

For use with the following:

AW-10101170 REV00

• PLC-ES1616P

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# **Chapter 1. Features of Web Server**

**Modular PLC Web Server** allows you to monitor and control the value of a PLC device online via the Internet.

### **1.** Features

- a) Include the Web Server Manager tool to configure the web server page.
- b) Eliminates the need to install additional software for configuration and monitoring.
- c) Enhanced security: Only authorized **IDs** and **IP Addresses** are permitted to access the web server. There are 15 distinct security levels for users and pages.
- d) Offers an easy-to-use tool for creating web pages using **MapleLogic**.
- e) Stores web pages on the **SD card** of the Modular PLC CPU module, eliminating the need for the CPU module's programming memory.
- f) Supports uploading .htm files to the web server.
- g) Allows a maximum of 3 concurrent users to access the web page.

## 2. Required CPU module and MapleLogic

PLC Type	Module	Web Firmware version
PLC-ES Modular PLC Series	PLC-ES1616P	6.34 or higher

## 3. Specification of Web Server

ltem	Web Server
HTTP version	1.1
Memory of SD card	FAT32 Format, Maximum 8GB
Security level of Web page	Level 1 ~ 15
Refresh time of Web page	1 ~ 10 sec.
Number of Web page	Maximum 30 pages
Memory of Web page	Maximum 60KB per a page

### **Notice**

- a) File names must contain fewer than 8 characters.
- b) Only .htm files are supported.
- c) Attached files (e.g. PDFs or images) must be smaller than 60 KB.

# **4.** Web Browsers

The following browsers are supported for opening the web page.

Browser name	Minimum Version	Company
Internet Explorer	V11.0	Microsoft
Chrome	V43.0	Google
Safari	V5.1.7	Apple
Firefox	V38.0.5	Mozilla

# **Chapter 2: Initial CPU Setup**

### 1. Preliminary Information

The PLC-ES1616P can host web server. The web server allows the user to control data registers, CPU functions, and more. The web server runs on HTML, while most browsers use HTML5. However, most browsers can read HTML websites, allowing the web server to be viewed in browsers listed in Chapter 1.

Important notice: When the web server firmware is loaded onto the PLC-ES CPU, the CPU will lose all non-webserver Ethernet functionality. The ethernet protocol, Modbus TCP/IP, and more will not work through the Ethernet port. A communication module like the MOD-SENT01 will be required to use the CPU's original Ethernet functionality.

### Required items:

- 1) PLC-ES1616P
- 2) PLC-ES CPU Web Firmware
- 3) SD Card (up to 32GB)

### 2. Create a WEB Folder on the SD Card

Plug the SD card into the computer. On the SD card, create a folder named "WEB".



### 3. Load the Web Server Firmware on the PLC-ES CPU

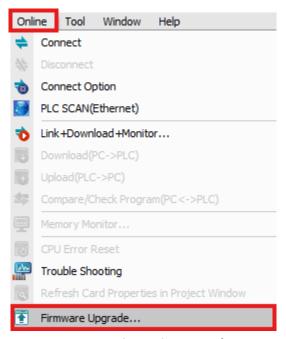
a) Connect the CPU to MapleLogic. To do this, navigate to "Online" and "Connect". To change the method of connecting to the PLC-ES, navigate to "Online" and "Connect Option". Afterwards, click "Connect".



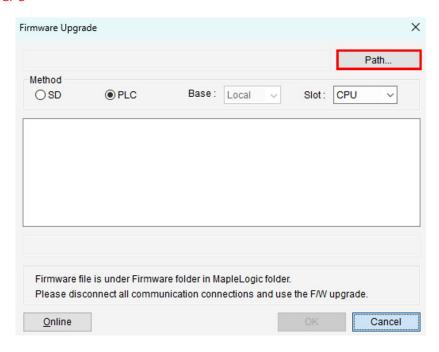
Optionally, the "Connect" icon in the toolbar can be clicked.



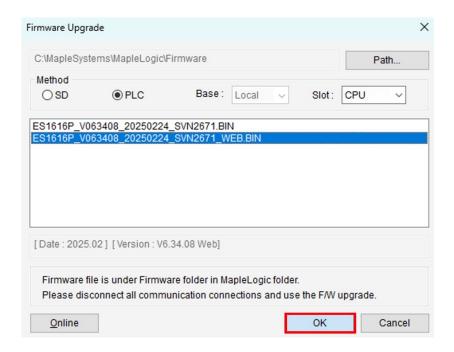
b) Navigate to "Online" and click "Firmware Upgrade".



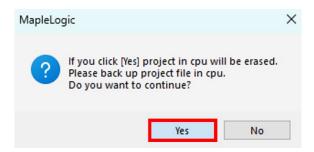
c) Click the "Path" button to navigate to the web server firmware's location. An example firmware name is "ES1616P\_V063408\_20250224\_SVN2671\_WEB.BIN". The firmware file name must match the CPU type - in the example given the "ES1616P" would match the PLC-ES1616P CPU



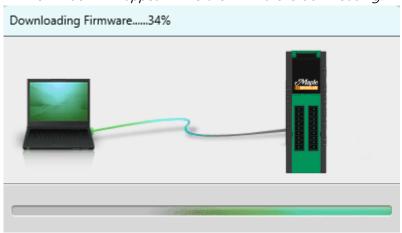
d) Once the path is selected, the firmware should appear in the white box. Click the firmware to install, and the click "OK".



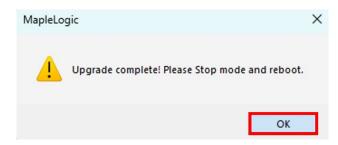
e) Click "Yes" to load the firmware onto the PLC-ES CPU.



This window will appear while the firmware is downloading:

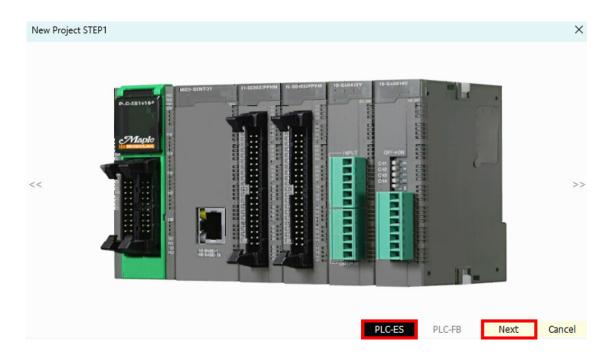


f) Once the firmware is downloaded, switch the PLC-ES CPU to **STOP MODE**, **POWER CYCLE** the PLC-ES CPU, and switch the PLC-ES CPU to **RUN MODE**.

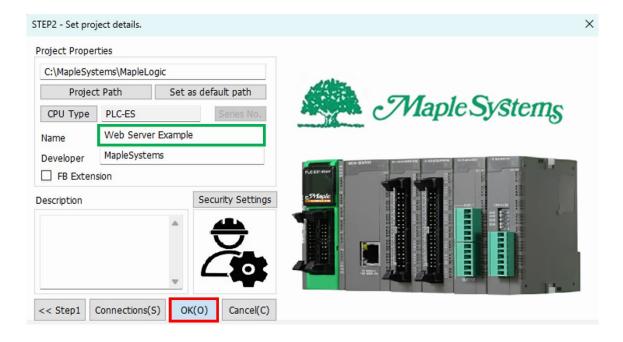


# Chapter 3. Creating a New Web Server Project

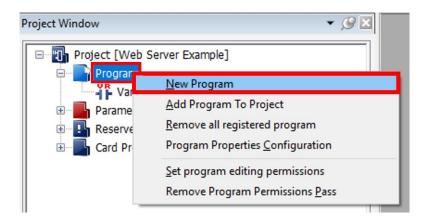
1. Select the "PLC-ES" and click "Next".



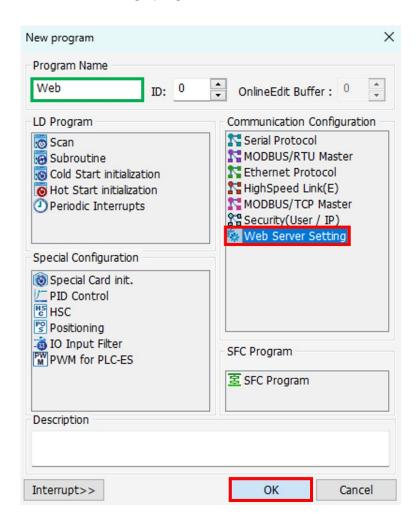
2. Name the project, select the path, and click "OK(O)".



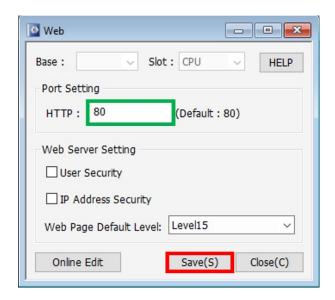
3. In the Project Tree, right-click "Program" and click "New Program".



4. Create a new "Web Server Setting" program. Select "OK" when finished.



5. Select the "Port" to use, User Security (optional), and IP Address Security (optional), and click "Save(S)".

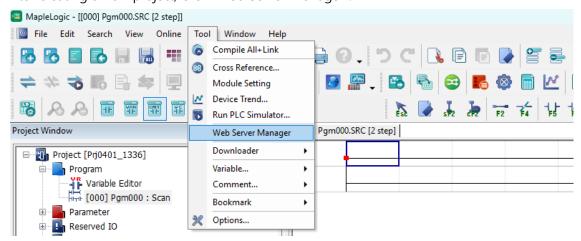


<sup>\*</sup> See Chapter 5 for using Web Server Security Features

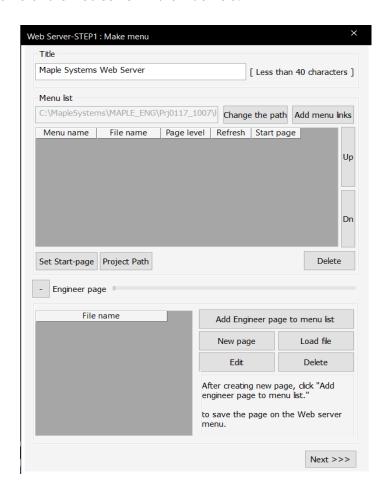
# **Chapter 4. Web Server Manager**

\*Format SD card and create a folder named "WEB" in your SD card before inserting SD card into PLC.

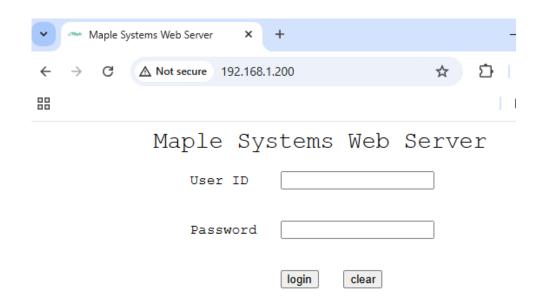
1. After creating a new project, click "Web Server Manager".



Enter the name of the web server in the Title field.

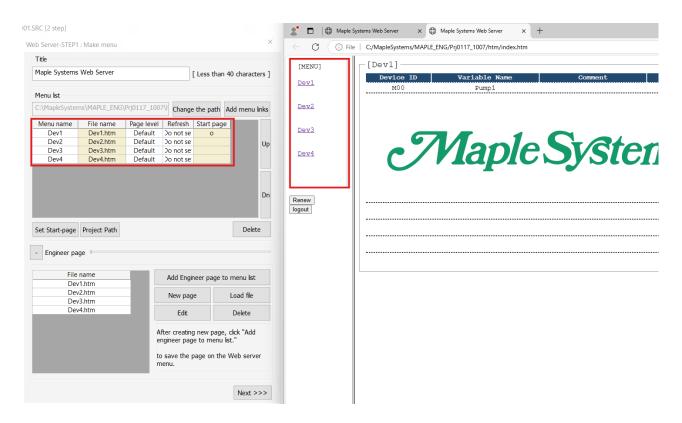


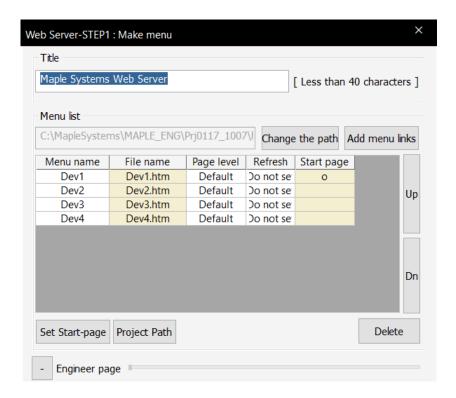
This title will be used in the web page name and login page, as shown below:



### 2. Menu List

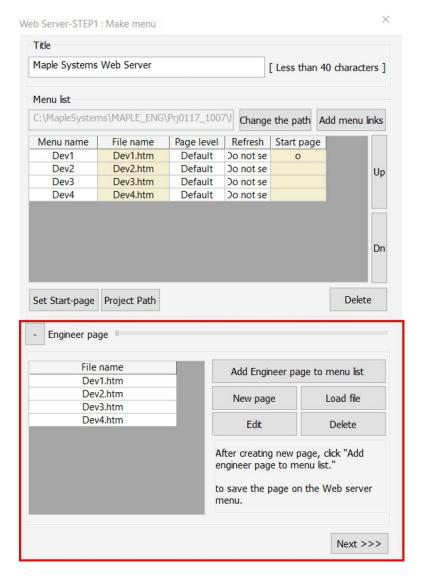
This menu list will appear on the web server menu. (Maximum 30 .htm can be added).





- a) Menu name: Click here to change the name.
- b) File name: Name of the .htm file.
- c) Page level: Choose from 1 to 15 security level or Default. (Level 1 is the highest level)
  - If you choose "Default," the default level will be determined by the "User Security Default Level" in the Web Server Security program. For example, if the User Security Default Level is set to 15, the Default Page Level will also be set to 15. (Refer to Chapter 3: Security Setting for more details.)
- d) **Refresh**: Specifies the refresh duration for updating values. Choose a duration between 1 to 10 seconds or select "Do not set."
- e) Start Page: Page that has been set as the first page.
- f) Add menu links: Select a .htm file to upload to the menu list.
- g) **Up and Down**: Rearrange the sequence of pages.
- h) **Set Start-page**: Click the page you want to set as the first page when opening the web server, then click Set Start-page.
- i) **Delete**: Remove the page from the menu list; however, the original .htm file will remain in the folder.

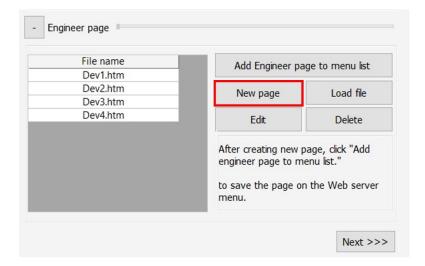
**3.** Under the Engineer page click "New Page" to create a new web page or select the page and press "Edit" to make changes to the page.



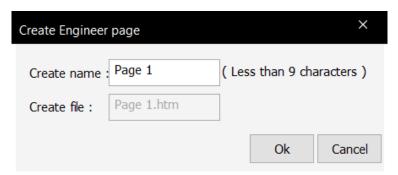
- a) Add Engineer Page to Menu List: If an engineer page is not included in the menu list, the web server page will not display the page in the menu. After creating a new page, click "Add Engineer Page to Menu List" to add it to the web server menu.
- b) **New Page**: Create a new engineer page to display on the web server.
- c) Load File: Update a .htm file from another folder.
- d) Edit: Modify an existing engineer page.
- e) **Delete**: Remove an engineer page from the file name list.

Note: Even if you delete an engineer page from the file name list, the .htm file will remain in the htm folder in the Project folder.

4. Click "New page".

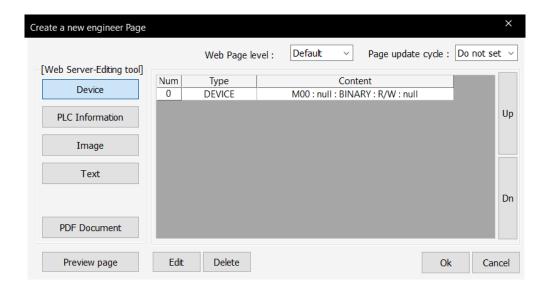


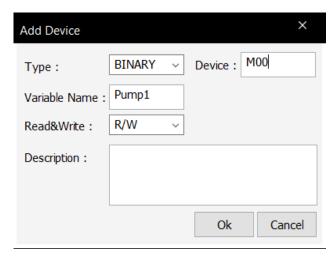
In the Create a new engineer Page window, enter a name (less than 9 characters) and click **OK.** A new engineer page configuration window will then appear.



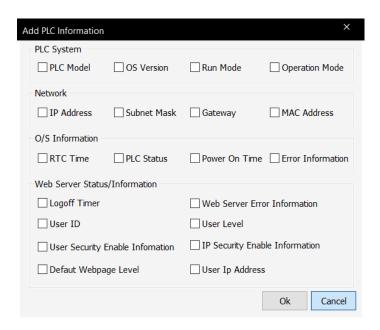
Using the Web Server Editing tool, you can add various content to the web page. The web page will display content in order based on the content number.

a) **Device:** To control or monitor a variable's value, you can add the device address here.





- a. **Type**: Select the device type from the drop-down "Type" menu.
- b. **Device**: Enter a device address (e.g. M00, D01).
  - Y, M, K, L, C, D: Read and Write (R/W).
  - **X**, **F**, **T**, **C**: Read-only (R).
- c. Variable Name (optional): Read and Write (R/W).
- d. Read & Write: Choose either Read or Read/Write.
- e. **Description (optional)**: Enter a description of the device address, if needed.
- b) **PLC information**: This information will appear on the web page.



- a. A maximum of 4 items can be selected per content line.
- b. Add more PLC information to the web page by creating additional PLC Information content lines.



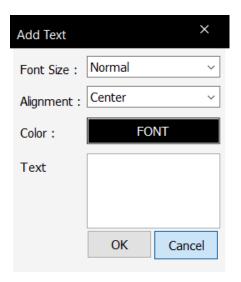
c) **Image**: Choose an image file to display on the web page.



- a. Image type: jpg, png, gif
- b. Image size: Less than 60KB
- c. File name: Maximum of 8 characters in length



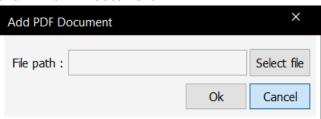
d) Text: Write text to display on the web page



a. Font Size: Small, Normal, Large, Big

b. Alignment: Left, Center, Right

e) PDF Document: Link a PDF document

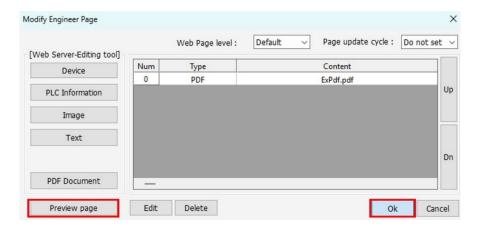


Select file: Choose the pdf file and add it

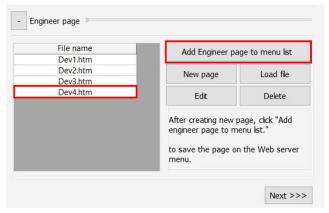
b. **PDF size**: Less than 60KB

c. File name: Maximum 8 characters in length

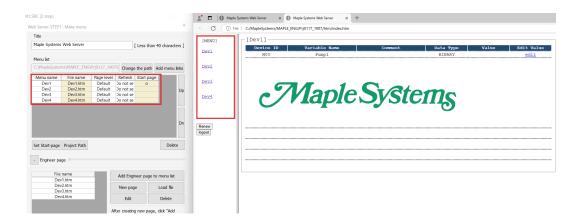
**5.** After creating each content, click **Preview** to see how it will be displayed on the web page. If the web page looks correct, click **OK** to save the engineer page.



6. Click "Add Engineer Page to Menu List" to save the web page to the web server menu.



\* If you don't add an engineer page to the Menu list, the web server will not show the page in the menu.

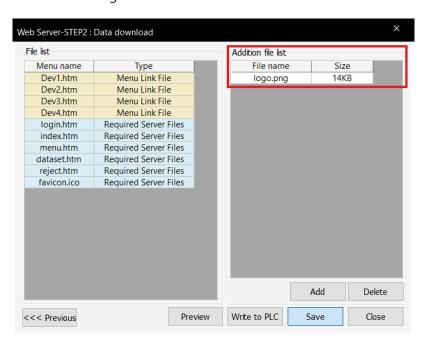


**7.** To set the start page, in the Menu List select the page you want to display when opening the web server and click "Set Start-page".

Web Server-STEP2 : Data download File list Addition file list Menu name Туре File name Size Menu Link File Dev1.htm Menu Link File Dev3.htm Menu Link File Dev4.htm Menu Link File login.htm Required Server Files Required Server Files Required Server Files index.htm menu.htm dataset.htm Required Server Files reject.htm favicon.ico Required Server Files Required Server Files Add Delete Preview Write to PLC Save <<< Previous Close

8. Click "Next >>>" and the Web Server Step 2: Data Download window will appear.

**9.** To display links, PDF files, and images, selected on the engineer page, click "Add" and choose all links, PDF files and images here.



<sup>\*</sup> If you don't add links, PDFs, or images to the Additional File List, they will not be displayed on the web page.

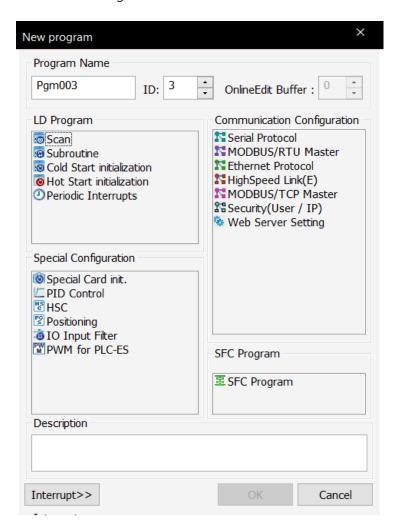
- **10.** Click "Save" and "Write to PLC" to download the web page settings and contents to the PLC CPU.
  - \* Unless you click "Write to PLC", PLC CPU will not have a web page even if the project is downloaded to PLC.

# **Chapter 5. Security Settings**

1. Security (User/IP) Program

To set up security for the web server, the "Security (User/IP)" program must be configured.

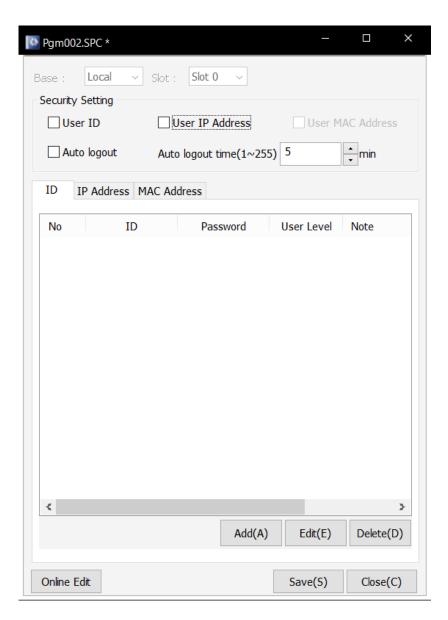
**a)** Right-click on "Program", select "New Program", and then choose "Security (User/IP)" under the Communication Configuration sections.



## **b)** Security Settings

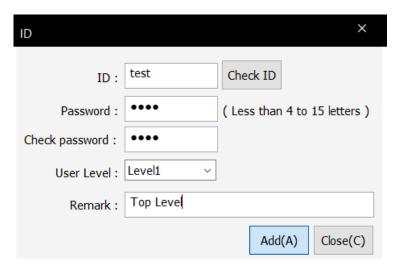
Choose the security options you want to configure for the web server.

- Options include:
  - User ID
  - User IP Address
  - Auto Logout

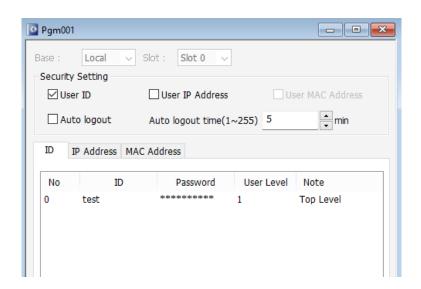


- a. User ID: Only registered User IDs with passwords can access the web server.
  - A maximum of 16 User IDs can be registered.
- b. IP Address: Only registered IP addresses can access the web server page.
  - A maximum of 16 IP addresses can be registered.
- c. **Auto Logout time**: The web page will automatically log out after the specified time (1-255 minutes).

c) To configure User ID security, click the "ID" tab and click "Add(A)".



- a. Enter the "ID" name and click "Check ID".
- Set a password (4 to 15 characters) and confirm it in the "Check Password" field.
- c. Choose a "User Level" (1 to 15).
  - Level 1 is the highest, granting access to all levels of pages.
  - Example: A page level of 5, users with levels 1 to 5 can access the web page.
- d. Add a remark/note if necessary (e.g. "Top Level").
- e. Click "Add(A) to save or "Close(C)" to exit.

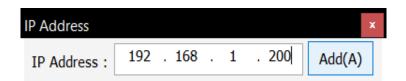


(Note: If you want to use only an ID and password for the web server, you do not need to configure IP Address settings.)

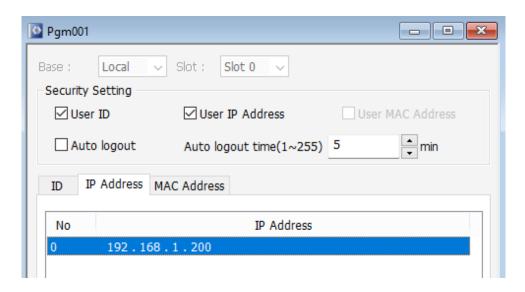
If **User ID** is enabled, the login page shown below will appear. The user viewing the page must know the user ID and password defined when enabling the User ID. Otherwise, they will not be able to log in to the main web page on the web server.

	PLC	Web	Server
Use	r ID		
Pas	sword		
		login	clear

d) To configure IP Address security, click the "IP Address" tab and click "Add(A)".



Write the IP address from which you want to access the web server. Once complete, click "Save".

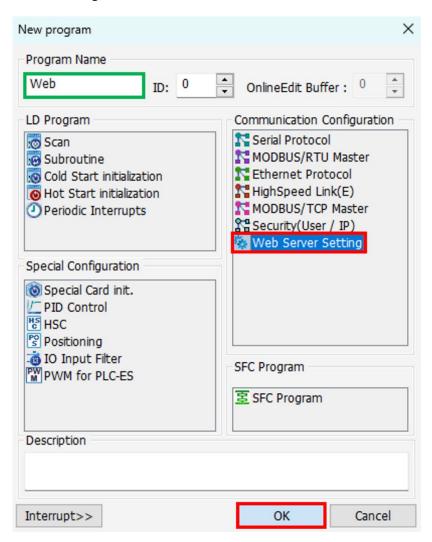


(Note: If you want to use both User ID and IP Address security, select **User ID** and **User IP Address**)

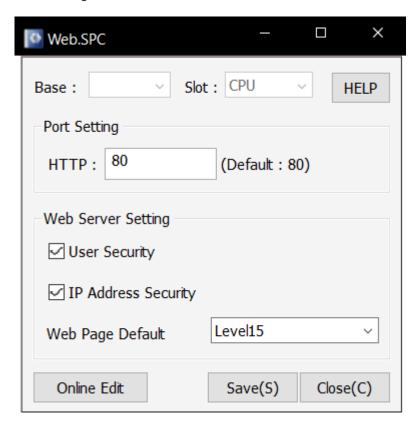
### 2. Web Server Setting Program

After configuring the "Security (User/IP)" program, create or open a "Web Server Setting" Program to apply security settings to the web server.

**a)** To create the program right-click on "Program", select "New Program", and then choose "Web Server Setting".



### **b)** Web Server Settings



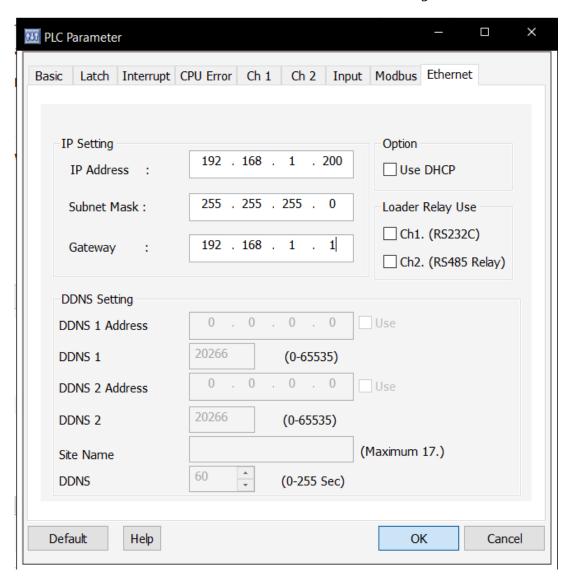
- a. **Port Setting**: Set the HTTP port (default: 80).
- b. Web Server Setting:
  - Enable "User Security" to restrict access using User IDs.
  - Enable "IP Address Security" to restrict access using registered IP addresses.
- c. Web Page Default: Set the default page security level (e.g. Level 15).
- d. Online Edit: While accessing the web server, you can also edit security settings.

If you want to use either "User ID" or "IP Address" for web server security, these settings must first be configured in the "Security (User/IP)" program.

Note: The "User Security Default Level" is linked to the "Page Level" in the Menu list in the Web Server Manager. For example, if the default level is set to Level 15, the Page Level will also be Level 15.

# **Chapter 6. Parameter Setting (Ethernet IP configuration)**

To access the web server of Modular PLC, click **PLC Parameter** and configure the Ethernet IP address.



Write the IP address of the Modular PLC CPU module that will be the web server IP address.

# Chapter 7. HTML source code

The standard for all HTML pages is HTML5, so if you want to create a web page without Web Server Manager, you should follow the format of the source code below.

# 1. Data CODE Table for Device Type

Data Type	Data CODE	Data Size (bit)	Description
ON/OFF	'O'	1	ON/OFF
HIGH/LOW	'H'	1	HIGH/LOW
UP/DOWN	'N'	1	UP/DOWN
BINARY	'b'	1	′0′, ′1′
UINT16	ʻu;	16	0 ~ 65535
INT16	'i'	16	-32768 ~ 32767
UINT32	′U′	32	0 ~ 4294967296
INT32	Ί΄	32	-2147483648 ~
			2147483647
FLOAT	'F'	32	-

### 2. Data Write Setting (Web page → PLC)

The HTTP method is **POST(<form method="POST">)** to send data. To write a value from the web page to PLC, a device address should be registered in MapleLogic in advance.

### FORMAT

<a href="POPUP/][Device symbol][Device address]/[Device type]/[Variable Name]" target="\_blank">[Link name]</a>

- ✓ Refer to the Data CODE table for Data CODE.
- ✓ The bit is included when bit types such as binary, ON/OFF, HIGH/LOW, and UP/DOWN are set.

### **EXAMPLE**

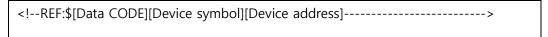
<a href="POPUP/D1500/u/PUMP1" target="\_blank">edit</a>

You can update the DataSet.htm file with data information.



Use the format below to read a device value from PLC to a web page.

### **FORMAT**



### **EXAMPLE**

```
<!--REF:$uD1500----->
```

If the value of D1500 is 1235, <!--REF:\$uD1500----->sends 1235 to web page.

### 4. Data Refresh Time

**EXAMPLE: REFRESH TIME IS 5 SEC.** 

```
<meta http-equiv="refresh" content="5">
```

## 5. Web page level

**EXAMPLE: WEB PAGE LEVEL IS 15.** 

```
<!DOCTYPE html>
<!--REF:&LV15-->
<html>
```

If the web page level is not configured, the default level will be level 15.

### 6. PLC Information

A total of 24 PLC information can be displayed.

## **FORMAT**

```
<!--REF:#[PLC Information Data CODE]----->
```

Refer to the PLC Information Data CODE table below.

## EXAMPLE: PLC INFORMATION IS PLC MODEL (DATA CODE: PM)

```
<!--REF:#PM----->
```

# **PLC INFORMATION DATA CODE TABLE**

Data Type	CODE	Description
PLC Model	"PM"	"PLC-ES1616P"
OS Version	"OV"	"%d.%d%d"
Run Mode	"RM"	"REMOTE RUN" or "REMOTE STOP"
Operation Mode	"OM"	"ROM Operation" or "RAM Operation"
IP Address (PLC)	"IA"	"%3d.%3d.%3d"
Subnet Mask	"SM"	"%3d.%3d.%3d"
Gateway	"GW"	"%3d.%3d.%3d"
MAC Address	"MA"	"%02X.%02X.%02X.%02X.%02X"
RTC Time	"RT"	"%4d/%02d/%02d"" SUN"" %02d:%02d:%02d"
PLC Status	"PS"	"Major Fault" or "Minor Fault" or "Normal"
Power On Time	"PT"	"%4d/%02d/%02d"" SUN"" %02d:%02d:%02d"
Error Information	"EI"	"ERROR CODE: %4X" or "No Error"
Logoff Timer	"LT"	"%02d:%02d" or "Auto Logoff Disabled"
Web Server Error	"WE"	Refer to "3.2 Web Server Status code"
Device Value	"DV"	Value of Device address
User ID	"UI"	"User ID" or "User Security Disabled"
User Level	"UL"	"User Level " or "User Security Disabled"
User Security Enable Info	"US"	"Enabled" or "Disabled"
IP Security Enable Info	"IS"	"Enabled" or "Disabled"
WebPage Level Default	"WL"	Security level of web page
User IP Address	"UP"	"%3d.%3d.%3d"
Device ID	"DV"	Device name
Data Type	"DT"	Type of Device
DataSet Result	"DR"	Result of Writing device value

# **EXAMPLE OF SOURCE CODE FOR WEB PAGE**

Dev1]					
Device ID	Variable Name	Comment	Data Type	Value	Edit Value
M00	Pump1		BINARY		<u>edit</u>
	Infomation		Value		
	Run_Mode				
	Run_Mode Operation_Mode				
	Run_Mode  Operation_Mode  PLC_Status				



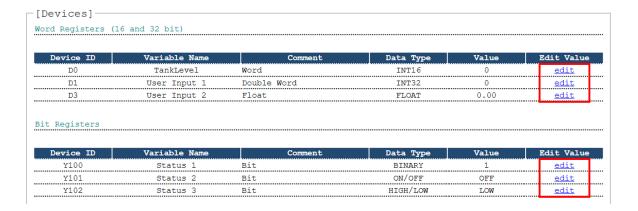
```
C: > MapleSystems > MAPLE_ENG > Prj0117_1007 > htm > ♦ Dev1.htm > ♦ html > ♦ head > ♦ title
      <!--KSC_CPSPF-->
      <!DOCTYPE html>
  2
  4
      <title>Maple Systems Web Server</title>
      <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
  6
      body {
  8
      font-family: Courier New;
  9
 10
      font-size: 12pt;
      color: □#000000;
 11
 12
 13
      fieldset {
 14
      width:1100px;
      display:inline-block;
 16
 17
      legend {
      font-size:16pt;
 18
 19
 20
      table {
 21
      border:0;
 22
      margin-bottom:30px;
      width:1100px;
 23
 24
 26
      td {
 27
      border-bottom:2px dotted;
 28
 29
      background-color: ■#224970;
 30
      color: #ffffff;
 31
      font-weight: bold;
 32
 33
 34
      .device-tbl th:first-child,
       .device-tbl td:first-child {
      width: 150px;
 36
 37
      text-align: center;
 38
      .device-tbl th:first-child + th,
 39
      .device-tbl td:first-child + td {
 40
 41
      width: 250px;
      text-align: center;
 42
 43
      .device-tbl th:first-child + th + th,
 44
 45
       .device-tbl td:first-child + td + td {
 46
      width: 250px;
 47
 48
      .device-tbl th:first-child + th + th + th,
 49
      .device-tbl td:first-child + td + td + td {
      width: 150px;
 50
      text-align: center;
 51
 52
 53
      .device-tbl th:first-child + th + th + th + th,
       .device-tbl td:first-child + td + td + td + td {
 54
      width: 150px;
 55
 56
      text-align: center;
 57
 58
      .device-tbl th:first-child + th + th + th + th + th,
       .device-tbl td:first-child + td + td + td + td + td {
 59
      width: 150px;
 60
 61
      text-align: center;
 62
      .plc-info-tbl th:first-child,
 63
 64
      .plc-info-tbl td:first-child {
      width: 450px;
      text-align: center;
```

# **Chapter 8: Connecting to the Web Server**

1. Navigate to a browser that supports HTML. In the browser's search bar, Type the IP address of the PLC followed by a colon and the port defined in the Web Server Project. Make sure the PLC is connected to the network properly via Ethernet. The Ethernet cord must be plugged into the PLC-ES CPU.



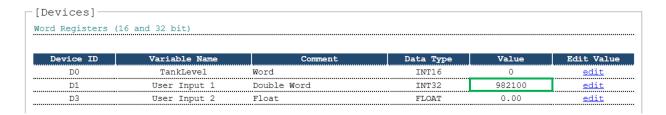
2. The web server will redirect to the main page defined in the Web Server Manager. This is where the data registers can be modified. Click **edit** to modify a data register's value.



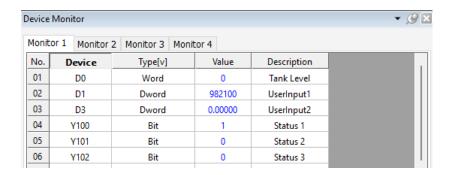
3. Enter a value allowed by the data register's data type. This example uses a DWORD data register. After clicking "send", the Success! Message will appear in the bottom left.



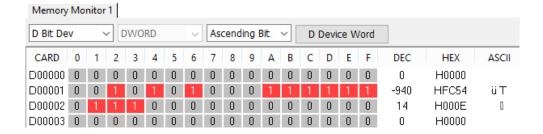
The value of the data register on the web page will appear to be updated.



In MapleLogic the Device Monitor window will also display the updated changes made on the web server.



The Memory Monitor window will also display the updated changes.





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