FATEK

M Series

Programmable Controller

M-Series PLC Software Interface

User Manual

Since the content of the manual will be revised as the version changes, this version may not be the final version.
To download the latest version of the manual, please go to the technical support area of www.fatek.com

FATEK AUTOMATION CORP.

INDEX

Manual for the FATEK M-Series PLC Software Interface

Preface

This Manual provides important information related to the use of the FATEK M-Series PLC CPU Module. Before using the product, be sure to read this Manual carefully in order to get familiar with and understand its content. Should you have any questions or comments, please contact the FATEK distributor for detailed warranty services and responsibility limit.

Warranty Service
The warranty period provided by FATEK for its product shall last for one year (or other period as otherwise agreed) starting from the date when the product is sold and it will be offered under the pre-conditions that there are no defects in product use. Please contact FATEK or the local distributor in the event failure occurs on any of the FATEK products for reasons not caused by man-made factors during the aforesaid warranty period. However, the failure due to any of the following reasons shall not be covered by the warranty services: 1. The malfunction is due to the user’ s failure in following the conditions, environment, operations, installation and correct wiring method specified in this Manual. 2. The malfunction is due to the user’ s failure in following the operating method originally designed. 3. The malfunction is not due to the reasons of the product. 4. The malfunction is not caused by the modification and the maintenance executed by FATEK. 5. The malfunction is caused by other types of *force majeure* factors such as natural disasters or man-made negligence. In the meantime, the aforesaid warranty services shall be limited to the FATEK product only and the losses resulting from the product failure will not be covered in the warranty scope.

Limit of responsibilities
Unless it has been confirmed that the product is properly used, stored, installed and serviced and that it has not been contaminated, abused, misused or improperly modified or repaired as being analyzed by FATEK; otherwise, FATEK shall not be liable for any product-related particular damage, consequential damage or derivative damage or even revenue loss or commercial loss that resulted from whatever means.

Precautions on Using the Product

Compliance with the application-related conditions
The user shall evaluate the suitability of FATEK product and shall install the product in the well-designed equipment or system. The user needs to check if the system, machinery or device currently used is compatible with the FATEK product. If the user fails to confirm the compatibility or the suitability, then FATEK shall not be liable for the suitability of the product. When required by the customer, FATEK shall provide correlated third party certification to define the value rating and the application restrictions that will be applicable for the product. However, the aforesaid certification message shall not be considered as sufficient to determine the suitability of the FATEK product, the final product, the machine, the system and other applications or relevant combinations. Described below are certain applications that should be cautiously treated by the user. In spite of this, the content described below shall neither be considered as having included all of the intended product purposes nor suggesting that all of the following purposes shall be entirely suitable for the product. For example, outdoors use, use in an area subjected to potential chemical contamination or electrical interference or used under conditions or functions not mentioned in this Manual or used with the system, machine and equipment that may create risks to life or properties. Before working with the product, the user will be required to check if the entire system is marked with a hazard sign and shall select the design that can ensure the safety such as the backup design, etc. Otherwise, the user shall not be allowed to use the product in the application that will present personnel and the property safety concerns. In no event shall FATEK be liable for the specifications, statutory regulations or restrictions that will be used by the customer in the product combination or the product operations. When using the product, FATEK shall not be liable for the programs edited by the user or the resulting consequences.

Disclaimers

Dimensions and weight
The dimensions and the weight specified in the manual are nominal values only. Even if provided with the tolerance, they cannot be used in the manufacturing purposes.

Performance data
The data specified in this Manual mean that the performance data obtained under FATEK’ s test conditions are provided for the user to confirm its compliance only. Therefore, the user is also required to consider the actual application conditions. Therefore, actual performance shall be defined according to the content of the guarantee and the limit of responsibilities established by FATEK.

Errors and negligence
The content of this Manual is provided through careful checking process and is considered as correct. However, FATEK shall not be liable for the errors or the negligence that may be found in the text, printing content and proofreading.

Change of specifications
The product specifications and accessories may be subject to change along with the technical improvement or other reasons. In the event that the published specifications or performance need to be changed or where significant structural change is required, FATEK will change the model number of the product accordingly. If certain specifications of the product have changed, then FATEK will not give the notice under the following situation: when it is required to use a special model number or create particular specifications in order to support the customer’ s application according to the instructions given by the customer. To confirm actual specifications of the product to be purchased, please contact the local FATEK distributor.

Precautions for Safety

Signs and meaning of safety precautions

The following signs will be used in this Manual in order to provide precautions that will be required for using the M-Series PLC safely. These precautions are extremely important for using the product safely. Please read the safety precautions carefully in order to get familiar with and understand the content and the meaning of the aforesaid instructions.

Warning	Means a potentially dangerous situation that will result in death or serious injury if not avoided. In the meantime, it may also lead to serious property losses.

Caution	Means a potentially dangerous situation that may result in minor or medium level injury or property losses if not avoided.

	Means operations that must not be executed.
	Means operations that must be executed.
	Means general precautions.
	Means the precautions relating to hot surfaces.
	Means the precautions related to the wiring, grounding and electrocution of the electrical system.

Warning	
Do not attempt to dismantle any module or touch the internal side of the module when it is under energized status or it may lead to electrocution injury.	
Do not attempt to touch any terminal or terminal board when the module is under energized status, or it may lead to electrocution injury.	
To ensure the system safety in order to avoid abnormal actions that may be caused by man-made external factors or false actions resulting from the faulty PLC, it is required to install the following safety measures in the external circuit (not within the PLC procedure); otherwise, it may lead to serious accident. The externally controlled circuit must be provided with emergency stop switch, interlocking circuit, limit switch and similar safety measures. The PLC will stop outputting the signals when encountering major failure alarm during the operations. However, the errors in the I/O controller and the I/O register as well as other undetectable errors will still trigger unexpected actions. To deal with the aforesaid errors, you are required to install external safety measures to protect the system safety. If the output relay is jammed, burnt or if the output transistor is damaged, then the PLC may still maintain its output at the ON or OFF status. To solve the aforesaid issues, it is required to install external safety measures to protect the system safety. By installing the corresponding safety measures in the system and the equipment, it allows you to maintain the safety of the entire system in spite of the fact that communication errors or false actions have occurred during the operating process.	
The user must take corresponding failure preventive measures in order to ensure safety when the signal line is damaged or when the power is instantly disconnected or when the signal is wrong, missing or abnormal as may be caused by other reasons. If failing to taking the appropriate measures, it may lead to improper operations that may result in serious accidents.	

Precautions	
Do not touch the power module when the PLC is under energized status or when the power source is disconnected. At this time, the power module might still present extremely high temperature that can cause a scorching injury.	
When connecting with the terminal board of the power module, the cable should be secured with the appropriately sized Ferrule. If the cable is loose, it may lead to burning or the failure of the power module.	
The online editing shall be allowed only after confirming that the extended PLC cycle duration will not result in any adverse impact or the system may not be able to read the input signal.	
After confirming that the I/O terminal is safe, you may transmit the required parameters to other terminals such as PLC setting, I/O table and I/O register data, etc. Otherwise, it may lead to unexpected actions if transmitting or modifying the aforesaid data before that.	

Precautions for Use

When using the M-Series PLC, please observe the precautions provided below.

Using the power

- Please use the voltage specified in the Manual. Incorrect voltage will lead to false action or burning damage to the equipment.
- If the number of the module being connected exceeds the current rating of the power module, you may not be able to start the CPU module or other modules.
- Please use the designated power source and then supply the power according to the specified voltage and frequency rating. Special attention should also be given to the location subjected to unsteady power supply, as incorrect power supply may result in false action.
- Before starting any of the following operations, be sure to disconnect the PLC power; or it may lead to false action or electrocution injury.

  (1) When installing or dismantling power module, I/O module, CPU module or any other type of module.

  (2) When connecting cables or executing the system wiring.

  (3) When connecting or disconnecting the connector.
- When using the power module, be sure to observe following precautions.

  (1) The voltage applied at the equipment output point or the connected load shall not be higher than the rated specifications established for the power module.

  (2) If it is required to put aside the power module for over 3 months, it shall be stored in a cool and dry location in order to maintain its function at normal status.

  (3) If the power module is improperly installed, it will result in the accumulation of heat as to cause the aging or the damage of the component within. Therefore, it shall be properly connected and you are also required to use the standard installation method.

Installation

- Do not install the PLC at the location near a high frequency noise interfering source.
- Confirm that the terminal board, the connector, the memory card, the peripheral communication wires and other buckle-mounted devices are latched in position. Improper latching will result in false action.
- After connecting to the adjacent module, the buckle at the top or the bottom must be securely locked (*i.e.,* properly latched). If failing to lock the buckle tightly, the module may not be able to achieve the intended function.

Wiring

- Please follow the instructions provided in the Manual in order to execute the wiring operations correctly.
- Before connecting the power, please check the setting status of all wires and switches. Incorrect wiring may result in burning damage to the equipment.
- After checking the installation position, you may start installing the terminal board and the connector.
- During the wiring process, the label should be tagged on the module. If you tear off the label, foreign mattes may get into the module as to cause a false action.
- To ensure normal heat dissipating function, please tear off the label after completing the wiring operations. If retaining the label, it may lead to false action.
- Please use an EU-standard terminal to execute the wiring operations. Do not connect the terminal with bare stranded wires. The aging or the breaking of wires may result in burning damage to the equipment.
- The voltage applied to the input module shall not be higher than the input voltage rating or it may result in burning damage to the equipment.
- The voltage or the load applied to the output module shall not be higher than the maximum switch capacity. The over-voltage or the overload may result in burning damage of the equipment.
- Do not drag or bend the cable excessively. Such action may cause the breaking of the cable.
- Do not place any objects on the cable or other type of wires or it may cause the breaking of the cable.
- Please set the grounding wire correctly for the power module and communication port to avoid communication error and equipment malfunction caused by noise interference.
- It is recommended to use M series dedicated AC power modules to supply power to MPLC related modules.
- It is recommended to use twisted-pair shielded cables for communication cables and ground them properly.

Operating

- Before supplying power to the MPLC to start the operations, ensure that the setting of the data register is correct without any mistakes.
- Before executing any of the following tasks, confirm that it will not bring about any adverse impact on the system; otherwise, it may result in unexpected action.

  (1) When changing the operating mode of the PLC (RUN Mode/STOP Mode).

  (2) When executing compulsory enable/ compulsory disable for any of the data retained in the register.

(3) When changing the present value of any bit or setting that has been logged in the register.

- Do not attempt to dismantle, repair or modify any module; or it may result in false action, fire or electrocution.
- It is required to protect the PLC from falling or from excessive vibration or impact.
- If the I/O is located at the "ON" position, when switching the "RUN Mode" to the "STOP Mode," the system will set the PLC output at the "OFF" position and then all output actions will be disabled. Please ensure that the external load will not generate hazardous factors during the aforesaid process.
- If the CPU module stops running due to catastrophic error, please set all of the output points on the output module at the "OFF" position. The output status will be retained after being set as the holding-type memory configuration parameters.
- If the status monitoring pages or the parameters are improperly set, it may result in unexpected action. Even though the status monitoring pages or the parameters are correct, it is also required to confirm that the controlled system will not be subject to adverse impact before starting.
- When applying maximum level of voltage or when the power supplied to the operating switch is interrupted suddenly during the Insulation Strength Test, it may result in the damage of the CPU module. In this case, please use the variable resistor to increase or reduce the voltage level gradually.
- Before conducting the Withstand Voltage Test or the Insulation Resistance Test, please separate the wire grounding terminal of the power module from the functional grounding terminal. Otherwise, it may result in burning damage to the equipment.

Precautions for the Application Environment

- Please follow the instructions described in this Manual for carrying out the installation activities correctly.
- Do not operate the control system in any of the following locations:

  (1) The location exposed to direct sunlight.

  (2) The location with temperature or humidity exceeding the specified range.

  (3) The location vulnerable to dewing effect due to abrupt temperature changes.

  (4) The location exposed to corrosive or combustible gases.

  (5) The location exposed to dust (especially iron chips) or smoke.

  (6) The location exposed to water, oil or chemicals.

  (7) The location vulnerable to impact or vibration.
- When installing the system in any of the following locations, appropriate and effective preventive measures should be taken:

  (1) The location exposed to electrostatic or other type of noise.

  (2) The location exposed to strong electromagnetic field.

  (3) The location that may be exposed to radioactive pollution.

  (4) The location near the power supply source.

1

Overview

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

UperLogic is a professional PLC software, which is mainly used to design and configure the new generation of M-series PLC. It runs on Windows operating system and is completely designed according to the operating habits of Windows environment. The window interface is presented in the style that is commonly used by the general public today. Easy to learn and use, both beginners and experienced users can operate in a very efficient way. The software adopts the project concept and presents the development content of the program in a hierarchical manner in a visual way, so that the relevant work content can be presented to the user at a glance. Both program development and maintenance can be carried out in a very intuitive way. In addition, it provides convenient keyboard and mouse shortcut operation methods, which can complete program editing and testing in a very efficient manner. It also provides a Multiple Document Interface (MDI) editing program screen, which can simultaneously display and compare, copy and edit programs in different sections.

Main Functions and Features:

- Full support for global tags, regional tags and system tags, which facilitates programmers to configure and manage registers in a more intuitive way.
- Supports Ladder Diagram (LD), Structured Text (ST), mainstream PLC language editing, and supports custom Function Module (FCM), can be aimed at repetitive logic program packaging and release for use.
- Provides three modes: Offline Editing/Online Monitoring/Online Editing, making it safer and more convenient to design programs and test machines.
- In addition to the monitoring table function to monitor the registers online in real time, it also provides a Data chart tool, which can more intuitively present register data from different sources on the graph at the same time, and can also facilitate comparisons.
- Brand new Device View function, more intuitive to set PLC and IO module system parameters and configuration. And you can know the device size, power consumption, module resources and other information in advance. In the On-line Monitor mode, you can directly monitor and modify IO data and understand the status of the PLC system.
- Users can divide the entire development work into several program units according to different functions or other classification methods, and can perform independent input annotations and tests, which is of great help to program development and subsequent maintenance work.
- Diversified program searching functions, in addition to basic search functions, also supports memory configuration and cross query functions. Help users understand the usage of the memory more quickly, and quickly find and open the relevant functions or program window screens of the register used, and modify the parameters.

- Provides program syntax checking function, the execution of this function can be proposed by the user, or the system will automatically execute when the user issues an operation command. After execution, a syntax check report window will be generated, and various errors will be listed in columns. If you click the error item directly with the mouse, the program corresponding to the error will be called out directly, and the cursor will be placed on the wrong location, this judgment on the error is helpful for the subsequent correction.
- Perfect protection of intellectual property rights. In addition to project passwords, program passwords, data passwords, and download passwords, protection measures for program IDs and PLC IDs are also provided, allowing users' projects and systems to be assigned according to the different roles of designers and operators. Different password permissions, thereby protecting the security of the system and intellectual property.
- Supports complete motion control functions, such as servo trial run, motion monitoring diagram, motion trajectory preview, and motion flow block. It can easily set the servo and cam related configuration (E-CAM), and plan the motion control process conveniently and systematically.

2

Installation Instructions

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section introduces the installation requests and process of UperLogic.

2-1 Operating Environment

It supports the following operation systems:
Windows 7 (32&64 bits)
Windows 8 (32&64 bits)
Windows 10 (32&64 bits)
Windows 11 (32&64 bits)

2-1-1 Connection Configuration

Through the USB/Type C or by connecting network to PC and PLC, it allows the user to upload and download the ladder diagram, control the PLC operation and monitor the PLC Register, etc.

2-2 Installation Process

This section describes how to install UperLogic.

1. After downloading the UperLogic Installation file from the official website, double click [Install] file to begin the installation. The system will ask if the user want to install the UperLogic to the PC. If yes, please click [Next].

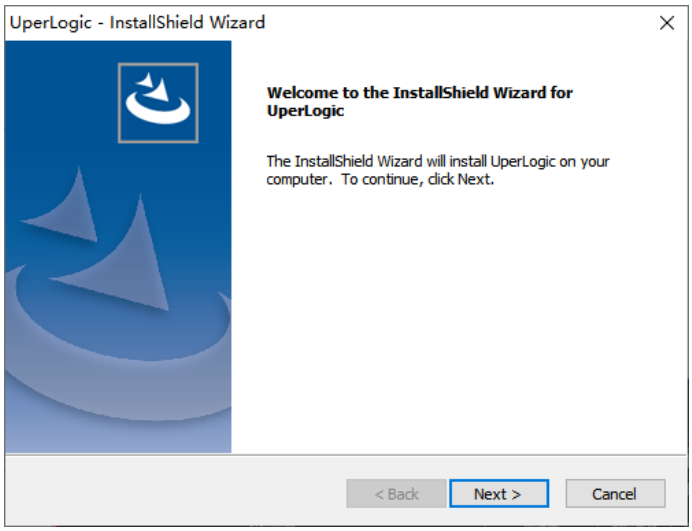


Fig. 1: Installation interface_1

2. The system will ask the user about the type to be installed. It is recommended that [Complete] be selected to prevent from missing out the corresponding drive software. After being confirmed, click [Next].

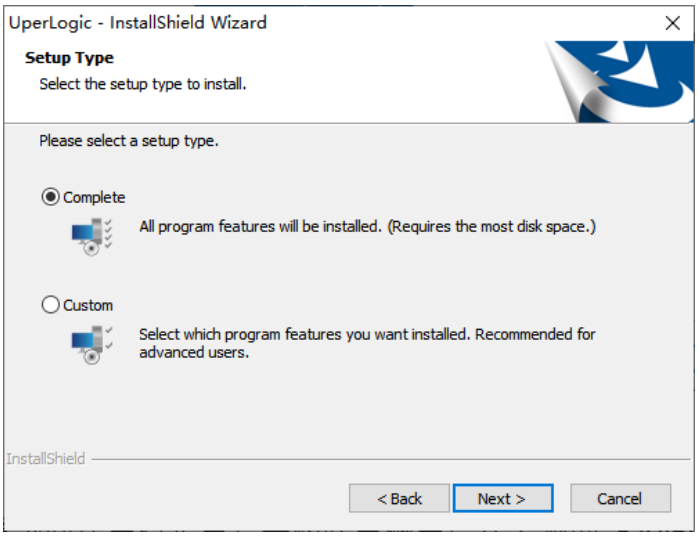


Fig. 2: Installation interface_2

3. After confirming that the executed installation as correct, click [Install] to being the installation. To modify the previous setting, click [Back] and you may return to the previous page to perform the required setting.

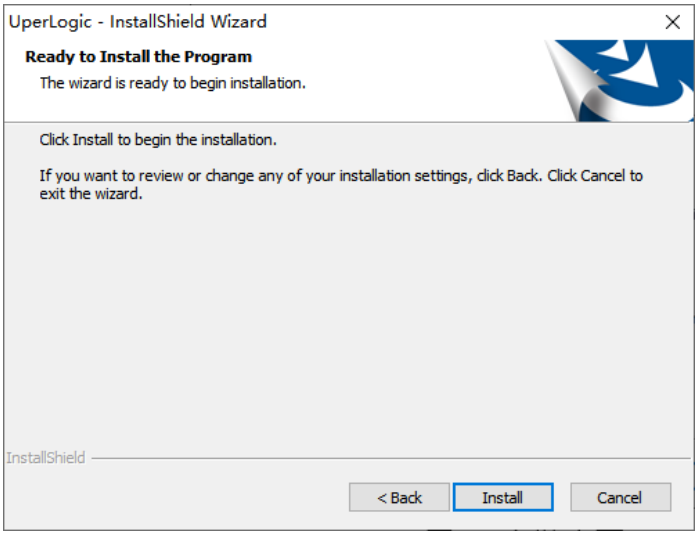


Fig. 3: Installation interface_3

4. During the system installation process, the FATEK Program Drive Install will appear in the webpage. Click [Next] to begin the drive program installation.

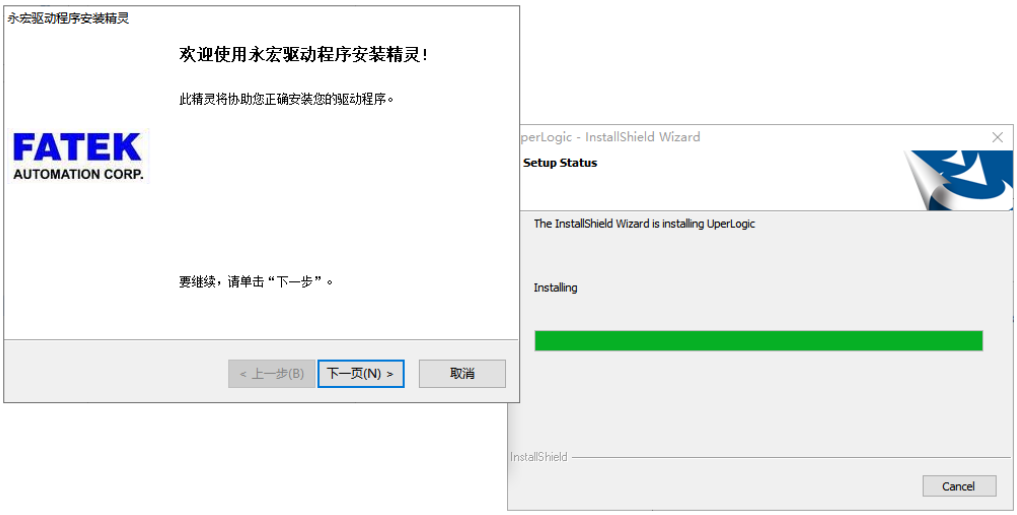


Fig. 4: Drive program installation interface

5. After installing the drive program, the system will display following information. Click [Finish] to complete the drive program installation.

Fig. 5: Drive program installation finished

6. After installing the drive program, the system will show that the UperLogic has been successfully installed. Click [Finish] to complete the installation.

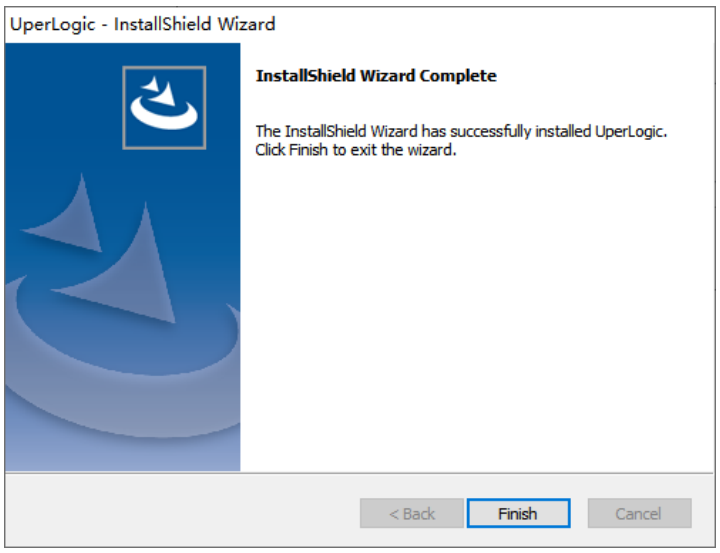
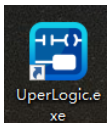
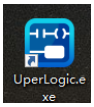


Fig. 6: Installation finished

7. After completing the installation of UperLogic, the user will find the corresponding software shortcut 

on the desktop.

8. Double click 

shortcut to open UperLogic.

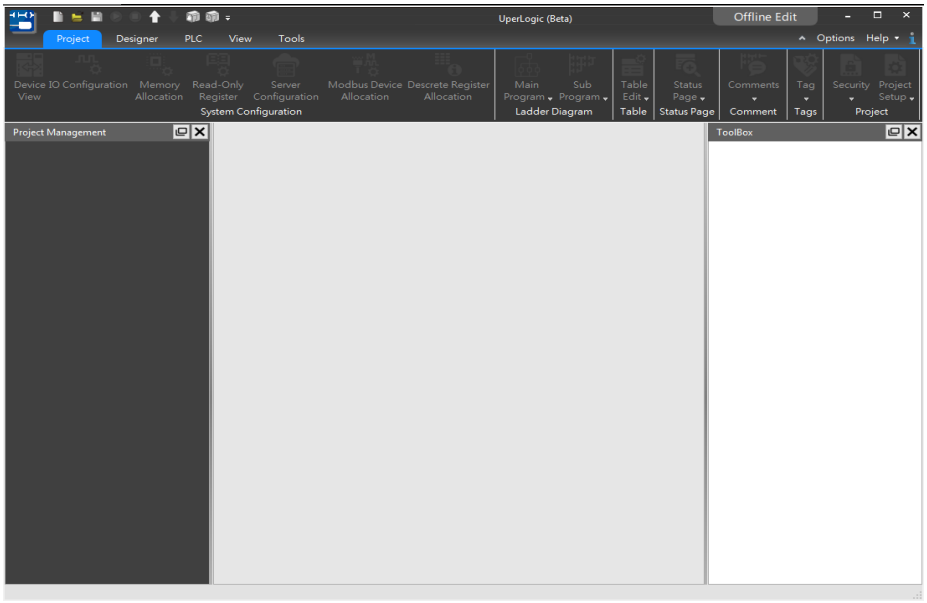


Fig. 7: Open software

3

Introduction of UperLogic

⚠ Danger
4. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 5. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 6. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or

malfunction.

This section describes the functions that will be displayed in the UperLogic software interface.

Displayed in the webpage below are the UperLogic working window and the status of the respective connection window.

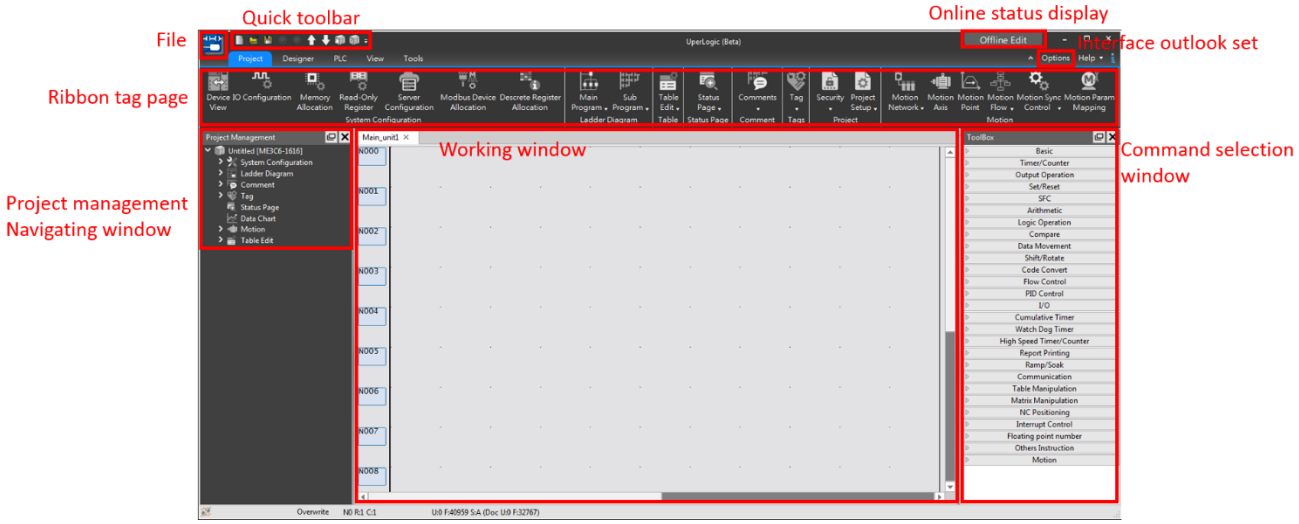


Fig. 8: Webpage configuration

3-1 File

Such function allows the user to perform project operations such as opening a new project, saving a project, saving a new file, importing and exporting, and printing.

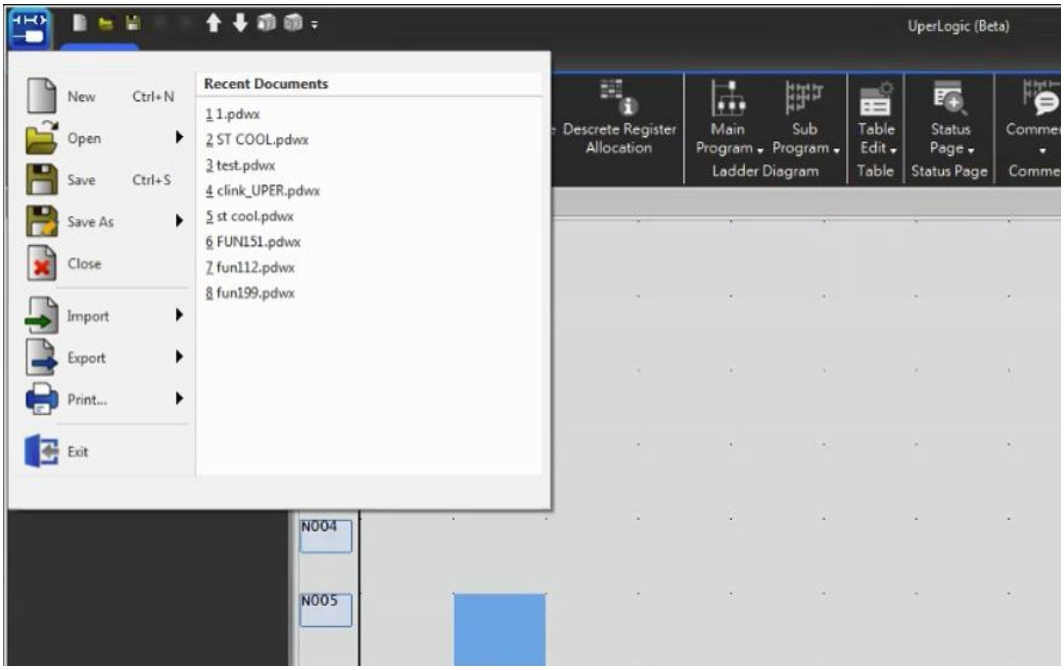


Fig. 9: File

Function	Description	Detailed introduction
Open new project	Create a new project for executing the editing.	Please refer to Section 4.1.
Open project	Open previously written project for executing the editing.	Please refer to Section 4.8.
Save project	Save currently edited project to disk.	Please refer to Section 4.4.
Save project as	Save currently edited project as another project name in the disk.	Please refer to Section 4.5.
Close project	Close currently edited project.	
Import	Import previously saved information to project.	Please refer to Section 4.6.
Export	Export the information from project to disk.	Please refer to Section 4.6.
Exit	Close UperLogic.	

Table 1: Detailed file function introduction

3-2 Quick Toolbar

The Quick Toolbar allows users to select frequently used functions for quick selection.

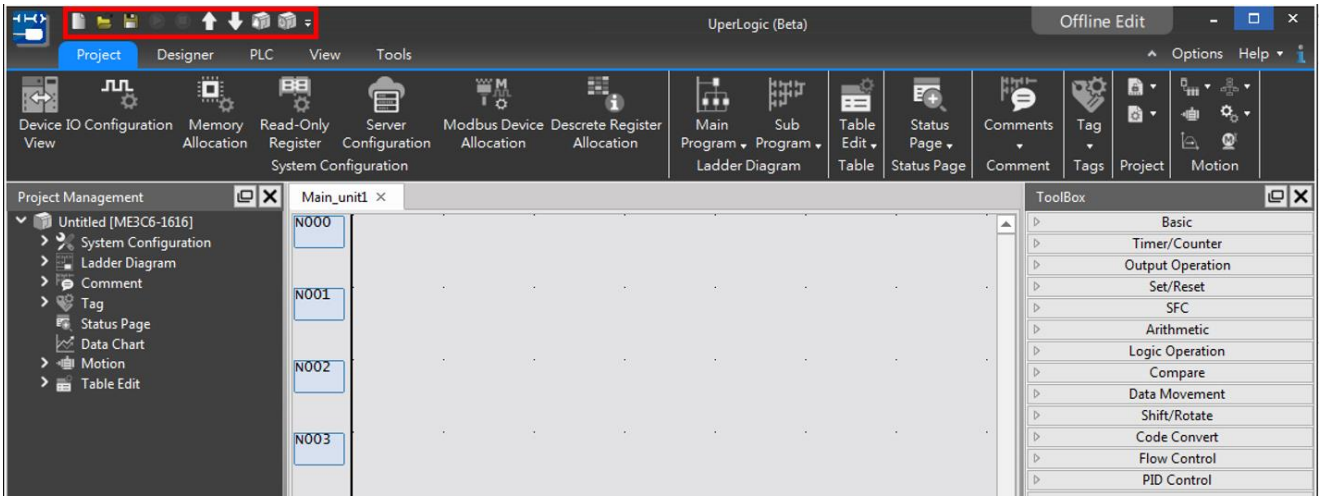


Fig. 10: Quick Toolbar

Quick key will display the function that can be used under current status.

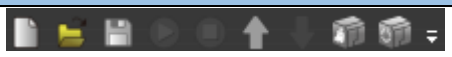
Status	Quick Toolbar display status
Offline editing, and project not opened.	
Offline editing, and project opened.	
Online monitoring, and PLC is running	
Online monitoring, and PLC stops running	

Table 2: Quick Toolbar display status

Function	Description	Detailed Introduction
Open new project	Create a new project for executing the editing.	Please refer to Section 4.1
Open project	Open previously written project for executing the editing.	Please refer to Section 4.8
Save project	Save currently edited project to disk.	Please refer to Section 4.4
Run (F9)	Run PLC	Please refer to Section 11.5

Stop Run (Shift+F9)	Stops running PLC	Please refer to Section 11.5
Upload	Upload project from PLC to software	Please refer to Section 11.3
Download	Download currently edited project to PLC	Please refer to Section 11.4
Clear data	Clear PLC data	Please refer to Section 1.6
PLC status	Display current PLC status	Please refer to Section 11.7
Self-defined quick toolbar	The user may define its own quick toolbar	

Table 3: Quick toolbar function introduction

3-3 Interface Outlook Setting

This function provides a number of software outlook interfaces for users to execute the adjustment according to their own demand.

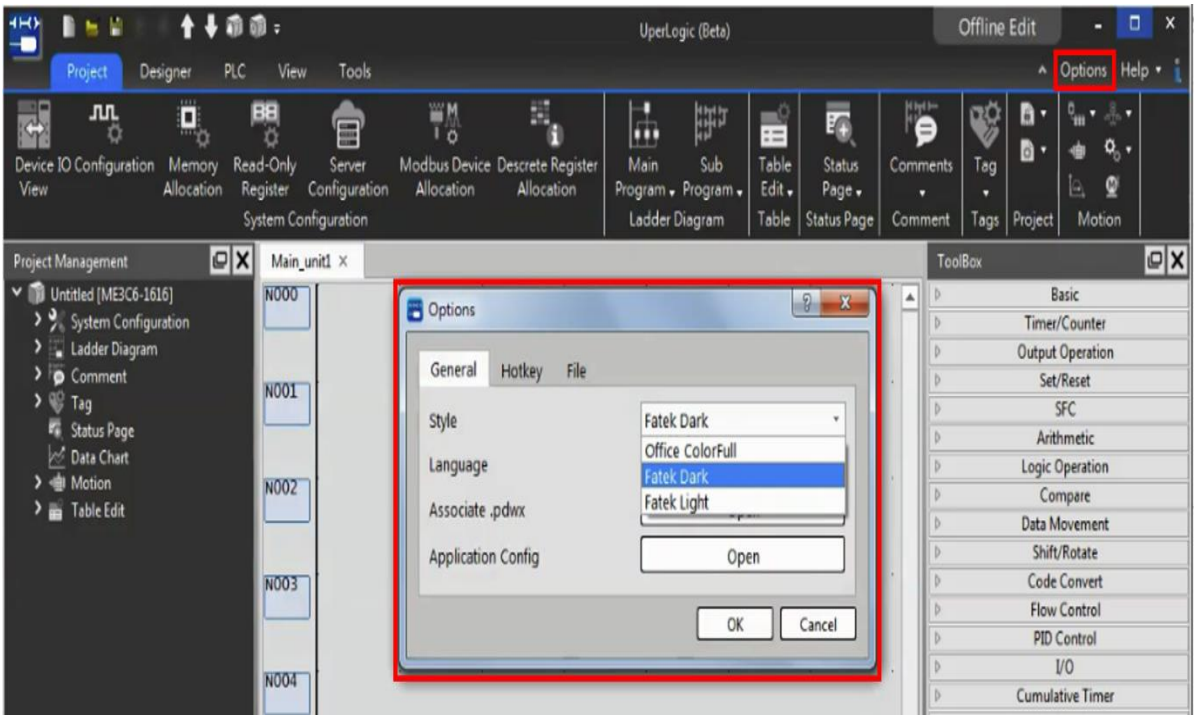
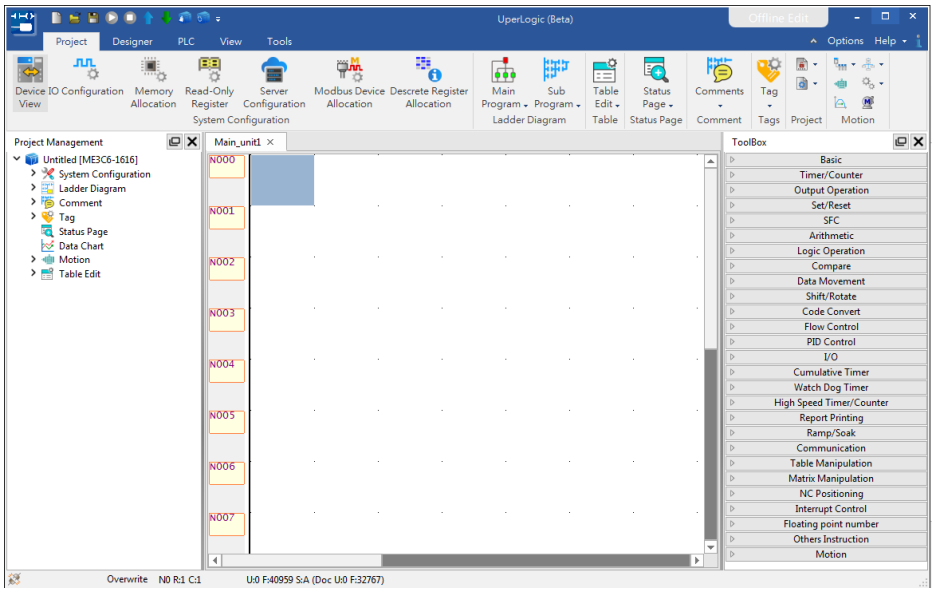
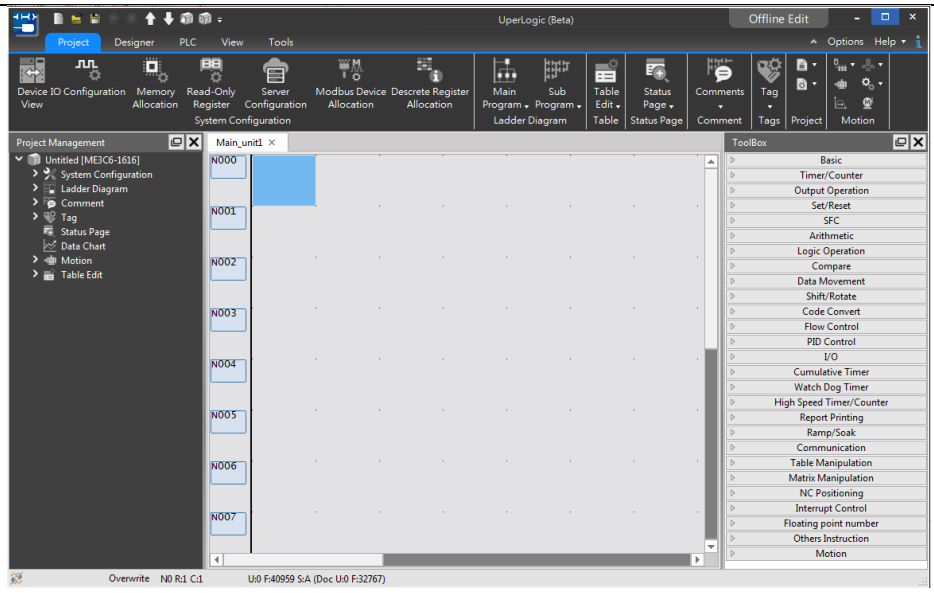


Fig. 11: Interface outlook setting options

Format	Preview
Office color	
Fatek dark color	

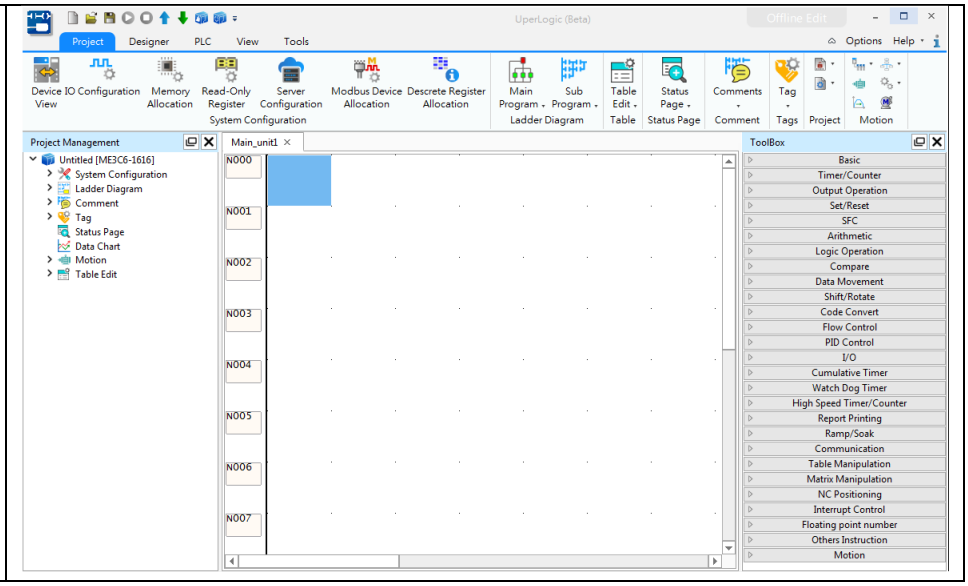
Fatek light color	

Table 4: Interface outlook format preview

3-4 Ribbon Tag Page

This function is designed to organize the created commands in a “tag” group, and each group comprises the required commands. Each application program corresponds to the related tag group in order to demonstrate the functions that will be provided by the program. Its purpose is allowing the user to search and use the functions of the application program more easily, as per the tag categorization indicated in the figure below.

3-4-1 Project

This tag page is mainly used to set the overall information of the project such as memory configuration and security.

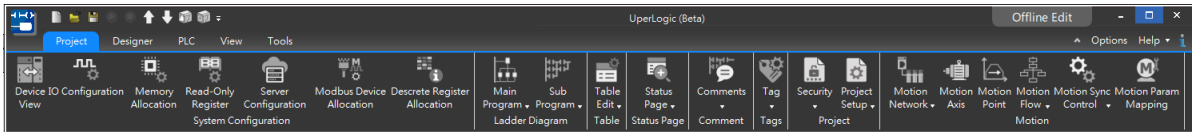


Fig. 12: Project tag page

Type	Function	Description	Detailed Introduction
System configuration	Device View	The equipment required for planning and checking current status of PLC.	Please refer to Section 10

	I/O Configuration	Set the I/O status	Please refer to Section 5.1
	Memory Allocation	Check current memory configuration	Please refer to Section 5.2
	ROR Register	Check and edit the read-only Register.	Please refer to Section 5.3
	Server Configuration	Set the connection between PLC and server	
	Modbus Device Allocation	Check and edit the settings of PLC Register and Modbus address.	Please refer to Section 5.4
Ladder diagram	Main Program	Add or revise Master Program	Please refer to Section 6.1
	Sub Program	Add or revise main sub-program	Please refer to Section 6.1
Data Table	Table Edit	Set required tables	Please refer to Section 7
Status Page	Status Page	Check current status of PLC Register	Please refer to Section 12.3
Comment Description	Comments	Set and edit the comment	Please refer to Section 8
Project	Security	Edit PLC security related setting.	Please refer to Section 13
	Project Setup	Edit the project attribute related setting.	Please refer to Section 4.7
	Discrete Register Allocation	Check contact and register related information	Please refer to Section 5.3
	Project information	Set project name and information	Please refer to Section 4.2
	Option	Set project automatic backup	Please refer to Section 4.3
Motion control	Motion Network	Edit motion network related setting	Please refer to Section 9.1

	Motion Axis	Edit motion axis related setting	Please refer to Section 9.2
	Motion Point	Edit the motion point related setting	Please refer to Section 9.3
	Motion Flow	Edit the motion process related setting	Please refer to Section 9.4
	Motion Sync Control	Edit the motion synchronization related setting	Please refer to Section 9.5
	Motion Param Mapping	Edit the motion network related setting	Please refer to Section 9.6

Table 5: Setting project tag page

Type	Function	Description	Detailed Introduction
System Configuration	Device View	The equipment required for planning and checking current status of PLC.	Please refer to Section 10
	I/O Configuration	Set the I/O status	Please refer to Section 5.1
	Memory Allocation	Check current memory configuration	Please refer to Section 5.2
	ROR Register	Check and edit the read-only Register.	Please refer to Section 5.3
	Server Setting	Set the connection between PLC and server	Please refer to Section 5.4
	Communication Setting	Check and edit PLC communication-related settings	Please refer to Section 5.5
	Information of contacts and registers	Check the information of contacts and registers	Please refer to Section 5.3
Program Unit	Main Program	Add or revise Main Program	Please refer to Section 6.1
	Sub-program	Add or revise Sub-program	Please refer to Section 6.1

Type	Function	Description	Detailed Introduction
	Interrupt Sub-program	Add or revise Interrupt Sub-program	Please refer to Section 6.6
	Function Module Program	Add or revise Function Module Program	Please refer to Section 6.7
Data Table	Data Table	Set required tables	Please refer to Section 7
Status Page	Status Page	Check current status of PLC Register	Please refer to Section 12.3
Comment Description	Comments	Set and edit the comment	Please refer to Section 8
Project	Security	Edit PLC security related setting.	Please refer to Section 13
	Project Setup	Edit the project attribute related setting.	Please refer to Section 4.2
Motion Control	Motion Network	Edit motion network related setting	Please refer to Section 9.1
	Motion Axis	Edit motion axis related setting	Please refer to Section 9.2
	Motion Point	Edit the motion point related setting	Please refer to Section 9.3
	Motion Flow	Edit the motion process related setting	Please refer to Section 9.4
	Motion Synchronization	Edit the motion synchronization related setting	Please refer to Section 9.5
	Motion Parameter Table	Edit the motion parameter related setting	Please refer to Section 9.6
	Motoin Recipe	Edit the motion recipe related setting	Please refer to Section 9.7

3-4-2 Design

This tab page is mainly used to edit the related design of the ladder diagram and the motion flow block program.

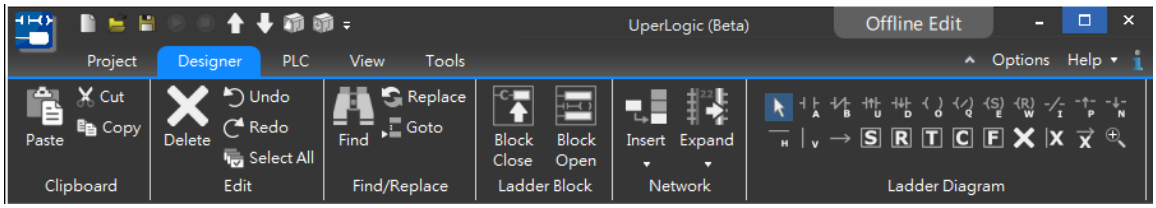


Fig. 13: Designing tag page

Type	Function	Description
Clip book	Paste	Paste the copied or clipped object
	Cut	Cut the selected object
	Copy	Copy the selected object
Edit	Delete	Delete the selected object
	Undo	Restore to previous status
	Redo	Cancel the restore
	Select All	Select all objects
Find/Replace	Find	Search object in Ladder Diagram
	Replace	Search and replace corresponding object
	Goto	To specific ladder program network bar
Ladder Block	Block Close	Close ladder block
	Block Open	Open ladder block
Network	Insert	Insert network in upper or lower side
	Expand	Compress or expand the network
Ladder Diagram	Cursor Arrow	Return to the mouse status where object is not being selected
	A contact	Constant open contact
	B contact	Constant close contact
	TU contact	Create a pulse wave when contact is energized (0→1).
	TD contact	Create a pulse wave when contact is closed (1→0).
	Coil	Send computation result to the coil.
	Inverse Coil	Send computation result back to coil
	Set Coil	Set the coil.

	Reset Coil	Clear the coil.
	Inverse	Execute reverse phase for node status.
	TU Power Flow	Retrieve upper differential for node status
	TD Power Flow	Retrieve lower differential for node status
	Horizontal Short	Add horizontal line in Ladder Diagram
	Vertical Short	Add vertical line in Ladder Diagram
	Horizontal Long	Add long horizontal line in Ladder Diagram
	Set	Set all bits for each point or Register (set as 1).
	Reset	Clear all bits from each point or Register (set as 0).
	Timer	General Timer command
	Counter	General Counter command
	Function	Set corresponding Function command
	Cursor Delete	Delete object from Ladder Diagram
	Delete Vertical Short	Delete vertical line from Ladder Diagram
	Delete Horizontal Long	Delete horizontal line from Ladder Diagram
	Zooming	Open the table setting corresponding to application command
Motion Process	Finish	Finish motion control
	Branch Selection	Select the corresponding branch
	Horizontal Branch	Simultaneous branching
	Coverage	Make motion process branches converge
	Point Reset	Set the reset process
	Position Control	Set the positioning control process
	Speed Control	Set speed control process
	Torque Control	Set torque control process
	Standby	Set standby process
	Sub-process	Set up Sub-process
	Page Skipping	Skip to other process
	Synchronizing Control	Set synchronizing control process
	Computation	Execute computing

Table 6: Setting tag design page

3-4-3 PLC

This tag page is mainly used for editing the Ladder Diagram related design.

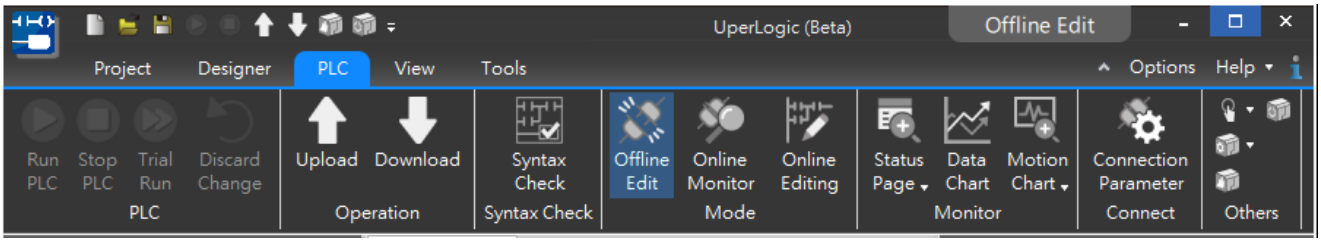


Fig. 14: PLC tag page

Type	Function	Description	Detailed introduction
PLC	Run PLC	Run PLC	Please refer to Section 11.5
	Stop PLC	Stop running PLC	Please refer to Section 11.5
	Trial Run	Test project while editing online	Please refer to Section 11.10
	Discard Change	Abandon the action of online editing	Please refer to Section 11.10
Operation	Upload	Upload project from PLC to software	Please refer to Section 11.3
	Download	Download currently edited project to PLC.	Please refer to Section 11.4
Syntax Check	Syntax Check	Check if syntax error exists in Ladder Diagram	Please refer to Section 6.4
Mode	Offline Edit	Edit when not connected with PLC.	Please refer to Section 11.1
	Online Monitor	Edit when connected with PLC.	Please refer to Section 11.2
Monitor	Status Page	Check current status of PLC Register	Please refer to Section 12.3
	Data Chart	The Trend Curve used for checking the change of each Register.	
	Motion Chart	Check current status of motion control	Please refer to Section 9.1
Connect	Connection Parameter	Set up PLC connection method and relevant parameters	Please refer to Section 11.1
Others	Quick Control	Set up PLC-related operation in quicker way	
	PLC Setting	Set up PLC-related setting	Please refer to Section 11.8
	Clear PLC	Clear PLC data	Please refer to Section 11.6
	PLC Status	Display current PLC status	Please refer to Section 11.7

Table 7: Setting PLC tag page

3-4-4 Inspection

This tag page is mainly used for editing the Ladder Diagram related design.

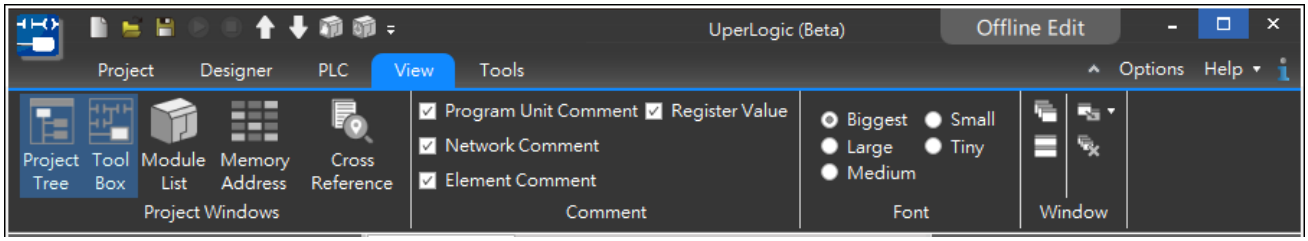


Fig. 15: Inspection tag page

Type	Function	Description	Detailed introduction
Project Window	Project Management	Display or hide project management window.	Please refer to Section 3.5
	Tool Box	Display or hide toolkit	Please refer to Section 3.6
	Module List	Display or hide module list	Please refer to Section 10.2
	Memory Position	Display or hide the position of memory	Please refer to Section 3.5
	Crosstab Searching	Display or hide crosstab searching	Please refer to Section 3.5
Comment	Program Comment	Display or hide program comment	Please refer to Section 6.1.5
	Network Comment	Display or hide network comment	Please refer to Section 6.2.5
	Component Comment	Display or hide component comment	Please refer to Section 8.3
	Register Value	Display or hide Register data	
Font	Font size	Set font size for Ladder Diagram	
Window	Cascade	Display window overlapping	Please refer to Section 6.2.1
	Tile Horizontal	Display entire window array	Please refer to Section 6.2.1
	Switch Window	Quick switch to corresponding window	Please refer to Section 6.2.1
	Close All	Close all windows	Please refer to Section 6.2.1

Table 8: Setting inspection tag page

3-4-5 Tools

This tag page is mainly used for editing the Ladder Diagram related design.

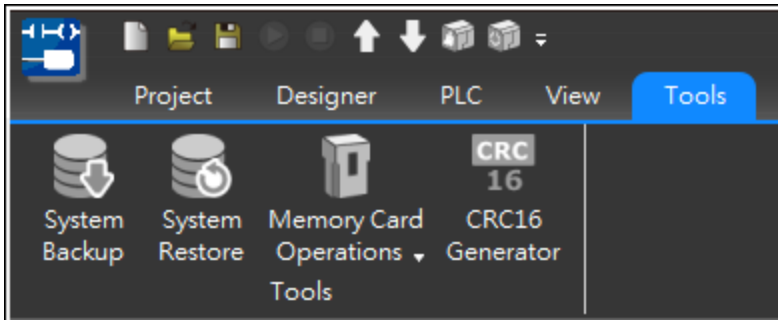


Fig. 16: Tool tag page

Type	Function	Description	Detailed introduction
Tools	System Backup	Set up and save system project related backup	Please refer to Section 14.2
	System Restore	Read originally saved system backup data	Please refer to Section 14.2
	Memory Card Operations	Execute memory cartridge related operation	Please refer to Section 14.3
	CRC16 Generator	System will calculate and produce the checking value automatically	Please refer to Section 14.4

Table 9: Setting tool tag page

3-5 Project Window

3-5-1 Project Management

Such function allows the user to organize regularly used functions into a tree diagram and then display it in the left-hand side Project Management window. By clicking the respective function setting tag under the Project Management, it also allows the user to open the required window in quicker way. For example, click the "IO Configuration" and the relevant setting window will pop up.

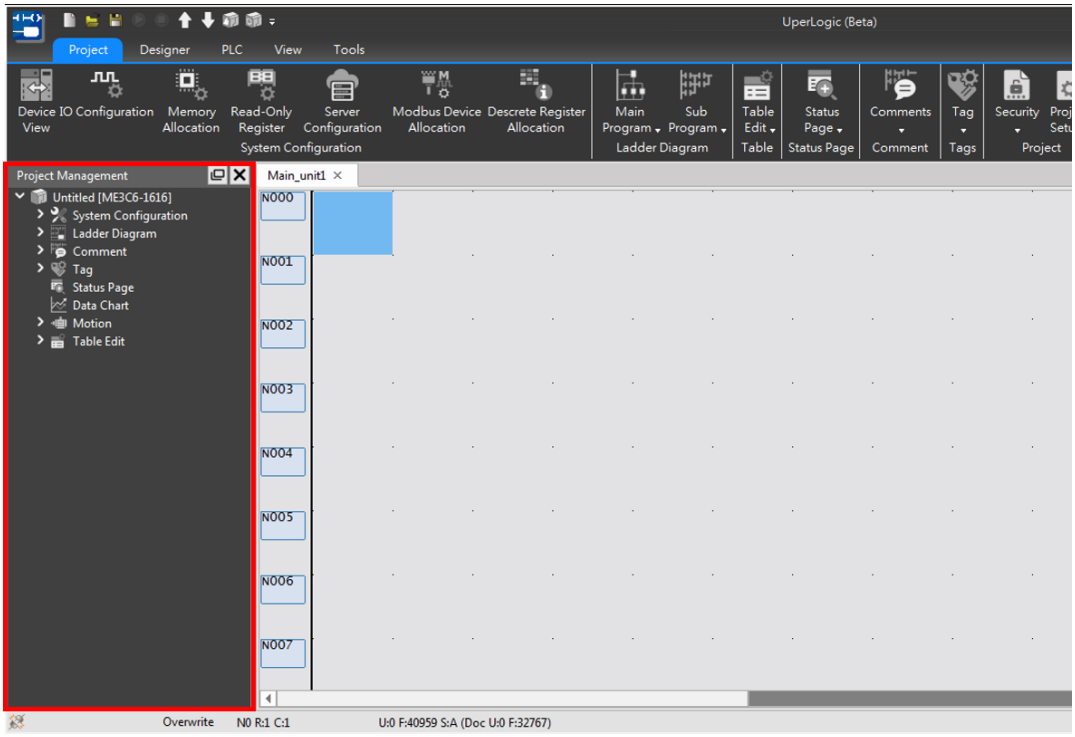


Fig. 17: Project management window

Type	Description	Detailed introduction
System Configuration	Check Register related setting	Please refer to Section 5
Program Unit	Check Main Program and sub-program	Please refer to Section 6.2
Comment Description	Manage the comment deployed in the Ladder Diagram	Please refer to Section 8
Status Page	Monitor current status of Register	Please refer to Section 12.3

Run Chart	Monitor the trend graph of individual register changes	Please refer to Section 6.2.1
Motion Control	Set the motion control related parameters.	Please refer to Section 9
Data Table	Set up various tables	Please refer to Section 7

Table 10: Setting project management window

3-5-2 Tool Box

For easier operation by users, normal commands are categorized for organizing in the toolkit. By clicking [View]→ [Tool Box] in the function toolbar, the user will be allowed to open the Tool Box command window.

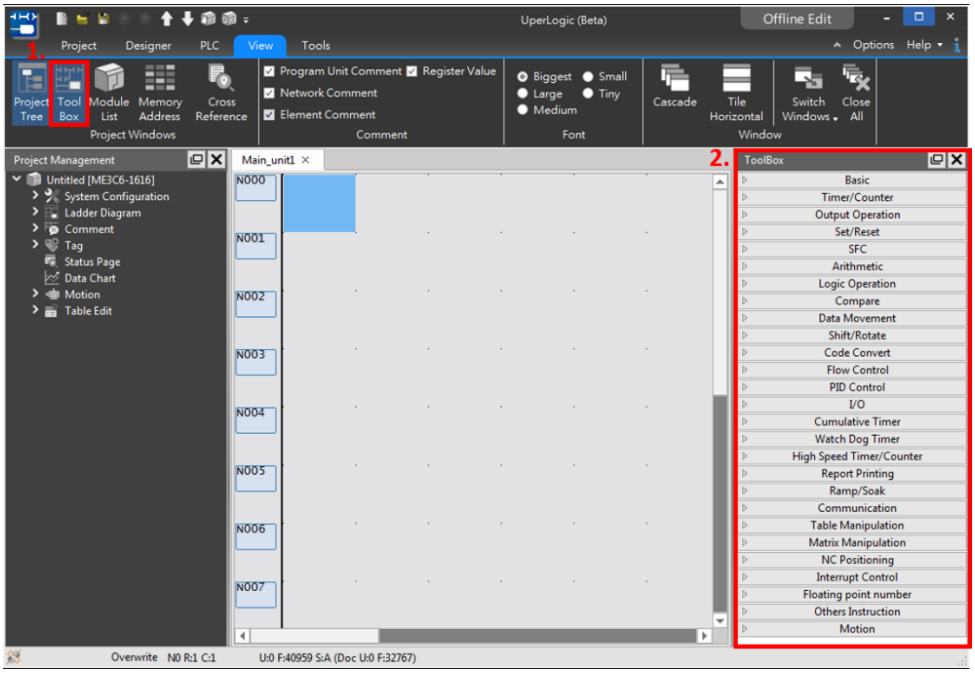


Fig. 18: Tool Box window

For the introduction of the functions in the tool box, please refer to the relevant manuals.

3-5-3 Module List

Click [View]→ [Module List] in the function toolbar, the following module management webpage appears, as shown in the figure below:

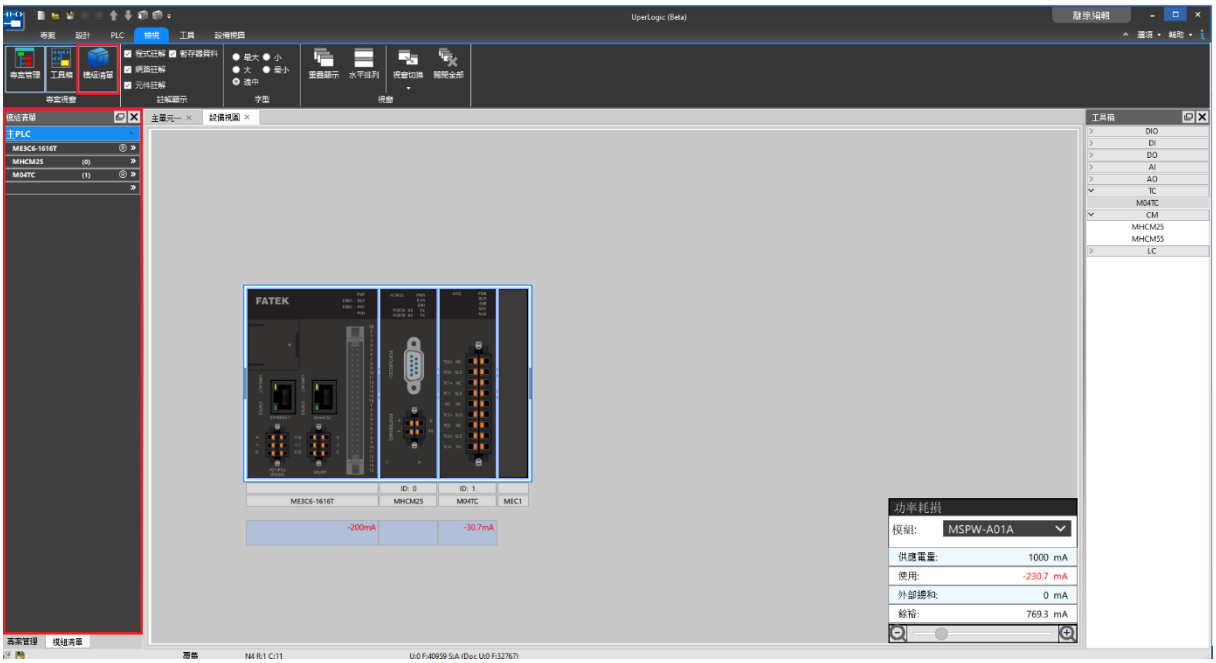


Fig. 19: Module List

Please refer to Section 10-2 for detailed description.

3-5-4 Position of Memory

When there are too many components used in the project, it is impossible for the user to fully remember which components or functions use which resources, but through this function, the user can clearly see which registers are used and the corresponding registers; therefore, users can plan the resources in the project more efficiently.

As shown in the figure below, red represents the used registers, and green represents the unused registers. Double-click the list item with the left mouse button to open the corresponding function window.

Fig. 20: Position of memory

3-5-5 Crosstab Searching

Through this function, users can quickly query the location, characteristics, functions and other information of registers or tags, and use the filtering function to further search for registers or tags with specific conditions. Double-click the list item with the left mouse button to open the corresponding function window.

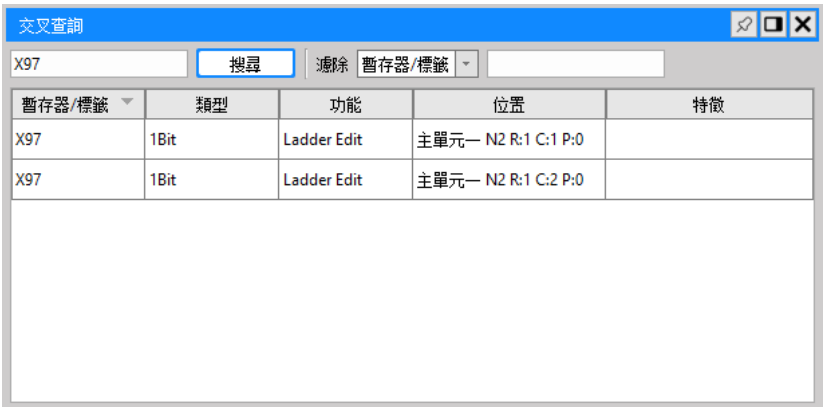


Fig. 21: Crosstab Searching

3-6 Webpage Configuration Management

In addition to displaying the window list currently opened, the user may also open the designated window or execute the arraying. When opening several windows, the user may arrange the display windows according to personal operating habitude.

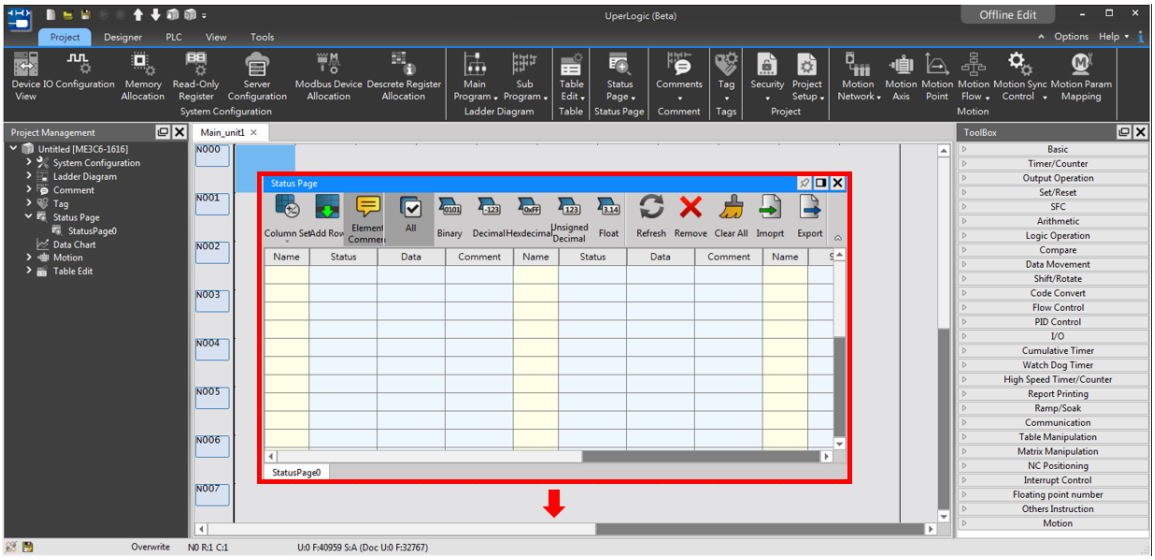


Fig. 22: Webpage management

For example, the user may drag the window of the opened monitoring page to the desired position, release the mouse and then the user will be allowed to change the window arraying pattern.

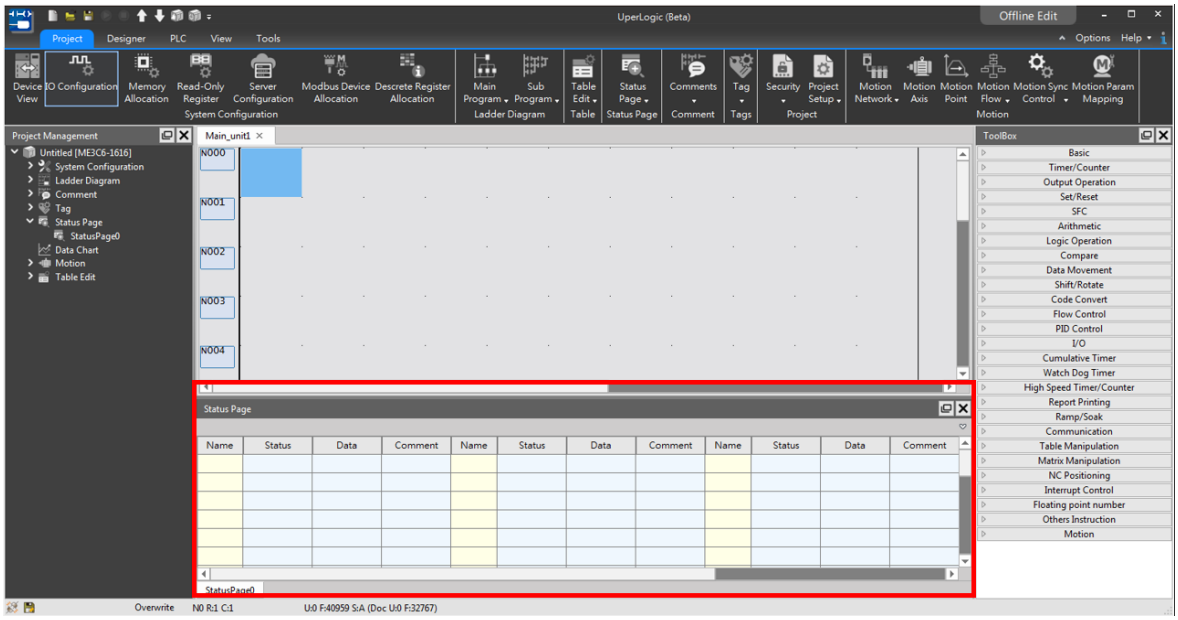


Fig. 23: Changing window arraying pattern

3-7 Quick key

Click [Project] →[Project] → [Quick Key] to view the shortcut keys provided, and also allow users to define familiar quick keys.

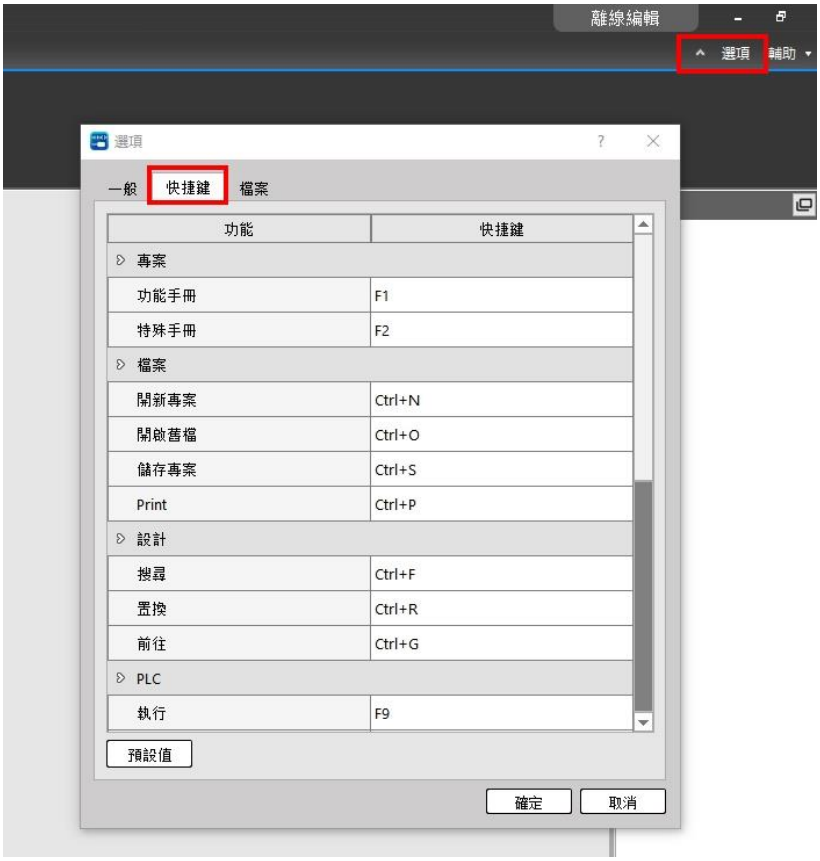


Fig. 24: Quick Key

Type	Function	Quick key
Project	Function Manual	"F1"
	Special Manual	"F2"
File	New	Ctrl+N
	Open	Ctrl+O
	Save	Ctrl+S
	Print	Ctrl+P
Design	Find	Ctrl+F
	Replace	Ctrl+R
	Goto	Ctrl+G
PLC	Run	F9
	Stop	Ctrl+F9

	Trial Run	F10
	Discard Change	Shift+F10
	Upload	F11
	Download	Ctrl+F11
	Offline Editing	Ctrl+F12
	Online Monitoring	F12
	Online Editing	Shift+F12
Other	Syntax Check	F8
	Register Content	F7
	Options	Ctrl+F8
	Ribbon Collapse	Ctrl+F1

Table 11: Quick key list

4

Project Management

This section describes how to open and save the project as well as certain relevant setting in order that the user may quickly control over the method in using the required functions.

4-1 Open a New Project

Create a new project to edit the controller program.

First, click the upper-left [File]  and then click [New], or click the [New] in Quick toolbar, or you may press [Ctrl+N] to open a new project directly.

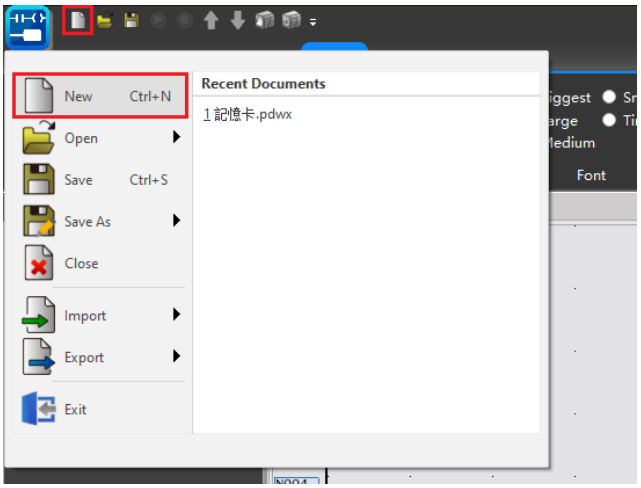


Fig. 25: Open new project

After that, the [Project Information] window appears as per the figure below. After completing the setting, click [OK] key to open the new project.

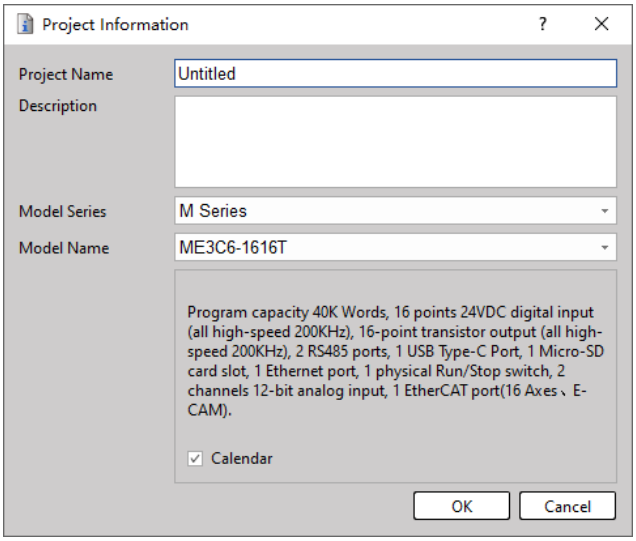


Fig. 26: Creating new project

Function	Description
Project Name	Please define the project name for the convenience of file management in the future.
Description	The lists the descriptive text relating to the project.
Series	Based on the series that will be actually needed, select a corresponding series with the scroll-down menu.
Model No.	Based on the model that will be actually needed, select a corresponding model with the scroll-down menu. After that, the program will display the specifications and the description of such model at the lower side automatically.
Perpetual Calendar	If the PLC is provided with a perpetual calendar, then RTC will be able to count the time correctly under PLC energizing or shutdown condition. The time figures provided by such calendar shall comprise the following seven time-value data: week, year, month, day, hour, minute and second. With the perpetual calendar clock, it allows the system to carry out 24-hour control continuously. It not only helps the control system coordinate with people's daily life automatically but also elevates the level of automatic control and the efficiency is therefore intensified. When using this column, please check if the PLC is provided with such perpetual calendar function.
Program Language	To change the language of the editing project, or can choose to edit through Ladder or ST.

Table 12: New project opening related setting

4-2 Project Setup

The project can modify and view project information, model, history and capacity by clicking [Project Setup] → [Project Information] on the function bar as shown below:

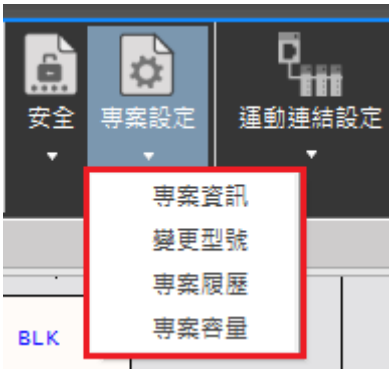


Fig. 27: Project Setup

Function	Description
Project Information	Please define the project name to facilitate future file management.
Change Module	Optionally list the explanatory text for this project.
Project Resume	According to the drop-down list, select a corresponding series according to the series actually used.
Project Capacity	Display the current project program and data usage.

4-2-1 Project Information

Click [Project Information] and then the below window appears. Users can edit project name and description through project information.

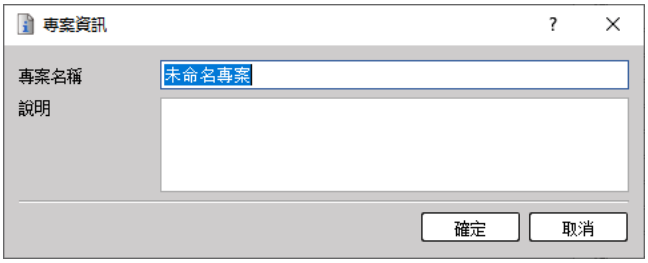


Fig. 28: Project Information

4-2-2 Change Module

Click [Change Model] to see the following screen. Users can select the series and model of the project.

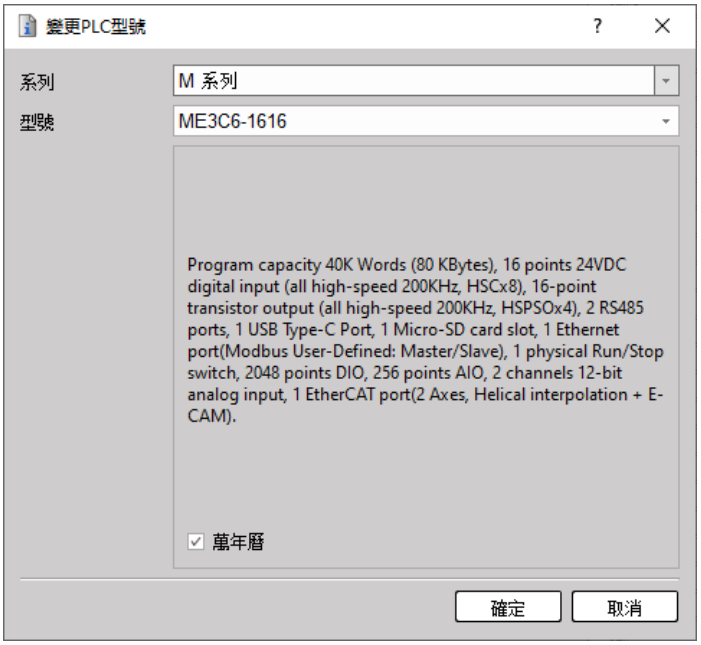


Fig. 29: Change PLC Module

4-2-3 Project History

Click [Project History] and you will see the following screen. Users can log in the history and write comments, and then restore the project to the original version when necessary.

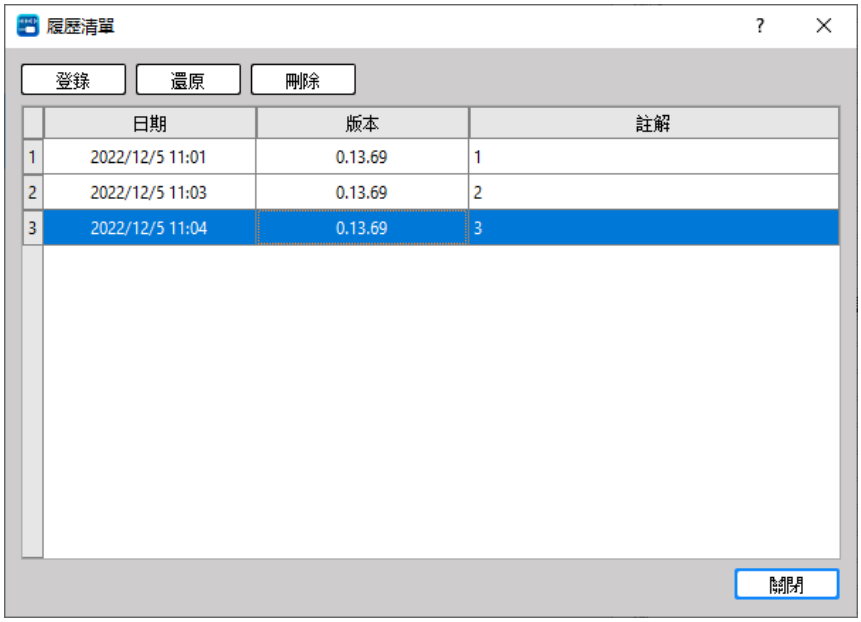
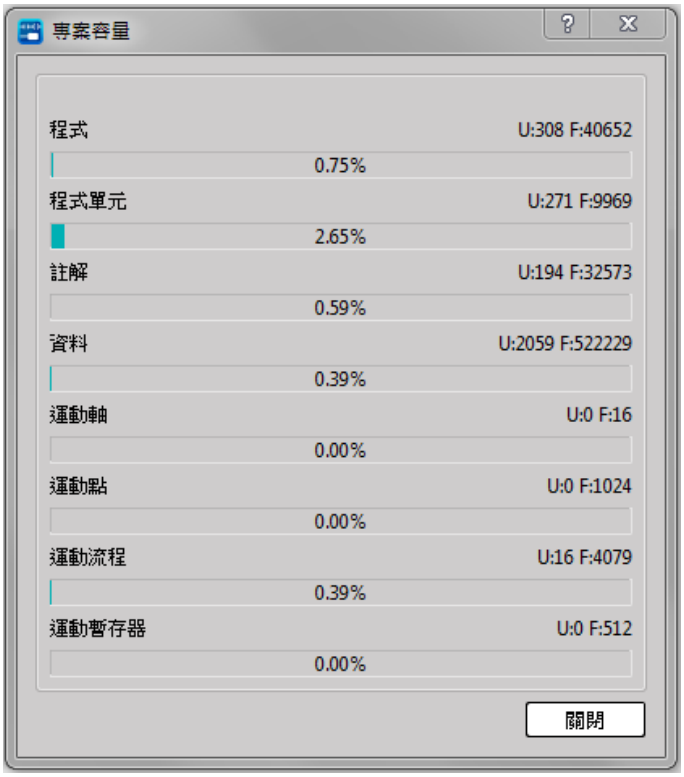


Fig. 30: History List

4-2-4 Project Capacity

Click [Project Capacity] and you will see the following screen. Users can clearly know the usage distribution of each part of the project through the bar graph.



4-3 Automatic Project Backup

To protect the newly edited project from losing due to unexpected contingencies, it allows the user to execute the automatic backup related setting action by clicking the [Project] → [Options] → [File] in the tag page.

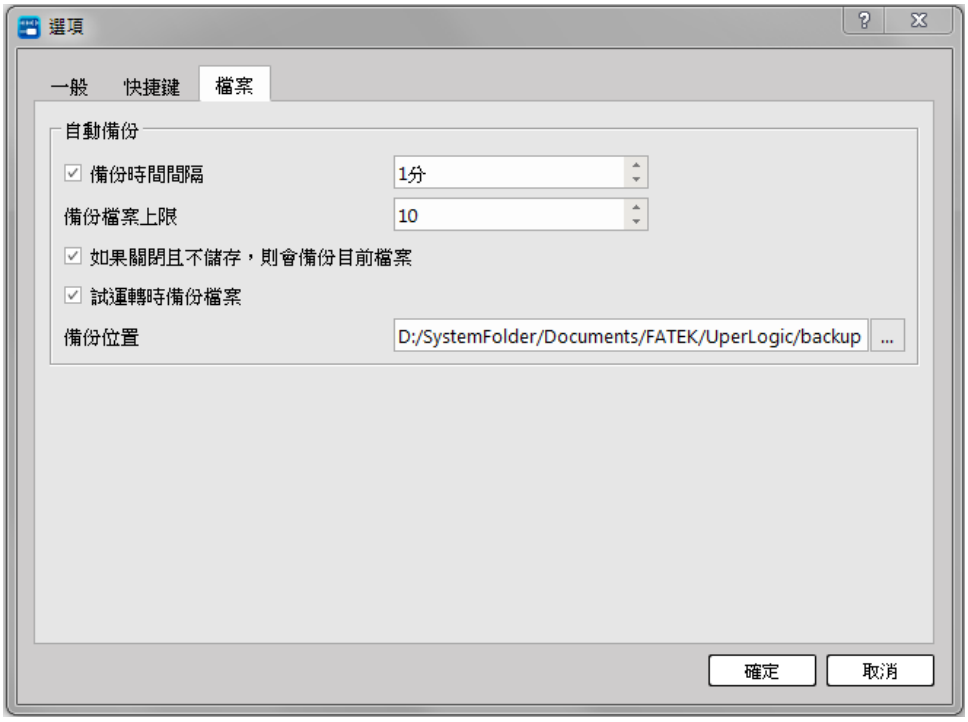


Fig. 31: File Processing

Function	Description
Backup Interval	Automatically back up projects based on set intervals. The time interval of automatic backup can be set from 1 to 999 minutes, and automatic backup will be enabled when checked.
Backup file limit	Set the upper limit of automatic backup files for the same project, and the setting range is 1 to 99. For example, if the project file name is “Untitled”, and the file limit is 5, it will be automatically backed up “($autosaved_0) Untitled”, “($autosaved_1) Untitled”, “($autosaved_2) Untitled”, “($autosaved_3) Untitled”, “($autosaved_4) Untitled”, it will be overwritten from “($autosaved_0) Untitled” in the future.

Backup file if I close file wothour saving	When the user has edited the project but closes the file without saving, checking this option will automatically back up the current project. For example, if the project file name is “untitled”, “($unsaved) untitled” will be automatically backed up.
Backup files during trial running	When the user uses the trial run function during online editing, checking this option will automatically back up the current project. For example, if the project file name is “untitled”, “($unsaved) untitled” will be automatically backed up.
Backup Directory	The location of the above backup files can be set.
Advanced Backup	When the file version is updated, use the new version program to start the file, and the program will automatically back up the old version of the file to the backup location. For example, the current project file name is “untitled”, the file version is 1009, and the new version of the program is 1011, and “($1)untitled” will be automatically backed up when the project is opened. This function is always enabled, there is no off setting.

4-4 Save the Project

Click the upper-left [File]  and then click [Save Project] or click [Save project] in Quick toolbar, or you may press [Ctrl+S] key to save the project directly and it is intended to save the project on the disk. You may use such function to save the revised project content on the disk.

4-5 Save a New Project

Click the upper-left “File”  and then click “Save project as.” If change will be required for the content of the opened project, you may save the revised project content as another project name in order to save it on the disk.

You may also point the cursor at [Save As] in the [File] and then the window will show detailed items of the project being newly saved. In the meantime, the [Save As] also comprises the following two modes and they are [Save As] and [Save As to PLC]. Described below is the difference between both.

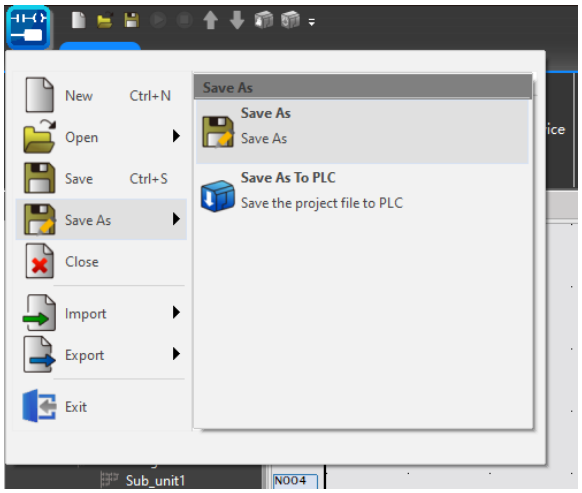


Fig. 32: Saving a new project (Save As)

Mode	Description
Save As	You may save the revised project content as another project name and then store it on the disk.
Save As To PLC	Same as [Download], you may download the project to PLC directly after setting up the [Online Parameter].

Table 13: Two modes of “Save As”

4-6 Project Content Import and Export

The project content import and export function shall include [Comment], [Ladder Diagram], [Status Page], [Table] and [Motion]. Click [File] → [Export] or [Import] in function toolbar and the desired function will be displayed. Described below are relevant details:

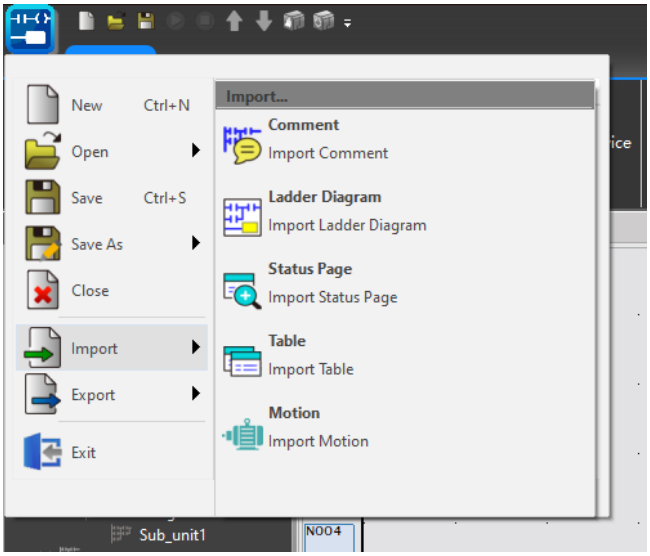


Fig. 33: Project Import

1. **Comment:**

- **Export:** Click [File] → [Export] → [Comment] in function toolbar and the [Comment Export] window will appear. The exported file is presented in text file format and its sub-file title is coded as "txt."

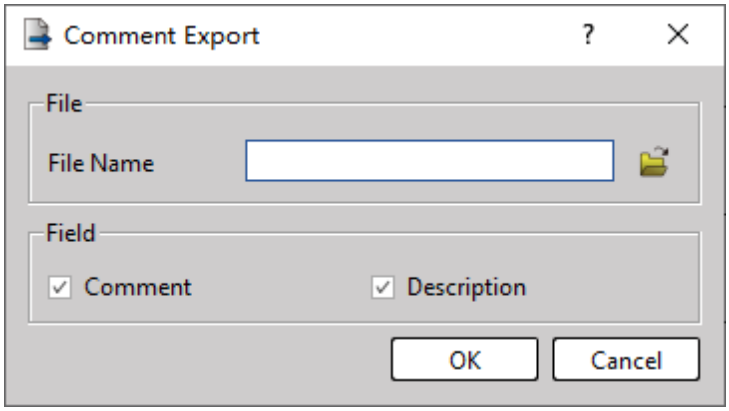


Fig. 34: Comment Export

- **Import:** If the text file contains the export comment, click [File] → [Import] → [Comment] in function toolbar and the [Comment Import] window will appear. Select text file and then execute the importing procedure:

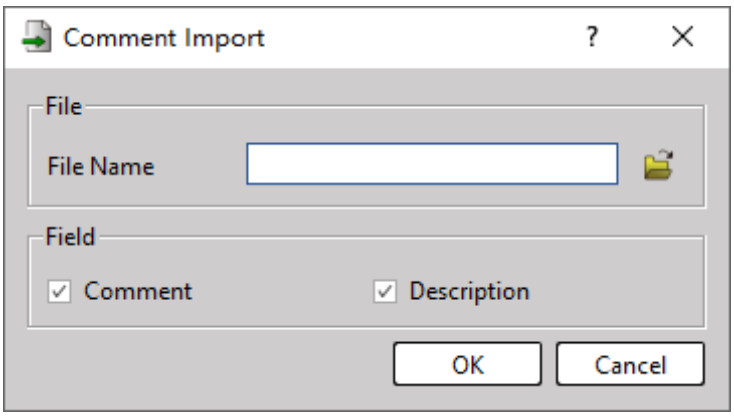


Fig. 35: Comment Import

2. Ladder Diagram

- **Export:** If you need to copy Network N001 of Project-1 to Project-2, execute according to the following step. First, open Project-1 and then highlight Network N001, as per the figure below:

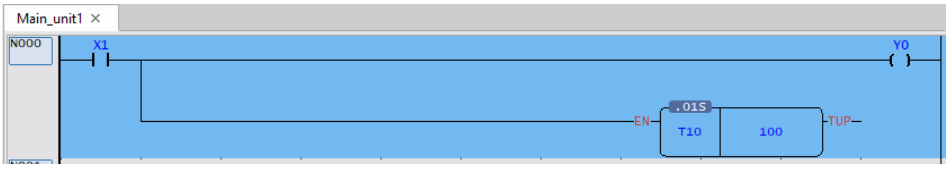


Fig. 36: Highlighting N001

Next, click [ File] → [Export] → [Ladder Diagram] in function toolbar and the [Save As] dialog box will be created. After inputting the file name, press [Save] to complete the exporting procedure.

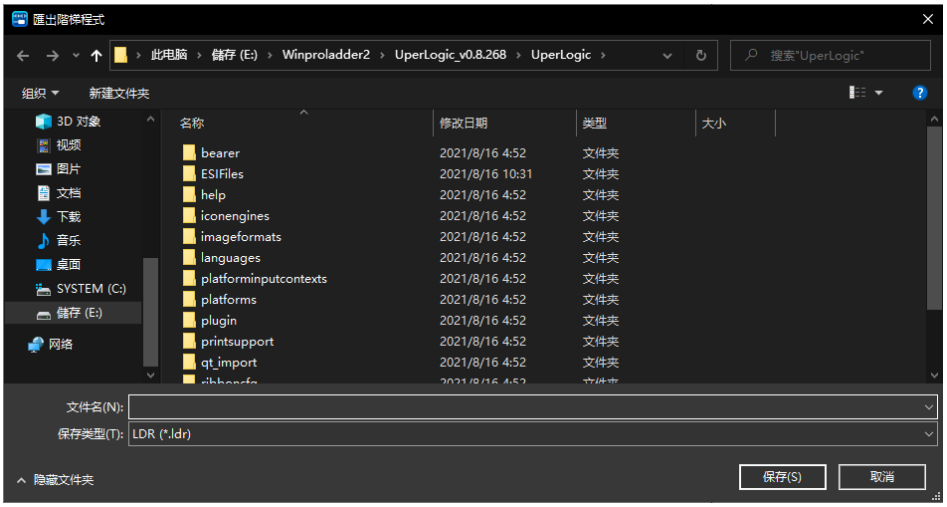


Fig. 37: Exporting Ladder Diagram

- **Import:** Open the project. Move the cursor to the position where the network will be inserted and then click [File] → [Import] → [Ladder Diagram] in function toolbar:
  Select the file to be inserted and then press [Start] to complete the importing procedure.

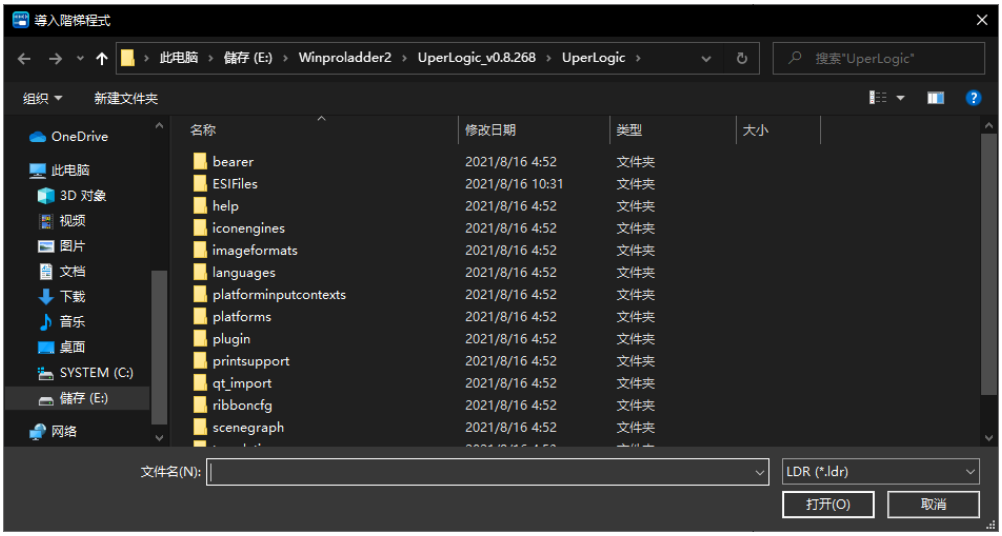


Fig. 38: Importing Ladder Diagram

3. Status Page:

- **Export:** Click [File] → [Export] → [Status Page] in function toolbar and the [Status Page Export] window will appear. In [Status Page List], select "Status Page 1" and then press [Export] button for saving it as "spf" sub-file to complete the Status Page exporting procedure.

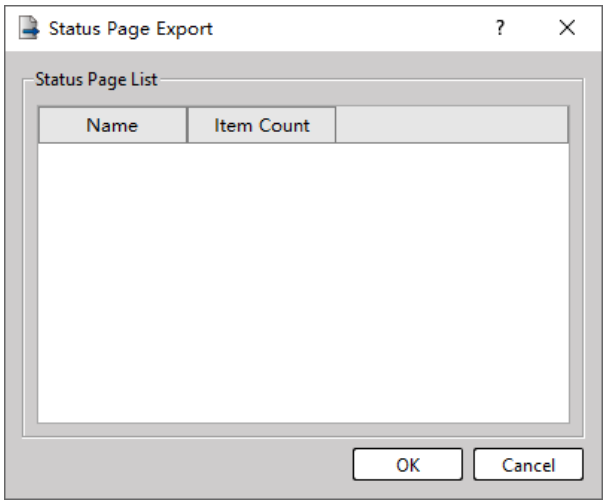


Fig. 39: Status Page Export

- **Import:** Click [File] → [Import] → [Status Page] in function toolbar and the [Status Page Import] window will appear. Select the file name of the Status Page that will be imported. Click [Status Page] in the list and then press [Import] button to complete the importing procedure. Open the [Status Monitor] window of this project and you will see the newly added Status Page.

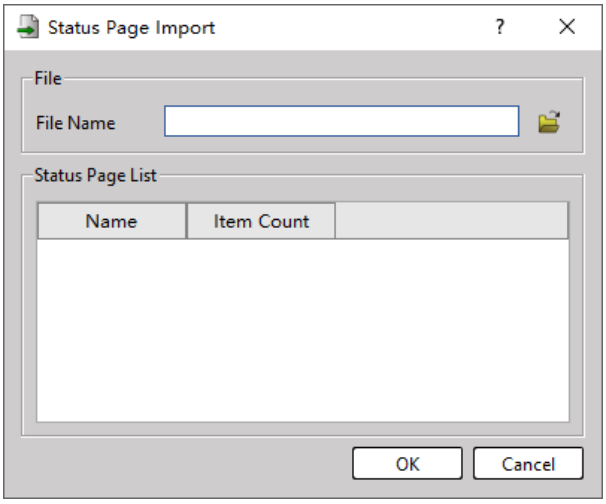


Fig. 40: Status Page Import

4. Export Table

- **Export:** Click [File] → [Export] → [Table] in function toolbar and the [Table Export] window will appear. In [Table List], select the table that will be exported. Press [Export] button and then save it as "tab" sub-file to complete the table exporting procedure.

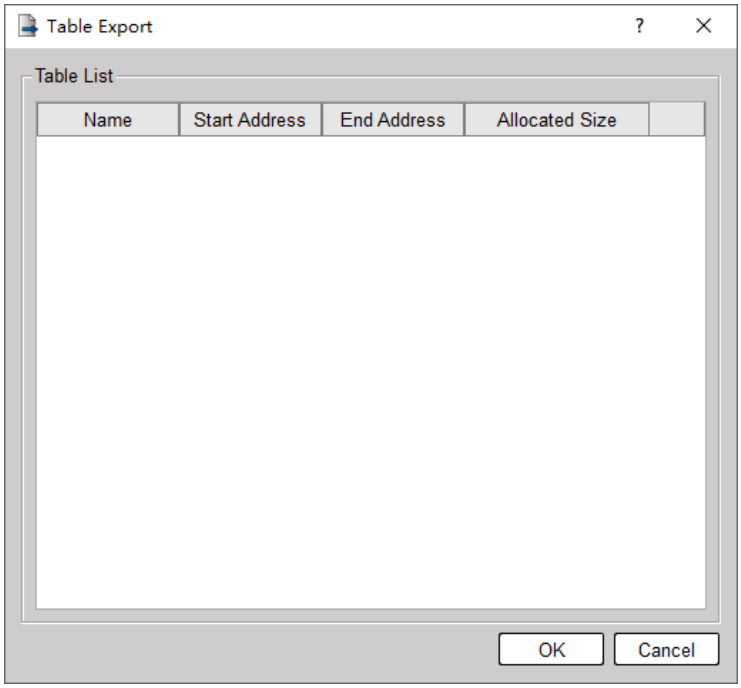


Fig. 41: Table Export

- **Import:** Click [File] → [Import] → [Table] in function toolbar and the [Table Import] window will appear. In [Table List], select the table that will be exported and then press [OK] button to complete the table importing procedure.

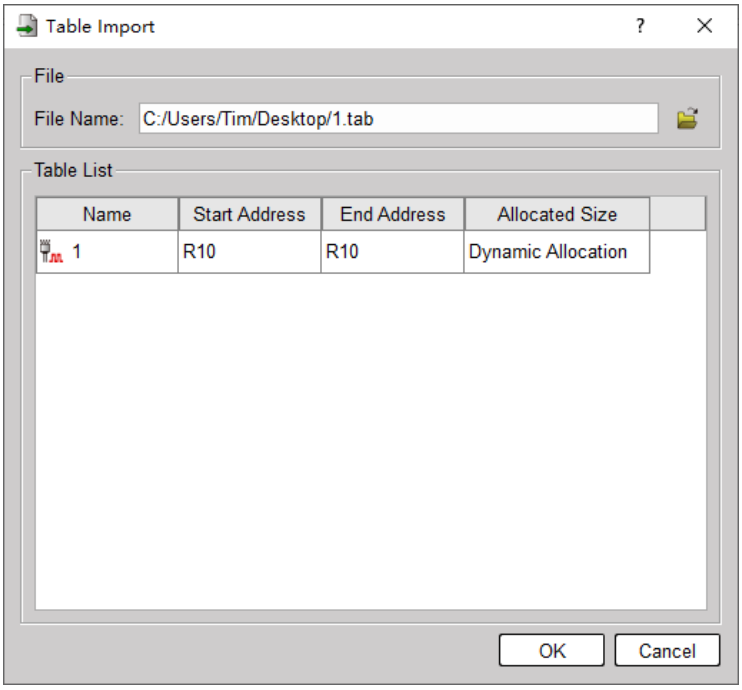


Fig. 42: Table Import

5. Motion

- **Export:** Click [File] → [Export] → [Motion] in function toolbar and the [Motion] window will appear. Press [Export] button and then save it as ".fmprj" sub-file to complete the Motion Control exporting procedure.

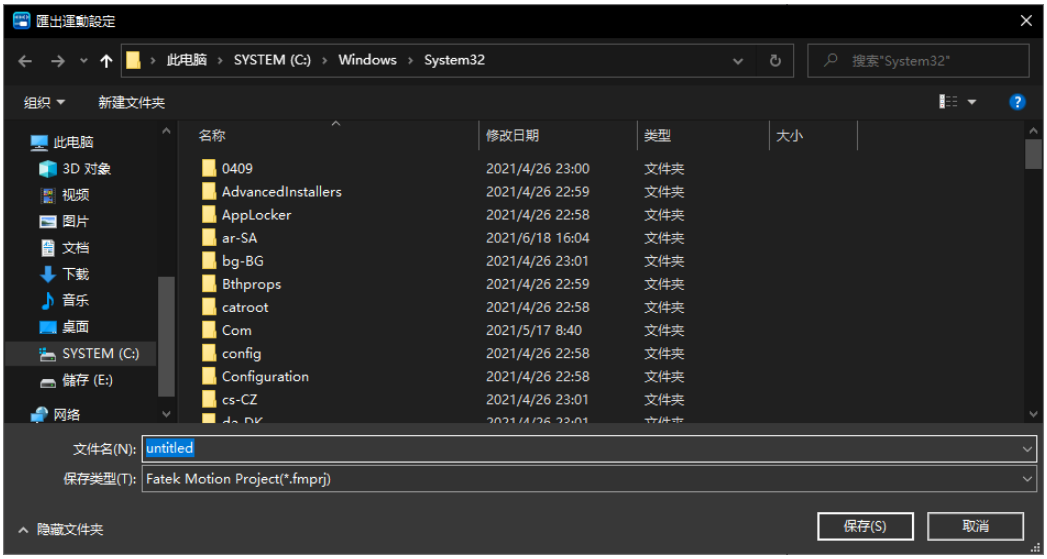


Fig. 43: Exporting Motion

- **Import:** Click [File] → [Import] → [Motion] in function toolbar and then select the file that will be imported to complete the Motion Control importing procedure.

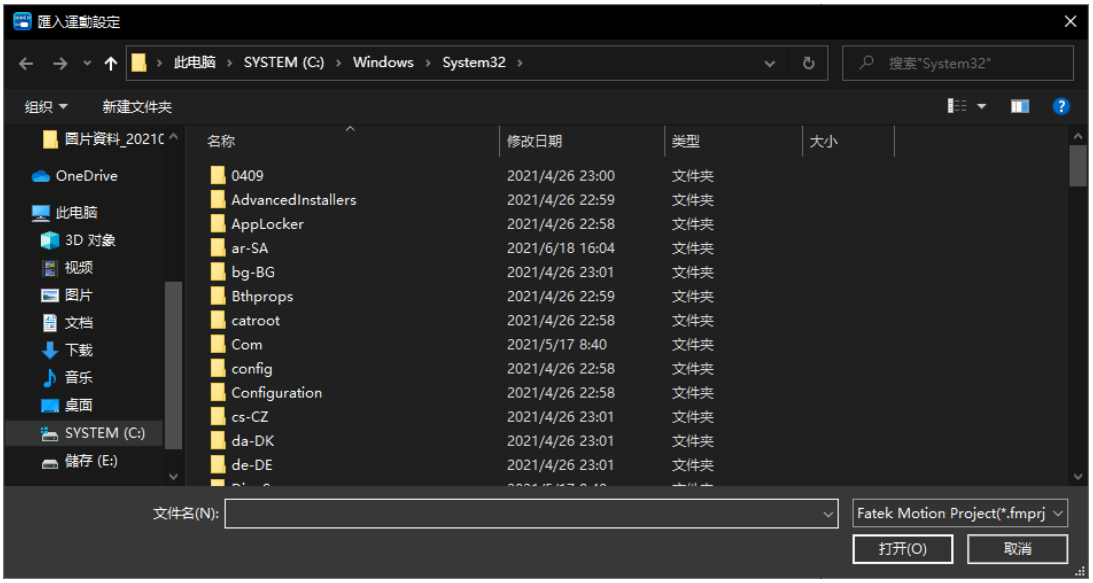


Fig. 44: Importing Motion

4-7 Open Old Projects

Click the upper-left [File] → [Open] or click [Open] of the quick toolbar and you may open the edited project.

By pointing the cursor at [Open] in [File], the system will display detailed items of the project that will be opened. The project opening can be achieved with any of the following three options: [Open], [Import WinProladder Project] or [Connect To PLC].

With the [Import WinProladder Project], it allows the user to easily convert the project being edited in "WinProladder" to "UperLogic" project for use. By simplifying the complicated rewriting procedure, the efficiency of project conversion is therefore enhanced. Attention should be paid to confirming the project content after conversion, some register definitions and functions are not fully compatible.

Provided below is the detailed description of the aforesaid three options.

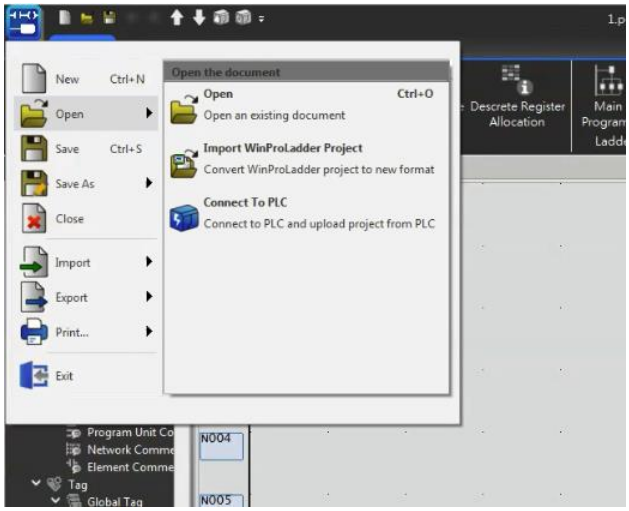


Fig. 45: Open Project

Mode	Description
Open Project (Ctrl+O)	Open the existing project.
Import WinProladder Project	Open the project (.pdw) being edited in WinProladder. After being converted, the user needs to confirm the content of the project; however, such function is not fully compatible.

Connect to PLC	Same as the [Upload] function. After setting up the [Online Parameter], the user will be allowed to read the project from the PLC.

Table 14: Three modes of Open Project

4-8 Project History

Provides users with the functions of registering, replying, and deleting project revision records, and the project revision records will exist in the project file (*.pdwx). When PLC is in the state of "Offline Editing", select the tab page [Project] → [Project Settings] → [Project History].

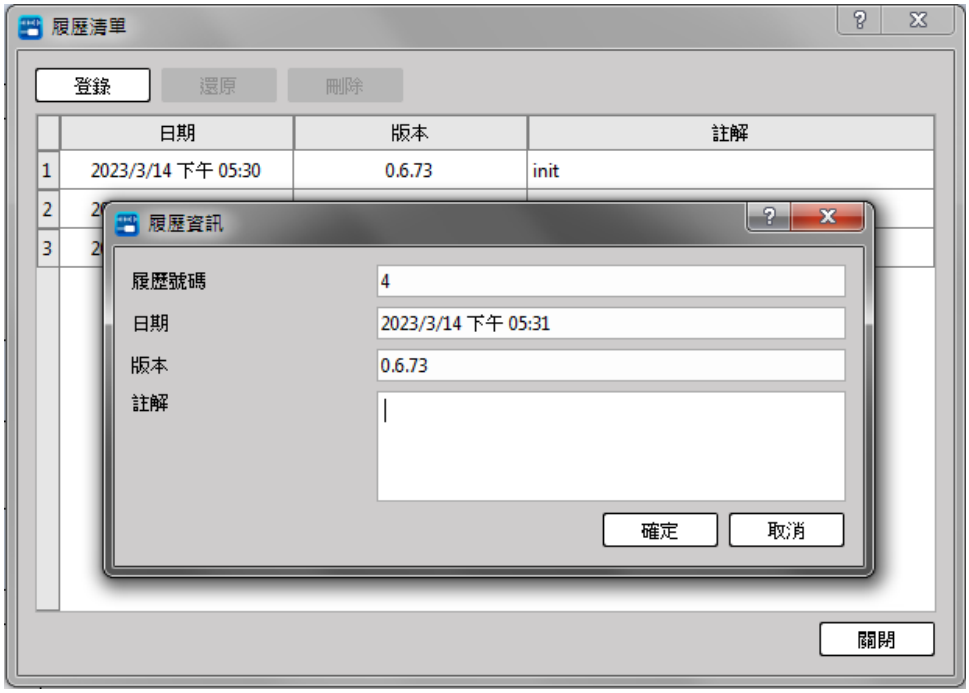


Fig. 46: Project History

模式	說明
Login	After clicking [Login], the log-in window will display the history number, login time, program version and provide users with the option to edit the notes of the history. After confirming, the history will be registered, and the upper limit is 100. If the current project is an unsaved project, the user will be prompted to save the current project.
Restore	Select the project history you want to restore, click [Restore], and the project will be restored to the state of the history.
Delete	Select the project history to be deleted, and click [Delete] to delete the history.

4-9 Print

The function of print includes [Print…], [Print RTF File], [Print Setup]. Click the upper-left [File] → [Print].

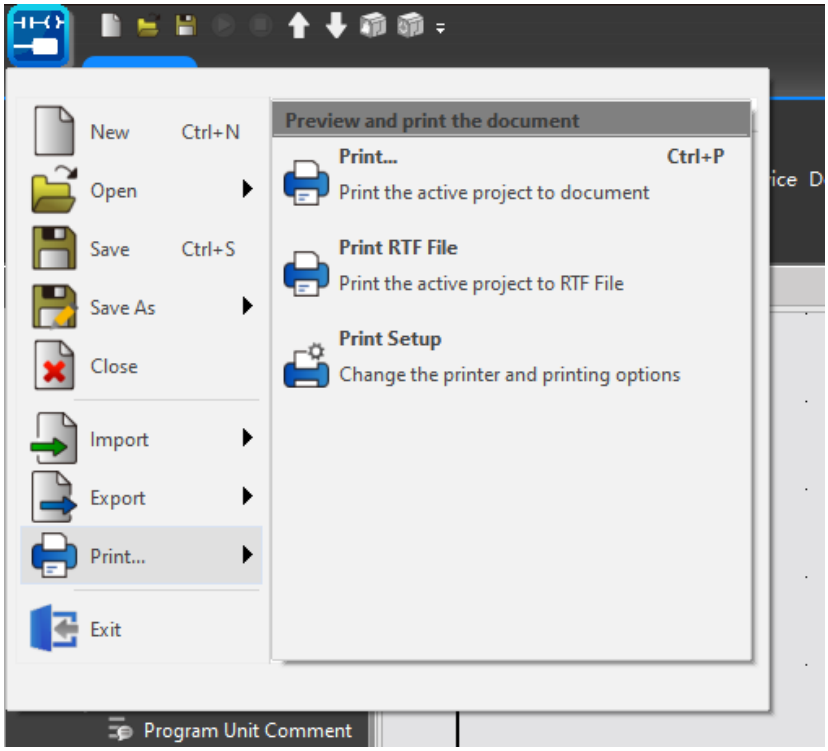


Fig. 47: Print

Mode	Description
Print….	Set the format to be printed and the content to be printed
Print RTF File	The selected print file will be converted into RTF format
Print Setup	You can modify the related settings of the printer

Table 14: The three modes of Print

4-9-1 Print…

After clicking [Print…] or press [Ctrl+P], the screen will be shown as below. Users can select the items which they want to print. And use [Move UP] or [Move Down] to change the display order. Users can also use the right-side function [Preview], [Page Setup], [Printer Setup] for setting.

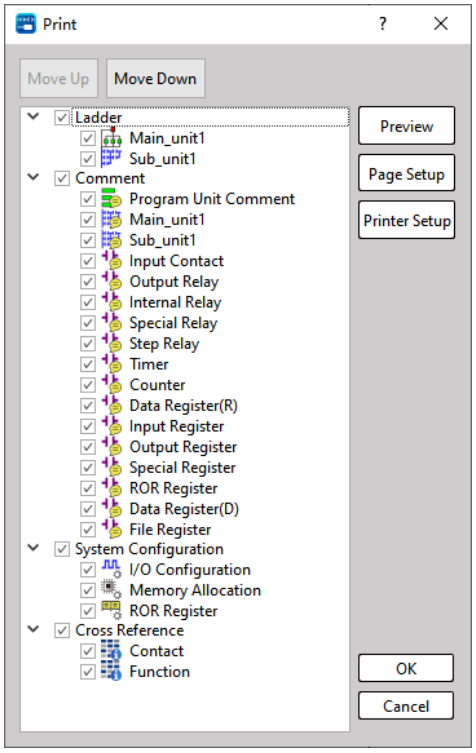


Fig. 48: Print

[Preview]:

Users can preview the completed print through "Print Preview".

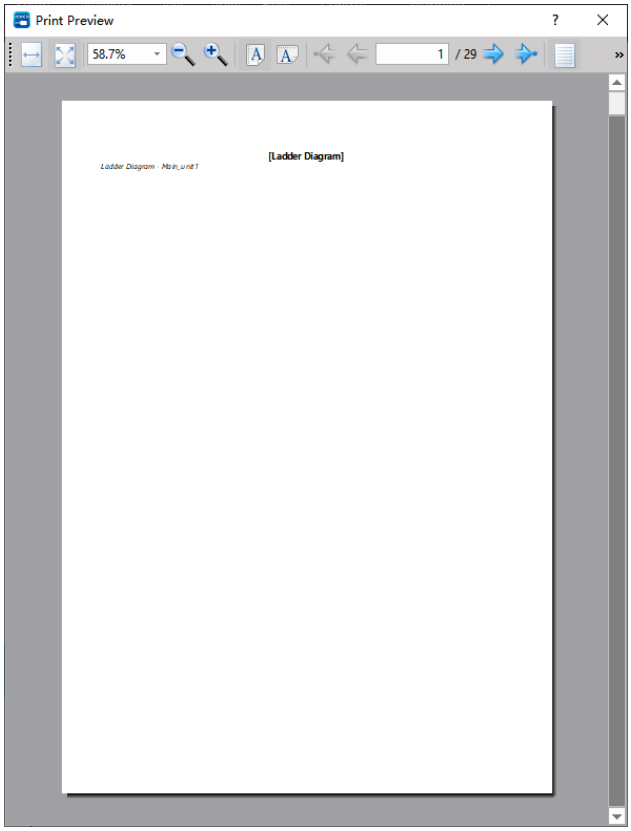


Fig. 49: Print Preview

[Page Setup]:

Users can modify related settings such as paper size, orientation, and borders through [Page Setup].

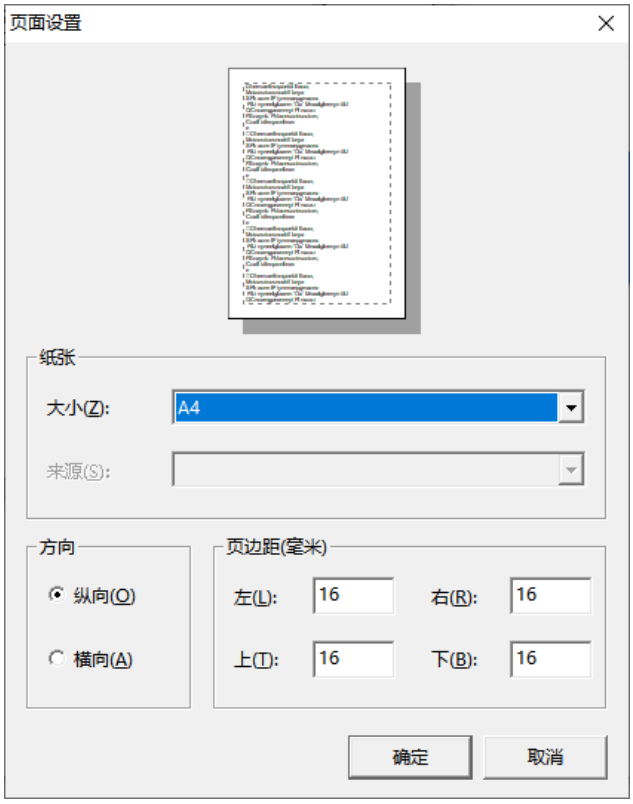


Fig. 50: Page Setup

[Printer Setup]:

Same as 4-8-3 [Printer Setup]. Users can set the printer to be used and related settings here.

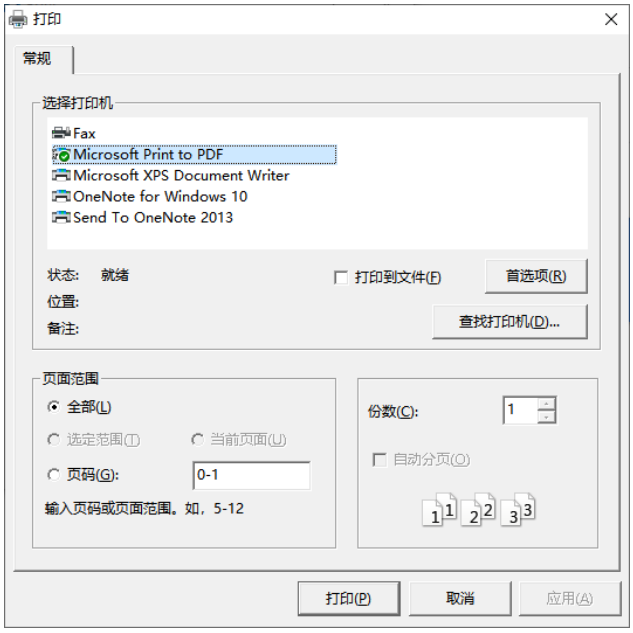


Fig. 51: Printer Setup

4-9-2 Print RTF File

Click [Print RTF File] to show a page almost same as [Print….]. Users can select the items which they want to print, and use [Move UP] or [Move Down] to change the display order.

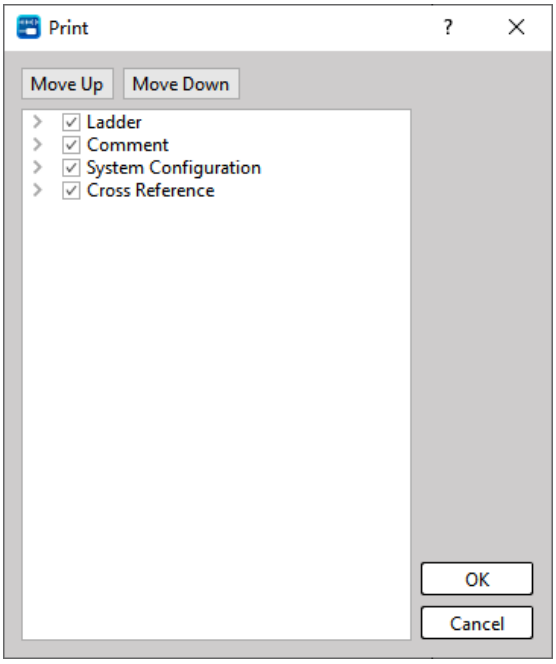


Fig. 52: Print RTF File

4-9-3 Print Setup

Users can set the printer to be used and related settings are shown below:

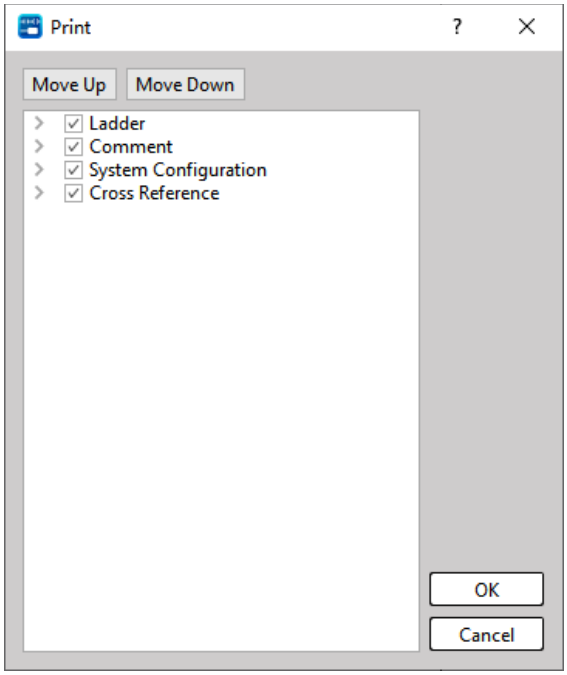


Fig. 53: Print RTF File

5

System Parameters

⚠ Danger
7. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 8. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 9. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the system related parameters that will be required for setting up the content of I/O configuration, memory configuration and read-only Register.

5-1 I/O Configuration

I/O configuration provides configuration enablement and adjustment of high-speed counters, interrupts, outputs and inputs. Execute the function bar [Project] → [I/O Configuration], or click [Test Example] → [System Configuration] → [I/O Configuration] in the project management window: **High-Speed Counter.**

Different modules have different numbers of high-speed counters, HSC0~3 provide 6 counting modes:

1. Single-phase independent up-counting high-speed counter U
2. Single-phase independent up-counting high-speed counter U*2
3. Single-phase relative up/down high-speed counter P/R
4. Bidirectional correlation high-speed counter A/B
5. Bidirectional correlation high-speed counter A/B*2
6. Bidirectional correlation high-speed counter A/B*4

Some modules of HSC4~7 only provide A/B*4, and all modules provide software masking and clearing.

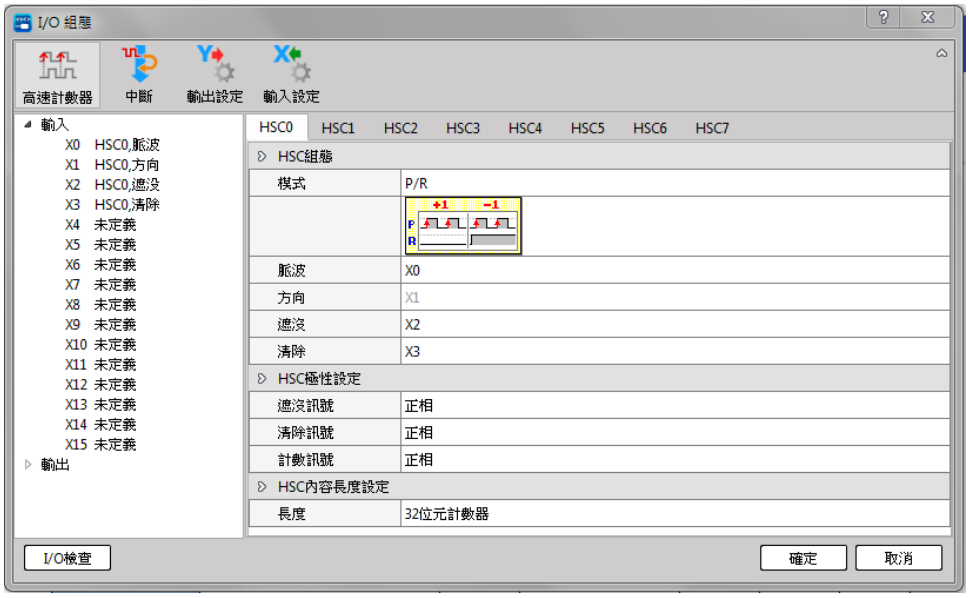


Fig. 54: High-Speed Counter

Item		說明
HSC Configuration	Up (UP)/Down (DN) Pulse/Direction A-Phase / B-Phase	Sets the selection of the counting input of the high counter.
	Mask (MSK)	Sets the selection for mask input.

		When the input signal is 1, the counter will be blocked and will not count, and the internal state will remain unchanged. When the signal returns to 0, the counter will work properly.
	Clear (CLR)	Sets the selection to clear the input. When the input signal is 1, the current count value temporary register inside the counter will be cleared to 0 and cannot count. The counter will not start counting from 0 until the signal returns to 0.
HSC Polarity	Mask Signal	Able to set the normal phase or negative phase of the mask input.
	Clear Signal	Able to set the normal phase or negative phase of the clear input.
	Counter Signal	The input signal can be set as normal counting or reverse counting.
HSC Data Length		Provides two modes "16-bit counter" and "32-bit counter" to choose from. For example: if the temporary register for HSC0 storing the count value is DR35280, if "32-bit counter" is selected, DR35280 will be used as the current count value register of the high-speed counter; if "16-bit counter" is selected, R35280 is still the current count value register of the high-speed counter. But R35281 will be used by the system as a 16-bit loop counter.

The inputs of the counting mode are interdependent. Except "U", which only has a single input, they must be used in pairs. For example, when "X4" is selected in the "A-Phase" field, "B-Phase" will automatically use "X5". The input selections of "Mask" and "Clear" also need to be paired, but you can choose to use only "Mask" or "Clear". In order to achieve optimal benefits, the input points are configured as shown in the table below:

	Input Point							
	Up (UP)	Pulse	A-Phase	Down (DN)	Direction	B-Phase	Mask (MSK)	Clear (CLR)
HHSC0	X0			NA	X1		X2, X4, X6, X8,	X3, X5, X7, X9,
HHSC1	X2				X3			

HHSC2	X4		X5	X10,	X11,
HHSC3	X6		X7	X12,	X13,
HHSC4	X8		X9	X14	X15
HHSC5	X10		X11		
HHSC6	X12		X13		
HHSC7	X14		X15		

Table 15 Configuration of input points

5-1-2 Interrupt Signal Configuration

The interrupt means that the PLC will send an interrupt request to the CPU immediately when the demand for immediate response occurs during the normal sequential execution of the scan cycle. After the CPU receives the interrupt request, it immediately stops the scanning work being executed, and executes the "interrupt service routine" first. After the task is completed, return to the unfinished scanning task. This page is used to set the use and trigger conditions of the input interrupt.

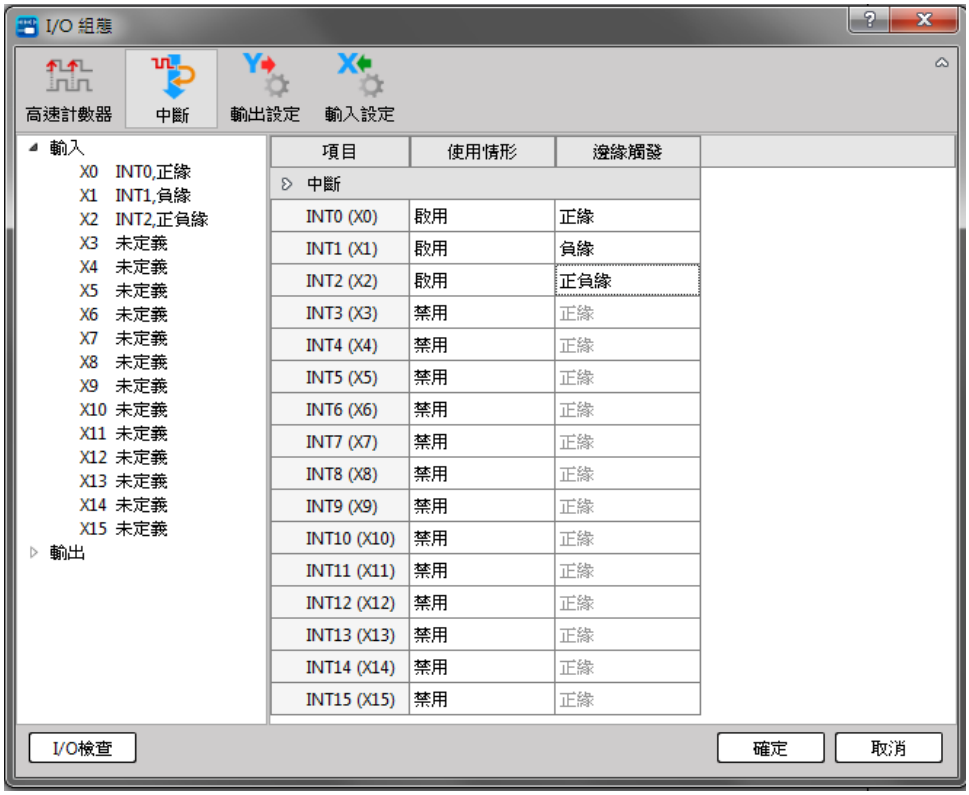


Fig. 55: Interrupt setting

Item	Description
Usage	Set to enable or disable the interrupt function.
Edge Trigger	Set trigger conditions. [Positive Edge] Input from 0 to 1 [Negative Edge] Input from 1 to 0 [Positive and negative edges] trigger when input changes

5-1-3 Output Signal Configuration

It is used to set the pulse form of output signal, output polarity and output power-off hold and other configurations.

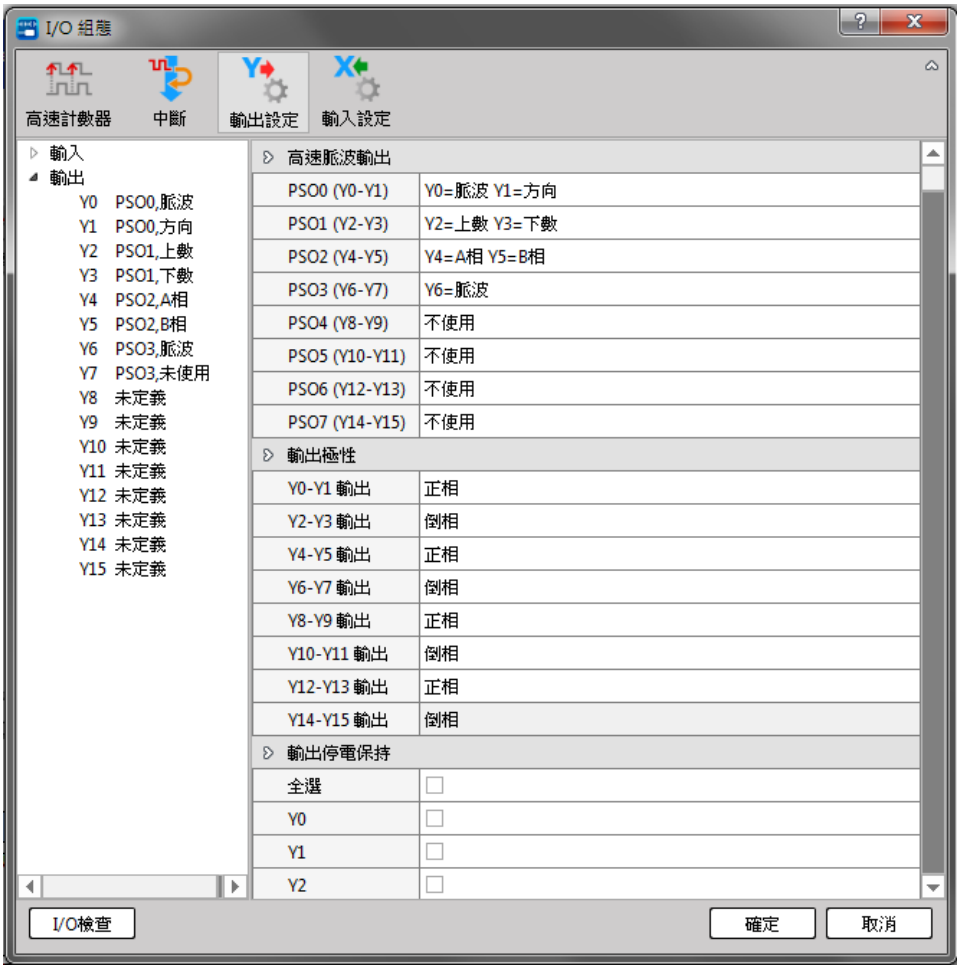


Fig. 56 Output Setting

Item	Description
High-Speed Pulse Output	Set the output mode of high-speed pulse output. Divided into four modes 1. Pulse (PLS) / Direction (DIR) 2. Up (UP) / Down (DN) 3. A-Phase / B-Phase 4. Single Point Pulse.
Output Polarity	Select normal output or reversed output.
Output Latched	When checked, it means that when the power is turned on again, the output will keep the original output value.

If not using the HSPSO function, the Y0–Y15 external output points of M-PLC will be corresponding to the status of Y0–Y15 output relays in the PLC. If the HSPSO is implemented, then the system will switch the Y0–Y15 external output points directly to the HSPSO output circuit in ASIC; therefore, it is irrelevant to Y0–Y15 relays in PLC.

Listed below are the signal details and the optional output modes of the output points at the respective axis of M-PLC. The "high-speed pulse output" can be set according to the method indicated in the table below:

Axis No.	External Output Point	Output Mode			
		PLS/DIR	UP/DN	A/B-Phase	Single Point PLS
PSO 0	Y0 Y1	Y0= PLS Y1= DIR	Y0= UP Y1= DN	Y0=A Y1=B	Y0= **PLS**
PSO 1	Y2 Y3	Y2= PLS Y3= DIR	Y2= UP Y3= DN	Y2=A Y3=B	Y2= **PLS**
PSO 2	Y4 Y5	Y4= PLS Y5= DIR	Y4= UP Y5= DN	Y4=A Y5=B	Y4= **PLS**
PSO 3	Y6 Y7	Y6= PLS Y7= DIR	Y6= UP Y7= DN	Y6=A Y7=B	Y6= **PLS**
PSO 4	Y8 Y9	Y8= PLS Y9= DIR	Y8= UP Y9= DN	Y8=A Y9=B	Y8= **PLS**
PSO 5	Y10 Y11	Y10= PLS Y11= DIR	Y10= UP Y11= DN	Y10=A Y11=B	Y10= **PLS**

Axis No.	External Output Point	Output Mode			
		PLS/DIR	UP/DN	A/B-Phase	Single Point PLS
PSO 6	Y12 Y13	Y12= PLS Y13= DIR	Y12= UP Y13= DN	Y12=A Y13=B	Y12= **PLS**
PSO 7	Y14 Y15	Y14= PLS Y15= DIR	Y14= UP Y15= DN	Y14=A Y15=B	Y14= **PLS**

Table 16: Output mode setting table

5-1-4 Input Signal Configuration

For many high-speed applications, in addition to using the interrupt input method to prevent signal omission, the input points included in the host can also be set as capture inputs to capture their fleeting signals. This page is used to set its captured input configuration.

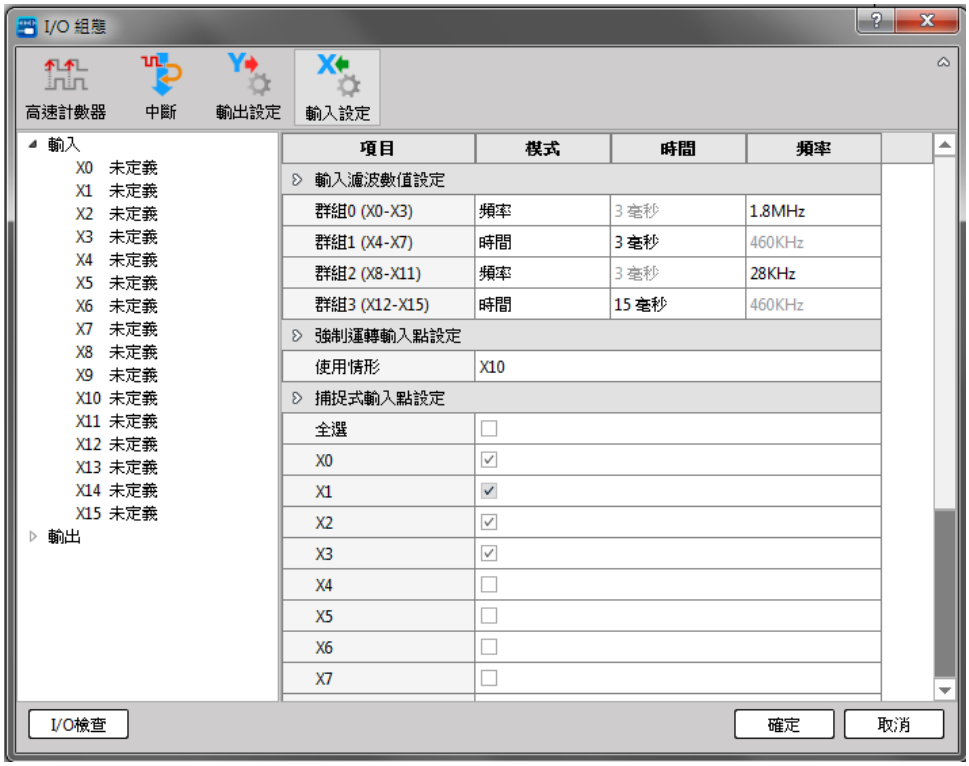


Fig. 57: Input Setting

Item	Description
Input Filter Value	The filter settings are divided into 4 groups (X0~X3), (X4~X7), (X8~X11), (X12~X15), and the filter conditions can be set to time or frequency: 7 options such as 28KHz to 1.8MHz can be set when the frequency is used as the condition; 3 to 15 milliseconds can be set when the time is used as the condition.
Forced Operation Input Point	Set the point of forced operation input point.
Captured Input Point	Check to set it as the input point to be captured.

5-2 Setting up the Number of Component Memory

When M-PLC leaves the factory, proper arrangements have been made in advance for the allocation of retentive and non-retentive coils or registers, timers, counters, and read-only registers. In most applications, the factory settings do not need to be changed, but in order to adapt to various special or complex applications, in addition to the factory settings, UperLogic also provides the function so that users can set them according to their needs.

Click [Project] → 

[Memory Allocation] in function toolbar or double clicking → [System Configuration] → [Memory Allocation] in the project window and then the memory allocation setting window will appear:

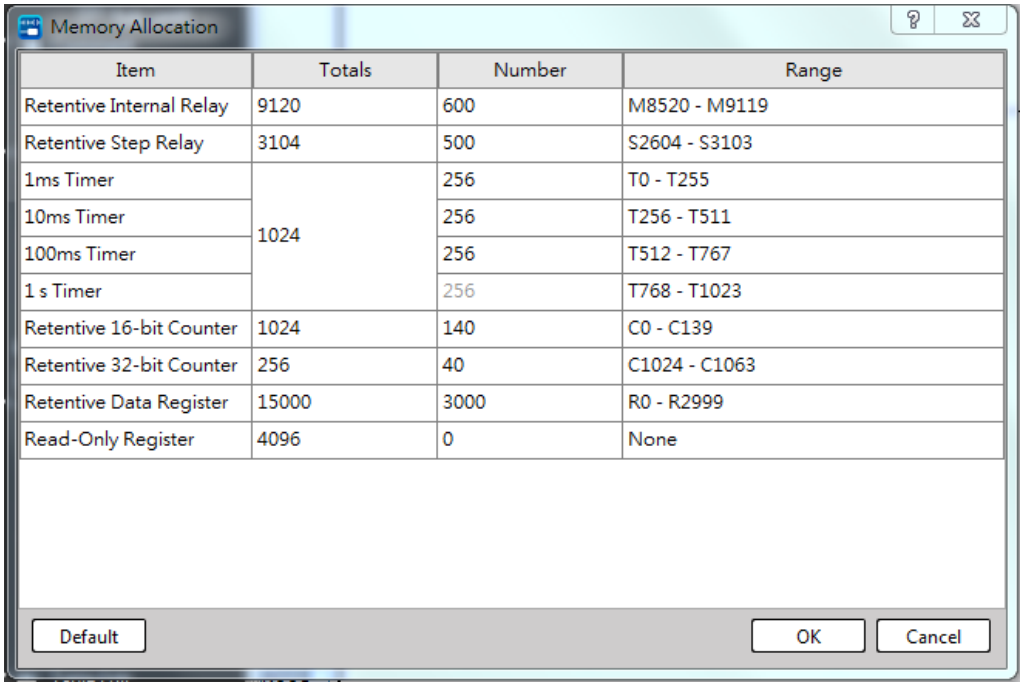


Fig. 58: Memory Allocation window

When restarting following the outage or switch PLC from STOP to RUN, the non-retentive relay or the Register will be cleared as "0", but the retentive relay will maintain its original (before outage or under STOP status) status. Described below are relevant details:

Item	Description
Retentive Internal Relay	[Total] Displays the total number that can be set as retentive type [Quantity] The quantity to be set as retentive type [Range] Displays the range after setting
Retentive Step Relay	[Total] Displays the total number that can be set as retentive type [Quantity] The quantity to be set as retentive type

	[Range] Displays the range after setting
Time Base of Timer	The timer is divided into four time bases of 1 ms, 10 ms, 100 ms and 1 s, and the four time bases share the total number. [Total] Displays the total number of timer [Quantity] The quantity to be set for each time base [Range] Displays the range of each time base setting
Retentive 16-bit Counter	[Total] Displays the total number that can be set as retentive type [Quantity] The quantity to be set as retentive type [Range] Displays the range after setting
Retentive 32-bit Counter	[Total] Displays the total number that can be set as retentive type [Quantity] The quantity to be set as retentive type [Range] Displays the range after setting
Retentive Data Register	[Total] Displays the total number that can be set as retentive type [Quantity] The quantity to be set as retentive type [Range] Displays the range after setting
Read-Only Register	[Total] Displays the total number that can be set as read-only register [Quantity] The quantity to be set as read-only register [Range] Displays the range after setting
Retentive Input Register	Set all output registers as retentive type or non-retentive type
Default Value	Restore to factory settings

After the setting of the memory allocation window is completed, the system will display the [Discrete & Register Allocation] window to provide the user with an overview of the complete allocation status, as shown in the figure below:

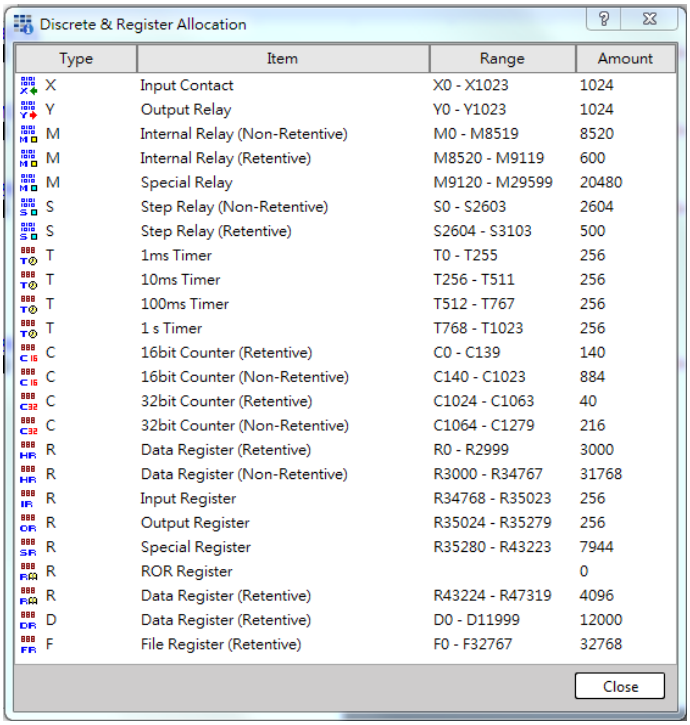
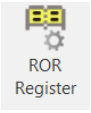


Fig. 59: Discrete and register allocation window

5-3 Setting up the Content of Read-Only Register

The configurable range of read-only registers is R43224~R47319 (4096 in total), and the range not planned as read-only registers can be used as general registers, which are retentive types. The content set as read-only registers will be stored in the project, so when the project is downloaded to the PLC, if there are read-only registers specified in the project, these read-only registers will be used when the PLC starts content as the initial value.

Click [Project] → 

[ROR Register] in function toolbar or double clicking [Test Example] → [System Configuration] → [ROR Register] in the project window. If the ROR range is not set, the following window will appear first to prompt the setting. When the setting is confirmed, it will automatically jump to the memory allocatoin window in Section 5.2 to provide the user with the set amount.

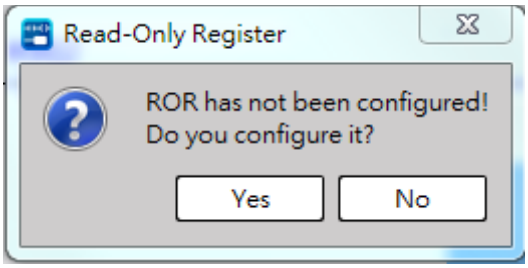


Fig. 60: Setting up read-only Register

The ROR window provides users with setting ROR data, comments and instructions, and can synchronize the Register value and ROR value.

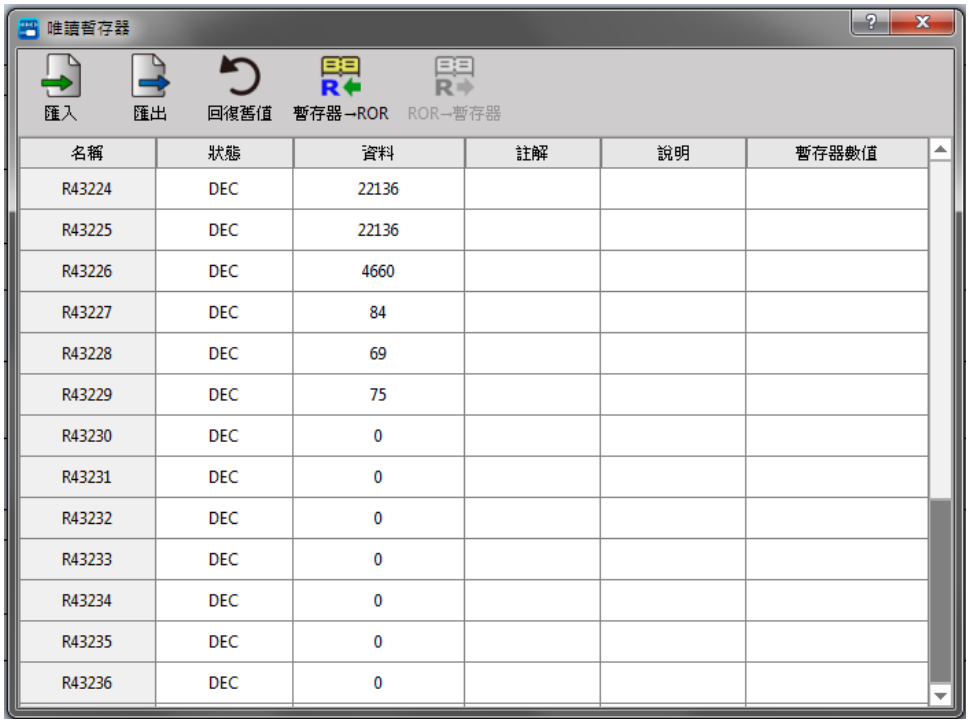


Fig. 61: Read-only Register

Item	Description
Export/Import	Notes and description of export/import
Restore Old Value	Restore the data to the one just entered the ROR window
Register→ROR	Synchronize general register value to read-only register
ROR →Register	Synchronize read-only register value to general register

5-4 Servo Configuration

Provides users with the settings related to the server on the PLC.

Click [Project] → [Servo Configuration].

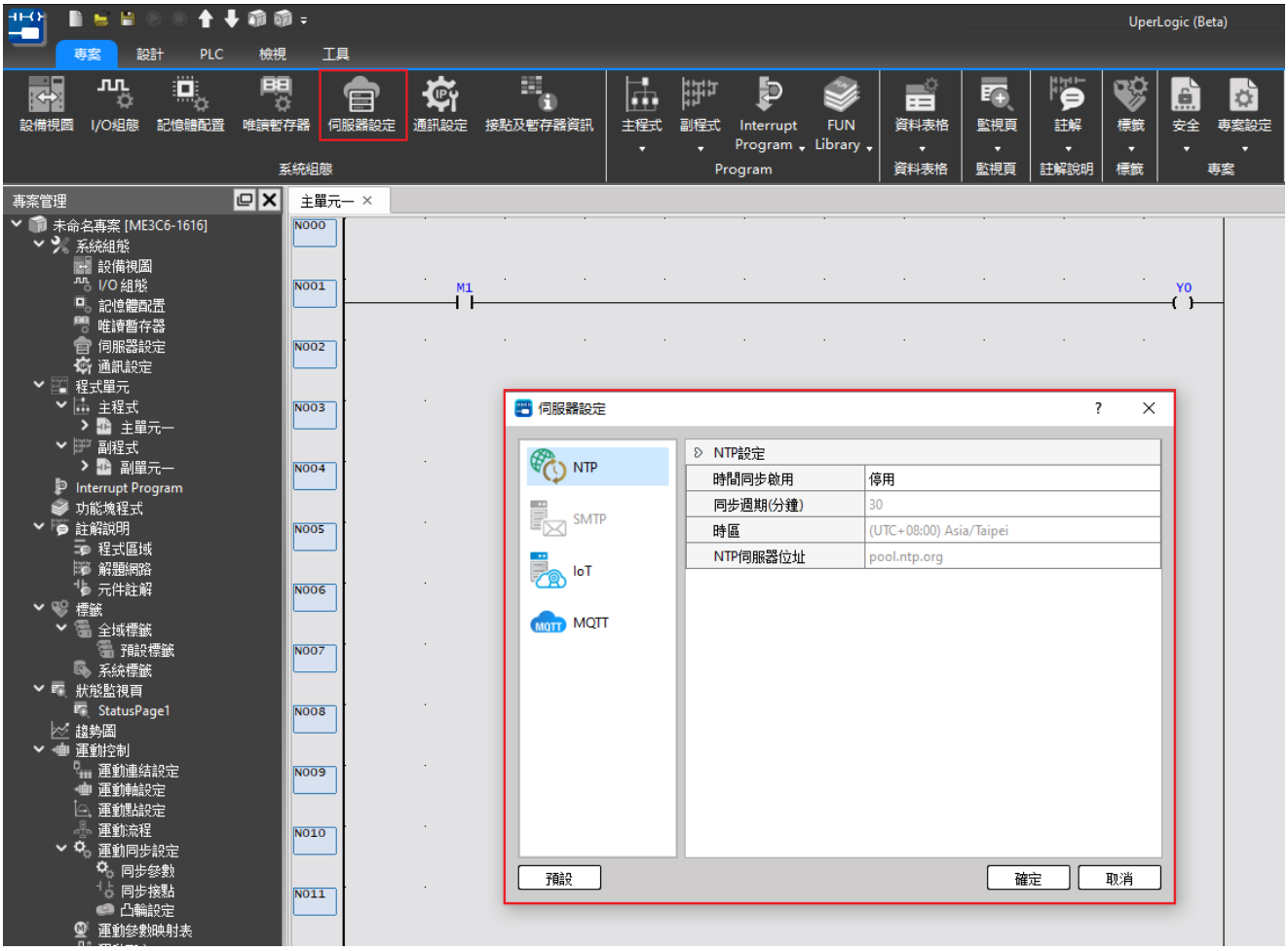


Fig. 62: Server Configuration

Users can apply the communication settings to configure NTP, SMTP, IoT and MQTT.

5-4-1 Network Time Protocols (NTP)

Provides users to set NTP parameters on PLC.

Click [Project] → [Servo Configuration] → [NTP].

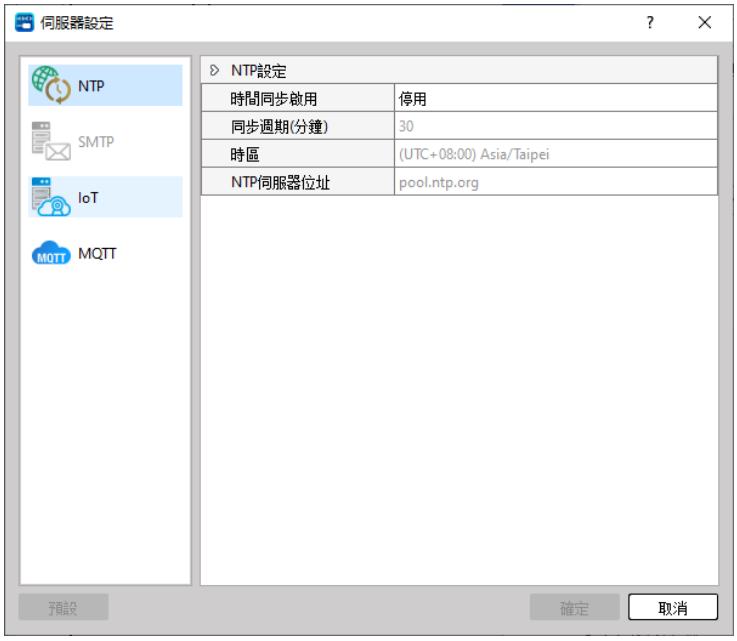


Fig 63: Setting NTP

5-4-2 IoT

Provides users with setting the IoT parameters on the PLC. When monitoring or editing online, the HWID of the PLC can be viewed and copied.

Click [Project] → [Servo Configuration] → [IoT]

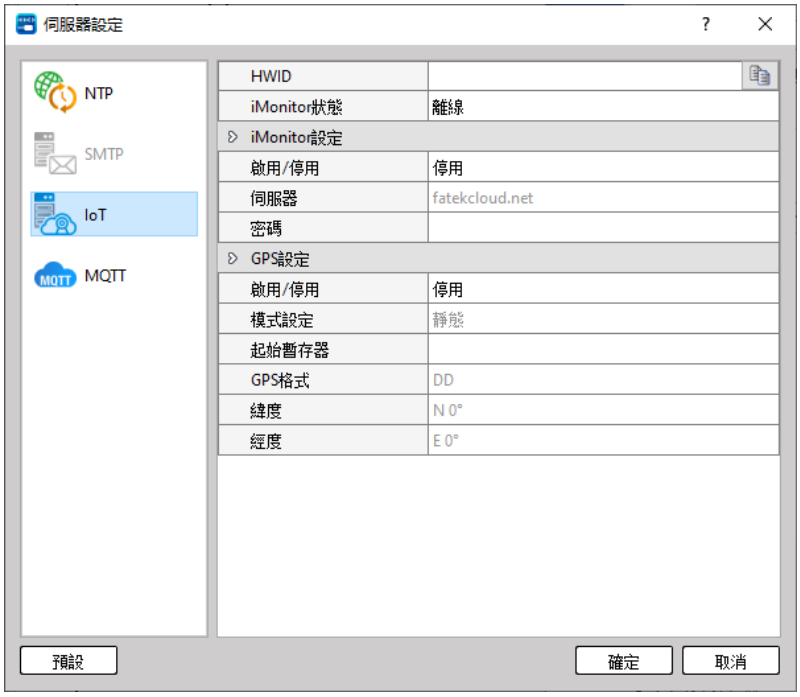


Fig. 64: Setting IoT

5-4-3 MQTT

MQTT is a communication protocol designed for IoT, characterized by simplicity and lightness. It is suitable for applications in environments with limited hardware resources and network bandwidth, and can meet the needs of remote monitoring and data exchange.

The mechanism of message transmission is publish/subscribe model, and each message must be identified by a topic name. The client is the publisher and the subscriber, the Publisher publishes a message with a topic, and the Subscriber subscribes to a topic; the server side is a Broker, which is responsible for receiving the publisher’ s message and forwarding it to Subscribers for the corresponding topic.

Provides users with setting the MQTT parameters on the PLC

Click [Project] → [Servo Configuration] → [MQTT]

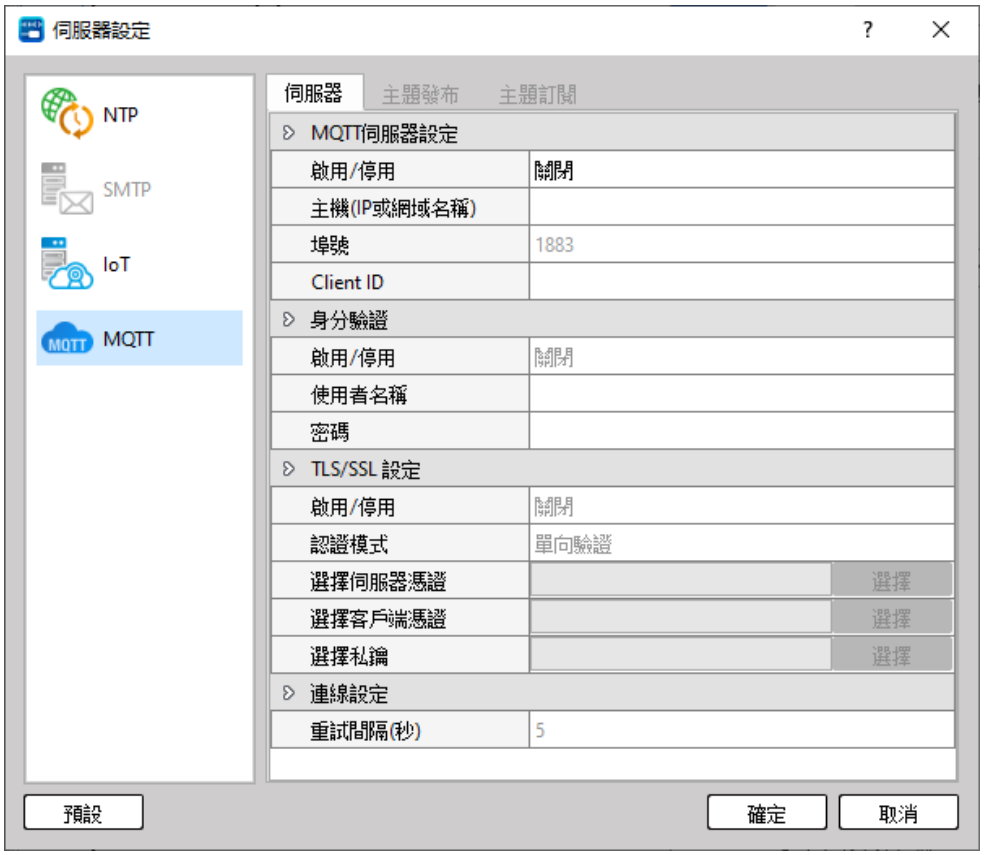
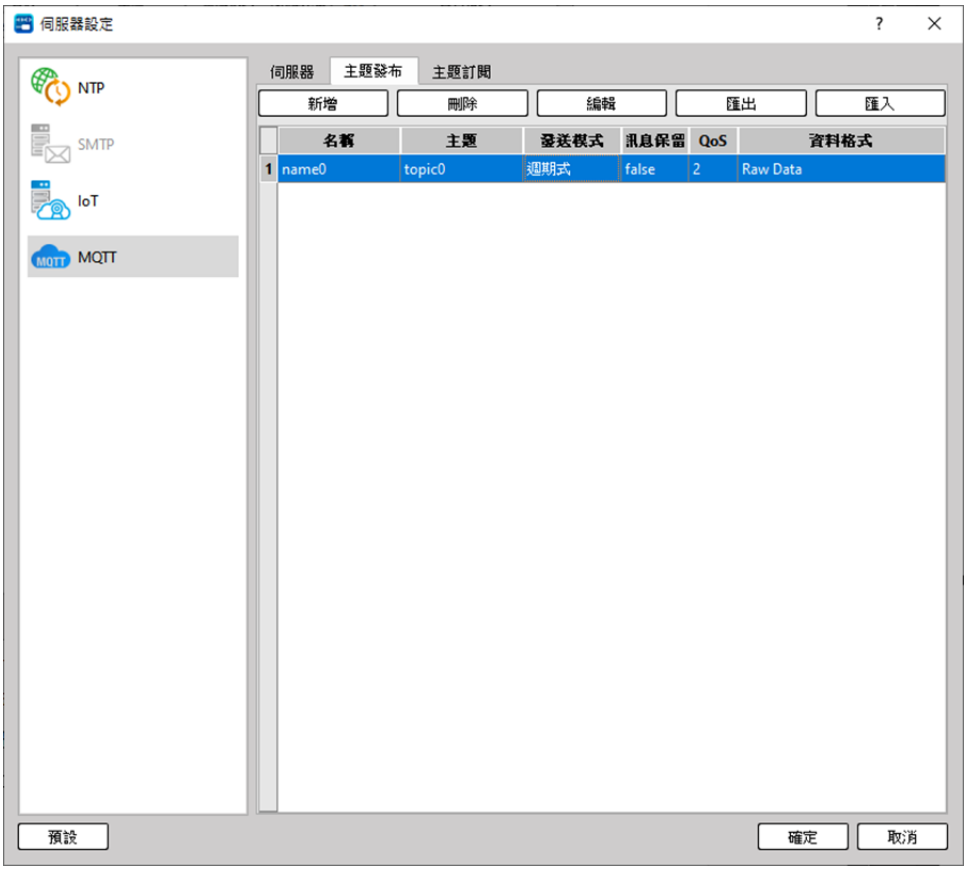


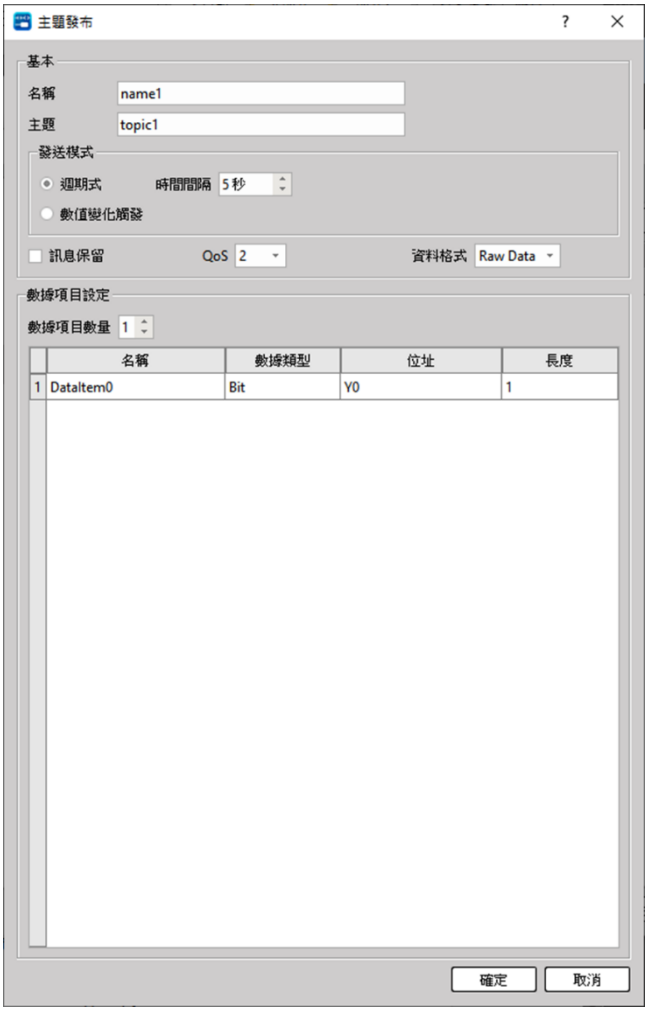
Fig. 65: Setting MQTT

Page	Property	Description
MQTT Server Configuration	Enable/Disable	This is the main switch of the MQTT function. Only after enabling it can you set the detailed fields, as well as related topic publishing and topic subscription.
	Host (IP or URL)	Set the Broker host address, you can fill in the IP or URL.
	Port No.	Set the connecting port of Broker. The default is 1883.
	Client ID	Client-specific identification code
Authentication	Enable/Disable	Enable/Disable authentication
	User Name	Input Broker-specified user name.
	Password	Input the password specified by the Broker, and it will be kept secret in cipher text after entering.
TLS/SSL Configuration	Enable/Disable	Enable/Disable TLS/SSL
	Identification Mode	One-way and two-way identification are optional.
	Select Server Certificate	Use server authentication. Import the required documents.
	Select Client Certificate	Use client authentication. Import the required documents.
	Select Private Key	Use client authentication. Import the required private key.
Connection Setting	Reconnection Interval (seconds)	The interval between reconnections if the MQTT connection is disconnected, in seconds.

Topic Publishing



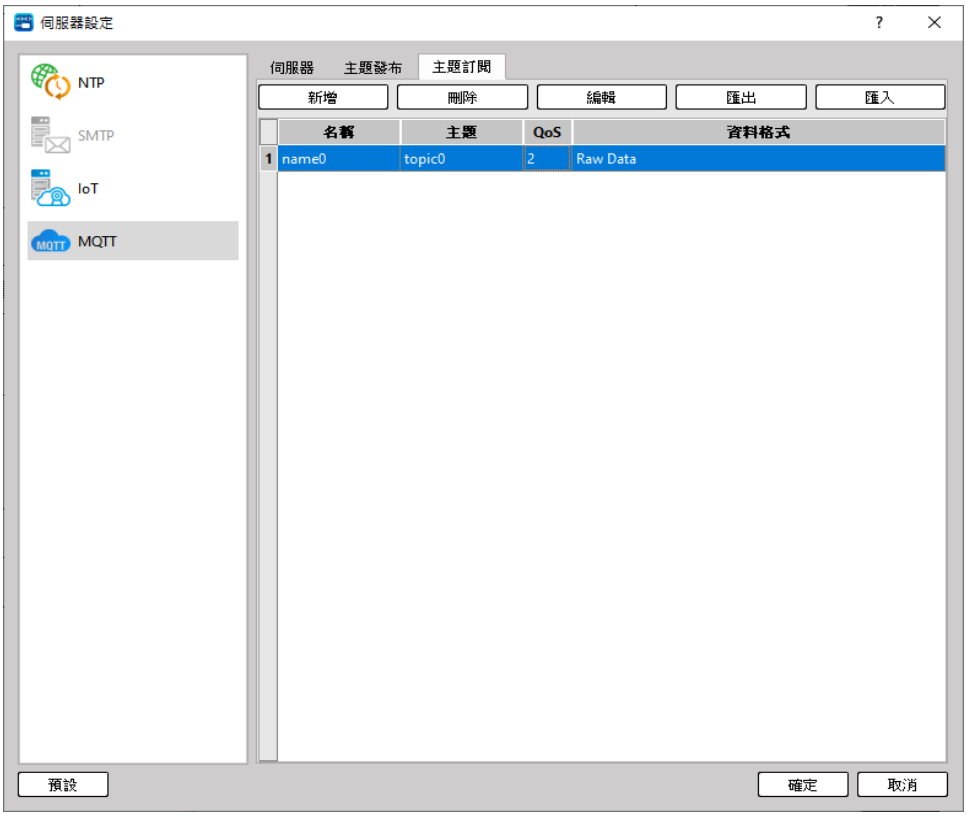
You can click [New] above to add a new theme, click the [Delete] button to delete the selected theme, click [Edit] or double-click the item in the theme list to edit the selected theme. If there is an existing theme in the theme list project, you can click [Export] to export all theme data into a CSV file in a specific format, and click [Import] to import a CSV file in a specific format to directly update the theme table.

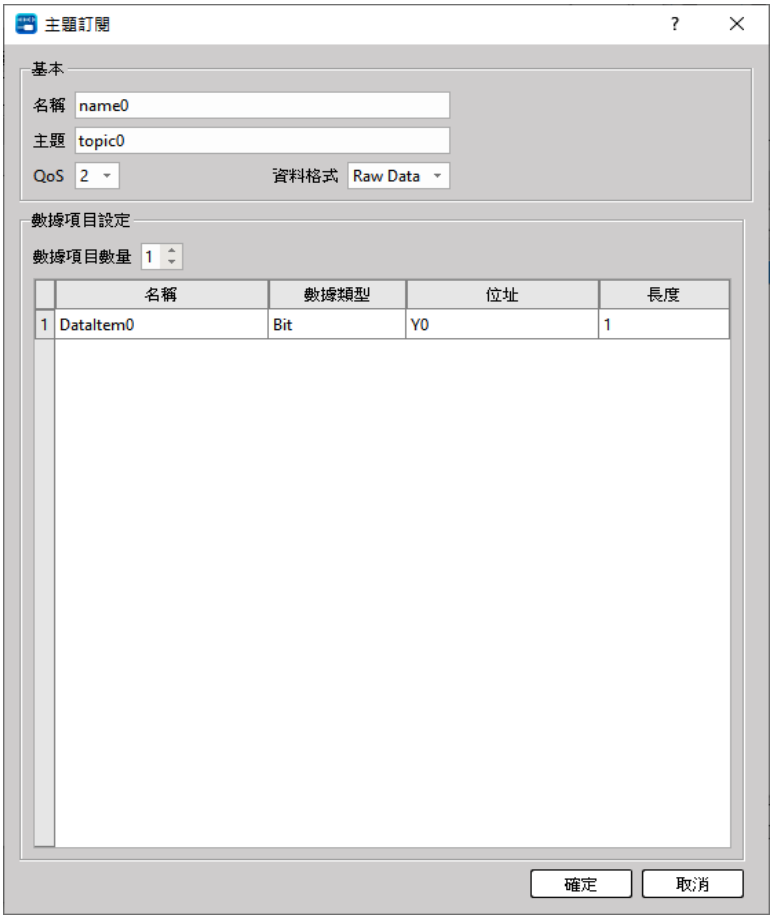


Page	Property	Description
Basic	Name	Set the name of the topic, which can be used as a description
	Topic	The topic used by MQTT to send messages. (Note: #, + are wild characters and cannot be used)
	Sending Mode	Cyclic: Send messages periodically, and you can set the interval in seconds.
		Value change trigger: A message will be sent only when the value of the data item changes.
	Keeping Message	Determines whether MQTT messages should be kept on the server. If checked, the server will save the subject message. Afterwards, if there are new subscribers, or

		previously disconnected subscribers reconnect, they will receive the latest reserved message.
	QoS	Set the Quality of Service of MQTT, which is divided into three levels: Grade Description 0: The message is sent only once, delivery is not guaranteed, and will not be repeated. 1: The message delivered at least once, guaranteed delivery, may be repeated. 2: The message is delivered exactly once, and it is guaranteed to be delivered and will not be repeated.
	Data Format	Raw Data
Data Item Setting	Number of Data Item	Sets the number of data items for this topic.
	Name	The name of the data item cannot be blank, and each item name must be unique, and the item name can be entered directly.
	Data Type	There are [bit], [16-bit BCD number], [16-bit integer], [16-bit positive integer], [32-bit BCD number], [32-bit integer], [32-bit positive integer], [32-bit floating point] and [Ascii] can be selected.
	URL	According to the data type, the user can set the address of each data item.
	Length	Users can determine the address length of this data item.

Topic Subscription





Page	Property	Description
Basic	Name	Set the name of the topic, which can be used as a description
	Topic	The topic used by MQTT to send messages. (Note: #, + are wild characters and cannot be used)
	QoS	Set the Quality of Service of MQTT, which is divided into three levels: Grade Description 0: The message is sent only once, delivery is not guaranteed, and will not be repeated. 1: The message delivered at least once, guaranteed delivery, may be repeated. 2: The message is delivered exactly once, and it is guaranteed to be delivered and will not be repeated.
	Data Format	Raw Data or JSON
Data Item Setting	Number of Data Item	Sets the number of data items for this topic.
	Name	The name of the data item cannot be blank, and each item name must be unique, and the item name can be entered directly.
	Data Type	There are [bit], [16-bit BCD number], [16-bit integer], [16-bit positive integer], [32-bit BCD number], [32-bit integer], [32-bit positive integer], [32-bit floating point] and [Ascii] can be selected.
	URL	According to the data type, the user can set the address of each data item.
	Length	Users can determine the address length of this data item.

5-5 Communication Configuration

It allows the user to configure the corresponding relationship between Register address and Modbud address in PLC.

Click [Project] → [Communication Configuration]

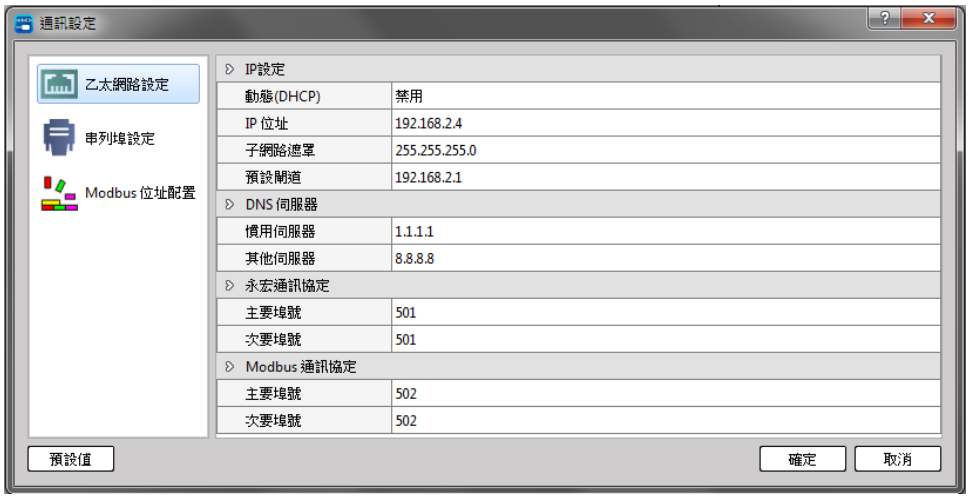


Fig. 66: Communication Configuration

Users can use communication settings to configure Ethernet, serial port and Modbus addresses.

5-5-1 Ethernet Port

The parameter allowing users to set up the network port on PLC.

Click [Project] → [Communication Configuration] → [Ethernet Port Setting]

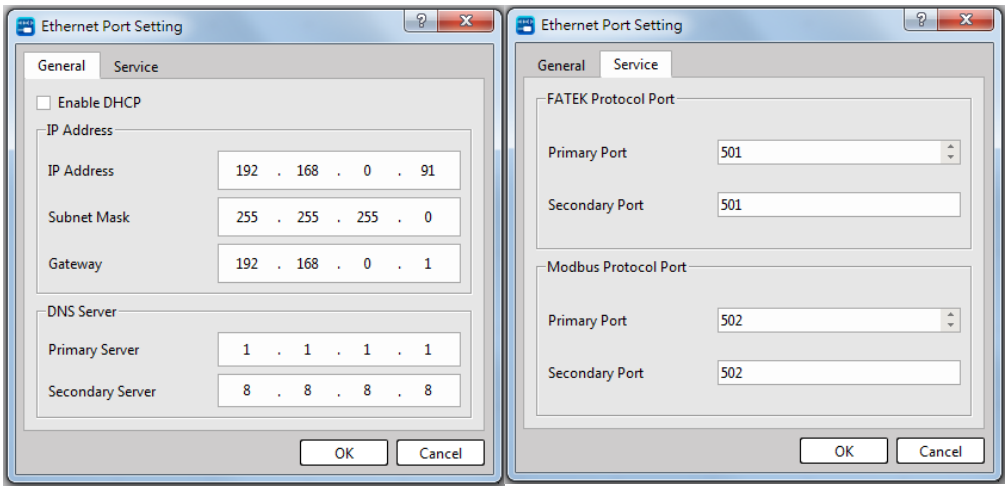


Fig. 67: Setting network station number

Page	Property	Description
General	Enable DHCP	Enable/disable dynamic host setting protocol
	IP address	Setting network address
	Subnet mask	Setting subnet mask
	Preset gate	Setting preset gate
	Regular server	Setting regular DNS server
	Other	Setting other DNS server
Service	Main connection port	Setting regular network connection port for FATEK communication protocol
	Other connection port	Setting fixed network connection port for FATEK communication protocol
	Main connection port	Setting regular network connection port for Modbus communication protocol
	Other connection port	Setting fixed network connection port for Modbus communication protocol

Table 17: Setting Network Station Number Table

3-1-1 Serial Port

Provides users with setting the parameters of the serial port on the PLC.

Click [Project] → [Communication Configuration] → [Serial Port]

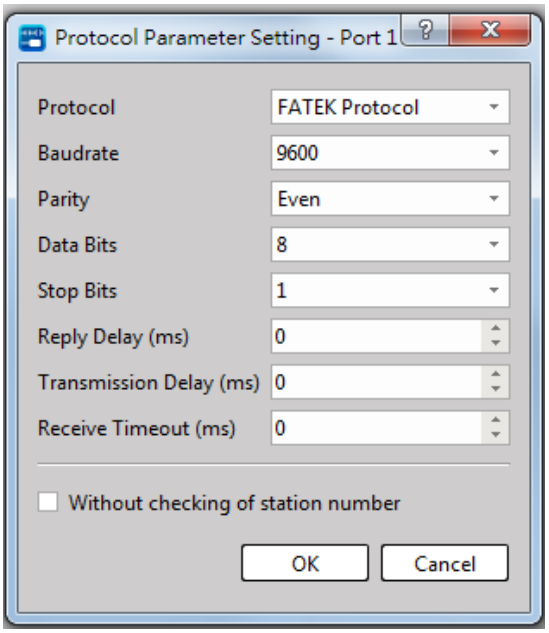


Fig. 68: Setting serial port parameter

頁面	屬性	敘述
Port1 Port2	Basic Settings_Baud Rate	Setting Baud Rate
	Basic Settings _ Check bit	Setting Check bit
	Basic Settings _Data bit	Setting Data bit
	Basic Settings _Stop bit	Setting Stop bit
	Basic Settings _ Response Delay Time (ms)	Setting Response Delay Time
	Basic Settings _Sending Delay Time (ms)	Setting Sending Delay Time
	Basic Settings _ Response error time out (ms)	Setting Response error time out
	Advanced Settings _Check Station No.	Whether to check the station number
	Advanced Settings_ Communication Protocol	Setting Communication Protocol
Station No.	Station No. Setting	Scope: 0-254

Table 18: Serial port parameter setting

5-5-3 Modbus Device Allocation

It allows the user to configure the corresponding relationship between Register address and Modbud address in PLC.

Click [Project] → [Communication Configuration] → [Modbus Device Allocation]

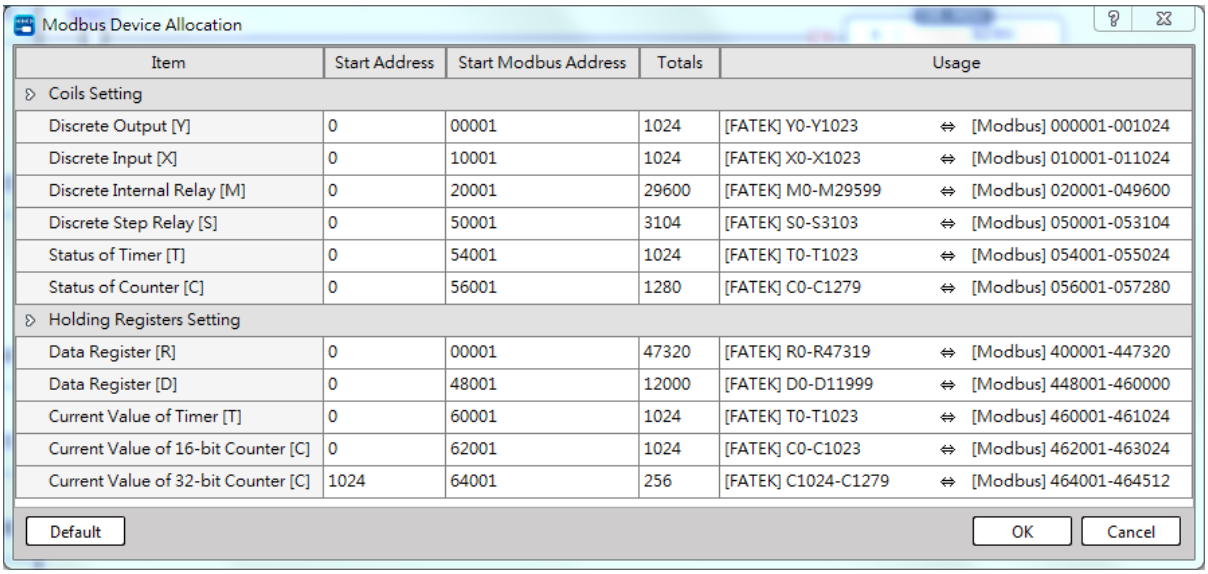


Fig. 69: Modbus address preset configuration

The preset configuration enables all of the Register addresses on PLC to communicate with the Modbus address. If the user wishes to reduce the number of Register used for communicating with Modbus address or to change the corresponding address, then the user may edit its own configuration type.

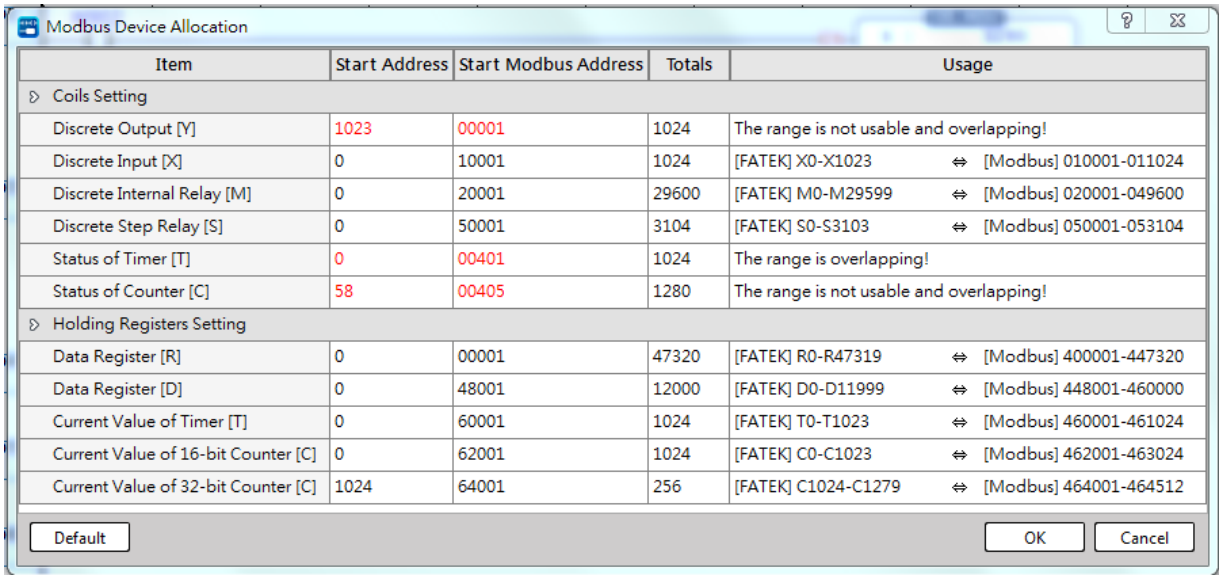


Fig. 70: Displaying setting error

If the address created by the user is incorrect, then the system will indicate the incorrect portion in red letter and will also display the error message.

<table>
<tr><th>Type</th><th>Description</th></tr>
<tr><td>Item</td><td>Explain the type of the contact that will be listed in this column.</td></tr>
<tr><td>Home address</td><td>Create the home address that will correspond to the contact or the Register (preset as zero).</td></tr>
<tr><td>Modbus home address</td><td>Create the Modbus home address that will correspond to the contact or the Register.</td></tr>
<tr><td>Sum</td><td>Create the Modbus sum (preset as maximum value) that will correspond to the contact or the Register.</td></tr>
<tr><td>Servicing status</td><td>Under normal condition, it displays the Modbus address status that will correspond to the contact or the Register. If the setting is wrong, then it will display the corresponding error.
<table>
<tr><th>Error message</th><th>Description</th></tr>
<tr><td>Is such scope overlapped?</td><td>Modbus address is overlapping.</td></tr>
<tr><td>Such scope cannot be used!</td><td>The contact or the Register address is wrongly created or exceeds the scope.</td></tr>
<tr><td>Such scope cannot be used and is overlapped!</td><td>Modbus address is overlapped. In the meantime, the contact or the Register address is wrongly created or exceeds the scope.</td></tr>
</table>
</td></tr>
</table>

Table 19: Items required for Modbus address configuration

6

Creating Program

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the program creating procedure that will be required for editing the Ladder Diagram.

6-1 Main Program and Sub-Program Unit Management

The editing window is divided into Master Program Field and Sub-program Field. It presents orderly organized program architecture for users to carry out the editing and the checking more easily. Both units are operated in the same way. Described below is the operation procedure of each program unit:

6-1-1 Creating new program unit

During the planning, the programs can be categorized for editing in order to present orderly organized program architecture. With such kind of program unit adding function, a well-defined architecture will be presented when planning the program.

You may click [Project] → [Ladder Diagram] → [Main Program] → [Right mouse button] → [Main Program Add] in project management toolbar, or you may select [Main Program Add] from the scroll-down menu in function toolbar icon.

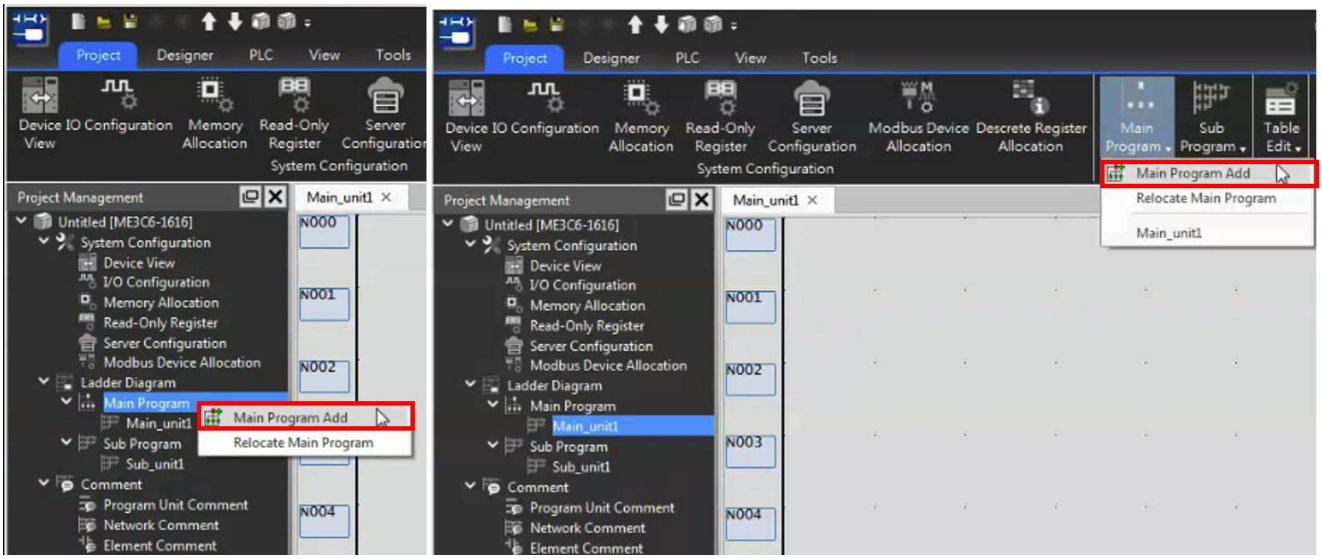


Fig. 71: Add Main Program Unit

6-1-2 Deleting program unit

If the created program unit is no longer required, you may delete it with the program unit deleting function. In this case, you may move the cursor to the unit tag and then click the right mouse button → [Delete] and then such program unit will be deleted.

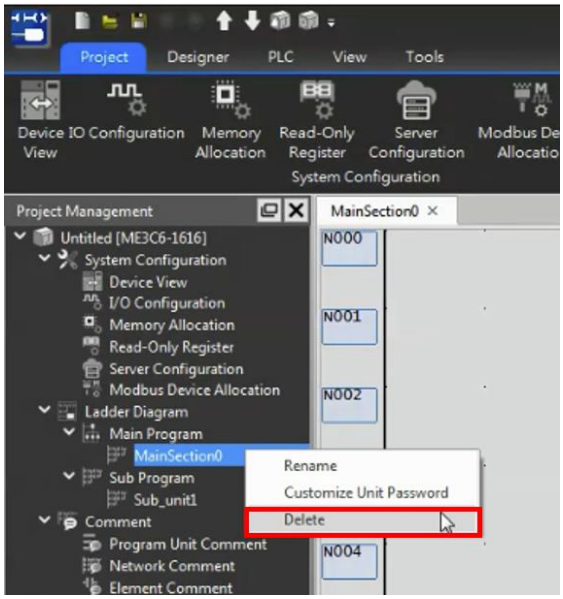


Fig. 72: Deleting program unit

6-1-3 Program unit relocating sequence

You may click [Project] → [Ladder Diagram] → [Main Program] → [Right mouse button] → [Relocate Main Program] in project management toolbar, or you may select [Relocate Main Program] from the scroll-down menu in the toolbar icon.

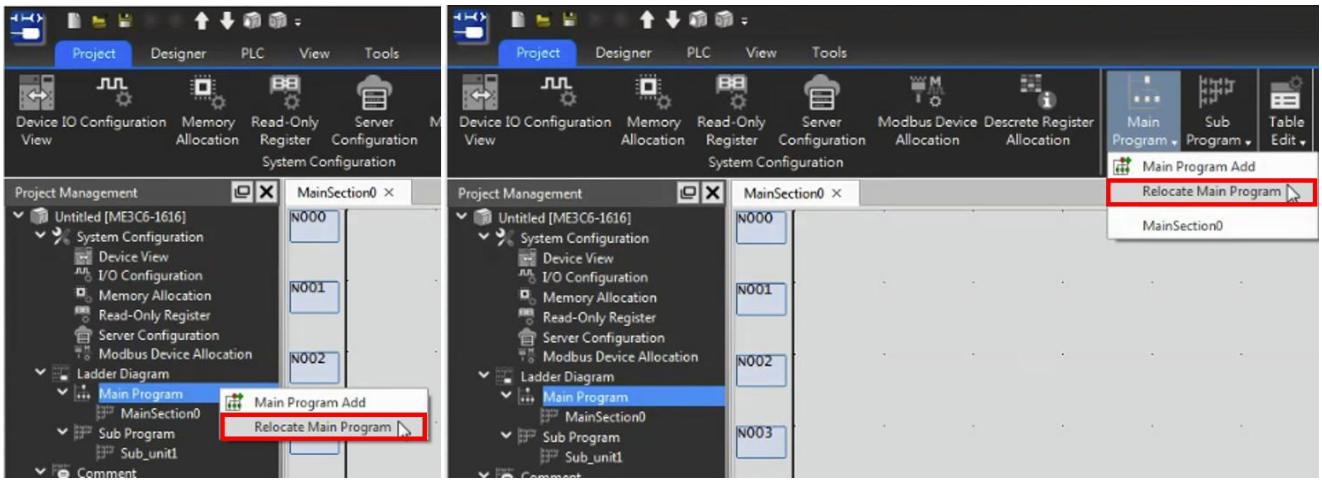


Fig. 73: Relocating Master Program Unit

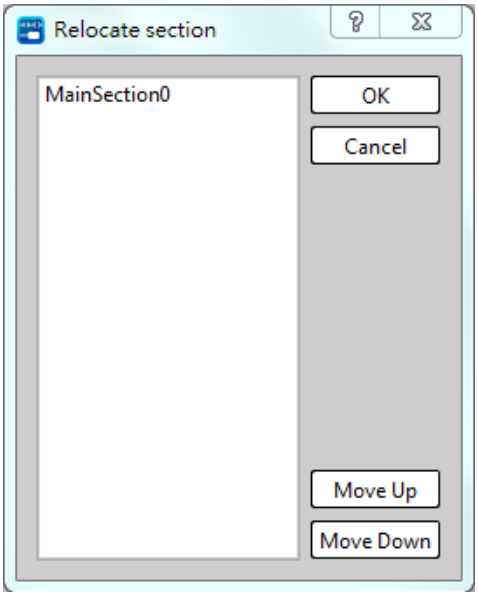


Fig. 74: Relocating Master Program Unit_2

Press [OK], and you may change the array of the program unit in the project window.

The [Relocate Main Program] of Sub-program can be adjusted in the same way as the Main Program. In this case, simply select the function from the Sub-program.

6-1-4 Changing program unit name

After creating the program unit name, you may change the program unit name. Click [Test Example]→ [Ladder Diagram] → [Main Program] → [Main Section] in project management window and then press the right mouse button → [Rename]:

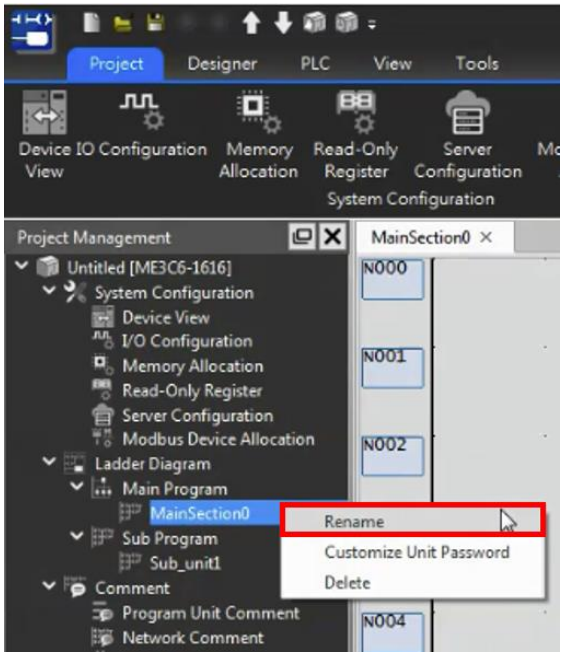


Fig. 75: Changing program unit name

6-1-5 Inputting program unit comment

If several program units are to be processed, it will be required to create a comment for the respective program unit for the convenience of checking and changing later on.

Inputting comment operation method in dedicated Comment Field

Click [Project] → [Comment] → "Program section" → "Double-click left mouse button" in function toolbar, or you may click toolbar icon and then the [Program Unit Comment] input field will appear.

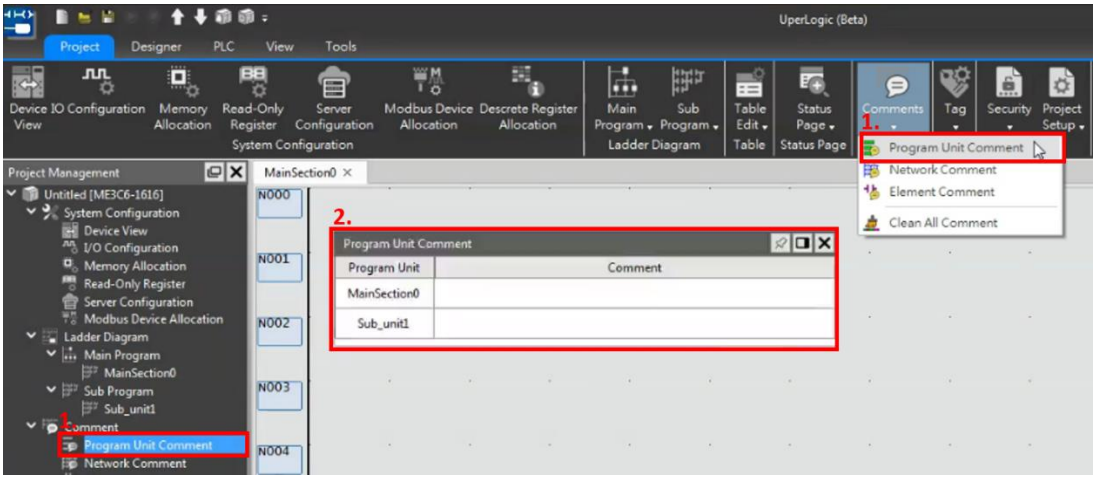


Fig. 76: Program unit comment

Input the comment text. Press [OK] and the comment will be displayed at the topmost side of such Ladder Diagram.

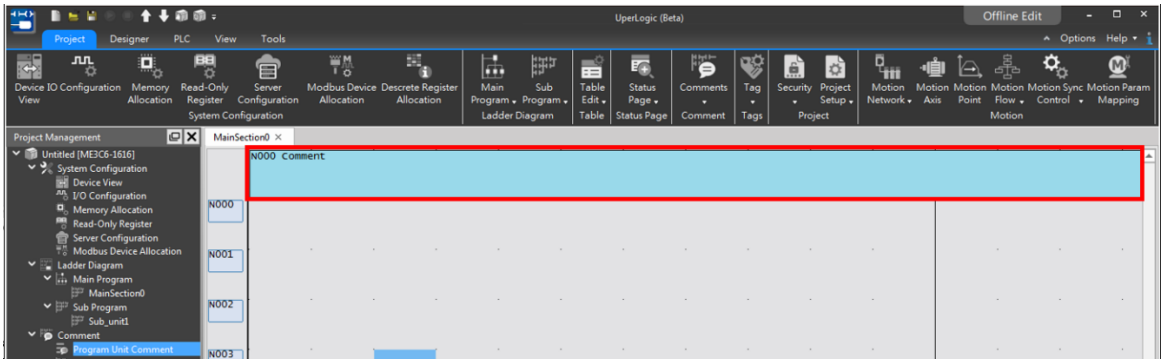


Fig. 77: Displaying comment at topmost side of Ladder Diagram

Operation method for inputting comment by selecting Single Program Unit

In the Ladder Diagram program field, click the right mouse button and the function menu will appear for selecting the desired [Network Comment] function:

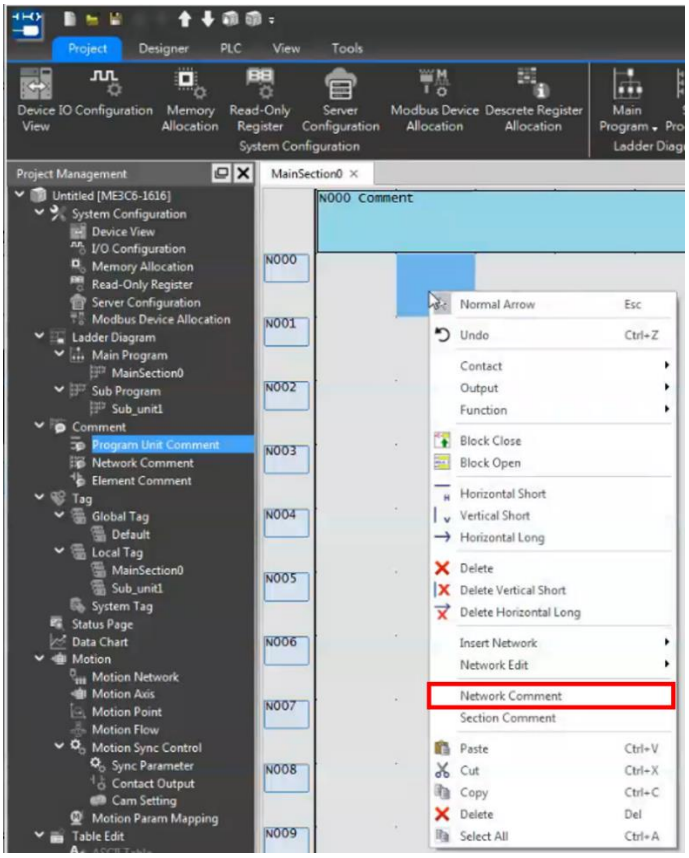


Fig. 78: Adding unit network comment

You may click [Project] → [Comment] → [Network Comment] in function toolbar and the program comment input field representing the respective unit will appear.

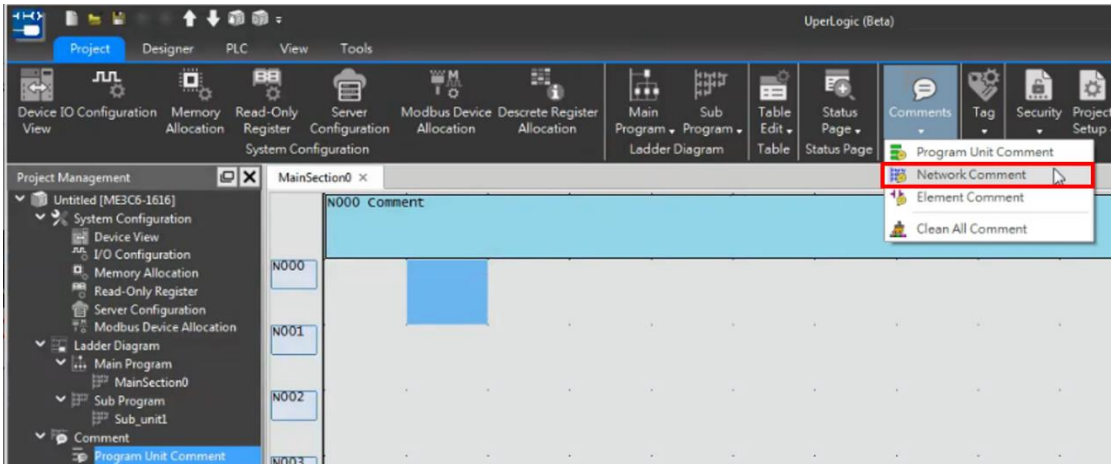


Fig. 79: Network Comment

Press [OK] to complete the inputting of network comment.

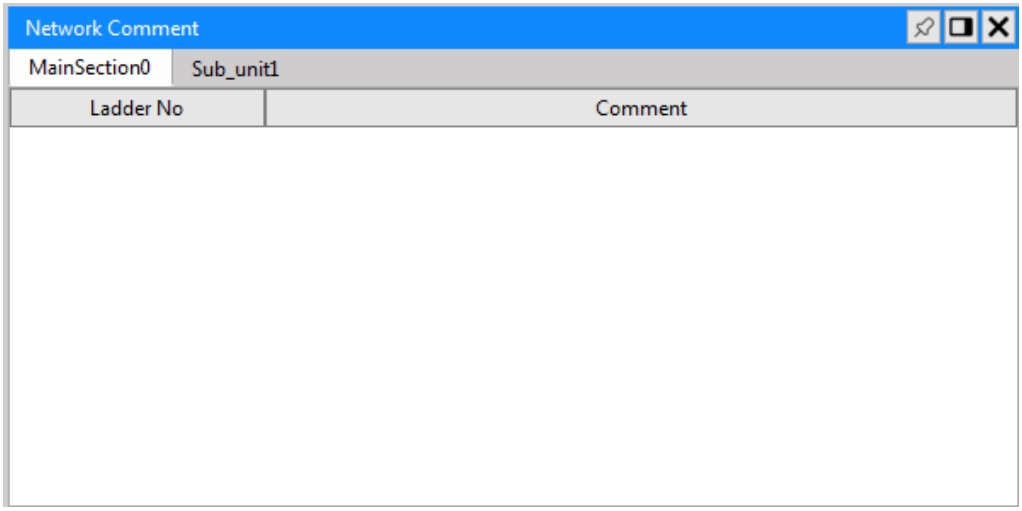


Fig. 80: Inputting network comment

Press [OK] and the comment will be displayed at upper side of the program.

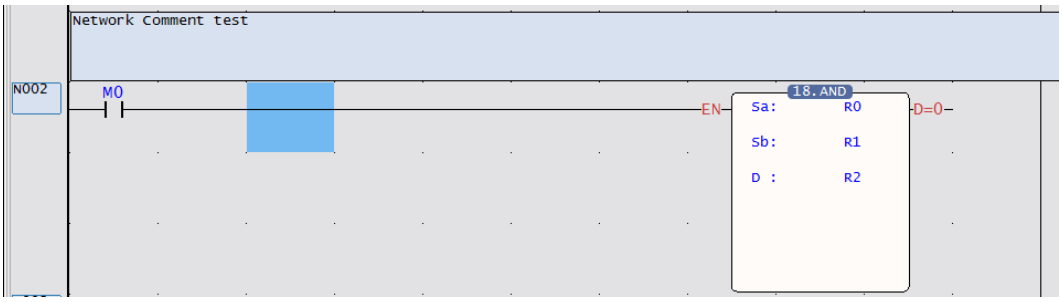


Fig. 81: Displaying comment at upper side of the program

6-2 Ladder Diagram (LD)

The most essential part of such application program is the compilation of the Ladder Diagram related program. For this purpose, it also provides the well-organized window in order to display relevant messages. Described below is its operation method:

6-2-1 Display elements

Window operation

It provides a number of window-based ladder program pictures for showing the programs being created for different sections at the same time for users to execute the compare, copy and edit functions.

1. Creating multi-ladder window

Each project comprises Master Program Section and Sub-program Section in which, each section will be allowed for adding the desired program tab, as per the figure below. By clicking "Switch page" in the "Tab," it allows the user to switch between the program section of each page.

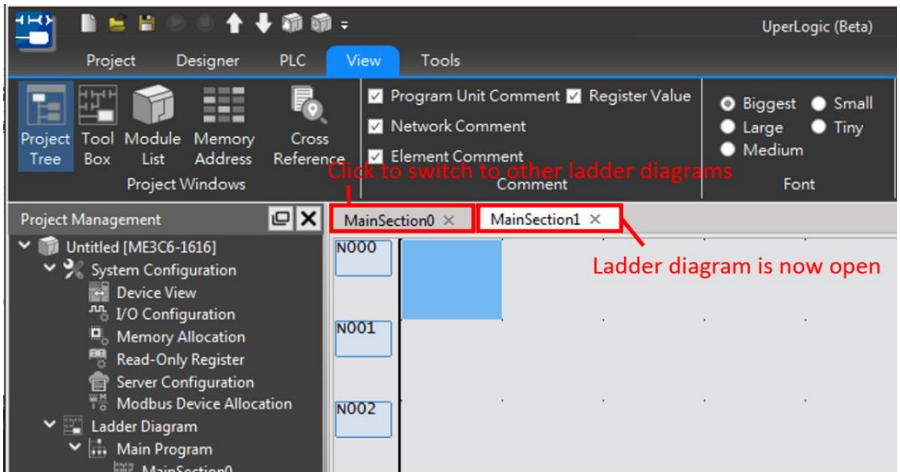


Fig. 82: Creating multi-ladder window

2. Arraying of ladder window

- Arraying of cascade display:

Click [Window] → [Cascade]

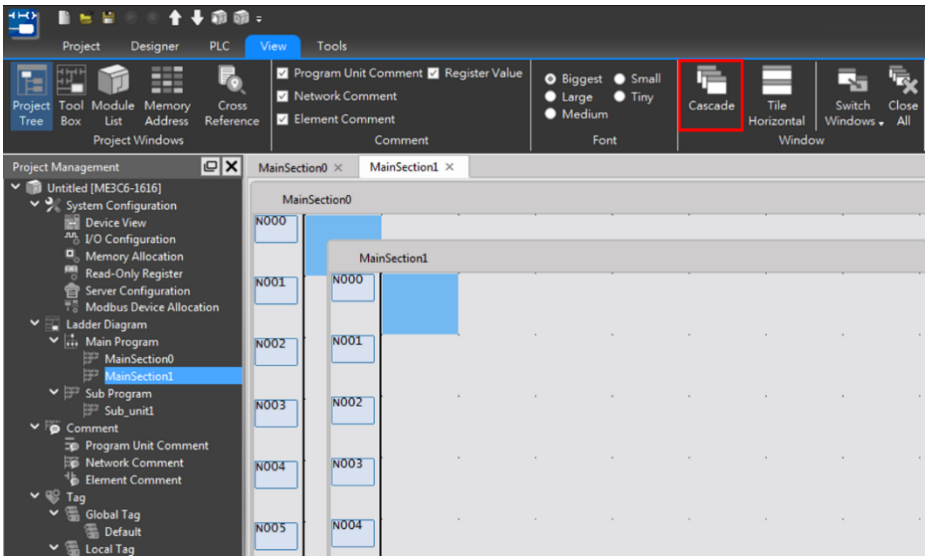


Fig. 83: Cascade window

- Arraying of tile horizontal display:

Click [Window] → [Tile Horizontal]

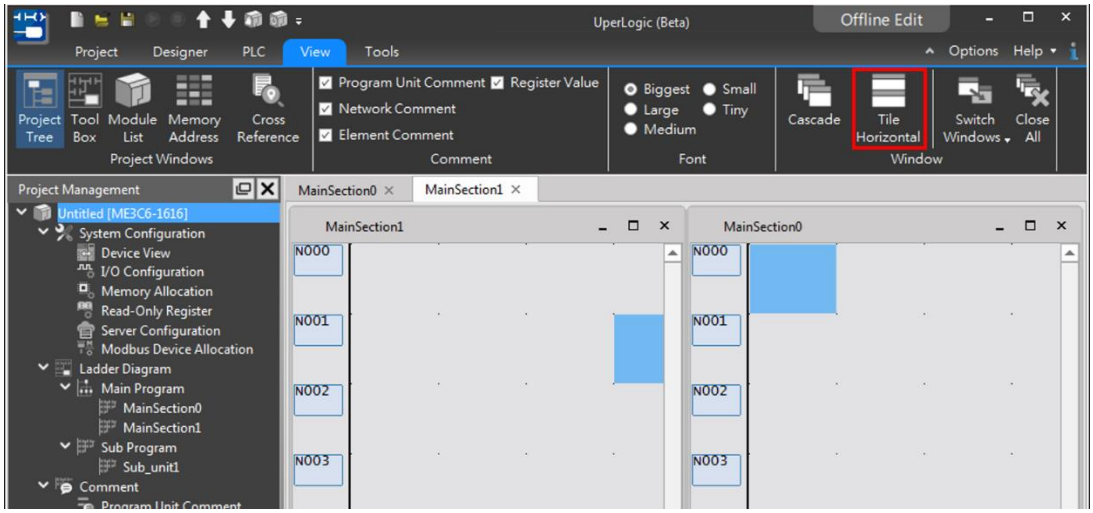


Fig. 84: Tile Horizontal display

6-2-2 Component operation

Click [Designer] → [Ladder Diagram] in function toolbar, and the component items from A Contact to vertical line will be displayed. Indicated in the figure below is the arraying method of the respective contact component in the company panel, as below:

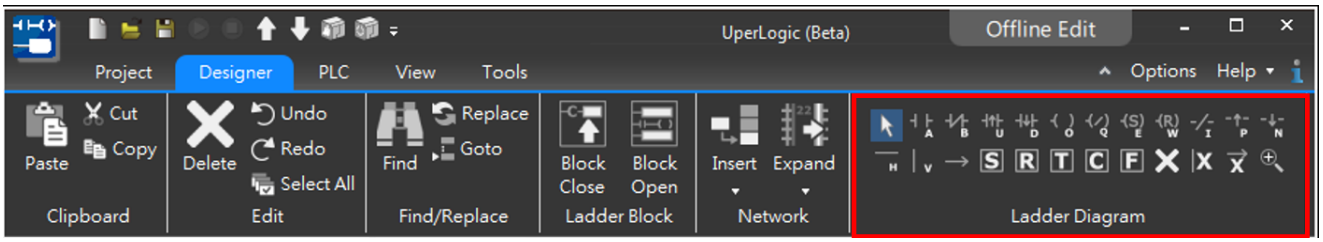


Fig. 85: Ladder Diagram component operation

Select the contact component that will be imported. Drag such component to Ladder Diagram program section and it will be displayed. Described below is the operation procedure:

Input contact component

Click [Designer] → [Component Panel] → [A Contact]  in function toolbar.

You may also move the cursor to the Ladder Diagram program section and then click the right mouse button and the Pop-up Menu will appear as the figure below. After that, select [Contact] → [A Contact]:

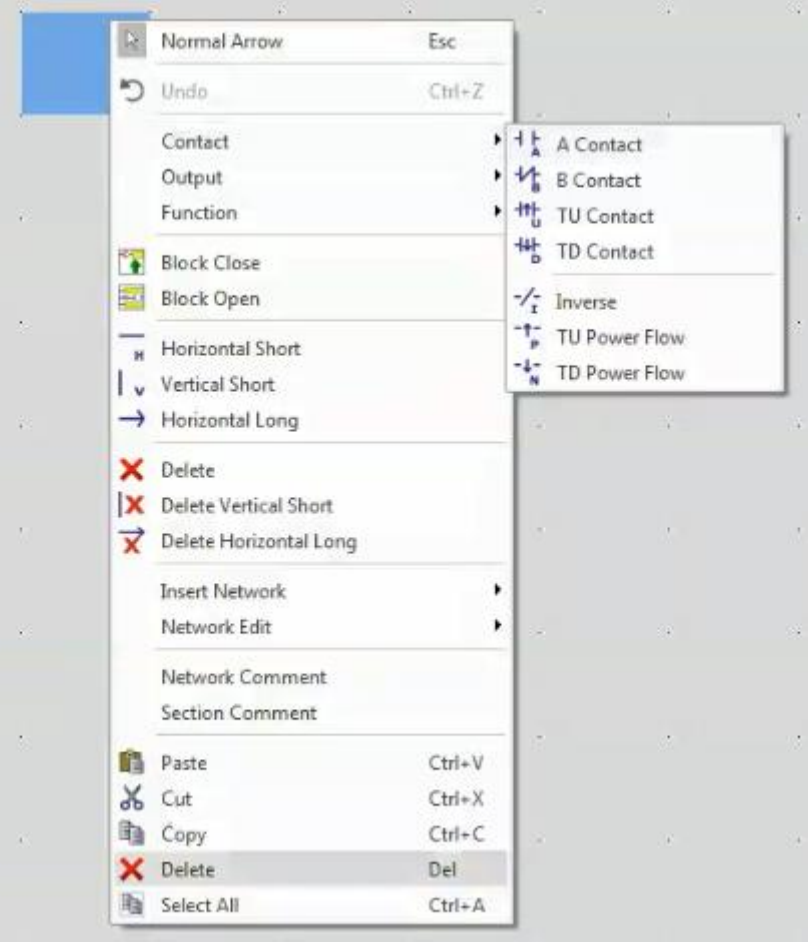


Fig. 86: Inputting contact component

Click the desired input position in the Ladder Diagram program section, and the [Element Edit] box will appear:

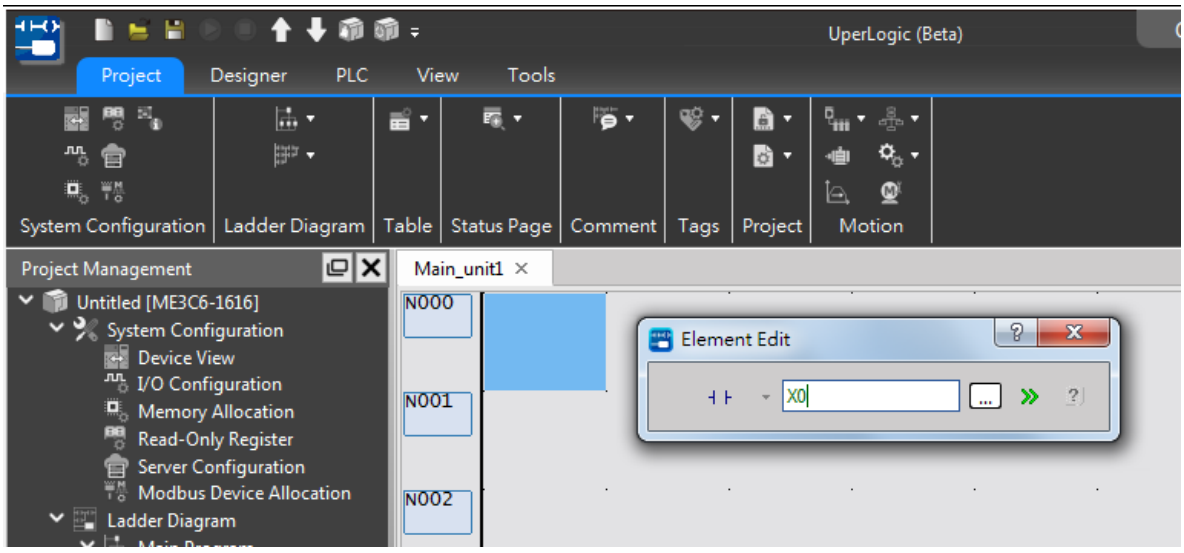


Fig. 87: Inputting component number

After inputting "X0", press "ENTER" key and the picture will be displayed as below:

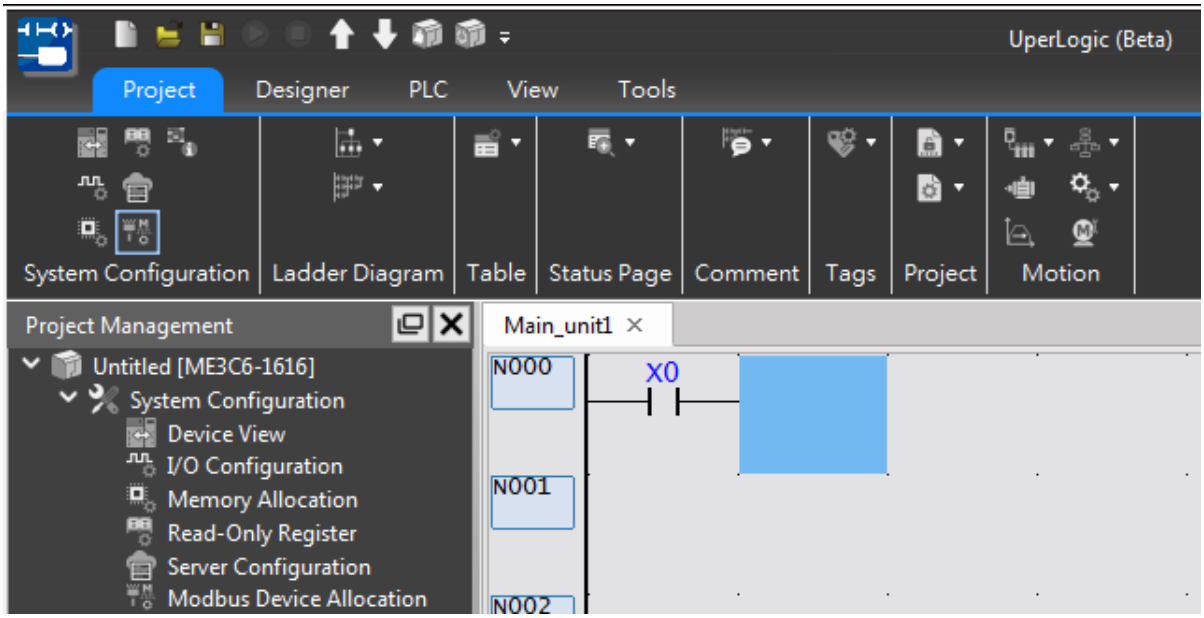


Fig. 88: Complete component inputting

Next, move the cursor to the input position in the Ladder Diagram program field. After that, click the left mouse button once and then input "AX0" or "X0A" with keyboard and the figure above will appear.

In the meantime, press "Shift" + "A" keys to show the webpage where A Contact component will be displayed in program section only without inputting the component number, as per the figure below:

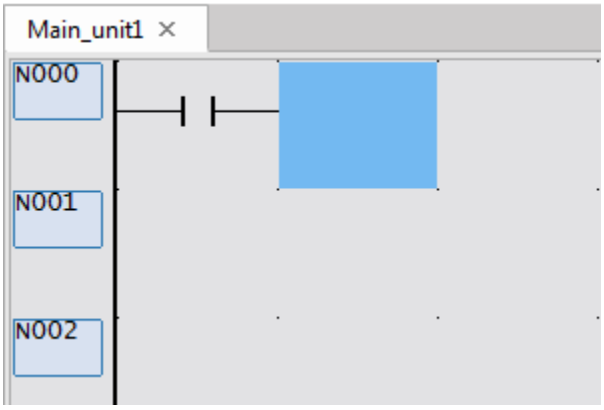


Fig. 89: Page without inputting component number

Changing the type or the number of contact component

To change the type of the contact component being entered, select the contact type to be changed; for example, select B Contact from the component panel, and then click the left button on the contact component to be modified in the ladder diagram program section, and the input number box of the B contact element will appear.

To change the component number, move the cursor to the component to be changed in the program section and then enter the new number or press "SPACE" key to show the edit window. After that, input the new number as per the figure below.

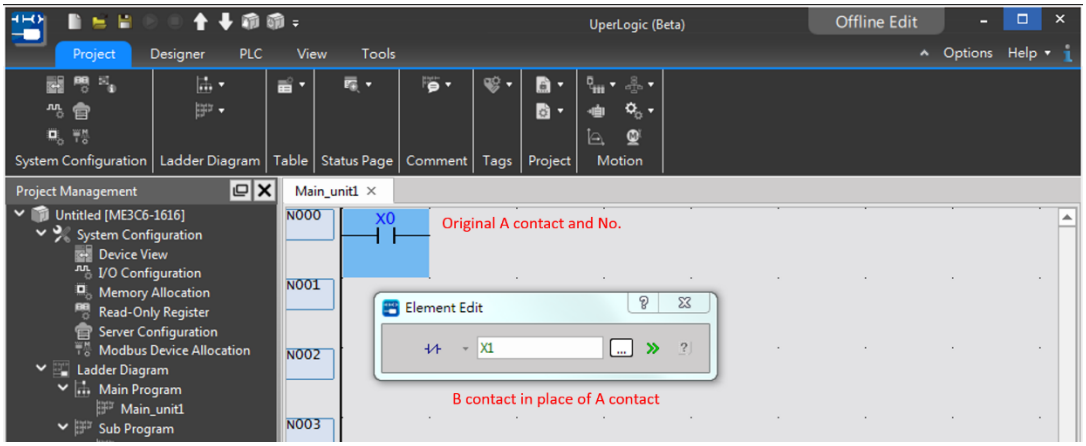


Fig. 90: Component number changing method

You may also key the number in the "Element Edit" box at B Contact, such as "X1". After that, the "X0" of the original A Contact will be revised as "X1" of B Contact.

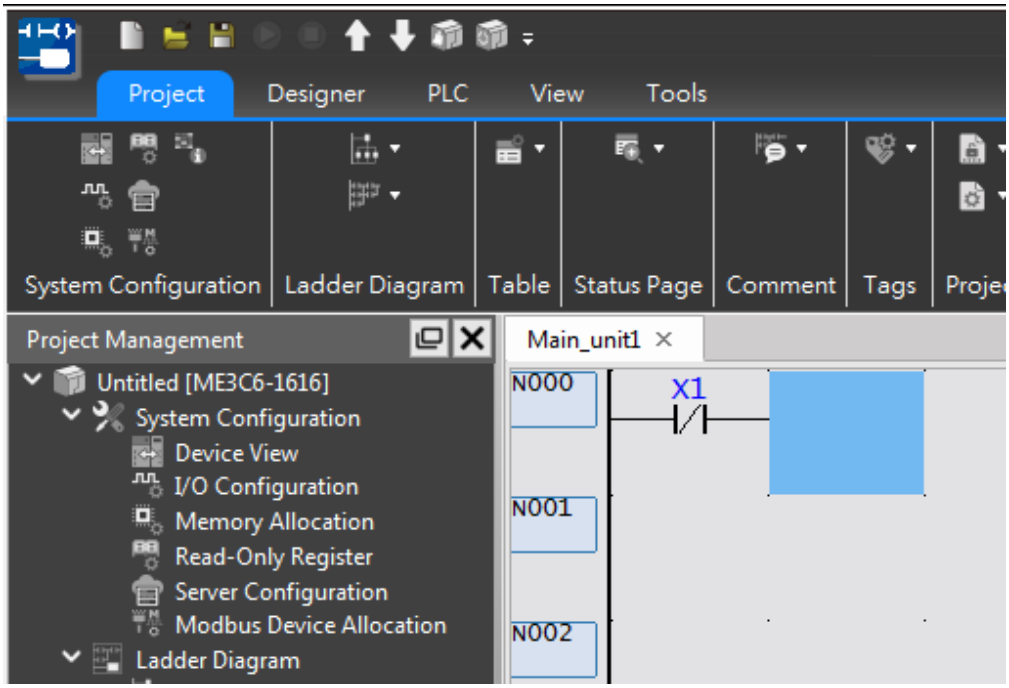


Fig. 91: Component number changing result

Deleting contact component

In component panel, you may select deletion icon 

or move the cursor to the Ladder Diagram program section. Next press the right mouse button to display the Pop-up Menu where you will be allowed to select the [Delete] function. At this time, the cursor serves as the deleting function; or you may

click [X1] of B Contact component and then press "Delete" key on the keyboard and "X1" will be deleted.

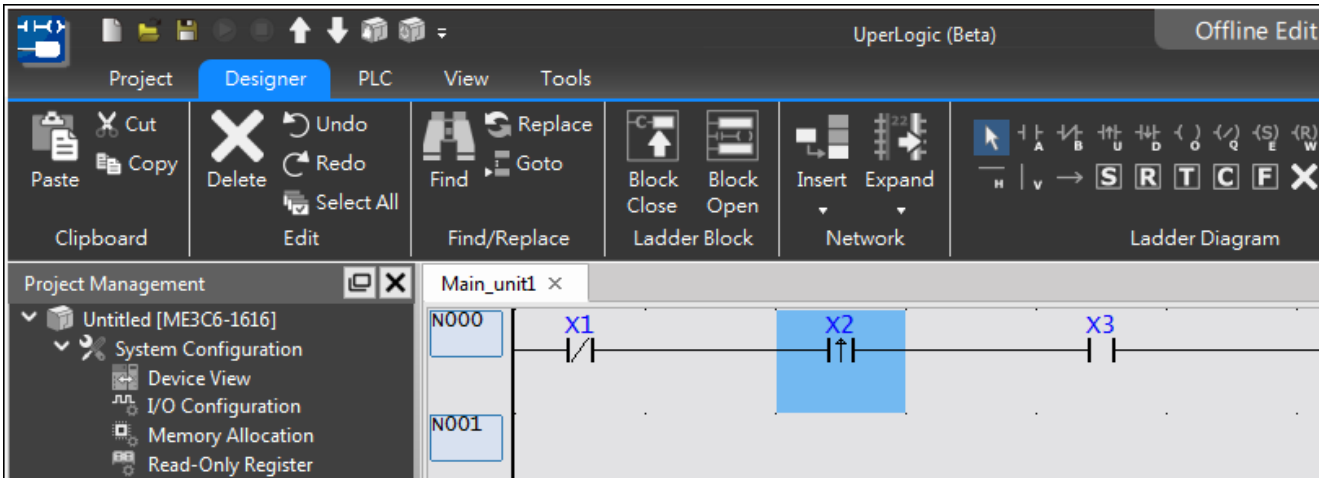


Fig. 92: Selecting the component to be deleted

Press "Delete" key on the keyboard, it will be deleted directly.

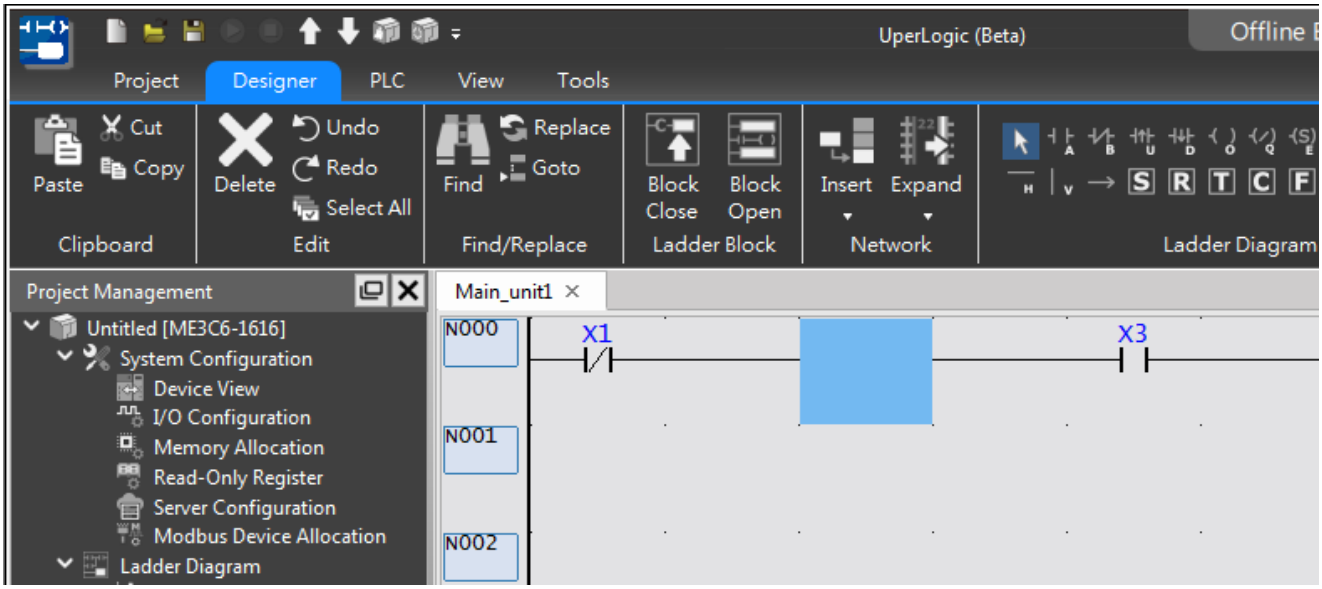


Fig. 93: Deleting component by clicking Delete

6-2-3 Operating by instructions

The UperLogic also provides convenient function instruction set. You may select the required instruction by clicking [Check] → [ToolBox] → [Set/Reset] → [Timer/Counter] → [Function Instruction] in function toolbar and drag the module to the configuration position by clicking the left mouse button. In the meantime, you may also click the component panel icon  which can be used as the function instruction option.

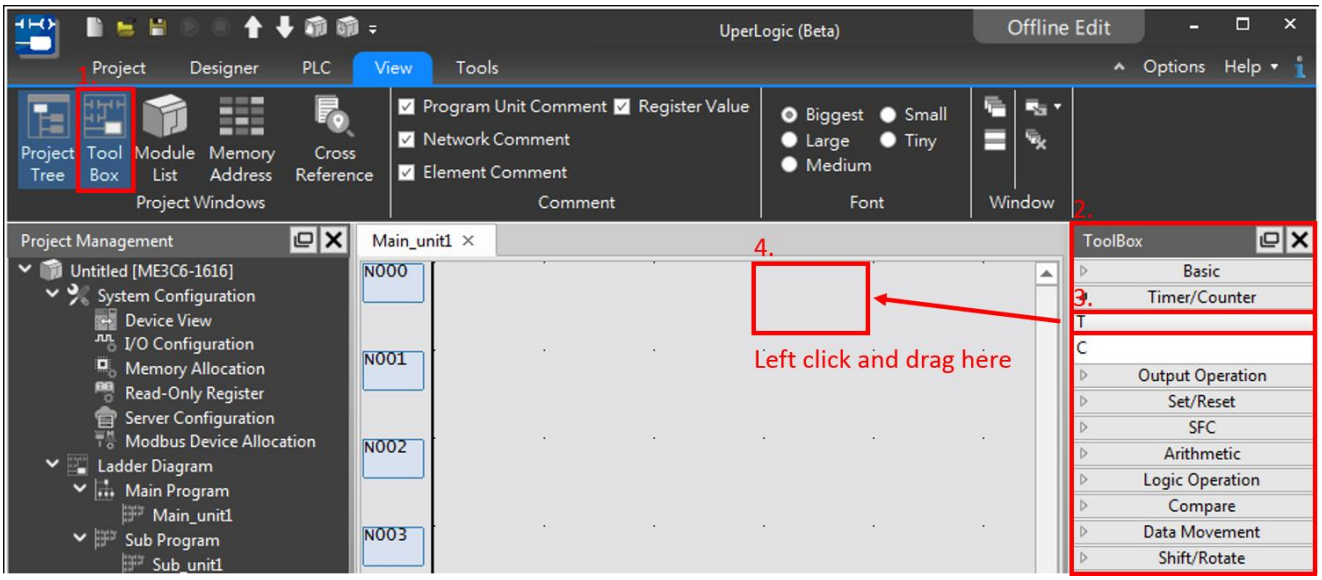


Fig. 94: Dragging Function instruction

After releasing the left mouse button, the function instruction will appear. After inputting the parameter setting, press [OK] to complete the configuration.

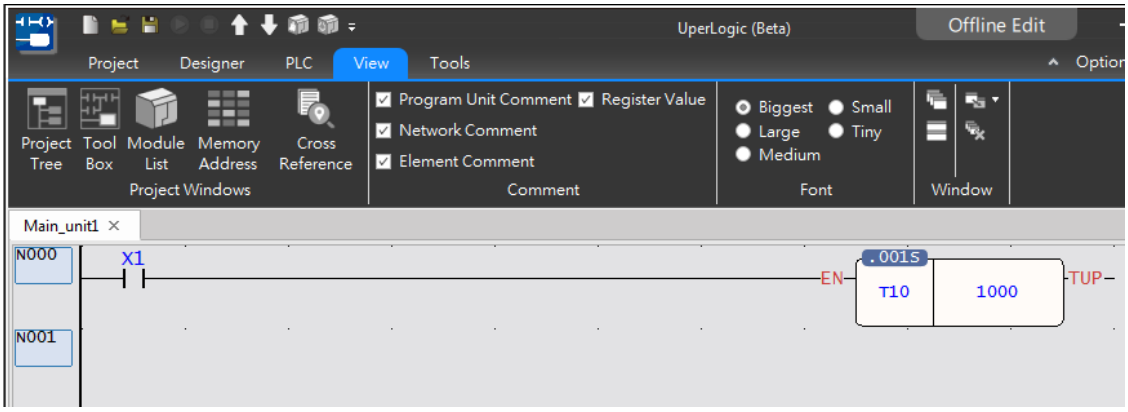


Fig. 95: Completing component dragging

Input Function instruction

If users want to use different function instructions, for example, when setting a fixed time timer, it is necessary to control the timing start, when the timing ends, and how much value the timing accumulates, etc., the operation steps can refer to the following instructions:

To set up a fixed-time Timer between X1 contact and Y0 output, you may input the Function instruction to carry out the setting:

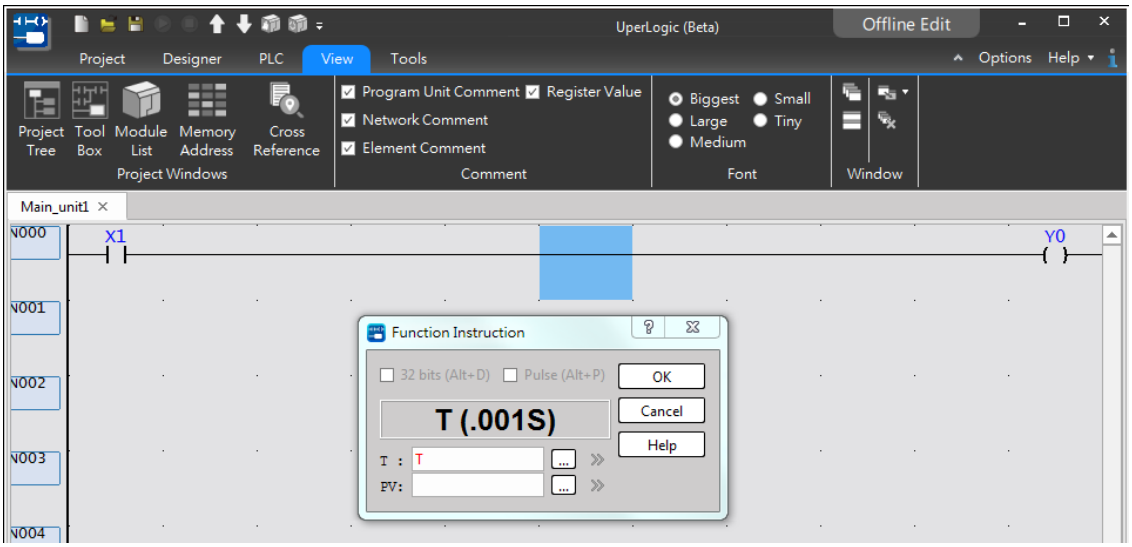


Fig. 96: Setting by inputting Function instruction

You may click [Designer] → [Ladder Diagram] → select timer function icon from component panel in function toolbar. At this time, the cursor is serving as the Timer. In the Ladder Diagram program section, click the space between X1 and Y0 and the "Timer" Function instruction setting dialog box will appear.

In the Ladder Diagram program section, you may also click the space between X1 and Y0 and then press "Shift" + "T" quick keys and the "Timer" Function instruction setting dialog box will appear:

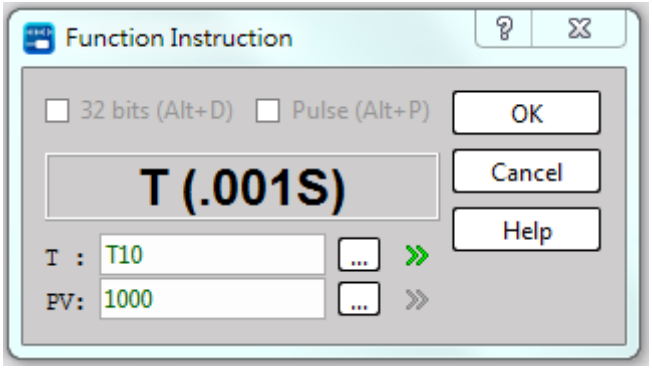


Fig. 97: "Timer" Function instruction setting dialog box

Key "T10" in "T" column and key "1000" in "PV" section to complete the fixed-time setting for the Timer:

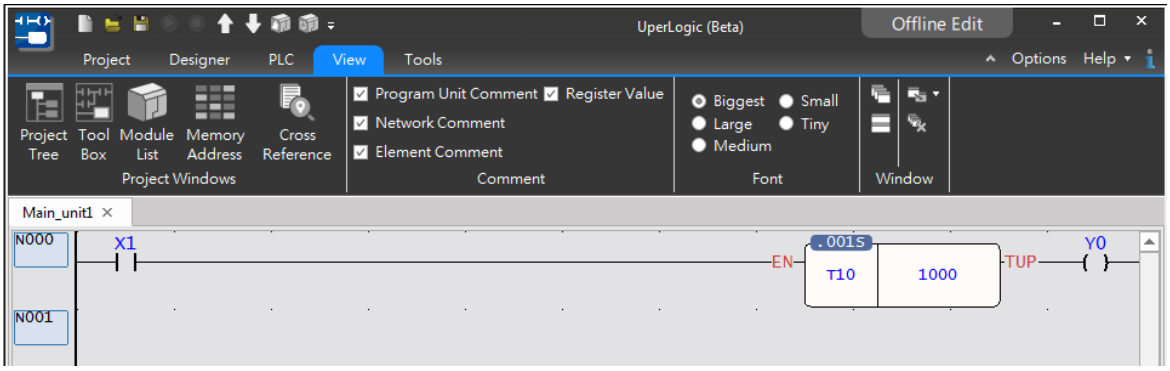


Fig. 98: Completing the fixed-time setting for Timer

Deleting functional component

You can select the delete icon in the component panel, or click the right button in the ladder diagram program section to display the Pop-up menu to select the [Delete] function, and the cursor represents the delete function; or directly click the function component, and then press the keyboard "Delete" key, you can also delete it directly

6-2-4 Network operation

In the Ladder Diagram program section, the network is an essential element that is designed with a variety of operation methods. Described below is the network operation method in the program section.

Copying single network

Point the cursor at the network to be copied. For example, network "N009" per the figure below:

Fig. 99: Replicating single network

Press the right mouse button to show the Pop-up Menu and then select [Copy] or press "Ctrl" + "C" quick key and then execute the copy instruction. Next, press the right mouse button to show the menu for selecting [Paste]; or press "Ctrl" + "V" quick key to execute the paste command. In this way, it allows the user to complete the single network copying:

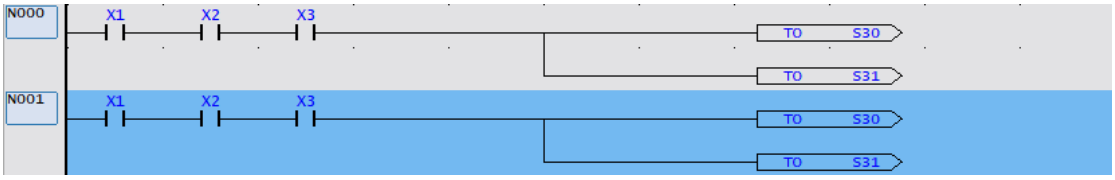


Fig. 100: Complete the copying of single network

Copying multiple networks

To copy the connected networks coded in N001 to N003, the user may use the mouse to scroll the selected N001 to N003 or press "Shift" key and then click Network N001 to N003, as per the figure below:

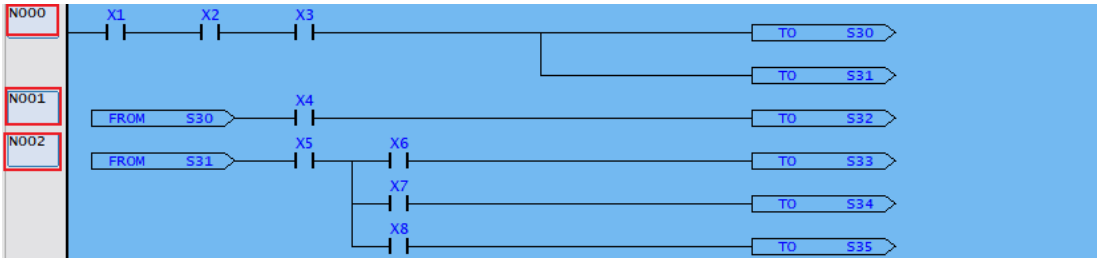


Fig. 101: Copying multiple networks

Execute the copying and pasting actions to complete the copying of networks that are connected with each other. To copy the non-connected networks such as N001, N003 and N005, highlights Network N001 with mouse, press "Ctrl" simultaneously and then highlights N003 and N005 to achieve the following result:

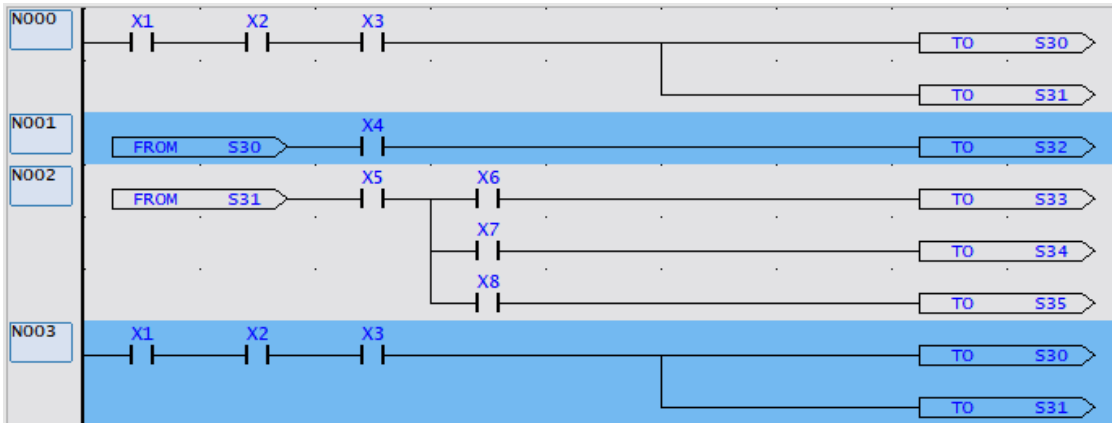


Fig. 102: Completing the copying of multiple networks

Execute the copying and pasting steps to complete the non-connected network copying.

Copying the network between different projects

First, open the UperLogic application program and then open Project-1 file. Likewise, open the UperLogic application program again and then open Project-2 file. In this way, you will be allowed to open two units of UperLogic application program windows. In Project-1, highlight Network N001 and press the right mouse button to show the Pop-up Menu and then select [Copy] or press "Ctrl" + "C" quick keys to copy the desired network. Next, move the cursor to the pasting position in Project-2 and then press the right mouse button to show Pop-up Menu. Next, select [Paste] or press "Ctrl" + "V" quick key to paste the network. In this way, it allows the user to complete the copying of network between different projects.

Deleting network

Highlight the Network Number to be deleted and then click [Designer] → [Delete] in function toolbar, or press "Delete" quick key and it will be deleted directly.

Editing network lines and rows

In the Ladder Diagram, the program section is composed of multiple Network Numbers. Through the lines and rows of the Network Number, an orderly configured program is presented that will be easier for maintenance. Further, other functions are also designed for the network lines and rows to achieve more convenient and quicker program compilation. Described below is the operation method of these functions:

Expand network to 22 lines

If multiple contacts are created that will be insufficient for the original 11 lines in the network, it can be expanded to 22 lines. By doing so, move the cursor to the network where 11 lines will be expanded to 22 lines and then click [Designer] → [Network] → [Expand to 22 lines] in function toolbar; or you may press the right mouse button to show Pop-up Menu and then click [Edit Network line/row] → [Expand to 22 lines].

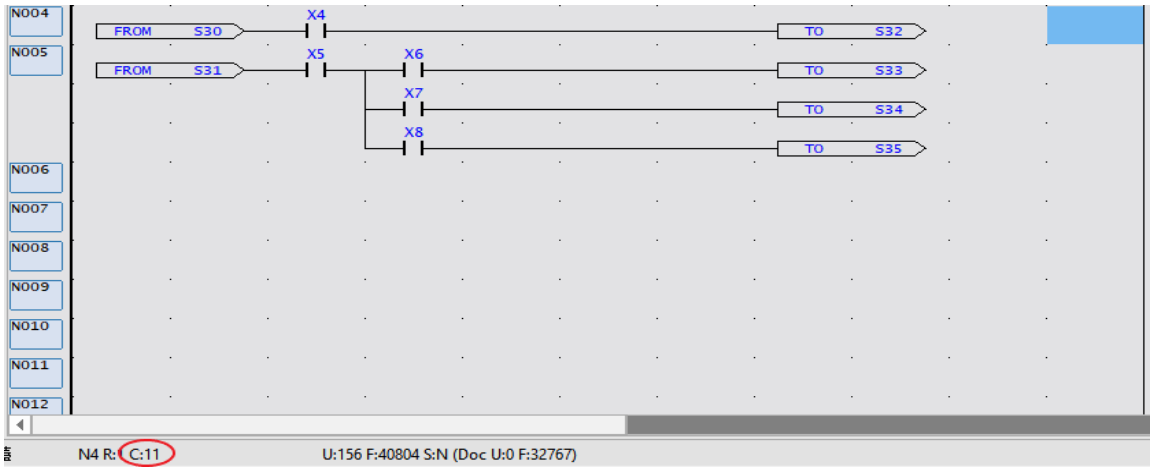


Fig. 103: Before expanding to 22 lines

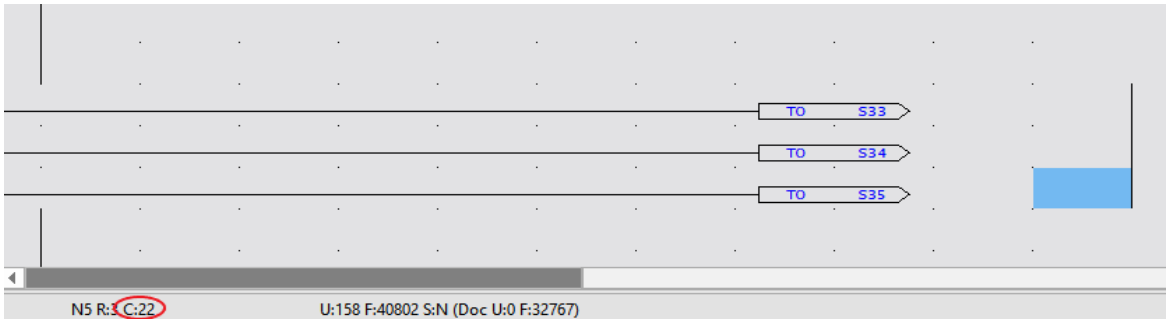


Fig. 104: After expanding to 22 lines

Compressing network to 11 lines

Move the cursor to the network where 22 lines will be compressed to 11 lines and then click [Designer] → [Network] → [Compress to 11 lines] in function toolbar; or you may press the right mouse button to show Pop-up Menu and then click [Edit Network line/row] → [Compress to 11 lines].

Vertical expanding

To expand the vertical distance between the upper and lower lines of X1 and X3, execute per the figure below:

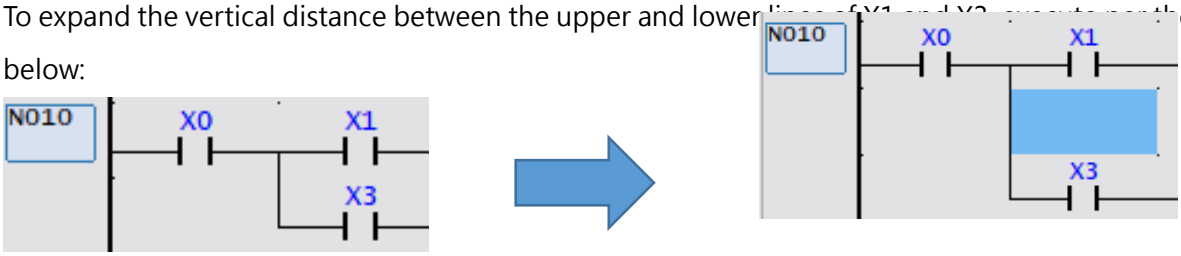


Fig. 105: Expanding vertical distance

Click X3 with cursor:

Click [Designer] → [Expand Network] → [Vertical Expand]; or press the right mouse button to show Pop-up Menu and then click [Edit Network line/row] → [Vertical Expand] to complete the vertical expanding.

Vertical compressing

To compress the vertical distance between the upper and lower lines of X1 and X3, execute per the figure below:

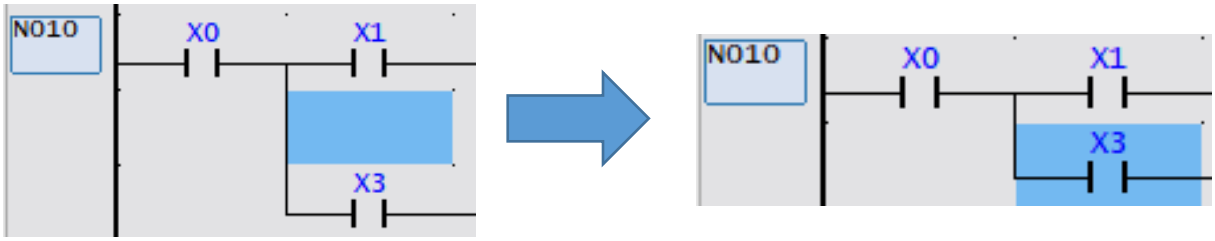


Fig. 106: Compressing vertical distance

Then the cursor clicks the blank row to be compressed between X1 and X3:

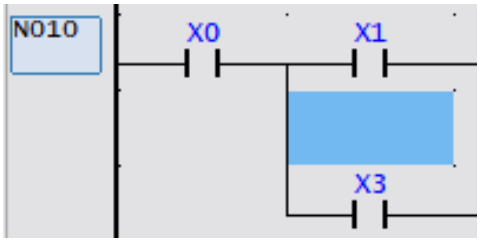


Fig. 107: Clicking the empty rows to be compressed

Click [Designer] → [Expand Network] → [Vertical Compress]; or press the right mouse button to show Pop-up Menu and then click [Edit Network line/row] → [Vertical Compress] to complete the vertical compressing.

Horizontal expanding

To expand the distance between X0 and X3:

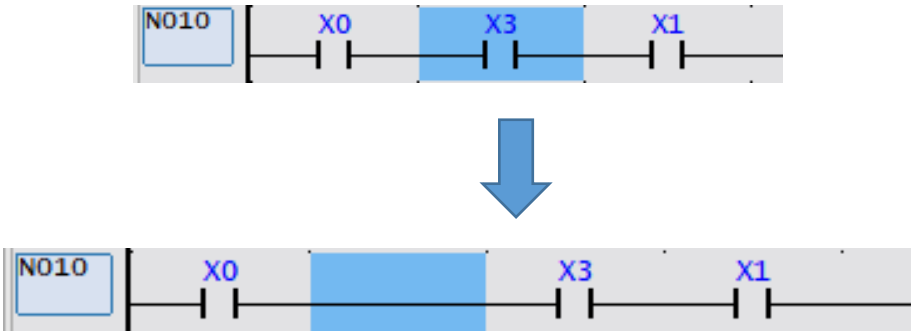


Fig. 108: Expanding horizontal distance

Click [Edit] → [Expand Network] → [Horizontal Expand] in function toolbar; or press the right mouse button to show Pop-up Menu and then click [Edit Network line/row] → [Horizontal Expand] to complete the horizontal expanding.

Horizontal compressing

To compress the distance between X0 and X3:

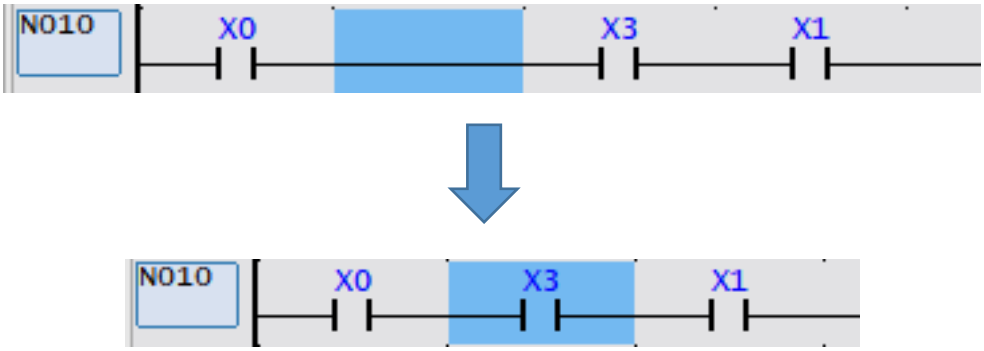


Fig. 109: Compressing horizontal distance

Click [Edit] → [Expand Network] → [Horizontal Compress] in function toolbar; or press the right mouse button to show Pop-up Menu and then click [Edit Network line/row] → [Horizontal Compress] to complete the horizontal compressing.

Inserting empty network

To insert an empty network in the upper side of Network N012, execute the following procedure:

In the Ladder Diagram program section, move the cursor to any component contact of N012 and then press the right mouse button to show Pop-up Menu. Next, click [Insert Empty Network] → [Upper Insert]; or you may press the right mouse button of Network N012 to show Pop-up Menu and then click [Insert Empty Network] → [Upper Insert]; or click [Designer → [Insert Network] → [Upper Insert]; or press "Shift" + "Insert" quick keys and then Network N012 will become an empty network. In the meantime, the content of original Network N012 will change to Network N013.

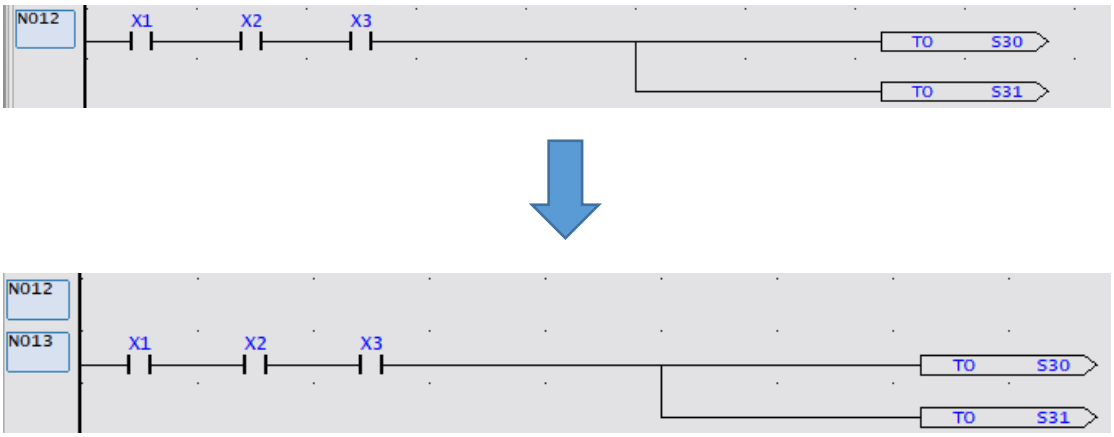


Fig. 110: Inserting empty network

Searching network

To search Network N001 of the intended program unit, click [Designer] → [Go To]; or press "Ctrl" + "G" quick keys to show the following window:

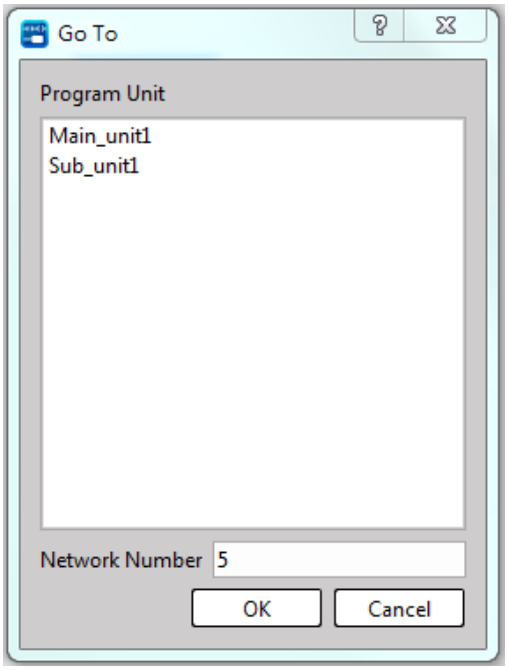


Fig. 111: Searching network

Taking the searching of Network N005 in [Main_unit1] for example:

In [Program Unit List], highlights [Main_Unit-1] and then enter “5” in [Network Number] column to represent N005. Next, press [OK] button and the cursor will move to the Network Number position to be searched.

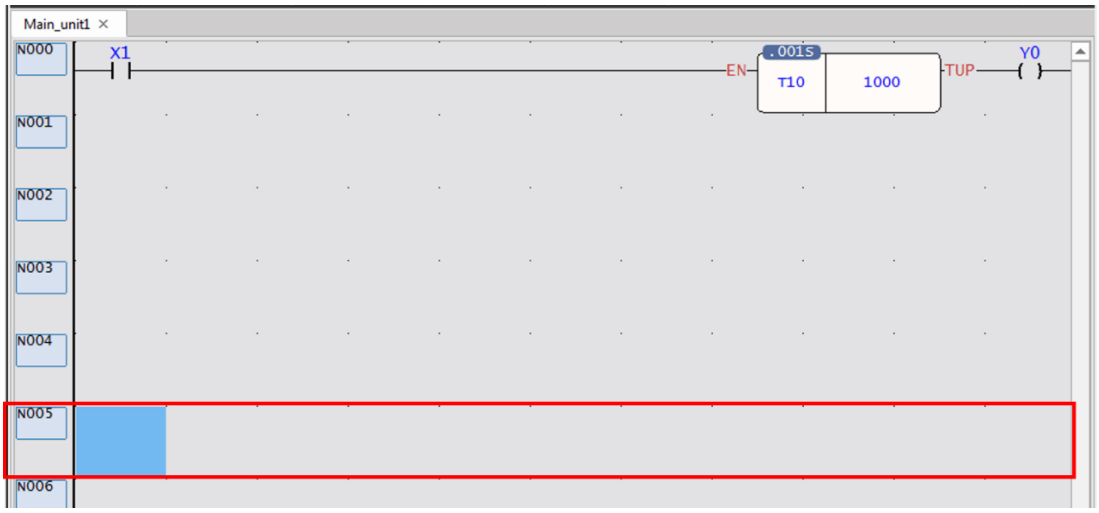


Fig. 112: Moving to the Network Number position to be searched

6-2-5 Editing comment

To input the network comment for Network N012, move the cursor to N12 or any component and then press the right mouse button to show Pop-up Menu. Next, click [Network Comment] and the network comment input section will appear:

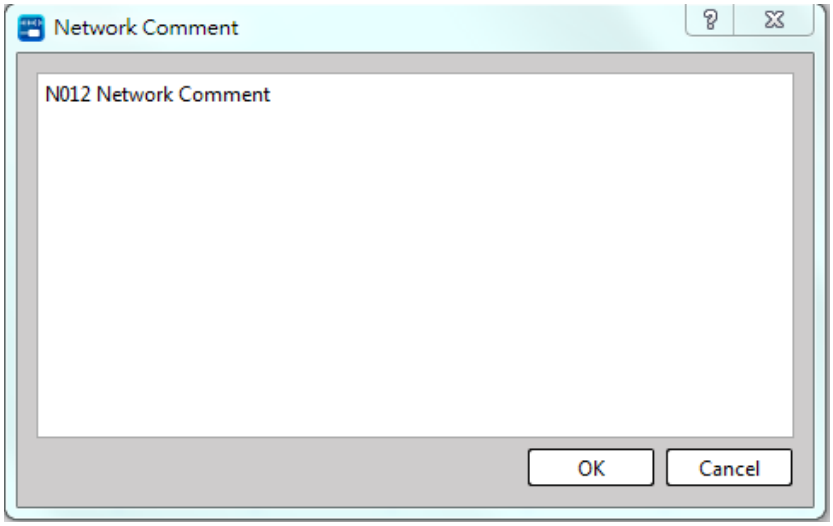


Fig. 113: Network comment input section

Input “N012 Network Comment.” Press [OK] button and you will see that the keyed comment is displayed in the previous line of the existing Network N012:

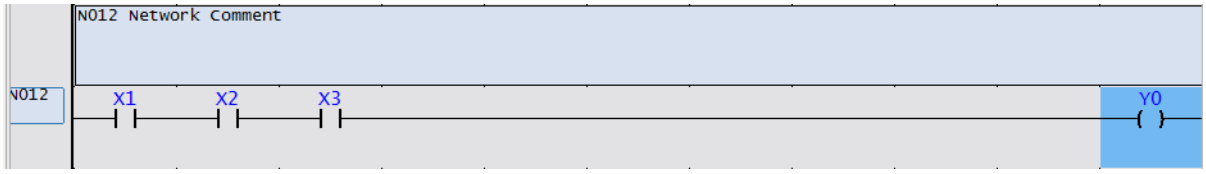


Fig. 114: Displaying comment in previous line of Network Number

In the meantime, you may double click [Project] → [Comment] → [Network Comment]; or in project window, double clicking → [Comment Description] → [Network Comment] to show all of the Network Numbers. Find out N012 by scrolling down the menu and then double clicking on the empty comment section and the network comment input empty section will appear:

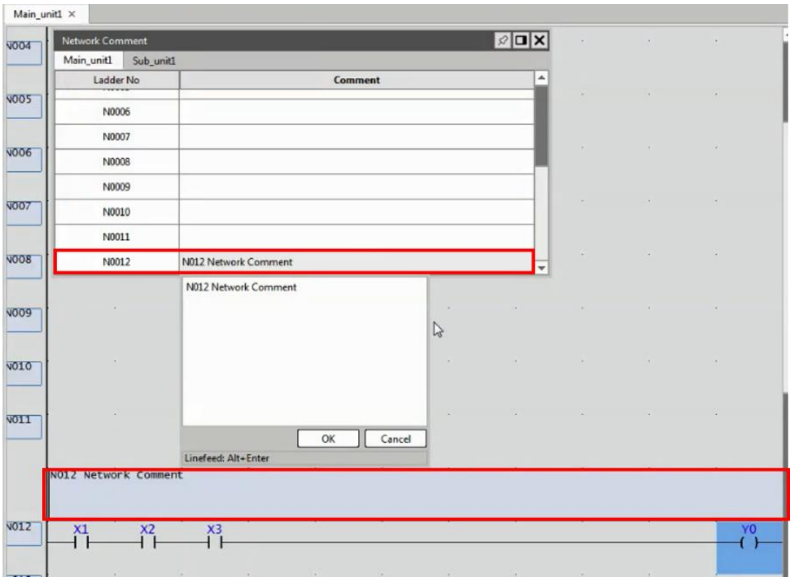


Fig. 115: Adding network comment

Input "N012 Network Comment" and then press [OK] button to complete the network comment inputting.

6-3 Structured Text (ST)

In addition to the most basic editing of ladder diagram programs, UperLogic also provides a structured document programming language (Structured Text), whose syntax is similar to Pascal. Through this syntax, it is convenient to perform complex logic and calculations that are more difficult to edit than ladder diagrams. Commonly used programs and circuits can also be edited through Function Block (FB) is created for repeated use. Its operation method is introduced as follows:

6-3-1 Display Composition

Window Operation

Provides a multi-window ladder program page, which can display programs in different sections at the same time for comparison, copying and editing.

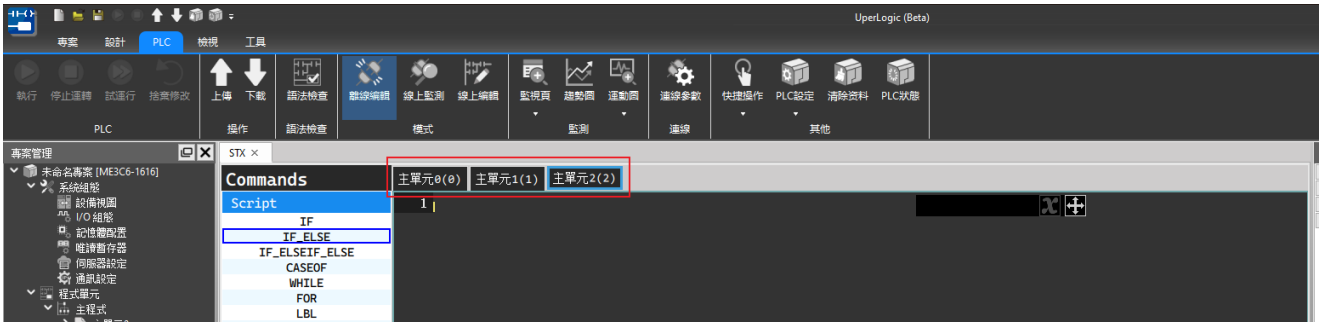


Fig. 116: List of programs in use

6-3-2 Commands Operation

[Commands] on the left side of the ST window will provide users with corresponding commands, which are divided into three categories: Script, System and FB:

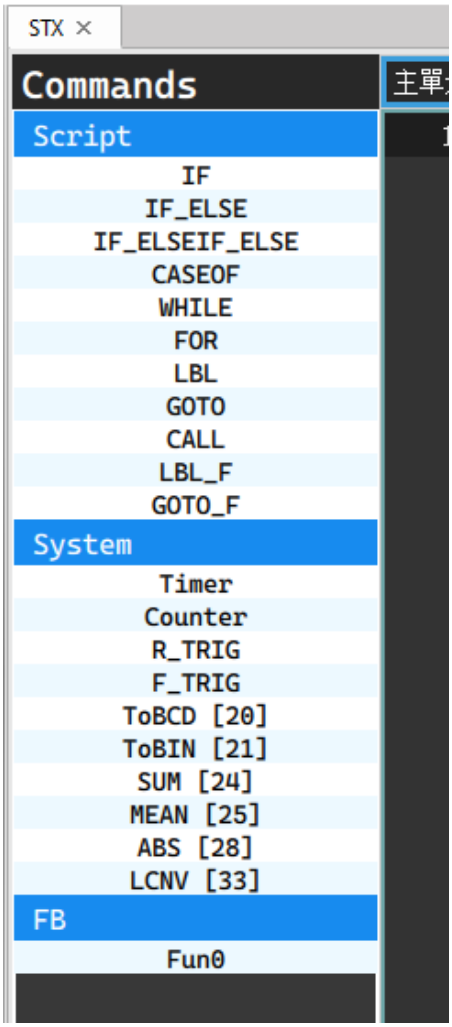


Fig. 117: ST commands operation

Double-click the command you want to use or enter it directly on the screen to use it. The following is the operation instruction:

Script :

Users can write programs through the instructions here. For example, after double-clicking the IF, the screen will display the corresponding specifications, and use ( ) to prompt the user to fill in the information here. If the user already understands, you can also directly enter the corresponding command.

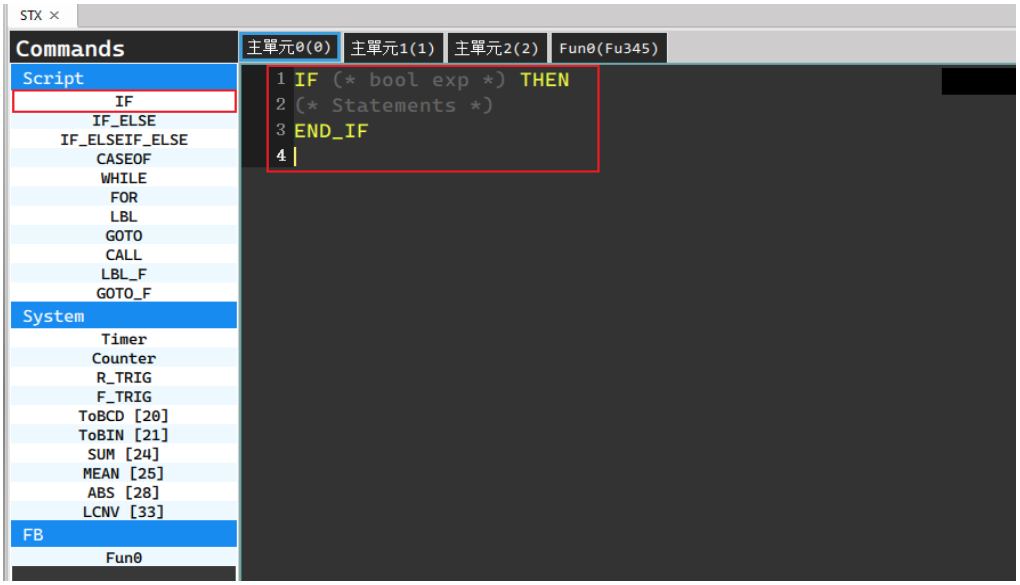


Fig. 118: Syntax hints comments

System :

Users can edit the project through the written program, and the function here will be similar to the Ladder command. The method of use is the same as that of Script. For example, after double-clicking Timer, the corresponding specification will be displayed on the screen, and ( ) will be used to prompt the user to fill in the information here. If the user already understands it, he can also directly enter the corresponding command.

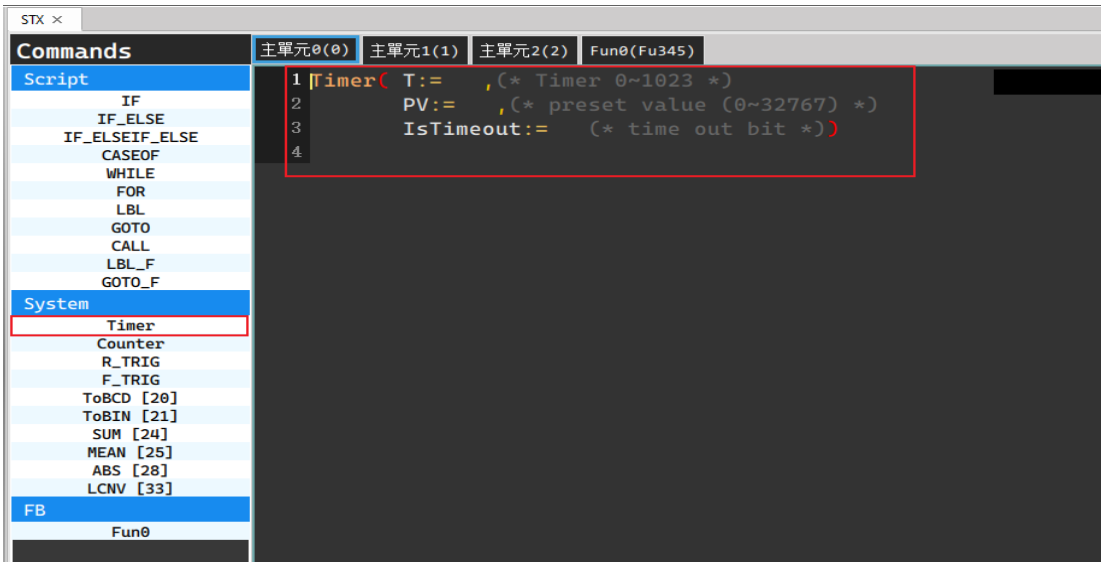


Fig. 119: Function hint comments

FB：

Users can use the function blocks written in the function block program to edit the project.

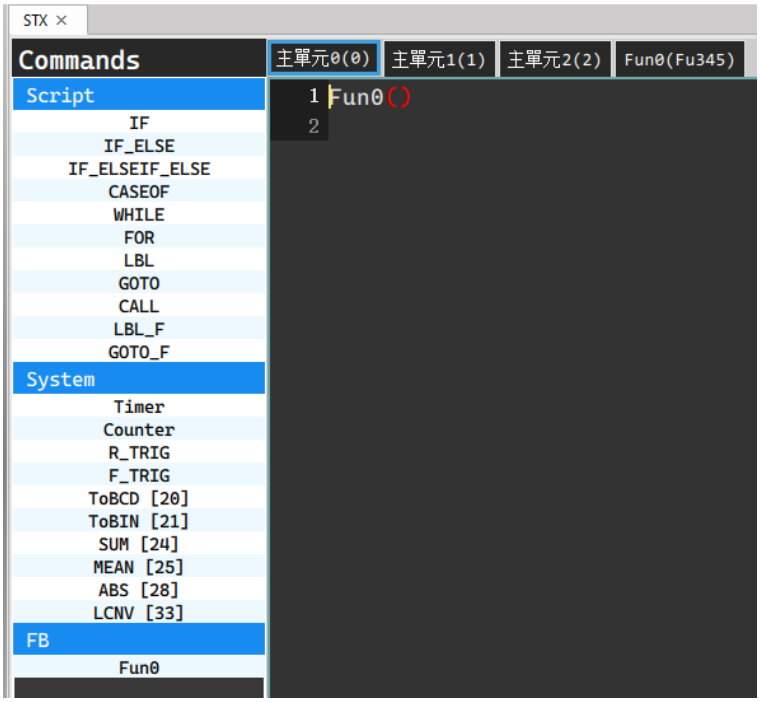


Fig. 120: Using Function Block

For the interface operation of the function block, please refer to Chapter 6-7.

6-4 Step Ladder Instruction Description

6-4-1 Instruction-based operation

The main purpose is to achieve higher program readability, easier maintainability and updating, as well as more reliable software quality. Aiming at the sequential control of mechanical action process, the software is designed for combining the widely accepted Ladder Diagram language under the support of step-based execution command. To operate, click [Designer] → [Ladder Diagram] → [Function Lookup] or press "F" quick key; or in Ladder Diagram program field, press the right mouse button to show Pop-up Menu and then click [Function Lookup] → [Function Lookup]. In the Ladder Diagram program section, click the position where step instruction will be conveyed and all types of function instructions will appear. Under type item, select [SFC instruction] and the right-side Function Name will show the following four step instructions, i.e., "STP," "FROM," "TO" and "STPEND," as per the figure below:

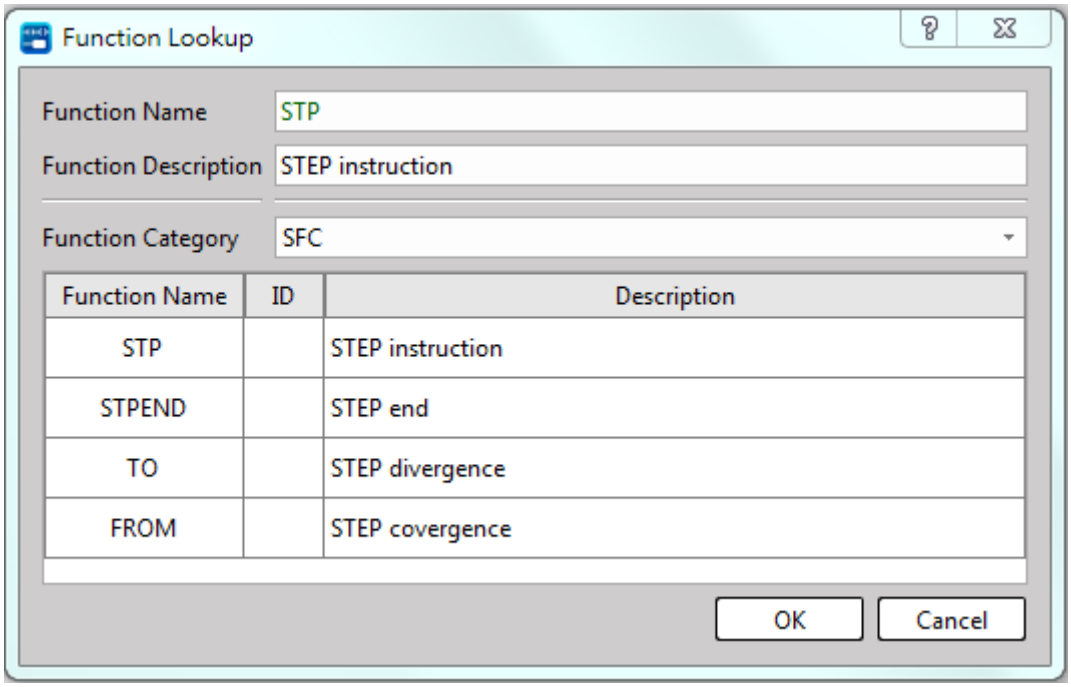


Fig. 121: SFC instructions

For its operation instructions, please refer to Chapter 8 of the M-PLC instruction application manual:

6-5 Syntax Check

After inputting the ladder program, the system will be allowed for executing the syntax check to help you find out program errors. To execute, click [PLC] → [Syntax check] in function toolbar to show the error statistic list resulting from the syntax check:

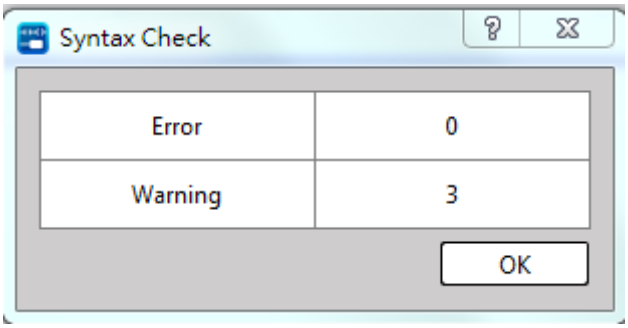


Fig. 122: Syntax check

The system will list all errors under the program section. In the error section, double clicking any item in error section and the program section will show the error component block, as per the figure below:

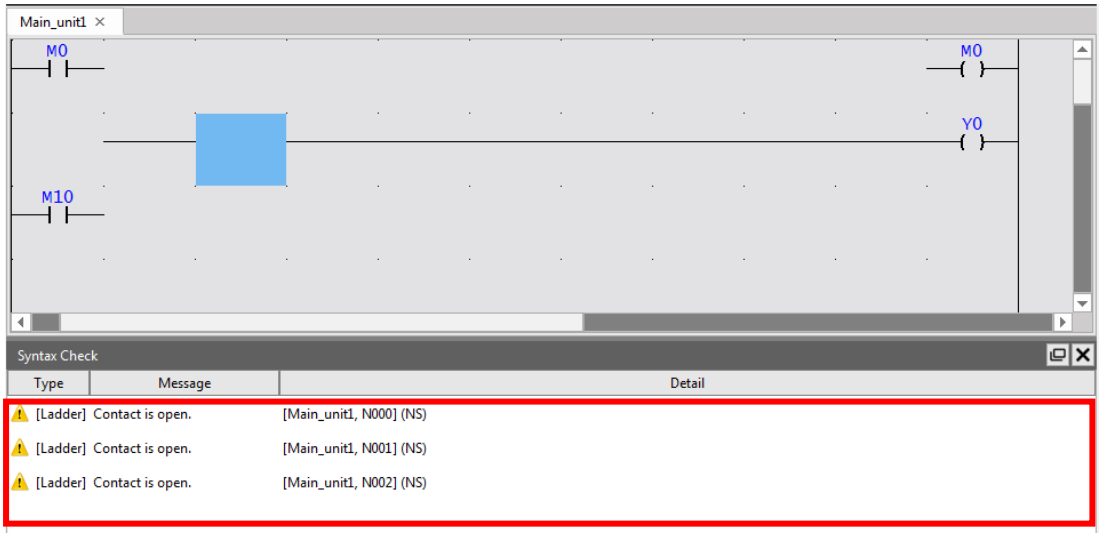


Fig. 123: Error displaying resulting from syntax check

6-6 Interrupt Program

UperLogic classifies related interrupt programs and motion control subroutines here, which is convenient for users to use and design. For example, to add an interrupt program, you only need to add and select the interrupt type, instead of defining the interrupt program through the command Label 65 and the end of RTI like Winproladder. In addition to the ladder LD language, programmers can also write special program logic through ST. Each special type of program is unique and cannot be repeated.

6-6-1 Types of Interrupt Program

No.	Interrupt Source	Priority	Interrupt Label	Condition	Note
17	Hardware Time Tick	3	STM0I	Interval from 1ms~9ms	Tick unit 1ms
18		3	STM1I	Interval from 1ms~9ms	
19		3	STM2I	Interval from 1ms~9ms	
20		3	STM3I	Interval from 1ms~9ms	
21		3	LTM0I	Interval from 10ms~60000ms	Tick unit 10ms
22		3	LTM1I	Interval from 10ms~60000ms	
23		3	LTM2I	Interval from 10ms~60000ms	
24		3	LTM3I	Interval from 10ms~60000ms	
33	HSC	2	HSC0I	Interval from HSC0 to (CV=PV)	

34		2	HSC1I	Interval from HSC1 to (CV=PV)	
35		2	HSC2I	Interval from HSC2 to (CV=PV)	
36		2	HSC3I	Interval from HSC3 to (CV=PV)	
37		2	HSC4I	Interval from HSC4 to (CV=PV)	
38		2	HSC5I	Interval from HSC5 to (CV=PV)	
39		2	HSC6I	Interval from HSC6 to (CV=PV)	
40		2	HSC7I	Interval from HSC7 to (CV=PV)	
25	HST	1	HST0I	Interval from HST0 to (CV=PV)	Tick uint 100us
26		1	HST1I	Interval from HST1 to (CV=PV)	
27		1	HST2I	Interval from HST2 to (CV=PV)	
28		1	HST3I	Interval from HST3 to (CV=PV)	
29			HST4I	Interval from HST4 to (CV=PV)	Not supported yet
30			HST5I	Interval from HST5 to (CV=PV)	Not supported yet
31			HST6I	Interval from HST6 to (CV=PV)	Not supported yet

32			HST7I	Interval from HST7 to (CV=PV)	Not supported yet
1	Build-in Digital Inputs	2	X0+I (INT0+)	X0 positive edge trigger	The software high speed counter HSC4~HSC7 can be assigned as the trigger source of any interrupt X0~X15. Therefore, the interrupt priority of the software high speed counter depends on the priority of X0~X15.
2		2	X0−I (INT0-)	X0 negative edge trigger	
3		2	X1+I (INT1+)	X1 positive edge trigger	
4		2	X1−I (INT1-)	X1 negative edge trigger	
5		2	X2+I (INT2+)	X2 positive edge trigger	
6		2	X2−I (INT2-)	X2 negative edge trigger	
7		2	X3+I (INT3+)	X3 positive edge trigger	
8		2	X3−I (INT3-)	X3 negative edge trigger	
9		2	X4+I (INT4+)	X4 positive edge trigger	
10		2	X4−I (INT4-)	X4 negative edge trigger	
11		2	X5+I (INT5+)	X5 positive edge trigger	
12		2	X5−I (INT5-)	X5 negative edge trigger	
13		2	X6+I (INT6+)	X6 positive edge trigger	

14		2	X6−I (INT6-)	X6 negative edge trigger	
15		2	X7+I (INT7+)	X7 positive edge trigger	
16		2	X7−I (INT7-)	X7 negative edge trigger	
41	External Module Event		COCPUI	Event from Co-processor (e.g., EtherCAT motion controller)	
42			LHMI	Event form left-side high-speed module	
43			RHM0I	Event form Right-side high-speed module 1	
44			RHM1I	Event form Right-side high-speed module 2	
45			RHM2I	Event form Right-side high-speed module 3	
46			RHM3I	Event form Right-side high-speed module 4	
47			RHM4I	Event form Right-side high-speed module 5	
48			RHM5I	Event form Right-side high-speed module 6	

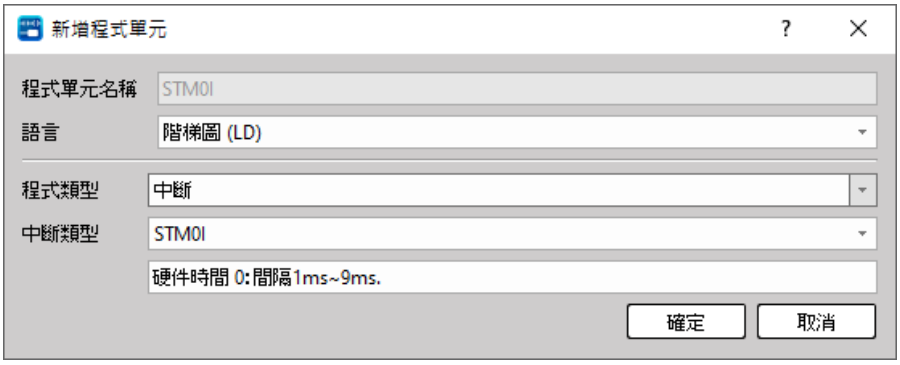


Fig. 124: Select interrupt program type

6-6-2 Types of motion program

No.	Motion Source	Priority	Motion Label	Condition	Note
49	Motion Control	1	MCCI	Synchronous Motion Parameter Program	

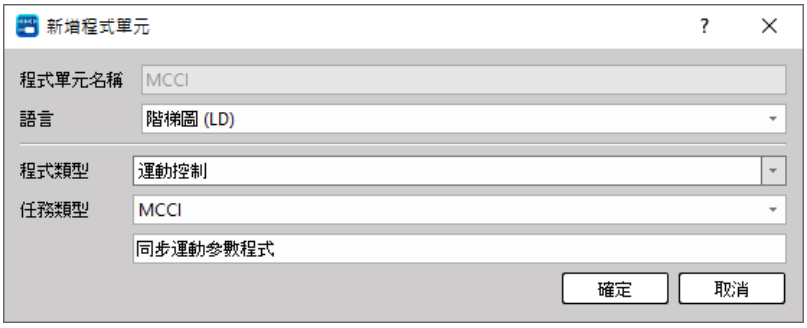


Fig. 125: Select motion program type

MCCI can be regarded as the continuous PLC program flow after the action of the continuation of the motion process. It is used as the planning of synchronous motion parameters to avoid the running time difference between the PLC program and the motion process. Designers can synchronize motion parameters in the MCCI program to output to PLC registers or output Y contacts in real time, ensuring that the output of motion control will not be affected by the existing PLC program logic. For more details, please refer to the chapter on motion control.

6-6-3 Add special program

Click [Project] → [Program Unit] → [Special Program] → [Add Special Program] with the mouse; or right-click [Add Special Program] in the project management window [Special Program] to create a new special program:

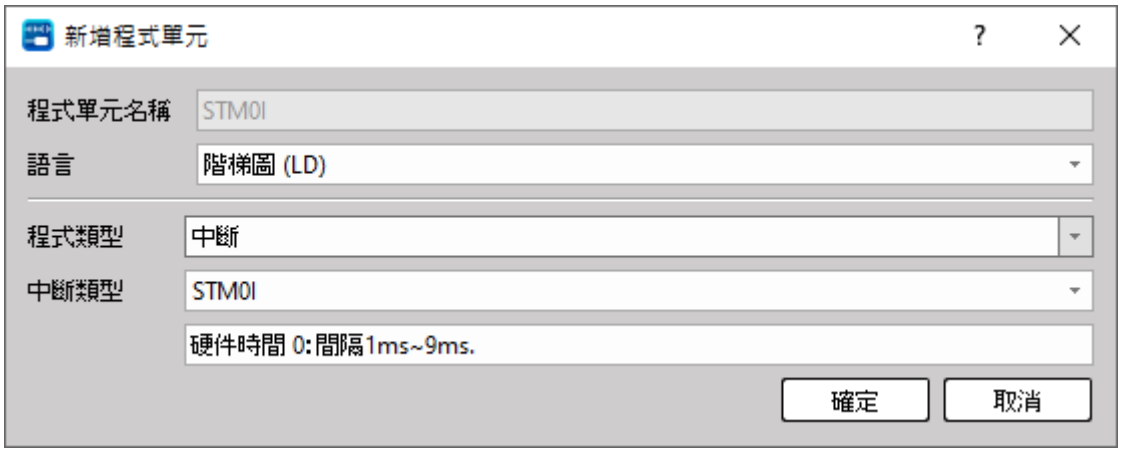


Fig. 126: Add special program unit

Program Unit Name:

Will be automatically generated by the system, and will have the same name as the interrupt or motion control type.

Language:

Users can choose whether this special program unit is edited using ladder diagram or ST programming language.

Interrupt Type:

Usera can choose the type of the interrupt program, and each interrupt type can only create one program unit, which cannot be created repeatedly.

6-6-4 Adjust Interrupt Program

Click [Project] → [Program Unit] → [Interrupt Program] → [Adjust Interrupt Program]; or right-click [Adjust Interrupt Program] in the project management window [Interrupt Program] to adjust the interrupt program order of sorting:

Fig. 127: Adjusting Interrupt Program

6-6-5 Call Interrupt Program

The calling of the interrupt is not by using software instructions, but by sending an interrupt signal to the CPU through the hardware circuit, and the CPU recognizes the name of the interrupt and automatically jumps into the interrupt subroutine and marks it with the interrupt name.

6-7 Function Module Program

FCM can package highly repetitive or special application program flow, which can be easily called repeatedly during program editing, significantly simplifying and speeding up PLC programming, and helping to avoid errors and repetitive editing and debugging. Furthermore, a library of functions commonly used by programmers is established to facilitate future reuse in different projects.

6-7-1 Add Function Module Program

Click [Project] → [Program Unit] → [Function Module Program] → [Add FCM Program] with the mouse; or right-click [Add FCM Program] in the project management window [Function Module Program], you can add new function module program:

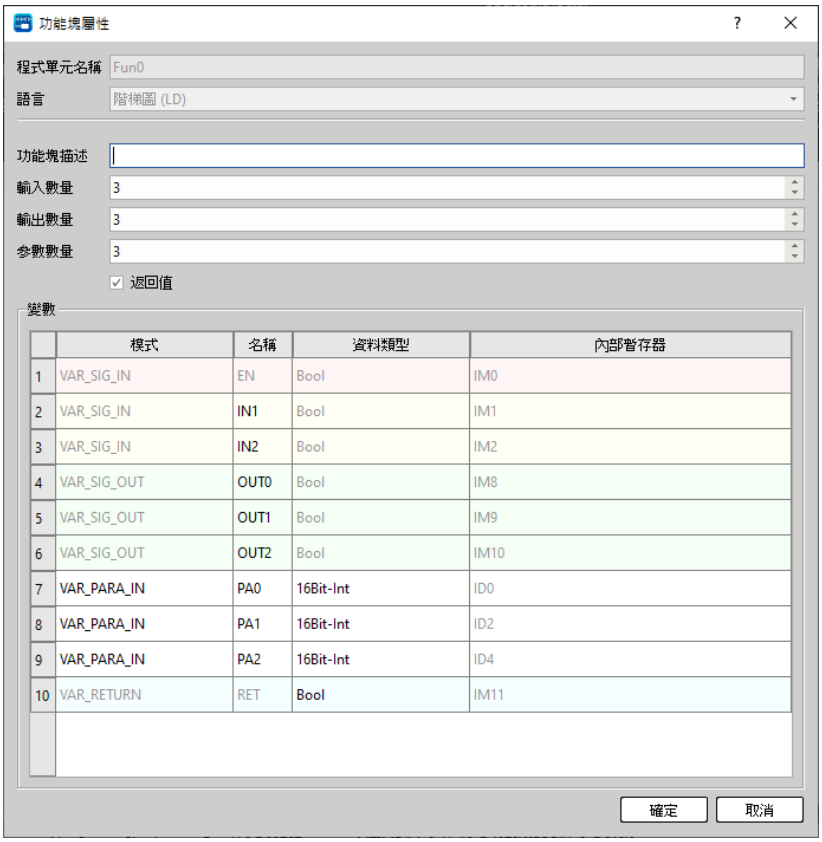


Fig. 128: Add Function Module Program

Program Unit Name:

Users can define the name of the desired program unit at the time of creation, and this name will be used when calling this function block program when other program units are programmed.

Language:

Users can choose whether to use the ladder diagram or ST programming language to edit the interrupt program unit.

Function Module Description:

Users can define the required program unit descriptions by themselves.

Input Numbers:

Users can set the quantity to be input, the minimum is 1 and the maximum is 8. The first group of input names is fixed as EN, and the remaining 7 groups of input names can be edited by the user.

變數

	模式	名稱	資料類型	內部暫存器
1	VAR_SIG_IN	EN	Bool	IM0
2	VAR_SIG_IN	IN1	Bool	IM1
3	VAR_SIG_IN	IN2	Bool	IM2
4	VAR_SIG_IN	IN3	Bool	IM3
5	VAR_SIG_IN	IN4	Bool	IM4
6	VAR_SIG_IN	IN5	Bool	IM5
7	VAR_SIG_IN	IN6	Bool	IM6
8	VAR_SIG_IN	IN7	Bool	IM7

Fig. 129: FCM input variables

Output Numbers:

Usera can set the quantity to be output, the minimum is 0 and the maximum is 8. Users can edit the name of the output by themselves.

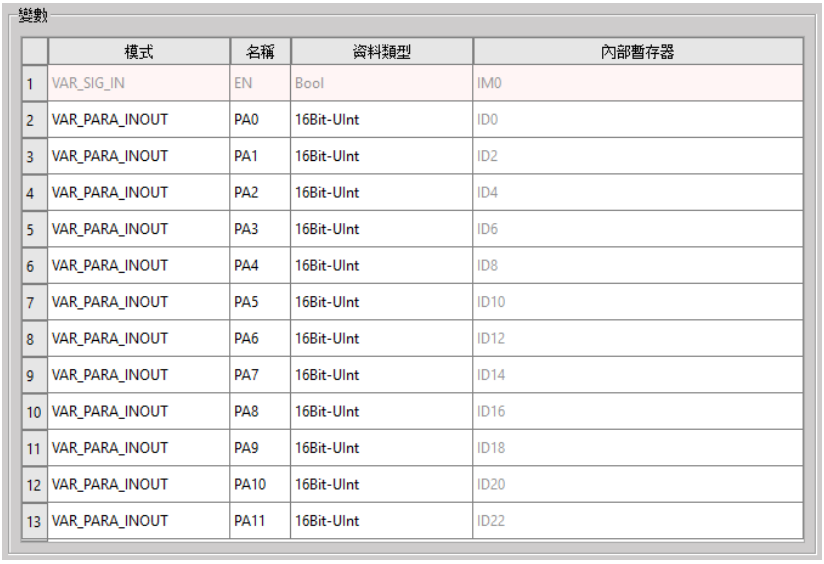
變數

	模式	名稱	資料類型	內部暫存器
1	VAR_SIG_IN	EN	Bool	IM0
2	VAR_SIG_OUT	OUT0	Bool	IM8
3	VAR_SIG_OUT	OUT1	Bool	IM9
4	VAR_SIG_OUT	OUT2	Bool	IM10
5	VAR_SIG_OUT	OUT3	Bool	IM11
6	VAR_SIG_OUT	OUT4	Bool	IM12
7	VAR_SIG_OUT	OUT5	Bool	IM13
8	VAR_SIG_OUT	OUT6	Bool	IM14
9	VAR_SIG_OUT	OUT7	Bool	IM15

Fig. 130: FCM output variables

Parameter Numbers:

The user can set the number of parameters required by the function module, the minimum is 0, and the maximum is 12. Users can define the mode, name and data type of parameters by themselves, which will be explained one by one below:



變數

	模式	名稱	資料類型	內部暫存器
1	VAR_SIG_IN	EN	Bool	IM0
2	VAR_PARA_INOUT	PA0	16Bit-UInt	ID0
3	VAR_PARA_INOUT	PA1	16Bit-UInt	ID2
4	VAR_PARA_INOUT	PA2	16Bit-UInt	ID4
5	VAR_PARA_INOUT	PA3	16Bit-UInt	ID6
6	VAR_PARA_INOUT	PA4	16Bit-UInt	ID8
7	VAR_PARA_INOUT	PA5	16Bit-UInt	ID10
8	VAR_PARA_INOUT	PA6	16Bit-UInt	ID12
9	VAR_PARA_INOUT	PA7	16Bit-UInt	ID14
10	VAR_PARA_INOUT	PA8	16Bit-UInt	ID16
11	VAR_PARA_INOUT	PA9	16Bit-UInt	ID18
12	VAR_PARA_INOUT	PA10	16Bit-UInt	ID20
13	VAR_PARA_INOUT	PA11	16Bit-UInt	ID22

Fig. 131: INOUT parameters of function block

- **Mode**

  Users can choose the mode of this parameter as input (IN), output (OUT), or output-input (INOUT).
  When IN is selected, the value of the parameter before entering FCM will be inherited, and the change in FCM will be ignored after the function block is terminated.
  When selecting OUT, the value of the parameter before entering the FCM will be ignored, and if the value is changed, it will be output to the designated register.
  When INOUT is selected, it will have both the characteristics of IN and OUT, inherit the value of the parameter before entering FCM, and retain the changes in FCM.

- **Name**

  Users can define the name of the parameter by themselves.

- **Data Type**

  Users can select the data type of the parameter as 16Bit-Int, 16Bit-UInt, 32Bit-Int, 32Bit-UInt or Float.

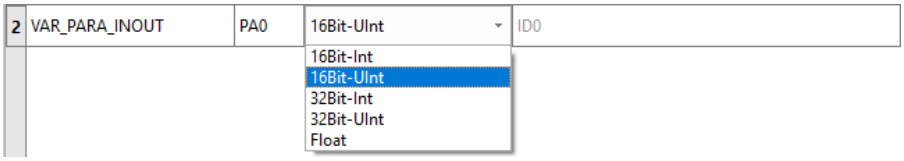


Fig. 132: Data type

- **Return Value**

  After checking, the return value and the specified register will be output. It is mainly used in ST language.

6-7-2 Adjust Function Module Program

Click the function bar [Project] → [Program Unit] → [FCM Program] → [Adjust FCM Program] with the mouse; or right click [Adjust FCM Program] in the project management window [FCM Program] to adjust the FCM program order of sorting:

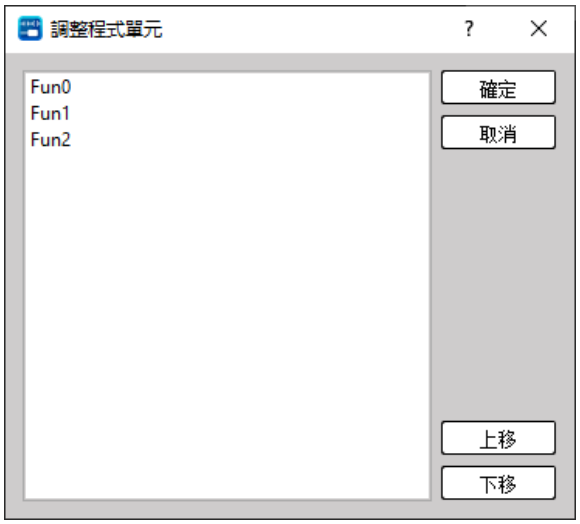


Fig. 133: Adjusting FCM Program

7

Creating Tables

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes how to set up the reports, link parameters and command tables. Through the user-friendly interface, it minimizes the complicated procedure when operated by the user. Provided below is the operation method of the respective table.

7-1 Table Management

7-1-1 Adding New Table

To add a table, please select [Table Edit] → [OOOO Table] → [New OOOO Table] in the project window, or select [Project] → [Table Edit] → [New OOOO Table], as shown below:

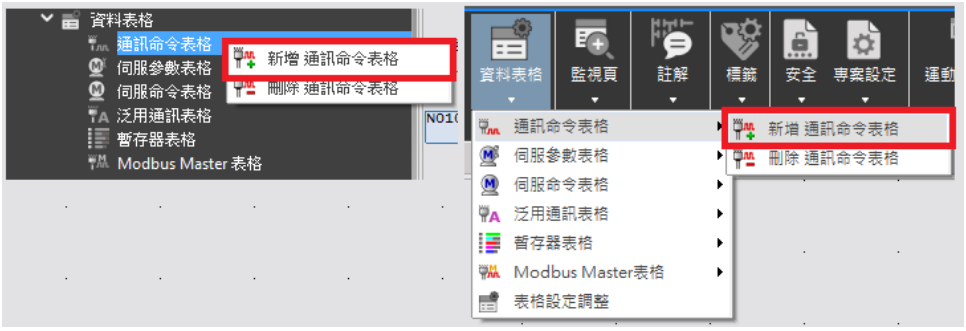


Fig. 134: Adiing a new table

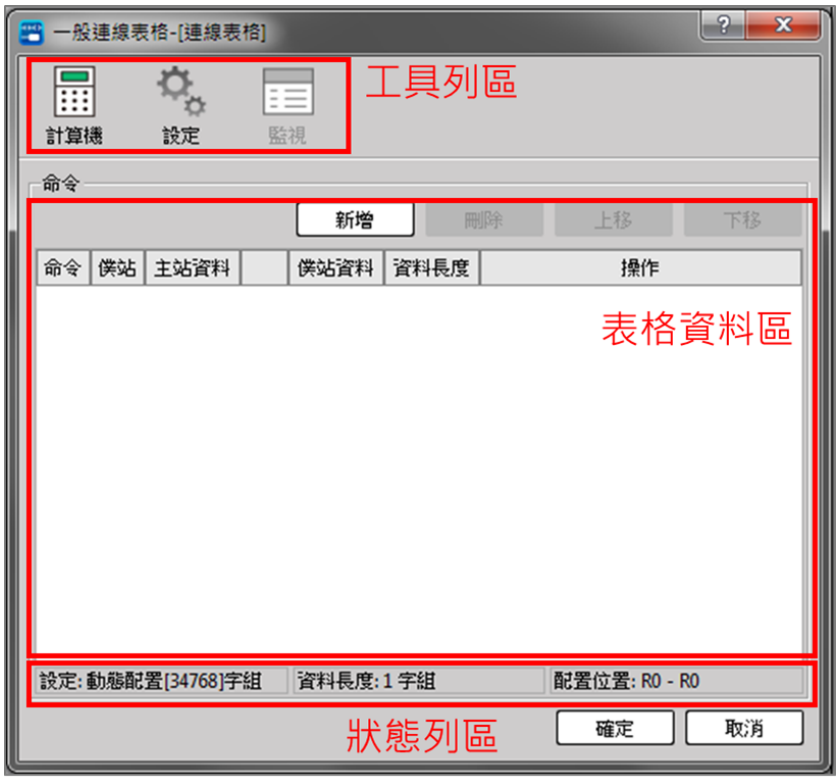
After clicking [New OOOO Table], the table editing window will pop up allowing users to create table properties.

Item	Description
Type	The subcategory of the table, which varies from data table to data table.
Name	The name of the table
Start Address	The starting address to use for this table, which can be entered as a register or a label.
Length	The length used by the table data; the unit is a word group.
Table Capacity	Choose whether you want to dynamically adjust the table capacity or a fixed capacity limit: ● Dynamic Allocation: Edit length changes with form content ● Fixed length: Edit length must not exceed configured length
Load Table From PLC	To load corresponding link tables from PLC.
Load Table From ROR	To load corresponding link tables from ROR.
Description	Provides users the description of editing tables

7-1-2 Table Edit

After adding a table, you will enter the table data window. In addition, you can enter the table editing window from [Table Edit] → [OOOO Table] → [Name] in the project window, or click [Project] → [Table Edit] → [OOOO Table] → [Name].

Users can edit the command details for this form in this window.



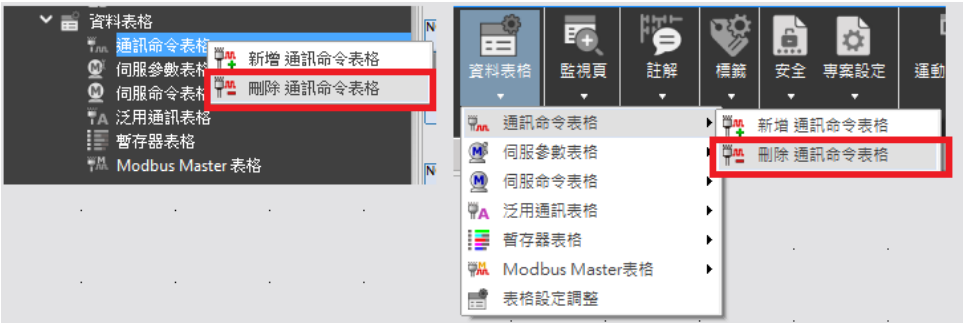
Function		Description
Toolbar Section	Calculator	Calling the easy-to-use calculator installed in the Windows.
	Setting	Calling the table edit window. It allows the user to rename the table or change the home address of such table.
	Monitor	The execution status of form commands can be monitored. The monitoring content depends on different form types, and the content will be described in detail in subsequent chapters. This function is only supported online and can be used by calling the Zooming function on the ladder diagram.
Table Data Section		Table data editing section, the content depends on different form types, and will be described in detail in subsequent chapters.
Status Section	Allow	The display table property is set to dynamic allocation or fixed length, and the maximum length is marked; the unit is a word group.
	Used	Displays the length of the table command currently used, and the unit is a word group.
	Position	Displays the address range currently used by table commands.

7-1-3 Rename

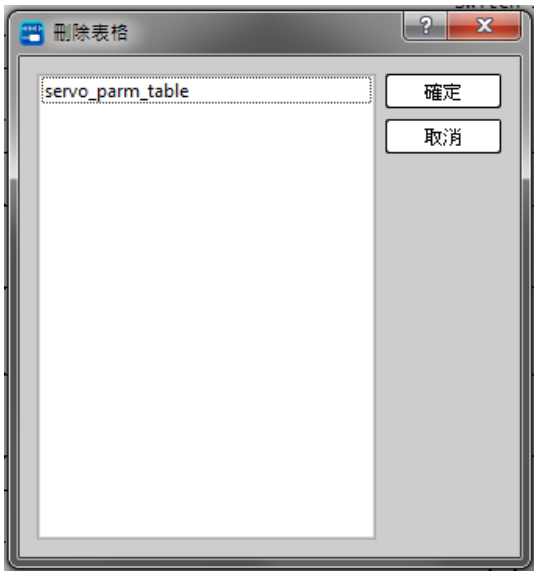
To change the name of the table, please select the table [Name] to be modified in [Table Edit] → [OOOO Table] in the project window, select [Rename] from the right-click menu or use the shortcut key "F2" to edit the name. In addition, you can directly enter the form editing window and change the name through editing properties.

7-1-4 Delete Table

To delete a table, please select [Table Edit] → [OOOO Table] in the project window, and select [Delete OOOO Table] from the right-click menu, or [Project] → [Table Edit] → [Delete OOOO Table] in the execution function bar, as shown in the figure below:



After the delete table window appears, select the table you want to delete and confirm. You can delete multiple selections.



7-1-5 Table Configuration Adjustment

Uperlogic provides a table overview function, which can be used to determine whether the addresses used in the tables overlap to avoid misuse during program execution. To use this function, please select [Table Configuration Adjustment] from the right-click menu in [Table Edit] in the project window, or [Project] → [Table Edit] → [Table Setting Adjustment] in the execution function bar.

Item	Description
Table	Display the basic properties of all tables of the current project. If the start address is marked with [OOO], it means that the address uses a label as the start address.
Configuration	Enter the table editing window to modify the properties of the table.
Edit	Enter the table data window to modify the table data.
Delete	Delete the selected table.
Write to PLC	Write the current project table data to PLC.
Table Comparison	Compare the data in the current project table with the data in the PLC register.
Message	Shows whether the addresses currently used between tables have overlapping ranges.

7-2 Link Table

The main purpose of the link table is to facilitate users to fill in the data content of the communication command FUN151 CLINK. The [General Online Table] category corresponds to MD0. For other descriptions of corresponding commands, please refer to the advanced manual.

7-2-1 Table Value

The table data section of [General Online Table] is as shown in the figure below. Users can edit individual commands of [General Online Table] through simple operations, and the content corresponds to the command Start Register (SR) on FUN151.

The operation description is shown as below:

Item			Description
Operation	New		After clicking, a row of commands will be added in the editing section for users to edit.
	Delete		After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
	Move Up		After clicking, move the command currently selected by the user up one column.
	Move Down		After clicking, move the command currently selected by the user down one column.
	Right-Click Menu	Cut	After clicking, cut the command currently selected by the user, and multiple selections can be cut.
		Copy	After clicking, copy the command currently selected by the user, multiple selections can be copied。

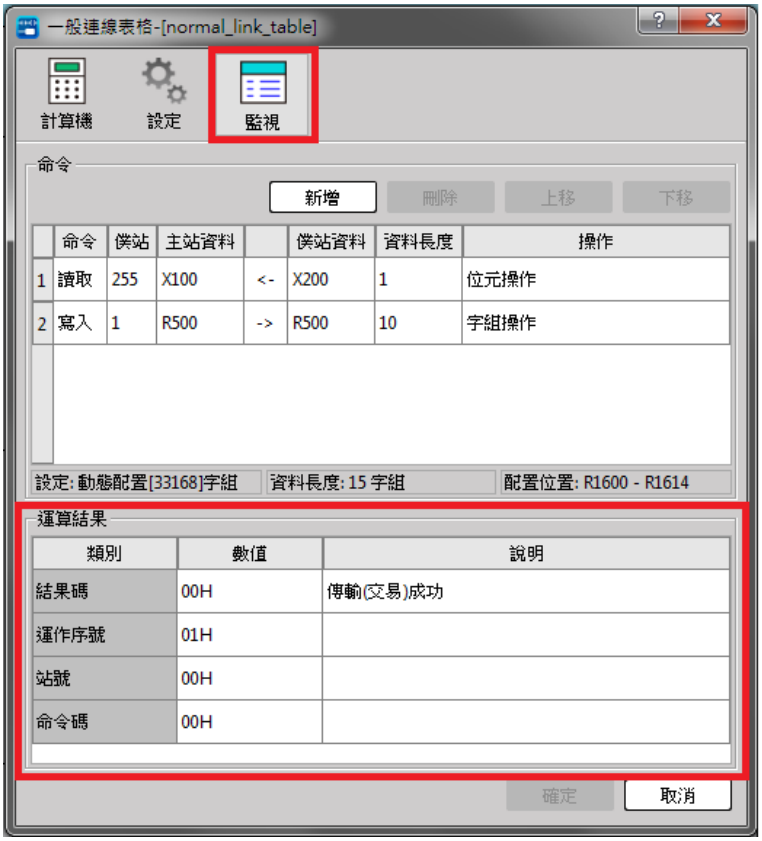
		Paste	After clicking, paste the command previously copied or cut by the user.
		Insert	After clicking, insert a row of commands at the selected position in the editor for users to edit.
		Delete	After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
		Move Up	After clicking, move the command currently selected by the user up one column.
		Move Down	After clicking, move the command currently selected by the user down one column.

The command data content is shown as below:

Item		Description
Data	No.	Display the command information of the Nth.
	Command	Edit this command action as [Read] or [Write]
	Slave	Edit the station number of the slave station to communicate.
	Master Data	Edit the data starting address of the Master station.
	Slave Data	Edit the data starting address of the Slave station.
	Data Size	The data size of such command
	Operation	Display this command as [Bit Operation] or [Word Group Operation]

7-2-2 Table Monitoring

The monitoring of [General Online Table] is as shown in the figure below. Users need to be online and call the Zooming function on FUN151 to use it. The content corresponds to the command operation start register (WR) on FUN151.



Item	Description
Result Code	Shows the operating result. 00H: Normal Other values: Error
Operation No.	Indicates that the Nth transaction is in operation.
Station No.	Indicates the station number of the slave station currently in communication.
Command Code	40H: Read slave PLC system status. 44H: Read the status of multiple consecutive single points of the slave PLC. 45H: Write the state of multiple consecutive single points of the slave PLC. 46H: Read the status of multiple consecutive registers of the slave PLC. 47H: Write the status of multiple registers in the slave PLC.

7-3 Servo Parameter Table

The main purpose of the servo parameter table is to facilitate the user to fill in the data content of the positioning program parameter setting command FUN141 MPARA. For the description of the corresponding command, please refer to the advanced manual.

7-3-1 Table Value

The table data section of [Servo Parameter Table] is as shown in the figure below, users can edit individual parameters of [Servo Parameter Table] through simple operations, and the content corresponds to the command start register (SR) on FUN141.

Fig. 135: Editing Servo Parameter Table

Parameter	Item	Description
0	Unit Setting	The unit used for the travel and speed settings used in the program. When the setting value is 0, the unit is mm, Deg, Inch, which is called the mechanical unit. When the setting value is 1, the unit is Pulse, which is called the motor unit. When the setting value is 2, the setting value is in mm, Deg, Inch, and the speed setting is in Pulse, which is called compound unit.
1	Ps/Rev	The number of pulses (A) required for one revolution of the motor. The range is 1 ~ 65535 Ps/Rev (when it is above 32767, set it with decimal positive number) When parameter 14 = 0, take parameter 1 as Ps/Rev.

<table>
<tr><td></td><td></td><td>When parameter 14 ≠ 0, take parameter 14 as Ps/Rev.</td></tr>
<tr><td>2</td><td>μM/Rev</td><td>The distance (B) driven by the motor for one revolution.
The range is 1 ~ 999999 μM/Rev (mDeg/Rev, 0.1 mInch/Rev).</td></tr>
<tr><td>3</td><td>Min. Setting Unit</td><td>
<table>
<tr><td>Setting Value</td><td colspan="3">Mechanical/Compound Unit</td><td>Motor Unit</td></tr>
<tr><td></td><td>mm</td><td>Deg</td><td>Inch</td><td>Ps</td></tr>
<tr><td>0</td><td>x1</td><td>x1</td><td>x0.1</td><td>x1000</td></tr>
<tr><td>1</td><td>x0.1</td><td>x0.1</td><td>x0.01</td><td>x100</td></tr>
<tr><td>2</td><td>x0.01</td><td>x0.01</td><td>x0.001</td><td>x10</td></tr>
<tr><td>3</td><td>x0.001</td><td>x0.001</td><td>x0.0001</td><td>x1</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Max. Speed Setting</td><td>Motor and compound unit: 1-921600 Ps/Sec
Mechanical unit: 1-153000 (cm/Min, x10 Deg/Min, Inch/Min),
but the maximum frequency can not be greater than 921600 Ps/Sec.</td></tr>
<tr><td>5</td><td>Start/Stop Speed</td><td>Motor and compound unit: 1-921600 Ps/Sec。
Mechanical unit: 1-15300 (cm/Min, ×10 Deg/Min, Inch/Min), but the maximum frequency can not be greater than 921600 Ps/Sec。</td></tr>
<tr><td>6</td><td>Return-to-origin Deceleration Speed</td><td>Motor and compound unit: 1-65535 Ps/Sec
Mechanical unit: 1-15300 (Cm/Min, x10 Deg/Min, Inch/Min)</td></tr>
<tr><td>7</td><td>Gear Backlash Correction Value</td><td>Setting scope: 0-32767 Ps
When walking in reverse, the walking distance will automatically add this value。</td></tr>
<tr><td>8</td><td>Acceleration and Deceleration Time Setting</td><td>Setting scope: 0-30000 ms。
The time represents the one required to accelerate from rest to maximum speed (parameter 4), or decelerate from maximum speed to rest. When parameter 12=0, this parameter is used as the deceleration time.</td></tr>
</table>

9-0	Direction of Operation	When the setting value=0, forward pulse output, the current Ps value will increase; the reverse pulse output, and the current Ps value will decrease. When the set value=1, the forward pulse output and the current Ps value will decrease; the reverse pulse output and current Ps value will increase.
9-1	Return-to-origin Direction	When the set value=0, the return-to-origin direction is the current Ps value plus the upward direction (the origin is on the right). When the setting value=1, the return-to-origin direction is the current Ps value minus downward direction (the origin is on the left).
10	Forward Revolution Movement Correction Value	When outputting forward revolution pulse, this value will be automatically added as the moving distance; the range is −32768 - 32767 Ps.
11	Compensation Value of Reverse Movement Value	When switching to pulse wave output, this value will be automatically added as the moving distance; the range is −32768 - 32767 Ps.
12	Deceleration Time Setting	The range is 0-30000 ms. When parameter 12=0, parameter 8 is used as the deceleration time. When parameter 12≠0, parameter 12 is used as the deceleration time.
13	Interpolation Acceleration/Deceleration Time Setting	It is used to set the time required to accelerate from stillness (speed = 0) to the working frequency during linear interpolation motion; this time is also used for deceleration and stop control; the range is 0-30000 ms.
14	Ps/Rev	The range is 0 to 1999999. y as parameter 14 = 0, take parameter 1 as Ps/Rev. y as parameter 14 ≠ 0, take parameter 14 as Ps/Rev.
15-0	Proximity DOG Input Contact Setting	Can set [Normally Open], [Normally Closed] or [Not Used] input contact; contact number is X0-X15.

15-1	Stroke Limit Input Contact Setting	Can set [Normally Open], [Normally Closed] or [Not Used] input contact; contact number is X0-X125.
15-2	Zero-Point Signal PG0 Input Contact Setting	You can set [Upper Edge Count], [Lower Edge Count] or [Not Used] input contact; the contact number is X0-X15.
15-3	Zero-Clear Signal CLR Output Contact Setting	You can set [Use] or [Not Used] output contact; the contact number is Y0-Y23.
16	Mechanic Original-Point Position Value	The range is -999999-999999 Ps.
17	Zero-Point Signal Numbers	The range is 0-255 Count.

7-3-2 Table Monitoring

No monitoring function is provided to [Servo Parameter Table].

7-4 Servo Program Table

The main purpose of [Servo Program Table] is to facilitate the user to fill in the data content of the single-axis high-speed pulse output command FUN140 HSPSO. For the description of the corresponding command, please refer to the advanced manual.

7-4-1 Table Value

The table data section of [Servo Program Table] is as shown in the figure below, users can edit individual commands of [Servo Program Table] through simple operations, and the content corresponds to the command start register (SR) on the FUN140.

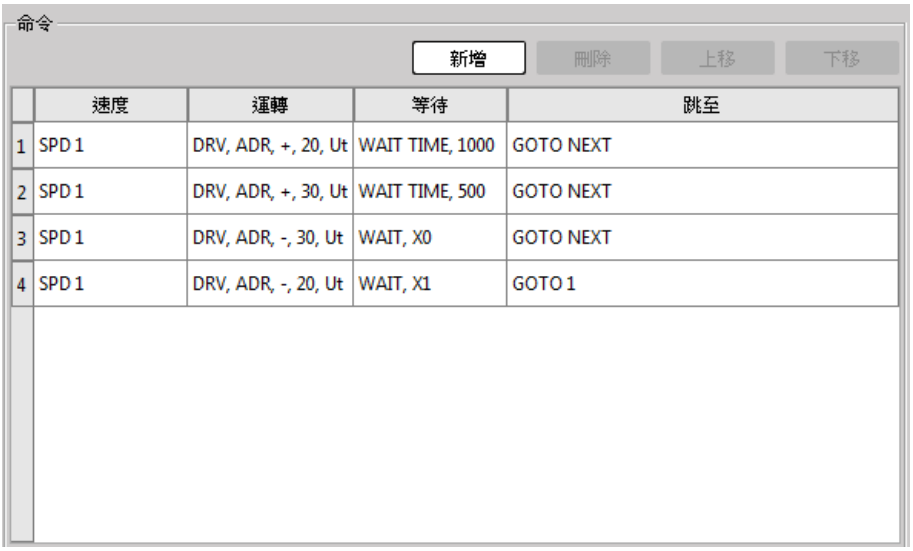
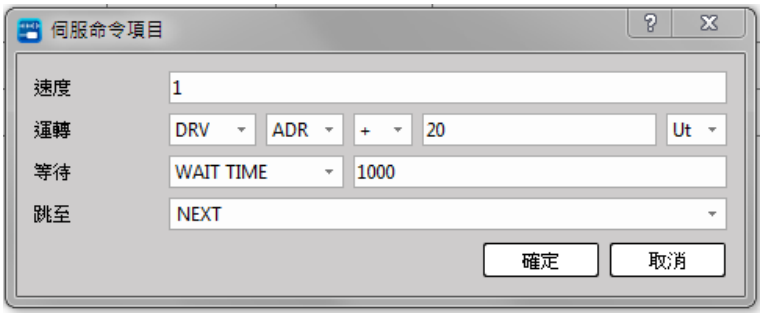


Fig. 136: Setting Servo Program Table

The operation description is shown as below:

Item			Description
Operation	New		After clicking, a row of commands will be added in the editing section for users to edit.
	Delete		After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
	Move Up		After clicking, move the command currently selected by the user up one column.
	Move Down		After clicking, move the command currently selected by the user down one column.
		Cut	After clicking, cut the command currently selected by the user, and multiple selections can be cut.

	Right-Click Menu	Copy	After clicking, copy the command currently selected by the user, multiple selections can be copied。
		Paste	After clicking, paste the command previously copied or cut by the user.
		Insert	After clicking, insert a row of commands at the selected position in the editor for users to edit.
		Delete	After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
		Move Up	After clicking, move the command currently selected by the user up one column.
		Move Down	After clicking, move the command currently selected by the user down one column.



Command data description is shown as below:

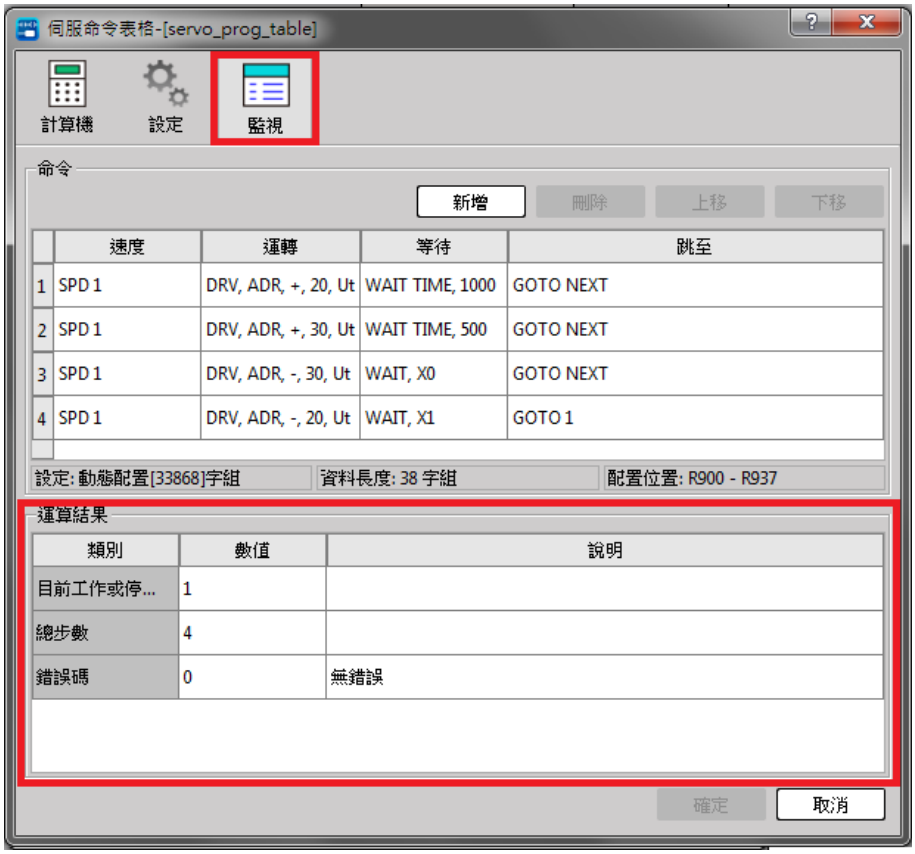
Item			Description
Command	Speed	SPD	The frequency or speed of the pulse output can be directly input to a constant or register (R/D). When FUN141 parameter 0=0, it is the speed; When FUN141 parameter 0=1 or 2, it is the frequency.
	Operation	DRV	Pulse Output amount. When FUN141 parameter 0=1, the unit is Ps; When FUN141 parameter 0=0 or 2, the unit is mm, Deg, Inch. There are four instruction operands: ● Select ADR or ABS for positioning coordinates: A. ADR, relative value coordinate positioning. B. ABS, absolute value coordinate positioning. ● Select '+' or '–' for the operating direction:

			A. ' + ', forward revolution or count up. B. ' − ', reverse or count down. ● The stroke setting value (pulse output value) can be directly input to a constant or a temporary register (R/D). ● Stroke setting value resolution Ut or Ps: A. For Ut, the resolution is determined by FUN141 parameter 0, 3. B. For Ps, the mandatory resolution is one Ps.
		DRVC	The usage is the same as DRV command.
		DRVZ	As a convenient command for return-to-origin, three different methods of return-to-origin, MD0-MD2, are provided in total.
	Wait	WAIT TIME	WAIT TIME (unit is 0.01 second) when the pulse output is completed. When the time is up, the number of steps indicated by GOTO will be executed; constants or registers (R/D) can be input directly.
		WAIT	WAIT for input contact signal when pulse output is completed. When the input contact signal is ON, execute the steps indicated by GOTO.
		ACT	After the action time described by the pulse output ACT, immediately execute the number of steps indicated by GOTO; the action time (unit: 0.01 second) can be directly input into a constant or register (R/D).
		EXT	External trigger command, when the pulse is being output (the number of pulse waves has not been sent), if the external trigger signal is activated (ON), it will immediately execute the steps indicated by GOTO.
	Go To	GOTO	When the condition of WAIT/ACT/EXT instruction is met, use GOTO instruction to describe the number of steps to be executed. • NEXT: To execute the next step. • A constant: The number of steps to execute.

			• Register (R/D): The number of steps to be executed is stored in the temporary register.
		MEND	Positioning program finished.

7-4-2 Table Monitoring

The monitoring of [Servo Program Table] is shown in the figure below. Users need to be online and call the Zooming function on FUN140 to use it. The content corresponds to the command operation start register (WR) on FUN140.



Item	Description
Currently Working/Stopping Steps	If the command is being executed, the content value is the number of steps being executed (1~N); If the instruction is not being executed, the content value represents the number of steps currently stopped.
Total Steps	Steps in total
Working Flag	Corresponds to flag of WR+1 B8 =ON, suspend output. B9 =ON, wait for transition condition. B10=ON, continuous operation (total output stroke is set to 0).

	B12=ON, pulse output (output indication "ACT"). B13=ON, command execution error (output indication "ERR"). B14=ON, one-step positioning is completed (output indication "DN").
Error Code	Error Codes of PSO 0-4

7-5 General Purpose Link Table

The main purpose of the [General Purpose Link Table] is to facilitate the user to fill in the data content of the communication command FUN151 CLINK, which corresponds to MD1/MD2. For the description of the corresponding command, please refer to the advanced manual.

7-5-1 Table Value

The table data section of [General Purpose Link Table] is as shown in the figure below. Users can edit individual commands of [General Purpose Link Table] through simple operations, and the content corresponds to the command start register (SR) on FUN151.

The data content description is shown as below:

Item		Description
Parameter	Communication Mode	[Only sending/receiving messages] When MD1 is only sending out messages, the other party does not respond; when MD2 is only receiving messages, there is no response. [Receive message after sending or Send message after accepting]

		MD1 is sending out a message, and then waiting to receive a response message from the other party; MD2 is receiving a message, and then sending out a response message.
	Receive even if a communication error occurs	When checked, the receiving action will be performed whether there is a communication error or not.
	The register uses only one bit of data	When checked, one data occupies one register; otherwise, two data temporarily occupy one register.
	Start Code	Start code describing the message.
	Finish Code	Finish code describing the message.
Command		Edit the content of the sent or received message. The editing content can use decimal, hexadecimal and character strings, and the data must be separated by commas or blanks.
Preview		Preview the message content to be sent or received.

7-5-2 Table Monitoring

The monitoring of [General Purpose Link Table] is as shown in the figure below. Users need to be online and call the Zooming function on FUN151 to use it. The content corresponds to the command operation start register (WR) on FUN151.

Item	Description
Result Code	Shows the operating result. 00H: Normal Other values: Error

7-6 Register Table

The register table function is mainly to provide users with fast batch writing of register values. Users can pre-plan the register table in the project, write in batches during the download process, or directly write in the new register table through online editing.

7-6-1 Table Value

The table data section of [Register Table] is as shown in the figure below, users can edit individual commands of [Register Table] through simple operations, and plan the register values in advance.

Fig. 137: Setting Register Table

The operation description is shown as below:

Item			Description
Operation	New		After clicking, a row of commands will be added in the editing section for users to edit.
	Delete		After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
	Move Up		After clicking, move the command currently selected by the user up one column.
	Move Down		After clicking, move the command currently selected by the user down one column.
	Right-Click Menu	Cut	After clicking, cut the command currently selected by the user, and multiple selections can be cut.
		Copy	After clicking, copy the command currently selected by the user, multiple selections can be copied。

		Paste	After clicking, paste the command previously copied or cut by the user.
		Insert	After clicking, insert a row of commands at the selected position in the editor for users to edit.
		Delete	After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
		Move Up	After clicking, move the command currently selected by the user up one column.
		Move Down	After clicking, move the command currently selected by the user down one column.

The command data description is shown as below:

Item		Description
Command	No.	The address of the register to be written in batches. Counting from the start address of the table, the No. will be automatically adjusted as the data type is word group or double word-group.
	Data Type	Divided into word group (16Bits) and double word-group (32Bits).
	Data	The data to be written into the register can be filled in decimal, hexadecimal or string. In decimal, just fill in the decimal number, EX: 1234. For hexadecimal, fill in the hexadecimal number, and fill in 'H' at the last character. EX: 1234H. String, just fill in ASCII characters in the quotation marks, EX: 'By'.
	Description	Optionally fill in a description for the command.

7-6-2 Table Monitoring

No monitoring function is provided to [Register Table].

7-7 Modbus Master Table

The main purpose of the [Modbus Master Table] is to facilitate the user to fill in the data content of the communication command FUN150 M-BUS. For the description of the corresponding command, please refer to the advanced manual.

7-7-1 Table Value

The table data section of [Modbus Master Table] is as shown in the figure below, users can edit individual commands of [Modbus Master Table] through simple operations, and the content corresponds to the command start register (SR) on the FUN150.

Fig. 138: Setting Modbus Master Table

The operation description is shown as below:

Item			Description
Operation	New		After clicking, a row of commands will be added in the editing section for users to edit.
	Delete		After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
	Move Up		After clicking, move the command currently selected by the user up one column.
	Move Down		After clicking, move the command currently selected by the user down one column.
		Cut	After clicking, cut the command currently selected by the user, and multiple selections can be cut.

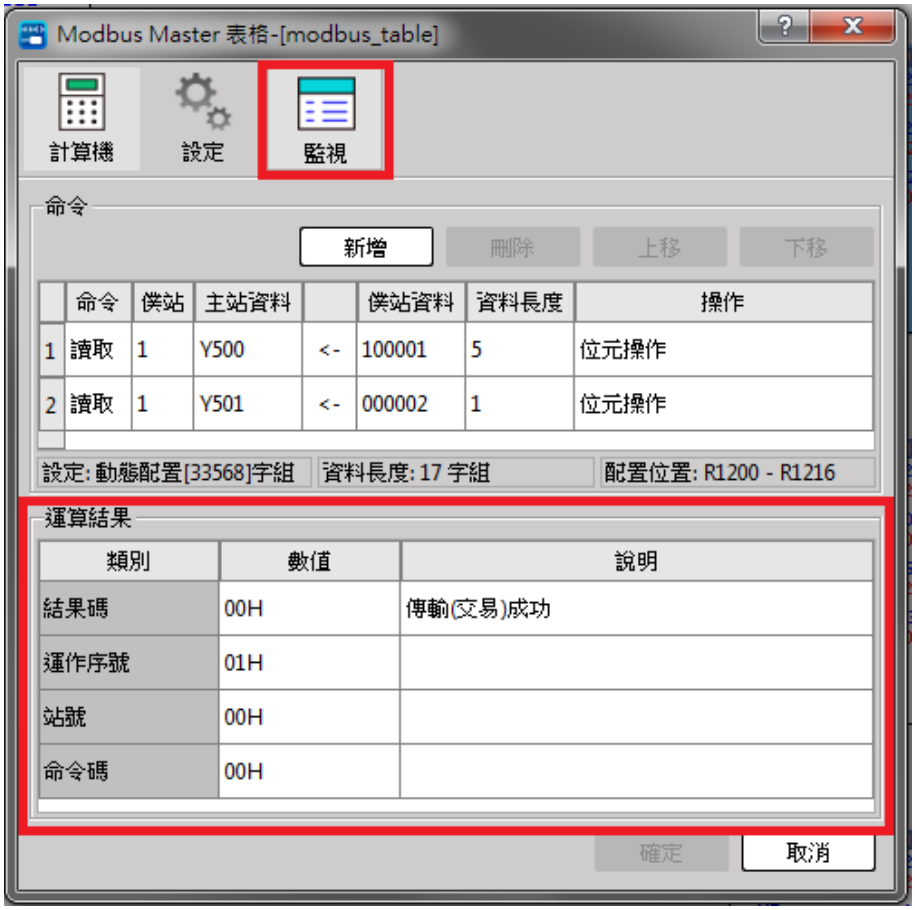
	Right-Click Menu	Copy	After clicking, copy the command currently selected by the user, multiple selections can be copied。
		Paste	After clicking, paste the command previously copied or cut by the user.
		Insert	After clicking, insert a row of commands at the selected position in the editor for users to edit.
		Delete	After clicking, delete the command currently selected by the user, and multiple selections can be deleted.
		Move Up	After clicking, move the command currently selected by the user up one column.
		Move Down	After clicking, move the command currently selected by the user down one column.

The command data content is shown as below:

Item		Description
Data	No.	Display the command information of the Nth.
	Command	Edit this command action as [Read] or [Write]
	Slave	Edit the station number of the slave station to communicate.
	Master Data	Edit the data starting address of the Master station.
	Slave Data	Edit the data starting address of the Slave station.
	Data Size	The data size of such command
	Operation	Display this command as [Bit Operation] or [Word Group Operation]

7-7-2 Table Monitoring

The monitoring of [Modbus Master Table] is as shown in the figure below. Users need to be online and call the Zooming function on FUN150 to use it. The content corresponds to the command operation start register (WR) on FUN150.



Item	Description
Result Code	Shows the operating result. 00H: Normal Other values: Error
Operation No.	Indicates that the Nth transaction is in operation.
Station No.	Indicates the station number of the slave station currently in communication.
Command Code	01H: Read the status of multiple consecutive single points 0xxxxx of the slave station. 02H: Read the status of multiple consecutive single points 1xxxxx of the slave station. 03H: Read the status of multiple consecutive registers 4xxxxx of the slave station. 04H: Read the status of multiple consecutive registers 3xxxxx of the slave station. 05H: Write a single-point 0xxxxx status to the slave. 06H: Write single register 4xxxxx data to the slave station. 0FH: Write consecutive multiple single points 0xxxxx status to the slave station 10H: Write consecutive multiple registers 4xxxxx data

8

Comment and Label Information

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the procedure where the comment function is used to improve the program readability and to facilitate maintenance in the future. Such descriptive comment is also available for components, network or program unit. In the meantime, this section also explains the function designed for hiding or displaying the comment.

8-1 Program Unit Comment

When running several program units, the user will be required to set up the comment for the respective program unit in order that the checking and modification will be executed more easily in the future.

Input descriptive comment for program unit: For detailed operation method, please refer to the description provided in Section 6.1.5: "Input Program Unit Comment."

Modify descriptive comment for program unit: After being imported, the user will be allowed to change the program according to the imported comment or to show the modification field by double clicking the comment text field in the Ladder Diagram program field. In this way, the user will be allowed to change the comment text.

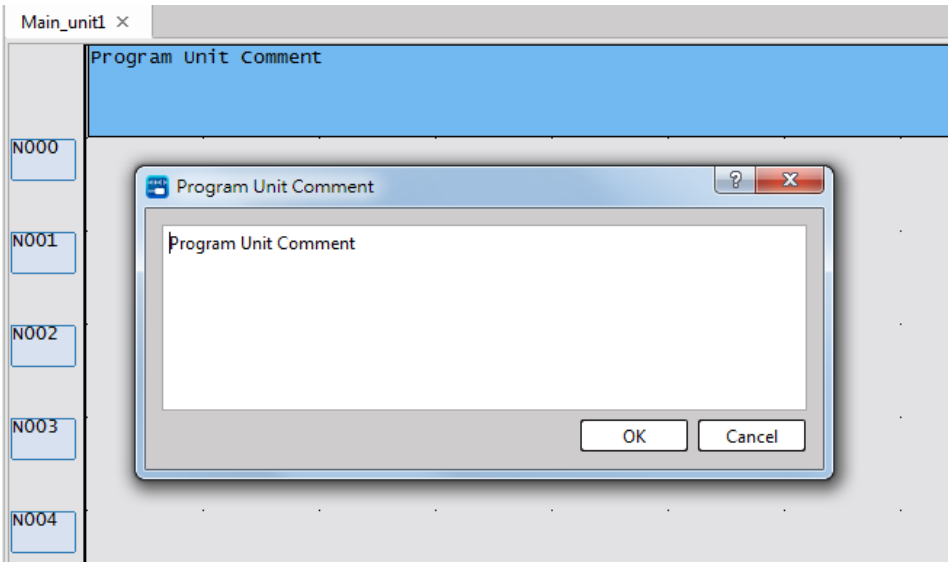


Fig. 139: Program unit comment

8-2 Network Comment

Each program unit comprises several network comments and each of them is designed with the intended function. By using such function with the comment, it will be easier for program modification and maintenance in the future.

8-2-1 Operation method for inputting comment in dedicated comment field

Click [Project] → [Comment] → [Network Comment] in function toolbar, or double clicking [Comment] → [Network Comment] in project management window and the [Network Comment] input window will be displayed:

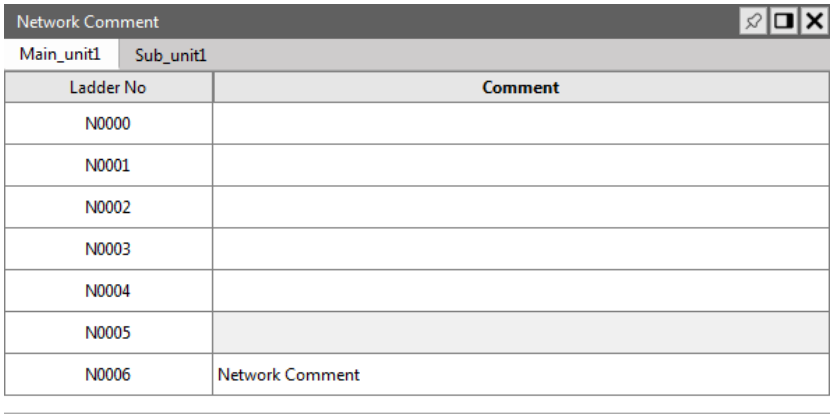


Fig. 140: Network Comment

The comment input method shall be the same as the operation instructions provided in Section 6.1.5: “Input Program Unit Comment”. After being imported, press [OK] to complete the comment setting for the network comment.

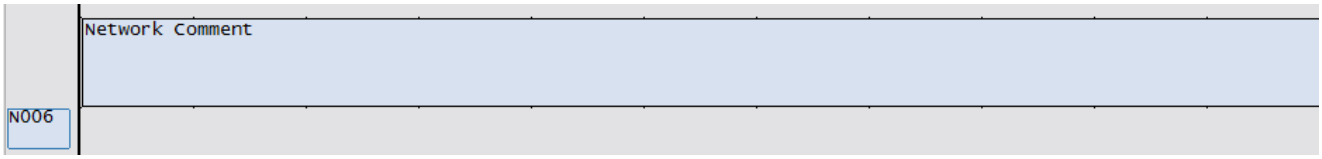


Fig. 141: Inputting network comment

8-2-2 Operation method for inputting comment by selecting Single Solution Network

In Ladder Diagram program section, you may click Network N000 or its component and then press the right mouse button to show Pop-up Menu in order to select the [Network Comment]. By clicking the right mouse button to show the function menu, it allows the user to select [Network Comment] function. At this time, the system will show the network comment input section that represents “Network N000.”

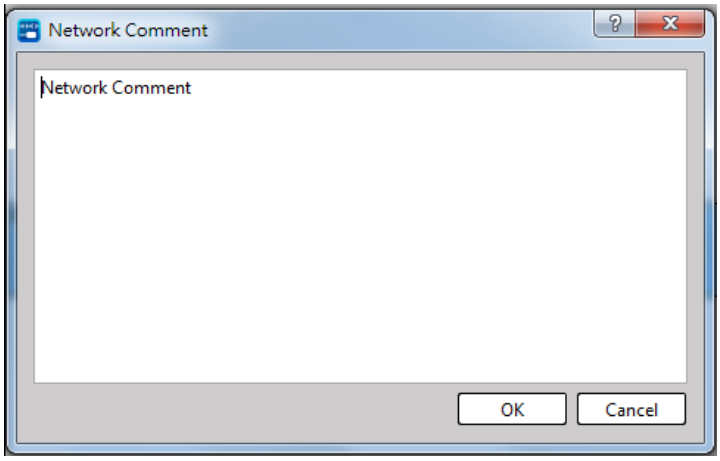


Fig. 142: Editing network comment

Press [OK] to complete the editing of comment for network comment.

Modifying network descriptive comment

For detailed operation method, please refer to Section 10.1: Section 6.1.5: "Input Program Unit Comment."

Deleting network descriptive comment

For detailed operation method, please refer to Section 10.1: Section 6.1.5: "Input Program Unit Comment."

8-3 Element Comment

The program unit is composed of several network comments where each component is also serving as a single network comment. Under such structure, lots of components exist in each Single Program Unit that it would be required to provide comment description for each component.

8-3-1 Setting Introduction

Click [Project] → [Comment] → [Element Comment] in function toolbar; or double clicking [Comment] → [Element Comment] in project management window and the [Element Comment] input sectoin will be displayed:

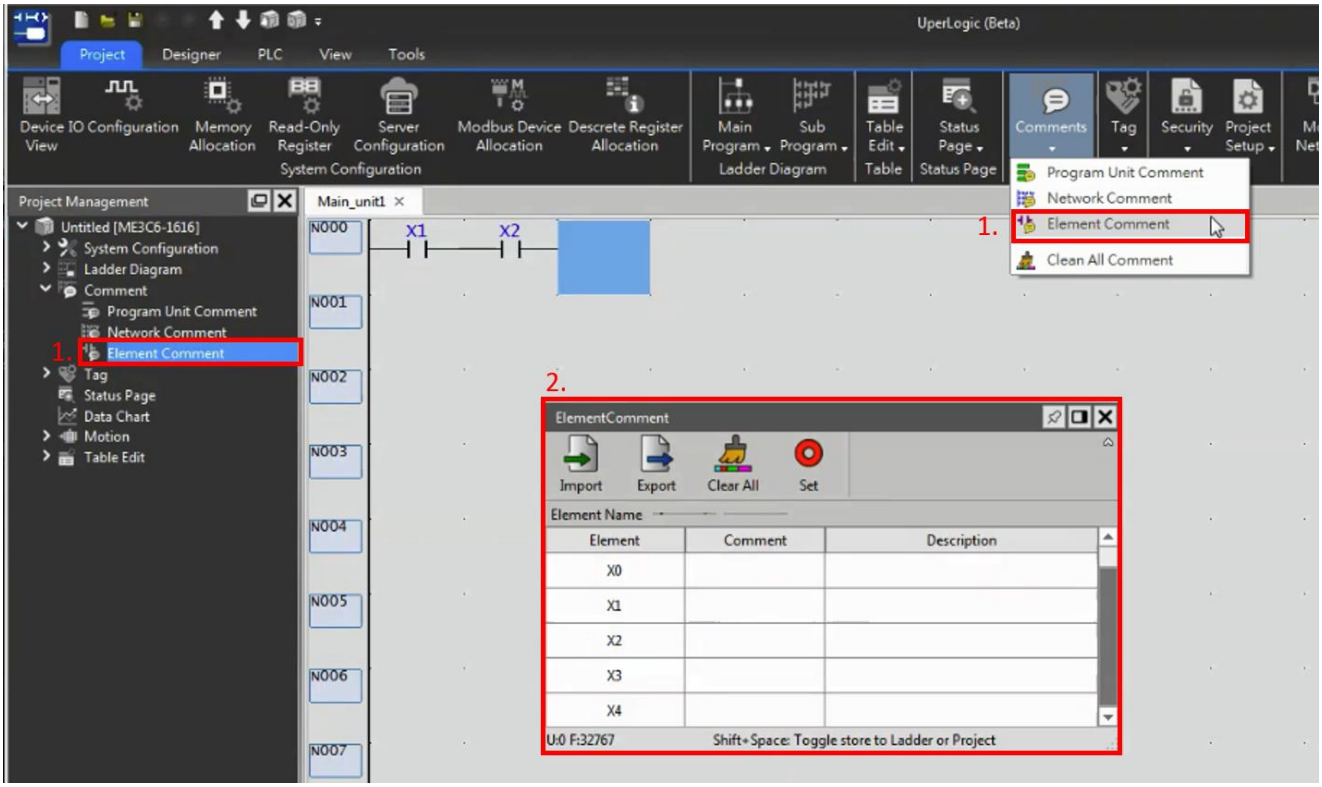


Fig. 143: Element comment

Element Comment_Import:

First select the file that will be imported. Next, select the column item to be imported and then press [OK].

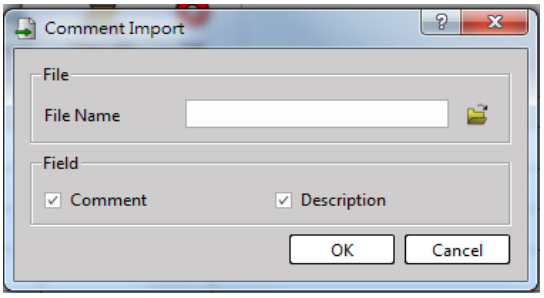


Fig. 144: Element comment_import

Element Comment_Export:

First select the file that will be exported. Next, select the column item to be exported and then press [OK].

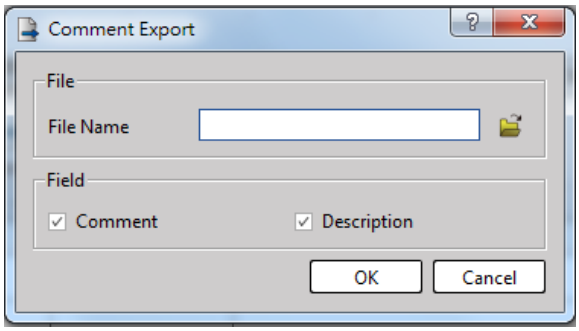


Fig. 145: Element comment_export

Element Comment_Clear All:

Delete all of the comment and description currently created.

Element Comment_Element Name:

Executing the GoTo function for entering the selected Register number address automatically.

Component Comment_Set:

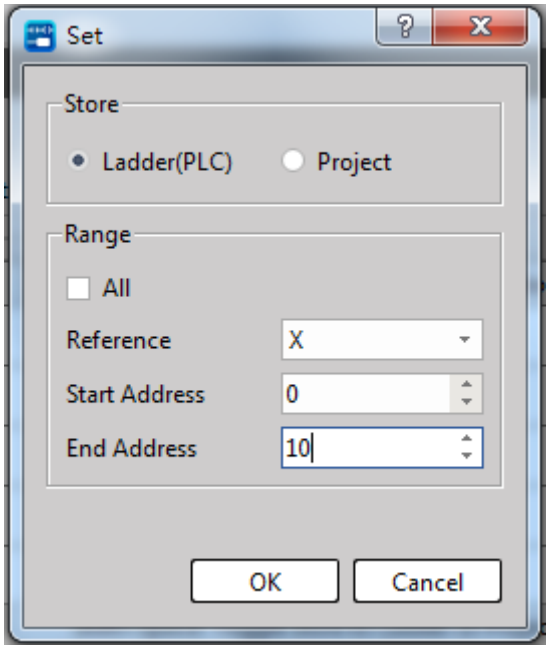


Fig. 146: Element comment_setting

Type	Function	Description
Saving position	PLC	Save the comment in the PLC and the occupied resources will be displayed at the lower-left corner of "Component comment" window.
	Project	Save the comment in the Project and will not occupy the PLC resources.
Scope	All	Change all components to the selected saving position.
	No.	Select the component number.
	Start address	Select the starting address of the component comment.
	End address	Select the ending address of the component comment.

Table 18: Introduction of items in equipment window

8-3-2 Operation method

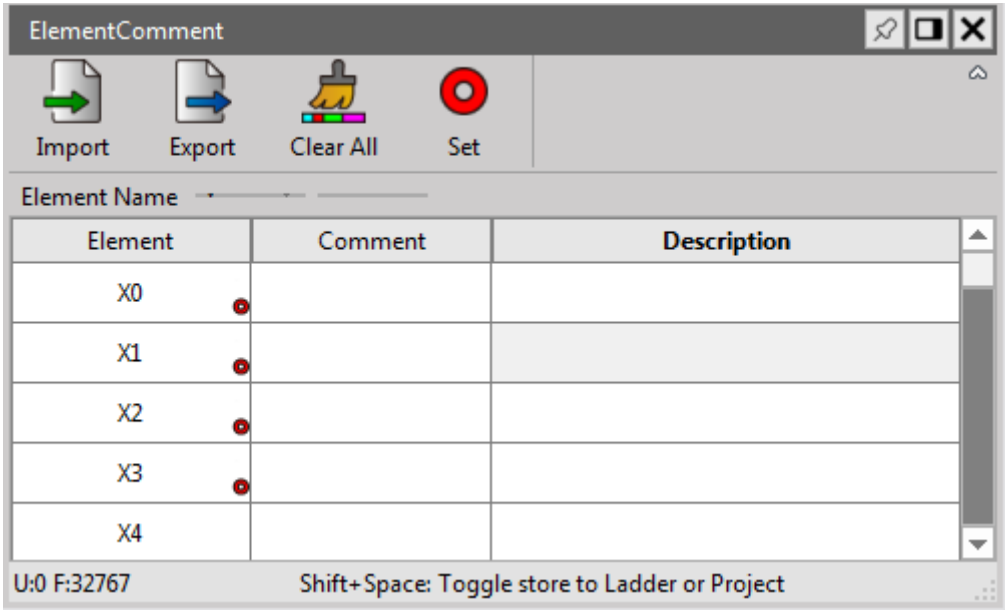


Fig. 147: Element comment window

With [Set] or "Shift+Space" quick keys, you may switch the component comment saving position. The red circle at the lower-right side of the component means that the component has been saved in the project instead of downloading to the PLC.

The field display at lower-left side represents the quantity (U) currently used and the remaining quantity (F).

8-4 Controlling of Comment Display

In Ladder Diagram, the program field is used for displaying program unit comment, network comment and component comment, etc. Described below is the operating method designed for displaying or hiding the aforesaid comments:

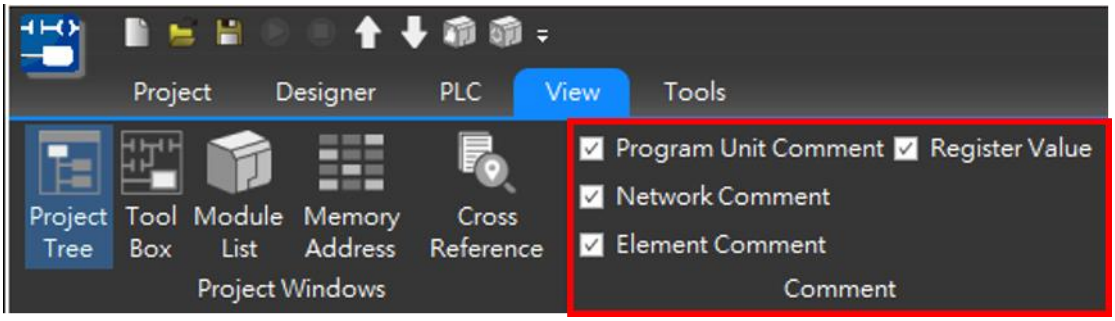


Fig. 148: Comment display

Click [View] → [Program Unit Comment] in function toolbar. If the "√ " symbol is not marked on the left side of text option, then the comment text will not be displayed at the upper side of the program field in Ladder Diagram. After completing such action, the "√ " symbol will appear on the left side of text option.

Such procedure also applies to Element Comment, Network Comment and Register Value.

8-5 Tag

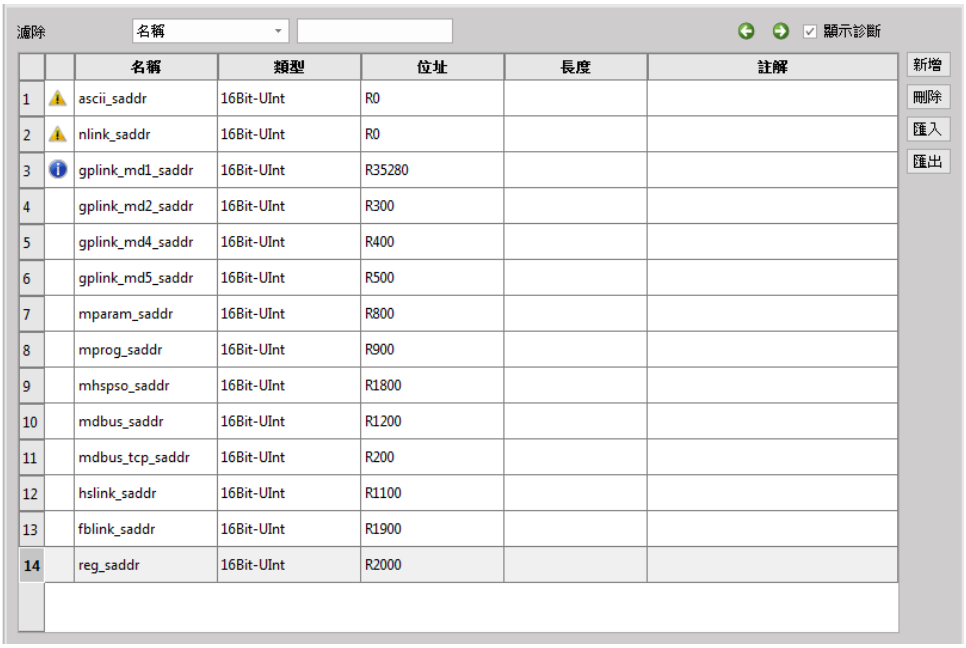
Tags are variables that are specified as arbitrary strings for input, output, and internal data. Tags can be designed to express the logic of the program more clearly through string descriptions. Programs using tags can also easily modify the variable configuration without modifying them one by one.

There are three types of UperLogic tags: global tags, regional tags, and system tags.

Item	Description
Global Tag	A tag that can be used by all programs and settings in the project, and can be created by oneself.
Regional Tag	The tags used in each program can only be used in such program and can be created by oneself.
System Tag	The default label of M-PLC cannot be created by oneself.

8-5-1 Tag Editor

Global tags and regional tags can be edited and exported through the following tag editor. The following describes each function.。



		名稱	類型	位址	長度	註解
1	⚠	ascii_saddr	16Bit-UInt	R0		
2	⚠	nlink_saddr	16Bit-UInt	R0		
3	ℹ	gplink_md1_saddr	16Bit-UInt	R35280		
4		gplink_md2_saddr	16Bit-UInt	R300		
5		gplink_md4_saddr	16Bit-UInt	R400		
6		gplink_md5_saddr	16Bit-UInt	R500		
7		mparam_saddr	16Bit-UInt	R800		
8		mprog_saddr	16Bit-UInt	R900		
9		mhspso_saddr	16Bit-UInt	R1800		
10		mdbus_saddr	16Bit-UInt	R1200		
11		mdbus_tcp_saddr	16Bit-UInt	R200		
12		hslink_saddr	16Bit-UInt	R1100		
13		fblink_saddr	16Bit-UInt	R1900		
14		reg_saddr	16Bit-UInt	R2000		

1. Filter Out

   According to the category selected by the user to be filtered out and the input content, the tags that will be kept on the screen are determined. Filterable categories include Name, Type, Address, Length, Comments, and None.

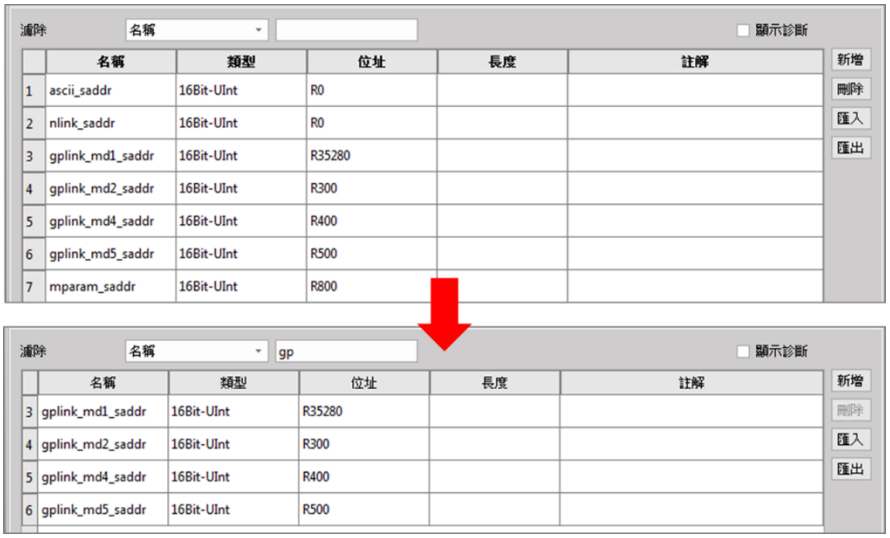


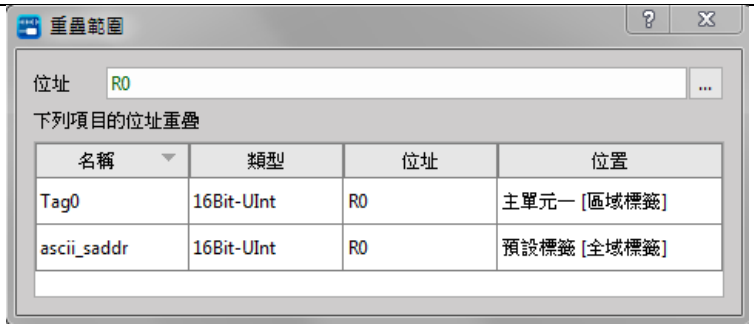
Fig. 149: Filtering out tags

2. **Display Diagnosis**

When the user checks [Display Diagnosis] on the right, a column will be added in front of the tag name, and the diagnosis result will be represented by an icon. When the icon is double-clicked, the details of the diagnosis window will be displayed.

Fig. 150: Display diagnostic result

Item	Description
	Jump to the previous diagnostic result.
	Jump to the next diagnostic result.
	Indicates that the tag address overlaps with other labels. After double-clicking the prompt, the details will be displayed. When the user double-clicks the overlapping item, it will directly jump to the tag editing page where the item is located. This function can remind the designer to avoid reusing the same register location, which may lead to program logic malfunction。

	
	Indicates that the tag address overlaps with a special relay or a special register.

3. Editing Section

Including table section, button section and right-click menu, details are as follows:

Item		Description
Table	Name	Set a tag name, the maximum length is 32 characters. It cannot be pure numbers, registers and reserved words.
	Type	Set tag data type, the types are divided into: [Bool] [16Bit-Int] [16Bit-UInt] [32Bit-Int] [32Bit-UInt] [Float]
	Address	Set the register or relay address assigned to the tag.
	Comment	Set the comment of the tag.
New		After clicking, a row of tags will be added in the editing section for users to edit.
Delete		After clicking, delete the tag currently selected by the user, and multiple selections can be deleted.

Import		After clicking, the tag will be imported after selecting the file. The file extension is *.csv
Export		After clicking, the tag can be exported after selecting the storage location. The file extension is *.csv
Right-Click Menu	Cut	After clicking, cut the tag currently selected by the user, and multiple selections can be cut.
	Copy	After clicking, copy the tag currently selected by the user, multiple selections can be copied。
	Paste	After clicking, paste the tag previously copied or cut by the user.
	Insert	After clicking, insert a row of tags at the selected position in the editor for users to edit.
	Delete	After clicking, delete the tag currently selected by the user, and multiple selections can be deleted.
	Move Up	After clicking, move the tag currently selected by the user up one column.
	Move Down	After clicking, move the tag currently selected by the user down one column.

8-5-2 Global Tag

The global tag editor can be edited through [Tag] → [Global Tag] in the project management window or in the function bar [Project] → [Tag] → [Global Tag].

UperLogic will pre-create a set of [Default Tag] tabs, and users can create global tabs by themselves through [Add Global Tag] and [Delete Global Tag].

Fig. 151: Global Tags

8-5-3 Regional Tag

The regional tag editor can be edited through [Program Unit] → [Arbitrary Program] → [Arbitrary Unit] → [Regional Tag] in the project management window or in the function bar [Project] → [Tag] → [Regional Tag].

The regional tag cannot create a page by itself. When creating a program unit, UperLogic will directly generate a page of the regional tag, and its name will directly correspond to the program unit name. The corresponding regional tag can only be used in this program unit. If you need to use it across program units, please select the global or system tag.

The label names of different regional tag pages can be repeated, but cannot be repeated with the global tag name.

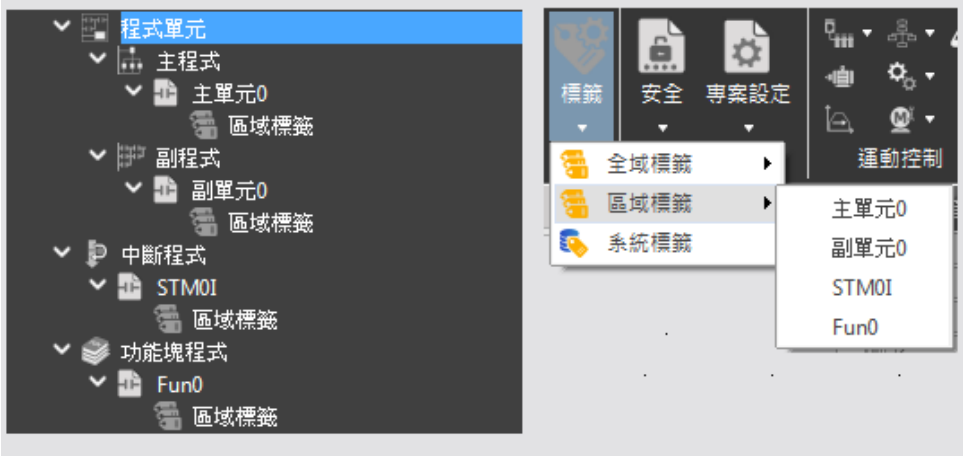
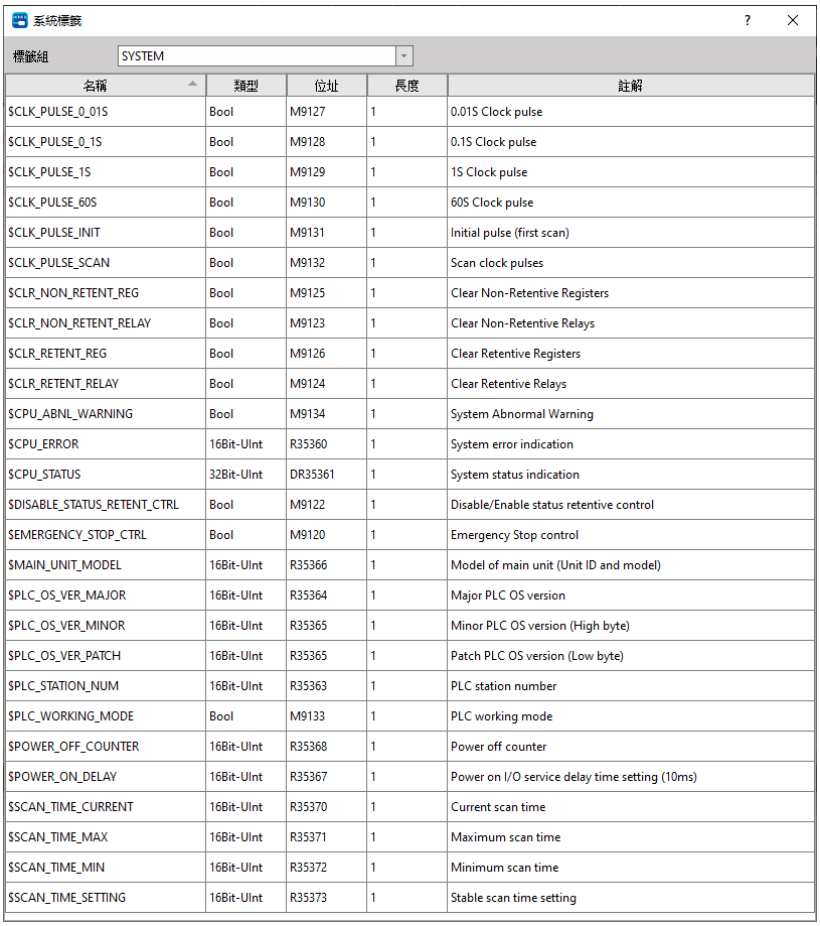


Fig. 152: Regional Tags

8-5-4 System Tag

The list of system tags can be viewed through [Tag] → [System Tag] in the project management window or by clicking [Project] → [Tag] → [System Tag]. The system label is a built-in label, which varies with different models. It is only for viewing, and cannot be added or edited. The name of the system tag must start with $ font size.



名稱	類型	位址	長度	註解
$CLK_PULSE_0_01S	Bool	M9127	1	0.01S Clock pulse
$CLK_PULSE_0_1S	Bool	M9128	1	0.1S Clock pulse
$CLK_PULSE_1S	Bool	M9129	1	1S Clock pulse
$CLK_PULSE_60S	Bool	M9130	1	60S Clock pulse
$CLK_PULSE_INIT	Bool	M9131	1	Initial pulse (first scan)
$CLK_PULSE_SCAN	Bool	M9132	1	Scan clock pulses
$CLR_NON_RETENT_REG	Bool	M9125	1	Clear Non-Retentive Registers
$CLR_NON_RETENT_RELAY	Bool	M9123	1	Clear Non-Retentive Relays
$CLR_RETENT_REG	Bool	M9126	1	Clear Retentive Registers
$CLR_RETENT_RELAY	Bool	M9124	1	Clear Retentive Relays
$CPU_ABNL_WARNING	Bool	M9134	1	System Abnormal Warning
$CPU_ERROR	16Bit-UInt	R35360	1	System error indication
$CPU_STATUS	32Bit-UInt	DR35361	1	System status indication
$DISABLE_STATUS_RETENT_CTRL	Bool	M9122	1	Disable/Enable status retentive control
$EMERGENCY_STOP_CTRL	Bool	M9120	1	Emergency Stop control
$MAIN_UNIT_MODEL	16Bit-UInt	R35366	1	Model of main unit (Unit ID and model)
$PLC_OS_VER_MAJOR	16Bit-UInt	R35364	1	Major PLC OS version
$PLC_OS_VER_MINOR	16Bit-UInt	R35365	1	Minor PLC OS version (High byte)
$PLC_OS_VER_PATCH	16Bit-UInt	R35365	1	Patch PLC OS version (Low byte)
$PLC_STATION_NUM	16Bit-UInt	R35363	1	PLC station number
$PLC_WORKING_MODE	Bool	M9133	1	PLC working mode
$POWER_OFF_COUNTER	16Bit-UInt	R35368	1	Power off counter
$POWER_ON_DELAY	16Bit-UInt	R35367	1	Power on I/O service delay time setting (10ms)
$SCAN_TIME_CURRENT	16Bit-UInt	R35370	1	Current scan time
$SCAN_TIME_MAX	16Bit-UInt	R35371	1	Maximum scan time
$SCAN_TIME_MIN	16Bit-UInt	R35372	1	Minimum scan time
$SCAN_TIME_SETTING	16Bit-UInt	R35373	1	Stable scan time setting

Fig. 153: List of System Tags

There are many tag groups in the system tag, users can view the labels of different categories by selecting a tag group.

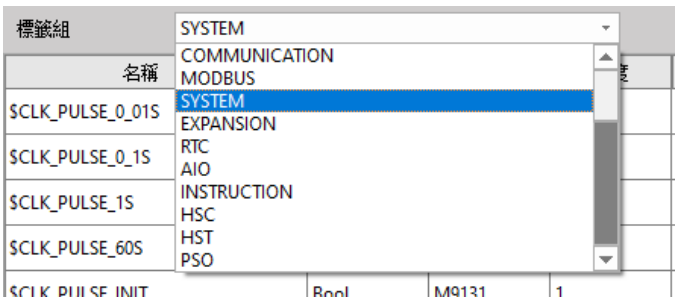


Fig. 154: Tag group menu

8-5-5 Tag Usage

1. Direct Use

   During the editing process, the user can directly input the relevant words of the corresponding tag name, and a drop-down menu will appear at this time to prompt possible tags to be used.

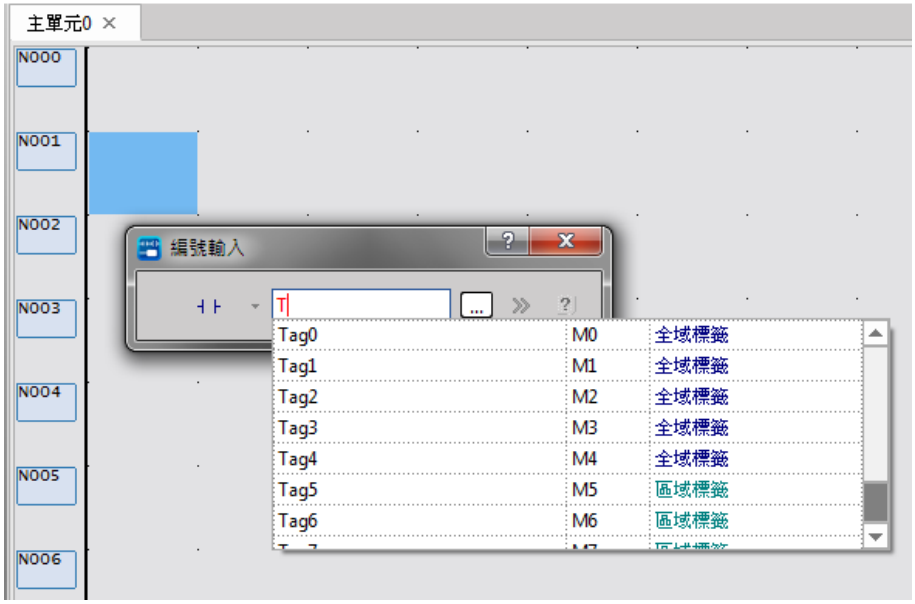


Fig. 155 Tags

2. Use after processing a new tag

   If the user wants to directly create a new tag and use it during the editing process, he can directly enter the name of the new tag and press “Enter”, and the system will automatically jump to the registration tag window to allow the user to register a new tag.

Item	Description
Name	Tag Name
Position	The registration position of the tag, which can be set in the global tag tab or the regional tag tab
Type	Set tag data type, the types are divided into: [Bool] [16Bit-Int] [16Bit-UInt] [32Bit-Int] [32Bit-UInt] [Float]
Address	Set the register or relay address assigned to the tag
Comment	Set the comment of the tag
Open the Tag Page after Registration	When checked, it will jump to the tag editor page after the registration is complete.

9

Motion Control

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the servo and cam related configuration methods. By combining the image-base display and the user-friendly interface, it allows the user to control the setting method more quickly and more efficiently.

To understand the detailed operation method of motion control, please refer to the relevant manuals. Described below is the operation method of different motions.

9-1 Motion Network

After implementing the setting axis in the "Motion Network," the user will be allowed to set the information of the connected slave station (virtual axis).

Setting process:

By clicking [Motion] → [Motion Network] → "Right mouse button" → [Motion Network] in project management row or clicking [Project] → [Motion] → [Motion Network] → [Motion Network], it allows the user to open the [Motion Network] page.

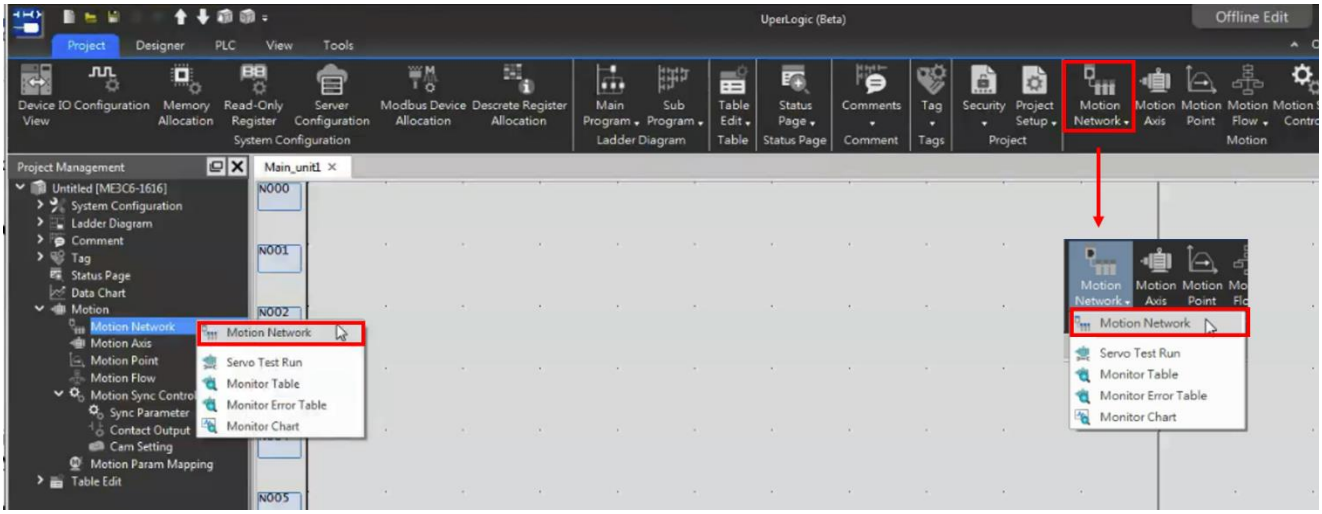


Fig. 156: Motion network setting page

1. Importing ESI file

Import the "EtherCAT" slave station data by clicking "Import ESI file." For details of ESI file, please contact your server dealer.

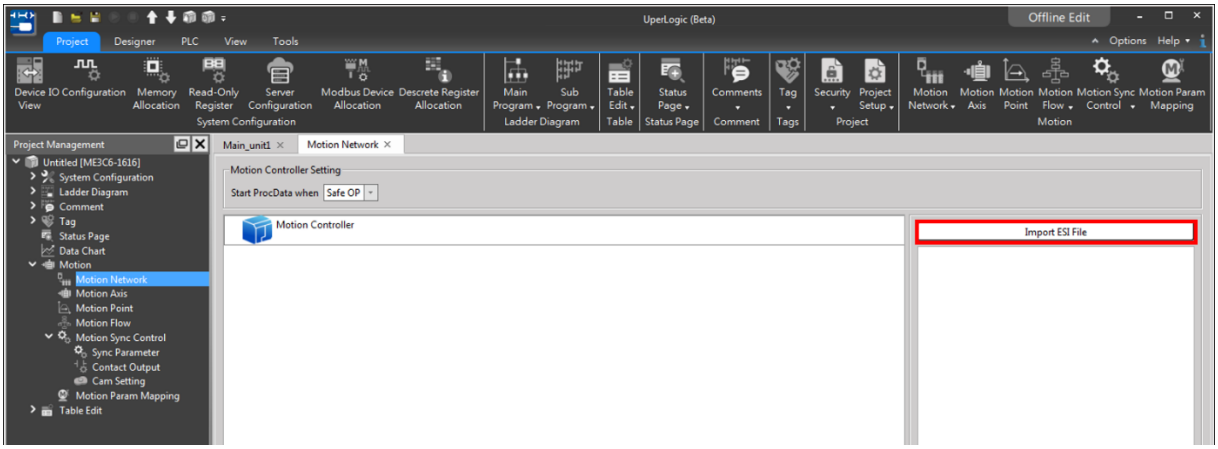


Fig. 157: Importing slave station data

2. Joining slave station

After being imported, the Slave Station Option List will appear. Double-click or scroll down to [Motion Controller] list, and the joining will be allowed.

※ The indicated sequence is the communication sequence.

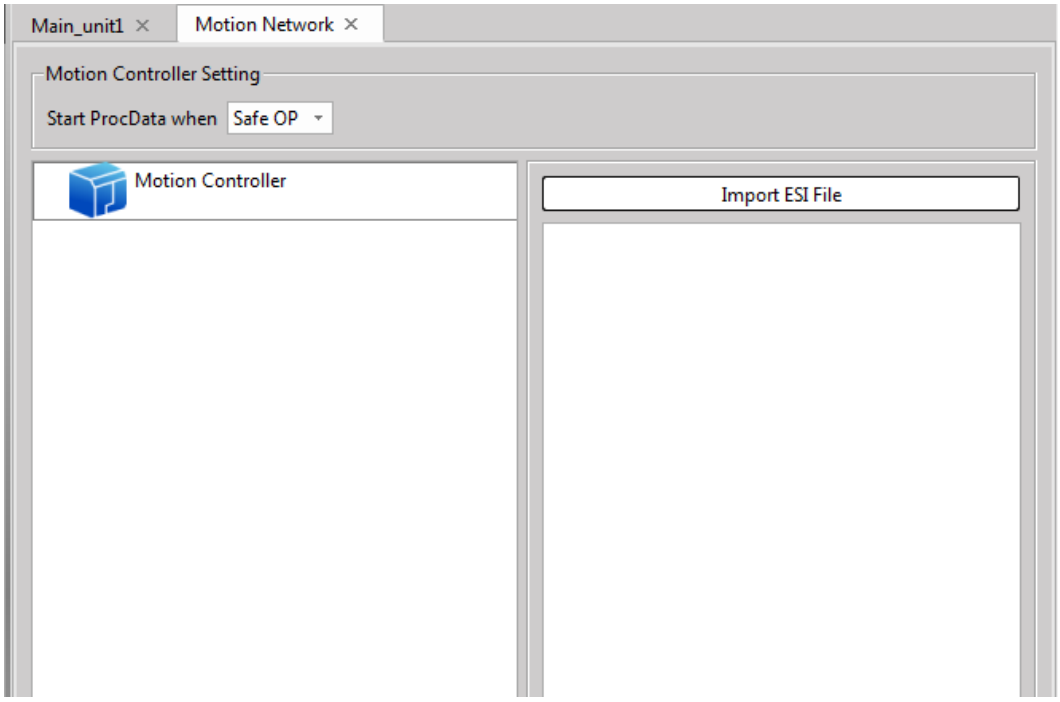


Fig. 158: Communication sequence list

3. Other functions

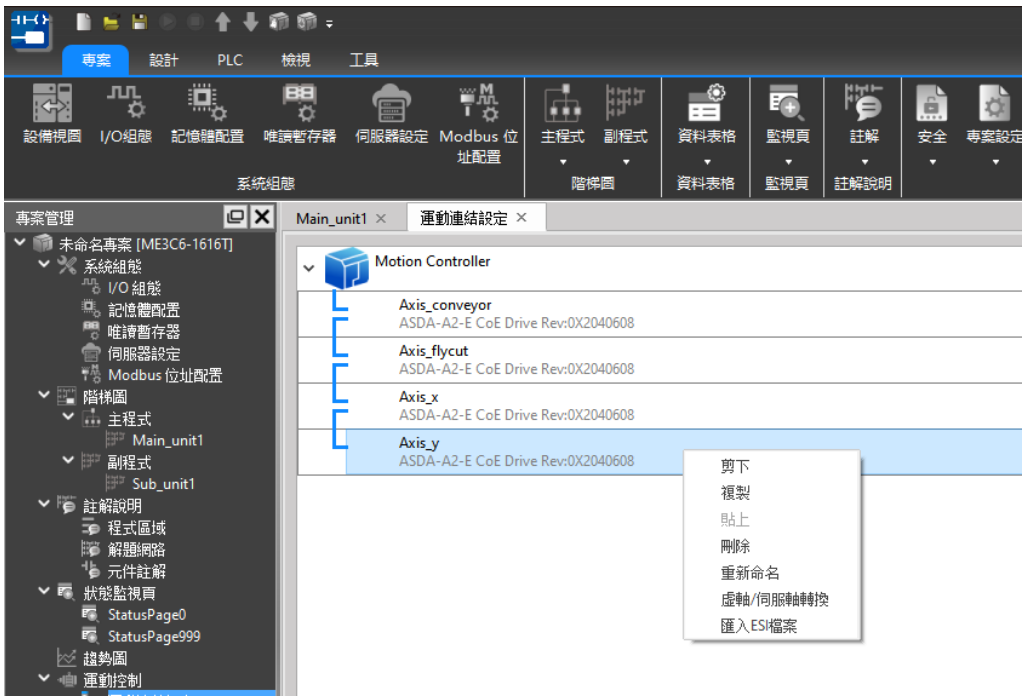


Fig. 159: Other functions

Function	Description
Cut	At the axis that will be cut, click the right mouse button and then select [Cut] in the menu.
Copy	At the axis that will be copied, click the right mouse button and then select [Copy] in the menu.
Paste	At the position that will be pasted, click the right mouse button and then select [Copy] in the menu and you may paste the axis being copied or clipped.
Delete	At the axis that will be deleted, click the right mouse button and then select [Delete] in the menu.
Rename	At the axis that will be renamed, click the right mouse button and then select [Rename] in the menu.
Real Axis-Virtual Axis Conversion	At the axis that will be converted, click the right mouse button and then select [Real Axis-Virtual Axis Conversion] in the menu.

Import ESI file	At the axis that will be imported, click the right mouse button and then select [Import ESI File] in the menu and you can start the importing.
Change Sequence	Drag the Slave Station to be changed to the intended position.

Parameter

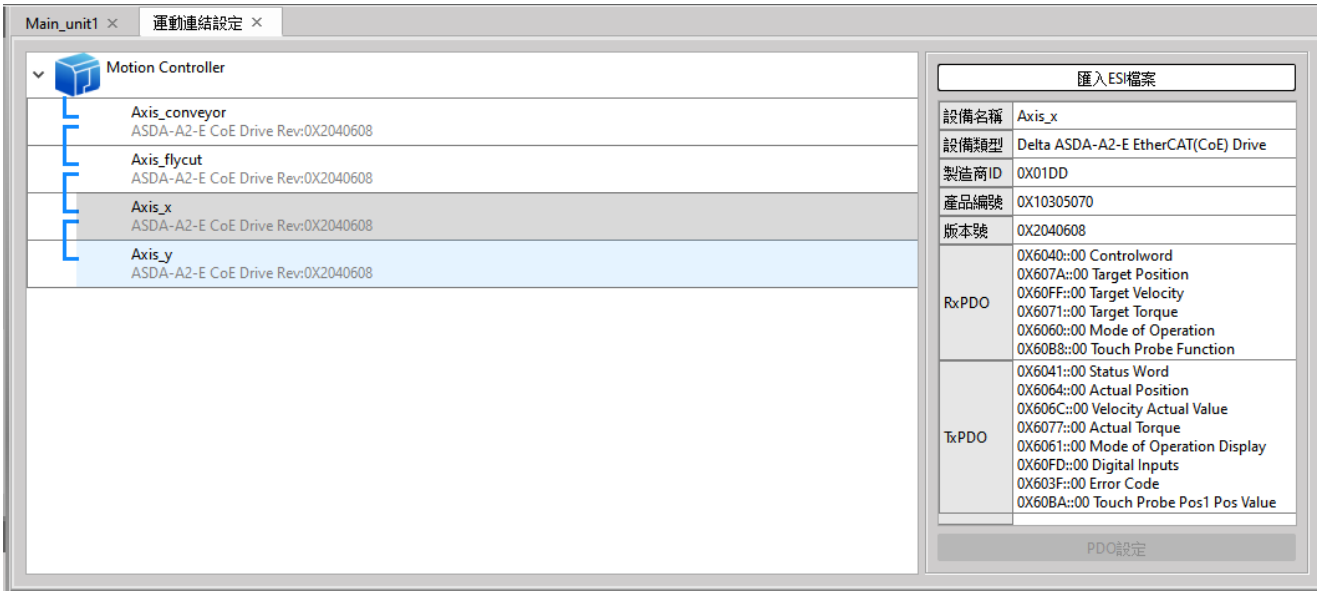


Fig. 160: Parameter setting page

Current fixed PDO setting as below:

PDO Type	Item	Name
RxPDO	0x6040	Controlword
	0x607A	Target position
	0x60FF	Target velocity
	0x6071	Target Torque
	0x6060	Mode Of Operation
	0x60B8	Touch Probe Function
TxPDO	0x6041	Status Word
	0x6064	Actual Position

	0x606C	Velocity actual value
	0x6077	Actual Torque
	0x6061	Mode Of Operation Display
	0x60FD	Digital inputs
	0x603F	Error code
	0x60BA	Touch Probe Pos1 Pos Value
	0x60BC	Touch Probe Pos2 Pos Value

Table 19: PDO setting table

Currently, the system uses 3 kinds of modes. Listed below are the parameters and the unit required for these modes (DELTA 0x60ff, using 0.1 rpm as the unit).

Index	Sub-Index	Name	Units	Type	Access	PdoMapping
603Fh	00h	Error code	---	U16	RO	TxPDO
6040h	00h	Controlword	---	U16	RW	RxPDO
6041h	00h	Statusword	---	U16	RO	TxPDO
6062h	00h	Position demand value	pulse	I32	RO	TxPDO
6064h	00h	Position actual value	pulse	I32	RO	TxPDO
6065h	00h	Following error window	pulse	U32	RW	No
6072h	00h	Max torque	0.1%	U16	RW	RxPDO
6077h	00h	Torque actual value	0.1%	I16	RO	TxPDO
607Ah	00h	Target position	pulse	I32	RW	RxPDO
6080h	00h	Max motor speed	r/min	U32	RW	RxPDO
60B0h	00h	Position offset	pulse	I32	RW	RxPDO
60B1h	00h	Velocity offset	Unit/s	I32	RW	RxPDO
60B2h	00h	Torque offset	0.1%	I16	RW	RxPDO
60F4h	00h	Following error actual value	Pulse	I32	RO	TxPDO
60FDh	00h	Digital inputs	---	U32	RO	TxPDO

Table 20: Synchronous Cycle Position Control Mode Table

Index	Sub-Index	Name	Units	Type	Access	PdoMapping
603Fh	00h	Error code	---	U16	RO	TxPDO
6040h	00h	Controlword	---	U16	RW	RxPDO
6041h	00h	Statusword	---	U16	RO	TxPDO
6072h	00h	Max torque	0.1%	U16	RW	RxPDO
6080h	00h	Max motor speed	r/min	U32	RW	RxPDO
60B1h	00h	Velocity offset	Unit/s	I32	RW	RxPDO
60B2h	00h	Torque offset	0.1%	I16	RW	RxPDO
60FFh	00h	Target velocity	Unit/s	I32	RW	RxPDO

Table 21: Synchronous Cycle Velocity Control Mode Table

Index	Sub-Index	Name	Units	Type	Access	PdoMapping
603Fh	00h	Error code	---	U16	RO	TxPDO
6040h	00h	Controlword	---	U16	RW	RxPDO
6041h	00h	Statusword	---	U16	RO	TxPDO
6071h	00h	Target torque	0.1%	I16	RW	RxPDO
6072h	00h	Max torque	0.1%	U16	RW	RxPDO
6080h	00h	Max motor speed	r/min	U32	RW	RxPDO
60B2h	00h	Torque offset	0.1%	I16	RW	RxPDO

Table 22: Synchronous Cycle Torque Control Table

9-1-1 Servo Test Run

Click [Motion] → [Motion Network] → "Right mouse button" → [Servo Test Run] in project management row.

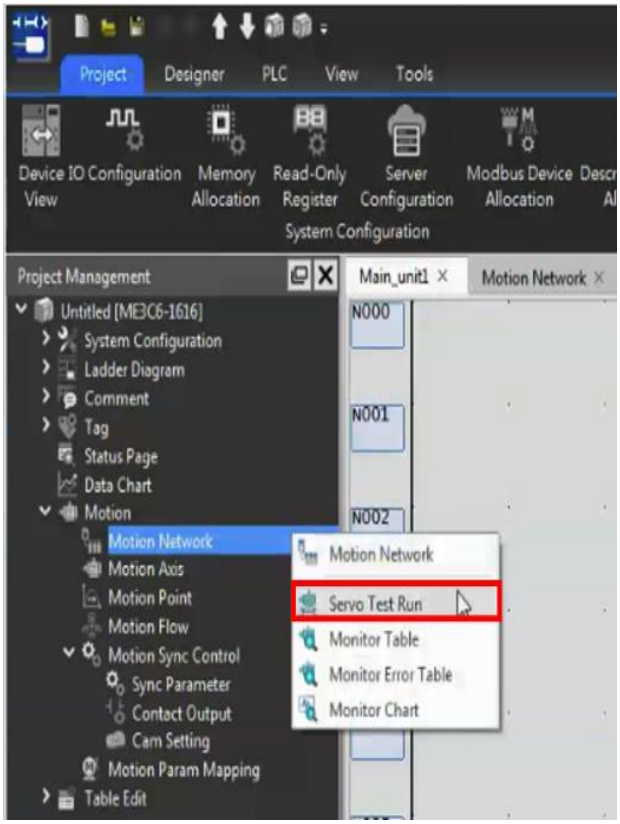


Fig. 161: Servo Test Run

Or you may select [Project] → [Motion] → [Motion Network] → [Servo Test Run] from the menu in function toolbar icon.

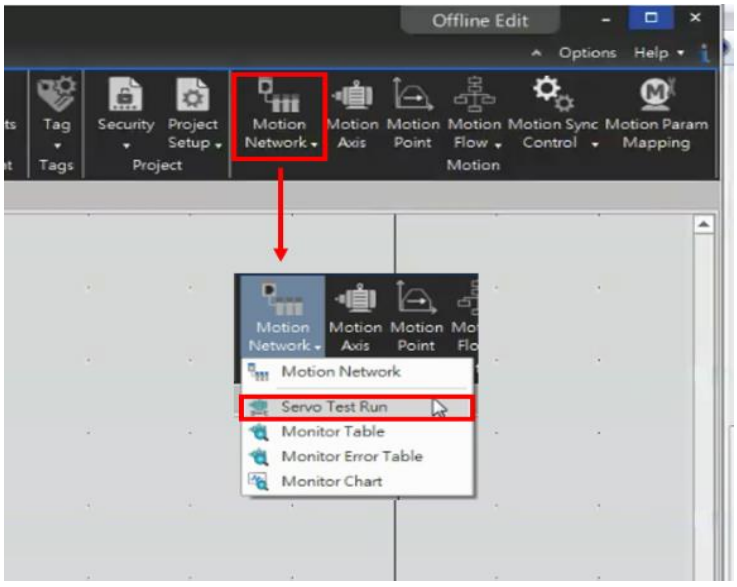


Fig. 162: Servo Test Run

Select the Test Run axis:

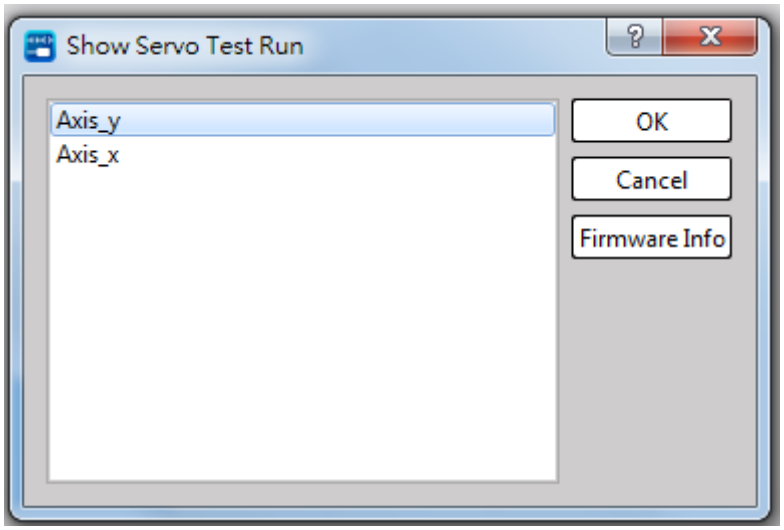


Fig. 163: Selecting the Test Run axis

Indicated below is the Test Run page and it comprises three types of control modes (Position, Velocity, Torque):

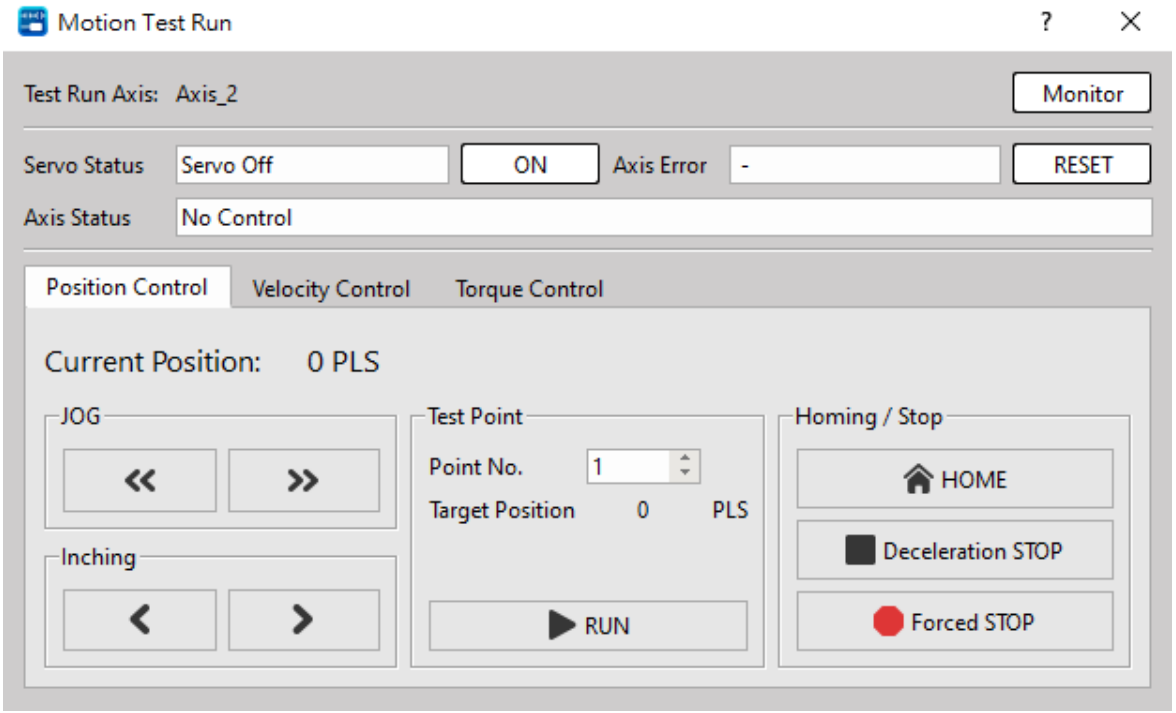


Fig. 164: Position Control Mode

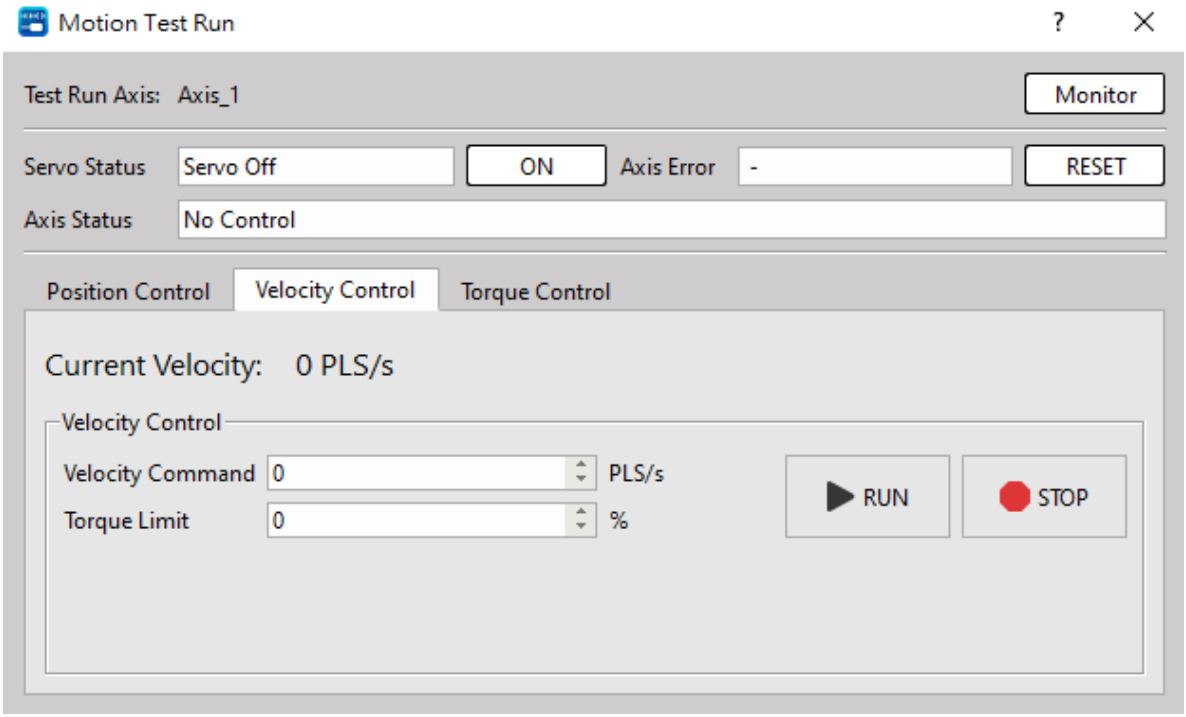


Fig. 165: Velocity Control Mode

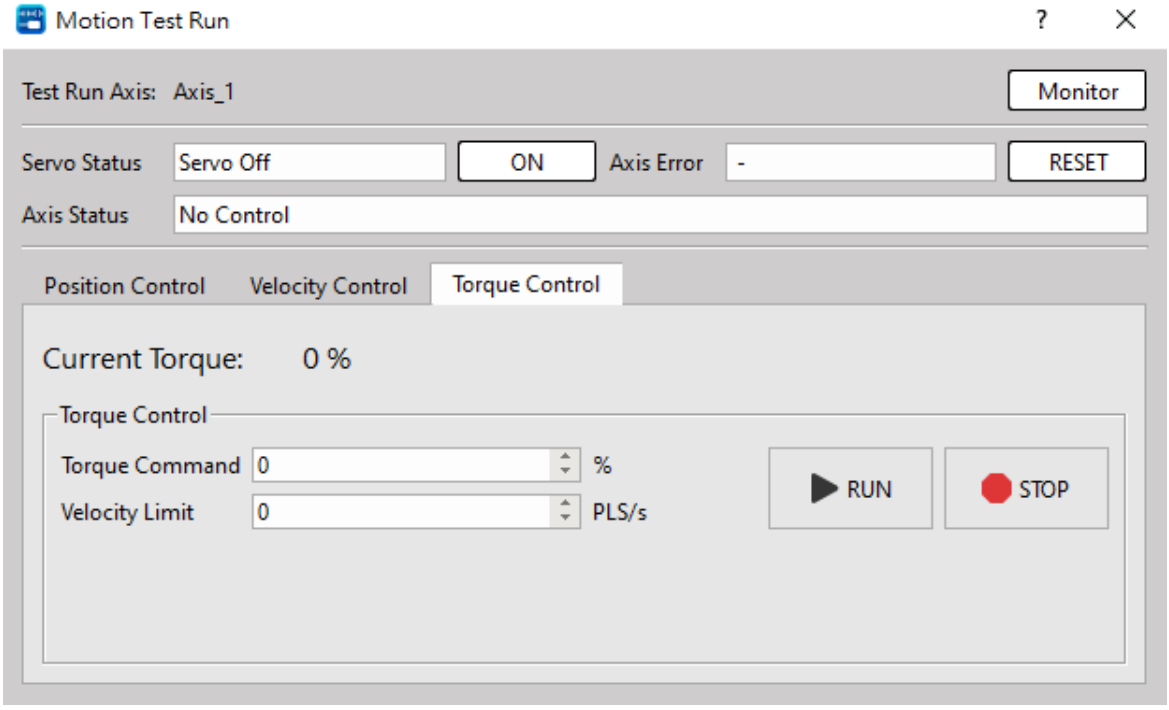


Fig. 166: Torque Control Mode

9-1-2 Monitor Table

Click [Motion] → [Motion Network] → "Right mouse button" → [Monitor Table] in project management row, or you may select [Project] → [Motion Network] → [Monitor Table] from the menu in function toolbar icon.

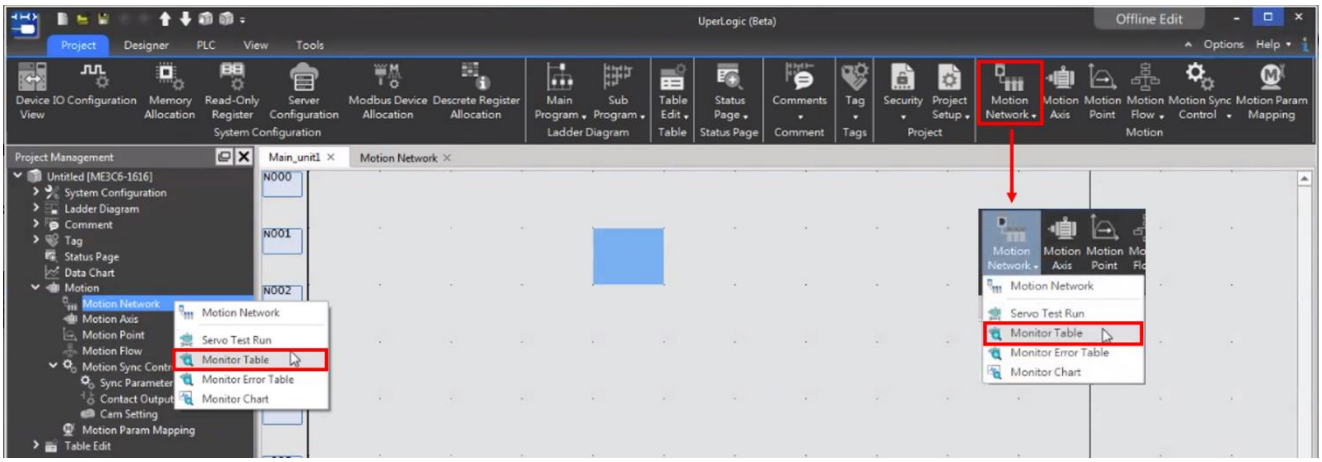
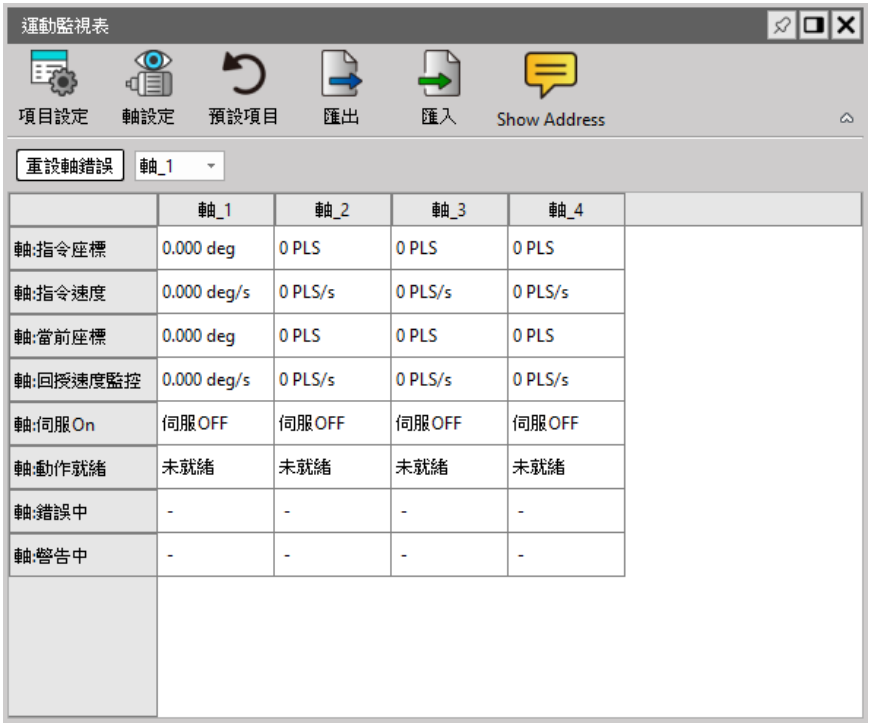


Fig. 167: Motion monitoring table

Provided below is the window showing the opened Motion Monitor Table. If there isn't any axis in the figure, please set up the axis through [Motion Network].



	軸_1	軸_2	軸_3	軸_4
軸:指令座標	0.000 deg	0 PLS	0 PLS	0 PLS
軸:指令速度	0.000 deg/s	0 PLS/s	0 PLS/s	0 PLS/s
軸:當前座標	0.000 deg	0 PLS	0 PLS	0 PLS
軸:回授速度監控	0.000 deg/s	0 PLS/s	0 PLS/s	0 PLS/s
軸:伺服On	伺服OFF	伺服OFF	伺服OFF	伺服OFF
軸:動作就緒	未就緒	未就緒	未就緒	未就緒
軸:錯誤中	-	-	-	-
軸:警告中	-	-	-	-

Fig. 168: Motion Monitor Table

Click [Item Setting], and you may select the object to be monitored.

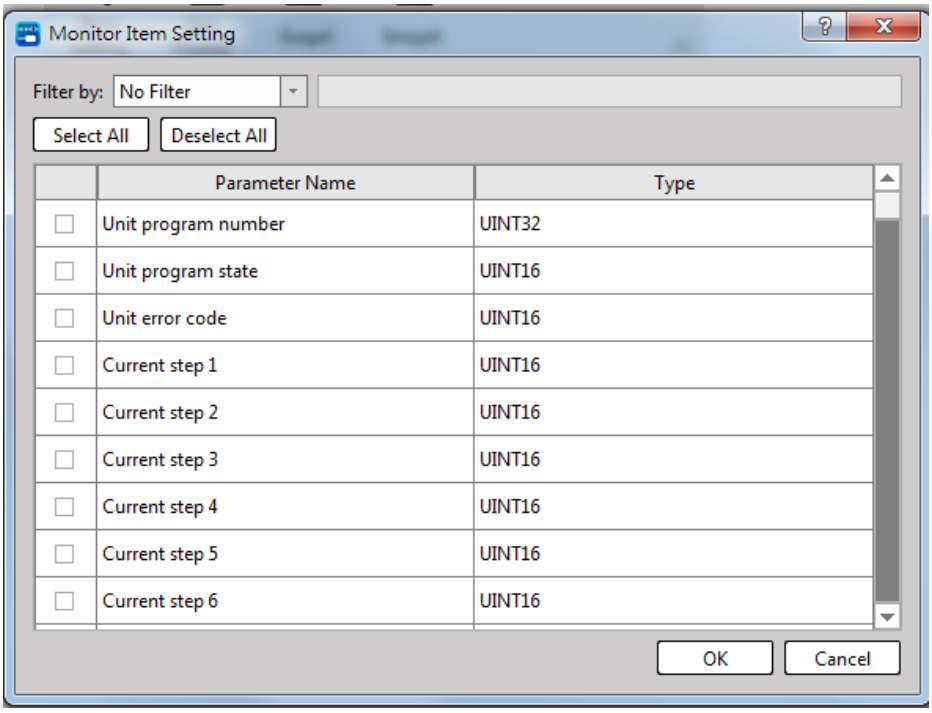


Fig. 169: Selecting the item to be monitored

Click [Axis Display], and you may select the axis to be displayed.

Click [Export] and [Import], and the system will show the setting required for exporting and importing the Motion Monitor Table.

9-1-3 Monitor Error Table

Click [Motion] → [Motion Network] → "Right mouse button" → [Monitor Error Table] in project management row, or you may select [Project] → [Motion Network] → [Monitor Error Table] from the menu in function toolbar icon.

Fig. 170: Motion eroor monitoring table

9-1-4 Monitor Chart

Click [Motion] → [Motion Network] → "Right mouse button" → [Monitor Chart] in project management row, or you may select [Project] → [Motion Network] → [Monitor Chart] from the menu in function toolbar icon.

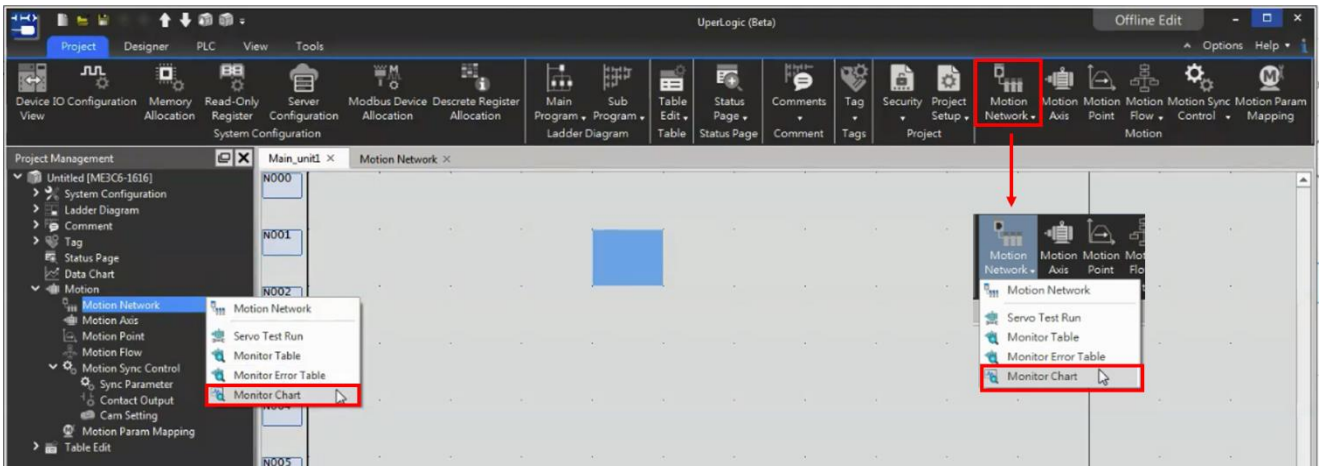


Fig. 171: Motion monitoring chart

Provided below is the window showing the opened Motion Monitor Chart.

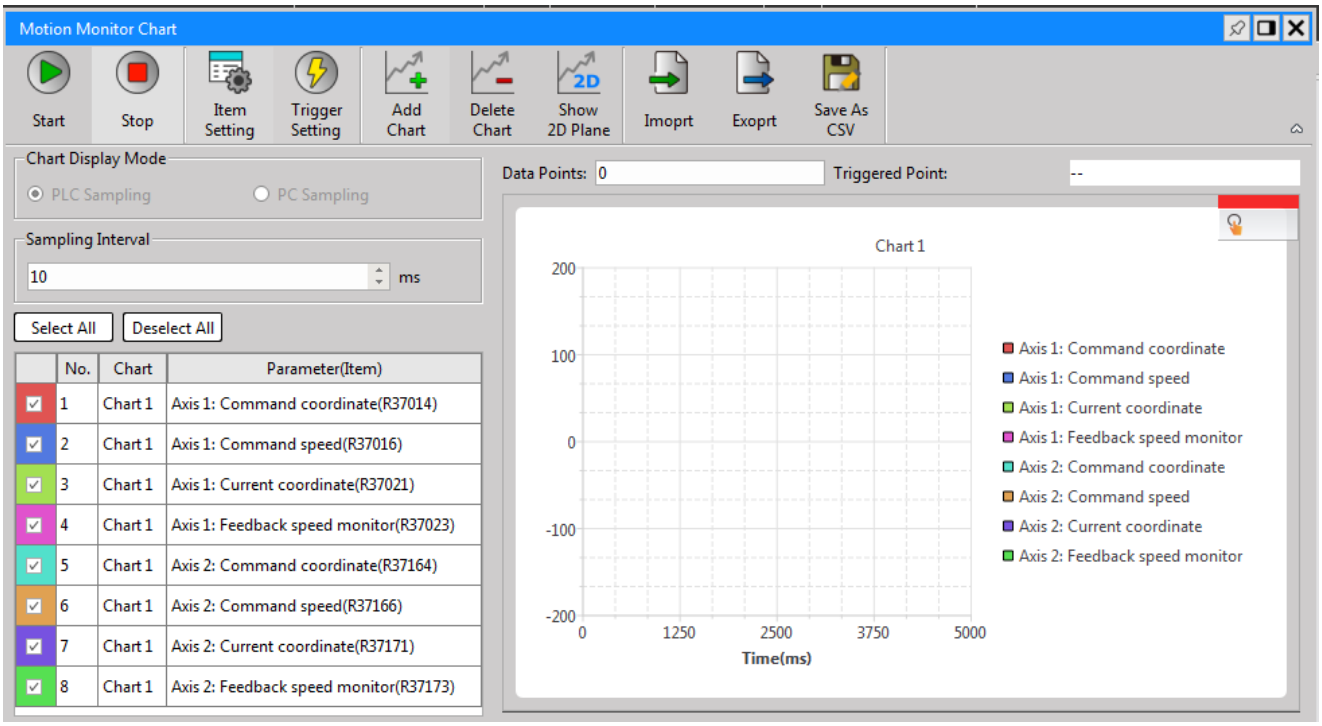


Fig. 173: Motion monitoring page

9-2 Motion Axis

1. Setting process

Click [Project] → [Motion] → [Motion Axis] in function toolbar, or you may select [Project] → [Motion Axis] in project management window and then double click the left mouse button to open the setting page.

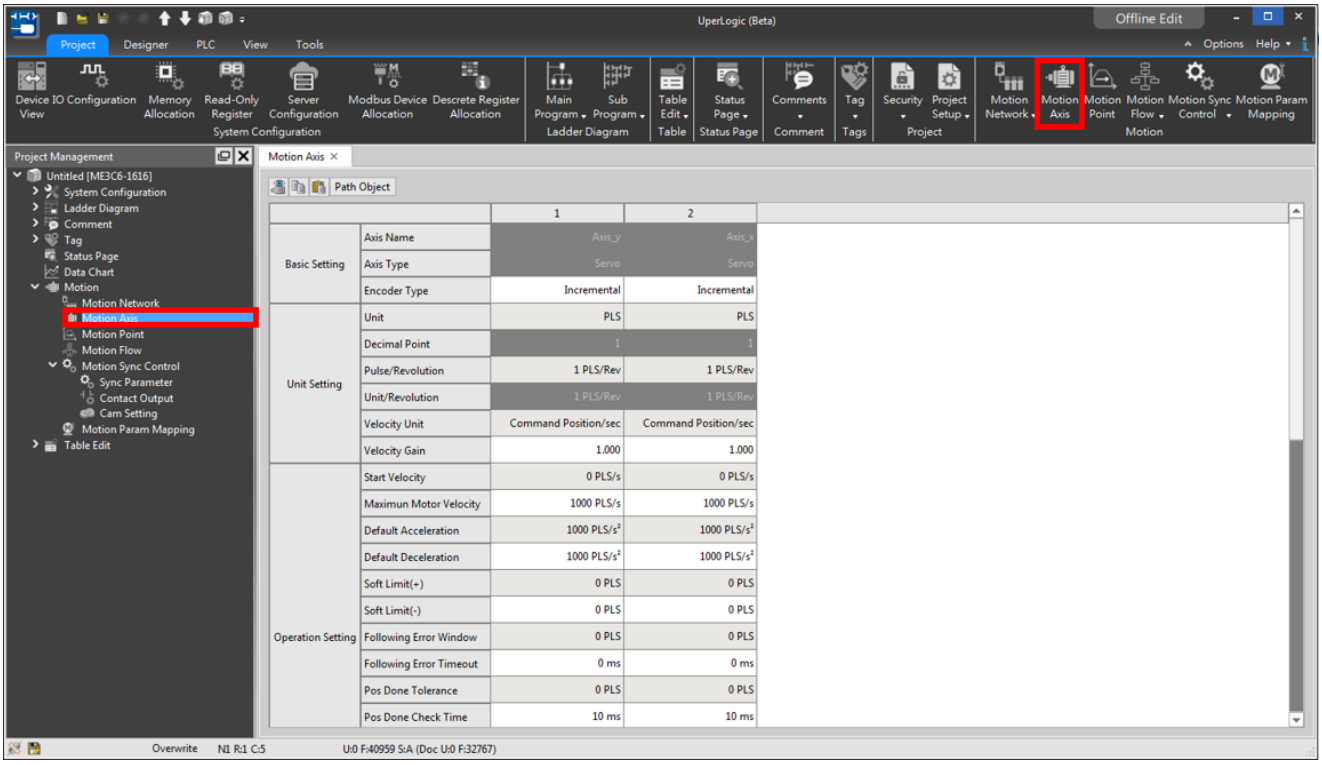


Fig. 173: Motion axis setting

2. Setting method

After setting adding axis in [Motion Axis], the system will add the desired axis automatically by clicking the table setting directly.

3. Display setting

By clicking [Axis Display Setting], it can be set as displaying the axis for users to create the desired axis more easily.

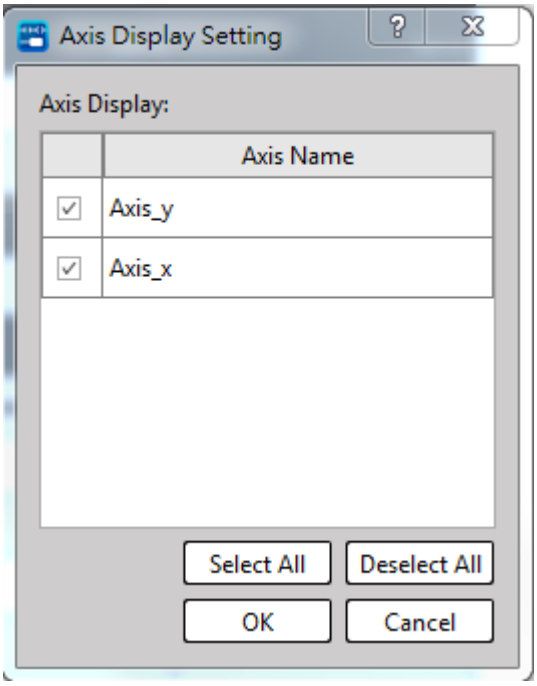
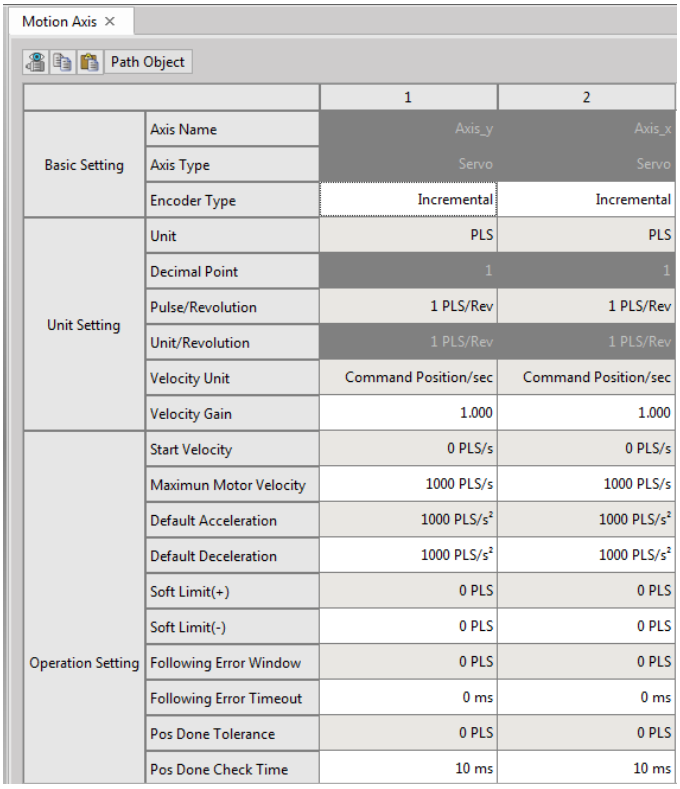


Fig. 174: Axis Display Setting

4. Parameter

Click the corresponding parameter position, and it allows the user to modify the parameter being created for such axis. For detailed description of parameters, please refer to Chapter 4 of Motion Control User Manual.



		1	2
Basic Setting	Axis Name	Axis_y	Axis_x
	Axis Type	Servo	Servo
	Encoder Type	Incremental	Incremental
Unit Setting	Unit	PLS	PLS
	Decimal Point	1	1
	Pulse/Revolution	1 PLS/Rev	1 PLS/Rev
	Unit/Revolution	1 PLS/Rev	1 PLS/Rev
	Velocity Unit	Command Position/sec	Command Position/sec
	Velocity Gain	1.000	1.000
Operation Setting	Start Velocity	0 PLS/s	0 PLS/s
	Maximun Motor Velocity	1000 PLS/s	1000 PLS/s
	Default Acceleration	1000 PLS/s²	1000 PLS/s²
	Default Deceleration	1000 PLS/s²	1000 PLS/s²
	Soft Limit(+)	0 PLS	0 PLS
	Soft Limit(-)	0 PLS	0 PLS
	Following Error Window	0 PLS	0 PLS
	Following Error Timeout	0 ms	0 ms
	Pos Done Tolerance	0 PLS	0 PLS
	Pos Done Check Time	10 ms	10 ms

Fig. 175: Axis Display Setting

9-3 Motion Point

1. Setting process

Click [Project] → [Motion] → [Motion Point] in function toolbar, or you may select [Project] → [Motion Point] in project management window and then double click the left mouse button to open the setting page.

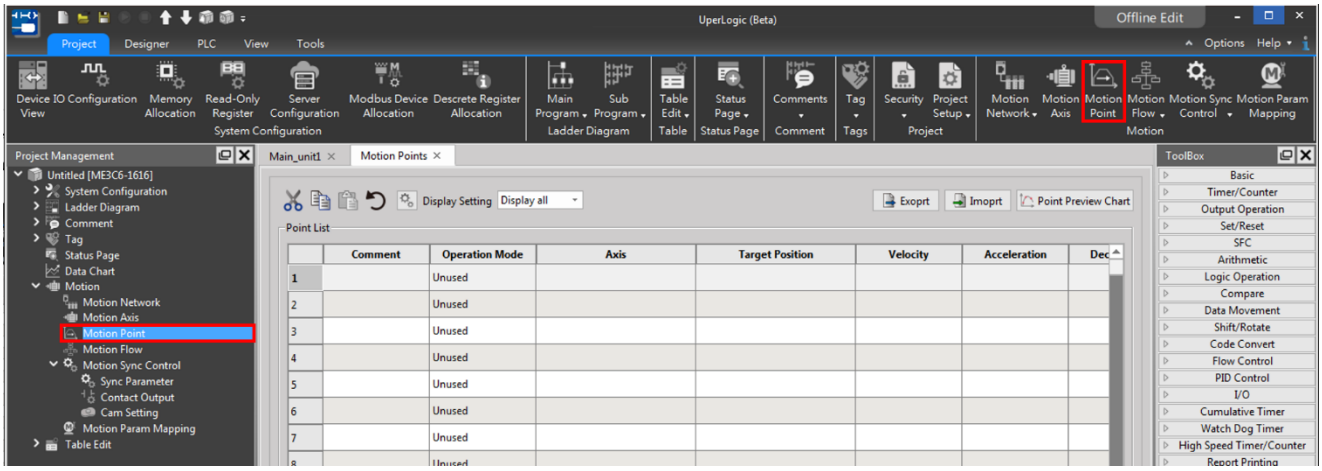


Fig. 176: Motion point setting

You may also click [Point Preview Chart] in the working window to open the preview page.

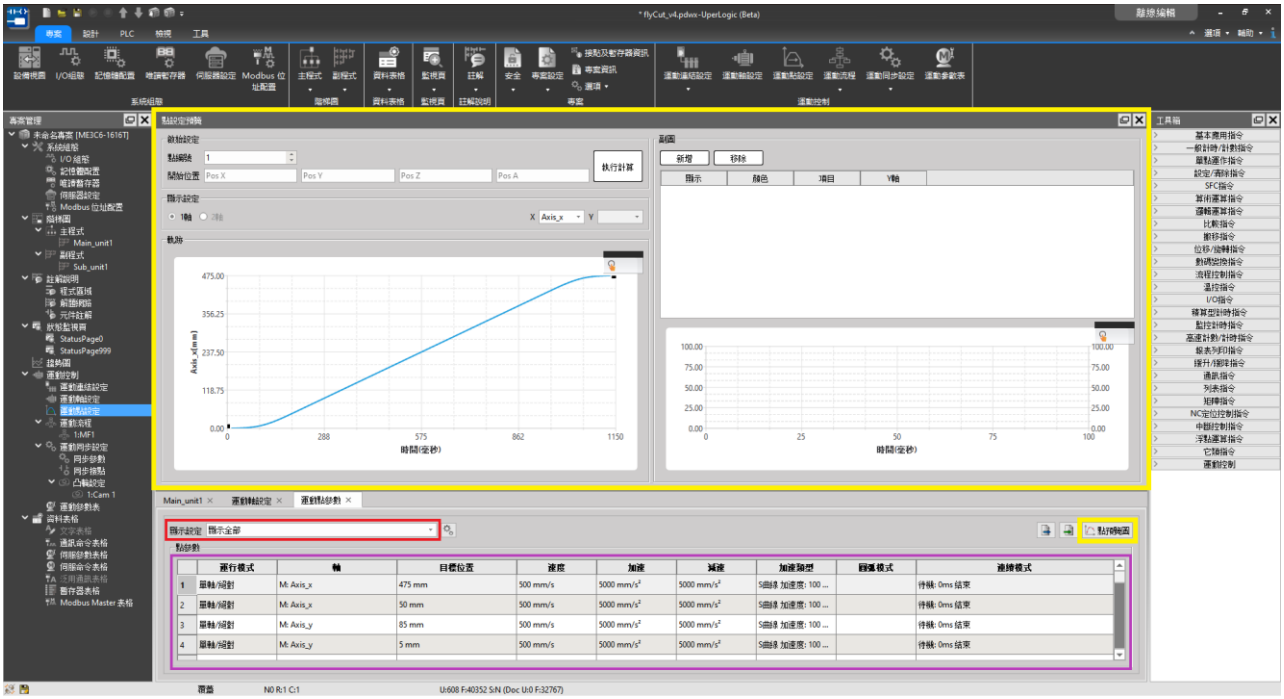


Fig. 177: Motion point preview page

Item	Description
Display Setting	Display all: Display all points (256 points until now) Display continuing point: Display the continuing points only and "Starting point" will be displayed on right-hand side for selection.
Point Preview Chart	Show the window highlighted by upper side yellow box for simulation reference.
Setting Page	From the purple block at upper side of the desired point parameter, select the motion point to be created. After double clicking, you may start setting the point data.

Table 23: Descriptive table of motion Point Preview Chart

2. Setting page parameters

Through the point data setting function, it allows the user to modify the parameter setting of the motion point. For detailed parameter description, please refer to Motion Control User Manual.

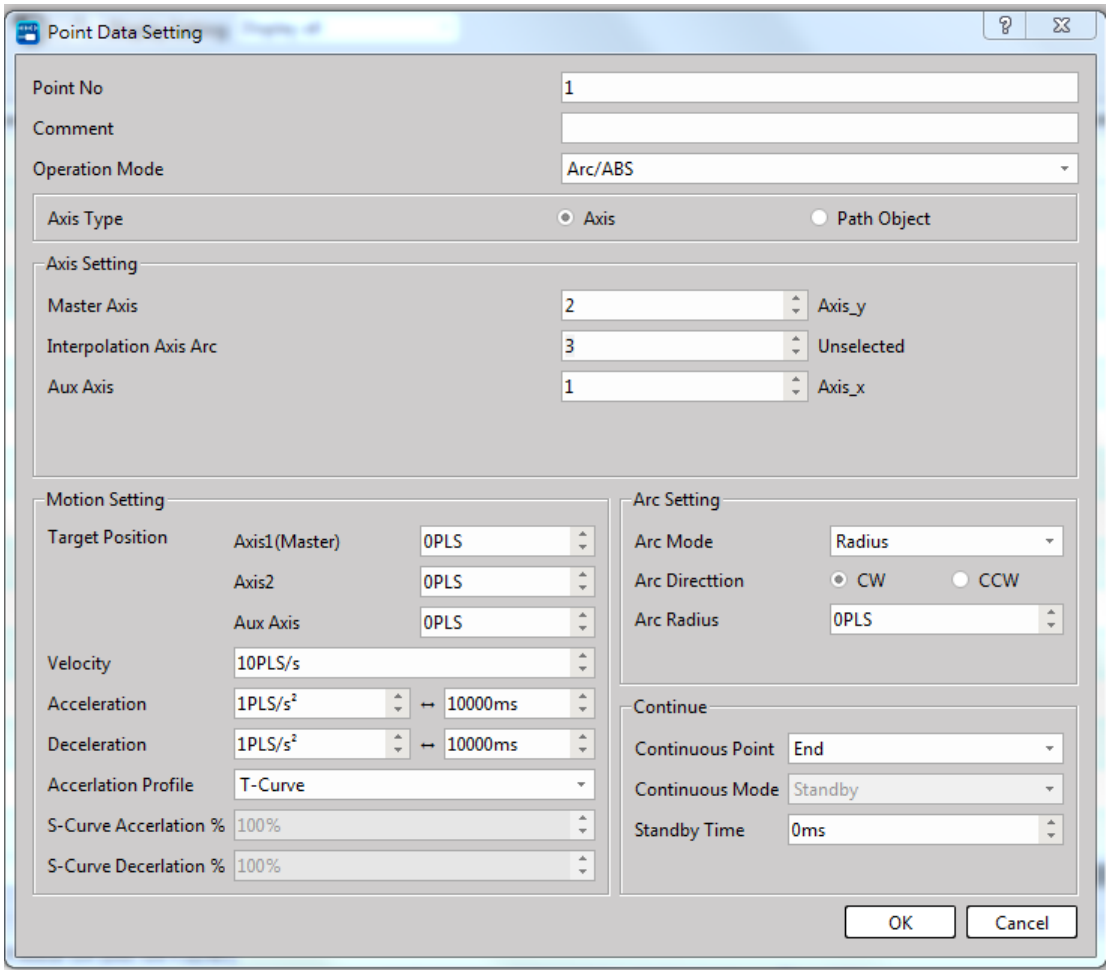


Fig. 178: Point Data Setting

3. Point Preview Chart

Click [Point No.] and then select the motion point to be previewed. After setting the [Start Pos], click [Execution Calculation] and the preview map of such motion point will be displayed at the lower side track. For detailed setting, please refer to Motion Control User Manual.

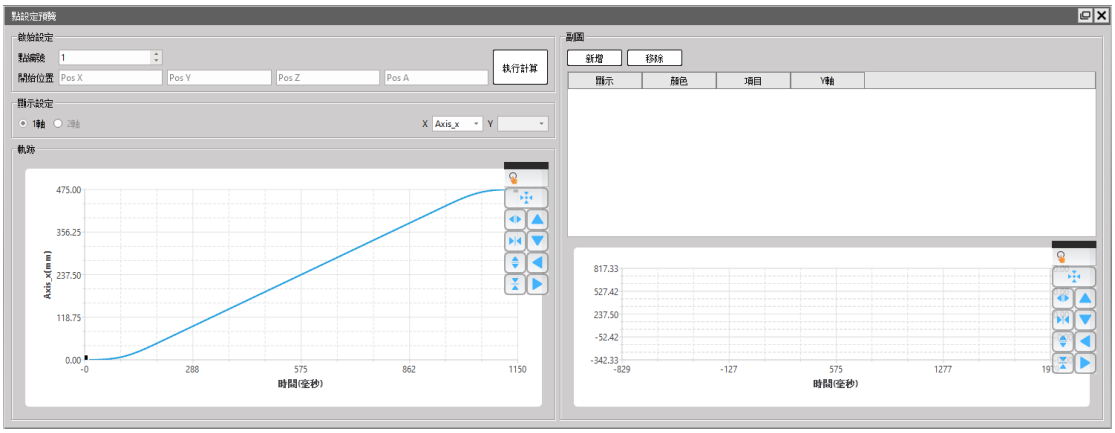


Fig. 179: Point Preview Chart setting

4. Trajectory display control

By clicking the icon, you may open the scroll-down menu containing the [Trajectory Display Control] option. Indicated in the figure below are the functions.

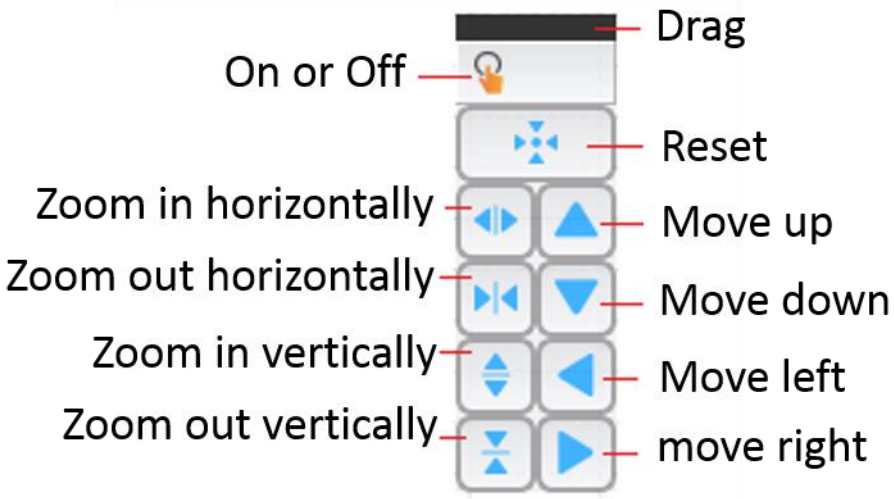


Fig. 180: Trajectory display control

9-4 Motion Flow

1. Setting process

Click [Project] → [Motion] → [New Motion Flow] in function toolbar, or you may select [Project] → [Motion] → [Motion Flow] in project management window and then double click the right mouse button to add new motion flow.

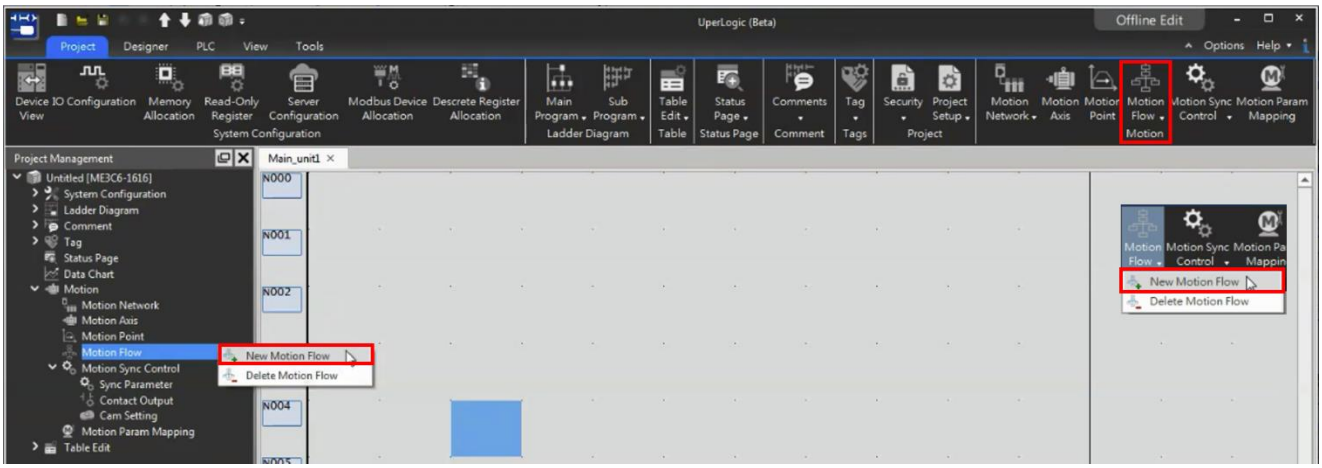


Fig. 181: Adding motion process

In Motion Flow options, click the right mouse button and the flow will be renamed.

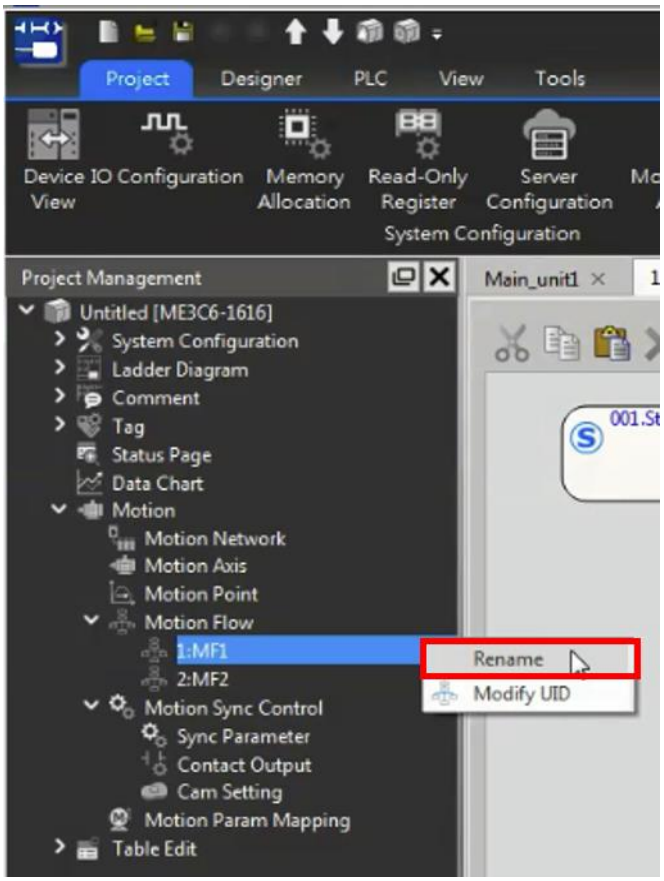


Fig. 182: Renaming motion flow

2. Adding flow block

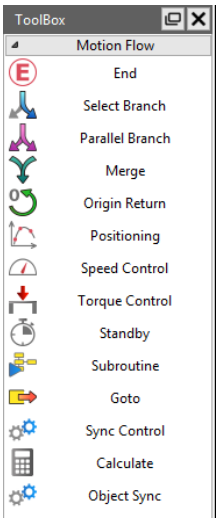
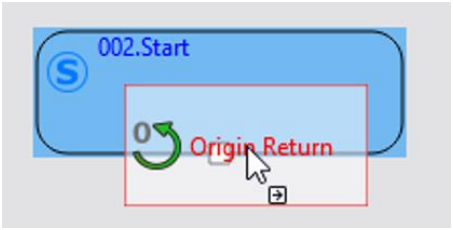
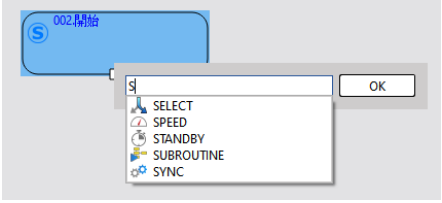
Description	Icon
Simply drag the right-side toolbox to the preview window.	
When dragging the block to the window, both will be connected by aligning red box with Node.	
After selecting the block, press “F” and you will be allowed to add the imported block.	

Table 24: Flow block adding setting table

3. Deleting flow block

Click block (multiple choices available) and then press “Delete.”

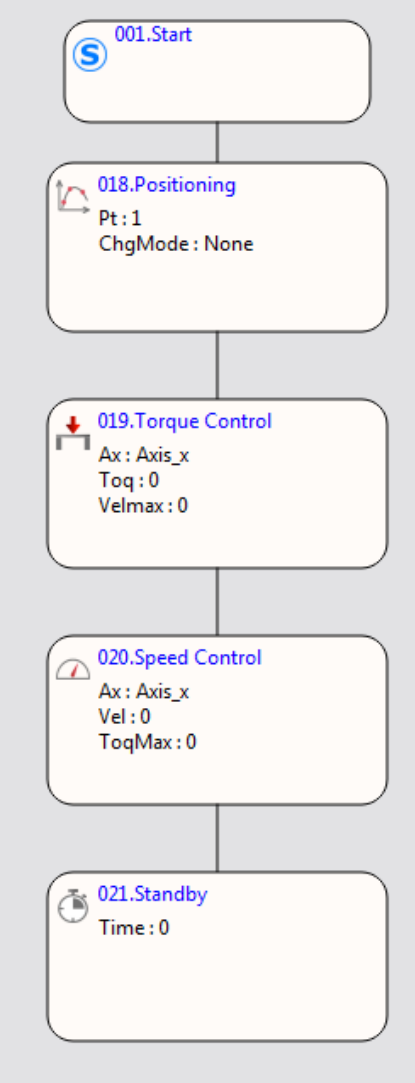


Fig. 183: Deleting flow block

4. Adding link

Press the contact and then drag it to the point to be connected.

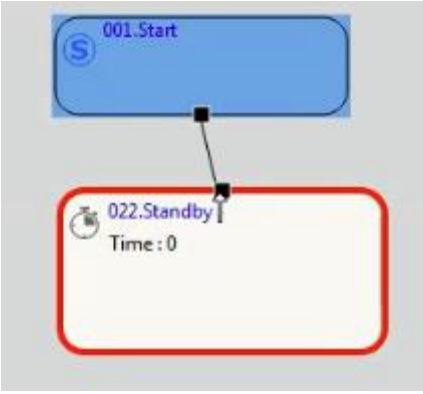


Fig. 184: Adding link for fkow block

5. Deleting link

Click the respective line and then press "Delete" and the link will be deleted.

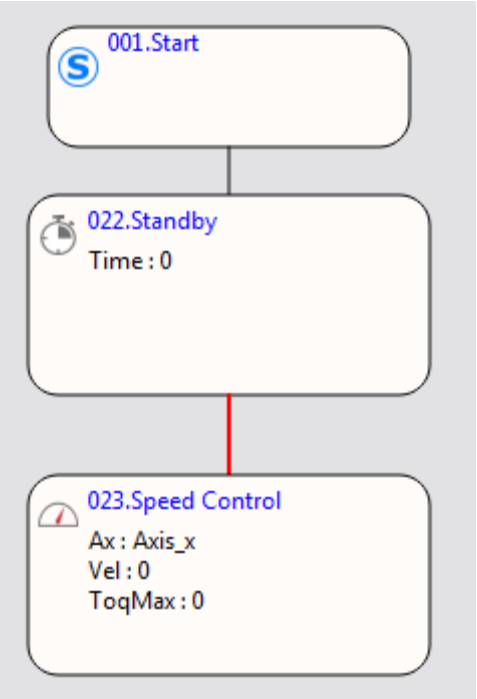
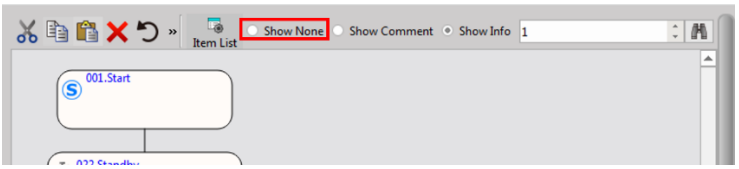
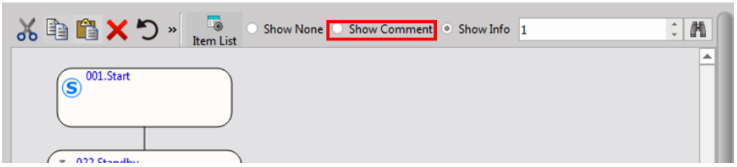
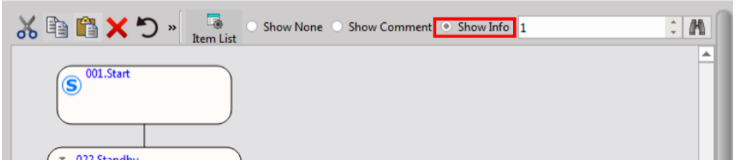
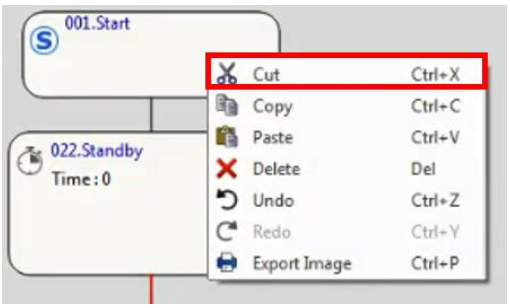
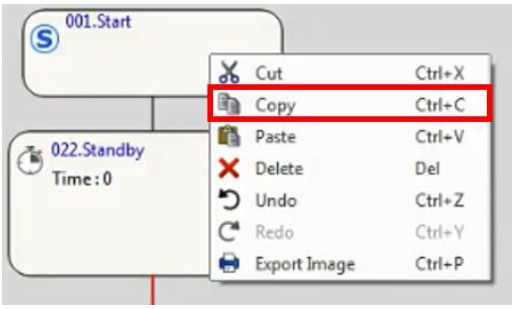
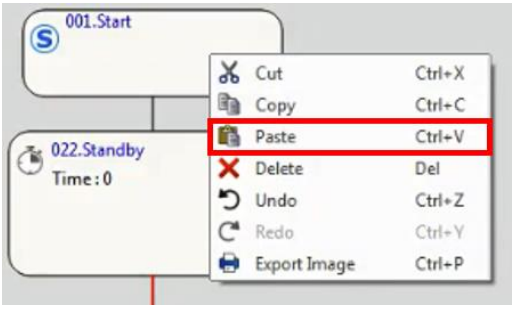
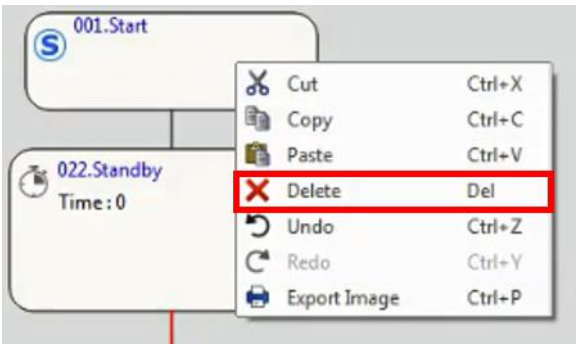
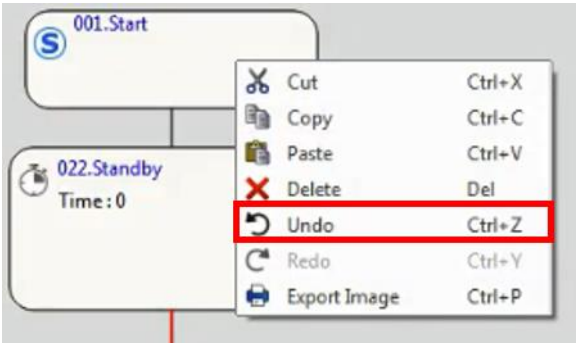
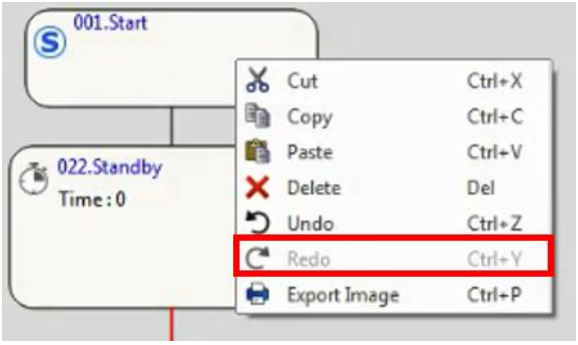
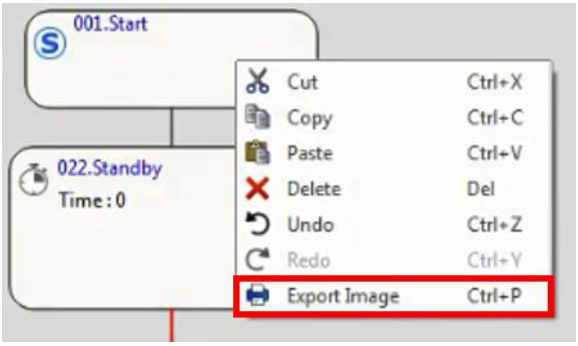


Fig. 186: Deleting flow block link

6. Others

Item	Description
Show None	
Show Comment	
Show Info	

Cut	
Copy	
Paste	
Delete	
Undo	

Redo	
Export Image	

Parameter

Flow setting block introduction.

Basic Description

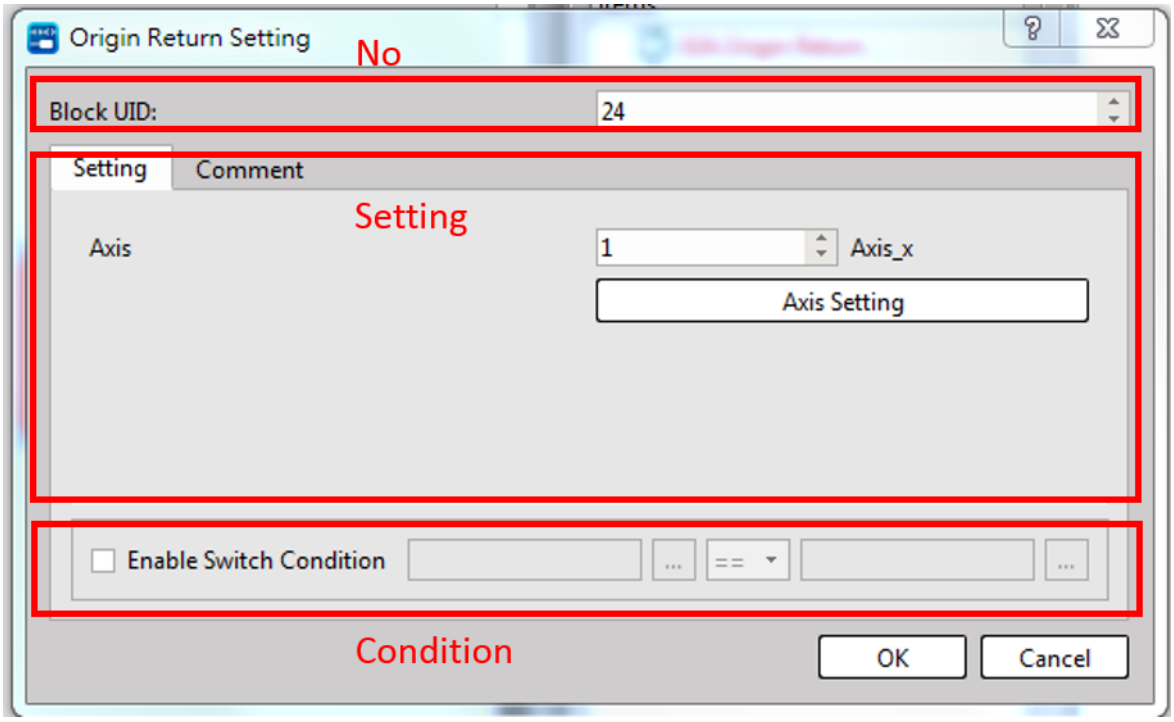


Fig. 186: Flow block basic description

Action number: The number coded for such action. It represents the ID of the action currently displayed by Register R36884–R36890.

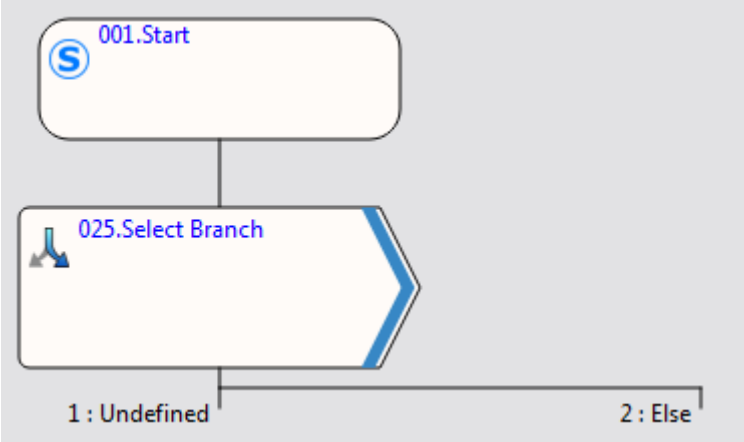
Action setting: The setting page of each action. After completing the action, Register R36891–R36906 will be displayed as "2" (action completed).

To next action condition: If such function is used, the system will go to next action block after meeting the conditions.

Note: Taking the GoTo for example (presuming the conditions are met → No. 1; otherwise → No. 3), the system has determined to proceed to next action block (if GoTo No. 1) when completing the current action. If the system has set up the conditions for proceeding to next action block, then the direction will remain unchanged (the system will not GoTo No.3 at this time) even though the system has changed the GoTo conditions again (the conditions for GoTo No. 1 no longer exist).

Start

Select Branch



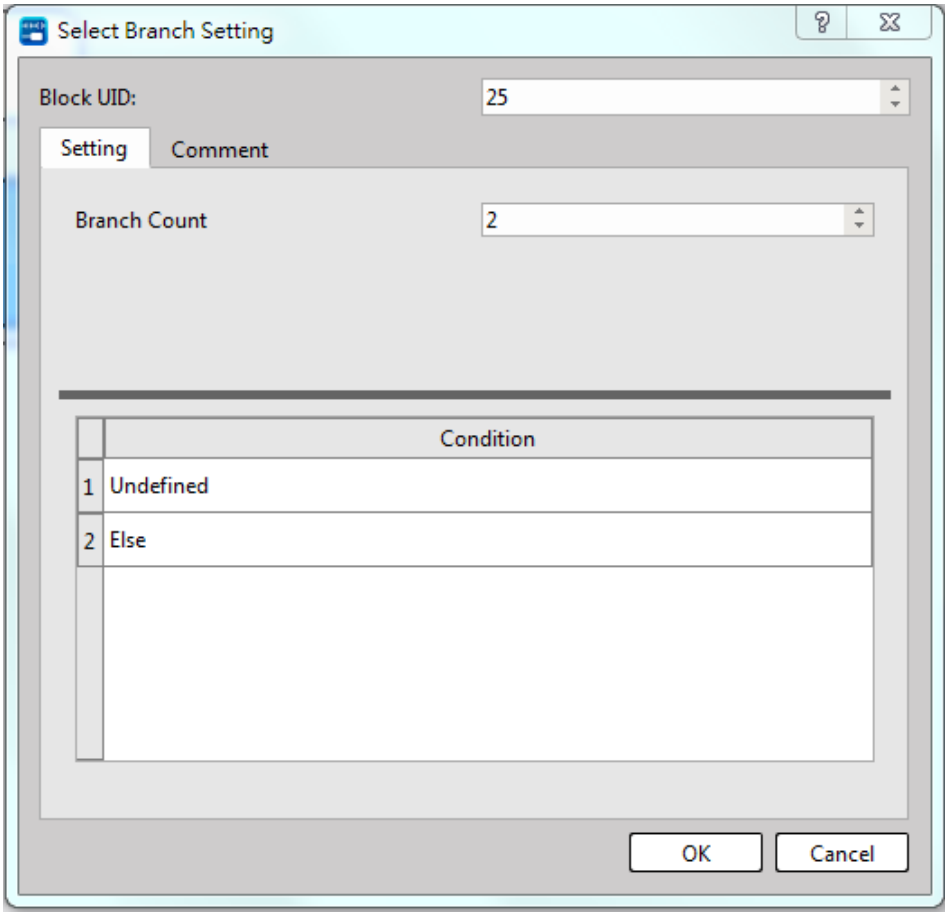


Fig. 187: Selecting branch

After selecting the branch blocks, the system will execute the inspection from left to right in order to execute the first branch that meets the conditions. The rightmost means "ELSE" and the system will execute the process blocks at the rightmost side if failing all of the conditions. Currently, the maximum number has been set up to 16 branches.

Item	Description
Branch Count	Number of branch blocks (1–16)
Condition	Branching execution conditions

Parallel Branch

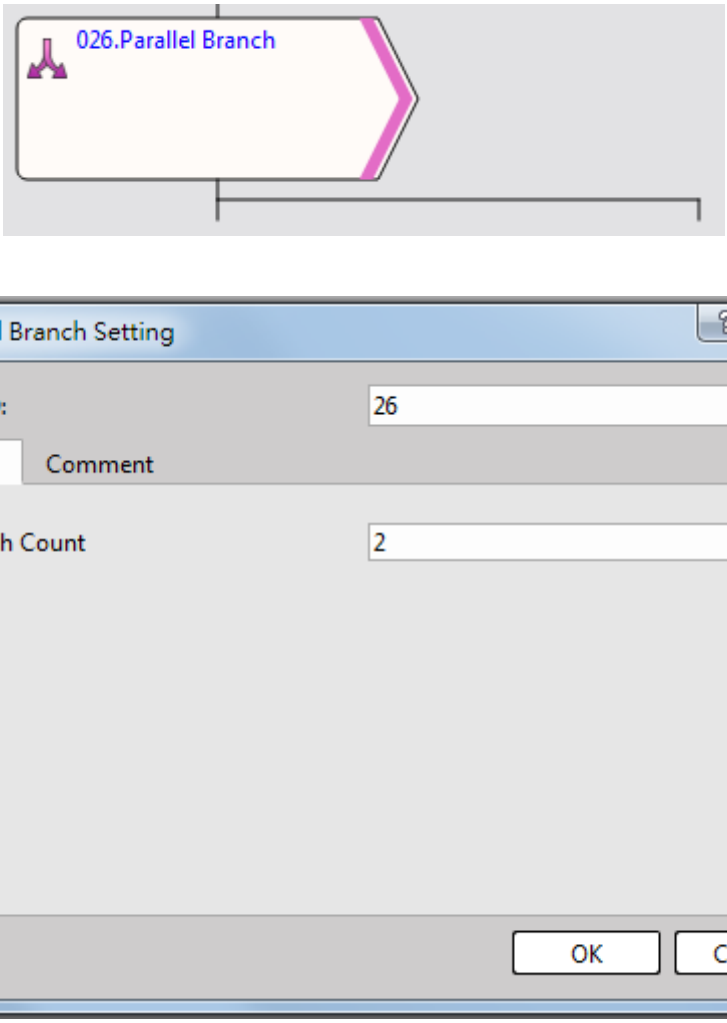


Fig. 188: Parallel branches

After executing the parallel branch blocks, the system will execute the process blocks according to the quantity set for the branch blocks. Currently, the maximum number has been set up to 16 branches.

Item	Description
Branch Count	Number of branch blocks (1–16)

Merge

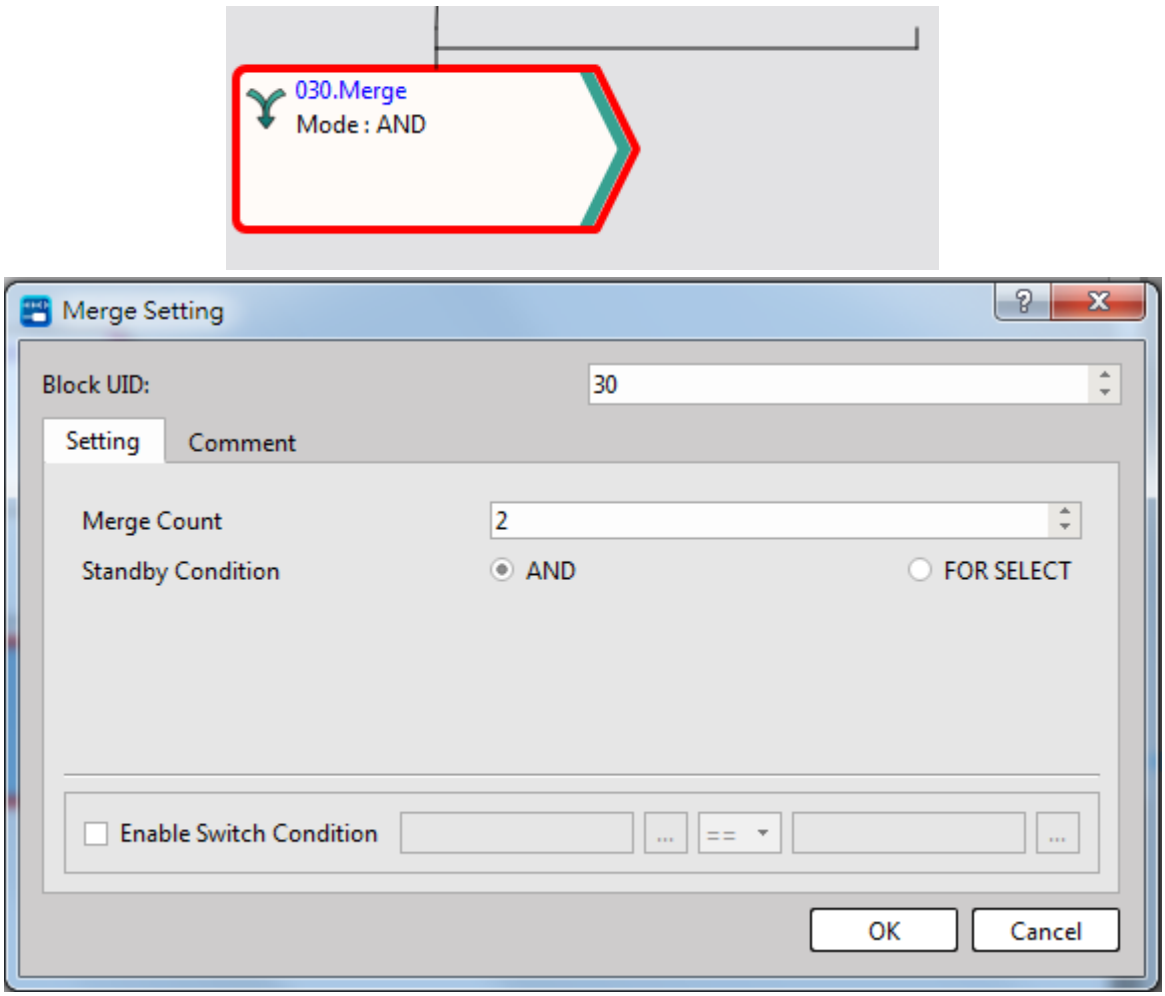


Fig. 189: Merge setting

The selected branches and the parallel branches shall be displayed in pairs. In this case, it means the branch setting is finished.

Item	Description
Merge Count	Composite quantity (1–6)
Standby Condition	1. AND: For parallel process 2. FOR SELECT: For block selections

Origin Return

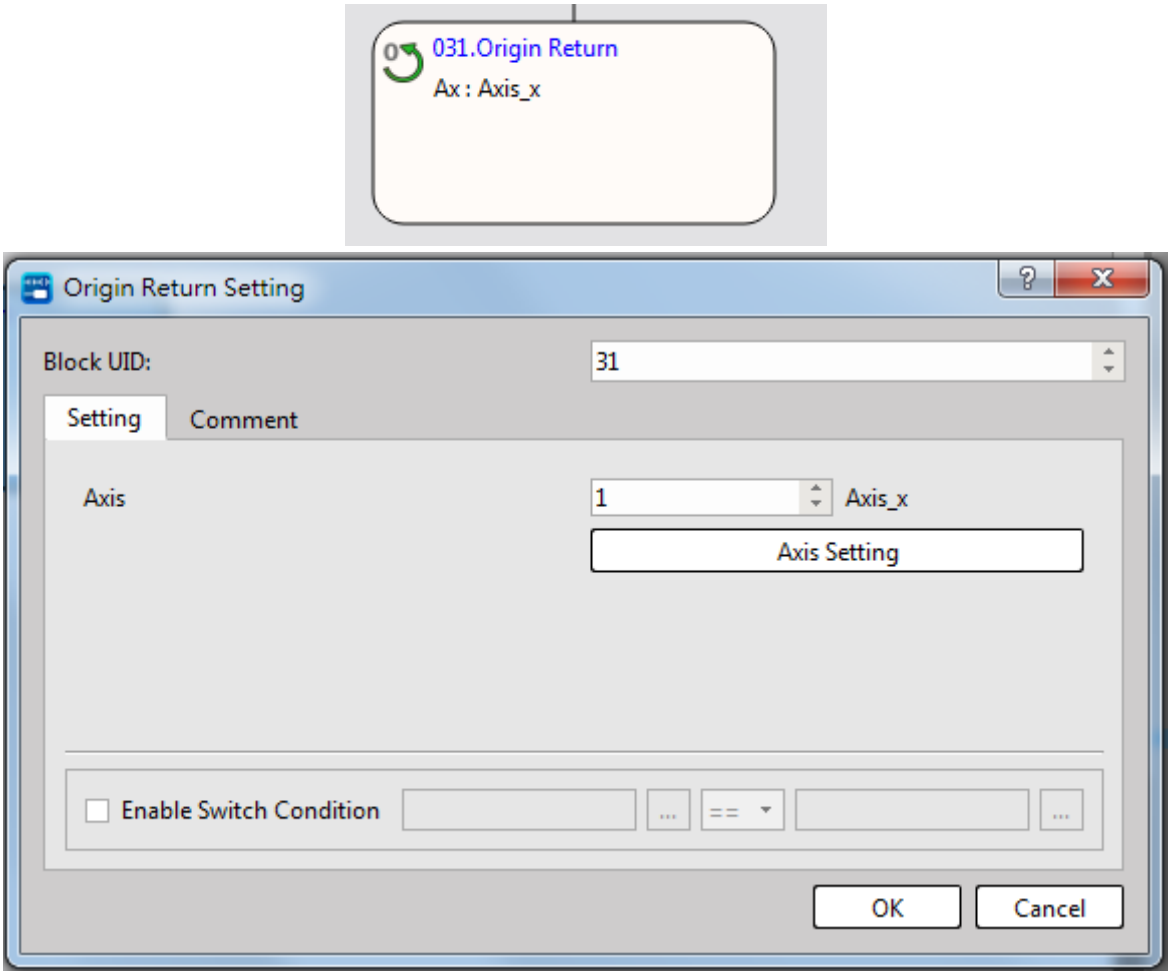
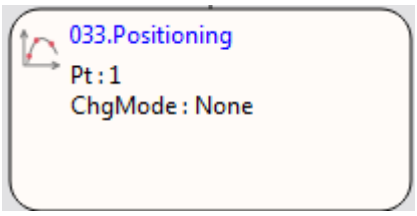


Fig. 190: Origin Return setting

After selecting the desired axis, the system will execute the Origin Return according to the axis setting pattern.

Item	Description
Axis	Axis_conveyor

Positioning



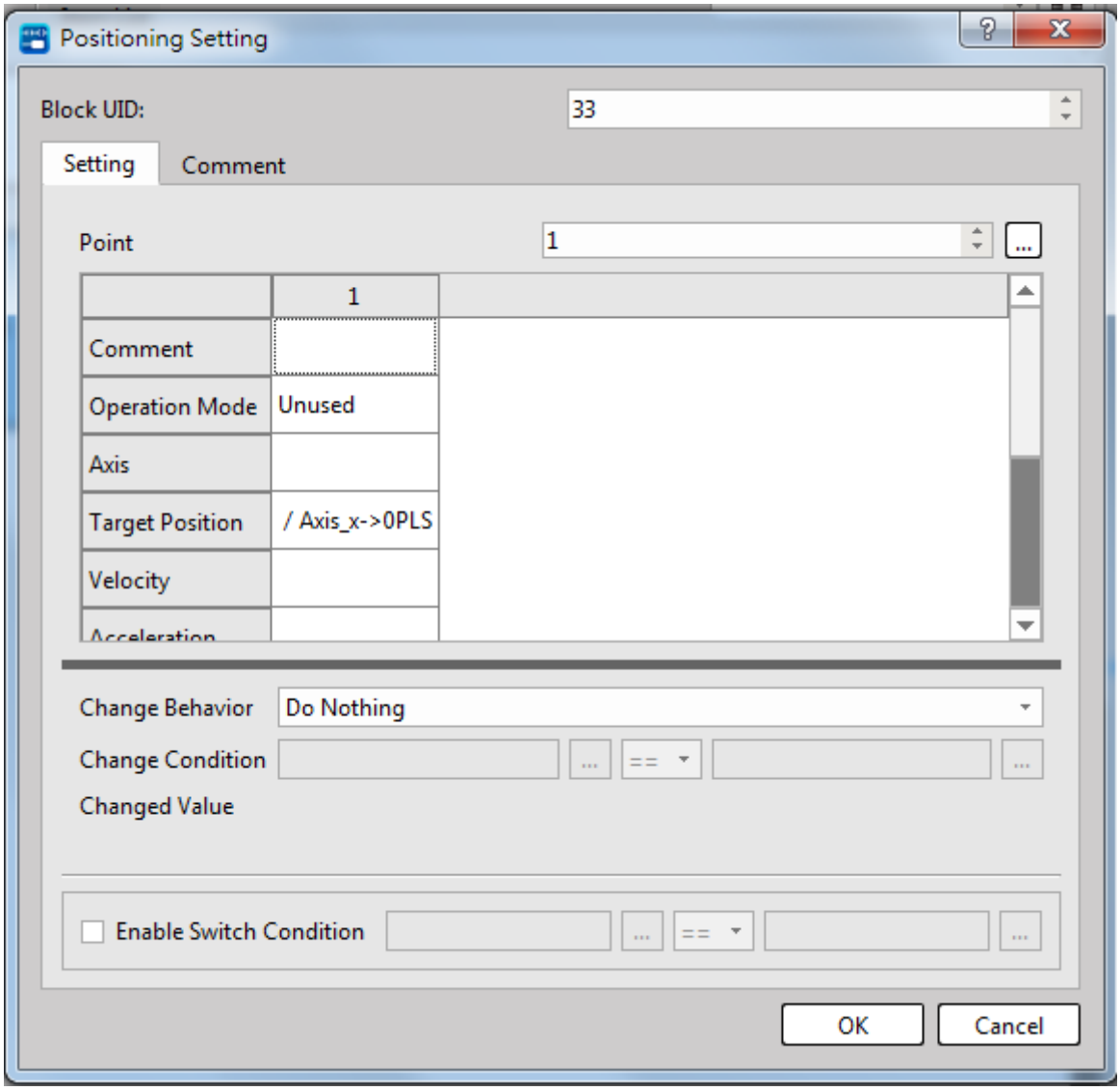


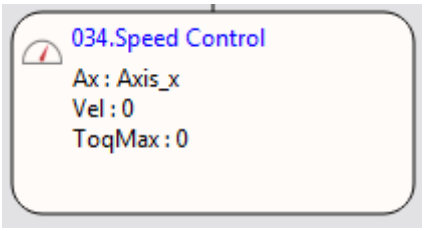
Fig. 191: Positioning setting

Select the parameters of the corresponding points and then start the positioning.

Item	Description
Point	The points to be controlled
Change Behavior	Do Nothing Change Current Coordinates Change Target Position Change Speed Stop after moving for certain distance

Change Condition	Change the desired parameters after meeting such condition during the positioning process.
Changed Value	The value to be changed. Speed is expressed as single value. When ticking such alignment point in the coordinates, the system will change the axis being used.

Speed Control



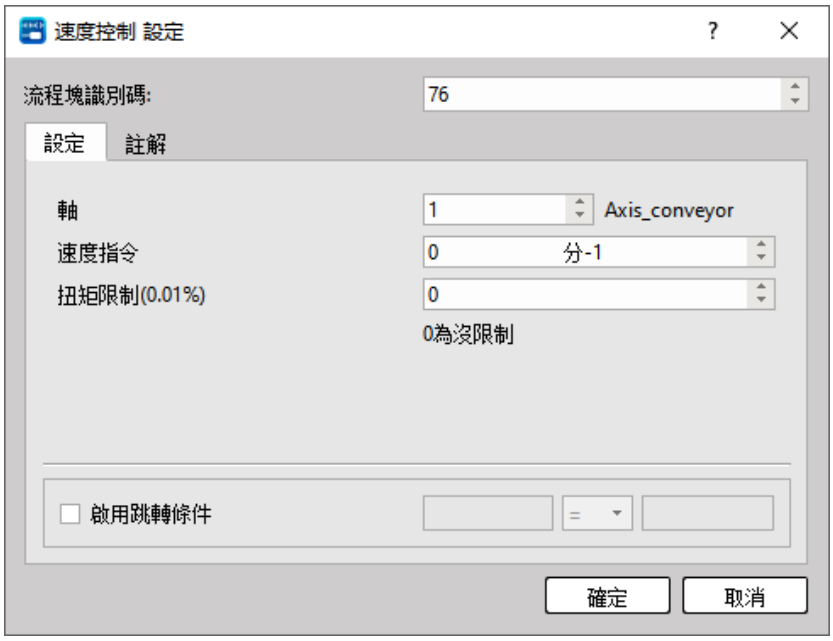
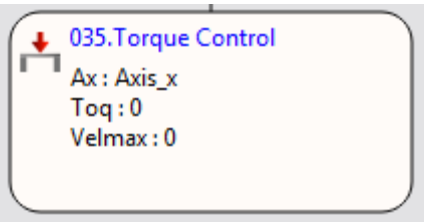


Fig. 192: Speed control setting

Select the corresponding axis and then start the speed control according to the set value.

Item	Description
Axis	The axis requiring speed control.
Velocity Command	The speed to be achieved (min-1)
Torque limit (0.01%)	Torque limit and “0” means unlimited.

Torque Control



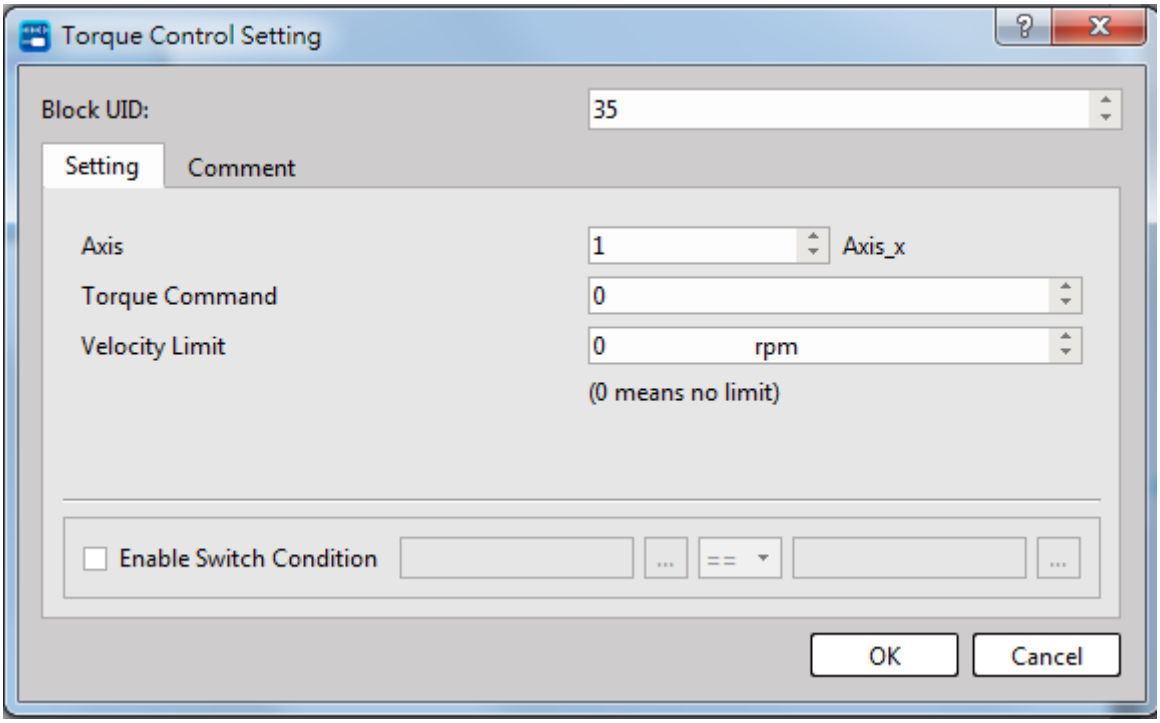
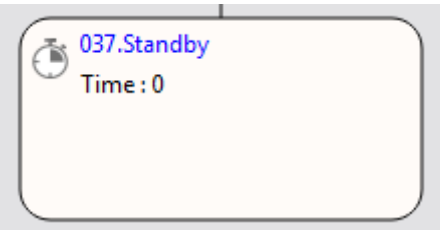


Fig. 193: Torque control setting

Select the corresponding axis and then start the torque control according to the set value.

Item	Description
Axis	The axis requiring speed control.
Torque Command	The torque to be achieved.
Velocity Limit	Speed limit and "0" means unlimited.

Standby



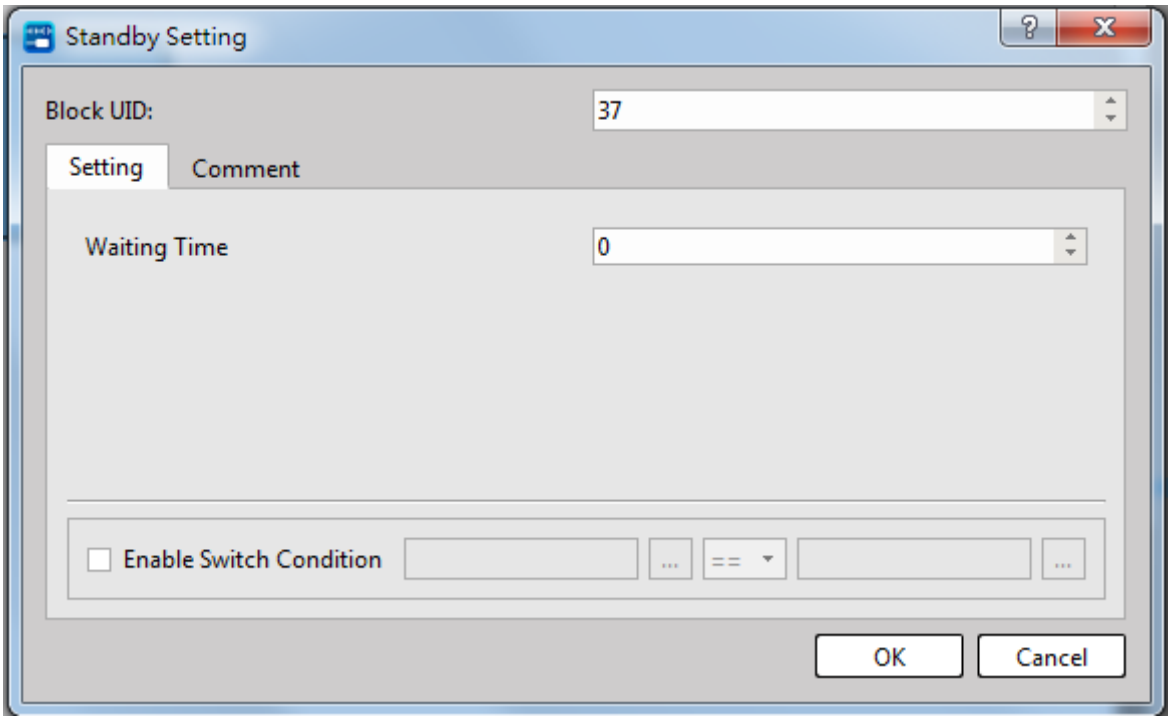
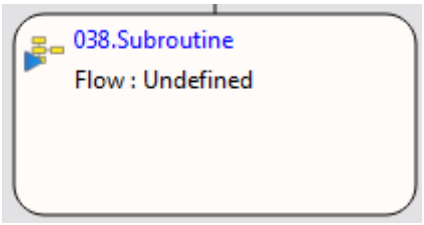


Fig. 194: Standby setting

Based on the conditions being created for the mode, GoTo next process block after meeting the intended conditions.

Item	Description
Waiting Time	The created waiting time, expressed in “ms” as the unit.
Enable Switch Condition	Switch conditions

Subroutine



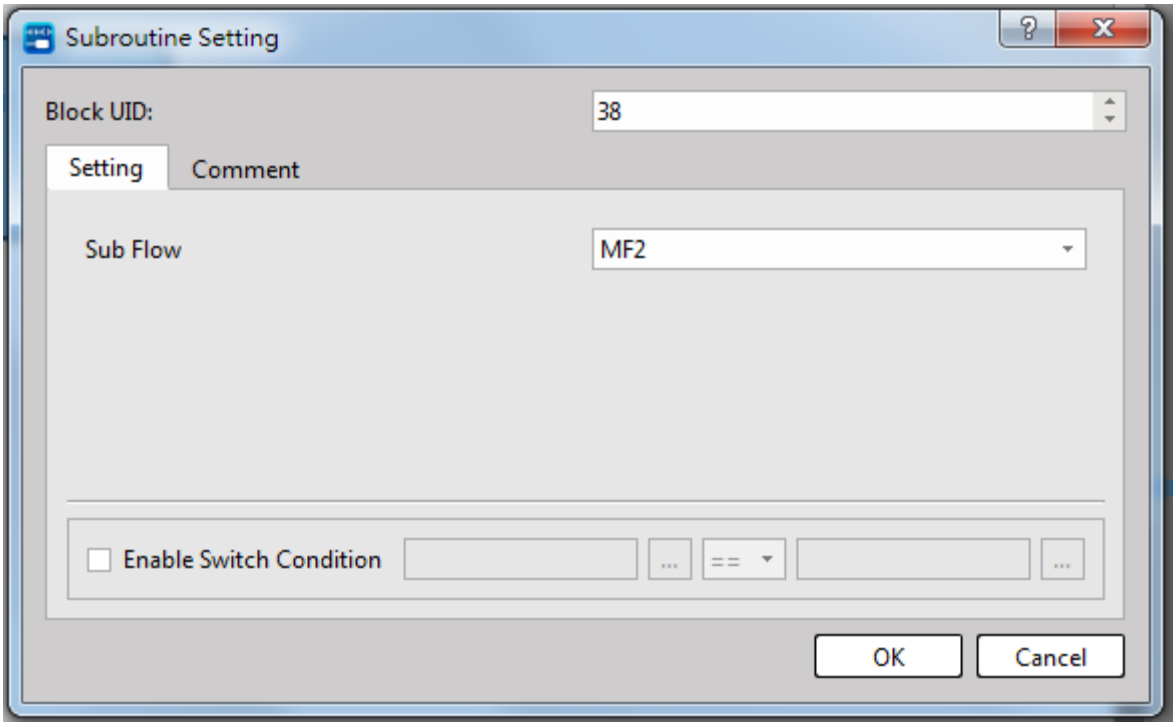
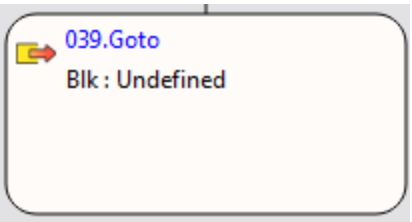


Fig. 195: Subroutine setting

When running to this process block, you may execute other process.

Item	Description
Sub-program	Select the process to be executed.

GoTo



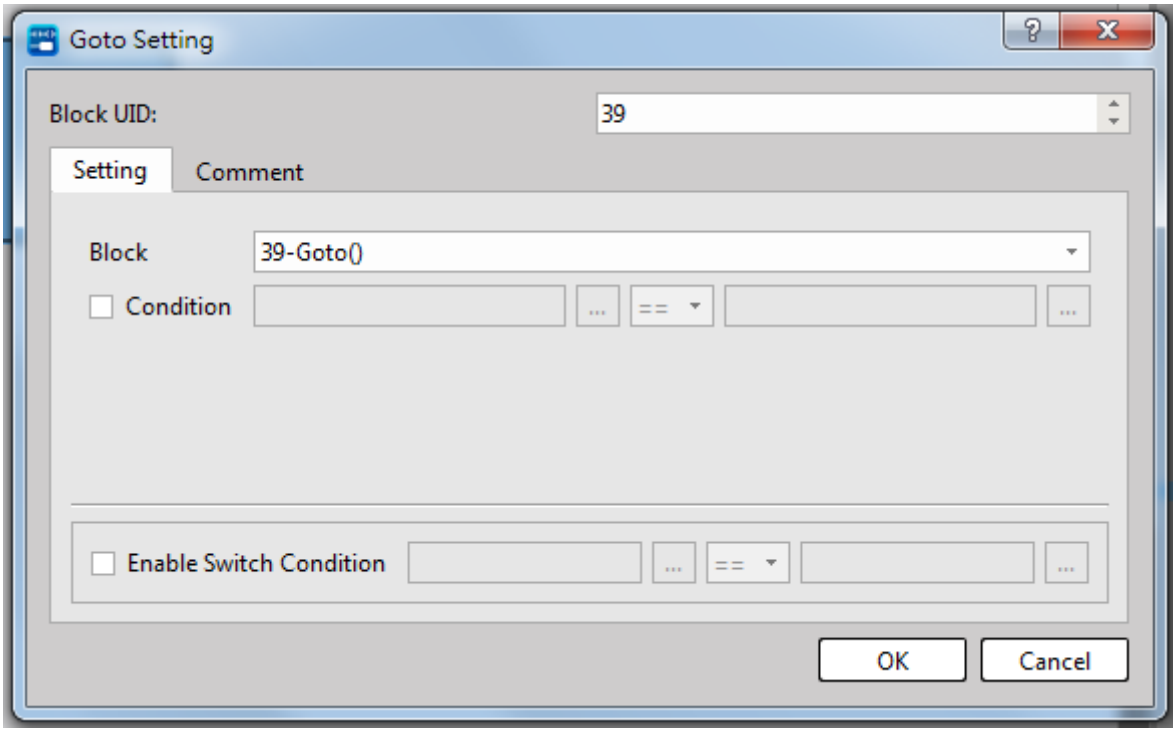


Fig. 196: GoTo setting

When running to this process block, you may execute the GoTo for entering other blocks of this process or finish the process directly.

Item	Description
Block	Select the process block of this process or finish the process.
Condition	Select the GoTo for entering the created setting block after meeting the conditions.

Synchronization

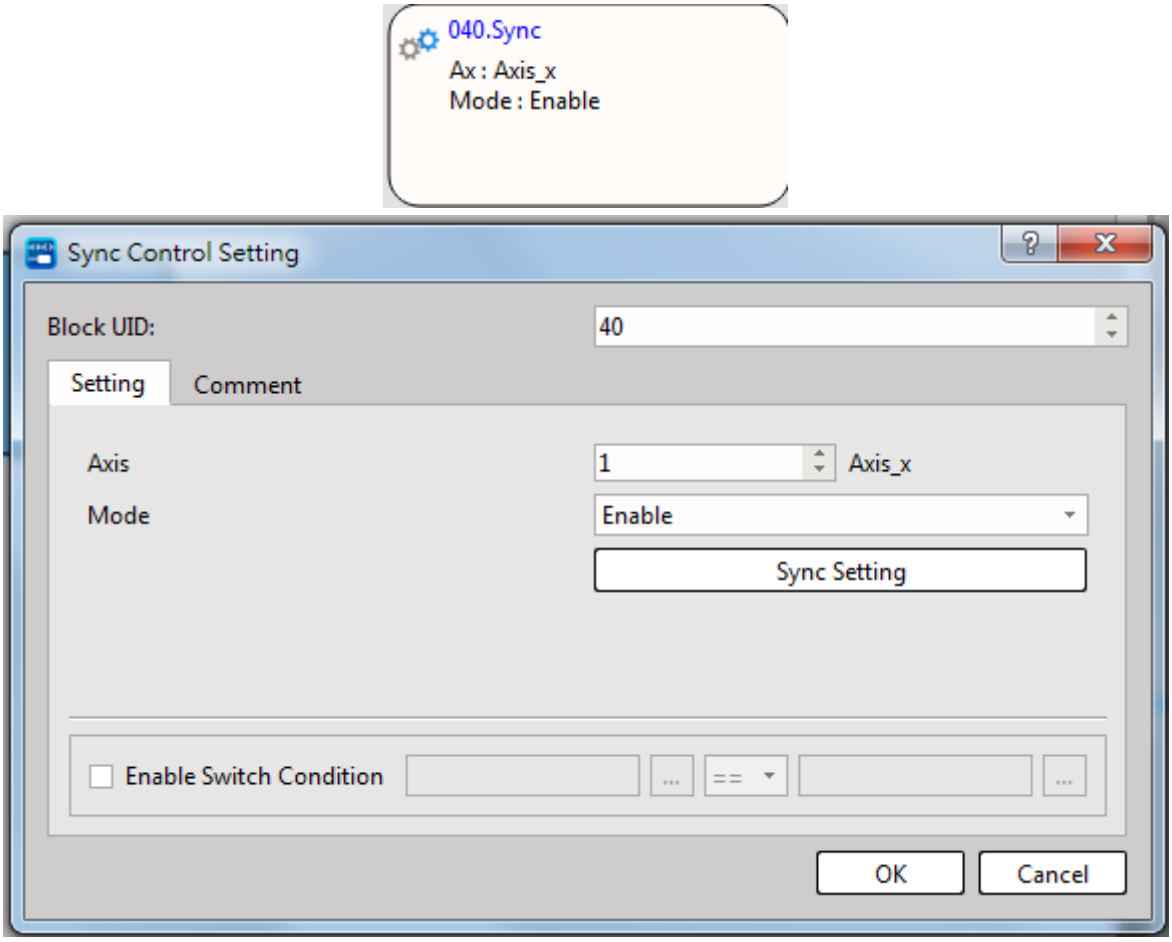


Fig. 197: Synchronization control setting

Enable or disable the designated axis synchronization control.

Item	Description
Axis	Start or close the synchronized axis.
Mode	Start or close the synchronization control.

9-5 Motion Sync Control

Click [Project] → [Motion] → [Motion Sync Control] in function toolbar and then click the left mouse button to open the scroll-down menu in order to select the page that will be set. You may select the page to be created by clicking [Project] → [Motion Sync Control] in project management window.

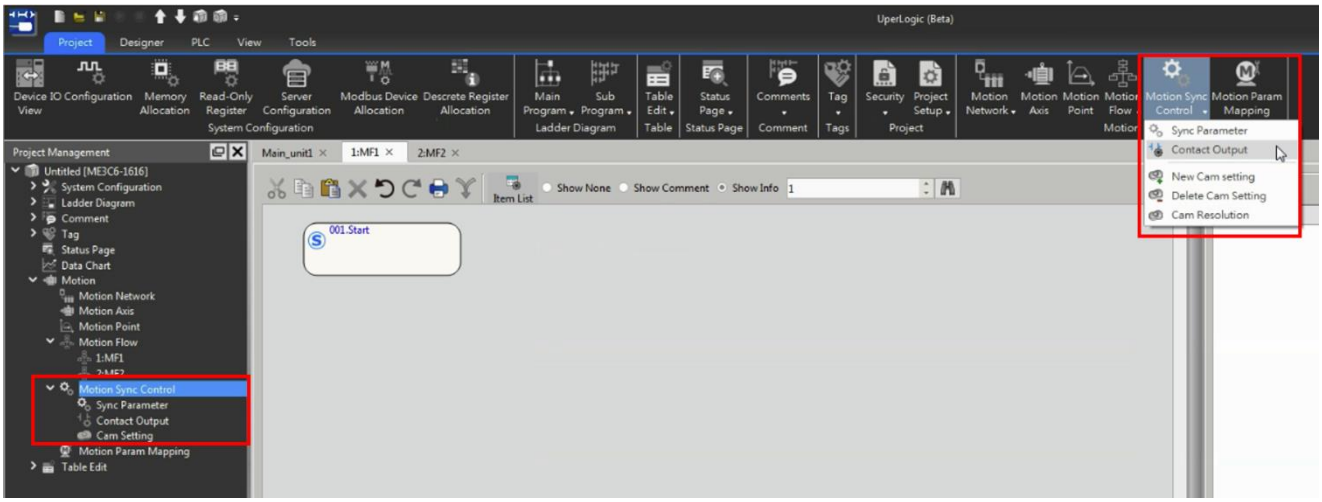


Fig. 198: Motion synchronization setting

9-5-1 Sync Parameter

Click [Sync Parameter] in scroll-down menu of [Motion Sync Control], or you may select [Project] → [Motion Sync Control] in project management window. Next, click the left mouse button to open the scroll-down menu to select [Sync Parameter].

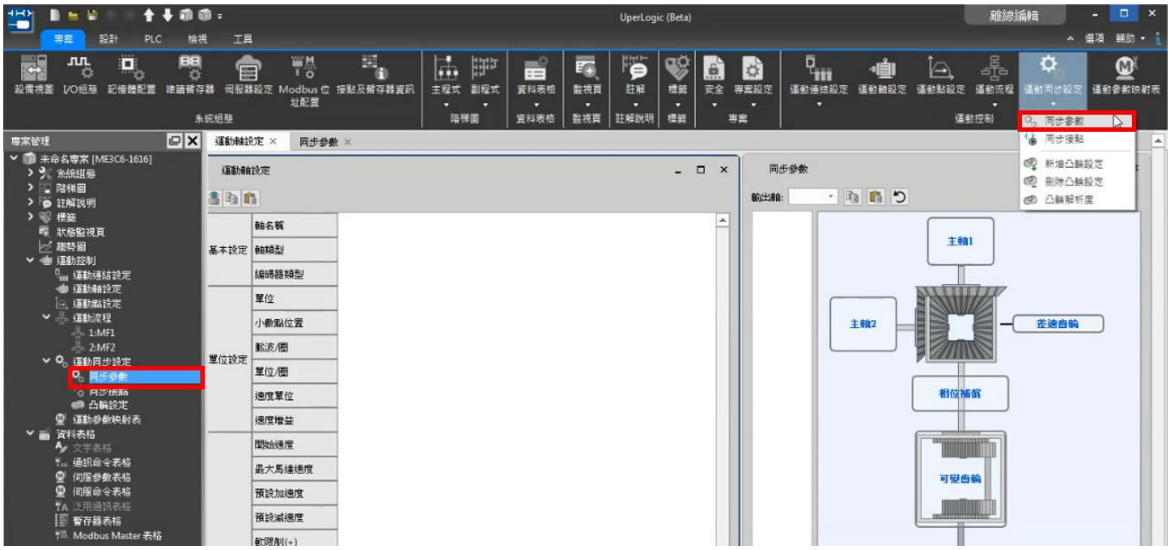


Fig. 199: Synchronize parameter setting

You may use the output axis to select the synchronize parameters of the axis that will be created. You may also use the copy and paste function next to the [Output Axis] for presetting the corresponding setting process. For detailed setting, please refer to Motion Control User Manual.

9-5-2 Contact Output (to be released)

Click [Sync Parameter] in scroll-down menu of [Motion Sync Control], or you may select [Project] → [Motion Sync Control] in project management window. Next, click the left mouse button to open the scroll-down menu to select [Contact Output].

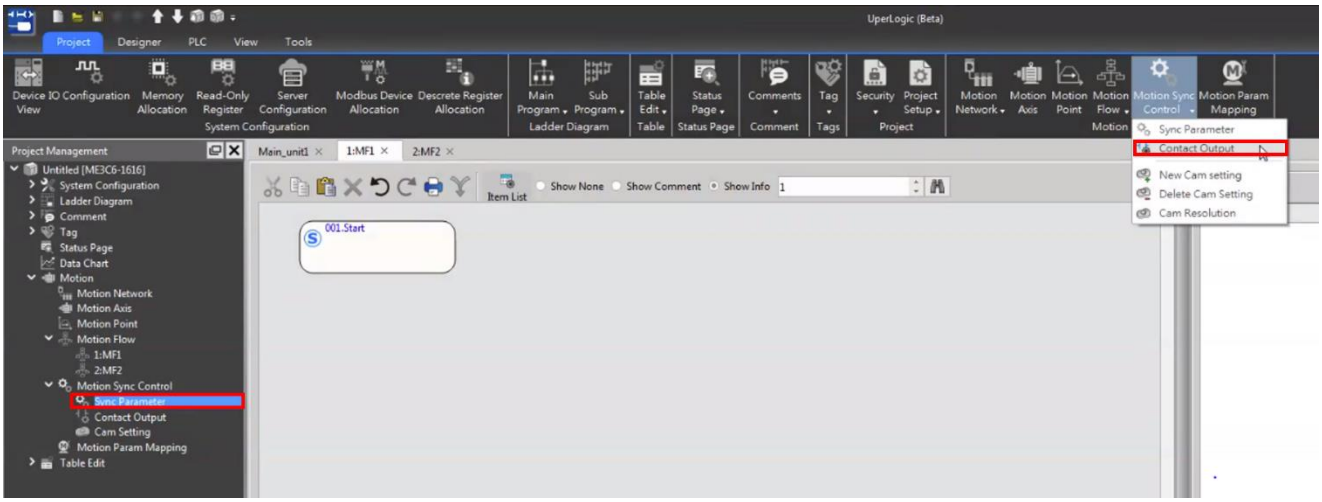


Fig. 200: Contact Output setting

For detailed setting of synchronize contact, please refer to Motion Control User Manual.

9-5-3 Cam setting

Click the scroll-down menu of [Motion Sync Control] and you will be allowed to select the required cam setting. You may also click [Project] → [Motion Sync Control] in project management window and then click the right mouse button to open [New Cam setting] in the scroll-down menu.

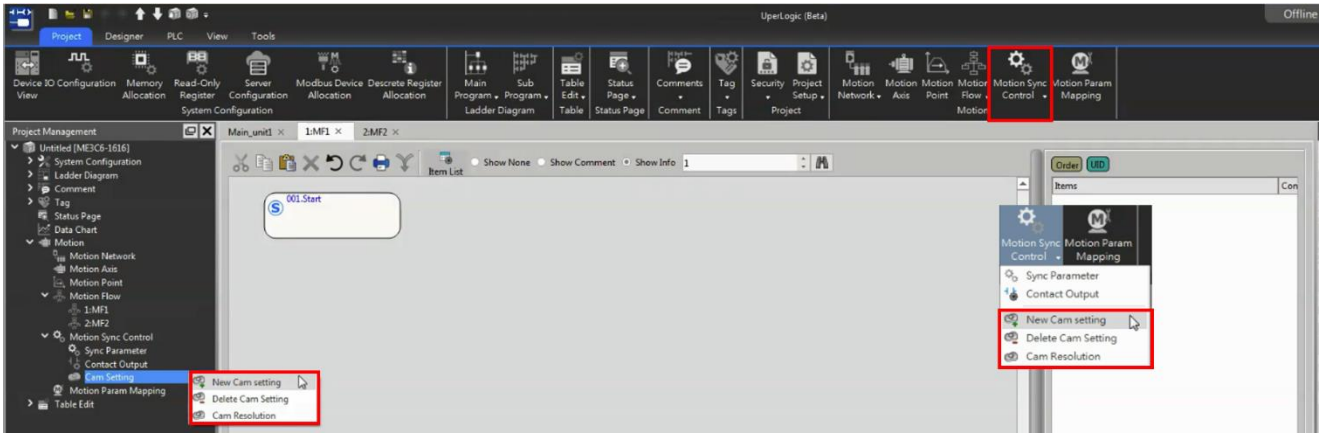


Fig. 201: Cam setting

New Cam setting

Click the scroll-down menu of [Motion Sync Control] and you will be allowed to select [New Cam setting] or you may select [Project] → [Motion Sync Control] → [Cam setting] in project management window. Next, click the right mouse button to open the scroll-down menu and then select [New Cam setting].

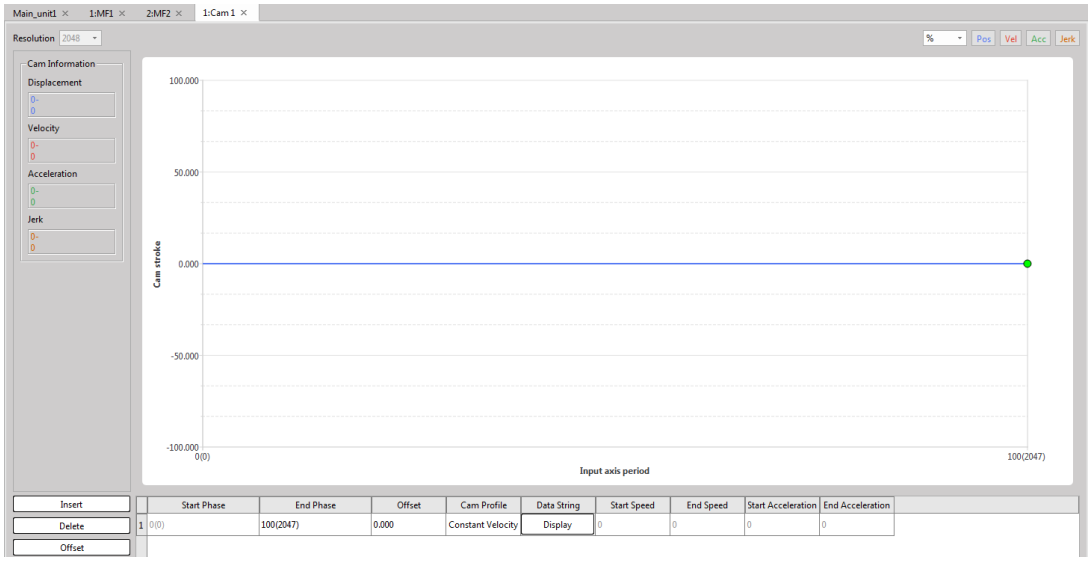


Fig. 202: New Cam setting

Delete Cam setting

Click the scroll-down menu of [Motion Sync Control]. Here, you will be allowed to select [Delete Cam Setting] or you may select [Project] → [Motion Sync Control] → [Cam Setting] in project management window. Next, click the right mouse button to open the scroll-down menu and then select [Delete Cam Setting].

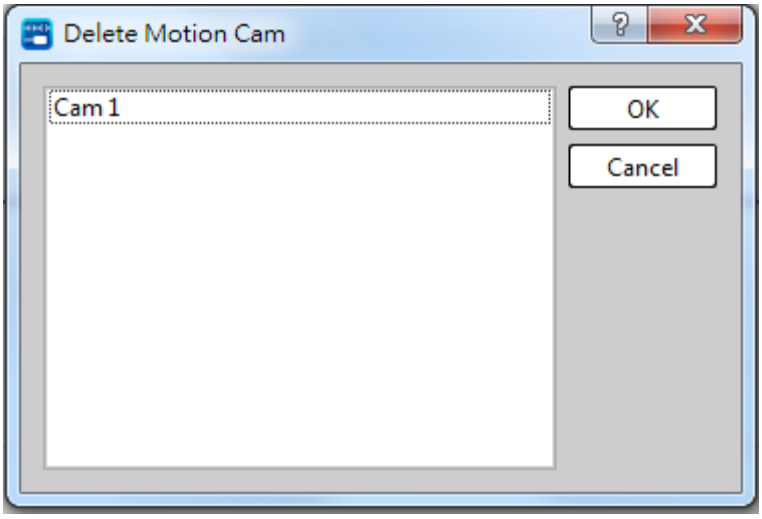


Fig. 203: Delete Cam setting

After being selected, such page will show "Delete Motion Cam" window. Select the cam to be deleted and then press [OK] to delete such cam.

Cam Resolution

Click the scroll-down menu of [Motion Sync Control]. Here, you will be allowed to select [Cam Resolution] or you may select [Project] → [Motion Sync Control] → [Cam Setting] in project management window. Next, click the right mouse button to open the scroll-down menu and then select [Cam Resolution].

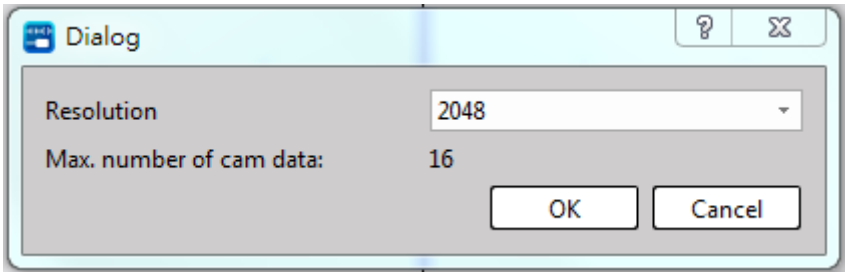


Fig. 204: Cam resolution setting

After being selected, such page will show "Dialog" window. Setting up cam resolution will affect the maximum quantity of the cam that can be added.

9-6 Motion Param Mapping

Click [Project] → [Motion] → [Motion Param Mapping] in function toolbar. You may also select [Project] → [Motion] → [Motion Param Mapping] in project management window and then double clicking the pagination function of [Motion Param Mapping].

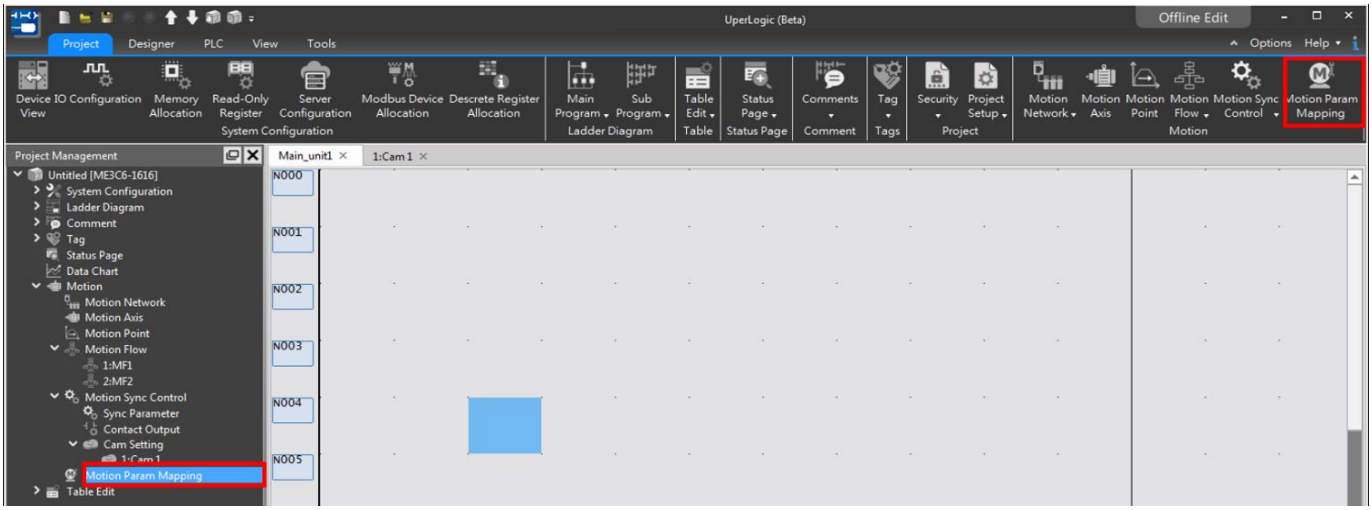


Fig. 205: Motion Param Mapping setting

Function	Description
Add	Add a new Motion Parameter Table and execute the required setting.
Delete	Delete old Motion Parameter Table
Up/Down	Change the sequential address of Motion Parameter Table in Summary Table.

Regarding the setting details of Motion Parameter Table, please refer to Motion Control User Manual.

9-7 Motion Recipe

Click [Project] → [Motion] → [Motion Recipe] in function toolbar. You may also select [Project] → [Motion] → [Motion Recipe] in project management window and then double clicking the pagination function of [Motion Recipe].

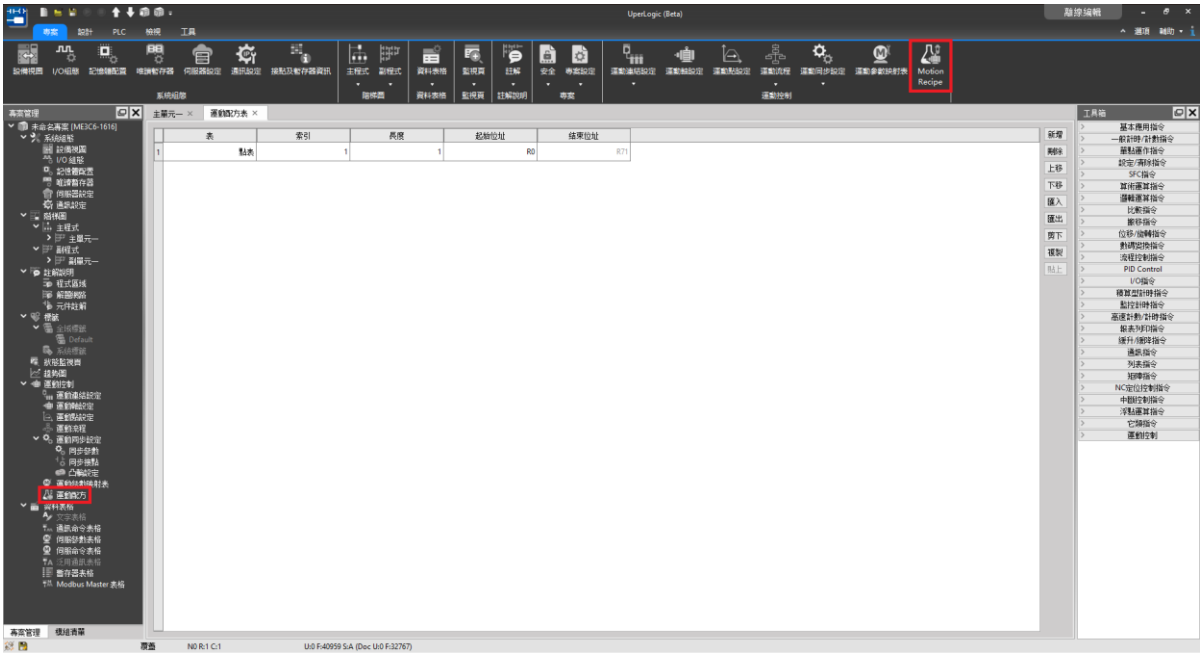


Fig. 206: Motion Recipe setting

Function	Description
Add	Add a new Motion Recipe and execute the required setting.
Delete	Delete old Motion Recipe
Up/Down	Change the sequential address of Motion Parameter Table in Summary Table.
Import/Export	Export or import information from Motion Recipe
Cut	Cut out the selected Motion Recipe information
Copy	Copy selected Motion Recipe information
Paste	Paste the copied or cut Motion Recipe information at the specified location

Regarding the setting details of Motion Recipe, please refer to Motion Control User Manual.

10

Module Configuration

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the graphical illustration method for helping the user achieve quick and convenient configuration as well as establish the configuration compatible with the PLC application. In the meantime, this section also explains the corresponding information setting instructions. Detailed description will be provided in the paragraph below.

10-1 Creating Module Layout Drawing

Page Display

Click [Project] → [Device View] in function toolbar, and the module management page will appear as below:

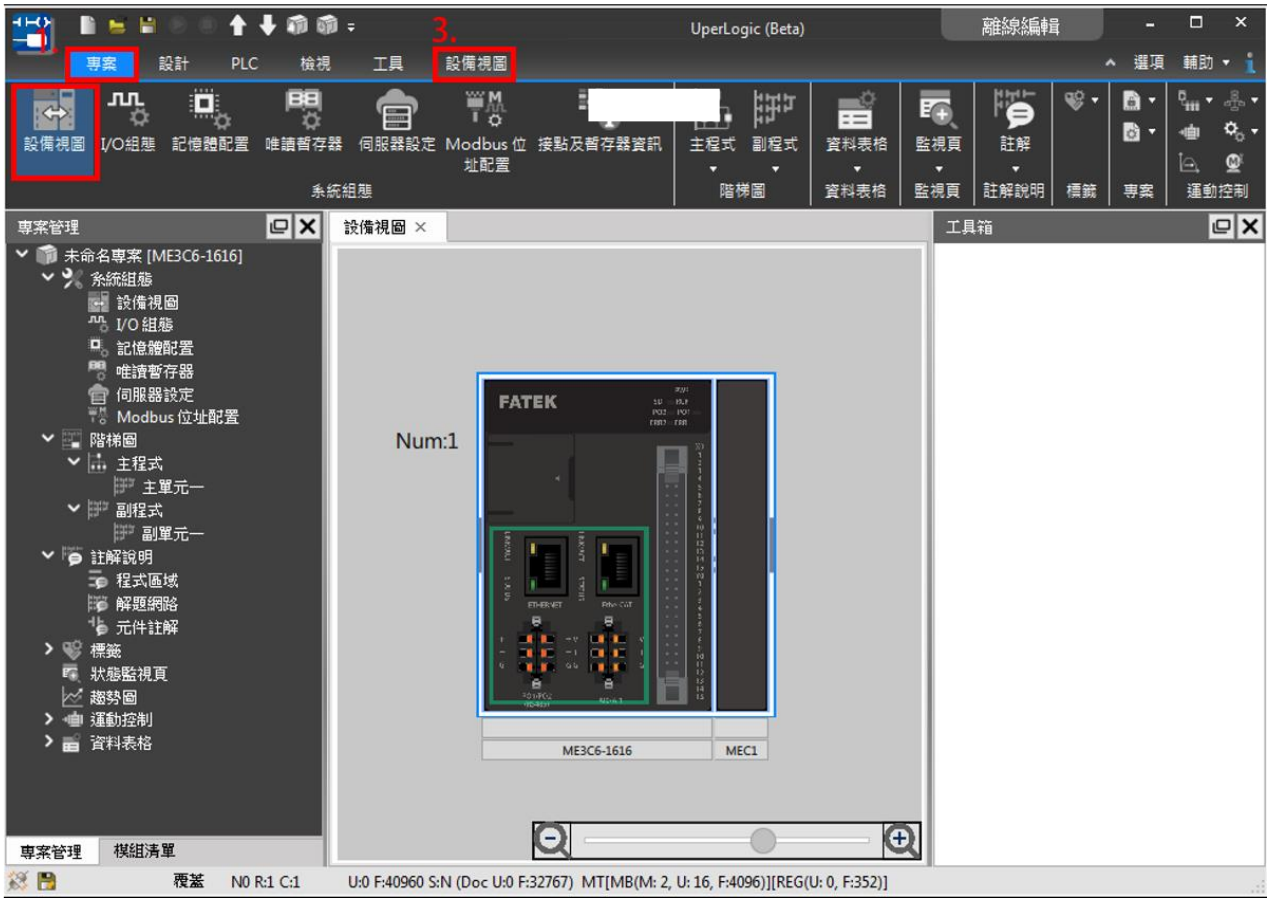


Fig. 207: Module management page

Click the toolbar icon, and you can call out following functions:

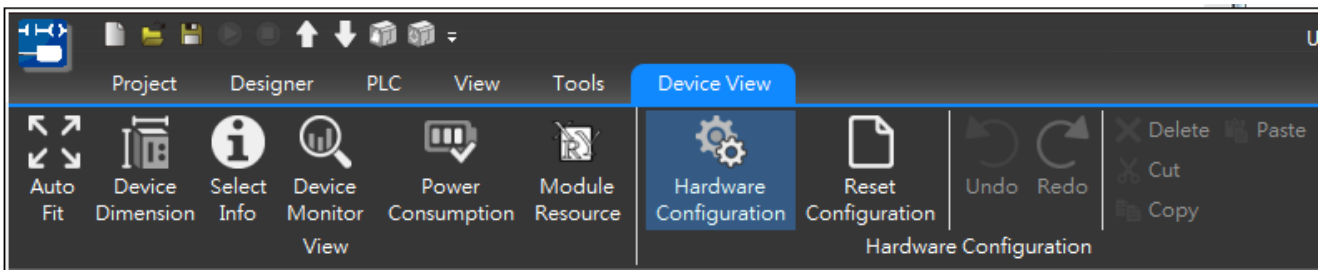


Fig. 208: Related functions of Module management page

Function	Description	Detailed introduction
Auto Fit	Compress and expand the module to appropriate position automatically.	
Device Dimension	Indicate the dimensions of the equipment.	Please refer to Section 10.1.3
Select Info	Display the information of the selected equipment such as ID, firmware version, hardware version, serial number and description, etc.	Please refer to Section 10.1.2
Device Monitor	Display the status of the selected module on the right-hand side.	Please refer to Section 10.3
Power Consumption	Calculate the power consumption status of all components being expanded until now.	Please refer to Section 10.4
Module Resource	Display the resource occupying status of such module at the lower side of the module.	Please refer to Section 10.1.4
Hardware Configuration	Display the module in the toolbox for users to expand the module.	Please refer to Section 10.1.1
Reset Configuration	Reset the module. After being pressed, it will remove all of the expanded components in the PLC and then return to initial status.	
Undo	Return to the previous step.	
Redo	Redo the next step.	

Table 25: Introduction of equipment window items

10-1-1 Operation setting

First, click [Hardware Configuration]. Next, select the module from the right-side toolbox and then drag it to the PLC module. During the dragging process, the intended configuration position will show yellow, as per the figure below. When the module reaches the rear section of the existing module, it will be placed at the rearmost end of the module automatically. By double clicking the module in the toolbox, the system will add new module to the rearmost end of the module that has been configured.

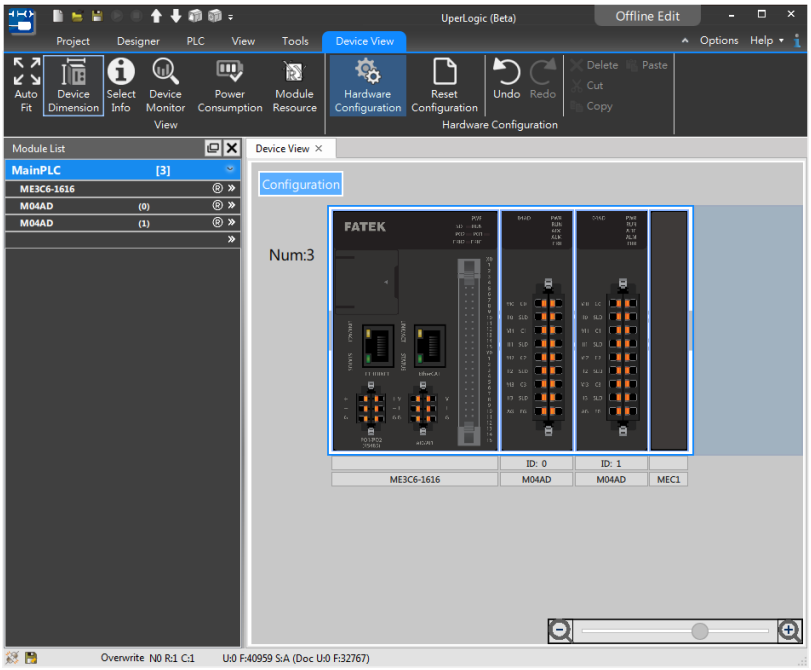


Fig. 209: Dragging the module to the rear section

The user may drag the module for adjusting the position of the added module in order to match with actual PLC configuration pattern.

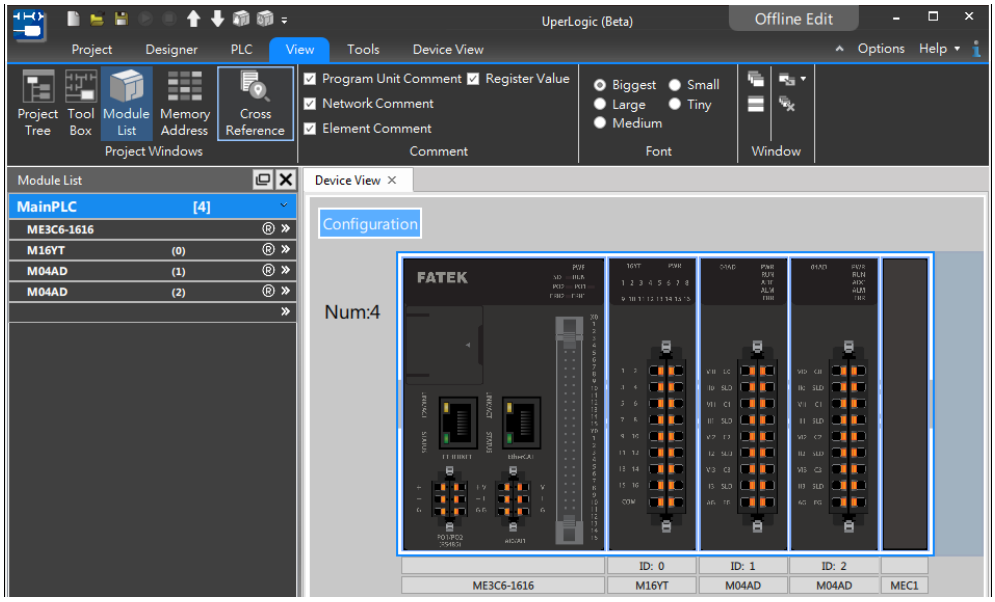


Fig. 210: Dragging module to the space between modules

Caution:

You cannot click [Download] if the expansion module in UperLogic is incompatible with the connected physical module. In this case, you will be allowed to use the uploading function only.

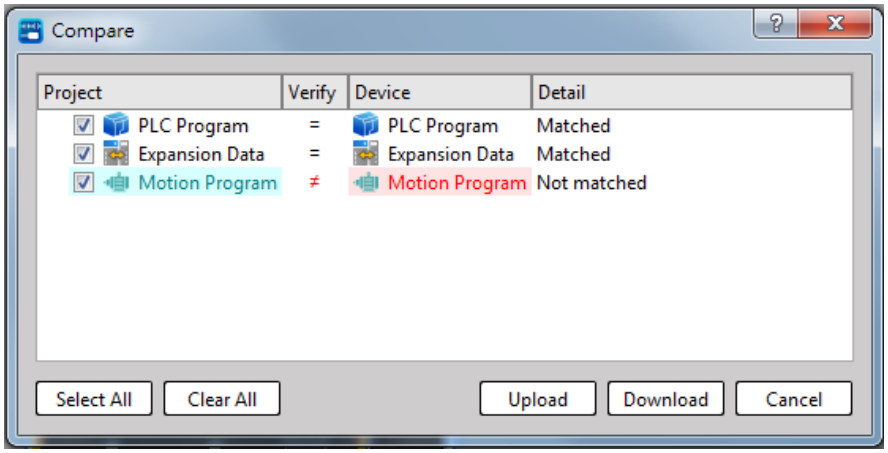


Fig. 211: Download remains inactive if incompatible with the module

10-1-2 Module information

Click [Project] → [Device View] → [Select Info] in function toolbar, and then move the cursor to the target module. Next, click the left mouse button and the window will show the information of the selected module such as version number, number of terminal board point and remark, etc., as per the figure below:

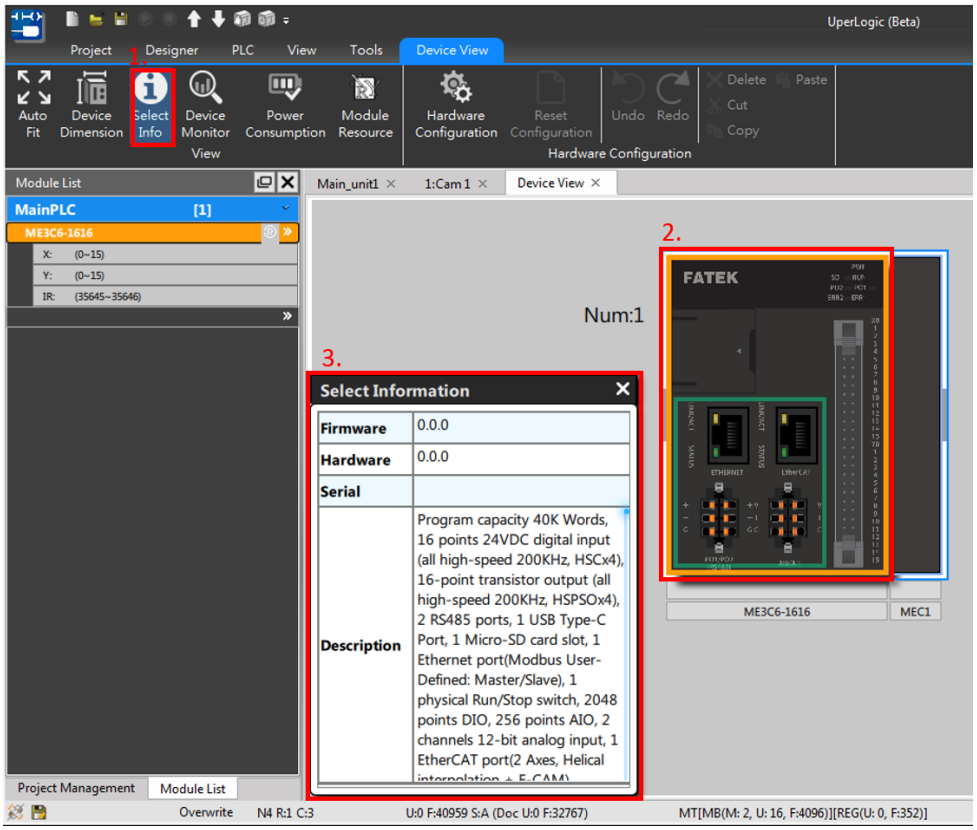


Fig. 212: Module information

10-1-3 Device Dimension

Click [Project] → [Device View] → [Device Dimension] in function toolbar and the module dimensions will be displayed in the webpage, as per the figure below:

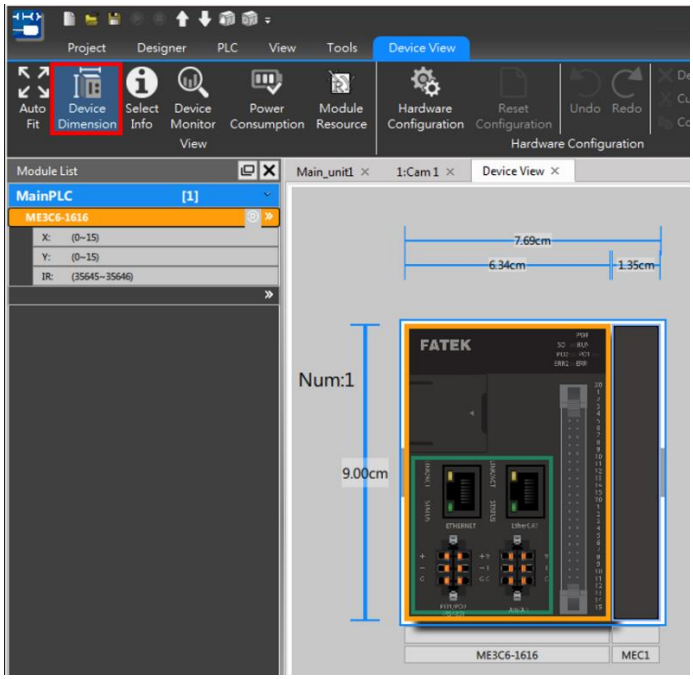


Fig. 213: Module dimensions

10-1-4 Module Resource

Click [Project] → [Device View] → [Module Resource] in function toolbar and the resource consuming status of each module will be displayed in the webpage, as per the figure below:

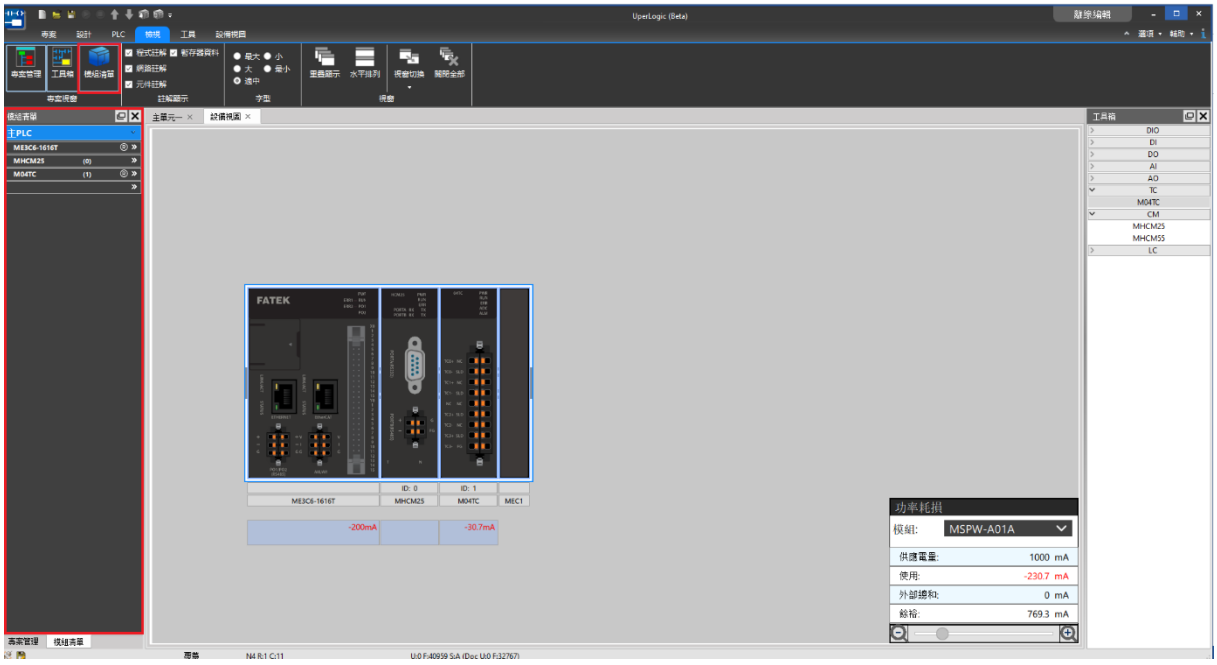


Fig. 214: Module Resource

10-2 Module List

Click [View] → [Module List] in function toolbar, and the module management page will be displayed, as per the figure below:

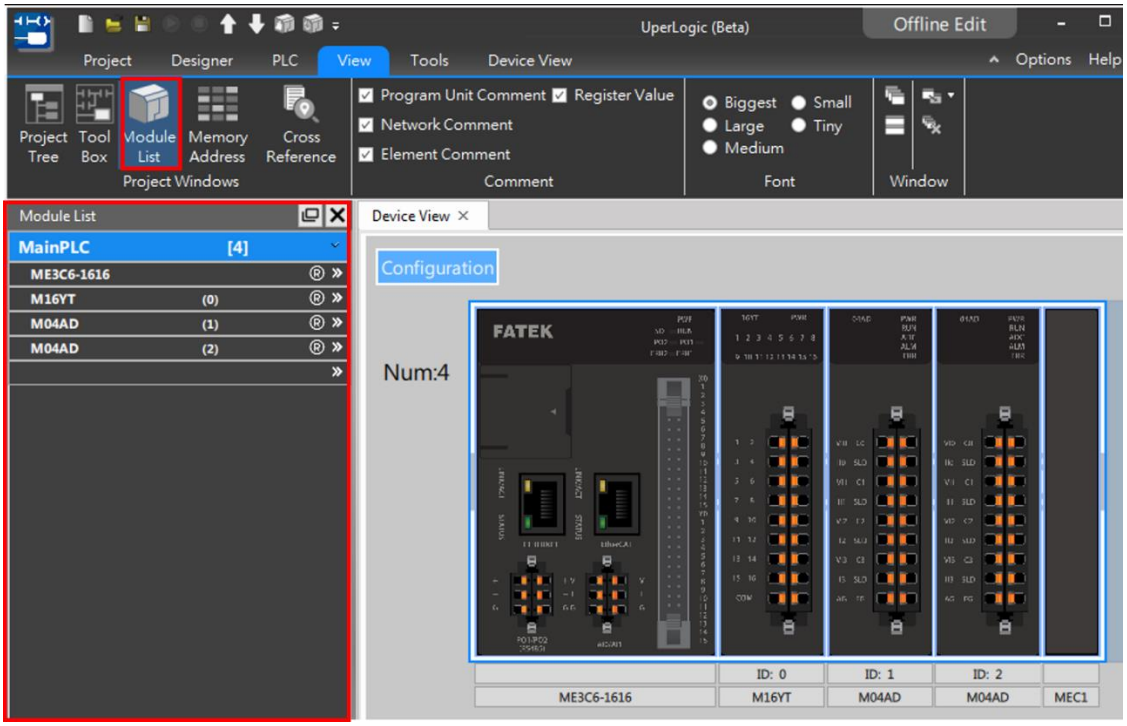


Fig. 215: Module List

The module list will display the module currently installed. When clicking the corresponding module, the module list will also display the module currently selected.

Fig. 216: Selecting module

Click the module in the Module List, and it will show the resource consuming status of the corresponding module.

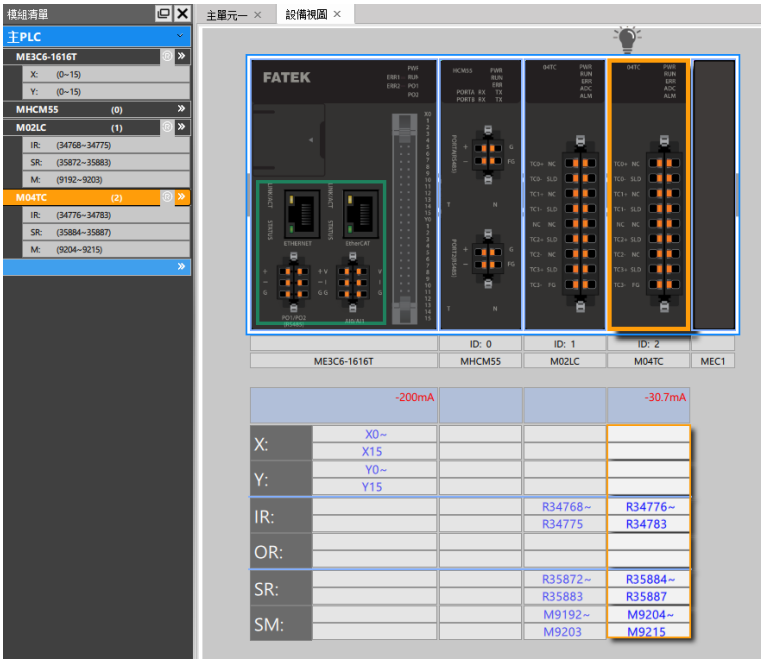


Fig. 217: Module resources in Module List

Based on the sequential order, the Module List will show the name, ID, Ⓡ and » of the module or PLC.

[Ⓡ]: To expand or compress the resources items of such module.

[»]: It allows the user to skip to equipment window directly from other page and the system will also mark the selected module automatically.

10-3 Device Monitor

Click [Project] → [Device View] → [Device Monitor] in function toolbar, and the system will show the right-side device monitoring window:

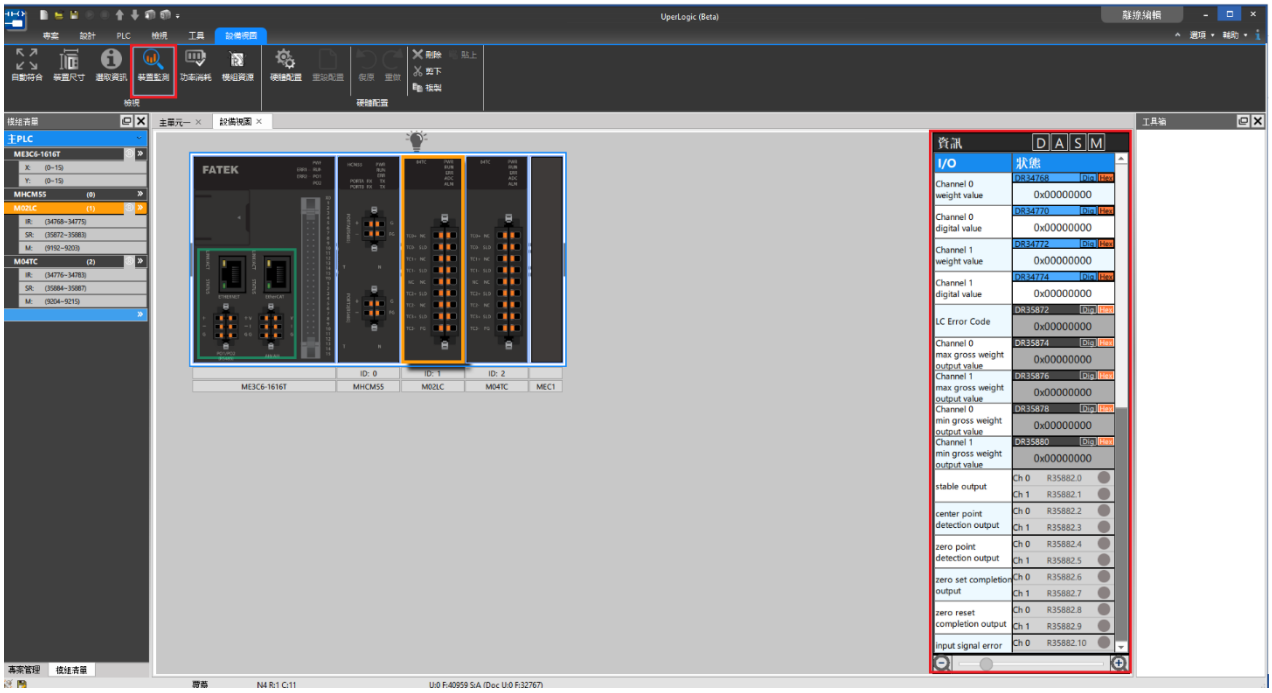


Fig. 218: Device monitoring

In the information, you may select the resource that will be displayed such as "Digital Data," "Logic Data," "Status Data" and "Relay."

10-3-1 Digital Data

When clicking [Digital Data] above [Device Monitor], the Module List will show digital data only. Next, point the mouse at the target value. When the switch is shown in blue as per the figure below, it means the user will be allowed to change the switch of such register.

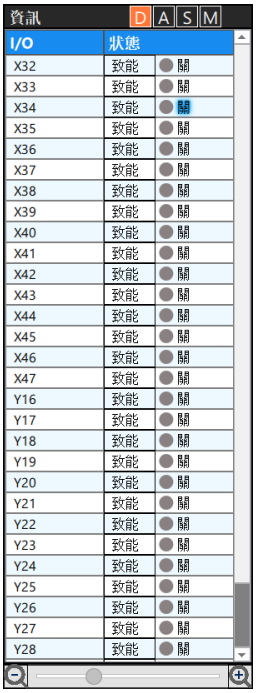


Fig. 219: Digital data of device monitoring

10-3-2 Logic Data

When clicking [Logic Data] of the information above [Device Monitor], the Module List will show logic data only. Next, point the mouse at the target value. When the data is shown in blue as per the figure below, it means the user will be allowed to change the switch of such register. In the meantime, it also allows the user to quickly change the value displaying pattern with [Dec] and [Hex] on the right side of the register.

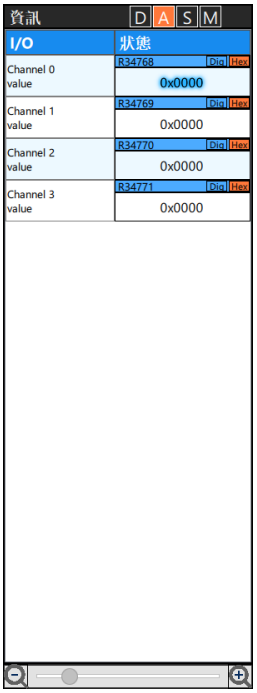


Fig. 220: Related logic data of device monitoring

10-3-3 Status Data

When clicking [Status Data] above [Device Monitor], the Module List will show status data only. If the data is shown in gray as per the figure below, it means the user will not be allowed to change the value of such register. However, the user is still allowed to instantly change the value displaying pattern with [Dec] and [Hex] on the right side of the register.

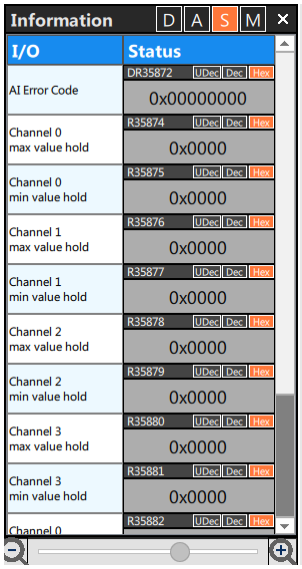


Fig. 221: Status data of device monitoring

10-3-4 Relay

When clicking [Relay] above [Device Monitor], the Module List will show status data only. Next, point the mouse at such value. If the data is shown in blue as per the figure, it means the user will be allowed to change the value of such register; otherwise, it will be impossible to make the change if the register field is shown in gray background.

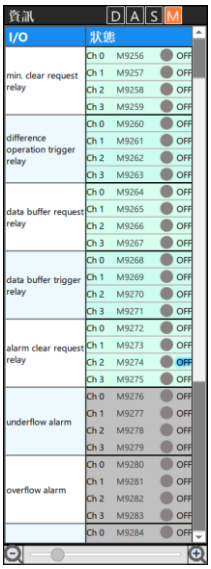


Fig. 222: Status data of device monitoring

10-4 Power Consumption

Click [Device View] → [Power Consumption] in function toolbar, the lower-right side will show the power consumption calculation window, as per the figure below:

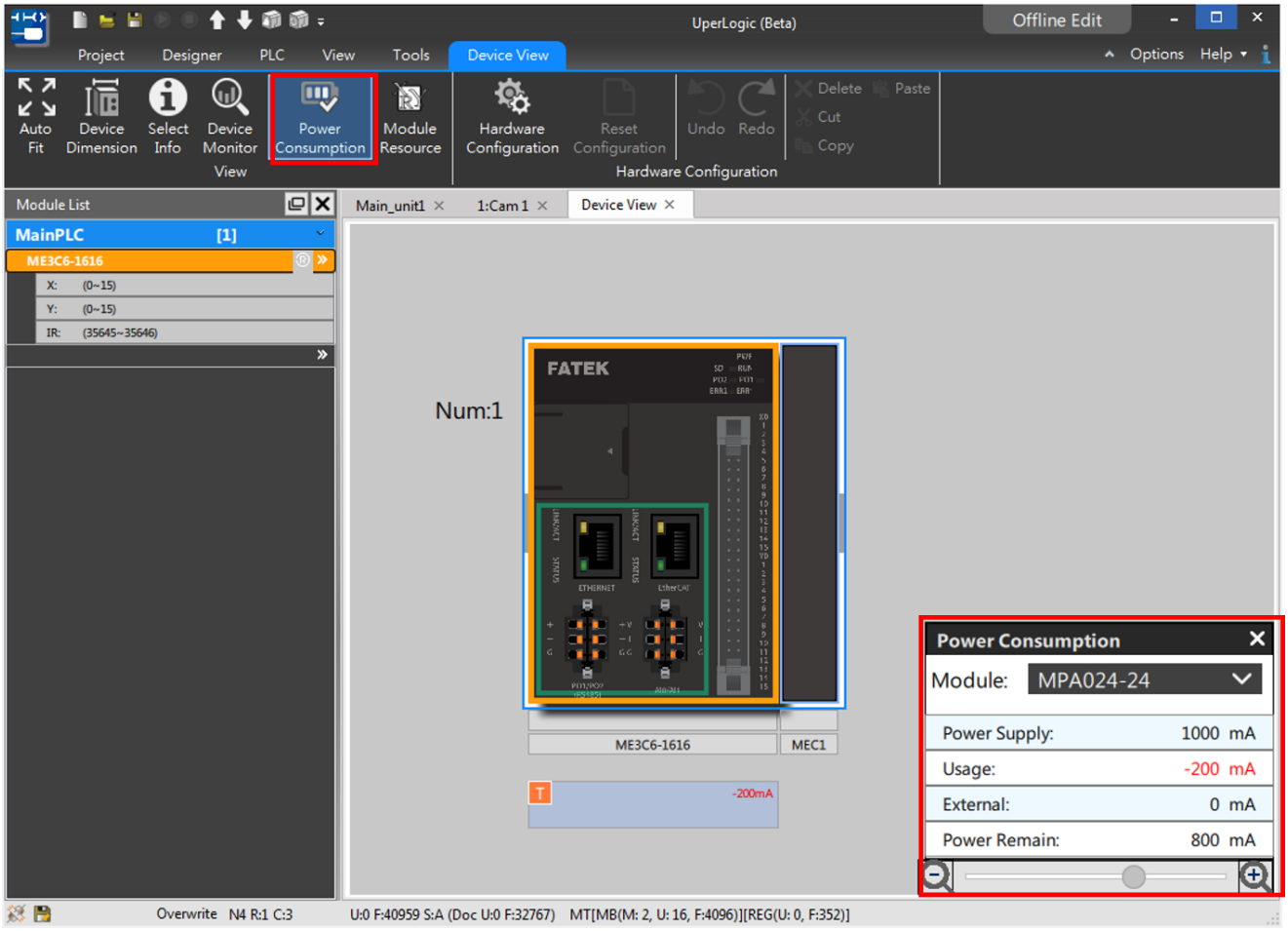


Fig. 223: Power Consumption

Function	Description
Module	Select the power module that will be used now.
Power Supply	The power capacity supplied by the power module.
Usage	Display the total power capacity consumed by all modules currently used.
External	Display the total power capacity supplied by external power source as estimated by the user.
Power Remain	Remaining power capacity after deducting the supplied capacity from the power module.

Table 26: Introduction of detailed power consumption

Additional power will be required for certain modules such as M04DA indicated in the figure. The user may determine if using the power supplied by the host or by the external source. If external power supply will be required, click  and set such power as external power supply and then recalculate the capacity currently required, as per the figure below:

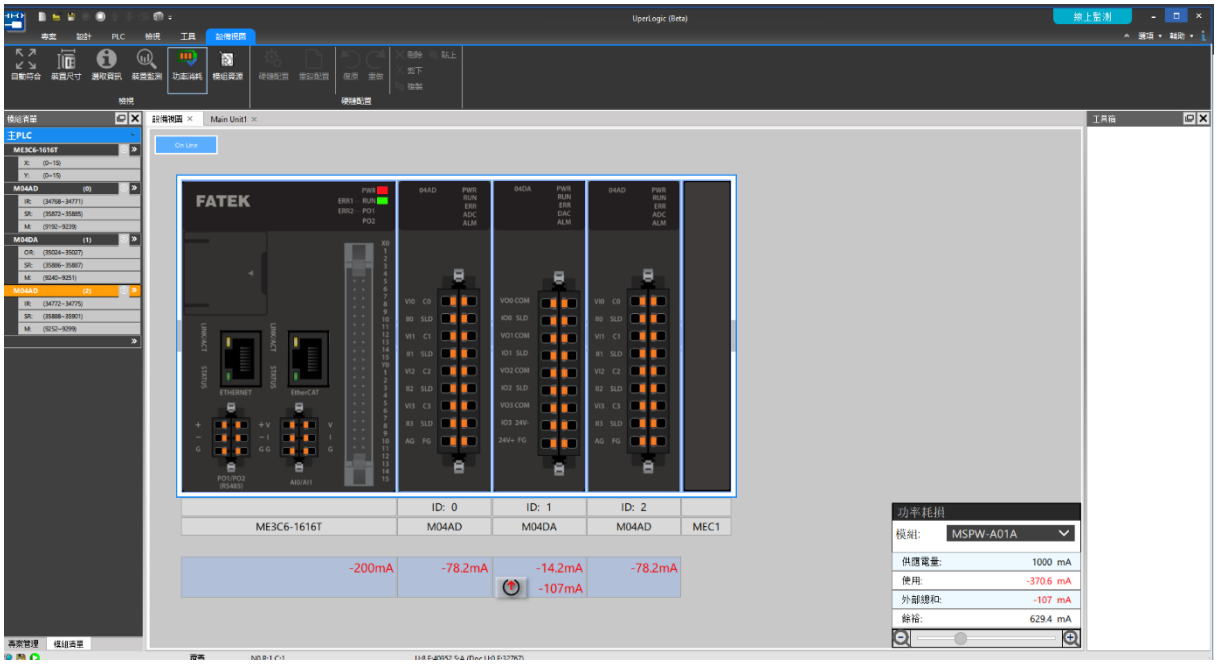


Fig. 224: External power supply

10-5 Module Setting

Double clicking the expansion component with the left mouse button and the corresponding module setting window will pop up. In addition to creating the equipment name and comment, the user is also allowed to set up the module parameters in "Offline Edit" and to calibrate the corresponding module in "Online Monitor."

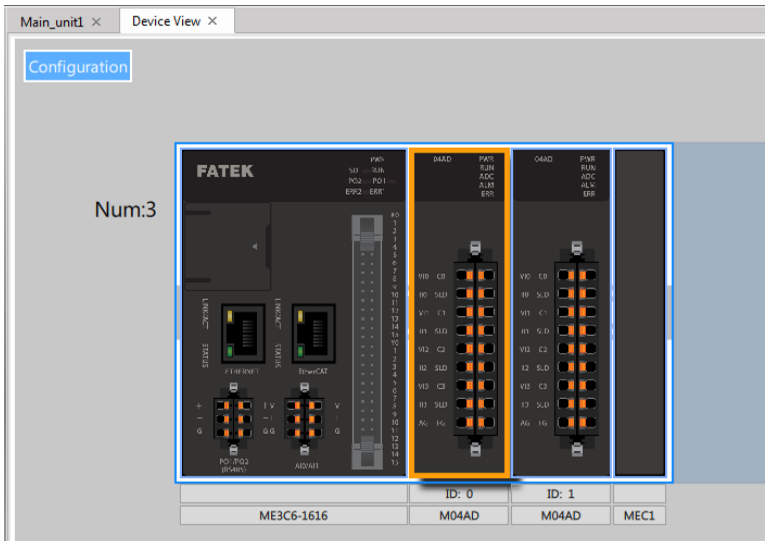


Fig. 225: Setting the module

Although the equipment information of each module may vary in name and description, however same information will be displayed. Indicated below is the introduction of the equipment information related content by using M04TC as the example.

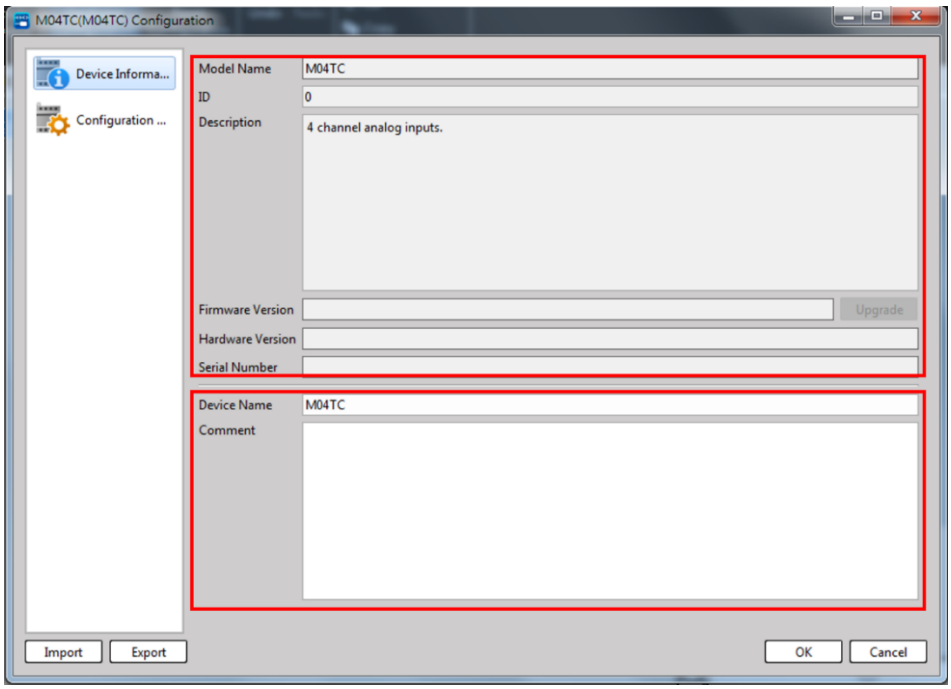


Fig. 226: Device information (M04TC)

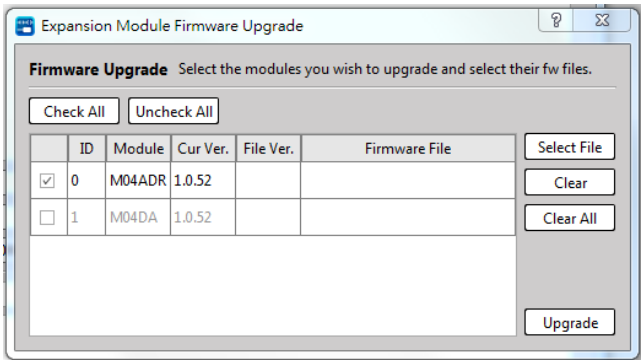
Information	Description
Module name	The name of the module. It is the default value and cannot be edited.
ID	Display present number of the module automatically according to the sequence of the string devices.
Description	The functional description of the module. It is A default value and cannot be edited.
Firmware Version	By clicking the right-side [Upgrade] button, you may upgrade the firmware of all modules installed in the PLC and such function will be active only under "Online Monitor." 
Hardware Version	Present hardware version of the module. It is a default value that cannot be edited.
Serial Number	Present serial number of the module. It is a default value that cannot be edited.
Device Name	The user may define the equipment name and then save the changed information in the Project.
Comment	The user may define its own comment and then save the changed information in the Project.

Table 27: Device Information List

After changing the device name, press [OK] and the changed name will be displayed under such device.

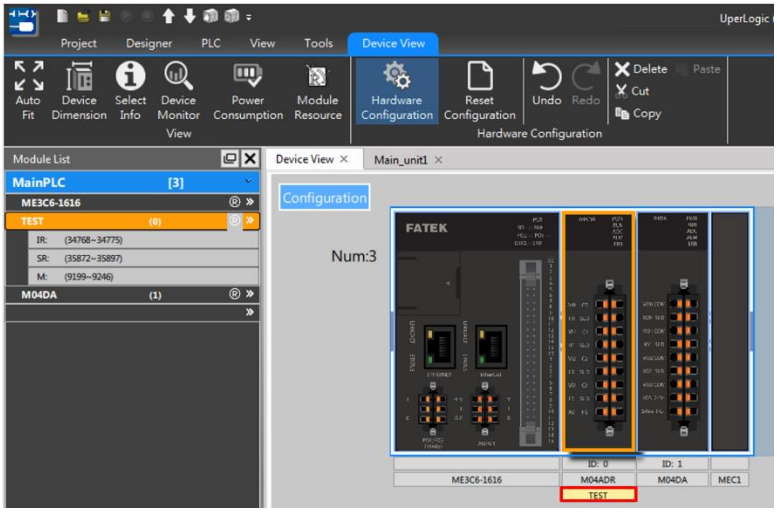


Fig. 227: Changed module name

Each module will be configured to display the content of the corresponding parameters. Provided below is the introduction on how to execute the configuration by using M04TC as the example.

When operated under "Offline Edit," the user may emable or disable the corresponding channel and change the desired parameter. Please refer to the relevant manuals.

Fig. 228: Configuration information_offline edit (M04TC)

When the CM Module is under "Office Edit," it allows the user to set up the packet or the table for the corresponding mode. Provided below is the introduction by using MHCM55 as the example.

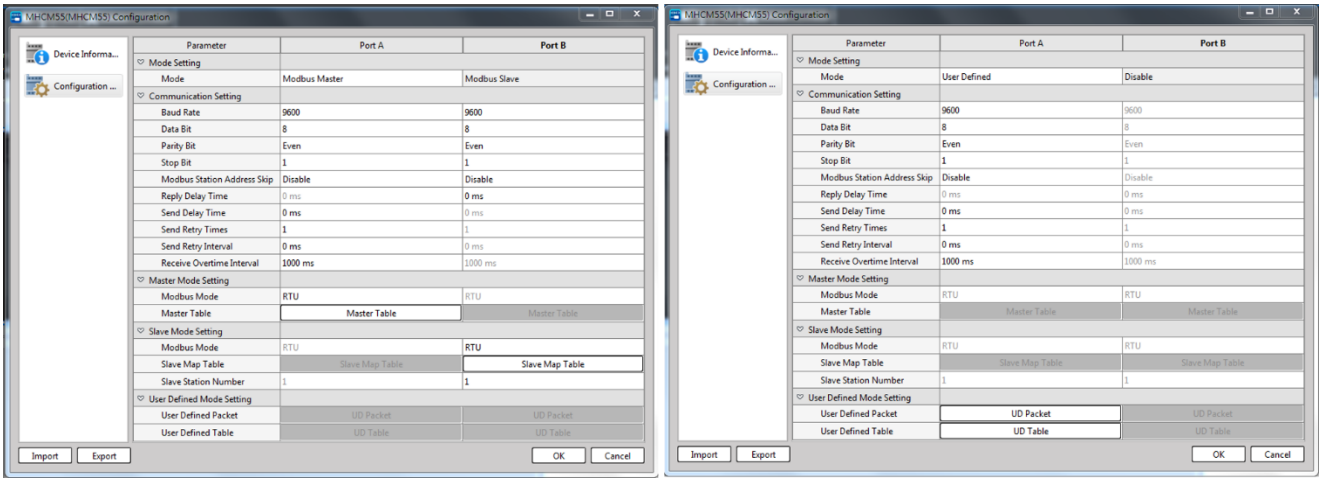


Fig. 229: Setting parameters for communication module (MHCM55)

Modbus Master Station

After selecting the Modbus Master Station, it allows the user to create the table for the Master Station.

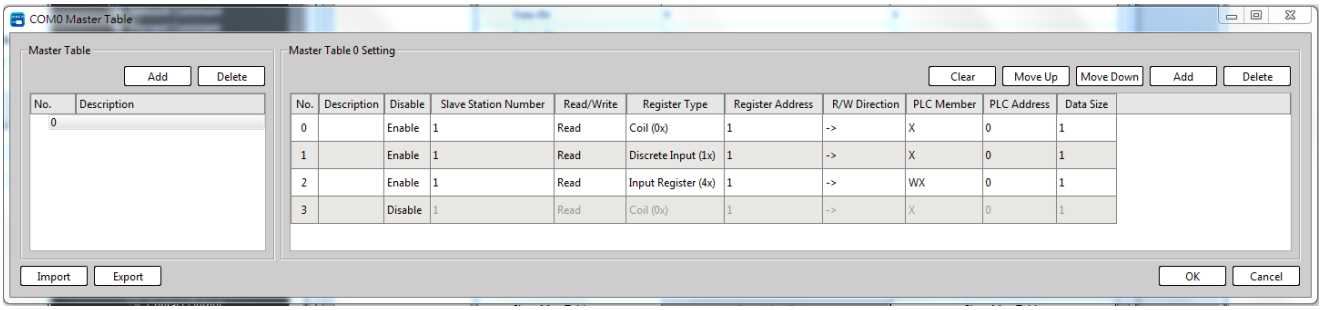


Fig. 230: Setting Master Station Table

In the left-side Master Station Table, the user will be allowed to Add (+) or Delete (-) the table and then create its own description for easier identification. After adding the table, the user may add new order in the right-side Master Station Table and then click the corresponding parameter to proceed with the change.

Please refer to the relevant manual for details about setting parameters in the table of the master station.

Modbus Slave Station

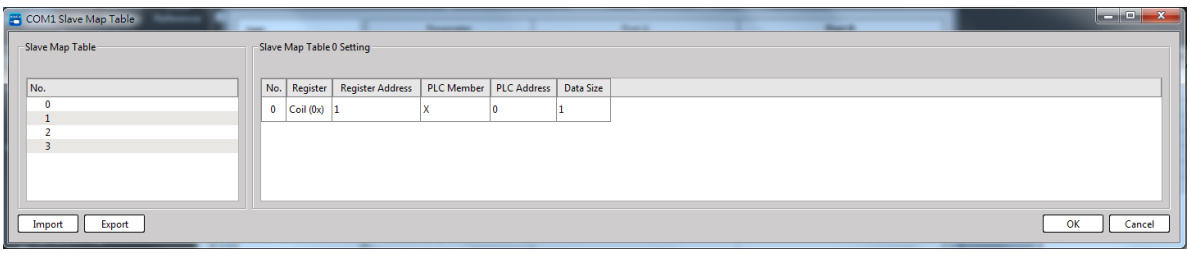


Fig. 231: Setting Slave Station Table

In the left-side Slave Station Table, select the number that will be edited. After that, you may start setting up the corresponding parameters in the right-side Slave Station Table.

Please refer to the relevant manual for details about setting parameters in the table of the slave station.

User Defined Value

The user defined value comprises two tables and they are User Defined Packet and User Defined Table.

User Defined Packet

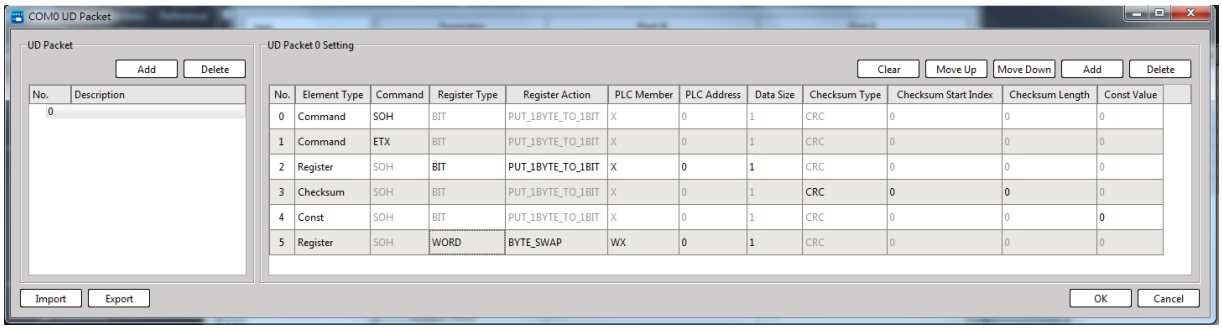


Fig. 232: Setting User Defined Packet

In the left-side User Defined Packet, the user will be allowed to Add (+) or Delete (-) the packet and then create its own description for easier identification. After adding the packet, the user may add new command in the right-side UserDefined Packet and then click the corresponding parameter to proceed with the change.

Please refer to the relevant manual for details about setting parameters in Use Defined Packet.

User Defined Table

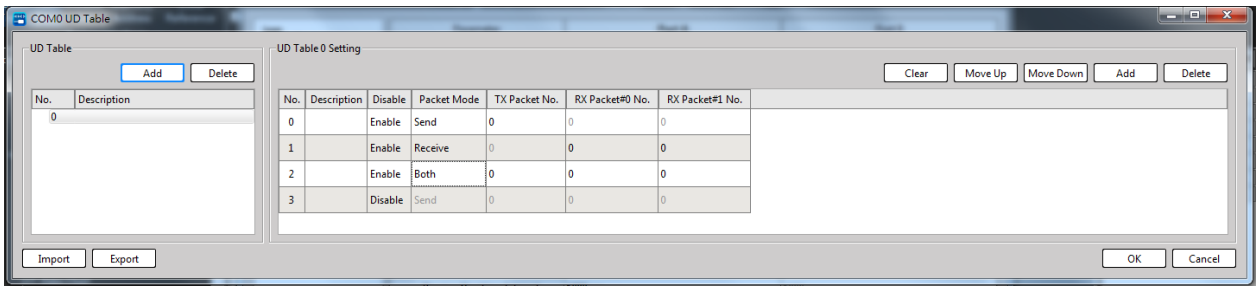


Fig. 233: Setting User Defined Table

In the left-side User Defined Table, the user will be allowed to Add (+) or Delete (-) the table and create its own description for easier identification. After adding the table, the user may add new command in the right-side User Defined Table and then click the corresponding parameter to proceed with the change.

Please refer to the relevant manual for details about setting parameters in User Defined Table.

When operated under "Online Monitor," the AI, AO, TC and LC modules will be provided with calibration function. Provided below is the introduction by using M04TC as the example.

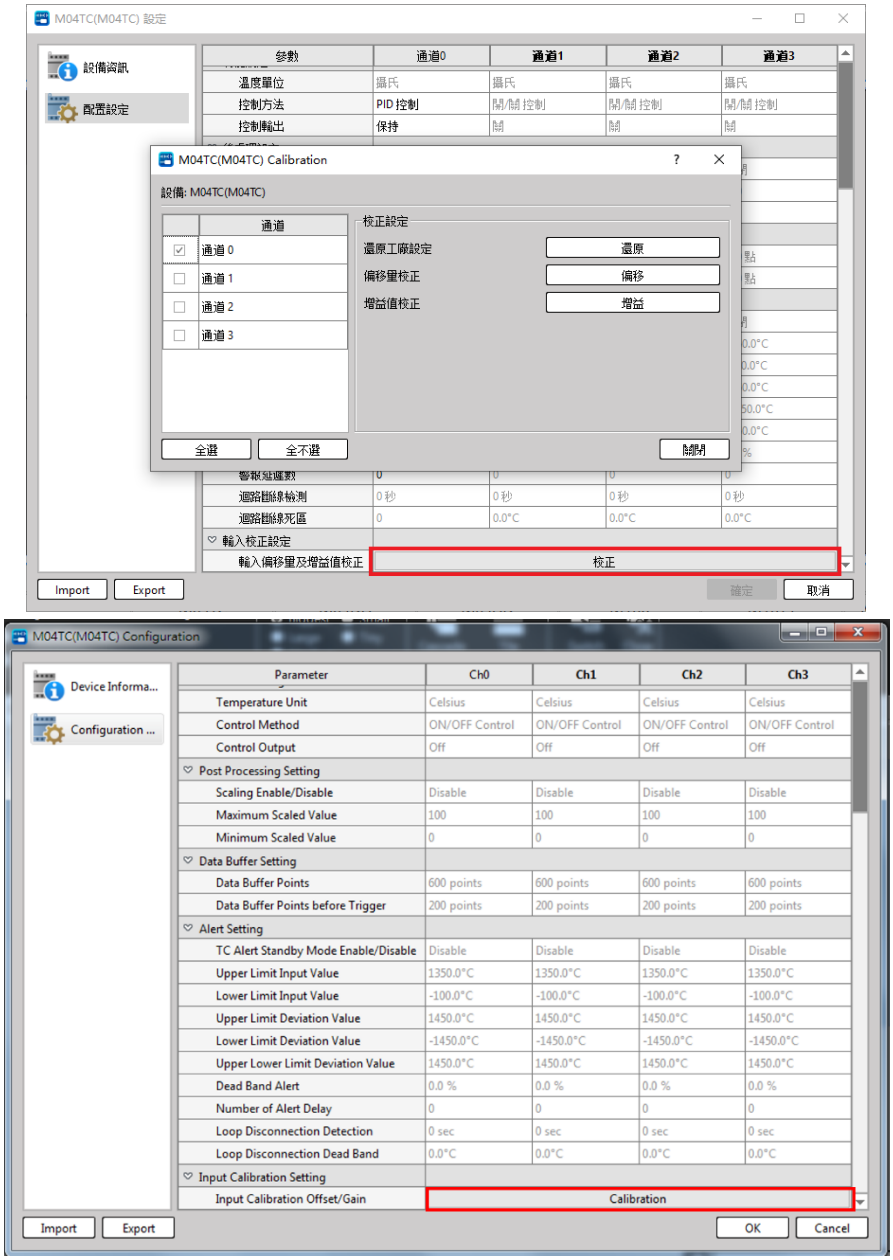


Fig. 234: Module calibration_Online monitor (M04TC)

Click [Calibration] at lower-middle of [Configuration Setting] column, and you can open the calibration window for the corresponding module. First, select the left-side channel that will be calibrated. Next, select the required setting procedure in calibration setting and then you may complete the calibration according to the corresponding steps.

The lower-left side of the module is configured with the export and import options for users to quickly export and import the edited setting result.

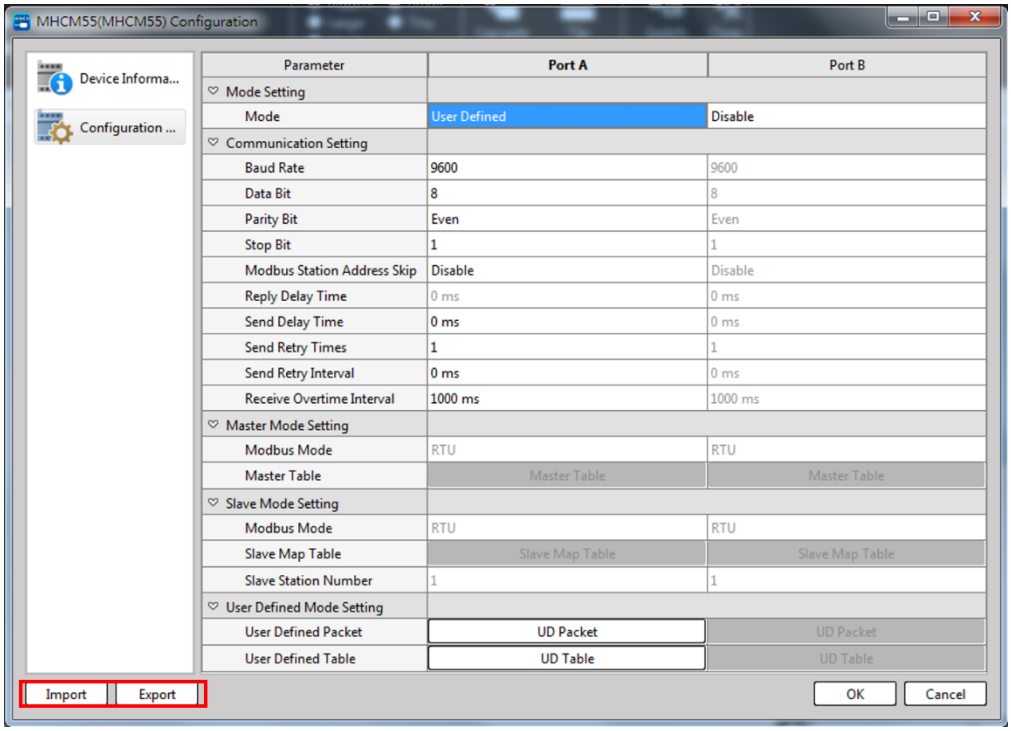


Fig. 235: Export and import of module setting

It should be noted that the file exported by the CM Module from different setting pages shall not be applicable for other purposes. As indicated in the figure below, the file exporting and importing function of the module cannot be used for exporting or importing the User Defined Packet.

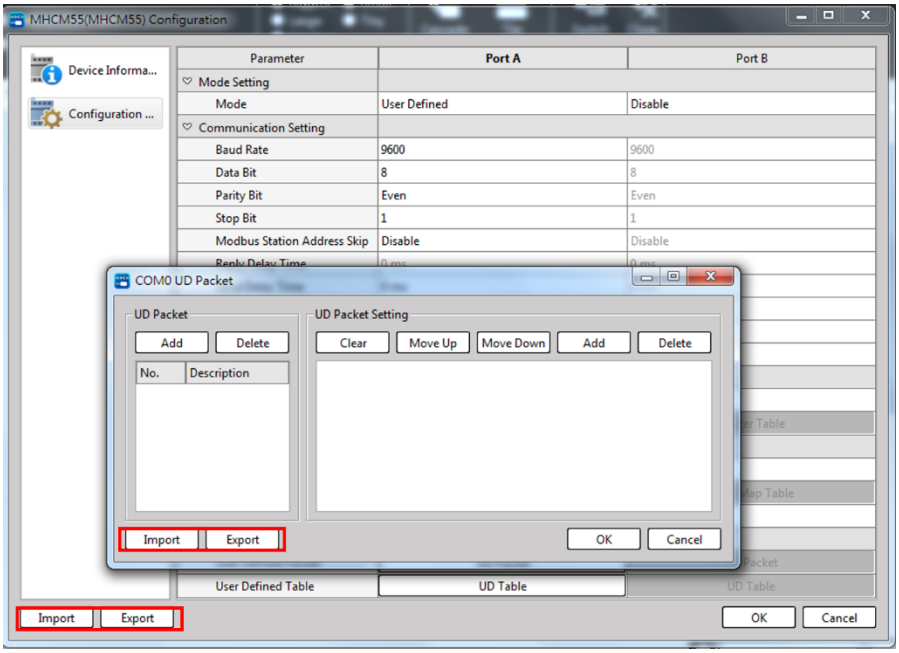


Fig. 236: Incompatible exporting and importing

Copy and Paste

In [Configuration], move the cursor to [Channel] and then click the right mouse button and you will be allowed to execute the copy, paste and reset functions.

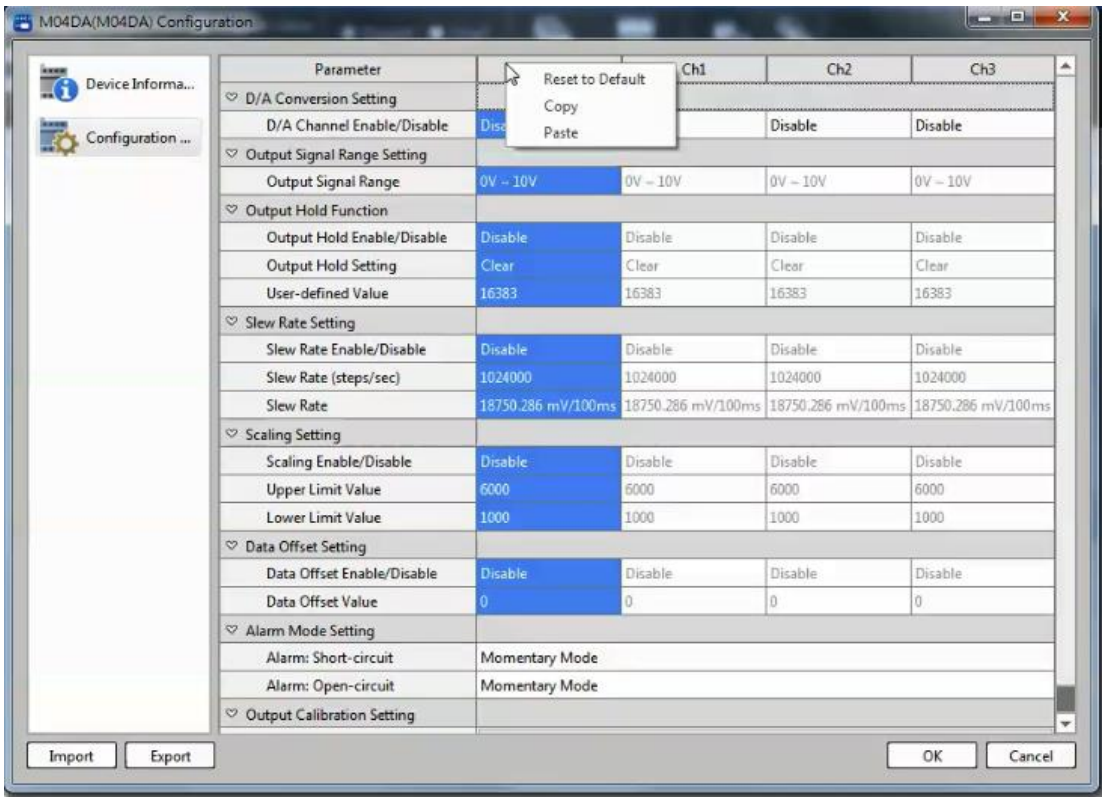


Fig. 237: Channel’ s right mouse button function

Function	Description
Reset to Default	Restore all of the channel settings to initial preset value.
Copy	Copy all settings of the channels currently selected.
Paste	Paste previously copied channel settings.

10-6 I/O Configuration Status

UperLogic adopts the automatic detection mode for the expansion unit. After connecting with the host, UperLogic will automatically read the status of the host and the expansion unit, and at the same time automatically allocate the occupied system resources.

Users can see how many expansion units are connected to the host in [Project] → [Device View], and which system resources are occupied by the expansion modules.

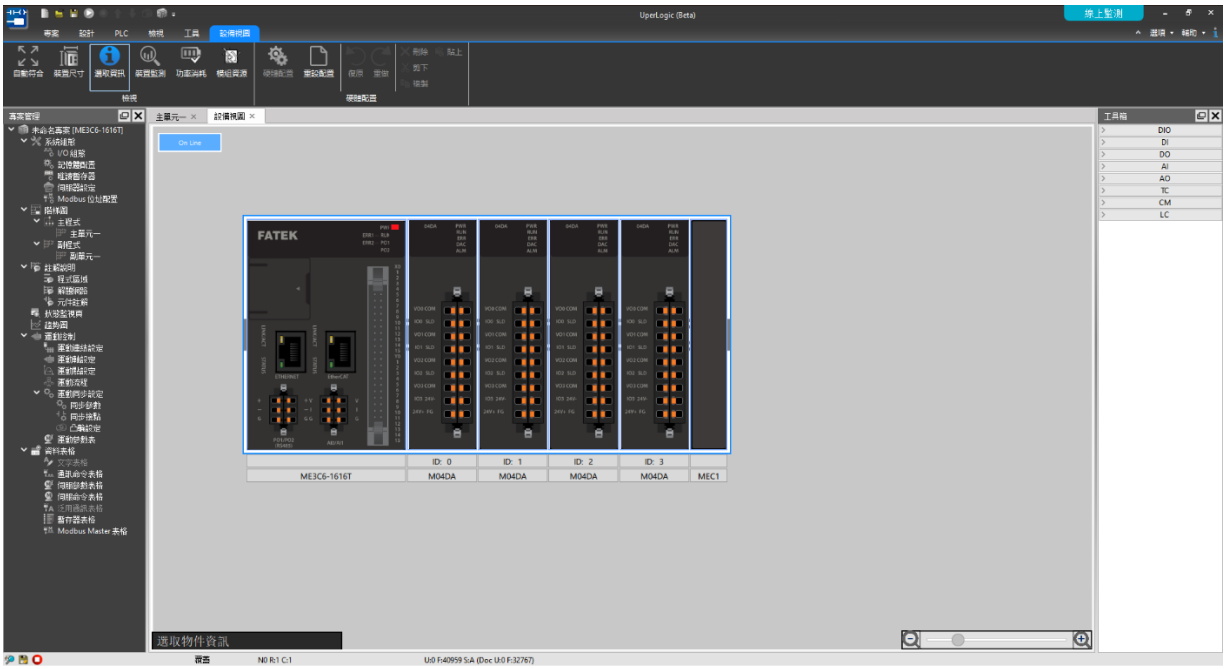


Fig. 238: Device management window

To view the configuration status of the I/O numbering, just click [Device View] → [Device Monitor], and then click the relevant module in the working window, and relevant information such as Digital/Analog/Status will be displayed on the right side, which is convenient for users to monitor the reading values and status of each IO more intuitively, as shown in the figure below:

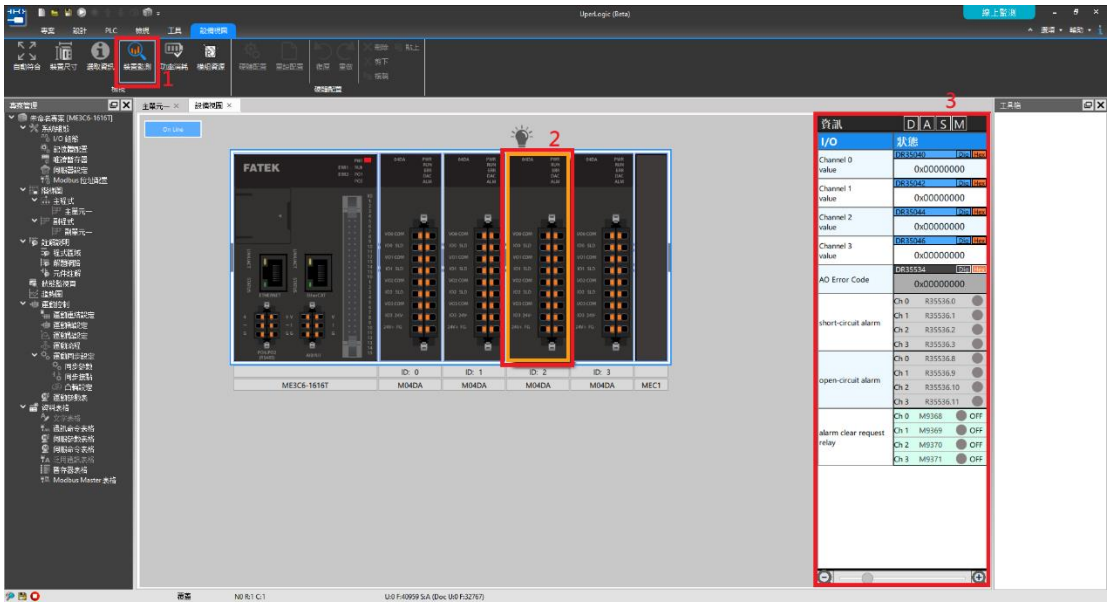


Fig. 239: The right-side display information such as Digital/Analog/Status

11

Communication Function

This section describes the operating procedure required for executing the PLC online and offline as well as the PLC program starting and stopping operations. Provided below are detailed operation methods required for executive the respective communication.

11-1 Connection

It allows the user to connect with the PLC function for changing current online parameters and creating online list, etc.

From the function bar [PLC] → [Connection Parameter], you can set the default connection parameter, which can be used directly for subsequent connections without additional settings.

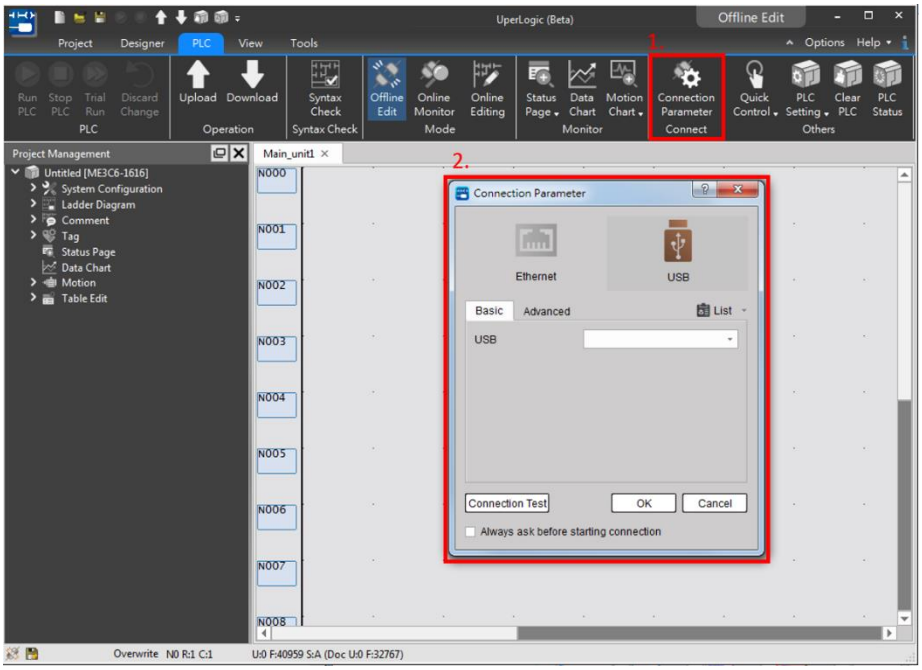


Fig. 240: Connection Parameter

Page	Connection Type	Attribute	Description
Basic	Ethernet	Network Connection	Select the network interface card users want to use.
		Type	Network online type, in TCP or UDP.
		IP Address	Connected PLC network address
		Communication Port	Connected PLC network port.

		Network Connection Info	Display the current network interface card information.
		Search	Search the PLC network address existing on the network.
	USB	USB	Select the M-PLC USB port that is currently connected to the computer.
Advanced		Timeout (ms)	PLC response timeout setting, the setting range is 100-30000 ms.
		Retest Frequency	Communication failure retest time setting, the setting range is 0-10 times
		Command Delay (ms)	The delay time setting of each communication, the setting range 0-1000 ms.
Other Settings		Connection List	A list of frequently used connections can be set, and the connection information can be quickly brought in by clicking the drop-down menu option.
		Connection Test	Use the current parameters to perform a quick connection test to confirm that the connection parameters are valid parameters.
		Be sure to ask before connecting	When checked, the connection parameter window will be displayed before each connection action. If it is not checked, the previous connection parameters will be used to directly connect.

Connection List

Click [Connection Parameter List] → [Connection List] in scroll-down menu and you will be allowed to create the Connection List.

Fig. 241: Connection Parameter List

Connection Test

Click [Connection Parameter List] → [Connection Test] to perform a quick connection test with the current parameter.

11-2 Offline Edit

Under PLC online status, click "PLC" → "Offline edit" in function toolbar and you will be allowed to execute the offline editing.

11-3 Upload

Such function allows users to upload the PLC project to PC for preparing backup copy or for inspection. The operation process differs depending on whether the project is opened or not, as detailed below:

8-1-1 Upload with Open Project

1. Select the tab page [PLC] → [Upload], and use the set connection parameters to connect.
2. After connecting, compare the currently opened project with the PLC project.
   A. When the comparison is the same, [The current project matches the connected PLC] will show.

   B. When the compare is not matched, a compare window will be displayed to allow the user to select the part to be uploaded.

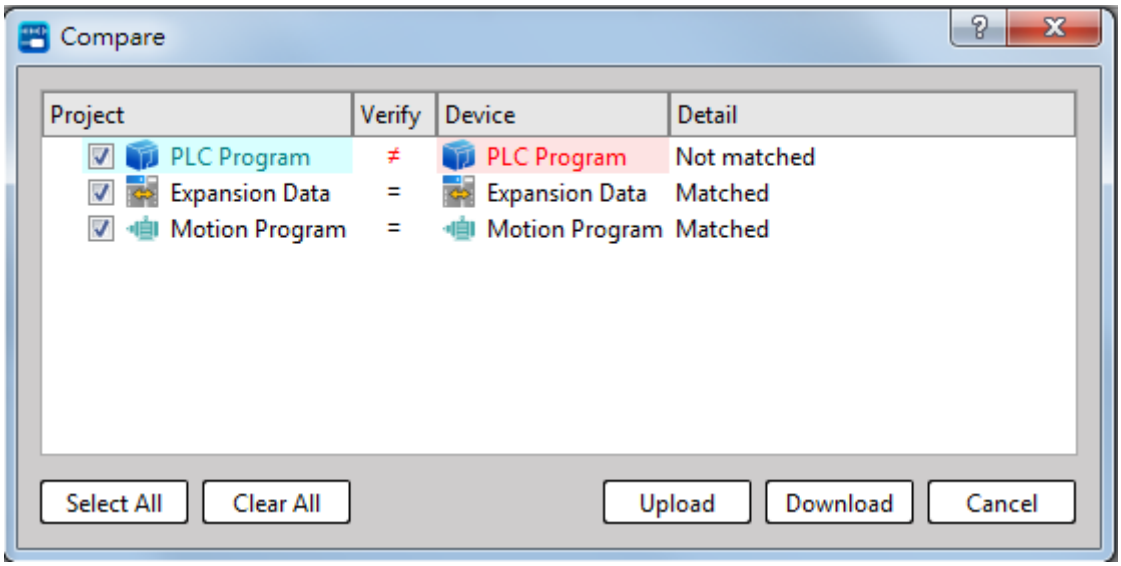
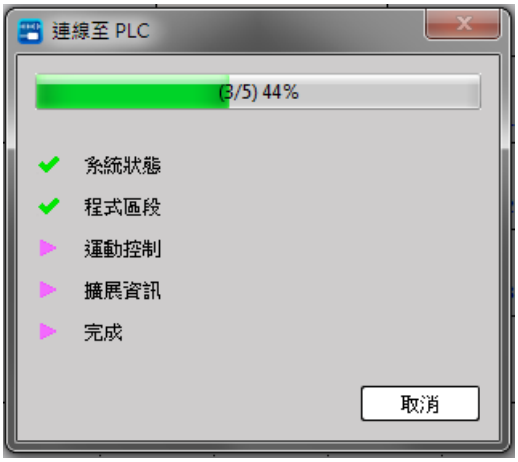


Fig. 242: Selecting the uploaded data

3. Click [Upload] to start uploading until the progress window is completed.



8-1-2 Upload with Closed Project

1. Select the tab page [PLC] → [Upload]
2. Ask "Do you open the relevan project?"
   A. Click [Yes] → The action is the same as Section 11-3-1.
   B. Click [No] → The connection parameters will be forcibly asked, and the connection will be performed using the set connection parameters.

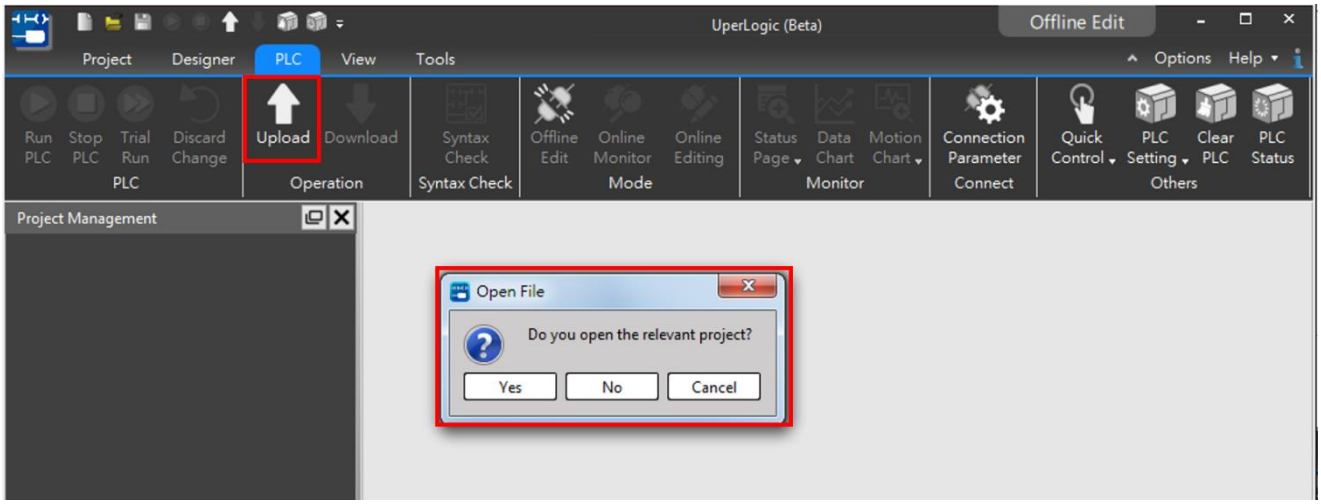


Fig. 243: Opening the relevant project

3. After connecting, the user can choose the data to be uploaded.

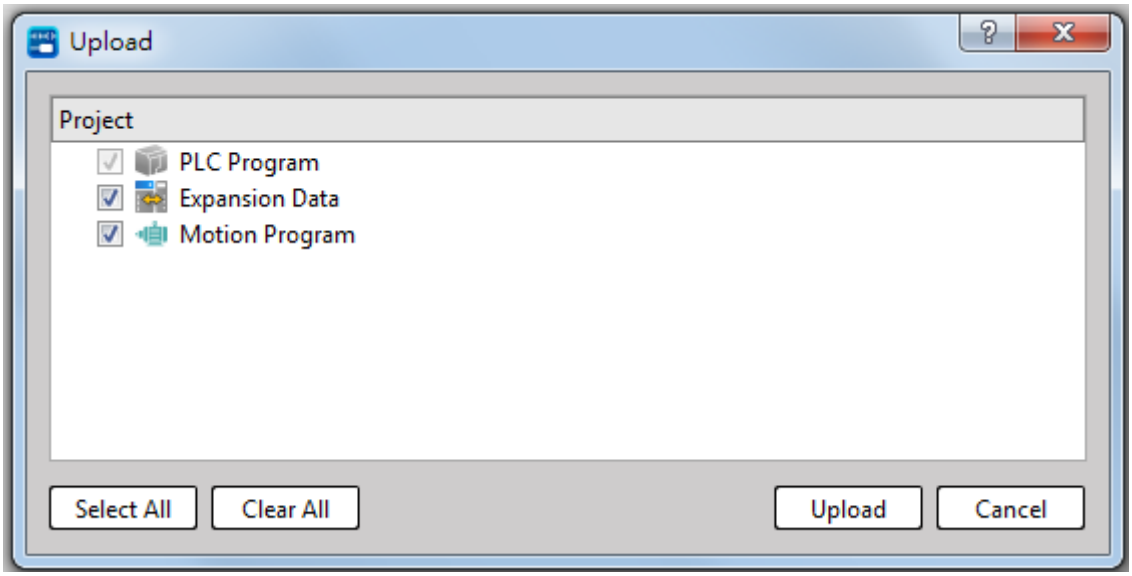
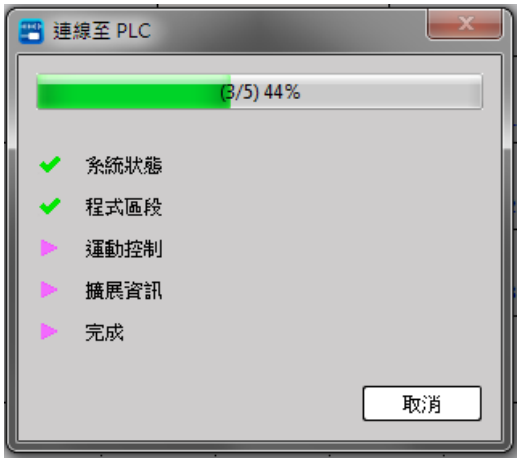


Fig. 244: Uploading the data

4. Click [Upload] to start uploading until the progress window is completed.



11-4 Download

Such function allows the user to download the PLC project being planned in PC to the PLC.

1. Select the tab page [PLC] → [Upload], and use the set connection parameters to connect.
2. After connecting, compare the currently opened project with the PLC project.
   A. When the compare is the same, [The current project matches the connected PLC] will show.

   B. When the compare is not matched, a compare window will be displayed to allow the user to select the part to be downloaded.

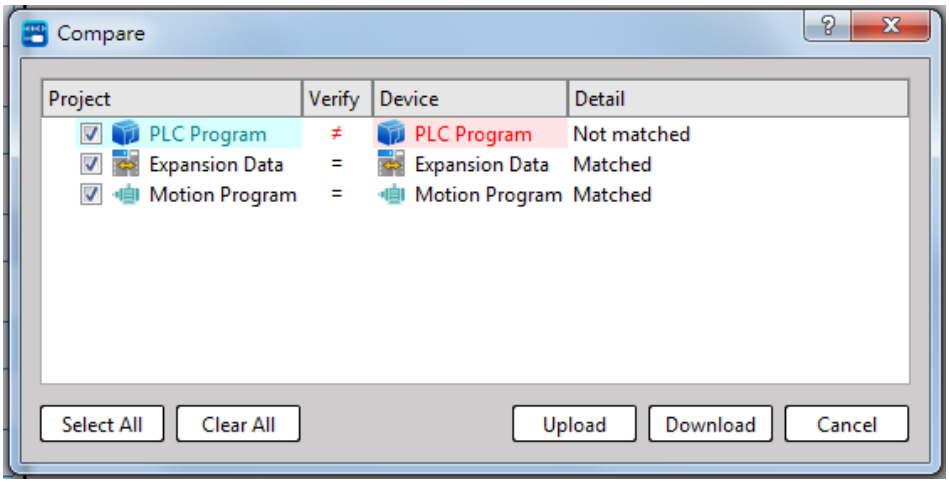
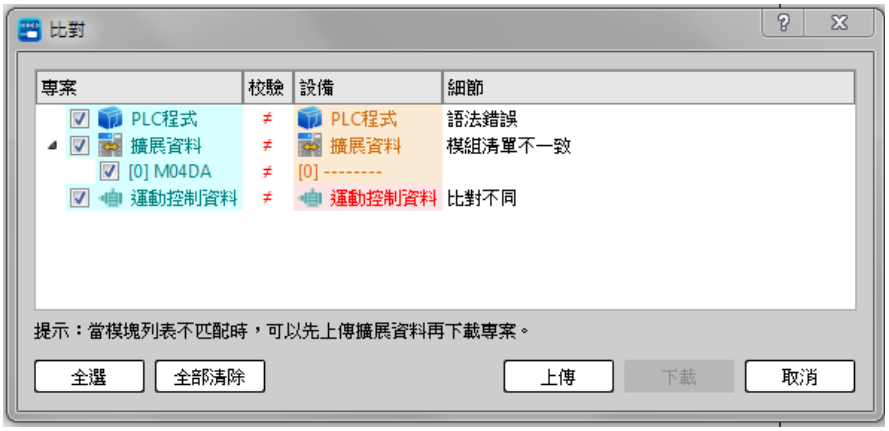
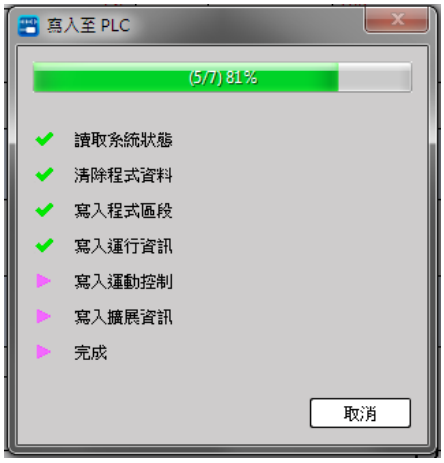


Fig. 245: Selecting the data to be downloaded

   C. If the compare is different, and there are syntax errors or inconsistent modules, only the upload function is provided.



3. Click [Download] to start downloading until the progress window is completed.


寫入至 PLC
(5/7) 81%
讀取系統狀態
清除程式資料
寫入程式區段
寫入運行資訊
寫入運動控制
寫入擴展資訊
完成
取消

11-5 Run/Stop PLC

Run PLC

When operated under online monitoring status, click [PLC] → [Run] in function toolbar or you may press "F9" quick key.

Fig. 246: Running PLC

Stop PLC

When operated under online monitoring status and when PLC is under Running Mode, click [PLC] → [Stop] in function toolbar.

Fig. 247: Stopping PLC

11-6 Clear PLC

When operated under online status, click [PLC] → [Clear PLC Data] in function toolbar, and [Clear All (Initialization)], [Clear Program Only], [Clea Registers Only], and [Clear Coils Only] options will appear as below:

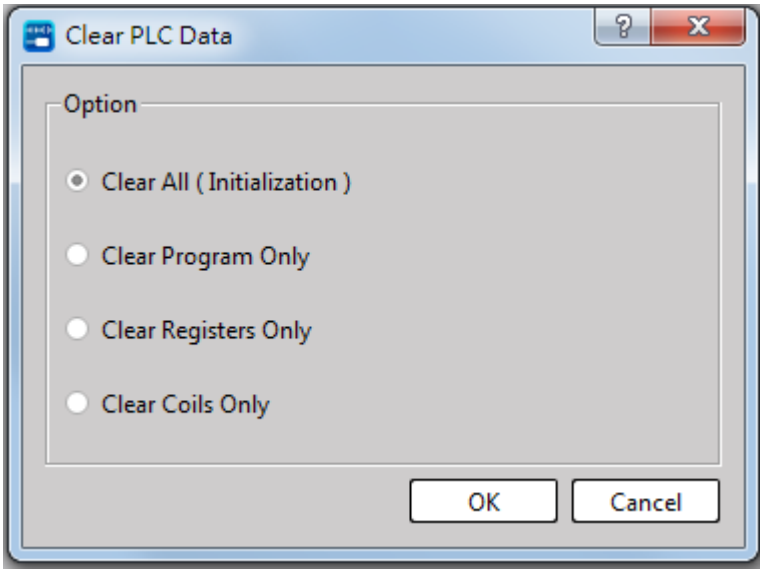


Fig. 248: Clearing PLC data

Function	Description
Clear All	Clear all PLC data and restore factory settings
Clear Program Only	Clear the program data in the PLC, including motion control data.
Clea Registers Only	Reset all register values in the PLC.
Clear Coils Only	Reset all coils in the PLC.

11-7 PLC Status

When operated under online status, click [PLC] → [PLC Status] in function toolbar and the data will appear as below:

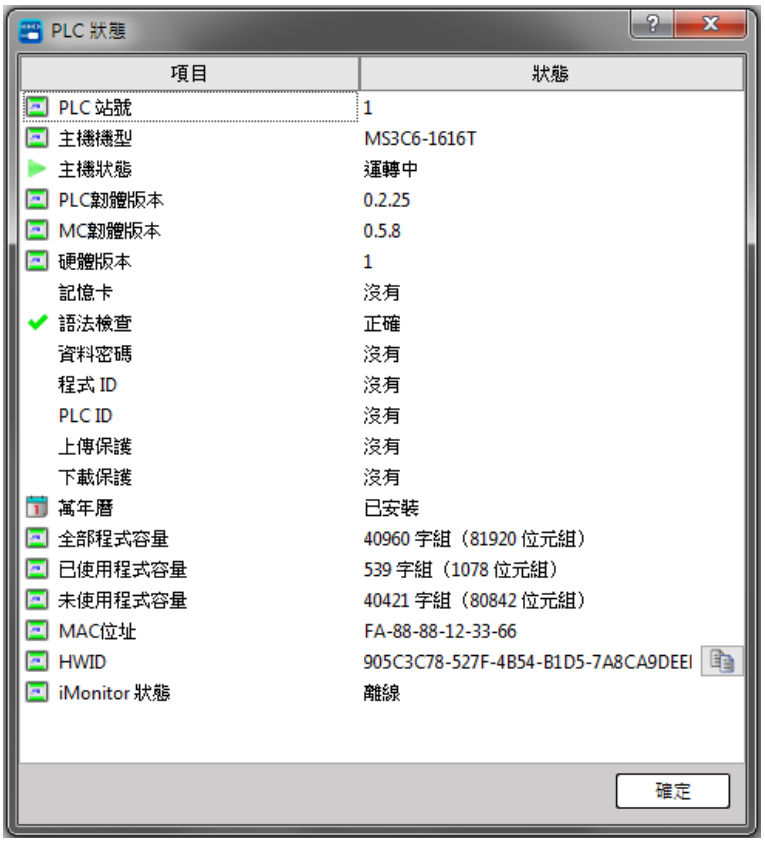


Fig. 249: PLC status

Function	Description
Station Number	Station number of the connected main unit.
Main Unit Type	Type of the connected main unit.
Main Unit Status	Working status of the connected main unit.
PLC OS Version	Firmware version of the connected main unit.
MC OS Version	Motion control firmware version of the connected main unit.
HW Version	Hardware version of the connected main unit.
Memory Pack	Whether the connected main unit is installed with a memory card.
Syntax Check	Program syntax checking condition of the connected main unit.
Data Password	Whether to set data password on the connected main unit.
Program ID	Whether to set Program ID on the connected main unit.
PLC ID	Whether to set PLC ID on the connected main unit.
Upload Protection	Whether to set upload protection on the connected main unit.

Download Protection	Whether to set download protection on the connected main unit.
Calendar	Whether the connected main unit is installed with RTC.
Total Capacity of Program	Total program capacity of the connected main unit.
Used Capacity of Program	Used program capacity of the connected main unit.
Free Capacity of Program	Free program capacity of the connected main unit.
MAC Address	MAC address of the connected main unit.
HWID	HWID of the connected main unit.
iMonitor Status	The iMonitor status of the connected main unit, including offline, online, connecting and error status.

11-8 PLC Setting

11-8-1 PLC ID Setting

When the PLC ID set by the PLC is different from the Program ID, the PLC cannot operate normally. The PLC ID can be set through the execution function bar [PLC]→[PLC Setting]→[PLC ID]. The ID rule is setting with 8 uppercase alphanumeric letters.

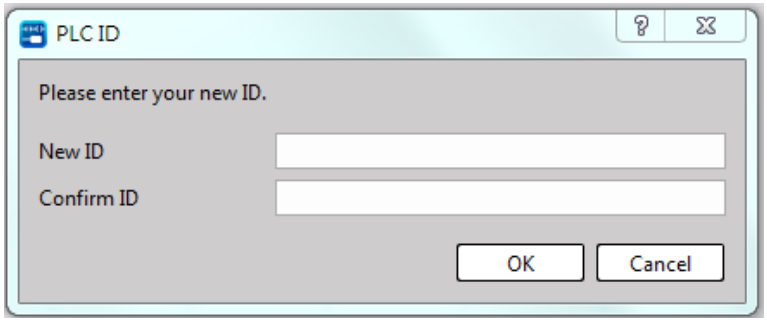


Fig. 250: Setting PLC ID

11-8-2 RTC Setting

When the PLC is under "Online" and "Run" status, the user will be allowed to click [PLC] → [PLC Setting] → [RTC]. After that, the following window will appear for the user to set up the perpetual calendar time required for the PLC.

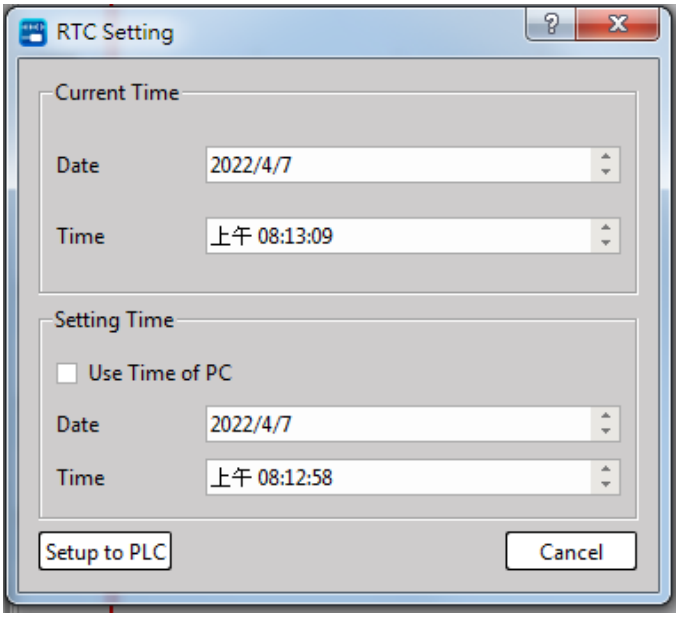


Fig. 251: Setting RTC

Function	Description
Current Time	Date and time of the currently connected main unit.
Setting Time	To set the date and time to the currently connected main unit.
Use Time of PC	When checked, the current computer time will be used as the setting time.
Setup to PLC	When clicked, the setting time will be written directly to the currently connected main unit.

11-8-3 Firmware Update

Select the function bar [PLC] → [PLC Setting] → [Firmware Update], and select the corresponding firmware file and start updating, until the progress window is closed and the prompt window showing the completion of the update is displayed. Wait until the light is displayed normally and then just restart the main unit. The extension of the firmware update file is *.os.

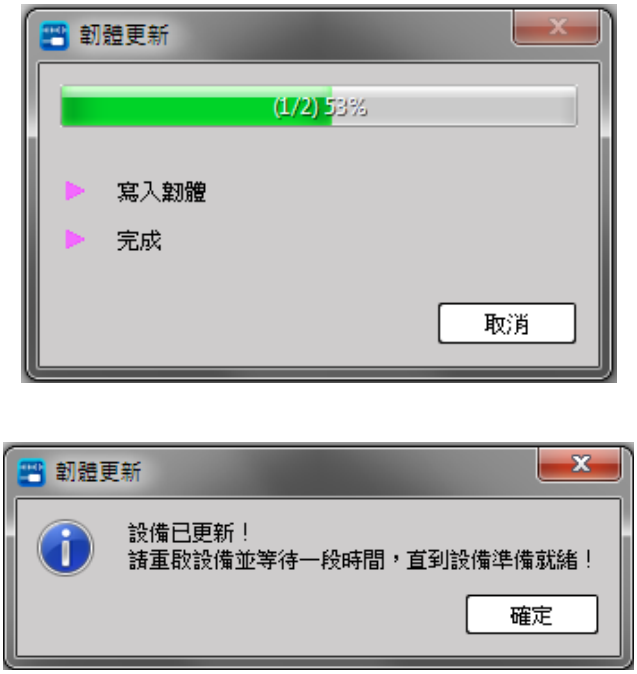


Fig. 252: Firmware Update

11-9 Quick Control

The Quick Control operation is for the convenience of the user. When the connection parameters are set correctly, the PLC can be connected to perform some operations without complete synchronization of data.

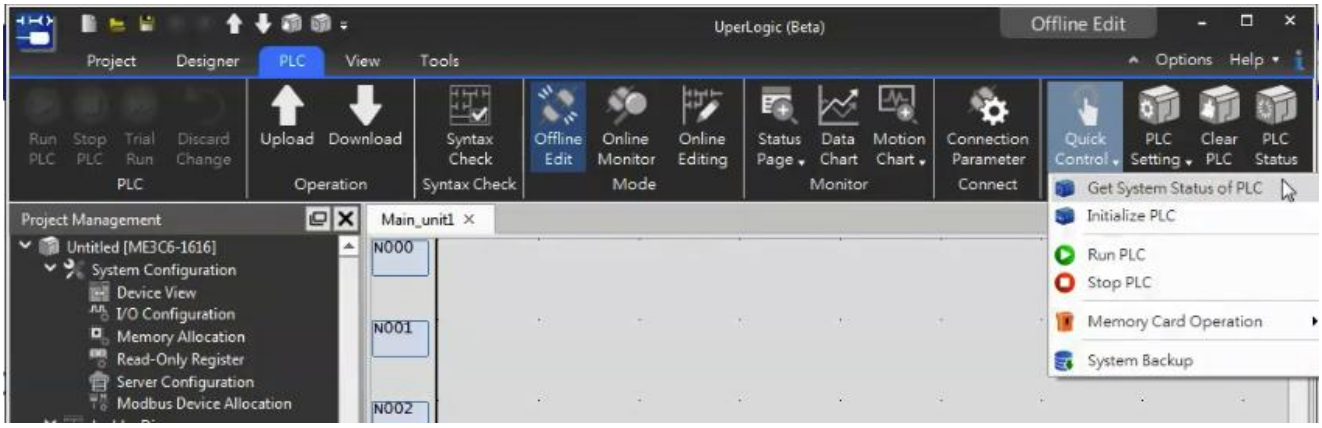


Fig. 253: Quick Control

11-9-1 Get System Status of PLC

Under the state of offline edit, when the connection parameters are set correctly, click [PLC] → [Quick Control] → [Get System Status of PLC] on the function bar to read various information of the PLC under offline conditions , the content is the same as section 11-7.

11-9-2 Initialize PLC

Under the state of offline edit, when the connection parameters are set correctly, click [PLC] → [Quick Control] → [Initialize PLC] on the function bar to initialize the PLC under offline conditions.

11-9-3 Run PLC

Under the state of offline edit, when the connection parameters are set correctly, click [PLC] → [Quick Control] → [Run PLC] on the function bar to run PLC under offline conditions.

11-9-4 Stop PLC

Under the state of offline edit, when the connection parameters are set correctly, click [PLC] → [Quick Control] → [Stop PLC] on the function bar to stop PLC under offline conditions.

11-9-5 Memory Card Opearation

Under the state of offline edit, when the connection parameters are set correctly, click [PLC] → [Quick Control] → [Memory Card Opearation] on the function bar to configure related PLC settings under offline conditions.

Fig. 254: Memory card configuration

For detailed setting description, please refer to Chapter 14-2.

11-10 Online Edit

The online editing function can directly change the program and project content on UperLogic page, so that users can make on-site adjustments during the final debugging of the program design.

When using the online editing function in the running state of the PLC, if the wrong method was used, it may bring great harm to the device and operators, and users need to carefully check the content during operation.

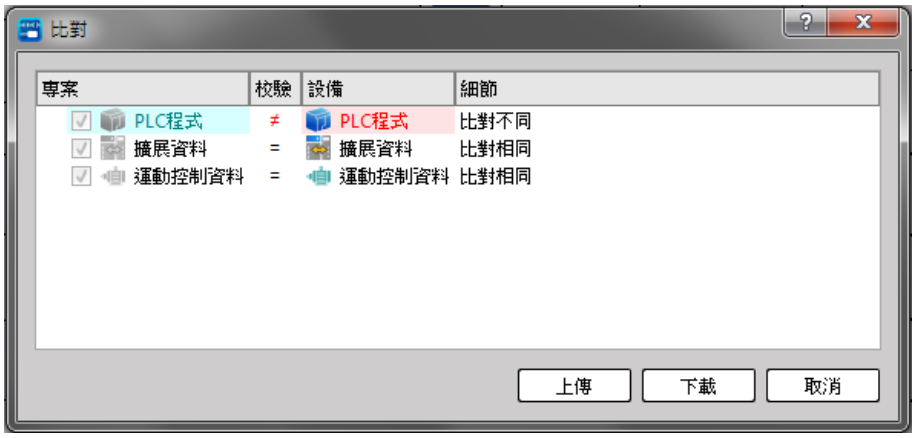
11-10-1 Starting Online Edit

The process is shown below:

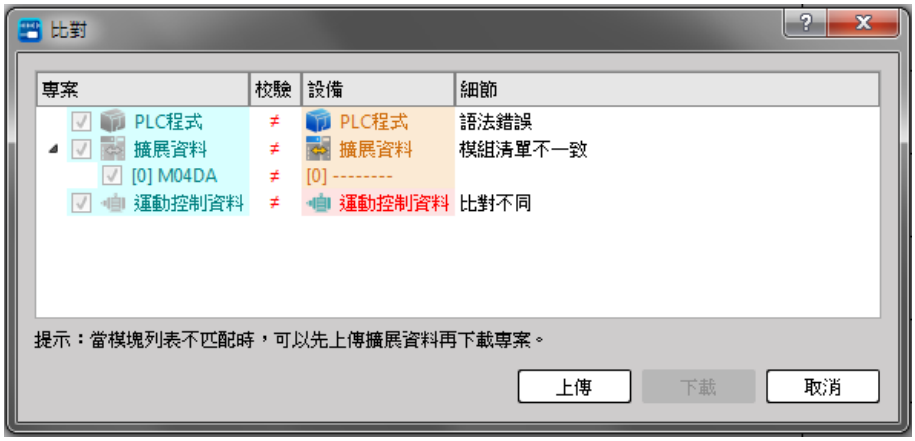
1. Click to execute the function bar [PLC] → [Online Edit] when the PLC is connected.

Fig. 255: Online Edit

2. After connecting, compare the current project with the PLC project.
   A. If the comparison is the same, skip directly to Step 4。
   B. When the comparison is different, the compare window will be displayed to prompt the different parts. Since it is necessary to synchronize the project and PLC data to enter the online editing mode, the user can choose to download the project or upload the PLC data for synchronization.



   C. When the comparison is different and the syntax check is wrong or the module list is inconsistent, you can only enter the online editing mode after selecting to upload PLC data for synchronization.



3. After clicking the sync direction, wait for the progress window to complete.
4. After the synchronization is completed, it will enter the online editing mode and display the PLC status window.

11-10-2 Trial Run

When editing online, the changed part of the project or program will not be written into the PLC immediately, but must be written to the PLC running section through the trial run mechanism to make the current changed part take effect. Click [PLC] → [Trial Run] in the function bar to perform a test run on the PLC.

Fig. 256: Trial Run

11-10-3 Discard Change

When editing online, if the debugging result after editing is not as expected, the project can be restored to the previous state through [Discard Change]. This operation only restores the project, if you need to restore the PLC data, you need to perform a trial run again.

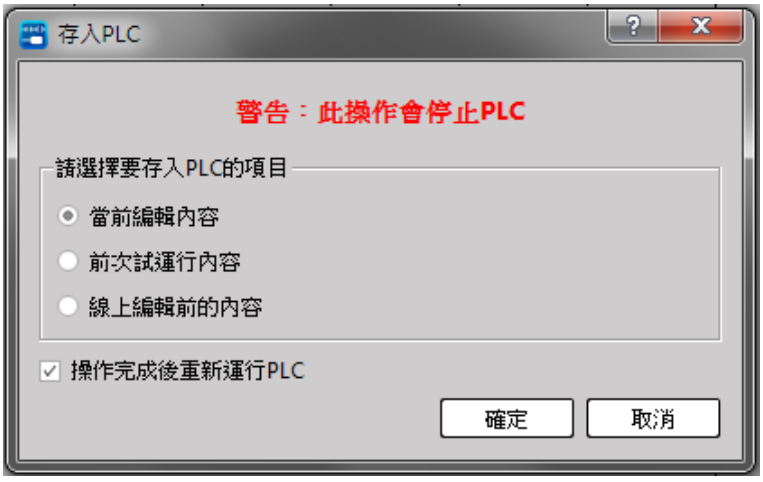
Click [PLC] → [Discard Change] on the function bar to restore the previous status.

Fig. 257: Discard Change

Function	Description
Content of the Previous Trial Run	Restore to the content of the project at the time of the previous trial run.
Content before Online Editing	Restore to the project content when entering online editing.

11-10-4 Finishing Online Edit

The debugging content during online editing will only exist in the PLC running section, so when you leave the online editing mode, you need to re-download the current project content to the PLC. Please note: this operation will stop the action. Switching from [Online Edit] to [Offline Edit] or [Online Monitor], the following prompt window will appear, allowing the user to select the data to be stored in the PLC.



Function	Description
Current Content	When the current project content is written to the PLC.
Contents of Previous Trial Run	Restore to the content of the project during the previous trial run and write it to the PLC
Content before Online Edit	Restore to the project content when entering online editing and write it to PLC
Restart the PLC after the operation is complete	When checked, restart the PLC after the write to PLC operation is completed

12

Monitoring Function

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the method of applying user-friendly interface as well as convenient operation and orderly-arranged pages to execute the required monitoring management for the designed functions such as toolbar, project window, status monitoring page and ladder window, etc. The purpose is to provide more convenient operation and well-defined window pages. Introduced below is the respective monitoring operation method.

12-1 Displaying Ladder Diagram Status

For detailed operation procedure, please refer to Section 7.2: "Ladder Diagram."

12-1-1 Monitoring and Debugging

1. Save the imported program in the PLC and then click [File] → [Save Project As] → [Save to PLC] in function toolbar. Next, the system will execute the online connection through the created "Online Parameter." After connecting, the window will appear as below:

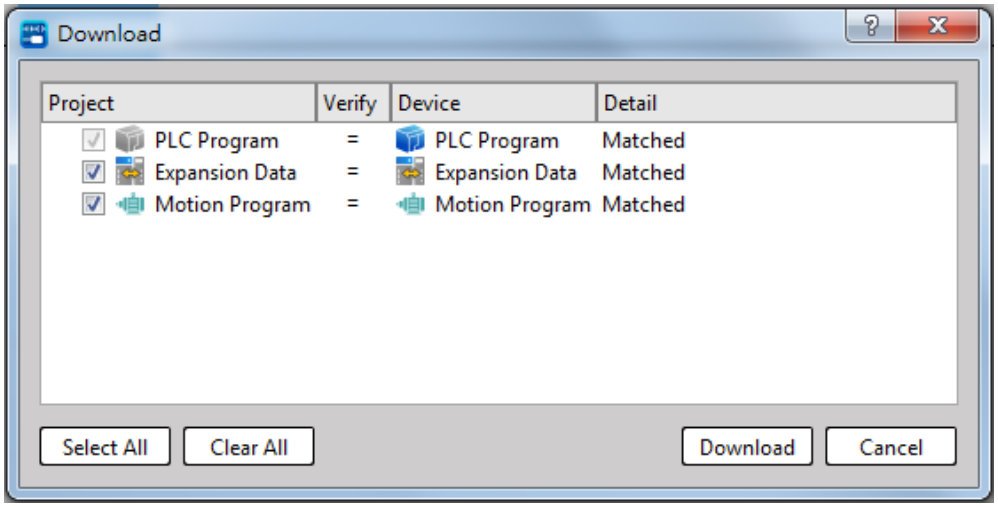


Fig. 258: Download setting

If the "Online Parameter" is configured incorrectly or if the online is faulty, then the window will display the corresponding error message.

2. After completing the download, click [Online Monitor]. After that, click [PLC] → [Run PLC] in function toolbar; or you may input "F9" quick key to instruct the PLC to start running the program. In the meantime, you may also click [PLC] → [Stop Run] in function toolbar.
   You may also click "Ctrl" + "F9" quick keys to instruct the PLC to stop running the program.

3. When running the PLC, the ladder program window will change to the following status:

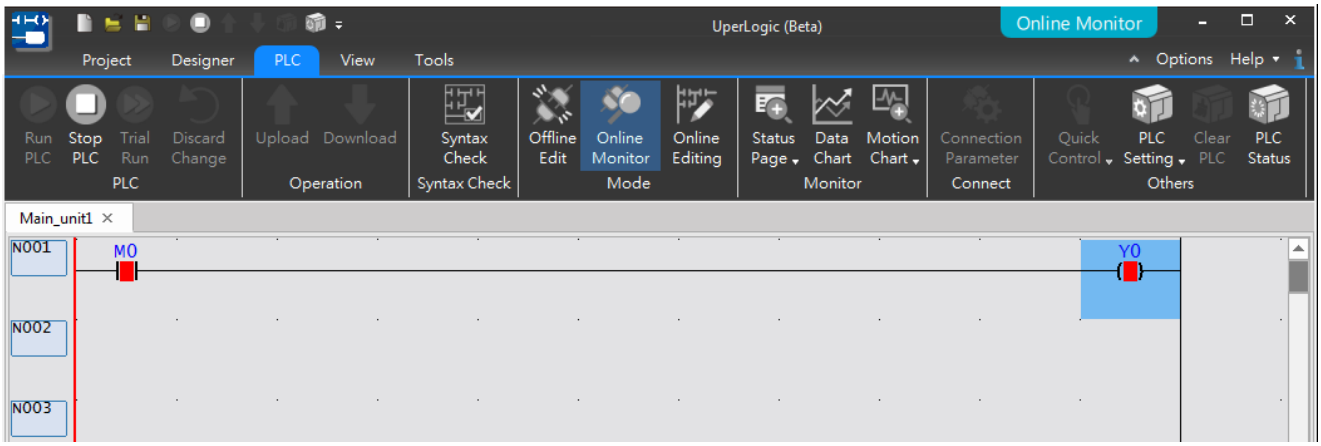


Fig. 259: Running PLC ladder program

The element indicated in the solid line block means it is under conducting state. At this time, you will be allowed to control the ladder program display in order to show the program comment or present Register value in the window page.

The displayed content in the ladder window comprises the following options:

- Program Unit Comment
- Network Comment
- Element Comment
- Register Value
- Font Size

The more the selected options, the more the displayed information; however, less program codes will be covered by the same screen space.

Clicking [View] in function toolbar with mouse and the tick-type menu will appear for selecting the desired option. Such menu will show the aforesaid options and then the user will be allowed to select the desired option by clicking steps. At this time, a tick symbol will appear on the left side of the selected item. Tick again, and this item will return to the unselected status.

Indicated below is the result after ticking [Element Comment] and [Single Network Comment]:

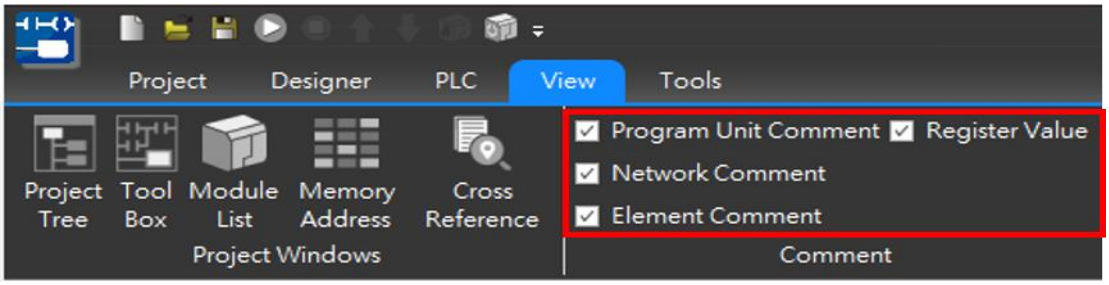


Fig. 260: Displaying the comment

As per the figure below, the ticked comment will appear in the comment field after being selected.

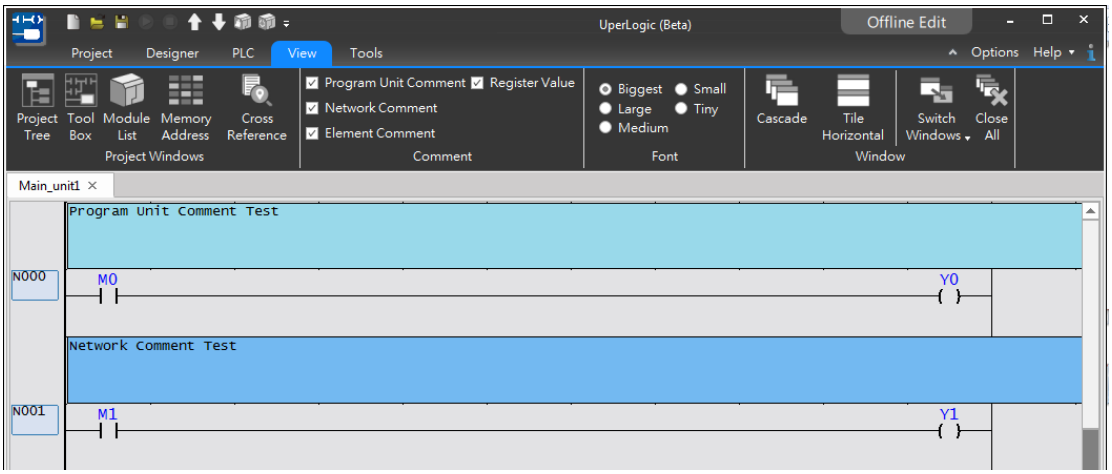


Fig. 261: Displayed in comment field

Coil enable/disable control:

After completing the "RUN" process, move the cursor to the coil position and then press the right mouse button to show the menu as below:

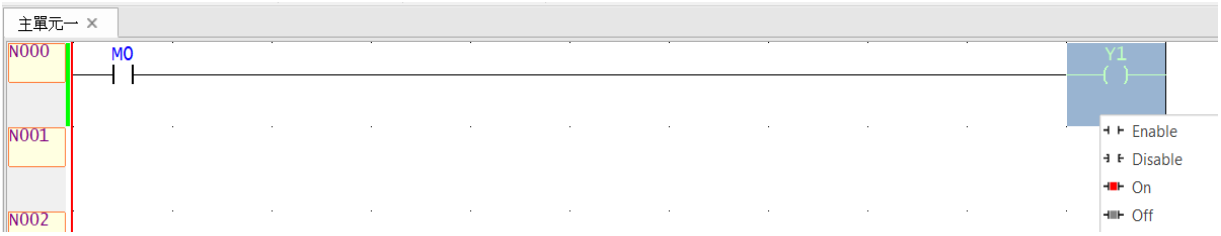


Fig. 262: Coil enable/disable control

With "Disable" function, the user will be allowed to remove the component from the program control. For example, when "Y0" is disabled, its status will not be changed by "M0" status. At this time, you may control its status by clicking [ON] and [OFF] and the disabled element will be indicated in the respective type of symbol. Provided below are the symbols display for "M0" and "Y0" of the "disabled" element:

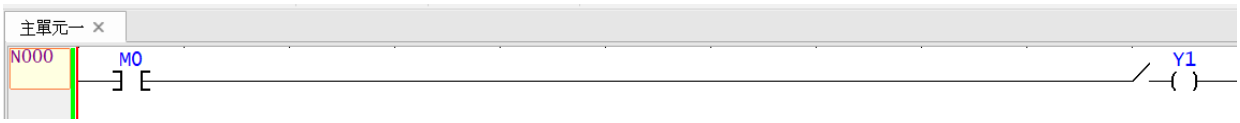


Fig. 263: Disabling the elememt

4. You will be allowed to start the test with [Status Page]. By doing so, open an empty status monitoring page according to the following procedure:
   Cclick [Project] → [Status Page] → [New Status Page] in function toolbar. You may also double click the icon in project management window with mouse or click the toolbar icon with mouse and then click [New Status Page].

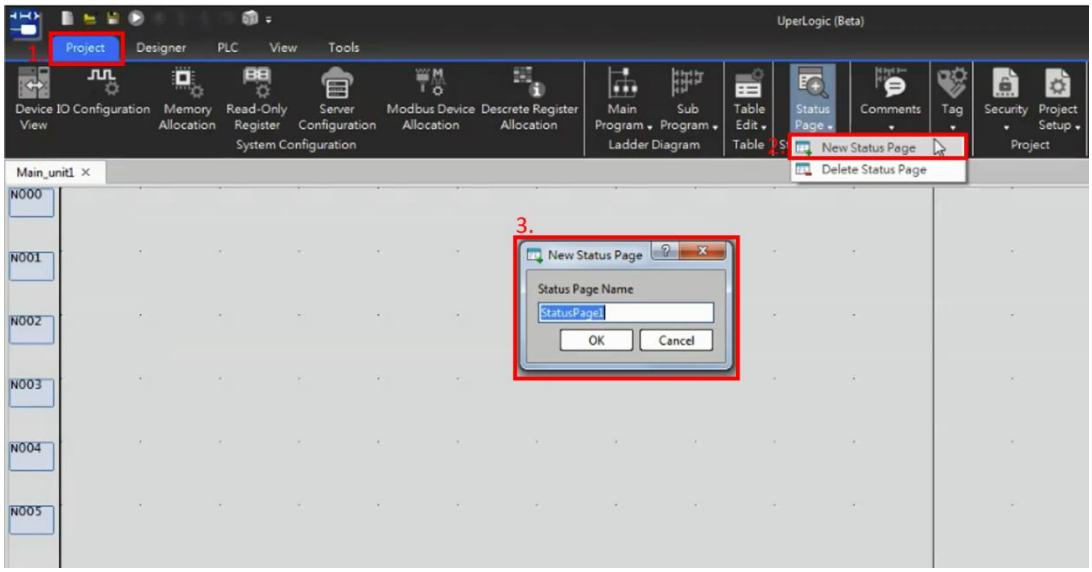


Fig. 264: New Status Page

The dialog box will be displayed after completing the aforesaid procedure. In [Status Page Name], import "StatusPage1" and then press [Enter] key to show the window as below:

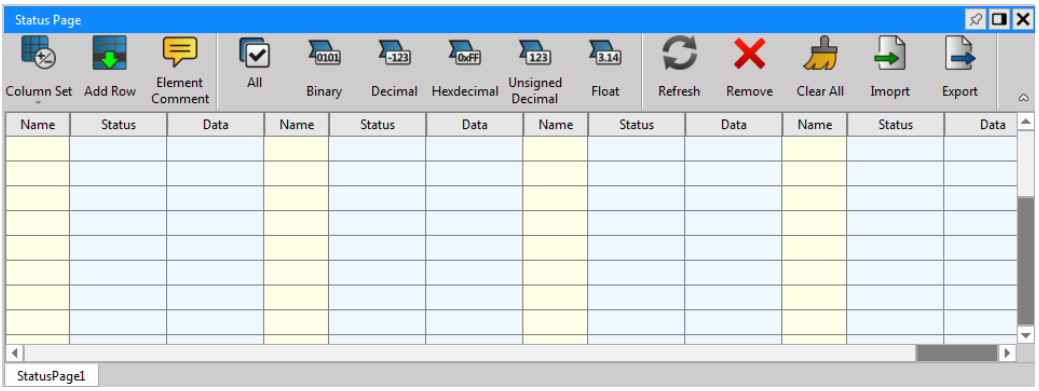


Fig. 265: Status Page

How to add Status Page?

To execute, move the mouse cursor to the first empty space in the leftmost [Name] column and then import "y0-7."

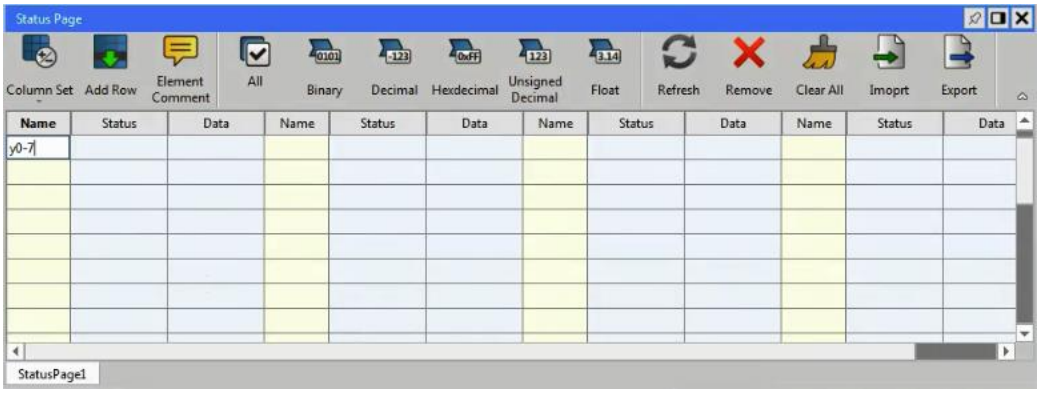


Fig. 266: Adding Status Page

Press [Enter] key. After that, the window will show the number of Y0–Y7 together with the enable/disable and ON/OFF status as well as the present value of the information.

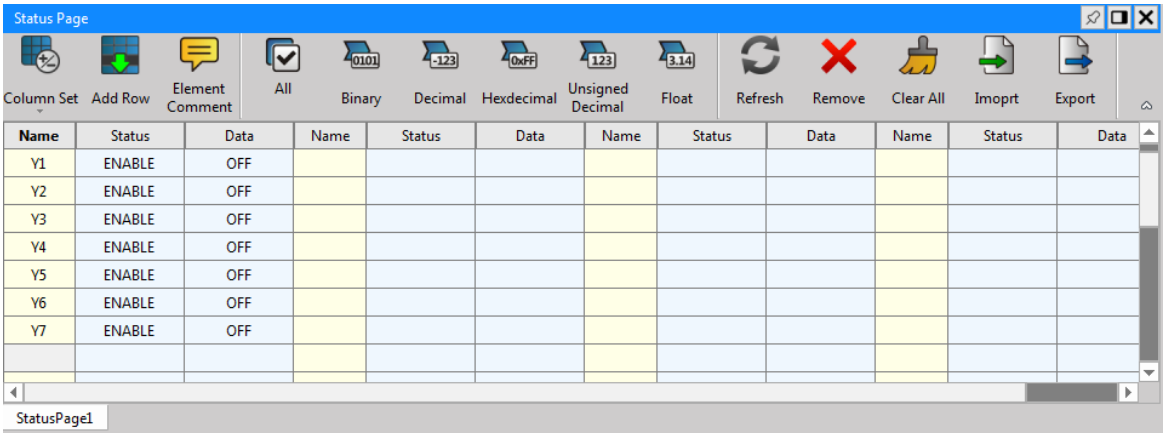


Fig. 267: Monitoring status of Status Page

How to execute Enable/Disable?

To enable/disable the contact or the coil, move the cursor to the corresponding [Status] column and then double clicking the mouse to show enable/disable option. To set its value, move the cursor to the corresponding Information column and then import "0" and "1" values or double clicking the left mouse button to open the [Value Input] column.

As far as the Register is concerned, the [Status] column can be used to control its display format. Currently, the software is provided with five kinds of display formats and they are systems of [Decimal], [Unsigned Decimal], [Binary], [Hexadecimal] and [Float]. To select the desired system, double clicking the [Status] column with the left mouse button to call out the menu. In addition to displaying the element number, the [Number] column can also display the number through the element comment. To execute, press the right mouse button in [Status Page] to call out the pop-up menu or click [Comments] at the top.

12-2 Status Page

12-2-1 Status page management

Click [Project] → [Status Page] in function toolbar and then select "StatusPage1" that already exists in the [Status Page Name] column. In project management window, you may also click [Comment Description → [Status Page] and then select "StatusPage0" that already exists in the [Status Page Name] column and then the [Status Page] window will appear. All of the existing monitoring names are listed in the widow tab. By clicking such tab, you may switch to the selected tab option and then click [X] icon at upper-right corner to close [Status Page] window.

12-2-2 Operating the monitor point

Definition of monitor point:

In [Status Page], you can double-click the [Name] column with the left button of the mouse to enter a number, such as R1000, indicating that the monitoring point is R1000; or input a range, such as D0-D4, indicating the range of monitoring D0 to D4.

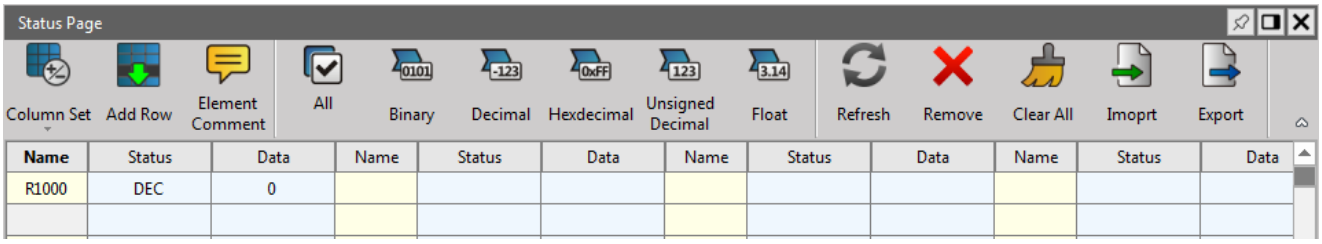


Fig. 268: Definition of monitor point

Deleting the monitor point:

Click the number to be deleted with the cursor and then press [Delete] key and the selected number will be deleted. To delete all points, press [Clear all].

Function	Description
Column Set	Users can display 1-4 field groups according to their own needs.
Insert After {Add Row}	Insert a column below the selected field.
Insert Above (Add Row)	Insert a column above the selected field.
Element Comment	Choose whether to show annotations.
All	Click and then choose the data type (binary, decimal...), the data on the page will all be displayed as the same data type.
Binary	Display data in binary

Decimal	Display data in decimal
Hexdecimal	Display data in hexdecimal
Unsigned Decimal	Display data in unsigned decimal
Float	Display data in float point
Refresh	Get the latest information on the elements on the page
Remove Row	Delete the selected row
Delete Content	Delete the selected data
Clear All	Delete all of the data on the page
Import	Import the previous status page data
Export	Export the current status page data

12-2-3 Run Chart

Through the run chart, the Register data can be displayed on the curve graph more intuitively at the same time, which is convenient for users to compare.

Click the function bar [PLC] → [Run Chart], click [Project Settings] to select the Register to be viewed, and then click [Start], the data of the Register will be displayed in a line chart.

On the control panel at the upper right of the run chart, operations such as zooming in and zooming out the run chart can be performed; the upper left is the sampling interval, which users can set according to their own needs; the list at the bottom left displays the registers currently being viewed. Check [Hide] to temporarily hide the run chart of the Register.

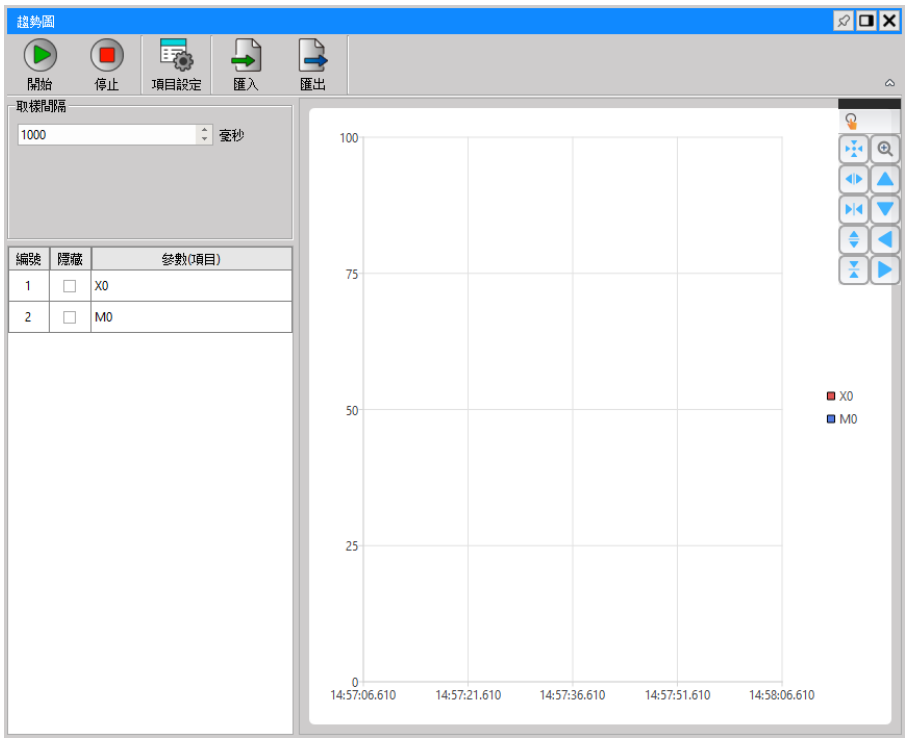


Fig. 269: Run Chart

Function	Description
Start	Start monitoring the configured Register
Stop	Stop monitoring the configured Register
Item Setting	Set the Register position to be monitored
Import	Import the previous run chart
Export	Export the currently written run chart

13

Security

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

In general, the Password is used to protect the intellectual property right of the developed program. In addition to the password, the M-PLC is also designed with additional ID and PLC ID protective measures. This section describes the protective measures such as password as well as program ID and PLC ID in order to intensify the security level in protecting the intellectual properties that are laboriously developed by the respective user.

13-1 Program ID

It helps the user prevent illegal program replication or stealing to achieve the intended protection effect. However, it cannot be used to protect the Hardcopy type of program replication.

The program ID must be identical with the PLC ID, or the PLC will not be functioning as intended.

You may open, cancel or change the program ID by clicking [Project] → [Security] → [Program ID] in the tag page. The password should be presented in capitalized English 8-digit alphanumeric characters (A–Z, 0–9).

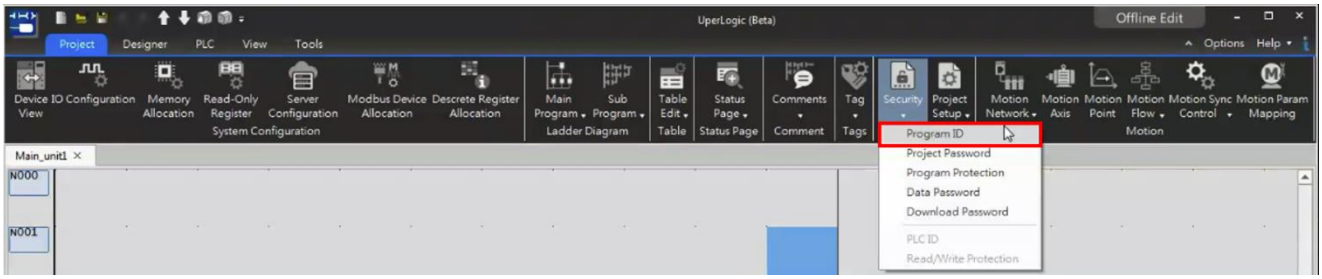


Fig. 270: Editing program ID

13-2 Project Password

It provides the "Encrypt Project File" (*.pdwx) function for users.

You may open, cancel or change the project password by clicking [Project] → [Security] → [Project Password] in the tag page. The password should be presented in capitalized English 8-digit alphanumeric characters (a–z, A–Z, 0–9).

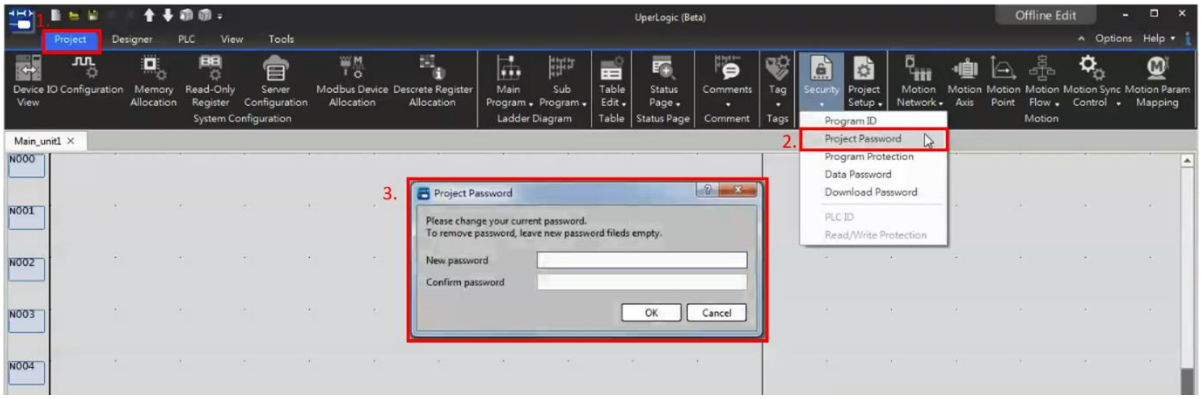


Fig. 271: Project password

13-3 Program Password

It provides the "Encrypt Program" function for users.

You may open the [Program Protection] window by clicking [Project] → [Security] → [Program Protection] in the tag page. If such window has been created with the protect password already, then you need to input the password beforehand in order to open such window.

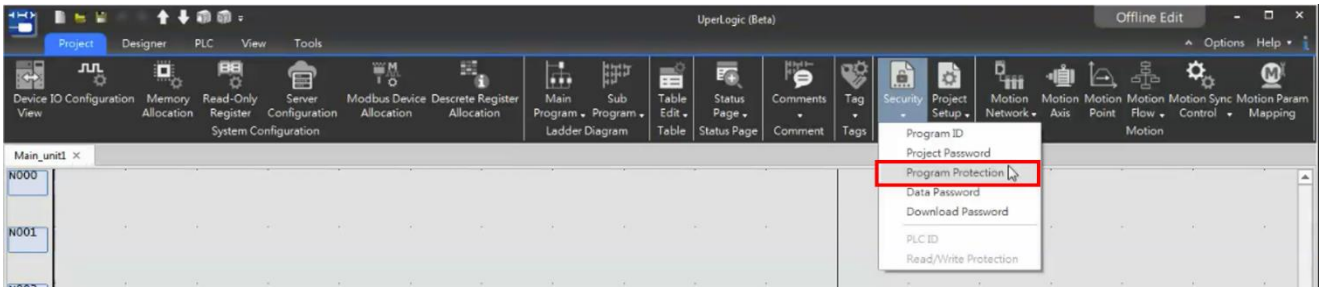


Fig. 272: Program unit password

After clicking, the window will show the "Program Protection Setting" window page.

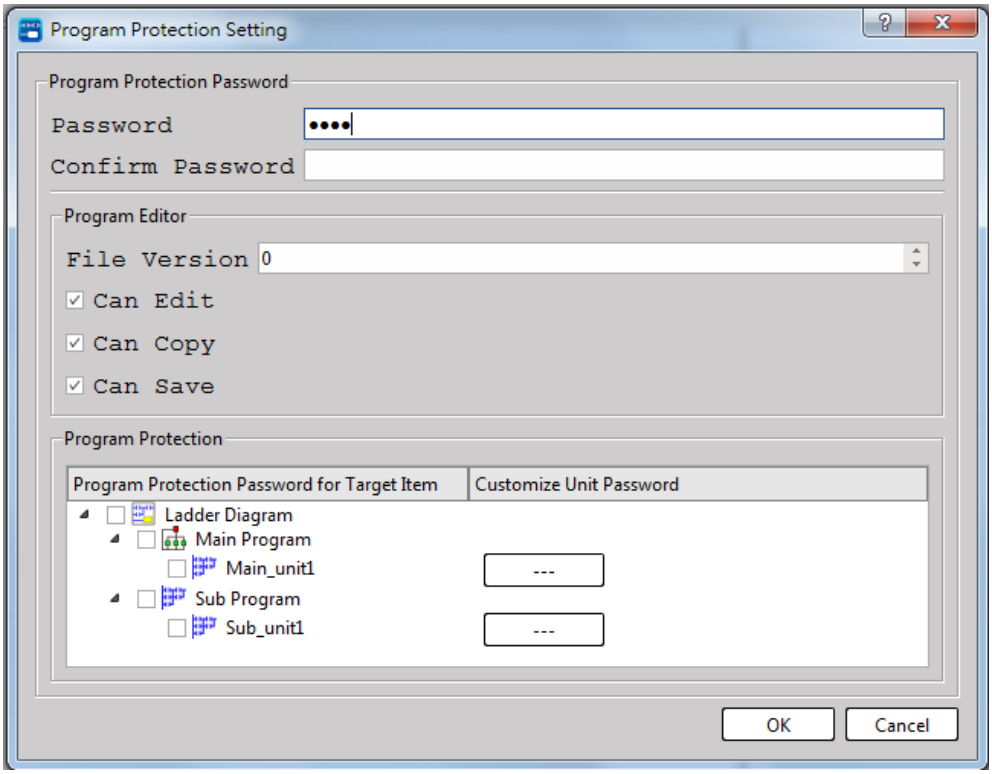


Fig. 273: Program Protection Setting

Type	Function	Description
Program Protection Setting	Password	Setting new password or changing old password.
	Confirm Password	The user needs to confirm the imported password again when creating new password or changing password.
Program Editor	File Version	Saving currently edited project on the disk.
	Can Edit	After being selected, it allows the user to edit the project.
	Can Copy	After being selected, it allows the user to copy the project.
	Can Save	After being selected, it allows the user to save the project.
Program Protection	Program Protection Password for Target Item	Selecting the unit to be protected.
	Customize Unit Password	The user may create extra unit password in this column. For detailed password setting method please refer to the respective paragraph.

Click [Activate Protection], input password and then press [OK] to complete the program unit password setting.

13-4 Program Unit Password

In customer project applications, programmers want to protect some key program logic or design process, and other basic application parameters are open to end customers to modify. At this time, program unit passwords can be used for hierarchical protection. UperLogic provides users with the function of encrypting program units, which can be used to encrypt individual program organization units, including Main Program/Sub Program/Interrupt Program/Function fast program, which has achieved the effect of protecting intellectual property rights.

Click [Project Management] → [Ladder Diagram] → [Main Program] and then select the program unit to be encrypted. Next, click the right mouse button → [Password Protection] and you will be allowed to set the unit password; or you may click [Project] → [Security]→ [Program Protection] → [Customize Unit Password in tag page and then select --- of the program unit to execute the encryption setting.

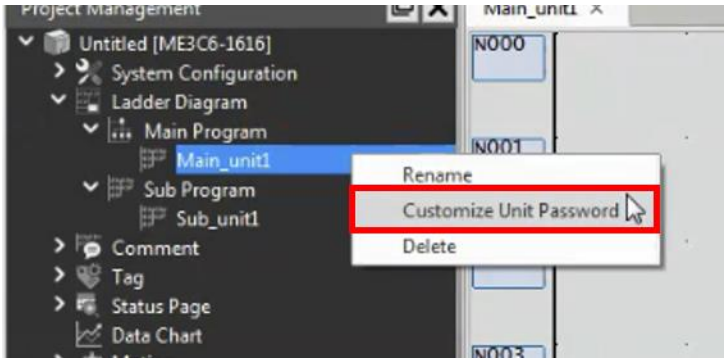


Fig. 274: Program unit password

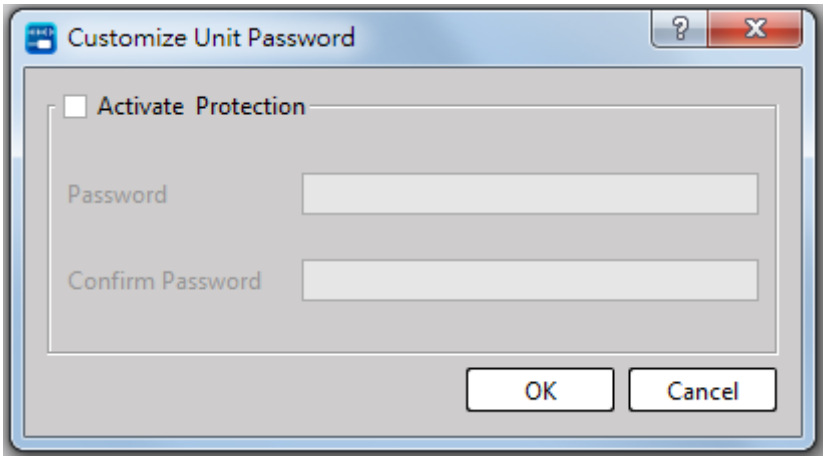


Fig. 275: Activate Customize Unit Password

After opening the window, set a password to complete the password setting. The icon of the password-protected program changes to  in the project management window. To open the program, the password must be entered to view and edit the program content.

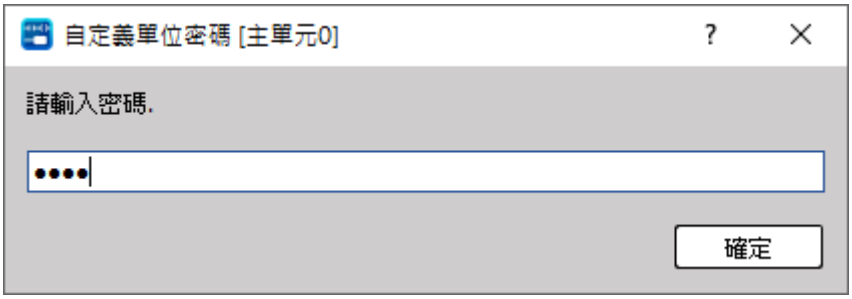
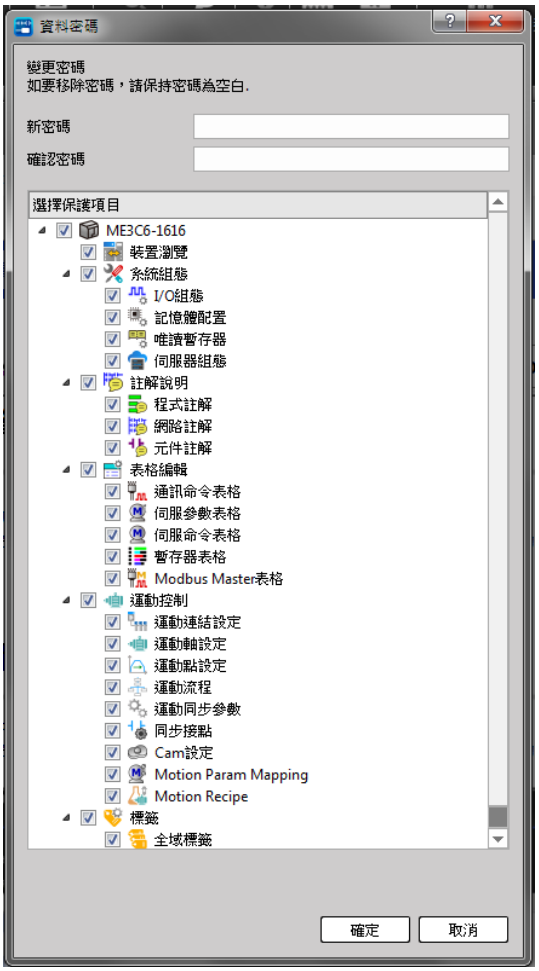


Fig. 276: Input Customize Unit Password

13-5 Data Password

Provide users data password function. For the data that is checked and set with a password, when you click on the data category, you need to enter the data password to access it.

From the tab page [Project] → [Security] → [Data Password], you can select the data to be protected, and Enable/Cancel/Change the data password. The password should be presented in capitalized English 8-digit alphanumeric characters (a–z, A–Z, 0–9).



13-6 Download Password

Provide users with the function of setting a download password to protect the project from being arbitrarily downloaded to different devices. For projects with a download password set, the correct password must be entered during the download process to continue the download process.

From the tab page [Project] → [Security] → [Download Password], and you can Enable/Cancel/Change the data password. The password should be presented in capitalized English 8-digit alphanumeric characters (a–z, A–Z, 0–9).

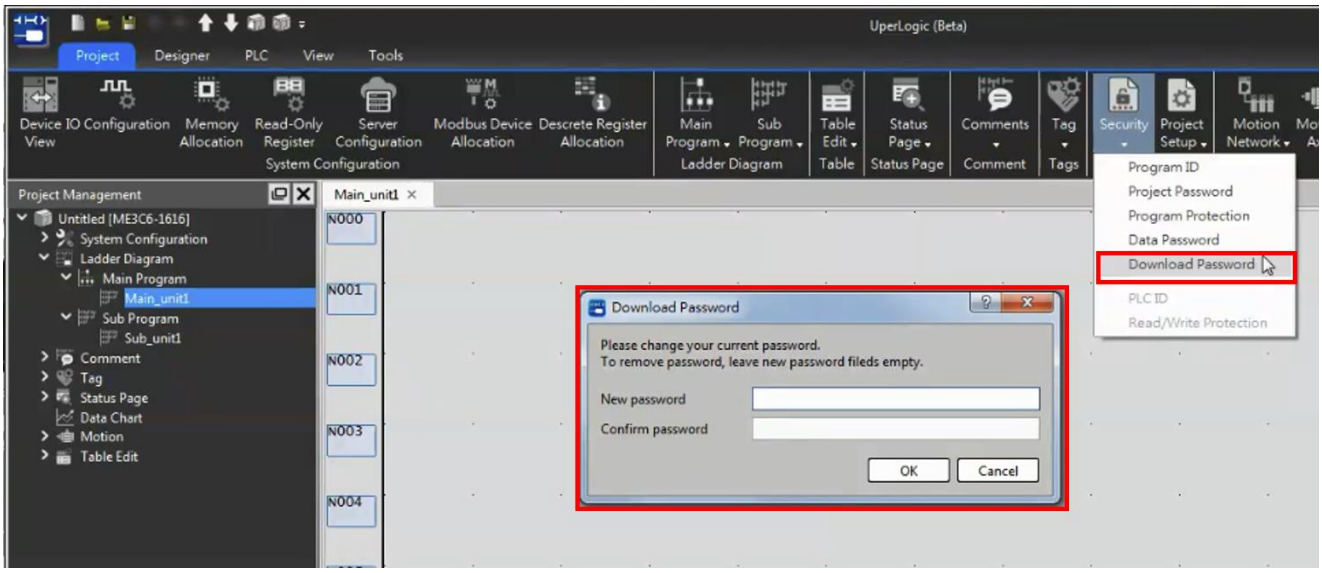


Fig. 277: Download password

13-7 Upload Protection

Provide users with the function of setting upload protection to protect PLC data from being uploaded arbitrarily. For a PLC with upload protection set, the correct password must be entered during the process to continue uploading.

From the tab page [Project] → [Security] → [Upload Protection], and you can Enable/Cancel/Change the data password. The password should be presented in capitalized English 8-digit alphanumeric characters (a–z, A–Z, 0–9).

13-8 Download Protection

Provide users with the function of setting download protection to protect PLC data from being downloaded arbitrarily. For a PLC with download protection set, the correct password must be entered during the process to continue downloading.

From the tab page [Project] → [Security] → [Download Protection], and you can Enable/Cancel/Change the data password. The password should be presented in capitalized English 8-digit alphanumeric characters (a–z, A–Z, 0–9).

14

Tools

⚠ Danger
1. When installing or removing the M-series CPU modules and various expansion modules or the equipment connected to it, all power must be turned off, otherwise it may cause electric shock or wrong action, resulting in death or serious personal injury and damage to the machine equipment. 2. Before the installation and wiring construction is completed, do not tear off the dust-proof paper on the PLC cooling hole, so as to prevent the drilling iron filings or wiring scraps from falling into the PLC during construction, causing fire, failure or malfunction. 3. After confirming that the installation and wiring are all completed, remember to tear off the above-mentioned dustproof paper to avoid poor heat dissipation of the PLC, resulting in fire, failure or malfunction.

This section describes the auxiliary functions provided by the software for users to check and calculate the corresponding functions more easily.

14-1 System Backup and Restore

This section describes how to execute the Register content backup function and the Register content backup saving function.

14-1-1 System Backup

This function can quickly backup PLC parameters, programs and data to files. Combined with the system restore function, it can be used as an error-prone PLC copy application. The extension of the system backup file is *.fsbx.

The backup process is as follows:

1. When operated under "Offline Edit" status, click [Tool] → [System Backup] in function toolbar, as below:

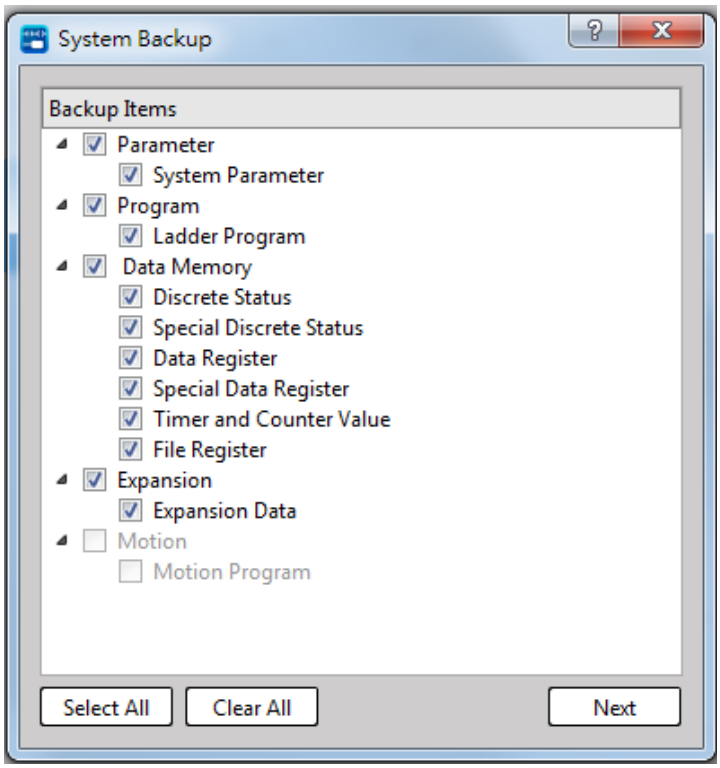


Fig. 278: System backup

Function		Description
Parameter	System Parameter	PLC current connection parameter setting
Program	All Program Units	PLC current complete program data
Data Memory	Discrete Status	PLC current input contact (X), output relay (Y), internal relay (M) and step relay (S) values

	Special Discrete Status	PLC current special relay (M) value
	Data Register	PLC current data register (R、D) values
	Special Data Register	PLC current input register (R), output register (R), special register (R) values
	Timer and Counter Value	PLC current timer (T) and counter (C) values
	File Register	PLC current file register (F) value
Expansion	Expansion Data	PLC current expansion module setting data
Motion	Motion Program	PLC current motion data

2. If password should be created for such project, then it allows the user to select the intended protection method and add the required password.

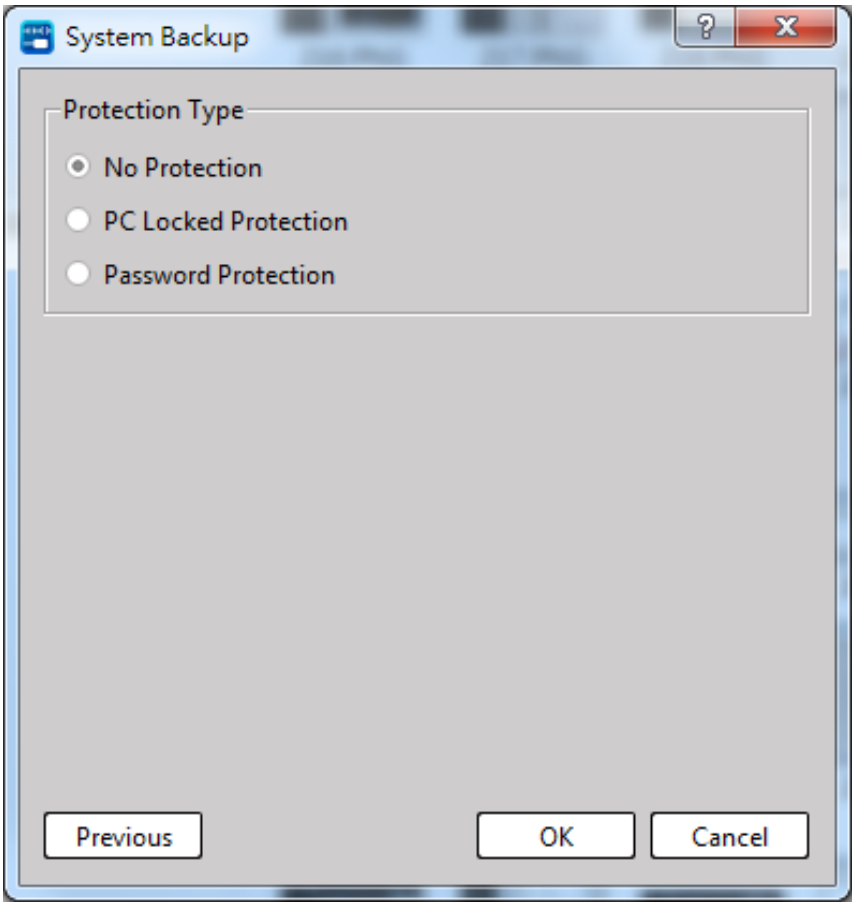


Fig. 279: System backup setting

Function	Description
No Protection	When restoring such backup file, it is not required to input the password and such file will be restored directly.
PC Locked Protection	When using this backup file to restore, it can be restored directly but only on the currently operating PC, and cannot be restored on another PC. Typically used in factory production situations.
Password Protection	To restore such backup file, the user needs to input the password in order to restore the backup file.

3. Users can enter the file name and file comment in the save dialog box, and start the backup after confirmation.

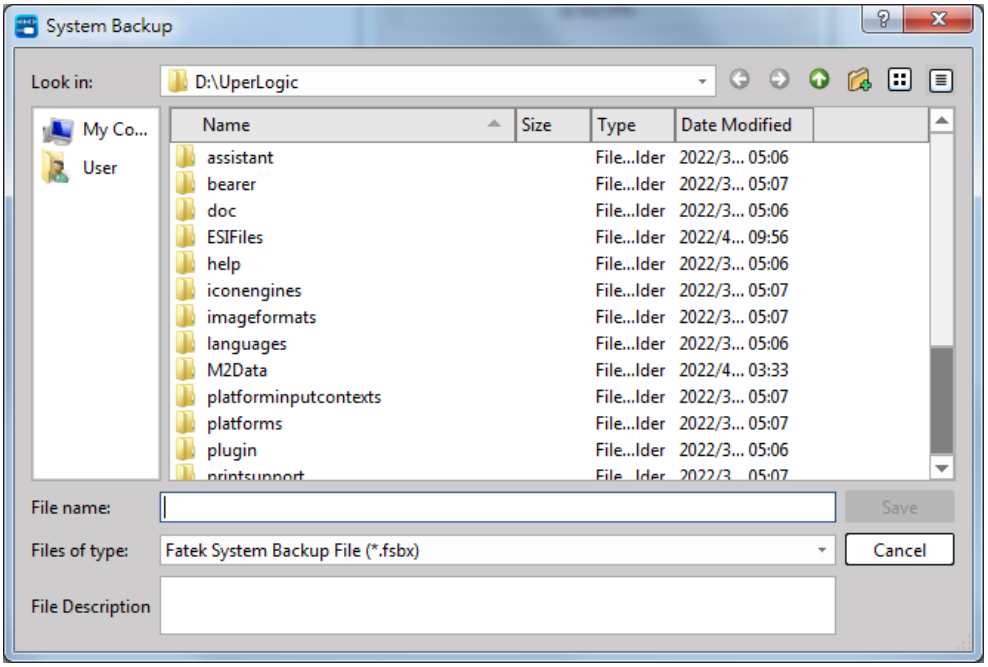


Fig. 280: Saving System backup

4. After the progress window ends, it will prompt that the system backup is complete.

14-1-2 System Restore

This function can quickly write the system restore file (*.fsbx) data to the PLC.

The backup process is as follows:

1. When operated under "Offline Edit" status, click [Tool] → [System Restore] in function toolbar to select the file to restore, as below:

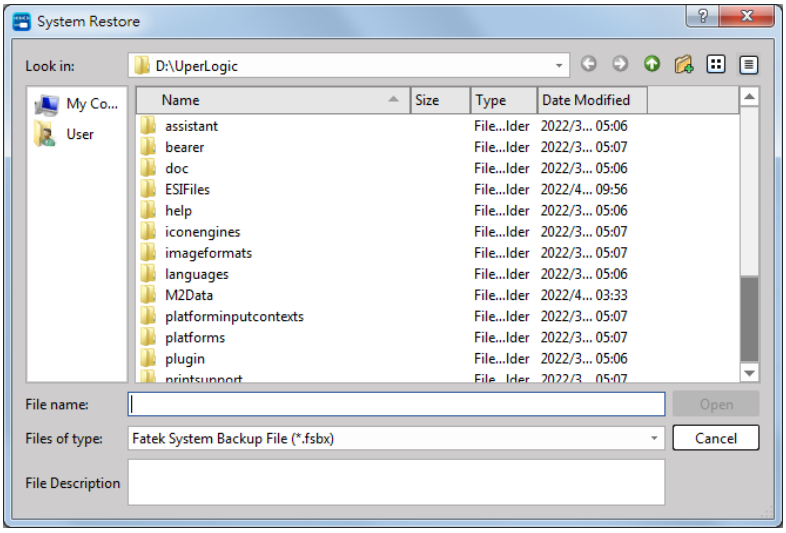


Fig. 281: System restore

2. If the file is protected by a password, a password confirmation dialog box will appear at this time, and the restoration will start after the correct input.

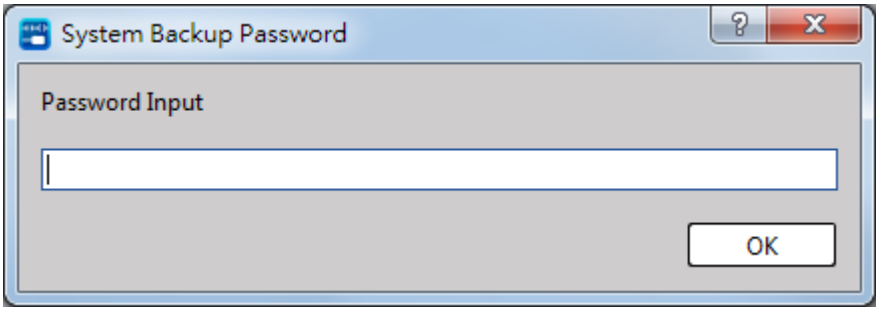


Fig. 282: Input system restoration password

3. After the progress window ends, it will prompt that the system restore is complete.

14-2 Memory Card Operations

Click [Tool] → [Memory Card Operations] in function toolbar to show the following window, as below:

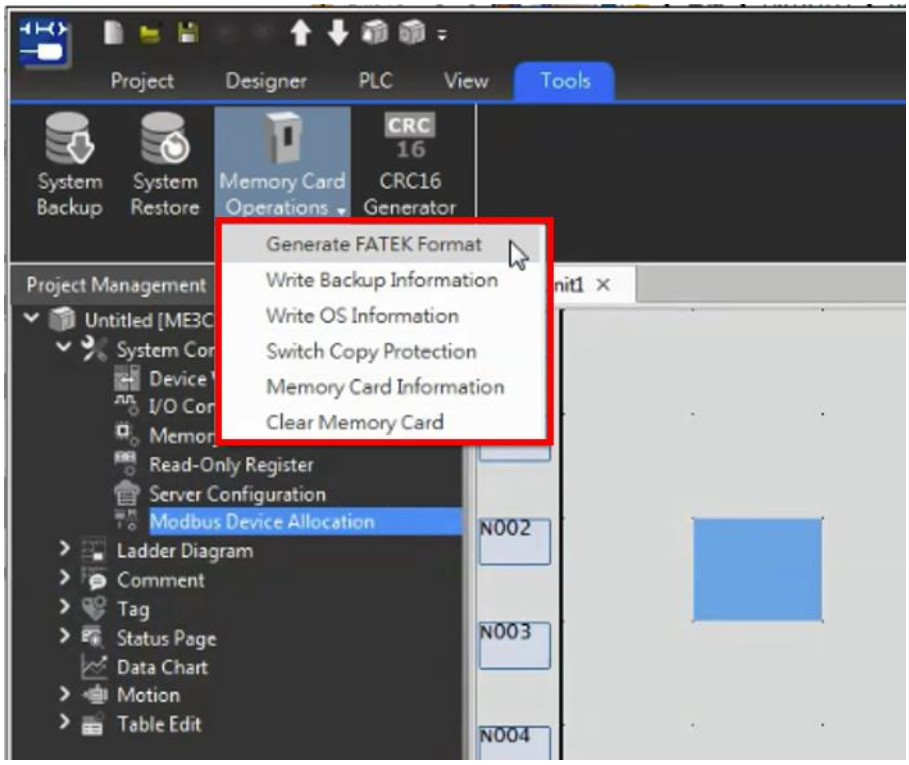


Fig. 283: Memory Card Operations

14-2-1 Write Backup Information

Click [Write Backup Information] and you will see the following screen. Users can perform functions related to memory card backup.

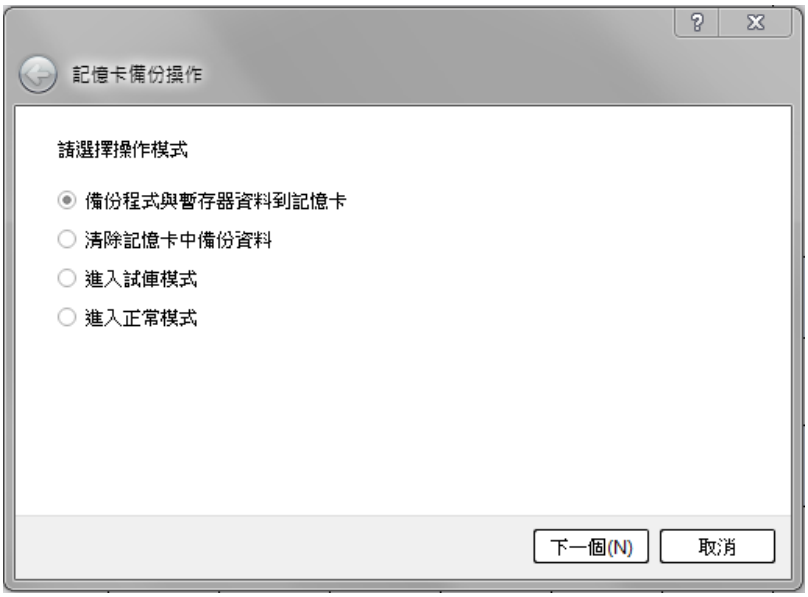


Fig. 284: Memory card backup operation

Function	Description
Backup Program and Register to Memory Card	This function can replicate the program and register contents to the memory card. After pressing [Next], there will be detailed settings that can be adjusted. For detailed functions, please refer to the Application manual.
Clear Backup Data in Memory Card	This function can clear the program or data stored in the memory card, click [Next] to start the action.
Enter Trial Mode	This function allows the user to choose whether to enter the trial modification mode (that is, whether to let the program and data in the memory card overwrite the program and data in the host). Press [Next] to start the action.
Enter Normal Mode	This functoin allows users to choose whether to enter normal mode. Press [Next] to start the action.

14-2-2 Write OS Information

Click [Write OS Information] and you will see the following screen. The user can choose to write the update or rescue file of the host or the expansion module. After the import is completed, the corresponding version will be displayed on the OS information side. Please refer to the Application manual for the detailed functions of the OS update and rescue functions of the memory card.

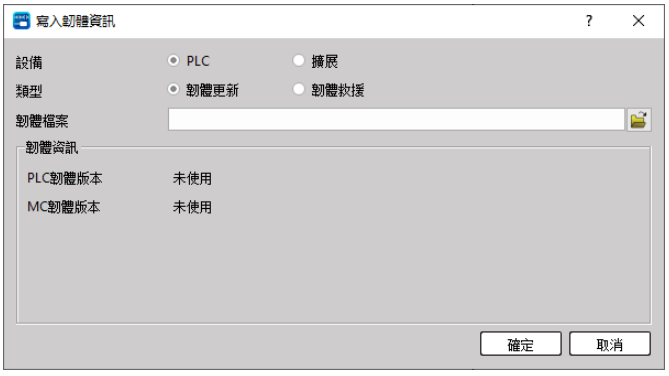


Fig. 285: Write OS Information

Item	Description
Device	Select the OS written to the [PC] or [Expansion] device.
Type	Choose to write the OS for [Update] or [Rescue].
OS Info	Displays the OS version.

	When the user chooses to write "OS Update" in "Expansion", the OS information can be written to multiple firmwares at the same time, as shown in the figure below: 
OS File	Select the path of the OS file to be written. When the user chooses to write "OS Update" in "Expanded", this path exists in the OS information.

14-2-3 Switch Copy Protection

After clicking [Switch Copy Protection], the user can set whether to enable the copy protection of the memory card. After copy protection is enabled, the memory card will be bound to the PC, and the memory card data cannot be transferred to aother PC for use.

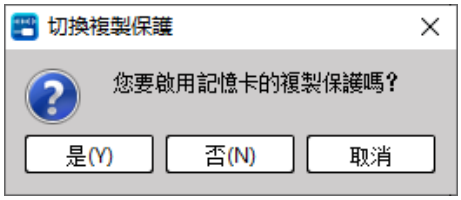


Fig. 286: Copy Protection

14-2-4 Memory Card Information

Click [Memory Card Information] and you will see the following screen. Users can check the relevant information of the memory card through the memory card information.

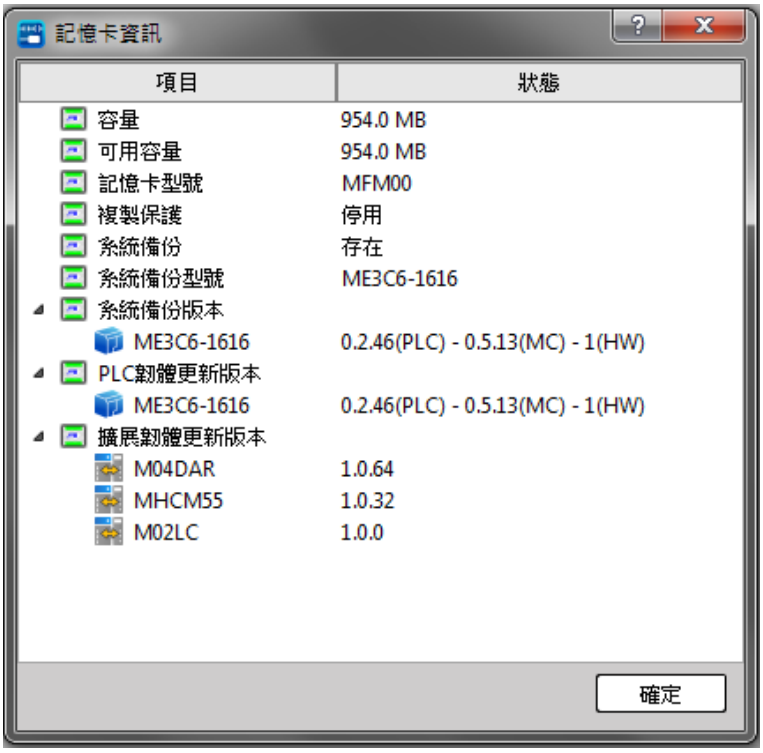


Fig. 287: Memory Card Information

Item	Description
Capacity	Indicates the full capacity of the memory card.
Available Capacity	Indicates the available capacity of the memory card.
Memory Card Type	Indicates the type of the memory card.
Copy Proyection	Indicates whether to enable copy protection.
System Backup	Indicates whether there is write backup information.
System Backup Type	Indicates the model of the write backup.
System Backup Version	Indicates the firmware and hardware version of the backup.
PC OS Update/Rescue Version	Indicates the PC update/rescue firmware and hardware version written.
Expansoin OS Update/Rescue Version	Indicates the Expansionsion update/rescue firmware and hardware version written.

14-2-5 Clear Memory Card

Click [Clear Memory Card] and you will see the following screen. The user can select the items to be cleared:

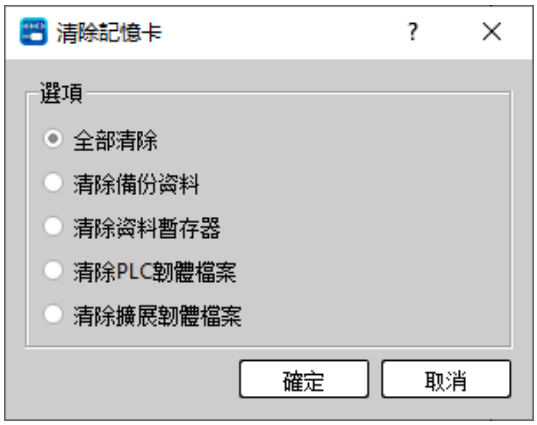


Fig. 288: Clear Memory Card

Function	Description
Clear All	Clear all data on the memory card.
Clear Backup Data	Clear the data backed up in Section 14-2-1.
Clear Information Register	Clear the data register backed up in Section 14-2-1
Clear PLC OS File	Clear the PLC OS files written in Section 14-2-2
Clear Expansoin OS File	Clear the Expansion OS files written in Section 14-2-2

14-3 CRC16 Calculator

The CRC value is generally used to check Communication Protocols. This function allows the system to automatically calculate and generate or inspect the check values after the user enters the data content, which is convenient for planning the packet content when communicating with third-party devices.

Click [Tool] → [CRC16 Calculator] in function toolbar to show the following window, as below:

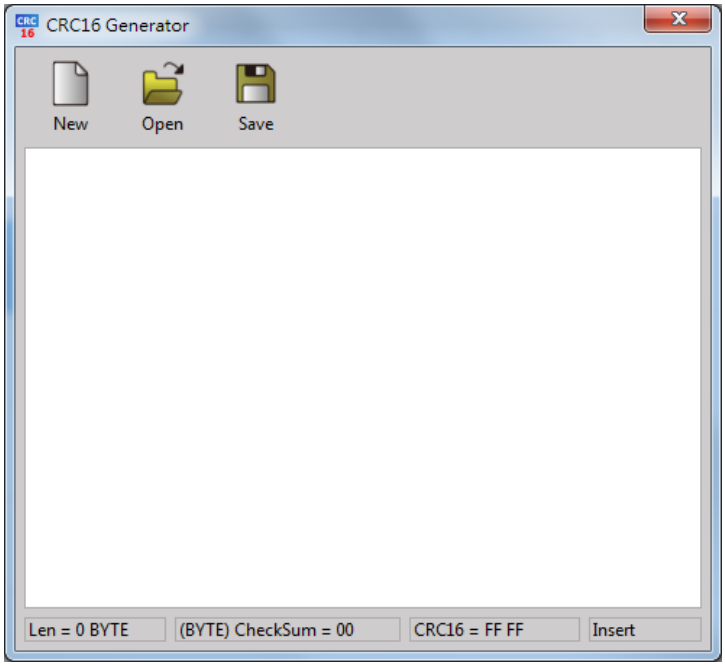


Fig. 289: CRC16 Calculator

After inputting the code to be checked, such function will display the number of bytes (Len) being imported until now and then it will calculate the Checksum value and the CRC16 value automatically. After completing the input, press [Save] for saving as the sub-file named as "txt" text file. In this way, it allows the user to call out the text file by pressing [Open] during the next round of operation without the need of executing input steps once again. Press [New], the input field will be cleared as blank ready for inputting again. Clicking the upper-right [X] icon or [Close], the user will be allowed to close the CRC16 Calculator window.

Appendix 1_Quick Start

This section will guide the user to quickly create the intended project and download it to PLC to run.

1. First, download the UperLogic from the website and then start the installation. For detailed installation steps, please refer to Chapter 2.
2. Click [UperLogic] to open new project. Next, click [Project] → [Project] → [Options] → [File] in function toolbar and then execute the project backup setting so as to prevent the designed project from losing inadvertently.

   Regarding detailed file setting steps, please refer to Chapter 4

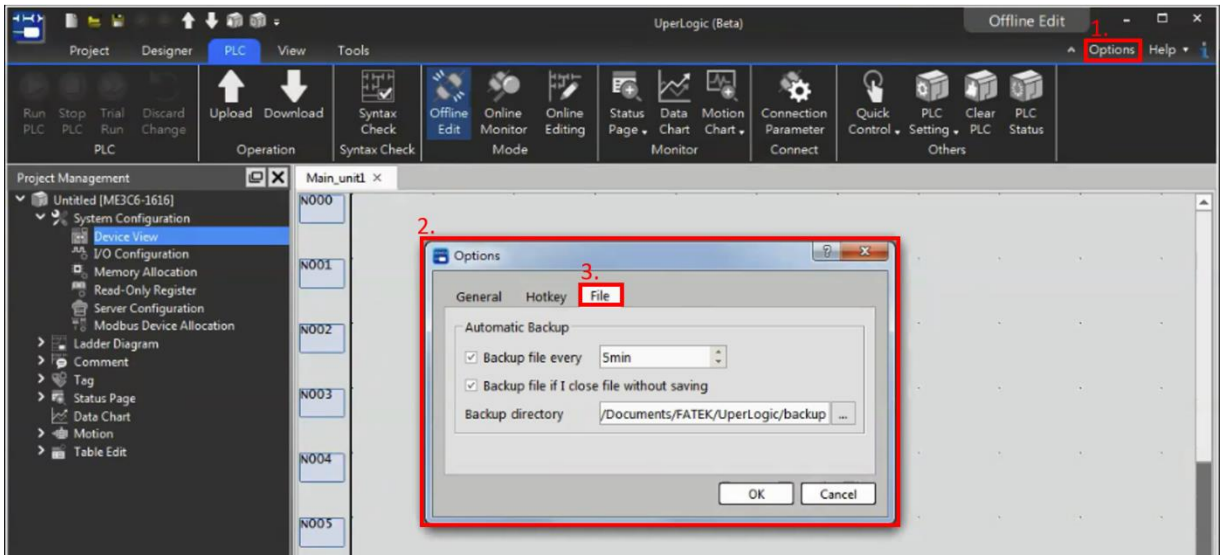


Fig. 290: Setting backup project

3. Open a new Project.
4. Click [Designer] → [Ladder Diagram] in function toolbar to create an easy-to-use project.

   For detailed information of Ladder Diagram, please refer to Chapter 6.

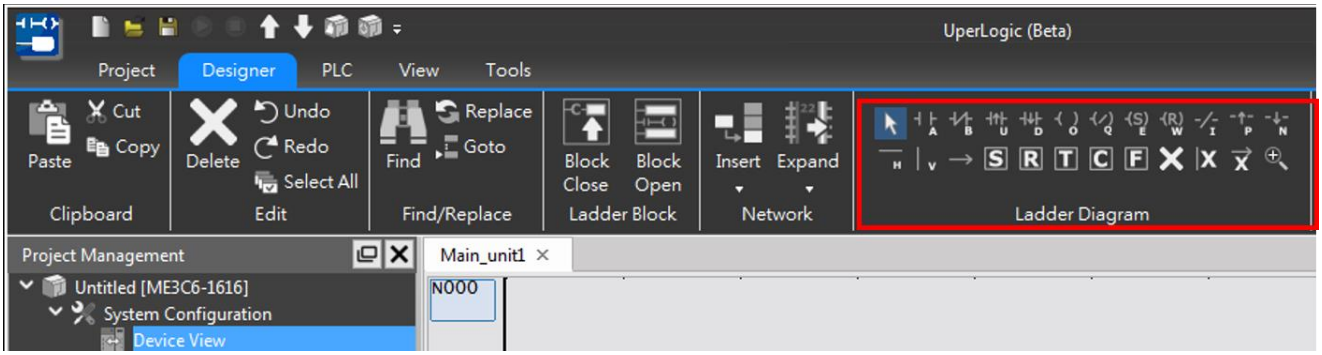


Fig. 291: Creating easy-to-use project

5. After creating the desired project, click [PLC] → [Connection Parameter] in function toolbar to establish the online communication with the PLC. In this example, the online will be established through USB/Type C. Therefore, the user needs to confirm that the PLC is properly connected with the PC with the USB/Type C cable and then check if the communication is correctly established through the online test.

   For detailed information of online parameter, please refer to Chapter 11.

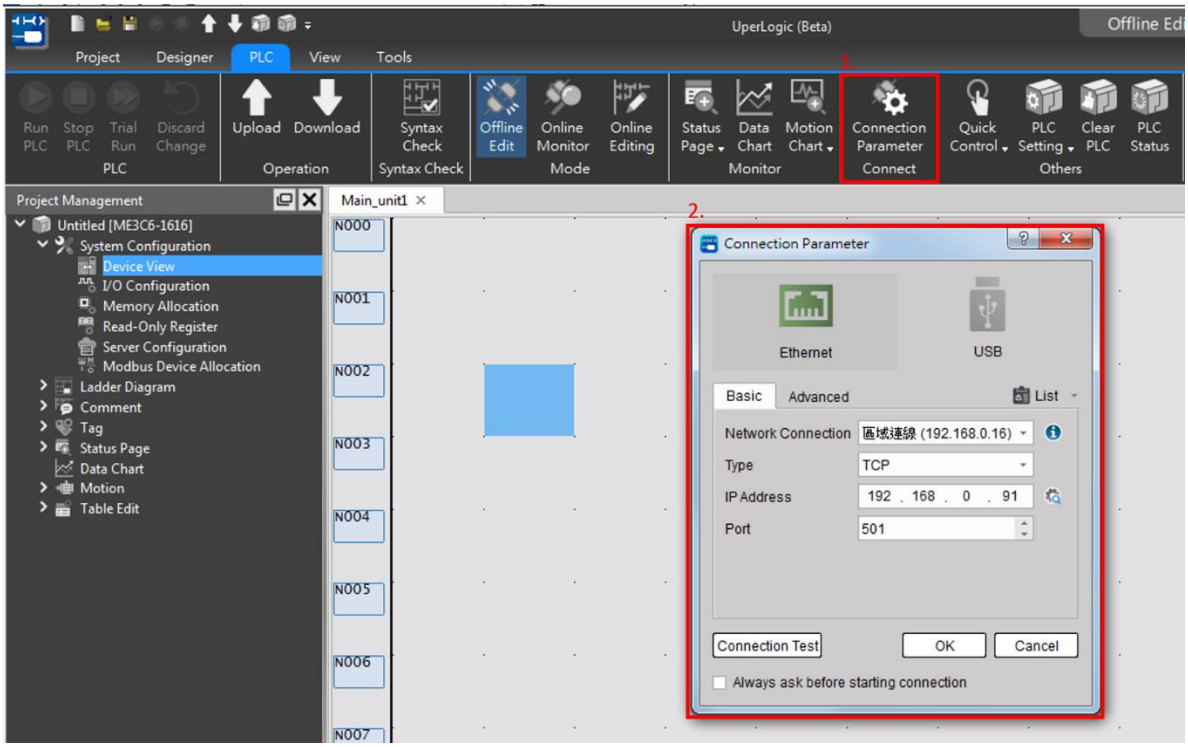


Fig. 290: Creating connection

6. After creating the desired connection parameter, click [PLC] → [Operation] → [Download] in function toolbar to download the project to the PLC. Before starting the download procedure, the software will compare the project with the PLC and then tell the user about the difference between both for the user to select the desired download item.

   For detailed information of downloading, please refer to Chapter 11.

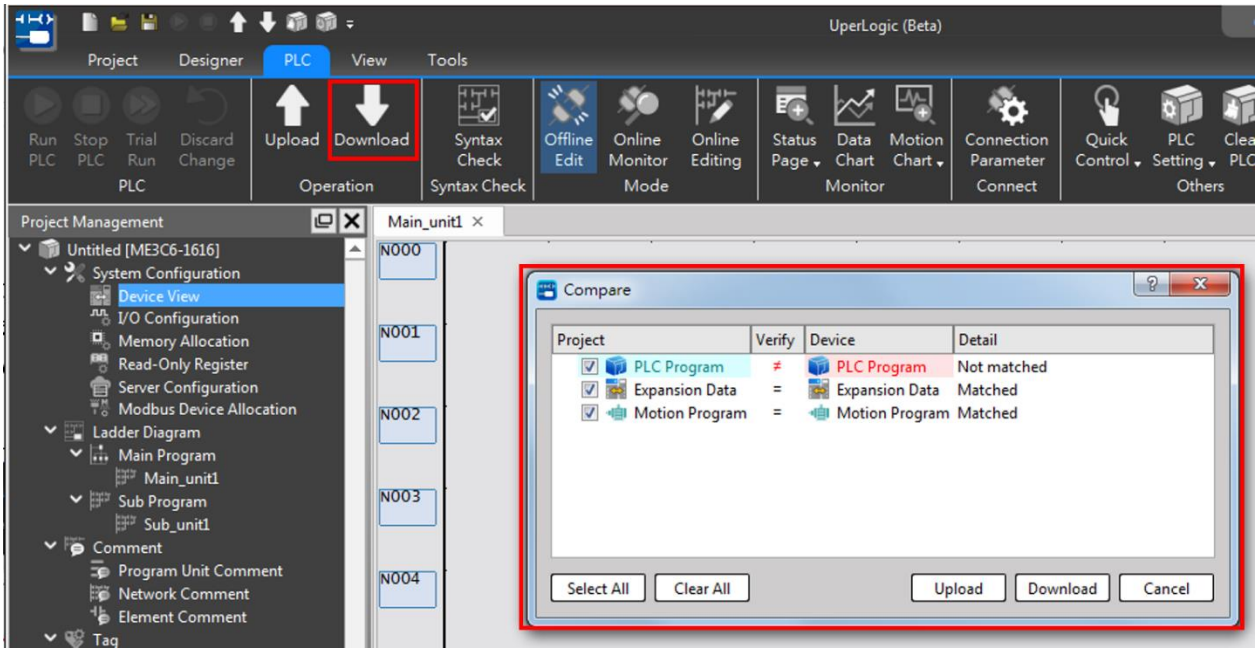


Fig. 291: Downloading project to PLC

7. After completing the download process, click [PLC] → [Mode] → [Online Monitor] in function toolbar and you will be allowed to monitor the PLC program operating status. When accessing the [Online Monitor], the system will display the window showing present PLC status for reference by the user. For detailed information of monitoring, please refer to Chapter 12.

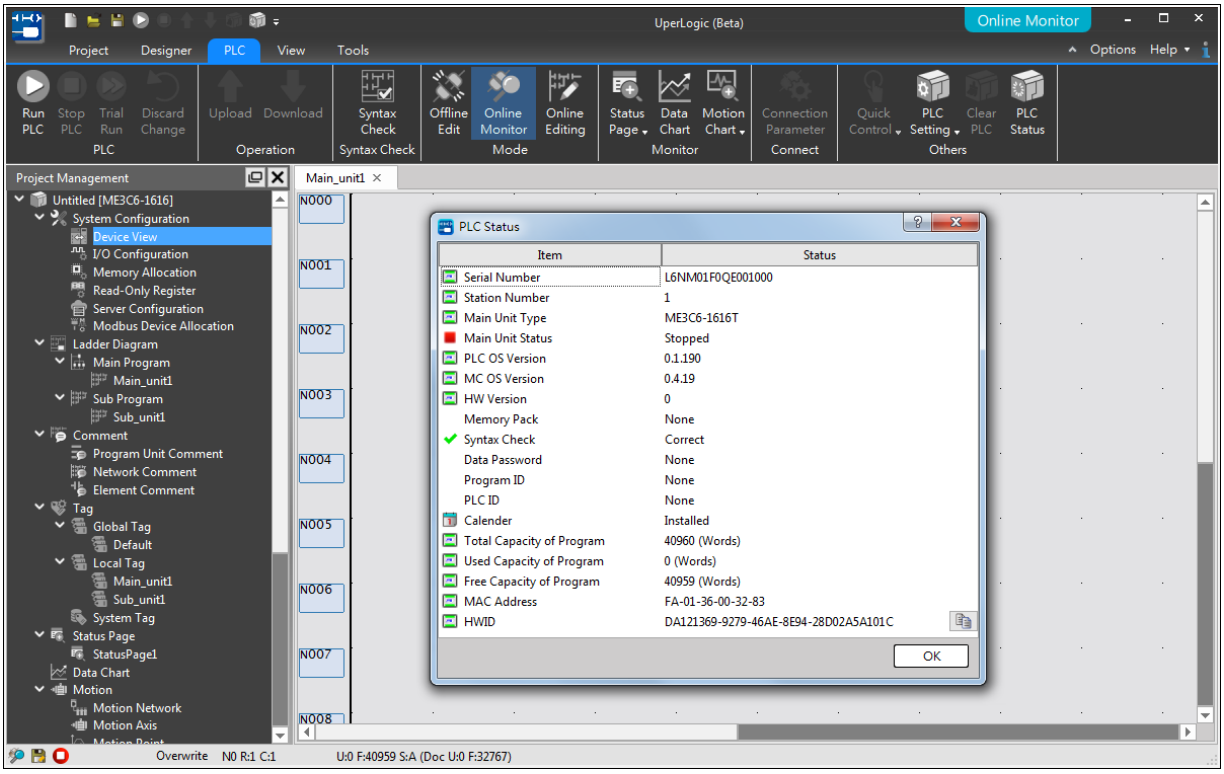


Fig. 292: Online monitoring PLC

8. After finishing the "Online Monitor" mode, the user may click the upper-left "File"  → "Save Project" to finish the online monitoring.
   For detailed project saving steps, please refer to Chapter 4.
9. Now, you have completed the editing of the easy-to-use project.