-sub (RS-232) connector		PLC - DVP series 8-pin male mini-DIN (RS-232) connector
RXD (2)	———	(5) TXD
TXD (3)	———	(4) RXD
GND (5)	———	(8) GND

- **RS-485**

DOP series 9-pin male D-sub (RS-485) connector		PLC - DVP series RS-485 terminal
D+ (1)	———	D+ (Red)
D- (6)	———	D- (Black)

4.4.2 PLC Device Addresses

Device	Range	Type	Effective range		DVP address (Hexadecimal)	Modbus address (Decimal)
			DVP14SS211R	DVP12SE11R		
S	000~255	Bit	000~1023		0000~00FF	000001~000256
S	256~511	Bit			0100~01FF	000257~000512
S	512~767	Bit			0200~02FF	000513~000768
S	768~1023	Bit			0300~03FF	000769~001024
X	000~377 (Octal)	Bit	000~377		0400~04FF	101025~101280
Y	000~377 (Octal)	Bit	000~377		0500~05FF	001281~001536
T	000~255	Bit	000~255		0600~06FF	001537~001792
		Word	000~255		0600~06FF	401537~401792
M	000~255	Bit	0000~4095		0800~08FF	002049~002304
M	256~511	Bit			0900~09FF	002305~002560
M	512~767	Bit			0A00~0AFF	002561~002816
M	768~1023	Bit			0B00~0BFF	002817~003072
M	1024~1279	Bit			0C00~0CFF	003073~003328
M	1280~1535	Bit			0D00~0DFF	003329~003584
M	1536~1791	Bit	0000~4095		B000~B0FF	045057~045312
M	1792~2047	Bit			B100~B1FF	045313~045568
M	2048~2303	Bit			B200~B2FF	045569~045824
M	2304~2559	Bit			B300~B3FF	045825~046080
M	2560~2815	Bit			B400~B4FF	046081~046336
M	2816~3071	Bit			B500~B5FF	046337~046592
M	3072~3327	Bit			B600~B6FF	046593~046848
M	3328~3583	Bit			B700~B7FF	046849~047104
M	3584~3839	Bit			B800~B8FF	047105~047360

Device	Range		Type	Effective range		DVP address (Hexadecimal)	Modbus address (Decimal)
				DVP14SS211R	DVP12SE11R		
M	3840~4095		Bit	0000~4095		B900~B9FF	047361~047616
C	0~199	16-bit	Bit	000~199		0E00~0EC7	003585~003784
			Word	000~199		0E00~0EC7	403585~403784
	200~255	32-bit	Bit	200~255		0EC8~0EFF	003785~003840
			Dword	200~255		0EC8~0EFF	403785~403840
D	000~255		Word	0000 ~ 4999	0000 ~ 11999	1000~10FF	404097~404352
D	256~511		Word			1100~11FF	404353~404608
D	512~767		Word			1200~12FF	404609~404864
D	768~1023		Word			1300~13FF	404865~405120
D	1024~1279		Word			1400~14FF	405121~405376
D	1280~1535		Word			1500~15FF	405377~405632
D	1536~1791		Word			1600~16FF	405633~405888
D	1792~2047		Word			1700~17FF	405889~406144
D	2048~2303		Word			1800~18FF	406145~406400
D	2304~2559		Word			1900~19FF	406401~406656
D	2560~2815		Word			1A00~1AFF	406657~406912
D	2816~3071		Word			1B00~1BFF	406913~407168
D	3072~3327		Word			1C00~1CFF	407169~407424
D	3328~3583		Word			1D00~1DFF	407425~407680
D	3584~3839		Word			1E00~1EFF	407681~407936
D	3840~4095		Word			1F00~1FFF	407937~408192
D	4096~4351		Word			9000~90FF	436865~437120
D	4352~4607		Word			9100~91FF	437121~437376
D	4608~4863		Word			9200~92FF	437377~437632
D	4864~5119		Word			9300~93FF	437633~437888

Device	Range	Type	Effective range		DVP address (Hexadecimal)	Modbus address (Decimal)
			DVP14SS211R	DVP12SE11R		
D	5120~5375	Word	N/A	0000 ~ 11999	9400~94FF	437889~438144
D	5376~5631	Word			9500~95FF	438145~438400
D	5632~5887	Word			9600~96FF	438401~438656
D	5888~6143	Word			9700~97FF	438657~438912
D	6144~6399	Word			9800~98FF	438913~439168
D	6400~6655	Word			9900~99FF	439169~439424
D	6656~6911	Word			9A00~9AFF	439425~439680
D	6912~7167	Word			9B00~9BFF	439681~439936
D	7168~7423	Word			9C00~9CFF	439937~440192
D	7424~7679	Word			9D00~9DFF	440193~440448
D	7680~7935	Word			9E00~9EFF	440449~440704
D	7936~8191	Word			9F00~9FFF	440705~440960
D	8192~8447	Word			A000~A0FF	440961~441216
D	8448~8703	Word			A100~A1FF	441217~441472
D	8704~8959	Word			A200~A2FF	441473~441728
D	8960~9215	Word			A300~A3FF	441729~441984
D	9216~9471	Word			A400~A4FF	441985~442240
D	9472~9727	Word			A500~A5FF	442241~442496
D	9728~9983	Word			A600~A6FF	442497~442752
D	9984~9999	Word			A700~A7FF	442753~443008
D	10000~11999	Word			A710~AEDF	442767~44768

4.4.3 Setting the Communication Parameters in a PLC

Function COM port

Number

Item \ Port	COM1	COM2	COM3
Communication format	D1036	D1120	D1109
Retaining communication settings	M1138	M1120	M1136
ASCII (Off)/RTU (On)	M1139	M1143	M1320
Slave communication address	D1121		D1255

Description:

COM1 is an RS-232 port, COM2 is an RS-485 port, and COM3 is an RS-485 port. They support Modbus ASCII/RTU communication. If RTU communication is selected, the data length selected should be 8 bytes. COM2 and COM3 support data rates up to 921 kbps. COM1, COM2, and COM3 can be used at the same time. If the communication port used is a USB port, it can not function as a master.

COM1:

COM1 can function as a master or a slave. It supports ASCII/RTU communication and data rates upt to (115200 bps). Besides, it can be used to change the number of data bits, a parity bit, and the number of stop bits.

D1036: Master/Slave communication protocol used by COM1 (Bit 8~bit 15 are not used. Please refer to the table below for more information.)

COM2:

COM2 can function as a master or a slave. It supports ASCII/RTU communication and data rates upt to (921 kbps). Besides, it can be used to change the number of data bits, a parity bit, and the number of stop bits.

D1120: Master/Slave communication protocol used by COM2 (Please refer to the table below for more information.)

COM3:

COM3 can function as a master or a slave. It supports ASCII/RTU communication and serial transmission speed upt to (921 kbps). Besides, it can be used to change the number of data bits, a parity bit, and the number of stop bits.

D1109: Master/Slave communication protocol used by COM3 (Bit 8~bit 15 are not used. Please refer to the table below for more information.)

- **Communication protocol**

	Contents	
b0	Data length	0: 7; 1: 8 (If RTU communication is selected, the data length selected should be 8 bytes.)
b2, b1	Parity bit	00: None
		01: Odd
		11: Even
b3	Stop bit	0: 1 bit; 1: 2 bits
b7~b4	Data rate	0001 (H1): 110
		0010 (H2): 150
		0011 (H3): 300
		0100 (H4): 600
		0101 (H5): 1200
		0110 (H6): 2400
		0111 (H7): 4800
		1000 (H8): 9600
		1001 (H9): 19200
		1010 (HA): 38400
		1011 (HB): 57600
		1100 (HC): 115200

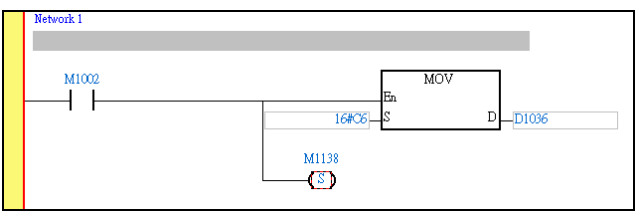
	Contents		
b7~b4	Data rate	1101 (HD): 500000 (Supported by COM2/COM3)	
		1110 (HE): 31250 (Supported by COM2/COM3)	
		1111 (HF): 921000 (Supported by COM2/COM3)	
b8	Start-of-text character	0: None	1: D1124
b9	First end-of-text character	0: None	1: D1125
b10	Second end-of-text character	0: None	1: D1126
b15~b11	Undefined		

4

- **Example: Modifying the communication format used by COM1**

1. If users want to modify the communication format used by COM1, they have to add the program code below to the top of the program in the PLC. When the PLC runs during the first program scan, it checks whether M1138 is On. If M1138 is On, the setting of COM1 will be changed according to the value in D1036.

2. Change the communication format used by COM1 is changed to an ASCII format (115200 bps, 7 data bits, Even parity bit, 1 stop bit).

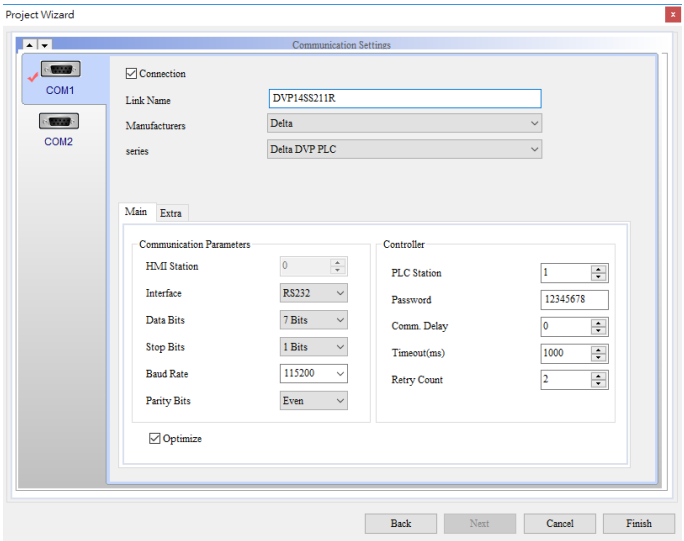


4.4.4 Setting the Communication Parameters in an HMI

- **DOP-107BV**

Setting communication

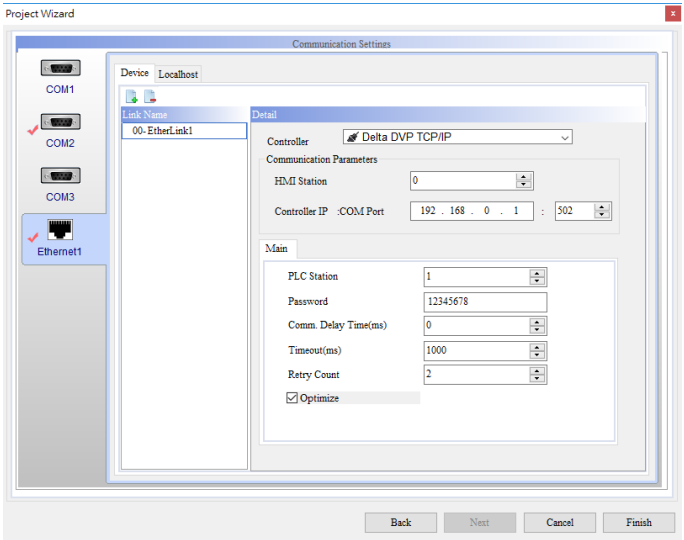
After users click **Communication Setting** on the **Options** menu in DOPSoft, they can set communication parameters related to COM1.



- **DOP-107EV**

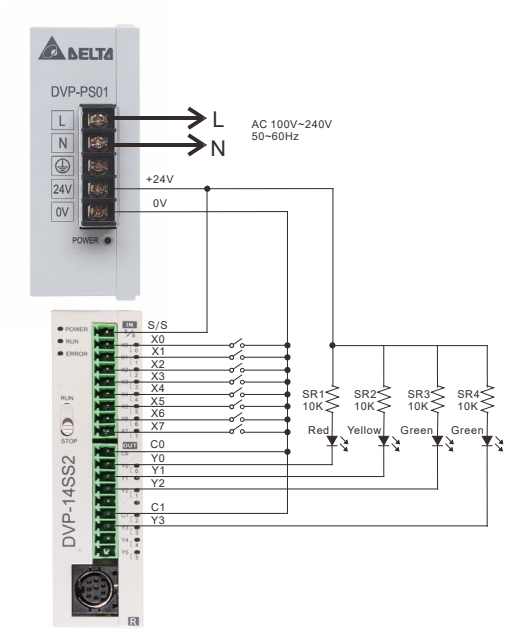
Setting communication

After users click **Communication Setting** on the **Options** menu in DOPSoft, they can set communication parameters related to Ethernet.

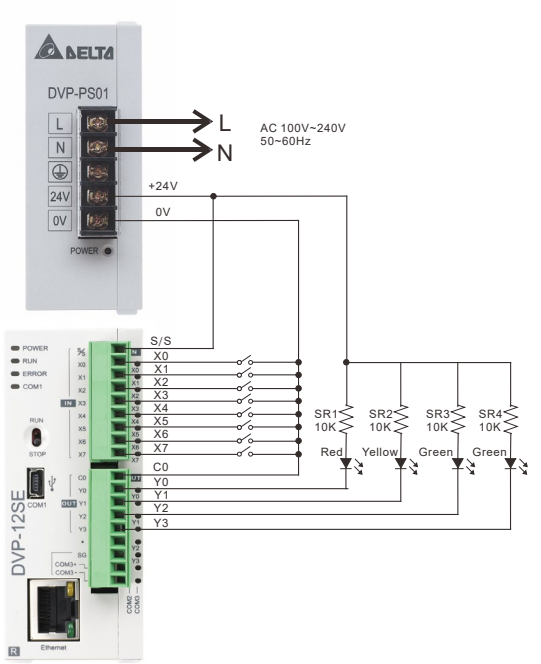


4.5 Equivalent Circuit of an I/O Simulator Board

4.5.1 Connecting to DVP14SS211R

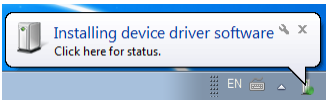


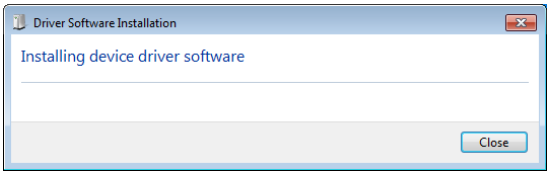
4.5.2 Connecting to DVP12SE11R



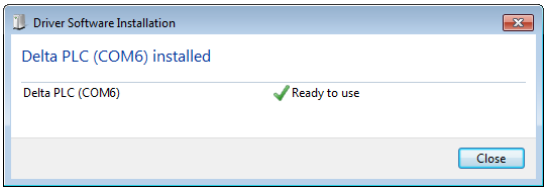
4.6 Installing the DVP12SE11R Driver

After ISPSoft is installed on a PC, the DVP12SE11R driver will appear in the folder in which ISPSoft is installed. After DVP12SE11R is connected to the PC, the message “Installing device driver software” will appear, and the PLC will install the DVP12SE11R driver automatically.





After the installation of the DVP12SE11R driver is complete, the message “Delta PLC” will appear in the **Driver Software Installation** window.



MEMO

Smarter. Greener. Together.

Industrial Automation Headquarters

Delta Electronics, Inc.
Taoyuan Technology Center
No.18, Xinglong Rd., Taoyuan District,
Taoyuan City 330477, Taiwan
TEL: +886-3-362-6301 / FAX: +886-3-371-6301

Asia

Delta Electronics (Shanghai) Co., Ltd.
No.182 Minyu Rd., Pudong Shanghai, P.R.C.
Post code : 201209
TEL: +86-21-6872-3988 / FAX: +86-21-6872-3996
Customer Service: 400-820-9595

Delta Electronics (Japan), Inc.
Industrial Automation Sales Department
2-1-14 Shibadaimon, Minato-ku
Tokyo, Japan 105-0012
TEL: +81-3-5733-1155 / FAX: +81-3-5733-1255

Delta Electronics (Korea), Inc.
1511, 219, Gasan Digital 1-Ro., Geumcheon-gu,
Seoul, 08501 South Korea
TEL: +82-2-515-5305 / FAX: +82-2-515-5302

Delta Energy Systems (Singapore) Pte Ltd.
4 Kaki Bukit Avenue 1, #05-04, Singapore 417939
TEL: +65-6747-5155 / FAX: +65-6744-9228

Delta Electronics (India) Pvt. Ltd.
Plot No.43, Sector 35, HSIIDC Gurgaon,
PIN 122001, Haryana, India
TEL: +91-124-4874900 / FAX: +91-124-4874945

Delta Electronics (Thailand) PCL.
909 Soi 9, Moo 4, Bangpoo Industrial Estate (E.P.Z),
Pattana 1 Rd., T.Phraksa, A.Muang,
Samutprakarn 10280, Thailand
TEL: +66-2709-2800 / FAX: +66-2709-2827

Delta Electronics (Australia) Pty Ltd.
Unit 2, Building A, 18-24 Ricketts Road,
Mount Waverley, Victoria 3149 Australia
Mail: IA.au@deltaww.com
TEL: +61-1300-335-823 / +61-3-9543-3720

Americas

Delta Electronics (Americas) Ltd.
5101 Davis Drive, Research Triangle Park, NC 27709, U.S.A.
TEL: +1-919-767-3813

Delta Electronics Brazil Ltd.
Estrada Velha Rio-São Paulo, 5300 Eugênio de
Melo - São José dos Campos CEP: 12247-004 - SP - Brazil
TEL: +55-12-3932-2300 / FAX: +55-12-3932-237

Delta Electronics International Mexico S.A. de C.V.
Gustavo Baz No. 309 Edificio E PB 103
Colonia La Loma, CP 54060
Tlalnepantla, Estado de México
TEL: +52-55-3603-9200

EMEA

Delta Electronics (Netherlands) B.V.
Sales: Sales.IA.EMEA@deltaww.com
Marketing: Marketing.IA.EMEA@deltaww.com
Technical Support: iatechnicalsupport@deltaww.com
Customer Support: Customer-Support@deltaww.com
Service: Service.IA.emea@deltaww.com
TEL: +31(0)40 800 3900

Delta Electronics (Netherlands) B.V.
Automotive Campus 260, 5708 JZ Helmond, The Netherlands
Mail: Sales.IA.Benelux@deltaww.com
TEL: +31(0)40 800 3900

Delta Electronics (Netherlands) B.V.
Coesterweg 45, D-59494 Soest, Germany
Mail: Sales.IA.DACH@deltaww.com
TEL: +49 2921 987 238

Delta Electronics (France) S.A.
ZI du bois Challand 2, 15 rue des Pyrénées,
Lisses, 91090 Evry Cedex, France
Mail: Sales.IA.FR@deltaww.com
TEL: +33(0)1 69 77 82 60

Delta Electronics Solutions (Spain) S.L.U
Ctra. De Villaverde a Vallecas, 265 1º Dcha Ed.
Hormigueras – P.I. de Vallecas 28031 Madrid
TEL: +34(0)91 223 74 20

Carrer Llacuna 166, 08018 Barcelona, Spain
Mail: Sales.IA.Iberia@deltaww.com

Delta Electronics (Italy) S.r.l.
Via Meda 2–22060 Novedrate(CO)
Piazza Grazioli 18 00186 Roma Italy
Mail: Sales.IA.Italy@deltaww.com
TEL: +39 039 8900365

Delta Greentech Elektronik San. Ltd. Sti. (Turkey)
Şerifali Mah. Hendem Cad. Kule Sok. No:16-A
34775 Ümraniye – İstanbul
Mail: Sales.IA.Turkey@deltaww.com
TEL: + 90 216 499 9910

Eltek Dubai (Eltek MEA DMCC)
OFFICE 2504, 25th Floor, Saba Tower 1,
Jumeirah Lakes Towers, Dubai, UAE
Mail: Sales.IA.MEA@deltaww.com
TEL: +971(0)4 2690148

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*We reserve the right to change the information in this manual without prior notice.