# EB8000 User Manual

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# Chapter 1 EasyBuilder 8000 Installation

EasyBuilder 8000 Installation

(1) Software:

Download from EasyBuilder 8000 CD or visit Weintek Labs, Inc.'s website at http://www.weintek.com to obtain all available software editions (including Simplified Chinese, Traditional Chinese and English version) and latest upgraded files.

(2) Hardware Requirements (Recommended):

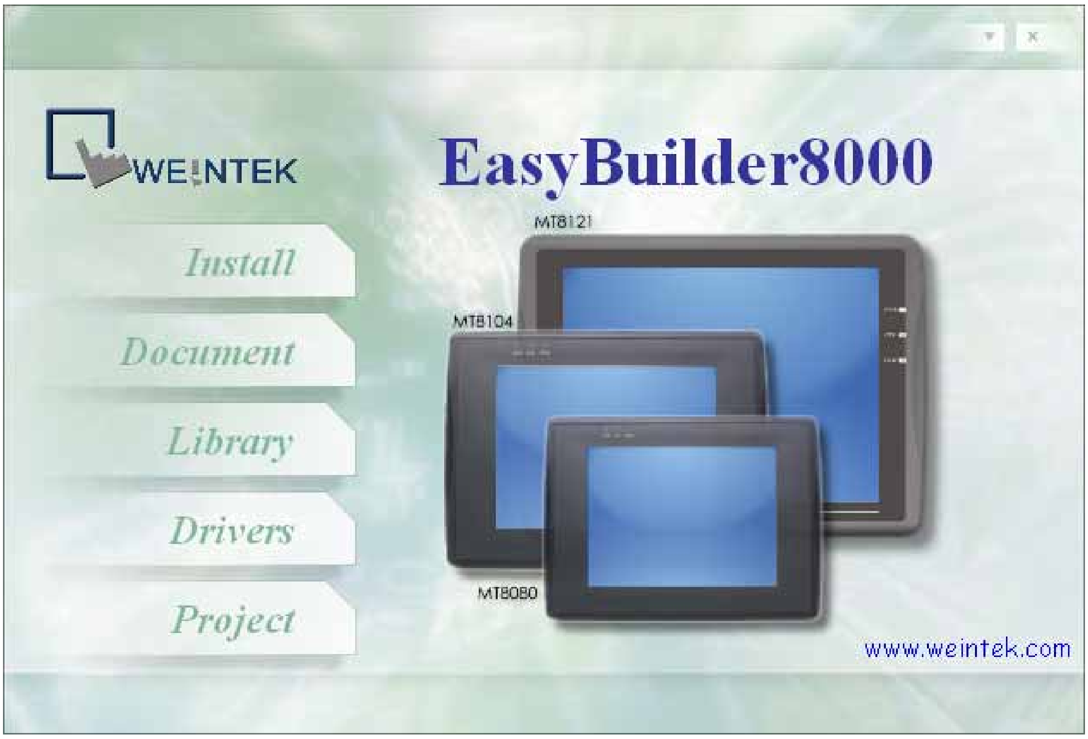
CPU: INTEL Pentium II or above
Memory: 64MB or above
Hard Disk: 2.5GB or above (Disc space available at least 10MB)
CD-ROM: 4X or above
Display: 256 color SVGA with 800 x 600 resolution or greater
Keyboard and Mouse: One for each
Ethernet: for project downloading/uploading
RS-232 COM: At least one RS-232 serial port available for on-line simulation
Printer

(3) Operating System:

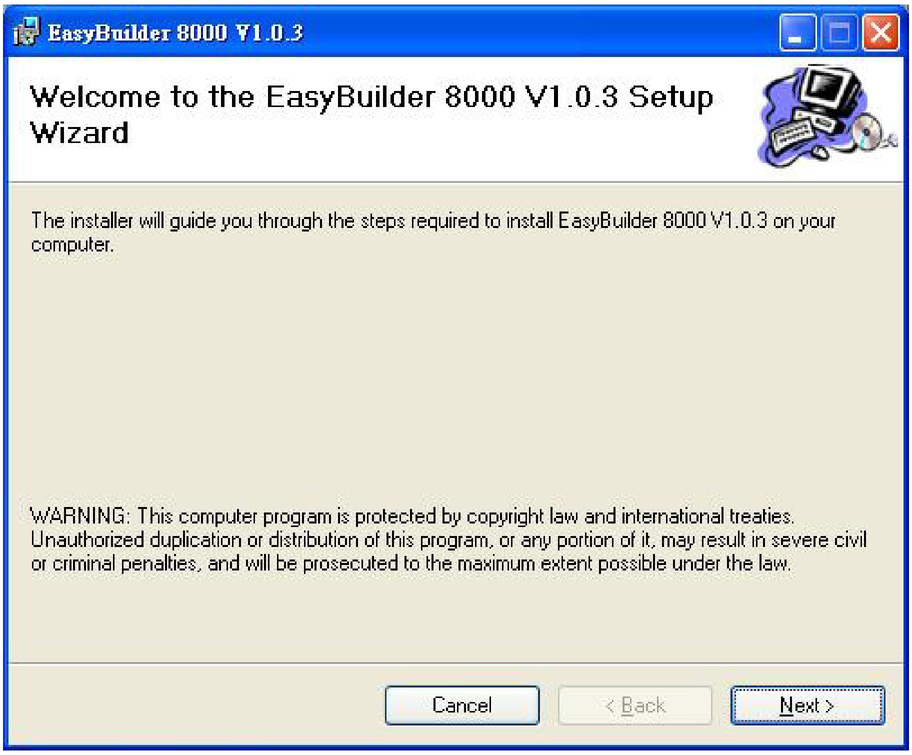
Windows 2000/Windows NT/Windows XP

(4) Installation:

1) When putting the EB8000 CD into CD Rom, the Autorun program will automatically execute by computer. Or run [Anutorun.exe] from the root directory manually and the screen shows as below:



2) Click [Install] and the screen appears as below:

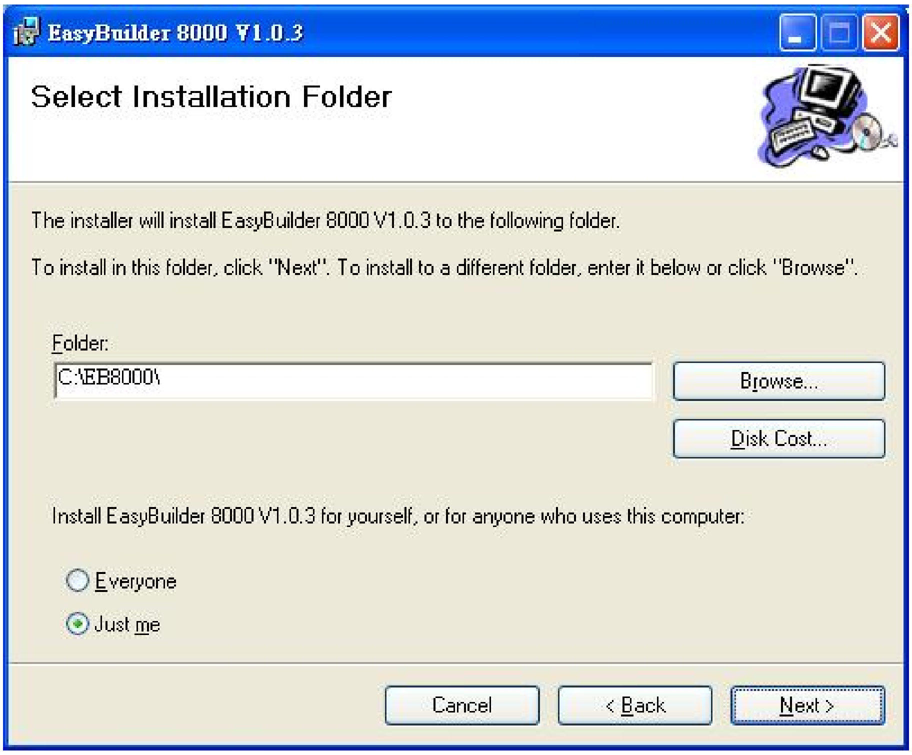


Welcome to the EasyBuilder 8000 V1.0.3 Setup Wizard

The installer will guide you through the steps required to install EasyBuilder 8000 V1.0.3 on your computer.

WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.

3) Follow the instructions and click [Next].



Select Installation Folder

The installer will install EasyBuilder 8000 V1.0.3 to the following folder.

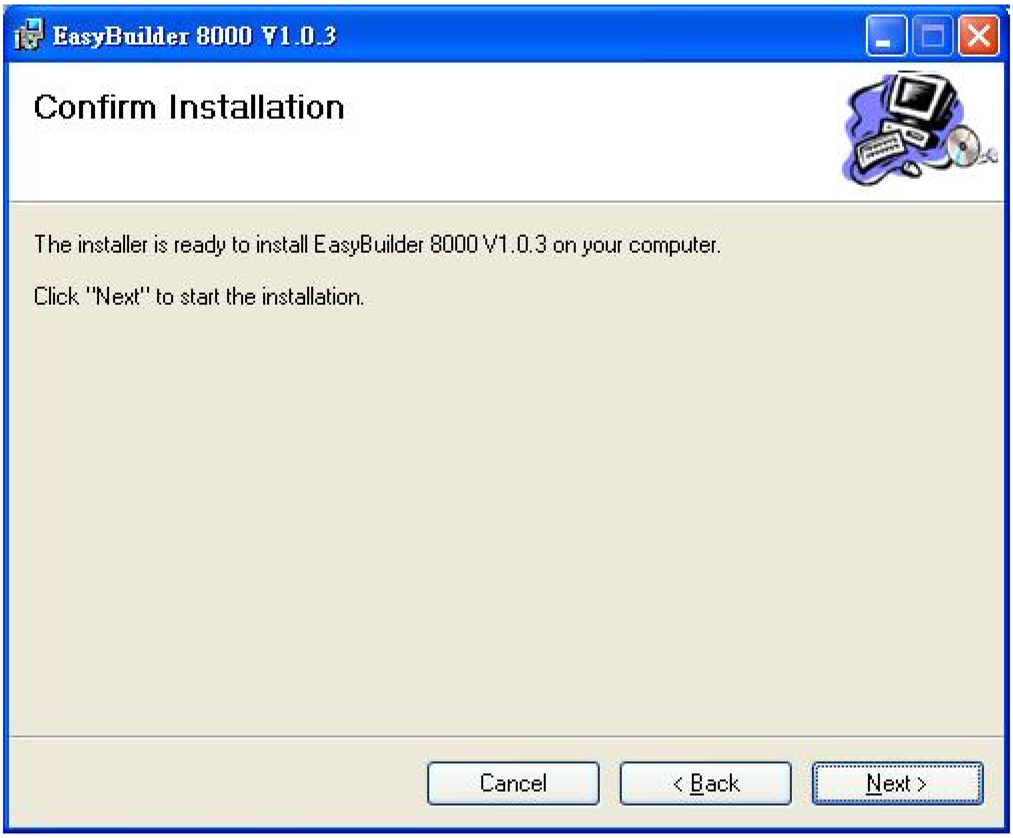
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".

Folder: C:\EB8000\

Install EasyBuilder 8000 V1.0.3 for yourself, or for anyone who uses this computer:

○ Everyone
● Just me

4) Select the target file for software installation or select suggestive path and then click [Next].

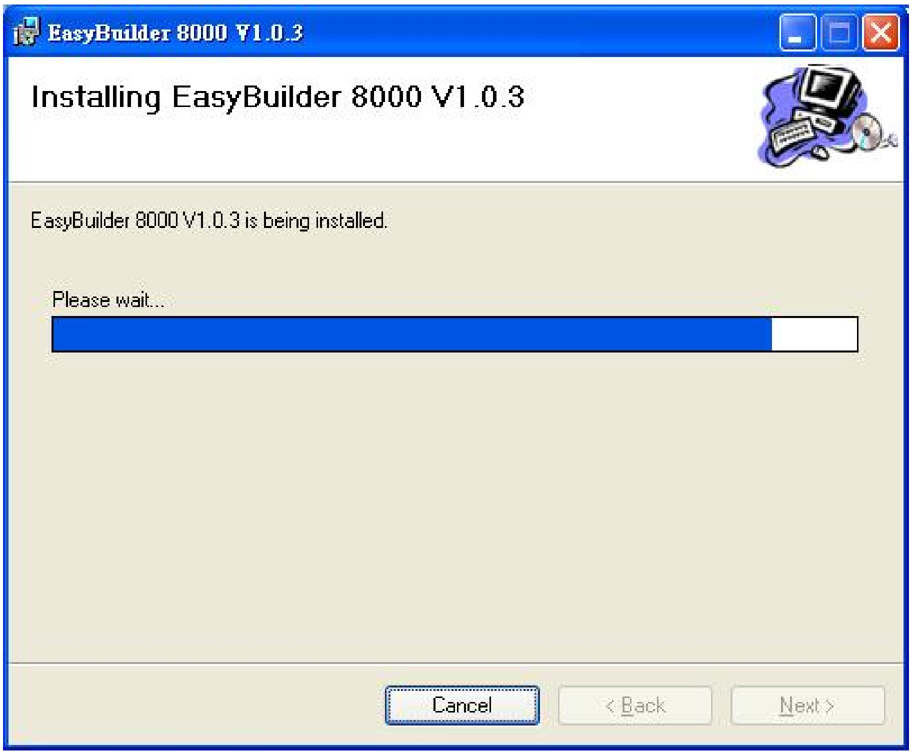


Confirm Installation

The installer is ready to install EasyBuilder 8000 V1.0.3 on your computer.

Click "Next" to start the installation.

Click “Next” to confirm the installation.

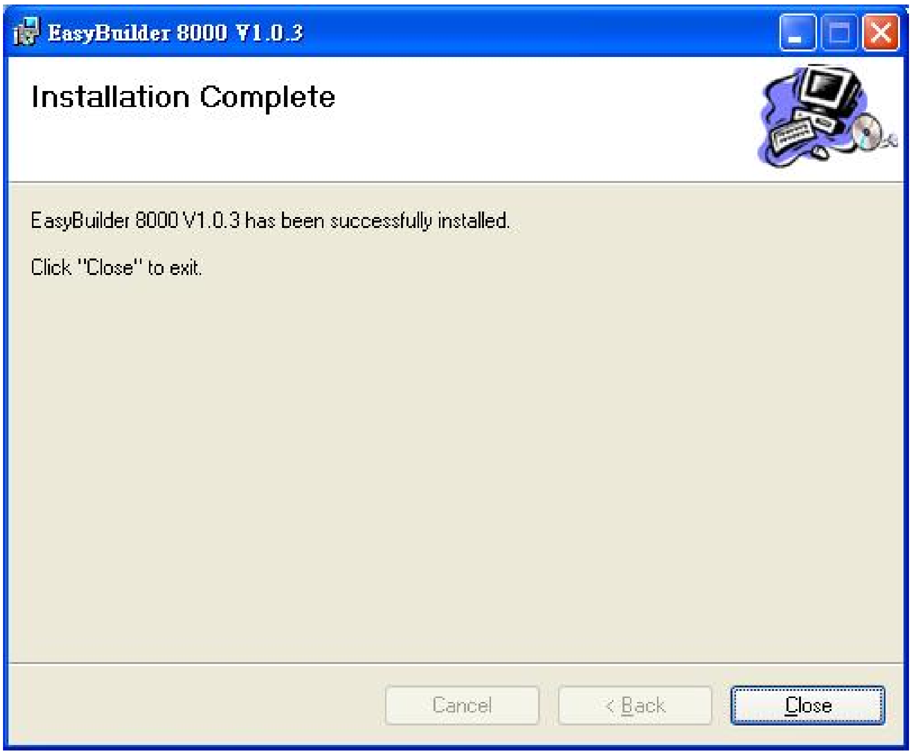


Installing EasyBuilder 8000 V1.0.3

EasyBuilder 8000 V1.0.3 is being installed.

Please wait...

Installation processing



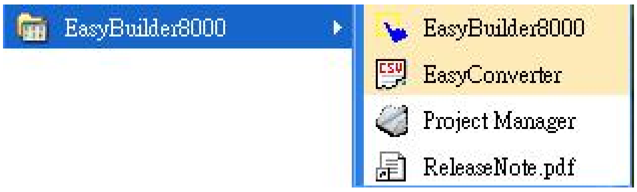
Installation Complete

EasyBuilder 8000 V1.0.3 has been successfully installed.

Click "Close" to exit.

Click” Close” to complete the installation.

5) Choosing menu [Start] / [Programs] / [EasyBuilder8000] to start the program.

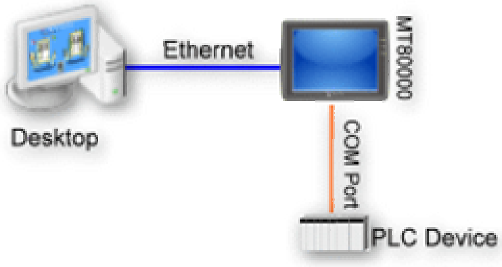


The identification of each selection under the directory of the software:

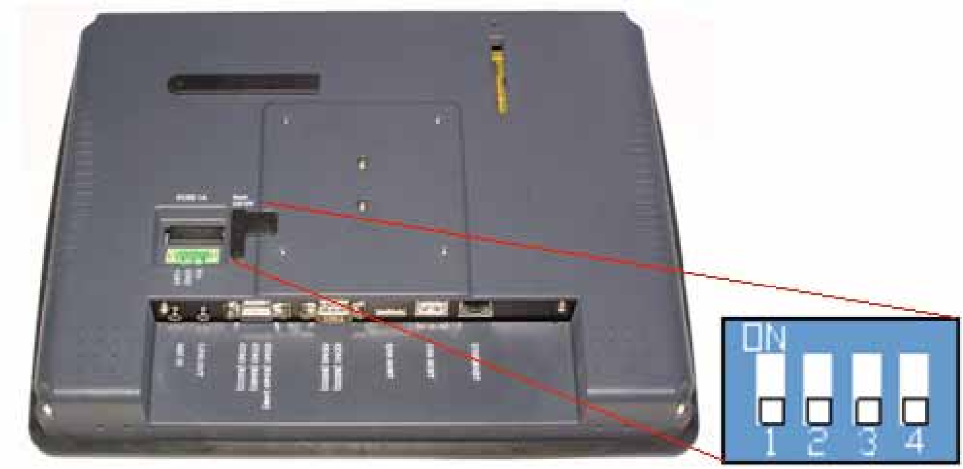
| | |
|---|---|
| EasyBuilder8000 | EB8000 touch screen editing software |
| EasyConverter | Data record conversion tool |
| Project Manager | MT8000 integration management software |
| ReleaseNote.pdf | Software version and latest information |

2. System Connection

Typical connection for the application of MT8000 series as below:



Connection interfaces equipped in MT8000:



USB Host
Support various devices with USB interface, such as mouse, keyboard, USB stick, printer…etc.

Ethernet Port
Connected with devices with Ethernet communication function, such as PLC, laptop…etc; exchange the information via Network.

44 Pin IDE Interface
Enlarge the available hard disk to store a variety of data or information.

Compact Flash card
Support the download/ upload of a project, including recipe transfer, Event Log Data…etc.

Serial I/O Port
COM ports, RS-232, RS485-2w/4w, can be connected to PLC or other peripheral devices. Here we view RS-422 the same as RS-485 (4 wire). Please refer to the appendix in the user manual for correct connection of PLC and touch screen. Besides, please make sure all DIP switches are on “OFF” (down) position (defaults of the display).

In addition, Weintek provides [MT8-COM1 Multi-Connector cable] and [MT8-COM3 Multi-Connector cable] to expand a COM port to multiple independent COM ports so that the efficiency of the operation will be improved. Please refer to the connection illustration in the manual.

3. MT8000 System Settings

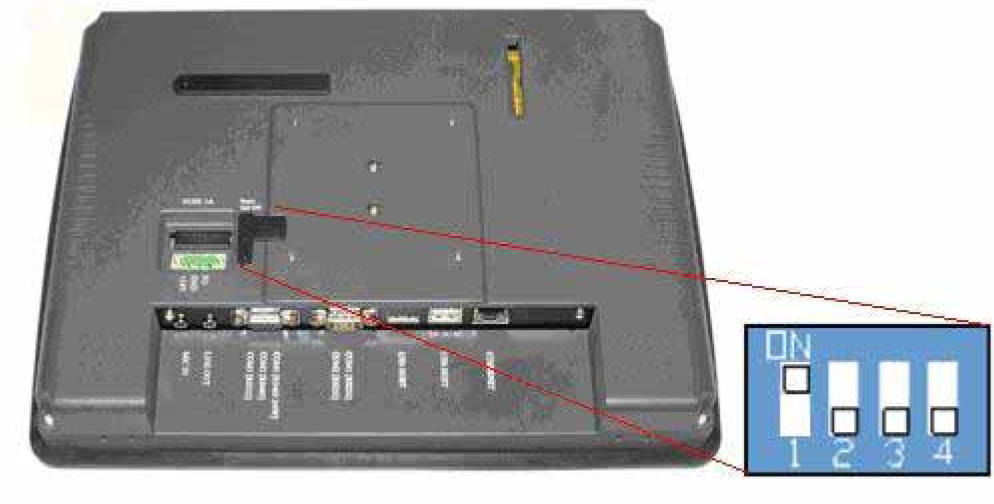
Before first operating MT8000, users have to complete every system setting. After the setup, use EB80000 editing software to develop a personal operation interface.

The following illustrates every system setting respectively.

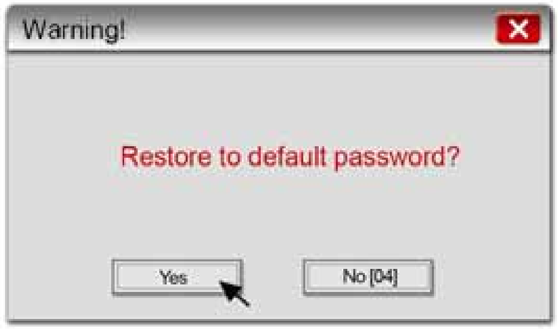
(1)System Reset

Each HMI is equipped with a set of reset button and DIP switch. When using Dip switch to change different modes, corresponding functions will be triggered. (Please refer to related chapters.)

If losing or forgetting system passwords, users can set Dip Switch 1 to “ON” position, the rest of Dips remain on “OFF” position and then reboot MT8000.

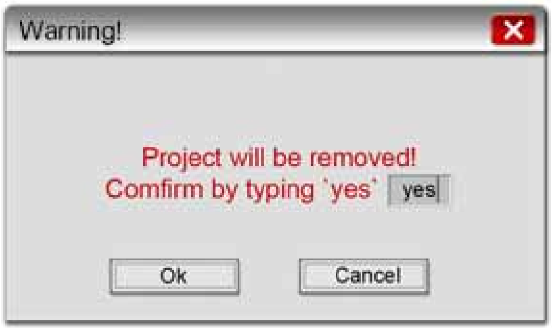


Under this situation, MT8000 will jump to Touch Adjust (Touch screen calibration) mode. After calibration, the pop-up window appears as the illustration below. Users will be inquired if restoring the system password to the default value.


Warning!

Restore to default password?

When “YES” is chosen, another pop-up dialog appears as below. Users will be confirmed again if restoring the system password to the default value and will be asked to input “YES”. Then click OK. (The default password is 111111. However, other passwords, including download and upload password, have to be reset.)

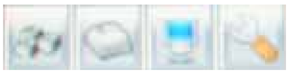

Warning!

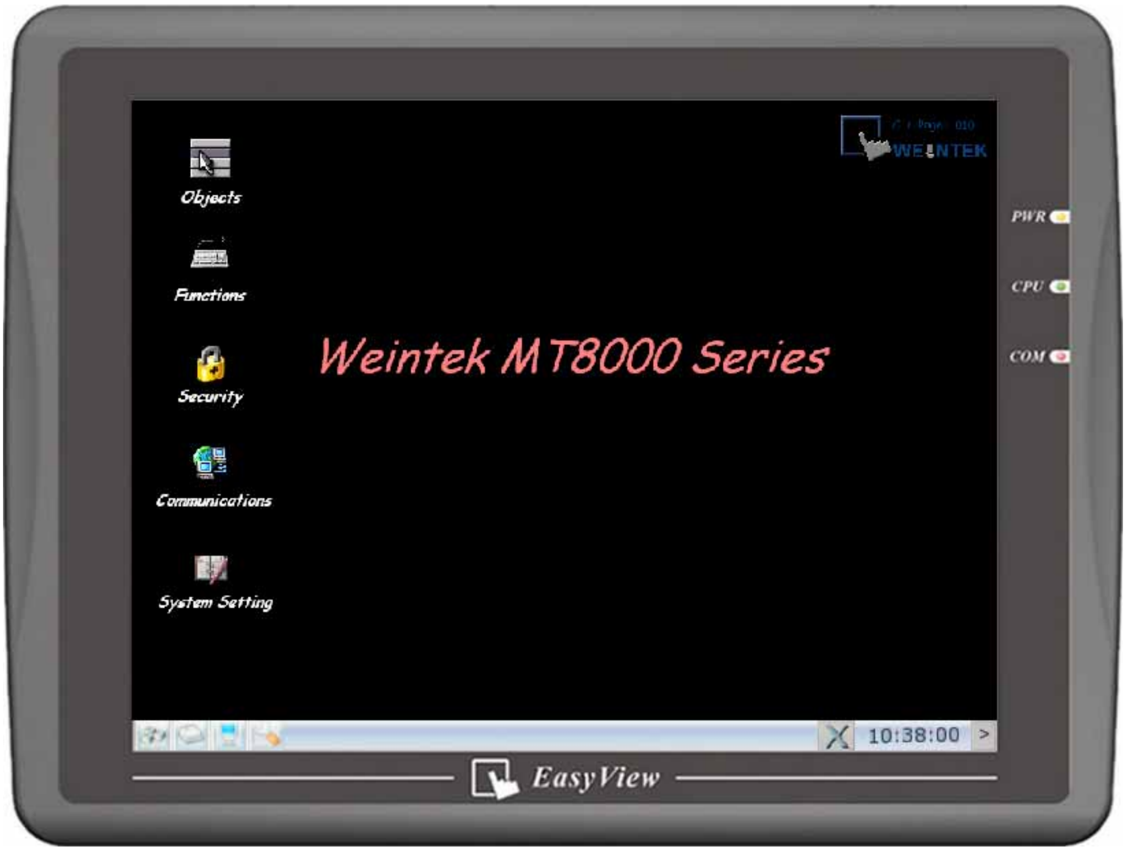
Project will be removed!
Comfirm by typing `yes` yes

Note: When the reset action is be taken, projects and saved data in the HMI will all be cleared.

(2) Tool bar

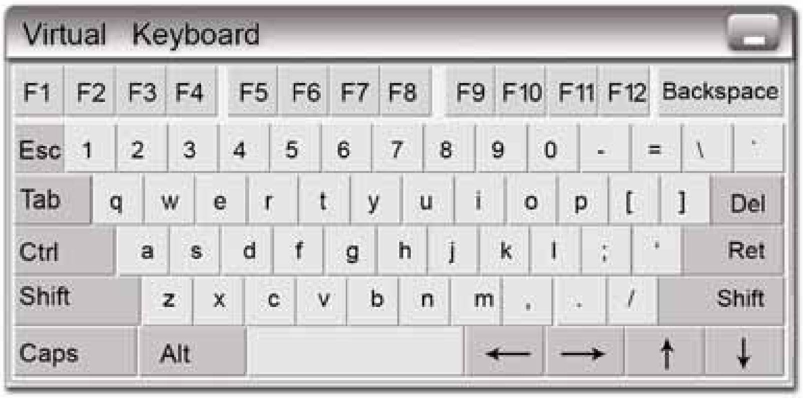
After activating the HMI, users can set the system by using the tool bar at the bottom of the screen. Normally, tool bar is hidden automatically. Only touch the target at the corner of the right-bottom will the tool bar pop up.





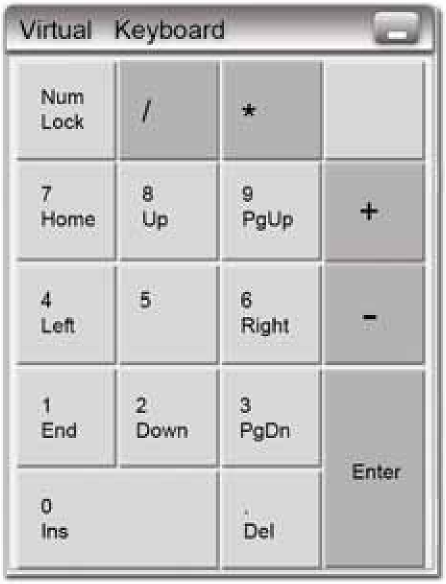
Large Keyboard

Use large keyboard to input the text information.


Virtual Keyboard
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 Backspace
Esc 1 2 3 4 5 6 7 8 9 0 - = \ `
Tab q w e r t y u i o p [ ] Del
Ctrl a s d f g h j k l ; ' Ret
Shift z x c v b n m , . / Shift
Caps Alt ← → ↑ ↓

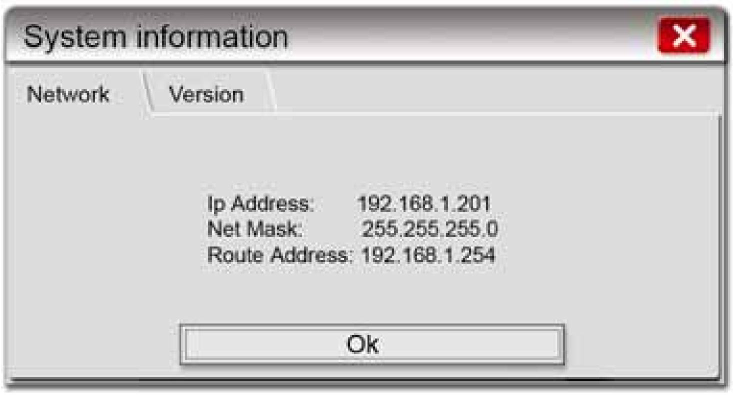
Small Keyboard

Use small keyboard to input the numerical information.



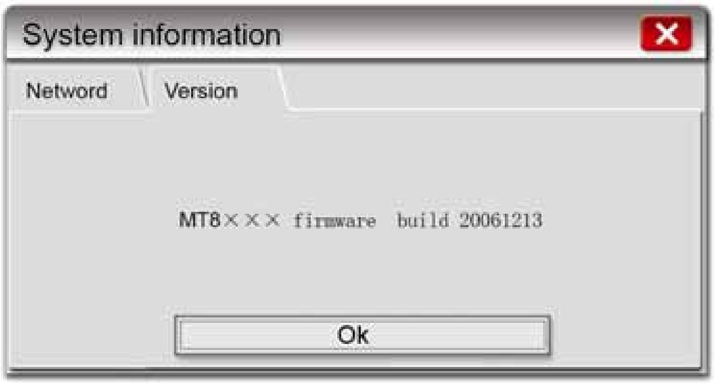
System Information

Network: Display Network information, including IP address of HMI and other network information.



Ip Address: 192.168.1.201
Net Mask: 255.255.255.0
Route Address: 192.168.1.254

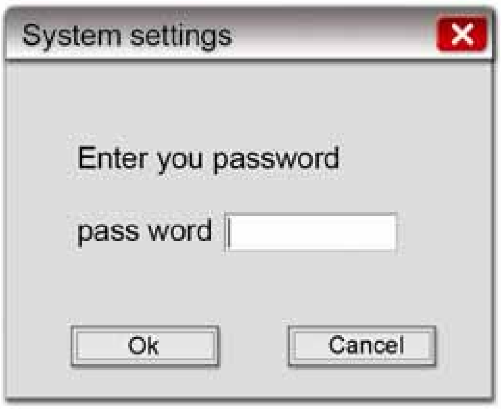
Version: Display information of the system version.



MT8××× firmware build 20061213

System Setting

Setting or modify system parameters. Password has to be confirmed in view of security.

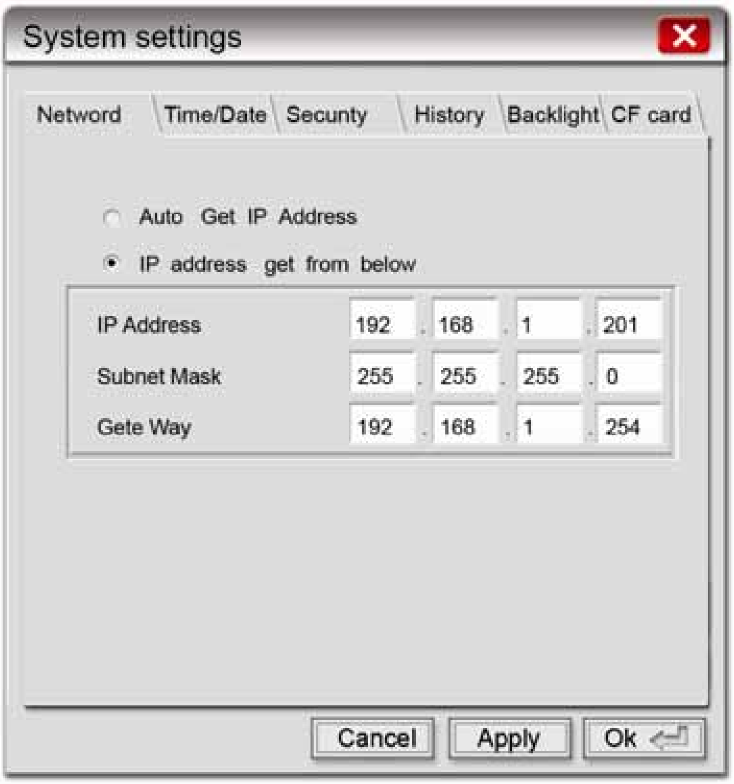

System settings

Enter you password

pass word

a. Network

Projects can be downloaded to MT8000 via Ethernet so that the IP address of operation target (HMI) must be correctly set. If “Auto Get IP Address” is selected, IP address will be automatically assigned from local DHCP network. While if “IP address get from below” is selected, IP address and other network information have to be input.


System settings

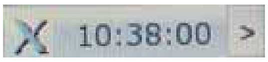
○ Auto Get IP Address

● IP address get from below

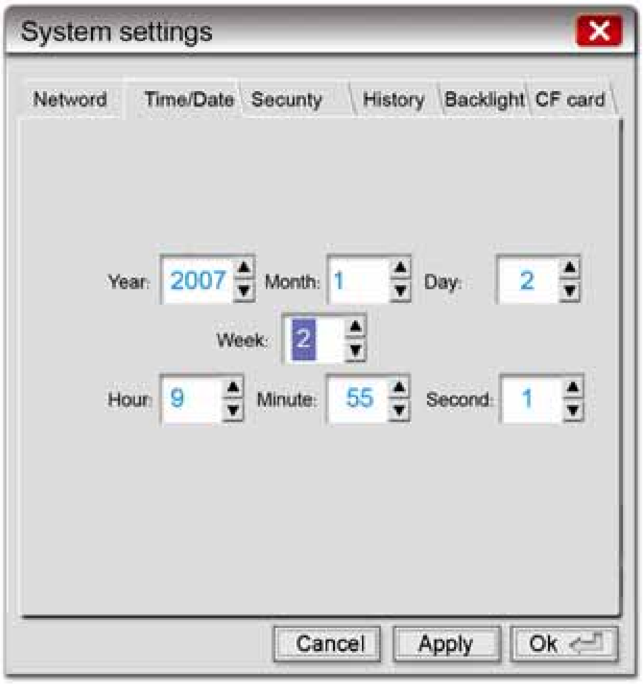
| | | | | |
|---|---|---|---|---|
| IP Address | 192 | 168 | 1 | 201 |
| Subnet Mask | 255 | 255 | 255 | 0 |
| Gete Way | 192 | 168 | 1 | 254 |

b. Time/Date

System time/date will display at the corner of the bottom-right after the adjustment.



10:38:00



System settings

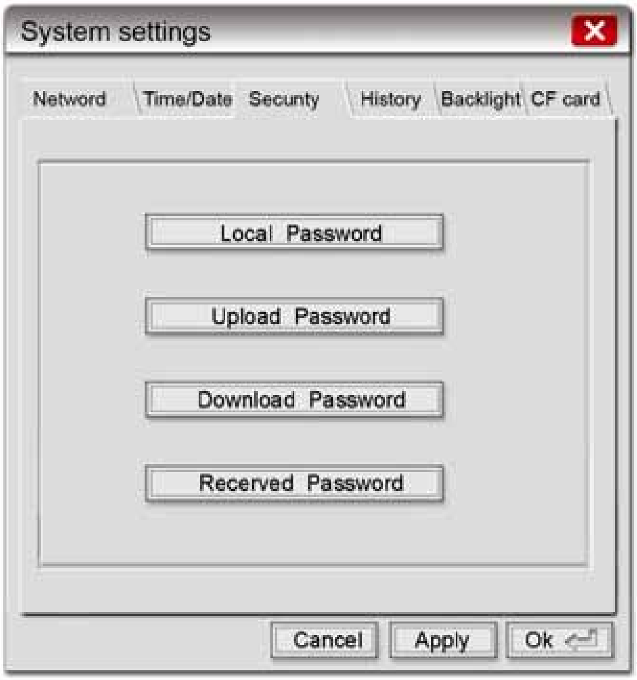
Year: 2007 Month: 1 Day: 2

Week: 2

Hour: 9 Minute: 55 Second: 1

c. Security

Providing stricter security protection for the MT8000. The default of the password is 111111.



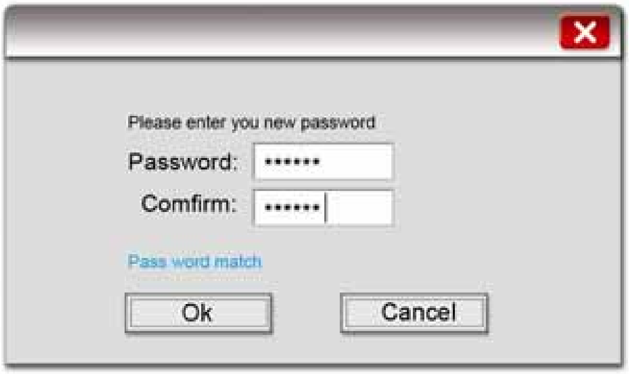
Local Password
Password to enter the system

Upload Password
Password to upload the project

Download Password
Password to download the project

Reserved Password
Password reserved for further usage

Password confirmation:



Please enter you new password

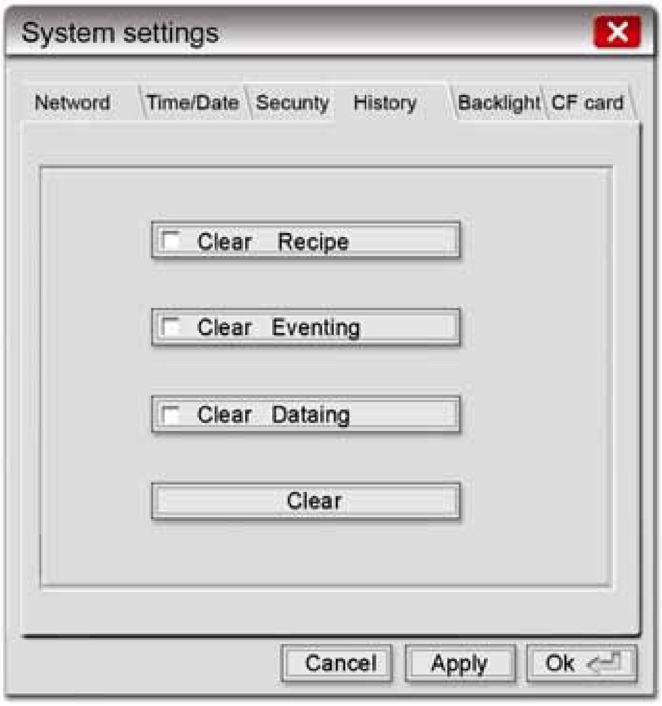
Password: ••••••

Comfirm: ••••••

Pass word match

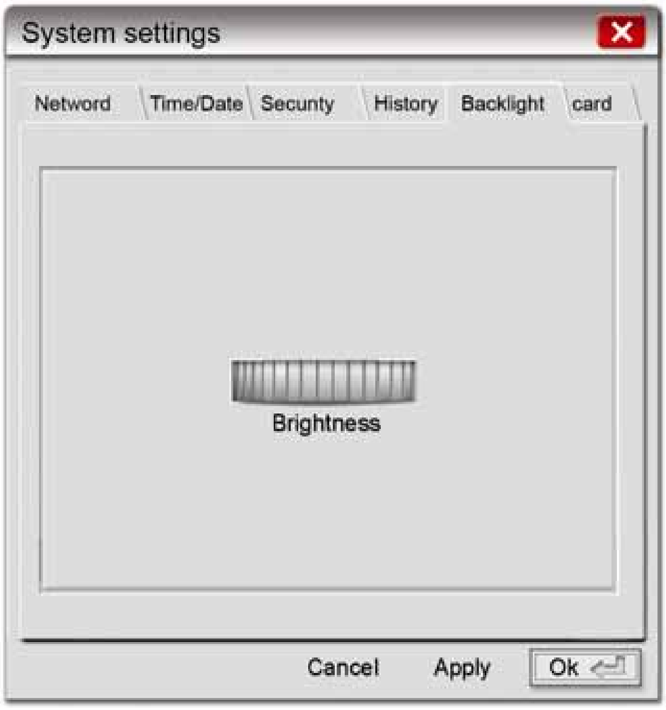
d. History

The tab can clear the historical data in the HIM: Recipe, Event log and Data log.



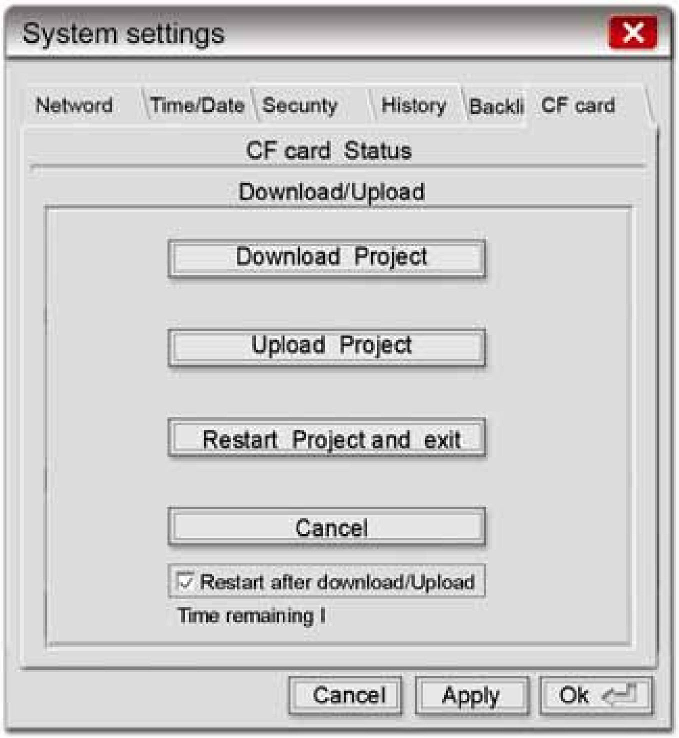
e. Backlight

Using the rolling bottom on the screen to adjust the brightness of LCD.



f. CF Card Stat

When HMI detects other new device, this function will be enabled.

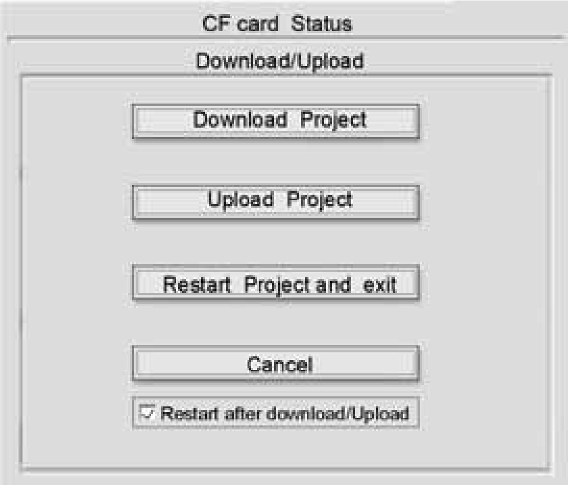


☑ Restart after download/Upload

Time remaining I

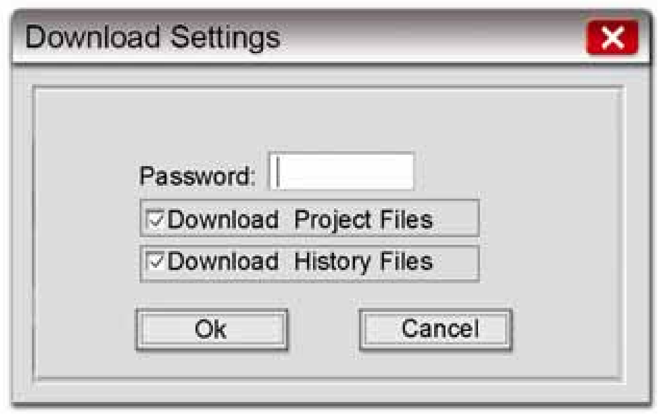
4. MT8000 Download Setting Screen

MT8000 provides two methods: CF card and USB stick, to download a project to HMI. After insert CF card or USB stick and assign the directory name, all context under the directory will be downloaded to the HMI. When HMI detects new peripheral devices, the following screen appears:



☑ Restart after download/Upload

Several functions can be selected at this time and some need the confirmation of the password. Please refer to the illustration below:

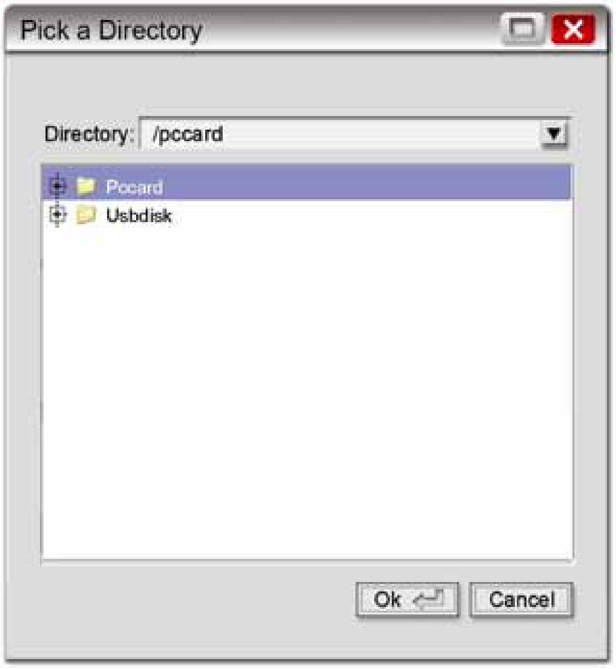


Password:

☑ Download Project Files

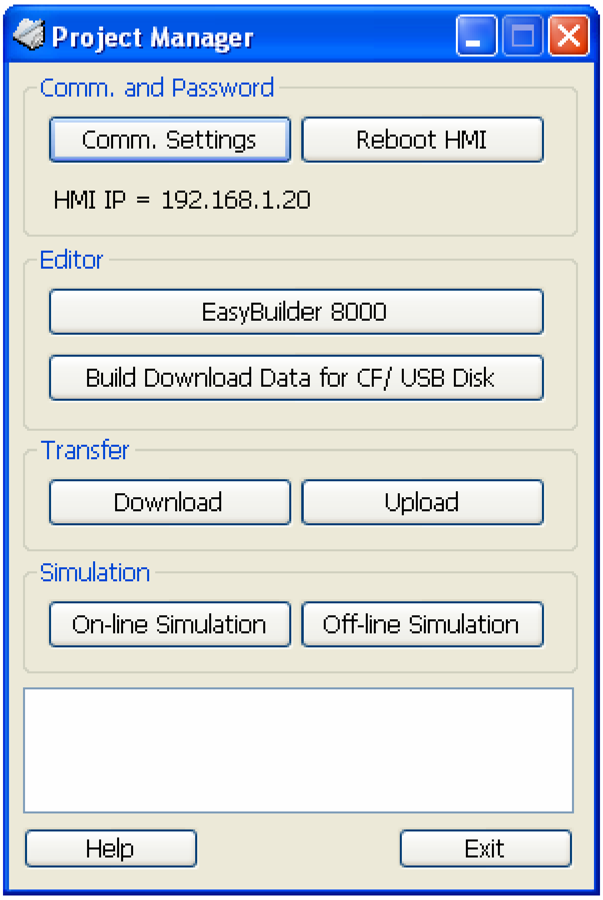
☑ Download History Files

After the confirmation of the password, directory names of the CF card…etc will be displayed. (pccard: CF Card ; usbdisk: usb device)



Select the download path and click OK for downloading.

Note: Data to be downloaded will be created from [Build Download Data for CF/USB Disk] of Project Manager.



HMI IP = 192.168.1.20

Generally speaking, Project Manager divides the downloaded files into two directories:

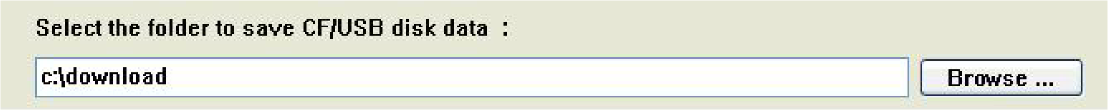
MT8000

store projects

History

The directory will be created when download the historical data.

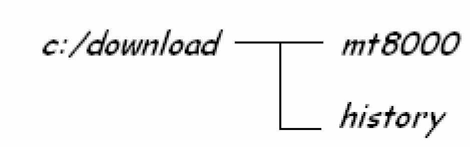
In other words, if location of the saved file as below,



Select the folder to save CF/USB disk data :

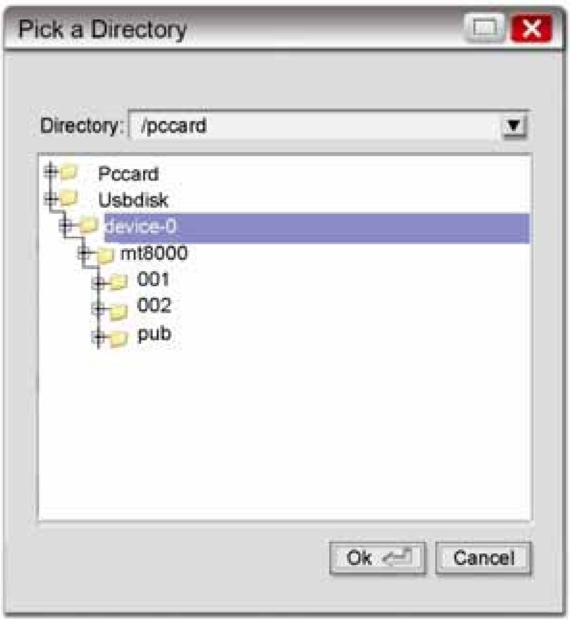
c:\download

the data structure will as follows:



The most upper path should be selected when downloading. In other words, take the structure above as an example, download must be selected but mt8000 or history is invalid.

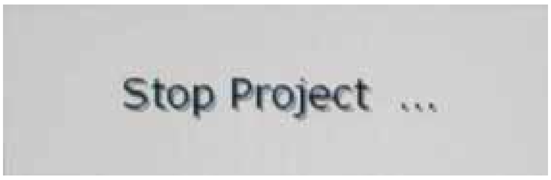
Take the illustration below as another example, usb disk only saves mt8000 directory but not includes history. In this case, users must choose device-0 to correctly download the file.



Pick a Directory

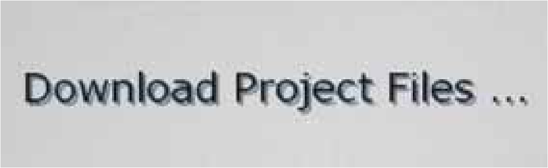
Directory: /pccard

In the process of downloading, screens of HMI change in order:



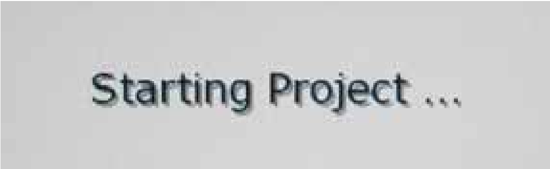
Stop Project ...

Stop the current project



Download Project Files ...

Start to download a new project

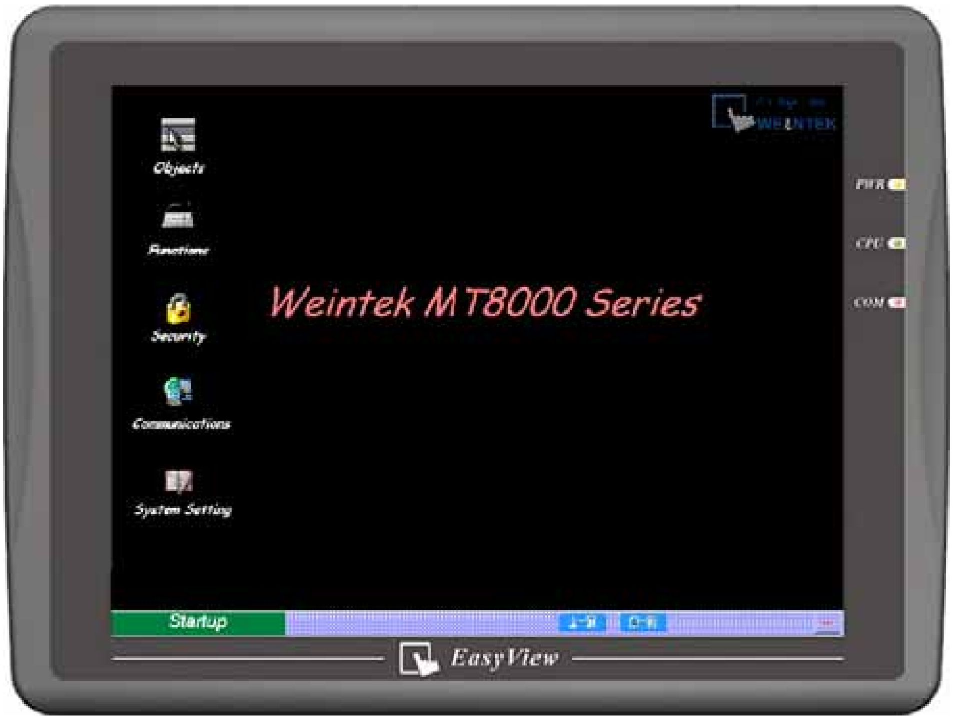


Starting Project ...

Activate the new project

Scan font file

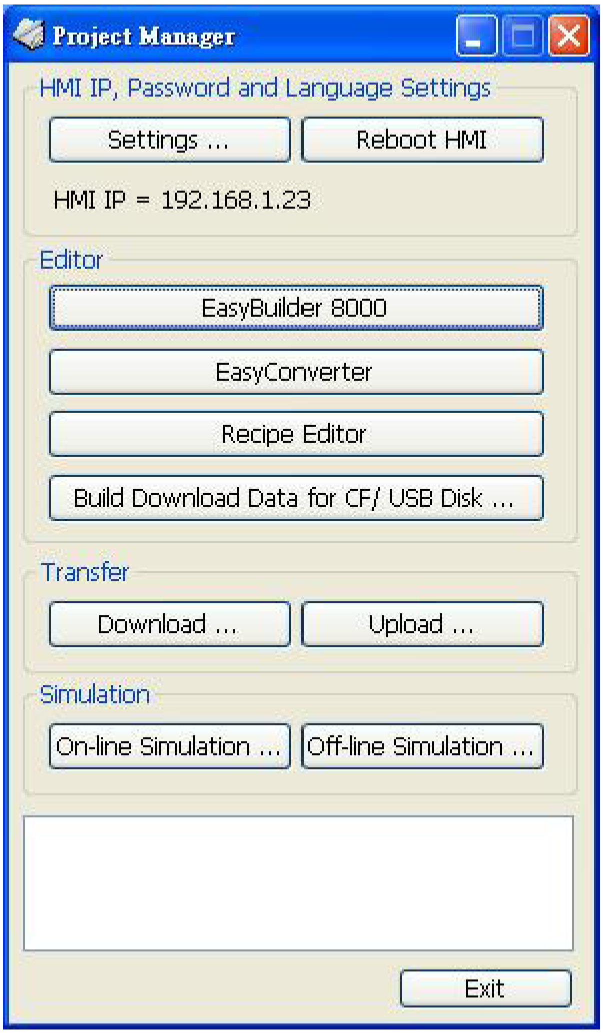
The screen appears as below after a successful new project downloading.



# Chapter 2 Project Manager Operations

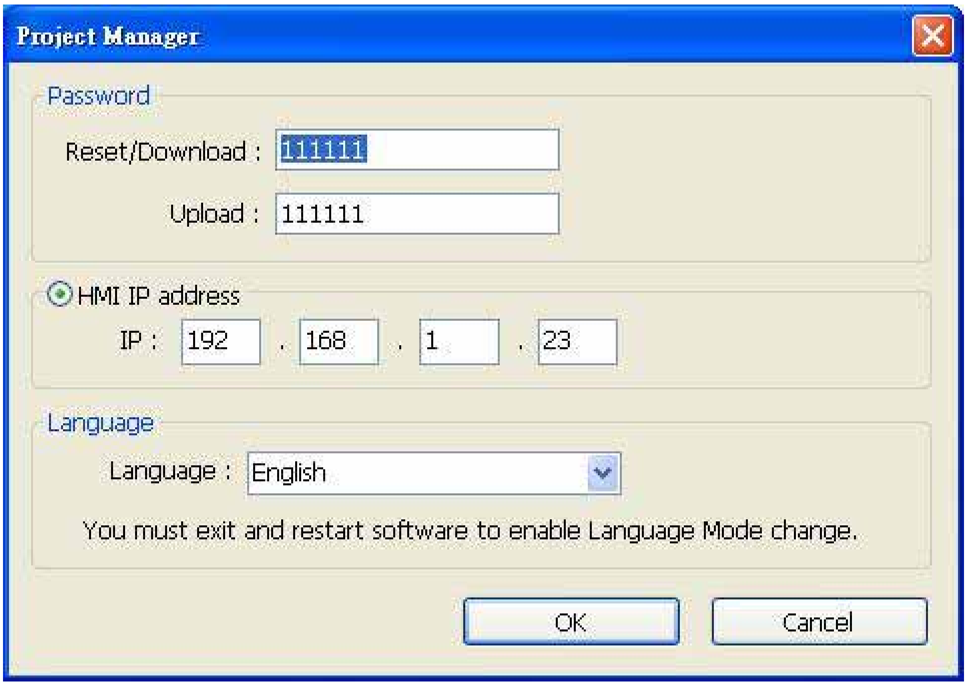
Introduction

Project Manager integrates every available function of the EB8000. Each function will be introduced in this chapter.



HMI IP = 192.168.1.23

### A .Settings


Project Manager

Password

Reset/Download : 111111

Upload : 111111

◉ HMI IP address

IP : 192 . 168 . 1 . 23

Language

Language : English

You must exit and restart software to enable Language Mode change.

Operating MT8000 by Ethernet needs to designate correct IP address and necessary password. “Download” and “Reset” functions share a set of password while “Upload” function uses another password. Please refer to the related chapters about how to modify or view the IP address and password. After change “Language”, please exit and restart software to enable language mode change.

### B. Reboot HMI

Under certain situation, users need to reset the system, such as updating the internal files of HMI. This function can be executed without restart the system.

### C. EasyBuilder 8000

Activate EasyBuilder 8000 graphical editor.

### D. EasyConverter

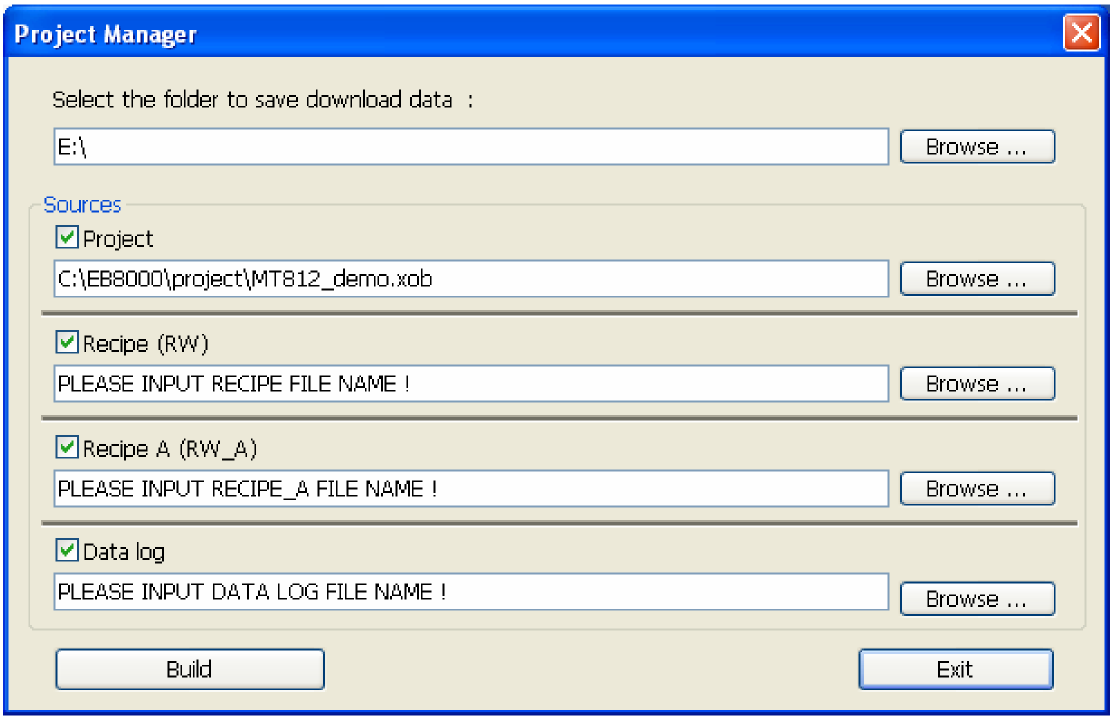
Data record conversion tool

### E. Recipe Editor

Recipe data conversion tool

### F. Building Download Data from CF Card/USB Stick

Except Ethernet, data also can be downloaded to the MT8000 by CF card or USB memory stick. The function is for building the download data and the settings shows as below.



Project Manager

Select the folder to save download data :

E:\

Sources

☑ Project

C:\EB8000\project\MT812_demo.xob

☑ Recipe (RW)

PLEASE INPUT RECIPE FILE NAME !

☑ Recipe A (RW_A)

PLEASE INPUT RECIPE_A FILE NAME !

☑ Data log

PLEASE INPUT DATA LOG FILE NAME !

[Select the folder to save download data]

Press [Browse] to search for and assign the file path (or directory name) and then press [Build] to set all contexts of the downloaded data. Users can directly designate the save location in CF card/ USB stick or copy the entire directory to CF card/USB stick after completely building the data.

Insert CF card or USB stick and assign the name of the file, EB8000 will start downloading the whole content of the file to HMI.

Note: Save location should be the name of directory and avoid designating only root directory.

For example, both c:\" and f:\\" are illegal names.

[Project]

Use EB8000 to configure the context of display (*.mtp file) and then compile it to *xob file for HMI terminal. The desired *xob file for CF card can be selected by using this function.

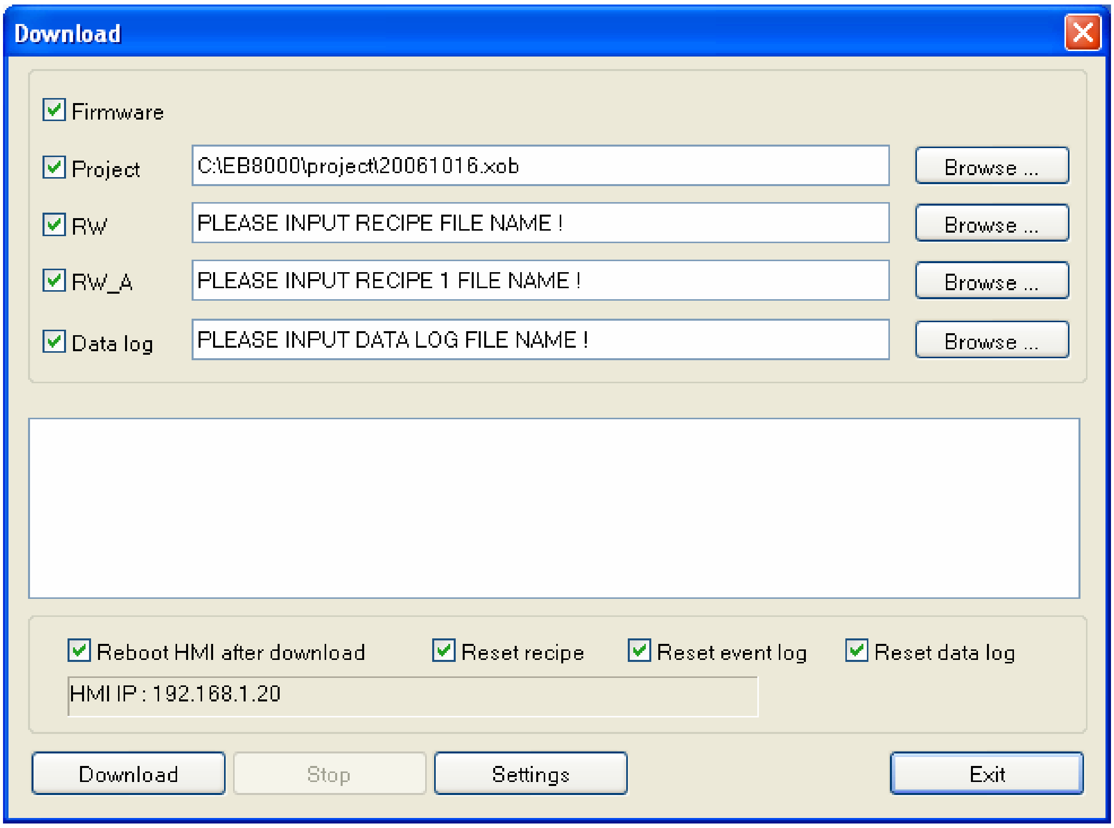
[Recipe (RW)]
RW Recipe file for CF card can be selected by this function. The max effective size of the file is 64K. Please refer to “Receipt Transfer” for more details.

[Recipe A (RW_A)]
RW_A Recipe file for CF card can be selected by this function. The max effective size of the file is 64K. Please refer to “Receipt Transfer” for more details.

[Data log]
Data log file for CF card can be selected by this function. Please refer to “data log object” for more details.

**G. Download**

Downloading files to the MT8000 through Ethernet. Press the [Download] button and the dialog appears as below:


Download

☑ Firmware
☑ Project C:\EB8000\project\20061016.xob
☑ RW PLEASE INPUT RECIPE FILE NAME !
☑ RW_A PLEASE INPUT RECIPE 1 FILE NAME !
☑ Data log PLEASE INPUT DATA LOG FILE NAME !

☑ Reboot HMI after download ☑ Reset recipe ☑ Reset event log ☑ Reset data log
HMI IP : 192.168.1.20

[Firmware]
Check [Firmware] to update all of the kernel programs of HMI.

[Project]
EB8000 are able to have the content of screen configuration (MTP file) compiled and get *.xob file for MT8000.The desired *.xob file downloaded to the terminal can be selected.

[RW]
Select the desired RW recipe data to be downloaded to MT8000. The max size available is 64K Please refer to [recipe transfer] chapter for further information.

[RW_A]
Select the desired RW_A recipe data to be downloaded to MT8000. The max size available is 64K. Please refer to [recipe transfer] chapter for further information.

[Data log]
Select the desired data log file to be downloaded to MT8000. Please refer to “Data log object” for more details.

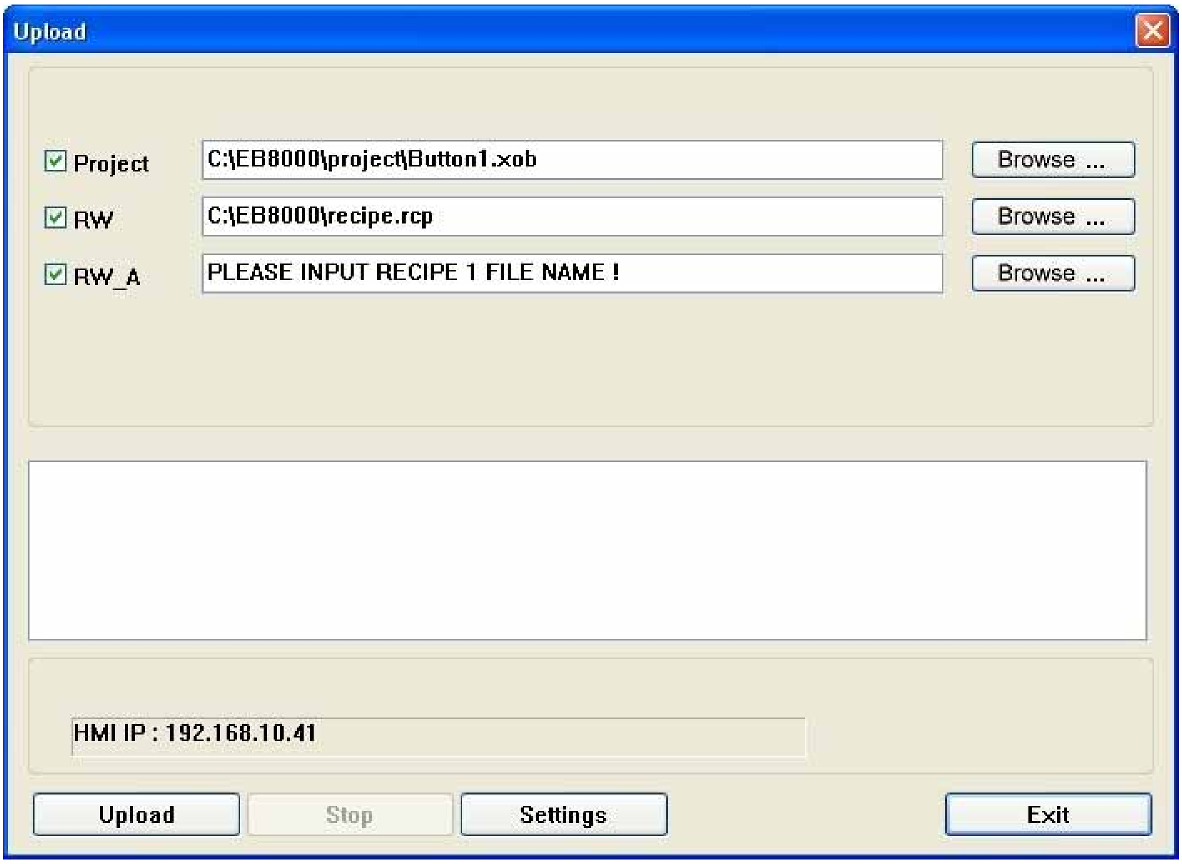
[Reset recipe]
Check [Reset recipe] to set all figures of recipe to 0 before the process of downloading.

[Reset event log]
Check [Reset Event log] to clear all of the event log files in HMI before the process of downloading.

[Reset data log]
Check [Reset data log] to clear all of the data log files in HMI before the process of downloading.

### H.Upload

Uploading files to MT8000 by Ethernet and the dialog box shows as below:



☑ Project C:\EB8000\project\Button1.xob

☑ RW C:\EB8000\recipe.rcp

☑ RW_A PLEASE INPUT RECIPE 1 FILE NAME !

HMI IP : 192.168.10.41

[Project]

Select *.xob save location after uploading.

[RW]

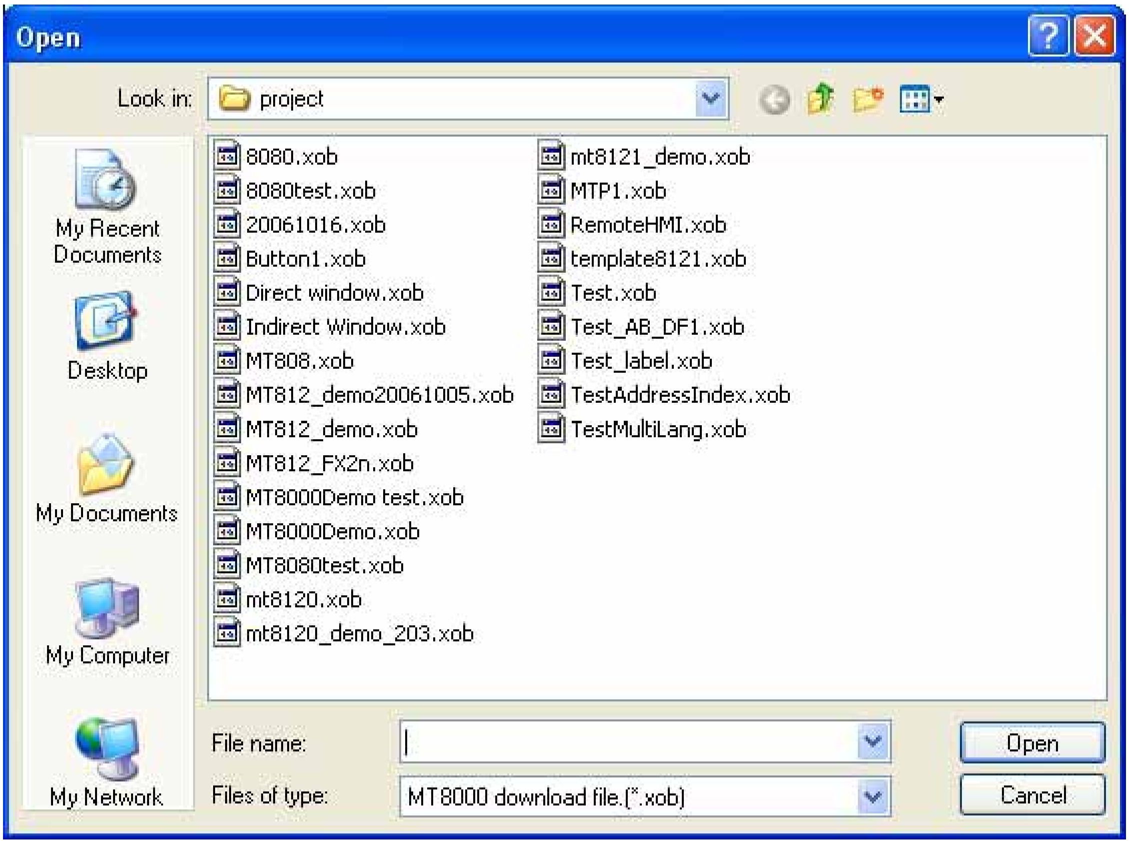
Select RW save location after uploading.

[RW_A]

Select RW_A save location after uploading.

### I. On-line Simulation/Off-line Simulation

Execute On-line/Off-line Simulation. Select the source of *.xob file before executing the function as follows:



Look in: project

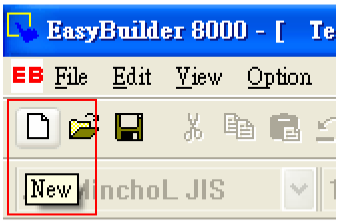
8080.xob
8080test.xob
20061016.xob
Button1.xob
Direct window.xob
Indirect Window.xob
MT808.xob
MT812_demo20061005.xob
MT812_demo.xob
MT812_FX2n.xob
MT8000Demo test.xob
MT8000Demo.xob
MT8080test.xob
mt8120.xob
mt8120_demo_203.xob
mt8121_demo.xob
MTP1.xob
RemoteHMI.xob
template8121.xob
Test.xob
Test_AB_DF1.xob
Test_label.xob
TestAddressIndex.xob
TestMultiLang.xob

File name:

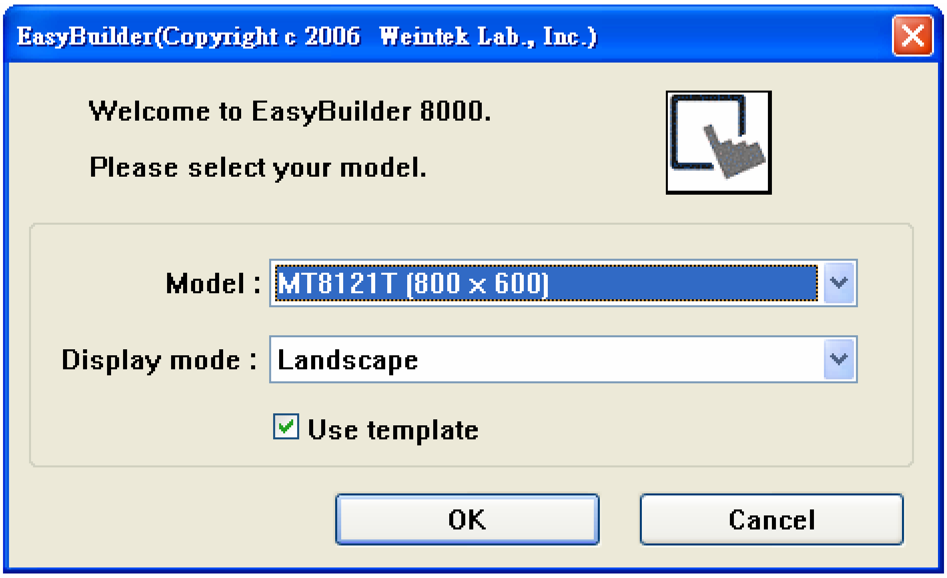
Files of type: MT8000 download file.(*.xob)

# Chapter 3 How to Create a Simple Object

The following takes MITSUBISHI PLC as an example to illustrate how to create a simple project. First of all, click [New] icon on the toolbar to create a new blank project as below:



Select HMI Model and Display mode and then click OK.



Welcome to EasyBuilder 8000.

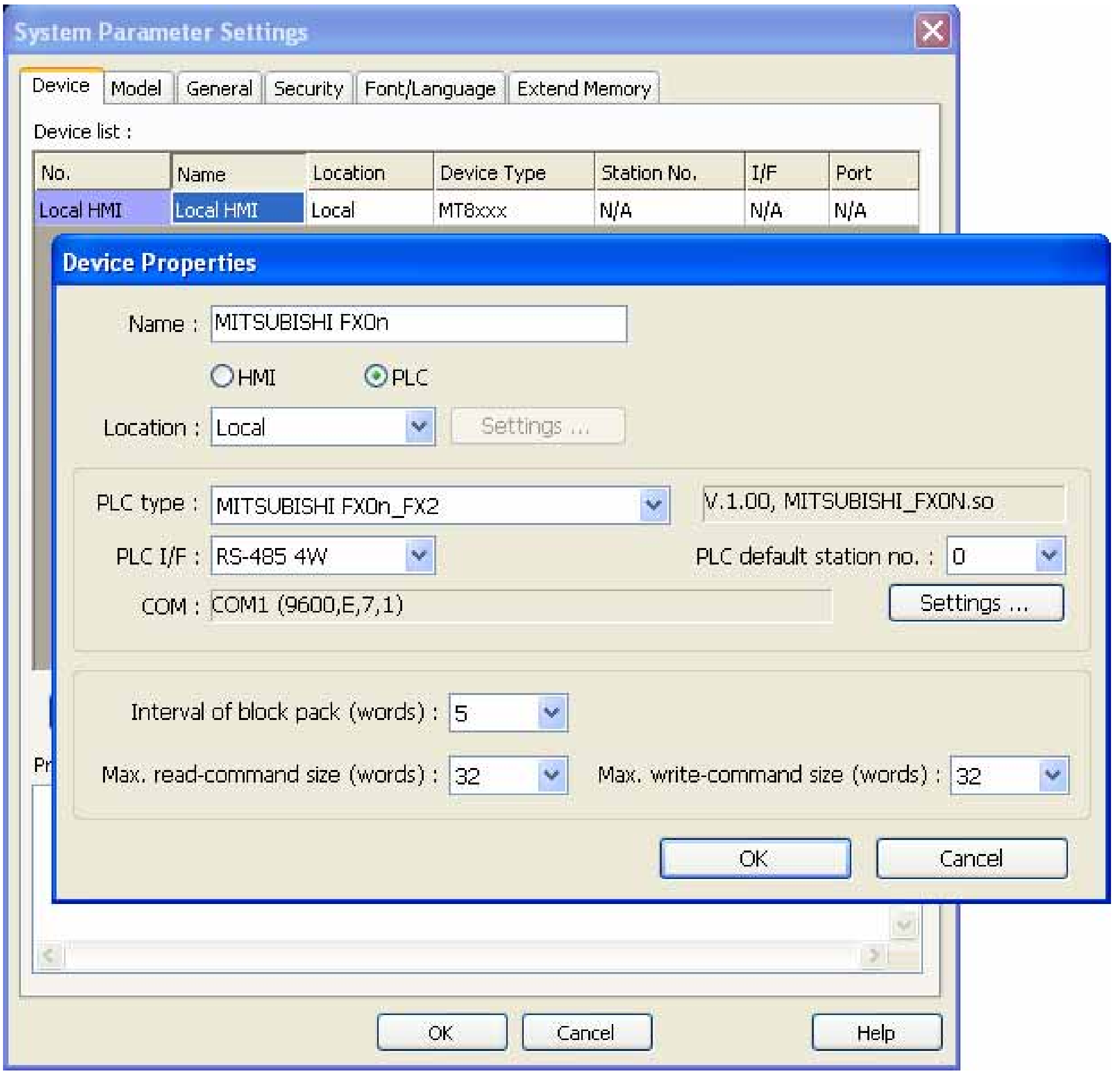
Please select your model.

Model : MT8121T (800 x 600)

Display mode : Landscape

☑ Use template

Except correctly setting the system parameters, click [New…] function on Device Table to add a new device. The settings are as below:



System Parameter Settings

Device | Model | General | Security | Font/Language | Extend Memory

Device list :

| No. | Name | Location | Device Type | Station No. | I/F | Port |
|---|---|---|---|---|---|---|
| Local HMI | Local HMI | Local | MT8xxx | N/A | N/A | N/A |

Device Properties

Name : MITSUBISHI FX0n

○ HMI ● PLC

Location : Local

PLC type : MITSUBISHI FX0n_FX2 V.1.00, MITSUBISHI_FX0N.so

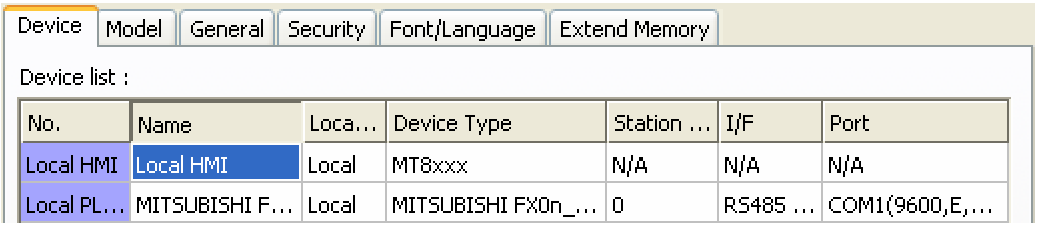
PLC I/F : RS-485 4W PLC default station no. : 0

COM : COM1 (9600,E,7,1)

Interval of block pack (words) : 5

Max. read-command size (words) : 32 Max. write-command size (words) : 32

Device “MISUBISHI FX0n” is added to the Device Table after click OK.

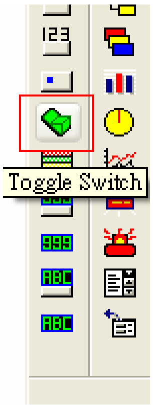


Device | Model | General | Security | Font/Language | Extend Memory

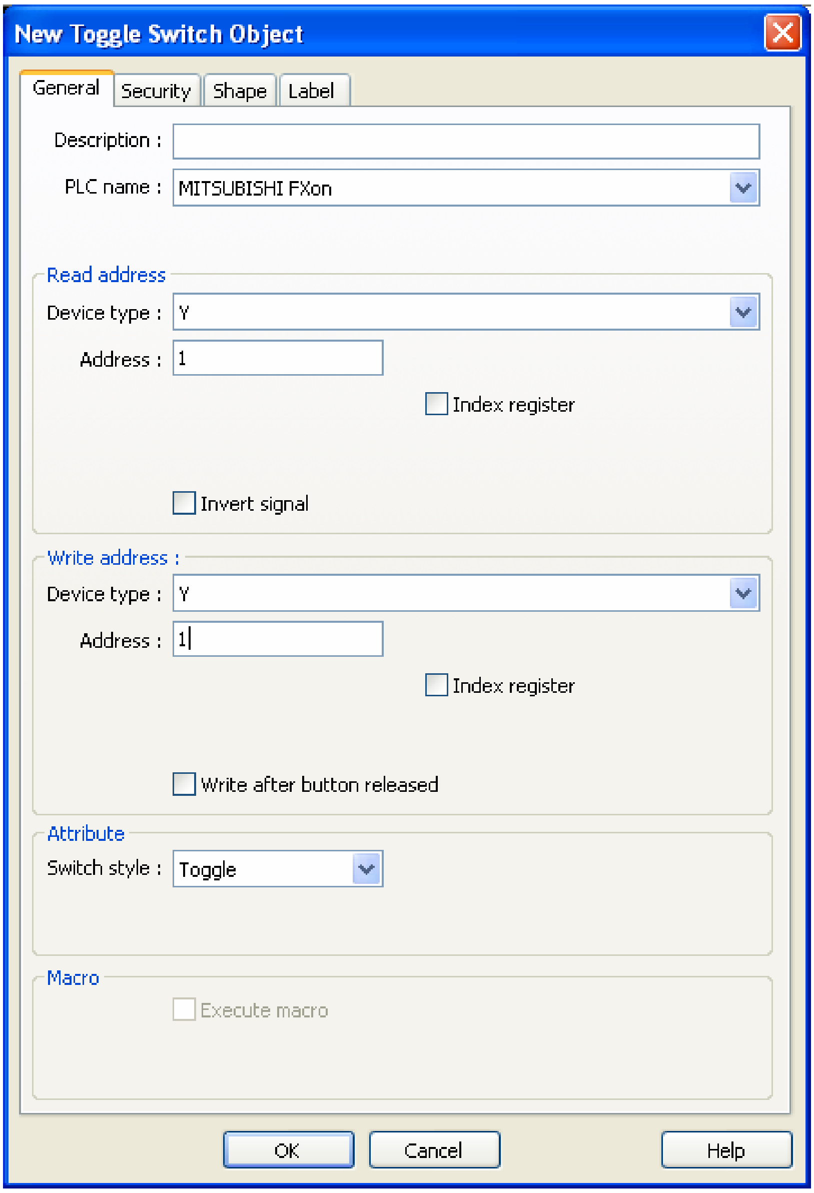
Device list :

| No. | Name | Loca… | Device Type | Station … | I/F | Port |
|---|---|---|---|---|---|---|
| Local HMI | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Local PL… | MITSUBISHI F… | Local | MITSUBISHI FX0n_… | 0 | RS485 … | COM1(9600,E,… |

If a toggle switch would like to be added, click the object buttons showed as follow.



New Toggle Switch Object dialog appears as the illustration. After correct settings of each property, click OK and put the object to the desired place.



New Toggle Switch Object

General | Security | Shape | Label

Description :

PLC name : MITSUBISHI FXon

Read address

Device type : Y

Address : 1

□ Index register

□ Invert signal

Write address :

Device type : Y

Address : 1

□ Index register

□ Write after button released

Attribute

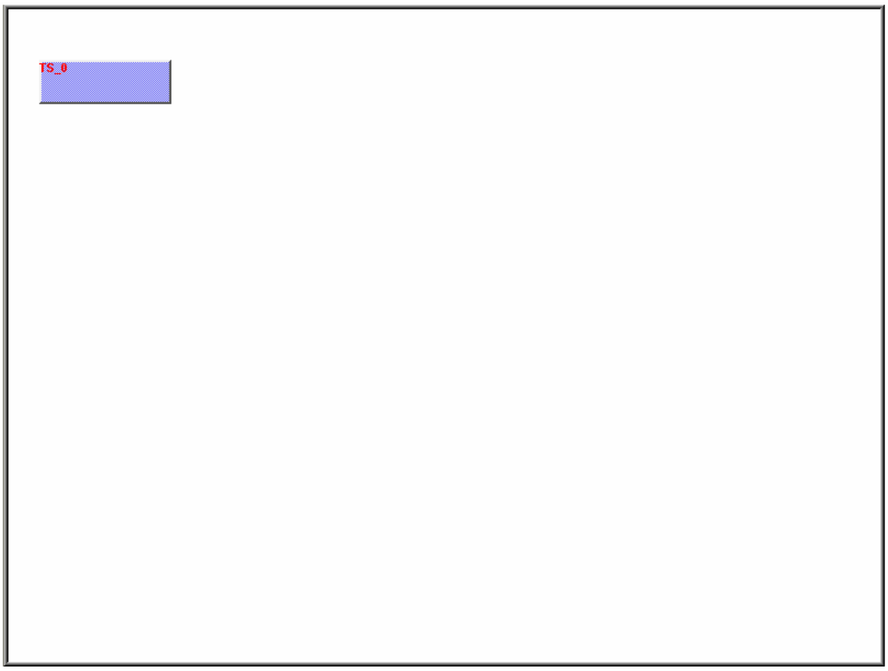
Switch style : Toggle

Macro

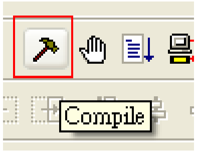
□ Execute macro

OK | Cancel | Help

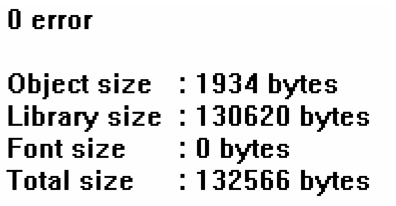
Finished window 10 is as below and a simple project is completed.



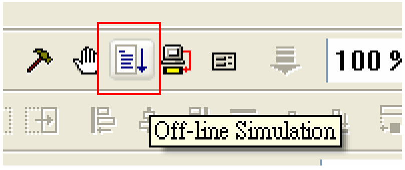
After the file is saved, users select [Compile] function icon to examine if the screen configuration is correct.



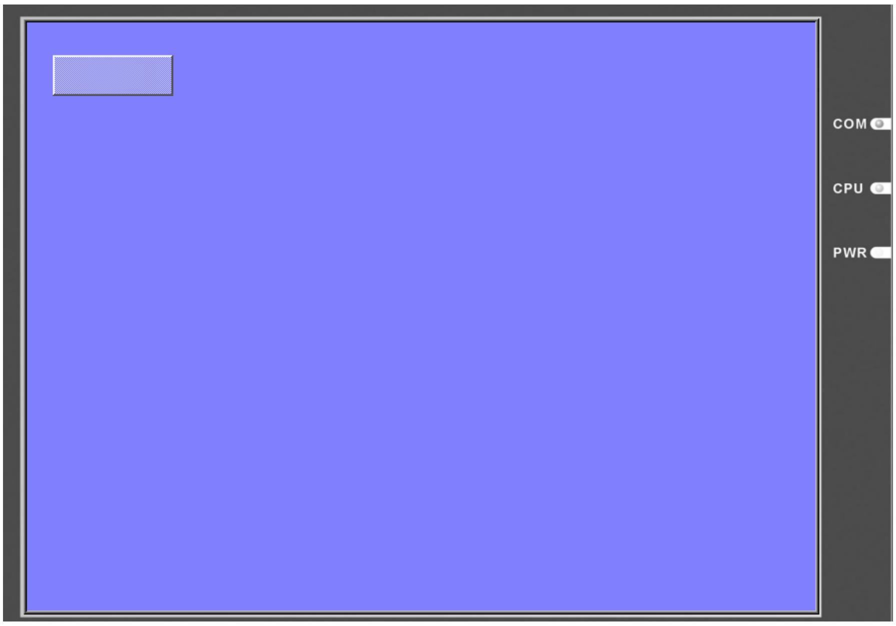
If the compiling result shows as below which means no error exists, then click the icon to execute the Off-line Simulation.



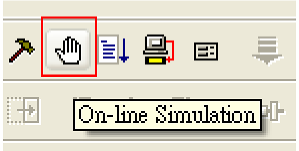
```
0 error

Object size   : 1934 bytes
Library size  : 130620 bytes
Font size     : 0 bytes
Total size    : 132566 bytes
```



The following screen is the screen after executing the off-line simulation:



If On-line Simulation needs to be done, click the icon for processing after connecting the device.



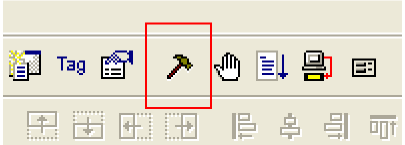
# Chapter 4 Compiling, Simulation and Downloading

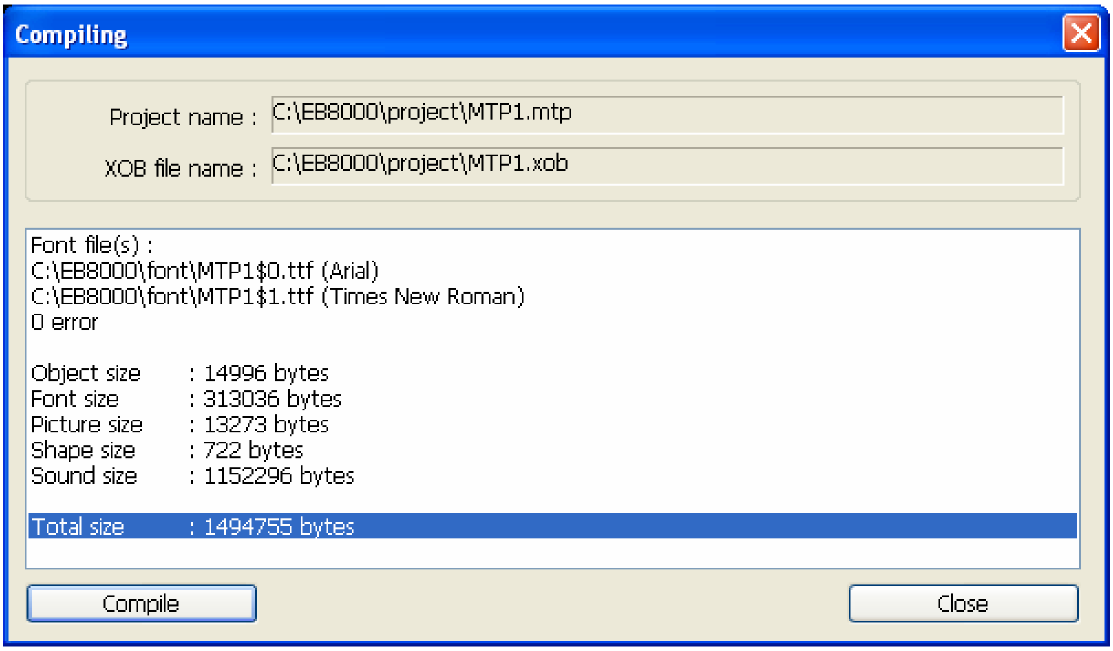
A complete design procedure includes: screen configuration, compiling, simulating and downloading.

Every step is introduced in this chapter.
Screen Configuration
Varied screens can be configured by the EB8000 and the edited context is saved as a *.mtp file.

- **Compiling**

After screen configuration (*.mtp file), transfer *.mtp file to *.xob format for MT8000 downloading by using compiling function. Click icon on tool bar and [Compiling] dialog appears as below:





Compiling

Project name : C:\EB8000\project\MTP1.mtp

XOB file name : C:\EB8000\project\MTP1.xob

```
Font file(s) :
C:\EB8000\font\MTP1$0.ttf (Arial)
C:\EB8000\font\MTP1$1.ttf (Times New Roman)
0 error

Object size     : 14996 bytes
Font size       : 313036 bytes
Picture size    : 13273 bytes
Shape size      : 722 bytes
Sound size      : 1152296 bytes

Total size      : 1494755 bytes
```

In [Compiling] dialog, [Project name] indicates the name of current configuration file while [XOB file name] indicates the name of compiled file.

Click [Compile] and the following information displays on [Compiling] dialog:

Font files
The font files for displayed text which will be downloaded to the MT8000.

Object size
The size of the compiled file.

Font size
The total size of font files.

Picture size
The size of picture library.

Shape size
The size of shape library.

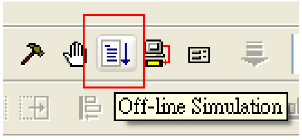
Sound size
The size of sound file.

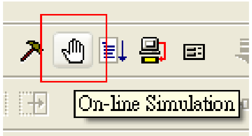
Message “0 error” means a successful compiling and then other simulation functions can be continued. If an error exists, users should follow instructions to correct errors.

- **Simulation**

There are two simulations: Off-line simulation & On-line simulation. By virtual device, PC simulates the operations of PLC without connecting to PLC. On the contrary, On-line simulation is executed by connecting with PLC and accurately setting the communication parameters. When simulating on PC, if the control target is a local PLC (i.e. the PLC directly connected to PC), there’s a 10 mins simulative limit.

Users can find Off-line simulation and On-line simulation functions from two ways:
**a.** Project Manager

**b.** Clicking 

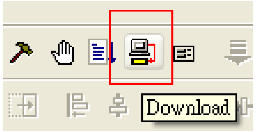
, 

icons from tool bar of the EB8000.

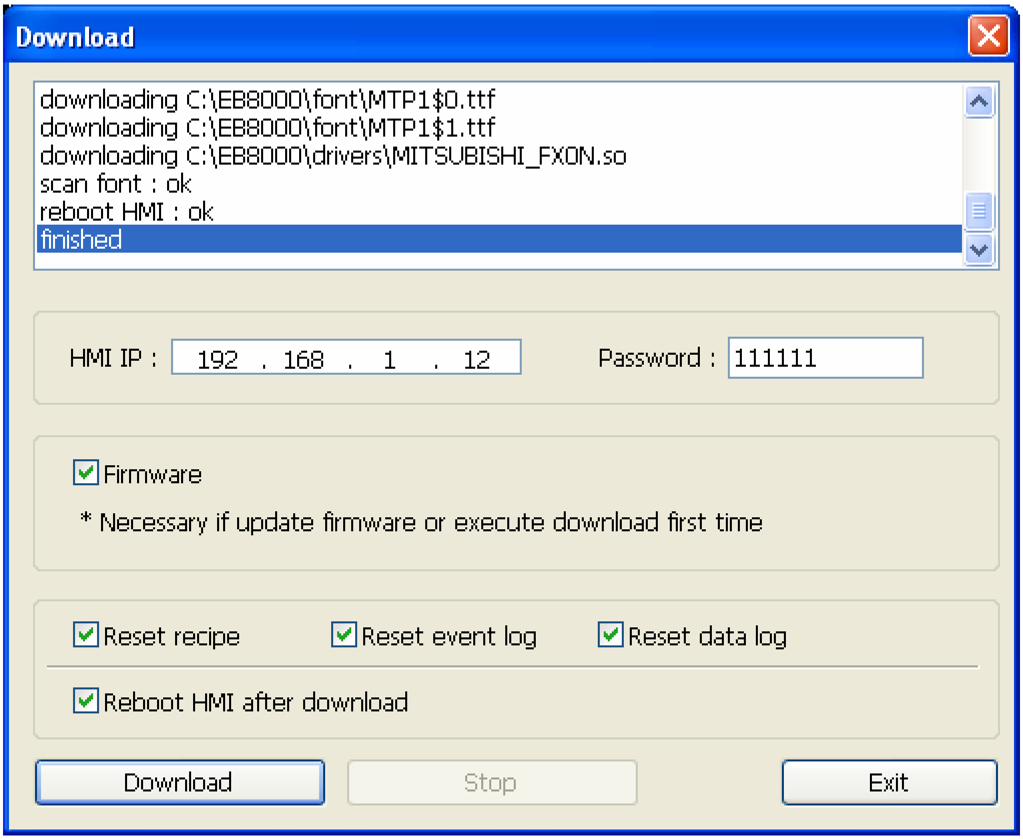
- **Downloading**

After the completion of the simulation and the confirmation of the screen configuration, next step is to download *.xob file to MT8000. Downloading *.xob file can be done by:

[Download] function from Project Manager. Please refer to” Project Manager” related chapters.

Click 

icon from tool bar of the EB8000 and [Download] dialog appears as below:



```
downloading C:\EB8000\font\MTP1$0.ttf
downloading C:\EB8000\font\MTP1$1.ttf
downloading C:\EB8000\drivers\MITSUBISHI_FX0N.so
scan font : ok
reboot HMI : ok
finished
```

HMI IP : 192 . 168 . 1 . 12    Password : 111111

☑ Firmware

* Necessary if update firmware or execute download first time

☑ Reset recipe    ☑ Reset event log    ☑ Reset data log

☑ Reboot HMI after download

[Download] dialog settings:

[HMI IP]

Assign the download target IP

[Password]

Input password. Please refer to the “hardware setting” related chapter.

[Reset recipe]
If the function is selected, all recipe figures will be set to 0 before downloading.

[Reset event log]
If the function is selected, all event log files saved in the MT8000 will be cleared before downloading.

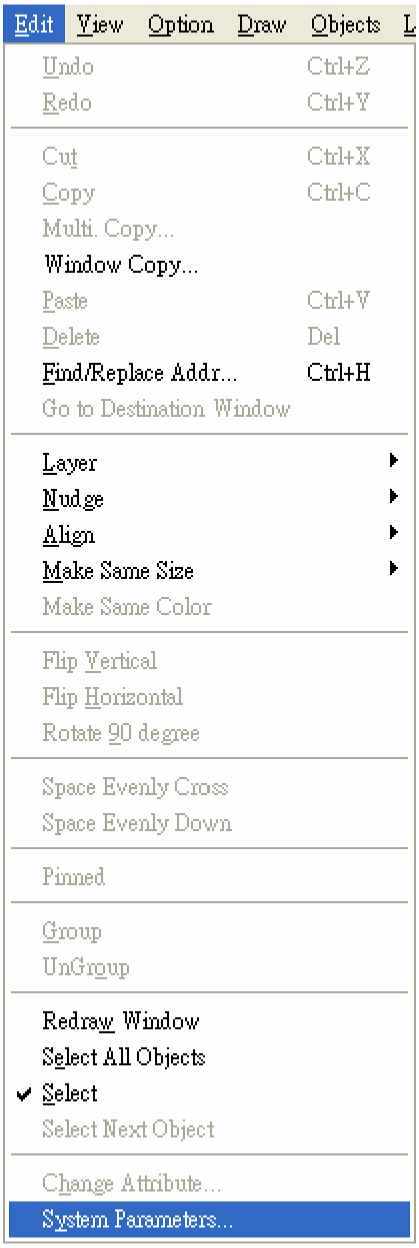
[Reset data log]
If the function is selected, all data log files saved in the MT8000 will be cleared before downloading.

[Reboot HMI after download]
If the function is selected, MT8000 reboots after downloading is done.

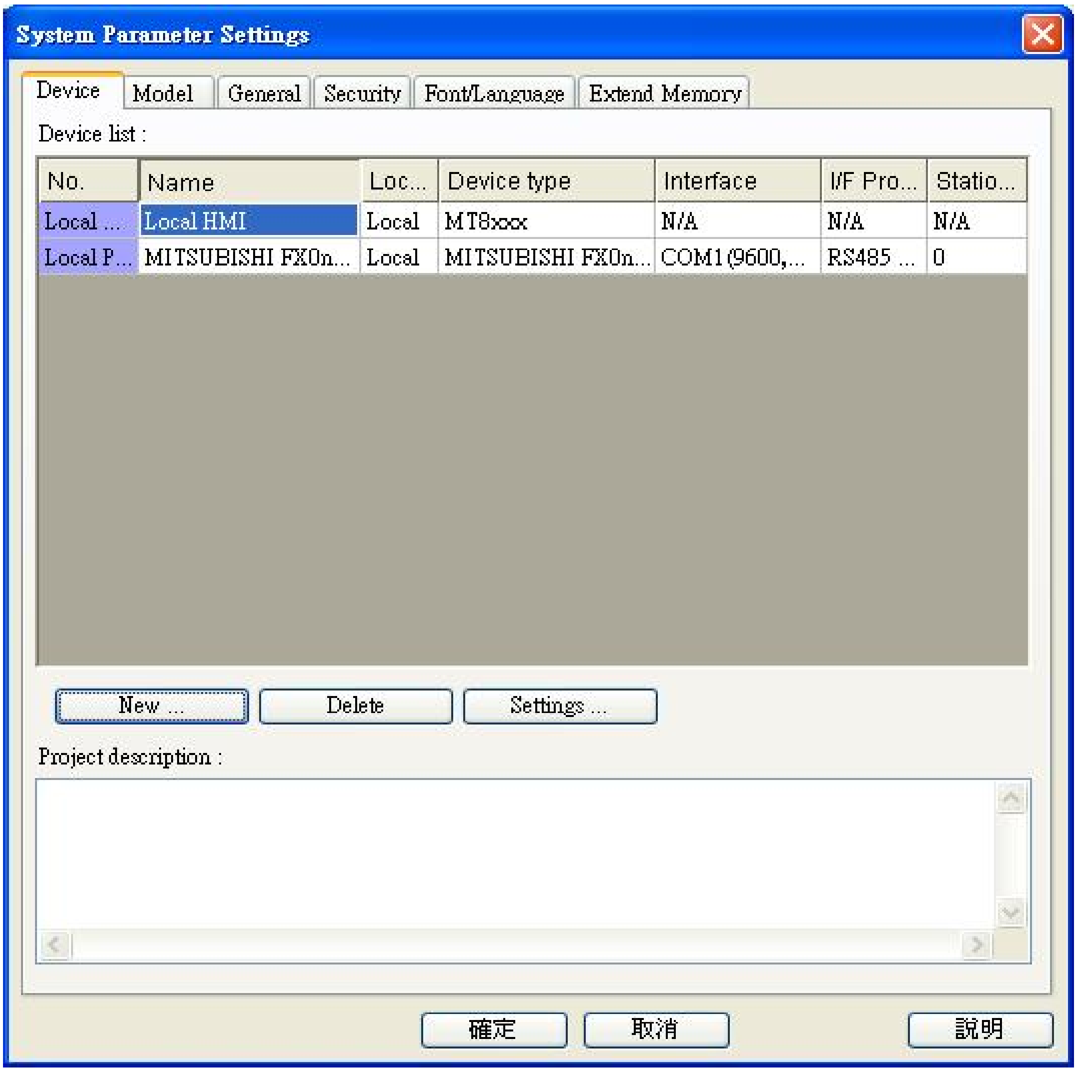
Click [Download] to execute downloading operation. Downloaded files will display on the message dialog.

# Chapter 5 System Parameters

In the EB8000, select menu [Edit] / [System Parameters…] and the system parameter setting dialog appears as follows:



System parameters are divided into six parts: [Device], [Model], [General], [Security] and [Font / Language], [Extend Memory] which are introduced respectively in this chapter.



Device list :

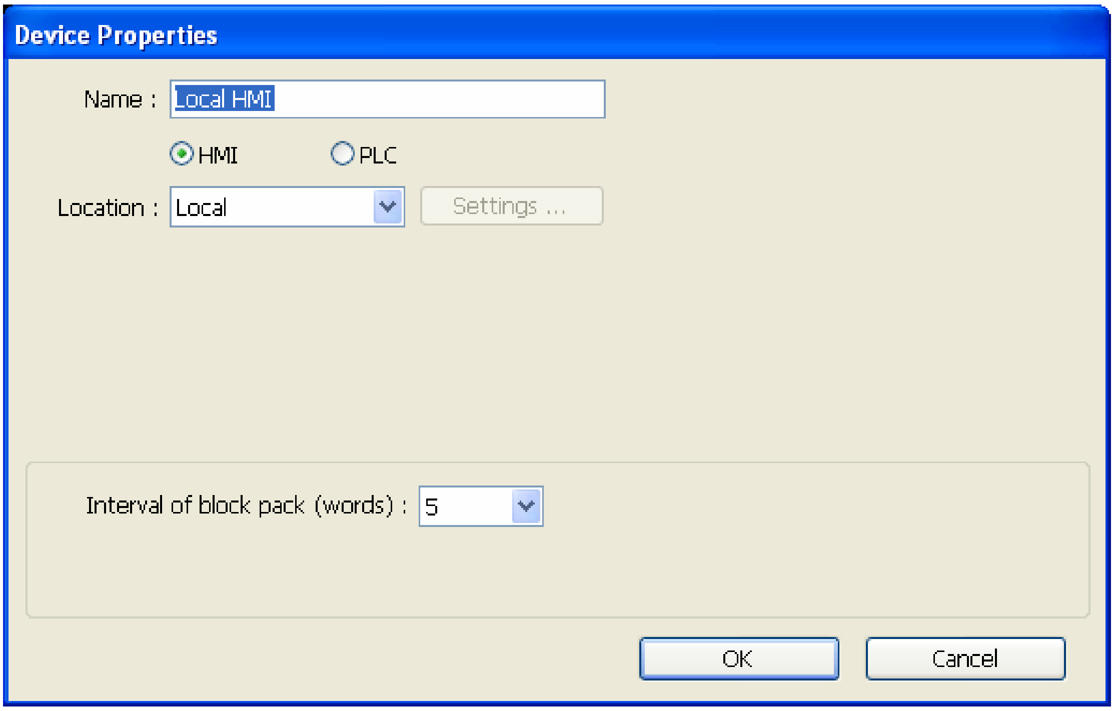
| No. | Name | Loc... | Device type | Interface | I/F Pro... | Statio... |
|---|---|---|---|---|---|---|
| Local ... | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Local P... | MITSUBISHI FX0n... | Local | MITSUBISHI FX0n... | COM1 (9600,... | RS485 ... | 0 |

Project description :

**[Device]**

[Device] parameters determine all of the characteristics of each device controlled by a HMI. These devices include PLC, remote HMI and PC. When open a new *.mtp file, a default device: “Local HMI” is in the table. “Local HMI” is used to identify current HMI .Each *.mtp should at least include a “Local HMI” device.

Click [Settings…] to open [Local HMI] dialog box. From the illustration below, the property of local HMI is “HMI” and the location is “Local”.



Device Properties

Name : Local HMI

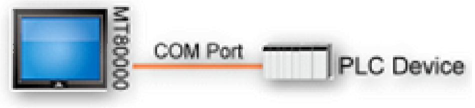
● HMI ○ PLC

Location : Local

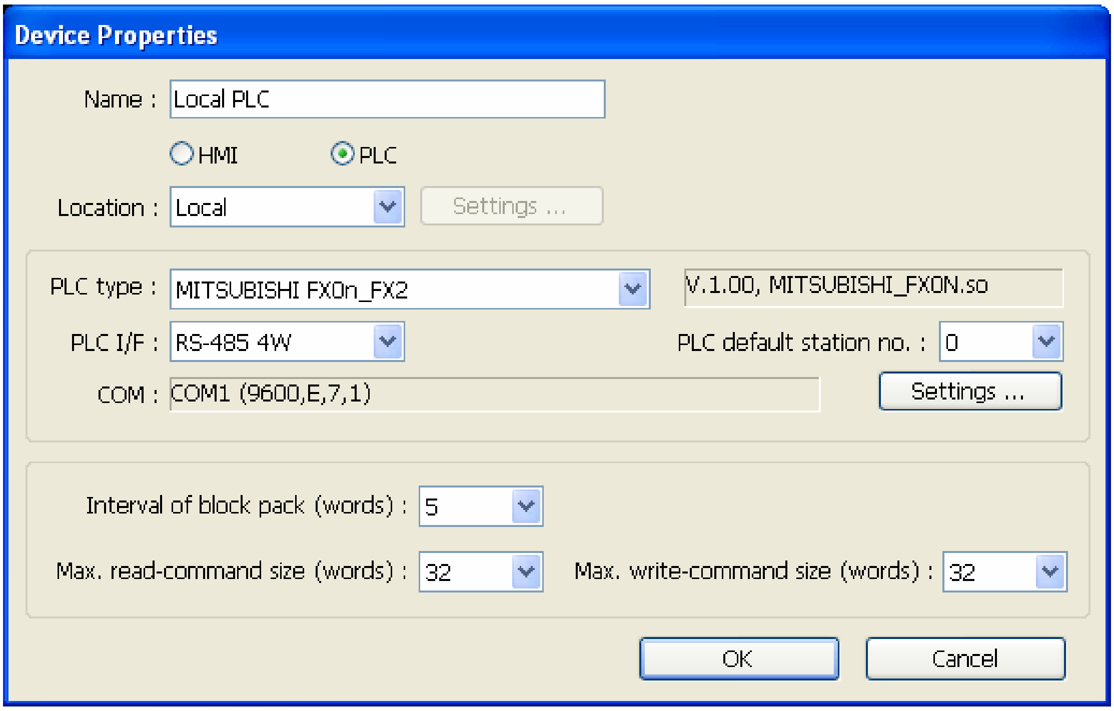
Interval of block pack (words) : 5

The procedure to create a new device:

How to control a local PLC



So-called “local PLC” means a PLC is directly connected to local HMI. To control a local PLC should add this type of device. Click [New…] and the following [Device Properties] dialog appears. Correctly fill in all of the properties as required.



Device Properties

Name : Local PLC

○ HMI ● PLC

Location : Local

PLC type : MITSUBISHI FX0n_FX2

V.1.00, MITSUBISHI_FX0N.so

PLC I/F : RS-485 4W

PLC default station no. : 0

COM : COM1 (9600,E,7,1)

Interval of block pack (words) : 5

Max. read-command size (words) : 32

Max. write-command size (words) : 32

Each setting is introduced as follows based on the example above.

[Name]

The name of the device.

[HMI] or [PLC]

If connecting device is PLC, then select “PLC

[Location]

“Local” or “Remote” can be selected. Select “Local” in this example.

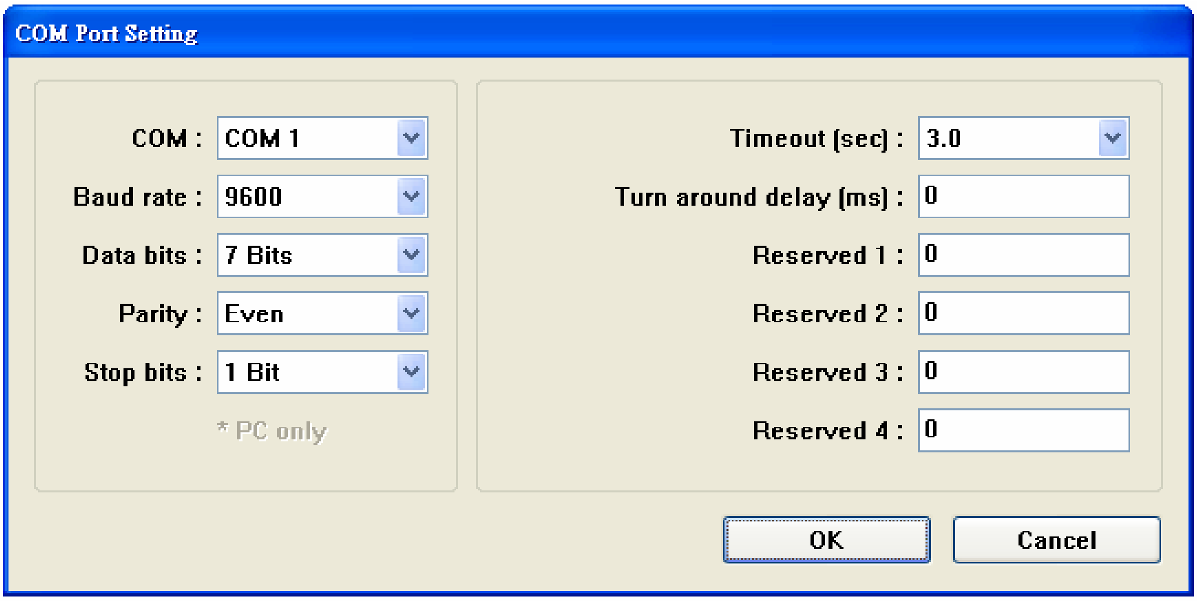
[PLC Type]

Select the type of PLC.

[PLC I/F]

Four PLC interfaces are available:”RS-232”, “RS-485 2W”, “RS232-485 4W”, and “Ethernet”.

If the interface is “RS-232”, “RS-485 2W”or “RS232-485 4W”, click [Setting…] and [Com port setting] dialog appears as below. User should correctly set the communication parameters.



COM : COM 1

Baud rate : 9600

Data bits : 7 Bits

Parity : Even

Stop bits : 1 Bit

* PC only

Timeout (sec) : 3.0

Turn around delay (ms) : 0

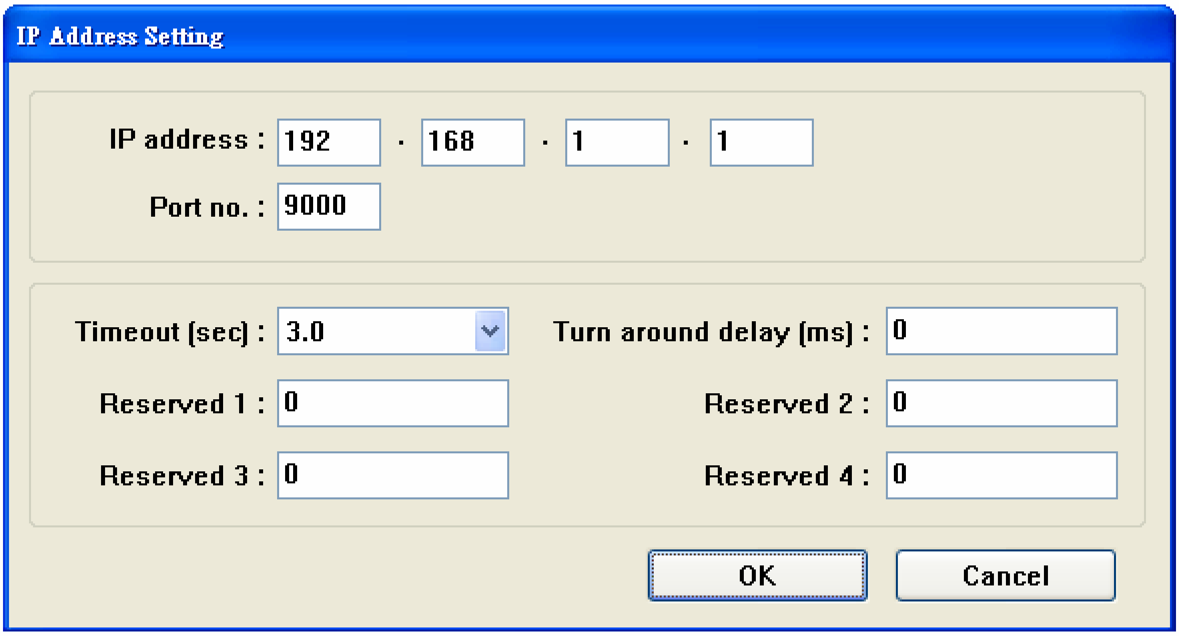
Reserved 1 : 0

Reserved 2 : 0

Reserved 3 : 0

Reserved 4 : 0

If the interface is “Ethernet”, click [Setting…] and then [IP Address Setting] dialog appears. Users should correctly set IP address and Port No. of the PLC.



IP address : 192 . 168 . 1 . 1

Port no. : 9000

Timeout (sec) : 3.0

Turn around delay (ms) : 0

Reserved 1 : 0

Reserved 2 : 0

Reserved 3 : 0

Reserved 4 : 0

[PLC default station no.]
Number of PLC station.

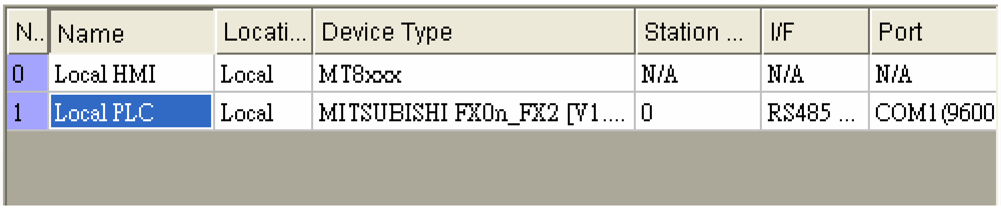
[Interval of block pack (words)]
If the interval of different read addresses of different commands is less than this value, these commands can be combined to one command. If this value is set to 0, the combination function will be cancelled.
For example, if the value is set to 5, when read out a word from LW3 and read out 2 words from LW6 respectively (i.e. read out the contents of LW6 and LW7), because the interval of addresses between LW3 and LW6 is smaller than 5, these two commands can be combined to one. The content of combined command becomes 5 consecutive words from LW3 (read out from LW3~LW7). Note: Max. combined command can't be more than Max. read-command size (words).

[Max. read-command size (words)]
The Max. data size to be read out from device at one time. Unit: word.

[Max. write-in size (words)]
The Max. data size to be written in to device at one time. Unit: word.

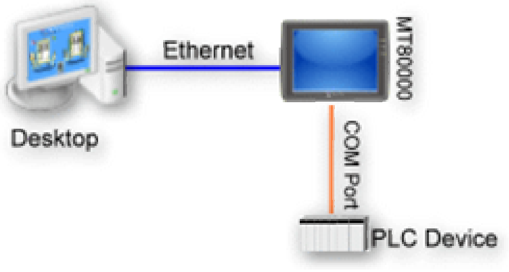
By changing the content of "devicetype.def" under C:\\ EB8000 path to modify the default of [Max. read-command size (words)] and [Max. write-in size (words)]; Please note that the values have to be accord with the features of devices. Improper modification will result in communication failure.

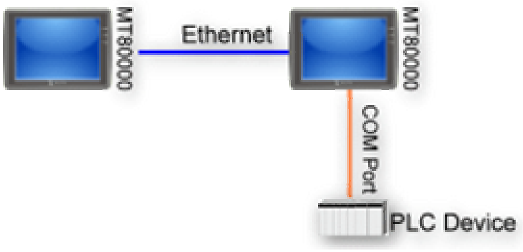
After every setting, a new name "Local PLC" device can be found on the table.



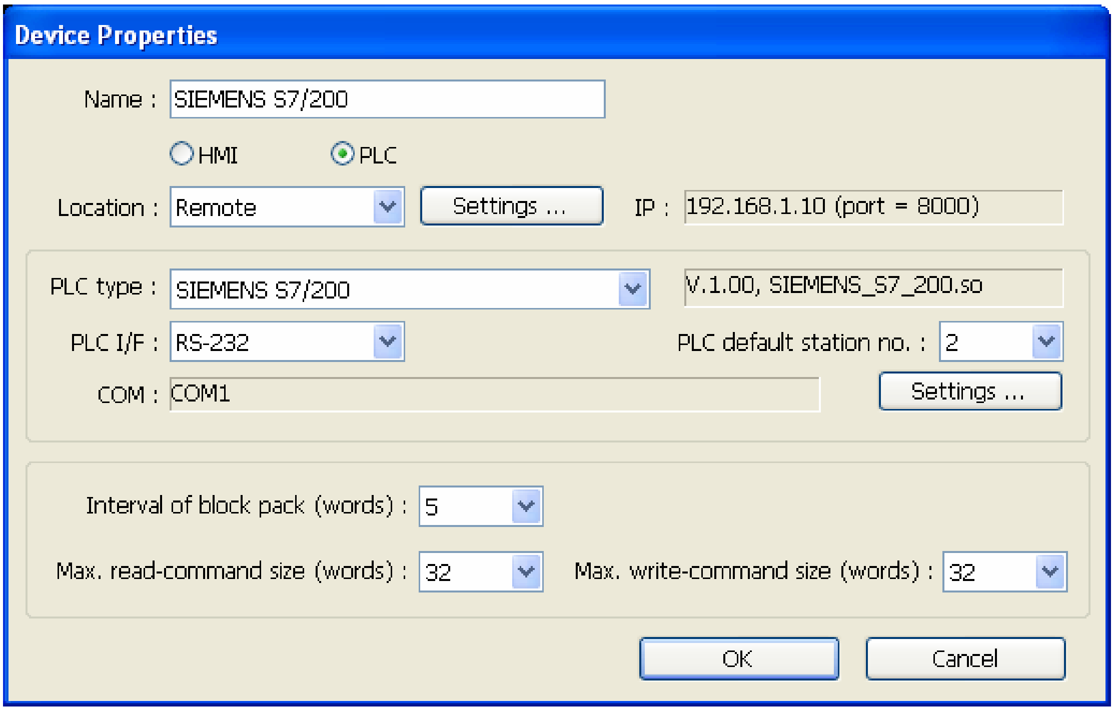
| N.. | Name | Locati... | Device Type | Station ... | I/F | Port |
|---|---|---|---|---|---|---|
| 0 | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| 1 | Local PLC | Local | MITSUBISHI FX0n_FX2 [V1.... | 0 | RS485 ... | COM1 (9600 |

How to control a remote PLC





So-called “remote PLC” means a PLC is directly connected to a remote HMI. To control a remote PLC should add this type of device. Click [New…] and the following [Device Properties] dialog appears. Correctly fill in all of the properties as required.



Name : SIEMENS S7/200

○ HMI ● PLC

Location : Remote

IP : 192.168.1.10 (port = 8000)

PLC type : SIEMENS S7/200
V.1.00, SIEMENS_S7_200.so

PLC I/F : RS-232
PLC default station no. : 2

COM : COM1

Interval of block pack (words) : 5

Max. read-command size (words) : 32
Max. write-command size (words) : 32

Each setting is introduced as follows based on the example above.

[Name]
The name of the device.

[HMI] or PLC]
If connecting device is PLC, then select “PLC”

[Location]

“Local” or “Remote” can be selected. Select “Remote” in this case and set the address of the remote HMI. Select [Location]/ [Setting…] to set the IP address of the remote HMI.

[PLC Type]

Select the type of PLC

[PLC I/F]

The type of interface for remote PLC. If COM port is used by remote PLC, interface ”RS-232”, “RS-485 2W” or “RS232-485 4W” can be selected.

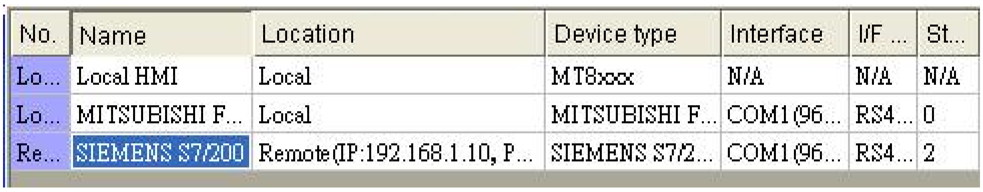
[PLC default station no.]

The No. of PLC station.

[COM]

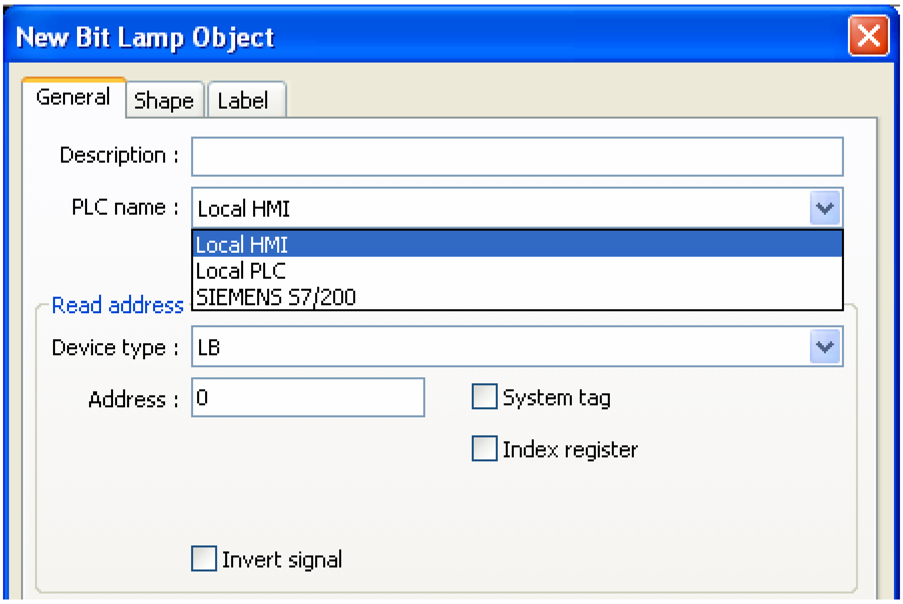
The COM port used by a remote PLC. The parameters should be correctly set.

After every setting, a new name “Remote PLC” device can be found in the table.



| No. | Name | Location | Device type | Interface | I/F ... | St... |
|---|---|---|---|---|---|---|
| Lo... | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Lo... | MITSUBISHI F... | Local | MITSUBISHI F... | COM1 (96... | RS4... | 0 |
| Re... | SIEMENS S7/200 | Remote (IP:192.168.1.10, P... | SIEMENS S7/2... | COM1 (96... | RS4... | 2 |

Select assigned device from the table to operate the specific content of PLC address.


New Bit Lamp Object

Description :

PLC name : Local HMI

- Local HMI
- Local PLC
- SIEMENS S7/200

Read address

Device type : LB

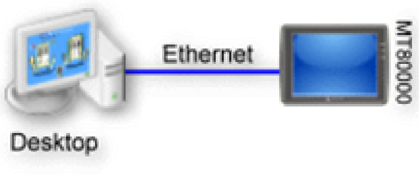
Address : 0

□ System tag

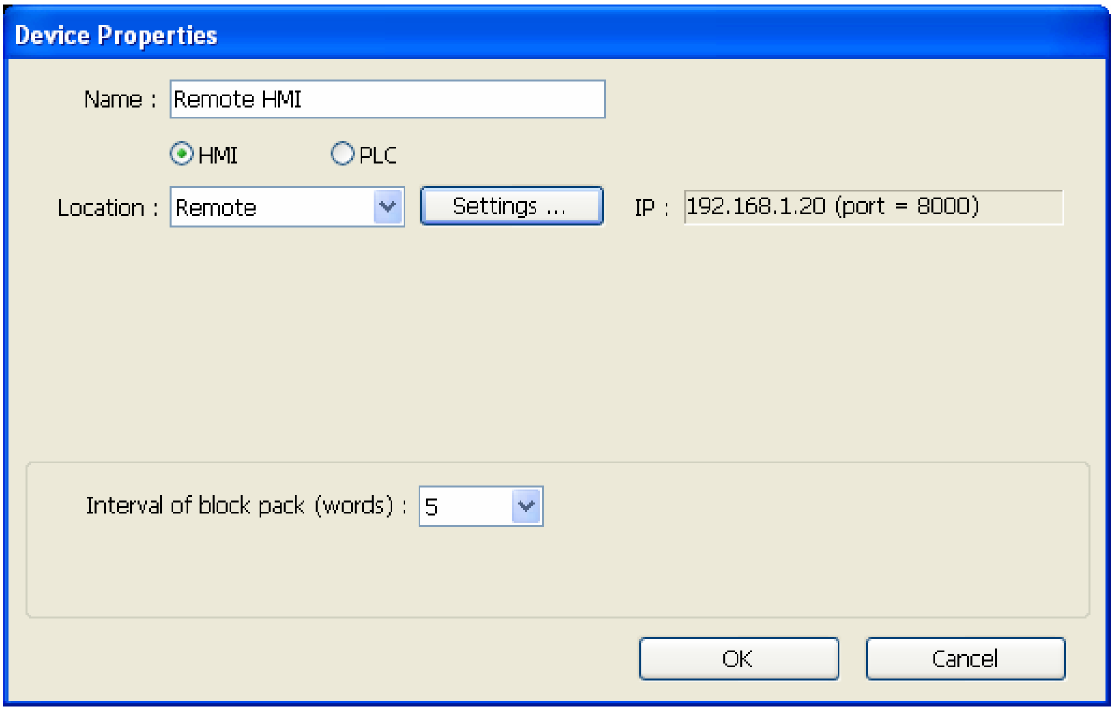
□ Index register

□ Invert signal

How to control a remote HMI



So-called “remote HMI” means a non-local HMI. PC also can be viewed as one kind of remote HMI. To control a remote HMI should add this type of device. Click [New…] and the following [Device Properties] dialog appears. Correctly fill in all of the properties as required.



Device Properties

Name : Remote HMI

● HMI ○ PLC

Location : Remote

IP : 192.168.1.20 (port = 8000)

Interval of block pack (words) : 5

Each setting is introduced as follows based on the example above.

[Name]

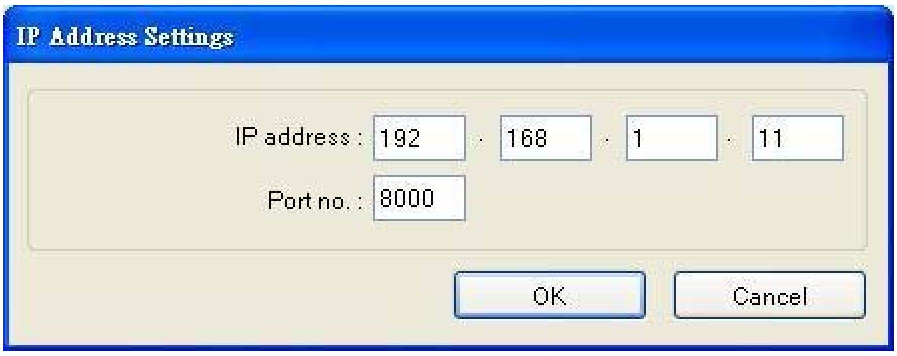
The name of the device

[HMI] or [PLC]

If connecting device is HMI, then select “HMI”

[Location]

“Local” or “Remote” can be selected. Select “Remote” in this case and set the address of the remote HMI. Select [Location]/ [Setting…] to set IP address of remote HMI and correct [Port no.]. Port no. of the remote HMI can be found from [System parameters]/[Model] in the *.mtp of remote HMI.

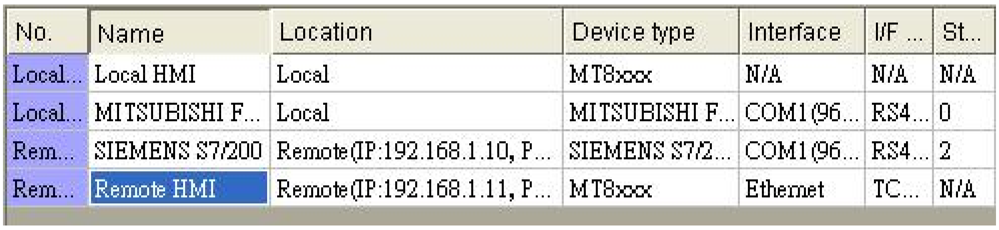


IP Address Settings

IP address : 192 . 168 . 1 . 11

Port no. : 8000

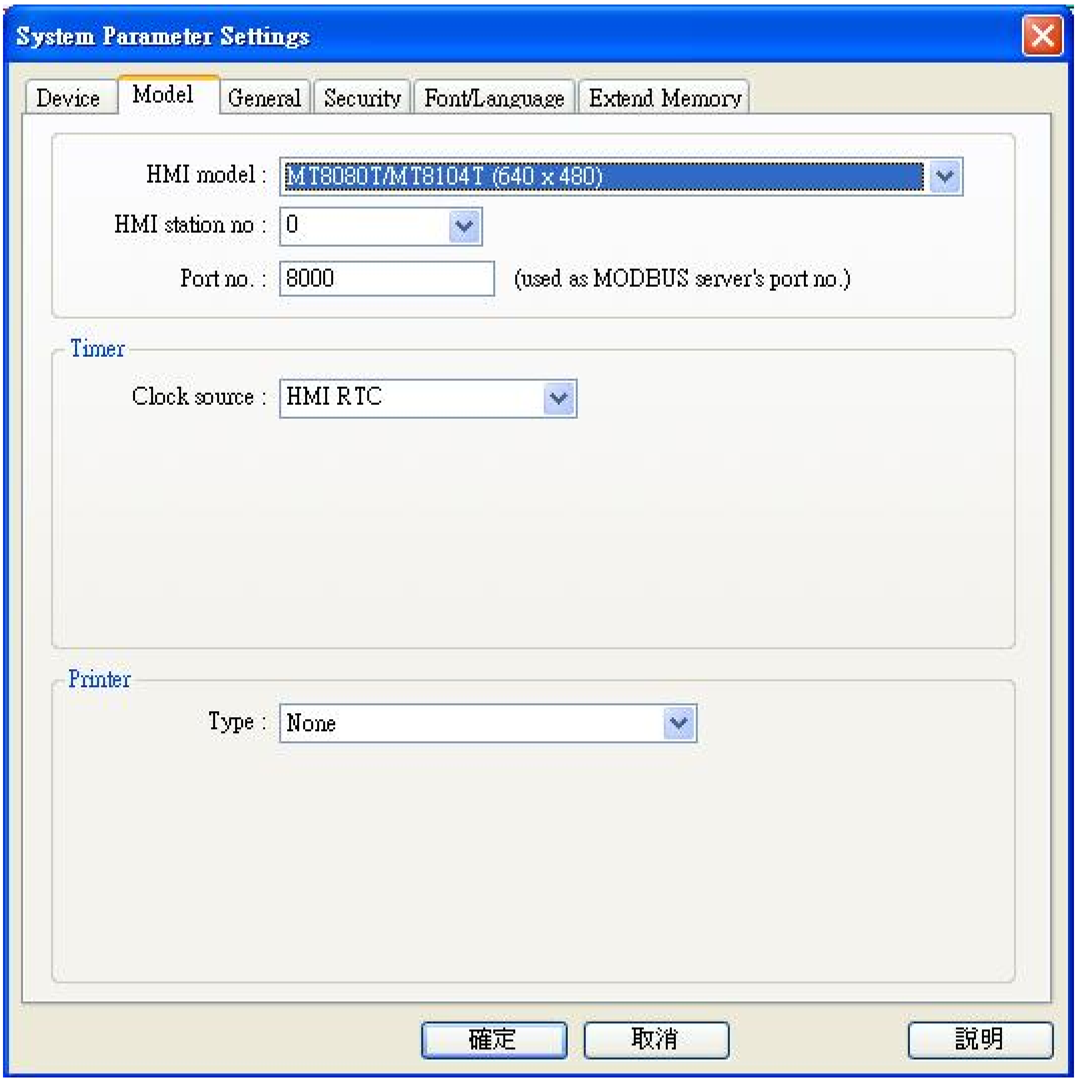
After every setting, a new name “Remote HMI” device can be found in the table.



| No. | Name | Location | Device type | Interface | I/F ... | St... |
|---|---|---|---|---|---|---|
| Local... | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Local... | MITSUBISHI F... | Local | MITSUBISHI F... | COM1(96... | RS4... | 0 |
| Rem... | SIEMENS S7/200 | Remote(IP:192.168.1.10, P... | SIEMENS S7/2... | COM1(96... | RS4... | 2 |
| Rem... | Remote HMI | Remote(IP:192.168.1.11, P... | MT8xxx | Ethernet | TC... | N/A |

**[Model]**

[Model] tab parameters determine the settings of HMI model, Display mode, Timer source and other communication related settings.



HMI model : MT8080T/MT8104T (640 x 480)

HMI station no : 0

Port no. : 8000 (used as MODBUS server's port no.)

Timer

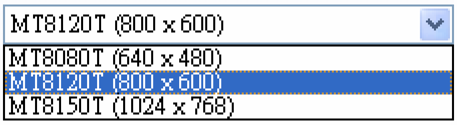
Clock source : HMI RTC

Printer

Type : None

[HMI model]

Select current HMI model as illustration below.



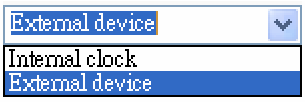
[HMI station no.]

Set the no. of HMI station. If no particular purpose, select default.

[Port no.]

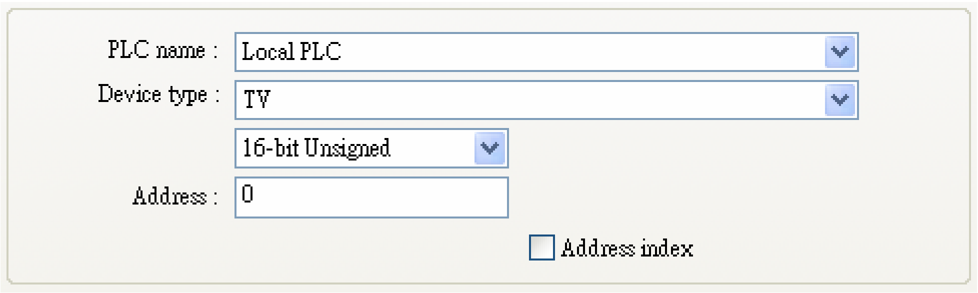
Set the port no. for HMI. If no particular purpose, select default.

[Time source]



Set the source of timer. The time of the timer is used by such as [Data Log], [Event Log] ….etc. objects which needs the time records.
Selecting "Internal clock" demonstrates the time signal comes from internal clock of the HMI.
Selecting "External clock" demonstrates the time signal comes from external device. The correct address source of time signal is necessary in this situation. Take the illustration below as an example. "TV" indicates the time from Local PLC. The contexts of 6 consecutives addresses starting from 0 show as follows:

| | | | |
|---|---|---|---|
| TV | 0 | -> | Sec. |
| TV | 1 | -> | Min. |
| TV | 2 | -> | Hr. |
| TV | 3 | -> | Day |
| TV | 4 | -> | Month |
| TV | 5 | -> | Year |



PLC name : Local PLC

Device type : TV

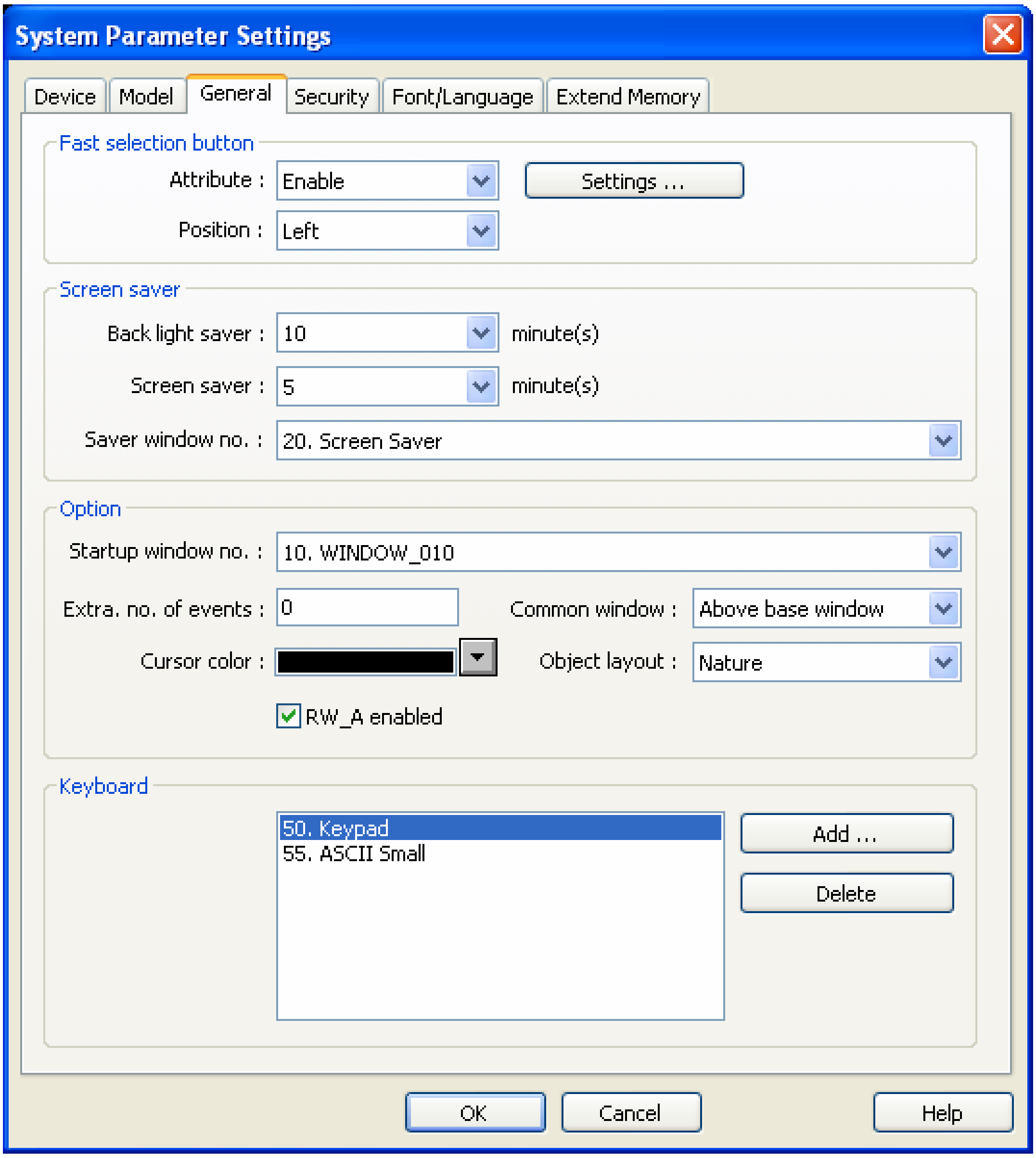
16-bit Unsigned

Address : 0

□ Address index

**[General]**

[General] tab parameters determine all properties related to screen operations.



Fast selection button

Attribute : Enable

Position : Left

Screen saver

Back light saver : 10 minute(s)

Screen saver : 5 minute(s)

Saver window no. : 20. Screen Saver

Option

Startup window no. : 10. WINDOW_010

Extra. no. of events : 0

Common window : Above base window

Cursor color :

Object layout : Nature

☑ RW_A enabled

Keyboard

50. Keypad

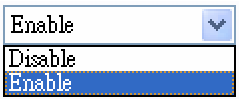
55. ASCII Small

Each setting is introduced as follows:

[Fast selection button]

The settings of all attributes for Fast selection window which is designated as window number 3.

a. [Attribute]



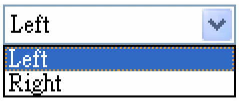
Enable

Disable

Enable

Enable or disable a Fast Selection window. After selecting “Enable”, click [Setting…] to set the personality attributes of the buttons including color and text.

b. [Position]



Select the location of the Fast select button. If “Left” is chosen, the button will show up at the corner of the left-bottom. If “Right” is chosen, the button will show up at the corner of the right-bottom.

[Screen saver]

a. [Back light saver]
If the untouched duration of screen is equal to this value, back light shuts off. The setting unit is minute. Back light is triggered once the screen is touched.

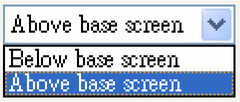
b. [Screen saver]
If the untouched duration of screen is equal to this value, the current screen automatically switches to the assigned [Saver window no.].The setting unit is minute. If “none” value is selected, screen saver function is disabled.

c. [Saver window no.]
When executing screen saver function, [Saver window no.] designates the screen to be switched.

[Option]
a. [Startup window no.]
Select the window after HMI is started up.

b. [Extra no. of event]
The default of number of events in the system is 1000 in total. If users would like to add more records, the setting value can be modified up to 10000.

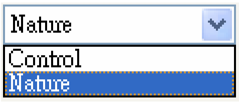
c. [Common window]



The objects of the common window (window 4) will be in each base window. This selection determines these objects are placed on or under the objects of the base window.

d. [Cursor color]
Set the color of cursor.

e. [Object layout]

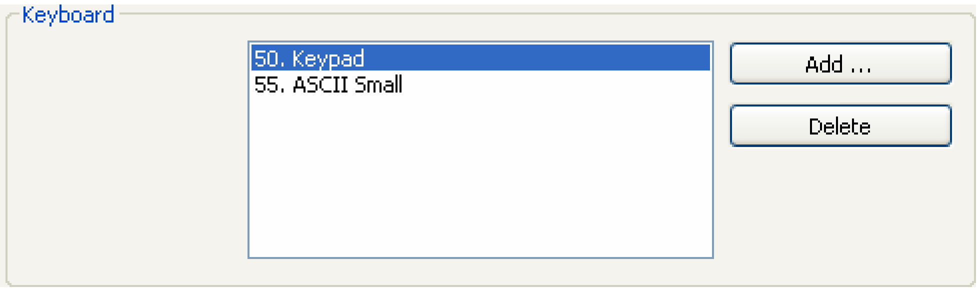


If “Control” mode is selected, when HMI operates, [Animation] and [Moving Shape] display above other kinds of objects and with no relation to the built ranking.

If “Nature” mode is selected, the displayed sequence of objects show according to objects’ built priority.

[RW_A enabled]
Enable or disable the recipe data RW_A. After activating RW_A, an object can operate the content of RW_A .The size of RW_A is 64K.

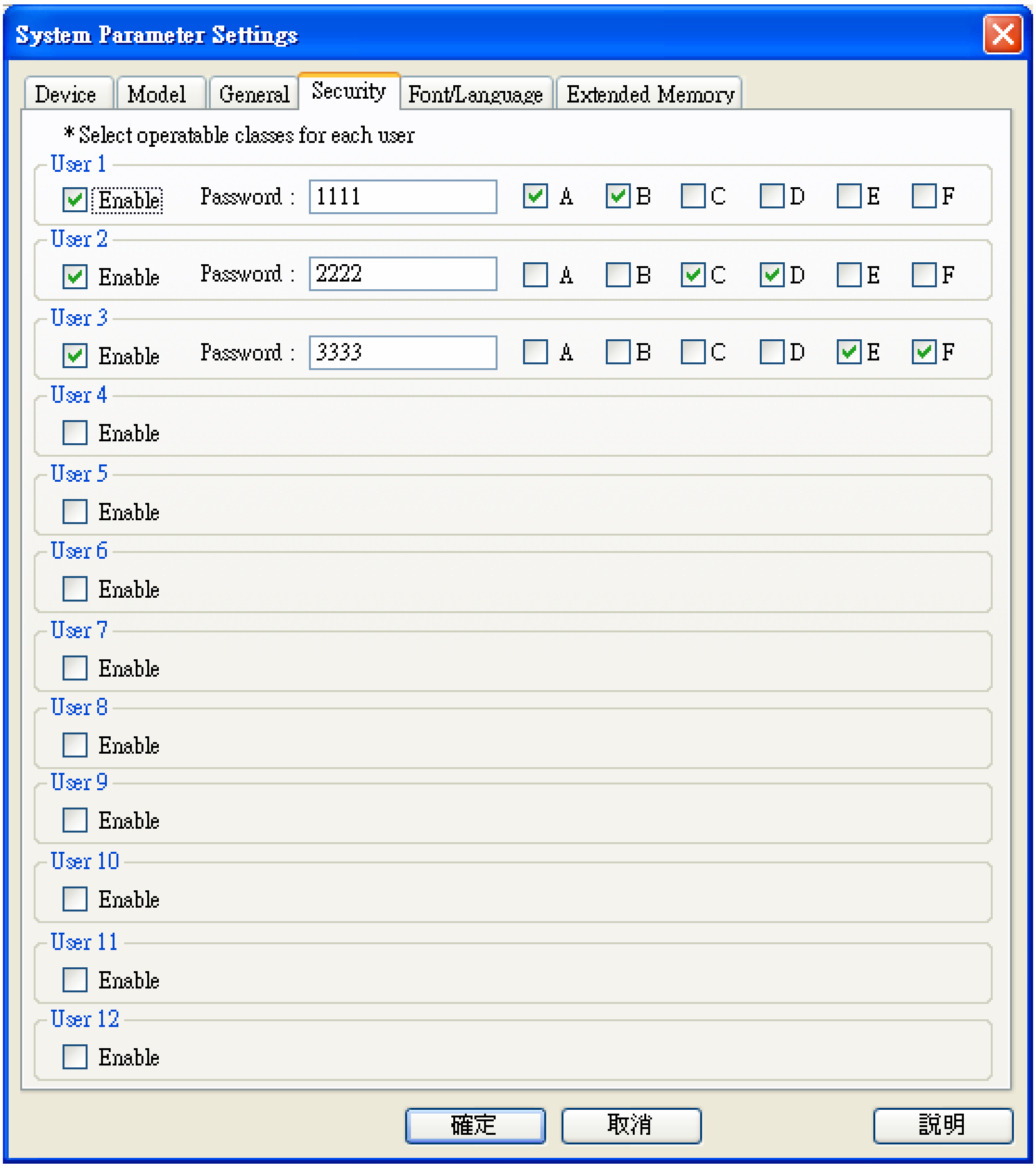
[Keyboard]
[Keyboard] function displays on the screen with keyboard. If these screens represent the use of [Numeric Input] and [ASCII Input], users can select the type of keyboard.



50. Keypad
55. ASCII Small

If users would like to build a keyboard, keyboard should be configured on the existing screen and select [Add…] function to add these windows to the table.

**[Security]**
[Security] tab determines the table of user passwords. Twelve sets of password can be set. Only figures are allowed for password. From user 1 to user 12, each user password has different object class from A to F.



* Select operatable classes for each user

User 1
☑ Enable Password : 1111 ☑ A ☑ B □ C □ D □ E □ F

User 2
☑ Enable Password : 2222 □ A □ B ☑ C ☑ D □ E □ F

User 3
☑ Enable Password : 3333 □ A □ B □ C □ D ☑ E ☑ F

User 4
□ Enable

User 5
□ Enable

User 6
□ Enable

User 7
□ Enable

User 8
□ Enable

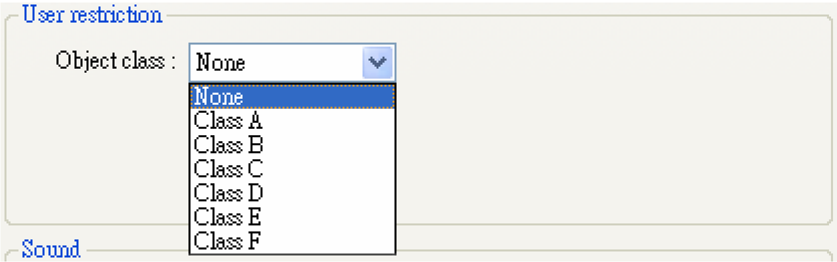
User 9
□ Enable

User 10
□ Enable

User 11
□ Enable

User 12
□ Enable

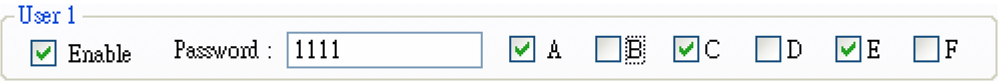
In the project, all object has been set to operate different class from None and class A to class F.



Object class : None

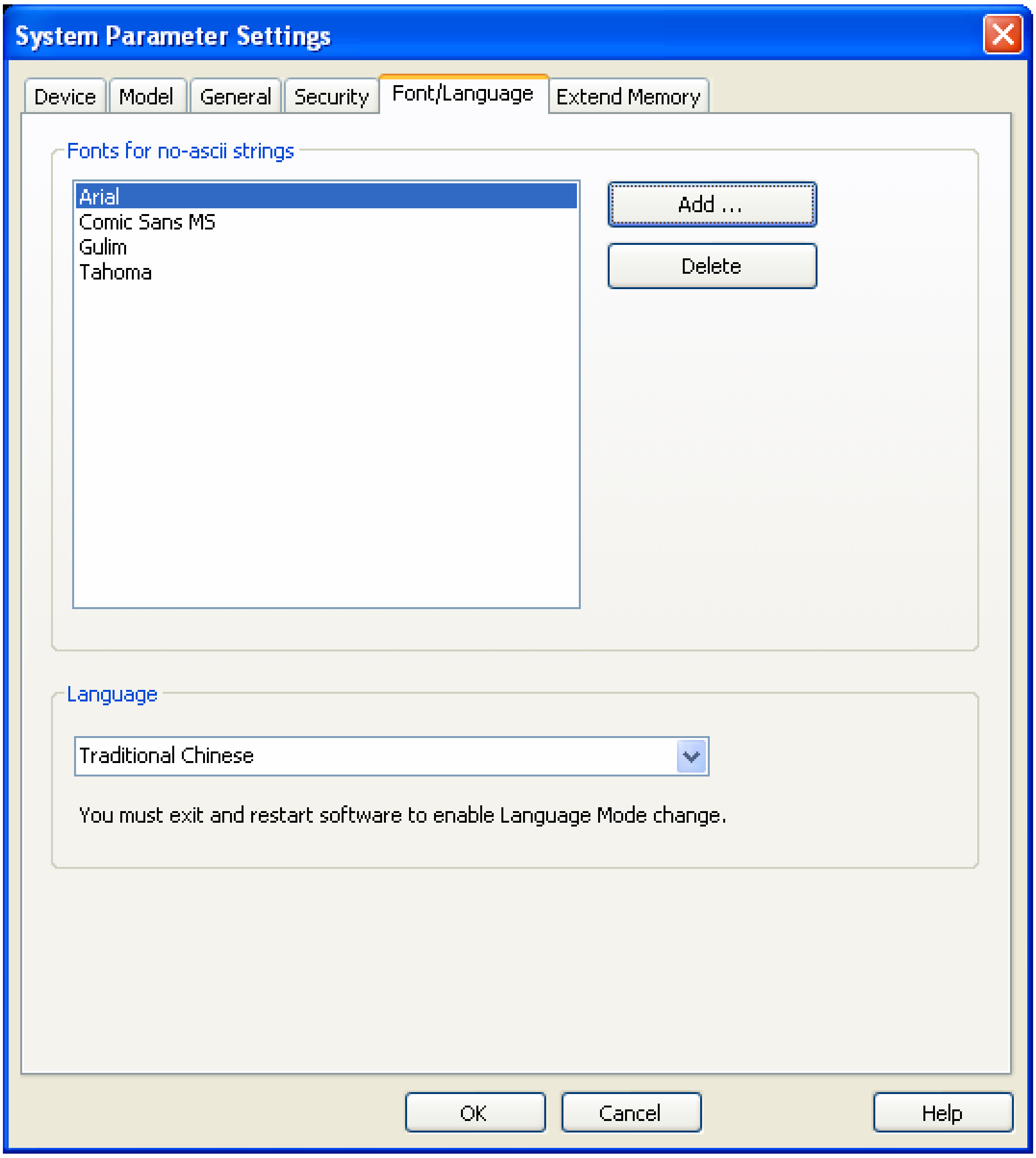
None
Class A
Class B
Class C
Class D
Class E
Class F

When setting user 1 as below, this user only can use None, A, C, E. Detail setting please refer "Chapter 10 Object's Security Guard".


User 1
☑ Enable Password : 1111 ☑ A □ B ☑ C □ D ☑ E □ F

**[Font / Language]**

[Font / Language] tab determines the font of non-ASCII strings.



Fonts for no-ascii strings

Arial
Comic Sans MS
Gulim
Tahoma

Language

Traditional Chinese

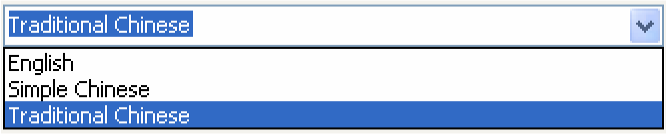
You must exit and restart software to enable Language Mode change.

[Fonts for non-ASCII strings]

This table lists the fonts for non-ASCII strings. If users use the fonts of non-ASCII strings without choosing the font from [Fonts for non-ascii strings] table, EB8000 will automatically pick up these fonts.

Users can test which non-ASCII strings in the WINDOWS can be used in MT8000 and add them to [Fonts for non-ASCII strings] table.

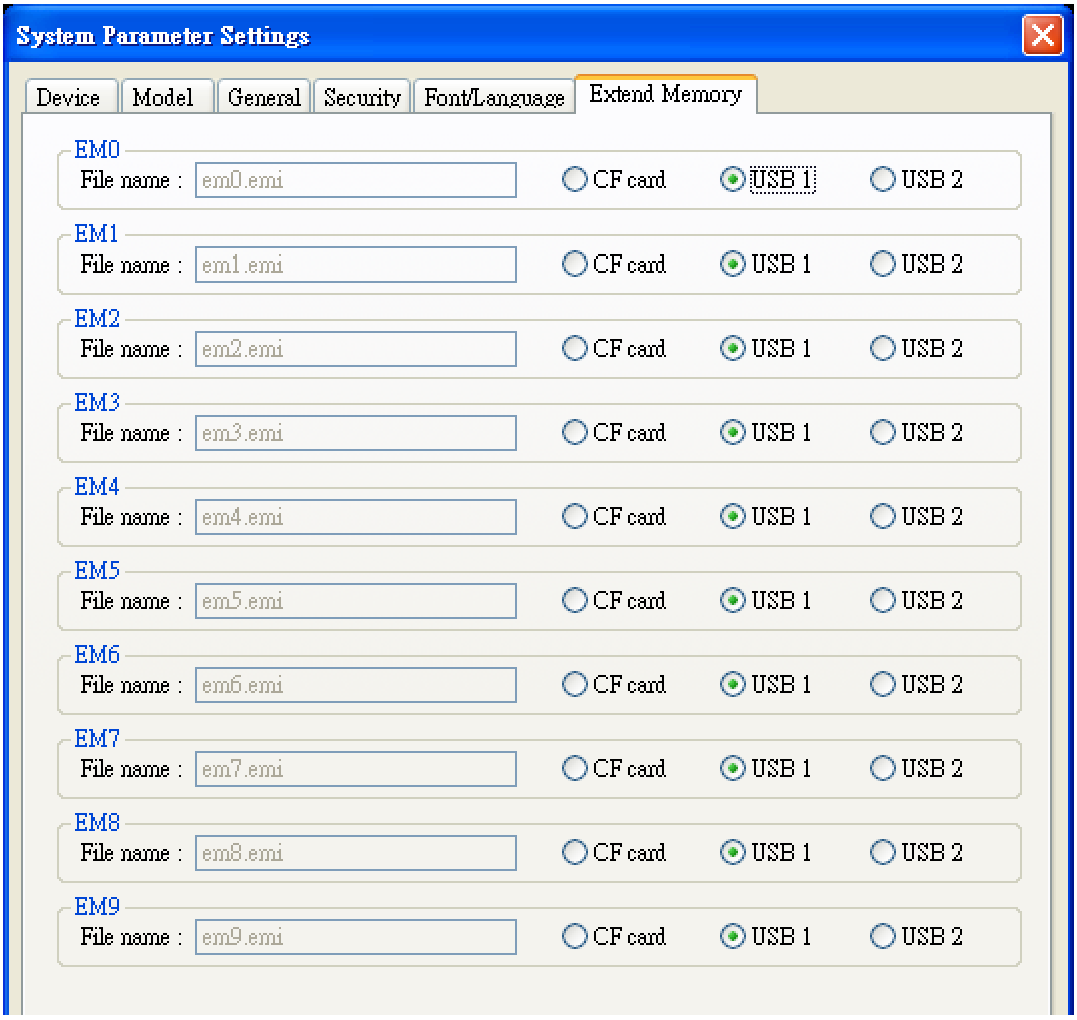
[Language]



Users can change the language of Easy/Builder 8000 toolbars by choosing [Language]. Language mode is enabled by exiting and restart EB8000 software.

[Extend Memory]

Set up the contents of this tab to decide the location of extended memory.



EM0
File name : em0.emi ○ CF card ● USB 1 ○ USB 2

EM1
File name : em1.emi ○ CF card ● USB 1 ○ USB 2

EM2
File name : em2.emi ○ CF card ● USB 1 ○ USB 2

EM3
File name : em3.emi ○ CF card ● USB 1 ○ USB 2

EM4
File name : em4.emi ○ CF card ● USB 1 ○ USB 2

EM5
File name : em5.emi ○ CF card ● USB 1 ○ USB 2

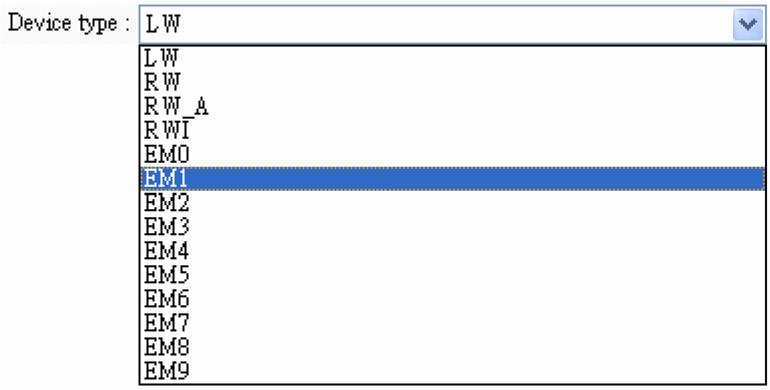
EM6
File name : em6.emi ○ CF card ● USB 1 ○ USB 2

EM7
File name : em7.emi ○ CF card ● USB 1 ○ USB 2

EM8
File name : em8.emi ○ CF card ● USB 1 ○ USB 2

EM9
File name : em9.emi ○ CF card ● USB 1 ○ USB 2

Extended Memory is numbered from EM1 to EM9. The usage is similar to other devices on HMI by only assigning device type. Max. size of each extended memory is up to 2G word data.



Device type : LW

The data in extended memory doesn’t lose because of power off which means when power on next time, the data in extended memory will restore to previous status, the same as receipt data (EW、RW _A). Especially, users are able to choose the location of extended memory—CF card, USB1 or USB2 memory stick.

When the device set as extended memory doesn’t exist, if users read out the data from extended memory, the content is always 0; When the device set as extended memory doesn’t exist, if users write in the data to extended memory, “PLC no response” message will appear.

MT8000 support “ hot insertion , hot swapping”: Under power continuously supplied, plug in or remove CF card, USB1 or USB2 anytime. By this feature, updating or retrieving the data in extended memory.

# Chapter 6 Window Operations

## 1. Screen types

A screen is composed of basic element—Window. Users are able to configure 1997 windows or screens. According to function and usage, there are 4 types of windows in the EB8000.

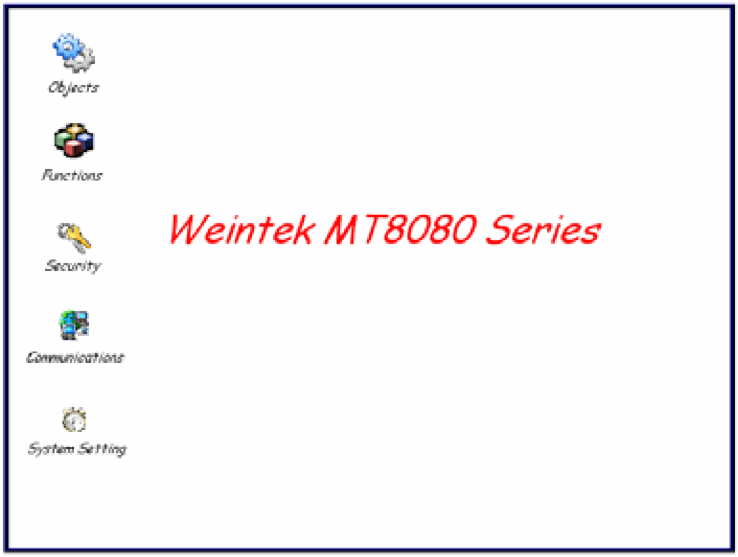
(1) Base Window
(2) Common Window
(3) Fast Selection
(4) System Message Window

For example as below:

(1) Base Window
Base window is a common type of window.
Except for primary screen, it is used on:

a. Foundation base: used as a background of other windows.
b. Keyboard window.
c. Pop-up window for function key objects.
d. Pop-up window for direct and indirect windows
e. Screen saver

The illustration below is the screen of startup which uses base window.

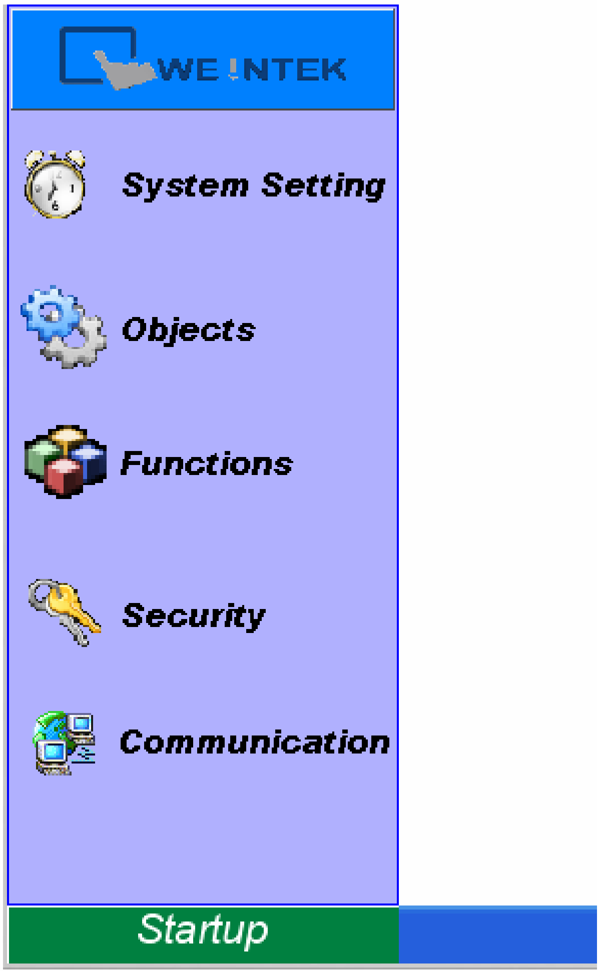


(2) Common Window

Window 4 is the default of common window. Objects on this window will display on other windows so that users always place the shared objects on common window. When system operates, [Change common window] mode of the function key can be used to change the source of common window. For example, change the common window from window 4 to window 20.

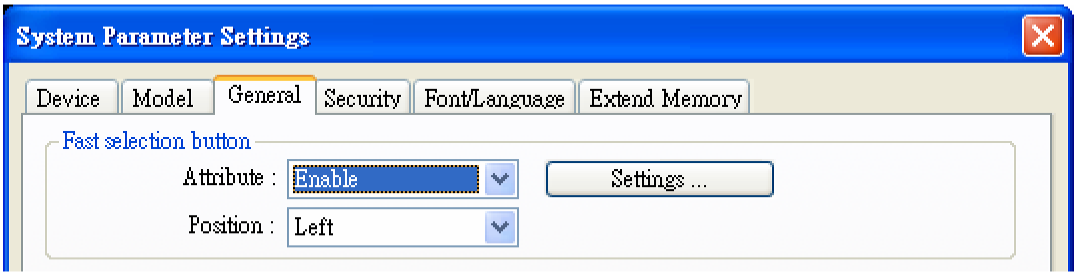
(3) Fast selection window

Window 3 is defined as Fast Selection Window. This window can co-exist with base window. Therefore, generally speaking, it is used by the common-used operation buttons as the picture below:



When using Fast Selection Window, except creating window 3 first, each function of Fast Selection button should be set. The [Startup] on the picture above is the Fast Selection button which is used to change the appearance and the disappearance of the

Fast Selection. Every setting of the Fast Selection button is in System Parameter Settings. Please refer to the illustration below.



System Parameter Settings

Fast selection button

Attribute : Enable

Position : Left

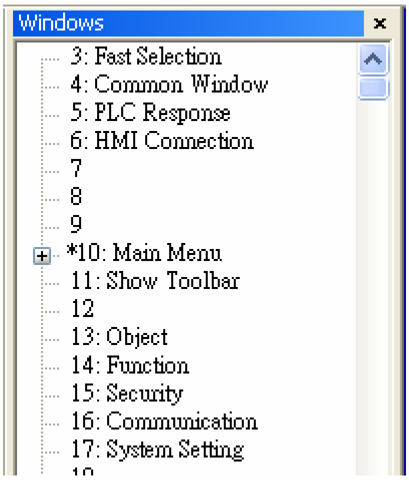
Except switching the appearance and the disappearance of the Fast Selection by Fast Selection button, system register also provides the following addresses for users who are able to control Fast Selection and Fast Selection button by the operation of the values in the address. Please refer to “system register” for further introduction.

[LB9013] Enable/Disable Fast Selection
[LB9014] Enable/Disable Task button
[LB9015] Enable/Disable Fast Selection/ Task button

(4) System Message Window
Window 5, Window 6 and Window 7 are the defaults of system message window. Among them, Window 5 is the “PLC Response” message window. When the signal of PLC is unreceivable, the message window will pop up automatically. Window 6 is the message window for “HMI Connection”. When connection of remote HMI fails, the message window will pop up automatically.
Window 7 is set for “Password Restriction” message window. If users don’t have enough authority to operate the object, window 7 will pop up according to the setting contents.

## 2. Creating, deleting and setting of a window

The picture below displays the window information of the EB8000. The following section introduces how to create and set these windows.

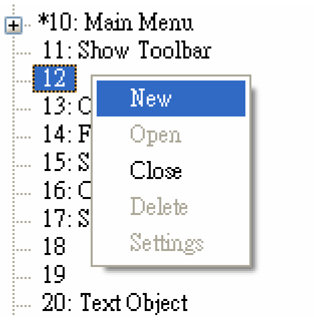


Windows

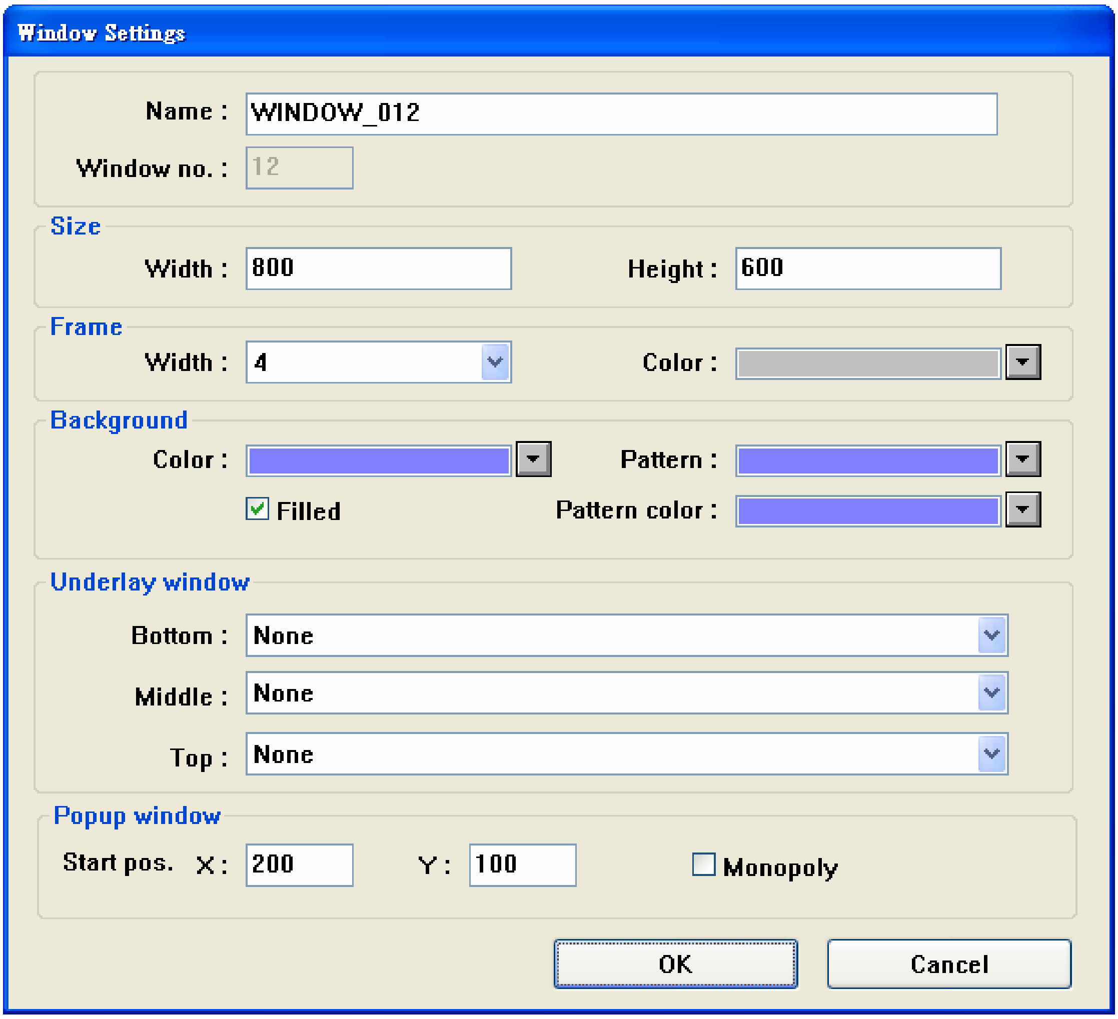
3: Fast Selection
4: Common Window
5: PLC Response
6: HMI Connection
7
8
9
*10: Main Menu
11: Show Toolbar
12
13: Object
14: Function
15: Security
16: Communication
17: System Setting

(1) Creating a window

There are two ways to create a window: a) selecting desired window number on the window tree and right click Select [New] on the message dialog and click confirm after the completion of all settings. Please refer to the example below:



*10: Main Menu
11: Show Toolbar
12
13: C
14: F
15: S
16: C
17: S
18
19
20: Text Object



Window Settings

Name : WINDOW_012

Window no. : 12

Size

Width : 800 Height : 600

Frame

Width : 4 Color :

Background

Color : Pattern :

☑ Filled Pattern color :

Underlay window

Bottom : None

Middle : None

Top : None

Popup window

Start pos. X : 200 Y : 100 ☐ Monopoly

[Name]
The name of the window

[Window no.]
The No. of the window, from 3 to 1999.

Size
The [Width] and [Height] of the window.

Frame
[Width]
The [Width] of the frame.

[Color]
The color of the frame.

Background

[Color]

The color of the background.

[Pattern]

The design of the background.

[Pattern color]

The color of the design.

[Filled]

The Filled option determines if the window’s background color is shown or not during project design.

Underlay window

[Bottom], [Middle], [Top]

Up to three windows can be specified as underlay windows for each base window, from [Bottom] to [Top]. The objects on the background window are displayed on base window in order.

Popup window

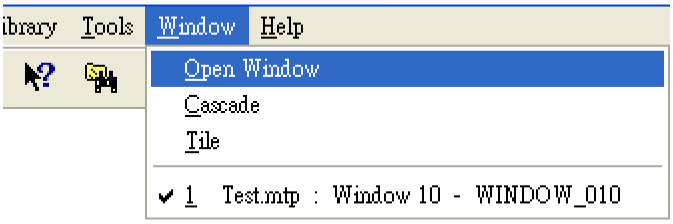
[X], [Y]

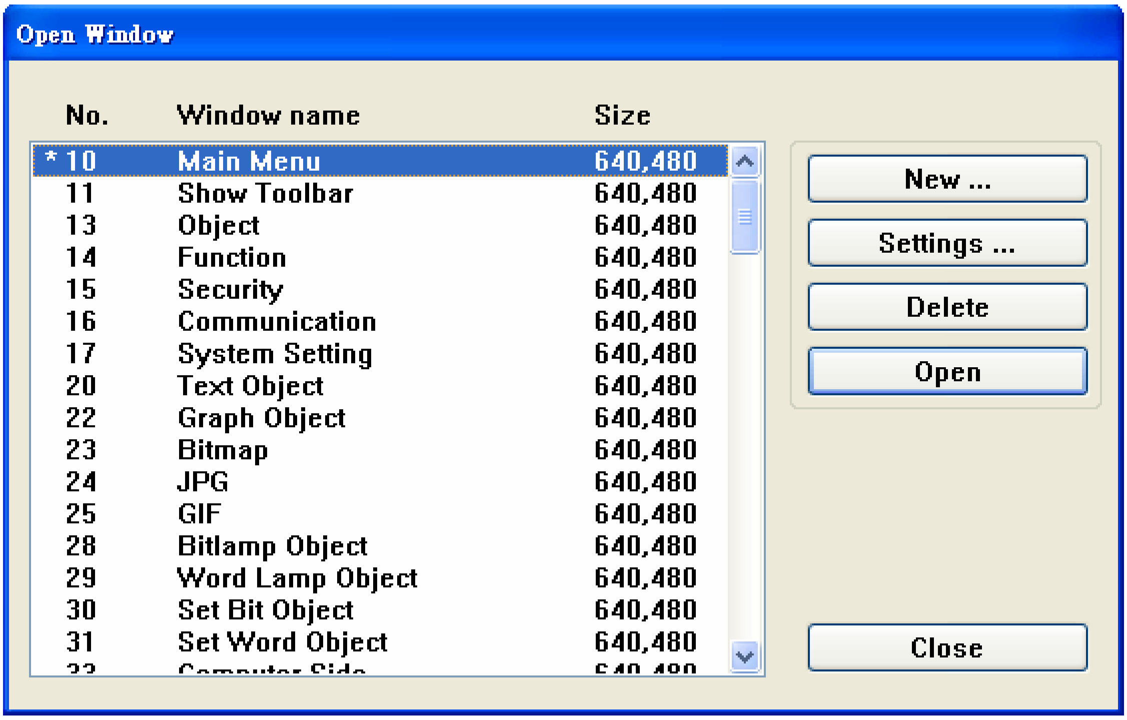
Base window can also be used as pop-up window. [X] and [Y] set the pop-up location of the base window.

[Monopoly]

If the option is checked, when a base window is used as pop-up window and appears, users are not allowed to operate other windows before the base window is closed. If a base window is used as a keyboard window,” Monopoly “property is automatically possessed by the window.

Another way to create a window is select [Open Window] from menu and [Open Window] dialog appears. Please refer to the illustration below.

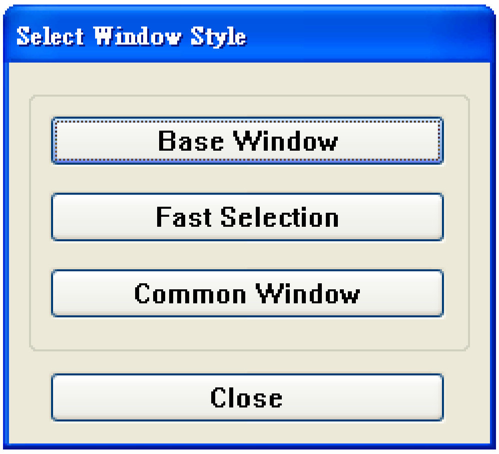




| No. | Window name | Size |
|---|---|---|
| * 10 | Main Menu | 640,480 |
| 11 | Show Toolbar | 640,480 |
| 13 | Object | 640,480 |
| 14 | Function | 640,480 |
| 15 | Security | 640,480 |
| 16 | Communication | 640,480 |
| 17 | System Setting | 640,480 |
| 20 | Text Object | 640,480 |
| 22 | Graph Object | 640,480 |
| 23 | Bitmap | 640,480 |
| 24 | JPG | 640,480 |
| 25 | GIF | 640,480 |
| 28 | Bitlamp Object | 640,480 |
| 29 | Word Lamp Object | 640,480 |
| 30 | Set Bit Object | 640,480 |
| 31 | Set Word Object | 640,480 |
| 32 | Computer Side | 640,480 |

Window No. and Window Name are listed on the message table.

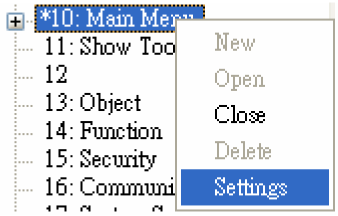
Click [New…] and choose window type from [Select Window Style] dialog. New window can be created after click OK.



(2) Window Settings

EB8000 provides two methods to modify window attributes:

a) Right click on the assigned window from window tree and select [Settings] to change the window properties.



b) Select [Open Window] from menu and [Open Window] dialog appears. Select [Settings] to change the window properties.

(3) Open, close and delete a window

To open an existing window, except double clicking the window No. from window tree, another way is right click the assigned window from the window tree and choose [Open] to open the window.

It’s the same operation process to close or delete an existing window but please note that the window has to remain in close status when deleting a window.

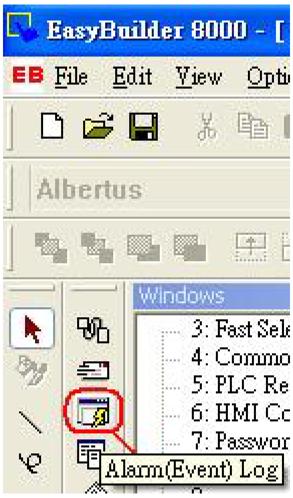
# Chapter 7 Event Log

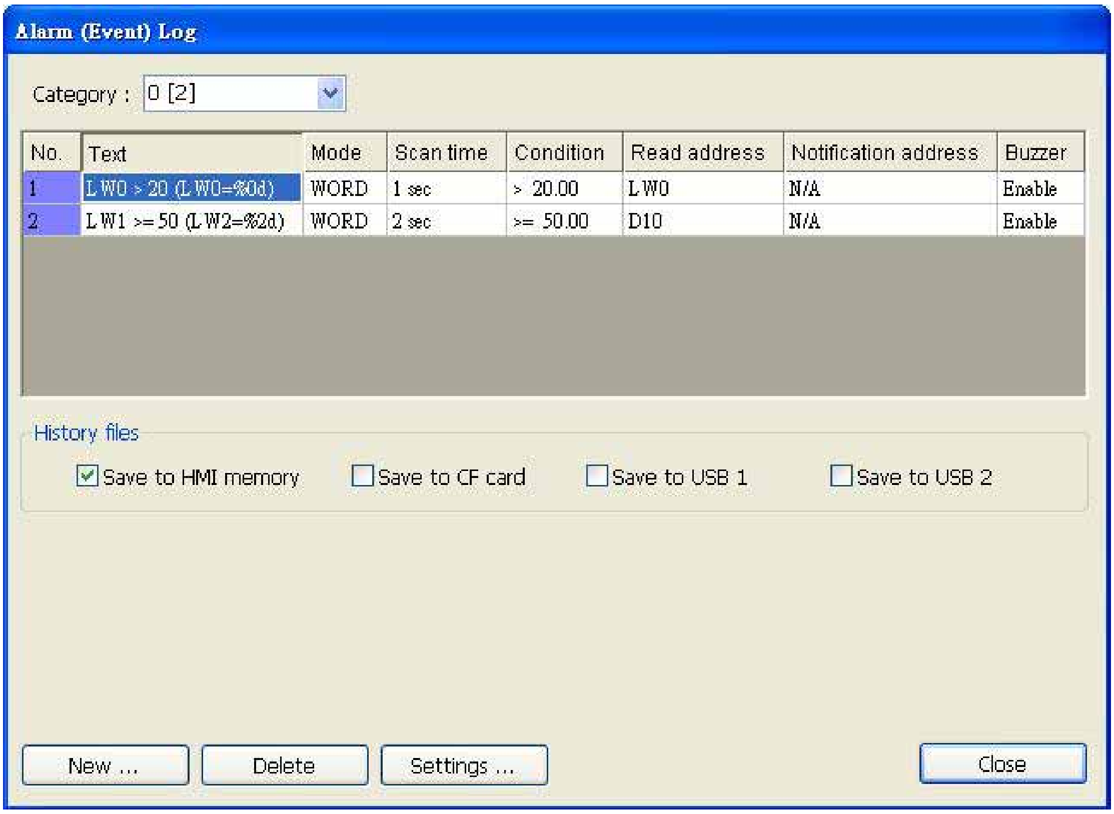
" Event log" is used to identify the content of an event and the conditions triggering this event. In addition, the triggered event (sometimes it is called alarm) and the processing procedure of the event can be saved to the designate location through the EB8000 as eventlogyyyymmdd.evt format where yyyymmdd indicates the creating time and is set by the system. For example, a file name of event, logeventlog20061127.evt, means the file is created on Nov. 27, 2006.

## 1. Creating a new data log

Accompanied with alarm bar, alarm display and event display, users are able to clearly understand the life cycle of whole event from happening, waiting, processing to alarm disappearing. Before using these objects, the content of an event has to be identified first.

Click the [Alarm(Event Log)] icon, and [Event Log] dialog appears as below:





Alarm (Event) Log

Category : 0 [2]

| No. | Text | Mode | Scan time | Condition | Read address | Notification address | Buzzer |
|---|---|---|---|---|---|---|---|
| 1 | LW0 > 20 (LW0=%0d) | WORD | 1 sec | > 20.00 | LW0 | N/A | Enable |
| 2 | LW1 >= 50 (LW2=%2d) | WORD | 2 sec | >= 50.00 | D10 | N/A | Enable |

History files

☑ Save to HMI memory □ Save to CF card □ Save to USB 1 □ Save to USB 2

[Category]

The EB8000 provides category function and divides an event into 0~255 classifications. Alarm Bar、 Alarm Display and Event Display can limit the displayed classifications.

[Catalog] selection determines the event catalog of current event. New added event type is determined by this function.

Category : 0 [2]

The [2] of 0[2] in the above illustration demonstrates two existing identified events in the classification 0.

History files

History files determine the save location of an event log. However, when users simulate on PC, files will be saved on the eventlog subdirectory, the same the subdirectory of EasyBuilder8000.exe.

[Save to HMI memory]
Record the event log to MT8000.

[Save to CF card]
Save the event log to CF card.

[Save to USB disk 1]
Save the event log to USB disk 1. The USB disk numbering rule is: the disk inserted to the USB interface in the first place is numbered 1, next is numbered 2 and the last is numbered 3. There’s no relation with the interface location.

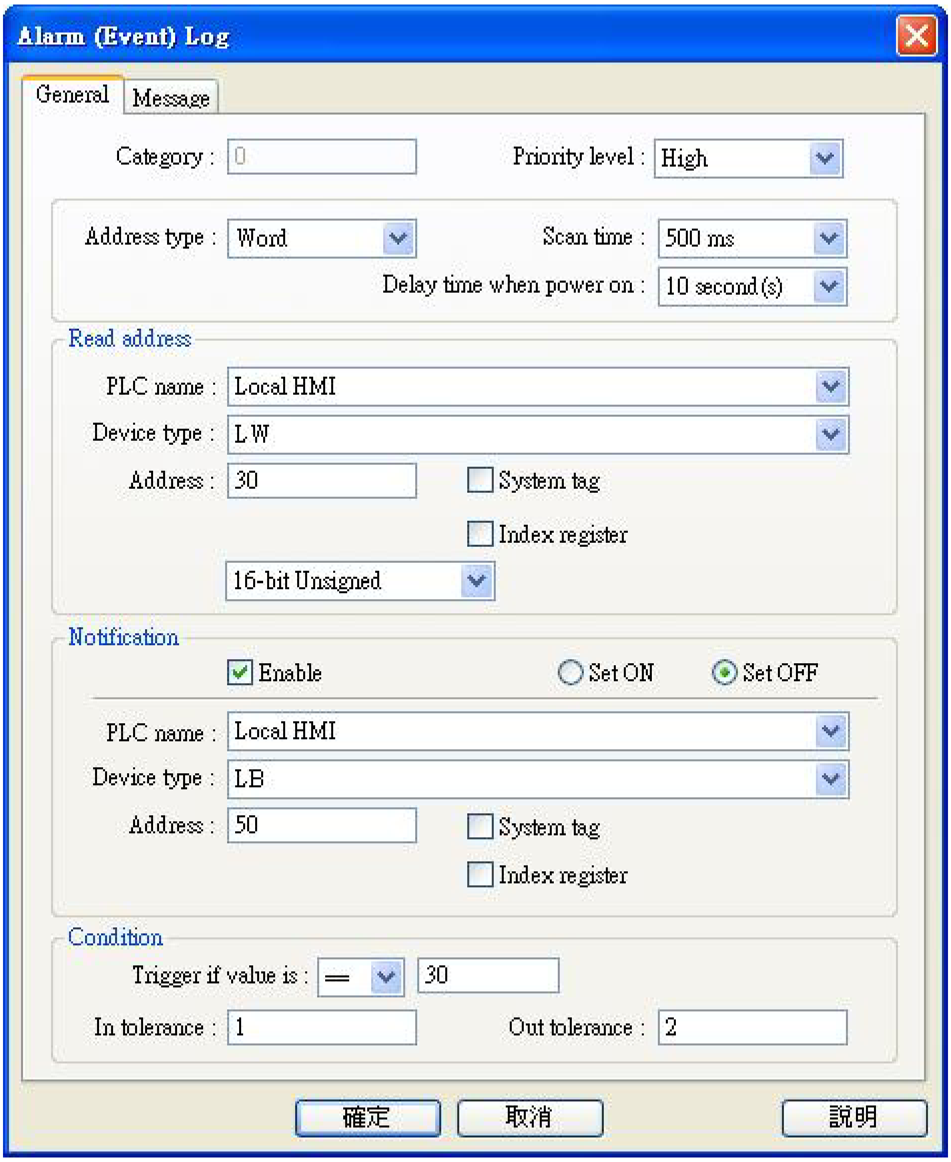
[Save to USB disk 2]
Save the event log to USB disk 2.

[New …]
Create a new event.

[Delete]
Delete a specific event.

[Settings …]
Modify the definition of a specific event.

After clicking [New…], [Event Log] dialog appears with two tabs and [General] tab shows as below:



Alarm (Event) Log

Category : 0

Priority level : High

Address type : Word

Scan time : 500 ms

Delay time when power on : 10 second(s)

Read address

PLC name : Local HMI

Device type : LW

Address : 30

□ System tag

□ Index register

16-bit Unsigned

Notification

☑ Enable ○ Set ON ● Set OFF

PLC name : Local HMI

Device type : LB

Address : 50

□ System tag

□ Index register

Condition

Trigger if value is : == 30

In tolerance : 1

Out tolerance : 2

**[Category]**

The category of the event.

**[Priority level]**

The level of the event: According to the degree of importance, users can choose ”Low”, “Middle”, “High”, or “Emergency”. When the number of event log is more than max number available in the system (the default is 1000, please refer to [General] of System Parameters to add extra records), less important events (lower level) will be deleted and new events will be added in.

[Address type]

The type of address—Bit or Word mode.

[Scan time]

The time interval of an event examination. By scan time, system checks if the event is satisfied with the triggered conditions.

[Delay time when power on]

The delay time of an event examination. System delays this time after rebooting so that it’s able to check if the event is satisfied with the triggered condition and avoids the unnecessary event log record.

[Read address]

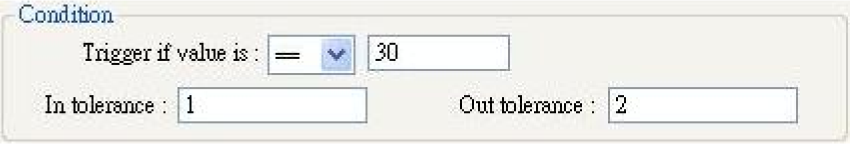
By reading the read address, system obtains the figure to check if an event is satisfied with the triggered condition. Please refer to Parts/General Settings for further details.

[Notification]

When an event is triggered, the specific message is sent out from Notification address. Select [Set ON] to send ON message out from the address. While select [Set OFF], Off message is sent out. Please refer to Parts/General Settings for further information.

[Condition]

Trigger conditions of an event. When the condition of [Address type] of an event is “Bit”, “ON” or “OFF” of Trigger can be selected. The illustration below shows if Trigger[On] is selected, that is, the status of [Read address] changes from OFF to ON, an event will be triggered and generate an event log record (or an alarm).



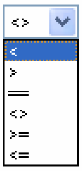
Condition

Trigger if value is : == 30

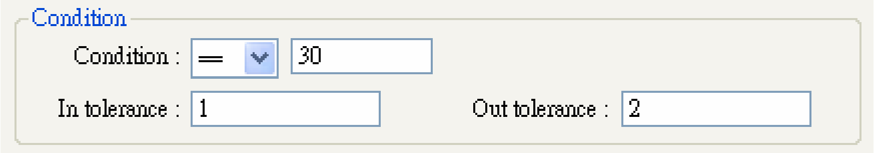
In tolerance : 1

Out tolerance : 2

When the condition of [Address type] of an event is “Word”, several selections are available as follows:



At this time, system will read values from [Read address] and then compare them with the trigger conditions to decide if the event is trigged. Especially if the trigger condition is ”==” or <>”, [In tolerance] and [Out tolerance] can be set where [In tolerance] is used for trigger condition and [In tolerance] is used for system’s normal condition.

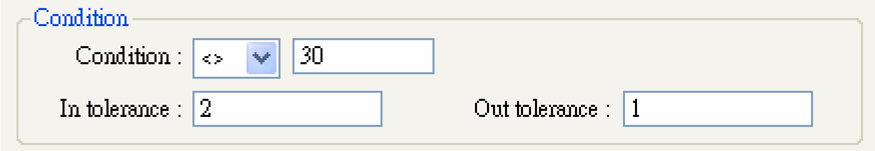


Condition : == 30

In tolerance : 1 Out tolerance : 2

From the example above, it indicates that if the value of [Read address] is bigger or equal to 29(=30-1) or smaller or equal to 31(=30+1), the event will be triggered.

After the event is triggered, only when the value of [Read address] is bigger than 32( =30+2) or smaller than 28(=30-2) will the system return to the normal condition.



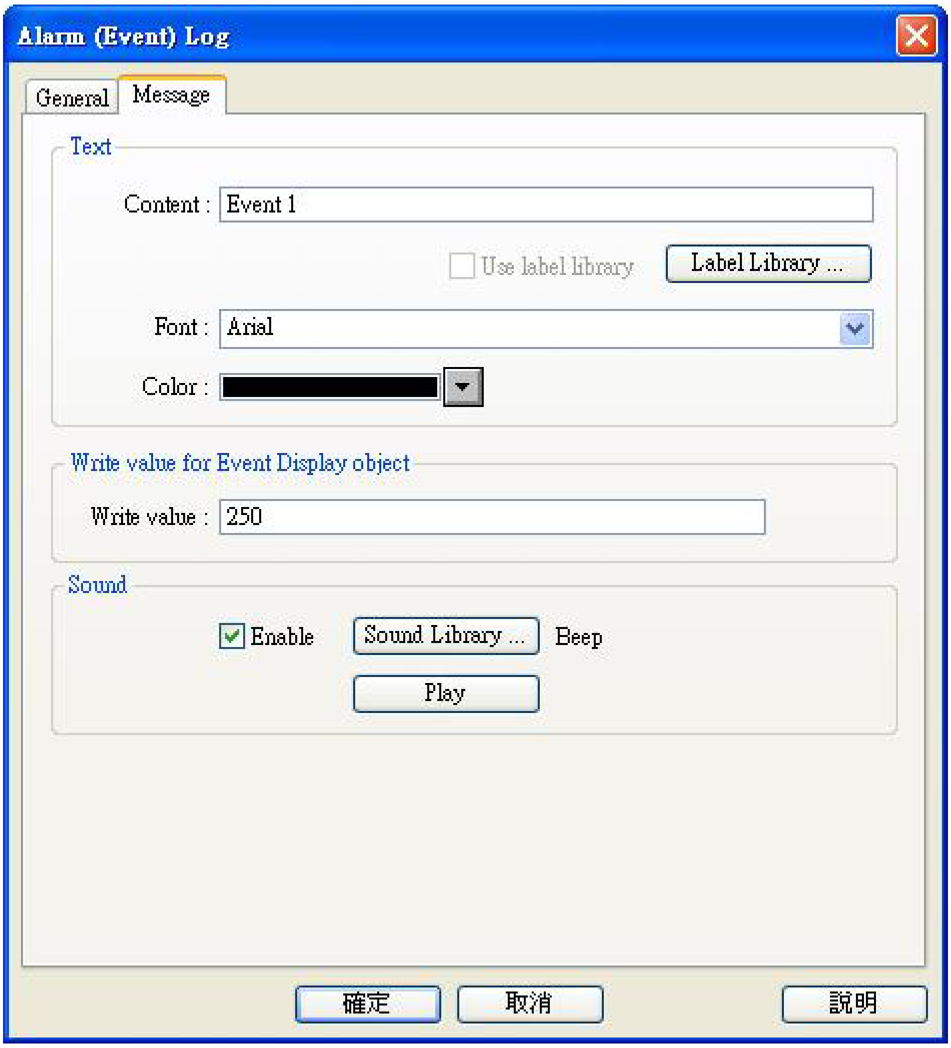
Condition : <> 30

In tolerance : 2 Out tolerance : 1

From the example above, it shows that system is under normal condition only when the value of [Read address] is bigger or equal to 28(=30-2) and smaller or equal to 32(=30+2).

When the event is triggered, system returns to normal condition only when the value of [Read address] is bigger or equal to 29(=30-1) and smaller than 31(=30+1).

Please refer to the picture below for the settings of [Message] tab.



Content : Event 1

□ Use label library

Font : Arial

Color : ■

Write value : 250

☑ Enable

Beep

Text

[Content]

The text context showed on alarm bar、alarm display and event display. Please refer to “Parts/General settings” for more information.

[Write value for event display]

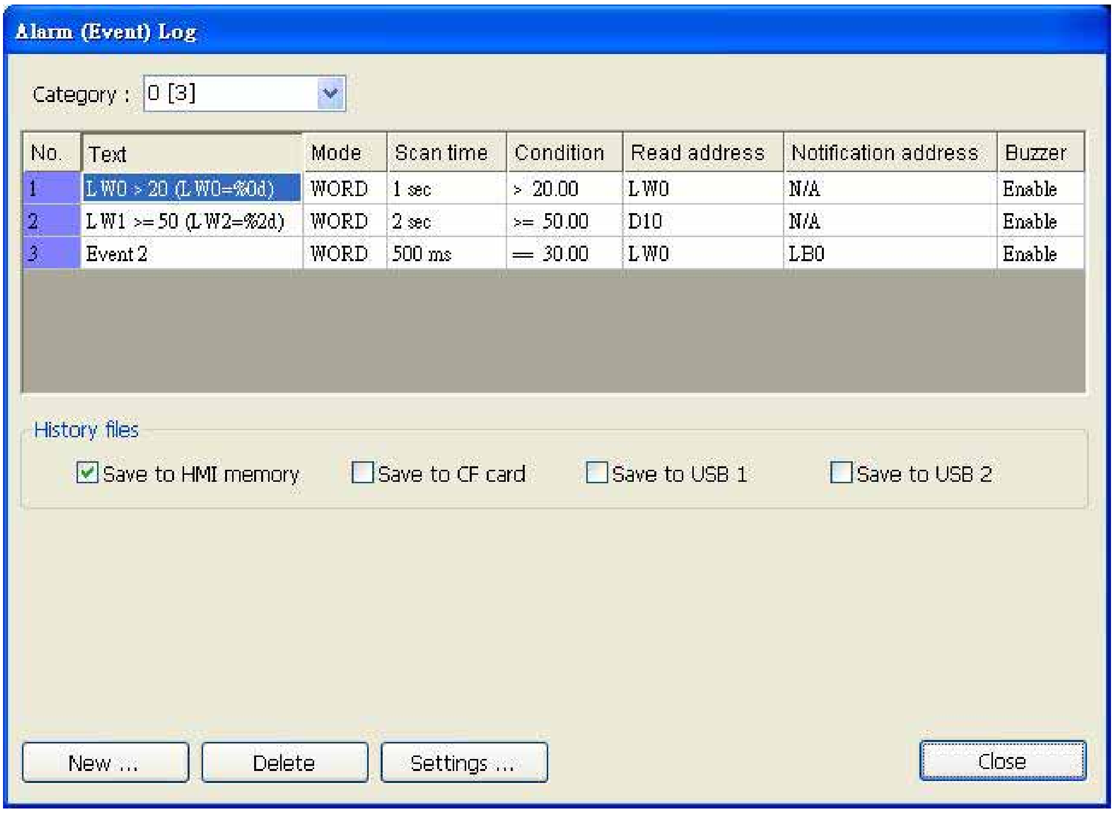
When event display of the event is touched, the write value is sent out to the assigned address. Please refer to event display of parts chapter.

[Sound]

The warning alarm can be selected when an event is triggered.

Click “Sound Library” to choose warning sound, and click “Play” to check the sound.

After the completion of each setting, a new event definition can be added as below:



Alarm (Event) Log

Category : 0 [3]

| No. | Text | Mode | Scan time | Condition | Read address | Notification address | Buzzer |
|---|---|---|---|---|---|---|---|
| 1 | LW0 > 20 (LW0=%0d) | WORD | 1 sec | > 20.00 | LW0 | N/A | Enable |
| 2 | LW1 >= 50 (LW2=%2d) | WORD | 2 sec | >= 50.00 | D10 | N/A | Enable |
| 3 | Event 2 | WORD | 500 ms | == 30.00 | LW0 | LB0 | Enable |

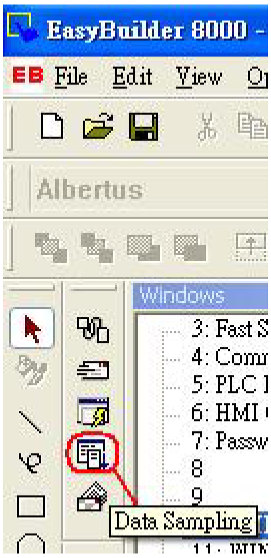
History files

☑ Save to HMI memory ☐ Save to CF card ☐ Save to USB 1 ☐ Save to USB 2

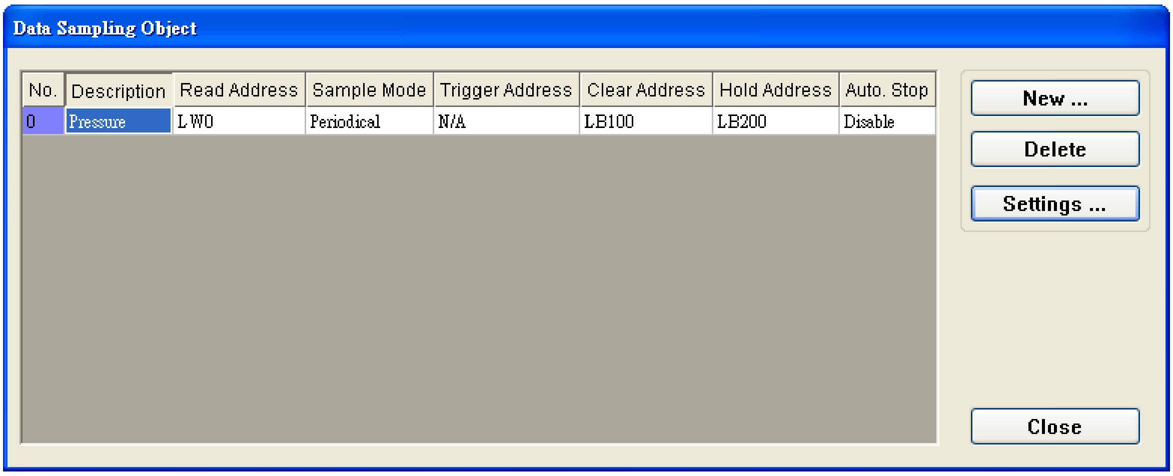
# Chapter 8 Data Sampling

“Data Sampling” identifies the method of data sampling, including sampling time and sampling location. Besides, EB8000 saves the obtained sample data as filenameyyyymmdd.dtl format to the assigned location where filename is defined by users and yyyymmdd is the built time setting by system. For example, if the file name is presser20061127.evt, it means the file saves the data sampled on Nov. 27, 2006.

## 1. Create a new defined of data sampling



Before using Trend display to view the content of data sampling, the method of data sampling has to be defined. Click [Data Sampling] from toolbar and then Data Sampling Object dialog appears as below:



| No. | Description | Read Address | Sample Mode | Trigger Address | Clear Address | Hold Address | Auto. Stop |
|---|---|---|---|---|---|---|---|
| 0 | Pressure | LW0 | Periodical | N/A | LB100 | LB200 | Disable |

[New …]

Create a new “data sampling” definition.

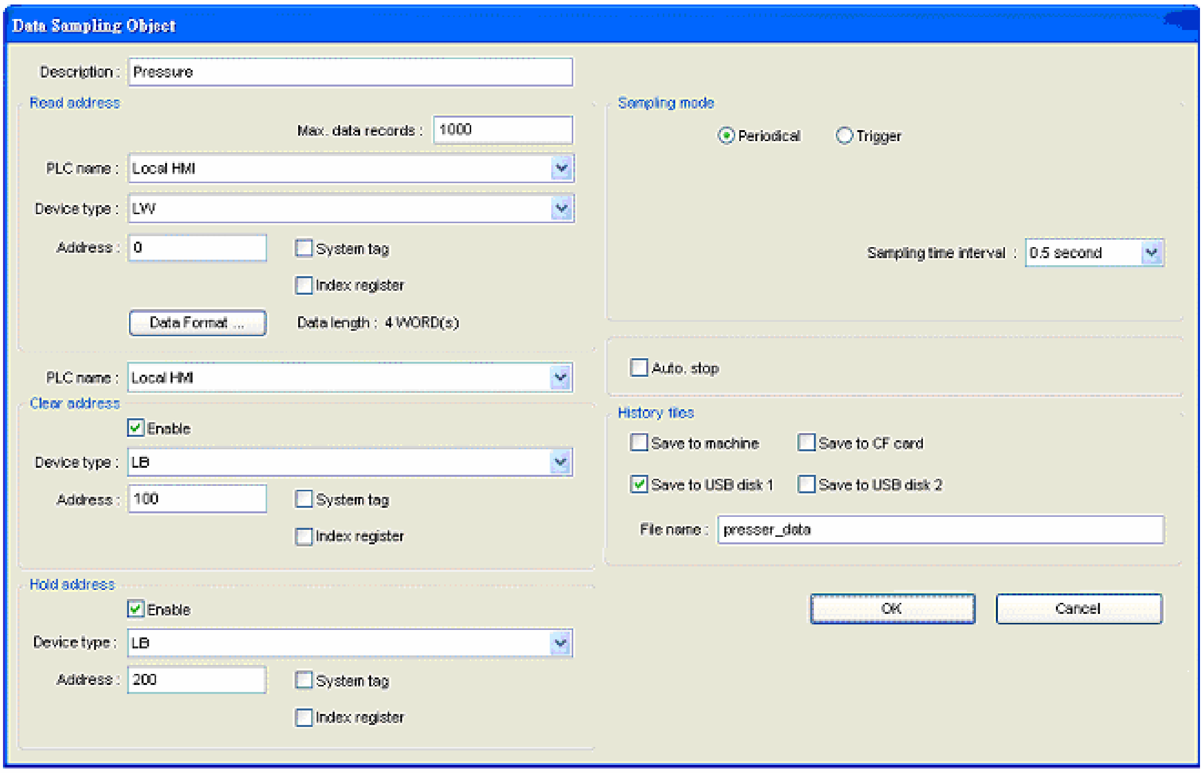
[Delete]

Delete the assigned “data sampling”.

[Settings …]

Modify and set the “data sampling” definition

Click [New…] and the Data Sampling Object setting dialog appears as below:



Data Sampling Object

Description : Pressure

Read address

Max. data records : 1000

PLC name : Local HMI

Device type : LW

Address : 0 □ System tag

□ Index register

Data Format ... Data length : 4 WORD(s)

PLC name : Local HMI

Clear address

☑ Enable

Device type : LB

Address : 100 □ System tag

□ Index register

Hold address

☑ Enable

Device type : LB

Address : 200 □ System tag

□ Index register

Sampling mode

● Periodical ○ Trigger

Sampling time interval : 0.5 second

□ Auto. stop

History files

□ Save to machine □ Save to CF card

☑ Save to USB disk 1 □ Save to USB disk 2

File name : presser_data

Read address

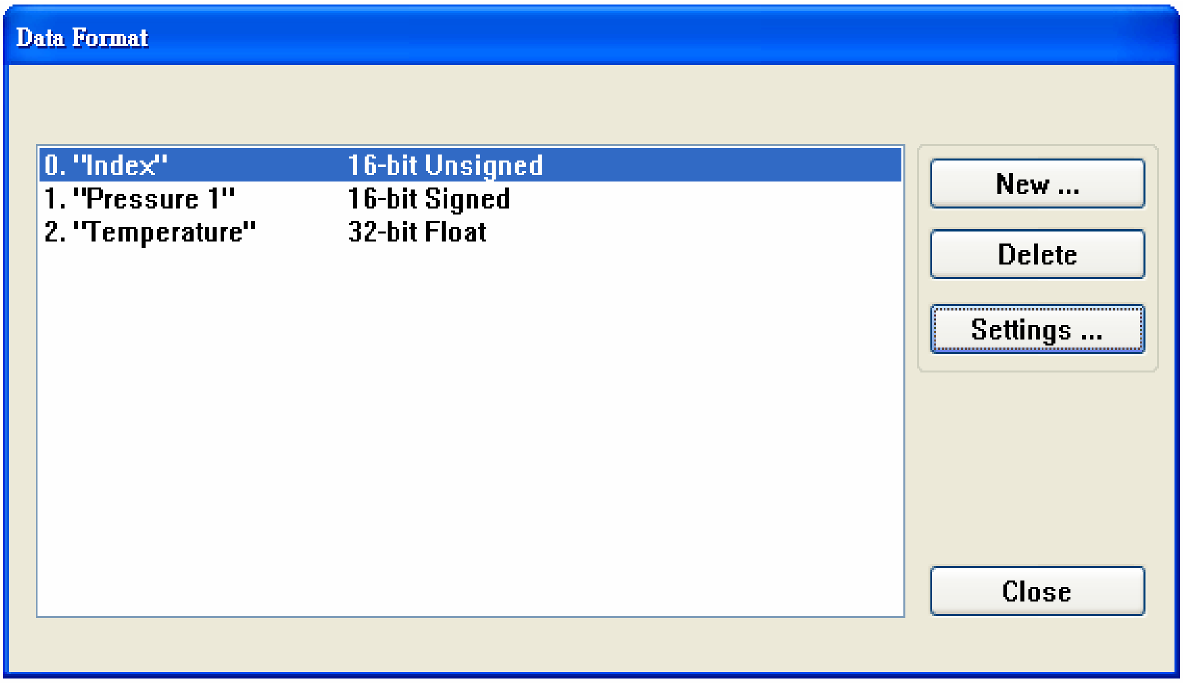
[Max. data records]

Max data records which can be saved to a data sampling definition (the limitation is 86400 records).

[Data Format …]

The format of a data sampling: A data sampling may include more than one record and EB8000 is able to retrieve different formats of records at the same time. After clicking [Data Format], users can use “Data Format” dialog to define the content of a record. Take the following as an example, users define three set of data: “Index”(16-bit Unsigned)、 “Pressure 1”(16-bit Signed) and “Temperature”(32-bit Float) respectively and 4 words in total length. In other words, EB8000 retrieves the length of 4 words as a record starting from the assign address.

Please refer to Parts—General Settings for more details.



0. "Index" 16-bit Unsigned
1. "Pressure 1" 16-bit Signed
2. "Temperature" 32-bit Float

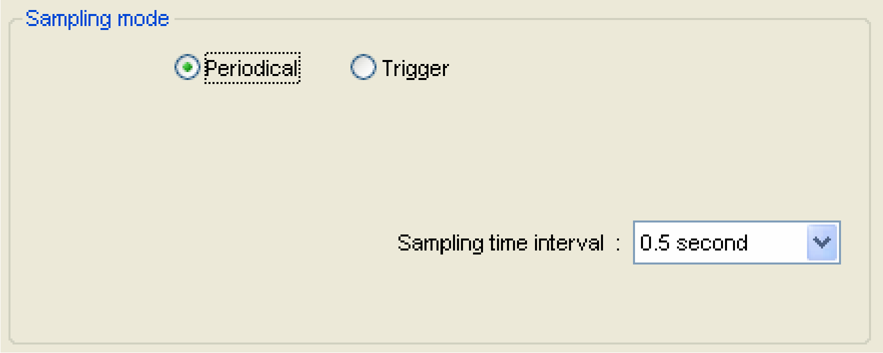
[PLC name]
Select the target PLC of data sampling.

[Clear address]
If the status of the assigned address is ON, obtained data will be cleared and the number of data sampling will be set to zero.

[Hold address]
If the status of the assigned address is ON, sampling will be paused until the status of assigned address returns to OFF. Please refer to Parts—General Settings for other details.

Sample mode

EB8000 provides two method of sampling: “Periodical” and “Trigger”. If “Periodical” mode is selected, EB8000 samples the data by a fixed time frequency. Users have to set the “sampling time interval”.

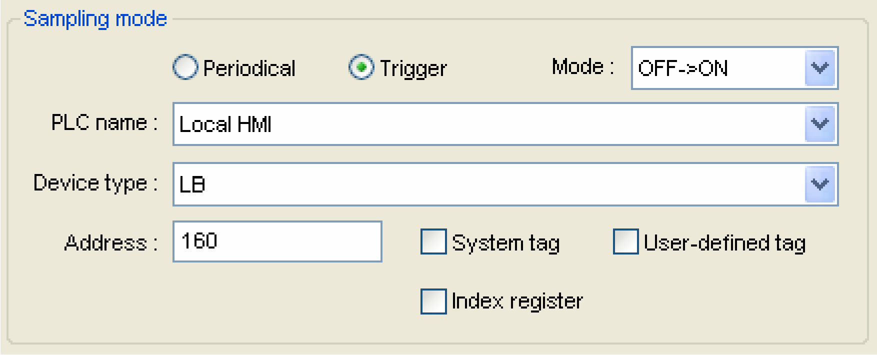


Sampling mode

● Periodical ○ Trigger

Sampling time interval : 0.5 second

If “Trigger” mode is selected, users can use a specific address status to trigger the data sampling.



Sampling mode

○ Periodical ● Trigger Mode : OFF->ON

PLC name : Local HMI

Device type : LB

Address : 160 □ System tag □ User-defined tag

□ Index register

[Mode]

Mode determines the condition to trigger the data sampling. Multiple choices are as follows:

“OFF->ON” If the assigned address status is from OFF to ON, data sampling is triggered.

“ON->OFF” If the assigned address status is from ON to OFF, data sampling is triggered.

“ON<->OFF” If the assigned address status is changed, data sampling is triggered.

Please refer to Parts—General Settings for more details.

[Auto stop]
When the number of obtained data is equal to [Max. data records], if the Auto stop option is selected, data sampling will stop automatically or EB8000 will delete old record and add in new data.

History files
History files assigns the save location of data sampling record. But when users do the simulation on PC, data is saved to datalog subdirectory, the same subdirectory as EasyBuilder 8000.exe.

[Save to machine]
Save the sampling to MT8000 display.

[Save to CF card]
Save the sampling to CF card.

[Save to USB stick 1]
Save the sampling to USB stick 1. The USB stick numbering rule is: the stick inserted to the USB interface in the first place is numbered 1, next is numbered 2 and the last is numbered 3. There's no relation with the interface position.

[Save to USB stick 2]
Save the sampling to USB stick 2.

[File name]
Set the file name of sampling and then EB8000 adds the time mark following the file name. For example, if users set the file name as ”pressure”, the real file name saved will become pressure20061127.dbl where 20061127 stands for the built date.

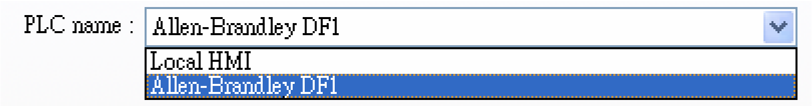
# Chapter 9 Object's General Attributes

The contents of object's general attribute setting include:

1. Selecting the Connection PLC Device
2. Setting the Reading and Writing Address
3. Using Shape Library and Picture Library
4. Setting Text Content
5. Adjusting Profile Size

1. Selecting the Connection PLC Device

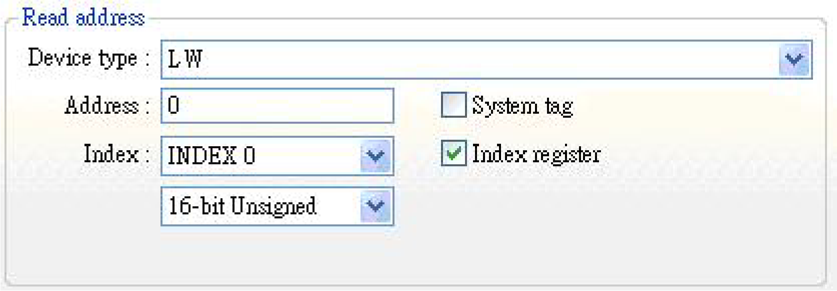
When using some objects, selection of the connection PLC device is required. See the picture below, [PLC name] is to indicate the name of the connection PLC device. The picture shows that there are two PLC devices available for selection: "Local HMI" and "Allen-Brandley DF1." These listed available PLC devices are sourced from "device table" in "system parameters."



PLC name : Allen-Brandley DF1

Local HMI
Allen-Brandley DF1

2. Setting the Reading and Writing Address



Read address

Device type : LW

Address : 0 □ System tag

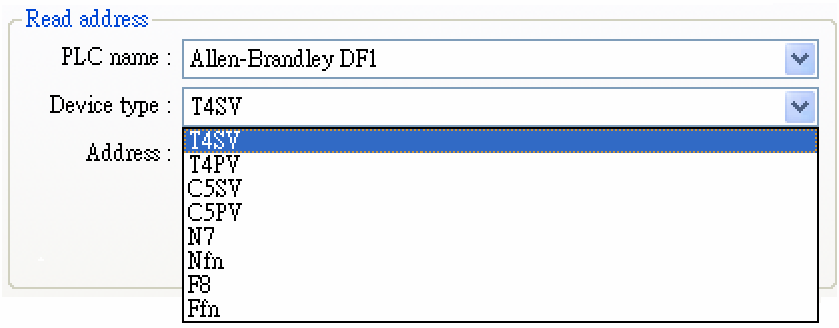
Index : INDEX 0 ☑ Index register

16-bit Unsigned

The above picture shows that the following items are contained in Reading and Writing Address settings:

[Device type]

In selection of device types, when the connection PLC device is different, there will be different device types for selection.


Read address

PLC name : Allen-Brandley DF1

Device type : T4SV

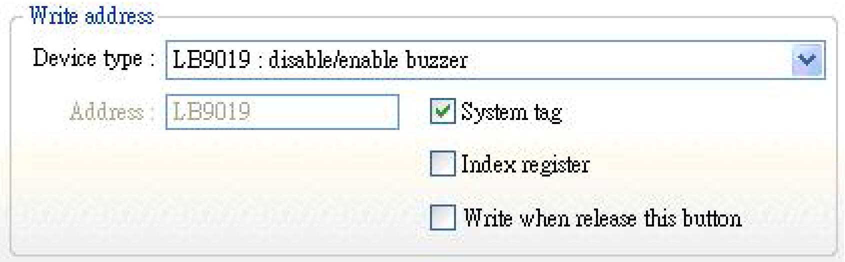
Address :

[Address]

Setting the reading and writing address.

[System tag]

Address tag includes “system tag” and “user-defined tag.” System tag, including bit address system tag and word address system tag, is to reserve the addresses of particular purposes for the system. When selecting “system tag,” in addition to that [Device type] will show the content of “system tag,” [Address] will indicate the selected system tag. Refer to the picture below.


Write address

Device type : LB9019 : disable/enable buzzer

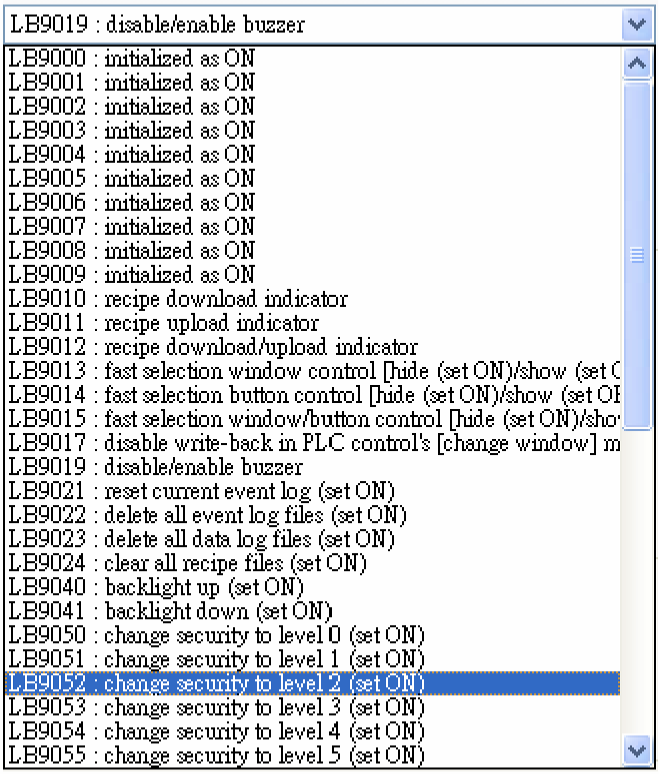
Address : LB9019

☑ System tag

□ Index register

□ Write when release this button

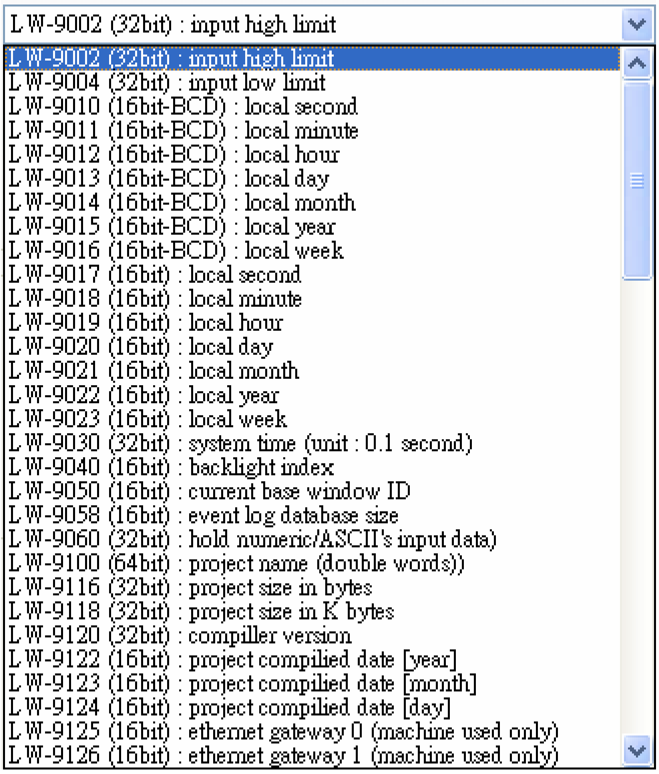
The following pictures show partial contents of bit address system tag and word address system tag respectively, and for further information, please refer to the illustrations in the “label library” section.



LB9019 : disable/enable buzzer

```
LB9000 : initialized as ON
LB9001 : initialized as ON
LB9002 : initialized as ON
LB9003 : initialized as ON
LB9004 : initialized as ON
LB9005 : initialized as ON
LB9006 : initialized as ON
LB9007 : initialized as ON
LB9008 : initialized as ON
LB9009 : initialized as ON
LB9010 : recipe download indicator
LB9011 : recipe upload indicator
LB9012 : recipe download/upload indicator
LB9013 : fast selection window control [hide (set ON)/show (set
LB9014 : fast selection button control [hide (set ON)/show (set O
LB9015 : fast selection window/button control [hide (set ON)/sho
LB9017 : disable write-back in PLC control's [change window] m
LB9019 : disable/enable buzzer
LB9021 : reset current event log (set ON)
LB9022 : delete all event log files (set ON)
LB9023 : delete all data log files (set ON)
LB9024 : clear all recipe files (set ON)
LB9040 : backlight up (set ON)
LB9041 : backlight down (set ON)
LB9050 : change security to level 0 (set ON)
LB9051 : change security to level 1 (set ON)
LB9052 : change security to level 2 (set ON)
LB9053 : change security to level 3 (set ON)
LB9054 : change security to level 4 (set ON)
LB9055 : change security to level 5 (set ON)
```

bit address system tag



LW-9002 (32bit) : input high limit

```
LW-9002 (32bit) : input high limit
LW-9004 (32bit) : input low limit
LW-9010 (16bit-BCD) : local second
LW-9011 (16bit-BCD) : local minute
LW-9012 (16bit-BCD) : local hour
LW-9013 (16bit-BCD) : local day
LW-9014 (16bit-BCD) : local month
LW-9015 (16bit-BCD) : local year
LW-9016 (16bit-BCD) : local week
LW-9017 (16bit) : local second
LW-9018 (16bit) : local minute
LW-9019 (16bit) : local hour
LW-9020 (16bit) : local day
LW-9021 (16bit) : local month
LW-9022 (16bit) : local year
LW-9023 (16bit) : local week
LW-9030 (32bit) : system time (unit : 0.1 second)
LW-9040 (16bit) : backlight index
LW-9050 (16bit) : current base window ID
LW-9058 (16bit) : event log database size
LW-9060 (32bit) : hold numeric/ASCII's input data)
LW-9100 (64bit) : project name (double words))
LW-9116 (32bit) : project size in bytes
LW-9118 (32bit) : project size in K bytes
LW-9120 (32bit) : compiller version
LW-9122 (16bit) : project compilied date [year]
LW-9123 (16bit) : project compilied date [month]
LW-9124 (16bit) : project compilied date [day]
LW-9125 (16bit) : ethernet gateway 0 (machine used only)
LW-9126 (16bit) : ethernet gateway 1 (machine used only)
```

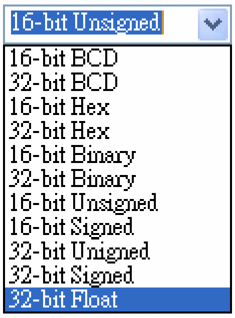
word address system tag

[Index register]

Refer to the illustrations in “index register” section for information on if it is necessary to select “index register” or not.

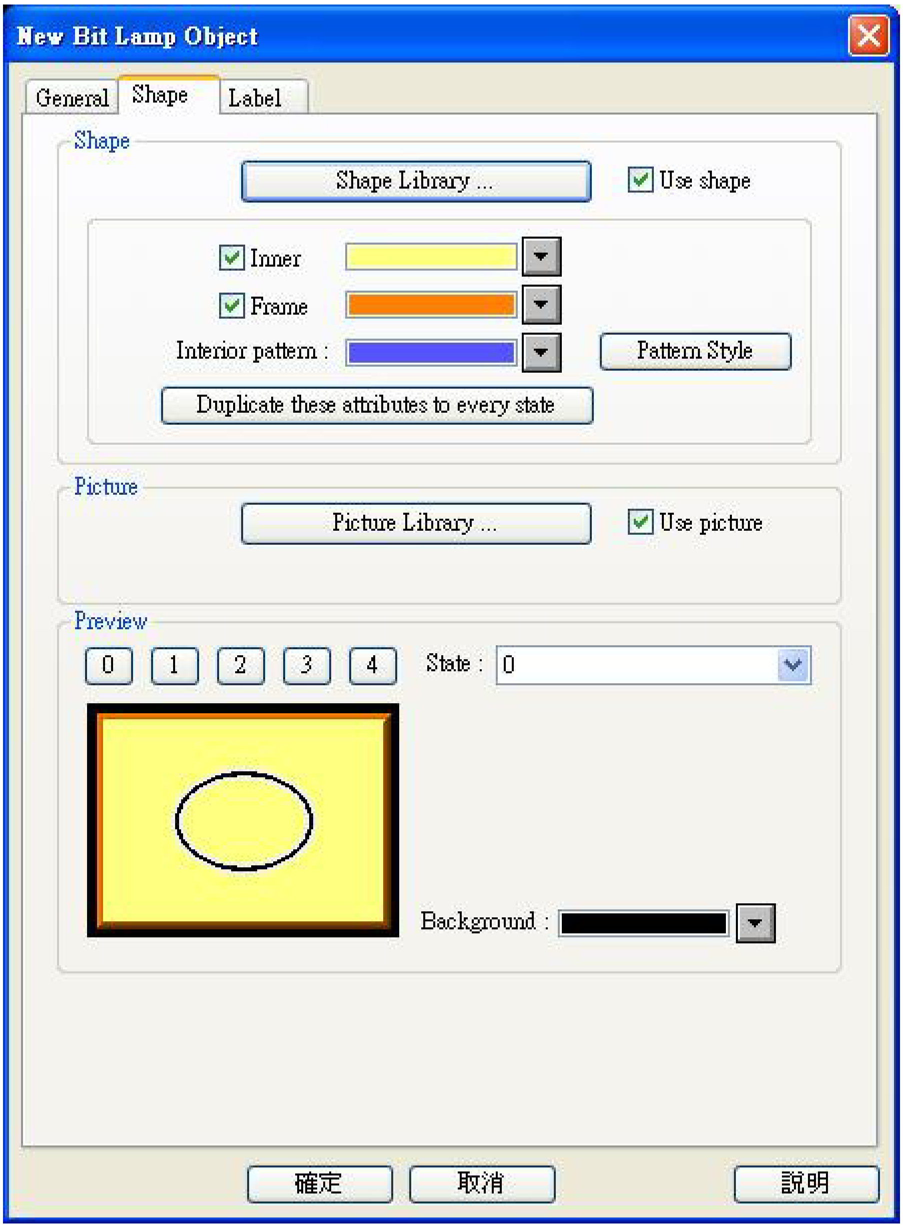
Selecting Numeric Type

The EB8000 supports the following listed numeric types. It is necessary to select the proper numeric type, especially when using address tag.



3.  Using Shape Library and Picture Library

Shape Library and Picture Library are available for some objects to enhance the object’s visual effects. See the picture below, go to the Bit Lamp Object’s Properties menu and then click the [Shape] tab to set up Shape Library and Picture Library.



☑ Use shape

☑ Inner

☑ Frame

☑ Use picture

State : 0

The descriptions of each item’s setting on the [Shape] menu are as follows:

Settings of Shape Library

[Shape Library …]

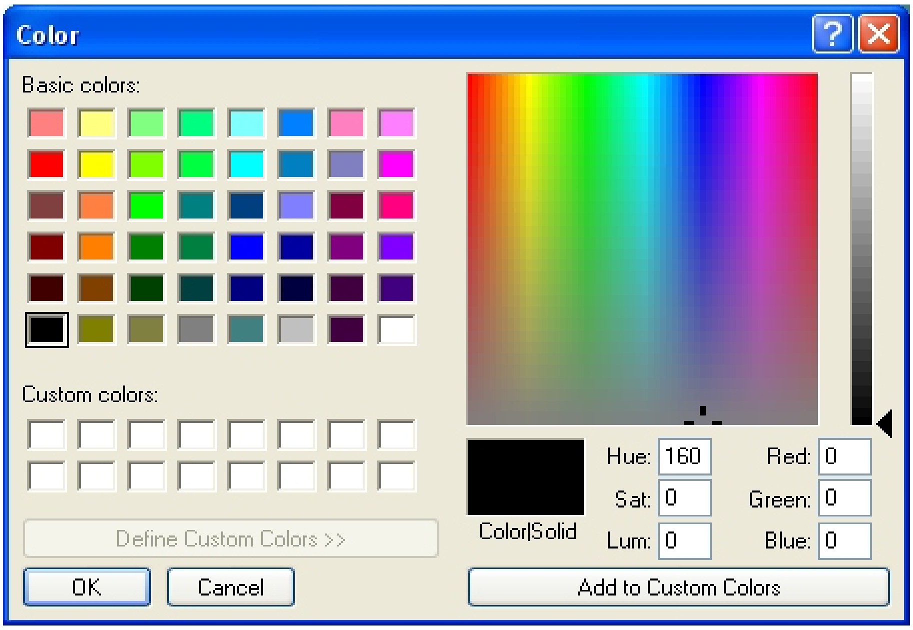
Refer to the part (I) at the last of this section for information related to the settings of [Shape Library …].

[Use Shape]

Set whether or not to use the functions in Shape Library by selecting [Use Shape] or not.

[Inner]

Set whether or not to add inner to the Shape by selecting [Inner] or not. When selecting [Inner] and clicking the color tab, the setting dialog box, as shown in the picture below, will be displayed to set the inner’s color.



Hue: 160
Sat: 0
Lum: 0
Red: 0
Green: 0
Blue: 0

[Frame]

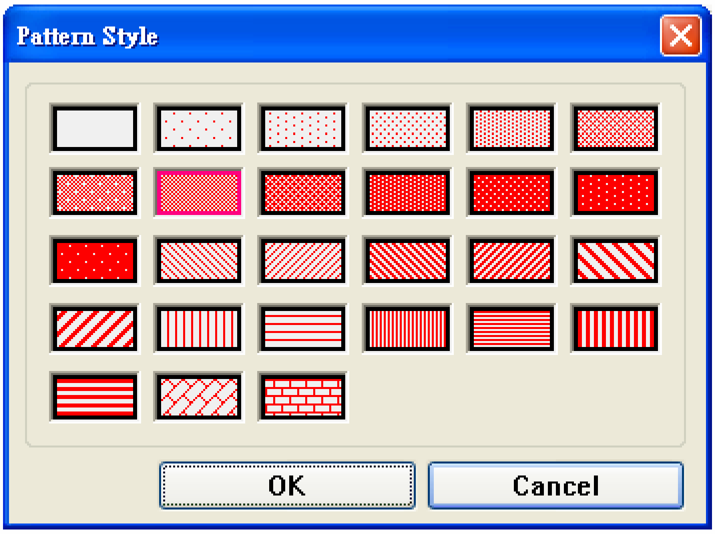
Set whether or not to add a frame to the Pattern by selecting [Frame] or not. When selecting [Frame] and clicking the color tab, the setting dialog box will be displayed to set the frame’s color.

[Interior Pattern]

[Interior Pattern] is used to set the color of the interior pattern.

[Pattern Style]

Click [Pattern Style] and a setting dialog box, as shown in the picture below, will be displayed to set the pattern style.



[Duplicate these attributes to every state]

[Duplicate these attributes to every state] is used to set all attributes of the present state to other states.

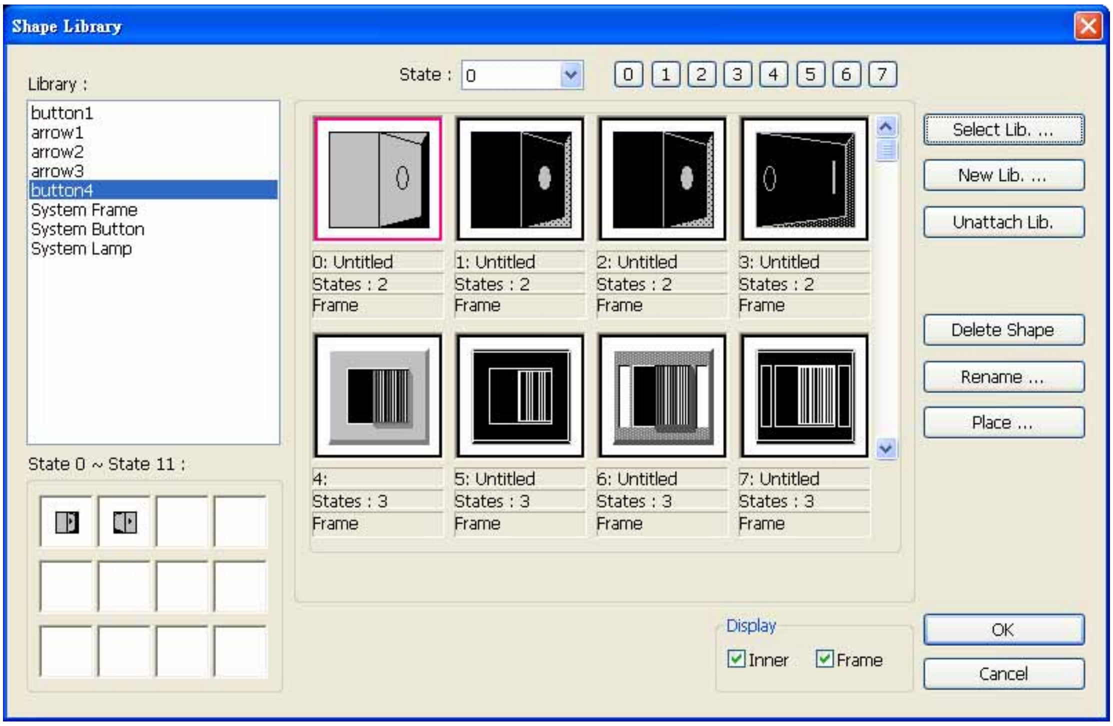
Settings of Picture Library

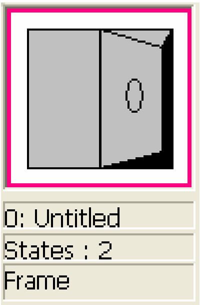
[Picture Library]

Refer to the part (II) at the last of this section for information related to the settings of [Picture Library …].

(I) How to set [Shape Library …]

Click [Shape Library …] and a setting dialog box, as shown in the picture below, will be displayed. From the dialog box, you can see that the presently selected pattern is marked with a red frame.





0: Untitled
States : 2
Frame

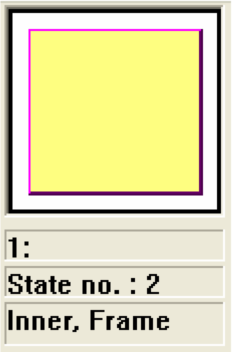
The above picture gives information of one of the Shapes in the Shape Library as follows:

0: Untitled — This indicates the Shape's name and number in the library.

State no.: 2 — This indicates the number of the Shape's states, and in this case, it shows the Shape possesses two states.

Frame — This indicates that the Shape is set with "frame" only.

And the picture below shows that the Shapes is set with "inner" and "frame."

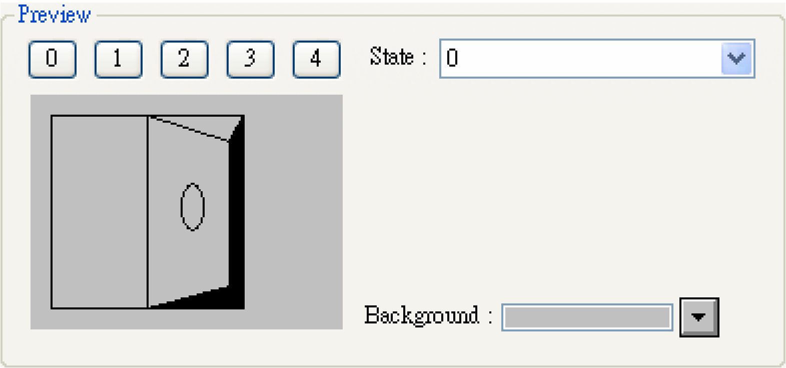


1:

State no. : 2

Inner, Frame

Refer to the illustrations in the "Setting-up and using Shape Library and Picture Library" section for the details about all of the settings in the "Shape Library's setting dialog box." After completing all the settings and clicking [OK], the selected Shape will be applied to the object, as shown in the picture below.

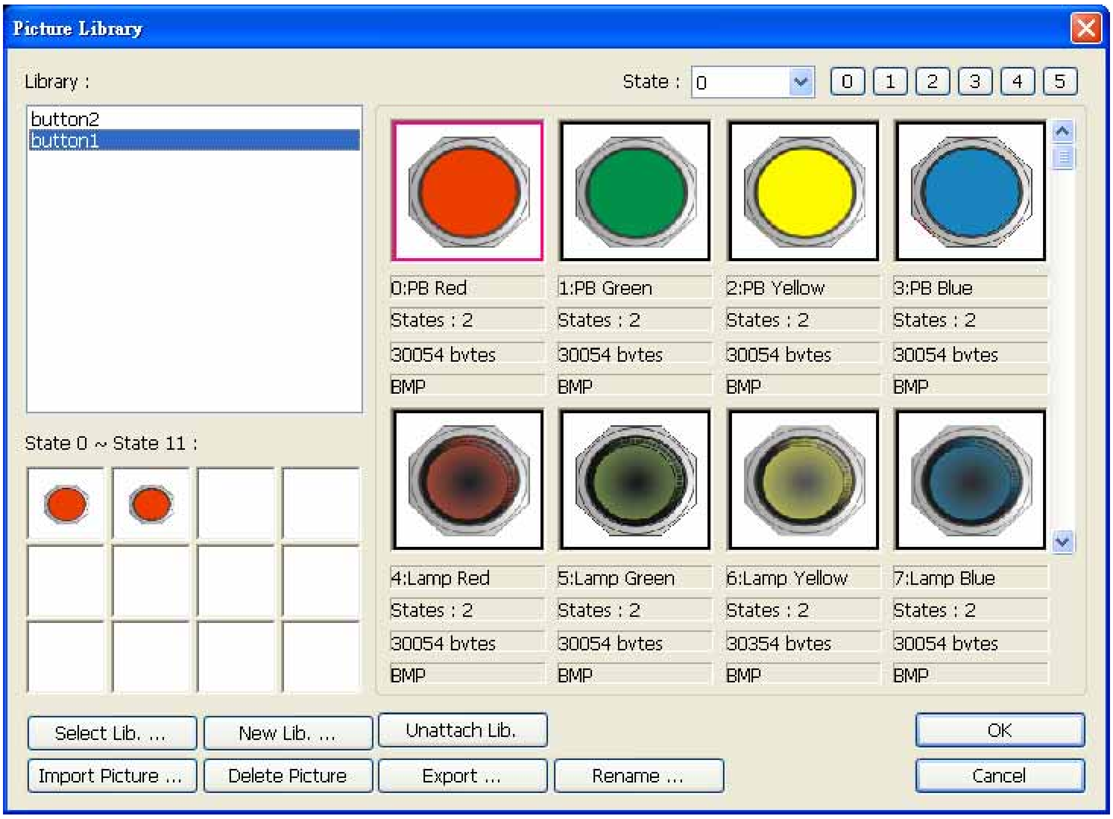


State : 0

Background :

(II) How to set [Picture Library …]

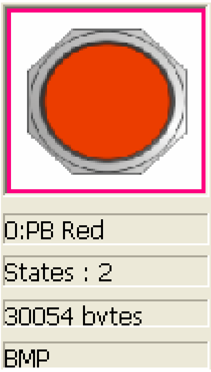
Click [Picture Library …] and a setting dialog box, as shown in the picture below, will be displayed. From the dialog box, you can see that the presently selected picture is marked with a red frame.



button2
button1

State : 0

| | | | |
|---|---|---|---|
| 0:PB Red | 1:PB Green | 2:PB Yellow | 3:PB Blue |
| States : 2 | States : 2 | States : 2 | States : 2 |
| 30054 bvtes | 30054 bvtes | 30054 bvtes | 30054 bvtes |
| BMP | BMP | BMP | BMP |
| 4:Lamp Red | 5:Lamp Green | 6:Lamp Yellow | 7:Lamp Blue |
| States : 2 | States : 2 | States : 2 | States : 2 |
| 30054 bvtes | 30054 bvtes | 30354 bvtes | 30054 bvtes |
| BMP | BMP | BMP | BMP |

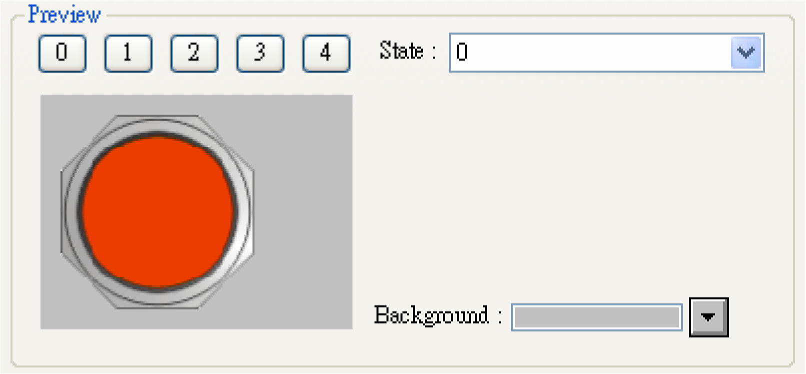


0:PB Red
States : 2
30054 bvtes
BMP

The above picture gives information of one of the Picture in the Picture Library as follows:

| | | |
|---|---|---|
| Picture name | : 0 : PB Red | the name of the Picture |
| Total states | : 2 | the number of the Picture states |
| Image size | : 30054 | the size of the Picture |
| BMP | : the format of the Picture; BMP means bitmap Picture and its format can be JPG or GIF. | |

Refer to the illustrations in the “Setting-up and using Shape Library and Picture Library” section for the details about all of the settings in the “Picture Library’s setting dialog box.” After completing all the settings and clicking [OK], the selected Picture will be applied to the object, as shown in the picture below.

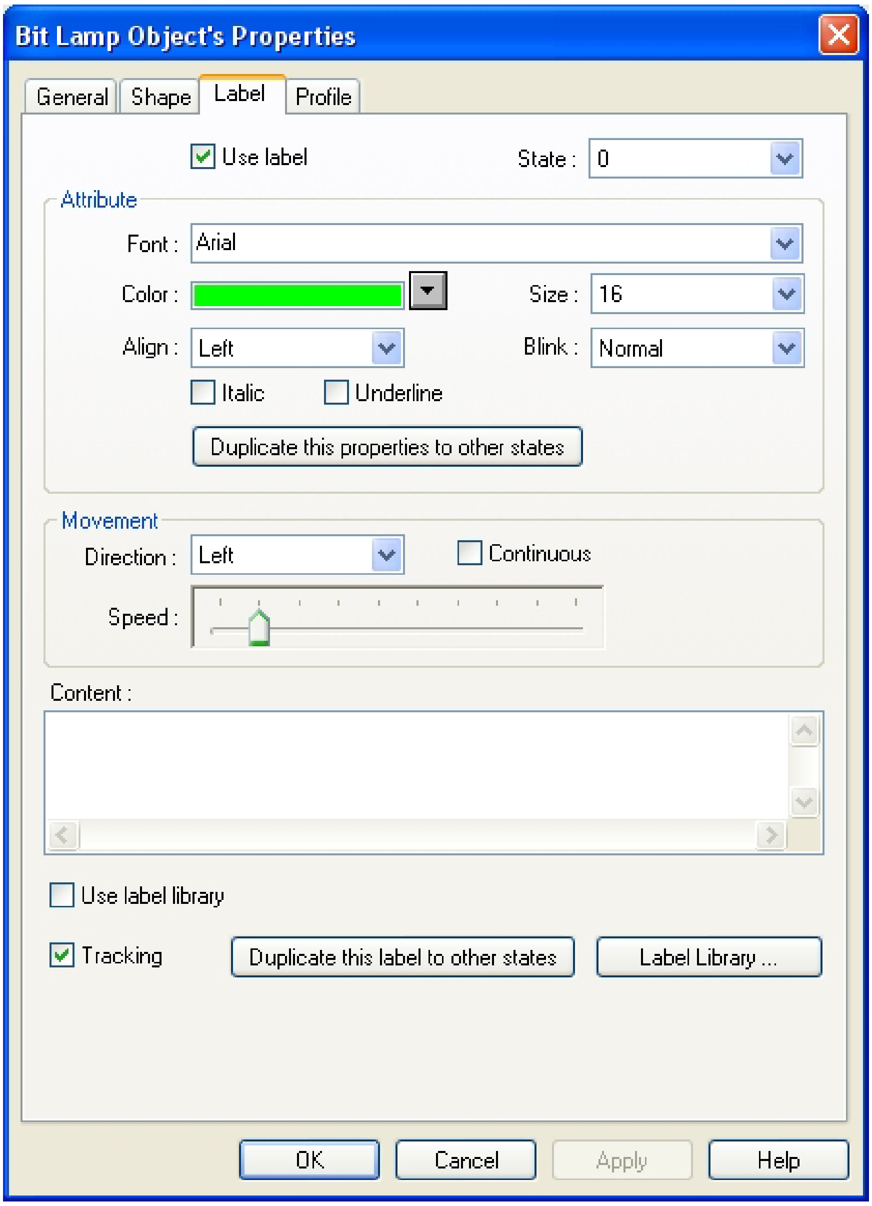


State : 0

Background :

4. Setting Text Content

See the picture below, go to the Bit Lamp Object's Properties menu and then click the [Label] tab, where you can set the text content that is going to be applied in the object.


Bit Lamp Object's Properties
General
Shape
Label
Profile
Attribute
Duplicate this properties to other states
Movement
Speed :
Content :
Duplicate this label to other states
Label Library ...
OK
Cancel
Apply
Help

☑ Use label  State : 0

Font : Arial

Color : 🟩  Size : 16

Align : Left  Blink : Normal

□ Italic  □ Underline

Direction : Left  □ Continuous

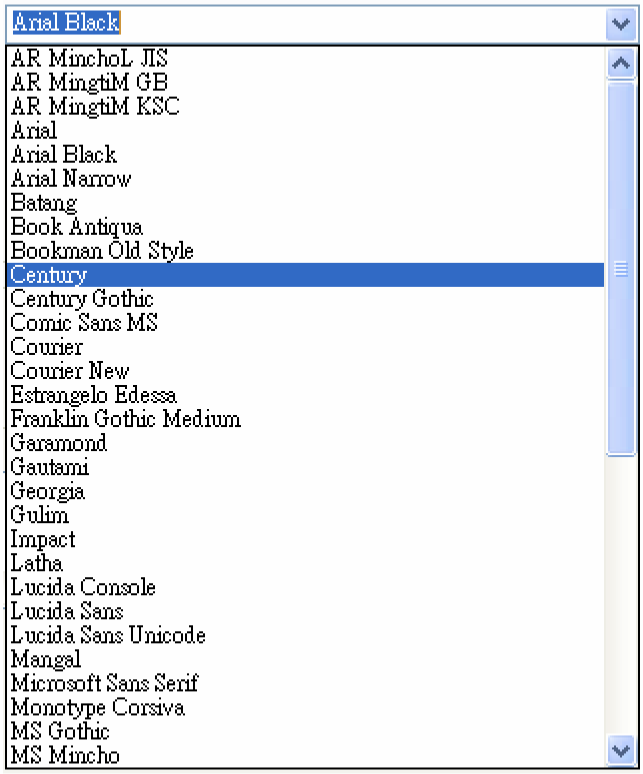
□ Use label library

☑ Tracking

Settings in "Attribute"

[Font]

[Font] is used to select the font for the text. The EB8000 supports WINDOWS's true-font. See the picture below.

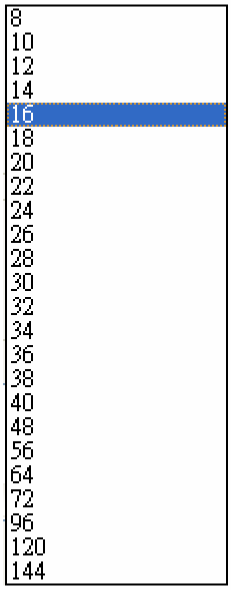


[Color]

[Color] is used to select the font color for the text.

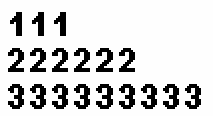
[Size]

[Size] is used to select the font size for the text. The EB8000 supports all the text sizes shown in the picture below.



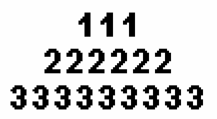
[Align]

[Align] is used to define the alignment method of the text input more than one line. The picture below shows how the lines of the text to be aligned by specifying “Left” in [Align].



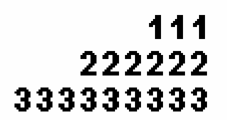
```
111
222222
333333333
```

The picture below shows how the lines of the text to be aligned by specifying “Center” in [Align].



```
   111
 222222
333333333
```

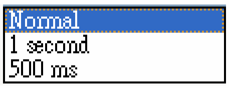
The picture below shows how the lines of the text to be aligned by specifying “Right” in [Align].



```
      111
   222222
333333333
```

[Blink]

[Blink] is used to define how the text blinks. There are three options in text blinking setting: specifying “Normal” for non-blinking text, or specifying the blinking speed to be “1 second” or “500 ms” for blinking text.



[Italic]

[Italic] is used to set whether or not to use italics.

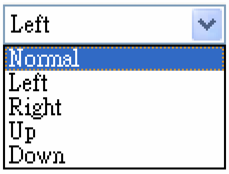
*Italic Label*

[Underline]

[Underline] is used to set whether or not to underline the text.

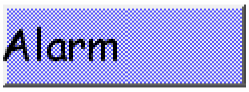
Settings in “Movement”

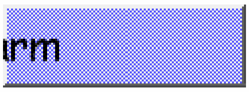
[Direction]
[Direction] is used to set the direction of the text movement while using the marquee effect, which is available in a choice of directions shown in the picture below:



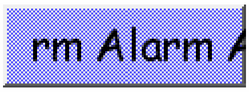
[Continuous]
When setting to use the marquee effect, the text in the picture below will be displayed in two ways:

When not selecting [Continuous], the latter text will emerge only after the former text disappears completely. See the picture below.





When selecting [Continuous], the text will emerge continuously.



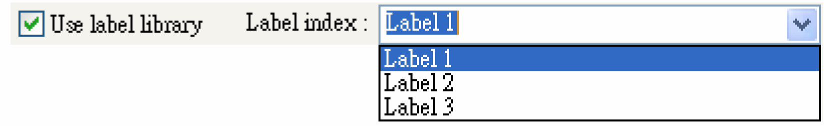
[Speed]
[Speed] is used to set the speed of the text movement.

[Content]

[Content] is used to set the content of the text. If using the Label Library, the content will be sourced from the Label Library.

[Use label library]

See the picture below, the content of the text will be sourced from the Label Library by selecting [Use label library].



☑ Use label library Label index : Label 1

[Tracking]

When selecting [Tracking], moving the text of some state will also move the text of other states.

[Duplicate this label to other states]

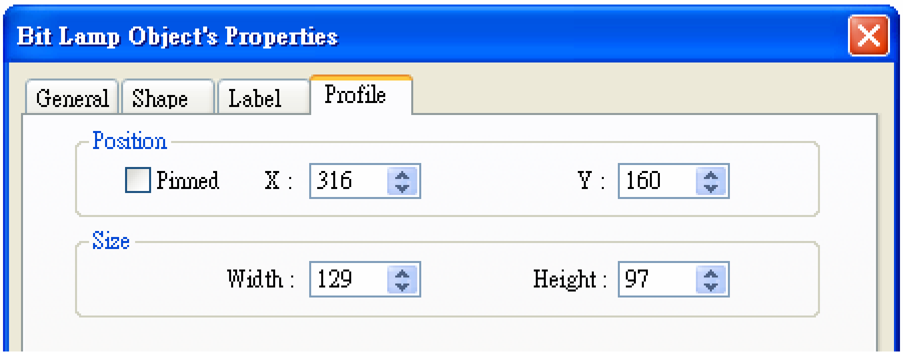
This function can be used to duplicate the present text content to the other states.

[Label Library …]

Refer to the illustrations in the “Setting-up and using Text and Label Library” section to view the content of label library.

5. Adjusting Profile Size

See the picture below, go to the Bit Lamp Object's Properties menu and then click the [Profile] tab to adjust the position and size of the object.



Position
□ Pinned X : 316 Y : 160

Size
Width : 129 Height : 97

Settings in "Position"

[Pinned]

Pinning the settings of the position and size of the object by selecting [Pinned], and the position and size of the object will not be able to be changed.

[X] and [Y] are the coordinates on the top left-hand corner of the object.

Settings in "Size"

[Width]

[Width] is used to adjust the width of the object.

[Height]

[Height] is used to adjust height of the object.

# Chapter 10 Object's Security Guard

The EB8000's object's security guard includes two parts:

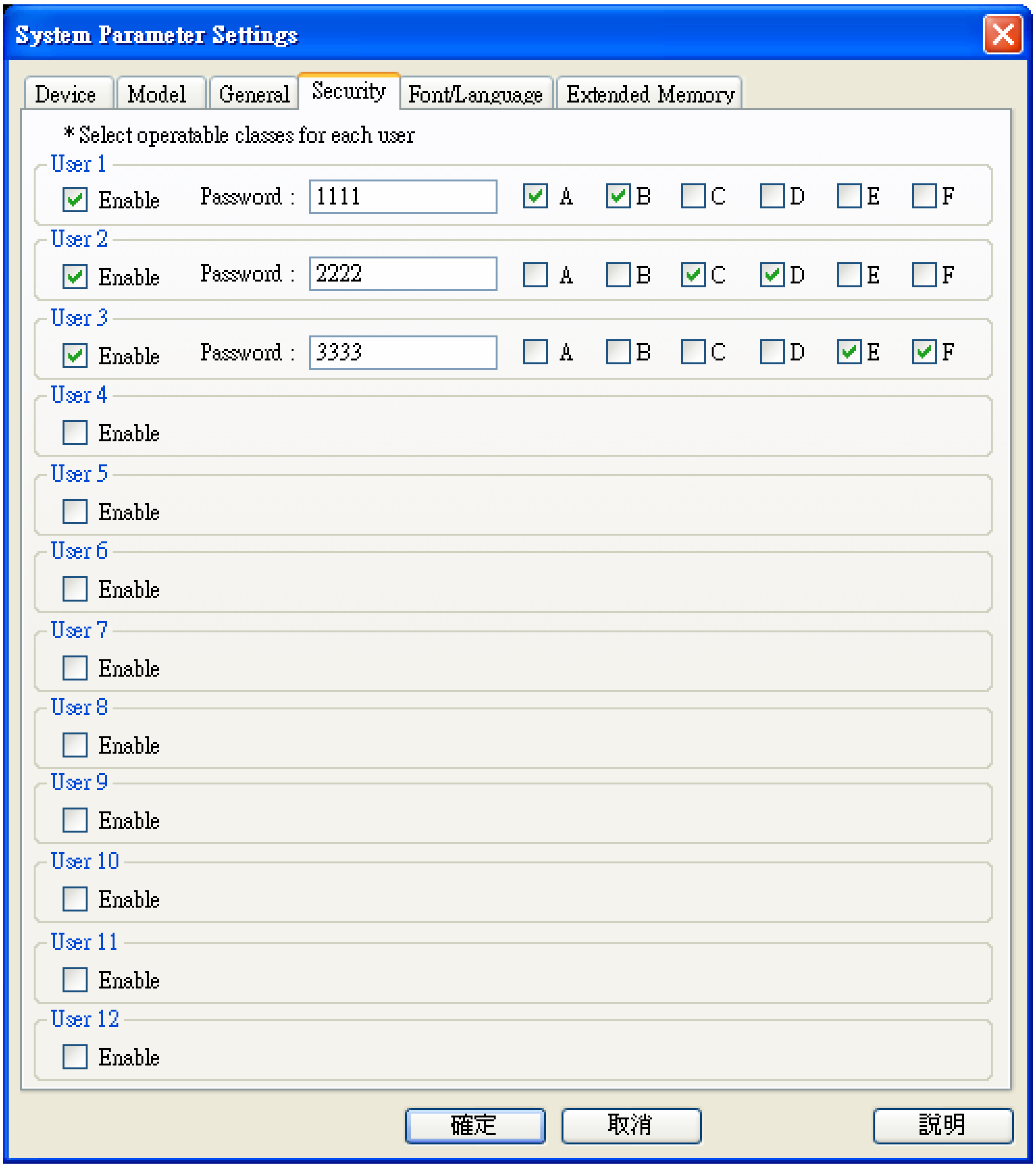
1. User password and operating object's setting
2. Object's Safety

1. User password and operating object's setting

Users can set the passwords and restrictions in the [Security] tab of [System parameters]..

In the EB8000, the object has 7 items, including "none", and "A~F".

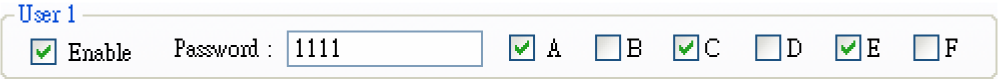
Each group of password must consist of 0-9 digits and the maximum passwords for users are 12sets.



* Select operatable classes for each user

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| User 1 | ☑ Enable | Password : 1111 | ☑ A | ☑ B | □ C | □ D | □ E | □ F |
| User 2 | ☑ Enable | Password : 2222 | □ A | □ B | ☑ C | ☑ D | □ E | □ F |
| User 3 | ☑ Enable | Password : 3333 | □ A | □ B | □ C | □ D | ☑ E | ☑ F |
| User 4 | □ Enable | | | | | | | |
| User 5 | □ Enable | | | | | | | |
| User 6 | □ Enable | | | | | | | |
| User 7 | □ Enable | | | | | | | |
| User 8 | □ Enable | | | | | | | |
| User 9 | □ Enable | | | | | | | |
| User 10 | □ Enable | | | | | | | |
| User 11 | □ Enable | | | | | | | |
| User 12 | □ Enable | | | | | | | |

After user fill in password, EB8000 will be following the security setting to limit the user to operate objects. For example, when user 1 operating class as below illustration, this user is permitted to operate "None", and A, C, E objects.



User 1

☑ Enable Password : 1111 ☑ A □ B ☑ C □ D ☑ E □ F

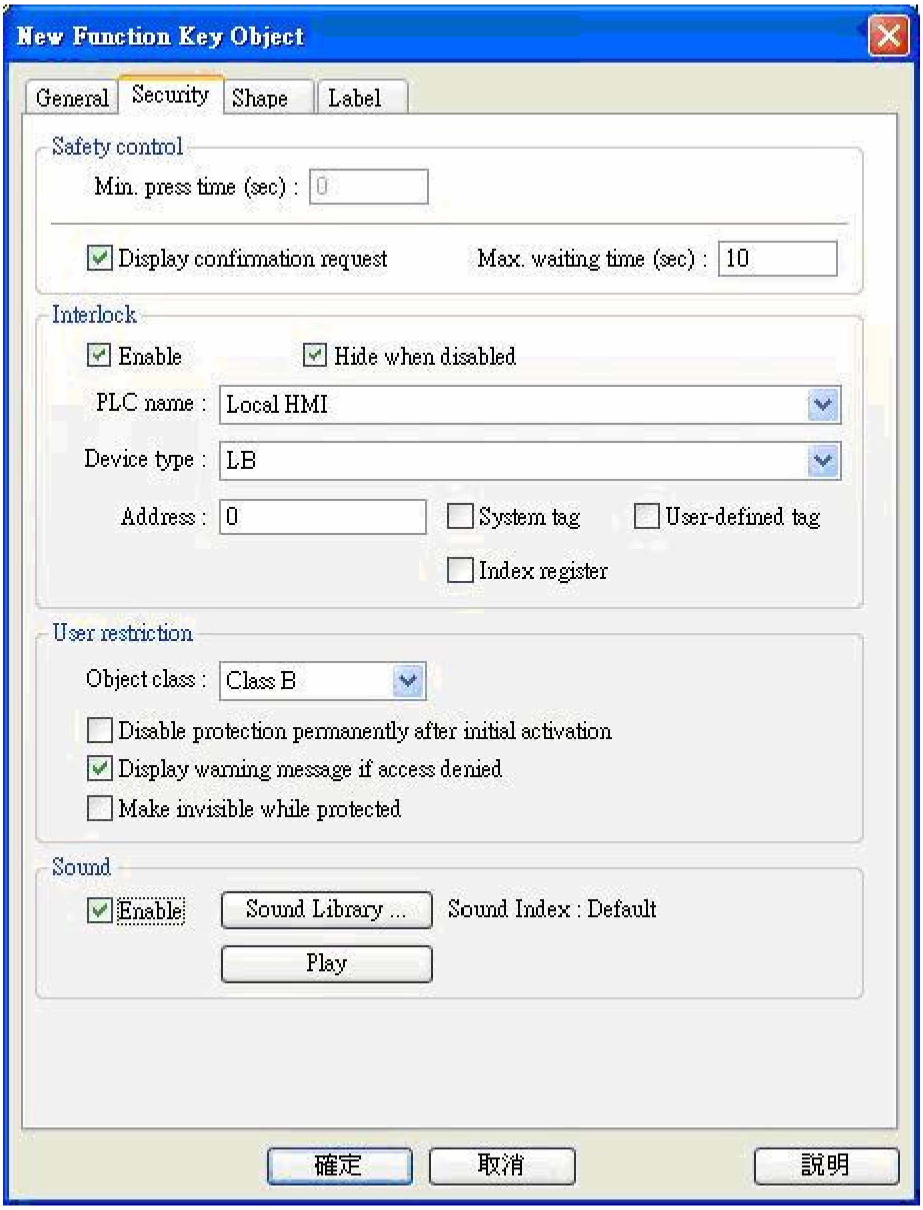
In addition to inputting the passwords to the system reserved [LW9220] register, which is a double words value, a correct process of password setting requires that users have to use [LW9219] to appoint the existing user. In [LW9219], it is necessary to use the digits 1~12 to represent User 1 ~ User 12 respectively.
When MT8000 is operated, user 1 to user 12 can read data of [LW9500] to [LW9522], totally 24 words.

Users can change passwords even when the MT8000 is in operation. By using the system reserved register [LB9061], when switching its state from OFF to ON, the EB8000 will use the data saved in the system reserved registers from [LW9500] to [LW9522] to update the password table, and the new passwords will be available immediately. There is something important here that the user's operation level will never be changed when the password table is updated.

To switch the current user can use [LW9050] (user logout), when [LW9050] state from ON to Off; at this time, the user only can operate the object of "class none".

Otherwise, [LW9222] record current user restrictions, bit0 = 1 means user restriction is class A; bit1=1 means user restriction is class B and so on.

2. Object’s Safety



New Function Key Object

General | Security | Shape | Label

Safety control

Min. press time (sec) : 0

☑ Display confirmation request    Max. waiting time (sec) : 10

Interlock

☑ Enable    ☑ Hide when disabled

PLC name : Local HMI

Device type : LB

Address : 0    □ System tag    □ User-defined tag

□ Index register

User restriction

Object class : Class B

□ Disable protection permanently after initial activation

☑ Display warning message if access denied

□ Make invisible while protected

Sound

☑ Enable    Sound Library ...    Sound Index : Default

The above picture shows the content of Object’s Safety, which is divided into several parts:

a. Safety control

b. Interlock

c. user restriction

d. Sound

a. Safety control

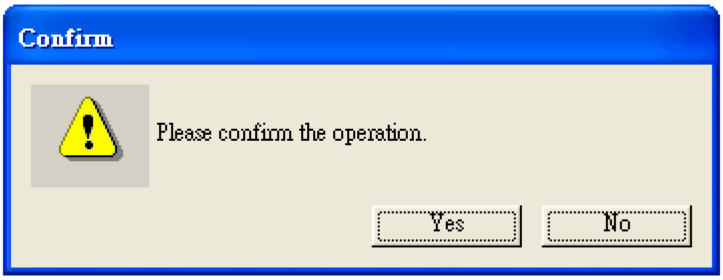
“Safety control” is mainly used to avoid operator’s incorrectly controlling an object in an unawareness situation. At present there are two methods of protection:

[Min. press time (sec)]

If only the time of continuously pressing an object is not less than the value of [Min. press time (sec)], users can operate the object successfully.

[Operator confirm]

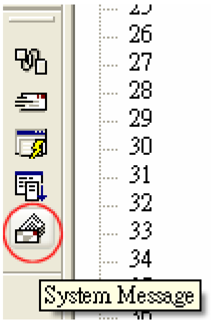
After pressing the object, a dialogue box, as shown in the picture below, will display, the operator can decide whether or not to perform the operation according to the real situation. The dialogue box will close automatically when the time of the operator making the decision on whether or not to perform the operation is longer than the value of [Max. waiting time (sec)].

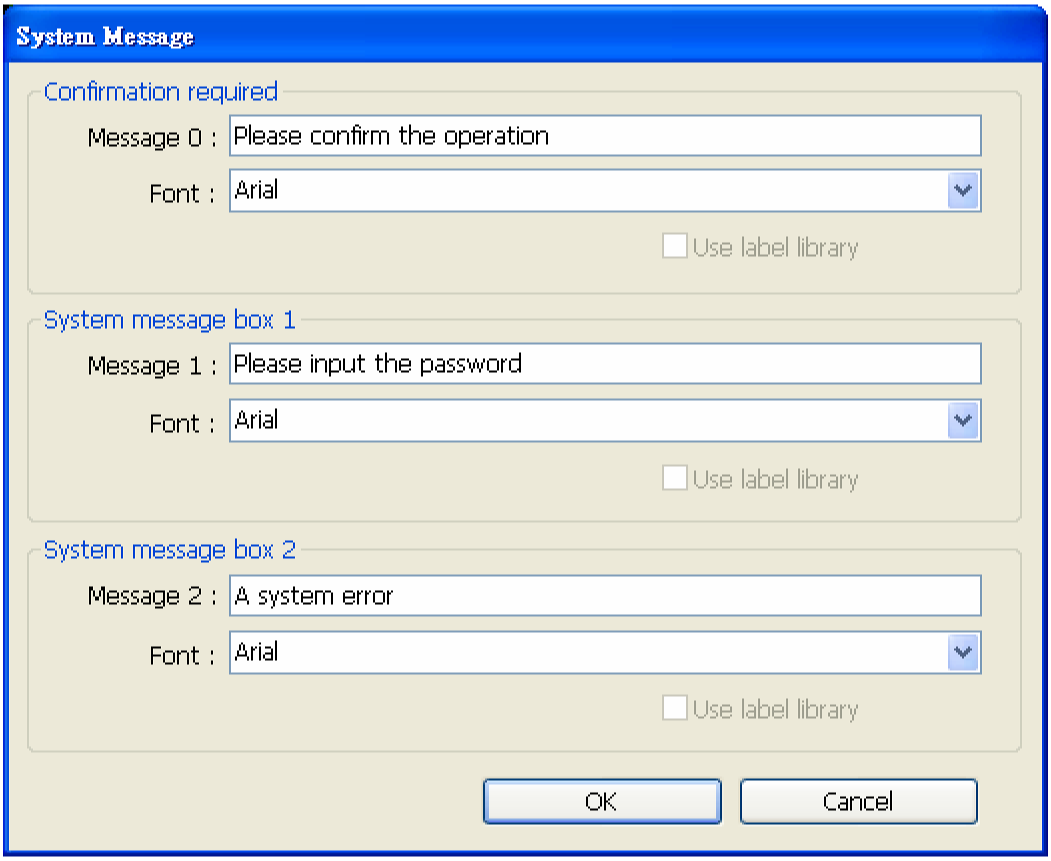


Confirm

Please confirm the operation.

Message text ( “Please confirm the operation.” above) in the window is defined in [System Message]. Text can be changed from [System Message] dialog. Click System Message icon from tool bar and then System Message dialog appears. First part is set for operation confirmation.





System Message

Confirmation required

Message 0 : Please confirm the operation

Font : Arial

□ Use label library

System message box 1

Message 1 : Please input the password

Font : Arial

□ Use label library

System message box 2

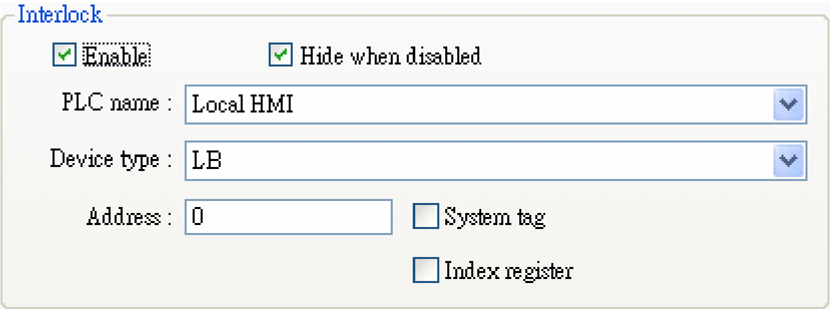
Message 2 : A system error

Font : Arial

□ Use label library

b. Interlock

When the function is applied to an object, whether or not to allow the object to be operated will decide the state of the appointed bit address (or called "Enable" address). "Enable" address must be in bit address format. The content of the address can be set in a dialogue box as shown in the picture below.



Interlock

☑ Enable ☑ Hide when disabled

PLC name : Local HMI

Device type : LB

Address : 0 □ System tag

□ Index register

Fox example, supposed that the "Enable control" function is applied to some "Set Bit" object and the "Enable" bit address is set to [LB0], then the "Set Bit" object can be operated when the state of [LB0] is ON. The "Enable control" function also provides the following settings.

[Enable]

The “Enable control” function can be used by selecting the check box

[Hide when disabled]

When using the “Enable control” function and the state of “Enable” bit address is set to OFF, the object will be hidden.

c. User restriction

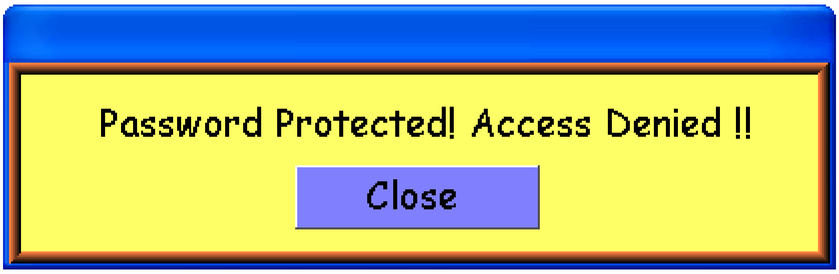
This function can be used to set the object’s operation , deciding which level’s operator is permitted to operate the object. When “Operator level” is selected as ”None”, it means the operation is open to the operators of all levels. The following settings are also available in the function:

[Disable protection permanently after initial activation]

Once the operator’s current operation level conforms to the operation condition of the object, the system will stop checking the operation level of the object for good. In that case, even if the current security level is lower than the object’s operation level, it will not affect the operation of the object.

[Display warning message if access denied]

When the operator’s current security level does not conform to the operation condition of the object, a warning dialogue box, as shown in the picture below, will display when pressing the object.



Password Protected! Access Denied !!

Window 7 is set as alert message for authority security. Users can design the content of the message.

[Make invisible while protected]

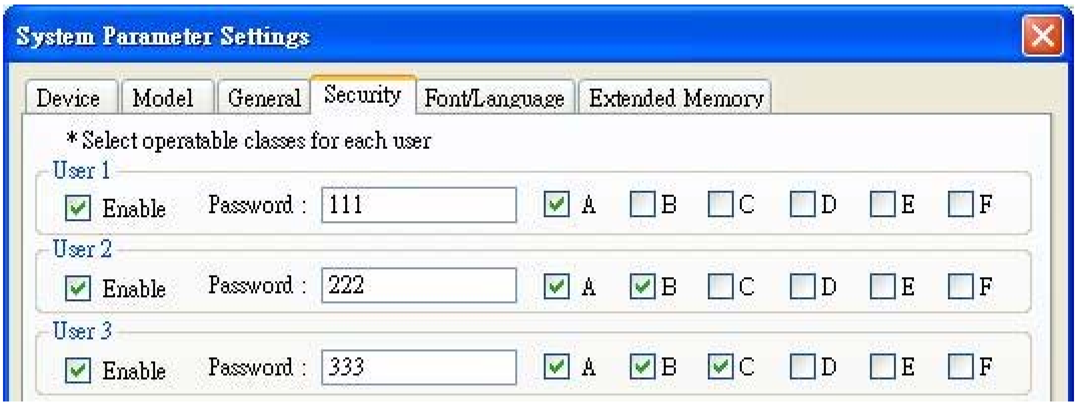
When the operator’s security level does not conform to the operation condition of the object, the object will be hidden.

d. Sound

Each object can be set to use the buzzer or not individually. The EB8000 also provides the reserved register [LB9019] as a switch of Buzzer. When the state of [LB9019] is OFF, the buzzer can be used. When restarting the machine, the EB8000 will use the state of the previous setting.

An example for security as below.

First, building a new project, and go to system parameter-> security, and then enable three users to set different password and class.



* Select operatable classes for each user

User 1

☑ Enable Password : 111 ☑ A □ B □ C □ D □ E □ F

User 2

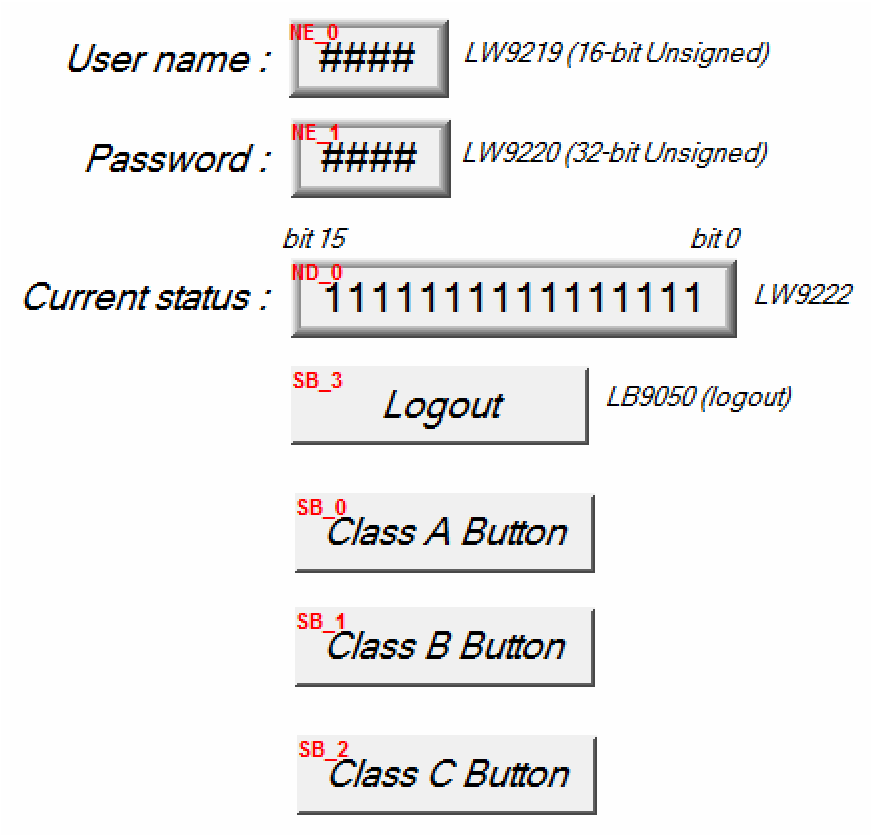
☑ Enable Password : 222 ☑ A ☑ B □ C □ D □ E □ F

User 3

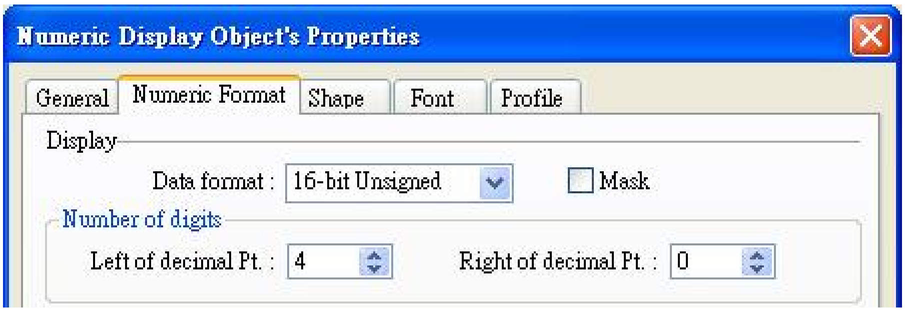
☑ Enable Password : 333 ☑ A ☑ B ☑ C □ D □ E □ F

User 1 can operate object A, user 2 can operate object A and B, user 3 can operate object A, B, and C.

Setting objects in Window_10 as below illustration.



[NE_0] and [NE_1] are numeric input, address are [LW9219] and [LW9220] for enter user ID and password. [LW9219] is for enter user ID(1~12), the length is 1 word, so this object need to choose 16-bit Unsigned data format, as below illustration.



Display

Data format : 16-bit Unsigned

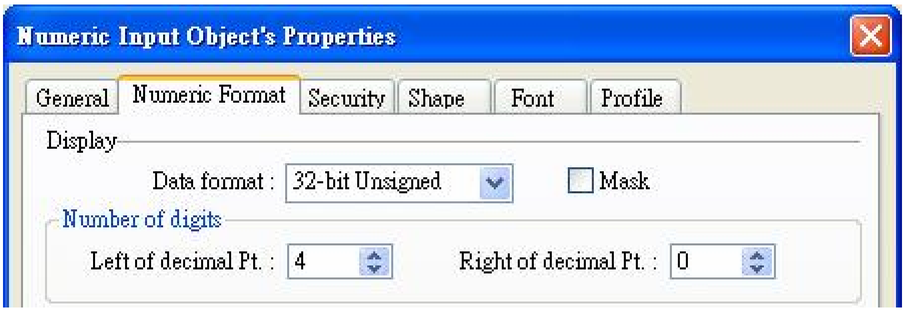
□ Mask

Number of digits

Left of decimal Pt. : 4

Right of decimal Pt. : 0

[LW9220] is for enter user password, the length is 2 words, so this object need to choose 32-bit Unsigned data format, as below illustration.



Display

Data format : 32-bit Unsigned

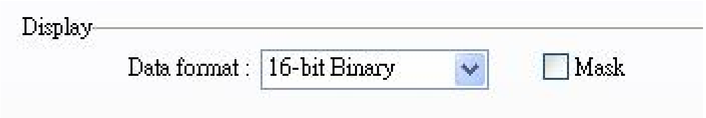
□ Mask

Number of digits

Left of decimal Pt. : 4

Right of decimal Pt. : 0

[ND_0] is numeric display object, address is [LW9222]. This is shown user's state. The data format is 16-bit Binary.

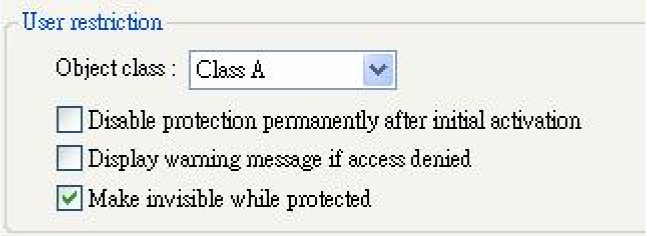


Display

Data format : 16-bit Binary

□ Mask

[SB_0]~[SB_2] are Set Bit objects, these three objects choose different class, but all select "Make invisible while protected". [SB_0] is class A, [SB_1] is class B, [SB_2] is class C. the setting of [SB_0] as below illustration.



User restriction

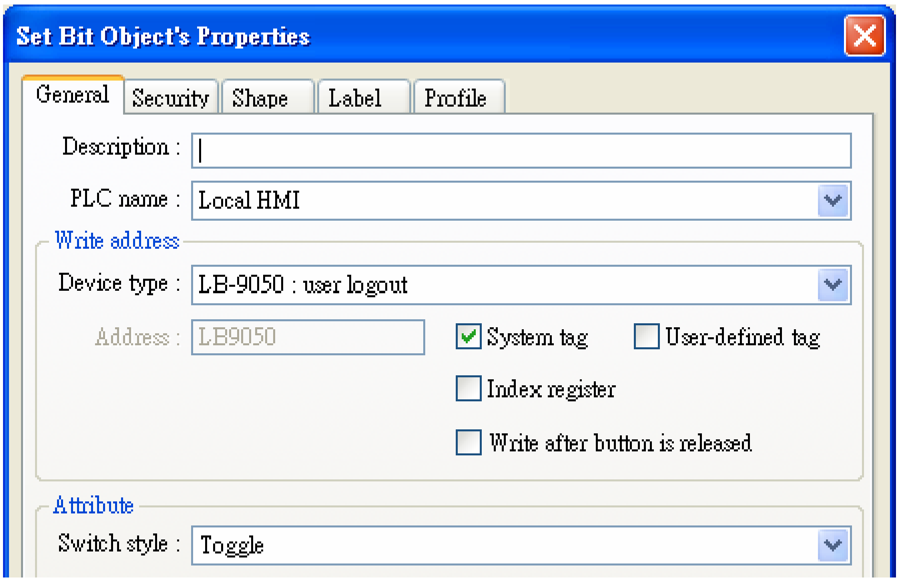
Object class : Class A

□ Disable protection permanently after initial activation

□ Display warning message if access denied

☑ Make invisible while protected

The Set Bit object(SB_3, LB9050) is for user logout, refer below illustration.



Set Bit Object's Properties

Description :

PLC name : Local HMI

Write address

Device type : LB-9050 : user logout

Address : LB9050

☑ System tag

□ User-defined tag

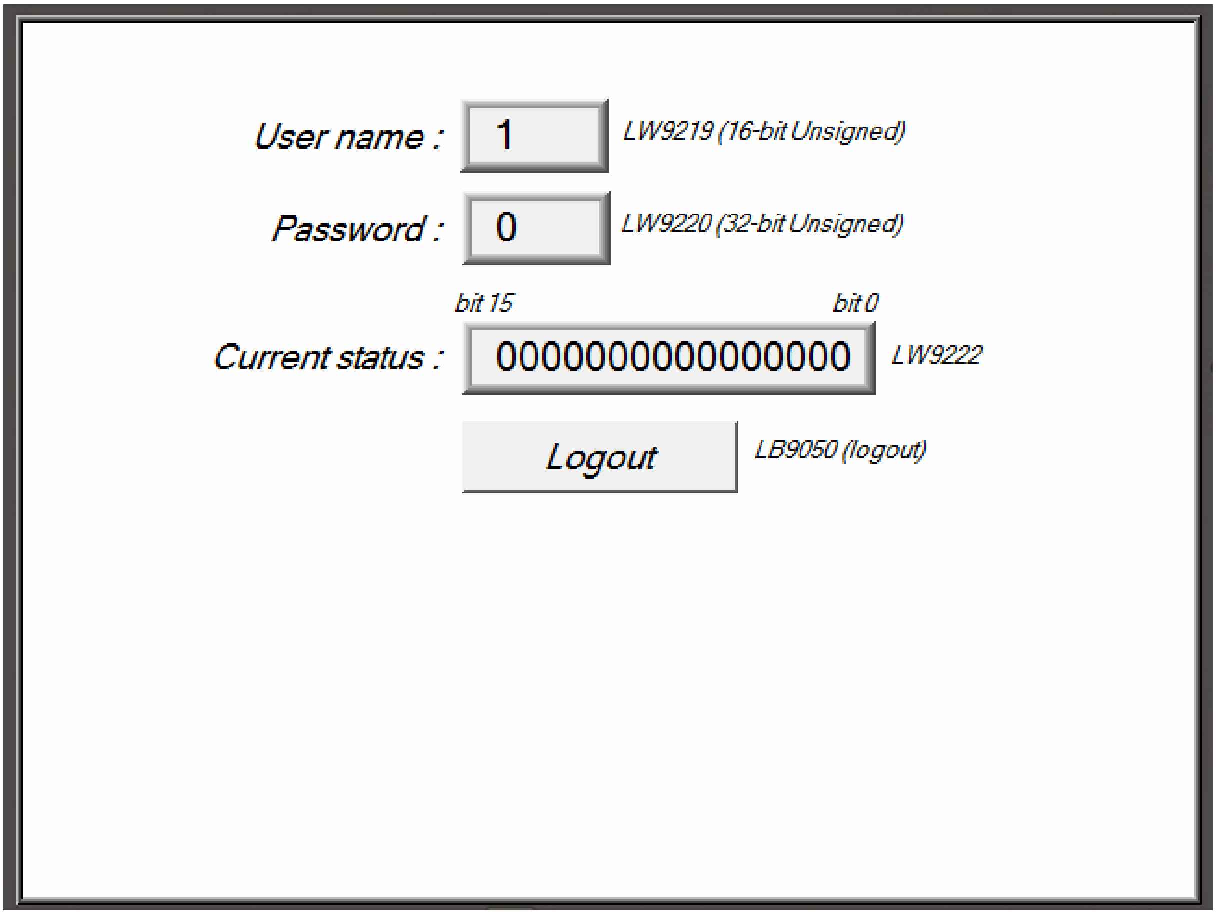
□ Index register

□ Write after button is released

Attribute

Switch style : Toggle

After finishing project, saving and compiling project, the illustration as below is initial screen in off-line simulation, at this time, no password has been enter, so [ND_0] is shown "00000000000000", it means the user only can use object of "none", moreover, [SB_0]~[SB_2] belong to class A~ class B and select "Make invisible while protected", so [SB_0]~[SB_2] will be hidden.



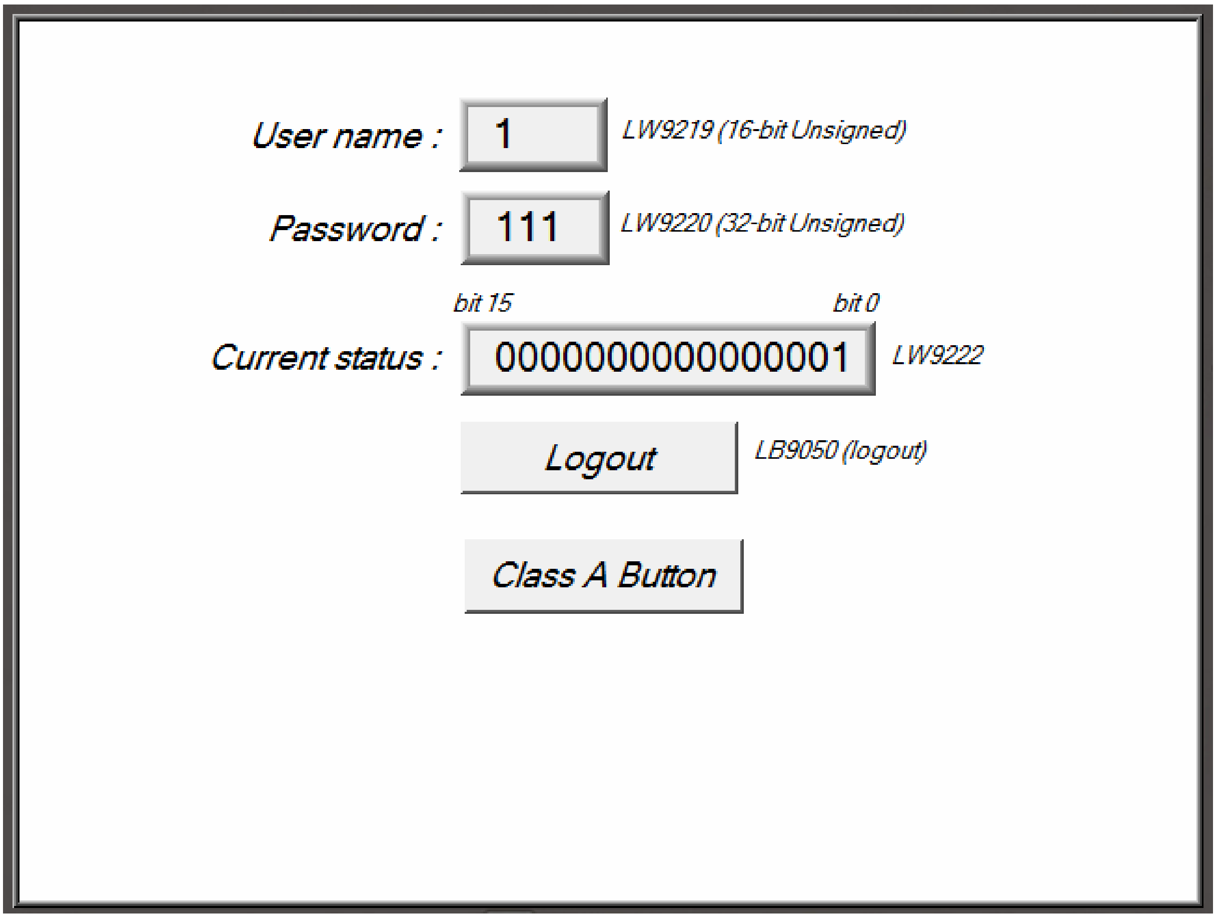
User name : 1 LW9219 (16-bit Unsigned)

Password : 0 LW9220 (32-bit Unsigned)

bit 15 bit 0

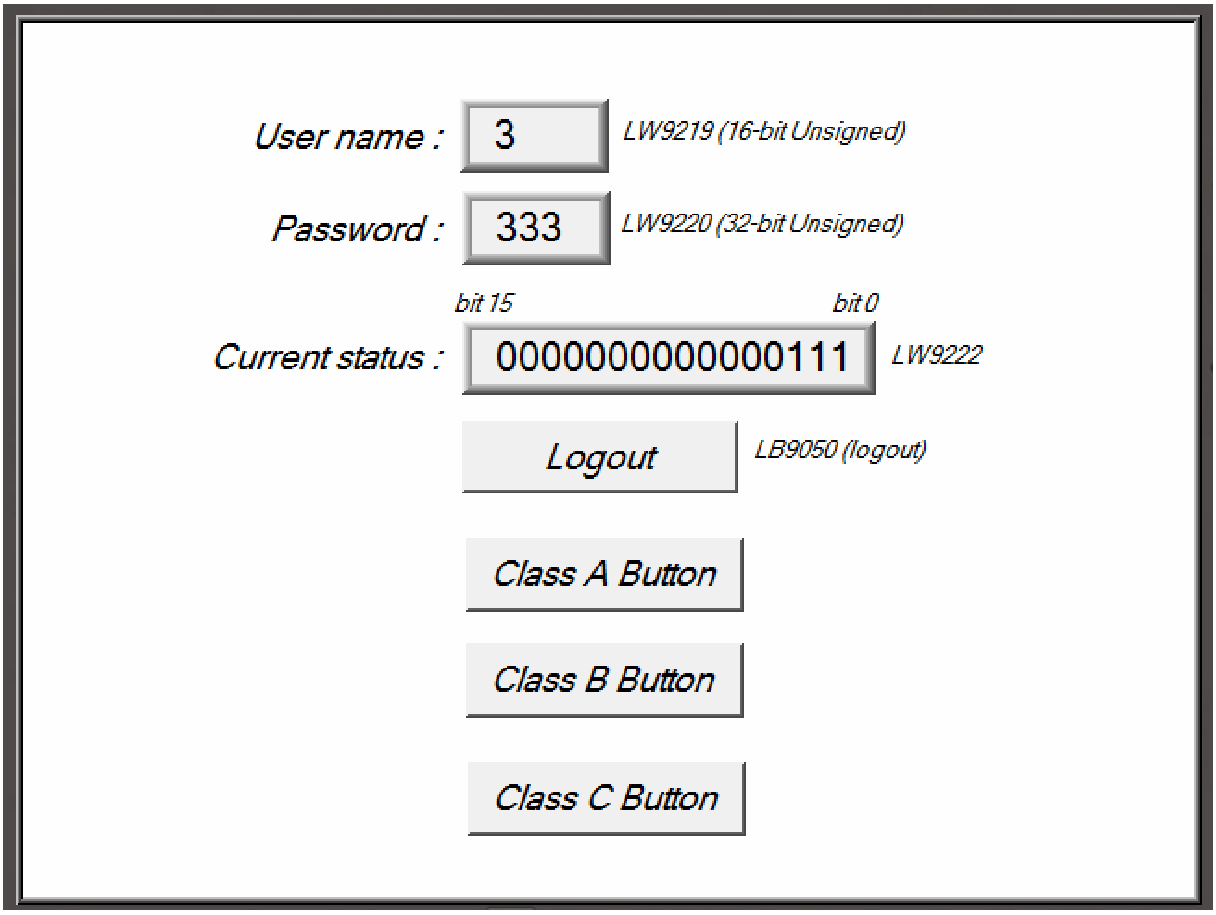
Current status : 0000000000000000 LW9222

After User enter the password (111) completely, the screen as below,



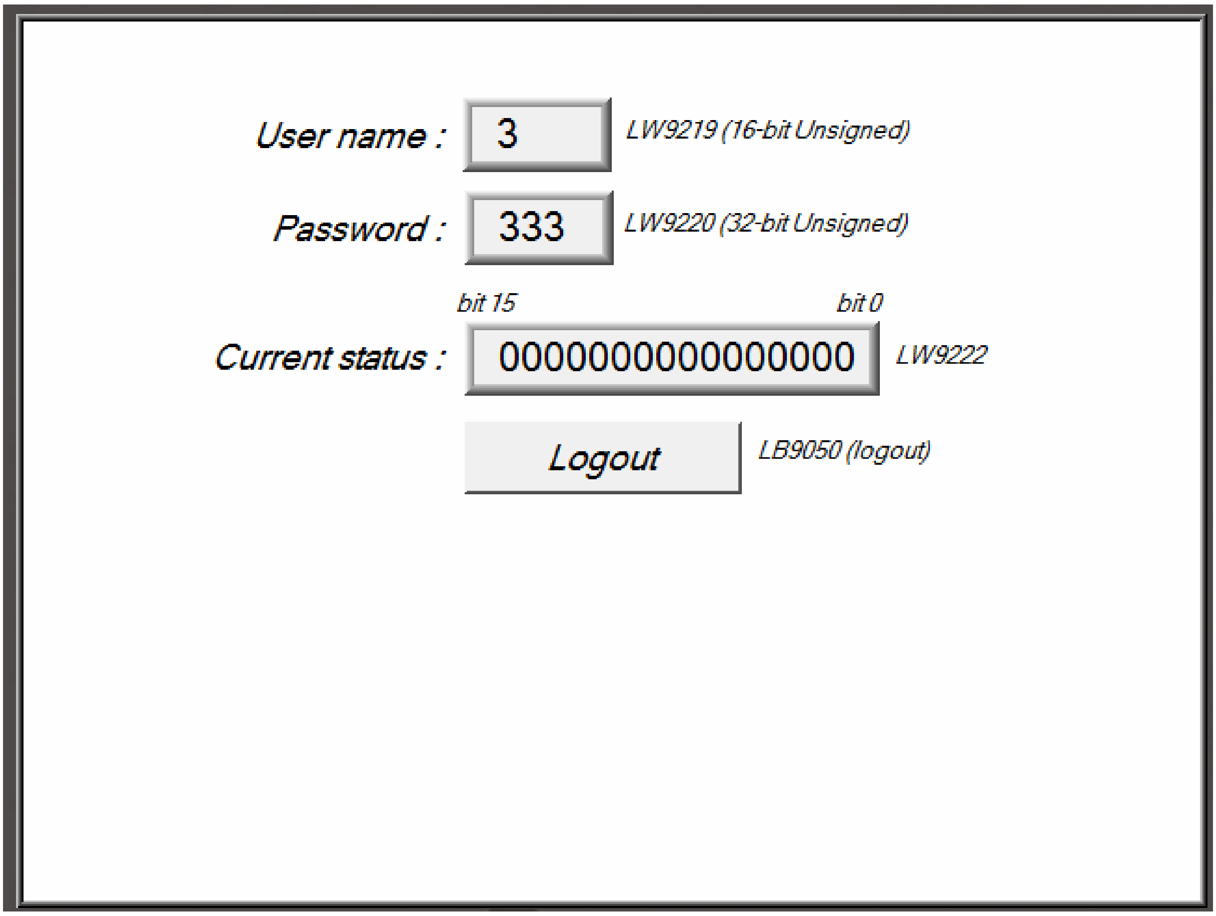
The user 1 is permitted to use object of class A, so [SB_0] appeared and allow user to operate. Now, [LW9222] bit 0 became 1, it means the user is allow to use object of class A.

Next, user enter the user 3's password (333), the screen as below,



From above illustration, user 3 is permitted to use object of class A, B and C. now, [LW9222] bit0~bit 3 all became 1, it means the user is allow to use object of class A, B and C.

Therefore, if press [SB_3] to logout, the system will return to initial state, and user is not allow to operate the object that is not belong to “none”.



User name : 3 LW9219 (16-bit Unsigned)

Password : 333 LW9220 (32-bit Unsigned)

bit 15 bit 0

Current status : 0000000000000000 LW9222

LB9050 (logout)

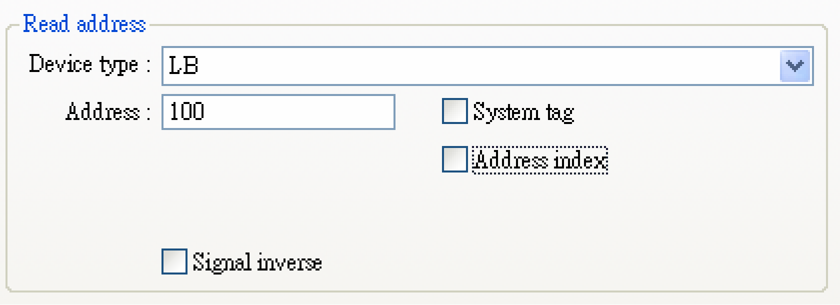
# Chapter 11 Index Register

Address Index

The EB8000 provides 16 index registers, and that enables users to enjoy a more flexible approach to application of the addresses. The addresses of the 16 index registers are as follows:

| | |
|---|---|
| INDEX 0 | [LW9200] (16-bit) |
| INDEX 1 | [LW9201] (16-bit) |
| INDEX 2 | [LW9202] (16-bit) |
| INDEX 3 | [LW9203] (16-bit) |
| . | |
| . | |
| INDEX 14 | [LW9214] (16-bit) |
| INDEX 15 | [LW9215] (16-bit) |

Here is an example to describe how to use the index registers. See the picture below, the “Read address” will be read as [LB100] while [Address index] is not selected.



Read address

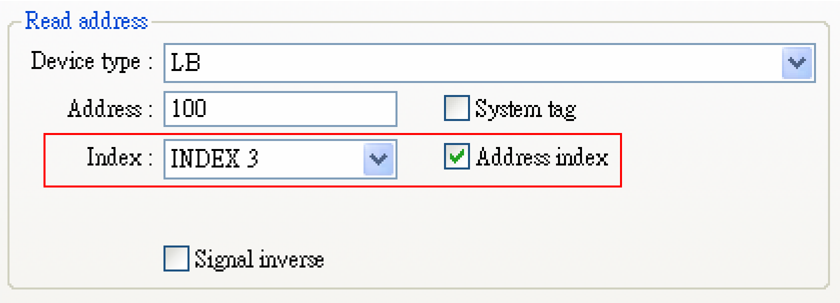
Device type : LB

Address : 100 □ System tag

□ Address index

□ Signal inverse

But in the picture below, the “Read address” becomes [LB(100 + INDEX3)] while [Address index] is selected, and INDEX3 represents the data at Index Register 3 or the [LB9023] address; in other words, if the data at the [LB9023] address is 5, the “Read address” in the picture below became [LB105].



Read address

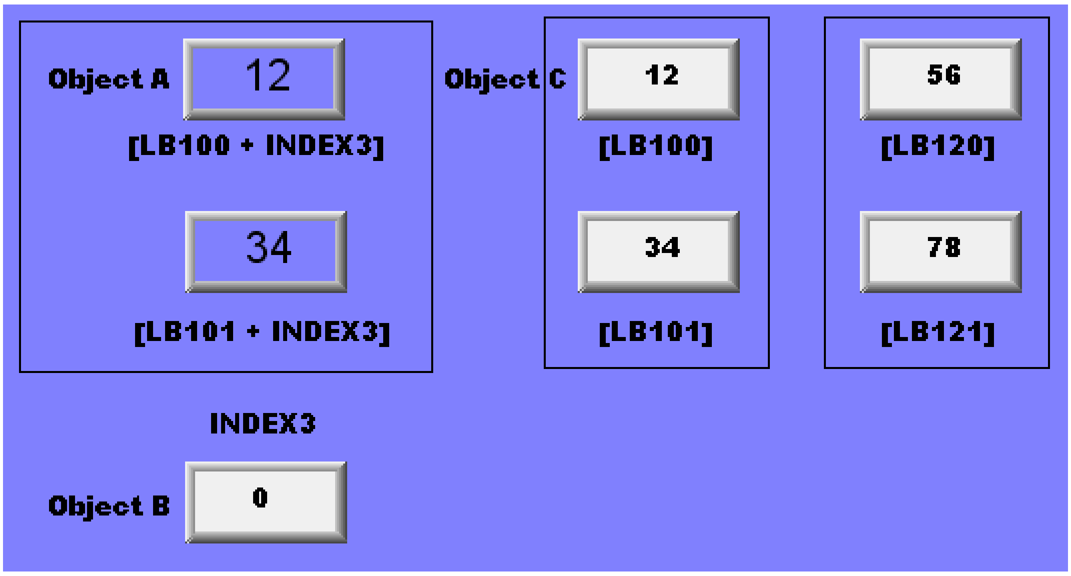
Device type : LB

Address : 100 □ System tag

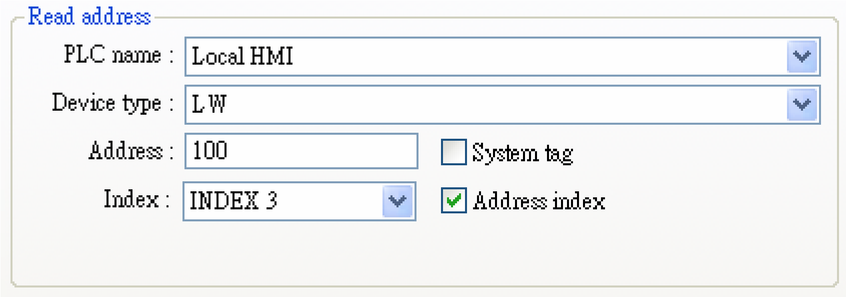
Index : INDEX 3 ☑ Address index

□ Signal inverse

By making use of the index registers, users can change object's reading and writing addresses online without changing the object's content. For example, in the picture below, INDEX3 is 0, and that means the data at the [LB9023] address is 0, so to reading the content of [LB100 + INDEX3] and [LB101 + INDEX3] means to read the content of [LB100] and [LB101].



At this time, the setting of Object A's "Read address" is as follows:



Read address

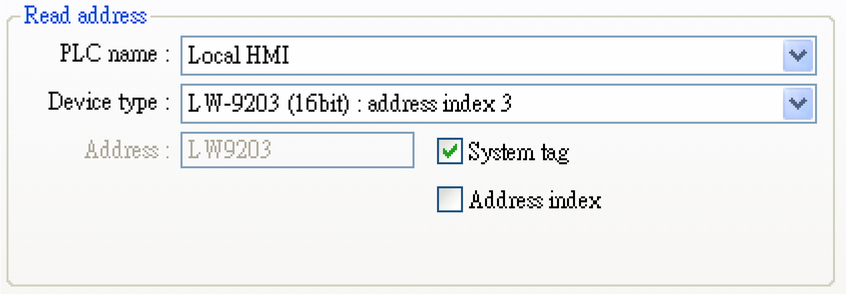
PLC name : Local HMI

Device type : LW

Address : 100 □ System tag

Index : INDEX 3 ☑ Address index

And the setting of Object B's "Read address" is as follows:



Read address

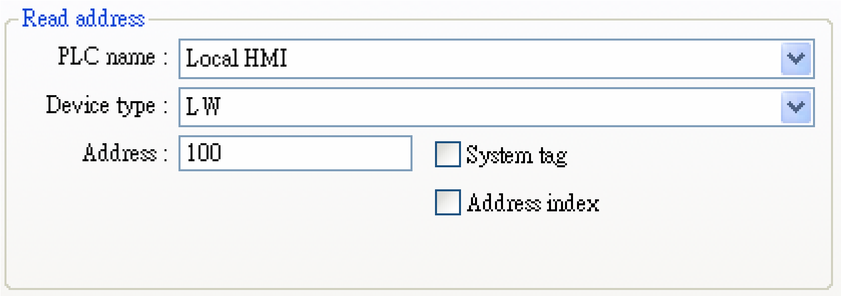
PLC name : Local HMI

Device type : LW-9203 (16bit) : address index 3

Address : LW9203 ☑ System tag

□ Address index

And the setting of Object C’s “Read address” is as follows:



Read address

PLC name : Local HMI

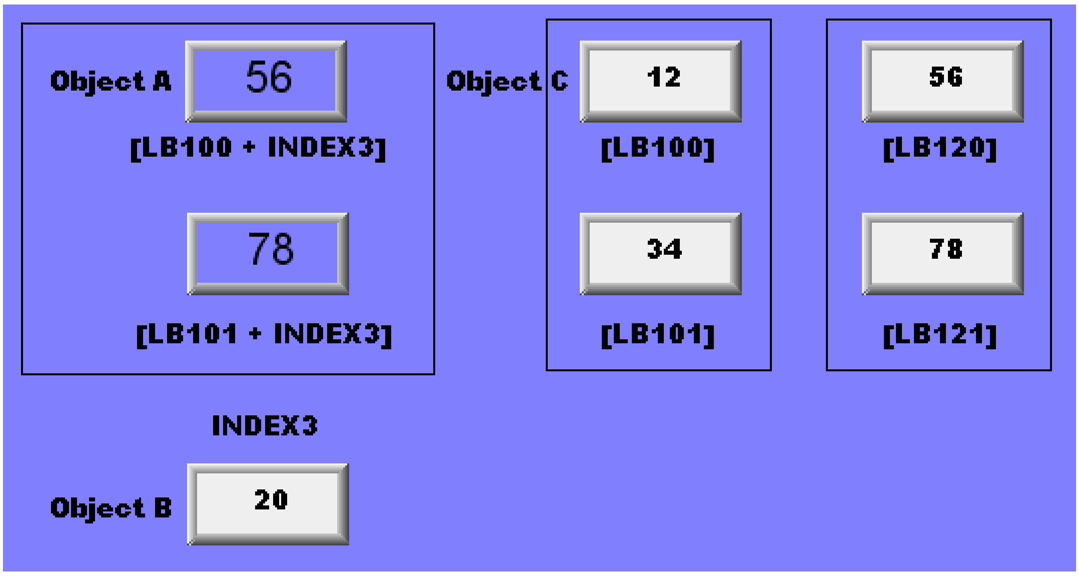
Device type : LW

Address : 100

□ System tag

□ Address index

If you set INDEX3 to 20, reading the content of [LB100 + INDEX3] and [LB101 + INDEX3] will mean to read the content of [LB120] and [LB121]. Refer to the picture below.

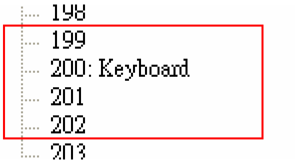


# Chapter 12    Designing and Using Keypad

Both “Numeric Input” and “ASCII Input” have to use a keypad as an inputting tool. The following description shows how to design a keypad.

Step 1

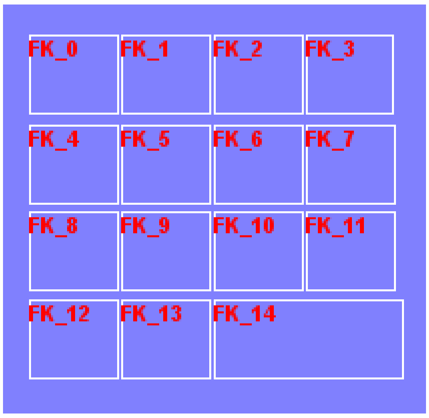
Set up a window which is intended as a keypad and open it. For example, set WINDOW 200 as the window for a keypad.



198
199
200: Keyboard
201
202
203

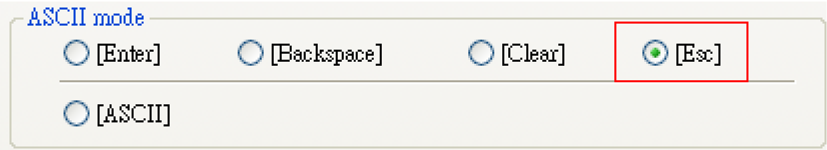
Step 2

Adjust the height and width of WINDOW 200 and on it set up a variety of objects as Function Keys. Different input signals will be made by pressing different Function Key objects.



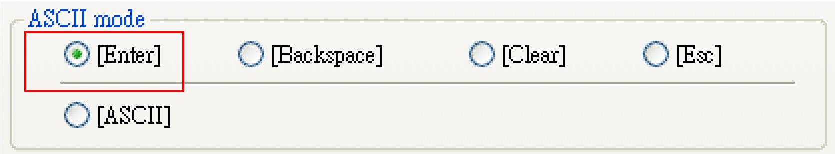
FK_0 FK_1 FK_2 FK_3
FK_4 FK_5 FK_6 FK_7
FK_8 FK_9 FK_10 FK_11
FK_12 FK_13 FK_14

The Function Key objects on WINDOW 200 are arranged as shown in the picture above. It is a must to select [ASCII mode] to set up all of the Function Key objects. Among the objects, the FK_11 is used as the “Escape (Esc)” key. See the picture below for the setting.



ASCII mode
○ [Enter] ○ [Backspace] ○ [Clear] ● [Esc]
○ [ASCII]

And the FK_12 is used as the “ENTER” key. See the picture below for the setting.

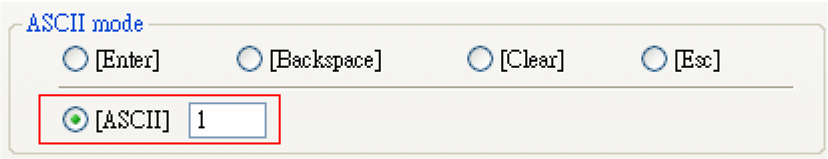


ASCII mode

● [Enter] ○ [Backspace] ○ [Clear] ○ [Esc]

○ [ASCII]

Most of the other Function Keys are used to input numbers or text. For example, the FK_0 is used to input the number “0”. See the picture below for the setting.

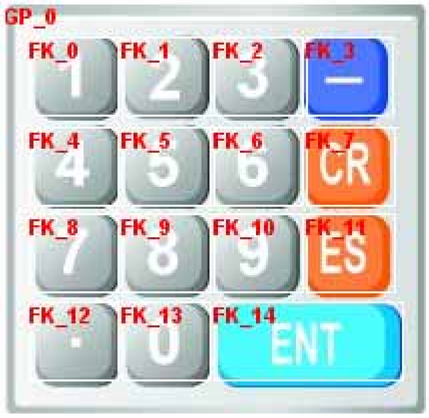


ASCII mode

○ [Enter] ○ [Backspace] ○ [Clear] ○ [Esc]

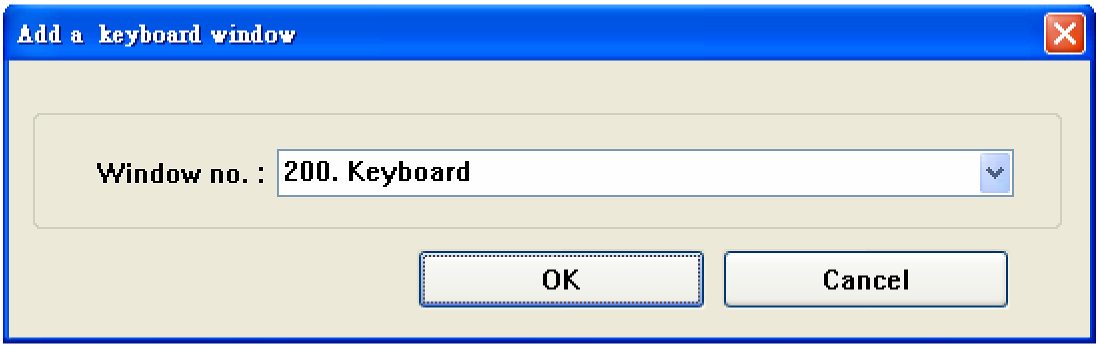
● [ASCII] 1

At last, select a proper Picture for each Function Key object, as shown in the picture below.



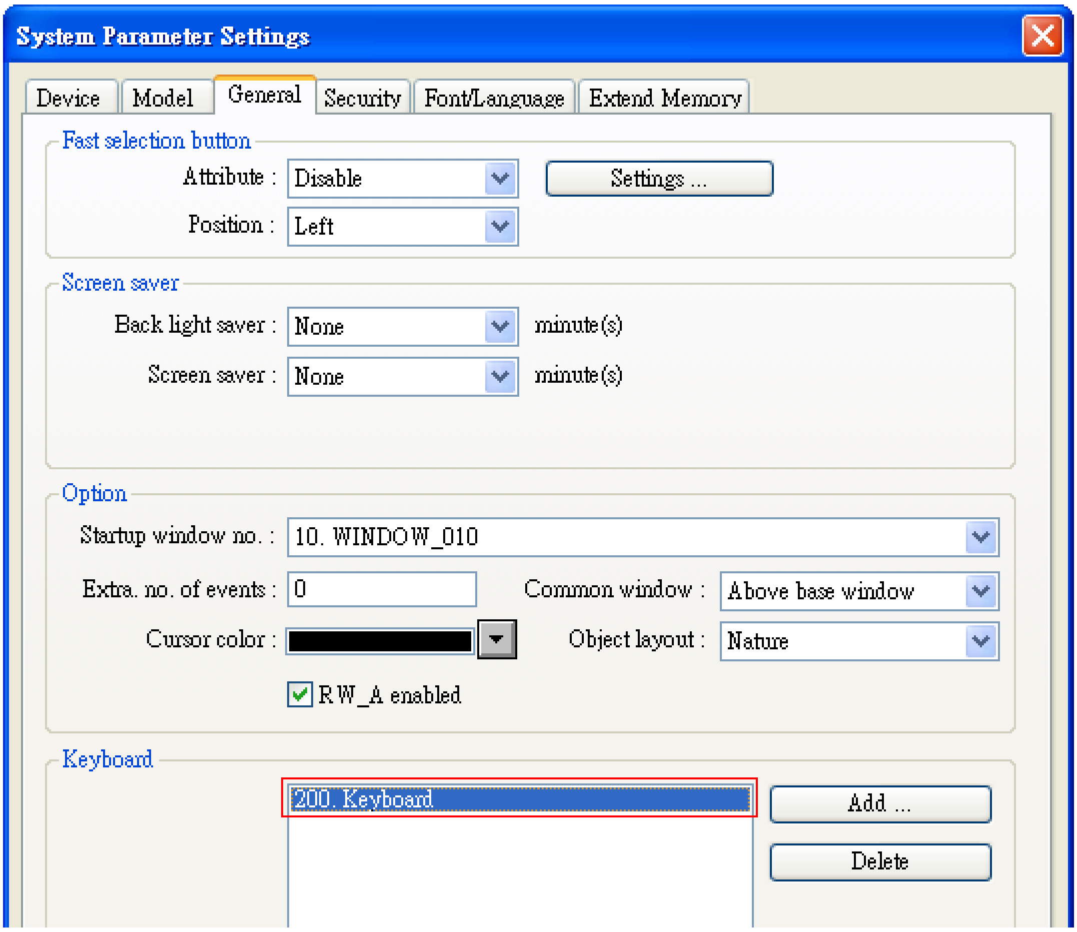
Step 3

Go to [General] tab in “System Parameter Settings” and click [Add…] in [Keyboard], a setting dialog box, as shown in the picture below, will be displayed, and then select WINDOW 200 and press “OK”.


Add a keyboard window

Window no. : 200. Keyboard

As shown in the picture below, a new item: “200.Keyboard” will be added to [Keyboard] in [General] tab in “System Parameter Settings.”


System Parameter Settings

Fast selection button

Attribute : Disable

Position : Left

Screen saver

Back light saver : None minute(s)

Screen saver : None minute(s)

Option

Startup window no. : 10. WINDOW_010

Extra. no. of events : 0

Common window : Above base window

Cursor color : ■

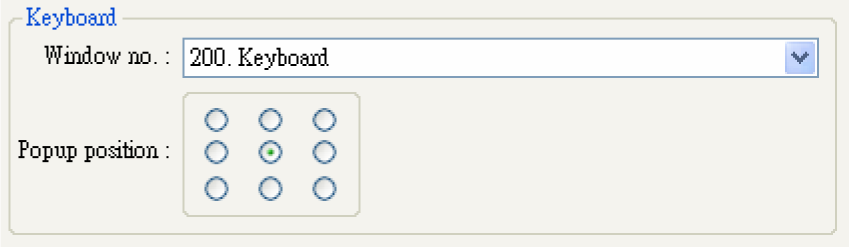
Object layout : Nature

☑ RW_A enabled

Keyboard

200. Keyboard

After completing all the steps described above, when users open the setting window of “Numeric Input” or “ASCII Input,” “200.Keyboard” can be found to add to [Window no] in [Keyboard] setting tab, as shown in the picture below. [Popup Position] can be used to set the displaying position of the keypad, and in this function, the EB8000 divides the screen into 9 areas. The top left-hand corner of the keypad will be placed in the top left-hand corner of the selected area.

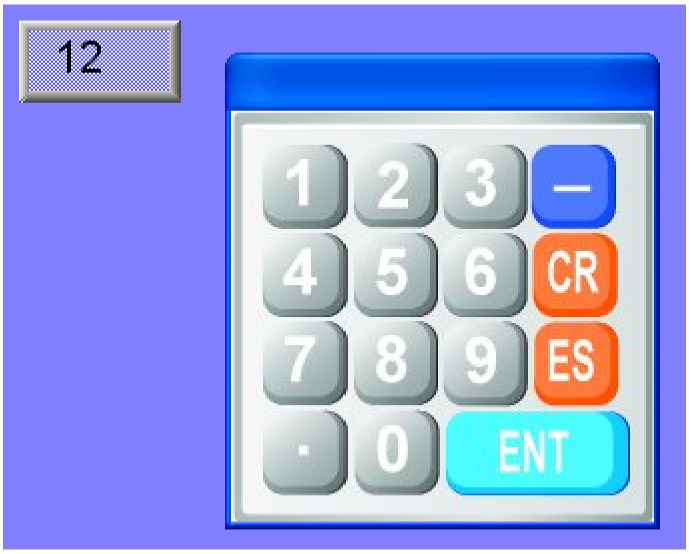


Keyboard

Window no. : 200. Keyboard

Popup position :
○ ○ ○
○ ● ○
○ ○ ○

After selecting “200.Keyboard,” when users press “Numeric Input” or “ASCII Input” objects, WINDOW 200 will pop up on the MT8000 screen. See the picture below, clicking the Function Key objects on the created keypad means the same thing of inputting information by using a physical keyboard.

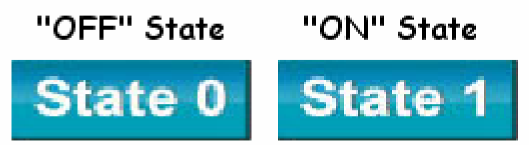


# Chapter 13　Object

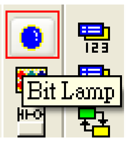
This chapter is to illustrate the ways of using and setting all kinds of objects, and information other than that provided in this chapter can be found in the chapter of “Object’s General Attributes” chapter.

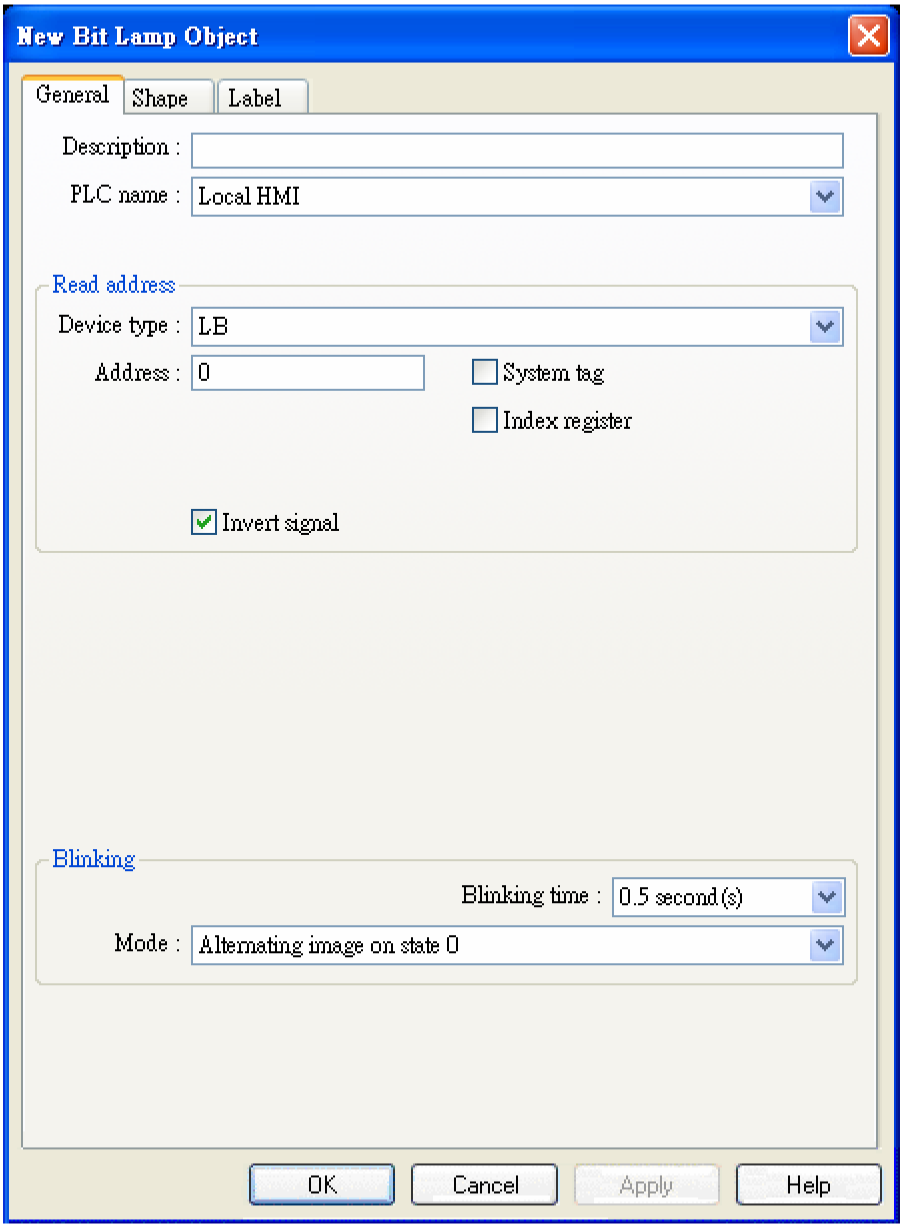
1. Bit Lamp Object

Bit Lamp object displays the ON and OFF states of a designated bit address. If the bit state is OFF, the State 0 shape will be displayed. If the bit state is ON, the State 1 shape will be displayed



Click the “bit lamp” icon on the toolbar and the “Bit Lamp Object’s Properties” dialogue box will appear, then press the OK button after correctly setting each item on the “General” tab, and a new bit lamp object will be created. See the pictures below.





Description :

PLC name : Local HMI

Read address

Device type : LB

Address : 0

□ System tag

□ Index register

☑ Invert signal

Blinking

Blinking time : 0.5 second (s)

Mode : Alternating image on state 0

[Description]

A reference name (not displayed) that you assign to the Bit Lamp.

[PLC name]

Select the PLC that you want to operate.

Read address

The PLC's register address that controls the Bit Lamp object's states.

[Invert signal]

Inverse displaying of present states; for example, in fact the present state is “OFF”, but the object displays the “ON” shape.

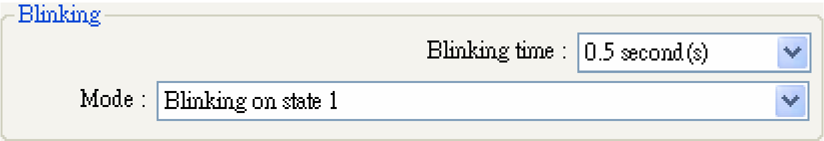
Blinking

The settings of blinking effect.

[Mode]

| Blinking mode | Description |
|---|---|
| None | No blinking. |
| Alternating image on state 0 | Enable the shape's blinking to alternate between state 0 and state 1 when the device address is OFF. |
| Alternating image on state 1 | Enable the shape's blinking to alternate between state 0 and state 1 when the device address is ON. |
| Blinking on state 0 | The shape of state 0 blinks when the device address is OFF. |
| Blinking on state 1 | The shape of state 1 blinks when the device address is ON. |

When select the blinking effect, [Blinking time] is used to set the frequency of blinking.



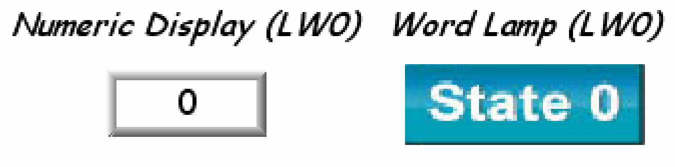
Blinking

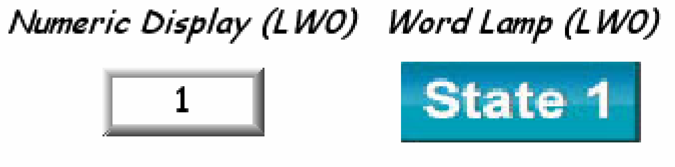
Blinking time : 0.5 second(s)

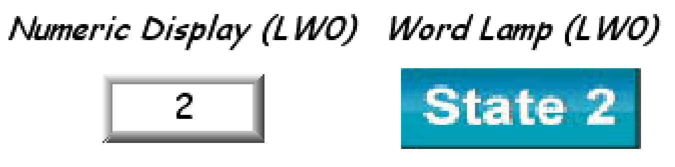
Mode : Blinking on state 1

2. Word Lamp Object

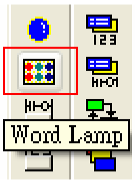
A Word Lamp object changes the state and shows the corresponding shape according to the value in the designated word address. (The EB8000 supports a maximum of 256 states)

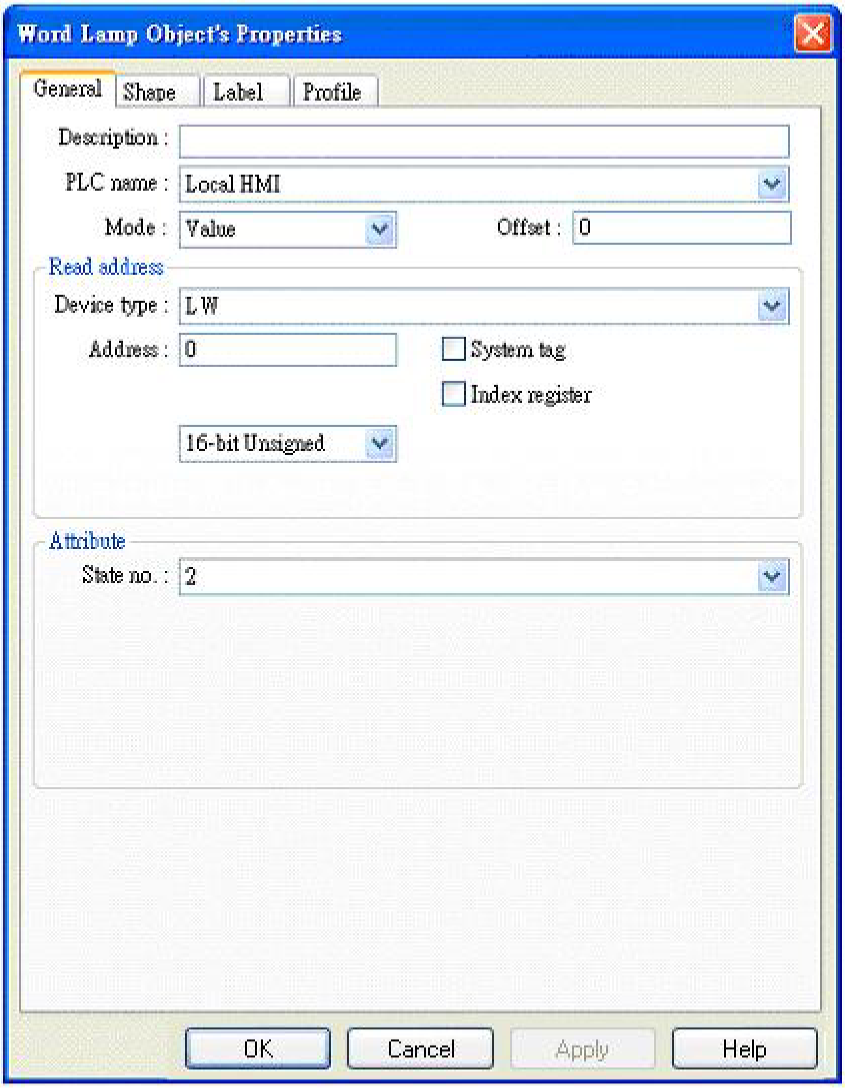






Click the “Word lamp” icon on the toolbar and the “Word Lamp Object’s Properties” dialogue box will appear, then press the OK button after correctly setting each item on the “General” tab, and a new word lamp object will be created. See the pictures below.





Word Lamp Object's Properties

Description :

PLC name : Local HMI

Mode : Value

Offset : 0

Read address

Device type : LW

Address : 0

□ System tag

□ Index register

16-bit Unsigned

Attribute

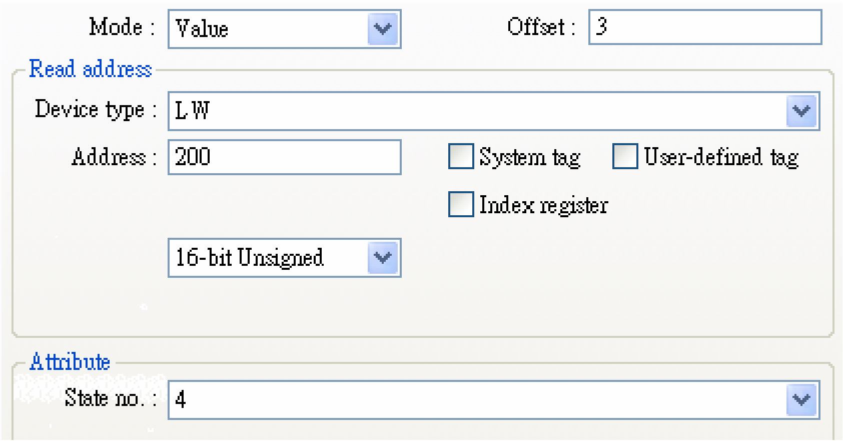
State no. : 2

[Mode]

Word lamp object offers the following three modes for selection:

“Value” display mode

Directly using the result of the value of register subtracting the setting number of [Offset] as the object’s current state. For example, add a new word lamp object, and the object’s [Offset] number is 3. Refer to the picture below for related settings.



Mode : Value

Offset : 3

Read address

Device type : LW

Address : 200

□ System tag □ User-defined tag

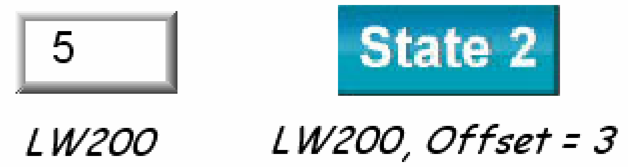
□ Index register

16-bit Unsigned

Attribute

State no. : 4

Therefore, if the value of [LW200] is 5, the state will show as 2 (= 5-3). See the picture below.



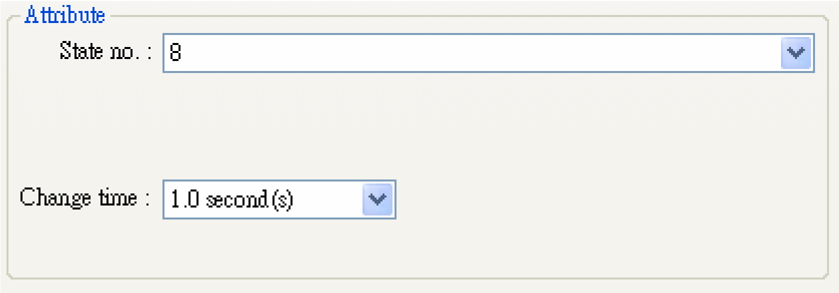
"LSB" display mode

In this mode, the value of the register will transfer to binary system first, and then the lowest bit other than value 0 will decide the current state. The following table shows an example of the register [LW200]:

| Decimal System | Binary System | Displayed State |
|---|---|---|
| 0 | 0000 | All bits are 0, displaying the state 0 |
| 1 | 0001 | The lowest bit other than 0 is bit 0, displaying the state 1 |
| 2 | 0010 | The lowest bit other than 0 is bit 1, displaying the state 2 |
| 3 | 0011 | The lowest bit other than 0 is bit 0, displaying the state 1 |
| 4 | 0100 | The lowest bit other than 0 is bit 2, displaying the state 3 |
| 7 | 0111 | The lowest bit other than 0 is bit 0, displaying the state 1 |
| 8 | 1000 | The lowest bit other than 0 is bit 3, displaying the state 4 |

“Auto changed” display mode

The states of the object have nothing to do with the register. The object will change the states according to the fixed frequency. Users can use [Change time] to set the frequency.



State no. : 8

Change time : 1.0 second(s)

Read address

The PLC’s register address that controls the Word Lamp object’s states.

Attribute

[State no.]

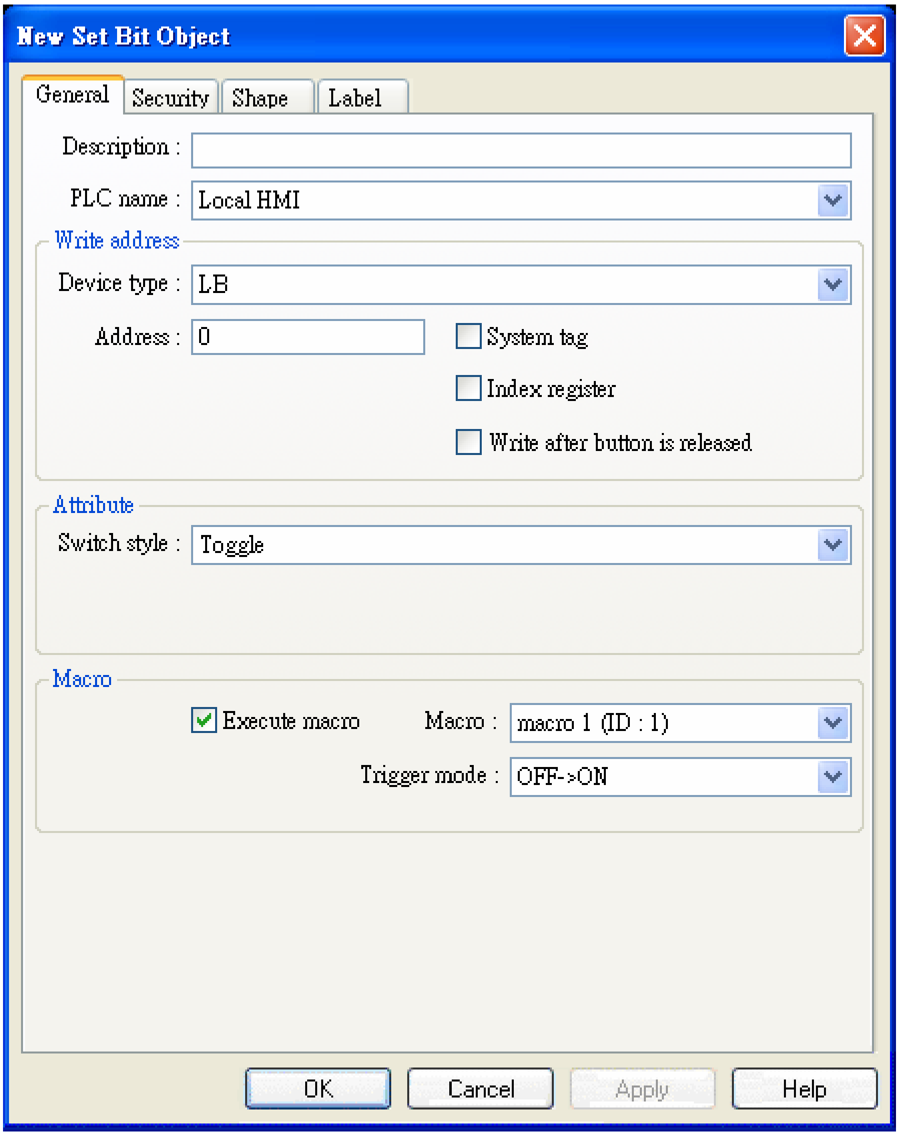
The number of the object’s states. The state’s serial number begins from 0, so the maximum state that can be showed is [State no.] - 1. Supposed that the number of the state is 8, and the states will be showed as 0, 1, 2,…, 7 in order. When the current state is beyond [State no.] - 1, the EB8000 will show the last state.

3. Set Bit Object

The Set Bit object provides two operation modes: the “manual operation” mode and the “automatic operation” mode. The Set Bit object can be used to define a touching area, and users can activate the area to set the state of the designated register to be ON or OFF.

When users select the “automatic operation” mode, the object’s defined action will be automatically activated in some particular conditions. In the “automatic operation” mode, the object will not have any when the object’s touching area is pressed.

Click the “Set Bit” icon on the toolbar and the “New Set Bit Object” dialogue box will appear, then press the OK button after correctly setting each item on the “General” tab, and a new Set Bit object will be created. See the pictures below.



New Set Bit Object

General | Security | Shape | Label

Description :

PLC name : Local HMI

Write address

Device type : LB

Address : 0

□ System tag

□ Index register

□ Write after button is released

Attribute

Switch style : Toggle

Macro

☑ Execute macro

Macro : macro 1 (ID : 1)

Trigger mode : OFF->ON

OK | Cancel | Apply | Help

Write address

The PLC's register address that controls the Set Bit object's states.

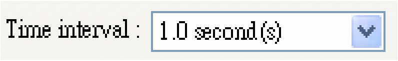
[Write after button is released]

When this function is selected, the object's defined action will be performed only after the pressing motion on the button is released completely. When the function is not selected, the object's defined action will be performed as soon as the touching area of the object is pressed. But when the "Momentary" switch is selected for the operation mode, the [Write after button is released] function will be disabled.

Attribute

[Switch Style]

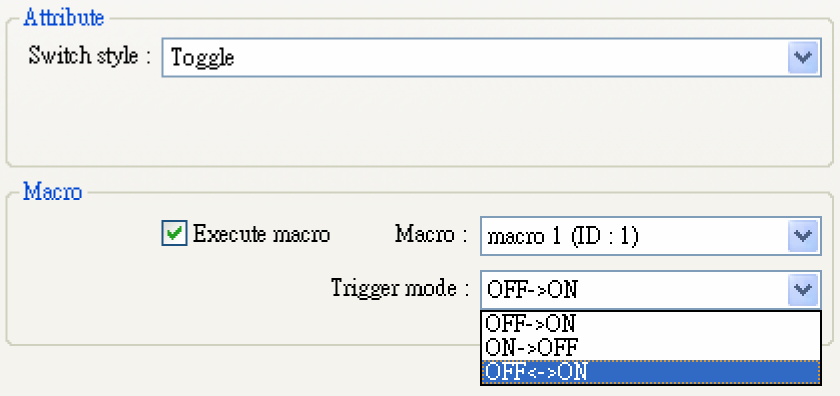
To set the operation mode. The available modes for selection are listed as follows:

| | |
|---|---|
| Set ON | In this mode, when the object is pressed, the state of the designated register will be set to ON. |
| Set OFF | In this mode, when the object is pressed, the state of the designated register will be set to OFF. |
| Toggle | In this mode, when the object is pressed, the state of the designated register will be set to the opposite, (i.e. ON → OFF or OFF → ON. |
| Momentary | In this mode, when the object is pressed, the state of the designated register will be set to the opposite; however, when the pressing motion stops, the state will resume as it was. |
| Periodical toggle | In this mode, the state of the designated register will be switched between ON and OFF periodically. Manual operation is not available in the mode, but operation's time interval can be selected in the combo box showed in the picture below:<br><br>Time interval : 1.0 second(s) |
| Set ON at window open | In this mode, when the window containing the Set Bit object is opened, the designated register will be automatically set to ON. |
| Set OFF at window open | In this mode, when the window containing the Set Bit object I opened, the designated register will be automatically set to OFF. |
| Set ON at window close | In this mode, when the window containing the Set Bit object is closed, the designated register will be automatically set to ON. |
| Set OFF at window close | In this mode, when the window containing the Set Bit object I closed, the designated register will be automatically set to OFF. |
| Set ON at backlight on | When the backlight is turned on, the designate register is automatically set ON. |
| Set OFF at backlight on | When the backlight is turned on, the designate register is automatically set OFF. |

| | |
|---|---|
| Set ON at backlight off | When the backlight is turned off, the designate register is automatically set ON. |
| Set OFF at backlight off | When the backlight is turned off, the designate register is automatically set OFF. |

Macro Commands

Users can execute set bit object with macro commands. Macro commands have to be built before users choose this function. Please refer to related chapter on how to edit Macros.



Attribute

Switch style : Toggle

Macro

☑ Execute macro

Macro : macro 1 (ID : 1)

Trigger mode : OFF->ON

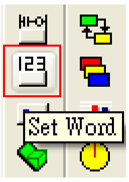
When “Switch style” is chosen, attributes of Macro can be set. Three trigger modes are available to execute Macro commands: OFF->ON, ON->OFF or ON<>OFF.

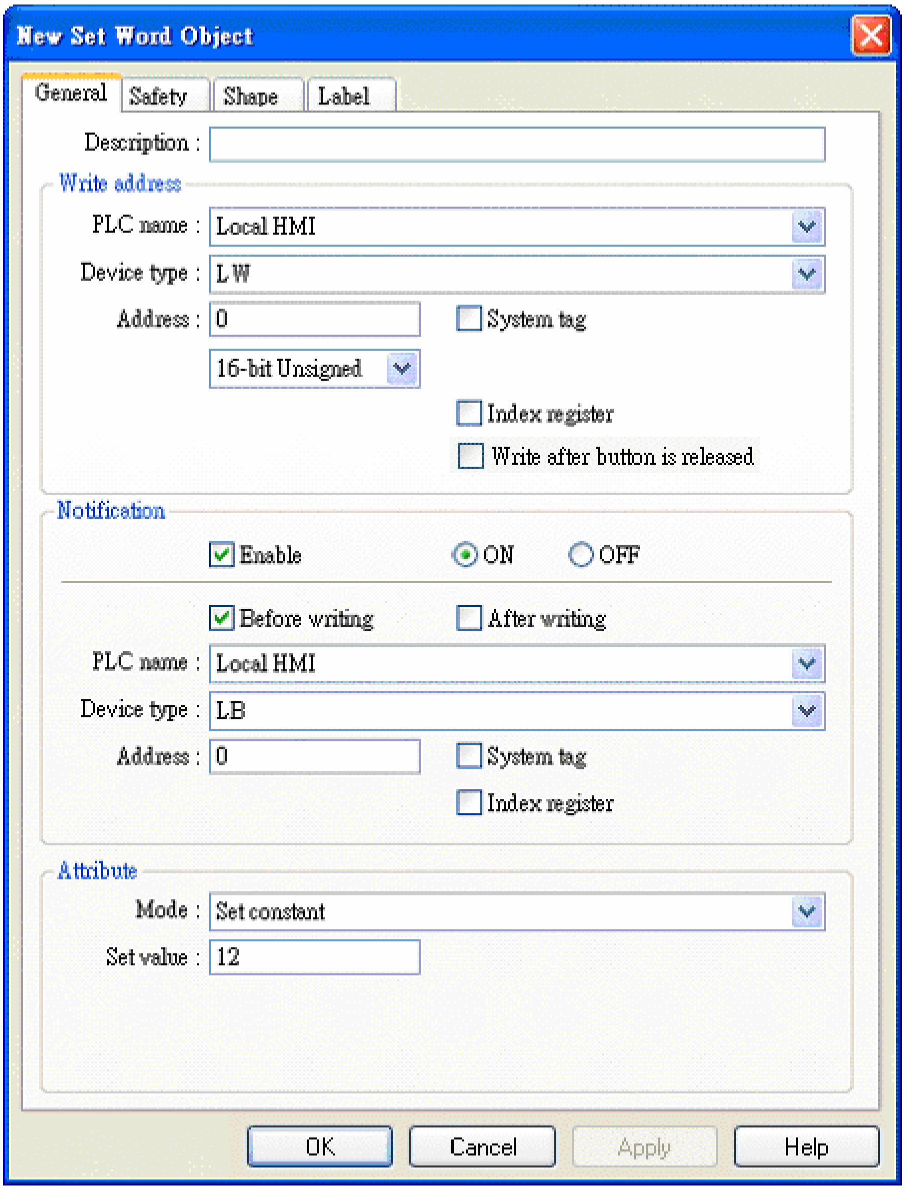
4. Set Word Object

The Set Word object provides two operation modes: the “manual operation” mode and the “automatic operation” mode. The Set Word object can be used to define a touching area, and users can activate the area to set the value of the designated register.

When users select the “automatic operation” mode, the object’s defined action will be automatically activated in some particular conditions. In the “automatic operation” mode, the object will not have any when the object’s touching area is pressed.

Click the “Set Word” icon on the toolbar and the “New Set Word Object” dialogue box will appear, then press the OK button after correctly setting each item on the “General” tab, and a new Set Word object will be created. See the pictures below.





New Set Word Object

General | Safety | Shape | Label

Description :

Write address

PLC name : Local HMI

Device type : LW

Address : 0 □ System tag

16-bit Unsigned

□ Index register

□ Write after button is released

Notification

☑ Enable ● ON ○ OFF

☑ Before writing □ After writing

PLC name : Local HMI

Device type : LB

Address : 0 □ System tag

□ Index register

Attribute

Mode : Set constant

Set value : 12

Write address
The PLC's register address that controls the Set Word object's states.

[Write after button is released]
When this function is selected, the object's defined action will be performed only after the pressing motion on the object is released completely. When the function is

not selected, the object’s defined action will be performed as soon as the object is pressed.

Notification

When this function is selected, in the “manual operation” mode, the state of the designated register can be set at the same time as the operation is completed. There are [ON] and [OFF] for selection to set the state.

[Enable]

This is for selecting whether or not to use the function.

[Before writing]

To set the state of the designated register before writing.

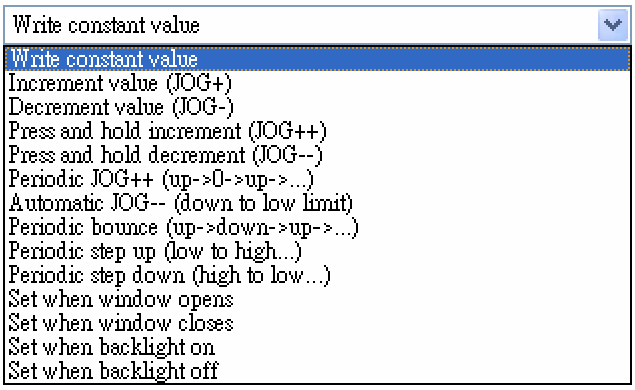
[After writing]

To set the state of the designated register after writing.

Attribute

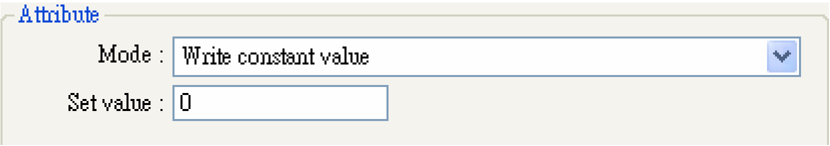
[Mode]

To set the operation mode. The available modes for selection are listed as follows:


Write constant value
Write constant value
Increment value (JOG+)
Decrement value (JOG-)
Press and hold increment (JOG++)
Press and hold decrement (JOG--)
Periodic JOG++ (up->0->up->...)
Automatic JOG-- (down to low limit)
Periodic bounce (up->down->up->...)
Periodic step up (low to high...)
Periodic step down (high to low...)
Set when window opens
Set when window closes
Set when backlight on
Set when backlight off

a. “Set const”

Constant setting function. Whenever the object is pressed, the value set in [Set value] will be written into the designated register. The constant’s style (16-bit BCD, 32-bit BCD, …) can be decided in “Write address”.

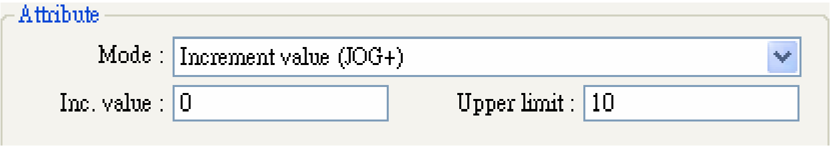

Attribute

Mode : Write constant value

Set value : 0

b. “Increment value (JOG+)”

Increment value function. Whenever the object is pressed, the value set in [Inc. value] will be added to the value of the designated register, but the resulting value will not be larger than the value in [Upper limit].



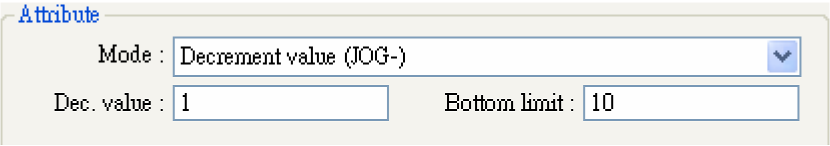
Attribute

Mode : Increment value (JOG+)

Inc. value : 0 Upper limit : 10

c. “Decrement Value(JOG-)”

Decrement value function. Whenever the object is pressed, the value set in [Dec. value] will be subtracted from the value of the designated register, but the resulting value will not be smaller than the value in [Bottom limit].



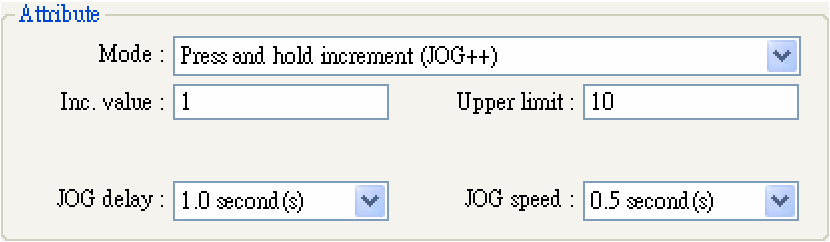
Attribute

Mode : Decrement value (JOG-)

Dec. value : 1 Bottom limit : 10

d. “JOG++”

Press and hold increment function. When the time of the object being pressed is longer than the time set in [JOG delay], the value of the designated register will be added by the value set in [Inc. value] at the speed set in [JOG speed], but the resulting value will not be larger than the value in [Upper limit].



Attribute

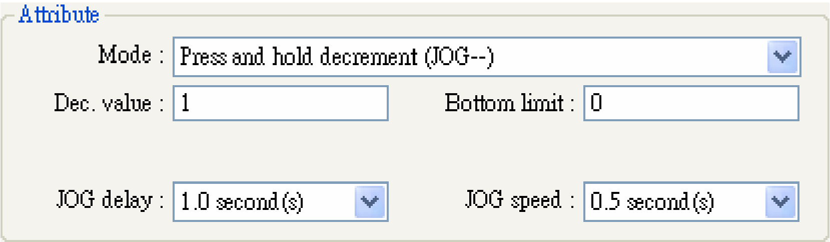
Mode : Press and hold increment (JOG++)

Inc. value : 1 Upper limit : 10

JOG delay : 1.0 second(s) JOG speed : 0.5 second(s)

e. “JOG--”

Press and hold decrement function. When the time of the object being pressed is longer than the time set in [JOG delay], the value of the designated register will be subtracted by the value set in [Dec. value] at the speed set in [JOG speed], but the resulting value will not be smaller than the value in [Bottom limit].


Attribute

Mode : Press and hold decrement (JOG--)

Dec. value : 1

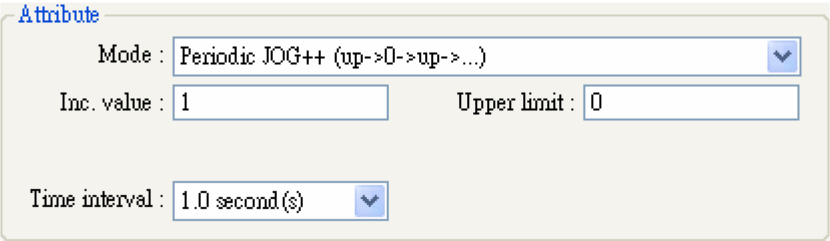
Bottom limit : 0

JOG delay : 1.0 second(s)

JOG speed : 0.5 second(s)

f. “Periodical JOG++”

Periodically increasing function. A set word object can use the interval set in [Break time] and the value set in [Inc. value] to automatically increase the value of the designated register, but the resulting value will not be larger than the value in [Upper limit].


Attribute

Mode : Periodic JOG++ (up->0->up->...)

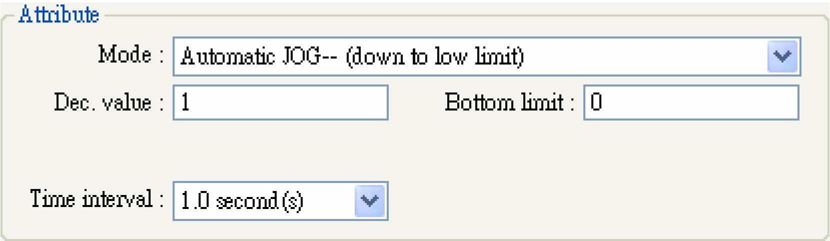
Inc. value : 1

Upper limit : 0

Time interval : 1.0 second(s)

g. “Periodical JOG--”

Periodically decreasing function. A set word object can use the interval set in [Break time] and the value set in [Dec. value] to automatically increase the value of the designated register, but the resulting value will not be smaller than the value in [Bottom limit].


Attribute

Mode : Automatic JOG-- (down to low limit)

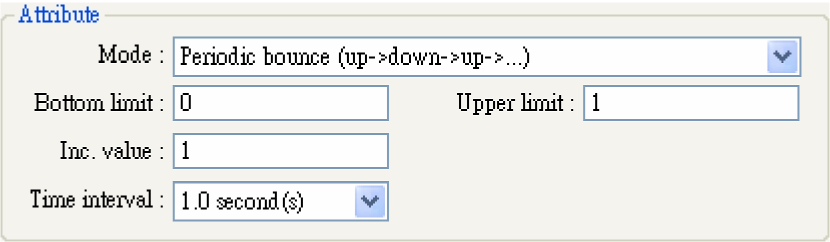
Dec. value : 1

Bottom limit : 0

Time interval : 1.0 second(s)

h. “Periodical bounce”

Periodically bouncing function. A Set word object will add the value set in [Inc. value] to the value of the designated register at the regular intervals set in [Break time] until the resulting value reaches the value in the [Upper limit], and then subtract the value set in [Inc. value] from the value of the designated register at the same intervals until the resulting value reaches the value in the [Bottom limit]. In the example showed in the picture below, the value in the designated register will change periodically in order of 0, 1, 2.., 9, 10, 9, 8, 7,…, 1, 0, 1, 2……



Attribute

Mode : Periodic bounce (up->down->up->...)

Bottom limit : 0

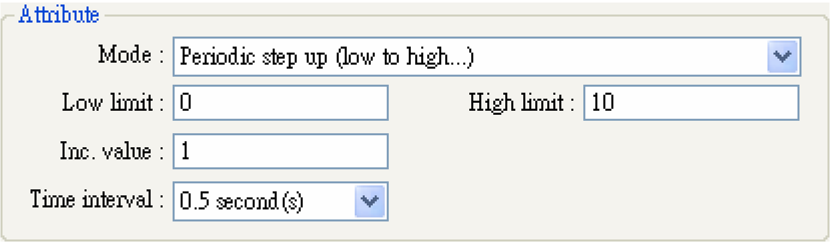
Upper limit : 1

Inc. value : 1

Time interval : 1.0 second(s)

i. “Step up”

Stepping up function. A Set word object will add the value set in [Inc. value] to the value of the designated register at the regular intervals set in [Break time] until the resulting value reaches the value in the [Upper limit], and the value of the designated register will return to the value in the [Bottom value] and then repeat the action to keep the value in an active state. In the example showed in the picture below, the value in the designated register will change periodically in order of 0, 1, 2,…, 9, 10, 0, 1, 2, ……



Attribute

Mode : Periodic step up (low to high...)

Low limit : 0

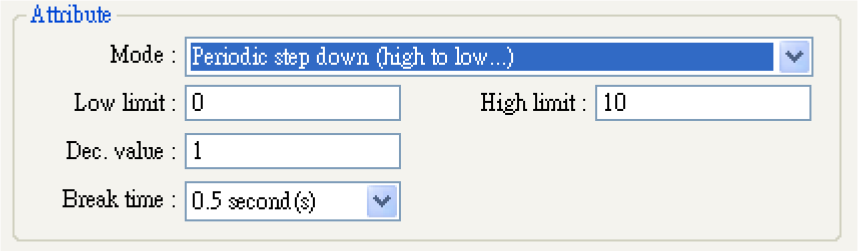
High limit : 10

Inc. value : 1

Time interval : 0.5 second(s)

j. “Step down”

Stepping down function. A Set word object will subtract the value set in [Dec. value] from the value of the designated register at the regular intervals set in [Break time] until the resulting value reaches the value in the [Bottom limit], and the value of the designated register will return to the value in the [Upper value] and then repeat the action to keep the value in an active state. In the example showed in the picture below, the value in the designated register will change periodically in order of 10, 9, 8,…, 1, 0, 10, 9, 8, ……



Attribute

Mode : Periodic step down (high to low...)

Low limit : 0

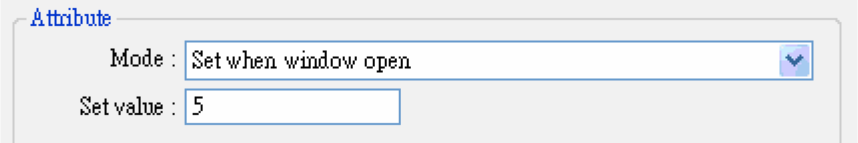
High limit : 10

Dec. value : 1

Break time : 0.5 second(s)

k. “Set when window open”

When the window containing the object is opened, the value set in [Set value] will be automatically written into the designated register.



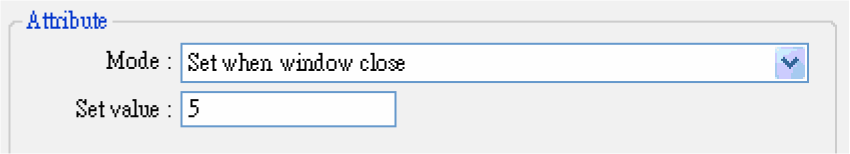
Attribute

Mode : Set when window open

Set value : 5

l. “Set when window close”

When the window containing the object is closed, the value set in [Set value] will be automatically written into the designated register.



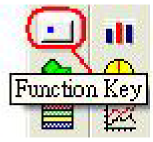
Attribute

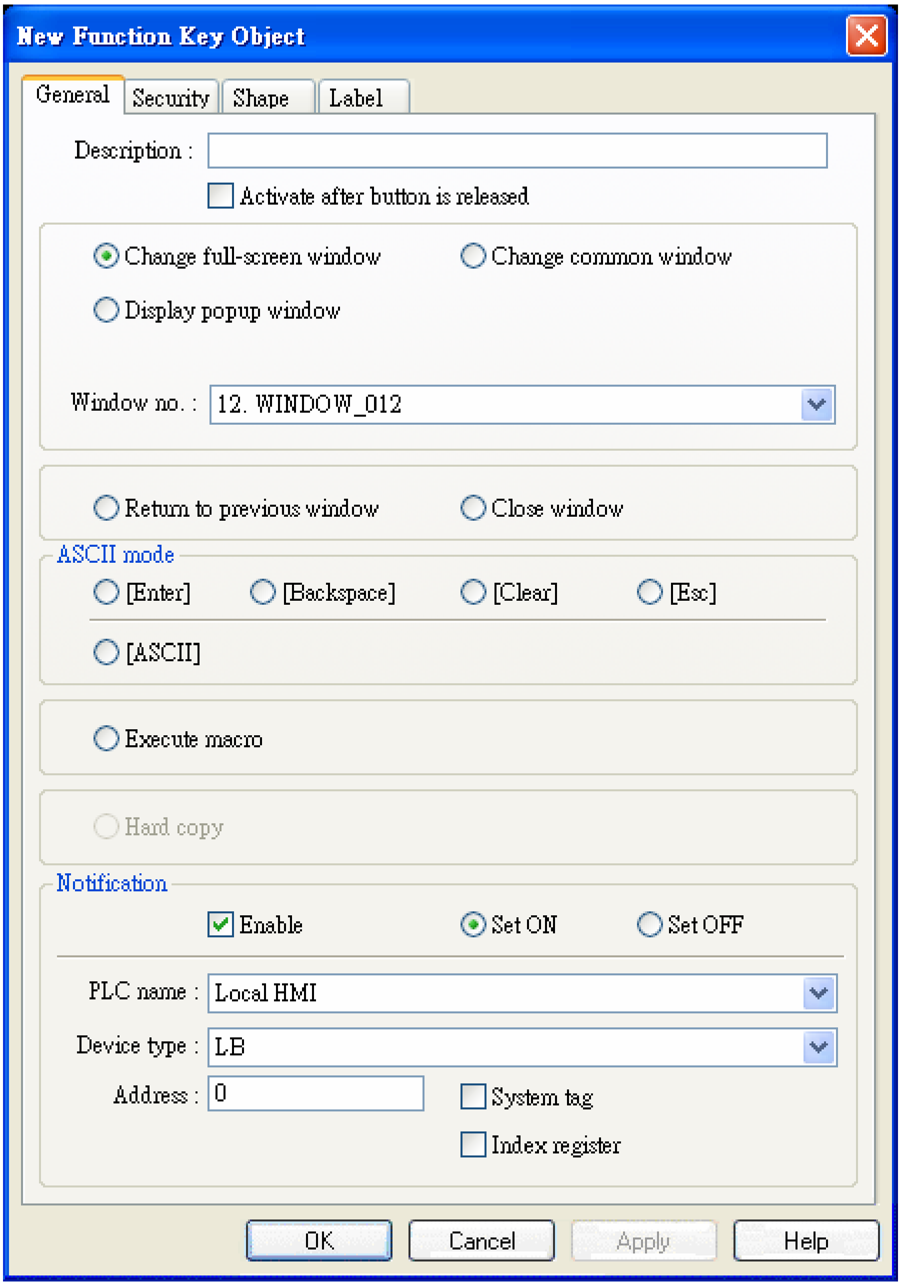
Mode : Set when window close

Set value : 5

5. Function Key Object

Function key object is used to change windows, call up windows and minimize or close windows. It can also be used to design the keypad buttons. Click the "Function Key" icon on the toolbar and the "Function Key Object's Properties" dialogue box will appear, then press the OK button after correctly setting each item in the "General" tab, and a new function key object will be created. See the pictures below.




New Function Key Object

Description :

☐ Activate after button is released

● Change full-screen window ○ Change common window

○ Display popup window

Window no. : 12. WINDOW_012

○ Return to previous window ○ Close window

ASCII mode

○ [Enter] ○ [Backspace] ○ [Clear] ○ [Esc]

○ [ASCII]

○ Execute macro

○ Hard copy

Notification

☑ Enable ● Set ON ○ Set OFF

PLC name : Local HMI

Device type : LB

Address : 0 ☐ System tag

☐ Index register

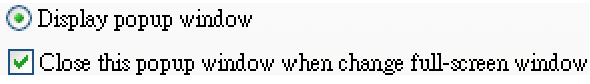
4. Function Key object provides the following operation modes:

[Active after button is released]
When the function is selected, the defined action will be performed only when the pressed the object is released completely. When the function is not selected, the defined action, for example, changing windows, will be performed immediately when the object is pressed.

[Change Base Window]
Change base window.

[Change Common Window]
Change common window; refer to the “windows” chapter for related information.

[Popup Window]
Calling up other windows. The called-up window must be upper than the base window. The [Close when change window] function is available in this function, see the picture below; when the function is selected, the called-up window will disappear when changing window. Otherwise, users have to set a “Close” button on the called-up window to close the window.



● Display popup window
☑ Close this popup window when change full-screen window

[Window no.]
This is used to select the window no. when performing “change base window”, “change common window”, and “call up other window”

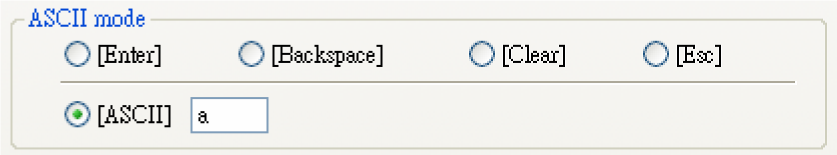
[Return to Previous Window]
This is used to return to the previous base window. Fox example, when changing window 10 to window 20, users can use this function to return to window 10. This function is only available in base window.

[Close window]

Closing the called-up windows in the base window, including information windows and so on.

Items in ASCII mode

[ASCII mode] is used as input signals of keypad, mainly in occasions when numbers or text are needed to key in from the keypad for a numeric input object or an ASCII input object is in need is required for keypad input. Refer to the “Designing and Using Keypad” chapter for detailed information.



ASCII mode

○ [Enter] ○ [Backspace] ○ [Clear] ○ [Esc]

● [ASCII] a

[Enter]

Same as the keyboard’s “enter” fuction.

[Backspace]

Same as the keyboard’s “backspace” fuction.

[Clear]

To clear the input data in the current numeric input object or ASCII input object.

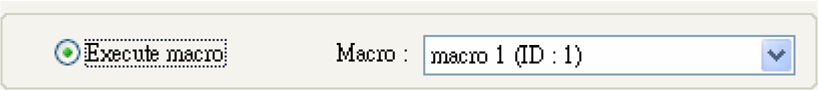
[Esc]

Same as the [Close window] function. Both can be used to close the called-up keypad window.

[ASCII]

To set the characters that are input in the numeric input object and the ASCII input object. Digital characters such as 0,1,2… or ASCII characters like a,b,c,… etc. are available for selection.

[Execute Macro]



● Execute macro

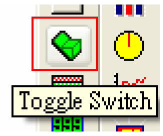
Macro : macro 1 (ID : 1)

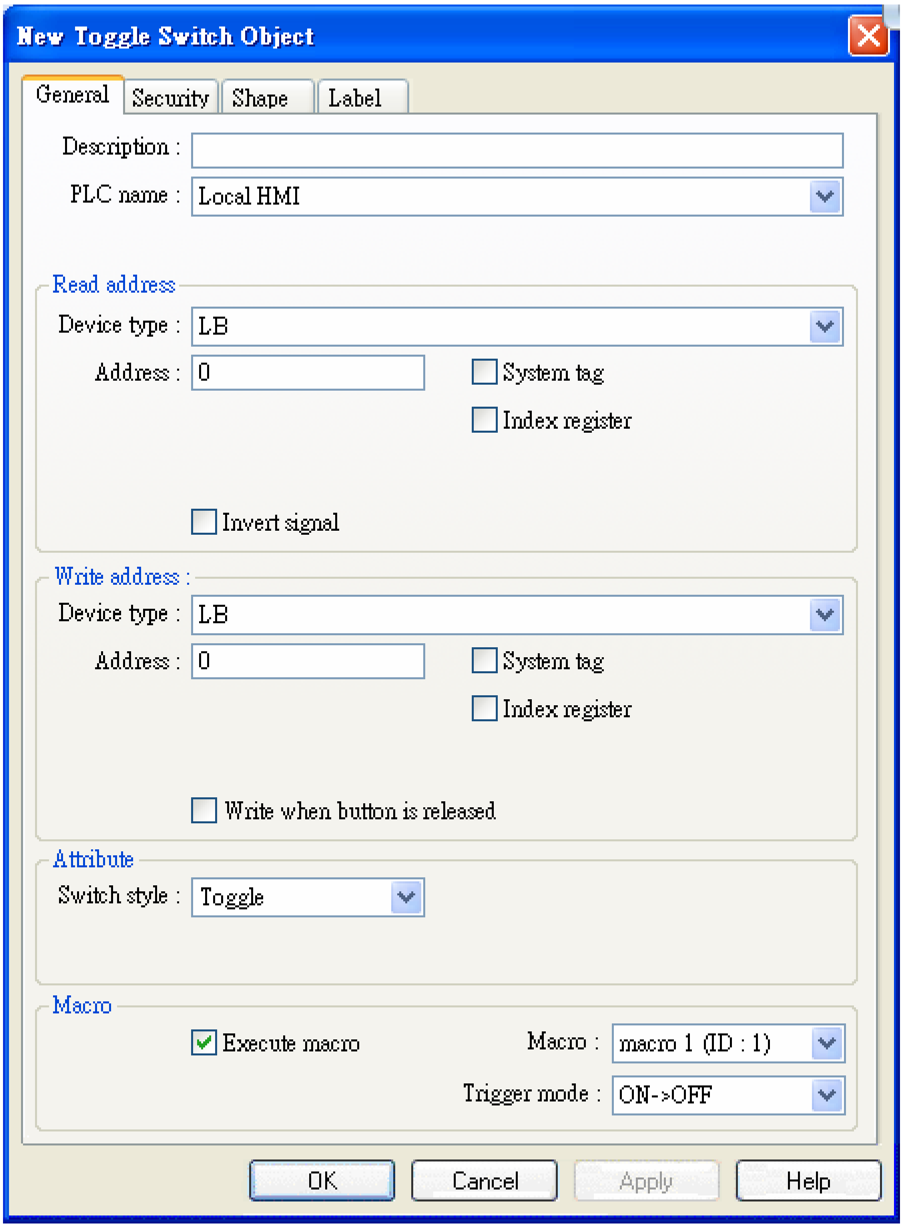
Macro commands are executed when the function is selected. Macro commands have to be built before users choose this function. Please refer to related chapter on how to edit Macros.

Notification

[Enable]
When the function is selected, the EB8000 will set the stated of the designated register after the action is completed. Use [ON] and [OFF] to select the state.

6. Toggle Switch Object
Toggle Switch object is a combination of bit lame object and set bit object. The object can be used not only to display the state of a register but also to define a touching area, and when the area is pressed, the state of the designed register will be set to “ON” or “OFF”. Click the “Toggle Switch” icon on the toolbar and the “New Toggle Switch Object” dialogue box will appear, then press the OK button after correctly setting each item in the “General” tab, and a new toggle switch object will be created. See the pictures below.





Description :

PLC name : Local HMI

Read address

Device type : LB

Address : 0

□ System tag

□ Index register

□ Invert signal

Write address :

Device type : LB

Address : 0

□ System tag

□ Index register

□ Write when button is released

Attribute

Switch style : Toggle

Macro

☑ Execute macro

Macro : macro 1 (ID : 1)

Trigger mode : ON->OFF

Read address

The PLC’s register address that controls the Toggle Switch object’s states.

Write address

The PLC’s register address that is controlled by the Toggle Switch object’s states. The register can be the same as or different from the register designated by the “Read address”

[Write when bottom is released]

Refer to the “Set Bit Object” section of this chapter for related information.

Attribute

This is used to select the operation mode. Available modes for selection include “Set ON”, “Set OFF”, ”Toggle”, and ”Momentary”. Refer to the illustrations in the “Set Bit Object” section of this chapter for related information.

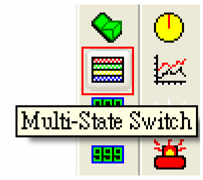
Macro Commands

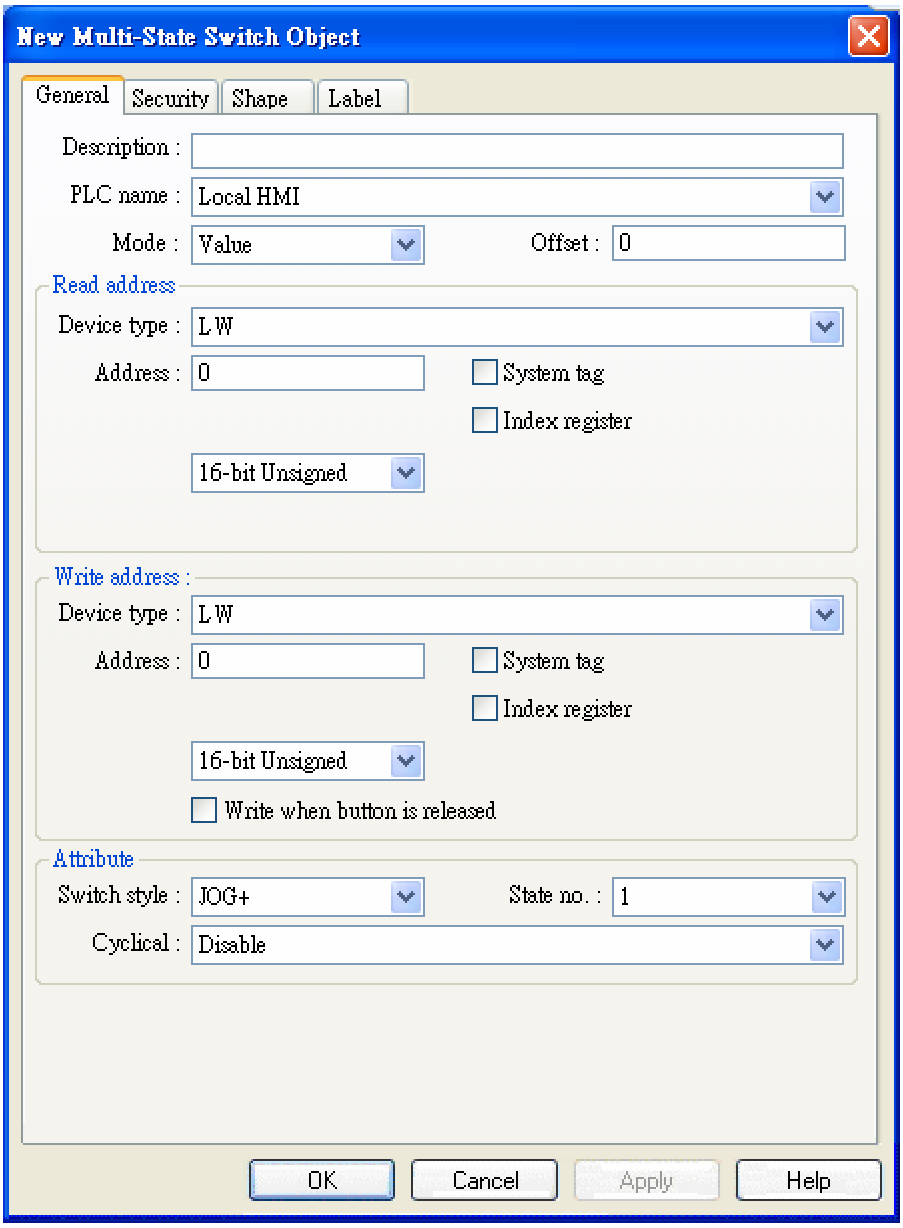
Users can execute toggle switch object with macro commands. The way is the same as that of set bit. Please refer to “set bit chapter” in this function.

## 7. Multi-Switch Object

Multi-State Switch object is a combination of word lamp object and set word object. The object can be used not only to display the state of a register according to the value but also to define a touching area in the window, and the value of the designed register can be set when the area is pressed.

Click the “Multi-State Switch” icon on the toolbar and the “New Multi-State Switch Object” dialogue box will appear, then press the OK button after correctly setting each item in the “General” tab, and a new Multi-State Switch object will be created. See the pictures below.





New Multi-State Switch Object

General | Security | Shape | Label

Description :

PLC name : Local HMI

Mode : Value    Offset : 0

Read address

Device type : LW

Address : 0    ☐ System tag

☐ Index register

16-bit Unsigned

Write address :

Device type : LW

Address : 0    ☐ System tag

☐ Index register

16-bit Unsigned

☐ Write when button is released

Attribute

Switch style : JOG+    State no. : 1

Cyclical : Disable

[Mode]

To provide “Value” and “LSB” display mode. Refer to the “Word Lamp Object” section of this chapter for related information.

[Offset]

It is used in the “Value” display mode. Refer to the “Word Lamp Object” section of this chapter for related information.

Read address

The PLC’s register address that controls the Multi-State Switch object’s states.

Write address

The PLC’s register address that is controlled by the Multi-State Switch object’s states. The register can be the same as or different from the register designated by the “Read address”

[Write when bottom is released]

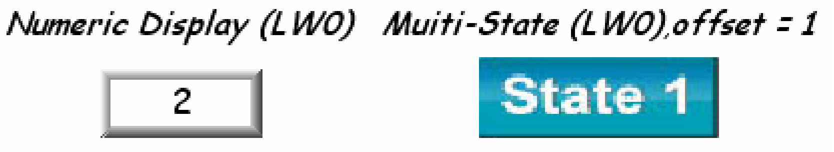
Refer to the “Set Bit Object” section of this chapter for related information.

Attribute

To select the object’s operation mode.

[Switch style]

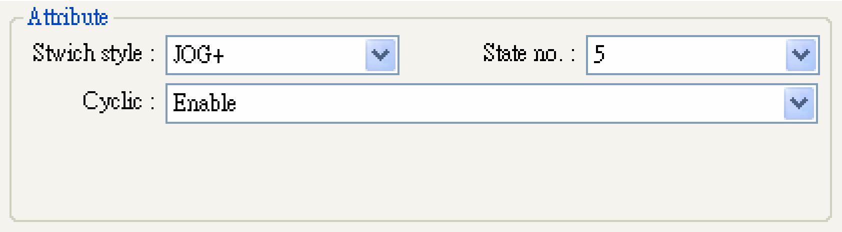
There are “JOG+” and “JOG-” for selection. When the read address is the same as the write address, the minimum value of the designated register is [Offset](the current state is 0), and the maximum value is ([State no.] -1) + [Offset] (the current state is [State no.] -1). See the picture below.



a. “JOG+”

Whenever the Multi-State Switch object is pressed, the value of the designated write address will be added by 1. In the “Value” display mode, if the resulting value is equal to or larger than the value of [State no.] + [Offset] and “Enable” in [Cyclic] is selected, the value of the register will return to [Offset] and show the state 0; otherwise the value of the register will maintain as ([State no.] – 1) + [Offset] and show the state ([State no.] – 1).

Note: Like the word lamp object, the state showed by Multi-State Switch object is the value of the designated register that subtracts [Offset].



Attribute

Stwich style : JOG+

State no. : 5

Cyclic : Enable

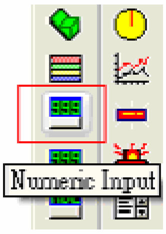
b. “JOG-”

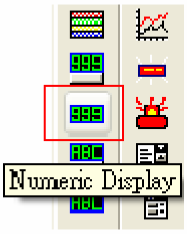
Whenever the Multi-State Switch object is pressed, the value of the register designated in “write address” will be subtracted by 1. In the “Value” display mode, if the resulting value is smaller than the value of [Offset] and “Enable” in [Cyclic] is selected, the value of the register will change to ([State no.] – 1) + [Offset] and show the state ([State no.] – 1); otherwise the value of the register will maintain as [Offset] and show the state 0.

## 8. Numeric Input and Numeric Display Objects

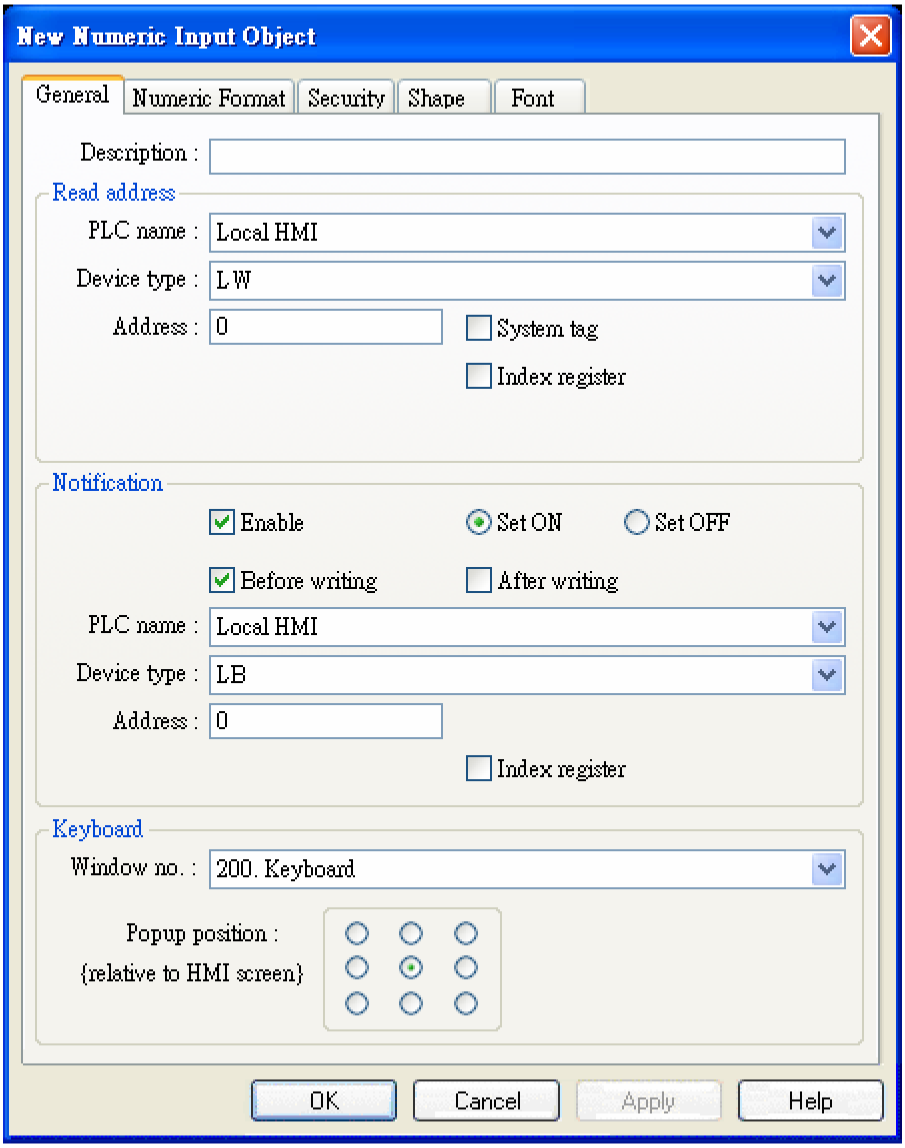
Both of the Numeric Input object and the numeric display object can be used to display the value of the designated register. Besides, the numeric input object can also use the value input by the keypad to change the value of the designated register.

Click the “numeric input” or “numeric display” icon on the toolbar and the “New Numeric Input Object” or “New Numeric Display Object” dialogue box will appear, then press the OK button after correctly setting each item in the “General” tab, and a new “Numeric Input Object” or “Numeric Display Object” will be created. See the pictures below.





The difference between the “New Numeric Input Object” and “New Numeric Display Object” dialogue boxes is that the latter has the settings for ”Notification” and keypad input while the former doesn’t have. The picture below shows the [General] tab in “New Numeric Display Object.”



Description :

Read address

PLC name : Local HMI

Device type : LW

Address : 0

□ System tag

□ Index register

Notification

☑ Enable ● Set ON ○ Set OFF

☑ Before writing □ After writing

PLC name : Local HMI

Device type : LB

Address : 0

□ Index register

Keyboard

Window no. : 200. Keyboard

Popup position :
(relative to HMI screen)

○ ○ ○
○ ● ○
○ ○ ○

Read address

The PLC's register address that controls the Numeric Input object's (or the numeric display object's) states.

Notification

When the settings in "Notification" are used, it is able to set the state of the designated register, using [ON] and [OFF] to select the state, after the value of the register is changed successfully (the input value must be limited to the defined range, refer to the "Numeric Format" section for related information.).

[Enable]

To decide whether or not to use the function.

[Before writing]

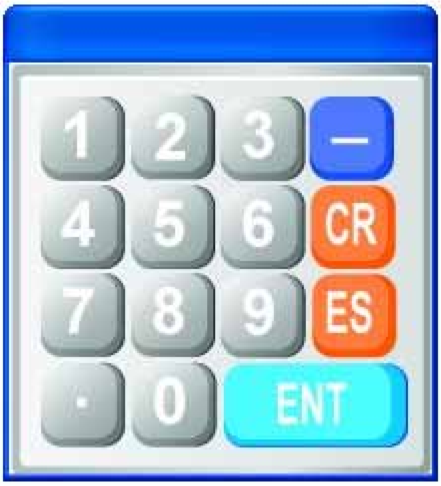
To set the state of the designated register before the value of the register is changed.

[After writing]

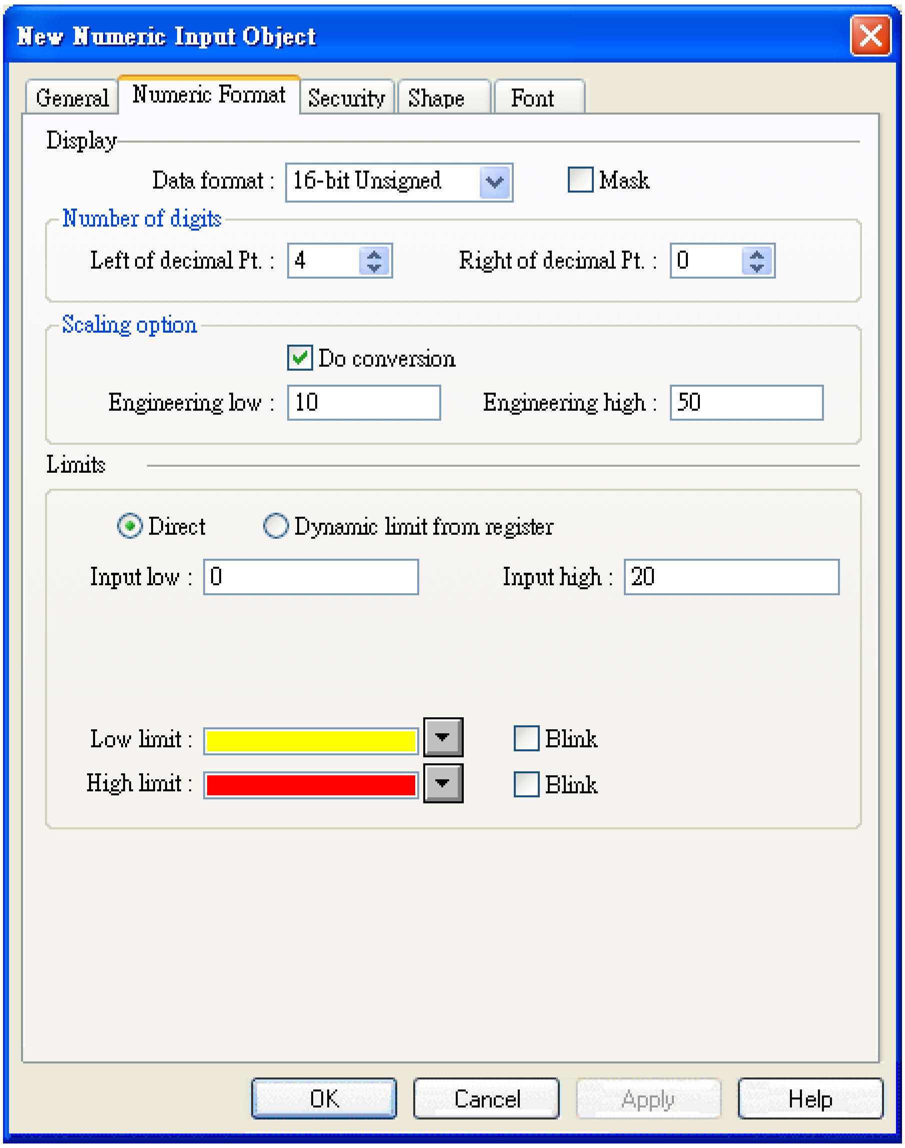
To set the state of the designated register after the value of the register is changed.

Keyboard

When using the Numeric Input Object, users are allowed to select the keypad style. Users need to select the window where the keypad will be displayed and set the displaying position of the keypad. When the Numeric Input object is touched, the keypad will appear automatically. Refer to the “Designing and Using Keypad” chapter for further information.



The picture below shows the [Numeric Format] tab, included in both of the numeric input object and the numeric display object, for setting the data display mode.



Display

Data format : 16-bit Unsigned □ Mask

Number of digits

Left of decimal Pt. : 4 Right of decimal Pt. : 0

Scaling option

☑ Do conversion

Engineering low : 10 Engineering high : 50

Limits

● Direct ○ Dynamic limit from register

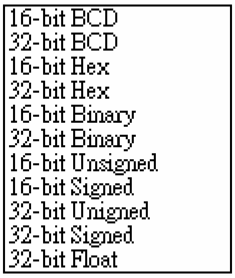
Input low : 0 Input high : 20

Low limit : 🟨 □ Blink

High limit : 🟥 □ Blink

[Data format]

To select the data format type of the PLC's register designated by the "Read address". The available types for selection are listed as follows:



16-bit BCD
32-bit BCD
16-bit Hex
32-bit Hex
16-bit Binary
32-bit Binary
16-bit Unsigned
16-bit Signed
32-bit Unigned
32-bit Signed
32-bit Float

[Mask]

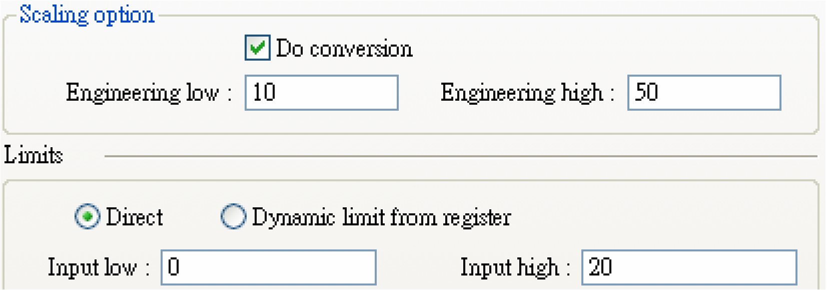
When the data is displayed, “*” will be used to replace all digitals and the color warning function will be cancelled.

[Left of decimal Pt]
The number of places before the decimal point.

[Right of decimal Pt]
The number of places after the decimal point.

[Do conversion]
The displayed data is the result of processing the raw data of the PLC’s register designated by the “Read address.” When the function is selected, it is necessary to set [Engineering low], [Engineering high], and [Input low] and [Input high] in the “Limitation”. Supposed that “A” represents the raw data and “B” represents the displayed data, and the converting formula expression can be:
B = [Engineering low] + (A - [Input low]) * ratio
In above, the ratio = ([Engineering high] - [Engineering low]) / ([Input high] - [Input low])

See the example in the picture below, the raw data is 15, after being converted by the above formula as 10 + (15 – 0) * (50 – 10) / (20 - 0) = 40, and 40 of the resulting data will be displayed on the numeric input object.



Scaling option

☑ Do conversion

Engineering low : 10

Engineering high : 50

Limits

● Direct ○ Dynamic limit from register

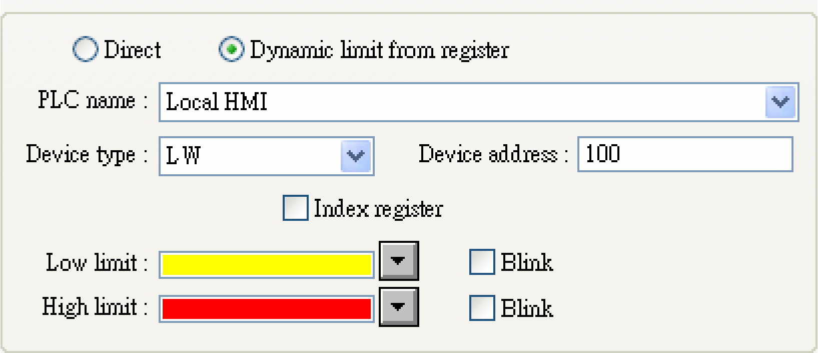
Input low : 0

Input high : 20

Limits
To set the source of the range for the input data and to set the warning color effect.

[Direct]
The low limit and high limit of the input data can be set in [Input low] and [Input high] respectively. If the input data is out of the defined range, it is not able to change the value of PLC’s register designated by the “Read address”.

[Dynamic limit from register]



○ Direct ● Dynamic limit from register

PLC name : Local HMI

Device type : LW Device address : 100

□ Index register

Low limit : 🟨 □ Blink

High limit : 🟥 □ Blink

Set the low limit and high limit of the input data to be sourced from the designated register. The data length of the designated register is related to the object's data displaying type. In the above example, the low limit and high limit are sourced from [LW100] and the following explains the addresses of the low limit and high limit.

a. If the displayed data's format type is "32-bitBCD", then

| | |
|---|---|
| [LW100] | low limit position (32-bit BCD) |
| [LW100 + 2] | high limit position (32-bit BCD) |

b. If the displayed data's format type is "16-bit unsigned", then

| | |
|---|---|
| [LW100] | low limit position (16-bit unsigned) |
| [LW100 + 1] | high limit position (16-bit unsigned) |

c. If the displayed data's format type is "32-bitfloat", then

| | |
|---|---|
| [LW100] | low limit position (32-bit float) |
| [LW100 + 2] | high limit position (32-bit float) |

[Low limit]

When the value of the PLC's register is smaller than [Low limit], the object will display data in the defined color.

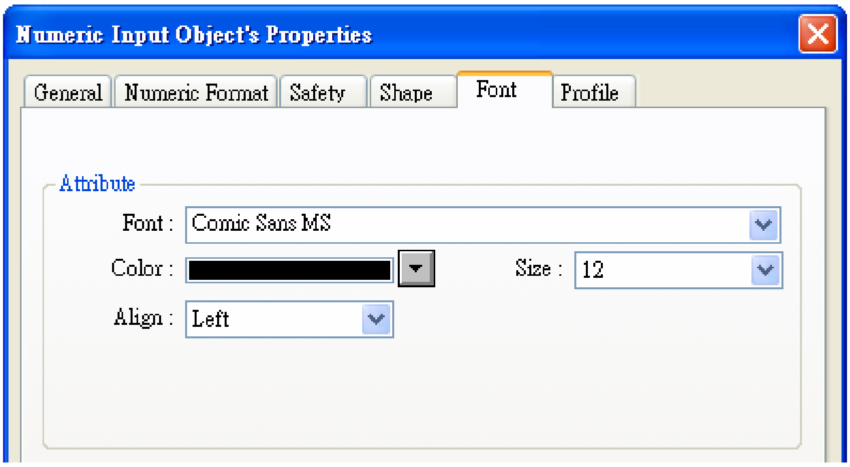
[High limit]

When the value of the PLC's register is larger than [High limit], the object will display data in the defined color.

[Blink]

When the value of the PLC's register is smaller than [Low limit] or larger than [High limit], the object will use the Blink effect as warning. The picture below shows the

[Font] tab, available in both of the numeric input object and the numeric display object, for setting the data’s displaying font, font size and color, and aligning mode.



Attribute

Font : Comic Sans MS

Color :

Size : 12

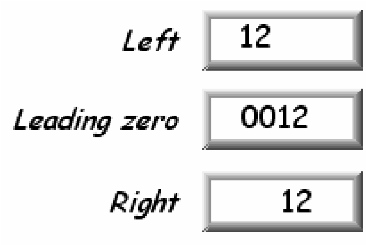
Align : Left

[Color]

When the data is in the defined range, they will be displayed in the defined color.

[Align]

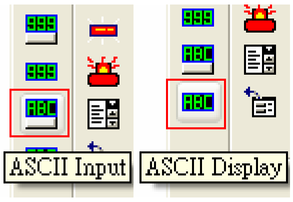
There are three aligning modes: “Left”, “Leading zero”, and “Right”. The picture below shows how each mode performs.



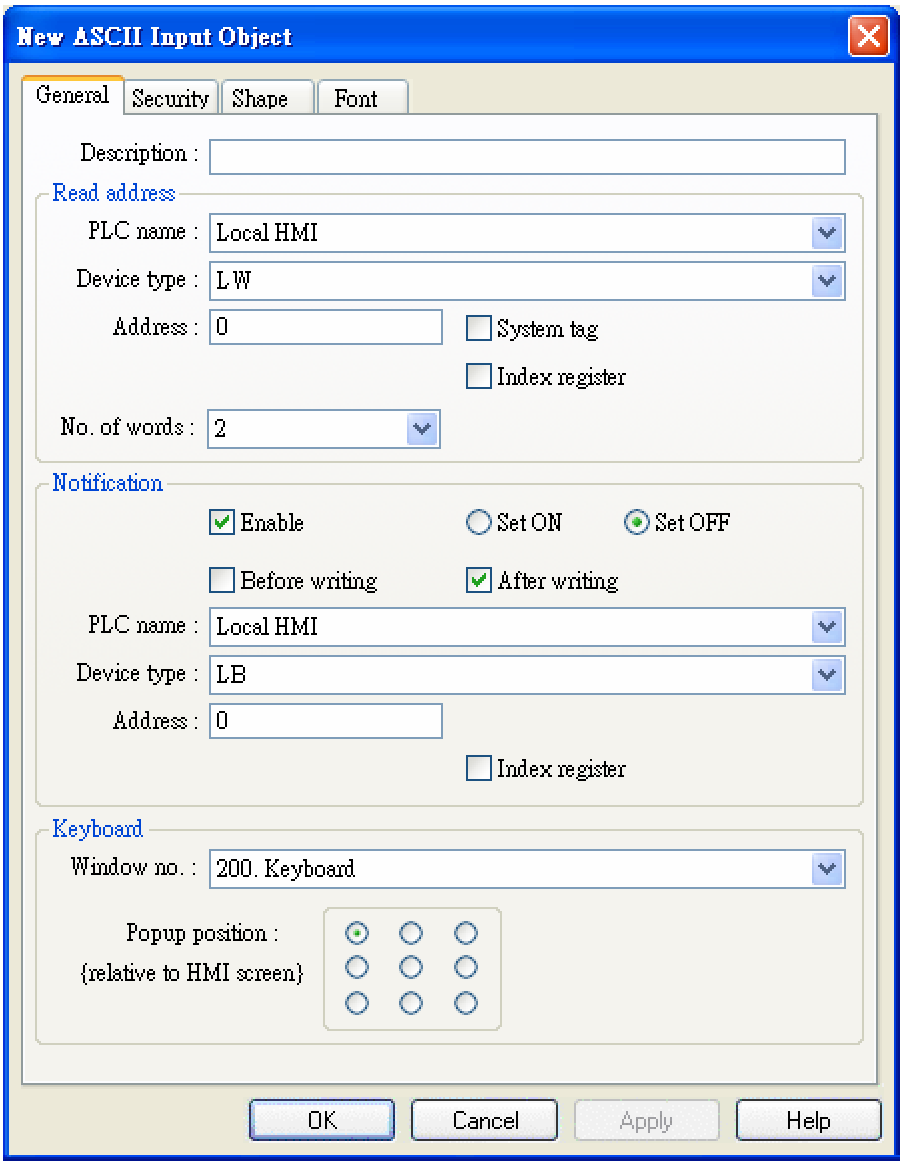
9. ASCII Input and ASCII Display Objects

Both of the ASCII input object and the ASCII display object can display the value of the designated PLC register in the ASCII mode. Besides, the ASCII input object can also use the value input by the keypad to change the value of the designated PLC register.

Click the “ASCII Input” or “ASCII Display” icon on the toolbar and the “New ASCII Input Object” or “New ASCII Display Object” dialogue box will appear, then press the OK button after correctly setting each item in the “General” tab, and a new “ASCII Input Object” or “ASCII Display Object” will be creased. See the pictures below.



The difference between the “New ASCII Input Object” and “New ASCII Display Object” dialogue boxes is that the latter has the settings for “Notification” and keypad input while the former doesn’t have. The picture below shows the [General] tab in the “New ASCII Input Object.”



Description :

Read address

PLC name : Local HMI

Device type : LW

Address : 0 ☐ System tag

☐ Index register

No. of words : 2

Notification

☑ Enable ○ Set ON ● Set OFF

☐ Before writing ☑ After writing

PLC name : Local HMI

Device type : LB

Address : 0

☐ Index register

Keyboard

Window no. : 200. Keyboard

Popup position :
(relative to HMI screen)

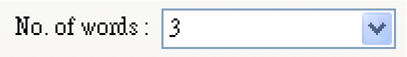
● ○ ○
○ ○ ○
○ ○ ○

Read address

The PLC’s register address that is displayed and modified by the ASCII Input.

[No. of words]

To set the maximum of displayed data length; the unit is word and the minimum length can be set for 1. Because the length of each ASCII character is one byte, it will display 2 characters at least every time. In the example shown in the pictures below, the object can display 3 * 2 = 6 characters the most.


No. of words : 3

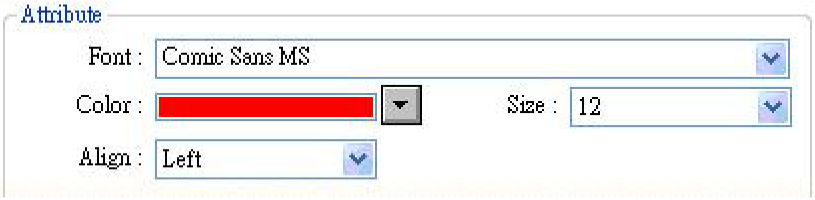
Notification

Refer to the “numeric input” section of this chapter for related information.

Keyboard

Refer to the “numeric input” section of this chapter for related information.

The picture shows the [Font] tab of the ASCII Input object and the ASCII display object. Users can set the data’s displaying font, font size and color, and aligning mode.



Attribute

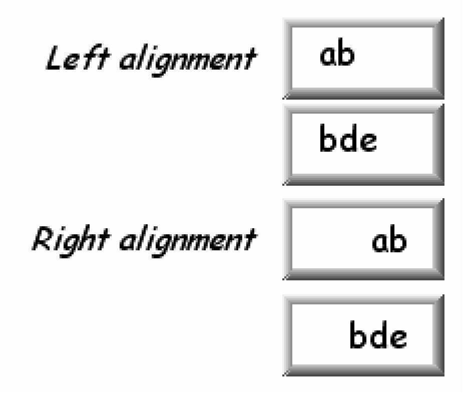
Font : Comic Sans MS

Color : 🟥 Size : 12

Align : Left

[Align]

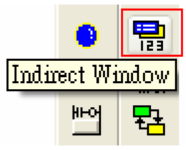
There are two aligning modes: “Left” and “Right”. The picture below shows how each mode performs.

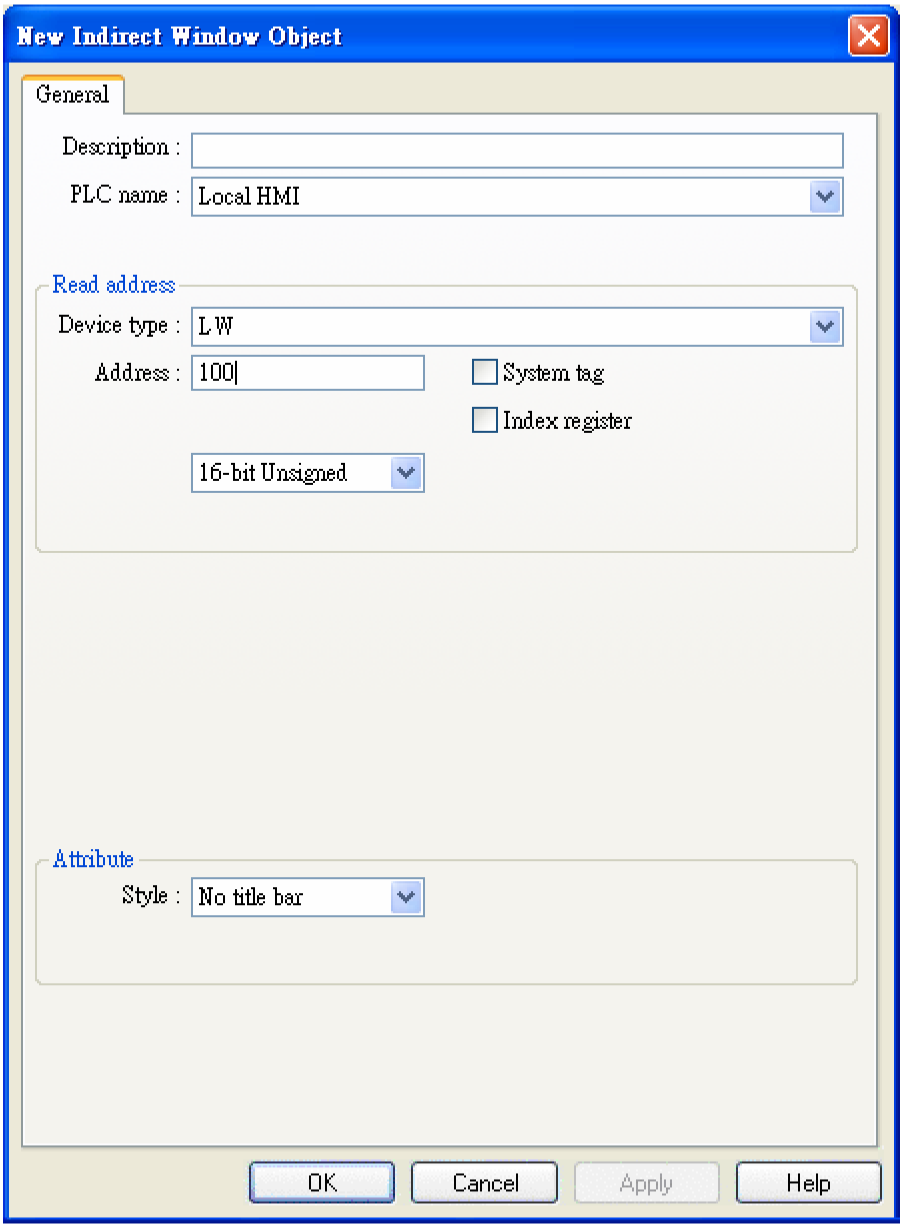


6. Indirect Window Object

Indirect window Object can define a display area in a window, and after the definition of a register is completed and when the value of the designated register is the same as the number of the defined window, the window will popup in the defined display area. The size of the popup window will not be larger than the display area. The popup window can be closed when the value of the designated register is set for 0.

Click the “indirect window” icon on the toolbar and the “New Indirect Window Object” dialogue box will appear, the press the OK button after correctly setting each item in the “General” tab, and a new “Indirect Window Object” will be created. See the pictures below.





New Indirect Window Object

General

Description :

PLC name : Local HMI

Read address

Device type : LW

Address : 100

□ System tag

□ Index register

16-bit Unsigned

Attribute

Style : No title bar

Read address

To set the register as the source for the window’s number.

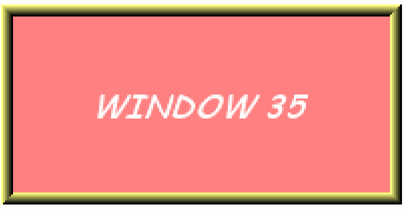
Attribute

[Style]

To set the displaying style of the popup window. There are two styles, “No drawing frame” and “Drawing frame” for selection.

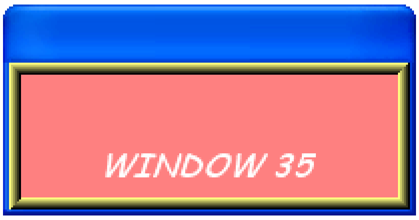
a. “No title bar”

The popup window does not have title bar, and its position is not movable.

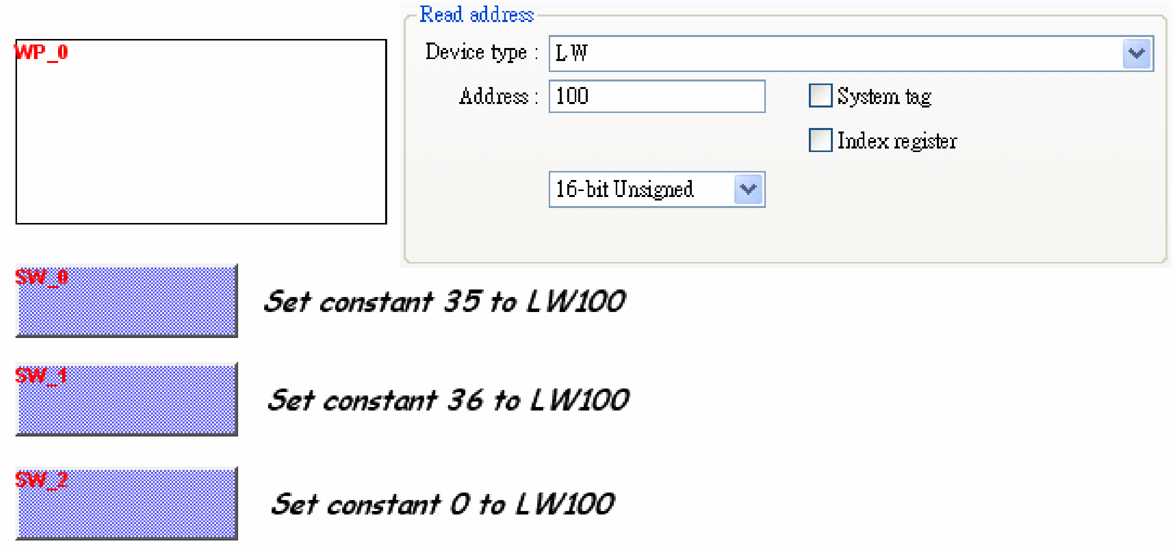


b. “Width title bar”

The Popup window possesses title bar, and its position is movable.



Here is a simple example to explain how to use the indirect window object. The pictures below show how to set the indirect window object. Use the register [LW100] to appoint the number of the window which is going to popup, and the window 35 and window 36 must have been created first.



Read address

Device type : LW

Address : 100

□ System tag

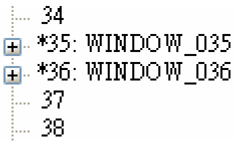
□ Index register

16-bit Unsigned

Set constant 35 to LW100

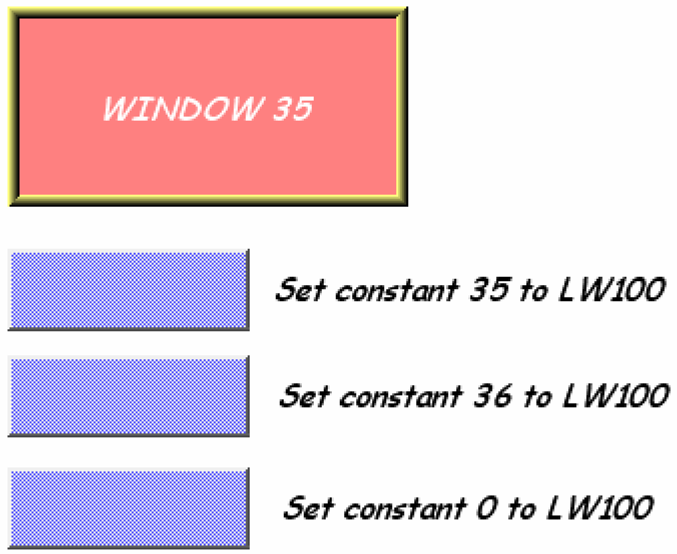
Set constant 36 to LW100

Set constant 0 to LW100

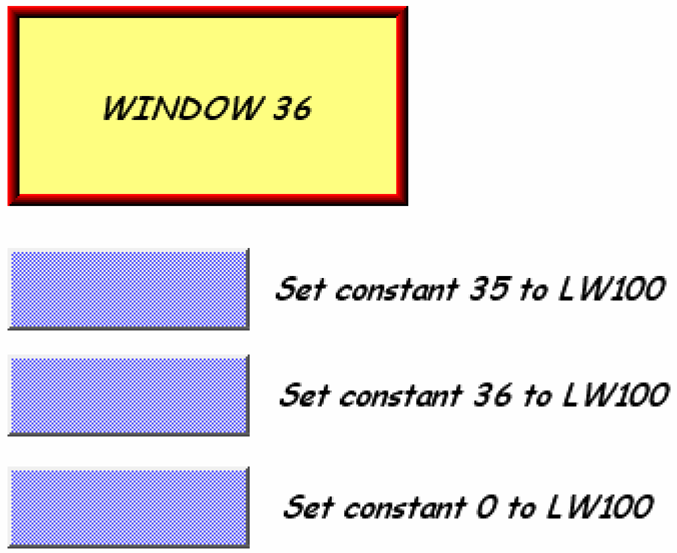


34
*35: WINDOW_035
*36: WINDOW_036
37
38

Use the set word object SW_0 and set the value of [LW100] to 35, and the display will be like the picture below.



If continue to use the set word object SW_1 and set the value of [LW100] to 36, the window 35 will be closed and the window 36 will be popped up. See the picture below.



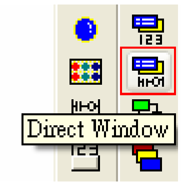
If want to close window 35 or window 36, besides using the set word object SW_2 to set the value of [LW100] to 0, users can set a function key object on window 35 and window 36 and select the [Close window] mode, and the popup window can be closed when pressing the object.

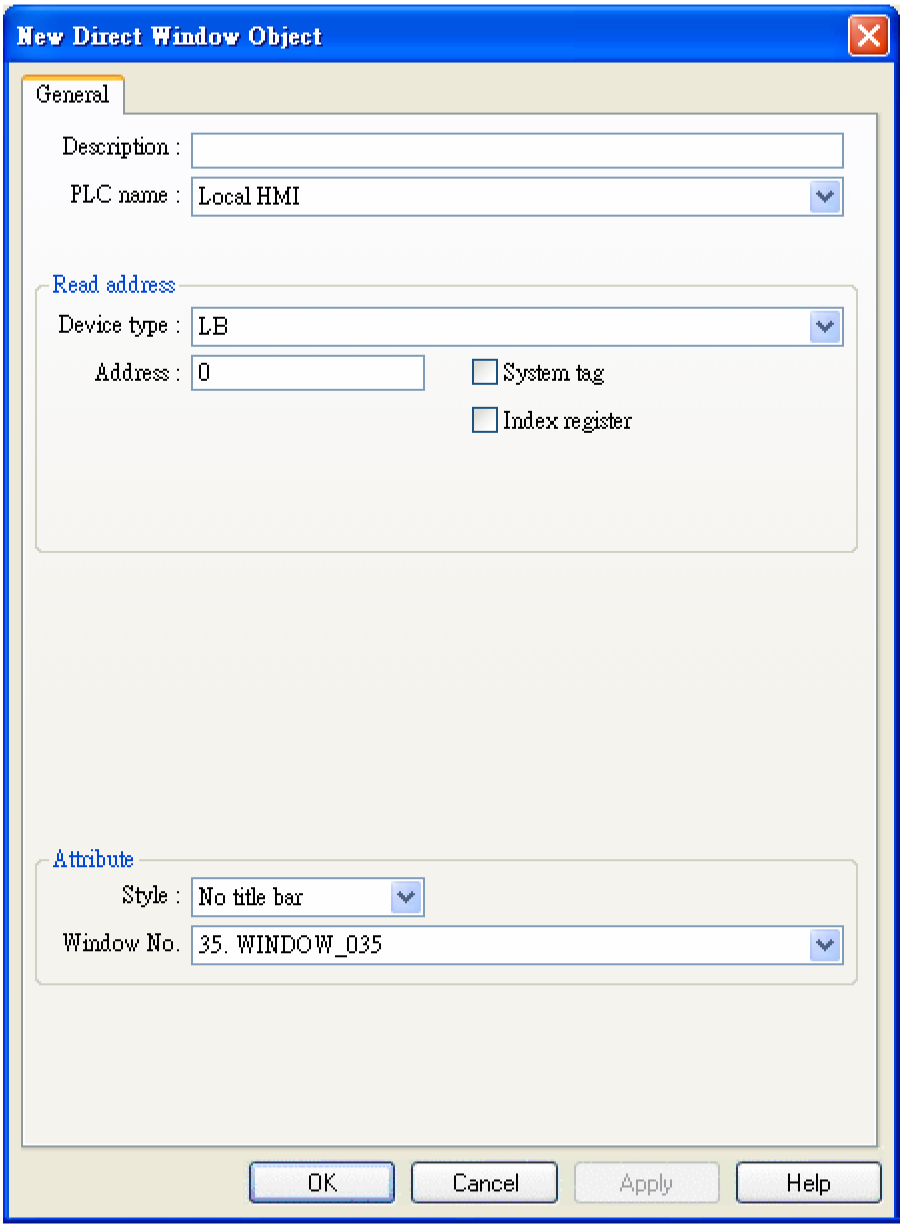
7. Direct Window Object

Direct window Object can be used to define a display area in a window, when the state of the designated register is changed from OFF to ON, the designated window will popup in the display area. The size of the popup window will not be larger than the display area. The popup window can be closed when the state of the designated register is changed from ON to OFF.

The difference between the “Direct window” and the “Indirect window” is that the direct window object sets the popup window in advance. When system is in operation, users can use the state of the designated register to decide whether to popup the window or to close the window.

Click the “Direct window” icon on the toolbar and the “New Direct Window Object” dialogue box will appear, then press the OK button after correctly setting each item in the “General tab, and a new “Direct Window Object” will be created. See the pictures below.





New Direct Window Object

General

Description :

PLC name : Local HMI

Read address

Device type : LB

Address : 0

□ System tag

□ Index register

Attribute

Style : No title bar

Window No. 35. WINDOW_035

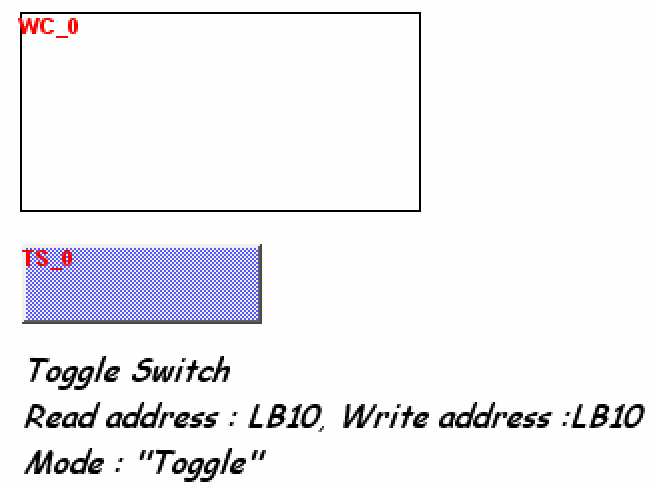
Read address
When the designated register's state is ON, the selected window (It is window 35 in the picture above) will be displayed in the defined area. When the state is OFF, the window will be closed.

Attribute

[Style]
Refer to the "Indirect Window Object" section of this chapter for related information.

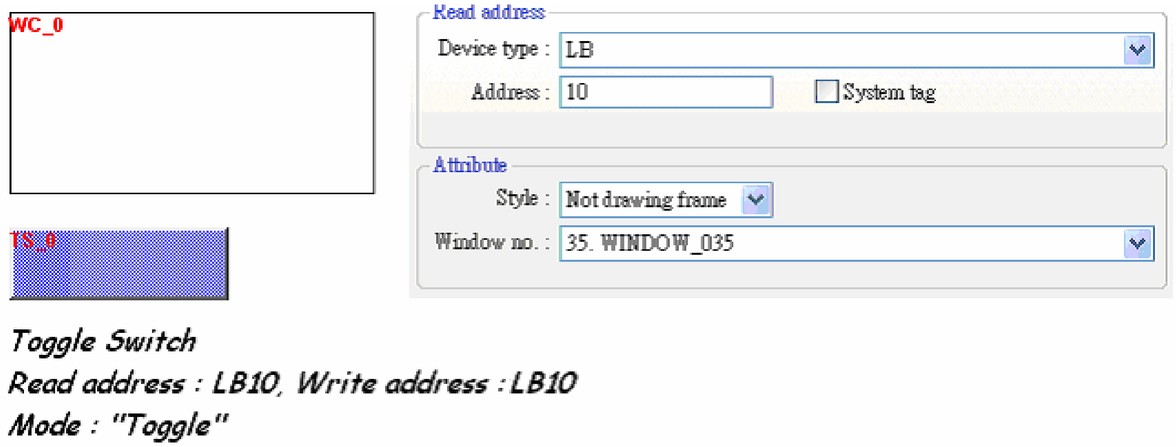
[Window no.]

To set the popup window number.



Toggle Switch
Read address : LB10, Write address :LB10
Mode : "Toggle"

Here is an example to explain how to use the direct window object. The picture below show the settings of the direct window object. In the example, use [LB10] to call up the window 35.

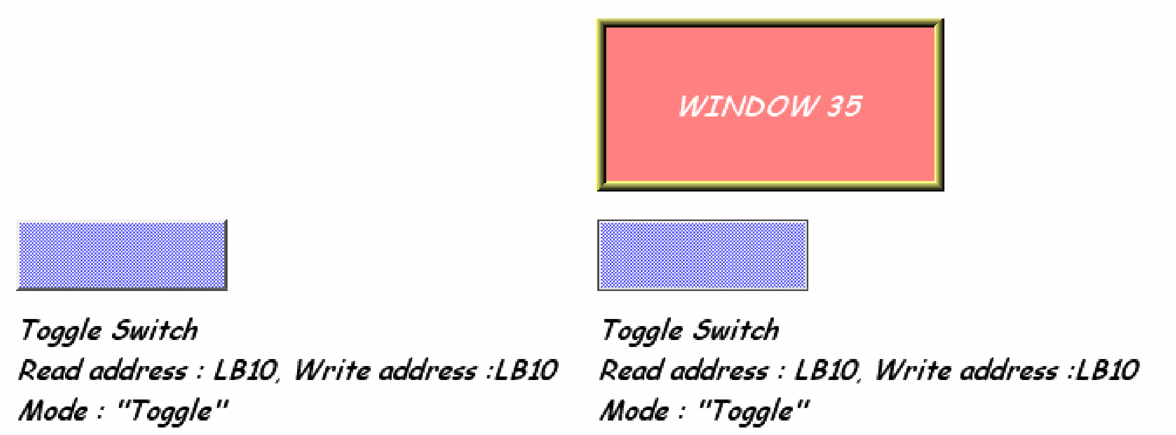


Read address
Device type : LB
Address : 10 □ System tag

Attribute
Style : Not drawing frame
Window no. : 35. WINDOW_035

Toggle Switch
Read address : LB10, Write address : LB10
Mode : "Toggle"

When the state of LB10 is to ON, the window 35 will popup; when the state of LB10 is OFF, the window 35 will disappear. See the picture below.

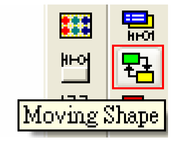


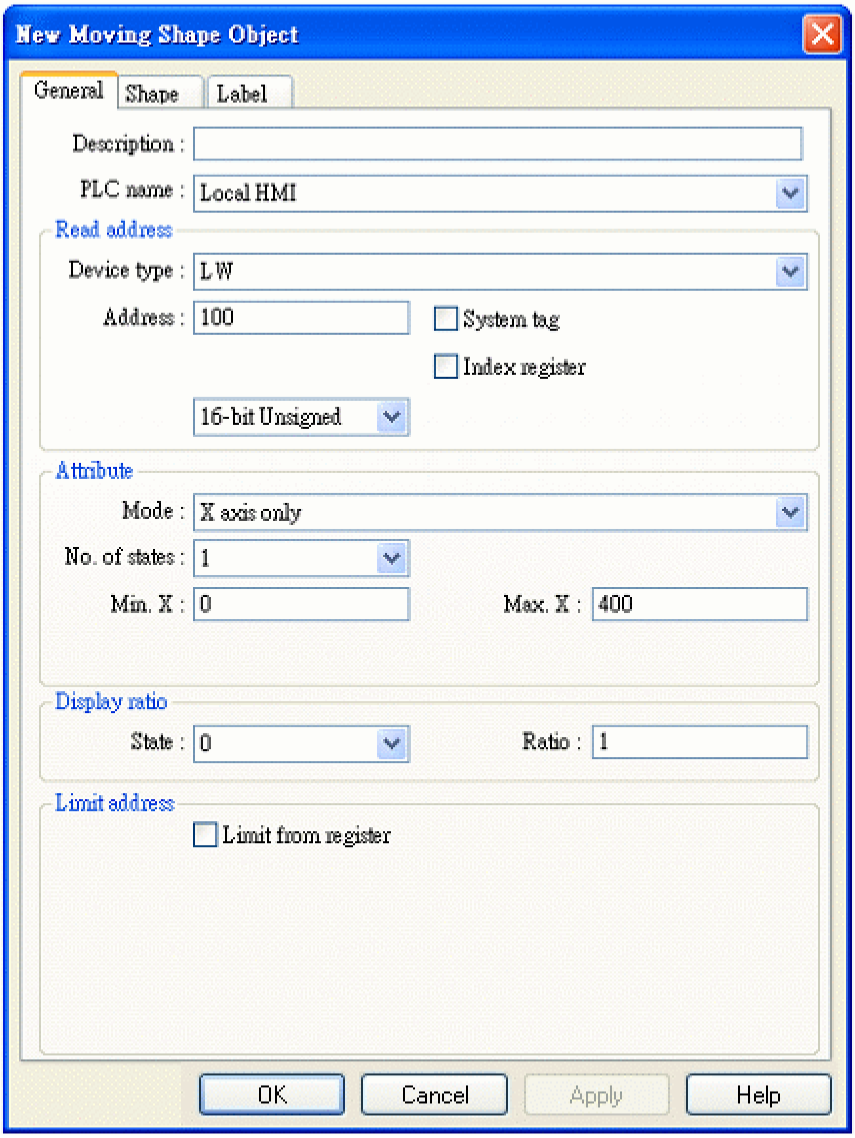
Toggle Switch
Read address : LB10, Write address :LB10
Mode : "Toggle"

Toggle Switch
Read address : LB10, Write address :LB10
Mode : "Toggle"

8. Moving Shape Object

Moving Shape object is used to define the object’s state and moving distance. Click the “Moving Shape” icon on the toolbar and “New Moving Shape Object” dialogue box will appear, then press the OK button after correctly setting each item in the “General” tab, and a new “Moving Shape Object” will be created. See the pictures below.




New Moving Shape Object

General | Shape | Label

Description :

PLC name : Local HMI

Read address

Device type : LW

Address : 100

□ System tag

□ Index register

16-bit Unsigned

Attribute

Mode : X axis only

No. of states : 1

Min. X : 0

Max. X : 400

Display ratio

State : 0

Ratio : 1

Limit address

□ Limit from register

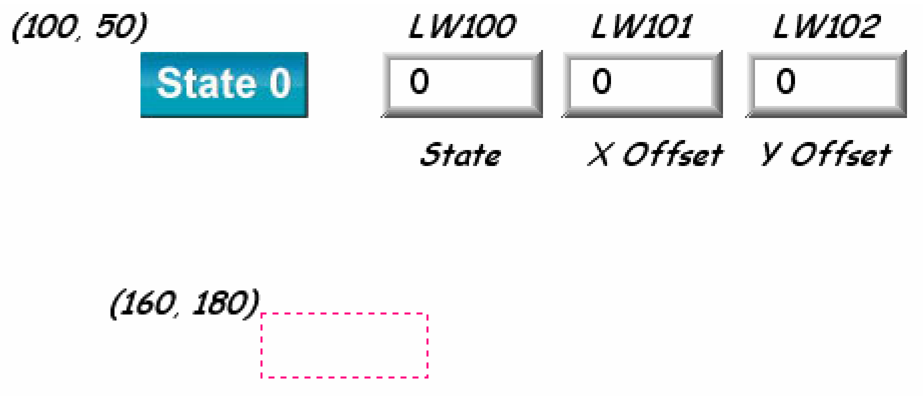
Read address

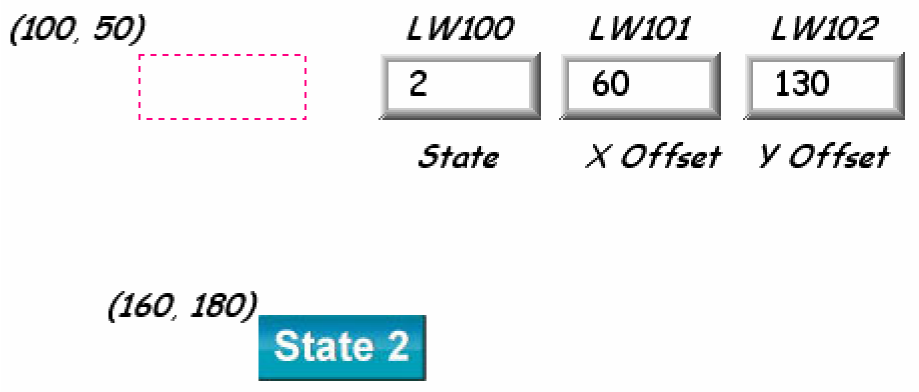
The PLC’s register address that controls the object’s state and moving distance. The table below shows the read address of object’s states and moving distance.

| Data format | Read address of object’s state | Read address of Moving Distance on the X-axis | Read address of Moving distance on the Y-axis |
|---|---|---|---|
| 16-bit BCD | Address | Address + 1 | Address + 2 |
| 32-bit BCD | Address | Address + 2 | Address + 4 |
| 16-bit Unsigned | Address | Address + 1 | Address + 2 |
| 16-bit Signed | Address | Address + 1 | Address + 2 |
| 32-bit Unsigned | Address | Address + 2 | Address + 4 |
| 32-bit Signed | Address | Address + 2 | Address + 4 |

For example, if the register’s address is [LW100] and the data format is “16-bit Unsigned”, [LW100] is to save the object’s state, [LW101] is to save the object’s moving distance on the X-axis, and [LW102] is to save the object’s moving distance on the Y-axis.

The picture below shows that the object’s read address is [LW100] and initial position is (100, 50). Supposed that the object is moved to the position (160, 180) and display the shape of State 2, the value of [LW100] must be set to 2, [LW101] = 160-100 = 60, [LW102] = 180-50 = 130.



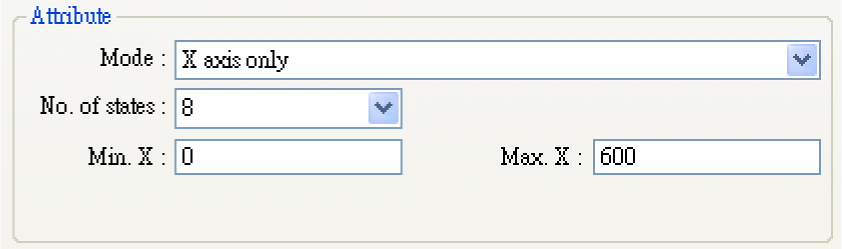


Attribute

To select the object's moving mode and range.

a. X axis only

The object is only allowed to move along the X-axis. The moving range is defined by [Min. X] and [Max. X].



Attribute

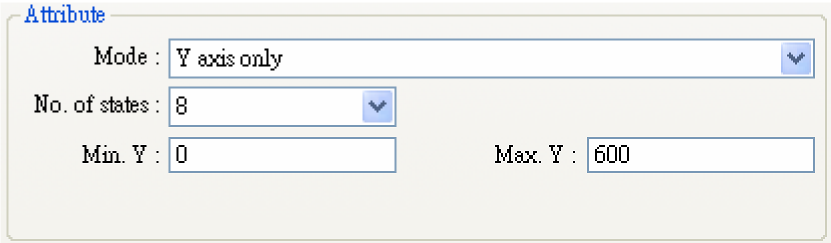
Mode : X axis only

No. of states : 8

Min. X : 0    Max. X : 600

b. Y axis only

The object is only allowed to move along the Y-axis. The moving range is defined by [Min. Y] and [Max. Y].



Attribute

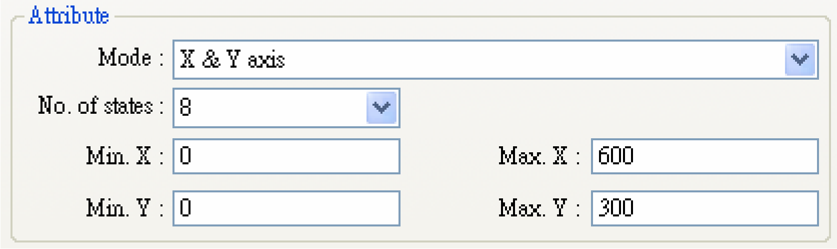
Mode : Y axis only

No. of states : 8

Min. Y : 0    Max. Y : 600

c. X & Y axis

The object is allowed to move along the X-axis and Y-axis. The moving range is defined by [Min. X], [Max. X] and [Min. Y], [Max. Y]



Attribute

Mode : X & Y axis

No. of states : 8

Min. X : 0    Max. X : 600

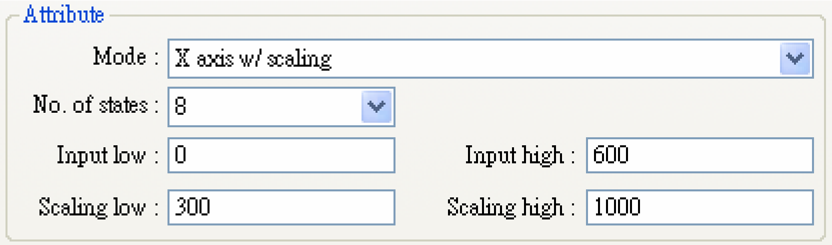
Min. Y : 0    Max. Y : 300

d. X axis w/ scaling

The object is only allowed to move by the designated scale along the horizontal X-axis. Supposed that the value of the designated register is DATA, and the following formula can calculate the moving distance on the X-axis.

X axis move distance =

(DATA – [Input low]) * ([Scaling high – Scaling low]) / ([Input high] – [input low])


Attribute

Mode : X axis w/ scaling

No. of states : 8

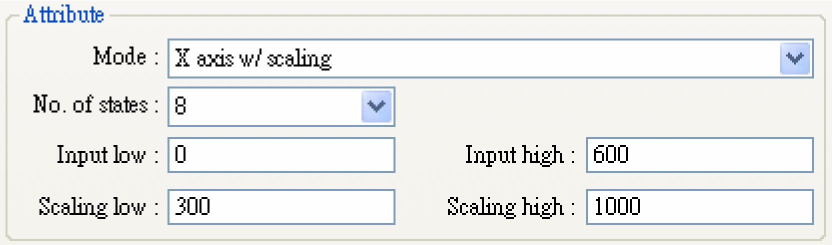
Input low : 0

Input high : 600

Scaling low : 300

Scaling high : 1000

For example, the object is only allowed to move within 0~600, but the range of the register's value is 300~1000, set [Input low] to 300 and [Input high] to 1000, and set [Scaling low] to 0 and [Scaling high] to 600, and the object will move in the designated range.


Attribute

Mode : X axis w/ scaling

No. of states : 8

Input low : 0

Input high : 600

Scaling low : 300

Scaling high : 1000

e. Y axis w/ scaling

The object is only allowed to move by the designated scale along the vertical Y-axis., and the formula to calculate the moving distance on the Y-axis is the same as the one in "X axis w/ scaling."

f. X axis w/ reverse scaling

This function is the same as "X axis w/ scaling", but the moving direction is reverse.

g. Y axis w/ reverse scaling

This function is the same as "Y axis w/ scaling", but the moving direction is reverse.

Display ratio

The displaying size of object's shape in different states can be set individually as shown in the picture below.

Ratio : 1
Ratio : 1.2
Ratio : 1.4
Ratio : 1.6
State 0
State 1
State 2
State 3

Limit address

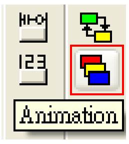
The object’s displaying range can be set not only by [Min. X], [Max. X] and [Min. Y] [Max. Y], but also by the designated register. Supposed that the object’s displaying range is set by the value of the designated register “Address”, the reading address of [Min. X], [Max. X] and [Min. Y] [Max. Y] are listed in the following table.

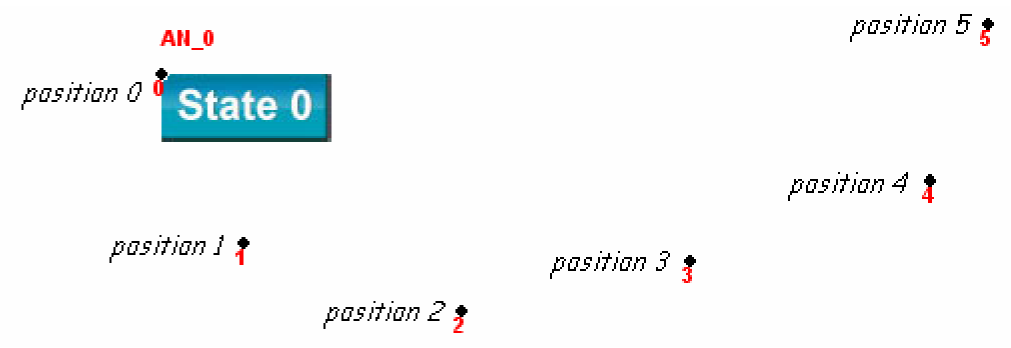
| Data format | [Min. X]<br>read address | [Max. X]<br>read address | [Min. Y]<br>read address | [Max. Y]<br>read address |
|---|---|---|---|---|
| 16-bit BCD | Address | Address + 1 | Address + 2 | Address + 3 |
| 32-bit BCD | Address | Address + 2 | Address + 4 | Address + 6 |
| 16-bit Unsigned | Address | Address + 1 | Address + 2 | Address + 3 |
| 16-bit Signed | Address | Address + 1 | Address + 2 | Address + 3 |
| 32-bit Unsigned | Address | Address + 2 | Address + 4 | Address + 6 |
| 32-bit Signed | Address | Address + 2 | Address + 4 | Address + 6 |

9. Animation Object

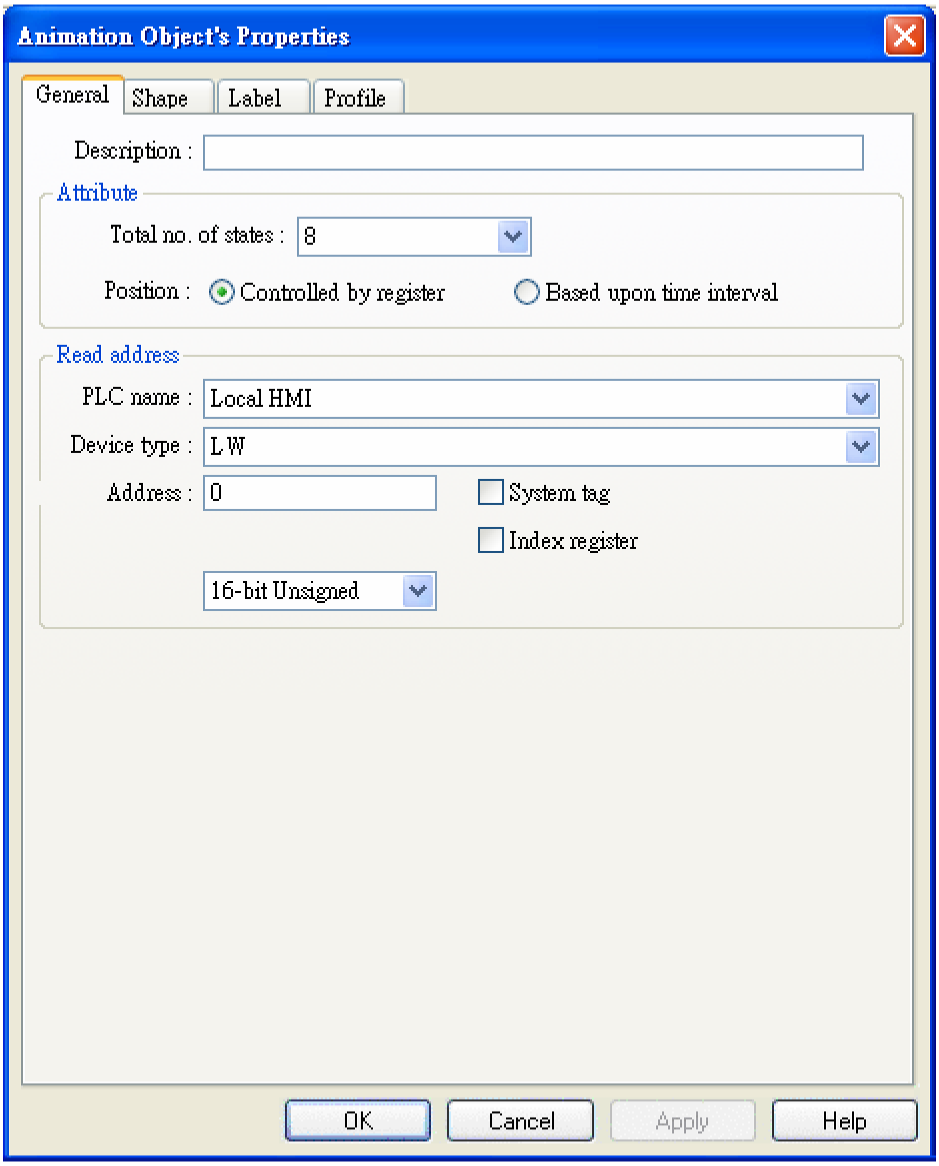
Users can define a moving path of the Animation Object in advance, and control the object's state and position on the moving path by changing the value of the designated register.

Click the "Animation" icon on the toolbar, and click the left button of the mouse at the proper position in the editing window to define a new moving position. When definitions of all moving positions are completed, click the right button of the mouse, and a new animation object and a moving path will be created. See the picture below.





When wanting to change the object's attributes, double click the left button of the mouse on the object, and the "Animation Object's Properties" dialogue box, as shown in the picture below, will appear for users to change the object's attributes.



Description :

Attribute

Total no. of states : 8

Position : ● Controlled by register ○ Based upon time interval

Read address

PLC name : Local HMI

Device type : LW

Address : 0 □ System tag

□ Index register

16-bit Unsigned

Attribute

[State no.]

To set the number of the object’s states.

[Position]

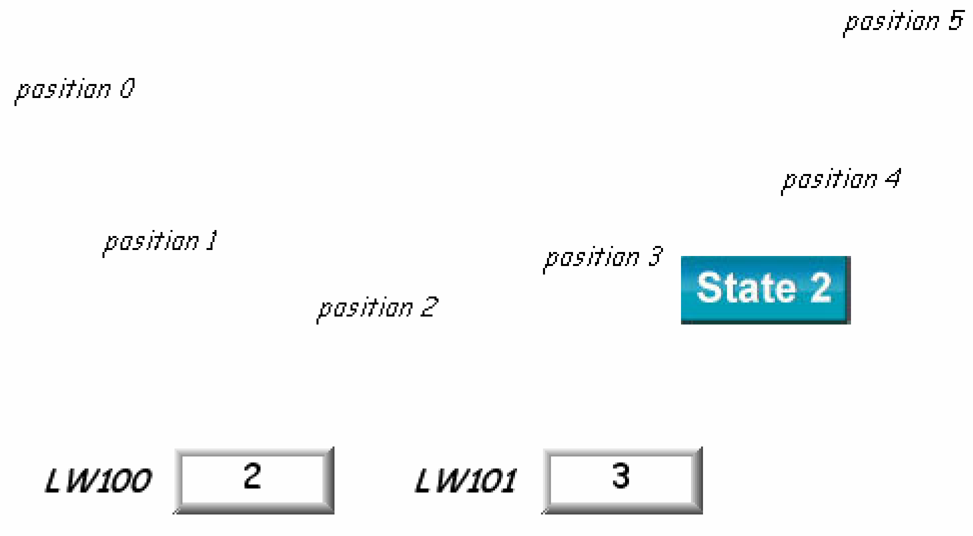
When select “Controlled by register”, the designated register controls the object’s state and position.

Read address

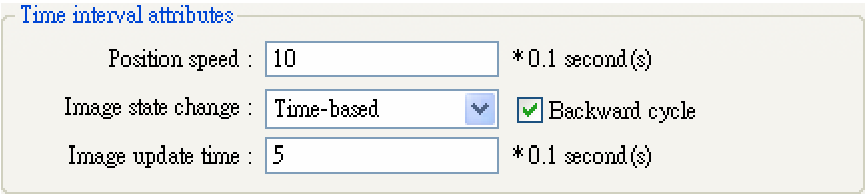
If the designated register controls the object's state and position, it is necessary to set the read address correctly. In the table below, Address represents the read address, when the register is [LW100], Address is 100.

| Data Format | Read address of object's state | Read address of object's position |
|---|---|---|
| 16-bit BCD | Address | Address + 1 |
| 32-bit BCD | Address | Address + 2 |
| 16-bit Unsigned | Address | Address + 1 |
| 16-bit Signed | Address | Address + 1 |
| 32-bit Unsigned | Address | Address + 2 |
| 32-bit Signed | Address | Address + 2 |

For example, if the designated register is [LW100] and the data format is "16-bit Unsigned", then [LW100] is to save the object's state, [LW101] is to save the object's displaying position. In the picture below, [LW100] = 2, [LW101] = 3, so the object's displaying state is 2 and displaying position is 3.



If " Based upon time interval" is chosen, the object automatically changes status and display location. "Time interval attributes" is for status setup and to display the way of location change.



Time interval attributes

Position speed : 10 *0.1 second(s)

Image state change : Time-based ☑ Backward cycle

Image update time : 5 *0.1 second(s)

[Speed]

Position changes speed, the unit is 0.1 second. Supposed that [Speed] is set to 10, the object will change its position every 1 second.

[Backward]

Supposed that the object has four positions: position 0, position 1, position 2, and position 3. If [Backward] is not selected, when the object moves to the last position (position 3), next position will be back to the initial position 0, and repeat the moving mode again and again. The moving path is shown as follows:

position 0-> position 1->position 2->position 3-> position 0-> position 1-> position 2…

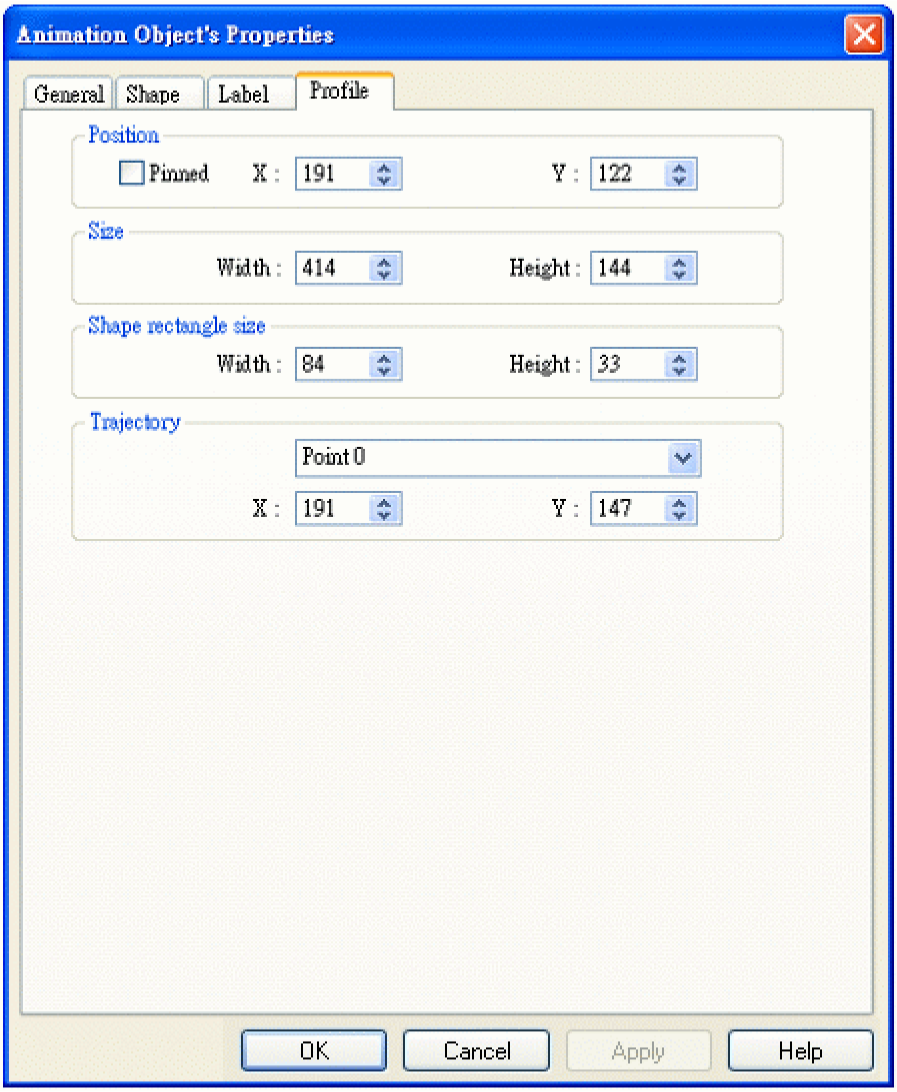
If [Backward] is selected, when the object moves to the last position (position 3), it will move backwards to the initial position 0, and repeat the moving mode again and again. The moving path is shown as follows.

position 0-> position 1->position 2->position 3-> position 2-> position 1-> position 0…

[State changed]

State's changing mode. There are "Position dependant" and "Auto changed" for selection. When "Position dependant" is selected, it means that following the change of position, the state will change too. When "Auto change" is selected, it means that the position will change automatically in a fixed frequency, and the changing frequency can be set in [Update time].

The following dialog shows size setup of animation object. A animation object appears by double clicking.



Animation Object's Properties

Position

□ Pinned X : 191 Y : 122

Size

Width : 414 Height : 144

Shape rectangle size

Width : 84 Height : 33

Trajectory

Point 0

X : 191 Y : 147

Shape rectangle size

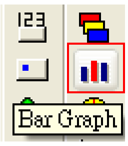
To set the size of object’s displaying shape.

Trajectory

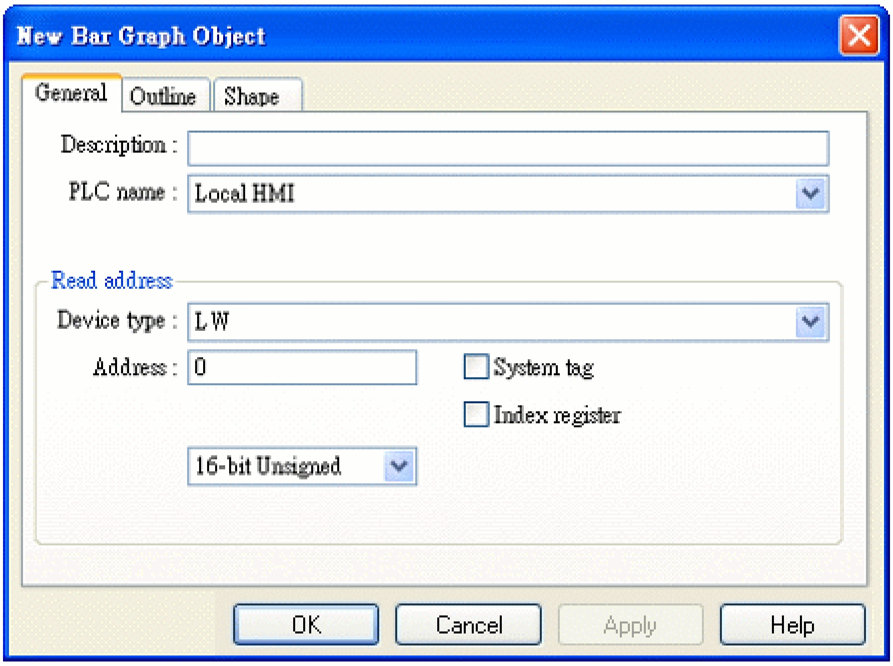
To set the position of each point on the moving path.

10. Bar Graph Object

Bar graph object displays PLC register data as a bar graph in proportion to its value. Click the “Bar Graph” icon on the toolbar, there will appear “Bar Graph” dialogue box, press OK button after correctly fill in the General Attribute, there will be a new “Bar Graph Object”. See the picture below.



The following picture shows the “General” tab of the bar graph object.



Description :

PLC name : Local HMI

Read address

Device type : LW

Address : 0

□ System tag

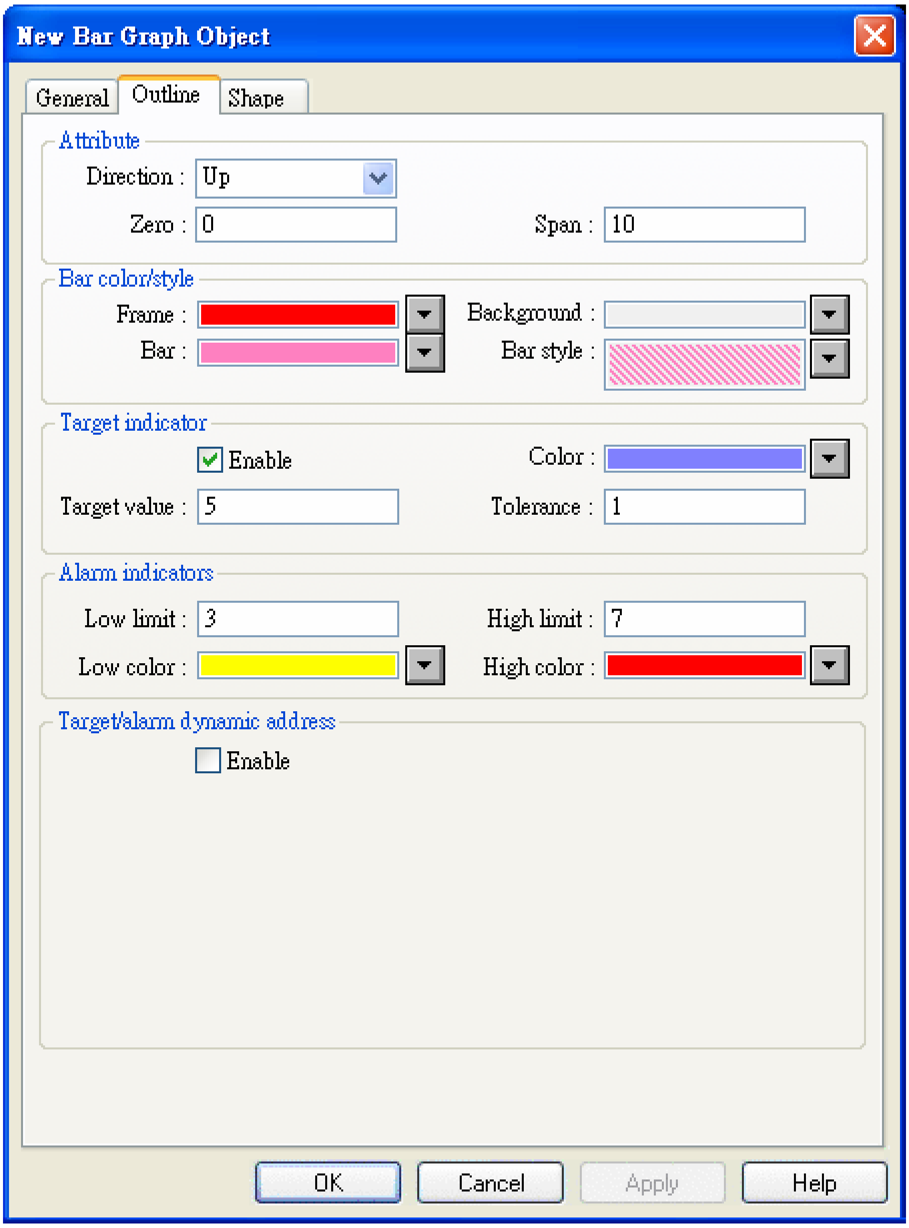
□ Index register

16-bit Unsigned

Read address

PLC’s register address that controls the bar graph display.

The following picture shows the “Outline” tab of the bar graph object.



Attribute

Direction : Up

Zero : 0    Span : 10

Bar color/style

Frame : 🟥    Background :

Bar : 🟪    Bar style : ▨

Target indicator

☑ Enable    Color : 🟦

Target value : 5    Tolerance : 1

Alarm indicators

Low limit : 3    High limit : 7

Low color : 🟨    High color : 🟥

Target/alarm dynamic address

☐ Enable

Attribute

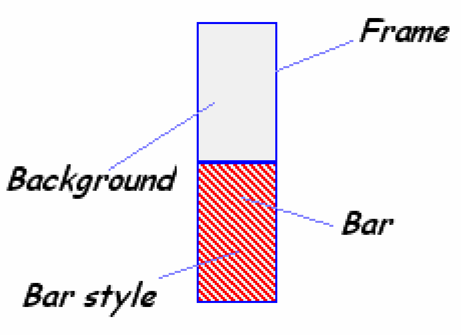
[Direction]
To select the bar’s displaying direction, and there are ”Up”, “Down”, “Right”, and “Left” for selection.

[Zero]、[Span]
The filled bar percentage can be calculated with the following formula:

The filled bar percentage = (Register value – Zero)/ [Span] – [Zero]) *100%

Bar color/style

To set the bar’s Frame, Background color, Bar style, and Bar color. See the picture below.

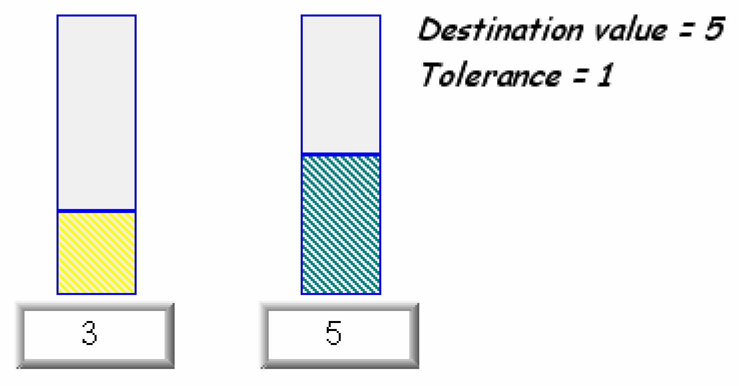


Target Indicator

When the register value meets the following condition, the filled area’s color of the bar will change to the “Destination color”

[Desti. Value] - [Tolerance]＜＝Register value＜＝[Desti. Value] + [Tolerance]

See the picture below, in here [Desti. Value] = 5, [Tolerance] = 1, if the register value is equal to or larger than 5-1=4 and equal to or less than 5+1=6, the filled area’s color of the bar will change to the “Destination color”

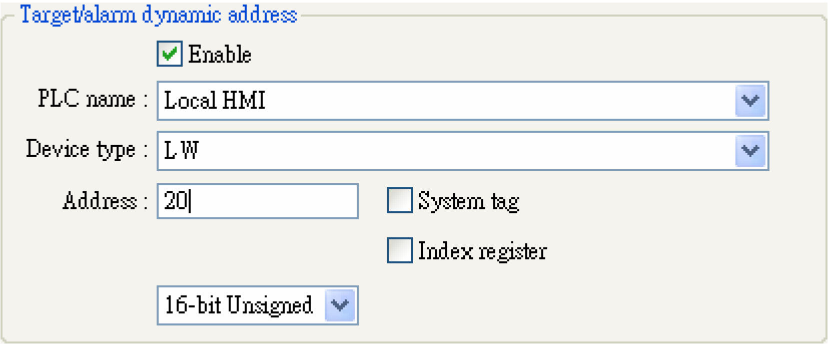


Alarm Indicator

When register’s value is larger than [High limit], the filled area’s color of the bar will change to [High color], when register’s value is smaller than [Low limit], the filled area’s color of the bar will change to [Low color].

Target/Alarm Dynamic Address

When select [Enable], the [Low limit] and [High limit] of “Limitation alarm” and the [Desti. Value] of “Destination” all come from designated register. See the picture below.



Target/alarm dynamic address

☑ Enable

PLC name : Local HMI

Device type : LW

Address : 20 □ System tag

□ Index register

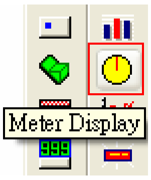
16-bit Unsigned

The following table shows the read address of low limit, high limit, and destination. The “Address” means the register’s address, for example, if the register is [LW100], the “Address” is 100.

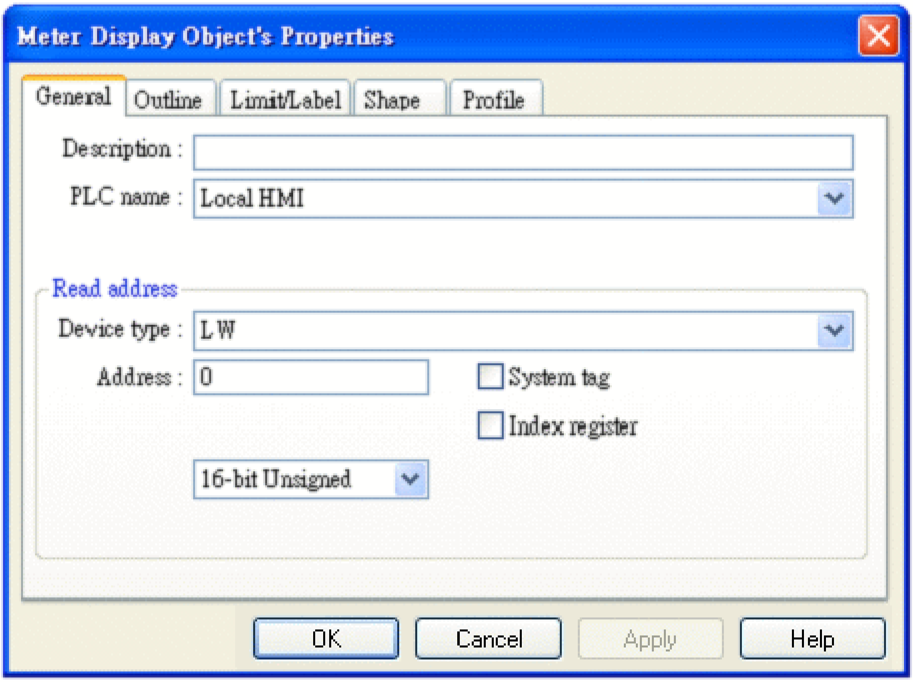
| Data Format | Low limit | High limit | Destination |
|---|---|---|---|
| 16-bit BCD | Address | Address + 1 | Address + 2 |
| 32-bit BCD | Address | Address + 2 | Address + 4 |
| 16-bit Unsigned | Address | Address + 1 | Address + 2 |
| 16-bit Signed | Address | Address + 1 | Address + 2 |
| 32-bit Unsigned | Address | Address + 2 | Address + 4 |
| 32-bit Signed | Address | Address + 2 | Address + 4 |

11. Meter Display Object

The meter display object can displays the PLC register's data by using meter in proportion. Click the "Meter Display" icon on the toolbar and the "Meter Display Object's Properties" dialogue box will appear, then press the OK button after correctly setting each item in the "General" tab, and a new "Meter Display Object" will be created. See the picture below.



The picture below shows the "General" tab in the "Meter Display Object's Properties" dialogue box.



Description :

PLC name : Local HMI

Read address

Device type : LW

Address : 0

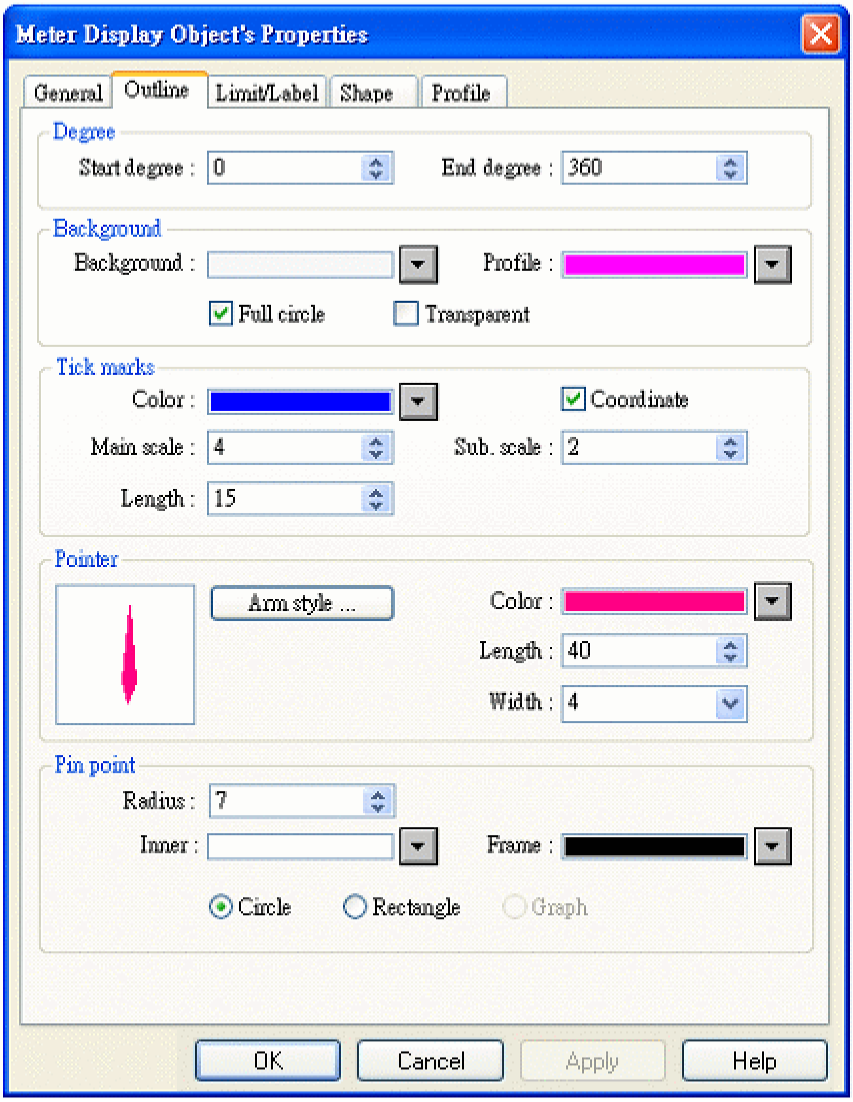
□ System tag

□ Index register

16-bit Unsigned

Read address

PLC's register address that control the displayed value.



Degree

Start degree : 0

End degree : 360

Background

Background :

Profile :

☑ Full circle

□ Transparent

Tick marks

Color :

☑ Coordinate

Main scale : 4

Sub. scale : 2

Length : 15

Pointer

Color :

Length : 40

Width : 4

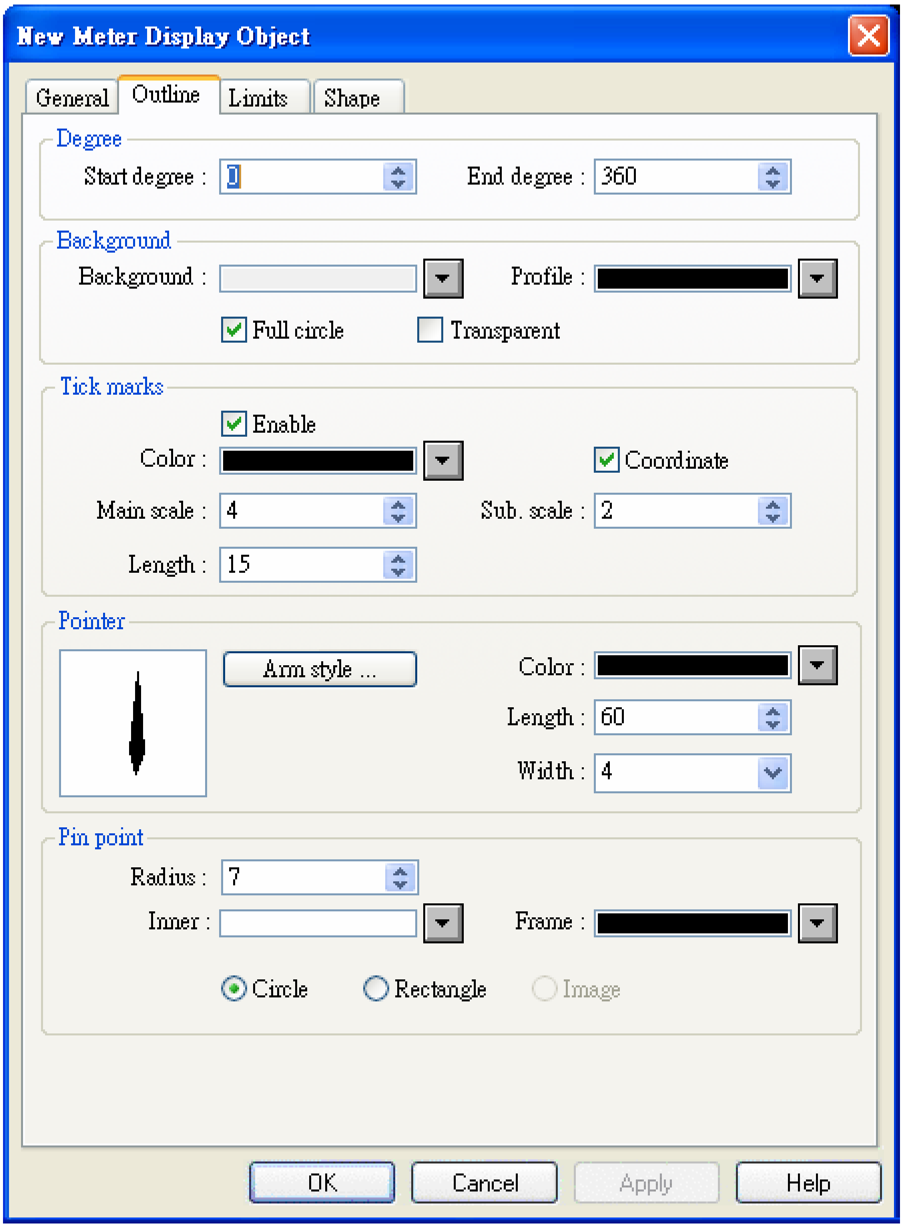
Pin point

Radius : 7

Inner :

Frame :

● Circle ○ Rectangle ○ Graph



Degree

Start degree : 0
End degree : 360

Background

Background :
Profile : ■

☑ Full circle
□ Transparent

Tick marks

☑ Enable
Color : ■
☑ Coordinate
Main scale : 4
Sub. scale : 2
Length : 15

Pointer

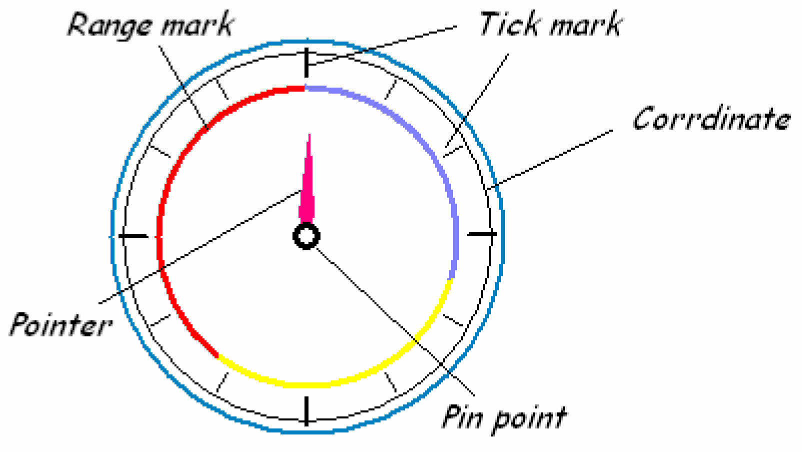
Color : ■
Length : 60
Width : 4

Pin point

Radius : 7
Inner :
Frame : ■

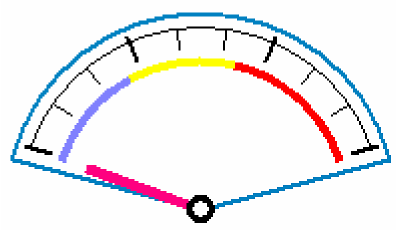
● Circle
○ Rectangle
○ Image

In the above dialogue box, users can set the meter display object's outline. Refer to the picture below for the names of each part of the meter.

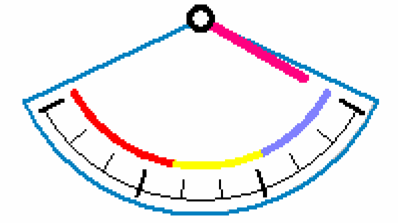


Degree

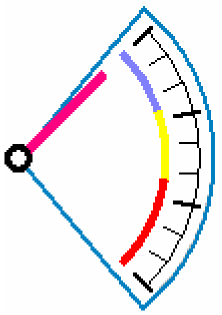
Set the object's "start degree" and "end degree", the angle range is 0-360 degrees. The following pictures show several results of different settings.



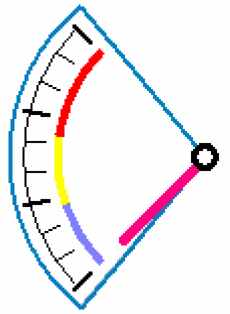
[Start degree] = 290, [End degree] = 70



[Start degree] = 45, [End degree] = 240



[Start degree] = 120, [End degree] = 135



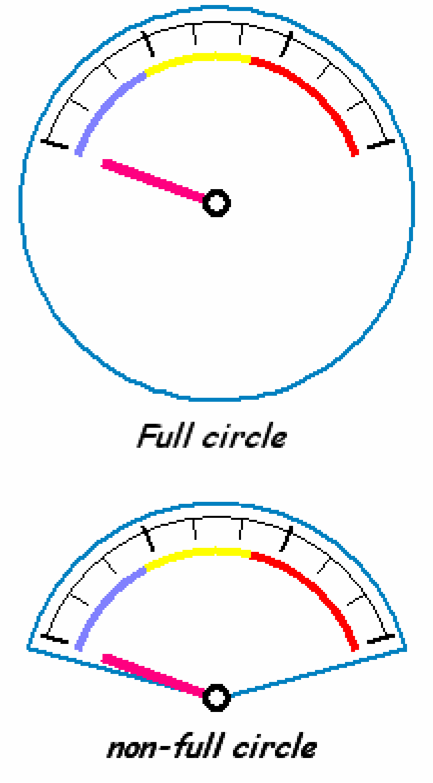
[Start degree] = 225, [End degree] = 315

Background

Set the object’s background color and profile color.

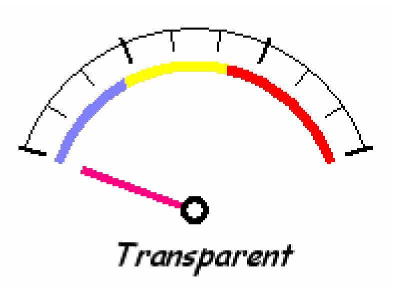
[Full circle]

When the “Full circle” is selected, the object will display the whole circle, otherwise the object will display the defined degree range. See the picture below.



[Transparent]

When the “Transparent” is selected, the object will not display the background and profile color. See the picture below.



Tick marks

To set the tick mark’s number and color.

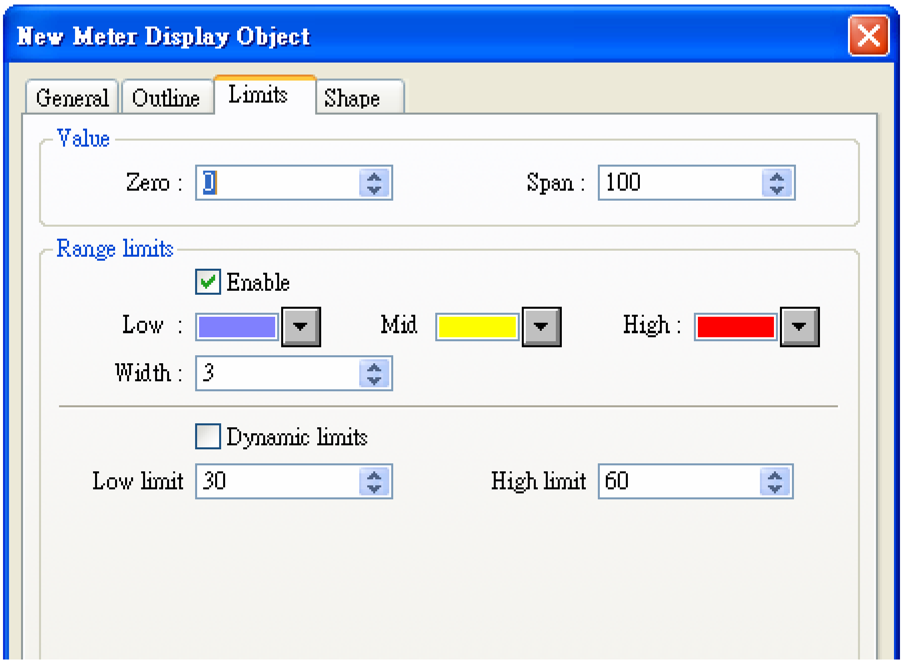
Pointer

To set Pointer’s style, length, width, and color.

Pin point

To set pin point’s style, radius, and color

The following pictures show the “Limit” tab and the sign of low and high limit set in the “Limit” tab.



Value

Zero : 0 Span : 100

Range limits

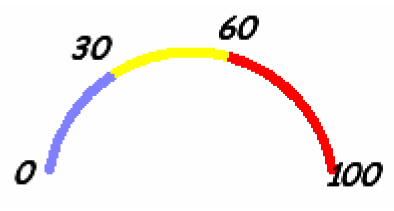
☑ Enable

Low : 🟦 Mid 🟨 High : 🟥

Width : 3

☐ Dynamic limits

Low limit 30 High limit 60

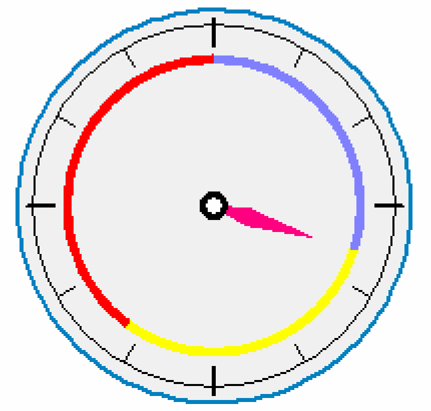


Value

To set object's displaying range. Meter display object will use the value of [Zero] and [Span] and the value of register to calculate the pointer's indication position. For example, supposed that [Zero] = 0, [Span] = 100, when the value of register is 30 and [Start degree] = 0, [End degree] = 360, then the degree indicated by pointer is:

{(30 – [Zero])/([Span] – [Zero])} * ([[End degree] - [Start degree]] =
{(30 – 0) / (100 - 0)} * (360 – 0) = 108

Pointer will indicate the position of 108 degrees. See the picture below.



Range

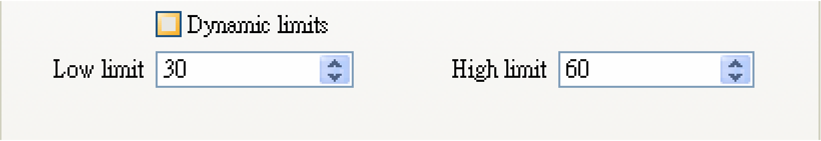
To set the value of low and high limit and the displaying color and width of the sign of low and high limit.

[Display different colors for different numerical ranges]

Whether or not to display the range mark.

[Dynamic Limits]

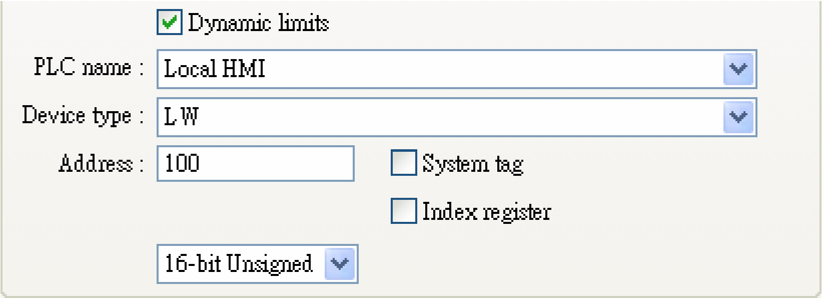
When "Dynamic Limits" is not selected, the low limit and high limit are a fixed value, which directly comes from settings. See the example in the picture below, the low limit is 30 and high limit is 60.



□ Dynamic limits

Low limit 30 High limit 60

When Dynamic Limits is selected, the low limit and high limit are decided by the register. Please refer to the following dialog.



☑ Dynamic limits

PLC name : Local HMI

Device type : LW

Address : 100 □ System tag

□ Index register

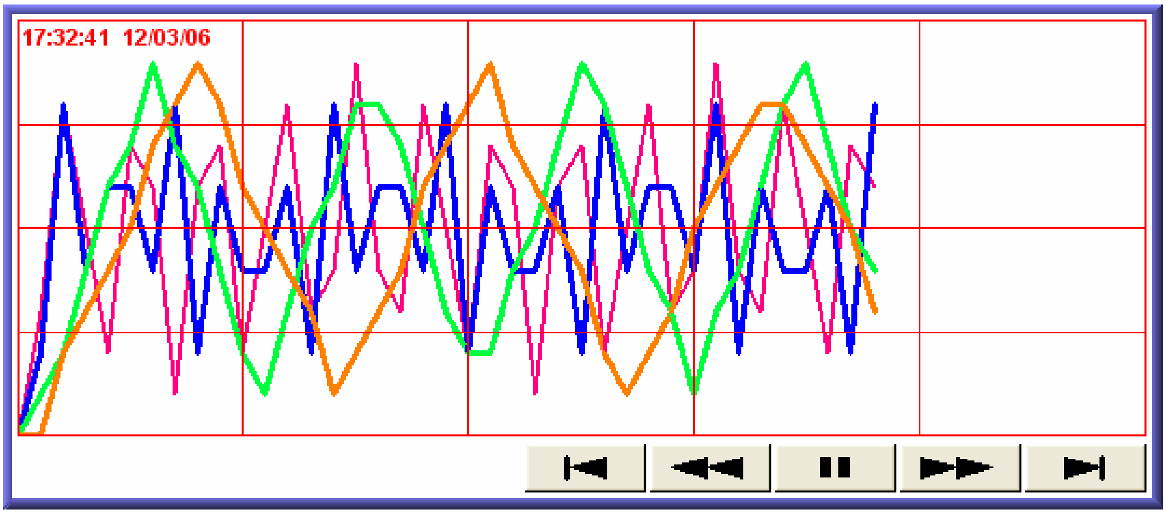
16-bit Unsigned

There following table shows the read address of low limit, high limit. The "Address" means the register's address. If the register is [LW100], the "Address" is 100.

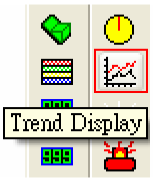
| Data format | High limit's read address | Low limit's read address |
|---|---|---|
| 16-bit BCD | Address | Address + 1 |
| 32-bit BCD | Address | Address + 2 |
| 16-bit Unsigned | Address | Address + 1 |
| 16-bit Signed | Address | Address + 1 |
| 32-bit Unsigned | Address | Address + 2 |
| 32-bit Signed | Address | Address + 2 |

12. Trend Display Object

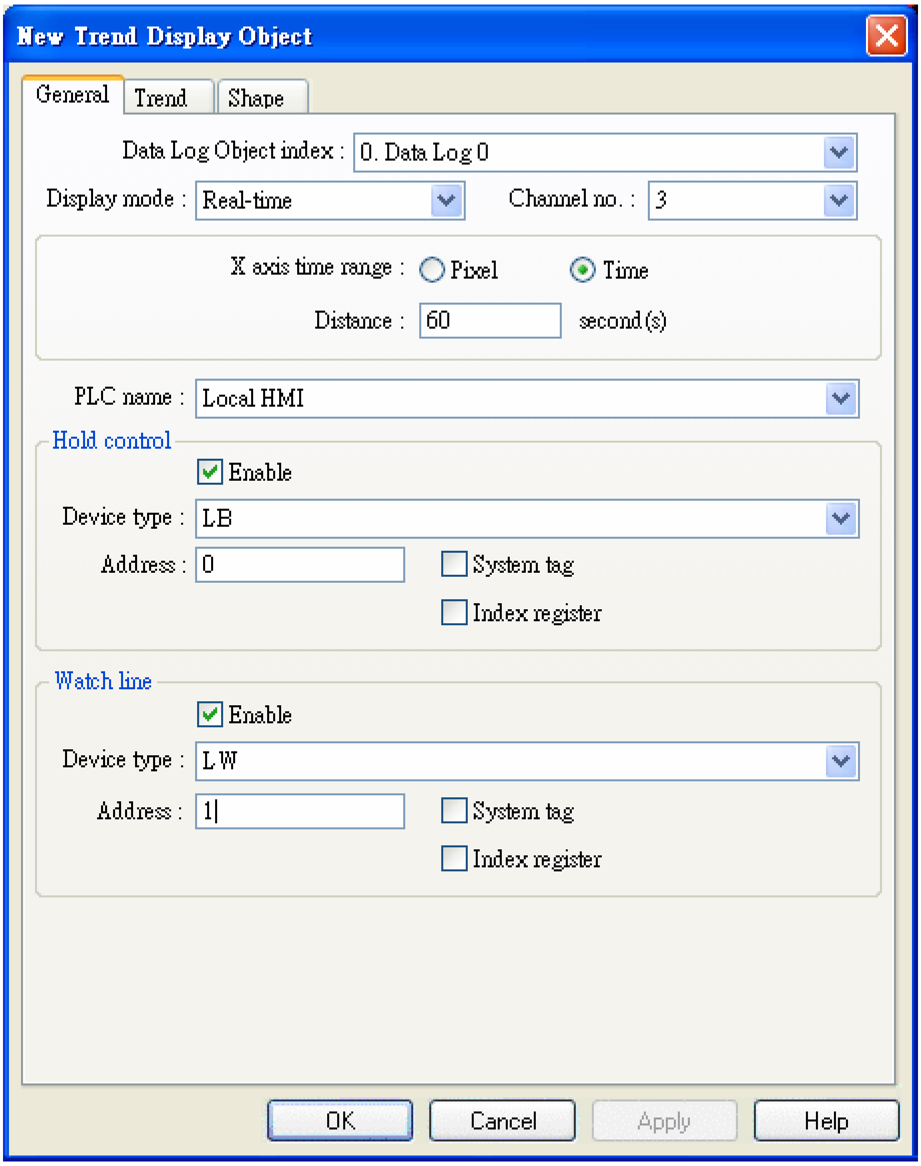
Trend display object can use the continuous line to describe the data recorded by data sampling object, so the trend of data changing's variation can be showed clearly. The following picture shows the status of using trend display object.



Click the "Trend Display" icon on the toolbar and the "Trend Display Object's Properties" dialogue box will appear, then press the OK button after correctly setting each item in the "General" tab, and a new "Trend Display Object" will be created. See the picture below.



The following picture shows the "General" tab in the "Trend Display Object's Properties" dialogue box.



New Trend Display Object

Data Log Object index : 0. Data Log 0

Display mode : Real-time  Channel no. : 3

X axis time range : ○ Pixel ● Time

Distance : 60 second(s)

PLC name : Local HMI

Hold control

☑ Enable

Device type : LB

Address : 0  □ System tag  □ Index register

Watch line

☑ Enable

Device type : LW

Address : 1  □ System tag  □ Index register

[Data Log Object Index]

To select data sampling object as the data source required for graphing. Refer to the "data sampling" section for related information.

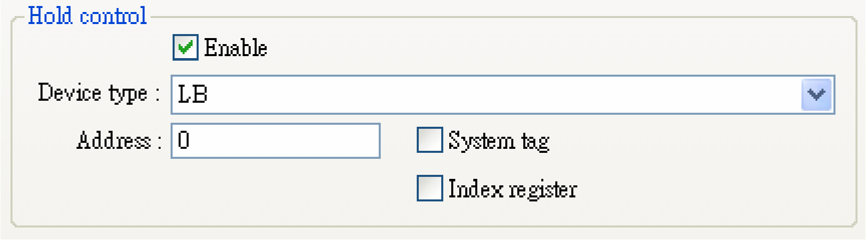
[Display mode]

To select the format of data source and there are "Real-time" and "History" for selection.

a. Real-time

In the mode, it can display the sampling data from the beginning of the MT8000 operation to the present time. If previous data are required, users must select the "History" mode to read the data from historical record.

Users can use the “Hold control” object to pause updating the trend display, but it is only limited to pausing the updating of the trend display, and it will never stop the object sampling the data. The picture below shows the “Hold control” setting page. Set the state of the designated register to ON, it will pause updating the trend display.



Hold control

☑ Enable

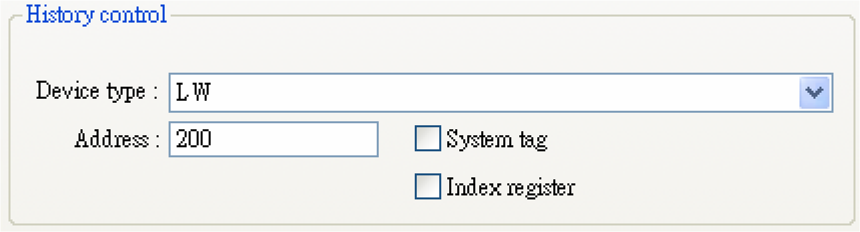
Device type : LB

Address : 0 □ System tag

□ Index register

b. History

In the mode, the displayed sampling data come from the historical record of the designated data sampling object in [Data sampling index]. Data sampling object will use the sampling data that are stored by sorting according to dates. It is able to use “History control” to select the historical records that are created by the same data sampling object. The picture below shows the “History control” setting page.



History control

Device type : LW

Address : 200 □ System tag

□ Index register

The EB8000 will sort the historical records of sampling data by date; the latest file is record 0 (normally it is today’s saved sampling data), the second latest file is record 1, and the rest may be deducted in the same way.

If the value of designated register in “History control” is 0, the trend display object will display data of record 0; if the value of designated register in “History control” is 1, the trend display object will display the data of record 1; therefore, we can deduce that if the register’s value is n, the trend display object will display the data of record n.

Here is an example to explain how to use the “History control.” In the above picture, the designated register is [LW200], if the sampling data are saved by the current data sampling object in the order of date as the files of pressure_20061120.dtl, pressure_20061123.dtl, pressure_20061127.dtl, and pressure_20061203.dtl, and today's date is 2006/12/3, according to the value of [LW200], the sampling data files displayed by the trend display object are arranged in the following table.

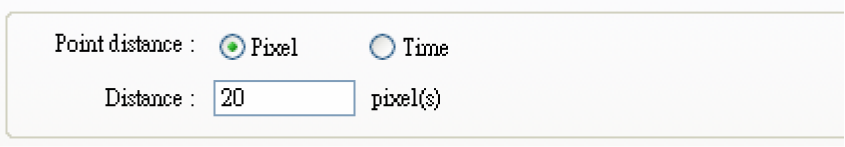
| Value of [LW200] | The files of the sampling data from the historical record |
|---|---|
| 0 | pressure_20061203.dtl |
| 1 | pressure_20061127.dtl |
| 2 | pressure_20061123.dtl |
| 3 | pressure_20061120.dtl |

In other words, the smaller the value of [LW200] is, the closer to the present time the historical record will be.

[Channel No.]

The channel number that the object can display. Each channel means the data sampling object continue to get the sampling data for one PLC register.

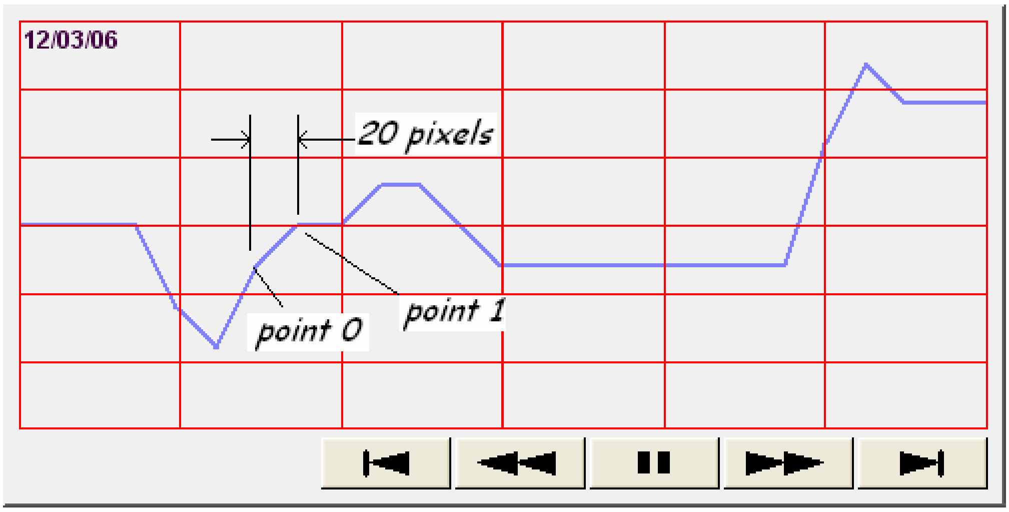
[Pixel]



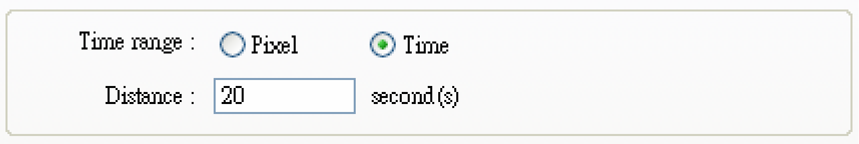
Point distance : ● Pixel ○ Time

Distance : 20 pixel(s)

Select [Pixel], the [Distance] can be used to set the distance between two sampling points.  See the picture below.



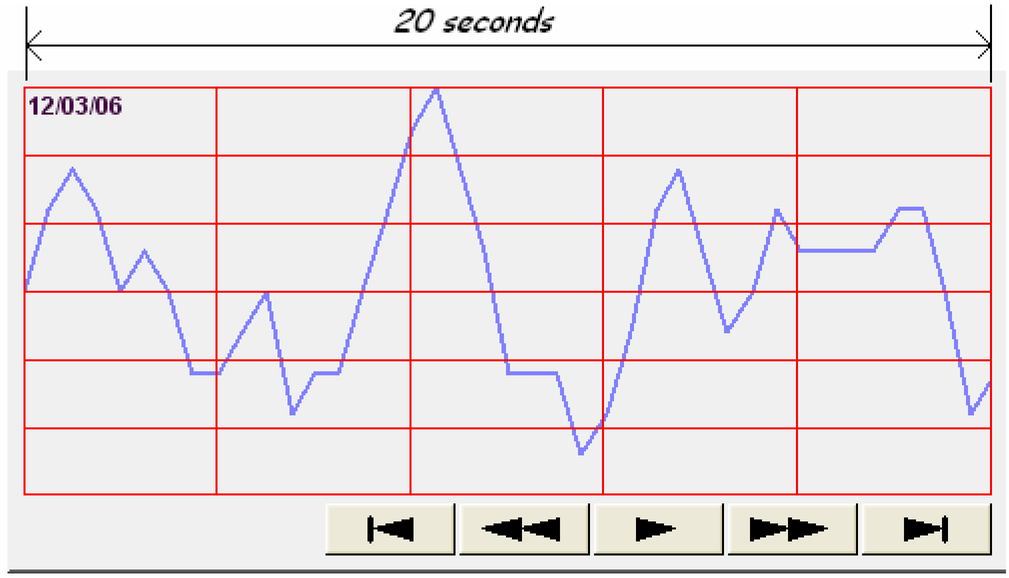
[Time]



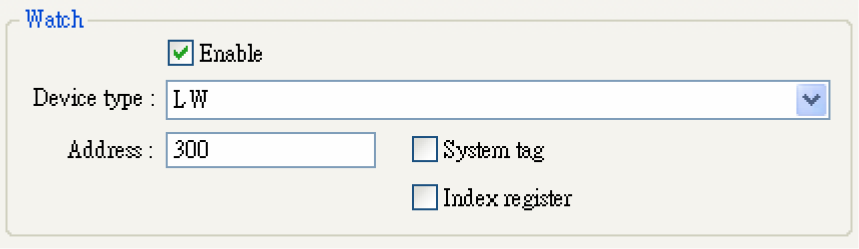
Time range : ○ Pixel ● Time

Distance : 20 second(s)

Select [Time], the [Distance] is used to set the time range for the display shape. See the picture below.



Watch



Watch

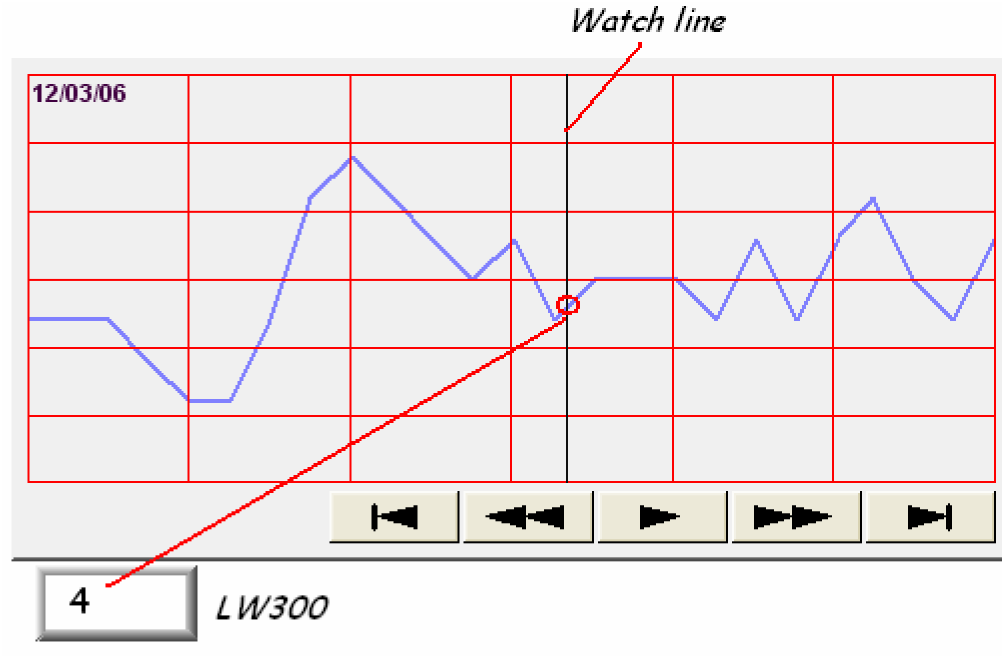
☑ Enable

Device type : LW

Address : 300 □ System tag

□ Index register

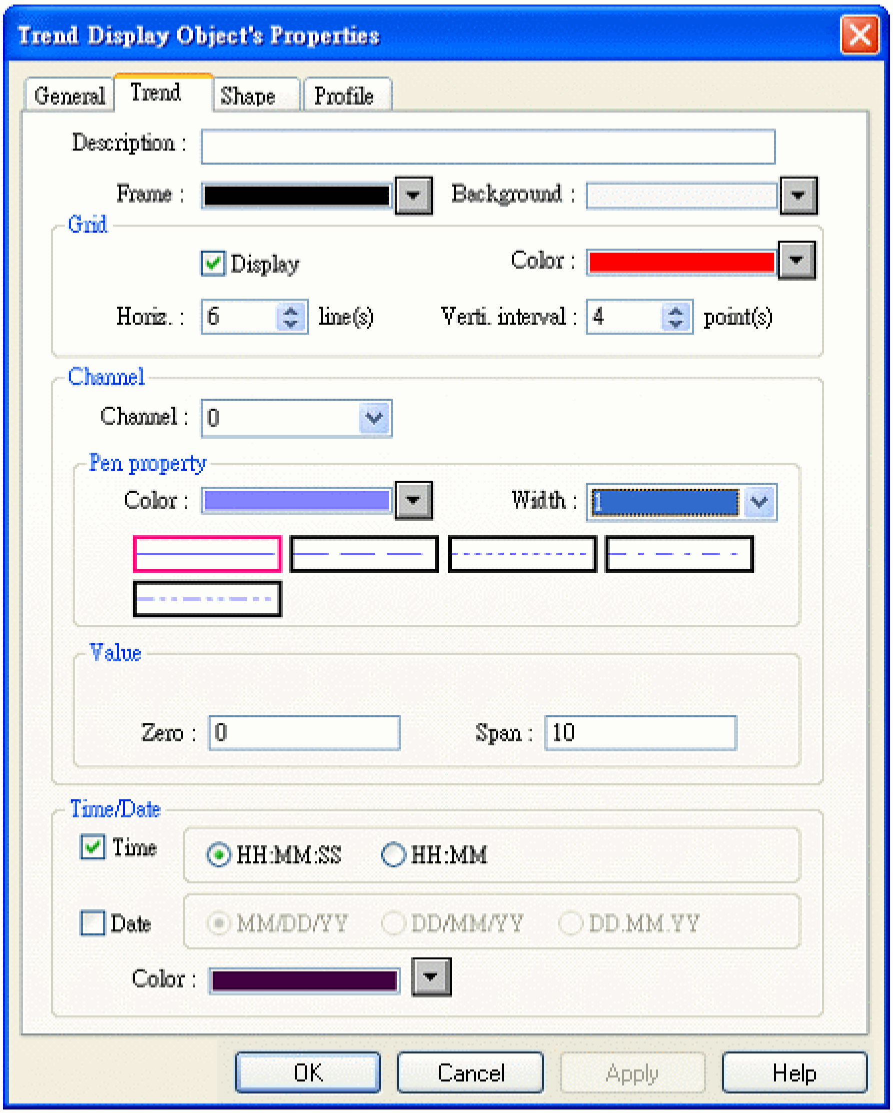
Using the “Watch” function, when user touch the trend display object, object will display a “watch line”, and can export the sampling data at the position of watch line to the designated register. See the picture below, export the sampling data at the position of watch line to [LW300]



"Watch" function also can export several channel sampling data, MT8000 export the sampling data at the position of watch line to the designated register in turn according to the data format defined by data sampling object. For example each sampling data include four data format, they are "16-bit unsigned", "32-bit unsigned", "32-bit float", and "16-bit Signed" respectively. Suppose now the [LW300] is the designated register defined by "Watch", the following are the export address of sampling data marked by "watch line".

| | | |
|---|---|---|
| [LW300] | Line 0 : 16-bit Unsigned | ( 1 words) |
| [LW301] | Line 1 : 32-bit Unsigned | ( 2 words) |
| [LW303] | Line 2 : 32-bit Unsigned | ( 2 words) |
| [LW305] | Line 3 : 16-bit Signed | ( 1 words) |

The picture below shows the "trend display" setting page.



Description :

Frame : ■ Background :

Grid

☑ Display Color : 🟥

Horiz. : 6 line(s) Verti. interval : 4 point(s)

Channel

Channel : 0

Pen property

Color : Width : 1

Value

Zero : 0 Span : 10

Time/Date

☑ Time ● HH:MM:SS ○ HH:MM

□ Date ● MM/DD/YY ○ DD/MM/YY ○ DD.MM.YY

Color :

[Frame]

Object frame’s color.

[Background]

Object background’s color.

[Grid]

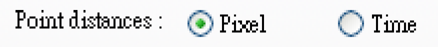
Set the number grid and grid color.

[Display]

Select whether use grid line.

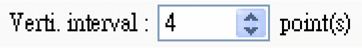
[Horiz.]
Set the number of horizontal line.

[Verti. interval]



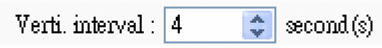
Point distances : ● Pixel ○ Time

When select [pixel] to set the display interval (see note on the above graph and “General” tab), the [Verti. interval] is used to select how many sampling point will be included between two vertical grid line. See the picture below.



Verti. interval : 4 point(s)

When select [Time] to set the time range of display data, the [Verti. interval] is used to select the time range between two vertical grid lines. See the picture below.



Verti. interval : 4 second(s)

According to these settings, MT8000 will calculate the number of vertical grid line automatically.

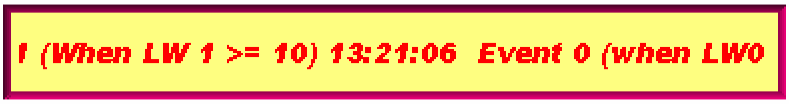
Channel
Set each sampling line’s format and color, and the display data’s low limit and high limit.

[Zero]、[Span]
[Zero] and [Span] are used to set the low limit and high limit of sampling data, So if the low limit is 50 and high limit is 100 for one sampling line, then [Zero] and [Span] must be set as [50] and [100], so all the sampling data can be totally displayed in the trend display object.

Time/Data
The time of latest sampling data will be marked on the top left corner of the object. It is used to set the time display format and color.

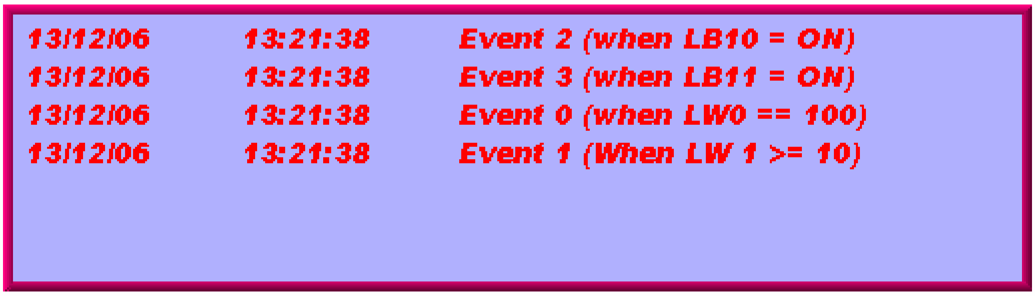
## 13. Alarm Bar and Alarm Display Objects

Alarm bar and alarm display object are used to display messages registered in the “event log” when the system current state meets trigger conditions. Here these messages are also called alarm. Alarm bar and alarm display object display these alarms in order of triggering time, of which alarm bar object will display all alarm messages in one line, alarm display object use multi-line to display alarm messages and each line display one alarm content. The following pictures show that the same alarm message is displayed in different object. Refer to the “Event Log” chapter for related information.



```
1 (When LW 1 >= 10) 13:21:06  Event 0 (when LW0
```

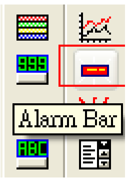
Alarm bar object

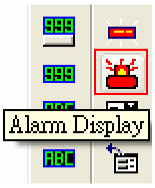


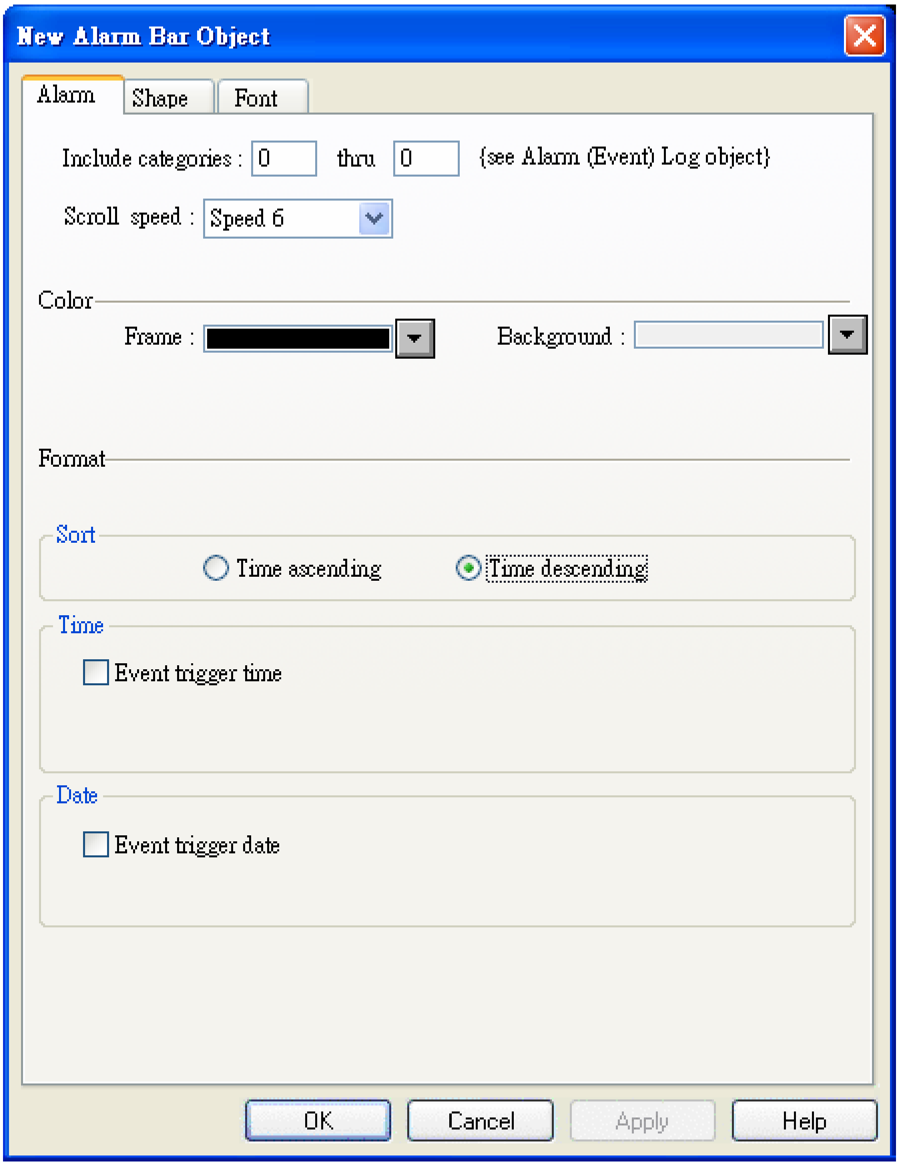
```
13/12/06     13:21:38     Event 2 (when LB10 = ON)
13/12/06     13:21:38     Event 3 (when LB11 = ON)
13/12/06     13:21:38     Event 0 (when LW0 == 100)
13/12/06     13:21:38     Event 1 (When LW 1 >= 10)
```

Alarm display object

Click the “Alarm bar” icon on the toolbar, there will appear the “Alarm bar” dialogue box; in the same way, click the “Alarm display” icon on the toolbar, there will appear the “Alarm display” dialogue box. Press the OK button after correctly setting in the “General” tab, a new object will be created. See the pictures below.






New Alarm Bar Object

Include categories : 0 thru 0 {see Alarm (Event) Log object}

Scroll speed : Speed 6

Color

Frame : ■ Background : □

Format

Sort

○ Time ascending ● Time descending

Time

□ Event trigger time

Date

□ Event trigger date

[Display the range of a Category]

Category of an event is displayed by conforming to the setting range. ( category of an event is set in event log) For example, if the category of an alarm bar is set to 2~4, only when "category" is equal to 2,3,or 4 can it be displayed in the alarm bar. Please refer to "Category" statement in "Event Log" chapter.

[Scroll Speed]

The display text's moving speed in alarm bar object.

Sort

Set the alarm display order.

[Time ascending]

Later triggering alarm is arranged the back (or down).

[Time descending]

Later triggering alarm is arranged the front (or up).

Time

[Event trigger time]

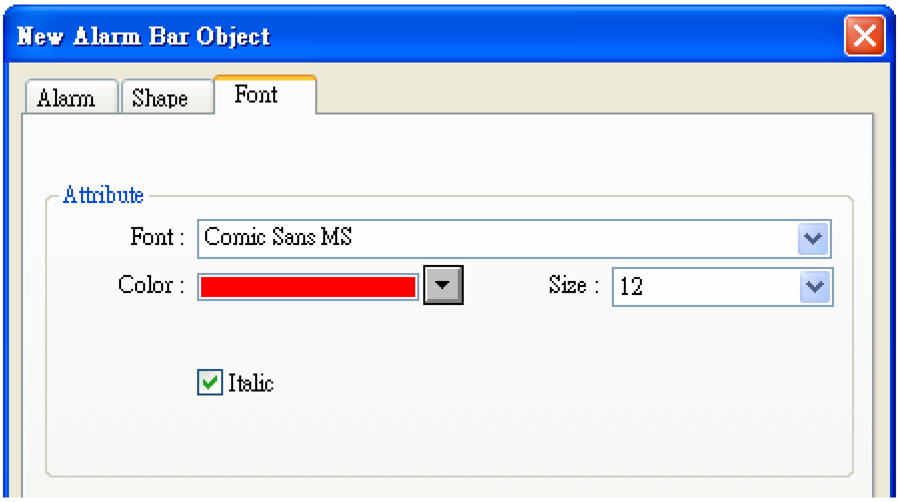
Select whether or not to display the trigger time.

Date

[Event trigger date]

Select whether or not to display the trigger date.

Set object’s font and color in the “Font” tab. See the picture below.



Font : Comic Sans MS

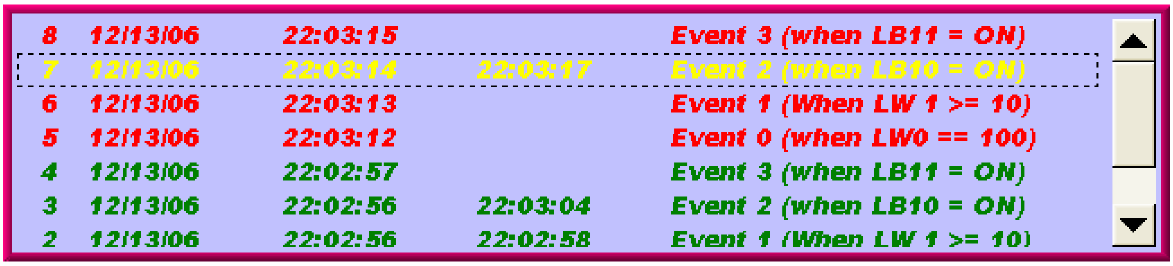
Color : 🟥

Size : 12

☑ Italic

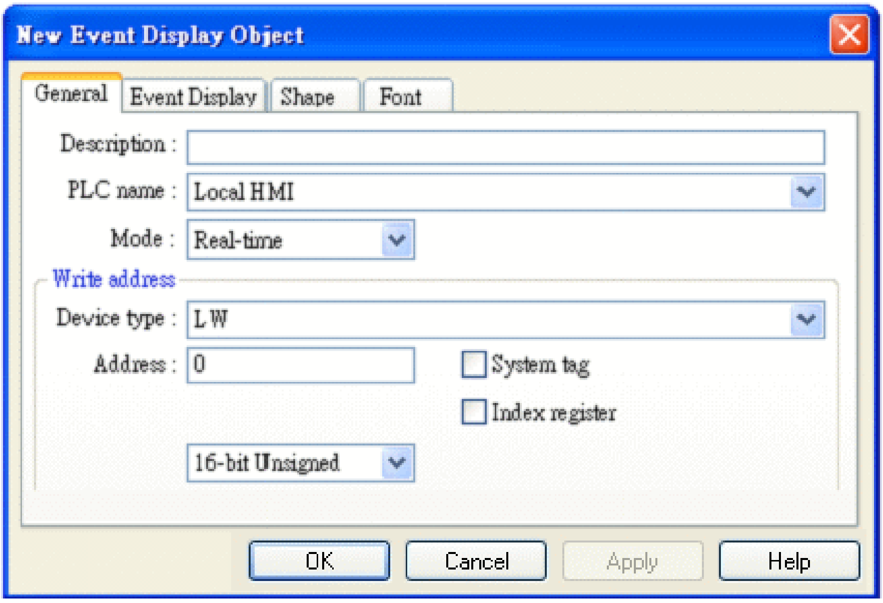
## 14. Event Display Object

Event display object can be used to display messages registered in the “event log” when the system current state meets trigger conditions. Event display object display these event messages in order of triggering time. See the picture below, event display object also allow the display of event trigger, acknowledge and return to normal times (System state does not meet the triggering conditions any longer.)



| | | | | |
|---|---|---|---|---|
| 8 | 12/13/06 | 22:03:15 | | Event 3 (when LB11 = ON) |
| 7 | 12/13/06 | 22:03:14 | 22:03:17 | Event 2 (when LB10 = ON) |
| 6 | 12/13/06 | 22:03:13 | | Event 1 (When LW 1 >= 10) |
| 5 | 12/13/06 | 22:03:12 | | Event 0 (when LW0 == 100) |
| 4 | 12/13/06 | 22:02:57 | | Event 3 (when LB11 = ON) |
| 3 | 12/13/06 | 22:02:56 | 22:03:04 | Event 2 (when LB10 = ON) |
| 2 | 12/13/06 | 22:02:56 | 22:02:58 | Event 1 (When LW 1 >= 10) |

Click the “Event Display” icon on the toolbar, there will appear the “Event Display” dialogue box, press the OK button after correctly setting each item in the “General” tab, and a new “Event Display Object” will be created. See the picture below.



New Event Display Object

Description :

PLC name : Local HMI

Mode : Real-time

Write address

Device type : LW

Address : 0

☐ System tag

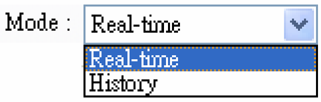
☐ Index register

16-bit Unsigned

[Mode]

Select the event source format, there are “Real-time” and “History” for selection.

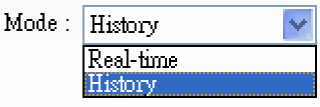
a. Real-time



Mode : Real-time

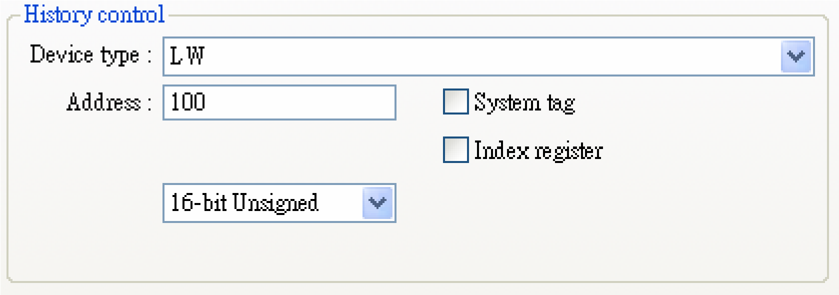
In the mode, it can display the data from the beginning of the MT8000 operation to the present time. If previous data are needed, users must select "History" mode to read the data from historical record.

b. History



Mode : History

In the mode, the event display object will display the events stored in the historical record. The EB8000 will save the event history record and sort it by date. Users can set the "History control" item to select display record. The picture below shows the "History control" setting page.



History control

Device type : LW

Address : 100

□ System tag

□ Index register

16-bit Unsigned

The EB8000 can arrange the history records in order of time, the latest file record is 0 (normally it is today's saved record), the second latest file record is 1. The rest may be deduced in the same way.

If the value of designated register in "History control" is 0, event display object will display the value of record 0; if the value of designated register in "History control" is 1, event display object will display the value of record 1, so if the register value is n, it will display the value of record n.

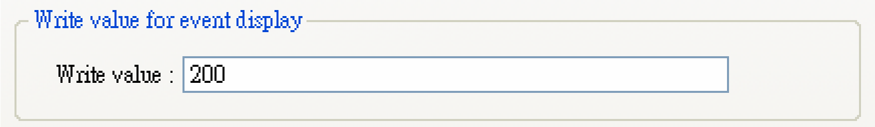
Here is an example to explain how to use the "History control". The designated register in the above picture is [LW100], supposed that the current historical record are saved in the order of date to the files as pressure_20061120.dtl, pressure_20061123.dtl, pressure_20061127.dtl, and pressure_20061203.dtl, and today's date is 2006/12/3, then the following table shows the event display object displays the historical record according to the value of [LW100].

| Value of [LW100] | Displayed Event’s Historical Record Files |
|---|---|
| 0 | EL_20061203.evt |
| 1 | EL_20061127. evt |
| 2 | EL_20061123. evt |
| 3 | EL_20061120. evt |

In other words, the smaller the value of [LW100] is the closer to the present time the historical record will be.

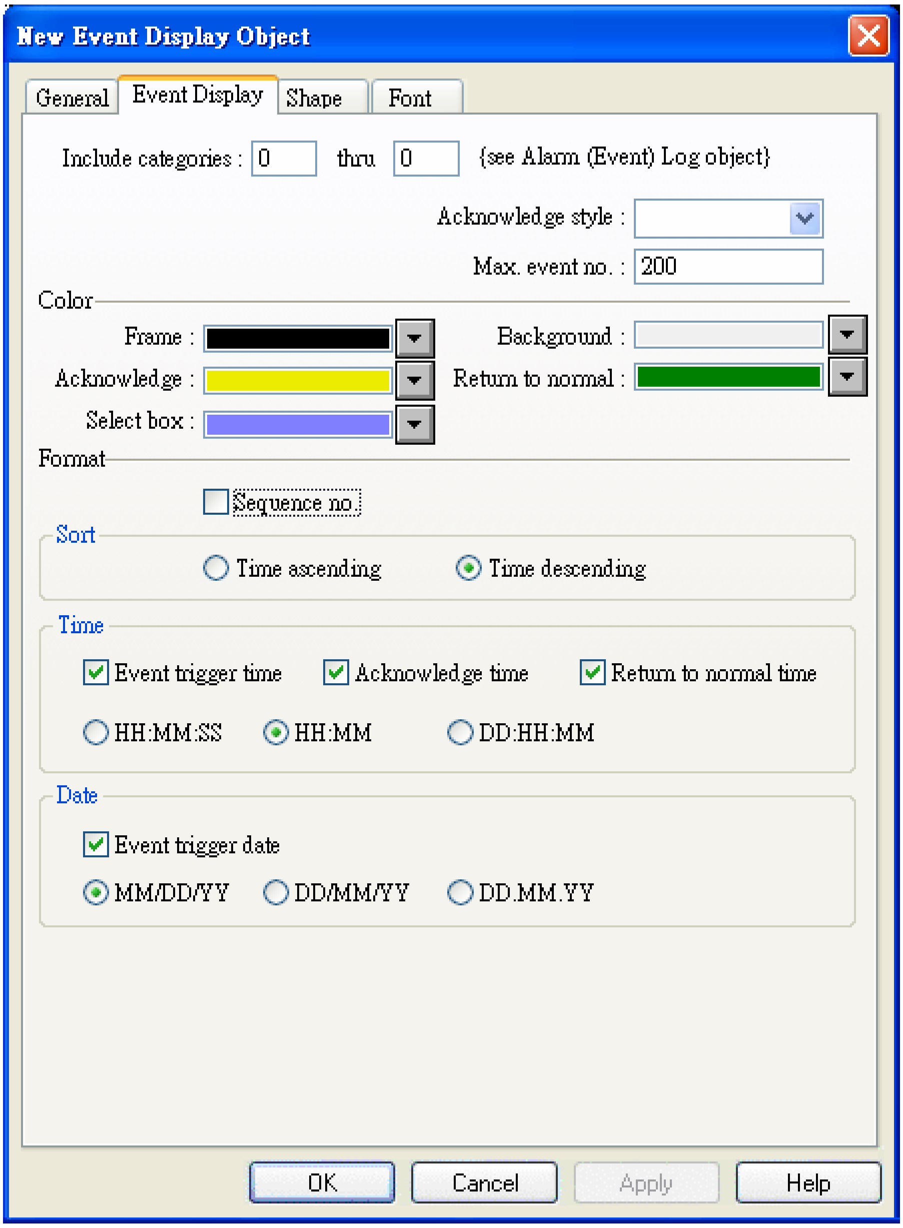
Write address

When the event is confirmed (refer to the following illustrations for detailed information), the data in “write value” will be exported to the designated register. The “write value” is set in “event log” item, as shown in the picture below. Refer to the “Event Log” chapter for related information.



Write value for event display

Write value : 200



New Event Display Object

General | Event Display | Shape | Font

Include categories : 0 thru 0 {see Alarm (Event) Log object}

Acknowledge style :

Max. event no. : 200

Color

Frame : ■ Background :

Acknowledge : 🟨 Return to normal : 🟩

Select box : ■

Format

□ Sequence no.

Sort

○ Time ascending ● Time descending

Time

☑ Event trigger time ☑ Acknowledge time ☑ Return to normal time

○ HH:MM:SS ● HH:MM ○ DD:HH:MM

Date

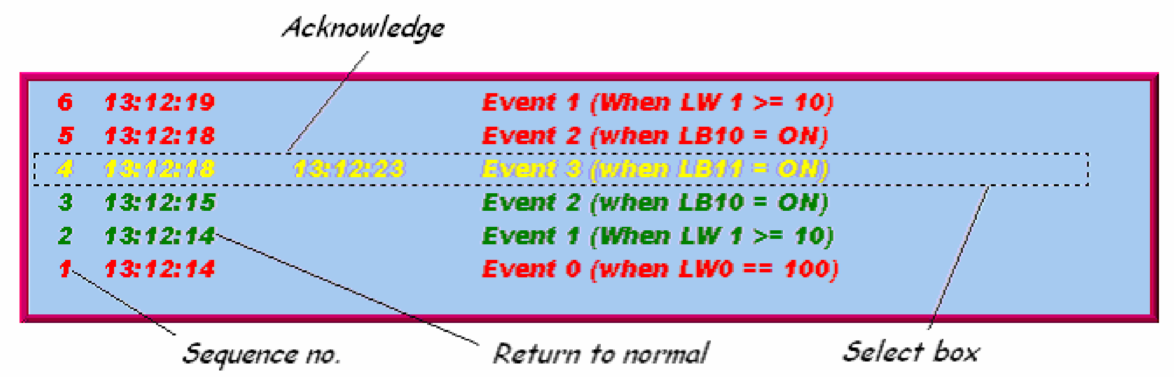
☑ Event trigger date

● MM/DD/YY ○ DD/MM/YY ○ DD.MM.YY

[Display the range of a Category]

Category of an event is displayed by conforming to the setting range. ( category of an event is set in event log) For example, if the category of an alarm bar is set to 2~4, only when “項目” is equal to 2,3,or 4 can it be displayed in the alarm bar. Please refer to “Category” statement in “Event Log” chapter.

[Acknowledge style]



```
6   13:12:19                 Event 1 (When LW 1 >= 10)
5   13:12:18                 Event 2 (when LB10 = ON)
4   13:12:18     13:12:23    Event 3 (when LB11 = ON)
3   13:12:15                 Event 2 (when LB10 = ON)
2   13:12:14                 Event 1 (When LW 1 >= 10)
1   13:12:14                 Event 0 (when LW0 == 100)
```

Select the "confirm" action, there are "Click" or "Double click" to select. Here "confirm" action means that the event which has happened and displayed on the event display object can be "Clicked" or "Double clicked" by user, after the "confirm" action, the EB8000 will not only change the event's color to the color in "Notification", but also export the value of "write address" to the designated register.

[Max. event no.]
The maximum of displaying event. When the number of displaying events is larger than maximum, new event will replace the event with lower security level.

Color
To set the color when the event is in the different states.

[Acknowledge]
To set the color after the event is confirmed.

[Return to normal]
To set the event's displaying color when system state can not meet the trigger conditions.

[Select box]
When event is selected, set the highlight box color.

[Sequence no.]
Select whether or not to add the sequence no. before the display event. A prior event uses a smaller sequence number.

Sort

Set the display order.

[Time ascending]

Later triggering event is arranged the back (or down).

[Time descending]

Later triggering event is arranged the front (or up).

Time

[Event trigger time]

Select whether display the trigger time.

[Acknowledge time]

Select whether display the “confirm” time.

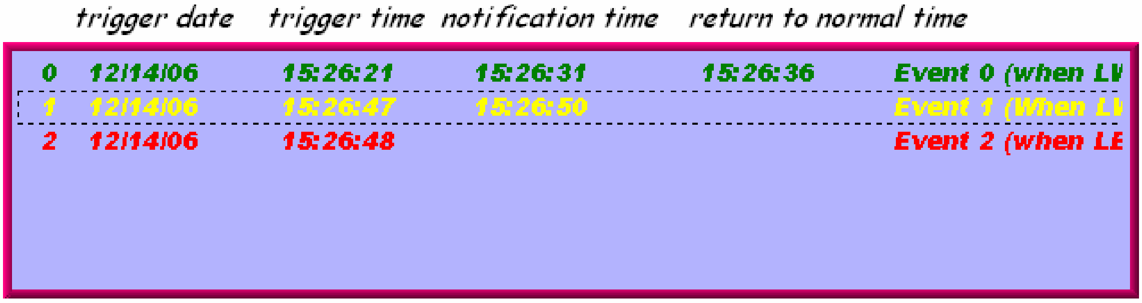
[Return to normal time]

Select whether display the display event returns to normal time.

Date

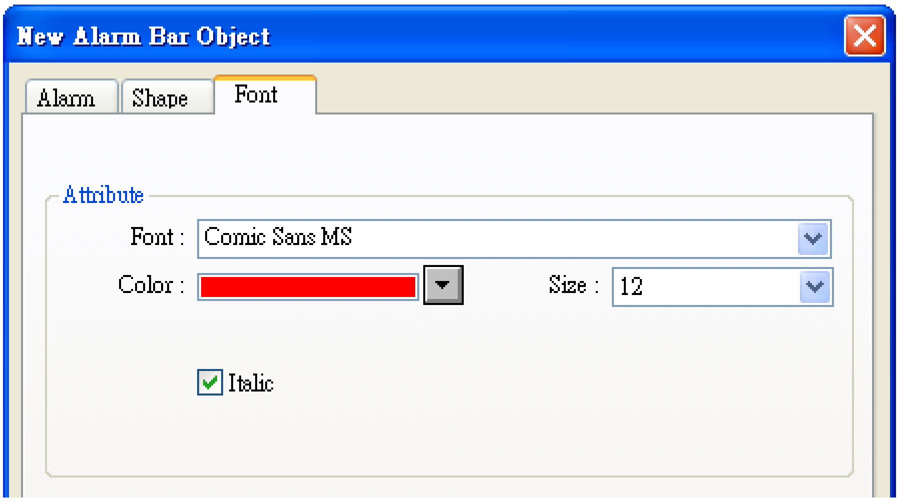
[Event trigger date]

Select whether or not to display the trigger date.



| | trigger date | trigger time | notification time | return to normal time | |
|---|---|---|---|---|---|
| 0 | 12/14/06 | 15:26:21 | 15:26:31 | 15:26:36 | Event 0 (when LV |
| 1 | 12/14/06 | 15:26:47 | 15:26:50 | | Event 1 (When LV |
| 2 | 12/14/06 | 15:26:48 | | | Event 2 (when LE |

If the event just happens, the font and color of display text can be set in the “Font” tab. See the picture below.



Font : Comic Sans MS

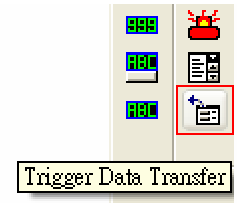
Color : 🟥

Size : 12

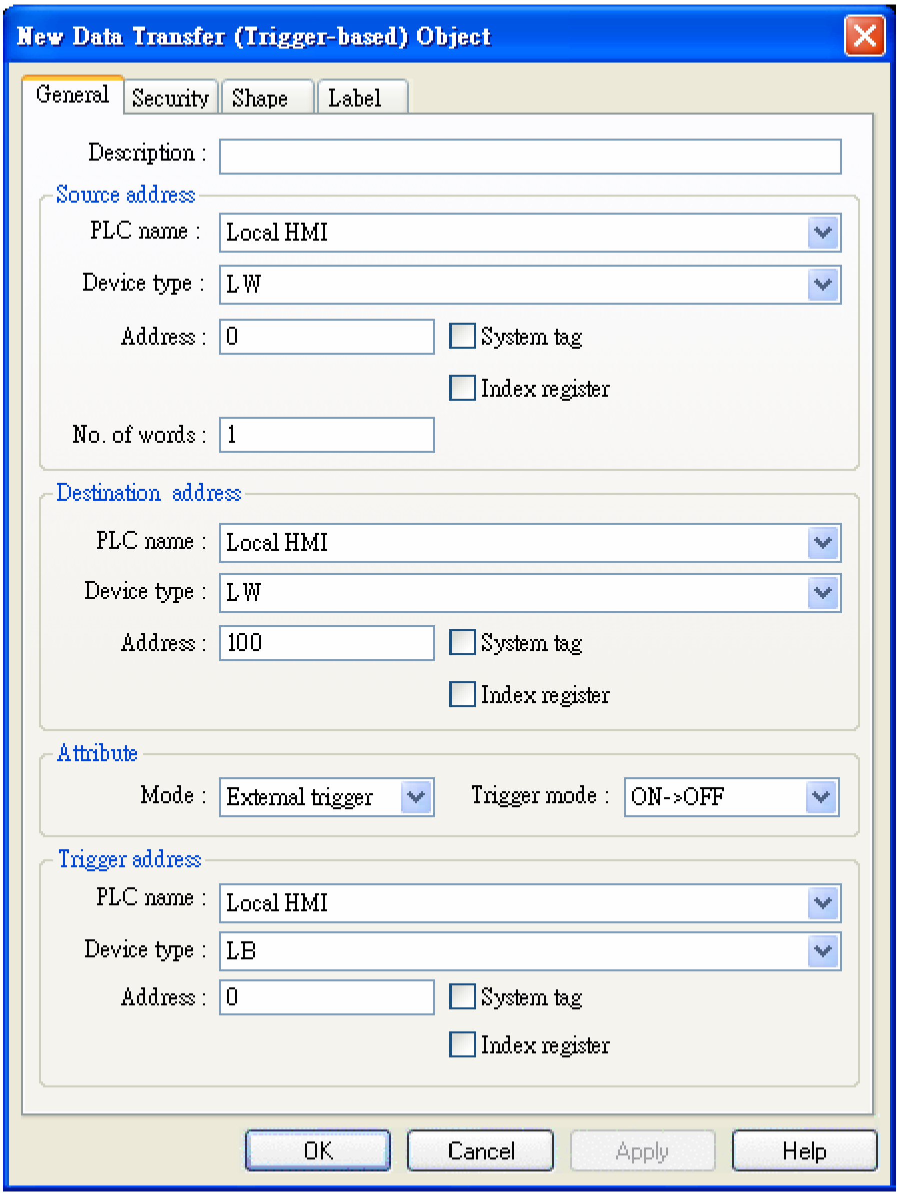
☑ Italic

16. Trigger Data Transfer Object

Trigger data transfer object can transfer the value of designated register to other designated register, user can use the manual button can do the action, and using the trigger of designated register's state also can do the action.



Click "Trigger Data Transfer object" icon on the toolbar, there will appear "Trigger Data Transfer object" dialogue box, then press the OK button after correctly setting each item in the "General" tab, a new Trigger Data Transfer object will be created. See the picture below.


New Data Transfer (Trigger-based) Object

Description :

Source address

PLC name : Local HMI

Device type : LW

Address : 0 □ System tag

□ Index register

No. of words : 1

Destination address

PLC name : Local HMI

Device type : LW

Address : 100 □ System tag

□ Index register

Attribute

Mode : External trigger Trigger mode : ON->OFF

Trigger address

PLC name : Local HMI

Device type : LB

Address : 0 □ System tag

□ Index register

Source address

Source address for data transfer.

[No. of words]

The number of transfer data and the unit is word.

Destination address

Destination address for data transfer.

Attribute

Set the data transfer mode.

[Mode]

There are “Manual” mode and “Trigger” modes for selection.

a. Manual mode

The object must be pressed manually to perform data transferring action.

b. Trigger mode

Using the change of the state of designated register to trigger the data transferring action. Select the proper trigger mode in [Trigger mode], the trigger mode include:

[ON->OFF]

When the register’s state switch from ON to OFF, will trigger data transfer action.

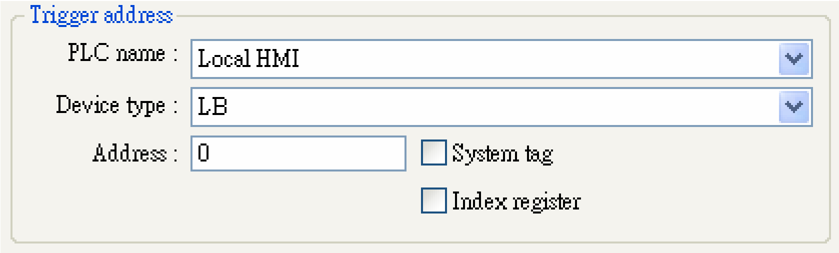
[OFF->ON]

When the register’s state switch from OFF to ON, will trigger data transfer action.

[ON<->OFF]

When the register’s state changes, will trigger data transfer action.

The designated register for the trigger mode can be set in [Trigger address] as shown in the picture below.



Trigger address

PLC name : Local HMI

Device type : LB

Address : 0

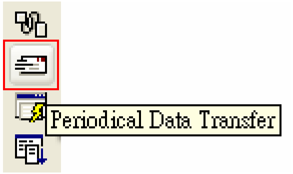
□ System tag

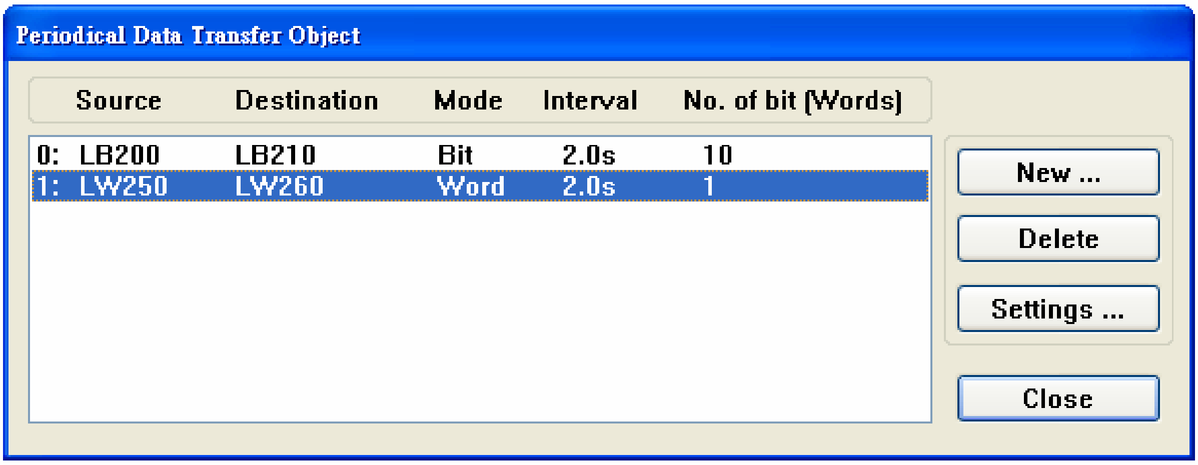
□ Index register

17. Periodical Data Transfer Object

Periodical data transfer object is the same as trigger data transfer object, transfer the value of designated register to other designated register. The difference from trigger data transfer object is, periodical data transfer object perform data transfer action automatically at a fixed frequency, and can transfer the data as the unit of bit.

Click “Periodical Data Transfer object” icon on the toolbar, there will appear the “Periodical Data Transfer object” dialogue box. See the pictures below.



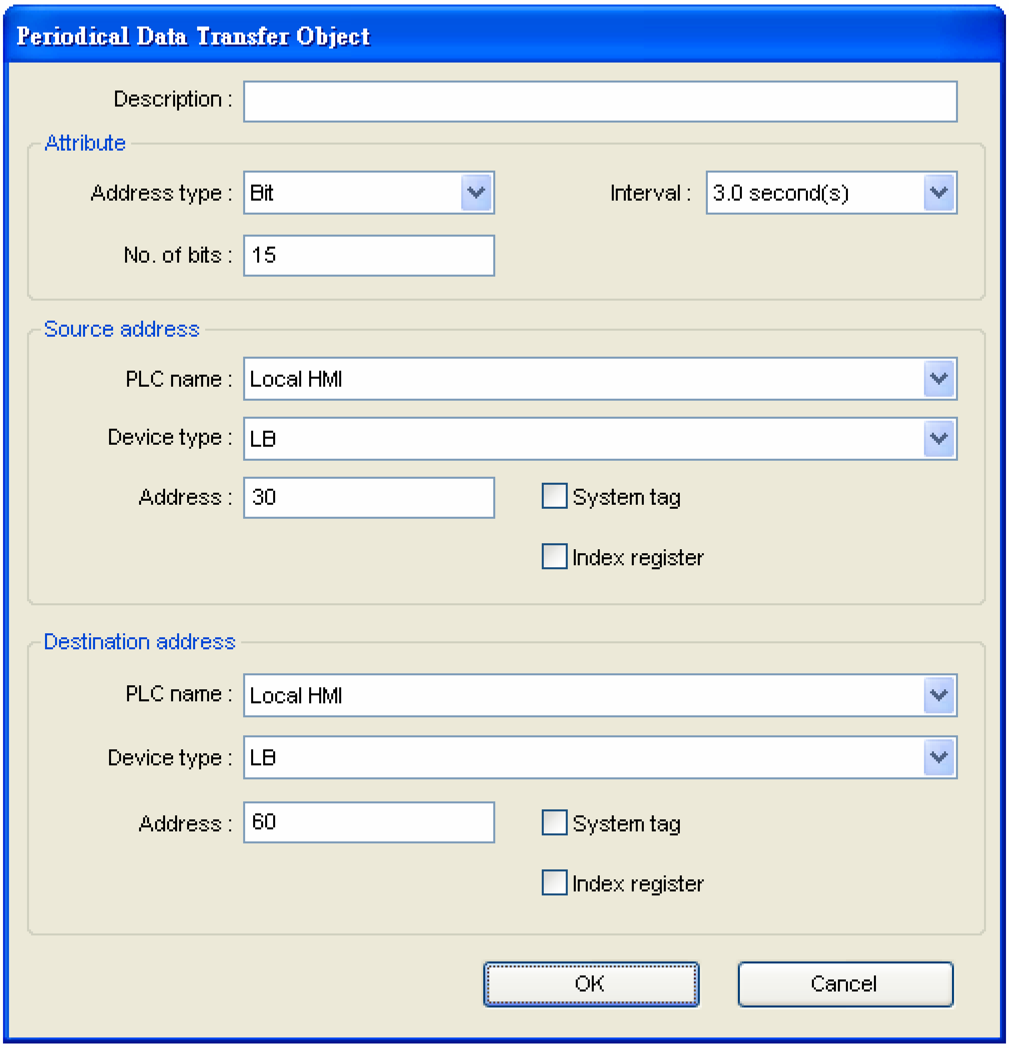


Periodical Data Transfer Object

| Source | Destination | Mode | Interval | No. of bit (Words) |
|---|---|---|---|---|
| 0: LB200 | LB210 | Bit | 2.0s | 10 |
| 1: LW250 | LW260 | Word | 2.0s | 1 |

Press the “New…” button after correctly setting each item is the “General” tab, and a new Periodical Data Transfer object will be created.

Press the “New…” button in the “Periodical Data Transfer Object” dialogue box, there will appear the ”Periodical Data Transfer object” dialogue box, as shown in the picture below, and set each item’s attribute correctly, and a periodical data transfer object will be created.



Periodical Data Transfer Object

Description :

Attribute

Address type : Bit

Interval : 3.0 second(s)

No. of bits : 15

Source address

PLC name : Local HMI

Device type : LB

Address : 30

□ System tag

□ Index register

Destination address

PLC name : Local HMI

Device type : LB

Address : 60

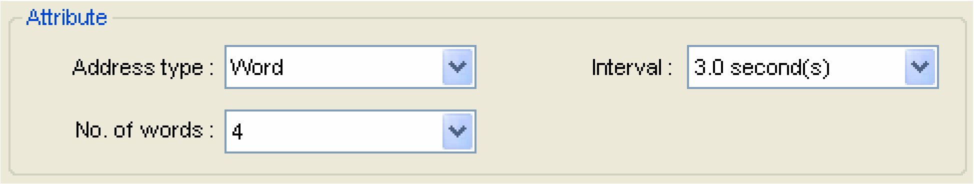
□ System tag

□ Index register

Attribute

[Address type]
Select the data type, there are word type or bit type to select.

[No. of words] or [No. of bits]
When select "Word type" for [address type], the transfer unit is word, set the transfer number in [No. of words]. See the picture below.



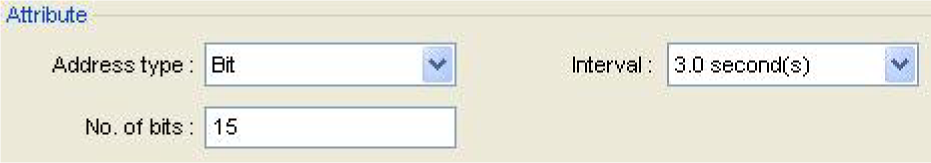
Attribute

Address type : Word

Interval : 3.0 second(s)

No. of words : 4

When select "Bit type" for [address type], the transfer unit is bit, set the transfer number in [No. of bits].



Attribute

Address type : Bit

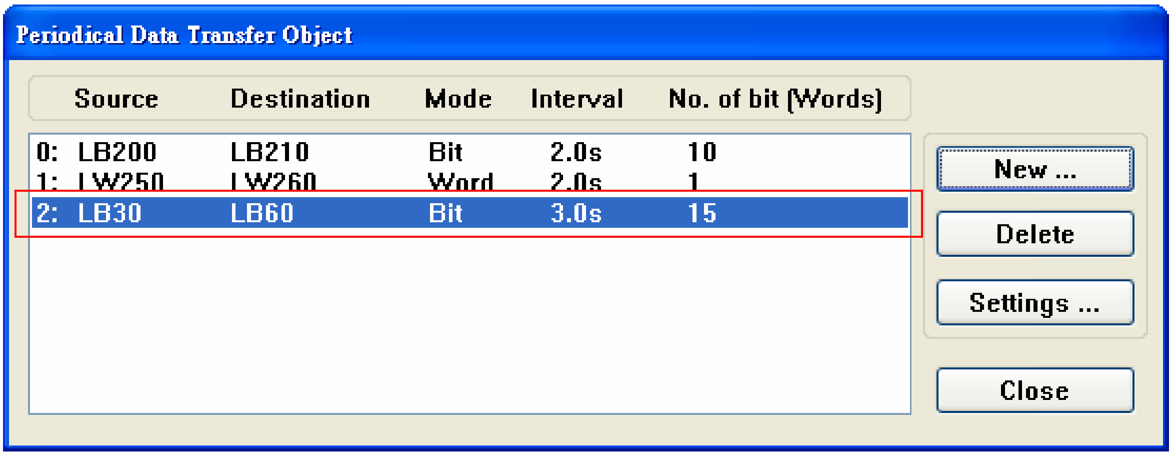
Interval : 3.0 second(s)

No. of bits : 15

[Interval]
Select the transfer frequency, for example, select 3 seconds, the EB8000 will transfer data to the designated register every 3 seconds.

Source address
Source address for data transfer.
Destination address
Destination address for data transfer.

After completing all settings and pressing the “OK” button, a new periodical data transfer object will be created and the object’s content can be seen in the “Periodical Data Transfer” dialogue box. The object will transfer the continuous 15 bit’s data of LB30 address to the LB60 address every 3 seconds.

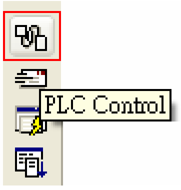


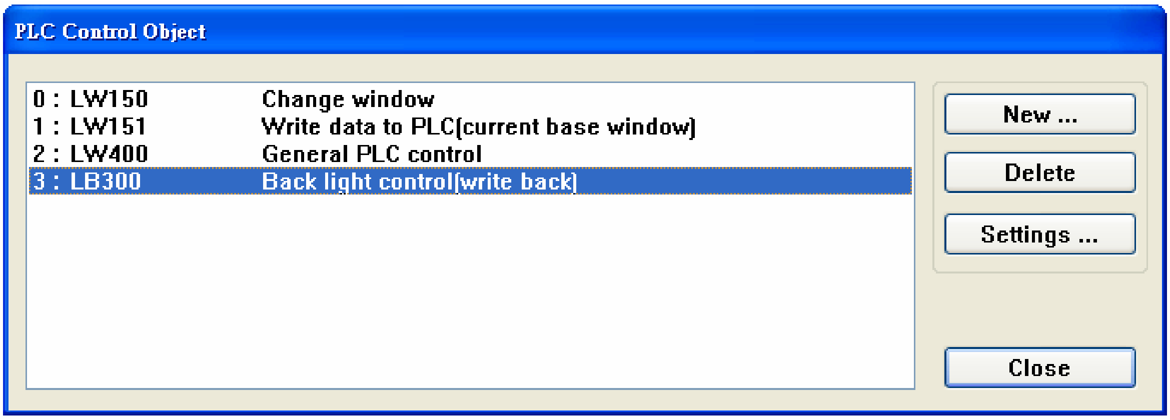
Periodical Data Transfer Object

| | Source | Destination | Mode | Interval | No. of bit (Words) |
|---|---|---|---|---|---|
| 0: | LB200 | LB210 | Bit | 2.0s | 10 |
| 1: | LW250 | LW260 | Word | 2.0s | 1 |
| 2: | LB30 | LB60 | Bit | 3.0s | 15 |

17. PLC Control Object

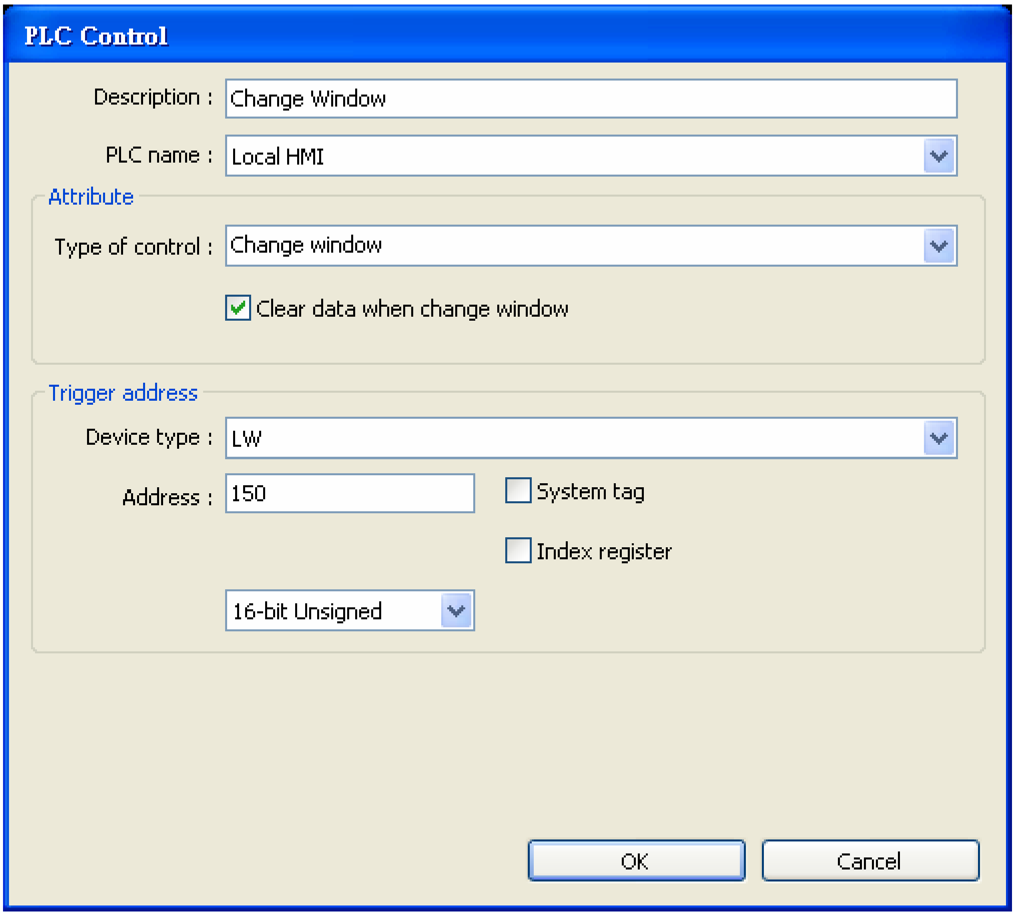
When the responding control is started up, the PLC Control Object will operate a particular action. Click the “PLC Control” icon and the “PLC Control Object” dialogue box, as shown in the picture below, will appear, then press the “New…” button and the “PLC Control” dialogue box will appear for users to set the object’s attributes. Press the OK button when all of the settings are completed and a new PLC control object will be created.





0 : LW150 Change window
1 : LW151 Write data to PLC(current base window)
2 : LW400 General PLC control
3 : LB300 Back light control(write back)

The picture below shows the “PLC Control” dialogue box which is displayed when pressing the “New…” button.



Description : Change Window

PLC name : Local HMI

Attribute

Type of control : Change window

☑ Clear data when change window

Trigger address

Device type : LW

Address : 150

□ System tag

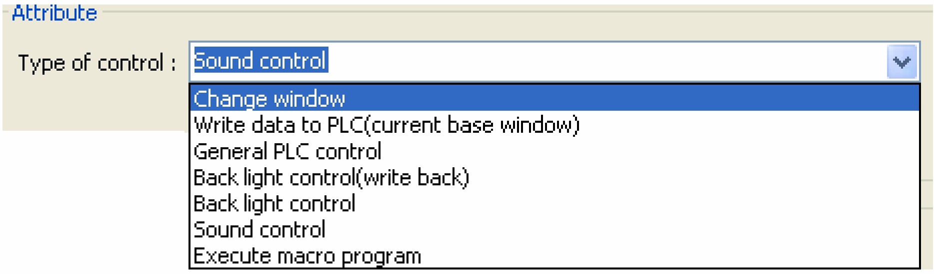
□ Index register

16-bit Unsigned

Attribute

[Type of control]

To set the type of control. The available types of control for selection are listed in the picture below.

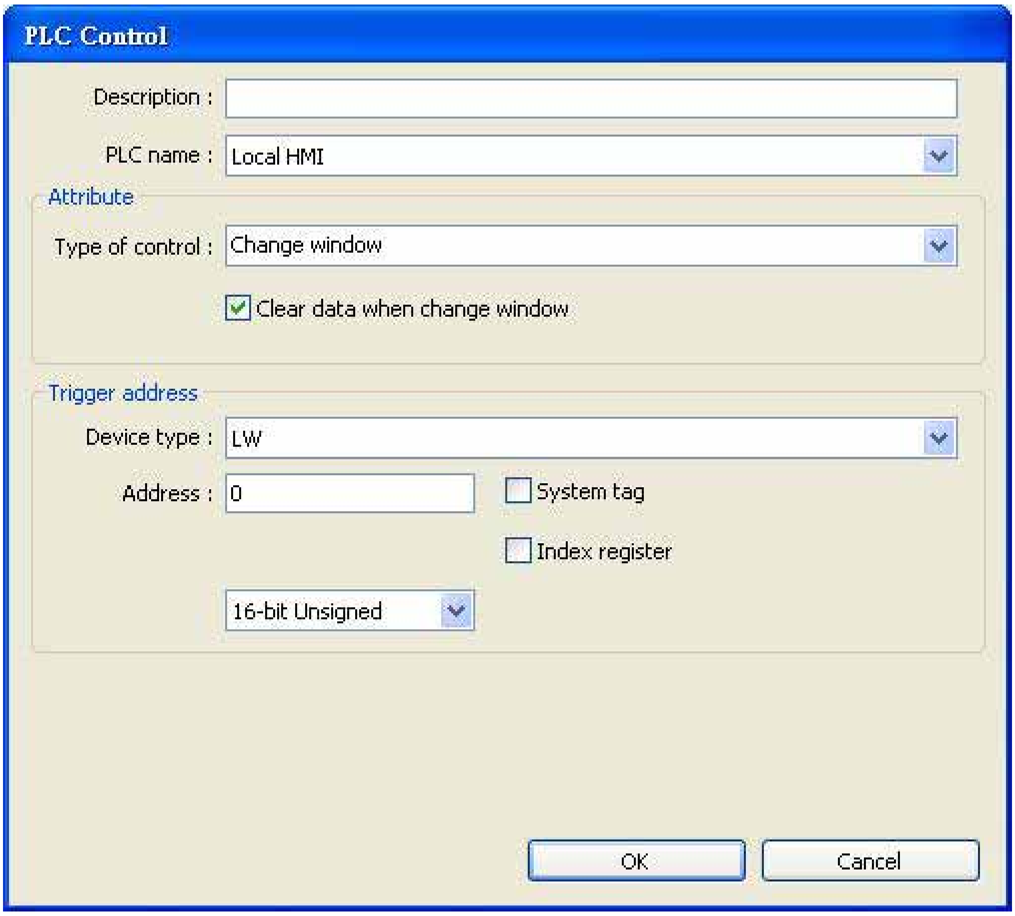


Attribute

Type of control : Sound control

a. “Chang window”

To change base window. When the value of [Trigger address] is changed to the number of an effective window, the current window will be closed and switch to the window designated by the value of [Trigger address], and the number of the new window will be written to the specified address. (Refer to the following illustrations for related information.) For example, supposed that the number of the current window is 10, and see the object's settings in the picture below.



Description :

PLC name : Local HMI

Attribute

Type of control : Change window

☑ Clear data when change window

Trigger address

Device type : LW

Address : 0

□ System tag

□ Index register

16-bit Unsigned

When the value of LW0 is changed to 11 due to other value, EB8000 will not only switch the base window to the window 11 but also change the value of LW1 to 11.

When the windows switch successfully, the write address for the number of the switching to window will relate to [Address] and data format. The table below shows the read address of the switching from window's number and the write address of the switching to window's number. "Address" represents the value of the register's address, for example, when the register's address is [LW100], "Address" is 100.

| Data Format | Read address of the switching from window's number | Write address of the switching to window's number |
|---|---|---|
| 16-bit BCD | Address | Address + 1 |
| 32-bit BCD | Address | Address + 2 |
| 16-bit | Address | Address + 1 |

|  |  |  |
|---|---|---|
| Unsigned |  |  |
| 16-bit Signed | Address | Address + 1 |
| 32-bit Unsigned | Address | Address + 2 |
| 32-bit Signed | Address | Address + 2 |

When the state of [LB9017] is set to ON, the switching to window’s number will not be written to the specified address.
When “clear data when change window” is been chosen, the switching to window’s number will become 0.

b. “Write data to PLC (current base window)”
When switch to a base window, the base window’s number will be written to the address designated by [Trigger address]

“General PLC Control”
The function enables users to use the value of the designated register to control the data transference between the PLC and the MT8000. The transference direction includes four types, see the table below:

| Data transference code | Data transference direction |
|---|---|
| 1 | Data of PLC’s register →MT8000’s RW Register |
| 2 | Data of PLC’s register →MT8000’s LW Register |
| 3 | Recipe Data of MT8000’s RW → PLC’s register |
| 4 | Recipe Data of MT8000’s LW → PLC’s register |

When this function is selected, the EB8000 will use the values of the four registers in row, starting from the address set in [Trigger address], to define the data transference direction, the data transference volume, the data sourcing address, and the address of data transference destination. The table below explains what the value of each register represents. [Trigger address] is used to indicate the address of PLC’s register, for example, when [Trigger address] = DM100, it means that the values of the four registers from DM100 to DM103 are used to define the content of data transference.

| Address | Purpose | Description |
|---|---|---|
| [Trigger address] | To save the data transference code, and to define the data transference direction | It represents the type of data transference. As mentioned above, there are four registers, and this register is used to save control type code. When a new code is written to the register, the MT8000 will operate the corresponding transference. When the transference is completed, the value of the register will resume as 0. |
| [Trigger address] + 1 | To save the data transference size, the unit is word. | |
| [Trigger address] + 2 | To save the slanting value of the sourcing address in data transference process. | The initial data sourcing address in the transference is<br>[Trigger address] + 4 + Slanting value of the sourcing address<br>In the example of OMRON PLC, if [Trigger address] is set to DM100, and the value of the [Trigger address] + 2 register, i.e. DM102, is 5, and the initial data sourcing address in the transference is DM109 (109=(100+4) +5). |
| [Trigger address] + 3 | To save the initial address of the recipe data register (RW) or the local data register (LW) | In the example of OMRON PLC, if [Trigger address] is set to DM100, and the value of the [Trigger address] + 3 register, i.e. DM 103, is “100”, the initial addresses of the RW and LW in the transference will be RW100 and LW100 respectively. |

Here is an example:

Supposed that it is necessary to use the “General PLC Control” function, we want to transfer the 16-word data of the OMRON PLC, starting with DM100, to the MT8000’s recipe register, starting with RW200. The setting steps are described as follows:

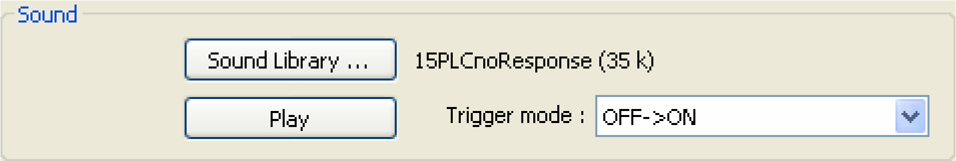
- Firstly, supposed that we use four registers, starting with DM10, to control the data transference. Set a PLC control object on windows of a HMI by selecting “General PLC Control” in the “type of Control” and setting the read address to DM10.
- Secondly, confirm the size of the processed data and slanting value of the sourcing address and set DM11 to 16, which means the size of the transferred data is 16 words, then set DM12 to 86, which means the data’s sourcing address is DM100 (100 = 10 + 4 + 86), and set DM13 to 200, which means the destination address is RW200.
- Lastly, according to the data transferring direction, set data transference code to perform the process of the transference. If DM10 is set to 1, which means to transfer the data from PLC’s register to the MT8000’s RW register. If DM10 is set to 3, the transferring direction is reverse.

The rest two transference modes have a similar setting method, and the only difference is that the MT8000’s RW register is changed to the local data register (LW).

d. “Back light control (write back)”
When the state of [Trigger address] is from OFF to ON, the MT8000 will turned off the CCFL backlight and the state of [Trigger address] will be set to OFF. When the CCFL backlight is turned off, users just have to touch the screen and the CCFL backlight will be turned on again.

e. “Back light control”
When [Trigger address] is from OFF to ON, the MT8000 will turn off the CCFL backlight, but because of being without the “write back” function, the state of [Trigger address] will not be set to OFF.

f. “Sound control”



Sound

15PLCnoResponse (35 k)

Trigger mode : OFF->ON

By changing the value of bit address, trigger PLC control object to play the designated sound file.

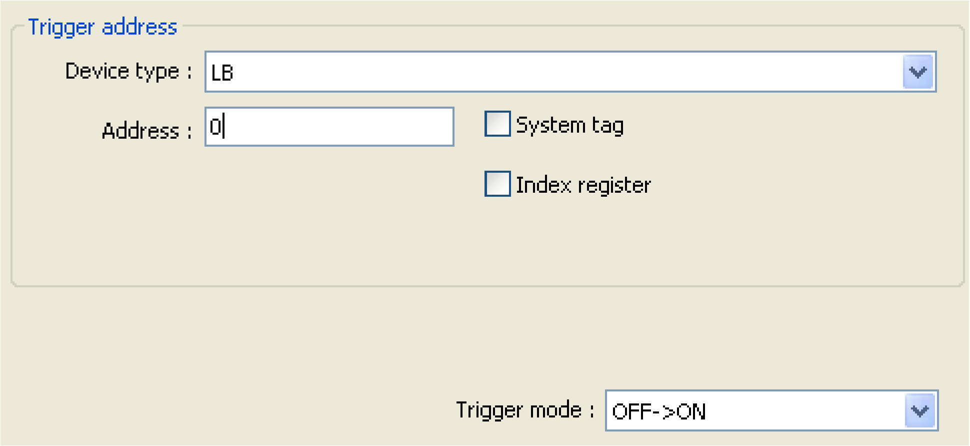
Methods of triggering:

(1) Status from OFF to ON (OFF->ON)

(2) Status from ON to OFF (ON->OFF)

(3) Status switch (OFF<->ON)

g. “Macro execution”



Trigger address

Device type : LB

Address : 0

□ System tag

□ Index register

Trigger mode : OFF->ON

By changing the value of bit address, trigger PLC control object to execute the designated Macro.

Methods of triggering:

(1) Status from OFF to ON (OFF->ON)

(2) Status from ON to OFF (ON->OFF)

(3) Status switch (OFF<->ON)

(4) Only maintain ON status can Macro be executed constantly.

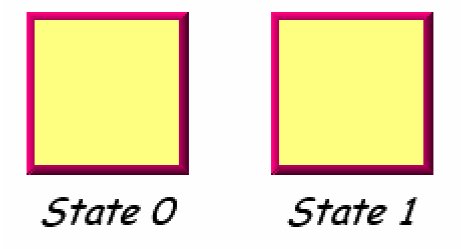
# Chapter 14 Creating and Using Shape Library and Picture Library

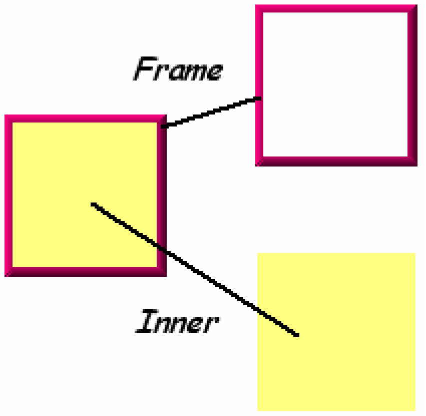
The EB8000 provides Shape Library and Picture Library functions to add the visual effects of objects. Each Shpae and Picture includes a maximum of 256 states. The picture below shows how to create Shape Library and Picture Library.

Refer to Chapter 9 - "Object's General Attribute" for information about how to use Shape Library and Picture Library.

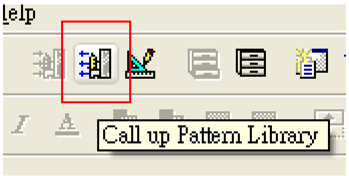
1. Creating Shape Library

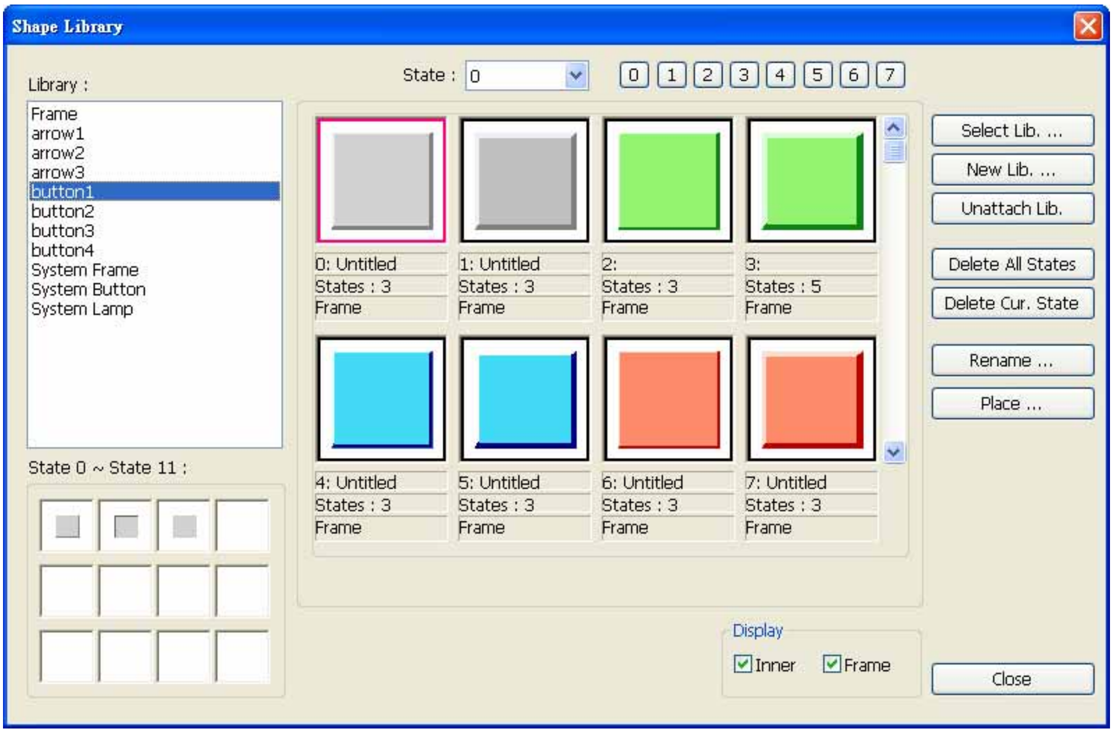
Shape is a graph composed of lines, rectangles, circles and other drawing objects. A complete Shape is likely to be more than one state, and each state can include two parts: frame and inner. See the picture below.





An object can be set to use alternatively the Shape's frame or inner, or to use both at the same time. Click the "Shape Library" button on the toolbar, and the "Shape Library" dialogue box, as shown in the second picture below, will be display.





State : 0

Display: ☑ Inner ☑ Frame

[Library]

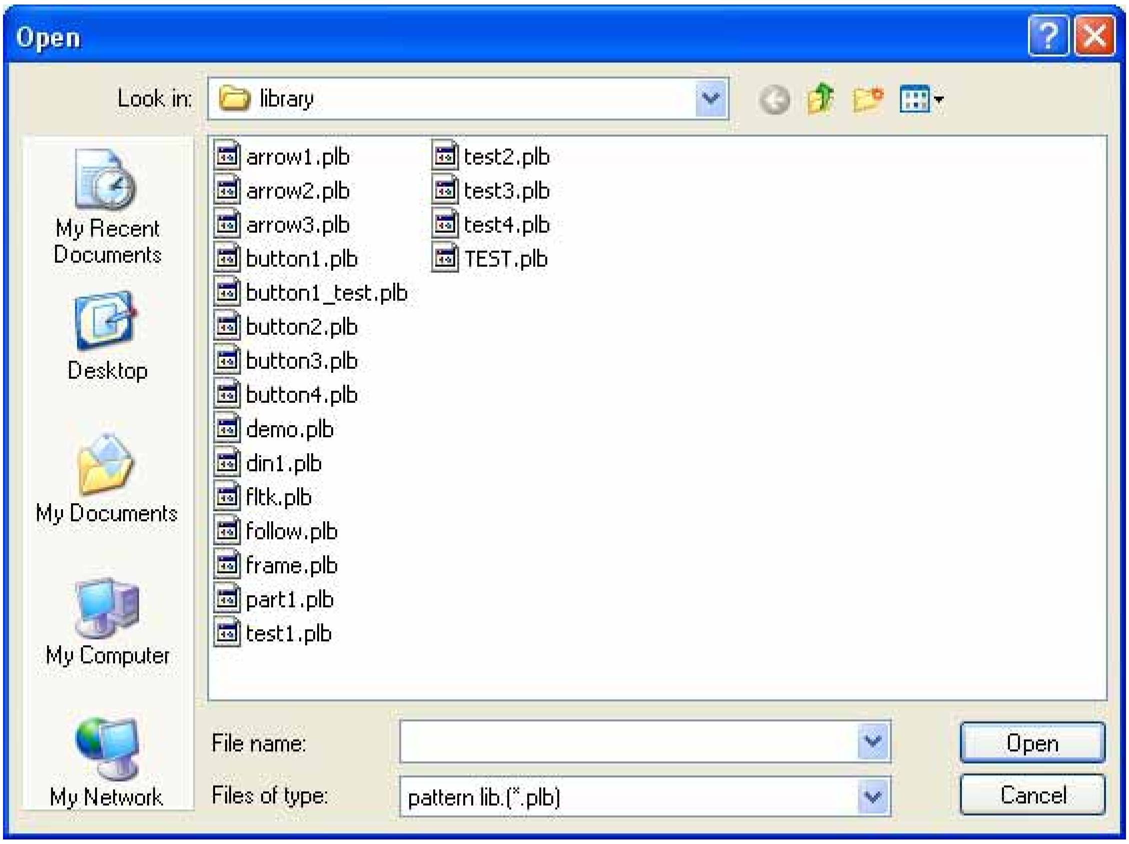
This is to select the source of a Shape from the Shape Library which has been added into the current project.

[State]

This is to select the state that the existing Shape wants to display. When there is no Shape of a Graph displayed in the window, it means that the Shape does not exist or the state of the Shape is not defined yet.

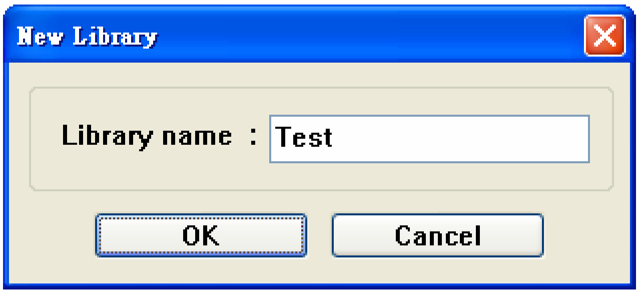
[Select Lib. …]

Click the [Select Lib. ...] button, and the following picture will be displayed for users to select the Shape Library to add to the current project.



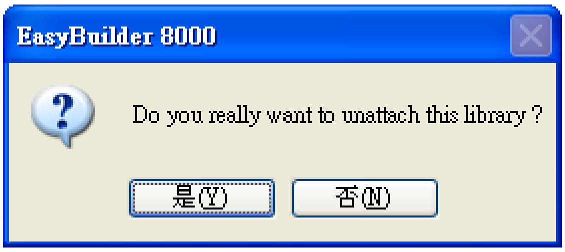
[New Lib. ...]

Click the button, and the following picture will be displayed for users to add a new empty Shape Library.



[Unattach Lib.]

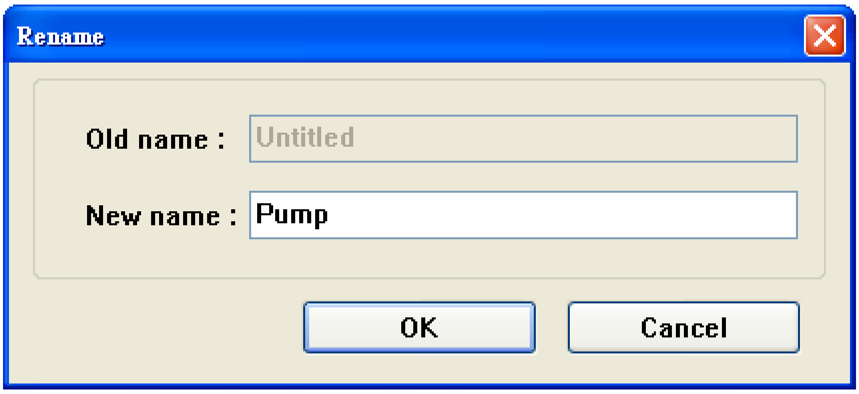
Click the button, and the following picture will be displayed for users to decide whether or not to delete the Shape Library in [Library] from the current project.



Do you really want to unattach this library ?

[Delete Shape]
The button is used to delete the selected Shape.

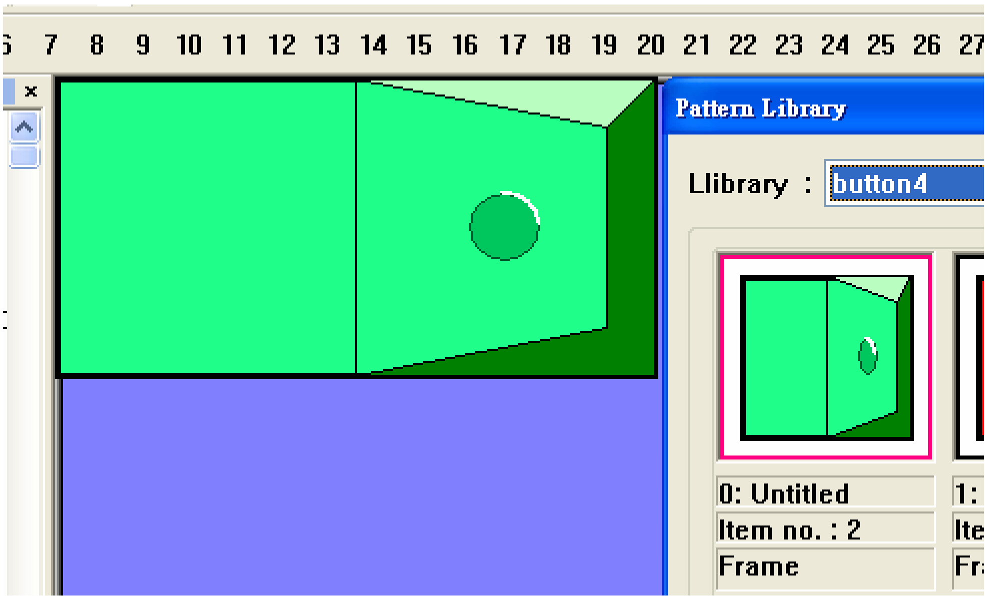
[Rename …]
Click the button, and the following picture will be displayed for users to rename the selected Shape.



Old name : Untitled

New name : Pump

[Place …]
This button is used to export the selected Shape to the window in operation. See the picture below.



Library : button4

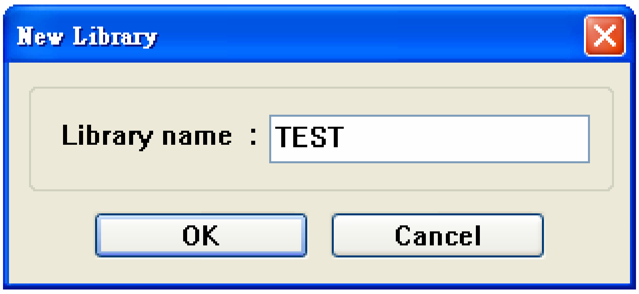
0: Untitled
Item no. : 2
Frame

1:
Ite
Fr

Here is an example of adding a Shape with two states to a new Shape Library to show how to create a new Shape Library and to add a new Shape to it.

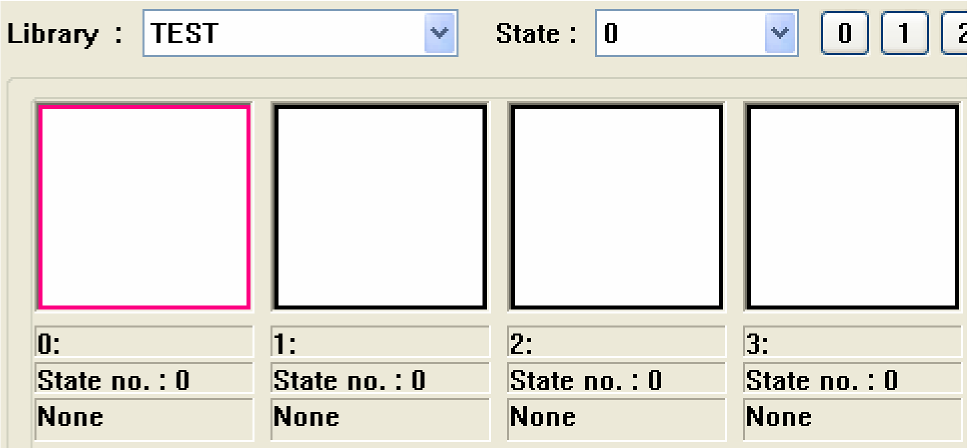
Step 1

Click [New Lib. ...] and input the name of the new Shape Library when the following dialogue box is displayed.



Library name : TEST

Then, a new Shape Library “TEST” will be added to the Shape Library Manager dialogue box, but at this moment, there are no Shapes in the library.

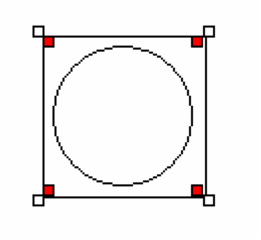


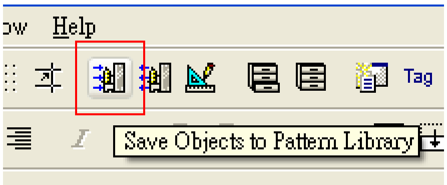
Library : TEST State : 0 0 1 2

| | | | |
|---|---|---|---|
| 0: | 1: | 2: | 3: |
| State no. : 0 | State no. : 0 | State no. : 0 | State no. : 0 |
| None | None | None | None |

Step 2

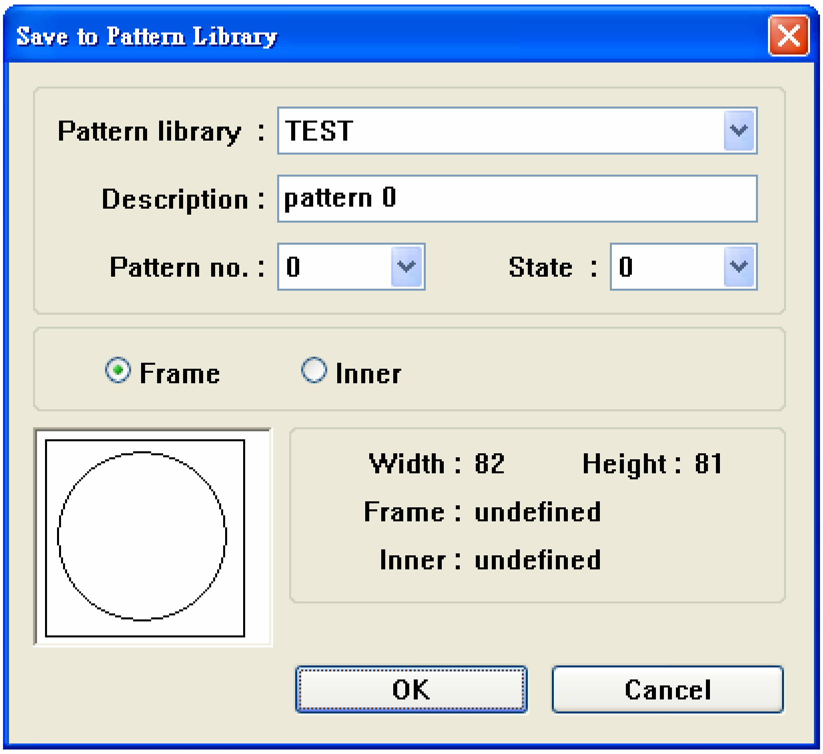
Add a state to the selected Shape. First, using the drawing tools to draw a graph in the window and select the graph which wants to be added to the Shape Library.





Save Objects to Pattern Library

Then, chick the “Save Objects to Shape Library” button on the toolbar and the following dialogue box will be displayed.



Save to Pattern Library

Pattern library : TEST

Description : pattern 0

Pattern no. : 0

State : 0

● Frame ○ Inner

Width : 82 Height : 81

Frame : undefined

Inner : undefined

[Shape library]
This is to select the Shape Library for the graph to add to, and here the Shape Library "TEST" is selected.

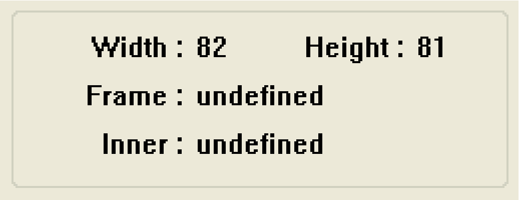
[Description]
The name of the Shape.

[Shape no.]
This is to select the Shape out of the Shape Library "TEST" where the graph will be added to.

[State]
This is to select the state of the Shape which the graph wants to be. Here the state is set for 0. The EB8000 provides 256 states for each Shape.

[Frame]
When [Frame] being selected, the graph will become a frame for the Shape.

[Inner]
When [Inner] being selected, the graph will become an inner for the Shape.

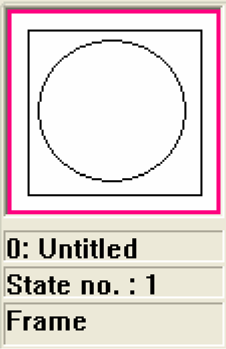


Width : 82 Height : 81

Frame : undefined

Inner : undefined

The above picture shows that neither frame nor inner is defined in the current state (state 0) of the Shape No. 0 in the Shape Library “TEST”. But see the picture below, after clicking the OK button, the graph will be added to the Shape Library; besides, it also shows that the Shape No.0 has only one state and frame has also been defined.



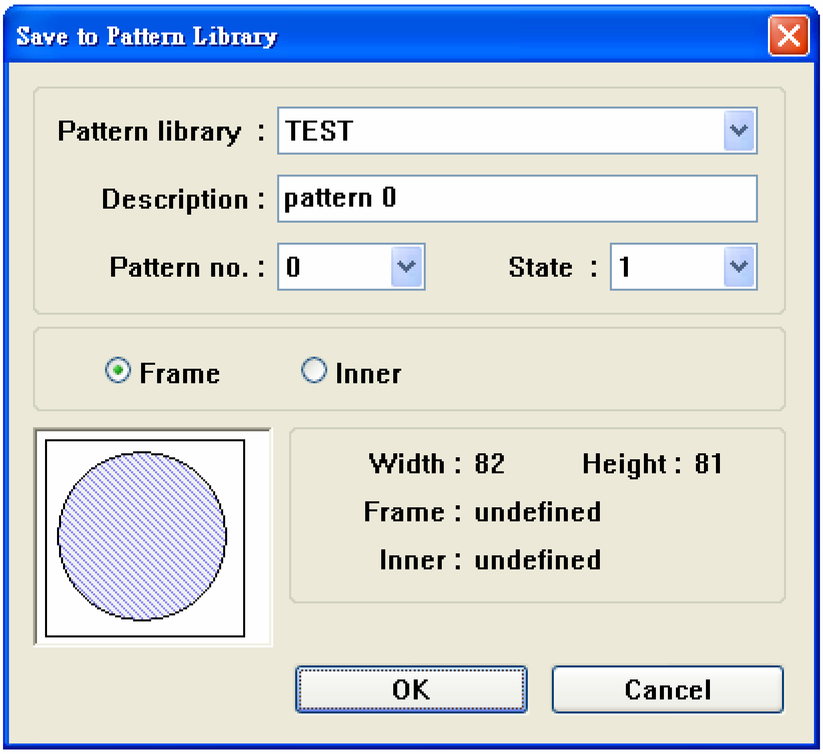
0: Untitled

State no. : 1

Frame

Step 3

The same process as in the Step 2, but the new graph has to be defined as state 1, refer to the following picture.



Save to Pattern Library

Pattern library : TEST

Description : pattern 0

Pattern no. : 0 State : 1

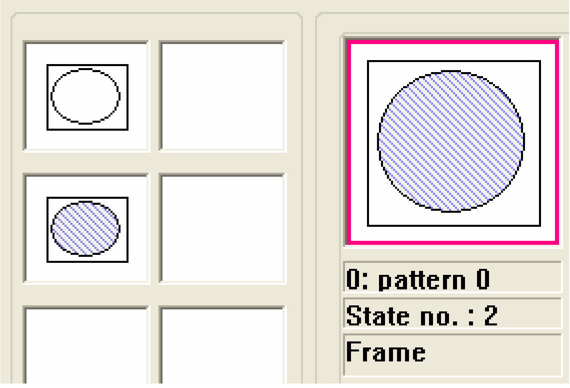
● Frame ○ Inner

Width : 82 Height : 81

Frame : undefined

Inner : undefined

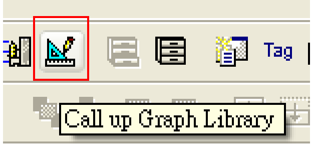
After the whole process that is described above is completed, a complete Shape is created. See the following picture.

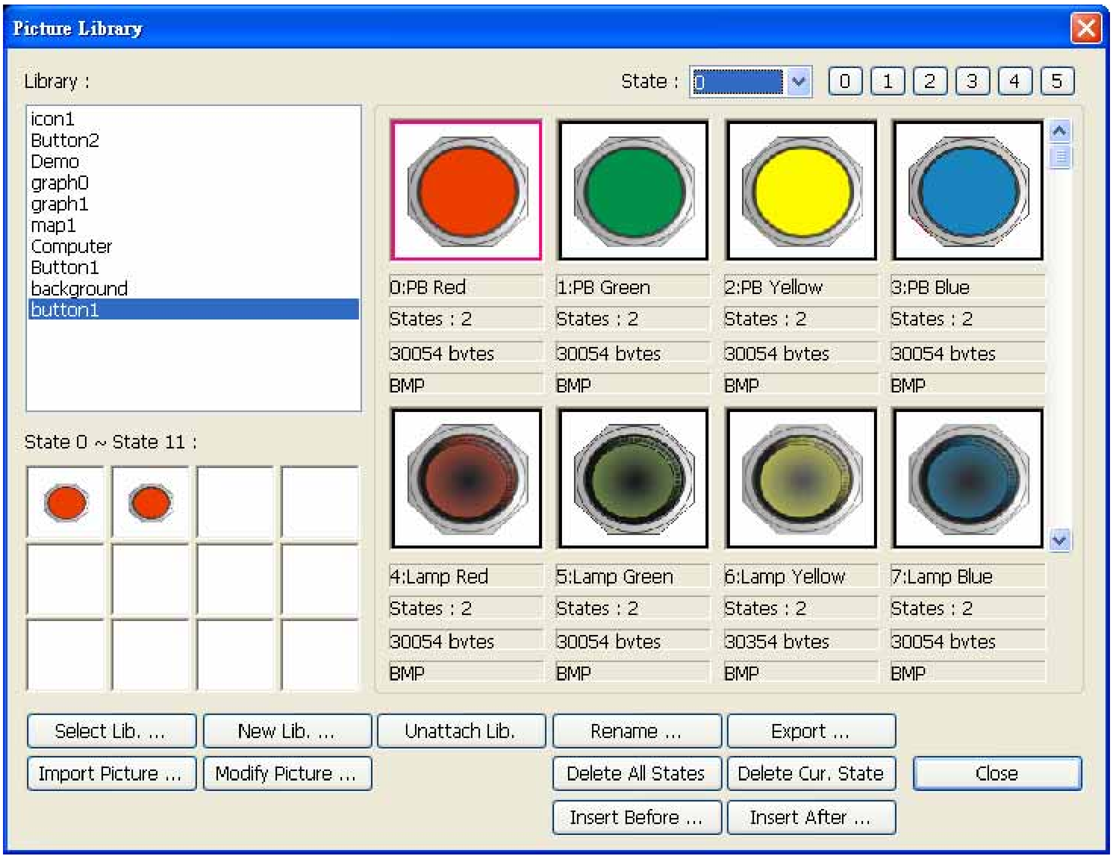


0: pattern 0
State no. : 2
Frame

2. Creating Picture Library

Click the “Picture Library” button on the toolbar, and the “Picture Library” dialogue box, as shown in the second picture below, will be displayed.





Library :

icon1
Button2
Demo
graph0
graph1
map1
Computer
Button1
background
button1

| | | | |
|---|---|---|---|
| 0:PB Red | 1:PB Green | 2:PB Yellow | 3:PB Blue |
| States : 2 | States : 2 | States : 2 | States : 2 |
| 30054 bytes | 30054 bytes | 30054 bytes | 30054 bytes |
| BMP | BMP | BMP | BMP |
| 4:Lamp Red | 5:Lamp Green | 6:Lamp Yellow | 7:Lamp Blue |
| States : 2 | States : 2 | States : 2 | States : 2 |
| 30054 bytes | 30054 bytes | 30354 bytes | 30054 bytes |
| BMP | BMP | BMP | BMP |

[Library]

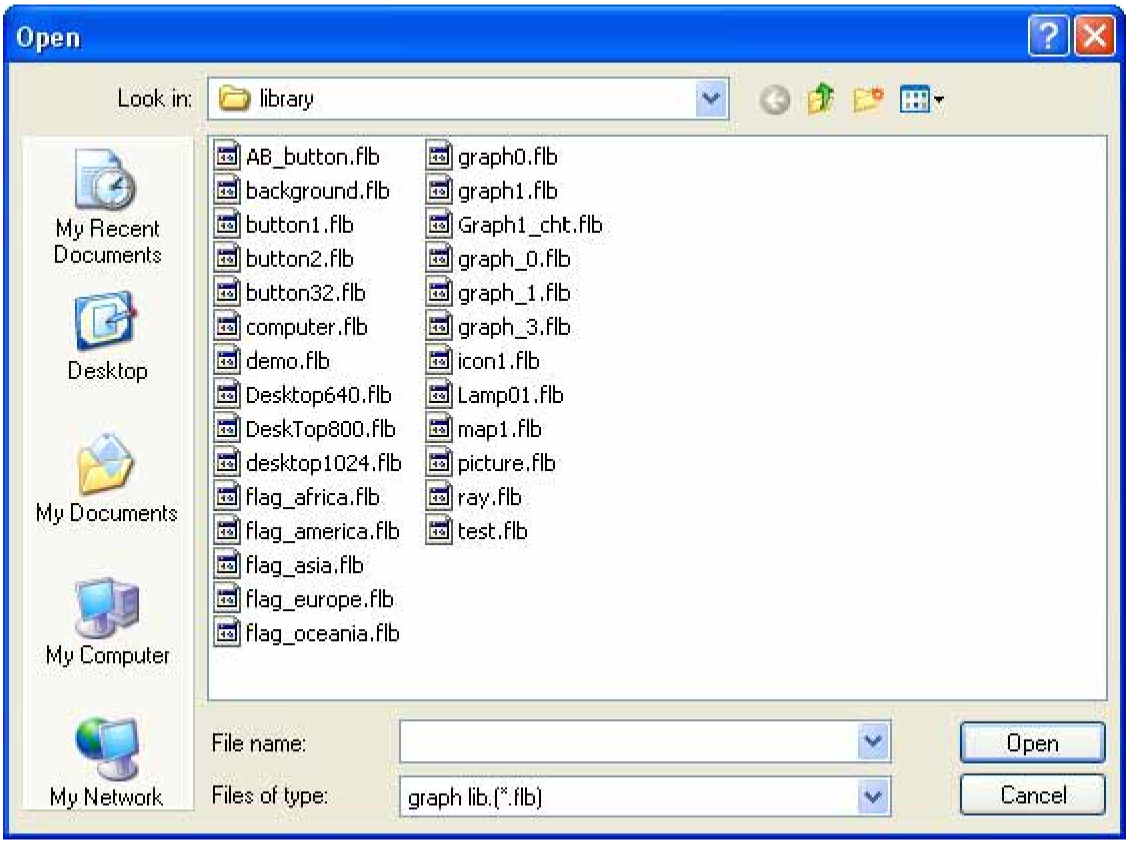
This is to select the source of a graph from the Picture Library which has been added into the current project.

[State]

This is to select the state that the existing graph wants to display. When there is no picture displayed in the window, it means that the picture does not exist or the state of the picture is not defined yet.

[Select Lib. …]

Click the [Select Lib. …] button, and the following picture will be displayed for users to select the Picture Library to add to the current project.



Look in: library

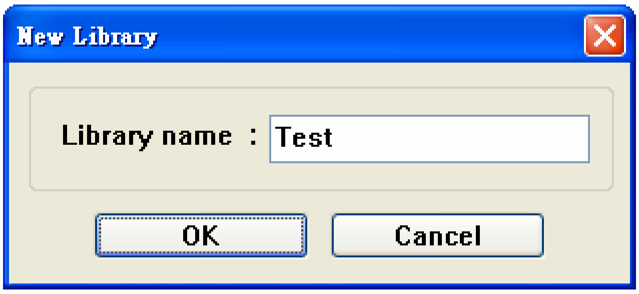
AB_button.flb
background.flb
button1.flb
button2.flb
button32.flb
computer.flb
demo.flb
Desktop640.flb
DeskTop800.flb
desktop1024.flb
flag_africa.flb
flag_america.flb
flag_asia.flb
flag_europe.flb
flag_oceania.flb
graph0.flb
graph1.flb
Graph1_cht.flb
graph_0.flb
graph_1.flb
graph_3.flb
icon1.flb
Lamp01.flb
map1.flb
picture.flb
ray.flb
test.flb

File name:

Files of type: graph lib.(*.flb)

[New Lib. …]

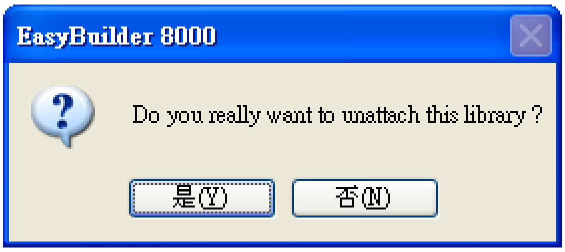
Click the button, and the following picture will be displayed for users to add a new empty Picture Library.



Library name : Test

[Unattach Lib.]

Click the button, and the following picture will be displayed for users to decide whether or not to delete the Picture Library in [Library] from the current project.



Do you really want to unattach this library ?

[Import Picture …]

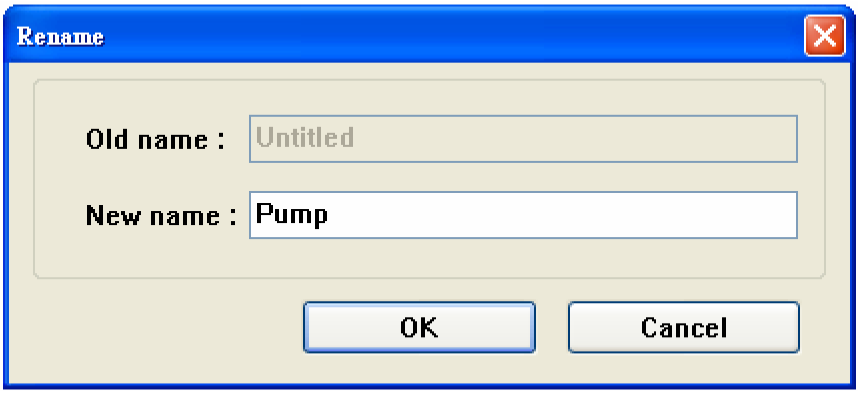
The button is used to add a new picture to the Picture Library

[Delete Picture]

The button is used to delete the selected picture.

[Rename …]

Click the button, and the following picture will be displayed for users to rename the selected picture.

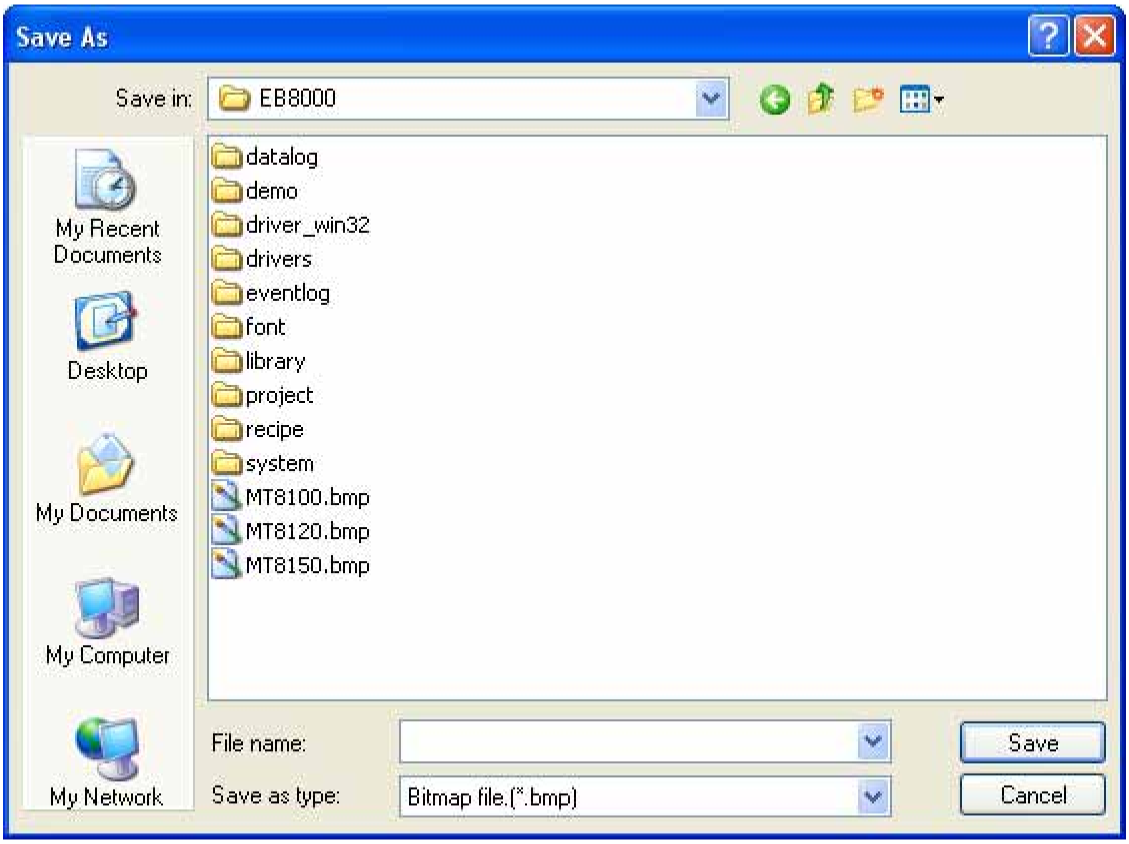


Old name : Untitled

New name : Pump

[Export …]

This button can be used to export the selected picture to the appointed place, as shown in the picture below, by that way users can get the original picture.



Save in: EB8000

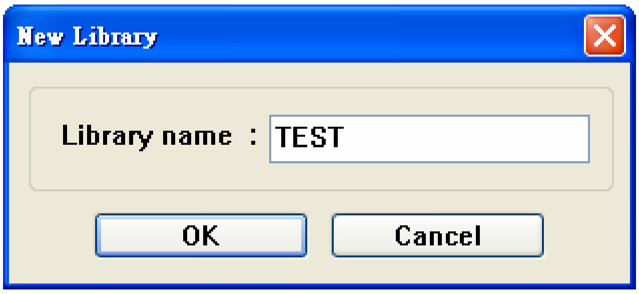
File name:

Save as type: Bitmap file.(*.bmp)

Here is an example of adding a picture with two states to a new Picture Library to show how to create a new Picture Library and to add a new picture to it.

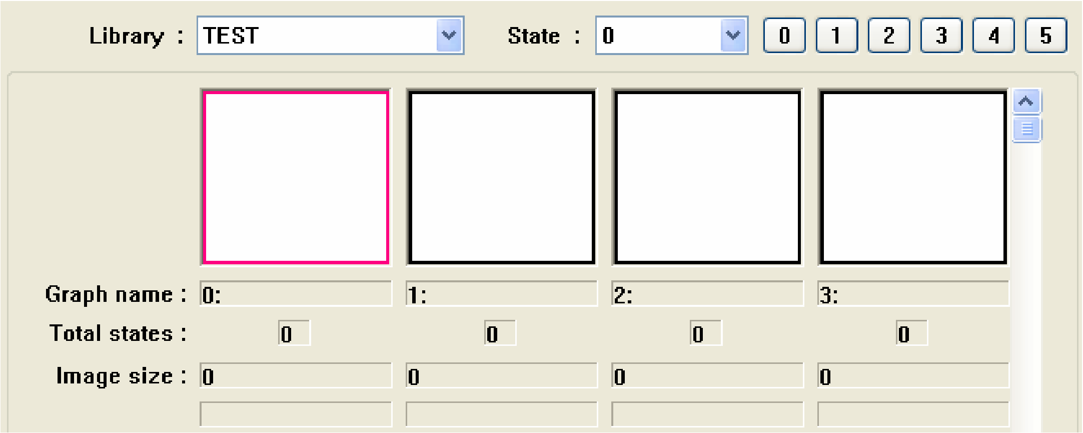
Step 1

Click [New Lib. …] and input the name of the new Picture Library when the following dialogue box is displayed.



Library name : TEST

Then, a new Picture Library “TEST” will be added to the Picture Library Manager dialogue box, but at this moment, there are no pictures in the library.



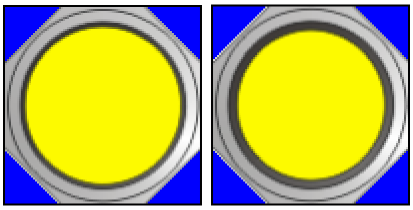
Library : TEST

State : 0

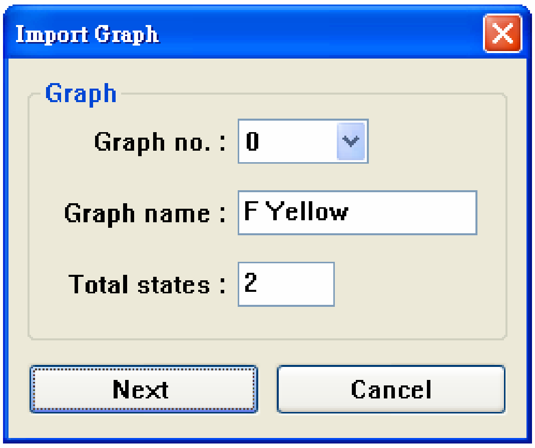
| | | | | |
|---|---|---|---|---|
| Graph name : | 0: | 1: | 2: | 3: |
| Total states : | 0 | 0 | 0 | 0 |
| Image size : | 0 | 0 | 0 | 0 |

Step 2

Get the needed graphs ready with the drawing tools first; suppose the two graphs in the following picture are used to represent the state 0 and the state 1 respectively.



Click the [Import Picture…] button first, and a dialogue box as shown in the picture below will be displayed, then set [Total states] for 2, meaning the picture includes 2 states, and last click [Next].



Import Graph

Graph

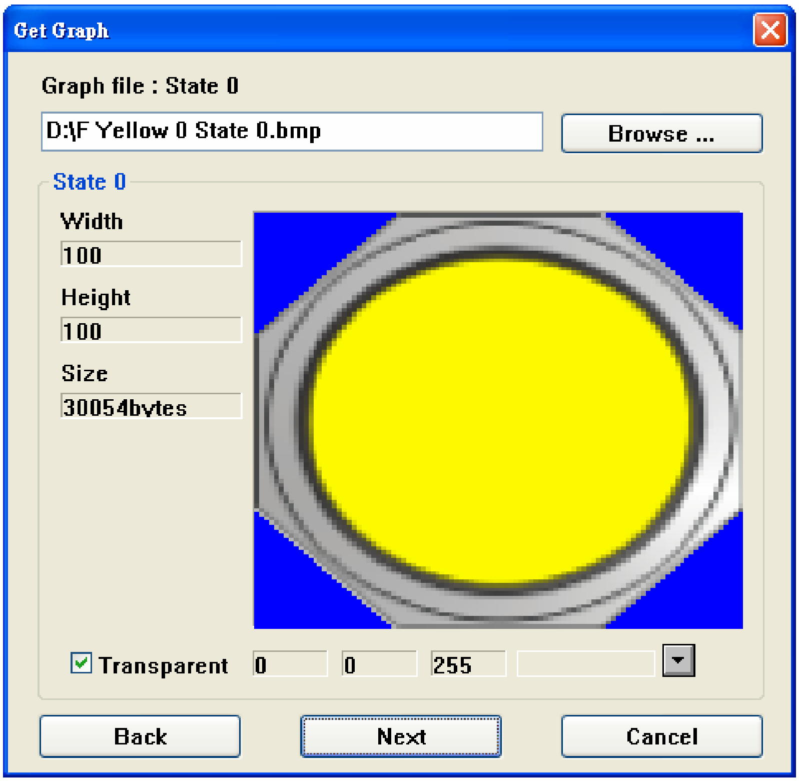
Graph no. : 0

Graph name : F Yellow

Total states : 2

Step 3

When the dialogue box as shown in the following picture displayed, select the source of a picture which state is 0, and select the correct transparent color. In the example below, the blue color RGB (0, 0, 255) is a transparent color. After the setting of the state 0 is completed, click the [next] button to continue the setting of the other state.



Get Graph

Graph file : State 0

D:\F Yellow 0 State 0.bmp

State 0

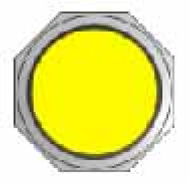
Width: 100

Height: 100

Size: 30054bytes

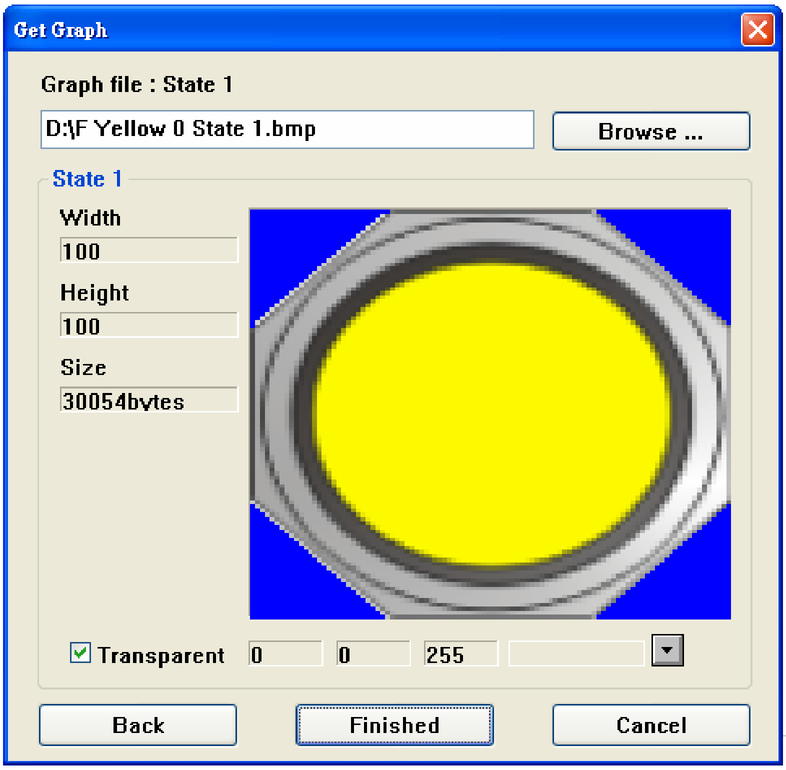
☑ Transparent 0 0 255

Before choosing transparent color, check [Transparent] box first and then left click on location-to-be. At this time, EB8000 will automatically display RGB value of the transparent color. Take above as an example, the actual shape shows as below:



Step 4

Same as the last step, select the source of a picture of which the state is 1 and select the correct transparent color for it. The work of creating a picture with two states is completed after clicking the [Finished] button,



Graph file : State 1

D:\F Yellow 0 State 1.bmp

State 1

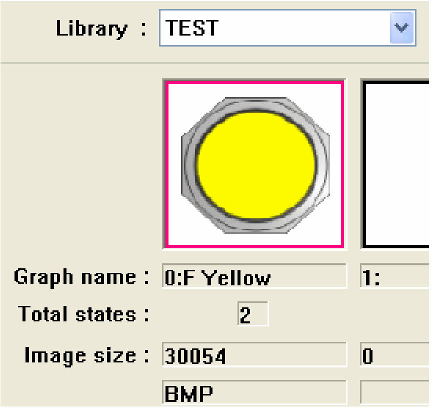
Width: 100

Height: 100

Size: 30054bytes

☑ Transparent 0 0 255

A complete picture, as shown in the picture below, will be created after all of the steps that are described above are done accordingly. Now the new picture “F Yellow” can be found in the Picture Library Manager dialogue box, and from the information we can know the picture is in the bitmap format and with two states.



Library : TEST

Graph name : 0:F Yellow 1:

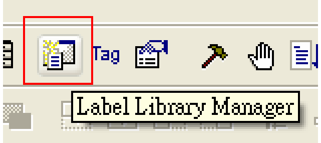
Total states : 2

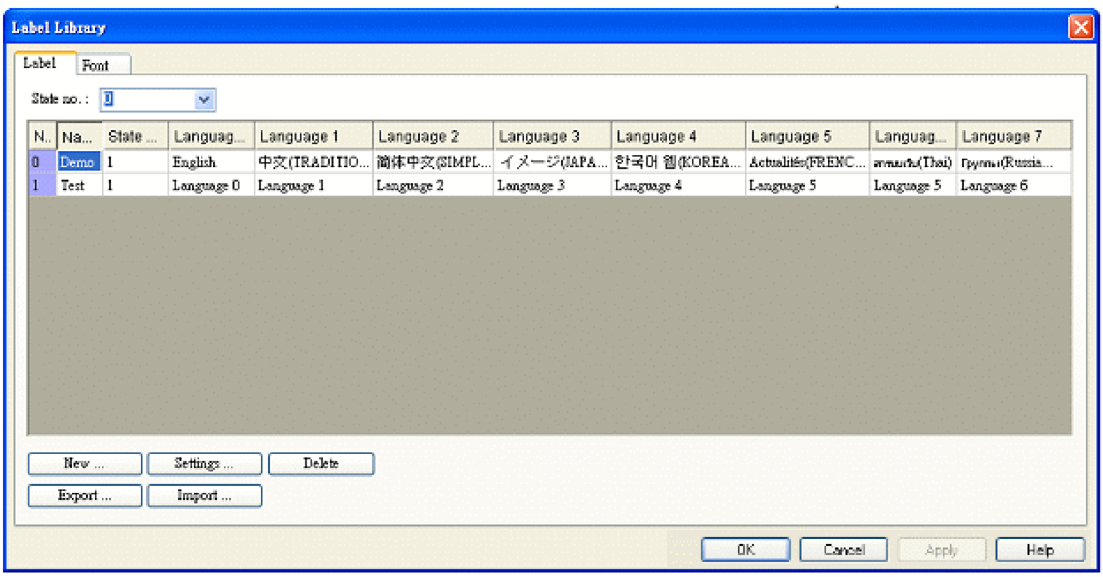
Image size : 30054 0

BMP

# Chapter 15　Label Library & Using Multi-Language

Label Library is used in the Multi-Language environment. Users can design the content of Label Library according to the actual demands. Select the needed label from Label Library on some occasion where text is needed. When operating the MT8000, the system can display the text which corresponds to the then language in use according to the settings of Label Library. The EB8000 can support displaying the corresponding text in 8 different languages simultaneously. Click the “Label Library Manager” button on the toolbar and a dialogue box, as shown in the picture below, will be displayed.





State no. : 0

| N.. | Na... | State ... | Languag... | Language 1 | Language 2 | Language 3 | Language 4 | Language 5 | Languag... | Language 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Demo | 1 | English | 中文(TRADITIO... | 简体中文(SIMPL... | イメージ(JAPA... | 한국어 웹(KOREA... | Actualités(FRENC... | [illegible](Thai) | Группы(Russia... |
| 1 | Test | 1 | Language 0 | Language 1 | Language 2 | Language 3 | Language 4 | Language 5 | Language 5 | Language 6 |

[State no.]

The function is to indicate the current state; each Label has a maximum of 256 states.

[New …]

The function is to add a new Label.

[Settings …]

The function is to change the content of Label.

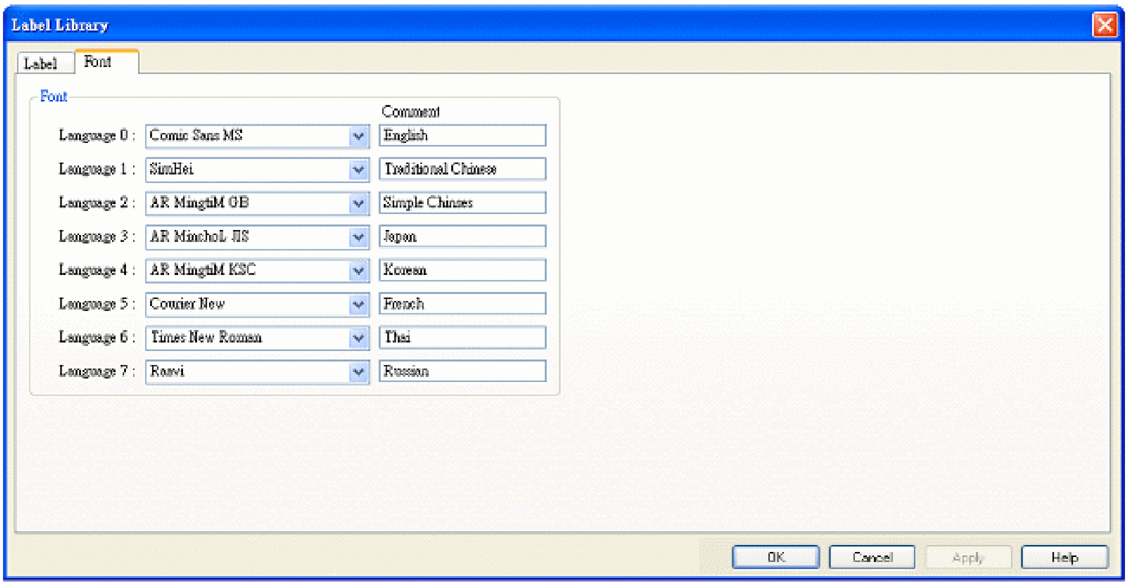
[Delete]
The function is to delete the specified Label.

[Export]
The function is to export the whole content of the specified Label Library in the CSV format to the appointed storage space.
This function can not support Unicode.

[Import]
The function is to import the existing Label Library which is already in the CSV format to the current project (MTP).
This function can not support Unicode.

The two Labels “Demo” and “Test” can be seen existing in the “Label Library” dialogue box, and “Demo” includes 8 languages which are: English, traditional Chinese, simplified Chinese, Japanese, Korean, French, Thai, and Russian.

**Settings of Label Library’s Font**
See the picture below, different fonts can be selected for different languages.

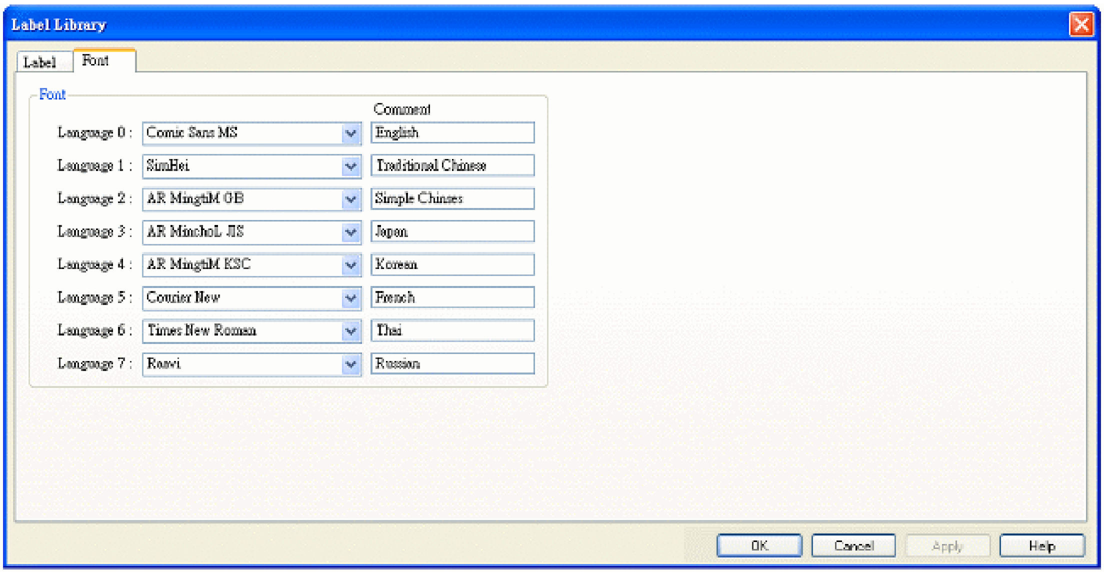


|  |  | Comment |
|---|---|---|
| Language 0 : | Comic Sans MS | English |
| Language 1 : | SimHei | Traditional Chinese |
| Language 2 : | AR MingtiM GB | Simple Chinses |
| Language 3 : | AR MinchoL JIS | Japan |
| Language 4 : | AR MingtiM KSC | Korean |
| Language 5 : | Courier New | French |
| Language 6 : | Times New Roman | Thai |
| Language 7 : | Raavi | Russian |

[Font]
The [Font] tab is to set the font for different languages in the Multi-Language environment.

[Comment]

The comment for each font.



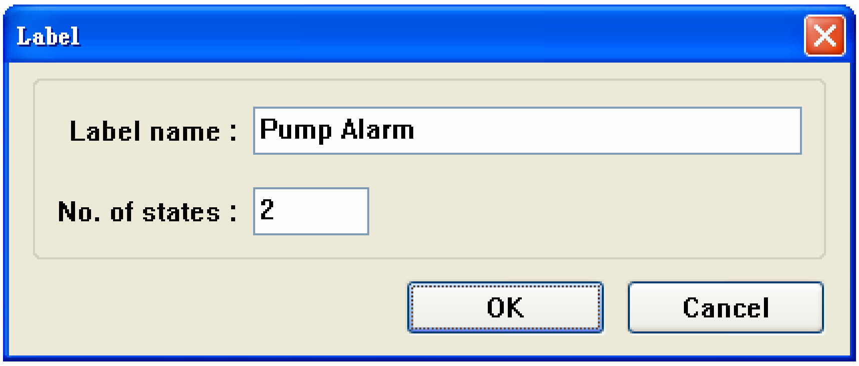
Font

| | | Comment |
|---|---|---|
| Language 0 : | Comic Sans MS | English |
| Language 1 : | SimHei | Traditional Chinese |
| Language 2 : | AR MingtiM GB | Simple Chinses |
| Language 3 : | AR MincholL JIS | Japan |
| Language 4 : | AR MingtiM KSC | Korean |
| Language 5 : | Courier New | French |
| Language 6 : | Times New Roman | Thai |
| Language 7 : | Raavi | Russian |

Creating Label Library

The following shows how to create Label Library.

At first open the "Label Library" dialogue box and click [NEW…], then the setting dialogue box, as shown in the picture below, will be displayed. Click the OK button when the settings are certain.



Label name : Pump Alarm

No. of states : 2

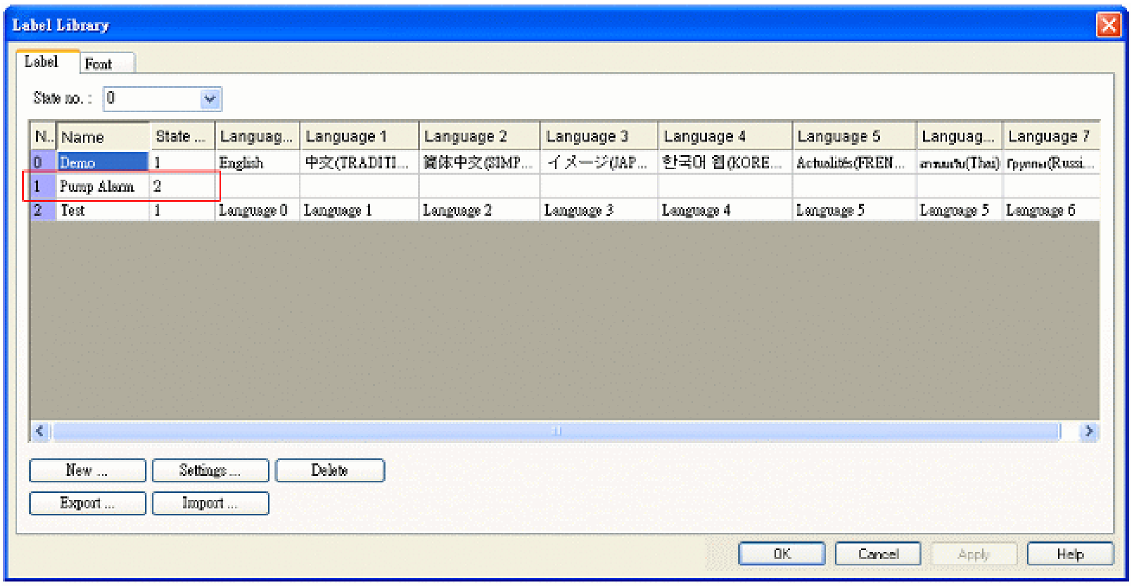
[Label name]

Label's name; in the example above, the Label is named as "Pump Alarm".

[No. of states]

The number of states possessed by the Label.

When the process is complete, a new Label “Pump Alarm” with 2 states will be added to the Label Library. See the picture below.

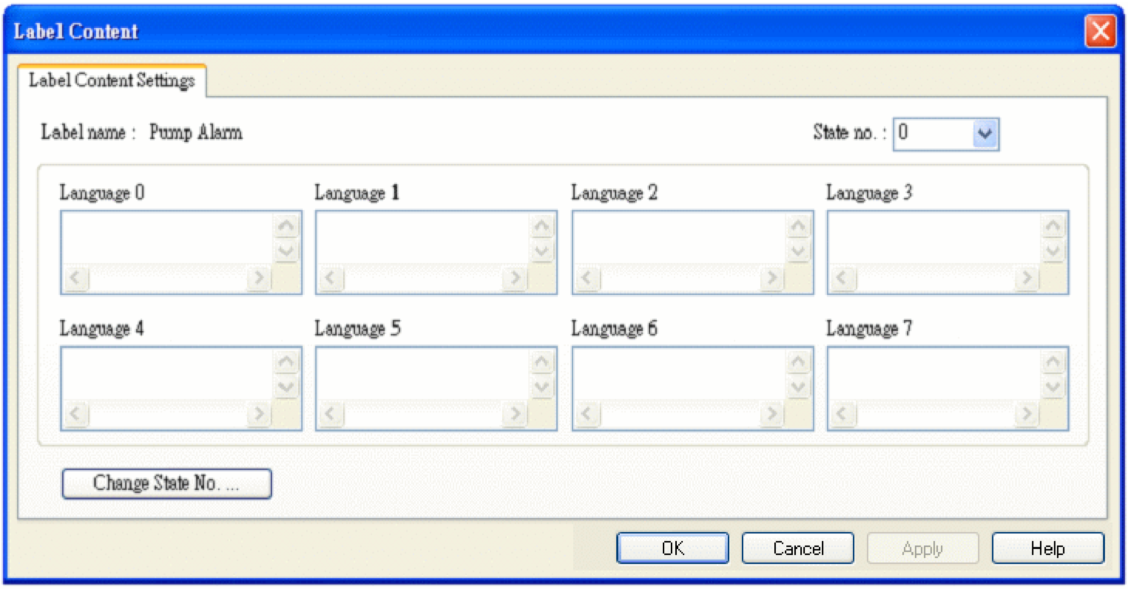

Label Library

Label | Font

State no. : 0

| N.. | Name | State ... | Languag... | Language 1 | Language 2 | Language 3 | Language 4 | Language 5 | Languag... | Language 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Demo | 1 | English | 中文(TRADITI... | 簡体中文(SIMP... | イメージ(JAP... | 한국어 됨(KORE... | Actualités(FREN... | ภาษาไทย(Thai) | Группы(Russi... |
| 1 | Pump Alarm | 2 | | | | | | | | |
| 2 | Test | 1 | Language 0 | Language 1 | Language 2 | Language 3 | Language 4 | Language 5 | Language 5 | Language 6 |

At last, select “Pump Alarm” and click [Settings …], and the setting dialogue box, as shown in the picture below, will be displayed for users to set up the corresponding language content.


Label Content

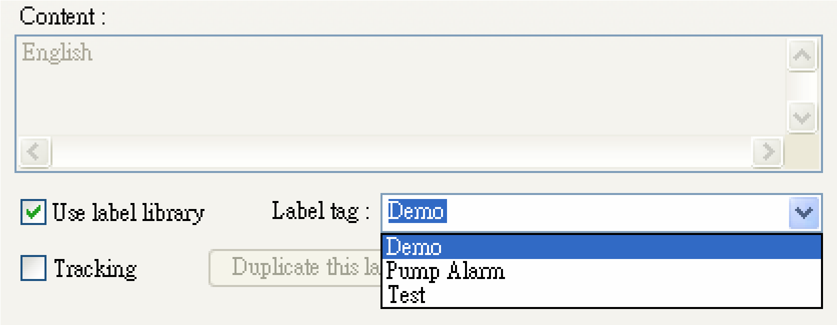
Label Content Settings

Label name : Pump Alarm

State no. : 0

Using Label Library

When there are already some defined labels in Label Library, users can find out those Labels in [Label tag] by selecting [Use label library] in the object’s [Label] tab.



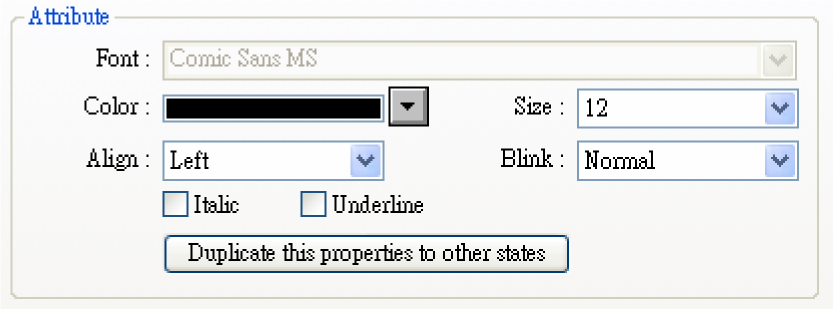
Content :

English

☑ Use label library

Label tag : Demo

After selecting these Labels, what that is shown in [Content] is the content of selected label, and the settings of the font in use are also included in the Label Library.



Attribute

Font : Comic Sans MS

Color :

Size : 12

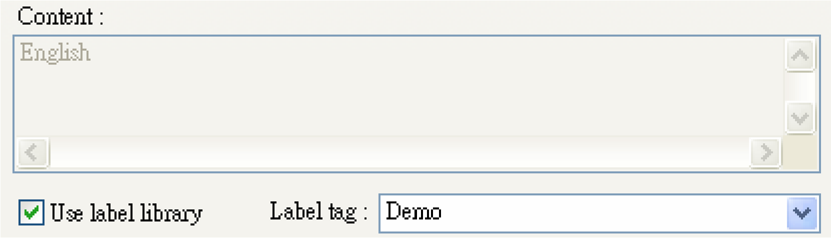
Align : Left

Blink : Normal

□ Italic □ Underline

The use of Multi-Language

When users want to have the multi-language effect on the content of the object's text, besides using the Label Library, it has to use the system reserved register [LW9134]. The available value range of the [LW9134] can be set from 0 to 7, and different value of [LW9134] corresponds to the different Language. The picture below demonstrates a simple example that shows how to use the multi-language. At first, create a Text Object and set the content of it, and the Label in use at this time can be seen from the Label tag.



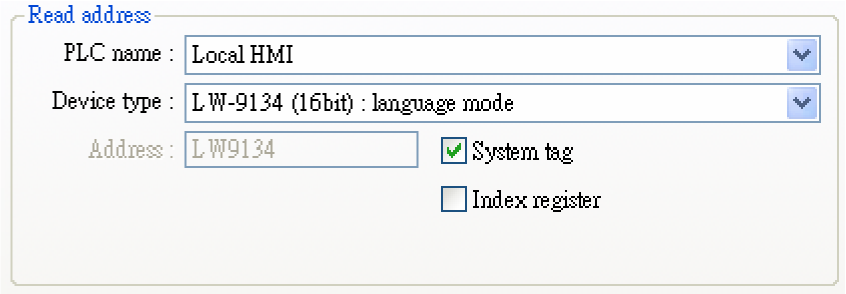
Content :

English

☑ Use label library

Label tag : Demo

Next, create a Numeric Input Object, then refer to the picture below to set its Read address, and you will see the Read address in use at this time is the system reserved register [LW9134].



Read address

PLC name : Local HMI

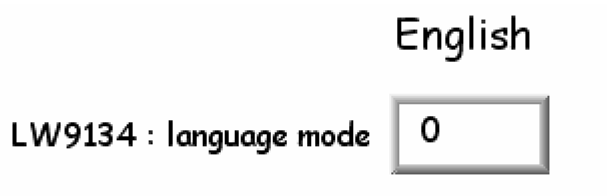
Device type : LW-9134 (16bit) : language mode

Address : LW9134

☑ System tag

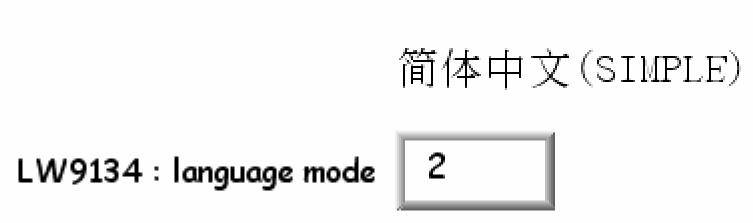
□ Index register

And afterwards, the simulation effects of the project will be like the pictures below. When change the value of [LW9134], the displayed content of the Text Object will be also changed automatically.



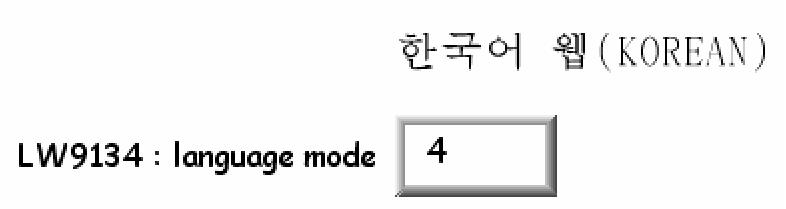
English

LW9134 : language mode 0



简体中文(SIMPLE)

LW9134 : language mode 2



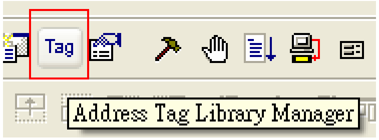
한국어 웹(KOREAN)

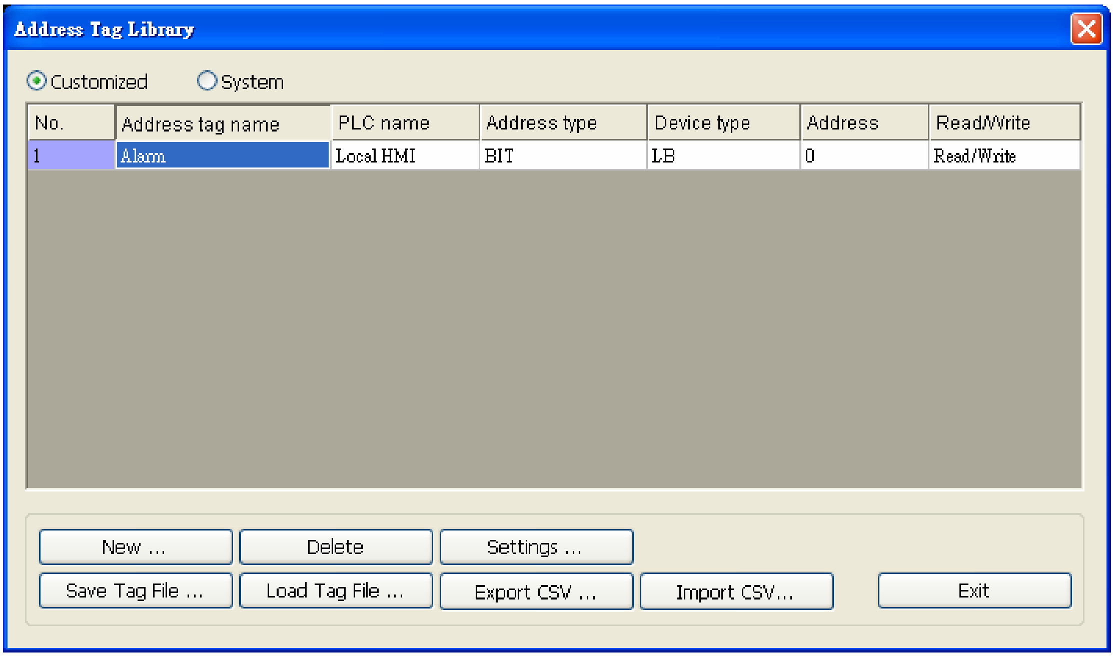
LW9134 : language mode 4

# Chapter 16  Creating and Using Address Tag Library

1. Creating Address Tag Library

Normally, at the beginning of designing a project, the common address is defined in the Address Tag Library. It is not only to save users repeating the address input but also to enhance the utility of object related information. Click the “Tag” button on the toolbar to call up the “Address Tag Library” dialogue box. See the pictures below.




Address Tag Library

● Customized ○ System

| No. | Address tag name | PLC name | Address type | Device type | Address | Read/Write |
|---|---|---|---|---|---|---|
| 1 | Alarm | Local HMI | BIT | LB | 0 | Read/Write |

[Customized]

This is to display the Address Tags defined by users.

[System]

This is to display the Address Tags of the system.

[New …]

This is to add a new Address Tag.

[Delete]

This is to delete a selected Address Tag.

[Settings …]

This is to change the selected Tag.

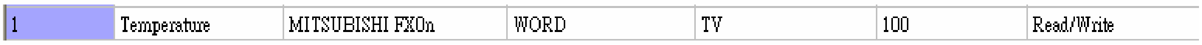
[Export …]

This is to export the current Address Tag Library in CSV format to the appointed space.

[Import …]

This is to import an Address Tag Library in CSV format to the current project.

The picture above shows the content of two existing customized Address Tags in the library. And the following explains the meaning of terms.

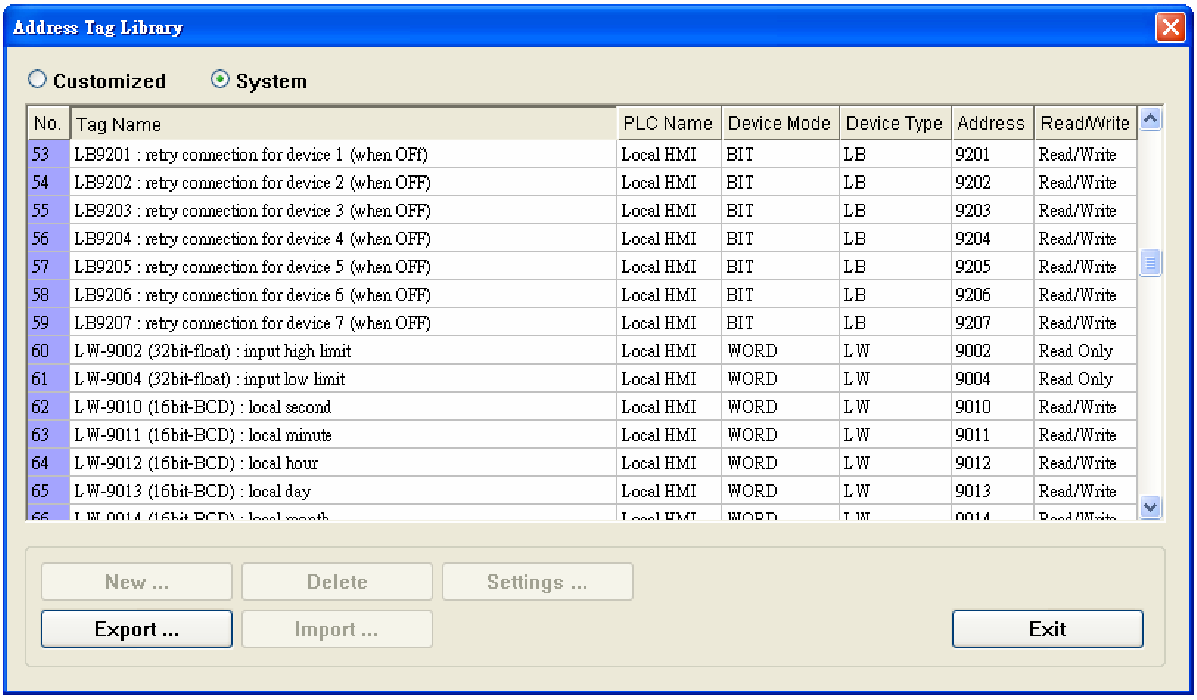


| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Temperature | MITSUBISHI FX0n | WORD | TV | 100 | Read/Write |

No. Tag name PLC Name Device Mode Device Type Address

Read/Write

The picture below indicates another kind of Address Tag which is the system reserved register.

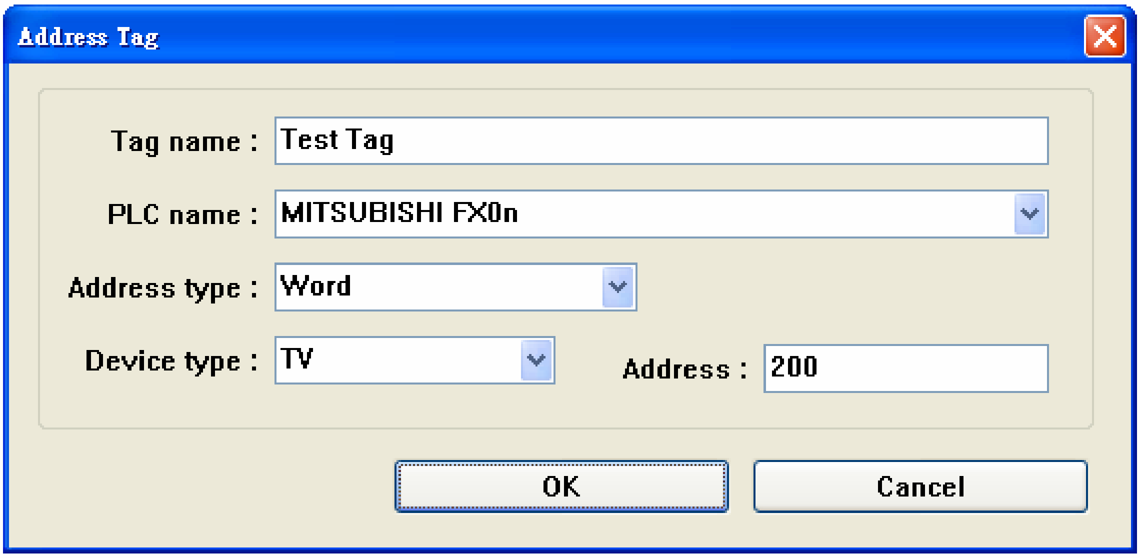


Address Tag Library

○ Customized ● System

| No. | Tag Name | PLC Name | Device Mode | Device Type | Address | Read/Write |
|---|---|---|---|---|---|---|
| 53 | LB9201 : retry connection for device 1 (when OFF) | Local HMI | BIT | LB | 9201 | Read/Write |
| 54 | LB9202 : retry connection for device 2 (when OFF) | Local HMI | BIT | LB | 9202 | Read/Write |
| 55 | LB9203 : retry connection for device 3 (when OFF) | Local HMI | BIT | LB | 9203 | Read/Write |
| 56 | LB9204 : retry connection for device 4 (when OFF) | Local HMI | BIT | LB | 9204 | Read/Write |
| 57 | LB9205 : retry connection for device 5 (when OFF) | Local HMI | BIT | LB | 9205 | Read/Write |
| 58 | LB9206 : retry connection for device 6 (when OFF) | Local HMI | BIT | LB | 9206 | Read/Write |
| 59 | LB9207 : retry connection for device 7 (when OFF) | Local HMI | BIT | LB | 9207 | Read/Write |
| 60 | LW-9002 (32bit-float) : input high limit | Local HMI | WORD | LW | 9002 | Read Only |
| 61 | LW-9004 (32bit-float) : input low limit | Local HMI | WORD | LW | 9004 | Read Only |
| 62 | LW-9010 (16bit-BCD) : local second | Local HMI | WORD | LW | 9010 | Read/Write |
| 63 | LW-9011 (16bit-BCD) : local minute | Local HMI | WORD | LW | 9011 | Read/Write |
| 64 | LW-9012 (16bit-BCD) : local hour | Local HMI | WORD | LW | 9012 | Read/Write |
| 65 | LW-9013 (16bit-BCD) : local day | Local HMI | WORD | LW | 9013 | Read/Write |
| 66 | LW-9014 (16bit-BCD) : local month | Local HMI | WORD | LW | 9014 | Read/Write |

Before using the Address Tag Library, users have to add the content of the library. Click the [New…] button, and the “Address Tag” dialogue box, as shown in the picture below, will be displayed.



Address Tag

Tag name : Test Tag

PLC name : MITSUBISHI FX0n

Address type : Word

Device type : TV

Address : 200

[Tag name]
The Address Tag’s name.

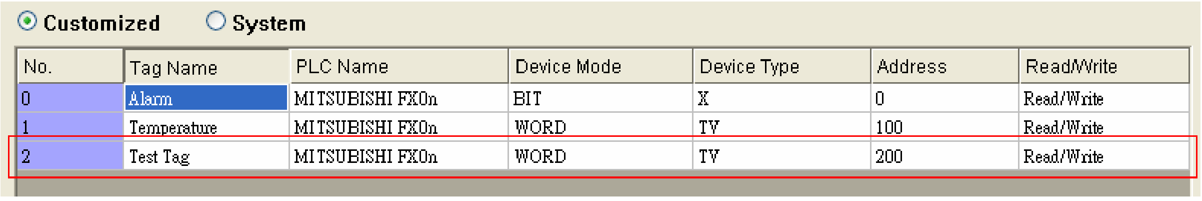
[PLC name]
The PLC’s name; can be selected from the device table.

[Address type]
Address type; there are “bit type” and “word type” for choice.

[Device type]
Device type; the selection is related to [PLC name] and [Address type].

[Address]
The content of address.

Click the OK button when the settings are done, and a new tag will be found in the customized library. See the picture below.

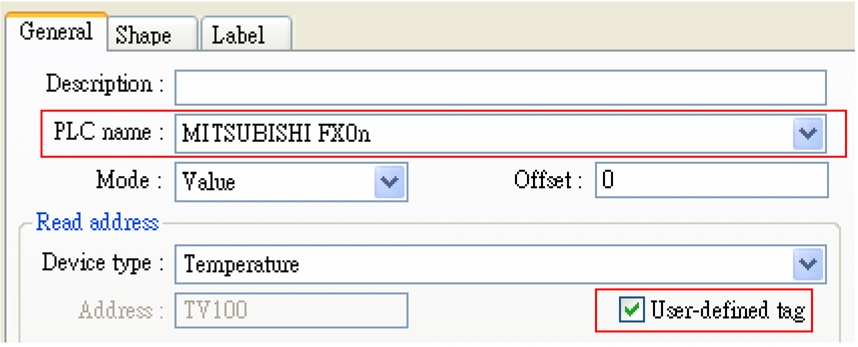


● Customized ○ System

| No. | Tag Name | PLC Name | Device Mode | Device Type | Address | Read/Write |
|---|---|---|---|---|---|---|
| 0 | Alarm | MITSUBISHI FX0n | BIT | X | 0 | Read/Write |
| 1 | Temperature | MITSUBISHI FX0n | WORD | TV | 100 | Read/Write |
| 2 | Test Tag | MITSUBISHI FX0n | WORD | TV | 200 | Read/Write |

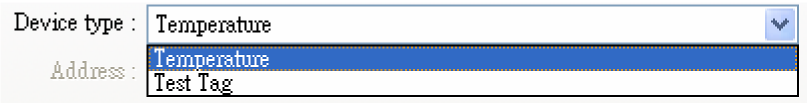
2. Using Address Tag Library

After creating the Address Tag Library, set up the connection PLC device which is related to the customized Tag in the [General] tab of the “Object Attributes,” where the [User-defined tag] check box can be found and by selecting it, users can make use of these address tags. See the picture below.



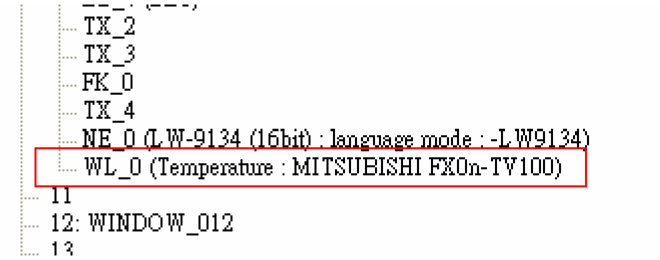
Description :
PLC name : MITSUBISHI FX0n
Mode : Value
Offset : 0
Read address
Device type : Temperature
Address : TV100
☑ User-defined tag

Then, as shown in the picture below, there are some items in the [Device type] tab for selecting.



Device type : Temperature
Address :
Temperature
Test Tag

When the settings are completed, the object information window will show the name of the Address Tag used for the object. See the picture below.



TX_2
TX_3
FK_0
TX_4
NE_0 (LW-9134 (16bit) : language mode : -LW9134)
WL_0 (Temperature : MITSUBISHI FX0n-TV100)
11
12: WINDOW_012
13

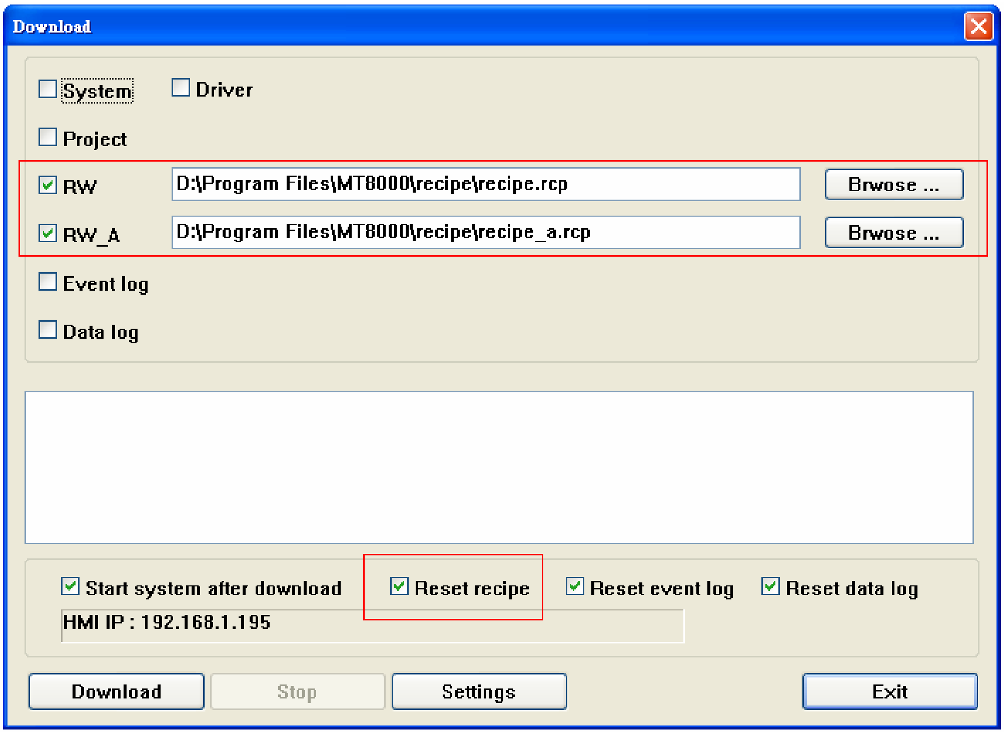
# Chapter 17  Transferring Recipe Data

Recipe Data are stored in RW and RW_A memory, the way of reading and writing Recipe Data is the same as operating the normal Word Register. The difference is that Recipe Data will be saved in the recipe memory when the machine shuts off and the data saved in RW and RW1 will remain the last record after the machine operates again.

The size of Recipe Data in both RW and RW1 are 64k words. Users can update Recipe Data by using CF Card or Ethernet and then update the PLC's data according to the new Recipe Data. Users can also upload Recipe Data to the appointed address; furthermore, users can save the PLC's data in recipe memory. The following will explain all of the ways of operating recipe data.

1. Updating Recipe Data by Using Ethernet.
Go to [Download] in Project Manager. Select [RW] and [RW_A] and designate the files which you want to download from the source files. After the downloads are done successfully, start up the machine again, and the content of RW and RW_A will be updated.

When [Reset recipe] is selected, before moving onto any download process, the EB8000 will set all the data of [RW] and [RW_A] for 0 first.



Download

☐ System ☐ Driver

☐ Project

☑ RW D:\Program Files\MT8000\recipe\recipe.rcp

☑ RW_A D:\Program Files\MT8000\recipe\recipe_a.rcp

☐ Event log

☐ Data log

☑ Start system after download ☑ Reset recipe ☑ Reset event log ☑ Reset data log

HMI IP : 192.168.1.195

2. Updating Recipe Data by Using CF Card or USB Disk

Please refer to the section of Project Manager for related information.

3. Transferring Recipe Data

Using the [Trigger Data Transfer] object to transfer Recipe Data to the appointed address, or saving the data of the appointed address in [RW] and [RW_A] as well. Refer to the [Trigger Data Transfer] section for related information.

4. Saving Recipe Data Automatically

In order to prolong the life of machine’s flash memory, the EB8000 will save Recipe Data automatically every five minutes to avoid losing the data because the machine shuts down. The EB8000 provides users with [LB9029] function to save Recipe Data manually. The EB8000 will save Recipe Data when users give the “ON” message to [LB9029]. But when users give the “ON” message to [LB9028], the EB8000 will set all Recipe Date back to 0.

# Chapter 18 Macro User’s Manual

This document is the user’s manual of macro module, which describes syntax, usage, and programming methods of macro commands.

The document includes the following chapters:

Macro Description
Macro Usage Description
Macro Commands and PLC Communication (Local Bit, Local Word)
Macro Operation Instruction
Notes about Using Macro
Compiling Error Message
Source Code Examples

- Macro Description

1. Constants and Variables

a. Constants

(1) Decimal constant

(2) Hexadecimal constant

(3) ASCII code (character constant)

(4) Boolean: True (not zero), False (zero)

b. Variables

(1) Naming rules

A variable must start with an alphabet and no longer than 32 characters.

(2) Variable types

| | |
|---|---|
| char. | Character (8 bit) variable |
| bool | Boolean( 1 bit) variable |
| short | Short integer(16 bit) variable |
| int | Double word (32 bit)variable |
| float | Floating point (32 bit) variable |

c. Operator

(1) Assignment operator

Assignment operator ： =

(2) Arithmetic operators

Addition ： +
Subtraction ： -
Multiplication ： *
Division ： /
Modulo Division ： %

(3) Comparison operators

Less than ： <
Less than or equal ： <=
Greater than ： >
Greater than or equal ： >=
Equal ： ==
Not equal ： <>

(4) Logic operators:

Conditional AND ： and
Conditional OR ： or

Exclusive OR ： xor

Boolean NOT ： not

(5) Bitwise and shift operators:

(a) Shift operators

Left shift ： <<

Right shift ： >>

(b) Bitwise operators

Bitwise AND ： &

Bitwise OR ： |

Bitwise XOR ： ^

Bitwise complement ： ~

2. Priority of operators

The process order of many operators within an expression is called the priority of operators.

a. Priority of the same kind of operator (From left to right, from up to low)

Arithmetic operator: ^ → ( * , / ) → ( mod ) → ( + , - )

Shift operator: From left to right within the expression

Comparison operator: From left to right within the expression

Logic operator: Not → And → Or → Xor,

b. Arithmetic operator is prior to Bitwise operator

Bitwise operator is prior to Comparison operator

Logic operator is prior to Assignment operator

3. Array

Only support fixed length, 1-D array which is:

1-D array: Array_Name [Array_Size]

The array size can be integer which from 0 to 4294967295

Minimum of array index = 0

Maximum of array index = Array size – 1

Example : Array[MAX] MAX = 100

Minimum of array index = 0

Maximum of array index = 99 ( 100 – 1)

4. Expression

a. Operation object

(1) Constants

(2) Variables

(3) Array

(4) Function

b. Components of expression

An expression is combined operation objects with operators by following specific rules.

5. Statement

a. Definition statement

(1) type name: Define the type of name

Example: int a, Define variable a as an integer

(2) type name[constant]: Define the type of array name

Example: int a[10], Define variable a as a 1-D array of size 10

Assignment statement

The form is ： Variable = Expression

Example: a = 2

b. Logic statement and branches

(1) One-line format

```
if Condition then
    [Statements]
end if
```

Example:

```
if a == 2 then
        b = 1
else
        b = 2
end if
```

(2) Block format

```
if Condition then
    [Statements]
[else [if Condition – n then
        [Else_If_Statements] ….
[else
    [Else_Statements]]
] ]
end if
```

Example:

```
if a == 2 then
        b = 1
else if a == 3
        b = 2
else
        b = 3
end if
```

Syntax description

| | |
|---|---|
| Condition | Necessary. This is a control statement. It will be FALSE when the value of condition is 0; and will be TRUE when the value of condition is 1. |
| Statements | It is optional in block format statement but necessary in one-line format without ELSE. The statement will be executed when the condition is TRUE. |
| Condition – n | Optional. See Condition. |
| Else_If_Statements | Optional in one-line or multi-line format statement. The **else if** statement will be executed when the relative Condition – n is TRUE. |
| Else_Statements | Optional. The **else** statement will be executed when Condition and Condition—n are both FALSE. |

c. Looping control

(1) for–next Statement

Use this for fixed execution counts. To means increase by step while down means decrease by step.

```
for Counter = Start to end [step Step]
    [Statements]
next [Counter]
```

```
for Counter = Start down end [step Step]
    [Statements]
next [Counter]
```

Example:

```
for a = 0 to 10 step 2
    b = a
next a
```

Syntax description

| | |
|---|---|
| Counter | Necessary. The counter of looping control. It can be integer or character. |
| Start | Necessary. The initial value of Counter. |
| End | Necessary. The end value of Counter. |
| Step | Optional. The increment/decrement step of Counter. It can be integer and can be omitted when value is 1. |
| Statements | Optional. Statement block between For and Next which will be executed fixed counts. |

(2) while – wend statement

Loop controlled by Condition. When Condition is TRUE, the statements will be executed repetitively until the condition turns to FALSE.

```
while Condition
    [statements]
wend
```

Example:

```
while a == 2
    b = b + 1
    GetData(a, “Local HMI”, LB, 5, 1)
wend
```

Syntax description

| | |
|---|---|
| Condition | Necessary. Logic expression which control the execution of statements. |
| Statements | Optional. Statement block. The statement will be executed when the condition is TRUE. |

(3) break

Used in looping control or select statement. It skips immediately to the end of the statement.

(4) continue

Used in looping control statement. It quits the current iteration of a loop and starts the next one.

(5) return

To stop executing the current method.

Reserved keywords:

The following keywords are reserved for Macro which can not be used in function name, array name, or variable name.

+ , - ,* , / ,^, mod, >= ,>, < ,<=, <> , == , And, Or, Xor, Not, <<, >>, = , & , |, ^,~,If ,Then,Else,EndIf,Select ,Case ,For, To, Down Step, Next, while, wend break, continue, return.

- Macro usage description

1. Local variables and global variables

   a. Local variables: Its value remains valid only within a specific statement.

   b. Global variables: Its value always remains valid after declaration.

When local variable and global variable have the same declaration name, only the local variable will be valid.

2. Variable and constant initialization

   a. Variable initialization

   (1) Initialize a value of variable in the declaration statement directly.

   Example: int h = 9

   (2) Use assignment operator to initialize a value after declaration.

   Example: temp = 9

   (3) Array initialization

   Format: int g[10] = { 1,2,3, , 10 }

   The initial values are written within the {} and divided by comma (,). These values are assigned orderly from left to right starting from array index=0.

   b. Constans.

   Macro supports:

   (1) Decimal integer constant

   (2) Hexadecimal integer constant: start with 0x

   (3) Character constant,

   (4) Boolean constant: True / False,

3. Boolean variables and Boolean expressions

   a. Boolean variables:

   True or False. Not zero value means TRUE while zero value means FALSE.

   b. Boolean expressions:

   The value of Boolean expression is not zero mean TRUE.

   The value of Boolean expression is zero mean FALSE.

4. Declaration statement

a. Declaration outside a function is a global variable declaration.

b. Declaration inside a function is local variable declaration. This declaration must at the very beginning of a statement within a function. Other statements before declaration statements will cause compiler error.

For example：

```
macro_command main( )
char i

i = 9//Assign statement within declaration area causes compiler error
int g[10]

for g[2] = 0 to 2
g[3] = 4
next g[2]
end macro_command
```

5. Function call and passing parameters

a. Function define

The format of function statement is:

```
sub Type FunName(Type1 var1, Type2 var2, …, TypeN varN)
        ……..
        return ret
end sub
```

Type is the return datae type,  FunName is function name,  Type1~TypeN is the parameter variable type,  var1~ varN is parameter, ret is the return data

For example：

```
 sub int func(int i)
        int h

                h = i + 10
        …..
        return h
```

```
    end sub
```

b. Function call

A function must be defined before its execution. Otherwise, a compiler error 'Function not defined' will occur.

For example：

```
macro_command main()
        int    i
        i = Func(i) // call an undefined function causes compiler error
end macro_command
```

c. Passing parameters

(1) Passing by value through local variable.

(2) Through the same global variables

6. Main Function

Macro must has one and only one main function which is the execution start point of Macro. The format is:

```
macro_command Function_name()


end macro_command
```

- Macro command and PLC communication (LocalBit, LocalWord):

Usage：Communicate with PLC through a function library
In the command program, Macro can communicate with data in the PLC. The function GetData( … ) can receive data from the PLC through EasyView. The function SetData( … ) can set data to the PLC through EasyView. The Macro command handles the communication details.

```
1. GetData(   Supported data types: DestData,
              char*     szPLCName,
              char*     szDeviceType,
              int       nAddress,
              int       nDataCount)
```

Description

Get data from PLC

Parameters：

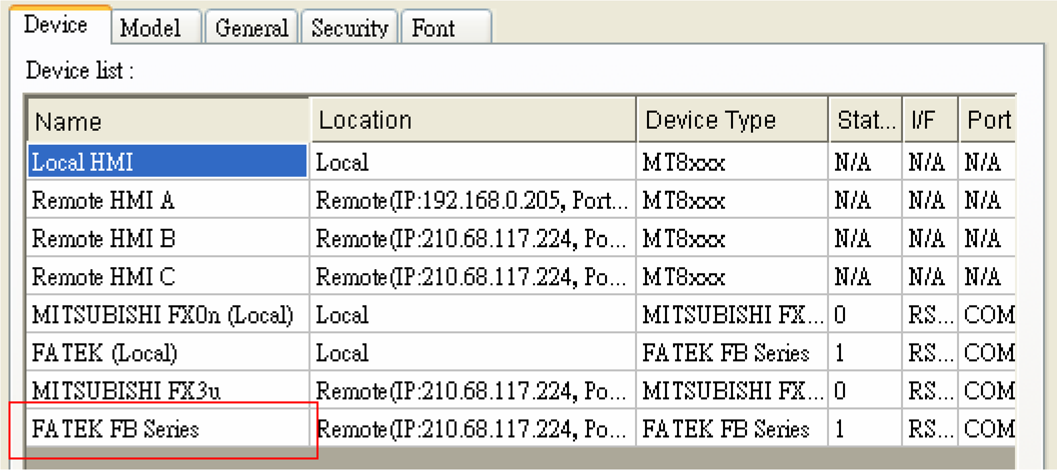
| | |
|---|---|
| DestData | The address of data to get |
| szPLCName | PLC name |
| szDeviceType | PLCtype and encoding method of PLC address |
| nAddress | The address of PLC |
| nDataCount | Number of data |

Return value:

None

szPLCName

Set the PLC operation object, identify the plc name by use the double quotation marks, those name have been defined in the Device List of System rameter.Example:”FATEK FB Series”, See the following graph, If use the name never been defined in the Device List,will will cause compiler error.
The name of HMI is fixed as “Local HMI”.



Device list :

| Name | Location | Device Type | Stat... | I/F | Port |
|---|---|---|---|---|---|
| Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Remote HMI A | Remote(IP:192.168.0.205, Port... | MT8xxx | N/A | N/A | N/A |
| Remote HMI B | Remote(IP:210.68.117.224, Po... | MT8xxx | N/A | N/A | N/A |
| Remote HMI C | Remote(IP:210.68.117.224, Po... | MT8xxx | N/A | N/A | N/A |
| MITSUBISHI FX0n (Local) | Local | MITSUBISHI FX... | 0 | RS... | COM |
| FATEK (Local) | Local | FATEK FB Series | 1 | RS... | COM |
| MITSUBISHI FX3u | Remote(IP:210.68.117.224, Po... | MITSUBISHI FX... | 0 | RS... | COM |
| FATEK FB Series | Remote(IP:210.68.117.224, Po... | FATEK FB Series | 1 | RS... | COM |

strDeviceType Format

AAA_BBB

AAA is the register name in the PLC. Example: LB or LW,BBB means the format data (BINor BCD).

For example: if strDeviceType is LB_BIN, It means the register is LB and the format is BIN.

If use BIN format, "_BIN" can be ignored, Example: LW_BIN is equal toLW, they both mean the register is LW and the format is BIN.

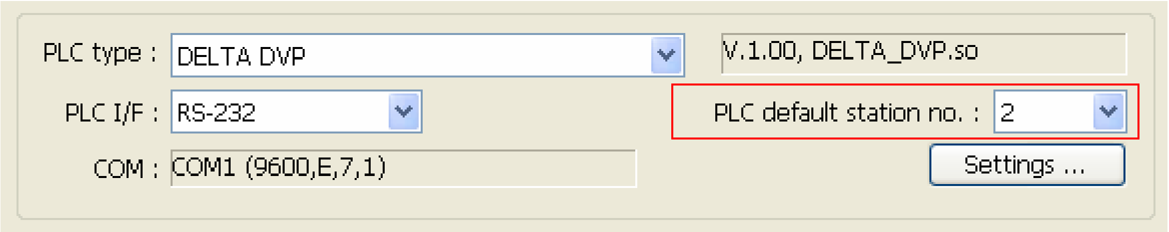
NAddress format

N#AAAAA

N means the station number of PLC, range is from 0 to 255. If use the default stationnumber in system parameter, 'N#' can be canceled, ; AAAAA is the address ofPLC register.

For example: if strAddress is 2#10, It means the station number of plc is 2,the 表 address of plc register is 10. So the function GetData(a, "DELTA DVP", M, 2#10, 1) means that read the data in the address M10 of "DELTA DVP" No.2 PLC.

If strAddress is, 'N#' is canceled, Now It will use the default station number of system parameter.See the following graph, now the default number is 2。



PLC type : DELTA DVP

V.1.00, DELTA_DVP.so

PLC I/F : RS-232

PLC default station no. : 2

COM : COM1 (9600,E,7,1)

For example :

```
bool a
bool b[30]
short c
short d[50]
int e
int f[10]
double g[10]

//   read the state of LB2,   and save in variable a
GetData(a, “Local HMI”, LB, 2, 1)

//   Read the total 30 states of LB0~LB29, and save in variables b[0]~b[29]
GetData(b[0], “Local HMI”, LB, 0, 30)

//   Read one word data from LW2,   and save in variable c
GetData(c, “Local HMI”, LW, 2, 1)

//   Read total 50 word datas from LW0~LW49, and save in variables d[0]~d[49].
GetData(d[0], “Local HMI”, LW, 0, 50)

//   Read one double word from LW6 ,and save in variable e
//   note：the type of e is int
GetData(e, “Local HMI”, LW, 6, 1)

//   read total 20 word data, and save in variables f[0]~f[9]
//   note：the type of f[10] is int
//   f[0] save the data of LW0~LW1,   f[1] save the data of LW2~LW3,   the rest may
be deduced by analogy, GetData (f[0], “Local HMI”, LW, 0, 10)

//   read one float data from LW2, size is double word,   and save in the variable f
```

```
GetData(f, “Local HMI”, LW, 2, 1)
```

2. SetData ( Supported data types: DestData,

```
                  char*      szPLCName,
                  char*      szDeviceType,
                  int        nAddress,
                  int        nDataCount)
```

Description

Send data to PLC,data can be inputted by filling a dialog.

Parameters：

| | |
|---|---|
| DestData | The address of data to set |
| szPLCName | PLC Name |
| szDeviceType | PLCtype and encoding method of PLC address |
| nAddress | The address of PLC |
| nDataCount | Number of data |

Return value

None

For example :

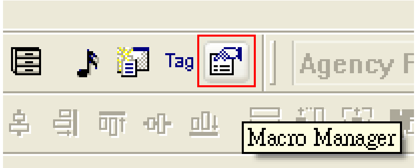
```
int i
bool a = True
bool b[30]
short c = False
short d[50]
int e = 5
int f[10]

for i = 0 to 29
b[i] = true
next i

for i = 0 to 49
d[i] = i * 2
next i
```

```
for i = 0 to 9
f[i] = i * 3
next i

//      set the state of LB2
SetData(a, “Local HMI”, LB, 2, 1)

//    set states of LB0~ LB29
SetData(b[0], “Local HMI”, LB, 0, 30)

//    set the data of LW2
SetData(c, “Local HMI”, LW, 2, 1)

//    set datas of LW0~LW49
SetData(d[0], “Local HMI”, LW, 0, 50)

//    set the data of LW6~LW7
//    note：the type of e is int
SetData(e, “Local HMI”, LW, 6, 1)

//    set datas of LW0~LW19
SetData(f[0], “Local HMI”, LW, 0, 10)
```

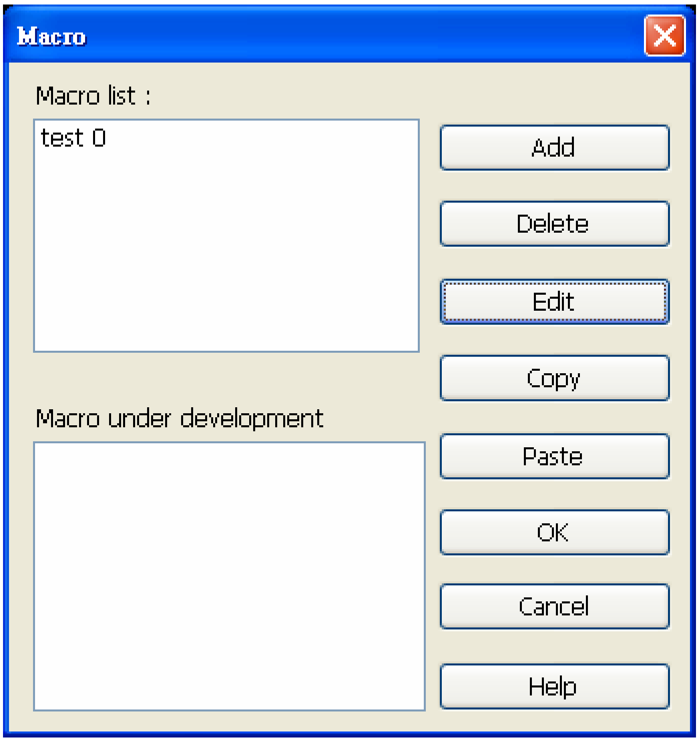
- Macro operation manual

1. Macro programming can be divided into three steps:

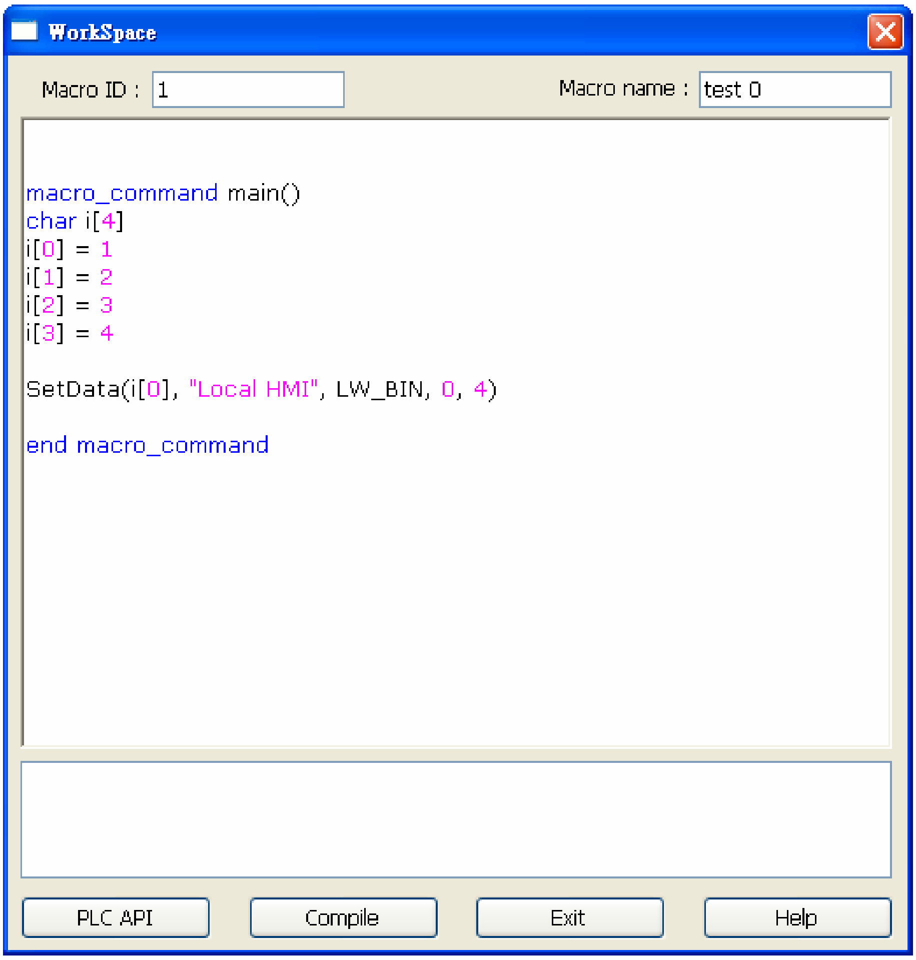
Step 1：click the first icon in the Macro tool box of EasyBuilder 8000



Step 2： Each Macro can be copied, deleted or edited in MacroControlDlg dialog. The source code of Macro can be edited by opening MacroWorkSpaceDlg dialog.



Step 3: Editing the source code of the Macro. Make sure the name and number of the Macro are correct. Compile the Macro and fix the error message.



Macro ID : 1

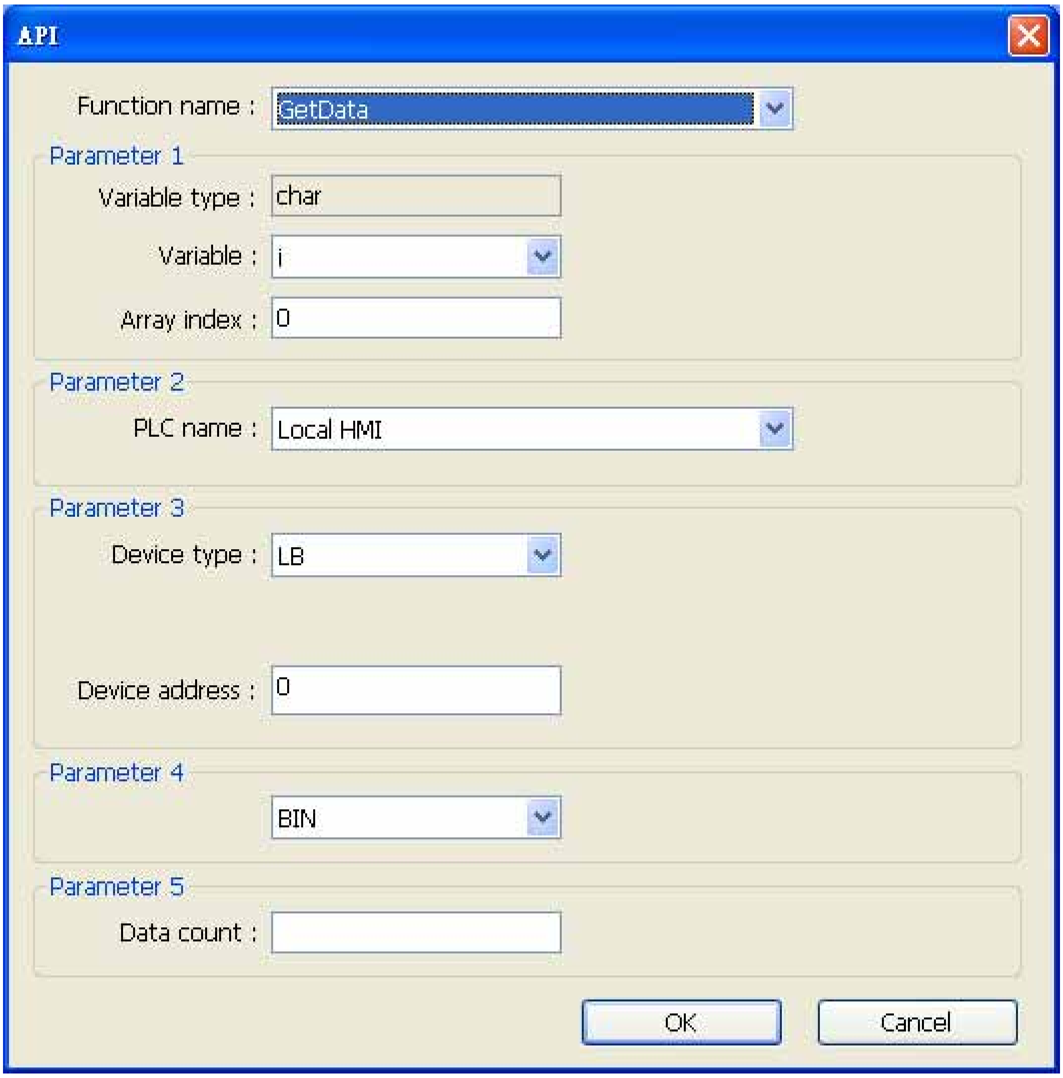
Macro name : test 0

```
macro_command main()
char i[4]
i[0] = 1
i[1] = 2
i[2] = 3
i[3] = 4

SetData(i[0], "Local HMI", LW_BIN, 0, 4)

end macro_command
```

2. Editing the communication source code of Macro:

a. Input

Step 1： Enter the keyword “Insert” in the proper position. Or by moving the cursor to the proper position and push [PLC API] button. There will appear a dialogue.



Function name : GetData

Parameter 1

Variable type : char

Variable : i

Array index : 0

Parameter 2

PLC name : Local HMI

Parameter 3

Device type : LB

Device address : 0

Parameter 4

BIN

Parameter 5

Data count :

Step 2：Select functions and parameters of the library in Library Editing Dialog. Push button “OK” to enter this sub-function; push button “Cancel” to abort this sub-function.

b. Edit

Move the cursor onto the modifying position to modify it. Follow the detail Step2 of Input.

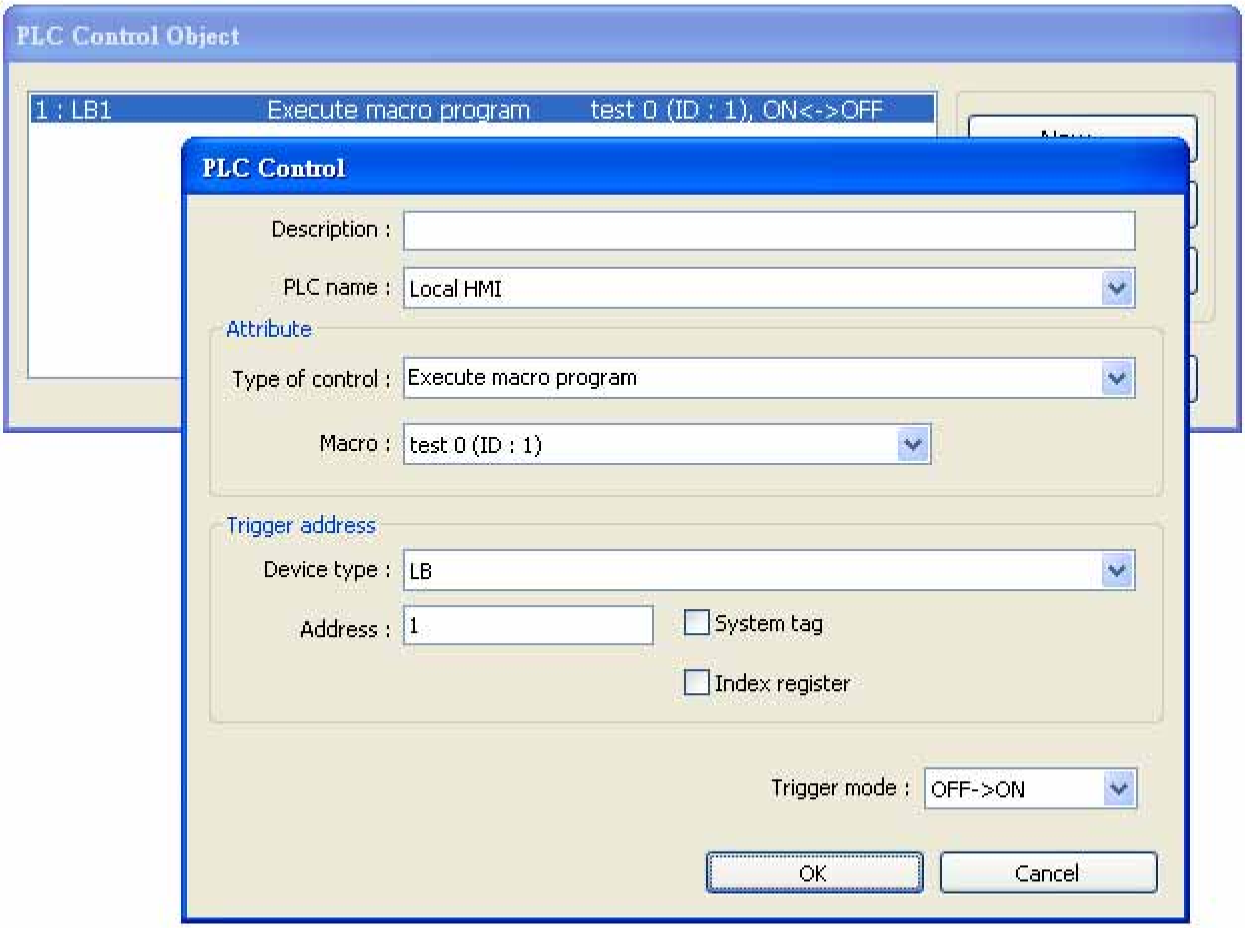
c. Delete

Highlight the selected function and push the button “Delete” to delete it.

3. Trigger condition of Macro

The objects of Set Bit, Toggle Switch, Function Key and PLC Control can use Macro, The following text will show how to trigger macro by use PLC Control object.

Step 1： Select control type to “Execute Macro Program” in the object property dialog of PlcControl.



PLC Control Object

1 : LB1 Execute macro program test 0 (ID : 1), ON<->OFF

PLC Control

Description :

PLC name : Local HMI

Attribute

Type of control : Execute macro program

Macro : test 0 (ID : 1)

Trigger address

Device type : LB

Address : 1

□ System tag

□ Index register

Trigger mode : OFF->ON

Step 2：Select a Macro name and define a trigger condition in the object property dialog PlcControl(Now it is LB1).

- Some notes about using Macro

1. Limitation of storage space of Macro

   The size of a Macro in a eob file is limited by the storage capacity. The maximum

   storage space of local variables in a Macro is 4K bytes. So the define range of different variable types are limited as following:

   ```
   char  a[4096]
   bool  b[4096]
   short c[2048]
   int   d[1024]
   float e[1024]
   ```

2. Limitation of maximum lines of Macro to execute

   There are at most 255 Macros in a eob file.

3. Macro may possibly cause deadlock of the machine.

   When there is a infinite loop in a Macro without communicating with PLC

   When the size of array exceeds the storage space in a Macro.

4. The Limitation of communication speed of Macro

   The execution of Macro may be a little slow down when communicating with PLC.

   This is caused by the data transferring time. Avoid too many complicated action in

   the Macro.

- Compiler error message

1. Error message format:

error C# : error description

# is the error number.

Example: error C37 : undeclared identifier : i

When there are compile errors, the error description can be referenced by the

compile error message number.

2：Error description

(C1) syntax error：’identifier’

There are many possibilities to cause compiler error.

For example :

```
macro_command main()
char i, 123xyz    //this is an unsupported variable name ,”Error message: “Syntax error: 123xyz”
end macro_command
```

(C2) ‘identifier’ used without having been initialized

Macro just support static array, must define the size of an array during declaration.

For example：

```
macro_command main()
char i
int g[i]        //    i used without having been initialized
end macro_command
```

(C3) redefinition error : ‘identifier’

The name of variable and function within its scope must be unique.

For example：

```
macro_command main()
int g[10],   g      //error
end macro_command
```

(C4) function name error : ‘identifier’

reserved keywords and constant can not be the name of a function

For example：

```
sub int if()      // error
```

(C5) parentheses have not come in pairs

Statement missing “(“ or “)”

For example：

```
macro_command main    )//    missing C
```

(C6) illegal expression without matching ‘if’

Missing expression in If statement

(C7) illegal expression (no ‘then’) without matching ‘if’

Missing “Then” in If statement

(C8) illegal expression (no ‘end if’)

Missing “EndIf”

(C9) illegal ‘end if’ without matching ‘if’

Unfinished “If’ statement before “End If”

(C10) illegal ‘else’

The format of “If” statement is:

If [logic expression]Then

[ Else [If [logic expression] Then ] ]

EndIf

Any format other than this format will cause compile error.

(C11) ‘case’ expression not constant
There should be constant behind “Case”

(C12) ‘select’ statement contains no ‘case’
Missing “Case” behind “Select”

(C13) illegal expression without matching ‘select case’
Missing “expression” behind “Select Case”

(C14) ‘select’ statement contains no ‘end select’
"Missing “End Select” statement

(C15) illegal ‘case’
Illegal “Case” statement"

(C16) illegal expression (no 'select') without matching ‘end select’
The format of “Select Case” statement is:
Select Case [expression]
Case [constant]

Case [constant]

Case [constant]

Case Else

End Select

Any format other than this format will cause compile error.

(C17) illegal expression (no 'for') without matching ‘next’
“For” statement error: missing “For” before “Next”

(C18) illegal variable type (not interger or char)

Should be integer of char variable

(C19) variable type error

Missing assign statement

(C20) must be key word ‘to’ or ‘down’

Missing keyword “to” or “down”

(C21) illegal expression (no 'next')

The format of “For” statement is:

For [variable] = [initial value] To [end value] [Step]

Next [variable]

Any format other than this format will cause compile error.

(C22) ‘wend’ statement contains no ‘while’

“While” statement error: missing “While” before “Wend”

(C23) illegal expression without matching ‘wend’

The format of “While” statement is:

While [logic expression]

Wend

Any format other than this format will cause compile error.

(C24) syntax error : ‘break’

“Break” statement can only be used in “For”, “While”, or “Select Case” statement

“Break” statement takes one line of Macro.

(C25) syntax error : ‘continue’

“Continue” statement can only be used in “For” statement, or “While” statement

“Continue” statement takes one line of Macro.

(C26) syntax error

expression is error.

(C27) syntax error

The mismatch of operation object in expression cause compile error.

For example：

```
macro_command main( )
int a, b

for a = 0 to 2
        b = 4 + xyz //illegal operation object
next a
end macro_command
```

(C28) must be ‘macro_command’

There must be ’macro_command’

(C29) must be key word ‘Sub’

The format of function declaration is:

```
sub [data type] function_name(…)
………..
end sub
```

For example::

```
sub int pow(int exp)
…….
end sub
```

Any format other than this format will cause compile error.

(C30) number of parameters is incorrect

Mismatch of the number of parameters

(C31) parameter type is incorrect
Mismatch of data type of parameter

(C32) variable is incorrect
The parameters of a function must be equivalent to the arguments passing to a function to avoid compile error.

(C33) function name : undeclared function
Undefined function

(C34) expected constant expression
Illegal member of array

(C35) invalid array declaration
Illegal definition of array

(C36) array index error
Illegal index of array

(C37) undeclared identifier : i ‘identifier’
Any variable or function should be declared before use.

(C38) PLC encoding method is not supported
The parameter of GetData( … ) , SetData( … ) should be legal PLC address.

(C39) ‘idenifier’ must be integer, char or constant
The format of array is:
Declaration: array_name[constant] (constant is the size of the array)
Usage: array_name[integer, character or constant]
Any format other than this format will cause compile error.

(C40) execution syntax should not exist before variable declaration or constant definition

For example :

```
Macro_Command main(  )
int a, b
```

```
For a = 0 To 2
    b = 4 + a
int h , k
//declaration statement position error//
Next a
End Macro_Command
```

(C41) float variables cannot be contained in shift calculation
Floating point can not bitwise shift

(C42) function must return a value
Missing function return value

(C43) function should not return a value
Function can not return a value

(C44) float variables cannot be contained in calculation
Illegal Float data type in expression

(C45) PLC address error
Error PLC address

(C46) array size overflow (max. 4k)
Stack can not exceed 4k bytes

(C47) macro command entry function is not only one
Only one main entrance in the Macro is allowed

(C48) macro command entry function must be only one

The only one main entrance of Macro is:

```
Macro_Command function_name( )

End Macro_Command
```

(C49) a extended addresse's station no. must be between 0 and 255

For example:

SetData(bits[0] , “PLC 1”, LB , 300#123, 100)
300#123 中的 300 means the station no is 300，but the maximum is 255

(C50) a invalid PLC name

PLC name is not included in the Device List of system paramter
For example:

SetData(bits[0] , “PLC 1”, LB , 300#123, 100)

There is no “PLC 1” in Device List.

(C51) macro command do not control a remote device

Macro just can control local machine
For example

SetData(bits[0] , “PLC 1”, LB , 300#123, 100)

“PLC 1“ is connected with the remote device ,so it is can not work.

- Example source code

1:”For” statement and other expressions (arithmetic, bitwise shift, logic and comparison)

```
macro_command main()
int a[10], b[10], i

b[0]= (400 + 400 << 2) / 401
b[1]= 22 *2 - 30 % 7
b[2]= 111 >> 2
b[3]= 403 > 9 + 3 >= 9 + 3 < 4 + 3 <= 8 + 8 == 8
b[4]= not 8 + 1 and 2 + 1 or 0 + 1 xor 2
b[5]= 405 and 3 and not 0
b[6]= 8 & 4 + 4 & 4 + 8 | 4 + 8 ^ 4
b[7]= 6 – (~4)
b[8]= 0x11
b[9]= 409

for i = 0 to 4 step 1
    if (a[0] == 400) then
        GetData(a[0],”Device 1”, 3x, 0,9)
        GetData(b[0],”Device 1”, 3x, 11,10)
end If
next i
end macro_command
```

2.while, if, break

```
macro_command main()
int b[10], i
i = 5
while i == 5 - 20 % 3
        GetData(b[1], ”Device 1”, 3x, 11, 1)

        if b[1] == 100 then
            break
        end if
```

```
wend
end macro_command
```

3:Global variables and function call

```
char g

sub int fun(int j, int k)
int y

SetData(j, “Local HMI”, LB, 14, 1)
GetData(y, “Local HMI”, LB, 15, 1)
g = y

return y
end Sub

macro_command main()
int a, b, i

a = 2
b = 3
i = fun(a, b)
SetData(i, “Local HMI”, LB, 16, 1)
end macro_command
```

4. ”If” statement

```
macro_command main()
int k[10], j

for j = 0 to 10
    k[j] = j
next j

if k[0] == 0 then
    SetData(k[1], “Device 1”, 3x, 0, 1)
end if
```

```
if k[0] == 0 then
    SetData(k[1], “Device 1”, 3x, 0, 1)
else
        SetData(k[2], “Device 1”, 3x, 0, 1)
end if

if k[0] == 0 then
    SetData(k[1], “Device 1”, 3x, 1, 1)
else if k[2] == 1 then
    SetData(k[3], “Device 1”, 3x, 2, 1)
end If

if k[0] == 0 then
    SetData(k[1], “Device 1”, 3x, 3, 1)
else if k[2] == 2 then
    SetData(k[3], “Device 1”, 3x, 4, 1)
else
    SetData(k[4], 3x_BIN, 5, 1)
end If
end macro_command
```

5. while statement

```
macro_command main()
char i = 0
int a[13], b[14], c = 4848

b[0] = 13

while b[0]
    a[i] = 20 + i * 10

    if a[i] == 120 then
        c =200
        break
    end if
```

```
        i = i + 1
    wend

    SetData(c, “Device 1”, 3x, 2, 1)
    end macro_command
```

6. break、continue statement

```
    macro_command main()
    char i = 0
    int a[13], b[14], c = 4848

    b[0] = 13

    while b[0]
        a[i] = 20 + i * 10

        if a[i] == 120 then
            c =200
            i = i + 1
            continue
        end if

        i = i + 1

        if c == 200 then
            SetData(c, “Device 1”, 3x, 2, 1)
        break
        end if
    wend
    end macro_command
```

7. array statement

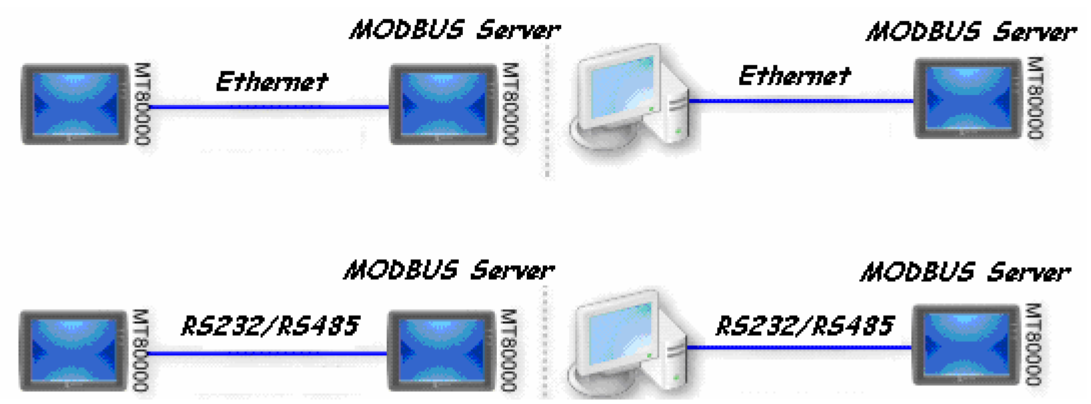
```
    macro_command main()
    int a[25], b[25], i

    b[0] = 13
```

```
for i = 0 to b[0] step 1
        a[i] = 20 + i * 10
next i

SetData(a[0], “Device 1”, 3x, 0, 13)
end macro_command
```

# Chapter 19 Exemplification

## 19.1 How to set HMI to MODBUS device

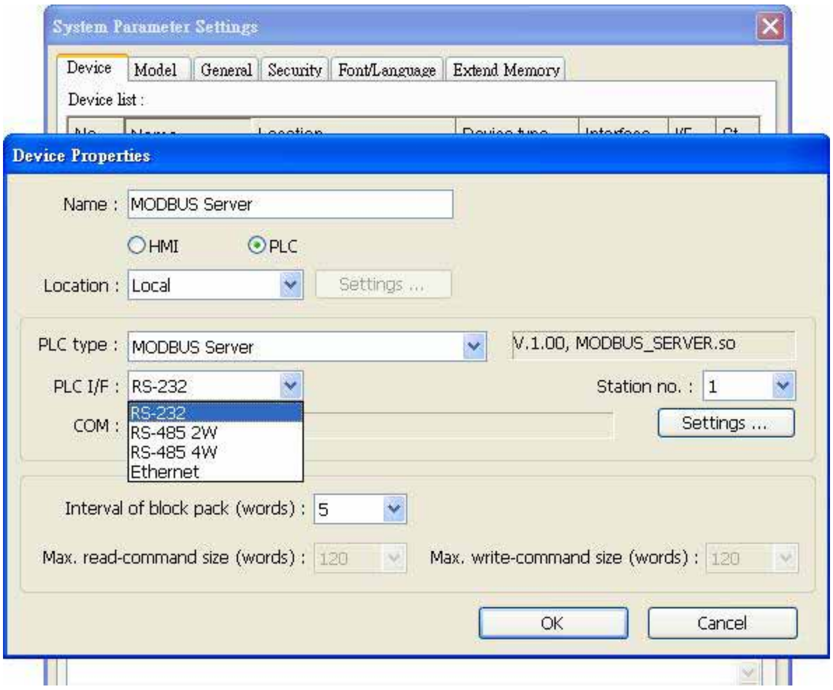
After setting HMI to MODBUS Server, the data of MT8000 can be read or write from MODBUS protocol.



Refer to above illustrated, its shows MT8000 has been set to MODBUS Server, HMI, PC or other device use MODBUS protocol, by Ethernet or RS232/485 interface, could read or write the data from MT8000. Please follow steps as below.

1. Creating a MODBUS Server

First of all, in the device table to create a new device and this PLC type should be chosen to “MODBUS Server”, PLC I/F can be set to RS232, RS485 2W, RS485 4W or Ethernet.



Name : MODBUS Server

○ HMI ● PLC

Location : Local

PLC type : MODBUS Server

V.1.00, MODBUS_SERVER.so

PLC I/F : RS-232

RS-232
RS-485 2W
RS-485 4W
Ethernet

Station no. : 1

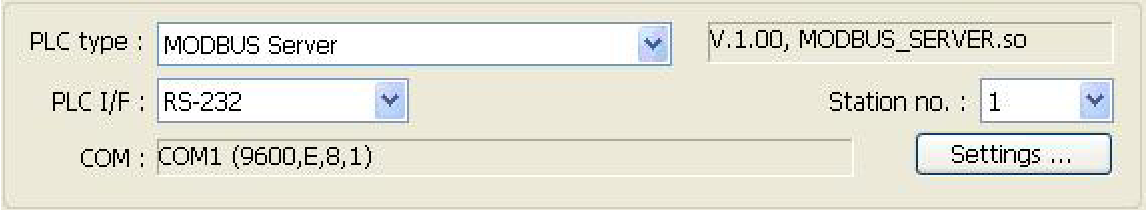
COM :

Interval of block pack (words) : 5

Max. read-command size (words) : 120

Max. write-command size (words) : 120

When PLC I/F has been set as RS232 or RS485, please select (COM 1 ~COM 3) for connecting and go to COM port setting to choose the baud rate, data bits parity and stop bits..



PLC type : MODBUS Server

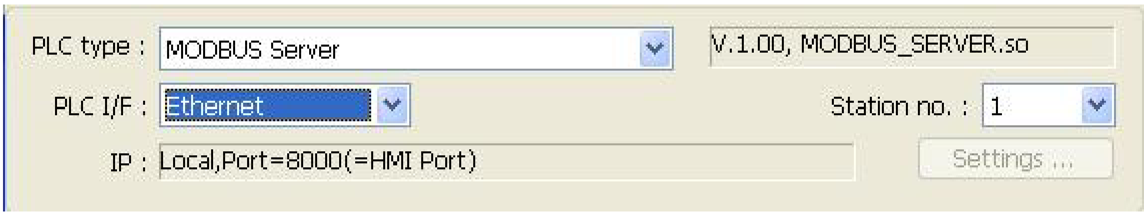
V.1.00, MODBUS_SERVER.so

PLC I/F : RS-232

Station no. : 1

COM : COM1 (9600,E,8,1)

When PLC I/F has been set as Ethernet, the IP is the same as HMI.



PLC type : MODBUS Server

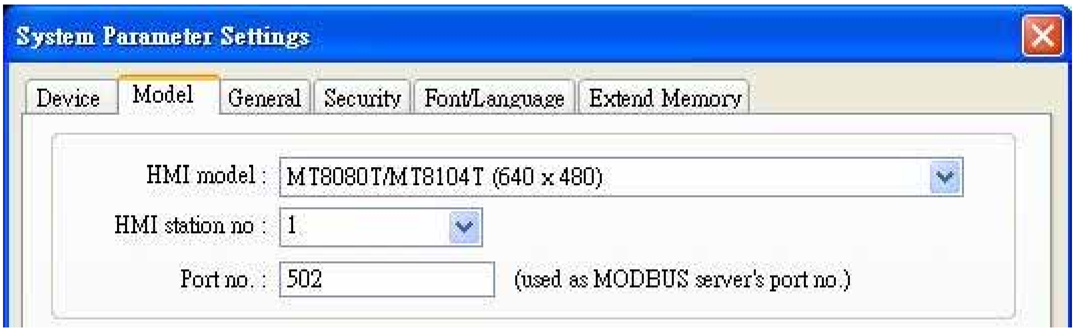
V.1.00, MODBUS_SERVER.so

PLC I/F : Ethernet

Station no. : 1

IP : Local,Port=8000(=HMI Port)

Because MODBUS Server and HMI use the same IP, please change the MODBUS Server IP setting in “Model”.



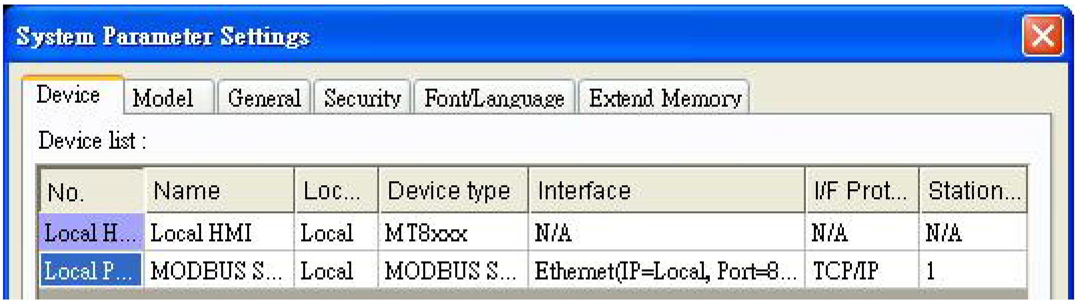
System Parameter Settings

HMI model : MT8080T/MT8104T (640 x 480)

HMI station no : 1

Port no. : 502 (used as MODBUS server's port no.)

After finishing the setting, MODBUS Server will be show up on the Device list. Reading or writing the data from MODBUS Server could be used after downloading the file of XOB to HMI.



System Parameter Settings

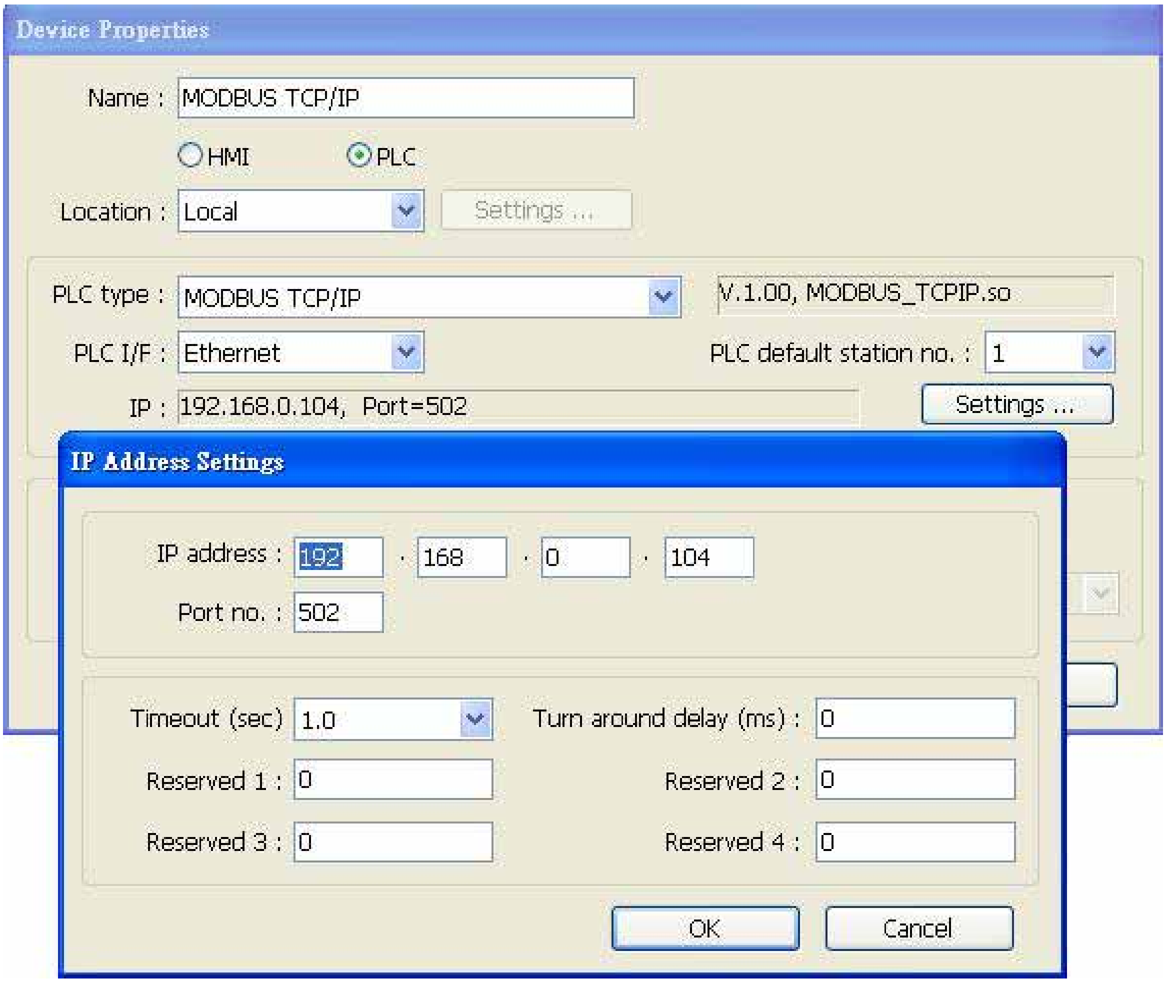
Device list :

| No. | Name | Loc... | Device type | Interface | I/F Prot... | Station... |
|---|---|---|---|---|---|---|
| Local H... | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Local P... | MODBUS S... | Local | MODBUS S... | Ethernet(IP=Local, Port=8... | TCP/IP | 1 |

2. How to reading or writing from MODBUS Server

MT8000 ( the client ) can reading or writing another MT8000 ( the server ) by MODBUS protocol.

First of all, adding a new device in the client of MTP of Model, if client’s IP I/F is been set as Ethernet, please set ”MODBUS RTU TCP/IP” as PLC type and fill in the correct IP and Port no..



Device Properties

Name : MODBUS TCP/IP

○ HMI ● PLC

Location : Local

PLC type : MODBUS TCP/IP

V.1.00, MODBUS_TCPIP.so

PLC I/F : Ethernet

PLC default station no. : 1

IP : 192.168.0.104, Port=502

IP Address Settings

IP address : 192 . 168 . 0 . 104

Port no. : 502

Timeout (sec) 1.0

Turn around delay (ms) : 0

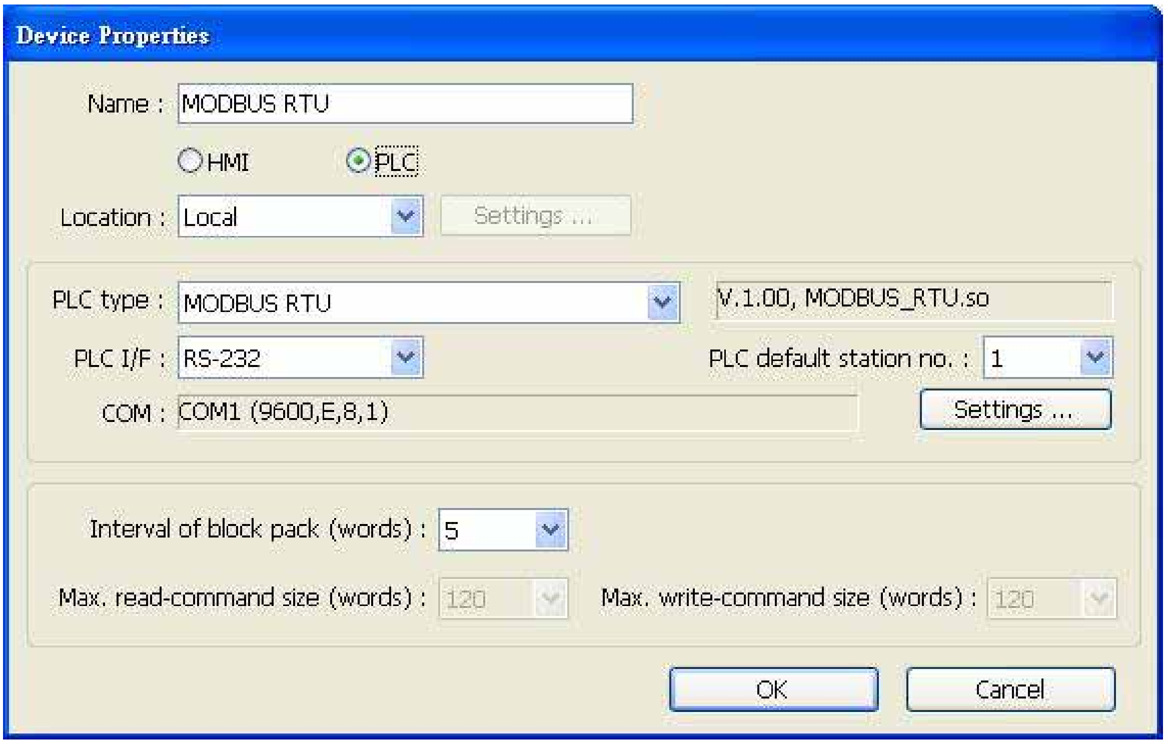
Reserved 1 : 0

Reserved 2 : 0

Reserved 3 : 0

Reserved 4 : 0

If client is using S232/485 interface, the PLC type should be set as ”MODBUS RTU”, please make sure the others setting is correct.



Device Properties

Name : MODBUS RTU

○ HMI ● PLC

Location : Local

PLC type : MODBUS RTU

V.1.00, MODBUS_RTU.so

PLC I/F : RS-232

PLC default station no. : 1

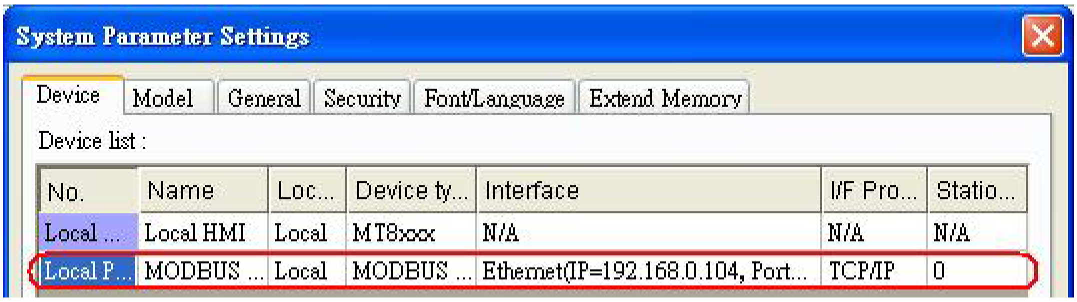
COM : COM1 (9600,E,8,1)

Interval of block pack (words) : 5

Max. read-command size (words) : 120

Max. write-command size (words) : 120

After setting and press OK, a new device ”MODBUS RTU” appeared in the device list.

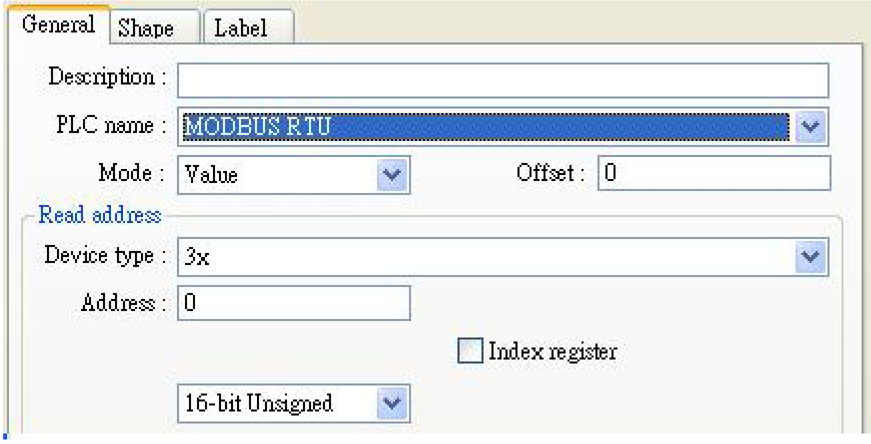


System Parameter Settings

Device list :

| No. | Name | Loc... | Device ty... | Interface | I/F Pro... | Statio... |
|---|---|---|---|---|---|---|
| Local ... | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Local P... | MODBUS ... | Local | MODBUS ... | Ethernet(IP=192.168.0.104, Port... | TCP/IP | 0 |

In the setting page of object, the PLC name has “MODBUS RTU”, Read address can be set for MODBUS device.



Description :

PLC name : MODBUS RTU

Mode : Value

Offset : 0

Read address

Device type : 3x

Address : 0

□ Index register

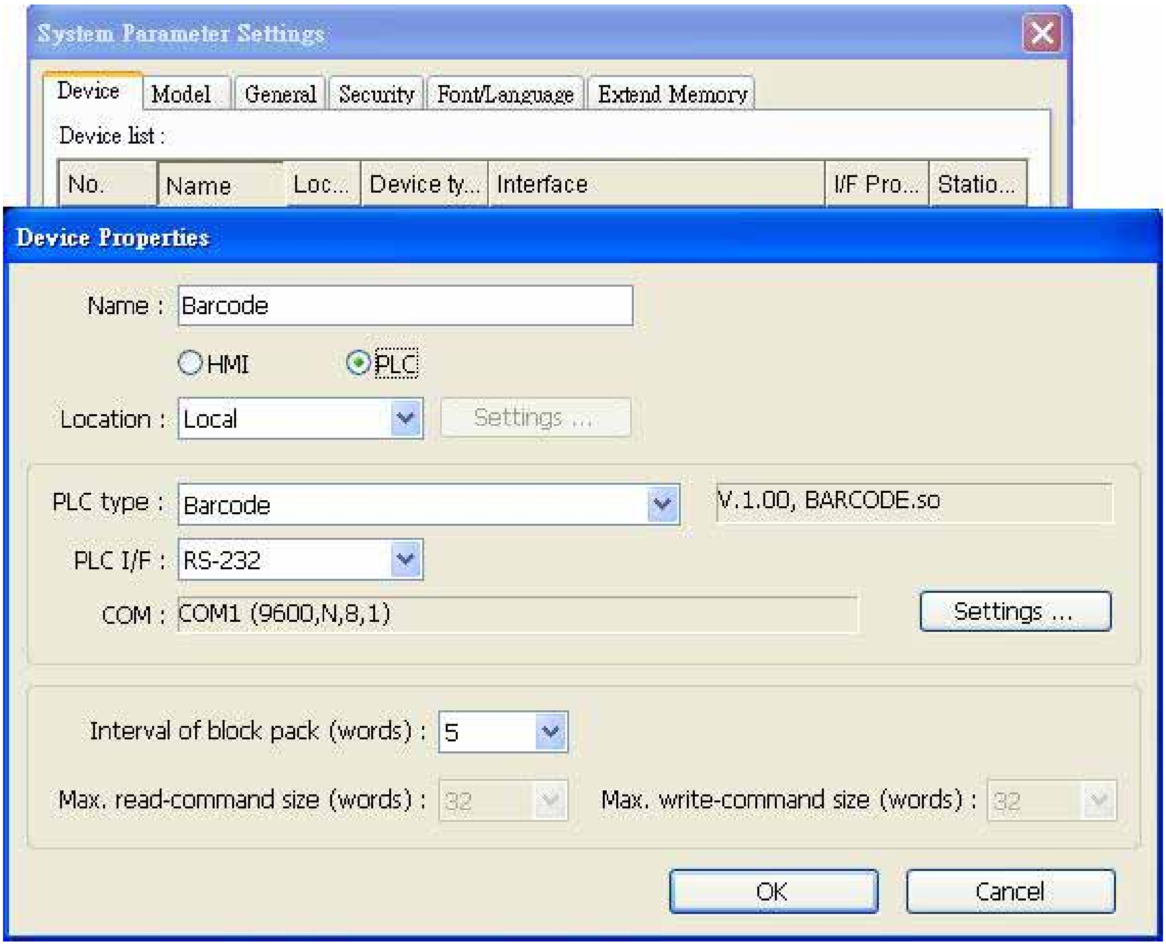
16-bit Unsigned

The server is MT8000, the reading and writing corresponding position as below：

| | | | |
|---|---|---|---|
| reading / writing | 0x/1x(1~9999) | to | reading / writing LB(0~9998) |
| reading / writing | 3x/4x/5x(1~9999) | to | reading / writing LW(0~9998) |

## 19.2 How to use Barcode

Please add a new Barcode in PLC type that can be read signal of barcode from MT8000：



Name : Barcode

○ HMI ● PLC

Location : Local

PLC type : Barcode

V.1.00, BARCODE.so

PLC I/F : RS-232

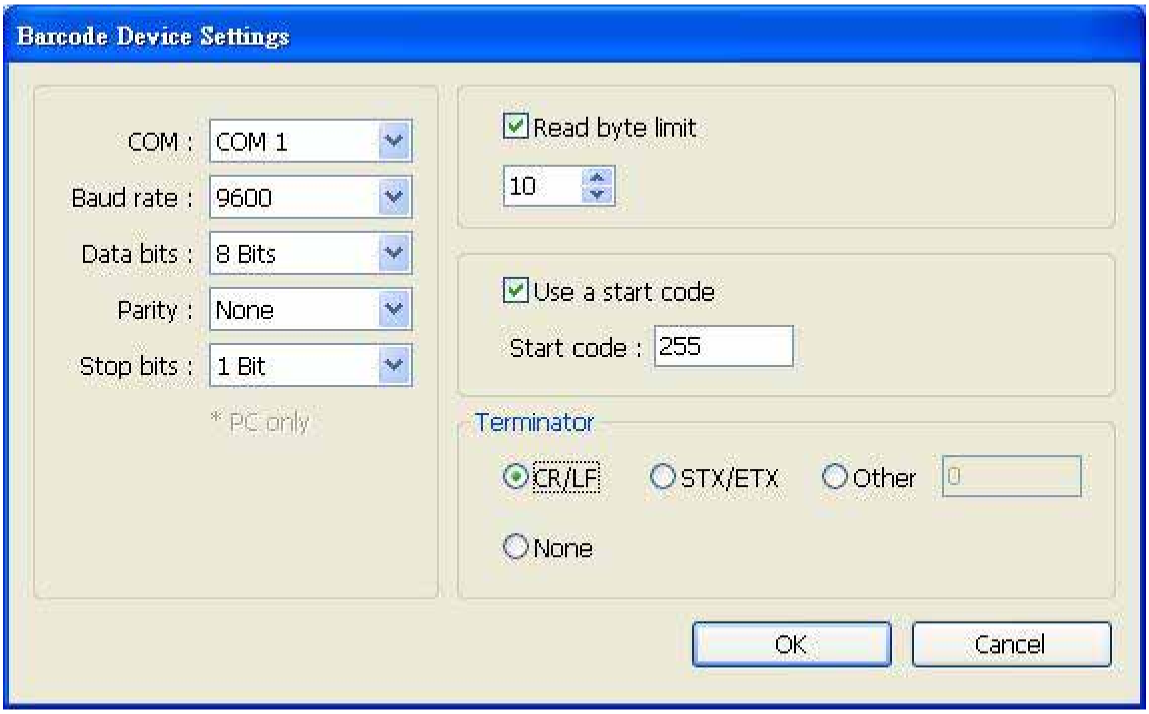
COM : COM1 (9600,N,8,1)

Interval of block pack (words) : 5

Max. read-command size (words) : 32

Max. write-command size (words) : 32

Pressing the icon of settings…, barcode device settings as below.



COM : COM 1

Baud rate : 9600

Data bits : 8 Bits

Parity : None

Stop bits : 1 Bit

* PC only

☑ Read byte limit

10

☑ Use a start code

Start code : 255

Terminator

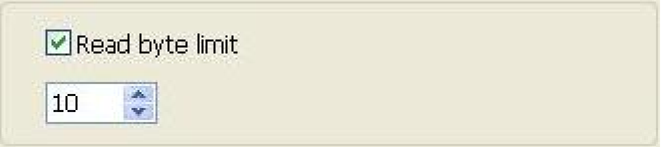
● CR/LF ○ STX/ETX ○ Other 0

○ None

Setting Barcode device data in [COM]、[Baud rate]、[Data bits]、[Parity]、 [Stop bits]

Barcode device should be connect to COM 1~ COM 3.

[Read byte limit]



☑ Read byte limit

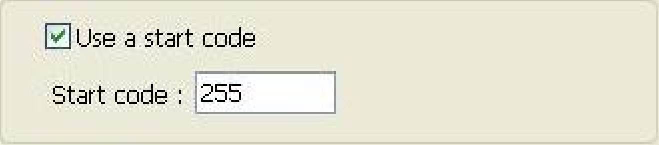
10

This function will limit the byte of reading, it can protect barcode device to read too many numbers.

For example:

If read byte limit is set to 10, if barcode device the original data are “0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37 0x30 0x38 0x33 0x38”, but we have limit it to read equal or less than 10 bytes, so the real data will be read are “0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37 0x30 0x38”

[Use a start code]



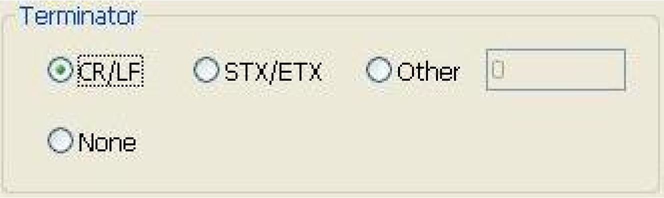
☑ Use a start code

Start code : 255

For this function, the first data of barcode device will be the same as start code (255), MT8000 will accept this data, otherwise MT8000 will ignore the data.

The start code won’t be saved in corresponding address, for example: if the start code is 255(0xff), and original data are “0xff 0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37” ,the real data in the barcode device will be “0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37”

[Terminator]



Terminator

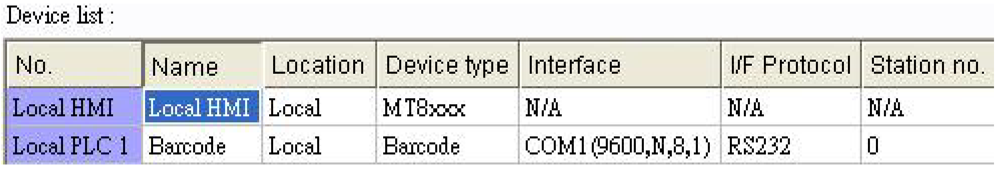
● CR/LF ○ STX/ETX ○ Other 0

○ None

Terminator means the end of data, when terminator has been read, that mean the data has been read completely.

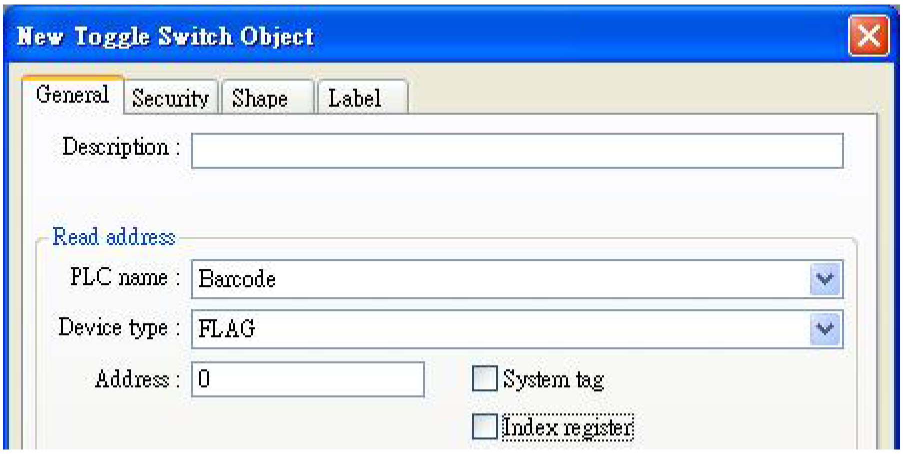
| | |
|---|---|
| [CR/LF] | 0x0a or 0x0d means end of data. |
| [STX/ETX] | 0x02 or 0x03 means end of data. |
| [Other] | User can set the terminator manually. |
| [None] | MT8000 will save all data to corresponding address of barcode device. |

After setting completely, a new barcode device will be in the device list.



Device list :

| No. | Name | Location | Device type | Interface | I/F Protocol | Station no. |
|---|---|---|---|---|---|---|
| Local HMI | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Local PLC 1 | Barcode | Local | Barcode | COM1(9600,N,8,1) | RS232 | 0 |



New Toggle Switch Object

Description :

Read address

PLC name : Barcode

Device type : FLAG

Address : 0

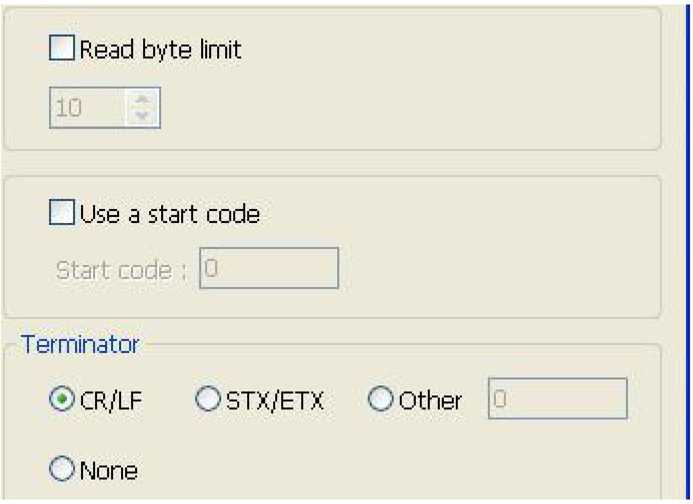
□ System tag

□ Index register

In the object setting page, the PLC name can be chosen “Barcode”. There are two type in the device type (Flag and Barcode).

| Device type | Address type | Description |
|---|---|---|
| FLAG | bit | FLAG 0 indicates the data that has reading already. When reading data completely, FLAG 0’s status will be changed from OFF to ON. |
| BARCODE | word | BARCODE 0 recording byte number.<br>BARCODE 1~n saving data of barcode device |

In case the setting of barcode device as below, and the data of barcode is ”9421007480830”
, numeric display object of device type is BARCODE 0, ASCII display object of device type is BARCODE 1。



☐ Read byte limit

10

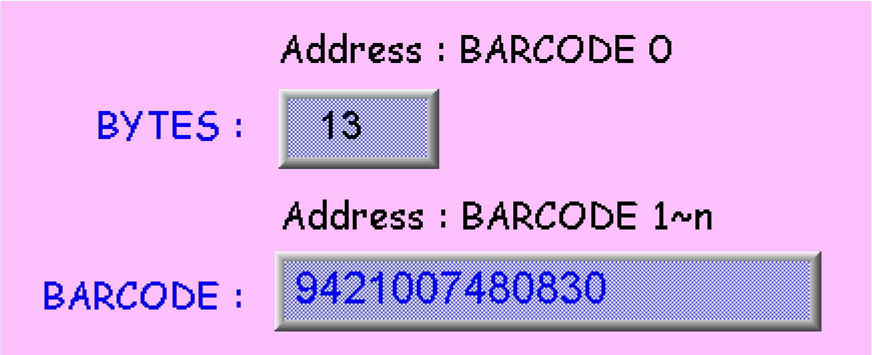
☐ Use a start code

Start code : 0

Terminator

● CR/LF ○ STX/ETX ○ Other 0

○ None



Address : BARCODE 0

BYTES : 13

Address : BARCODE 1~n

BARCODE : 9421007480830

The data of barcode device corresponding address as below:

| Barcode corresponding address | Data |
|---|---|
| BARCODE 0 | 13 bytes(decimal)<br>The real data in the address is 14 bytes = 7 words. If the data is odd, will add a byte (0x00) to become even. |
| BARCODE 1 | 3439HEX |
| BARCODE 2 | 3132HEX |
| BARCODE 3 | 3030HEX |
| BARCODE 4 | 3437HEX |
| BARCODE 5 | 3038HEX |
| BARCODE 6 | 3338HEX |

| | |
|---|---|
| BARCODE 7 | 0030HEX |
| BARCODE 8 | not used |

19.3 How to execute on line and off line simulation

User can execute on line or off line simulation by using batch file or coding program. No need to use EB8000 or Project Manager. User can find out com.exe and gui.exe in the
folder of EB8000 (C:\EB8000).

**1. [Command]**

Executing completely command in order.

[full_path + com.exe][space][“full_path + xob_name”][space][“work_path”][space][s]

[full_path + gui.exe][-f][“full_path + xob_name”][space][“work_path”]

**[Instructions]**

**[full_path + com.exe]**

Indicating com.exe’s position,
for example:
[full_path + com.exe] = c:\EB8000\com.exe

**[space]**

Insert a space

**[“full_path + xob_name”]**

Indicating .xob position and including quotation marks(“ “),
for example:
[“full_path + xob_name”] = “c:\EB8000\project\test.xob”

**[“work_path”]**

Indicating folder of EB8000 and including quotation marks,
for example:

[“work_path”] = “c:\EB8000”

**[s]**

**If using off line simulation, please add s in the end of commend.**

**[full_path + gui.exe]**

Indicating gui.exe's position,
for example:
[full_path + gui.exe] = c:\EB8000\gui.exe

2. **[Exemplification]**

In case folder of EB8000 is "c:\EB8000" and file of XOB saved in the "d:\design\test.xob", the contact of command as below.

a. **Off line simulation**

```
c:\EB8000\com.exe "c:\design\test.xob" "c:\EB8000" s
c:\EB8000\gui.exe -f"c:\design\test.xob" "c:\EB8000"
```

b. **On line simulation**

```
c:\EB8000\com.exe "c:\design\test.xob" "c:\EB8000"
c:\EB8000\gui.exe -f"c:\design\test.xob" "c:\EB8000"
```

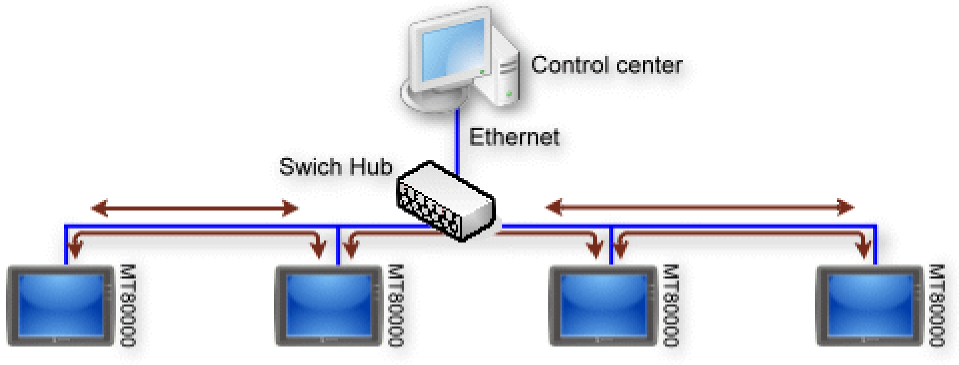
**** Don't miss any marks.**

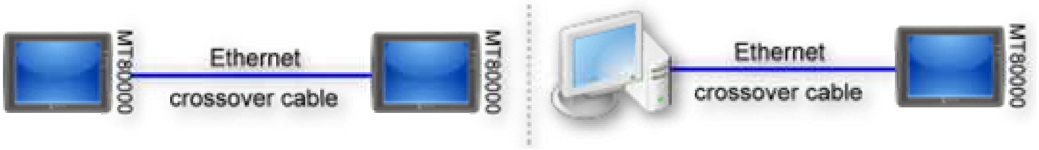
# Chapter 20 Ethernet Communication and Multi-HMIs Connection

By using the Ethernet network, the EB8000 provides following methods for data transmission:

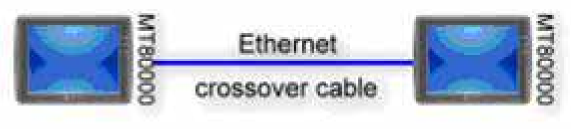
1. HMI to HMI communication.
2. PC to HMI communication.
3. Operating the PLC connected to other HMIs

There are two ways of the Ethernet communication; one way is to use RJ45 straight through cable with the use of a hub (hubs), and the other way is to use RJ45 crossover cable. In the second way there is no need to use hub(s), and it is limited to the condition of point to point connection (HMI to HMI, or PC to HMI). The following descriptions will show how to set up and perform the Ethernet connection in each way.





1. HMI to HMI Communication

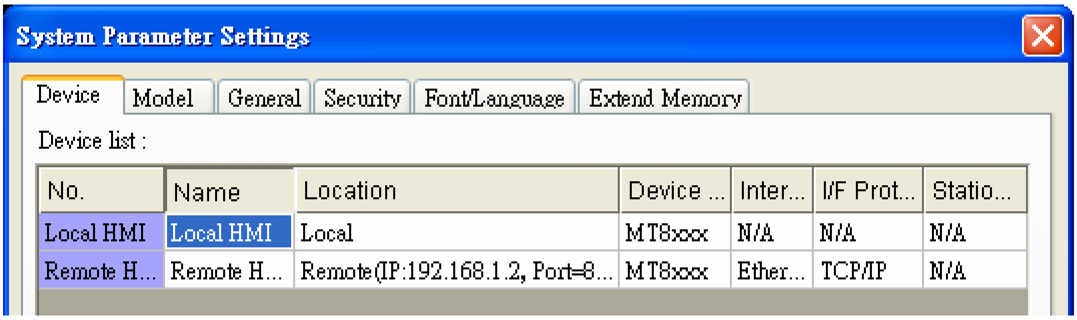


Different HMIs can monitor and control each other's data through the Ethernet network. By using the system reserved register (LB and LW), one HMI can master performance of other HMI(s). One HMI can handle requests from a maximum of 32 other HMIs simultaneously.

Here is an example of communicating two HMIs (HMI A and HMI B). When HMI A wants to use the set bit object to control the [LB123] node of HMI B, the procedure for setting the Project files (MTP) on HMI A is as follows:

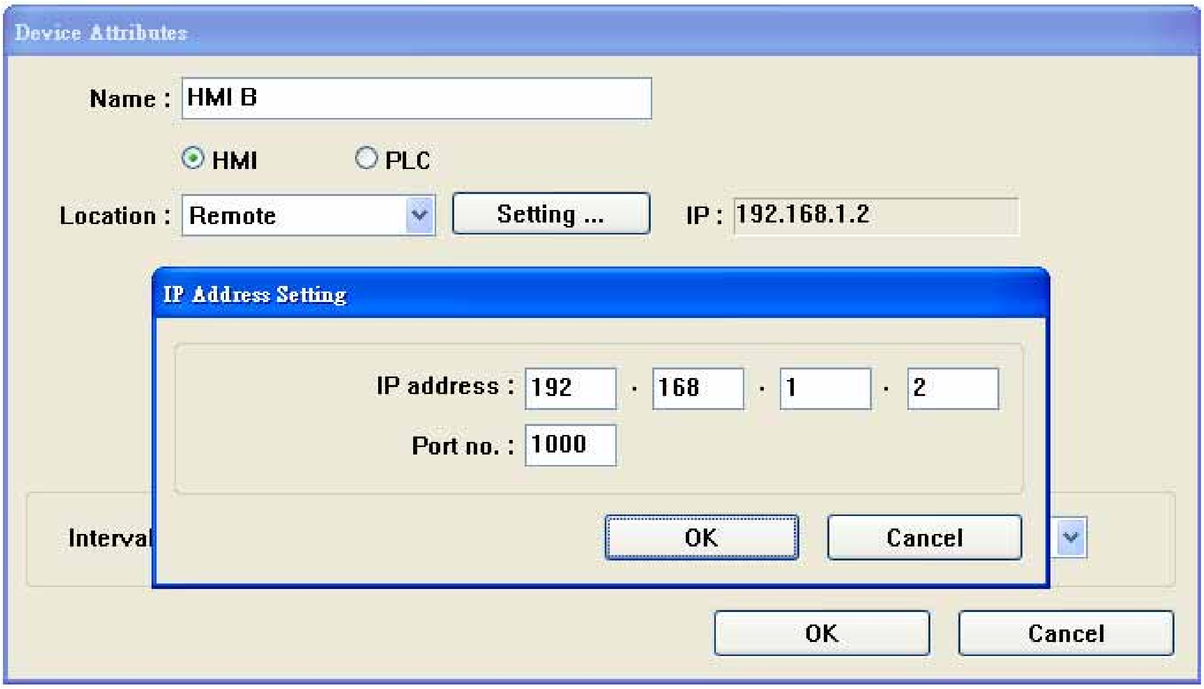
Step 1
Set the IP address of the two HMIs (Refer to the related chapter for the details). Suppose that the IP address of HMI A and HMI B are set for "192.168.1.1" and "192.168.1.2" respectively.

Step 2
Running the EB8000, and select the [Device Table] tab on the [System Parameter Setting] menu, then add the IP address and Port number of HMI B. (The picture below shows the content of HMI A's MTP projects.)



Device list :

| No. | Name | Location | Device ... | Inter... | I/F Prot... | Statio... |
|---|---|---|---|---|---|---|
| Local HMI | Local HMI | Local | MT8xxx | N/A | N/A | N/A |
| Remote H... | Remote H... | Remote(IP:192.168.1.2, Port=8... | MT8xxx | Ether... | TCP/IP | N/A |



Device Attributes

Name : HMI B

● HMI ○ PLC

Location : Remote

IP : 192.168.1.2

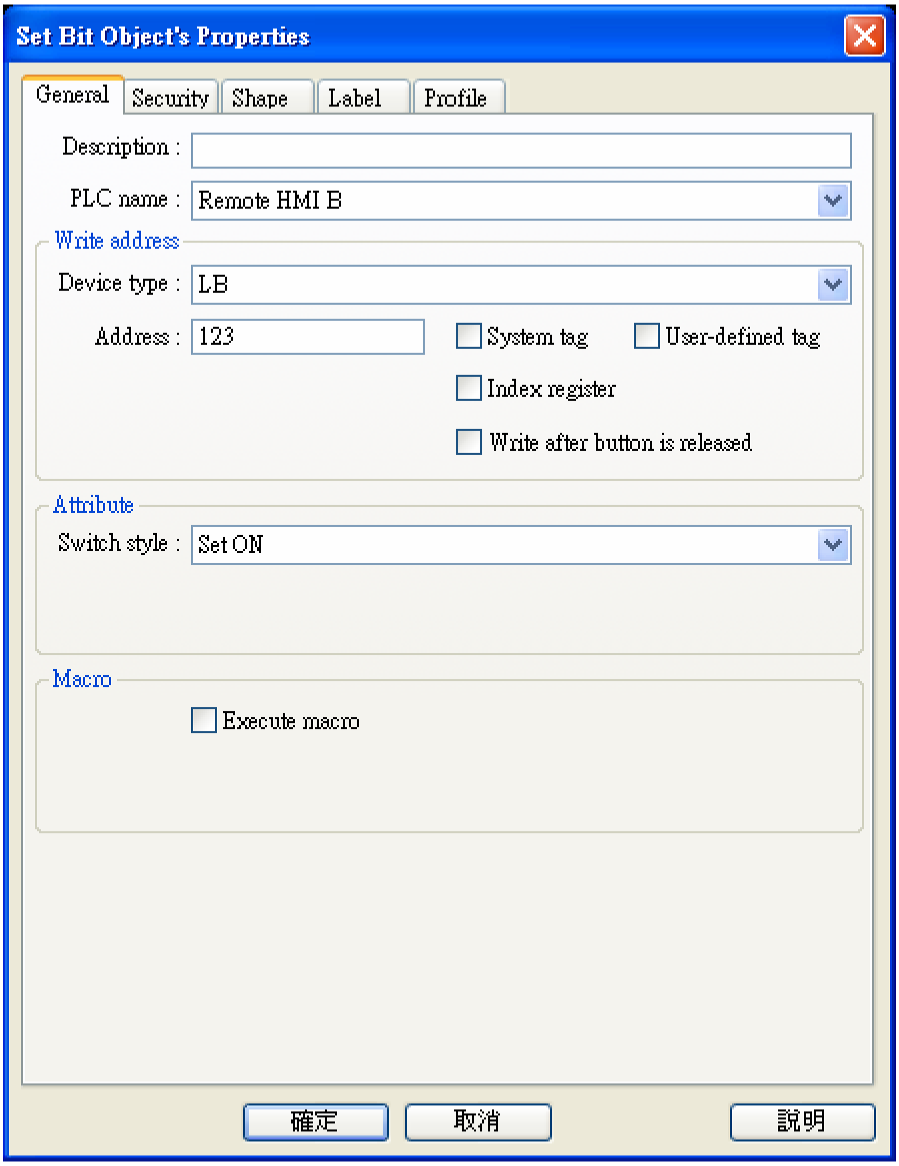
IP Address Setting

IP address : 192 . 168 . 1 . 2

Port no. : 1000

Step 3

Select “HMI B” for [PLC name] on the “Set Bit Object’s Attributes” menu, and now HMI A can operate the content of the LB of HMI B.



Description :

PLC name : Remote HMI B

Write address

Device type : LB

Address : 123

□ System tag □ User-defined tag

□ Index register

□ Write after button is released

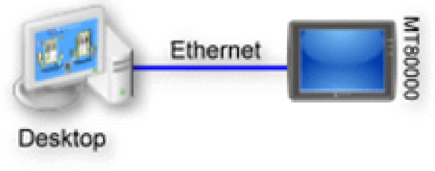
Attribute

Switch style : Set ON

Macro

□ Execute macro

2. PC to HMI Communication



By using the simulator Function of the EB8000, PC can catch HMI’s data through the Ethernet network and save the data as files on computer.

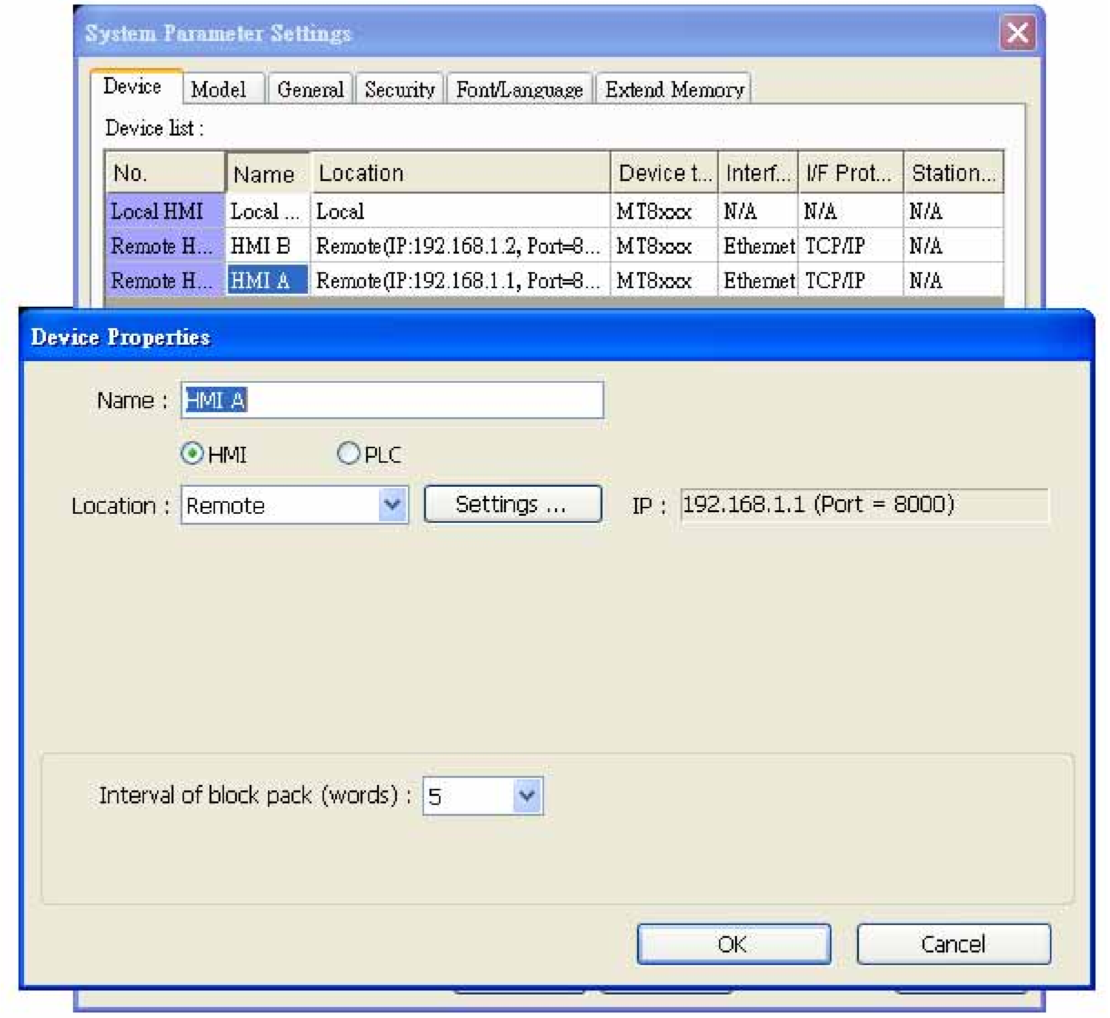
PC can master HMI by operating the system reserved register (LB and LW) of HMI. On the contrary, HMI can also directly control PC’s operation, for example, asking PC save data from HMI or PLC.

The number of HMIs mastered by PC is unlimited.

Suppose that PC is going to communicate with two HMIs (HMI A and HMI B), the procedure for setting PC’s MTP projects is as follows:

Step 1
Set the IP address of the two HMIs (Refer to the related chapter for the details). Suppose that the IP address of HMI A and HMI B are set for “192.168.1.1” and “192.168.1.2” respectively.

Step 2
Running the EB8000, and select the [Device Table] tab on the [System Parameter Setting] menu, then add the IP addresses and Port numbers of HMI A and HMI B.



Device list :

| No. | Name | Location | Device t... | Interf... | I/F Prot... | Station... |
|---|---|---|---|---|---|---|
| Local HMI | Local ... | Local | MT8xxx | N/A | N/A | N/A |
| Remote H... | HMI B | Remote(IP:192.168.1.2, Port=8... | MT8xxx | Ethernet | TCP/IP | N/A |
| Remote H... | HMI A | Remote(IP:192.168.1.1, Port=8... | MT8xxx | Ethernet | TCP/IP | N/A |

Name : HMI A

● HMI ○ PLC

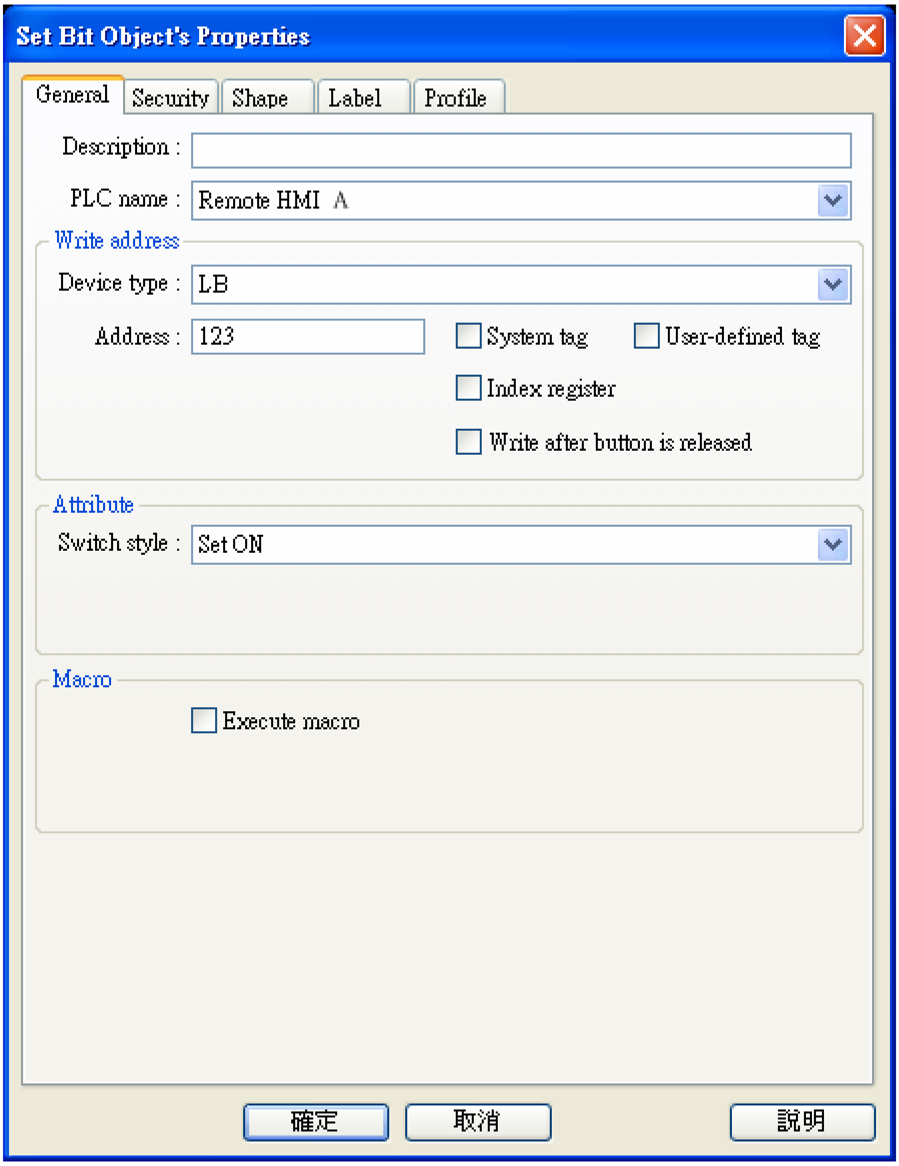
Location : Remote

IP : 192.168.1.1 (Port = 8000)

Interval of block pack (words) : 5

Step 3

Select correct PLC for [PLC name]. In the [General] tab on the [Set Bit Object's Attributes] menu, if you intend to control the LB of HMI A, you have to select "HMI A" for [PLC name]. See the picture below.



Set Bit Object's Properties

Description :

PLC name : Remote HMI A

Write address

Device type : LB

Address : 123

□ System tag □ User-defined tag

□ Index register

□ Write after button is released

Attribute

Switch style : Set ON

Macro

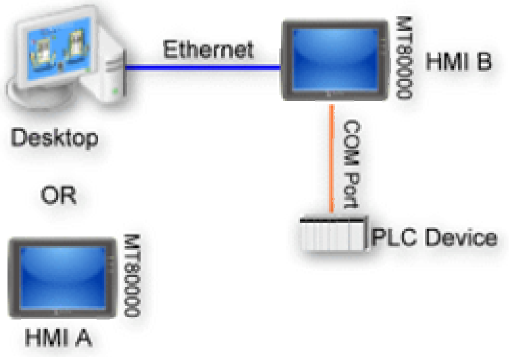
□ Execute macro

Step 4

Making use of HMI’s MTP projects on PC and performing the simulator function (either online mode or offline mode), and then all HMI’s data can be controlled by PC.

It is also available for HMI to control PC’s data. Just considering the PC another HMI to add it as a new HMI device to the MTP projects of HMI A or HMI B and set the IP address pointing to the PC.

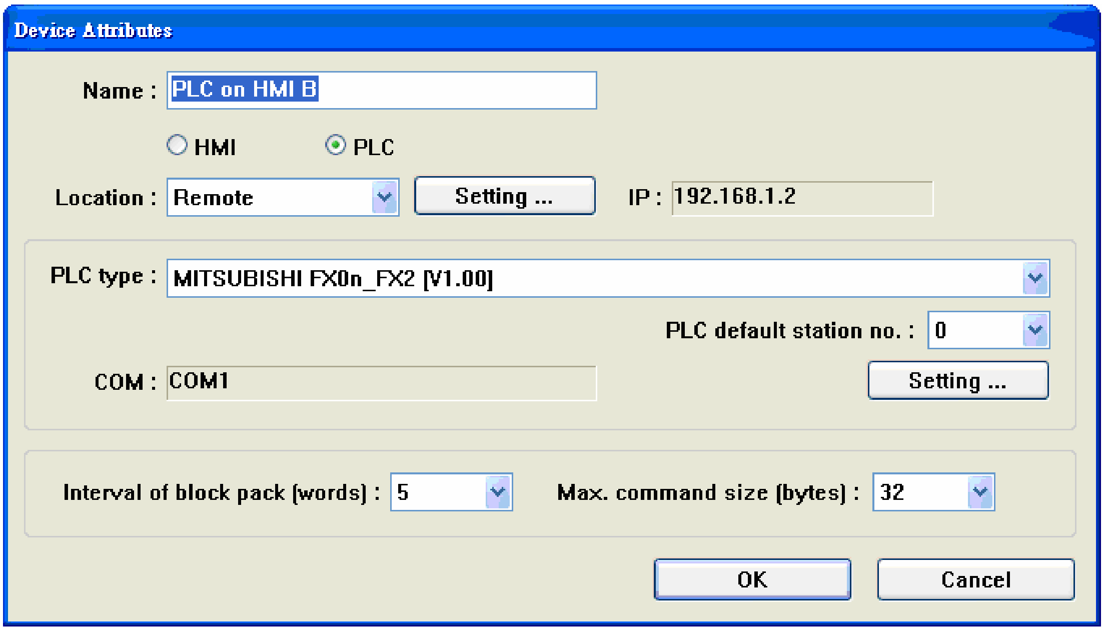
3. Operate the PLC connected with other HMIs.



Through the Ethernet network, PC and HMI can also operate PLC that is connected to other HMI; for example, suppose that there is a Mitsubishi PLC connected to HMI B's COM 1, when PC or HMI A wants to read data of the PLC, the procedure for setting PC or HMI A's MTP projects is as follows:

Step 1
Set the IP address of HMI B; suppose the IP address of HMI B is set for ”192.168.1.2”.

Step 2
Running the EB8000, and select the [Device Table] tab on the [System Parameter Setting] menu, then add a PLC device (defined as Mitsubishi FX0n_FX2 in the example below) and set the correct communication parameters.



Name : PLC on HMI B

○ HMI ● PLC

Location : Remote

IP : 192.168.1.2

PLC type : MITSUBISHI FX0n_FX2 [V1.00]

PLC default station no. : 0

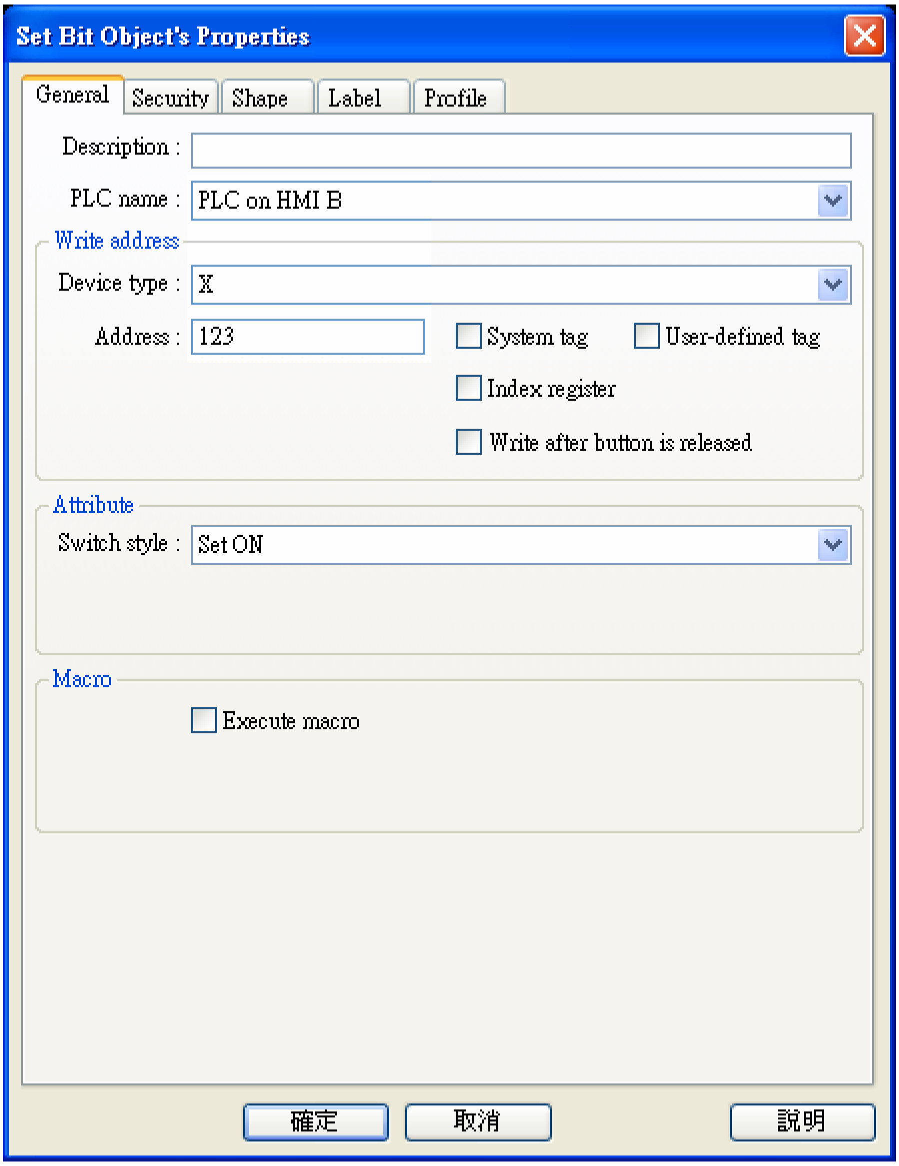
COM : COM1

Interval of block pack (words) : 5

Max. command size (bytes) : 32

Step 3

In the case of using the set bit object to operate the Mitsubishi PLC connected to HMI B, just need to select “PLC on HMI B” for [PLC name] on the [General] tab on the [Set Bit Object’s Attributes] menu, then it is able to operate the PLC connected to the remote HMI B on PC through the simulator function .



Set Bit Object's Properties

General | Security | Shape | Label | Profile

Description :

PLC name : PLC on HMI B

Write address

Device type : X

Address : 123

□ System tag □ User-defined tag

□ Index register

□ Write after button is released

Attribute

Switch style : Set ON

Macro

□ Execute macro

# Chapter 21 HMI State Controlling (System Reserved Register Addresses)

1. Normal States and Control

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-900n | n = 0~9<br>When the HMI starts up, the initial states of these bits will be set as ON. | R/W | Yes |
| LB-9017 | When the state is ON, it will disable the return function of [PLC Control] [Change Base Window]. | R/W | Yes |
| LW-9050 | File numbers of the base windows that are currently displaying on the machine. | R | Yes |
| LW-9100 ~ LW-9115 | File names of the MTP projects used by the machine. | R | Yes |
| LW-9116 ~ LW-9117 | Sizes of MTP projects (unit: byte). | R | Yes |
| LW-9118 ~ LW-9119 | Sizes of MTP projects (unit: K byte). | R | Yes |
| LW-9120 ~ LW-9121 | Version of complier that is used for MTP projects. | R | Yes |
| LW-9122 | Time (year) of MTP project being produced. | R | Yes |
| LW-9123 | Time (month) of MTP project being produced. | R | Yes |
| LW-9124 | Time (day) of MTP project being produced. | R | Yes |
| LW-9125 | The Ethernet IP0 used by the machine.<br>(The real addresses are IP0. IP1. IP2. IP3.) | R | Yes |
| LW-9126 | The Ethernet IP1 used by the machine. | R | Yes |
| LW-9127 | The Ethernet IP2 used by the machine. | R | Yes |
| LW-9128 | The Ethernet IP3 used by the machine. | R | Yes |
| LW-9129 | The Ethernet gateway 0 used by the machine.<br>(The real addresses are gateway 0. gateway 1. gateway 2. gateway 3.) | R | Yes |
| LW-9130 | The Ethernet gateway 1 used by the machine. | R | Yes |
| LW-9131 | The Ethernet gateway 2 used by the machine. | R | Yes |

| | | | |
|---|---|---|---|
| LW-9132 | The Ethernet gateway 3 used by the machine. | R | Yes |

2. States of Data Input

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LW-9002 ~ LW-9003 | Maximum value that is input by the currently used data inputting object.<br>The data format is 32-bit (float). | R | No |
| LW-9004 ~ LW-9005 | Minimum value that is input by the currently used data inputting object.<br>The data format is 32-bit (float). | R | No |
| LW-9150 ~ LW-9181 | Data that is input with the keypad, saved in the ASCII format and the length of data is 32 words. | R | No |
| LW-9540 | Reserved for the use of the Caps Lock key on the keypad. | R | No |

3. Recipe Data

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-9010 | ON when recipe data are being downloaded. | R | Yes |
| LB-9011 | ON when recipe data are being uploaded. | R | Yes |
| LB-9012 | ON when recipe data are being downloaded/uploaded. | R | Yes |
| LB-9028 | When ON message is sent to the register, all recipe data will be set for 0. | R | Yes |
| LB-9029 | The EB8000 will automatically save recipe data (RW or RWA) on the machine every 5 minutes.<br>When ON message is sent to the register, recipe data will be compulsorily saved on the machine. | R | Yes |

4. Task Button and Fast Selection Window

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-9013 | Disable Fast Selection Window when ON message is sent to the register.<br>Enable Fast Selection Window when OFF message is sent to the register. | W | No |
| LB-9014 | Disable Task Button when ON message is sent to the register.<br>Enable Task Button when OFF message is sent to the register. | W | No |
| LB-9015 | Disable Fast Selection Window/Task Button when ON message is sent to the register.<br>Enable Fast Selection Window/Task Button when ON message is sent to the register. | W | No |

5. Event Logging

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-9021 | When ON message is sent to the register, all event logs of the day on the machine will be deleted. | W | Yes |
| LB-9022 | When ON message is sent to the register, the oldest event log on the machine will be deleted. (The function can only work for event logs on the machine.) | W | Yes |
| LB-9023 | When ON message is sent to the register, all event logs of the machine will be deleted. (The function can only work for event logs on the machine.) | W | Yes |
| LB-9024 | When ON message is sent to the register, it will re-measure the file sizes of all event logs on the machine. (The function can only work for event logs on the machine.) | W | Yes |
| LW-9223 | The number of event logs on the machine. | R | Yes |
| LW-9224 | The file sizes of all event logs on the machine (32-bit Unsigned). | R | Yes |

6. Data Logging

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-9025 | When ON message is sent to the register, the oldest data sampling on the machine log will be deleted. (The function can only work for data sampling logs on the machine.) | W | Yes |
| LB-9026 | When ON message is sent to the register, all data sampling logs on the machine will be deleted. (The function can only work for data sampling logs on the machine.) | W | Yes |
| LB-9027 | When ON message is sent to the register, it will re-measure the file sizes of all data sampling logs on the machine. (The function can only work for data sampling logs on the machine.) | W | Yes |
| LW-9226 | The number of data sampling logs on the machine. | W | Yes |
| LW-9227 | The file sizes of all data sampling logs on the machine (32-bit Unsigned). | W | Yes |

7. Password and Operation Level

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-905n | n = 0~5, when ON message is sent to this address, the user's operation level will be lowered to level n. This function is only available to lower the user's operation level. | R/W | No |
| LB-9060 | ON when a password error occurs. | R/W | No |
| LB-9061 | When ON message is sent to this address, the HMI will use the data stored in [LW9500] to [LW9535] to update the password. | R/W | No |
| LW-9219 | For judging the data input in [LW9220] are from user 1, user 2, or user 3. | R/W | No |
| LW-9220<br>~<br>LW-9221 | Addresses for password entering (32-bit). | R/W | No |
| LW-9222 | Level (0~6) of currently entered password. | R/W | Yes |
| LW-9500<br>~<br>LW-9501 | A new password for user 1's level 1 | R/W | No |
| LW-9502<br>~<br>LW-9503 | A new password for user 1's level 2 | R/W | No |
| LW-9504<br>~<br>LW-9504 | A new password for user 1's level 3 | R/W | No |
| LW-9506<br>~<br>LW-9505 | A new password for user 1's level 4 | R/W | No |
| LW-9508<br>~<br>LW-9506 | A new password for user 1's level 5 | R/W | No |
| LW-9510<br>~<br>LW-9511 | A new password for user 1's level 6 | R/W | No |
| LW-9512<br>~ | A new password for user 2's level 1 | R/W | No |

|  |  |  |  |
|---|---|---|---|
| LW-9513 |  |  |  |
| LW-9514<br>~<br>LW-9515 | A new password for user 2’s level 2 | R/W | No |
| LW-9516<br>~<br>LW-9517 | A new password for user 2’s level 3 | R/W | No |
| LW-9518<br>~<br>LW-9519 | A new password for user 2’s level 4 | R/W | No |
| LW-9520<br>~<br>LW-9521 | A new password for user 2’s level 5 | R/W | No |
| LW-9522<br>~<br>LW-9523 | A new password for user 2’s level 6 | R/W | No |
| LW-9524<br>~<br>LW-9525 | A new password for user 3’s level 1 | R/W | No |
| LW-9526<br>~<br>LW-9527 | A new password for user 3’s level 2 | R/W | No |
| LW-9528<br>~<br>LW-9529 | A new password for user 3’s level 3 | R/W | No |
| LW-9530<br>~<br>LW-9531 | A new password for user 3’s level 4 | R/W | No |
| LW-9532<br>~<br>LW-9533 | A new password for user 3’s level 5 | R/W | No |
| LW-9534<br>~<br>LW-9535 | A new password for user 3’s level 6 | R/W | No |

8. Time of HMI

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LW-9010 | Local time (second, BCD) | R/W | Yes |
| LW-9011 | Local time (minute, BCD) | R/W | Yes |
| LW-9012 | Local time (hour, BCD) | R/W | Yes |
| LW-9013 | Local time (day, BCD) | R/W | Yes |
| LW-9014 | Local time (month, BCD) | R/W | Yes |
| LW-9015 | Local time(year, BCD) | R/W | Yes |
| LW-9016 | Local time (week, BCD) | R | Yes |
| LW-9017 | Local time (second, BIN) | R/W | Yes |
| LW-9018 | Local time (minute, BIN) | R/W | Yes |
| LW-9019 | Local time (hour, BIN) | R/W | Yes |
| LW-9020 | Local time (day, BIN) | R/W | Yes |
| LW-9021 | Local time (month, BIN) | R/W | Yes |
| LW-9022 | Local time (year, BIN) | R/W | Yes |
| LW-9023 | Local time (week, BIN) | R | Yes |
| LW-9030 ~ LW-9031 | System time (in units of 0.1 second), timing from the machine starts up. | R | Yes |

9. Hardware of HMI

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-9019 | ON when the buzzer is turned on, and OFF when the buzzer is turned off.<br>The current state will remain until next startup of the machine. | R/W | No |
| LB-9040 | When ON message is sent to the register, the brightness of CCFL backlight can be increased. | W | Yes |
| LB-9041 | When ON message is sent to the register, the brightness of CCFL backlight can be decreased. | W | Yes |
| LW-9040 | The brightness value of CCFL backlight, ranging from 0 to 31.<br>At the first time using the machine, adjust the brightness of CCFL backlight to the darkest or the brightest, and the value will be set at 0 or 31 as a criterion for brightness adjustment in the future. | W | Yes |

10. The States of Communicating with Remote HMI(s)

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-910n | n = 0~31<br>The registers can be used to indicate the states of communication with remote HMIn.<br>When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to remote HMIn; at this time set the state at ON, and the system will try connecting to remote HMIn again. | R/W | Yes |

11. The States of Communicating with PLC

| Address | Description | Read & Write | Remote HMI Control |
|---|---|---|---|
| LB-9150 | When the state is ON, the system will automatically resume connection if the PLC device on COM 1 is disconnected.<br>When the state is OFF, the disconnection to the PLC device will be ignored. | R/W | Yes |
| LB-9151 | When the state is ON, the system will automatically resume connection if the PLC device on COM 2 is disconnected.<br>When the state is OFF, the disconnection to the PLC device will be ignored. | R/W | Yes |
| LB-9152 | When the state is ON, the system will automatically resume connection if the PLC device on COM 3 is disconnected.<br>When the state is OFF, the disconnection to the PLC device will be ignored. | R/W | Yes |
| LB-9153~<br>LB-9184 | When the state is ON, the system will automatically resume connection if the PLC device on the Ethernet port is disconnected; n = 0~31.<br>When the state is OFF, the disconnection to the PLC device will be ignored. | R/W | Yes |
| LB-9200~<br>LB-9455 | The registers can be used to indicate the states of communication with the PLC device on COM 1. LB9200 is to indicate the states of communication with the PLC on the station no. 0, LB9201 is to indicate the states of communication with the PLC on the station no. 1, and the rest can be deduced accordingly.<br>When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try connecting to the PLC device again. | R/W | Yes |

|  |  |  |  |
|---|---|---|---|
| LB-9500~<br>LB-9755 | The registers can be used to indicate the states of communication with the PLC device on COM 2.<br>LB9500 is to indicate the states of communication with the PLC on the station no. 0, LB9501 is to indicate the states of communication with the PLC on the station no. 1, and the rest can be deduced accordingly.<br>When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try connecting to the PLC device again. | R/W | Yes |
| LB-9800~<br>LB-10055 | The registers can be used to indicate the states of communication with the PLC device on COM 3.<br>LB9800 is to indicate the states of communication with the PLC on the station no. 0, LB9801 is to indicate the states of communication with the PLC on the station no. 1, and the rest can be deduced accordingly.<br>When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try connecting to the PLC device again. | R/W | Yes |
| LB-10100<br>~<br>LB-10131 | The registers can be used to indicate the states of communication with the PLC device on the Ethernet port.<br>When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try connecting to the PLC device again. | R/W | Yes |
| LW-930n | The number of the driver that is used by local PLC device. | R | Yes |
| LW-935n | The number of unprocessed commands that are gave to the local PLC device. | R | Yes |
| LW-940n | The content of the latest connection error when connecting to the local PLC device. | R | Yes |

12. Client connected to Server

|  |  |  |  |
|---|---|---|---|
| LB-9016 | Set ON when client connects to server. | R/W | Yes |
| LW-9006 | The number of clients connected to server. | R | Yes |

13. MODBUS Server Station no.

|  |  |  |  |
|---|---|---|---|
| LW-9541 | When set HMI to MODBUS device station no.(COM 1) | R/W | Yes |
| LW-9542 | When set HMI to MODBUS device station no.(COM 2) | R/W | Yes |
| LW-9543 | When set HMI to MODBUS device station no. (COM 3) | R/W | Yes |
| LW-9544 | When set HMI to MODBUS device station no. (ethernet) | R/W | Yes |

14. COM Communication

|  |  |  |  |
|---|---|---|---|
| LB-9030 | When LB9030 from OFF to ON, the content of LW9050~LW9054 modify COM 1's communication | R/W | Yes |
| LW-9550 | COM 1 mode<br>0: RS232<br>1: RS232 2W<br>2: RS232 4W | R/W | Yes |
| LW-9551 | COM 1 baud rate<br>0: 4800<br>1: 9600<br>2: 19200<br>3: 38400<br>4: 57600<br>5: 115200 | R/W | Yes |
| LW-9552 | COM 1 data bits<br>7 : 7 bits<br>8: 8 bits | R/W | Yes |
| LW-9553 | COM 1 parity<br>0: none<br>1: even<br>2: odd | R/W | Yes |
| LW-9554 | COM 1 stop bits<br>1: 1 bit<br>2: 2 bits | R/W | Yes |
| LB-9031 | When LB9031 from OFF to ON, the content of LW9056~LW9059will change to COM 2'c communication. | R/W | Yes |
| LW-9556 | COM 2 baud rate<br>0: 4800<br>1: 9600 | R/W | Yes |

| | | | |
|---|---|---|---|
| | 2: 19200<br>3: 38400<br>4: 57600<br>5: 115200 | | |
| LW-9557 | COM 2 data bits<br>7 : 7 bits<br>8: 8 bits | R/W | Yes |
| LW-9558 | COM 2 parity<br>0: none<br>1: even<br>2: odd | R/W | Yes |
| LW-9559 | COM 2 stop bits<br>1: 1 bit<br>2: 2 bits | R/W | Yes |
| LB-9031 | When LB9032 from OFF to ON, the content of LW9060~LW9064 will be changed to COM 3's communication. | R/W | Yes |
| LW-9560 | COM 3 mode<br>0: RS232<br>2: RS232 4W | R/W | Yes |
| LW-9561 | COM 3 baud rate<br>0: 4800<br>1: 9600<br>2: 19200<br>3: 38400<br>4: 57600<br>5: 115200 | R/W | Yes |
| LW-9562 | COM 3 data bits<br>7 : 7 bits<br>8: 8 bits | R/W | Yes |
| LW-9563 | COM 3 parity<br>0: none<br>1: even<br>2: odd | R/W | Yes |
| LW-9564 | COM 3 stop bits<br>1: 1 bit<br>2: 2 bits | R/W | Yes |

# Chapter 22 EasyView MT8000 seires HMI and PLC connecting guide

# Allen Bradley CompactLogix/FlexLogix

Allen-Bradley CompactLogix, FelxLogix CH0 DF1

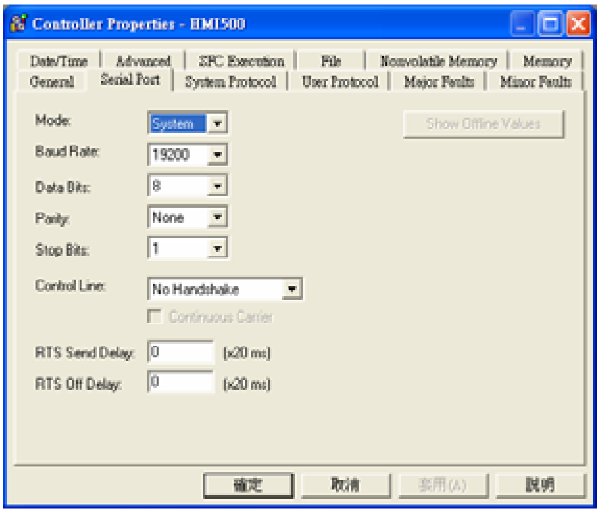
http://www.ab.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Allen-Bradley<br>CompactLogix/FlexLogix | | |
| Com port | RS232 | | |
| Baud rate | 19200 | 9600, 19200, 38400 | |
| Parity bit | None | Even, Odd, None | |
| Data Bits | 8 | 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 1 | 1-31 | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **DF1 Full Duplex protocol 19200, None, 8, 1 (default)**<br>**Error Check: BCC, Station Address: 1** |



Controller Properties - HMI500

Mode: System

Baud Rate: 19200

Data Bits: 8

Parity: None

Stop Bits: 1

Control Line: No Handshake

□ Continuous Carrier

RTS Send Delay: 0 (x20 ms)

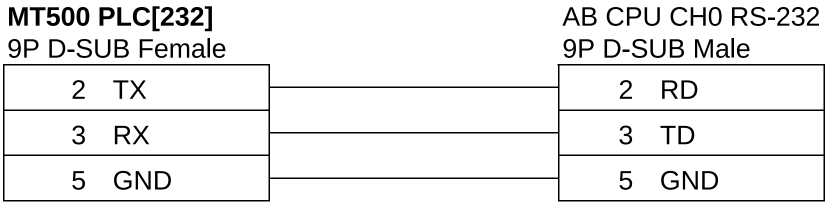
RTS Off Delay: 0 (x20 ms)

# Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | B_BOOL | ffddd(dd) | File no. ff: 3, 10~99<br>Element no. ddd: 0~255<br>Bit no. (dd): 0~15 | Bit data file |
| B | N_BOOL | ffddd(dd) | File no. ff: 7, 10~99<br>Element no. ddd: 0~255<br>Bit no. (dd): 0~15 | Integer data file bit level (N7, 10~255) |
| W | Bx_INT | fffddd | File no. fff: 3, 10~255<br>Element no. ddd: 0~255 | Bit data file word level |
| DW | Tx.PRE | fffddd | File no. fff: 4, 10~255<br>Element no. ddd: 0~255 | Timer Preset Value (T4, T10~255) |
| DW | Tx.ACC | fffddd | File no. fff: 4, 10~255<br>Element no. ddd: 0~255 | Timer Accumulator Value (T4, T10~255) |
| DW | Cx.PRE | fffddd | File no. fff: 5, 10~255<br>Element no. ddd: 0~255 | Counter Preset Value (C5, C10~255) |
| DW | Cx.ACC | fffddd | File no. fff: 5, 10~255<br>Element no. ddd: 0~255 | Counter Accumulator Value (C5, C10~255) |
| F | F8_REAL | ddd | ddd:0~255 | Floating point data file (F8) |
| DW | Nx_INT | fffddd | File no. fff:0~255<br>Element no. ddd:0~255 | Integer data file (N7, 10~255) |

# Wiring diagram:

RS-232: ControlLogix, CompactLogix CPU CH0

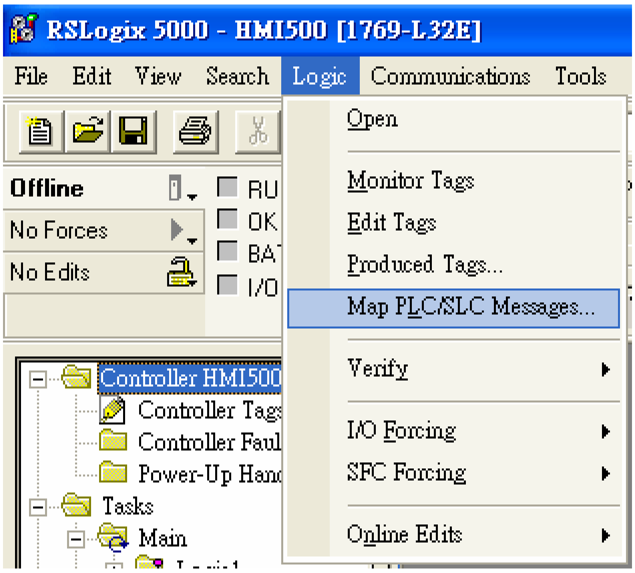


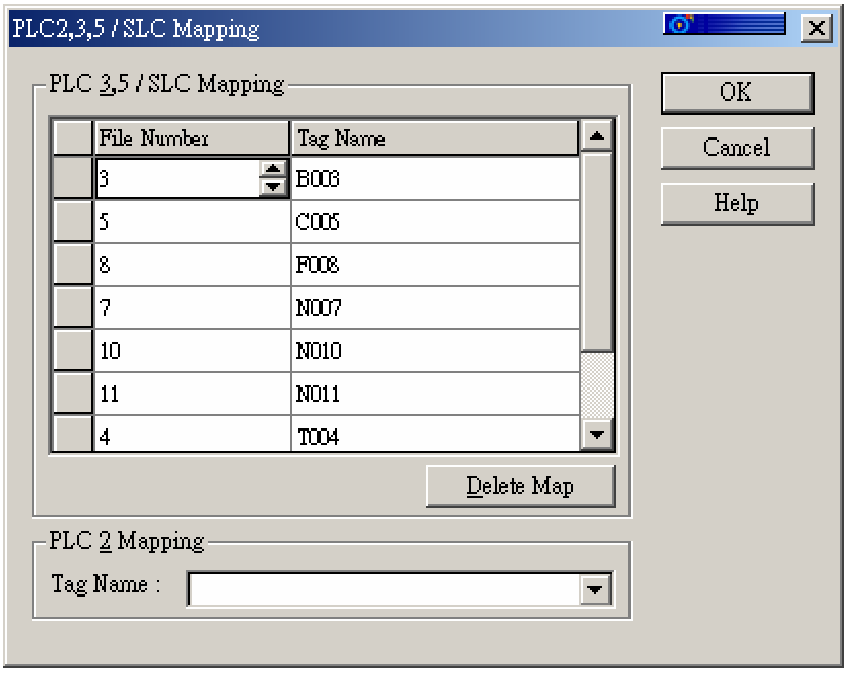
RSLogix 5000 setting

You can configure a mapping table to allow the controller to accept the PLC-2, 3, 5, or SLC/500 messages.

Configure Mapping for a PLC-3, PLC-5, or SLC/500 Processor

1. From the Logic menu, choose Map PLC Messages.
2. In the Mapping frame, enter the File Number and Tag Name to be mapped.
3. Click on OK to configure the mapping.

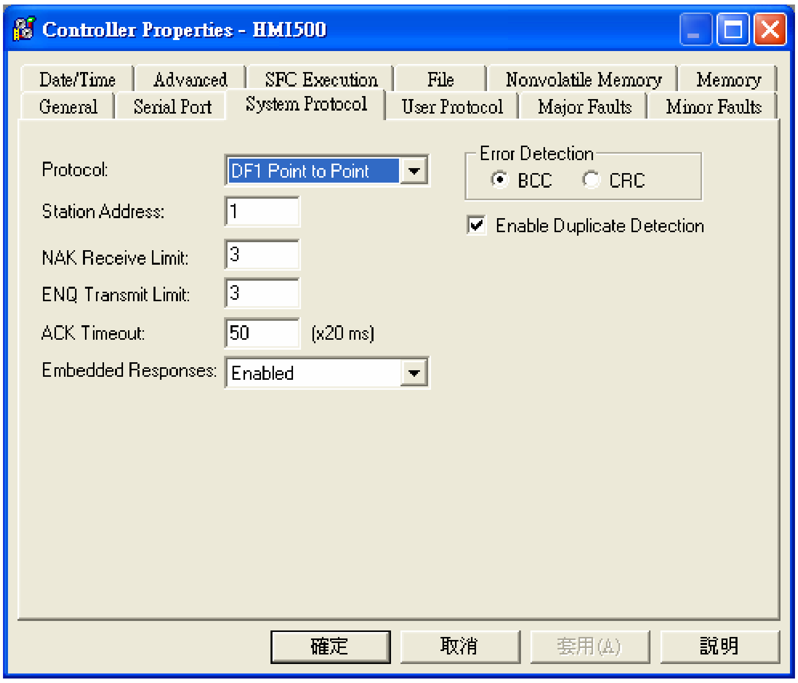




| File Number | Tag Name |
|---|---|
| 3 | B003 |
| 5 | C005 |
| 8 | F008 |
| 7 | N007 |
| 10 | N010 |
| 11 | N011 |
| 4 | T004 |

Tag Name :

ControlLogix, CompactLogix CPU CH0 setting:


Controller Properties - HMI500

Protocol: DF1 Point to Point

Station Address: 1

NAK Receive Limit: 3

ENQ Transmit Limit: 3

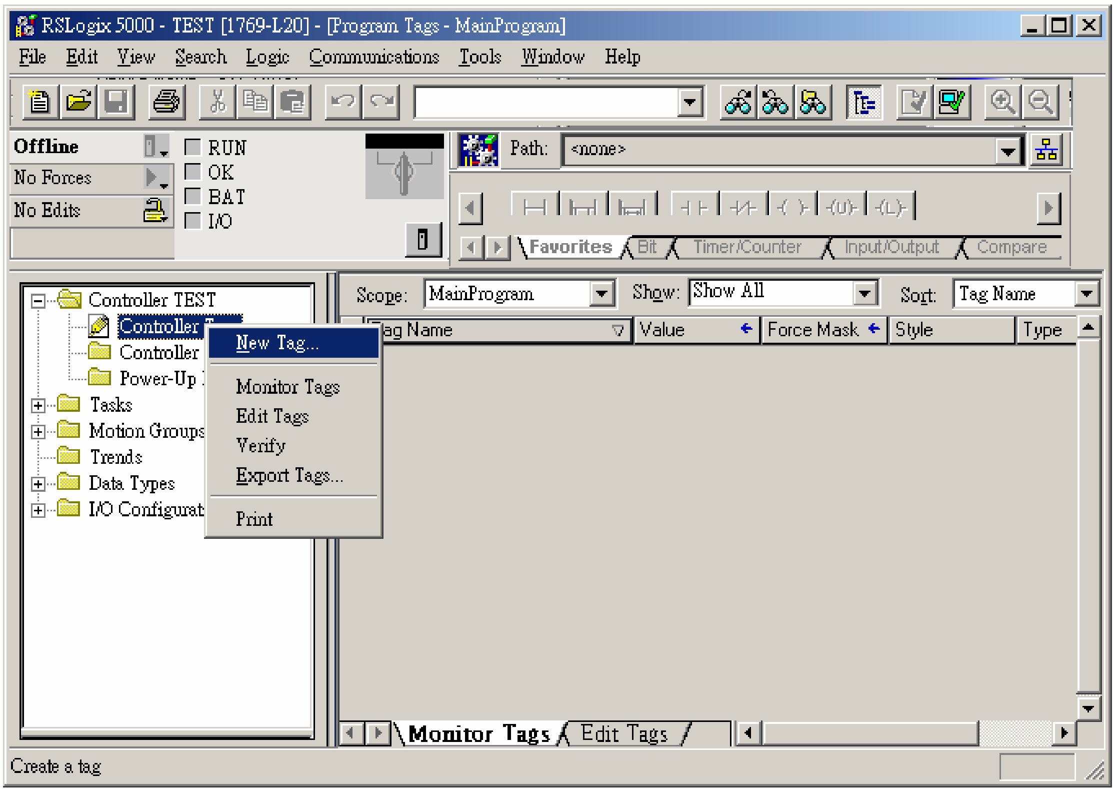
ACK Timeout: 50 (x20 ms)

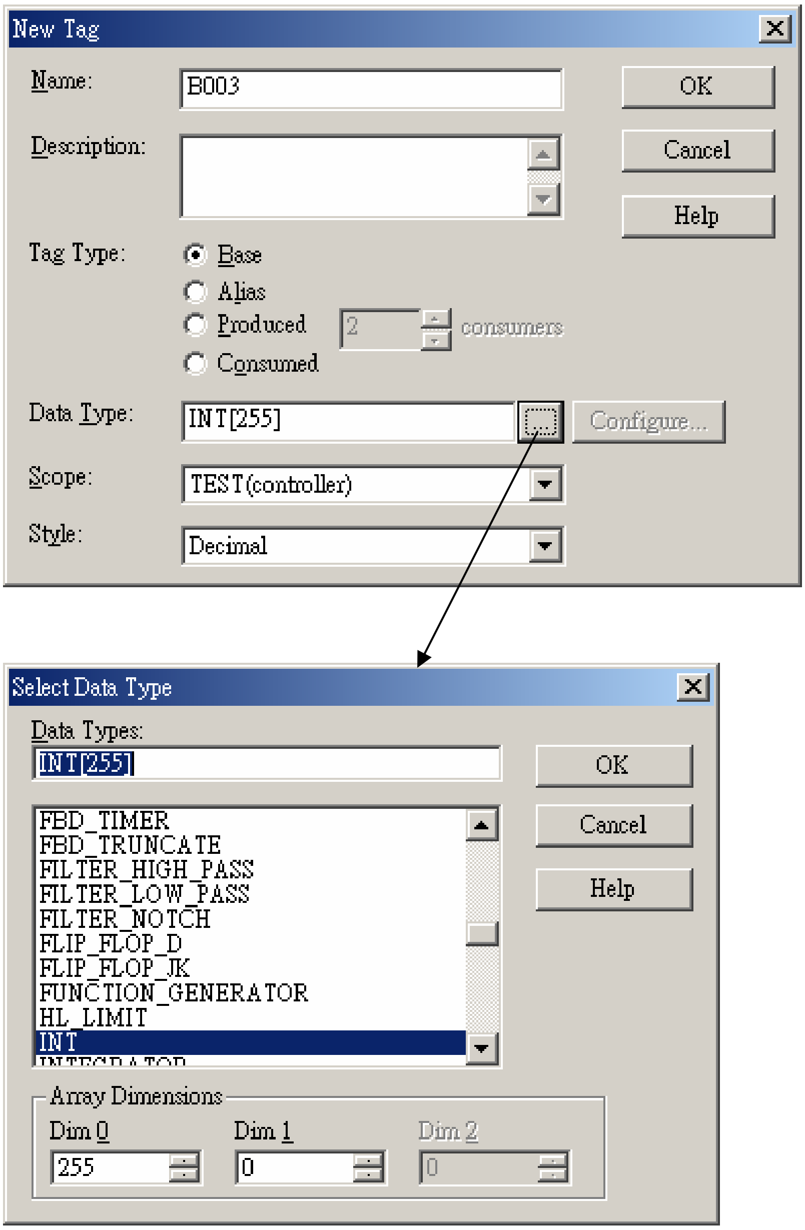
Embedded Responses: Enabled

Error Detection: ● BCC ○ CRC

☑ Enable Duplicate Detection

Create the Tag:





Name: B003

Description:

Tag Type: ● Base ○ Alias ○ Produced 2 consumers ○ Consumed

Data Type: INT[255]

Scope: TEST(controller)

Style: Decimal

Data Types: INT[255]

FBD_TIMER
FBD_TRUNCATE
FILTER_HIGH_PASS
FILTER_LOW_PASS
FILTER_NOTCH
FLIP_FLOP_D
FLIP_FLOP_JK
FUNCTION_GENERATOR
HL_LIMIT
INT
INTEGRATOR

Array Dimensions

Dim 0: 255 Dim 1: 0 Dim 2: 0

# Allen-Bradley DF1

Allen-Bradley MicroLogix 1000, 1100, 1200, 1500, SLC 5/03, 5/04, 5/05

http://www.ab.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Allen-Bradley DF1 | | |
| Com port | RS232 | | |
| Baud rate | 19200 | 9600, 19200 | |
| Parity bit | None | Even, Odd, None | |
| Data Bits | 8 | 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 1 | 1-31 | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **DF1 Full Duplex protocol 19200, None, 8, 1 (default)**<br>**Error Check: CRC** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | I1 | ddd(dd) | ddd:0~254 (dd): 0~15 | Input (I) |
| B | O0 | ddd(dd) | ddd:0~254 (dd): 0~15 | Output (O) |
| B | B3 | ddd(dd) | ddd:0~254 (dd): 0~15 | Bit data file (B3) |
| B | Bfn | fffddd(dd) | File no. fff: 3, 10~254<br>Element no. ddd: 0~254<br>Bit no. (dd): 0~15 | Bit data file (B3, 10~254) |
| B | NfnBit | fffddd(dd) | File no. fff: 7, 10~254<br>Element no. ddd: 0~254<br>Bit no. (dd): 0~15 | Integer data file bit level (N7, 10~254) |
| W | T4SV | ddd | ddd:0~254 | Timer Preset Value (T4) |
| W | T4PV | ddd | ddd:0~254 | Timer Accumulator Value (T4) |
| W | C5SV | ddd | ddd:0~254 | Counter Preset Value (C5) |
| W | C5PV | ddd | ddd:0~254 | Counter Accumulator Value (C5) |
| W | N7 | ddd | ddd:0~254 | Integer data file (N7) |
| W | Nfn | fffddd | File no. fff:0~254 | Integer data file (N7, 10~254) |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| | | | Element no. ddd:0~254 | |
| 32bit Float | F8 | ddd | ddd:0~254 | Floating point data file (F8) |
| 32bit Float | Ffn | fffddd | File no. fff:0~254<br>Element no. ddd:0~254 | Floating point data file (F8, 10~254) |

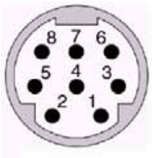
## Wiring diagram:

RS-232: MicroLogix 1000, 1100, 1200, 1500

MT8000 RS232
9P D-SUB Female

MicroLogix RS232
8P mini DIN

| COM1 | COM2 | COM3 | | |
|---|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 4 | RXD |
| 2 RX | 6 RX | 8 RX | 7 | TXD |
| 5 GND | 5 GND | 5 GND | 8 | GND |



RS-232: SLC5/03, 04, 05 CH0

MT8000 RS232
9P D-SUB Female

AB CPU CH0
RS-232
9P D-SUB Female

| COM1 | COM2 | COM3 | | |
|---|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 2 | RD |
| 2 RX | 6 RX | 8 RX | 3 | TD |
| 5 GND | 5 GND | 5 GND | 5 | GND |

# Allen-Bradley EtherNet/IP (DF1)

Allen-Bradley MicroLogix 1100, SLC5/05 Ethernet port.
MicroLogix1000, 1200, 1500, SLC 5/03, 5/04 with 1761-NET-ENI

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Allen-Bradley EtherNet/IP (DF1) | | |
| Com port | Ethernet | | |
| TCP Port no. | 44818 | | |
| HMI Station No. | 0 | | |
| PLC Station No. | 1 | | |

## PLC Setting:

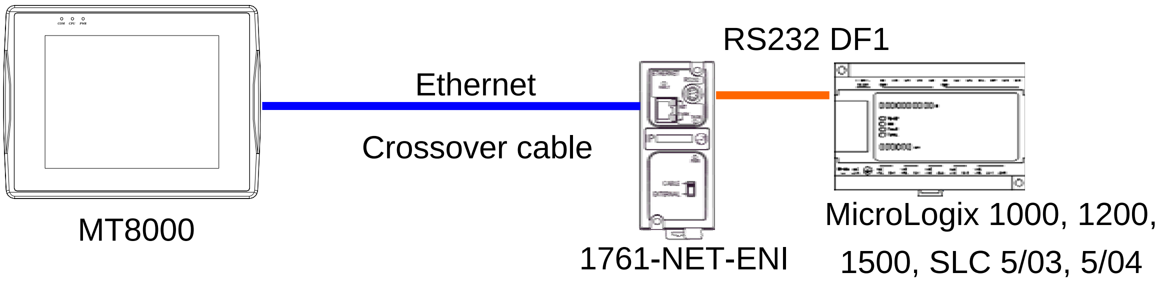
| | |
|---|---|
| Communication mode | **Port Setting: 10/100 Mbps Full Duplex/Half Duplex** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | I1 | ddd(dd) | ddd:0~254 (dd): 0~15 | Input (I) |
| B | O0 | ddd(dd) | ddd:0~254 (dd): 0~15 | Output (O) |
| B | B3 | ddd(dd) | ddd:0~254 (dd): 0~15 | Bit data file (B3) |
| B | Bfn | fffddd(dd) | File no. fff: 3, 10~254<br>Element no. ddd: 0~254<br>Bit no. (dd): 0~15 | Bit data file (B3, 10~254) |
| B | NfnBit | fffddd(dd) | File no. fff: 7, 10~254<br>Element no. ddd: 0~254<br>Bit no. (dd): 0~15 | Integer data file bit level (N7, 10~254) |
| W | T4SV | ddd | ddd:0~254 | Timer Preset Value (T4) |
| W | T4PV | ddd | ddd:0~254 | Timer Accumulator Value (T4) |
| W | C5SV | ddd | ddd:0~254 | Counter Preset Value (C5) |
| W | C5PV | ddd | ddd:0~254 | Counter Accumulator Value (C5) |
| W | N7 | ddd | ddd:0~254 | Integer data file (N7) |
| W | Nfn | fffddd | File no. fff:0~254<br>Element no. ddd:0~254 | Integer data file (N7, 10~254) |
| 32bit Float | F8 | ddd | ddd:0~254 | Floating point data file (F8) |
| 32bit Float | Ffn | fffddd | File no. fff:0~254<br>Element no. ddd:0~254 | Floating point data file (F8, 10~254) |

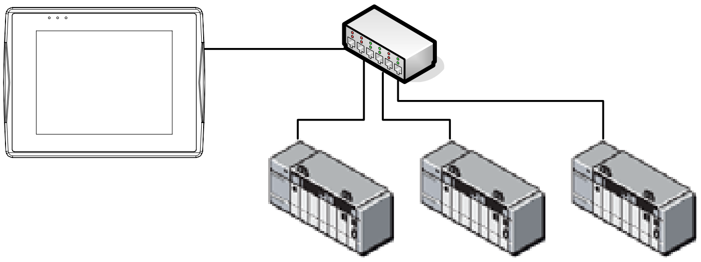
## Wiring diagram:

Ethernet: Direct connect (crossover cable)

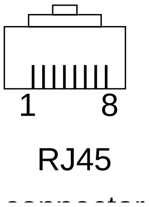


| MT8000 Ethernet RJ45 | | Wire color | PLC RJ45 | |
|---|---|---|---|---|
| 1 | TX+ | White/Orange | 3 | RX+ |
| 2 | TX- | Orange | 6 | RX- |
| 3 | RX+ | White/Green | 1 | TX+ |
| 4 | BD4+ | Blue | 4 | BD4+ |
| 5 | BD4- | White/Blue | 5 | BD4- |
| 6 | RX- | Green | 2 | TX- |
| 7 | BD3+ | White/Brown | 7 | BD3+ |
| 8 | BD3- | Brown | 8 | BD3- |

Ethernet:



| MT500 Ethernet RJ45 | | Wire color | Ethernet Hub or Switch RJ45 | |
|---|---|---|---|---|
| 1 | TX+ | White/Orange | 1 | RX+ |
| 2 | TX- | Orange | 2 | RX- |
| 3 | RX+ | White/Green | 3 | TX+ |
| 4 | BD4+ | Blue | 4 | BD4+ |
| 5 | BD4- | White/Blue | 5 | BD4- |
| 6 | RX- | Green | 6 | TX- |
| 7 | BD3+ | White/Brown | 7 | BD3+ |
| 8 | BD3- | Brown | 8 | BD3- |



# DELTA DVP

DELTA DVP series

http://www.deltadriver.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | DELTA DVP | | |
| Com port | RS232 | RS232, RS485 | |
| Baud rate | 9600 | 9600, 19200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 7 | 7, 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 1 | 0-255 | |

## PLC Setting:

| | |
|---|---|
| Communication mode | |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0 ~ 23417 (Octal) | Input |
| B | Y | ooo | 0 ~ 23417 (Octal) | Output |
| B | M | dddd | 0 ~ 9999 | Auxiliary Relay |
| B | S | dddd | 0 ~ 9999 | Step Relay |
| B | T | dddd | 0 ~ 9999 | Timer |
| B | C | dddd | 0 ~ 9999 | Counter |
| B | TV | dddd | 0 ~ 9999 | Timer |
| W | CV | ddd | 0 ~ 127 | Counter |
| W | CV2 | ddd | 232 ~ 255 | Double word counter |
| W | D | dddd | 0 ~ 9999 | Data Register |

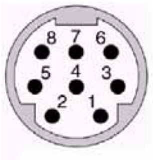
## Wiring diagram:

1. RS232: CPU port

MT8000 RS232
9P D-SUB

DELTA DVP CPU
port
8p mini DIN

| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 5 RXD |
| 2 RX | 6 RX | 8 RX | 4 TXD |
| 5 GND | 5 GND | 5 GND | 3 GND |



2. RS485: CPU port

MT8000 RS232

9P D-SUB

DELTA DVP

RS-485 port

| COM1 | COM3 | |
|---|---|---|
| 1 RX- | 6 Data- | - |
| 2 RX+ | 9 Data+ | + |

# FATEK FB Series

FATEK FBs series, FB MC series, FB MA series need FB-DTBR converter.

http://www.fatek.com/

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | FATEK FB Series | | |
| Com port | RS232 | RS232/RS485 | Must match the PLC's port setting. |
| Baud rate | 9600 | | Must match the PLC's port setting. |
| Parity bit | Even | | Must match the PLC's port setting. |
| Data Bits | 7 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | Does not apply to this protocol. |
| PLC Station No. | 1 | 0-255 | Must match the PLC's port setting. |

## PLC Setting:

| | |
|---|---|
| Communication mode | |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ddd | ddd : 0~9999 | Input |
| B | Y | ddd | ddd : 0~9999 | Output |
| B | M | ddd | ddd : 0~9999 | Internal Relay |
| B | S | ddd | ddd : 0~9999 | Step Relay |
| B | T | ddd | ddd : 0~9999 | Timer |
| B | C | ddd | ddd : 0~9999 | Counter |
| W | R | ddd | ddd : 0~9999 | Data Register |
| W | D | ddd | ddd : 0~9999 | Data Register |
| W | RT | ddd | ddd : 0~9999 | Timer Register |
| W | RC | ddd | ddd : 0~9999 | Counter Register |
| DW | DRT | ddd | ddd : 0~9999 | Double word Timer Register |
| DW | DRC | ddd | ddd : 0~9999 | Double word Counter Register |

## Wiring diagram:

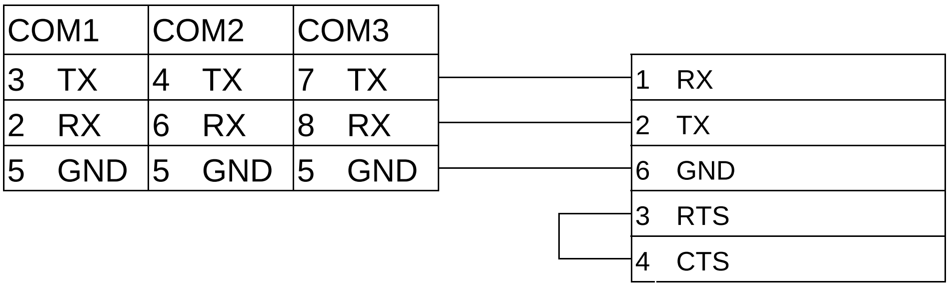
1. RS232: CPU port

**MT8000 RS232**

9P D-SUB Male

FB CPU port

15P D-SUB Male



| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

| | |
|---|---|
| 1 | RX |
| 2 | TX |
| 6 | GND |
| 3 | RTS |
| 4 | CTS |

2. RS485: CPU port

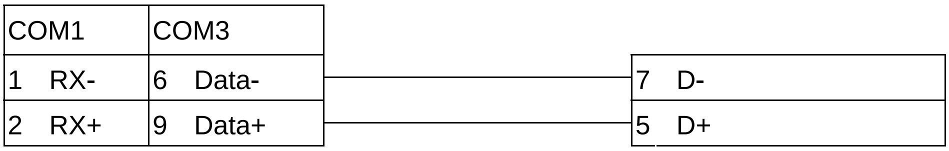
**MT8000**

**COM[RS-485] 2w**

9P D-SUB Female

FB CPU port

15P D-SUB Male



| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |

| | |
|---|---|
| 7 | D- |
| 5 | D+ |

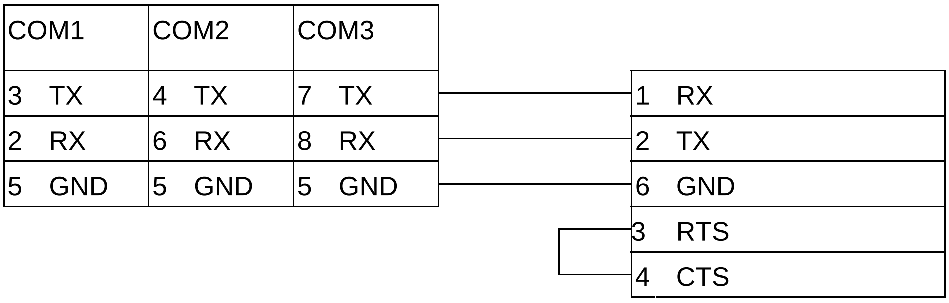
3. RS232: FB-DTBR/DTBR-E

**MT8000 RS232**

9P D-SUB Male

FB-DTBR/DTBR-E

15P D-SUB Male



| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

| | |
|---|---|
| 1 | RX |
| 2 | TX |
| 6 | GND |
| 3 | RTS |
| 4 | CTS |

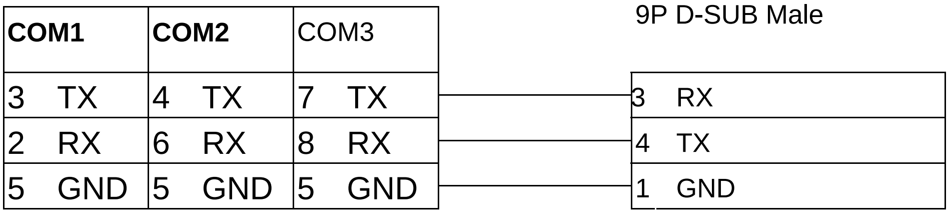
4. RS485: FB-DTBR/DTBR-E

**MT8000 RS232**

9P D-SUB Male

FB-DTBR/DTBR-E

9P D-SUB Male



| **COM1** | **COM2** | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

| | |
|---|---|
| 3 | RX |
| 4 | TX |
| 1 | GND |

## 5. RS485: FB-DTBR/DTBR-E

**MT8000**
**COM[RS-485] 2w**
9P D-SUB Female

FB-DTBR/DTBR-E
3P Terminal Block

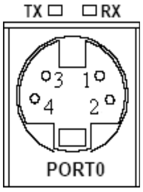
| COM1 | COM3 | |
|---|---|---|
| 1 RX- | 6 Data- | D- |
| 2 RX+ | 9 Data+ | D+ |

## 6. RS232: FBs Port0

**MT8000 RS232**
9P D-SUB Male

FB-DTBR/DTBR-E
4P Mini-Din Male

| **COM1** | **COM2** | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 4 RX |
| 2 RX | 6 RX | 8 RX | 3 TX |
| 5 GND | 5 GND | 5 GND | 2 GND |



4P Mini-Din
Female

# IDEC

IDEC Micro3, Micro3C, MicroSmart, OpenNet Controller series

http://www.idec.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | IDEC Micro | | Support Extend address mode |
| Com port | RS232 | RS232, RS485 | |
| Baud rate | 9600 | 9600, 19200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 7 | 7, 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 255 (for 1:1 connect) | 0-255 | 255 or same as the PLC setting |

| | | |
|---|---|---|
| Online Simulator | YES | |
| Extend address mode | YES | Don't set the PLC Station No.= 255 |

## PLC Setting:

| | |
|---|---|
| Communication mode | **9600,E,7,1(default), Use Computer Link Protocol** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ddd(o) | ddd=0~2047, (o)=0~7 | Input(I) |
| B | Y | ddd(o) | ddd=0~2047, (o)=0~7 | Output(Q) |
| B | M | ddd(o) | ddd=0~2047, (o)=0~7 | Internal Relay(M) |
| W | RT | ddd | ddd=0~9999 | Timer(T) |
| W | RC | ddd | ddd=0~9999 | Counter(C) |
| W | D | ddd | ddd=0~9999 | Data Register(D) |

# Wiring diagram:

RS232: Micro3C, MicroSmart, OpenNet Controller CPU Ladder Port

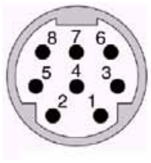
MT8000 RS232

CPU port 1 or port2 RS-232

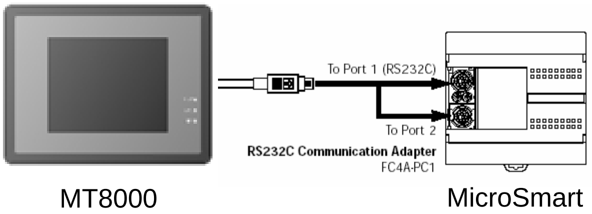
8P mini DIN Male

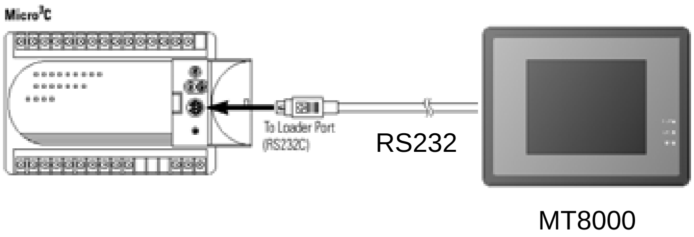
| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

| | |
|---|---|
| 4 | RXD |
| 3 | TXD |
| 7 | GND |



8Pin mini DIN
Female Pin





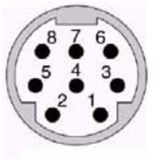
RS485: Micro3 CPU Port, MicroSmart with FC4A-PC2 RS485 Communication Adapter

**MT8000 RS-485**

CPU Port RS-485
8P mini DIN Male

| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 5 GND | 5 GND |

| | |
|---|---|
| 2 | RXD- |
| 1 | RXD+ |
| 7 | GND |



8Pin mini DIN
Female Pin

RS485: Micro3C, OpenNet Controller Data Link Terminals,

MicroSmart with FC4A-PC3 RS485 Communication Adapter

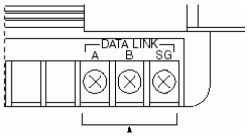
**MT8000 RS-485**

9P D-SUB Female

Data Link Terminals

| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 5 GND | 5 GND |

| | |
|---|---|
| A | RXD- |
| B | RXD+ |
| SG | GND |



# KOYO DirectLogic

KOYO DirectLogic series PLC DL05, DL06，DL105, DL205, DL305 and DL405 series

http://www.automationdirect.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | KOYO DIRECT | | |
| Com port | RS232 | RS232, RS485 | |
| Baud rate | 9600 | 9600, 19200, 38400 | |
| Parity bit | Odd | Even, Odd, None | |
| Data Bits | 8 | 7, 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | Does not apply to this protocol. |
| PLC Station No. | 1 | 1-90 | |

## PLC Setting:

1. The PLC must not have a password.
2. PLC must be set for Full Duplex operation.
3. PLC must be set for No Hardware Handshaking.
4. The PLC must be set to use the ‘K’ Sequence Protocol.
5. Set the mode switch to the TERM mode
6. When using the D4-440 CPU, you must set the station number to 1.

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0 ~ 77777 | Input Bits |
| B | Y | ooo | 0 ~ 77777 | Output Bits |
| B | C | ooo | 0 ~ 77777 | Control Relays |
| B | T | ooo | 0 ~ 77777 | Timer Status Bits |
| B | CT | ooo | 0 ~ 77777 | Counter Status Bits |
| W | V | ooo | 0 ~ 77777 | V Memory |

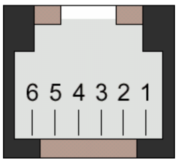
# Wiring diagram:

1. CPU unit: DL05/DL06/DL105/DL230/DL240/DL250/DL350/DL450 RS232 port

MT8000 RS232
9P D-SUB

KOYO DirectLogic PLC
RS232 port
6P RJ12 phone jack

| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 3 RX |
| 2 RX | 6 RX | 8 RX | 4 TX |
| 5 GND | 5 GND | 5 GND | 1 GND |



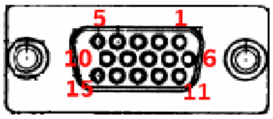
RJ12 6Pin

2. CPU unit: DL06/DL250 CPU Port2 RS232

MT8000 RS232
9P D-SUB

KOYO DirectLogic PLC
CPU RS232 Port2
15P D-SUB Female

| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 3 RX |
| 2 RX | 6 RX | 8 RX | 2 TX |
| 5 GND | 5 GND | 5 GND | 7 GND |
| | | | 4 RTC |
| | | | 5 CTS |



15P D-SUB Female

3. CPU unit: DL06/DL250 CPU Port2 RS422

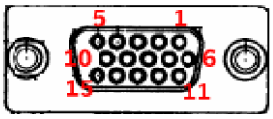
**MT8000**

**COM1 [RS-485] 4w**

9P D-SUB

KOYO DirectLogic PLC
CPU RS422 Port2
15P D-SUB Female

| | |
|---|---|
| 1 RX- | 10 TX- |
| 2 RX+ | 9 TX+ |
| 5 GND | 7 GND |
| 3 TX- | 6 RX- |
| 4 TX+ | 13 RX+ |
| | 11 RTS+ |
| | 14 CTS+ |
| | 12 RTS- |
| | 15 CTS- |



Note: DL06/DL250 CPU Port2 include RS232 and RS422

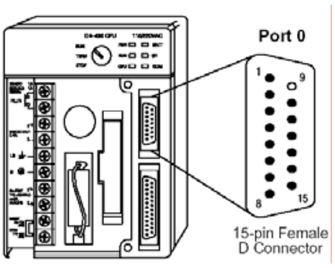
4. CPU unit: DL430/DL440/DL450 CPU unit Port0 RS232

MT8000 RS232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

KOYO DirectLogic PLC
DL405 CPU RS232 Port0
15P D-SUB Female

| | |
|---|---|
| 3 | RX |
| 2 | TX |
| 13 | GND |
| 1 | YOP |
| 7 | CTS |
| 2 | YOM |
| 4 | ONLINE |
| 14 | GND |



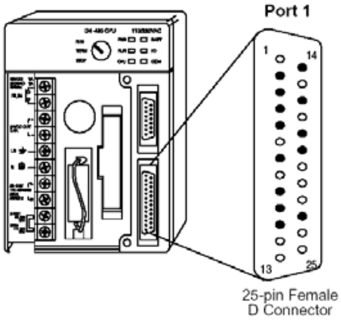
5. CPU unit: DL430/DL440/DL450 CPU unit Port1 & DL350 CPU unit Port2 RS232

MT8000 RS232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

KOYO DirectLogic PLC
DL305/405 CPU RS232 Port
25P D-SUB Female

| | |
|---|---|
| 3 | RX |
| 2 | TX |
| 7 | GND |
| 4 | RTC |
| 5 | CTS |



6. CPU unit: DL430/DL440/DL450 CPU unit Port1 & DL350 CPU unit Port2 RS422

**MT8000**

**COM1[RS-485]4w**

9P D-SUB

| | |
|---|---|
| 1 | RX- |
| 2 | RX+ |
| 5 | GND |
| 3 | TX- |
| 4 | TX+ |

KOYO DirectLogic PLC
DL305/405 CPU RS422 Port
25P D-SUB Female

| | |
|---|---|
| 16 | TX- |
| 14 | TX+ |
| 7 | GND |
| 10 | RX- |
| 9 | RX+ |
| 19 | RTS+ |
| 11 | CTS+ |
| 18 | RTS- |
| 23 | CTS- |

7. CPU unit: DL450 CPU unit Port3 RS422

**MT8000**

**COM1[RS-485]4w**

9P D-SUB

KOYO DirectLogic PLC
DL405 CPU RS422 Port3
25P D-SUB Female

| 9P D-SUB | | 25P D-SUB Female | |
|---|---|---|---|
| 1 | RX- | 13 | TX- |
| 2 | RX+ | 12 | TX+ |
| 5 | GND | 7 | GND |
| 3 | TX- | 25 | RX- |
| 4 | TX+ | 24 | RX+ |

8. Communication unit: DL205 series D2-DCM and DL405 series D4-DCM RS232

MT8000 RS232
9P D-SUB

KOYO DirectLogic PLC
DL205/405 DCM RS232 Port
25P D-SUB Female

| COM1 | COM2 | COM3 | 25P D-SUB Female |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 3 RX |
| 2 RX | 6 RX | 8 RX | 2 TX |
| 5 GND | 5 GND | 5 GND | 7 GND |
| | | | 4 RTC |
| | | | 5 CTS |

# LS MASTER-K Cnet

LS MASTER-K series: K80S, K200S, K300S, K1000S
http://www.lgis.com/

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | LS MASTER-K Cnet | | |
| Com port | RS232 | RS232/RS485 | Must match the PLC's port setting. |
| Baud rate | 38400 | 9600, 19200, 38400 | Must match the PLC's port setting. |
| Parity bit | None | Even, Odd, None | Must match the PLC's port setting. |
| Data Bits | 8 | 8 | Must match the PLC's port setting. |
| Stop Bits | 1 | 1 | Must match the PLC's port setting. |
| HMI Station No. | 0 | | Does not apply to this protocol. |
| PLC Station No. | 0 | 0-31 | Must match the PLC's port setting. |

| | | |
|---|---|---|
| Online Simulator | YES | |
| Extend address mode | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **38400, None, 8, 1** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | P | ddd(h) | 0~255F | I/O Relay (P) |
| B | K | ddd(h) | 0~255F | Keep Relay (K) |
| B | M | ddd(h) | 0~255F | Auxiliary Relay (M) |
| B | L | ddd(h) | 0~255F | Link Relay (L) |
| B | F | ddd(h) | 0~255F | Special Relay (F) |
| W | TV | ddd | 0~255 | Timer Present Value |
| W | CV | ddd | 0~255 | Counter Present Value |
| W | D | dddd | 0~9999 | Data Register (D) |

d: Decimal h: Hexadecimal

## Wiring diagram:

MT8000 RS232<br>9P D-SUB

CPU port Cnet I/F<br>RS232

| COM1 | COM2 | COM3 | 9P D-SUB Female |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 4 RX |
| 2 RX | 6 RX | 8 RX | 7 TX |
| 5 GND | 5 GND | 5 GND | 5 GND |

If connect with Cnet module please refer Cnet module’s document.

# LS MASTER-K300S CPU

LS MASTER-K series: K80S, K200S, K300S, K1000S

http://www.lgis.com/

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | LG MASTER-K300S | | |
| Com port | RS232 | RS232/RS485 | Must match the PLC's port setting. |
| Baud rate | 38400 | 9600, 19200, 38400 | Must match the PLC's port setting. |
| Parity bit | None | Even, Odd, None | Must match the PLC's port setting. |
| Data Bits | 8 | 8 | Must match the PLC's port setting. |
| Stop Bits | 1 | 1 | Must match the PLC's port setting. |
| HMI Station No. | 0 | | Does not apply to this protocol. |
| PLC Station No. | 0 | 0-31 | Must match the PLC's port setting. |

| | | |
|---|---|---|
| Online Simulator | YES | |
| Extend address mode | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **38400, None, 8, 1** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | P | ddd(h) | 0~255F | I/O Relay (P) |
| B | K | ddd(h) | 0~255F | Keep Relay (K) |
| B | M | ddd(h) | 0~255F | Auxiliary Relay (M) |
| B | L | ddd(h) | 0~255F | Link Relay (L) |
| B | F | ddd(h) | 0~255F | Special Relay (F) |
| W | TV | ddd | 0~255 | Timer Present Value |
| W | CV | ddd | 0~255 | Counter Present Value |
| W | D | dddd | 0~9999 | Data Register (D) |

d: Decimal h: Hexadecimal

## Wiring diagram:

MT8000 RS232
9P D-SUB

CPU port RS232
9P D-SUB

| COM1 | COM2 | COM3 | Female |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 2 RX |
| 2 RX | 6 RX | 8 RX | 3 TX |
| 5 GND | 5 GND | 5 GND | 5 GND |

# Matsushita FP

NAIS(Matsushita) FP series include FP0, FP1, FP2, FP2SH, FP10SH and FP3
http://www.aromat.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Matsushita FP | | |
| Com port | RS232 | RS232/RS485 | Must match the PLC's port setting. |
| Baud rate | 9600 | 9600, 19200, 38400, 57600, 115200 | Must match the PLC's port setting. |
| Parity bit | Odd | Even, Odd, None | Must match the PLC's port setting. |
| Data Bits | 8 | 7 or 8 | Must match the PLC's port setting. |
| Stop Bits | 1 | 1 or 2 | Must match the PLC's port setting. |
| HMI Station No. | 0 | 0-255 | Does not apply to this protocol. |
| PLC Station No. | 1 | 0-255 | Must match the PLC's port setting.<br>**FP3 must set 0.** |

## PLC Setting:

| | |
|---|---|
| Communication mode | **9600,O,8,1(default)** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | dddd(h) | 0~9999F | Input(X) |
| B | Y | dddd(h) | 0~9999F | Output(Y) |
| B | R | dddd(h) | 0~9999F | Internal Relay(R) |
| B | L | dddd(h) | 0~9999F | Link Relay(L) |
| B | T | ddd | 0~9999 | Timer(T) |
| B | C | ddd | 0~9999 | Counter(C) |
| W | SV | ddd | 0~9999 | Timer/Counter set value(SV) |
| W | EV | ddd | 0~9999 | Timer/Counter elapse value(EV) |
| W | DT | ddd | 0~32767 | Data Register(DT) |

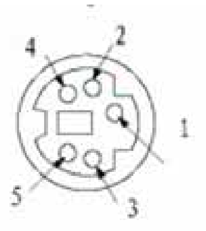
# Wiring diagram:

MT8000 RS232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

FP0, FP2, FP2SH,FPM
CPU Tool port
5P mini DIN RS-232

| | |
|---|---|
| 3 | RXD |
| 2 | TXD |
| 1 | GND |



Mini Din 5 Pin

Female

MT8000 RS232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

FP0 CPU RS232
3P terminal

| |
|---|
| R |
| S |
| G |

MT8000 RS232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

FP1, FP2, FP2SH,FP10SH CPU
9p D-SUB Male RS232

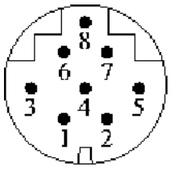
| | |
|---|---|
| 3 | RXD |
| 2 | TXD |
| 7 | GND |
| 4 | RTS |
| 5 | CTS |
| 8 | CD |
| 9 | ER |

MT8000
COM1[RS-485]4w
9P D-SUB

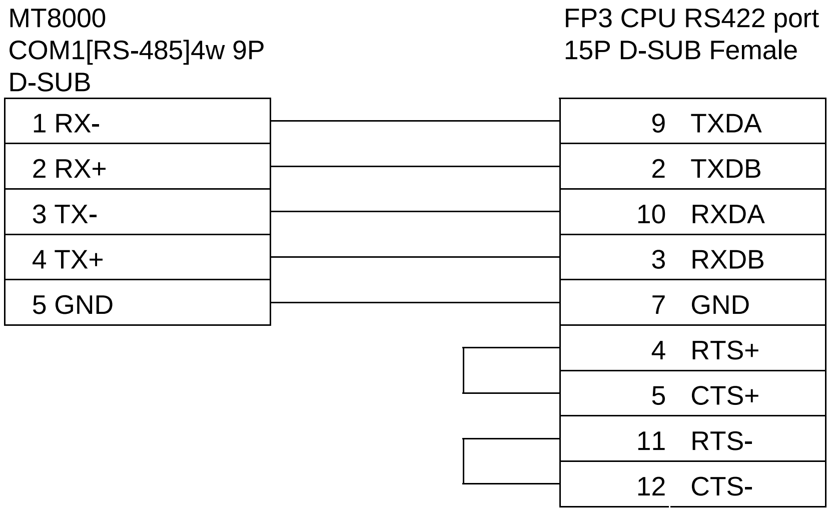
| |
|---|
| 1 RX- |
| 2 RX+ |
| 3 TX- |
| 4 TX+ |
| 5 GND |

FP1 CPU RS422 port
Hirose 8Pin Port

| | |
|---|---|
| 2 | TXDA |
| 5 | TXDB |
| 3 | RXDA |
| 6 | RXDB |
| 1 | GND |



Hirose 8Pin Port


MT8000
COM1[RS-485]4w 9P
D-SUB
FP3 CPU RS422 port
15P D-SUB Female
1 RX-
9 TXDA
2 RX+
2 TXDB
3 TX-
10 RXDA
4 TX+
3 RXDB
5 GND
7 GND
4 RTS+
5 CTS+
11 RTS-
12 CTS-

# Mitsubishi AJ71

Mitsubishi A series PLC with AJ71C24 communication module using the Computer Link protocol.

http://www.mitsubishi-automation.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MITSUBISHI AJ71 | MITSUBISHI AJ71(AnA/AnU CPU)<br>MITSUBISHI AJ71[format4] pds driver | |
| Com port | RS485 4W | RS485 4W, RS232 | |
| Baud rate | 19200 | 9600, 19200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 8 | 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | Computer Link protocol 9600, Even, 8, 1 (default) |
| Mode Setting Switch | **Format 1** |
| Parity Check | **Enable** |
| Sum Check | **Enable** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | hhh | hhh: 0~270F (hex-decimal) | Input Bits |
| B | Y | hhh | hhh: 0~270F (hex-decimal) | Output Bits |
| B | M | dddd | dddd:0~9999 | Internal Relays |
| W | TV | ddd | ddd:0~255 | Timer Preset Value |
| W | CV | ddd | ddd:0~255 | Counter Preset Value |
| W | D | dddd | ddd:0~9999 | Data Registers |

# Wiring diagram:

## RS-485 4W:

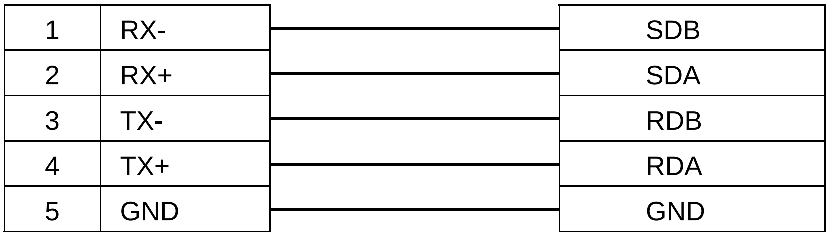
**MT800 Com1**

**RS-485]**

AJ71C24

RS-422

9P D-SUB

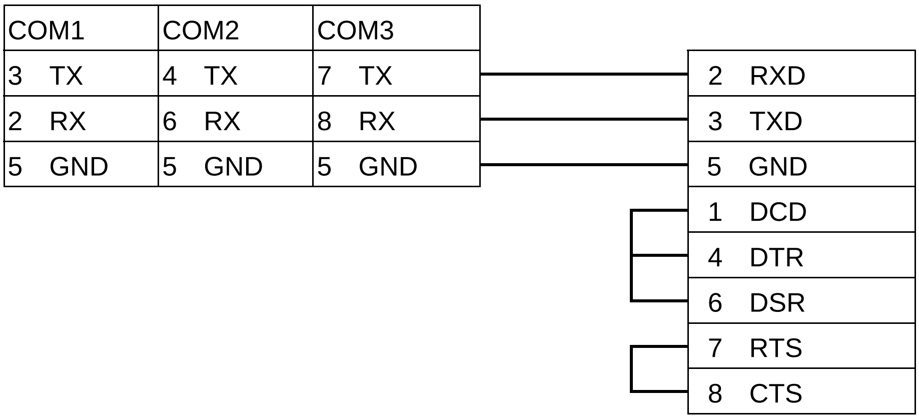


| | | |
|---|---|---|
| 1 | RX- | SDB |
| 2 | RX+ | SDA |
| 3 | TX- | RDB |
| 4 | TX+ | RDA |
| 5 | GND | GND |

## RS-232: A1SJ71UC24-R2

MT8000 RS232
9P D-SUB

RS232 port
9P D-SUB Female



| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 2 RXD |
| 2 RX | 6 RX | 8 RX | 3 TXD |
| 5 GND | 5 GND | 5 GND | 5 GND |
| | | | 1 DCD |
| | | | 4 DTR |
| | | | 6 DSR |
| | | | 7 RTS |
| | | | 8 CTS |

# Mitsubishi FX0n/FX2

Mitsubishi FX0s/FX0n/FX1s/FX1n/FX2 PLC

http://www.mitsubishi-automation.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Mitsubishi FX0n/FX2 | Mitsubishi FX0n/FX2 | |
| Com port | RS485 | RS232/RS485 | |
| Baud rate | 9600 | 9600/19200/38400/57600/ 115200 | must same as the PLC setting |
| Parity bit | Even | Even, Odd, None | must same as the PLC setting |
| Data Bits | 7 | 7,8 | must same as the PLC setting |
| Stop Bits | 1 | 1,2 | must same as the PLC setting |
| HMI Station No. | 0 | 0-255 | Does not apply to this protocol |
| PLC Station No. | 0 | 0-255 | must same as the PLC setting |

## PLC Setting:

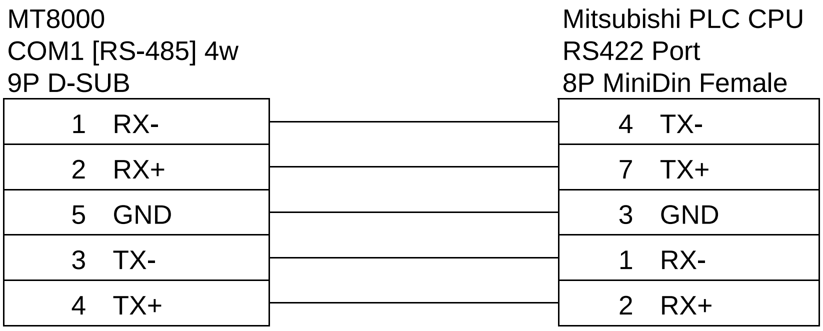
| | |
|---|---|
| Communication mode | 9600,Even,7,1 |

## Device address:

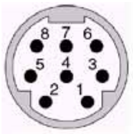
| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0-377 | Input Relay |
| B | Y | ooo | 0-377 | Output Relay |
| B | M | ddd | 0-9999 | Auxiliary Relay |
| B | T | ddd | 0-255 | Timer Relay |
| B | C | ddd | 0-255 | Counter Relay |
| W | TV | ddd | 0-255 | Timer Memory |
| W | CV | ddd | 0-199 | Counter Memory |

| | | | | |
|---|---|---|---|---|
| W | D | ddd | 0-9999 | Data Register |
| DW | CV2 | ddd | 200-255 | Counter Memory(D Word) |
| W | SD | ddd | 8000-9999 | Special Data Register |

## Wiring diagram:



| MT8000<br>COM1 [RS-485] 4w<br>9P D-SUB | Mitsubishi PLC CPU<br>RS422 Port<br>8P MiniDin Female |
|---|---|
| 1 RX- | 4 TX- |
| 2 RX+ | 7 TX+ |
| 5 GND | 3 GND |
| 3 TX- | 1 RX- |
| 4 TX+ | 2 RX+ |



8Pin miniDin
Female

# Mitsubishi FX2n

Mitsubishi FX2n series PLC

http://www.mitsubishi-automation.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Mitsubishi FX2n | Mitsubishi FX2n | |
| Com port | RS485 | RS232/RS485 | |
| Baud rate | 9600 | 9600/19200/38400/57600/115200 | |
| Parity bit | Even | | |
| Data Bits | 7 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | NO |
| Broadcast command | NO | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | 9600,Even,7,1 |

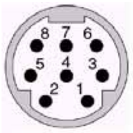
## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0-377 | Input Relay |
| B | Y | ooo | 0-377 | Output Relay |
| B | M | dddd | 0-7999 | Auxiliary Relay |
| B | T | ddd | 0-255 | Timer Relay |
| B | C | ddd | 0-255 | Counter Relay |
| B | SM | dddd | 8000-9999 | Special Auxiliary Relay |
| B | D_Bit | dddd(dd) | 0~7999(0~15) | Data Register Bit (D) |
| B | S | dddd | 0~4095 | State Relay (S) |
| W | TV | ddd | 0-255 | Timer Memory |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| W | CV | ddd | 0-199 | Counter Memory |
| W | D | ddd | 0-7999 | Data Register |
| DW | CV2 | ddd | 200-255 | Counter Memory(D Word) |
| W | SD | ddd | 8000-9999 | Special Data Register |

## Wiring diagram:

| MT8000<br>COM1 [RS-485]4w<br>9P D-SUB | Mitsubishi FX series<br>PLC CPU RS422 Port<br>8P MiniDin Female |
|---|---|
| 1 RX- | 4 TX- |
| 2 RX+ | 7 TX+ |
| 3 TX- | 1 RX- |
| 4 TX+ | 2 RX+ |
| 5 GND | 3 GND |



8Pin miniDin Female

# Mitsubishi FX3U

Mitsubishi FX3U/FX3UC

http://www.mitsubishi-automation.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MITSUBISHI FX3u | | |
| Com port | RS485 4w | RS232/RS485 2w/4w | |
| Baud rate | 9600 | 9600/19200 | must same as the PLC setting |
| Parity bit | Even | | must same as the PLC setting |
| Data Bits | 7 | | must same as the PLC setting |
| Stop Bits | 1 | | must same as the PLC setting |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 0 | | Does not apply to this protocol |

| Online Simulator | YES | Extend address mode | NO |
|---|---|---|---|
| | | | |

## PLC Setting:

| Communication mode | 9600,Even,7,1 |
|---|---|

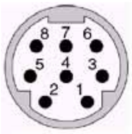
## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0~377 | Input Relay |
| B | Y | ooo | 0~377 | Output Relay |
| B | M | dddd | 0~7679 | Auxiliary Relay |
| B | SM | dddd | 8000~9999 | Special Relay (M) |
| B | S | dddd | 0~4095 | State Relay (S) |
| B | T | ddd | 0~511 | Timer Relay (T) |
| B | C | ddd | 0~199 | Counter Relay (C) |
| B | D_Bit | dddd(dd) | dddd=0~7999<br>(dd)=0~15 | Data Register Bit (D) |
| W | TV | ddd | 0~511 | Timer Memory (T) |
| W | CV | ddd | 0~199 | Counter Memory (C) |
| DW | CV2 | ddd | 200~255 | Counter Memory(D Word) |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| W | D | dddd | 0~7999 | Data Register (D) |
| W | SD | dddd | 8000~9999 | Special Data Register (D) |
| W | R | ddddd | 0~32767 | Extended Register (R) |

## Wiring diagram:

| MT8000<br>COM1[RS-485]4w<br>9P D-SUB | | Mitsubishi FX series<br>PLC CPU RS422 Port<br>8P MiniDin Female | |
|---|---|---|---|
| 1 | RX- | 4 | TX- |
| 2 | RX+ | 7 | TX+ |
| 3 | TX- | 1 | RX- |
| 4 | TX+ | 2 | RX+ |
| 5 | GND | 3 | GND |



8Pin miniDin Female

# MITSUBISHI FX232/485BD

Mitsubishi FX0n/FX2/FX2n COM For Communication Module BD
FX2N-485-BD, FX2N-232-BD, FX1N-485-BD and FX1N-232-BD
http://www.mitsubishi-automation.com

## HMI Setting:

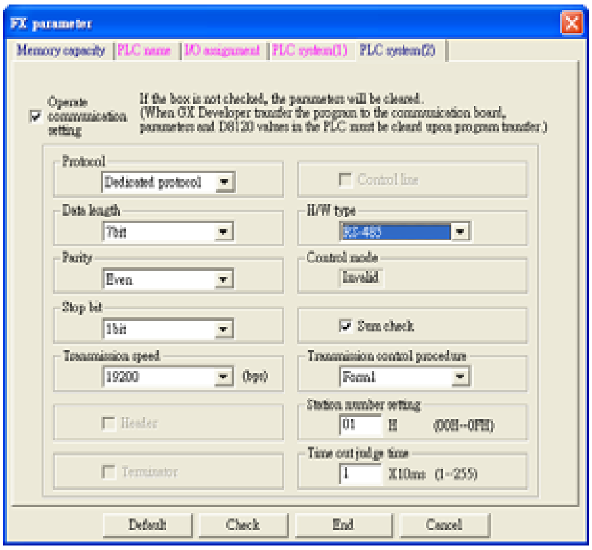
| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MITSUBISHI<br>FX232/485BD | | |
| Com port | RS232/RS485 | RS232/RS485 2w/4w | in accordance with the BD module |
| Baud rate | 19200 | 9600/19200 | must same as the PLC setting |
| Parity bit | Even | Even, Odd, None | must same as the PLC setting |
| Data Bits | 7 | 7,8 | must same as the PLC setting |
| Stop Bits | 1 | 1,2 | must same as the PLC setting |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 1 | 0-15 | must same as the PLC setting |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | YES |
| Broadcast command | | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | Must set PLC station when use the BD Module |

Register D8120 setting:set b9 and b8 of BFM#0 as 0

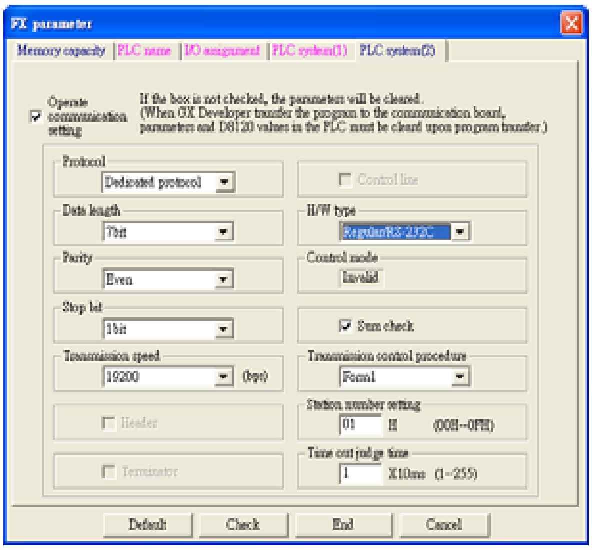


☑ Operate communication setting

If the box is not checked, the parameters will be cleared.
(When GX Developer transfer the program to the communication board, parameters and D8120 values in the PLC must be cleard upon program transfer.)

Protocol: Dedicated protocol
□ Control line
Data length: 7bit
H/W type: RS-485
Parity: Even
Control mode: Invalid
Stop bit: 1bit
☑ Sum check
Transmission speed: 19200 (bps)
Transmission control procedure: Form1
□ Header
Station number setting: 01 H (00H--0FH)
□ Terminator
Time out judge time: 1 X10ms (1--255)

FX2N-485-BD, FX1N-485-BD



☑ Operate communication setting

If the box is not checked, the parameters will be cleared.
(When GX Developer transfer the program to the communication board, parameters and D8120 values in the PLC must be cleard upon program transfer.)

Protocol: Dedicated protocol
□ Control line
Data length: 7bit
H/W type: Regular/RS-232C
Parity: Even
Control mode: Invalid
Stop bit: 1bit
☑ Sum check
Transmission speed: 19200 (bps)
Transmission control procedure: Form1
□ Header
Station number setting: 01 H (00H--0FH)
□ Terminator
Time out judge time: 1 X10ms (1--255)

FX2N-232-BD, FX1N-232-BD

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0-377 | Input Relay |
| B | Y | ooo | 0-377 | Output Relay |
| B | M | ddd | 0-9999 | Auxiliary Relay |
| B | T | ddd | 0-255 | Timer Relay |
| B | C | ddd | 0-255 | Counter Relay |
| W | TV | ddd | 0-255 | Timer Memory |
| W | CV | ddd | 0-199 | Counter Memory |
| W | D | ddd | 0-9999 | Data Register |
| W | CV2 | ddd | 200-255 | Counter Memory(D Word) |

## Wiring diagram:

Communication Module RS232BD:

MT8000 RS232
9P D-SUB

**232BD Module**
9P D-SUB
Female

| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 2 RXD |
| 2 RX | 6 RX | 8 RX | 3 TXD |
| 5 GND | 5 GND | 5 GND | 5 GND |

Communication Module RS485BD:

**MT8000 COM1**
**RS-485 4w**
9P D-SUB Male

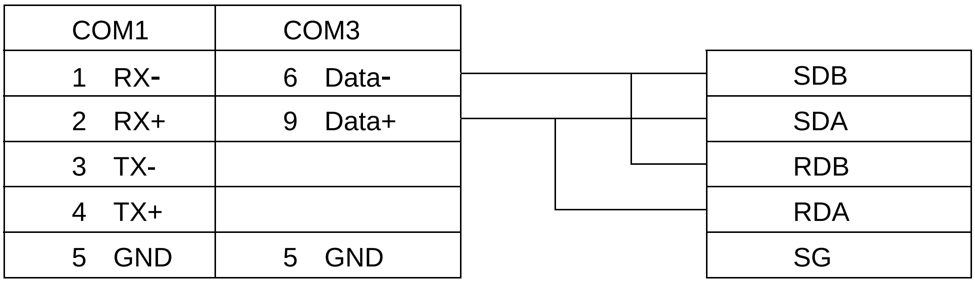
**485BD Module**
5P terminal

| | |
|---|---|
| 1 RX- | SDB |
| 2 RX+ | SDA |
| 3 TX- | RDB |
| 4 TX+ | RDA |
| 5 GND | SG |

Communication Module RS485BD:

MT8000 RS-485 2Wire
9P D-SUB

**RS485BD Module**
5P terminal



| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 3 TX- | |
| 4 TX+ | |
| 5 GND | 5 GND |

| |
|---|
| SDB |
| SDA |
| RDB |
| RDA |
| SG |

# MITSUBISHI Q02H

Mitsubishi Q02H CPU port.

http://www.mitsubishi-automation.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MITSUBISHI Q02H | | |
| Com port | RS232 | RS485 4W, RS232 | |
| Baud rate | 115200 | 115200 only | |
| Parity bit | Odd | | |
| Data Bits | 8 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | NO |
| Broadcast command | NO | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | hhh | 0~1FFF | Input Relay |
| B | Y | hhh | 0~1FFF | Output Relay |
| B | M | dddd | 0~8191 | Internal Relay |
| B | L | dddd | 0~8191 | Latch Relay |
| B | F | dddd | 0~2047 | Annunciator |
| B | V | dddd | 0~2047 | Edge Relay |
| B | B | hhh | 0~1FFF | Link Relay |
| B | TC | ddd | 0~2047 | Timer Coil |
| B | SS | ddd | 0~2047 | Retentive Timer Contact |
| B | SC | ddd | 0~2047 | Retentive Timer Coil |
| B | CS | ddd | 0~1023 | Counter Contact |
| B | CC | ddd | 0~1023 | Counter Coil |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | SB | hhh | 0~7FF | Special Link Relay |
| B | S | dddd | 0~8191 | Step Relay |
| B | DX | hhh | 0~1FFF | Direct Input |
| B | DY | hhh | 0~1FFF | Direct Output |
| B | TS | ddd | 0~2047 | Timer Contact |
| W | W | hhh | 0~1FFF | Link Register |
| W | TN | ddd | 0~2047 | Timer Current Value |
| W | SN | ddd | 0~2047 | Retentive Timer Current Value |
| W | CN | ddd | 0~1023 | Counter Current Value |
| W | R | ddddd | 0~32767 | File Register |
| W | SW | hhh | 0~7FF | Special Link Register |
| W | Z | d | 0~9 | Index Register |
| W | ZR | hhhh | 0~FFFF | File Register |
| W | D | ddddd | 0~12287 | Data Register |

ddd: Decimal, hhh: Hexadecimal, ooo: Octal.

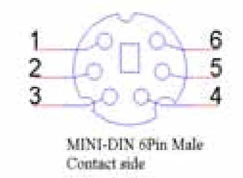
## Wiring diagram:

RS-232:

MT8000 RS232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

Q02
CPU port
Mini-DIN 6pin



| | |
|---|---|
| 3 | RXD |
| 4 | TXD |
| 5 | GND |

MINI-DIN 6Pin
Female

# MITSUBISHI Q06H

Mitsubishi Q06H CPU port.

http://www.mitsubishi-automation.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MITSUBISHI Q06H | | |
| Com port | RS232 | RS485 4W, RS232 | |
| Baud rate | 115200 | 115200 only | |
| Parity bit | Odd | | |
| Data Bits | 8 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | NO |
| Broadcast command | NO | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | hhh | 0~1FFF | Input Relay |
| B | Y | hhh | 0~1FFF | Output Relay |
| B | M | dddd | 0~8191 | Internal Relay |
| B | L | dddd | 0~8191 | Latch Relay |
| B | F | dddd | 0~2047 | Annunciator |
| B | V | dddd | 0~2047 | Edge Relay |
| B | B | hhh | 0~1FFF | Link Relay |
| B | TC | ddd | 0~2047 | Timer Coil |
| B | SS | ddd | 0~2047 | Retentive Timer Contact |
| B | SC | ddd | 0~2047 | Retentive Timer Coil |
| B | CS | ddd | 0~1023 | Counter Contact |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | CC | ddd | 0~1023 | Counter Coil |
| B | SB | hhh | 0~7FF | Special Link Relay |
| B | S | dddd | 0~8191 | Step Relay |
| B | DX | hhh | 0~1FFF | Direct Input |
| B | DY | hhh | 0~1FFF | Direct Output |
| B | TS | ddd | 0~2047 | Timer Contact |
| W | W | hhh | 0~1FFF | Link Register |
| W | TN | ddd | 0~2047 | Timer Current Value |
| W | SN | ddd | 0~2047 | Retentive Timer Current Value |
| W | CN | ddd | 0~1023 | Counter Current Value |
| W | R | ddddd | 0~32767 | File Register |
| W | SW | hhh | 0~7FF | Special Link Register |
| W | Z | d | 0~9 | Index Register |
| W | ZR | hhhh | 0~FFFF | File Register |
| W | D | ddddd | 0~12287 | Data Register |

ddd: Decimal, hhh: Hexadecimal, ooo: Octal.

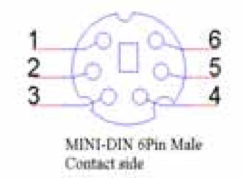
## Wiring diagram:

RS-232:

MT8000 RS232
9P D-SUB

Q06
CPU port
Mini-DIN 6pin

| COM1 | COM2 | COM3 | | |
|---|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 3 | RXD |
| 2 RX | 6 RX | 8 RX | 4 | TXD |
| 5 GND | 5 GND | 5 GND | 5 | GND |



MINI-DIN 6Pin
Female

# MITSUBISHI QJ71

Mitsubishi Q series PLC with QJ71C24 communication module, Q00, Q01 CPU port.
http://www.mitsubishi-automation.com

## HMI Setting:

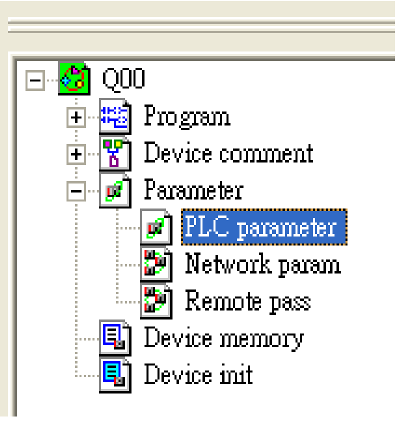
| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MITSUBISHI<br>Melsec_QJ71 | | |
| Com port | RS232 | RS485 4W, RS232 | |
| Baud rate | 9600 | | |
| Parity bit | Odd | | |
| Data Bits | 8 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | | |

| | |
|---|---|
| Online Simulator | YES |
| Extend address mode | NO |

## PLC Setting:

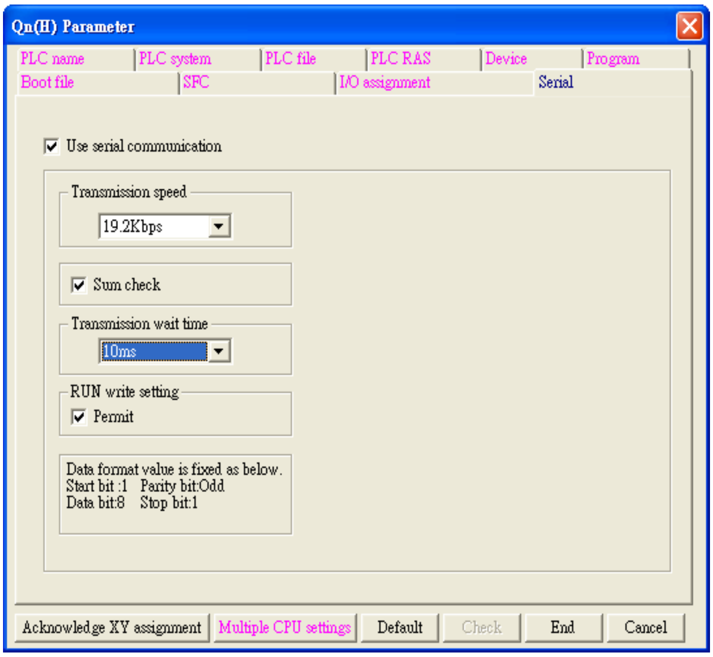
| | |
|---|---|
| Communication mode | |

Q00, Q01 CPU port setting:



1. In the GX Developer “PLC data list” click the “PLC parameter”
2. In the “PLC parameter” select “Serial” page.
3. Select “Use serial communication”
4. Set the “Transmission speed”. 9600~115200.
5. Select “Sum check”
6. Select “Transmission wait time” to 10ms.
7. Select “RUN write setting”
8. Click “End” close the dialog.
9. Write the PLC Parameter to PLC.

10. RESET the PLC, the parameter will active.



☑ Use serial communication

Transmission speed: 19.2Kbps

☑ Sum check

Transmission wait time: 10ms

RUN write setting
☑ Permit

Data format value is fixed as below.
Start bit:1 Parity bit:Odd
Data bit:8 Stop bit:1

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | hhh | 0~1FFF | Input Relay |
| B | Y | hhh | 0~1FFF | Output Relay |
| B | M | dddd | 0~8191 | Internal Relay |
| B | L | dddd | 0~8191 | Latch Relay |
| B | F | dddd | 0~2047 | Annunciator |
| B | V | dddd | 0~2047 | Edge Relay |
| B | B | hhh | 0~1FFF | Link Relay |
| B | TC | ddd | 0~2047 | Timer Coil |
| B | SS | ddd | 0~2047 | Retentive Timer Contact |
| B | SC | ddd | 0~2047 | Retentive Timer Coil |
| B | CS | ddd | 0~1023 | Counter Contact |
| B | CC | ddd | 0~1023 | Counter Coil |
| B | SB | hhh | 0~7FF | Special Link Relay |
| B | S | dddd | 0~8191 | Step Relay |
| B | DX | hhh | 0~1FFF | Direct Input |
| B | DY | hhh | 0~1FFF | Direct Output |
| B | TS | ddd | 0~2047 | Timer Contact |
| W | W | hhh | 0~1FFF | Link Register |
| W | TN | ddd | 0~2047 | Timer Current Value |
| W | SN | ddd | 0~2047 | Retentive Timer Current Value |
| W | CN | ddd | 0~1023 | Counter Current Value |
| W | R | ddddd | 0~32767 | File Register |
| W | SW | hhh | 0~7FF | Special Link Register |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| W | Z | d | 0~9 | Index Register |
| W | ZR | hhhh | 0~FFFF | File Register |
| W | D | ddddd | 0~12287 | Data Register |

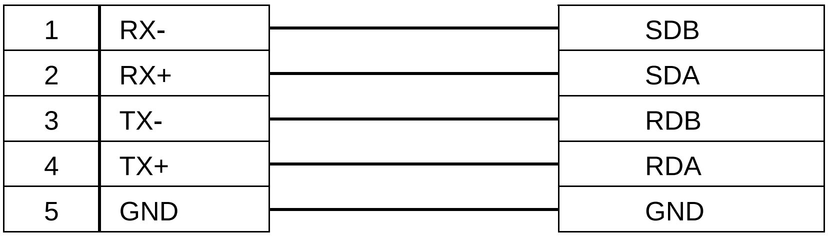
ddd: Decimal, hhh: Hexadecimal, ooo: Octal.

## Wiring diagram:

RS-485 4W:

**MT8000 COM1**
**RS-485 4w**
9P D-SUB Male

**QJ71C24 CH.2**
RS-422

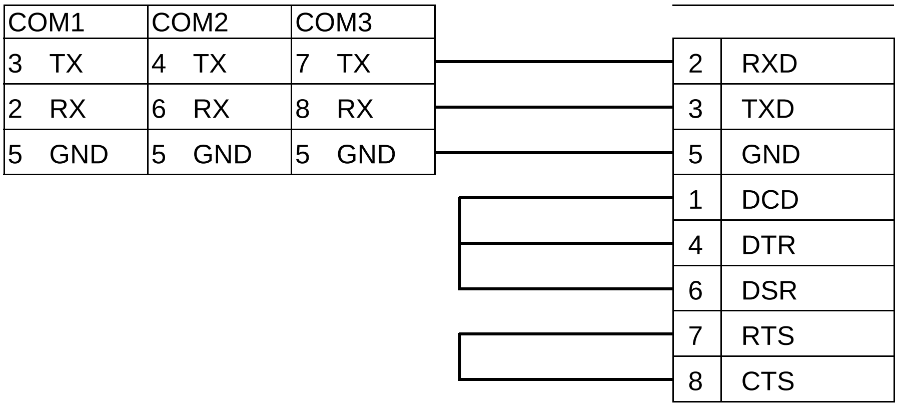


| | | |
|---|---|---|
| 1 | RX- | SDB |
| 2 | RX+ | SDA |
| 3 | TX- | RDB |
| 4 | TX+ | RDA |
| 5 | GND | GND |

RS-232:

**MT8000 RS232**
9P D-SUB

**QJ71C24 CH.1**
RS232 port
9P D-SUB Male

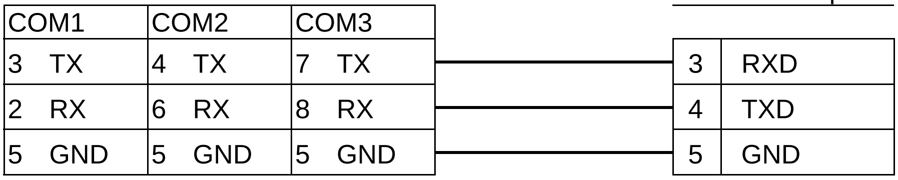


| COM1 | COM2 | COM3 | | |
|---|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 2 | RXD |
| 2 RX | 6 RX | 8 RX | 3 | TXD |
| 5 GND | 5 GND | 5 GND | 5 | GND |
| | | | 1 | DCD |
| | | | 4 | DTR |
| | | | 6 | DSR |
| | | | 7 | RTS |
| | | | 8 | CTS |

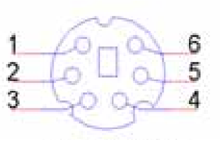
Q00, Q01 CPU port RS-232:

**MT8000 RS232**
9P D-SUB

**Q00, Q01**
CPU port
Mini-DIN 6pin



| COM1 | COM2 | COM3 | | |
|---|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 3 | RXD |
| 2 RX | 6 RX | 8 RX | 4 | TXD |
| 5 GND | 5 GND | 5 GND | 5 | GND |



MINI-DIN 6Pin

Female

# MODBUS ASCII

MODBUS ASCII CONTROLLER

http://www.modbus.org

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Modbus ASCII | | |
| Com port | RS485 | RS232/RS485 | |
| Baud rate | 9600 | 9600/19200/38400/57600/<br>115200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 8 | 7,8 | |
| Stop Bits | 1 | 1,2 | |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 1 | 0-255 | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Broadcast command | YES |
| Extend address mode | YES | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | Modbus ASCII protocol |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | 0x | ddddd | 1-65535 | Output bit |
| B | 1x | ddddd | 1-65535 | Input bit (read only) |
| B | 3x_Bit | ddddd(dd) | 100-6553515 | Input Register bit (read only) |
| B | 4x_Bit | ddddd(dd) | 100-6553515 | Output Register bit |
| W | 3x | ddddd | 1-65535 | Input Register (read only) |
| W | 4x | ddddd | 1-65535 | Output Register |

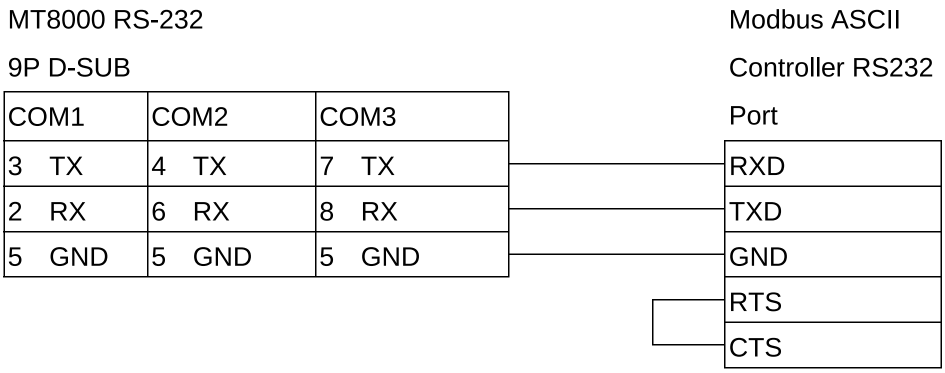
Modbus RTU function code:

| | | |
|---|---|---|
| 0x | 0x01 Read coil | 0x05 write single coil |
| 1x | 0x02 Read discrete input | N/A for write operation |
| 3x | 0x04 Read input register | N/A for write operation |
| 4x | 0x03 Read holding register | 0x10 write multiple register |

3xbit is equivalent to 3x
4xbit is equivalent to 4x

## Wiring diagram:

### MODBUS RS232 PORT

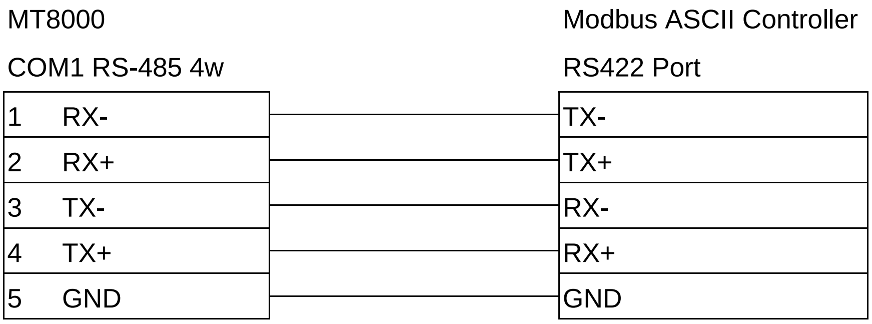


MT8000 RS-232
9P D-SUB

Modbus ASCII
Controller RS232
Port

| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | RXD |
| 2 RX | 6 RX | 8 RX | TXD |
| 5 GND | 5 GND | 5 GND | GND |
| | | | RTS |
| | | | CTS |

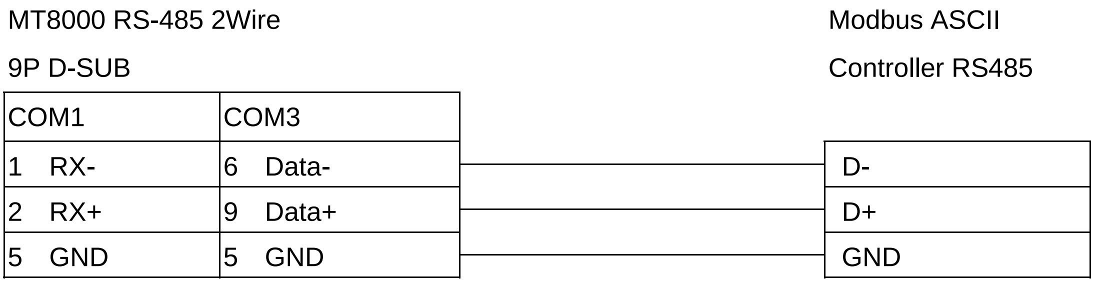
### MODBUS RS422/485 PORT



MT8000
COM1 RS-485 4w

Modbus ASCII Controller
RS422 Port

| | |
|---|---|
| 1 RX- | TX- |
| 2 RX+ | TX+ |
| 3 TX- | RX- |
| 4 TX+ | RX+ |
| 5 GND | GND |



MT8000 RS-485 2Wire
9P D-SUB

Modbus ASCII
Controller RS485

| COM1 | COM3 | |
|---|---|---|
| 1 RX- | 6 Data- | D- |
| 2 RX+ | 9 Data+ | D+ |
| 5 GND | 5 GND | GND |

# MODBUS RTU

MODBUS RTU CONTROLLER

http://www.modbus.org

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Modbus RTU | | |
| Com port | RS485 | RS232/RS485 | |
| Baud rate | 9600 | 9600~115200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 8 | 7,8 | |
| Stop Bits | 1 | 1,2 | |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 1 | 0-255 | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Broadcast command | YES |
| Extend address mode | YES | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | Modbus RTU protocol |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | 0x | ddddd | 1-65535 | Output bit |
| B | 1x | ddddd | 1-65535 | Input bit (read only) |
| B | 3x_Bit | ddddd(dd) | 100-6553515 | Input Register bit (read only) |
| B | 4x_Bit | ddddd(dd) | 100-6553515 | Output Register bit |
| W | 3x | ddddd | 1-65535 | Input Register (read only) |
| W | 4x | ddddd | 1-65535 | Output Register |
| DW | 5x | ddddd | 1-65535 | 4x double word swap |
| W | 6x | ddddd | 1-65535 | 4x single word write |

NOTE:

Address type “5x” are mapping to Hold Reg. The communication protocol of 5x almost same as “4x” except “5x”making double word swap.

If 4x have following information

| Address | 1 | 2 | 3 | 4 | 5 | 6 | ... |
|---|---|---|---|---|---|---|---|
| Data in word | 0x1 | 0x2 | 0x3 | 0x4 | 0x5 | 0x6 | |
| Data | 0x20001 | | 0x40003 | | 0x60005 | | |

For 5x, it become

| Address | 1 | 2 | 3 | 4 | 5 | 6 | ... |
|---|---|---|---|---|---|---|---|
| Data in word | 0x2 | 0x1 | 0x4 | 0x3 | 0x6 | 0x5 | |
| Data | 0x10002 | | 0x30004 | | 0x50006 | | |

Modbus RTU function code:

| | | |
|---|---|---|
| 0x | 0x01 Read coil | 0x05 write single coil |
| 1x | 0x02 Read discrete input | N/A for write operation |
| 3x | 0x04 Read input register | N/A for write operation |
| 4x | 0x03 Read holding register | 0x10 write multiple register |
| 5x | 0x03 Read holding register | 0x10 write multiple register |

( note: reverse word order in double word format)

3xbit is equivalent to 3x

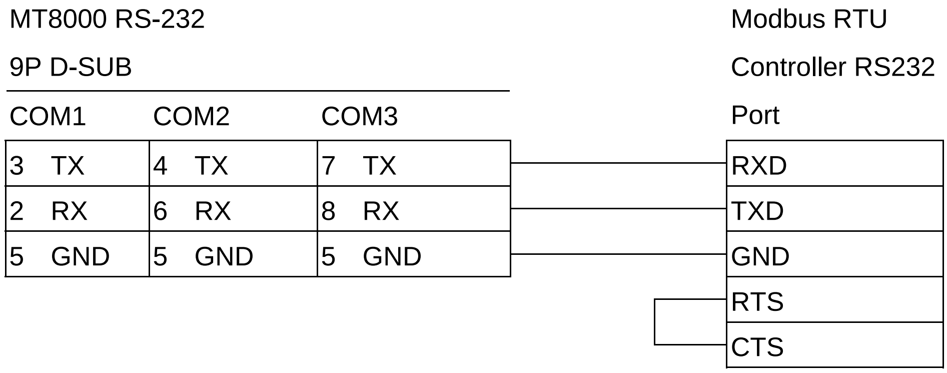
4xbit is equivalent to 4x

| | | |
|---|---|---|
| 6x | 0x03 Read holding register | 0x06 write single register |

( note: use 6x device is limited to device of one word only )

## Wiring diagram:

MODBUS RS232 PORT



MT8000 RS-232
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

Modbus RTU
Controller RS232
Port

| |
|---|
| RXD |
| TXD |
| GND |
| RTS |
| CTS |

## MODBUS RS422/485 PORT

MT8000

COM1 RS-485 4w

Modbus RTU Controller

RS422 Port

| | | |
|---|---|---|
| 1 | RX- | TX- |
| 2 | RX+ | TX+ |
| 3 | TX- | RX- |
| 4 | TX+ | RX+ |
| 5 | GND | GND |

MT8000 RS-485 2Wire

9P D-SUB

Modbus RTU

Controller RS485

| COM1 | COM3 | |
|---|---|---|
| 1 RX- | 6 Data- | D- |
| 2 RX+ | 9 Data+ | D+ |
| 5 GND | 5 GND | GND |

# Modbus Server (Modbus RTU Slave)

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Modbus Server | | |
| Com port | RS232 | RS232, RS485 | |
| Baud rate | 9600 | 9600~115200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 8 | 8 | |
| Stop Bits | 1 | 1 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 1 | 1-31 | **HMI Modbus station No.** |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | NO |
| Broadcast command | NO | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **Modbus RTU protocol** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | LB | dddd | 0~9998 | Mapping to 0x/1x 1~9999 |
| W | LW | dddd | 0~9998 | Mapping to 3x/4x 1~9999 |
| W | RW | ddddd | 0~55536 | Mapping to 3x/4x 10000~65536 |

LB0 = 0x0001, LB1 = 0x0002, LW0 = 3x0001, LW1 = 3x0002

Modbus RTU Server doesn't support function Code 06(to preset single register), please use function code 16(0x10, preset multiple register).

# Wiring diagram:

RS-232:

**MT8000 RS232**
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

Modbus RTU RS232
9P D-SUB

| | |
|---|---|
| 3 | RX |
| 2 | TX |
| 5 | GND |

RS-485:

**MT8000 RS485 2w**
9P D-SUB

| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 5 GND | 5 GND |

Modbus RTU RS-485
9P D-SUB

| | |
|---|---|
| 1 | RX- |
| 2 | RX+ |
| 5 | GND |

# Modbus TCP/IP

Modbus RTU TCP/IP device.

http://www.modbus.org

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | MODBUS TCP/IP | | |
| Com port | Ethernet | | |
| HMI Station No. | 0 | Does not apply | |
| PLC Station No. | 0 | 0~255 | |
| TCP/IP port | 502 | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | |

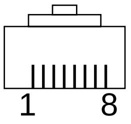
## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | 0x | ddddd | 1-65535 | Output bit |
| B | 1x | ddddd dd | 1-65535 | Input bit (read only) |
| B | 3x_bit | ddddd dd | 100-6553515 | Input Register bit (read only) |
| B | 4x_bit | ddddd | 100-6553515 | Output Register bit |
| W | 3x | ddddd | 1-65535 | Input Register (read only) |
| W | 4x | ddddd | 1-65535 | Output Register |
| DW | 5x | ddddd | 1-65535 | 4x double word swap |

## Wiring diagram:

Ethernet::

| MT500 Ethernet RJ45 | | Wire color | Ethernet Hub or Switch RJ45 | |
|---|---|---|---|---|
| 1 | TX+ | White/Orange | 1 | RX+ |
| 2 | TX- | Orange | 2 | RX- |
| 3 | RX+ | White/Green | 3 | TX+ |
| 4 | BD4+ | Blue | 4 | BD4+ |
| 5 | BD4- | White/Blue | 5 | BD4- |
| 6 | RX- | Green | 6 | TX- |
| 7 | BD3+ | White/Brown | 7 | BD3+ |
| 8 | BD3- | Brown | 8 | BD3- |



RJ45

Ethernet: Direct connect (crossover cable)

| MT500 Ethernet RJ45 | | Wire color | Modbus TCP Device RJ45 | |
|---|---|---|---|---|
| 1 | TX+ | White/Orange | 3 | RX+ |
| 2 | TX- | Orange | 6 | RX- |
| 3 | RX+ | White/Green | 1 | TX+ |
| 4 | BD4+ | Blue | 4 | BD4+ |
| 5 | BD4- | White/Blue | 5 | BD4- |
| 6 | RX- | Green | 2 | TX- |
| 7 | BD3+ | White/Brown | 7 | BD3+ |
| 8 | BD3- | Brown | 8 | BD3- |

# OMRON C/CQM1 Series

OMRON C, CPM, CQM Series (Host Link Protocol),
http://oeiweb.omron.com/oei/Products-PLC.htm

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | OMRON C/CQM1 Series | | |
| Com port | RS232 | RS232, RS422, RS485 | |
| Baud rate | 9600 | 9600, 19200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 7 | 7 or 8 | |
| Stop Bits | 2 | 1 or 2 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | 0-31 | **Host Link Station No.** |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Broadcast command | YES |
| Extend address mode | YES | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **Host Link protocol** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | IR | ddd(dd) | 0-409515 | I/O and internal Relay |
| B | HR | ddd(dd) | 0-409515 | Hold Relay |
| B | AR | ddd(dd) | 0-409515 | Auxiliary Relay |
| B | LR | ddd(dd) | 0-409515 | Link Relay |
| B | TC | ddd | 0-519 | Timer/Counter Register |
| W | DM | dddd | 0-6659 | Data register |
| W | EM0 | dddd | 0-6149 | Extend Memory |

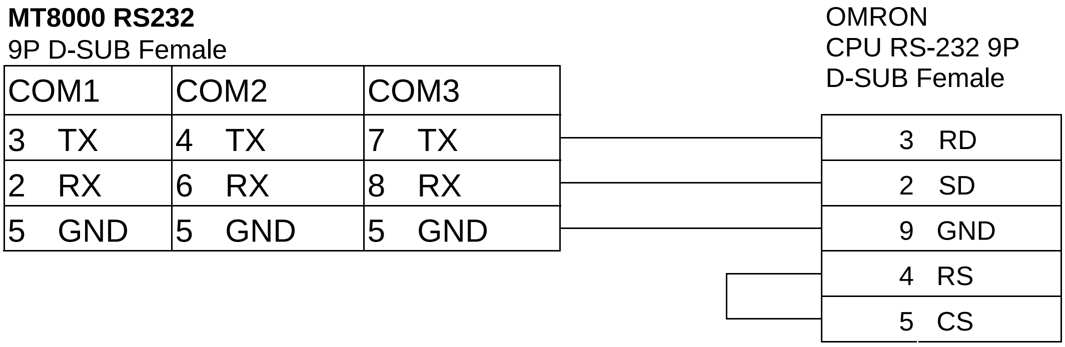
## Wiring diagram:

CPU Port(CPM2A,CQM1/1H,C200H/HS/ALPHA series)

Communication Module:

CPM1-CIF01 adapter(for CPM1/CPM1A/CPM2A series,CQM1/CQM1H series)

CPM1H-SCB41 communication module(for CQM1H-CPU51/61)



**MT8000 RS232**
9P D-SUB Female

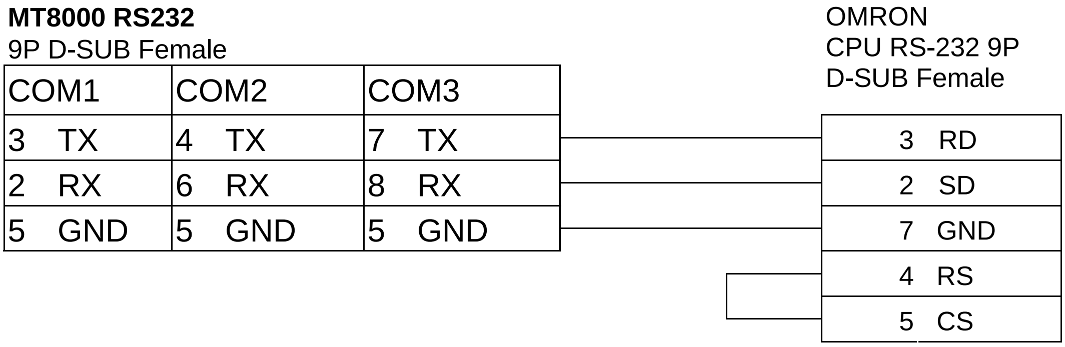
| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

OMRON
CPU RS-232 9P
D-SUB Female

| |
|---|
| 3 RD |
| 2 SD |
| 9 GND |
| 4 RS |
| 5 CS |

C200h-LK201,3G2A6-LK201 communication module

C200HW-COM02/03/04/05/06 communication module



**MT8000 RS232**
9P D-SUB Female

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

OMRON
CPU RS-232 9P
D-SUB Female

| |
|---|
| 3 RD |
| 2 SD |
| 7 GND |
| 4 RS |
| 5 CS |

# OMRON CJ1/CS1

OMRON CJ1M, CJ1H, CJ1G, CS1H and CS1G. (Host Link Protocol FINS command), This driver supports Extend Addressing mode.

http://oeiweb.omron.com/oei/Products-PLC.htm

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | OMRON CJ1/CS1 | | |
| Com port | RS232 | RS232, RS422, RS485 | |
| Baud rate | 9600 | 9600, 19200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 7 | 7 or 8 | |
| Stop Bits | 2 | 1 or 2 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | 0-31 | **Host Link Station No.** |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | YES |
| Broadcast command | NO | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **Host Link protocol** |

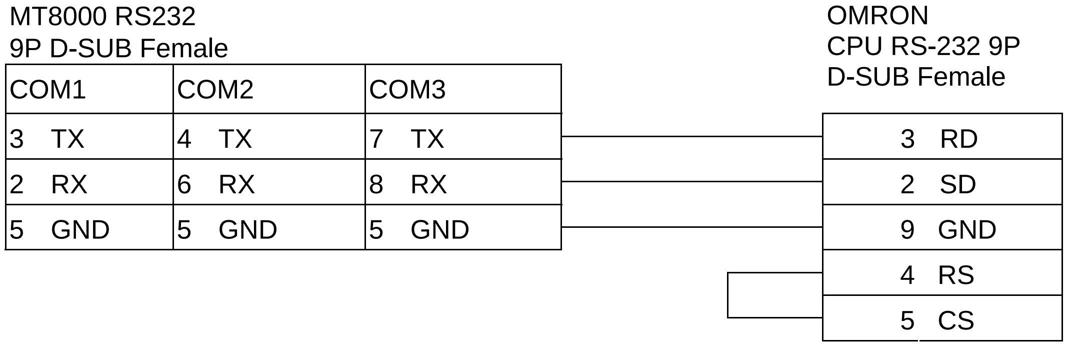
## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| Bit | D_bit | ddd(dd) | ddd:0~32767 (dd): 0~15 | Data Memory (DM) |
| Bit | H_bit | ddd(dd) | ddd:0~511 (dd): 0~15 | Holding Area (HR) |
| Bit | W_bit | ddd(dd) | ddd:0~511 (dd): 0~15 | Work Area (WR) |
| Bit | CIO_bit | ddd(dd) | ddd:0~6143 (dd): 0~15 | Channel I/O (CIO) |
| Bit | A_bit | ddd(dd) | ddd:0~959 (dd): 0~15 | Auxiliary Relay (AR) |
| Bit | T_bit | ddd | ddd:0~4095 | Timer (TIM) |
| Bit | C_bit | ddd | ddd:0~4095 | Counter (CNT) |
| Word | D | ddd | ddd:0~32767 | Data Memory (DM) |
| Word | H | ddd | ddd:0~511 | Holding Area (HR) |
| Word | W | ddd | ddd:0~511 | Work Area (WR) |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| Word | CIO | ddd | ddd:0~6143 | Channel I/O (CIO) |
| Word | A | ddd | ddd:0~959 | Auxiliary Relay (AR) |
| Word | T | ddd | ddd:0~4095 | Timer (TIM) |
| Word | C | ddd | ddd:0~4095 | Counter (CNT) |

## Wiring diagram:

RS-232:



MT8000 RS232
9P D-SUB Female

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

OMRON
CPU RS-232 9P
D-SUB Female

| |
|---|
| 3 RD |
| 2 SD |
| 9 GND |
| 4 RS |
| 5 CS |

# OMRON E5CN

OMRON E5□N series Temperature controller with communication option.

E5EN/CN/GN series

http://oeiweb.omron.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | OMRON E5CN | | |
| Com port | RS485 2W | | |
| Baud rate | 9600 | 9600/19200/38400/57600<br>/115200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 7 | 7,8 | |
| Stop Bits | 2 | 1,2 | |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 0 | 0-99 | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Broadcast command | YES |
| Extend address mode | YES | | |

## PLC Setting:

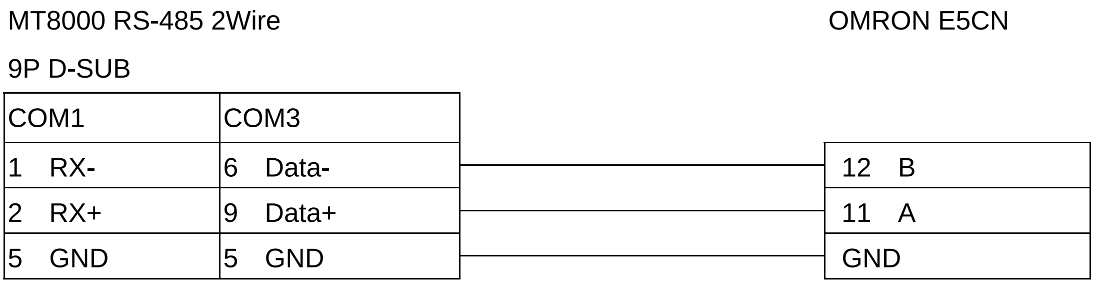
| | |
|---|---|
| Communication mode | 9600, Even, 7, 2 (default) |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | Status | dd | 0-31 | Page40 |
| DW | C0 | hhhh | 0-5 | Read only (Hex) Page34 |
| DW | C1 | hhhh | 0-1C | Read/Write (Hex) Page35 |
| DW | C3 | hhhh | 0-1D | Read/Write (Hex) Page36 |
| W | Operation00_00 | hh | 0 | Communications writing OFF (disabled) |
| W | Operation00_01 | hh | 0 | Communications writing ON(Enabled) |
| W | Operation01_00 | hh | 0 | Run |
| W | Operation01_01 | hh | 0 | Stop |
| W | Operation02_00 | hh | 0 | Multi-SP Set point 0 |
| W | Operation02_01 | hh | 0 | Multi-SP Set point 1 |

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| W | Operation02_02 | hh | 0 | Multi-SP Set point 2 |
| W | Operation02_03 | hh | 0 | Multi-SP Set point 3 |
| W | Operation03_00 | hh | 0 | AT cancel |
| W | Operation03_01 | hh | 0 | AT execute |
| W | Operation04_00 | hh | 0 | Write mode (Backup) |
| W | Operation04_01 | hh | 0 | Write mode (Ram) |
| W | Operation05_00 | hh | 0 | Save RAM data |
| W | Operation06_00 | hh | 0 | Software reset |
| W | Operation07_00 | hh | 0 | Move to setup area 1 |
| W | Operation08_00 | hh | 0 | Move to protect level |

## Wiring diagram:



MT8000 RS-485 2Wire

9P D-SUB

| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 5 GND | 5 GND |

OMRON E5CN

| | |
|---|---|
| 12 | B |
| 11 | A |
| GND | |

# SIEMENS S7/200

Siemens S7/200 series PLC(CPU212/214/215/216/221/222/224/226/226XM)

http://www.ad.siemens.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | SIEMENS S7/200 | | |
| Com port | RS485 | RS485 | |
| Baud rate | 9600 | 9600, 19200 | Must same as the PLC setting |
| Parity bit | Even | Even, Odd, None | Must same as the PLC setting |
| Data Bits | 8 | 7,8 | Must same as the PLC setting |
| Stop Bits | 1 | 1, 2 | Must same as the PLC setting |
| HMI Station No. | 0 | 0-255 | |
| PLC Station No. | 2 | 0-255 | Must same as the PLC setting |
| Turn around delay (ms) | 5 | | |
| Reserved 1 | 30 | | ACK delay time |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | NO |
| Broadcast command | NO | | |

## PLC Setting:

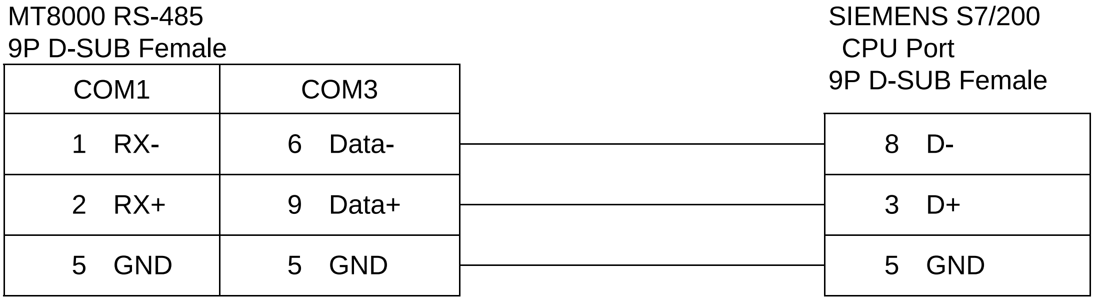
| | |
|---|---|
| Communication mode | **Set station number as 2** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | I | dddd(o) | 0-40957 | Input (I) |
| B | Q | dddd(o) | 0-40957 | Output (O) |
| B | M | dddd(o) | 0-40957 | Bit Memory |
| B | VW.Bit | ddddd(o) | 0-102397 | V Memory bit address |
| W | VW | ddddd | 0-10238 | V memory |
| DW | VD | ddddd | 0-10236 | V memory double word |

* Double word and Floating point value must use VD device type.

## Wiring diagram:



MT8000 RS-485
9P D-SUB Female

| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 5 GND | 5 GND |

SIEMENS S7/200
CPU Port
9P D-SUB Female

| | |
|---|---|
| 8 | D- |
| 3 | D+ |
| 5 | GND |

# SIEMENS S7/300

Siemens S7/300 series PLC

http://www.ad.siemens.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | SIEMENS S7/300 | | |
| Com port | RS232 | | |
| Baud rate | 19200, 38400 | 9600~115200 | Must same as the PLC setting |
| Parity bit | Odd | | |
| Data Bits | 8 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | Does not apply to this protocol |
| PLC Station No. | 2 | | Must same as the PLC setting |

## PLC Setting:

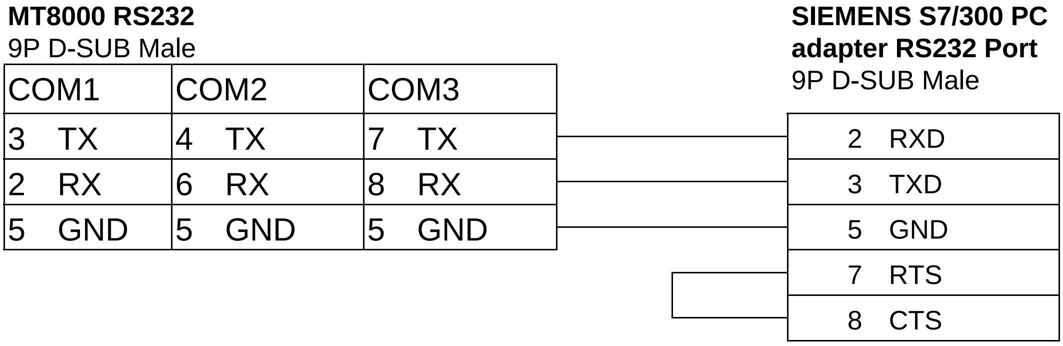
| | |
|---|---|
| Communication mode | |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | I | dddd(o) | 0-40957 | Input (I) |
| B | Q | dddd(o) | 0-40957 | Output (O) |
| B | M | dddd(o) | 0-40957 | Bit Memory |
| B | DB0Bit-DB99Bit | dddd(o) | 0-81927 | Data register bit |
| W | DB0-DB99 | dddd | 0-8192 | Data register(must be even) |
| W | IW | dddd | 0-4095 | Input (I) |
| W | QW | dddd | 0-4095 | Output (O) |
| W | MW | dddd | 0-4095 | Bit Memory |
| W | DBn | dddddd | 000000-998192 | Data register(must be even) |
| DW | DBDn | ffdddd | ff:0-99, dddd:0-8192 | Data register double word |

* Double word and Floating point value must use DBDn device type.

# Wiring diagram:

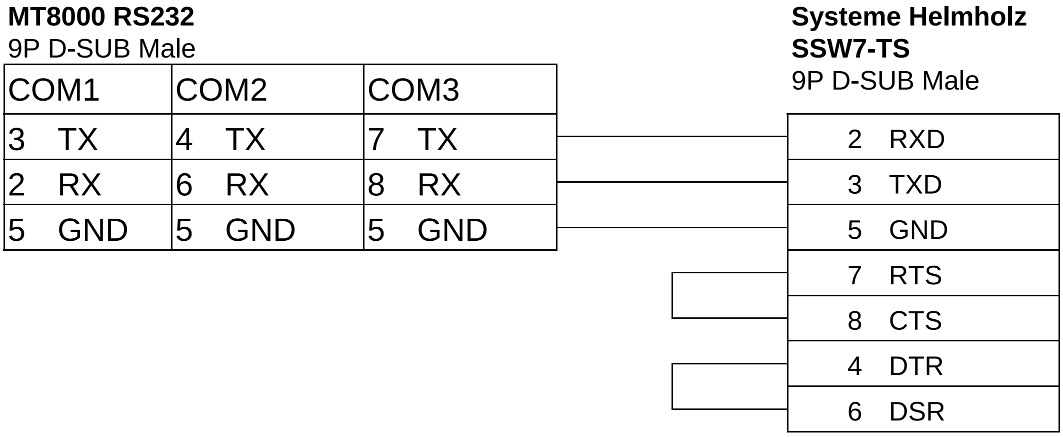


**MT8000 RS232**
9P D-SUB Male

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

**SIEMENS S7/300 PC adapter RS232 Port**
9P D-SUB Male

| | |
|---|---|
| 2 | RXD |
| 3 | TXD |
| 5 | GND |
| 7 | RTS |
| 8 | CTS |



**MT8000 RS232**
9P D-SUB Male

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

**Systeme Helmholz SSW7-TS**
9P D-SUB Male

| | |
|---|---|
| 2 | RXD |
| 3 | TXD |
| 5 | GND |
| 7 | RTS |
| 8 | CTS |
| 4 | DTR |
| 6 | DSR |

# Telemecanique UniTelWay

Modicon TSX Micro&Nano&Neza series PLC

http://www.modicon.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Telemecanique UniTelWay | | |
| Com port | RS485 | RS232/RS485 | |
| Baud rate | 9600 | 9600~115200 | Must same as the PLC setting |
| Parity bit | Odd | Even, Odd, None | Must same as the PLC setting |
| Data Bits | 8 | 7,8 | Must set as 8 to this protocol |
| Stop Bits | 1 | 1, 2 | Must same as the PLC setting |
| HMI Station No. | 5 | 4-7 | Must set by manual |
| PLC Station No. | 0 | 0-3 | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | YES |
| Broadcast command | NO | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **UniTelWay protocol,set PLC as master** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | S | ddd | 0-32767 | Internal relay |
| B | M | ddd | 0-32767 | Auxiliary relay |
| B | MW.B | ddd(dd) | 0-999915 | Data register bit |
| W | MW | ddd | 0-9999 | Data register |

# Wiring diagram:

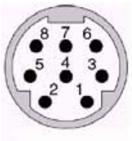
## TSX37-XX/TSX07-XX CPU

MT8000 RS-485
9P D-SUB

| COM1 | COM3 |
|---|---|
| 1 RX- | 6 Data- |
| 2 RX+ | 9 Data+ |
| 5 GND | 5 GND |

**TSX series CPU port**
8P mini-din Female

| | |
|---|---|
| 8 | D- |
| 3 | D+ |
| 5 | GND |



8Pin miniDin
Female

# TOSHIBA T series

Toshiba T series

http://www.tic.toshiba.com

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Toshiba T Serial | | |
| Com port | RS232 | RS232/RS485 | In accordance with plc port |
| Baud rate | 9600 | 9600, 19200,38400,57600,115200 | Must same as the PLC setting |
| Parity bit | Odd | Even, Odd, None | Must same as the PLC setting |
| Data Bits | 8 | 7,8 | Must same as the PLC setting |
| Stop Bits | 1 | 1, 2 | Must same as the PLC setting |
| HMI Station No. | 0 | 0-255 | Does not apply to this protocol |
| PLC Station No. | 0 | 0-255 | In accordance with PLC setting |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | YES |
| Broadcast command | | | |

## PLC Setting:

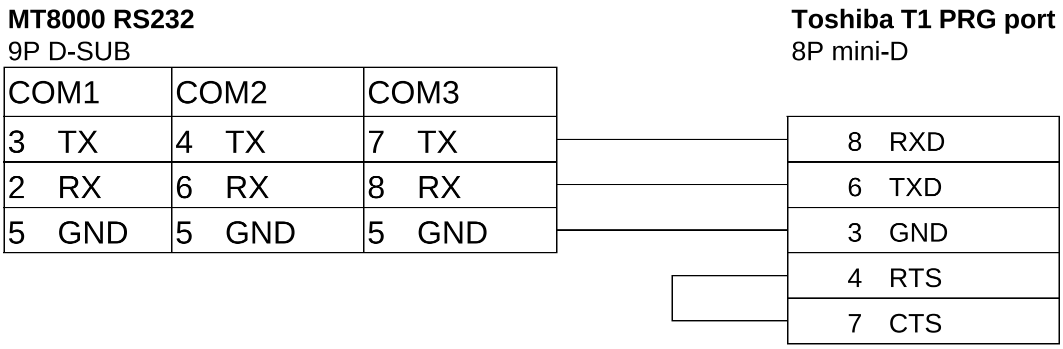
| | |
|---|---|
| Communication mode | **Must set PLC node ID** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ddd(h) | 0-9999f | Input Bit |
| B | Y | ddd(h) | 0-9999f | Output Bit |
| B | R | ddd(h) | 0-9999f | Auxiliary Bit |
| B | S | ddd(h) | 0-9999f | Special Bit |
| W | T | ddd | 0-9999 | Timer Register |
| W | C | ddd | 0-9999 | Counter Register |
| W | D | ddd | 0-9999 | Data Memory |
| W | SW | ddd | 0-9999 | Special Register |
| W | XW | ddd | 0-9999 | Input Register |
| W | YW | ddd | 0-9999 | Output Register |
| W | RW | ddd | 0-9999 | Auxiliary Register |

# Wiring diagram:

## RS232

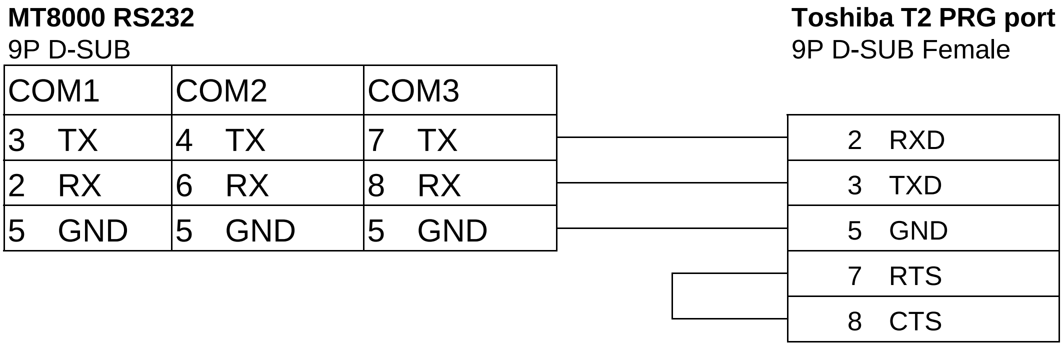


**MT8000 RS232**
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

**Toshiba T1 PRG port**
8P mini-D

| | |
|---|---|
| 8 | RXD |
| 6 | TXD |
| 3 | GND |
| 4 | RTS |
| 7 | CTS |



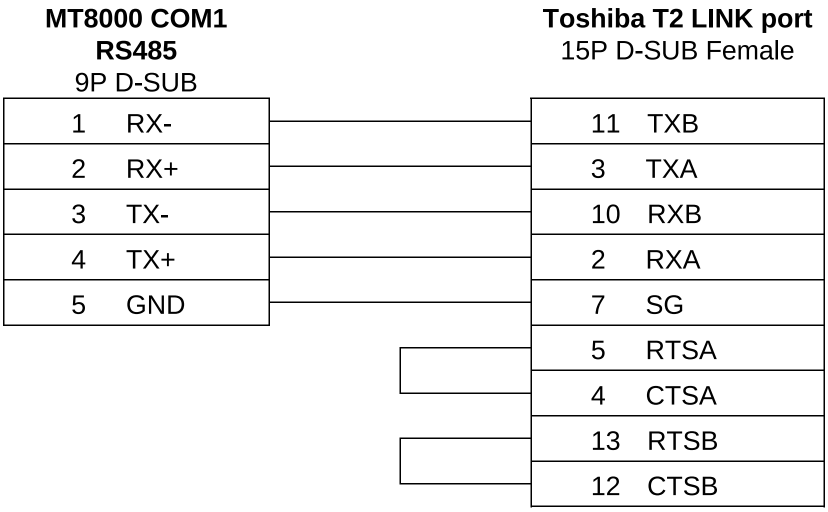
**MT8000 RS232**
9P D-SUB

| COM1 | COM2 | COM3 |
|---|---|---|
| 3 TX | 4 TX | 7 TX |
| 2 RX | 6 RX | 8 RX |
| 5 GND | 5 GND | 5 GND |

**Toshiba T2 PRG port**
9P D-SUB Female

| | |
|---|---|
| 2 | RXD |
| 3 | TXD |
| 5 | GND |
| 7 | RTS |
| 8 | CTS |

## RS485



**MT8000 COM1**
**RS485**
9P D-SUB

| | |
|---|---|
| 1 | RX- |
| 2 | RX+ |
| 3 | TX- |
| 4 | TX+ |
| 5 | GND |

**Toshiba T2 LINK port**
15P D-SUB Female

| | |
|---|---|
| 11 | TXB |
| 3 | TXA |
| 10 | RXB |
| 2 | RXA |
| 7 | SG |
| 5 | RTSA |
| 4 | CTSA |
| 13 | RTSB |
| 12 | CTSB |

# TOSHIBA VF-S11

Toshiba Invertor Protocol(ASCII code)

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | Toshiba VF-S11 | | |
| Com port | RS485(2 wire) | RS422, RS485 | |
| Baud rate | 9600 | 9600, 19200 | |
| Parity bit | Even | Even, Odd, None | |
| Data Bits | 8 | 7 or 8 | |
| Stop Bits | 1 | 1 or 2 | |
| HMI Station No. | 0 | | |
| PLC Station No. | 0 | 0-99 | |

| | | | |
|---|---|---|---|
| Online Simulator | YES | Extend address mode | YES |
| Broadcast command | YES | | |

## PLC Setting:

| | |
|---|---|
| Communication mode | **9600 E,8,1, Station No=0** |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| Word | Communication No. | HHH | HHH:0~ 0FFF | Parameters and data memory |
| Bit | Comm.No.Bit | HHH(DD) | HHH(DD):0-FFF(15) | |

## Wiring diagram:

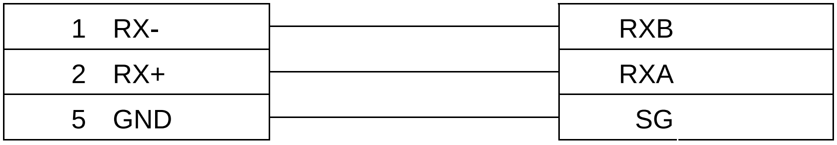
**Pay Attention:**

**Before you connect the VF-A11,Make sure you have put two switch on of sw1.(SW1: Wiring method selector switch)**

## RS-485

**MT500 PLC[RS485]**
9P D-SUB male

Toshiba VF-S11
communication port



# VIGOR

VIGOR M Series

http://www.vigorplc.com.tw/

## HMI Setting:

| Parameters | Recommend | Option | Notes |
|---|---|---|---|
| PLC type | VIGOR | | |
| Com port | RS232 | RS232, RS485 4wires, | |
| Baud rate | 19200 | | |
| Parity bit | Even | | |
| Data Bits | 7 | | |
| Stop Bits | 1 | | |
| HMI Station No. | 0 | | |
| PLC Station No. | 1 | | |

## PLC Setting:

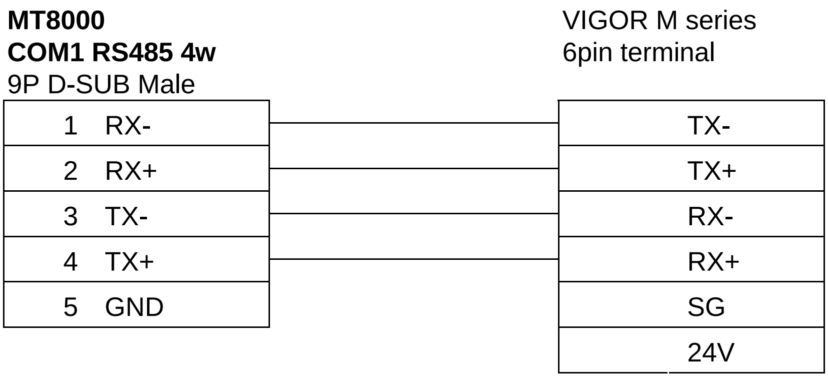
| | |
|---|---|
| Communication mode | None |
| | |

## Device address:

| Bit/Word | Device Type | Format | Range | Memo |
|---|---|---|---|---|
| B | X | ooo | 0~177 | |
| B | Y | ooo | 0~177 | |
| B | M | dddd | 0~4095 | |
| B | S | ddd | 0~999 | |
| B | T | ddd | 0~255 | |
| B | C | ddd | 0~255 | |
| W | TV | ddd | 0~255 | |
| W | CV | ddd | 0~255 | |
| W | D | dddd | 0~4095 | |
| W | DL | dddd | 0~4095 | Double word |

# Wiring diagram:

RS-485 4wire:

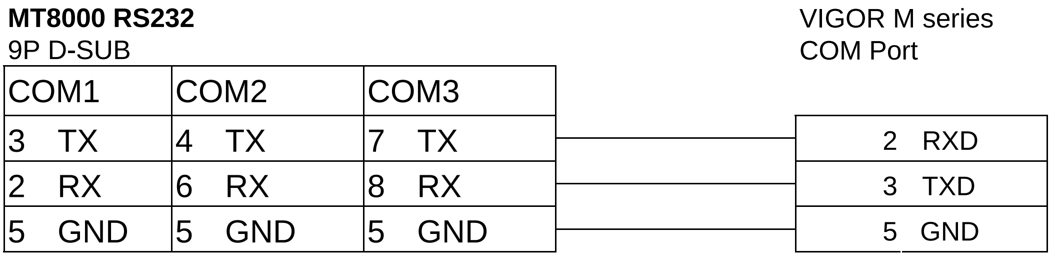


**MT8000**
**COM1 RS485 4w**
9P D-SUB Male

VIGOR M series
6pin terminal

| MT8000 | VIGOR M series |
|---|---|
| 1 RX- | TX- |
| 2 RX+ | TX+ |
| 3 TX- | RX- |
| 4 TX+ | RX+ |
| 5 GND | SG |
| | 24V |

RS-232:



**MT8000 RS232**
9P D-SUB

VIGOR M series
COM Port

| COM1 | COM2 | COM3 | |
|---|---|---|---|
| 3 TX | 4 TX | 7 TX | 2 RXD |
| 2 RX | 6 RX | 8 RX | 3 TXD |
| 5 GND | 5 GND | 5 GND | 5 GND |

## Chapter 23 MT8000 supports printer

MT8000 print function supports EPSON ESC/P2, HP PCL AND SP Printer.

### EPSON ESC/P2

**Impact Printers:**

LQ-300, LQ-300+, LQ-300K+ (RS232)

LQ-300+II (RS232)

**Inkjet Printer:**

Stylus Photo 750 (USB)

**Laser Printer:** (USB)

EPL-5800

### HP PCL Series

USB port, HP PCL level 3 protocol.

**Inkjet Printer:**

HP DeskJet 920C, 930C, D2360, D2460

### SP-M, D, E, F

EPSON ESC protocol 9-pin printer.

RS232 port

SIUPO

http://www.siupo.com

SP-M, D, E, F series

SP-E1610SK (paper width: 45mm)

SP-E400-4S (paper width: 57.5mm)

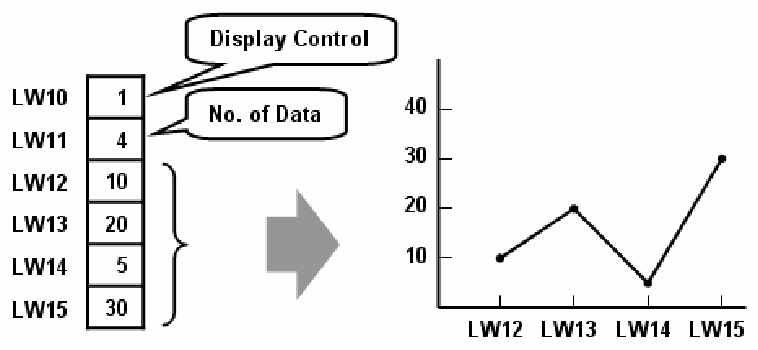
SP-MDEF

Recommended SP printer type for customers outside China

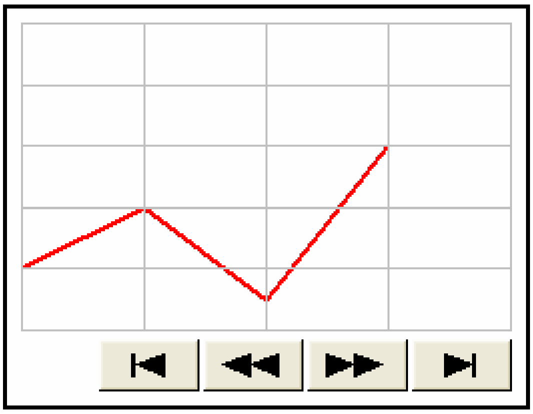
## A. Data Block Display

Data Block is a value of serial addresses, for example LW12, LW13, LW14, LW15 and so on. This object display multiple addresses simultaneously, for example, it can display two data block LW12~LW15 and RW12~RW15, User can observe and compare the value of multiple data points by this function.

Data block display is used to display multiple addresses LW12~LW15, as illustration below.



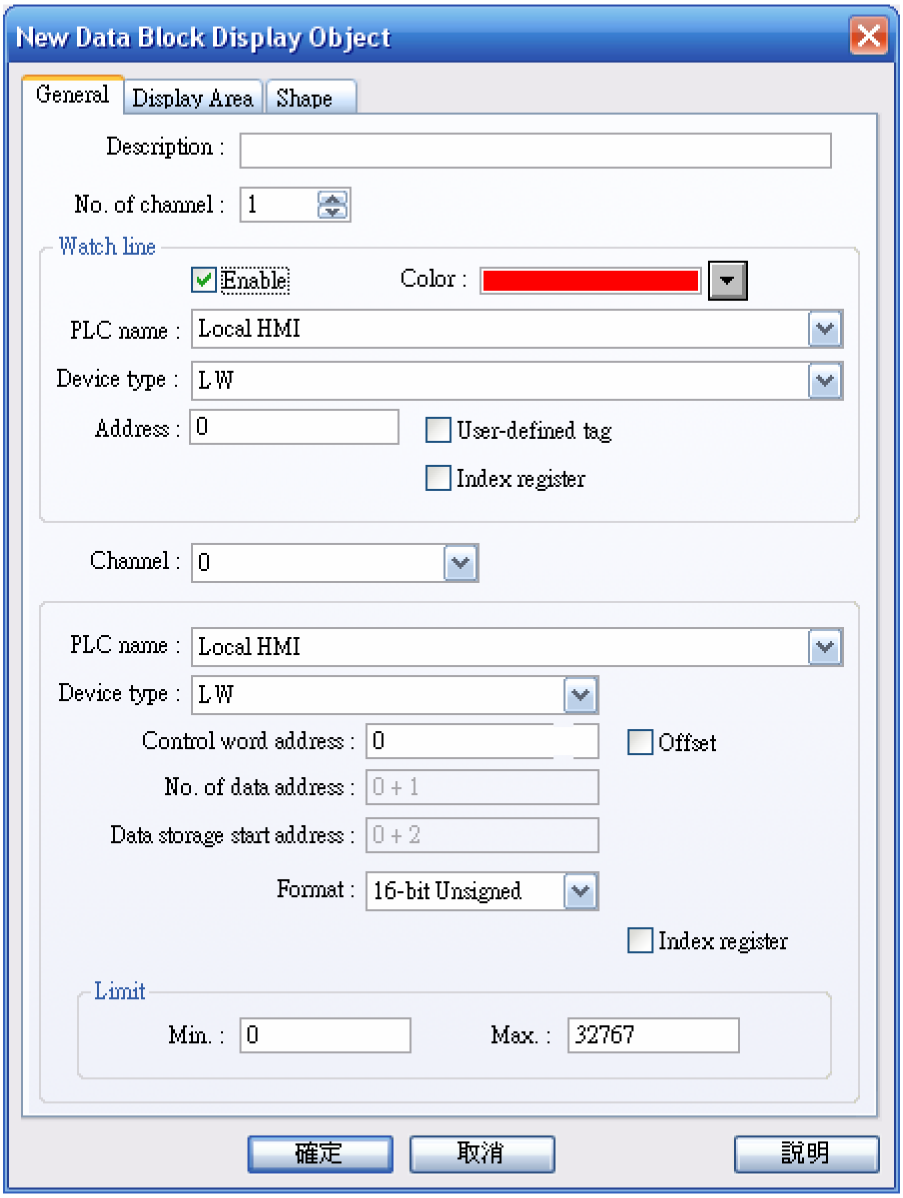
| | |
|---|---|
| LW10 | 1 |
| LW11 | 4 |
| LW12 | 10 |
| LW13 | 20 |
| LW14 | 5 |
| LW15 | 30 |



Execution result

**[New object]**

1. Click the “Data Block Display” icon, and “Data Block Display’s properties” dialogue box appears.



New Data Block Display Object

General | Display Area | Shape

Description :

No. of channel : 1

Watch line

☑ Enable Color :

PLC name : Local HMI

Device type : LW

Address : 0 □ User-defined tag

□ Index register

Channel : 0

PLC name : Local HMI

Device type : LW

Control word address : 0 □ Offset

No. of data address : 0 + 1

Data storage start address : 0 + 2

Format : 16-bit Unsigned

□ Index register

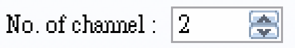
Limit

Min. : 0 Max. : 32767

2. **[General]**

   a. Setting No. of channel.

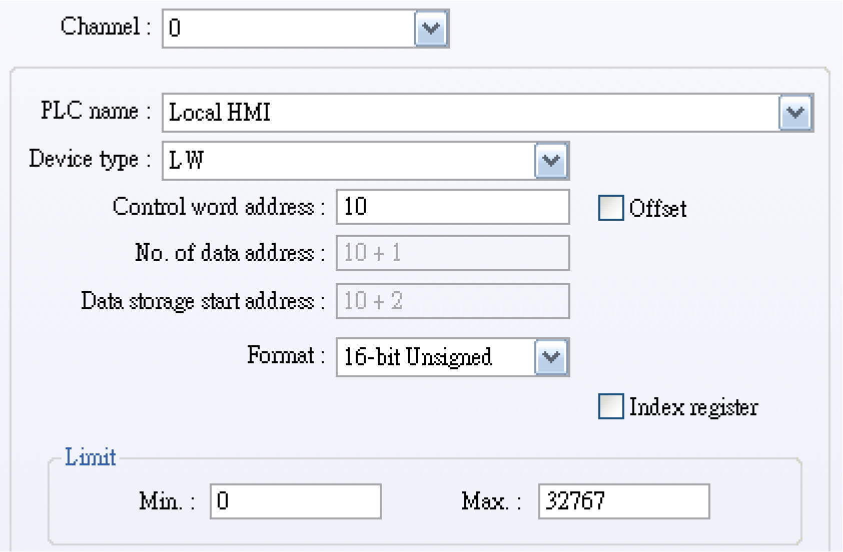
   Setting the no. of channel that user would like to observe a set or series registers in the data block.



No. of channel : 2

As illustration above, the No. of channel is set to 2, user can observe two type of address simultaneously.

b. Setting “Control word address, format, minimum and maximum of limitation.



Channel : 0

PLC name : Local HMI

Device type : LW

Control word address : 10 □ Offset

No. of data address : 10 + 1

Data storage start address : 10 + 2

Format : 16-bit Unsigned

□ Index register

Limit

Min. : 0 Max. : 32767

**[Channel]**

To assign the setting for no. of channel

**[PLC name]**

Select the PLC that you want to operate

**[Device type]**

Select the device type that you want to operate

**[Control word address]**

“Control word address” is used for controlling graph’s display and clear data, after setting control word address, the EB8000 will set address to “No. of data address” and “Data storage start address”, those two address will have different address, for example, if the “Control word address” = LW10, that is used for controlling graph’s display and clear data; LW11 will be set to No. of data address automatically, that is used to store the number of data displayed and LW12 is the data storage start address when the offset is disable.

**[No. of data address]**

This is used to store the number of data displayed.

**[Data storage start address]**

This is the data storage start address.

**[Format]**

Setting data format.
LW12 is the data storage start address.
when format is set to 16 bit unsigned, LW12 = Data1, LW13 = Data2 and so on…

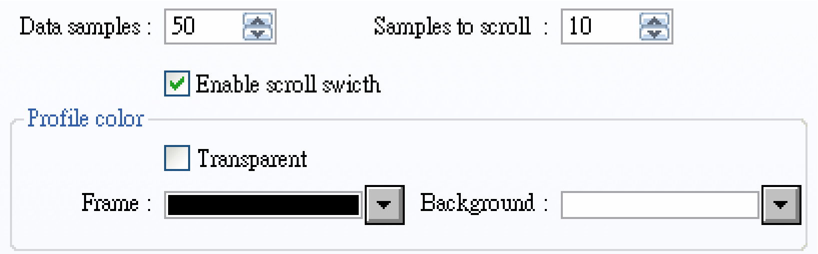
When format is set to 32 bit Unsigned, LW12=Data1, LW14=Data2 and so on…

**[Limit]**

Setting the minimum and maximum of limitation of graph, set the range of data stored in that address.

3. **[Display Area]**

   a. Setting the data samples, samples to scroll, frame and color of background.



Data samples : 50  Samples to scroll : 10

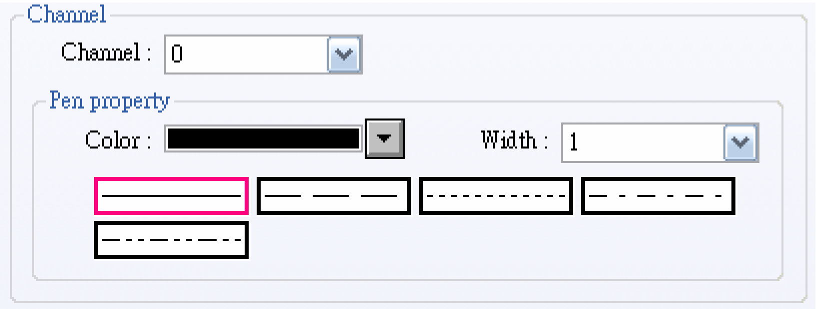
☑ Enable scroll swicth

Profile color

□ Transparent

Frame :  Background :

   b. Setting the color and width of the line to be displayed.



Channel : 0

Color :

Width : 1

## **B.** Operating

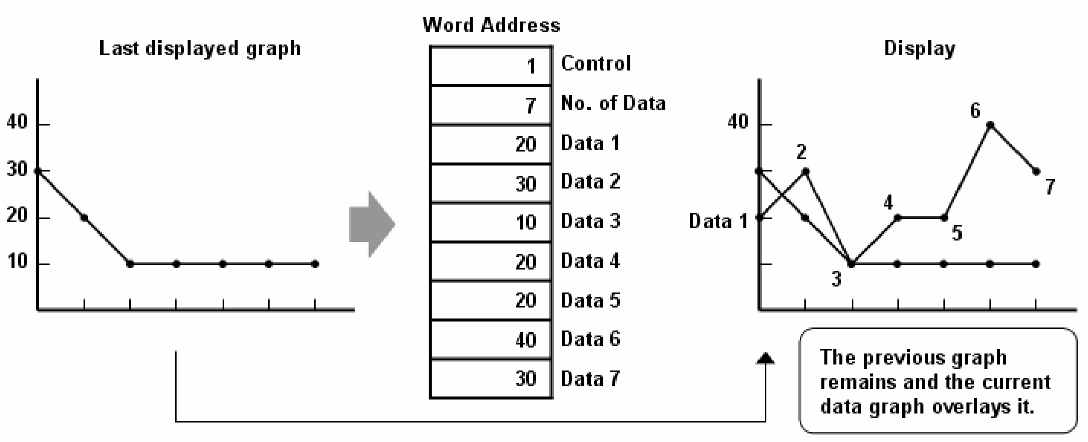
### 1. How to Display content of Data Block

a. [No. of data address]: write in the number of data for display.

b. [Data storage start address]: fill in the content of data.

c. [Control word address]: Write ”1” (turn ON bit 0) the previous graph remains and the current data graph overlays it.

d. MT8000 will write “0” in [Control word address] after the graph is displayed.



Word Address

| | |
|---|---|
| 1 | Control |
| 7 | No. of Data |
| 20 | Data 1 |
| 30 | Data 2 |
| 10 | Data 3 |
| 20 | Data 4 |
| 20 | Data 5 |
| 40 | Data 6 |
| 30 | Data 7 |

The previous graph remains and the current data graph overlays it.

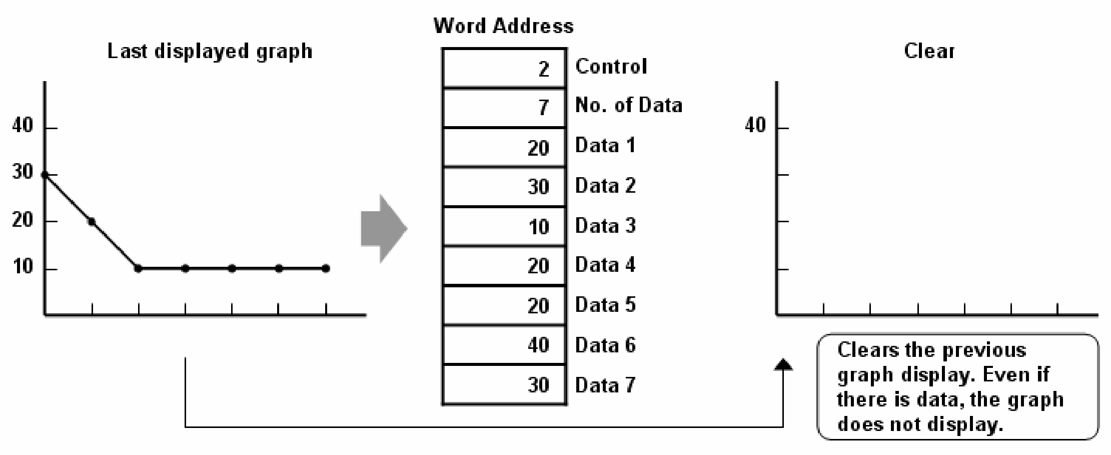
NOTE

- During the action between c and d, please don’t change the content of [Control], [No. of Data] and [Data], it might causing incompletely result

### 2. How to clear the displayed graph

a. [Control word address] : Write ”2” (turn ON bit 1), the displayed graph is cleared.

b. MT8000 will write “0” after the graph is displayed.



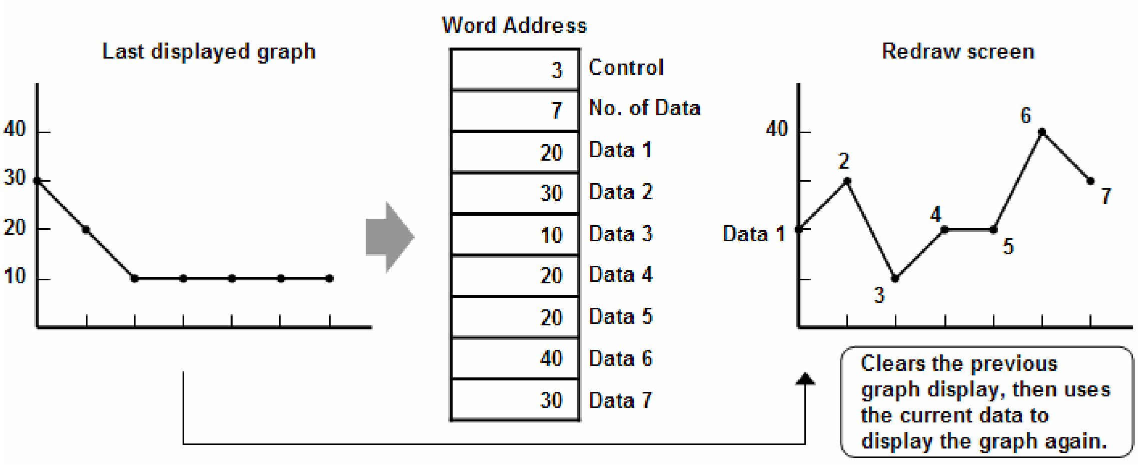
### 3. Clear the previous graph and display new graph

a. [No. of data address]: write in the number of data for display.

b. [Data storage start address]: fill in the content of data.

c. [Control word address]: write ”3” (turn ON bit 0 and bit 1), after the displayed graph is cleared, the graph is redisplayed with the currently stored data.

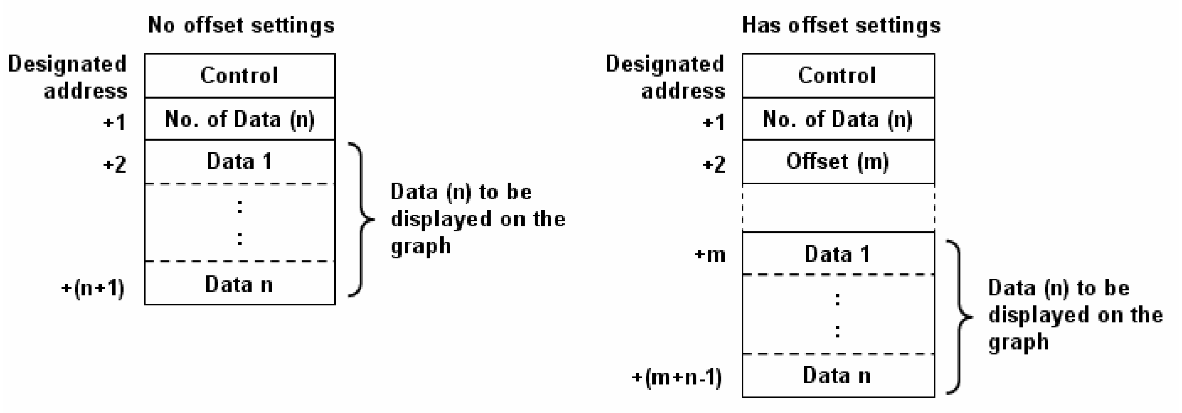
d. MT8000 will write “0” in [Control word address] after the graph is displayed.



## 4. Offset mode

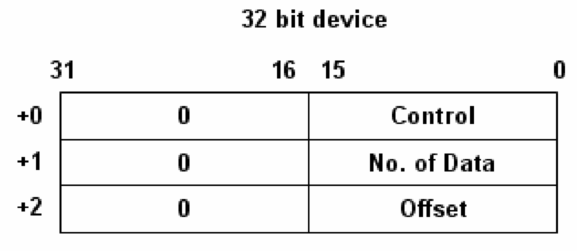
If check the Offset mode, the [Data storage start address] will become to [Offset value storage address], please refer below illustration. The illustrated left is no offset mode setting, the [Data storage start address] is [Control word address (as Designated address)] + 2; but in the Offset mode, the content change to [Data storage start address]'s

Offset value, if the value is m, the [Data storage start address] is [Control word address] + m.



NOTE

- [Control]、[No. of Data] and [Offset] are 16 bit unsigned, in the "Data Block Display" properties, the format is related to [Data].
- When indicated register is 32 bit unsigned, only functional the 0-15, please set in 0 in the 16-31 bit. (as below illustration)

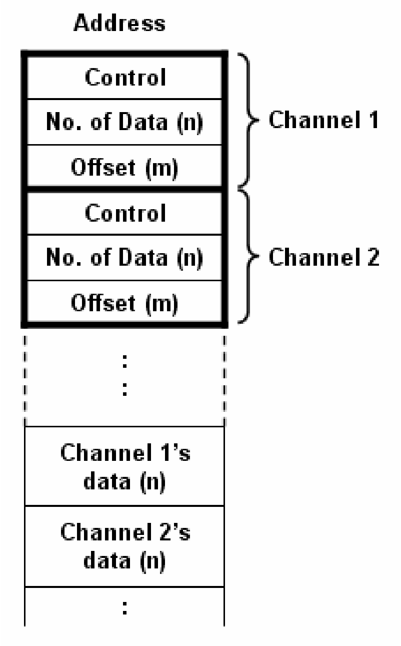


32 bit device

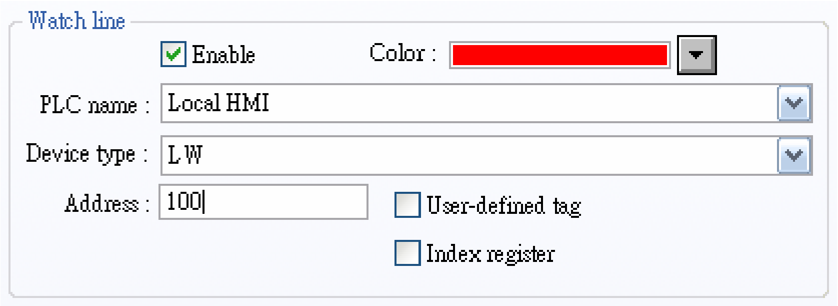
| | 31 16 | 15 0 |
|---|---|---|
| +0 | 0 | Control |
| +1 | 0 | No. of Data |
| +2 | 0 | Offset |

- After building the object, it keep reading content of [Control], [No. of Data] and [Offset], but it will start to read the contect of [Data] when the [Control] Bit 0 is ON.

- When indicate two or more than two channel and every channel is using the same device type, please use Offset mode, please refer below illustration: when setting [Control], [No. of Data] and [Offset] in the two channels in series addresses, system will read all data in each communicating period, that will decrease the communicating time and getting quickly reply.



## 5. Watch



Watch line

☑ Enable Color : 🟥

PLC name : Local HMI

Device type : LW

Address : 100

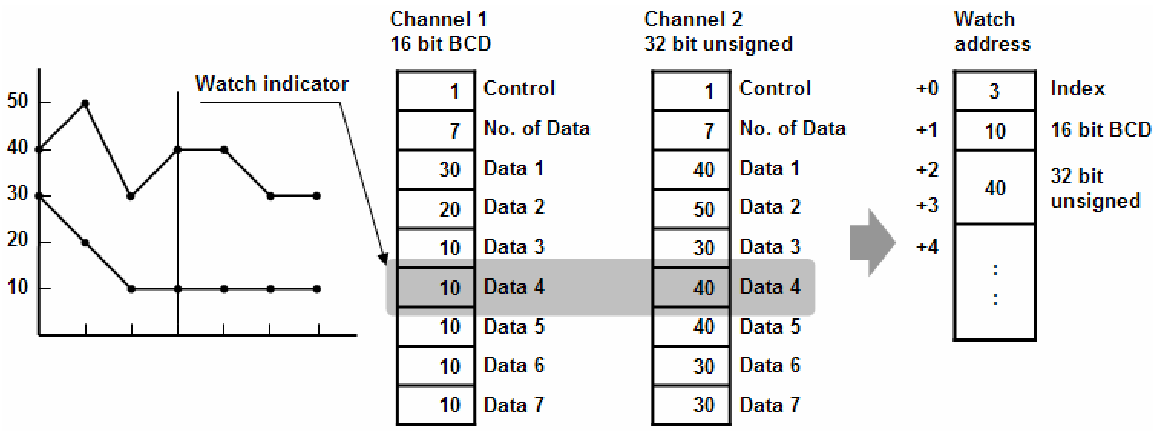
□ User-defined tag

□ Index register

Using the “Watch” function for checking the value of line. When user touched the graph of data block object on HMI, it will display a “Watch line”. EB8000 will write in the value, like Data Index and value of channel to the assigning address in order and then to display value by “Numeric display object”. The format will be the same as the setting in the General of Data Block object.

See the illustration below:

From the illustration, it display two Data block, channel 1’s format is 16 bit BCD and channel 2’s format is 32 bit unsigned. When watching Data 4, the object will send the data from the Data Index(zero-based, the index is 3) and content of channel 1 and channel 2 to the assigning address, the channel 1 is 16 bit BCD and the channel 2 is 32 bit Unsigned.



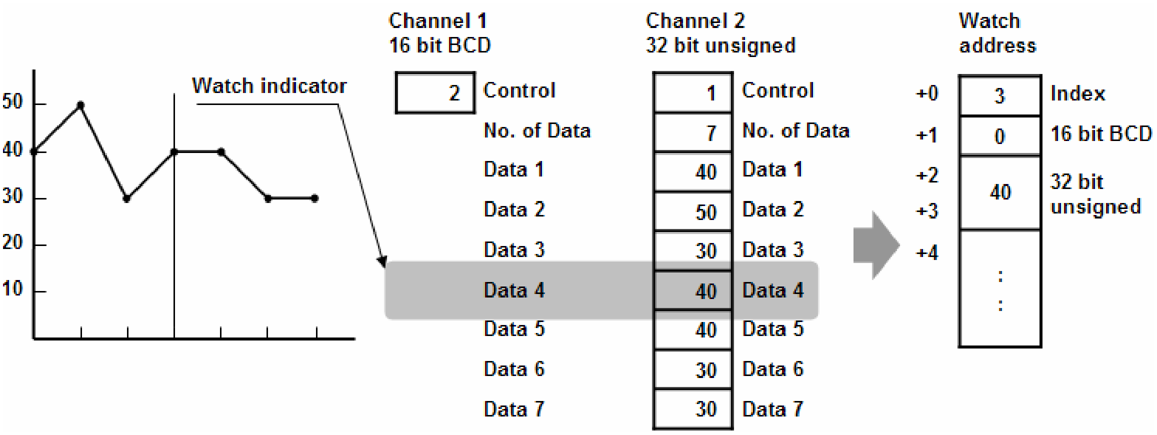
| Channel 1<br>16 bit BCD | |
|---|---|
| 1 | Control |
| 7 | No. of Data |
| 30 | Data 1 |
| 20 | Data 2 |
| 10 | Data 3 |
| 10 | Data 4 |
| 10 | Data 5 |
| 10 | Data 6 |
| 10 | Data 7 |

| Channel 2<br>32 bit unsigned | |
|---|---|
| 1 | Control |
| 7 | No. of Data |
| 40 | Data 1 |
| 50 | Data 2 |
| 30 | Data 3 |
| 40 | Data 4 |
| 40 | Data 5 |
| 30 | Data 6 |
| 30 | Data 7 |

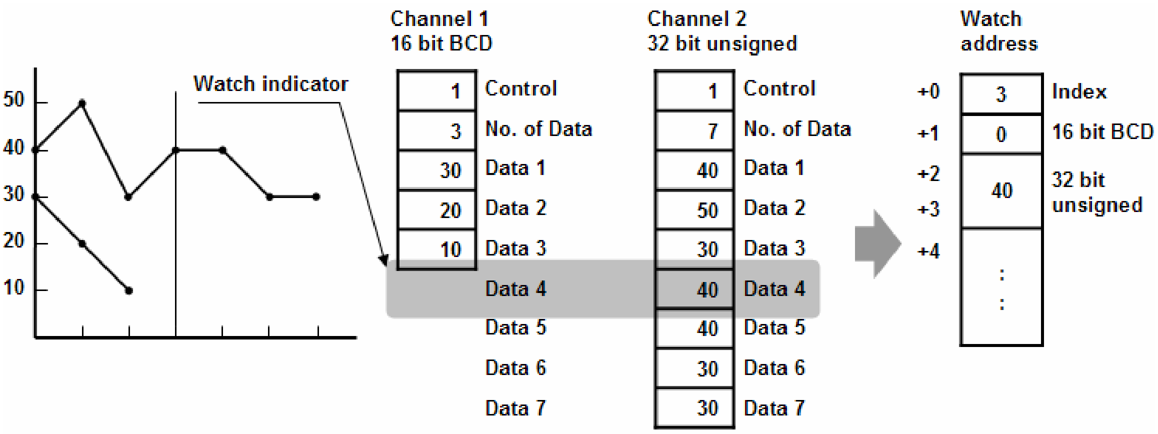
| | Watch<br>address | |
|---|---|---|
| +0 | 3 | Index |
| +1 | 10 | 16 bit BCD |
| +2<br>+3 | 40 | 32 bit<br>unsigned |
| +4 | :<br>: | |

NOTE

- [Data Index] is a zero-based 16 bit unsigned integer; when the indicate register is 32bit, only the lower bit (0-15) functional.
- The Channel can display different time's data, when setting the [Control]=1 (please refer 1 **How to Display content of Data Block**), but the content of watch will display the latest data, the previous value can't be watched.
- If channel 1 is cleared or hasn't display before watching, the 0 will be displayed as below illustration.



- If Channel 1 only has three data, and when watching Data 4(no. of data is not enough), the data of Watch will display 0.

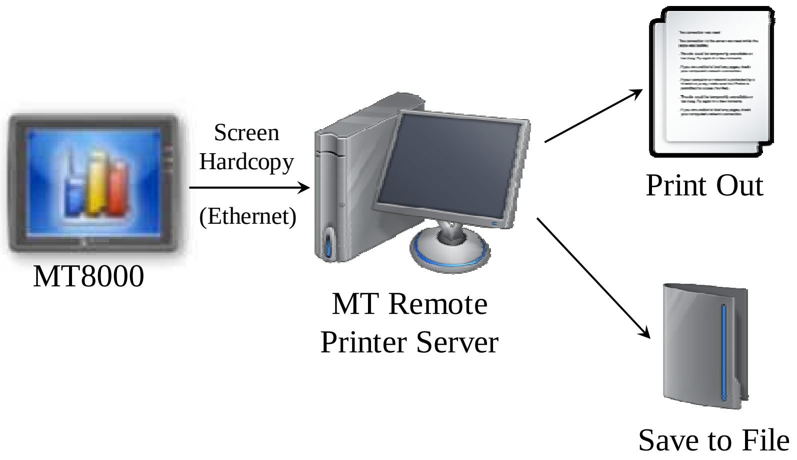


**[limitation]**

1. The limitation of Channel is 12.

2. The maximum of graph is 32; after that (like 33), it won’t display graph.

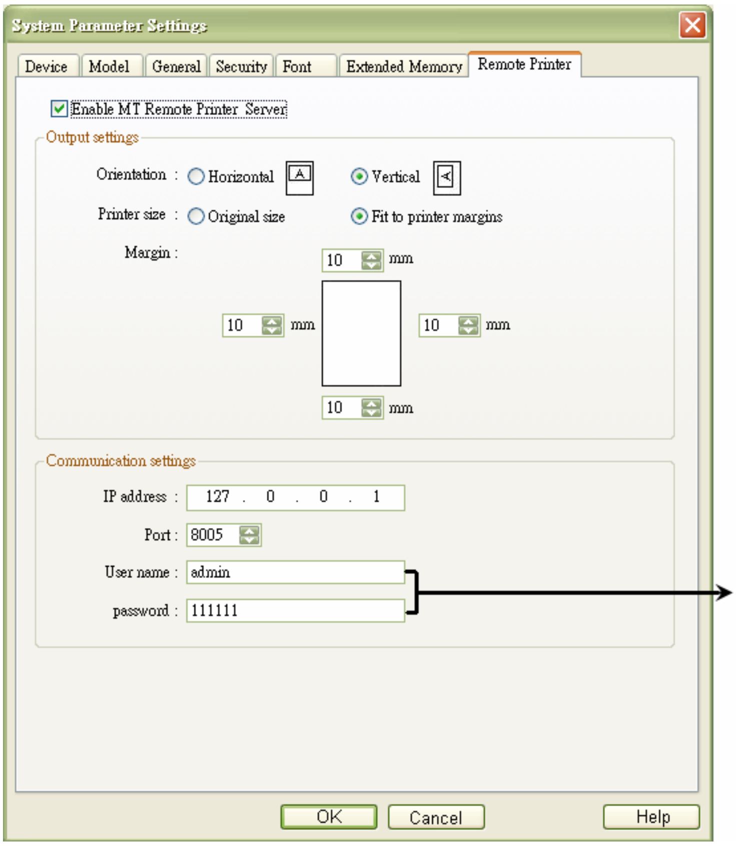
# MT Remote Printer Server



## Step 1: Enable MT Remote Printer Server in EB8000

Menu → Edit → System Parameters → Remote Printer

Check the “Enable MT Remote Printer Server” box


System Parameter Settings

Device | Model | General | Security | Font | Extended Memory | Remote Printer

☑ Enable MT Remote Printer Server

Output settings

Orientation : ○ Horizontal ● Vertical

Printer size : ○ Original size ● Fit to printer margins

Margin : 10 mm (top), 10 mm (left), 10 mm (right), 10 mm (bottom)

Communication settings

IP address : 127 . 0 . 0 . 1

Port : 8005

User name : admin

password : 111111

Note:
In MT Remote Printer Server, there is a communication setting page. Before using MT Remote Printer the IP address, Port, User name and password have to set correctly.

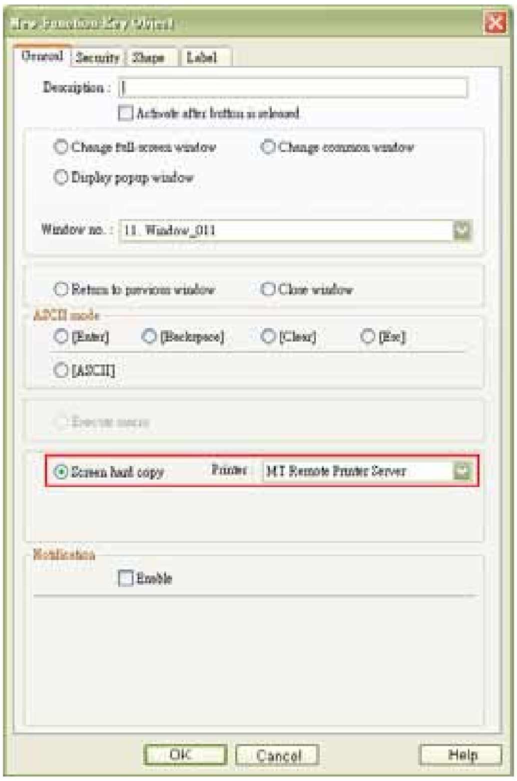
IP address can be set “127.0.0.1”

Port can be set the range from 100 to 65535.

User name / Password: user define.

## Step 2: Choose Remote Printer as Output Device When Hardcopy.

Function Key



New Function Key Object

General | Security | Shape | Label

Description :

□ Activate after button is released

○ Change full-screen window ○ Change common window

○ Display popup window

Window no. : 11. Window_011

○ Return to previous window ○ Close window

ASCII mode

○ [Enter] ○ [Backspace] ○ [Clear] ○ [Esc]

○ [ASCII]

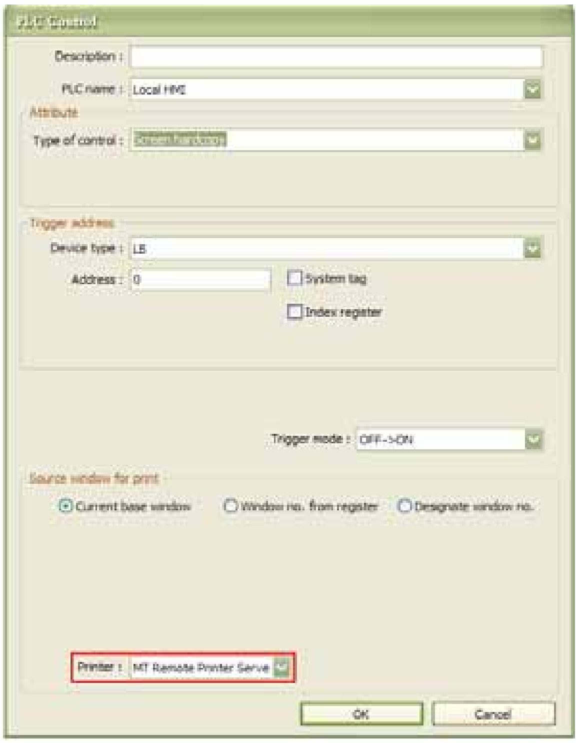
○ Execute macro

● Screen hard copy Printer MT Remote Printer Server

Notification

□ Enable

PLC Control



PLC Control

Description :

PLC name : Local HMI

Attribute

Type of control : Screen hardcopy

Trigger address

Device type : LB

Address : 0

□ System tag

□ Index register

Trigger mode : OFF->ON

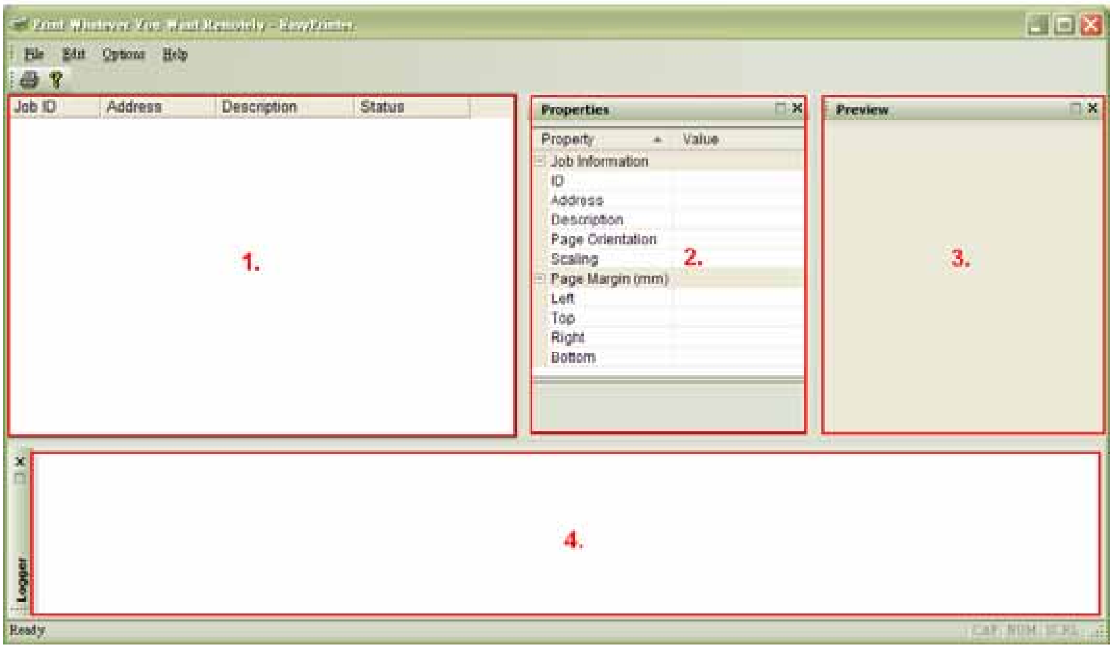
Source window for print

● Current base window ○ Window no. from register ○ Designate window no.

Printer : MT Remote Printer Serve

## Step 3: Start MT Remote Printer Server on Destination PC

Go to Start=> Programs=> EasyBuilder8000=> Select Easy printer



Area 1: Listing the receipted Print Request (Job list).

Area 2: Display the Job properties which has selected in Job list.

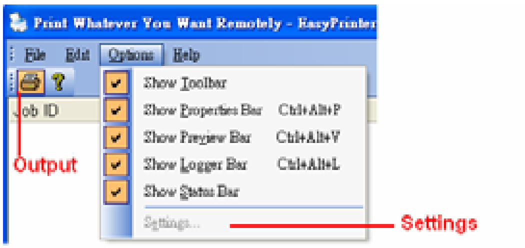
Area 3: Display the Job Preview which has selected in Job list.

Area 4: Message Logger.

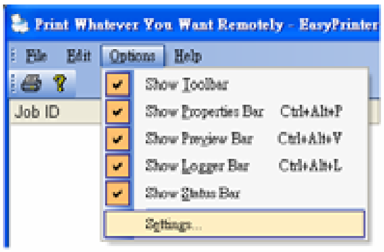
### Step 4: Configurations of MT Remote Printer Server

Menu -> Options -> Settings

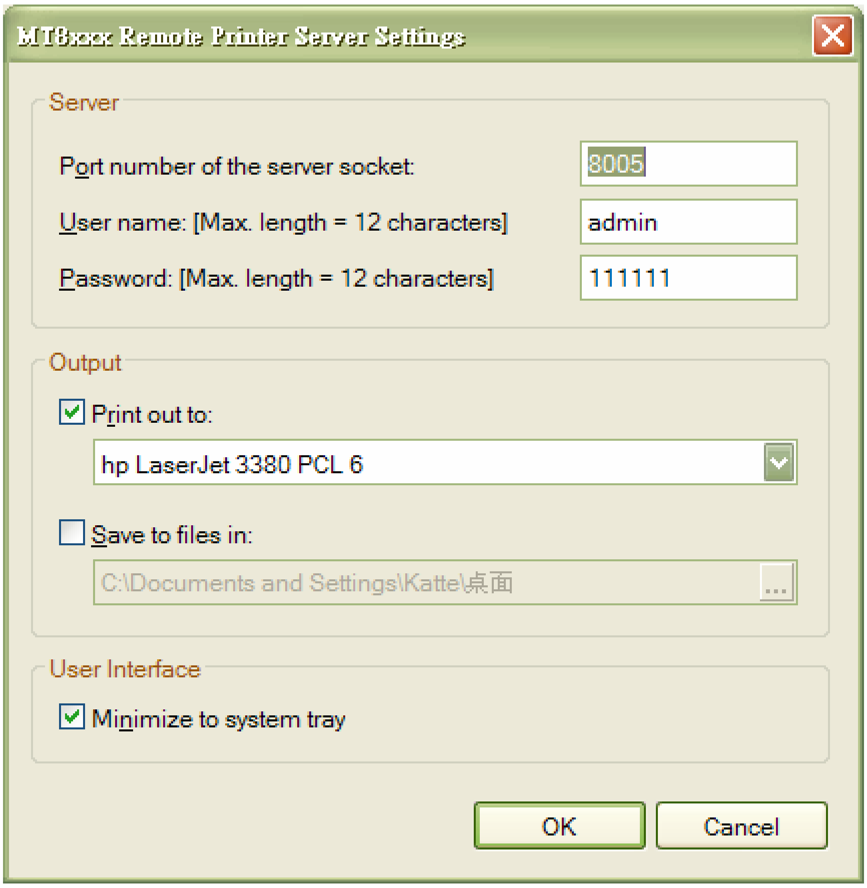
MT Remote Printer Server setting is available when stop Print Requests(Output becomes blue background).


Print Whatever You Want Remotely - EasyPrinter
File Edit Options Help
Job ID
Output
Show Toolbar
Show Properties Bar Ctrl+Alt+P
Show Preview Bar Ctrl+Alt+V
Show Logger Bar Ctrl+Alt+L
Show Status Bar
Settings...
Settings

Not available for settings
Click Output becomes yellow background


Print Whatever You Want Remotely - EasyPrinter
File Edit Options Help
Job ID
Show Toolbar
Show Properties Bar Ctrl+Alt+P
Show Preview Bar Ctrl+Alt+V
Show Logger Bar Ctrl+Alt+L
Show Status Bar
Settings...

Available for settings
Click Output becomes blue background



MT8xxx Remote Printer Server Settings

Server

Port number of the server socket: 8005

User name: [Max. length = 12 characters] admin

Password: [Max. length = 12 characters] 111111

Output

☑ Print out to:

hp LaserJet 3380 PCL 6

□ Save to files in:

C:\Documents and Settings\Katte\桌面

User Interface

☑ Minimize to system tray

Server

Port number of the server socket: Port number of the Printer Server.

User name: For MT8000 to login.

Password: For MT000 to login.

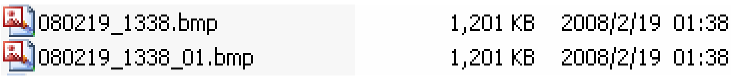
Output

Print out to: Select printer from the list for print out the data.

Save to files in: Indicate the file folder for saving files.

When saving to files, if file name has existed, the new file name will add two digits after the file’s name.

[IPxxx.xxx.xxx.xxx]\[yymmdd_hhmm.bmp]



```
080219_1338.bmp        1,201 KB   2008/2/19  01:38
080219_1338_01.bmp     1,201 KB   2008/2/19  01:38
```

User Interface

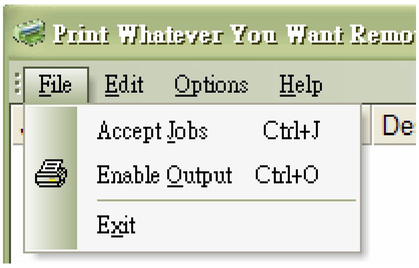
Minimize to system tray: when user press minimize window, EasyPrint will minimize to system tray.

***Step 5: Start Receiving Print Requests from MT8000s***

Menu -> File -> Accept Jobs

***Step 6: Start Outputting Print Requests When (Printer) Ready***

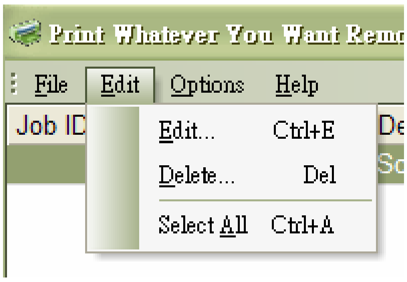
Menu -> File -> Enable Output



Menu-> File

Accept Jobs: Start or stop accepting Print Requests of MT8000.

Enable Output: Start or stop printing Print Requests to Printer and File.



Menu-> Edit

Edit: Edit properties of the selected job.

Delete: Delete the selected jobs.

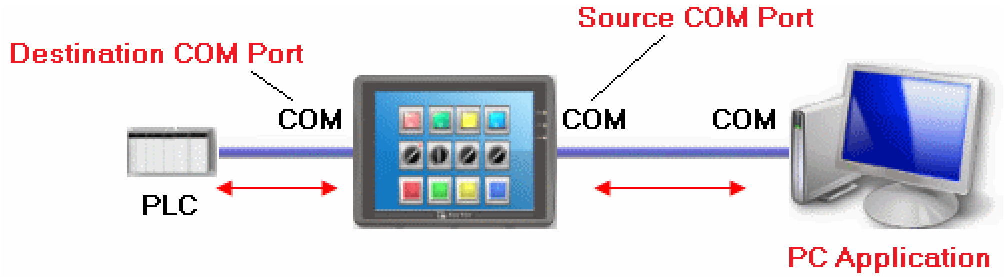
Select All: Select all Jobs in the job list.

Precaution:

- MT Remote Printer Server does not offer printer setting (Ex: Paper size) User can go to Start -> Setting -> Printers and faxes -> Printing Preferences
- The maximum of Logger message is 10000 records, if over 10000 records, the data will be delete from the first record.
- The maximum of reserve Job Data is 128MB in MT Remote Printer Server, if data is over 128MB, Print Job will not receive anymore, please print out or delete Print Job for new Job reserved.

## Pass-through

The pass-through function is allowed the PC application to connect with PCL via HMI, at this time, the HMI is acting as a converter.



Source COM port: This port is connected between MT8000 and PC.

Destination COM port: This port is connected between MT8000 and PLC.

When using pass-through, the source and destination com port have to set correctly.

There are two ways for user to enable pass-through function.

1. **Use Project Manager to start pass-through**
2. **The LW-9901 and LW9902 can be set to enable pass-through.**

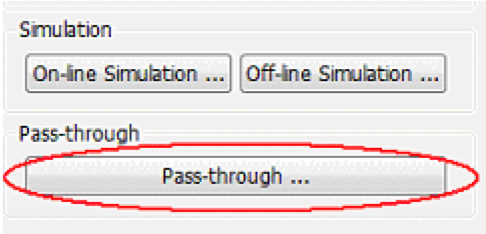
   **LW-9901: pass-through source com port.**

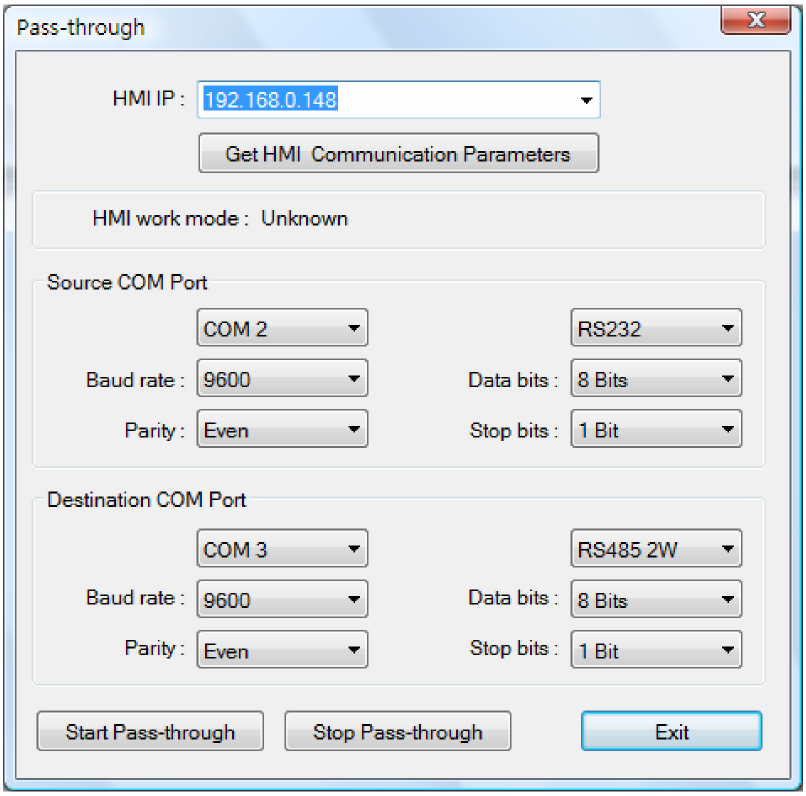
   **LW-9902: pass-through destination com port.**

**Caution: if user wants to resume HMI and PLC communication, please select "stop pass-through" to stop this function.**

## A. Start Pass-through in project manager.

Click Pass-through button on the Project Manager for setting the pass through:





HMI IP : 192.168.0.148

HMI work mode : Unknown

Source COM Port

COM 2 RS232

Baud rate : 9600 Data bits : 8 Bits

Parity : Even Stop bits : 1 Bit

Destination COM Port

COM 3 RS485 2W

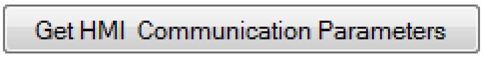
Baud rate : 9600 Data bits : 8 Bits

Parity : Even Stop bits : 1 Bit

### [HMI IP]

When using Pass-through in Project Manager, indicate the IP address of HMI

### [Get HMI Communication Parameters]



To read the parameter of source and destination COM port, that parameter comes from reserved addresses, the detail of addresses as following.

**Source COM port and destination COM port**

| | |
|---|---|
| LW9901 (Source com port) | 0 : COM 1 1 : COM 2 2 : COM 3 |
| LW9902 (Destination com port) | 0 : COM 1 1 : COM 2 2 : COM 3 |

**COM 1 mode setting**

| | |
|---|---|
| LW9550 (PLC I/F) | 0 : RS232 1 : RS485/2W 2 : RS485/4W |
| LW9551 (baud rate) | 0 : 4800 1 : 9600 2 : 19200 3 : 38400<br>4 : 57600 5 : 115200 |
| LW9552 (data bits) | 7 : 7 bits 8 : 8 bits |
| LW9553 (parity) | 0 : none 1 : even 2 : odd |
| LW9554 (stop bits) | 1 : 1 bit 2 : 2 bits |

**COM 2 mode setting**

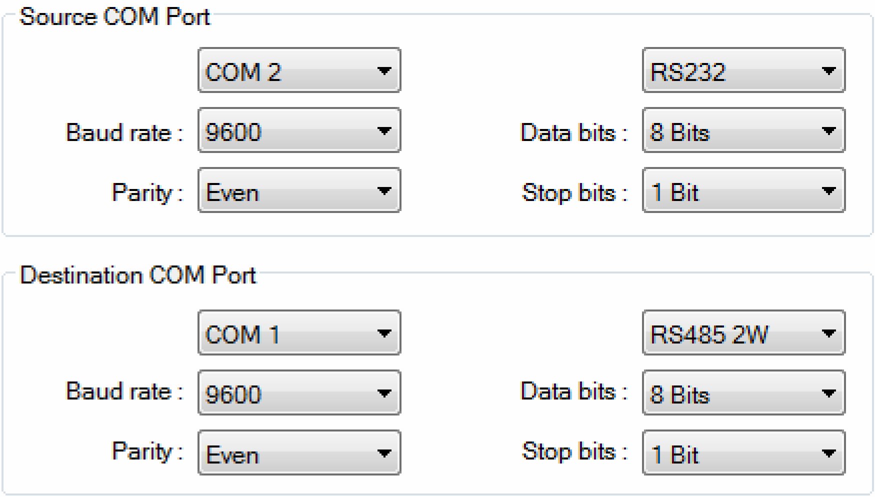
| | |
|---|---|
| LW9556 (baud rate) | 0 : 4800 1 : 9600 2 : 19200 3 : 38400<br>4 : 57600 5 : 115200 |
| LW9557 (data bits) | 7 : 7 bits 8 : 8 bits |
| LW9558 (parity) | 0 : none 1 : even 2 : odd |
| LW9559 (stop bits) | 1 : 1 bit 2 : 2 bits |

**COM 3 mode setting**

| | |
|---|---|
| LW9560 (PLC I/F) | 0 : RS232 1 : RS485/2W |
| LW9561 (baud rate) | 0 : 4800 1 : 9600 2 : 19200 3 : 38400<br>4 : 57600 5 : 115200 |

| | |
|---|---|
| LW9562 (data bits) | 7 : 7 bits 8 : 8 bits |
| LW9563 (parity) | 0 : none 1 : even 2 : odd |
| LW9564 (stop bits) | 1 : 1 bit 2 : 2 bits |

After clicking [Get HMI Communication Parameters], the HMI current status and setting data will be displayed on the window as illustration.



Source COM Port

COM 2 RS232

Baud rate : 9600 Data bits : 8 Bits

Parity : Even Stop bits : 1 Bit

Destination COM Port

COM 1 RS485 2W

Baud rate : 9600 Data bits : 8 Bits

Parity : Even Stop bits : 1 Bit

**[HMI work mode]**

There are three work modes in the pass-through function,

**Unknown**: Display current work mode of HMI. Before reading the setting of HMI, the work mode is displayed “Unknown”.

**Normal**: After reading the HMI status, the word mode is displayed “Normal” that means, the HMI do not accept data from source COM port.

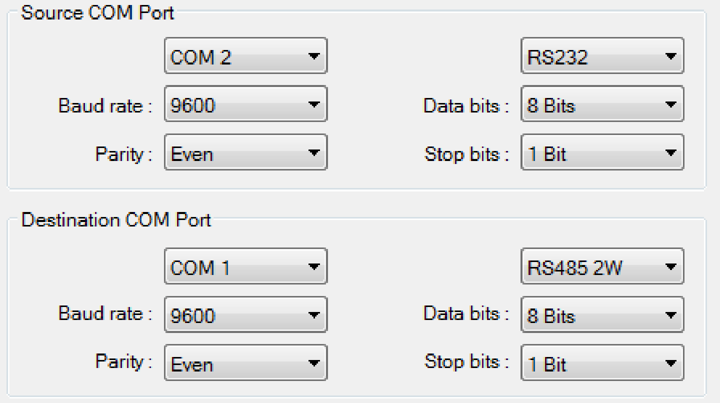
**Pass-through**: HMI is working as pass-through status; at this time, the PC application can control PLC via source com port.

**[Source COM Port]、[Destination COM Port]**

Display the data from source and destination COM port. **The data will be used when**

**pass-through is enabled. The “Baud rate”, “Data bit”, “Parity”, and “Stop bits” have to set as the same in [Source COM Port] and [Destination COM Port].** [Source COM Port] is connect to PC, so RS232 has to be chosen; [Destination COM Port] is connect to PLC, so the COM port setting depends on the PLC.

The illustration below shows the setting when connect to SIEMENS S7/200, COM 2 is connected to PC and COM 1 is connected to PLC, PLC’s parameter is ”9600, E, 8, 1” and use RS485 2W.



Source COM Port

COM 2 RS232

Baud rate : 9600 Data bits : 8 Bits

Parity : Even Stop bits : 1 Bit

Destination COM Port

COM 1 RS485 2W

Baud rate : 9600 Data bits : 8 Bits

Parity : Even Stop bits : 1 Bit

### [Start Pass-through]

Start Pass-through function, meanwhile the HMI work mode is switched to “ Pass-through”.

### [Stop Pass-through]

Stop Pass-through function, the work mode is switched to “Normal”.

**B. Use system reversed addressed to enable Pass-through function**

Another way to enable Pass-through function is to change LW9901 (source COM port) and LW9902(destination COM port) directly. When the values of LW9901 and LW9902 match conditions as below, HMI will start Pass-through automatically:

a. The value in LW9901 and LW9902 has to be 1 or 2 or 3 (1: COM 1 / 2: COM 2 / 3: COM 3).

b. The COM port values can not be the same as in LW9901 and LW9902.

If user needs to change the communication parameter setting; just change the LW9901 and LW9902 and set ON to LB9030, LB9031 and LB9032, the HMI will be forced to accept new setting.

LB9030: Setting to ON, HMI will reset communication parameter of COM1 from reserved address. (Update COM1 communication parameters)

LB9031: Setting to ON, HMI will reset communication parameter of COM2 from reserved address. (Update COM2 communication parameters)

LB9032: Setting to ON, HMI will reset communication parameter of COM3 from reserved address. (Update COM3 communication parameters)

If user wants to stop Pass-through, just change the value except 1,2, and 3.(for example: you can set to 0.)

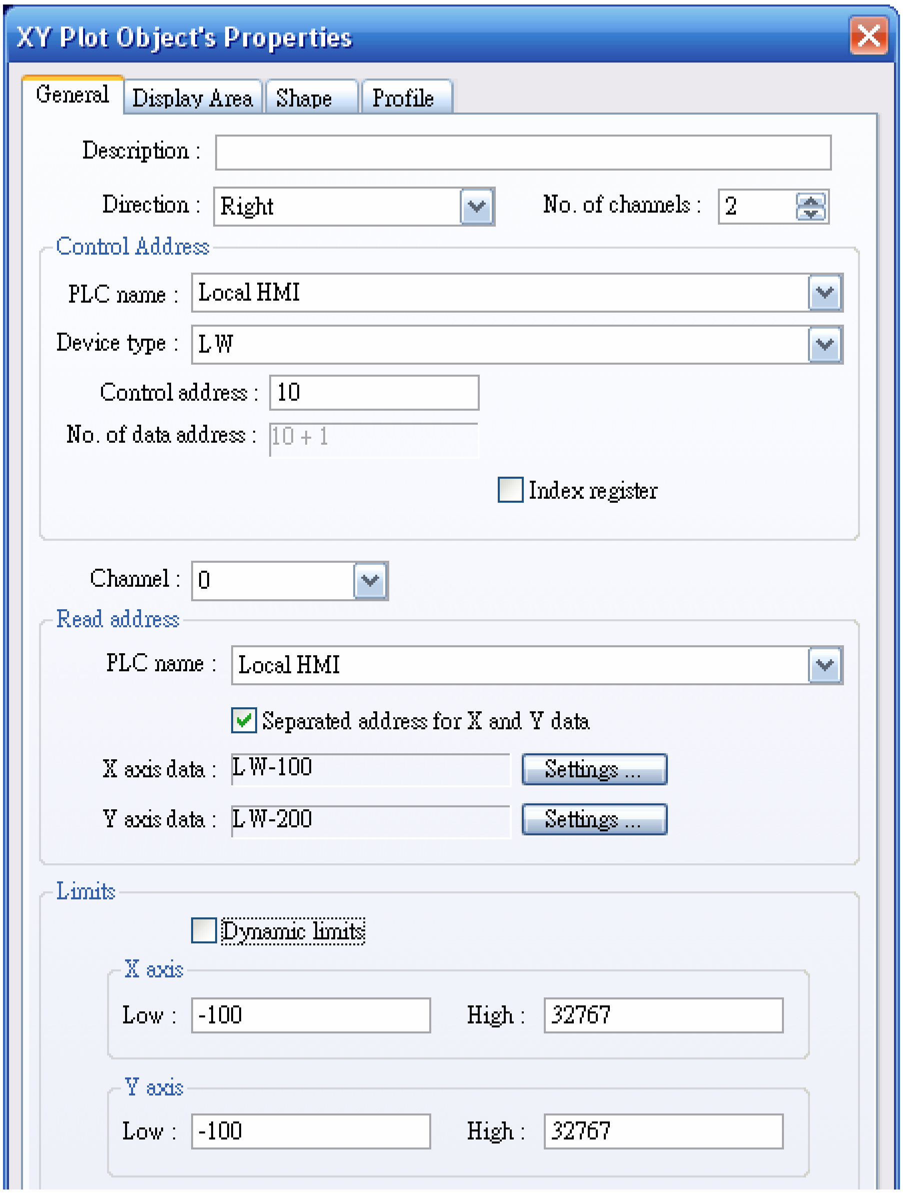
## XY Plot Object

XY Plot object is value of serial addresses to display and compare with a line graph.

The maximum of 16 lines can be displayed and negative values also can be used.

**[New object]**

1. Click the “XY plot” icon , and “XY Plot Object” dialogue box appears.



XY Plot Object's Properties

Description :

Direction : Right

No. of channels : 2

Control Address

PLC name : Local HMI

Device type : LW

Control address : 10

No. of data address : 10 + 1

□ Index register

Channel : 0

Read address

PLC name : Local HMI

☑ Separated address for X and Y data

X axis data : LW-100

Y axis data : LW-200

Limits

□ Dynamic limits

X axis

Low : -100 High : 32767

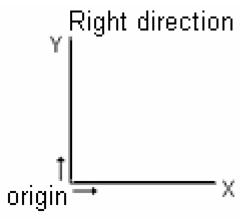
Y axis

Low : -100 High : 32767

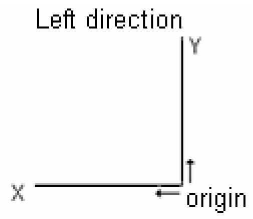
2. **[General]**

   a. Direction: Choose from right, left, up or down to select the direction for drawing the graph.

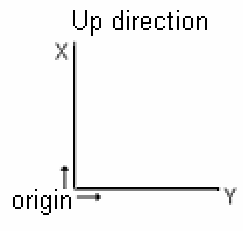
Right:



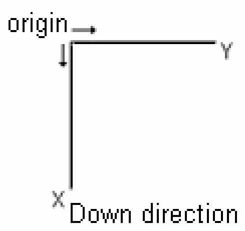
Left:



Up:

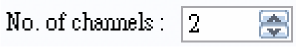


Down:



b. Setting No. of channel.

Setting the no. of channel that user would like to observe a set or series registers in the XY plot.



No. of channels : 2

As illustration above, the No. of channel is set to 2, user can observe two type of address simultaneously.

c. Setting "Control address"

**[PLC name]**

Select the PLC that you want to be a control address

**[Device type]**

Select the device type that you want to operate

**[Control address]**

"Control address" is used for controlling graph's display and clear data,

1= Plot data

Write "1" (turn ON bit 0) the previous graph remains and the current data graph overlays it. MT8000 will write "0" after the graph is displayed.

2= Clear Plot
Write ”2” (turn ON bit 1), the displayed graph is cleared. MT8000 will write “0” after the graph is cleared.
3= Refresh Plot (resets Control Word to 0)
Write ”3” (turn ON bit 0 and bit 1), after the displayed graph is cleared, the graph is redisplayed with the currently stored data. MT8000 will write “0” after the graph is displayed.

After setting control address, the EB8000 will set address to “No. of data address” for example,
If LW10=“Control address”, that is used for controlling graph’s display and clear data;
LW11 will be set to No. of data address automatically, that is used to store the number of data displayed.

**[No. of data address]**

This is used to store the number of data points to plot. Channel’s data is less than 1024 points per channel (1~1023).

**[Channel]**

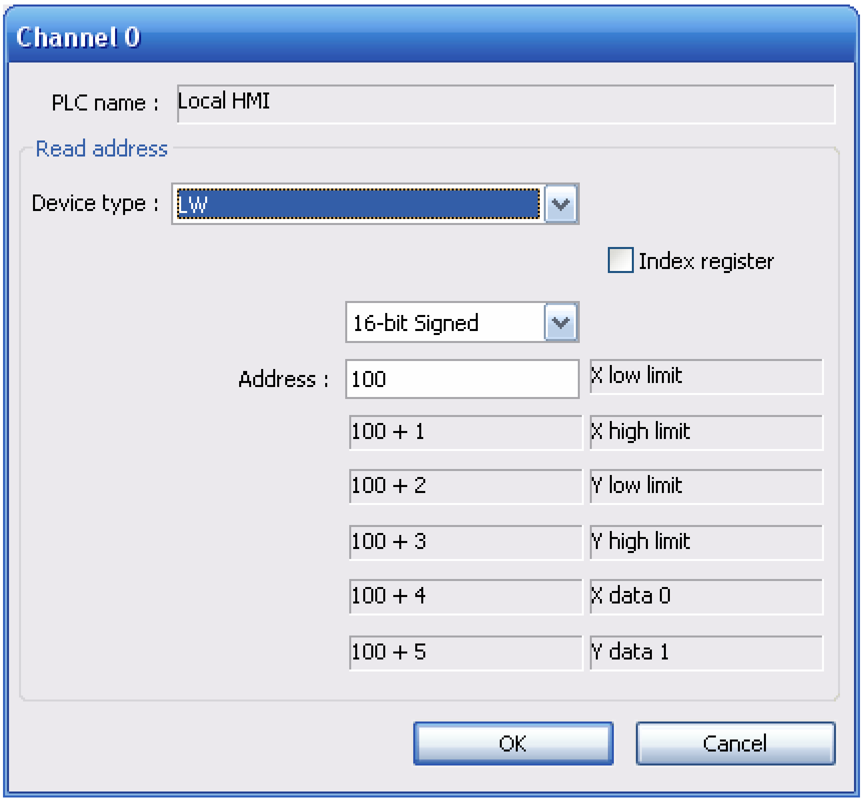
Setting the channels detail for graph display.

d. Setting “Read address” and “Limits”

**[PLC name]**

Select the PLC that you want to read data.

**[PLC address]**



Channel 0

PLC name : Local HMI

Read address

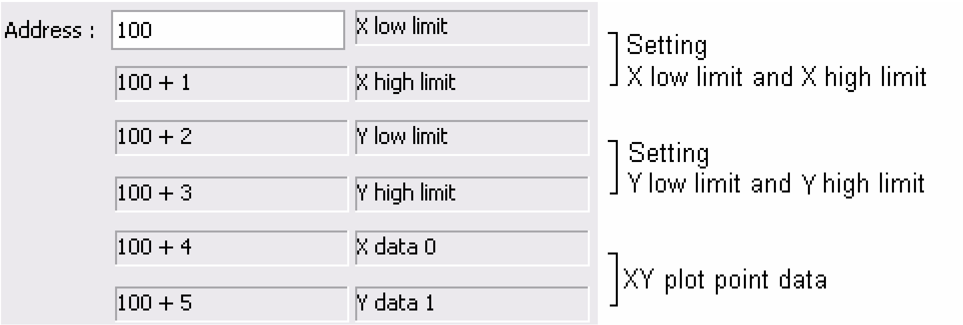
Device type : LW

□ Index register

16-bit Signed

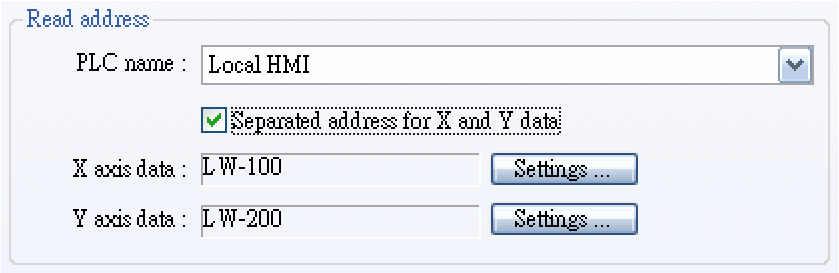
| Address : | |
|---|---|
| 100 | X low limit |
| 100 + 1 | X high limit |
| 100 + 2 | Y low limit |
| 100 + 3 | Y high limit |
| 100 + 4 | X data 0 |
| 100 + 5 | Y data 1 |

When click setting, a pop-up window appeared, you can set the Device type and data format here, on the right side of address is display the address for X, Y Low and high limit and then the XY plot point data.



| Address : | | |
|---|---|---|
| 100 | X low limit | Setting<br>X low limit and X high limit |
| 100 + 1 | X high limit | |
| 100 + 2 | Y low limit | Setting<br>Y low limit and Y high limit |
| 100 + 3 | Y high limit | |
| 100 + 4 | X data 0 | XY plot point data |
| 100 + 5 | Y data 1 | |

If you check "Separated address for X and Y data, the pop-up window appeared as below,



Read address

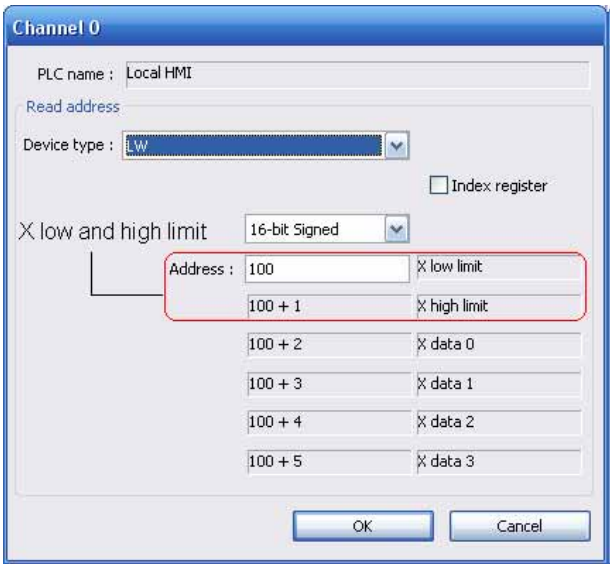
PLC name : Local HMI

☑ Separated address for X and Y data

X axis data : LW-100

Y axis data : LW-200

You have to set the X and Y axis data in the setting page, and X,Y low or high limit will be set separated.



Channel 0

PLC name : Local HMI

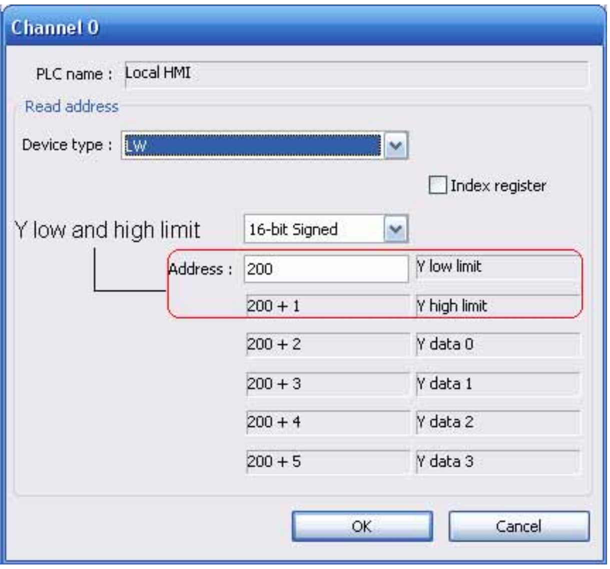
Read address

Device type : LW

□ Index register

X low and high limit: 16-bit Signed

| | | |
|---|---|---|
| Address : | 100 | X low limit |
| | 100 + 1 | X high limit |
| | 100 + 2 | X data 0 |
| | 100 + 3 | X data 1 |
| | 100 + 4 | X data 2 |
| | 100 + 5 | X data 3 |



Channel 0

PLC name : Local HMI

Read address

Device type : LW

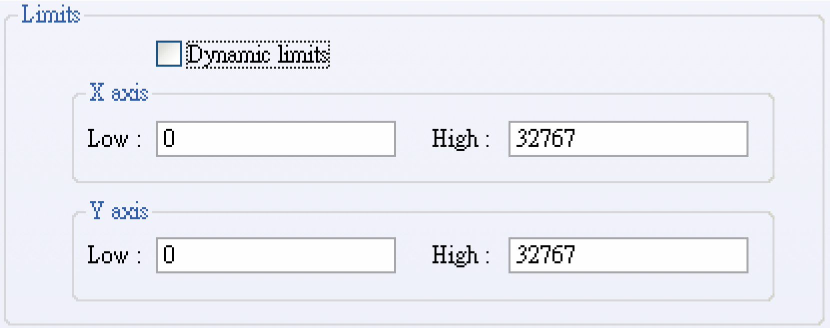
□ Index register

Y low and high limit: 16-bit Signed

| | | |
|---|---|---|
| Address : | 200 | Y low limit |
| | 200 + 1 | Y high limit |
| | 200 + 2 | Y data 0 |
| | 200 + 3 | Y data 1 |
| | 200 + 4 | Y data 2 |
| | 200 + 5 | Y data 3 |

**[Limit]**

Setting the minimum and maximum of limitation of graph, if you have check “Dynamic limits”, the limitation of XY low and high limit will as above, if no check the “Dynamic limits”, the limits is as the value you fill in.



Limits

□ Dynamic limits

X axis

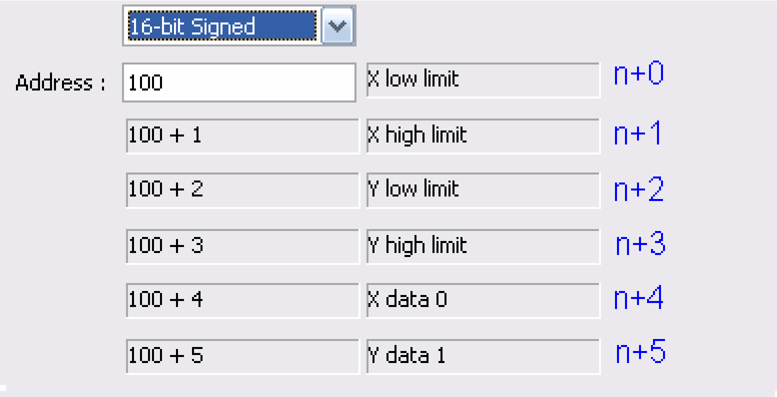
Low : 0 High : 32767

Y axis

Low : 0 High : 32767

The Memory allocation varies depending on the setting for X axis data points and data format for each of plot point. For example,

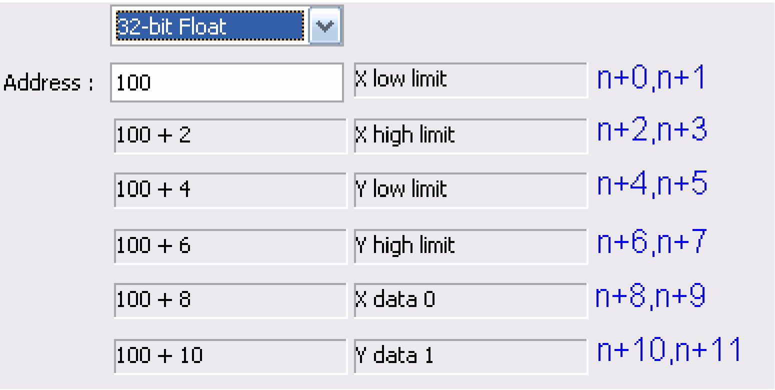
1 word (16-bit signed, 16-bit unsigned):



16-bit Signed

|  |  |  |  |
|---|---|---|---|
| Address : | 100 | X low limit | n+0 |
|  | 100 + 1 | X high limit | n+1 |
|  | 100 + 2 | Y low limit | n+2 |
|  | 100 + 3 | Y high limit | n+3 |
|  | 100 + 4 | X data 0 | n+4 |
|  | 100 + 5 | Y data 1 | n+5 |

2 word (32-bit Float):

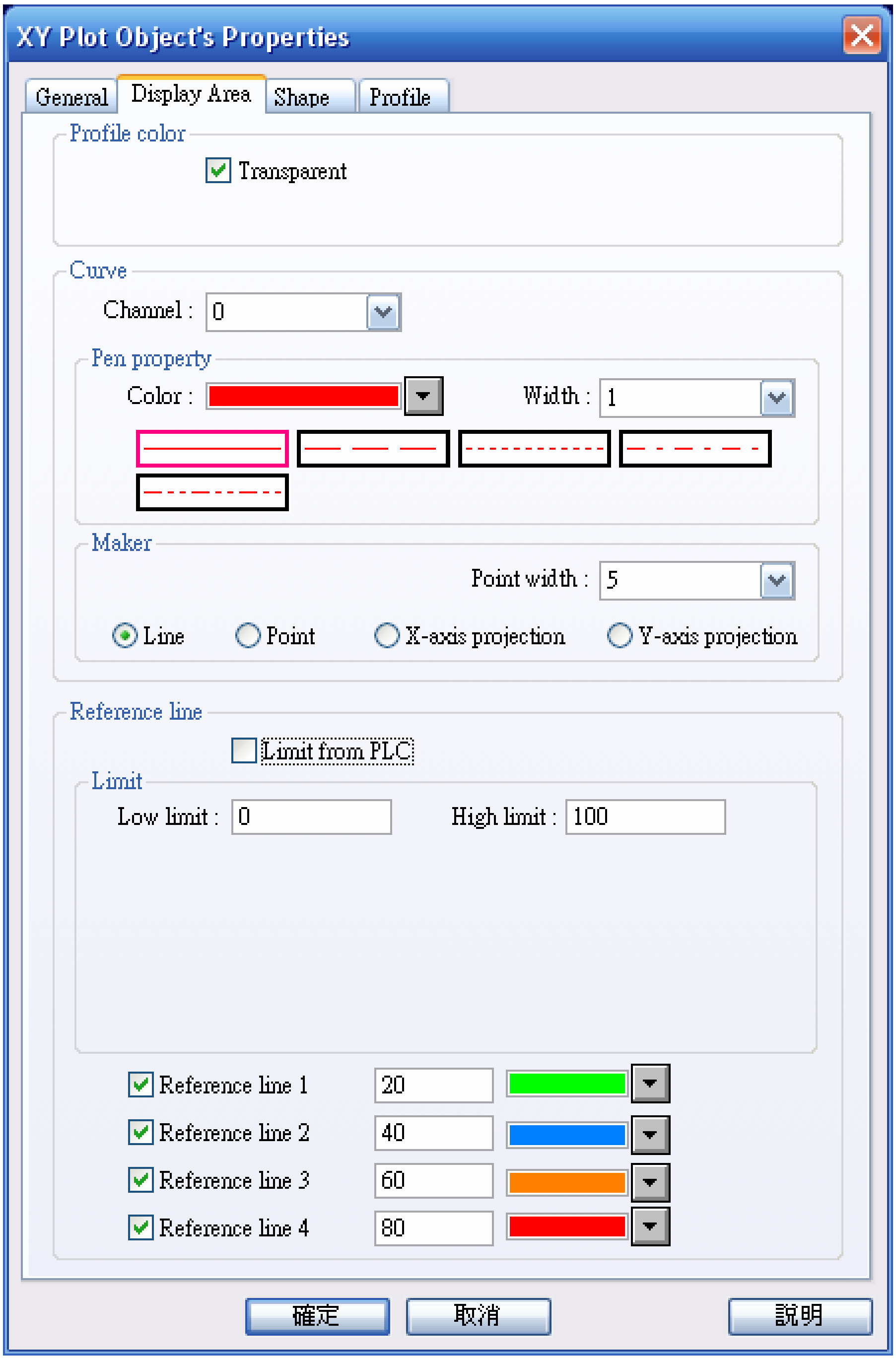


32-bit Float

|  |  |  |  |
|---|---|---|---|
| Address : | 100 | X low limit | n+0,n+1 |
|  | 100 + 2 | X high limit | n+2,n+3 |
|  | 100 + 4 | Y low limit | n+4,n+5 |
|  | 100 + 6 | Y high limit | n+6,n+7 |
|  | 100 + 8 | X data 0 | n+8,n+9 |
|  | 100 + 10 | Y data 1 | n+10,n+11 |

The scale range is depend on the value of X low limit and X high limit

3. **[Display Area]**



Profile color

☑ Transparent

Curve

Channel : 0

Pen property

Color : 🟥 Width : 1

Maker

Point width : 5

● Line ○ Point ○ X-axis projection ○ Y-axis projection

Reference line

□ Limit from PLC

Limit

Low limit : 0 High limit : 100

|  |  |  |
|---|---|---|
| ☑ Reference line 1 | 20 | 🟩 |
| ☑ Reference line 2 | 40 | 🟦 |
| ☑ Reference line 3 | 60 | 🟧 |
| ☑ Reference line 4 | 80 | 🟥 |

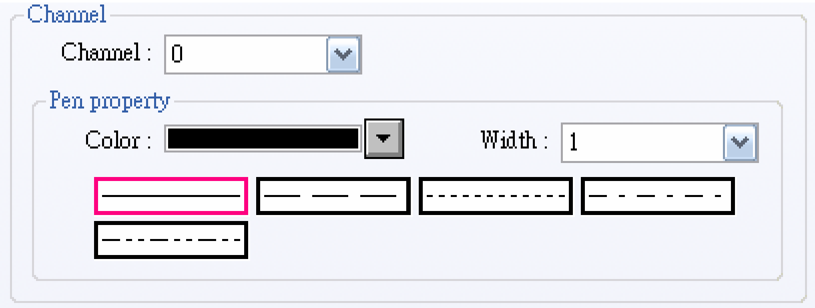
a. Profile color

Transparent checked: the background won't display.

Transparent unchecked: the background will appear with the color you selected.

b. Curve

Set the color and width of the line to display.


Channel

Channel : 0

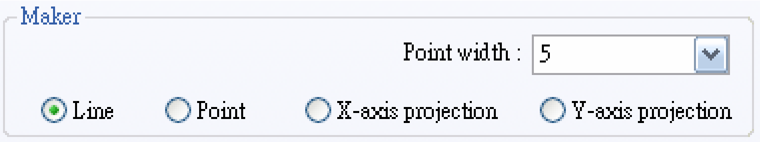
Pen property

Color :

Width : 1

c. Maker

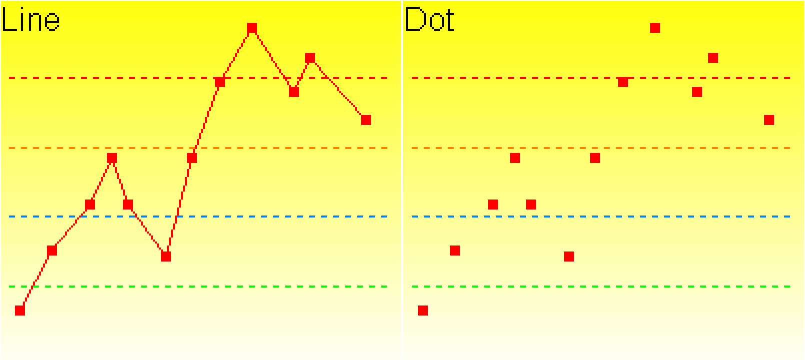
Set the Line, point with width and X-axis projection, Y-axis projection to display on the screen.


Maker

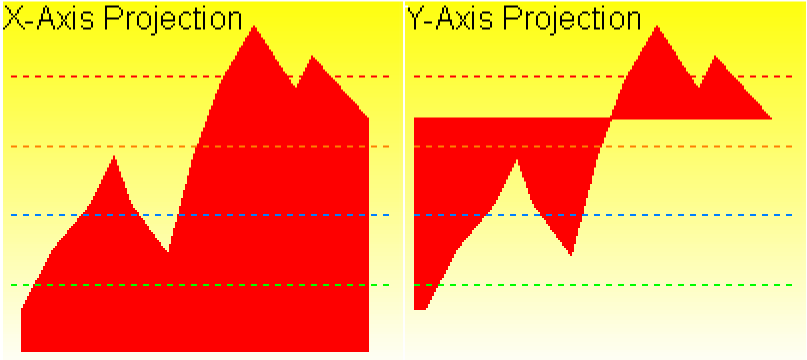
Point width : 5

● Line ○ Point ○ X-axis projection ○ Y-axis projection

Line & Point:



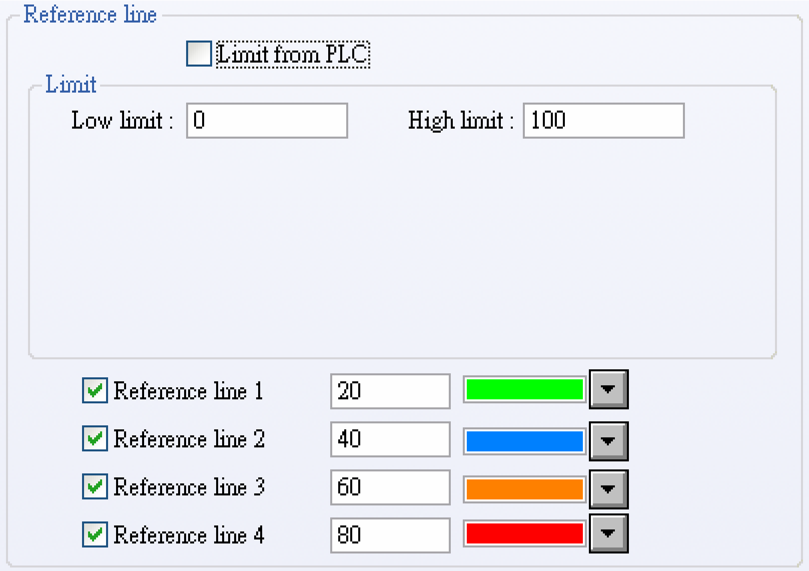
X-axis projection & Y-axis projection:



d. Reference line

It is possible to draw a maximum of four horizontal dotted lines for reference on the graph.

You can select the line color and value at which the reference line should be displayed.



Reference line

□ Limit from PLC

Limit

Low limit : 0    High limit : 100

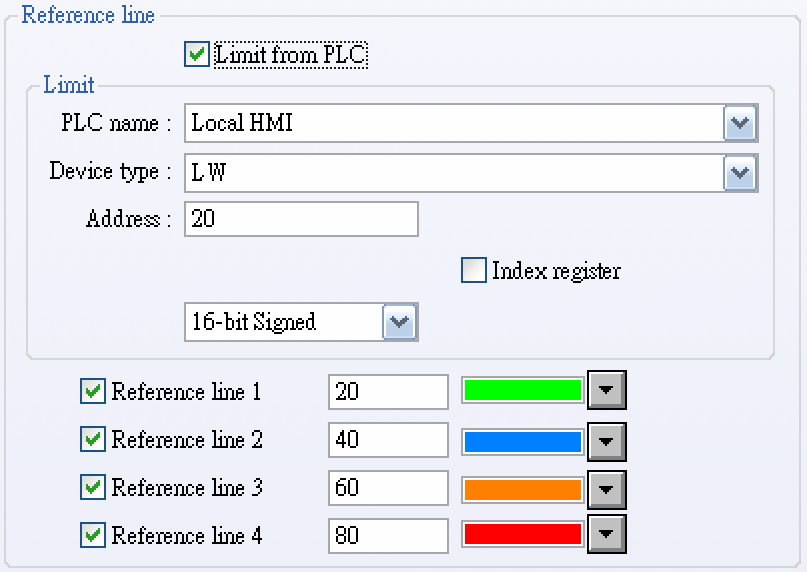
☑ Reference line 1    20    🟩

☑ Reference line 2    40    🟦

☑ Reference line 3    60    🟧

☑ Reference line 4    80    🟥

If check "Limit from PLC", you have to select the PLC address for the Limitation of reference line.



Reference line

☑ Limit from PLC

Limit

PLC name : Local HMI

Device type : LW

Address : 20

□ Index register

16-bit Signed

☑ Reference line 1    20    🟩

☑ Reference line 2    40    🟦

☑ Reference line 3    60    🟧

☑ Reference line 4    80    🟥

# MT500 / MT8000 Series

# ASCII Protocol Specification

# Table of Contents

Edition: 05 2008

## Command List

The following commands are used for communication between the ASCII host and the MT500 or MT8000.

| Mnemonic | Command Name | Description |
|---|---|---|
| RD | Batch Read | Reads specified data in a continuous block |
| WD | Batch Write | Writes specified data in a continuous block |
| RR | Random Read | Reads data from multiple, non-consecutive devices |
| RW | Random Write | Writes data to multiple, non-consecutive devices |
| RC | Read Coil | Reads the specified coils in a continuous block |
| WC | Write Coil | Writes the specified coils in a continuous block |

## Optional Parameters-MT500

**Parameters 1 – 5 are used as follows:**

**Parameter 1** is reserved for the RS485/RS422 Wiring Mode.
When serial port select RS485. The Parameter 1: 0: RS422, 1: RS485
EB500 V2.3.0 and newer version, select the serial port by **PLC I/F port**. And set the Parameter 1 to 0.

**Parameter 2** is the Turn Around Delay
This sets the time delay (Range: 0~1000, Unit: about 10ms) between when the MT500 receives a command, and when a response is issued. Also, see Parameter 4.

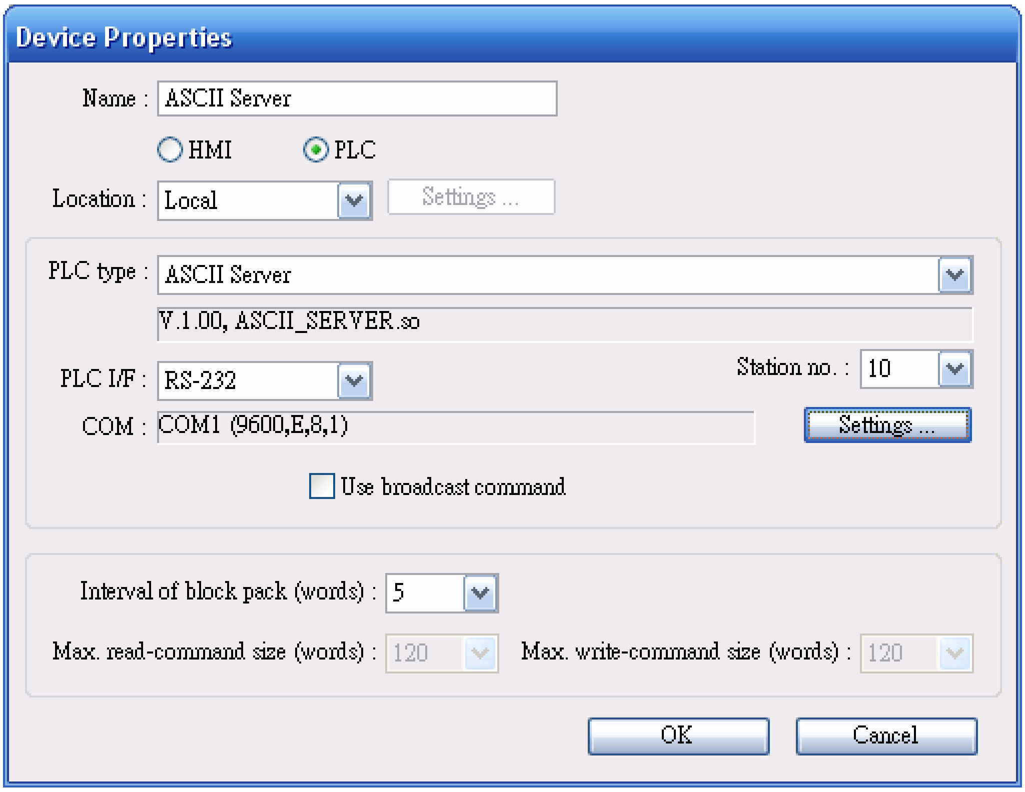
**Parameter 3** sets the Protocol Mode 0: Robust
The protocol uses the non-printable characters STX (02H) and ETX (03H), ACK (06H), and NAK (15H); and includes a 2-byte checksum. 1: Simple
Some Host devices (such as some Motion Controllers) are not capable of generating the non-printable characters, or calculating the checksum. In this mode, the data packets are formed as defined below, but do not include the STX, ACK, ETX, NAK, or checksum. The 0x0D at the end of the packet, the packet sent by the MT500 also has a 0x0D at the end.
**Parameter 4** sets whether or not the MT500 responds to Write commands..
0: Responses On
1: Responses Off

Note:
If set to 1, the Turn Around Delay setting (Parameter 2) has no affect.

**Parameter 5** HMI station number. ([pds]hmi500ascii_driverVer2)

## Optional Parameters-MT8000

Go to EB8000 / Edit / System parameters / Device setting the ASCII driver and parameters.



Device Properties

Name : ASCII Server

○ HMI ● PLC

Location : Local

PLC type : ASCII Server

V.1.00, ASCII_SERVER.so

PLC I/F : RS-232

Station no. : 10

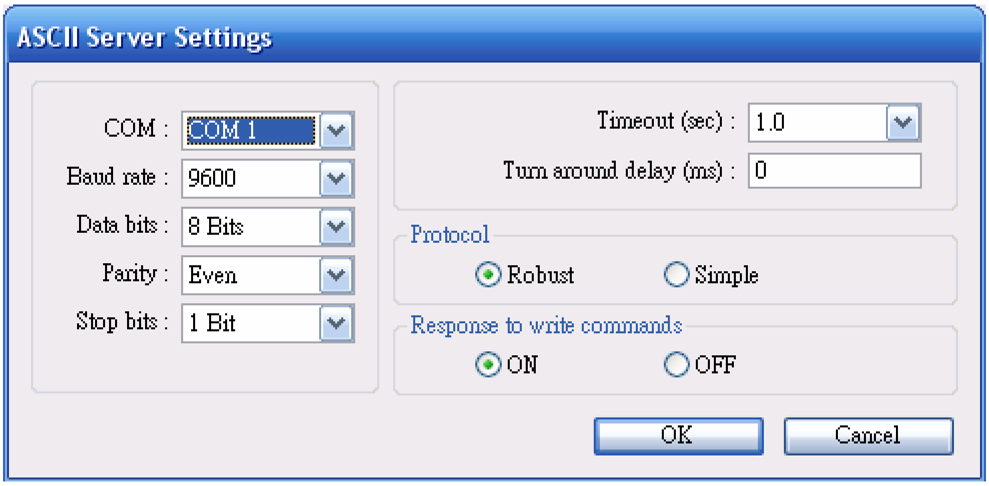
COM : COM1 (9600,E,8,1)

□ Use broadcast command

Interval of block pack (words) : 5

Max. read-command size (words) : 120

Max. write-command size (words) : 120



ASCII Server Settings

COM : COM 1

Baud rate : 9600

Data bits : 8 Bits

Parity : Even

Stop bits : 1 Bit

Timeout (sec) : 1.0

Turn around delay (ms) : 0

Protocol

● Robust ○ Simple

Response to write commands

● ON ○ OFF

### Protocol

**Robust:** The protocol uses the non-printable characters STX (02H) and ETX(03H), ACK(06H), and NAK(15H); and includes a 2-byte checksum.

**Simple:** Some Host devices (such as some Motion Controllers) are not capable of generating the non-printable characters, or calculating the checksum. In this mode, the data packets are formed as defined below, but do not include the STX, ACK, ETX, NAK, or checksum. The 0x0D at the end of the packet.

# Network Support

## Wiring

The ASCII protocol shall support network wiring using RS485 2-wire or 4-wire, based on the setting of PLC I/F port.

## Addressing

The protocol shall support each MT500/MT8000 having a unique Station ID. Valid Station ID’s shall be from 1 to 255.

## Broadcast Messages

A command with a Station ID of 0 shall be considered to be a Broadcast Message. Broadcast Messages shall be processed by the MT500/MT8000, regardless of the MT500/MT8000’s Station Address. The MT500/MT8000 shall not issue a reply message when a Broadcast Message is received, regardless of the setting of Parameter 4.

## Command Usage

## RD (Batch Read)

## Request

This command reads up to 99 consecutive 16-bit items from the HMI's 'LW' memory area. The command is always 14 bytes long.

| Byte 1 | Bytes 2,3 | Bytes 4, 5 | Bytes 6-9 | Bytes 10, 11 | Byte 12 | Bytes 13, 14 |
|---|---|---|---|---|---|---|
| 1 Byte | 2 Bytes | 2 Bytes | 4 Bytes | 2 Bytes | 1 Byte | 2 Bytes |
| STX | Station | RD | Addr. | No. of Items | ETX | Checksum |

Byte 1: Always STX (0x02)
Bytes 2, 3: The Station Number of the HMI to read (2 Hex digits)
Bytes 4, 5: The command to execute
Bytes 6-9: This is the starting address to read from. Must be 4 bytes long,
Bytes 10, 11: This the number of addresses to read, up to 99. Must be 2 bytes long.
Byte 12: Always ETX (0x03)
Bytes 13, 14: The checksum is the lowest 8 bits of the sum of bytes 2 through 12.

Example: Read 3 words starting from address LW100, from the HMI at station 10 (0AH). This will read addresses LW100 – LW102.

| Byte 1 | Bytes 2,3 | Bytes 4, 5 | Bytes 6-9 | Bytes 10, 11 | Byte 12 | Bytes 13, 14 |
|---|---|---|---|---|---|---|
| STX | 0A | RD | 0100 | 03 | ETX | 2E |
| 02 | 30,41 | 52,44 | 30,31,30,30 | 30,33 | 03 | 32,45 |

The checksum (bytes 13 and 14) is calculated as the lowest 8 bits of the sum of the Hex codes for bytes 2 – 12.
30 + 41+ 52 + 44 + 30 + 31 + 30 + 30 + 30 + 33 + 03 = 22E.
The lowest 8 bits of the result returns 2E.

## Reply

The reply length is
L = (N * 4 ) + 8
Where N = the number of requested devices.

If the command is successful, the reply length will be at least 12 bytes, but could be as long as 404 bytes. It consists of the STX, followed by four bytes for each requested device, then the ETX and Checksum.

| Byte | Bytes | Bytes | Bytes | Bytes | Bytes | Bytes | Bytes |
|---|---|---|---|---|---|---|---|
| 1 | 2, 3 | 4,5 | 6-9 | 10-13 | 14-17 | 18 - (L-7) | (L-6) -(L-3) |
| STX | Station | CMD | Data 1 | Data 2 | Data 3 | Data 4 – Data (N-1) | Data N |

| Byte | Byte |
|---|---|
| L-2 | L-1, L |
| ETX | Checksum |

The above example returns the following, assuming the HMI contains the following data:

| **Address** | **Data** |
|---|---|
| 100 | 75 (4BH) |
| 101 | 8047 (1F6FH) |
| 102 | 16,321 (3FC1H) |

The following is the packet sent from the HMI

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STX | ‘0’ | ‘A’ | ‘R’ | ‘D’ | ‘0’ | ‘0’ | ‘4’ | ‘B’ | ‘1’ | ‘F’ | ‘6’ | ‘F’ | ‘3’ | ‘F’ | ‘C’ | ‘1’ |

02H 30H 41H 52H 44H 30H 30H 34H 42H 31H 46H 36H 48H 33H 46H 43H 31H

| | | |
|---|---|---|
| ETX | ‘C’ | ‘2’ |

02H 43H 32H

The values in each requested device are returned in Hex. The checksum is calculated on bytes 2 – (L-2).

In the event of an error, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 | Byte 6 |
|---|---|---|---|
| NAK | Station | ‘R’, ‘D’ | Err Code |

## WD (Batch Write)

## Request

This command writes up to 99 consecutive 16-bit items to the HMI's LW memory area. The length of the command is

L = (N * 4) + 14

Where N = the number of requested devices

The command will be at least 18 bytes long, but can be up to 410 bytes long.

| Byte 1 | Bytes 2, 3 | Bytes 4, 5 | Bytes 6-9 | Bytes 10,11 | Bytes 12-15 | Bytes 16-19 | Bytes 20 - (L-7) | Bytes (L-6) -(L-3) |
|---|---|---|---|---|---|---|---|---|
| STX | Station | WD | Addr. | No. of Items | Data 1 | Data 2 | Data 3 – Data(N-1) | Data N |

| Byte L-2 | Byte L-1, L |
|---|---|
| ETX | Check-sum |

Byte 1: Always STX (0x02)
Bytes 2, 3: The Station Number of the HMI to write (2 Hex digits)
Bytes 4, 5: The command to execute
Bytes 6, 7: This is the starting address to write to. Must be 4 bytes long,
Bytes 8, 9: This the number of addresses to write. Must be 2 bytes long.
Bytes 10 – (L-3): The data to write. Up to 99 items, four Hex digits each.
Byte (L-2): Always ETX (0x03).
Bytes L-1, L: Checksum

Example: Write 3 words starting from address D201, to the HMI at station 17 (11H). This will write to addresses LW201, LW202, and LW203.

LW201 = 101 (0x65)
LW202 = 575 (0x23F)
LW203 = 1049 (0x419)

| Byte 1 | Bytes 2, 3 | Bytes 4, 5 | Bytes 6-9 | Bytes 10,11 | Bytes 2-15 | Bytes 16-19 | Bytes 20-23 |
|---|---|---|---|---|---|---|---|
| STX | 11 | WD | 0201 | 03 | 0065 | 023F | 0419 |
| 02 | 31,31 | 57,44 | 30,32,30,31 | 30,33 | 30,30,36,35 | 30,32,33,46 | 30,34,31,39 |

| Byte 24 | Bytes 25,26 |
|---|---|
| ETX | 9A |
| 03 | 39,41 |

The checksum (bytes 25 and 26) is calculated as the lowest 8 bits of the sum of the Hex codes for bytes 2 – 24.
31+ 31 + 57 + 44 + 30 + 32 + 30 + 31 + 30 + 33 + 30 + 30 + 36 + 35 + 30 + 32 + 33+ 46 + 30 + 34+ 31+ 39 + 03 = 49A.
The lowest 8 bits of the result returns 9A.

## Reply

If the command is successful, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 |
|---|---|---|
| ACK | Station | ‘W’, ‘D’ |

In the event of an error, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 | Byte 6 |
|---|---|---|---|
| NAK | Station | ‘W’, ‘D’ | Err Code |

## RR (Random Read)

## Request

This command reads up to 99 independently-addressed 16-bit items from the HMI’s LW memory area. The length of the command is

L = (N * 4) + 8

Where N = the number of requested devices

The command will be at least 12 bytes long, but can be up to 402 bytes long.

| Byte1 | Bytes 2, 3 | Bytes 4, 5 | Bytes 6-9 | Bytes 10-13 | Bytes 14 - (L-7) | Bytes (L-6) - (L-3) | Byte L-2 |
|---|---|---|---|---|---|---|---|
| STX | Station | RR | Addr1 | Addr2 | Addr 3 – Addr (N-1) | Addr N | ETX |

| Byte L-1, L |
|---|
| Checksum |

Byte 1: Always STX (0x02)
Bytes 2, 3: The Station Number of the HMI to read (2 Hex digits)
Bytes 4, 5: The command to execute
Bytes 6-9: This is the first address from which to retrieve data. Must be 4 bytes long,
Bytes 10-13: This is the second address from which to retrieve data. Must be 4 bytes long,
Bytes 14 – (L-7): The remaining addresses from which to retrieve data. Each address must be 4 bytes long.
Byte (L-2): Always ETX (0x03).
Bytes L-1, L: Checksum, calculated as the lower 8 bits of the sum of bytes 2 – (L-2).

## Reply

If successful, the reply length is

L = (N * 4) + 8

Where N = the number of requested devices
If successful, the reply length will be at least 12 bytes, but can be up to 406 bytes. It consists of the STX, followed by four bytes for each requested device, then the ETX and Checksum.

| Byte<br>1 | Bytes<br>2,3 | Bytes<br>4,5 | Bytes<br>6-9 | Bytes<br>10-13 | Bytes<br>14-17 | Bytes<br>18 - (L-7) |
|---|---|---|---|---|---|---|
| STX | Station | Cmd | Data 1 | Data 2 | Data 3 | Data 4 –<br>Data (N-1) |

| Bytes<br>(L-6) -(L-3) | Byte<br>L-2 | Byte<br>L-1, L |
|---|---|---|
| Data N | ETX | Checksum |

The values in each requested device are returned in Hex. The checksum is calculated as the lower 8 bits of the sum of bytes 2 – (L-2)..
In the event of an error, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 | Byte 6 |
|---|---|---|---|
| NAK | Station | ‘R’, ‘R’ | Err Code |

## RW (Random Write)

## Request

This command writes up to 99 independently-addressed 16-bit items to the HMI’s LW memory area. The length of the command is

L = (N * 8) + 8

Where N = the number of requested devices

The command will be at least 16 bytes long, but can be up to 800 bytes long.

| Byte<br>1 | Bytes<br>2,3 | Bytes<br>4,5 | Bytes<br>6-9 | Bytes<br>10-13 | Bytes<br>14-17 | Bytes<br>18 - 21 |
|---|---|---|---|---|---|---|
| STX | Station | RW | Addr 1 | Data 1 | Addr 2 | Data 2 |

| Bytes<br>(L-10) - (L-7) | Bytes<br>(L-6) -(L-3) | Byte<br>L-2 | Byte<br>L-1, L |
|---|---|---|---|
| Addr N | Data N | ETX | Checksum |

Byte 1: Always STX (0x02)
Bytes 2, 3: The Station Number of the HMI to read (2 Hex digits)
Bytes 4, 5: The command to execute
Bytes 6-9: This is the first address to write data to. Must be 4 bytes long,
Bytes 10-13: This is the data to write to the address specified by the previous 4 bytes. Must be 4 bytes long,
Bytes 14 – (L-3): The remaining addresses and data to write to the HMI. Each address and data item must be 4 bytes long.
Byte (L-2): Always ETX (0x03).
Bytes L-1, L: Checksum, calculated as the lower 8 bits of the sum of bytes 2 – (L-2).

## Reply

If the command is successful, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 |
|---|---|---|
| ACK | Station | ‘R’, ‘W’ |

In the event of an error, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 | Byte 6 |
|---|---|---|---|
| NAK | Station | ‘R’, ‘W’ | Err Code |

## RC (Read Coils)

## Request

This command reads up to 99 consecutive coils from the HMI’s ‘LB’ memory area. The command is always 14 bytes long.

| Byte1 | Bytes2,3 | Bytes4,5 | Bytes6-9 | Bytes10, 11 | Bytes12 | Bytes13, 14 |
|---|---|---|---|---|---|---|
| 1 Byte | 2 Bytes | 2 Bytes | 4 Bytes | 2 Bytes | 1 Byte | 2 Bytes |
| STX | Station | RC | Addr | No. of Items | ETX | Checksum |

Byte 1: Always STX (0x02)
Bytes 2, 3: The Station Number of the HMI to read (2 Hex digits)
Bytes 4, 5: The command to execute
Bytes 6-9: This is the starting address to read from. Must be 4 bytes long,
Bytes 10, 11: This the number of coils to read, up to 99. Must be 2 bytes long.
Byte 12: Always ETX (0x03)
Bytes 13, 14: The checksum is the lowest 8 bits of the sum of bytes 2 through 12.

Example: Read 12 coils starting from address LB100, from the HMI at Station 7. This will read coils LB100 – LB111.

| Byte1 | Bytes2,3 | Bytes4,5 | Bytes6-9 | Bytes10, 11 | Bytes12 | Bytes13, 14 |
|---|---|---|---|---|---|---|
| STX | 07 | RC | 0100 | 02 | ETX | 22 |
| 02 | 30,37 | 52,43 | 30,31,30,30 | 30,32 | 03 | 32,32 |

The checksum (bytes 13 and 14) is calculated as the lowest 8 bits of the sum of the Hex codes for bytes 2 – 12.
30 + 37 + 52 + 43 + 30 + 31 + 30 + 30 + 30 + 32 + 03 = 222.
The lowest 8 bits of the result returns 22.

## Reply

The reply length is

L = N + 8

Where N = the number of requested devices

If the command is successful, the reply length will be at least 9 bytes, but could be as long as 107 bytes. It consists of the STX, followed by one byte for each requested device, then the ETX and Checksum.

| Byte1 | Bytes2,3 | Bytes4,5 | Byte2 | Byte3 | Byte4 | Bytes<br>5 - (L-4) |
|---|---|---|---|---|---|---|
| STX | Station | RC | Data 1 | Data 2 | Data 3 | Data 4 – Data (N-1) |

| Byte<br>(L-3) | Byte<br>L-2 | Byte<br>L-1, L |
|---|---|---|
| Data N | ETX | Checksum |

If the HMI contains the following data:

| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |

The the following data is returned

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STX | ‘0’ | ‘7’ | ‘R’ | ‘C’ | ‘0’ | ‘0’ | ‘1’ | ‘0’ | ‘1’ | ‘0’ | ‘1’ | ‘1’ | ‘0’ | ‘0’ | ‘0’ | ‘1’ |

02H 30H 37H 52H 43H 30H 30H 31H 30H 31H 30H 31H 31H 30H 30H 30H 31H

| | | |
|---|---|---|
| ETX | ‘4’ | ‘6’ |

03H 34H 36H

The values in each requested device are returned in Hex. The checksum is calculated on bytes 2 – (L-2).

In the event of an error, the reply is

| Byte 1 | Byte 2,3 | Byte 4,5 | Byte 6 |
|---|---|---|---|
| NAK | Station | ‘R’, ‘C’ | Err Code |

## WC (Write Coils)

## Request

This command writes up to 99 consecutive coils to the HMI's 'LB' memory area. The length of the command is

L = N + 14

Where N = the number of requested devices

The command will be at least 15 bytes long, but can be up to 113 bytes long.

| Byte1 | Bytes2,3 | Bytes4, 5 | Bytes6-9 | Bytes10-11 | Byte12 | Byte13 | Bytes 14 - (L-4) |
|---|---|---|---|---|---|---|---|
| STX | Station | WC | Addr. | No. of Items | Data 1 | Data 2 | Data 3 – Data (N-1) |

| Byte(L-3) | ByteL-2 | ByteL-1, L |
|---|---|---|
| Data N | ETX | Check-sum |

Byte 1: Always STX (0x02)
Bytes 2, 3: The Station Number of the HMI to read (2 Hex digits)
Bytes 4, 5: The command to execute
Bytes 6-9: This is the starting address to write to. Must be 4 bytes long,
Bytes 10, 11: This the number of addresses to write. Must be 2 bytes long.
Bytes 12 – (L-3): The data to write. Up to 99 items, one Hex digit each.
Byte (L-2): Always ETX (0x03).
Bytes L-1, L: Checksum

Example: Write 5 bits starting from address LB214 to the HMI at station 12. This will write to addresses LB214 – LB218.

Write the following data:

| 214 | 215 | 216 | 217 | 218 |
|---|---|---|---|---|
| 1 | 1 | 0 | 0 | 1 |

| Byte 1 | Bytes 2,3 | Bytes 4, 5 | Bytes 6-9 | Bytes 10,11 | Byte 12 | Byte 13 | Byte 14 | Byte 15 | Byte 16 | Byte 17 | Bytes 18, 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STX | 0C | WC | 0214 | 05 | 1 | 1 | 0 | 0 | 1 | ETX | 2F |
| 02 | 30,43 | 57,43 | 30,32,31,34 | 30,35 | 31 | 31 | 30 | 30 | 31 | 03 | 32,46 |

The checksum (bytes 18 and 19) is calculated as the lowest 8 bits of the sum of the Hex codes for bytes 2 – 17.
30 + 43+ 57 + 43 + 30 + 32 + 31 + 34 + 30 + 35 + 31 + 31 + 30 + 30 + 31 + 03 = 32F.
The lowest 8 bits of the result returns 2F.

## Reply

If the command is successful, the reply is

| Byte 1 | Byte 2, 3 | Byte 4,5 |
|---|---|---|
| ACK | Station | ‘W’, ‘C’ |

In the event of an error, the reply is

| Byte 1 | Byte 2, 3 | Byte 4, 5 | Byte 6 |
|---|---|---|---|
| NAK | Station | ‘W’, ‘C’ | Err Code |

# Error Codes

The following table lists the error conditions, and the Error Codes returned for those errors.

| **Code** | **Description** |
|---|---|
| 06H | Invalid Checksum |
| 10H | Unknown Command |
| 11H | Data Length Error – data overflowed receive buffer |
| 12H | Communication Data Error – ETX not found |
| 7AH | Illegal Address |
| 7BH | More than 99 data items were requested |