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CIMON
Total Solution for Industrial Automation

# CIMON-PLC

## CICON SOFTWARE USER MANUAL

## Table of Contents

# 1. CICON Installation

## 1.1 System requirements

If you want to run CICON on your PC, here's what it takes,

Operation system: Windows 8/7/XP/2000/98SE

Processor (CPU): Pentium 133 MHz or faster

RAM: 64MB RAM minimum

Free hard disk space: 13MB minimum

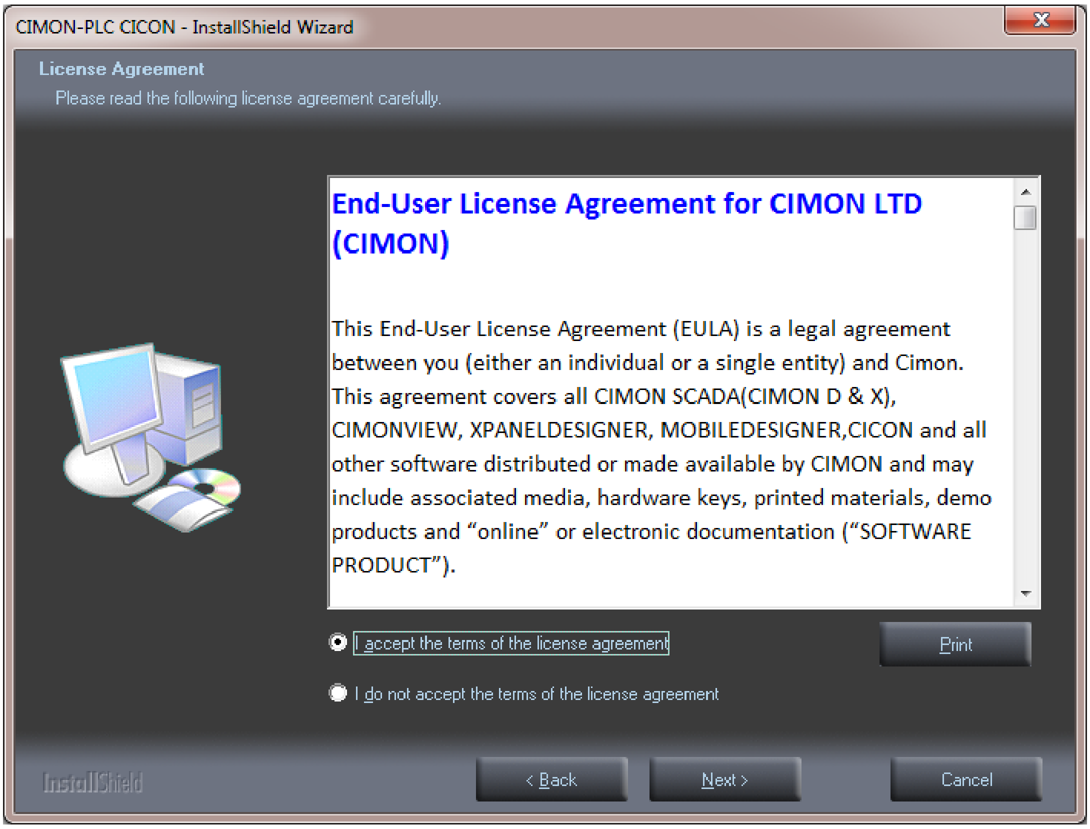
Communication Port: USB port, Ethernet port or Serial port is recommended.

## 1.2 Installation of CICON Software

CICON software is available in our website www.cimon.com.

You can download it free of charge at the SUPPORT → Software.

1) Double click the installation Setup file.
2) When End User License Agreement dialog box appears, click I accept the terms of the license agreement, and then click Next.


CIMON-PLC CICON - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.

End-User License Agreement for CIMON LTD (CIMON)

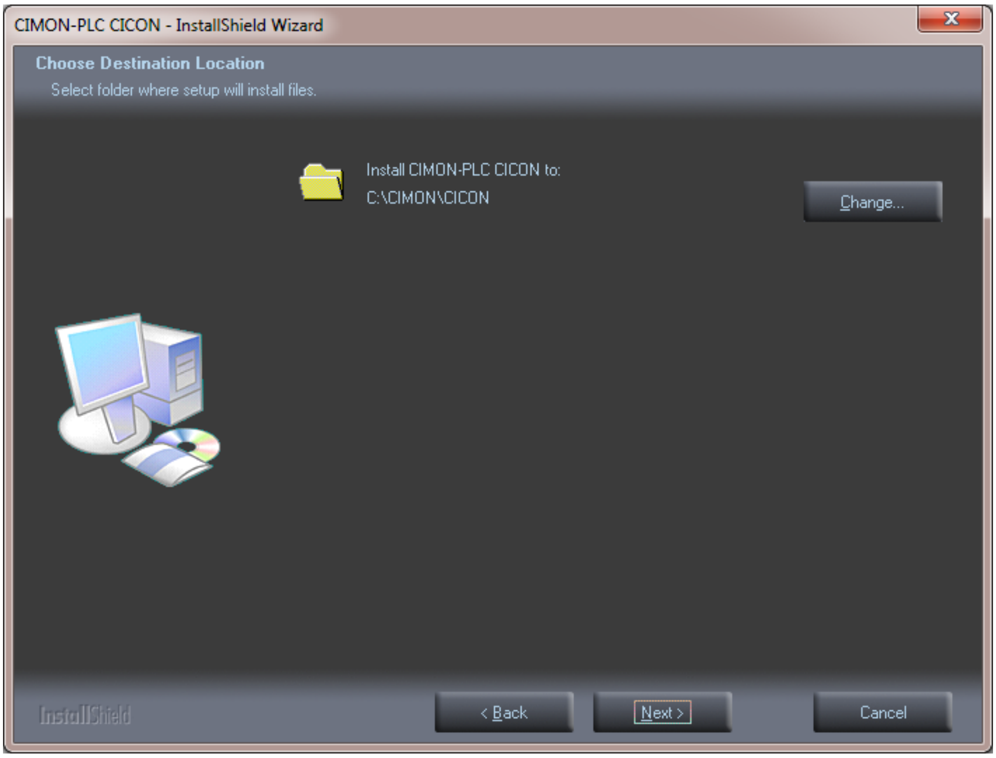
This End-User License Agreement (EULA) is a legal agreement between you (either an individual or a single entity) and Cimon. This agreement covers all CIMON SCADA(CIMON D & X), CIMONVIEW, XPANELDESIGNER, MOBILEDESIGNER,CICON and all other software distributed or made available by CIMON and may include associated media, hardware keys, printed materials, demo products and "online" or electronic documentation ("SOFTWARE PRODUCT").

● I accept the terms of the license agreement

○ I do not accept the terms of the license agreement

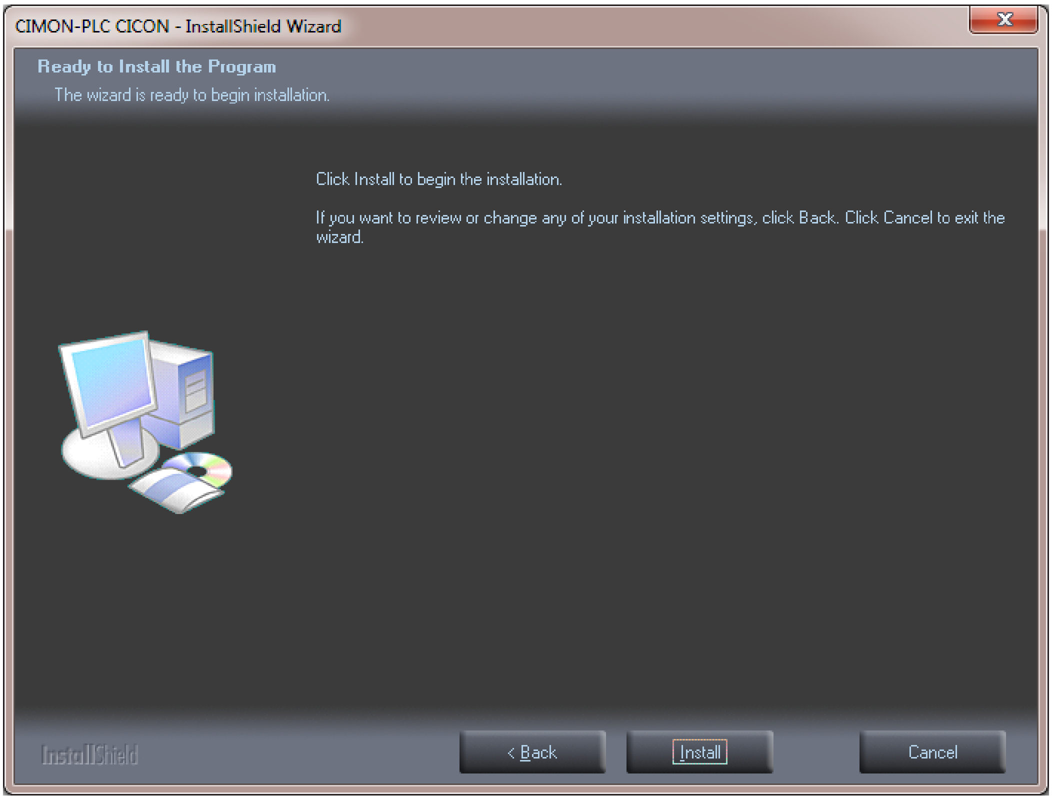
3) Click Change on the installation dialog box to change the program installation destination folder and then click Next.

(Default folder is C:\CIMON\CICON as appear on the dialog box.)


CIMON-PLC CICON - InstallShield Wizard
Choose Destination Location
Select folder where setup will install files.
Change...
InstallShield
< Back
Next >
Cancel

Install CIMON-PLC CICON to:
C:\CIMON\CICON

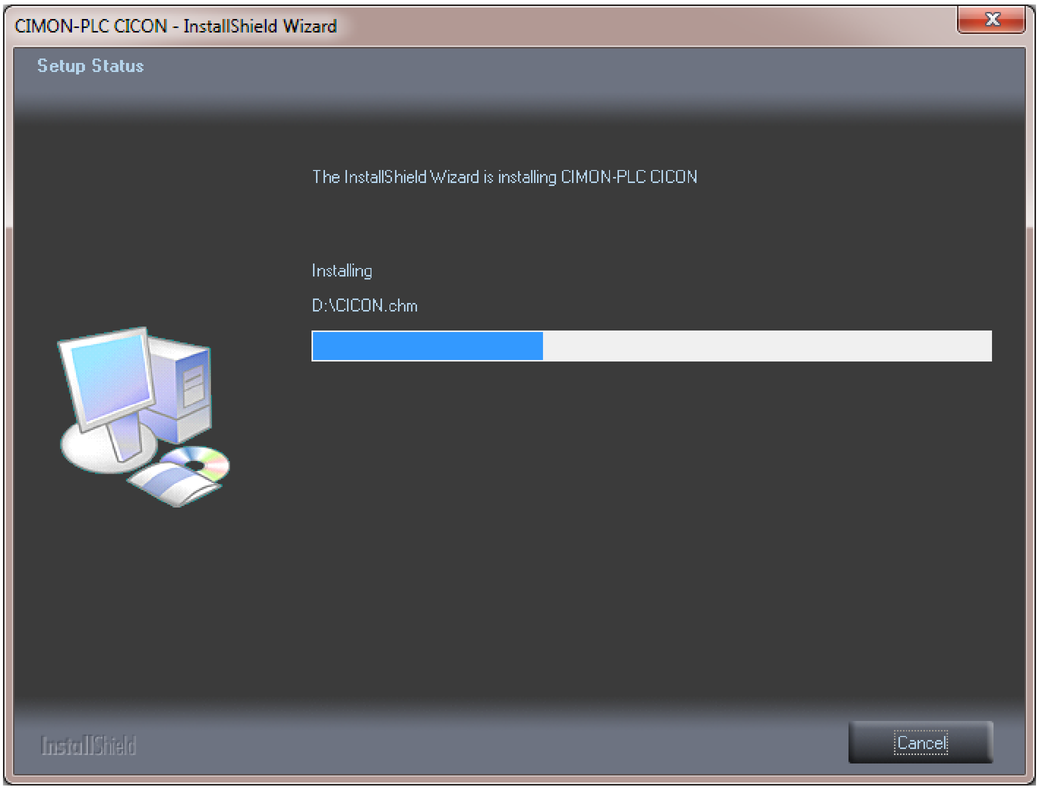
4) Click Install.


CIMON-PLC CICON - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
InstallShield
< Back
Install
Cancel

Click Install to begin the installation.

If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

5) The progress bar appears.

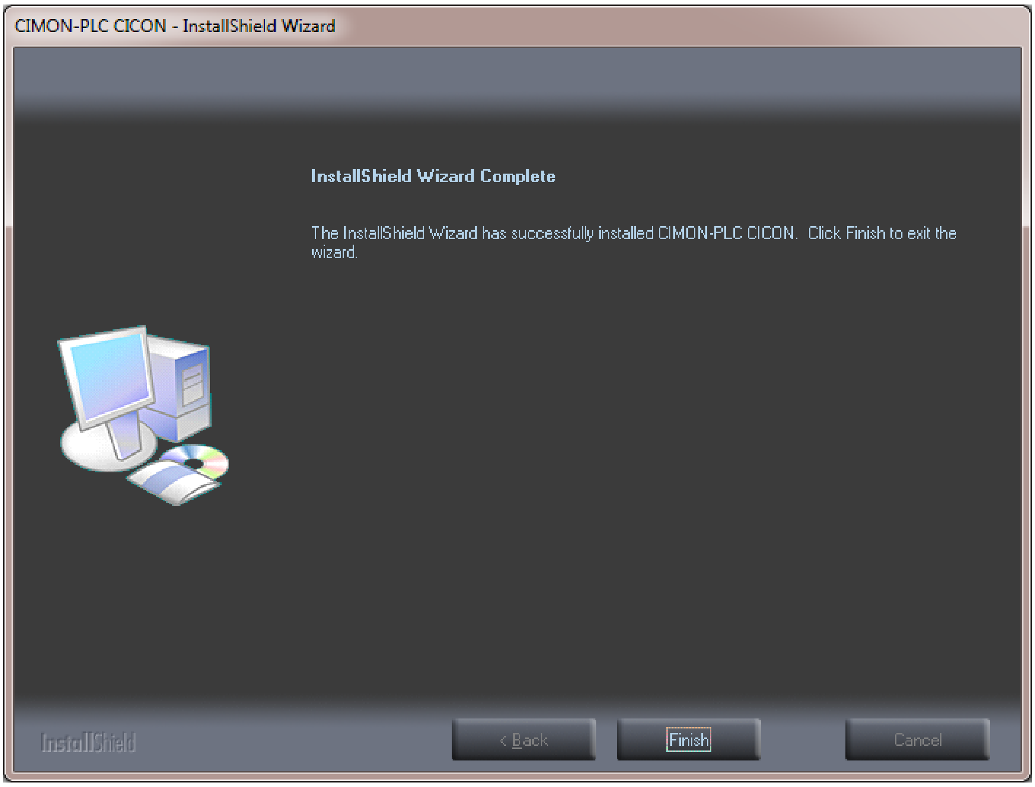


The InstallShield Wizard is installing CIMON-PLC CICON

Installing

D:\CICON.chm

6) After the installation is finished, the complete InstallShield Wizard appears.



**InstallShield Wizard Complete**

The InstallShield Wizard has successfully installed CIMON-PLC CICON. Click Finish to exit the wizard.

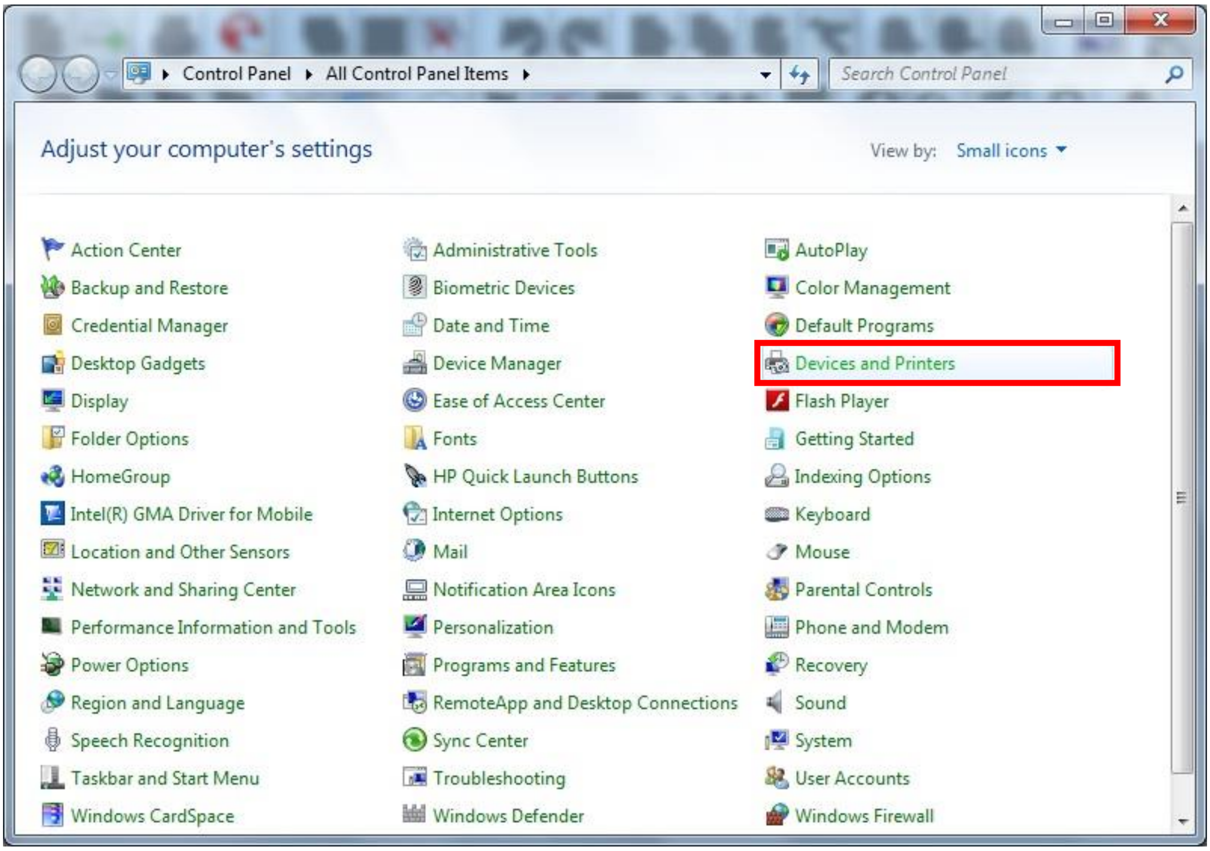
7) Click Finish.
You do not have to reboot the system to complete the installation.

### 1.3 Installation of USB Device Driver

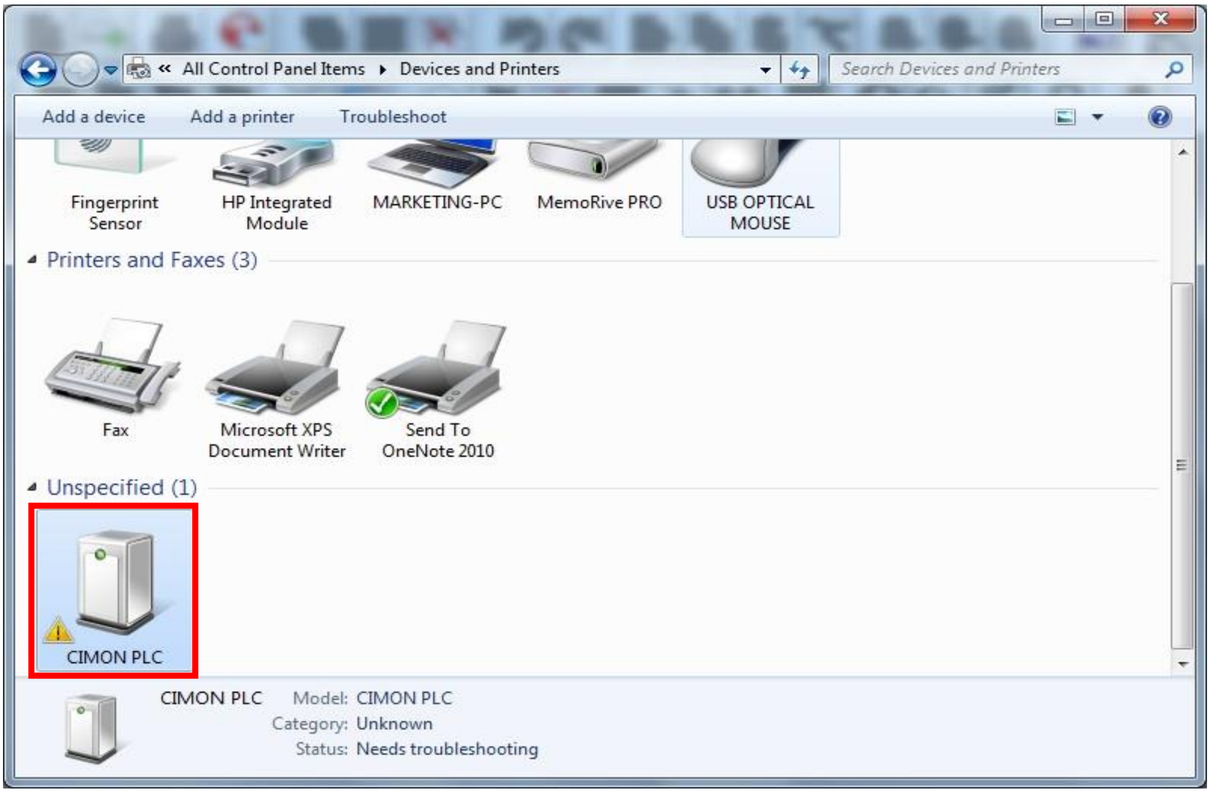
Windows XP: USB device driver is installed automatically when you run CICON after CICON installation.

Windows 7 and 8: Install USB device driver as following steps:

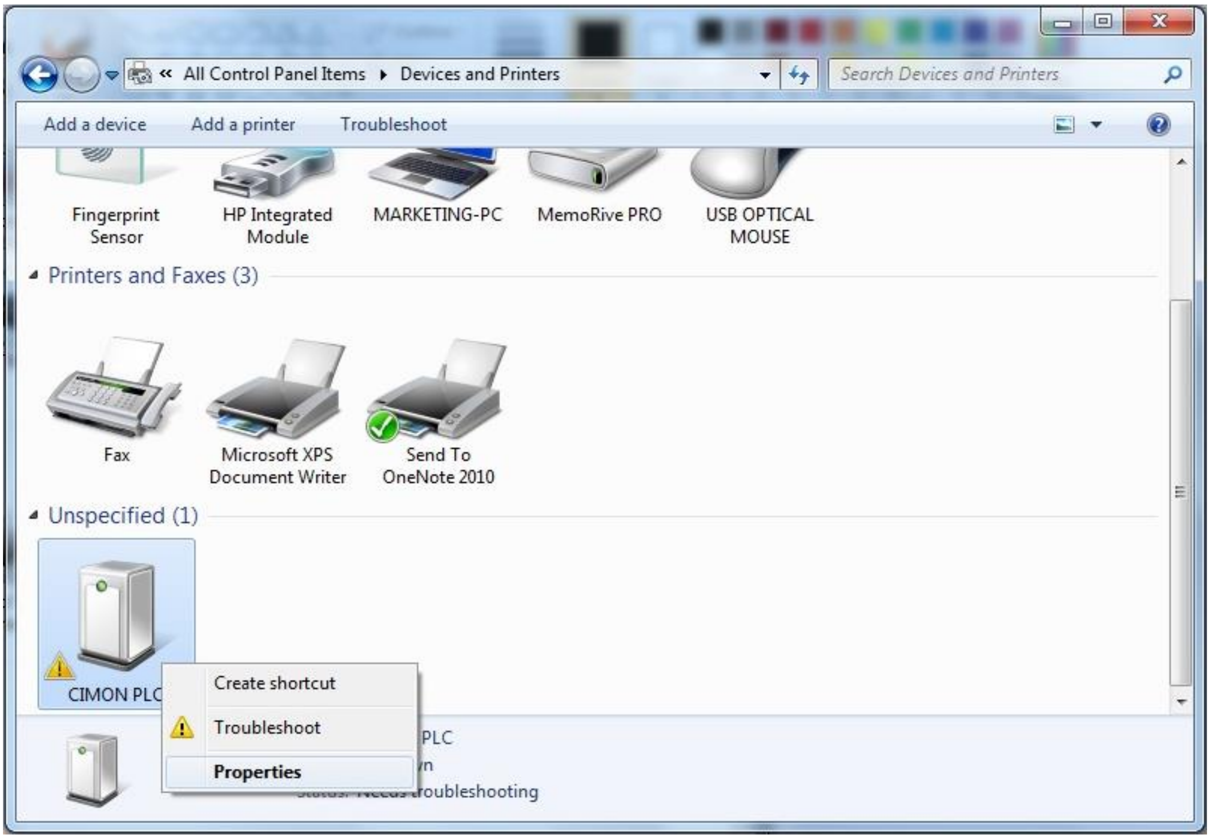
1) Turn PLC power on and connect PLC to PC with USB cable.
   Select [Control Panel] → [Devices and Printers].



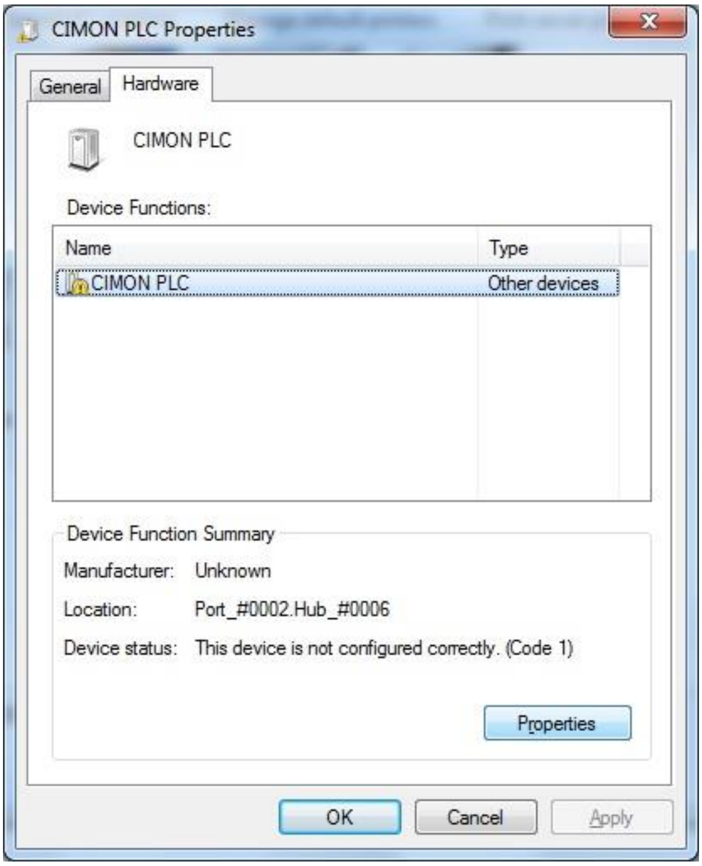
2) There is CIMON PLC in [Unspecified].
Click the right button of the mouse with cursor on the [CIMON PLC] and select [Properties].



CIMON PLC
Model: CIMON PLC
Category: Unknown
Status: Needs troubleshooting



3) Select [Hardware] tap and click [Properties].



CIMON PLC

Device Functions:

| Name | Type |
|---|---|
| CIMON PLC | Other devices |

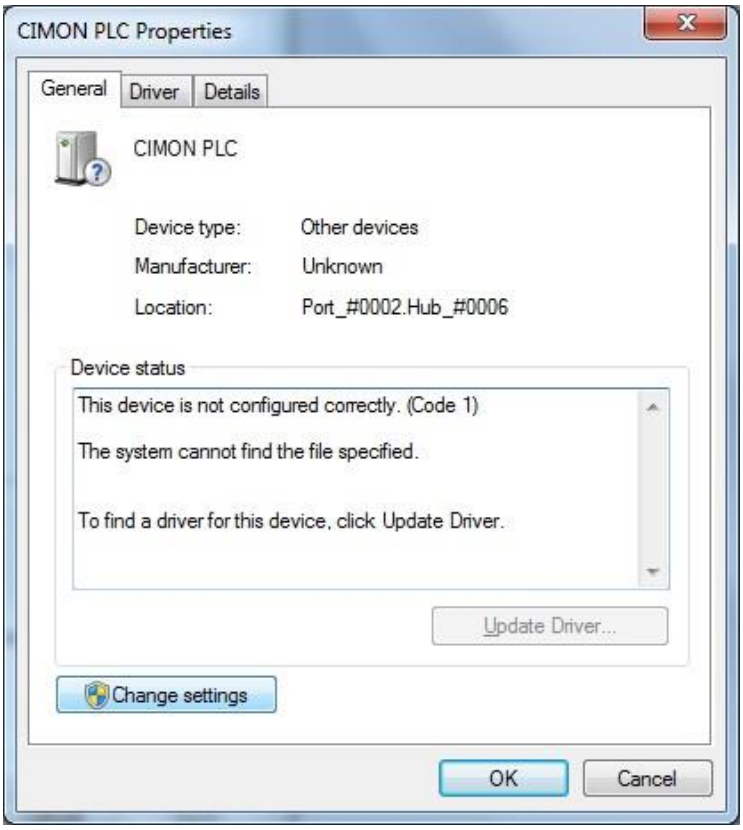
Device Function Summary

Manufacturer: Unknown

Location: Port_#0002.Hub_#0006

Device status: This device is not configured correctly. (Code 1)

4) Click [Change settings]



CIMON PLC

Device type: Other devices

Manufacturer: Unknown

Location: Port_#0002.Hub_#0006

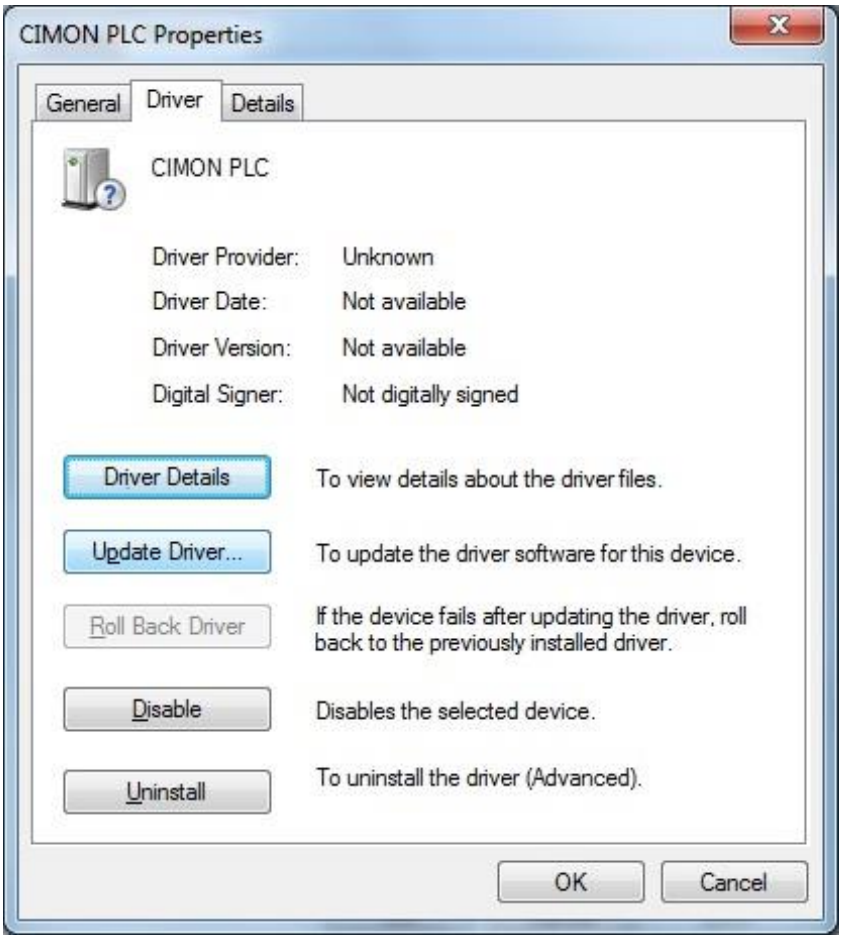
Device status

This device is not configured correctly. (Code 1)

The system cannot find the file specified.

To find a driver for this device, click Update Driver.

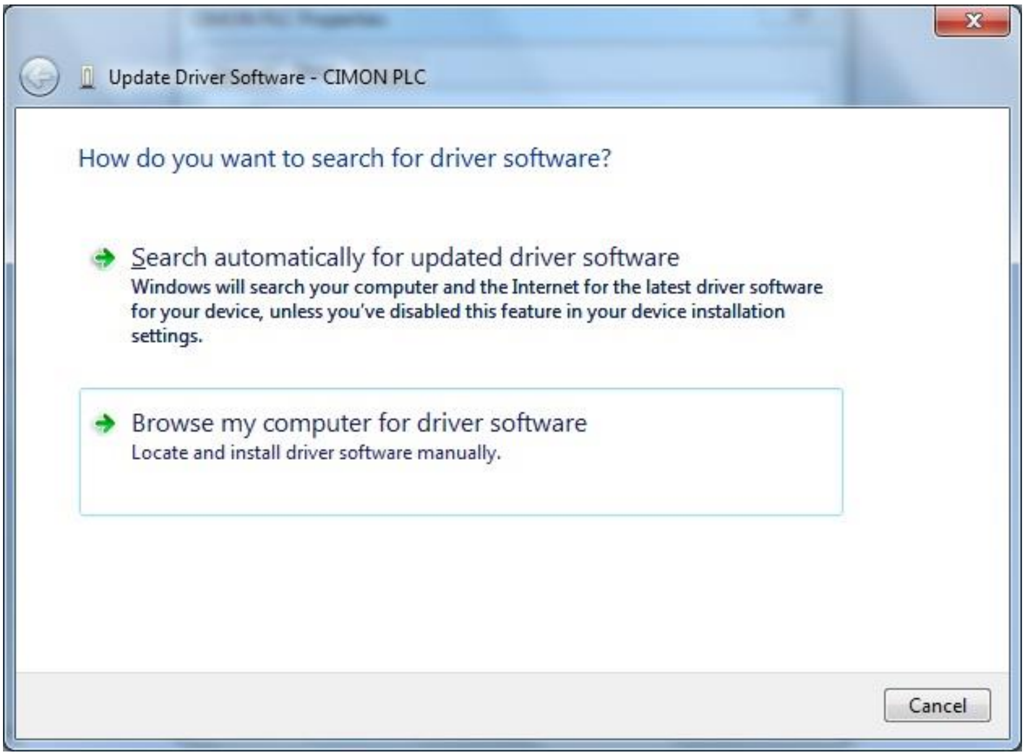
5) Select [Driver] tab and click [Update Driver].



Driver Provider: Unknown
Driver Date: Not available
Driver Version: Not available
Digital Signer: Not digitally signed

To view details about the driver files.
To update the driver software for this device.
If the device fails after updating the driver, roll back to the previously installed driver.
Disables the selected device.
To uninstall the driver (Advanced).

6) Select [Browse my computer for driver software] at [Update Driver Software – CIMON PLC].



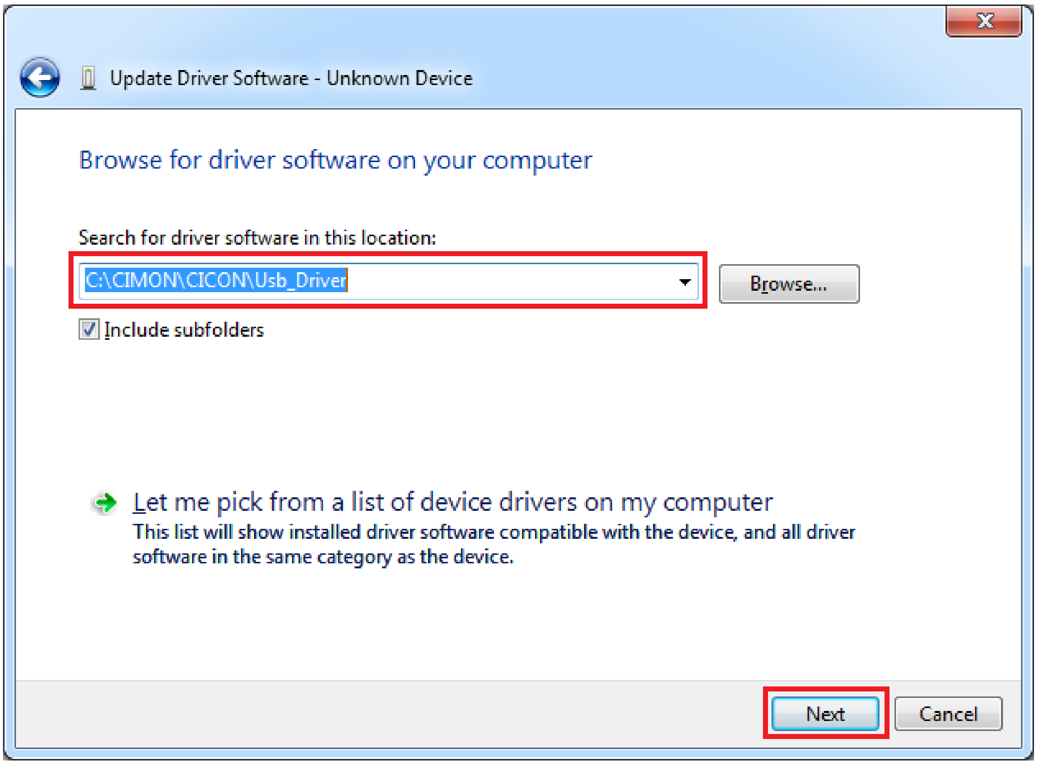
How do you want to search for driver software?

Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

Browse my computer for driver software
Locate and install driver software manually.

7) Select [Usb_Driver] folder where CICON is installed and click [Next].

* In case of Windows 7 64Bit, Select [Usb_Driver] → [OS_64Bit] folder.

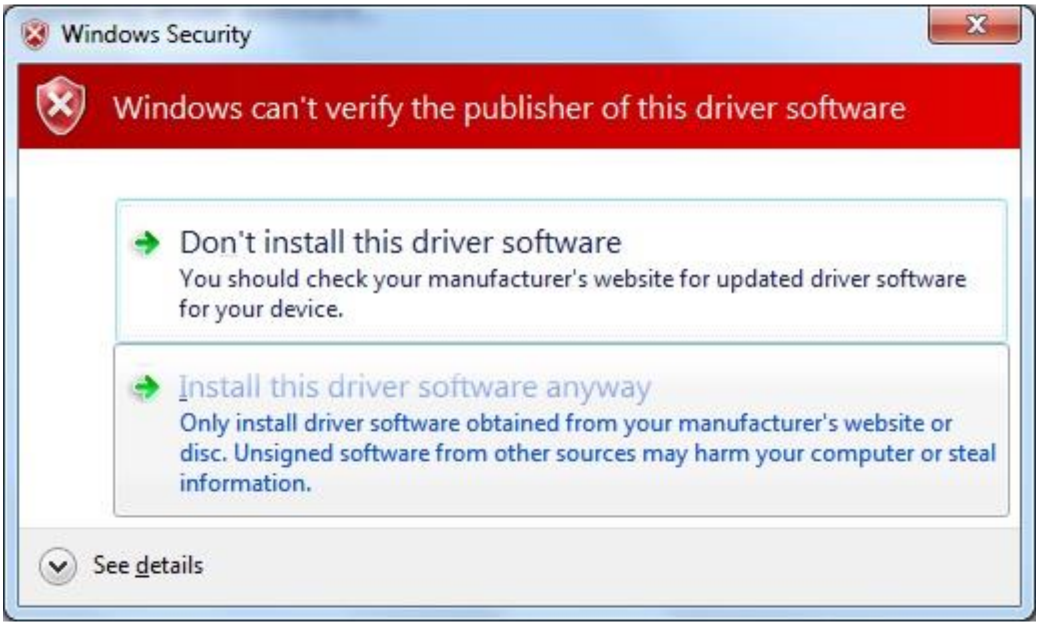

Update Driver Software - Unknown Device
Browse for driver software on your computer
Browse...
Let me pick from a list of device drivers on my computer
Next
Cancel

Search for driver software in this location: C:\CIMON\CICON\Usb_Driver

☑ Include subfolders

This list will show installed driver software compatible with the device, and all driver software in the same category as the device.

8) Select [Install this driver software anyway] at [Windows Security].

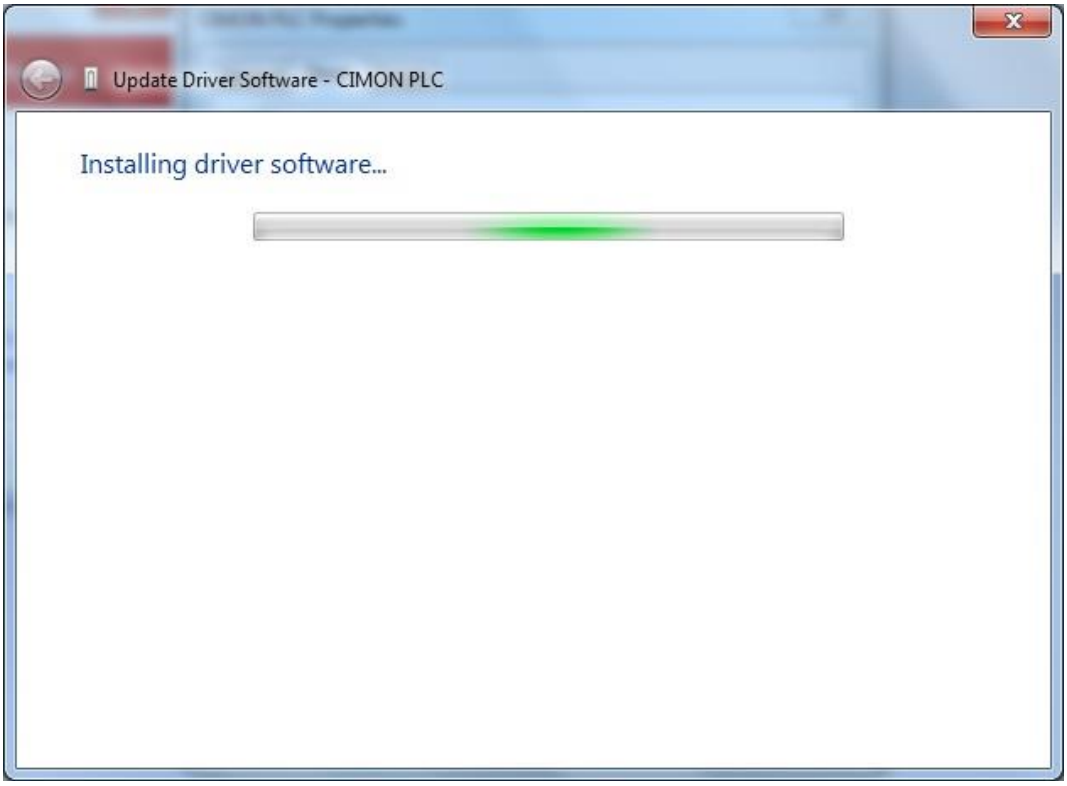


Windows can't verify the publisher of this driver software

Don't install this driver software
You should check your manufacturer's website for updated driver software for your device.

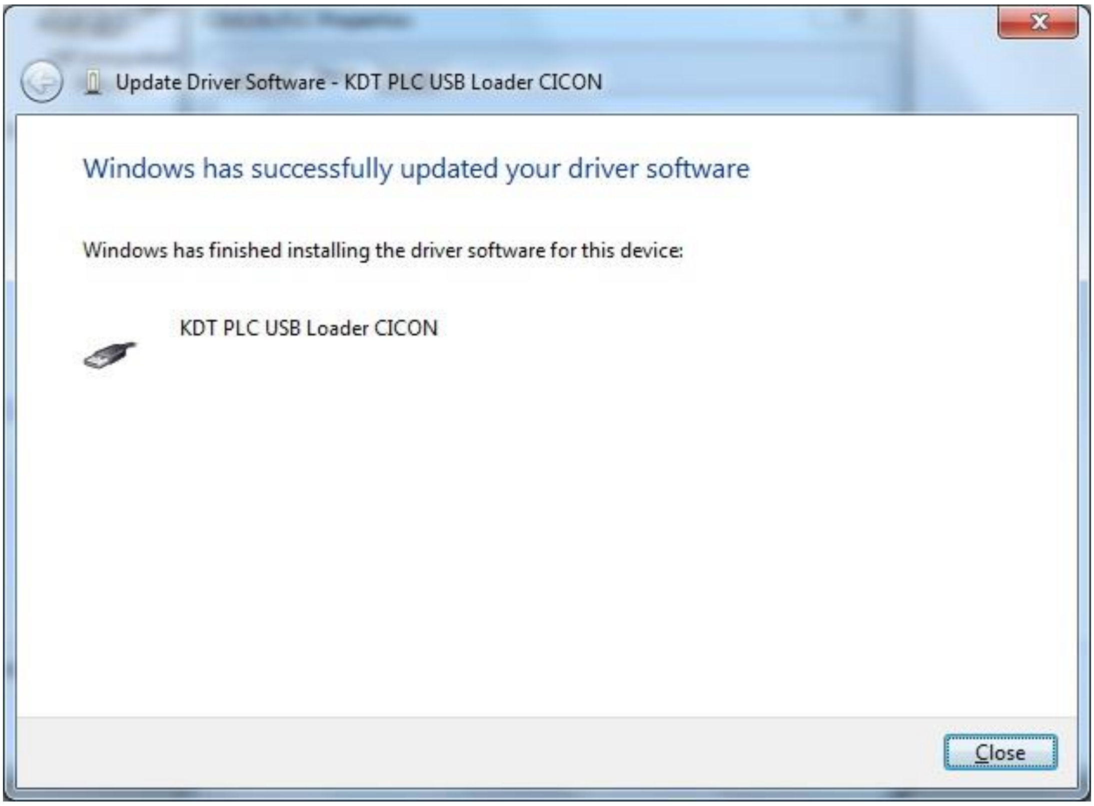
Install this driver software anyway
Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.

9) The Driver Software is being installed.



Installing driver software...

10) If USB Driver is installed successfully, [KDT PLC USB Loader CICON] appears. Click [Close] to finish installation.

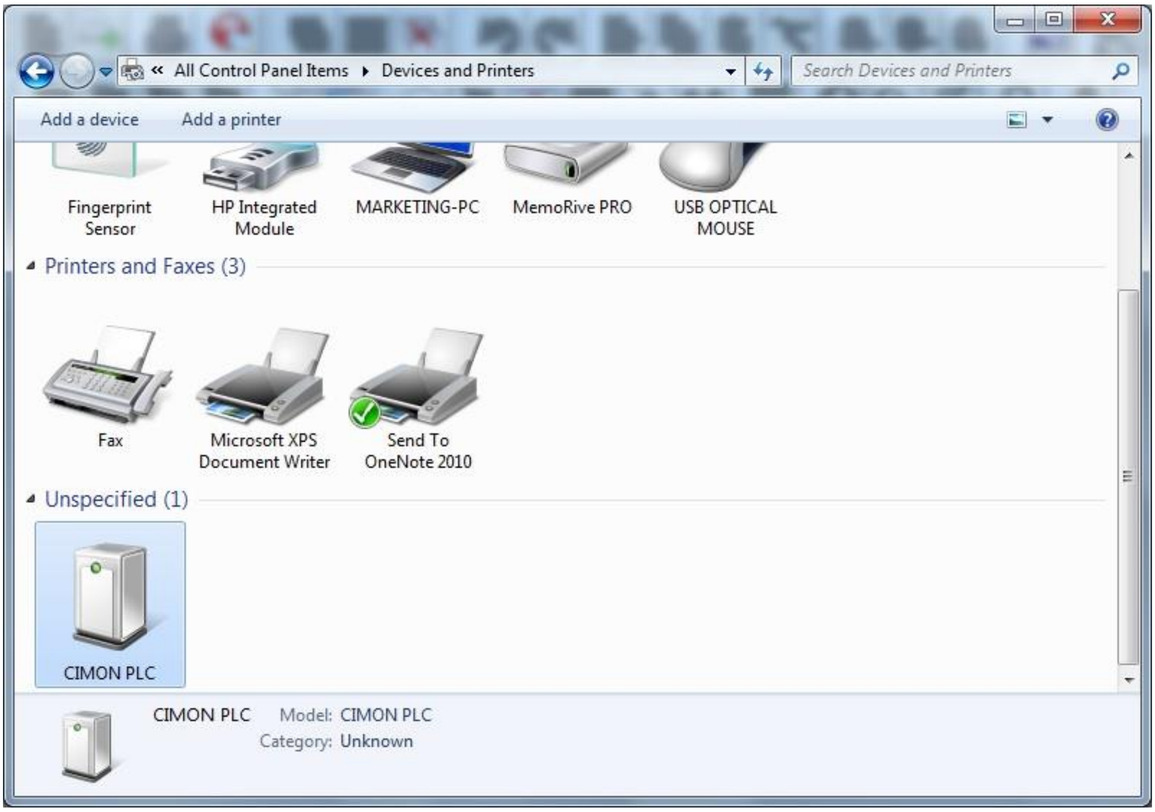


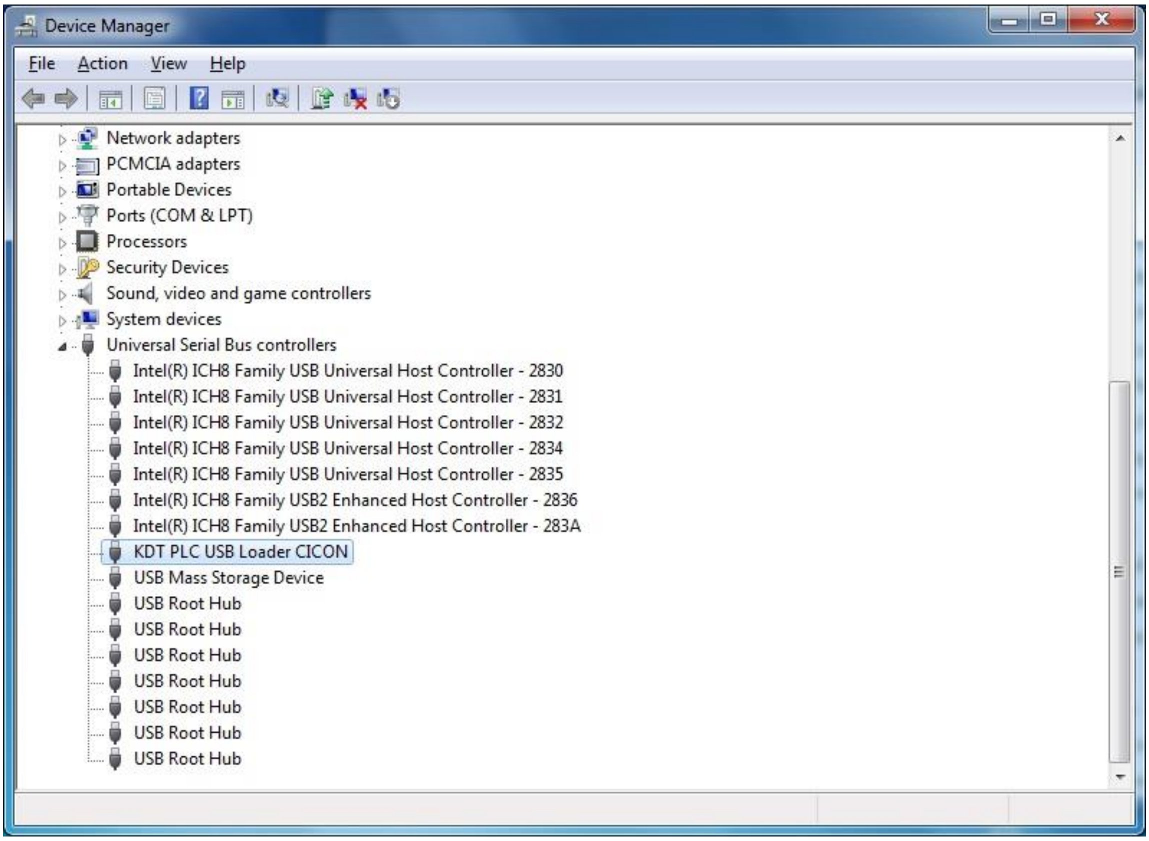
Windows has successfully updated your driver software

Windows has finished installing the driver software for this device:

KDT PLC USB Loader CICON

11) If USB Driver is installed successfully, [KDT PLC USB Loader CICON] appears under [Universal Serial Bus Controllers].

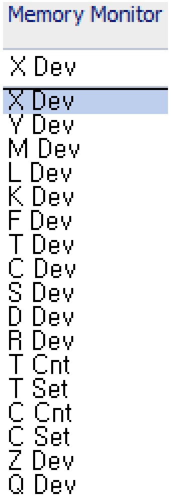



Device Manager
File
Action
View
Help
Network adapters
PCMCIA adapters
Portable Devices
Ports (COM & LPT)
Processors
Security Devices
Sound, video and game controllers
System devices
Universal Serial Bus controllers
Intel(R) ICH8 Family USB Universal Host Controller - 2830
Intel(R) ICH8 Family USB Universal Host Controller - 2831
Intel(R) ICH8 Family USB Universal Host Controller - 2832
Intel(R) ICH8 Family USB Universal Host Controller - 2834
Intel(R) ICH8 Family USB Universal Host Controller - 2835
Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836
Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A
KDT PLC USB Loader CICON
USB Mass Storage Device
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub

## 2. CIMON PLC Device Memory

CIMON PLC uses 17 differently named devices.

Each device has its own symbol and is denoted by a capital character.



Memory Monitor

X Dev

X Dev
Y Dev
M Dev
L Dev
K Dev
F Dev
T Dev
C Dev
S Dev
D Dev
R Dev
T Cnt
T Set
C Cnt
C Set
Z Dev
Q Dev

**X Device (Bit / Input)**

- X device is an input contact that receives a signal from the input module.

- It accepts the signal from the input device such as a push button switch or limit switch.

- Since the input status of X device is stored inside the PLC, a user can use A and B contacts.

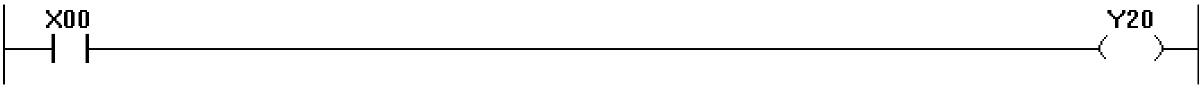
- If used as a word type, X device can be used according to the bit device's word usage.

- It is a read-only device that a user cannot enter a value.

- X Device Allocation for PLC modules (Input and special modules) other than CPU:

1. PLC card occupies 16 points (1 Word).
2. Input card with 16 points or less: occupies 16 points (1 Word).
3. Input card with 32 points: occupies 32 points (2 Word).
4. Special cards other than input cards occupy 16 points (1 Word).

Example)



Turning on X00 device will output Y20.

### Y Device (Bit / Output)

- Y device is an output contact that delivers the operation result to output devices such as solenoid valves, motors and lamps.

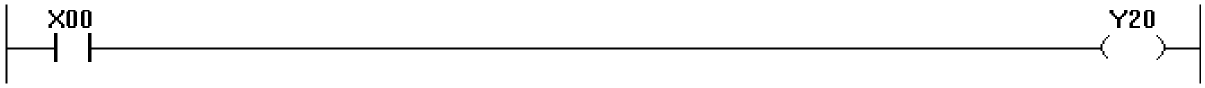
- If used as a word type, Y device can be used according to the bit device’s word usage.

- Y device can only use and output Contact A.

- Y Device Allocation for PLC modules (Output and special modules) other than CPU:

1. PLC card occupies 16 points (1 Word).
2. Output card with 16 points or less: occupies 16 points (1 Word).
3. Output card with 32 points: occupies 32 points (2 Word).
4. Special cards other than output cards occupy 16 points (1 Word).

Example)



Turning on X00 device will output Y20.

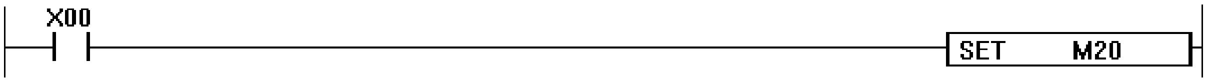
### M Device (Bit / Internal Auxiliary Relay)

- M device is an internal input and output digital device that cannot output the operation result to external devices. But the output in connection with I/O contacts can be made possible.

- It can be used in applications such as intermediate data storage, virtual I/O and word data storage.

- M device can use Contact A and B.

Example)



Turning on X00 device will turn on M20. SET instruction keeps M20 ON even if X00 turns OFF.

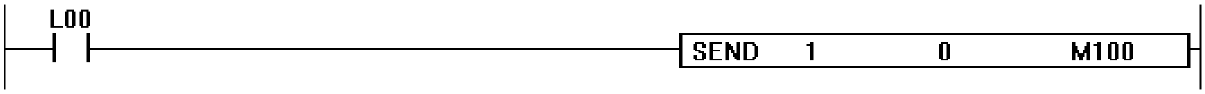
### L Device (Bit / Link Relay)

- L device can be used as a special contact for computer link and data link modules.

- If not used as a link, L device can be used as same as M device.

- If used as a word type, L device can be used according to the bit device’s word usage.

Example)



Turning on L00 device will send Frame No. 0 of the Program ID No. 1 and saves the sending result in M100 device.

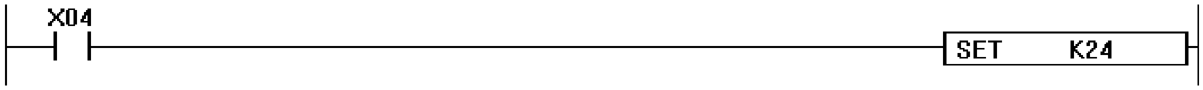
### K Device (Bit / Latch Relay)

- The usage of K device is very similar to M device. But K device has additional functionality of latch.

- All data in this K device are retained even when power is OFF and CPU stops the operation.

- If used as a word type, K device can be used according to the bit device’s word usage.

Example)



Turning on X04 device will turn on K24 device.

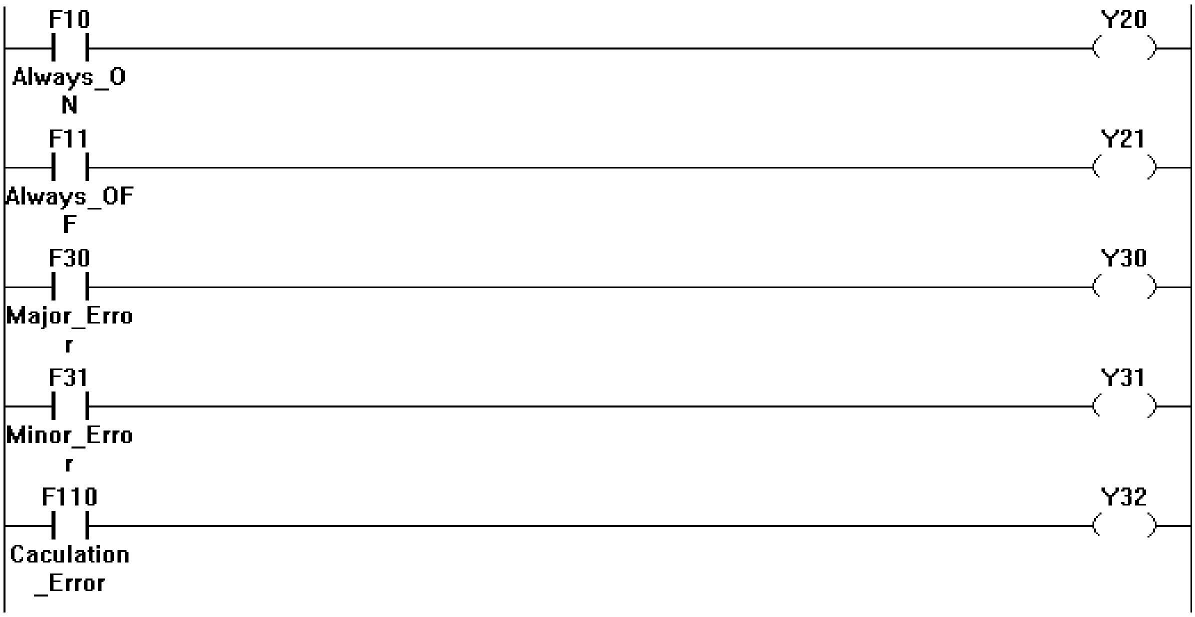
### F Device (Bit / Flag)

- F Device is used as a contact for notifying PLC status, scan status, time, date and many other flags.

- It is a read-only device that a user cannot enter a value.

- Descriptions and variables of the F device are pre-registered.

Example)



F10: Always ON Flag

F11: Always OFF Flag

F30: Major CPU Error Flag

F31: Minor CPU Error Flag

F110: CPU Calculation Error Flag

**T Device (Bit), TC (Word), TS (Word) / Timer Device**

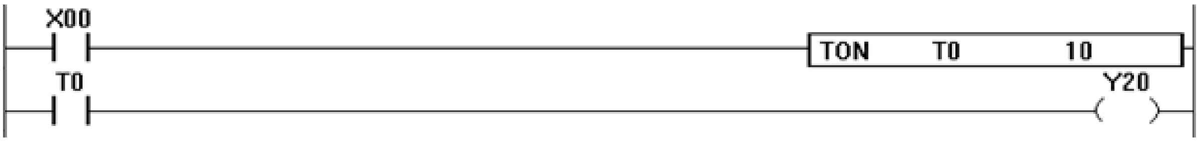
- T device is auxiliary relay for timer instructions.
- A user can configure 100 m/s or 10 m/s in the parameter's timer settings.
- T / TC / TS devices exist respectively and operate as a single unit with the same index number.
- T device is a bit device that delivers the result value of the timer instructions.
- TC device is a word device that shows the current time value of the timer instructions.
- TS device is a word device that shows the setting time value of the timer instructions.

Bit data type represents timer output status in LOAD instructions and timer reset output for RST instruction. Word data types are setting and ticking values. The set value can be written only by TIMER instructions (TRM, TON, TOFF, TMON, TRIG). The tick value can be modified or verified by various word instructions such as MOV, INC, comparative instructions and so on.

Symbol character for all these devices is ‘T’ in sequence programming point of view. But in monitoring point of view, two more symbol characters are used. ‘T’ represents the output status of timer, ‘TC’ represents the tick counter of timer and ‘TS’ represents set value of timer. These two new symbols of word are utilized in device memory monitoring window of CICON and in communication protocols for HMI.

| Device ‘T’ In Monitoring | | |
|---|---|---|
| Symbols | Data Types | Descriptions |
| T | Bit | The status of timer output |
| TC | Word | The tick count of timer (0 ~ 65,535) |
| TS | Word | The set value of timer (0 ~ 65,535) |

Example)



When X00 is ON for 1000 m/s, T0 device gets turned ON and outputs Y20.

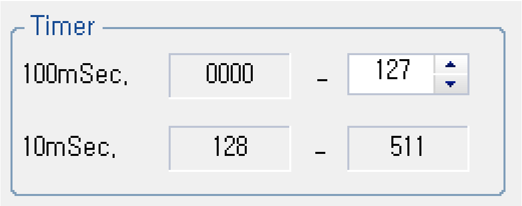
In this example, TS 0 (Timer’s set value) is 10 while TC 0 is the time during which X00 is turned ON.

When TC 0 “time value” reaches TS 0 “set value”, T 0 “bit device” gets turned ON.

PLC Parameter Timer Setting

- Configures the operation unit of the timer device.

- 100 mSec: configures the range of the timer whose single unit is 100 m/s.
- 10 mSec: configures the range of the timer whose single unit is 10 m/s.



Timer

100mSec. 0000 - 127

10mSec. 128 - 511

### C Device (Bit), CC (Word), CS (Word) / Counter Device

- C device is auxiliary relay for counter instructions.

- C / CC / CS devices exist respectively and operate as a single unit with the same index number.

- C device is a bit device that delivers the result value of the counter instructions.

- CC device is a word device that shows the counting value of the counter instructions.

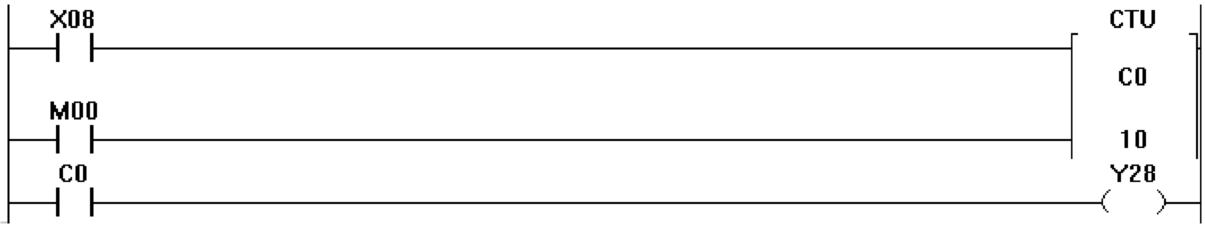
- CS device is a word device that shows the setting value of the counter instructions.

Bit data type represents counter output status in LOAD instructions. Word data types are setting and counting values. The set value can be written only by COUNTER instructions (CTU, CTD, CTUD, CTR). The count value can be modified or verified by various word instructions such as MOV, INC, comparative instructions and so on.

Symbol character for all these devices is ‘C’ in sequence programming point of view. But in monitoring point of view, two more symbol characters are used. ‘C’ represents just the output status of counter, ‘CC’ represents the counted value of counter and ‘CS’ represents set value of counter. These two new symbols of word are utilized in device memory monitoring window of CICON and in communication protocols for HMI.

| Device ‘C’ In Monitoring | | |
|---|---|---|
| Symbols | Data Types | Descriptions |
| C | Bit | The status of counter output |
| CC | Word | The counting value of counter (-32,768 ~ 32,767) |
| CS | Word | The set value of counter (-32,768 ~ 32,767) |

Example)



When X08 gets turned ON for 10 times, C0 will be turned ON and output Y28.

CS0 (Counter’s set value) is 10 while CC0 is X08’s counting value.

When CC0 “counting value” reaches CS0 “set value”, C0 “bit device” gets turned ON.

### S Device (Step Controller)

- S device is a special purpose relay for control algorithm which proceeds step by step.

- CIMON PLC supports up to 100 cards of step controller (S00.nn ~ S99.nn).

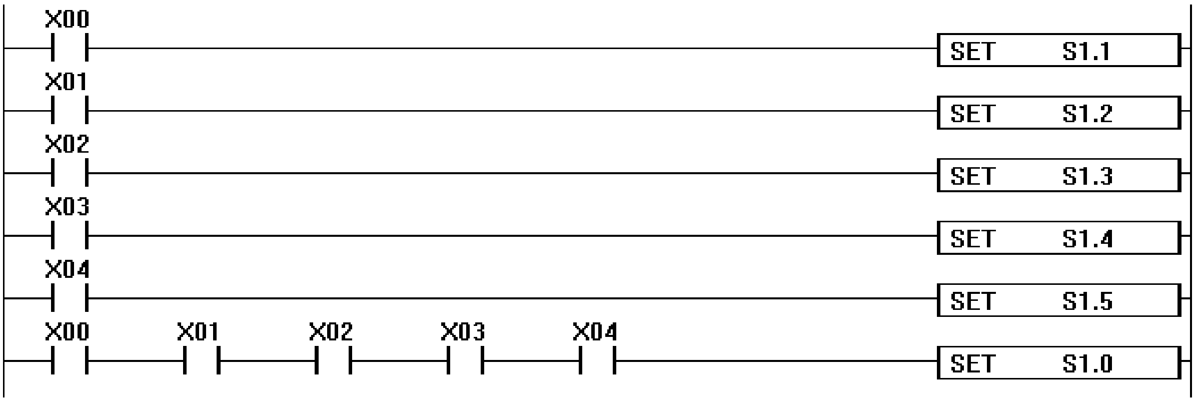
- Each step controller has 100 differently numbered state (Sxx.00~Sxx.99).

- S device can be used with OUT or SET instruction.

- OUT instruction sets (activates) one designated state and there are no restrictions on operation.

- SET instruction also sets (activates) one designated state (assume the state number is 'n'), however, with one condition that the previous state (state number 'n-1') must be on active state in order to move on to the next step.

Example for SET instruction)



Turning on X00 will turn on S1.1.

Device X01 has to be turned on in order to activate S1.2.

While S1.2 is OFF and X04 gets on, it will NOT turn on S1.5. (S1.2, S1.3 and S1.4 have to be turned on)

When all the devices from X00 to X04 turn on, it will clear and erase all the values of Step No. 1 (S1.00 ~ S1.99).

### D Device (Word / Data Register)

- D device stores internal data either in Word or Double Word.

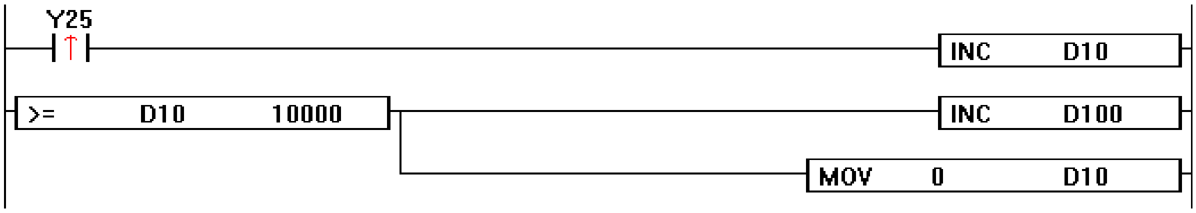
- It is used to read and write 16 bit (Word) and 32 bit (Double Word).

- For 32 Bit, specified number is the lower 16 bit whereas the number + 1 is the upper 16 bit

Ex) Using D0010 for 32 Bit, D10 is the lower 16 bit.

D11 is the upper 16 bit.

Example)



Turning on Y25 will increase the value of D10 by 1. When the value of D10 reaches 10,000, it will increase the value of 100 by 1 and clear the data of D10 as 0.

### R Device (Index Register)

- R device is used for index qualification (indirect addressing) of a device in sequence program.

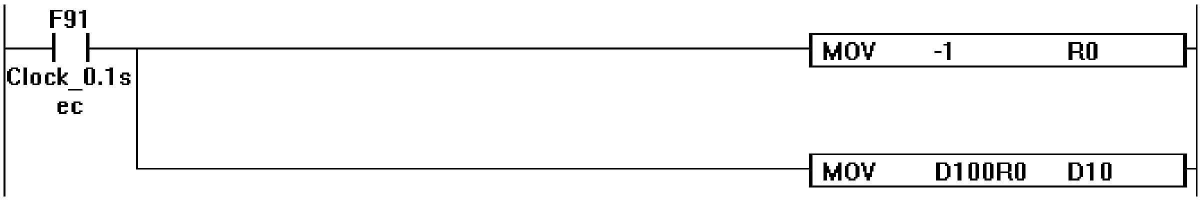
- CIMON PLC CPU offers a total of 16 index registers.

- Index qualification uses one index register and is specified by 16 bit data

(-32767 – 32767 or 0000h – FFFFh)

- Index registers are represented as ‘R00’ – ‘R15.’

Example)



-1 is stored in R0.

D100R0 is the Index Qualification.

Data of D100R0 (=D99) is stored in D10.

**Z Device (Word / Subroutine)**

- Z device is used for exchanging data with subroutine programs.

- Every running scan program has two 64 words of Z memory area. (One for scan / one for subroutine)

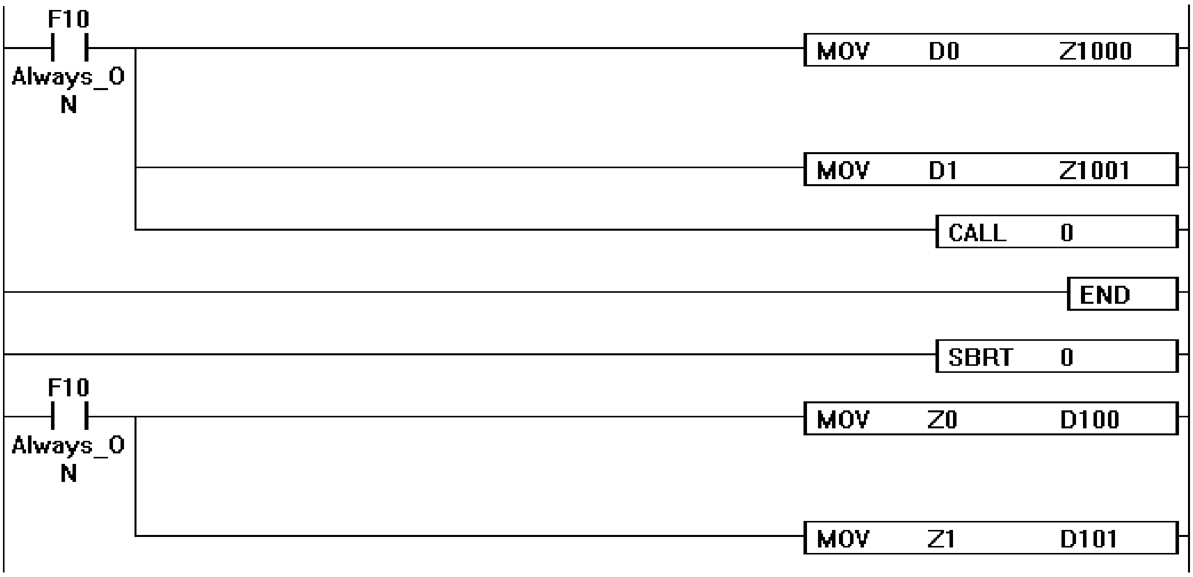
- Its own memory area (parameter) can be accessed with Z1000 to Z1063.

- Subroutine's memory can be accessed with Z0000 to Z0063.

If there is some data to transfer to subroutine, just store them in 'Z1000' to 'Z1063' and next call the subroutine. Then, the called subroutine can read and process the data and store the result at the address of 'Z0000' to 'Z0063'.

At any time a sequence program can access two 64 words blocks of 'Z' memory. And the total size of physical 'Z' device is 1024 words that the reason maximum call level is restricted to 16. The relationship between physical memory and programming address of 'Z' device at different call level was explained more precisely in following drawing.

Example)



After inserting the value of D0 to Z1000 and the value of D1 to Z1001, a subroutine is called.

In the subroutine, it transfers the value of Z0 to D100 and the value of Z1 to D101 and then ends.

In other words, this is how the above scan program processes the data:

D0 → Z1000 → Subroutine jump → Z0 → D100

D1 → Z1001 → Subroutine jump → Z1 → D101

### Q Device (Bit / Sequential Function Chart)

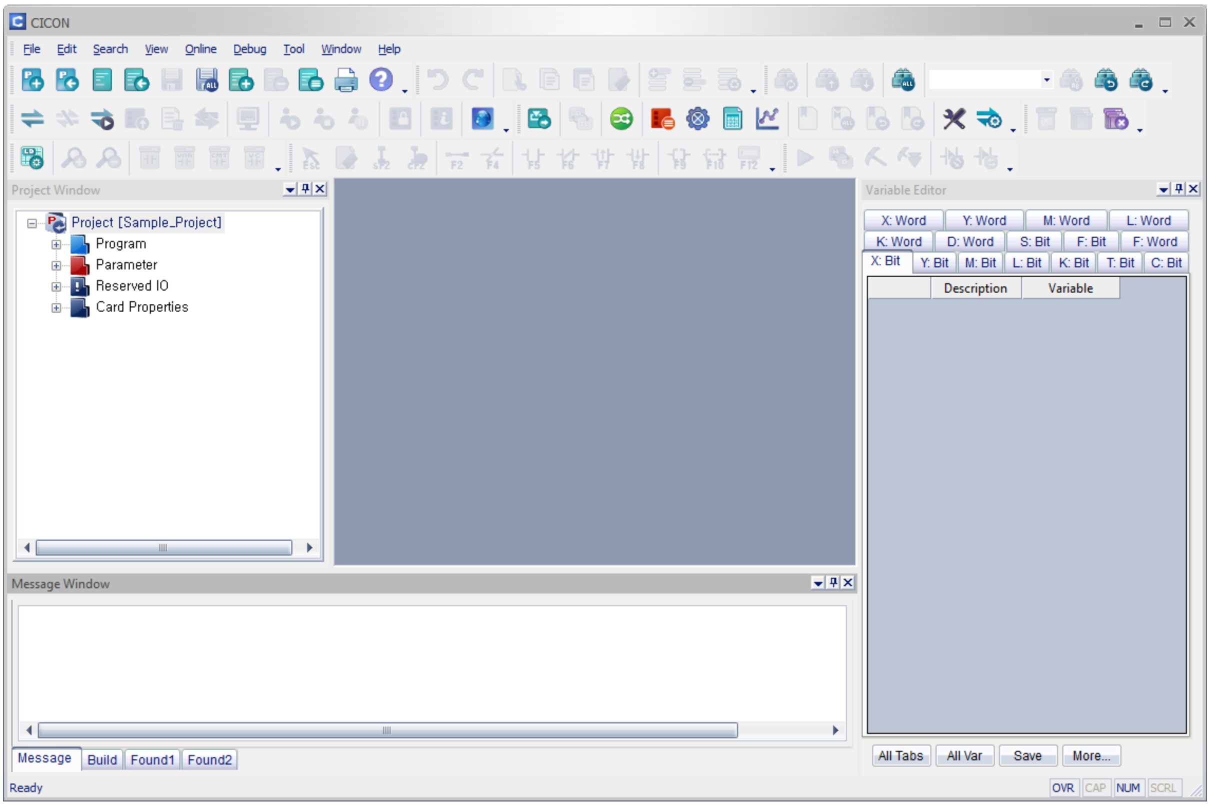
- Q device is used only for the SFC program.

- Descriptions and variables of the Q device are pre-registered.

- Only PLCS (CM3) CPU series can utilize the Q device.

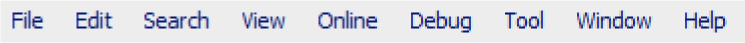
- If used as a word type, Q device can be used according to the bit device’s word usage.

## 3. CICON Screen Configuration



1) Menu Bar
2) Toolbar
3) Project Window
4) Message Window
5) Work Window
6) Variable Editor Window
7) Toolbar Customize Feature
8) Docking Feature
9) Status Window Shortcuts

## 3.1 Menu Bar

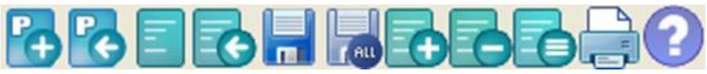


Menu names provided by the CICON software will be displayed. When you click the Menu Bar, the dropdown menu will be displayed and enable you to use various functions.

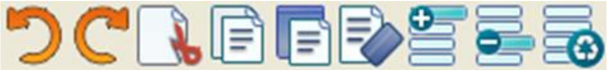
## 3.2 Toolbar

Frequently used menu icon buttons are displayed on the Toolbar.

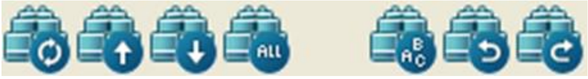
**Basic**



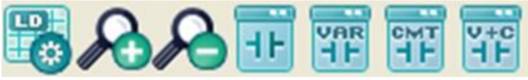
**Edit**



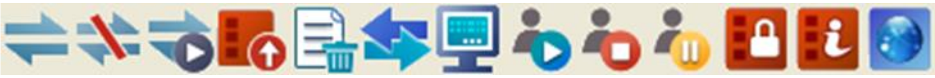
**Search**



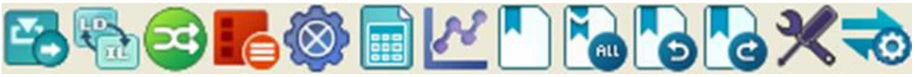
**View**



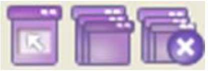
**Online**



**Tool**

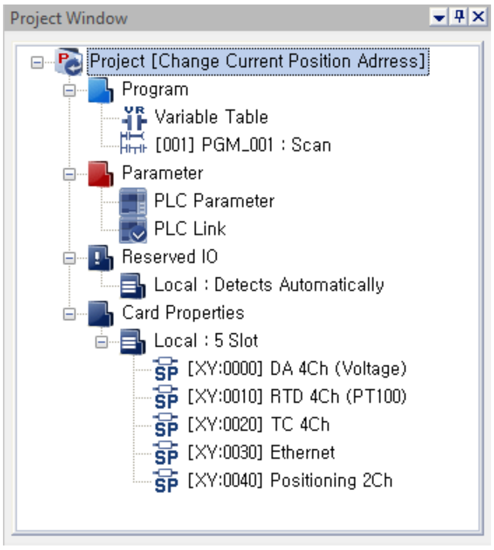


**Window**



## 3.3 Project Window

Project Window displays a current project and its related program, parameter and card properties.



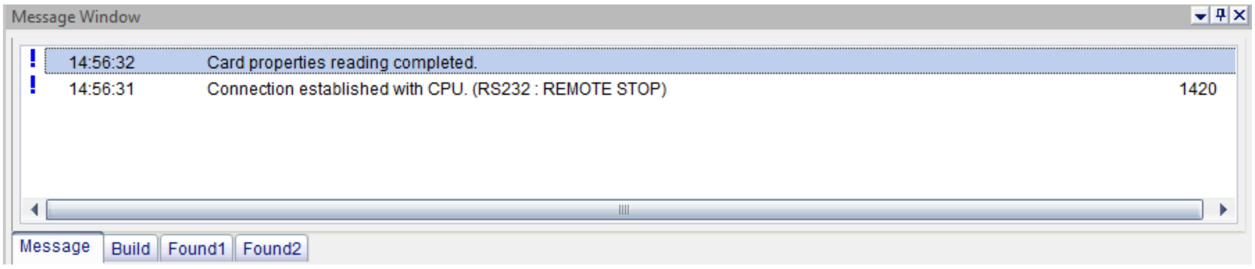
Project Window

- Project [Change Current Position Adress]
  - Program
    - Variable Table
    - [001] PGM_001 : Scan
  - Parameter
    - PLC Parameter
    - PLC Link
  - Reserved IO
    - Local : Detects Automatically
  - Card Properties
    - Local : 5 Slot
      - [XY:0000] DA 4Ch (Voltage)
      - [XY:0010] RTD 4Ch (PT100)
      - [XY:0020] TC 4Ch
      - [XY:0030] Ethernet
      - [XY:0040] Positioning 2Ch

## 3.4 Message Window

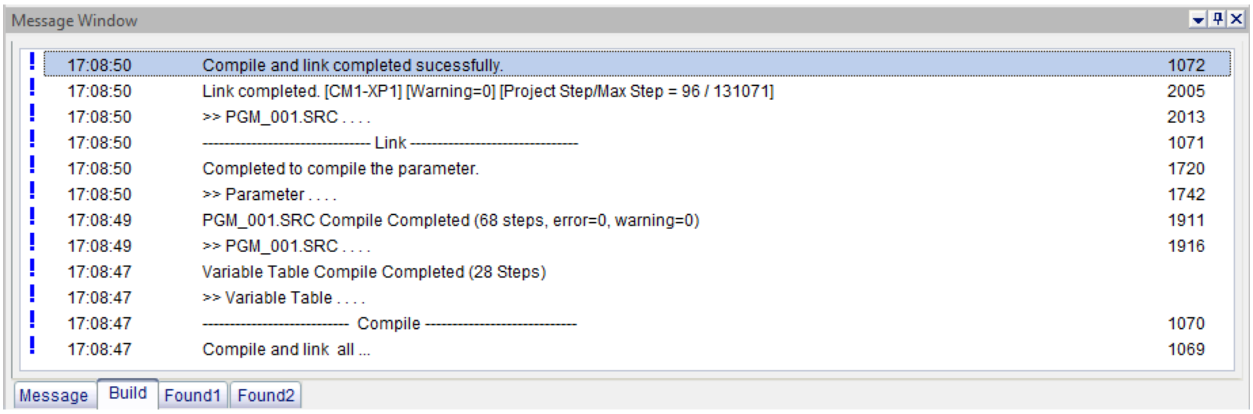
The Message Window displays results of compilation, download and search in a list. To check the previous messages, scroll down the bar on the right side of the Message Window.

**Message: displays all the notifications executed in the CICON software.**



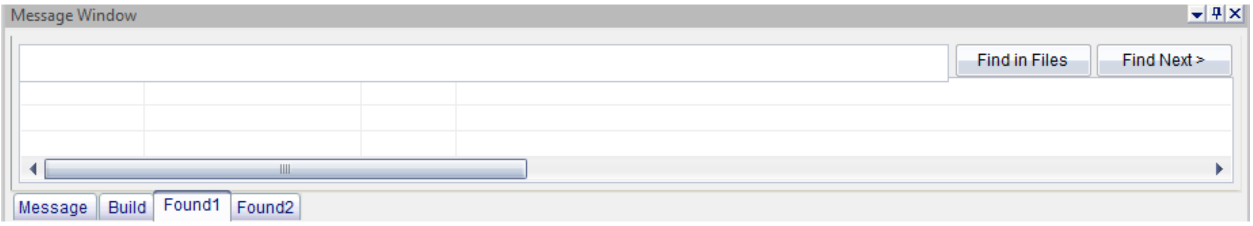
```
14:56:32    Card properties reading completed.
14:56:31    Connection established with CPU. (RS232 : REMOTE STOP)        1420
```

**Build: displays results of compiling and linking with PLC program.**



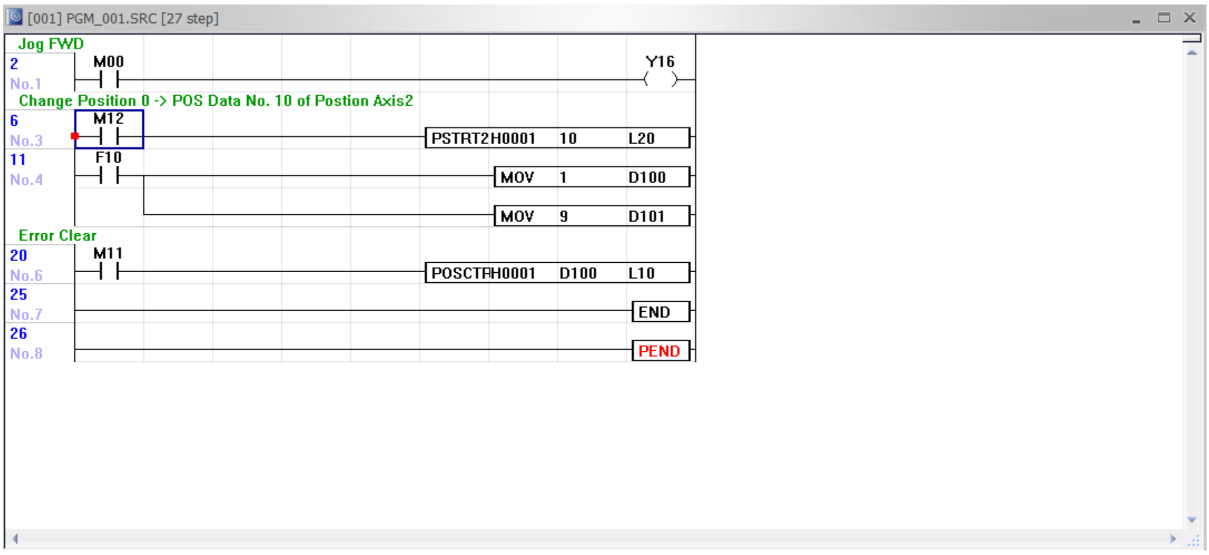
```
17:08:50    Compile and link completed sucessfully.                                          1072
17:08:50    Link completed. [CM1-XP1] [Warning=0] [Project Step/Max Step = 96 / 131071]      2005
17:08:50    >> PGM_001.SRC . . . .                                                           2013
17:08:50    ------------------------------ Link ------------------------------               1071
17:08:50    Completed to compile the parameter.                                              1720
17:08:50    >> Parameter . . . .                                                             1742
17:08:49    PGM_001.SRC Compile Completed (68 steps, error=0, warning=0)                     1911
17:08:49    >> PGM_001.SRC . . . .                                                           1916
17:08:47    Variable Table Compile Completed (28 Steps)
17:08:47    >> Variable Table . . . .
17:08:47    -------------------------- Compile ---------------------------                   1070
17:08:47    Compile and link  all ...                                                        1069
```

**Found 1/2: displays search results.**



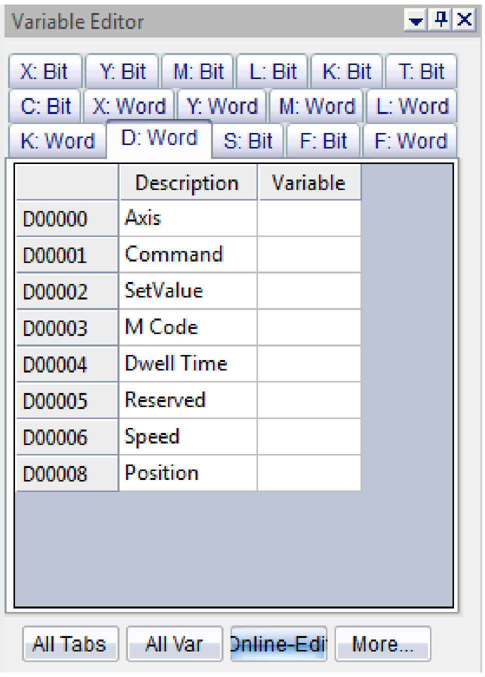
### 3.5 Work Window

The Work Window displays several types of edit windows such as Edit Variable, Edit Ladder Diagram and Edit Parameter. Each Edit Window is used to edit program, parameter and configuration.



### 3.6 Variable Editor Window

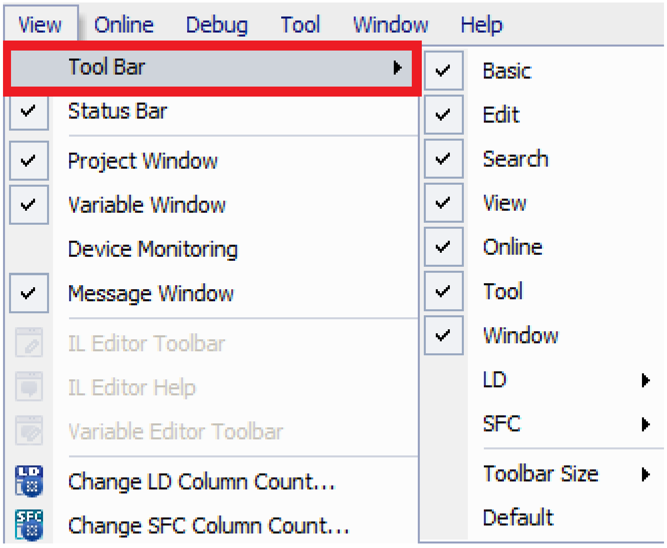
The Variable Editor Window displays variables for each device area and is used to add, delete, edit and describe variables.



| | Description | Variable |
|---|---|---|
| D00000 | Axis | |
| D00001 | Command | |
| D00002 | SetValue | |
| D00003 | M Code | |
| D00004 | Dwell Time | |
| D00005 | Reserved | |
| D00006 | Speed | |
| D00008 | Position | |

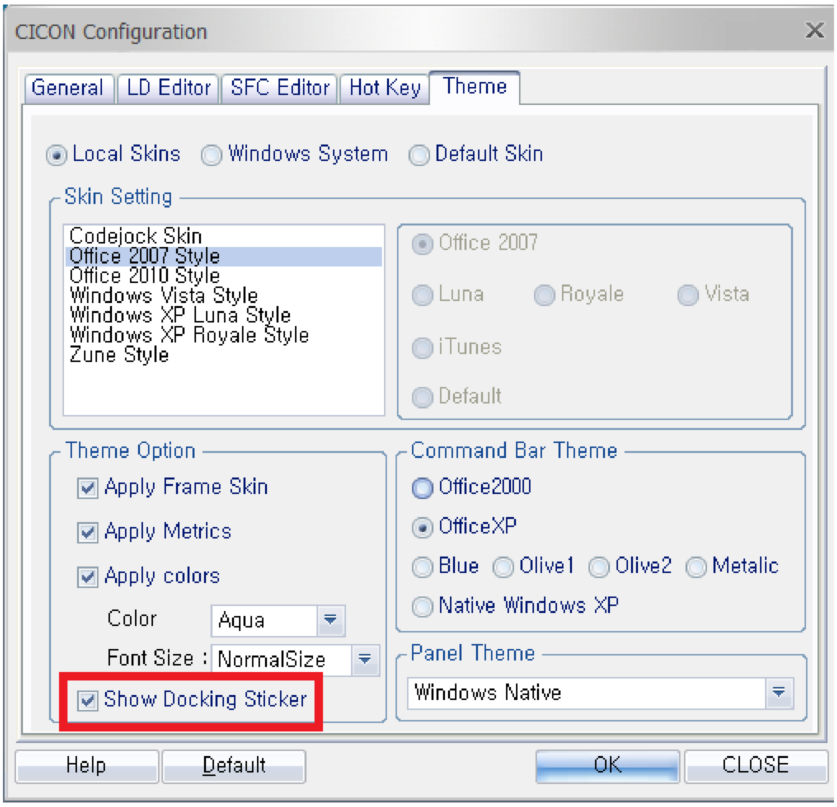
### 3.7 Toolbar Customize Feature

The Toolbar Customize Feature allows a user to select which icons to be displayed on the Toolbar.



### 3.8 Docking Feature

The Docking Feature is used to situate each window based on a user’s preference in the CICON software. By clicking “Show Docking Sticker” in the CICON Configuration, the Docking Feature is enabled.



● Local Skins ○ Windows System ○ Default Skin

Skin Setting

Codejock Skin
Office 2007 Style
Office 2010 Style
Windows Vista Style
Windows XP Luna Style
Windows XP Royale Style
Zune Style

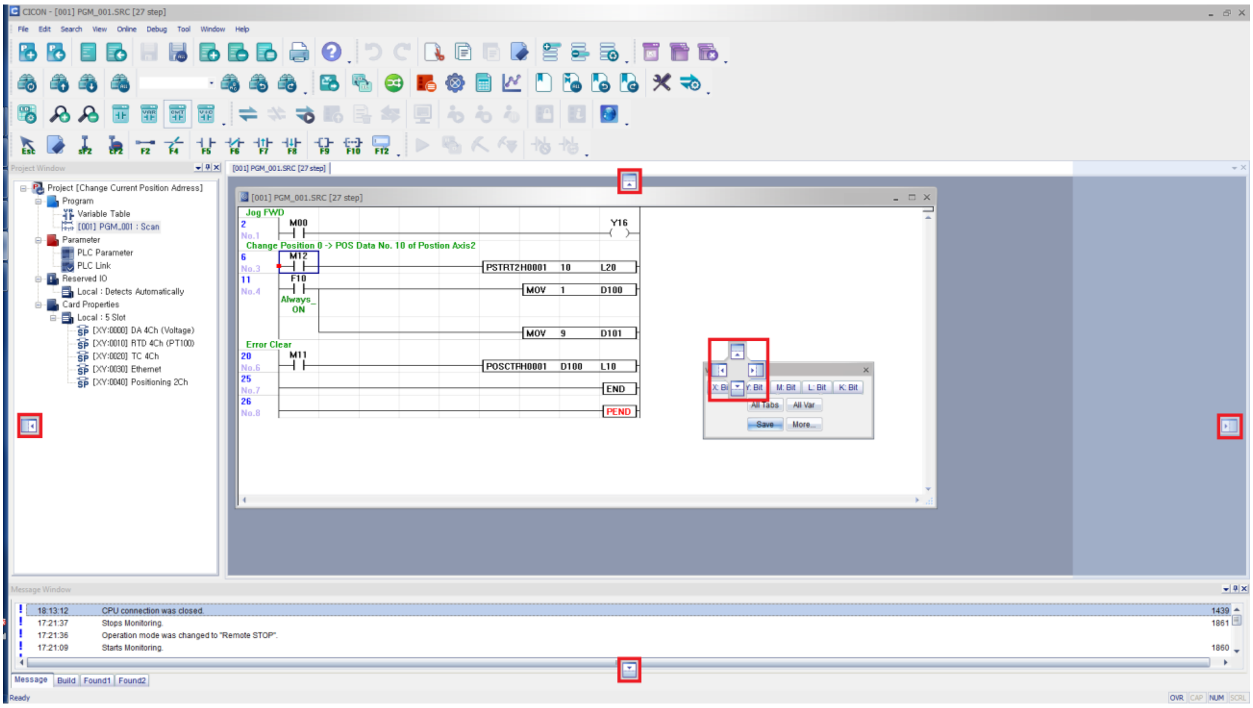
● Office 2007
○ Luna ○ Royale ○ Vista
○ iTunes
○ Default

Theme Option
☑ Apply Frame Skin
☑ Apply Metrics
☑ Apply colors
Color Aqua
Font Size : NormalSize
☑ Show Docking Sticker

Command Bar Theme
○ Office2000
● OfficeXP
○ Blue ○ Olive1 ○ Olive2 ○ Metalic
○ Native Windows XP

Panel Theme
Windows Native

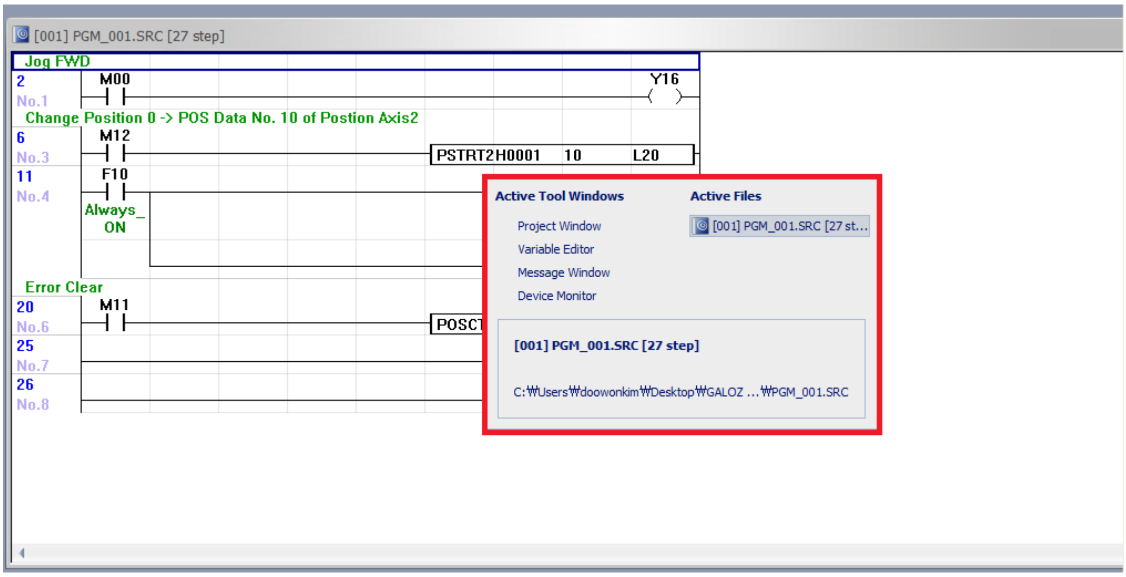
The Docking Feature (marked in red) will appear on the screen when you drag the header of any window (Project Window, Device Monitor Window, Message Window and Variable Editor Window). With the Docking Feature being activated, you can modify the location of each window by dragging your mouse.



18:13:12 CPU connection was closed. 1439
17:21:37 Stops Monitoring. 1861
17:21:36 Operation mode was changed to "Remote STOP".
17:21:09 Starts Monitoring. 1860

## 3.9 Status Window Shortcuts

1) Alt + F6: a change of focus among Status Windows
2) Alt + F7: displays Status Window Focus Movement Tool on the screen
3) Ctrl + Tab: displays Program Focus Movement Tool on the screen



[001] PGM_001.SRC [27 step]

C:₩Users₩doowonkim₩Desktop₩GALOZ …₩PGM_001.SRC

## 3.10 CICON Menu in detail

### 3.10.1 FILE (F)

| Menu | Note |
|---|---|
| New Project | Creates a new project. |
| Open Project | Opens the project that was already created. |
| Open Project from PLC | Opens the project from PLC. |
| Import OPC UA Project File | Imports OPC UA project file. |
| Export OPC UA Project File | Exports OPC UA project file. |
| Close Project | Closes the currently working project. |
| Clone Project | Copies the desired project. |
| Recent Project | Shows the list of projects that were recently edited and created. When you click the file, it will be executed. |
| New Program | Creates a new program. |
| Open Program | Opens the program that was already created. |
| Close Program | Closes the currently working program. |
| Save Program | Saves the currently working program. |
| Save Program As | Saves the currently working program with a different name and entity. |
| Save All | Saves all programs belonging to the currently working project. |
| Project Properties | Displays properties of currently working project. |
| Program Properties | Displays properties of currently working program. |
| Program Properties Configuration | Displays configuration for each program of the currently working project. |
| Add a Program | Adds the existing program to the selected project. |
| Delete a Program | Deletes the selected from the project. |
| Restore Program | Restores a program to the previous conditions by selecting the desired program and the different times it was saved. |
| Import Single Program | Imports a program from a different project and registers on the currently working project. |
| Print | Prints out the currently working program. |
| Preview | Shows the print preview screen. |
| Print Setup | Modifies the printer and its settings. |
| Page Setup | Adjusts margins of the printing page. |
| Exit | Ends the CICON software. |

### 3.10.2 EDIT (E)

| Menu | Note |
|---|---|
| Undo | Cancels the job that was made just before. |
| Redo | Cancels the undoing job that was made just before. |
| Cut | Copies the selected area in the clipboard first and deletes the selected area. |
| Copy | Copies the selected area in the clipboard. |
| Paste | Pastes the copied contents into the designated clipboard area. |
| Delete | Deletes the contents of the selected area. |
| Select All | Selects the entire program area. |
| Insert Row | Inserts an empty rung below the blue cursor. |
| Insert Next Row | Inserts an empty rung above the blur cursor. |
| Delete Row | Deletes the selected rung. |
| Space Column | Moves the selected contact to the right by one column. |
| Arrange Rung | Clears up unnecessary steps of rungs in the LD Editor. |
| Device Description | Adds a description underneath the selected device or an instruction. |
| Program Line-Up | Deletes empty or incomplete rungs in the program. |
| Remove All Comments | Clears all comments of the currently working program. |

### 3.10.3 SEARCH (S)

| Menu | Note |
|---|---|
| Find and Replace | Finds and replaces the selected contents. |
| Find Previous | Searches for the contents located above the current position. |
| Find Next | Searches for the contents located below the current position. |
| Find All | Searches for the contents within the selected scan program and displays the result on the Message Window. |
| Go to Step | Moves to the designated step number. |
| Go to Statement | Moves to the designated comment or description. |

### 3.10.4 VIEW (V)

| Menu | Note |
|---|---|
| Toolbar | Shows and hides the CICON Toolbar. |
| Status Bar | Shows and hides the CICON Status Bar. |
| Project Window | Shows and hides the Project Window. |
| Variable Window | Shows and hides the Variable Window. |

| | |
|---|---|
| Device Monitoring | Shows and hides the Device Monitoring Window. |
| Message Window | Shows and hides the Message Window. |
| IL Edit Toolbar | Shows and hides the toolbar on the IL Edit Window. |
| IL Edit Help | Shows and hides the IL Edit Help Window. |
| Variable Editor Toolbar | Shows and hides the toolbar on the Variable Edit Window. |
| Change LD Column Count | Shortens or lengthens the length of the rung by selecting the number of the LD columns from 9 to 15. |
| Change SFC Column Count | Shortens or lengthens the length of the rung by selecting the number of the SFC columns from 12 to 32. |
| Zoom In | Zooms in the LD Edit Window. |
| Zoom Out | Zooms out the LD Edit Window. |
| Variable Editor | Controls displays of device, variable and description on the LD Edit Window. |
| Show Grid | Shows and hides the grid on the LD Edit Window. |
| Language | Selects the CICON display language between English and Korean. |

### 3.10.5 ONLINE (O)

| Menu | Note |
|---|---|
| Link+Download+Monitor | Proceeds connecting with, downloading to and monitoring PLC. |
| Connect | Makes a PLC connection attempt. |
| Disconnect | Disconnects from PLC in the online state. |
| PLC SCAN (Ethernet) | Scans PLC for Ethernet IP Address. |
| Download (PC → PLC) | Downloads the compiled program from the CICON software to PLC. |
| Upload (PLC → PC) | Uploads the program that was downloaded to PLC. |
| Compare/Check Program (PC ←→PLC) | Verifies whether the edited program matches the program downloaded to PLC. |
| Firmware Upgrade | Upgrades firmware for PLC-S, MPnA and XPnX only. |
| SD Card | Downloads to and uploads from SD card for PLC-S, MPnA and XPnX only. |
| Module Config Export – for Simulator | Exports the module configuration for simulator. |
| Online-Edit Start/Cancel | Starts or cancels modification while running PLC. |
| Online-Edit Download | Downloads the modified program while running PLC. |
| Memory monitor | Activates the Memory Monitor. |
| Program Monitor | Starts and stops program monitoring. |
| Clear Memory | Deletes the programs and parameters saved in the PLC RAM or clears all data from PLC. |

| | |
|---|---|
| Flash Memory | Changes the modes of PLC operation between RAM and ROM, copies the RAM program to the ROM or deletes the ROM. |
| Memory Download/Upload | Downloads and saves device memory data as a back-up file. The back-up file can also be uploaded to PLC. |
| Change Mode | Runs, stops, pauses PLC when the PLC mode switch is in the remote state. |
| CPU Error Reset | Resets status of CPU failures and reactivates self-detection of CPU. |
| Enable/Disable Module | Prevents I/O mounting/dismounting error of the specified slot. |
| Enable/Disable Scan Program | Controls enabling and disabling of a specific scan program. |
| PLC Password | Sets the connection password for PLC. |
| Special Module Setup | Sets configuration for each special module connected with PLC. |
| Refresh Card Properties in Project Window | Reads the information on the module mounted on PLC and displays it on the Project Window. |
| PLC Status | Checks the PLC CPU state and sets the time. |

### 3.10.6 DEBUG (D)

| Menu | Note |
|---|---|
| Enable Forced Input/Output | Allows forced input and output. |
| Forced Input/Output Setup | Sets up configuration for forced input and output. |
| Run Debugging/Continue | Starts and continues debugging. |
| Stop Debugging | Stops debugging. |
| Run and Scans | Maintains operation for the designated scan area. |
| Assign/Release Break Point | Sets or clears the break point. |
| Release All Break Points | Clears all break point settings. |

### 3.10.7 TOOL

| Menu | Note |
|---|---|
| Compile | Compiles the working file. |
| Link | Links the compiled file. |
| Compile+Link | Complies and links sequentially. |
| Compile+All Link | Compiles and links the entire project. |
| Downloader | Creates and exports a “.DWN” file that can be downloaded. |
| IL-LD Conversion | Converts the editing program to IL or LD. |

| | |
|---|---|
| Cross Reference | Provides an overview of the use of addresses within the CICON user program. |
| Bookmark | Leaves and clears a bookmark. |
| PLC Parameter | Opens the PLC Parameter Setting Window. |
| I/O Reservation | Opens the I/O Reservation Setting Window. |
| Position Module | Opens the configuration and status windows for the Position Module. |
| Variable Editor | Opens the Variable Editor Window. |
| Device Trend | Opens Device Trend. |
| Run PLC Simulator | Monitors and controls ladder program without running the actual PLC. |
| CICON Option | Configures settings related with CICON operation. |
| Connection Setup | Configures communication settings for each different type of connection. |

### 3.10.8 WINDOW (W)

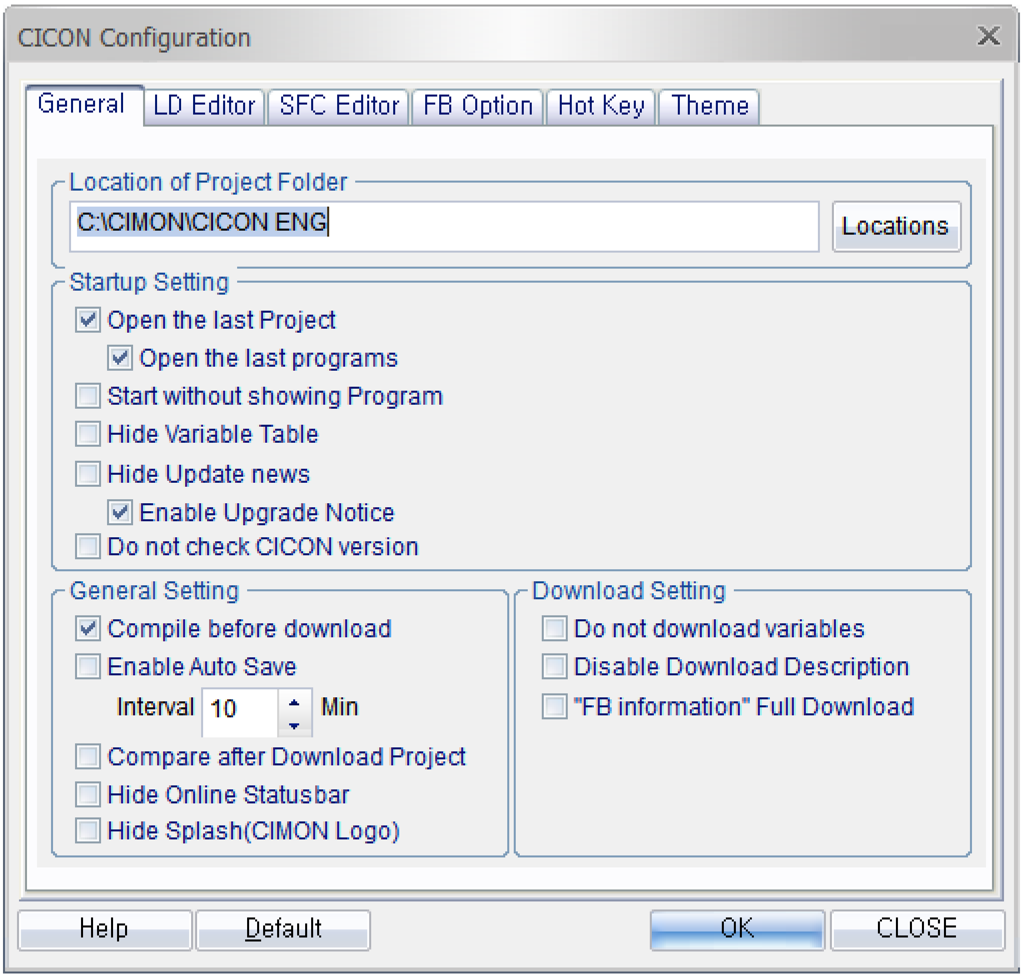
| Menu | Note |
|---|---|
| Close All | Closes all the editing and working windows at once. |
| Activate Inactive Menu | Activate menu that was disabled during compiling or downloading. |
| Cascade type | Arranges the editing windows with a cascading layout. |
| Tile type | Arranges windows as horizontal and non-overlapping tiles. |
| Arrange Icons | Arranges icons at the bottom of the window. |

### 3.10.9 HELP (H)

| Menu | Note |
|---|---|
| Help | Opens the help text on the CICON software. |
| About | Displays the version of the currently installed CICON software. |

## 3.11 CICON Configuration

### 3.11.1 General



Location of Project Folder
C:\CIMON\CICON ENG

Startup Setting
- ☑ Open the last Project
  - ☑ Open the last programs
- ☐ Start without showing Program
- ☐ Hide Variable Table
- ☐ Hide Update news
  - ☑ Enable Upgrade Notice
- ☐ Do not check CICON version

General Setting
- ☑ Compile before download
- ☐ Enable Auto Save
  - Interval 10 Min
- ☐ Compare after Download Project
- ☐ Hide Online Statusbar
- ☐ Hide Splash(CIMON Logo)

Download Setting
- ☐ Do not download variables
- ☐ Disable Download Description
- ☐ "FB information" Full Download

**Location of Project Folder:** Specifies the default folder for new project. When creating a new folder, the folder name cannot contain any of the following characters (\ / : * ? “ < >).

**Open the Last Project:** Opens the most recent project automatically when starting the CICON software.

**Open the Last Programs:** Opens the most recent program along with the project when starting the CICON software.

**Start without Showing Program:** If this feature is activated, the last program will NOT be displayed automatically even when “Open the Last Program” has been clicked.

**Hide Variable Table:** Hides the Variable Table when starting the CICON software. Using the shortcut key “F11,” you can easily hide and show the Variable Table.

**Hide Update News:** Hides “Update News” when starting the CICON software.

**Enable Upgrade Notice:** Displays “Update News” when starting the CICON software.

**Do Not Check CICON Version:** If this feature is activated, a user will NOT be notified on whether the installed CICON software is up to date with the latest version available.

**Compile before Download:** If the downloading program is modified, it will be automatically compiled.

**Do Not Download Variables:** Variables are excluded at the time of compilation. The Variable Table will NOT be saved in PLC. When the downloaded PLC program is uploaded, the Variable Table will NOT be uploaded. This feature is useful for program security.

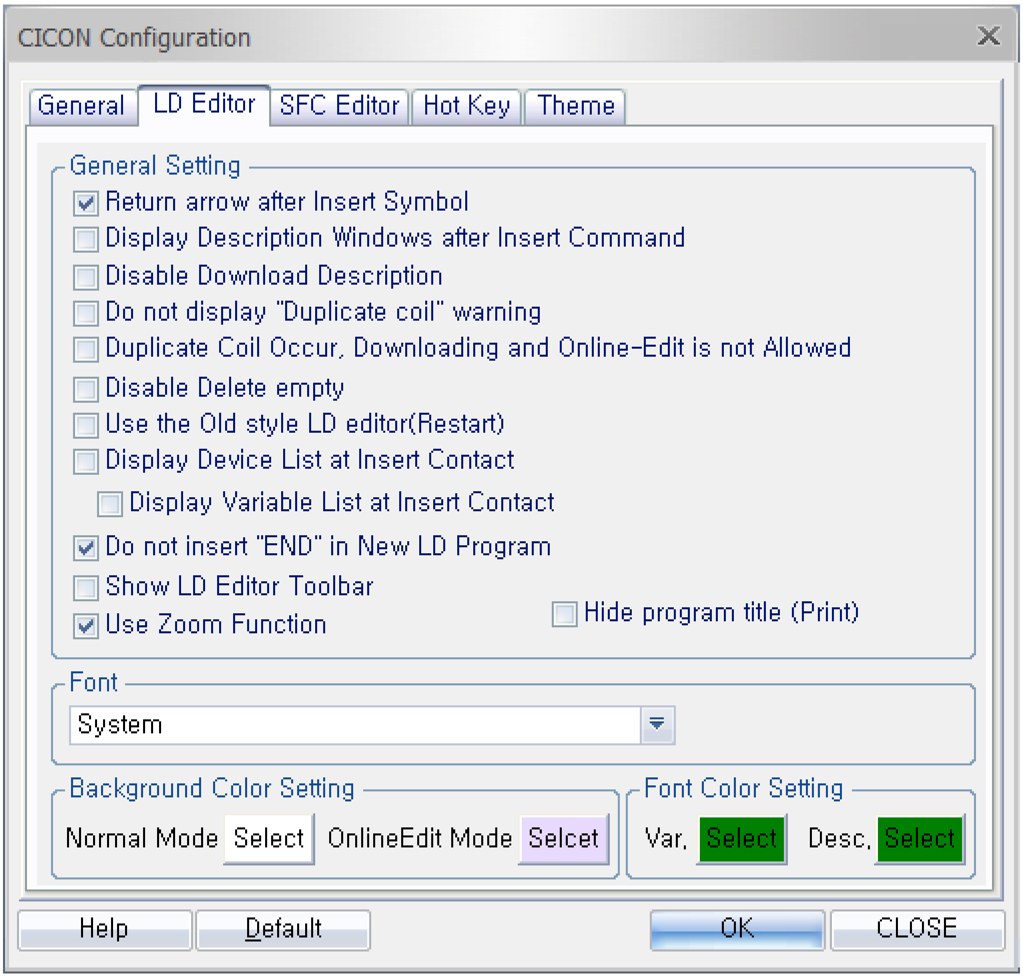
**Enable Auto Save:** Automatically saves the project at the specified time interval (1-100 min). This feature activates only when there is a change to the contents of a program.

**Compare & Verify after Download Project:** Compares program files in the CICON software one after another with that of PLC and notify the user of the differences between them.

**Hide Online Status Bar:** Hides Online Status Bar which otherwise displays CPU version, current mode and connection status of PLC with the CICON software. It also lets you either disable and enable forced I/O.

**Hide Splash (CICON Logo at the start of the program):** Hides the CICON logo splash when starting the CICON software.

### 3.11.2 LD Editor



General Setting

☑ Return arrow after Insert Symbol
☐ Display Description Windows after Insert Command
☐ Disable Download Description
☐ Do not display "Duplicate coil" warning
☐ Duplicate Coil Occur, Downloading and Online-Edit is not Allowed
☐ Disable Delete empty
☐ Use the Old style LD editor(Restart)
☐ Display Device List at Insert Contact
  ☐ Display Variable List at Insert Contact
☑ Do not insert "END" in New LD Program
☐ Show LD Editor Toolbar
☑ Use Zoom Function
☐ Hide program title (Print)

Font: System

Background Color Setting: Normal Mode Select, OnlineEdit Mode Select

Font Color Setting: Var. Select, Desc. Select

**Return arrow after Insert Symbol:** After entering the LD symbol, the mouse cursor returns to “Select Mode” otherwise previously selected LD symbol will stay with the mouse cursor.

**Display Description Windows after Insert Command:** Whenever a contact, coil or instruction is inserted in the ladder diagram, a description window follows and enables a user to describe each entity.

**Disable Download Description:** Compile the programs without descriptions. When a user uploads the programs, the descriptions will be displayed in empty lines. This feature is useful for program security.

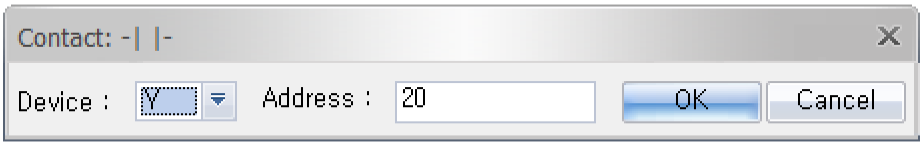
**Do not display “Duplicate coil” warning:** Despite a duplicate coil, a warning message will not pop up.

**Duplicate Coil Occur, Downloading and Online-Edit is not Allowed:** When a duplicate coil is found in the ladder diagram, the program will not be downloaded to PLC nor Online-Edit is allowed.

**Disable Delete empty:** This feature enables a user to have empty rungs in the ladder diagram.

**Use the Old style LD editor (Restart):** A user can write and edit ladder diagram in the old style. The CICON software must be restarted.

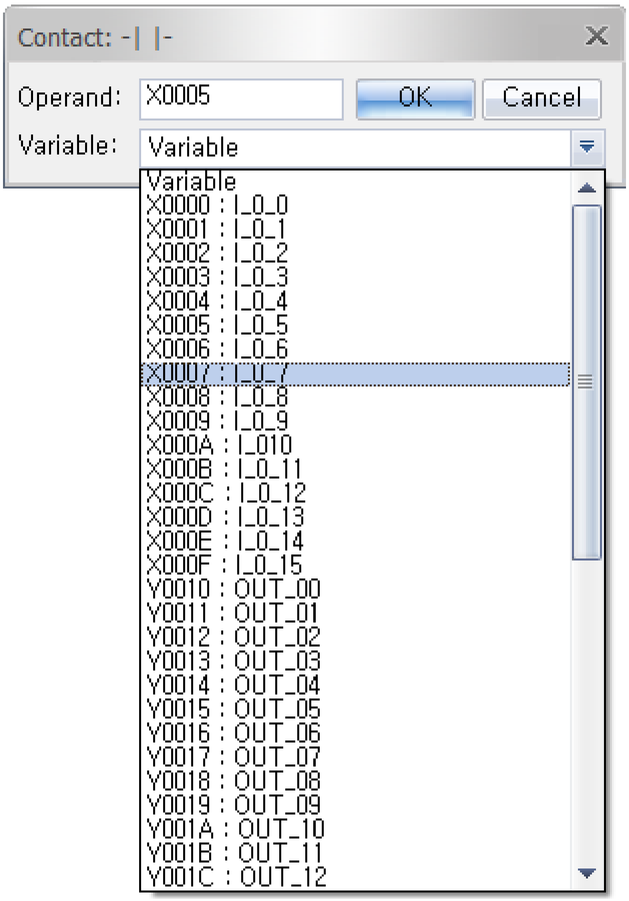
**Display Device List at Insert Contact:** Whenever a contact is inserted, the Device List Window is followed and enables a user to select a device among the list.



Device : Y

Address : 20

**Display Variable List at Insert Contact:** Whenever a contact is inserted, the Variable List Window is followed and enables a user to select a variable among the list.



Operand: X0005

Variable: Variable

Variable
X0000 : I_0_0
X0001 : I_0_1
X0002 : I_0_2
X0003 : I_0_3
X0004 : I_0_4
X0005 : I_0_5
X0006 : I_0_6
X0007 : I_0_7
X0008 : I_0_8
X0009 : I_0_9
X000A : I_010
X000B : I_0_11
X000C : I_0_12
X000D : I_0_13
X000E : I_0_14
X000F : I_0_15
Y0010 : OUT_00
Y0011 : OUT_01
Y0012 : OUT_02
Y0013 : OUT_03
Y0014 : OUT_04
Y0015 : OUT_05
Y0016 : OUT_06
Y0017 : OUT_07
Y0018 : OUT_08
Y0019 : OUT_09
Y001A : OUT_10
Y001B : OUT_11
Y001C : OUT_12

**Do not insert "END" in NEW LD Program:** The instruction "END" will not automatically be inserted into a new LD program whenever it is created.

**Show LD Editor Toolbar:** The LD Editor Toolbar is activated and shown within the Ladder Diagram Editor Window (also called Work Window).

**Use Zoom Function:** This feature enables a user to zoom in and out the ladder diagram.

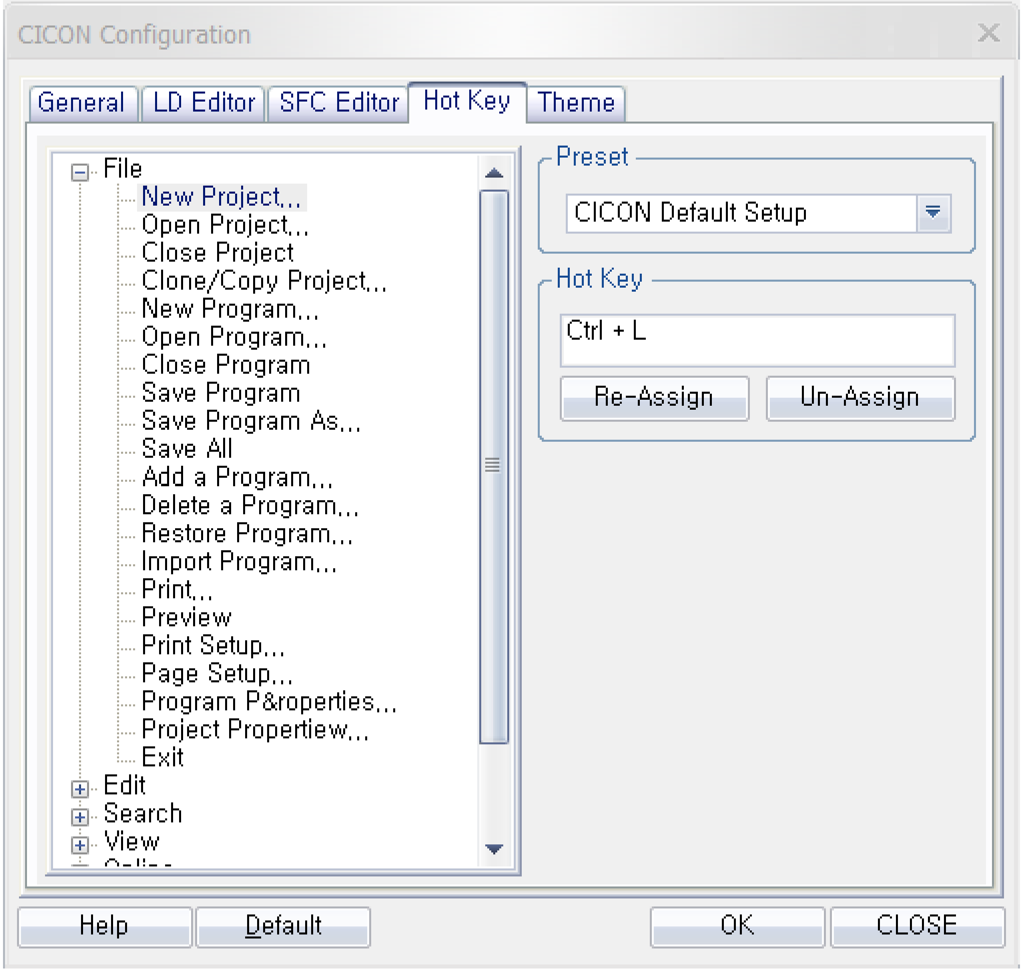
**Hide program title (Print):** The ladder diagram will be printed without project and program titles.

**Font Setting:** A user can select a LD Editor font provided by Windows System. However, some fonts may cause display problems and may not represent variable names or instructions clearly.

**Background Color Setting:** Background color of ladder diagram can be selected respectively for Normal Mode and Online Edit Mode.

**Font Color Setting:** Font color can be selected for variable names and descriptions.

### 3.11.3 HOT KEY



Preset: CICON Default Setup

Hot Key: Ctrl + L

Shortcut keys can be customized and registered for all the menu and functions. Select a menu that you wish to create a shortcut for and then type in any desired combination of keys. Click the [OK] button.

### 3.11.4 THEME

A display theme can be selected based on a user’s preference. Unless specifically selected, default setting will be applied automatically.

**Show Docking Sticker:** The Docking Feature is used to situate each window based on a user’s preference in the CICON software. By clicking “Show Docking Sticker” in the CICON Configuration, the Docking Feature is enabled. Instructions on how to use it are found in **3.8 Docking Feature**.

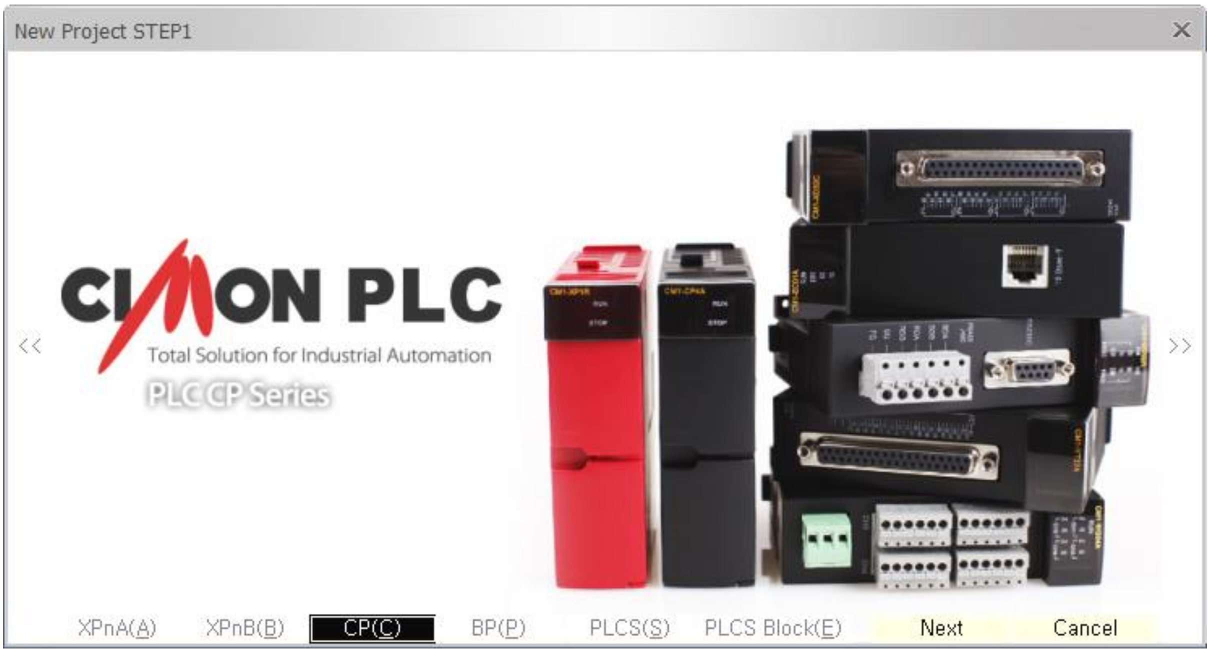
## 4. Develop Application

### 4.1 Create a Project

In order to develop logic program, project file must be created at first.

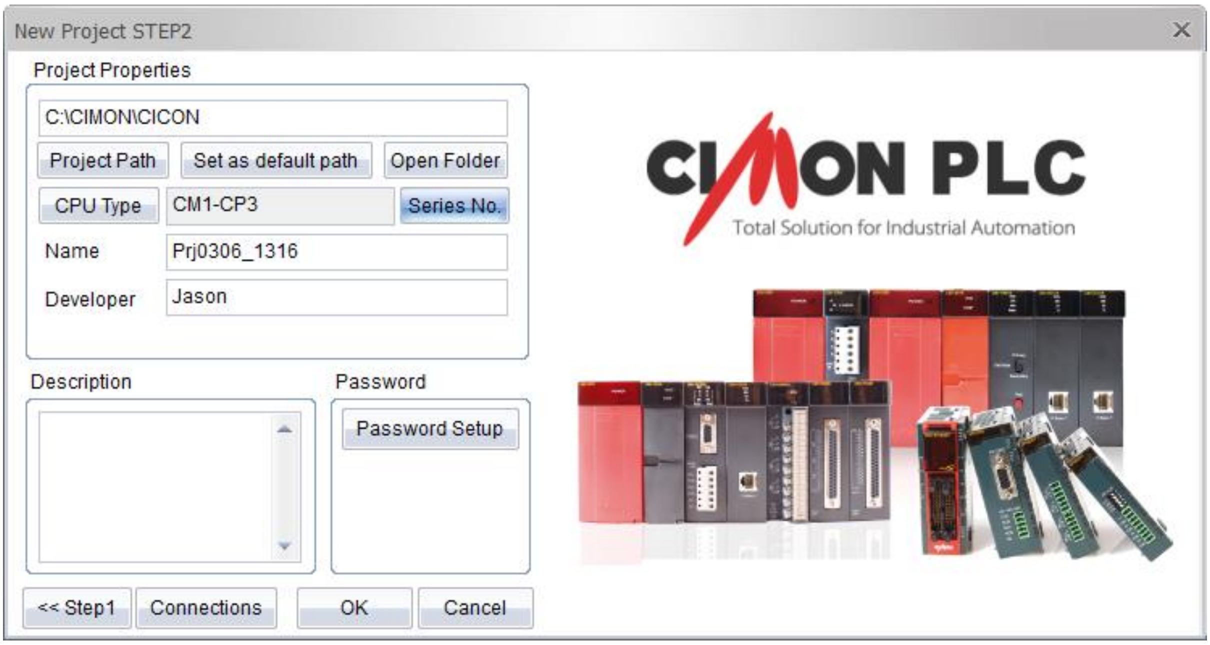
1) Start CICON software.

2) Click File → New Project or click
Choose the PLC CPU type and then click Next.



- XPnA: XP1A, XP1R, XP2A, XP3A
- XPnB: XP1B, XP2B, XP3B
- CP: CP3A, CP3B, CP3U, CP3P, CP4A, CP4B, CP4C, CP4D, CP4U
- PLCS: SP32, SP16, Hybrid Xpanel (HP-07CD)
- PLCS Block: SB16

3) Project Properties dialog box appears.



C:\CIMON\CICON

CPU Type: CM1-CP3

Name: Prj0306_1316

Developer: Jason

- ● Default path: it is where project file will be stored.
- ● Project Path: It is used to change the path where project file will be stored.
- ● Set as default path: click this if you want to make current path as default path.

Another way to change Default folder, click Tool → CICON Options.

In General tab, click Locations and choose the folder where project file will be saved.

- ● CPU Type: It is used to go back to CPU type dialog box.
- ● Series No. : click this to change CPU series.

In case of Hybrid Xpanel, Hybrid XPanel appears on the Project Properties.

Click the box to choose Hybrid Xpanel.

- ● Name: The default project name is current date and time. Rename project name.

“Prj+month+date_current hour+minute”

Example) Prj0306_1316 → March 6th. 13:16PM

- ● Developer: The developer name is the same as the name of your PC(Administrator).
- ● Description: Write description of Project if necessary.
- ● Password: Click Password Setup in order to lock project with password.

This password will be used when you open this project file.

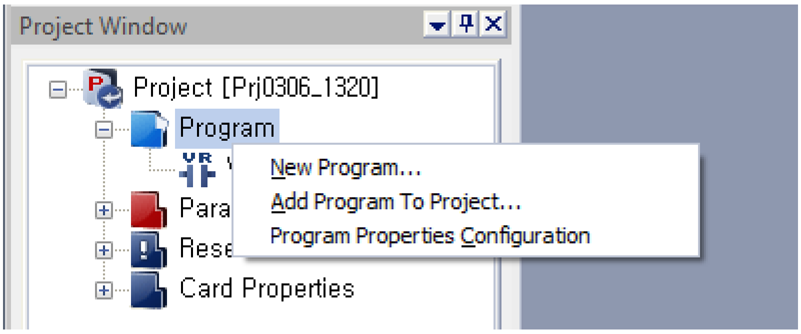
If you forget the password, your project cannot open.

- ● Connections: It is used to choose the type of project download.

You can choose Serial port, Dial-up Modem Leased Line Modem, Ethernet, PLC Simulator, and USB port. Click OK to save all data and to open new project.

## 4.2 Register a New Program

1) Click File → New Program or click
Or Right-click Program and click New Program.



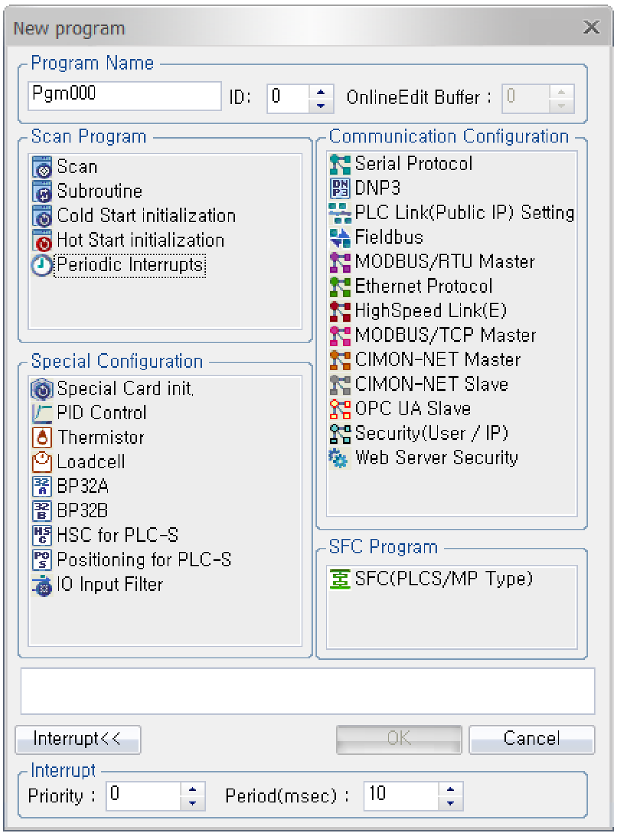
2) Type program name and select ID number.

● ID: The lowest ID number runs first.

● Online Edit Buffer: It is extra steps for online edit. Default is different with CPU types.

If this number of steps is reduced when you edit steps online.

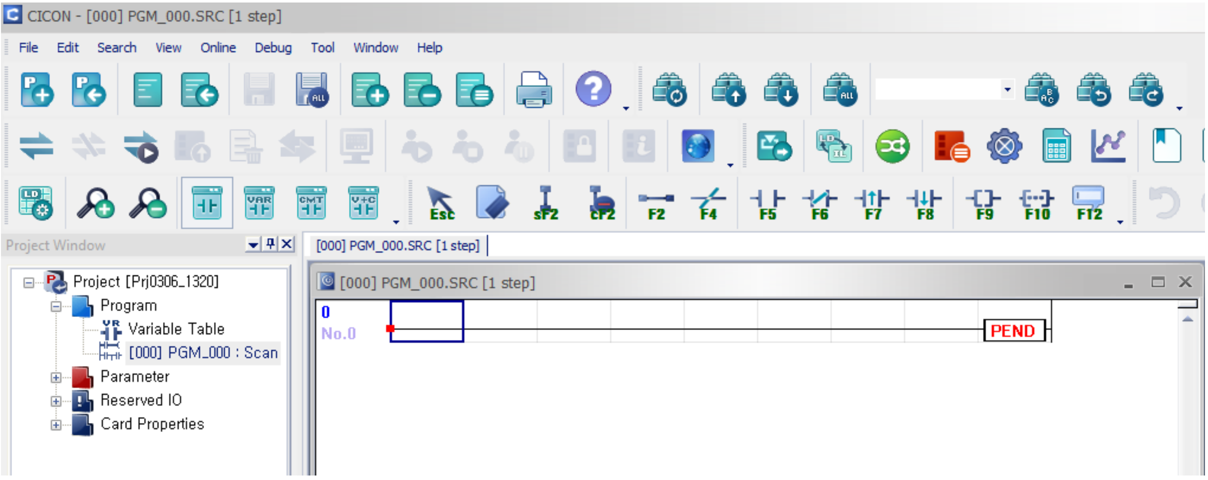
3) Choose a Scan program and then click OK.


New program

Program Name: Pgm000 ID: 0 OnlineEdit Buffer : 0

Interrupt — Priority : 0 Period(msec) : 10

## 4.3 Enter Ladder Logic


CICON - [000] PGM_000.SRC [1 step]
File Edit Search View Online Debug Tool Window Help
Esc sF2 cF2 F2 F4 F5 F6 F7 F8 F9 F10 F12
Project Window
Project [Prj0306_1320]
Program
Variable Table
[000] PGM_000 : Scan
Parameter
Reserved IO
Card Properties
[000] PGM_000.SRC [1 step]
0
No.0
PEND

LD Edit ToolBar

To enter ladder logic, you have the following options:

Erase: Delete logic elements or Instructions

Normally Open Contact: If the bit is On(1) then the Coil turns the On(1)

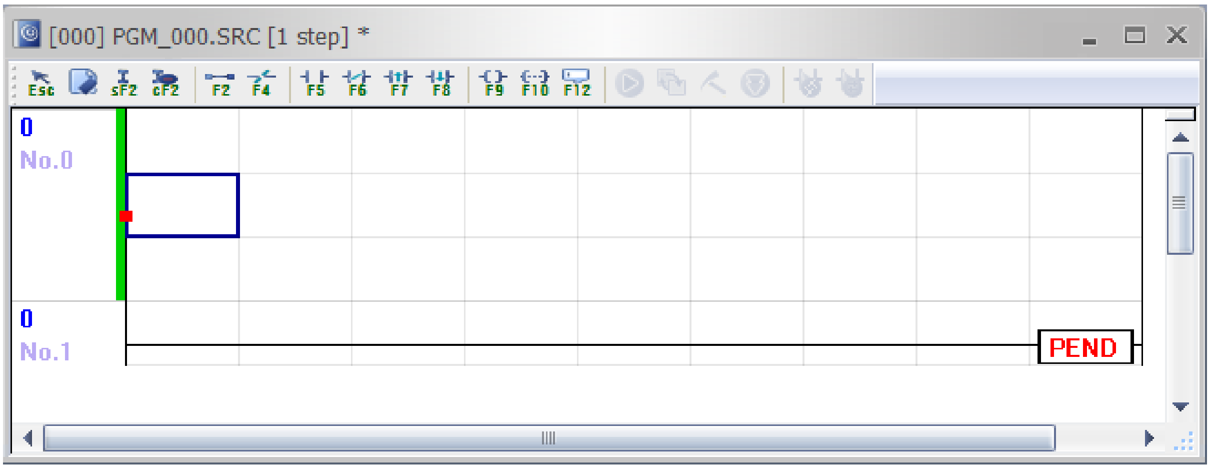
Normally Closed Contact: If the bit is Off(0) then the Coil turns the On(1)

Coil: An output instruction that controls one bit of data.

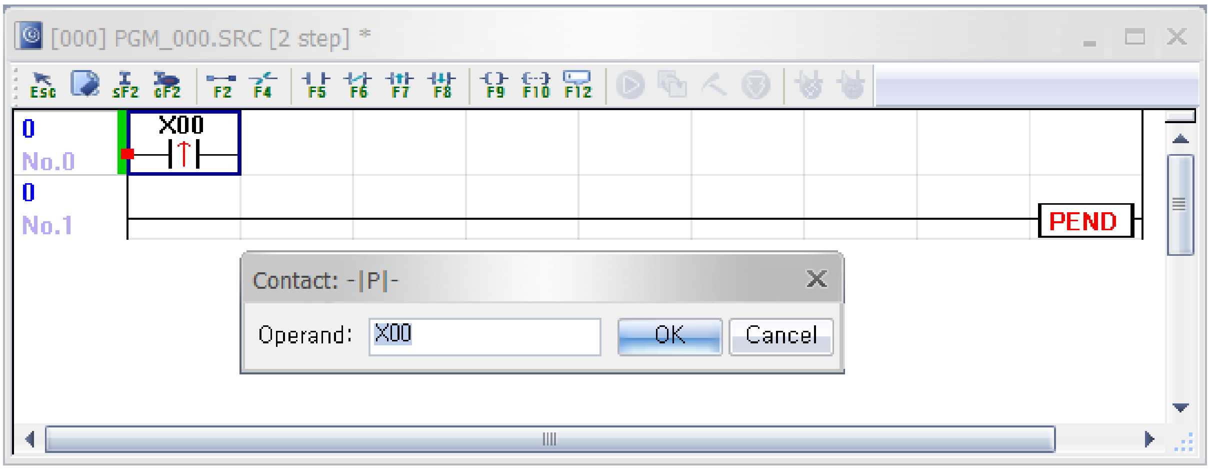
Vertical Line: Add vertical line (It connects branch to branch)

Delete Vertical Line: Delete Vertical Line

1) Add a Rung: Click Edit → Insert Row or press Ctrl+L, Rung is added at the below of Blue cursor. Click Edit → Insert Next Row or press Ctrl+Enter, Rung is added at the above of Blue cursor.


[000] PGM_000.SRC [1 step] *
Esc sF2 cF2 F2 F4 F5 F6 F7 F8 F9 F10 F12
0
No.0
0
No.1
PEND

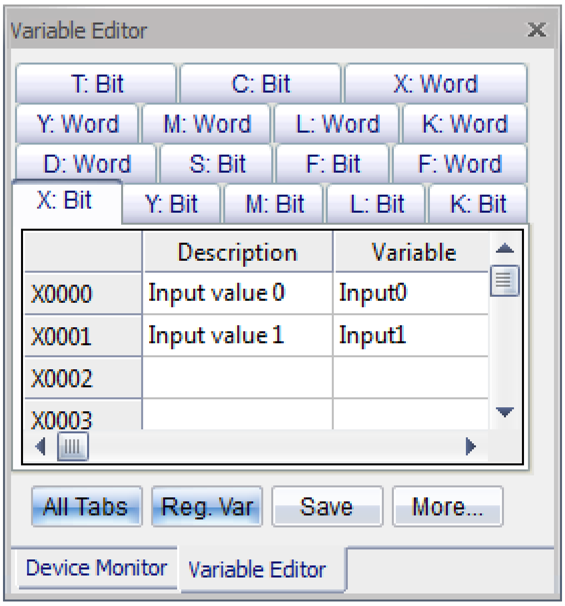
2) Click (Positive Transition-Sensing Contact) or press F7 and then type X0000.



Contact: -|P|-

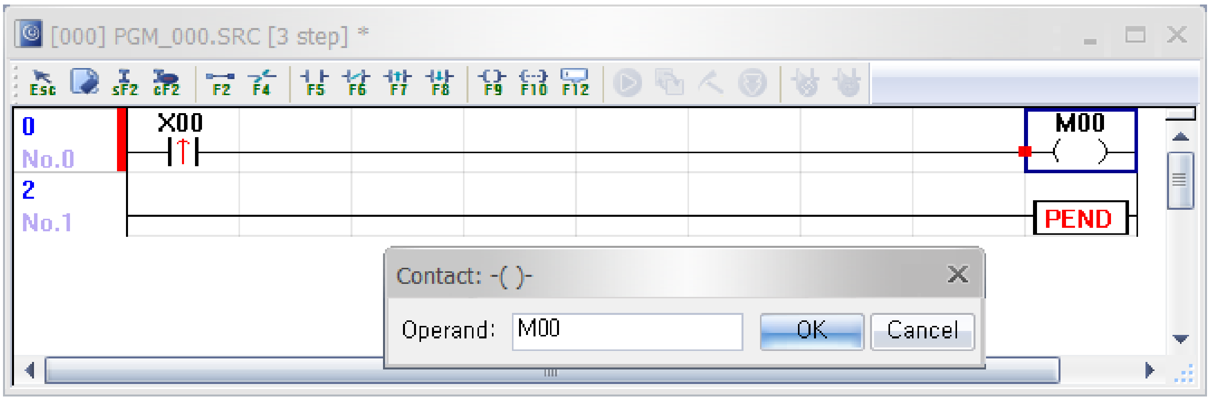
Operand: X00

3) If you want to register variable description with name, use Variable Editor Window.



| | Description | Variable |
|---|---|---|
| X0000 | Input value 0 | Input0 |
| X0001 | Input value 1 | Input1 |
| X0002 | | |
| X0003 | | |

4) Click (Coil) or press F9 and type M0000.



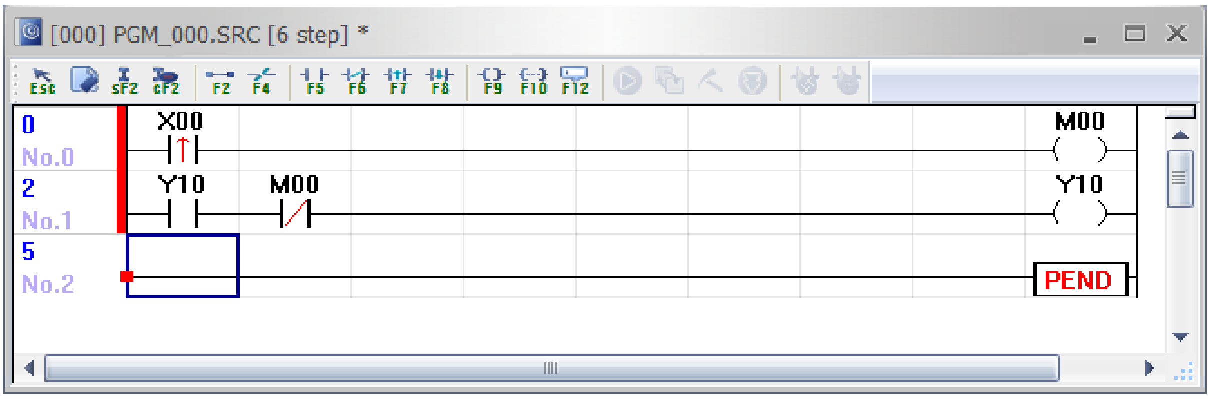
Contact: -( )-

Operand: M00

5) Click Edit → Insert Row or press Ctrl+L to add Rung and click F5 (Normally Open Contact) or press F5 and then type Y0010.

6) Click F6 (Normally Closed Contact) or press F6 and type M0000.

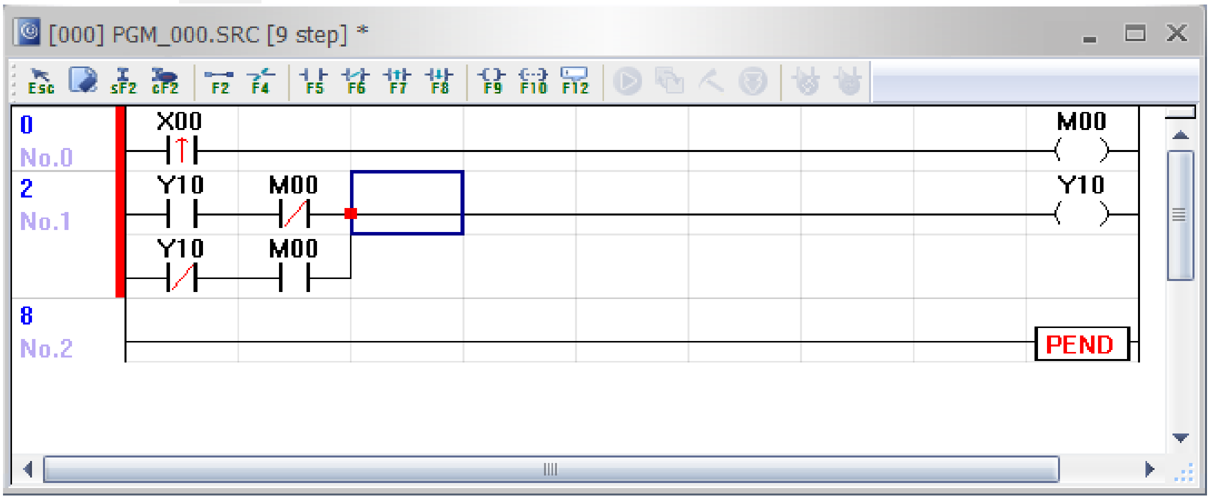
7) Click F9 (Coil) or press F9 and type Y0010.



8) Click Edit → Insert Row or press Ctrl+L.

Click F6 and type Y0010.

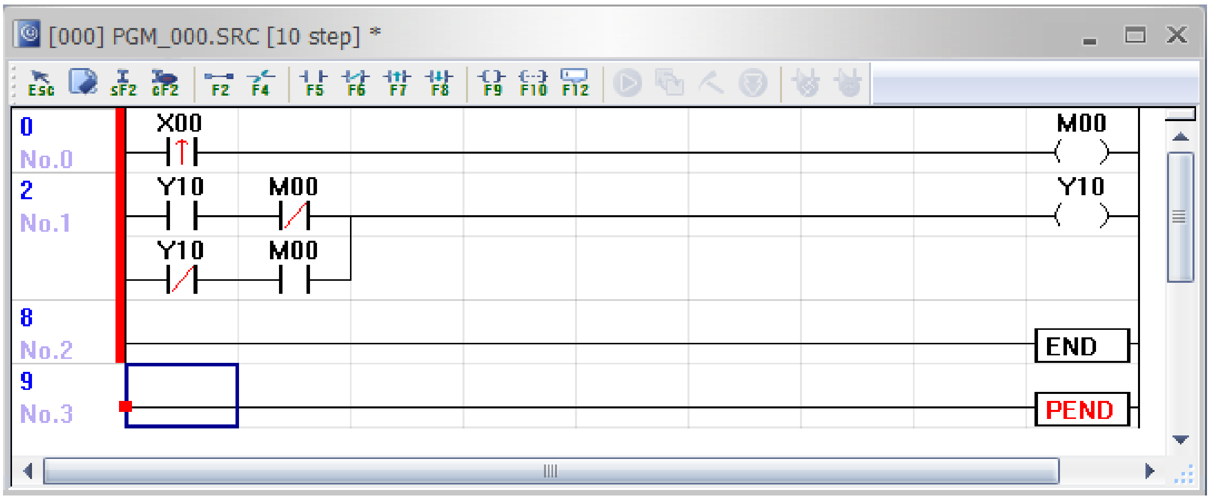
Click F5 and type M0000 and then press Ctrl+↑ to add vertical line.



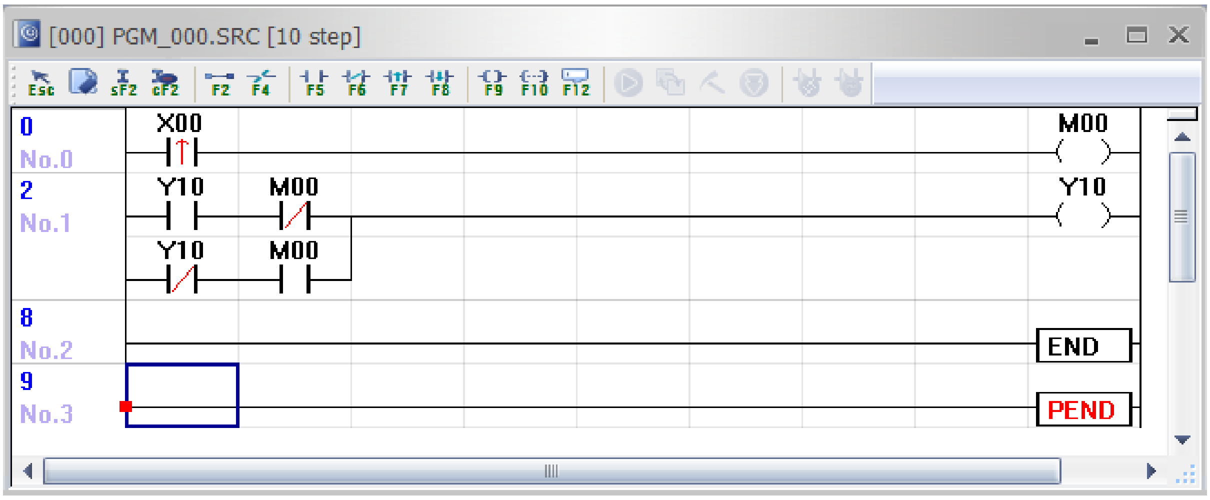
Now this example shows a parallel branch with two levels.

9) Click PEND Rung and press Ctrl+L to add a Rung.

Click F10 (Application Instruction) or press F10 and then type END to finish developing ladder logic.



10) Click File → Save Program or click

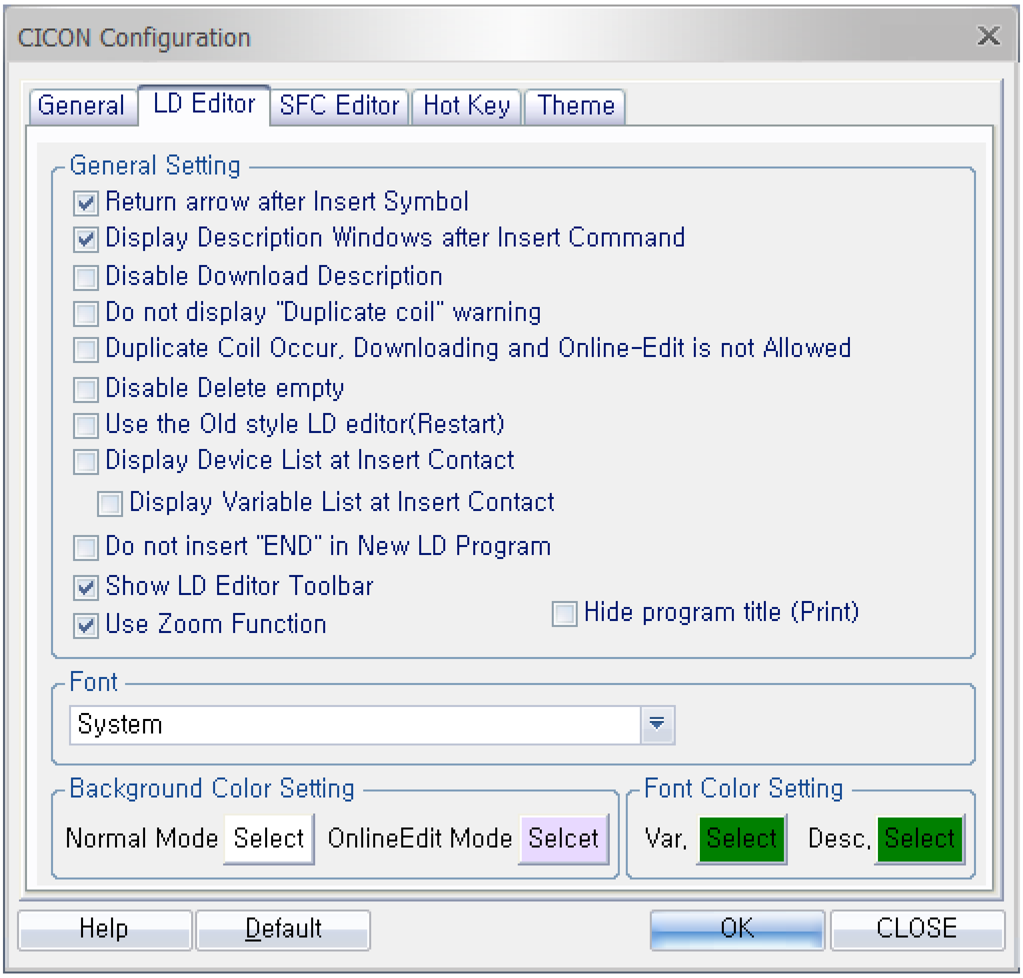


If program is saved completely, red vertical line disappears.

TIP

Click Tool → CICON Options and CICON Configuration pops up.

Click LD Editor Tab to change the LD Editor setting.



CICON Configuration

General Setting

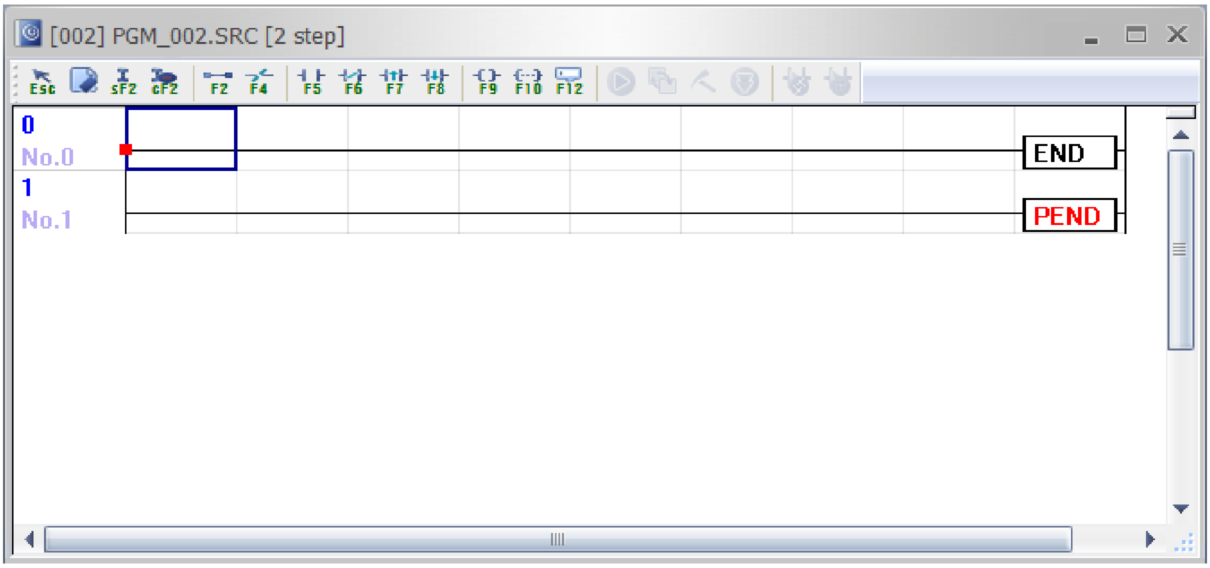
- ☑ Return arrow after Insert Symbol
- ☑ Display Description Windows after Insert Command
- ☐ Disable Download Description
- ☐ Do not display "Duplicate coil" warning
- ☐ Duplicate Coil Occur, Downloading and Online-Edit is not Allowed
- ☐ Disable Delete empty
- ☐ Use the Old style LD editor(Restart)
- ☐ Display Device List at Insert Contact
  - ☐ Display Variable List at Insert Contact
- ☐ Do not insert "END" in New LD Program
- ☑ Show LD Editor Toolbar
- ☑ Use Zoom Function
- ☐ Hide program title (Print)

Font: System

Background Color Setting: Normal Mode Select, OnlineEdit Mode Selcet

Font Color Setting: Var. Select, Desc. Select

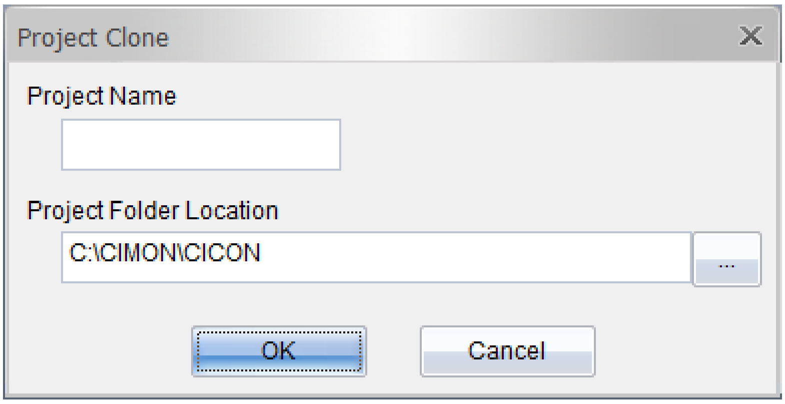
If you choose Show LD Editor Toolbar and do not choose Do not insert "END" in New LD Program, a new scan program appears as below picture.



## 4.4 Copy a Project

You can copy a project and paste to other folder with different name.

Click File → Clone Project.



Project Name:

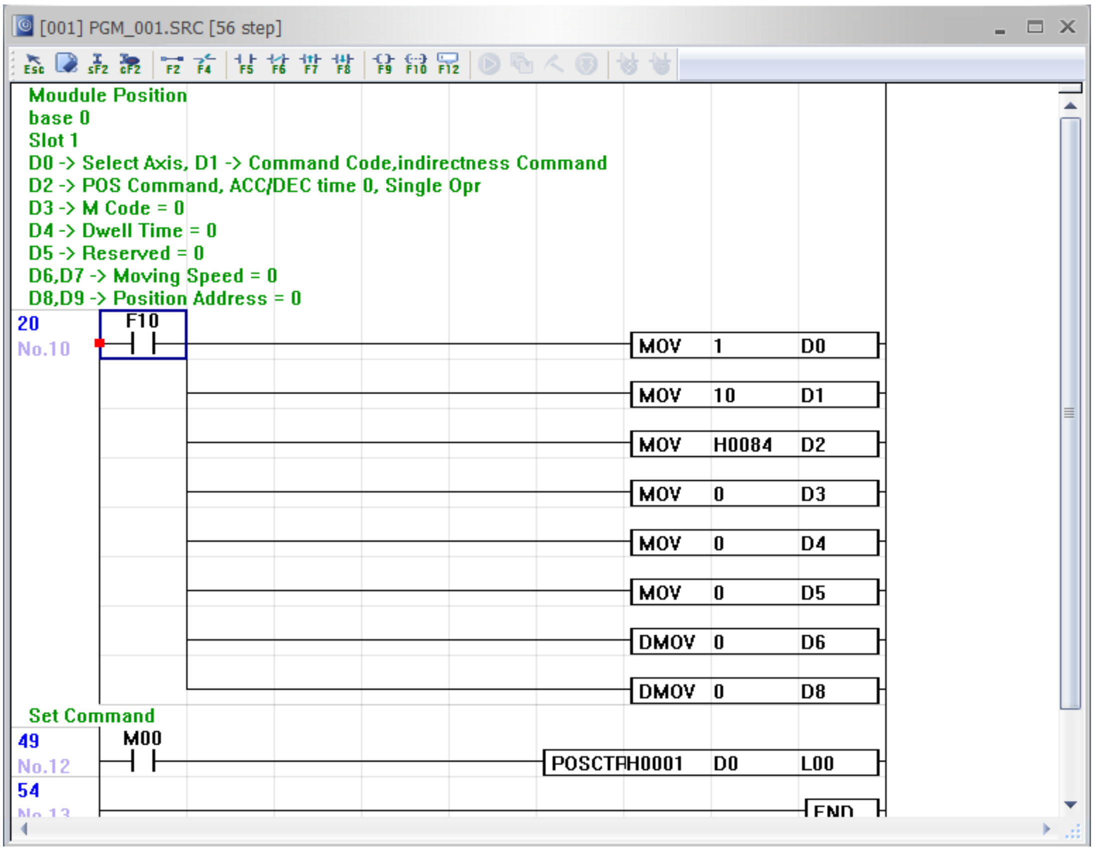
Project Folder Location: C:\CIMON\CICON

Type Project name and choose the folder you want to save in.

## 4.5 Find and Replace

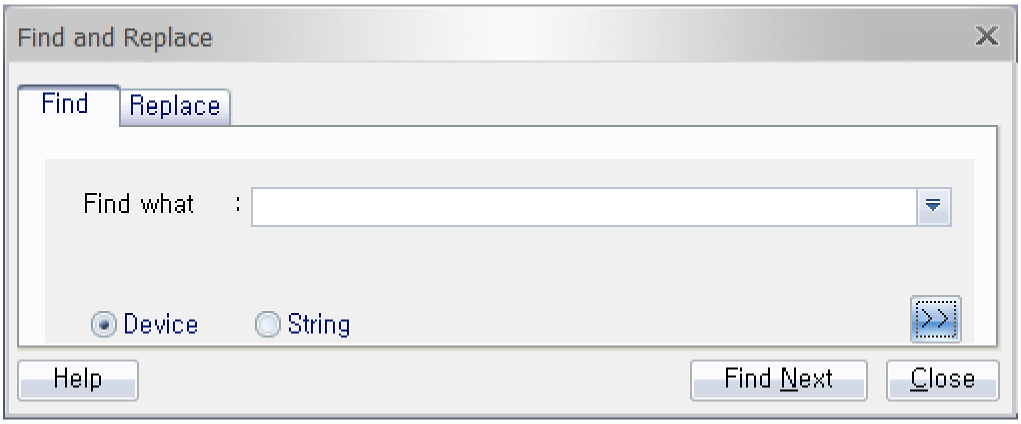
It is used to search device address or comments in ladder Logic program.

1) Click the Rung where you want to start finding.



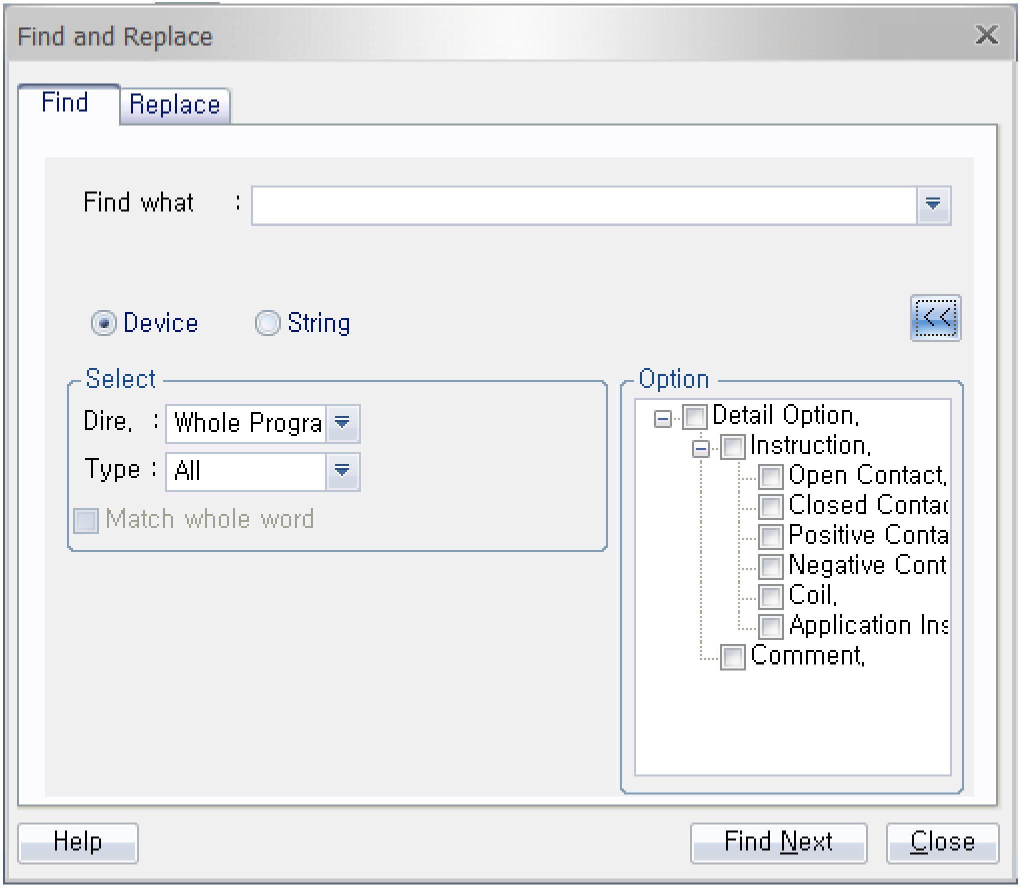
```
Moudule Position
base 0
Slot 1
D0 -> Select Axis, D1 -> Command Code,indirectness Command
D2 -> POS Command, ACC/DEC time 0, Single Opr
D3 -> M Code = 0
D4 -> Dwell Time = 0
D5 -> Reserved = 0
D6,D7 -> Moving Speed = 0
D8,D9 -> Position Address = 0
20      F10     MOV    1      D0
No.10           MOV    10     D1
                MOV    H0084  D2
                MOV    0      D3
                MOV    0      D4
                MOV    0      D5
                DMOV   0      D6
                DMOV   0      D8
Set Command
49      M00     POSCTRH0001   D0     L00
No.12
54                                   END
No.13
```

2) Click Search and then click Find and Replace.
Write device or comments that you want to find out.



- Device: It finds out only device address.
- String: It finds out only Comments. (Capital / Small letter)

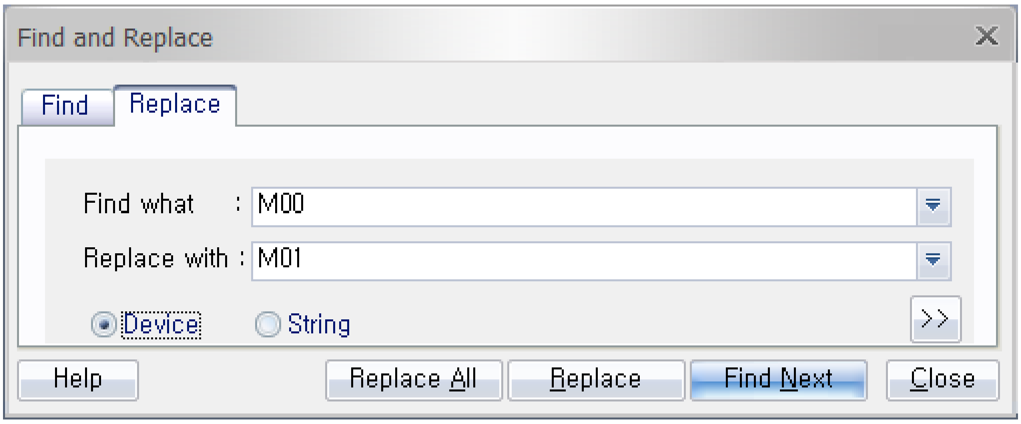
If you click there are more detailed options as follows.



You can choose the direction and data type for Device search.

3) Click Find Next.
If it finds out a device or a comment, the cursor will move to that device or comment.

4) If you want to replace a device or comment to others, click Replace tab.



Find what : M00

Replace with : M01

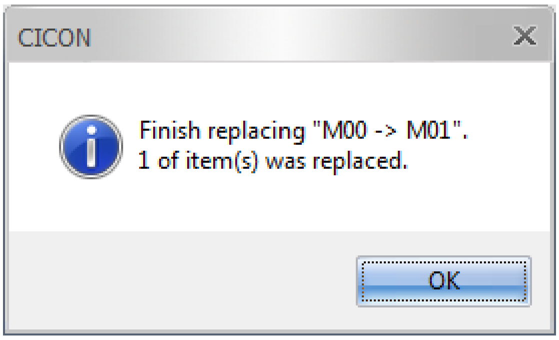
● Device ○ String

Example) Change M00 device to M01

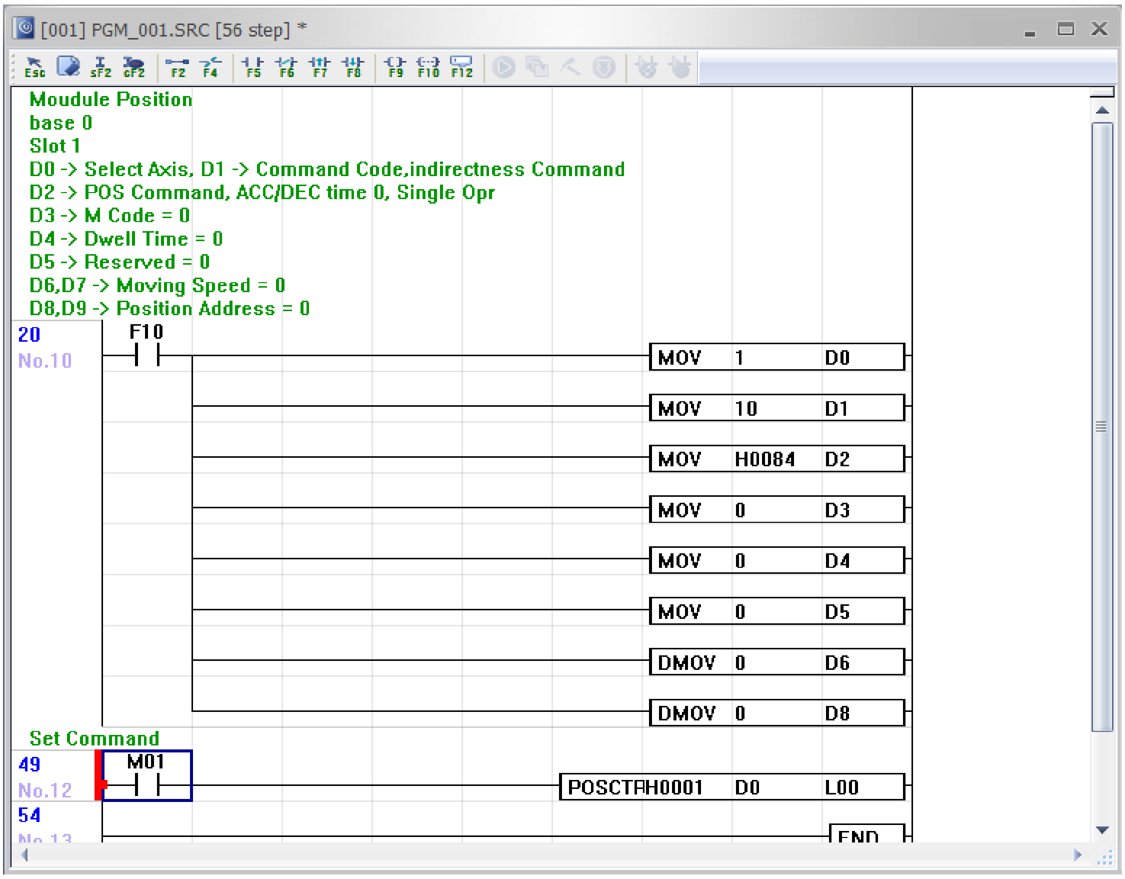
Type M00 at Find what and M01 at Replace with.

Click Replace All or Replace

5) Pop-up message appear as follows and device M00 is replaced to M01.



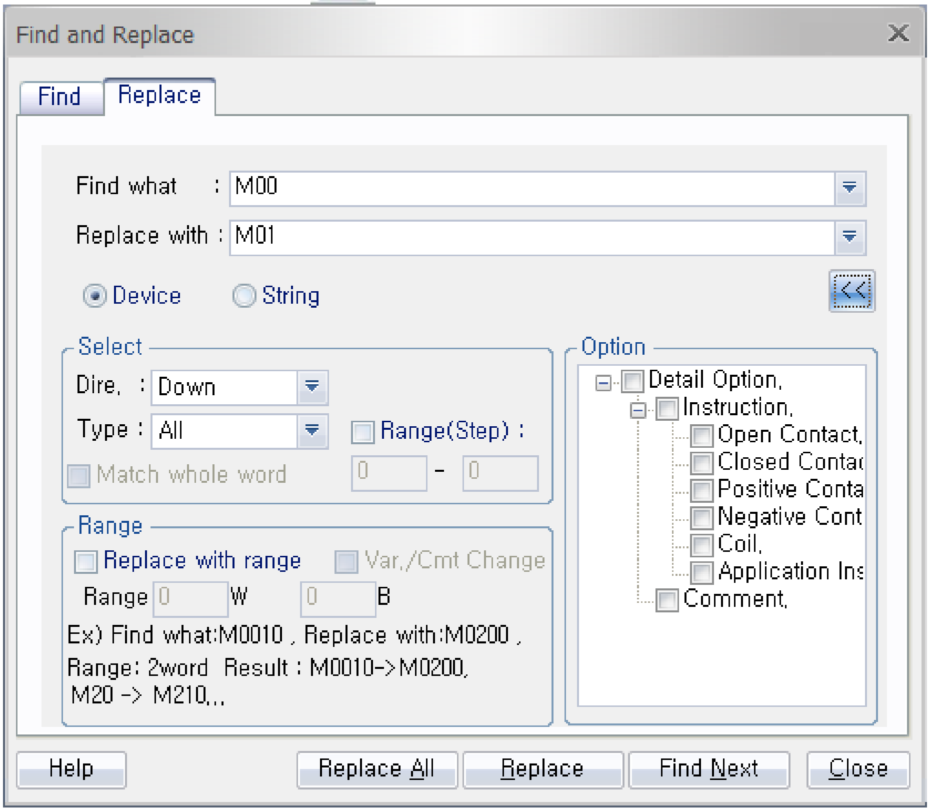
Finish replacing "M00 -> M01".
1 of item(s) was replaced.



[001] PGM_001.SRC [56 step] *

```
Moudule Position
base 0
Slot 1
D0 -> Select Axis, D1 -> Command Code,indirectness Command
D2 -> POS Command, ACC/DEC time 0, Single Opr
D3 -> M Code = 0
D4 -> Dwell Time = 0
D5 -> Reserved = 0
D6,D7 -> Moving Speed = 0
D8,D9 -> Position Address = 0
20      F10
No.10   MOV   1      D0
        MOV   10     D1
        MOV   H0084  D2
        MOV   0      D3
        MOV   0      D4
        MOV   0      D5
        DMOV  0      D6
        DMOV  0      D8
Set Command
49      M01
No.12   POSCTRH0001  D0  L00
54
No.13   END
```

6) If you click, >> there are more detailed options as follows.



Find and Replace

Find what : M00

Replace with : M01

● Device ○ String

Select

Dire. : Down

Type : All ☐ Range(Step) : 0 - 0

☐ Match whole word

Range

☐ Replace with range ☐ Var./Cmt Change

Range 0 W 0 B

Ex) Find what:M0010 , Replace with:M0200 ,
Range: 2word Result : M0010->M0200,
M20 -> M210,..

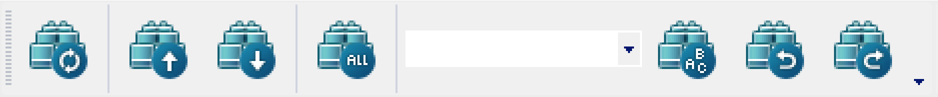
Option

- ☐ Detail Option.
  - ☐ Instruction.
    - ☐ Open Contact.
    - ☐ Closed Contac
    - ☐ Positive Conta
    - ☐ Negative Cont
    - ☐ Coil.
    - ☐ Application Ins
  - ☐ Comment.

- ● Range (Step): It finds and replaces in the set range. (Device only)
- ● Replace with range: It replaces device from starting device address.

W: Word, B: Bit

■ Icon for Find and Replace



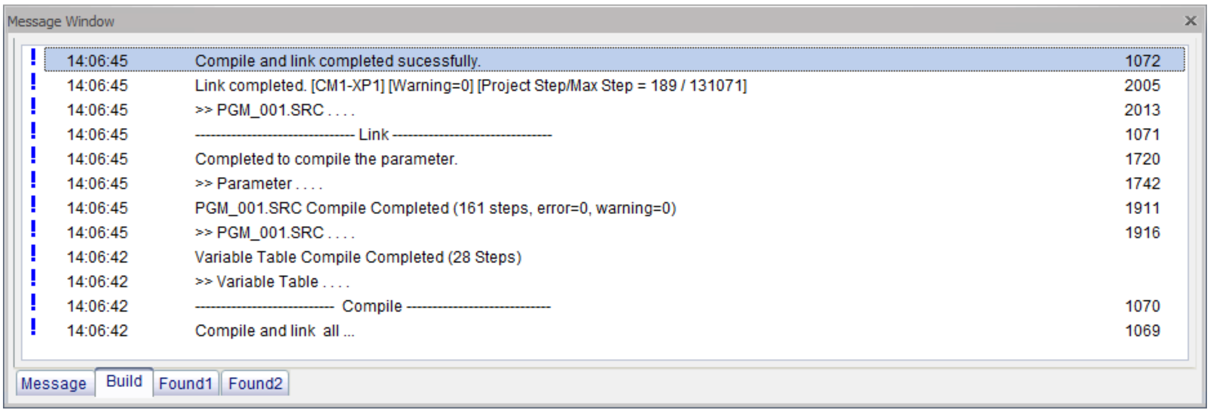
In order to use Search icon, click View → Tool Bar and choose Search.

Type a device or comment and click icon for quick search.

## 4.6 Compile and Link

Before you download a project to PLC, ladder logic program must be compiled.

1) Open a project that you want to download.
2) Click Tool and choose Compile All+Link.
3) The result appears on the Message window.



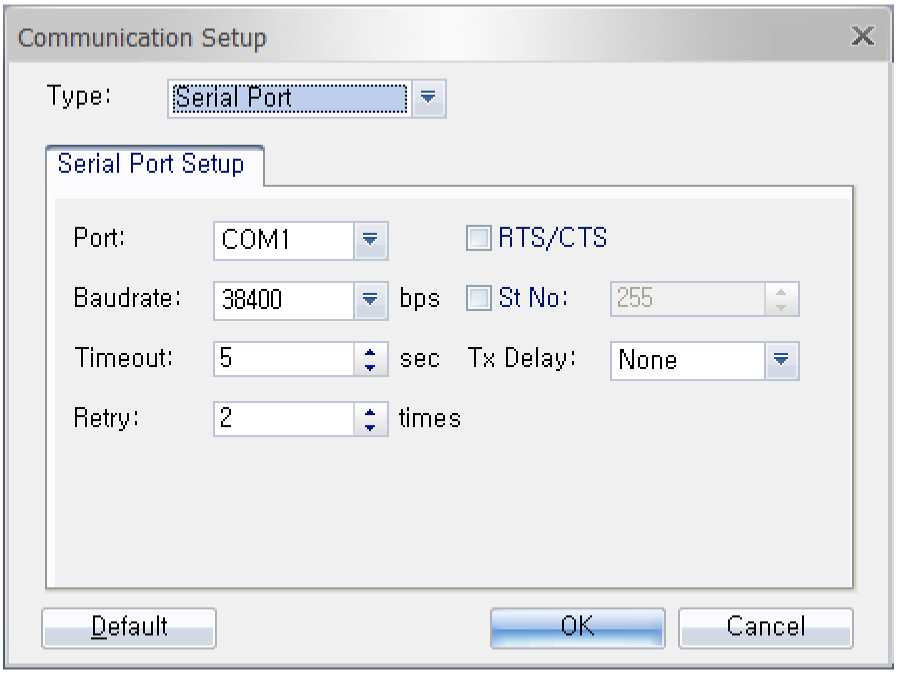
```
Message Window
!  14:06:45   Compile and link completed sucessfully.                                            1072
!  14:06:45   Link completed. [CM1-XP1] [Warning=0] [Project Step/Max Step = 189 / 131071]        2005
!  14:06:45   >> PGM_001.SRC . . . .                                                             2013
!  14:06:45   ----------------------------- Link -----------------------------                   1071
!  14:06:45   Completed to compile the parameter.                                                1720
!  14:06:45   >> Parameter . . . .                                                               1742
!  14:06:45   PGM_001.SRC Compile Completed (161 steps, error=0, warning=0)                      1911
!  14:06:45   >> PGM_001.SRC . . . .                                                             1916
!  14:06:42   Variable Table Compile Completed (28 Steps)
!  14:06:42   >> Variable Table . . . .
!  14:06:42   ------------------------ Compile --------------------------                        1070
!  14:06:42   Compile and link  all ...                                                          1069
```

## 4.7 Connection Setup for Downloading a Project to the PLC

Before you download a project from your computer to the PLC, Computer and PLC must be connected through one of communication in Connection Setup.

1) Open the CICON project that you want to download.
2) Click Tool and then Connection Setup.
3) From the Type pull-down menu, choose one of communication.
   There are 6 types of communications as follows.

■ Serial Port



Communication Setup

Type: Serial Port

Serial Port Setup

Port: COM1

☐ RTS/CTS

Baudrate: 38400 bps

☐ St No: 255

Timeout: 5 sec

Tx Delay: None

Retry: 2 times

● Port : Choose the port number of computer which Serial cable is connected to PLC.

● Baud rate : Choose default 38400bps if computer is connected to loader port of CPU module.

If computer is connected to Serial communication module (CM1-SC02A, SC01A, SC01B, SC02C, CM3-SP02ERS, SP02ERR, or etc.), it must be matched with Baud rate of Serial module.

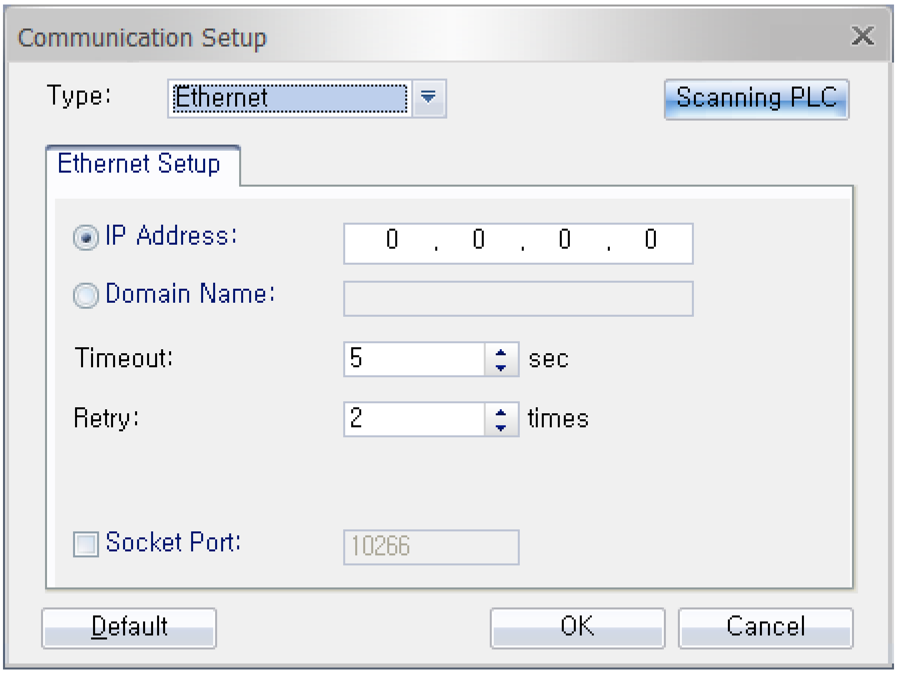
| | CPU module (Loader port) | Serial communication module |
|---|---|---|
| Default Baud rate | 38400bps | 300 – 38400bps |

● RTS/CTS : It is used when computer is connected to PLC through RS485 type.

● Tx Delay : it is used when computer is connected to PLC through USB to Serial converter.

From the Tx Delay pull-down menu, choose the one to protect heavy frame loading.

■ Ethernet



Type: Ethernet

● IP Address: 0 . 0 . 0 . 0

○ Domain Name:

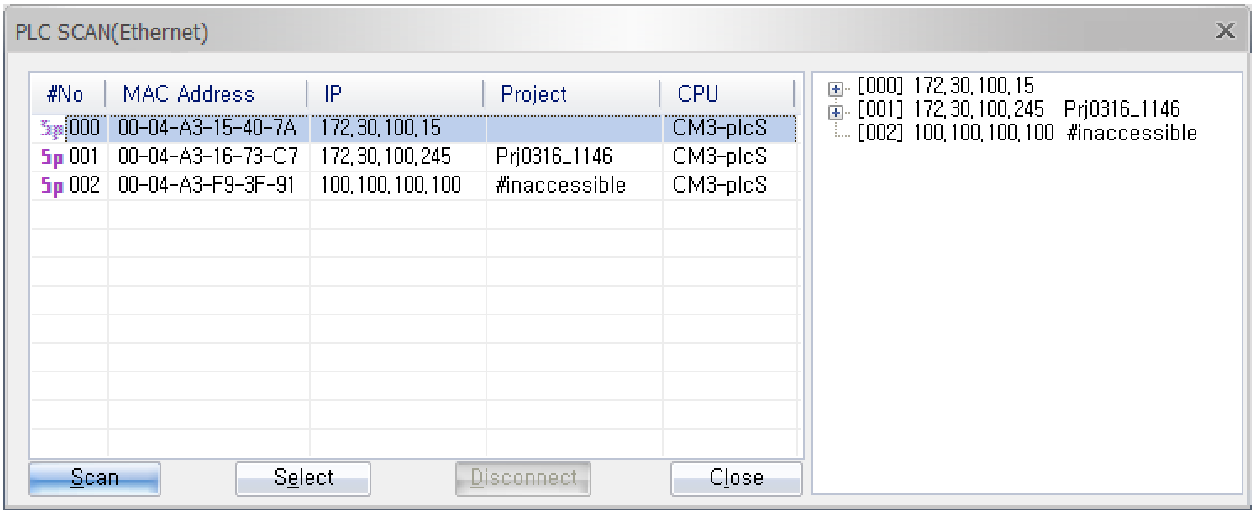
Timeout: 5 sec

Retry: 2 times

☐ Socket Port: 10266

Type IP Address or Domain name of Ethernet module or CM3 CPU module.

● Scanning PLC : To find out IP address of PLC which is already connected to your computer, click Scanning PLC.

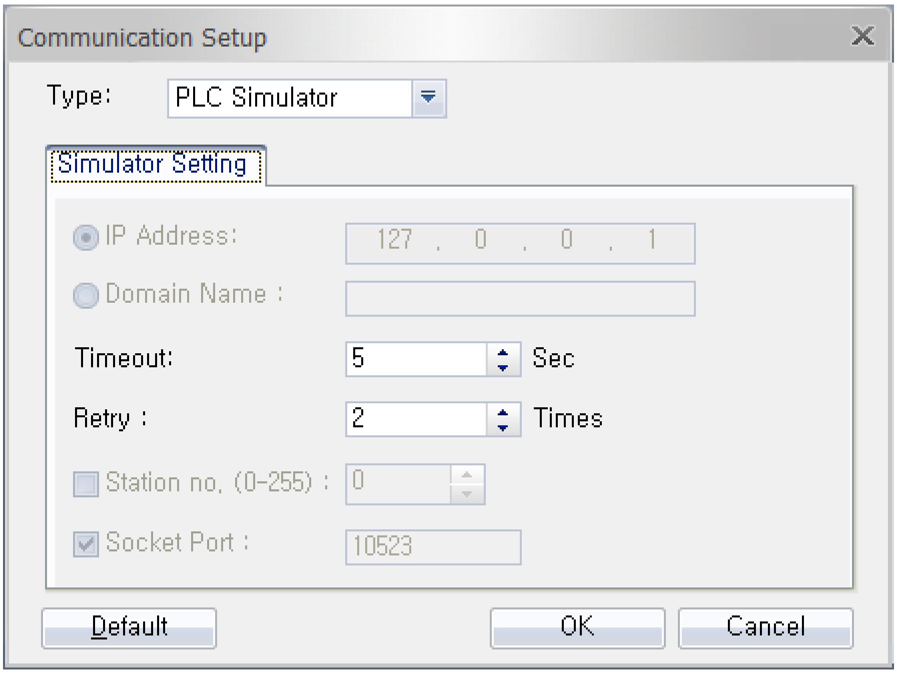


| #No | MAC Address | IP | Project | CPU |
|---|---|---|---|---|
| 000 | 00-04-A3-15-40-7A | 172,30,100,15 | | CM3-plcS |
| 001 | 00-04-A3-16-73-C7 | 172,30,100,245 | Prj0316_1146 | CM3-plcS |
| 002 | 00-04-A3-F9-3F-91 | 100,100,100,100 | #inaccessible | CM3-plcS |

[000] 172,30,100,15
[001] 172,30,100,245 Prj0316_1146
[002] 100,100,100,100 #inaccessible

Click Scan to search IP address and choose the one you want to connect.

■ PLC Simulator



Type: PLC Simulator

○ IP Address: 127 . 0 . 0 . 1

○ Domain Name :

Timeout: 5 Sec

Retry : 2 Times

☐ Station no. (0-255) : 0

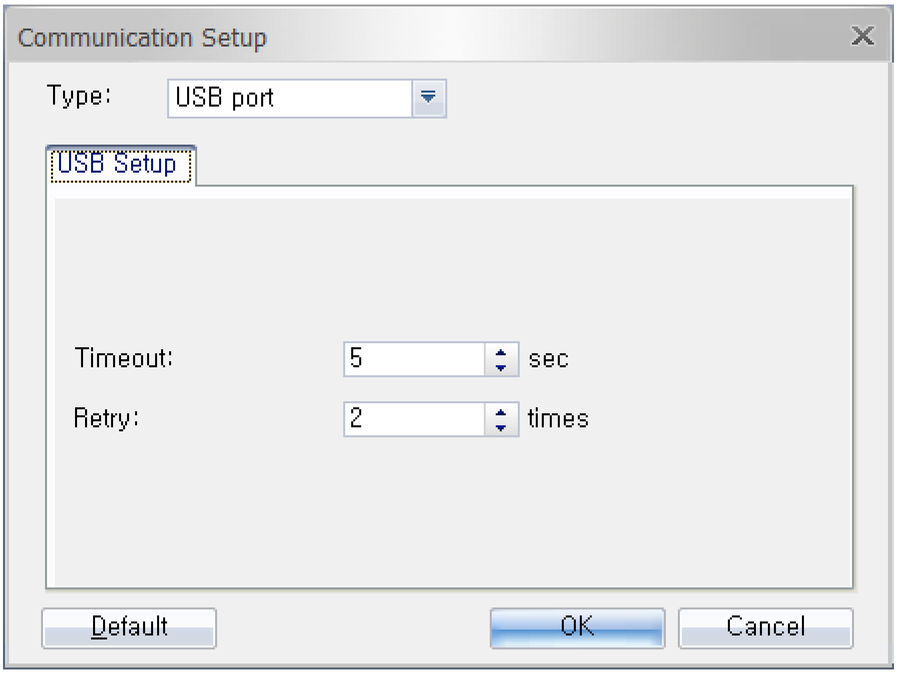
☑ Socket Port : 10523

To simulate ladder logic program without PLC modules, choose PLC Simulator.

You can also connect PLC Simulator to XPANEL or UltimateAccess(SCADA software).

For more information of PLC Simulator setting, please refer to PLC Simulator chapter.

■ USB port



Type: USB port

Timeout: 5 sec

Retry: 2 times

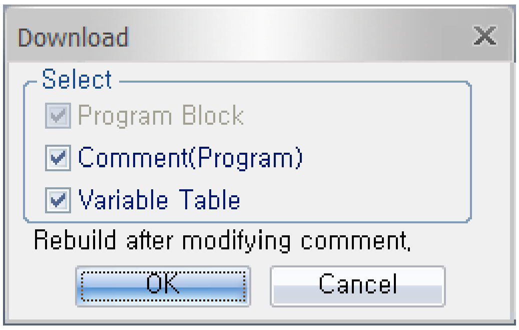
Choose USB port if your computer is connected to PLC through USB cable.

● If your computer connects PLC through USB port first time, the computer may not connect to PLC because USB driver is not installed in the computer.

For USB driver installation, please click here.

## 4.8 Download a Project to the PLC

1) Open a project you want to download.
2) Click Online and choose Link+Download+Monitor or Download(PC→PLC)



Download

Select

☑ Program Block

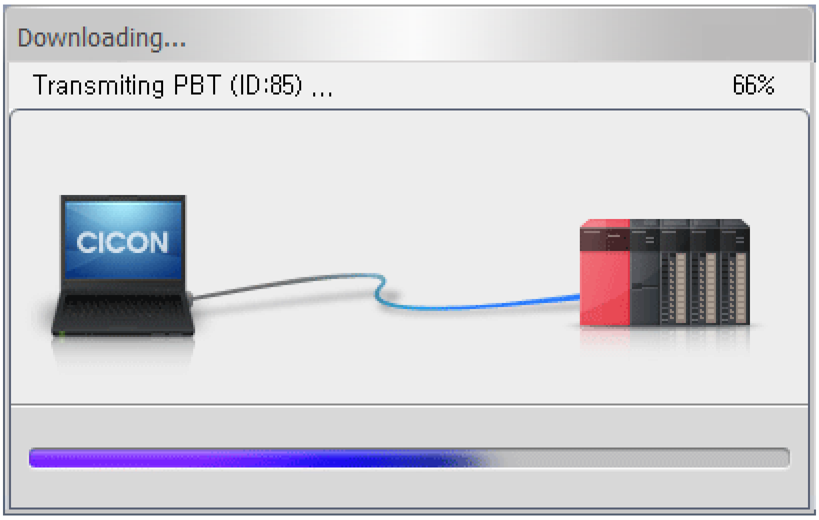
☑ Comment(Program)

☑ Variable Table

Rebuild after modifying comment.

● If you want to save memory of CPU, uncheck Comment(Program) and Variable Table.

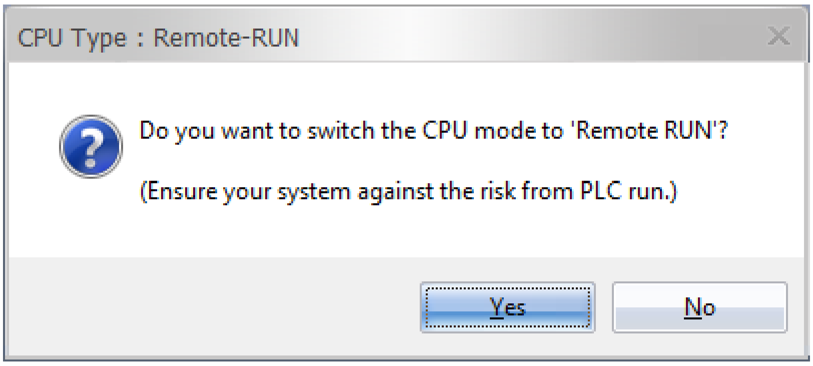
3) Click OK.



Downloading...

Transmiting PBT (ID:85) ... 66%

4) When download completes, pop-up message appears as follows.



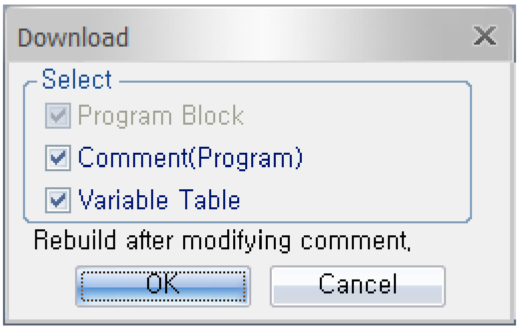
CPU Type : Remote-RUN

Do you want to switch the CPU mode to 'Remote RUN'?

(Ensure your system against the risk from PLC run.)

Open a project you want to download.

5) Click Online and choose Link+Download+Monitor or Download(PC→PLC)



Download

Select

☑ Program Block

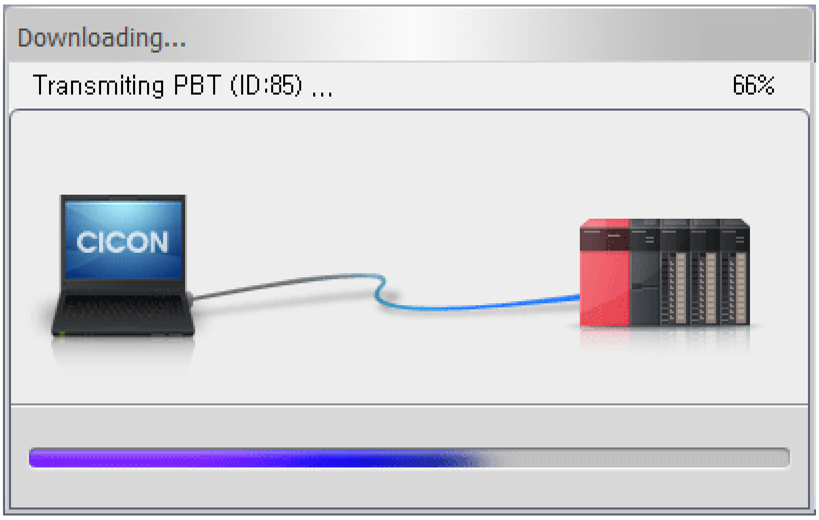
☑ Comment(Program)

☑ Variable Table

Rebuild after modifying comment.

- ● If you want to save memory of CPU, uncheck Comment(Program) and Variable Table.

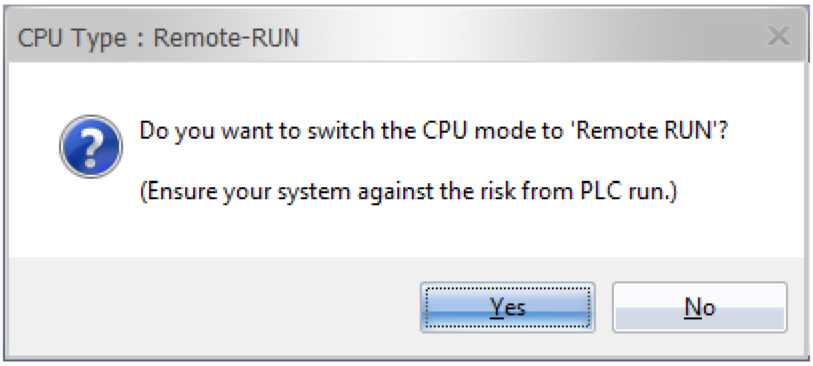
6) Click OK.



Downloading...

Transmiting PBT (ID:85) ... 66%

7) When download completes, pop-up message appears as follows.



CPU Type : Remote-RUN

Do you want to switch the CPU mode to 'Remote RUN'?

(Ensure your system against the risk from PLC run.)

## 4.9 Monitor a program

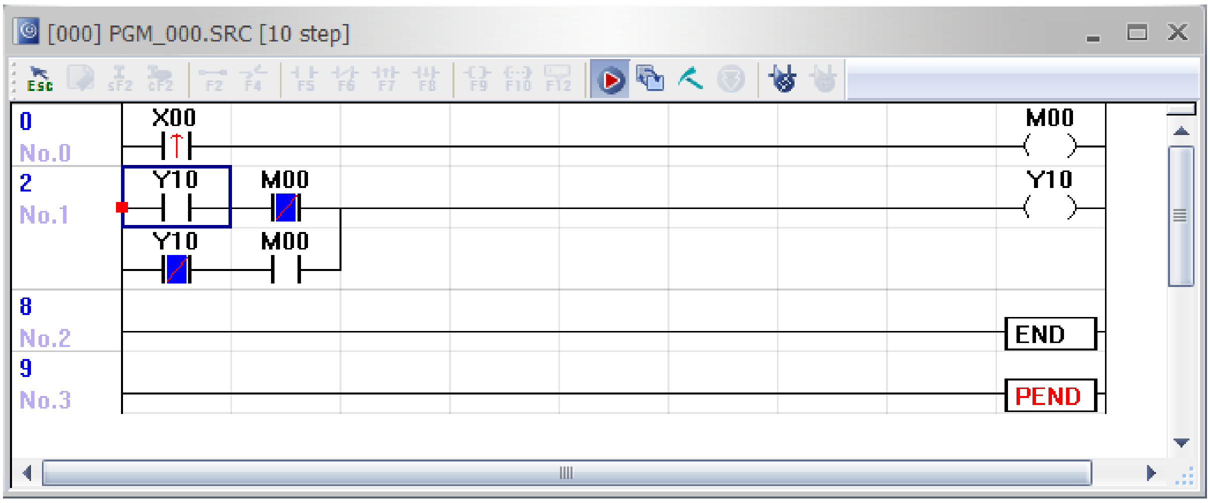
To monitor a project that is executing in a PLC, CICON(computer) must be connected to PLC.

There are three way to operate program monitor.

● Click Online and choose Connect.

● Click Online and choose Link+Download+Monitor, Monitor runs automatically when downloading completes.

● Click Online → Program Monitor and choose Start Program Monitor or click ▶

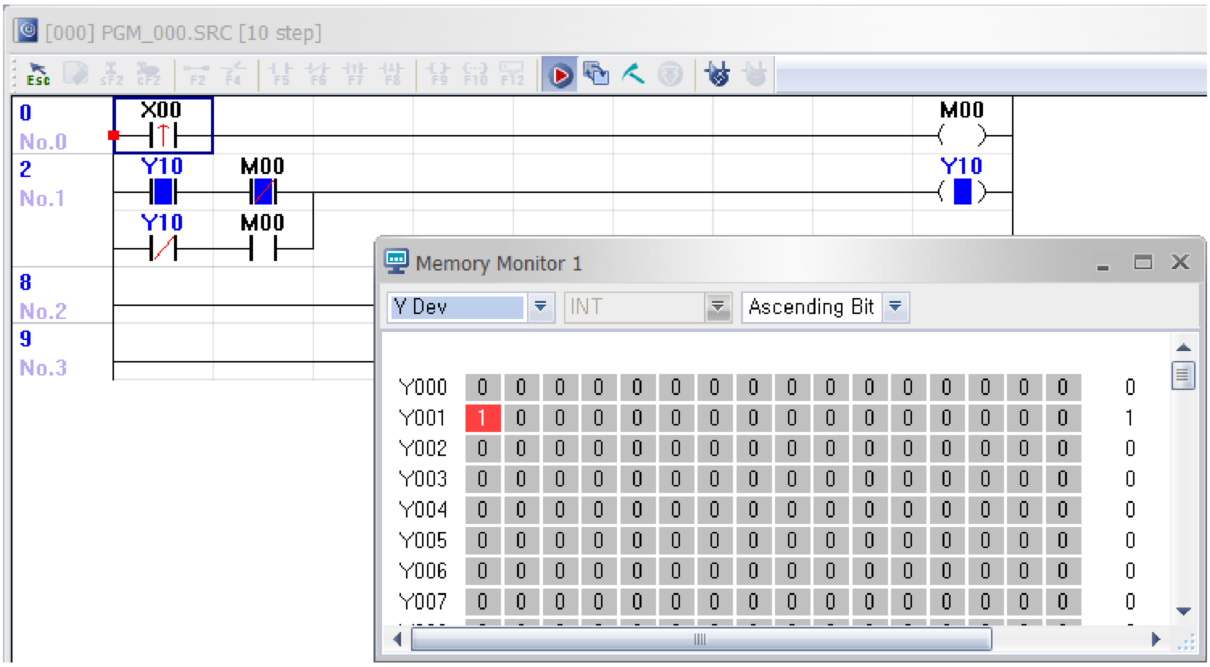


If contact is ON, blue mark appears on the contact.

To change the device value, press Shift + double click the contact or press Shift + Enter.

■ Memory Monitor

To monitor device values, click Online and choose Memory Monitor or click 🖥.

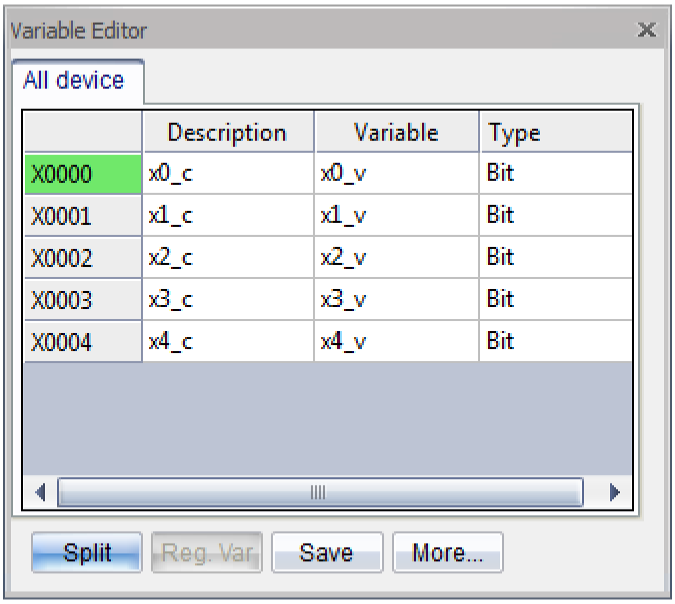


| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y001 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Y002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Y007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

If you change the value at the ladder logic program, Memory Monitor shows the value.

## 4.10 Create a Variable Editor for Device

1) Click View and choose Variable Window or press F11.
2) Variable Editor appears.



| | Description | Variable | Type |
|---|---|---|---|
| X0000 | x0_c | x0_v | Bit |
| X0001 | x1_c | x1_v | Bit |
| X0002 | x2_c | x2_v | Bit |
| X0003 | x3_c | x3_v | Bit |
| X0004 | x4_c | x4_v | Bit |

Device address is Bit or Word type.

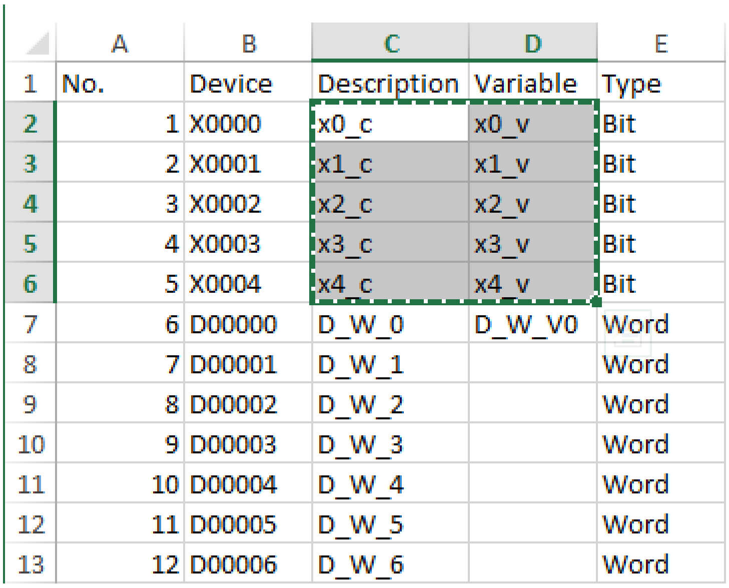
- Bit Device : X, Y, M, L, K, T, C, S

- Word Device : X, Y, M, L, K, D

3) Click Reg. Var and type variable description or name.

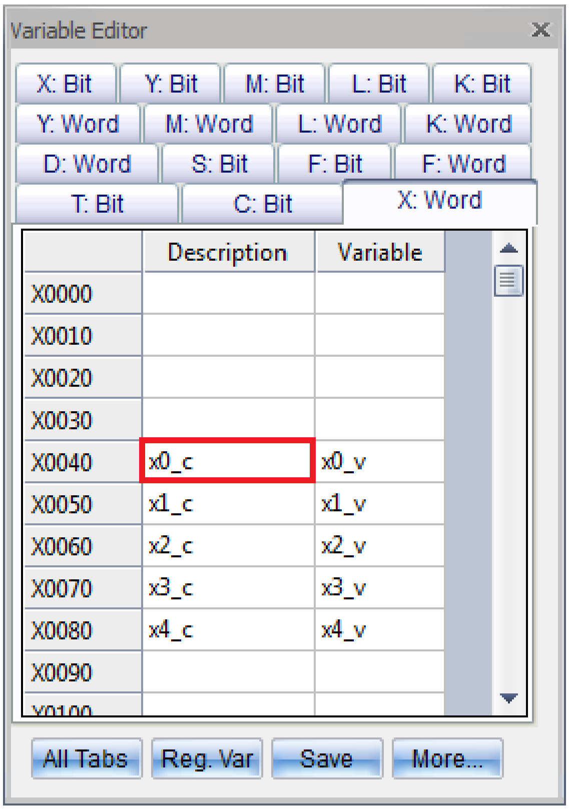
4) You can also copy the variable description and name from Excel and paste to Variable Editor.

5) Write variable description and name on the Excel and drag cells that you want to copy and press Ctrl + C.



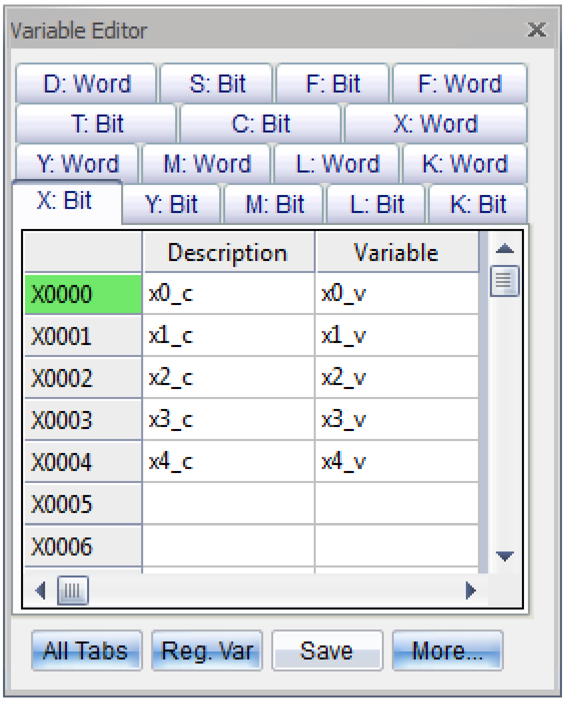
|  | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | No. | Device | Description | Variable | Type |
| 2 | 1 | X0000 | x0_c | x0_v | Bit |
| 3 | 2 | X0001 | x1_c | x1_v | Bit |
| 4 | 3 | X0002 | x2_c | x2_v | Bit |
| 5 | 4 | X0003 | x3_c | x3_v | Bit |
| 6 | 5 | X0004 | x4_c | x4_v | Bit |
| 7 | 6 | D00000 | D_W_0 | D_W_V0 | Word |
| 8 | 7 | D00001 | D_W_1 |  | Word |
| 9 | 8 | D00002 | D_W_2 |  | Word |
| 10 | 9 | D00003 | D_W_3 |  | Word |
| 11 | 10 | D00004 | D_W_4 |  | Word |
| 12 | 11 | D00005 | D_W_5 |  | Word |
| 13 | 12 | D00006 | D_W_6 |  | Word |

6) Click the Split or All Variable and select device and then click the Description cell of address you want to paste and press Ctrl + V.



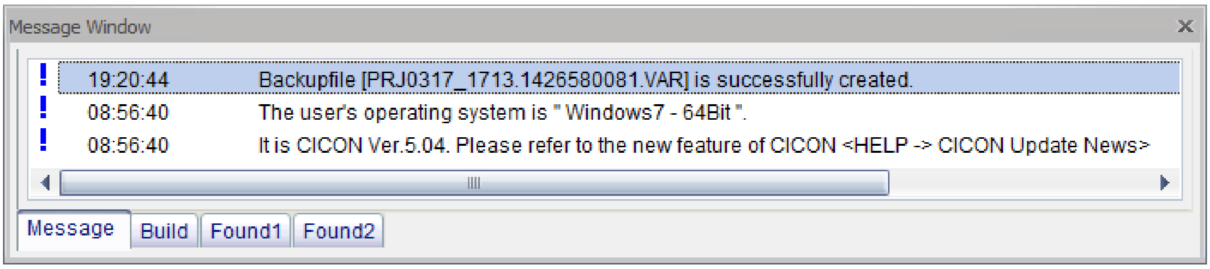
|  | Description | Variable |
|---|---|---|
| X0000 |  |  |
| X0010 |  |  |
| X0020 |  |  |
| X0030 |  |  |
| X0040 | x0_c | x0_v |
| X0050 | x1_c | x1_v |
| X0060 | x2_c | x2_v |
| X0070 | x3_c | x3_v |
| X0080 | x4_c | x4_v |
| X0090 |  |  |

7) If you click Split, you can see Variable description and name by Device.



| | Description | Variable |
|---|---|---|
| X0000 | x0_c | x0_v |
| X0001 | x1_c | x1_v |
| X0002 | x2_c | x2_v |
| X0003 | x3_c | x3_v |
| X0004 | x4_c | x4_v |
| X0005 | | |
| X0006 | | |

8) Click Save.
If Variable is saved completely, the message pops up as below.



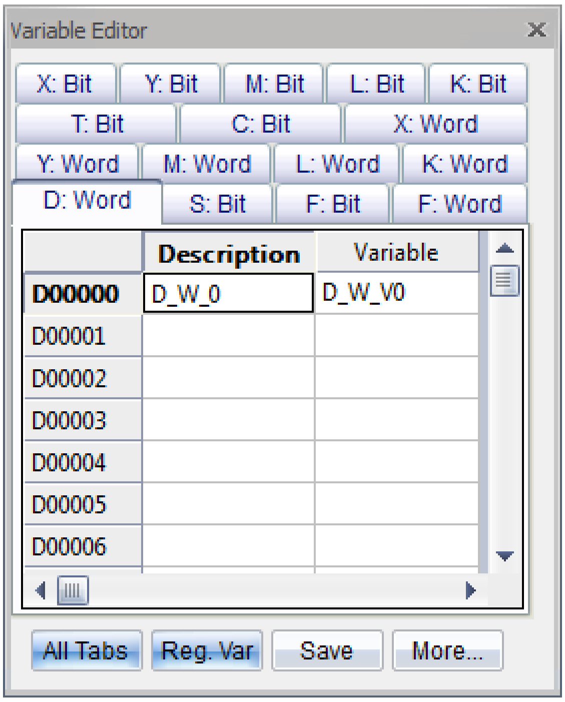
```
19:20:44    Backupfile [PRJ0317_1713.1426580081.VAR] is successfully created.
08:56:40    The user's operating system is " Windows7 - 64Bit ".
08:56:40    It is CICON Ver.5.04. Please refer to the new feature of CICON <HELP -> CICON Update News>
```

If you don't save the Variable table and close CICON, all variable that you add or edit will be removed.

Also, when you print or export Variable, Variable table must be saved.

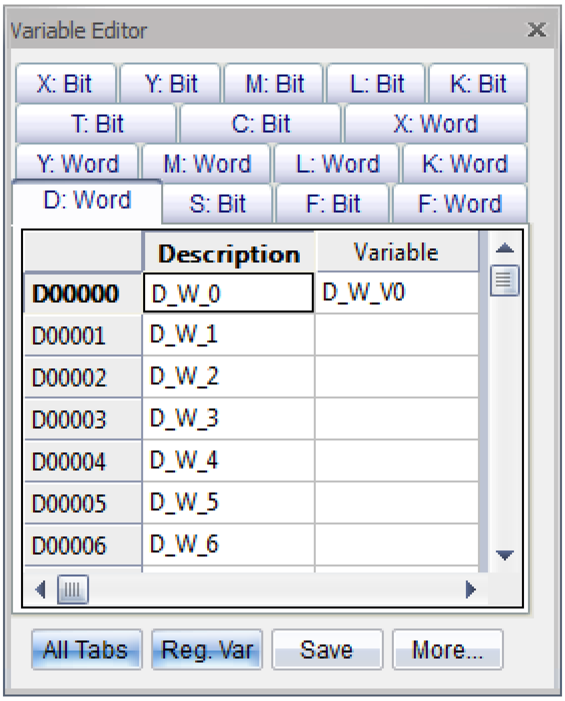
[TIP] Consecutive number can be created automatically.

1) Type description or Variable name at the first cell. (Last character must be number)



| | Description | Variable |
|---|---|---|
| **D00000** | D_W_0 | D_W_V0 |
| D00001 | | |
| D00002 | | |
| D00003 | | |
| D00004 | | |
| D00005 | | |
| D00006 | | |

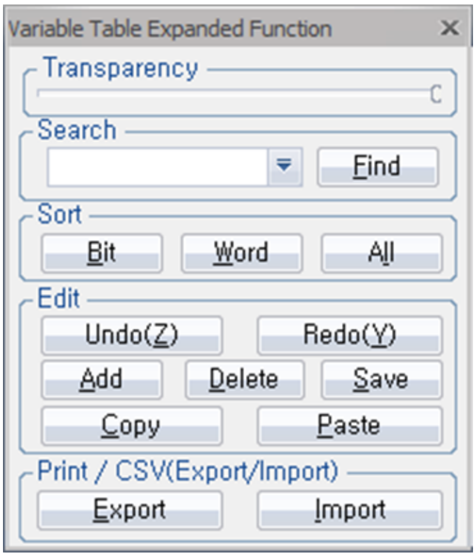
2) Select the first cell and press Shift and drag mouse down.



| | Description | Variable |
|---|---|---|
| **D00000** | D_W_0 | D_W_V0 |
| D00001 | D_W_1 | |
| D00002 | D_W_2 | |
| D00003 | D_W_3 | |
| D00004 | D_W_4 | |
| D00005 | D_W_5 | |
| D00006 | D_W_6 | |

■ Variable Table Expanded Function

If you click More, Variable Table Expanded Function dialog box pops up as below.



● Transparency : Adjust dialog box transparent.

● Search : It is used to search device address, variable description, variable name or type.

Type what you want to find out and click Find.

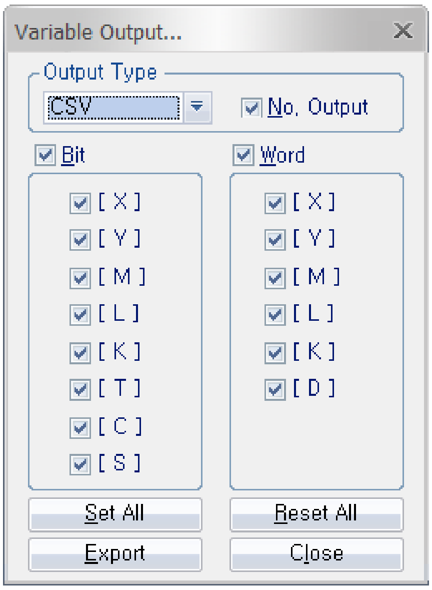
● Sort : It is used to show variable by data type.

● Print / CSV (Export/Import) : It is used to import and export variable table.

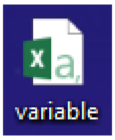
- Export : You can export Variable table to CSV file or print it out.

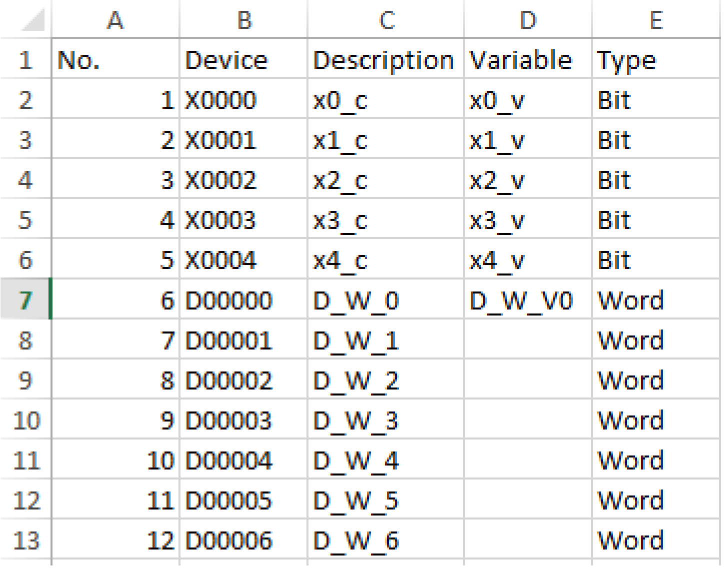
(You can also export Variable table in another way. Click Tool → Variable and choose Export. It is saved as PLCV file.)

1) If you click Export, Variable Output dialog box appears.



2) Choose the Output Type and variable that you want to export and click Export.
3) Select the folder that you want to save and click Save.
4) Your variable table is saved in CSV file as follows.



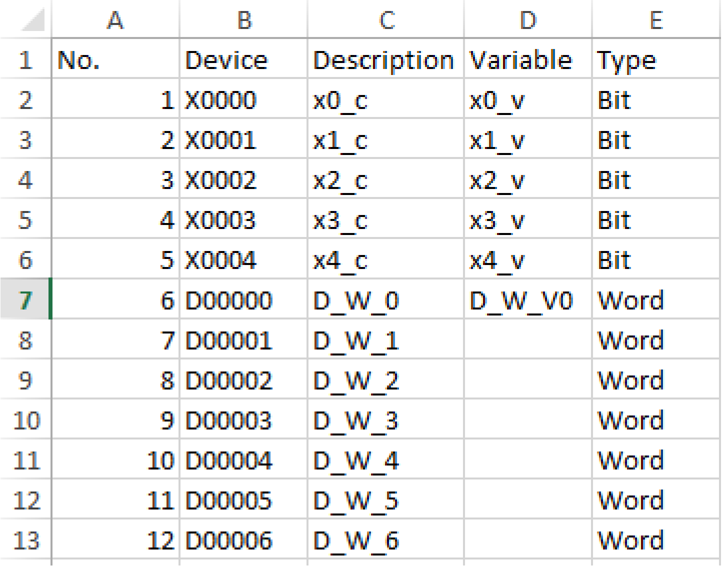


|  | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | No. | Device | Description | Variable | Type |
| 2 | 1 | X0000 | x0_c | x0_v | Bit |
| 3 | 2 | X0001 | x1_c | x1_v | Bit |
| 4 | 3 | X0002 | x2_c | x2_v | Bit |
| 5 | 4 | X0003 | x3_c | x3_v | Bit |
| 6 | 5 | X0004 | x4_c | x4_v | Bit |
| 7 | 6 | D00000 | D_W_0 | D_W_V0 | Word |
| 8 | 7 | D00001 | D_W_1 |  | Word |
| 9 | 8 | D00002 | D_W_2 |  | Word |
| 10 | 9 | D00003 | D_W_3 |  | Word |
| 11 | 10 | D00004 | D_W_4 |  | Word |
| 12 | 11 | D00005 | D_W_5 |  | Word |
| 13 | 12 | D00006 | D_W_6 |  | Word |

- Import : You can open CSV file in Variable Editor.

(You can also import PLCV file in another way. Click Tool → Variable and choose Import.)

The variable table format must be as follows.



|  | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | No. | Device | Description | Variable | Type |
| 2 | 1 | X0000 | x0_c | x0_v | Bit |
| 3 | 2 | X0001 | x1_c | x1_v | Bit |
| 4 | 3 | X0002 | x2_c | x2_v | Bit |
| 5 | 4 | X0003 | x3_c | x3_v | Bit |
| 6 | 5 | X0004 | x4_c | x4_v | Bit |
| 7 | 6 | D00000 | D_W_0 | D_W_V0 | Word |
| 8 | 7 | D00001 | D_W_1 |  | Word |
| 9 | 8 | D00002 | D_W_2 |  | Word |
| 10 | 9 | D00003 | D_W_3 |  | Word |
| 11 | 10 | D00004 | D_W_4 |  | Word |
| 12 | 11 | D00005 | D_W_5 |  | Word |
| 13 | 12 | D00006 | D_W_6 |  | Word |

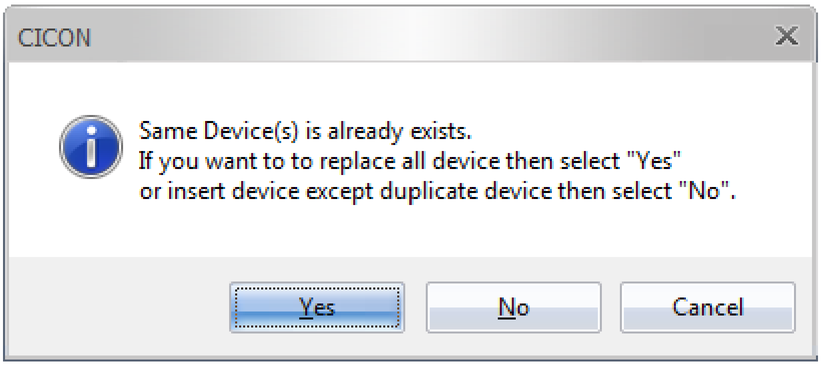
■ Format follows these conventions

The first row (No., Device, Description, Variable and Type) can be eliminated.

Variable name cannot contain special character, space or same variable name.

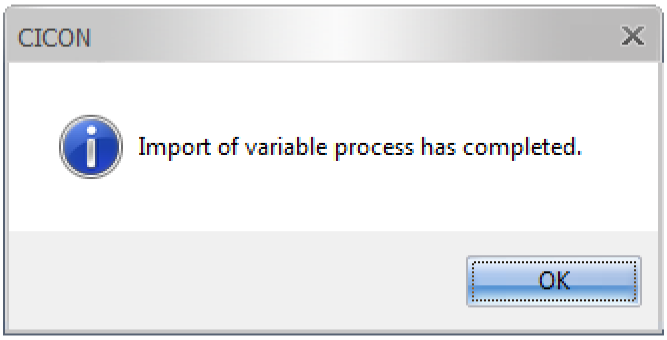
Only Bit and Word are available.

1) Click Import and select CSV file that you want to open.
2) If variable name already exists in Variable Editor, you can select options.



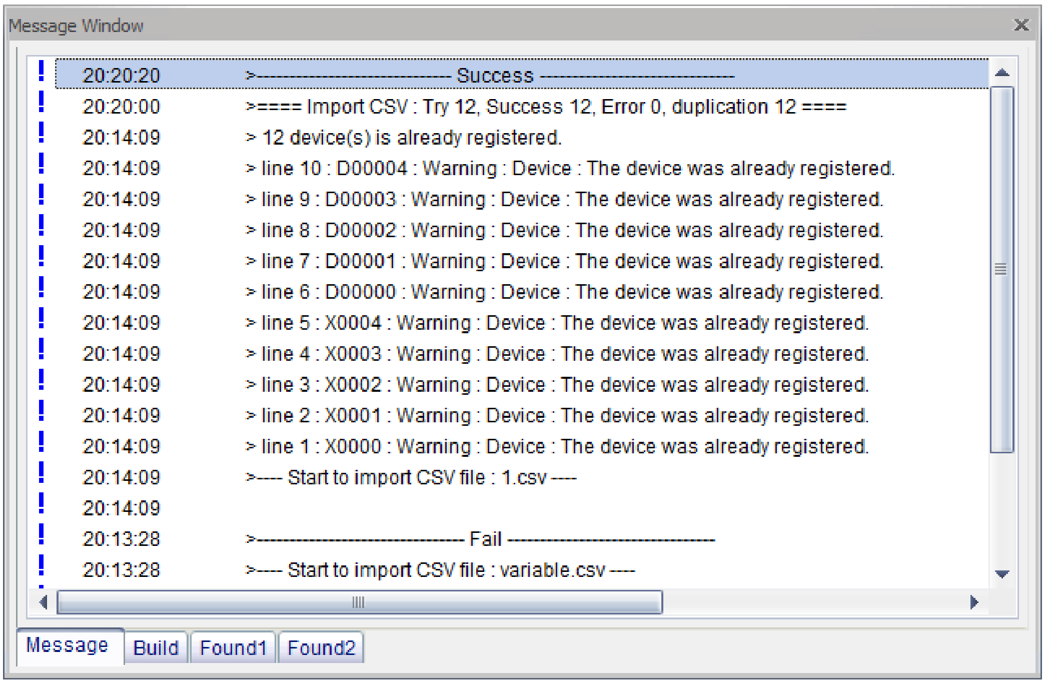
Same Device(s) is already exists.
If you want to to replace all device then select "Yes"
or insert device except duplicate device then select "No".

3) If CSV file opens successfully, below message appears.



Import of variable process has completed.

You can also check all history at the Message Window.



```
20:20:20    >-------------------------- Success --------------------------
20:20:00    >==== Import CSV : Try 12, Success 12, Error 0, duplication 12 ====
20:14:09    > 12 device(s) is already registered.
20:14:09    > line 10 : D00004 : Warning : Device : The device was already registered.
20:14:09    > line 9 : D00003 : Warning : Device : The device was already registered.
20:14:09    > line 8 : D00002 : Warning : Device : The device was already registered.
20:14:09    > line 7 : D00001 : Warning : Device : The device was already registered.
20:14:09    > line 6 : D00000 : Warning : Device : The device was already registered.
20:14:09    > line 5 : X0004 : Warning : Device : The device was already registered.
20:14:09    > line 4 : X0003 : Warning : Device : The device was already registered.
20:14:09    > line 3 : X0002 : Warning : Device : The device was already registered.
20:14:09    > line 2 : X0001 : Warning : Device : The device was already registered.
20:14:09    > line 1 : X0000 : Warning : Device : The device was already registered.
20:14:09    >---- Start to import CSV file : 1.csv ----
20:14:09
20:13:28    >---------------------------- Fail ----------------------------
20:13:28    >---- Start to import CSV file : variable.csv ----
```

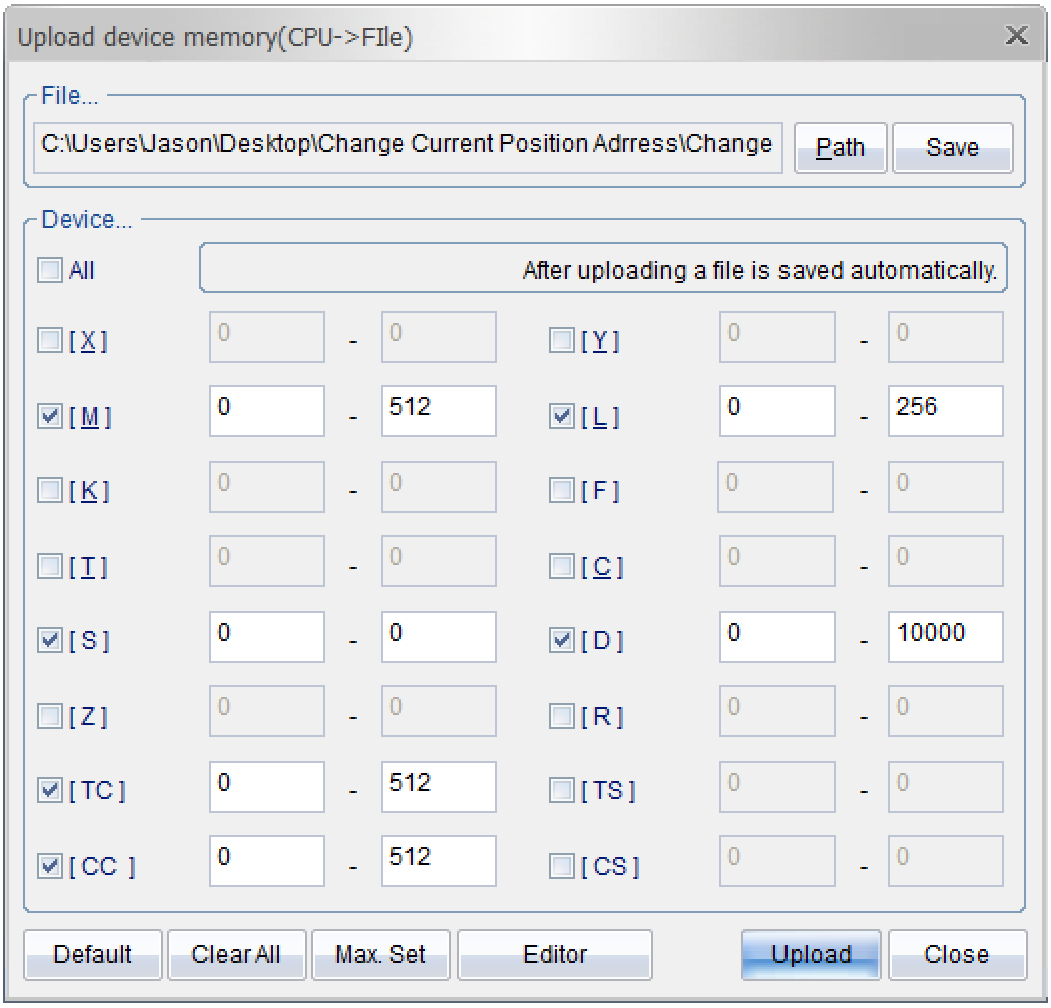
## 4.11 Device Memory download and upload

It is used to download device memory value from CICON to connected CPU module or upload device memory value from CPU module to CICON.

### Upload device memory

Click Online → Memory Download/Upload and choose Upload device memory (CPU → File).

The Upload device memory window appears.



Upload device memory(CPU->FIle)

File...

C:\Users\Jason\Desktop\Change Current Position Adrress\Change

Device...

☐ All

After uploading a file is saved automatically.

| | | | | | |
|---|---|---|---|---|---|
| ☐ [ X ] | 0 - 0 | | ☐ [ Y ] | 0 - 0 | |
| ☑ [ M ] | 0 - 512 | | ☑ [ L ] | 0 - 256 | |
| ☐ [ K ] | 0 - 0 | | ☐ [ F ] | 0 - 0 | |
| ☐ [ T ] | 0 - 0 | | ☐ [ C ] | 0 - 0 | |
| ☑ [ S ] | 0 - 0 | | ☑ [ D ] | 0 - 10000 | |
| ☐ [ Z ] | 0 - 0 | | ☐ [ R ] | 0 - 0 | |
| ☑ [ TC ] | 0 - 512 | | ☐ [ TS ] | 0 - 0 | |
| ☑ [ CC ] | 0 - 512 | | ☐ [ CS ] | 0 - 0 | |

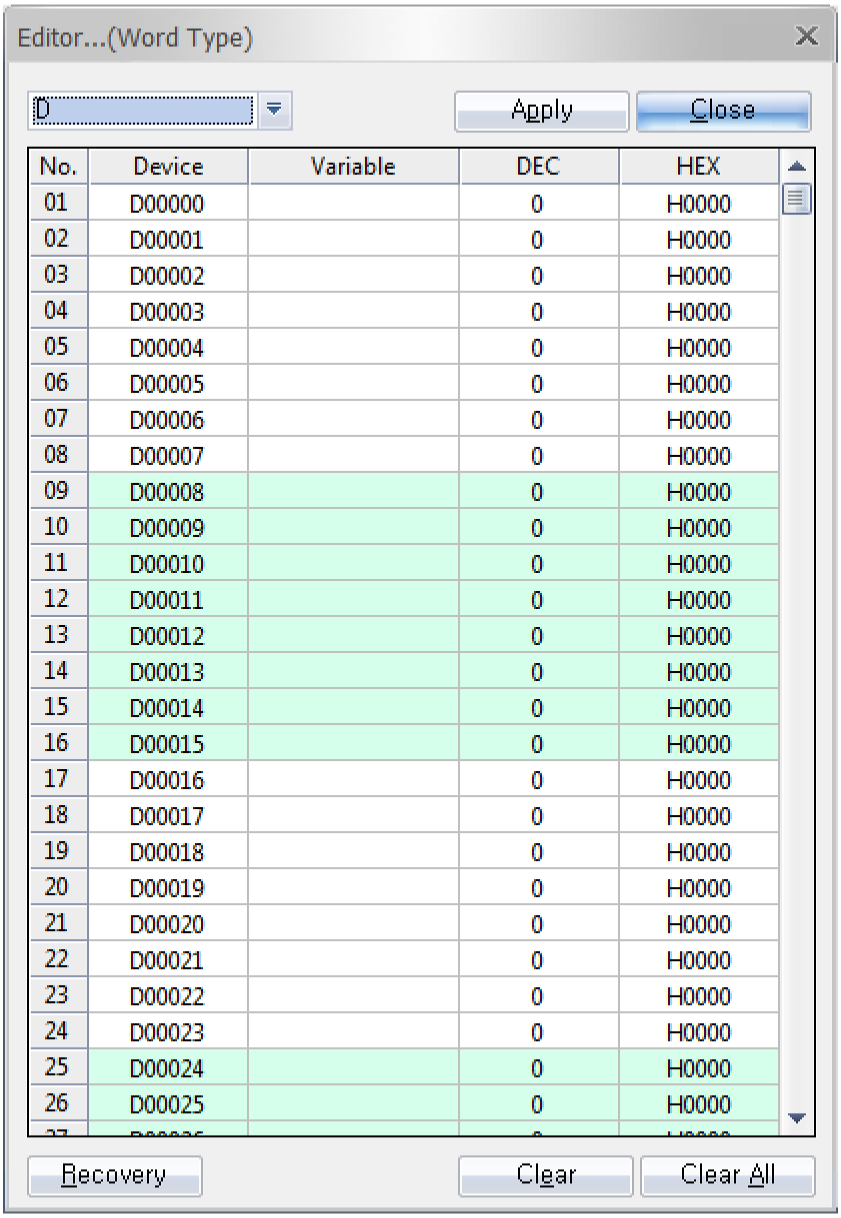
- File : Click Path to select the folder that you want to save uploaded device memory.

(Default folder is Project folder)

- Save : Choose the device and edit address and then click Save.
- Default : Latch device and address are default.
- Clear All : Delete all device and address.

- Max. Set : Maximum address will be set for all devices.
- Editor : You can monitor or edit the value of device memory.

(It is activated after uploading is completed.)



| No. | Device | Variable | DEC | HEX |
|---|---|---|---|---|
| 01 | D00000 |  | 0 | H0000 |
| 02 | D00001 |  | 0 | H0000 |
| 03 | D00002 |  | 0 | H0000 |
| 04 | D00003 |  | 0 | H0000 |
| 05 | D00004 |  | 0 | H0000 |
| 06 | D00005 |  | 0 | H0000 |
| 07 | D00006 |  | 0 | H0000 |
| 08 | D00007 |  | 0 | H0000 |
| 09 | D00008 |  | 0 | H0000 |
| 10 | D00009 |  | 0 | H0000 |
| 11 | D00010 |  | 0 | H0000 |
| 12 | D00011 |  | 0 | H0000 |
| 13 | D00012 |  | 0 | H0000 |
| 14 | D00013 |  | 0 | H0000 |
| 15 | D00014 |  | 0 | H0000 |
| 16 | D00015 |  | 0 | H0000 |
| 17 | D00016 |  | 0 | H0000 |
| 18 | D00017 |  | 0 | H0000 |
| 19 | D00018 |  | 0 | H0000 |
| 20 | D00019 |  | 0 | H0000 |
| 21 | D00020 |  | 0 | H0000 |
| 22 | D00021 |  | 0 | H0000 |
| 23 | D00022 |  | 0 | H0000 |
| 24 | D00023 |  | 0 | H0000 |
| 25 | D00024 |  | 0 | H0000 |
| 26 | D00025 |  | 0 | H0000 |

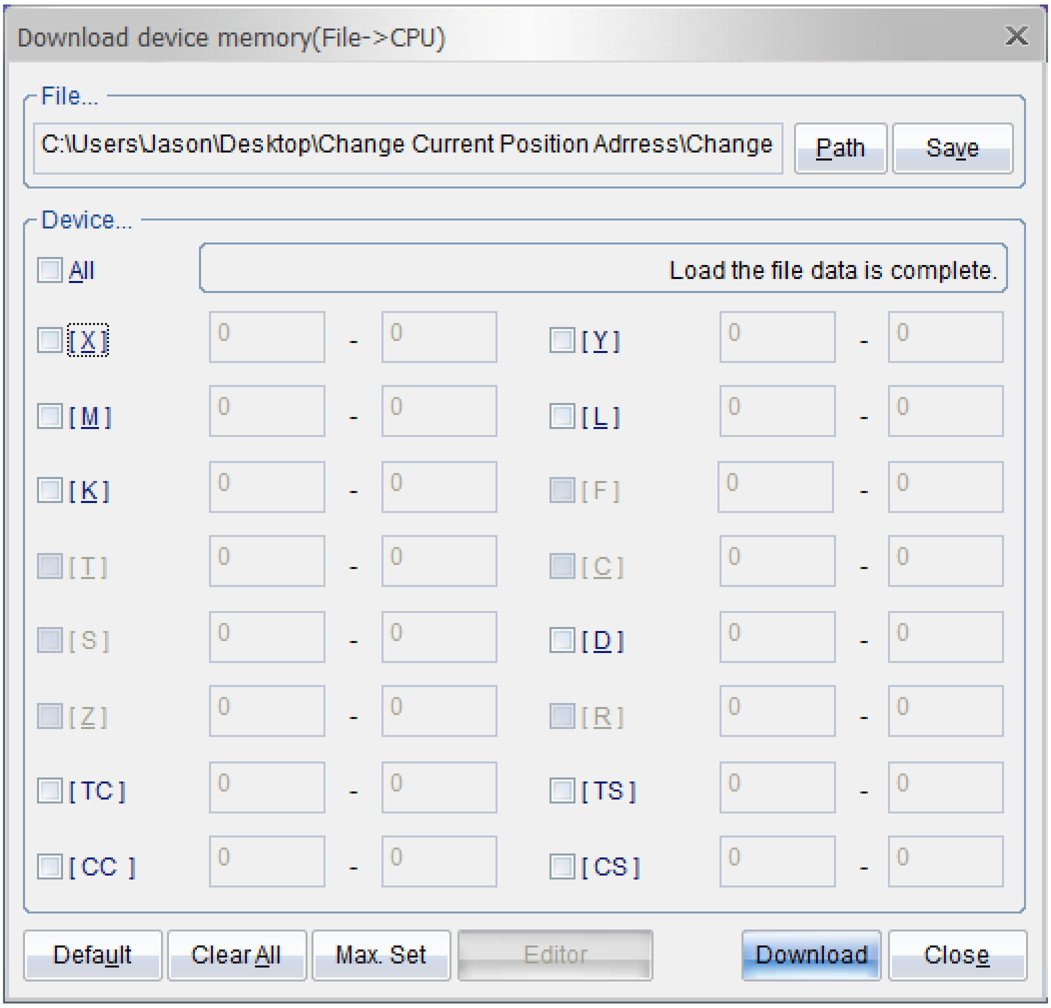
- Upload : The values of selected device and address are uploaded from CPU module to computer.

■ The range of starting and finishing address depends on CPU type.

**Download device memory**

Click Online → Memory Download/Upload and choose Download device memory (File → CPU).

The Download device memory window appears.



C:\Users\Jason\Desktop\Change Current Position Adrress\Change

Load the file data is complete.

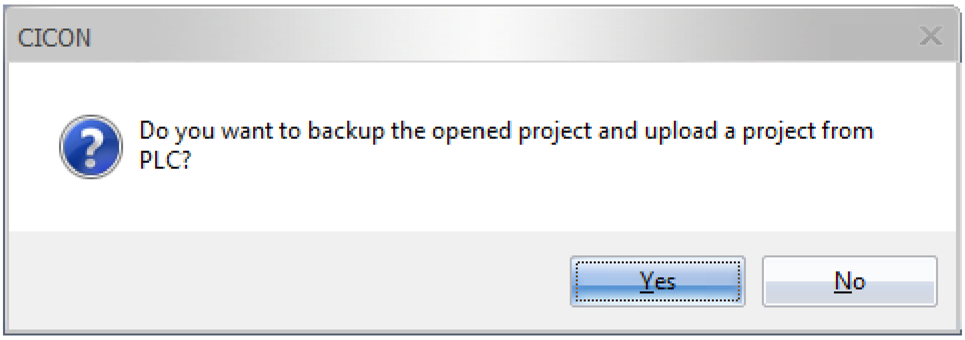
The setting configuration is the same with Upload device memory window.

- T, S, Z, F, C and R cannot be downloaded.

## 4.12 Upload Program from PLC to computer

It is used to import Programs from connected CPU module to computer.

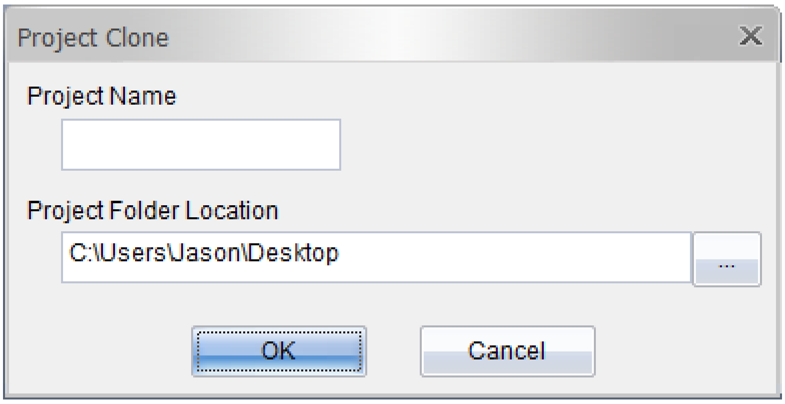
1) Click Online and select Connect.
2) When CICON connects to CPU module, click Online and select Upload (PLC → PC).



Do you want to backup the opened project and upload a project from PLC?

If you want to backup opened project, click Yes.

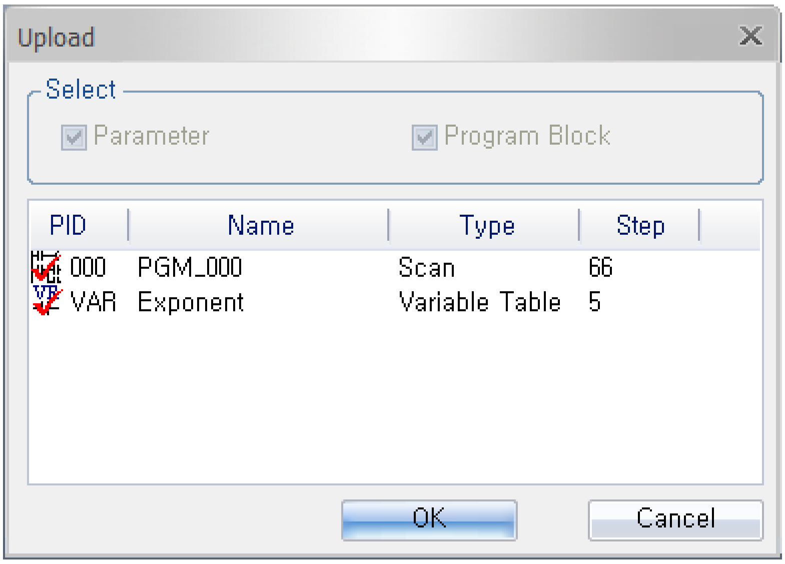
3) Type project name and choose the folder that you want to back up and then click OK.



Project Name

Project Folder Location C:\Users\Jason\Desktop

4) If backup is completed, Upload window appears.



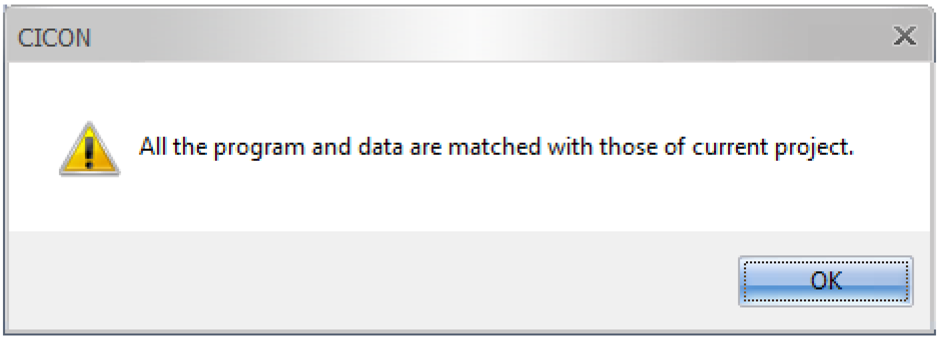
Select
☑ Parameter ☑ Program Block

| PID | Name | Type | Step |
|---|---|---|---|
| 000 | PGM_000 | Scan | 66 |
| VAR | Exponent | Variable Table | 5 |

- Parameter : If you choose it, the parameter data of CPU is uploaded.
- Program Block : If you choose it, the program and variable table are uploaded.

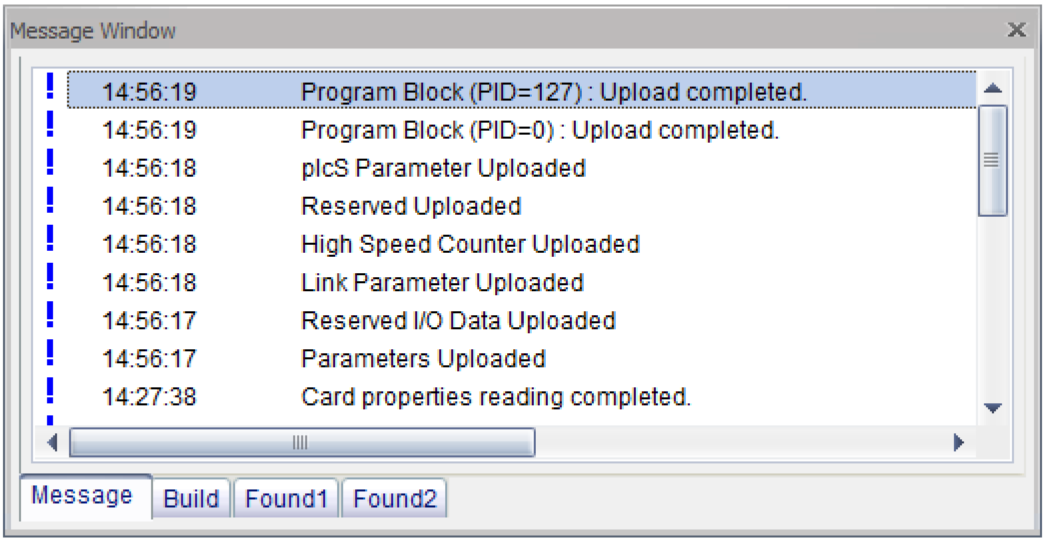
5) Click OK to upload.

6) Uploading is completed, below message appears.



All the program and data are matched with those of current project.

You can find out uploaded contents at the Message Window.



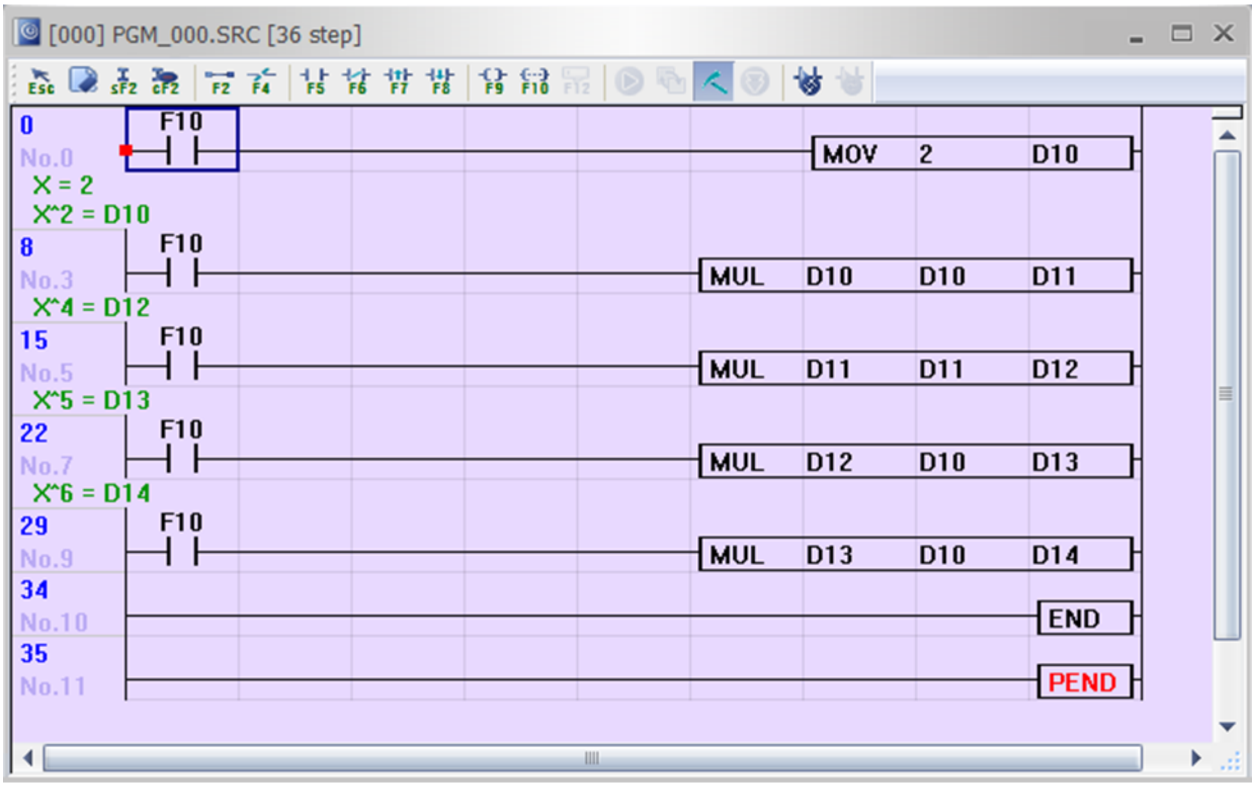
```
14:56:19    Program Block (PID=127) : Upload completed.
14:56:19    Program Block (PID=0) : Upload completed.
14:56:18    plcS Parameter Uploaded
14:56:18    Reserved Uploaded
14:56:18    High Speed Counter Uploaded
14:56:18    Link Parameter Uploaded
14:56:17    Reserved I/O Data Uploaded
14:56:17    Parameters Uploaded
14:27:38    Card properties reading completed.
```

## 4.13 Edit Logic while Online

Edit your Ladder logic while the controller continues to control your machine or process.

1) Click Online and choose Edit Start/Cancel or click

   The background color of LD Editor Window is changed.
   (To change color, click Tool → CICON Options and click LD Editor tap and select color of Online Edit mode.)



■ If more than 64 steps of ladder logic are edited online, Online Editor will not work.

2) Click rung or command that you want to edit.

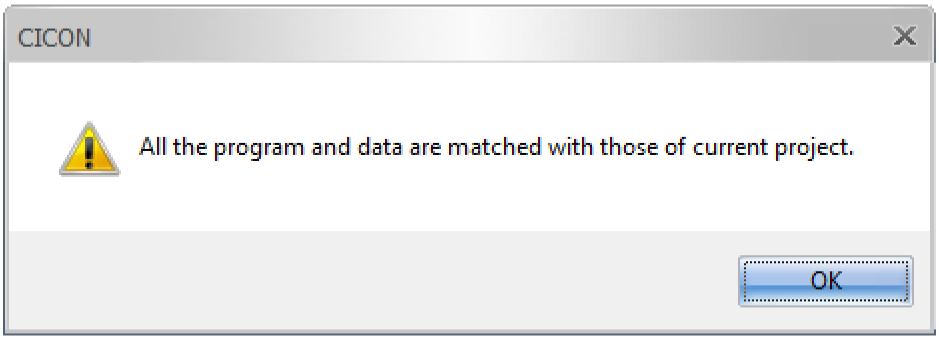
3) Click Online and choose Online-Edit Download or click to download.

## 4.14 Compare the downloaded program

It is possible to compare downloaded program in PLC with program in CICON.

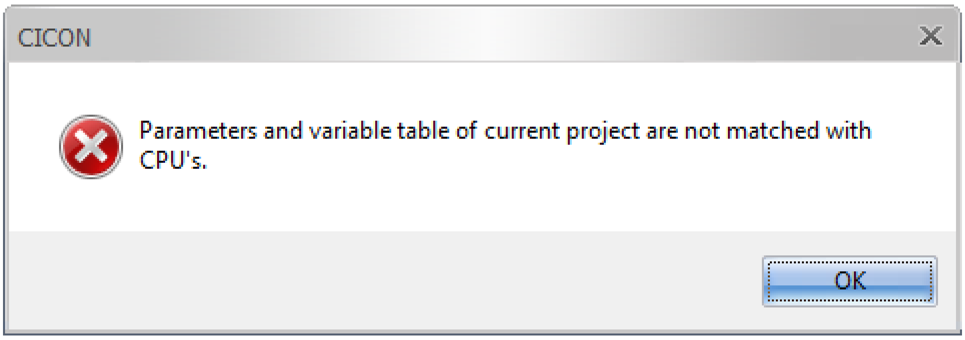
Click Online and choose Compare/Check Program (PC ↔ PLC) or click.

● In case of matched program



All the program and data are matched with those of current project.

● In case of unmatched program



Parameters and variable table of current project are not matched with CPU's.

### 4.15 Set the Password for PLC and Program

CICON provides password security for both program and PLC to protect the PLC Program, Configuration access from unauthorized person.

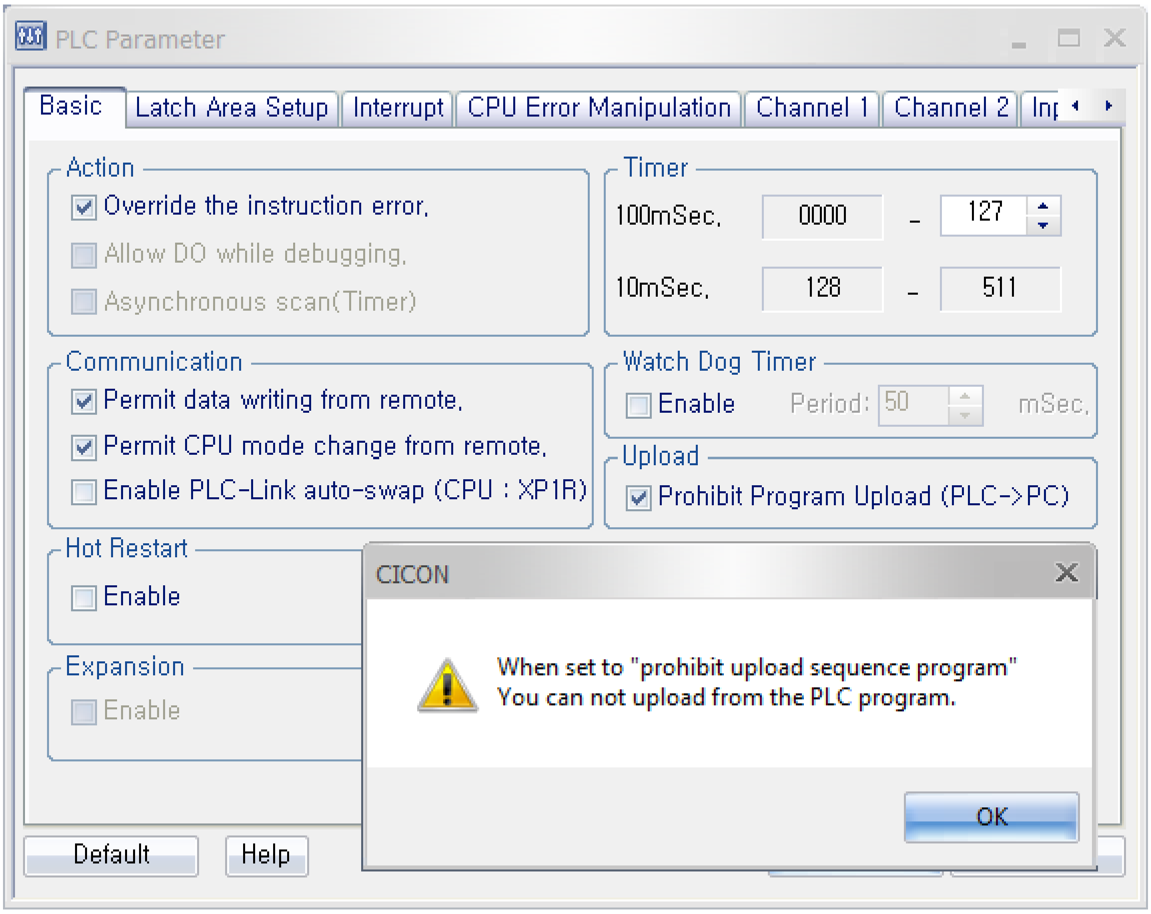
1) Set the Program Password

You can set the Program Password when you create new project or edit project properties.

To open the Program file, you need to know the password.

However once this program is downloaded to PLC, you can upload it to CICON without password.

In order to lock the uploading program from PLC to CICON, choose Prohibit Program Upload(PLC→PC) at the PLC Parameter as below.



☑ Override the instruction error.
☐ Allow DO while debugging.
☐ Asynchronous scan(Timer)

100mSec. 0000 – 127
10mSec. 128 – 511

☑ Permit data writing from remote.
☑ Permit CPU mode change from remote.
☐ Enable PLC-Link auto-swap (CPU : XP1R)

☐ Enable Period: 50 mSec.

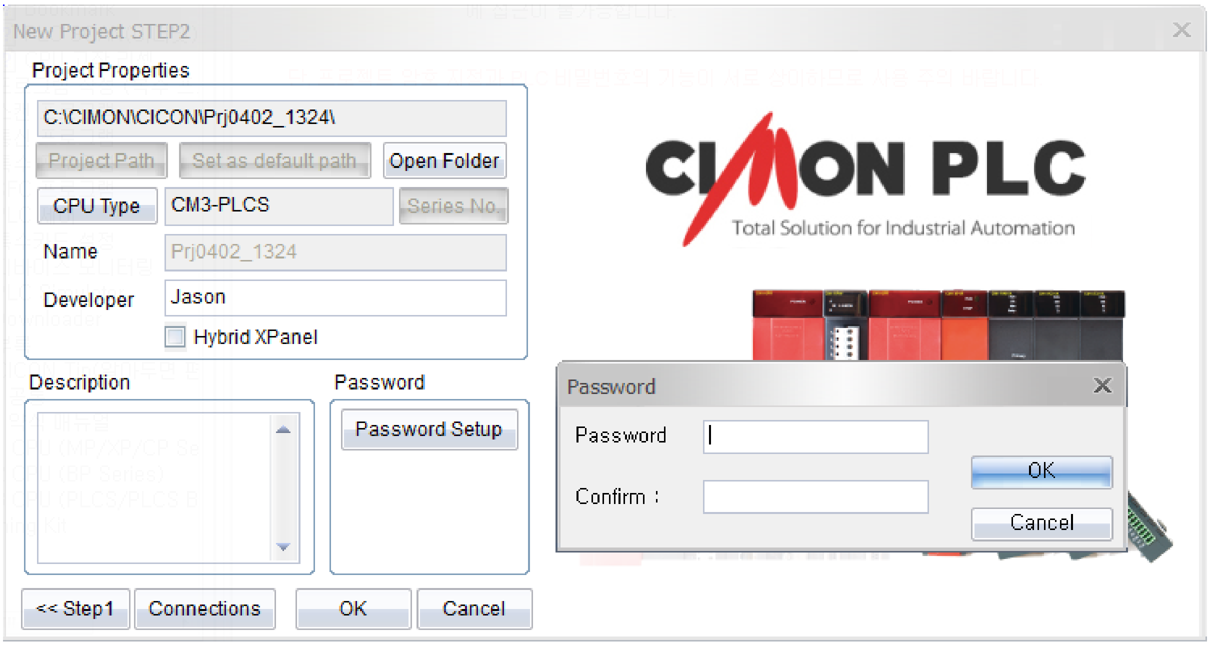
☑ Prohibit Program Upload (PLC->PC)

☐ Enable

☐ Enable

When set to "prohibit upload sequence program"
You can not upload from the PLC program.

Click File → project Properties



C:\CIMON\CICON\Prj0402_1324\

CPU Type: CM3-PLCS

Name: Prj0402_1324

Developer: Jason

☐ Hybrid XPanel

Password:

Confirm :

Whenever you try to open the program, CICON asks you for password.

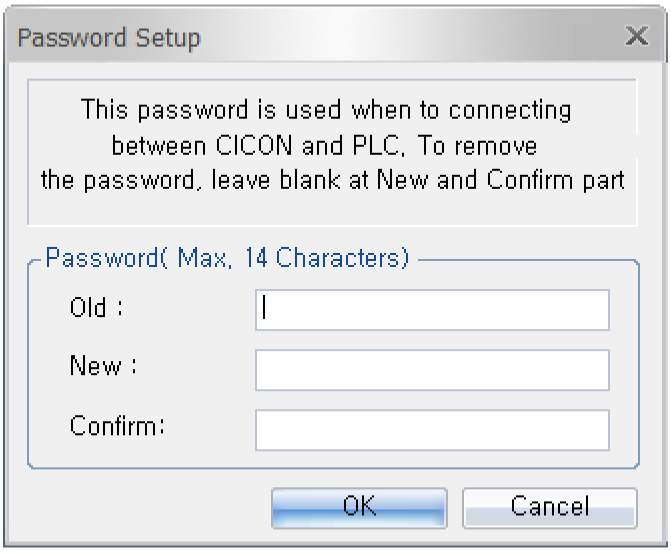
2) Set the PLC Password

It is used to protect connection to PLC CPU module.

(If you lose the password, it is impossible to connect this PLC again.)

To set up the PLC Password, CICON must connect to PLC first.

Click Online → PLC Password.



This password is used when to connecting
between CICON and PLC. To remove
the password, leave blank at New and Confirm part

Password( Max. 14 Characters)

Old :

New :

Confirm:

If there is password already, type current password at Old.

If there is no password, just leave blank at Old and type new password at New.

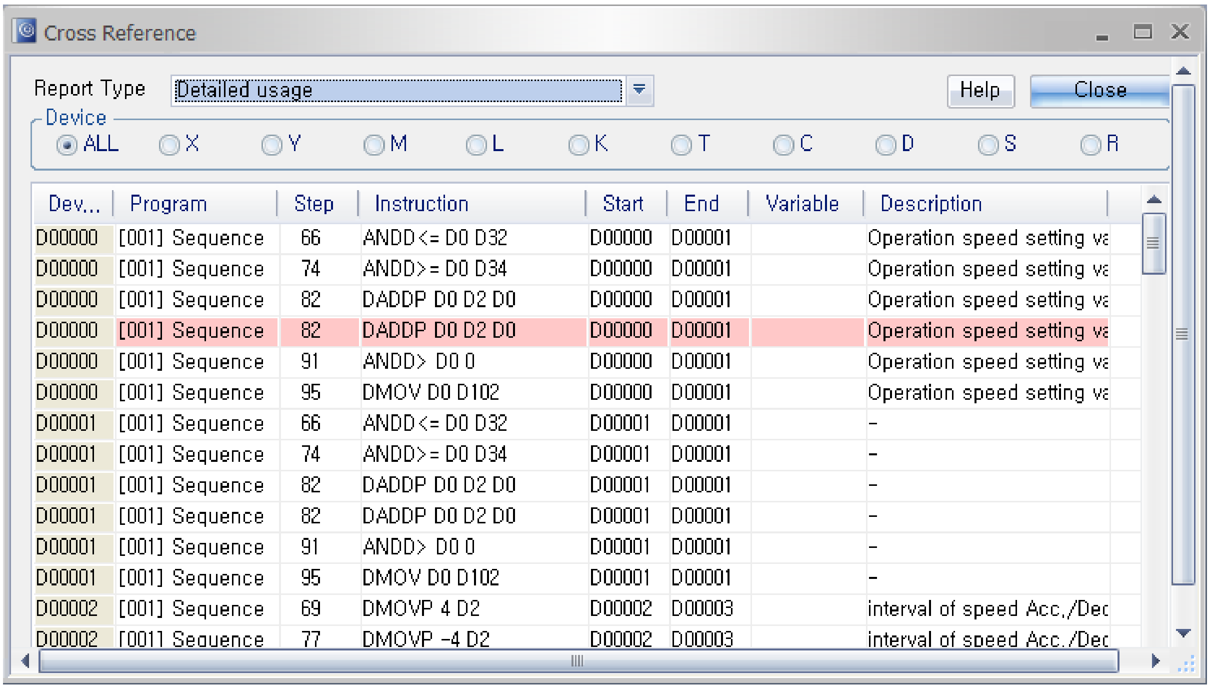
Whenever you try to connect PLC CPU module, CICON asks you password.

## 4.16 Cross Reference

Cross Reference shows all used device information on Report window.

Click Tool and choose Cross Reference.

If you choose Detailed usage at the Report Type, you can see all devices information as below picture.



Report Type: Detailed usage

Device: ● ALL ○ X ○ Y ○ M ○ L ○ K ○ T ○ C ○ D ○ S ○ R

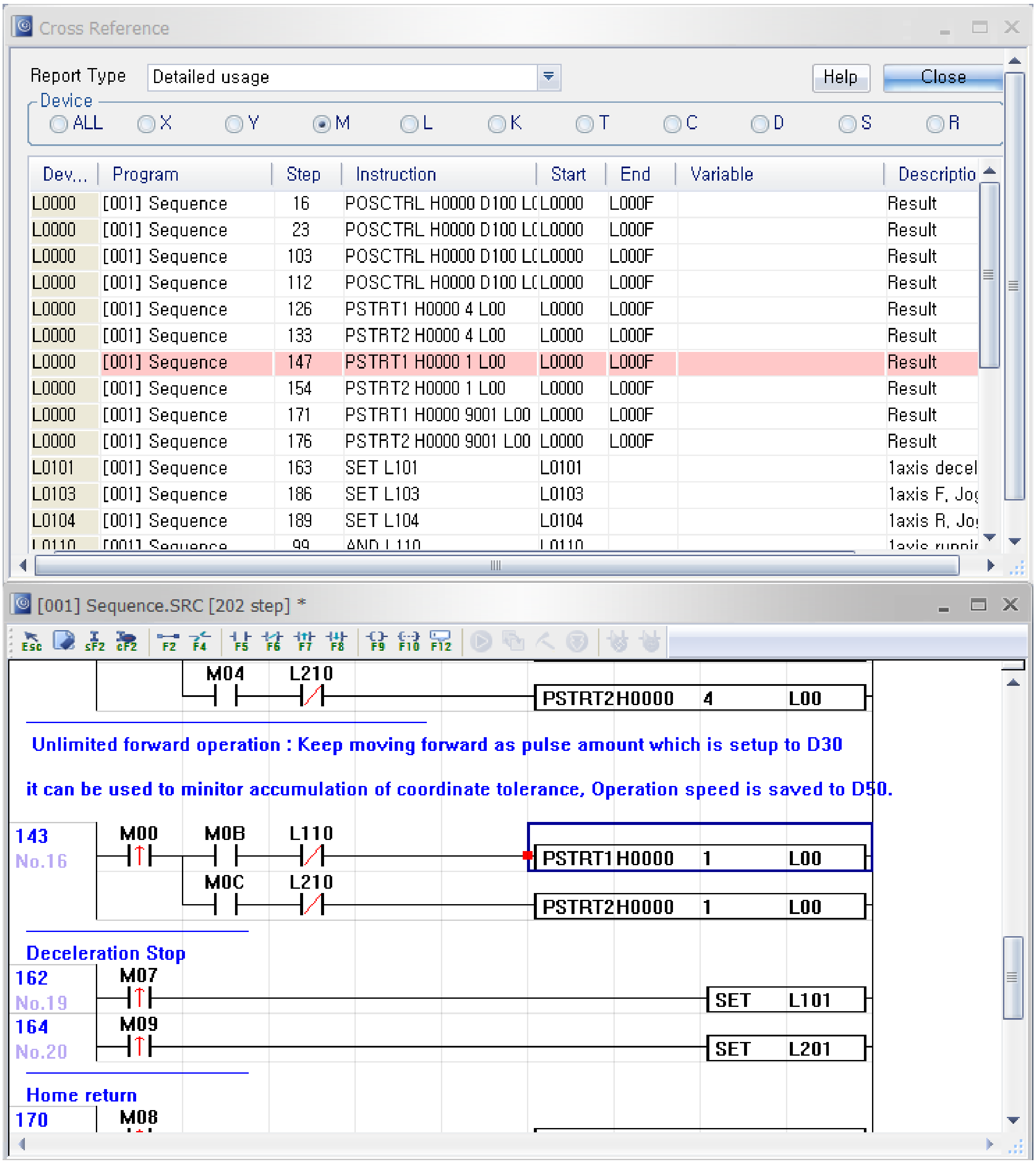
| Dev... | Program | Step | Instruction | Start | End | Variable | Description |
|---|---|---|---|---|---|---|---|
| D00000 | [001] Sequence | 66 | ANDD<= D0 D32 | D00000 | D00001 |  | Operation speed setting va |
| D00000 | [001] Sequence | 74 | ANDD>= D0 D34 | D00000 | D00001 |  | Operation speed setting va |
| D00000 | [001] Sequence | 82 | DADDP D0 D2 D0 | D00000 | D00001 |  | Operation speed setting va |
| D00000 | [001] Sequence | 82 | DADDP D0 D2 D0 | D00000 | D00001 |  | Operation speed setting va |
| D00000 | [001] Sequence | 91 | ANDD> D0 0 | D00000 | D00001 |  | Operation speed setting va |
| D00000 | [001] Sequence | 95 | DMOV D0 D102 | D00000 | D00001 |  | Operation speed setting va |
| D00001 | [001] Sequence | 66 | ANDD<= D0 D32 | D00001 | D00001 |  | - |
| D00001 | [001] Sequence | 74 | ANDD>= D0 D34 | D00001 | D00001 |  | - |
| D00001 | [001] Sequence | 82 | DADDP D0 D2 D0 | D00001 | D00001 |  | - |
| D00001 | [001] Sequence | 82 | DADDP D0 D2 D0 | D00001 | D00001 |  | - |
| D00001 | [001] Sequence | 91 | ANDD> D0 0 | D00001 | D00001 |  | - |
| D00001 | [001] Sequence | 95 | DMOV D0 D102 | D00001 | D00001 |  | - |
| D00002 | [001] Sequence | 69 | DMOVP 4 D2 | D00002 | D00003 |  | interval of speed Acc./Dec |
| D00002 | [001] Sequence | 77 | DMOVP -4 D2 | D00002 | D00003 |  | interval of speed Acc./Dec |

From the Report Type pull-down menu, you can choose 6 different report type.

- Detailed usage : Display all information of devices
- Usage overview : Display value of used device address
- Usage overview with comments : Display Device Contact, Coil, Variable name and Description.
- Usage overview including unused : Display value of used device address
- Usage overview with comments including unused : Display Device Contact, Coil, Variable name and Description.
- Duplicate usage : Display duplicated device address with Program, Variable name and Description.

If you click Device, Program name, Step or Instruction, LD Editor will show you where you click.

The blue box point out where you have clicked on the Cross Reference.



Report Type: Detailed usage

Device: ○ ALL ○ X ○ Y ● M ○ L ○ K ○ T ○ C ○ D ○ S ○ R

| Dev... | Program | Step | Instruction | Start | End | Variable | Descriptio |
|---|---|---|---|---|---|---|---|
| L0000 | [001] Sequence | 16 | POSCTRL H0000 D100 L( | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 23 | POSCTRL H0000 D100 L( | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 103 | POSCTRL H0000 D100 L( | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 112 | POSCTRL H0000 D100 L( | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 126 | PSTRT1 H0000 4 L00 | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 133 | PSTRT2 H0000 4 L00 | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 147 | PSTRT1 H0000 1 L00 | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 154 | PSTRT2 H0000 1 L00 | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 171 | PSTRT1 H0000 9001 L00 | L0000 | L000F | | Result |
| L0000 | [001] Sequence | 176 | PSTRT2 H0000 9001 L00 | L0000 | L000F | | Result |
| L0101 | [001] Sequence | 163 | SET L101 | L0101 | | | 1axis decel |
| L0103 | [001] Sequence | 186 | SET L103 | L0103 | | | 1axis F, Jog |
| L0104 | [001] Sequence | 189 | SET L104 | L0104 | | | 1axis R, Jo |
| L0110 | [001] Sequence | 99 | AND L110 | L0110 | | | 1axis runnir |

[001] Sequence.SRC [202 step] *

Unlimited forward operation : Keep moving forward as pulse amount which is setup to D30

it can be used to minitor accumulation of coordinate tolerance, Operation speed is saved to D50.

Deceleration Stop

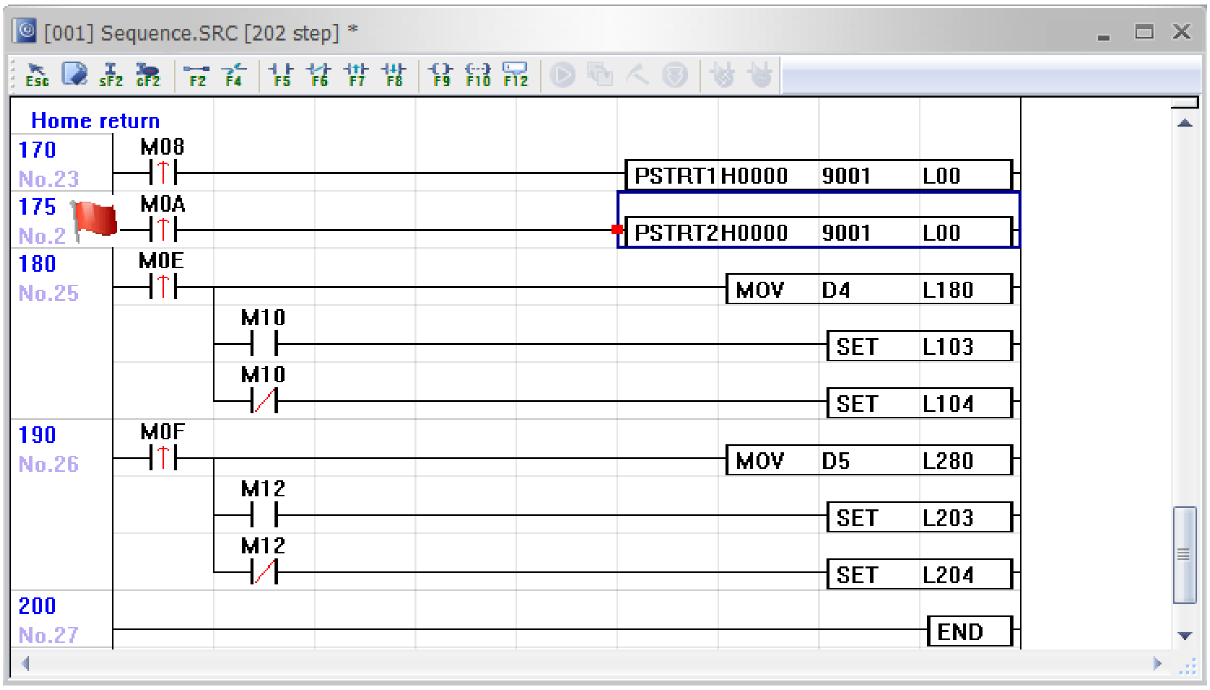
Home return

## 4.17 Bookmark

Bookmarks are links to Rung that make it easy to get back to Rung you saved.

To save Bookmark, click the Rung that you want to save and click Tool → Bookmark and choose Save/Delete Bookmark or click 🔖.

The Bookmark 🚩 appears next to Rung number.



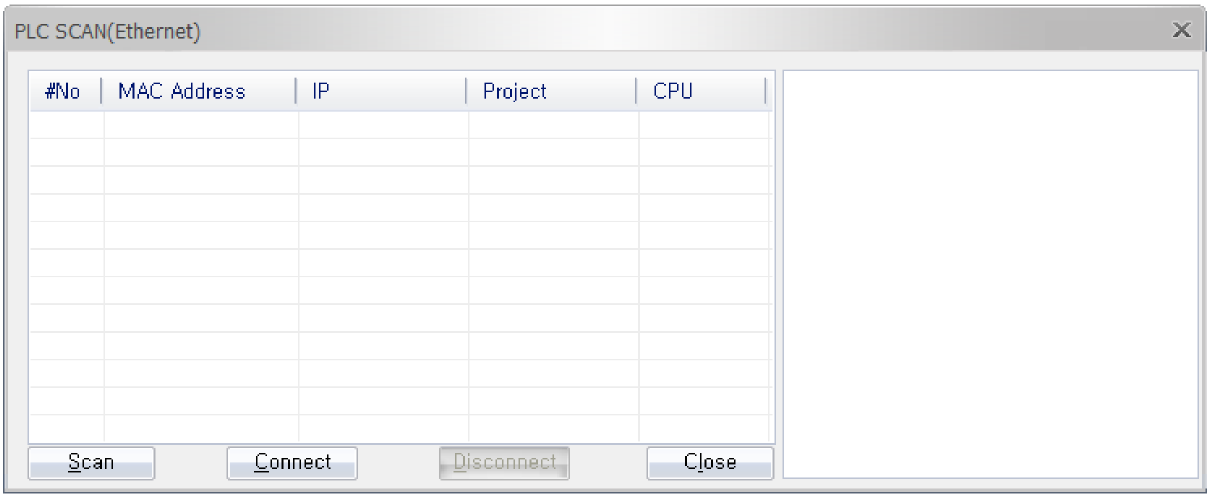
If you delete a Bookmark, click Tool → Bookmark and choose Save/Delete Bookmark .

You can also move previous bookmark or next bookmark with icon

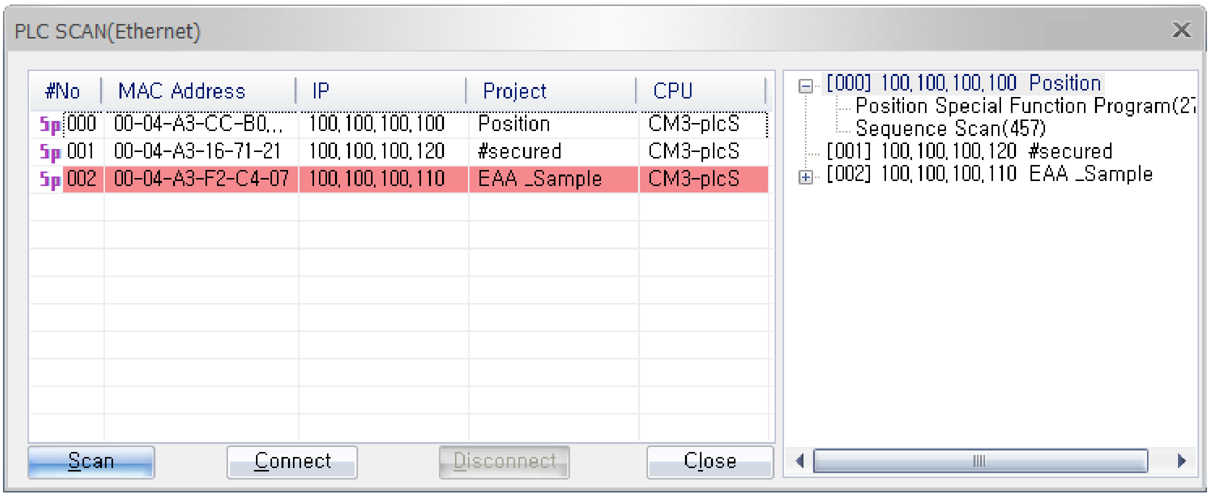
## 4.18 Search PLC by Ethernet Scan

If your network is standalone network, CICON can search PLCs which are connected the network by Ethernet.

Click Online and choose PLC SCAN(Ethernet).



To search a PLC, click Scan.



| #No | MAC Address | IP | Project | CPU |
|---|---|---|---|---|
| 000 | 00-04-A3-CC-B0... | 100.100.100.100 | Position | CM3-plcS |
| 001 | 00-04-A3-16-71-21 | 100.100.100.120 | #secured | CM3-plcS |
| 002 | 00-04-A3-F2-C4-07 | 100.100.100.110 | EAA _Sample | CM3-plcS |

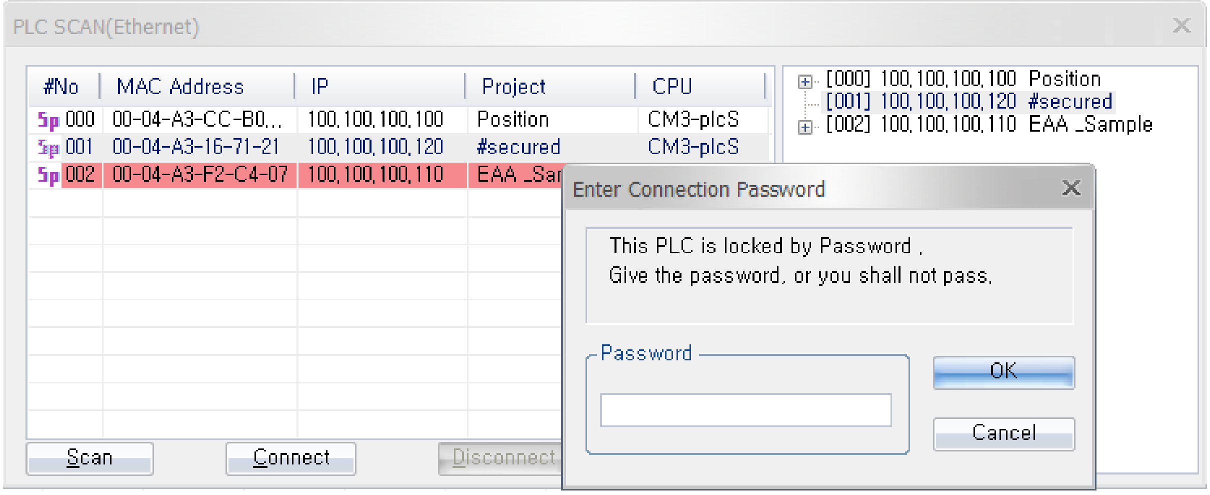
- [000] 100.100.100.100 Position
  - Position Special Function Program(27
  - Sequence Scan(457)
- [001] 100.100.100.120 #secured
- [002] 100.100.100.110 EAA _Sample

All Ethernet IP addresses which are connected to the network display on the PLC SCAN window.

If PLC has the same project file with your CICON, red highlight is remarked.

If PLC is locked with password, #secured displays at the Project.

In order to connect locked PLC, double click IP address and type password.



| #No | MAC Address | IP | Project | CPU |
|---|---|---|---|---|
| 000 | 00-04-A3-CC-B0... | 100.100.100.100 | Position | CM3-plcS |
| 001 | 00-04-A3-16-71-21 | 100.100.100.120 | #secured | CM3-plcS |
| 002 | 00-04-A3-F2-C4-07 | 100.100.100.110 | EAA _Sar | |

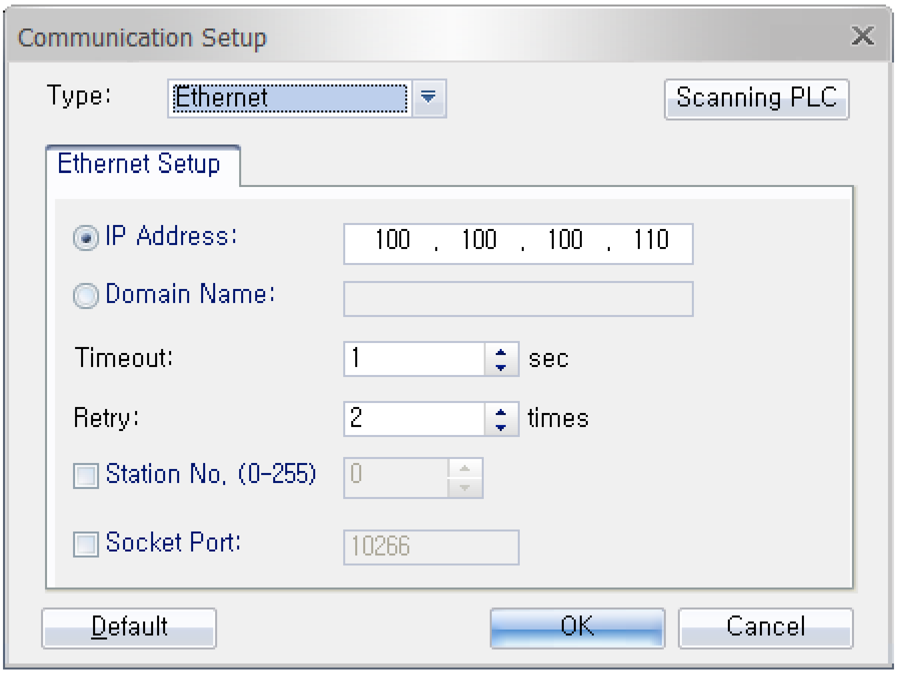
- [000] 100.100.100.100 Position
- [001] 100.100.100.120 #secured
- [002] 100.100.100.110 EAA _Sample

This PLC is locked by Password .
Give the password, or you shall not pass.

You can also open PLC SCAN at the Communication Setup.

Click Tool and choose Connection Setup.

From the Type pull-down menu, choose Ethernet.



Type: Ethernet

● IP Address: 100 . 100 . 100 . 110

○ Domain Name:

Timeout: 1 sec

Retry: 2 times

☐ Station No. (0-255) 0

☐ Socket Port: 10266

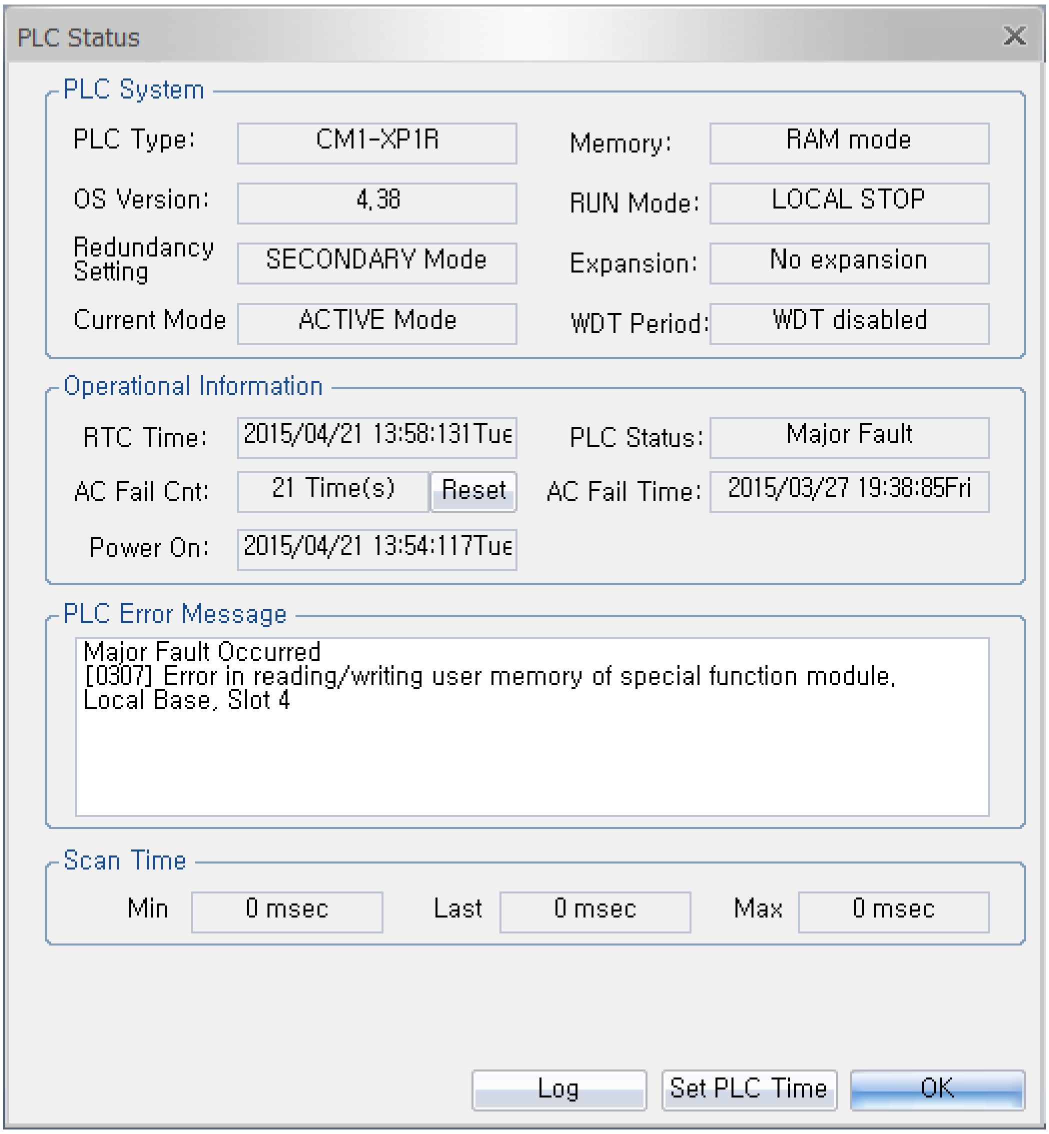
Click Scanning PLC.

### 4.19 Reset CPU Error

It is used to reset CPU error.

(Only Remote mode supports this function.)

If error occurs, PLC Status shows Major Fault. (Click Online → PLC Status)



PLC Status

PLC System

PLC Type: CM1-XP1R
Memory: RAM mode
OS Version: 4.38
RUN Mode: LOCAL STOP
Redundancy Setting: SECONDARY Mode
Expansion: No expansion
Current Mode: ACTIVE Mode
WDT Period: WDT disabled

Operational Information

RTC Time: 2015/04/21 13:58:131Tue
PLC Status: Major Fault
AC Fail Cnt: 21 Time(s)
AC Fail Time: 2015/03/27 19:38:85Fri
Power On: 2015/04/21 13:54:117Tue

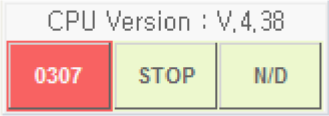
PLC Error Message

Major Fault Occurred
[0307] Error in reading/writing user memory of special function module.
Local Base, Slot 4

Scan Time

Min: 0 msec
Last: 0 msec
Max: 0 msec

Or Online Status Bar displays error.

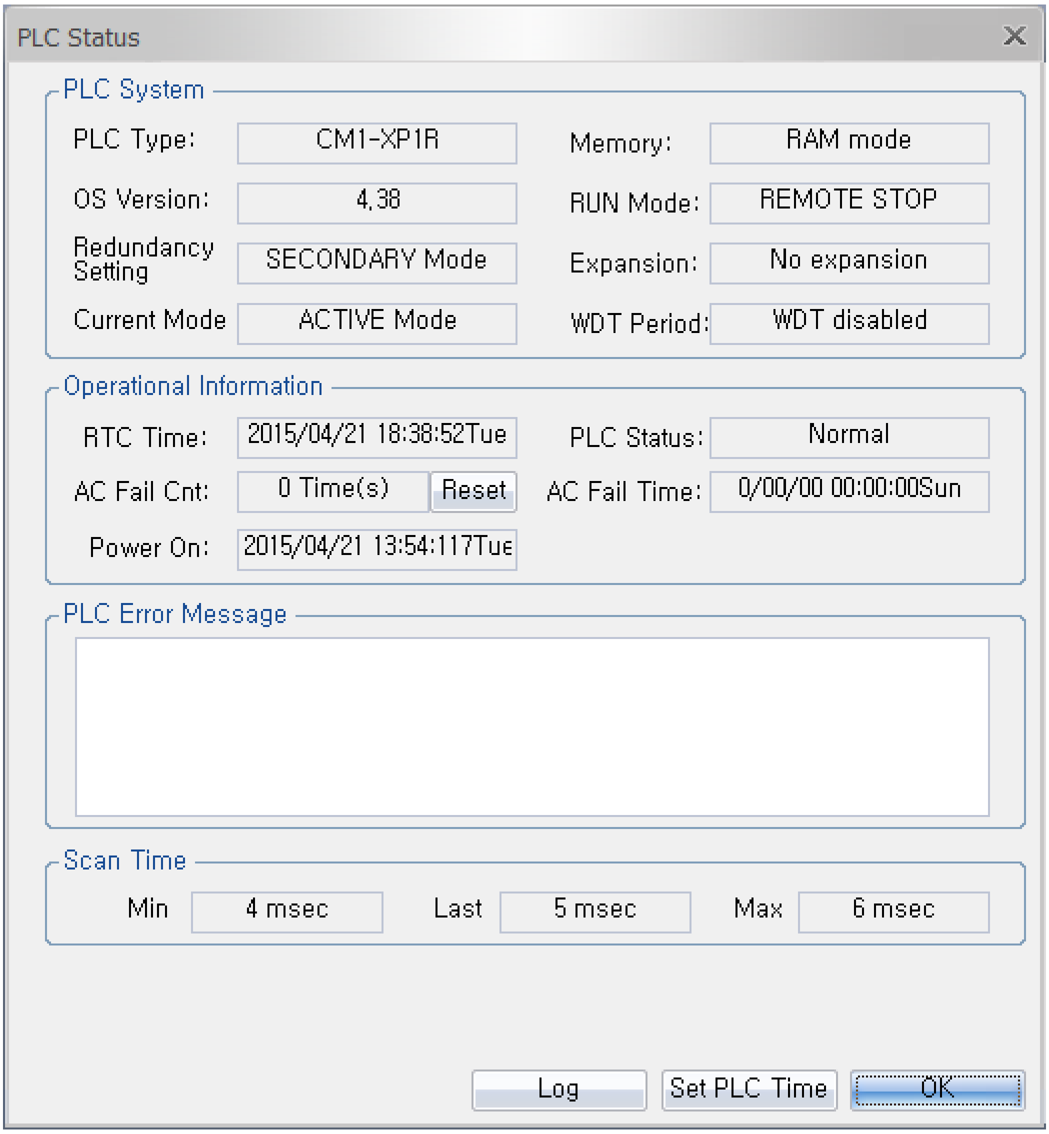


CPU Version : V.4.38
0307 | STOP | N/D

In order to reset error, CPU module must be Remote mode.

(Turn switch on CPU module as Stop mode → Remote mode)

Click Online and choose CPU Error Reset.

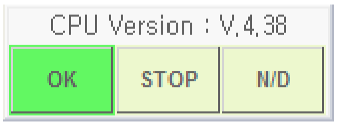


PLC Type: CM1-XP1R
Memory: RAM mode
OS Version: 4.38
RUN Mode: REMOTE STOP
Redundancy Setting: SECONDARY Mode
Expansion: No expansion
Current Mode: ACTIVE Mode
WDT Period: WDT disabled

RTC Time: 2015/04/21 18:38:52Tue
PLC Status: Normal
AC Fail Cnt: 0 Time(s)
AC Fail Time: 0/00/00 00:00:00Sun
Power On: 2015/04/21 13:54:117Tue

Min: 4 msec
Last: 5 msec
Max: 6 msec

PLC Status changes to Normal.



Online Status Bar also display OK signal.

▶ Notice

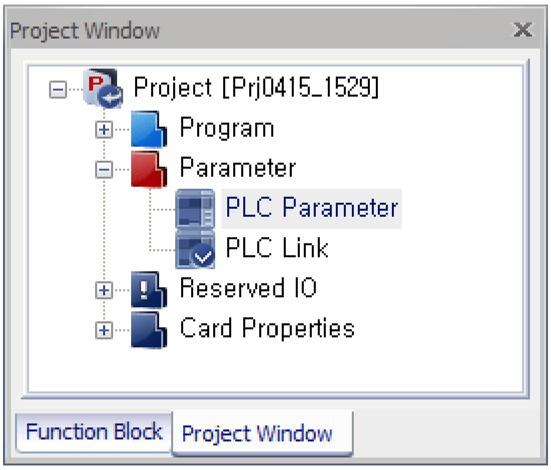
CPU Error Reset can be supported below firmware version.

| Module | Firmware version |
|---|---|
| CM1-XPxxx | 3.09 or higher |
| CM1-CPxxx | 3.02 or higher |
| CM1-EPxxx | 3.04 or higher |
| CM3-SPxx | ALL |
| CM3-SBxx | ALL |
| CM2-BP32xx | 1.25 or higher |
| CM2-BP16xx | 1.14 or higher |

# 5. PLC Parameter and Reserved IO

## 5.1 PLC Parameter configuration

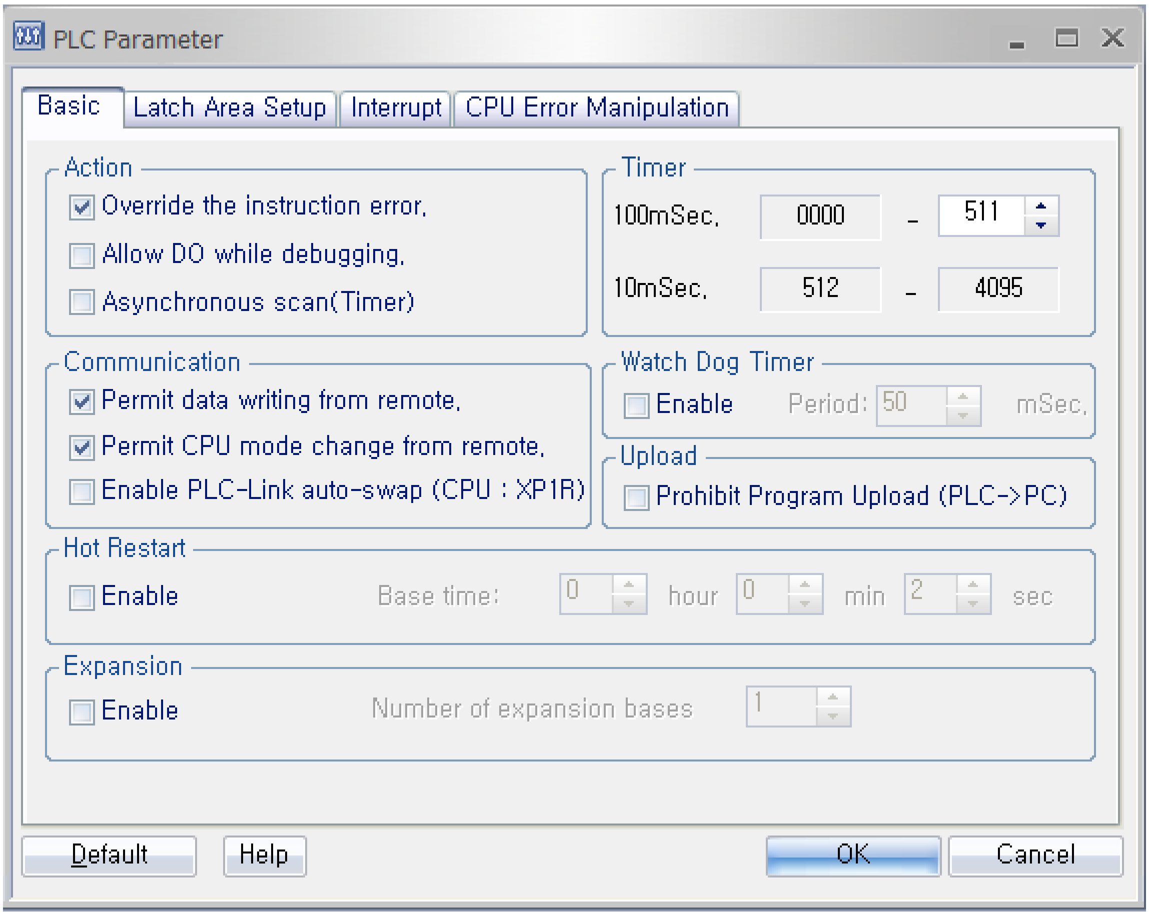
According to CPU type, the configuration menu for PLC parameter is different.



▶ XPnA CPU and CP3 CPU Type

All CIMON CPU Type has below Parameter menu as standard.

Basic, Latch Area Setup, Interrupt and CPU Error manipulation are in PLC Parameter.



Action
☑ Override the instruction error.
☐ Allow DO while debugging.
☐ Asynchronous scan(Timer)

Timer
100mSec. 0000 - 511
10mSec. 512 - 4095

Communication
☑ Permit data writing from remote.
☑ Permit CPU mode change from remote.
☐ Enable PLC-Link auto-swap (CPU : XP1R)

Watch Dog Timer
☐ Enable Period: 50 mSec.

Upload
☐ Prohibit Program Upload (PLC->PC)

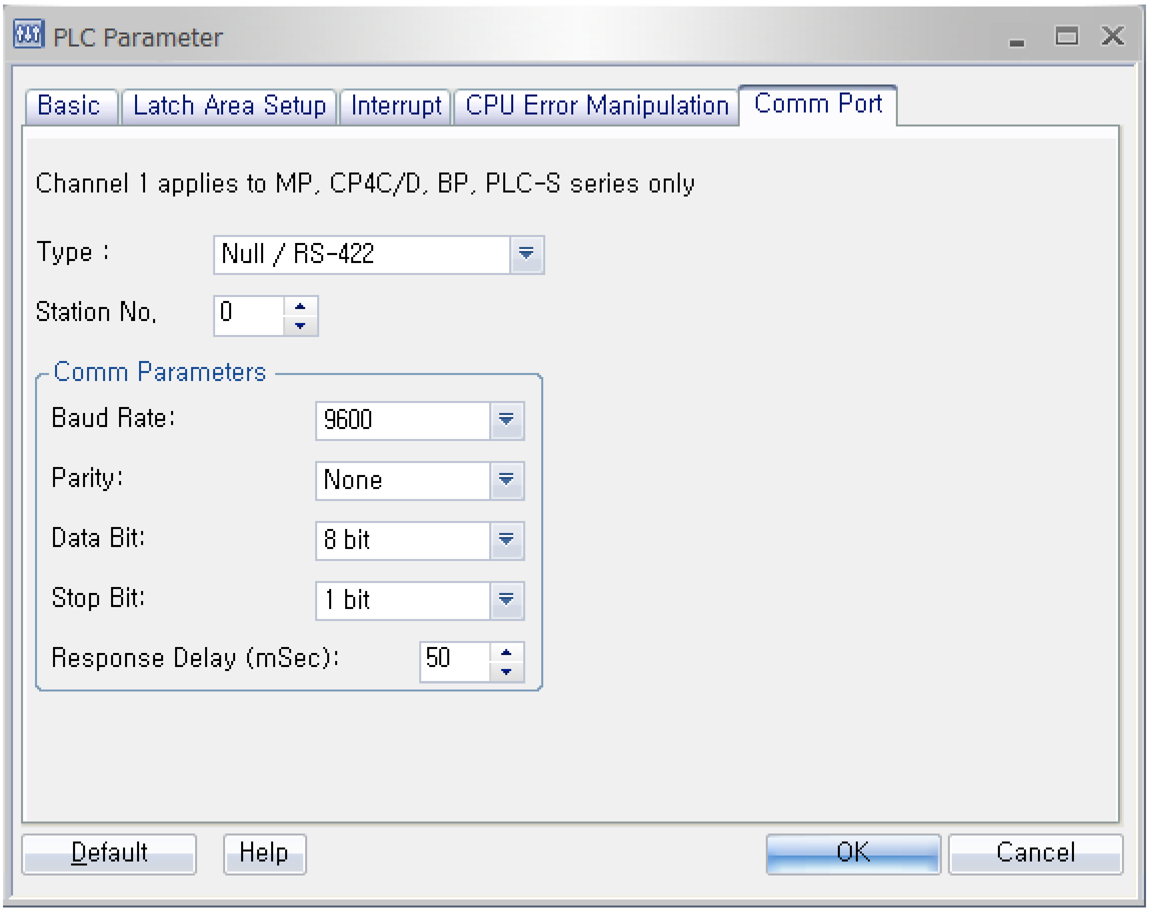
Hot Restart
☐ Enable Base time: 0 hour 0 min 2 sec

Expansion
☐ Enable Number of expansion bases 1

▶ MP CPU and CP4 CPU Type

Communication Port menu is included.

User can set RS232, RS422 and RS485 parameter for CP4C, CP4D and CP4U CPU type.



Channel 1 applies to MP, CP4C/D, BP, PLC-S series only

Type : Null / RS-422

Station No. 0

Comm Parameters

Baud Rate: 9600

Parity: None

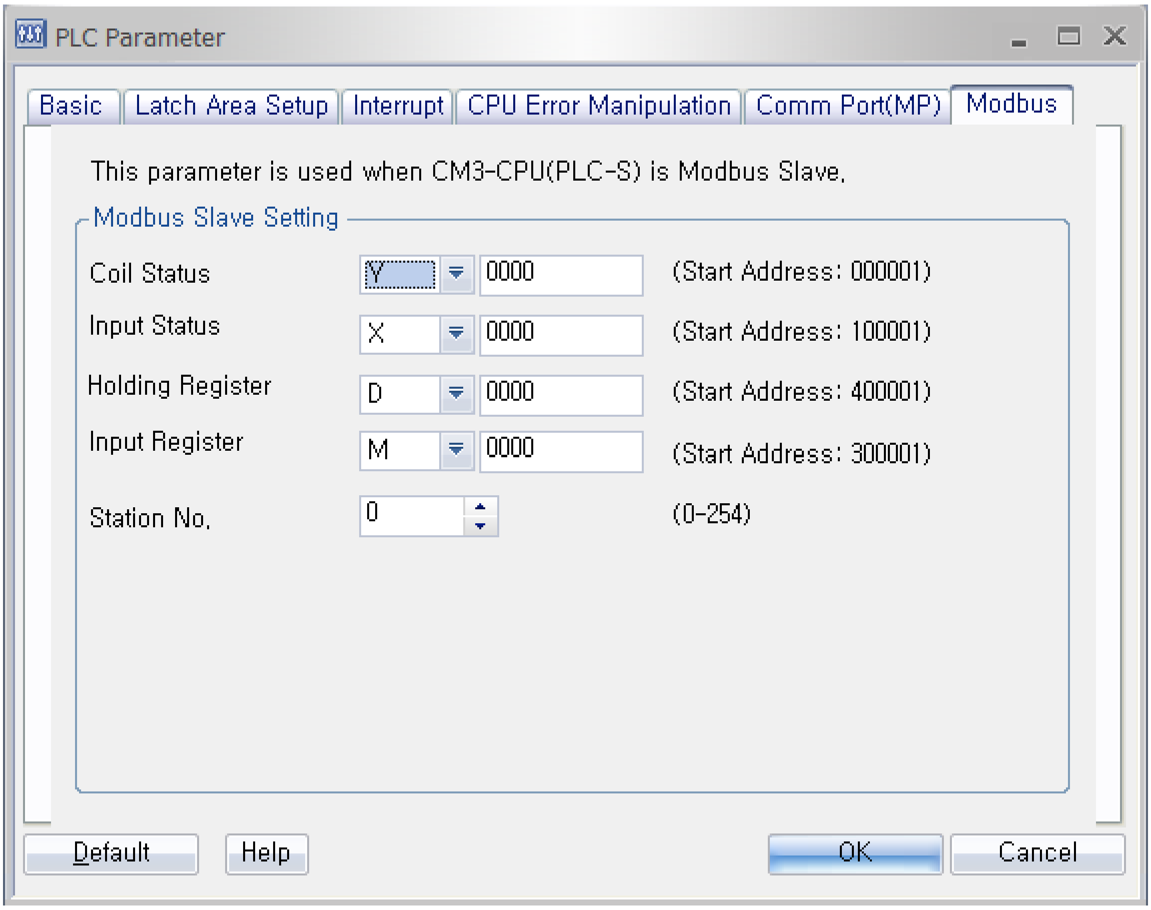
Data Bit: 8 bit

Stop Bit: 1 bit

Response Delay (mSec): 50

▶ XPnB CPU Type

Modbus menu is included and it can be used for XPnB and CM3 CPU type.



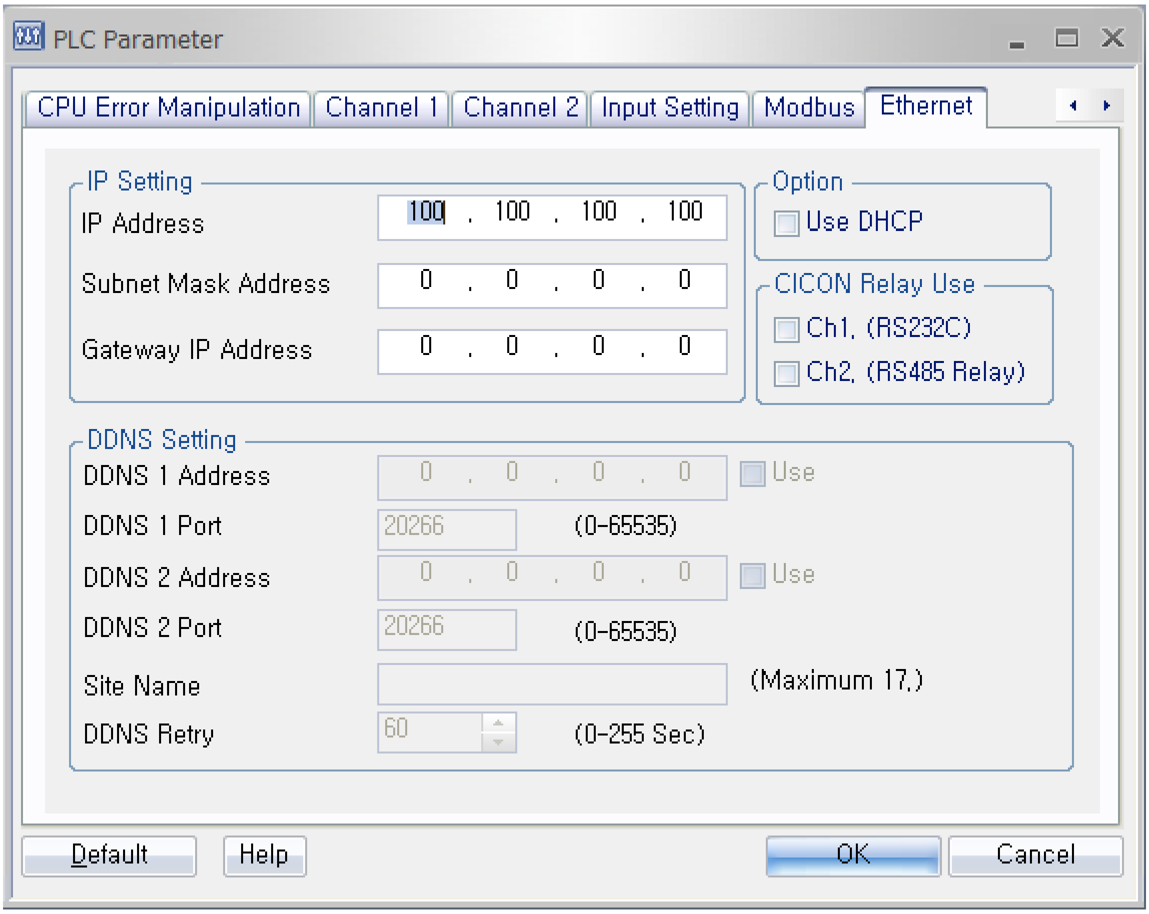
This parameter is used when CM3-CPU(PLC-S) is Modbus Slave.

Modbus Slave Setting

Coil Status Y 0000 (Start Address: 000001)
Input Status X 0000 (Start Address: 100001)
Holding Register D 0000 (Start Address: 400001)
Input Register M 0000 (Start Address: 300001)
Station No. 0 (0-254)

▶ CM3 CPU type

Channel 1, Channel 2, Input Setting, Modbus and Ethernet menu are included.



IP Setting

IP Address: 100 . 100 . 100 . 100

Subnet Mask Address: 0 . 0 . 0 . 0

Gateway IP Address: 0 . 0 . 0 . 0

Option

☐ Use DHCP

CICON Relay Use

☐ Ch1. (RS232C)

☐ Ch2. (RS485 Relay)

DDNS Setting

DDNS 1 Address: 0 . 0 . 0 . 0 ☐ Use

DDNS 1 Port: 20266 (0-65535)

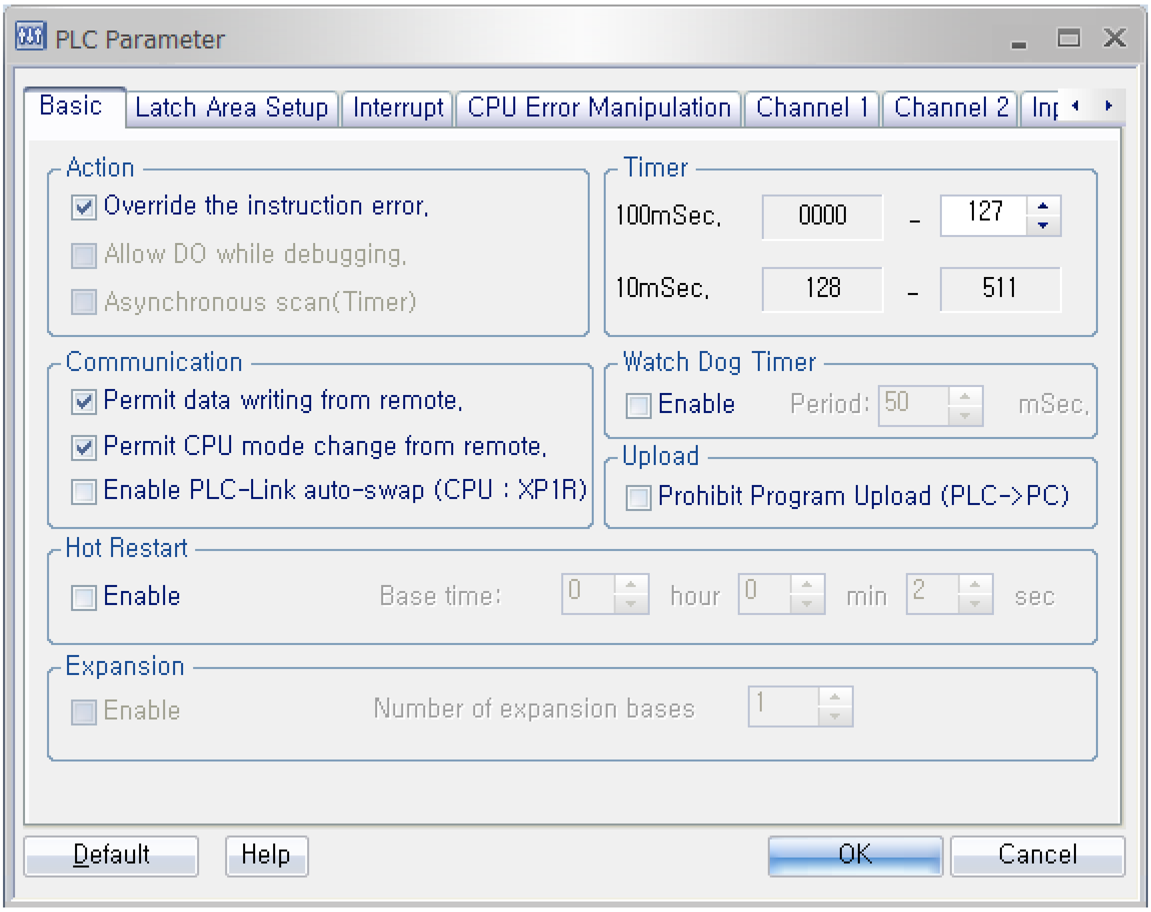
DDNS 2 Address: 0 . 0 . 0 . 0 ☐ Use

DDNS 2 Port: 20266 (0-65535)

Site Name: (Maximum 17.)

DDNS Retry: 60 (0-255 Sec)

### 5.1.1 Basic



Action
☑ Override the instruction error.
☐ Allow DO while debugging.
☐ Asynchronous scan(Timer)

Timer
100mSec. 0000 - 127
10mSec. 128 - 511

Communication
☑ Permit data writing from remote.
☑ Permit CPU mode change from remote.
☐ Enable PLC-Link auto-swap (CPU : XP1R)

Watch Dog Timer
☐ Enable Period: 50 mSec.

Upload
☐ Prohibit Program Upload (PLC->PC)

Hot Restart
☐ Enable Base time: 0 hour 0 min 2 sec

Expansion
☐ Enable Number of expansion bases 1

#### 5.1.1.1 Action

- Override the instruction error : CPU keeps running even if there is instruction error in scan program.
- Allow DO while debugging : Use output while debugging is running. (Default is “Not used”)

*It does not support CM3 CPU Type.

- Asynchronous scan(Timer) : Scan does not match Timer.

#### 5.1.1.2 Timer

- Set time unit for Timer instruction.

If Timer is configured as above, T0000~T0127 device has 100ms time unit and T0128~T0511 has 10ms time unit. If 100ms range is 0~-1, all Timer devices become 10ms.

According to CPU type, Timer device range is different.

| CPU Type | Timer Range |
|---|---|
| XP CPU | T0000 ~ T4095 |
| CP CPU | T0000 ~ T1023 |
| CM3 CPU | T0000 ~ T0511 |
| CM2 CPU | T0000 ~ T0255 |

#### 5.1.1.3 Communication

- Permit data writing from remote

User can access CPU memory and change the device value by remote access (CICON).

- Permit CPU mode change from remote

User can change the CPU mode (RUN, STOP, PAUSE) by remote access (CICON).

- Enable PLC-Link auto-swap (CPU: XP1R)

In Redundancy system, if Primary is failed, Secondary will run automatically.

*It is only for XP1R type.

#### 5.1.1.4 Watch Dog Timer

You can set 10ms up to 60000ms to prevent malfunction of scan program.

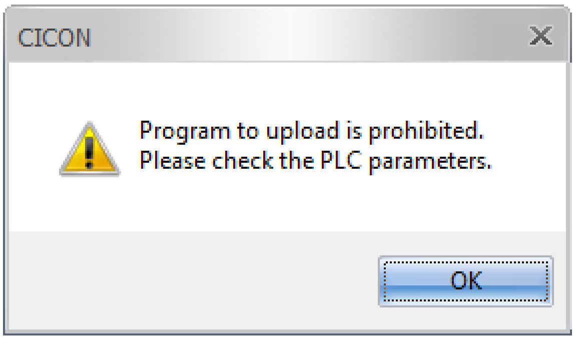
Designed WDT is longer than scan time, CPU will be reset automatically.

#### 5.1.1.5 Upload

- Prohibit Program Upload (PLC → PC)

Uploading project file from PLC to CICON is not possible.

If you click Online → Upload(PLC → PC) after downloading program to PLC with this function, Error message will pop up as below.



Program to upload is prohibited.
Please check the PLC parameters.

#### 5.1.1.6 Hot Restart

If power is ON in designed time, Hot Start Initialization program will run first before scan program.

*If CPU does not support RTC, it does not work.

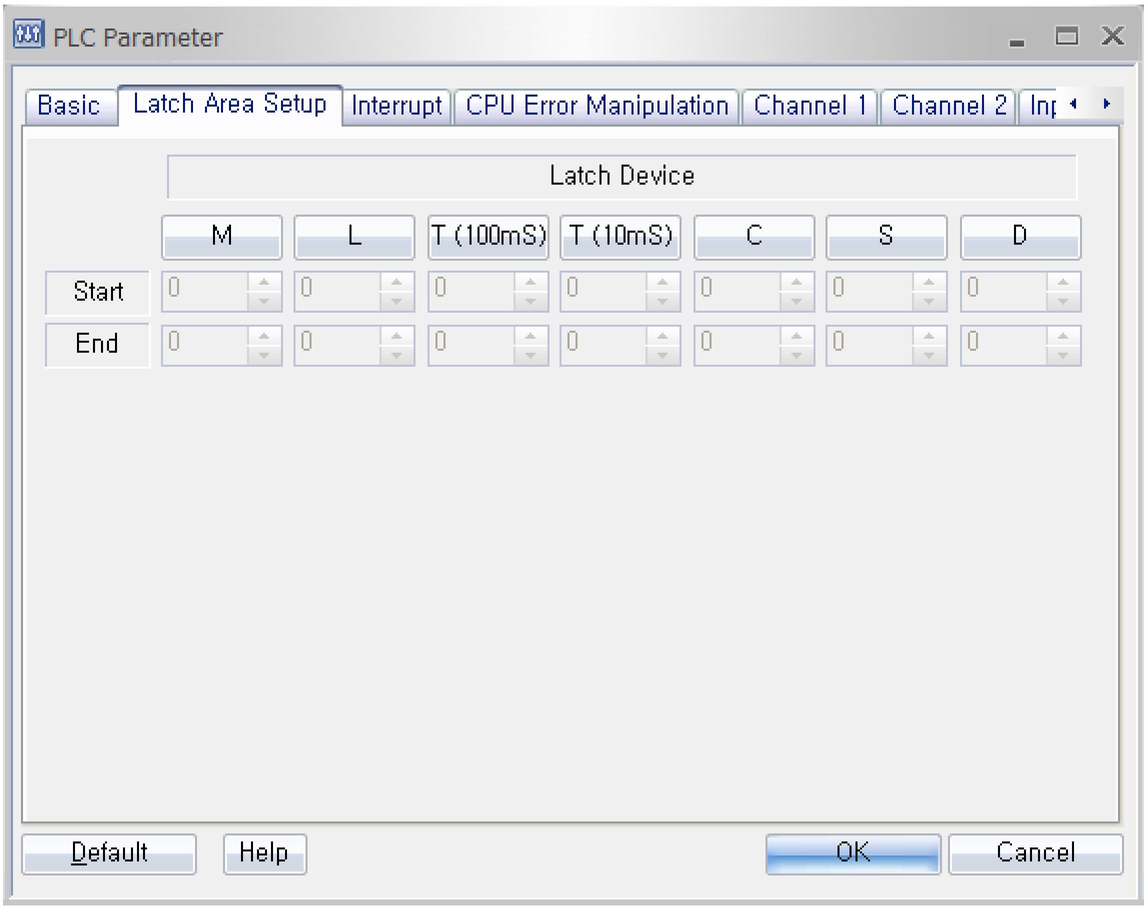
(CM1-CP3A, CM1-CP4A, CM3-SB16MDT and CM3-SB16MDTV do not support Hot Restart)

#### 5.1.1.7 Expansion

If you want to use Expansion Base, choose Base number.

*CP3 and XP CPU type support Expansion Base.

### 5.1.2 Latch Area Setup



Latch Device

| | M | L | T (100mS) | T (10mS) | C | S | D |
|---|---|---|---|---|---|---|---|
| Start | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| End | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

It is used to save the final value in designed device address after CPU power off.

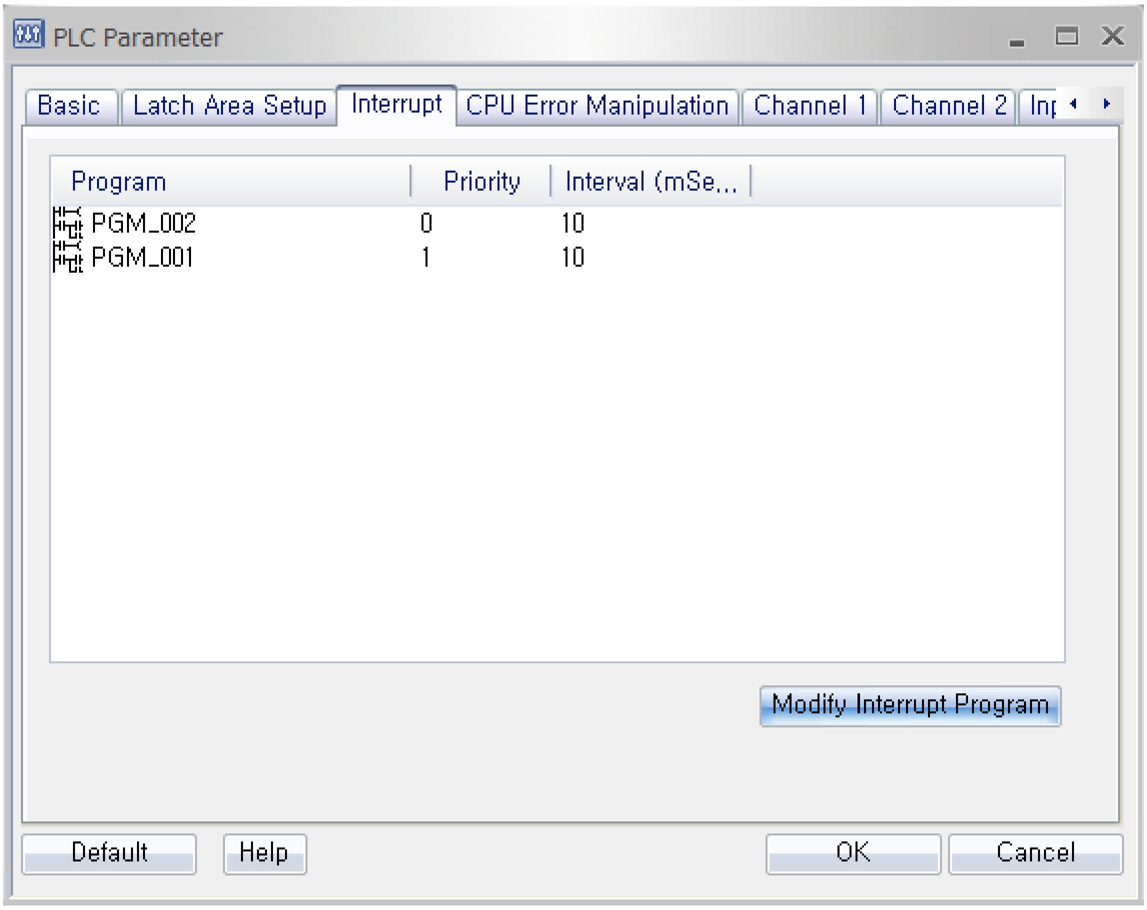
If you turn CPU on, the final value is still in Latch device.

The Latch device range is different according to CPU Type.

*K device supports Latch as standard.

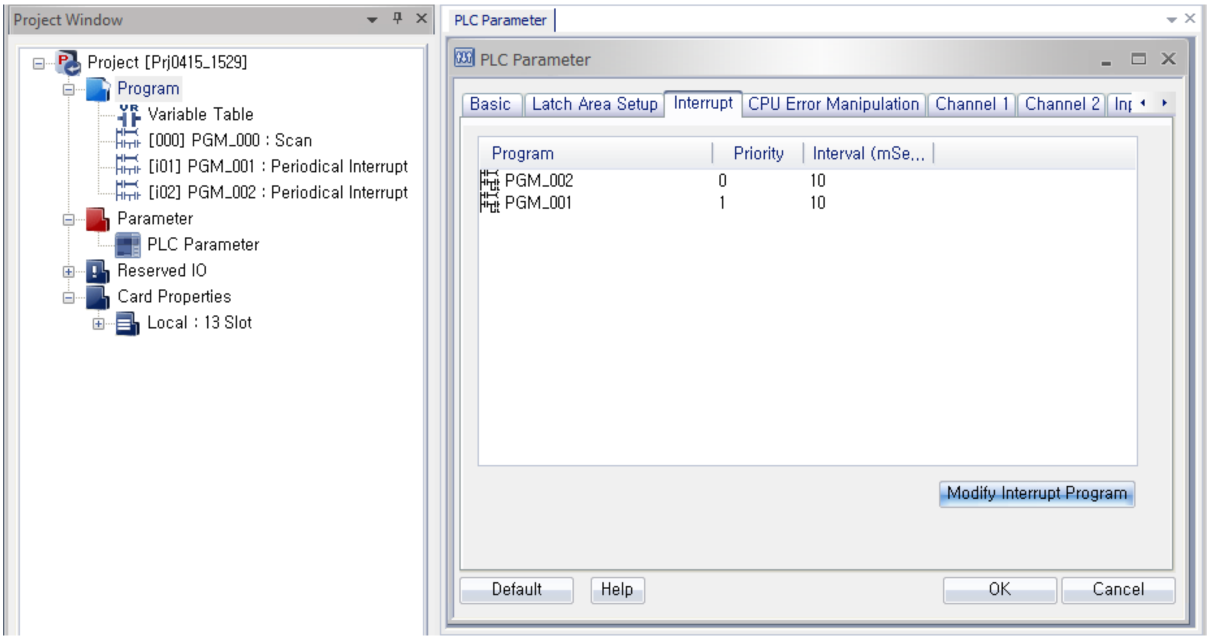
### 5.1.3 Interrupt

It is used to make sequence of Periodical Interrupt program.



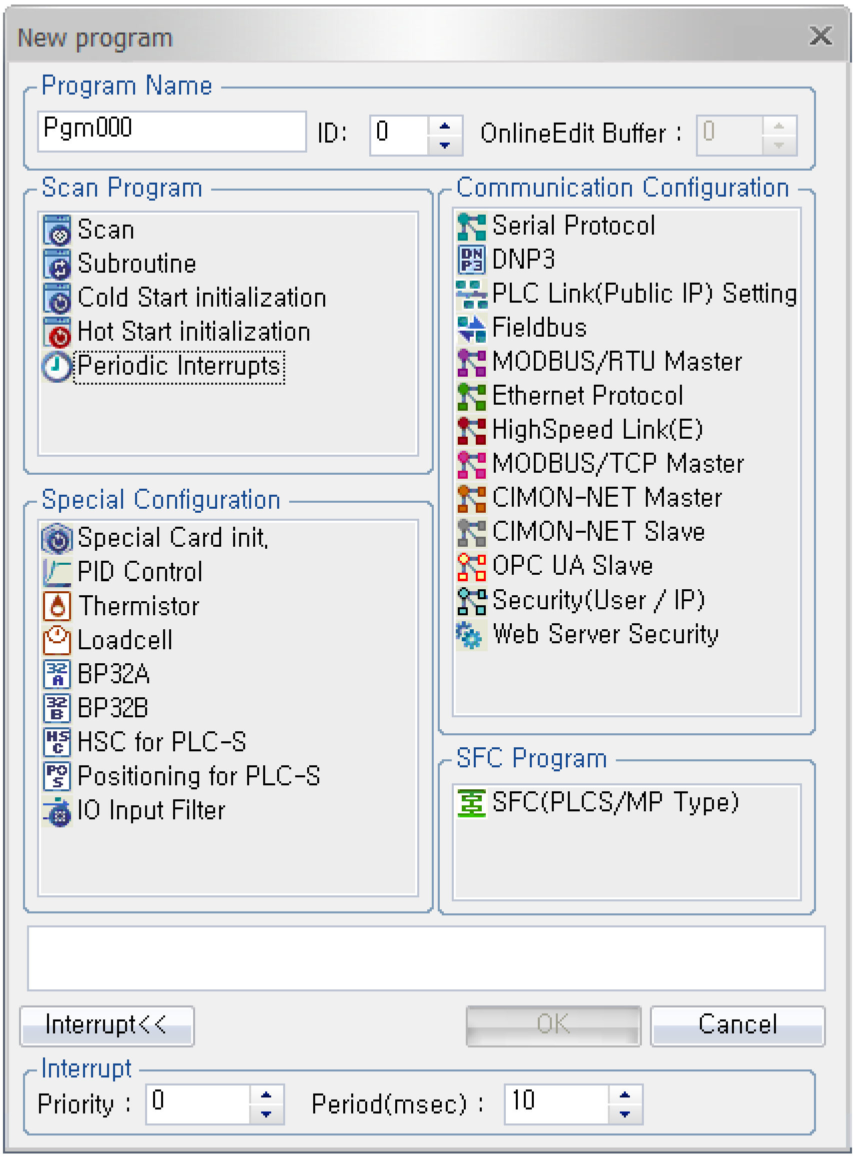
| Program | Priority | Interval (mSe... |
|---|---|---|
| PGM_002 | 0 | 10 |
| PGM_001 | 1 | 10 |

Periodical Interrupt program must be in Program folder.



| Program | Priority | Interval (mSe... |
|---|---|---|
| PGM_002 | 0 | 10 |
| PGM_001 | 1 | 10 |

- Modify Interrupt Program



New program

Program Name

Pgm000 ID: 0 OnlineEdit Buffer : 0

Scan Program
- Scan
- Subroutine
- Cold Start initialization
- Hot Start initialization
- Periodic Interrupts

Communication Configuration
- Serial Protocol
- DNP3
- PLC Link(Public IP) Setting
- Fieldbus
- MODBUS/RTU Master
- Ethernet Protocol
- HighSpeed Link(E)
- MODBUS/TCP Master
- CIMON-NET Master
- CIMON-NET Slave
- OPC UA Slave
- Security(User / IP)
- Web Server Security

Special Configuration
- Special Card init.
- PID Control
- Thermistor
- Loadcell
- BP32A
- BP32B
- HSC for PLC-S
- Positioning for PLC-S
- IO Input Filter

SFC Program
- SFC(PLCS/MP Type)

Interrupt<< OK Cancel

Interrupt

Priority : 0 Period(msec) : 10

If you click Modify Interrupt Program, you can set ID, Priority and period of Interrupt.

- Priority : Number0 is the most priority.

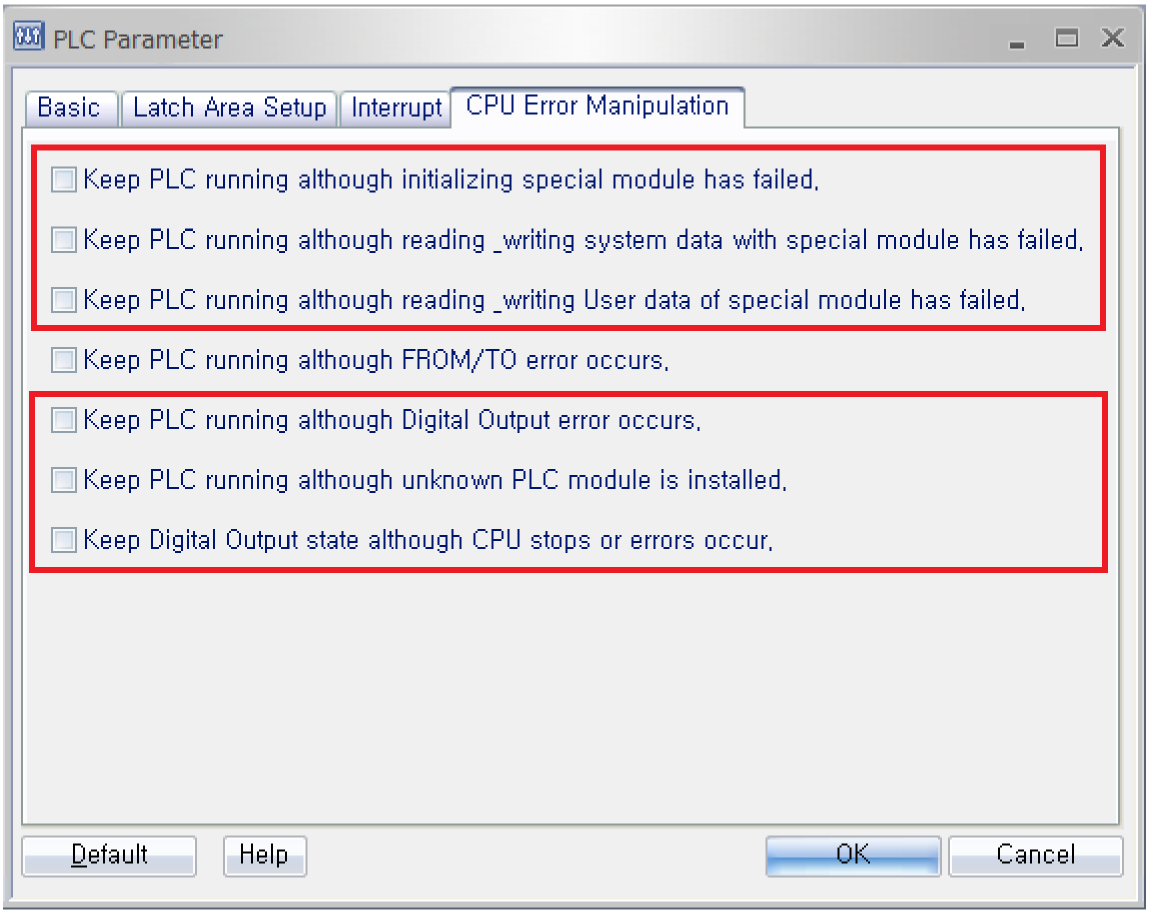
Period(msec) range : 10ms ~ 655,350ms

*Interrupt instruction

| Instruction | LD | Description |
|---|---|---|
| EI | EI n | Enable Interrupt |
| DI | DI n | Enable Interrupt |
| GEI | GEI | Enable Interrupt |
| GDI | GDI | Enable Interrupt |
| IRET | IRET | End Interrupt |

For more details, please refer to Instruction manual.

### 5.1.4 CPU Error Manipulation



☐ Keep PLC running although initializing special module has failed.

☐ Keep PLC running although reading _writing system data with special module has failed.

☐ Keep PLC running although reading _writing User data of special module has failed.

☐ Keep PLC running although FROM/TO error occurs.

☐ Keep PLC running although Digital Output error occurs.

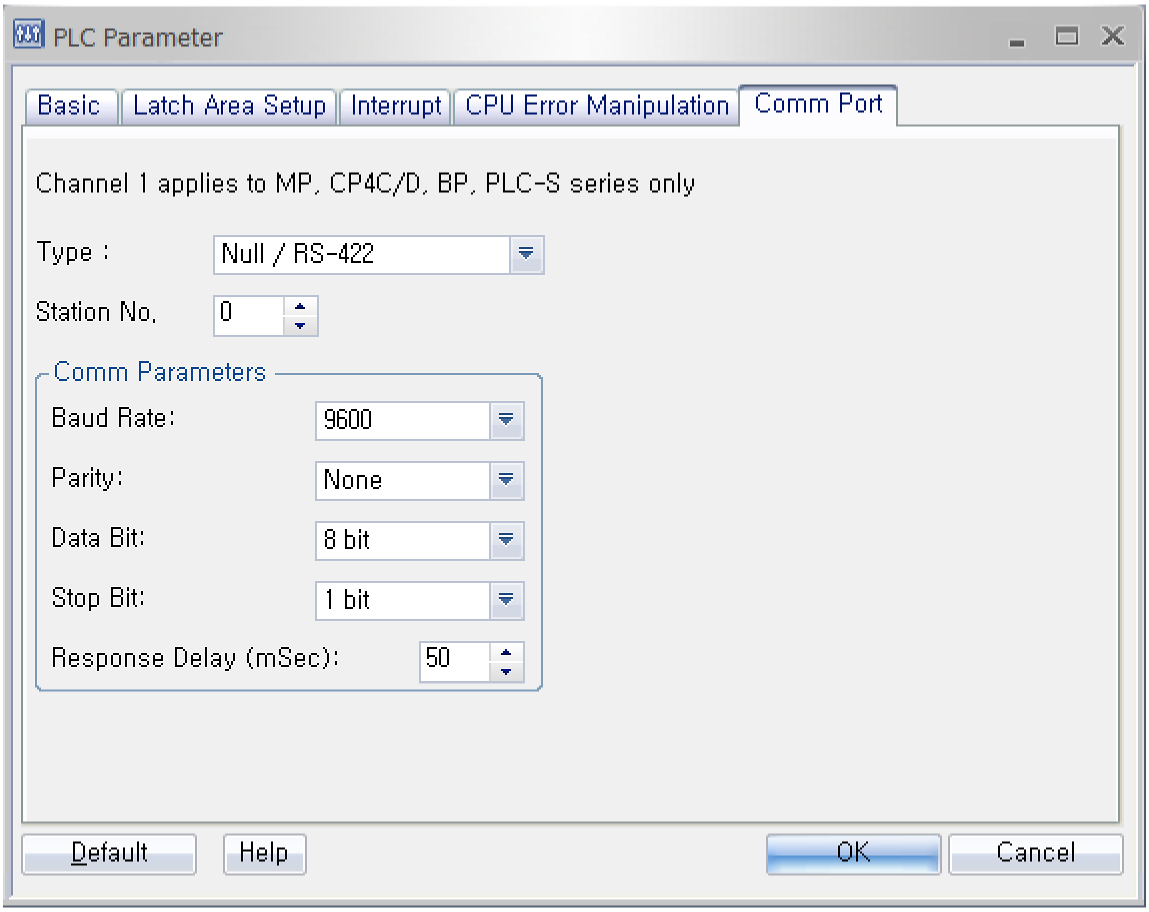
☐ Keep PLC running although unknown PLC module is installed.

☐ Keep Digital Output state although CPU stops or errors occur.

User can choose the operating condition of CPU when error occurs on a module.

- The features in the red box do not support CM3 CPU type.

### 5.1.5 Communication Port



Channel 1 applies to MP, CP4C/D, BP, PLC-S series only

Type : Null / RS-422
Station No. 0

Baud Rate: 9600
Parity: None
Data Bit: 8 bit
Stop Bit: 1 bit
Response Delay (mSec): 50

User can set RS232, RS422 and RS485 parameter for CP4C, CP4D and CP4U CPU type.

- Type

- Null/RS-422
1) CM1-CP4C, CM2-BP32MDxx-R : RS232C without modem
   *CM1-CP4C should use Null/RS-422.
2) CM1-CP4D, CP4U, CM2-BP32MDxx-S : RS422

- Modem / RS-485
1) CM1-CP4C, CM2-BP32MDxx-R : RS232C with Modem
2) CM1-CP4D, CP4U, CM2-BP32MDxx-S : RS485

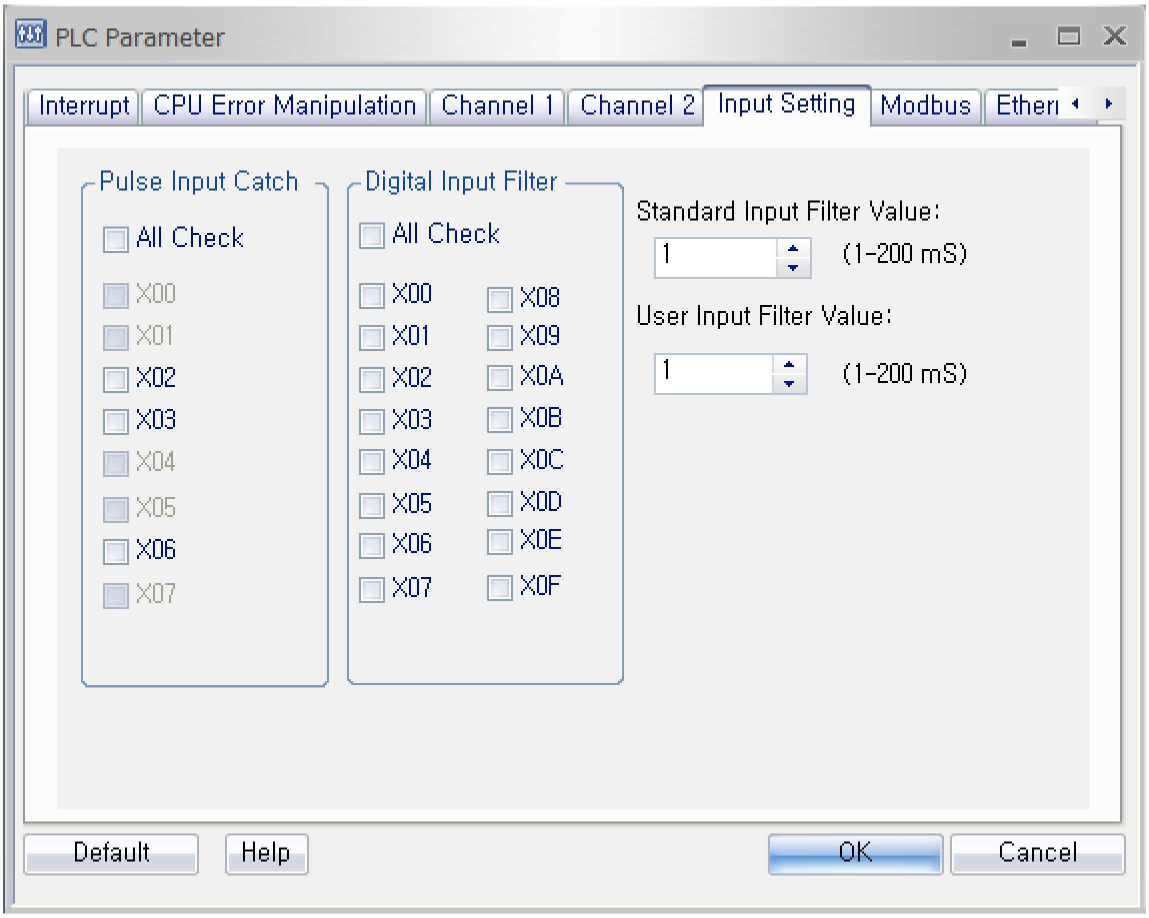
- Station No.

You can set up from 0 to 31.

- Communication Parameters

This parameter must be the same with connected device.

### 5.1.6 Input Setting



Pulse Input Catch

☐ All Check

☐ X00
☐ X01
☐ X02
☐ X03
☐ X04
☐ X05
☐ X06
☐ X07

Digital Input Filter

☐ All Check

☐ X00 ☐ X08
☐ X01 ☐ X09
☐ X02 ☐ X0A
☐ X03 ☐ X0B
☐ X04 ☐ X0C
☐ X05 ☐ X0D
☐ X06 ☐ X0E
☐ X07 ☐ X0F

Standard Input Filter Value: 1 (1-200 mS)

User Input Filter Value: 1 (1-200 mS)

*Input Setting is used with CM3 CPU type.

- Pulse Input Catch

If you want to use HSC, choose the address.

- Digital Input Filter

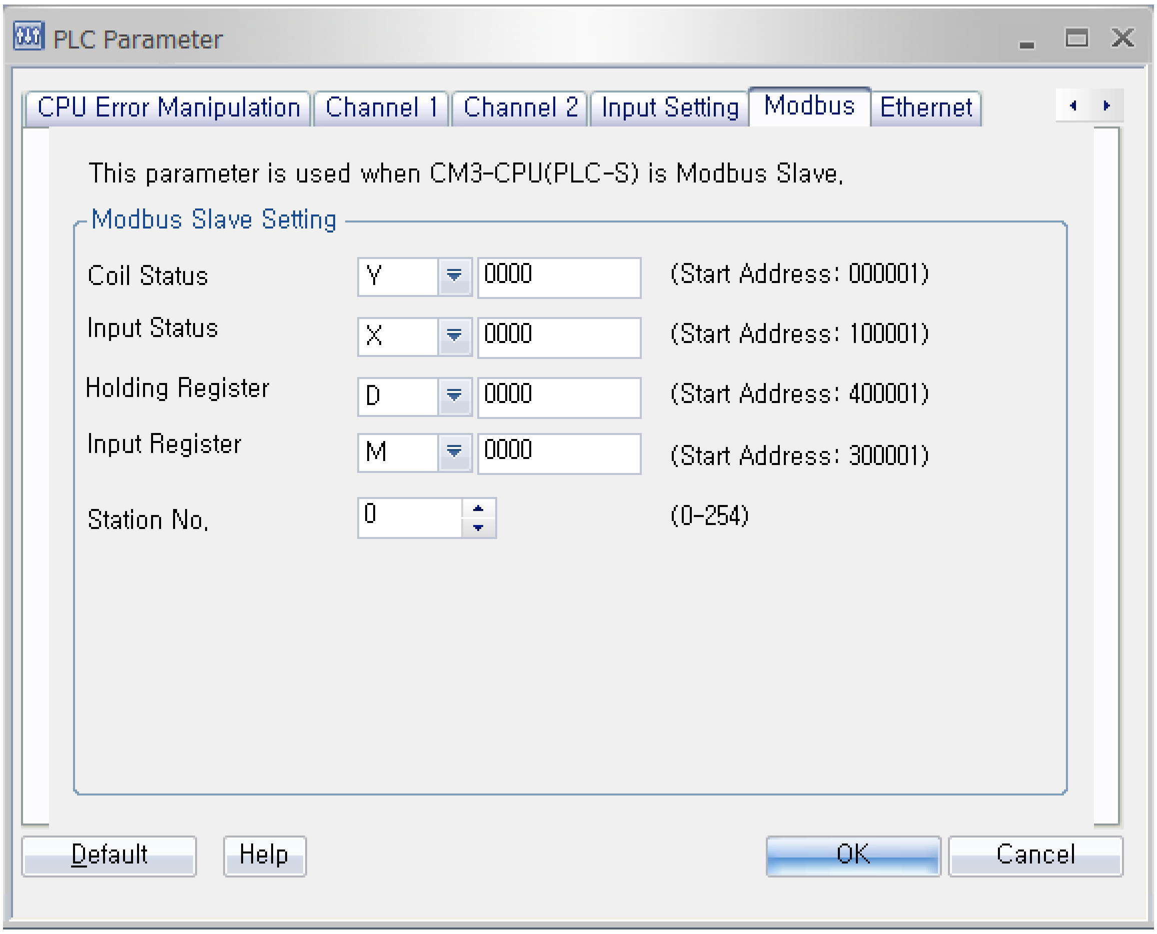
The Digital Input Filter is a feature that eliminates noise from input signals. This is useful when on-site condition is noisy or pulse width is an important factor. By controlling the Digital Input Filter, it can increase the reliability on input pulse. If Input signal is shorter than the pre-defined Digital Input Filter time (value), this signal is recognized as invalid signal and ignored by module. Digital Input Filter also applies to noisy or chattering pulse.

The selected address will run by User Input Filter Value.

The unselected address will run by Standard Input Filter Value.

*The minimum Input Filter value(Time) is 1ms.

### 5.1.7 Modbus



This parameter is used when CM3-CPU(PLC-S) is Modbus Slave.

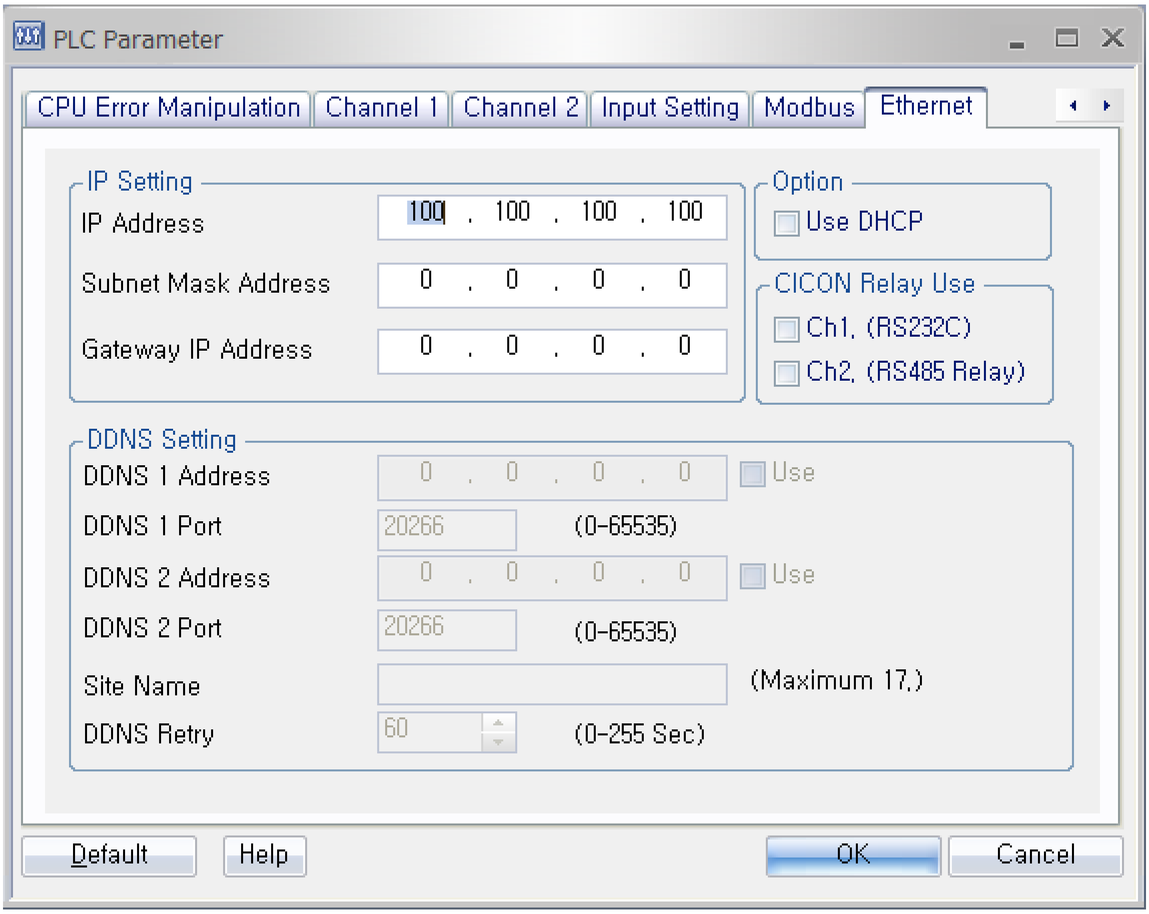
Modbus Slave Setting

| | | | |
|---|---|---|---|
| Coil Status | Y | 0000 | (Start Address: 000001) |
| Input Status | X | 0000 | (Start Address: 100001) |
| Holding Register | D | 0000 | (Start Address: 400001) |
| Input Register | M | 0000 | (Start Address: 300001) |
| Station No. | 0 | | (0-254) |

*Modbus Slave is used with CM3 CPU type.

Choose the starting address for each type.

### 5.1.8 Ethernet



IP Setting
IP Address 100 . 100 . 100 . 100
Subnet Mask Address 0 . 0 . 0 . 0
Gateway IP Address 0 . 0 . 0 . 0

Option
☐ Use DHCP

CICON Relay Use
☐ Ch1. (RS232C)
☐ Ch2. (RS485 Relay)

DDNS Setting
DDNS 1 Address 0 . 0 . 0 . 0 ☐ Use
DDNS 1 Port 20266 (0-65535)
DDNS 2 Address 0 . 0 . 0 . 0 ☐ Use
DDNS 2 Port 20266 (0-65535)
Site Name (Maximum 17.)
DDNS Retry 60 (0-255 Sec)

- IP Setting : Type IP address if Ethernet port is used.

- Option : If you choose DHCP, IP address is assigned automatically.

- CICON Relay Use (Programming Bridge) : When multiple PLC-S are connected over RS232C or RS485(N:N), CICON can provide a communication bridge channel between PLC-S.

- DDNS Setting : DDNS setting is used to make a connection between PLC and CIMON SCADA especially when dynamic IP address is assigned to PLC. After setting DDNS Address and port, Site Name (ID) and DDNS Connection Retry must be set up.

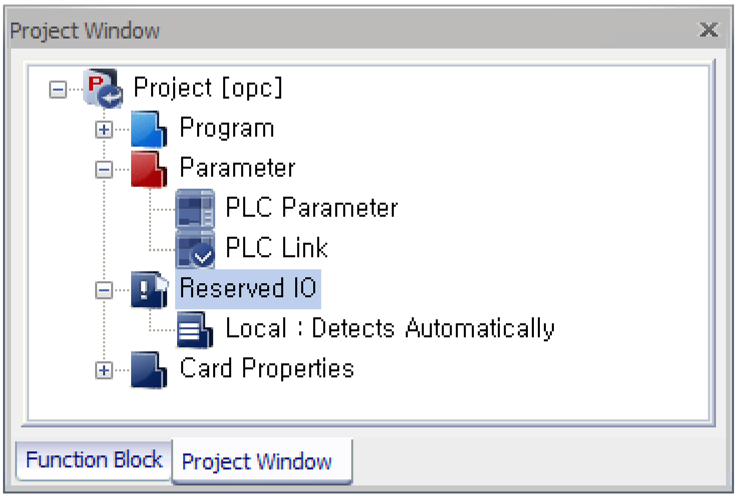
## 5.2 Reserved I/O

Reserved I/O let you organize I/O points to match your modules which will be installed in Base.

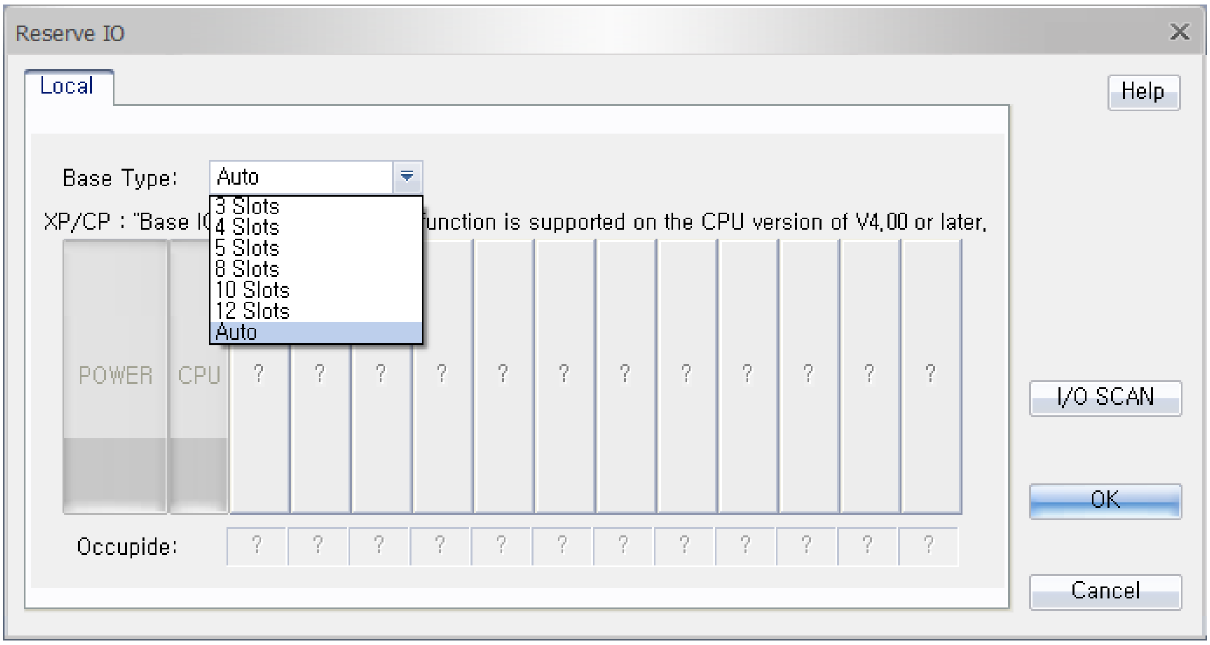
It is easier to detect wrong module installation and to replace module without I/O change.

- The Reserved I/O supports only CM1 series.

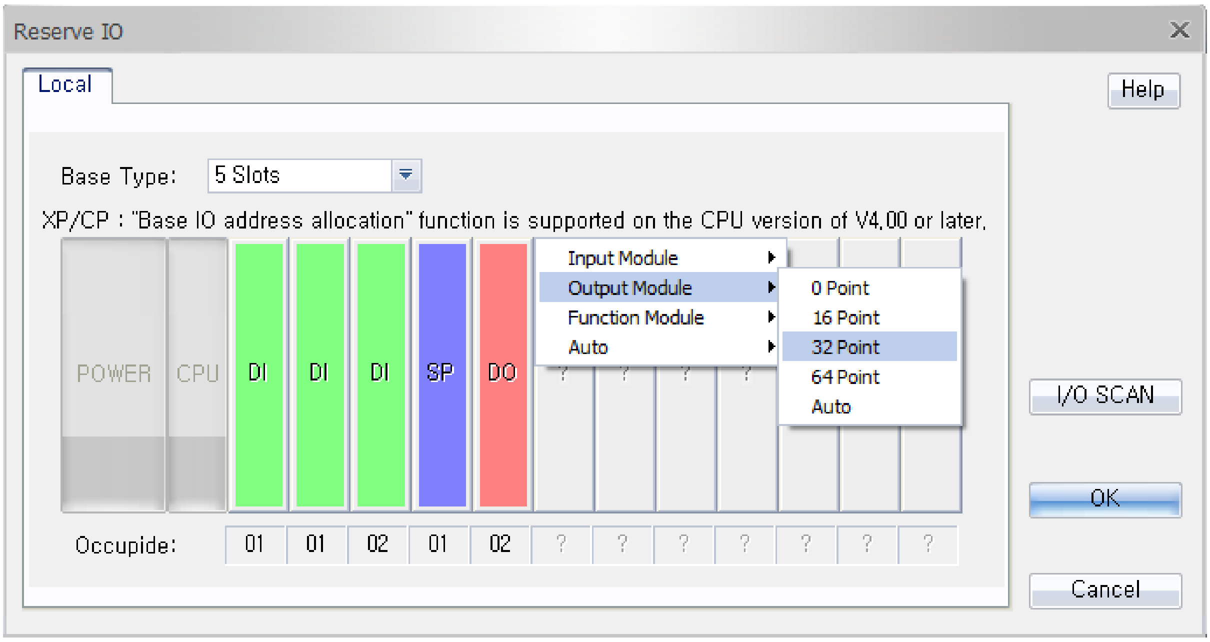
1) Click Local : Detects Automatically.



2) From the Base Type pull-down menu, choose the Base number.

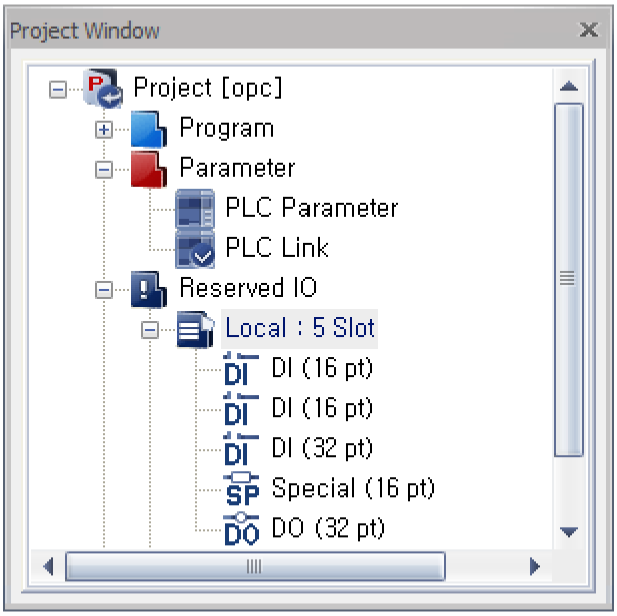


3) Click the module and choose I/O type and points.

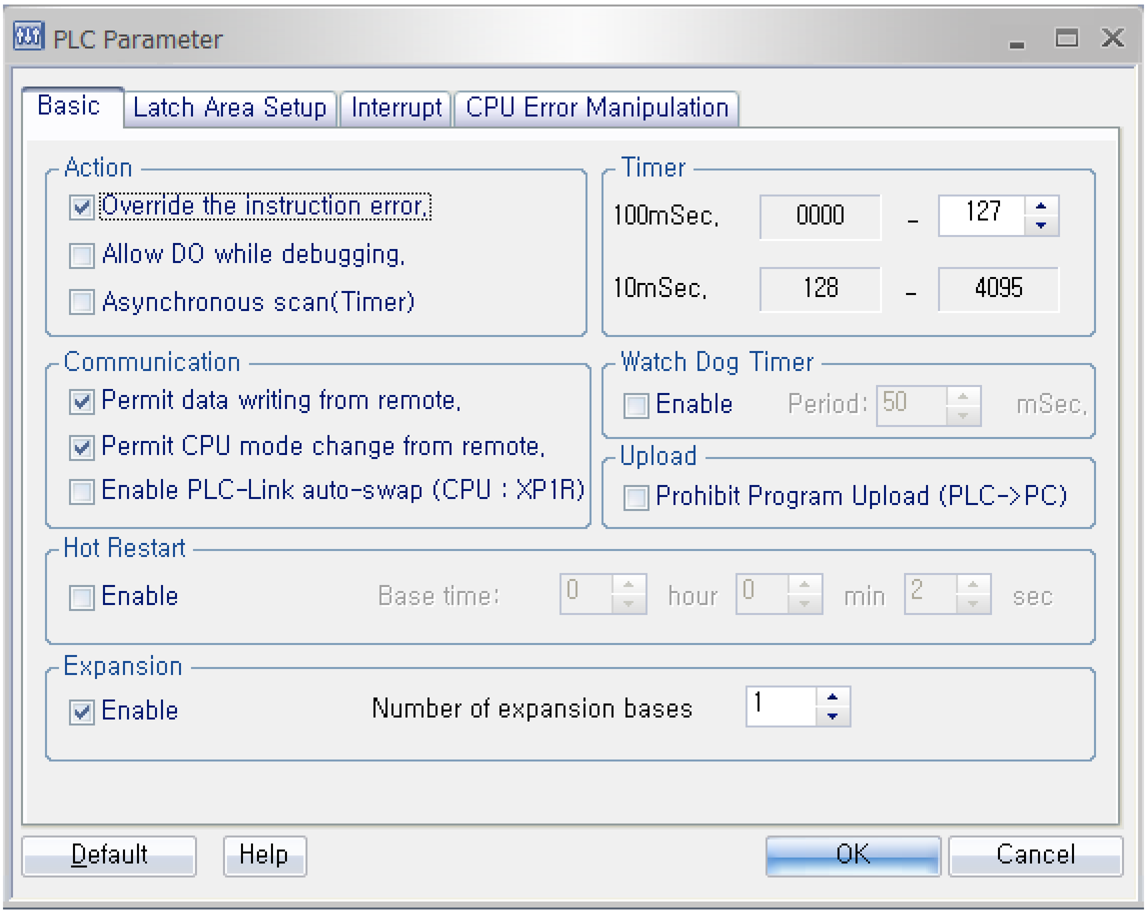


- Occupy 01 : I/O 16points
- Occupy 02 : I/O 32points

4) Click Ok.
You can find out I/O point for each slot you have just made.



5) In order to reserve I/O points for expansion Base, click Enable and choose the number of expansion base at the PLC Parameter.



Action
☑ Override the instruction error.
☐ Allow DO while debugging.
☐ Asynchronous scan(Timer)

Timer
100mSec. 0000 - 127
10mSec. 128 - 4095

Communication
☑ Permit data writing from remote.
☑ Permit CPU mode change from remote.
☐ Enable PLC-Link auto-swap (CPU : XP1R)

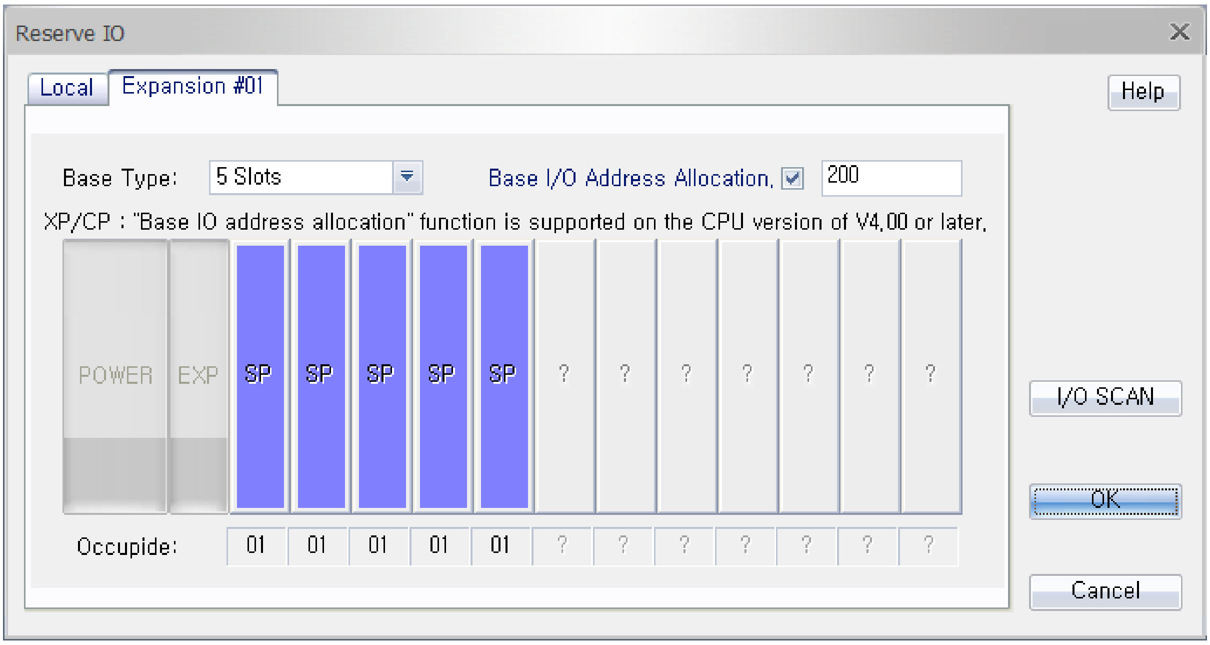
Watch Dog Timer
☐ Enable Period: 50 mSec.

Upload
☐ Prohibit Program Upload (PLC->PC)

Hot Restart
☐ Enable Base time: 0 hour 0 min 2 sec

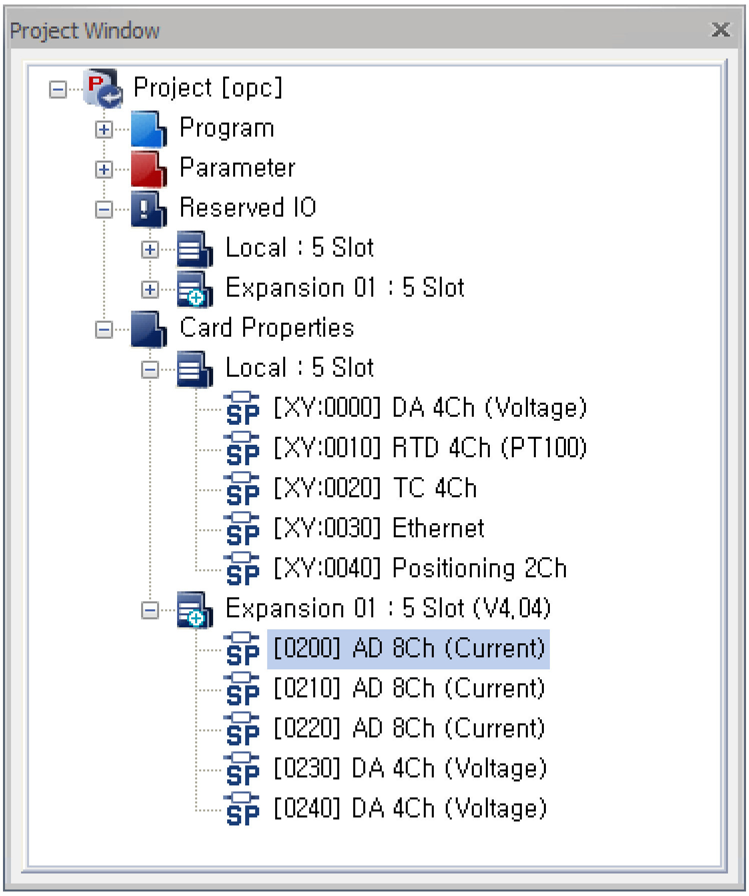
Expansion
☑ Enable Number of expansion bases 1

6) Double-click Reserved IO and click Expansion#01 tab.
Choose Base type and write starting I/O address.
The starting I/O address must be different with other expansion base or local.



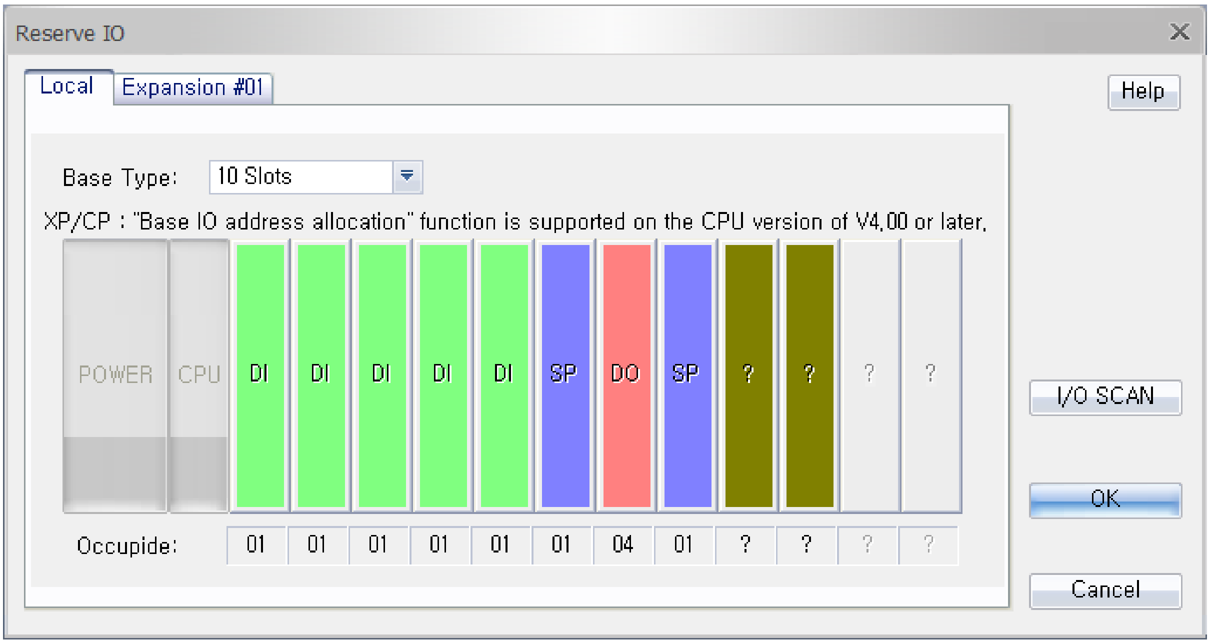
Base Type: 5 Slots
Base I/O Address Allocation. ☑ 200
XP/CP : "Base IO address allocation" function is supported on the CPU version of V4.00 or later.
Occupide: 01 01 01 01 01 ? ? ? ? ? ? ?

7) You can also use I/O SCAN to find out slot information automatically.
8) Click the module and choose I/O type and points.
   If module is not Digital I/O module, choose the Function Module.
9) Click Online → Download then you can find out expansion I/O address starts from 200.



- Project [opc]
  - Program
  - Parameter
  - Reserved IO
    - Local : 5 Slot
    - Expansion 01 : 5 Slot
  - Card Properties
    - Local : 5 Slot
      - [XY:0000] DA 4Ch (Voltage)
      - [XY:0010] RTD 4Ch (PT100)
      - [XY:0020] TC 4Ch
      - [XY:0030] Ethernet
      - [XY:0040] Positioning 2Ch
    - Expansion 01 : 5 Slot (V4.04)
      - [0200] AD 8Ch (Current)
      - [0210] AD 8Ch (Current)
      - [0220] AD 8Ch (Current)
      - [0230] DA 4Ch (Voltage)
      - [0240] DA 4Ch (Voltage)

■How to read I/O points



Base Type: 10 Slots

XP/CP : "Base IO address allocation" function is supported on the CPU version of V4.00 or later.

Occupide: 01 01 01 01 01 01 04 01 ? ? ? ?

I/O address :0000~0100

Slot No.0 : 16points, Occupied 1

Slot No.1 : 16points, Occupied 1

Slot No.2 : 16points, Occupied 1

Slot No.3 : 16points, Occupied 1

Slot No.4 : 16points, Occupied 1

Slot No.5 : 16points, Occupied 1

Slot No.6 : 64points, Occupied 4

Slot No.7 : 16points, Occupied 1

If Local base use 0000~0100, Expansion base needs to use from 0110.

## 6. Scan Program

SCAN PROGRAM OVERVIEW

**Scan Program:** Program that processes the regularly repeated signal for every scan.

**Subroutine Program:** Program composed of sub-routines that are called by “ECALL” command in the scan program.

**Initialization Program (Cold):** Program executed when the power is supplied or mode of the PLC is switched to Run Mode. It configures the initial data and initializes the peripheral or special module required to execute a scan program.

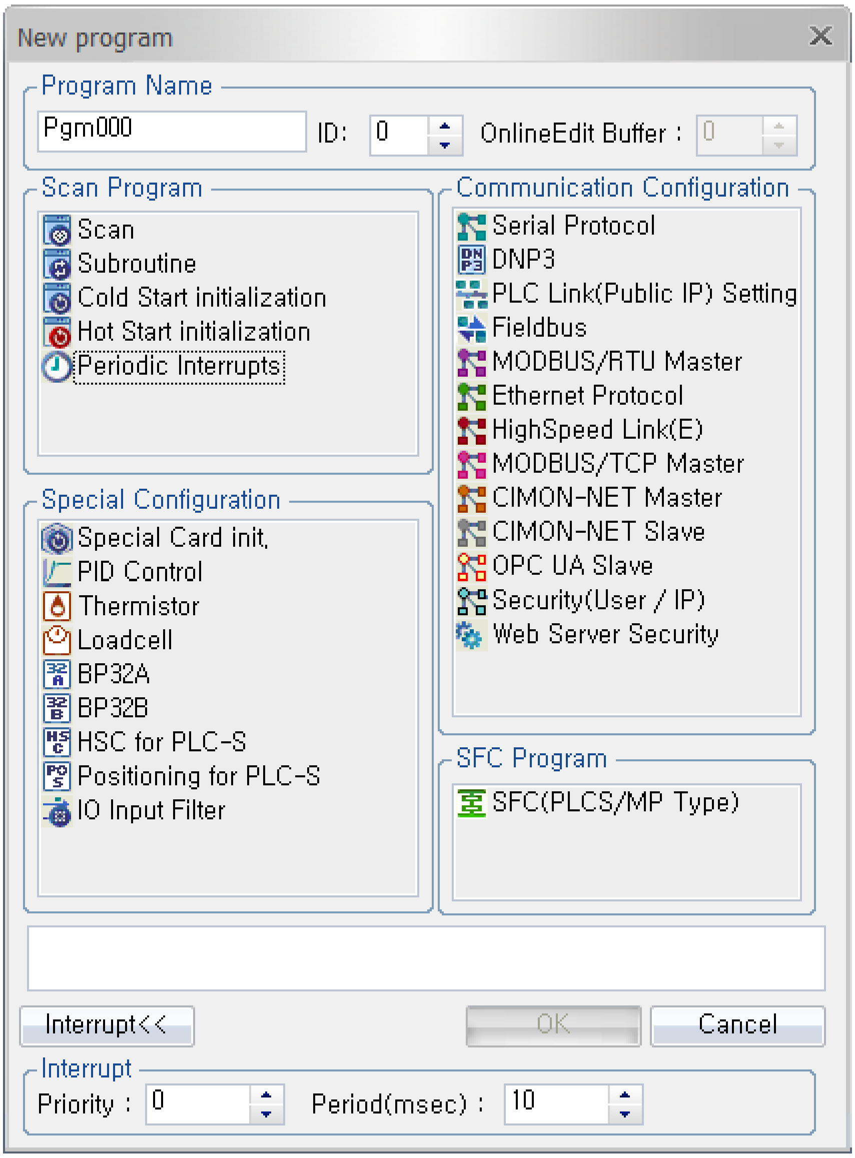
**Initialization Program (Hot):** If the power fails temporarily within the setting time and the Hot Restart function is enabled in the PLC Parameter, this program is executed to keep previous values before the power failure and to successively execute a scan program.

**Periodic Interrupt Program:** Program executed at the specified intervals.

### 6.1 Scan Program

The Scan Program processes the regularly repeated signal for every scan.

Select File → New Program menu to create a new scan program.



New program

Program Name: Pgm000 ID: 0 OnlineEdit Buffer : 0

Interrupt — Priority : 0 Period(msec) : 10

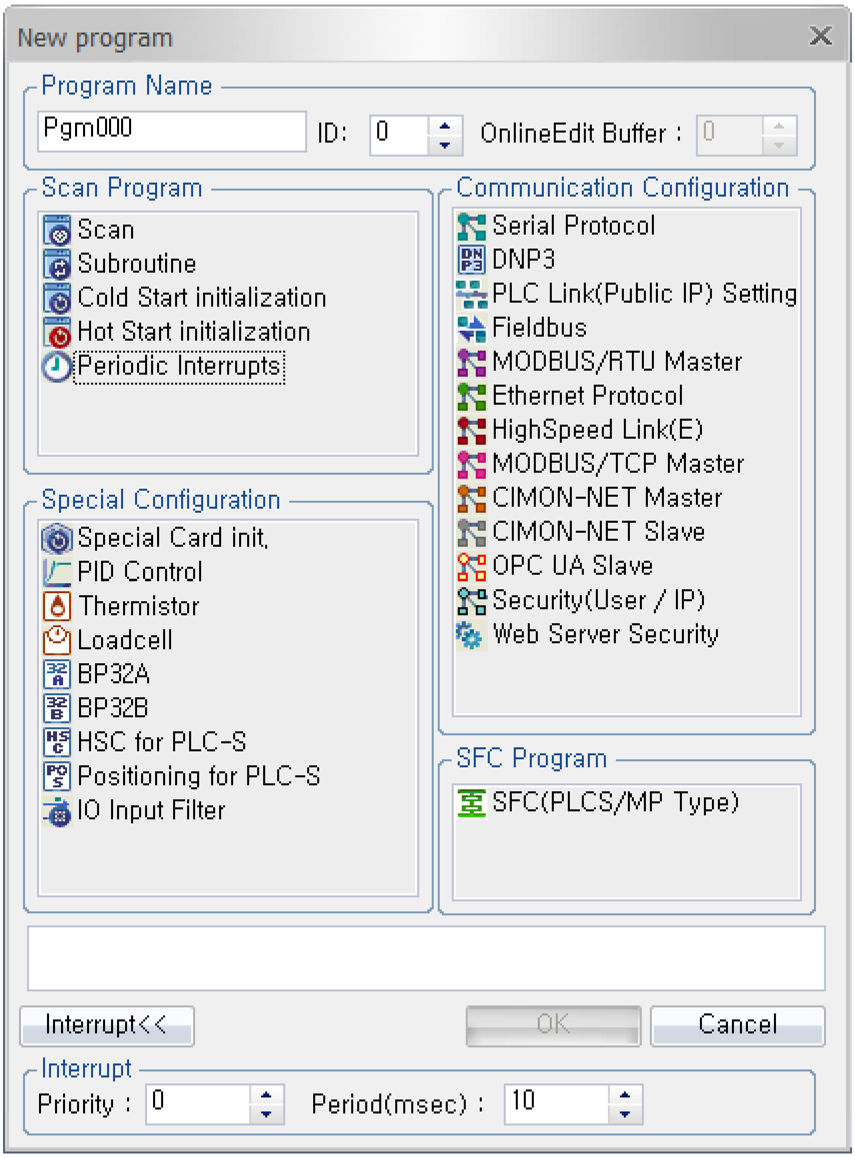
**Scan Program Properties**

1) **Program Name:** Displays the name of the program.
2) **Program ID:** Decides the priority of program execution. Program is executed from ID with

the lowest number.

3) **Online Edit Buffer:** Free space is reserved for the modification function while the program is running. If you keep editing online without downloading the program to PLC, the free space is reduced. Therefore, it is recommended that you secure the free space by reconfiguring the size of memory specified for downloading.

### 6.2 Subroutine Program



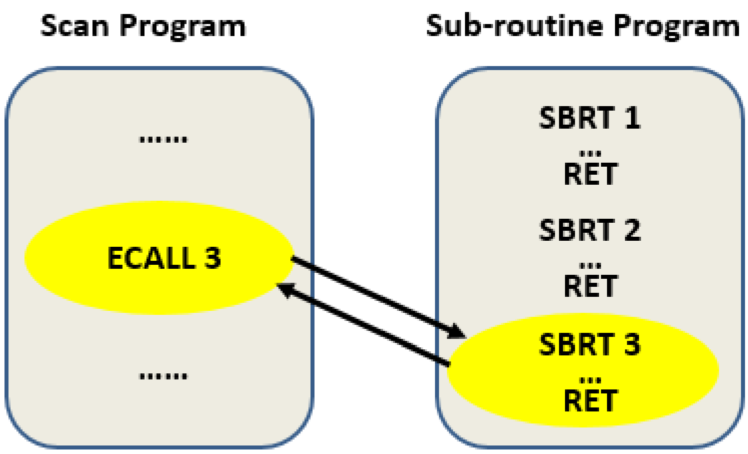
New program

Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0

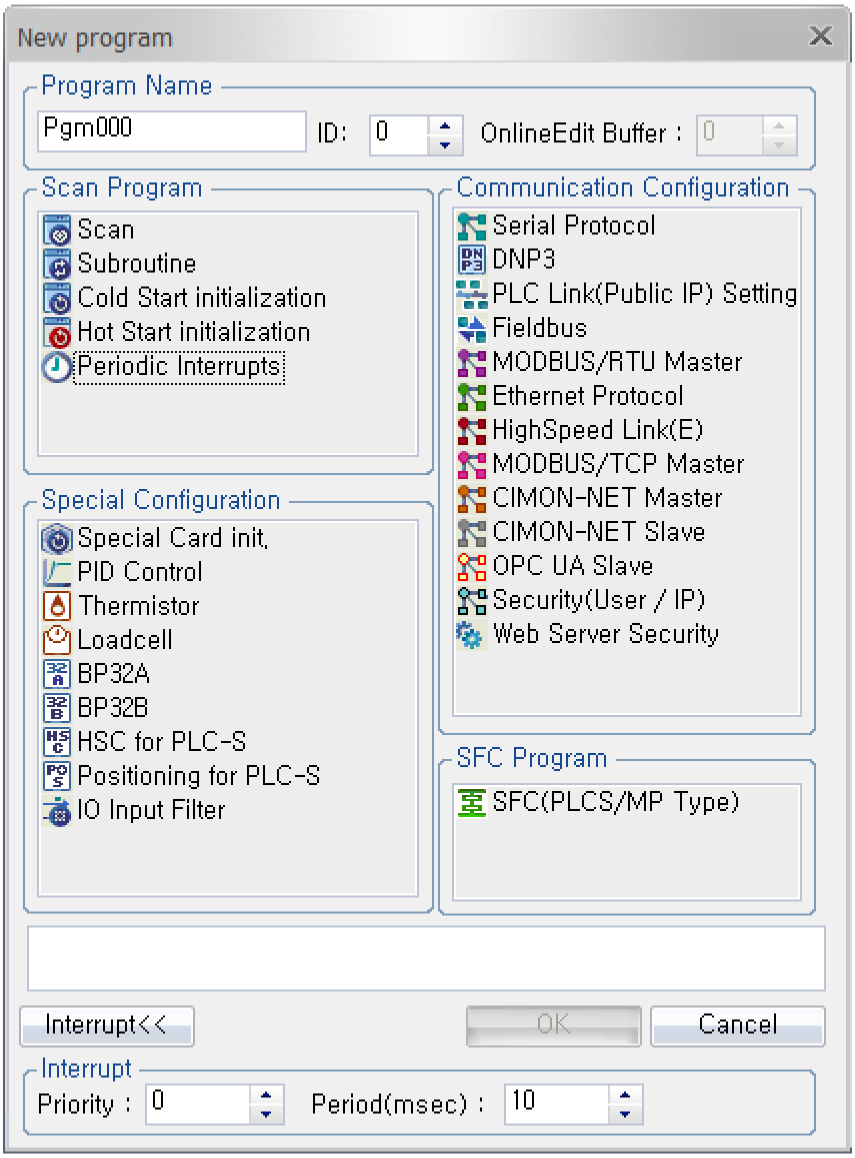
Interrupt
Priority : 0
Period(msec) : 10

The Subroutine Program is a collection of programs that are called by the “ECALL” command in the scan program. The scan program calls SBRT n ~ RET commands in the Subroutine Program according to the “ECALL” command.

For the “ECALL” command, a user enters Subroutine Program ID and its number. The result value of an instruction (Coil instruction, etc.) operating in the Subroutine Program is processed only when the Subroutine Program is called.



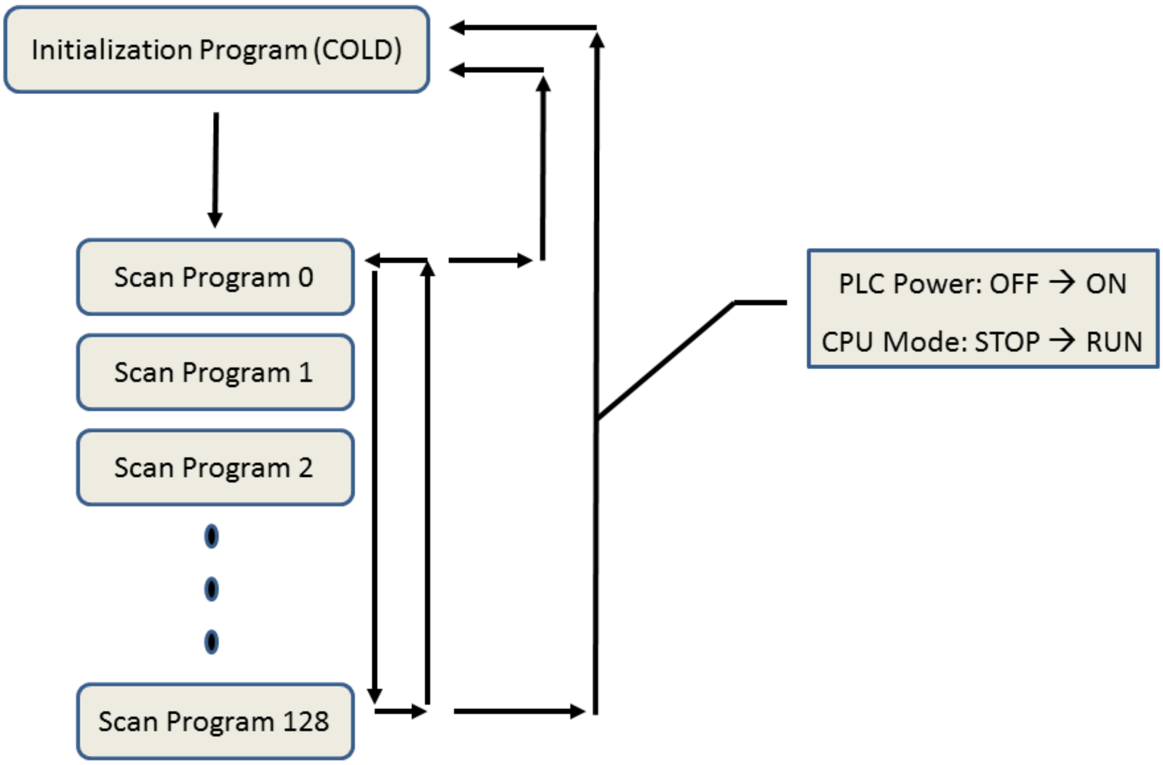
### 6.3 Cold Start Initialization Program



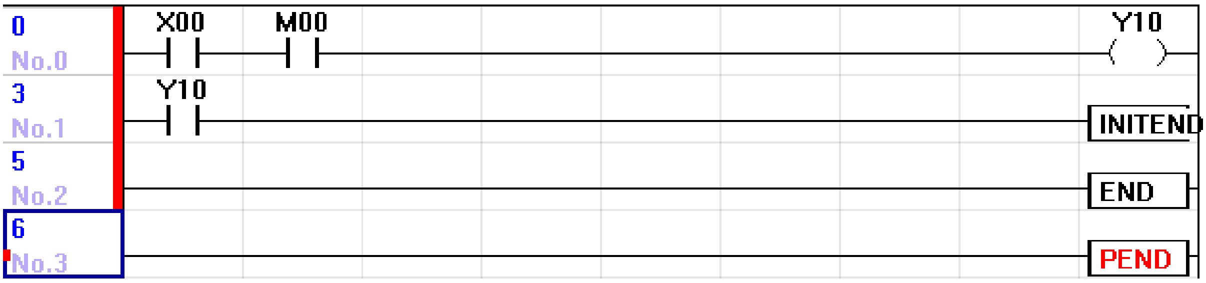
Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

The Cold Start Initialization Program is executed when the power is supplied or CPU mode is switched from STOP to RUN mode. The Scan Program is executed after the Cold Start Initialization Program is complete. The Cold Start sets the initial data or initializes the peripheral and special module to run the Scan Program.

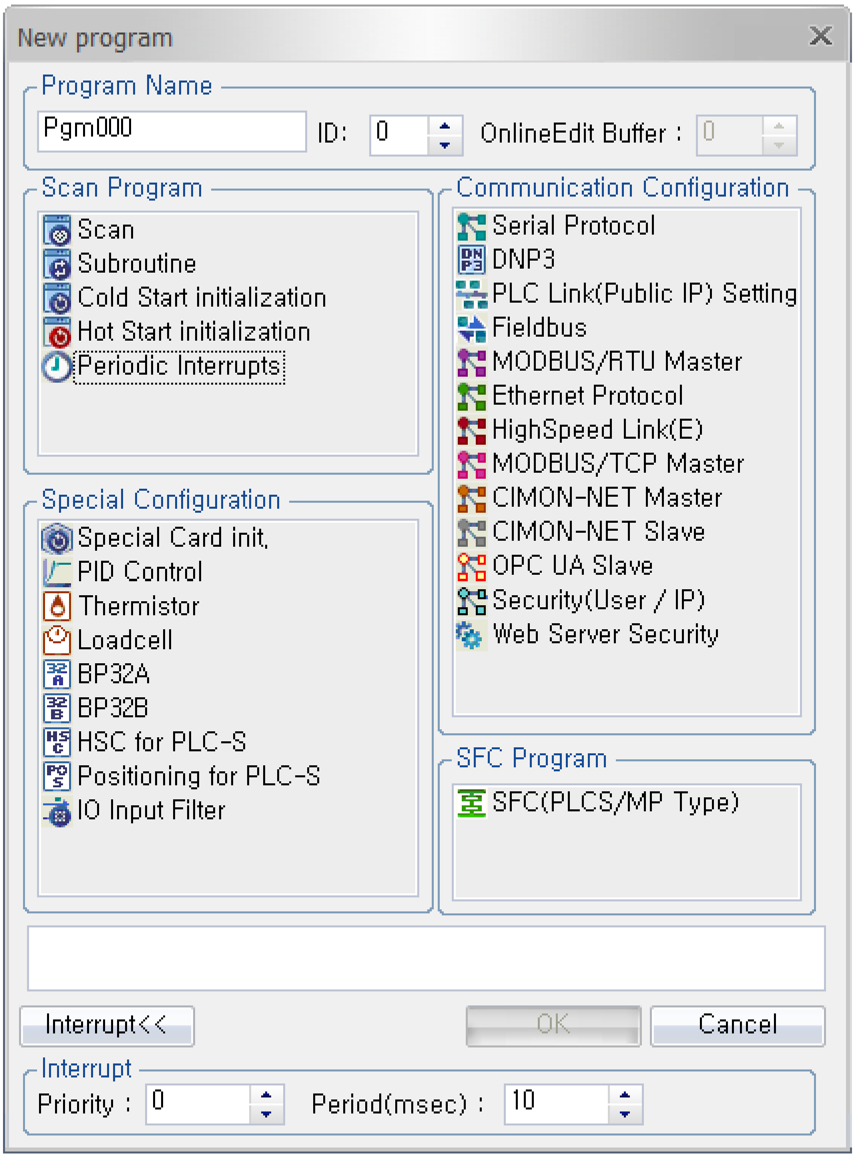


You must use the "INITEND" command to end the initialization program.



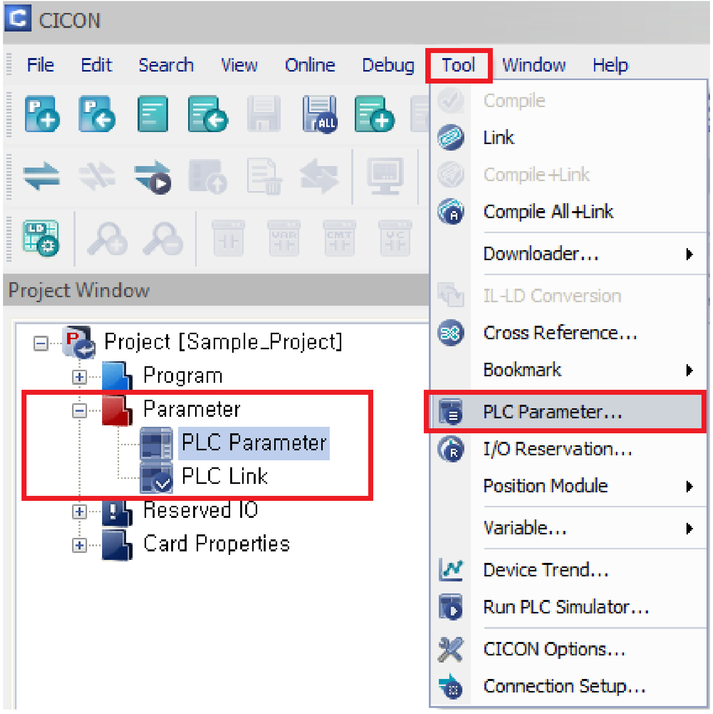
### 6.4 Hot Start Initialization Program

[Menu] → [Tool] → [PLC Parameter] or [Project Window] → [Parameter] → [PLC Parameter].

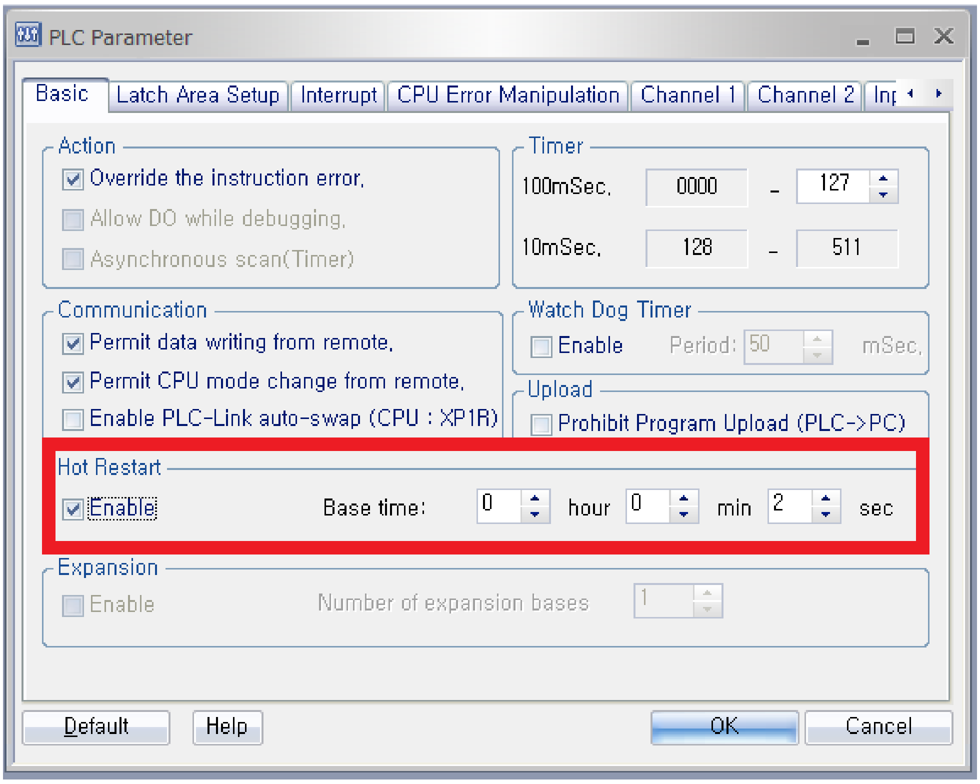


Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0
Priority : 0
Period(msec) : 10

1) [Menu] → [Tool] → [PLC Parameter] or [Project Window] → [Parameter] → [PLC Parameter]



2) Enable the Hot Restart function in the PLC Parameter Window and set the time. This function will be executed only if the temporary power failure occurs within the setting time.



Action
☑ Override the instruction error.
☐ Allow DO while debugging.
☐ Asynchronous scan(Timer)

Timer
100mSec. 0000 - 127
10mSec. 128 - 511

Communication
☑ Permit data writing from remote.
☑ Permit CPU mode change from remote.
☐ Enable PLC-Link auto-swap (CPU : XP1R)

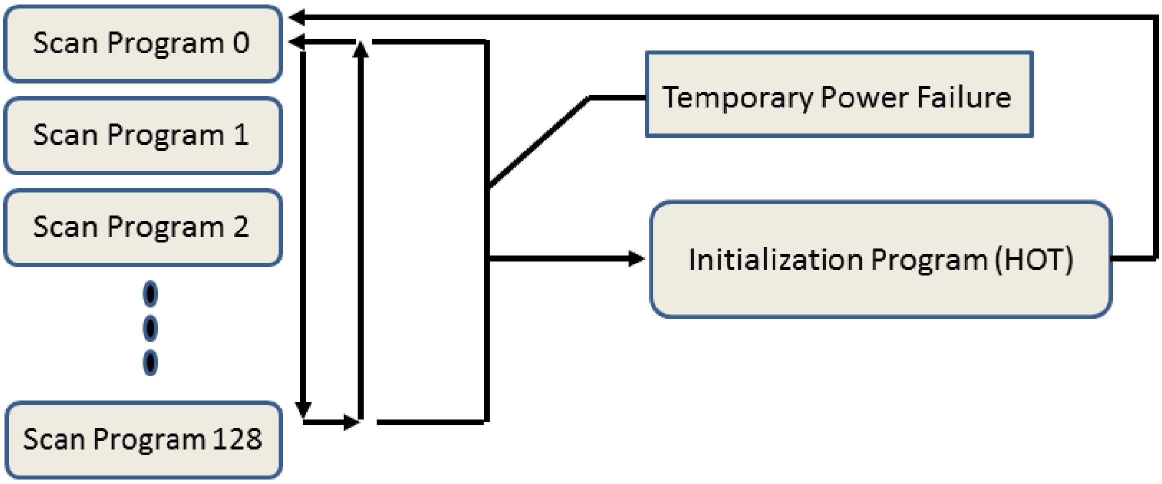
Watch Dog Timer
☐ Enable Period: 50 mSec.

Upload
☐ Prohibit Program Upload (PLC->PC)

Hot Restart
☑ Enable Base time: 0 hour 0 min 2 sec

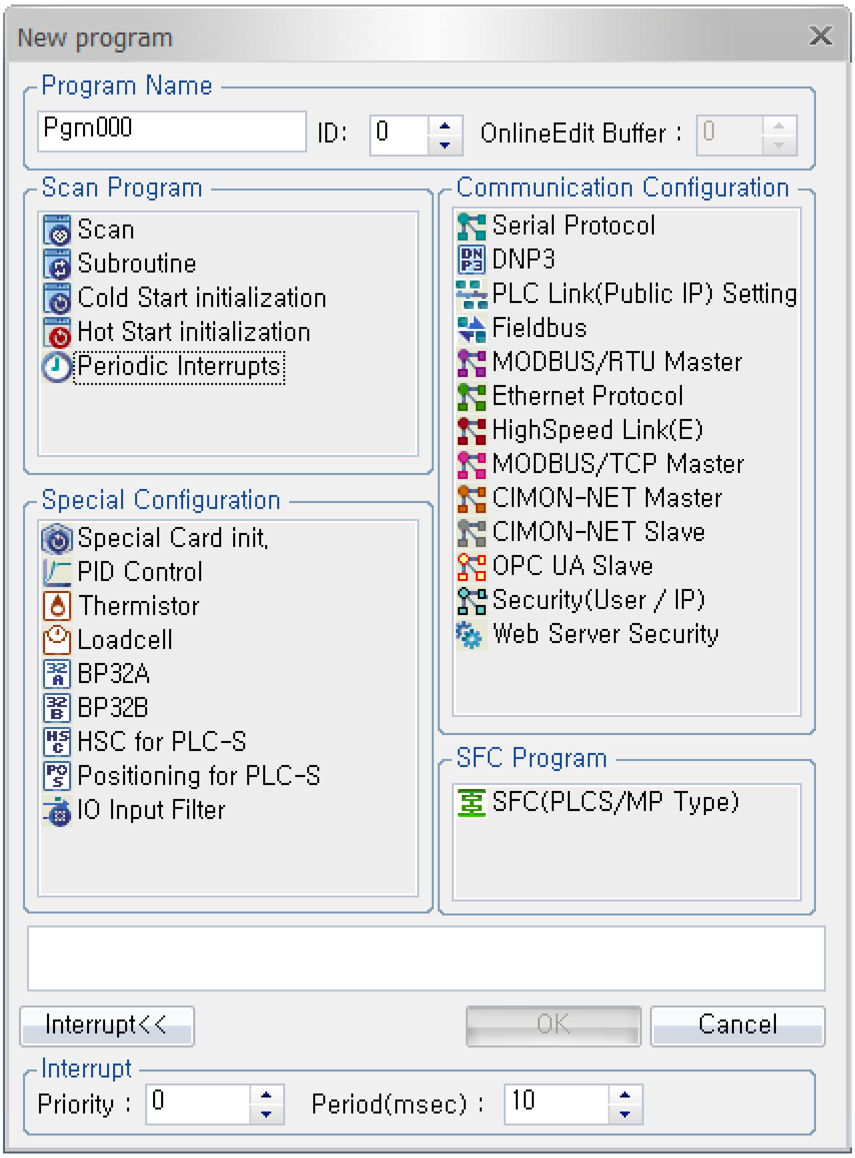
Expansion
☐ Enable Number of expansion bases 1

If the power fails temporarily within the setting time and the Hot Restart function is enabled in the PLC Parameter, the Hot Start Initialization Program is executed to keep previous values before the power failure and to successively execute a scan program. You must use the "INITEND" command to end the initialization program.



### 6.5 Periodic Interrupt Program

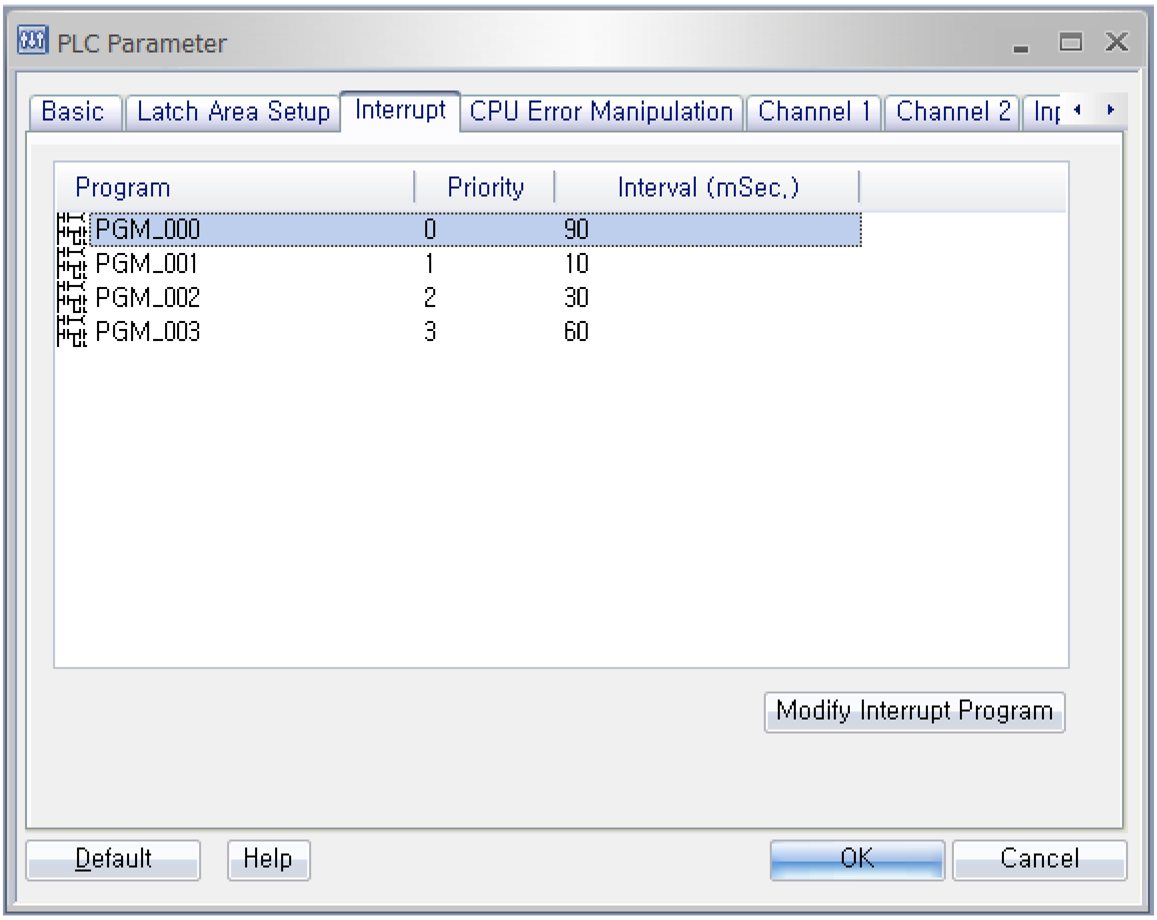
The Periodic Interrupt Program is executed at intervals specified by Interrupt Period.



Pgm000
ID: 0
OnlineEdit Buffer : 0
Priority : 0
Period(msec) : 10

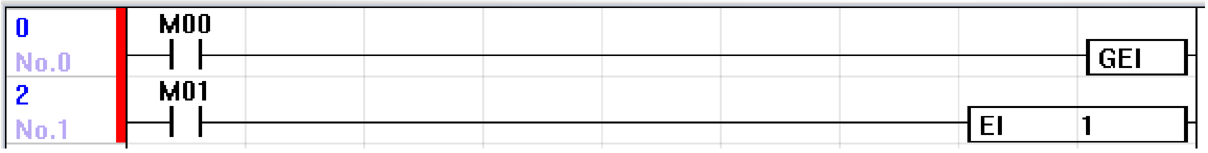
**How to Configure the Interrupt Program:**

1) Specify the Interrupt ID from 0 to 15. The ID number cannot be duplicated.
2) Free space is reserved for the modification function while the program is running. If you keep editing online without downloading the program to PLC, the free space is reduced. Therefore, it is recommended that you secure the free space by reconfiguring the size of memory specified for downloading.
3) The program with the lowest Interrupt ID gets a higher priority and will be executed first.



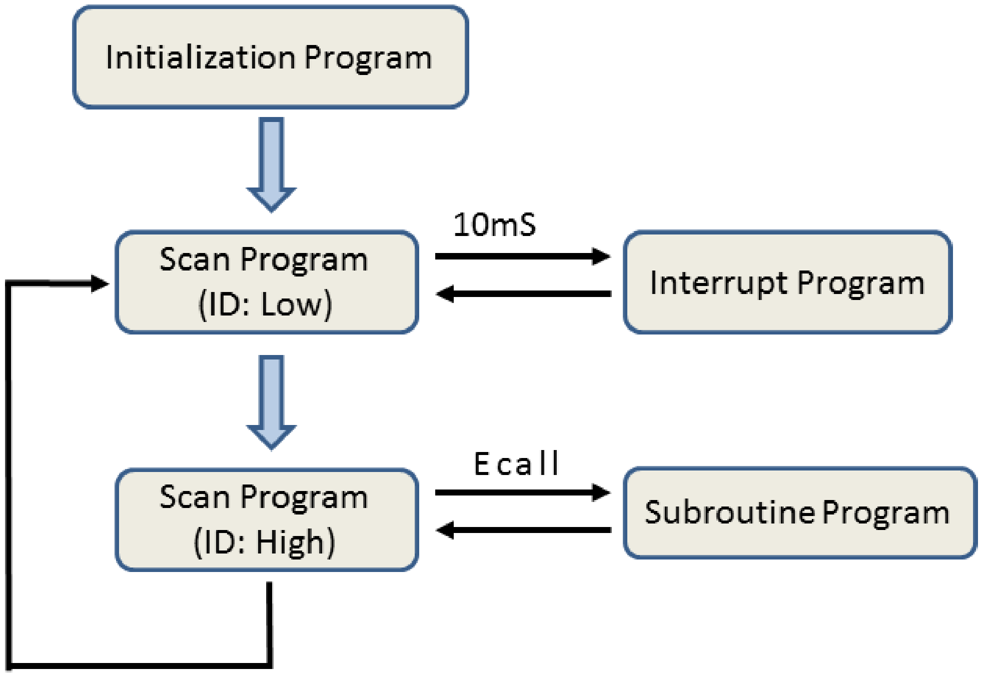
| Program | Priority | Interval (mSec.) |
|---|---|---|
| PGM_000 | 0 | 90 |
| PGM_001 | 1 | 10 |
| PGM_002 | 2 | 30 |
| PGM_003 | 3 | 60 |

4) Enter the Interrupt Period that will execute the program by the specified intervals.
5) If you want to run the Interrupt Program, use the “GEI” command to enable the usage of the program. Then, execute the program using the “EI” command.



* For XPnB CUP type, Interrupt Program is executed automatically if it was registered previously. If Interrupt feature is disabled by using command “DI” on XPnB CPU type, then command “GEI” must be used to enable the Interrupt feature again. For all CPU types except XPnB, these two commands “GEI” and “EI” are used to enable and execute an Interrupt Program.

**Program Operating Principle:**



The Initialization Program operates only during the early stage of PLC operation whereas the Scan Program operates repeatedly as long as the PLC is running. The Subroutine Program is executed only when it is called out by the “ECALL” command during the Scan Program.

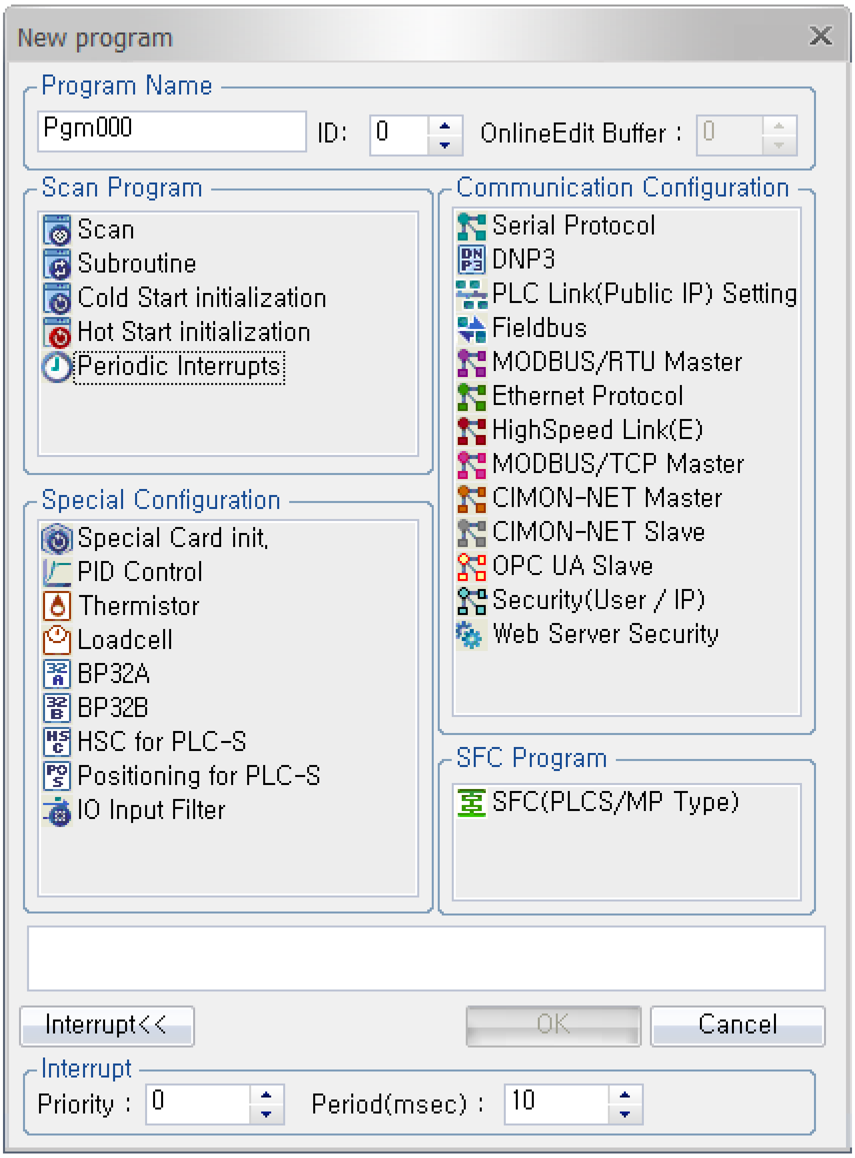
# 7. Communication Program

## 7.1 Serial Protocol

The Serial Protocol program enables the user to manually define the communication frame of the serial communication module.

**Registering the Serial Protocol program**

Select [File] → [New Program] → [Serial Protocol] menu.



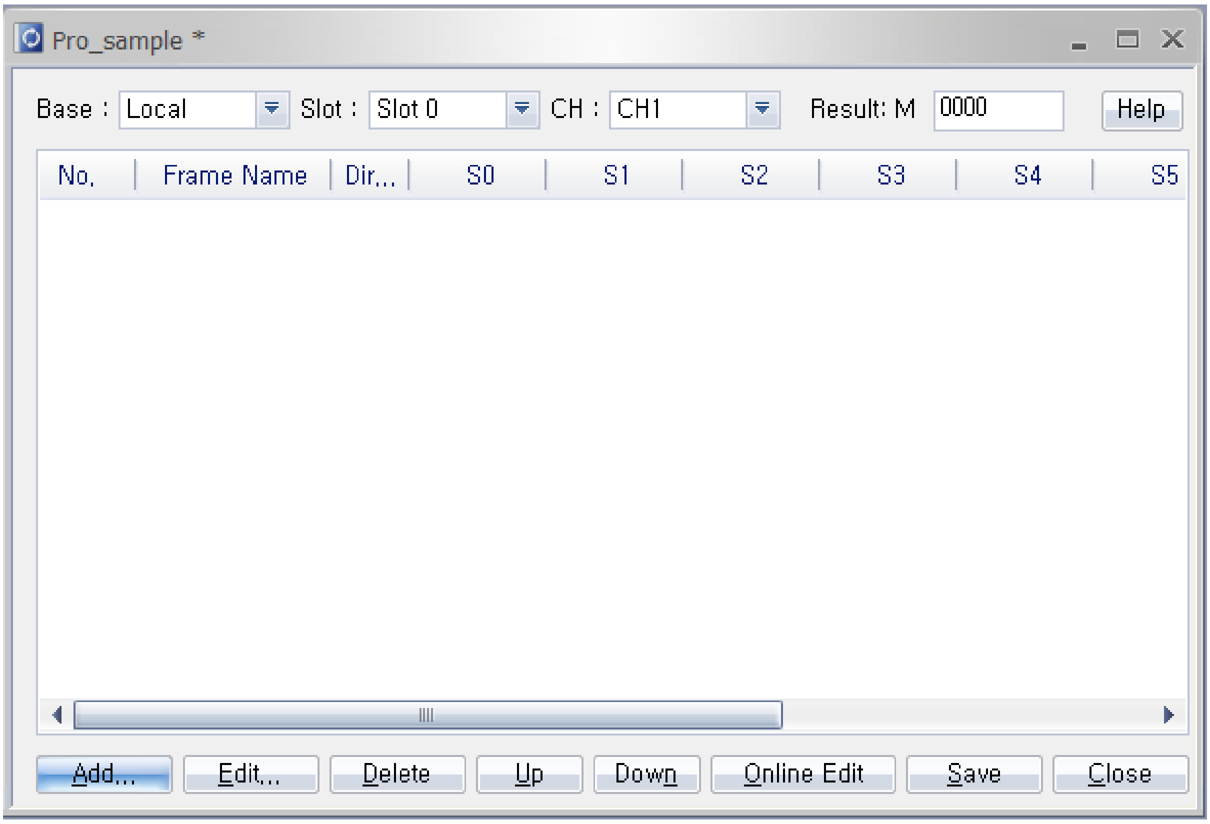
Pgm000
ID: 0
OnlineEdit Buffer : 0
Priority : 0
Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

**Writing the Serial Protocol program**

**Example of writing a program**: The sample program reads 5 words from %MW100 of Glofa PLC and saves it in 5 words from D00100 of CIMON PLC. Communication is established using the channel #1 (RS232) of the serial communication module, which is mounted in local base, slot #0.

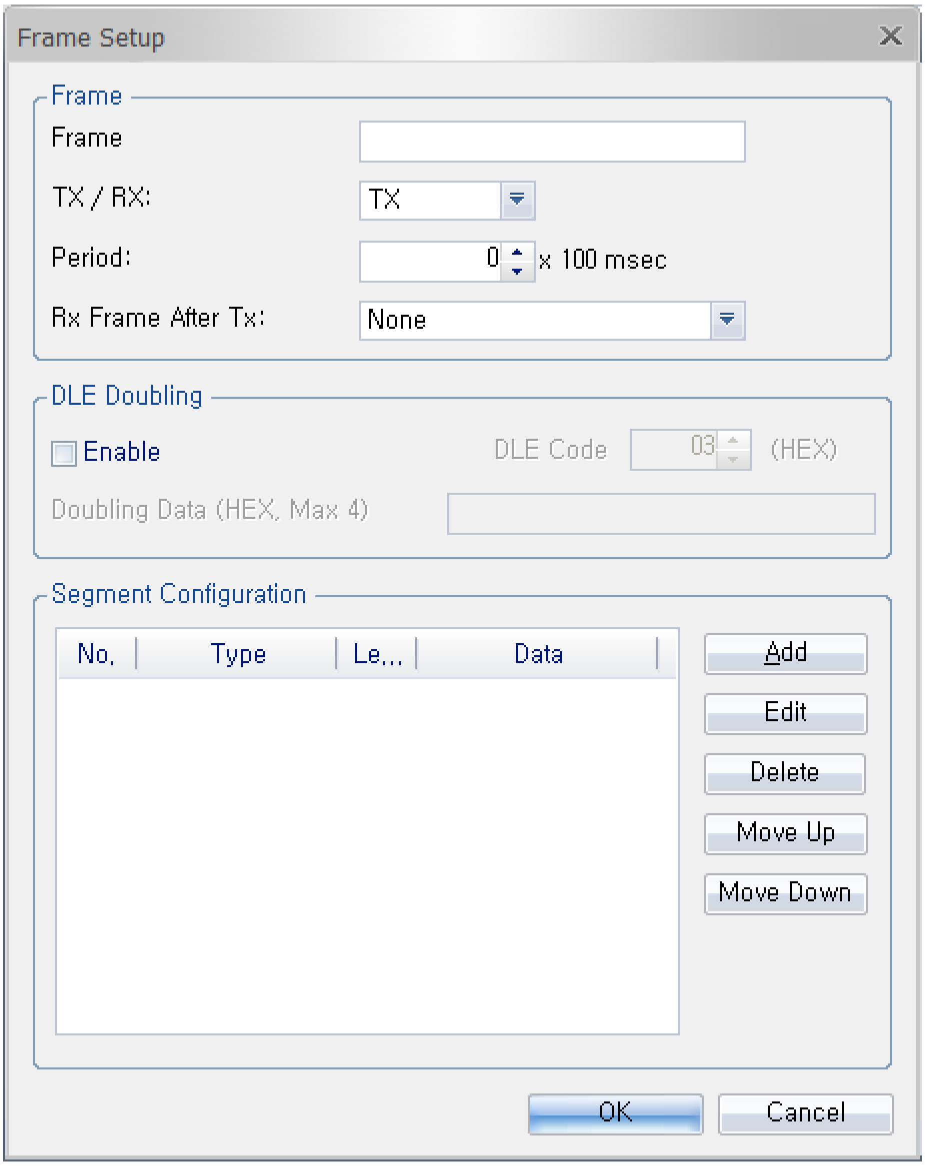


- **Base:** Local (Module mounted base)
- **Slot:** Slot 0 (Module mounted slot)
- **CH:** Ch1 (Channel to use: Ch1 (RS232), Ch2 (RS422/485))
- **Result:** M0000 (Specifying the device to save the communication result)

- **Add:** Defines and adds new frame.
- **Edit:** Edits the registered frame.
- **Delete:** Deletes the registered frame.
- **Up:** Moves up the registered frame by one space.
- **Down:** Moves down the registered frame by one space.
- **Online Edit:** Saves and applies the edited details to PLC when it is online.
- **Save:** Saves the modified details.

To move the frame position, Cut (Ctrl+X), move position and paste it (Ctrl+V).

When you click the [Add] button, the Frame Setup window will appear as shown below.



[Frame Setup Items]

- **Frame:** Name to differentiate the frame.
- **TX/RX:** Sets the communication direction – sending or receiving.
- **Period:** Sending frames will be automatically sent at the specified interval.
- **Rx Frame After Tx/ Tx Frame by Rx:** Specifies the frame that corresponds to the response.

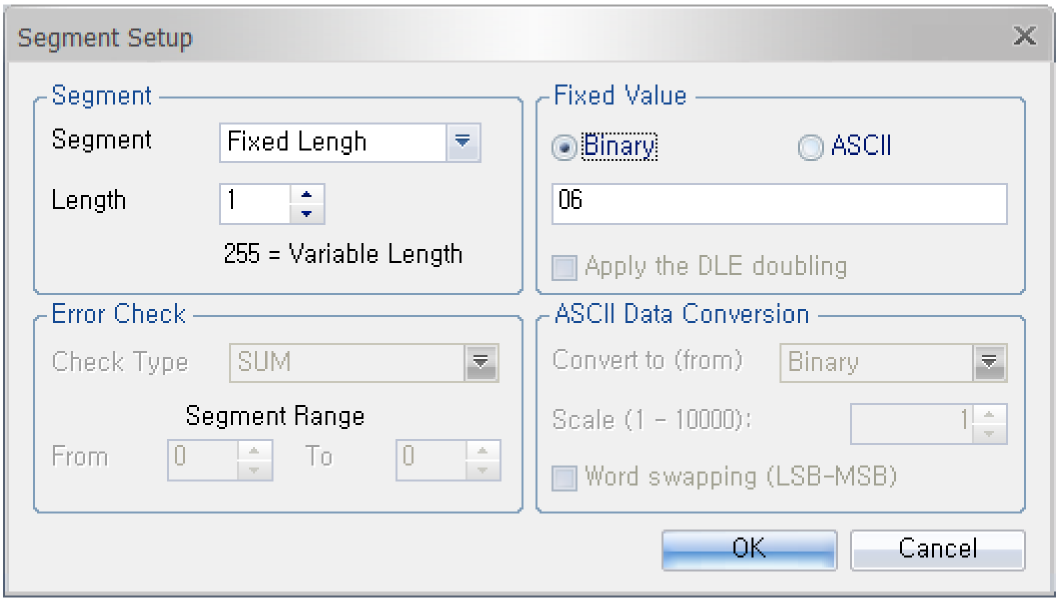
[Segment Configuration Functions]

- **Add:** Defines and adds a new segment.
- **Edit:** Edits the registered segment details.
- **Delete:** Deletes the selected segment.
- **Move Up:** Moves the selected segment upward.
- **Move Down:** Moves the selected segment downward.

1) **Defining a receiving frame** (RX frame of the continuous read command for the direct variable)
It defines the frame contents to interpret the response frame for the continuous read requesting frame of the Glofa PLC's direct variable.

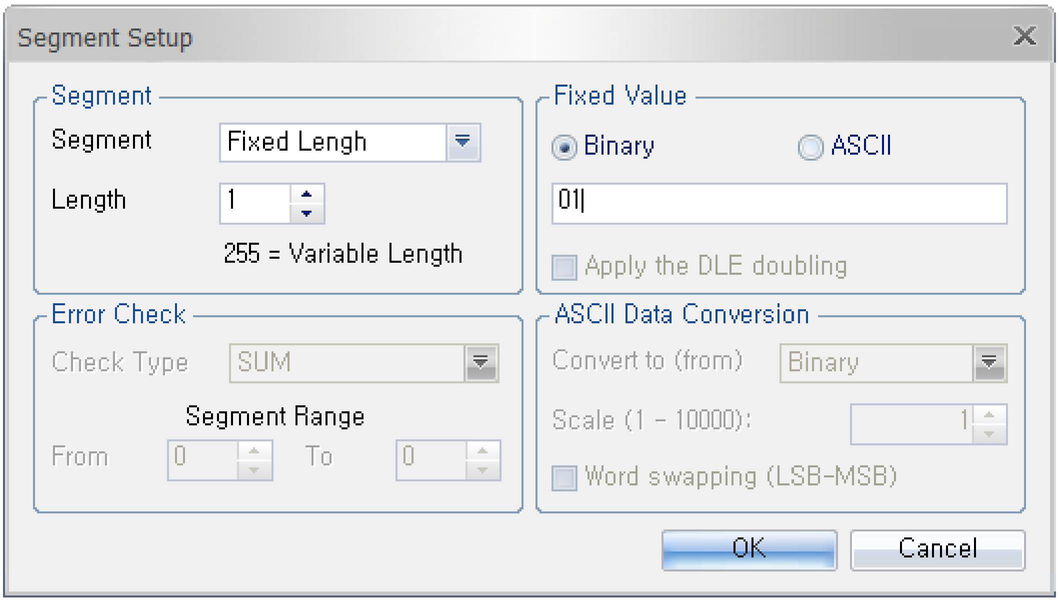
* Frame Setup: Select "Memory Link" or "Ignore" for [Segment] and configure 255 for [Length].

i. **Defining a segment (header):** Sets the header of the protocol.
The header for the ACK response frame is ACK (06H) and should be set as shown below.



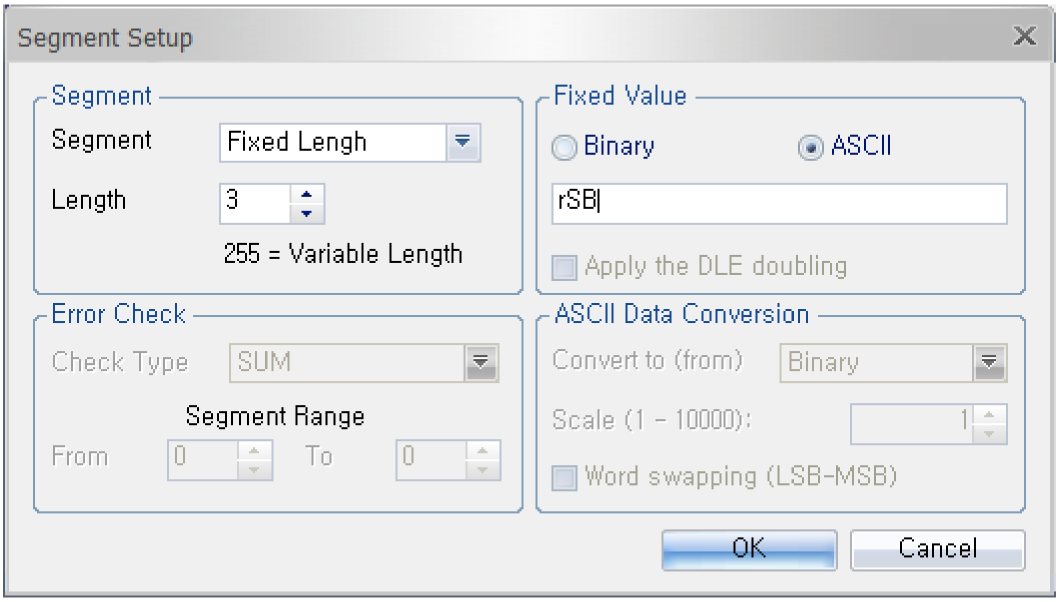
Segment: Fixed Lengh
Length: 1
● Binary ○ ASCII
06
☐ Apply the DLE doubling
Check Type: SUM
From: 0 To: 0
Convert to (from): Binary
Scale (1 ~ 10000): 1
☐ Word swapping (LSB-MSB)

ii. **Defining a segment (station number):** Sets the station number area for the protocol.
Enter the station number of the counterpart (LG Glofa). The station number is "01" (1) and should be set as shown below.



Segment: Fixed Lengh
Length: 1
● Binary ○ ASCII
01
☐ Apply the DLE doubling
Check Type: SUM
From: 0 To: 0
Convert to (from): Binary
Scale (1 ~ 10000): 1
☐ Word swapping (LSB-MSB)

iii. **Defining a segment (command + command type):** Continuous read command for the direct variable + command type rSB (r + SB) should be set as shown below.



Segment Setup

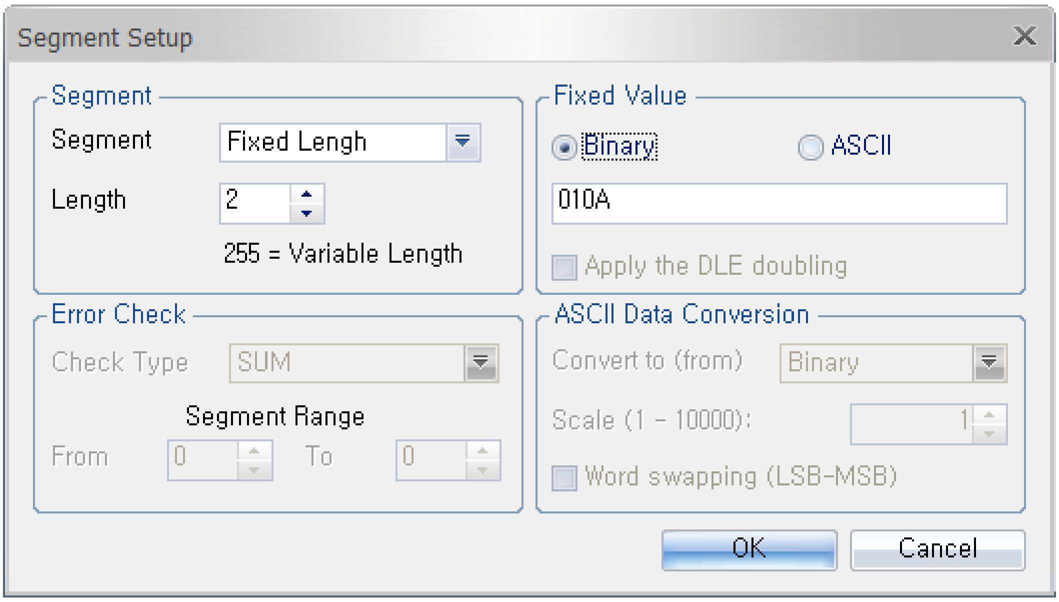
Segment: Fixed Lengh
Length: 3
255 = Variable Length

Fixed Value: ○ Binary ● ASCII
rSB
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range From: 0 To: 0

ASCII Data Conversion
Convert to (from): Binary
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

iv. **Defining a segment (number of blocks + number of data):** The number of block is 1 and the number of data is 10 (= 5Word * 2, 0AH). It should be set (01+0A) as shown below.



Segment Setup

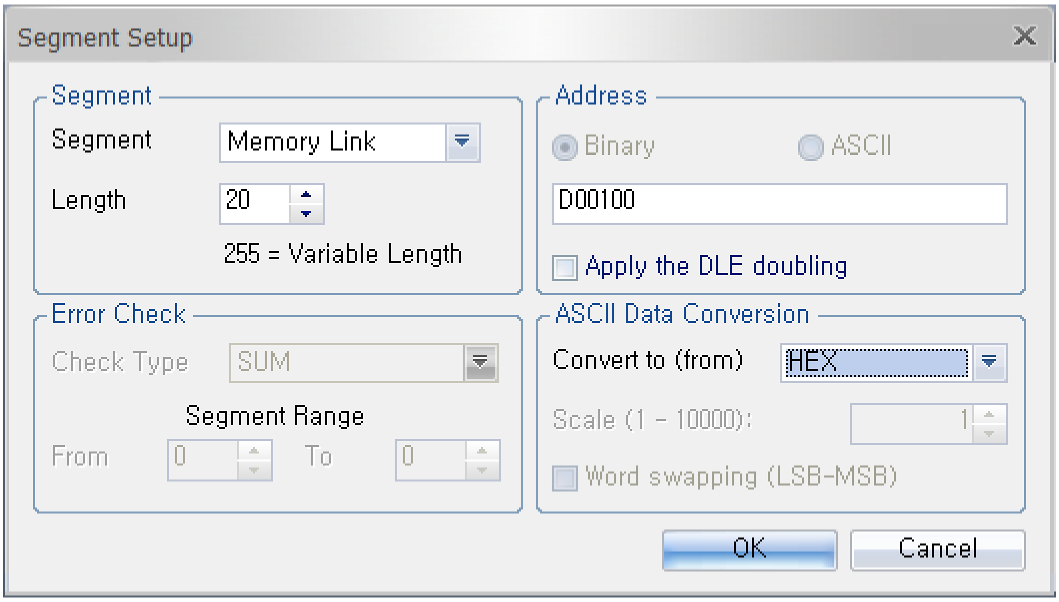
Segment: Fixed Lengh
Length: 2
255 = Variable Length

Fixed Value: ● Binary ○ ASCII
010A
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range From: 0 To: 0

ASCII Data Conversion
Convert to (from): Binary
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

v. **Defining a segment (data):** Set to save 5 word data received from Glofa PLC in 5 words from D00100 of CIMON PLC. To display 5 word data as an ASCII code, 20 bytes (= 5 words * 4 characters) are needed.



Segment Setup

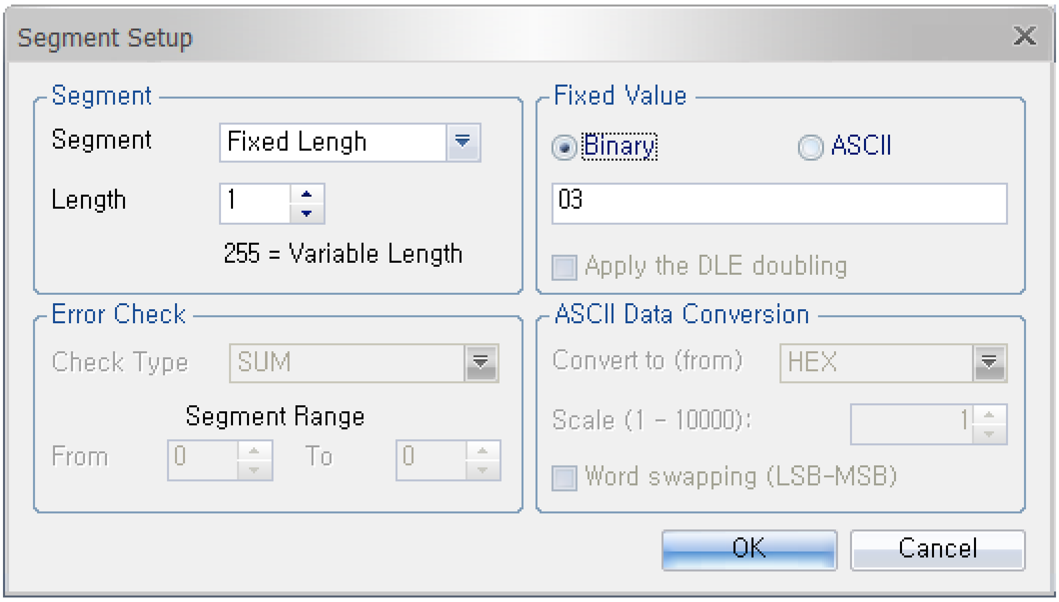
Segment
Segment: Memory Link
Length: 20
255 = Variable Length

Address
● Binary ○ ASCII
D00100
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

vi. **Defining a segment (tail):** The tail of the ACK frame is ETX (03H) as shown below.



Segment Setup

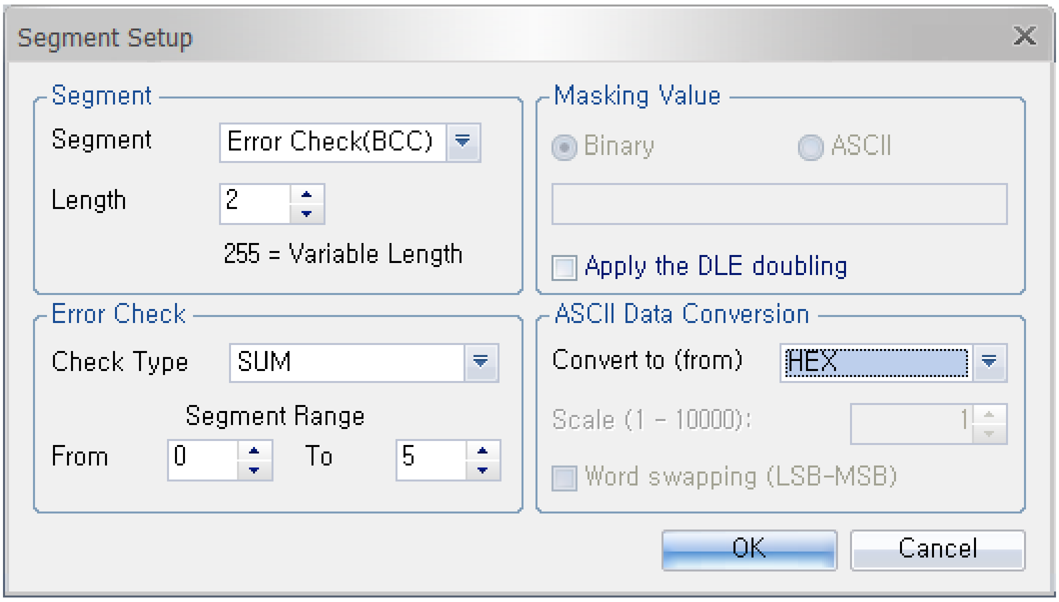
Segment
Segment: Fixed Length
Length: 1
255 = Variable Length

Fixed Value
● Binary ○ ASCII
03
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

vii. **Defining a segment (BCC):** BCC is the ASCII converted value of the lowest 1 byte out of the ASCII value that adds from the header to the tail. Configure as 2 byte for length, 0 ~ 5 for segment range, SUM for check type and hexadecimal for ASCII data conversion.



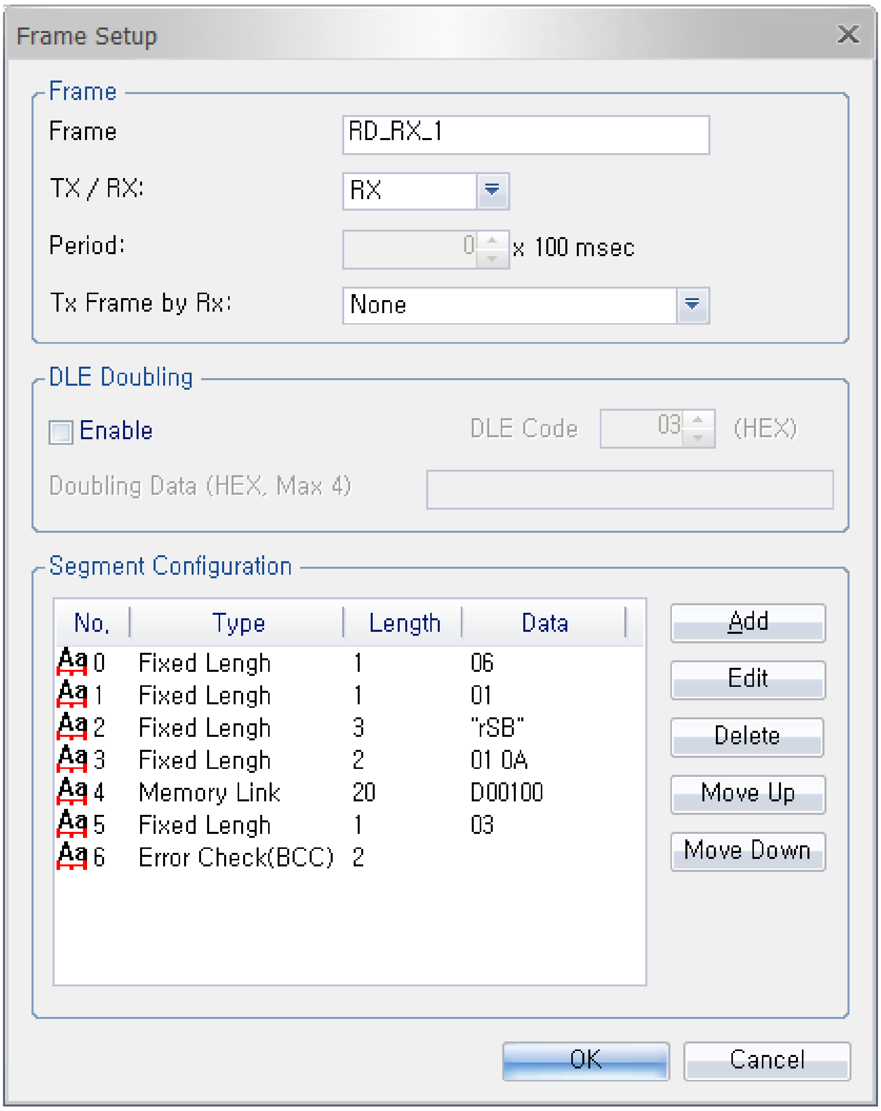
Segment
Segment: Error Check(BCC)
Length: 2
255 = Variable Length

Masking Value
○ Binary ○ ASCII
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 5

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

2) **Completing a receiving frame definition:** (RX frame for the continuous read command of the direct variable). The communication direction is the receiving frame as shown below.



Frame
Frame: RD_RX_1
TX / RX: RX
Period: 0 x 100 msec
Tx Frame by Rx: None

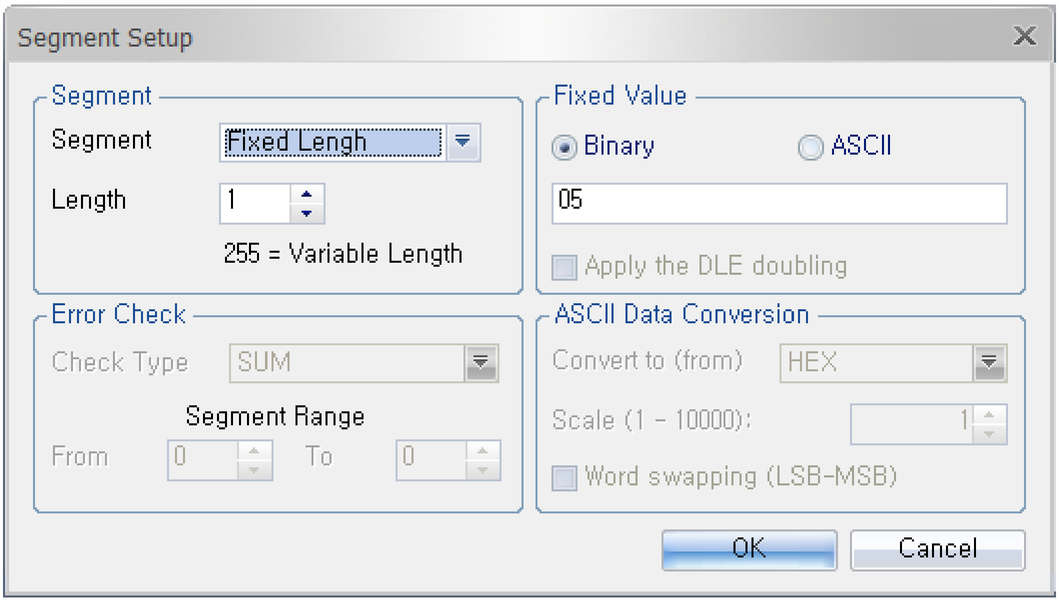
DLE Doubling
☐ Enable
DLE Code: 03 (HEX)
Doubling Data (HEX, Max 4)

Segment Configuration

| No. | Type | Length | Data |
|---|---|---|---|
| 0 | Fixed Lengh | 1 | 06 |
| 1 | Fixed Lengh | 1 | 01 |
| 2 | Fixed Lengh | 3 | "rSB" |
| 3 | Fixed Lengh | 2 | 01 0A |
| 4 | Memory Link | 20 | D00100 |
| 5 | Fixed Lengh | 1 | 03 |
| 6 | Error Check(BCC) | 2 | |

3) **Defining a sending frame**: (TX frame for the continuous read command of the direct variable)
It defines the request frame of the continuous read command for the direct variable.

i. **Defining a segment (header):** The header of the request frame is ENQ(05H) as shown below.



Segment Setup

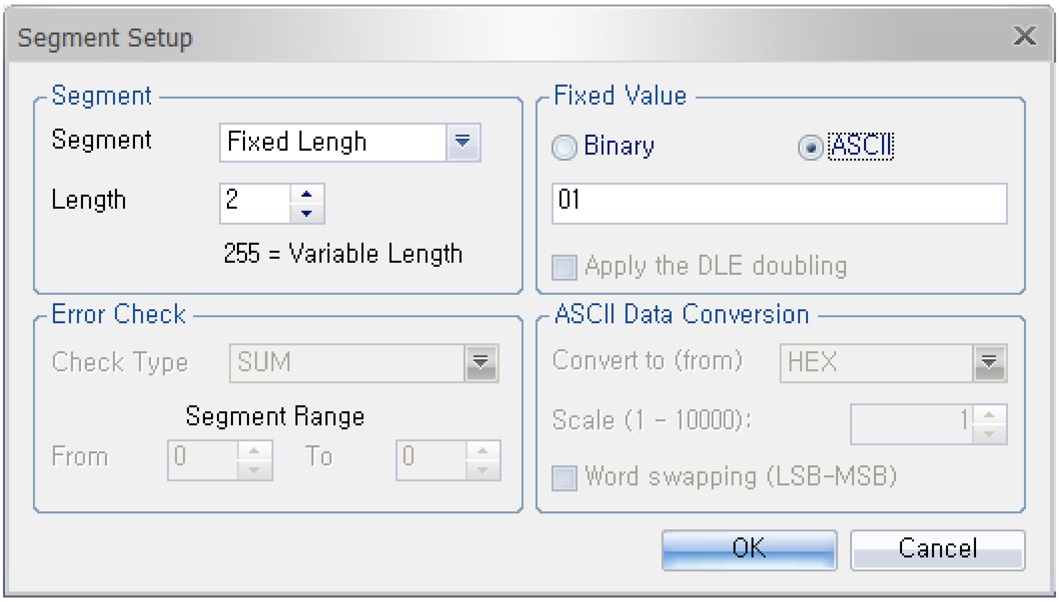
Segment
Segment: Fixed Lengh
Length: 1
255 = Variable Length

Fixed Value
● Binary ○ ASCII
05
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

ii. **Defining a segment (station number):** Set the station number as “01” (1).
(See the contents in the “RX frame of the continuous read command for the direct variable” section.)



Segment Setup

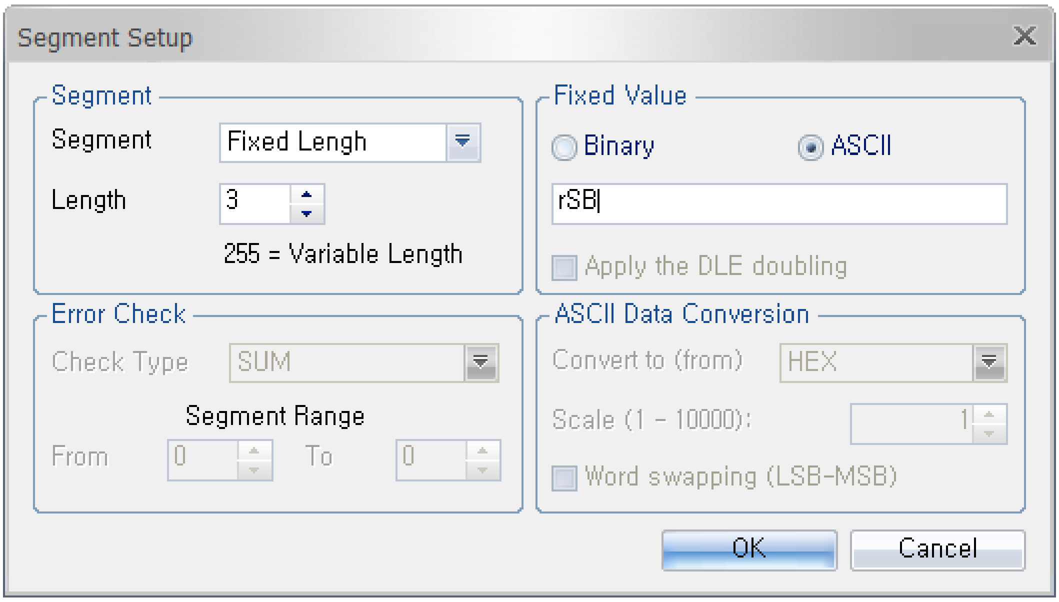
Segment
Segment: Fixed Lengh
Length: 2
255 = Variable Length

Fixed Value
○ Binary ● ASCII
01
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

iii. **Defining a segment (command + command type):** Set continuous read command for the direct variable + command type as “rSB.” (See the contents in the “RX frame of the continuous read command for the direct variable” section.)



Segment Setup

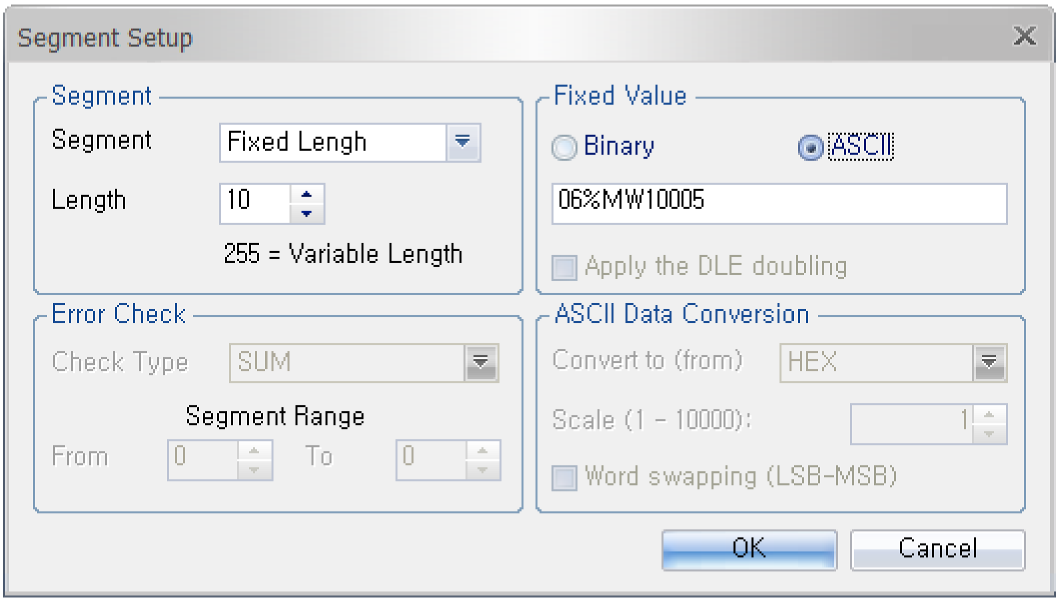
Segment
Segment: Fixed Lengh
Length: 3
255 = Variable Length

Fixed Value
○ Binary ● ASCII
rSB|
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

iv. **Defining a segment (variable length + variable name + number of data):** Set the variable length as 6 bytes (06H), direct variable as "%MW100," and the number of data as 5 words (05H) as shown below. (06 + %MW100 + 05)



Segment Setup

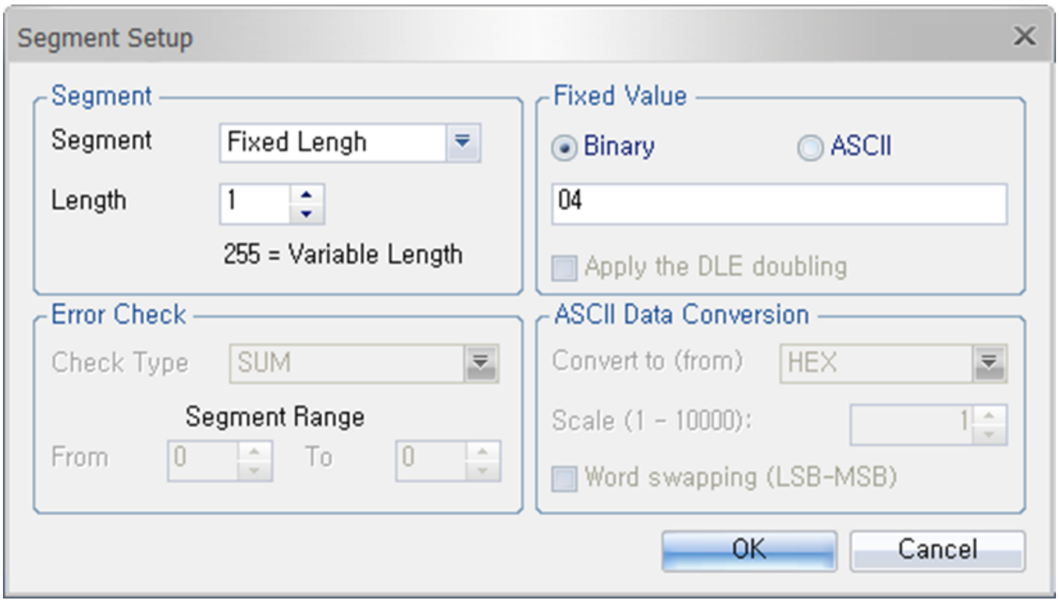
Segment
Segment: Fixed Lengh
Length: 10
255 = Variable Length

Fixed Value
○ Binary ● ASCII
06%MW10005
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 - 10000): 1
☐ Word swapping (LSB-MSB)

v. **Defining a segment (tail):** The tail of the request frame is EOT (04H) as shown below.



Segment Setup

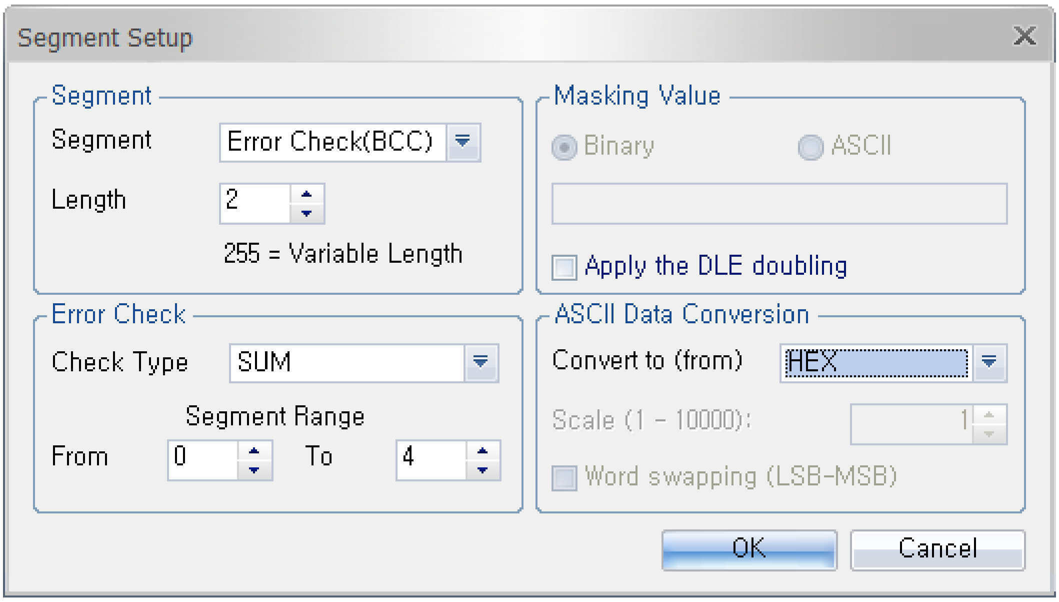
Segment
Segment: Fixed Lengh
Length: 1
255 = Variable Length

Fixed Value
● Binary ○ ASCII
04
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 0

ASCII Data Conversion
Convert to (from): HEX
Scale (1 ~ 10000): 1
☐ Word swapping (LSB-MSB)

vi. **Defining a segment (BCC):** BCC is the ASCII converted value of the lowest 1 byte out of the ASCII value that adds from the header to the tail. Configure as 2 byte for the length, 0 ~ 4 for segment range, SUM for check type and hexadecimal for ASCII data conversion.



Segment Setup

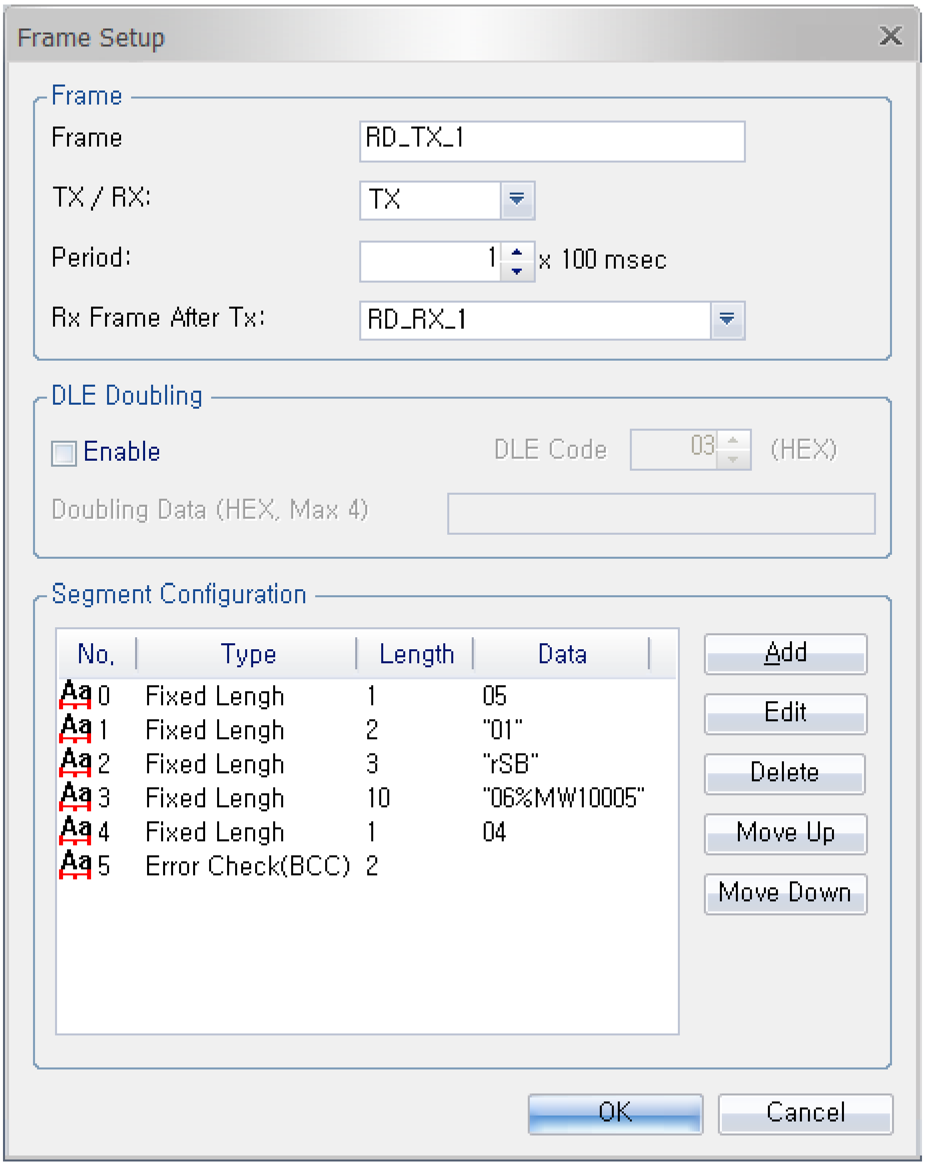
Segment
Segment: Error Check(BCC)
Length: 2
255 = Variable Length

Masking Value
● Binary ○ ASCII
☐ Apply the DLE doubling

Error Check
Check Type: SUM
Segment Range
From: 0 To: 4

ASCII Data Conversion
Convert to (from): HEX
Scale (1 ~ 10000): 1
☐ Word swapping (LSB-MSB)

4) **Completing a sending frame definition:** (TX frame of the continuous read command for the direct variable) Set the communication direction as sending frame, communication interval as 100msec and receiving frame for sending as RD_RX_1 as shown below.



Frame Setup

Frame

Frame: RD_TX_1

TX / RX: TX

Period: 1 x 100 msec

Rx Frame After Tx: RD_RX_1

DLE Doubling

☐ Enable

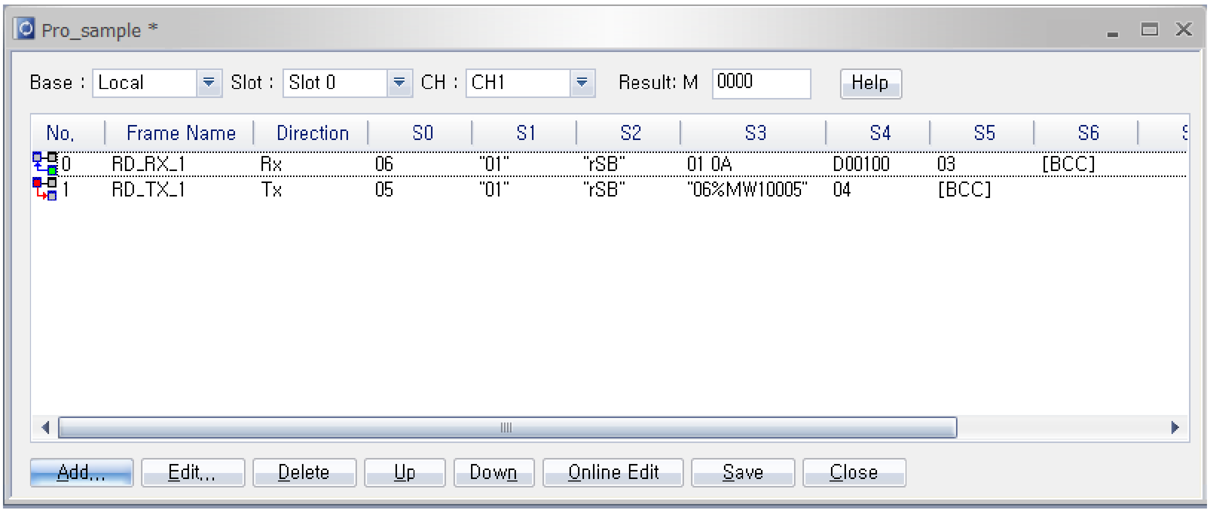
DLE Code: 03 (HEX)

Doubling Data (HEX, Max 4):

Segment Configuration

| No. | Type | Length | Data |
|---|---|---|---|
| 0 | Fixed Lengh | 1 | 05 |
| 1 | Fixed Lengh | 2 | "01" |
| 2 | Fixed Lengh | 3 | "rSB" |
| 3 | Fixed Lengh | 10 | "06%MW10005" |
| 4 | Fixed Lengh | 1 | 04 |
| 5 | Error Check(BCC) | 2 | |

5) **Completing frame registration** (Requesting continuous read of the direct variable and receiving the response frame). Communication can be established only by the protocol program without having a separate scan program.



Base : Local
Slot : Slot 0
CH : CH1
Result: M 0000

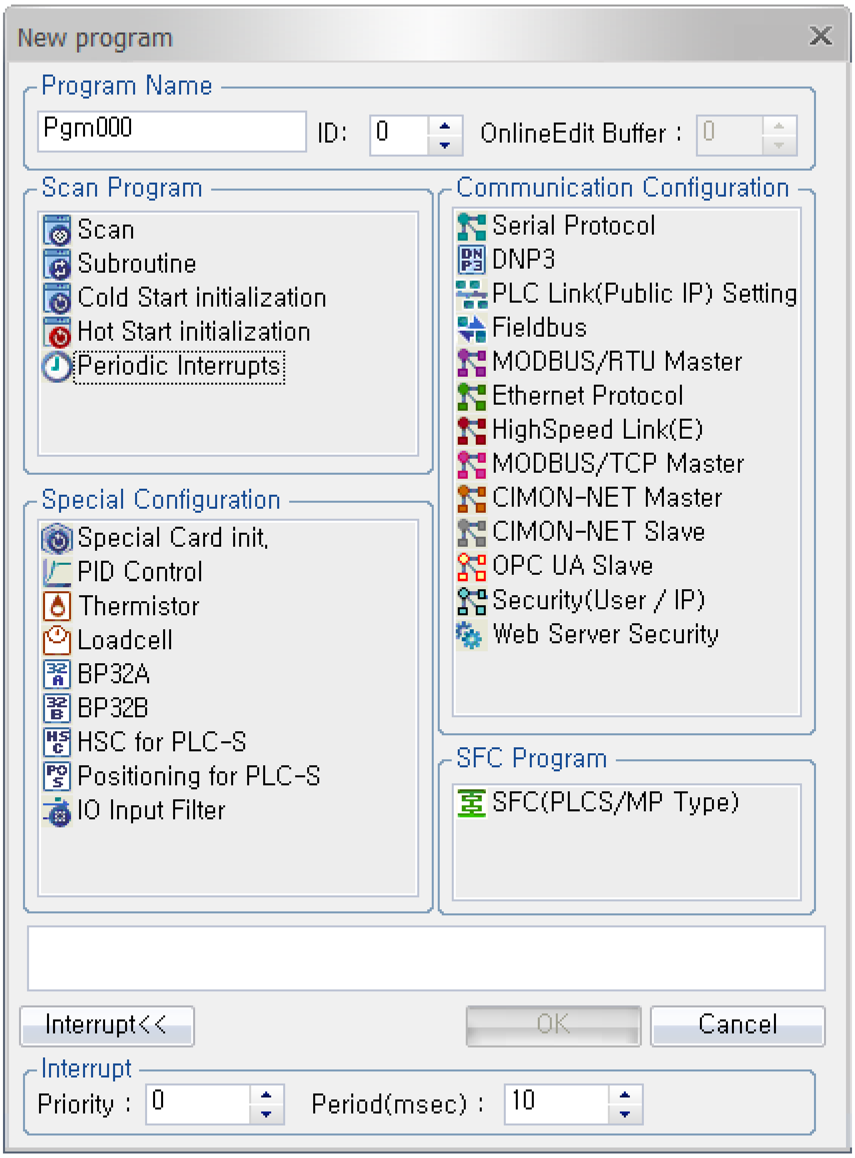
| No. | Frame Name | Direction | S0 | S1 | S2 | S3 | S4 | S5 | S6 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | RD_RX_1 | Rx | 06 | "01" | "rSB" | 01 0A | D00100 | 03 | [BCC] |
| 1 | RD_TX_1 | Tx | 05 | "01" | "rSB" | "06%MW10005" | 04 | [BCC] | |

## 7.2 DNP3 Protocol

Distributed Network Protocol, **DNP3**, is a set of communications protocols mainly used in utilities such as electric and water companies. The CIMON DNP3 program is designed to connect the device defined in the DNP3 protocol to the PLC device.

**Registering the DNP3 program**

Select [File] → [New Program] → [DNP3] menu.



Program Name: Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

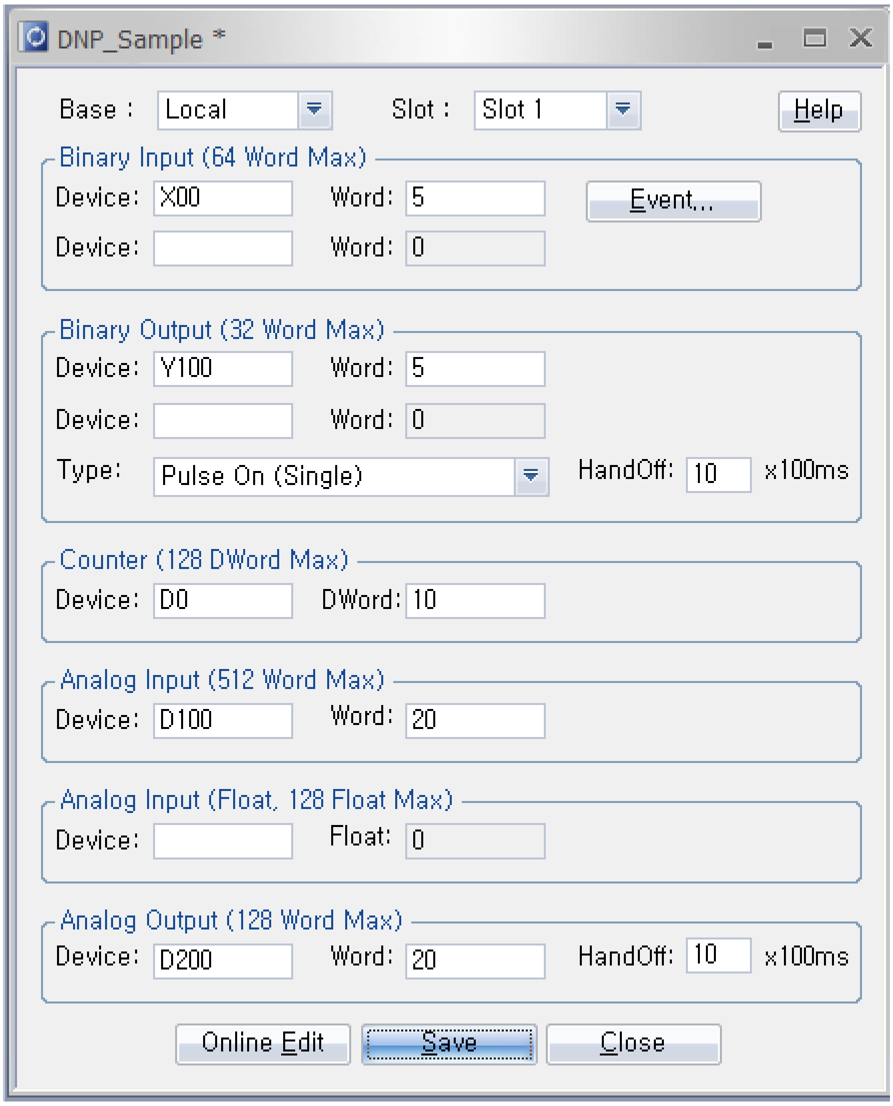
Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

## Writing the DNP3 program

### Example of writing a program:

For configuring the DNP communication module device at local base, slot#1.



DNP_Sample *

Base : Local
Slot : Slot 1

Binary Input (64 Word Max)
Device: X00 Word: 5
Device: Word: 0

Binary Output (32 Word Max)
Device: Y100 Word: 5
Device: Word: 0
Type: Pulse On (Single) HandOff: 10 x100ms

Counter (128 DWord Max)
Device: D0 DWord: 10

Analog Input (512 Word Max)
Device: D100 Word: 20

Analog Input (Float, 128 Float Max)
Device: Float: 0

Analog Output (128 Word Max)
Device: D200 Word: 20 HandOff: 10 x100ms

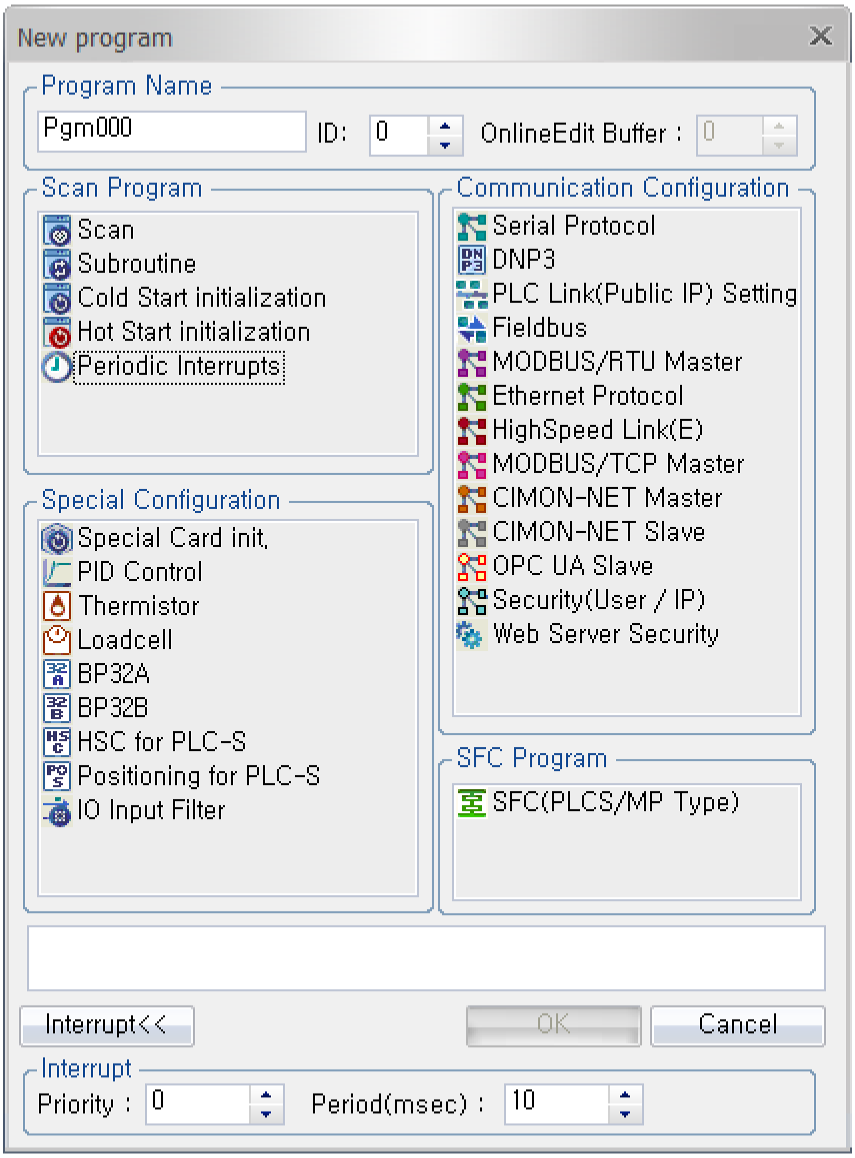
- Set 5 words from X0000 in the **Binary Input** field.
- Set 5 words from Y0100 in the **Binary Output** field.
- Set **Binary Output Type** as Pulse On (Single) and **Hand Off** as 10x100ms (1 second).
- Set 10 words from D00000 in the **Counter** field.
- Set 20 words from D00100 in the **Analog Input** field.
- Set 20 words from D00200 in the **Analog Output** field.
- Set **Hand Off** in **Analog Output** as 10x100ms (1 second).

### 7.3 PLC Link (Public IP) Protocol

When some PLC links use the public network, users can register IP and station number in the PLC Link (Public IP) Setting program in order to differentiate the IPs on the network using the station number.

**Registering the PLC Link (Public IP) Setting program**

Select [File] → [New Program] → [PLC Link (Public IP) Setting] menu.



Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0
Priority : 0
Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

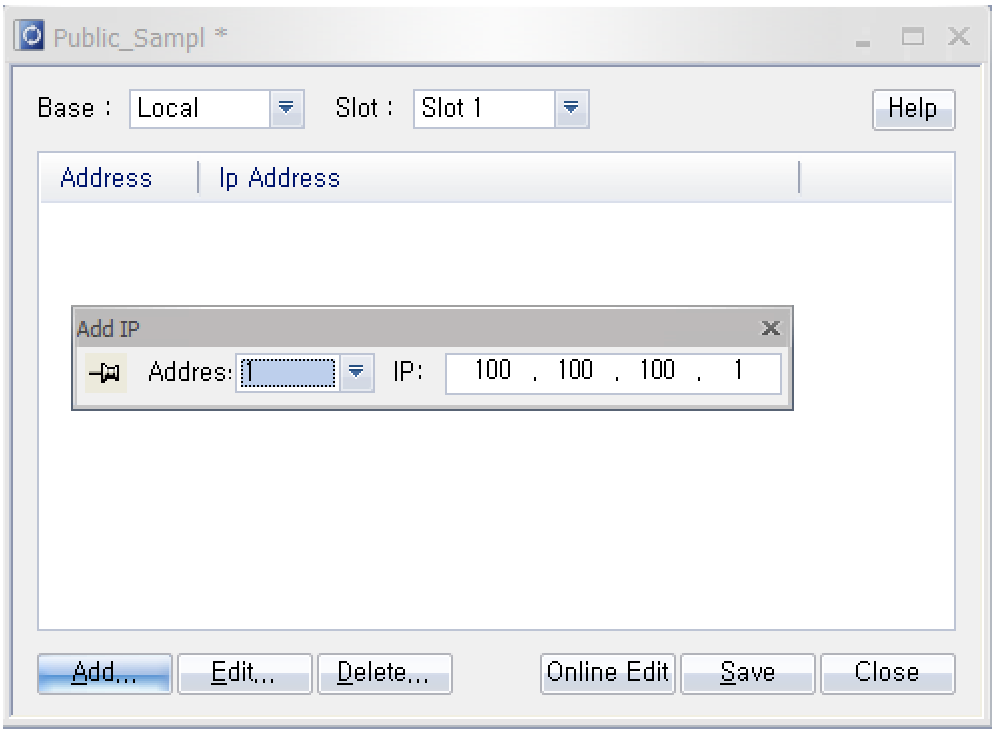
## Writing the PLC Link (Public IP) Setting program

**Example of writing a program:**

When configuring the common network using the Ethernet module at local base, slot #1.

- Set the IP address of the mounted module as “100.100.100.1” and station number as 1.
- Register the IP “100.100.100.2” in the station number 2.
- Register the IP “100.100.100.3” in the station number 3.

1) Click the [Add] button to display the “Add IP” window.
   Select the station number (1) in the “Add IP” window and enter the IP address (100.100.100.1).



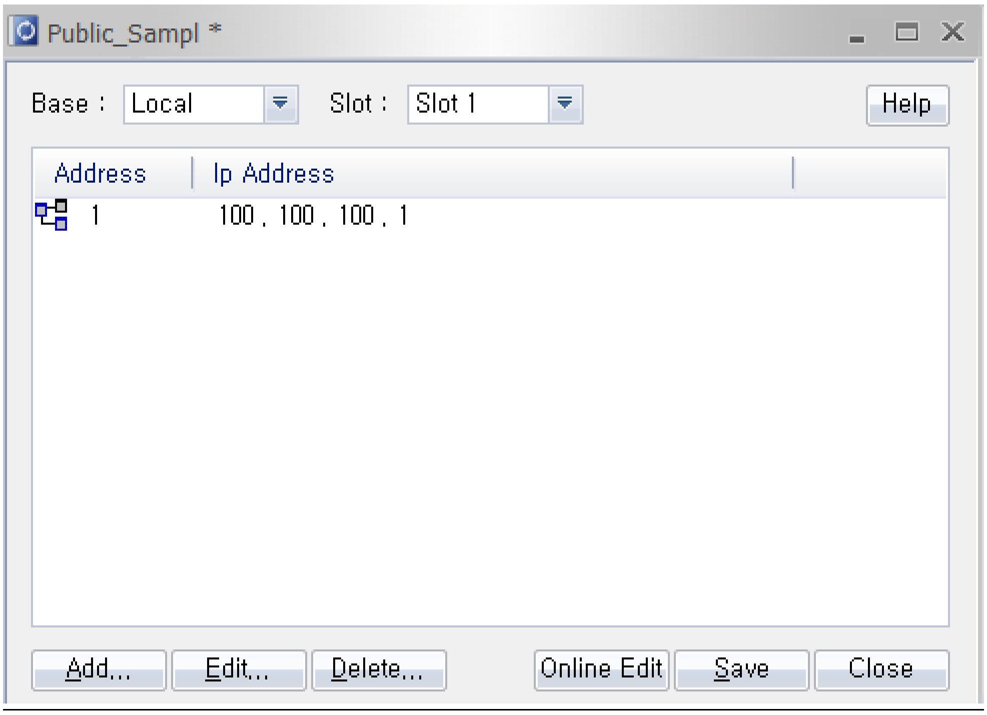
Base : Local

Slot : Slot 1

Addres: 1

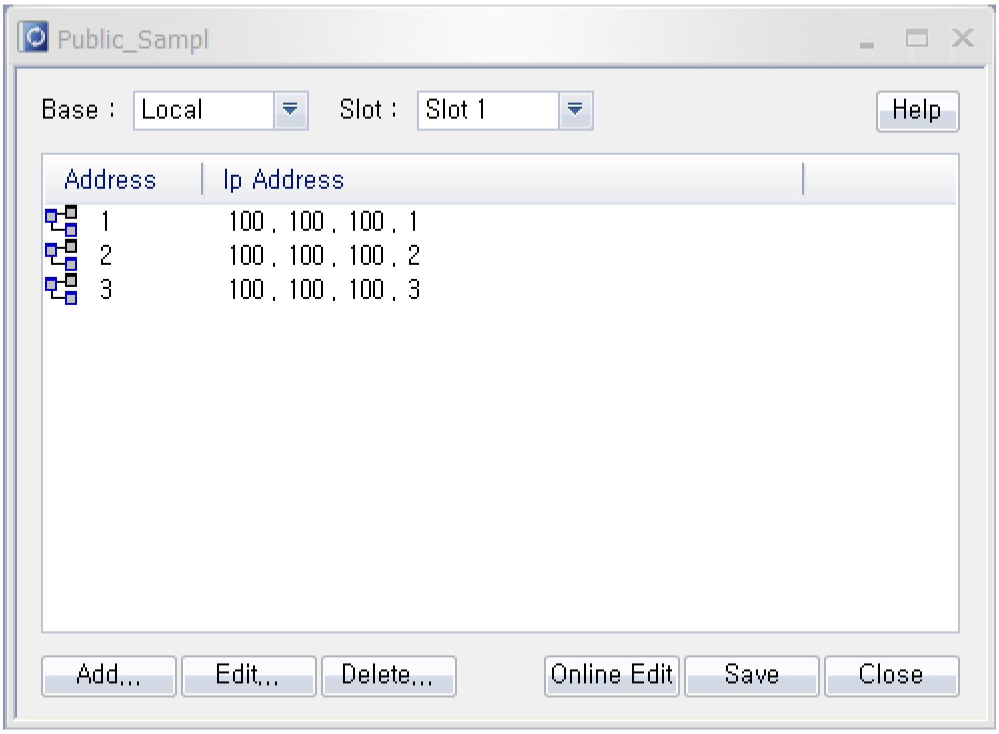
IP: 100 . 100 . 100 . 1

2) Press the [Enter] key to register the IP address (100.100.100.1).



| Address | Ip Address |
|---|---|
| 1 | 100 . 100 . 100 . 1 |

3) Likewise, register the station numbers 2 and 3.



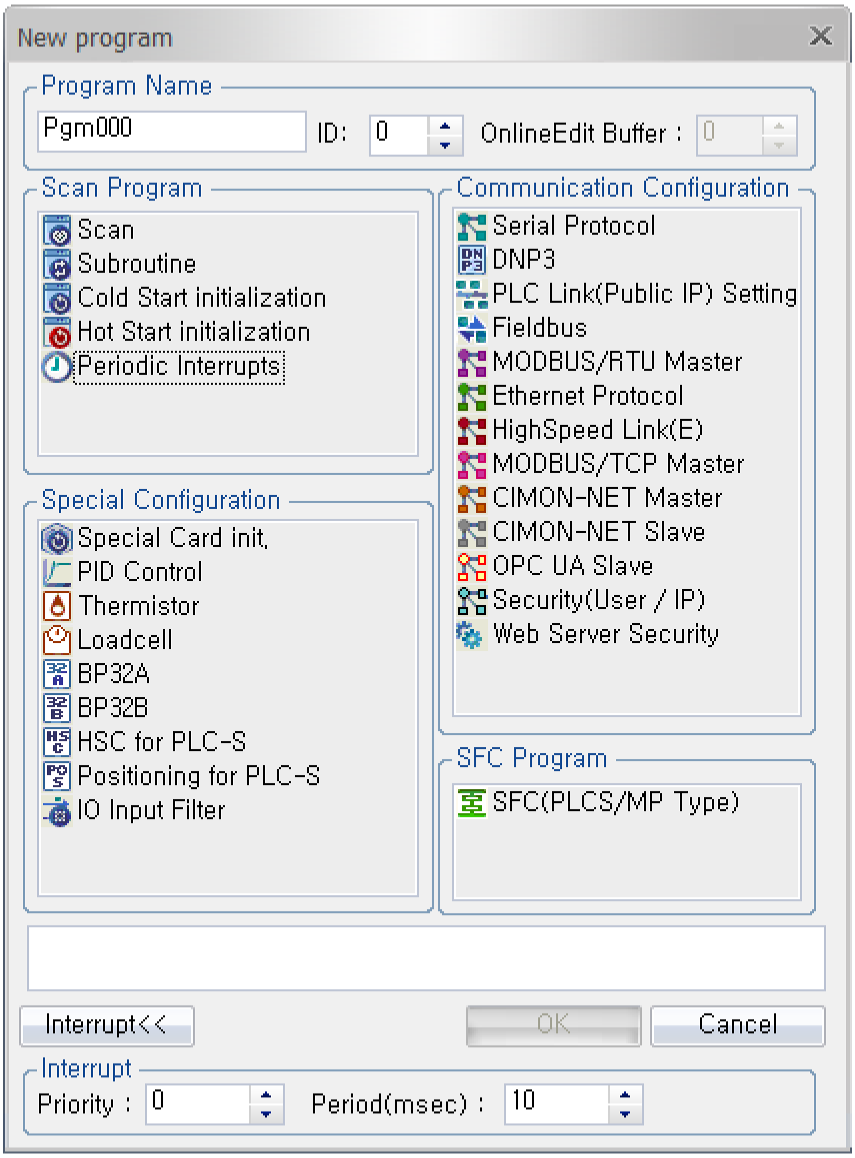
| Address | Ip Address |
|---|---|
| 1 | 100 . 100 . 100 . 1 |
| 2 | 100 . 100 . 100 . 2 |
| 3 | 100 . 100 . 100 . 3 |

### 7.4 Fieldbus Protocol

When controlling the remote I/O using the internal PLC device in the Profibus DP or DeviceNet Master module, configure the I/O area using the fieldbus communication block setting program.

**Registering the Fieldbus program**

Select [File] → [New Program] → [Fieldbus] menu.



Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

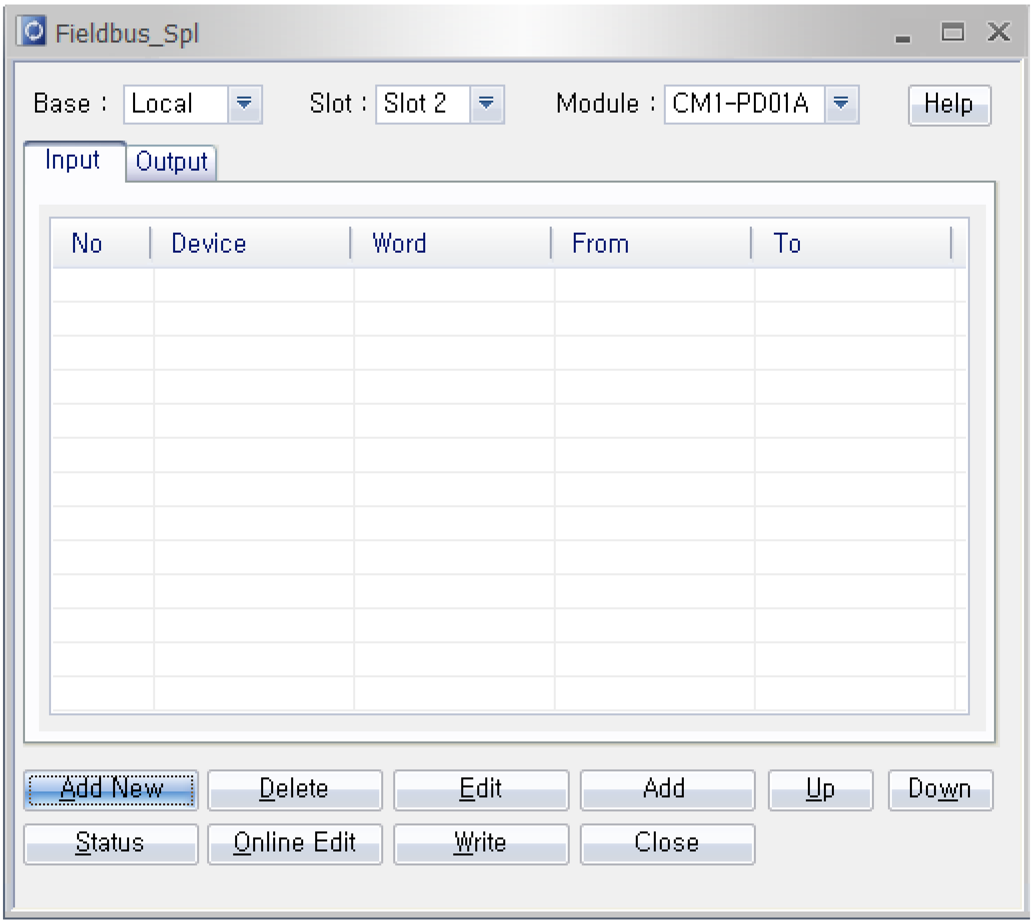
Click the [OK] button.

**Writing the Fieldbus program**

**Example of writing a program:** When controlling the remote I/O using the fieldbus (PD01A: Profibus DP) master module at local base, slot #2, the number of remote I/O connected to the fieldbus master is 32 point inputs and 16 point outputs.

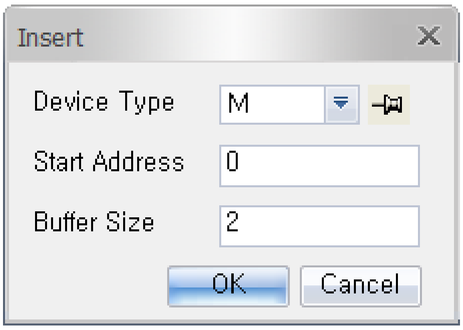
Select “Local” for Base, “2” for Slot, and “CM1-PD01A” for Module type.

In case of reading the input of the remote I/O and configuring to save 2 words (32 bit) from M0000.



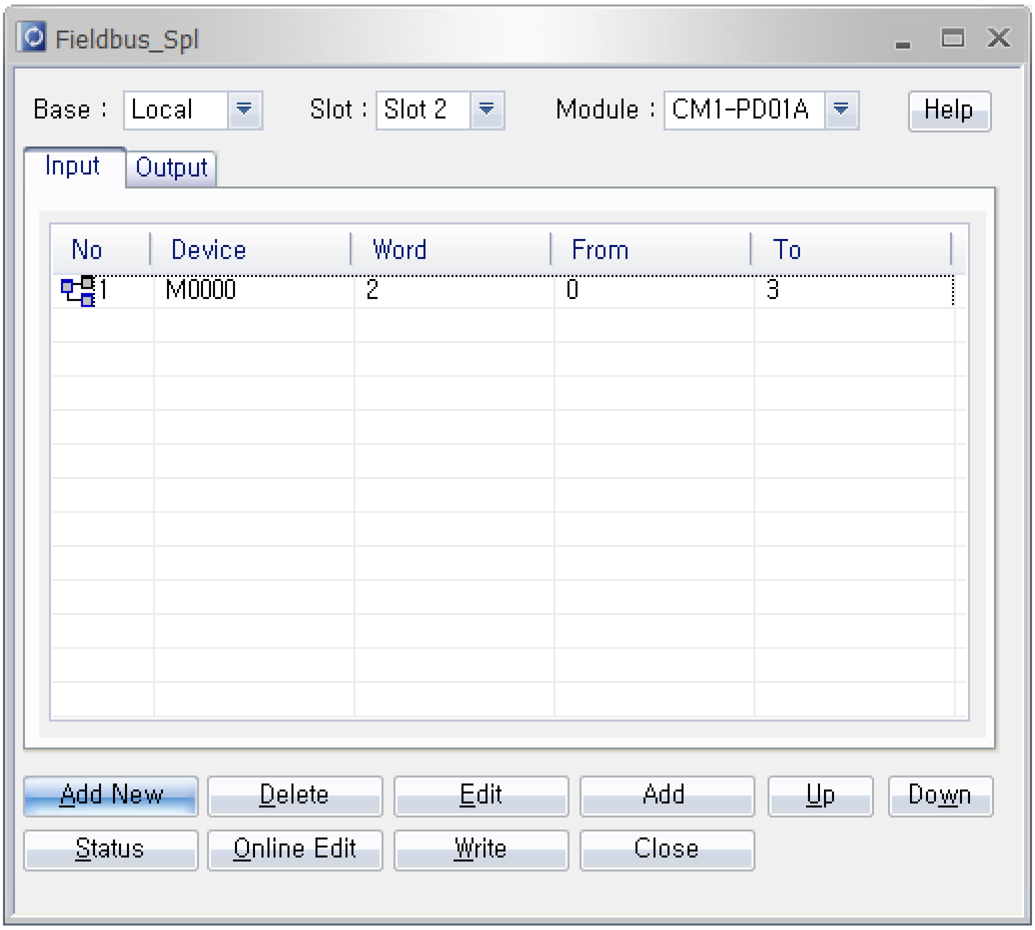
Base : Local
Slot : Slot 2
Module : CM1-PD01A

Select [Input] tab and click [Add New] button.



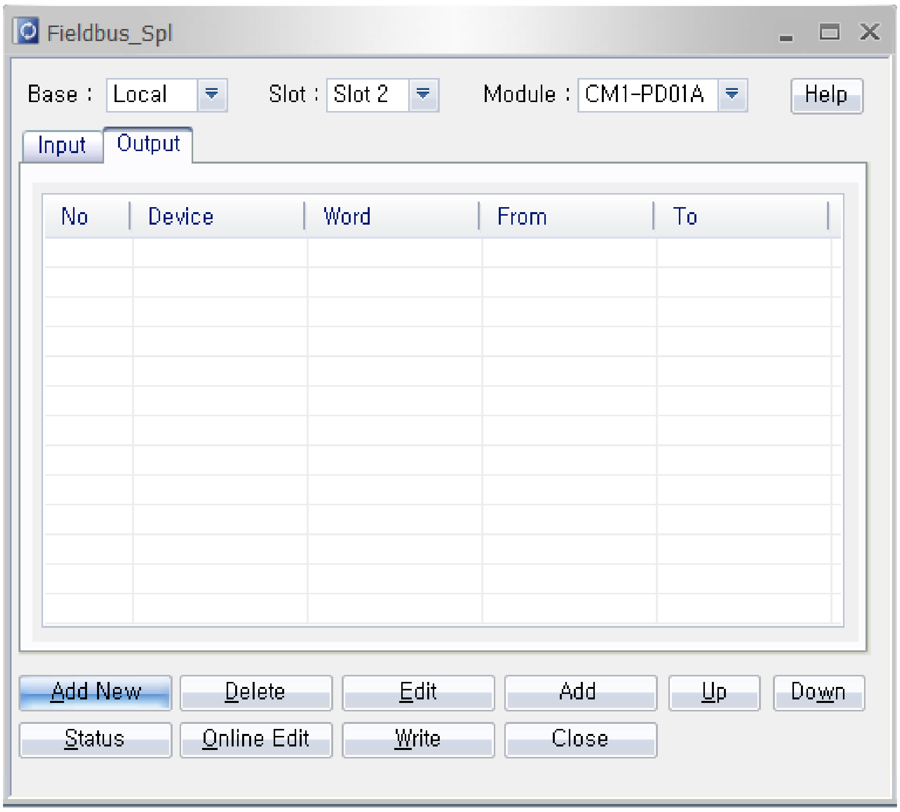
Device Type M
Start Address 0
Buffer Size 2

Select “M” for Device Type, 0 for Star Address, and 2 for Buffer Size. Click [OK] button.

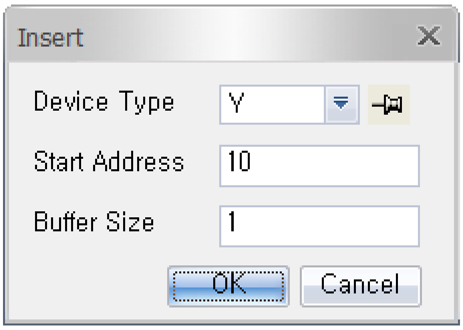


| No | Device | Word | From | To |
|---|---|---|---|---|
| 1 | M0000 | 2 | 0 | 3 |

In case of setting 1 word (16 bit) data from Y0010 as the output of the remote I/O.



Select [Output] tab and click [Add New] button.



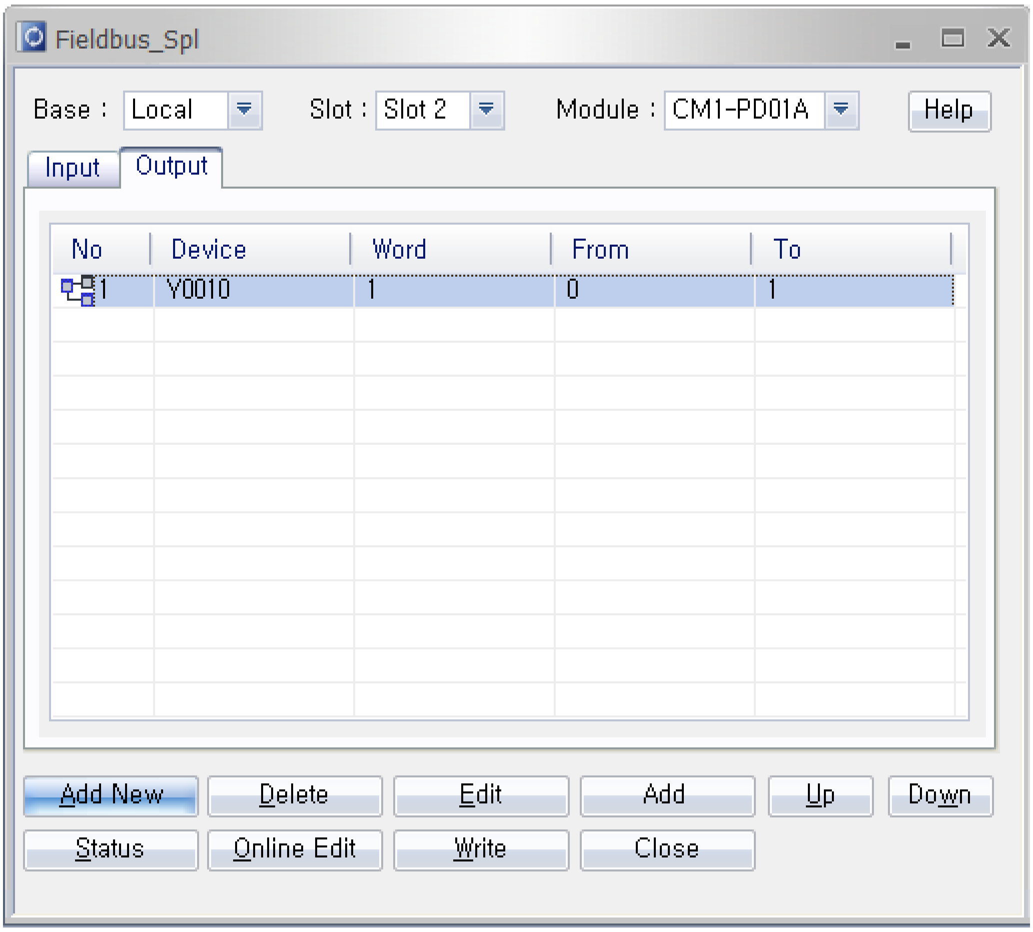
Insert

Device Type: Y

Start Address: 10

Buffer Size: 1

Select "Y" for Device Type, 10 for Start Address, and 1 for Buffer Size. Click [OK] button.



Fieldbus_Spl

Base : Local

Slot : Slot 2

Module : CM1-PD01A

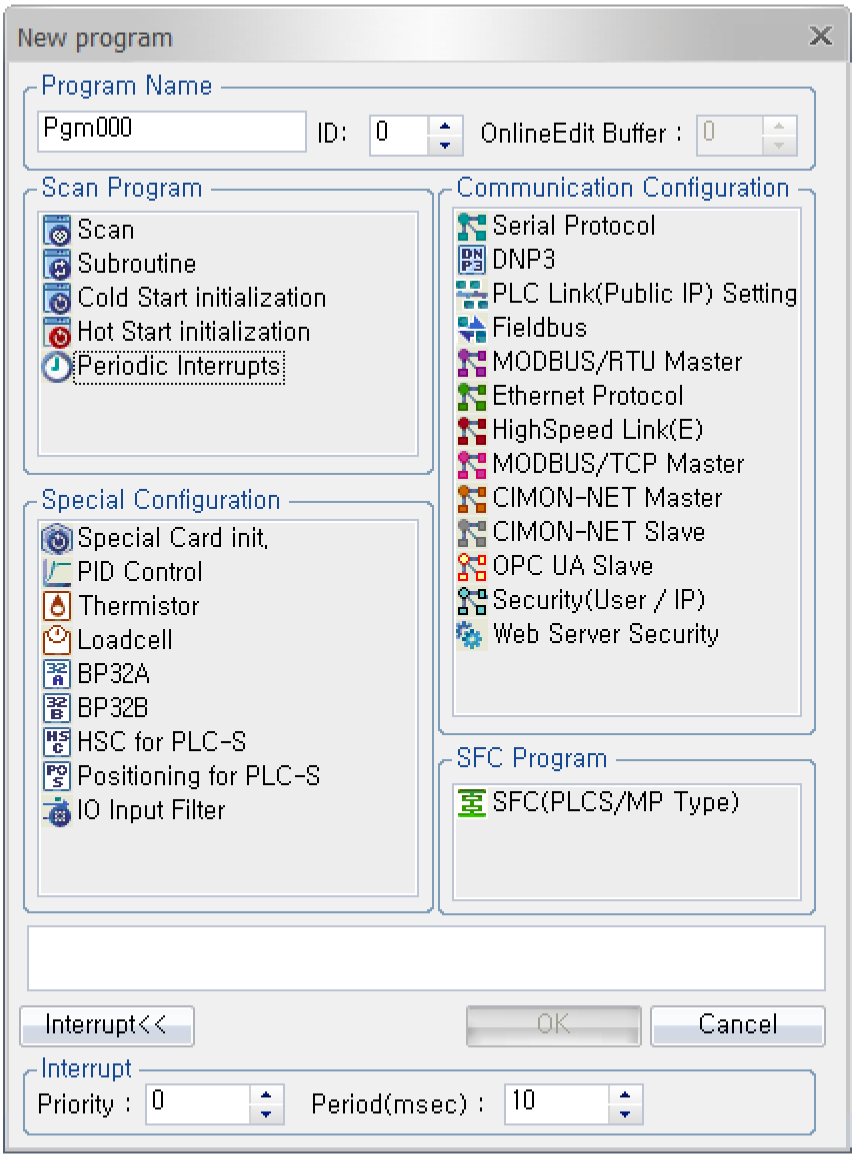
| No | Device | Word | From | To |
|---|---|---|---|---|
| 1 | Y0010 | 1 | 0 | 1 |

### 7.5 Modbus RTU Master Protocol

The Modbus RTU Master program is used to define the communication block in order to read and write the data from and to the Modbus RTU Slave using the serial communication module.

**Registering the Modbus RTU Master program**

Select [File] → [New Program] → [MODBUS/RTU Master] menu.



Pgm000 ID: 0 OnlineEdit Buffer : 0

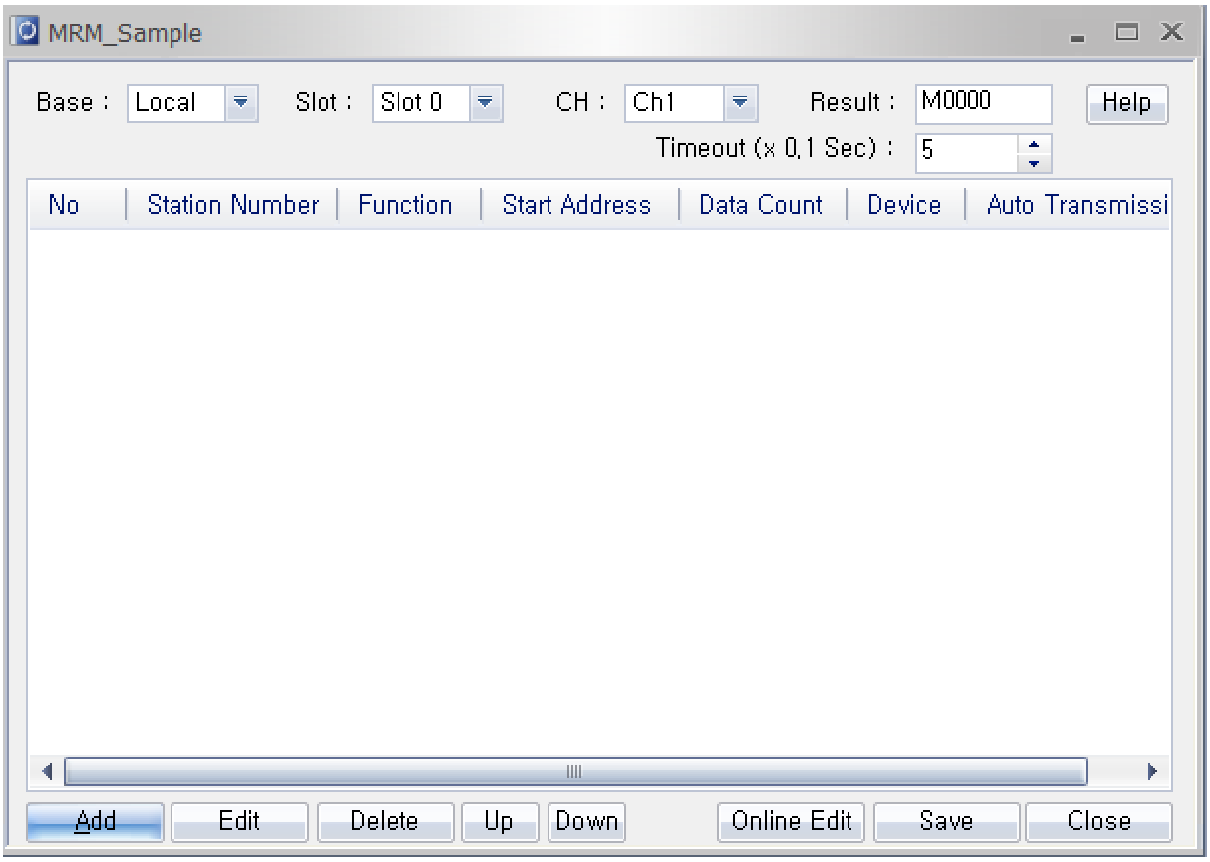
Priority : 0 Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

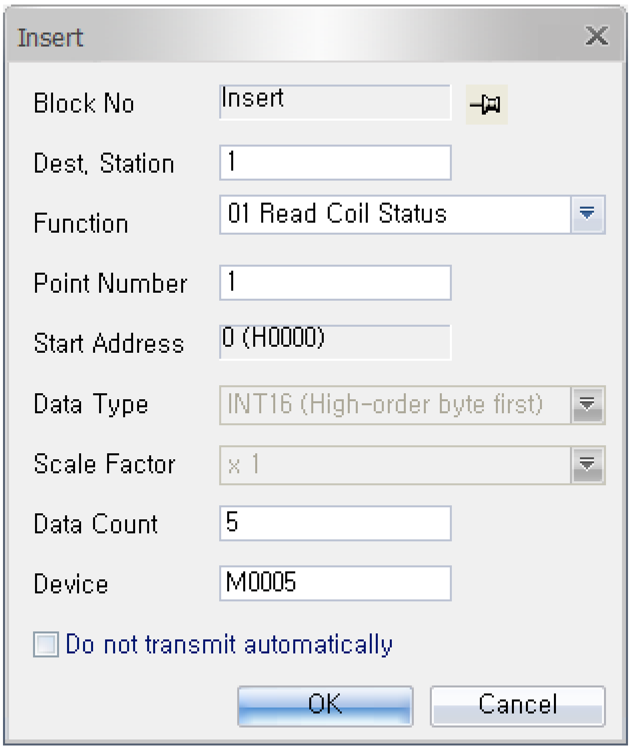
**Writing the Modbus RTU Master program**

An example for controlling the MODBUS-RTU Slave using the Serial (SC0nn) module at local base, slot #0.



**Communication block that reads 5 data from the coil status (Start Address: 0) of the Slave (station number: 1) and saves it in 5 bits from M0005.**

Click [Add] button.



Block No: Insert
Dest. Station: 1
Function: 01 Read Coil Status
Point Number: 1
Start Address: 0 (H0000)
Data Type: INT16 (High-order byte first)
Scale Factor: x 1
Data Count: 5
Device: M0005

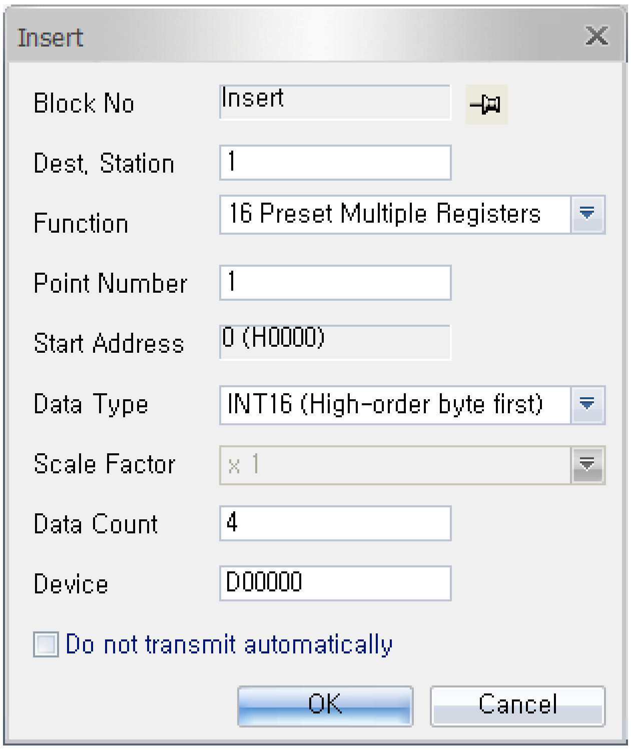
☐ Do not transmit automatically

- **Counterparty's Station Number:** (1)
- **Function:** (01 Read Coil Status)
- **Point Number:** (1) Enter the number that is bigger than **Start Address** by 1.
- **Data Type:** If the data to read is bit, the data type is meaningless.
- **Data Count:** (5)
- **Device:** (M0005)
- If you don't select **"Do not transmit automatically"** option, the communication block will be automatically processed.

Click [OK] button.

**Communication block that writes 4 words from D00000 at the Multiple Registers (Start Address: 0) of the Slave (station number: 1)**

Click [Add] button.



Block No: Insert

Dest. Station: 1

Function: 16 Preset Multiple Registers

Point Number: 1

Start Address: 0 (H0000)

Data Type: INT16 (High-order byte first)

Scale Factor: x 1

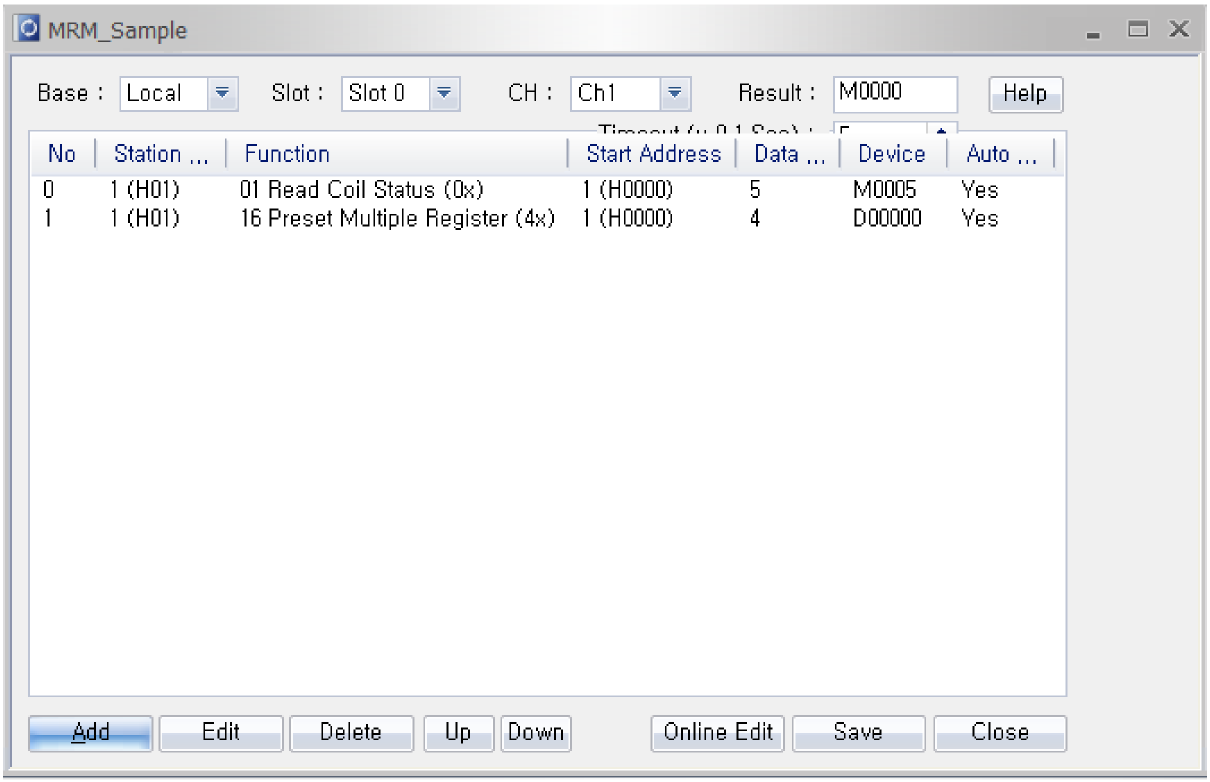
Data Count: 4

Device: D00000

☐ Do not transmit automatically

- **Counterparty's Station Number:** (1)
- **Function:** (16 Preset Multiple Registers)
- **Point Number:** (1) Enter the number that is bigger than **Start Address** by 1.
- **Data Type:** (INT16: High order byte first)
- **Data Count:** (4)
- **Device:** (D00000)
- If you don't select **"Do not transmit automatically"** option, the communication block will be automatically processed.

Click [OK] button.



Base : Local
Slot : Slot 0
CH : Ch1
Result : M0000

| No | Station ... | Function | Start Address | Data ... | Device | Auto ... |
|---|---|---|---|---|---|---|
| 0 | 1 (H01) | 01 Read Coil Status (0x) | 1 (H0000) | 5 | M0005 | Yes |
| 1 | 1 (H01) | 16 Preset Multiple Register (4x) | 1 (H0000) | 4 | D00000 | Yes |

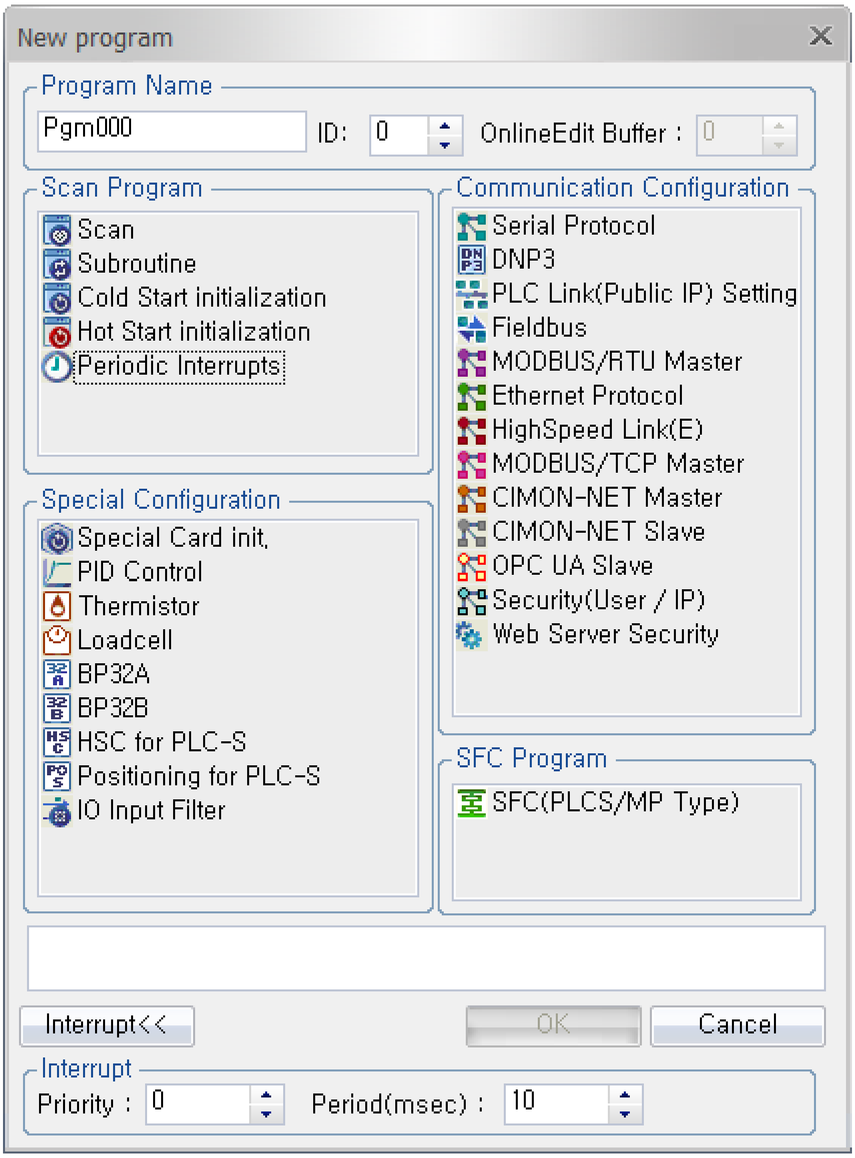
You can change the block locations using the [Up] and [Down] buttons.

## 7.6 Ethernet Protocol

The Ethernet Protocol program enables the user to define the communication frame of the Ethernet communication module.

**Registering the Ethernet Protocol program**

Select [File] → [New Program] → [Ethernet Protocol] menu.



Pgm000 ID: 0 OnlineEdit Buffer : 0

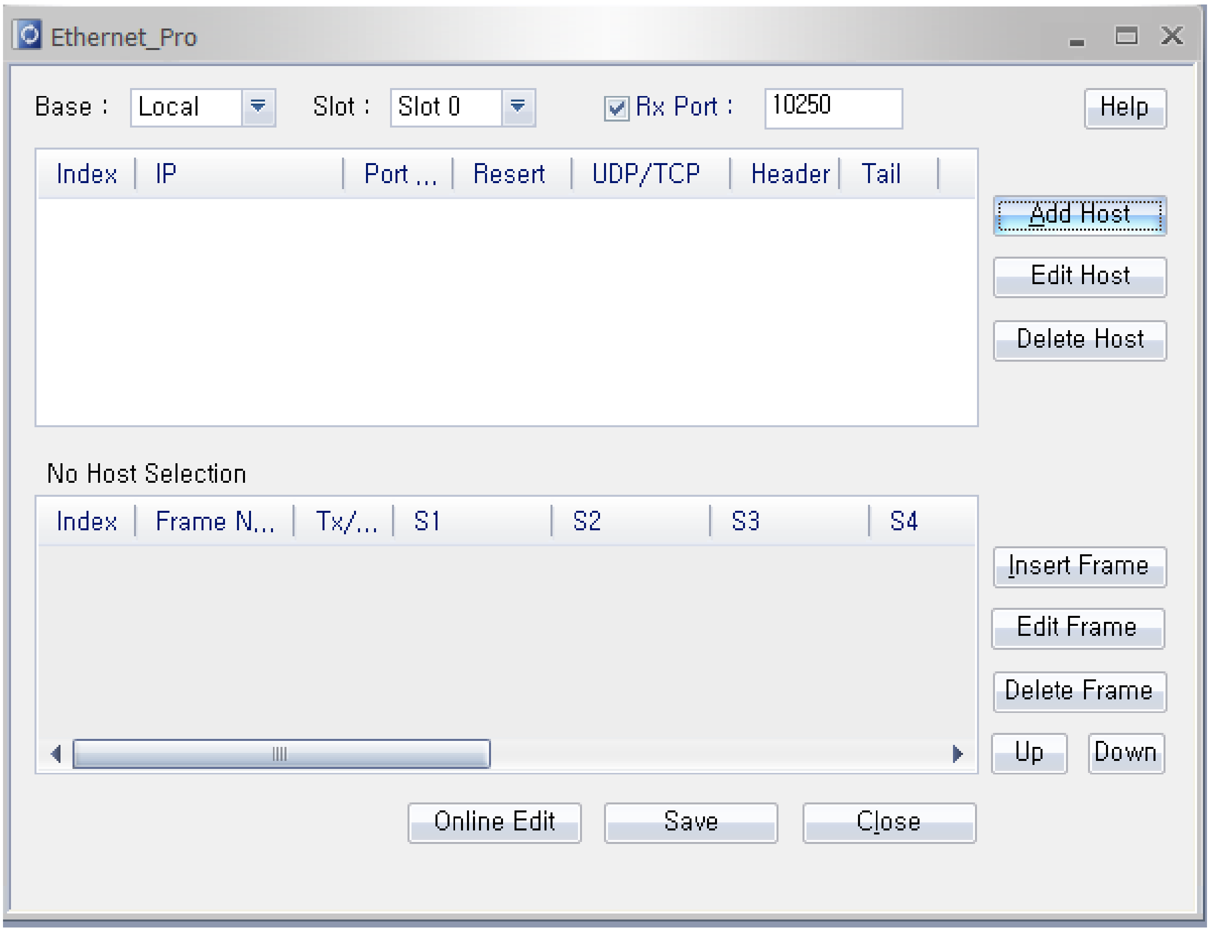
Priority : 0 Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

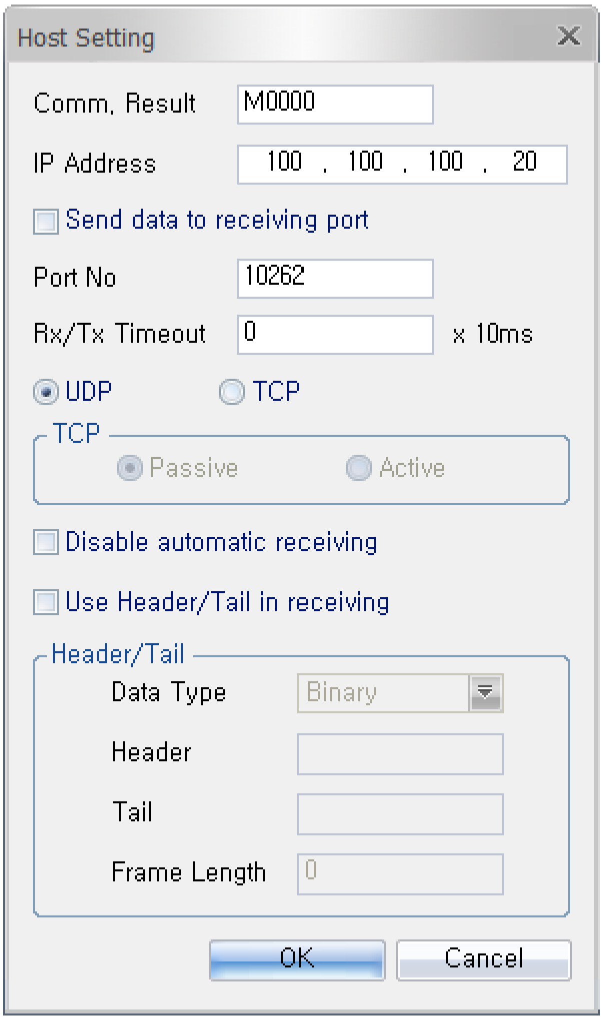
Click the [OK] button.

**Writing the Ethernet Protocol program**

An example program reads 5 words from D00100 of the counterparty's CIMON PLC (100.100.100.20) using the dedicated service and saves it in 5 words from D00100 of CIMON PLC. Communication is established using the Ethernet communication module mounted in local base, slot #0.



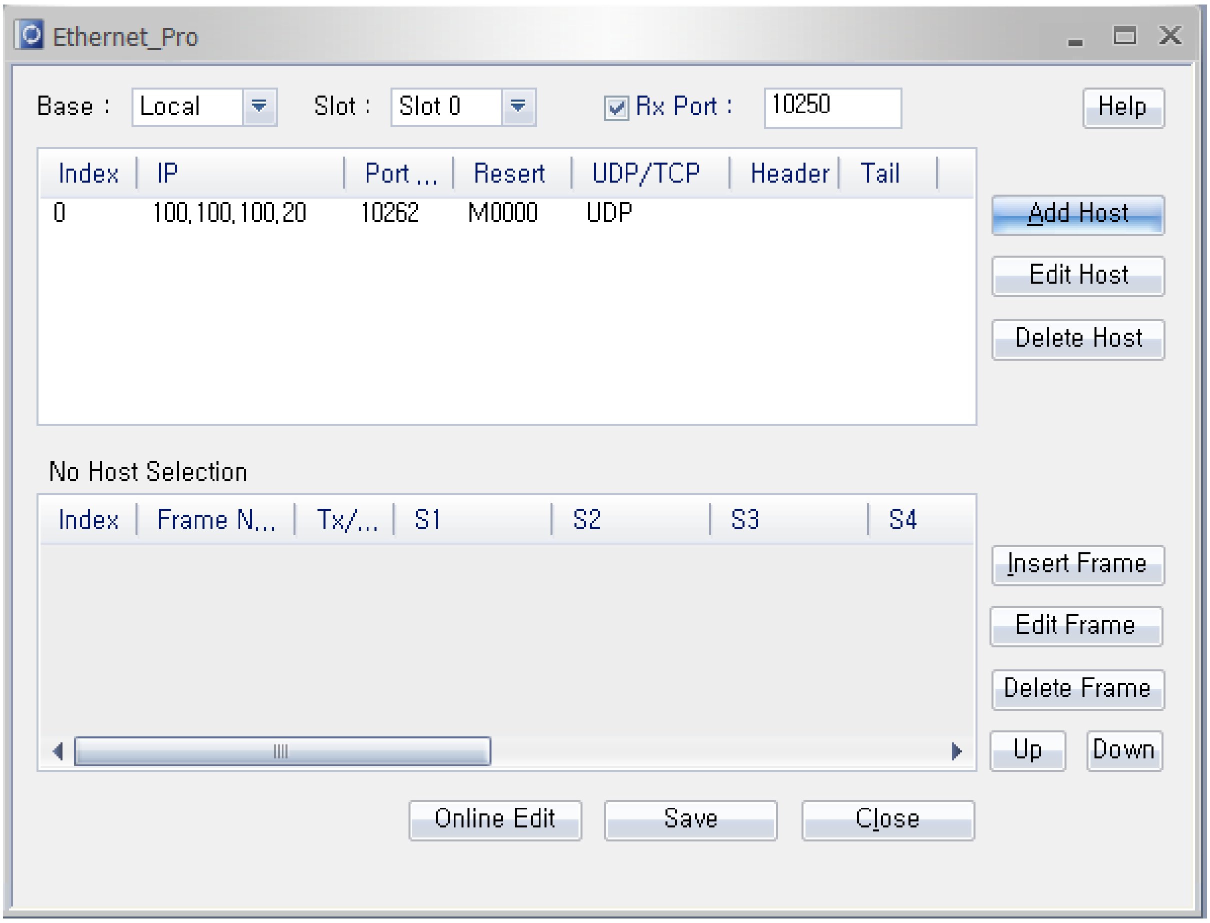
1) **Register a host**:
Register the PLC Ethernet card to read the data. Click [Add Host] button.



Comm. Result: M0000
IP Address: 100 . 100 . 100 . 20
☐ Send data to receiving port
Port No: 10262
Rx/Tx Timeout: 0 x 10ms
● UDP ○ TCP
TCP: ● Passive ○ Active
☐ Disable automatic receiving
☐ Use Header/Tail in receiving
Header/Tail
Data Type: Binary
Header:
Tail:
Frame Length: 0

- **Communication Result**: Enter the device (M0000) to save the communication result.
- **IP Address**: Enter the counterparty's IP (100.100.100.20)
- **Port Number**: Enter the Port Number (10262) to use for communication. The port number in the dedicated service uses TCP (10260) and UDP (10262). Select "UDP."
- Click [OK] button.

* **Receive Header/Tail** is used when the entire frame has a header and tail but receives as the header and tail are split. All frames are combined, from the time the header has been received to the time when the tail is received, to process as a frame (request or response).



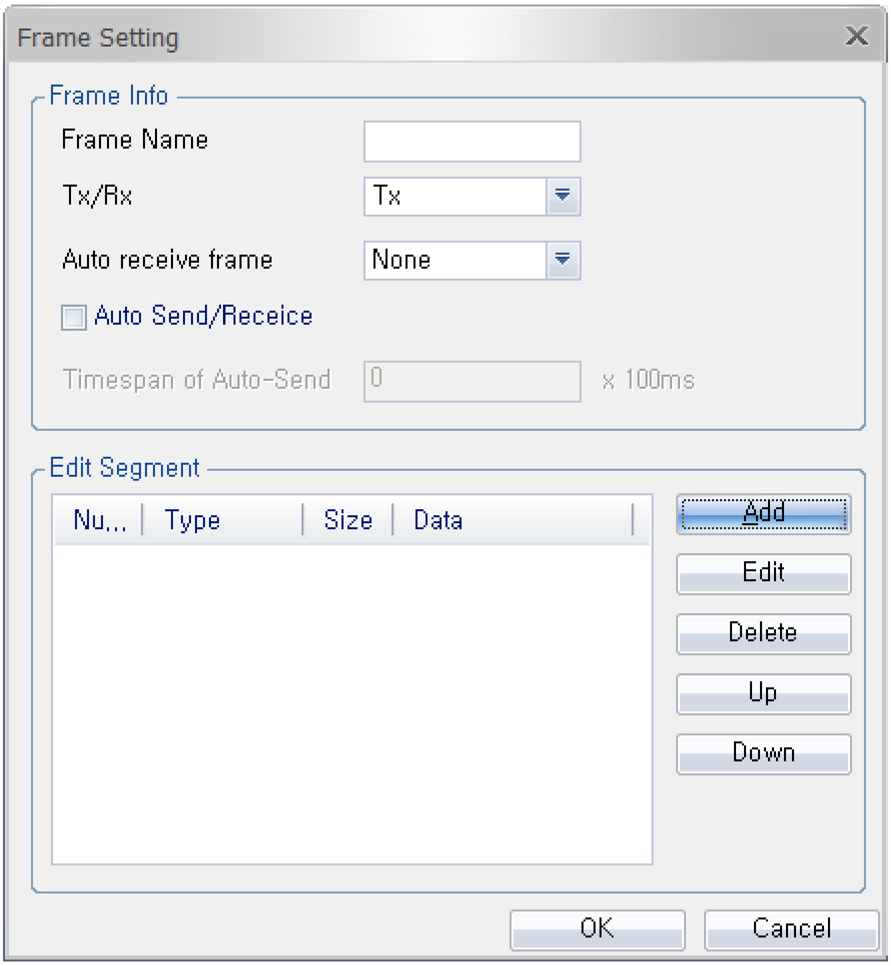
Base : Local
Slot : Slot 0
☑ Rx Port : 10250

| Index | IP | Port ... | Resert | UDP/TCP | Header | Tail |
|---|---|---|---|---|---|---|
| 0 | 100.100.100.20 | 10262 | M0000 | UDP | | |

No Host Selection

| Index | Frame N... | Tx/... | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|

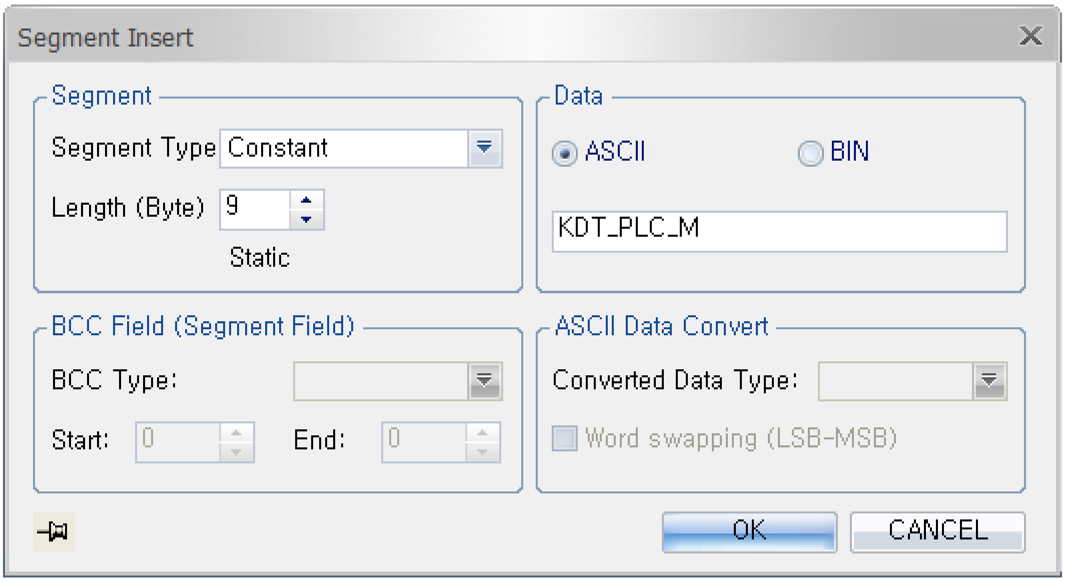
2) **Register a frame (Rx frame for the Word Block Read command):**
Select a host and click the [Insert Frame] button. The Frame Setting window will appear as below.



- **Frame Name:** Enter name to differentiate the frame.
- **Tx/Rx:** Sets the communication direction – sending or receiving.
- **Auto receive frame:** Specifies the frame that corresponds to the response.
- **Auto Send/Receive:** Sending frames will be automatically sent at the specified interval.

3) **Define a frame (Rx frame for the Word Block Read command):**
Defines the frame contents to interpret the response frame to the Word Block Read request frame of CIMON PLC.

i. **Define a segment (ID):** Sets the ID in the protocol.
In this case, the ID for the dedicated service is “KDT_PLC_M” as shown below.



Segment Insert

Segment

Segment Type: Constant

Length (Byte): 9

Static

Data

● ASCII ○ BIN

KDT_PLC_M

BCC Field (Segment Field)

BCC Type:

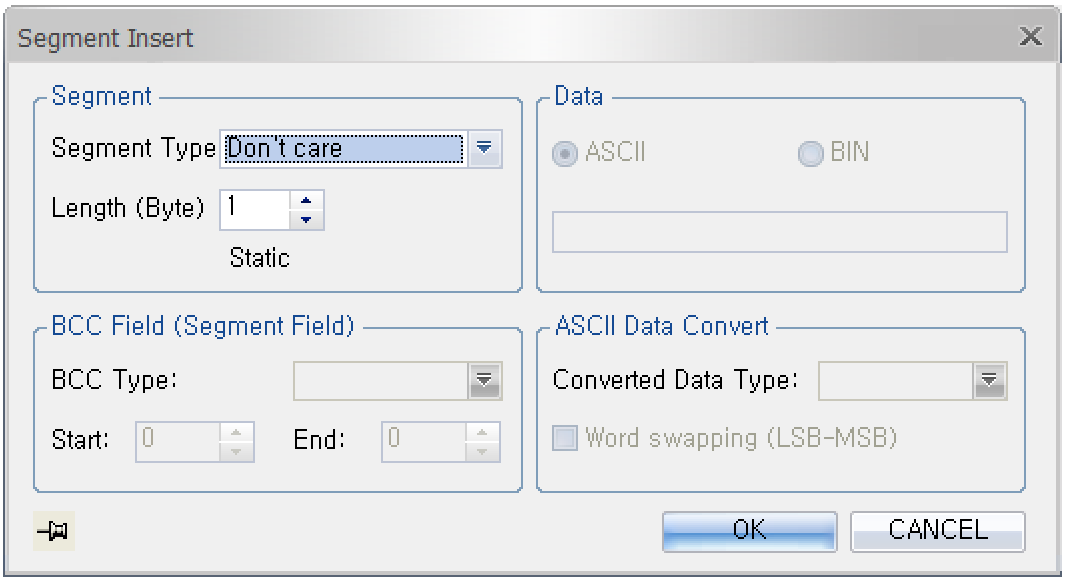
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

ii. **Define a segment (Frame No.):** Sets the frame number area in the protocol. Select "Don't care" for the Segment Type since it is not related with the data. The area designated as "Don't care" will not be compared. Length is 1 byte as shown below.



Segment Insert

Segment

Segment Type: Don't care

Length (Byte): 1

Static

Data

● ASCII ○ BIN

BCC Field (Segment Field)

BCC Type:

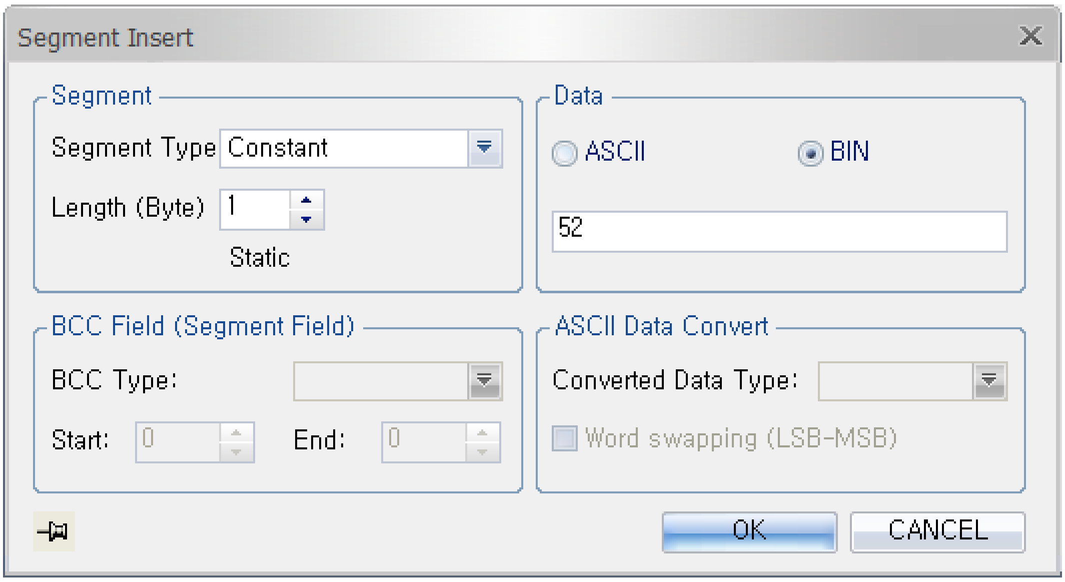
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

iii. **Define a segment (Cmd)**: The command of the ACK response to the Word Block Read is 52h as shown below.



Segment Insert

Segment

Segment Type Constant

Length (Byte) 1

Static

Data

○ ASCII ● BIN

52

BCC Field (Segment Field)

BCC Type:

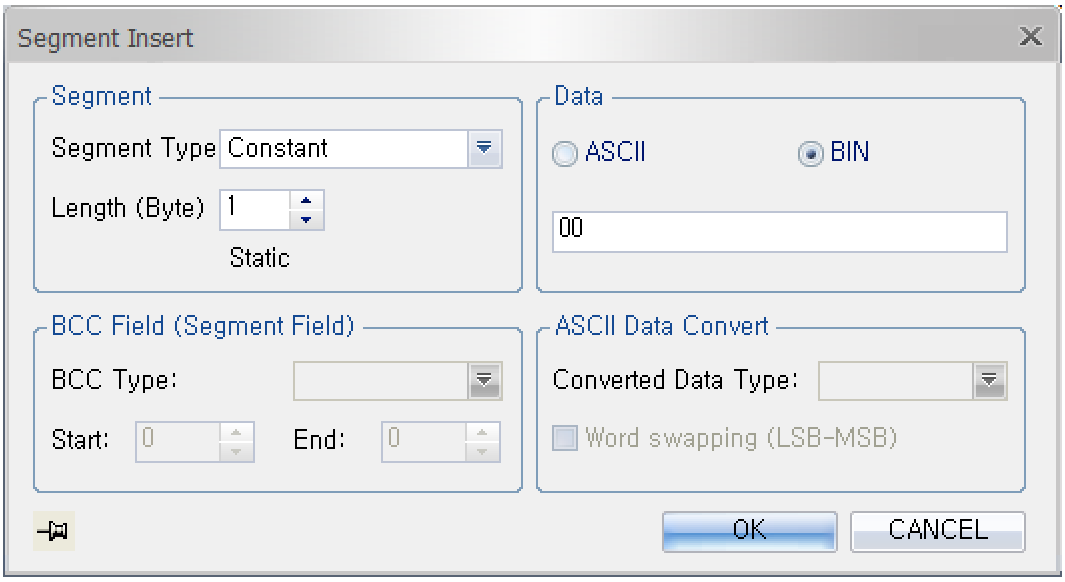
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

iv. **Define a segment (Res: Reserved area 00h)**: The reserved area is 00h as shown below.



Segment Insert

Segment

Segment Type Constant

Length (Byte) 1

Static

Data

○ ASCII ● BIN

00

BCC Field (Segment Field)

BCC Type:

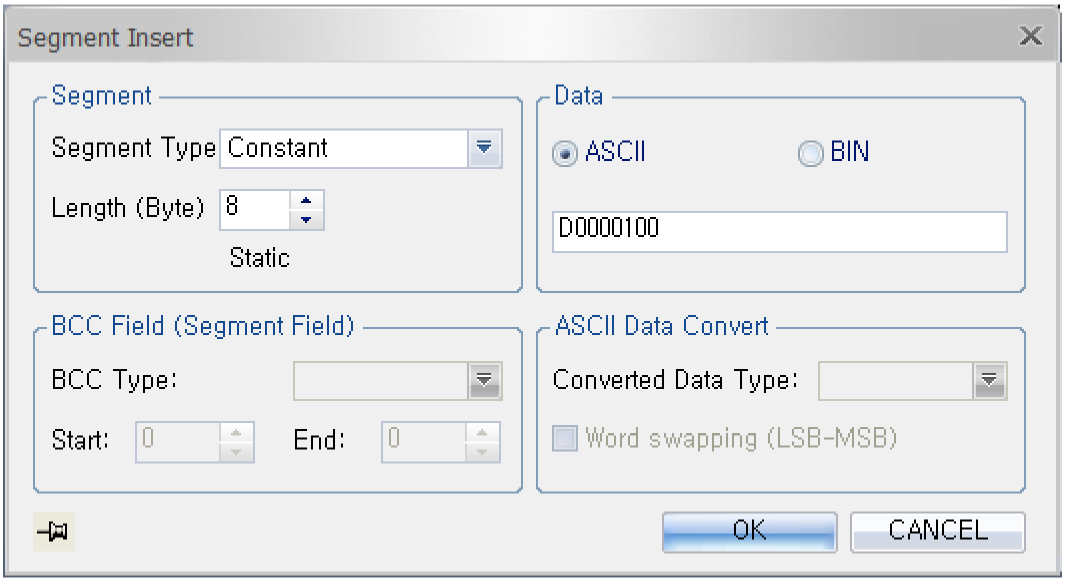
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

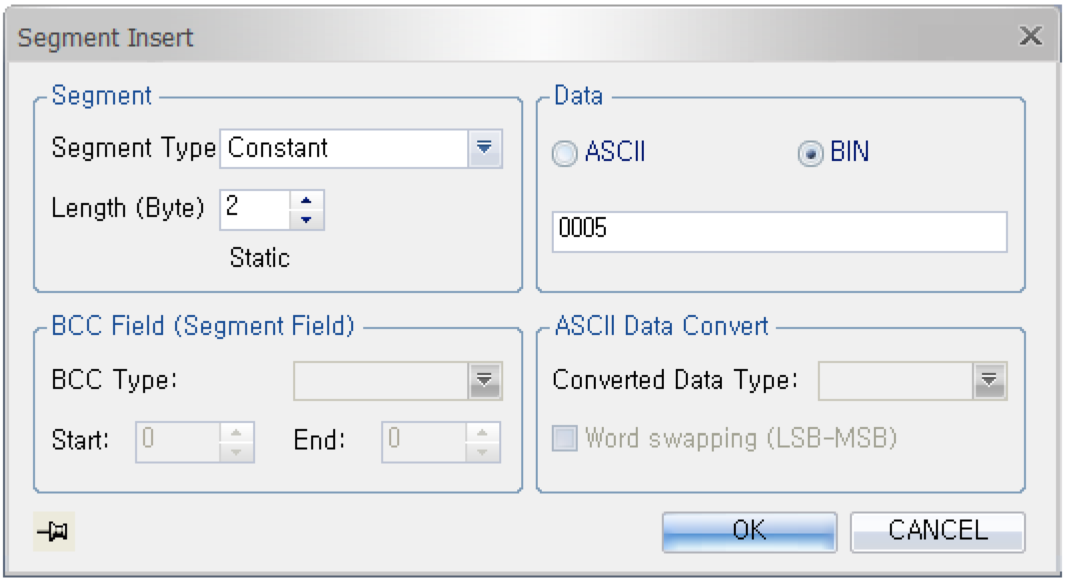
☐ Word swapping (LSB-MSB)

v. **Define a segment (Data area: Requesting device):** Since 5 words data from D00100 is requested, the requesting device of the response frame is received in D00100 as shown below.



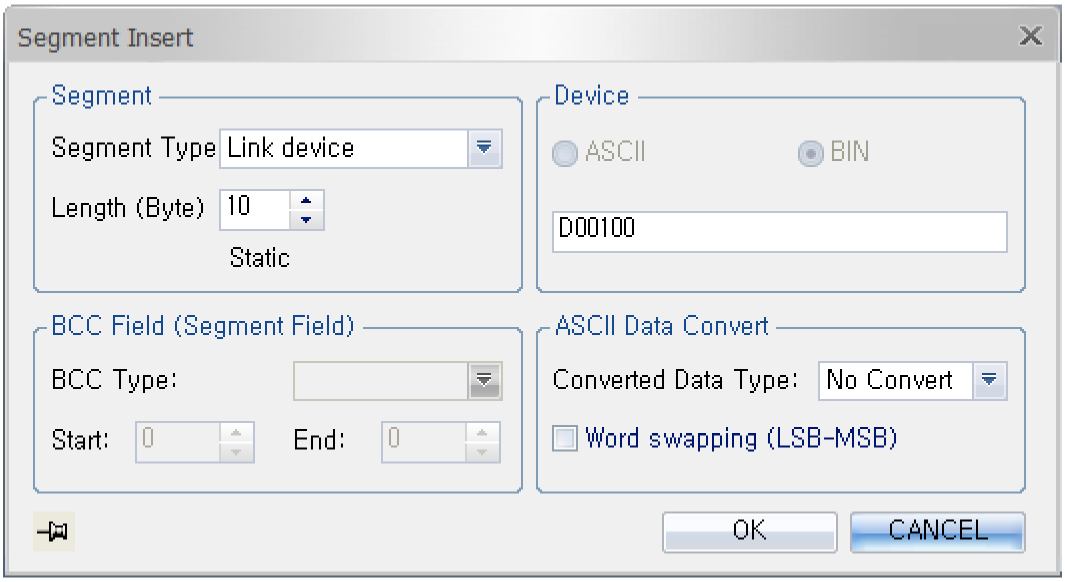
Segment Type: Constant
Length (Byte): 8
Static
Data: ● ASCII ○ BIN
D0000100
BCC Type:
Start: 0 End: 0
Converted Data Type:
☐ Word swapping (LSB-MSB)

vi. **Define a segment (Data area: Number of requesting data)**: The number of requesting data is received as 005h since 5 data has been requested.



Segment Type: Constant
Length (Byte): 2
Static
Data: ○ ASCII ● BIN
0005
BCC Type:
Start: 0 End: 0
Converted Data Type:
☐ Word swapping (LSB-MSB)

vii. **Define a segment (Data area: Receiving data):** Since requested data is received sequentially, configure as shown below in order to save the received data in D00100 sequentially.



Segment Insert

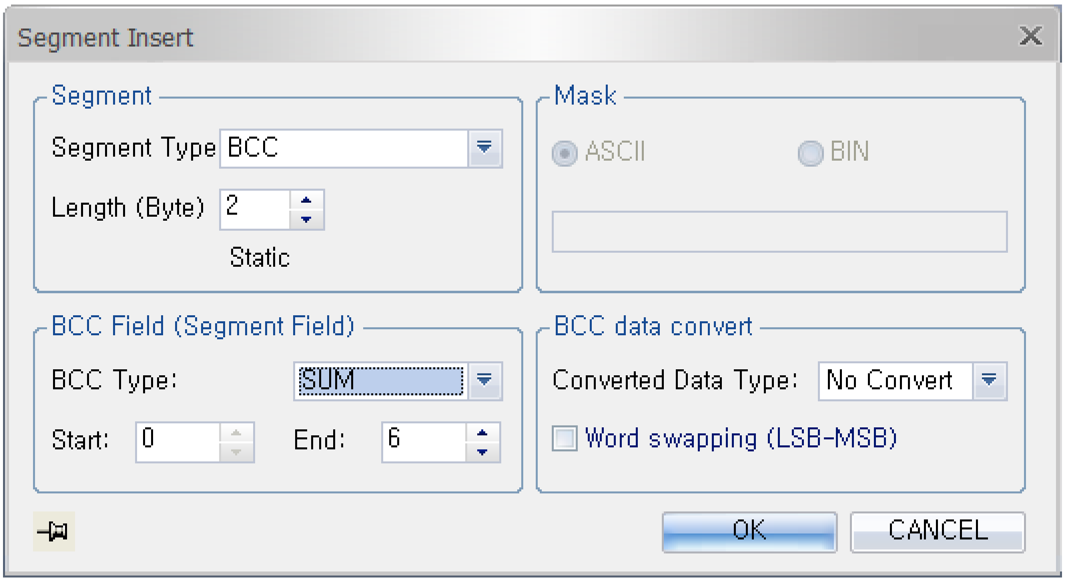
Segment
Segment Type: Link device
Length (Byte): 10
Static

Device
○ ASCII ● BIN
D00100

BCC Field (Segment Field)
BCC Type:
Start: 0 End: 0

ASCII Data Convert
Converted Data Type: No Convert
☐ Word swapping (LSB-MSB)

viii. **Define a segment (Check Sum):** The checksum area covers the entire frame area.



Segment Insert

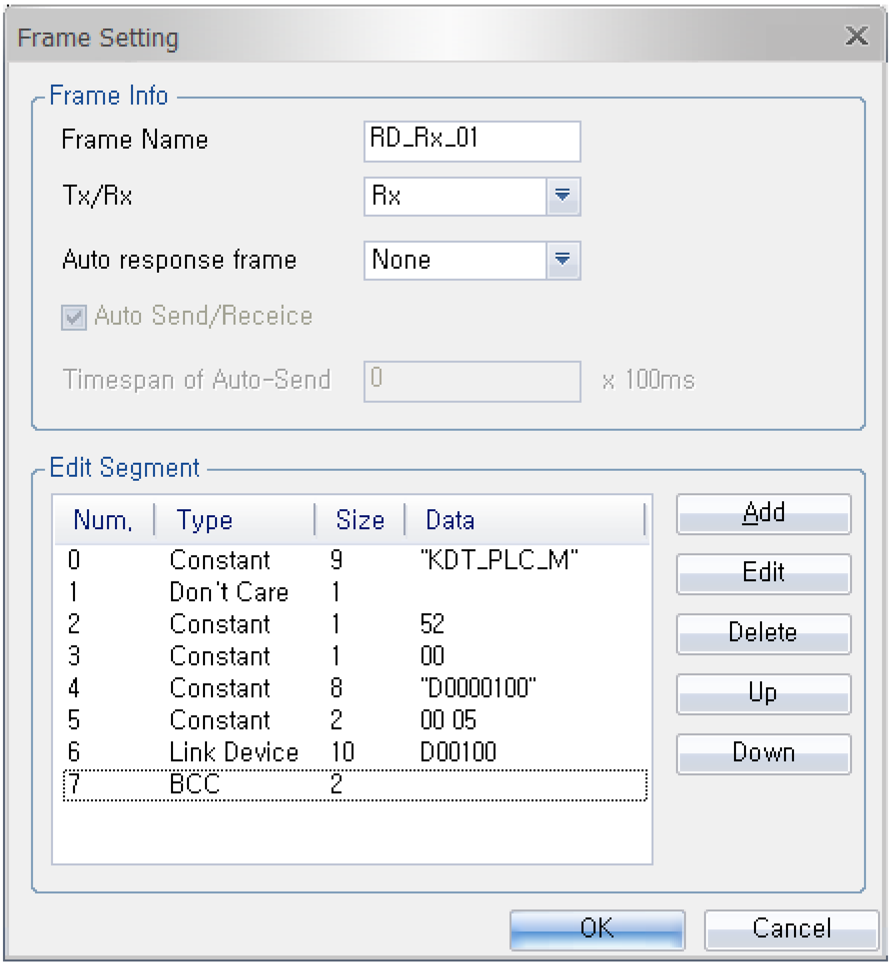
Segment
Segment Type: BCC
Length (Byte): 2
Static

Mask
● ASCII ○ BIN

BCC Field (Segment Field)
BCC Type: SUM
Start: 0 End: 6

BCC data convert
Converted Data Type: No Convert
☐ Word swapping (LSB-MSB)

4) **Complete defining a frame (Rx frame for Word Block Read):**
The communication direction is receiving frame as shown below.



Frame Setting

Frame Info

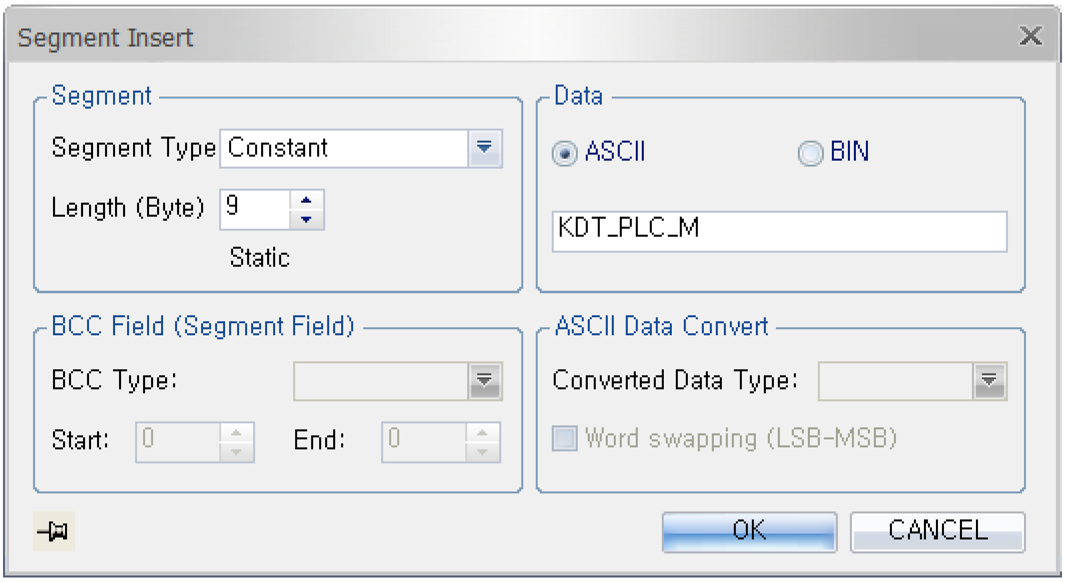
Frame Name: RD_Rx_01
Tx/Rx: Rx
Auto response frame: None
☑ Auto Send/Receice
Timespan of Auto-Send: 0 x 100ms

Edit Segment

| Num. | Type | Size | Data |
|---|---|---|---|
| 0 | Constant | 9 | "KDT_PLC_M" |
| 1 | Don't Care | 1 | |
| 2 | Constant | 1 | 52 |
| 3 | Constant | 1 | 00 |
| 4 | Constant | 8 | "D0000100" |
| 5 | Constant | 2 | 00 05 |
| 6 | Link Device | 10 | D00100 |
| 7 | BCC | 2 | |

5) **Define a frame (Tx frame for the Word Block Read command):**
Defines the request frame for Word Block Read.

i. **Define a segment (ID):** Sets the ID in the protocol.
The ID for the dedicated service is “KDT_PLC_M” as shown below.



Segment Insert

Segment

Segment Type: Constant
Length (Byte): 9
Static

Data

● ASCII ○ BIN
KDT_PLC_M

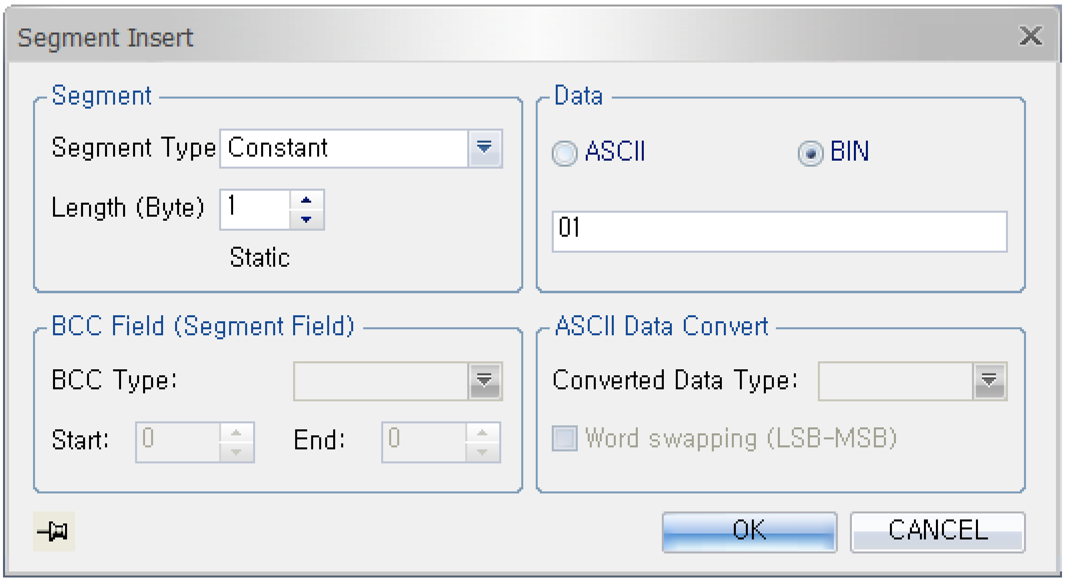
BCC Field (Segment Field)

BCC Type:
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:
☐ Word swapping (LSB-MSB)

ii. **Define a segment (Frame No.):** Sets the frame number area in the protocol. Length is 1 byte as shown below.



Segment Insert

Segment

Segment Type: Constant

Length (Byte): 1

Static

Data

○ ASCII ● BIN

01

BCC Field (Segment Field)

BCC Type:

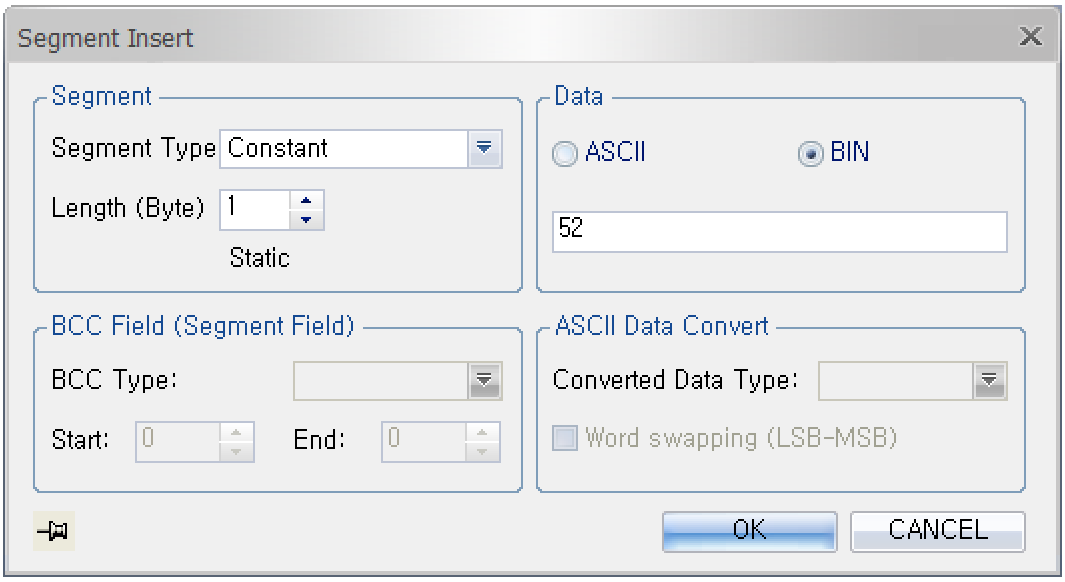
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

iii. **Define a segment (Cmd):** The command to the Word Block Read is 52h as shown below.



Segment Insert

Segment

Segment Type: Constant

Length (Byte): 1

Static

Data

○ ASCII ● BIN

52

BCC Field (Segment Field)

BCC Type:

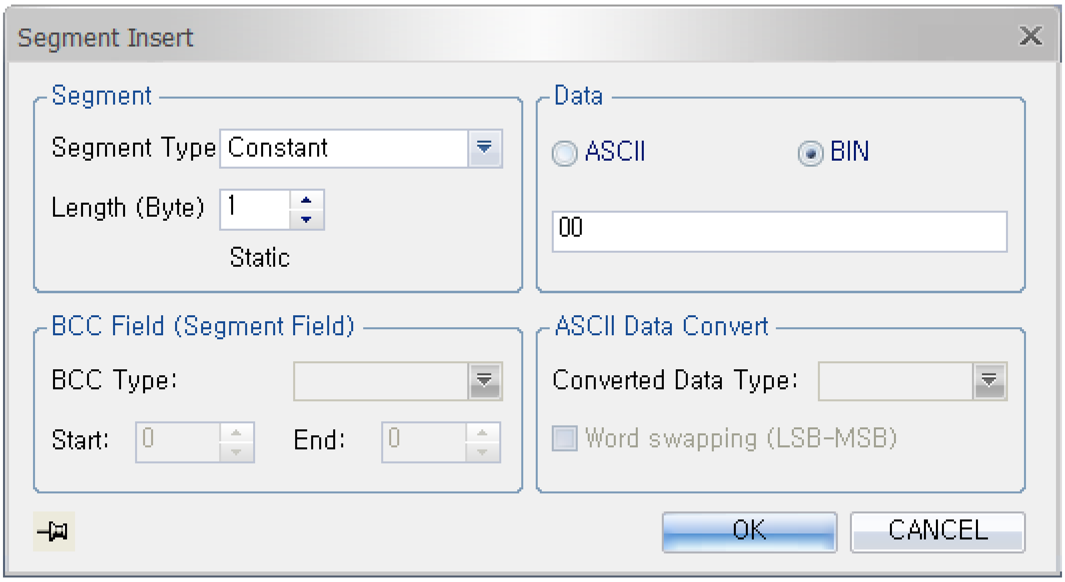
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

iv. **Define a segment (Res: Reserved area 00h):** The reserved area is 00h as shown below.



Segment Insert

Segment

Segment Type: Constant

Length (Byte): 1

Static

Data

○ ASCII ● BIN

00

BCC Field (Segment Field)

BCC Type:

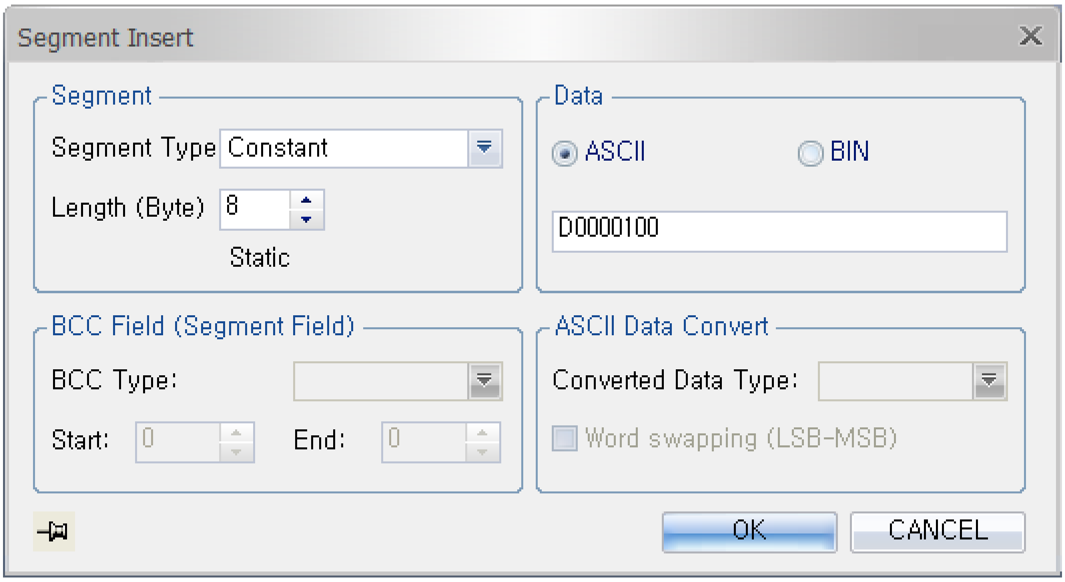
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

v. **Define a segment (Data area: Requesting device):** Since 5 words data from D00100 is requested, the requesting device of the response frame is received as D00100. Set as shown below.



Segment Insert

Segment

Segment Type: Constant

Length (Byte): 8

Static

Data

● ASCII ○ BIN

D0000100

BCC Field (Segment Field)

BCC Type:

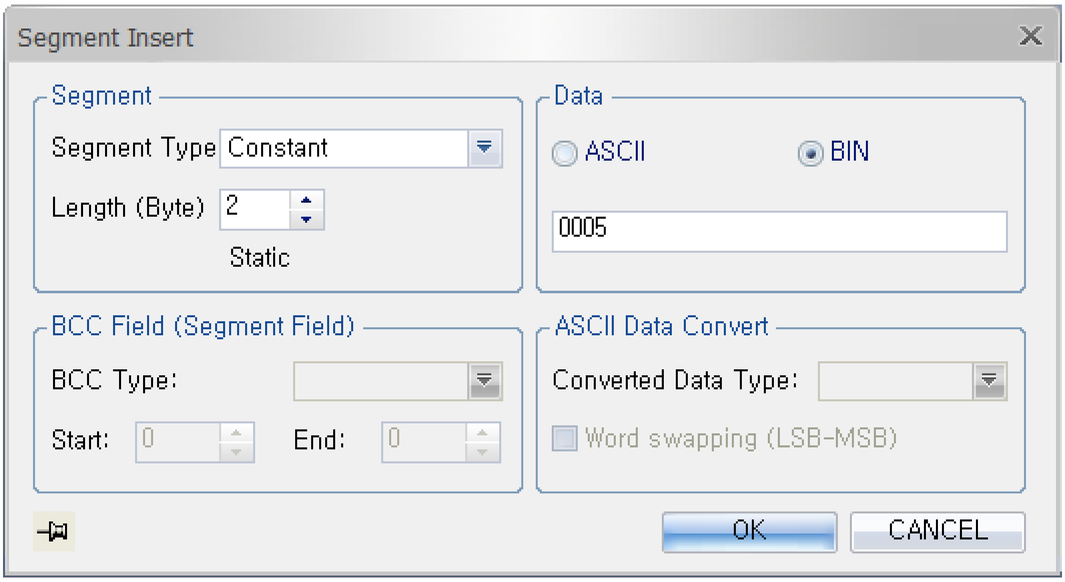
Start: 0 End: 0

ASCII Data Convert

Converted Data Type:

☐ Word swapping (LSB-MSB)

vi. **Define a segment (Data area: Number of requesting data):** The number of requesting data is received as 0005h since 5 data is requested.


Segment Insert

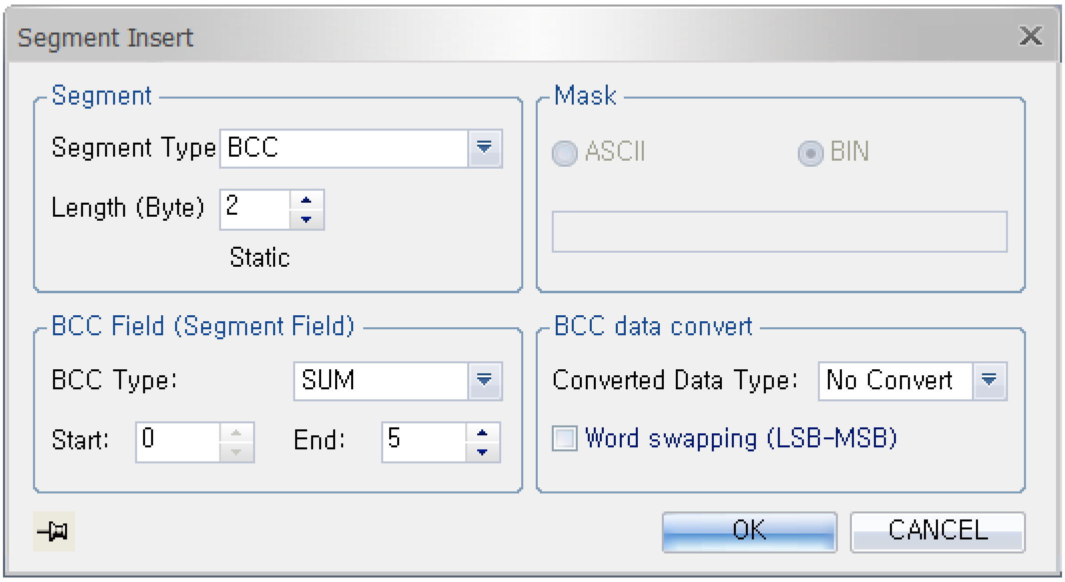
Segment
Segment Type: Constant
Length (Byte): 2
Static

Data
○ ASCII ● BIN
0005

BCC Field (Segment Field)
BCC Type:
Start: 0 End: 0

ASCII Data Convert
Converted Data Type:
☐ Word swapping (LSB-MSB)

vii. **Define a segment (Check Sum):** The checksum area covers the entire frame area.


Segment Insert

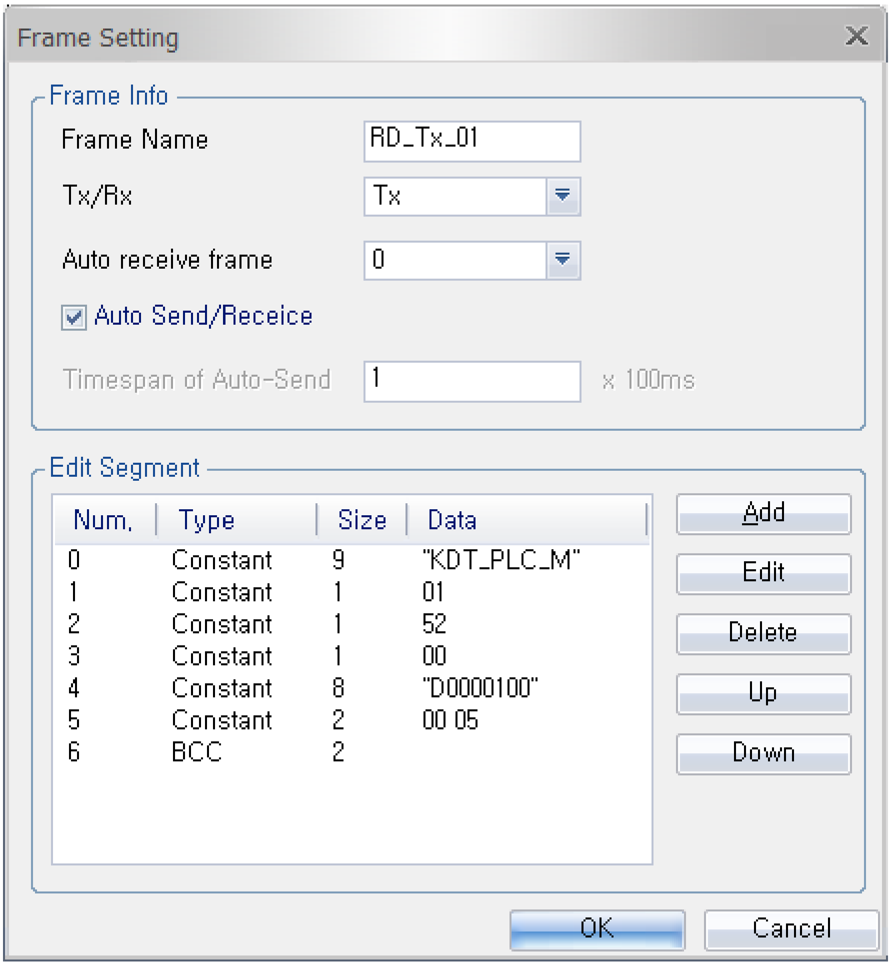
Segment
Segment Type: BCC
Length (Byte): 2
Static

Mask
○ ASCII ● BIN

BCC Field (Segment Field)
BCC Type: SUM
Start: 0 End: 5

BCC data convert
Converted Data Type: No Convert
☐ Word swapping (LSB-MSB)

6) **Complete frame registration (Tx frame for Word Block Read):**



Frame Setting

Frame Info

Frame Name: RD_Tx_01

Tx/Rx: Tx

Auto receive frame: 0

☑ Auto Send/Receice

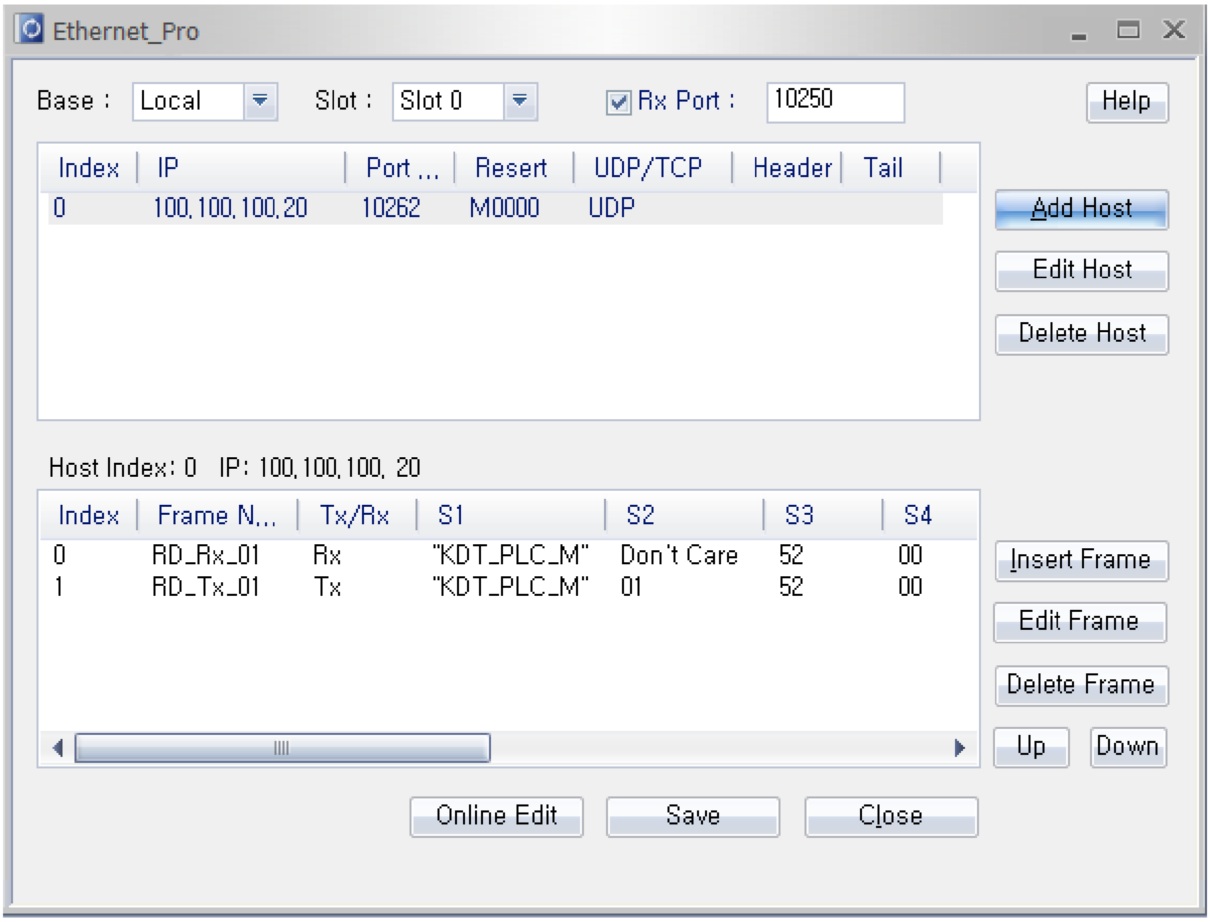
Timespan of Auto-Send: 1 x 100ms

Edit Segment

| Num. | Type | Size | Data |
|---|---|---|---|
| 0 | Constant | 9 | "KDT_PLC_M" |
| 1 | Constant | 1 | 01 |
| 2 | Constant | 1 | 52 |
| 3 | Constant | 1 | 00 |
| 4 | Constant | 8 | "D0000100" |
| 5 | Constant | 2 | 00 05 |
| 6 | BCC | 2 | |

Set the communication direction as the sending frame. Also, set the automatic receiving frame after sending so that the system automatically awaits the receiving of the specified frame (0) after sending. Lastly, set the automatic sending interval as 0.1 second so that communication is established at every 0.1 second.

7) **Complete frame registration (Word Block Read request and response frame receiving)**



Base : Local Slot : Slot 0 ☑ Rx Port : 10250

| Index | IP | Port ... | Resert | UDP/TCP | Header | Tail |
|---|---|---|---|---|---|---|
| 0 | 100.100.100.20 | 10262 | M0000 | UDP | | |

Host Index: 0 IP: 100.100.100. 20

| Index | Frame N... | Tx/Rx | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|---|
| 0 | RD_Rx_01 | Rx | "KDT_PLC_M" | Don't Care | 52 | 00 |
| 1 | RD_Tx_01 | Tx | "KDT_PLC_M" | 01 | 52 | 00 |

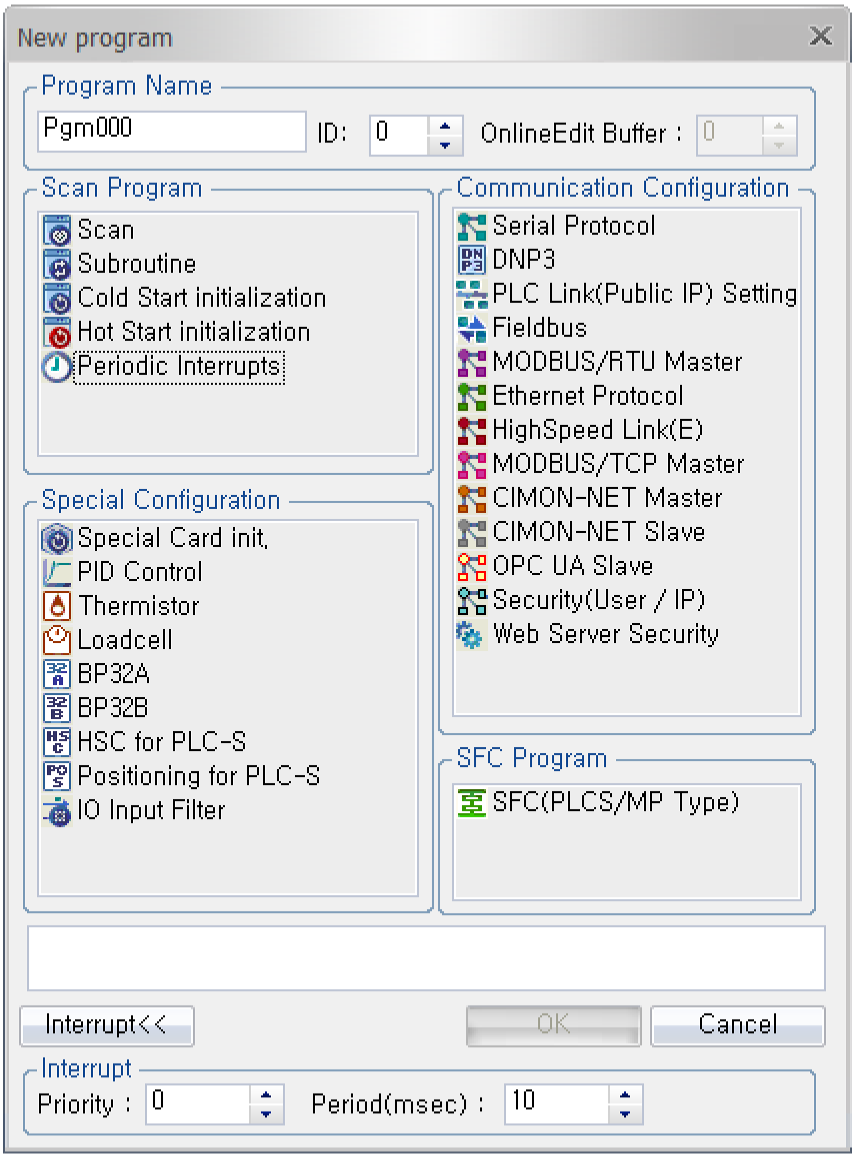
Communication will be established by the protocol program without having another separate scan programming.

## 7.7 HighSpeed Link (Ethernet) Protocol

The Ethernet High Speed Link program is used when fast communication between CIMON PLCs is needed. This program allows each PLC to send and receive data of 64 stations, but sending stations are limited to 32 stations. There can be a maximum of 64 words executive data in a station. In order to enjoy the best performance, it should be separated with other networks. If it works with other networks, its network speed will be significantly reduced.

**Registering the HighSpeed Link(E) program**

Select [File] → [New Program] → [HighSpeed Link(E)] menu.

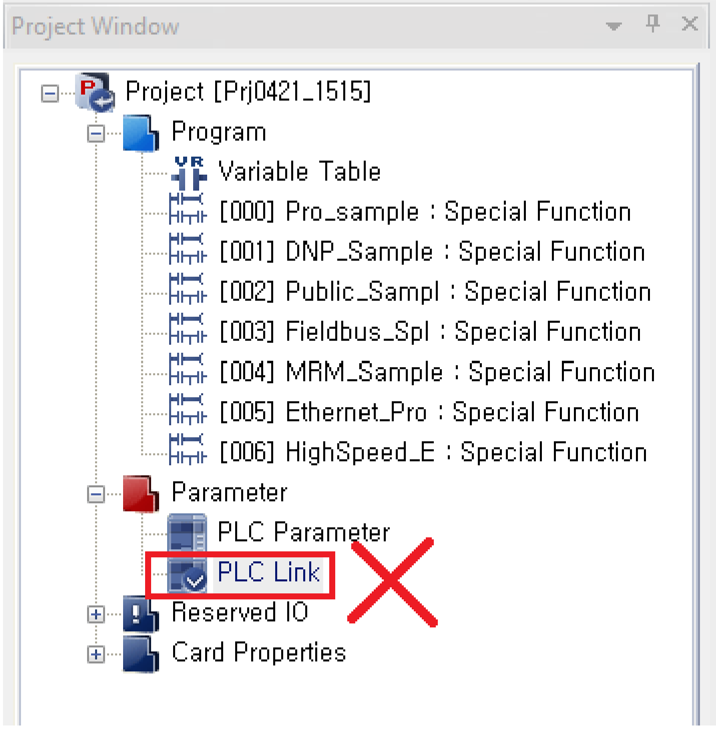


Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

* **Note:** [PLC Link] in [Parameter] does not support High Speed PLC Link to PLC-S.

Only [Ethernet High Speed Link] program in the Communication Configuration supports this function.


Project Window
Project [Prj0421_1515]
Program
Variable Table
[000] Pro_sample : Special Function
[001] DNP_Sample : Special Function
[002] Public_Sampl : Special Function
[003] Fieldbus_Spl : Special Function
[004] MRM_Sample : Special Function
[005] Ethernet_Pro : Special Function
[006] HighSpeed_E : Special Function
Parameter
PLC Parameter
PLC Link
Reserved IO
Card Properties

Communication modules compatible with [Ethernet High Speed Link] program are as follows:

- PLC-S: All CPU modules with Ethernet Option
- PLC-S: CM3-SP01EET (Ethernet Expansion module)
- CP/XP: CM1-EC10A, CM1-EC10B
- Note: CM1-EC01A of CP/XP series is not compatible with Ethernet option of CM2-BP series.

High Speed PLC Link Port

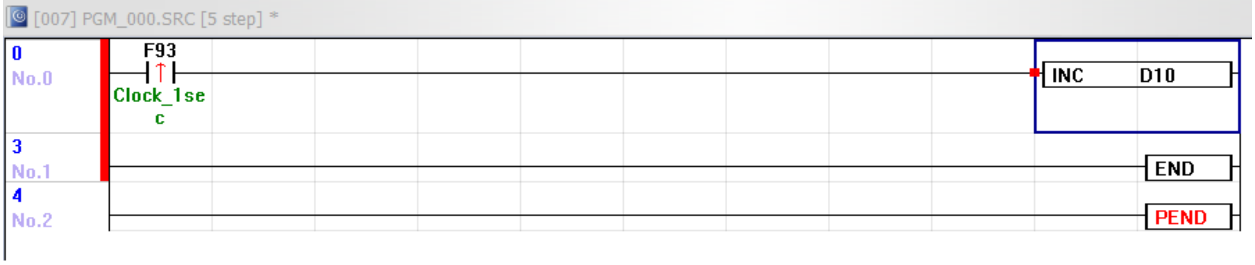
- Communication Port Number: UDP/IP 10264

### Writing the HighSpeed Link(E) program

**An example of using the Ethernet HighSpeed Link program:** Communication is established between two modules where #1 PLC-S sends data which increases by +1 at every second to the device area D11 of #2 PLC-S. Then, the received data will be sent back to the device area D11 of #1 PLC-S. Likewise, this example includes 32 blocks of internal communication between these two PLC-S modules.

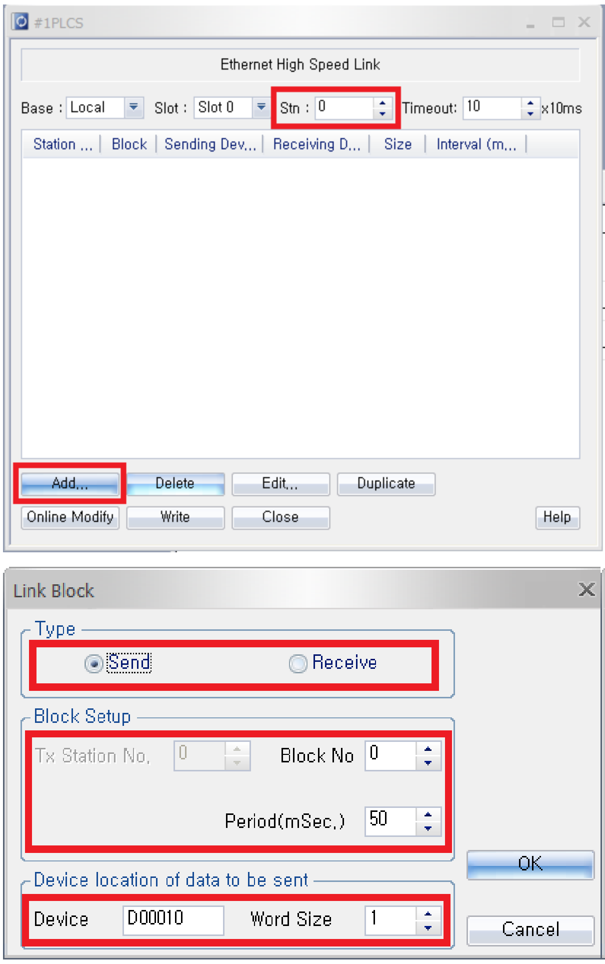
1) Have two PLC-S modules ready and connected with two programs inside the CICON software.

2) Write a scan program that increases the data by +1 at every second as shown below.



```
[007] PGM_000.SRC [5 step] *
0    F93
No.0 -|↑|- Clock_1sec ------------------------ [INC  D10]
3
No.1 ------------------------------------------ [END]
4
No.2 ------------------------------------------ [PEND]
```

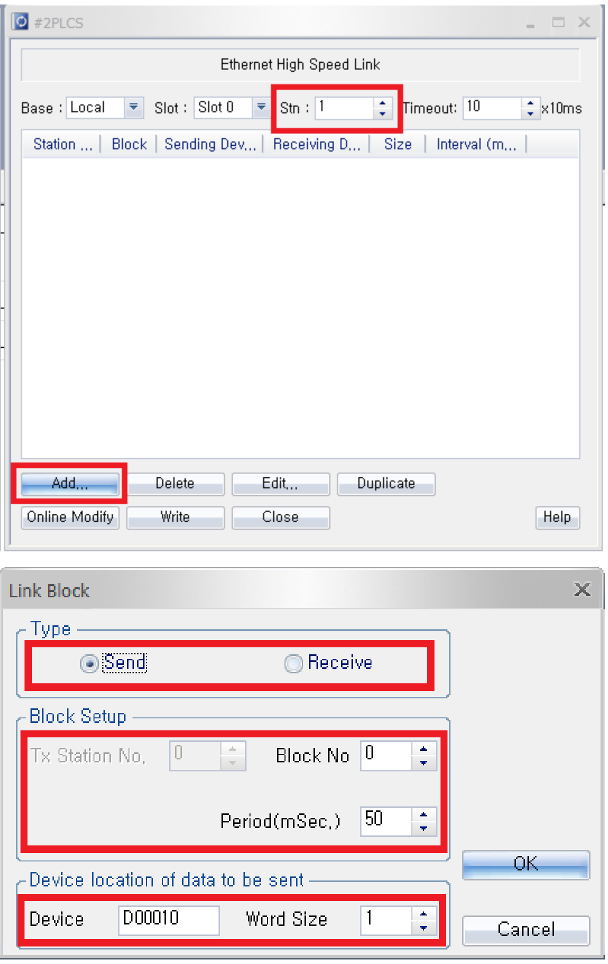
3) Below images are two separate Ethernet High Speed Link programs for two PLC-S modules. Set station numbers (Stn) as 0 and 1 for #1 PLC-S and #2 PLC-S respectively. Then, click on [Add] button.



#1PLCS – Ethernet High Speed Link: Base : Local, Slot : Slot 0, Stn : 0, Timeout: 10 x10ms

Link Block: Type: ● Send ○ Receive; Block Setup: Tx Station No. 0, Block No 0, Period(mSec.) 50; Device location of data to be sent: Device D00010, Word Size 1

* #1 PLC-S Configuration



#2PLCS – Ethernet High Speed Link: Base : Local, Slot : Slot 0, Stn : 1, Timeout: 10 x10ms

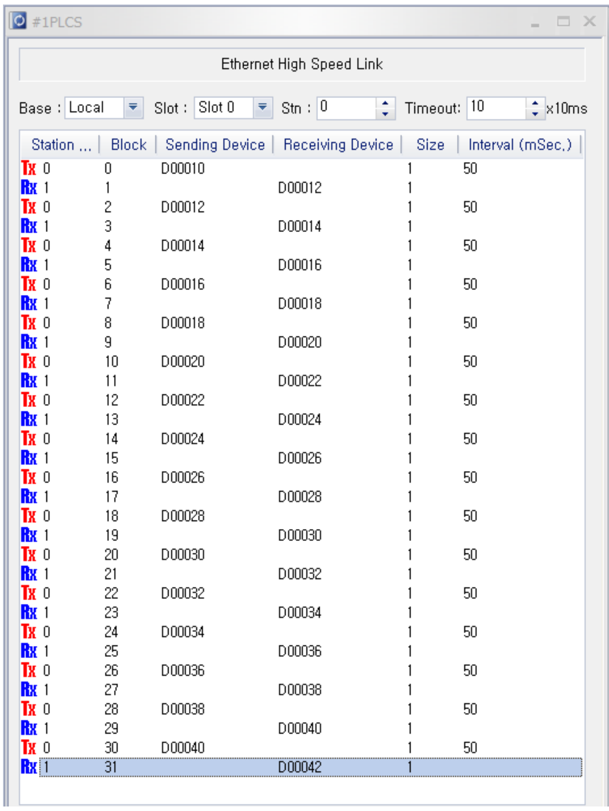
Link Block: Type: ● Send ○ Receive; Block Setup: Tx Station No. 0, Block No 0, Period(mSec.) 50; Device location of data to be sent: Device D00010, Word Size 1

* #2 PLC-S Configuration

4) Block numbers for #1 PLC-S and #2 PLC-S must be the same in order to communicate. Configure so that TX block number of #1 PLC-S is identical with RX block number of #2 PLC-S as shown above.

5) The address of the Block Number 0 will travel from Device D10 of #1 PLC-S and send data to D11 of #2 PLC-S as shown above.

6) In the same way as above, you can add 32 blocks for each #1 PLC-S and #2 PLC-S. When you complete adding blocks, it will look like below image.

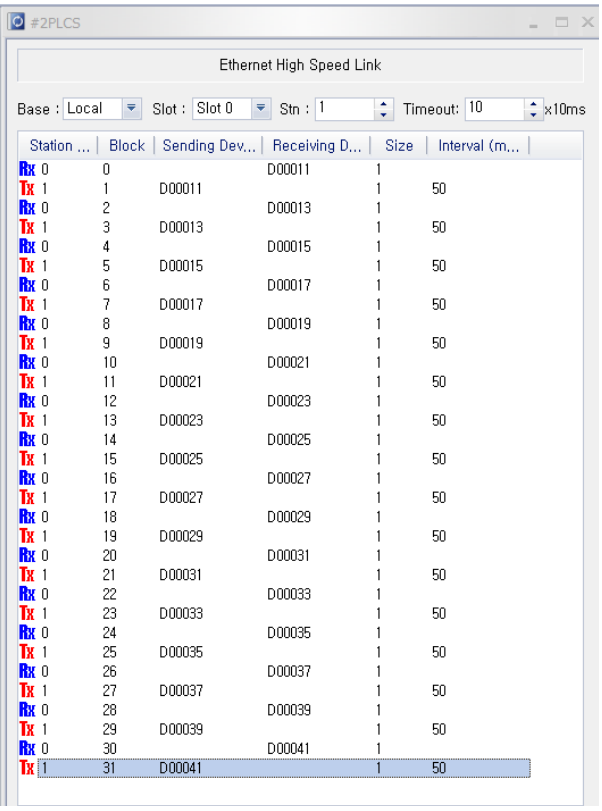


Ethernet High Speed Link

Base : Local Slot : Slot 0 Stn : 0 Timeout: 10 x10ms

| Station ... | Block | Sending Device | Receiving Device | Size | Interval (mSec.) |
|---|---|---|---|---|---|
| Tx 0 | 0 | D00010 | | 1 | 50 |
| Rx 1 | 1 | | D00012 | 1 | |
| Tx 0 | 2 | D00012 | | 1 | 50 |
| Rx 1 | 3 | | D00014 | 1 | |
| Tx 0 | 4 | D00014 | | 1 | 50 |
| Rx 1 | 5 | | D00016 | 1 | |
| Tx 0 | 6 | D00016 | | 1 | 50 |
| Rx 1 | 7 | | D00018 | 1 | |
| Tx 0 | 8 | D00018 | | 1 | 50 |
| Rx 1 | 9 | | D00020 | 1 | |
| Tx 0 | 10 | D00020 | | 1 | 50 |
| Rx 1 | 11 | | D00022 | 1 | |
| Tx 0 | 12 | D00022 | | 1 | 50 |
| Rx 1 | 13 | | D00024 | 1 | |
| Tx 0 | 14 | D00024 | | 1 | 50 |
| Rx 1 | 15 | | D00026 | 1 | |
| Tx 0 | 16 | D00026 | | 1 | 50 |
| Rx 1 | 17 | | D00028 | 1 | |
| Tx 0 | 18 | D00028 | | 1 | 50 |
| Rx 1 | 19 | | D00030 | 1 | |
| Tx 0 | 20 | D00030 | | 1 | 50 |
| Rx 1 | 21 | | D00032 | 1 | |
| Tx 0 | 22 | D00032 | | 1 | 50 |
| Rx 1 | 23 | | D00034 | 1 | |
| Tx 0 | 24 | D00034 | | 1 | 50 |
| Rx 1 | 25 | | D00036 | 1 | |
| Tx 0 | 26 | D00036 | | 1 | 50 |
| Rx 1 | 27 | | D00038 | 1 | |
| Tx 0 | 28 | D00038 | | 1 | 50 |
| Rx 1 | 29 | | D00040 | 1 | |
| Tx 0 | 30 | D00040 | | 1 | 50 |
| Rx 1 | 31 | | D00042 | 1 | |

*HighSpeed PLC Link configuration for #1 PLC-S



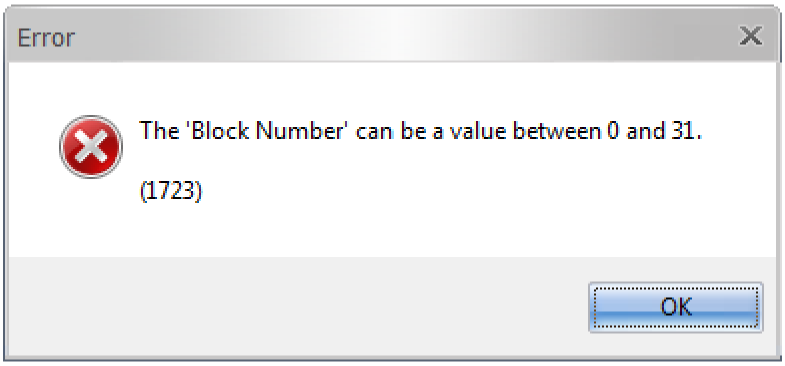
Ethernet High Speed Link

Base : Local Slot : Slot 0 Stn : 1 Timeout: 10 x10ms

| Station ... | Block | Sending Dev... | Receiving D... | Size | Interval (m... |
|---|---|---|---|---|---|
| Rx 0 | 0 | | D00011 | 1 | |
| Tx 1 | 1 | D00011 | | 1 | 50 |
| Rx 0 | 2 | | D00013 | 1 | |
| Tx 1 | 3 | D00013 | | 1 | 50 |
| Rx 0 | 4 | | D00015 | 1 | |
| Tx 1 | 5 | D00015 | | 1 | 50 |
| Rx 0 | 6 | | D00017 | 1 | |
| Tx 1 | 7 | D00017 | | 1 | 50 |
| Rx 0 | 8 | | D00019 | 1 | |
| Tx 1 | 9 | D00019 | | 1 | 50 |
| Rx 0 | 10 | | D00021 | 1 | |
| Tx 1 | 11 | D00021 | | 1 | 50 |
| Rx 0 | 12 | | D00023 | 1 | |
| Tx 1 | 13 | D00023 | | 1 | 50 |
| Rx 0 | 14 | | D00025 | 1 | |
| Tx 1 | 15 | D00025 | | 1 | 50 |
| Rx 0 | 16 | | D00027 | 1 | |
| Tx 1 | 17 | D00027 | | 1 | 50 |
| Rx 0 | 18 | | D00029 | 1 | |
| Tx 1 | 19 | D00029 | | 1 | 50 |
| Rx 0 | 20 | | D00031 | 1 | |
| Tx 1 | 21 | D00031 | | 1 | 50 |
| Rx 0 | 22 | | D00033 | 1 | |
| Tx 1 | 23 | D00033 | | 1 | 50 |
| Rx 0 | 24 | | D00035 | 1 | |
| Tx 1 | 25 | D00035 | | 1 | 50 |
| Rx 0 | 26 | | D00037 | 1 | |
| Tx 1 | 27 | D00037 | | 1 | 50 |
| Rx 0 | 28 | | D00039 | 1 | |
| Tx 1 | 29 | D00039 | | 1 | 50 |
| Rx 0 | 30 | | D00041 | 1 | |
| Tx 1 | 31 | D00041 | | 1 | 50 |

*HighSpeed PLC Link configuration for #2 PLC-S

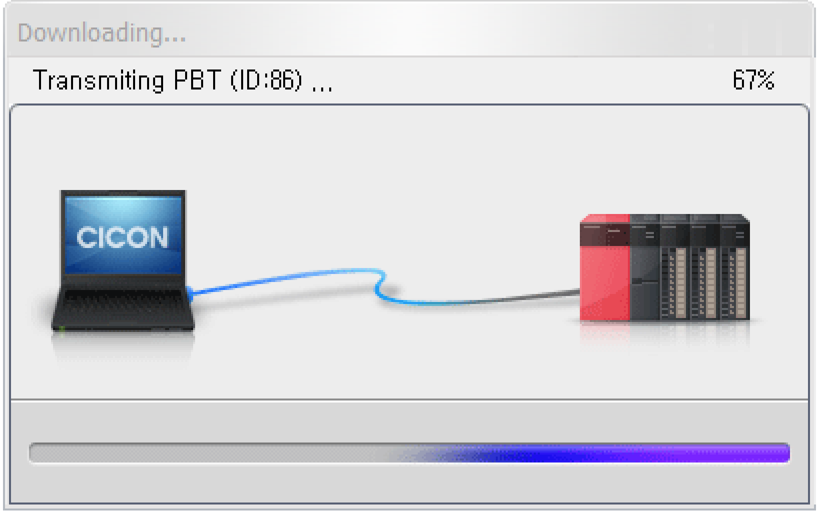
**TIP:** PLC can send and receive a maximum of 64 data blocks while sending blocks are limited to 32. If the number of sending blocks exceeds 32, you will get an error message as shown below.



The 'Block Number' can be a value between 0 and 31.

(1723)

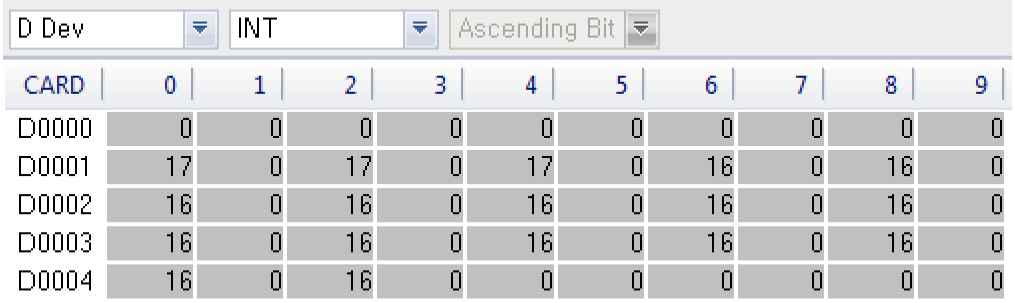
7) When you're done with configurations, download the programs into the #1 and #2 PLC-S respectively and see the communication results.



Downloading...

Transmiting PBT (ID:86) ... 67%

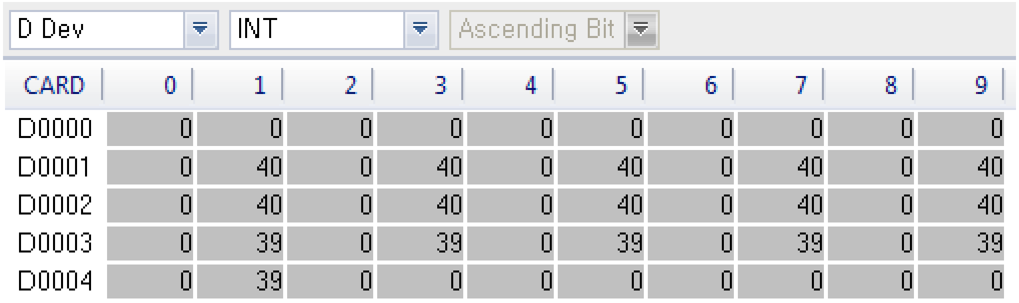
8) When you check the communication results, you can use Memory Monitor to see the online status of PLC-S while in RUN mode.



D Dev | INT | Ascending Bit

| CARD | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| D0000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| D0001 | 17 | 0 | 17 | 0 | 17 | 0 | 16 | 0 | 16 | 0 |
| D0002 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 |
| D0003 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 | 16 | 0 |
| D0004 | 16 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*** Communication results for D device area of #1 PLC-S**



D Dev | INT | Ascending Bit

| CARD | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| D0000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| D0001 | 0 | 40 | 0 | 40 | 0 | 40 | 0 | 40 | 0 | 40 |
| D0002 | 0 | 40 | 0 | 40 | 0 | 40 | 0 | 40 | 0 | 40 |
| D0003 | 0 | 39 | 0 | 39 | 0 | 39 | 0 | 39 | 0 | 39 |
| D0004 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

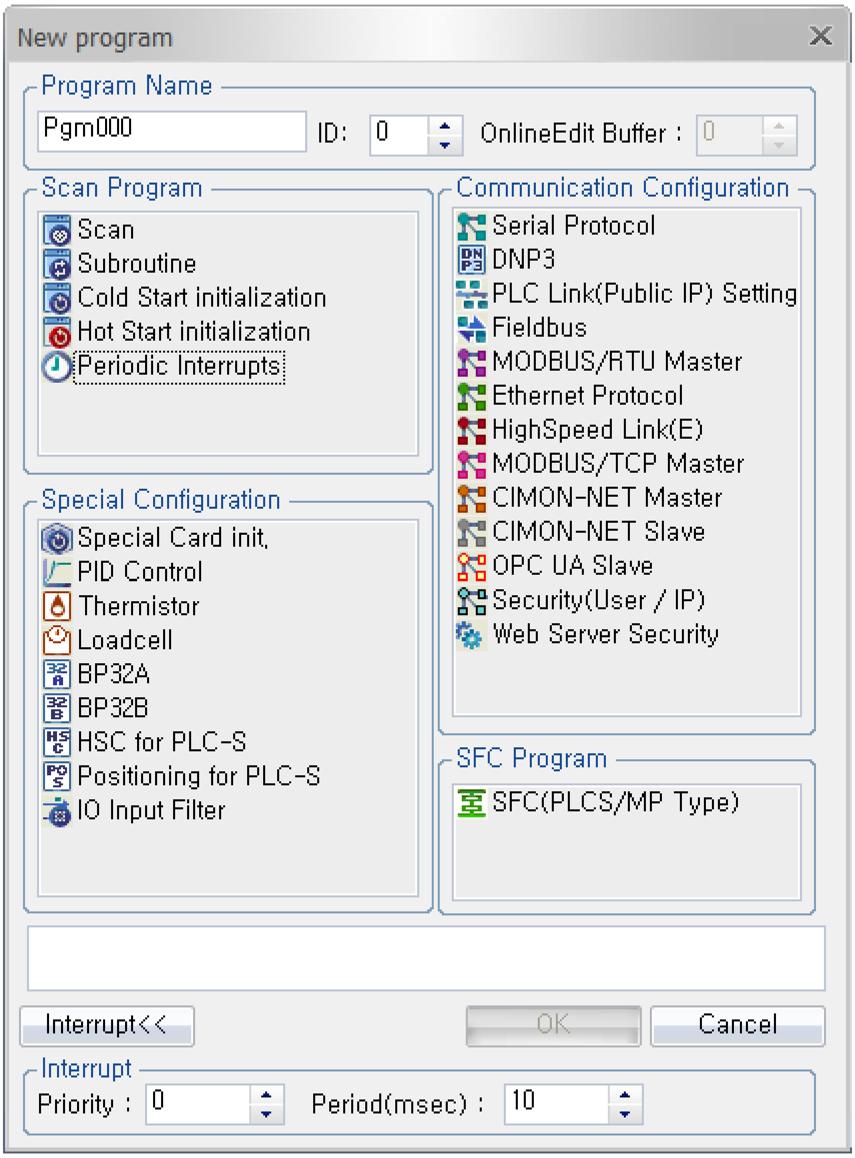
*** Communication results for D device area of #2 PLC-S**

## 7.8 Modbus TCP Master Protocol

The Modbus/TCP Master program is used to exchange data with TCP Modbus Slave device and is compatible with CM1-EC10A and CM1-EC10B modules.

**Registering the Modbus/TCP Master program**

Select [File] → [New Program] → [MODBUS/TCP Master] menu.



Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

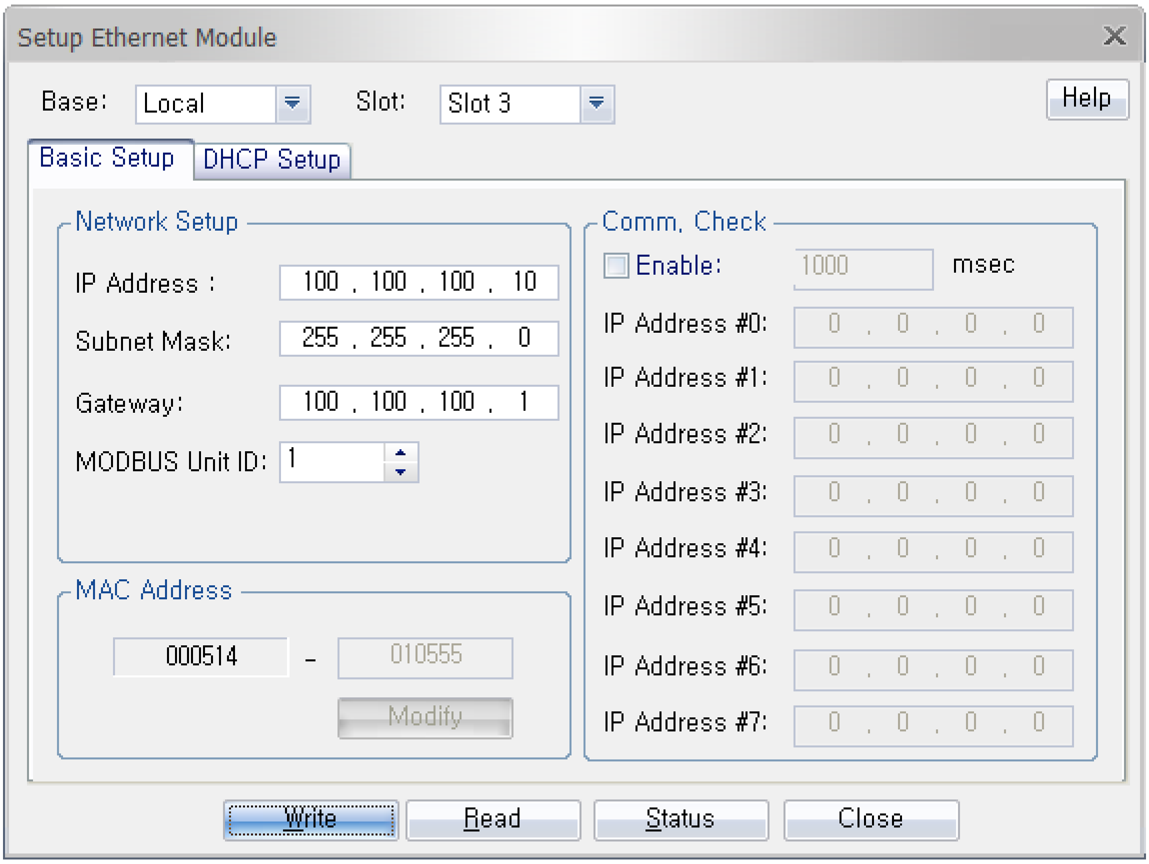
Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

**Writing the Modbus/TCP Master program**

This example shows communication system and frame configurations between CIMON-PLC and TCP Modbus Slave device.

1) Register the Modbus/TCP Master program that will process the values of PV/SV from the Slave Device to the CIMON-PLC and configure communication parameters of the communication module.



Setup Ethernet Module

Base: Local

Slot: Slot 3

Network Setup

IP Address : 100 . 100 . 100 . 10

Subnet Mask: 255 . 255 . 255 . 0

Gateway: 100 . 100 . 100 . 1

MODBUS Unit ID: 1

MAC Address

000514 - 010555

Comm. Check

☐ Enable: 1000 msec

IP Address #0: 0 . 0 . 0 . 0

IP Address #1: 0 . 0 . 0 . 0

IP Address #2: 0 . 0 . 0 . 0

IP Address #3: 0 . 0 . 0 . 0

IP Address #4: 0 . 0 . 0 . 0

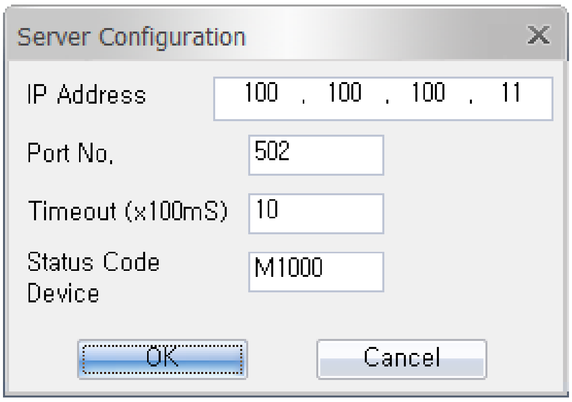
IP Address #5: 0 . 0 . 0 . 0

IP Address #6: 0 . 0 . 0 . 0

IP Address #7: 0 . 0 . 0 . 0

2) Fill out the Modbus/TCP Master program that configures the value of SV and reads the value of PV from the Slave Device to the CIMON-PLC.

a. Register a connecting device



Server Configuration

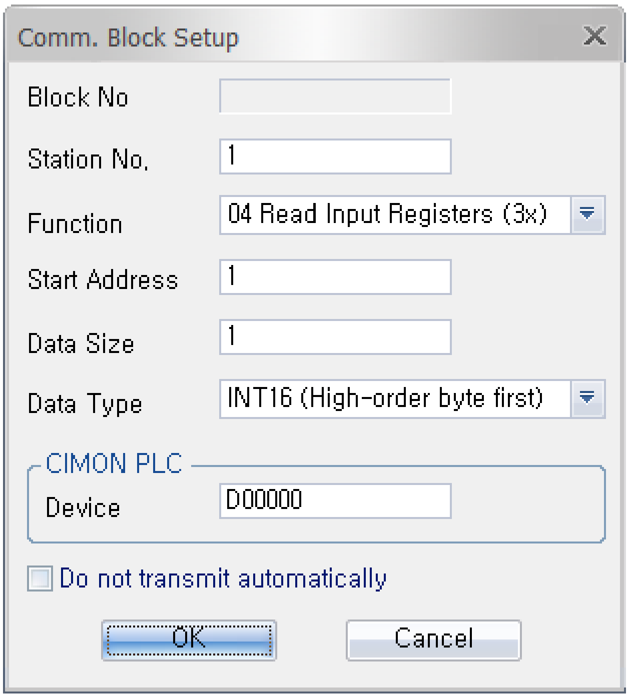
IP Address 100 . 100 . 100 . 11

Port No. 502

Timeout (x100mS) 10

Status Code Device M1000

b. Register a communication block that reads the value of PV



Block No

Station No. 1

Function 04 Read Input Registers (3x)

Start Address 1

Data Size 1

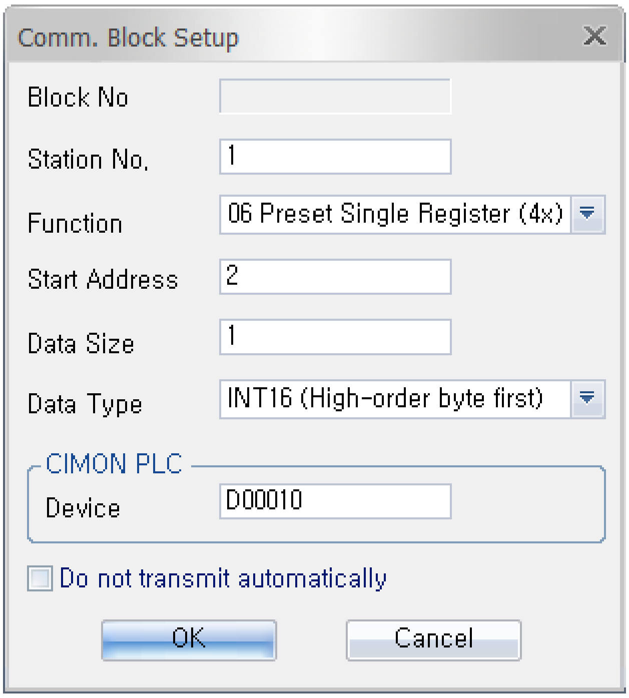
Data Type INT16 (High-order byte first)

CIMON PLC

Device D00000

☐ Do not transmit automatically

c. Register a communication block that controls the value of SV



Block No

Station No. 1

Function 06 Preset Single Register (4x)

Start Address 2

Data Size 1

Data Type INT16 (High-order byte first)

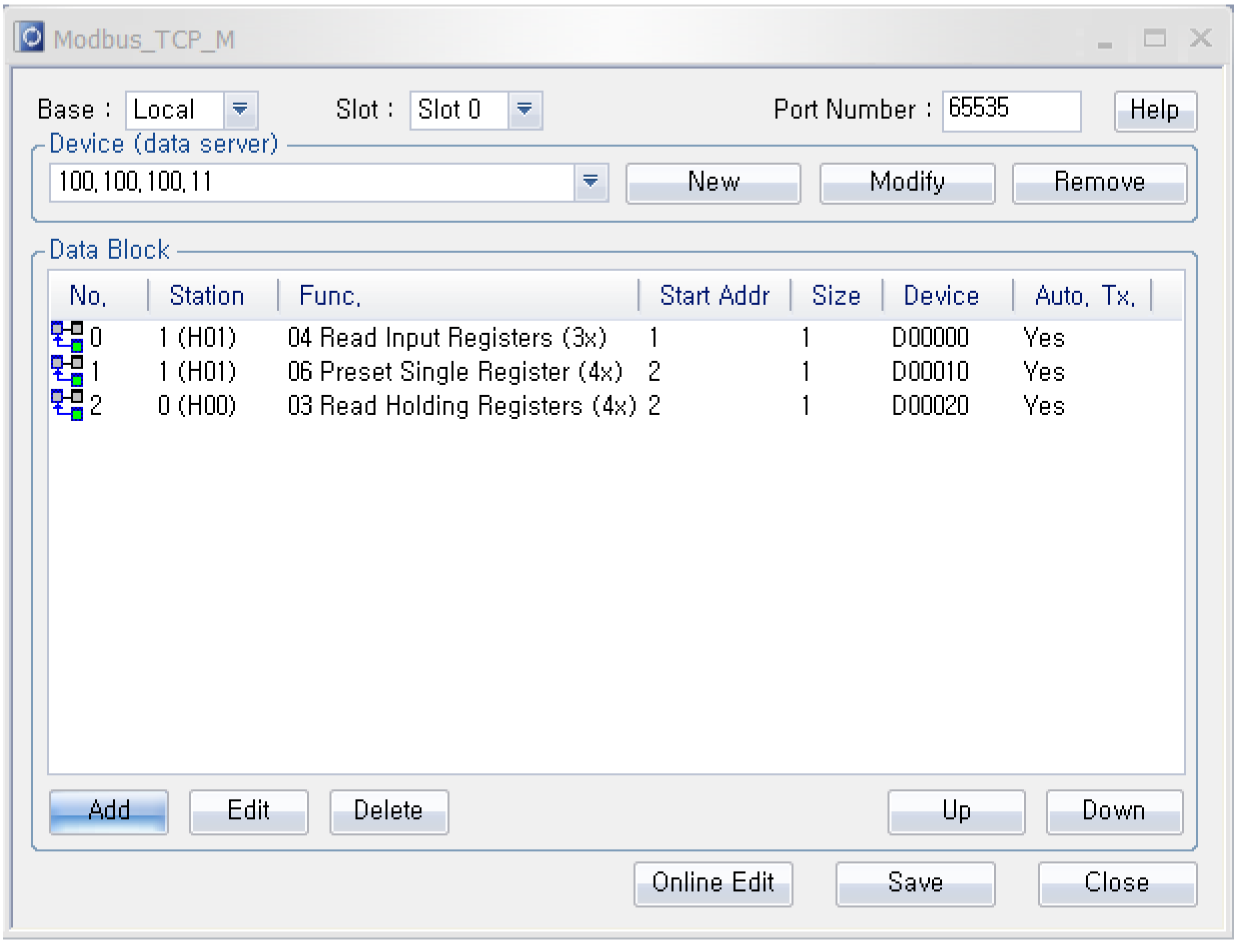
CIMON PLC

Device D00010

☐ Do not transmit automatically

***Note:** If you mark the checkbox “Do not transmit automatically,” then you have to use “SEND” command in the scan program to execute the same communication function.

d. Complete communication block registration
(Comm. block No. 2 has been registered in order to read the value of SV at all times)



Base : Local
Slot : Slot 0
Port Number : 65535

Device (data server): 100.100.100.11

Data Block

| No. | Station | Func. | Start Addr | Size | Device | Auto. Tx. |
|---|---|---|---|---|---|---|
| 0 | 1 (H01) | 04 Read Input Registers (3x) | 1 | 1 | D00000 | Yes |
| 1 | 1 (H01) | 06 Preset Single Register (4x) | 2 | 1 | D00010 | Yes |
| 2 | 0 (H00) | 03 Read Holding Registers (4x) | 2 | 1 | D00020 | Yes |

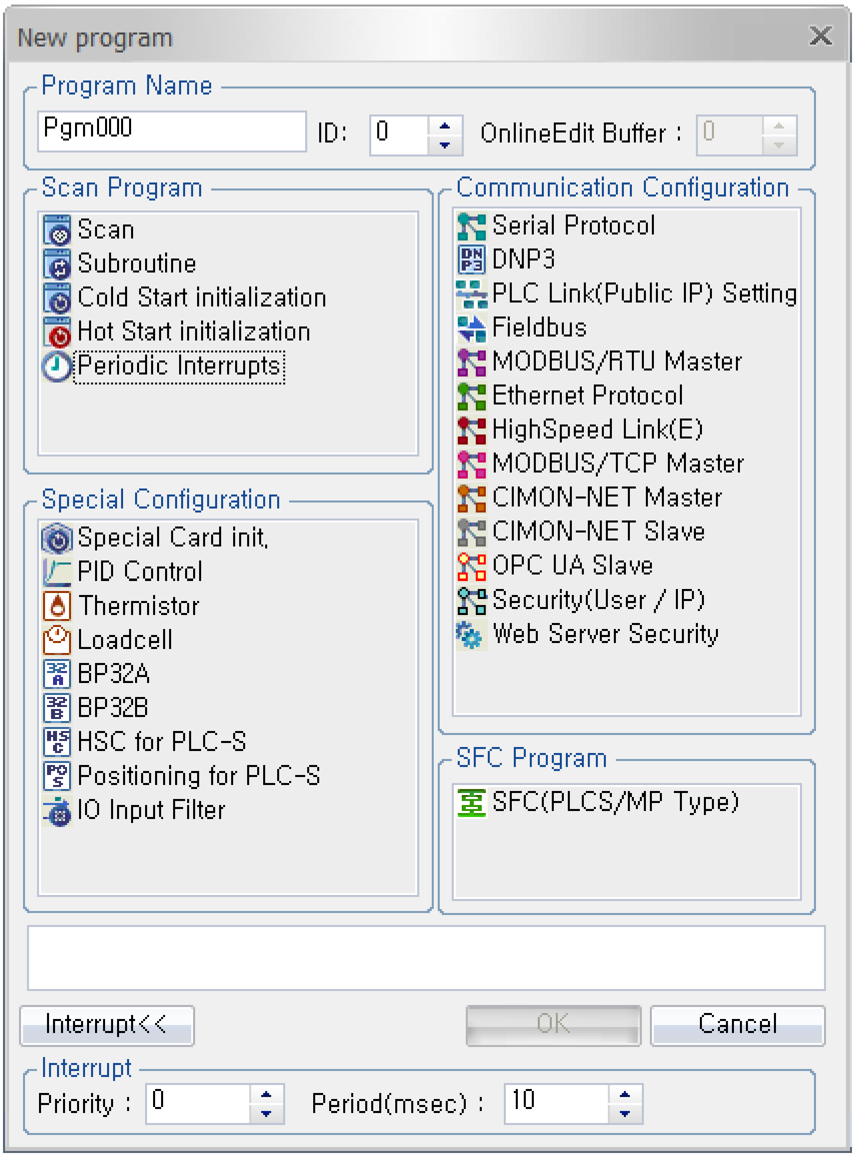
3) Download the PLC program and then switch the PLC mode to RUN.

### 7.9 CIMON-NET Master Protocol

The CIMON-NET Master program is used to configure I/O device area for controlling Remote I/O with CIMON NET Master Module (CM1-CN01M).

**Registering the CIMON-NET Master program**

Select [File] → [New Program] → [CIMON-NET Master] menu.

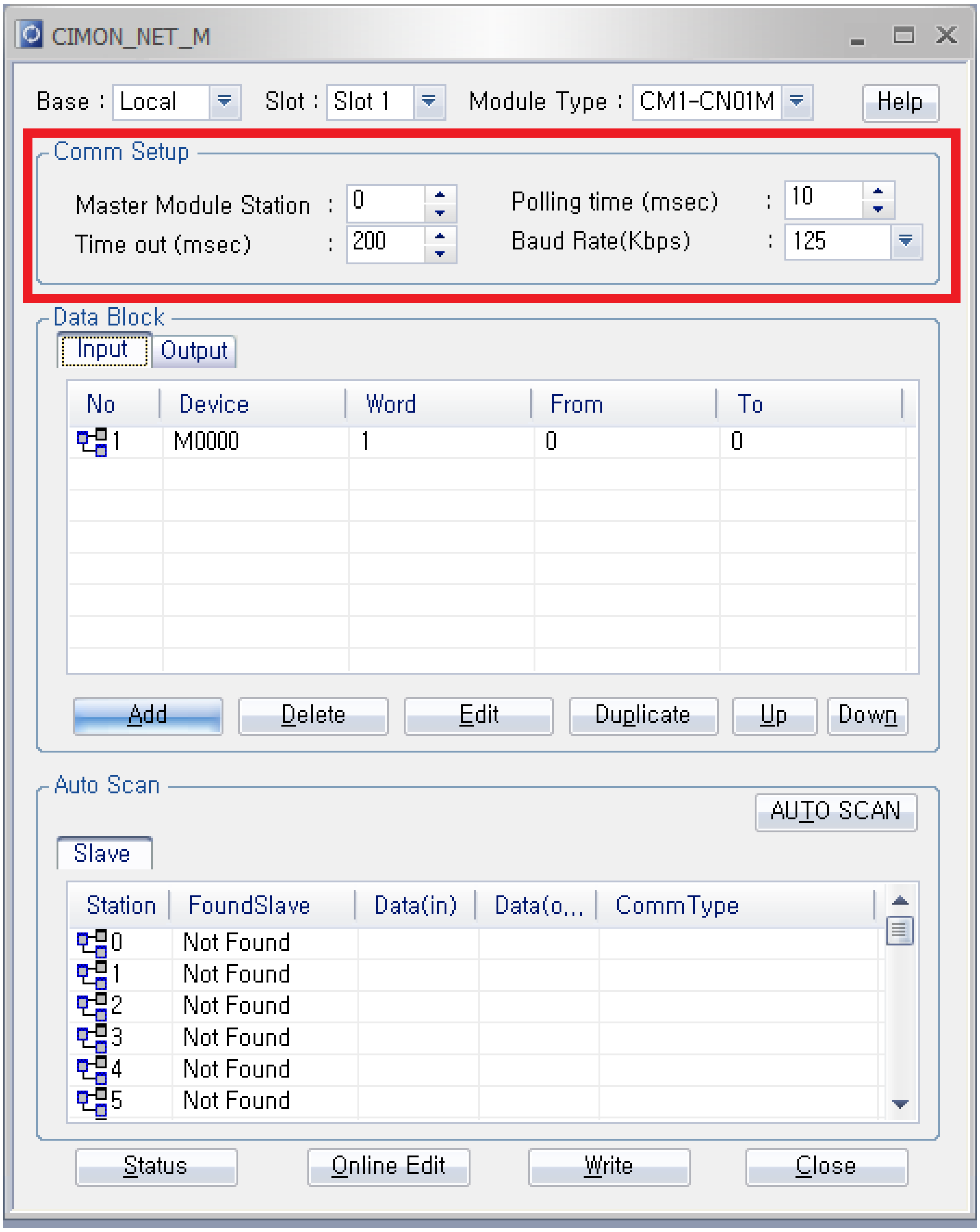


Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

### Writing the CIMON-NET Master program

This example applies to a case when CIMON-NET Master Module (CM1-CN01M) controls Remote IO and the module is mounted on local base, slot #1. The number of points for the Remote IO connected to the CM1-CN01M is 16 inputs and 16 outputs.



Base : Local
Slot : Slot 1
Module Type : CM1-CN01M

Comm Setup

Master Module Station : 0
Time out (msec) : 200
Polling time (msec) : 10
Baud Rate(Kbps) : 125

Data Block

| No | Device | Word | From | To |
|---|---|---|---|---|
| 1 | M0000 | 1 | 0 | 0 |

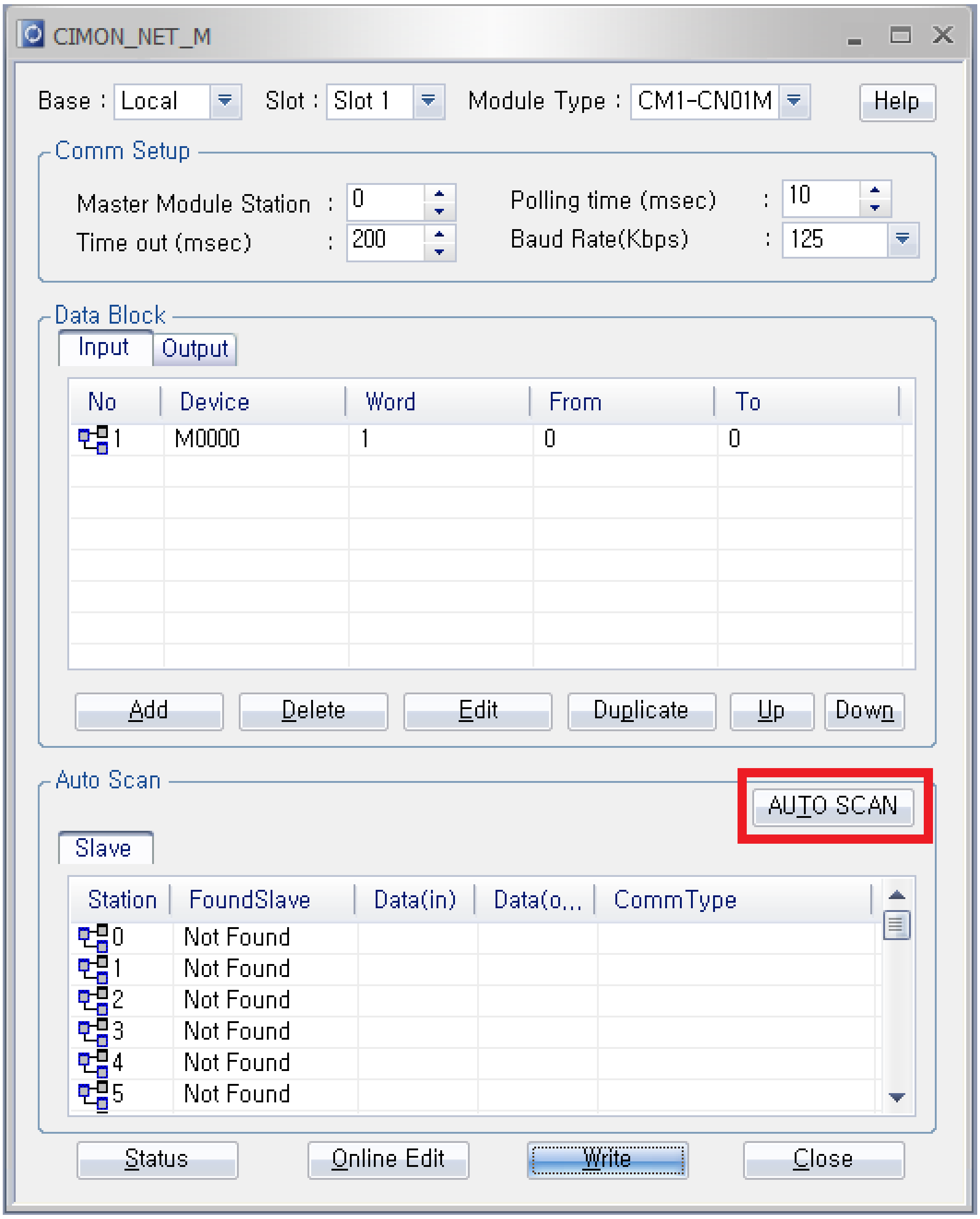
Auto Scan

| Station | FoundSlave | Data(in) | Data(o... | CommType |
|---|---|---|---|---|
| 0 | Not Found | | | |
| 1 | Not Found | | | |
| 2 | Not Found | | | |
| 3 | Not Found | | | |
| 4 | Not Found | | | |
| 5 | Not Found | | | |

Configure communication setup for the Master Module.

- **Base:** Local (Default)
- **Slot:** 1
- **Module Type:** CM1-CN01M (Default)
- **Master Module Station:** 0 (Default)
- **Baud Rate:** 125 (Default)
- **Time out:** 200 (Default)
- **Polling time:** 10 (Default)

Click on [Write] button.



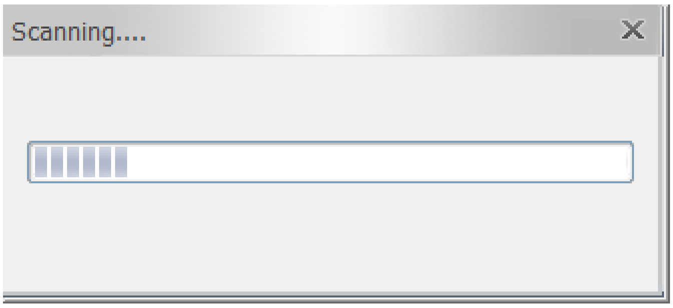
Base : Local
Slot : Slot 1
Module Type : CM1-CN01M

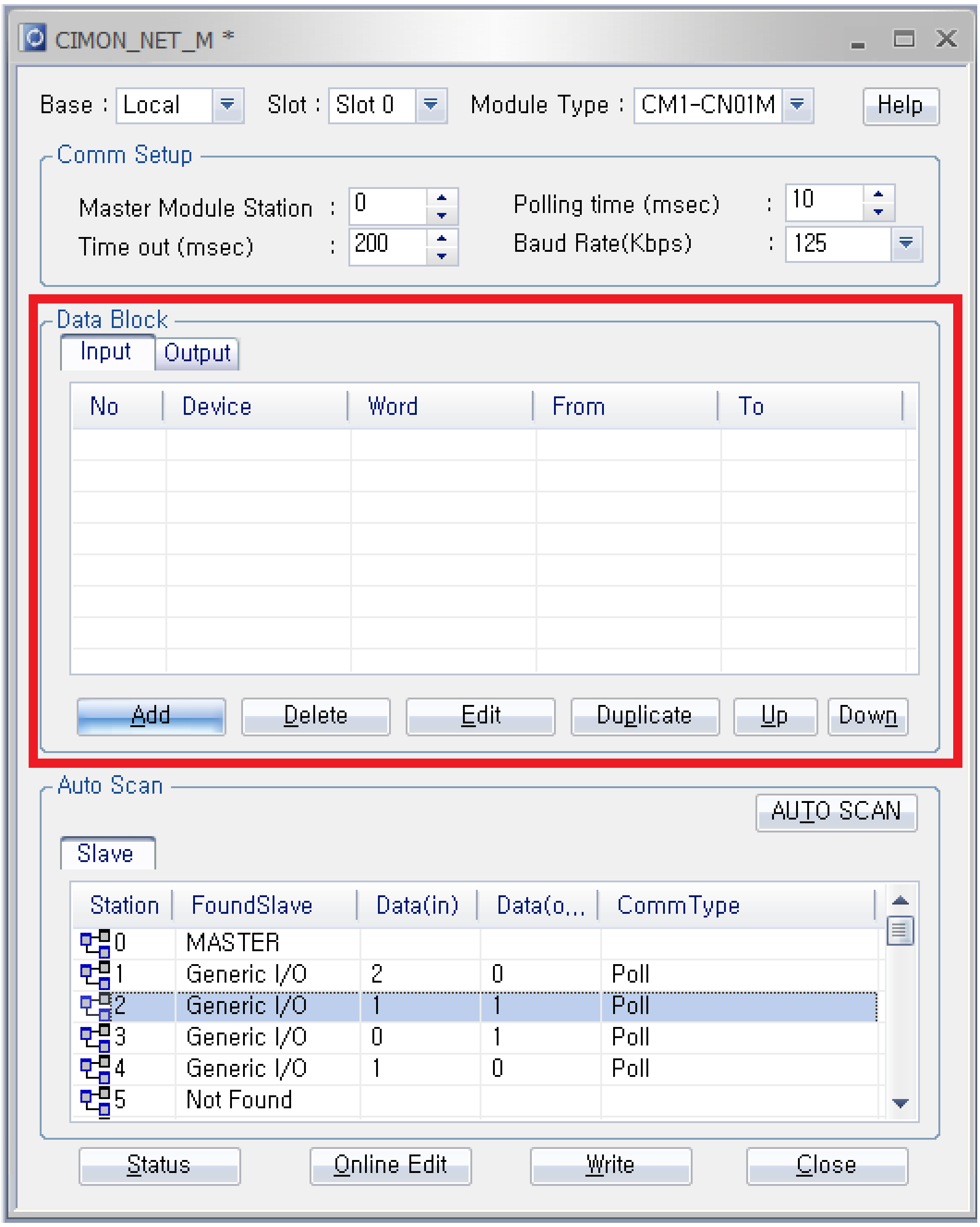
Master Module Station : 0
Time out (msec) : 200
Polling time (msec) : 10
Baud Rate(Kbps) : 125

| No | Device | Word | From | To |
|---|---|---|---|---|
| 1 | M0000 | 1 | 0 | 0 |

| Station | FoundSlave | Data(in) | Data(o... | CommType |
|---|---|---|---|---|
| 0 | Not Found | | | |
| 1 | Not Found | | | |
| 2 | Not Found | | | |
| 3 | Not Found | | | |
| 4 | Not Found | | | |
| 5 | Not Found | | | |

Click on [AUTO SCAN] button.



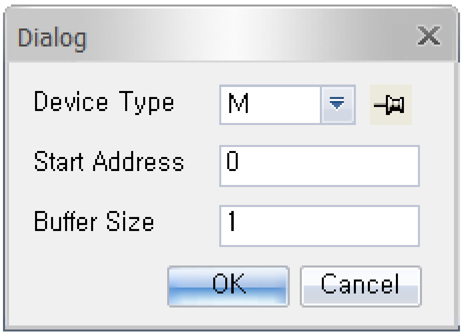


Base : Local
Slot : Slot 0
Module Type : CM1-CN01M

Master Module Station : 0
Time out (msec) : 200
Polling time (msec) : 10
Baud Rate(Kbps) : 125

| Station | FoundSlave | Data(in) | Data(o... | CommType |
|---|---|---|---|---|
| 0 | MASTER | | | |
| 1 | Generic I/O | 2 | 0 | Poll |
| 2 | Generic I/O | 1 | 1 | Poll |
| 3 | Generic I/O | 0 | 1 | Poll |
| 4 | Generic I/O | 1 | 0 | Poll |
| 5 | Not Found | | | |

When the Remote I/O is detected after the [AUTO SCAN] as shown above, select [Input] tab under the [Data Block] and click on [Add] button in order to read input of the Remote I/O and save 1 Word (16bit) in M0000.



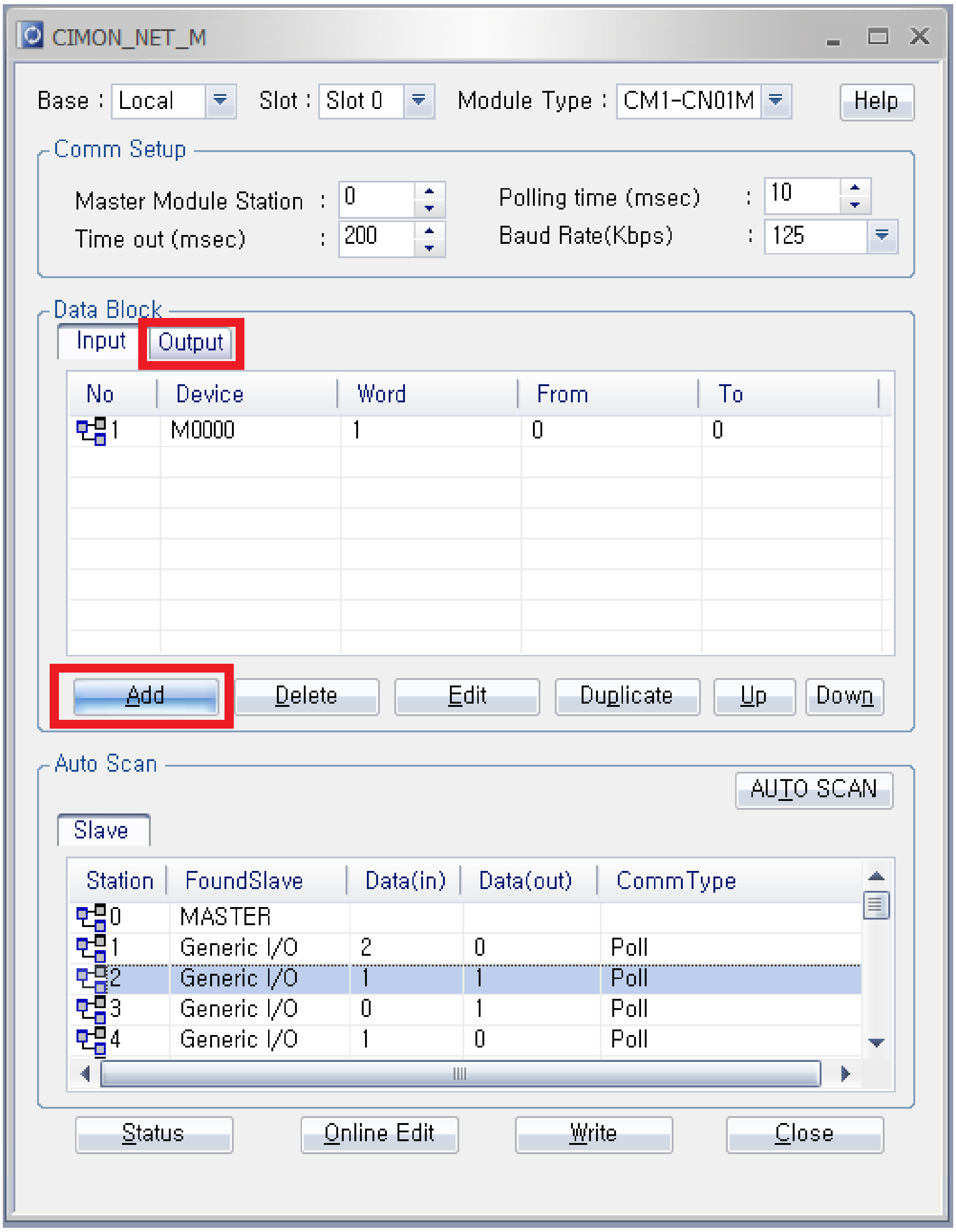
Device Type: M

Start Address: 0

Buffer Size: 1

Select M for Device Type, 0 for Start Address and 1 for Buffer Size.

Click on [OK] button.



Base : Local

Slot : Slot 0

Module Type : CM1-CN01M

Master Module Station : 0

Time out (msec) : 200

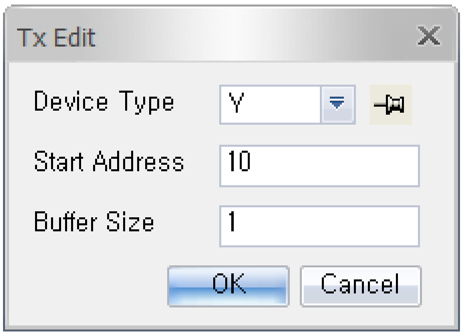
Polling time (msec) : 10

Baud Rate(Kbps) : 125

| No | Device | Word | From | To |
|---|---|---|---|---|
| 1 | M0000 | 1 | 0 | 0 |

| Station | FoundSlave | Data(in) | Data(out) | CommType |
|---|---|---|---|---|
| 0 | MASTER | | | |
| 1 | Generic I/O | 2 | 0 | Poll |
| 2 | Generic I/O | 1 | 1 | Poll |
| 3 | Generic I/O | 0 | 1 | Poll |
| 4 | Generic I/O | 1 | 0 | Poll |

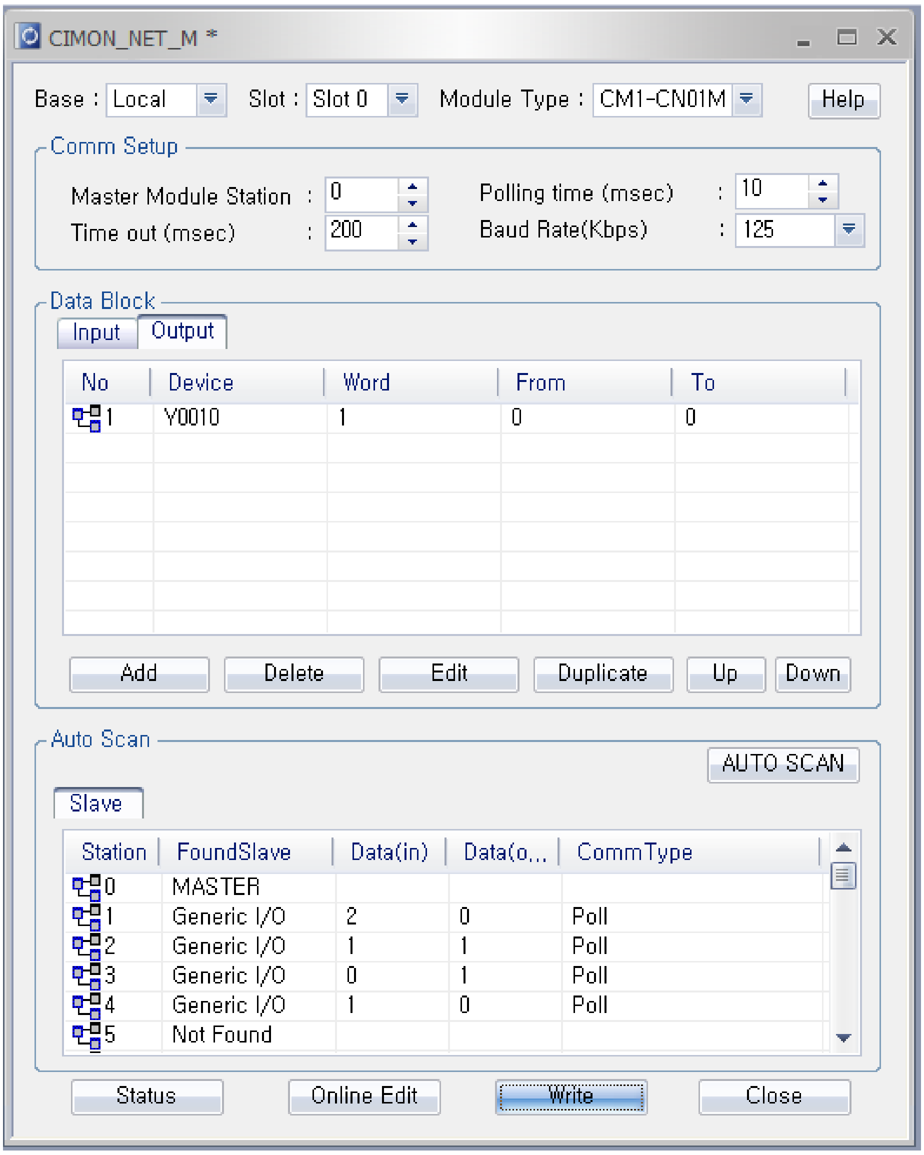
Select [Output] tab under the [Data Block] and click on [Add] button in order to set the data of 1 Word (16bit) from Y0010 as the output of the Remote I/O.



Device Type: Y
Start Address: 10
Buffer Size: 1

Select Y for Device Type, 10 for Start Address and 1 for Buffer Size.

Click on [OK] button.



Base : Local
Slot : Slot 0
Module Type : CM1-CN01M

Master Module Station : 0
Time out (msec) : 200
Polling time (msec) : 10
Baud Rate(Kbps) : 125

| No | Device | Word | From | To |
|---|---|---|---|---|
| 1 | Y0010 | 1 | 0 | 0 |

| Station | FoundSlave | Data(in) | Data(o... | CommType |
|---|---|---|---|---|
| 0 | MASTER | | | |
| 1 | Generic I/O | 2 | 0 | Poll |
| 2 | Generic I/O | 1 | 1 | Poll |
| 3 | Generic I/O | 0 | 1 | Poll |
| 4 | Generic I/O | 1 | 0 | Poll |
| 5 | Not Found | | | |

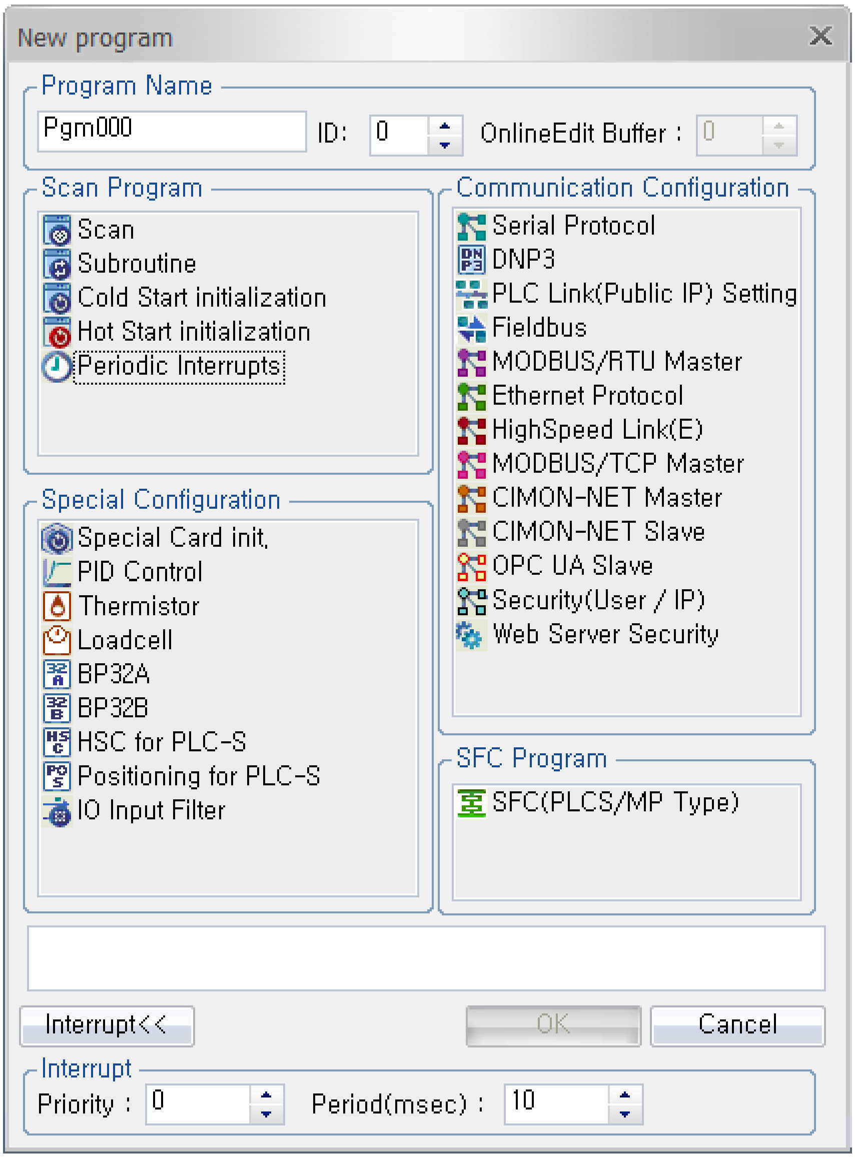
Click on [Write] button.

## 7.10 CIMON-NET Slave Protocol

The CIMON-NET Slave program is used to exchange data between CIMON PLCs using CIMON-NET Master Module (CM1-CN01M) and CIMON-NET Slave Module (CM1-CN01S).

**Registering the CIMON-NET Slave program**

Select [File] → [New Program] → [CIMON-NET Slave] menu.



New program

Program Name: Pgm000

ID: 0

OnlineEdit Buffer : 0

Interrupt Priority : 0

Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

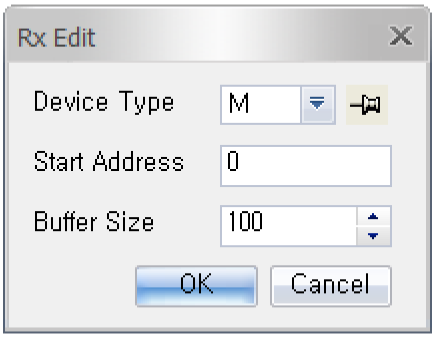
**Writing the CIMON-NET Slave program**

Example of writing a program:

- Base: Local
- Slot: 1
- Module Type: CM1-CN01S
- Station No: 0
- Input: Register to send the 100 words data from M0000 to the master module.
- Output: Register to receive the 50 words data from D00100 of the master module.

**-Input**

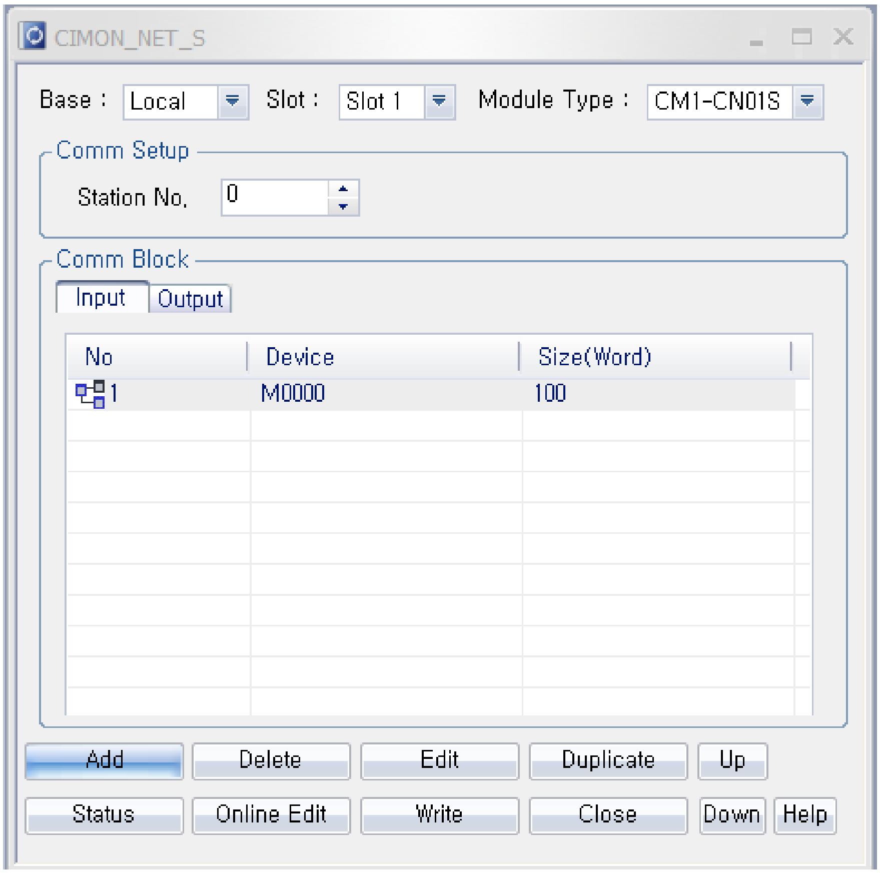
Click on [Input] tab → [Add] button.



Device Type: M
Start Address: 0
Buffer Size: 100

Select M for Device Type, 0 for Start Address and 100 for Buffer Size.

Click [OK] button.

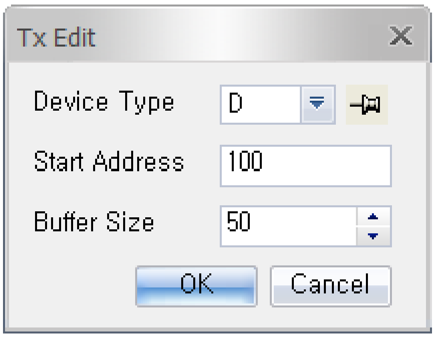


Base : Local
Slot : Slot 1
Module Type : CM1-CN01S
Station No. 0

| No | Device | Size(Word) |
|---|---|---|
| 1 | M0000 | 100 |

**-Output**

Click on [Output] tab → [Add] button.


Tx Edit

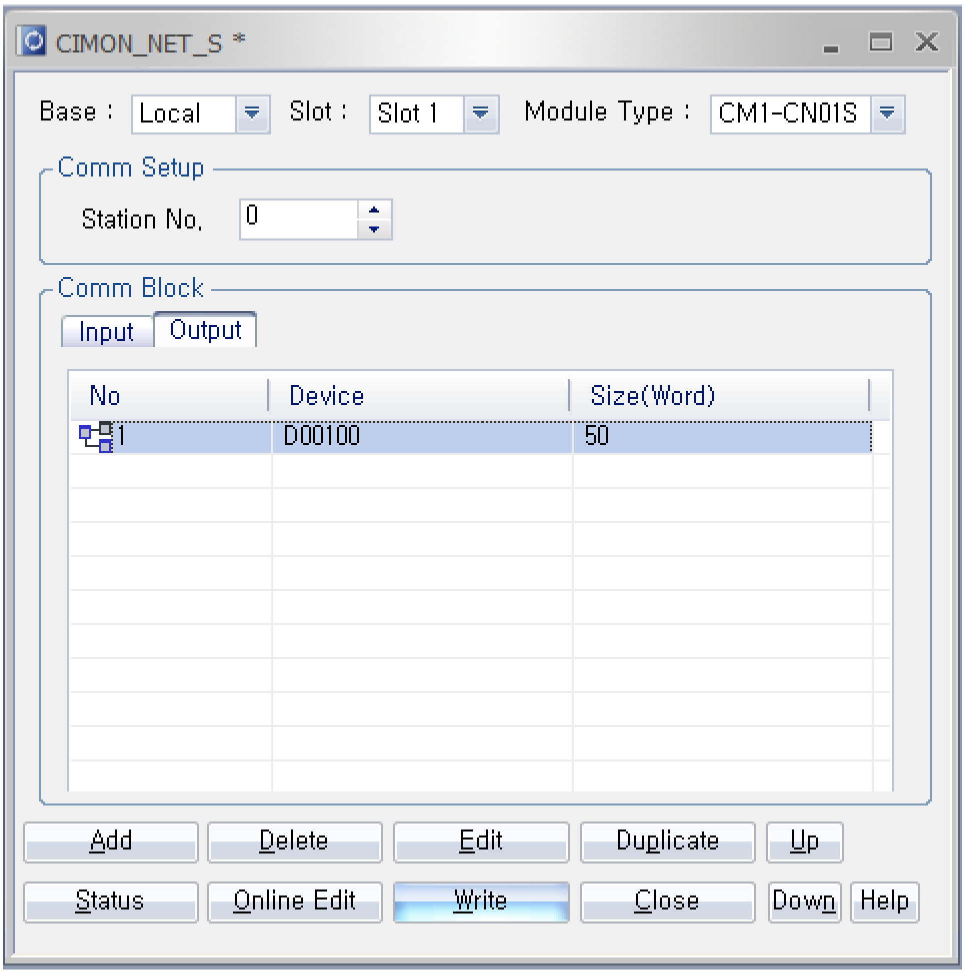
Device Type: D

Start Address: 100

Buffer Size: 50

Select D for Device Type, 100 for Start Address and 50 for Buffer Size.

Click [OK] button.


CIMON_NET_S *

Base : Local  Slot : Slot 1  Module Type : CM1-CN01S

Comm Setup

Station No. 0

Comm Block

| No | Device | Size(Word) |
|---|---|---|
| 1 | D00100 | 50 |

Click on [Write] button.

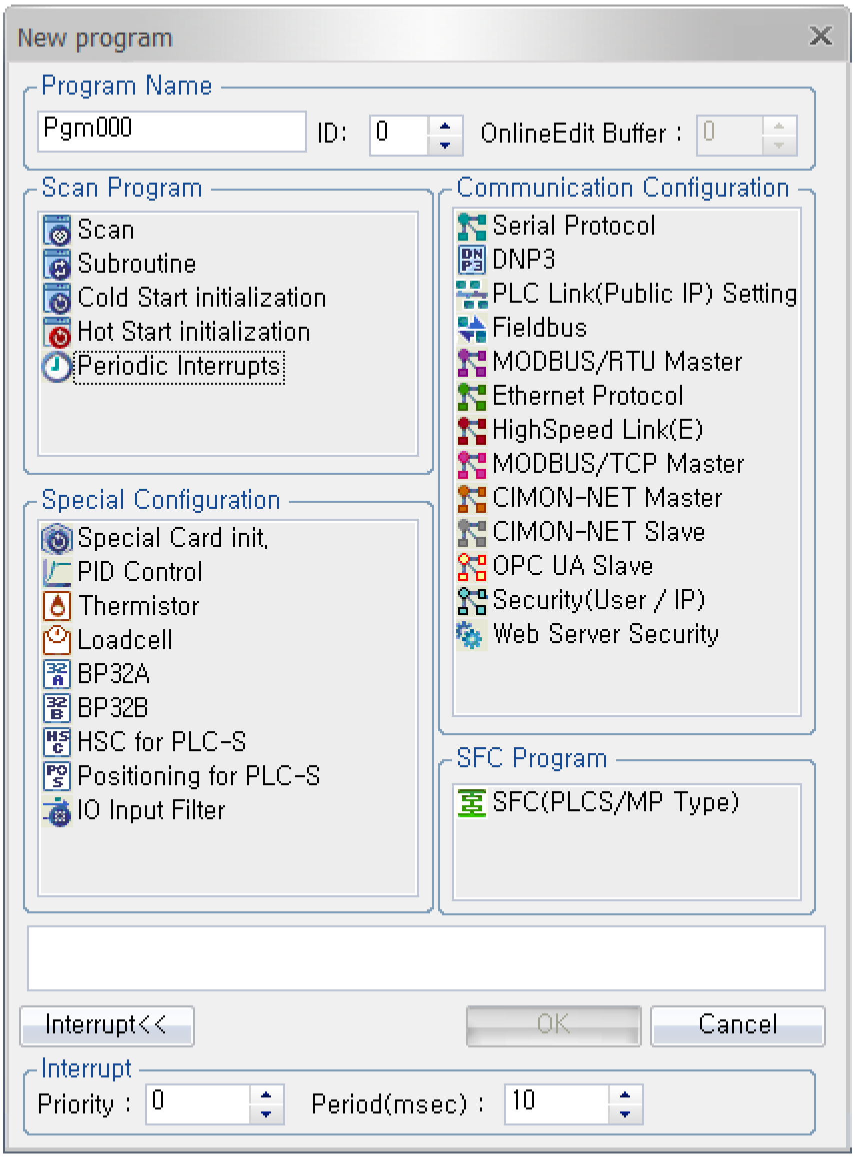
## 7.11 Security (User / IP)

The Security program is used to register user ID, IP address and Mac address to allow only registered user, IP address and Mac address access the network or program such as Web Server.

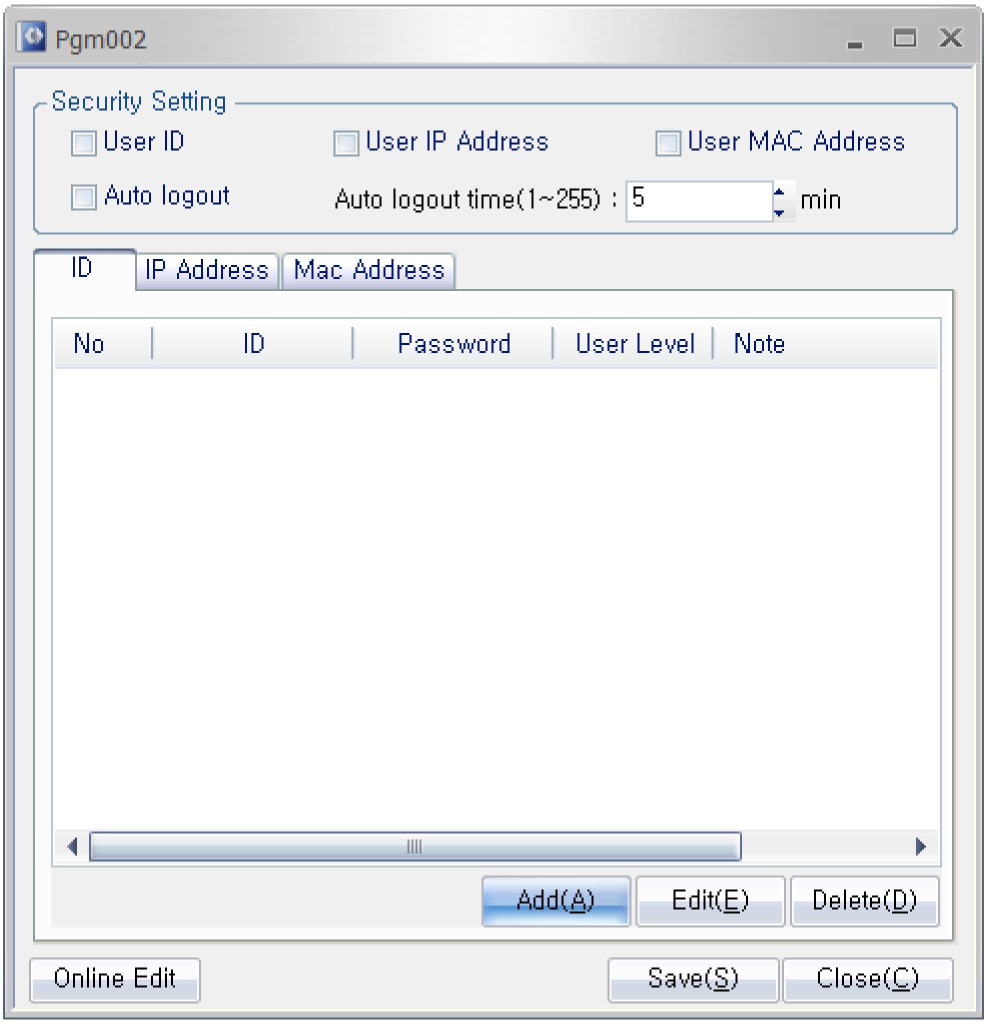
Example) Security setting for Web Server

In order to build security on the web server, Security program must be configured.

1) Right-click on the Program and choose New Program and then choose Security (User / IP).


Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0
Priority : 0
Period(msec) : 10

2) Security Setting
Choose the security option that you want to use for web server.



Auto logout time(1~255) : 5 min

- User ID : Only registered user ID can access the web server page with password.

Maximum 16 ID can be registered.

- IP Address : Only registered IP address can access the web server page.

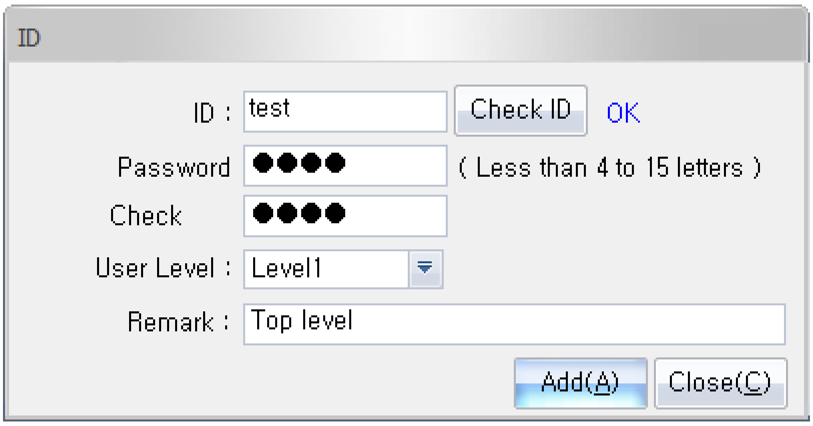
Maximum 16 IP address can be registered.

- MAC Address : Only registered PC can access the web server page.

Maximum 16 MAC address can be registered.

- Auto logout : Web page will be logged out after set time.

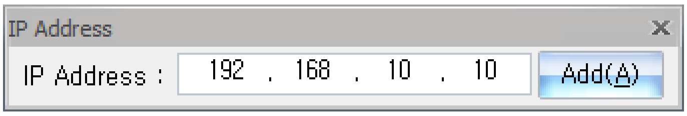
3) Click ID tab and click Add.



ID : test
Password ●●●●
Check ●●●●
User Level : Level1
Remark : Top level

Write ID name and click Check ID.
You can choose 1 to 15 security level. (Level 1 is the top that you can access all levels of pages.)
Example) Level 5 : Level 1 ~5 users can access web page.
(If you want to use only ID and Password for web server, you don't have to set up IP Address and Mac Address.)

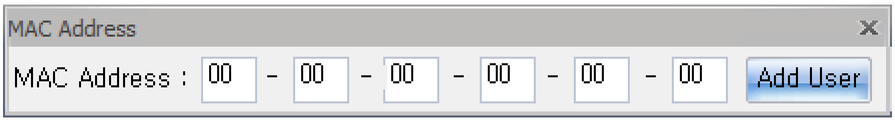
4) Click IP Address tab and click Add.



IP Address : 192 . 168 . 10 . 10

Write the IP Address where you want to access the web server from.

5) Click MAC Address tab and click Add.



MAC Address : 00 - 00 - 00 - 00 - 00 - 00

Write the Mac address of the PC where you want to access the web server from.

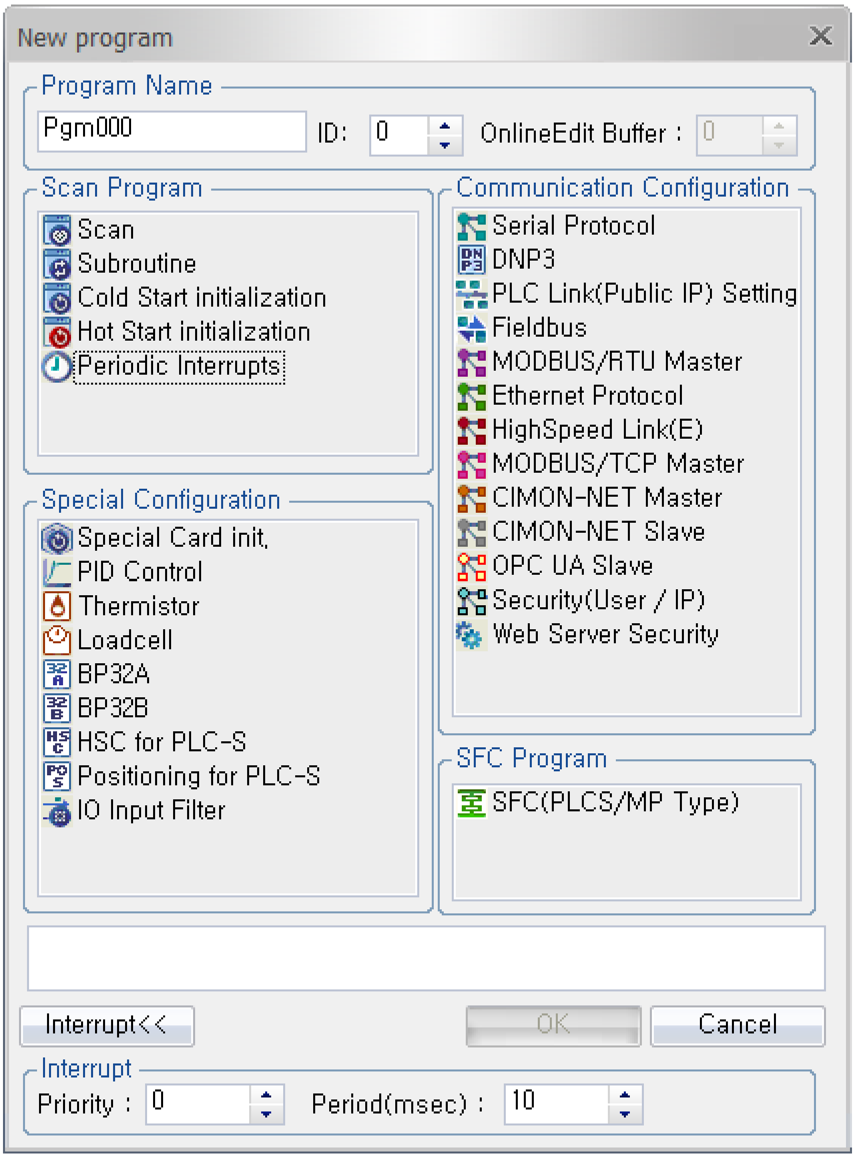
* If you want to use those 3 types of security, choose User ID, User IP Address and User MAC Address.

## 7.12 Web Server Security

The Web Server Setting program is used to select user ID or/and IP address to allow only registered user or/and IP address can access the Web Server.

*In order to use Web Server Setting program, Security (User / IP) program must be configured at first.

1) Right-click on the Program and choose New Program and then choose Web Server Setting.

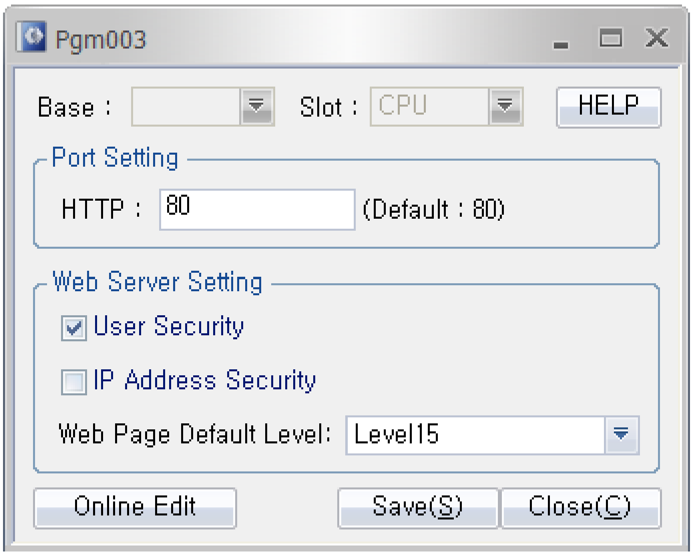


New program

Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0

Priority : 0
Period(msec) : 10

Choose the security option that you want to use for web server.



Pgm003

Base :
Slot : CPU

Port Setting
HTTP : 80 (Default : 80)

Web Server Setting
☑ User Security
☐ IP Address Security
Web Page Default Level: Level15

If you want to use either User ID or IP Address for web server security, they must be set up at the Security (User / IP) program at first.

- User Security : Only registered ID can access web server page.

- IP Address Security : Only registered IP address can access web server page.

- Web Page Default Level : Choose security level from 1 to 15 (No.1 is the highest level)

When page level in Web Server Manager is Default, this selected level will be default.

Example) If you choose Level 5, the default of “Page level” will be level 5 too.

*Online Edit : While you access web server, you can also edit security option.

# 8. Special Program

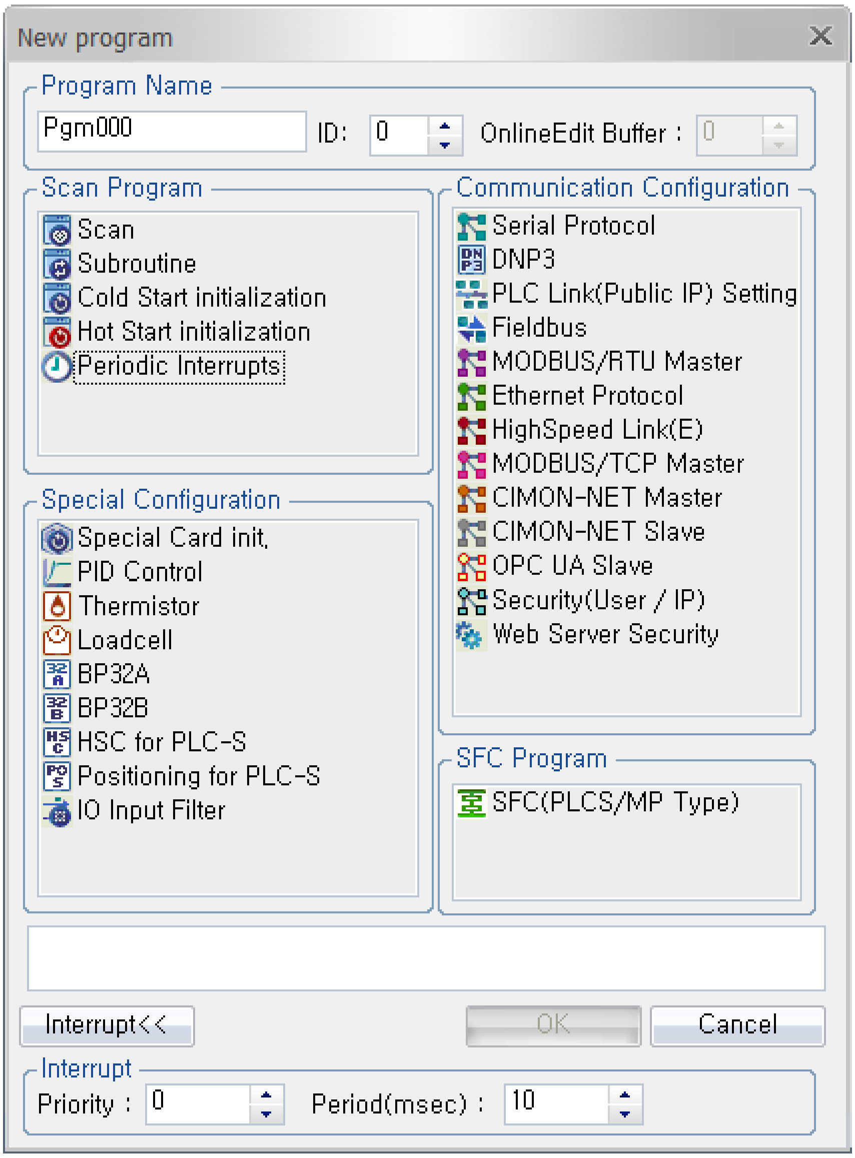
## 8.1 Special Card (Module) Initialization

The Special Card Initialization Program saves the setting values of a special card as a scan program and provides the stored information automatically when there is a special card replacement that requires resetting without any additional operations of connecting to the CICON software.

**Registering the Special Card Initialization program**

Select [File] → [New Program] → [Special Card init] menu.

*Only one Special Card Initialization Program can be registered for a project.



Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

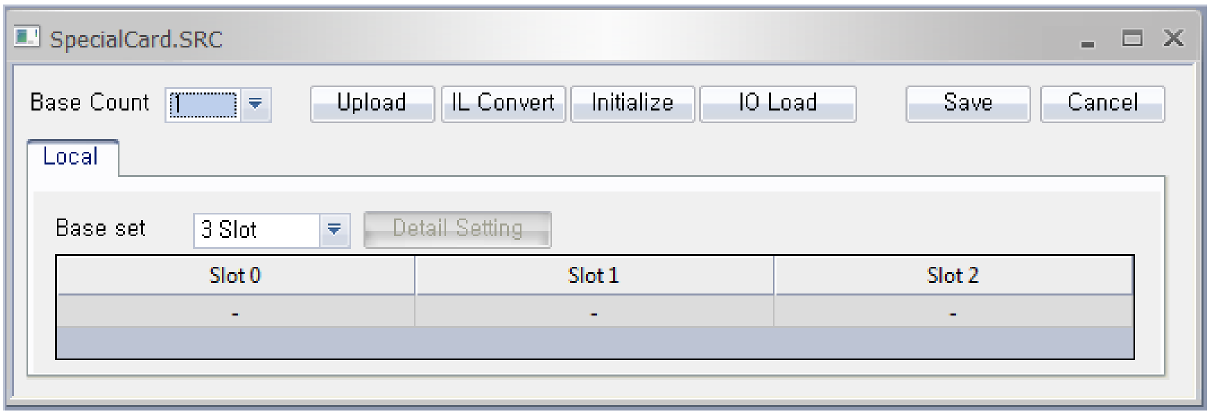
Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

**<u>These are the benefits for using the Special Card Initialization Program</u>:**

- After a special card replacement, you can write the default settings on the selected card just by switching the PLC mode from STOP to RUN.
- You can recall the settings of the special card connected to the PLC in a single operation (Upload – automatic scan function).
- Even if you're not connected with PLC, you can still configure settings for a special card. (Offline editing function)
- You can convert the Special Card Initialization Program into a scan program that can be edited. (IL Conversion function)
- You can recall the setting values of I/O reservation and reflect those values for special card configuration (I/O Reservation Load function)

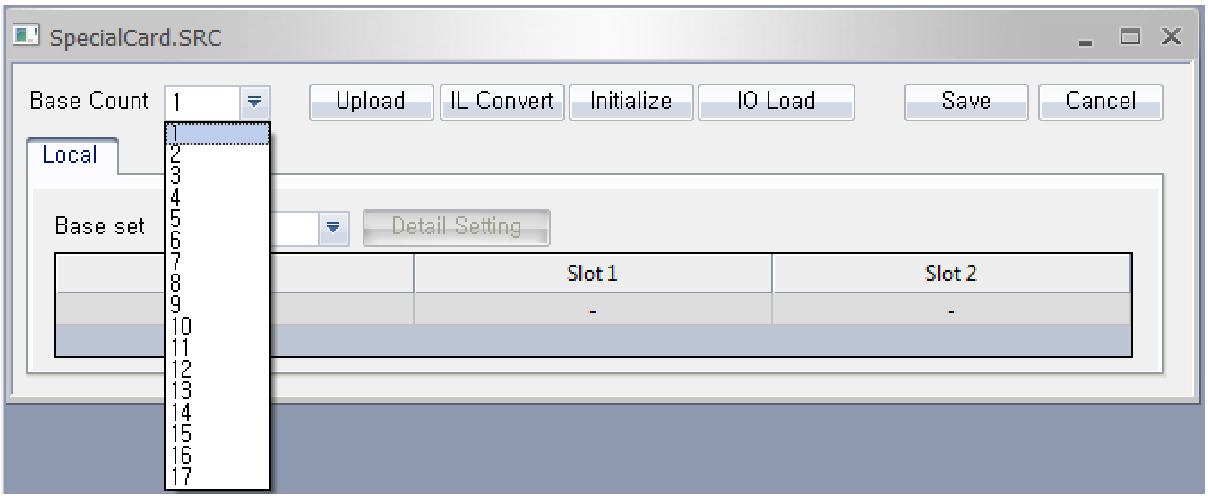
## The Program Screen Configuration



- In case of a non-response card, it is displayed as an empty slot.
- If you're not using a special card, the background color for a slot is grayed out as seen in the above image.
- These are the list of special cards that can be used in this program.
    1. Ethernet module
    2. RS232C/422 module
    3. Logger module
    4. CDMA module
    5. BACNet module
    6. A/D conversion module
    7. D/A conversion module
    8. A/D D/A conversion module
    9. AD MUX module
    10. RTD conversion module
    11. TC conversion module
    12. High Speed Counter module

## Writing the Special Card Initialization Program

1) **Base Count:** Select the number of base. The default value is 1 (Local), and you configure up to maximum of 17 (Local: 1/ Expansions: 16) bases.

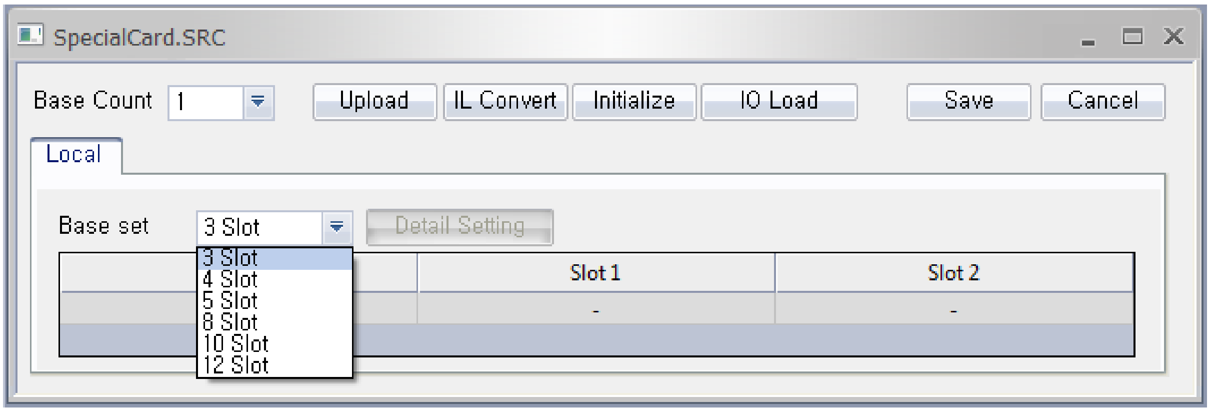


*For Block PLC (BP) and PLCS, "Base Count" and "Base set" are fixed values due to restrictions on specifications.

- Block PLC: Base Count "1," Base set is 4.
- PLCS: Base Count "1," Base set is 12.

*If you change the Base Count after configuring the special cards, the existing data can be deleted.

2) **Base set:** Select the number of base slots.
The default is "3" Slot, you can select 3 / 4 / 5 / 8 / 10 / 12 Slots.

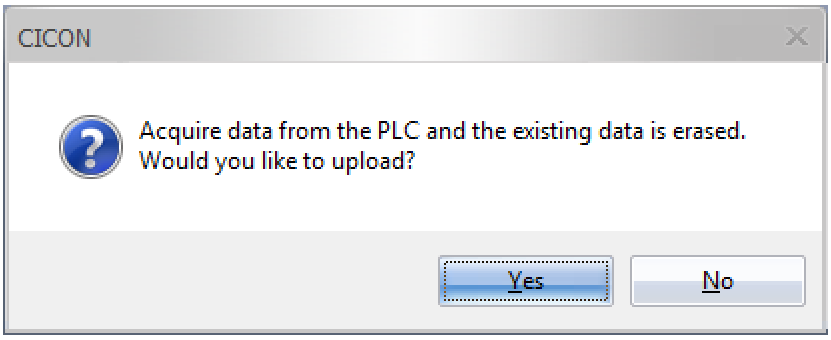


*If you change the Base set after configuring the special cards, the existing data can be deleted.

*For Block PLC (BP) and PLCS CPU types, the Base set is fixed and cannot be selected.

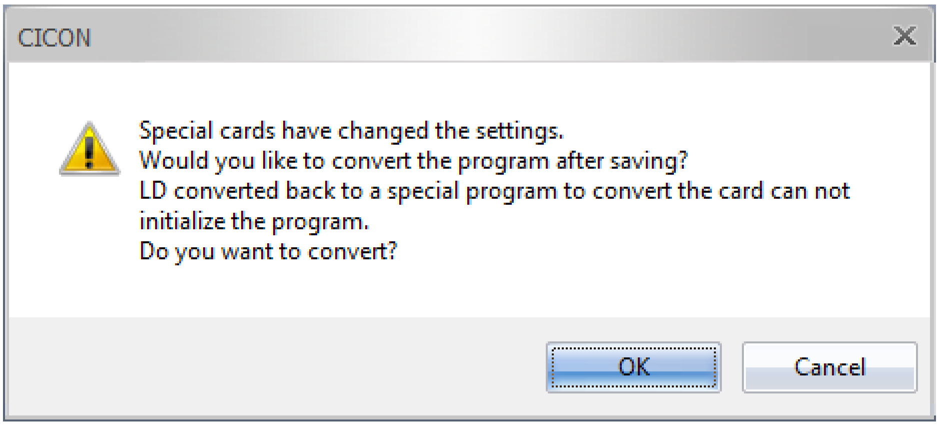
3) **Upload (Automatic Scan)**: You recall the setting values of each card by connecting to the PLC. Before you upload, make sure to check CPU types and their communication configurations. When you upload, be aware that the existing data configurations will be initialized.

*Assigned value for the Base I/O Address configured in the I/O Reservation cannot be erased.



Acquire data from the PLC and the existing data is erased.
Would you like to upload?

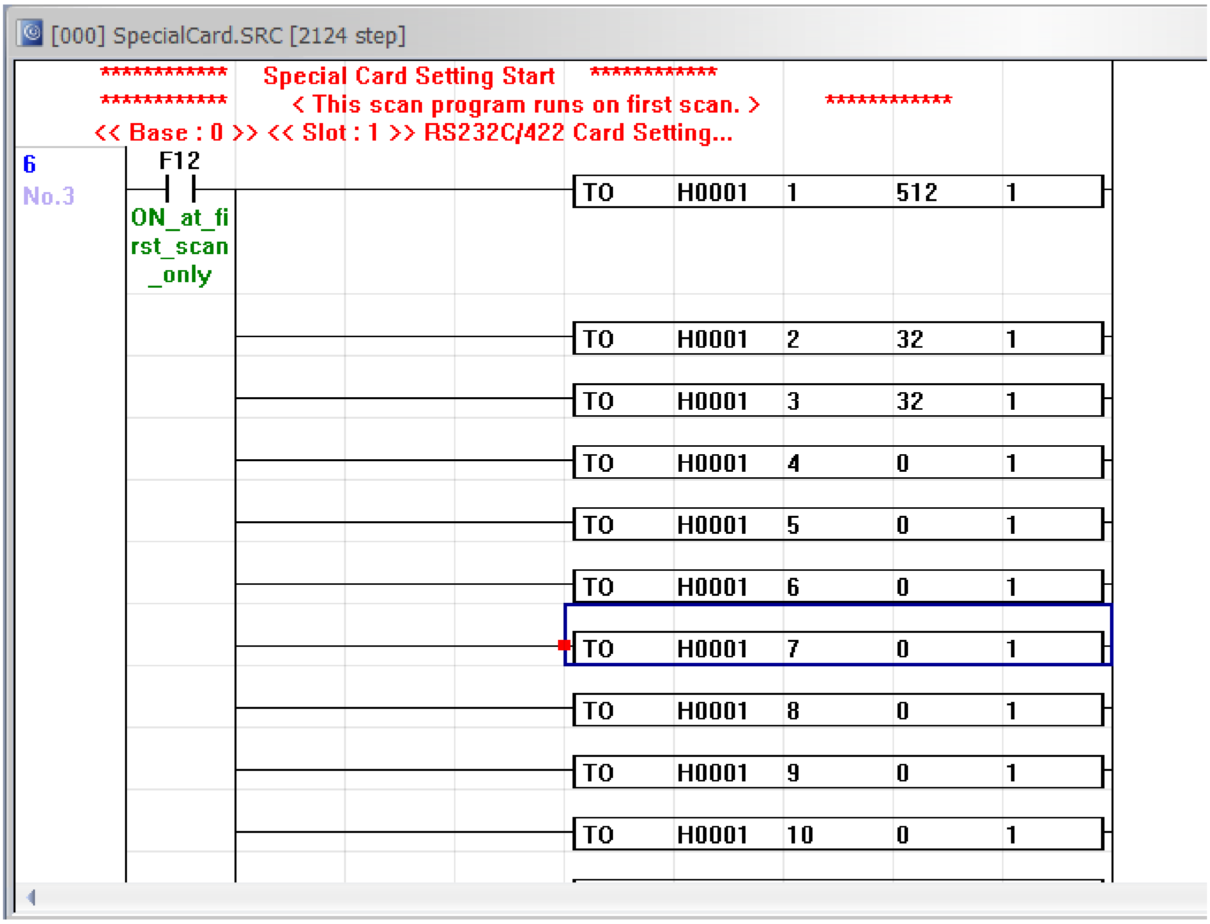
4) **IL Convert:** You can convert the Special Card Initialization program into IL program. Once you convert it to IL program, you cannot revert to the Special Card Initialization program.



CICON

Special cards have changed the settings.
Would you like to convert the program after saving?
LD converted back to a special program to convert the card can not initialize the program.
Do you want to convert?

**After IL conversion**:



[000] SpecialCard.SRC [2124 step]

```
************ Special Card Setting Start ************
************ < This scan program runs on first scan. > ************
<< Base : 0 >> << Slot : 1 >> RS232C/422 Card Setting...
6      F12
No.3   ON_at_first_scan_only   TO  H0001  1   512  1
                               TO  H0001  2   32   1
                               TO  H0001  3   32   1
                               TO  H0001  4   0    1
                               TO  H0001  5   0    1
                               TO  H0001  6   0    1
                               TO  H0001  7   0    1
                               TO  H0001  8   0    1
                               TO  H0001  9   0    1
                               TO  H0001  10  0    1
```

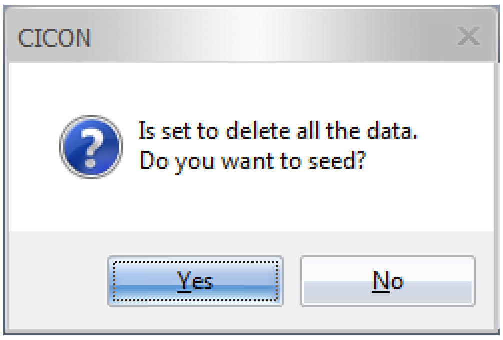
*Each slot is separated by its comment. (Comment will not be created for an empty slot or a non-responsive card.)

Modifying or editing in the LD Editing Window is not recommended. If you download the incorrect buffer memory and incorrect input and output settings to the PLC, this may cause a malfunction of the PLC.

<<Precautions for Online Edit>>

If the output of one contact is greater than the maximum of 64, Online Edit may not work properly. In the “Special Card Initialization Program,” it is recommended that you separate the contacts on the basis of a maximum 32 steps for effective step management.

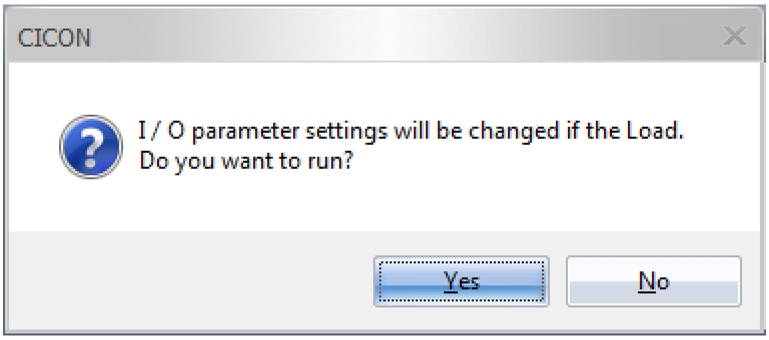
5) **Initialize:** All the configured data will be erased.
After the data initialization, the program will be set as the default configuration of “Local Base” and “3 Slot.” (Except for Block PLC / PLCS)
*Even after the initialization, if you close the program without saving, you can still restore previous configurations.



CICON

Is set to delete all the data.
Do you want to seed?

6) **I/O Reservation Load:** This brings I/O reservation settings.
Use this function when you use I/O occupancy setup or there is start address value of the expansion base.

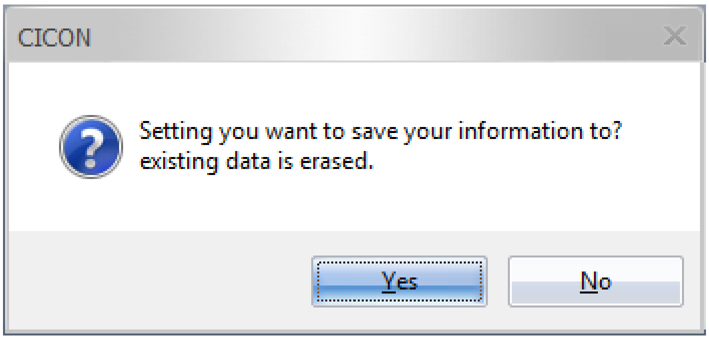


CICON

I / O parameter settings will be changed if the Load.
Do you want to run?

*After the I/O Reservation Load, please set up a card individually.

7) **Save:** Saves the setting values in a file.

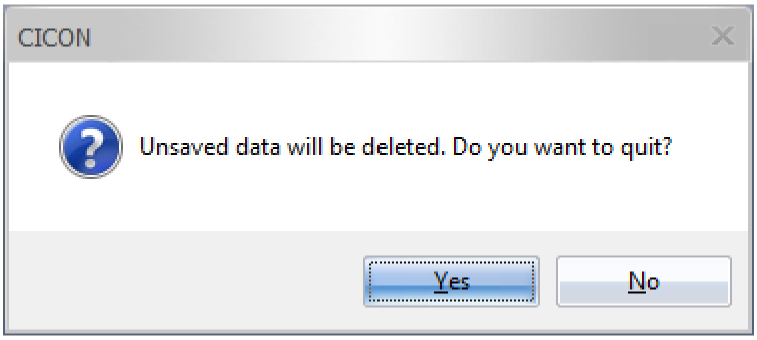


CICON

Setting you want to save your information to?
existing data is erased.

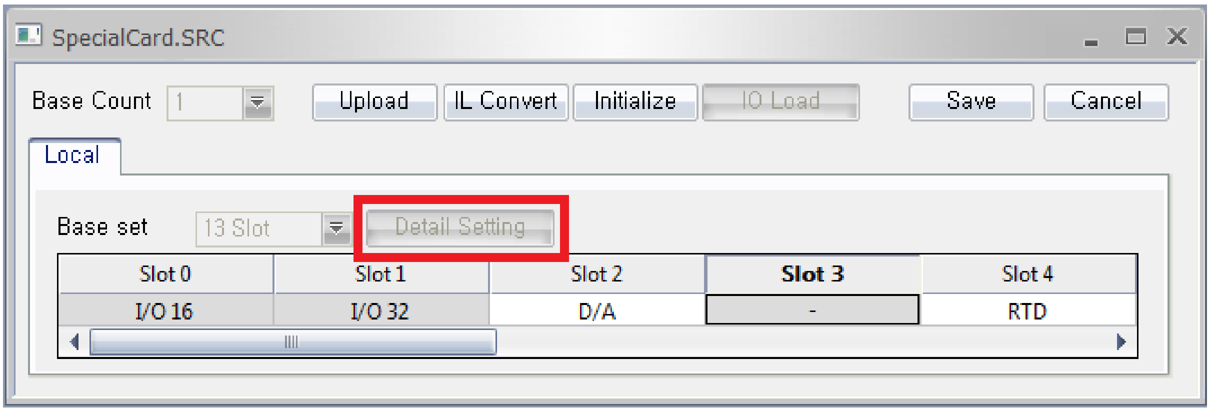
*If you close without saving, the lastly saved data will be kept.

8) **Cancel:** It closes the program.
   If you close the program without saving, a confirmation message is displayed as shown below.



Unsaved data will be deleted. Do you want to quit?

9) **Detail Setting:** It brings out setup window of a special card. If the slot is displayed as "-"(empty or non-responsive) or "I/O 0, 16, 32, 64," the Detail Setting button will not be activated.



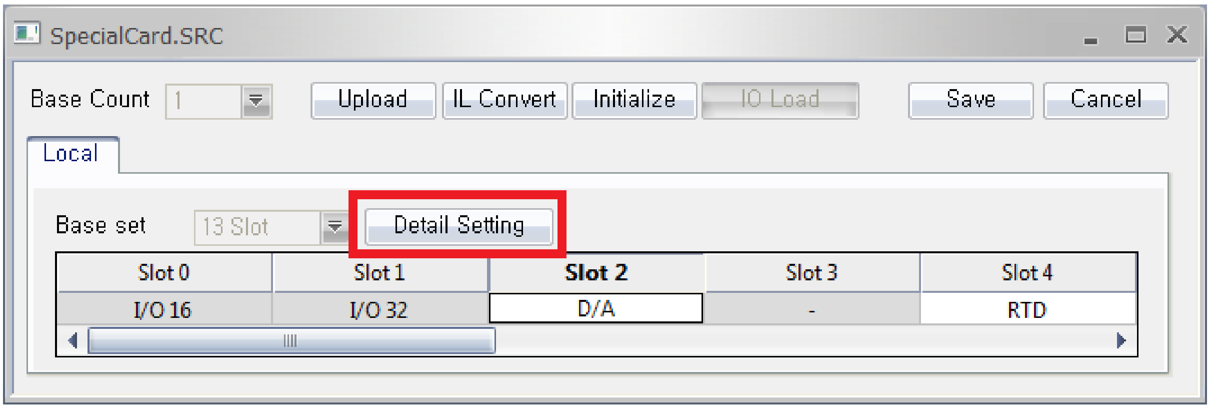
Base Count: 1

Base set: 13 Slot

| Slot 0 | Slot 1 | Slot 2 | Slot 3 | Slot 4 |
|---|---|---|---|---|
| I/O 16 | I/O 32 | D/A | - | RTD |

When a special card is selected, the Detail Setting button will be activated.

*If you double-click the slot with the special card selected, Detail Setting window pops up.

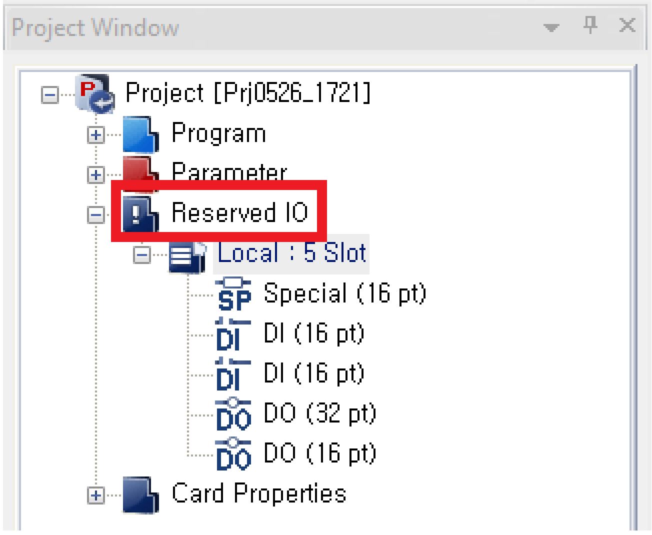


Base Count: 1

Base set: 13 Slot

| Slot 0 | Slot 1 | Slot 2 | Slot 3 | Slot 4 |
|---|---|---|---|---|
| I/O 16 | I/O 32 | D/A | - | RTD |

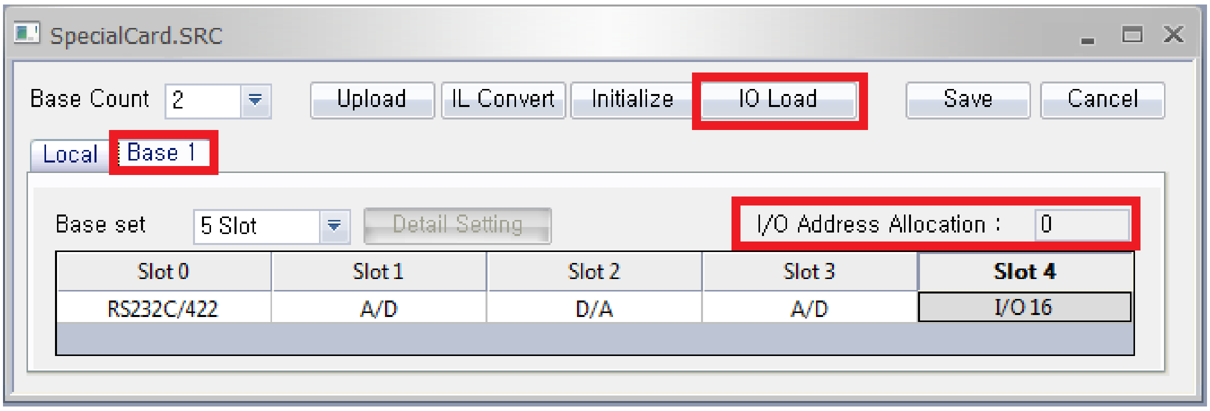
10) **I/O Address Allocation (Expansion base only):** Base I/O address allocation value configured in the Reserved IO (in red box) will be displayed in this function.



In order to use the “Base I/O address allocation” function, you have to follow these two steps:

**10.1)** CICON → Reserved IO → Configure “Base I/O address allocation”

**10.2)** Special card initialization program → Click “I/O Load.”



Base Count 2

Base set 5 Slot

I/O Address Allocation : 0

| Slot 0 | Slot 1 | Slot 2 | Slot 3 | **Slot 4** |
|---|---|---|---|---|
| RS232C/422 | A/D | D/A | A/D | I/O 16 |

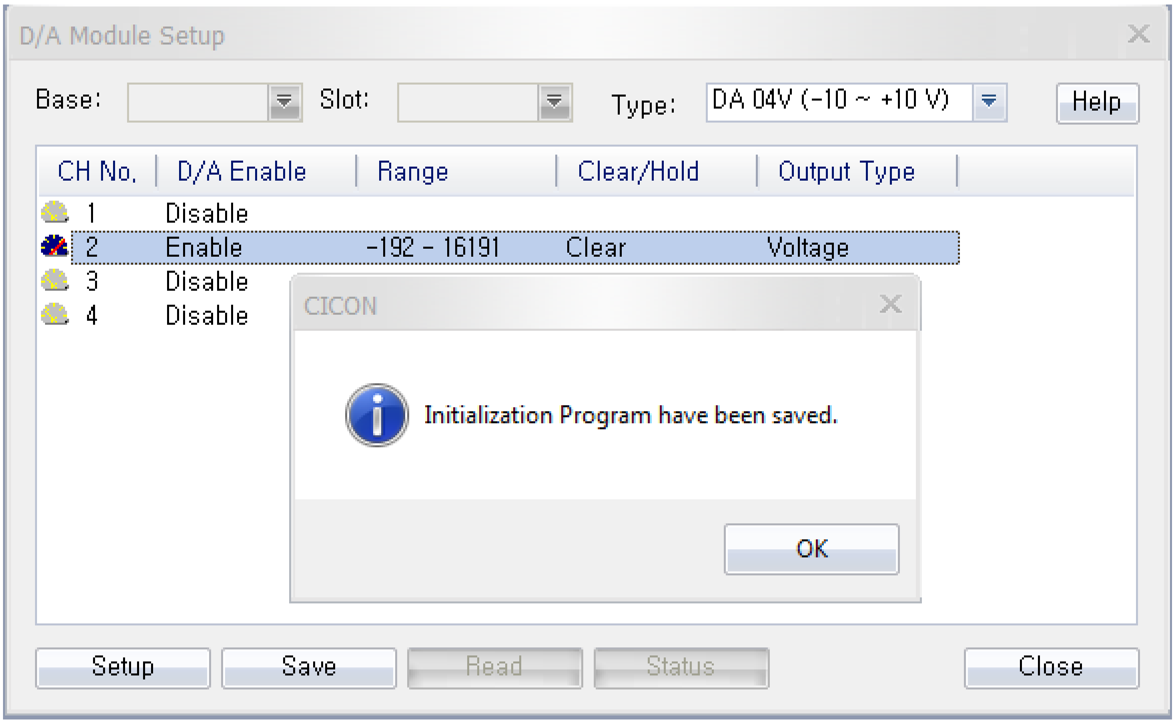
*Even if you upload (automatic scan), you cannot reset “I/O Address allocation value.”
*If you want to modify or delete, follow 10.1 and 10.2 steps.

<Precautions for saving the value of “I/O Address Allocation”>

*You have to configure at least one special card of the expansion base in order to save the value of “I/O Address Allocation” by clicking “IO Load” button.
*If there are no special card configurations for local base or expansion base, the “I/O Address Allocation” value for the relevant base will not be saved.

11) **Special Card Setup:** When you double-click the slot with the special card selected, the Detail Setting window pops up and lets you configure individual settings of each special card.

Ex) D/A Module Setup



Type: DA 04V (-10 ~ +10 V)

| CH No. | D/A Enable | Range | Clear/Hold | Output Type |
|---|---|---|---|---|
| 1 | Disable | | | |
| 2 | Enable | -192 - 16191 | Clear | Voltage |
| 3 | Disable | | | |
| 4 | Disable | | | |

Initialization Program have been saved.

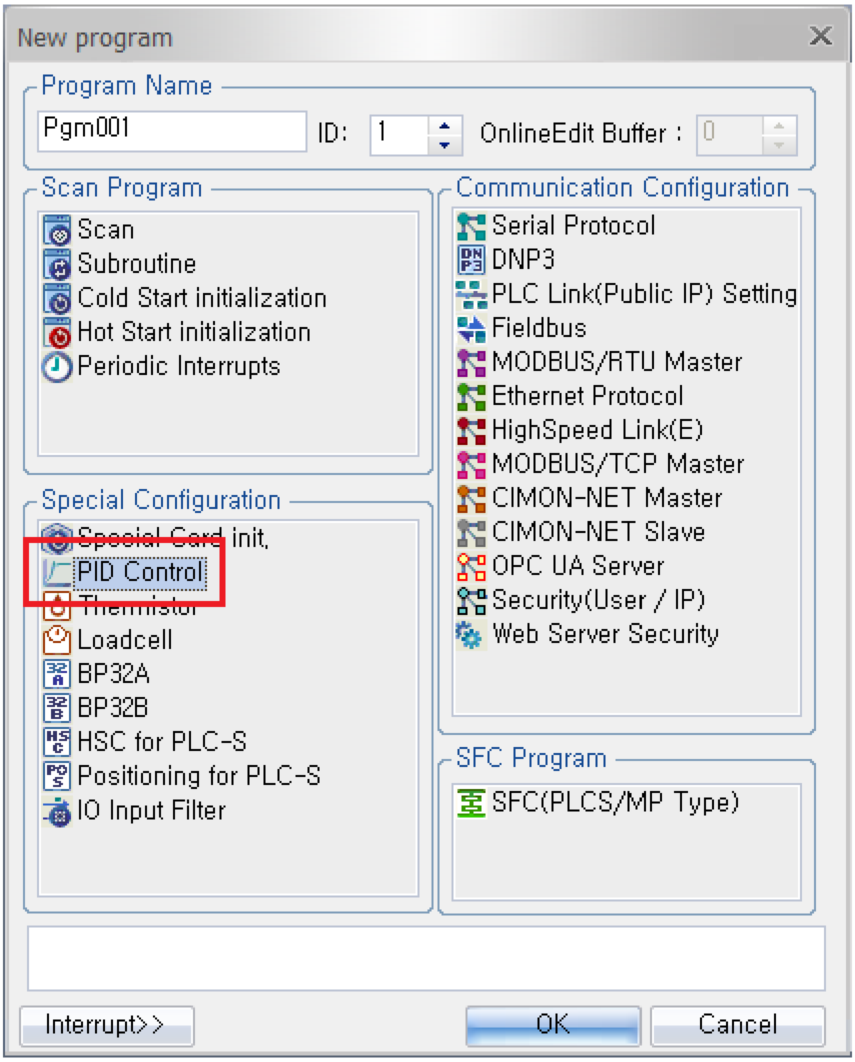
*Make sure to click “Save” after configurations. Otherwise, the configurations will not be reflected in the Special Card Initialization Program.

## 8.2 PID Control

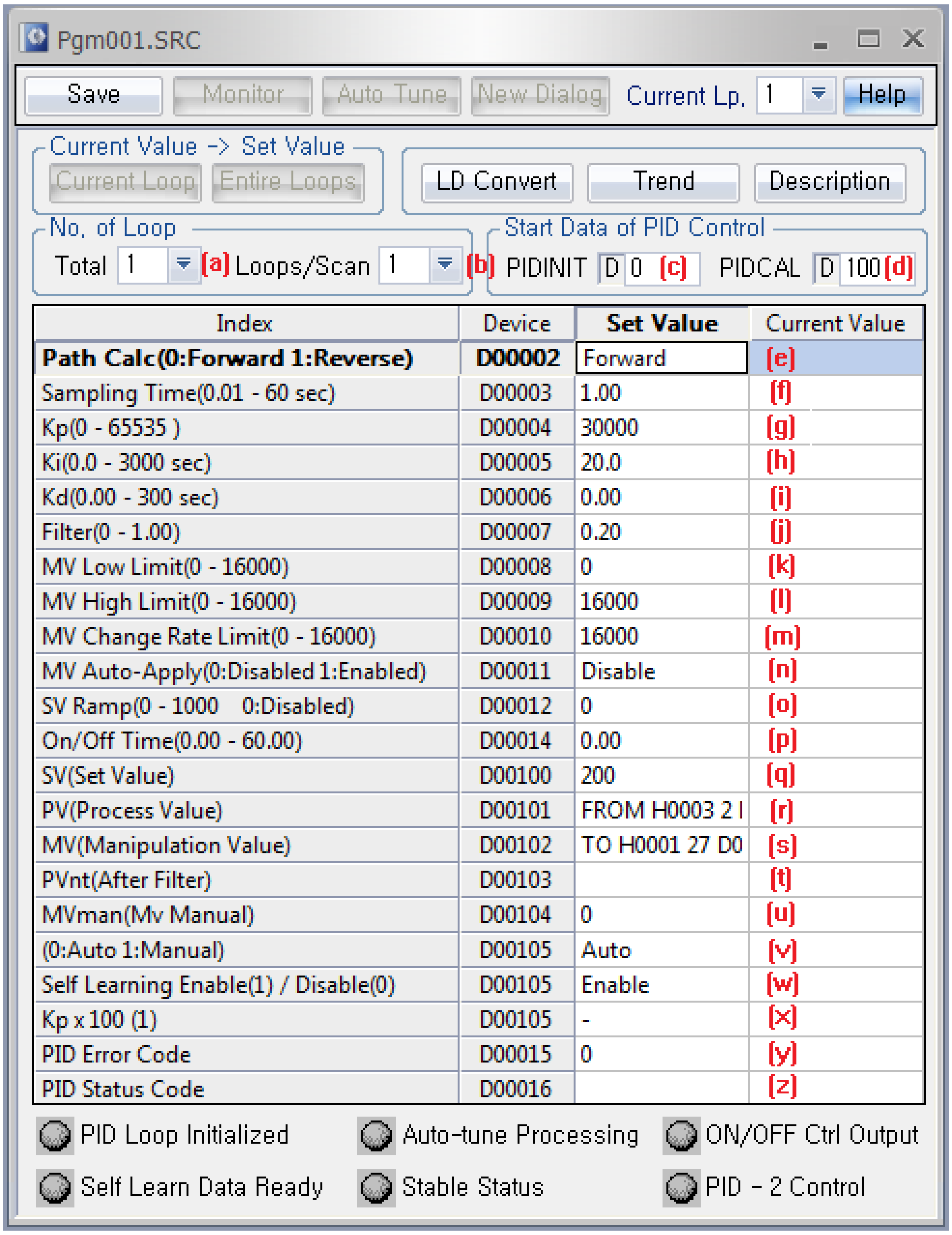
PID control is a control loop feedback mechanism in which the controller continuously calculates an “error value” as the difference between a measured process variable (PV) and a desired set point.

**Registering the PID Special Program**

PID Special Program must be registered only once for a CICON project, and it can have 32 Loops within one program.



**Configure the PID Special Program**



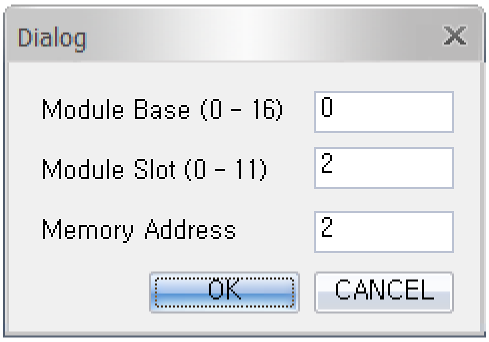
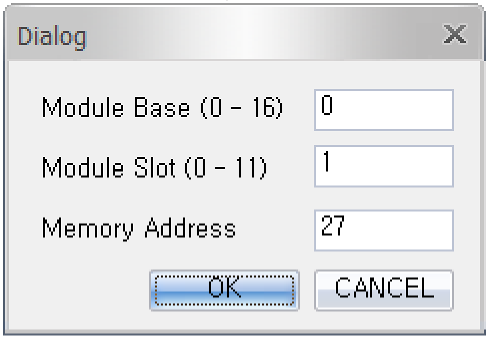
Current Lp. 1

Total 1 [a] Loops/Scan 1 [b]

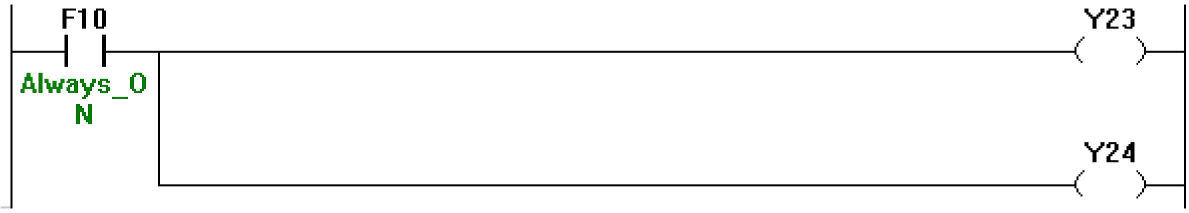
PIDINIT D 0 [c] PIDCAL D 100 [d]

| Index | Device | Set Value | Current Value |
|---|---|---|---|
| **Path Calc(0:Forward 1:Reverse)** | **D00002** | Forward | [e] |
| Sampling Time(0.01 - 60 sec) | D00003 | 1.00 | [f] |
| Kp(0 - 65535 ) | D00004 | 30000 | [g] |
| Ki(0.0 - 3000 sec) | D00005 | 20.0 | [h] |
| Kd(0.00 - 300 sec) | D00006 | 0.00 | [i] |
| Filter(0 - 1.00) | D00007 | 0.20 | [j] |
| MV Low Limit(0 - 16000) | D00008 | 0 | [k] |
| MV High Limit(0 - 16000) | D00009 | 16000 | [l] |
| MV Change Rate Limit(0 - 16000) | D00010 | 16000 | [m] |
| MV Auto-Apply(0:Disabled 1:Enabled) | D00011 | Disable | [n] |
| SV Ramp(0 - 1000 0:Disabled) | D00012 | 0 | [o] |
| On/Off Time(0.00 - 60.00) | D00014 | 0.00 | [p] |
| SV(Set Value) | D00100 | 200 | [q] |
| PV(Process Value) | D00101 | FROM H0003 2 I | [r] |
| MV(Manipulation Value) | D00102 | TO H0001 27 D0 | [s] |
| PVnt(After Filter) | D00103 | | [t] |
| MVman(Mv Manual) | D00104 | 0 | [u] |
| (0:Auto 1:Manual) | D00105 | Auto | [v] |
| Self Learning Enable(1) / Disable(0) | D00105 | Enable | [w] |
| Kp x 100 (1) | D00105 | - | [x] |
| PID Error Code | D00015 | 0 | [y] |
| PID Status Code | D00016 | | [z] |

| Number | Item | Description |
|---|---|---|
| (a) | Number of Total Loops | Because the system to be controlled is one, select ‘1.’ |
| (b) | Number of Loops Per Scan | Since the total number of loops is one, select ‘1’ also. |
| (c) | PIDINIT Start Address | Enter the start address in which PIDINIT setting values are stored. By changing the start address, the device of the setting items get automatically changed. |
| (d) | PIDCAL Start Address | Enter the start address in which PIDCAL setting values are stored. By changing the start address, the device of the setting items get automatically changed. |
| (e) | Operation Type | When the manipulated variable increases, so does the measurement value. Therefore, select the forward operation. |
| (f) | Sampling Time (Ts) | If it is a system where measurement values are changed sensitively for the change of the manipulated variable, the sampling interval should be set short. For a general HVAC system in which the measurement values are insensitive to changes, the sampling interval can be set about 1 second. |
| (g) | Proportional Gain ($K_p$) | Enter the proportional gain value of the system. If the hunting of the value is severe, reduce the proportional value. In this test, the value is set to 30,000. |
| (h) | Integral Gain ($K_i$) | Enter the integral gain value of the system. If the integral gain value is large, hunting gets reduced but the time to stabilize can be prolonged. In this test, the value is set to 20. |
| (i) | Derivative Gain ($K_d$) | Enter the derivative gain value of the system. This value is used when there is severe disturbance or a system with a quick reaction. In this test, it is assumed that there is no serious impact of disturbance. Therefore, this value is set as ‘0 (Not Use).’ |
| (j) | Filter Coefficient ($\alpha$) | This value configures to what extent the filtering is going to be applied on the measurement values. The closer the value gets to 0, the less the filtering effect is. |
| (k) | MV Low Limit | Enter the lowest limit of the manipulated variable. The value is set as 0 in this test. |
| (l) | MV High Limit | Enter the highest limit of the manipulated variable. Because it is a system in which the manipulated variable value can be outputted more than a specific value, the MV High Limit is set as 16,000 in this test. |
| (m) | MV Change Rate Limit | Enter the manipulated variable variation rate limit. This value is used to prevent the change of the manipulated variable from occurring suddenly. Since this test requires no specific need to limit on the change of the manipulated variable, the value is set as 16,000. |
| (n) | MV Auto Apply | This value is used when a user wants to keep the MV value when switching from automatic to manual mode. In this test, the value is set as ‘0 (Disabled).’ |
| (o) | SV Transition Step | This value is used to control the time taken to reach the set value. In this test, the value is set as ‘0 (Disabled).’ |
| (p) | On/Off Time | This value is used to control on/off time using the MV value. If a value more than 1 is entered for operation, the MV Low Limit and the MV High Limit will be outputted in turn as the manipulated variable. Because this test does not involve On/Off control, this value is set as ‘0 (Disabled).’ |
| (q) | SV(Set Value) | Enter the target value that you want to control. (i.e.) ‘200’ is entered. |

| | | |
|---|---|---|
| (r) | PV(Process Value) | Enter the process value of the control unit. You can configure the ERO module and enter the appropriate values as shown in the below dialog image in order to read the data directly. The memory address is set as ‘2’ in order to detect the temperature value of the channel 2 of the ERO module by reading the value from the current directly. As mentioned above, the Module Slot is set as ‘2’ (ERO module being in the second slot) and the Module Base is set as ‘0’ since there is no expansion base.<br><br>Module Base (0 - 16) 0<br>Module Slot (0 - 11) 2<br>Memory Address 2<br> |
| (s) | MV(Manipulation Value) | The manipulated variable is the calculated result of the PID operation. You can either get this value by using the MOV command from the external scan program or configuring the DA card directly in order to output the MV value. Enter the value as shown below to use the DA card and to output the MV value directly in this test.<br><br>Module Base (0 - 16) 0<br>Module Slot (0 - 11) 1<br>Memory Address 27<br> <br>The channel 2’s digital output value (DA) of the EAA module is configured as Memory Address ‘27’ (Please check the buffer memory of CM3-SP04EAA in the HELP file for the detailed information) in order to adjust the temperature value through the current. Also as mentioned above, the Module Slot is set as ‘1’ (EAA module being in the first slot) and the Module Base is set as ‘0’ since there is no expansion base. |
| (t) | Pvnt(After Filter) | Only monitoring is possible. |
| (u) | MVman(MV Manual) | Use this value when the manipulated variable value is set to manual mode. |
| (v) | Auto / Manual Selection | This specifies the initial operating mode. In this test, it is ‘Auto Mode.’ |

**Write the Scan Program**

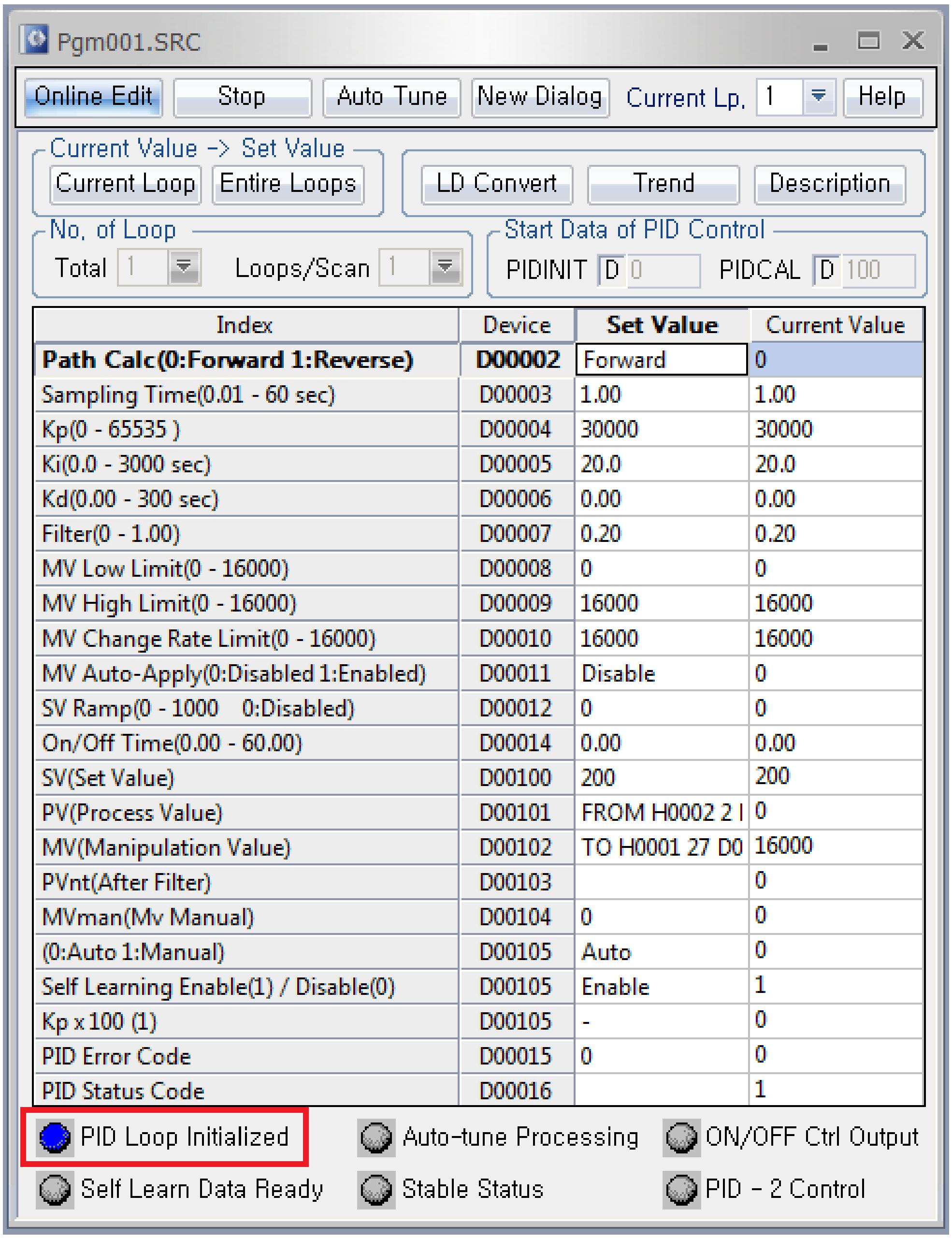


This scan program enables channel 1 and channel 2 outputs of the EAA module to operate directly.

Refer to the table below for the input and output signals of the PLC-S (CM3)-SP04EAA-CPU.

| Signal direction (CPU ← A/D, D/A) | | Signal direction (CPU → A/D, D/A) | |
|---|---|---|---|
| **Input** | **Signal Name** | **Output** | **Signal Name** |
| X20 | A/D module Ready | Y20 | |
| X21 | | Y21 | |
| X22 | Operating Condition Save Complete | Y22 | Operating Condition Save Command |
| X23 | CH.1 High Level Alarm | Y23 | DA CH.1 Output Enable |
| X24 | CH.2 High Level Alarm | Y24 | DA CH.2 Output Enable |
| X25 | CH.3 High Level Alarm | Y25 | |
| X26 | CH.4 High Level Alarm | Y26 | |
| X27 | | Y27 | |
| X28 | | Y28 | |
| X29 | | Y29 | |
| X2A | | Y2A | |
| X2B | | Y2B | |
| X2C | | Y2C | |
| X2D | | Y2D | |
| X2E | | Y2E | |
| X2F | D/A Module Error flag | Y2F | Error Clear Command |

**Download and Control**



Current Lp. 1

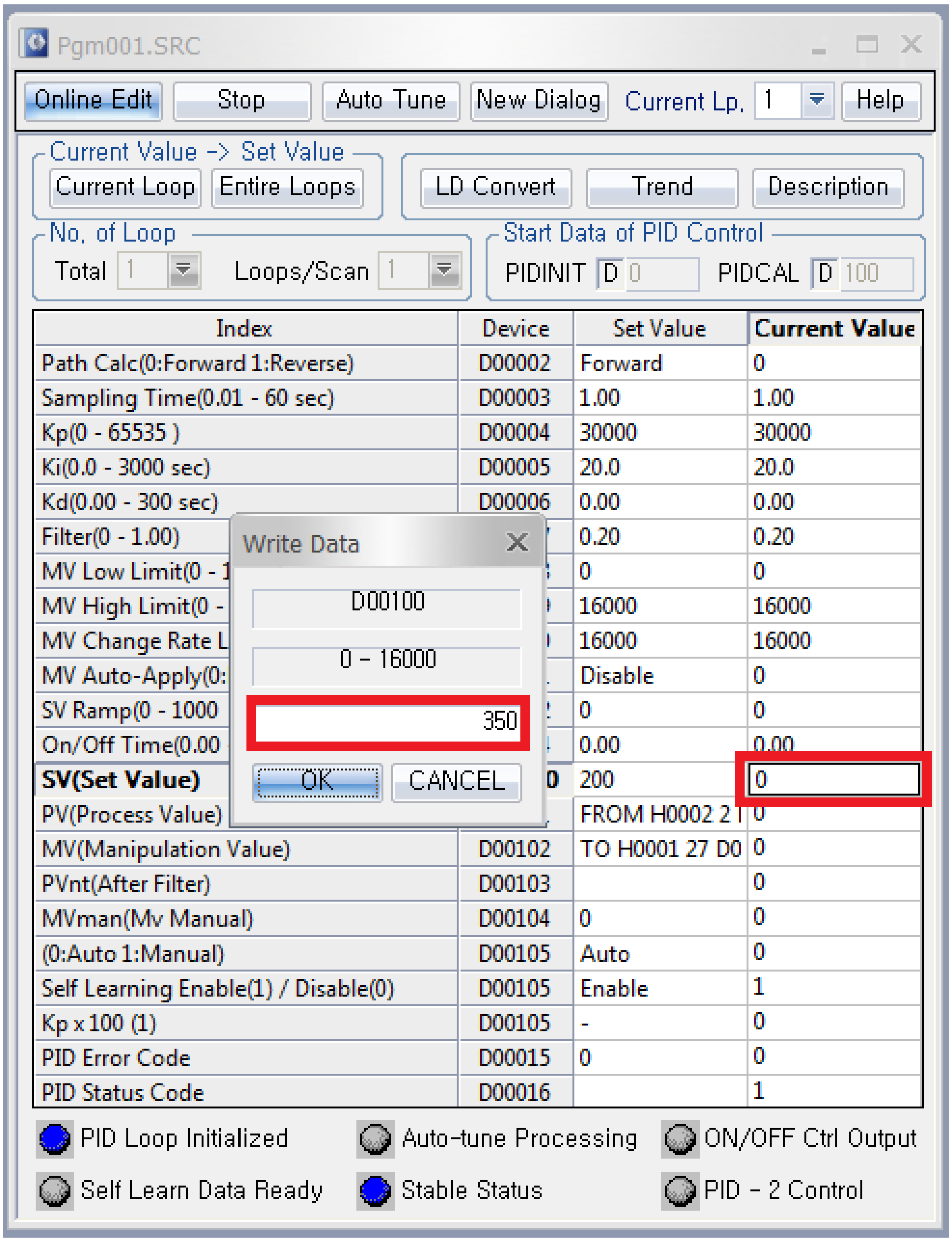
No, of Loop Total 1 Loops/Scan 1

Start Data of PID Control PIDINIT D 0 PIDCAL D 100

| Index | Device | Set Value | Current Value |
|---|---|---|---|
| **Path Calc(0:Forward 1:Reverse)** | **D00002** | Forward | 0 |
| Sampling Time(0.01 - 60 sec) | D00003 | 1.00 | 1.00 |
| Kp(0 - 65535 ) | D00004 | 30000 | 30000 |
| Ki(0.0 - 3000 sec) | D00005 | 20.0 | 20.0 |
| Kd(0.00 - 300 sec) | D00006 | 0.00 | 0.00 |
| Filter(0 - 1.00) | D00007 | 0.20 | 0.20 |
| MV Low Limit(0 - 16000) | D00008 | 0 | 0 |
| MV High Limit(0 - 16000) | D00009 | 16000 | 16000 |
| MV Change Rate Limit(0 - 16000) | D00010 | 16000 | 16000 |
| MV Auto-Apply(0:Disabled 1:Enabled) | D00011 | Disable | 0 |
| SV Ramp(0 - 1000 0:Disabled) | D00012 | 0 | 0 |
| On/Off Time(0.00 - 60.00) | D00014 | 0.00 | 0.00 |
| SV(Set Value) | D00100 | 200 | 200 |
| PV(Process Value) | D00101 | FROM H0002 2 I | 0 |
| MV(Manipulation Value) | D00102 | TO H0001 27 D0 | 16000 |
| PVnt(After Filter) | D00103 |  | 0 |
| MVman(Mv Manual) | D00104 | 0 | 0 |
| (0:Auto 1:Manual) | D00105 | Auto | 0 |
| Self Learning Enable(1) / Disable(0) | D00105 | Enable | 1 |
| Kp x 100 (1) | D00105 | - | 0 |
| PID Error Code | D00015 | 0 | 0 |
| PID Status Code | D00016 |  | 1 |

● PID Loop Initialized
○ Auto-tune Processing
○ ON/OFF Ctrl Output
○ Self Learn Data Ready
○ Stable Status
○ PID - 2 Control

The fact that the blue LED of the “PID Loop Initialized” is turned ON signifies that the program is operating normally.



Current Lp. 1

Total 1
Loops/Scan 1

PIDINIT D 0
PIDCAL D 100

| Index | Device | Set Value | Current Value |
|---|---|---|---|
| Path Calc(0:Forward 1:Reverse) | D00002 | Forward | 0 |
| Sampling Time(0.01 - 60 sec) | D00003 | 1.00 | 1.00 |
| Kp(0 - 65535 ) | D00004 | 30000 | 30000 |
| Ki(0.0 - 3000 sec) | D00005 | 20.0 | 20.0 |
| Kd(0.00 - 300 sec) | D00006 | 0.00 | 0.00 |
| Filter(0 - 1.00) | | 0.20 | 0.20 |
| MV Low Limit(0 - 1 | | 0 | 0 |
| MV High Limit(0 - | | 16000 | 16000 |
| MV Change Rate L | | 16000 | 16000 |
| MV Auto-Apply(0: | | Disable | 0 |
| SV Ramp(0 - 1000 | | 0 | 0 |
| On/Off Time(0.00 | | 0.00 | 0.00 |
| **SV(Set Value)** | | 200 | 0 |
| PV(Process Value) | | FROM H0002 2 1 | 0 |
| MV(Manipulation Value) | D00102 | TO H0001 27 D0 | 0 |
| PVnt(After Filter) | D00103 | | 0 |
| MVman(Mv Manual) | D00104 | 0 | 0 |
| (0:Auto 1:Manual) | D00105 | Auto | 0 |
| Self Learning Enable(1) / Disable(0) | D00105 | Enable | 1 |
| Kp x 100 (1) | D00105 | - | 0 |
| PID Error Code | D00015 | 0 | 0 |
| PID Status Code | D00016 | | 1 |

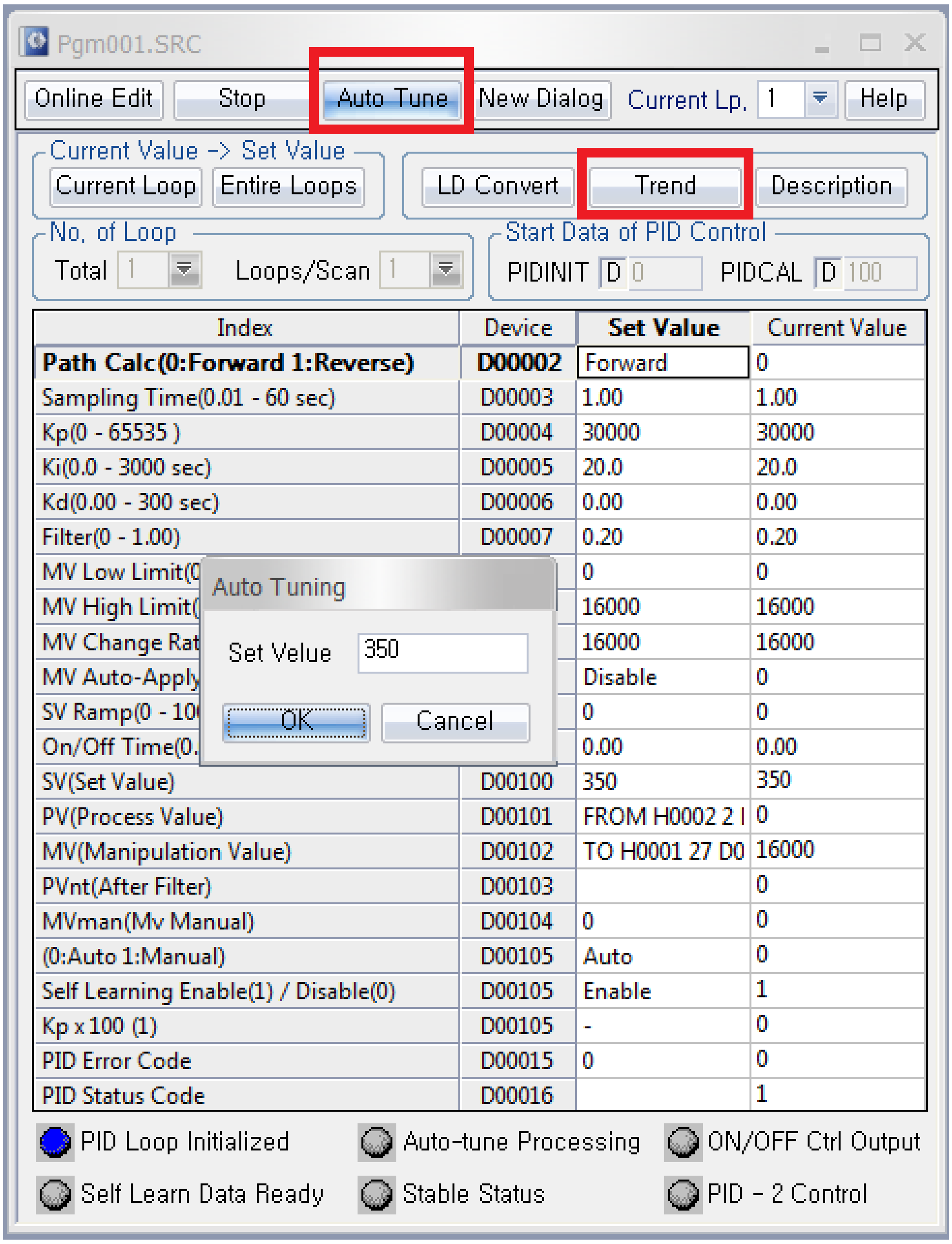
Write Data
D00100
0 – 16000
350

● PID Loop Initialized
○ Auto-tune Processing
○ ON/OFF Ctrl Output
○ Self Learn Data Ready
● Stable Status
○ PID – 2 Control

Enter the number ‘350’ for the Set Value (SV).

The number **‘350’** signifies **35.0°C**. When you want to have the value of **45.5°C**, enter the number **‘455.’**

## Using Auto Tune Function



Current Lp. 1

No. of Loop
Total 1
Loops/Scan 1

Start Data of PID Control
PIDINIT D 0
PIDCAL D 100

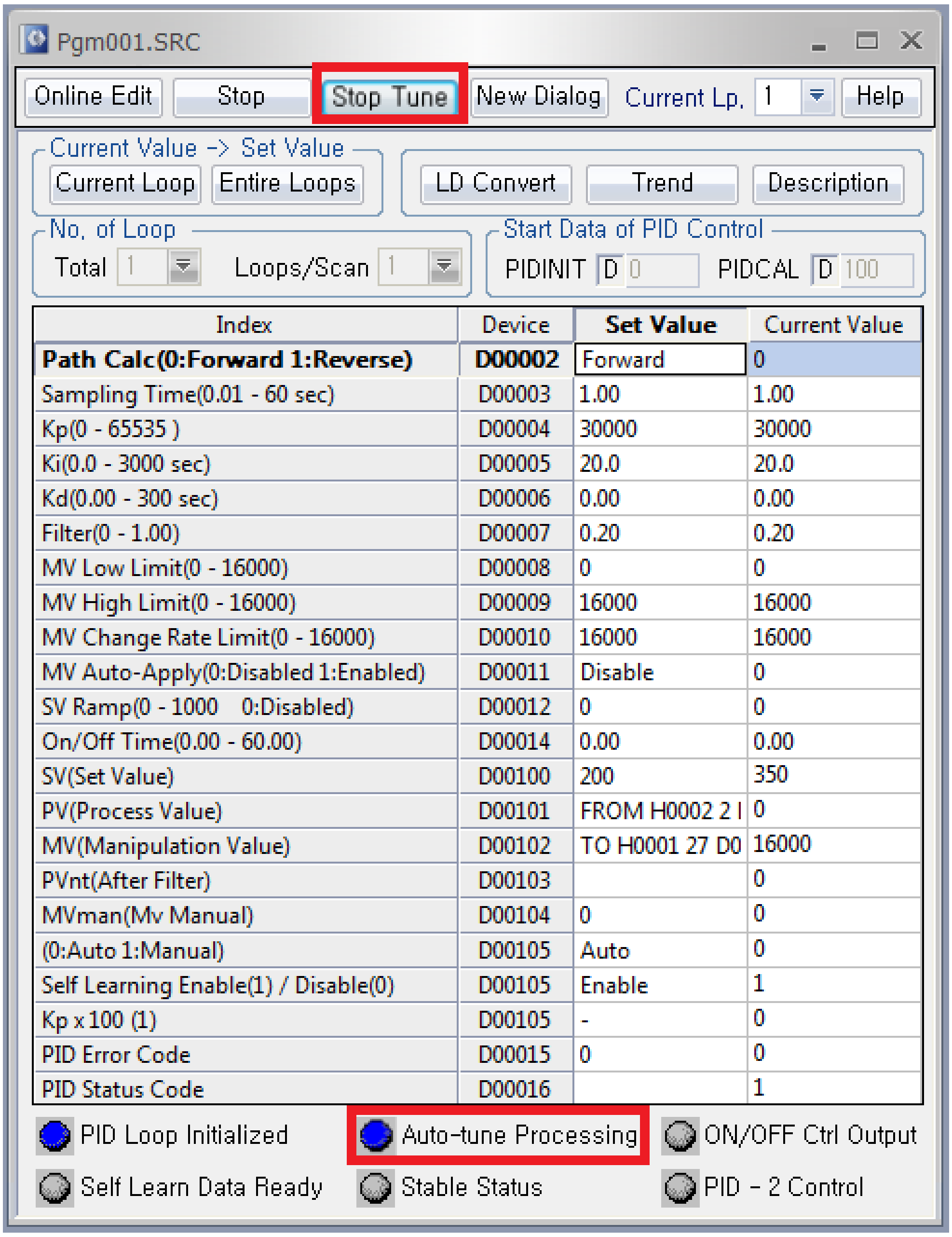
| Index | Device | Set Value | Current Value |
|---|---|---|---|
| **Path Calc(0:Forward 1:Reverse)** | **D00002** | Forward | 0 |
| Sampling Time(0.01 - 60 sec) | D00003 | 1.00 | 1.00 |
| Kp(0 - 65535 ) | D00004 | 30000 | 30000 |
| Ki(0.0 - 3000 sec) | D00005 | 20.0 | 20.0 |
| Kd(0.00 - 300 sec) | D00006 | 0.00 | 0.00 |
| Filter(0 - 1.00) | D00007 | 0.20 | 0.20 |
| MV Low Limit(0 | | 0 | 0 |
| MV High Limit( | | 16000 | 16000 |
| MV Change Rat | | 16000 | 16000 |
| MV Auto-Apply | | Disable | 0 |
| SV Ramp(0 - 10( | | 0 | 0 |
| On/Off Time(0. | | 0.00 | 0.00 |
| SV(Set Value) | D00100 | 350 | 350 |
| PV(Process Value) | D00101 | FROM H0002 2 I | 0 |
| MV(Manipulation Value) | D00102 | TO H0001 27 D0 | 16000 |
| PVnt(After Filter) | D00103 | | 0 |
| MVman(Mv Manual) | D00104 | 0 | 0 |
| (0:Auto 1:Manual) | D00105 | Auto | 0 |
| Self Learning Enable(1) / Disable(0) | D00105 | Enable | 1 |
| Kp x 100 (1) | D00105 | - | 0 |
| PID Error Code | D00015 | 0 | 0 |
| PID Status Code | D00016 | | 1 |

Set Velue 350

● PID Loop Initialized
○ Auto-tune Processing
○ ON/OFF Ctrl Output
○ Self Learn Data Ready
○ Stable Status
○ PID - 2 Control

The temperature control is possible by using the Auto Tune function. Depending on the response capability of the system, tuning operations can often be time consuming.

Before the tuning operations, be sure to check whether the flag status of the loop is normal. When the tuning operations are completed, the current value of the proportional, integral, and derivative gain of the loop gets modified.



Current Lp. 1

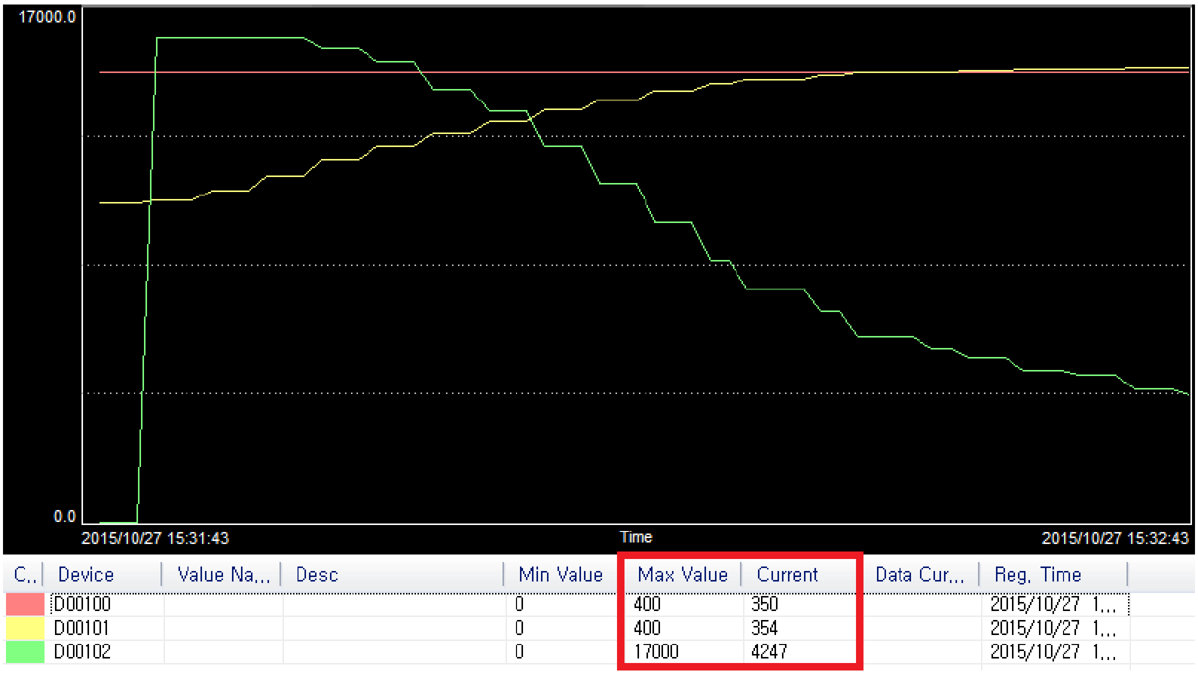
Total 1 Loops/Scan 1

PIDINIT D 0 PIDCAL D 100

| Index | Device | Set Value | Current Value |
|---|---|---|---|
| **Path Calc(0:Forward 1:Reverse)** | **D00002** | Forward | 0 |
| Sampling Time(0.01 - 60 sec) | D00003 | 1.00 | 1.00 |
| Kp(0 - 65535 ) | D00004 | 30000 | 30000 |
| Ki(0.0 - 3000 sec) | D00005 | 20.0 | 20.0 |
| Kd(0.00 - 300 sec) | D00006 | 0.00 | 0.00 |
| Filter(0 - 1.00) | D00007 | 0.20 | 0.20 |
| MV Low Limit(0 - 16000) | D00008 | 0 | 0 |
| MV High Limit(0 - 16000) | D00009 | 16000 | 16000 |
| MV Change Rate Limit(0 - 16000) | D00010 | 16000 | 16000 |
| MV Auto-Apply(0:Disabled 1:Enabled) | D00011 | Disable | 0 |
| SV Ramp(0 - 1000 0:Disabled) | D00012 | 0 | 0 |
| On/Off Time(0.00 - 60.00) | D00014 | 0.00 | 0.00 |
| SV(Set Value) | D00100 | 200 | 350 |
| PV(Process Value) | D00101 | FROM H0002 2 I | 0 |
| MV(Manipulation Value) | D00102 | TO H0001 27 D0 | 16000 |
| PVnt(After Filter) | D00103 |  | 0 |
| MVman(Mv Manual) | D00104 | 0 | 0 |
| (0:Auto 1:Manual) | D00105 | Auto | 0 |
| Self Learning Enable(1) / Disable(0) | D00105 | Enable | 1 |
| Kp x 100 (1) | D00105 | - | 0 |
| PID Error Code | D00015 | 0 | 0 |
| PID Status Code | D00016 |  | 1 |

If you want to cancel the tuning operation, click the button “Stop Tune.” When the Auto Tune function is operating normally, the blue LED of the “Auto-tune Processing” gets turned ON. The target value should be set in a way that is in line with the operation type. In other words, it should be forward direction when the target value is greater than the current PV. It should be reverse direction if the target value is smaller than the current PV. The tuning operation will be automatically completed when the process value reaches about 68 percent of the error between the current PV and the target value.

**Verify results with a trend graph**

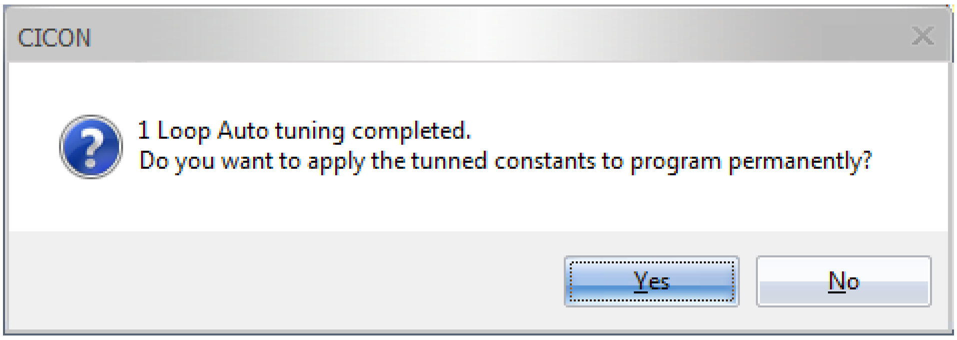


| C.. | Device | Value Na... | Desc | Min Value | Max Value | Current | Data Cur... | Reg. Time |
|---|---|---|---|---|---|---|---|---|
| 🟥 | D00100 | | | 0 | 400 | 350 | | 2015/10/27 1... |
| 🟨 | D00101 | | | 0 | 400 | 354 | | 2015/10/27 1... |
| 🟩 | D00102 | | | 0 | 17000 | 4247 | | 2015/10/27 1... |

Through the Trend function, it is possible to check the status of the SV (Set Value), PV (Process Value), and MV (Manipulation Value).

In the image above, the red line signifies the SV while yellow line signifies the PV and the green line signifies the MV. In order to recognize the amount of variation with ease, the max value of the SV and PV is configured as 400. The max value of the MV is set as 17,000.

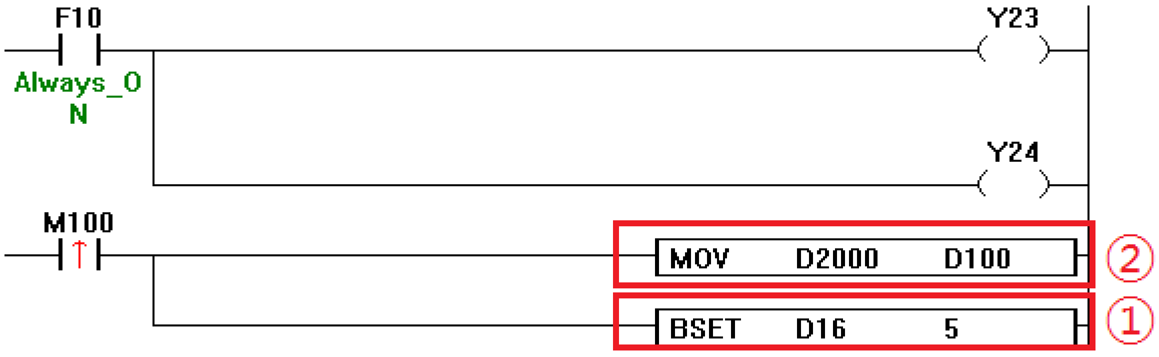
After the setting value is set as 400, the current value is getting closer to the set value as the temperature changes according to the variation in the amount of MV. Once the PID program is fully stabilized, the current value and the set value almost remain the same without the difference between each other. When Auto Tuning is completed, you will get a message as shown below.



1 Loop Auto tuning completed.
Do you want to apply the tunned constants to program permanently?

## Executing AUTO TUNING in the Sequence Program

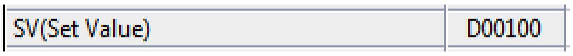
a) Writing a Scan Program



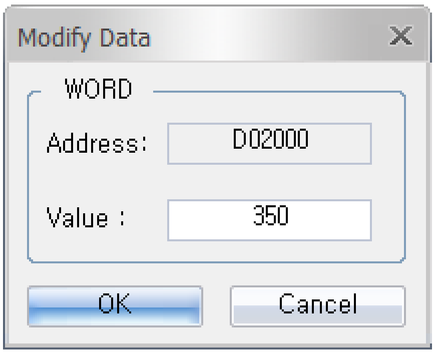
When writing a scan program, the conditional equation **D2000 > D100 (direct action)** must be satisfied.

1) BSET D16 5 activates the 5th bit of the device D16.
What information is contained in the 5th bit of D16?
The 5th bit is a flag used to start the Auto Tuning as the AUTO-TUNE CMD bit.

2) MOV D2000 D100 transfers the value of D2000 to D100.
Why use D100? SV (Set Value) is written on the device D100.



| | |
|---|---|
| SV(Set Value) | D00100 |



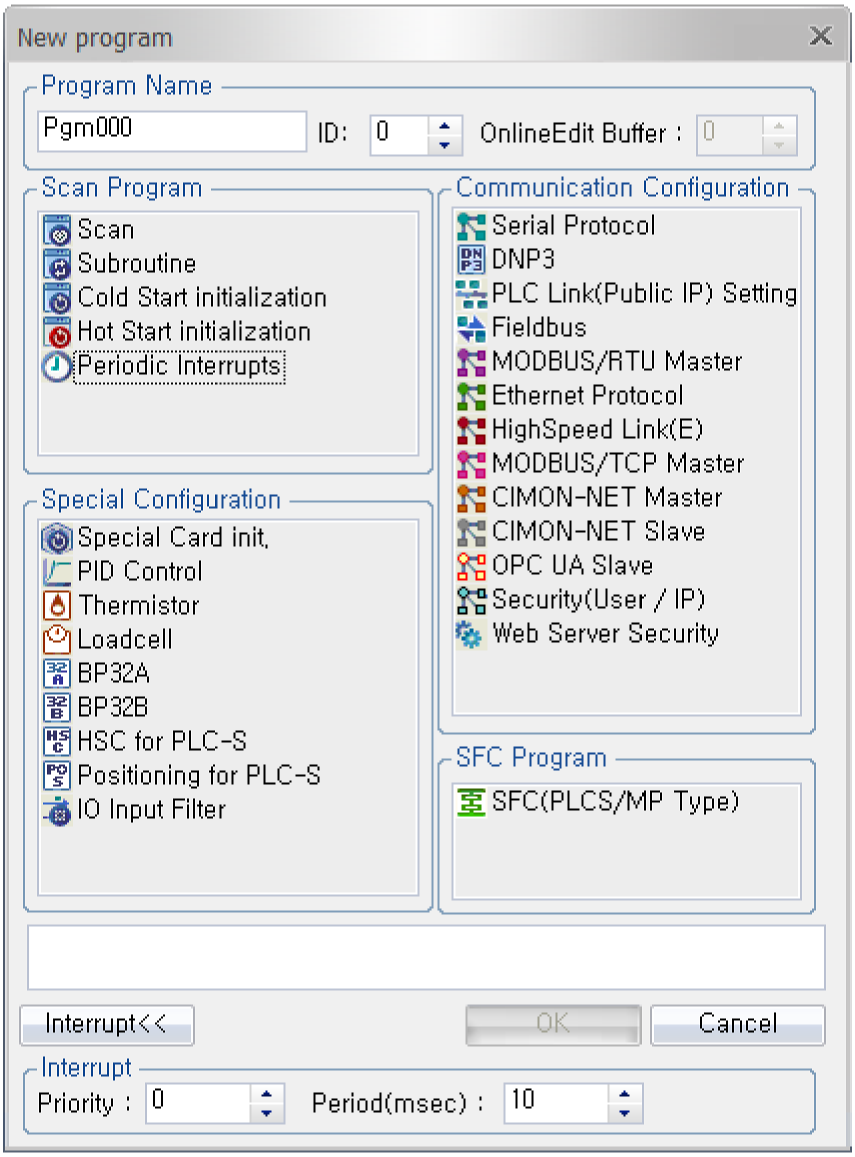
Address: D02000
Value : 350

When you enter the desired value in D2000, the value of 350 will be written in the SV (D100). D2000 has been randomly assigned in this test and can be designated by the user as desired. However, it should be configured to avoid overlapping with other PIDCAL, PIDINIT addresses.

## 8.3 Thermistor Setting Program

Thermistor module is used to measure the temperature by calibrating thermistor resister.

a) Register the program
Select [File] → [New Program] → [Thermistor].



New program

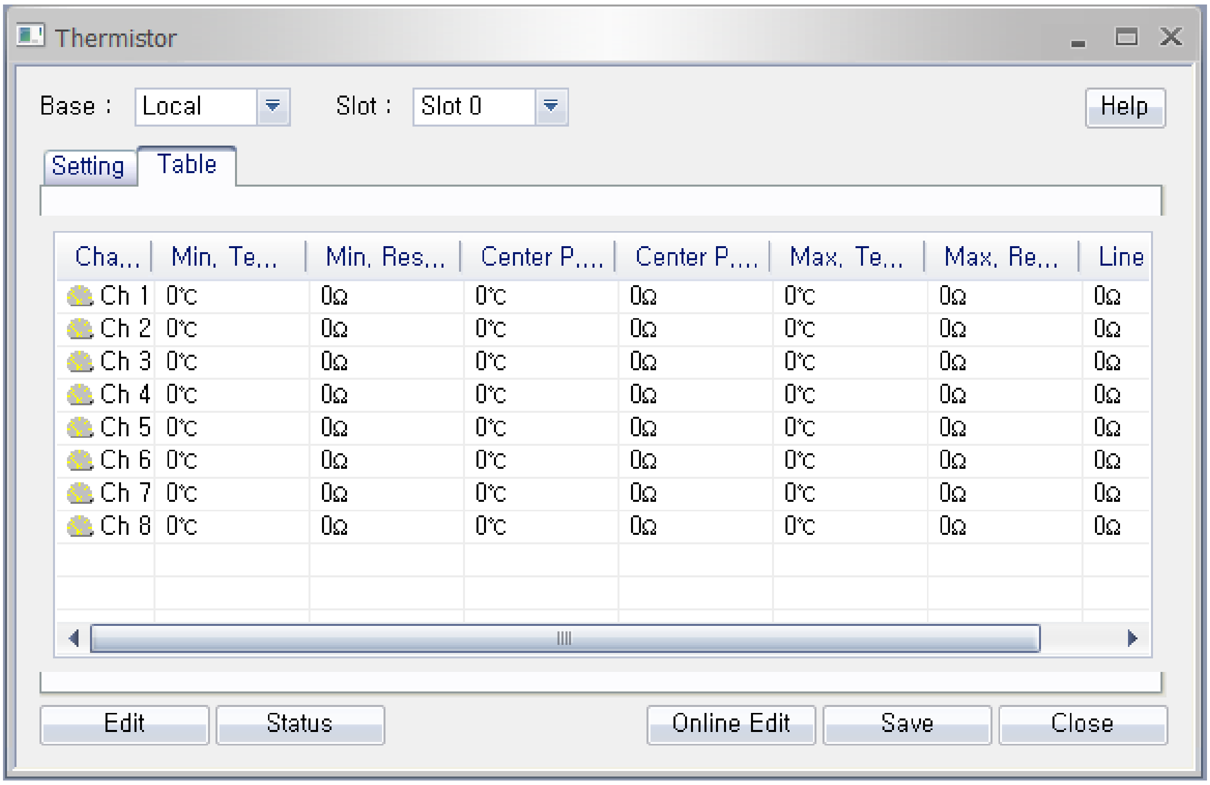
Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0

Interrupt
Priority : 0
Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

b) Writing a thermistor program.
After registering the program, below box appears.



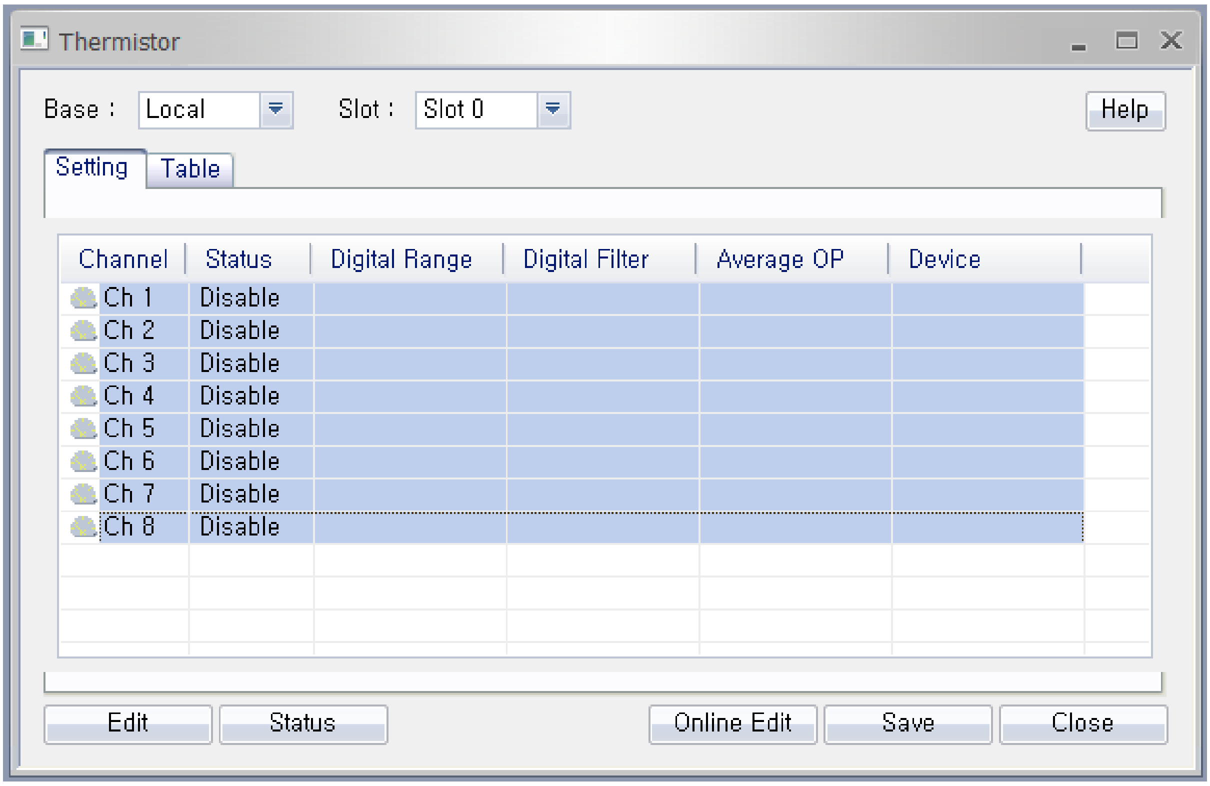
Base : Local

Slot : Slot 0

| Cha... | Min. Te... | Min. Res... | Center P.... | Center P.... | Max. Te... | Max. Re... | Line |
|---|---|---|---|---|---|---|---|
| Ch 1 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 2 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 3 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 4 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 5 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 6 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 7 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 8 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |

Register “Base” and “Slot” of the thermistor module.

i. **Setting Channels:** Setting Tab is sued to set status, digital range, digital filter, average OP and Device.



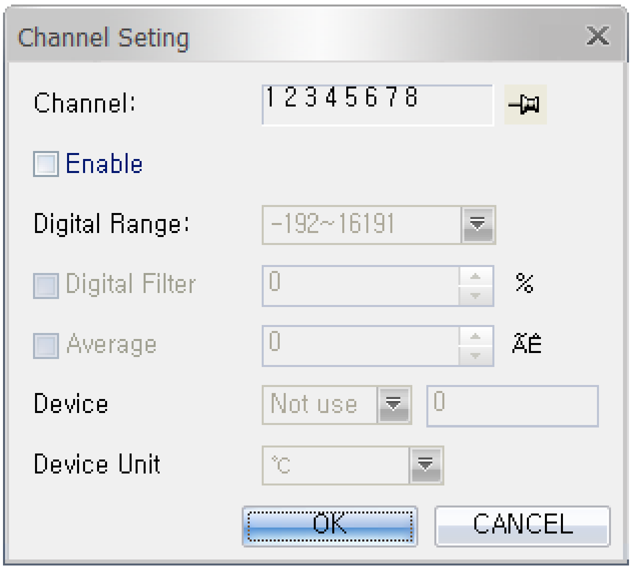
Base : Local

Slot : Slot 0

| Channel | Status | Digital Range | Digital Filter | Average OP | Device |
|---|---|---|---|---|---|
| Ch 1 | Disable | | | | |
| Ch 2 | Disable | | | | |
| Ch 3 | Disable | | | | |
| Ch 4 | Disable | | | | |
| Ch 5 | Disable | | | | |
| Ch 6 | Disable | | | | |
| Ch 7 | Disable | | | | |
| Ch 8 | Disable | | | | |

- Drag a mouse, you can select many channels.
- If you want only one channel, select a channel by clicking a mouse.
- By using a ctrl-Key, you can select channels what you want.

ii. Select [Edit] button. The below box appears.



Channel: 1 2 3 4 5 6 7 8

☐ Enable

Digital Range: -192~16191

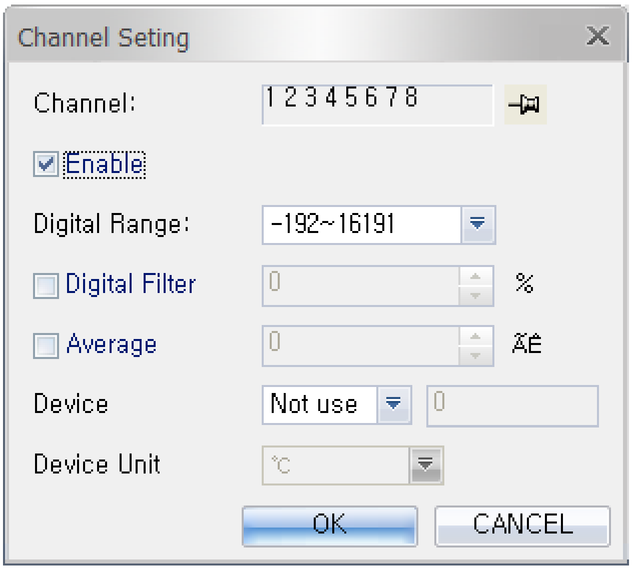
☐ Digital Filter 0 %

☐ Average 0 ÃÊ

Device Not use 0

Device Unit ℃

iii. Select [Enable] and you can change a value.



Channel: 1 2 3 4 5 6 7 8

☑ Enable

Digital Range: -192~16191

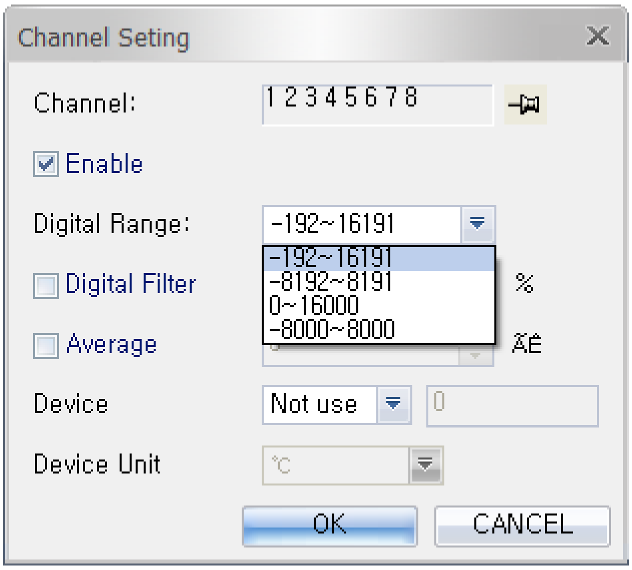
☐ Digital Filter 0 %

☐ Average 0 ÃÊ

Device Not use 0

Device Unit ℃

iv. **Digital Range:** It is used to convert the maximum and minimum temperature to a digital value according to a temperature converting table.



Channel Seting

Channel: 1 2 3 4 5 6 7 8

☑ Enable

Digital Range: -192~16191

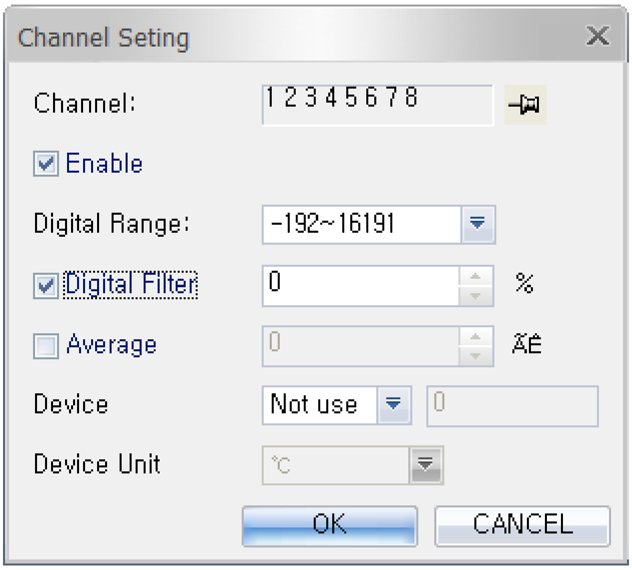
☐ Digital Filter

☐ Average

Device: Not use 0

Device Unit: ℃

v. **Digital Filter:** Used to set up in case of hunting by outside noise when converting temperature. It is restricted to converting ranges before storing converted temperature.



Channel Seting

Channel: 1 2 3 4 5 6 7 8

☑ Enable

Digital Range: -192~16191

☑ Digital Filter: 0 %

☐ Average: 0 ÅÊ

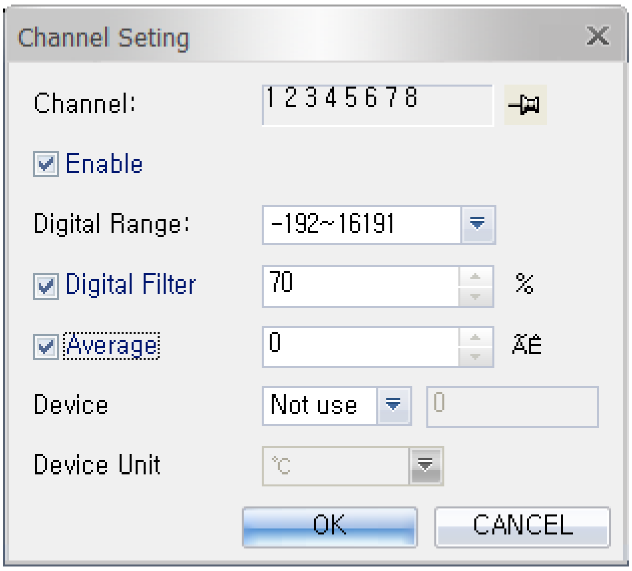
Device: Not use 0

Device Unit: ℃

Range of set value: 0~70%

Example: Values which store the buffer memory are present values by adjusting digital filter. Preset Value = Present value + (formal value – present value) * Digital Filter(%)/100

vi. **Average:** Used to set up calibrating value for average time.



Channel Seting

Channel: 1 2 3 4 5 6 7 8

☑ Enable

Digital Range: -192~16191

☑ Digital Filter: 70 %

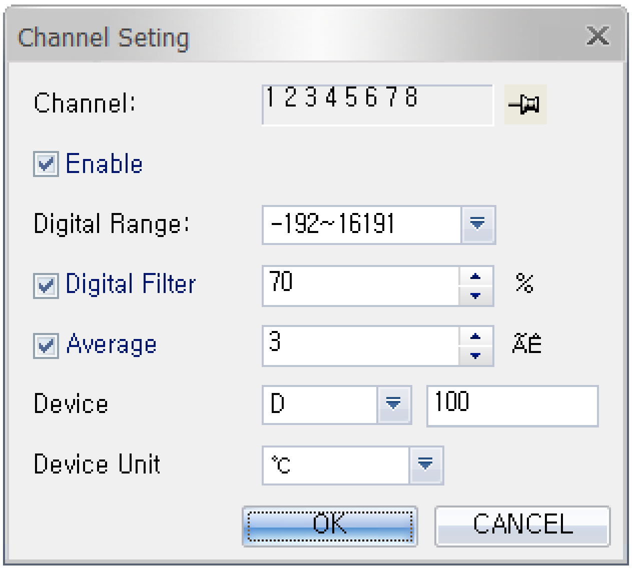
☑ Average: 0 ÃÊ

Device: Not use 0

Device Unit: ℃

Range of set value: 0~255 sec.

vii. **Device:** Used to store converted temperature in CPU memory.



Channel Seting

Channel: 1 2 3 4 5 6 7 8

☑ Enable

Digital Range: -192~16191

☑ Digital Filter: 70 %

☑ Average: 3 ÃÊ

Device: D 100

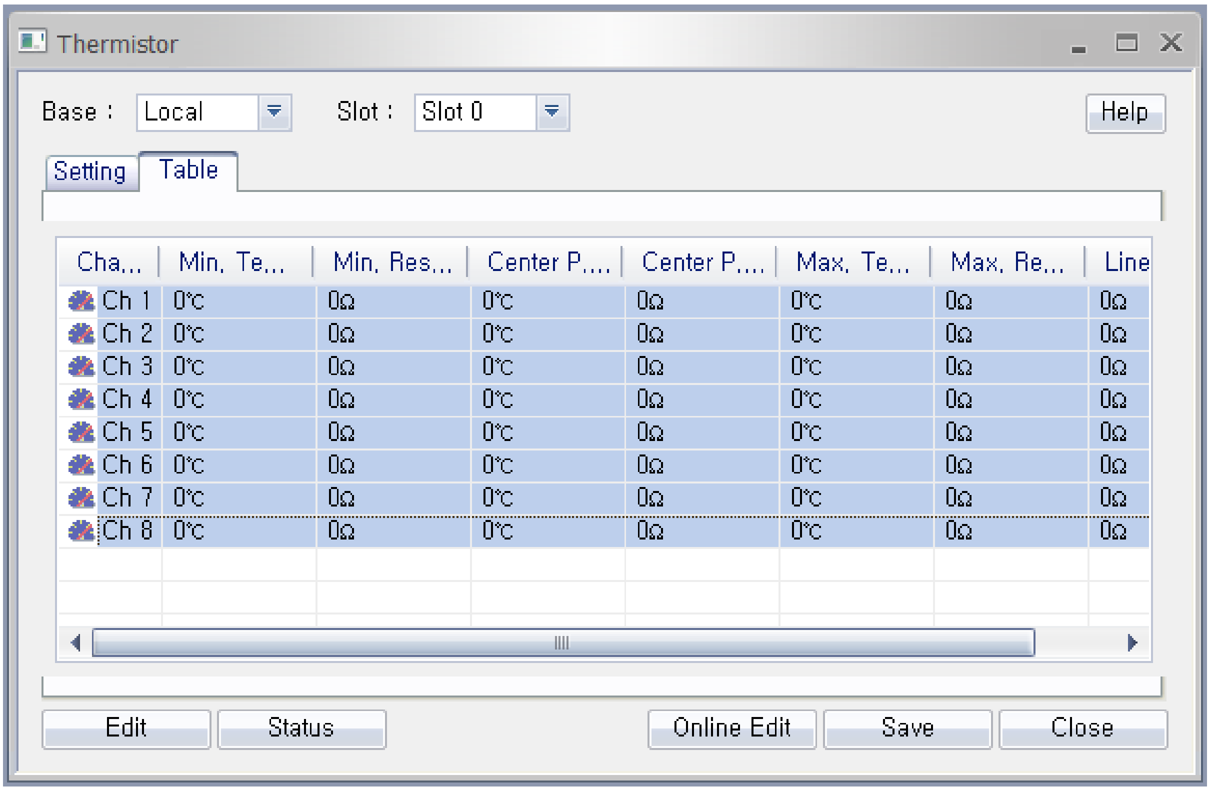
Device Unit: ℃

Enable Domain: X, Y, M, L, K, D

Type of stored data: Fahrenheit, Celsius, digital value

Example: The above example shows that you can store Celcius value in D100.

Table Tab: It is used to input the temperature and resistance of a thermistor.



Base : Local
Slot : Slot 0

| Cha... | Min. Te... | Min. Res... | Center P.... | Center P.... | Max. Te... | Max. Re... | Line |
|---|---|---|---|---|---|---|---|
| Ch 1 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 2 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 3 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 4 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 5 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 6 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 7 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |
| Ch 8 | 0℃ | 0Ω | 0℃ | 0Ω | 0℃ | 0Ω | 0Ω |

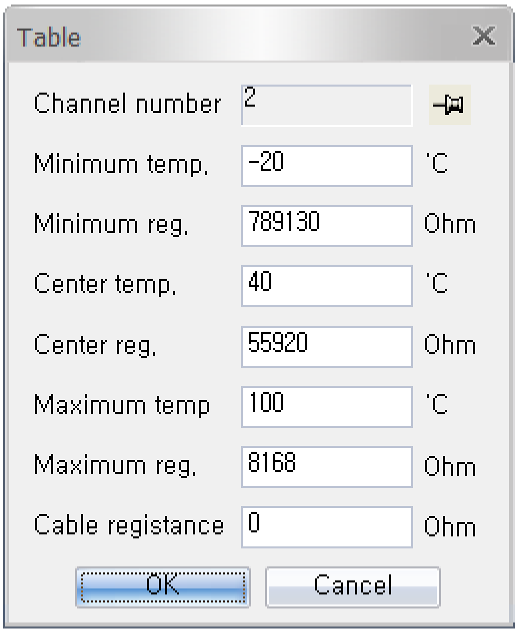
Please register the values refer to temperature-resistance table by provided manual from thermistor cooperation.

- Center P. temperature = Max. Temperature – (Max. Temperature – Min. Temperature) / 2

- In case of inputting the temperature-resistance table incorrectly, converted temperature value is out of range (0.3%)

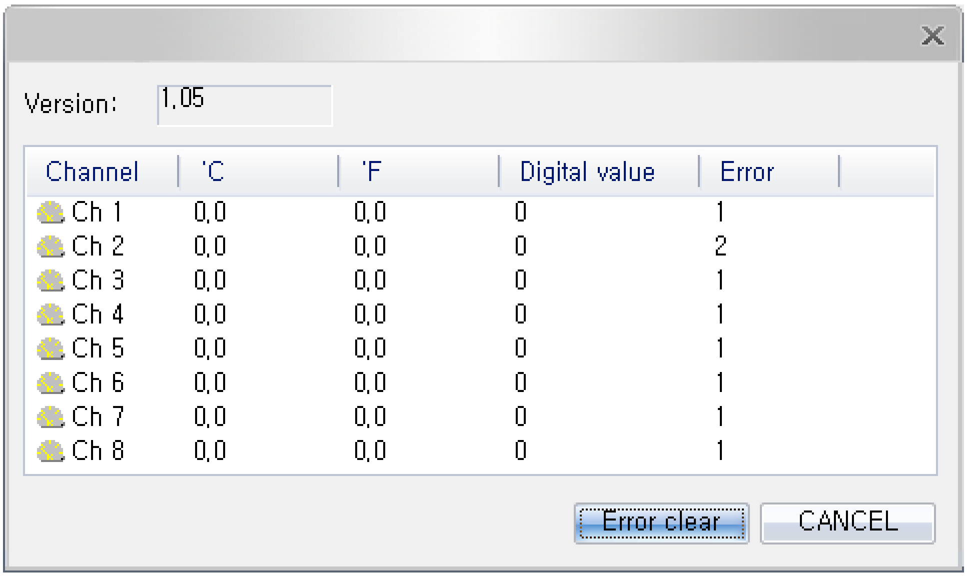
  Example : Max. Temperature = 100°C, Min. temperature = -20°C
  100 – (100 - (- 20) / 2 = 100 – 60 = 40°C

- Register temperature values (Max. = 100°C, Center = 40°C, Min. = -20°C), and then Input resistance values of each temperature



Channel number: 2
Minimum temp.: -20 'C
Minimum reg.: 789130 Ohm
Center temp.: 40 'C
Center reg.: 55920 Ohm
Maximum temp: 100 'C
Maximum reg.: 8168 Ohm
Cable registance: 0 Ohm

Click [Status], and you can see the current status of the thermistor module.



Version: 1.05

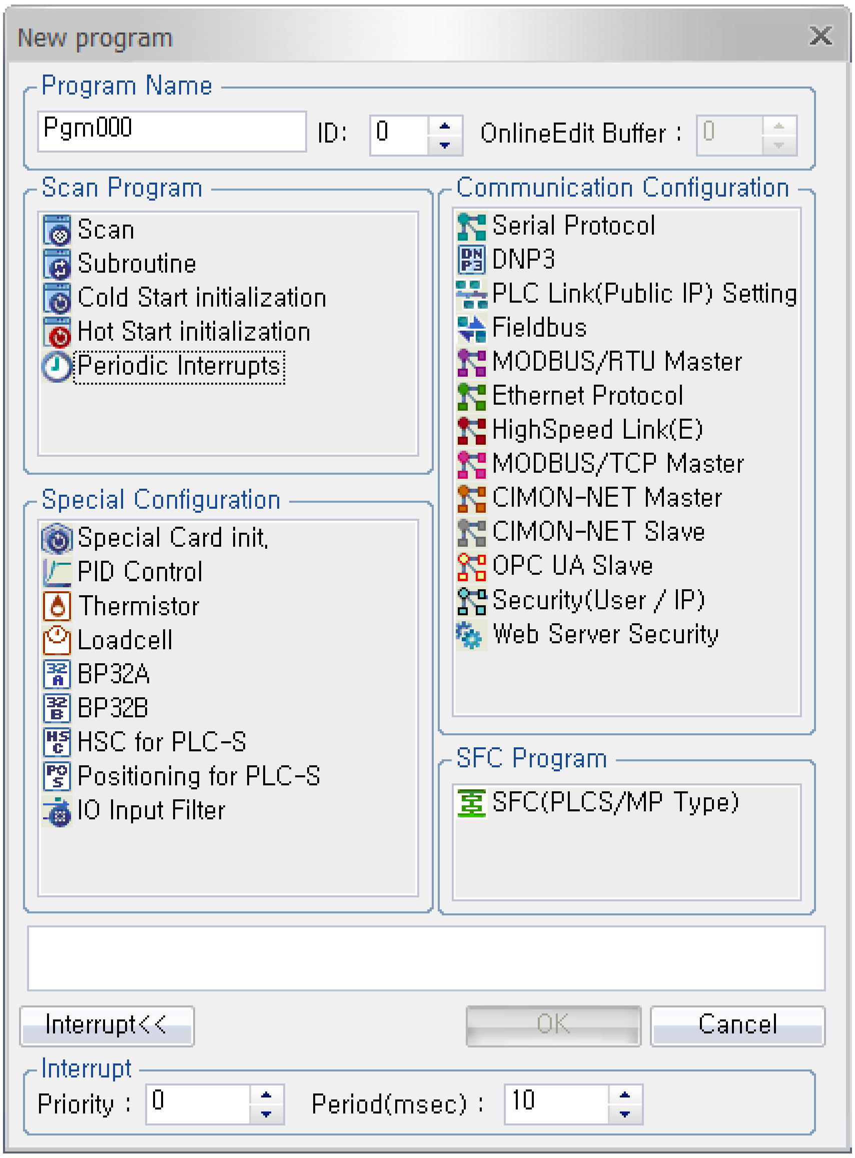
| Channel | 'C | 'F | Digital value | Error |
|---|---|---|---|---|
| Ch 1 | 0.0 | 0.0 | 0 | 1 |
| Ch 2 | 0.0 | 0.0 | 0 | 2 |
| Ch 3 | 0.0 | 0.0 | 0 | 1 |
| Ch 4 | 0.0 | 0.0 | 0 | 1 |
| Ch 5 | 0.0 | 0.0 | 0 | 1 |
| Ch 6 | 0.0 | 0.0 | 0 | 1 |
| Ch 7 | 0.0 | 0.0 | 0 | 1 |
| Ch 8 | 0.0 | 0.0 | 0 | 1 |

## 8.4 Loadcell Setting Program

The Loadcell Program configures parameters of the Loadcell modules including WG02A, WG04A, WG02C, WG02D and WG02E.

**Registering the Loadcell program**

Select [File] → [New Program] → [Loadcell] program.

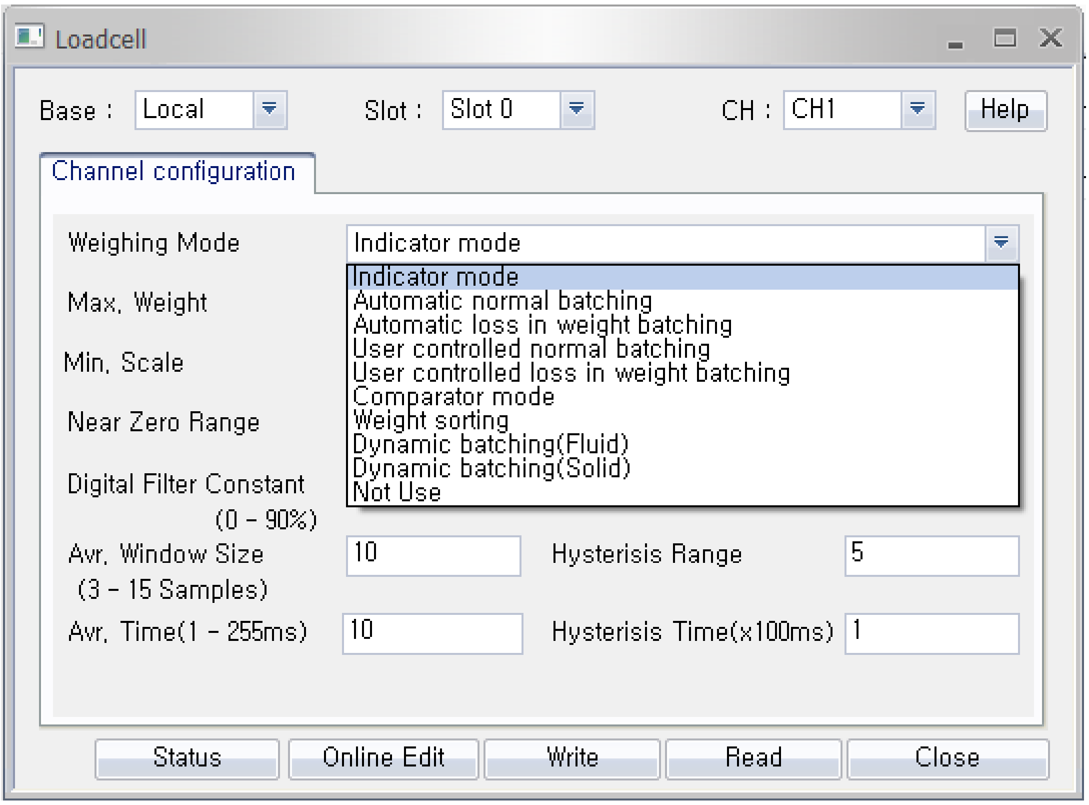


Program Name: Pgm000
ID: 0
OnlineEdit Buffer : 0
Priority : 0
Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

**Configuring the Loadcell program**



Base : Local
Slot : Slot 0
CH : CH1
Weighing Mode: Indicator mode
Avr. Window Size (3 - 15 Samples): 10
Hysterisis Range: 5
Avr. Time(1 - 255ms): 10
Hysterisis Time(x100ms): 1

1) **Weighing Mode:** The Loadcell modules provide 8 different operating modes.

- Indicator mode: is the simplest operating mode, provides the measured weight only and has no control functionality.

- Automatic normal batching: A batch is weighed automatically by controlling the full flow and dribble flow signals. The batch control is started by 'Start (Y2/3/4/5) signal or "WGBATCH" instruction. The batching data must firstly be configured by this special program (Loadcell) or written into the shared memory area of WG0nA module by sequence program.

- Automatic loss in weight batching: A batch is weighed by measuring the loss in weight as the material is discharged from the weighing hopper. The batch control is started by 'Start (Y2/3/4/5)' signal or "WGBATCH" instruction. Also, this batch needs 'Tare (YA/B/C/D)' input from sequence program during the progress.

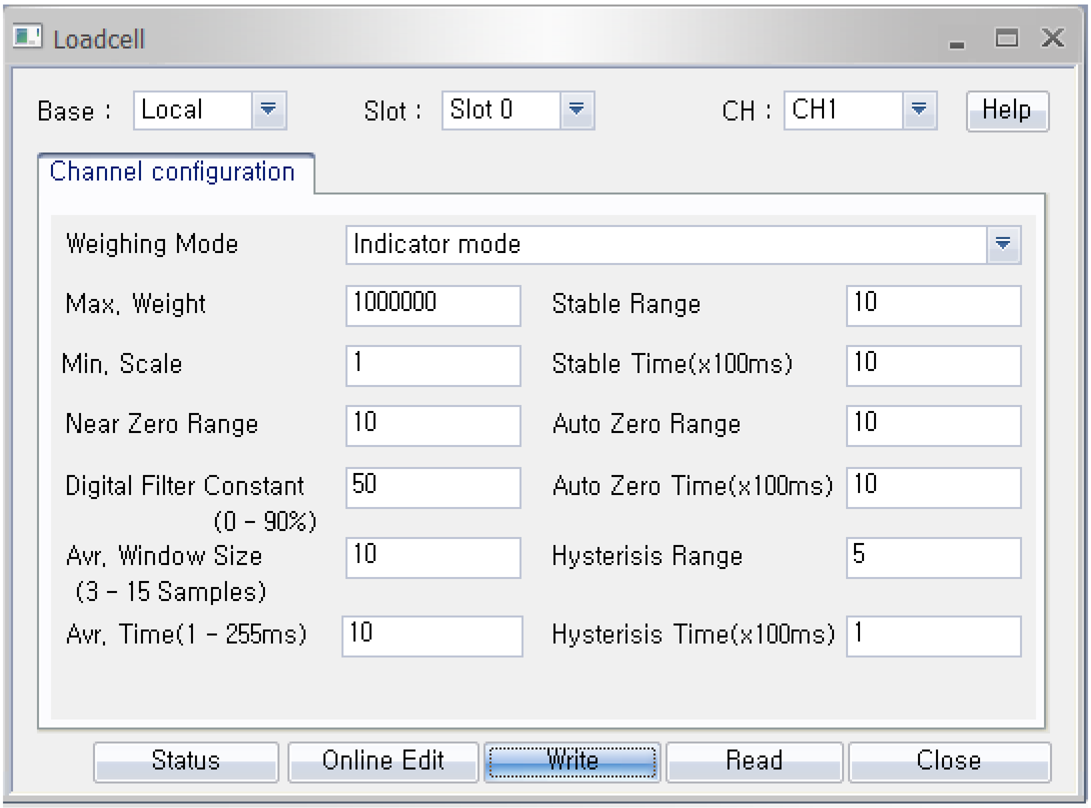
- User controlled normal batching: This mode performs normal batch weighing but the comparator output is dependent only on the current weight data. This mode, while being more flexible than the automatic mode, is more difficult to implement as the full flow and dribble flow signals must be turned off by a sequence program before the hopper is discharged. No compensation is performed.

- User controlled loss in weight batching: This mode performs loss in weight batching but the comparator output is dependent only on the net weight data. This mode, while being more flexible than the automatic mode described in section "Automatic Loss in Weight Batch," is more difficult to implement. No compensation is performed in this mode. After starting of this mode, the batching signal (X6/7/8/9) is turned on until when the WGSTOP instruction or 'Batch Stop' command (code 3) with Y2/3/4/5 signal is issued by sequence program.

• Comparator mode: This mode performs only comparison between set values and net weight.

• Weight sorting: This mode gets 7 different boundaries (set values) for classifying the 8 different ranges of weight. Each 8 ranges have their output bits in control outputs (offset 3, 18, 33, 48). At any time, only one bit of control outputs is set according to the currently measured net weight.

• Dynamic batching (fluid): This dynamic weighing batch program is supported by WG02D model only. WG02D model is specially turned for weighing fluid objects such as eggs, filled bottles and etc. at high speed (typical speed: 0.5 sec). Measured weight of fluid object has a special characteristic that series of measured values have wave pattern. A measuring idea can be suggested by this characteristic. Actual weight of the object would be located at the middle point of minimum and maximum wave cycle approximately.



Base : Local
Slot : Slot 0
CH : CH1

Weighing Mode: Indicator mode

| | | | |
|---|---|---|---|
| Max. Weight | 1000000 | Stable Range | 10 |
| Min. Scale | 1 | Stable Time(x100ms) | 10 |
| Near Zero Range | 10 | Auto Zero Range | 10 |
| Digital Filter Constant (0 - 90%) | 50 | Auto Zero Time(x100ms) | 10 |
| Avr. Window Size (3 - 15 Samples) | 10 | Hysterisis Range | 5 |
| Avr. Time(1 - 255ms) | 10 | Hysterisis Time(x100ms) | 1 |

2) **Max. Weight:** Maximum weight that the Loadcell can measure.
3) **Min. Scale:** Sets the display digit span value. If set value was '5', measured weight will be displayed as 0, 5, 10, and 15 … so on.
4) **Near Zero Range:** If current measured weight is within the valid set range (within 1% of Max. Weight), the zero signal will be turned on.
5) **Digital Filter Constant:** Valid set value (%) is 0-90%. WG0nA module has a digital filter for removing the noise from Loadcell output signal.
6) **Average Window Size and Time:** The weight data that can be used in batch control and sequence program is the average of a number of AD samples. This parameter sets the

number of samples for the average and the sampling time between each sampled data. The number of samples used does not affect the update rate of the weight data because the average is a 'moving window' type. If the set value is zero, the averaging function will not be activated.

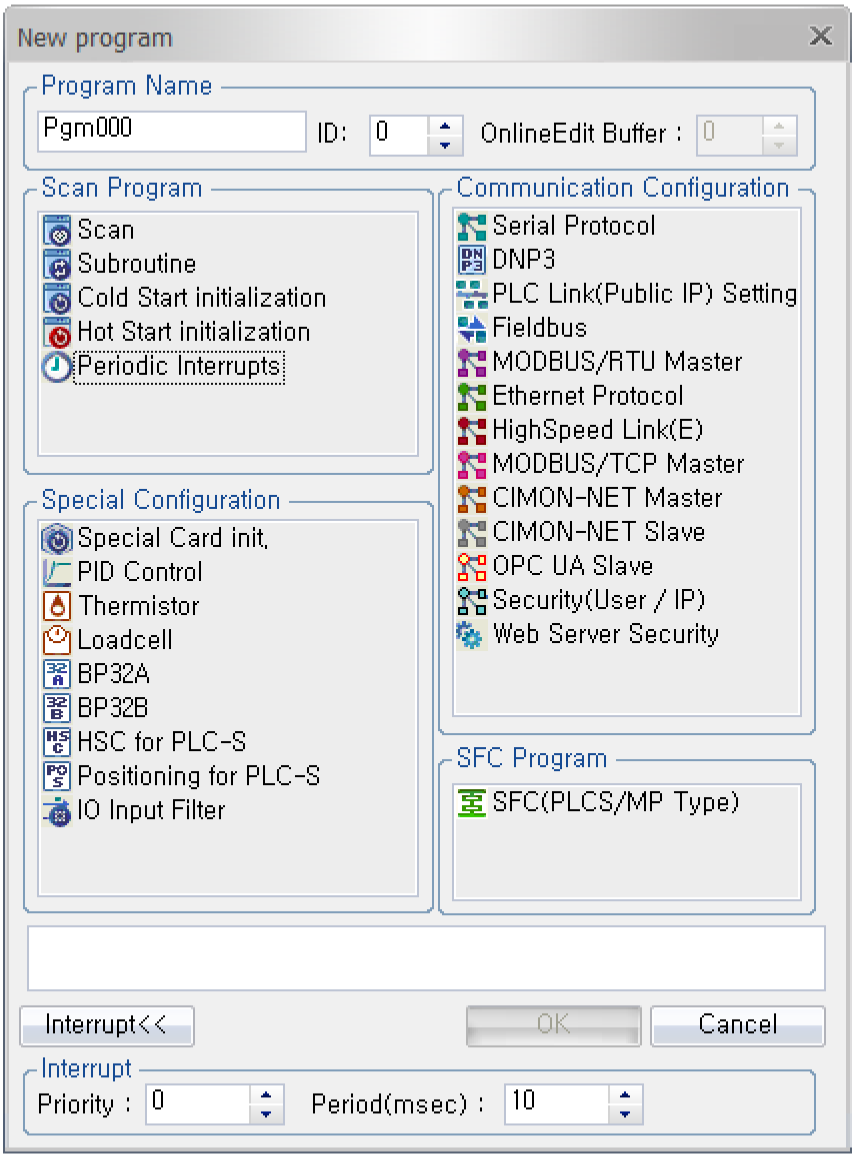
7) **Stable Range and Time:** Valid set range is within 1% of Max. Weight while valid set time (unit of 100 msec) is 1 – 100 (100msec – 10,000msec). A weight which does not change within the specified range for the time specified is considered to be stable and the stable output will be set to ON. If one of these set values is zero, the stable detect function will not be activated.
8) **Auto Zero Range:** Valid set range is within 1% of Max. Weight while valid set time (unit of 100 msec) is 1 – 100 (100msec – 10,000msec). The auto zero function removes the zero drift in the system by periodically re-zeroing the measured weight when it is near zero. The auto zero range is the maximum zero shift that will be corrected and the time period is the minimum time between corrections. If the measured weight shifts from zero to a value outside the auto zero range (within the zero time period) the weight will not be re-zeroed. If one of these set values is zero, the auto zero function will not be activated.
9) **Hysteresis Range and Time:** Valid set range is within 1% of Max. Weight while valid set time (unit of 100 msec) is 1 – 100 (100msec – 10,000msec). The hysteresis function suppresses flicker of the measured weight data. If the weight changes within the range specified and returns to the previous value within the time limit specified, the measured weight data will not be affected. If one of these set values is zero, the hysteresis function will not be activated.

## 8.5 High Speed Counter Program for PLC-S

The HSC for PLC-S Program is a special program that configures and controls High Speed Counter function built in PLC-S CPU.

**Registering the HSC for PLC-S**

Select [File] → [New Program] → [HSC for PLC-S] program.



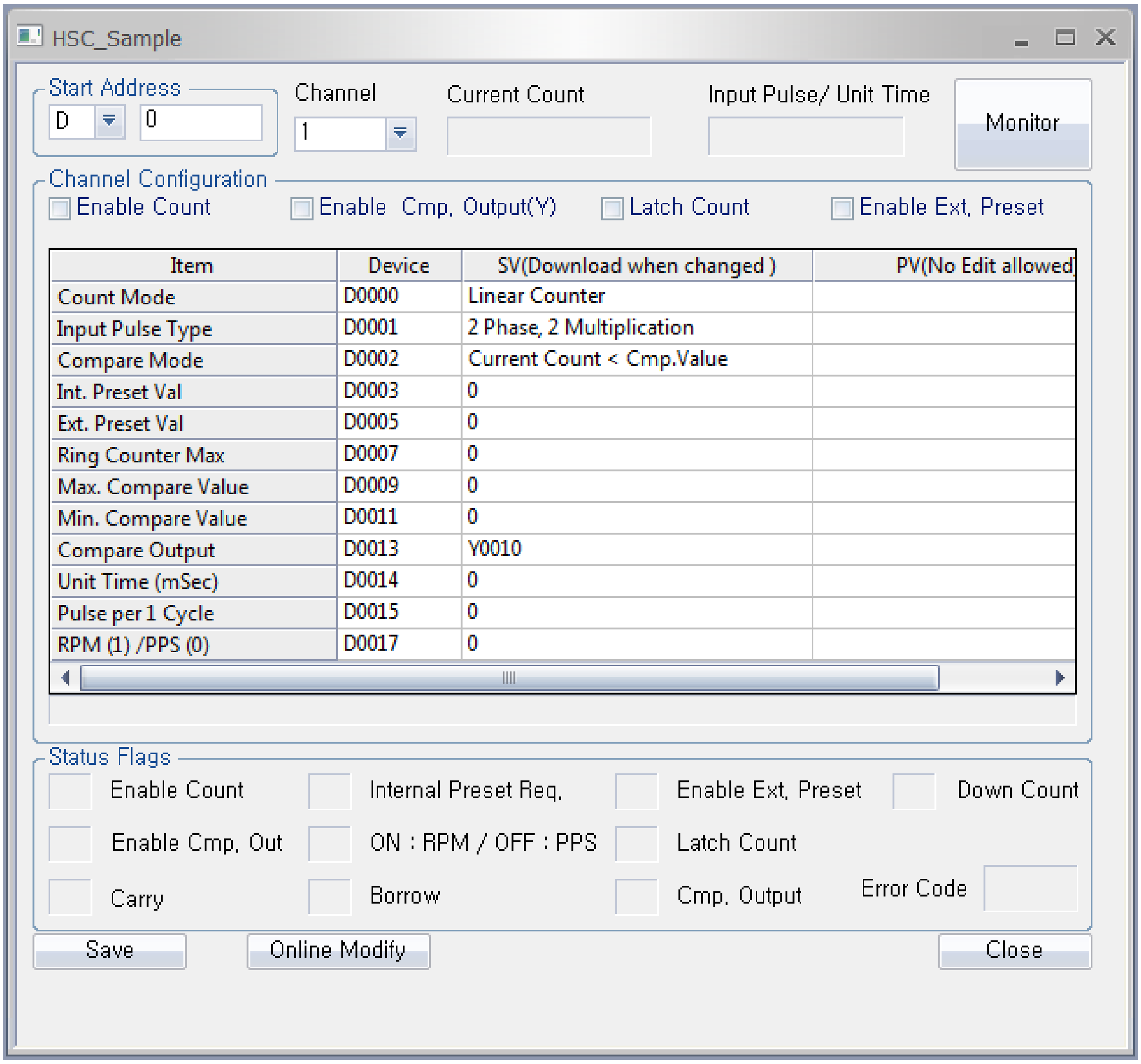
Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

**Configuring the HSC for PLC-S program**



Start Address: D 0

Channel: 1

Current Count

Input Pulse/ Unit Time

Channel Configuration

☐ Enable Count ☐ Enable Cmp. Output(Y) ☐ Latch Count ☐ Enable Ext. Preset

| Item | Device | SV(Download when changed ) | PV(No Edit allowed) |
|---|---|---|---|
| Count Mode | D0000 | Linear Counter | |
| Input Pulse Type | D0001 | 2 Phase, 2 Multiplication | |
| Compare Mode | D0002 | Current Count < Cmp.Value | |
| Int. Preset Val | D0003 | 0 | |
| Ext. Preset Val | D0005 | 0 | |
| Ring Counter Max | D0007 | 0 | |
| Max. Compare Value | D0009 | 0 | |
| Min. Compare Value | D0011 | 0 | |
| Compare Output | D0013 | Y0010 | |
| Unit Time (mSec) | D0014 | 0 | |
| Pulse per 1 Cycle | D0015 | 0 | |
| RPM (1) /PPS (0) | D0017 | 0 | |

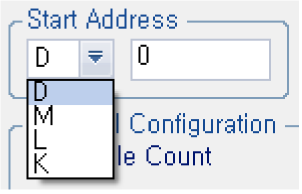
Status Flags

☐ Enable Count ☐ Internal Preset Req. ☐ Enable Ext. Preset ☐ Down Count

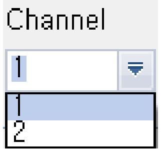
☐ Enable Cmp. Out ☐ ON : RPM / OFF : PPS ☐ Latch Count

☐ Carry ☐ Borrow ☐ Cmp. Output Error Code

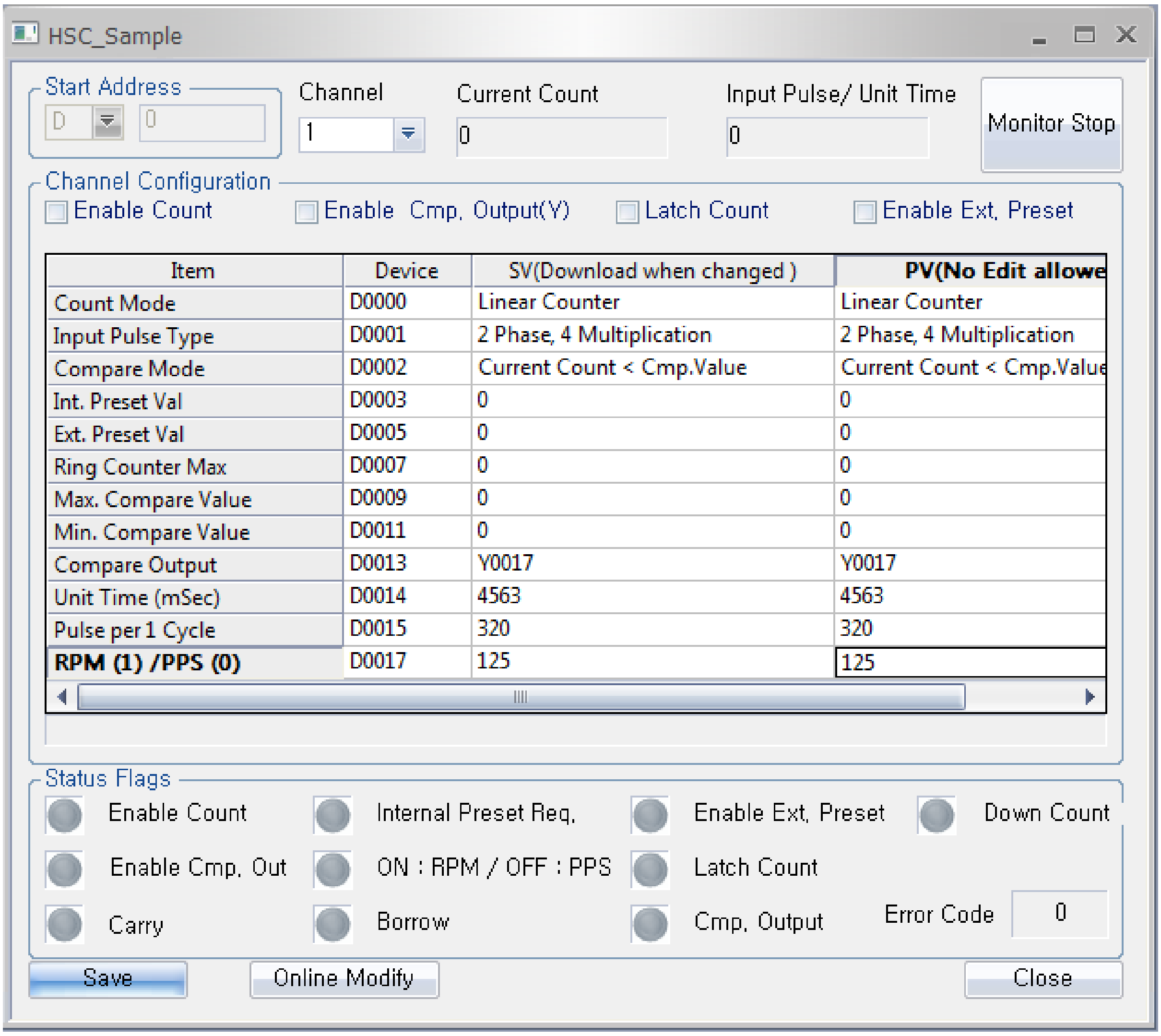
- **Start Address:** The parameters of the High Speed Counter program are stored in M, L, K, D areas in which you specify. **You cannot specify start address while in monitoring mode. Select the Start Address after shutting down the monitor mode.**



- **Channel:** Two channels are offered and can be selected.



- **Monitor:** Monitor mode is activated by clicking the “Monitor” button.



Start Address: D 0

Channel: 1

Current Count: 0

Input Pulse/ Unit Time: 0

Channel Configuration
☐ Enable Count ☐ Enable Cmp. Output(Y) ☐ Latch Count ☐ Enable Ext. Preset

| Item | Device | SV(Download when changed ) | PV(No Edit allowe |
|---|---|---|---|
| Count Mode | D0000 | Linear Counter | Linear Counter |
| Input Pulse Type | D0001 | 2 Phase, 4 Multiplication | 2 Phase, 4 Multiplication |
| Compare Mode | D0002 | Current Count < Cmp.Value | Current Count < Cmp.Value |
| Int. Preset Val | D0003 | 0 | 0 |
| Ext. Preset Val | D0005 | 0 | 0 |
| Ring Counter Max | D0007 | 0 | 0 |
| Max. Compare Value | D0009 | 0 | 0 |
| Min. Compare Value | D0011 | 0 | 0 |
| Compare Output | D0013 | Y0017 | Y0017 |
| Unit Time (mSec) | D0014 | 4563 | 4563 |
| Pulse per 1 Cycle | D0015 | 320 | 320 |
| **RPM (1) /PPS (0)** | D0017 | 125 | 125 |

Status Flags
● Enable Count ● Internal Preset Req. ● Enable Ext. Preset ● Down Count
● Enable Cmp. Out ● ON : RPM / OFF : PPS ● Latch Count
● Carry ● Borrow ● Cmp. Output Error Code 0

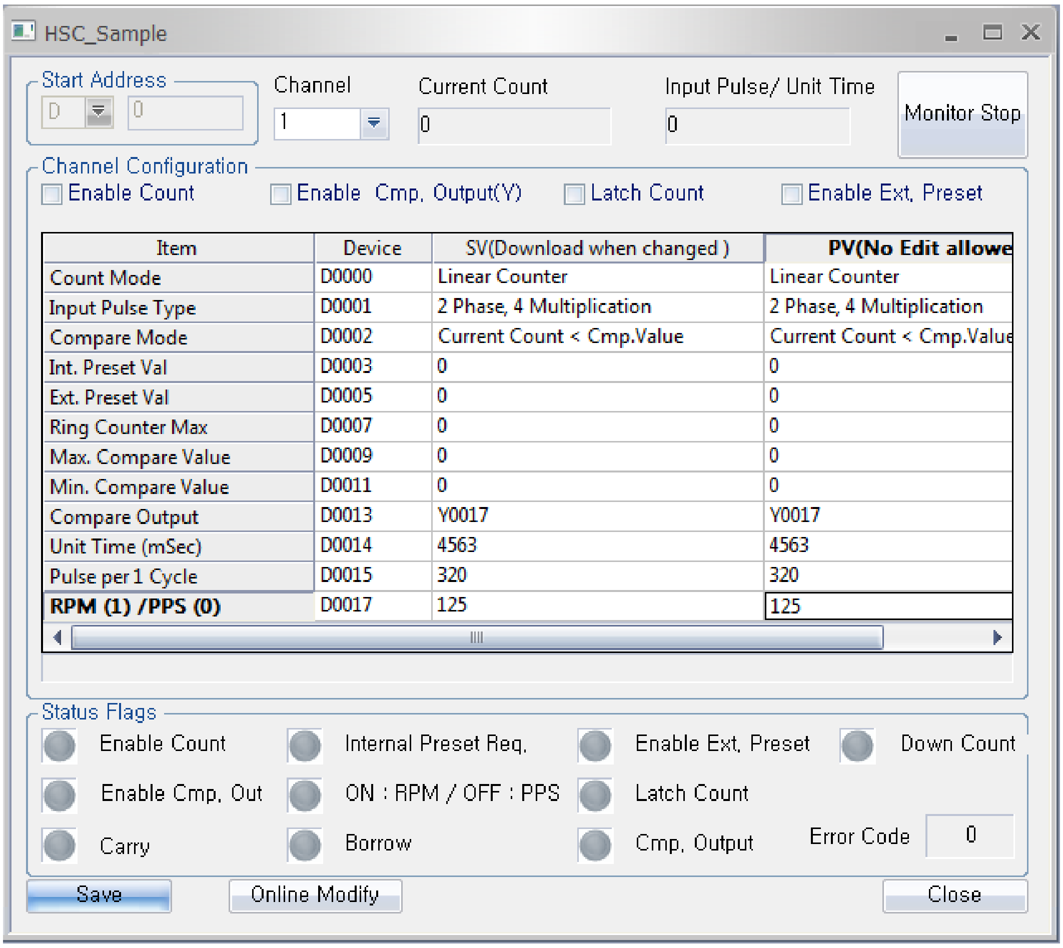
“Monitor Stop” button appears when the Monitor mode is activated.

- **Parameter:** The parameters of each channel are listed in the below table.

| Oft | Group | Description | Setting | | Memory | Remark |
|---|---|---|---|---|---|---|
| | | | Value | Function | | |
| 0 | Parameter | Count Type | H0000 | Linear Counter | Word | Read Only |
| | | | H0001 | Ring Counter | | |
| 1 | | Input Pulse Mode | H0000 | 2 Phase, 2 Input, 2 Multi. | Word | Read Only |
| | | | H0001 | 2 Phase, 2 Input, 4 Multi. | | |
| | | | H0002 | 1 Phase, 2 Multi. (Low) | | |
| | | | H0003 | 1 Phase, 2 Multi. (High) | | |
| 2 | | Compare Mode | H0000 | < | Word | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | H0001 | <= | | |
| | | | H0002 | = | | |
| | | | H0003 | => | | |
| | | | H0004 | > | | |
| | | | H0005 | < > | | |
| | | | H0006 | > < | | |
| 3 | | Int. Preset Value | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low |
| 4 | | | | | | High |
| 5 | | Ext. Preset Value | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low |
| 6 | | | | | | High |
| 7 | | Ring Max. Value | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low |
| 8 | | | | | | High |
| 9 | | Compare Max. | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low |
| 10 | | | | | | High |
| 11 | | Compare Min. | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low |
| 12 | | | | | | High |
| 13 | | Compare Output | HFFFF | N/A | Word | Read Only |
| | | | H0000 | Y0010 | | |
| | | | H0001 | Y0011 | | |
| | | | H0002 | Y0012 | | |
| | | | H0003 | Y0013 | | |
| | | | H0004 | Y0014 | | |
| | | | H0005 | Y0015 | | |
| | | | H0006 | Y0016 | | |
| | | | H0007 | Y0017 | | |
| 14 | | Unit Time | 1~60,000 mSec | | Word | |
| 15 | | Pulse / Rotation | 1~60,000 Pulse | | Word | |
| 16 | Control | Counter Enable | Bit 0 | SET = Enable | Word | |
| | | Int. Preset | Bit 1 | SET = Preset | | |
| | | Ext. Preset Enable | Bit 2 | SET = Enable | | |
| | | Down Counting | Bit 3 | SET = Down | | Read Only |
| | | Compare Output Enable | Bit 4 | SET = Enable | | Read Only |
| | | RPM / PPS Select | Bit 5 | RPM(1), PPS(0) | | |
| | | Count Latch | Bit 6 | SET = Enable | | Read Only |
| | | | Bit 7..F | | | |
| 17 | Monitor | RPM/PPS Measured Value | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low Word |
| 18 | | | | | | High Word |
| 19 | | | | | | |
| 20 | | Carry | Bit 0 | SET = Carry | Word | Read Only |
| | | Borrow | Bit 1 | SET = Borrow | | Read Only |
| | | Compare Result | Bit 2 | SET = Result | | Read Only |
| | | | Bit 3..F | | | |
| 21 | | Current Count Value | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low Word |
| 22 | | | | | | High Word |
| 23 | | Input Pulse per Unit Time | -2,147,483,648 ~ 2,147,483,647 | | Dword | Low Word |
| 24 | | | | | | High Word |
| 25 | | Error Code | Refer Error Code Table | | Word | |

- **Operation Status:** displays status flags of High Speed Counter.



Start Address: D 0

Channel: 1

Current Count: 0

Input Pulse/ Unit Time: 0

Channel Configuration

☐ Enable Count ☐ Enable Cmp. Output(Y) ☐ Latch Count ☐ Enable Ext. Preset

| Item | Device | SV(Download when changed ) | PV(No Edit allowe |
|---|---|---|---|
| Count Mode | D0000 | Linear Counter | Linear Counter |
| Input Pulse Type | D0001 | 2 Phase, 4 Multiplication | 2 Phase, 4 Multiplication |
| Compare Mode | D0002 | Current Count < Cmp.Value | Current Count < Cmp.Value |
| Int. Preset Val | D0003 | 0 | 0 |
| Ext. Preset Val | D0005 | 0 | 0 |
| Ring Counter Max | D0007 | 0 | 0 |
| Max. Compare Value | D0009 | 0 | 0 |
| Min. Compare Value | D0011 | 0 | 0 |
| Compare Output | D0013 | Y0017 | Y0017 |
| Unit Time (mSec) | D0014 | 4563 | 4563 |
| Pulse per 1 Cycle | D0015 | 320 | 320 |
| **RPM (1) /PPS (0)** | D0017 | 125 | 125 |

Status Flags

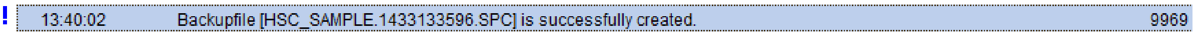
● Enable Count ● Internal Preset Req. ● Enable Ext. Preset ● Down Count

● Enable Cmp. Out ● ON : RPM / OFF : PPS ● Latch Count

● Carry ● Borrow ● Cmp. Output

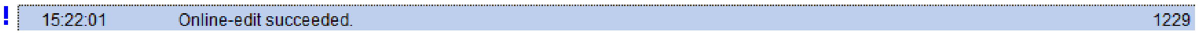
Error Code: 0

- **Save:**
When the HSC for PLC-S program is saved, a confirmation message appears as shown below.



```
!  13:40:02    Backupfile [HSC_SAMPLE.1433133596.SPC] is successfully created.    9969
```

- **Online Modify:** You can modify and change values while running the program. Once saved, a confirmation message appears as shown below.



```
!  15:22:01    Online-edit succeeded.    1229
```

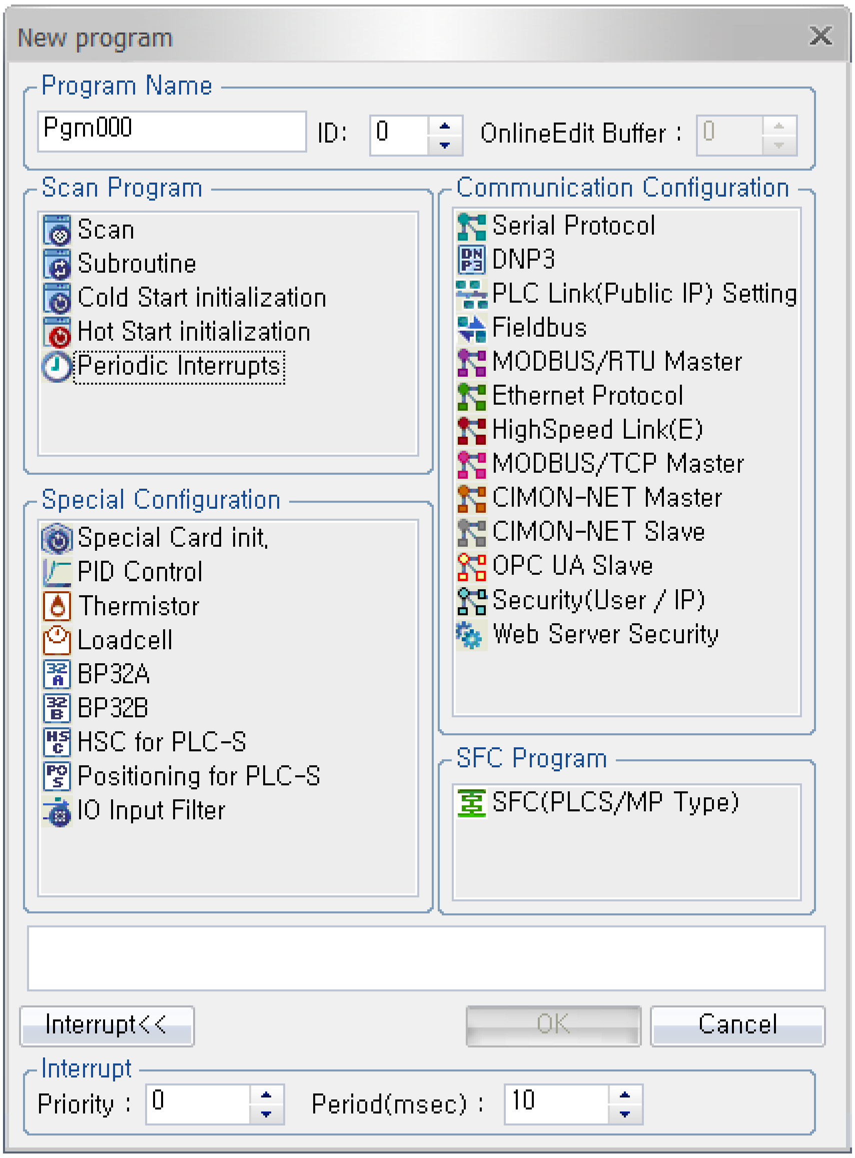
- **Close:** closes the program.

### 8.6 Positioning Program for PLC-S

The Positioning for PLC-S program is a special program that configures and controls positioning function built in PLC-S CPU. Only one positioning program for PLC-S can be registered for a CICON project.

**Registering the Positioning for PLC-S**

Select [File] → [New Program] → [Positioning for PLC-S] program.



Program Name: Pgm000

ID: 0

OnlineEdit Buffer : 0

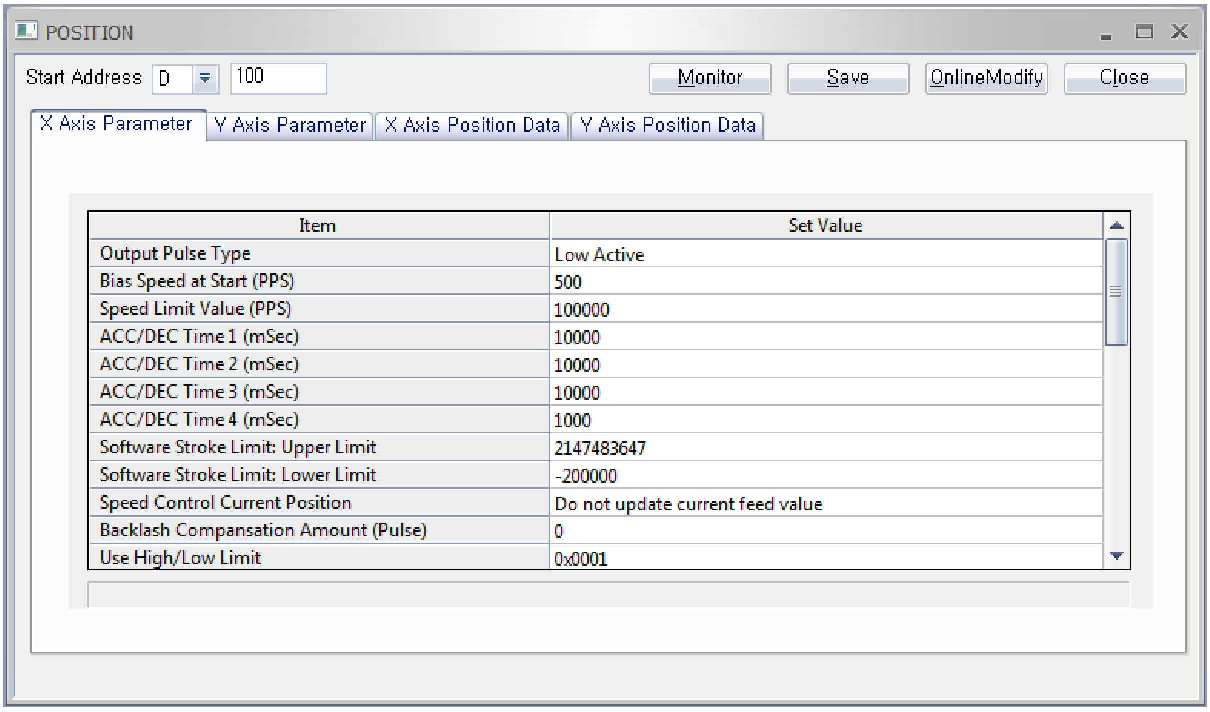
Priority : 0

Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

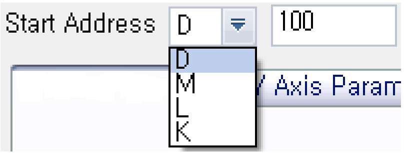
Click the [OK] button.

## Configuring the Positioning for PLC-S



| Item | Set Value |
|---|---|
| Output Pulse Type | Low Active |
| Bias Speed at Start (PPS) | 500 |
| Speed Limit Value (PPS) | 100000 |
| ACC/DEC Time 1 (mSec) | 10000 |
| ACC/DEC Time 2 (mSec) | 10000 |
| ACC/DEC Time 3 (mSec) | 10000 |
| ACC/DEC Time 4 (mSec) | 1000 |
| Software Stroke Limit: Upper Limit | 2147483647 |
| Software Stroke Limit: Lower Limit | -200000 |
| Speed Control Current Position | Do not update current feed value |
| Backlash Compansation Amount (Pulse) | 0 |
| Use High/Low Limit | 0x0001 |

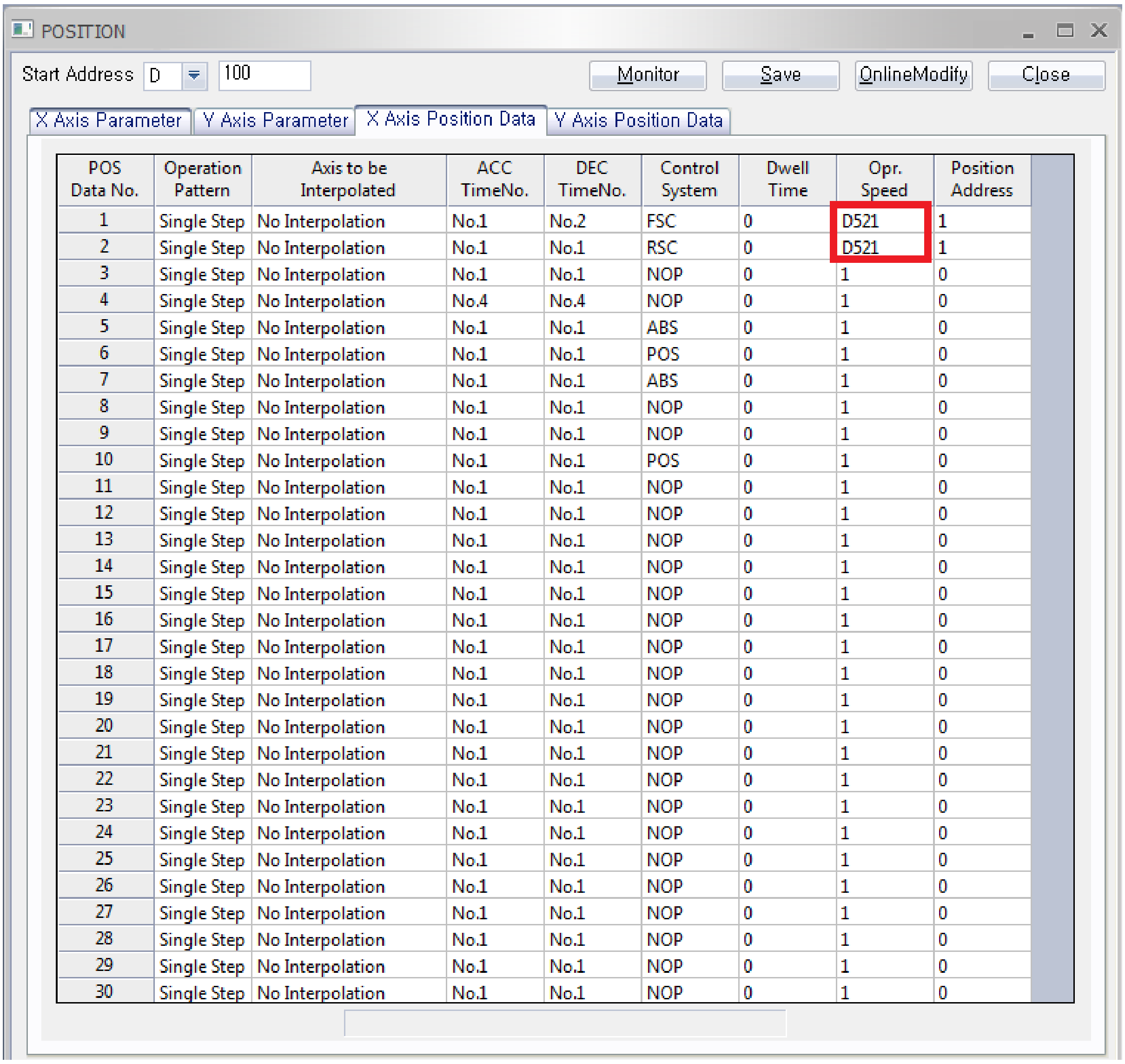
- **Start Address:** The parameters of the positioning program are stored in M, L, K, D areas in which you can specify. **You cannot select start address while in monitoring mode. Specify the Start Address after shutting down the monitor mode.**



- **X/Y Axis Parameter Configurations:** Because the parameter configurations are stored in the same space (flash memory) in which the sequence program is saved, the parameters will be kept even after power is removed.

| Off Set | Item | Configuration Details | | R/W | Remark |
|---|---|---|---|---|---|
| | | Default | Function | | |
| 0 | Output Pulse Type | 0 | 0=Not Used<br>1=High Active<br>2=Low Active | W | |
| 1 | Bias Speed at Start | 1 | 1 ~ 100,000 PPS | DW | Low |
| 2 | | | | | High |
| 3 | Speed Limit Value | 50,000 | 1 ~ 100,000 PPS | DW | Low |
| 4 | | | | | High |
| 5 | ACC/DEC Time 1 | 1,000 | 1 ~ 65,535 mSec | W | |
| 6 | ACC/DEC Time 2 | 1,000 | 1 ~ 65,535 mSec | W | |
| 7 | ACC/DEC Time 3 | 1,000 | 1 ~ 65,535 mSec | W | |
| 8 | ACC/DEC Time 4 | 1,000 | 1 ~ 65,535 mSec | W | |
| 9 | S/W Upper Limit | 2,147,483,647 | -2,147,483,648 ~ 2,147,483,647 | DW | Low |
| 10 | | | | | High |
| 11 | S/W Lower Limit | -2,147,483,648 | -2,147,483,648 ~ 2,147,483,647 | DW | Low |
| 12 | | | | | High |
| 13 | Speed Control Current Position | 0 | 0=Do not update<br>1=Update<br>2=Clear and update | W | |
| 14 | Backlash Compensation | 0 | 0 ~ 65,535 Pulse | W | |
| 15 | External Upper/Lower Limit Signal | 0 | 0=Not Used<br>1=Wired (Used) | W | |
| 16 | Jog Speed Limit | 20,000 | 1 ~ 100,000 PPS<br>(Bias Speed<Jog Speed<Speed Limit) | DW | Low |
| 17 | | | | | High |
| 18 | Jog Acc/Dec Time | 0 | No. of Acc/Dec Time (0~3) | W | |
| 19 | Inching Speed | 100 | 0 ~ 65,535 PPS | W | |
| 20 | Complete Output Signal Duration | 1000 | 0 ~ 65,535 mSec | W | |
| 21 | OPR Method | 0 | 0=DOG / Zero OFF<br>1=DOG / Zero ON<br>2=DOG | W | |
| 22 | OPR Direction | 0 | 0=Forward<br>1=Backward | W | |
| 23 | Origin Address | 0 | -2,147,483,648 ~ 2,147,483,647 | DW | Low |
| 24 | | | | | High |
| 25 | OPR High Speed | 50,000 | 1 ~ 100,000 PPS | DW | Low |
| 26 | | | | | High |
| 27 | OPR Low Speed | 1,000 | 1 ~ 100,000 PPS | DW | Low |
| 28 | | | | | High |
| 29 | OPR Acc/Dec Time | 0 | No. of Acc/Dec Time (0~3) | W | |
| 30 | DWELL Time | 0 | 0 ~ 50,000 mSec. | W | |

- **X/Y Axis Position Data:** The basic controls such as position control and speed control are executed by configuring the required items in this 'Position Data' and starting this position data. Maximum of 30 'position data' can be defined for each axis. Each position data occupies 8 Word sized memory. This same structure of 8 word memory is also used for positioning command "POSCTRL."



Start Address D 100

| POS Data No. | Operation Pattern | Axis to be Interpolated | ACC TimeNo. | DEC TimeNo. | Control System | Dwell Time | Opr. Speed | Position Address |
|---|---|---|---|---|---|---|---|---|
| 1 | Single Step | No Interpolation | No.1 | No.2 | FSC | 0 | D521 | 1 |
| 2 | Single Step | No Interpolation | No.1 | No.1 | RSC | 0 | D521 | 1 |
| 3 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 4 | Single Step | No Interpolation | No.4 | No.4 | NOP | 0 | 1 | 0 |
| 5 | Single Step | No Interpolation | No.1 | No.1 | ABS | 0 | 1 | 0 |
| 6 | Single Step | No Interpolation | No.1 | No.1 | POS | 0 | 1 | 0 |
| 7 | Single Step | No Interpolation | No.1 | No.1 | ABS | 0 | 1 | 0 |
| 8 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 9 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 10 | Single Step | No Interpolation | No.1 | No.1 | POS | 0 | 1 | 0 |
| 11 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 12 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 13 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 14 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 15 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 16 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 17 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 18 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 19 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 20 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 21 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 22 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 23 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 24 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 25 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 26 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 27 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 28 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 29 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |
| 30 | Single Step | No Interpolation | No.1 | No.1 | NOP | 0 | 1 | 0 |

*For Dwell Time / Operating Speed / Position Address, invariable numbers and device addresses (D, M, L, K) can be entered.

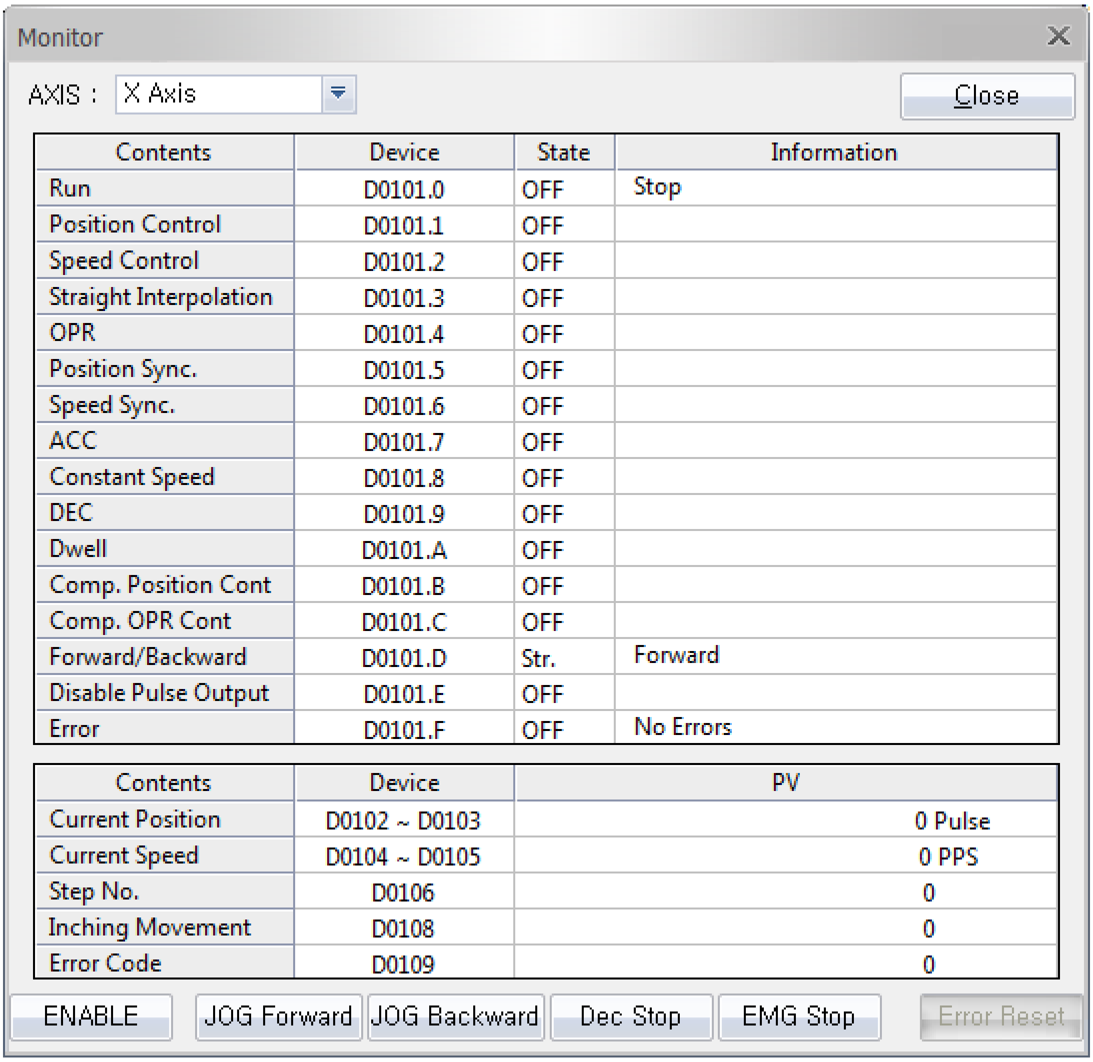
| Off Set | Item | Bit | Description | Unit |
|---|---|---|---|---|
| 0 | Operation Pattern | 0 | 00 = Single step control<br>01 = Continuous control | |
| | | 1 | | |
| | Axis to be Interpolated | 2 | 00 = Non-Interpolation<br>01 = Main Axis : Y (Linear Interpolation)<br>10 = Main Axis : X (Linear Interpolation) | |
| | | 3 | | |
| | ACC Time | 4 | Acc/Dec No. (0 ~ 3) | |
| | | 5 | | |
| | DEC Time | 6 | Acc/Dec No. (0 ~ 3) | |
| | | 7 | | |
| | Control System | 8..F | See 'Control Code' table | |
| 1 | | | | |
| 2 | Dwell Time | 0 ~ 65,535 or indirect data (device memory) | | mSec |
| 3 | | | | |
| 4 | OPR Speed | L | 1 ~ 100,000<br>or indirect data (device memory) | PPS |
| 5 | | H | | |
| 6 | Target Position Address | L | -2,147,483,648 ~ 2,147,483,647<br>or indirect data (device memory) | Pulse |

'**Control code**' must be 0 at the end of 'position data' list. While in operation, if the control code is zero, PLC-S terminates the series of positioning control and does not go onto the next item on the list.

| **Code** | | **Sym** | **Function** | **Remark** |
|---|---|---|---|---|
| **Hex** | **Dec** | | | |
| 00H | 0 | - | End of position data | Terminates continuous control |
| 01H | 1 | **ABS** | Absolute position control | |
| 05H | 5 | **INC** | Incremental position control | |
| 09H | 9 | **FEED** | Incremental position control after address reset | |
| 13H | 19 | **FSC** | Speed control (Forward) | |
| 17H | 23 | **RSC** | Speed control (Backward) | |
| 80H | 128 | **NOP** | No operation is performed. | |
| 81H | 129 | **JUMP** | Force to change next step No. | Next step set value is stored in 'target position address' |
| 82H | 130 | **LOOP** | The first step of loop | Loop count is stored in 'target position address' |
| 83H | 131 | **LEND** | The last step of loop | |
| 84H | 132 | **POS** | Force to change the current position address | New address is stored in 'target position address' |

- **Monitor:** runs monitor mode.

The monitor mode displays device information of the start address and contents of the axis.



AXIS : X Axis

| Contents | Device | State | Information |
|---|---|---|---|
| Run | D0101.0 | OFF | Stop |
| Position Control | D0101.1 | OFF | |
| Speed Control | D0101.2 | OFF | |
| Straight Interpolation | D0101.3 | OFF | |
| OPR | D0101.4 | OFF | |
| Position Sync. | D0101.5 | OFF | |
| Speed Sync. | D0101.6 | OFF | |
| ACC | D0101.7 | OFF | |
| Constant Speed | D0101.8 | OFF | |
| DEC | D0101.9 | OFF | |
| Dwell | D0101.A | OFF | |
| Comp. Position Cont | D0101.B | OFF | |
| Comp. OPR Cont | D0101.C | OFF | |
| Forward/Backward | D0101.D | Str. | Forward |
| Disable Pulse Output | D0101.E | OFF | |
| Error | D0101.F | OFF | No Errors |

| Contents | Device | PV |
|---|---|---|
| Current Position | D0102 ~ D0103 | 0 Pulse |
| Current Speed | D0104 ~ D0105 | 0 PPS |
| Step No. | D0106 | 0 |
| Inching Movement | D0108 | 0 |
| Error Code | D0109 | 0 |

- AXIS: You can select either X Axis or Y Axis. When you change the axis, its device also changes, and the monitor window displays current state of the device.

- ENABLE / DISABLE:
  Read: notifies the user whether or not the selected axis is currently active.
  Write: If this flag is set, the selected axis is switched to the active state. If the flag is reset, the axis is switched to the disabled mode.

- Forward/Backward JOG:
  JOG drive operates forward and backward without a command, and it operates according to the 'JOG Speed Limit' and 'JOG Accelerate / Decelerate Time' values configured in the parameters. JOG motion can operate without having to determine starting point. ***If you close the monitor window while driving JOG forward or JOG backward, be aware that the operating status is maintained.**

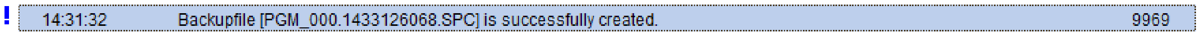
- Decelerate (Dec) stop: gradually stops the axis in operation.

- Emergency Stop: immediately stops the axis in operation without ‘decelerate section.’

- Error Reset: this button is activated when an error occurs during the operation of the selected axis. The error is displayed according to the error code below.

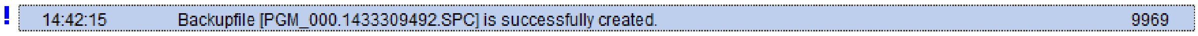
| Category | Error Code | Error Name | Description |
|---|---|---|---|
| - | 0 | No error | Normal operation status |
| Common | 104 | H/W upper limit | Exceeds position limit<br>(H/W upper limit signal detected) |
|  | 105 | H/W lower limit | Exceeds position limit<br>(H/W lower limit signal detected) |
|  | 106 | Opr. speed error | Operational speed in bigger than speed Limit |
|  | 154 | S/W upper limit | Exceeds S/W position upper limit |
|  | 155 | S/W lower limit | Exceeds S/W position lower limit |
|  | 156 | Emergency Stop | Positioning control is denied.<br>(Emergency stop signal is ON) |
| OPR | 202 | OPR required | Home position is not decided.<br>Cannot execute positioning control. |
|  | 203 | No DOG signal | Exceeds DOG signal input time limit (30 seconds) during OPR operation. |
| Manual | 300 | JOG/Inching fault | JOG/Inching command/input is executed while other positioning control is under operation. |
| Positioning | 519 | Interpolation fault | Partner axis is busy with non-interpolation operation. |
|  | 550 | Position address change fault | A command to change current position address is issued while the axis is under operation. |
|  | 551 | Speed change fault | A command to change current speed is issued while the axis in stop or dwell. |
|  | 552 | Target address change fault | A command to change target address is issued while the axis in stop or dwell. |
|  | 553 | Duplicated position control | Another position control command is issued while the axis is under operation. |
|  | 554 | Online edit fault | Online program edit/modify is performed while axis are under operation. |

- **Save:** When the Positioning for PLCS program is successfully saved, you will get a message.



```
14:31:32          Backupfile [PGM_000.1433126068.SPC] is successfully created.          9969
```

- **Online Modify:** downloads the positioning program while running the positioning program. When the modified program is successfully saved, you will get a confirmation message.



```
14:42:15          Backupfile [PGM_000.1433309492.SPC] is successfully created.          9969
```

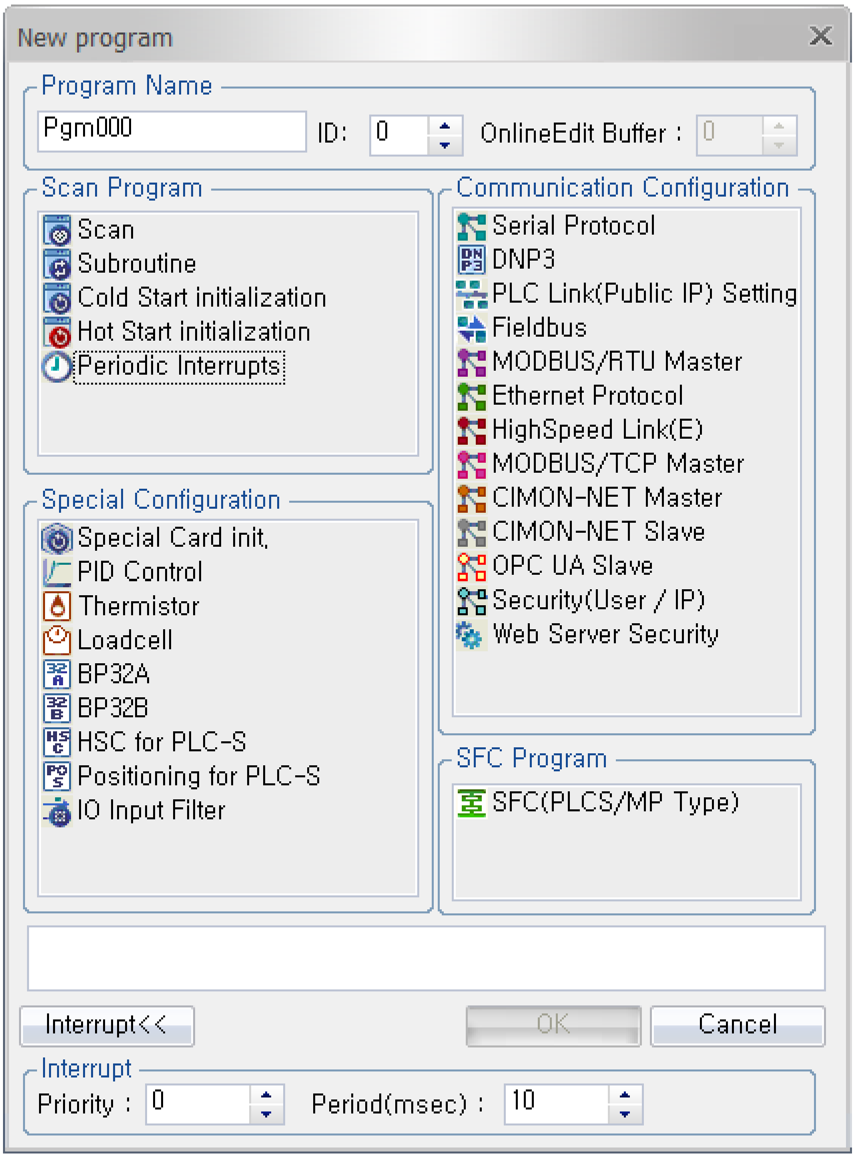
- **Close:** closes the PLCS Positioning program.

## 8.7 IO Input Filter for PLC-S

The IO Input Filter Program is a special program that configures the IO Input Filter for PLC-S modules.

### Registering the IO Input Filter

Select [File] → [New Program] → [IO Input Filter] program.



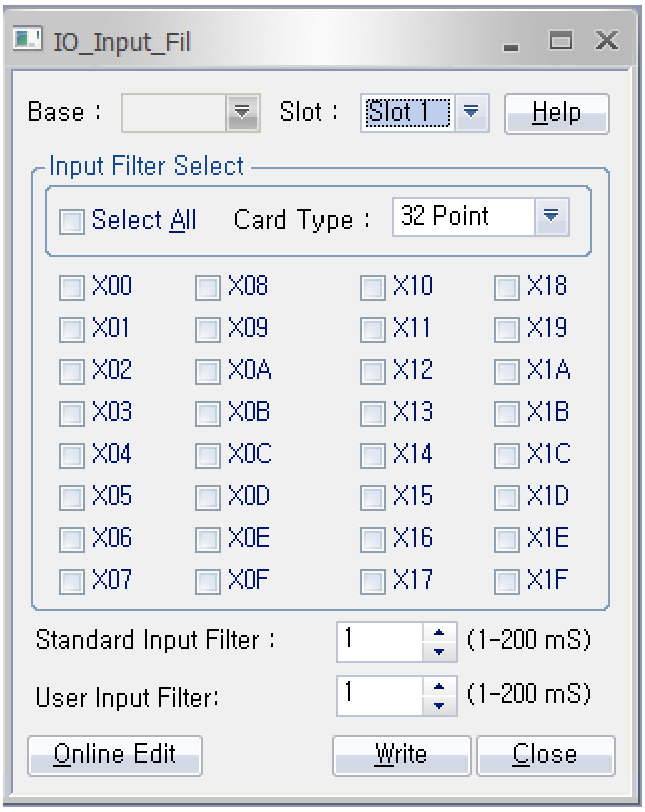
Pgm000 ID: 0 OnlineEdit Buffer : 0

Priority : 0 Period(msec) : 10

Enter the Program Name, Program ID and Program Free Space (Online Edit Buffer).

Click the [OK] button.

**Configuring the IO Input Filter Program**



Slot : Slot 1

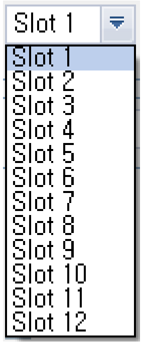
Card Type : 32 Point

Standard Input Filter : 1 (1-200 mS)

User Input Filter: 1 (1-200 mS)

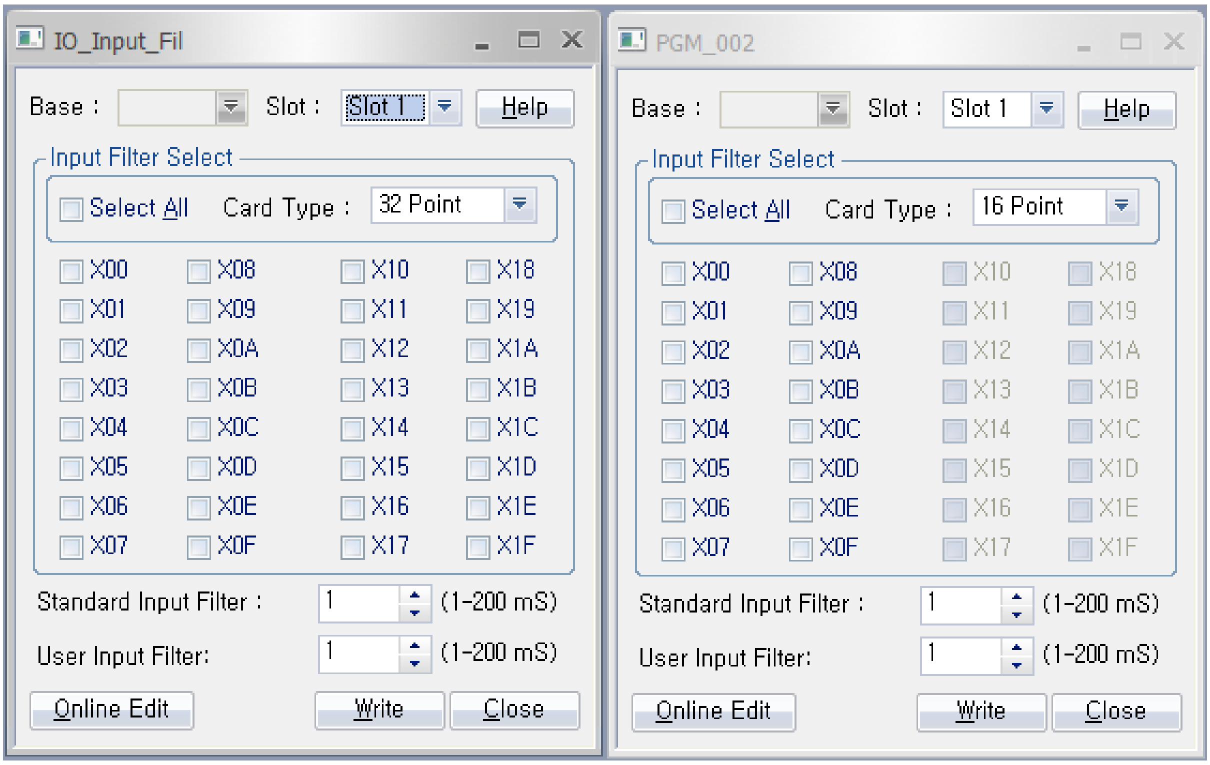
1) **Base:** There is no need to select base since PLC-S is fixed with local base.

2) **Slot:** Select a slot to configure IO. A user can select from Slot 1 to Slot 12.



3) **Help:** displays Help documentation of the IO Input Filter program.

4) **Input Filter Select:** selects desired input contacts. “Select All” configures 32 points at once. There are two card types: 32 Point and 16 Point.


IO_Input_Fil
Base :
Help
Input Filter Select
☐ Select All
☐ X00 ☐ X01 ☐ X02 ☐ X03 ☐ X04 ☐ X05 ☐ X06 ☐ X07
☐ X08 ☐ X09 ☐ X0A ☐ X0B ☐ X0C ☐ X0D ☐ X0E ☐ X0F
☐ X10 ☐ X11 ☐ X12 ☐ X13 ☐ X14 ☐ X15 ☐ X16 ☐ X17
☐ X18 ☐ X19 ☐ X1A ☐ X1B ☐ X1C ☐ X1D ☐ X1E ☐ X1F
Online Edit
Write
Close
PGM_002
Base :
Help
Input Filter Select
☐ Select All
☐ X00 ☐ X01 ☐ X02 ☐ X03 ☐ X04 ☐ X05 ☐ X06 ☐ X07
☐ X08 ☐ X09 ☐ X0A ☐ X0B ☐ X0C ☐ X0D ☐ X0E ☐ X0F
☐ X10 ☐ X11 ☐ X12 ☐ X13 ☐ X14 ☐ X15 ☐ X16 ☐ X17
☐ X18 ☐ X19 ☐ X1A ☐ X1B ☐ X1C ☐ X1D ☐ X1E ☐ X1F
Online Edit
Write
Close

IO_Input_Fil:
Slot : Slot 1
Card Type : 32 Point
Standard Input Filter : 1 (1-200 mS)
User Input Filter: 1 (1-200 mS)

PGM_002:
Slot : Slot 1
Card Type : 16 Point
Standard Input Filter : 1 (1-200 mS)
User Input Filter: 1 (1-200 mS)

5) **Standard Input Filter:** Devices that are not selected in the ‘Input Filter Select’ will be drive cycle for the Standard Input Filter. You can enter up to 1~200.

6) **User Input Filter:** Devices that are selected in the ‘Input Filter Select’ will be drive cycle for the User Input Filter. You can enter up to 1~200.

7) **Online Edit:** You can edit the program while PLC is in RUN Mode.

8) **Write:** saves the modified contents of the program.

9) **Close:** closes the IO Input Filter program. Unless saved, the modified contents will be deleted.

## 9. Special Module Configuration

### 9.1 Ethernet Module Setting

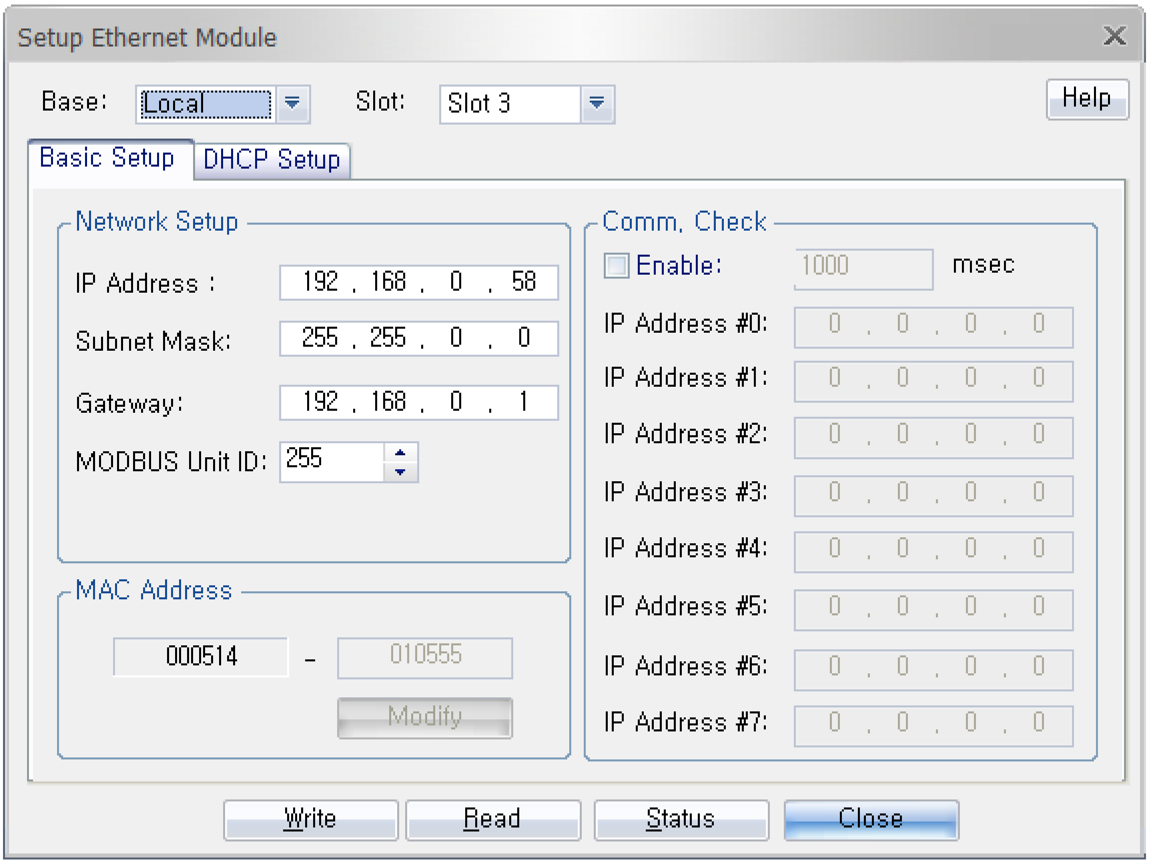
Establish Ethernet communication with the PLC.

1) Basic Setup

In order to connect PLC to HMI or access the project in the PLC through Ethernet, it is used to assign an IP Address to the Ethernet Communication Module.

Applied Module: CM1-EC01A, CM1-EC10A, CM1-EC10B, CM1-EC10C, CM3-SP01EET.

Click Online → Special Module Setup and choose Ethernet Module or click Ethernet module on the Card Properties.



Base: Local

Slot: Slot 3

IP Address : 192 . 168 . 0 . 58

Subnet Mask: 255 . 255 . 0 . 0

Gateway: 192 . 168 . 0 . 1

MODBUS Unit ID: 255

MAC Address: 000514 - 010555

☐ Enable: 1000 msec

IP Address #0: 0 . 0 . 0 . 0

IP Address #1: 0 . 0 . 0 . 0

IP Address #2: 0 . 0 . 0 . 0

IP Address #3: 0 . 0 . 0 . 0

IP Address #4: 0 . 0 . 0 . 0

IP Address #5: 0 . 0 . 0 . 0

IP Address #6: 0 . 0 . 0 . 0

IP Address #7: 0 . 0 . 0 . 0

i. If CPU is connected to CICON online, Base and Slot number display automatically.
ii. If not, choose Base and Slot number where Ethernet module is installed.
iii. Type IP Address, Subnet Mask and Gateway for your network.
iv. If it is Modbus Slave, choose the Modbus Unit ID.
v. Click Write to save the data.

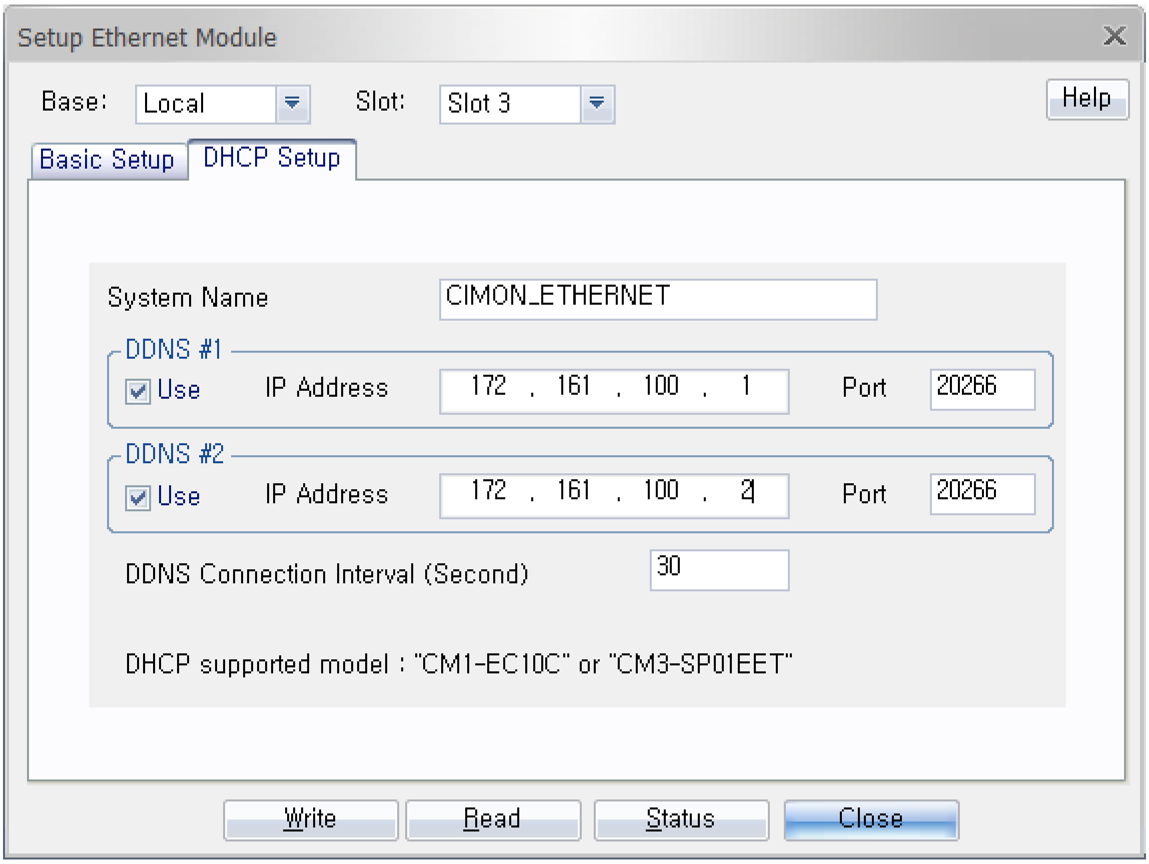
- Notice :

In case of expansion base, communication module is recommended to be installed in Local base.

If you need to install communication module in expansion base, only one communication module is recommended to be installed because communication speed (performance) should be decreasing.

### 2) DHCP Setup

To connect CIMON SCADA and PLC via dynamic IP(DHCP), CM1-EC10C can be used.



Setup Ethernet Module

Base: Local
Slot: Slot 3

System Name: CIMON_ETHERNET

DDNS #1
☑ Use IP Address 172 . 161 . 100 . 1 Port 20266

DDNS #2
☑ Use IP Address 172 . 161 . 100 . 2 Port 20266

DDNS Connection Interval (Second) 30

DHCP supported model : "CM1-EC10C" or "CM3-SP01EET"

i. Choose the Base and Slot number where CM1-EC10C is installed.

ii. Type System Name (Maximum 17characters).
The System name must be different for each module because CIMON SCADA will use this name to find out correct module.

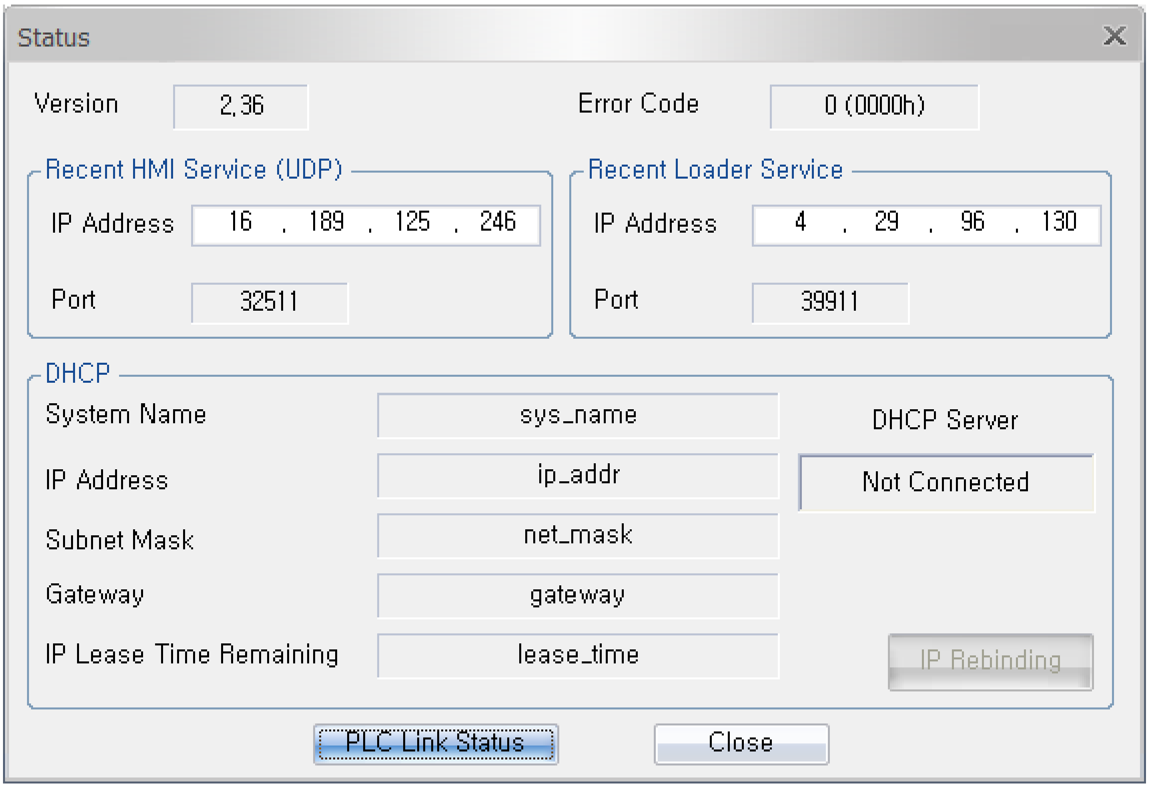
iii. Type IP address to DDNS #1 and Port number.
If SCADA is configured redundancy system, type IP address to DDNS #1 and #2.
Both Port number must be the same with CIMON SCADA configuration.

iv. Type DDNS Connection interval time.
It is refresh time that PLC send its IP address to CIMON SCADA.
If it is too short, system should have heavy load and if it too long, recovery should be delayed. 10 to 60 seconds would be recommended.

v. Click [Write].

- Tips

If you click Status, you can find out module information.



Status

Version: 2.36

Error Code: 0 (0000h)

Recent HMI Service (UDP)

IP Address: 16 . 189 . 125 . 246

Port: 32511

Recent Loader Service

IP Address: 4 . 29 . 96 . 130

Port: 39911

DHCP

System Name: sys_name

IP Address: ip_addr

Subnet Mask: net_mask

Gateway: gateway

IP Lease Time Remaining: lease_time

DHCP Server: Not Connected

Version : Firmware version of module.

Recent HMI Service : The last IP address that Ethernet module has connected to HMI.

Recent Loader Service : The last IP address that Ethernet module has connected to CICON.

Error Code : Refer to Ethernet module manual

DHCP : If DHCP is configured, configuration will display.

PLC Link Status : If PLC Link is connected, station number will be shown as blue color.

### 9.2 Serial Module Setting

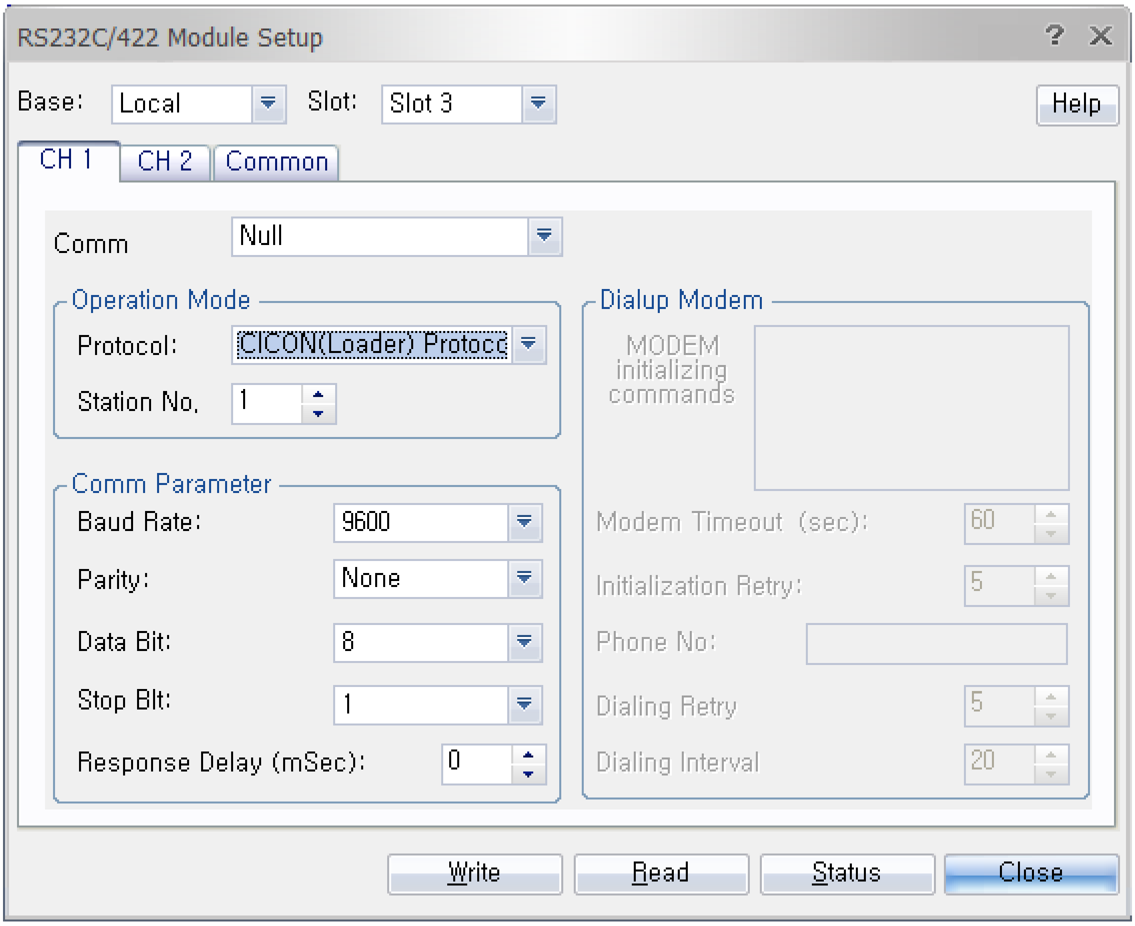
Establish Serial communication with the PLC.

1) RS232C Setup (Channel No. 1)

In order to connect PLC to HMI or access the project in the PLC through Serial protocol, it is used to set parameter to Serial Communication Module.

Applied Module : CM1-SC02A, CM1-SC01A, CM1-SC01B, CM1-SC02C, CM3-SP02ERS, CM3-SP02ERR

Click Online → Special Module Setup and choose RS232C/422 Module or click Serial module on the Card Properties.



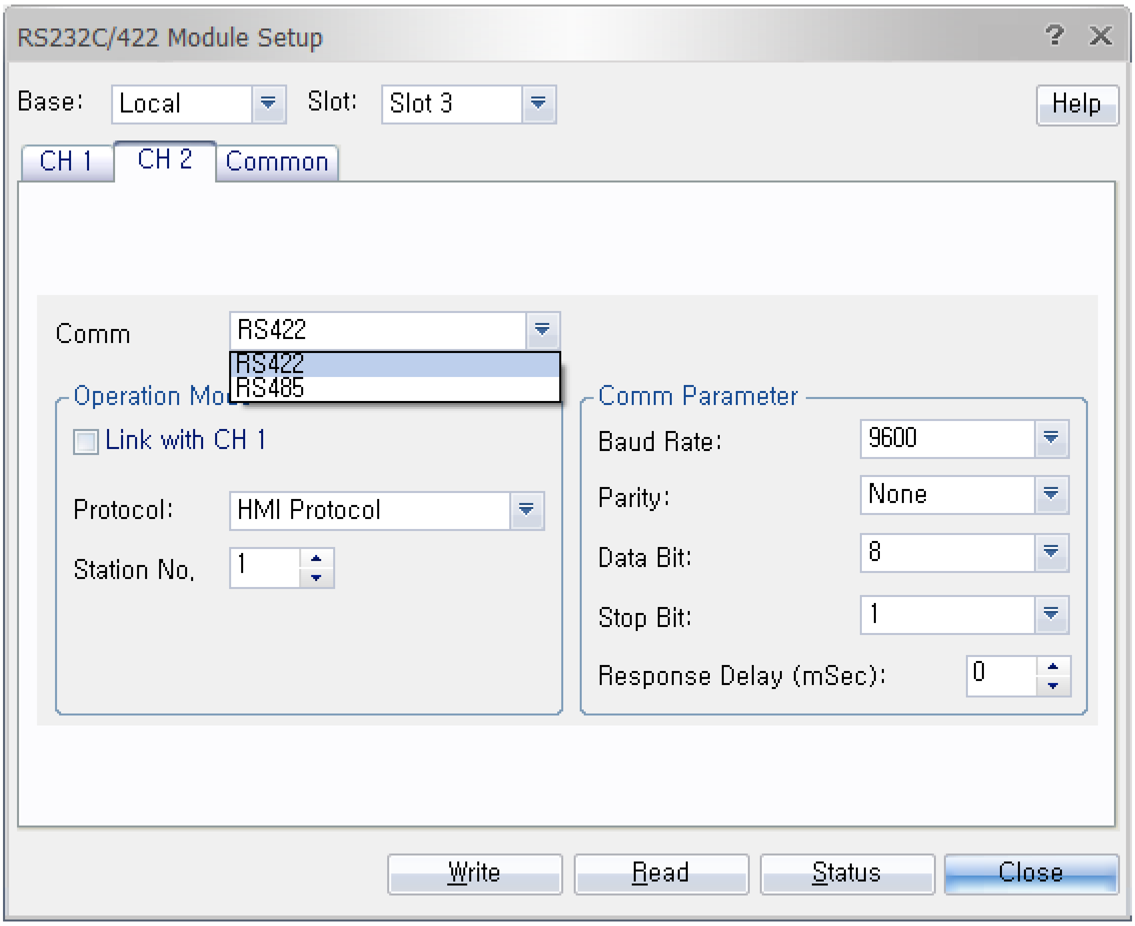
Base: Local
Slot: Slot 3
Comm: Null
Protocol: CICON(Loader) Protocc
Station No. 1
Baud Rate: 9600
Parity: None
Data Bit: 8
Stop BIt: 1
Response Delay (mSec): 0
MODEM initializing commands
Modem Timeout (sec): 60
Initialization Retry: 5
Phone No:
Dialing Retry 5
Dialing Interval 20

i. If CPU is connected to CICON online, Base and Slot number display automatically.
ii. If not, choose Base and Slot number where Serial module is installed.
iii. From the Communication type full-down menu, choose Null.
iv. From the Protocol full-down menu, choose one of them.
  - Protocol Program : User can build his own protocol to communicate other device.
  - HMI Protocol : It makes PLC communicate with SCADA or XPANEL.
  - MODBUS RTU Protocol : It is for Modbus RTU Slave
  - PLC Link Protocol : It is used to make PLC Link
  - CICON (Loader) Protocol : It is used to connect CICON through RS232C port. You can download a project to the CPU module.
  - MODBUS Master Program : It is for Modbus RTU Master
v. Choose the Station number from 0 to 31.
vi. Choose each communication parameter.
  - Baud Rate : 300 to 76800
  - Parity : None, Even, Odd
  - Data Bit : 7 or 8
  - Stop Bit : 1 or 2
  - Response Delay : 0~ 200ms, Sending data frame is delayed as response delay time.

vii. Click [Write] to save all parameters to module.

2) RS422/RS485 Setup (Channel No.2 )

In order to use RS422 or RS485, set up Channel2.



RS232C/422 Module Setup

Base: Local

Slot: Slot 3

Comm: RS422

Operation Mode

☐ Link with CH 1

Protocol: HMI Protocol

Station No. 1

Comm Parameter

Baud Rate: 9600

Parity: None

Data Bit: 8

Stop Bit: 1

Response Delay (mSec): 0

The configuration is the same with RS232C (Channel 1).

i. Choose the Base and Slot number where the serial module is installed.

ii. Type System Name (Maximum 17characters).
The System name must be different for each module because CIMON SCADA will use this name to find out correct module.

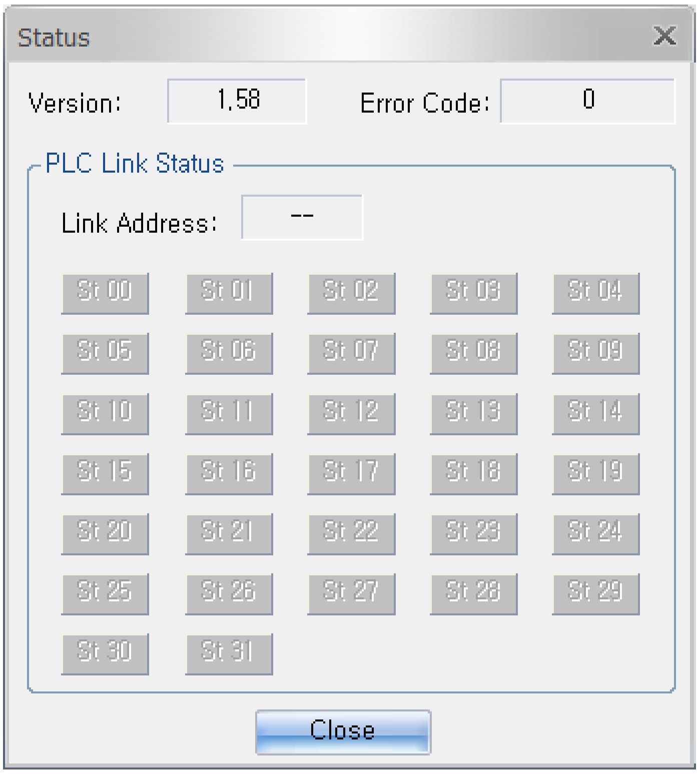
iii. Type IP address to DDNS #1 and Port number.
If SCADA is configured redundancy system, type IP address to DDNS #1 and #2.
Both Port number must be the same with CIMON SCADA configuration.

iv. Type DDNS Connection interval time.
It is refresh time that PLC send its IP address to CIMON SCADA.
If it is too short, system should have heavy load and if it too long, recovery should be delayed. 10 to 60 seconds would be recommended.

v. Click [Write].

- Tips

If you click Status, you can find out module information.



Version: 1.58

Error Code: 0

PLC Link Status

Link Address: --

Version : Firmware version of module.

Error Code : Refer to Serial module manual

PLC Link Status : If PLC Link is connected, station number will be shown as blue color.

### 9.3 Data Logger Module Setting

Data Logger (RS-232) Module

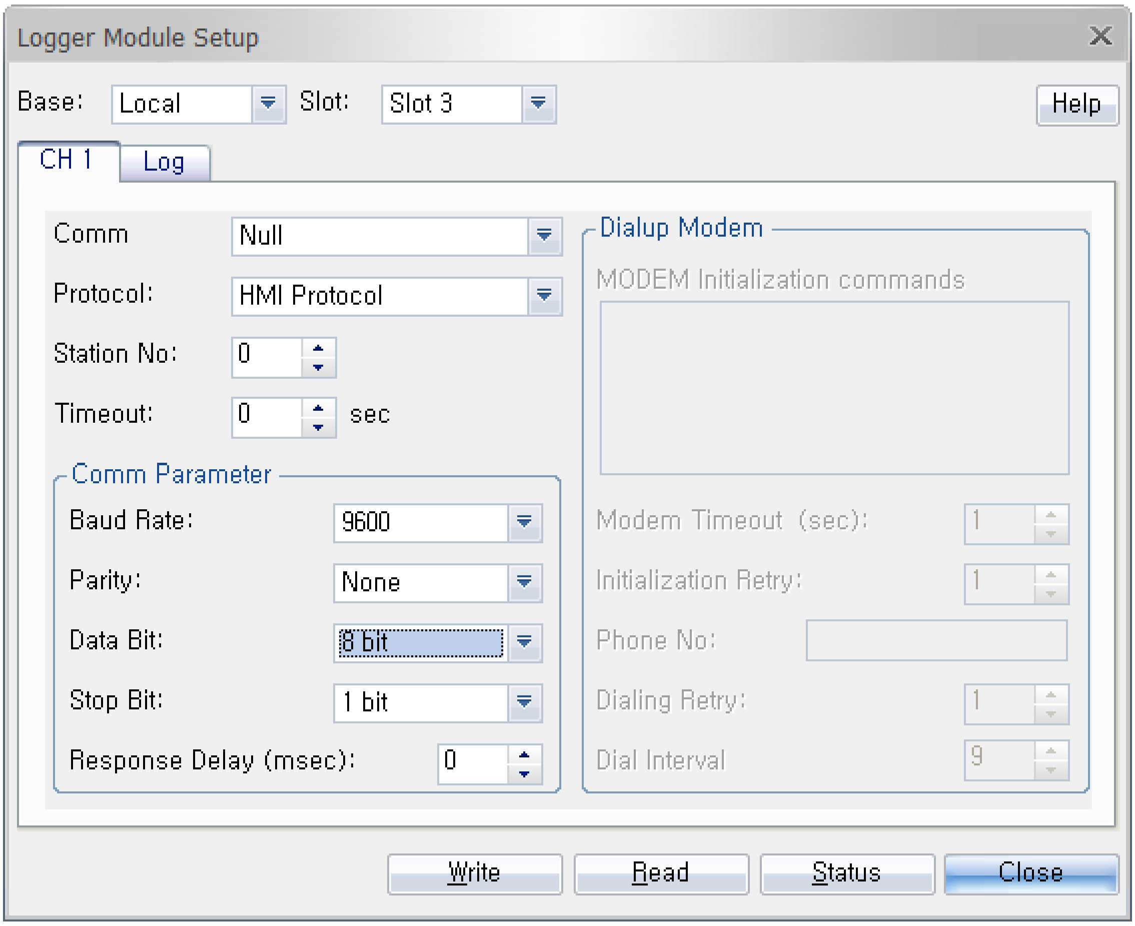
1) RS232C Setup (Channel No.1)

In order to connect data logger module to HMI, RS232 (CH1) must be configured first.

Click Online → Special Module Setup and choose Data Logger (RS-232) Module or click Data Logger module on the Card Properties.

Applied Module : CM1-LG32A

RS232 configuration is the same way with Serial module setup.

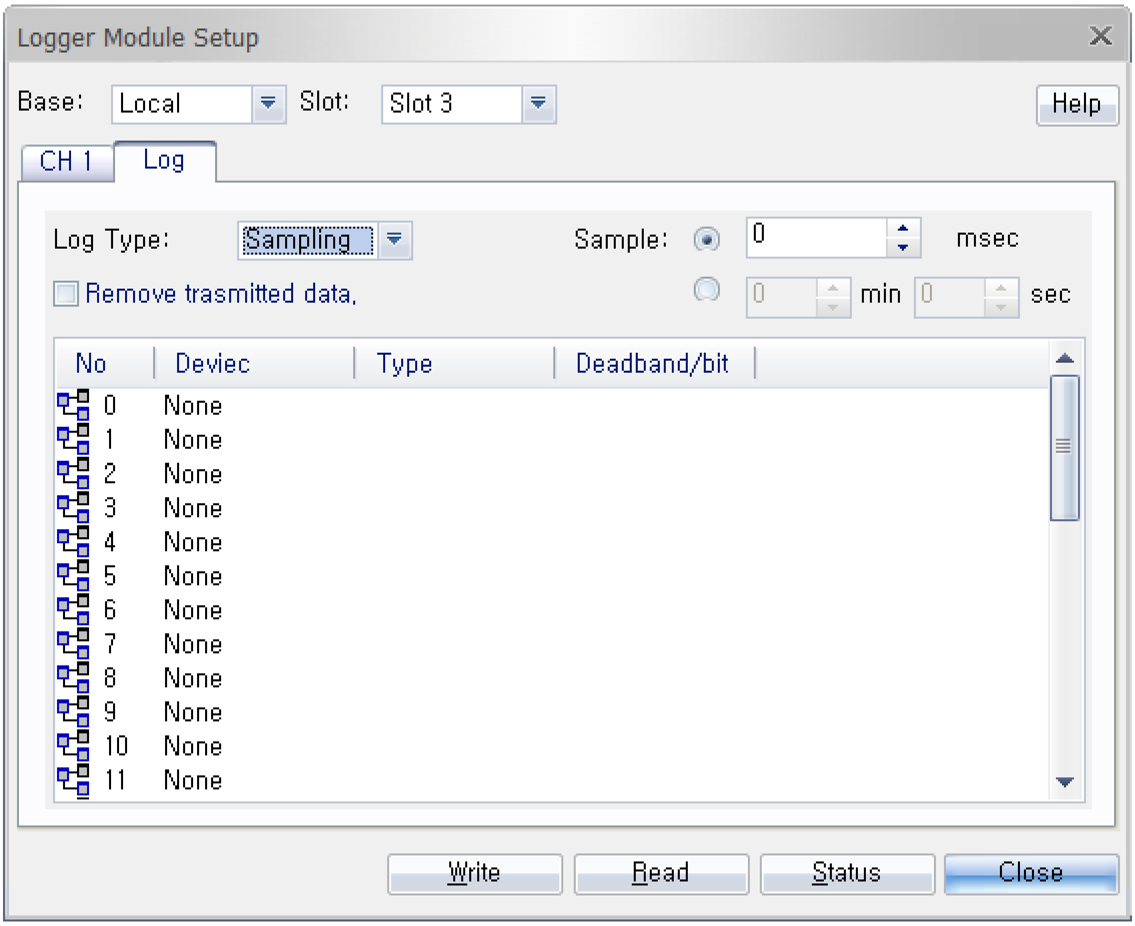


Base: Local
Slot: Slot 3
Comm: Null
Protocol: HMI Protocol
Station No: 0
Timeout: 0 sec
Baud Rate: 9600
Parity: None
Data Bit: 8 bit
Stop Bit: 1 bit
Response Delay (msec): 0
Modem Timeout (sec): 1
Initialization Retry: 1
Phone No:
Dialing Retry: 1
Dial Interval 9

i. If CPU is connected to CICON online, Base and Slot number display automatically.
ii. If not, choose Base and Slot number where Serial module is installed.
iii. From the Communication type full-down menu, choose Null.
iv. From the Protocol full-down menu, choose one of them.
  - HMI Protocol : It makes PLC communicate with SCADA or XPANEL.
  - Terminal : Configuration, alarm, Delete and etc. can be possible by Hyper terminal
v. Choose the Station number from 0 to 31.
vi. Choose each communication parameter.
  - Baud Rate : 300 to 76800
  - Parity : None, Even, Odd
  - Data Bit : 7 or 8
  - Stop Bit : 1 or 2
  - Response Delay : 0~ 200ms, Sending data frame is delayed as response delay time.
vii. Click [Write] to save all parameters to module.

2) Log

In order to read online data or logged data from connected HMI, set up Logging configuration.



Logger Module Setup

Base: Local

Slot: Slot 3

Log Type: Sampling

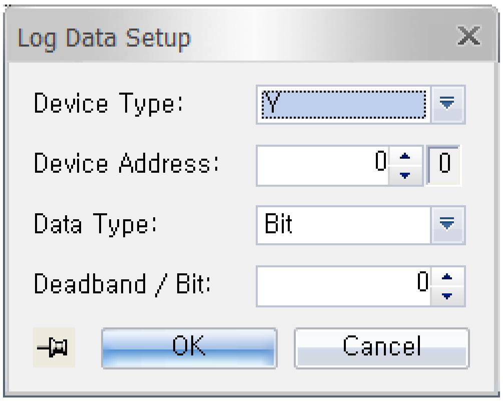
Sample: ● 0 msec

○ 0 min 0 sec

☐ Remove trasmitted data.

| No | Deviec | Type | Deadband/bit |
|---|---|---|---|
| 0 | None | | |
| 1 | None | | |
| 2 | None | | |
| 3 | None | | |
| 4 | None | | |
| 5 | None | | |
| 6 | None | | |
| 7 | None | | |
| 8 | None | | |
| 9 | None | | |
| 10 | None | | |
| 11 | None | | |

i. From the Log Type full-down menu, choose one of types.
   - Sampling : It collects data by sampling time that you set up.
   - Trigger : It collects data when PLC program asks.
   - Event : It collects data when the data status change.
ii. Choose the sampling period. It is only used with Sampling log type.
iii. If you want to delete data after sending data to HMI, select Delete sent data.
iv. Double-click Device number in order to register logging data.



Log Data Setup

Device Type: Y

Device Address: 0 0

Data Type: Bit

Deadband / Bit: 0

- Device Type and Address : Choose the device type and starting device address.

(Word address is ok. EX: Y0000, Y0010, Y0100 and etc.)

- Data Type : Bit, Word(12Byte) and DWord(4Byte)

- Deadband / Bit : If Log type is Event, Deadband is standard value for changing value.

Regardless of Log type, selected bit will be logged.

v. Click [Write] to save configuration.

## 9.4 DNP3 Ethernet Module Setting

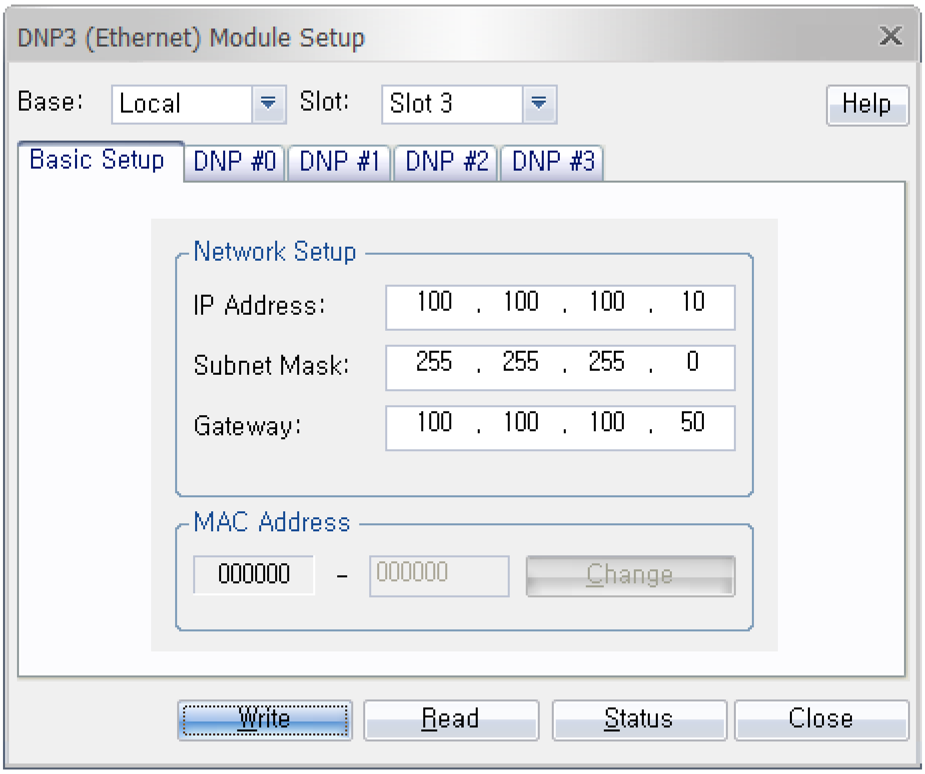
Establish DNP3 Ethernet communication with the PLC.

1) Basic Setup

In order to connect PLC to Host or access the project in the PLC through Ethernet, it is used to assign an IP Address to the DNP3 Communication Module.

Applied Module : CM1-EC01DNP and CM1-EC04DNP

Click Online → Special Module Setup and choose DNP3 (Ethernet) Module or click DNP3 (Ethernet) module on the Card Properties.



DNP3 (Ethernet) Module Setup

Base: Local

Slot: Slot 3

Network Setup

IP Address: 100 . 100 . 100 . 10

Subnet Mask: 255 . 255 . 255 . 0

Gateway: 100 . 100 . 100 . 50

MAC Address

000000 - 000000

i. If CPU is connected to CICON online, Base and Slot number display automatically.
ii. If not, choose Base and Slot number where Ethernet module is installed.
iii. Type IP Address, Subnet Mask and Gateway for your network.
iv. Click Write to save the data.

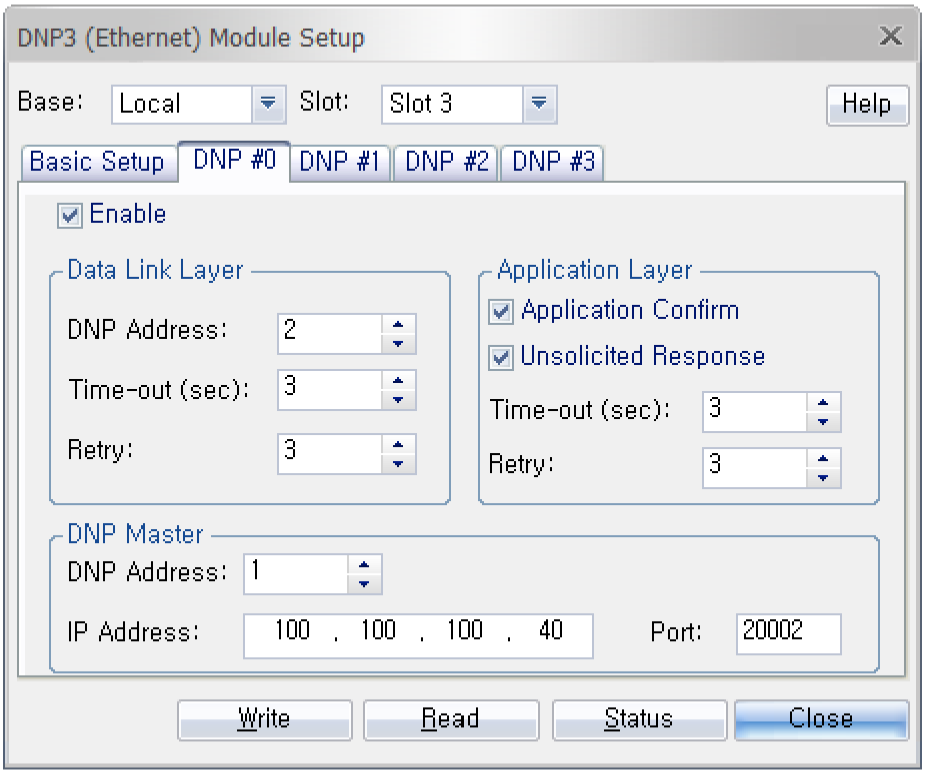
- Notice :

In case of expansion base, communication module is recommended to be installed in Local base.

If you need to install communication module in expansion base, only one communication module is recommended to be installed because communication speed (performance) should be decreasing.

2) DNP Setup

To connect PLC to Host devices, set up DNP configuration as below.


DNP3 (Ethernet) Module Setup

Base: Local
Slot: Slot 3

☑ Enable

Data Link Layer
DNP Address: 2
Time-out (sec): 3
Retry: 3

Application Layer
☑ Application Confirm
☑ Unsolicited Response
Time-out (sec): 3
Retry: 3

DNP Master
DNP Address: 1
IP Address: 100 . 100 . 100 . 40
Port: 20002

i. Click Enable and choose each Data Link Layers
- DNP Address : Assign DNP number to DNP module.
- Time-out(sec) : Choose the time-out second.
- Retry : choose the number of retry.

ii. Application Layer
- Application Confirm : DNP module checks communication status from Host.
It increases communication reliability but it also decreases communication speed.
- Unsolicited Response : If an assigned data is changed, DNP module send this data to Host.

iii. DNP Master

- DNP Address : Write HOST address
- IP Address : Write IP address of HOST

iv. Click Write.

### 9.5 DNP3 Serial Module Setting

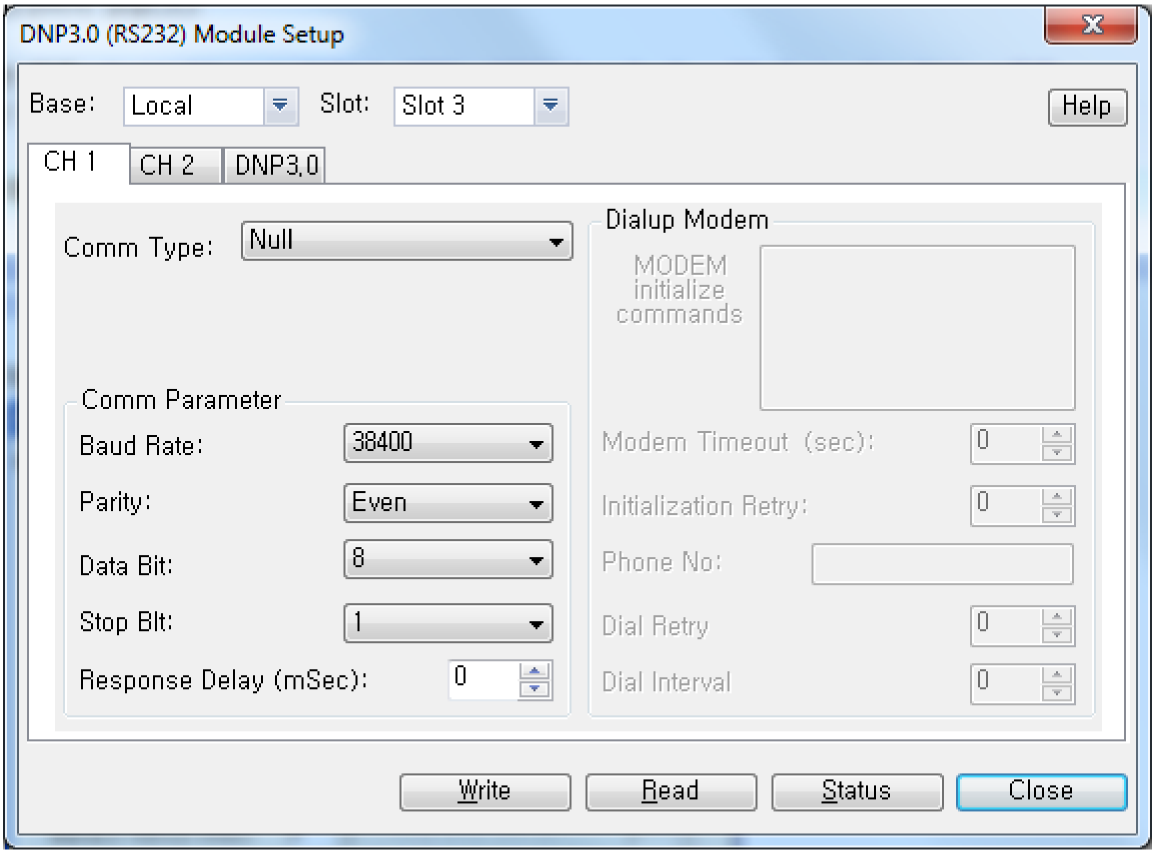
Establish DNP3 Serial communication with the PLC.

1) Basic Setup (Channel No. 1)

In order to connect PLC to Host or access the project in the PLC through Ethernet, it is used to assign communication parameters to the DNP3 (RS232/422) Module.

Applied Module: CM1-SC01DNP

Click Online → Special Module Setup and choose DNP3 (RS232/422) Module or click DNP3 (RS232/422) module on the Card Properties.



DNP3.0 (RS232) Module Setup

Base: Local
Slot: Slot 3

Comm Type: Null

Comm Parameter
Baud Rate: 38400
Parity: Even
Data Bit: 8
Stop Blt: 1
Response Delay (mSec): 0

Dialup Modem
Modem Timeout (sec): 0
Initialization Retry: 0
Phone No:
Dial Retry 0
Dial Interval 0

i. If CPU is connected to CICON online, Base and Slot number display automatically.
ii. If not, choose Base and Slot number where Serial module is installed.
iii. From the Communication type full-down menu, choose Null. (1:1 by cable)
iv. Choose each communication parameter.
   - Baud Rate : 300 to 38400
   - Parity : None, Even, Odd

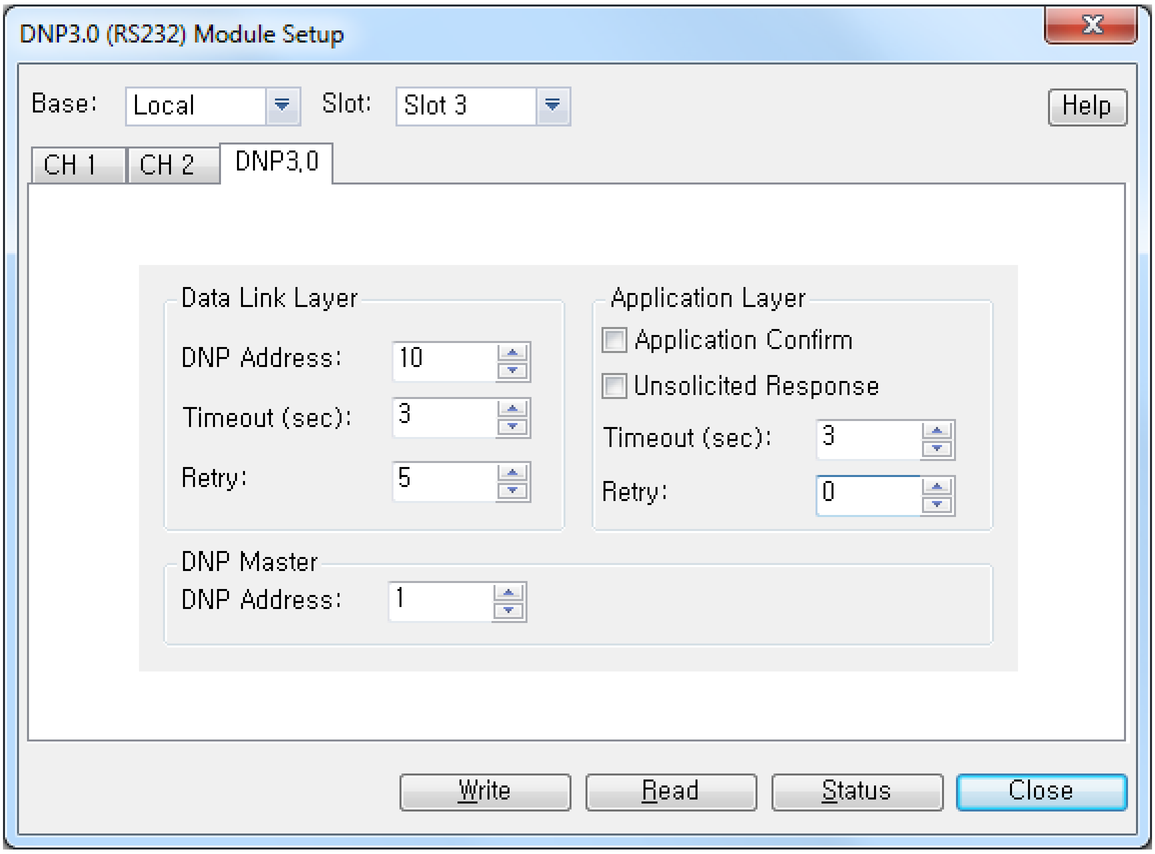
- Data Bit : 7 or 8
- Stop Bit : 1 or 2
- Response Delay : 0~ 200ms, Sending data frame is delayed as response delay time.

(Response Delay time depends on HOST device. If response of SC01DNP is too fast, Host may not receive it. In this case, 50 mSec delay time would be recommended.)

v. Click Write to save all parameters to module.

2) DNP3.0 Setup

To connect PLC to Host devices, set up DNP configuration as below.



DNP3.0 (RS232) Module Setup

Base: Local
Slot: Slot 3

Data Link Layer
DNP Address: 10
Timeout (sec): 3
Retry: 5

Application Layer
☐ Application Confirm
☐ Unsolicited Response
Timeout (sec): 3
Retry: 0

DNP Master
DNP Address: 1

i. Click DNP3.0 tap and choose each Data Link Layers.
- DNP Address : Assign DNP number to DNP module.
- Time-out(sec) : Choose the time-out second.
- Retry : choose the number of retry.

ii. Application Layer
- Application Confirm : DNP module checks communication status from Host.

It increases communication reliability but it also decreases communication speed.
- Unsolicited Response : If an assigned data is changed, DNP module send this data to Host.

iii. DNP Master
- DNP Address : Write HOST address

iv. Click Write.

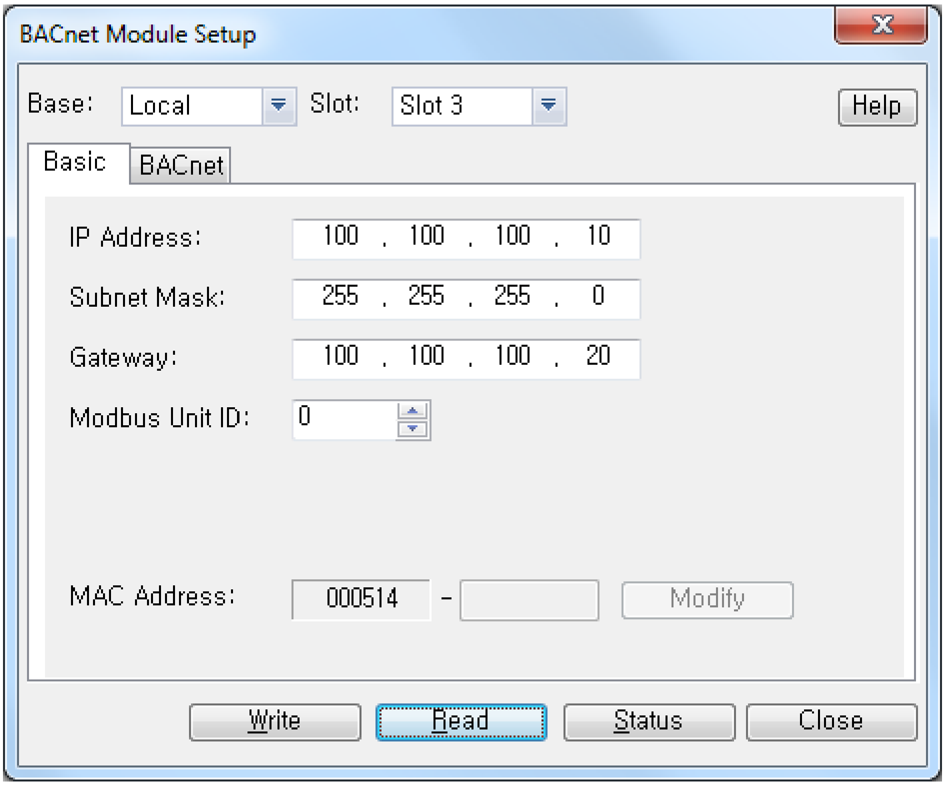
### 9.6 BACnet (Slave) Module Setting

Establish BACnet (Slave) communication with the PLC.

1) Basic Setup

Applied Module : CM1-BN01A

Click Online → Special Module Setup and choose BACnet (Slave) Module or click BACnet (Slave) module on the Card Properties.



BACnet Module Setup

Base: Local

Slot: Slot 3

IP Address: 100 . 100 . 100 . 10

Subnet Mask: 255 . 255 . 255 . 0

Gateway: 100 . 100 . 100 . 20

Modbus Unit ID: 0

MAC Address: 000514 -

i. If CPU is connected to CICON online, Base and Slot number display automatically.
ii. If not, choose Base and Slot number where Ethernet module is installed.
iii. Type IP Address, Subnet Mask and Gateway for your network.
iv. Click Write to save the data.

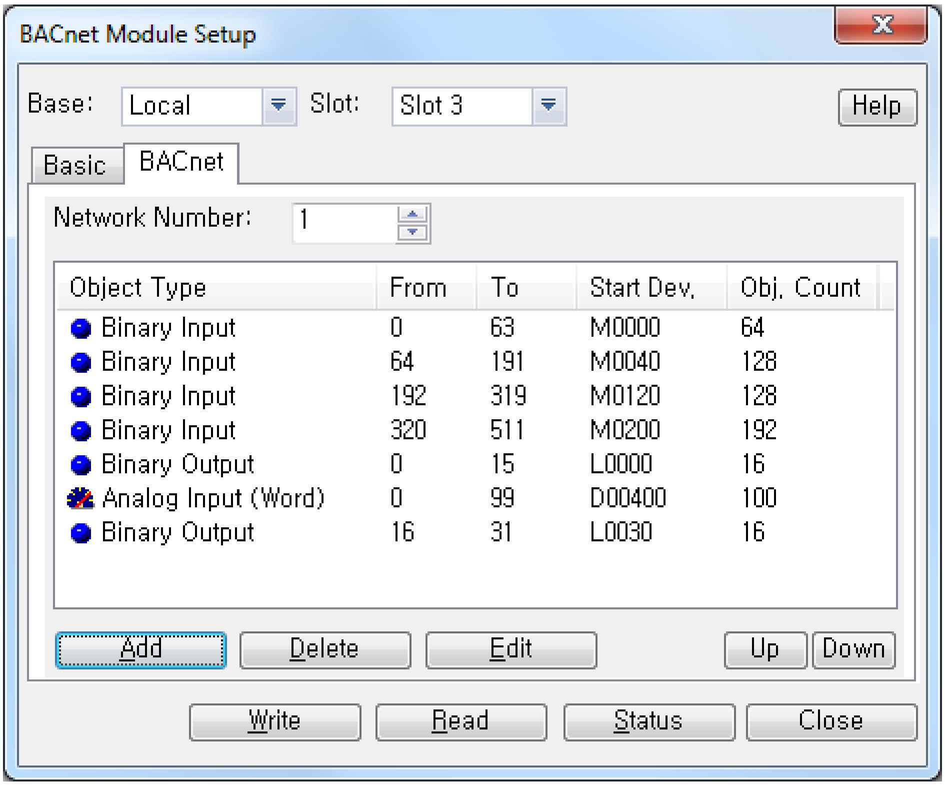
- Notice :

In case of expansion base, communication module is recommended to be installed in Local base.

If you need to install communication module in expansion base, only one communication module is recommended to be installed because communication speed (performance) should be decreasing.

2) BACnet Setup

To connect PLC to Master devices, set up BACnet configuration as below.



Base: Local

Slot: Slot 3

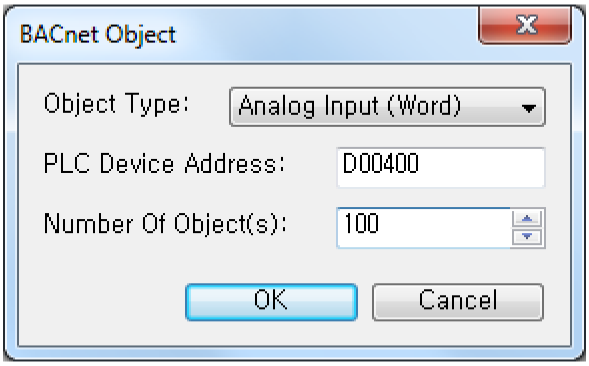
Network Number: 1

| Object Type | From | To | Start Dev. | Obj. Count |
|---|---|---|---|---|
| ● Binary Input | 0 | 63 | M0000 | 64 |
| ● Binary Input | 64 | 191 | M0040 | 128 |
| ● Binary Input | 192 | 319 | M0120 | 128 |
| ● Binary Input | 320 | 511 | M0200 | 192 |
| ● Binary Output | 0 | 15 | L0000 | 16 |
| Analog Input (Word) | 0 | 99 | D00400 | 100 |
| ● Binary Output | 16 | 31 | L0030 | 16 |

In order to respond to Master, device must be registered in Object Type.

i. Network Number : In order to distinguish each module in many BACnet modules on the same network, write network number. Master can find out Slave with this network number.

ii. Click Add to register devices.
Example) Analog Input 100word from D00400.



Object Type: Analog Input (Word)

PLC Device Address: D00400

Number Of Object(s): 100

iii. Click Write.

## 9.7 AD Module Setting

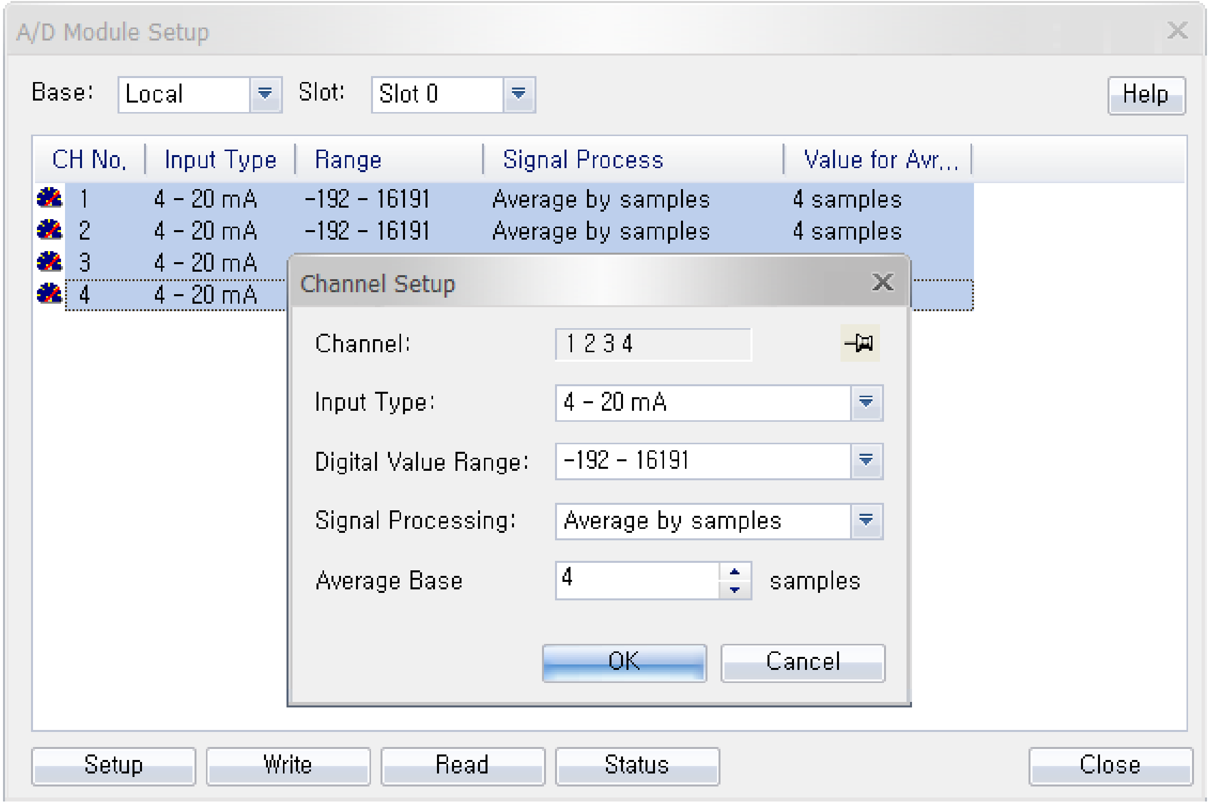
In order to read analog input value from device, it is used to set analog input value range to assigned channels.

Click Online → Special Module Setup and AD Module or click AD module on the Card Properties.

CM1 AD module and CM3 AD module have different configuration window.

Applied Module : CM1-AD04VI, CM1-AD08V, CM1-AD08I, CM1-AD04W and CM3-SP04EAO.

■ CM1 AD module



Base: Local

Slot: Slot 0

| CH No. | Input Type | Range | Signal Process | Value for Avr... |
|---|---|---|---|---|
| 1 | 4 - 20 mA | -192 - 16191 | Average by samples | 4 samples |
| 2 | 4 - 20 mA | -192 - 16191 | Average by samples | 4 samples |
| 3 | 4 - 20 mA | | | |
| 4 | 4 - 20 mA | | | |

Channel: 1 2 3 4

Input Type: 4 - 20 mA

Digital Value Range: -192 - 16191

Signal Processing: Average by samples

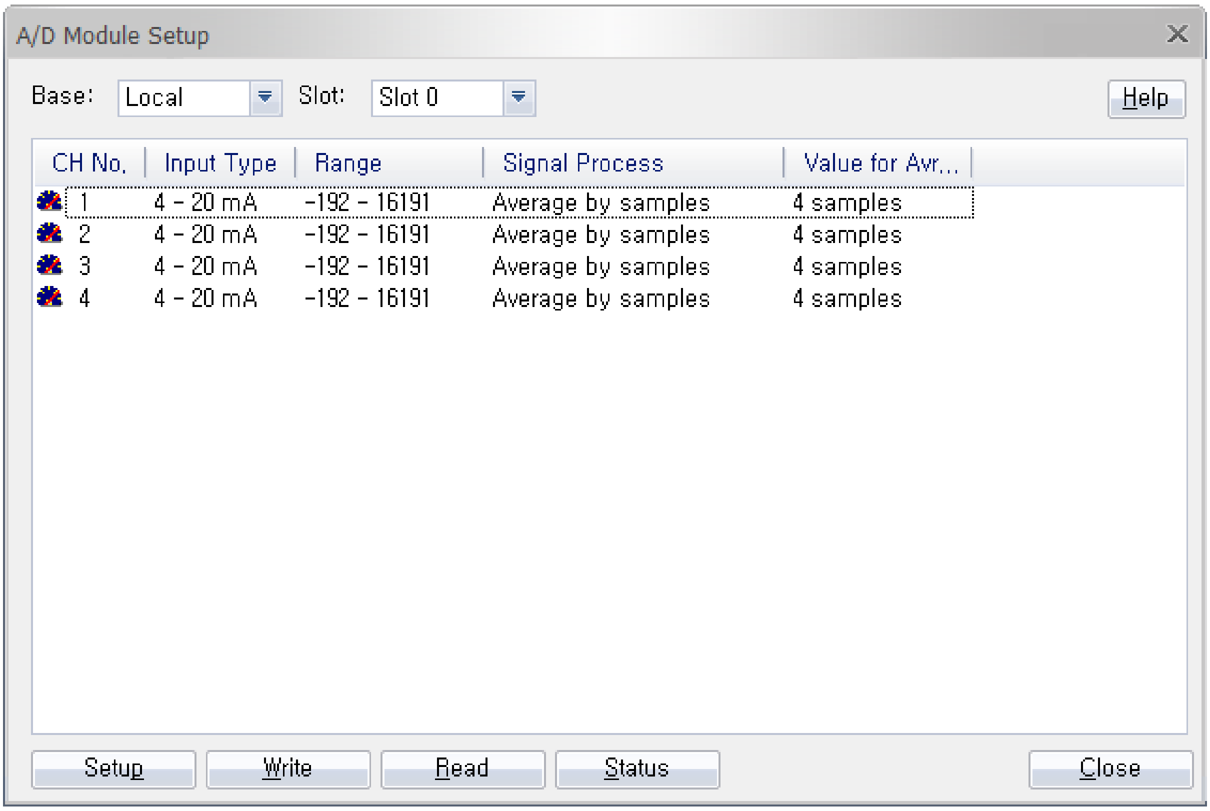
Average Base 4 samples

i. If you want to set all 4 channels at once, press Ctrl and click channels.

ii. Click Setup and choose Input type, Digital value range, Signal Processing and Average Base.

- Input Type : 4 - 20mA / 0 - 20mA / 1 - 5V / 0 - 5V / -10 - +10V / 0 - 10V / Disable
- Digital Value Range : -192 - 16191 / -8192 - +8191 / 0 - 16000 / -8000 - +8000
- Signal Processing : Average by samples / Average by time / Disable

iii. Click Ok.



Base: Local
Slot: Slot 0

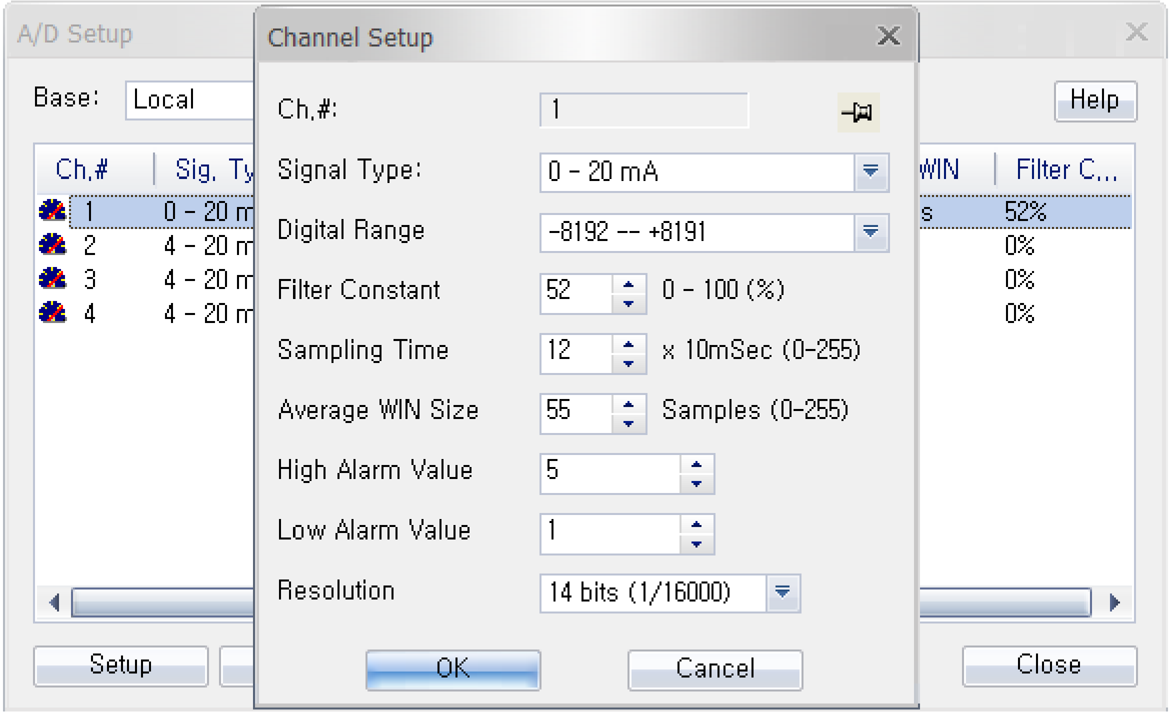
| CH No. | Input Type | Range | Signal Process | Value for Avr... |
|---|---|---|---|---|
| 1 | 4 - 20 mA | -192 - 16191 | Average by samples | 4 samples |
| 2 | 4 - 20 mA | -192 - 16191 | Average by samples | 4 samples |
| 3 | 4 - 20 mA | -192 - 16191 | Average by samples | 4 samples |
| 4 | 4 - 20 mA | -192 - 16191 | Average by samples | 4 samples |

iv. Click Write to save parameter to PLC.

v. Click to Read to check parameter.

vi. If you click Status, you can see current value, minimum and maximum value, firmware version of module and error code.

■ CM3 AD module



Base: Local

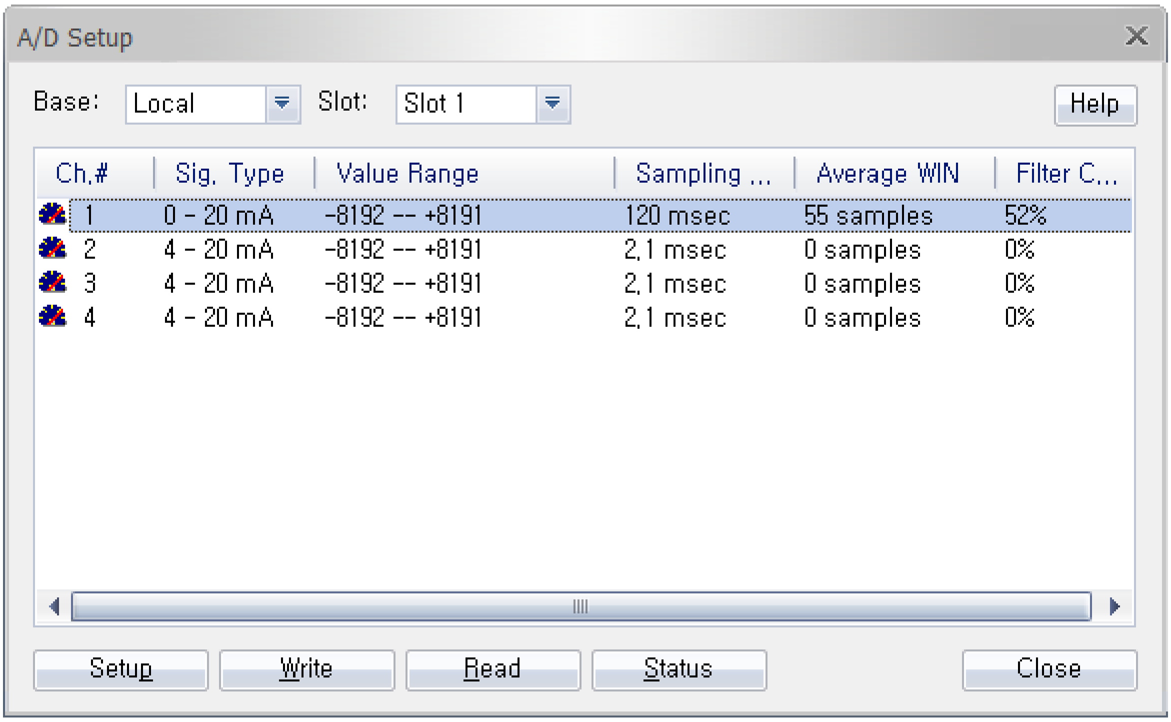
Ch.#: 1
Signal Type: 0 - 20 mA
Digital Range: -8192 -- +8191
Filter Constant: 52 0 - 100 (%)
Sampling Time: 12 x 10mSec (0-255)
Average WIN Size: 55 Samples (0-255)
High Alarm Value: 5
Low Alarm Value: 1
Resolution: 14 bits (1/16000)

i. Double click Channel number 1 to open Channel Setup window.
(If you want to set all 4 channels at once, press Ctrl and click channels.)

ii. Choose each parameters.

- Signal Type (Input type): 4 - 20mA / 0 - 20mA / 1 - 5V / 0 - 5V / -10 - +10V / 0 - 10V
- Digital Range : -8192 - +8191 / -8000 - +8000 / -192 – 16191 / 0 – 16000
- Filter Constant : 0 – 100%
- Sampling Time : 0 – 2550mSec
- Average Window size : 0 – 255 samples
- High Alarm Value: in the Digital conversion value range.
- Low Alarm Value: in the Digital conversion value range.

iii. Click OK.



Base: Local

Slot: Slot 1

| Ch.# | Sig. Type | Value Range | Sampling ... | Average WIN | Filter C... |
|---|---|---|---|---|---|
| 1 | 0 - 20 mA | -8192 -- +8191 | 120 msec | 55 samples | 52% |
| 2 | 4 - 20 mA | -8192 -- +8191 | 2.1 msec | 0 samples | 0% |
| 3 | 4 - 20 mA | -8192 -- +8191 | 2.1 msec | 0 samples | 0% |
| 4 | 4 - 20 mA | -8192 -- +8191 | 2.1 msec | 0 samples | 0% |

iv. Click Write to save parameter to PLC.

## 9.8 DA Module Setting

In order to write analog output value to device, it is used to set analog output value to assigned channels.

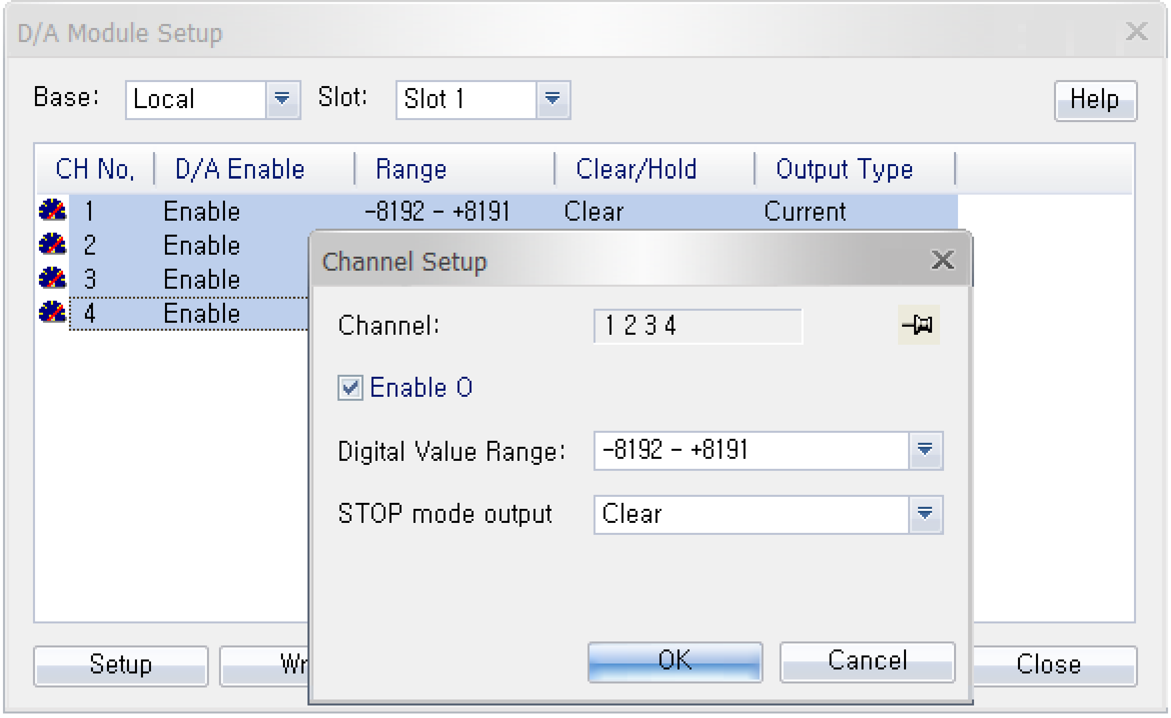
Click Online → Special Module Setup and DA Module or click DA module on the Card Properties.

CM1 DA module and CM3 DA module have different configuration window.

Applied Module : CM1-DA04V, CM1-DA04VA, CM1-DA08V, CM1-DA08VA, CM1-DA04I and CM1-DA08I.

CM3-SP04EOAI and CM3-SP04EOAV

■ CM1 DA module



Base: Local
Slot: Slot 1

| CH No. | D/A Enable | Range | Clear/Hold | Output Type |
|---|---|---|---|---|
| 1 | Enable | -8192 ~ +8191 | Clear | Current |
| 2 | Enable | | | |
| 3 | Enable | | | |
| 4 | Enable | | | |

Channel: 1 2 3 4
☑ Enable 0
Digital Value Range: -8192 ~ +8191
STOP mode output: Clear

Base and Slot number will appear automatically if CICON connects to PLC.

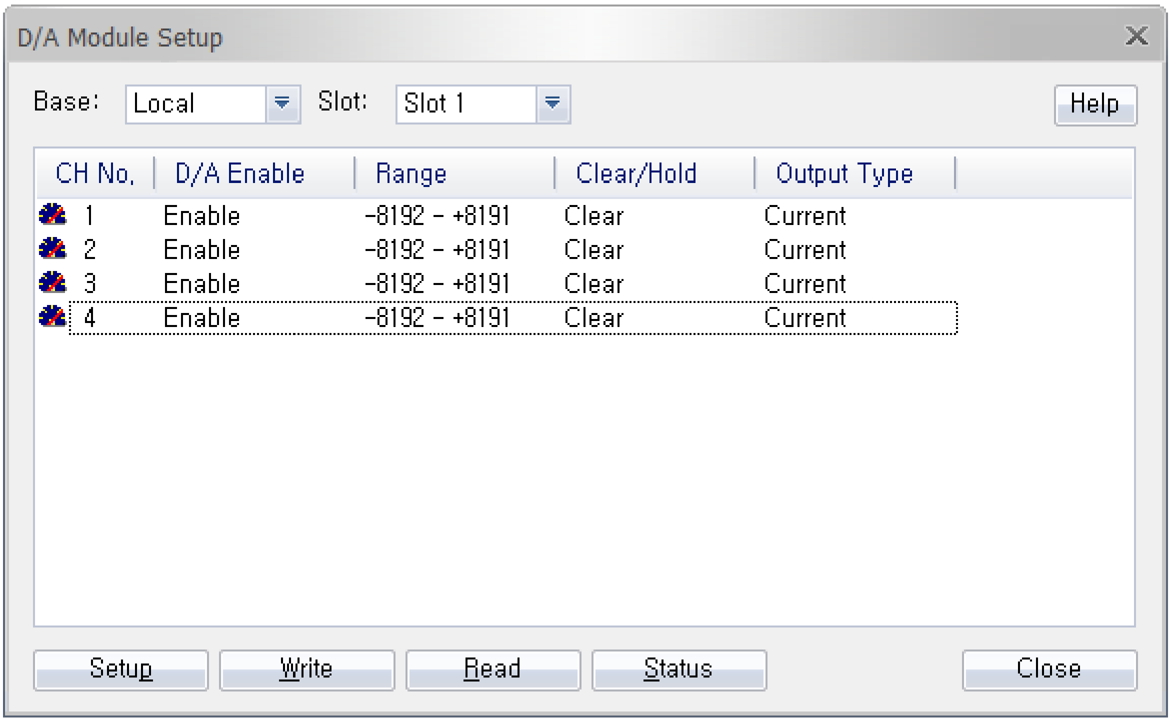
i. If you want to set all 4 channels at once, press Ctrl and click channels.

ii. Click Enable and choose Digital Value Range and STOP mode output.
    - Digital Value Range : -192 - 16191 / -8192 - +8191
    - STOP mode output: Clear or Hold

    Clear - If CPU mode is STOP, the last value will be output.

    Hold – If CPU mode is STOP, ‘0’ value will be output.

iii. Click OK.



Base: Local
Slot: Slot 1

| CH No. | D/A Enable | Range | Clear/Hold | Output Type |
|---|---|---|---|---|
| 1 | Enable | -8192 - +8191 | Clear | Current |
| 2 | Enable | -8192 - +8191 | Clear | Current |
| 3 | Enable | -8192 - +8191 | Clear | Current |
| 4 | Enable | -8192 - +8191 | Clear | Current |

iv. Click Write to save parameter to PLC.

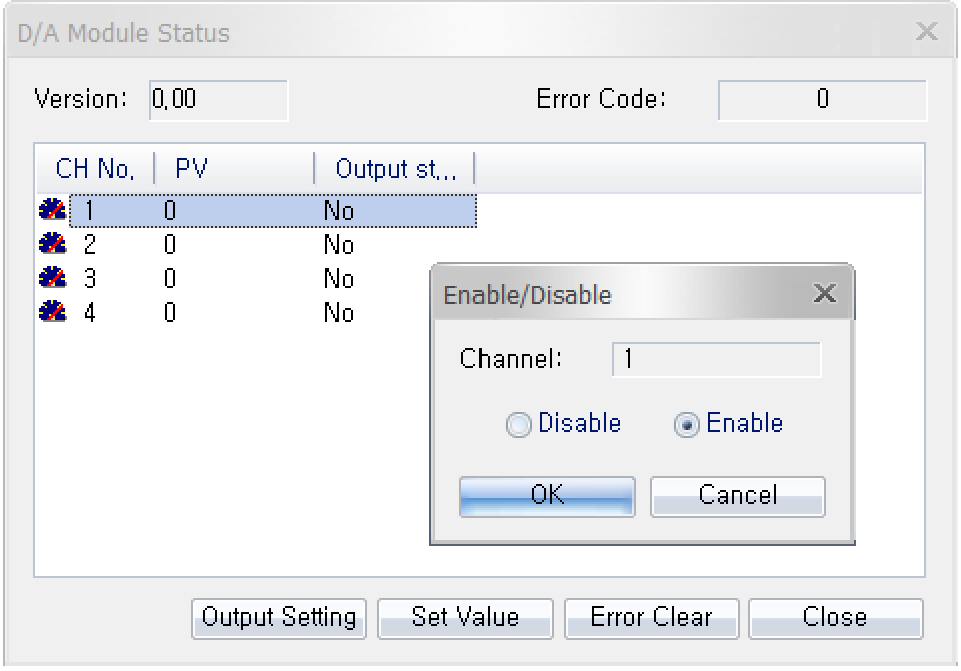
v. Click Read to check parameter.

vi. If you click Status, you can see current value, minimum and maximum value, firmware version of module and error code.

■ TIP : Channel Enable or Disable setting

1. Check PLC is RUN mode.

2. Click Status and double-click Channel number 1.



Version: 0.00
Error Code: 0

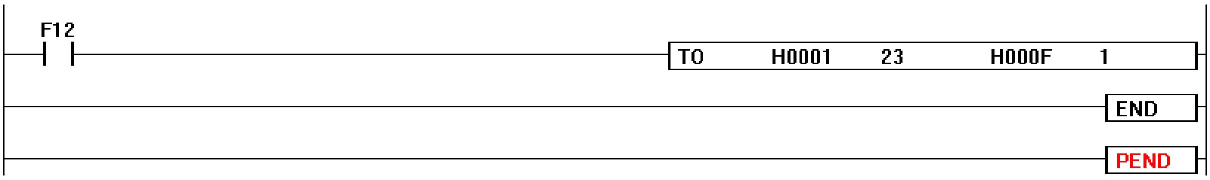
| CH No. | PV | Output st... |
|---|---|---|
| 1 | 0 | No |
| 2 | 0 | No |
| 3 | 0 | No |
| 4 | 0 | No |

Channel: 1
○ Disable ● Enable

3. Choose Enable and click OK.

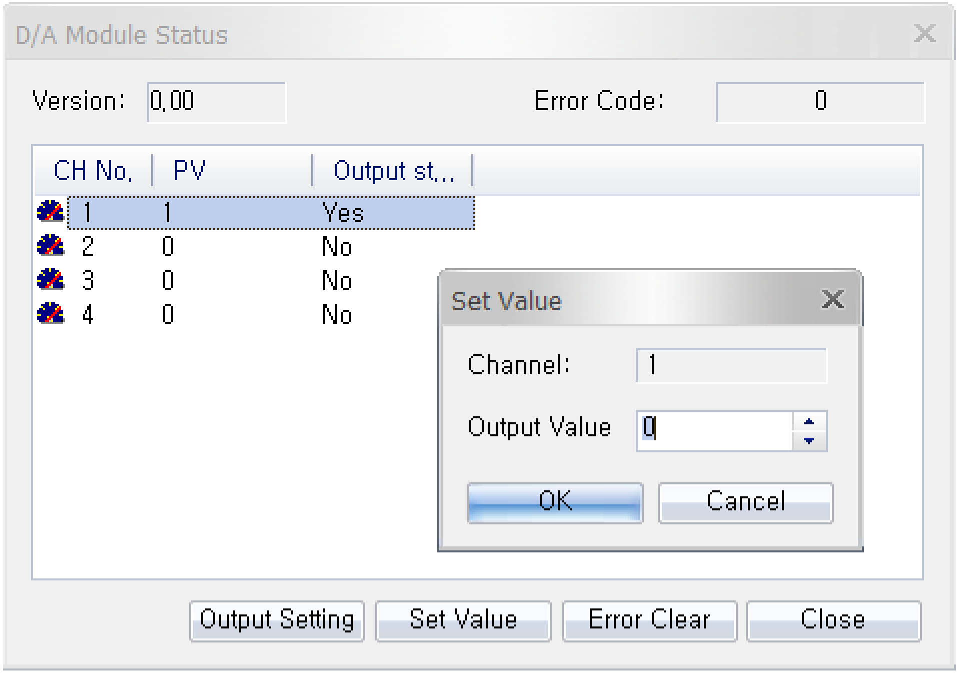
4. If PLC is turned ON, enable for all 4 channels are remained.

Example)



- H0001 : DA module slot number
- 23 : Buffer memory 23 for DA output Enable or Disable setting
- H000F : choose channel to Enable output (CH1~CH8)
- 1: Data word to save in buffer memory

5. Click Set value and choose the Output value and click OK.


D/A Module Status

Version: 0,00

Error Code: 0

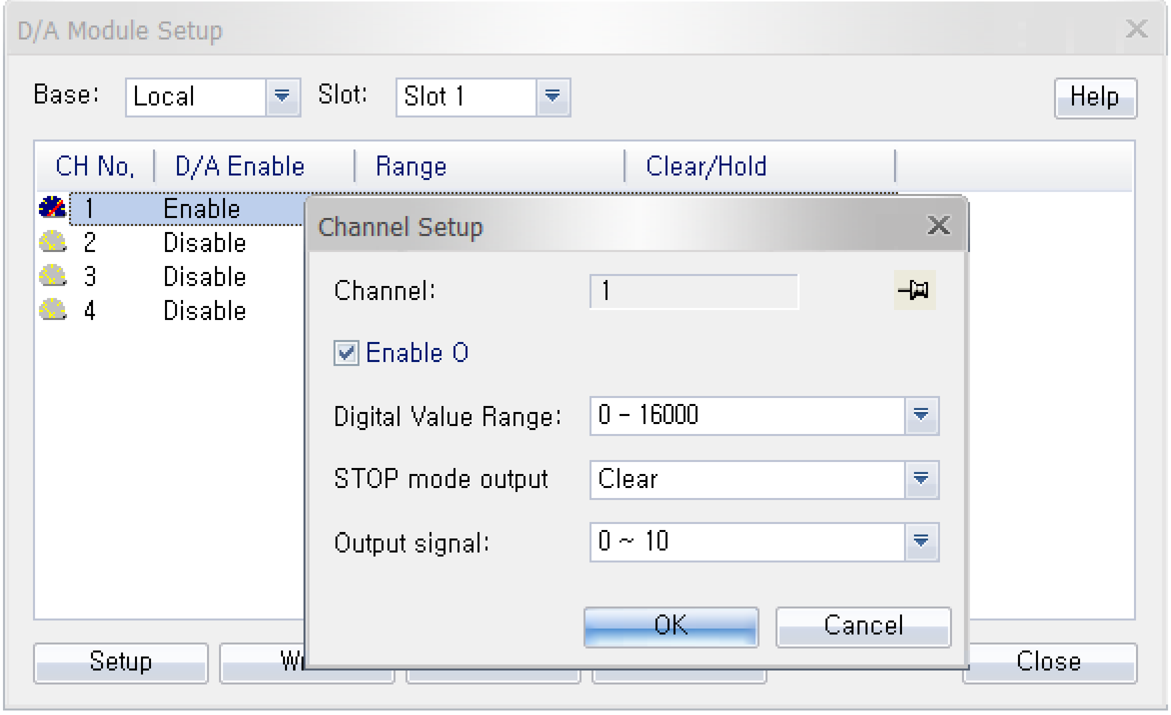
| CH No. | PV | Output st... |
|---|---|---|
| 1 | 1 | Yes |
| 2 | 0 | No |
| 3 | 0 | No |
| 4 | 0 | No |

Set Value

Channel: 1

Output Value 0

■ CM3 DA module : CM3-SP04EOAI, CM3-SP04EOAV



D/A Module Setup

Base: Local Slot: Slot 1

| CH No. | D/A Enable | Range | Clear/Hold |
|---|---|---|---|
| 1 | Enable | | |
| 2 | Disable | | |
| 3 | Disable | | |
| 4 | Disable | | |

Channel Setup

Channel: 1

☑ Enable O

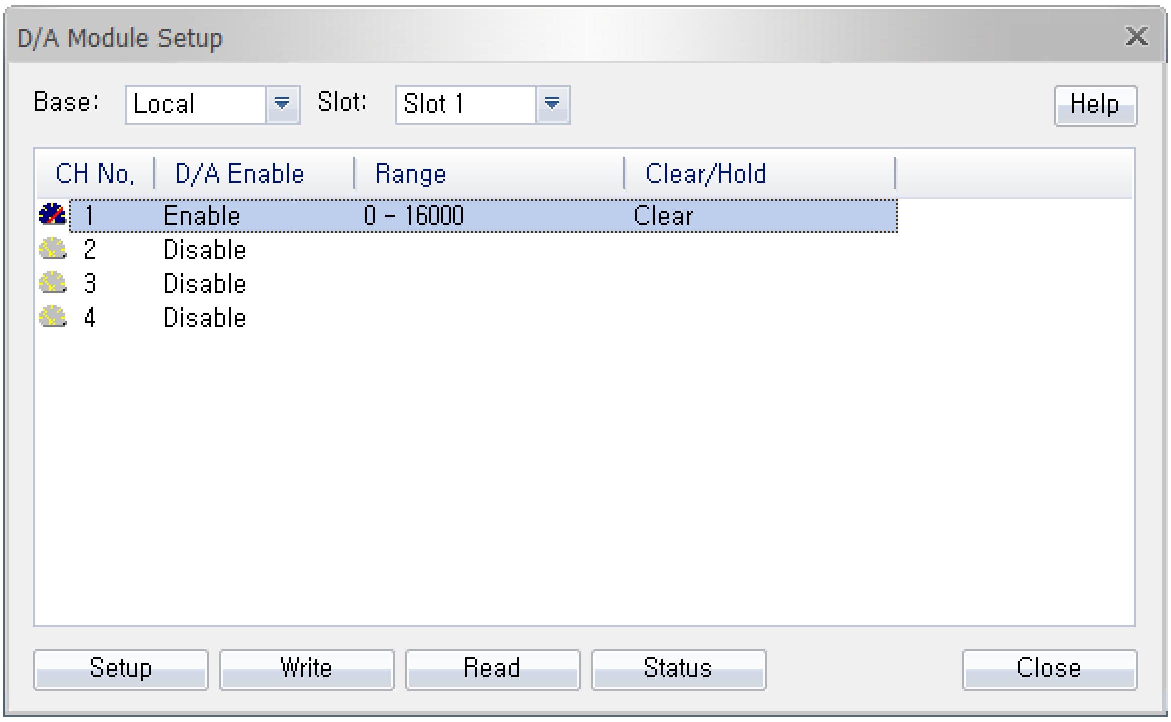
Digital Value Range: 0 - 16000

STOP mode output: Clear

Output signal: 0 ~ 10

1. Double click Channel number 1 to open Channel Setup window.
   (If you want to set all 4 channels at once, press Ctrl and click channels.)

2. Click Enable and choose each parameters.
   - Digital Value Range : 0 - 16000 / -8000 - +8000 / 0 – 10000(Percentage)
   - STOP mode output : Clear, Hold, Half Level or Max. Level
   - Output signal : 0 – 10 / -10 - 10 (Only SP04EOAV(Voltage) has this parameter.)
3. Click OK.



D/A Module Setup

Base: Local Slot: Slot 1

| CH No. | D/A Enable | Range | Clear/Hold |
|---|---|---|---|
| 1 | Enable | 0 - 16000 | Clear |
| 2 | Disable | | |
| 3 | Disable | | |
| 4 | Disable | | |

4. Click Write to save parameter to PLC.

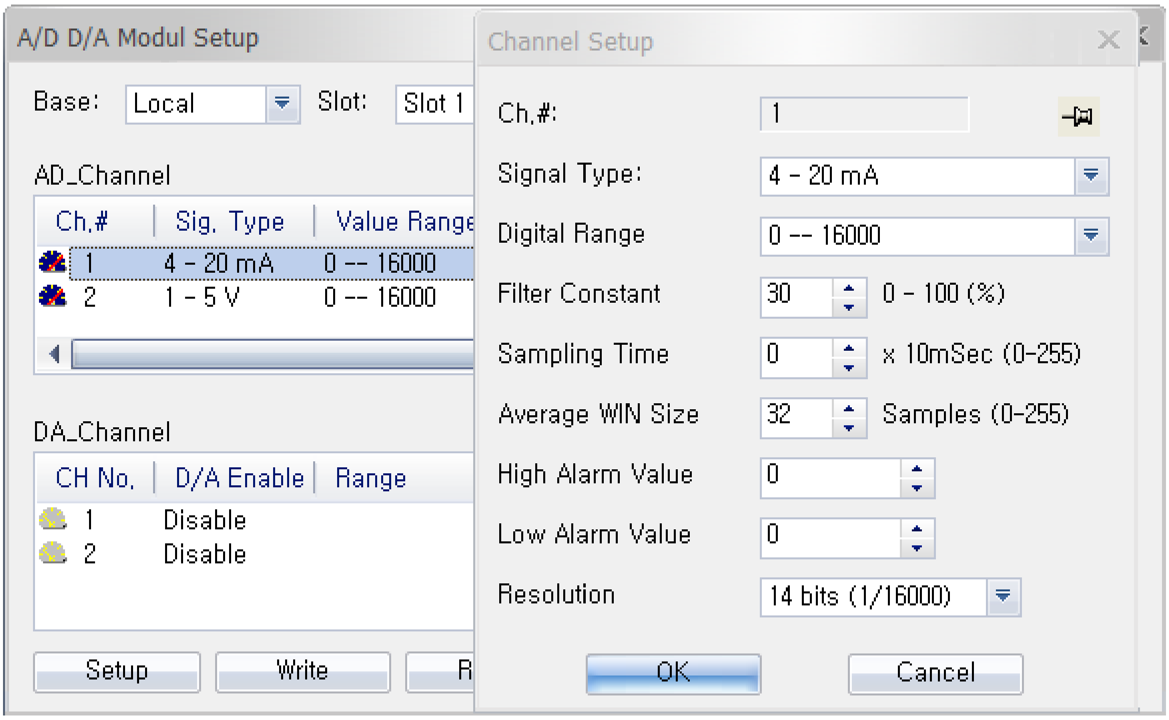
### 9.9 ADDA Module Setting

In order to read analog input value and write analog output value, it is used to set analog input and output value to assigned channels.

Click Online → Special Module Setup and AD/DA Module or click ADDA module on the Card Properties.

Applied Module : CM3-SP04EAA

■ AD Channel Setting



Base: Local
Slot: Slot 1

AD_Channel

| Ch.# | Sig. Type | Value Range |
|---|---|---|
| 1 | 4 - 20 mA | 0 -- 16000 |
| 2 | 1 - 5 V | 0 -- 16000 |

DA_Channel

| CH No. | D/A Enable | Range |
|---|---|---|
| 1 | Disable | |
| 2 | Disable | |

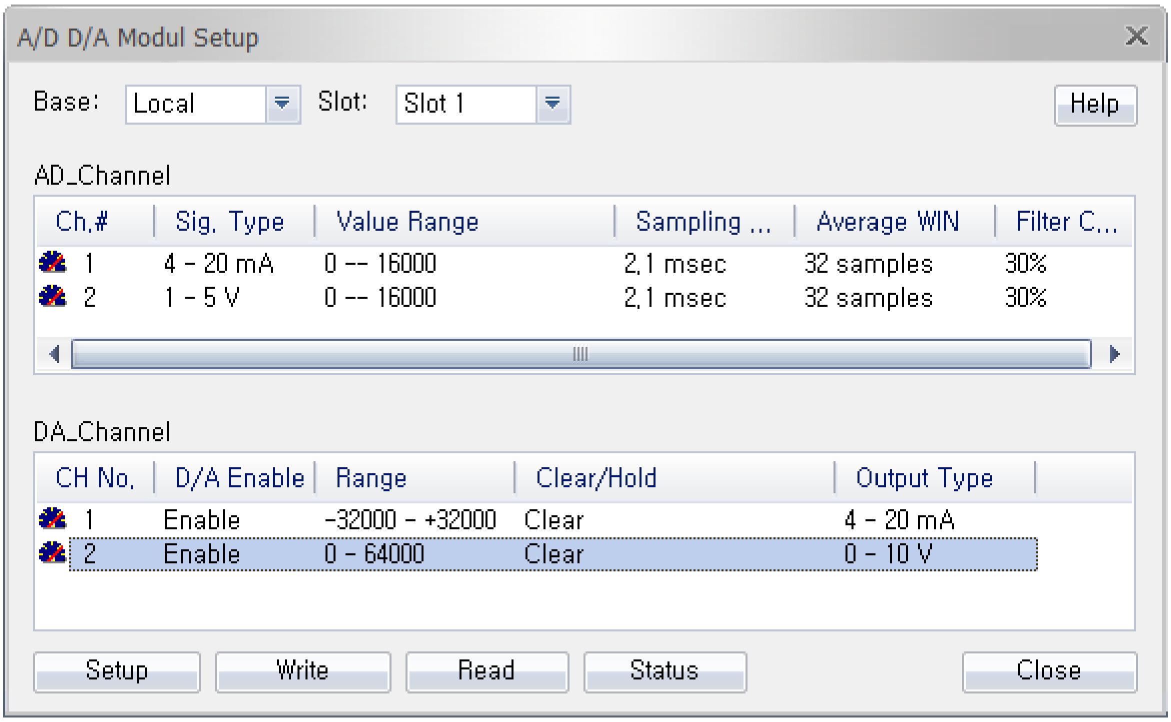
Ch.#: 1
Signal Type: 4 - 20 mA
Digital Range: 0 -- 16000
Filter Constant: 30 0 - 100 (%)
Sampling Time: 0 x 10mSec (0-255)
Average WIN Size: 32 Samples (0-255)
High Alarm Value: 0
Low Alarm Value: 0
Resolution: 14 bits (1/16000)

Base and Slot number will appear automatically if CICON connects to PLC.

i. Double click Channel number 1 to open Channel Setup window.
(If you want to set all 2 channels at once, press Ctrl and click channels.)

ii. Choose each parameters.
  - Signal Type (Input type): 4 - 20mA / 0 - 20mA / 1 - 5V / 0 - 5V / -10 - +10V / 0 - 10V
  - Digital Range : -8192 - +8191 / -8000 - +8000 / -192 – 16191 / 0 – 16000
  - Filter Constant : 0 – 100%
  - Sampling Time : 0 – 2550mSec
  - Average Window size : 0 – 255 samples
  - High Alarm Value: in the Digital conversion value range.
  - Low Alarm Value: in the Digital conversion value range.
  - Resolution : 14bits or 16bits

iii. Click OK.



Base: Local
Slot: Slot 1

AD_Channel

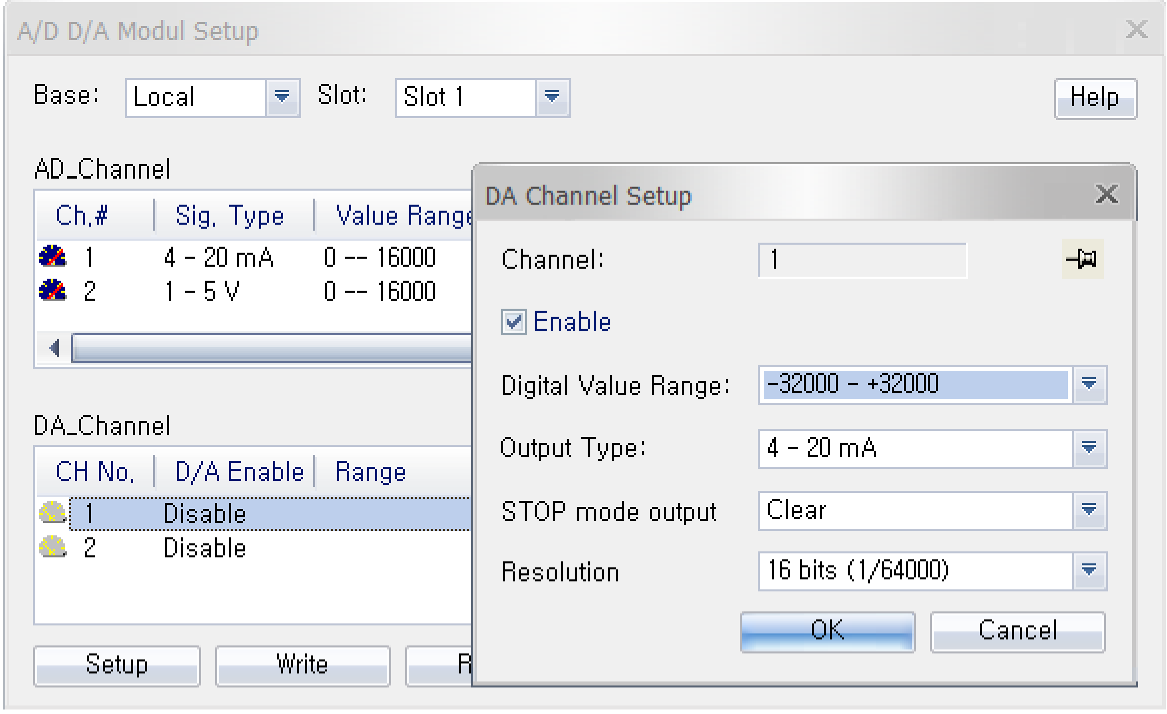
| Ch.# | Sig. Type | Value Range | Sampling ... | Average WIN | Filter C... |
|---|---|---|---|---|---|
| 1 | 4 - 20 mA | 0 -- 16000 | 2.1 msec | 32 samples | 30% |
| 2 | 1 - 5 V | 0 -- 16000 | 2.1 msec | 32 samples | 30% |

DA_Channel

| CH No. | D/A Enable | Range | Clear/Hold | Output Type |
|---|---|---|---|---|
| 1 | Enable | -32000 - +32000 | Clear | 4 - 20 mA |
| 2 | Enable | 0 - 64000 | Clear | 0 - 10 V |

iv. Click Write to save parameter to PLC.

- DA Channel Setting



Base: Local
Slot: Slot 1

AD_Channel

| Ch.# | Sig. Type | Value Range |
|---|---|---|
| 1 | 4 - 20 mA | 0 -- 16000 |
| 2 | 1 - 5 V | 0 -- 16000 |

DA_Channel

| CH No. | D/A Enable | Range |
|---|---|---|
| 1 | Disable | |
| 2 | Disable | |

Channel: 1
☑ Enable
Digital Value Range: -32000 - +32000
Output Type: 4 - 20 mA
STOP mode output: Clear
Resolution: 16 bits (1/64000)

i. Double click Channel number 1 to open Channel Setup window.
(If you want to set all 2 channels at once, press Ctrl and click channels.)

ii. Click Enable and choose each parameters.

- Digital Value Range : 14Bit → 0 - 16000 / -8000 - +8000 / 0 – 10000(Percentage)
  16Bit → 0 – 64000 / -32000 - +32000 / Signal value (Current/Voltage) / 0 – 10000 (Percentage)
- Output Type : 4 - 20mA / 0 - 20mA / 1 - 5V / 0 - 5V / -10 - +10V / 0 - 10V /
- STOP mode output : Clear, Hold, Half Level or Max. Level
  Clear - If CPU mode is STOP, the last value will be output.
  Hold – If CPU mode is STOP, ‘0’ value will be output.
- Resolution : 14bits or 16bits

iii. Click OK.

iv. Click Write to save parameter to PLC.

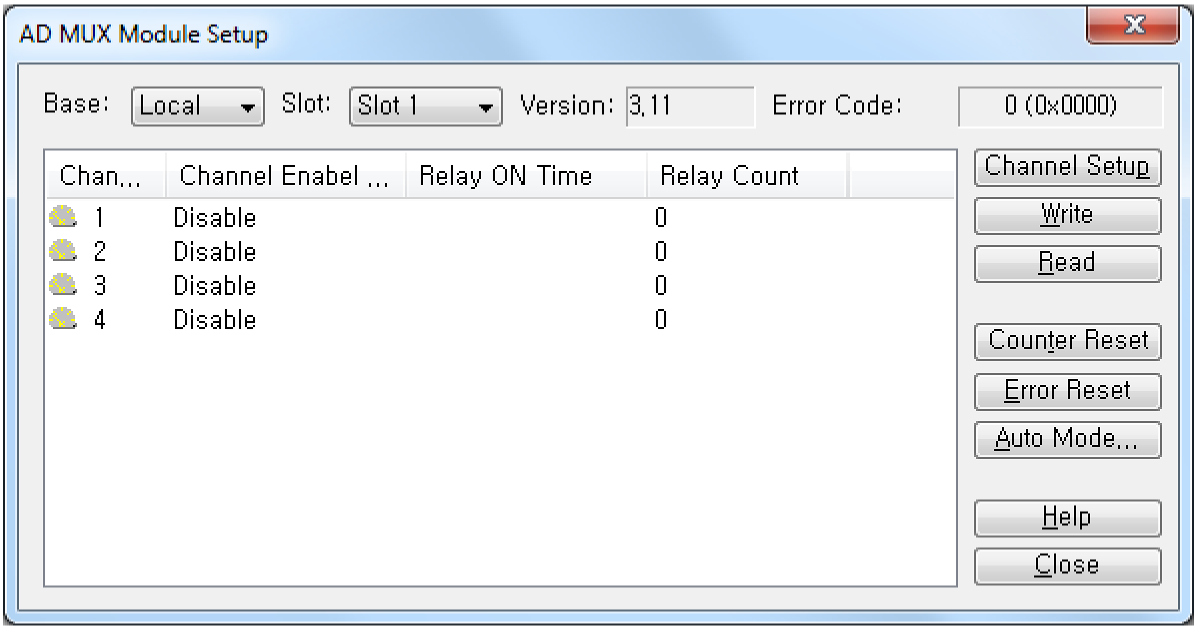
## 9.10 AD MUX Module Setting

In order to read analog value from other sensors, it is used to set analog input value to assigned channels.

Click Online → Special Module Setup and AD MUX Module or Analog MUX module on the Card Properties.

Applied Module : CM3-SP04EAM

■ AD MUX Module Setup



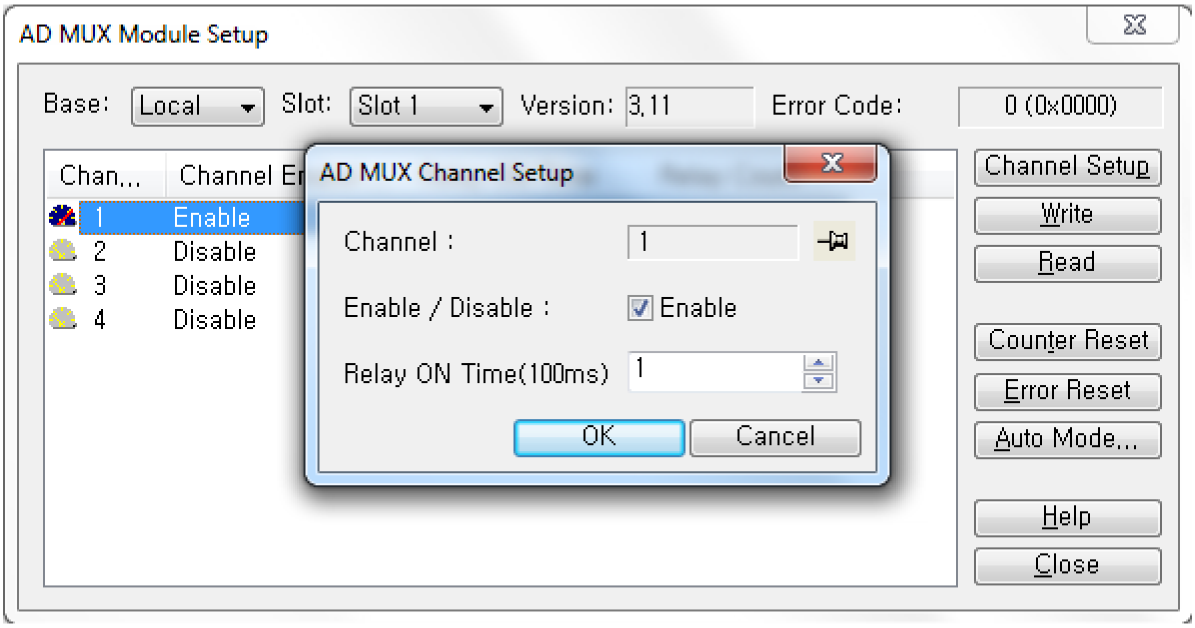
Base: Local  Slot: Slot 1  Version: 3.11  Error Code: 0 (0x0000)

| Chan... | Channel Enabel ... | Relay ON Time | Relay Count |
|---|---|---|---|
| 1 | Disable | | 0 |
| 2 | Disable | | 0 |
| 3 | Disable | | 0 |
| 4 | Disable | | 0 |

Base and Slot number will appear automatically if CICON connects to PLC.

i. Click Channel 1. (If you want to set all 4 channels at once, press Ctrl and click channels)

ii. Click Enable and choose Relay ON Time.


AD MUX Module Setup

Base: Local Slot: Slot 1 Version: 3.11 Error Code: 0 (0x0000)

| Chan... | Channel En |
|---|---|
| 1 | Enable |
| 2 | Disable |
| 3 | Disable |
| 4 | Disable |

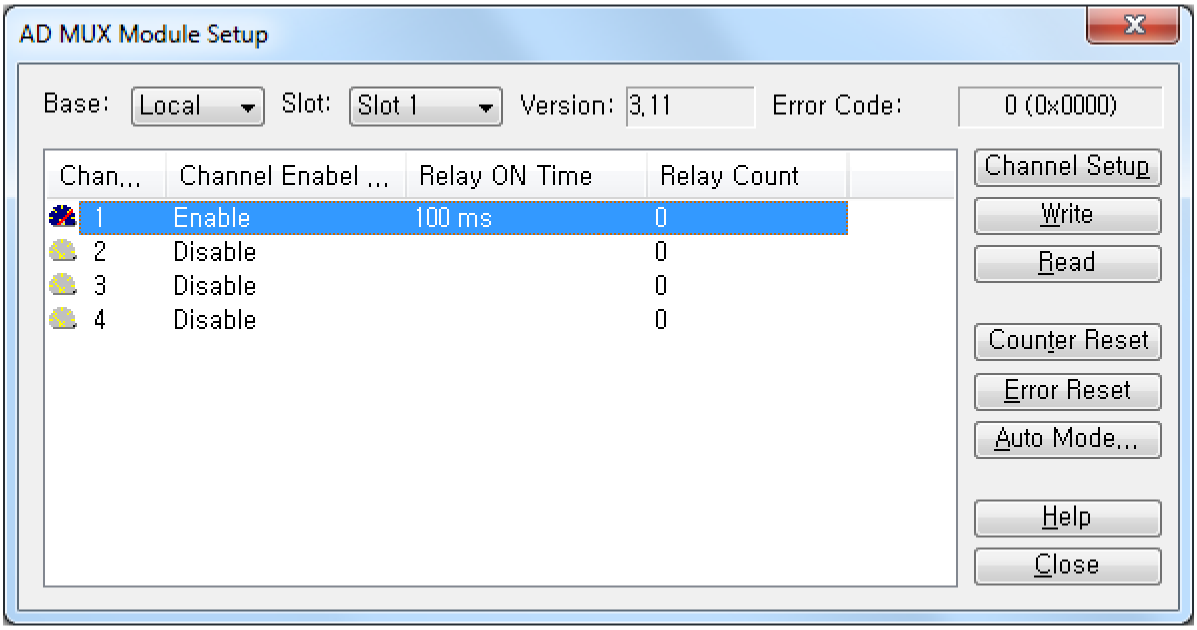
AD MUX Channel Setup

Channel : 1

Enable / Disable : ☑ Enable

Relay ON Time(100ms) 1

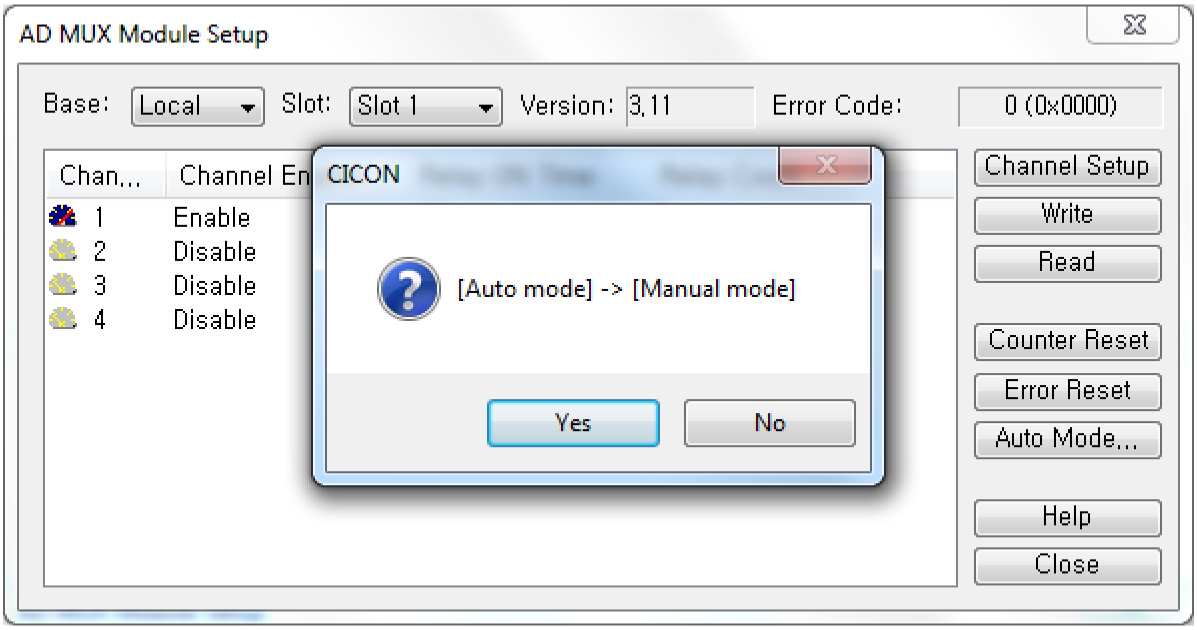
iii. Click OK.


AD MUX Module Setup

Base: Local Slot: Slot 1 Version: 3.11 Error Code: 0 (0x0000)

| Chan... | Channel Enabel ... | Relay ON Time | Relay Count |
|---|---|---|---|
| 1 | Enable | 100 ms | 0 |
| 2 | Disable | | 0 |
| 3 | Disable | | 0 |
| 4 | Disable | | 0 |

iv. Click Write to save parameter to PLC.
v. Click Read to check parameter.
vi. If you click Counter Reset, the selected channel will be reset.
vii. If you want to change Auto Mode to Manual Mode, click Auto Mode.


AD MUX Module Setup

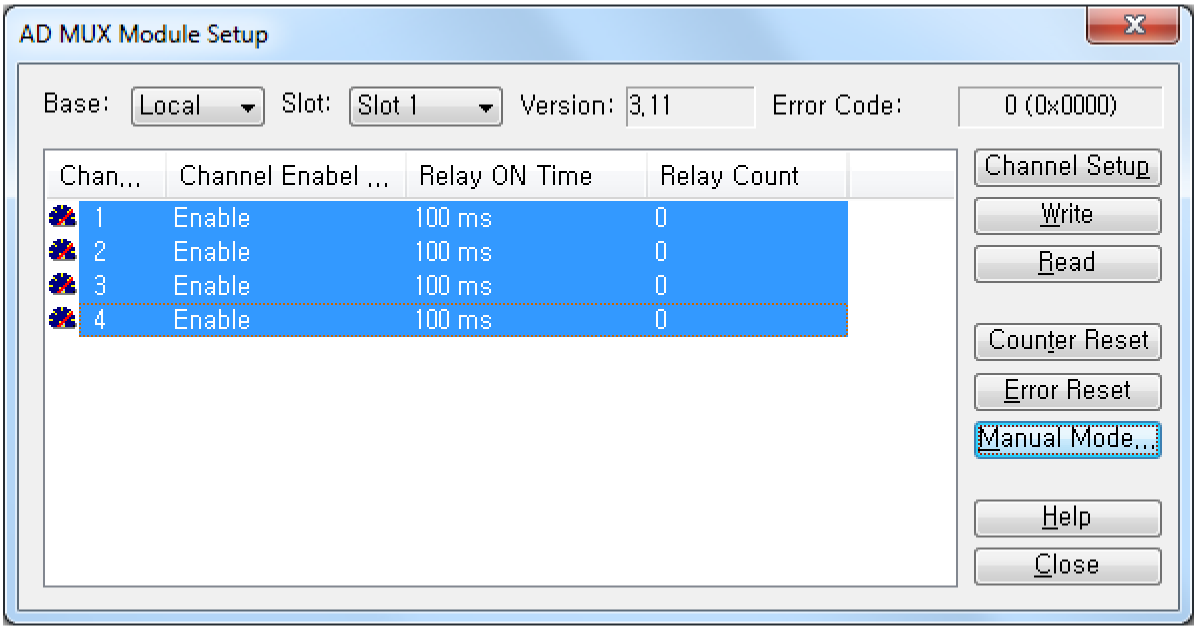
Base: Local Slot: Slot 1 Version: 3.11 Error Code: 0 (0x0000)

| Chan... | Channel En |
|---|---|
| 1 | Enable |
| 2 | Disable |
| 3 | Disable |
| 4 | Disable |

CICON

[Auto mode] -> [Manual mode]

Click Yes, then Manual Mode appears.


AD MUX Module Setup

Base: Local Slot: Slot 1 Version: 3.11 Error Code: 0 (0x0000)

| Chan... | Channel Enabel ... | Relay ON Time | Relay Count |
|---|---|---|---|
| 1 | Enable | 100 ms | 0 |
| 2 | Enable | 100 ms | 0 |
| 3 | Enable | 100 ms | 0 |
| 4 | Enable | 100 ms | 0 |

## 9.11 RTD Module Setting

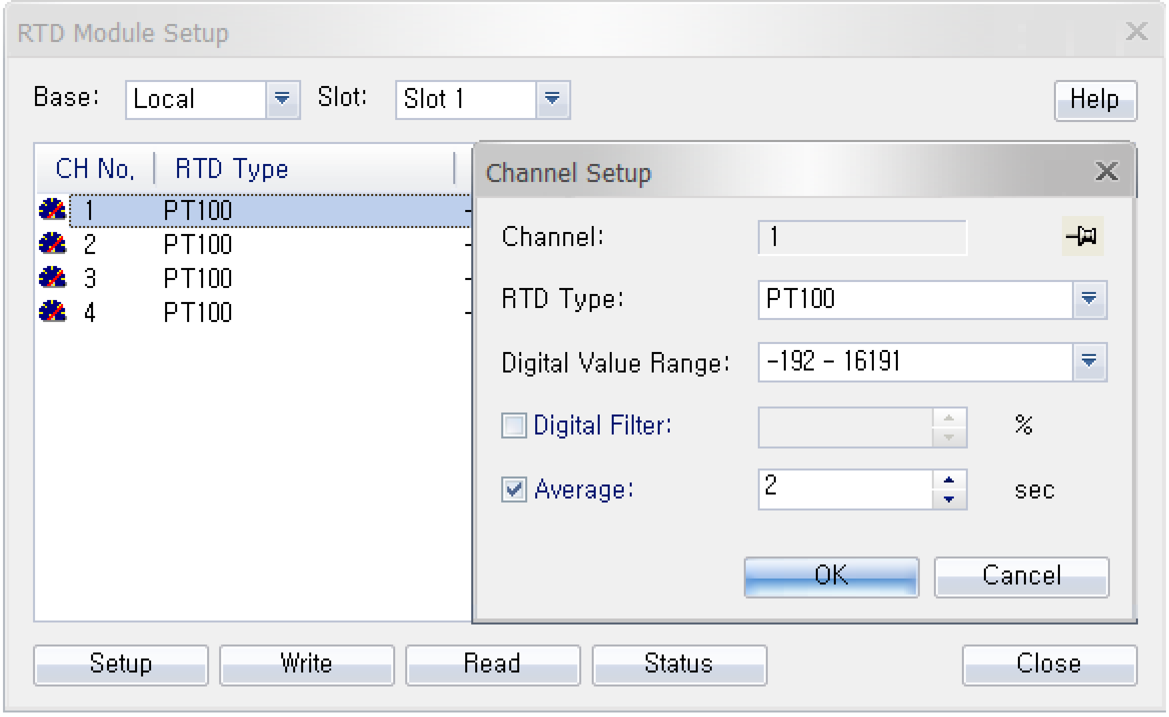
In order to read temperature value and convert it to digital value, it is used to set parameter to assigned channels.

Click Online → Special Module Setup and RTD Module or click RTD module on the Card Properties.

Applied Module : CM1-RD04A, CM1-RD04B and CM3-SP04ERO

■ Channel Setting

Example) PT100 sensor is connected to each Channel 1 and 2 and you want to measure temperature for 2 seconds and convert average value by 0~16000.



Base: Local
Slot: Slot 1

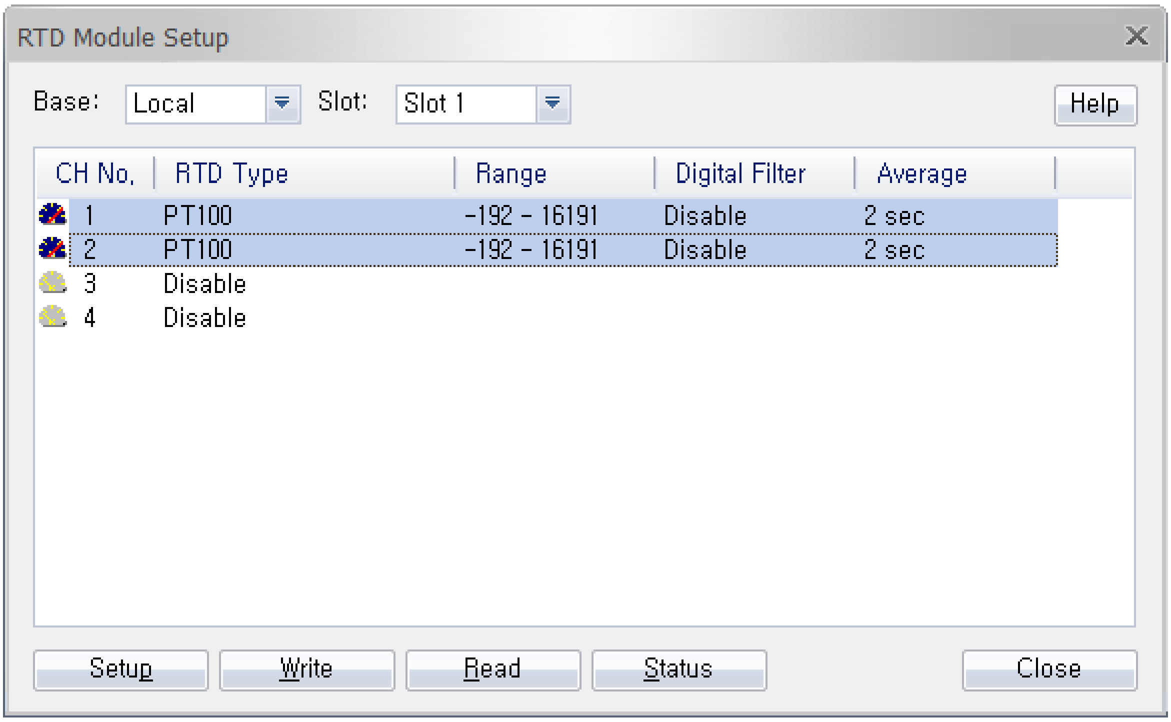
| CH No. | RTD Type |
|---|---|
| 1 | PT100 |
| 2 | PT100 |
| 3 | PT100 |
| 4 | PT100 |

Channel: 1
RTD Type: PT100
Digital Value Range: -192 – 16191
☐ Digital Filter: %
☑ Average: 2 sec

Base and Slot number will appear automatically if CICON connects to PLC.

i. Double click Channel number 1 to open Channel Setup window.
(If you want to set all 4 channels at once, press Ctrl and click channels.)
ii. Choose each parameters.
- RTD Type : PT100, JPT100, PT1000, NI1000(DIN43760), NI1000(TER5000), Disable
- Digital Value Range : -192 - 16191, -8192 - +8191, 0 – 16000, -8000 - +8000
- Average : Choose the seconds

iii. Click OK.



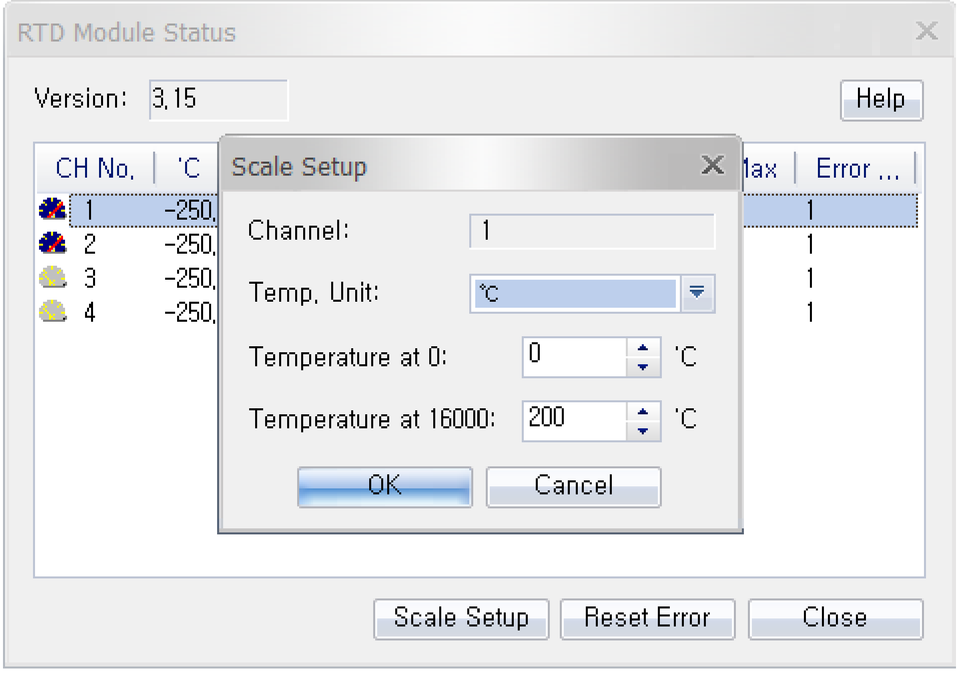
Base: Local Slot: Slot 1

| CH No. | RTD Type | Range | Digital Filter | Average |
|---|---|---|---|---|
| 1 | PT100 | -192 - 16191 | Disable | 2 sec |
| 2 | PT100 | -192 - 16191 | Disable | 2 sec |
| 3 | Disable | | | |
| 4 | Disable | | | |

iv. Click Write to save the parameters.

■ Scale Setup

Example) Channel 1 : 0°C ~ 200°C Scale



Version: 3.15

| CH No. | 'C | lax | Error ... |
|---|---|---|---|
| 1 | -250. | | 1 |
| 2 | -250. | | 1 |
| 3 | -250. | | 1 |
| 4 | -250. | | 1 |

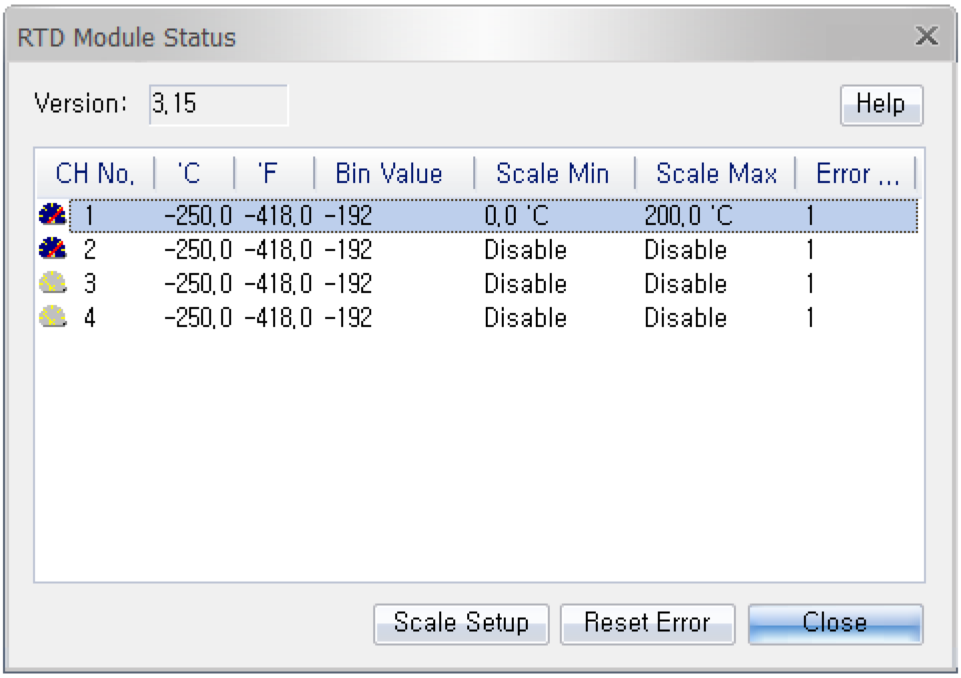
Channel: 1
Temp. Unit: ℃
Temperature at 0: 0 'C
Temperature at 16000: 200 'C

i. Temp. Unit : Choose °C

ii. Temperature at 0 : 0°C

iii. Temperature at 16000 : 200°C

iv. Click OK.



| CH No. | 'C | 'F | Bin Value | Scale Min | Scale Max | Error ... |
|---|---|---|---|---|---|---|
| 1 | -250.0 | -418.0 | -192 | 0.0 'C | 200.0 'C | 1 |
| 2 | -250.0 | -418.0 | -192 | Disable | Disable | 1 |
| 3 | -250.0 | -418.0 | -192 | Disable | Disable | 1 |
| 4 | -250.0 | -418.0 | -192 | Disable | Disable | 1 |

## 9.12 TC Module Setting

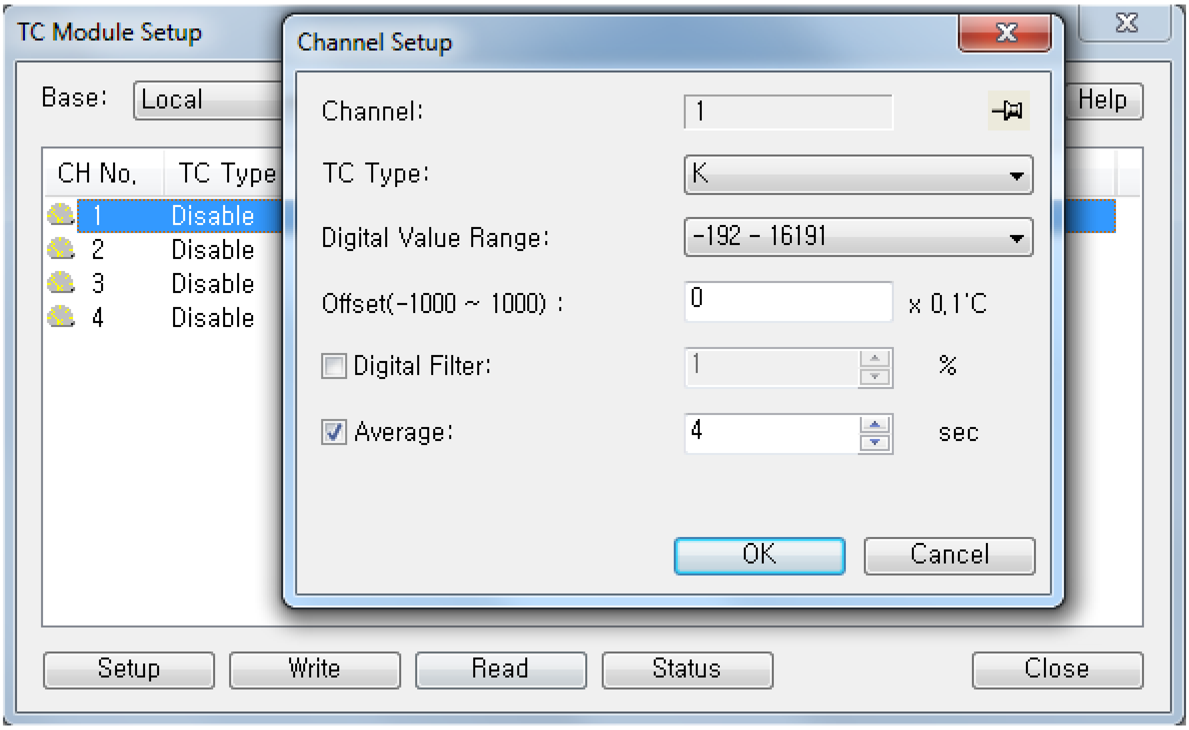
In order to read temperature value and convert it to digital value, it is used to set parameter to assigned channels.

Click Online → Special Module Setup and TC Module or click TC module on the Card Properties.

Applied Module : CM1-TC04A, CM3-SP04ETO

■ Channel Setting

Example) K type sensor is connected to each Channel 1 and 2 and you want to measure temperature for 4 seconds and convert average value by 0~16000.



Base: Local

| CH No. | TC Type |
|---|---|
| 1 | Disable |
| 2 | Disable |
| 3 | Disable |
| 4 | Disable |

Channel: 1

TC Type: K

Digital Value Range: -192 - 16191

Offset(-1000 ~ 1000) : 0 x 0.1'C

☐ Digital Filter: 1 %

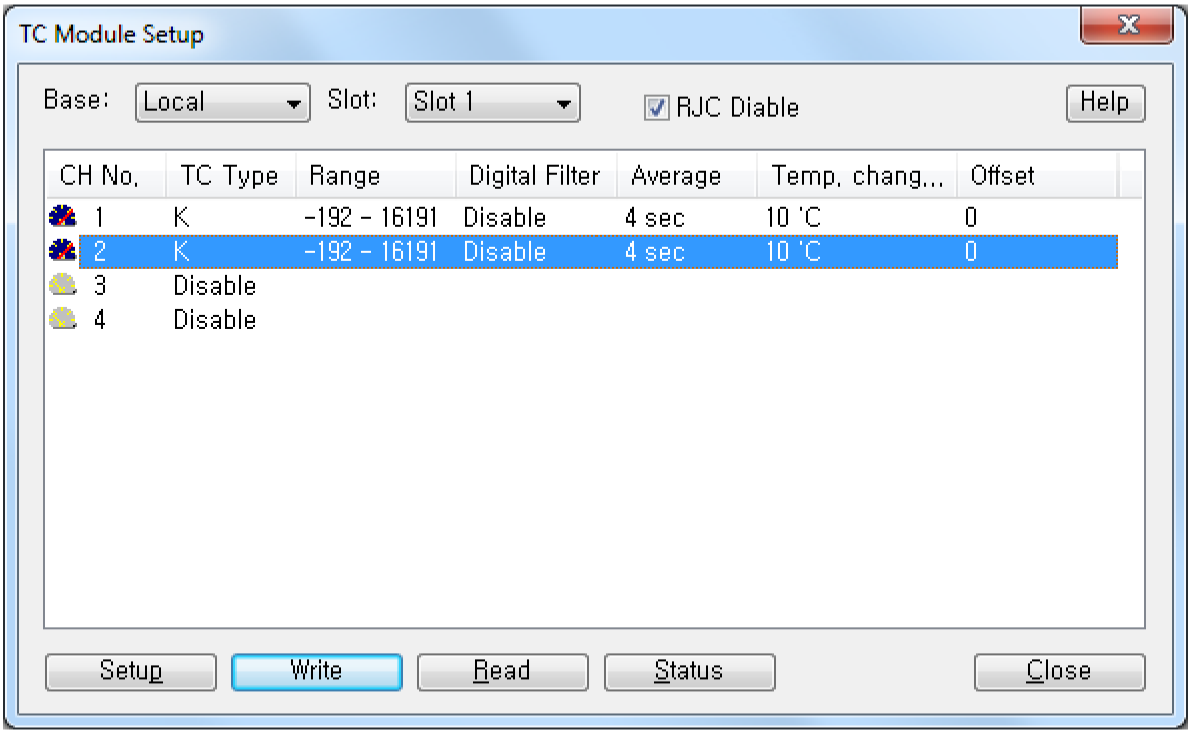
☑ Average: 4 sec

Base and Slot number will appear automatically if CICON connects to PLC.

i. Double click Channel number 1 to open Channel Setup window.
(If you want to set all 4 channels at once, press Ctrl and click channels.)

ii. Choose each parameters.
  - TC Type : K, J, E, T, R, S, B, N, and Disable
  - Digital Value Range : -192 – 16191 or -8192 - +8191
  - Offset(-1000 ~ 1000) : Write offset value of measured temperature. (Buffer memory 5-8)
    Example) If you write 300, Offset will be +30°C. (300 x 0.1°C)
  - Digital Filter : Write percentage from range 1 to 70%
  - Average : Choose the seconds

iii. Click OK.



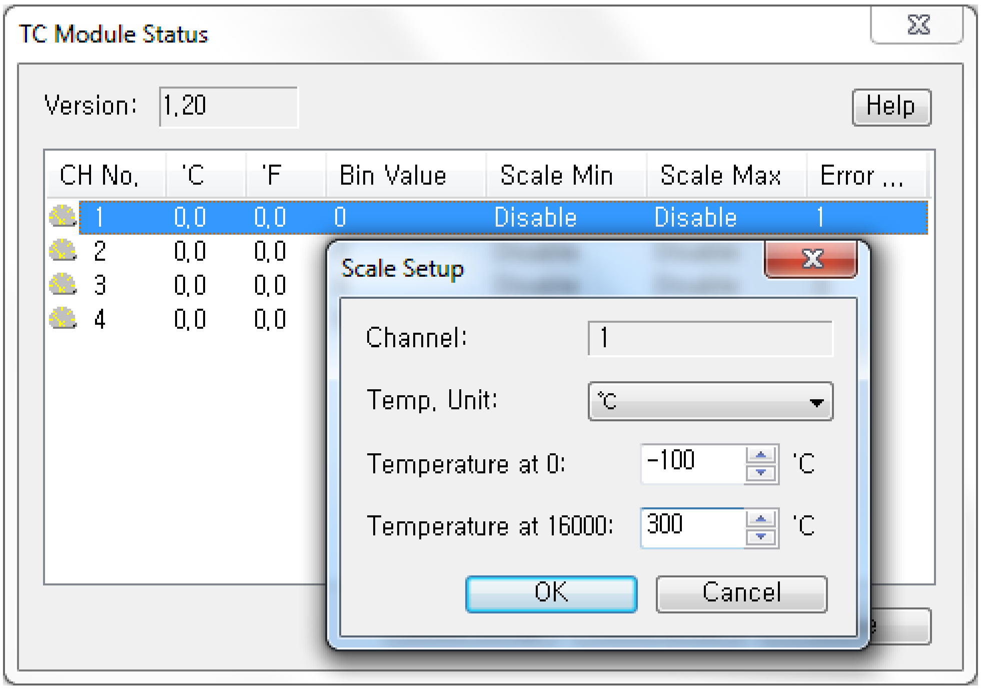
Base: Local Slot: Slot 1 ☑ RJC Diable

| CH No. | TC Type | Range | Digital Filter | Average | Temp. chang... | Offset |
|---|---|---|---|---|---|---|
| 1 | K | -192 - 16191 | Disable | 4 sec | 10 'C | 0 |
| 2 | K | -192 - 16191 | Disable | 4 sec | 10 'C | 0 |
| 3 | Disable | | | | | |
| 4 | Disable | | | | | |

iv. Click Write to save the parameters.

■ Scale Setup

Example) Channel 1 : -100°C ~300°C Scale to 0~16000



Version: 1.20

| CH No. | 'C | 'F | Bin Value | Scale Min | Scale Max | Error ... |
|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.0 | 0 | Disable | Disable | 1 |
| 2 | 0.0 | 0.0 | | | | |
| 3 | 0.0 | 0.0 | | | | |
| 4 | 0.0 | 0.0 | | | | |

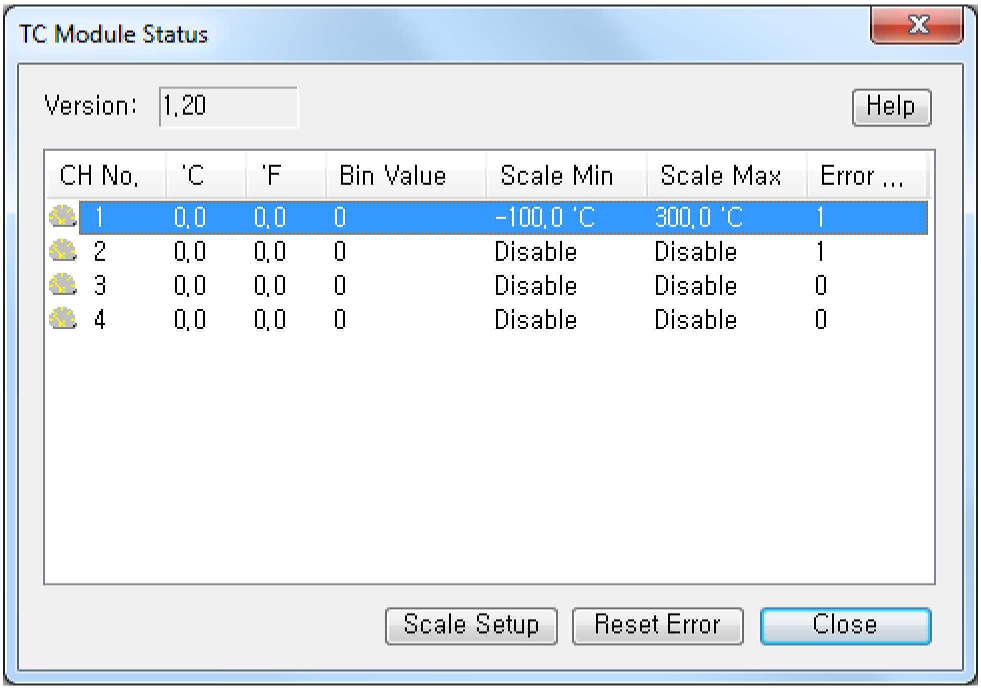
Channel: 1
Temp. Unit: ℃
Temperature at 0: -100 'C
Temperature at 16000: 300 'C

i. Temp. Unit : Choose °C

ii. Temperature at 0 : -100°C

iii. Temperature at 16000 : 300°C

iv. Click OK.



Version: 1,20

| CH No. | 'C | 'F | Bin Value | Scale Min | Scale Max | Error ... |
|---|---|---|---|---|---|---|
| 1 | 0,0 | 0,0 | 0 | -100,0 'C | 300,0 'C | 1 |
| 2 | 0,0 | 0,0 | 0 | Disable | Disable | 1 |
| 3 | 0,0 | 0,0 | 0 | Disable | Disable | 0 |
| 4 | 0,0 | 0,0 | 0 | Disable | Disable | 0 |

## 9.13 High Speed Counter Module Setting

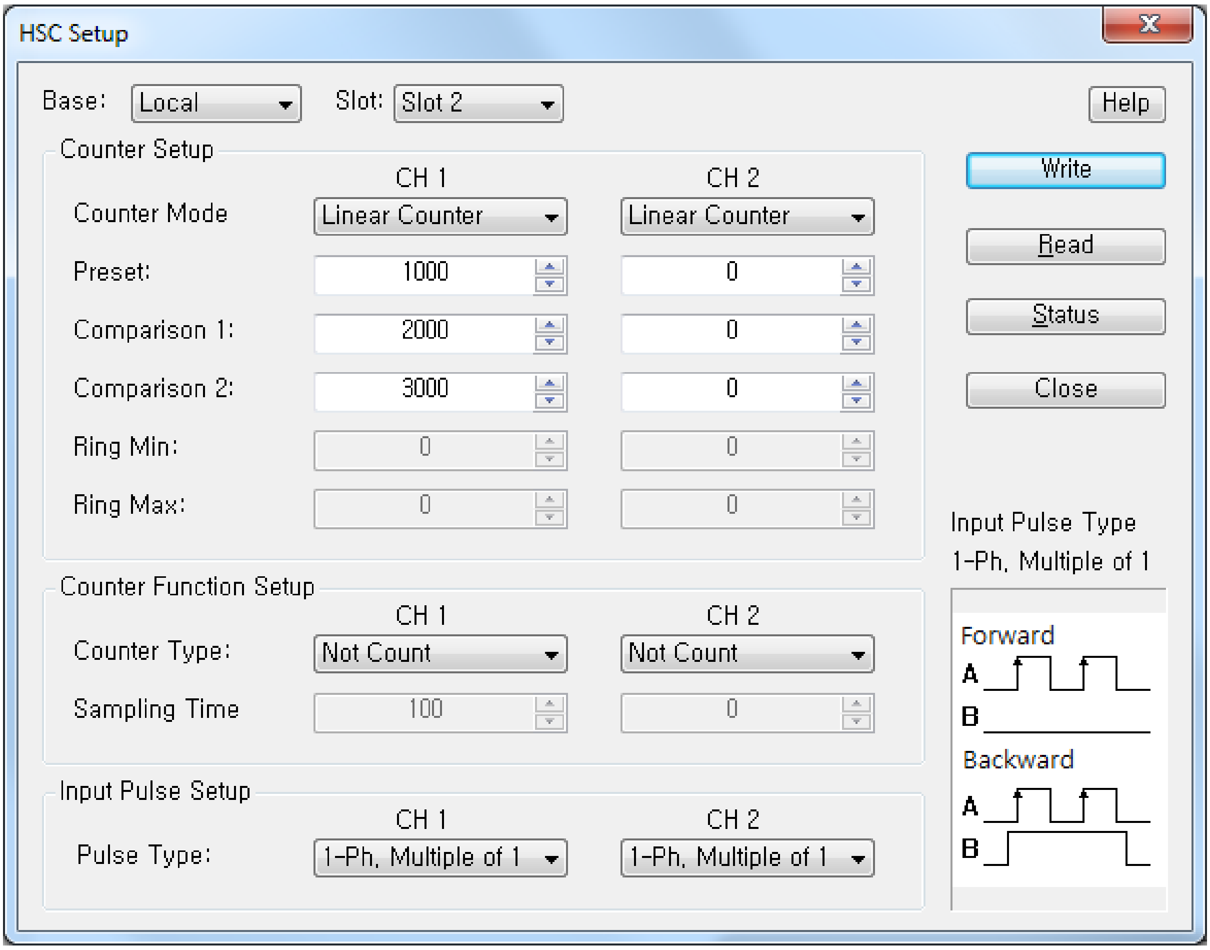
It is used to set parameter of HSC channels.

Click Online → Special Module Setup and High Speed Counter Module or click High Speed Counter module on the Card Properties.

Applied Module : CM1-HS02C, CM1-HS02E, CM1-HS02F

■ Channel Setting

Example) Counter mode : Linear with 1 Phase and 1Multiple



HSC Setup

Base: Local

Slot: Slot 2

Counter Setup

| | CH 1 | CH 2 |
|---|---|---|
| Counter Mode | Linear Counter | Linear Counter |
| Preset: | 1000 | 0 |
| Comparison 1: | 2000 | 0 |
| Comparison 2: | 3000 | 0 |
| Ring Min: | 0 | 0 |
| Ring Max: | 0 | 0 |

Counter Function Setup

| | CH 1 | CH 2 |
|---|---|---|
| Counter Type: | Not Count | Not Count |
| Sampling Time | 100 | 0 |

Input Pulse Setup

| | CH 1 | CH 2 |
|---|---|---|
| Pulse Type: | 1-Ph, Multiple of 1 | 1-Ph, Multiple of 1 |

Input Pulse Type

1-Ph, Multiple of 1

Base and Slot number will appear automatically if CICON connects to PLC.

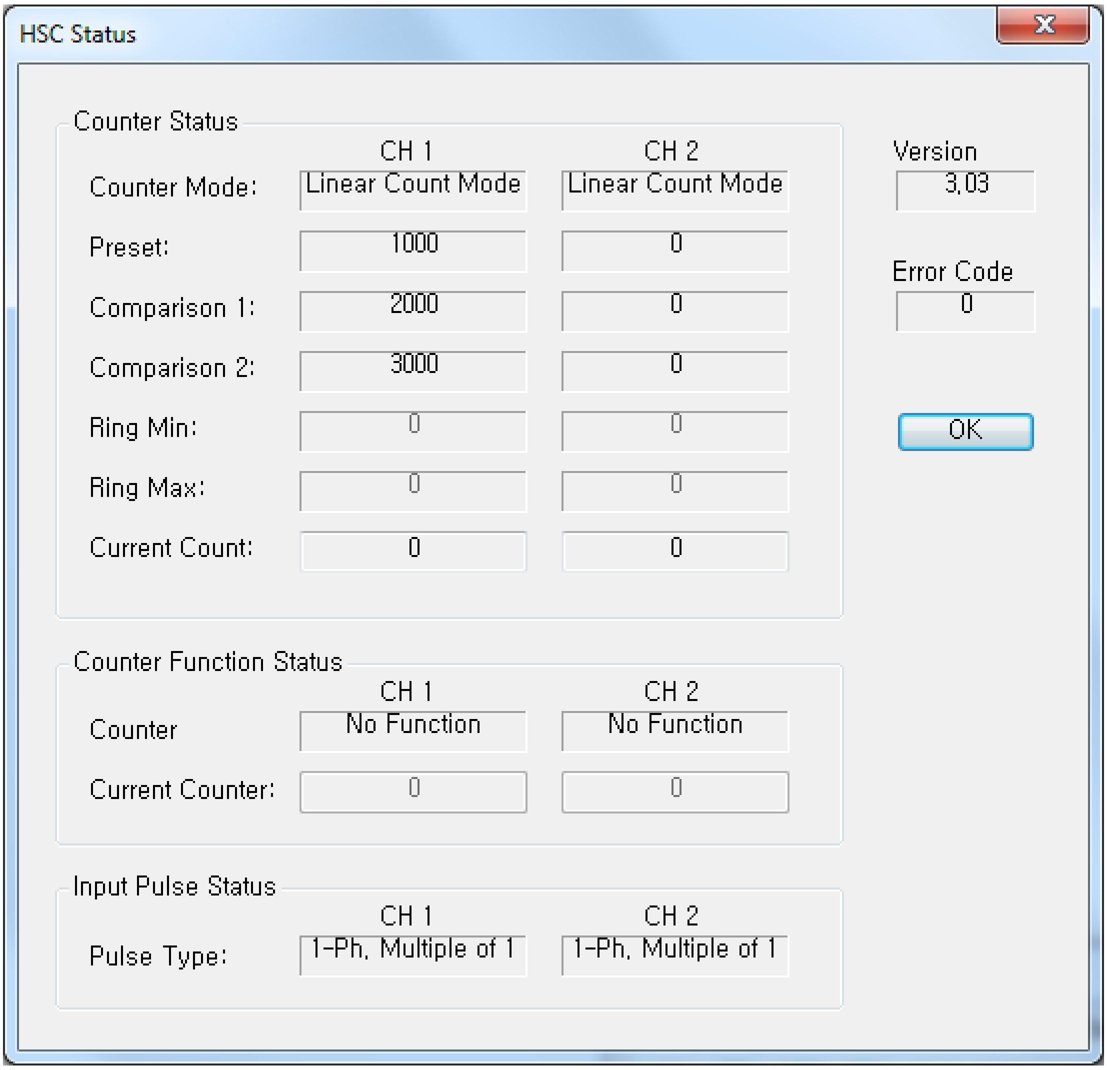
i. From the Counter Mode full-down menu, choose Linear Counter

ii. Type value each Preset, Comparison 1 and Comparison 2. If Preset buffer memory is ON, preset value will become current value.

iii. Counter Type : choose Not Count. Only if Counter Enable and Counter Start are turned ON , Counter will get started.

iv. Click Write to save the parameters.

v. Click Status to check status of each channels.



Counter Status

| | CH 1 | CH 2 |
|---|---|---|
| Counter Mode: | Linear Count Mode | Linear Count Mode |
| Preset: | 1000 | 0 |
| Comparison 1: | 2000 | 0 |
| Comparison 2: | 3000 | 0 |
| Ring Min: | 0 | 0 |
| Ring Max: | 0 | 0 |
| Current Count: | 0 | 0 |

Version: 3,03

Error Code: 0

Counter Function Status

| | CH 1 | CH 2 |
|---|---|---|
| Counter | No Function | No Function |
| Current Counter: | 0 | 0 |

Input Pulse Status

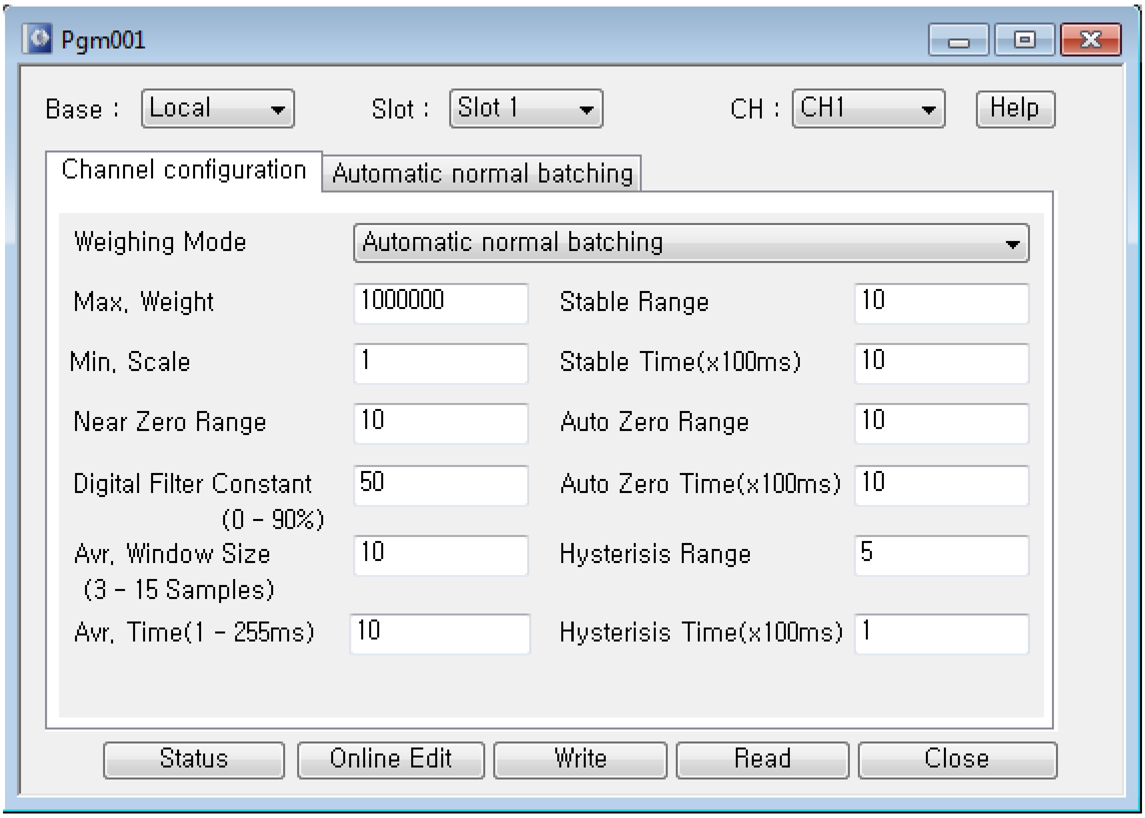
| | CH 1 | CH 2 |
|---|---|---|
| Pulse Type: | 1-Ph, Multiple of 1 | 1-Ph, Multiple of 1 |

## 9.14 Loadcell Module Setting

It is used to see the status of each channels.

Click Online → Special Module Setup and Loadcell Module or click Load Cell on the Card Properties.

In order to set parameters of loadcell channels, create Loadcell program at the Special Configuration as below. For more details, refer to here. (Loadcell – Basic Configuration with Special Program)



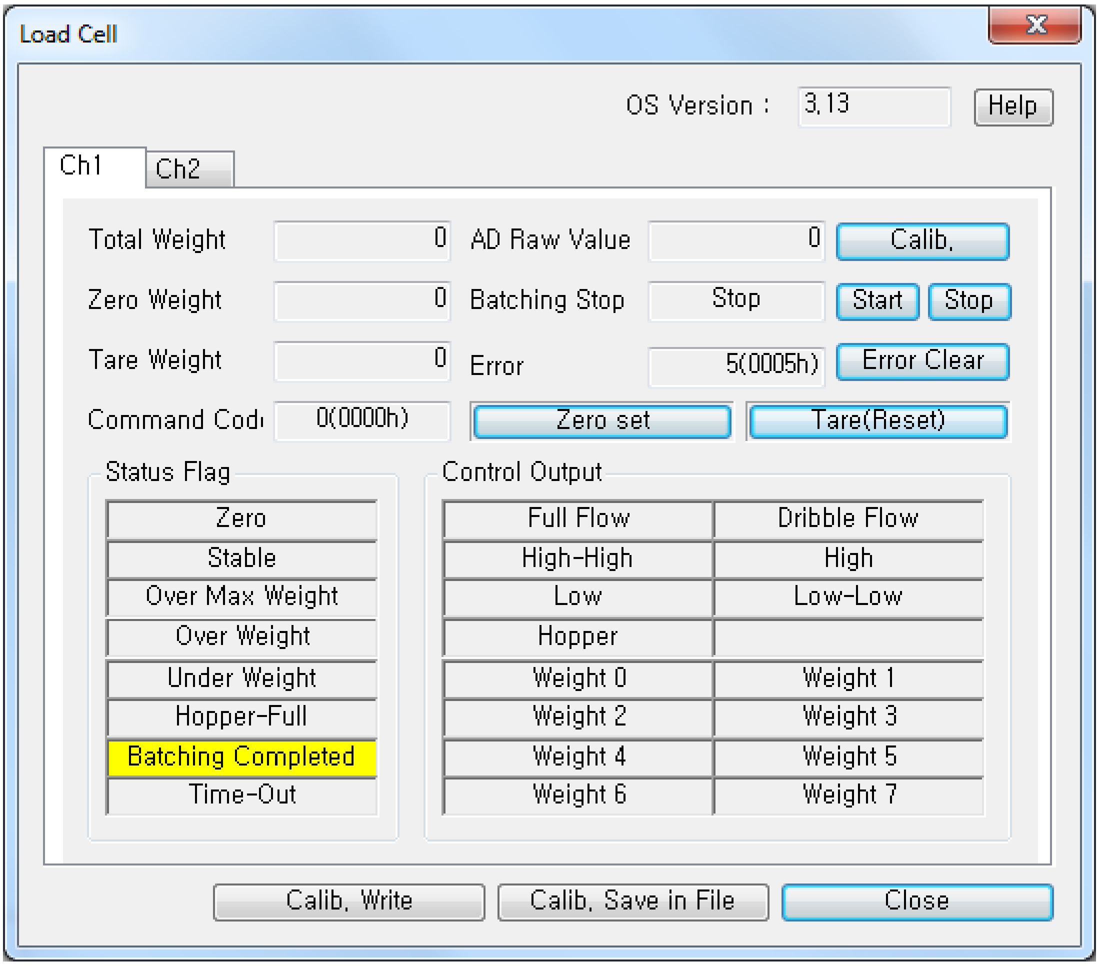
Base : Local
Slot : Slot 1
CH : CH1

Weighing Mode: Automatic normal batching

| | | | |
|---|---|---|---|
| Max. Weight | 1000000 | Stable Range | 10 |
| Min. Scale | 1 | Stable Time(x100ms) | 10 |
| Near Zero Range | 10 | Auto Zero Range | 10 |
| Digital Filter Constant (0 - 90%) | 50 | Auto Zero Time(x100ms) | 10 |
| Avr. Window Size (3 - 15 Samples) | 10 | Hysterisis Range | 5 |
| Avr. Time(1 - 255ms) | 10 | Hysterisis Time(x100ms) | 1 |

Applied Module: CM1-WG02A, CM1-WG04A, CM1-WG02C, CM1-WG02D, CM1-WG02E

### ■ Load Cell



OS Version : 3.13

Total Weight 0

AD Raw Value 0

Zero Weight 0

Batching Stop Stop

Tare Weight 0

Error 5(0005h)

Command Codı 0(0000h)

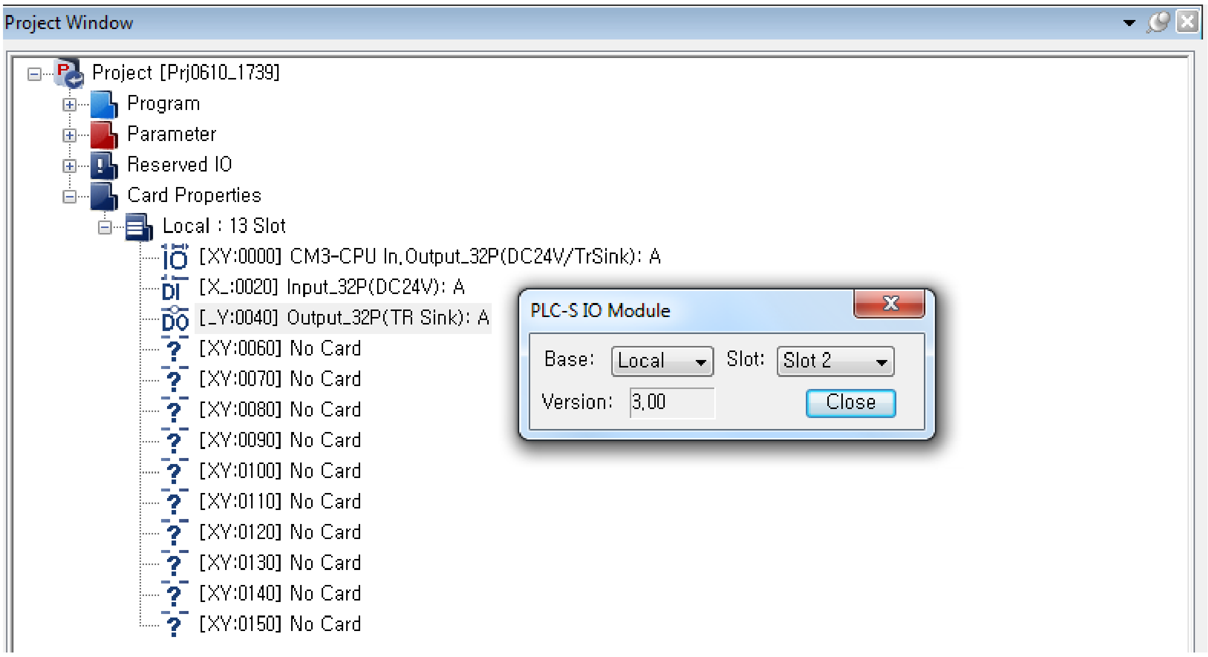
- Total Weight : Total weight that Loadcell module measures appears.
- AD Raw Value : AD conversion value dispaly
- Zero Weight : Zero Command(Y06~Y09) is ON, total weight will become 0.
- Batching : it shows status of Batch program. You can start and stop batch program.
- Tare Weight : When Tare BIT(Y0A~Y0D) is turned Off and On, current total weight becomes 0.
- Error : It shows error code.
- Command Code : It shows Command main code.
- Zero Reset : If you click it, total weight will become 0 and display it to Zero Weight (Offset5, 20,35 and 50.)
- Tare Reset : If you click it, total weight will become 0 and display it to Tare Weight (Offset10, 25, 40 and 55)
- Status Flag : If Flag is ON, assigned bit will be turned Yellow.
- Control Output : If Flag is ON, assigned bit will be turned Yellow.

### 9.15 PLC-S IO Module Setting

You can find out slot number and firmware version of PLC-S Digital IO module.

Click Online → Special Module Setup and PLC-S IO Module or click Digital module on the Card Properties.

Applied Module : CM3-SP32EDO, SP32EOT, SP32EOC, SP32EDT, SP16DOR, SP16EDR



Project [Prj0610_1739]
  Program
  Parameter
  Reserved IO
  Card Properties
    Local : 13 Slot
      [XY:0000] CM3-CPU In,Output_32P(DC24V/TrSink): A
      [X_:0020] Input_32P(DC24V): A
      [_Y:0040] Output_32P(TR Sink): A
      [XY:0060] No Card
      [XY:0070] No Card
      [XY:0080] No Card
      [XY:0090] No Card
      [XY:0100] No Card
      [XY:0110] No Card
      [XY:0120] No Card
      [XY:0130] No Card
      [XY:0140] No Card
      [XY:0150] No Card

Base: Local  Slot: Slot 2
Version: 3.00

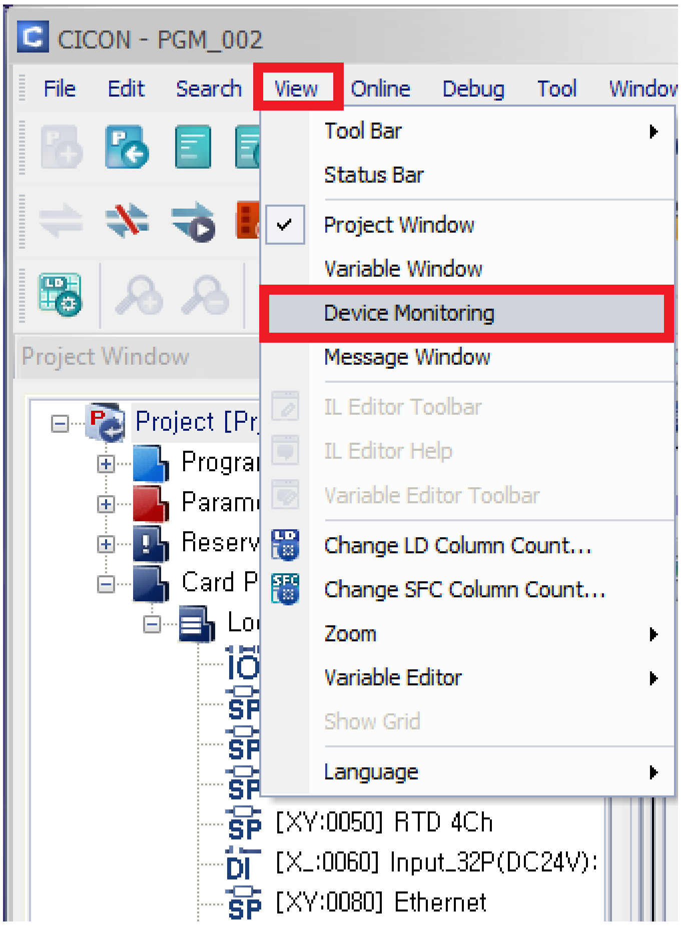
Example) If you click Output_32P(TR Sink) module, it shows slot number2 and firmware version 3.00.

## 10. Device Monitoring

By registering the desired device, you can monitor the value of constantly changing devices in real time.

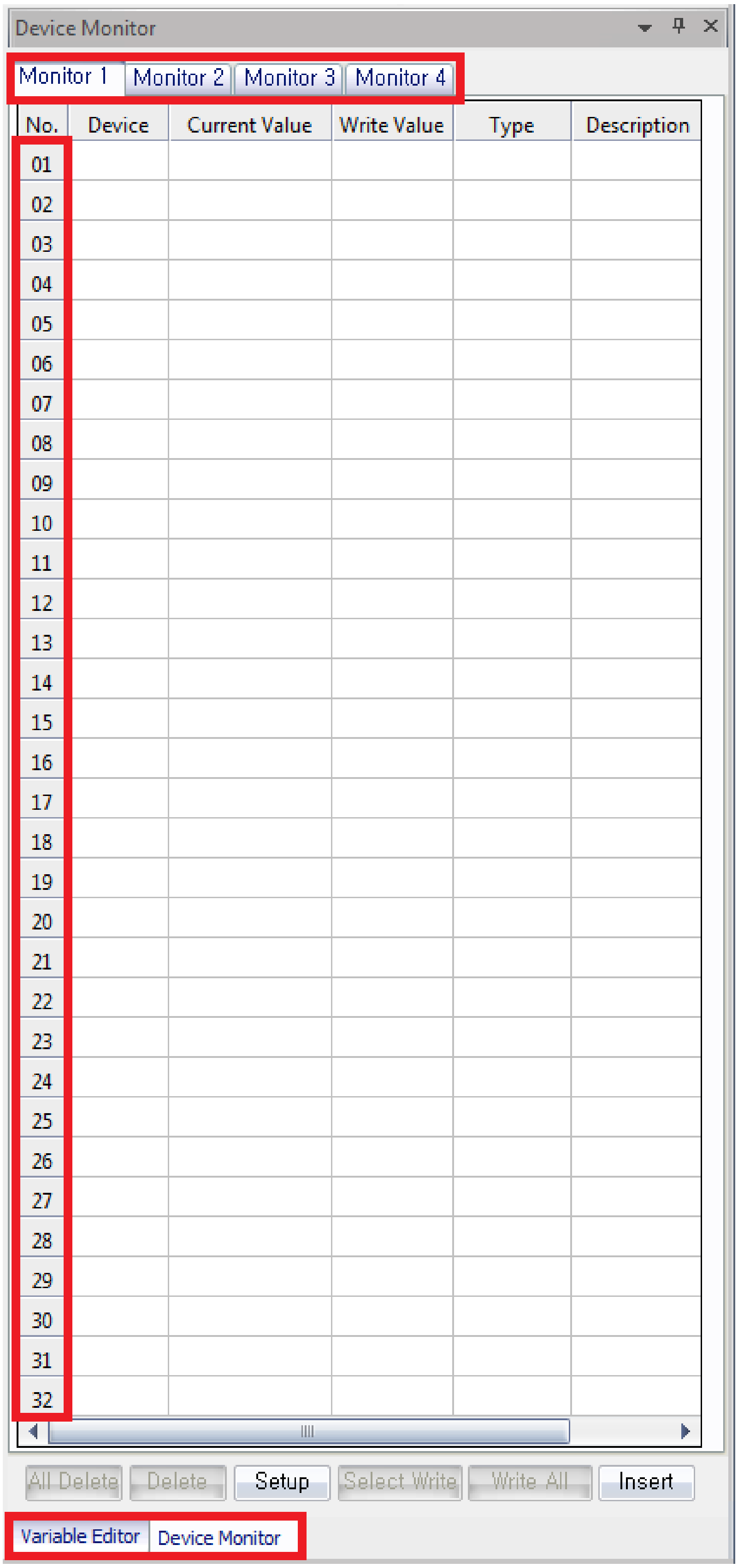
## How to Run Device Monitoring

Select [View] → [Device Monitoring] menu.



## Device Monitoring Configuration

When you select the Device Monitoring, it will be displayed in the right corner of the CICON software program. If you select ‘Variable Window’ along with Device Monitoring, it will also be displayed in the right corner next to the Device Monitoring.



*When there are no registered devices, only 'Setup' and 'Insert' buttons will be activated.

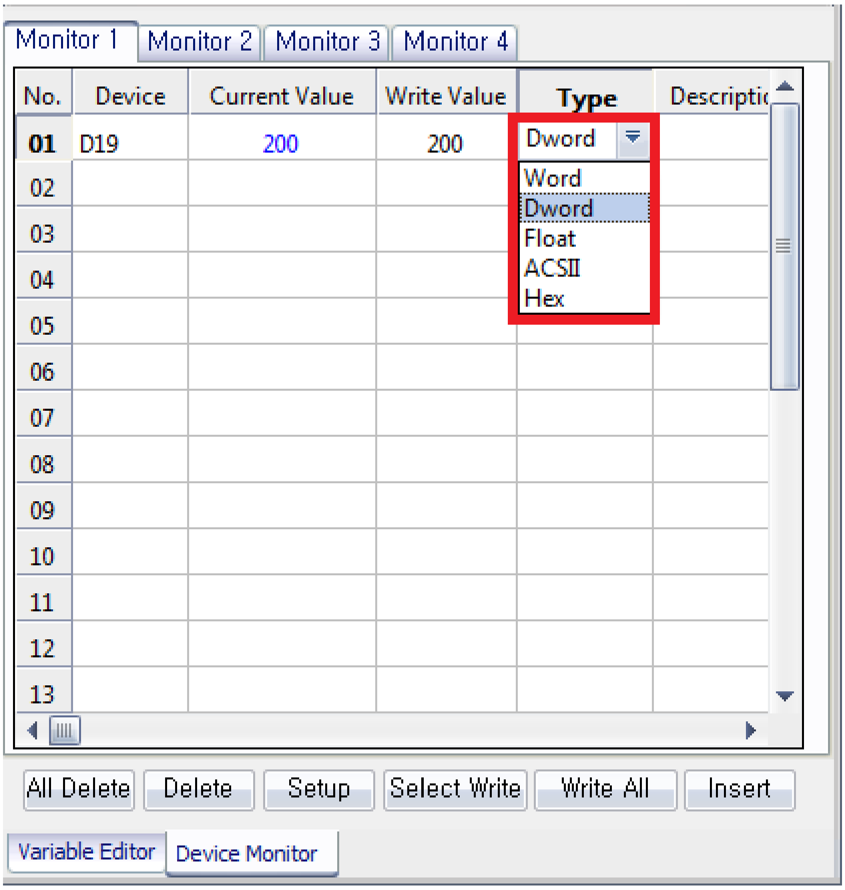
- Four tabs of Device Monitor can each have 32 devices and select the ones to monitor.

- Once a device is registered, the device can be changed into the desired type and monitored in real time.

- If the last address of the Bit device ends with 0, the value of Dword and Word can be changed.

- If the last address does not end with 0, then the device can only be registered as bit device.

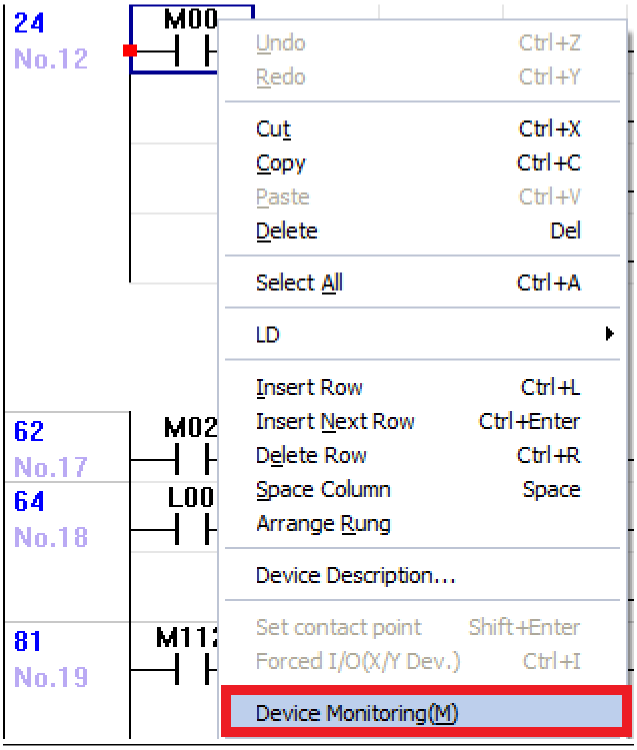
Y device cannot be changed into another type.



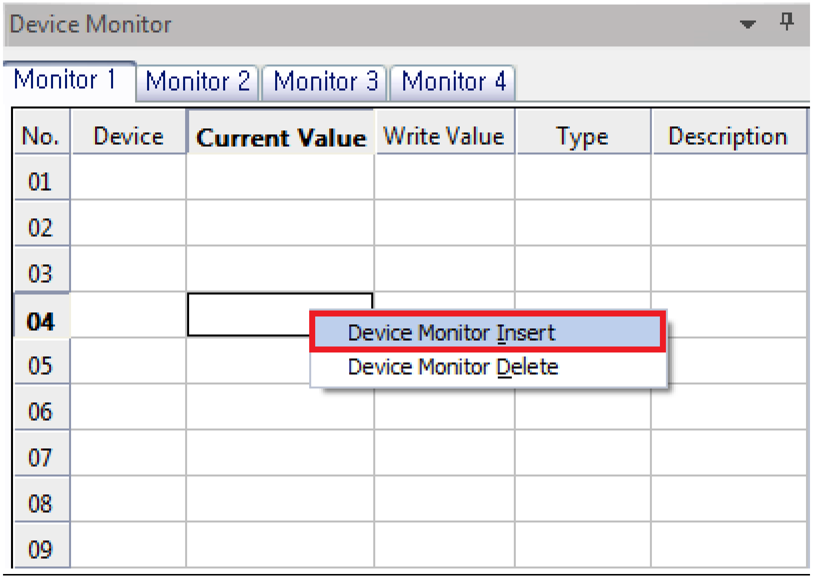
| No. | Device | Current Value | Write Value | Type | Descriptio |
|---|---|---|---|---|---|
| 01 | D19 | 200 | 200 | Dword | |
| 02 | | | | | |
| 03 | | | | | |
| 04 | | | | | |
| 05 | | | | | |
| 06 | | | | | |
| 07 | | | | | |
| 08 | | | | | |
| 09 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |

## How to Insert a Device in multiple ways

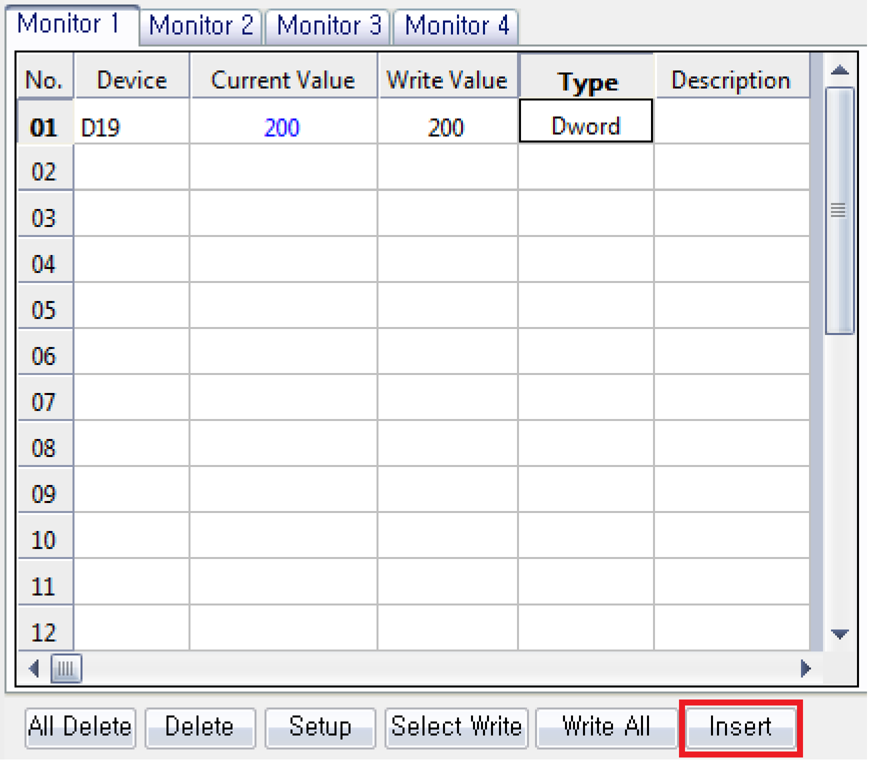
1) You can insert and register a device in a scan program.



2) Insert a device by right-click in the Device Monitoring tab.

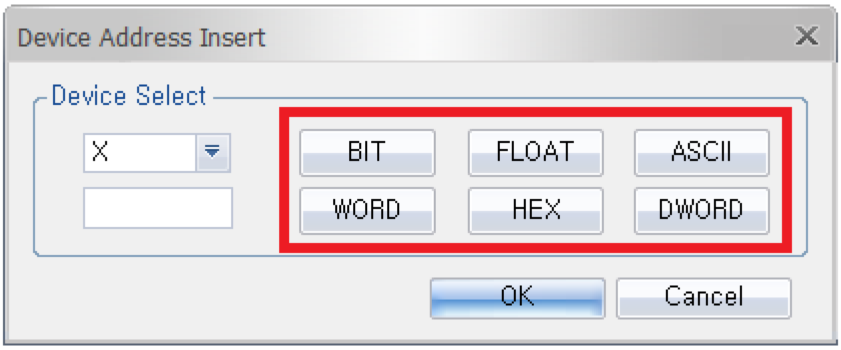


3) Register a device by clicking ‘Insert’ button at the bottom of the Device Monitoring tab.

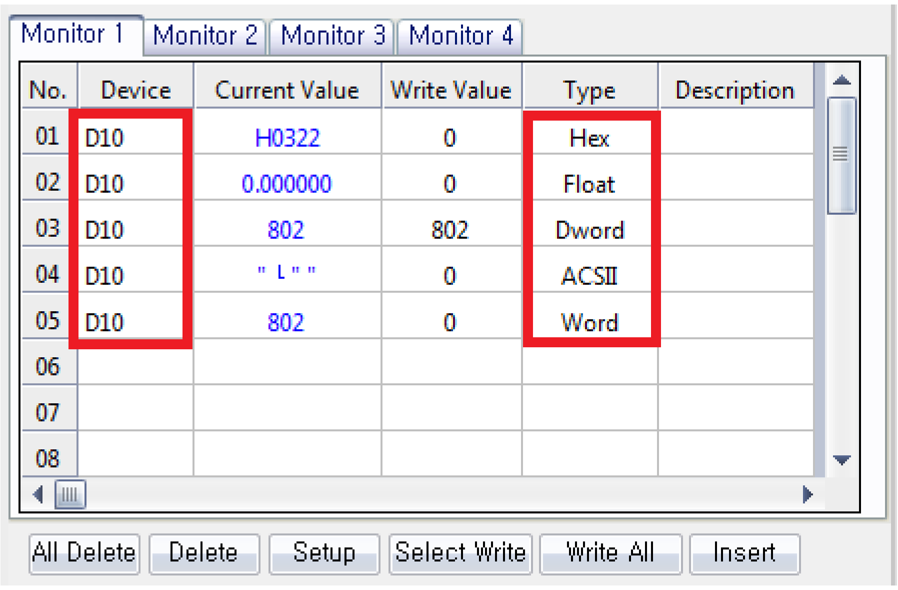


| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D19 | 200 | 200 | Dword | |
| 02 | | | | | |
| 03 | | | | | |
| 04 | | | | | |
| 05 | | | | | |
| 06 | | | | | |
| 07 | | | | | |
| 08 | | | | | |
| 09 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |

*When inserting a device, there are 6 types available (Bit, Float, ASCII, Word, HEX, DWORD).
* If the last address of the Bit device ends with 0, the device can be Dword and Word types.
* If the last address does not end with 0, then the device can only be monitored as bit device.

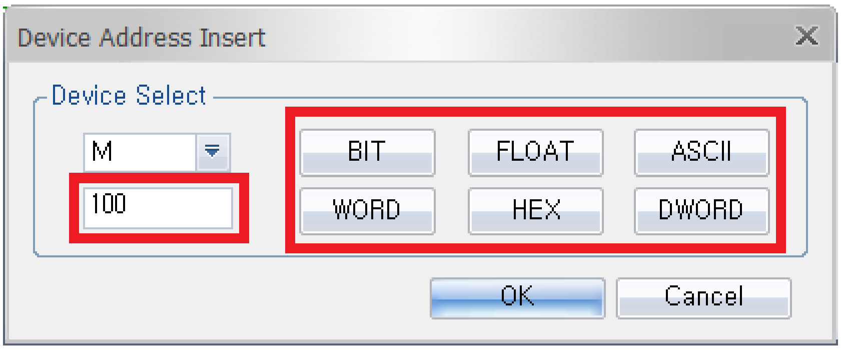


*A duplicate device cannot be registered. However, a same device address with a different device type can be registered and monitored in redundancy.



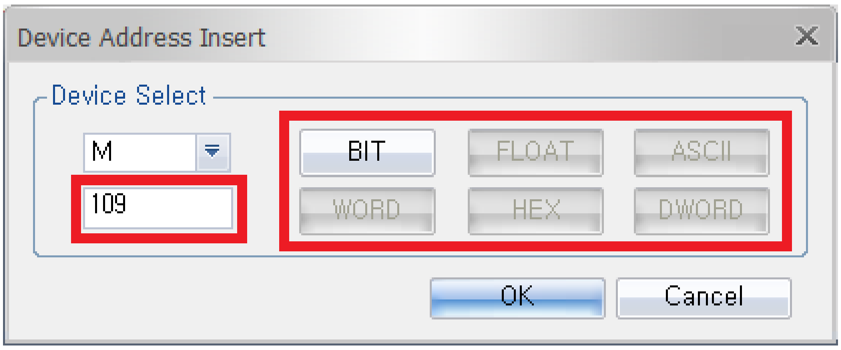
| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D10 | H0322 | 0 | Hex | |
| 02 | D10 | 0.000000 | 0 | Float | |
| 03 | D10 | 802 | 802 | Dword | |
| 04 | D10 | " L " " | 0 | ACSII | |
| 05 | D10 | 802 | 0 | Word | |
| 06 | | | | | |
| 07 | | | | | |
| 08 | | | | | |

* If the last address of the Bit device ends with 0, all types can be selected.



M
100

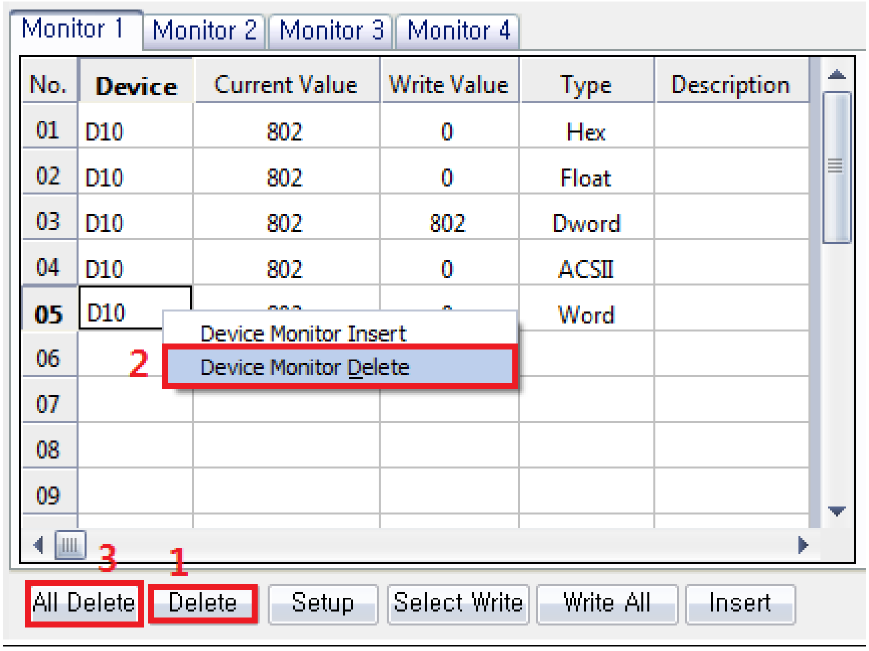
*If the last address of the Bit device does NOT end with 0, only BIT type can be selected.



M
109

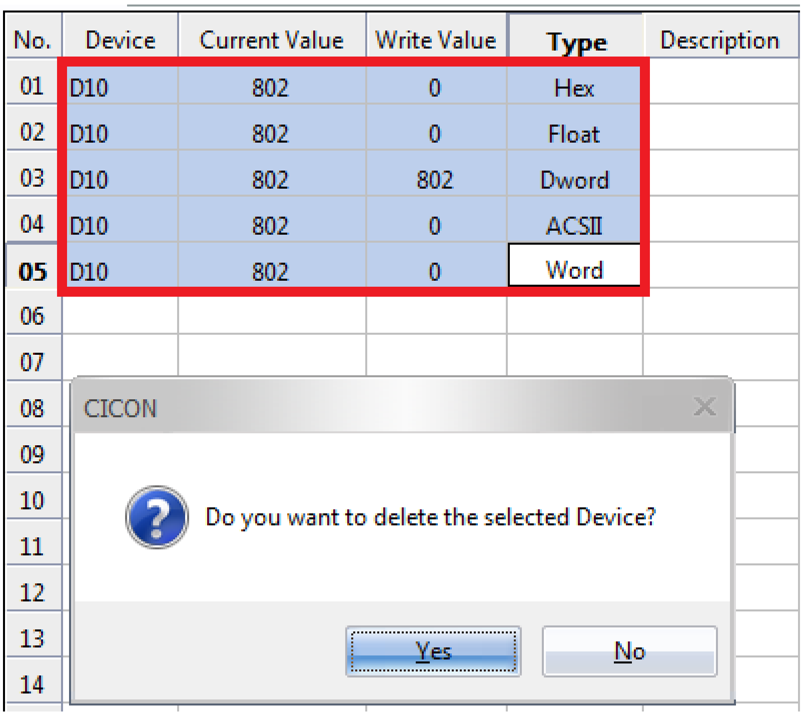
**How to Delete a Device in multiple ways**

1) Delete a device by clicking ‘Delete’ button at the bottom of the Device Monitoring tab.
2) Delete a device by right-click in the Device Monitoring tab.
3) Delete a device by clicking ‘All Delete’ button.



| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D10 | 802 | 0 | Hex | |
| 02 | D10 | 802 | 0 | Float | |
| 03 | D10 | 802 | 802 | Dword | |
| 04 | D10 | 802 | 0 | ACSII | |
| 05 | D10 | | | Word | |
| 06 | | | | | |
| 07 | | | | | |
| 08 | | | | | |
| 09 | | | | | |

4) Specify area and select a desired device or multiple devices. Click “Delete” on the keyboard.



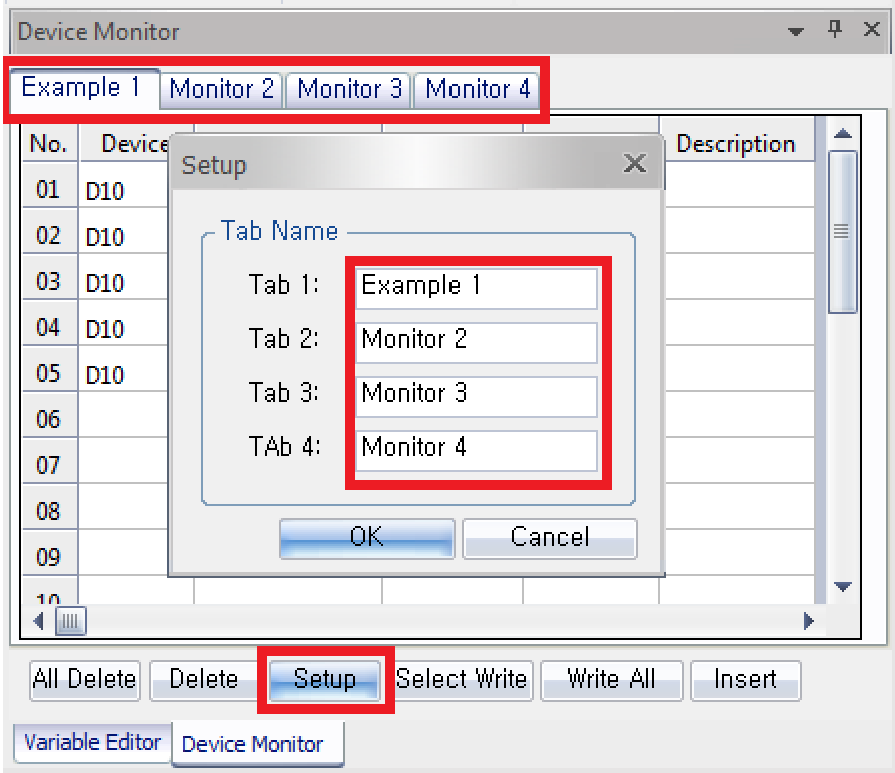
| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D10 | 802 | 0 | Hex | |
| 02 | D10 | 802 | 0 | Float | |
| 03 | D10 | 802 | 802 | Dword | |
| 04 | D10 | 802 | 0 | ACSII | |
| 05 | D10 | 802 | 0 | Word | |
| 06 | | | | | |
| 07 | | | | | |
| 08 | | | | | |
| 09 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |

Do you want to delete the selected Device?

## How to Name Device Monitoring Tab

By clicking ‘Setup’ button on the bottom of the Device Monitoring; you can easily name the tab.

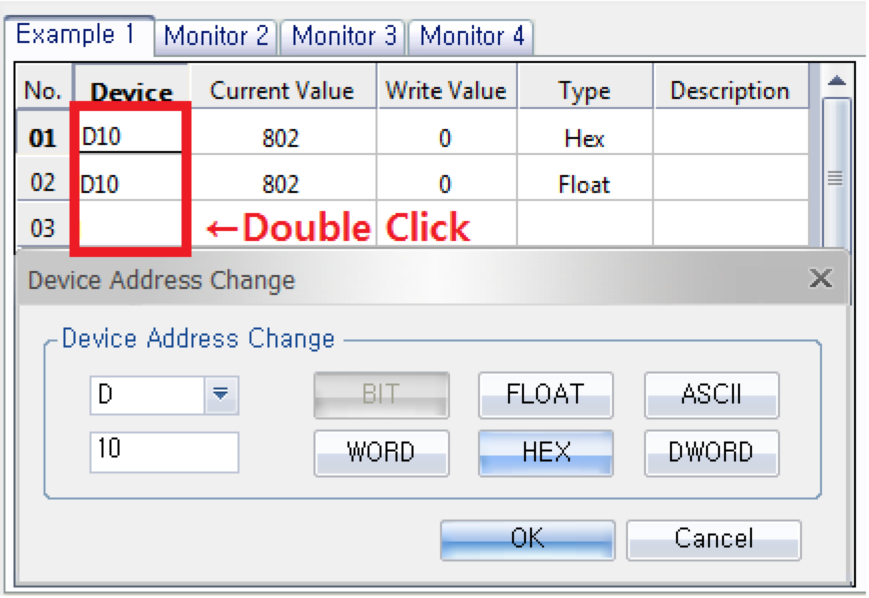
A maximum of 16 letters can be entered for each tab name.



Tab 1: Example 1
Tab 2: Monitor 2
Tab 3: Monitor 3
TAb 4: Monitor 4

## How to Modify a Device and its Type

By double-clicking a desired device, you can modify its address and device type.



| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D10 | 802 | 0 | Hex | |
| 02 | D10 | 802 | 0 | Float | |
| 03 | | | | | |

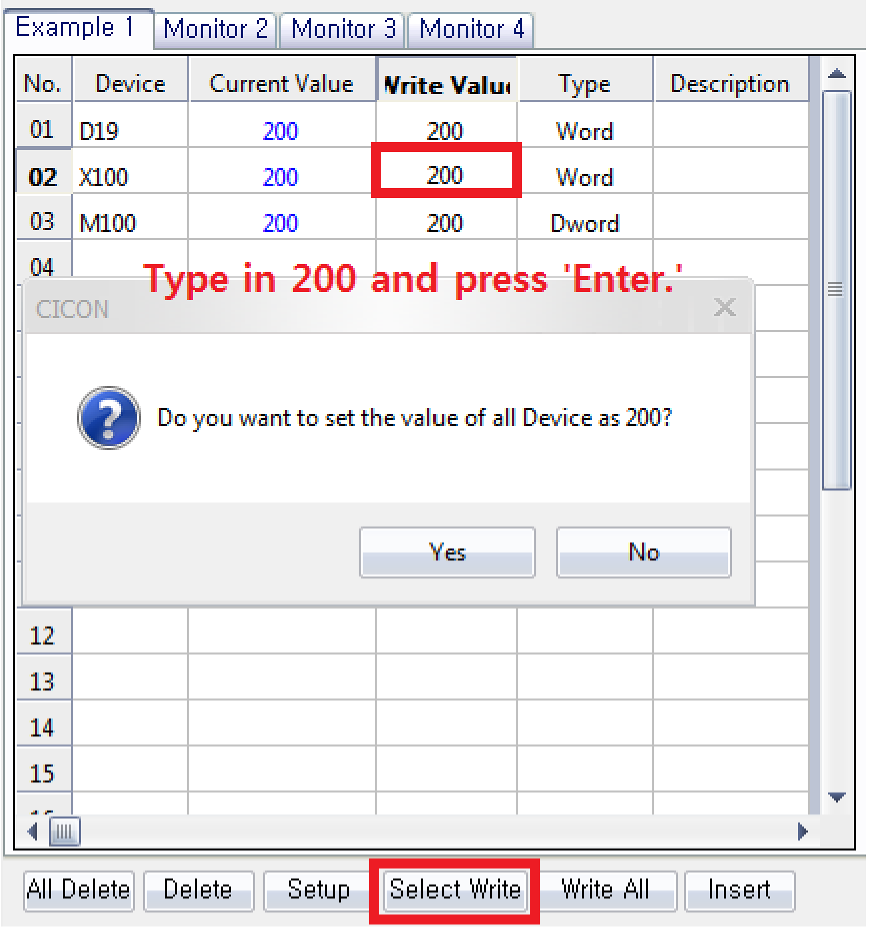
D
10

## How to Write and Apply Value to a Device

*Devices F, TS, TC cannot be written.

1) Select Write: enables a user to write one value and apply to all devices at once.

   As you can see in the example below, the value of 200 was written to D19, X100 and M100.



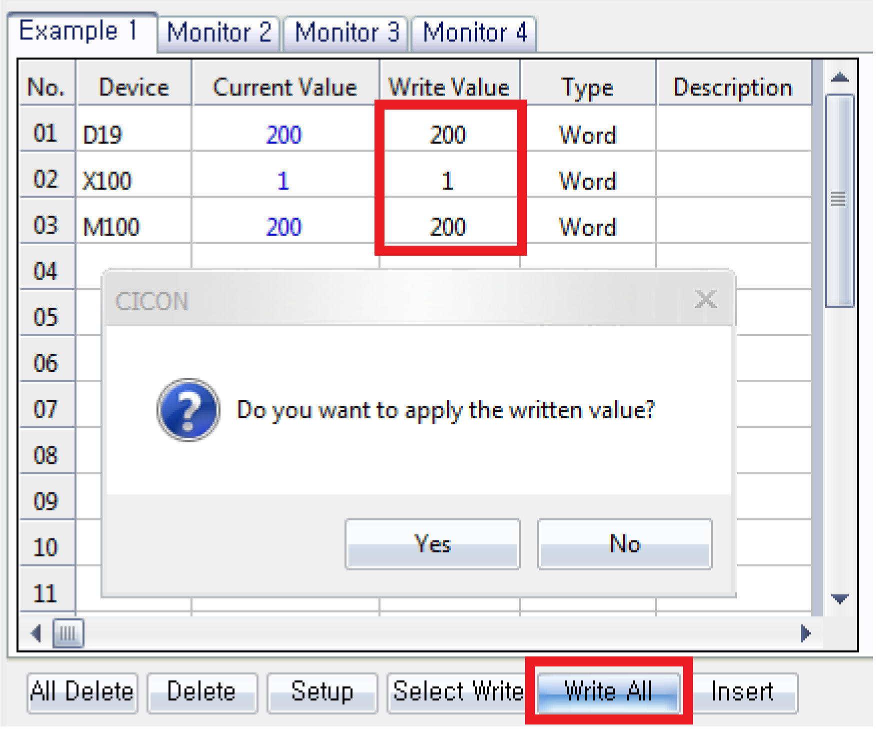
| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D19 | 200 | 200 | Word | |
| 02 | X100 | 200 | 200 | Word | |
| 03 | M100 | 200 | 200 | Dword | |

Type in 200 and press 'Enter.'

CICON

Do you want to set the value of all Device as 200?

2) Write All: Each differently written value can be applied to each device at once.
   For example, each value (200, 1, 200) was applied to D19, X100, and M100 respectively.

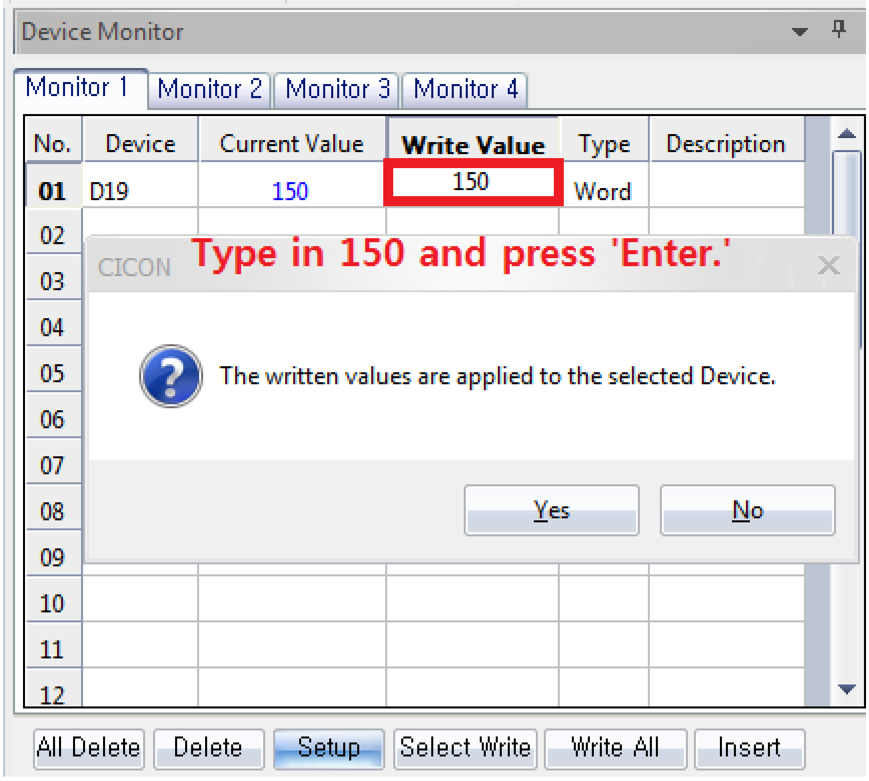


| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D19 | 200 | 200 | Word | |
| 02 | X100 | 1 | 1 | Word | |
| 03 | M100 | 200 | 200 | Word | |

CICON

Do you want to apply the written value?

3) Write value individually: Not using 'Select Write' and 'Write All' functions, a user can write value to a device individually by typing in a desired value and pressing 'Enter.'



| No. | Device | Current Value | Write Value | Type | Description |
|---|---|---|---|---|---|
| 01 | D19 | 150 | 150 | Word | |

Type in 150 and press 'Enter.'

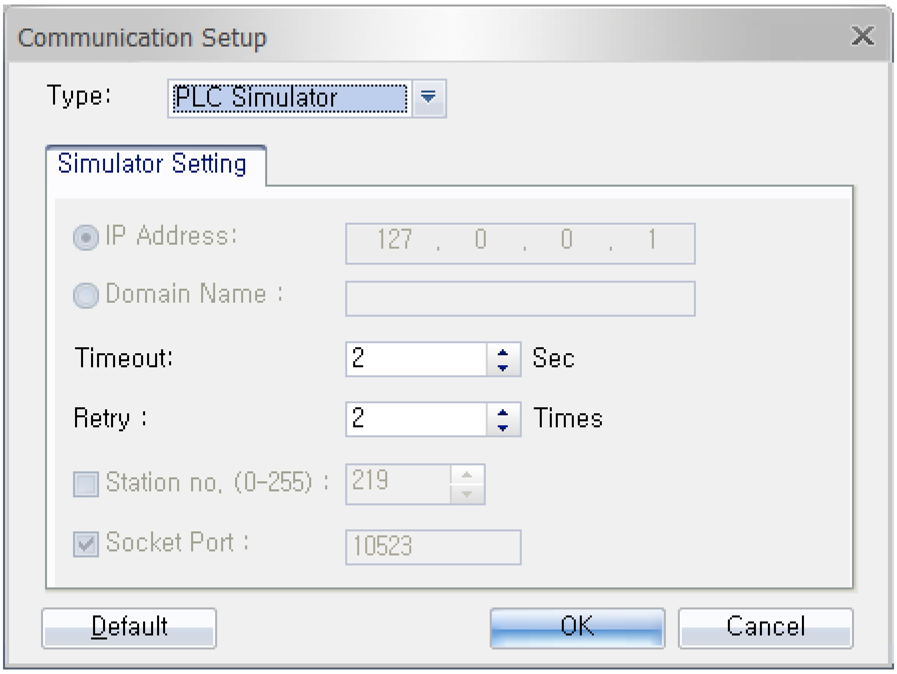
CICON

The written values are applied to the selected Device.

*Unless you press 'Enter,' the written value will not be applied to a selected device.

## 11. CICON Simulator

1) After creating new project, click [Tool] → [Connection Setup] and then select 'PLC Simulator' at the Type.



Type: PLC Simulator

● IP Address: 127 . 0 . 0 . 1

○ Domain Name :

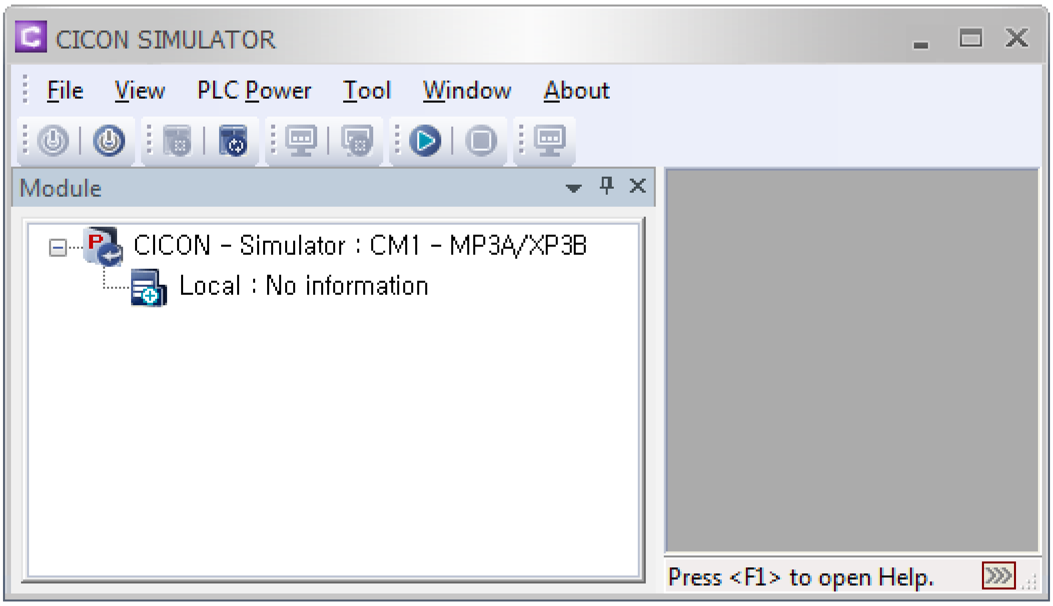
Timeout: 2 Sec

Retry : 2 Times

☐ Station no. (0-255) : 219

☑ Socket Port : 10523

2) After making logic ladder, click [Tool] → [Run PLC Simulator]

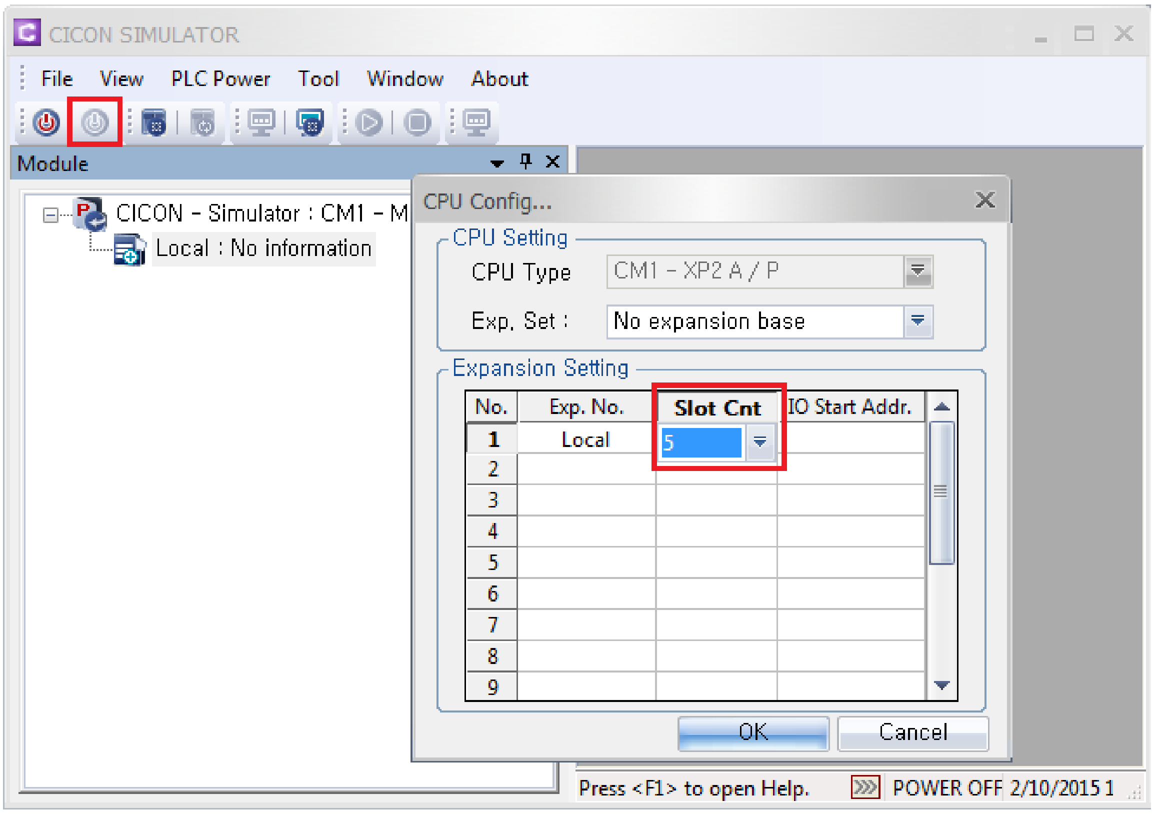


CICON - Simulator : CM1 - MP3A/XP3B

Local : No information

Press <F1> to open Help.

3) Click ‘PLC OFF’ and click [Tool] → [PLC TYPE] to select modules.



CICON - Simulator : CM1 - M
Local : No information

CPU Type: CM1 - XP2 A / P
Exp. Set : No expansion base

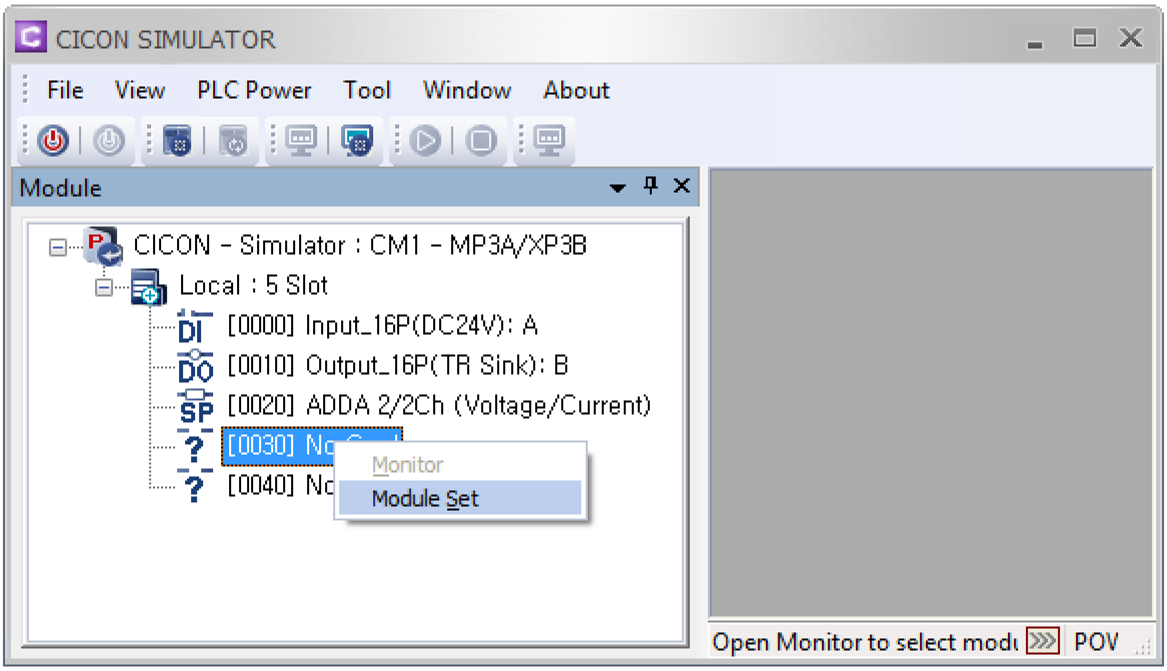
| No. | Exp. No. | Slot Cnt | IO Start Addr. |
|---|---|---|---|
| 1 | Local | 5 | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |

Press <F1> to open Help. POWER OFF 2/10/2015 1

If you have expansion Base, select number of Base at the Exp. Set.

According to number of module, select slot number.

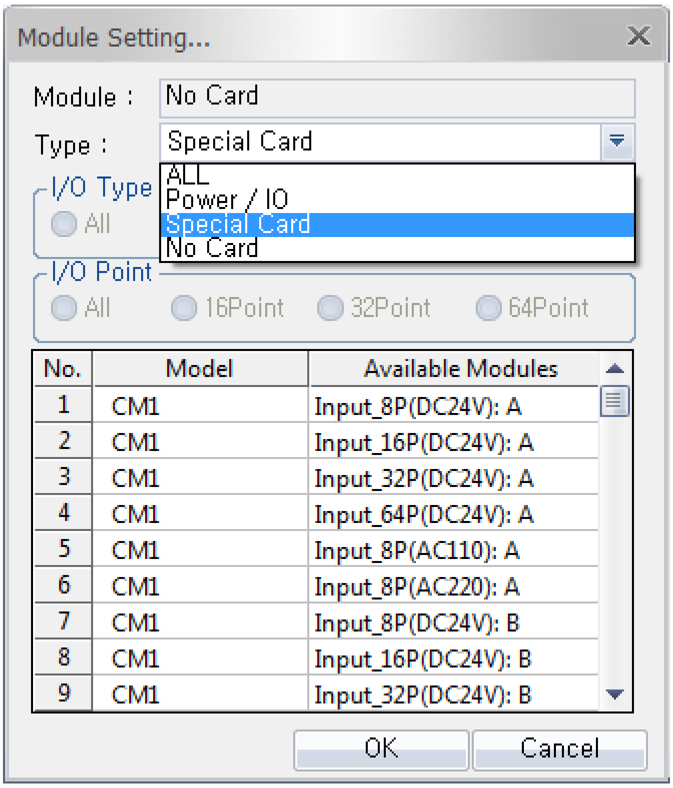
4) Put your mouse on the slot and click right button of mouse and Module Set.



CICON - Simulator : CM1 - MP3A/XP3B
Local : 5 Slot
[0000] Input_16P(DC24V): A
[0010] Output_16P(TR Sink): B
[0020] ADDA 2/2Ch (Voltage/Current)
[0030] No
[0040] No

Open Monitor to select modu POV

5) Select a module Type and Model.

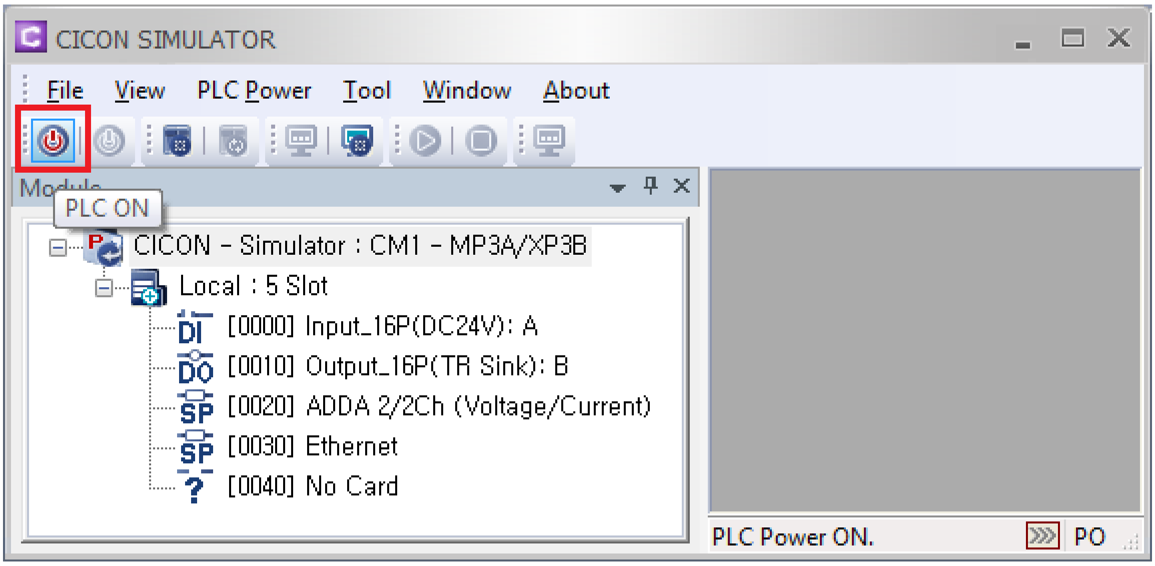


Module : No Card

Type : Special Card

| No. | Model | Available Modules |
|---|---|---|
| 1 | CM1 | Input_8P(DC24V): A |
| 2 | CM1 | Input_16P(DC24V): A |
| 3 | CM1 | Input_32P(DC24V): A |
| 4 | CM1 | Input_64P(DC24V): A |
| 5 | CM1 | Input_8P(AC110): A |
| 6 | CM1 | Input_8P(AC220): A |
| 7 | CM1 | Input_8P(DC24V): B |
| 8 | CM1 | Input_16P(DC24V): B |
| 9 | CM1 | Input_32P(DC24V): B |

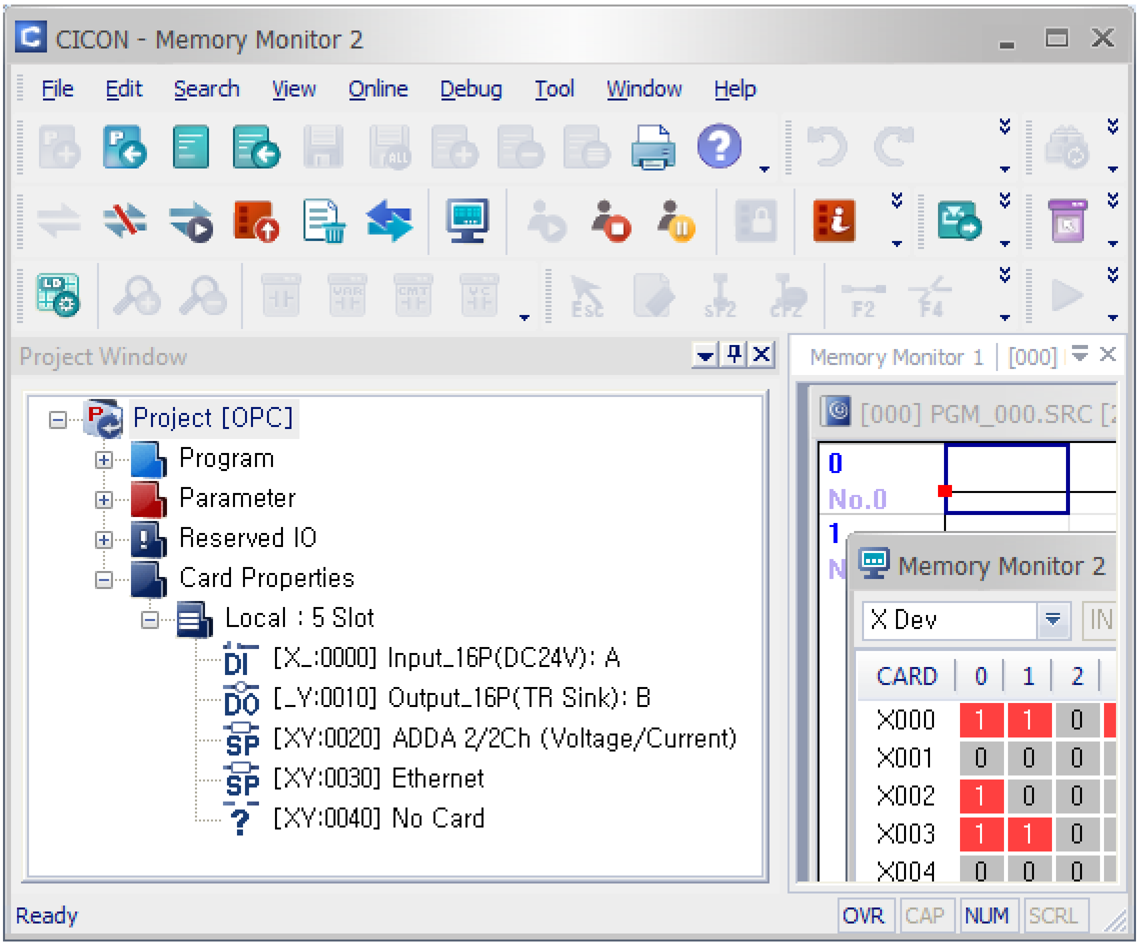
6) After selecting modules, click ‘PLC ON’ and then click [Online] → [Connect] at the CICON. Click [Download] to download all configuration and logic ladder to Simulator.



CICON - Simulator : CM1 - MP3A/XP3B
Local : 5 Slot
[0000] Input_16P(DC24V): A
[0010] Output_16P(TR Sink): B
[0020] ADDA 2/2Ch (Voltage/Current)
[0030] Ethernet
[0040] No Card

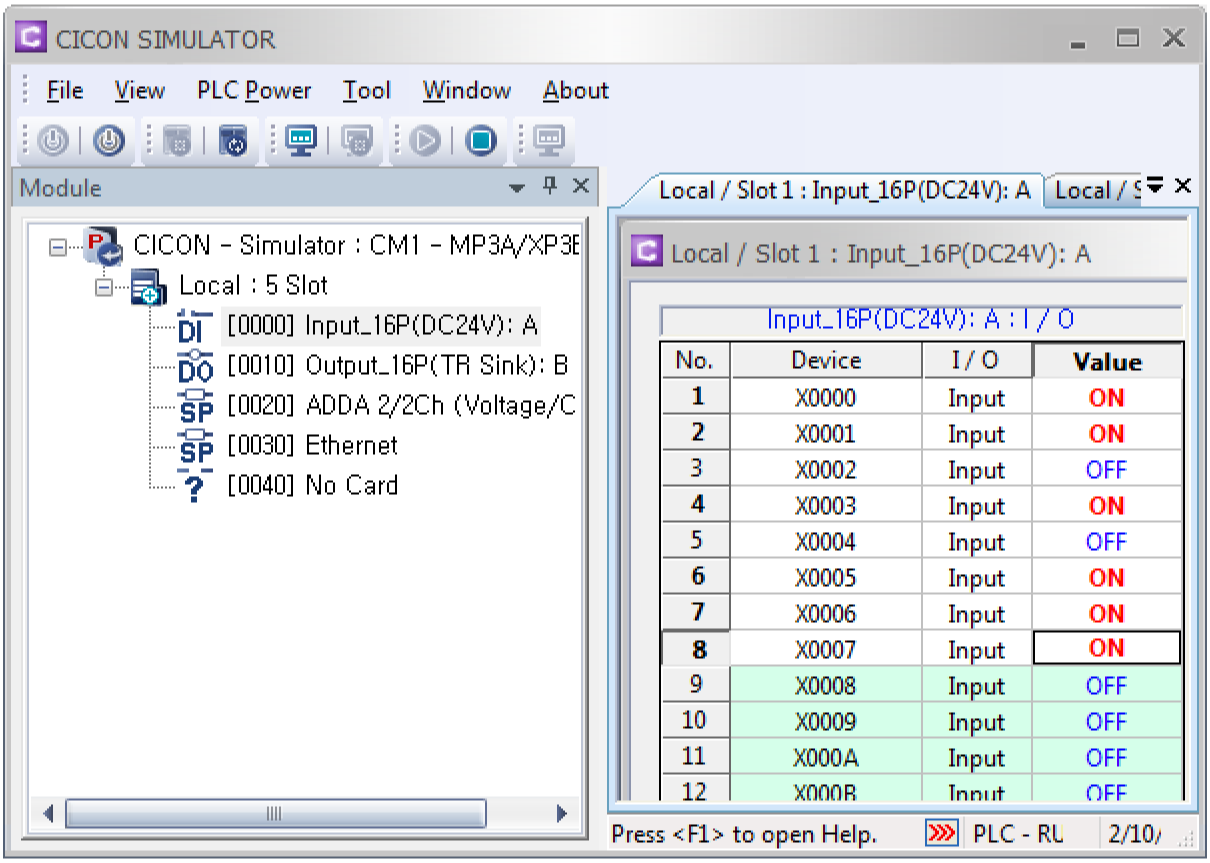
PLC Power ON.

7) If download is completed, Card Properties has the same configuration with Simulator.



| CARD | 0 | 1 | 2 |
|---|---|---|---|
| X000 | 1 | 1 | 0 |
| X001 | 0 | 0 | 0 |
| X002 | 1 | 0 | 0 |
| X003 | 1 | 1 | 0 |
| X004 | 0 | 0 | 0 |

8) If you double click module at the Simulator, you can see the memory monitor just like CICON.

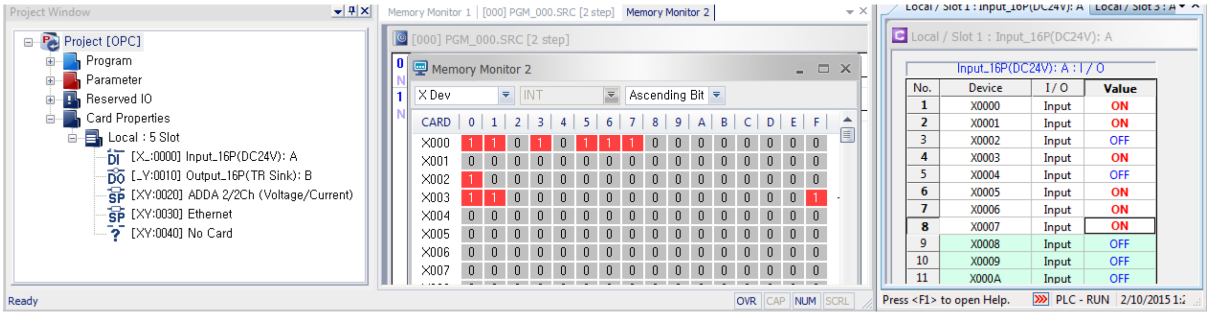


CICON – Simulator : CM1 – MP3A/XP3E
Local : 5 Slot
[0000] Input_16P(DC24V): A
[0010] Output_16P(TR Sink): B
[0020] ADDA 2/2Ch (Voltage/C
[0030] Ethernet
[0040] No Card

Local / Slot 1 : Input_16P(DC24V): A

Input_16P(DC24V): A : I / O

| No. | Device | I / O | Value |
|---|---|---|---|
| 1 | X0000 | Input | ON |
| 2 | X0001 | Input | ON |
| 3 | X0002 | Input | OFF |
| 4 | X0003 | Input | ON |
| 5 | X0004 | Input | OFF |
| 6 | X0005 | Input | ON |
| 7 | X0006 | Input | ON |
| 8 | X0007 | Input | ON |
| 9 | X0008 | Input | OFF |
| 10 | X0009 | Input | OFF |
| 11 | X000A | Input | OFF |
| 12 | X000B | Input | OFF |



Project [OPC]
Program
Parameter
Reserved IO
Card Properties
Local : 5 Slot
[X_:0000] Input_16P(DC24V): A
[_Y:0010] Output_16P(TR Sink): B
[XY:0020] ADDA 2/2Ch (Voltage/Current)
[XY:0030] Ethernet
[XY:0040] No Card

[000] PGM_000.SRC [2 step]

Memory Monitor 2

X Dev | INT | Ascending Bit

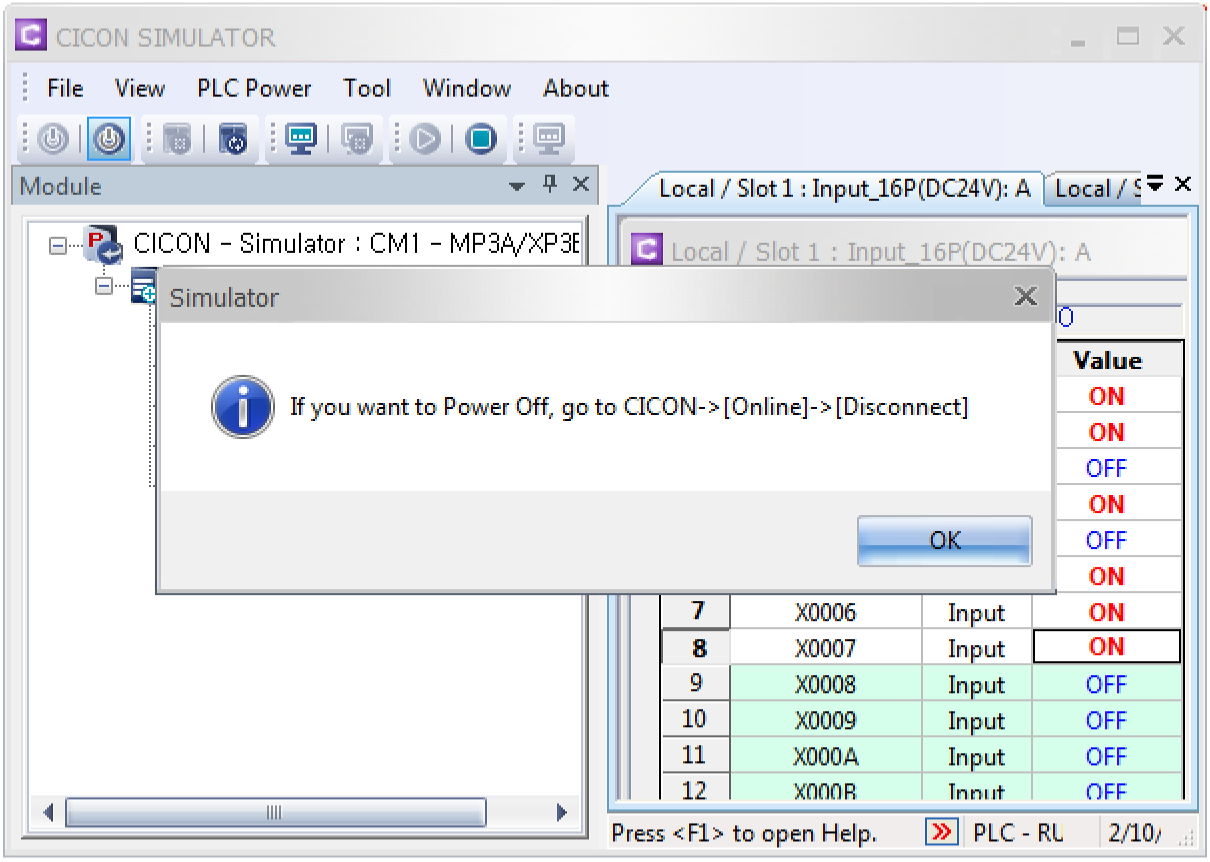
| CARD | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X000 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X002 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X003 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| X004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Local / Slot 1 : Input_16P(DC24V): A

Input_16P(DC24V): A : I / O

| No. | Device | I / O | Value |
|---|---|---|---|
| 1 | X0000 | Input | ON |
| 2 | X0001 | Input | ON |
| 3 | X0002 | Input | OFF |
| 4 | X0003 | Input | ON |
| 5 | X0004 | Input | OFF |
| 6 | X0005 | Input | ON |
| 7 | X0006 | Input | ON |
| 8 | X0007 | Input | ON |
| 9 | X0008 | Input | OFF |
| 10 | X0009 | Input | OFF |
| 11 | X000A | Input | OFF |

9) In order to turn Simulator off, Disconnect CICON from Simulator first.
Click [Online] [Disconnect] at the CICON.



Simulator

If you want to Power Off, go to CICON->[Online]->[Disconnect]

OK

|  |  |  | Value |
|---|---|---|---|
|  |  |  | ON |
|  |  |  | ON |
|  |  |  | OFF |
|  |  |  | ON |
|  |  |  | OFF |
|  |  |  | ON |
| 7 | X0006 | Input | ON |
| 8 | X0007 | Input | ON |
| 9 | X0008 | Input | OFF |
| 10 | X0009 | Input | OFF |
| 11 | X000A | Input | OFF |
| 12 | X000B | Input | OFF |

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