Silver Series EM Operator Interface Terminals

EZwarePlus Programming Manual

Operator Interface Terminals

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WARRANTY

Warranty Statements are included with each unit at the time of purchase and is available at www.MapleSystems.com

TECHNICAL SUPPORT

This manual is designed to provide the necessary information for trouble-free installation and operation of your new HMI. However, if you need assistance, please contact Maple Systems:

- Phone: (507) 494-5656 (7 a.m. and 5 p.m. Central Time. Ask for an applications engineer.)
- Email: wintechsupport@watlow.com
- Web: http://www.watlow.com

Regarding Watlow Part Numbers

When you purchased your Operator Interface Terminal and accessories from Watlow, you ordered and received them under Watlow part numbers. The parts are also labeled with Maple Systems' part numbers and are referred to by those part numbers throughout this manual and other support documents. The table below correlates the Watlow and Maple Systems part numbers.

Watlow P/N	Maple P/N	Description
Silver Series EM	HMI5000	Family of Maple Systems operator interfaces offered by Watlow
TS00-0043-EM00	HMI5043L	4.3 in. (480 x 272) color TFT LCD touch screen; two-tone, light gray bezel; USB host; two serial ports and Ethernet
TS00-0043-EM0B	HMI5043LB	4.3 in. (480 x 272) color TFT LCD touch screen; two-tone, dark gray bezel; USB host; two serial ports and Ethernet
TS00-0070-EM00	HMI5070L	7 in. (800 x 480) color TFT LCD touch screen; two-tone, light gray bezel; USB host; two serial ports and Ethernet
TS00-0070-EM0B	HMI5070LB	7 in. (800 x 480) color TFT LCD touch screen; two-tone, dark gray bezel; USB host; two serial ports and Ethernet
TS00-0100-EM00	HMI5100L	10 in. (800 x 480) color TFT LCD touch screen; two-tone, light gray bezel; USB host; two serial ports and Ethernet

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Chapter 1 – Introduction

Welcome

Welcome to the Maple Systems HMI5000 Series Human Machine Interfaces (HMIs). Using graphic HMIs has never been easier. This powerful family of graphic HMIs connects to programmable logic controllers (PLCs) to provide the human-machine interface in industrial applications. The HMI5000 Series have several features not found in other graphic HMIs. This manual explains the programming and operation of the HMI5000 Series HMIs and how to implement the many available features using the EZwarePlus Configuration Software.

EZwarePlus Support

HMI Models Supported

For the latest list of HMI5000 Series models supported by EZwarePlus, please visit our website at www.maplesystems.com.

PLCs Supported

For the latest list of PLCs and controllers supported by the HMI5000 Series touchscreens, please visit our website.

About Your Documentation

Watlow and Maple Systems provides many resources to allow you to get the most out of your HMI5000 Series touchscreen.

• This EZwarePlus Programming Manual (shipped with EZwarePlus as a PDF file) describes the general operation and features of the HMI5000P/L/RMI Series using EZwarePlus configuration software.

• *Using Watlow Products with the Silver Series EM* manual addendum contains specific instructions and examples on communicating with and creating interfaces for Watlow controllers.

• HMI5000P/L/RMI Installation Guides (shipped with the HMI) provide information on installing, powering, and connecting the HMI5000P/L Series to a PLC/Controller.

• Controller Information Sheets provide important information specific to each supported protocol (available on our website).

• EZwarePlus Online Help covers the operation of EZwarePlus. Help is always available by clicking Help Topics from the Help menu in EZwarePlus, or press F1 from any dialog.

For more information, please visit the Support Center section on our website at http://www.maplesystems.com/support.htm. The Support Center provides links to manuals, FAQs, technical notes, training videos, sample projects, controller information sheets, and controller cables.

Conventions

When using EZwarePlus, there are usually several ways to perform a task. For example, if you want to copy a graphics object, you can:

• Click the Copy command on the Edit menu.

• Click the Copy button on the Standard toolbar.

• Press the CTRL + C keys on your computer.

In most cases, we will describe each method when the task is first discussed. The menu method is then used whenever the task is used in later procedures. Other conventions used in this manual are listed in the table on the following page.

Convention	Meaning
Bold	Characters that you must type exactly as they appear or identifying text in program fields and commands. For example, if you are directed to type **a:\setup**, you should type all the bold characters exactly as they are printed.
Italic	Placeholders for information you must provide. For example, if you are directed to type *filename*, you should type the actual name for a file instead of the word shown in italic type. Italics are also used to indicate a glossary term.
ALL CAPITALS	Directory names, file names, key names, and acronyms
KEY1+KEY2	A plus sign (+) between key names means to press and hold down the first key while you press the second key.
Click	Refers to clicking the primary mouse button (usually the left mouse button) once.
Double-click	Refers to quickly clicking the primary mouse button (usually the left mouse button) twice.
Right-click	Refers to clicking the secondary mouse button (usually the right mouse button) once. Right-clicking usually opens shortcut menus.

The following table identifies symbols and margin icons.

Icon	Meaning
▶	Identifies a procedure.
📄	Indicates a reference to additional information.
☞	Indicates an important note.

What You Need
The following items are needed to configure and operate your HMI.

Configuration Software	EZwarePlus
Configuration Cable[1]	7431-0104 (Ethernet Crossover cable for Ethernet-equipped models) 7431-0115 (USB download cable for USB Client-equipped models) 7431-0119 (USB download cable for HMI5070P later models)
Personal Computer[2]	User Provided
Power Cable	6030-0009 2-conductor 18 AWG, shielded, no connectors
24VDC Power Supply	User Provided (or available from Maple Systems)
PLC	User Provided

Controller Information Sheet	Maple Systems provides Controller Information Sheets which contain important information specific to each PLC. **Please locate the sheet that corresponds to your PLC in the Support Center section on our website.**
Communication Cable (HMI to PLC)	Refer to our web site (www.maplesystems.com) for a list of available cables.

[1]Allows you to connect the HMI directly to a PC Ethernet port or to a USB port to download/upload projects into the HMI.

[2]Computer requirements include a Pentium 1.7 GHz or higher processor, 512 MB RAM, 200 MB available Hard Disk Space, SVGA or higher resolution monitor, Keyboard and Mouse, available Ethernet port, USB 2.0 port for downloading project (depending on model), at least one RS232 port for online simulation, Windows XP, Vista, Windows 7, or Windows 8 operating system.

HMI Basics

Human Machine Interfaces (HMIs) provide much more versatility than traditional mechanical control panels. An HMI allows a plant floor operator to monitor current conditions of a control system and, if necessary, to initiate a change in the operation of the system. HMIs connect to programmable logic controllers (PLCs) typically through the PLC's serial communications port. The HMI can be programmed to monitor and change current values stored in the data memory of the PLC.

A graphics-based HMI can display text characters of varying fonts and sizes and graphics shapes such as icons, bitmaps, or pictures. Using pictures instead of words or characters often greatly simplifies the operation of the HMI, making it much more intuitive to use. For example switches can be created on a graphical touchscreen that appear only when needed. Now let us define some terms that are used throughout the EZwarePlus Programming Manual and Help files.

Projects

The HMI has two basic segments of internal memory. The *code memory* contains the information required by the HMI that controls how it operates such as the features supported and how it communicates to a PLC. The HMI programmer does not have the ability to change code memory. The *project memory* pertains to all the window screens created and any other features that the HMI programmer can create using the EZwarePlus configuration software. Therefore, the term *project* is used to designate the file that is sent to the HMI from the EZwarePlus software.

Backing Up Projects

We recommend that you frequently back up your projects to another folder or an external or network drive. In addition, when you have completed a project, archive it by running the compression utility (Tools > Compress/Uncompress), which bundles the project file with the libraries that are associated with the project. This allows the project to be opened on another computer and retain all the shapes and pictures that are linked to the project. Refer to the Help menu for more information (Help > Help Topics > Contents > How Do I…Backup a Project?).

The HMI also has internal memory that can be used by the programmer for temporary or permanent storage of data.

Register Memory	Description
LW (0-8999)	Local Words: Non-retentive memory available for program (Resets to zero when power is cycled on the HMI)
LW (9000 and above)	Reserved Local Words (System tags): Used for various system functions
RW (0-524287)	Recipe Words: Retentive memory available for storing recipe data (Stored in flash memory)
RW_A (0-65535)	Recipe Word Annex: Reserves an additional 64K of memory for recipes (Stored in flash memory)
RWI (0-65535)	Recipe Word Index: Uses the offset supplied by LW9000
PLW (0-5)	Private Local Words (RMI5010 only): Used by the cMT Viewer for local storage of data
RECIPE	Access recipe items configured on the Recipe tab of the System Parameters window (Stored in flash memory)
EM (0-9)	Extended Memory: Access additional memory on a connected USB flash drive or SD card
Discrete Memory	**Description**
LB (0-8999)	Local Bits: Non-retentive memory available for program (Resets to zero when power is cycled on the HMI)
LB (9000 and above)	Reserved Local Bits (System tags): Used for various system functions
LW_Bit	Access individual bits within Local Words (LW)
RW_Bit	Access individual bits within Recipe Words (RW) (Stored in flash memory)
RBI	Recipe Bit Index: Uses the offset supplied by LW9000
PLB	Private Local Bits (RMI5010 only): Used by the cMT Viewer for local storage of data
PLW_Bit	Access individual bits within Private Local Words (PW) (RMI5010 only)

Objects

An *object* is any 'thing' that performs an action while the HMI is communicating to the PLC. In order to get the HMI to 'do anything', you must program the HMI with objects. Objects perform actions such as display text or graphics, write a value to a PLC register, or display an alarm. Objects most often are graphics shapes that are to be displayed on the HMI screen. For example, a *Text Object* is used to display text on the HMI. But objects are also used to configure the HMI to perform some action. For example, a *PLC Control Object* tells the HMI to continuously monitor a PLC register that is used by the PLC to request a new window. Some objects can display a graphics shape on the HMI screen and perform some action. For example, a *Toggle Switch Object* creates a graphic object on the HMI that, when pressed, activates a bit in the PLC.

Graphics Object

A *Graphics Object* is any text, icon, or picture that can be displayed on the HMI. Graphics objects are further defined by how they are composed or created. A *Text Object* is a graphics object that displays text on the HMI screen. A *Bitmap Object* is a graphics object that displays a bitmap on the HMI screen. Bitmaps are files stored in the HMI to display pictures. A *Shape Object* is a graphics object that displays a shape on the HMI screen. Shapes are also files stored in the HMI to display pictures. Shapes differ from bitmaps in that shapes are stored using a vector-based file format whereas bitmaps use a pixel-based file format. Each format has its advantages and disadvantages. For example, vector-based graphics can be resized without losing resolution, whereas bitmap graphics lose resolution as they are magnified. Finally, a *Group Object* is the most complex type of graphics object. It is a combination of other objects. Briefly, a group object consists of one or more objects that are 'grouped' together and stored as one object. A good example is a keypad, which is really a combination of several keys each designed to perform a specific task. When grouped together, a keypad can be stored as a group object for use in other projects or windows.

Windows

A *window* is a screen that can be displayed on the HMI. Windows can be full-sized to completely cover the HMI display or partially sized. Any partially sized window is usually referred to as a *popup window*. Windows can appear on the HMI display by a request from the PLC or by a press from the touchscreen. Windows can be configured to any size. Once a window is displayed, it can be moved around the HMI display or removed from the display. Windows can even overlap each other. Each window can display graphics objects and there is no limit to the number of graphics objects that can be placed on each window. The HMI5000P/L Series is capable of storing up to 1999 windows, but the actual limit is determined by the total amount of memory used for the application.

What is an HMI5000 Series?

The HMI5000 Series by Maple Systems are graphic operator interfaces designed to connect to PLCs in an industrial environment. The displays are covered with analog resistive touchscreens designed for harsh industrial environments. The touchscreens use the latest in touchscreen technology enabling the HMI programmer to create switches that are very fine in resolution. Unlike many other touchscreen HMIs on the market, the HMI5000 Series are not limited to a fixed number of cells in which switches can be created. The project can contain as many objects of varying sizes and shapes as desired, limited only by the total amount of memory available for the project.

LED indicators are provided on the face of the HMIs to provide instant feedback to the HMI operator of the current operating condition of the HMI.

Models: HMI5121XL, HMI5150XL, HMI5070P(v2)

LED Indicator	Purpose
PWR LED (amber)	Indicates if power is applied to the HMI
CPU LED (green)	Blinks when reading/writing to flash memory
COM LED (blue)	Indicates communications activity on serial port only (Does not indicate network activity)

All other models: (some models have PWR LED only; some models have no LEDs)

LED Indicator	Purpose
PWR LED (amber)	Indicates if power is applied to the HMI
CPU LED (green)	Indicates if the HMI is operating correctly

| COM LED (blue or red) | Indicates communications activity on serial or Ethernet port |

The HMI5000 Series have two serial ports, which provide a connection to a PLC using RS-232, RS-485; CANbus communications, and an Ethernet connection for PLC communication and project upload and download. Some models also have a USB port for project upload and download.

The RMI5001 and RMI5010 have three serial ports (on a single DE9P connector), which provide a connection to a PLC using RS-232 and RS-485 communications, and an Ethernet connection for PLC communication and project upload and download.

- The RMI5001 is a DIN-rail mounted unit designed to display information on an HDMI-compatible monitor.
- The RMI5010 is a DIN-rail mounted unit designed to display information wirelessly (optional wireless access point required) on an iPad or Android device, or by a hardwired RMI5090 touch panel. The RMI5010 also has a second, separate Ethernet port.

⌨ The L-Series and RMI-Series do not support CANbus.

⌨ Some EZware objects have different configuration options when used with the RMI5010. This is to take advantage of the 'pinch and zoom' functionality of tablet devices.

The HMI5000 Series are powered using +24VDC. A reset switch is provided on the back of some models to reinitialize the HMI if an operational failure occurs. The HMI5000 Series is designed for industrial environments and carries a NEMA4/IP65 rating as well as CE compliance for noise immunity and emissions. The RMI5000 series carry the CE rating for noise and immunity, but are designed to be installed inside an enclosure.

List of Features

The next chapter will guide you through the creation of your first project. Before you proceed, you may wish to read this brief list of some of the features offered in the EZwarePlus programming software. Please refer to the EZwarePlus Help section for details of the objects listed.

	💡	Bit Lamp	Creates a graphic object to reflect the current status of a PLC bit.
	🚦	Word Lamp	Creates a graphics object to reflect the current state of a multi-state PLC data register.
	⊬⊢⊙	Set Bit	Creates a touchscreen graphics object that represents a two-state switch. When pressed it sets/resets a PLC bit.
	123	Set Word	Creates a touchscreen graphic object that represents a multi-state switch. When pressed it can place a constant value in a PLC register or jog the value.
	◆	Toggle Switch	Creates a touchscreen graphic object that represents a two-state switch changing state (picture) based upon a PLC bit. When pressed, it can control that bit or a different PLC bit.
	🖿	Multi-State Switch	Creates a multi-state touchscreen graphic object that changes state (picture) according to the value in a PLC data register. When pressed, it sends a

		value(s) to the same or a different PLC register.
	Option List	Displays a list of text items with the selected item being determined by the value in a register. Optionally, selecting an item can write the corresponding value to a register.
	Slider Object	Creates a touchscreen graphic object that changes a register value according to the position of a slider switch.
	Function Key	Creates a touchscreen graphic object that changes windows, inputs data as part of a keypad, executes a macro, or prints the screen to a USB flash drive or printer.
	Combo Button	Creates a touchscreen graphic object that allows multiple actions to be triggered with a single touch.
	Numeric	Displays a number stored in a PLC register. The number can be changed using a numeric keypad. The Read and Write addresses can be the same or different.
	ASCII	Displays ASCII characters stored in a PLC register. Characters can be changed using an alphanumeric keypad. The Read and Write addresses can be the same or different.
	QR Code	Displays ASCII characters stored in a PLC register as a QR code.
	Indirect Window	Displays any Window based on the value in a PLC word address.
	Direct Window	Displays a specified Window based on a bit in a PLC register.
	Moving Shape	Creates a multi-state graphic object, which changes state (picture) based on a PLC register value, and position based on X- and Y-coordinates from PLC registers.
	Animation	Creates a multi-state graphic object, which changes state (picture) based on a PLC register value, and pre-defined position based on a PLC register value.
	Flow Block	Creates animation along a fixed path. The speed of the animation can be set from a PLC register.
	Date/Time	Displays the Date and Time as text, in one of several formats.
	Media Player	Displays a video file from a connected USB flash drive or SD card.
	Video In	Input and play video on the HMI from an external source. The HMI5121P/5150P support NTSC composite video. These units and the HMI5070P, 5121XL/5150XL/5097XL/5097NXL/5097DXL, and RMI5001 also support USB Web Cam video.

	Bar Graph	Creates a bar graph with alarm monitoring.
	Meter Display	Creates an analog-face meter with built-in legend and scaling.
	Pie Chart	Displays the data stored in a series of register as a pie chart.
	Data Block Display	Displays the data stored in a series of registers as a line graph.
	XY Plot	Creates an XY Plot of data stored in a series of registers. On the RMI5090 and tablet devices, 'pinch and zoom' is supported.
	Recipe View	Displays recipe data in a tabular format.
	Picture View	Displays images stored on the HMI or an attached SD or USB storage device.
	Data Sampling	Stores data for trending and archiving.
	Trend Display	Creates a trend graph. Monitors data in single or multiple PLC registers and plots the data on a time graph. On the RMI5090 and tablet devices, 'pinch and zoom' is supported.
	Circular Trend Display	Creates a circular trend graph. Monitors data in single or multiple PLC registers and plots the data on a circular graph where the circumference represents time and the radius represents the range of data.
	History Data Display	Displays historical data in a tabular format.
	Event (Alarm) Log	Contains the data for detecting alarm conditions.
	Alarm Bar	Displays alarms detected by the Alarm (Event) Log Object on a single horizontal scrolling line.
	Alarm Display	Display alarms detected by the Alarm (Event) Log Object in a table format.
	Event Display	Displays messages detected in the Alarm (Event) Log and can acknowledge the message(s).
	Data Transfer (Trigger-based)	Transfers data to the specified PLC registers based on a touch or PLC bit status.
	Backup	Copies recipe, event, or historical data to one of the USB flash drives or to a PC connected via Ethernet.
	Timer	Controls an internal bit or PLC bit based on a timer; supports five different configurations.

	PLC Control	Configures the HMI to monitor PLC data registers to display full window screens, execute a data transfer, control the backlight, play a sound, execute a macro, or print a screen.
	Data Transfer (Time-based)	Transfers data to the specified PLC registers on a timed basis.
	System Message	Customizes the content of system-generated messages.
	Scheduler	Performs an action based upon a time schedule.
	Operation Log	Records entries and keystrokes.
	File Browser	Lists the files in a selected folder. Some objects can use the File Browser to select a file.
	Recipe Import/Export	Allows recipe data from a Recipe Database table to be imported/exported using Comma-separated Variable (CSV) files.
	Drawing Tools	Includes Line, Arbitrary Line, Link Line, Arc, Ellipse/Circle, Pie, Rectangle, Polygon, Scale, Text, Picture, and Shape.

Chapter 2 – HMI Local Setup

Factory Configuration

Each HMI arrives from the factory with a demo project file that illustrates some of the most popular features of the HMI. For a first time user, it is worthwhile to navigate through the screens in the demo project and become familiar with the features and capabilities of the HMI and EZwarePlus. Refer to the EZwarePlus Help file for more information about the features and operation of the HMI and EZwarePlus.

Some HMIs also have a black reset push button and a four-position DIP switch located through an access hole on the back of the enclosure. The reset switch can be used to reinitialize the HMI if the HMI malfunctions. DIP switch 1 puts the HMI into Touch Calibration mode. For normal operation, all of the DIP switches should be set to the OFF position.

This chapter describes how to use the HMI5000 Series' local setup options. The local setup allows touchscreen calibration, transferring projects to and from the HMI, configuring the HMI's IP settings, passwords, time and date, screen brightness, as well as managing the storage of recipe and history files. Additionally, memory and other system information can be viewed.

🖮 Local Setup on the *RMI5010* is done online from a web browser. See the **RMI5010/RMI5090 Quick Start Guide**.

Calibrating the Touchscreen

The touchscreen of the HMI is fully calibrated before it leaves the factory so there is no need to adjust it. However, over time the touchscreen may need to be recalibrated.

To calibrate the touchscreen:
1. Turn DIP switch 1 ON. For units without DIP switches, open the System Toolbar and touch the Calibration icon (see "Getting into Local Setup" below).
2. Cycle power to the HMI (or press the reset button next to the DIP switches).
3. After the HMI displays a crosshair cursor, you are prompted to touch the cursor in each of the four corners and in the center position. Touch each corner for approximately one second.
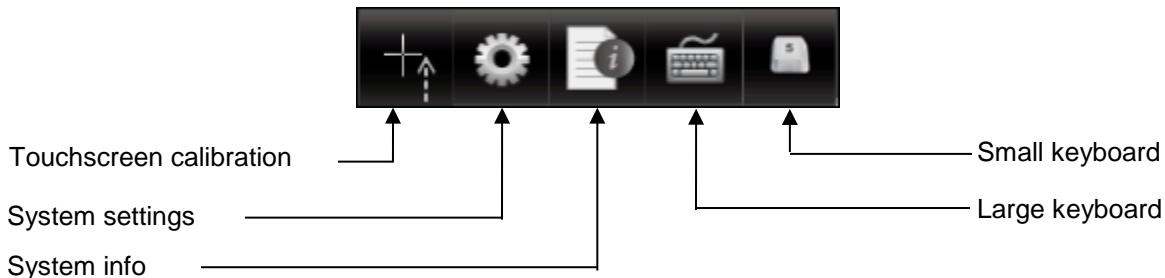
System reset:
Units with DIP switches will present the option to restore the system settings password to the default setting (111111). If you choose **Yes**, a dialog box will inform you that the project will be erased in the HMI. You must type **Yes** and click **OK** to complete the operation. When you next download a project, check the Firmware and Font files checkboxes in the Download dialog.

If you choose **No** or allow the option to timeout, the HMI will resume initializing and run the project.

🖮 On most models, touchscreen calibration can also be started by pressing on the screen as the unit boots up.

Getting into Local Setup

Access the local setup menu by touching the arrow in the lower right-hand corner of the HMI screen. The following Toolbar will pop up (the actual appearance may vary depending on the model):

Touchscreen calibration

System settings

System info

Small keyboard

Large keyboard

⌨ The Touchscreen Calibration icon is present only on units without DIP switches.
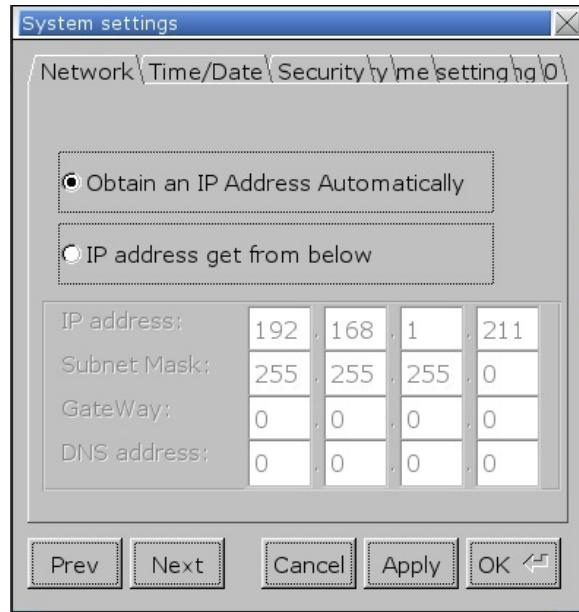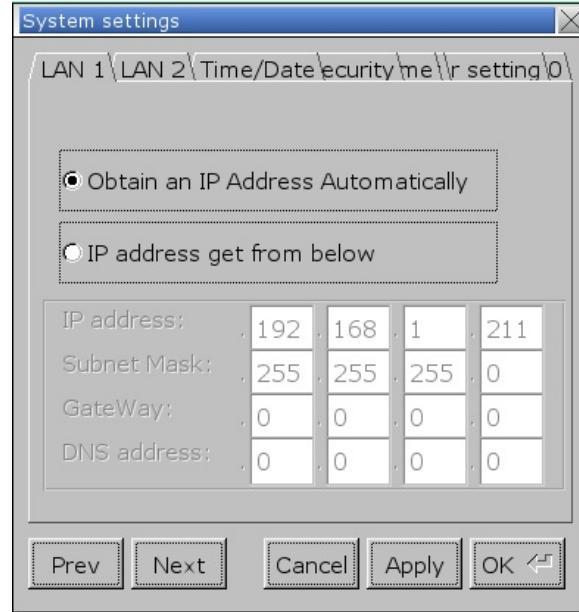
Changing the System Settings

To change the system settings on the HMI:
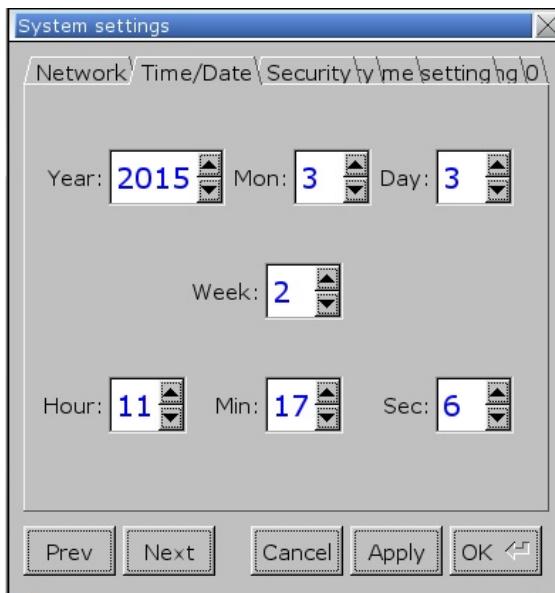
1. Open the System Settings Toolbar as described above, and click the System Settings icon.

📄 The System Setting Toolbar can be hidden to make it inaccessible to the operator.

• When DIP switch 2 is set ON, the System Settings Toolbar is disabled. Cycle power for the setting to take effect.
• For the RMI Series, set DIP switch 1 ON to disable the System Settings Toolbar.
• The System Settings Toolbar can be disabled in the project that is downloaded to the HMI by selecting the "Hide system setting bar" option in the System Parameters > System Setting tab.
• The System Settings Toolbar can be disabled with a system bit in the HMI. When LB-9020 is ON, the toolbar is enabled and when LB-9020 is OFF, the toolbar is disabled.

2. A dialog will be displayed requesting the Local password. The default password is 111111.

⌨ You may have to move windows around a bit to gain access to the virtual keyboard. You may also have to click inside the password field again.

3. Once the correct password has been entered, the System Settings dialog is displayed. For all tabs, the **Previous**, **Next**, **Cancel**, **Apply**, and **OK** buttons are available.

Previous	Move to the Previous tab
Next	Move to the Next tab
Cancel	Close the System Settings dialog without saving any changes.
Apply	Save the current settings without closing the System Settings dialog.
OK	Save the current settings and close the System Settings dialog.

4. Click on the **Network** tab to configure network settings. The Network dialog is displayed.

Single Ethernet Port Models   **Dual Ethernet Port Models**

5. The Network tab allows configuration of the IP settings. The default setting is **Obtain an IP Address Automatically**. Use this setting if the HMI will obtain an IP address from a DHCP server. If connected to a DHCP server, this dialog will display the IP settings obtained by the HMI. The IP fields are disabled and are not editable.

6. If using a static IP address, use the **IP Address get from below** option. The IP fields are enabled. Enter the appropriate settings for your network.

7. Click the **Next** button or the **Time/Date** tab to configure time/date settings. The time/date dialog is displayed.

8. Configure appropriate time and date settings.

9.   Click the **Next** button or the **Security** tab to display the security settings dialog. Here, you can select your system passwords.
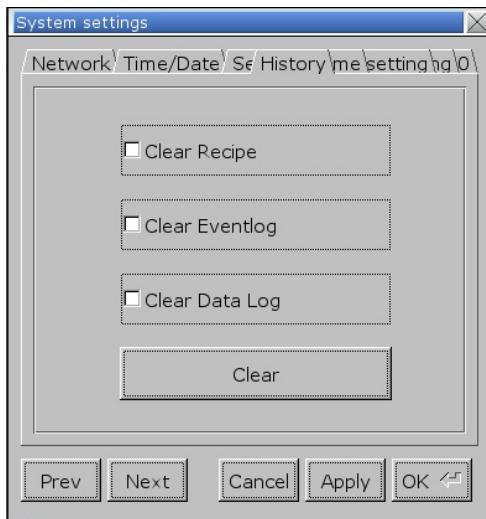
10. Configure your password settings.

Local Password	The password required to enter local setup.
Upload Password	The password required to upload data from the HMI to a PC or memory module.
Download Password	The password required to download data to the HMI from a PC or memory module.
Upload (History) Password	The password required to upload history files from the HMI to a PC or memory module.

11. The new password must be entered, and then entered again to confirm. As the password is entered into the confirm field, an indicator will show if the two passwords match.

12. Click the **Next** button or the **History** tab to display the History dialog. This is where data stored in the HMI can be cleared.
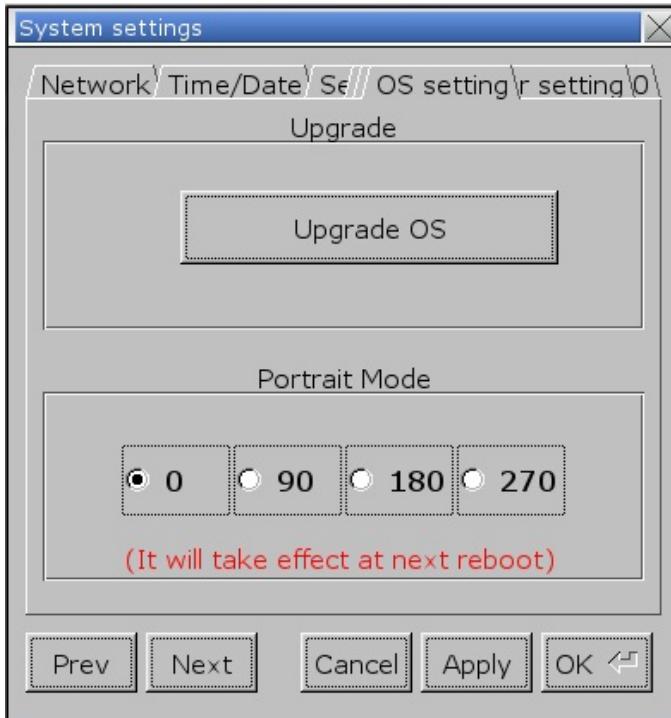
Clear Recipe	The HMI's stored recipe data will be cleared when the Clear button is clicked.
Clear Event log	The HMI's stored event log data will be cleared when the Clear button is clicked.
Clear Data log	The HMI's stored data log data will be cleared when the Clear button is clicked.

☞ This will not clear data stored on an SD card or USB flash drive.

13. Click the **Next** button or the **HMI name** tab to give the HMI a unique name. This name can be used to address the HMI for downloading over Ethernet.

14. Click the **Next** button or the **OS setting** tab to access the **Upgrade OS** option and the **Portrait Mode** settings (for models with the Portrait feature).

Upgrade OS: Click this button to upgrade the Operating System in the HMI from a USB flash drive or SD card. Contact Maple Systems Technical Support for instructions on how to perform this procedure.

Portrait Mode: Select the orientation of how the project is displayed on the HMI. Landscape mode or Portrait mode can be selected when a project is created in EZwarePlus. If Landscape mode is selected, choose 0 degrees or 180 degrees. If Portrait mode is selected, choose 90 degrees or 270 degrees.

⌨ Once a project is created, the Portrait/Landscape Display mode selected cannot be changed.
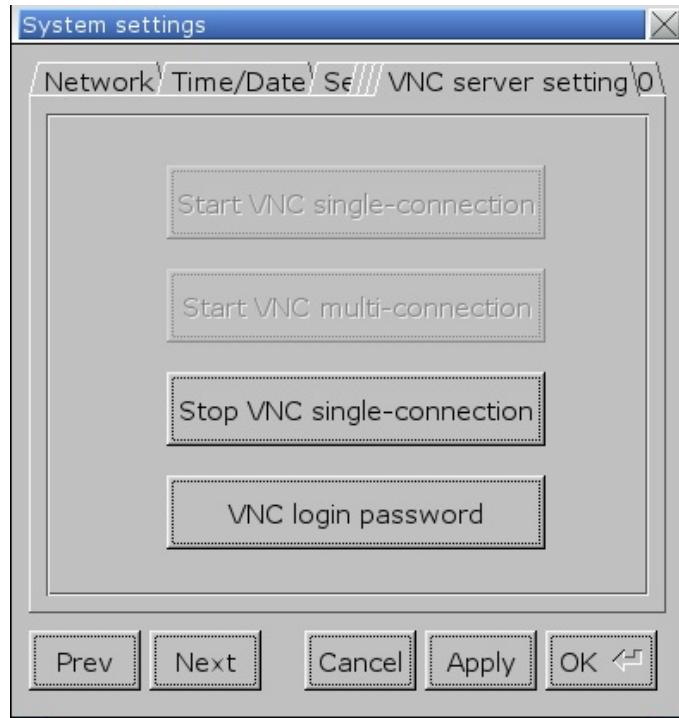
15. Click the **Next** button or the **VNC server setting** tab to enable remote access using VNC (Virtual Network Computing). VNC makes it possible to view and interact with an HMI from another computer or mobile device with network access to the HMI (via LAN or Internet).

In order to access an HMI over a VNC connection, you must install a VNC client application on a PC or mobile device (e.g., smartphone or tablet).

📄 Maple Systems does not provide a VNC viewer application. There are many VNC applications available on the internet.

WARNING: The VNC remote connection allows full-access control of the HMI over a network. Any capability accessible through the touchscreen interface is accessible remotely. If the HMI is connected to a controller, it is possible for an operator to activate machinery through the VNC connection. If activating the VNC connection, have safety measures in place to prevent accidents.

⌨ System bit LB-12088 can be used to enable VNC monitor mode (when ON). This disables remote control of the HMI and allows only monitoring data.

Click **Start VNC single-connection** to enable the VNC server and allow only one connection at a time.

Click **Start VNC multi-connection** to enable the VNC server and allow multiple simultaneous connections. While there is no limit to the number of connections, more connections will degrade HMI performance.
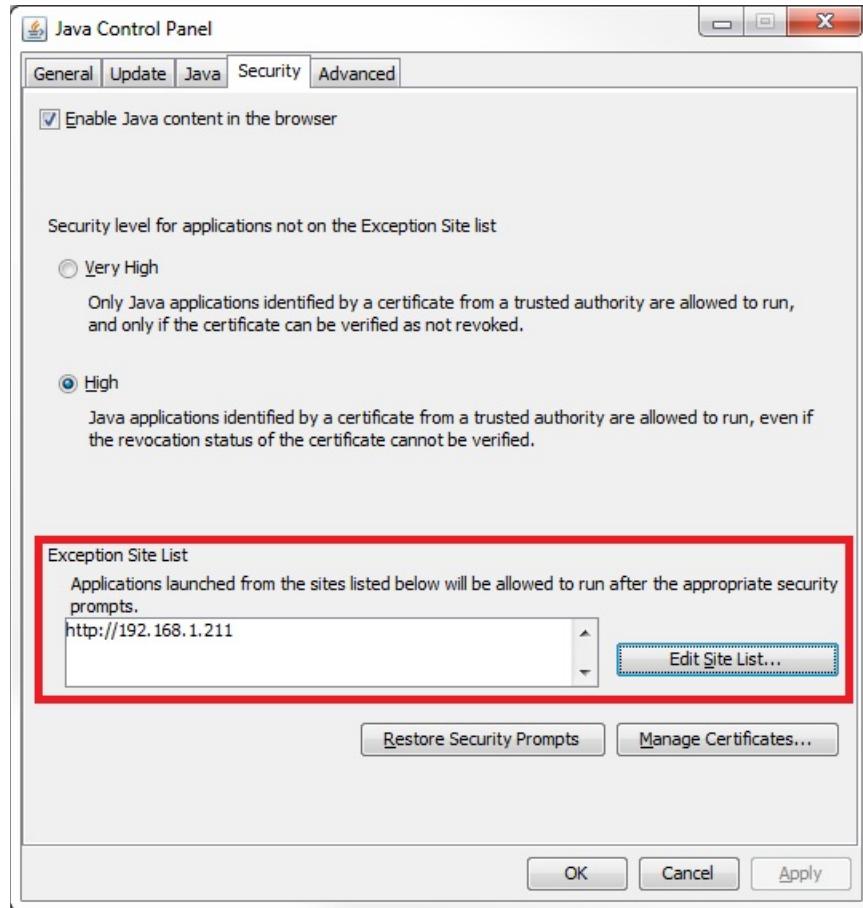
Click **Stop VNC…** to disable VNC and disconnect any currently-connected users.

▤ When VNC is **started**, the *Start* buttons are disabled.
▤ When VNC is **stopped**, the *Stop* button is disabled.

Click the **VNC login password** to enter the password used to login to the HMI with a remote VNC viewer. The default password is 111111.

Click **Apply** and then click **OK** to save the settings and exit the System Settings window.

▦ The VNC server option in the System Parameters > System Settings tab will override the VNC login password in the HMI when Password from project is checked.

▦ When connecting to an HMI remotely through a router, use port forwarding to direct the VNC connection to the HMI.
Use TCP port 5900 for a stand-alone VNC viewer.
Use TCP port 5800 (or port 80) for web-browser or Java VNC viewers.

▦ When using a web browser or Java VNC viewers, the security settings in Java will affect the VNC connection. If the VNC connection cannot be made:

   1. Open Windows Control Panel and select **Java** to open the Java Control Panel.
   2. Click the **Security** tab and click **Edit Site List**. Enter the IP address of the HMI in the Exception Site List (for example, http://192.168.1.211).
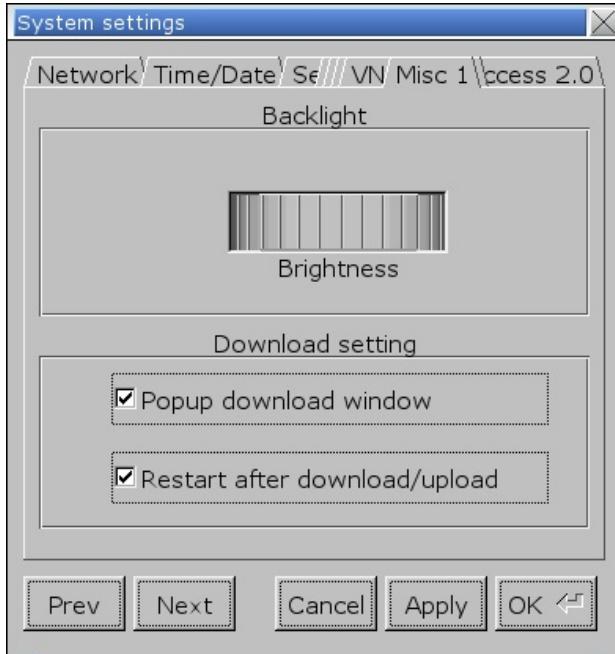
System tags for VNC control:

LB-12088:   enable VNC monitor mode (when ON); enables monitor mode only
LB-12089:   VNC password free (when ON); disables password requirement for VNC client to log in
LB-12090:   indicates when a VNC client has connected to the HMI
LB-12091:   disable auto-logout function when a VNC client has connected to the HMI (when ON)
LB-12092:   enable VNC server (ON), disable VNC server (OFF)
LB-12093:   VNC connection mode (single connection OFF, multi-connection ON)
LW-9530 (8 words): VNC server password
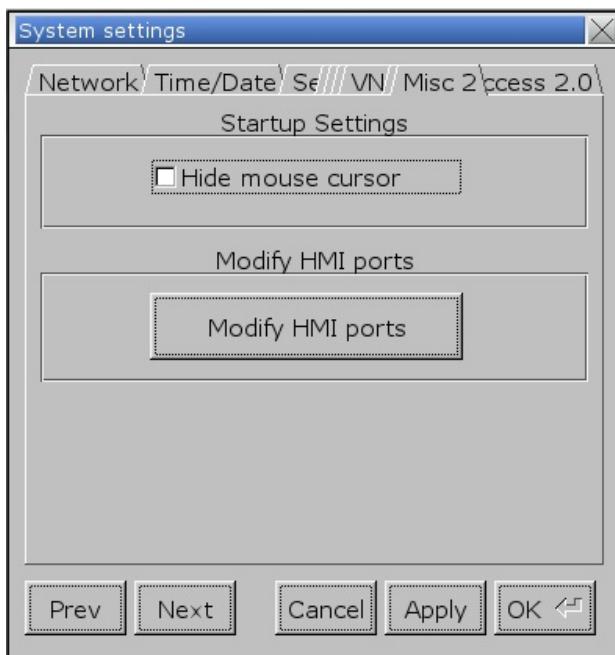
   16. Click the **Next** button or the **Misc 1** tab to display the Backlight dialog. The **Brightness** control
       adjusts the brightness of the HMI's backlight. Use the mouse or touchscreen to roll the wheel.
       Rolling to the left decreases the brightness, rolling to the right increases the brightness.

       ≡⃗ System tags "Backlight Up (LB9040)," "Backlight Down (LB9041)," and "Backlight Index
       (LW9040)" can be used to adjust the brightness at runtime (range 0-31).
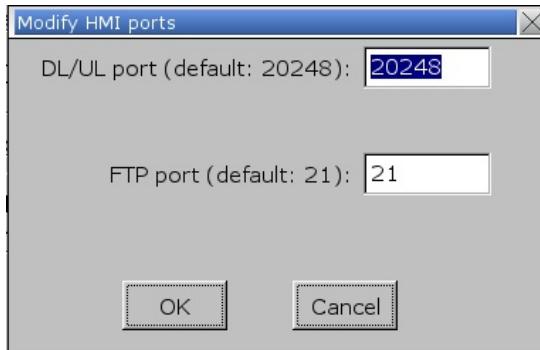
The **Popup download window** option allows you to turn on or off whether the Download dialog window appears on the screen when a USB flash drive is connected to the USB port on the HMI. The **Restart after download/upload** option causes the HMI to reboot after a download or upload from a USB flash drive or SD card, when selected.

17. Click the **Next** button or the **Misc 2** tab to display the **Hide mouse cursor** option. This hides the mouse cursor on the HMI screen when the HMI first starts up.

   • The mouse cursor can be disabled in the project that is downloaded to the HMI by selecting the "Hide mouse cursor" option in the System Parameters > System Setting tab.
   • The mouse cursor can be disabled with a system bit in the HMI. When LB-9018 is ON, the mouse cursor is disabled and when LB-9018 is OFF, the mouse cursor is enabled.

• The **Modify HMI ports** option allows you to customize the TCP port used for uploading and downloading to the HMI (default TCP port 20248) and to customize the FTP port used for accessing the HMI as an FTP server (default FTP port 21).

```
Modify HMI ports                        ✕

  DL/UL port (default: 20248):  20248

  FTP port (default: 21):  21

         OK              Cancel
```
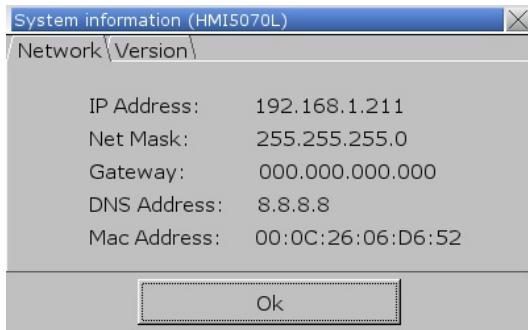
18. Click the **Next** button or the **EasyAccess 2.0** tab to display the EasyAccess 2.0 setup options.

⌨ As of this writing, EasyAccess 2.0 is not supported.
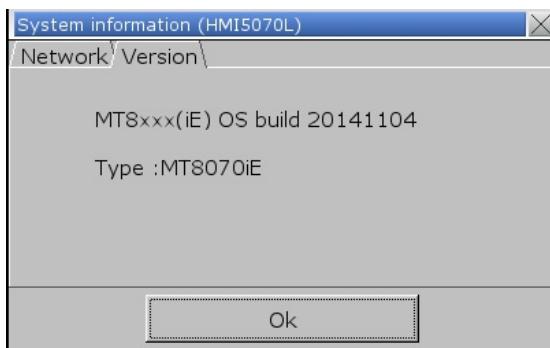
Viewing System Information

To view system information:

1. Open the System Setup Toolbar as described above, and click the System Information icon 🖵. A dialog will be displayed with two tabs.
2. Click on the **Network** tab to display the current IP settings.

```
System information (HMI5070L)           ✕
 Network  Version

     IP Address:      192.168.1.211
     Net Mask:        255.255.255.0
     Gateway:         000.000.000.000
     DNS Address:     8.8.8.8
     Mac Address:     00:0C:26:06:D6:52

                 Ok
```

3. Click on the **Version** tab to display the current firmware information.

```
System information (HMI5070L)           ✕
 Network  Version

     MT8xxx(iE) OS build 20141104

     Type :MT8070iE

                 Ok
```

Changing or Restoring the HMI Settings by USB or SD

There may be times when it is necessary to change or update the settings in an HMI, when the IP address or password of the HMI is unknown. EZwarePlus provides a tool to create a system settings file, and transfer that file to the HMI.
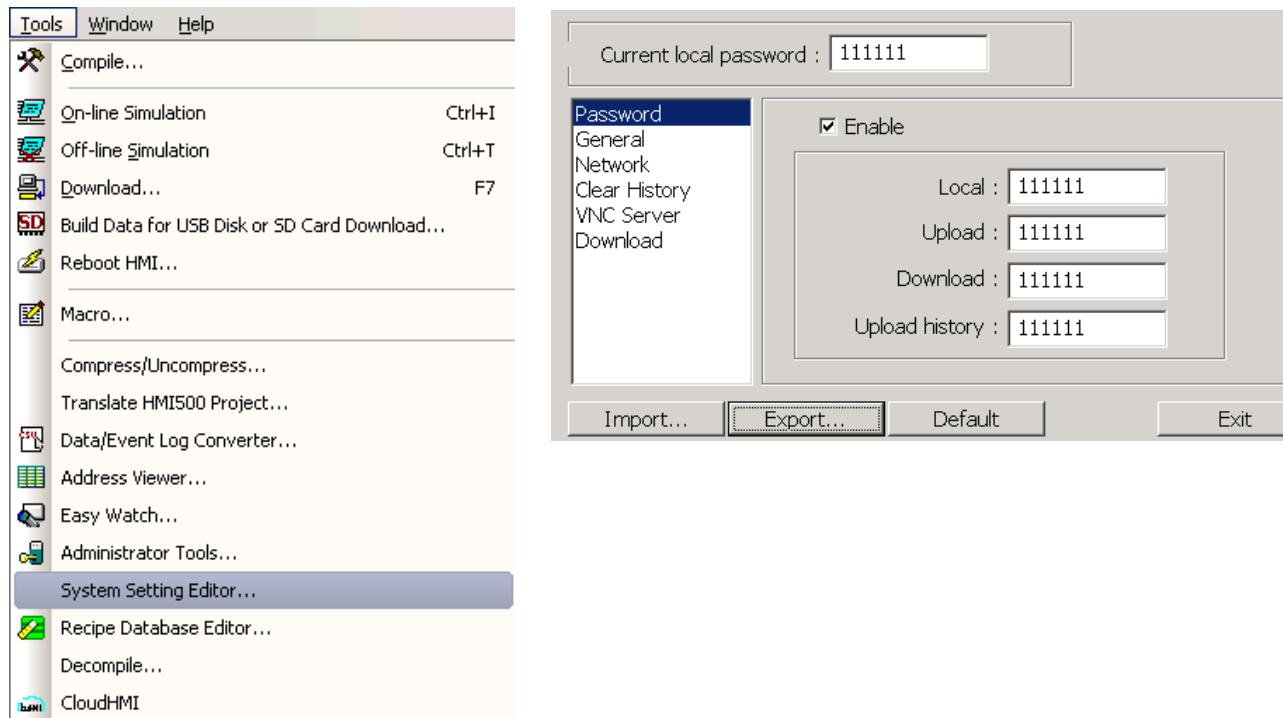
Note: The HMI must have OS version 20131106 or later.

The following settings can be changed with the System Setting Editor:
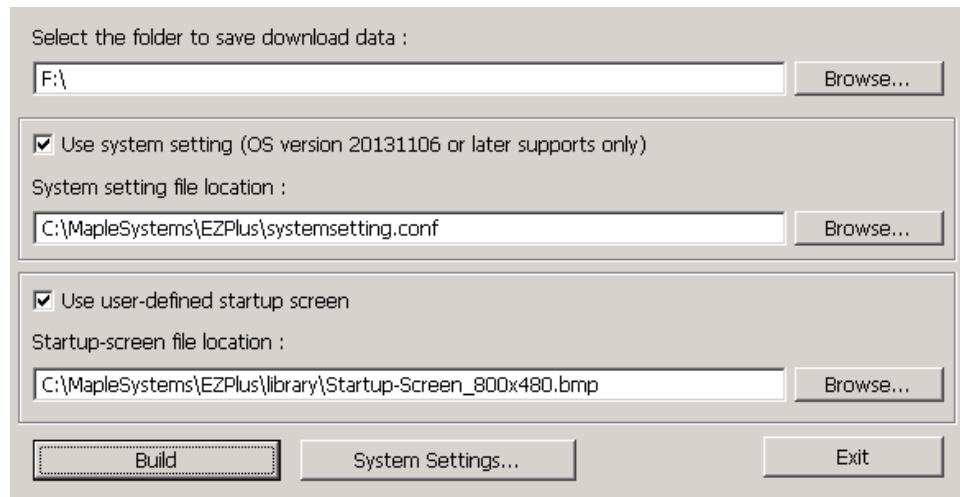
▧ The HMI password is not required when the file is loaded into the HMI, but
the proper HMI password must be supplied in the editor's *Current local password* field.

Password	Local, Upload, Download, Upload History
General	HMI Name, Backlight Brightness, Time Offset (Time Zone Adjustment), Portrait Mode (0, 90, 180, 270 degree rotation)
Network	Use DHCP, IP Address, Subnet Mask, Gateway, DNS
Clear History	Recipe, Data Log, Event Log, Operation Log
VNC Server	Enable, Stop VNC, Stop VNC, Start VNC Single Connection, Start VNC Multiple Connection
Download	Popup Download Window, Restart After Download/Upload (recommend leaving these checked)

To open the System Settings Editor, use the Tools menu in EZwarePlus:

Once all the settings are made, click the **Export** button to save the data to a file. Then, from the EZwarePlus Tools menu, select **Build Data for USB Disk or SD Card Download**.

1. Select the drive corresponding to the SD or USB device. Note that the **Save** folder must be the root level of the SD or USB device (in this case, the root level of the F: drive).

2. Check the **Use system setting** box, and select the file exported above.

3. Click the **Build** button to create the required data structure on the SD or USB device.

    ⬚ In this example, the **Use user-defined startup screen** option is checked, but that is not required for configuring the System Settings.

    EZwarePlus will also create folders with the data for the project currently open in EZwarePlus. Therefore, it is recommended that a very simple project be created in EZware prior to building the USB/SD data.

4. Insert the SD or USB device into the HMI. The following dialog will appear after a few seconds.

⬚ If Local Bit LB-9063 is set in the HMI project, this dialog will not appear.

5. Click the **Load System Setting** button. The HMI will transfer the system settings from the SD/USB device.

⬚ The HMI will also load the project from the SD/USB device, overwriting the project currently present on the HMI. This is done to protect any intellectual property in the project currently residing on the HMI.

Chapter 3 – Connect the HMI to the PLC or Controller

The Graphic HMI can be configured to connect to many PLCs from many different manufacturers. Because each PLC is unique, the information needed to establish a particular connection is not included in this manual. All of the information needed to connect to any specific PLC is contained in a Controller Information Sheet (CIS) available for download from the Support Center at www.maplesystems.com. The first step in establishing a PLC connection is to review the information in the CIS.

The HMI5000 Series of HMIs can connect to one, two, or more PLC/controllers. This is accomplished via one or two 9-pin D-sub serial communications connectors (Port A and Port B) and one Ethernet port. Each PLC/Controller has its own wiring requirements. Maple Systems offers HMI-to-PLC/Controller communication cables for most PLC/Controllers that are tested for high reliability. The HMI5000 Series has three software controlled communications ports (COM1, COM2, and COM3 or CANbus depending on the model) located on one or two physical connectors, designated as Port A and Port B.

☞ Some models do not support CANbus.

Each software controlled communications port can only be selected for one communication type. Once a communication type is selected for one of these software controlled ports, that port cannot be used for another communication type. Each of these communication ports has between one and three communication types. COM1 can be RS232, RS485 4-Wire, or RS485 2-Wire. COM3 is either RS232 or RS485 2-Wire. The CANbus port is strictly for CANbus connections using the CANopen protocol. The RMI-series also support RS485 2-Wire and 4-Wire on COM2.

COM1 cables are readily available for purchase from Maple Systems. COM3 and CANbus cables are custom-made according to wiring diagrams that can be found on Maple Systems' web site. Connecting multiple PLCs and controllers may require a splitter.

☞ The RMI5090 does not connect directly to a PLC. Please refer to the RMI5090 Installation Guide for more information.
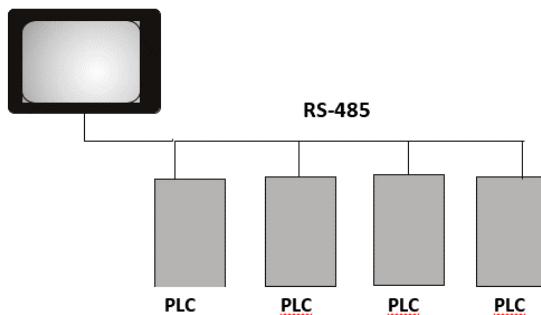
☞ Refer to the "Installation Guide" for the specific model that you are working with for pinout information on the serial COM ports.

Connecting to multiple ports on the same connector

Maple Systems HMI5000P/L/RMI family of HMIs is capable of connecting to multiple PLC/controllers. If you choose to take advantage of this feature, a splitter will be needed to break out the pins for each port. Refer to the pin definitions above.

Connecting multiple PLC/controllers serially using daisy chaining

The RS485 4-wire and RS485 2-wire communications ports of the HMI5000P/L/RMI family support multi-drop connections. A daisy-chain connection is made from the HMI to the first PLC/controller, and then from the first PLC/controller to the second and so on (see following page). The network may need biasing resistors – refer to the PLC/controller documentation for more information.

Connecting one or more PLC/controllers via Ethernet

The HMI5000 Series have a single RJ45 Ethernet connector configured for 10BaseT and 100BaseT operation. This port is used for communicating with a PC for configuration purposes as well as communicating with supported Ethernet PLCs and protocols.

The connector is wired just like the RJ45 Ethernet connector on a PC. The Ethernet connection to a PLC/controller will vary with each PLC/controller. Some will require a straight-through connection, while others require a crossover connection. See Maple Systems' website for cable drawings of Ethernet cables.

To connect a single PLC/controller to an HMI:
1. Attach one end of the Ethernet cable to the RJ45 connector on the HMI.
2. Attach the other end to the RJ45 connector on the PLC/controller.

A router or switch is required to connect multiple PLCs/controllers to a single HMI. In general, standard straight-through type cables can be used when connecting to a PLC/controller through a router or switch. Some routers and switches may be auto-sensing. In this case, either type of cable may be used.

Troubleshooting

The HMI must be connected to a PLC/controller in order for the project to run correctly in the HMI. If there is a problem with communications between the HMI and PLC/controller, the "PLC no response" message (window 5) will appear on the screen and objects addressing PLC registers will *not* appear on the screen.

Communication issues can be caused by several things, but the most common are:

- Hardware – the physical wiring could be incorrectly connected or physically damaged, or the network hardware could be improperly set up.
- Addressing – there could be misprints or accidents in the addressing of data registers from either the HMI or PLC resulting in misplaced information.
- Traffic - the length of the data connections as well as the volume of data traffic on the connection can lead to issues analogous to a traffic jam. Removing all but one variable with a confirmed address eliminates addressing and traffic errors and allows the user to confirm the hardware is functional.

Here are some things to check:

1. Make sure you have selected the correct communication protocol (driver) for the PLC you are using in the System Parameters (Edit > System Parameters > Device Properties).

    ▤ The demo version of EZwarePlus will not download the driver to the HMI and will automatically generate a "PLC no response" error message. Make sure you are running EZwarePlus from the **EZPlus** folder and not the **EZPlusDemo** folder.

2. Make sure the communication settings in the HMI (Edit > System Parameters > Device Properties) match the communication settings in the PLC (for example, Baud rate, Parity, Data bits, Stop bits, IP address, etc.).

3. Make sure the Runtime file has been downloaded at least once with the project file (Tools > Download) to ensure that the project is compatible with the HMI's operating system.

4. Make sure the communication cable is wired correctly for your application. Double-check the cable wiring and test for continuity, as well as for any shorts between adjacent pins. Refer to the Controller Cable Assembly drawings on our website for specific cabling information for your PLC/controller. (http://www.maplesystems.com/cables1023.htm).

5. Check the address formatting for objects that are reading from or writing to registers in the PLC. If the objects cannot access specific registers in the PLC, they will not appear on the screen and the

"PLC no response" message will appear on the screen. Refer to the Controller Information Sheet for your particular PLC/controller for specific information about accessible registers in the PLC memory and the correct addressing format for the various registers. (http://www.maplesystems.com/products/prodbycon-bot.htm)

To resolve communication issues, it is often helpful to create a new project with only one Numeric object on the screen assigned to a known register address in the PLC. This will reduce the number of variables that may be causing the communication error.

Chapter 4 – Creating a Sample Project

Often the best way to learn about new software is to jump right in and begin using it. This chapter will step you through the process of creating a sample project that can be downloaded to your HMI. In this sample project, we will create a bar graph with a tank shape that will represent the level of the fluid in the tank, and create a pump with a pipeline connected to the tank to indicate when the pump is operating to increase or decrease the level in the tank.

Starting EZwarePlus
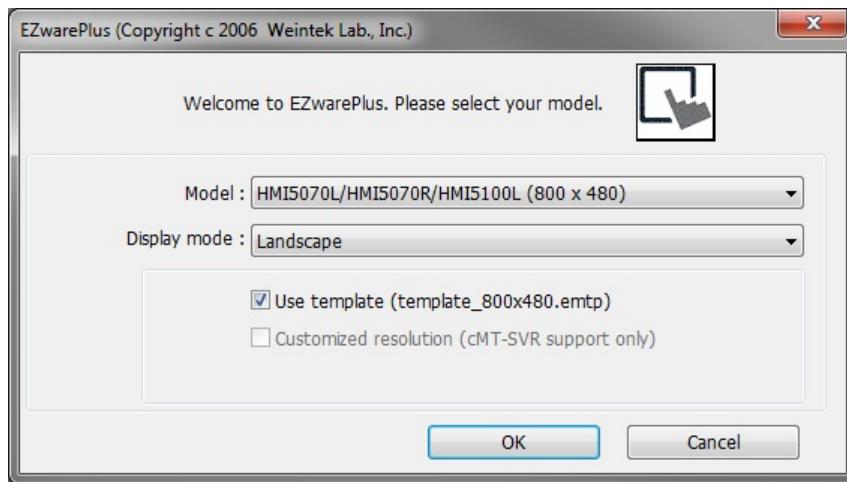
Before you can create a sample project, you must start the configuration software. The EZwarePlus software has two main applications:

- **EZwarePlus** – used to create the project downloaded to the HMI.
- **Utility Manager** – used to launch various applications and utilities including EZwarePlus.
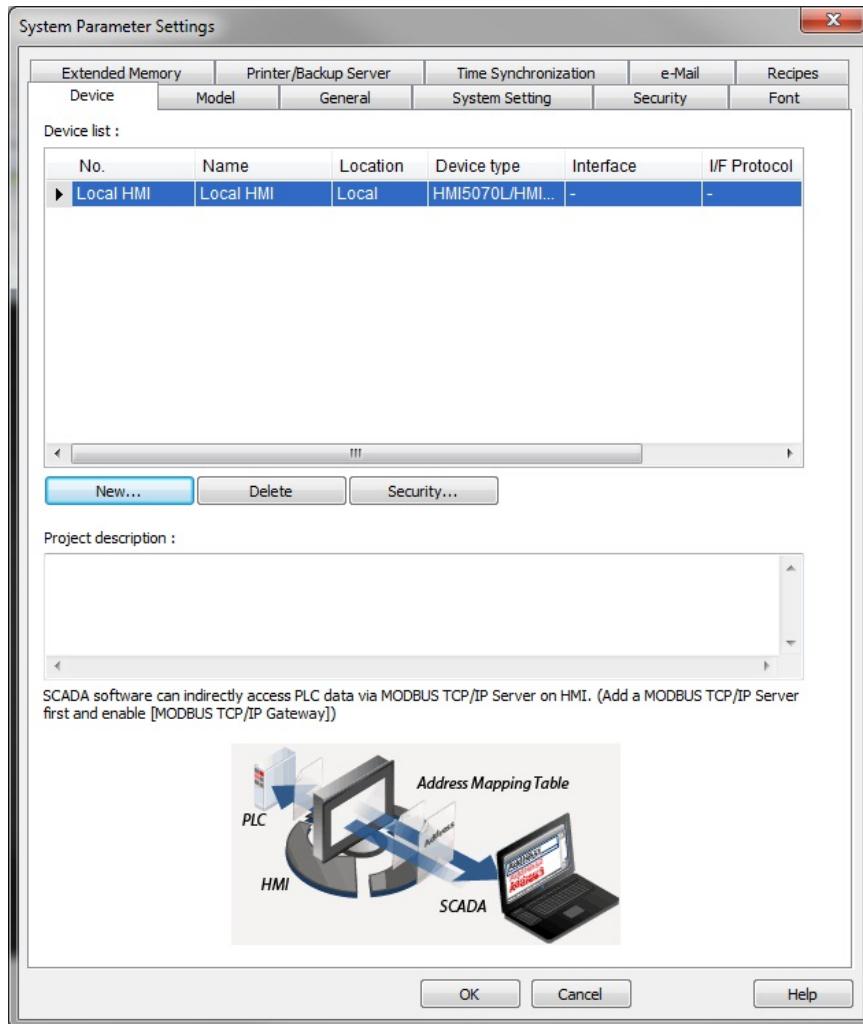
To start Utility Manager and EZwarePlus:

1. From the Windows Task Bar, click the Start button, select All Programs > Maple Systems > EZwarePlus > Utility Manager.
2. On the **Utility Manager** dialog box, click **EZwarePlus**.
3. The **EZwarePlus** dialog box appears. Click **New** and then **OK**.
4. Select the HMI model that you intend to use with your project. We will use the HMI5070L for this example. Select **Landscape** display mode (you can select Portrait as an option), and select the **Use template** checkbox to open the project with the default template for your selected model.

   ⬚ Once a project is created, the Portrait/Landscape Display mode selected cannot be changed. Make sure the corresponding orientation is selected in the HMI's **System Settings > OS setting** tab (choose 0 or 180 degrees for Landscape mode; choose 90 or 270 degrees for Portrait mode).

5. Click **OK**. The System Parameter Settings window opens next. For now, we will not add any more devices to the Device List and we will use the default settings in the System Parameters. Click **OK** to accept the settings.

📖 Refer to the Help menu "How Do I… Set Up a PLC or Controller in EZwarePlus?" to configure the devices in the Device List. You may also jump ahead to "Chapter 6 – Using EZwarePlus" (*System Parameter Settings*).

Creating a Bargraph

Window 10 is the default initial screen that EZwarePlus uses when a project is opened. Let's create Window 11 to place the bar graph, and use a Function Key to change windows from window 10 to window 11.
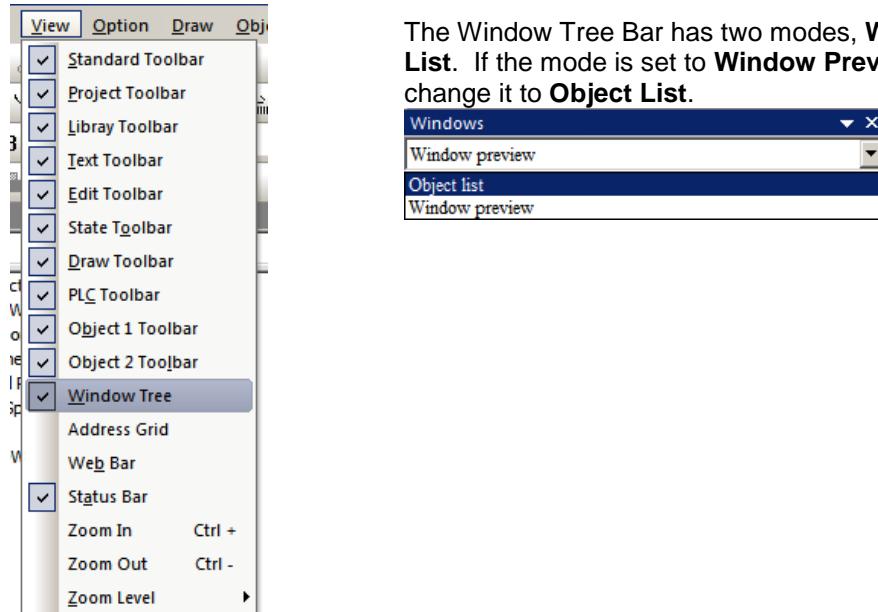
To create Window 11:

There are two ways to create a window:
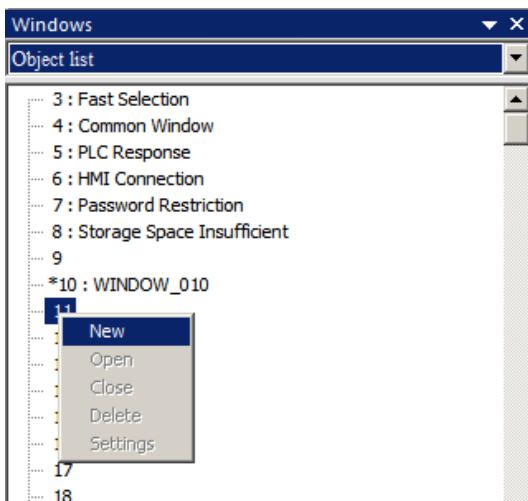
- Method 1, using the Window Tree Bar:

The Window Tree Bar is a window-management tool normally located on the left side of the main EZwarePlus window.
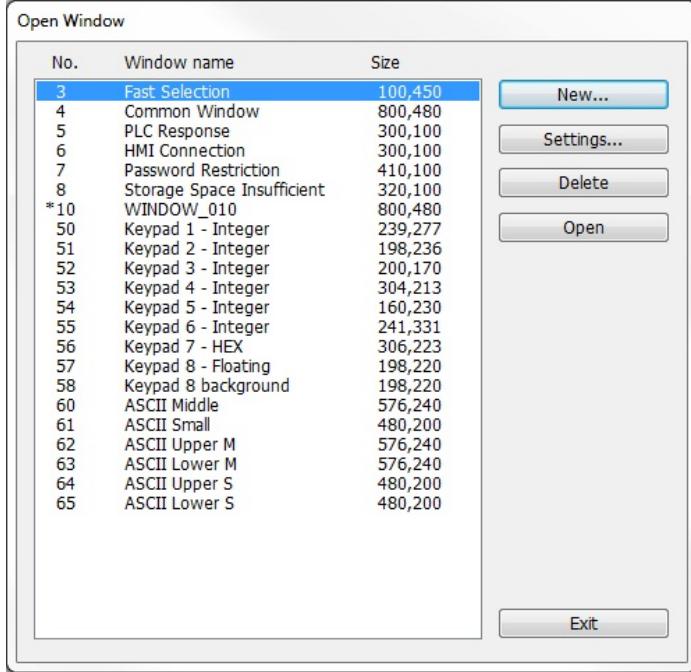
If the Tree Bar is not visible, click the **View** menu and select **Window Tree**. (See on next page)

The Window Tree Bar has two modes, **Window Preview** and **Object List**. If the mode is set to **Window Preview**, click the drop-down and change it to **Object List**.

Right-click on **11**, and select **New**.

- Method 2, using the Open Window dialog:

1. From the Window menu, click **Open Window**. The Open Window dialog box appears.
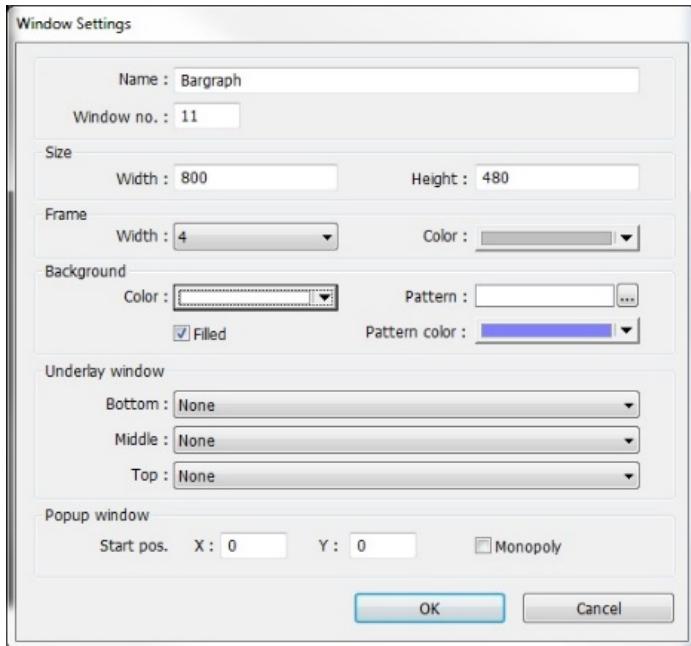
2. Click **New…** The Select Window Style dialog box appears.

3. Click **Base Window**.

Method 1 and Method 2 both display the Window Settings dialog box.
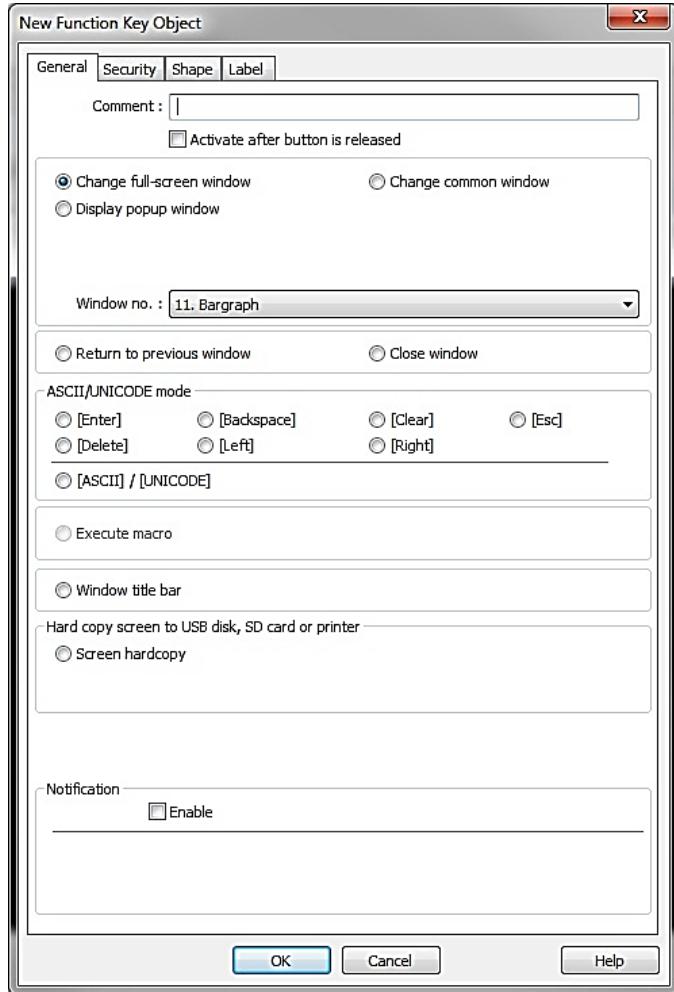
1. Type "Bargraph" in the Name field. The number 11 should already be in the Window No. field.

2. Click the box for the Background color. The color palette box opens. Click on the white color box in the lower-right corner. The color box will reflect the color that you have selected.

3. Click **OK**. If Method 1 was used, the new window will open. If Method 2 was used, highlight **Window 11: Bargraph** in the Open Window list, then click the **Open** button. Window 11 now appears on your work area.
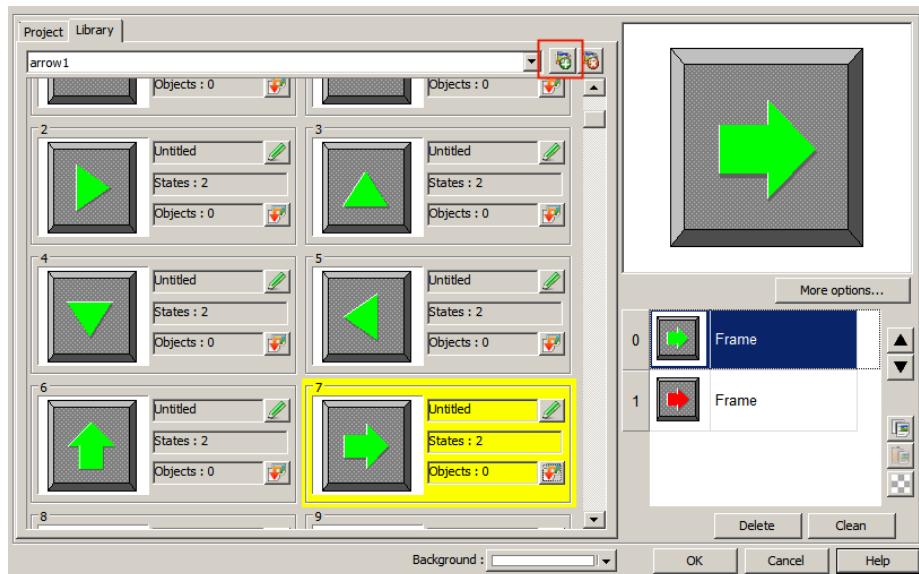
Now let's create a function key to open Window 11 from the initial screen, Window 10.

To create a Function Key:
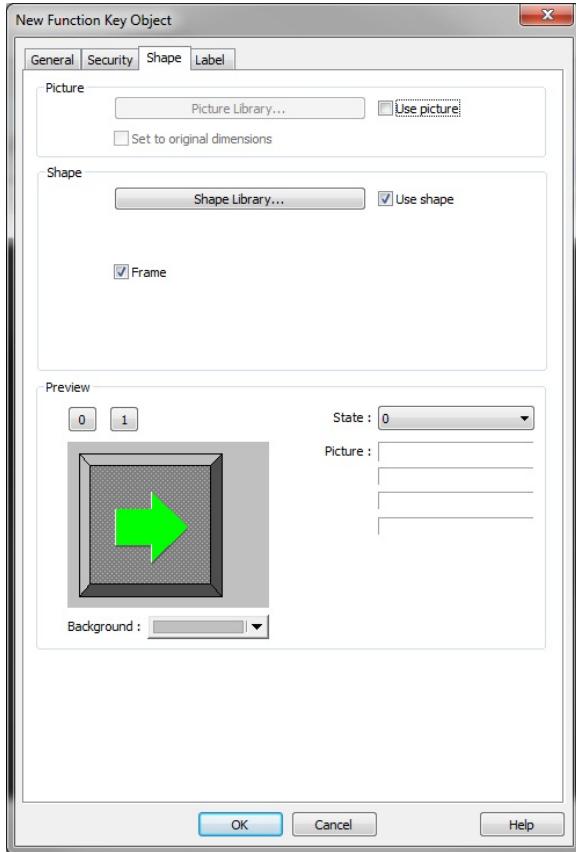
1. Click on Window 10 in the Windows Object List to open Window 10.

2. In the top menu bar in EZwarePlus, click **Objects > Button > Function Key** (or select the Function Key icon in the Object 1 Toolbar).

3. In the Function Key Properties **General** tab, select **Change full-screen window** and select **11. Bargraph** in the Window no.: box.
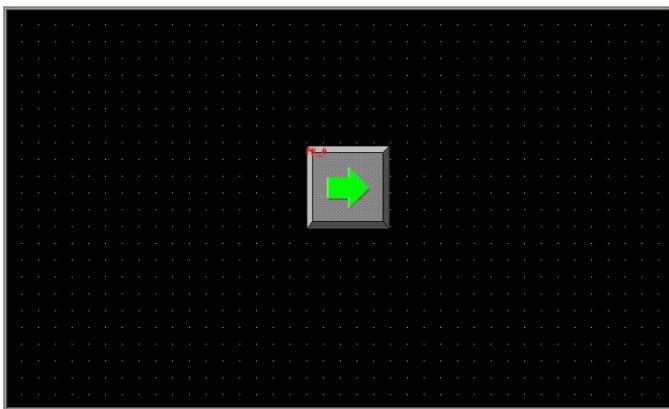
4. Click the **Shape** tab and select the **Use Shape** checkbox. Click the **Shape Library** button to open the Shape Manager window. Click the **New Library** button (red box in the image below), browse to the **arrow1.plb** file, and click **Open**.

5. Select shape number 7 and click **OK**. The Function Key Object's Shape tab now shows a preview of how the function key will appear on the screen. Click **OK**.
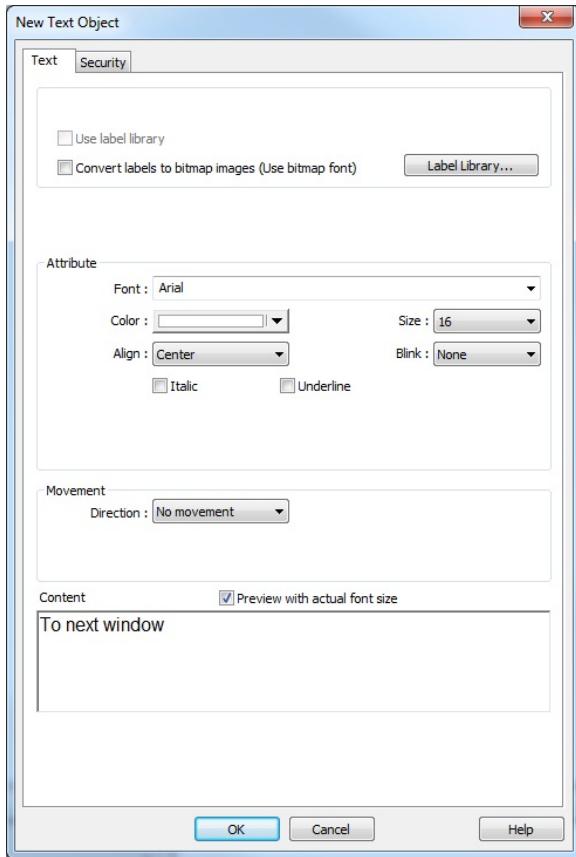
6. On the main screen of EZwarePlus you will see a white rectangle outline that is attached to your cursor in the work area. This represents the Function Key just created. Click to place the Function Key in the middle of Window 10. You can click and drag on the handles around the Function Key Object to resize it.
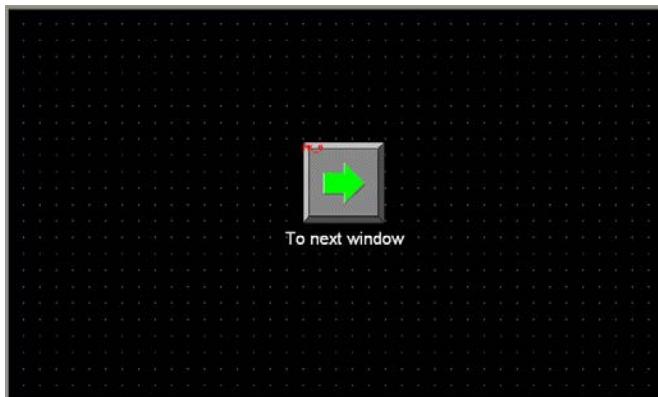
7. In the top menu bar in EZwarePlus, click **Draw > Text** (or select the Text Tool icon in the Draw Toolbar). In the New Text Object properties window, select **Arial** in the Font box and **16** pt in the Size box. Click the Color box and the color palette box opens. Click on the white color box in the lower-right corner. The color box will reflect the color that you have selected.

8. In the Content box at the bottom of the properties window, type **To next window** and click **OK**.

9. On the main screen of EZwarePlus you will see a white rectangle outline that is attached to your cursor in the work area. Click to place the text just below the function key in the middle of Window10. You can click and drag it to center it beneath the function key.
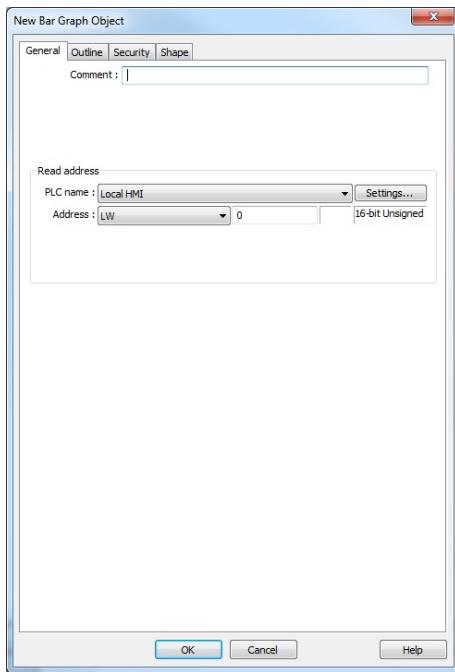
Now let's create a bar graph on Window 11. We will use the bar graph to indicate the level of a tank. We will create pushbuttons to increase or decrease the level of the tank by turning a pump on and off.
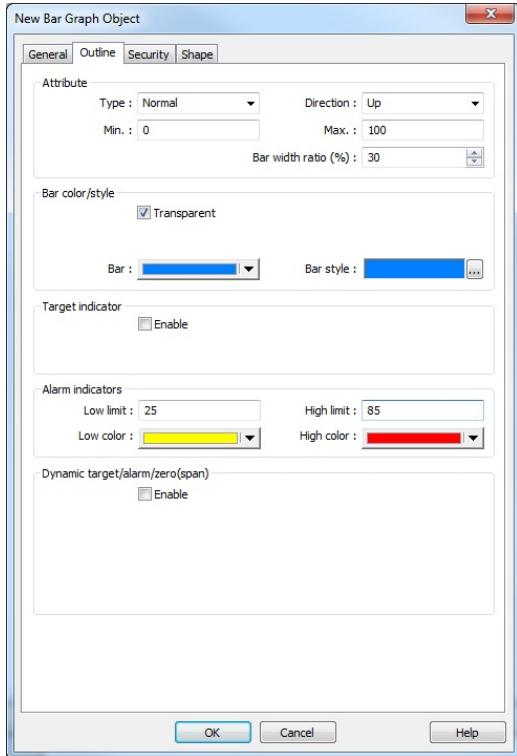
To open Window 11, double-click on Window 11 in the Windows Tree Bar on the left side of the EZwarePlus screen. Alternatively, select **Window > Open Window** and double-click Window 11 in the list.

To create a Bar graph:
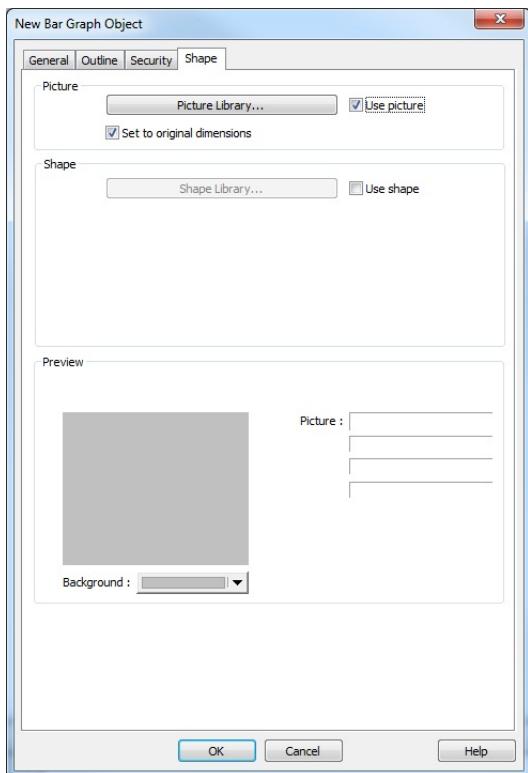
1. In the top menu bar in EZwarePlus, click **Objects > Bar Graph** (or select the Bargraph icon in the Object 2 Toolbar).

2. In the Bar Graph Properties **General** tab, select LW0 for the Read address. Leave the numeric format set to the default 16-bit unsigned.
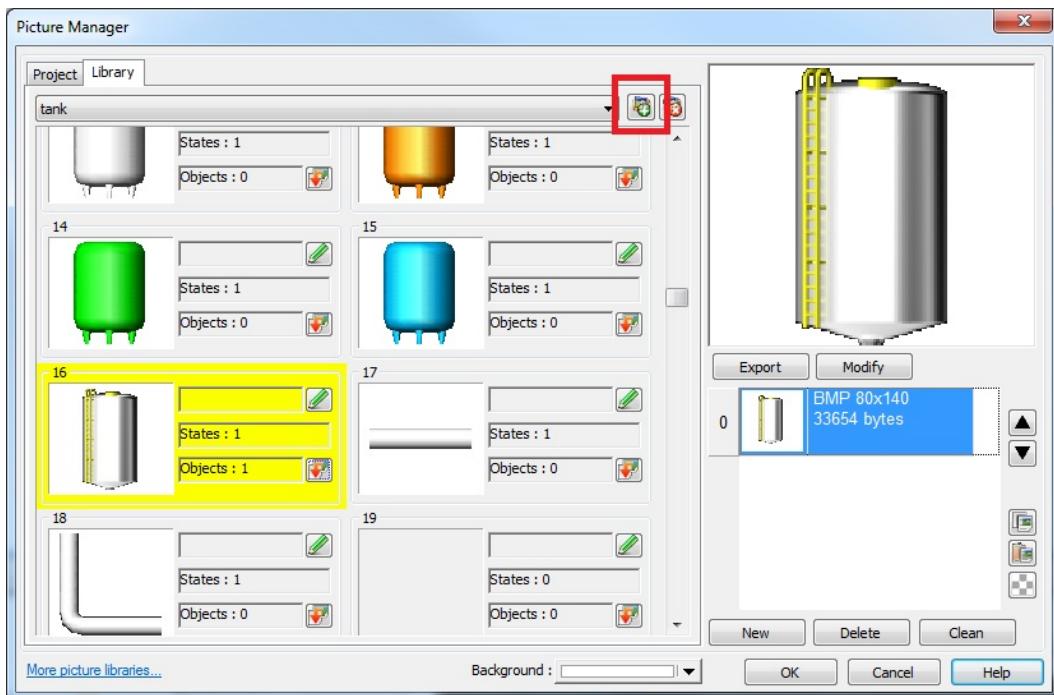
3. Click the **Outline** tab. In the **Attribute** section, select the following:
    Type: Normal
    Direction: Up
    Min: 0 (the register value represented when the bar graph is minimum)
    Max: 100 (the register value represented when the bar graph is maximum)
    Bar width ratio (%): 30
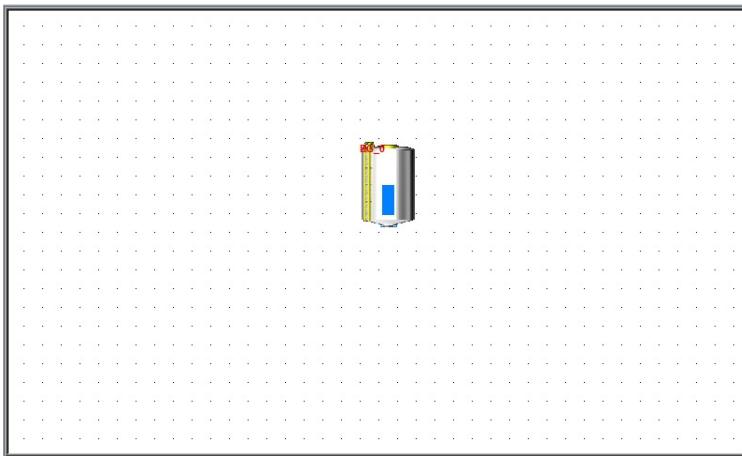
4. In the **Bar color/style** section, click the **Transparent** checkbox. Leave the **Bar** and **Bar style** colors at their default blue.

5. Leave the Target indicator **Enable** box unchecked.

6. In the **Alarm indicators** section, select the following:
    Low limit: 25
    High limit: 85
    Low color: yellow (the bar graph color is yellow when the register value is below 25)
    High color: red (the bar graph color is red when the register value is above 85)

7. Click the **Shape** tab. Leave the **Use shape** checkbox unchecked and click the **Use picture** checkbox.

8. Click the **Picture Library…** button and click the **New Library** button (red box in the image below). Locate tank.flb in the Library folder. Select it and click **Open** to add it to the list. Select picture number 16 and click **OK**. This is the picture that will appear over the bar graph on the screen.
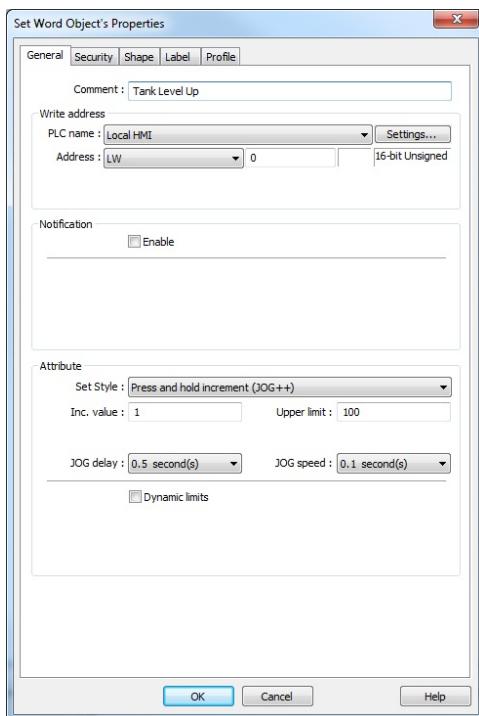
9. Click **OK** to accept the properties settings. On the main screen of EZwarePlus you will see a white rectangle outline that is attached to your cursor in the work area. Click to place the Bargraph Object in the middle of Window 11. You can click and drag it to adjust its position once you have placed it on the window.
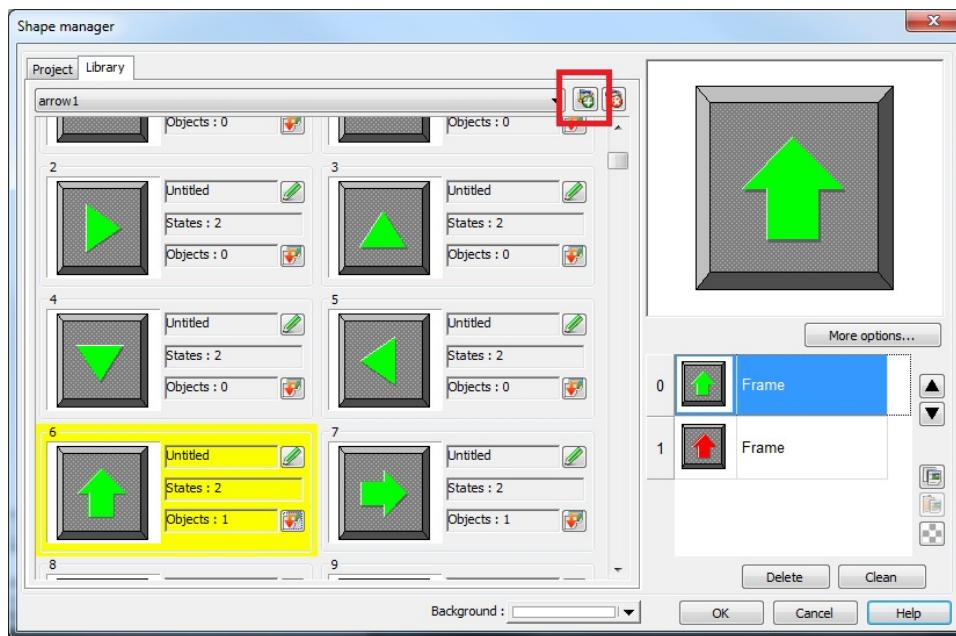
Next we will create a pushbutton to raise the level of the tank and another one to lower the level of the tank. This will use the Set Word Object to increment and decrement the value in LW0, the register that the bar graph is monitoring.

To create a Set Word:
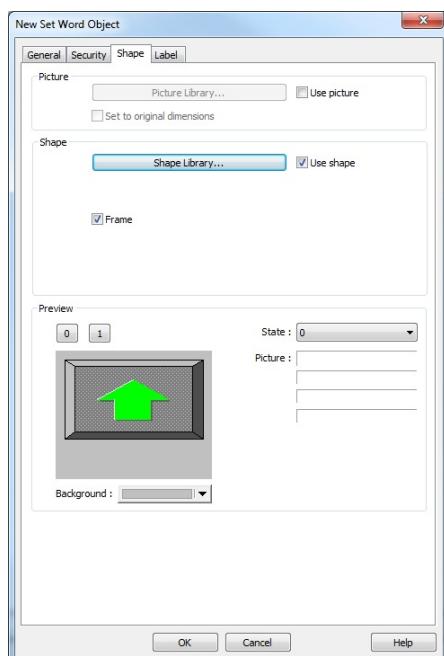
1. In the top menu bar in EZwarePlus, click **Objects > Button > Set Word** (or select the Set Word icon in the Object 1 Toolbar).

2. In the Set Word Object's Properties **General** tab, you can enter a description of the object such as "Tank Level Up." Select LW for the **Device Type** and 0 for the **Write address**. Leave the numeric format set to the default 16-bit unsigned.
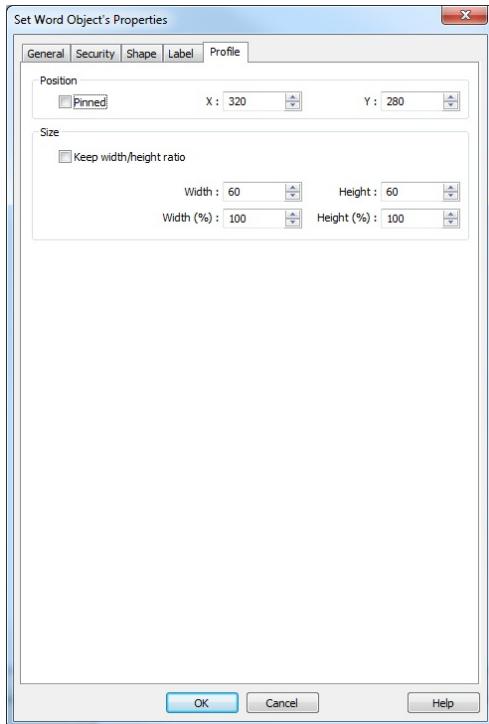
3. In the **Attribute** section, select the following:
   Set Style: Press and hold increment (JOG++)
   (this will cause the value in the register to increase while the button is pressed)
   Inc. value: 1
   Upper limit: 100
   JOG delay: 0.5 second(s)
   JOG speed: 0.1 second(s)

4. Click the Shape tab. Click the **Use Shape** checkbox and click the **New Library** button (red box in the image below). Select the arrow1 library. Select shape number 6 and click **OK**.
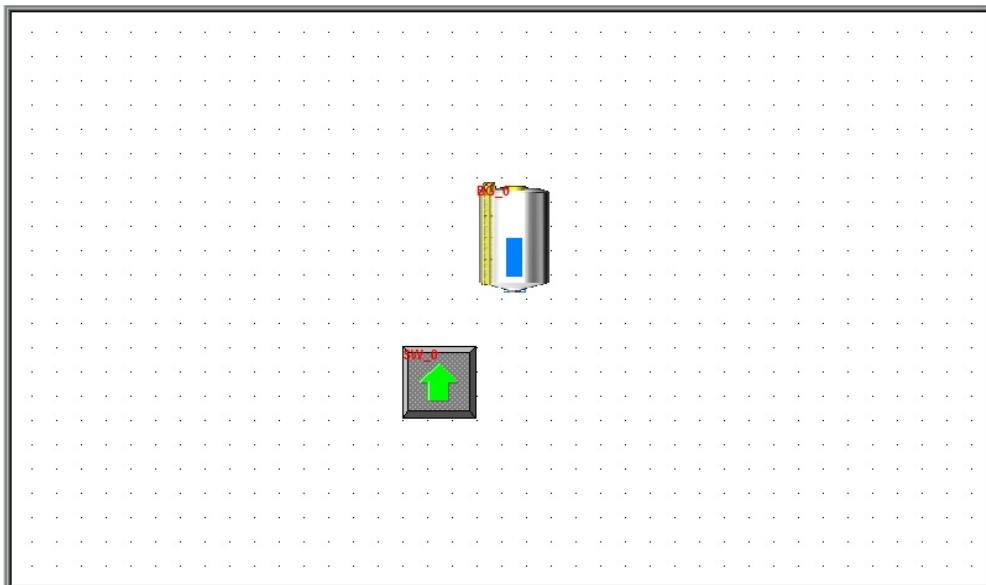
5. A preview of the selected shape appears in the properties window.

6. Click **OK** and place the Set Word Object below the bargraph on Window 11 in EZwarePlus. You can click and drag it to adjust its position once you have placed it on the window.

7. Click on the screen to deselect the Set Word Object, then double-click on it to reopen the properties (or right-click on it and select **Attribute**) and click the **Profile** tab (the Profile tab is not available when creating a new object). Set the **Width** and **Height** to 60 (pixels).
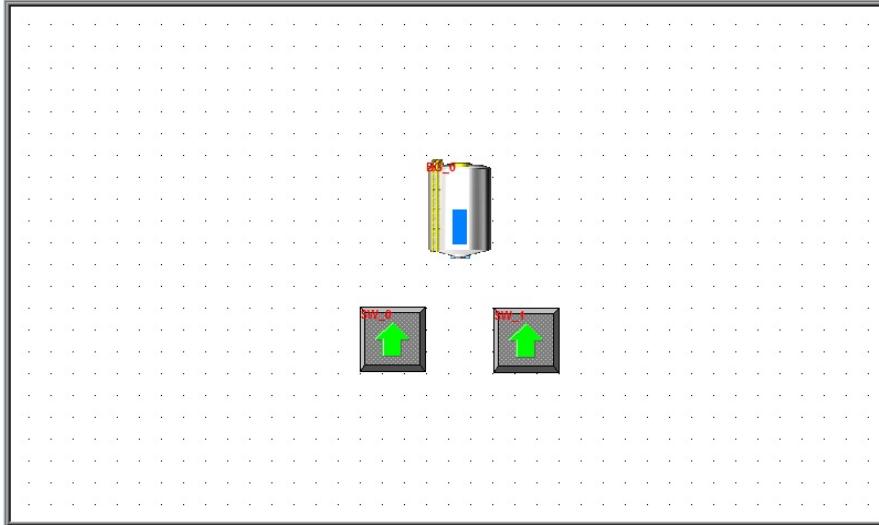
8. Click **OK** to accept the new profile settings.
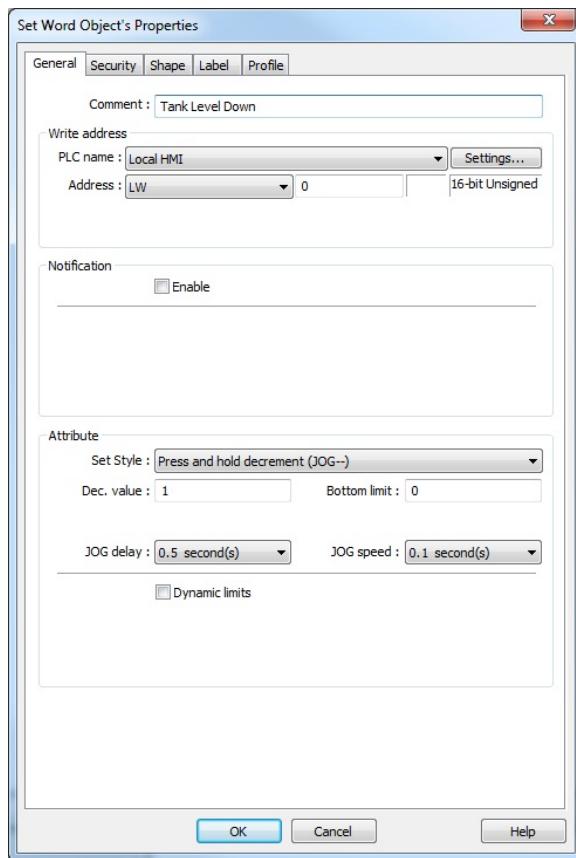
9. Now we will create another Set Word Object to lower the level of the tank. Select the Set Word Object that we just created and copy it (**Edit > Copy** or Ctrl+C on the keyboard).

10. Paste the Set Word Object to the window (**Edit > Paste** or Ctrl+V) and drag it next to the other Set Word Object.

11. Click on the screen to deselect it then double-click on the new Set Word Object to open the Properties window (or right-click on it and select **Attribute**).

12. In the Set Word Object's Properties **General** tab, you can enter a description of the object such as Tank Level Down. Select LW and 0 for the Write address. Leave the numeric format set to the default 16-bit unsigned.

13. In the **Attribute** section, select the following:
    Set Style: Press and hold decrement (JOG--)
        (this will cause the value in the register to decrease while the button is pressed)
    Dec. value: 1
    Bottom limit: 0
    JOG delay: 0.5 second(s)
    JOG speed: 0.1 second(s)
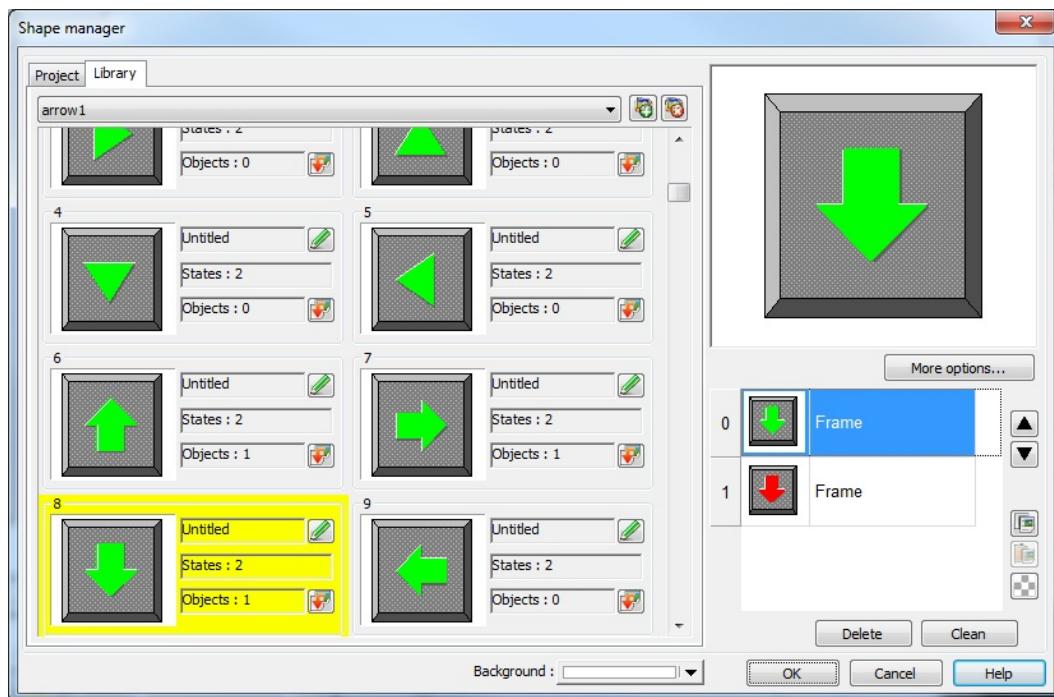
14. Click the **Shape** tab. Click the **Shape Library…** button. Select the Arrows 1 library. Select shape number 8 and click **OK**.
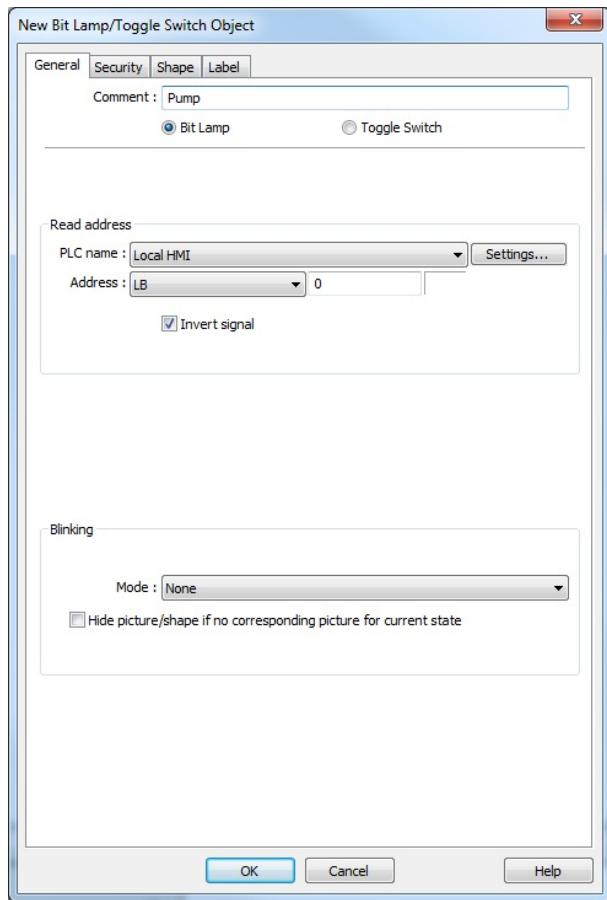
15. Click **OK** to accept the properties settings.
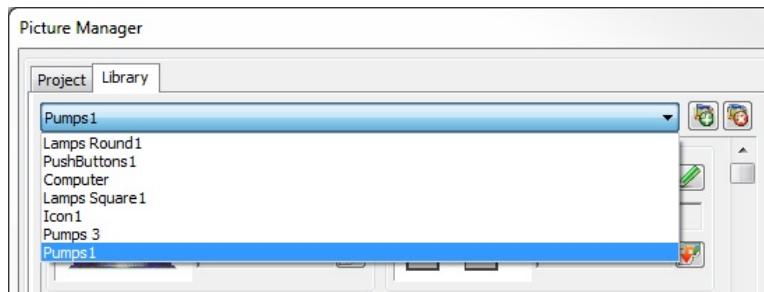
Next we will create a Bit Lamp Object to represent a pump and another to represent a pipe connecting the pump to the tank.

To create a Bit Lamp:
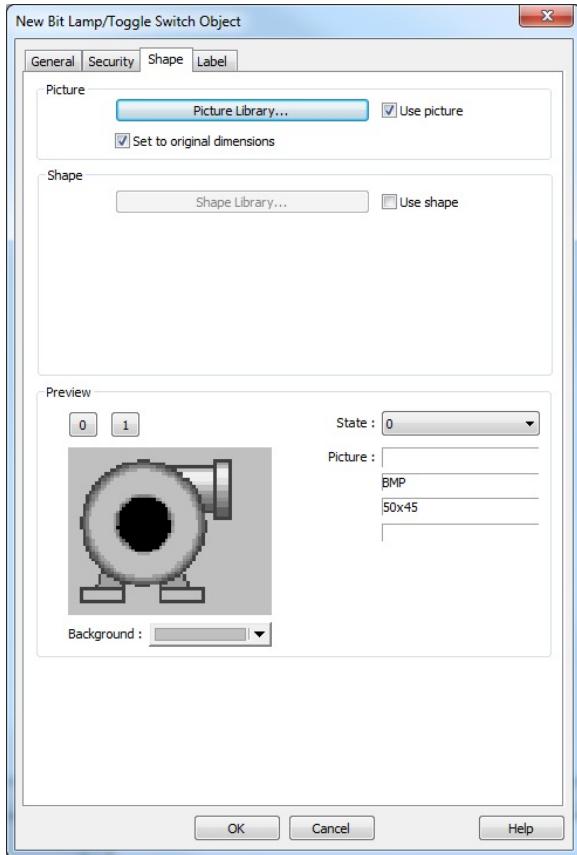
1. In the top menu bar in EZwarePlus, click **Objects > Lamp > Bit Lamp** (or select the Bit Lamp icon in the Object 1 Toolbar).

2. In the Bit Lamp Object's Properties **General** tab, you can enter a description of the object such as Pump. Select LB and 0 for the Read address.
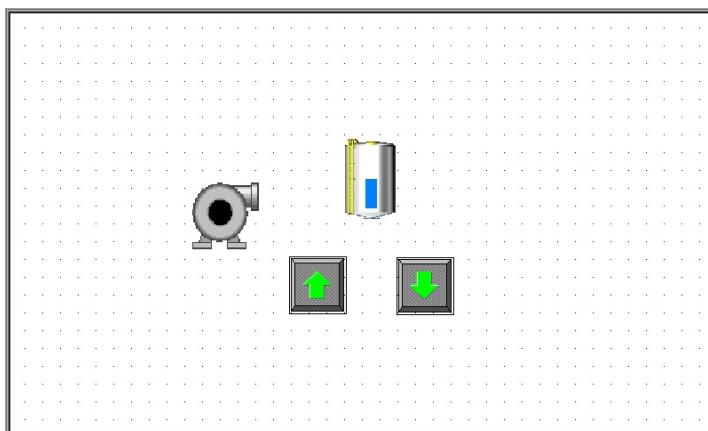

3. In the **Blinking** section, select **None** for the **Mode**.
   Leave **Hide picture/shape of no corresponding picture for current state** unchecked.

4. Click the **Shape** tab and check the **Use Picture** checkbox (uncheck the **Use Shape** checkbox if it is selected).

5. Click the **Picture Library…** button and select Pumps1 in the Library list. If it does not appear in the Library list, click the **New Library** button and locate Pumps1.flb in the Library folder. Select it and click **Open** to add it to the list.
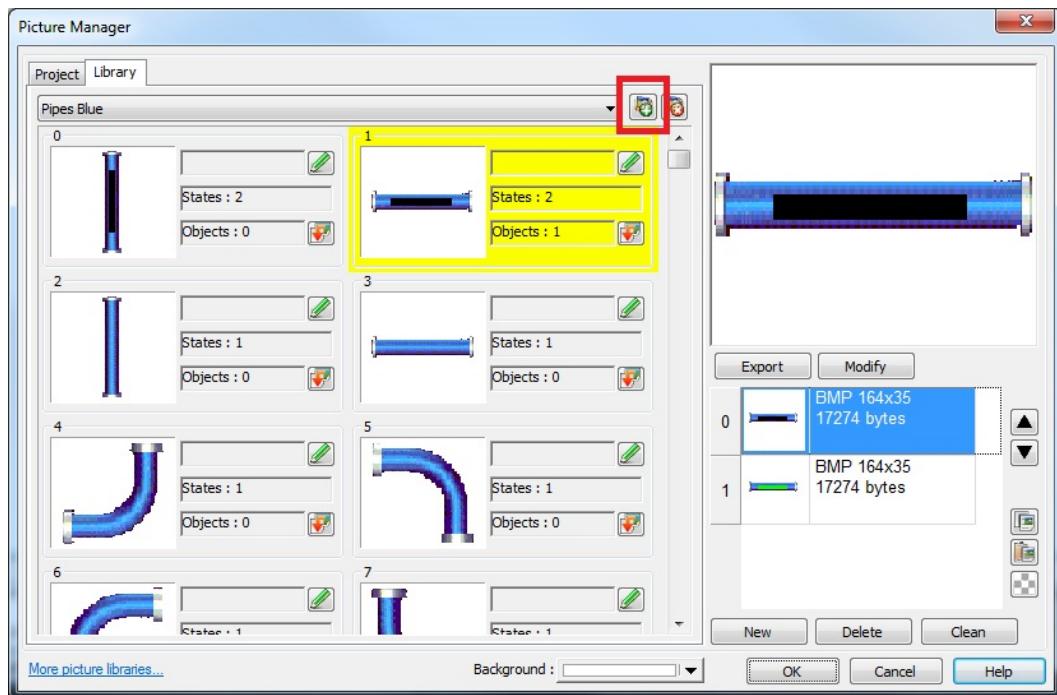
6. Select shape number 5. Notice that it has four states associated with it. We will use the first two states, grey and green. Click **OK** and a preview of the pump will appear in the Properties window.
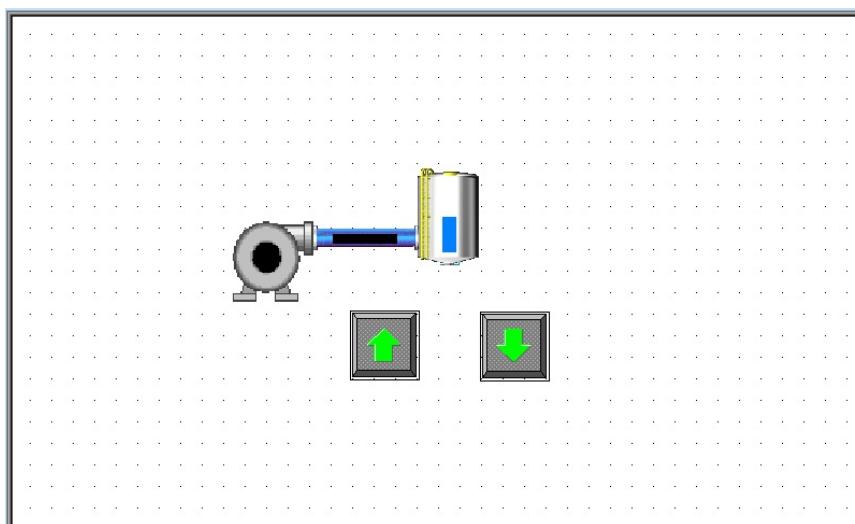
7. Click **OK** and place the Bit Lamp Object to the left of the tank. You can click and drag it to adjust its position once you have placed it on the window.

8. Click on the screen to deselect the Bit Lamp Object, then double-click on it to reopen the properties (or right-click on it and select **Attribute**) and click the **Profile** tab. Set the **Width** and **Height** to 75 (pixels).

9. Click **OK** to accept the new Profile properties.

10. Copy and paste the Bit Lamp Object (pump) to the same window and open the Properties window. Leave the read address set to LB-0 and set the **Blinking Mode** to **Alternating image on state 1** (**Blinking time: 0.5 seconds**).

11. Click the **Shape** tab. Click the **Picture Library…** button and select the **Pipes Blue** library (use the **New Library** button if it doesn't appear in the Library list). Select picture number 1 and click **OK**.
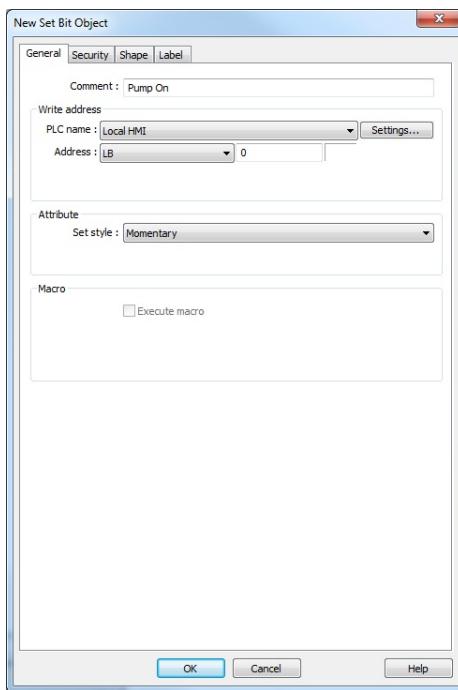
12. Click the **Profile** tab and set the **Width** to 100 and the **Height** to 25 (pixels).

13. Click **OK** to accept the properties. Click to place the Bit Lamp Object between the pump and the tank. You can click and drag it to adjust its position once you have placed it on the window.
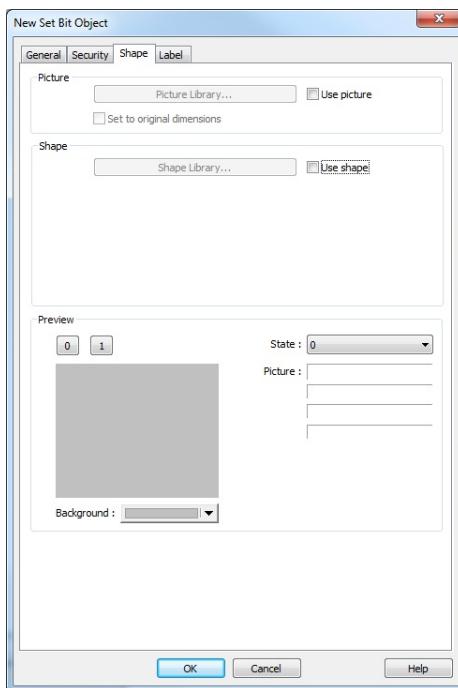
Now we will create a Set Bit Object to turn the pump and pipe on and off whenever the Up or Down Arrows (Set Word Objects) are pressed.

To create a Set Bit:
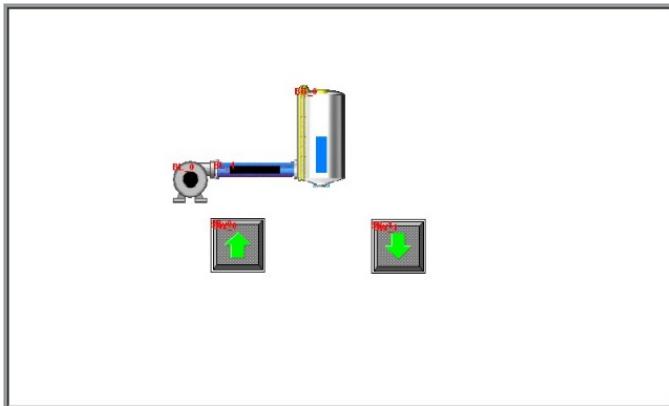
1. In the top menu bar in EZwarePlus, click **Objects > Button > Set Bit** (or select the Set Bit icon in the Object 1 Toolbar).

2. In the Set Bit Object's Properties **General** tab, you can enter a description of the object such as Pump On. Select LB for the Device Type and 0 for the Write address. Select **Momentary** for the Set Style. Leave **Write after button is released** unchecked.

3. Click the **Shape** tab and deselect the **Use Shape** checkbox. This will make the Set Bit invisible on the screen.

4. Click **OK** and place the Set Bit Object on the window. It will appear as a square frame. Click on the screen to deselect it then double-click on it to reopen the properties (or right-click on it and select **Attribute**). Click the **Profile** tab and set the **Width** and **Height** to 65 (pixels). Click **OK** to accept the new Profile settings.

5. Move the Set Bit Object over the Arrow Up button.

6. Copy and paste the Set Bit Object and place the second one over the Arrow Down button. When the Up or Down buttons are pressed, the pump and pipe will change states to indicate that they are on.
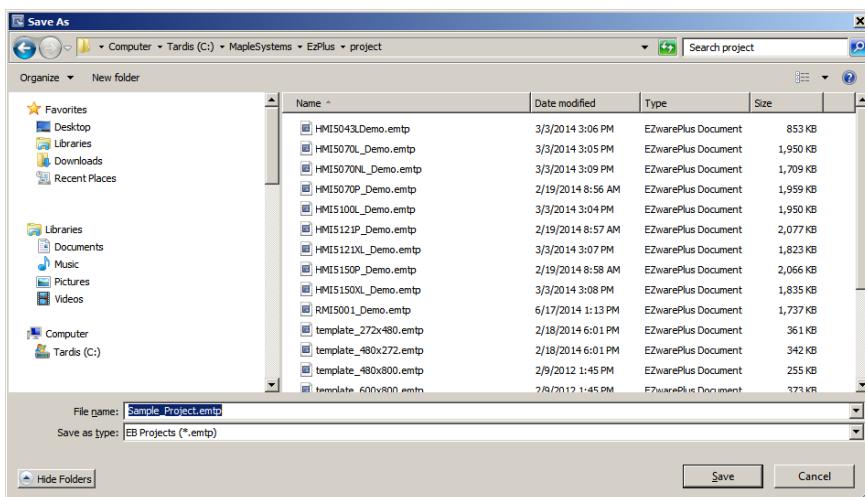
Finishing Up

There are still a few more steps to finish your first project. In this section, you will:

- save the project onto your computer hard drive
- compile the project into a format that can be understood by the HMI
- run the offline simulator to test the project
- download the project to the HMI
- verify that the HMI operates as expected
- exit the EZwarePlus software

Saving your first project
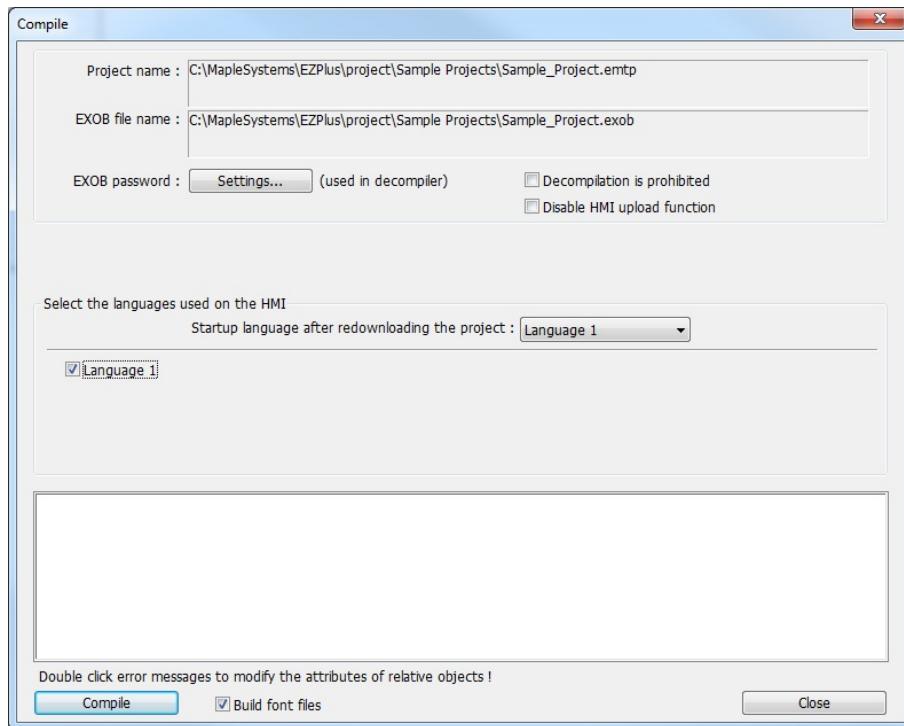
1. From the **File** menu, click **Save As**. The **Save As** dialog box appears.

2. Use the drop-down menus to locate the project folder in EZwarePlus.

3. In the File name text box, type Sample_Project.emtp.

4. Click **Save**. The file is saved onto your computer hard drive and the main screen of EZwarePlus reappears.

Compiling your first project
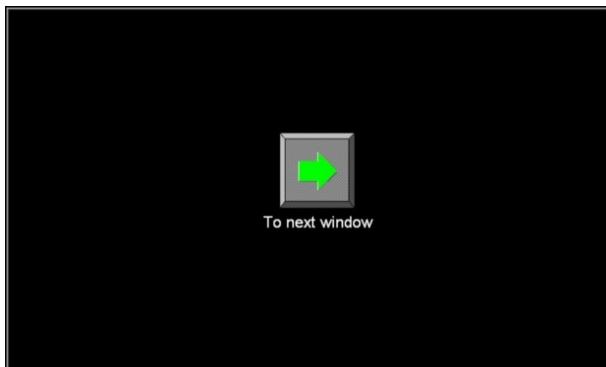
1. From the **Tools** menu, click **Compile**. The Compiling dialog box appears.
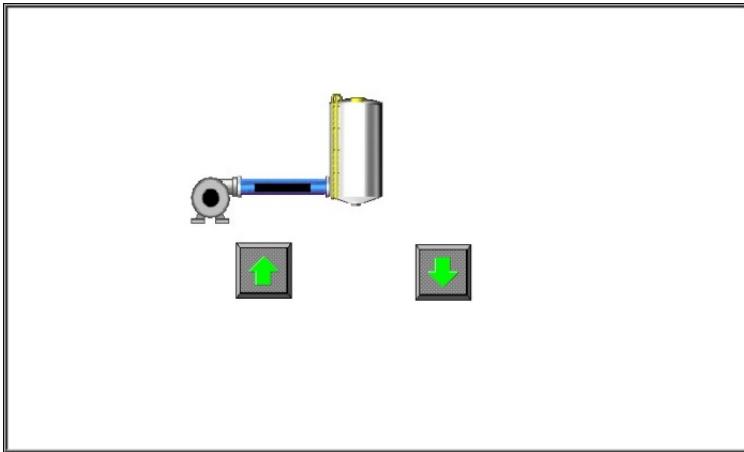
2. Click the **Compile** button. EZwarePlus will compile your project and display error results.

3. If no errors occur, click **Close**. The main screen of EZwarePlus reappears. If errors have occurred, repeat the steps in the "Creating a Sample Project" section.

Simulating your first project
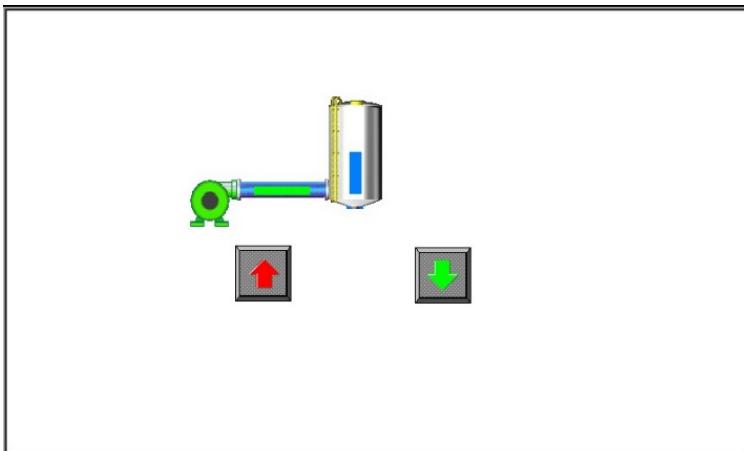
1. Click **Tools** in the top menu bar and select **Off-line Simulation** (Ctrl+T) or click the Off-line Simulation icon in the Project Toolbar. The Simulation Window will appear on the screen.
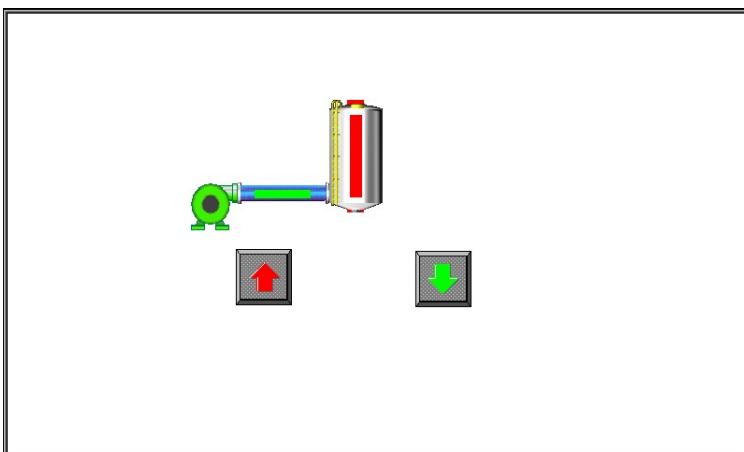
2. Click the arrow button to go to the next window.

3. Click and hold the arrow UP button to fill the tank. The pump turns green and the pipe starts blinking. The bar graph is yellow when the tank begins to fill and turns blue when it fills more than 25%.

4. When the tank fills above 85% the bar graph turns red.

5. Click and hold the arrow DOWN button to lower the tank level.

6. Right-click in the simulation window and select **Exit simulation**.

Downloading your first project

First, connect a +24 VDC power supply to the HMI. Refer to the **HMI5000P/L/RMI Installation Guide** for more information.

In order to download your project, you must first connect the HMI to your computer. There are three methods of downloading to the HMI; Ethernet, USB configuration cable, or USB flash drive/SD card.

Ethernet

Ethernet Crossover Configuration Cable: P/N 7431-0104

It is necessary to determine the IP Address of the HMI. By default, the HMI is configured to get a dynamic IP address from a DHCP server. This setting can be changed. To determine or change the HMI's IP address:

1. Connect the HMI to your computer using an Ethernet crossover cable (7431-0104).

2. Touch the arrow in the lower right corner of the HMI screen. A menu bar will appear. Touch the gear icon on the menu bar.

3. Enter the System Settings password (default password is 111111).

4. On the **Network** tab of the System Settings dialog, the HMI's IP address will be shown. If set for **Obtain an IP Address Automatically**, the HMI's current IP setup information is displayed but is not changeable. To change the IP address, select **IP Address Get From Below** and enter the data.

5. Once the IP Address has been established, the project can be downloaded. Select **Tools > Download** from the EZwarePlus menu (or click the Download icon).

6. Enter the HMI's IP address (or optionally the HMI name). The default download password is 111111.
    Note: The computer's Ethernet port IP address should have the same Subnet Mask as the HMI's IP address, usually 255.255.255.0. Therefore, the first three octets of the IP address should be the same for both devices.

7. Make sure that the **Ethernet**, **Firmware**, and **Reboot HMI After Download** boxes are checked.

8. Click the **Download** button. If the HMI is properly connected to the PC, the status box on the download dialog will update with messages indicating the progress of the transfer. The HMI itself will also display messages reflecting its status.

9. When the download is complete, the HMI will restart and will begin running your project. Click the **Exit** button on the Download dialog.

USB Cable

USB Configuration Cable: P/N 7431-0115 (HMI5070Pv2: 7431-0119)

1. Make sure the USB driver has been installed on your computer. See the Help menu "How Do I…Install the Maple Systems USB Driver" for more information.

2. Connect the HMI to your computer using the USB configuration cable
    (PN 7431-0115; HMI5070Pv2: 7431-0119).

3. Select **Tools > Download** from the EZwarePlus menu (or click the Download icon).

4. Make sure that the **USB**, **Firmware**, and **Reboot HMI After Download** boxes are checked.

5. Click the **Download** button. If the HMI is properly connected to the PC, the status box on the download dialog will update with messages indicating the progress of the transfer. The HMI itself will also display messages reflecting its status.

6. When the download is complete, the HMI will restart and begin running your project. Click the **Exit** button on the Download dialog.

Note: When connecting two powered devices, a difference in potential can exist between the ground reference on each device. If there is a large difference in ground potential (voltage), making a connection via a USB cable can complete a ground loop that may damage the HMI and PC. *The connectors on the Maple Systems USB Configuration Cable (P/N 7431-0115; 7431-0119) are electrically isolated to prevent a potentially damaging ground loop, and we recommend using this cable to connect the HMI to the PC. Maple Systems cannot be held responsible for any damage to the HMI, PLC, or PC due to improper wiring.* Please refer to the *HMI5000 Series Installation Guide* for proper wiring instructions.

USB Flash Drive/SD Card
USB Flash Drive: Up to 8 GB
SD Card: Up to 32 GB (FAT 32)

Projects can be uploaded from and downloaded to an HMI from a USB flash drive or SD card.
* See Appendix C for information on downloading a project to the HMI from a USB drive or SD card.
* See Appendix D for information on uploading a project from the HMI to a USB drive or SD card.
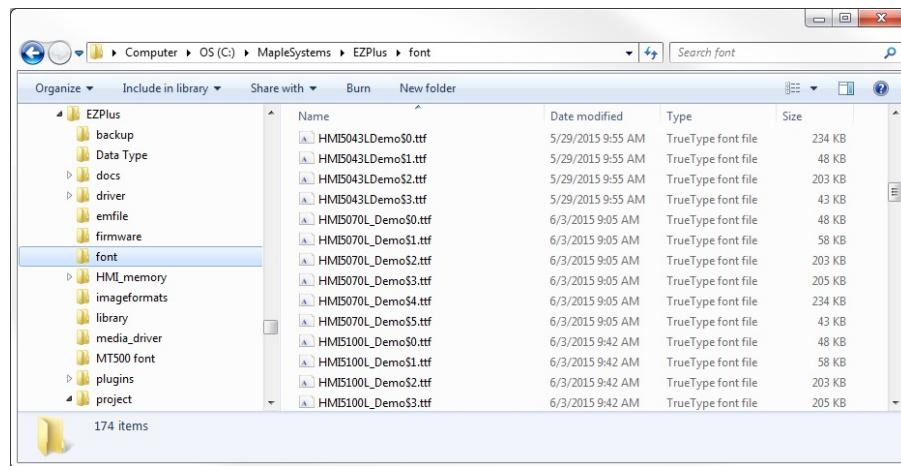
CONGRATULATIONS! You have completed your first EZwarePlus project. Select **File > Exit** to close EZwarePlus.

Managing Fonts and Libraries in EZwarePlus

Downloading a Compiled Project File and Fonts to an HMI
When you compile a project (Tools > Compile), the fonts used in the project are copied into the *EZPlus > Font* folder. The fonts are renamed with the filename of the project (i.e., project$0.ttf, project$1.ttf, project$2.ttf, etc.). These are the font files that are downloaded to the HMI along with the compiled project.

This works when you download a project with the same computer that created the project. However, if you transfer a project to another computer, you must be aware of the fonts and libraries associated with the project to ensure that the project is successfully downloaded to the HMI with the correct fonts, shapes, and pictures.

The **Font Management** option (Edit menu > Font Management) provides a method of copying the font files used in the project to a specified location or to replace a font used in the project with another one. See "Chapter 6 – Using EZwarePlus > EZwarePlus Features > Edit Menu > Font Management" for more information.

Uploading a Compiled Project File to a PC

When you upload a file (Tools > Upload) the compiled application is transferred from the HMI to your PC. Enter the IP address of the target HMI to upload, enter (or browse to) a folder to hold the project and click the upload button at the bottom of the window. Once this process is completed, the compiled file (project.exob) will be placed in the folder chosen for the Project Location.

To convert this file into a development file, use the Decompile function (Tools > Decompile). Browse to the project.exob file; the project file name (for the .emtp file) will be auto generated. Click on the decompile button on this dialog. If you receive a password error, verify you have the correct decompile password entered in the EXOB password field.

Transferring a Project File to Another Computer

When transferring a project (*.emtp file) to another computer (computer 1 to computer 2), verify that computer 2 has all of the fonts and libraries used in the project. When you open the project on another computer, EZwarePlus will let you know if there is a missing library file with a warning message that says, "Cannot find the library below. Replace or unattach it?" If you select **Unattach**, the objects associated with the missing libraries will have no shape or picture and will become "invisible" on the screen.

Make sure the text appears correctly in each screen. If not, there may be a missing font. Compile the project on computer 2 to load the fonts into the *EZPlus > Font* folder so they can be downloaded to the HMI.

Transferring a Compiled Project File to Another Computer

When transferring a compiled project (*.exob file) to another computer (computer 1 to computer 2), you may not be able to download the *.exob file directly to an HMI and have it appear correctly because the fonts have not been loaded into the *EZPlus > Font* folder on computer 2. Either copy the fonts from the *EZPlus > Font* folder on computer 1 to computer 2, or decompile the project on computer 2, open the *.emtp file in EZwarePlus, and recompile the project to load the fonts into the *EZPlus > Font* folder. Once again, make sure the text appears correctly in each screen (if not, verify that computer 2 has all of the fonts used in the project).

🗐 When a compiled project is decompiled, new Shape and Picture library files are created and copied to the *EZPlus > Library* folder with the filename of the project (i.e., project_0.plb and project_0.flb). These libraries are associated with the *.emtp project file after decompiling it from a *.exob file.

Decompiling a Project Created on Another Computer

When decompiling a *.exob file, the fonts are not extracted from the *.exob file (this includes decompiling a project that has been uploaded from an HMI using Utility Manager). After decompiling, you must open the *.emtp file in EZwarePlus and recompile the project to load the fonts into the *EZPlus > Font* folder. Once again, make sure the text appears correctly in each screen (if not, verify the computer has all of the fonts used in the project).

Compressing and Uncompressing a Project

When compressing a project (Tools > Compress/Uncompress), the associated library files are included in the compressed file (*.ecmp), but the fonts are not. When uncompressing a project, the Shape and Picture libraries are copied into the *EZPlus > Library* folder. However, in order to load the fonts into the *EZPlus > Font* folder (if they are not already there), you must open the *.emtp file and compile the project. Once again, make sure the text appears correctly in each screen (if not, verify the computer has all of the fonts used in the project).

🗐 Using the Compress utility is a good way to archive your projects once they are completed. Backup the font files along with your compressed project to complete the archive.

Uploading and Downloading Using USB Flash Drive or SD Card

When uploading a project using a USB flash drive or SD card, the fonts are uploaded from the HMI and stored in the font folder in the mt8000ie (or emt3000) folder (mt8000ie > pub > font). Connecting the USB flash drive to another HMI to download the project will also download the fonts.

Compile a project before using the "Build Data for USB Disk or CF Card Download" in order to include the fonts from the *EZPlus > Font* folder, which are downloaded to the HMI along with the project.

◢ If the fonts are not available in the *EZPlus > Font* folder when downloading a project, the project is downloaded to the HMI without the fonts, and default fonts are used. There is no error message to warn that the fonts are not available.

Chapter 5 – Simulator Mode

As you saw from creating the sample project in the last chapter, downloading any changes you make to the HMI can take time. To decrease the amount of time required to download a project to the HMI, you can uncheck the Firmware option on the EZwarePlus download dialog after you have downloaded it once.
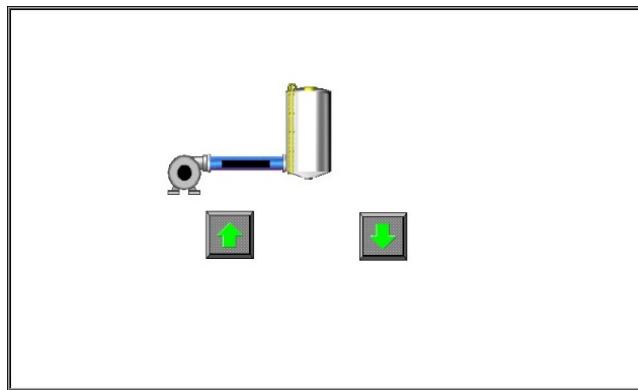
A better way of testing changes made to a project is to use the computer to simulate the operation of the HMI.

This chapter shows you how to dramatically save time when creating and testing a project by putting the computer into Simulation Mode. In Simulation Mode, the computer displays a screen that simulates what is seen when the HMI executes the project file. You can use the mouse on your computer to simulate the operation of the touchscreen on the HMI. Rather than waiting for the download to test each change you make to your project, you can now instantly switch to Simulation Mode to see if your project is working as expected.

You can enter Simulation Mode from EZwarePlus or from the Utility Manager.

The Simulation Screen

All modes of simulation use the same screen.

For our example, we are showing the sample project as it would appear after the "To next window" function key has been pressed. When the Simulation Mode screen first appears, it will always show the startup screen of the project. You can test any objects you have created which require touchscreen input by clicking on them. In this example, clicking on the increment key simulates the key as it is pressed on the touchscreen. Simulation Mode always uses the compiled version of the project that you have created (the *.xob file). Therefore, you must save and compile any changes you make to the project before you can simulate it.

Simulating the HMI is done in on-line or off-line mode.

On-line simulation is most useful when a project is near completion and you need to test the interaction of the project with the PLC. It is also very convenient when making minor changes to a project because these changes can be instantly checked for operation.

Off-line simulation does not require any connection to the HMI. Because of this, off-line simulation is most often used when starting a project. You can quickly test new ideas and create preliminary screens without the HMI.

Off-line simulation is also great for demonstrating the operation of the HMI and becoming familiar with the operation of the HMI before it is installed. If you want to simulate the interaction with a PLC when off-line, it can be done by creating additional windows on the HMI which allow PLC data input.

 Right-click on the simulator screen and select "Screenshot" to generate a bitmap image of the currently open window. The BMP file is saved in the "screenshot" folder in the EZPlus folder (C:\MapleSystems\EZPlus\screenshot).

To use off-line simulation mode from EZwarePlus:

1. If the project has been modified since the last time it was saved and compiled, or if it has not yet been compiled, it must be saved and compiled before the simulator can start.

2. Select **Tools > Off-line Simulation** from the top menu bar (or click the Off-line Simulation icon in the Project toolbar).

3. The Simulation Mode screen will appear.

4. To end off-line simulation, right-click in the simulation screen and click **Exit simulation,** or click the red "X" button in the upper-right corner of the simulator.

Simulation mode can also be started from the Utility Manager. Utility Manager requires only the compiled project file (*.xob). This can be useful in situations in which you want to demonstrate changes made to a project for a client without giving him access to your project file. It also allows you to rapidly switch from simulating one project to another without having to open, save, and compile each project.

To use off-line simulation mode from Utility Manager

1. Start the Utility Manager software.

2. Select the *Design* tab.

3. Click **Simulation**. The Open Project box appears. Click the folder icon, and browse to the exob file to run simulation on.

4. Click the Off-line Simulation button.

5. Click **Open**. The simulation screen will appear.

6. To end off-line simulation, right click in the simulation screen and click **Exit**.

To use on-line simulation mode from EZwarePlus

Online simulation requires a direct connection between the PC and the controller. It is not necessary to have the HMI connected.

The HMI's COM1 RS232 connection is wired the same as a standard PC 9-pin serial connector. Therefore, the standard Maple Systems' COM1 RS232 cable for the selected PLC/controller can be used with online simulation. Connect the cable end marked "HMI" to the PC's serial port, and connect the other end to the PLC/controller.

1. If the project has been modified since the last time it was saved and compiled, or if it has not yet been compiled, it must be saved and compiled before the simulator can start.

2. Select **Tools > On-line Simulation** from the top menu bar (or click the On-line Simulation icon in the Project toolbar 🖳).

3. The Simulation Mode screen will appear.

4. To end on-line simulation, right-click in the simulation screen and click **Exit simulation**.

To use on-line simulation mode from Utility Manager

1. Start the Utility Manager software.

2. Select the *Design* tab.

3. Click **Simulation**. The Open Project box appears. Click the folder icon, and browse to the exob file to run simulation on.

4. Click the **On-line Simulation** button.

5. Click **Open**. The simulation screen will appear.

6. To end off-line simulation, right click in the simulation screen and click **Exit**.

🖅 The above method will work with a standard PC serial COM port, regardless of the COM number assigned to the PC serial port. EZwarePlus supports RS232 communication on ports COM1 – COM9. COM2 and COM4 and higher are intended for use with online simulation only, since the HMI5000 itself supports RS232 communication on COM1 on all models, and also COM3 on some models.

🖅 If simulating with RS422 or RS485 communication, the PC will require some mechanism to support RS422/485. A communication card can be installed in the PC, a USB communications module can be used, or an external RS232-to-RS485 converter can be used. In any case, a standard Maple Systems cable may not work.

If simulating a project using Ethernet communications, the IP settings of the PC are used by the simulator. An Ethernet cable between the PC and the PLC/controller is needed.   Consult the PLC/controller documentation for details.

To use EasySimulator

Online or offline simulation can be initiated without having to open EZwarePlus or Utility Manager by using EasySimulator. EasySimulator is located in the same folder as EZwarePlus and Utility Manager (C:\MapleSystems\EZPlus\EasySimulator.exe). If you have installed the EZwarePlus Downloader, it is located at C:\MapleSystems\EZPlusUtil\EasySimulator.exe.

When EasySimulator starts, it reads the file "XOB_POS.def," which is also located in the same folder as EasySimulator. This definition file determines whether to run offline or online simulation, the location of the com.exe and gui.exe files, and the location and name of the *.xob file to simulate. The following are the default settings for the XOB_POS.def file:

// mode – 0: offline, 1: online
"0"

// directory containing com.exe and gui.exe
"c:\MapleSystems\EZPlusUtil"

// xob file
"c:\MapleSystems\EZPlusUtil\HMI5121PDemo.xob"

Edit the XOB_POS.def file in a text editor such as Notepad.

Now that you are familiar with using simulation mode, the next chapter guides you through the fundamental operation of three primary segments of the EZwarePlus configuration software.

Chapter 6 – Using EZwarePlus
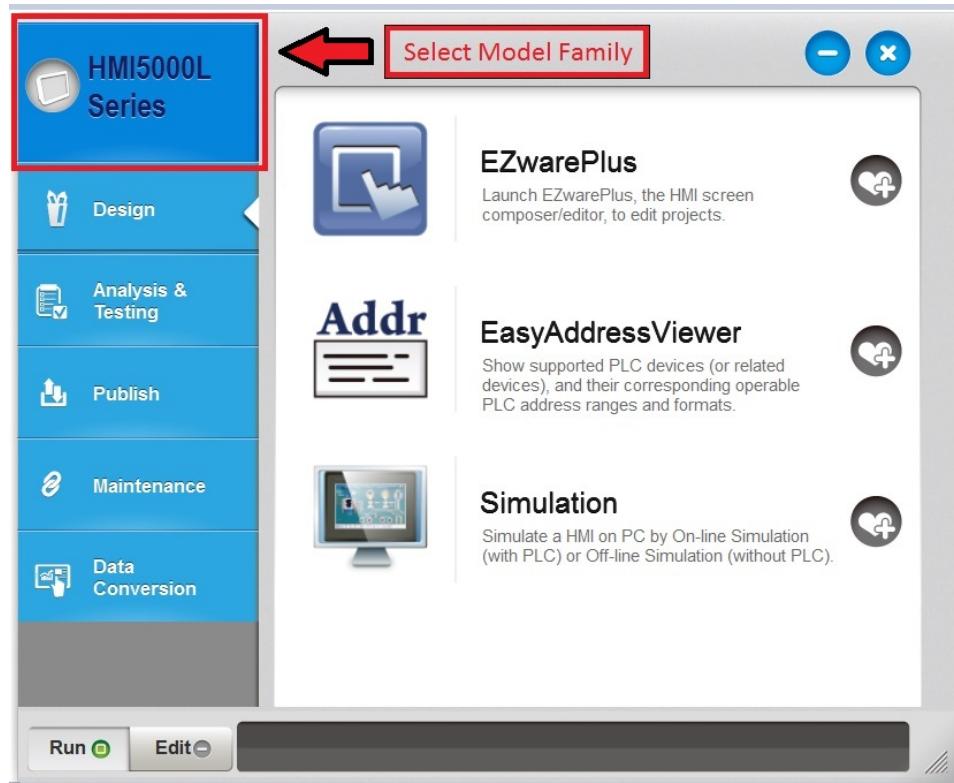
Overview

The EZwarePlus software is composed of a number of separate applications that are accessible from the EZPlus folder, including EZwarePlus, Utility Manager, and EasyConverter. EZwarePlus is the application software used to create a project file. Utility Manager is a utility application that is used to launch the various applications and utilities that are included with EZware. EasyConverter changes certain binary files created by the HMI into text files.

By the end of this chapter, you should be quite familiar with the operation of EZwarePlus and Utility Manager and be able to maneuver around the EZwarePlus programming software easily.

- EZwarePlus includes extensive online help. From any dialog box within the software, click on the **HELP** button, or press the computer's F1 key.

- Projects created in EasyBuilder-5000 can be opened in EZwarePlus. The System Parameters window will open on the Model tab so you can reassign the project to an HMI5000P/L/RMI model. If the screen size of the selected HMI5000P/L/RMI model is different from the original project, the Resize pop-up windows/objects dialog will open with options for resizing objects in the project. EasyBuilder-5000 projects use the file extensions mtp and xob, EZwarePlus projects use the file extensions *e*mtp and *e*xob (or cmtp and cxob for the RMI5010).

- Projects created in EasyBuilder-500 should be converted to EasyBuilder-5000 first using the **Translate HMI500 Project** selection under the Tools menu, then opened in EZwarePlus.

The Utility Manager

The Utility Manager is a launching pad for a number of EZware applications. Open the Utility Manager by clicking on the Windows **Start** menu on your computer and selecting "All Programs > Maple Systems > EZwarePlus > Utility Manager." Alternately, navigate to the EZPlus folder (C:\MapleSystems\EZPlus) and double-click on **UtilityManagerEX.exe**.

When the **Run** tab is selected at the bottom, clicking a 'heart' icon will add the corresponding application to the **Favorites** bar at the bottom of the window. When the **Edit** tab is selected, clicking the red '–' icon on an item in the Favorites bar removes the application from the Favorites bar.

The applications are divided into groups. Not all applications are available for all HMI families.

Select Model (IMPORTANT!)

- In the upper-left corner of Utility Manager, select the family of models for the HMI that you are using (HMI5000P Series, HMI5000L Series, HMI5000XL Series, RMI5001 Series, RMI5010 Series).

Design

- EZwarePlus: Opens EZwarePlus. Create projects for the HMI
- EasyAddressViewer: Examine supported addresses and devices for the PLC and controller communications drivers provided with EZwarePlus.
- Simulation: Run a compiled EZwarePlus project without transferring to an HMI (see "Chapter 5 – Simulator Mode").

Analysis & Testing

- EasyDiagnoser: Connect to an HMI via Ethernet, and monitor/debug communications to an HMI (see **Chapter 18 – EasyDiagnoser and Easy Watch**).
- EasyWatch: Monitors data in the PLC and HMI over Ethernet, displayed in a spreadsheet-style arrangement (see "Chapter 18 – EasyDiagnoser and Easy Watch").
- Reboot: Reboot the HMI connected to the PC by Ethernet or USB.
- Pass-Through: Allows PC applications to communicate to the PLC through the HMI.

Publish

- Download: Transfer a compiled EZwarePlus project, as well as firmware, startup screen image, recipe, and data log files *to* the HMI.
- Upload: Transfer a compiled EZwarePlus project, as well as recipe, data log files, event log files and operation log files *from* the HMI.
- Build Download Data for SD/USB Disk: Build a directory structure containing project data on an SD or USB device for direct transfer to the HMI.

Maintenance

- EasyPrinter/Backup Server: Runs on a PC so that data can be sent to the PC from the HMI over an Ethernet connection.
- Administrator Tools: Put user account and email data on an SD or USB device for direct transfer to an HMI.
- EasyAccess 1.0: Allow remote access to the HMI from anywhere that has internet access.
- Data/Event Log Information: Display information about the size and quantity of Data and Event log files on the HMI.
- cMT Viewer (RMI5010 Series only): Connect to an RMI5010 from the PC and view the project running in the RMI5010. Please refer to the "RMI5010/5090 Quick-Start Guide" for more information.
- RMI5090 Upgrade (RMI5010 Series only): Used to upgrade the OS and runtime firmware on an RMI5090.

Data Conversion

- Recipe Database Editor: Edit a recipe database without modifying the HMI project itself.
- EasyConverter: Convert binary data and event log files to CSV format.

Recipe Editor: Edit recipe data stored in RW and RW_A memory, as well as data stored in Extended Memory.Many of the applications launched by the Utility Manager are self-contained and have their own documentation. Some of the applications are discussed below.

Utilities

EasyAddressViewer

(Design)

Starts the Easy Address Viewer application for viewing the device types and memory ranges for the selected communications driver.

Simulation

(Design)

On-line Simulation

Opens a compiled project (*.exob) in on-line simulator mode.

Off-line Simulation

Opens a compiled project (*.exob) in off-line simulator mode.

⬚ See "Chapter 5 – Simulator Mode" for more information.

EasyDiagnoser

(Analysis & Testing)

Opens the EasyDiagnoser utility, which connects to the HMI over Ethernet and monitors the read/write commands between the HMI and the PLC and helps resolve communication errors. See "**Chapter 18 – EasyDiagnoser and Easy Watch**" for more information.

EasyWatch

(Analysis & Testing)

Opens the EasyWatch utility, which connects to the HMI over Ethernet and provides a method of displaying and editing PLC and HMI registers in a spreadsheet-style view. It also can be used to trigger existing macros in an HMI. See "Chapter 18 – EasyDiagnoser and Easy Watch" for more information.
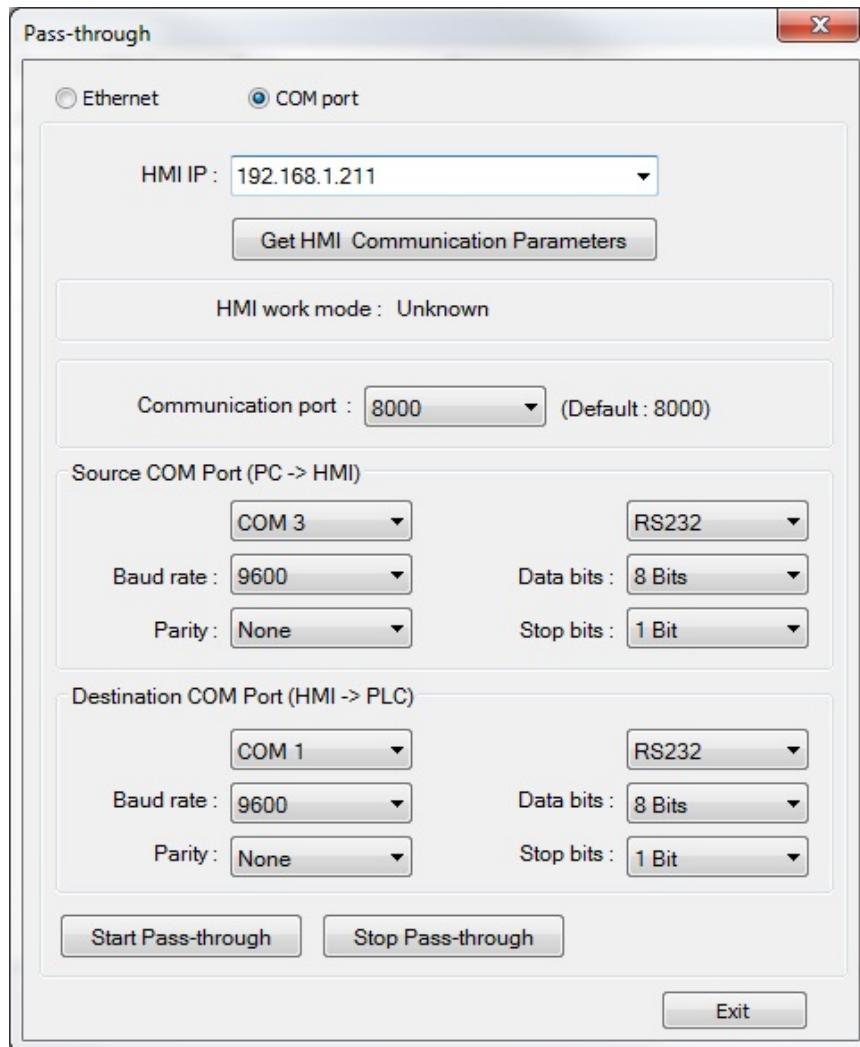
Pass-Through

(Analysis & Testing)

The pass-through mode allows serial communications from the PC to the PLC, through the HMI. This can eliminate the need to disconnect the PLC from the HMI when it is necessary to configure the HMI or PLC.

🖅 Pass-through mode is only available on HMIs with an Ethernet port. An Ethernet connection from the PC to the HMI is required to initiate pass-through mode, even when using serial pass-through mode.
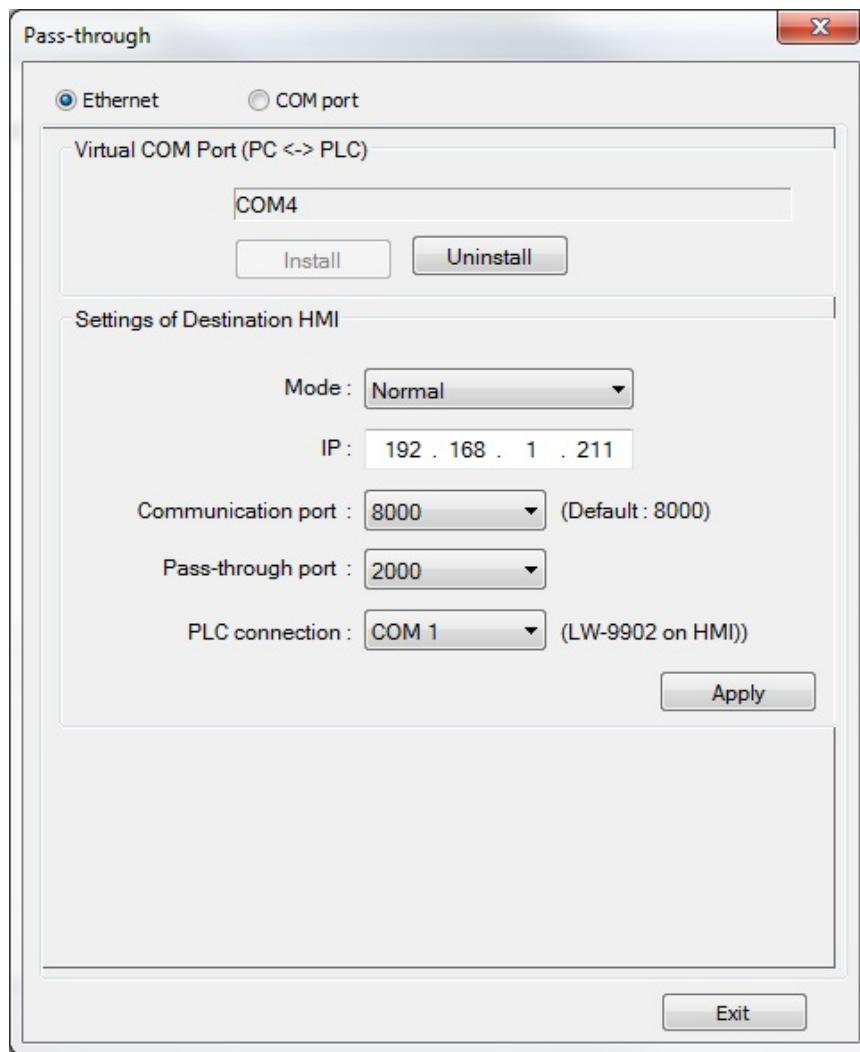
To use the serial pass-through mode:

1. Select **COM port**. In the serial pass-through mode, data coming in on one serial port on the HMI is re-transmitted out another serial port to the PLC.

2. **HMI/IP:** Specify the IP Address of the HMI that is to be used in pass-through mode and click **Get HMI Communication Parameters** to read the current communication settings for the HMI (if the HMI is connected directly to the PC's Ethernet port, you must use a crossover Ethernet cable).

3. **HMI work mode:** Indicates the current mode of the HMI. After the communication parameters have been received, the mode will be either **Normal** (HMI set to communicate with PLC) or **Pass-through** (HMI is in pass-through mode).

4. **Source COM Port (PC -> HMI):** Set COM settings for the HMI COM port that will be connected to the PC.

5. **Destination COM Port (HMI -> PLC):** Set COM settings for the HMI COM port that will be connected to the PLC.

6. Click **Start Pass-through** to begin pass-through communication and **Stop Pass-through** to end. Click **Exit** to exit pass-through mode.

🗐 When the HMI is in serial pass-through mode, the HMI may suspend communications with the PLC and the application in the HMI may not run, depending on the PLC and PLC programming software used.

To use the Ethernet pass-through mode:

In the Ethernet pass-through mode, the HMI acts as an Ethernet-to-Serial bridge. A virtual COM port driver is installed on the PC (in this example, COM4), which provides the connection between EZwarePlus (or the PLC programming software) and the Ethernet port connected to the HMI. The virtual COM port uses the next available port on the PC.

1. Click **Install** to install the virtual COM port driver. The **Virtual COM Port (PC <-> PLC)** indicates the virtual COM port used on the PC.

   🖙 To change to another port, use the COM ports section of Device Manager on the PC.

2. **PLC Connection Port (HMI <-> PLC)**:
   For most PLCs, set the mode to Normal. Some Siemens PLCs will use MPI ISOTCP;
   Enter the IP address of the HMI;
   Select the TCP Port to use. This must the same setting as the Pass-Through Port Number set in the

EZwarePlus project, on the Model tab of the System Parameters dialog;
Set the COM port on the HMI connected to the PLC.

3. Click **Apply** to accept the settings.

4. Click **Stop Pass-through** to end.

5. Click **Uninstall** to uninstall the virtual COM port driver on the PC.
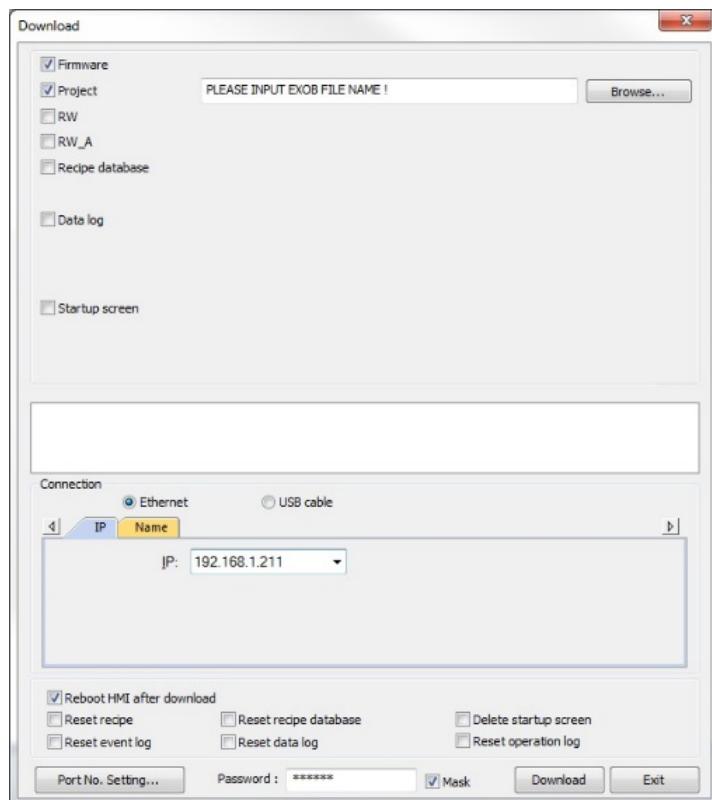
◪ The HMI must be powered and connected to the PC or Windows will not recognize the virtual port as an available serial port.

System tags for pass-through mode:

LW-9901:   pass-through source COM port (1-3 = COM1-COM3)
LW-9902:   pass-through destination COM port (1-3 = COM1-COM3)
LW-9903:   pass-through control (0=normal, 1=pause, 2=stop communications between HMI and
                PLC when executing pass-through)

Download
(Publish)

Sends a compiled project file stored on the computer to the HMI. The download window also gives you the option of downloading firmware files, recipe files, data log files, and a startup screen graphic.

When downloading to an HMI for the first time, select the **Firmware** checkbox and the **Project** checkbox. Click on the **Browse** button to the right of the **Project** checkbox and navigate to where the EXOB project file is located. Select it and click **Open**.

Select the connection method for downloading to the HMI, Ethernet or USB cable.

When Ethernet is selected, enter the IP address of the HMI in the IP address field.

🖅 The HMI and the computer must be on the same subnet. If connecting the HMI directly to the computer, an Ethernet crossover cable may be required.

Selecting any of the "Reset" options will erase the selected file-type when the project is downloaded.

The **Port No. Setting** button provides a way to select a different TCP port than the default 20248.

The download **Password** must match the download Password in the HMI's System Settings (Security tab). The default password is 111111.
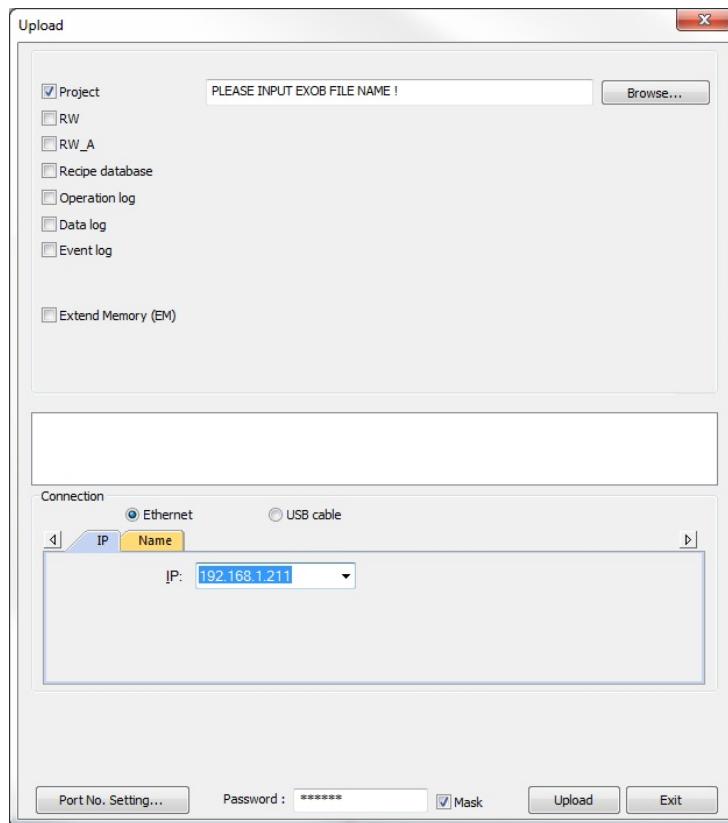
📋 When downloading a project to an HMI, the fonts are downloaded along with the project file. The fonts are stored in the fonts folder in the EZPlus (or EZPlusUtil) folder when the project is compiled. If the project was not compiled on the same computer that is being used to download the EXOB file, it may be necessary to copy the font files from the computer where the project was compiled to the computer where the project is being downloaded. The font file naming format is: <Project name>$n.ttf, where n is a sequential number beginning at 0.1, 2, 3, etc..

Upload
(Publish)

Receives a compiled project file from the HMI to be stored on the computer.

The upload window also gives you the option of uploading recipe files, operation log files, data log files, event log files, and extended memory files.

When uploading a project from an HMI, select the **Project** checkbox. Click on the **Browse** button to the right of the **Project** checkbox and navigate to where you want to save the EXOB project file. Enter the name of the project in the "File name" field at the bottom and click **Open**.

Select the connection method for uploading to the computer, Ethernet or USB cable.

When Ethernet is selected, enter the IP address of the HMI in the IP address field.

▄▄ The HMI and the computer must be on the same subnet. If connecting the HMI directly to the computer, an Ethernet crossover cable may be required.
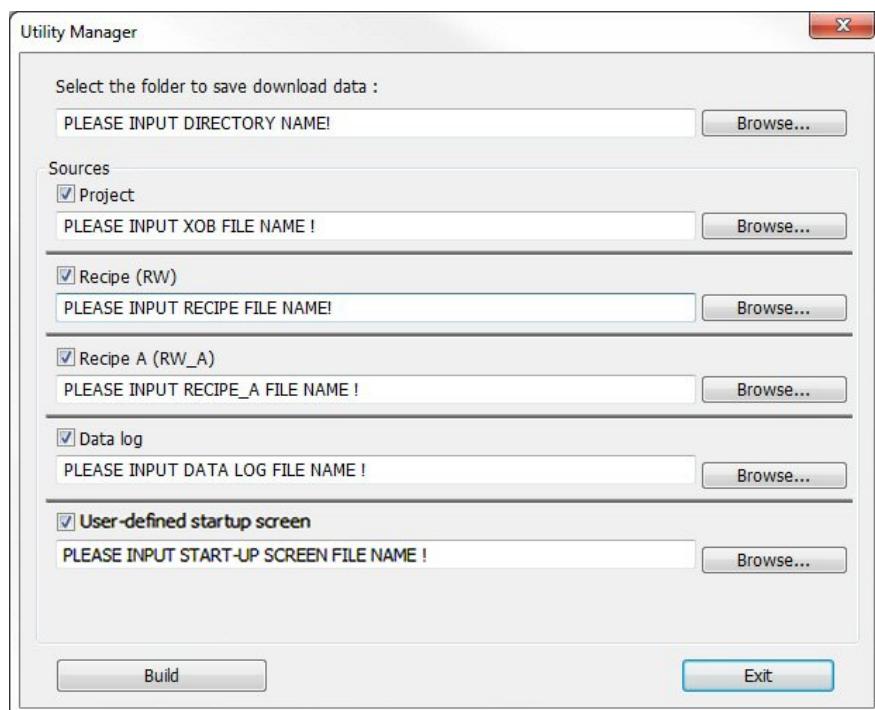
The **Port No. Setting** button provides a way to select a different TCP port than the default 20248.

The upload **Password** must match the upload Password in the HMI's System Settings (Security tab). The default password is 111111.

Once the EXOB file is uploaded from the HMI, use the **Decompile** option under the Tools menu in EZwarePlus to create the EMTP project file, which can be opened in EZwarePlus.

Build Download Data for SD/USB Disk
(Publish)

Data can be downloaded to the HMI5000 Series using an SD card and USB flash drive. The **Build Download Data** function builds the data files to do this.

(Not supported in the **RMI5010**.)

To build download data for SD card or USB flash drive:
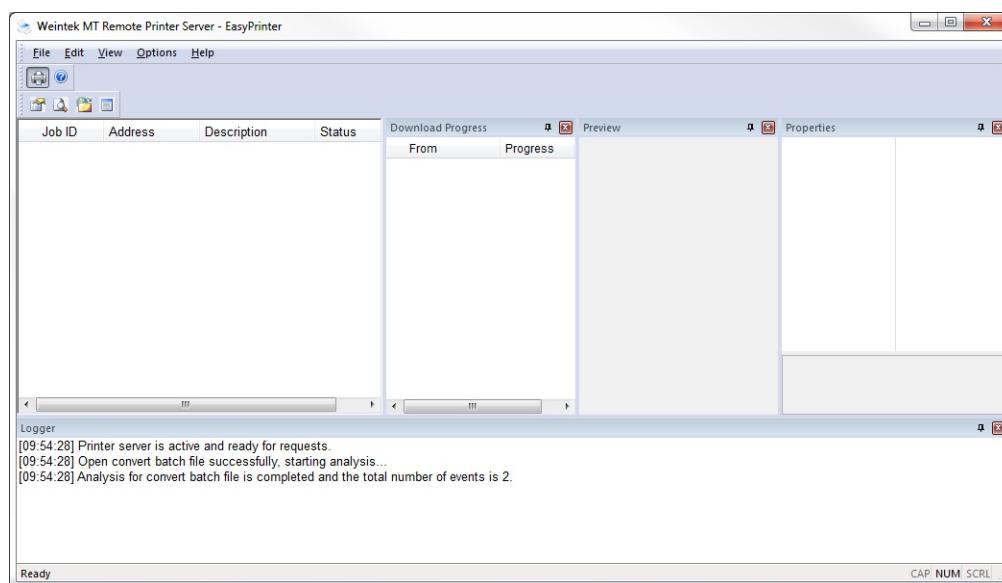
1. Start Utility Manager.

2. Click **Build Download Data for SD/USB Disk…** The Utility Manager dialog appears.

3.   Insert SD card or USB flash drive into PC. Note the drive that represents the SD/USB device.

4.   Click **Browse...** next to **Select the folder to save download data:** to select the drive that represents the SD/USB device.

5.   Check the boxes that will be the sources for your data and browse to the appropriate file for that source. Click **Build**.

☞ The L Series do not support SD cards.

EasyPrinter/Backup Server
(Maintenance tab)

The Easy Printer button starts the EasyPrinter application. The EasyPrinter application runs as a server on the pc, and allows screen images from the HMI to be printed via a printer connected to the pc running the EasyPrinter application. Additionally, the HMI Backup object can be used to send certain data to the PC running EasyPrinter.

The printer is set up on the Printer/Backup Server tab in the EZwarePlus Systems Parameters (not available for the RMI5010). Select the Use Remote Printer/Backup Server checkbox to enable remote screen printing and backup of data log file (*.dtl).

File Menu

> **Enable Output**: Enable the printer. If not enabled, nothing will be sent to the printer.
> **Exit**: Terminates the EasyPrinter utility. If EasyPrinter is terminated, the HMI cannot send data to the printer or receive backup data.

Edit Menu

> **Edit**: Edit the selected print job.
> **Delete**: Delete the selected print job.
> **Select All**: Select all print jobs.

View Menu

The **Jobs** area is always displayed and indicates the source of the data, the operation being performed, and the status of the job.

> **Properties Bar**: Displays the properties of the selected print job.
> **Preview Bar**: Displays an image of the data being sent to the printer.
> **Download Bar**: Displays the status of the data being transferred from the HMI, not the status of the data being sent to the printer.
> **Logger Bar**: Displays the status of the EasyPrinter utility.

Options Menu
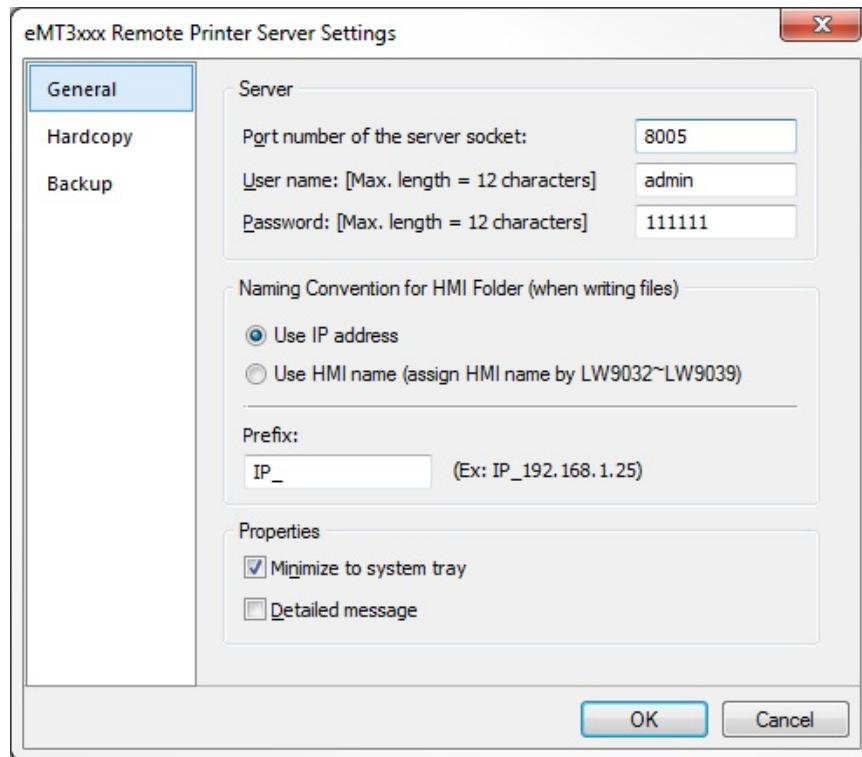
> **Toolbars:** Provides the option of turning on and off the Standard toolbar and the View toolbar.
> **Status bar**: Provides the option of turning on and off the Status bar at the bottom of the EasyPrinter window.
> **Settings:** The Settings window is used to configure the operation of EasyPrinter.
> 🗐 The Output must be disabled before the Settings option is enabled.

> **General**

> **Port Number of the Server Socket:** Specify the IP Port number to use. This must match the *Port* setting on the Printer Server tab in the EZwarePlus System Parameters dialog.

> **User Name:** Specify a User Name. This must match the *User Name* setting on the Printer Server tab in the EZwarePlus System Parameters dialog.

> **Password:** Specify a Password. This must match the *Password* setting on the Printer Server tab in the EZwarePlus System Parameters dialog.
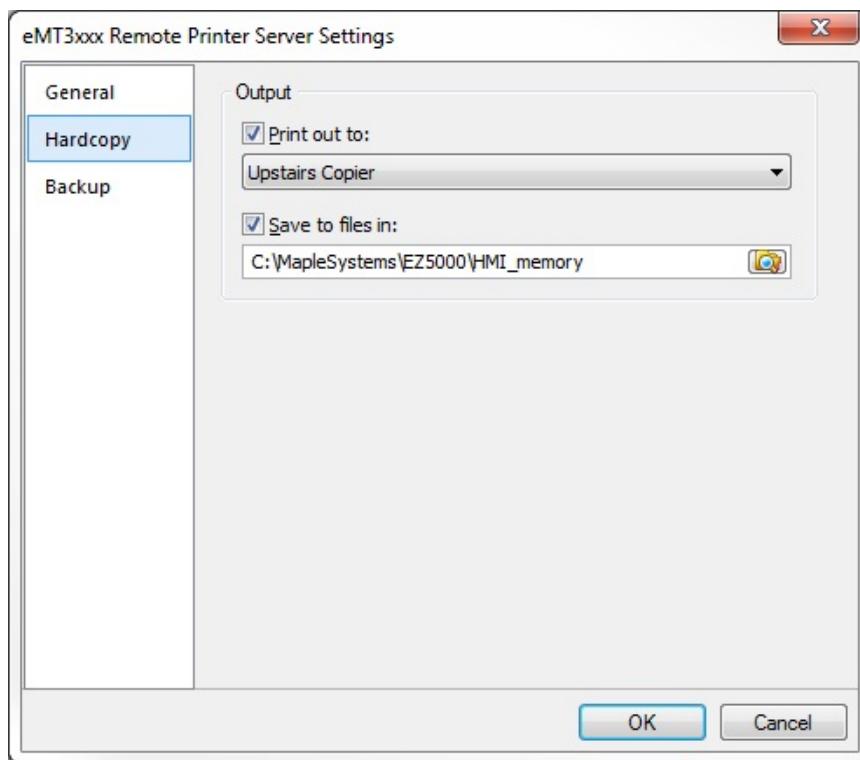
Naming Convention for HMI Folder (when writing files): Select **Use IP address** to create a folder named with the IP address of the HMI. Select **Use HMI name** to create a folder using the HMI name assigned in the Data Sampling Object's **Folder name**, which is used to save history data files. The folder name is stored in LW9032-LW9039.

Prefix: Optional prefix to append to the folder name defined above. For example, if Use IP address is selected for the naming convention, the IP address of the HMI is 192.168.1.211, and IP_ is entered in the Prefix box, the folder will be named IP_192.168.1.211.

Minimize to System Tray: If checked, the minimized EasyPrinter utility will appear in the System Tray. If unchecked, the utility will be minimized to the Task Bar.

Detailed Message: If checked, detailed messages will be written to the Logger window. If unchecked, general messages will be written to the Logger window.
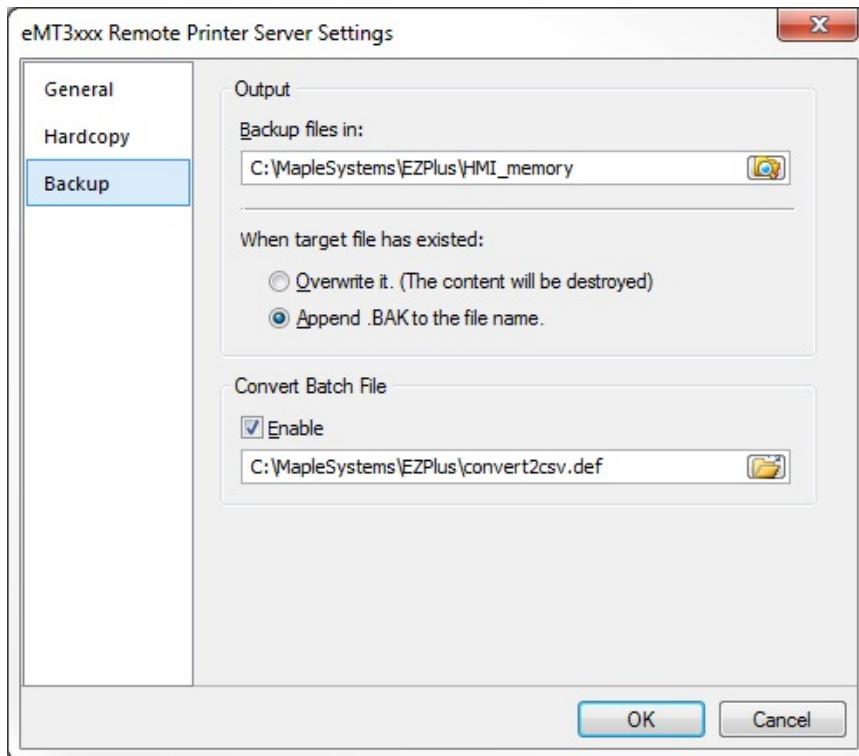
Hardcopy

Print Out To: When checked, specifies the printer or device to send the data to. The drop-down list will be populated with devices available on the PC.

Save to files in: When checked, saves a *.bmp file of the screen print to the designated folder on the computer.

Backup

Backup files in: Specifies the location on the computer to save the data file.

When target file has existed: When **Overwrite it** is checked, the existing file will be overwritten by the new file. When **Append.BAK to the file name** is checked, the existing file will have .BAK appended to the filename so it will be preserved.

Convert Batch File: When enabled, defines the path to the definition file used to convert the data file to CSV file format (C:\MapleSystems\EZPlus\convert2csv.def is the default).

Administrator Tools

(Maintenance)
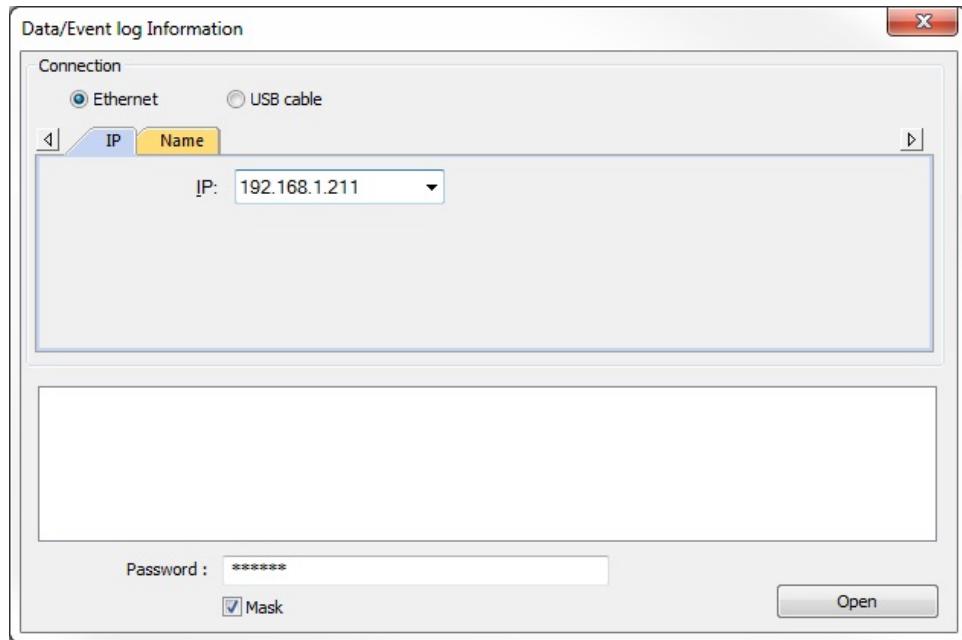
The Administrator Tools allow some security and email settings to be saved to a USB flash drive and loaded into an HMI during runtime. See **Chapter 14 – Administrator Tools** for more information.

EasyAccess 1.0

(Maintenance)

Opens the EasyAccess (v1.0) window, which provides a method of connecting to the HMI remotely over the internet. Unlike VNC, EasyAccess transfers only data (no images), resulting in much faster communication between the EasyAccess client running on a PC and the HMI. The EasyAccess client can run the same project that is running in the HMI, or a different project. The project in the EasyAccess client runs independently from the project in the HMI. See Technical Note 5082 "Using EasyAccess" for more information.

Data/Event Log Information

(Maintenance)

The Data/Event Log Information window is used to read the data log files and event log files in the HMI and provides a listing of the files stored in HMI memory. If connecting over Ethernet, enter the IP address of the HMI and click **Open**. The **Data/Event Log File Information** window will pop up showing a list of the data log files and event log files in the HMI.

Recipe Database Editor

(Data Conversion)

The Recipe Database Editor is used to modify an existing recipe.db file and add or delete records within a recipe. See **Adding and Editing Data in a Recipe in the Recipe Database Editor** in **Chapter 16 – Recipes** for more information.

Easy Converter

Data Conversion

The EasyConverter application is used to view data log files (*.dtl) and event log files (*.evt) that are created by the HMI during operation. Data log files are files the HMI creates when capturing data using the Data Sampling object. Event log files are history files the HMI creates when using the Event (Alarm) Log object. Both files are in binary format to minimize the amount of file space required.
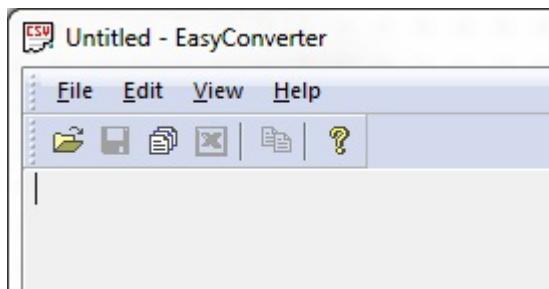
To view these files with a computer, you must use the EasyConverter application. In addition, EasyConverter can take a data or event log file and convert it into a CSV (Comma Separated Value) file that can be easily imported into other applications such as Microsoft Excel.

- For more information on how to do data logging, see "**Chapter 12 – Data Sampling and Trend Displays**."
- For more information on how to use Event Log files, see "**Chapter 13 – Capturing Alarms and Events**" section "Monitoring Alarms with the Event (Alarm) Log."
- For information on uploading history files from the HMI, see "Appendix D – Uploading a Project to the HMI from a USB Drive or SD Card."
- For information on accessing history files in the HMI from the FTP server, see "**Appendix F – Accessing the FTP server in an HMI**."

To start the EasyConverter Application

1. Click the **EasyConverter** button in the Utility Manager Data Conversion window or click the EasyConverter icon in the Project Toolbar. The EasyConverter application appears.

2. Click **File > Open** to display the Open dialog box. Search for the data log file (*.dtl) or event log file (*.evt) that you wish to view, then click the **Open** button.
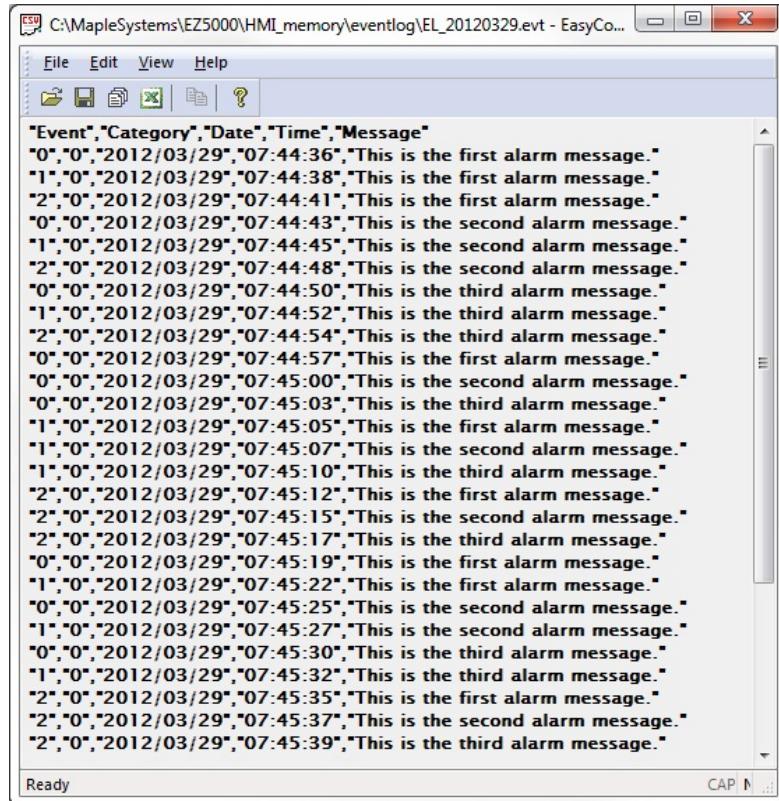
Please Note:
These files are captured by the HMI and stored in internal HMI memory, an attached SD card, or USB flash drive. You must copy these files into your computer before using the EasyConverter utility. If you are running a project that is capturing data log or event log files using the Offline Simulator, the EZwarePlus application automatically creates new folders on your computer and creates the files (C:\MapleSystems\EZPlus\HMI_memory).

Data log files are stored in a folder using the name that you assigned in the Data Sampling Object attribute box (e.g., C:\MapleSystems\EZPlus\HMI_memory\data log\History Data1\20100618.dtl)

Event log files are stored in an event log folder (e.g., C:\MapleSystems\EZPlus\event log\EL_20100625.evt).

Viewing an Event Log File (*.evt)

1. From the EasyConverter application, click **File… Open** and locate the Event Log file (*.evt).
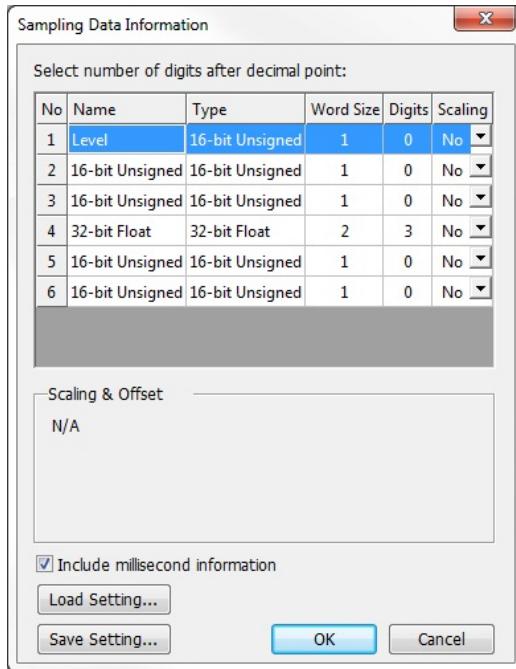
2. "Event": This column indicates the following: 0 = Event triggered; 1 = Event acknowledged; 2 = Event returns to normal.
    "Category": Indicates the event category.
    "Date": Indicates the date of the event (YYYY/MM/DD).
    "Time": Indicates the time of the event (HH:MM:SS)
    "Message": Indicates the Event/Alarm message.

🗐 This is read only – the EasyConverter application does not allow any edits.
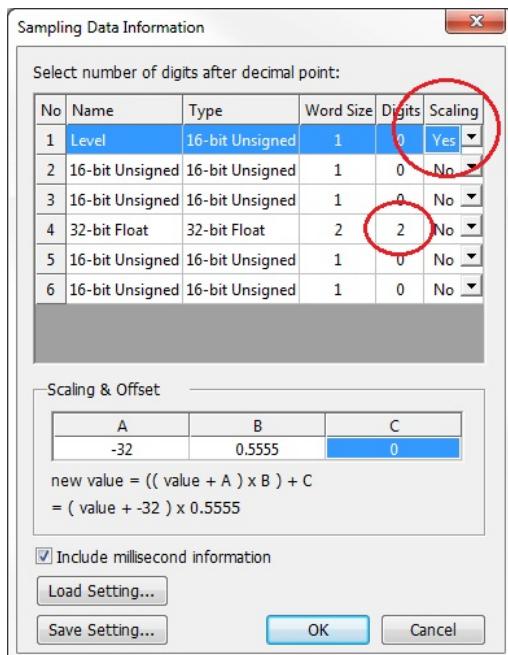
Viewing a Data Log File (*.dtl)

1. From the EasyConverter application, click **File…Open** and locate
    the Data Log file (*.dtl). As the file is loaded,
    the following popup window appears:

Sampling Data Information: This shows the type and number of data samples contained in the data file. You can select the number of digits after the decimal point to display and whether or not millisecond information is displayed.
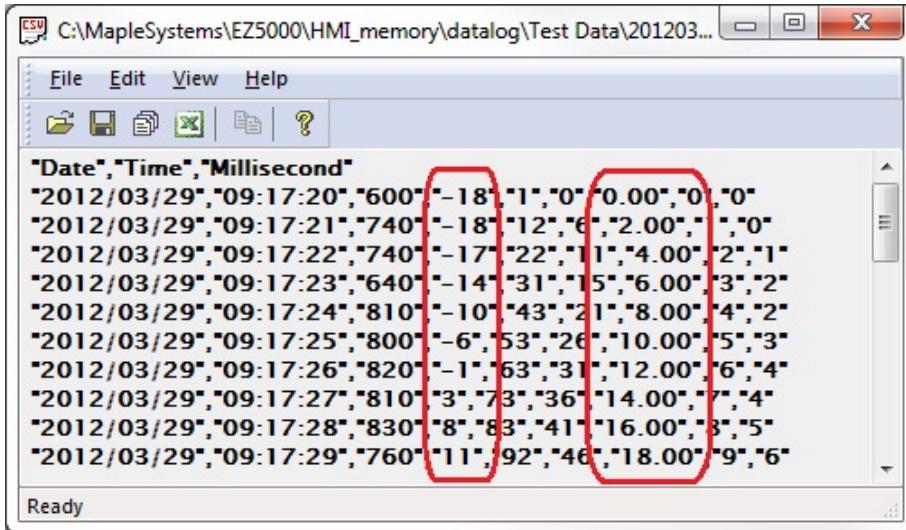
2. In addition, there is a scaling option that can apply linear scaling to the data before it is displayed. For this example, we have elected to use the linear scaling formula on Data No 1 to convert the raw data (which is measuring temperature in °F) to °C.

3. Also, the raw data collected for Data 4 is a floating point number calculated to three decimal places. However, we are only concerned with a two decimal accuracy, so we change the 'Digits' field from 3

to 2. If we want to use these same changes on other files, click the **Save Setting…** button to save the changes as a conversion file (*.lgs). When opening other data log files, we can apply the same changes by clicking on the **Load Setting…** button and selecting the proper conversion file.

4. Click **OK** to continue. The data log file is shown:

5. The data shown includes the Date (YYYY/MM/DD), Time (HH:MM:SS), Milliseconds, and the actual data for each register sampled. In our example, notice that the value for Data 1 has been converted to °C and the value for Data 4 has two decimal places instead of three.

    ▤ This is read only – the EasyConverter application does not allow any edits.

Saving a Data/Event Log File as a CSV or XLS file 💾

After opening a Data/Event Log file in EasyConverter, you can easily save the file as a CSV or XLS file.

1. Click **File > Save As…** or click the Save As icon. The **Save As** dialog opens.

2. Click the **Save as type:** drop-down box and select either **Text files (*.csv)** or **Excel files (*.xls)**. By default, the new file is saved in the same folder as the original file, but you can navigate to a different folder by clicking the **Save in** box at the top.

Exporting a Data/Event Log File as an XLS file to Excel 📊

After opening a Data/Event Log file in EasyConverter, you can export the file as a XLS file and open it directly in Microsoft Excel.
▤ Microsoft Excel is required to convert the file when exporting to Excel.
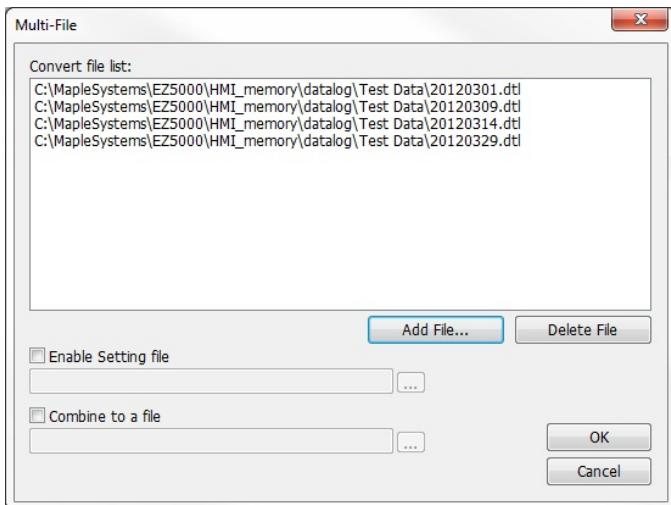
1. Click **File > Export to Excel** or click on the Excel icon.

2. Microsoft Excel opens and you should see the data in a spreadsheet format. Simply click **File…Save As** to save the file.

Converting Multiple Files

EasyConverter also has a feature that allows you to select multiple Data/Event Log files and save them to one XLS file.

1. Click **File > Multi-File** or click on the Multi-File icon.

2. Click **Add File…** then select which Data/Event Log files you wish to combine.

3. **Enable Setting file**: Check this box to select a conversion (*.lgs) file that performs a linear scaling conversion or decimal point conversion on the selected files.

4. **Combine to a file**: Check this box to combine the files and save them into an Excel spreadsheet.

    Click the browse button to select the location and filename where you want to save the combined XLS file. Click **OK** to save the file.

Recipe/Extended Memory Editor
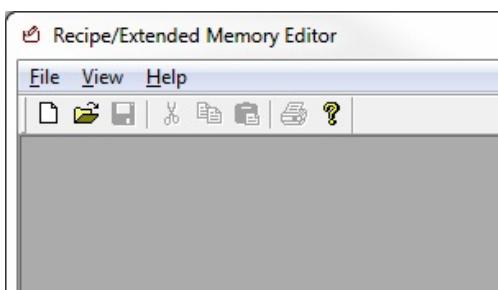
Data Conversion

The Recipe/Extended Memory Editor is an application that allows you to create, view, and modify recipe (*.rcp) files and Extended Memory (*.emi) files. You can also use this editor to import/export recipe and extended memory files to CSV formatted files, which can then be shared by other applications.
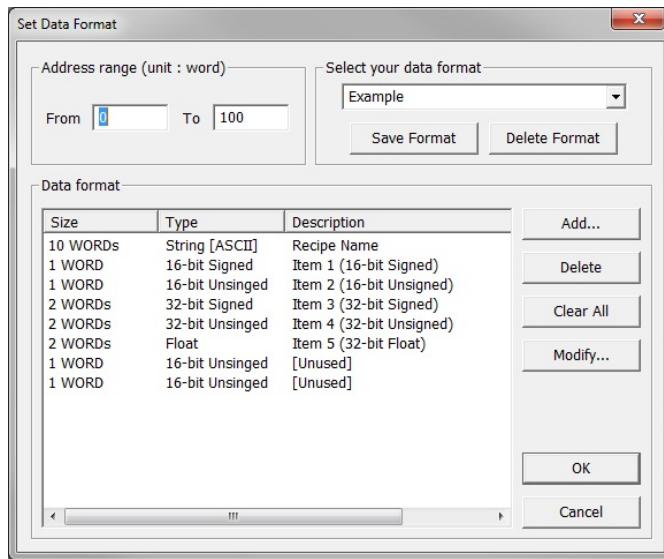
▤ EZwarePlus has a new way of implementing recipes in addition to the method described here. With the new implementation, recipe data is stored in a database file and can be edited in the Database Editor or directly on the HMI screen. See "Chapter 16 – Recipes" for more information.

▸ *To create a new Recipe/Extended Memory file:*

From the Utility Manager application, click **Recipe/Extended Memory Editor**:
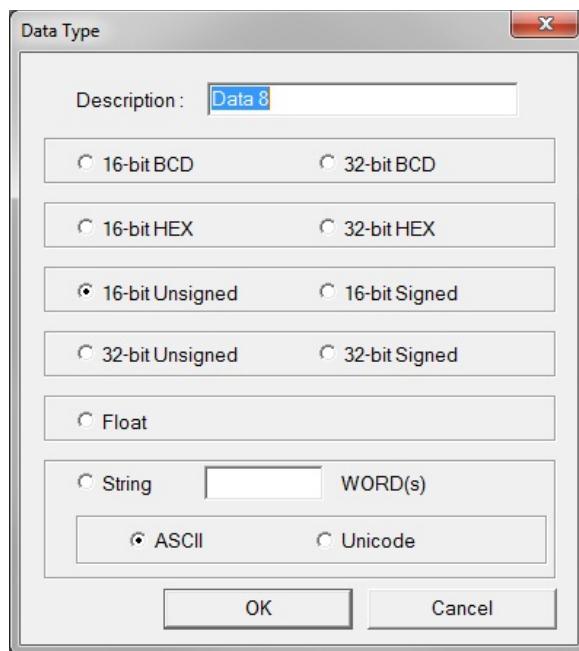
1. Click **File > New**. The following dialog box appears:

2. **Address range (unit: word)**: Use this area to select the total number of RW (recipe word) registers or EMx (Extended Memory) registers that are used for the recipe or extended memory file. In the example above, RW0 thru RW100 will be used.

3. **Select your data format**: Use this area to enter how each data register element is interpreted by the HMI. The data collected and stored in recipe/extended memory files is in binary format and does not contain any information about how each data should be interpreted by the HMI (for example, is the data in 16-bit signed integer format or BCD?). Therefore, the data format is used to define how each data element is formatted (i.e., Signed vs. Unsigned, 16-bit vs. 32-bit, Float, String, etc.).

    a. **Add**: Click to add a new data register format. The following dialog box appears:

In the **Data Type** dialog box you can enter a description of the Data Type and select which format that the HMI will use to interpret the data.

🗐 For String format, you must enter the total number of 16-bit register words used for the character string.

   b. **Delete**: If you wish to delete an item from the list, highlight a data element and click **Delete** to remove from list.
   c. **Clear All**: Click to erase entire list of data elements.
   d. **Modify**: Highlight a data element and click **Modify** to revise the name of the data element or format.

2. **Select your data format**: Use to select or create a data format template that can be used for other recipes or extended memory files. In the example above, the data elements configured in the **Data format** list have been saved to a template called 'Example'. Click **OK**.

3. A table of data elements appears that shows the recipe or extended memory table.
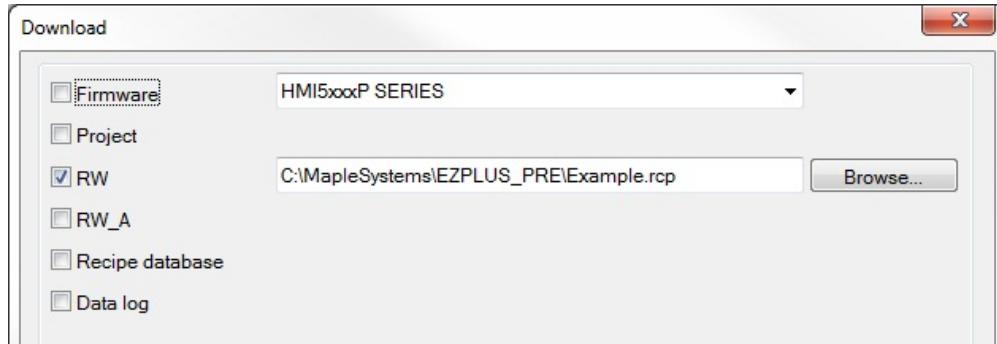
4. This table has several columns with headers:

   a. **ID**: This is the ID number for each record.
   b. **ADDRESS**: This is the starting RW address or EMx address for each record.
   c. Data headers: These are the descriptions used for each data element created in the step above.

5. Edit the table by clicking on each data element field and entering the preset value. Please note that you are only allowed to enter data according to the format defined for each data element.

6. Here is an example of a completed table:
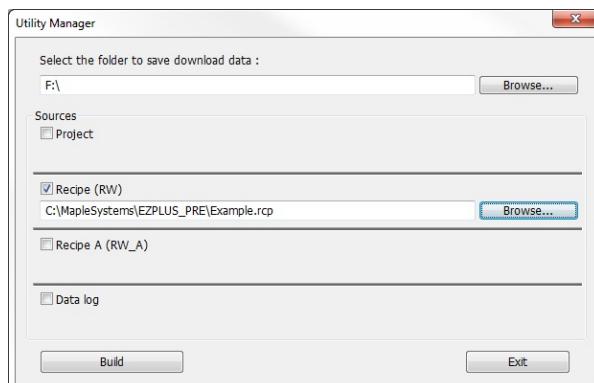
7. Click **File > Save** with the following options:
   a. Save file as *.rcp for recipes.
   b. Save file as *.emi for extended memory files.
      🗐 You must use file names which correspond to the ten extended memory areas preconfigured in the HMI (ex. em0.emi, em1.emi, …, em9.emi).
   c. Save file as *.csv to open the file in applications such as Microsoft Excel.

8. Once the file is saved, you can copy the recipe file to your HMI by:
   a. Procedure 1-- Downloading the file using the Utility Manager:
      i. With the computer connected to your HMI, click **Download**.
      ii. On the Download dialog box, check the **RW** enable box, then select the recipe file.
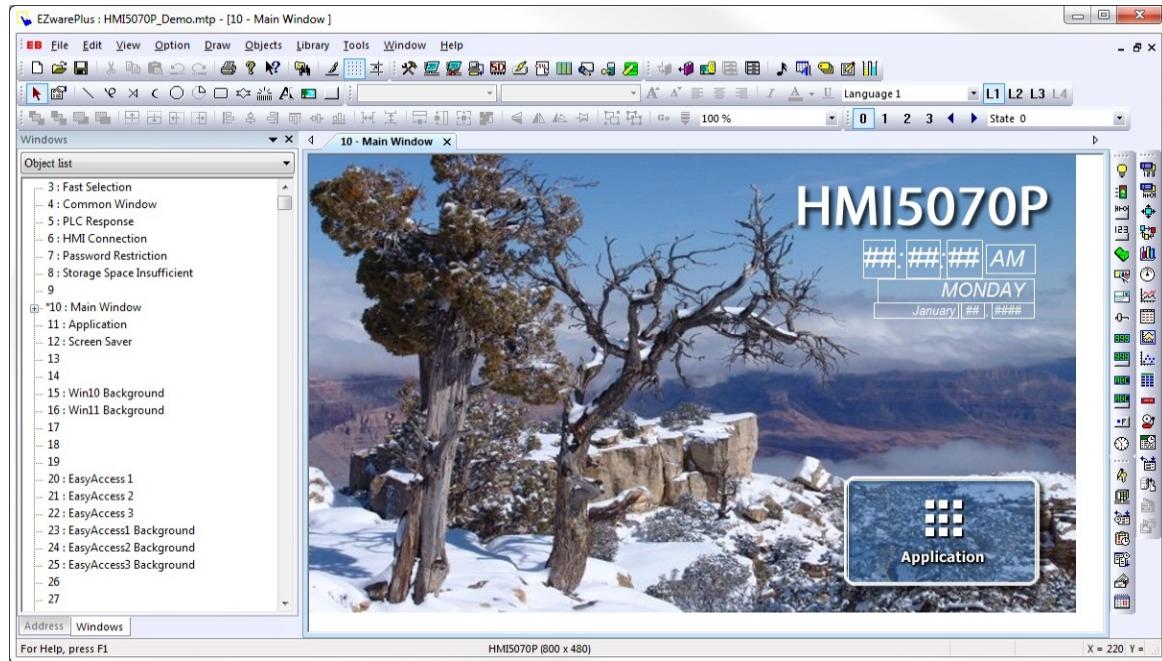
   b. Procedure 2 -- Downloading using a SD card or USB Flash Drive:
      i. Attach an SD card or USB Flash Drive to your computer.
      ii. In Utility Manager, click **Build Download Data for SD/USB Disk** button.

      iii. Select the folder to save download data. Enter the SD card or USB Flash drive location.
      iv. Check the **Recipe (RW)** enable box, then select the recipe file.
      v. Click the **Build** button. A folder called 'mt8000' is created on the root directory of your drive.
      vi. Remove the SD or USB drive and connect it to your HMI.

EZwarePlus Features

This section guides you in a basic understanding of the features and capabilities that EZwarePlus has to offer, from an overview of all the objects available in the software to enter and display data, to setting up the system parameters and selecting the target PLC. This information will be useful for understanding more advanced features explained in later chapters.

EZwarePlus Development Window

Objects Summary

EZwarePlus includes several active graphics objects that are used to represent data that is stored in the PLC or internal memory of the HMI. The data represented can be single bit coils, 16-bit, or 32-bit registers. The data can be represented as numbers, ASCII characters, or as graphic shapes or bitmap images. This section provides a summary of all the objects available in EZwarePlus. Most of these objects are accessible by clicking **Objects** in the top menu in EZwarePlus, or by clicking on its icon in one of the toolbars.

Refer to the Help file (**Help > Help Topics > Using EZware > Parts List**) for more information relating to each object.

Bit Lamp

The Bit Lamp Object is used as an indicator to represent the ON or OFF status of a bit or coil in the PLC, or a bit in the HMI local memory (LB). If the bit is cleared (0, False), the State 0 Shape of the Bit Lamp will be displayed. If the bit is set (1, True), the State 1 Shape of the Bit Lamp will be displayed. The Bit Lamp can also blink in various ways.

Word Lamp

The Word Lamp Object is used as an indicator to represent the value in a PLC register, or the value in a register in the HMI local memory (LW). Creates a graphics object to reflect the current state of a multi-state PLC data register. It can display a different shape or picture depending on the value in the register. If the

value is 0, the first shape is displayed, if the value is 1, the second shape is displayed, etc. A Word Lamp can display up to 256 different shapes and text strings, corresponding to register values of 0 – 255.

There are four modes of operation available for the Word Lamp.

Value: The state of the Word Lamp is displayed according to the value in the **Read address**. The **Offset** field will cause the Word Lamp to display the state according to the value in the Read address + the Offset. For example, if the Read address contains a value of 3 and the Offset is set to 4, the Word Lamp will display state 7 (4 + 3 = 7).

LSB: Displays the state represented by the least significant bit in the binary word.

Decimal	Binary	Displayed state
0	0000	State 0 is displayed. All the bits are 0.
1	0001	State 1 is displayed. The least significant active bit is 1.
2	0010	State 2 is displayed. The least significant active bit is 2.
3	0011	State 1 is displayed. The least significant active bit is 1.
4	0100	State 3 is displayed. The least significant active bit is 3.
5	0101	State 1 is displayed. The least significant active bit is 1.
6	0110	State 2 is displayed. The least significant active bit is 2.
7	0111	State 1 is displayed. The least significant active bit is 1.
8	1000	State 4 is displayed. The least significant active bit is 4.

☞ The LSB mode does not work with 32-bit Float data format.

Bit combination: The state of the Word Lamp is displayed according to discrete bits rather than the value in a PLC or HMI register. One to four bits are used, depending on the number of states selected (1-16). The selected bits can be non-consecutive.

PLC 1 = least significant bit (LSB)
PLC 2 = next significant bit
PLC 3 = next significant bit
PLC 4 = most significant bit (MSB)
The binary value represented by the PLC bits selected determines the state of the Word Lamp.

PLC 4	PLC 3	PLC 2	PLC 1	State
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8

…and so forth.

Change state by time: The state of the Word Lamp increments automatically at the interval specified by the **Time interval**. After the last state (up to 96 states), the Word Lamp returns to state 0 and repeats.

Set Bit

The Set Bit Object is used as a button to toggle ON or OFF the state of a bit or coil in the PLC, or a bit in the HMI local memory (LB). There are a number of different options (Set Styles) available to operate the button including touch (On, Off, Toggle, Momentary), window open or closed, and backlight on or off.

Set Word

The Set Word Object is used as a button to change the value in a PLC register, or the value in a register in the HMI local memory (LW). There are a number of different options (Set Styles) available to operate the button including touch (Write a constant value, increment or decrement), window open or closed, backlight on or off, and periodic bounce or jog.

Toggle Switch

The Toggle Switch Object is a combination of the Bit Lamp and Set Bit objects. It is used as a button to toggle ON or OFF the state of a bit or coil (specified by the Write Address), and as an indicator to represent the ON or OFF status of a bit or coil (specified by the Read Address) in a PLC register or HMI local memory. It can be configured with various Switch Styles including Set On , Set Off, Toggle, or Momentary.

Multi-State Switch

The Multi-State Switch Object is a combination of the Word Lamp and Set Word objects. It is used as a button to change the value of a register (specified by the Write Address), and as an indicator to represent the value in a register (specified by the Read Address). A Multi-State Switch can display up to 256 different shapes and text strings, corresponding to register values of 0 – 255.

Option List

The Option List Object provides a way to display a list of names corresponding to values in a register (**Monitor address**). The **Source of item data** selection determines how the Option List operates. If Recipes are used, the Option List can contain the names of the recipes.

Predefine: The Option List displays a list of items where the item displayed or selected (configured on the **Mapping** tab) is determined by the value in a register. Optionally, selecting an item from the list can write its corresponding value to a register.

Dates of historical data: When data sampling (Data Sampling Object) or Alarms (Alarm/Event Log) are employed, the Option List can be used to list the dates corresponding to Historical data/event files for displaying in a Historical Trend Display, History Data Display, or History Event Display.

Item address: Custom text for the Option List can be stored in registers and changed or updated during runtime.
Control register: Set to 1 to update the item list.
Control register + 1: Determines the number of items in the list.
Item address: The starting address for the item list contents (ASCII or UNICODE).

User account: When "Enhanced Security Mode" is enabled in the **System Parameters > Security** tab, the Option List can display the user names in the drop-down list. With the Monitor address pointing to the

Control Address + 2 (Index of accounts register) configured for the Enhanced Security, you can select the user name to login from the Option List and the corresponding value will be written to the Index register.

Slider Object

The Slider Object is used as a control to change the value in a PLC register, or the value in a register in the HMI local memory (LW), based on the position of the slide control. Low and High limits can be configured based on constant values or on PLC/HMI register values, and the resolution of the slide control can be adjusted to accommodate the range of values in the register. The position of the Slider will change if the register value is changed by some other device.

Function Key

The Function Key Object is used to change windows, popup a window, return to a previous window, close a window, or input data as part of a keypad. It can also be used to execute a macro or print the screen to a USB flash drive, SD card, or printer.

Combo Button

This button can be configured to perform multiple functions in sequential order and display the state of a bit or word as a Bit Lamp or a Word Lamp. Available actions are **Set Bit, Set Word, Change Window, Execute Macro**, and **Delay** (50ms to 500ms). Up to 20 actions can be selected.

The **Change Window** function can only be executed once by the Combo Button and it must be the last action performed.

The **Delay** action can only be executed once by the Combo Button.

Numeric
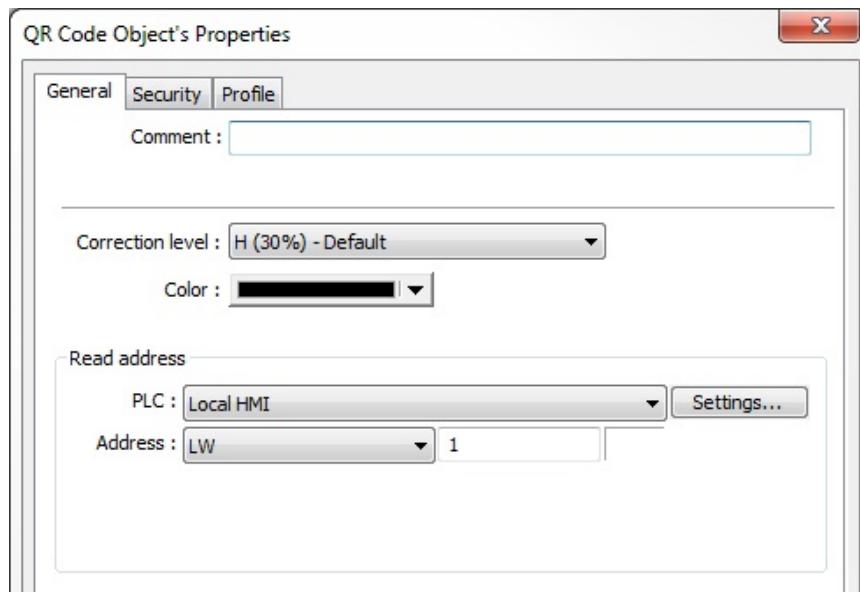
The Numeric Object is used to display the current value in a register and to optionally change the value in the register using a popup numeric keypad or external keyboard (iPad or smartphone keyboard for the **RMI5010**). The value can be displayed as BCD, Hex, Binary, or Decimal (signed or unsigned). The Numeric Object has the option to read and write to different registers, to set a notification bit when a value is entered, and to set a notification bit on an invalid (out-of-range) entry.

ASCII

The ASCII Object is used to display the value in one or more registers as text (ASCII characters or Unicode characters) and to optionally change the value in the register using a popup ASCII (alphanumeric) keypad or external keyboard (iPad or smartphone keyboard for the **RMI5010**). Up to 64 registers can be written to and displayed.

QR Code

The QR Code object converts ASCII characters in a series of registers (up to 1024 registers) into a QR Code that displays on the HMI screen. The code can then be read by a scanning device (e.g., a mobile phone) to display text or go to a website.

Correction level: The QR Code object has error correction capability to restore damaged data. Four correction levels are available, with each one adding additional amounts of backup data based on the amount of damage the QR code is expected to suffer as a result of the image being obscured or unclear. As the error correction level increases, the number of rows and columns in the QR code increases to store the original data plus the backup codewords.

Choose Level L for up to 7% damage (25 x 25 array)
Choose Level M for up to 15% damage (26 x 26 array)
Choose Level Q for up to 25% damage (28 x 28 array)
Choose Level H for up to 30% damage (29 x 29 array) (recommended for industrial environments)
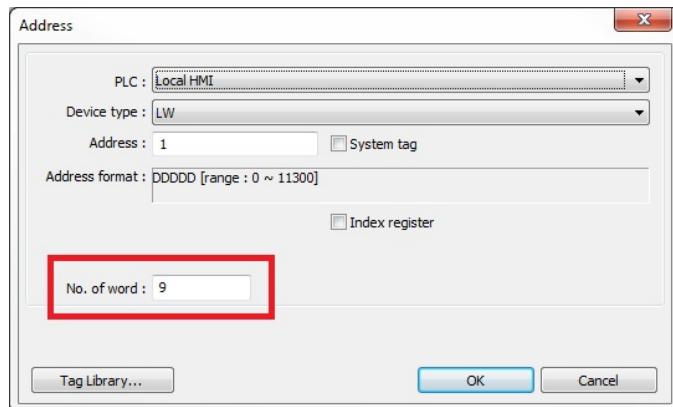
Color: Use this color bar to select the display color of the QR Code on the HMI screen.

Read address: Select the first address of the block of registers that contain the ASCII data for the QR Code (up to 1024 words). Click the Settings button next to the PLC name to open the Address window. Select the number of words that contain the ASCII data.

Indirect Window

The Indirect Window Object is used to display a window based on the value in a register (specified by the Read Address). The window whose number appears in the register is displayed within the frame of the

Indirect Window. The Indirect Window Object should be the same size as the window(s) that are being displayed. If the Indirect Window is too small, some information may not display properly. Indirect Windows can be displayed with or without a Title Bar. Using a Title Bar allows the window to be moved around the screen. Indirect Windows can also optionally auto-size based on the size of the window being displayed, and optionally use an offset value.

The window is displayed as long as the value in the register contains the window number. Set the value to zero (or to a window number that hasn't been created) to clear the Indirect Window.

Direct Window

The Direct Window Object is used to display a window based on the state of a bit in a register (specified by the Read Address). The window being displayed is selected in the Attributes section of the Direct Window Object's Properties and appears within the frame of the Direct Window. The Direct Window Object should be the same size as the window being displayed. If the Direct Window is too small, some information may not display properly. Direct Windows can be displayed with or without a Title Bar. Using a Title Bar allows the window to be moved around the screen.

Toggle the bit to turn the window on and off (the window can be triggered to display with bit ON or OFF).

Moving Shape

The Moving Shape Object is used to move a shape or picture on the screen based on values in consecutive registers (specified by the Read Address). The value in the Read Address register determines the state of the object and can be used to change its appearance. The value in the next consecutive register(s) determines the position of the part (relative to the object's initial position, in pixels). The position can be defined by X values, Y values, and XY values, where the Read Address + 1 = the X or Y position (for X axis only or Y axis only modes), or the Read Address + 1 = the X position and Read Address +2 = Y position (for X & Y axis mode). These addresses define the position relative to the upper-left corner of the shape. The Min/Max XY values in the Moving Shape object's properties define the total area within which the object is allowed to move, regardless of the values in the controlling registers.

Animation

The Animation Object is used to move a shape or picture on the screen based on values in consecutive registers (specified by the Read Address). The value in the Read Address register determines the state of the object and can be used to change its appearance. The value in the next consecutive register (Read Address + 1) determines the preselected position of the part.

When the Animation Object is selected, the cursor changes to a crosshair (+). Left-click the mouse on each location where the object will appear. When all locations have been defined, right-click the mouse to finish drawing the object. There must be at least three positions defined. The first location is represented by a 0 in the register, the second location by a 1 in the register, and so on.

Flow Block

Creates animation along a fixed path to represent flow in a pipe or other transportation line. The speed and direction of the animation can be preset or controlled from a PLC register (range of -25 to +25).

Date/Time

Displays the HMI Date and Time as text, in one of several formats
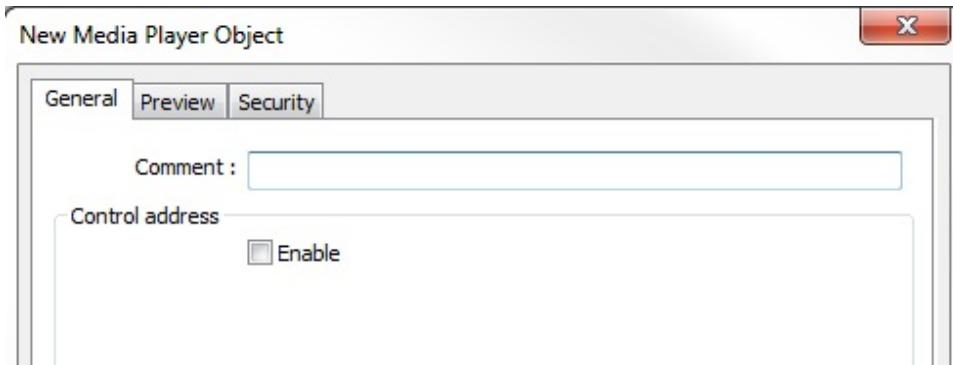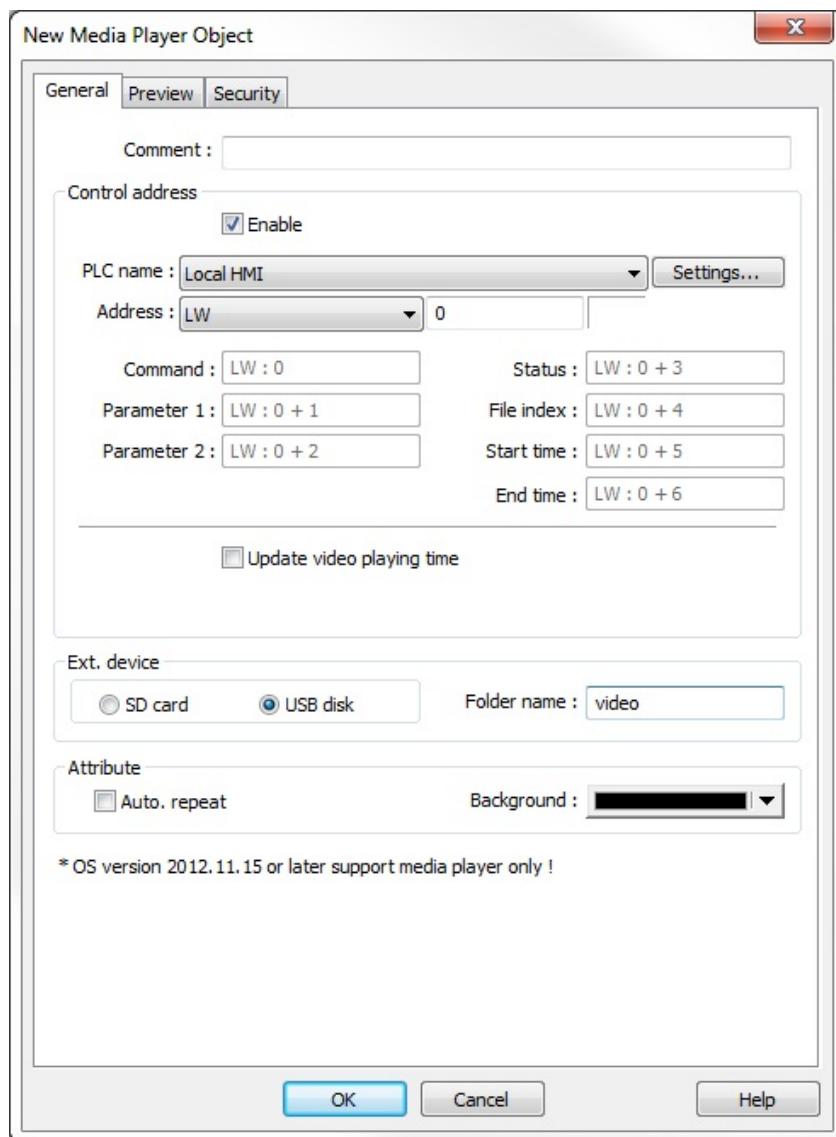
Media Player

The Media Player Object is used to play a media file on the HMI screen. The media file is stored on a USB flash drive or SD card connected to the HMI. Click the **Preview** tab to load the media file and view the file. If the file plays in the Preview tab, it will play in the simulator and the HMI. The media player supports the following formats: avi, flv, mov, mp3, mp4, mpg/mpeg, wav, wmv.

> Not all models support the Media Player.

The Media Player provides two options for playback control: manual and automatic. Automatic video playback begins playing a video immediately when the window containing the media player object is displayed. To enable Automatic playback in the Media Player Object's Properties window, un-check the **Enable** option under the Control address section.

To enable manual video control in the Media Player Object's Properties window, check the **Enable** box under the Control address section. Enabling the control address provides control for functions such as play, pause, stop, seek, zoom, and volume adjustment. These control functions are managed by setting the parameter 1 and 2 register values and writing the command value to the command register. The Media Player control address defines a series of registers used to manipulate the various video playback control functions.

The command register address is defined on the **General** tab in the Media Player Object's Properties window. The subsequent register addresses contain additional parameters and video playback information as indicated below.

Enable: When enabled, the Control address and subsequent registers controls the operation of the Media Player. When disabled, video playback will begin automatically when the window opens with the first video in the designated folder.

Command (Command + 0): This register controls the operation of the Media Player (see table below for command options).

Parameter 1 (Command + 1): Used in conjunction with the Command +0 register (see table below).

Parameter 2 (Command + 2): Not currently used.

Status (Command + 3): Indicates the status or errors.
Bit 0 = File open
Bit 1 = File playing
Bit 8 = Command error
Bit 9 = File format or loading error

File index (Command + 4): Contains the index number of the file being played. The HMI will write the file index value to this register when the video begins.
When multiple media files are available, name them with the following format:
n_NAME, where n is an integer starting at 1.

Start time (Command + 5): Contains the time index (seconds) at which to start the file (default is 0).

End time (Command + 6): Contains the time index (seconds) at which to end the file (default is the run time of the file).

Update video playing time: When checked, the Media Player will write the elapsed time of the media file into the **Playing time register** (Command + 7).

Update period: Defines how often the Media Player writes the elapsed time of the media file into the Playing time register (1-60 seconds).

Ext. device: Determines which external device contains the media files to be played, SD card, USB 1, or USB 2. (USB 1 is the first USB device connected to the HMI and USB 2 is the second USB device connected.)

Folder name: Specifies the folder on the USB device where the media file(s) reside. The root folder is not allowed and only one level is supported. For example, an entry of "video" specifies the folder "video" on the USB or SD device, and is allowed. An entry of "video\files" specifies the folder "files" under the folder "video," and is not allowed.

⌨ The folder name cannot be empty and cannot contain the following characters: / \ : * ? " < > |.
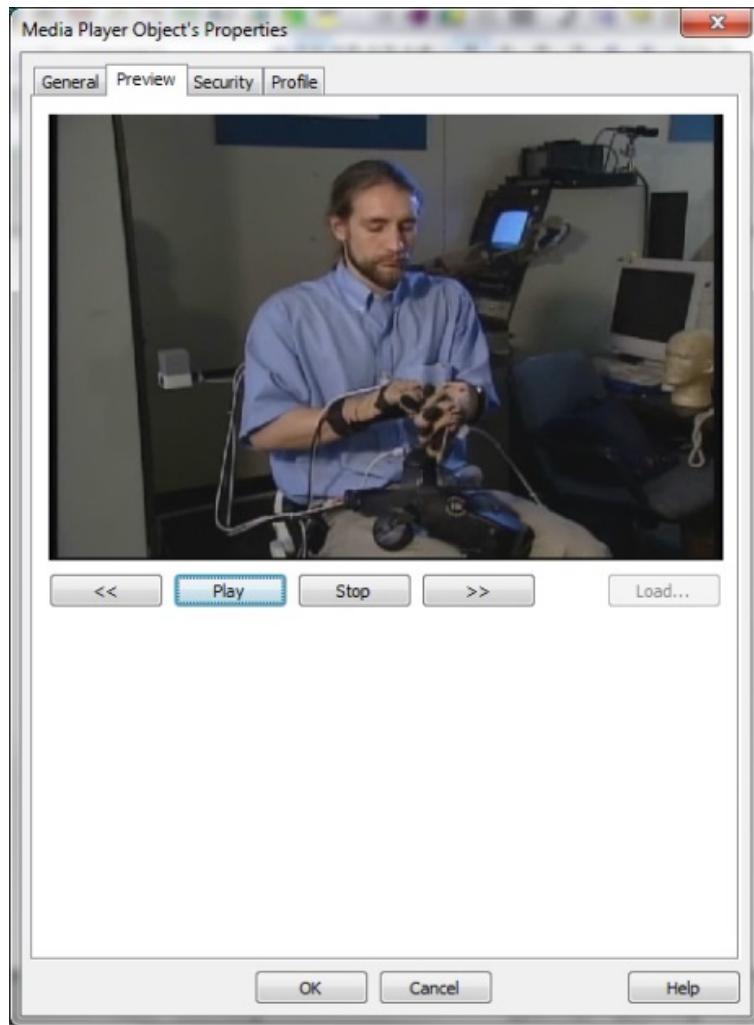
Auto repeat: When checked, the selected media file will restart after it has finished playing. If multiple files are present, all the files will be repeated (for example, [video 1] > [video 2] > … [video n] > [video 1] > etc.).

Background: Sets the background color of the Media Player, visible if the media being played does not completely fill the Media Player's outline.

Media Player Commands

Command	Parameter 1	Parameter 2	Function
1	0, 1, 2, …	0	Plays the file indicated by Parameter 1, where 0 is the first file in the specified folder, 1 is the second file, etc. Files are sorted in numerical and alphabetical order.
2	0	0	Play the previous file. Files are sorted in numerical and alphabetical order.
3	0	0	Play the next file. Files are sorted in numerical and alphabetical order.
4	0	0	Play / Pause toggle.
5	0	0	Stop playing and close the file.
6	1 to n-1	0	Start playing the file at the point specified by Parameter 1, where n is the length of the file in seconds.
7	1 to n-1	0	Jump ahead to the point in the file specified by Parameter 1, where n is the length of the file in seconds.
8	1 to n-1	0	Jump back to the point in the file specified by Parameter 1, where n is the length of the file in seconds.
9	0-128	0	Volume level.
10	0-16	0	Zoom level. 0 causes the video to fit the display object size; non-zero values adjust the magnification in 25% increments: 1=25%, 2=50%,…16=400%.
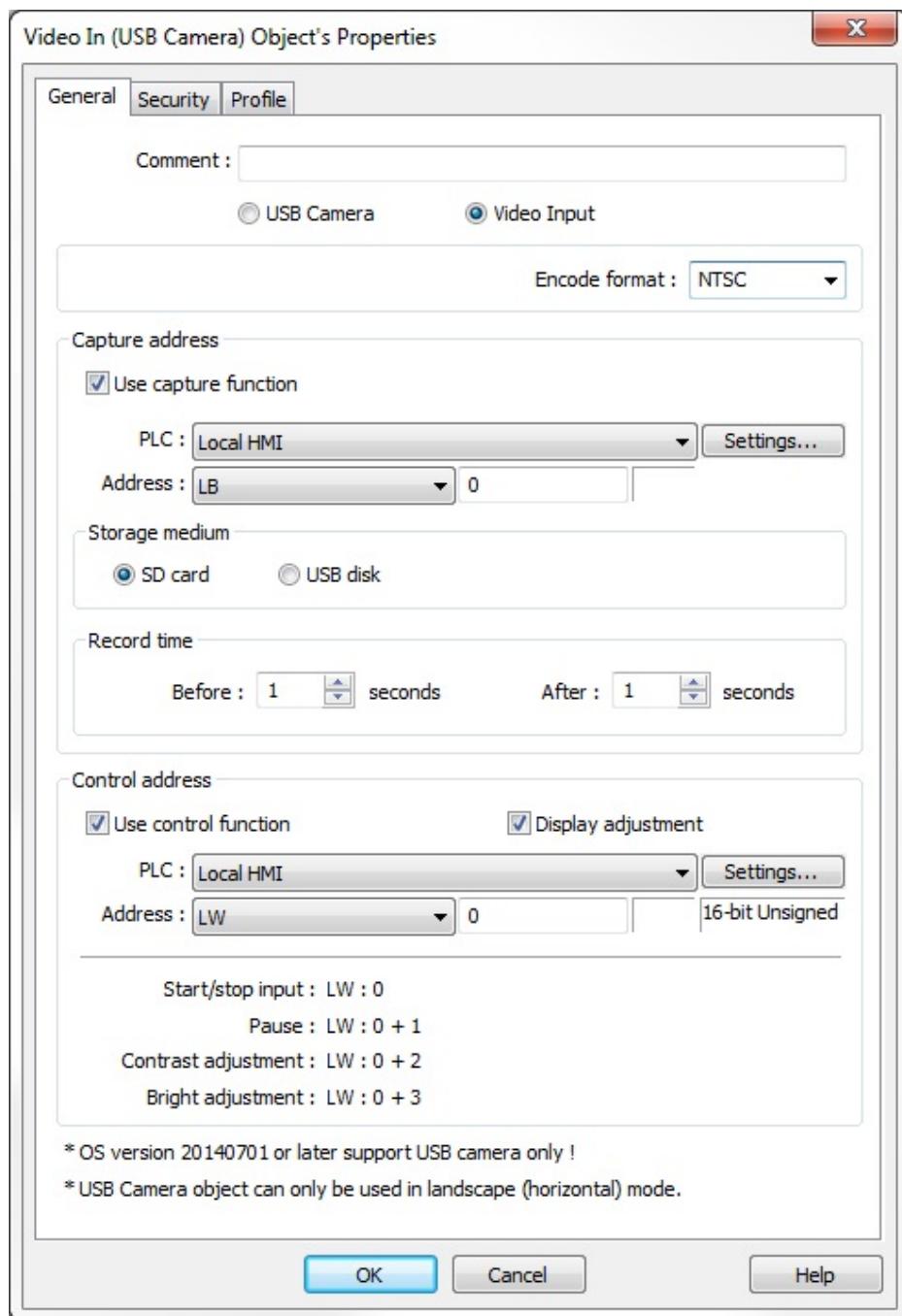
Click the **Preview** tab to load the media file and view the file. If the file plays in the Preview tab, it will play in the simulator and in the HMI.

Video In

The Video In object can display analog video on the HMI5121P and HMI5150P. USB video can be displayed on the HMI5070P/5121P/5150P, and the HMI5121XL/5150XL/5097XL/5097NXL/5097DXL. Analog and USB video have different capabilities.

Analog Video

One of two video input channels can be selected either in the program or dynamically using a PLC register. The composite video inputs can be configured to accept NTSC or PAL video formats. A capture function and a control function can be enabled that allows the value in a PLC register to control and capture images of the video input.

Recommended Format and Resolution

	100% (1:1)	50% (1:2)
NTSC	720 x 480	360 x 240
PAL	720 x 576	360 x 288

A **capture function** allows capturing video images and storing them as *.jpg files on a USB flash drive or SD card. The video capture is triggered by a PLC or local bit (OFF > ON) and can be configured to capture video once per second for a period of time defined by the **Record tim**e. The time **Before** and time **After** define the time period (up to 10 seconds each) before and after the trigger during which the video capture takes place. A buffer memory stores 10 seconds of captured video when the capture function is enabled. The capture function will work even if the video is in Pause mode.

The file format for captured video before and after is:
YYYYMMDDhhmmss.jpg

The file format for captured video at the moment the capture was triggered is:
YYYYMMDDhhmmss@.jpg

USB Video

Video is captured from an external USB camera. The size of the object at runtime may not be the same as what was configured. The Video In (USB) object will resize based on the size of the image from the camera. On the HMI5070P, the maximum size of the object is 340x240 pixels. On the HMI5121P/5150P and HMI5121XL/5150XL, the maximum size is 640x480. The object must be at least 50 pixels from the bottom right corner of the window it is placed on. If the camera is unplugged, the display will go blank. When the camera is re-connected, the display can be restored by using the Control Address, by switching screens, or by restarting the HMI.

When using a USB camera, the capture function can only capture the current moment; it does not have buffering capability. The captured video is saved to SD card only. The file format for captured video is:
YYYYMMDDhhmmss.png

OS versions that support USB camera:
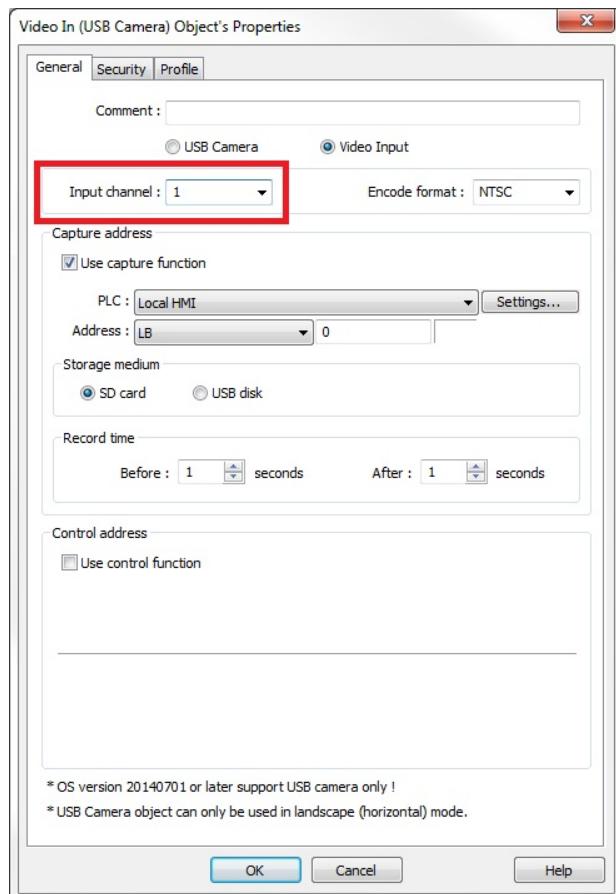
Model	OS Version (or later)
HMI5070P	20140116
HMI5121P/5150P	20140701
HMI5121XL/5150XL/5097XL/5097NXL/5097DXL	20140624
RMI5001	20140807

A **control function** can be enabled that allows the value in a PLC register to control the video input. For example, if the Control address is set to LW-n, where is any LW address, the designated and subsequent addresses will execute the following commands:

Address	Value	Command
LW-n	0	Stop displaying image
	1	Open channel 1 and display the image on HMI
	2	Open channel 2 and display the image on HMI
	3	Open channel 1 but don't display the image on HMI (capture function operable)
	4	Open channel 2 but don't display the image on HMI (capture function operable)
LW-n + 1	1	Pause/resume the video (register resets to 0 after command is executed)
LW-n + 2 *	1-100	Adjust the contrast ratio (analog video only)
LW-n + 3 *	1-100	Adjust the brightness (analog video only)

* **Display adjustment** must be selected.

🗐 If the **Control function** is not enabled, use the **Input channel** field to select the channel to play.

Bar Graph

The Bar Graph Object is used to display register data in a bar graph display. It can be configured to have alarm indicators using different colors on the bar graph to provide a warning when the value in the register is approaching a maximum or minimum allowable value.
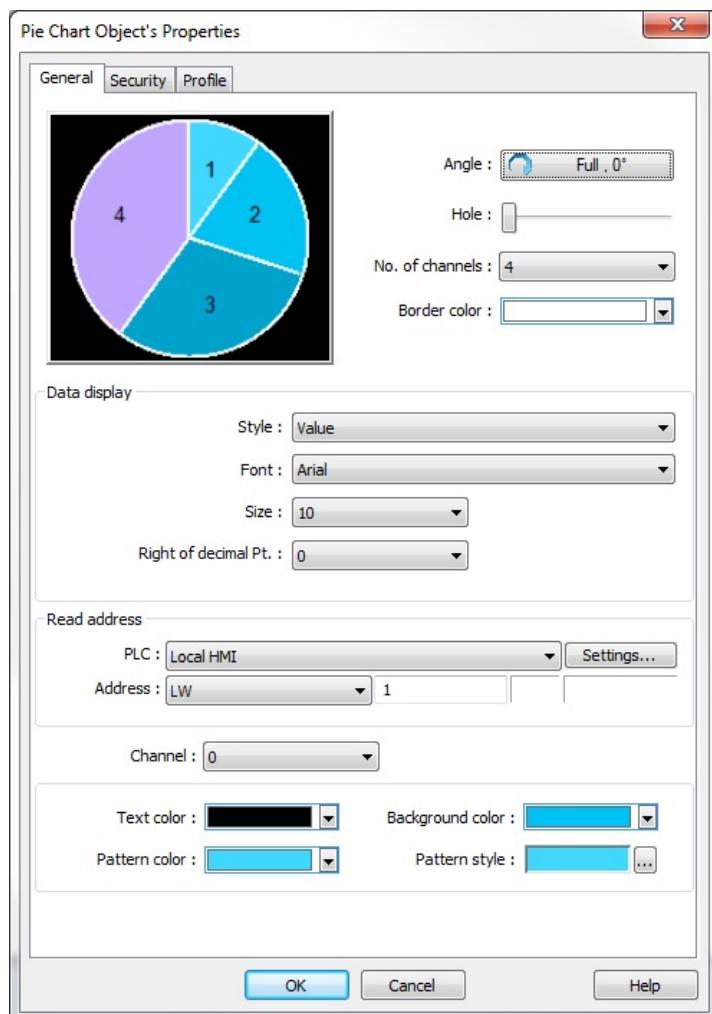
Meter Display

The Meter Display is used to display register data in an angular position on an analog-style meter. The scale (tick marks) can be adjusted around the circumference of the meter and the pointer style can be changed. Scale values can be assigned to the tick marks by assigning a span range (e.g., 0-100).
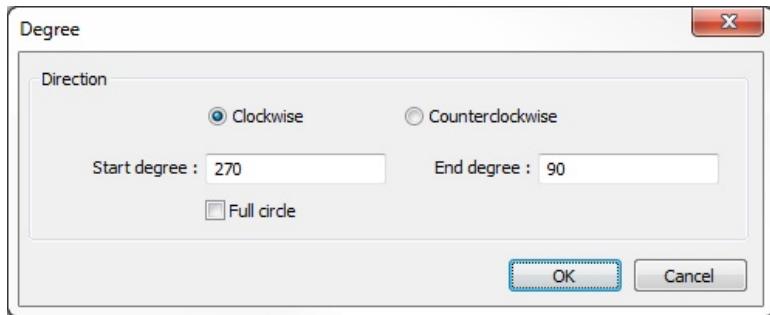
It can be configured to have alarm indicators using different color bars around the inside of the meter to provide a warning when the value in the register is approaching a maximum or minimum allowable value.

Pie Chart

The Pie Chart object can display data from up to 16 consecutive registers as a pie chart. The Pie Chart is divided into segments to illustrate the numerical proportion of the values in the designated channels' addresses. The Pie Chart can display actual values on each slice, percentage, or none.

Angle: The Angle dialog box allows you to determine the start and stop point in degrees (0-359) of the data in the Pie Chart or if it is displayed as a full circle. You can also select whether the data is displayed in a clockwise direction or counterclockwise.

Hole: Use this slider control to adjust the diameter of the center hole in the Pie Chart.

No. of channels: Select from two to 16 channels to display in the Pie Chart.

Border color: Use this color palette to choose the color of the border around the Pie Chart. This is also used to determine the color of the segment lines within the chart.

Style: Select **None** to have no label on the segments of the Pie Chart. With **Value** selected, the actual values contained in the registers is displayed on each segment. You can select the **Font**, **Size** and number of digits **Right of decimal point**. With **Percentage** selected, the percentage of each segment with respect to all of the channels is displayed.

Read address: Select the first address to be displayed. This is for channel 1. The next consecutive address will be channel 2 and so on, up to 16 channels.

Channel: Select each channel and adjust the **Text color, Background color, Pattern color**, and **Pattern style** individually for each channel.
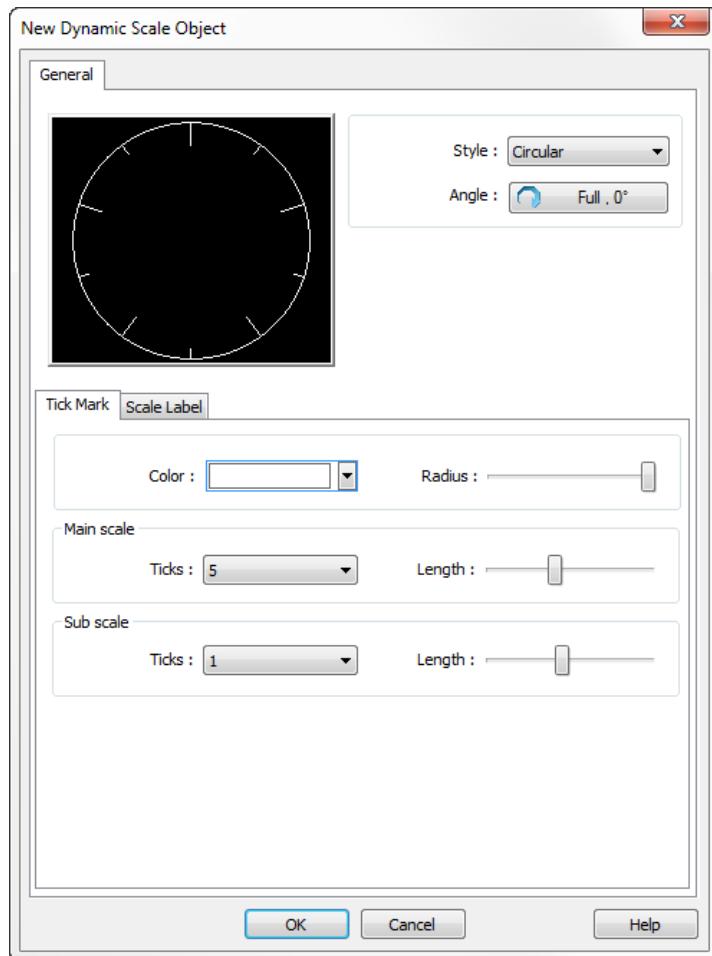
The Pie Chart object is not available for the RMI5010.

Dynamic Scale

The Dynamic Scale object allows the user to create a vertical, horizontal, or circular scale with dynamic or fixed high and low limits. The interior tick mark values are then interpolated based on the number of tick marks, the number of displayed digits, and the high and low values. Click the Dynamic Scale icon on the toolbar or select **Dynamic Scale** from the objects menu to create the object.
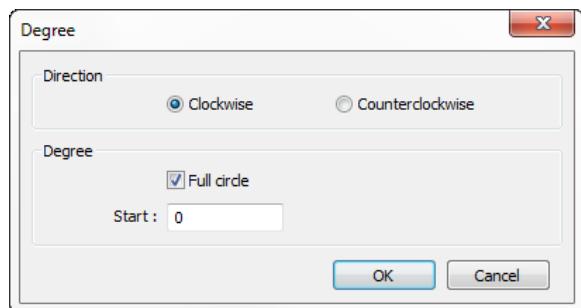
General Tab

Style – From the drop down menu select **Circular, Horizontal,** or **Vertical** to choose the style of scale.

Angle – For **Circular** scales click the **Angle** button to open the **Degree** dialog shown.

Direction – Sets the direction for the scale as either **Clockwise or Counterclockwise.**

Degree – Start sets the value for the starting point of the scale in degrees. When **Full Circle** is unchecked **End** sets the value for the ending point of the scale in degrees.

Tick Mark
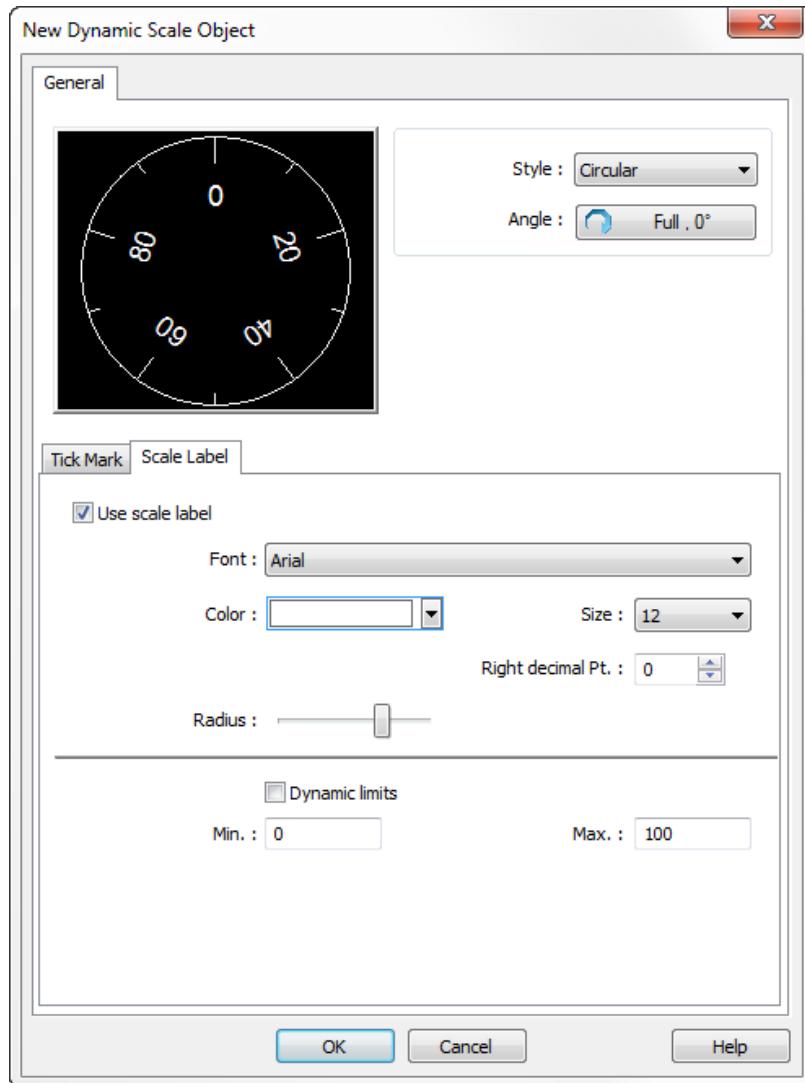
For **Horizontal** and **Vertical** scales the length of the individual tick marks is dictated by the size of the object. To make the tick marks smaller or larger change the size of the object. For the **Circular** scale the radius of the circle, and the length of the major and minor tick marks are adjustable with sliders.

Color – sets the color of the tick marks

Main Scale – sets the number of tick marks for the primary scale. These will have numbers on them.

Sub scale – sets the number of tick marks for the minor scale. These do not have numbers on them.

Scale Label – Circular
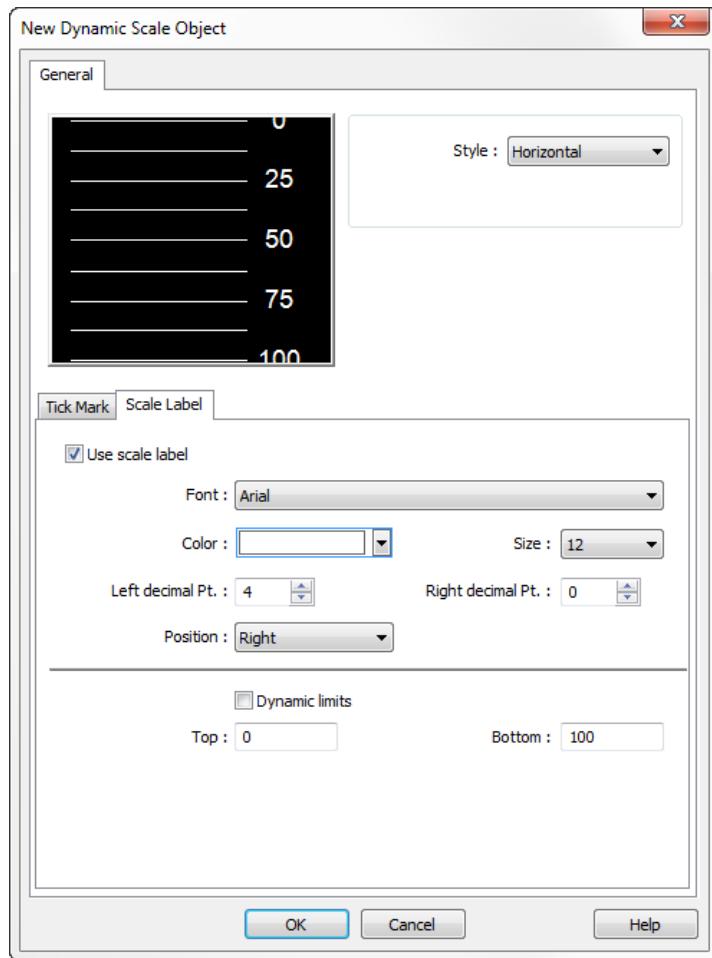
Use scale label – When checked the scale will include numeric labels on the main tick marks.

Font, Color, and **Size –** These adjust the appearance of the scale labels.

Right decimal Pt: - This sets how many digits appear after the decimal point on the scale labels.

Radius – This adjusts the position of the scale labels relative to the total scale radius.

Scale Label – Horizontal/Vertical

Use scale label – When checked the scale will include numeric labels on the main tick marks.
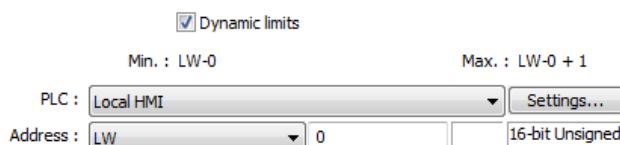
Font, Color, and **Size –** These adjust the appearance of the scale labels.

Left decimal Pt: - This sets how many digits appear before the decimal point on the scale labels.

Right decimal Pt: - This sets how many digits appear after the decimal point on the scale labels.

Position – This sets the position for the scale labels. **Right/left** for **horizontal,** and **top/bottom** for **vertical.**

Dynamic Limits – When unchecked the **Top** and **Bottom** (maximum and minimum) scale values are specified here. When **dynamic limits** is checked the max. and min. values for the scale are read from the specified register and the next address.

Data Block Display

The Data Block Display Object is used to draw line graphs of the data contained in consecutive registers (up to 1024 consecutive registers). In addition, up to 12 individual sets of data can be displayed in the Data Block Display. The line graphs can display data in any supported format, but the data in each graph must be of the same format.

The Y-axis scaling is configured on the **General** tab with the **Minimum** and **Maximum** Limit fields (this defines the bottom and the top of the Data Block Display and should contain the range of data values). The X-axis scaling is configured on the **Display Area** tab in the **Data Samples** field (this defines the number of data samples to plot on a single screen).

The Control address specifies the address to use to control the selected channel (data set). Each channel has its own Control Word address.

XY Plot

The XY Plot Object is used to plot one series of values against another series of values on a line graph.

The direction of the plot is defined in the **Direction** field as follows:

Direction	Result
Right	The origin is at the lower left. The X-axis moves to the right, the Y-axis moves up.
Left	The origin is at the lower right. The X-axis moves to the left, the Y-axis moves up.
Up	The origin is at the lower left. The X-axis moves up, the Y-axis moves to the right.
Down	The origin is at the upper left. The X-axis moves down, the Y-axis moves to the right.

The **No. of channels** field specifies the number of datasets to plot (up to 16 channels).

The **Control Address** specifies the address to use to control how the XY Plot operates. The following values can be written to the Control Address to control the plot:

The **No. of data address** field is automatically assigned to the next consecutive address after the Control Address. It must be loaded with the number of pairs of X-Y data to plot. This value must be set before a trigger value is written to the Control Address. Up to 1023 data points can be plotted per channel.

The **Read address** field is the starting address of the data to plot. Each channel has its own **Read address**. Normally, the X and Y data are read from two consecutive addresses beginning with the Read address. To have the XY Plot use separate addresses for X and Y data, check the **Separated address for X and Y data** checkbox. Separating the X and Y data addresses also allows the X and Y data to have different formats. The first Read address field defines the X-axis data and the second Read address field defines the Y-axis data.

The X-axis and Y-axis scaling is configured in the **Limits** section on the General tab. The Low and High limits define the left-to-right range and the bottom-to-top range for the X-axis and Y-axis respectively.

If **Dynamic limits** is checked, the limits are read from registers.

The appearance of the plot is configured on the **Display Area** tab, including the frame and background color of the display, and the color and width of the plot line. The **Maker** area lets you configure how the data for each channel is plotted:

Line: The data is plotted as a Line graph, with squares plotted at each data point.
Point: The data is plotted as squares at each data point.
X-axis projection: The data is plotted as a line graph (no squares). The plot is filled along the X-axis.
Y-axis projection: The data is plotted as a line graph (no squares) with the X and Y data transposed. The plot is filled along the Y-axis.

The **Reference line** section lets you configure up to four horizontal lines that can be drawn across the plot. Each line can be enabled separately, and can have a unique color and position. The position specified for each line is relative to the values entered in the **Low Limit** and **High Limit** fields. If the **Limit from PLC** box is checked, the reference lines are referenced to the values entered in the specified register addresses (low limit = value in register address; high limit = value in register address + 1).

Recipe View

The Recipe View is used to display recipe data on the HMI screen. The recipes are created on the Recipe tab in the System Parameters and the data is stored in the recipe database file (*.db). Recipe data cannot be edited in the Recipe View table. However, Numeric Input objects can be used to enter or change recipe data by selecting the Recipe Device Type in the address field and selecting the Recipe and Item to be edited. See "Chapter 16 – Recipes" for more information.

Picture View

Displays images stored on an attached SD or USB storage device. This includes screen images captured by the HMI, and stills captured from the video input(s). Supported picture formats include *.jpg, *.bmp, *.gif, and *.png. The file name must contain ASCII characters only; Unicode characters are not supported.

Picture files are displayed in numerical and alphabetical order. In order to have the files displayed in a particular order, add an alphabetical prefix to the file name. For example:
A_name
B_name
C_name
…
AA_name
AB_name
AC_name
etc.
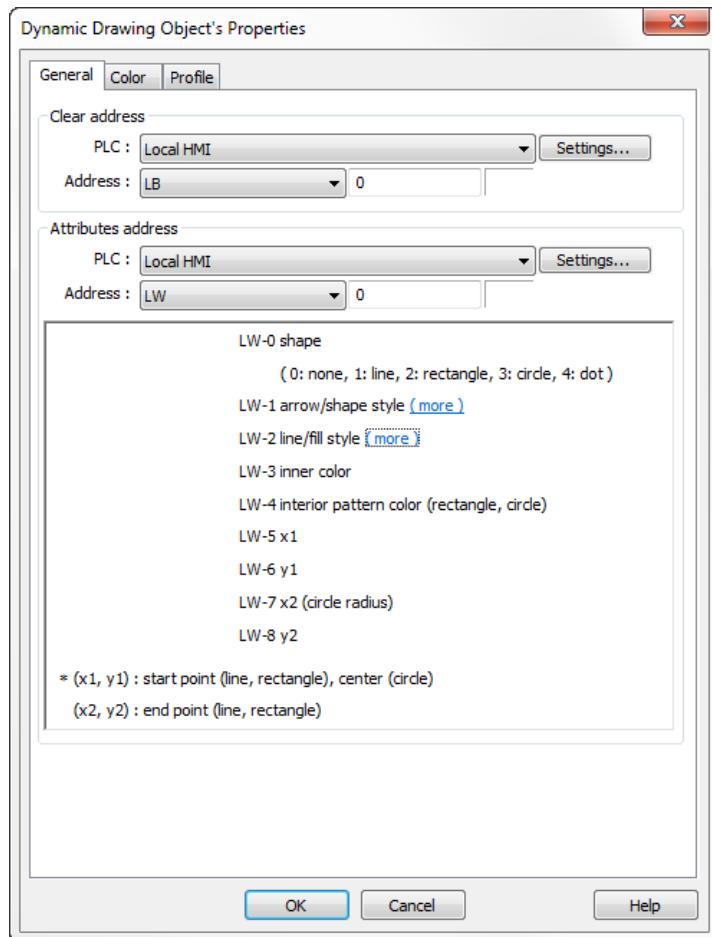
Dynamic Drawing

The Dynamic Drawing object enables drawing a shape in a specified region on the HMI screen. The shapes supported are line, rectangle, circle, or dot. The style, color, and pattern can be adjusted with the Attribute Addresses. When a value is written to the specified Attribute Address (AA-0, Shape) the shape specified by AA-0 is drawn into the drawing area with the attributes specified by the remaining attribute addresses (AA-1 to AA-8)

General Tab

The **Clear Address** specifies the register address used to clear all the contents in the drawing area. When this bit is set to 1 everything in the drawing space is erased.

The **Attribute Address** specifies the register of the first attribute, shape. There are nine attributes in total. They are stored in the specified register and the next eight sequential registers. The following tables gives the location and effect of different attribute settings.
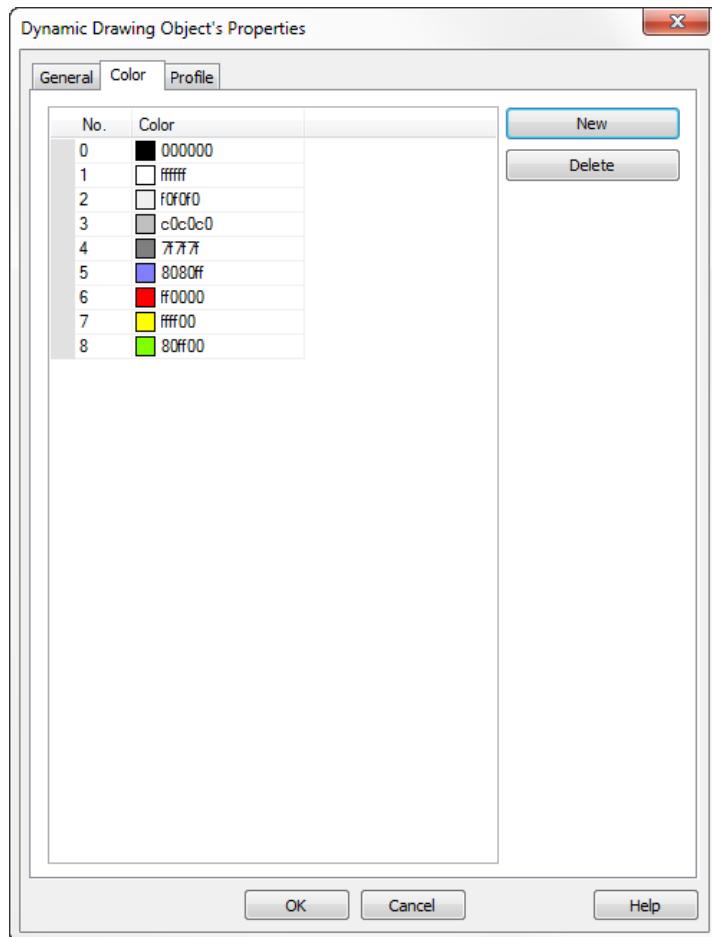
Attributes Address	Attributes Address+0	Attributes Address+1		Attributes Address+2	Attributes Address+3	Attributes Address+4
Default	0	Ones	Tens		Customizable	Customizable
Line	1	0: Non-arrow	0: Small	0: Solid line	Line color	
		1: Single-ended arrow (Hollow)	1: Large	1: Dashed line		
		2: Double-ended arrow (Hollow)		2: Dotted line		
		3: Single-ended arrow (Solid)		3: Dash Dot line		
		4: Double-ended arrow (Solid)		4: Dash Dot Dot line		
				5 and up: Solid line with thicknesses greater than 2		
Rectangle	2	0: Hollow		Drawn in Line mode	Rectangle color	Interior pattern color
		1: Solid		Drawn in Pattern mode		
Circle	3	0: Hollow		Drawn in Line mode	Circle color	Interior pattern color
		1: Solid		Drawn in Pattern mode		
Dot	4				Dot color	

Attributes Address	Attributes Address+0	Attributes Address+5	Attributes Address+6	Attributes Address+7	Attributes Address+8
Default	0				
Line	1	Start point X	Start point Y	End point X	End point Y
Rectangle	2	Left-top point X	Left-top point Y	Right-bottom point X	Right-bottom point Y
Circle	3	Center point X	Center point Y	Radius	
Dot	4	Dot X	Dot Y		

The value of attribute address +2 (AA+2) determines either the line style or pattern mode depending on which shape (AA+0) and style (AA+1) are chosen according the following table.

Color Tab

The color tab allows the user to specify which colors are assigned to the attribute values in inner color (AA+3) and pattern color (AA+4). The nine colors shown are the default values. These can be removed using **Delete** and additional colors can be added from the color palette using **New**.

On the **Profile Tab** the user can modify the position and size of the drawing area placed on the HMI window.

Data Sampling

The Data Sampling Object is used to create Data Logs. A Data Log gathers data that can be saved as History files to the HMIs internal memory, or to a compact flash, SD card, or USB drive (depending on the model). That data can then be displayed in a Trend Display or History Data Display in real-time or historical. The data can then be displayed in a Trend Display in real-time, and data files from previous days can also be displayed in History mode. The History Data Display can also display historical data in a table format.

The data files can also be transferred to a PC and saved in *.csv or *.xls format using the EasyConverter application (included with EZwarePlus).

Note: Every 60 seconds, the HMI checks to see if the size of the updated data file exceeds 4000 bytes. If so, the data file is written to non-volatile memory.

Sampling can be configured to occur periodically (Time-based) with sampling intervals ranging from 0.1 second to 120 minutes, or it can be triggered by the state of a bit (Trigger-based). The **Read address**

defines the starting address of the data samples and the **Data Record** area allows you to configure how many consecutive registers to sample. Up to 40 Data Sampling objects can be created.

The **High Priority** option enables the HMI to place a higher priority updating a Data Sampling object than objects displayed on the HMI screen. This helps to ensure that the sampling time interval is met. Note that enabling the High Priority option on many Data Sampling objects may slow down the update rate for other objects.

The **Data Format** button opens a dialog to configure the format of a data log record. A record is a single line or group of lines of data. Different data formats can be used within the same record. When multiple items are configured in the same record, consecutive addresses are used beginning with the address specified in the **Read address**. The number of registers is determined by the number of items defined in the **Data Format** list and the size of each item (i.e., 16-bit or 32-bit). The first item is read from the specified **Read address**, the next item is read from the address after the **Read Address**, etc.

Note: When creating a Data Sample for use with a multi-pen Trend Object, use the **Data Format** button to configure the data for each of the trend's pens. Each additional item in the **Data Format** list will use the next consecutive address from the specified **Read Address**.

Clear real-time data address: when the specified bit goes into the selected condition, the Real-Time Trend display associated with this Data Sample will be cleared. Logged data will not be affected.
(Not supported in the **RMI5010**.)

Hold address: when the specified bit goes into the selected condition, data collection will pause. Data collection will resume when the bit goes back its original condition.

Save to HMI memory: when checked, historical data will be saved in HMI internal memory.

Save to SD card: when checked, historical data will be saved in the SD card inserted into the HMI.

Save to USB disk: when checked, historical data will be saved in the USB device inserted into the HMI.

☞ To save historical data, one of the *Save to* options must be selected. Only one of the three *Save to* options can be selected. Some HMI units support either USB or SD, but not both.

▤ The **RMI5010** has **Sync. To SD card** and **Sync. To USB disk** options. When the sampled data reaches 10,000 records, the sampled data is automatically saved to the selected external device and the earliest 1000 records are deleted from RMI5010 memory. The sampled data can be sync'd manually by enabling the Control address and writing a '2' to the Control register.

Each File Consists of all Records of a Day: One data file is created for each day. The data file has a file name of the form yyyymmdd.dtl, where yyyy is the four-digit year; mm is the two-digit month (01 for January, 12 for December); dd is the two digit date. A new file is created at midnight. This is the default setup.
(Not supported in the **RMI5010**.)

Customized File Handling: When this mode is selected, a dialog is available that allows the user to specify the name of the log file, as well as when a new file is created. The file name supports 2- and 4-digit year, month, day, year, hour, minute, and second. In addition, static text may be embedded in the name. A new file can be created either when a user-specified bit changes state, or when the log file reaches a preset number of records.
(Not supported in the **RMI5010**.)

Folder Name: Specify the name of the folder in which the log files will be stored on the selected *Save To* device.

File name example: shows the format of the log file name.

Preservation limit: select the number of days of data to keep. Data outside this limit will be deleted.

Trend Display

The Trend Display Object is used to display real-time or historical data collected by the Data Sample Object on a line graph. Up to 20 channels can be displayed on the graph with data collected from consecutive addresses, and with different colors assigned to each channel (pen).

The Y-axis scaling is configured on the **Channel** tab with the **Zero** and **Span** fields (this defines the bottom and the top of the Trend Display and should contain the range of values in the data sample). The X-axis scaling is configured on the **General** tab with the **Distance between data samples** section. There are two options: **Pixel** (number of pixels between samples – **Millimeter** in the RMI5010) and **Time** (sets the width of the entire Trend Display in seconds). Setting the x-axis scaling to a register allows the width of the trend to be adjusted on-the-fly.

When using the **RMI5010**, the x-axis is not adjustable. The display device (**RMI5090** or tablet) supports 'pinch and zoom' functionality.

In **Real-time** mode, data is displayed on the graph as it is generated. In **History** mode, data is plotted from data log files saved in memory. A new data log file is created each day and can be displayed in the Trend Display by changing the value in the History Control register. When the value in the History Control register is 0, the data for today is displayed on the trend. When the value is 1, the data from yesterday is displayed, etc.

⊞ For the **RMI5010**, the Trend Display combines Real-time and History modes. You can select the range of data to display by touching the icon in the upper-right corner of the Trend Display to open the Option window. When using an iPad or smartphone, swipe your finger left and right on the Trend Display to view older or newer data. Use two fingers to zoom in and out on the Trend Display's data.

See "Chapter 12 – Creating Data Sampling Objects and Trend Displays" for more information.

Circular Trend Display

Configuration of the Circular Trend Display is very similar to the Trend Display. It monitors data in single or multiple PLC registers and plots the data on a circular graph (polar coordinate system) where the circumference represents time (angular coordinate) and the radius represents the range of data (radial coordinate).

The **Zoom in/out** register enlarges and reduces the magnification of the object on the HMI screen. The maximum size is 10 times larger. If a larger number is entered, it will remain at 10x. When magnified, use the scroll controls to navigate around the Circular Trend Display.

⊞ The Circular Trend Display is not supported in the **RMI5010**.

History Data Display

The History Data Display Object is used to display historical data collected by the Data Sample Object in a table format. Up to 16 channels of data can be displayed from consecutive addresses, and can be any mix of data types (e.g., 16-bit unsigned, 16-bit signed, 32-bit float, etc.).

Note: The **History files** section in the Data Sampling Object must have a box checked (e.g., **Save to HMI memory**) and a **Folder name** defined in order for the data files to be stored and displayed in the History Data Display.

The History Control register is used to select the historical data file to display. When the value in the History Control register is 0, the data for today is displayed in the table. When the value is 1, the data from yesterday is displayed, etc.

Event (Alarm) Log

The Event (Alarm) Log Object is used to configure alarms and events. Select one of the **History files** checkboxes to save alarm/event files in HMI memory or to an SD card or USB flash drive. This is used when an Event Display is configured for History mode. The Preservation limit lets you limit the number of history files to save. A new file is created each day with the filename EL_yyyymmdd.evt where yyyy=year, mm=month, and dd=day. For example, the file for June 12, 2010 would be EL_20100612.evt.

The **RMI5010** has **Sync. To SD card** and **Sync. To USB disk** options. When the Event Log data reaches 10,000 records, the data is automatically saved to the selected external device and the earliest 1000 records are deleted from RMI5010 memory. The Event Log data can be sync'd manually by enabling the Control address and writing a '2' to the Control register.

Click the **New** button to create a new alarm/event. An alarm/event can be triggered by a bit or a word. The **Notification** field can be configured to set or clear a bit when the alarm is triggered. The **Follow** option resets the Notification bit automatically when the alarm/event has returned to its normal state.

The **Message** tab allows you to enter a message that will appear in the Alarm Bar, Alarm Display, or Event Display when the alarm/event is triggered. The **Write value for Event Display object** is used to enter a window number that is written to the Write address configured in the Event Display object. This window number is used by an Indirect Window configured to popup when an alarm/event is acknowledged.

For HMI5000 models with the audio line-out option, a sound can be played when the alarm/event is triggered. Click the **Enable** button and select a sound from the Sound Library.

The **WATCH** addresses can be used to display the data in up to four registers in messages. Click the **Syntax** button to see how to configure the message to display the data.

See "Chapter 13 – Capturing Alarms and Events" for more information.

Alarm Bar

The Alarm Bar Object is used to display alarms detected by the Alarm (Event) Log Object. It displays the alarm message for each current alarm in a single horizontal scrolling line across the Alarm Bar's display. Only the most recent alarm appears in the Alarm Bar.

Alarm Display

The Alarm Display Object is used to display alarms detected by the Alarm (Event) Log Object. It displays the alarm message for each alarm in a table format arranged in chronological order. All current alarms are displayed in the Alarm Display and are removed from the list once the alarm condition is cleared.

An Alarm Acknowledge function can be enabled, which provides a **Write address** for the Alarm Display. Each alarm/event can be acknowledged by touching the message in the Alarm Display. A different color can be assigned for the **Acknowledge** status.

An Indirect Window can be configured to popup when the alarm/event is acknowledged to provide additional information to the operator on how to proceed. The Indirect Window should be placed on the same window as the Alarm Display. The window number is configured in the Alarm (Event) Log's **Message** tab (**Write value for Event Display object**) and is written into the **Write address** assigned in the Event Display.

Event Display

The Event Display Object is used to display alarms or events monitored by the Alarm (Event) Log Object. Events can be displayed in **Real-time** or **History** mode. In **Real-time** mode, each alarm/event can be acknowledged by touching the alarm/event in the Event Display. Different colors can be assigned for the **Acknowledge** and **Return To Normal** statuses.

 For the **RMI5010**, the Event Display combines Real-time and History modes. You can select the range of events to display by touching the icon in the upper-right corner of the Event Display to open the Option window. When using an iPad or smartphone, swipe your finger up and down on the Trend Display to view older or newer data.

An Indirect Window can be configured to popup when the alarm/event is acknowledged to provide additional information to the operator on how to proceed. The Indirect Window should be placed on the same window as the Event Display. The window number is configured in the Alarm (Event) Log's **Message** tab (**Write value for Event Display object**) and is written into the **Write address** assigned in the Event Display.

In **History** mode, alarm/events from previous days can be displayed. The **Write address** changes to **History Control** address, and the value in the History Control register determines which historical data is displayed. When the value in the History Control register is 0, the data for today is displayed in the Event Display. When the value is 1, the data from yesterday is displayed, when the value is 2, the data from two days ago is displayed, etc. Use the Option List configured for "Source of item data: Dates of historical data" to select the day by date.

Check **Enable reading multiple histories** to display events from more than one day at a time. There are two modes:

> With **Number of days** selected, the value entered in the History control register determines the starting day (most recent, where 0 = today) and the value in the History control register + 1 determines the number of days of data to display (including the starting day). If three days are selected, but only two event files are included within the three day period, only two event files will be displayed.

> With **Index of the last history** selected, the value entered in the History control register determines the starting day (most recent, where 0 = today) and the value in the History control register + 1 is the number of event files to display. This setting is not dependent on the date and the Event Display will display the designated number of event files from most recent to oldest.

> The Event Display can display up to 4MB of historical data. If the combined file size of the selected historical data exceeds 4MB, the most recent data is displayed and the oldest data beyond 4MB is not displayed.

Select **Enable event management** to control which events to display or hide, and allow users to delete selected events.

Data Transfer (Trigger-based)

The Data Transfer (Trigger-based) Object is used to transfer word-based data from the specified Source address(es) to the specified Destination address(es). This can be used to transfer data from one device to another.
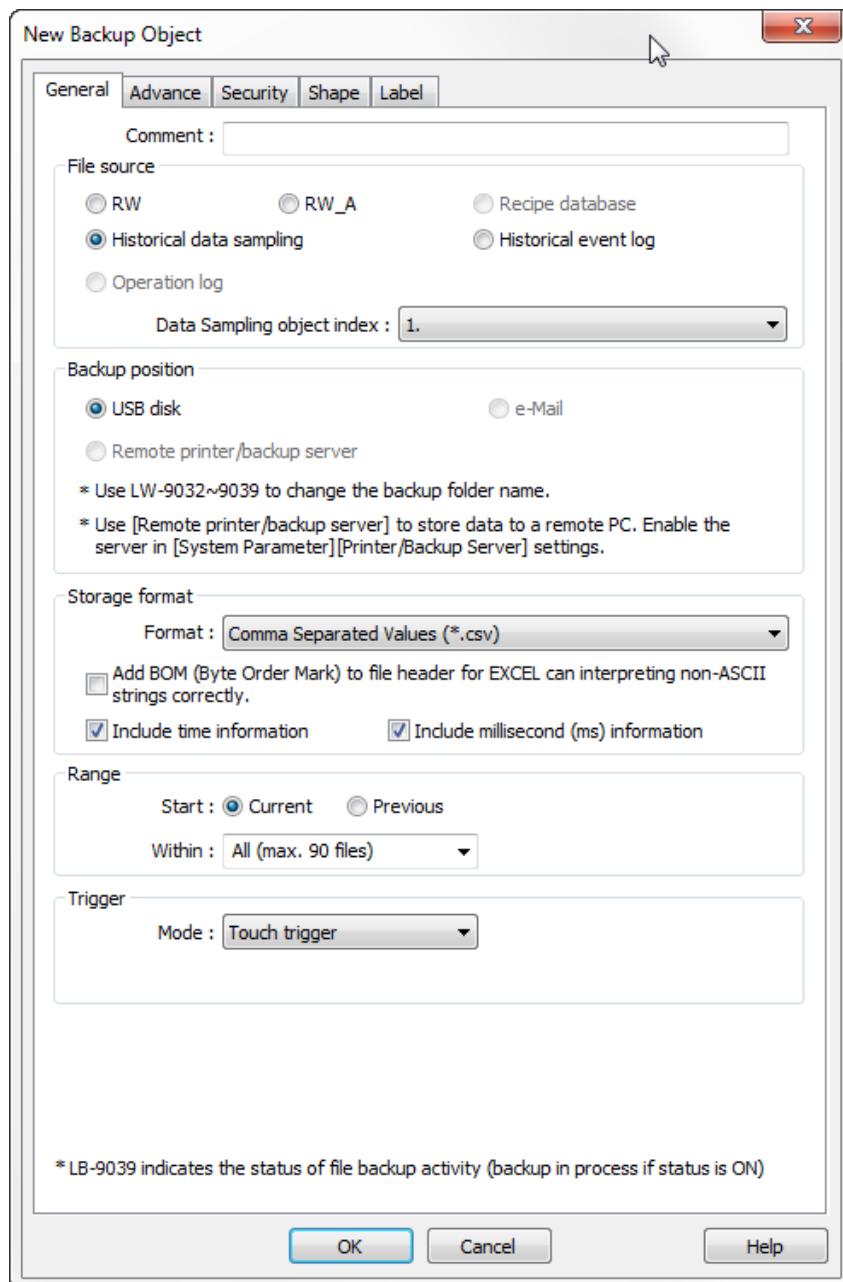
The **Source** and **Destination** address fields define the starting addresses, and the **No. of words** field specifies how many consecutive addresses are transferred. The data transfer can be triggered by touch (**Touch trigger** mode) or by an external or internal bit (**External trigger** mode).

Backup

The Backup Object is used to copy recipe files (*.rcp or *.db), event log files (*.evt), data log files (*.dtl or *.db), and operation log files (*.db) from the HMIs internal memory to a USB flash drive, SD card, or a PC running EasyPrinter connected via Ethernet. If the e-Mail function is enabled in the System Parameters, files can be emailed to a list of recipients with the Backup object.

☞ The L Series do not support SD cards.

▦ Since the event log files and data log files in an **RMI5010** can be sync'd to a USB flash drive or SD card, email is the only option available for backing up these files with the RMI5010.

New Backup Object

General | Advance | Security | Shape | Label

Comment :

File source

- ○ RW
- ○ RW_A
- ○ Recipe database
- ⦿ Historical data sampling
- ○ Historical event log
- ○ Operation log

Data Sampling object index : 1.

Backup position

- ⦿ USB disk
- ○ e-Mail
- ○ Remote printer/backup server

* Use LW-9032~9039 to change the backup folder name.

* Use [Remote printer/backup server] to store data to a remote PC. Enable the server in [System Parameter][Printer/Backup Server] settings.

Storage format

Format : Comma Separated Values (*.csv)

☐ Add BOM (Byte Order Mark) to file header for EXCEL can interpreting non-ASCII strings correctly.

☑ Include time information   ☑ Include millisecond (ms) information

Range

Start : ⦿ Current   ○ Previous

Within : All (max. 90 files)

Trigger

Mode : Touch trigger

* LB-9039 indicates the status of file backup activity (backup in process if status is ON)

[OK]   [Cancel]   [Help]

When **Historical event log** or **Historical data sampling** is selected, the historical event logs or data logs can be saved in their native file formats (*.evt or *.dtl respectively) or in *.csv format. When **Comma Separated Values (*.csv)** is selected, you can choose whether or not to include a **Byte Order Mark (BOM)** to the file header (used to signal the order of bytes in a text file) and whether or not to **Include time information** in the data log file**.** If include time information is selected you also have the option to **include millisecond (ms) information**.

The event log file contains five columns; *Event, Category, Date, Time, Message*. The **Event** column indicates the type of event as follows:

	A	B	C	D	E
1	Event	Category	Date	Time	Message
2	0	1	2013/7/4	16:12:11	Event A
3	2	1	2013/7/4	16:12:12	Event A
4	0	0	2013/7/4	16:12:33	Event B
5	2	0	2013/7/4	16:12:36	Event B
6	0	0	2013/7/4	16:12:37	Event B
7	1	0	2013/7/4	16:12:37	Event B
8	2	0	2013/7/4	16:12:39	Event B
9	0	0	2013/7/4	16:12:40	Event B

0 = Event is triggered
1 = Event is acknowledged
2 = Event returned to normal

🖅 Use EasyConverter to open an event log file (*.evt), data log file (*.dlt), or SQLite database file (*.db; RMI5010).

The range of history files can be selected and the backup can be triggered by touch (**Touch trigger** mode), by an external or internal bit (**External trigger (bit)**), or by an external or internal word (**External trigger (word)**).

When **External trigger (word)** is selected for the Trigger Mode, the following registers control the Backup, allowing the operator to define what files are backed up:
Trigger address: When the value changes from 0 to 1, the backup is triggered. When the backup is complete, the Trigger address is automatically reset to 0.
Trigger address + 1: Defines the start day for the backup.
Trigger address + 2: Defines the range of days to backup (maximum 90 days).
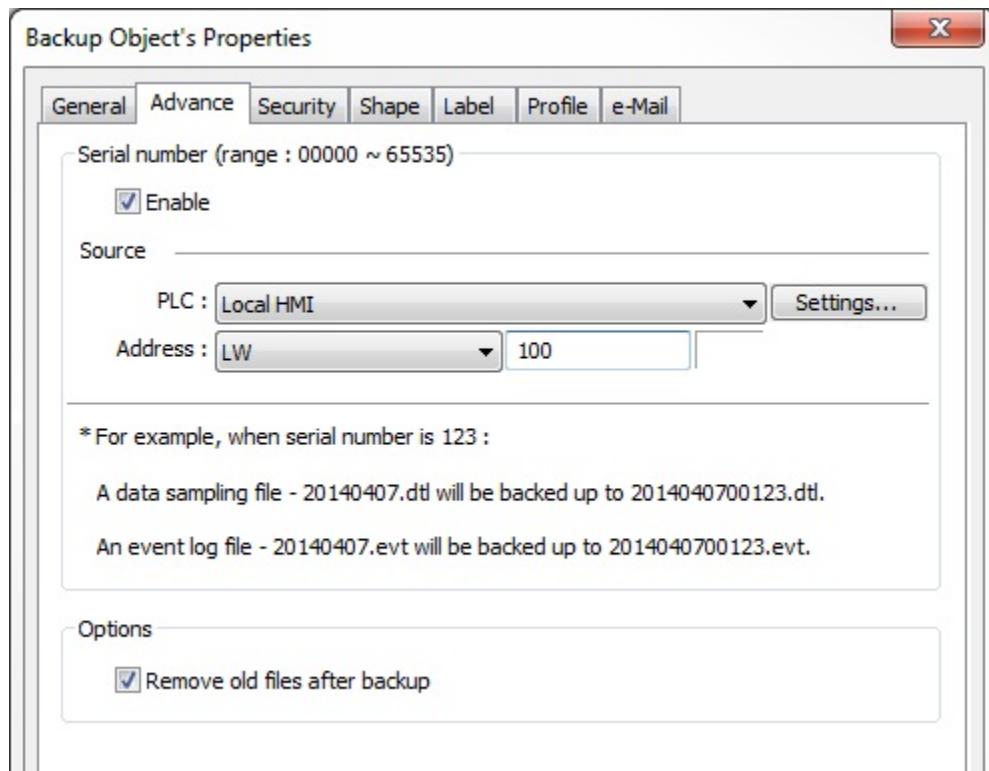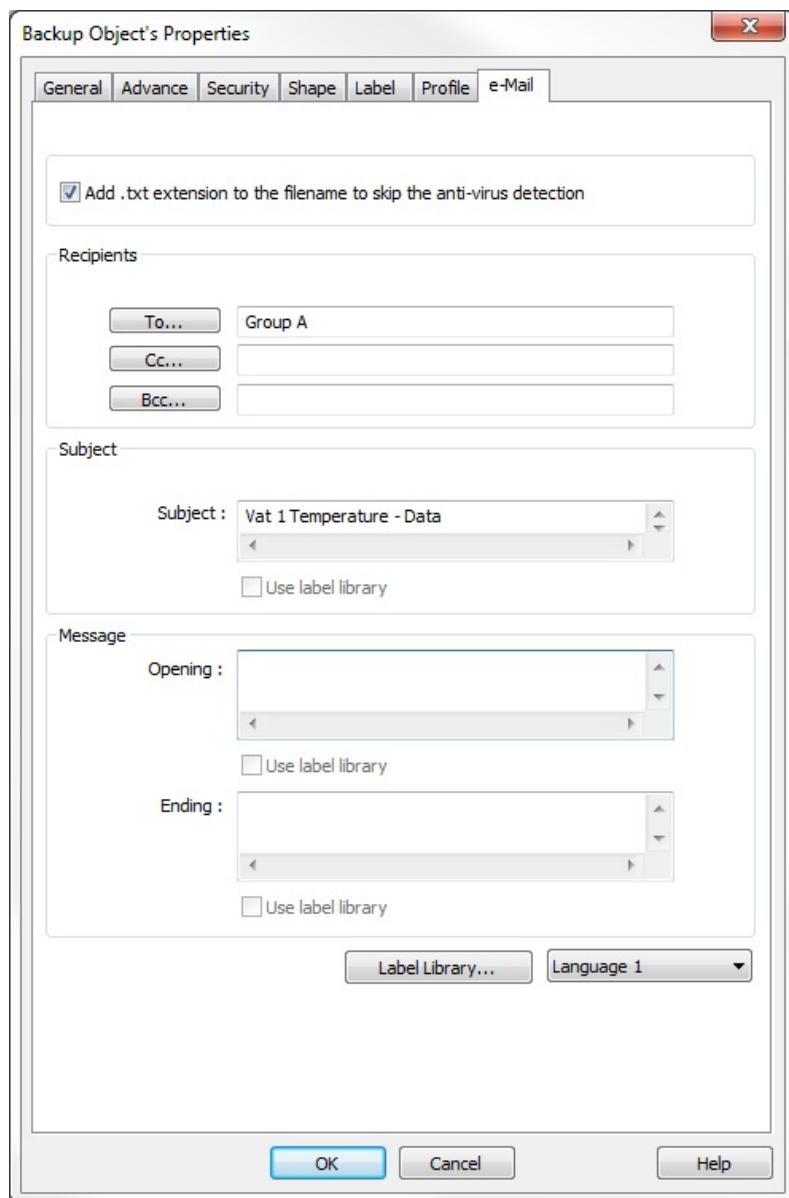
When the backup process starts, local bit LB-9039 is set. When the backup is complete, local bit LB-9039 is reset.

The **Advance** tab provides the option of adding a 5-digit serial number to the name of the file being backed up, with a range of 00000 – 65535.

The value contained in the **Source** register is appended to the backup filename, after the date code but before the file extension. The 5-digit serial number is padded out to five digits with leading zeros if the number is below 10000. Select **Remove old files after backup** to delete old history files after backup.

🗐 The native *.dtl or *.evt **Storage format** must be selected in order to enable the serial number option.

🗐 If the Remote printer/backup server is selected for the Backup position, the option to Remove old files after backup is disabled.
(Use HMI Remote Printer/Backup Server must be enabled on the Printer/Backup Server tab in the System Parameters in order for this backup option to be available.)

🗐 The **Advance** tab is not available for the RMI5010.

If **e-Mail** is selected for the **Backup position**, click on the **e-Mail** tab to configure the recipients of the email as well as the Subject line and message.

Select **Add .txt extension to the filename to skip the anti-virus detection** if the intended recipient's email server blocks the file attachment.

Timer

The Timer Object is used to control an output bit based on the state of an input bit and a measurement bit that is controlled by a preset time. There are five different configurations or modes for the timer including On Delay, Off Delay, Pulse, Accumulated On Delay, and Accumulated Off Delay.

When placed on a base window, the timer object is active only when that window is showing on the HMI. When placed on the Common Window (Window 4), the timer object is active at all times, regardless of which window is displayed on the HMI.

▤ With the **RMI5010**, the Timer Object runs in the background and is active at all times.

PLC Control

The PLC Control Object is used to perform a number of background tasks. Click the **New** button to set up a control object. Click **Type of control** to open a drop-down box with the following options:

Change Window

This causes the HMI to close the currently-displayed Base Window, and display the Base Window whose number is in the specified **Trigger address**.

The Change Window action occurs only when the HMI detects a *change* in the value of the specified Trigger Address. After the window is changed, the HMI will write the number of the newly-displayed window to (Trigger Address +1).

Note: Several options are available in the **Attribute** section.

Active only when designated window opened: This option removes the global feature of the **PLC Control Object** so the trigger address is only monitored by the HMI when the selected window is open. It also changes how the **PLC Control Object** handles an unchanged trigger address. By default the **PLC Control Object** is always monitoring the trigger address and only looks for a change in the data to call a new base window. When a designated window is selected, the **PLC Control Object** checks the trigger address each time the designated window is opened and will change to the screen in the trigger address regardless of whether it has changed.

Turn on Back Light: This overrides the screen saver option in the HMI and turns on the backlight when the PLC object calls a new screen.

Clear Data after window changed: This option clears the trigger address back to 0 when the window is changed. This allows the **PLC Control Object** to call the same window again in the future. Since the **PLC Control Object** is looking for a change in the trigger address, leaving the last selected window number in the trigger address would prevent the **PLC Control Object** from calling that same window again. If **Active only when designated window** is also selected the trigger address will be read each time that the designated window is opened, so clearing the data is necessary to prevent the **PLC Control Object** from triggering each time the designated window is selected.

Use window no. offset: This option allows the user to designate a numeric offset to the selected window number. For example, if the PLC writes a 20 to the trigger address and the offset is set at -2, then window 18 (20-2) would be called on the HMI.

Write data to PLC (current base window)

When the HMI initializes, and when the Base Window changes (for any reason), the number of the new Base Window is written to the PLC Register specified by the **Trigger address**.

General PLC Control

Executes a data transfer of up to 32 words from the HMI to the PLC or from the PLC to the HMI when the value in the Trigger Address is set to a valid operation code. After the operation is complete, the HMI sets the value in the Trigger address to 0. A total of four values are needed to configure the General PLC Control attribute.

Note: The HMI will transfer data to/from the Device Type specified by the Trigger address.

It is recommended that the data in (Trigger Addr + 1), (Trigger Addr +2), and (Trigger Addr +3) be set before writing the Operation Code to (Trigger Addr).

(General PLC Control is not supported in the **RMI5010**.)

Backlight Control (Write Back)

Allows the PLC to control the HMI's backlight via the bit specified in the Trigger address. Once the requested operation has been performed, the HMI will reset the bit.

Note: The PLC Control Object may be configured with two *Backlight Control (Write Back)* items, with different bits for the On and Off control. The backlight can then be controlled directly from the PLC.

(Backlight Control (Write Back) is not supported in the **RMI5010**.)

Backlight Control

Operates the same as the *Backlight Control (Write back)* attribute described above, but the HMI will *not* reset the bit specified in the Trigger address.
(Not supported in the **RMI5010**.)

Sound Control

Plays the selected sound when the bit specified by the Trigger address matches the trigger mode conditions.
(Not supported in the **RMI5010**.)

Execute Macro Program

Executes the designated macro when triggered by the bit specified in the Trigger address.
Note: Only available when a macro has been created in the project.

Screen Hardcopy

Prints the specified window when the bit specified by the Trigger address matches the trigger mode conditions. The **Source window for print** option provides the following selections:

Current base window: When the trigger occurs, the window currently displayed on the HMI is printed.
Window no. from register: When the trigger occurs, the window number is read from the specified register; the window is displayed and printed.
Designate window no.: The window is selected from a list during project development. When the trigger occurs, this pre-selected window is displayed and printed.

The **Printer** field allows you to select the destination for the screen hardcopy: a printer attached to the HMI, an SD or USB device, or the Remote Printer Server. If an SD or USB device is selected, the file is saved as a JPEG image, named as <yymmdd>_nnnn, where nnnn is a four-digit serial number. If the **Customized File Handling** option is checked, the Settings button appears and allows customization of the file name and the folder in which the file is stored.

(Screen Hardcopy is not supported in the **RMI5010**.)

Data Transfer (Time-based)

The Data Transfer (Time-based) Object is used to transfer bit-based or word-based data from the specified **Source** address(es) to the specified **Destinatio**n address(es) at periodic intervals. The interval is adjustable from 0.5 to 25.5 seconds, in 0.1 second steps.

The **Address type** selects whether the data transferred is word or bit, and the **No. of word/No. of bit** field specifies how many consecutive addresses are transferred. The **Source** and **Destination** address fields define the starting addresses.

Note: When transferring bits, bits can only be transferred to the local HMI's internal memory. It is not possible to transfer bits to a remote HMI or another PLC.

System Message

The System Message is used to customize the content of system-generated messages.

Confirmation required: Message that is displayed when confirmation of an operation is required.
Deny write-command: Message that is displayed when the HMI Monitor Mode is turned ON with LB-9196.
Allow write-command: Message that is displayed when the HMI Monitor Mode is turned OFF with LB-9196.

Scheduler

The Scheduler is used to change a bit or a word based on a time schedule. Each scheduled action can have a start time and an end time. Up to 32 items can be entered in the Scheduler list.

Power-ON start/end action: Determines the action to perform when the HMI is turned ON.
When checked: If the HMI is turned ON within the scheduled time range, the start action is performed immediately. If the HMI is turned ON outside of the scheduled time range, the end action is performed immediately (if enabled).
When unchecked: If the HMI is turned ON within the scheduled time range but after the start time, the start action is not performed but the end action is performed (if enabled). If the HMI is turned ON outside of the scheduled time range, no action is performed.

Action modes include **Bit ON**, **Bit OFF**, or **Word write.**
Bit ON: Start action sets the **Action address** bit. End action clears the **Action address** bit.
Bit OFF: Start action clears the **Action address** bit. End action sets the **Action address** bit.
Word write value settings – Constant: Start action writes the **Start value** into the **Action address register.** End action writes the **End value** into the **Action address** register.
Word write value settings – Address: Start action writes the value stored in the designated register into the **Action address register.** End action writes the value stored in the designated register+1 into the **Action address** register.

Note: The end action is only available when **Enable termination action** is checked on the **Time Set** tab.

Click the **Time Set** tab to configure the start and end times for the scheduled action. When **Constant** is selected, the action is configured to occur on the specified days at the specified times. Multiple days can be selected. If the start and end times need to span several days, select the **Setting on individual day** checkbox.

When **Address** is selected, the start and end times are determined by values in 11 consecutive registers beginning with the designated **Time setting address**.

Operation Log

The Operation Log records inputs by operators. When security is enabled, the Operation Log can track which operator made which inputs. Refer to "Chapter 17 – Operation Log" for details.

(Not supported in the **RMI5010**.)

File Browser

The File Browser displays folders, CSV files only, or all files within the selected folder on an SD card or USB disk. When different folders are selected, the file list updates for that folder. Some objects can use the selected file.

General tab

Folder Path Address: When enabled, the selected folder is represented as ASCII text in the specified series of registers. If a path is entered into the specified address, the File Browser will update to show the contents of that path. If selected, **Full (folder + file name) Address** should not be selected.

File Name Address: When enabled, the selected file is represented as ASCII text in the specified series of registers. If a file name is entered into the specified address, the File Browser will select that file if it exists. If selected, **Full (folder + file name) Address** should not be selected.

Full (folder + file name) Address: When enabled, the selected path and file are represented as ASCII text in the specified series of registers. If a path and file name are entered into the specified address, the File Browser will select that file if it exists. If selected, **Folder Path Address** and **File Name Address** should not be selected.

(The File Browser is not supported in the **RMI5010**.)

Outline tab

File Position: select whether the File Browser should reference the SD device or the USB device. The available selections will vary with the HMI in use.

File Type: select whether the File Browser should show CSV files only, or all files.

Background: select the color of the background of the object.

Color: select the color of the object's border.

Recipe Import/Export

The Recipe Import/Export object allows recipe data to be exported to a comma-separated variable file, or imported from a comma-separated file. Multiple import/export items can be configured, so that different recipe tables can be used with different locations on SD and USB storage devices. The Recipe Import/Export object does not require placement on a window.

New: create a new import/export item (see below).

Delete: delete the selected import/export item.

Settings: edit the selected import/export item (see below).

When the New or Settings button is clicked, a configuration dialog is displayed.

File Position: Select whether the CSV file is located on an SD or USB device. Some HMI units support only the USB device.

Recipe: select which recipe table is to be imported or exported. The recipe table must already exist in the HMI recipe database.

Control address: specify a PLC or HMI local address to manage the import/export.
The following values are supported:
1: Import
2: Export, but do not overwrite an existing file
3: Export, and allow overwrite an existing file

The HMI will reset the register to 0 when the operation is finished. Additionally, the two consecutive addresses after the specified address have functionality:

[Control Address + 1]: Status, 0=Idle, 1=Busy
[Control Address + 2]: Result, 1=Success, any other value is an error. Please refer to the EZwarePlus Help system for the meaning of specific values.
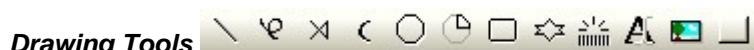
File name address: specify a PLC or HMI local address to contain an ASCII data string representing the CSV *file* name.

Include folder path: if checked, the path of the file will also be included in the string, and the *Folder path setting* will not be available.

Folder path address: if **Include folder path** is not checked, specify a PLC or HMI local address to contain an ASCII data string representing the CSV *folder* name.

(The Recipe Import/Export is not supported in the **RMI5010**.)
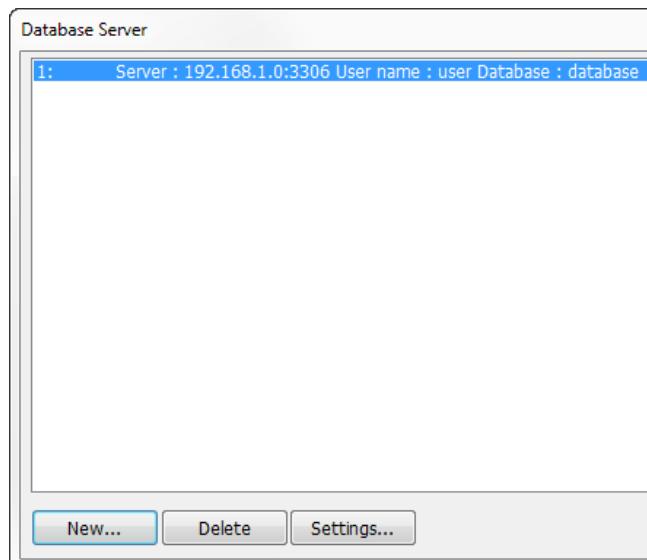
Drawing Tools

Includes Line, Arbitrary Line, Link Line, Arc, Ellipse/Circle, Pie, Rectangle, Polygon, Scale, Text, Picture, Shape.

Refer to the Help file for instructions in using each individual drawing tool (Help > Parts List > By Function > Drawing Objects).
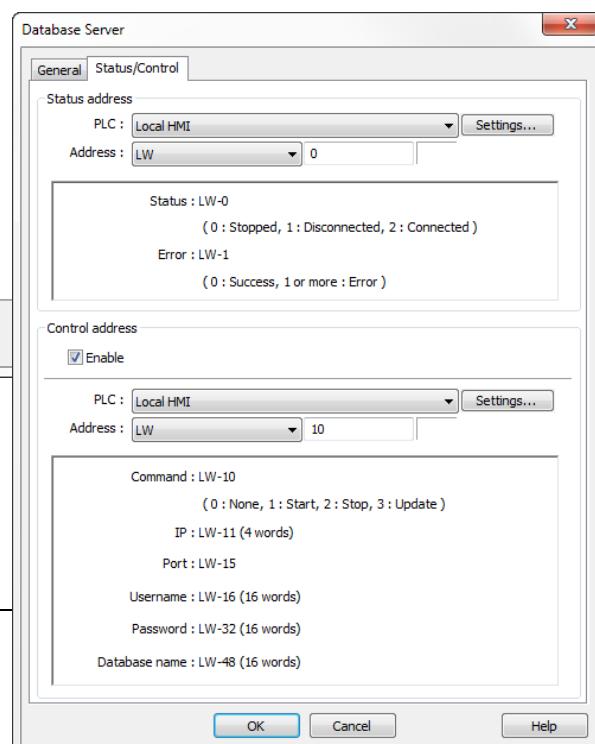
Database Server

The database server object enables the HMI to connect to a MySQL database server on a PC to send sampled data or event logs to the MySQL database.

Click the **Database Server** icon on the toolbar, or select **Objects –> Database Server**, to open the **Database Server** dialog and create a new server object.

Click **New** to create a new server object. This opens the **Database Server** object. Click **Settings** to modify the settings of an existing server object.

General Tab

IP – Enter the IP address of the database.

Port – Enter the port number of the database.

Username – Enter the username for connecting the database. The maximum is 32 words.

Password – Enter the password for connecting the database. The maximum is 32 words.

Database Name – Enter the name of the database for collecting historical data.

Address Tab

Status Address

> **LW-n:** Displays the connection status of the Database Server.

Value	Description
0	Not attempting to connect to database
1	Failed to connect to database
2	Connection succeeded

LW-n+1: Error indicator

Value	Description
0	No error
1 or more	An error occured

Control Address

LW-n: Controls the operation of the database server.

Value	Description
0	Ready
1	Start
2	Stop
3	Update

LW-n+1: Sets the IP address of the database.

LW-n+5: Sets the port number of the database.

LW-n+6: Sets the username for connecting the database.

LW-n+22: Sets the password for connecting the database.

LW-n+38: Sets the name of the database.

If sampled data is successfully synchronized to the SQL database, three tables will be generated in the database. The sampled data is saved in the *_data table.

Table	Description
<HMI NAME>_<DATALOG NAME>_data	Saves data sampling
<HMI NAME>_<DATALOG NAME>_data_format	System folder
<HMI NAME>_<DATALOG NAME>_data_section	System folder
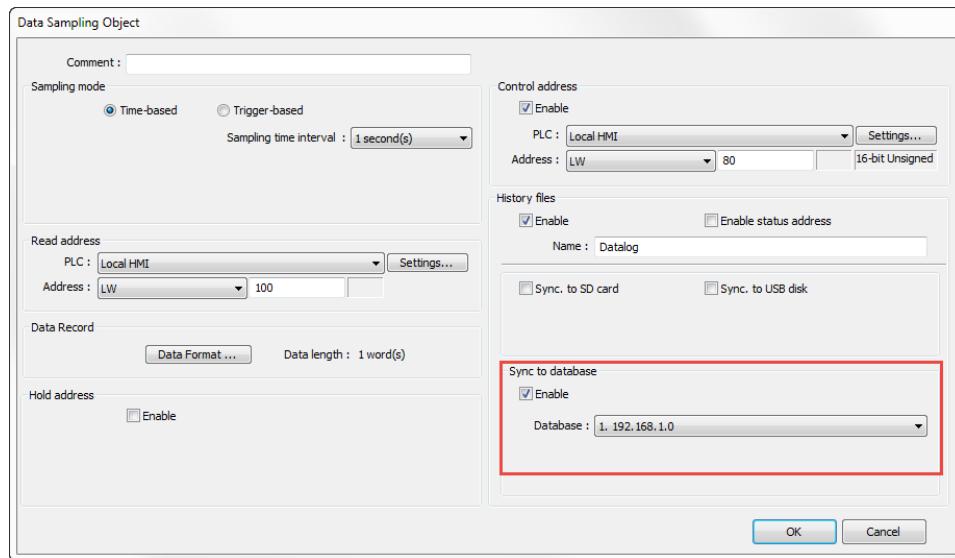
When synchronizing event logs the following three tables will be generated in the database. The event log is saved in the *_event table.

Table	Description
<HMI NAME>_event	Saves event log
<HMI NAME>_event_log	System folder
<HMI NAME>_event_update_time	System folder

If the content of the data sampling/event log is changed, such as data format or event message, please delete the tables listed above before backing up the database.
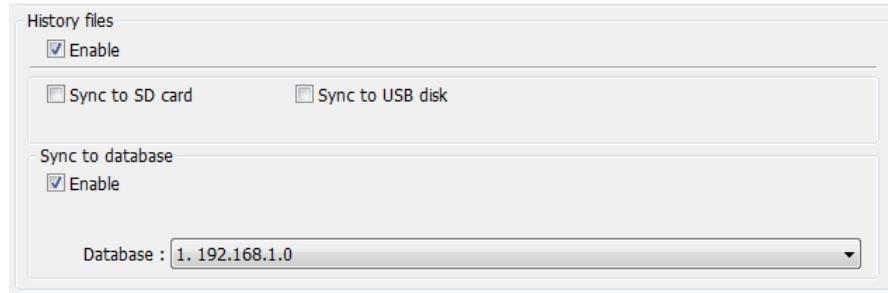
Data Sampling Object

When configuring a **Data Sampling Object** that will be backed up to the SQL database check **Enable** in the **Sync to Database** section and select the **Database** to back up to.

Event (Alarm) Log

When configuring the **Event (Alarm) Log** to be backed up to an SQL database, first check the **History files Enable** check box then check **Enable** the **Sync to Database Enable** checkbox and select the **Database** to back up to.
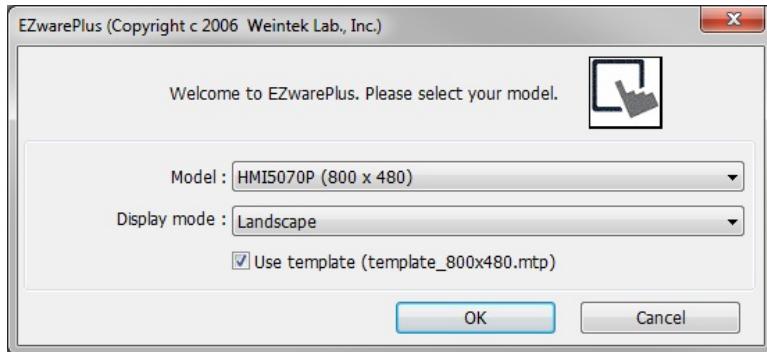

Managing Projects

Like most Windows™ application software, EZwarePlus will open, save, close, and print files using the standard windows format.

File Menu

To create a new project

1. On the **File** menu, click **New** or click the **New** icon in the Standard toolbar. The EZwarePlus dialog box appears.

2. Select the HMI model that you intend to use with your project and whether you want to use the HMI in Landscape or Portrait mode. Select the **Use template** checkbox to open the project with the default template for your selected model.

3. Click **OK**. The System Parameter Settings window opens next. Refer to the **Help** menu "How Do I… Set Up a PLC or Controller in EZware?" to configure the devices in the Device List. You may also jump ahead to *System Parameter Settings.* Click **OK** to accept the settings.

To open an existing project:

1. On the **File** menu, click **Open** or click the Open icon in the Standard toolbar. The Open dialog box appears.

2. Click on the project file you intend to open.

3. Click **Open**. The main screen of EZwarePlus appears with the initial screen of the project displayed.

To close a project:

1. On the **File** menu, click **Close**.

2. If changes have been made to the project file, EZwarePlus will ask you if you would like to save the project. Then the main screen of EZwarePlus will remain but with no work area displayed. You must now use the **Open** or **New** commands to edit a project.

To save an existing project:
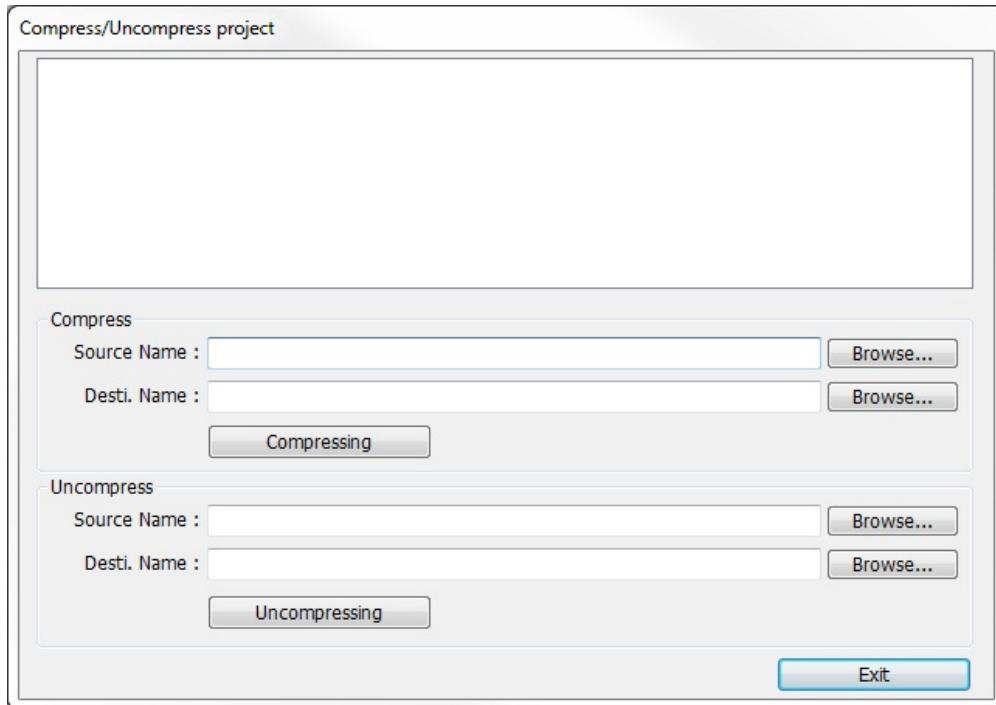
1. On the **File** menu, click **Save** or click the Save icon in the Standard toolbar.

2. If the project already has a name, then the project will automatically be saved. If this is a new project, then the **Save As** dialog box appears.

3. Enter a file name and then click **Save**.

4. The main screen of EZwarePlus reappears.

To save a project using the compress feature:

The compress feature allows you to save a project in compressed format so that the project data takes less space on your hard drive. This utility also will save the graphics libraries associated with the project into the compressed file. This facilitates sending a copy of the project to another person who has EZwarePlus in order to open and download the project into an HMI. It is also the best way to archive and backup your projects when you have completed them.

⊞ The compress feature doesn't save the fonts used in the project. It is best to use common Windows True Type fonts (or the HMI True Type fonts) in your project so that if it is opened on another computer, EZwarePlus will have access to the same fonts.

1. From the **Tools** menu, select **Compress/Uncompress**.... The Compress/Uncompress Project dialog box appears.

2. In the Compress box under **Source Name**, select the project (*.emtp) file that you wish to compress. The file must have a *.emtp or *.cmtp extension.

3. Click **Compressing…** to begin. The utility will compress the project file and all related graphics libraries into a single file with a *.ecmp extension.

To extract a compressed project file:

1. From the **Tools** menu, select **Compress/Uncompress...**. The Compress/Uncompress Project dialog box appears.

2. In the Uncompress box under **Source Name**, select the project (*.ecmp or *.ccmp) file that you wish to uncompress.

3. Click **Uncompressing…** to begin. The utility will extract the project file (*.emtp or *.cmtp) and all graphics libraries from the compressed file.

Note: It is a good idea to back up your Library folder before uncompressing a *.cmp/*.ecmp/*.ccmp file because the uncompress utility will overwrite any existing library files with the same name. You also have the option not to overwrite existing files, and in most cases this is okay unless the project being uncompressed uses modified libraries with the same names as the standard libraries in the Library folder.

To exit EZwarePlus:

On the **File** menu, click **Exit** or click on the standard windows Close icon in the upper right corner.

Display Options

A number of toolbars are available in EZwarePlus that provide quick access to tools and functions in the software.

View Menu

Select the toolbars that you want to display in EZwarePlus under the **View** menu. These toolbars can be moved around within the EZwarePlus window by clicking and dragging on the left edge of the toolbar.

Standard Toolbar:

Includes New, Open, and Save project; Cut, Copy, Paste, Undo, Redo, Print, About, Help, Find/Replace, Redraw, Grid, Snap, Display Common Window, Display Underlay Window.

Project Toolbar:
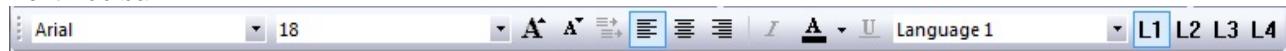
Includes Compile, On-line Simulation, Off-line Simulation, Download, Build data for USB disk or CF/SD card download, Reboot HMI, Data/Event Log Converter, Address Viewer, Easy Watch, Administrator Tool, Recipe Database Editor, cMT Viewer.

Library Toolbar:

Includes Save Objects to Shape Library, Call up Shape Library, Call up Picture Library, Save to Group Library, Call up Group Library, Sound Library Manager, Label Library Manager, Address Tag Library Manager, Macro, Recipe Records.

Text Toolbar:

Includes Font Name, Font Size, Big Font, Small Font, Label Position Tracking, Left Alignment, Center Alignment, Right Alignment, Italic, Text Color, Underline, Language (L1, L2, L3, L4).

Edit Toolbar:
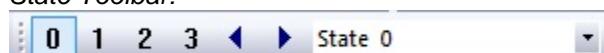
Includes Top Layer, Bottom Layer, Previous Layer, Next Layer, Vertical Center in Window, Horizontal Center in Window, Nudge Up, Nudge Down, Nudge Left, Nudge Right, Decrease Height, Increase Height, Decrease Width, Increase Width, Align Left, Align Horizontal Center, Align Right, Align Top, Align Vertical Center, Align Bottom,

Space Evenly Across (Horizontally), Space Evenly Down (Vertically), Make Same Width, Make Same Height, Make Same Size, Make Same Color, Flip Vertical, Flip Horizontal, Rotate, Pinned, Group, Ungroup, Go to destination window, Next Object, Zoom (%).

State Toolbar:

Select the state to view multistate objects in the development window. The objects will appear on the window as they would in the selected state.

Draw Toolbar:
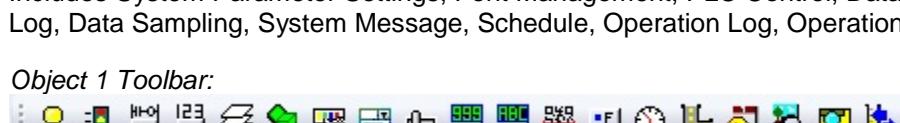
Includes Select, Properties, Line, Free Line, Linked Line, Arc, Ellipse/Circle, Pie, Rectangle, Polygon, Scale, Text, Picture, Shape.

PLC Toolbar:

Includes System Parameter Settings, Font Management, PLC Control, Data Transfer (Global), Event (Alarm) Log, Data Sampling, System Message, Schedule, Operation Log, Operation Log Printing.

Object 1 Toolbar:

Includes Bit Lamp, Word Lamp, Set Bit, Set Word, Combo Button, Toggle Switch, Multi-State Switch, Option List, Slider, Numeric, ASCII, QR Code, Function Key, Timer, Flow Block, Date/Time, Picture View, File Browser, Recipe Import/Export.

Object 2 Toolbar:
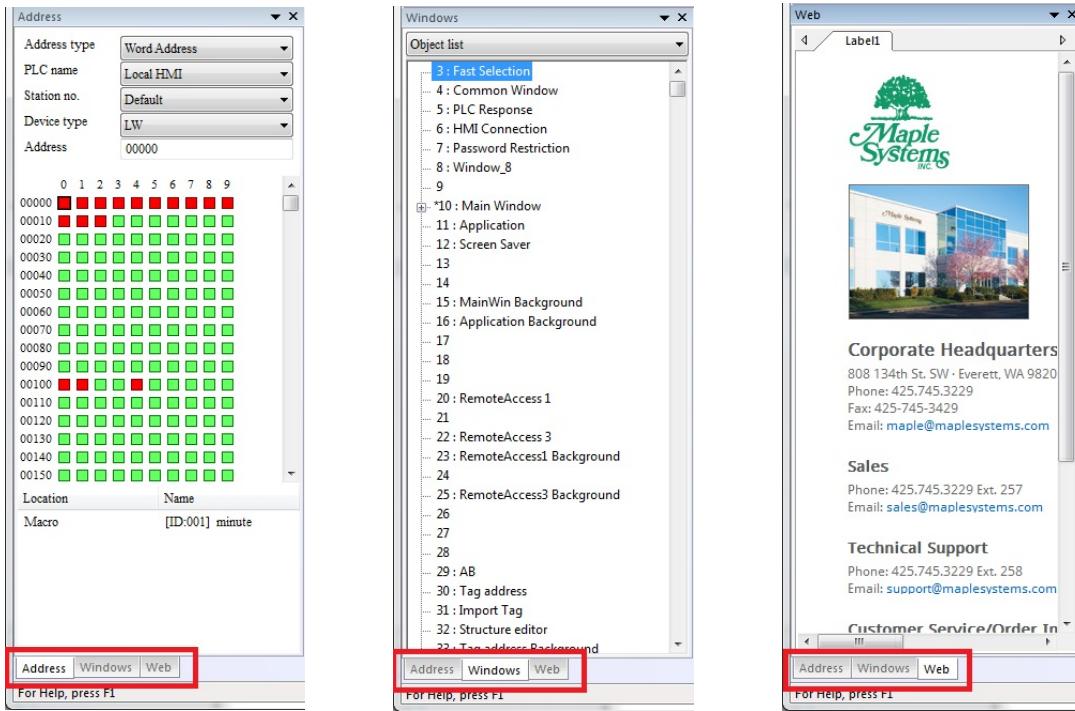
Includes Indirect Window, Direct Window, Moving Shape, Animation, Bar Graph, Meter Display, Pie Chart, Trend Display, Circular Trend Display, History Data Display, Data Block Display, XY Plot, Recipe View, Operation Log View, Alarm Bar, Alarm Display, Event Display, Data Transfer (Trigger-based), Backup, Media Player, Video In.

Window Tree, Address Grid, Web Bar:
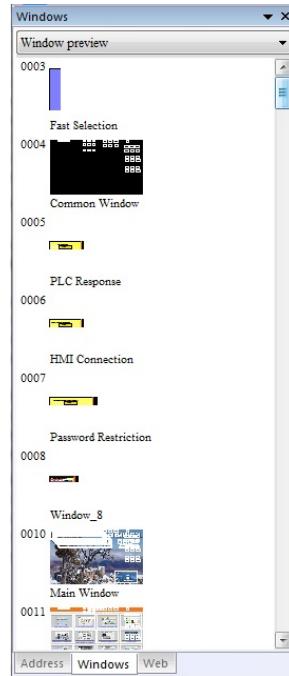
EZwarePlus provides a Window Tree that can be used to easily maneuver among windows of a project. It also allows you to select any object that is on the window that is currently displayed.

‣ *To display/hide the Window Tree:*
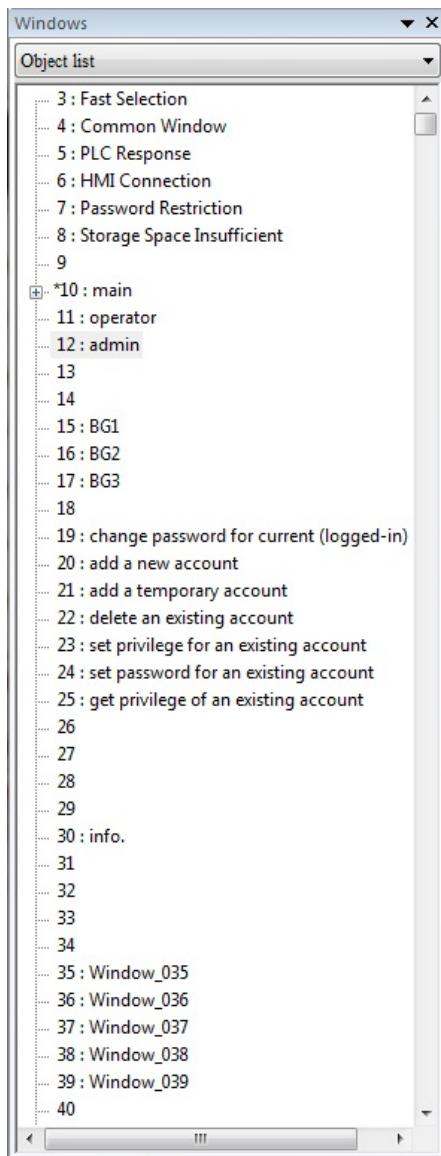
1. On the **View** Menu, click **Window Tree**.

2. When the Window Tree, Address Grid, and Web Bar are enabled in the **View** menu, you can select which view is on top by clicking on the tabs at the bottom of the side bar.

3. At the top of the Window Tree, there is a drop-down box that allows you to select either **Object List** or **Window Preview**. The **Window Preview** displays thumbnail views of each of the windows in the project.
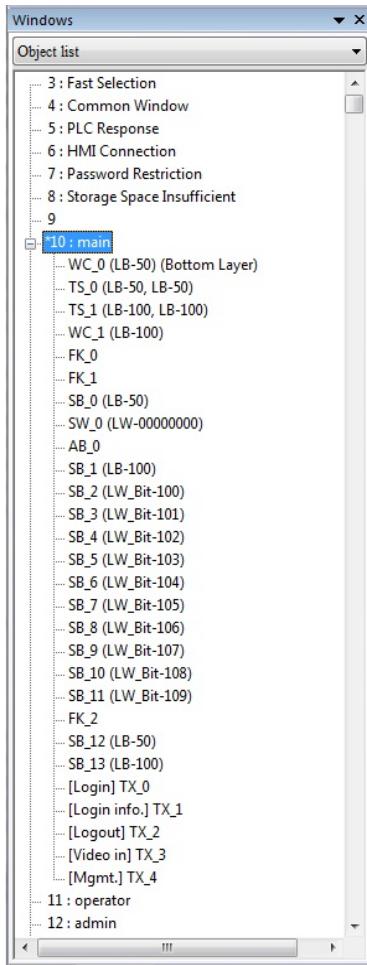
4. The **Object List** combines a list of all of the windows in a project, and all of the objects on each window, into a single tree. Notice that the tree displays the title for each window next to the window number. This makes it easy to determine the windows that have been created for a project. An asterisk (*) next to a window indicates that the window is currently open.

5. To display an open window, click on the *window number* in the Window Tree. To display a window that is not yet open, double-click on the *window number*. This will automatically open the window and display it.

6. To change any settings or close an open window, click on the *window number* to select it. Then right-click anywhere inside the Window Treebar to display a popup dialog box. Select **Close** to close the window or **Setting** to change any of the window settings.

7. Finally, to create a new window click on any window number that is not currently used. Then, right-click inside the Window Tree and select **New**.

Using the Window Tree to change object attributes:

1. On the Window Tree, click the small plus sign [+] adjacent to any window number. The tree will expand to list the objects on that window, as shown:

2. The Object ID of each object will be listed. For example, WC_0 is Direct Window #0, TS_0 is Toggle Switch #0, etc.

3. To highlight a particular object on the screen, click on the Object ID in the list. This allows the quick selection of a particular object, especially on crowded screens or screens where objects may be overlapping.

4. To display the object's attribute dialog box, double-click the *Object ID* in the Window Tree.

Zoom:

To zoom in on the selected window:

1. Use the zoom pull-down menu in the Edit Toolbar. Zoom levels range from 50% to 200% in 25% increments.

2. On the **View** menu, select **Zoom Level**. Zoom levels range from 50% to 200% in 25% increments.

3. Use the **Zoom In** and **Zoom Out** selections to zoom in and out in steps of 25% increments.

Option Menu
Grid/Snap

One display option is to have the work area covered with grid lines. These grid markings can be helpful when trying to align objects that are created on the work area. If Grid Display is selected, you can adjust the dimensions of the grid points on the window.
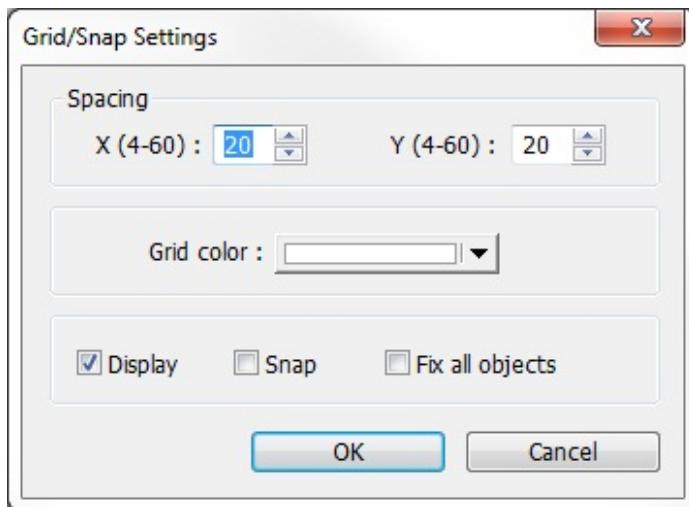
Turning the Grid on and off:

1. On the **Option** menu, click **Grid/Snap**.

2. Click the Display box or click the Grid icon in the Standard toolbar to turn the grid on and off.

▤ If you still don't see the grid after you have enabled it, make sure that the color of the grid doesn't match the background color of the window currently displayed.

Changing the grid size and color:

1. On the **Option** menu, click **Grid/Snap**.

2. Select the **X spacing** and **Y spacing** for grid size.

▤ Spacing is measured in pixels.

3. Select the **Grid color** in the drop-down menu.

If you enable the Grid on the work area, you may also take advantage of a useful feature called **Snap**. The Snap option causes all objects placed into the work area to fall along the boundaries set by the grid lines. The Snap option can help provide a more ordered appearance to graphics objects.

Using the snap option:

1. The Grid option must be enabled.

2. On the **Option** menu, click **Grid/Snap**. The Grid/Snap Settings dialog box appears.

3. Click the **Snap** checkbox.

4. Click **OK**.

Finally, you will find that you can move objects by selecting them with the mouse cursor and dragging them to a new location. However, you may find it difficult to select an object *without* accidentally moving it just a little. At times this may be frustrating, so you may wish to disable the move feature using the mouse and only move an object by changing its X and Y position parameters in the Profile tab of the object's attributes box. This is the intent of the Fix all objects feature.

To enable the fix all objects command:

1. On the **Option** menu, click **Grid/Snap**. The Grid/Snap Settings dialog box appears.

2. Click the **Fix all objects** checkbox.

3. Click **OK**. Movement by mouse cursor is now disabled.

Preferences
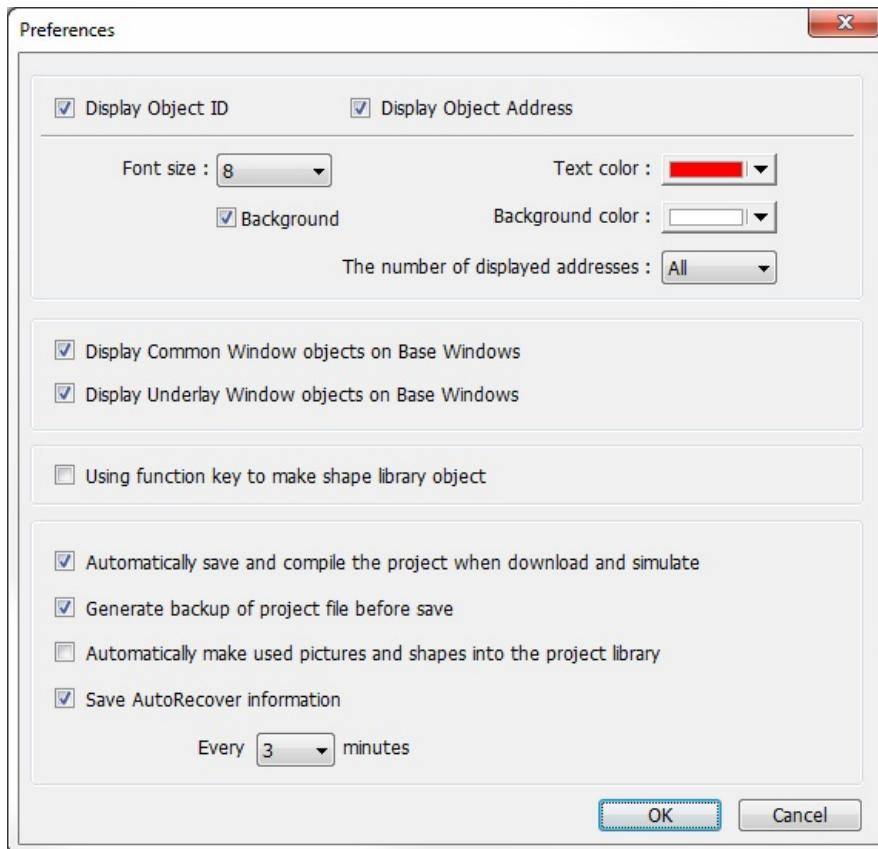
Display Object ID:

Every time you create a new object in EZwarePlus, an Object ID tag is assigned to the new object. This is done for several reasons:

- Object ID tags are required by EZwarePlus to differentiate each object created.
- If an error occurs during the compile process, EZwarePlus can refer to the window and object ID to indicate the object that is causing problems.

To enable/disable displaying Object ID tags:

1. On the **Option** menu, click **Preferences**. The Preferences dialog box appears.

2. Click the **Display Object ID** checkbox to display ID tags. This will cause the Object ID number to
    appear on each object in the project for easy identification.
    🖅 The Object ID will *not* appear on the object when the project is downloaded to an HMI.

3. Select the **Font size** and **Text color** for the ID tags.

4. Click **OK**.

The **Preferences** dialog also has the following options:

> **Display Object Address:** When selected, the address that is assigned to objects in EZwarePlus will
> appear on each object in the project. If more than one address is assigned to some of the objects,
> you can select how many of the addresses will appear on the object with **The number of displayed
> addresses** option.

> **Display Common Window objects on Base Windows**: When unchecked, objects on the Common
> Window will not appear on base windows in the EZwarePlus development screens. Objects on the
> Common Window will always appear on the base windows when the project is downloaded to the
> HMI. Check this to enable viewing the Common Window objects on the base windows in the
> development screens.
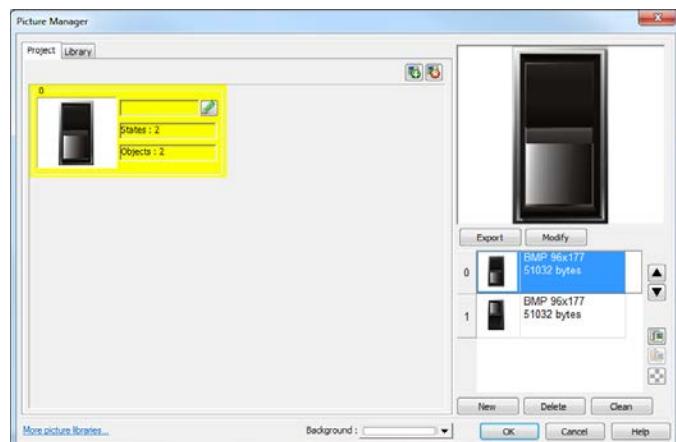
> **Display Underlay Window objects on Base Windows**: When unchecked, objects on Underlay
> Windows assigned in the base window's settings will not appear in the EZwarePlus development
> screens. Objects on the assigned Underlay Windows will always appear on the base windows when
> the project is downloaded to the HMI. Check this to enable viewing the Underlay Window objects on
> the base windows in the development screens.

> **Using Function key to make shape library object**: Allows shapes to be placed inside the area
> defined by a Function Key before being imported into a Shape library. This allows a shape to occupy
> any position inside a shape library cell. See "Help > How Do I…Add a New Shape or Picture into the
> Libraries?" for more information.

> **Automatically save and compile the project when download and simulate**: This option causes
> EZwarePlus to automatically save and compile the project when a simulation is started or prior to
> commencing a download to the HMI.

> **Generate backup of project file before save**: This option causes EZwarePlus to automatically
> save a backup of the project when saving changes. Up to three backup projects will be saved with
> the extensions *.bak1, *.bak2, and *.bak3.

> **Automatically make used pictures and shapes into the project library**: When selecting a picture
> or shape to represent an object on the object's Shape tab, the picture or shape is simply linked to
> the project from the selected library file. Selecting this option will place the picture or shape onto the
> Project tab in the Picture Manager or Shape Manager. Once it is placed on the Project tab, the
> picture or shape is stored in the project file (*.emtp or *.cmtp).

Save AutoRecover information: When checked, EZware will automatically save the project at the specified time interval (3 to 10 minutes). A backup file is not created. If the **Generate Backup** option is checked, a backup is only created when **File > Save** is selected.

Basic Editing Commands

Edit menu

Using the Undo [icon] *and Redo* [icon] *commands:*

1. The **Undo** command is used to cancel the last command or action that you made.

    From the **Edit** menu, click **Undo** or click the Undo icon from the **Standard Toolbar**. You can also press **CTRL+Z**. The deleted text box reappears.

2. The **Redo** command is used to cancel the **Undo** command.
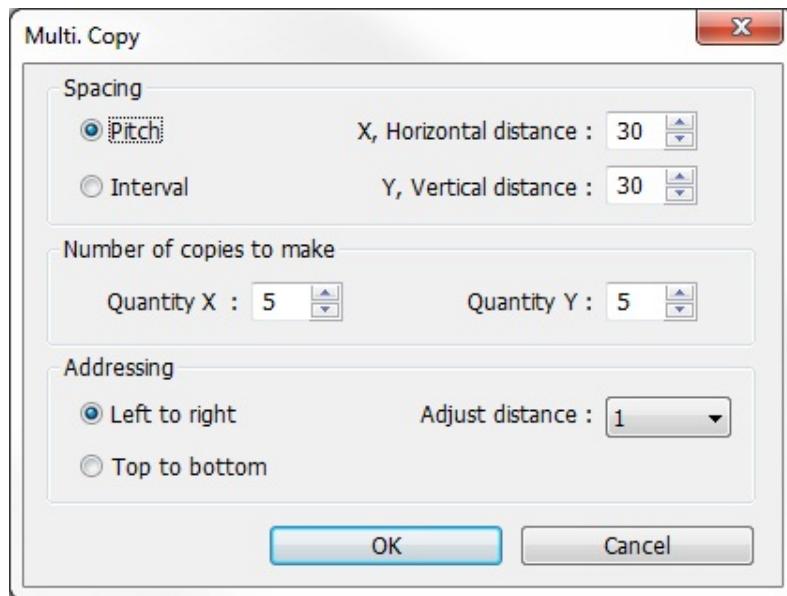
Using the Cut [icon] *, Copy* [icon] *, and Paste* [icon] *commands:*

1. These commands are all selected from the **Edit** menu.

2. Select the graphics object or objects you wish to cut or copy.

3. Click **Cut** to copy and remove the graphics object(s) from the work area or click **Copy** to copy the graphics object(s).

4. Objects cut or copied from one window can be pasted into other windows. Once the object has been selected and cut or copied, open another window, then paste the object into that window.

5. The pasted object appears highlighted in the work area of the new window.

6. Move the object by clicking on the highlighted area and dragging it to the desired position.

Using the Multi-Copy command:

The Multi-Copy command is used to make multiple copies of a single object on a screen. This is most useful when creating new keyboards or data tables. In addition to copying the object, this command will automatically assign new memory addresses to each object.

1. Select the object you wish to copy.

2. From the **Edit** menu, select **Multi. Copy...**. The Multi. Copy dialog box appears (see on following page).

3. Modify the settings according to your requirements.

4. Click **OK**. The main screen of EZwarePlus is redisplayed with the Multi. Copy command executed.

Multiple objects can be created according to these parameters:

> *Pitch* vs. *Interval*: This setting affects how EZwarePlus places the copies of an object on the screen relative to each other. The **Pitch** setting will interpret the X Distance setting as the distance from the left side of an object to the left side of the next object and the Y Distance setting as the distance from the top of one object to the top of another object.
>
> The **Interval** setting will interpret the X Distance setting as the distance from the right side of one object to the left side of the next object. The Y Distance setting is the distance from the bottom of one object to the top of the next object.
>
> *X, Horizontal Distance* and *Y, Vertical Distance*: These settings determine the spacing (in pixels) between objects.
>
> *Quantity X* and *Quantity Y*: These settings determine the number of copies to be made along the X axis (horizontal) and the Y axis (vertical).
>
> *Left to right* and *Top to bottom*: When **Left to right** is selected, objects are created and addressed in the X-axis first and then in the Y-axis. When **Top to bottom** is selected, objects are created and addressed in the Y-axis first and then in the X-axis.
>
> *Adjust Distance*: This is the offset used when assigning a new address to each new copy. For example, if 1 is selected, then EZwarePlus will add one to the address for each new copy made.

Delete
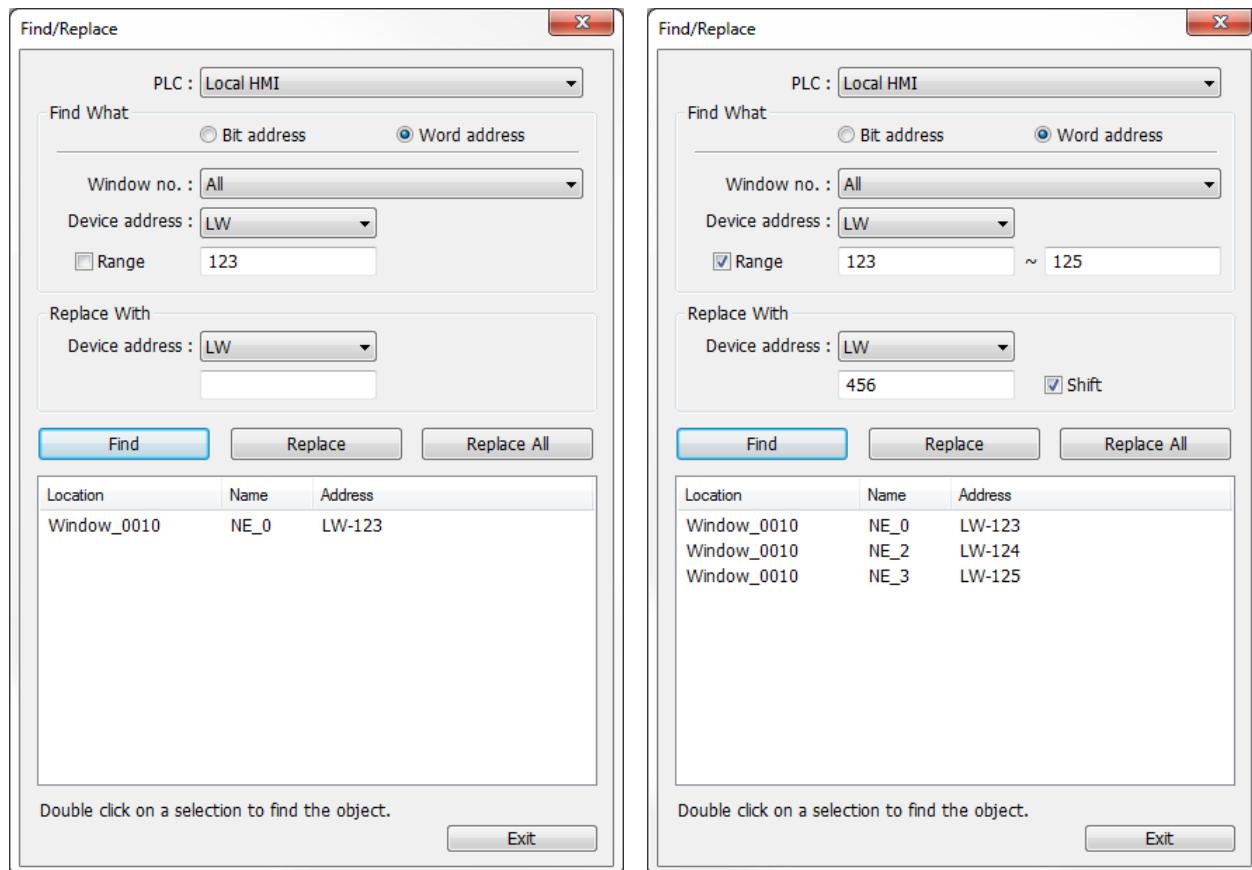
To delete a graphics object(s):

1. Select the object or objects you wish to delete.

2. Press the **DELETE** key or from the **Edit** menu, click **Delete**.

⌨ You can restore the deleted object by using the **Undo** command.
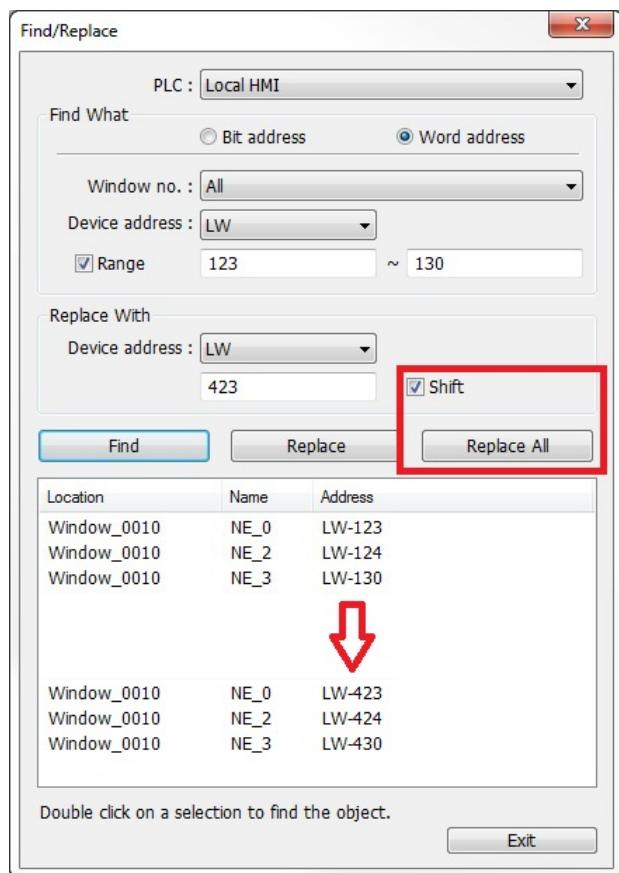
Find/Replace Address

The Find/Replace option offers a quick way to determine if a particular address has been used in the project.

Select either the Local HMI or the PLC being used at the top of the Find/Replace window and enter either the Bit address or Word address you wish to find. Click the **Find** button and a list of objects that use the selected address will appear at the bottom of the Find/Replace dialog, along with the Object ID and the window number. Use the **Replace With** field and the **Replace** or **Replace All** buttons to replace one or more of the selected addresses with a different address.

Click the **Range** option to find addresses used within a range of addresses. You can replace all the selected addresses with a different address, or click the **Shift** option to replace the addresses with relative addresses beginning with the address in the **Replace With** field.

Go to destination window

If you select a Function Key in the project that is configured to change windows, selecting this option will open the destination window assigned to the Function Key.

Include in Operation Log

If the Operation Log function has been enabled in the project, use this option to quickly enable a selected object in the Operation Log settings. See "Chapter 17 – Operation Log" for more information.

Layer

Graphics objects can be overlaid upon each other. When 'layered,' the graphics object on the topmost layer will be completely seen. How much of the other graphics objects are seen depends on what is on top of them. The following layer commands help to position the overlaid objects exactly how you want them.

> **Top Layer:** ⬚ Brings the selected object to the top layer.

> **Bottom Layer:** ⬚ Send the selected object to the bottom layer.

> **Previous Layer:** ⬚ Moves the selected object to the previous layer.

> **Next Layer:** ⬚ Moves the selected object to the next layer.

Normally, an object that is controlled by a PLC Register (i.e., Animation and Moving Shape) is brought to the Top Layer when the value in the PLC Register changes. This behavior can be changed by the **Object Layout** option on the **General** tab of the System Parameters dialog. A setting of **Control** sets the behavior as outlined above. A setting of **Nature** (default setting) results in the object remaining at the layer assigned during development.

☞ The **Object Layout** setting is global and affects all PLC-controlled objects in the application.

Center in Window

Use this option to center selected objects either vertically [icon] or horizontally [icon] in the window.

Nudge

Nudging is used to fine-tune the placement of objects in the work area of EZwarePlus. Using the nudge feature on a selected object will move that object in the specified direction either by one pixel or by the grid setting amount.
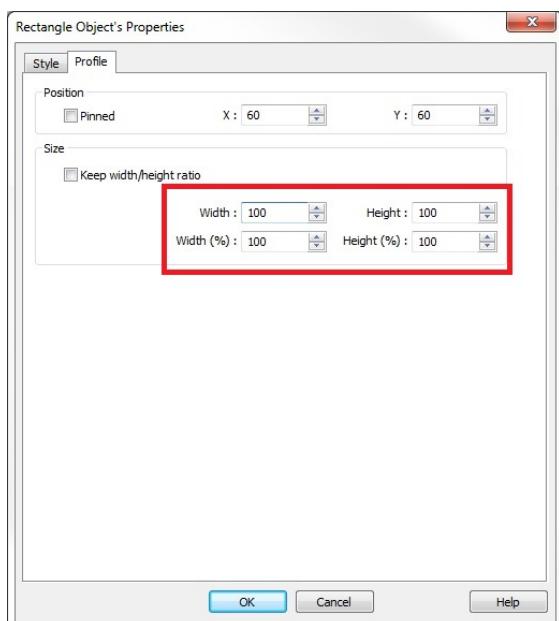
Use the nudge up [icon], down [icon], left [icon], and right [icon] commands (**Edit > Nudge** or the Nudge icons in the Edit toolbar) to move objects on the window. This function is duplicated with the arrow keys on the keyboard.

Resize

The resize option allows you to increase or decrease the width and height of a selected object in one pixel increments.

Other methods for resizing a graphics object:

1. Select the object to be resized.

2. To resize the object, move the mouse cursor over one of the small blue squares on the perimeter of the object. The cursor changes to a double-arrow icon to indicate that it is in resizing mode.

3. Click and drag the mouse to resize the object.

4. Objects can also be resized by changing the width and height attributes in the **Profile** tab of the **Attributes** dialog box.

Align

The alignment option can be used to quickly align two or more objects. Aligning justifies objects to the desired position of the last-selected object. The last selected object will have "handles" of a different color than the other selected objects.

Use the align left ![icon], align right ![icon], align top ![icon], align bottom ![icon], horizontal center ![icon], and vertical center ![icon] commands (**Edit > Align** or the Align icons in the Edit toolbar) to clean up the alignment of objects on the window.

Make Same Size

This feature is handy if you want to quickly make two or more objects the same size. Objects are sized to the size of the last-selected object. The last-selected object will have "handles" of a different color than the other selected objects. This is most often used when you are trying to overlap objects that must be the same size.

To make objects the same width:

1. Select the objects you wish to make the same width.

2. From the **Edit** menu, select **Make Same Size**, then **Width** or click the "Make Same Width" icon ![icon] from the Edit toolbar.

To make objects the same height:

1. Select the objects you wish to make the same height.

2. From the **Edit** menu, select Make Same Size, then **Height** or click the "Make Same Height" icon ![icon] from the Edit toolbar.

To make objects the same size:
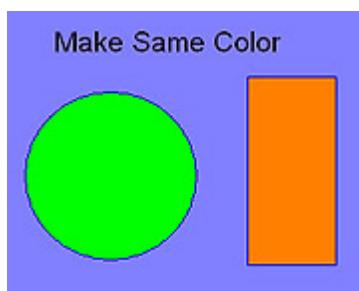
1. Select the objects you wish to make the same size.

2. From the **Edit** menu, select **Make Same Size**, then **Both** or click the "Make Same Size" icon ![icon] from the Edit toolbar.
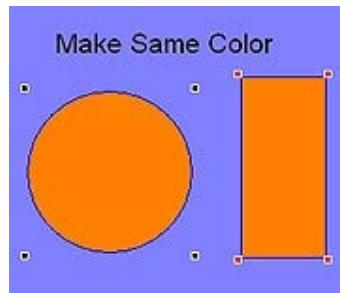
Make Same Color

This feature can be used to make two or more drawn objects the same color.

To make objects the same color:

1. Select the objects that you wish to make the same color. The group of objects selected will be changed to the color of the last of the objects selected.

2. From the **Edit** menu, select **Make Same Color**. The selected objects will all change to the same color as the last selected object. For example, if green and orange objects are selected and orange is the last object selected, all the objects will change to orange after executing the command.

Flip/Rotate

These options allow you to quickly flip or rotate an object in a new direction.

✍ The Flip/Rotate function only works on objects created with the Draw tools in EZwarePlus.

To flip objects vertically:

1. Select the object you wish to flip vertically.

2. From the **Edit** menu, select **Flip/Rotate > Flip Vertical** or click the "Flip Vertical" icon from the Edit toolbar.

To flip objects horizontally:

1. Select the object you wish to flip horizontally.

2. From the **Edit** menu, select **Flip/Rotate > Flip Horizontal** or click the "Flip Horizontal" icon from the Edit toolbar.

To rotate objects:

1. Select the object you wish to rotate.

2. From the **Edit** menu, select **Flip/Rotate > Rotate 90 Degrees** or click the "Rotate" icon from the Edit toolbar.

Space Evenly

This option allows you to space multiple objects evenly among each other.

To space objects horizontally:

1. Select all the objects you wish to space horizontally.
2. From the **Edit** menu, select **Space Evenly > Space Evenly Across** or click the "Space Evenly Across" icon from the Edit toolbar.

To space objects vertically:

1. Select all the objects you wish to space vertically.
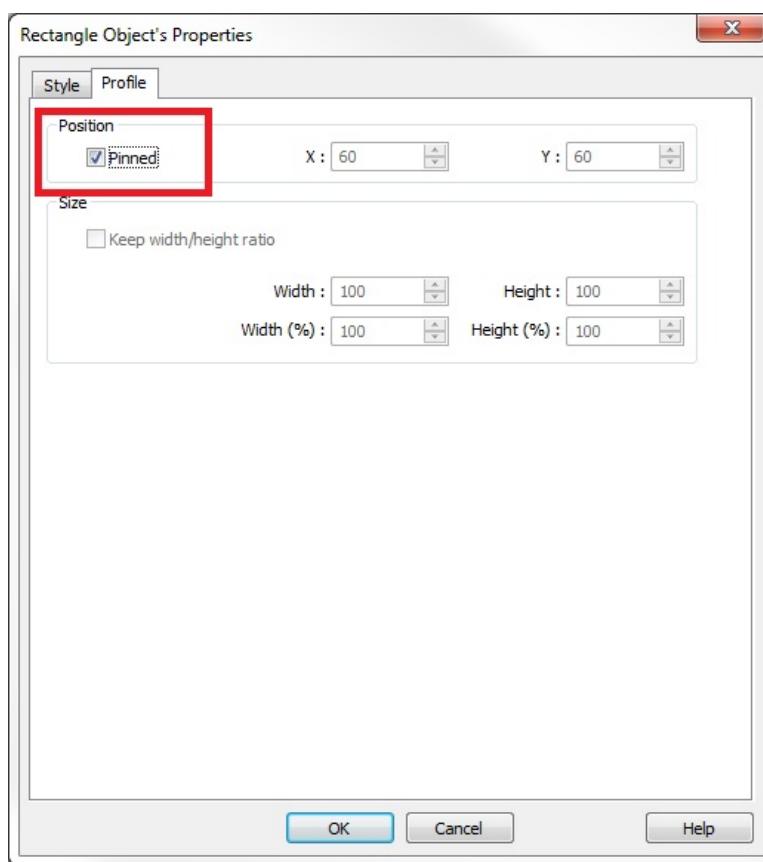
2. From the **Edit** menu, select **Space Evenly > Space Evenly Down** or click the "Space Evenly Down"

    icon ⬍ from the Edit toolbar.

Pinned

Each object's position and size can be locked by using the **Pinned** option. When the object is locked, its position and size cannot be changed.

To lock an object:

1. Select the object to be locked.

2. From the **Edit** menu, select **Pinned** or click the "Pinned" icon 📌 from the Edit toolbar.

3. To unlock the object, deselect **Pinned** from the **Edit** menu or click the "Pinned" icon once again in the Edit toolbar.

4. Objects can also be locked by selecting the Pinned option in the **Profile** tab of the **Attributes** dialog box.

Group

When creating graphics on a window, you may create a complex graphic that is actually composed of several simpler objects grouped together. Grouping objects together makes it easier to move or copy multiple objects at the same time.

To group objects:

1. Select the objects to be grouped.

2. From the **Edit > Group** menu, click **Group** or click the "Group" icon ⊞ from the Edit toolbar.

3. All objects within the group can now be copied, deleted, or moved by clicking on the group.

To ungroup objects:

1. Select the objects to be ungrouped.

2. From the **Edit > Group** menu, click **UnGroup** or click the "Ungroup" icon ⊞ from the Edit toolbar.

3. All objects within the group can now be copied, deleted, or moved separately.

Window Process
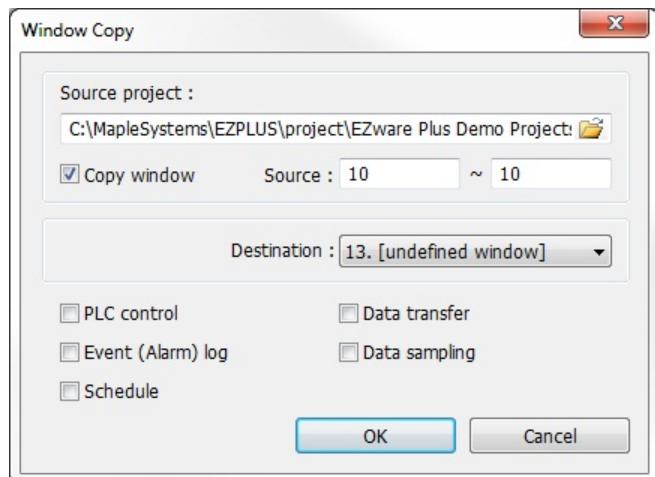
Select **Close Window** to close the currently open window in EZwarePlus. If there is only one window open, then selecting this option will close the project.

The **Window Copy** option allows you to copy an entire window from one location to another, either within a project or from one project to another.

Using the Window Copy command:

The Window Copy command is used to copy a window from an existing project into the project that you are currently editing. This feature reduces time spent creating new projects since you can now use windows that you created for other similar projects.

1. From the **Edit** menu, select **Window Process** and click **Window Copy...**. The Window Copy dialog box appears.

2. In the **Source project** box, specify the path to the project that contains the window screen(s) you wish to copy. Use the Browse... button [image] to navigate to the project if you are unsure of the location or name of the project file.

3. In the **Source** boxes, enter the numbers of the window screen(s) you wish to copy. They must be consecutive windows. If you are only copying one window, put the same window number in both boxes.

4. In the **Destination** box, select the number of the window in the current project that you wish to copy the selected window(s) to. If multiple windows are selected, they will be copied into consecutive windows beginning with the one designated in the **Destination** window.

5. There are checkboxes for PLC control, Event (Alarm) log, Schedule, Data transfer, and Data sampling. The selected options will also be copied into the current project.

   Click **OK** to complete the process.

Select All Objects

Use this option to select all the objects on the currently open window.

Select Next Object

This option can be used to easily select an object that is underneath another object on the screen. To use this option, you must first select the overlapping object.

To select next object:

1. On the **Edit** Menu, click **Select Next Object** or click on the "Select Next Object" icon [icon] on the **Edit Toolbar**. You can also click and drag across the multiple objects to select them and then right-click on the top-most object on the screen. This will display a menu with a list of the overlapping objects. Select the object that you wish to access and click the **Settings** button to open the Attributes.

2. Once the object you are trying to access is selected, you can proceed to modify its attributes or delete it.

Select

To select a graphics object:

1. On the **Edit** Menu, click **Select** or click the "mouse cursor" icon [icon] in the **Draw Toolbar**.

2. Click on the graphics object. This causes the text box to be selected, with small square blocks around the edges indicating the boundaries of the object. Deselect the object by clicking somewhere else in the work area.

3. When a graphics object is selected, it can then be modified, copied, deleted, or moved to a new location.

To select multiple graphics objects:

1. On the **Edit** Menu, click **Select** or click the "mouse cursor" icon [icon] in the **Draw Toolbar**.

2. Click and hold down the left mouse button at the upper left corner of the graphics objects you wish to highlight.

3. Drag the mouse cursor to the lower right corner of the highlighted objects. Notice that a rectangle is formed as you do this.

4. Release the mouse button. The rectangle outline changes to small blue square blocks around the perimeter of the objects selected. Now multiple objects are selected.

📝 If you do not completely enclose a graphics object you wish to highlight, then it will not be selected.

5. Alternatively, you may select objects by holding down the CTRL key while selecting each object until all objects are selected.

6. When several graphics objects are selected, they can easily be moved, deleted or copied together.
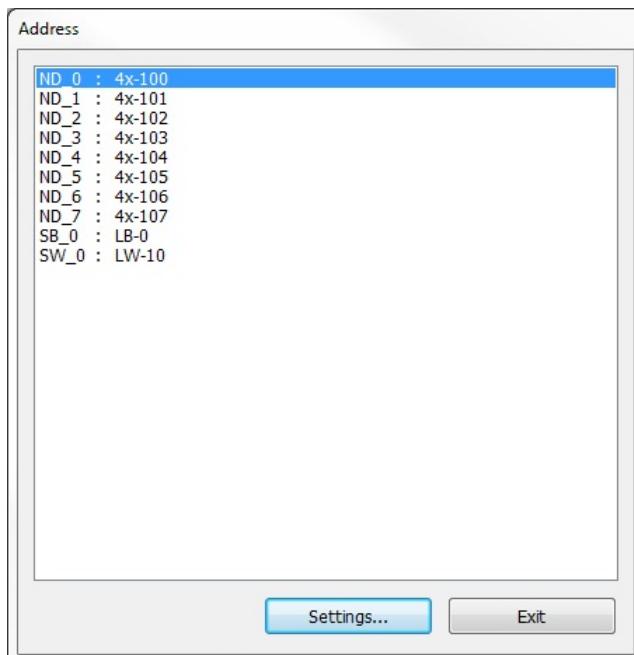
Change Object Attributes

To change attributes of a graphics object:

1. Select the object to be changed, then select **Change Object Attributes** from the Edit menu. You can also double-click the object.

2. The object's attribute dialog box is displayed. Object Attributes defines what the object is or how it behaves, (i.e., size, position, color, etc.). Click **OK** to accept any changes made or **Cancel** to cancel any changes.

*To view object attributes of multiple graphics objects on a window:*
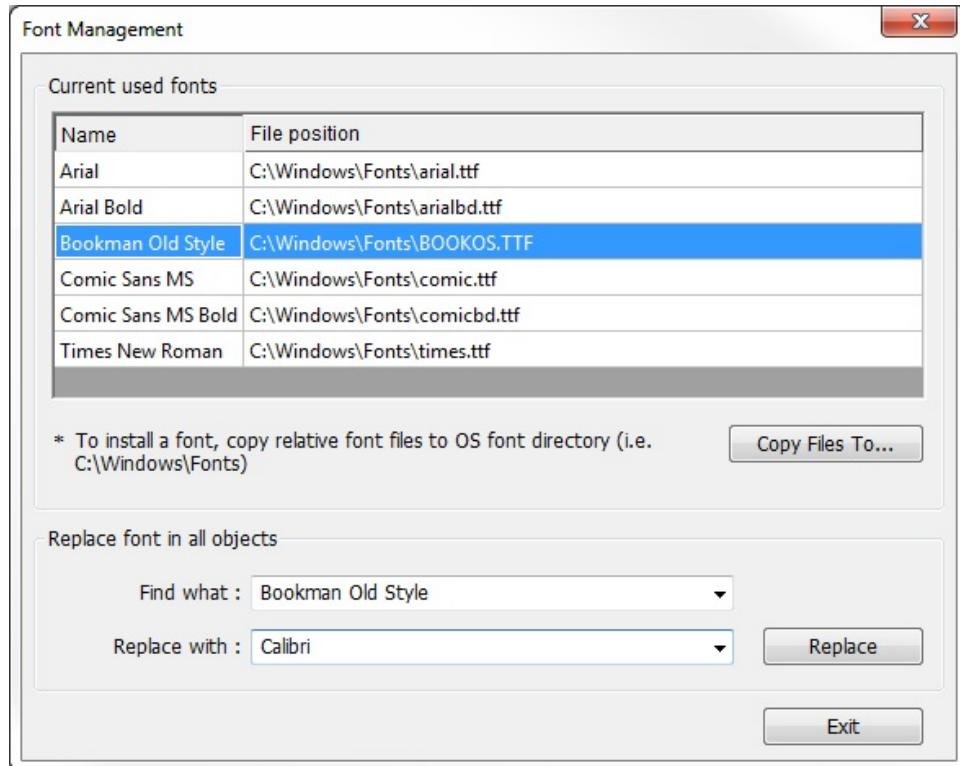
1. There will be times when you may want to quickly determine what PLC data registers are tied to which objects in a window. This can easily be done using the **Change Object Attributes** command.

2. On the Edit menu, click Select all objects.

3. From the **Edit** menu, click **Change Object Attributes**. The Object Attribute dialog box is displayed.

4. All of the objects that use PLC data registers or the internal memory of the HMI are listed in this dialog box according to their Object ID tag. Alongside each ID tag is the PLC or HMI memory identifier.

Font Management

The Font Management option is used to copy the font files used in the project to a specified location or to globally select a font that is used in the project and replace it with a different font.

The **Font Management** window displays a list of the currently used fonts in the project.
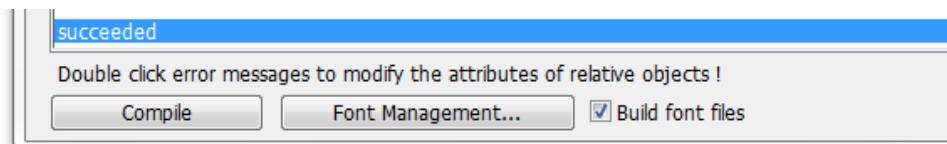
To copy the fonts to a specified location:

1. Click the **Copy Files To…** button and navigate to the directory where you wish to save the fonts. All the fonts in the list will be copied to the specified location.

To replace a font with a different font:

1. Select the currently used font in the list that you want to replace.

2. The selected font will appear in the **Find what** field at the bottom of the window.

3. Click the down-pointing arrow in the **Replace with** field and select the font you want to use to replace the selected currently used font.

4. Click the **Replace** button to complete the action. Everywhere the initial currently used font was used in the project will be replaced with the new font.
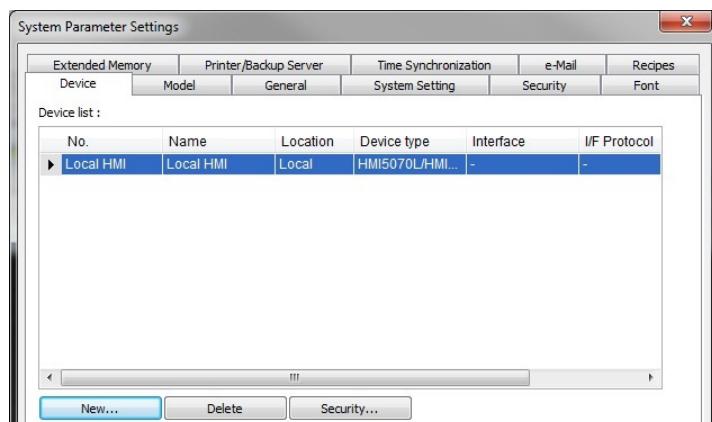
There is also a **Font Management** button at the bottom of the **Compile** window that opens the Font Management dialog.

System Parameter Settings
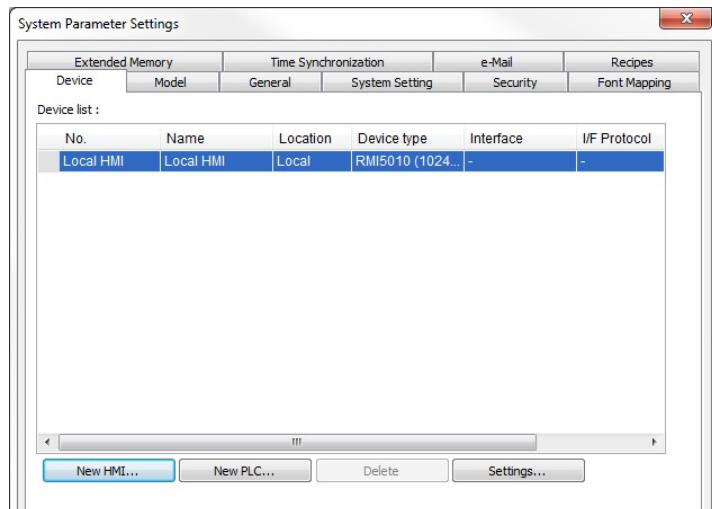
The final section of this chapter shows all the settings or parameters that can be configured using EZwarePlus. From the **Edit** menu, select **System Parameters**. The **System Parameter Settings** dialog box appears. The dialog box has eleven tabs: Device, Model, General, System Setting, Security, Font, Extended Memory, Printer/Backup Server (not available for the RMI5010), Time Synchronization, e-Mail, and Recipes.

P Series/L Series/RMI5001

RMI5010

☞ Some of the System Parameter Settings windows are different for the RMI5010 and are identified when necessary.

Device tab settings:
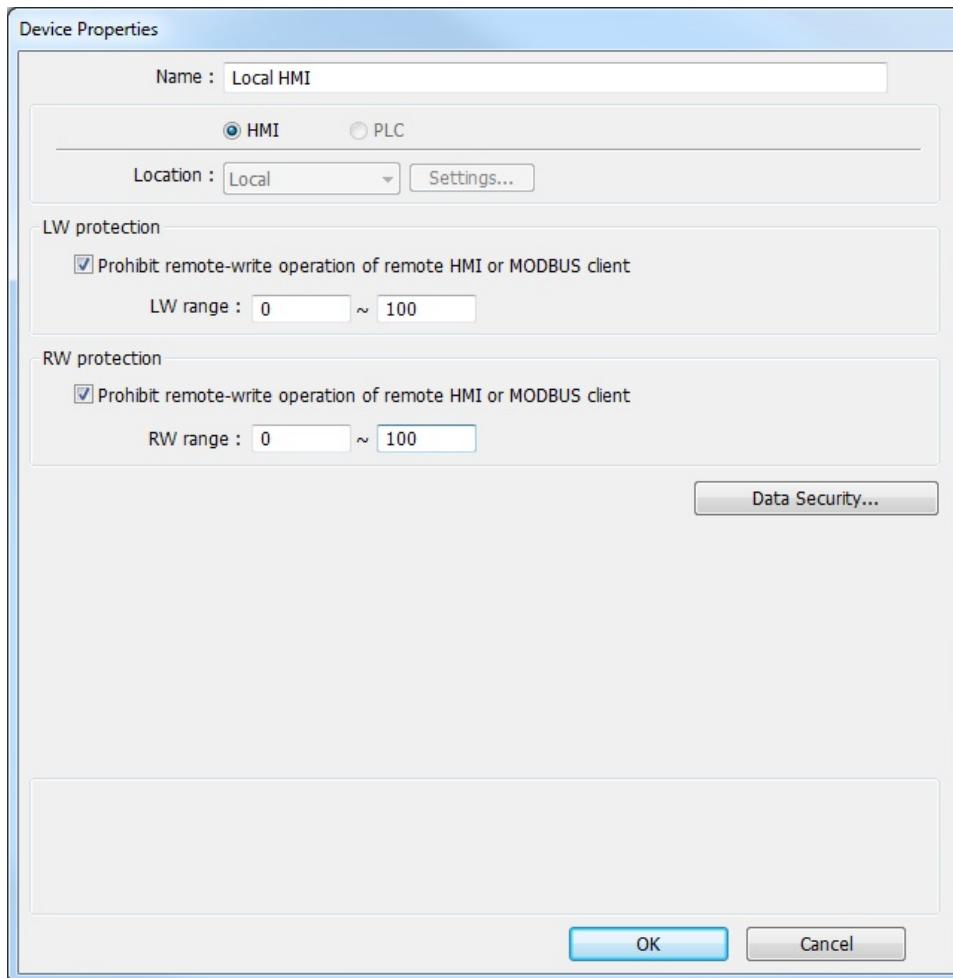
Local HMI:
The Local HMI device is automatically created when starting a new project and the model is selected.
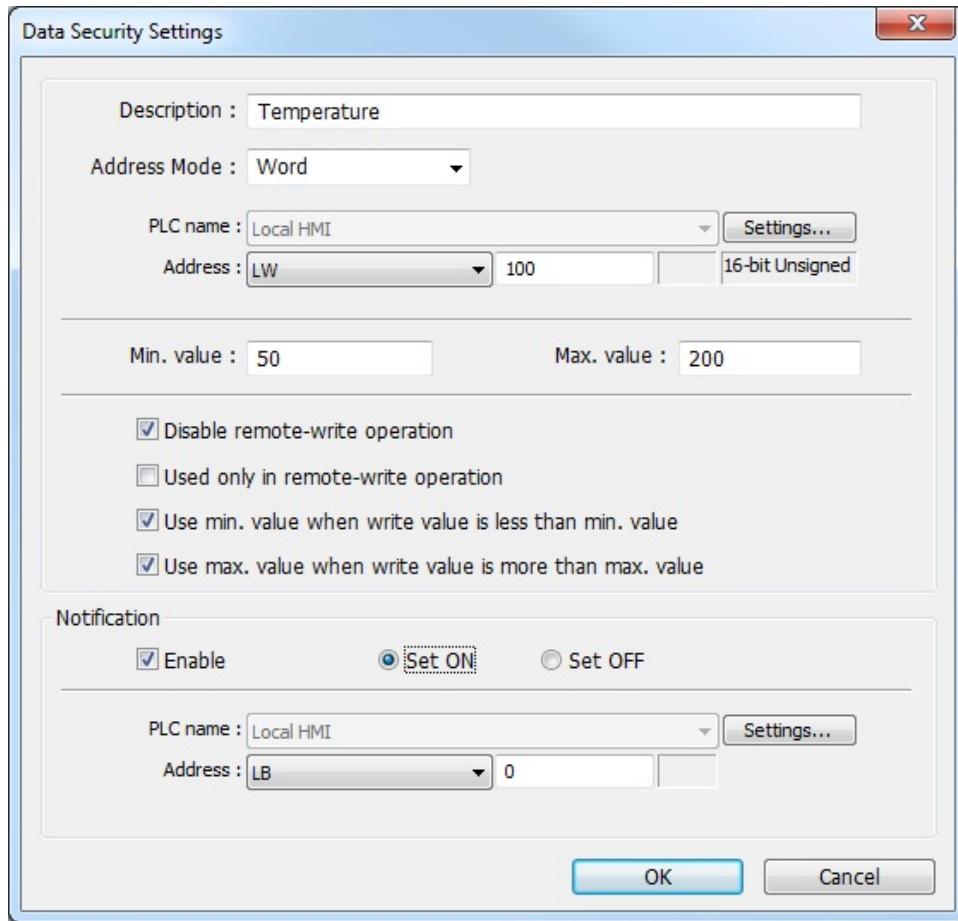
1. With the Local HMI selected in the Device list, click the **Security** button below it to open the Device Properties window for the Local HMI. The PLC radio button and the Location option are greyed out and cannot be changed.

📝 The following options are not available for the RMI5010.

2. **LW protection:** When **Prohibit remote-write operation of remote HMI or MODBUS client** is checked, remote HMI(s) are prevented from writing to the range of Local Word addresses specified in the **LW range** boxes.
3. **RW protection:** When **Prohibit remote-write operation of remote HMI or MODBUS client** is checked, remote HMI(s) are prevented from writing to the range of Recipe Word addresses specified in the **RW range** boxes.

4. **Data Security:** Opens the **Data Security** window. Click the **Add** button to add items to the list.

Description: Enter text to describe the data being secured.

Address Mode: Select either **Word** (LW) or **Bit** (LB).

> When **Word** is selected, enter the **Min. value** and **Max. value** that can be entered in the specified register.

> When **Bit** is selected, you can select **Set ON only** or **Set OFF only**. This can be used to latch the specified bit ON or OFF.

Disable remote-write operation: When selected, a remote HMI is prohibited from writing to the specified register or bit.

Used only in remote-write operation: When selected, the Data Security Settings only apply to a remote HMI writing to the specified register or bit, not the local HMI.
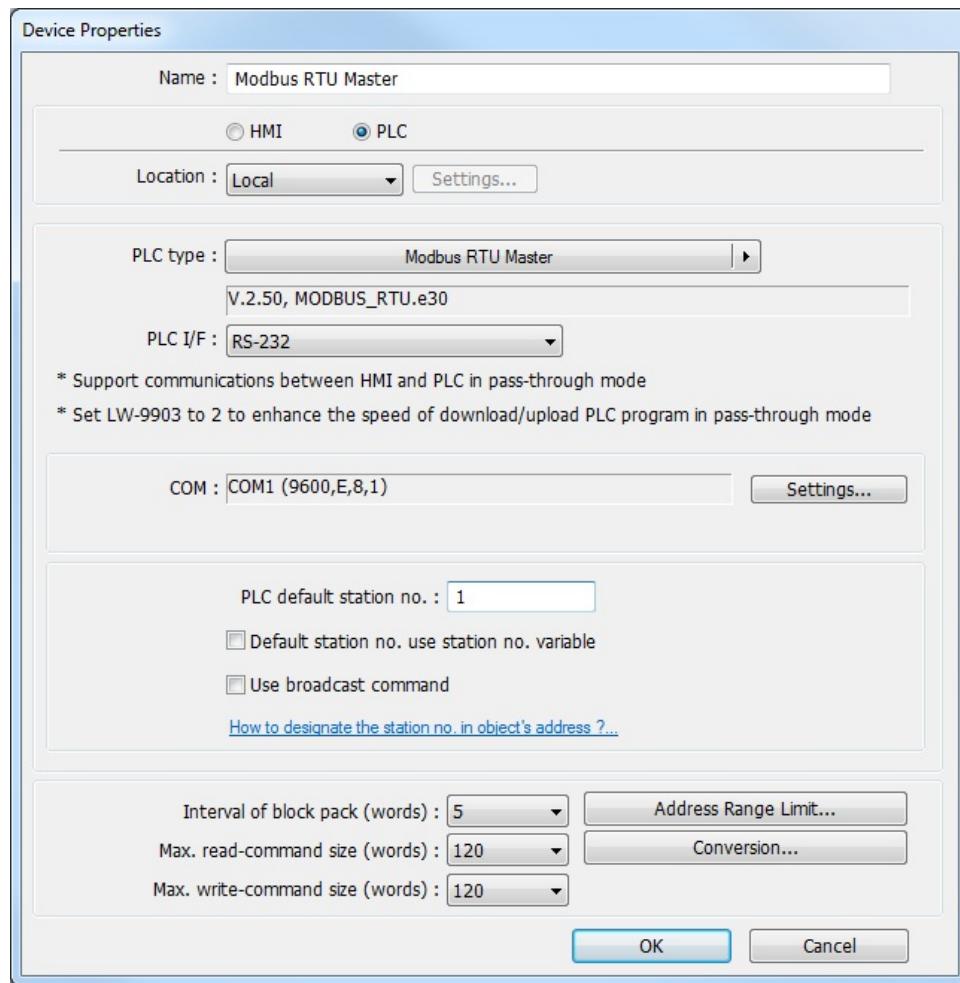
Use min. value when write value is less than min. value: When selected, if a value less than the specified minimum value is entered, it will default to the minimum value.

Use max. value when write value is more than max. value: When selected, if a value greater than the specified maximum value is entered, it will default to the maximum value.

Notification: When enabled, the designated bit will turn ON (with **Set ON** selected) or turn OFF (with **Set OFF** selected) when an attempt is made to write to the specified address in violation of the Data Security Settings.

Local PLC:

1. Click the **New…** button. The **Device Properties** dialog appears.
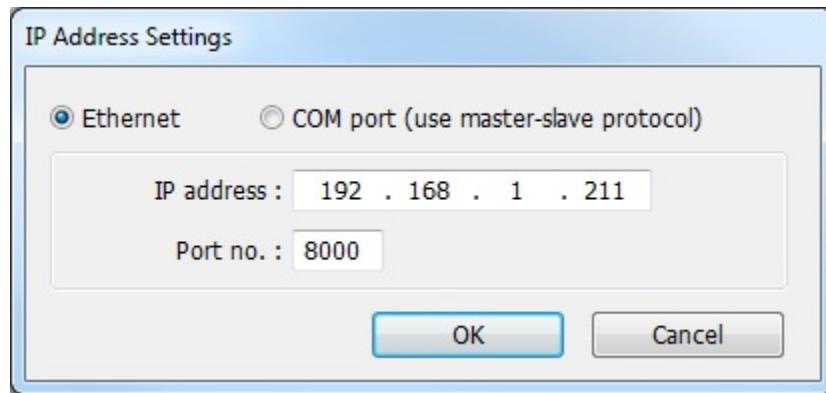
📝 You can "export" a project created for one PLC brand to a different PLC brand by loading the project file into EZwarePlus, then entering a different PLC type in this box. EZwarePlus will go through your entire project and attempt to change each reference to PLC data registers to a logical selection for the new PLC protocol; however, we strongly recommend that you review these changes to ensure that they are satisfactory.

2. Make sure the **PLC** button is selected.

3. There are two choices for **Location** – either **Local** or **Remote**. Select **Local** if the HMI will be connected directly to the PLC. Select **Remote** if the HMI will be connected to the PLC through another HMI.

For the RMI5010, see step **3a** next.
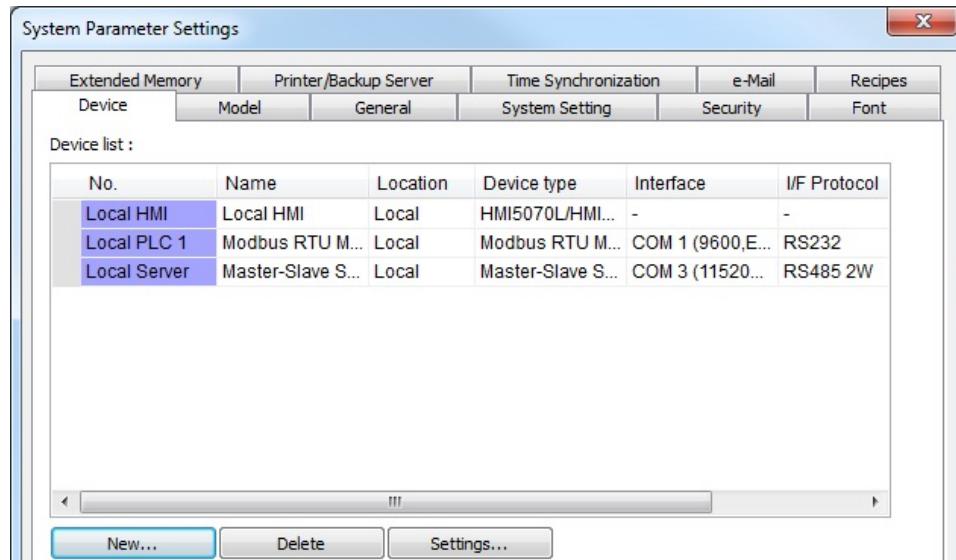
If **Remote** is selected, click the **Settings** button and select whether the HMI-to-HMI connection will be via Ethernet or a serial COM port.

Ethernet: Enter the IP address of the Local HMI (the HMI that is connected directly to the PLC with *Location: Local* selected). Enter the TCP/IP port assigned to the Local HMI (default is port 8000 – located in the System Parameter Settings on the Model tab).
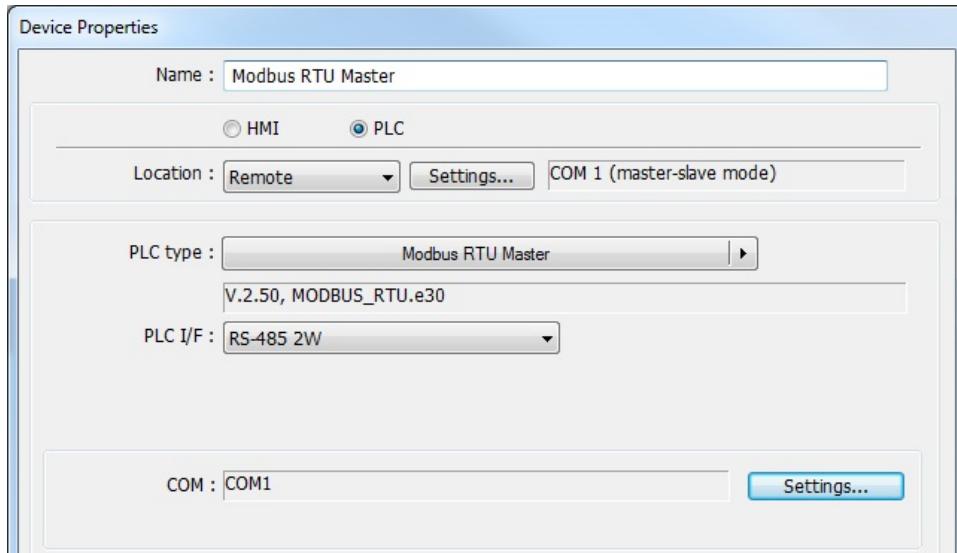
COM port: You must use the Master-Slave protocol in the Local HMI in order to make the HMI-to-HMI connection.

Configuring the Local HMI: Add the Master-Slave Server protocol to the Device list of the Local HMI.
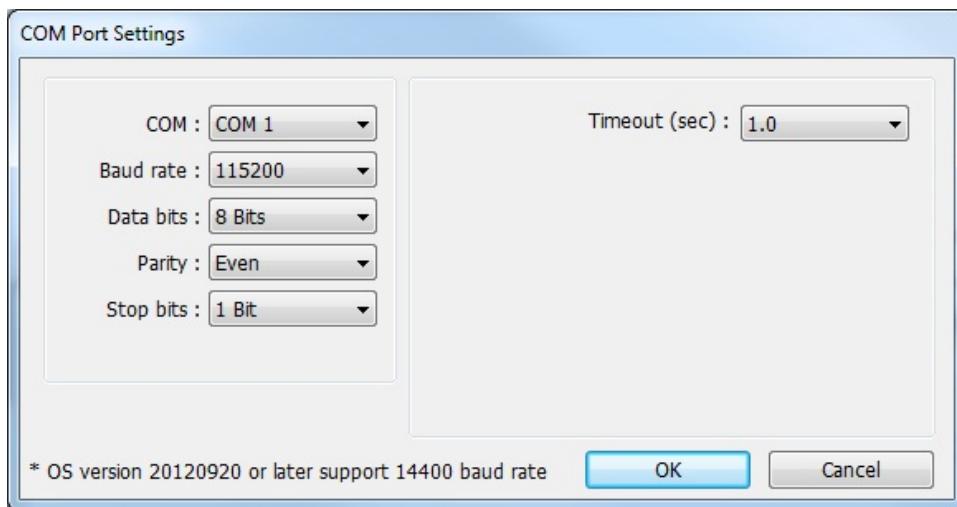
In this example, since the Local HMI is already using COM 1 to connect to the PLC using the Modbus RTU Master protocol, the Master-Slave Server is assigned to COM 3. The Remote HMI will connect to COM 3 on the Local HMI serially.

Configuring the Remote HMI: Add the same PLC driver in the Device list as the Local HMI and select **Remote** for the location. Set the PLC I/F to match the Interface setting of the Master-Slave Server in the Local HMI (in this case, RS485 2W).
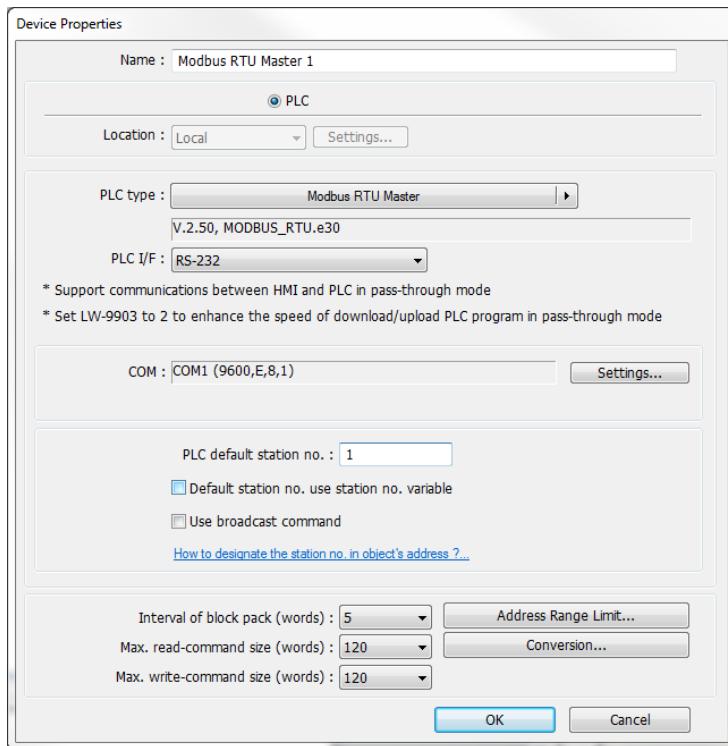
Click the **Settings** button next to **Location: Remote** and select **COM port**.

Click the **Settings** button in the **COM** section and set the Baud rate, Data bits, Parity, and Stop bits to match the settings of the Master-Slave Server configuration in the Local HMI project.
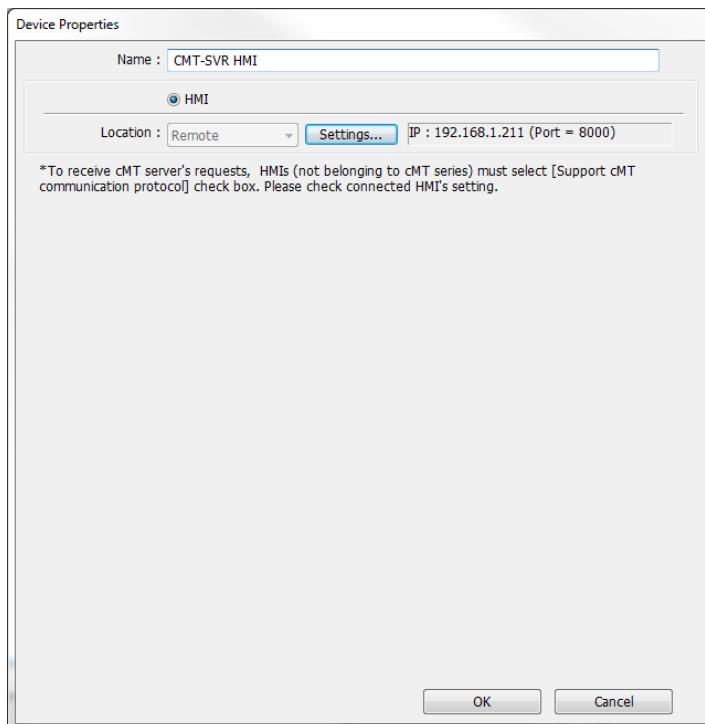
In this example, the Remote HMI is configured to communicate on COM 1, so COM 1 on the Remote HMI is connected to COM 3 on the Local HMI.
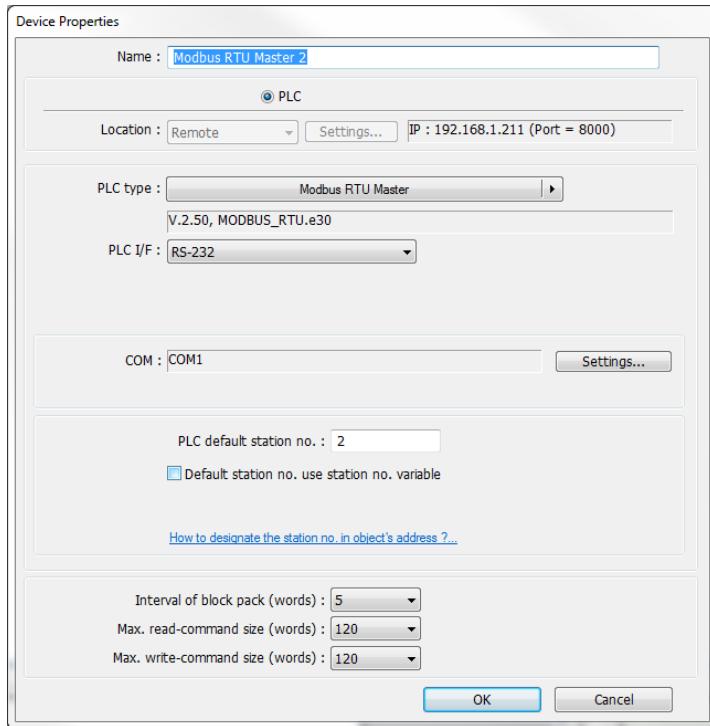
3a. For the **RMI5010**, the Remote HMI and Remote PLC are configured differently. The Local HMI can only have a Local PLC assigned to it. The Local/Remote option is greyed out.

Device Properties

Name : Modbus RTU Master 1

○ PLC

Location : Local   Settings...

PLC type :   Modbus RTU Master ▶

V.2.50, MODBUS_RTU.e30

PLC I/F : RS-232

* Support communications between HMI and PLC in pass-through mode

* Set LW-9903 to 2 to enhance the speed of download/upload PLC program in pass-through mode

COM : COM1 (9600,E,8,1)   Settings...

PLC default station no. : 1

☐ Default station no. use station no. variable

☐ Use broadcast command

How to designate the station no. in object's address ?...

Interval of block pack (words) : 5   Address Range Limit...
Max. read-command size (words) : 120   Conversion...
Max. write-command size (words) : 120

OK   Cancel

To add a remote HMI and remote PLC, click the **New HMI** button and enter the IP address of the remote HMI in the **IP Address Settings** window. Click **OK**.

Device Properties

Name : CMT-SVR HMI

○ HMI

Location : Remote   Settings...   IP : 192.168.1.211 (Port = 8000)

*To receive cMT server's requests, HMIs (not belonging to cMT series) must select [Support cMT communication protocol] check box. Please check connected HMI's setting.

OK   Cancel
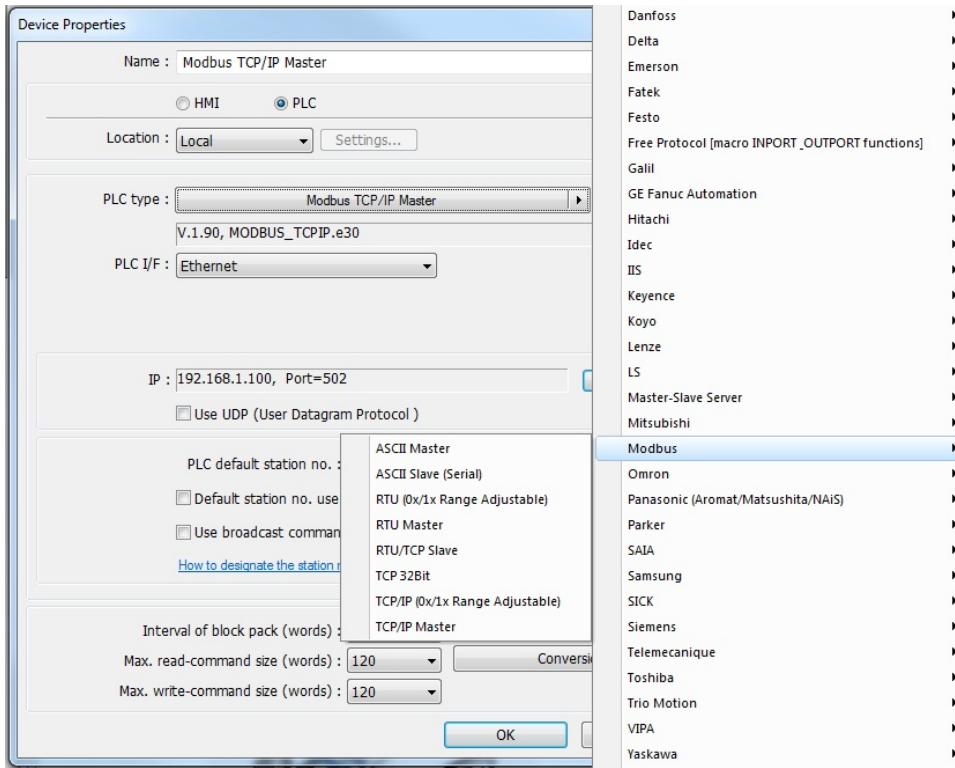
Then click the **New PLC** button and add the Remote PLC.

Click **OK**.

4. Click the **PLC type** drop-down box and select the appropriate driver for your PLC type.
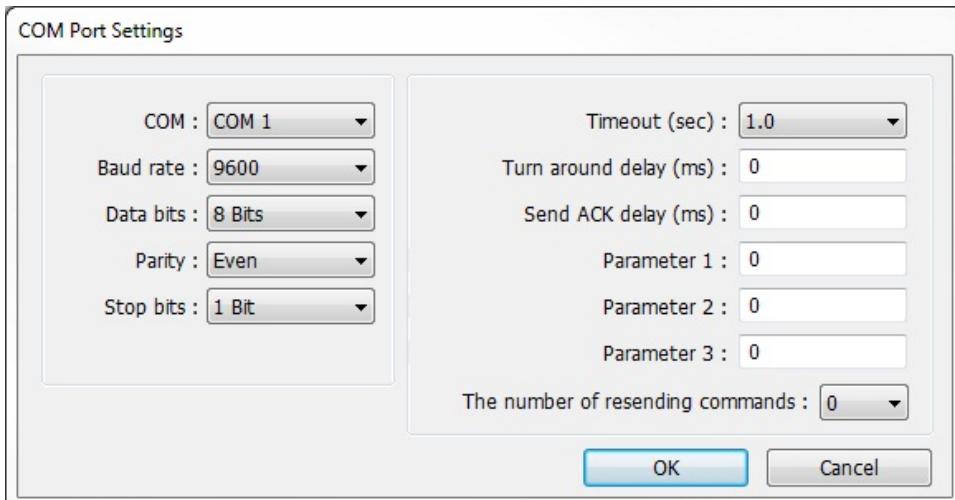
5. There are five selections for **PLC I/F:**
    RS-232 /RS-485 2W / RS-485 4W / Ethernet / USB
    Choose the PLC interface appropriate for your PLC model.

6. Select the PLC station number for your PLC if appropriate (see Controller information Sheet for your PLC) and then click **Settings…** The **COM Port Settings** dialog appears.

7. Select the appropriate **COM** port. This is the COM port used by the HMI.

8. Select **Baud rate, Data bits, Parity** and **Stop bits**. Use Maple Systems' Controller Information Sheets or the PLC manufacturer's operations manual for information on the communications parameters required by the PLC. These parameters must match the PLC settings.

   Timeout adjusts the amount of time (in seconds) it takes for the *PLC no response* message to popup when communication is lost or disrupted between the HMI and PLC.

   Turn around delay adjusts the amount of time (in milliseconds) that the HMI waits after receiving a reply before sending the next request.

   Send ACK delay and the **Parameter 1-3** settings are optional depending on the PLC type. Refer to the Controller Information Sheet for the PLC selected.

9. **The number of resending commands** sets the maximum number of retries the HMI will attempt to establish communication when communication is lost. When "0" is selected, the HMI will continue to retry indefinitely.

10. Click **OK**.

11. **PLC default station no.:** Defines the station number or unit ID number of the PLC, if applicable (e.g., Modbus station number).

12. **Default station no. use station no. variable:** Enables using a Local Word (where LW10000-LW10015 corresponds to var0-var15) to define the station number. By using the var syntax in the address field (e.g., var0#100), the station number can be changed at runtime by changing the value in the corresponding Local Word.

13. **Use broadcast command:** When enabled, causes the HMI to not expect a response from the station number specified by the **Broadcast station no.** field.
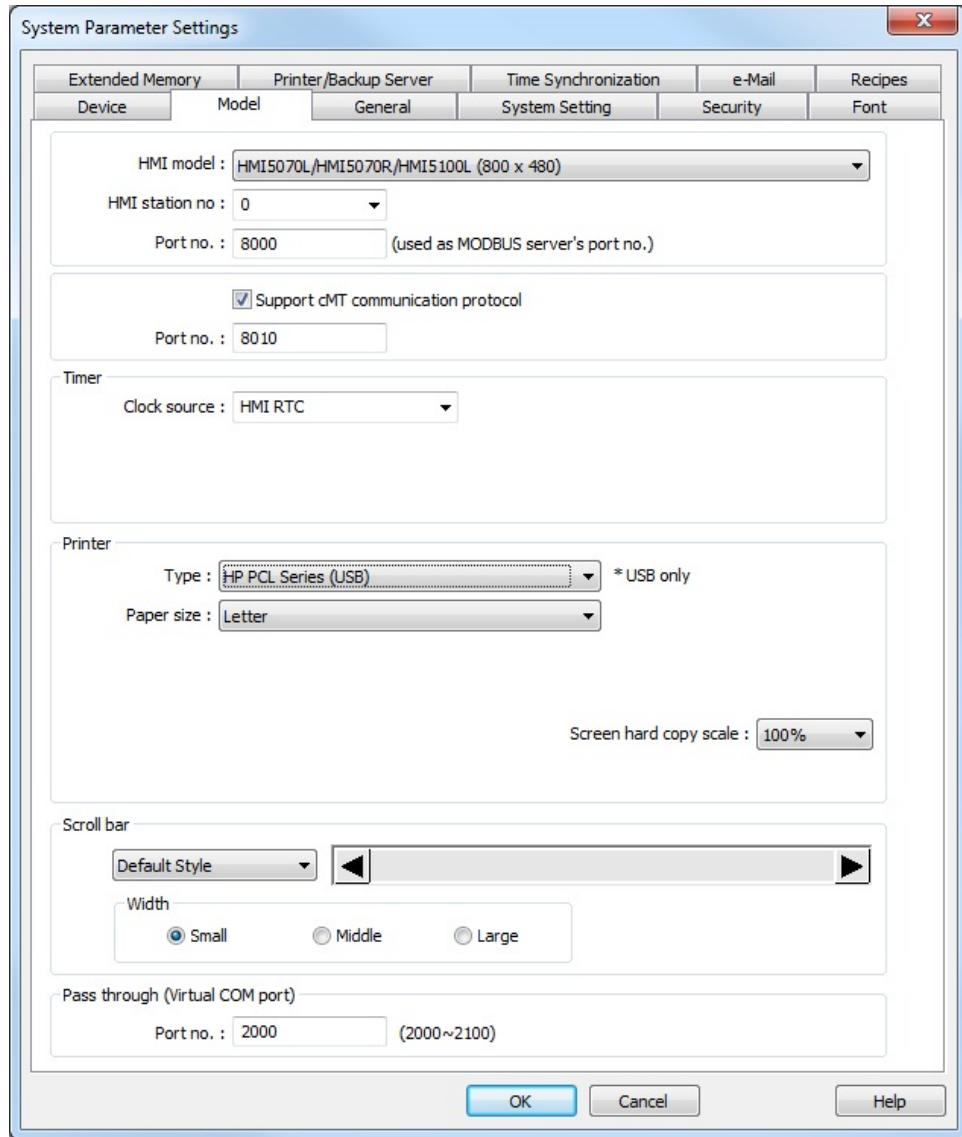
14. **Interval of block pack (words):** Determines how many words are read from the PLC in one communication cycle. For more information on this feature, select **Help> Help Topics** in EZwarePlus and select **Miscellaneous > Optimizing the Update Rate With PLC Block Pack**.

15. **Max. read-command size (words):** The maximum data size to be read from a device at one time.
    🔲 The **Interval of block pack (words)** setting must be less than this setting.

16. **Max. write-command size (words):** The maximum data size to be written to a device at one time.
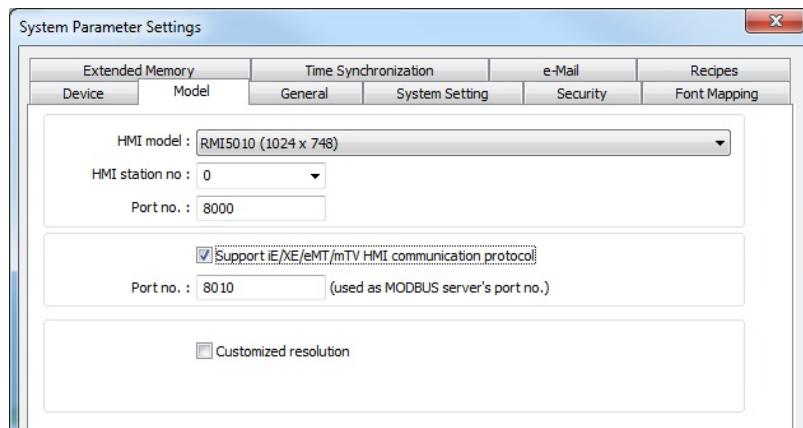
17. Click **OK**.

Model tab settings:

1. **HMI model:** Select the HMI model that you are programming.

2. **HMI station no.:** When multiple HMIs are used, this selects the unique network address of the HMI. See Controller Information Sheet for more information.

3. **Port No:** Assign a TCP/IP port so that another HMI can access the HMI through this port. For more information, select **Help > Help Topics > How Do I…Setup TCP Port Forwarding With the HMI**.

4. **Support cMT communication protocol:** When selected, the HMI supports a remote connection from an RMI5010. The remote HMI port number in the RMI5010 project (under **Support iE/XE/eMT/mTV HMI communication protocol**) must match the Port No. entered here.

RMI5010 System Parameter Settings Model Tab

📑 The remaining options do not apply to the RMI5010.

5. **Clock Source:** Select internal HMI RTC or External Device.
   HMI RTC uses the internal real-time clock in the HMI.
   External Device points to a PLC register to obtain real-time clock data. When the HMI first starts up, it will read the RTC data from six consecutive 16-bit registers in the PLC, starting at the specified register. The RTC data must be provided in the following order:
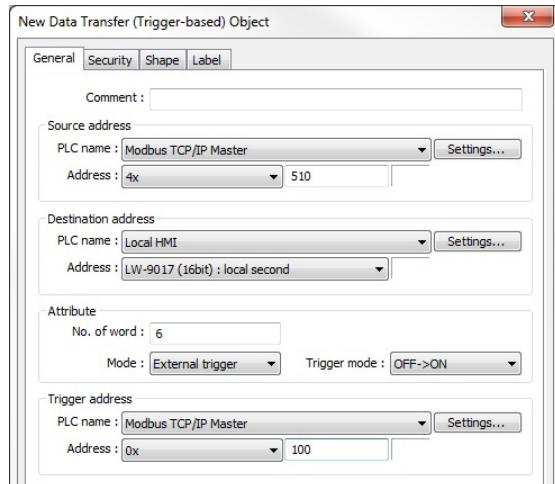
   Address = Seconds (0-59)
   Address+1 = Minutes (0-59)
   Address+2 = Hours (0-23)
   Address+3 = Day of Month (0-31)
   Address+4 = Month (1-12)
   Address+5 = Year (4 digits)

📇 To update the RTC more frequently, use a Data Transfer object. In the **Source address** section, select the address in the external device that holds the first of the RTC values (seconds).

In the **Destination address** section, select the Local HMI system tag LW-9017 (local second).

In the **Attribute** section, enter a 6 into the **No. of word:** field.
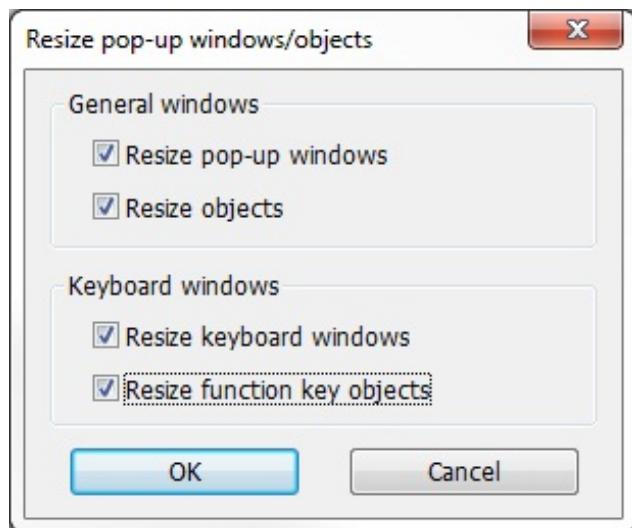
6. **Printer Type:** Select type of printer to be connected locally to the HMIs serial port or USB port. Printers are not supported on the RMI series.

7. **Scroll bar:** select the size and appearance of the scroll bar(s) on certain display objects. The scroll bars appear automatically as needed.

8. **Pass through (Virtual COM port):** select the Port Number to use in Pass-Through mode. The same setting needs to be made in the Utility Manager when Pass-Through is selected.

Auto Resizing Using the Model Tab

This tab can be used to automatically resize your project when changing to another HMI model with a different size touchscreen. The project and all objects and graphics will be proportionately resized automatically.
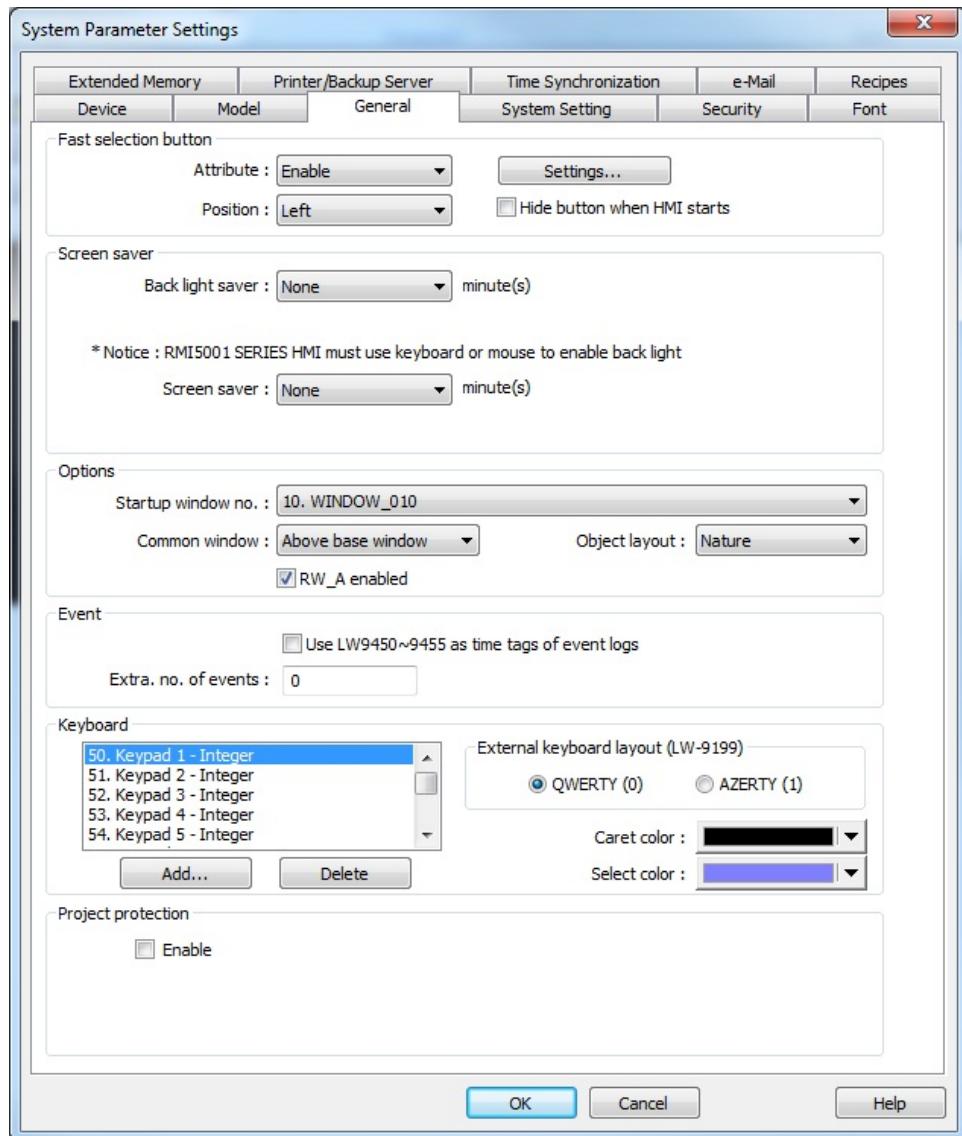
To auto resize your project using the Model tab in the System Parameters dialog:

1. In the **Model** tab, select a different display size from the **HMI model** drop-down box and click **OK**.

2. The Resize popup windows/objects dialog appears.

3. Check all the resize options and then click **OK**. The project will automatically resize.

General tab settings:

1. **Fast selection button**: The **Attribute:** drop-down enables or disables the fast selection button, which is used to open the Fast Selection window (window number 3). The Fast Selection window is used as a menu window to quickly access other windows in the project with Function Keys.The Fast Selection button, when enabled, is accessible from every other window.

    The **Settings** button sets the look of the button including shape and color. The **Position** drop-down sets the fast selection button on either the lower left or lower right portion of the display. When checked, the **Hide button when HMI starts** option causes the fast select button to be hidden when the HMI starts. Use Local Bit 9014 to control the Fast Select button. Clear the bit to show the button and set the bit to hide it.

    ▤ Place an invisible Set Bit object assigned to LB-9013 over the Fast Selection window (Window 3) to automatically close the Fast Selection window when a Function Key button is pressed on the window.

⬚ Fast Selection is not supported in the RMI5010.

2. **Screen Saver:** The **Back light saver** sets the number of minutes (none-255) of inactivity after which the backlight is turned off. If the value **None** is selected, then the back light saver is disabled.

   ▤ The backlight is re-triggered when the screen is touched or when an alarm occurs (if the **Enable back light when alarm occurs** option is selected).

   Screen Saver sets the number of minutes (none-255) of inactivity after which the screen saver is activated. If the value **None** is selected, then the screen saver is disabled.

   Saver window no. designates the window that will be used as the screen saver.

   ▤ Use the Backlight Saver to extend the life of the backlight in the HMI.
   Use the Screen Saver to have the HMI return to a Main Menu screen after a designated number of minutes of inactivity.

3. **Options:** The **Startup window no.** selects the window number that will be displayed every time the HMI is started up. Window 10 is the default startup window.

   The **Common window** option determines if objects in the common window (window 4) are placed above or below the base window.

   The **Object layout** option determines the layout and display of objects by selecting either **Control** mode or **Nature** mode.

   ⬚ Normally, an object that is controlled by a PLC Register (i.e., Animation or Moving Shape) is brought to the Top Layer when the value in the PLC Register changes. This behavior can be changed by the **Object layout** option. A setting of **Control** sets the behavior as outlined above. A setting of **Nature** (default setting) will result in the object remaining at the layer assigned during development.

   The RW_A enabled checkbox enables an extra 64K of recipe storage memory.

4. **Event:** When the **Use LW9450-9455 as time tags of event logs** box is checked, the Time/Date stamp for items in the Event Display will be taken from Local Words LW9450-9455. You can select the data format of the Time/Date stamp – BCD (binary-coded decimal) or BIN (16-bit signed decimal).
   If unchecked, the Time/Date stamp is taken from the selected clock (HMI RTC or External).

   Extra No of events: The default maximum number of events that can be displayed in the Event Display is 1000. To display more events, enter the additional number of events you would like to display, up to 10,000.

5. **Keyboard:** Lists the windows that have been configured as keyboards.

   Add: Opens a window list from which you can select an additional window to be available as a project keyboard.

   Delete: Deletes the selected keyboard from the list.

   The **Caret color** drop-down allows you to set the color of the cursor in the Numeric Input object when the keyboard is activated
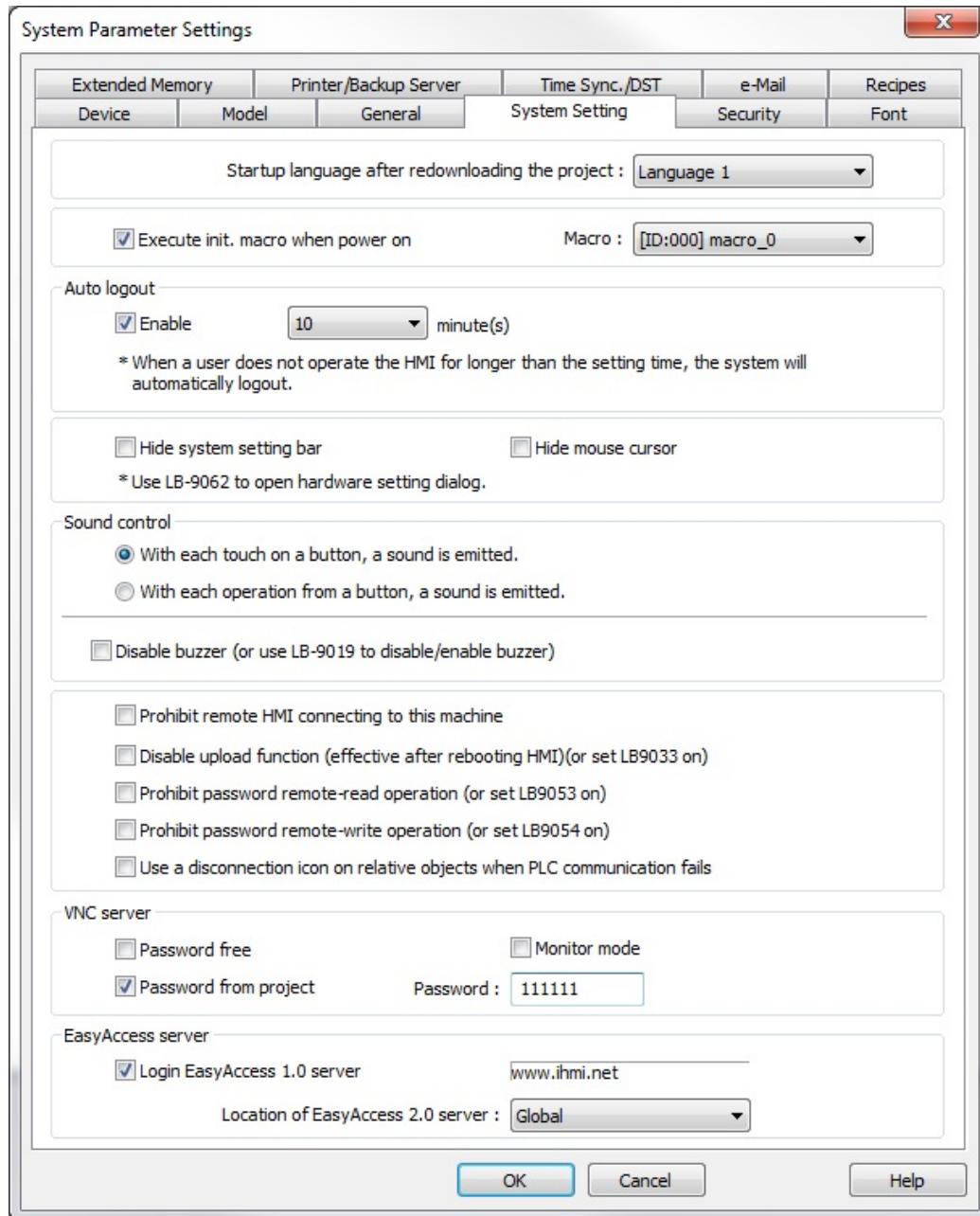
   The **Select color** drop-down allows you to set the highlight color in the Numeric Input object when the keyboard is activated.

External keyboard layout (LW-9199): Select the style of keyboard that is connected to the USB port on the HMI, **QWERTY(0)** or **AZERTY(1)**. Local Word LW-9199 can also be used to make the selection (0 = QWERTY; 1 = AZERTY).

6. **Project protection:** When checked, the HMI will compare the value in the **Project key** field to the 32-bit unsigned value stored in HMI Local Words LW9046 and LW9047. If the value is different, the HMI will not run the project.

   ✑ The **Fast Selection** button and **keyboard** option are not supported in the RMI5010.

System Setting tab settings:

1. **Startup language after redownloading the project:** Select the language that the HMI is to use when restarting after a download.

2. **Execute init. MACRO when power on:** When checked, the HMI will execute the selected macro on startup. Available only when one or more macros exist in the project.

3. **Auto logout:** When checked, the HMI will automatically log out of security if no touchscreen activity is detected during the specified interval. The time interval can range from 1 -256 minutes.

4. **Hide system setting bar:** When checked, the HMI will not display the button in the lower-right corner that displays the System Setting toolbar. Local Bit LB-9020 can be used to control the button. Set the bit to show the button and clear the bit to hide the button. Local Bit LB-9062 will cause the System Setting dialog window to open when set.

5. **Hide mouse cursor:** When checked, the HMI will not display the mouse cursor. Local Bit LB-9018 can be used to control the mouse cursor. Set the bit to hide the cursor and clear the bit to show the cursor.

6. **Sound Control:** Controls how the buzzer operates when pressing buttons.

   The Sound option must be enabled on the Security tab in the object's properties.

   With each touch on a button, a sound is emitted – causes the HMI to produce a beep when a button is pressed.

   With each operation from a button, a sound is emitted – when the minimum press time is activated on a button, enabling this option will cause the HMI to produce a beep when the operation is actually performed, as determined by the minimum press time, rather than when the button is initially pressed.
7. **Disable buzzer:** When checked, the HMI will not sound the buzzer (beep) when the screen is touched. Local Bit LB-9019 can also be used to control the buzzer. Set the bit to disable the buzzer and clear the bit to enable the buzzer.
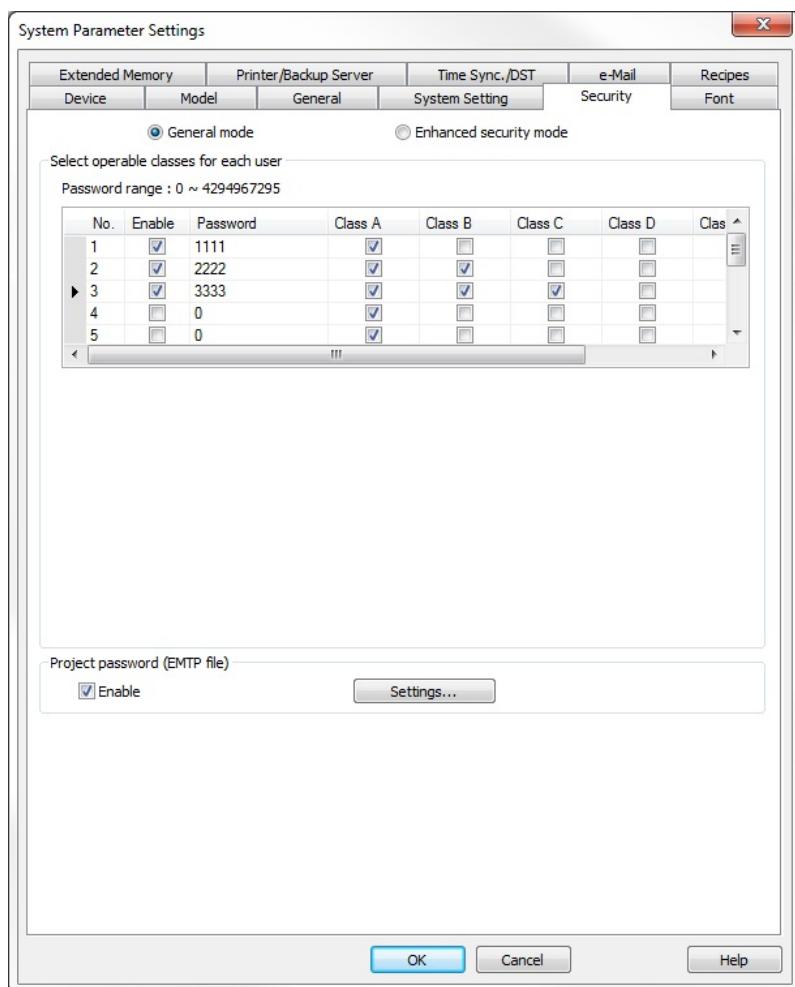
8. **Prohibit remote HMI connecting to this machine:** When checked, the HMI will not allow connections from a remote HMI. Local Bit LB-9044 can also be used to control remote connections. Set the bit to disallow remote connections, clear the bit to allow remote connections.

   This setting controls whether or not other HMIs can connect to *this* HMI. It does not affect how this HMI connects to *other* HMIs.

9. **Disable upload function (effective after rebooting HMI):** When checked, prevents the project from being uploaded from the HMI (sets LB-9033 ON). Reports "error: uploading /mt8000/001/mt8000."

   The **Disable upload function** can also be selected in the Compile window.

10. **Prohibit password remote-read operation:** When checked, a remote HMI cannot read from the local words containing the VNC password (LW-9530 to LW9537) and User password (LW-9500 to LW-9522) data (sets LB-9053 ON).

11. **Prohibit password remote-write operation:** When checked, a remote HMI cannot write to the local words containing the VNC password (LW-9530 to LW-9537) and User password (LW-9500 to LW-9522) data (sets LB-9054 ON).

12. **Use a disconnection icon on relative objects when PLC communication fails:** When checked, any object that cannot be resolved due to communication loss will be displayed with a special icon:

13. **VNC server:** Check **Password from project** to use the password entered in the adjacent **Password** box for a VNC client to use to connect to the HMI's internal VNC server. When not checked, use the VNC password entered in the HMI's System Settings **VNC Server Setting** tab.

   ▤ The VNC Server Password is stored in Local Words LW-9530 to LW-9537.

14. **VNC Server:** Check **Password free** to allow VNC Client(s) to connect to the HMI without requiring a password.

   ▤ This setting is also controlled by Local Bit LB-12089.

15. **VNC Server:** Check **Monitor Mode** to allow VNC Client(s) to connect to the HMI, but not allow the client(s) to change any data.

   ▤ This setting is also controlled by Local Bit LB-12088.

16. **EasyAccess server:** Check **Login EasyAccess server** to enable EasyAccess in the HMI. See Technical Note 5082, "Using EasyAccess" for more information.

▤ Several of these options are not supported in the RMI5010.

Security tab settings:
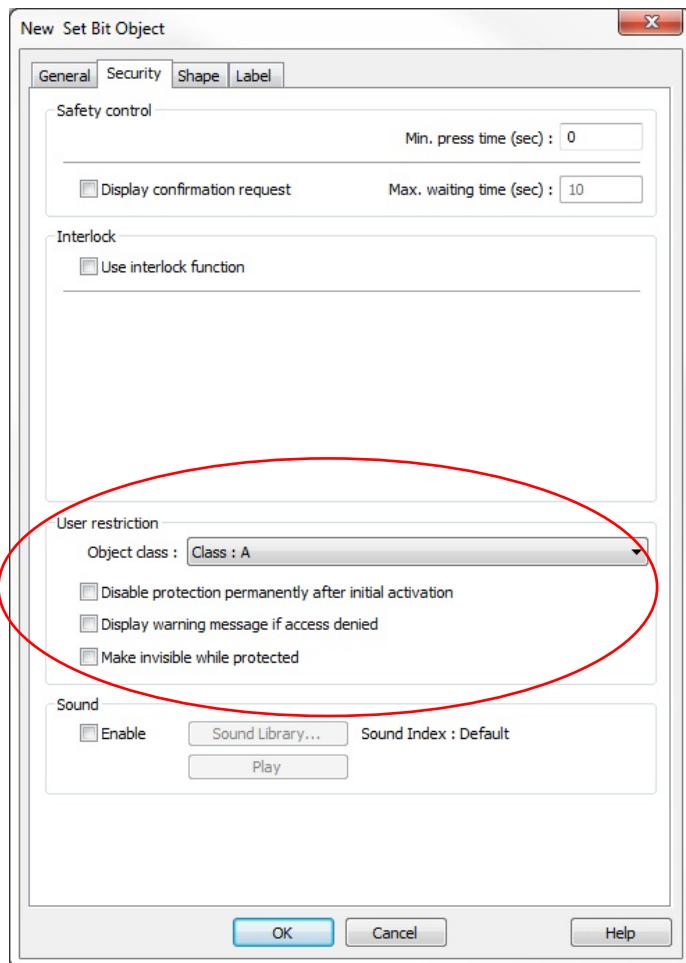
The Security tab is used to set up a table of users, user levels (access classes), and passwords.

General mode

When **General mode** is selected, up to 12 users can be individually enabled, and each has a unique password and combination of any six access classes (A-F). Only numbers are allowed for passwords. When an object is created, it can be assigned an access class. When that object is activated (for example, a button is touched), the HMI compares the access classes allowed for the currently logged-in user to the access class specified for the object. If the access class of the object is within the classes allowed, the object's action is executed.

The access class for an object is configured in the **User restriction** section of the **Security** tab for that object. So, for example, if you wish to set the access class for a set bit object, click on the **Security** tab of that object's properties dialog, as shown below:

The object can be configured to handle insufficient security in one of two ways:

- The object can be hidden while security is not sufficient (**Make invisible while protected**).
- The HMI can display the message on Window 7 – Password Restriction (**Display warning message if access denied**).

There are a number of local HMI addresses that can be used with the security features.

Address	Description	Data Type	Notes
LB-9050	Reset security level to 0 (no security)	Boolean	Set momentarily to trigger. Also serves as user logout.
LB-9060	Invalid password	Boolean	Set by the HMI when an invalid password is entered. Must be explicitly reset.
LB-9061	Load new passwords	Boolean	Loads new passwords as defined by LW-9500-9523
LW-9219	User level	16-bit unsigned	Set to 1-12. Determines which password is used.
LW-9220	Password	32-bit unsigned	Enter password into this address to change the security level
LW-9222	Current access classes	16-bit binary	Indicates the Access Classes currently allowed. Bit 0 indicates Class A; Bit 5 indicates Class F.
LW-9500, LW-9501	New password, user 1	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9502, LW-9503	New password, user 2	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9504, LW-9505	New password, user 3	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9506, LW-9507	New password, user 4	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9508, LW-9509	New password, user 5	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9510, LW-9511	New password, user 6	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9512, LW-9513	New password, user 7	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9514, LW-9515	New password, user 8	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9516, LW-9517	New password, user 9	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9518, LW-9519	New password, user 10	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9520, LW-9521	New password, user 11	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily
LW-9522, LW-9523	New password, user 12	32-bit unsigned	Loaded into security system when LB-9061 is set momentarily

To log out a user, use a Set Bit Object to momentarily set bit LB-9050.

Enhanced security mode
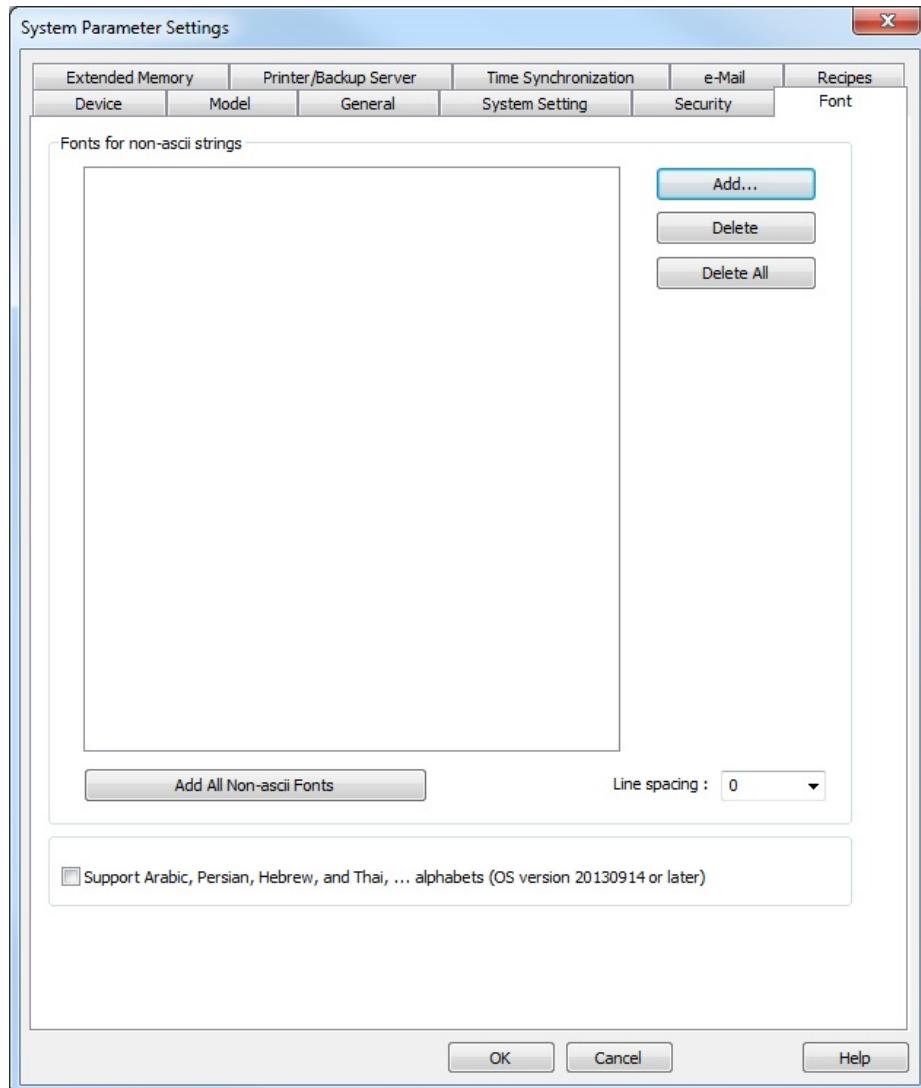
When **Enhanced security mode** is selected, each user can be assigned up to twelve access classes (A-L). Passwords and User Names can be alphanumeric, which are stored in local memory as assigned by the Control address. One user is reserved as an administrator, which has complete access. The Option List object can be configured to display the User Names, providing a quick way to select a user to log-in.

In addition, up to 127 more user accounts can be added using the Administrator Tools. See "Chapter 14 – Security" for more information about Enhanced security mode and "Chapter 15 – Administrator Tools" for more information on adding more user accounts with a USB flash drive or SD card.
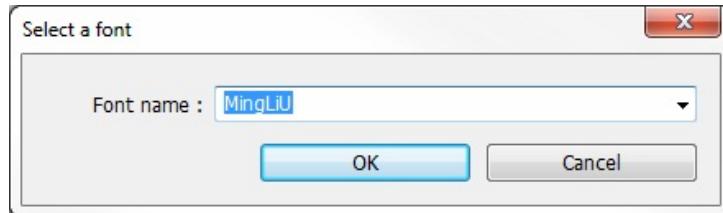
📑 The RMI5010 only has Enhanced security mode available.

Project password (MTP file): Select this option to set a password in order to prevent unauthorized users from opening and editing a project. The correct password must be entered in order to open the password-protected project.

Font tab settings:

Determines the fonts available for non-ASCII strings. If a non-ASCII character set or double-byte character set is used (e.g., simplified Chinese, Japanese, Korean, etc.) but not listed in the **Fonts for non-ASCII strings** table, EZwarePlus will select a font from the list to substitute for it automatically. To add a Windows TrueType font that is on your computer, click **Add...** and select the font from the drop-down menu that appears, and click **OK**.

Line spacing: Select the spacing between lines of text, with a range of 0 (closest) to 6 (widest).
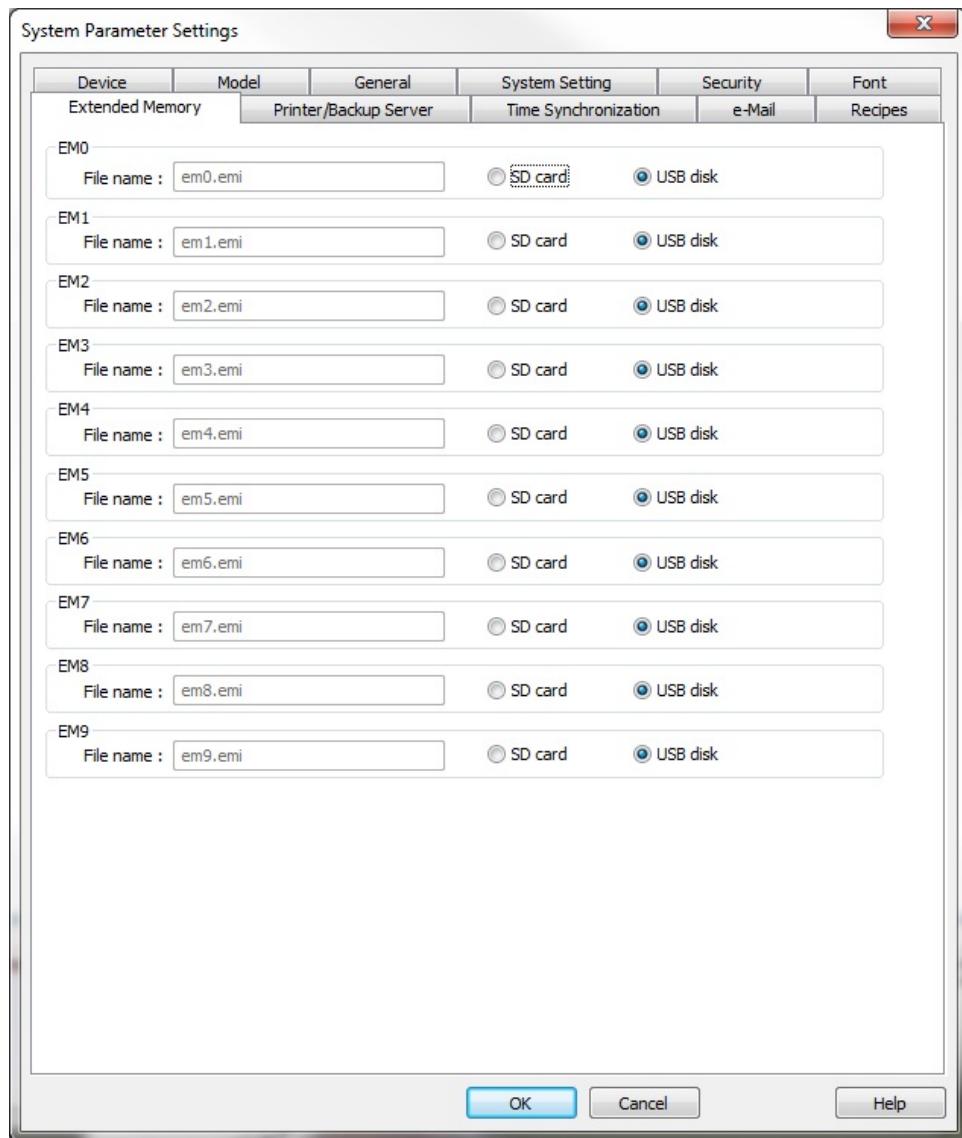
Select **Support Arabic, Persian, Hebrew, and Thai, …alphabets** to correctly display these characters.

🗐 For an RMI5010 project, this tab lists the Windows fonts and the corresponding fonts displayed on an i-Pad and the RMI5090 touchscreen.

Extended Memory tab settings:

The Extended Memory tab is used to configure the extended memory for saving data to an SD card or USB flash drive. There are 10 files that can be configured for saving data, em0.emi through em9.emi. Each extended memory location can be accessed using the Device Type setting in an object's properties. There is no address limitation for the extended memory other than the size of the SD card or USB drive connected to the HMI. The HMI will assume 16-bit data registers for unused addresses, so if address 100 is used for em0.emi, the memory storage must have at least 200 bytes of available memory.
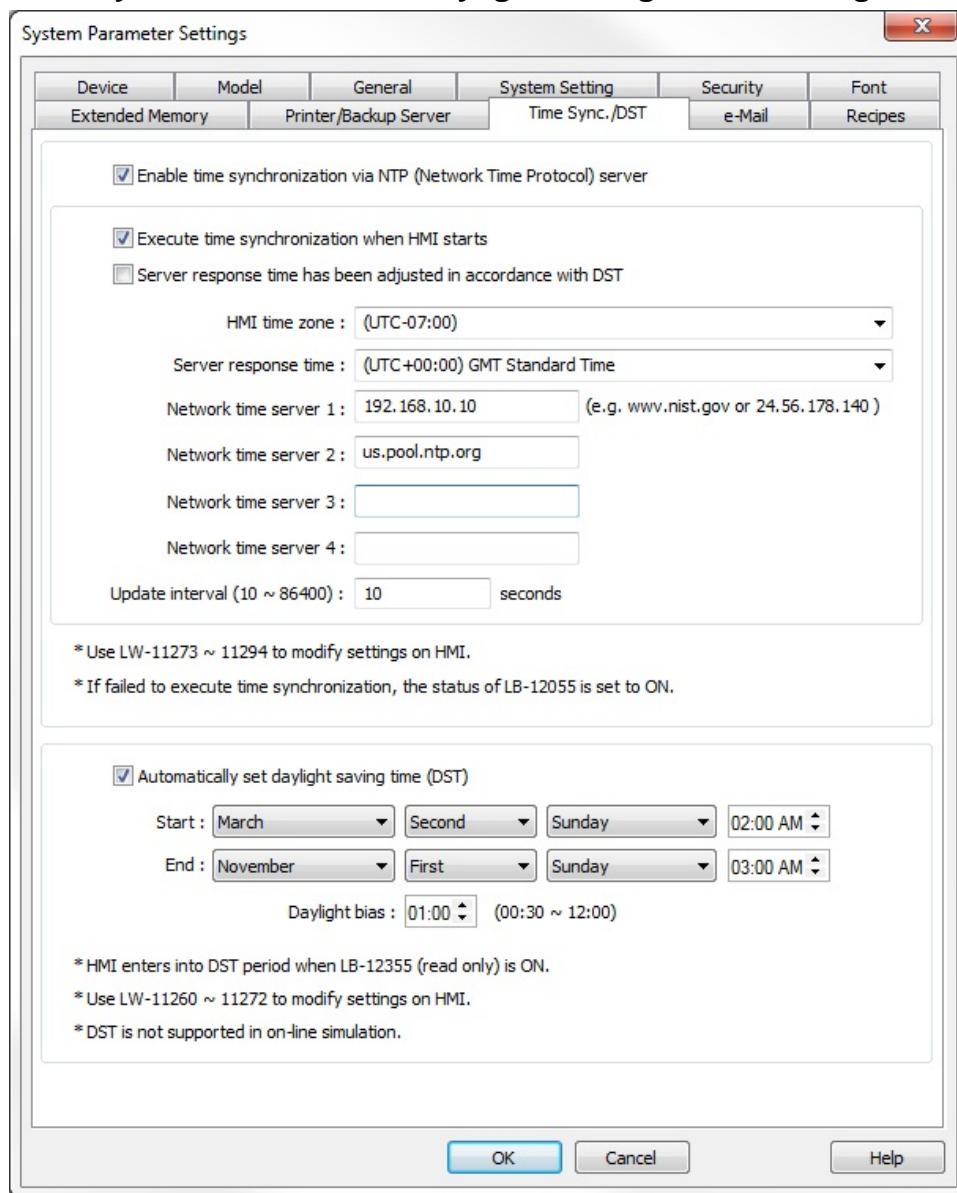
📃 Extended memory files (*.emi) can be edited and converted to *.csv file format using the Recipe/Extended Memory Editor, which can be opened with Utility Manager.

Printer/Backup Server tab settings:

1. Check the **Use Remote Printer/Backup Server** checkbox to enable the HMI to print to a printer connected to a PC on the network or backup files to a PC on the network.

    ▤ The EasyPrinter utility (included with EZwarePlus and accessible through Utility Manager) must be running on the PC with the network printer connected.

2. In the **Output settings** section, select page layout (horizontal or vertical), print area size, and margins.
3. In the **Communications settings** section, set the settings for the PC hosting the printer.

▤ The Printer/Backup Server tab is not available in the RMI5010.

Time Synchronization and Daylight Savings Time settings:

Select **Enable time synchronization via NTP (Network Time Protocol) server** to synchronize the HMI time with an NTP server.

Execute time synchronization when HMI starts: Synchronizes the HMI time with the NTP server when the HMI starts.

Server response time has been adjusted in accordance with DST: Check this box if the NTP server automatically adjusts to daylight savings time.
🖺 When this option is selected, the option "Automatically set daylight saving time (DST)" is deselected.

HMI time zone: Select the time zone of the HMI relative to UTC time (Coordinated Universal Time; also called Greenwich Mean Time or GMT).

Server response time: Select the time zone of the NTP server relative to UTC time.

Network time server: There are four Network time server fields available to configure. You can enter the IP address or the domain name of the NTP server(s). If the synchronization with server 1 fails, the HMI will try to synchronize with server 2, and so on. If the HMI is unable to synchronize with any of the NTP servers, the system bit LB-12055 will turn ON to indicate that time synchronization failed.
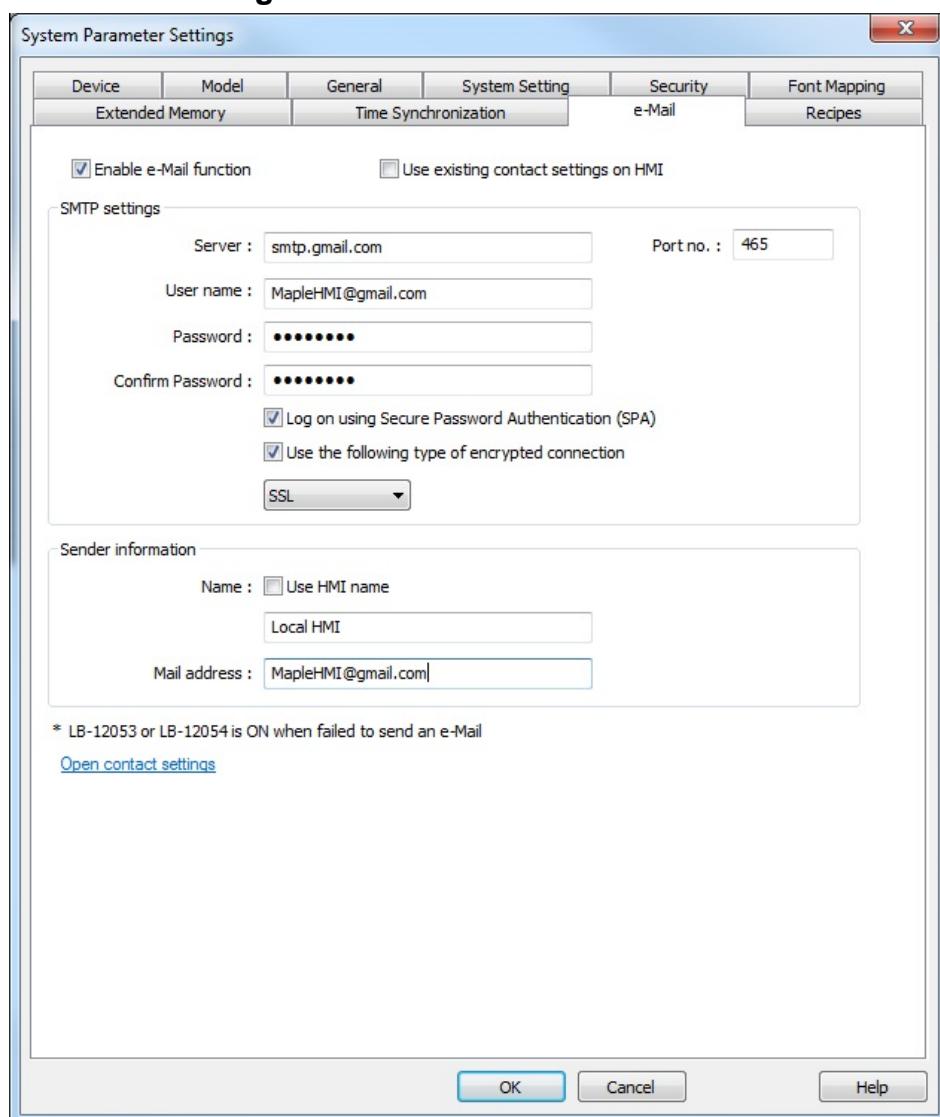
Update interval: Determines the frequency with which the HMI attempts to synchronize with the NTP server. The range is 10 seconds to 86400 seconds (24 hours).

Automatically set daylight saving time (DST): This option is available if the Server response time has been adjusted in accordance with DST is NOT selected.

The **Start** and **End** fields allow you to choose when Daylight Savings Time begins and when it ends. The clock will move forward at the Start time and will move back at the End time.

Daylight bias determines the time offset that will be used when DST starts and ends (usually 1:00 hour).

E-Mail tab settings:

The e-Mail tab is used to enable and configure the email feature in EZwarePlus. Alarms can be configured to automatically send an email to a list of recipients when the alarm occurs and when the alarm is cleared. In addition, a screenshot of the HMI's screen can be attached to the email. An email can also be sent when a Backup object is activated to send history files, recipe files, or the operation log to a list of recipients.

Enable e-Mail function: Check this box to enable the emailing feature.

Use existing contact settings on HMI: Email SMTP settings and contacts can be imported to the HMI from a USB flash drive using the Administrator Tools. When this box is checked, emails will be sent using the settings in the HMI.

SMTP settings: SMTP (Simple Mail Transfer Protocol) is an internet standard for sending email across IP networks. Contact your IT or LAN administration staff for specific information on entering the SMTP settings.

> **Server:** Enter the SMTP server address for your particular email provider.

> **Port:** Enter the port number used by the email server for SMTP communications.

> **User name:** Enter the user name that the email account requires (usually the email address).

> **Password:** Enter the password associated with the email account.

> **Confirm Password:** Enter the password again. It must match the first password entry.

> **Log on using Secure Password Authentication (SPA):** Check this box if your email server requires Secure Password Authentication.
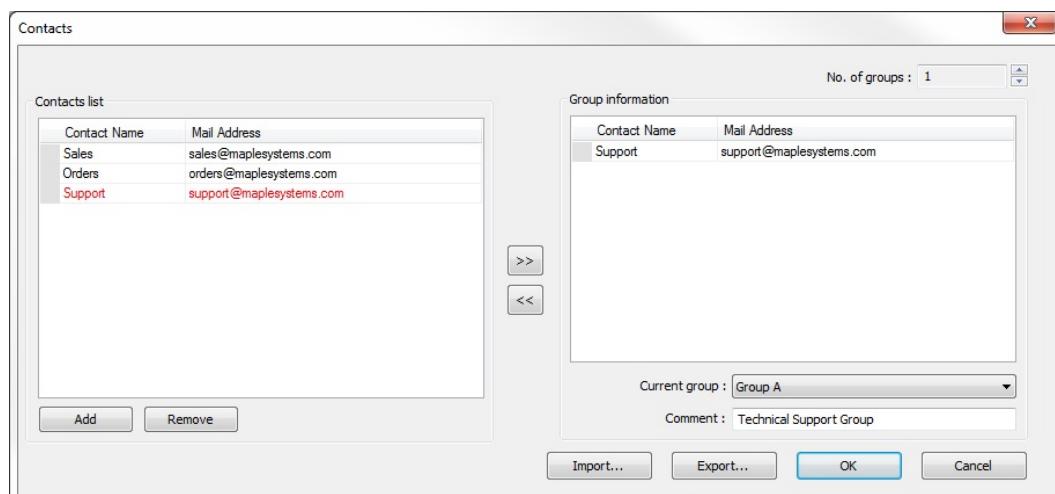
> **Use the following type of encrypted connection:** Check this box if your email server requires TLS or SSL encryption.

Sender information: Configures how the sender (HMI) will appear to the recipients.

> **Name:** Check "Use HMI name" to use the name assigned to the HMI in the System Parameters Device List. If unchecked, a name can be assigned in the field below.

> **Mail address:** This is the "From" email address as it will appear in the email that is sent.

Open contact settings: Click here to open the **Contacts** dialog box, which is used to enter email addresses and create groups of recipients. Up to 16 groups can be created with a different list of recipients for each group.

Add: Add a new email address to the Contacts list.

Remove: Remove an email address from the Contacts list.
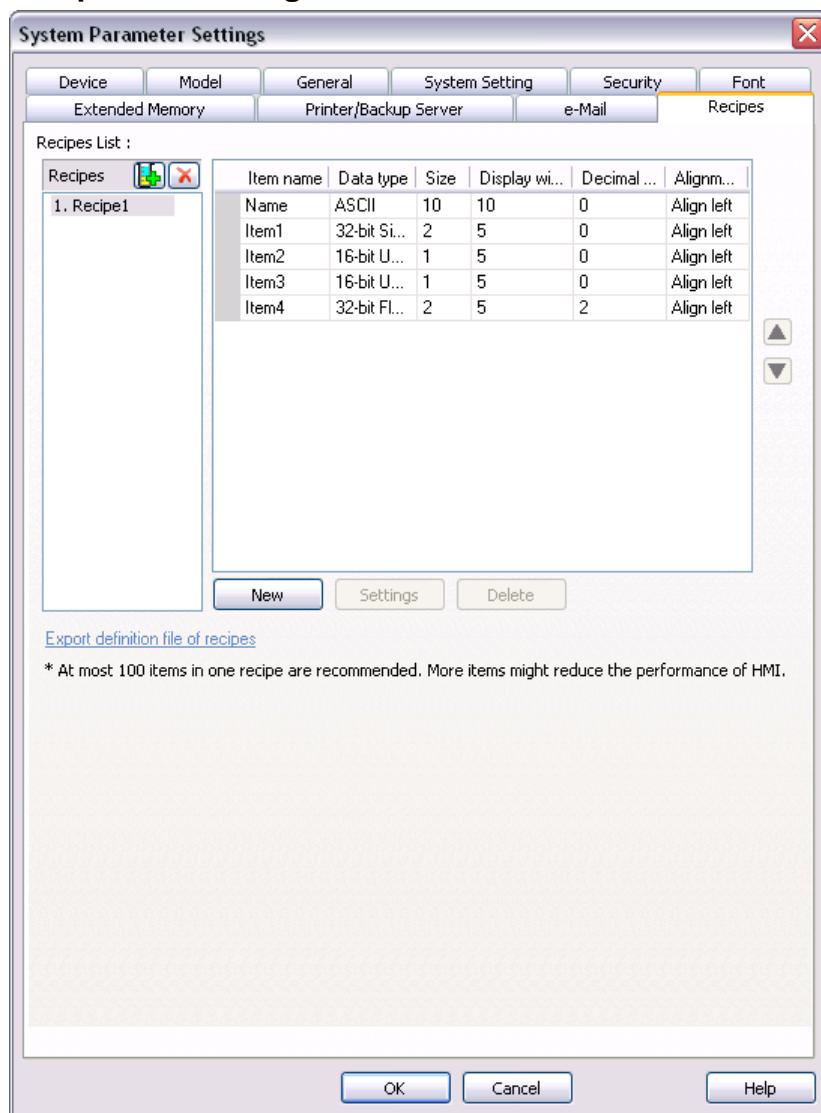
Left and Right Arrows [<<] [>>] : Add or remove a selected contact in the left side of the window to or from the selected group in the right side of the window.

Export: Export the Contact List and Group Lists in a CSV file format. The list can then be backed up or edited to add more contacts.

Import: Import a CSV file containing the Contact List and Group Lists for a project.

See "Chapter 13 – Capturing Alarms and Events" for more information on using alarms and events to trigger an email from the HMI.

Recipes tab settings:

There are two methods for creating and storing recipes in EZwarePlus. One method uses the RW memory in the HMI to store data and LW-9000 to index (jump) from one recipe to another. The data can be entered manually using Numeric Input objects or imported as a *.rcp file from the Recipe Editor.
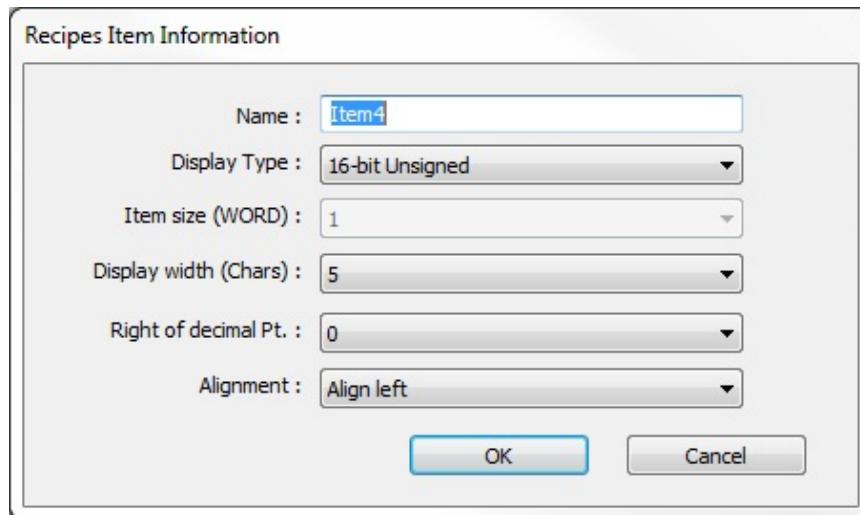
Another method stores the data in a database file (*.db) in the HMI. The recipe format (definition) is created in the Recipe tab of the System Parameters and the data is entered manually in Offline or Online Simulation mode using the Recipe View object and Numeric Input objects, or edited directly in the database file using the Recipe Database Editor (Tools > Recipe Database Editor).

Click the "Add New Recipe" button ![icon] to create a new recipe. There are six parameters to define for the recipe records in a new recipe.

1. **Item name:** Provides a name for the recipe record, usually an alphanumeric name, occupied by the first column when displayed in the Recipe View object.

2. **Data type:** Defines the type of data that is used for each element in the recipe record (i.e., ASCII, 16-bit unsigned, 32-bit float, etc.).

3. **Size:** Defines the number of words for each element in the recipe record. Adjustable only for the ASCII, Unicode, and High/Low Reversed data types. All other data types set this field automatically.

4. **Display width:** Defines the width of the data to be displayed in number of characters. This includes the sign, decimal point, and all digits to the left and right of the decimal point. For example, -1.34 would require a Display width of 5, while 1.3 would require 3.

5. **Decimal Pt.:** Defines the number of digits to the right of the decimal point.

6. **Alignment:** Defines how the data will be aligned in the Recipe View cell (Align left, Align center, Align right).

Click the **New** button to add items (data fields) to the recipe after the selected item. Each new item adds a column to the recipe when viewed in the Recipe View object.

Click the **Settings** button to edit the parameters for the selected item in the Recipes Item Information popup window.

The parameters can also be edited directly in the item list in the Recipes tab.
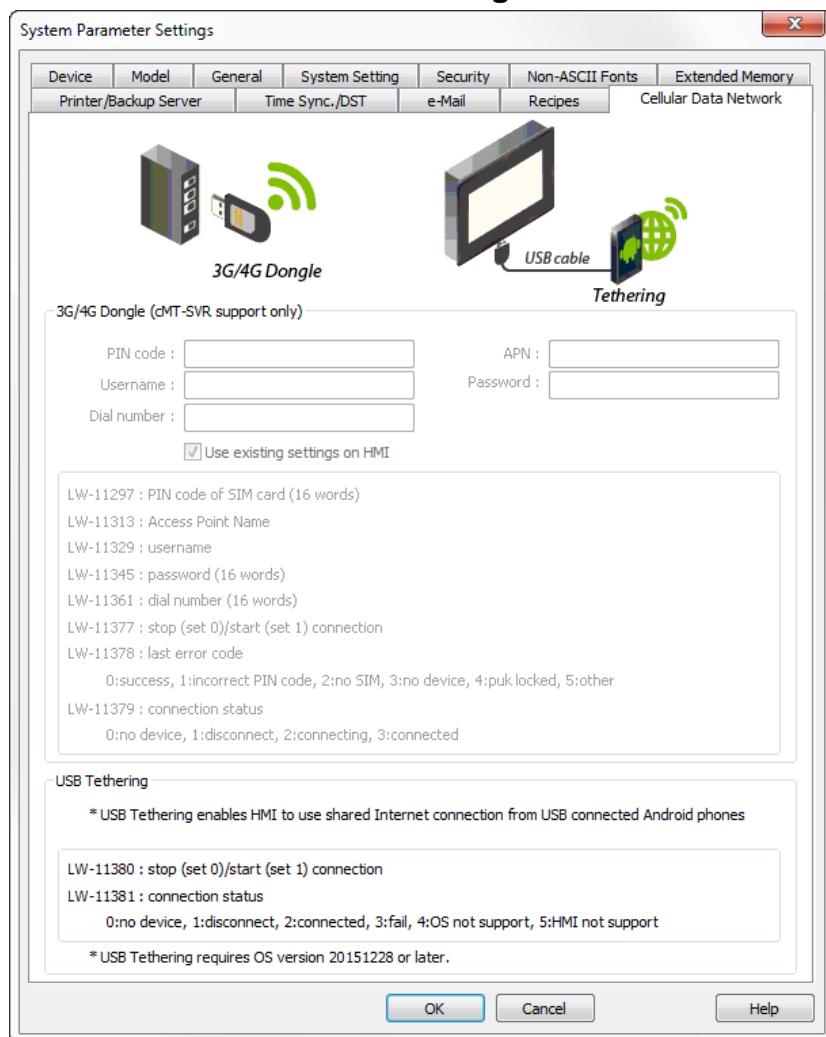
Click the **Delete** button to delete the selected item from the list.

Click the Up/Down arrow buttons on the right side of the Recipes tab to move the selected item up and down in the list.

Click **Export definition file of recipes** to save the recipe definitions in a *.rdef file. This can be imported into the Recipe Database Editor for adding data to the recipe.

See "Chapter 16 – Recipes" for more information about using recipes in EZwarePlus.

Cellular Data Network tab settings:

The Cellular Data Network tab is used to setup the cellular network connection for the HMI. Network data settings will be different between different network providers and hardware manufacturers, please refer to documentation from your hardware manufacturer and service provider for network settings.

RMI 5010

Attaching a 3G/4G USB dongle to the USB port enables the RMI5010 to connect to the 3G/4G network through the device.

If **Use existing settings on HMI** is checked the cellular data settings currently in the HMI will be used. When no specific settings are required, set **PIN code** to "0000," **APN** to "internet," and leave **Username, Password,** and **Dial Number** blank.

Registers:

- LW-11297: (16 words) : PIN code of SIM card (cellular network)
- LW-11313: (16 words) : APN - Access Point Name (cellular network)
- LW-11329: (16 words) : username (cellular network)
- LW-11345: (16 words) : password (cellular network)
- LW-11361: (16 words) : dial number (cellular network)
- LW-11377: (16bit) : stop (set 0)/start (set 1) connection (cellular network)
- LW-11378: (16bit) : last error code (0:success, 1:incorrect PIN code, 2:no SIM, 3:no device, 4:puk locked, 5:other) (cellular network)
- LW-11379: (16bit) : connection status (0:no device, 1:disconnect, 2:connecting, 3:connected) (cellular network)

HMI or RMI5001 Connecting an Android mobile phone to the HMI with a USB cable enables the HMI to share the network connection of the mobile phone.

On the Android mobile phone enable USB tethering.

Registers:

- LW-11380: (16bit) : stop (set 0)/start (set 1) connection (USB tethering)
- LW-11381: (16bit) : connection status (0:no device, 1:disconnected, 2:connected, 3:fail, 4:OS not supported, 5:HMI not supported) (USB tethering)

Reboot HMI

EZwarePlus can automatically reboot the HMI after download.

To enable automatic reboot of HMI after download:

1. From the **Tools** menu, select **Download**. The Download dialog box is displayed.

2. Check the **Reboot HMI after download** checkbox.

3. Click **OK**.

To manually reboot HMI:

1. From the **Tools** menu, select **Reboot HMI**.

2. Select Ethernet or USB cable.

3. You can reset the recipe, recipe database, event log, and data sampling by selecting the corresponding checkbox.

4. Click Reboot HMI.

Save and Compile the Project

EZwarePlus can automatically save and compile the project when downloading or simulating.

To enable automatic save and compile:
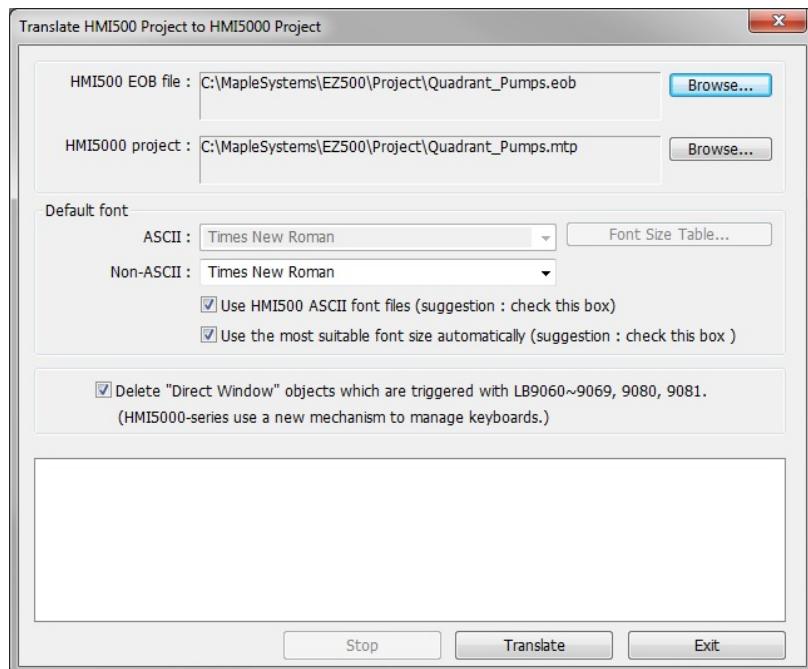
1. From the **Option** menu, select **Function Property**. The Function Property dialog box is displayed.

2. Check the **Automatic save and compile when download and simulate** checkbox.

3. Click **OK** to exit the Function Property dialog box.

EZware-500 Project Translation Utility

EZwarePlus has a translation utility that will convert projects created in EasyBuilder-500 into a project format that can be read and modified using the EZwarePlus software. Below is a brief description of how to use this utility (for more information, download Technical Note 5102 on this subject from Maple Systems' website):

To convert a *.eob (EasyBuilder-500 compiled project) into a *.emtp (EZwarePlus project), it is necessary to use the Translation utility in EasyBuilder-5000 first and then transfer the translated project to EZwarePlus:

1. Open EasyBuilder-5000.

2. From the **Tools** menu, click **Translate HMI500 Project:**
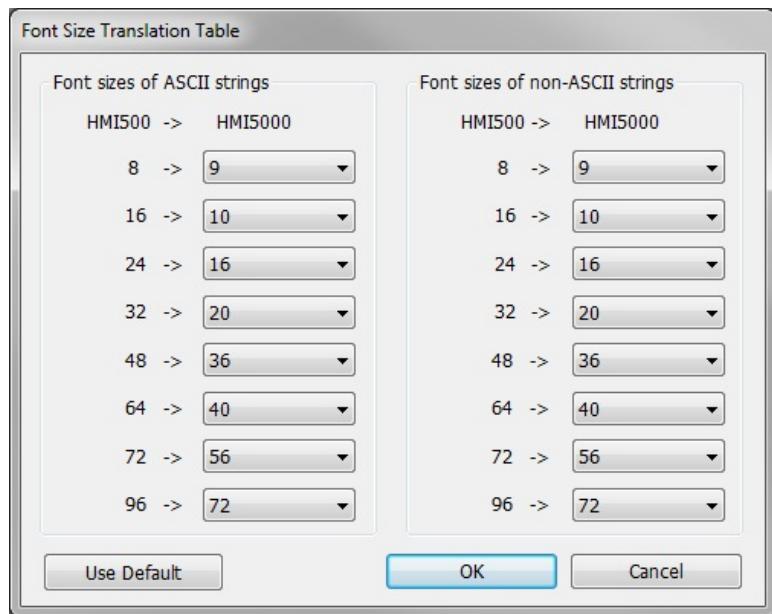
3. Click the **Browse…** button for the HMI500 EOB file and select the EasyBuilder-500 project file you wish to convert.

4. By default, the converted file is automatically placed into the same directory. To modify the name of the file or location, click the **Browse…** button for the HMI5000 project file.

5. **Default font:** All text objects in theEasyBuilder-500 project file use a proprietary fixed font. When converting to an EasyBuilder-5000 project, these text objects are converted to TrueType fonts. Use this section to specify which TrueType fonts you wish to use.

🖅 The EZware-500 configuration software uses proprietary fonts that must be replaced with a Windows TrueType font. EZware-5000 installs three TrueType fonts into the Windows > Fonts folder that closely resemble the fonts used in EZware-500 (HMI 500 16p, HMI 500 24p, HMI 500 8p). Select **Use HMI500 ASCII font files** to use these fonts. If you choose to use another Windows TrueType font (by unchecking **Use HMI500 ASCII font files**), additional 'tweaking' may be required after you have converted your project. We recommend using Calibri if you have this font available on your computer. Otherwise, another san serif font like Helvetica should work.
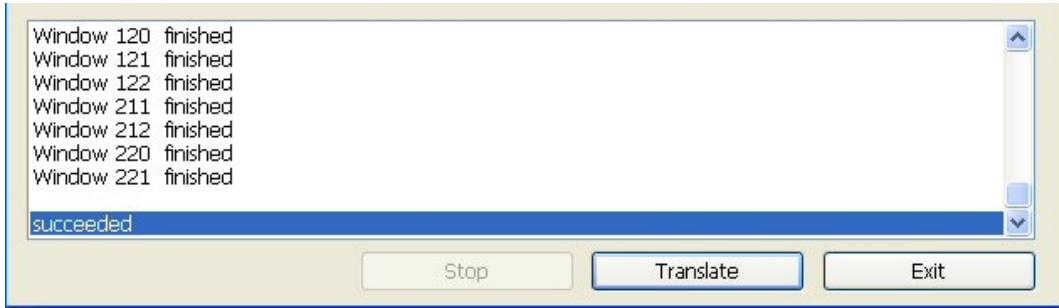
You can allow EasyBuilder-5000 to automatically adjust the font size for you by selecting **Use the most suitable font size automatically**. If you uncheck this box, you can click on the **Font Size Table** button, which allows you to customize the transition size of the fonts from EasyBuilder-500 to EasyBuilder-5000 projects. This gives you maximum flexibility in deciding which font and which sizes you would like to use. For the Calibri font, we recommend those items as shown in the table on the next page.

Font Size Translation Table		
Font sizes of ASCII strings		**Font sizes of non-ASCII strings**
HMI500 -> HMI5000		HMI500 -> HMI5000
8 -> 9		8 -> 9
16 -> 10		16 -> 10
24 -> 16		24 -> 16
32 -> 20		32 -> 20
48 -> 36		48 -> 36
64 -> 40		64 -> 40
72 -> 56		72 -> 56
96 -> 72		96 -> 72
Use Default	OK	Cancel

6. Delete "Direct Window" objects which are triggered with LB9060~9069, 9080, 9081, (HMI5000-series use a new mechanism to manage keyboards.): Check this box to delete any Direct Windows objects in the EasyBuilder-500 project file that are triggered by the internal local memory bits LB9060-LB9069, LB9080-LB9081.

   🗐 In EasyBuilder-500, these local memory bits allowed a popup window to appear in the display based upon touching any Numeric Input or ASCII Input object located in a particular area of the screen. This feature is not available in EZwarePlus. By default, this option is checked.

7. Click the **Translate** button to begin conversion of the file. When done, you will see text in the comments field that indicates if the conversion is successful.

8. Click the **Exit** button to go back to the main screen of EasyBuilder-5000. Open the converted file as you would normally open any EasyBuilder-5000 project file.

◢ Due to some incompatibilities between the EZware-500 software and the EasyBuilder-5000 software, you should check each screen and test operation after conversion to make sure that your HMI works to your satisfaction.

◢ The Shape Library and Picture Library file formats in EZwarePlus are different than those used in EasyBuilder-500. When a project is translated, EasyBuilder-5000 creates new libraries with the same file name as the translated project containing the shapes and pictures (bitmaps) from the original EasyBuilder-500 project. For example, if a 500 Series project is translated and saved with the filename "PumpStation4.mtp," a Shape Library is created with the name "PumpStation4_0.plb" and a Picture Library is created with the name "PumpStation4_0.flb" and saved into the EZware-5000 Library folder (C:\MapleSystems\EZ5000\library).

9. Depending on the HMI model you have to replace the HMI500 Series, you may need to select a new model in the System Parameters > Model tab that corresponds to the screen size of the HMI5000 Series you are converting to. Use the following table to match the target HMI (the HMI5000 Series that you have) with the model you should select in EasyBuilder-5000.
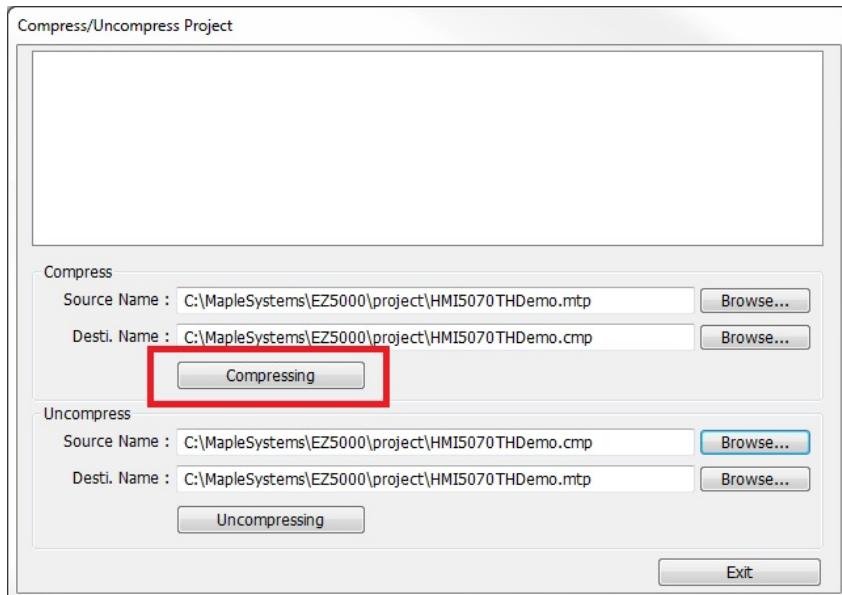
Target HMI	Screen Resolution	EasyBuilder-5000 Model
HMI5043L	480x282	HMI5043N/T
HMI5070P/L/DL/R; 5100L	800x480	HMI5070NH/TH
HMI5121P/XL; HMI5150P/XL; 5097XL/NXL	1024x768	HI5150X
RMI5001	1280x720	HMI5150X (closest fit)
RMI5010	1024x748	HMI5150X (closest fit) (not all features will convert)

10. Once you have selected the corresponding model in the Model tab, click **OK**. A popup window will appear with options for resizing windows and objects in the project.
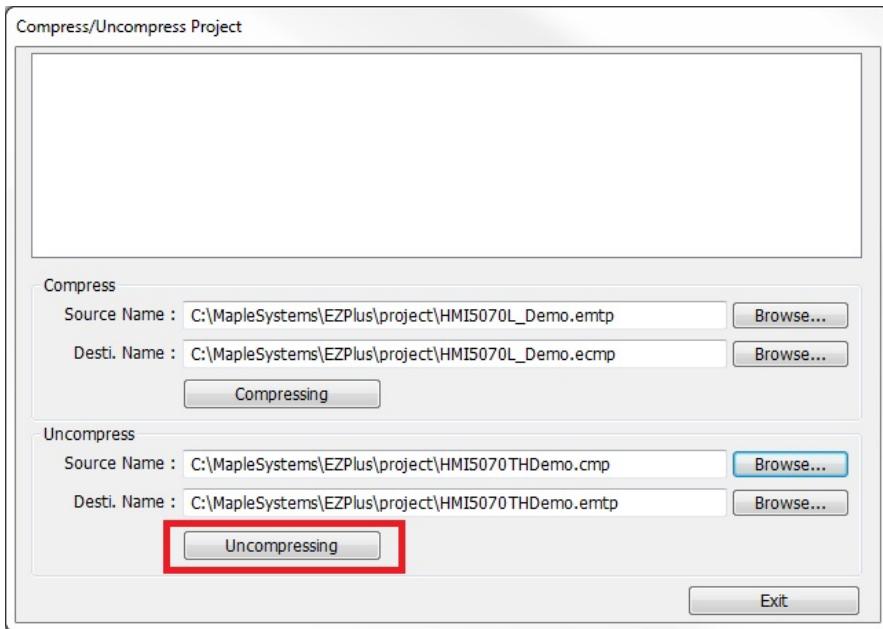
There are four options for resizing the project. Select **Resize pop-up windows and Resize objects** under General windows. If you want the keypads to be resized appropriately for the new screen size, select **Resize keyboard windows** and **Resize function key** objects under Keyboard windows.

11. Click **OK** and the windows will automatically resize to the selected model's screen resolution. Save the project.

12. Compress the file by opening the **Compress** utility (Tools > Compress/Uncompress) and clicking the **Compressing** button.

13. This creates a new file with the same name as the project but with a *.cmp extension. The compress utility bundles the project file (*.mtp) with the library files that are linked to the project.

14. Copy the compressed file (*.cmp) into the EZwarePlus project folder (C:\MapleSystems\EZPlus\Project). Open EZwarePlus and run the **Uncompress** utility (Tools > Compress/Uncompress).

This extracts the *.emtp project file and the library files and places them in the Project folder and Library folder, respectively.

15. Open the project in EZwarePlus and select the appropriate model in the System Parameters > Model tab.

Chapter 7 – Creating Windows

This section shows how to create and use windows in EZwarePlus.

Window Fundamentals

An operator interface terminal wouldn't be very useful if all of the information to be displayed could only be placed onto one screen. Therefore, most HMIs have multiple screens that you can use to display information. The Maple Systems HMI5000P/L are capable of storing up to 1999 windows (actual limit is determined by memory requirements of each screen), giving you maximum flexibility in designing your operator interface. We prefer to call these screens 'windows' because they have several features not normally associated with screens:

- Windows can be created in any size. You can make the window full-sized so that it fits the entire area of the HMI display or you can create a window that partially covers the display.
- Windows can be overlaid on top of each other. All data on each window displayed is updated continuously regardless of whether or not it is covered up by another window.
- Windows can be moved around the HMI display to allow portions of other windows to come into view.
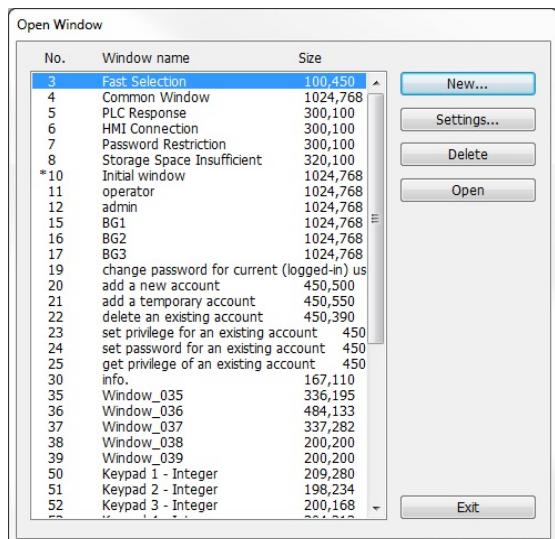
The HMI5000 Series has four basic types of windows available for use: Base windows, a Common window, System Message window, and a Fast Selection window. Base windows are the windows that you will most often use. The Common window and Fast Selection window are two windows reserved for special functions. System Message windows are reserved for custom messages from the controller. By the end of this chapter, you will be able to create these windows and use the many features available to them.

Opening and Closing a Window

To view the contents of a window in EZwarePlus, it must first be opened. When you create or open an existing project file, only the initial window is opened. To view any other windows that have already been created, you must first open the window. This can be done using the Window Tree (see "Chapter 6 – Using EZwarePlus > Display Options") or by performing the following:

To open a window:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Click on the Window you wish to open. Then click **Open**.
   🗐 You can also open the window by double-clicking the window.

3. The Open Window dialog box closes and the opened window is displayed in the EZwarePlus work area.

The Open Window dialog box lists all of the windows currently created for the project. An asterisk next to a Window indicates that the window has already been opened. Each window is listed with the Window name and size. The window name is the name that you assign to the window when it is created. The window size is shown for quick reference. Finally, you will notice that the Open Window dialog box is also used to create a new window or change any of the settings for a window.

By default, when a window is opened it will replace any window that was displayed in the work area of EZwarePlus. To switch between open windows, click the Window menu and select from the list of windows currently open. You can also cascade (select **Window-Cascade**) or tile (select **Window-Tile**) the open windows to see the windows at the same time.

EZwarePlus requires more resources from your computer every time you open another window. When many windows are open, the performance of the computer may be affected. Therefore, you may wish to close some of the windows until you need to edit them.

To close a window:

1. You will notice three small icons located in the upper right hand corner of each window: the minimize icon ▬ , the maximize icon 🗗 , and the close icon ✖ . To close a window, click the close icon associated with that window. These icons show in the window if minimized. Otherwise, the icons are located on the rightmost end of the menu bar of EZwarePlus.

2. There is a close icon on each window tab as well, located just above the work area.

Creating a New Window

Whenever you create a new project, several windows have already been created by EZwarePlus. Windows 5, 6, 7, and 10 are created by default. You must have the "Use template" option checked when creating the project to create the other windows listed below.

#3: Fast Selection – The window controlled by the Fast Sel button that appears on every window (when enabled in the **System Parameters > General** tab). This allows you to quickly jump to commonly accessed windows or objects by placing Function Keys on the Fast Selection window.

#4: Common Window – A window that displays graphics (such as a company logo) or objects that are always on every screen of the display. The common window runs below every other window that is being displayed on the HMI.

#5: PLC Response – This is the window that is displayed when the HMI loses communications with the PLC.

#6: HMI Connection – This is the window that is displayed with the HMI loses communications with a remotely connected HMI.

#7: Password Restriction – This is a window that is displayed when access is attempted on a protected object without the proper password.

#8: Storage Space Insufficient – This is a window that is displayed when the available memory in the HMI, USB Flash drive, or SD card is running low.
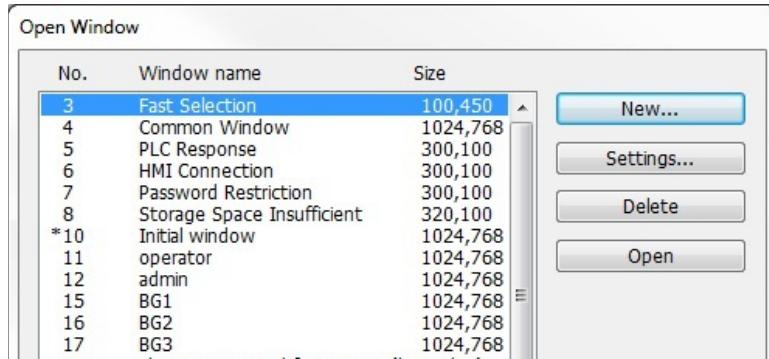
#10: Startup Window – The window that displays whenever the HMI is started up. The Startup window can be redefined in the System Parameter Settings, on the General tab.

#50-65: Various Keypads– A selection of different style keypads to use for numeric or alphanumeric entry including Integer, Hex, Floating, and ASCII.

The remaining windows are available to be created as you desire for your project. In order to create new windows, the following steps must be performed.

To create a new window:
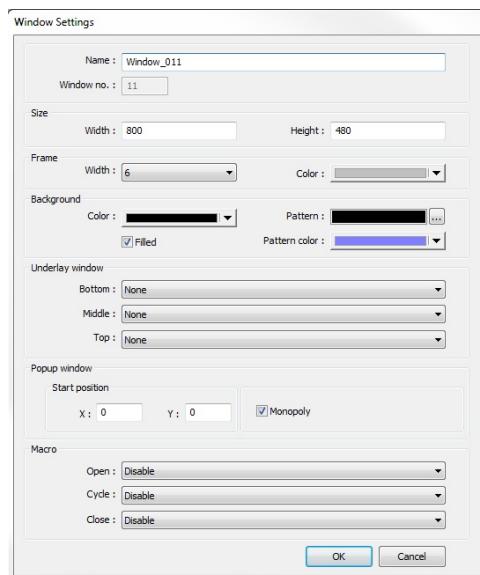
1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Click **New…** The Select Window Style dialog box appears.

3. Click **Base Window**. If the Fast Selection and Common Window buttons appear grayed out, then it is because those windows have already been created. The Window Setting dialog box appears.

4. Modify the window parameters, then click **OK**. The Open Window dialog box reappears.

5. If you wish to open the window you just created, click on the window and click **Open**. Otherwise, click **Exit** to return to the main screen of EZwarePlus.

6. An alternate method of creating a new window is to right-click on an unused window number in the **Windows Object List** and select **New**. The Window Settings dialog opens.

Window Settings

Let's look more closely at the parameters you can change when creating a new window.

⌨ When a window is initially created, the window settings can be edited to make changes. To change the window settings, highlight the desired window in the Open Window dialog and click on the **Settings...** button. Alternately, right-click on the desired window in the **Window Tree > Object List** and select **Settings**.

Window Name

The Name is a description box used to help you identify what the window is used for without having to actually open the window and look at the contents. Up to 50 characters can be entered into this field with space characters allowed.

Window Number

Although 1999 windows are available on the HMI5000P/L Series, two are specifically reserved for the Common Window and the Fast Selection window and several are reserved for internal use. Therefore, you can assign #10-1999 to any window you create. When you initially create a window, EZwarePlus will automatically assign the lowest available number to the window. However, once you create the window you can go back into the Window Settings and reassign it to any number within the allowed range. In this manner, you can group windows together that may share some common traits.

Size of Window

You can vary the size of a new window to create full screen or popup windows. Popup windows are most often used to display data that does not need to be on the HMI display all of the time. For example, you might want to configure an instructional message in a popup window that can be moved aside or closed when not needed. The message can be triggered to pop up when needed or appear with a keypress.

Window Frame

The Window Settings dialog provides the option of having a frame around any window that you create. You can create a frame from 0-16 pixels wide in any of the EZwarePlus 65K available colors.

Window Background

You can also select a different background color for each window created. The default setting is black.

To select a different background color:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Click on the window that you wish to change the background color. Click **Settings**. The Window Setting dialog box appears.

3. In the **Background** section, check the **Filled** box.

4. Click the pull-down arrow of the **Color** box. The Color dialog box appears.

5. Select from one of the basic colors or add new colors from the customized list of colors. To create a customized color, click on the Custom button at the bottom of the Color dialog box..

6. The color table dialog box appears allowing you to select or modify one of the colors available.

7. Click **OK** in the Color dialog box to go back to the Window Setting dialog box. Click **Close** to return to the EZwarePlus main screen.

Instead of using a solid background color, you can select a pattern that is displayed in the background of a window.

To select a background pattern:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Click on the window that you wish to change the background pattern. Click **Settings**. The Window Setting dialog box appears.

3. In the Background section, check the **Filled** box. Select a background color as described above.

4. Click the pull-down arrow of the **Pattern** box and select a pattern, then click **OK**.

5. Click the pull-down arrow of the **Pattern color** box and select a color.
    ▤ To use the background pattern, the color selected for Pattern color must be different then the color selected for the Background color.

6. Once a pattern color is selected, click **OK** in the Color dialog box to go back to the Window Setting dialog box.

7. Click **Close** to return to the EZwarePlus main screen.

Underlay Windows

An Underlay Window is a Base Window that is displayed at the same time as the Base Window that calls it. Each full-size Base Window can display up to three underlay windows. A popup window cannot display any underlay windows. There may be times when it is desirable to place the same information on multiple (but not all) windows. Underlay windows provide a means to accomplish that without the overhead of a Direct or Indirect Window, and without using the Common Window (which makes the information visible on all windows). Underlay windows also eliminate the need to actually place the same objects on multiple windows, which increases the memory required for the project. Each base window can display up to three underlay windows, which are called Bottom, Middle, and Top.

How to Display Underlay Windows

When you have common objects to display on multiple screens, use the underlay window feature to store these on underlay windows attached to a base window. This decreases the amount of memory required for the project. The base window "calls" the underlay window. Each full-size base window can display up to three underlay windows, which are called Bottom, Middle, and Top. Objects on the underlay windows cannot be edited from the base window on which they are displayed.

▤ It may be desirable to use Underlay Windows but temporarily hide them when developing the project.

The 🗖 button on the Standard Toolbar toggles the visibility of objects on Underlay Windows. You can also toggle the Underlay Window visibility in the **Preferences** window under the **Option** menu .

▤ A popup window cannot display any underlay windows.

To assign underlay windows to a base window, you must first create the underlay windows. Underlay windows are created the same way base windows are created. Then you can assign the underlay windows to the base window.

To assign underlay windows to a base window:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Highlight the base window you wish to use.

3. Click the **Settings…** button. The Window Setting dialog box appears.

4. Click the pull-down list box for each Underlay window selection to assign the underlay window screens to the base window.

5. Click **OK**. Click **Close** on the Window Setting dialog box.

Rules That Apply to Underlay Windows

- Only the objects of an underlay window are displayed on the base window. All background information about the underlay window (i.e. background color, frame color and size, etc.) are not displayed on the base window.

- Active objects can be 'overlaid' on top of each other over two or more underlay windows. For example, a Set Bit object that is configured to set an HMI local bit LB0 is located at X=20, Y=50 for Underlay Window #1. Another Set Bit object that controls LB1 is placed on Underlay Window #2 at the same location. When the Base Window displays these two windows, both objects will be active so that when they are pressed both LB0 and LB1 will be set.

- Static objects may be overlaid using underlay windows. However, any static object that is on the Base Window has the highest precedence and will be displayed over any static objects that are on the underlay windows. Active objects have higher precedence over static objects.

- Popup windows cannot display underlay windows.

- Underlay windows are always positioned from the top left corner of the screen. Any position settings you make when creating the underlay window are ignored when the window is displayed by a Base Window as an underlay window.

For more information and an example of how to use underlay windows, consult the EZwarePlus Help files.

Popup Window Start Position

This is the starting position that the window goes to when it is initially called onto the HMI screen as a popup window. The X and Y positions refer to the pixel location of the HMI display at which the upper left-hand corner of the window is to be displayed.

The default setting is X=0 and Y=0 which is the upper left-hand corner of the HMI display. The X-axis refers to the horizontal location and the Y-axis refers to the vertical location.

Monopoly Feature

The monopoly feature is used to 'monopolize' all touchscreen action that can occur on the HMI screen. For instance, suppose the HMI display is currently showing a full screen window with several objects. If a popup window is displayed that does not have the monopoly feature enabled, the HMI operator is able to press and activate any objects on the popup window or the full screen window since objects on both screens are active.
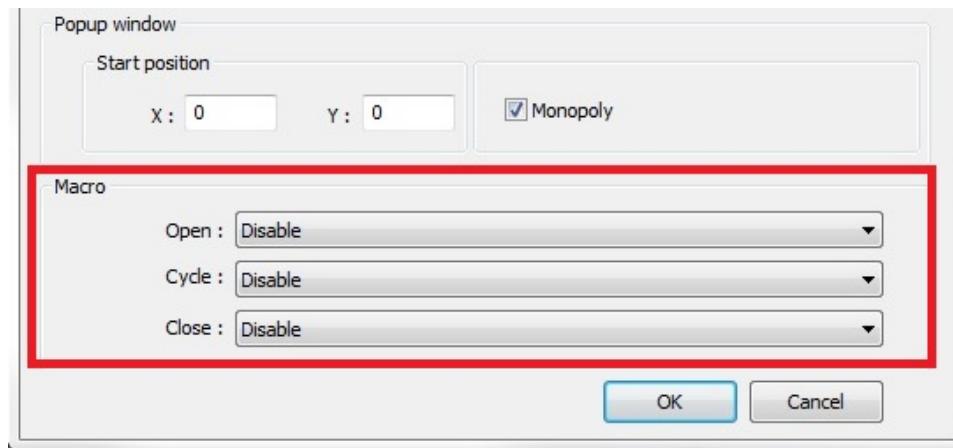
If another popup window is displayed that does have the monopoly feature enabled, then the objects on the full screen window will not respond when pressed.

Please note that the monopoly feature only disables touchscreen objects on the full screen window. Objects on other popup windows can still be activated.

The monopoly feature can be used to display a popup window with some action that the HMI operator must perform before being allowed to do some other action on the HMI. For example, you might construct a dialog box that asks the HMI operator if some step in the control process has been performed. The dialog box would have Yes and No function key options which, with the monopoly feature enabled, the HMI operator must press before continuing.

Macro

Macros can be executed when a window opens, closes, or while it is open.

🗐 The Macro options do not appear unless a macro has been created in the project.

The options are:

1. **Open:** runs once when window opens.

2. **Cycle:** runs once every 500 milliseconds while window is open.

3. **Close:** runs once when window closes.

Notes:

1. The macro options work on base windows, popup windows, direct windows, indirect windows, and windows called from PLC control objects.

2. For indirect windows, the open and close macros are both executed when the window is changed.

3. The monopoly feature does not prevent the macro from being executed.

Deleting a Window

Before any window can be deleted from a project, the window must be closed. To close a window, see the section earlier in this chapter on opening and closing windows.

To delete a window:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Highlight the window that you wish to delete.

3. Click the **Delete** button. A dialog box appears asking if you want to delete this window.

4. Click **Yes**. The dialog box disappears and the selected window is deleted.

5. Click **Close** in the Open Window dialog box to go back to the EZwarePlus main screen.

☞ If the Delete button does not appear when the window is highlighted, this means that this is a Window that can't be deleted. Typically, if you are unable to delete a window, it is because it is one of the predefined windows discussed earlier in this chapter or the window is still open.

☞ Windows can also be deleted by right-clicking on the window in the Windows Object list and selecting **Delete**. The window must be closed before it can be deleted.

Using Base Windows

Of the four types of windows, base windows are the most commonly used. A base window is used to create a full screen window or a popup (partially sized) window. Popup windows can also be moved about on the HMI display and can overlap each other. The number of objects that can be placed onto each base window is limited only by the total amount of memory available within the HMI.

How to Display Base Windows

Base windows can be displayed on the HMI screen by using a function key to display the window or by using the PLC to call up the window.

Using a Function Key

The Function Key Object is a graphic touch object that is placed onto a window to perform an action. Function keys have many purposes, but two actions that a function key can perform are:
• Calling a full screen window
• Calling a popup window

Calling a full screen window

If a function key object is created to call a full screen window, the window that is displayed replaces the base window currently displayed and closes any popups that were opened with the **Close this popup window when parent window is closed** option selected.

To call a full screen window using a function key object:

1. From the **Objects** menu, select **Function Key**. The New Function Key Object dialog box appears.

2. In the **General** tab, click the **Change full-screen window** option button.

3. In the same section, enter the **Window No.** you want to call.

4. Select the **Shape** tab, click the **Use shape** or **Use picture** checkbox, and then click the **Shape Library** button or **Picture Library** button. Select the shape or bitmap you wish to use to represent the function key and click **OK**.

5. Select the **Label** tab and check **Use label** and create a label for the function key.

6. Click **OK** to return to the main screen of EZwarePlus.

7. Place the function key object where you want it on the window you are editing. You must select a window that is full size when using the Change Window function.

Calling a popup window

If a function key object is created to call a popup window, the window that is displayed is generally overlaid over all other windows that are on display. Think of calling a popup window as opening another active window for display.

To call a popup window using a function key object:

1. From the **Objects** menu, select **Function Key**. The New Function Key Object dialog box appears.

2. In the **General** Tab, check the **Display popup window** option button. Note that the **Close this popup window when parent window is closed** checkbox will cause the popup to close automatically whenever the base window changes.

3. In the same section, enter the **Window No.** you want to call.

4. Select the **Shape** tab, click the **Use shape** or **Use picture** checkbox, and then click the **Shape Library** button or **Picture Library** button. Select the shape or bitmap you wish to use to represent the function key and click **OK**.

5. Select the **Label** tab and check **Use label** and create a label for the function key.

6. Click **OK** to return to the main screen of EZwarePlus.

7. Place the function key object where you want it on the window you are editing. You must select a window that is less than full size when using the Popup Window function.

To display a full screen or popup window, press the touchscreen where the function key object is located. The window displays in the location on the HMI display as determined by the X and Y position in the Window Settings box for that window.

Using the PLC

Three objects are used by the PLC to call or display a base window. The PLC Control Object is used by the PLC to display full screen windows. The Direct and Indirect Window Objects are used by the PLC to display popup windows.

The PLC Control Object
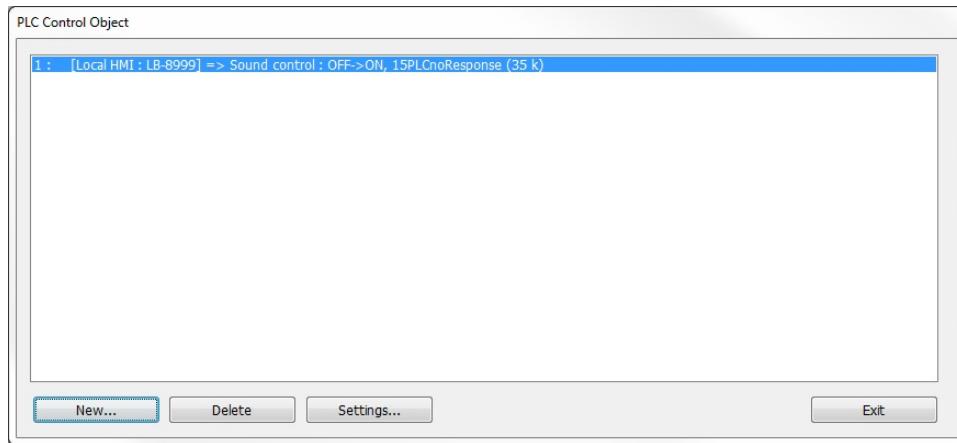
The PLC can display a full screen window by using the PLC Control Object. This object allows the HMI to continuously scan a PLC register to display a full screen window, which corresponds to the number in the PLC register.

Once the HMI displays a window that is requested by the PLC Control Object, the HMI will automatically write the number of the requested window to the next consecutive register. For example, if you assign a Modbus holding register 4x10 to a PLC Control Object/Change Window and the number 3 is placed into this register, then the HMI will display Window #3. Finally, it will put the number 3 into 4x11. This allows the PLC to confirm that the window has been properly displayed by the HMI.
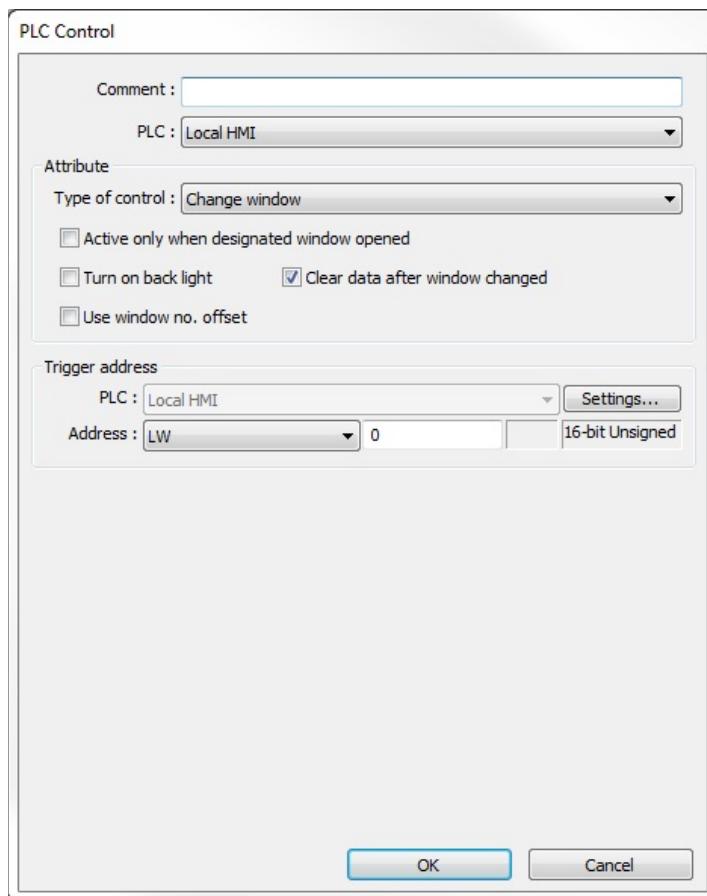
You can create as many PLC Control Objects as you need -- each object is universal and is not dependent upon which HMI window is currently on display.

To call a full screen window using the PLC Control object:

1. From the **Objects** menu, select **PLC Control**. The PLC Control Object dialog box appears.

2. Click **New...**. The PLC Control dialog appears.

3. Select **Change window** from the **Type of control** drop-down box in the **Attribute** section.

4. Click the **Setting…** button in the **Trigger address** section and select the **Device type** and **Address** for the actual PLC address you wish to monitor.

   ☞ The HMI will write the number of the newly-displayed window to the next consecutive address after the address specified in this step.

5. Select the format from the drop-down menu (e.g., 16-bit or 32-bit unsigned, signed or BCD).

6. Click **OK** to return to the PLC Control dialog box. Click **OK** again to return to the PLC Control Object dialog box.

7. You will see a new entry that lists the PLC address that is monitored by the HMI.

The PLC must only enter window numbers that represent full-size windows when using the PLC Control Object function. If the PLC writes the number of a popup window or a non-defined window to the thrigger address, then no action will be taken.

🔲 See "Chapter 6 – Using EZwarePlus > EZwarePlus Features > Objects Summary > PLC Control "for more information about the Change Window feature.

The Direct and Indirect Window Objects

If you want the PLC to call up a popup window that is to be overlaid on top of other windows already open, then there are two methods used to do this:
• Direct Window Object
• Indirect Window Object

☞ Unlike the PLC Control Object, the Direct and Indirect Window Objects are only active for the windows into which they are placed. Place the Direct or Indirect Window on the Common Window if you want it to be active regardless of which window is open in the HMI.

Both the Direct and Indirect Windows can be configured to display a Title Bar. When the application is running (in the HMI or simulator), the Title Bar can be grabbed (or clicked) and used to move the window around the screen.
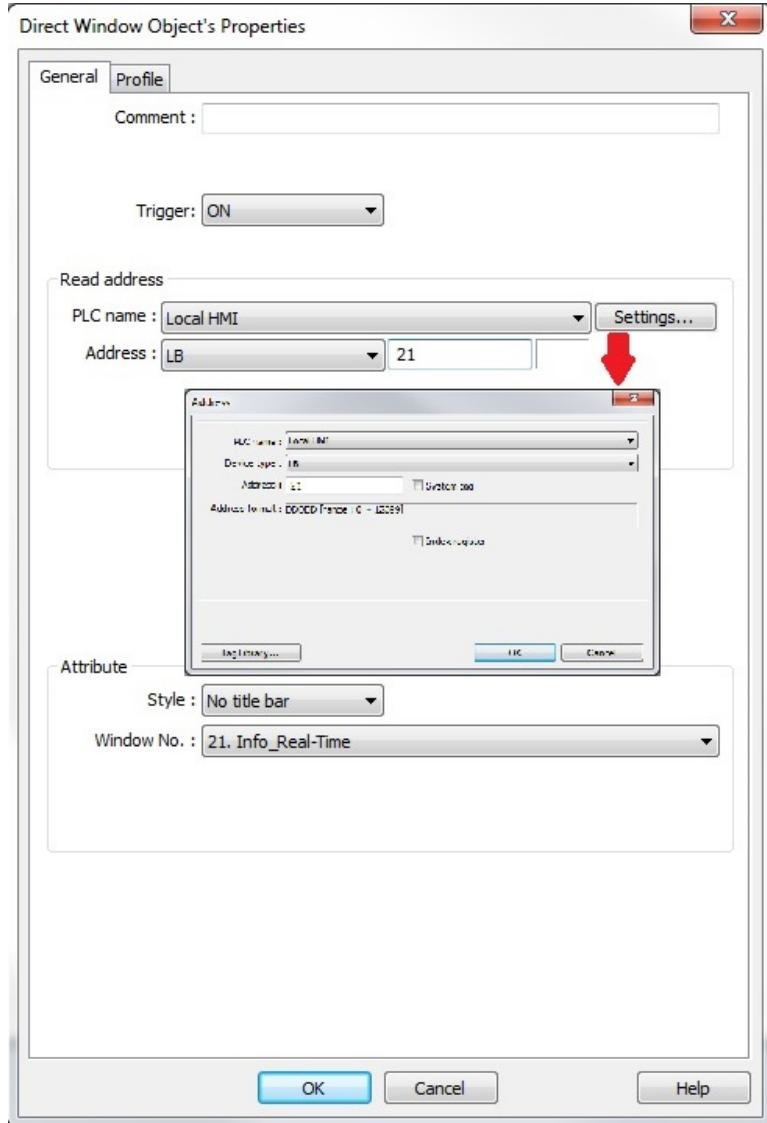
The Direct Window Object is used to display a popup window using a PLC bit. The HMI continuously reads the value of the PLC bit, as long as the window containing the Direct or Indirect Window object is active, to determine its state. If the trigger state is detected, then the designated popup window is displayed within the frame of the Direct Window Object..

The Indirect Window Object is used to display a popup window using a PLC data register. Similar to the PLC Control Object, the HMI continuously monitors the selected PLC data register. It will display any popup window that corresponds to the number placed into the PLC data register by the PLC. If the Window Offset feature is checked, the displayed window will be the window whose number is the sum of the value in the register and the selected offset value.

The PLC must reference a window that is less than full size when using the Direct Window and Indirect Window objects.

To call a popup window using the Direct Window Object:

1. From the **Objects** menu, select **Direct Window**. The New Direct Window Object dialog box appears.
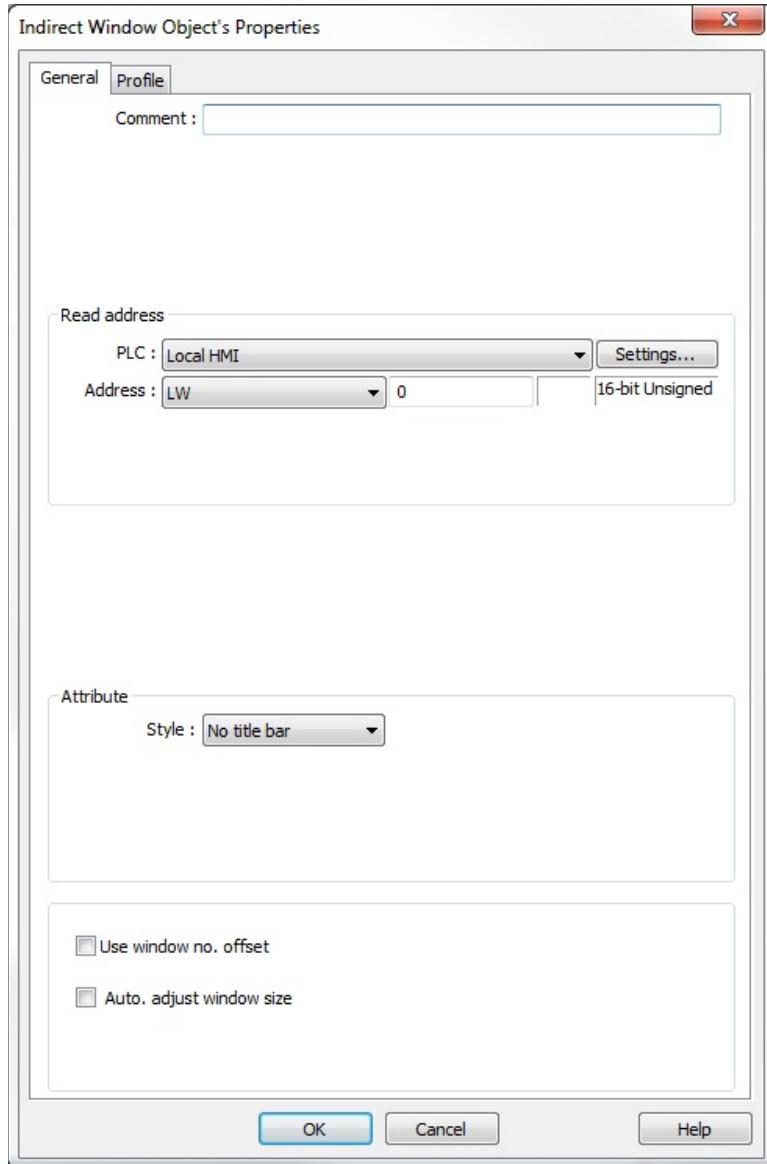
2. Select the trigger state in the **Trigger** drop-down box (ON or OFF).

3. Click the **Settings…** button in the **Read address** section and select the PLC address according to Device type selected from the drop-down menu and then enter the address. Click **OK** to close the Address window.

4. Select the **Window No.** you want to call from the drop-down menu under the **Attribute** heading.

5. Select the **Style** of the popup window, **With title bar** or **No title bar**. Enabling the title bar allows the user to grab the window and move it around the display.

6. Click **OK** to return to the main screen of EZwarePlus. The mouse cursor will have a square object that represents the size of the popup window.

7. Place the Direct Window object where you want the popup window to appear.

    📝 The Direct Window object should be the same size as the popup window it is calling. You can resize the object after you have placed it by clicking on the object and dragging on the sizing handles

or selecting the **Profile** tab in the Direct Window Object's Properties window and adjusting the **Width** and **Height** settings.

To call a popup window using the Indirect Window Object:

1. From the **Objects menu**, select **Indirect Window**. The New Indirect Window Object dialog box appears.

2. Select Click the **Setting…** button in the **Read address** section and select the PLC address according to Device type selected from the drop-down menu and then enter the address.

3. Leave the Attribute set to **No title bar**. Using a Title Bar allows the window to be moved around the screen.

4. Leave Use window no offset and Auto adjust window size unchecked.

5. Click **OK** to return to the main screen of EZwarePlus. The mouse cursor will have a square object that represents the size of the popup window.

6. Place the Indirect Window object where you want the popup window to appear.

🖅 The Indirect Window object should be the same size as the popup window it is calling. You can resize the object after you have placed it by clicking on the object and dragging on the sizing handles or selecting the **Profile** tab in the Indirect Window Object's Properties window and adjusting the **Width** and **Height** settings.

Tips and Suggestions

Having trouble deciding which method to use to display a base window? Here are some suggestions:

• If you want to clear the HMI display of all open windows and display a new full screen window, then use the PLC Control Object function or select the Change Window option in the Function Key Object. The PLC Control Object is global (meaning it does not matter which windows are currently on display), so the HMI will always monitor the PLC address that you have selected. The Function Key Object can be made local to one or more windows by placing the object on only those windows. It can also be made global (meaning the HMI operator can always change to this window no matter which window is currently displayed), by placing the Function Key Object on the Common Window or the Fast Selection Window.

• If you want to display a popup window on one particular full screen window, then try using the Popup Window option in the Function Key Object. This is particularly useful if you want the HMI operator to control the ability to display the popup window. If you want the PLC to determine when to display the popup window, then use the Direct Window object.

• If you want to display a popup window that can be shown on any full screen window, then try using the Popup Window option in the Function Key Object. You should place the Function Key Object on the Common Window or in the Fast Selection Window. This will allow the HMI operator access to that popup window regardless of which full screen window is displayed. If you want to display the popup window only when some condition in the PLC has occurred, then use the Direct Window object on the Common Window.

• If you want to display one of many possible popup windows on any full screen window, then try using the Indirect Window object on the Common Window. You can then let the PLC determine which popup window should be displayed or you can create several Set Word objects to allow the HMI operator to select which window to look at.

Returning to a previous window

You can configure a function key to display the full-sized base window that was on the HMI screen before the currently shown window.

Create a function key to return to previous window:

1. From the **Objects** menu, select **Function Key**. The New Function Key Object dialog box is displayed.

2. Select the **Return to previous window** option button.

3. Configure the rest of the function key, and then click **OK**.

4. Place the function key object onto the full-sized base screen.

🕮 Placing a **Return to previous window** function key onto a popup window will not work.

Using a function key to close a window

You can configure a function key to close any popup window that is currently displayed on the HMI screen, and was called by a function key.

Create a function key to close a window:

1. From the **Objects** menu, select **Function Key**. The New Function Key Object dialog box is displayed.

2. Select the **Close window** option button.

3. Configure the rest of the function key, and then click **OK**.

4. Place the function key object onto the popup window.

🗐 Placing a **Close window** function key onto a full-size base screen will not work. To close a direct window, turn off the controlling bit. To close an indirect window, write a 0 to the controlling register.

Using the Common Window

Your project might require that some data be displayed on the HMI screen at all times, regardless of which window(s) are displayed. For example, you may want to display a company logo on the HMI screen at all times, or you may want to display some critical data or an alarm message which should be seen no matter what windows are displayed.

Using base windows to display this information requires that you configure every full screen base window with the same graphics object. The common window however, is a predefined window in the HMI that you can enable to display this information. When created, the common window always operates in the background as a full screen window that overlays any full screen base window displayed.
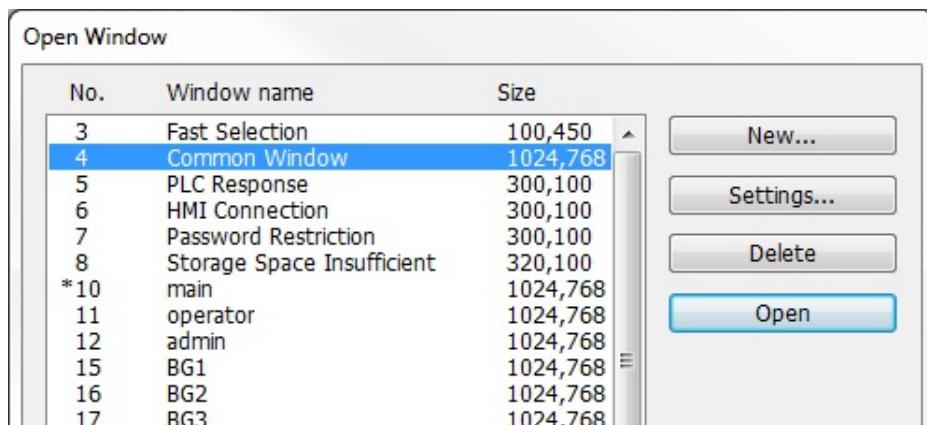
🗐 It may be desirable to use the Common Window but temporarily hide it when developing the project.

The 🔲 button on the Standard Toolbar toggles the visibility of objects on the Common Window.
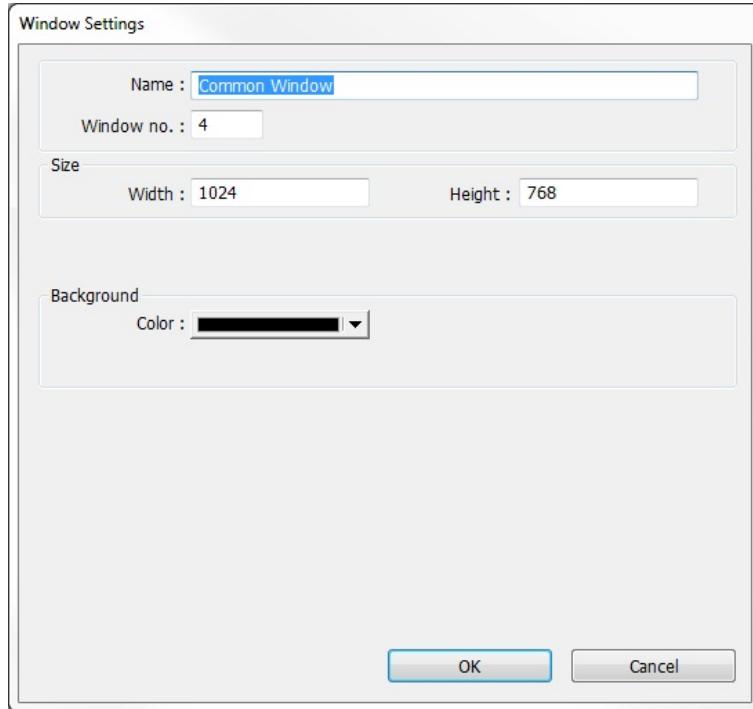
Whenever you create a new project, the common window (Window #4) is automatically created.

To access the common window:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears (see on following page).

No.	Window name	Size
3	Fast Selection	100,450
4	Common Window	1024,768
5	PLC Response	300,100
6	HMI Connection	300,100
7	Password Restriction	300,100
8	Storage Space Insufficient	320,100
*10	main	1024,768
11	operator	1024,768
12	admin	1024,768
15	BG1	1024,768
16	BG2	1024,768
17	BG3	1024,768

New...
Settings...
Delete
Open
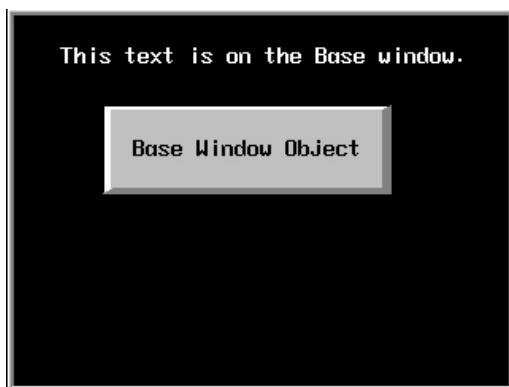
2. Highlight Window #4, **Common Window** and click **Settings**. The Window Setting dialog box appears.

3. As you can see, some of the parameters for a common window are disabled and cannot be changed. Window #4 is always reserved for the Common Window. Although the Background settings are active, none of these settings affects the operation of the common window.

4. Click **OK**. The Open Window dialog box reappears with the Common Window selected.

5. If you wish to open the common window, click **Open**. Otherwise, click **Close** to return to the main screen of EZwarePlus.

Displaying the common window above/below the base window

This setting resolves the conflict that can occur if a graphics object on the common window occupies the same space on the HMI display as a graphics object on a base window. Using the **Above base window** attribute forces the graphics object on the common window to cover the base window graphics object. Using **Below base window** has the opposite effect.
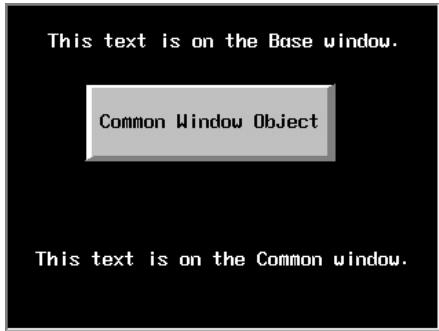
Base Window   *Common Window*

When **Above base window** is set, the result is:

When **Below base window** is set, the result is:

To set the Above/Below base window option for a common window:

1. From the **Edit** menu, select **System Parameters**. The System Parameter Settings dialog box appears.

2. Select the **General** tab. In the **Options** section next to **Common window**, select either **Above base window** or **Below base window**.

3. Click **OK** to return to the main screen of EZwarePlus.

✍ Active graphics objects (objects that display information or graphics according to a data value in a PLC register or coil) take precedence over passive graphics objects (objects such as circles, lines, rectangles, etc.). Therefore, a Set Word Object on a base window will cover a Rectangle Object on a common window that occupies the same space even with the **Above base screen** attribute enabled.

Changing the Active Common Window

Although only one common window can be on the HMI display at one time, you do have the ability to create multiple common windows by using base windows as common windows. Then, with the help of a Function Key object (using the **Change common window** checkbox), the HMI operator can change the active common window.

The ability to change the common window adds more flexibility to your project should you need it. For example, you may have a series of full screen windows which all need a keypad for entry. Another series of full screen windows may require a common alarm message. By changing the common window with each series of windows, you can customize each common window to contain only the graphics objects that are needed.

To change the active common window:

1. Create a new project. The Common Window (Window 4) is automatically created.

2. Create a base window that is full screen. This will be used as another common window.

    ⃞ Note that when a base window is used as a common window, the Start Pos:, Style, Frame, and Background settings are ignored by the HMI. For this example, let's use Window #30 as the alternate common window.

3. Create another full screen base window that can be displayed along with the common windows, (such as a startup window). Let's use Window #10, the initial window, for our example.

4. On Window #10, create a Function Key object that is used to change the common window. From the **Objects** menu, click **Function Key**. The New Function Key Object dialog box appears.

5. On the **General** tab, select the **Change common window** option button.

6. In the same section, select 30 from the **Window no.** drop-down menu.

7. Click the **Shape** tab. Click **Use Shape...** and then click on the **Shape Library…** button. Select Shape #1 from the **button1** library. Click **OK** to return to the Create Function Key Object dialog box.

8. Click the **Label** tab. Click the **Use label** checkbox.

9. For our example, type CCW (meaning Change Common Window) into the **Content box**. Click **OK** to exit the Create Function Key Object dialog box and go back to the EZwarePlus main screen.

10. Place the new Function Key object somewhere on Window #10.

Below is an illustration of what the default common window, Window#30 (alternate common window), and Window#10 (startup window) might look like:
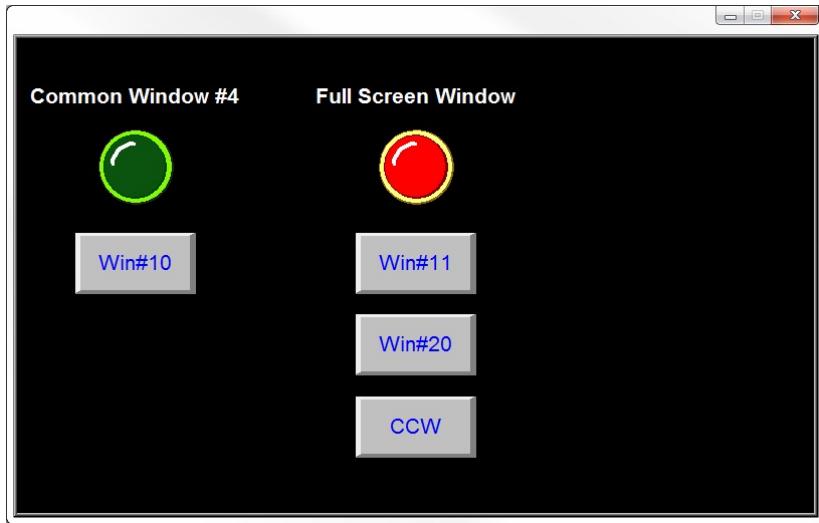
Default Common Window #4   Alternate Common Window #30   Initial Window #10
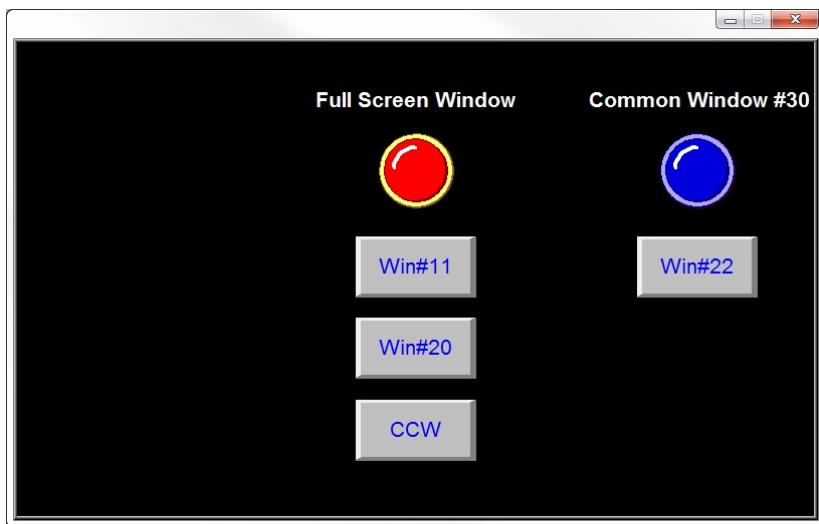
When the HMI initializes, it displays the startup screen (Window #10) and the default common window.

To change common windows, we press the CCW function key that has been configured to change the common window to Window #30.

Window #30 remains the common window until another function key object is pressed that changes the common window or until the HMI is reset.

Using the Fast Selection Window
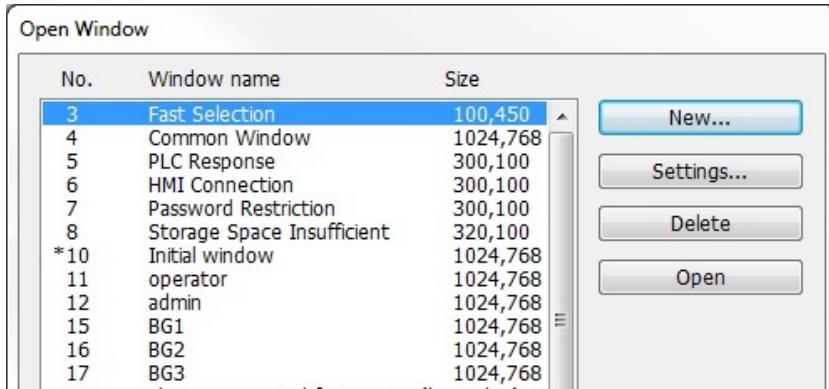
In the last section, you read that common windows are great for displaying information that should be displayed all the time, regardless of which base windows are active. You may also create projects that require a window that is always accessible (like a common window) but not always displayed. For example, you may want a numeric keypad available for any data entry; however, a keypad takes precious space on the HMI display. Ideally it should appear on screen only when a key was pressed and then, by pressing another (or the same) key, the keypad should disappear.

This is essentially the purpose of the Fast Selection window. The Fast Selection window can also be used as a menu key that allows the HMI operator to rapidly switch screens.
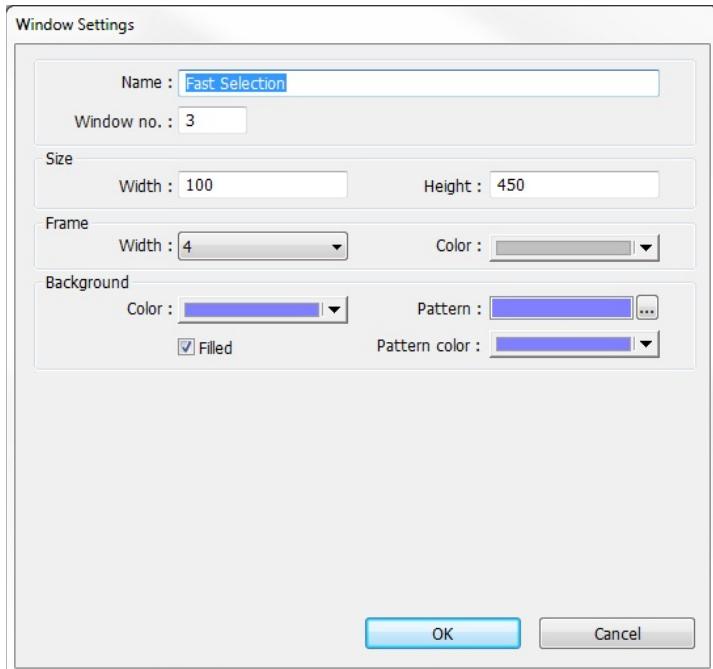
Whenever a new project is created, the fast selection window (Window #3) is automatically created (except when Portrait mode is selected; you can create a Fast Selection window using the **Window > Open Window > New… > Fast Selection** command).

To open a fast selection window:

1. From the **Window** menu, select **Open Window**. The Open Window dialog box appears.

2. Highlight the Fast Selection Window and click **Settings**. The Window Setting dialog box appears.

3. The **Name:** and **Window No.:** are reserved to identify the Fast Selection window. The other parameters can be modified, (see the Window Settings section earlier in this chapter for more information). Notice that the default size is Width = 100 and Height = 450. The default was selected to create a 'sidebar' that contains function keys to display other windows on the HMI5070P. The example below illustrates how the Fast Selection Window can be used for this purpose.

4. Press **OK**. The Open Window dialog box reappears with the Fast Selection window selected.

5. If you wish to open the fast selection window, click **Open**. Otherwise, click **Close** to return to the main screen of EZwarePlus.

Using the Fast Selection Button

The fast selection button is used to display the Fast Selection window.
Pressing the button again causes the Fast Selection window to close.

Creating the Fast Selection Button

The fast selection button must be activated in the System Parameters > General tab in order
to have it display on the HMI. When enabled, the fast selection button is always
visible on the screen.

You can use the following system bits to control the Fast Selection button and window:

LB-9013: Fast Select window control (hide when ON, show when OFF)
LB-9014: Fast Select button control (hide when ON, show when OFF)
LB-9015: Fast Select window and button control (hide when ON, show when OFF)
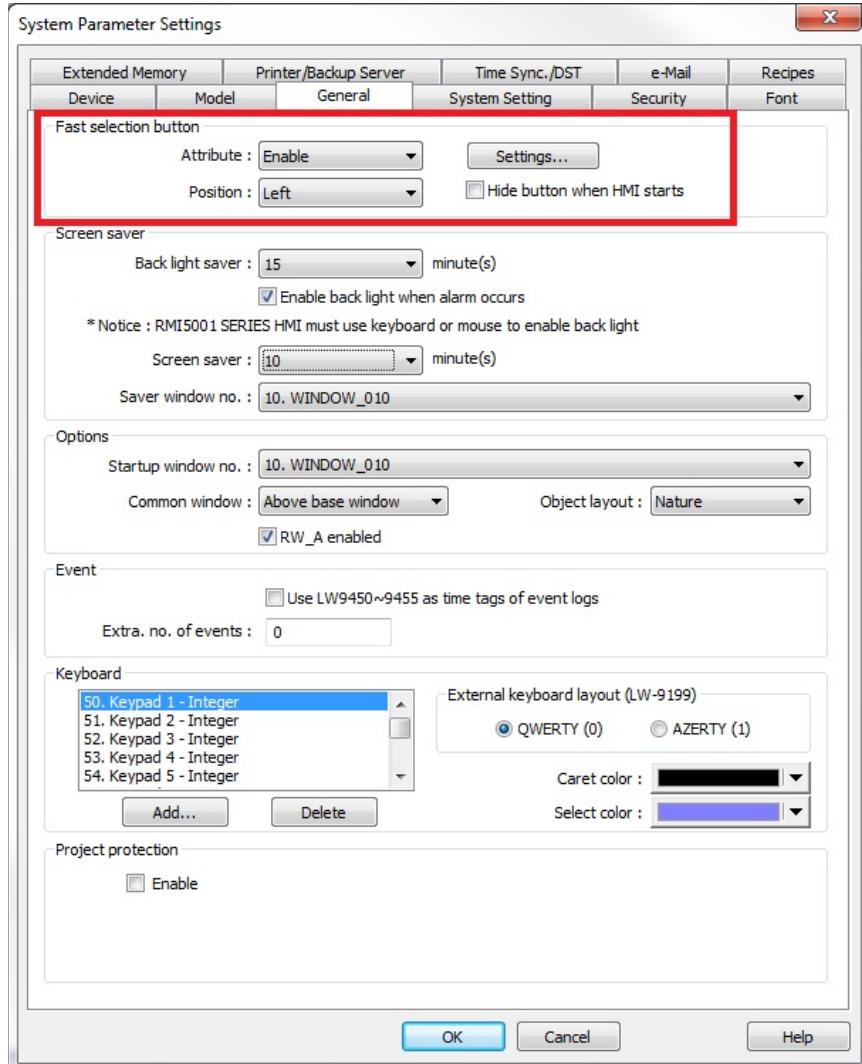
For example, place an invisible Set Bit object over the entire Fast Select window assigned to LB-9013 and
configured to **Set ON**. This will cause the window to close automatically once a selection is made on the
window.

To display the fast selection button:

1.   Select **Edit > System Parameters**. The System Parameters Setting Dialog
      appears. Select the **General** tab.

2. In the **Fast selection button** section, select **Enable** from the **Attribute** drop-down menu.

3. Select either **Right** or **Left** from the **Position** drop-down menu to select whether the button will appear in the right-lower corner or left-lower corner of the screen.

4. Click **Settings...** Click the **Use shape** checkbox, and then click the **Shape Library…** button.

5. Select a shape for your fast selection button and click **OK**.

6. Click **OK**.
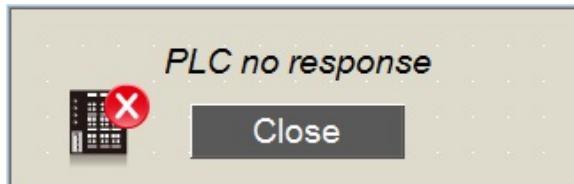
✐ The Fast Selection window can only call full screen windows, not popup windows. Therefore, you cannot use Function Key Objects configured to **Display popup window** in Fast Selection windows.

System Message Windows
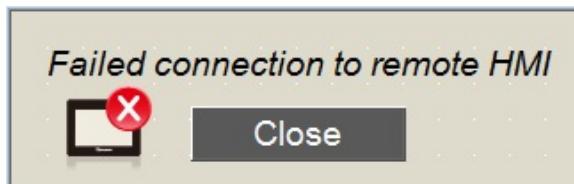
EZwarePlus has five windows designated as System Message windows. These windows have been pre-configured with automated messages and a function key to close the window, so no changes are necessary, though you may customize them for your own application if desired.

☞ You must select the "Use template" option when you create your project in EZwarePlus in order for these windows to become available.

Window #5 is designated as the **PLC Response** window that pops up automatically when the HMI loses communications with the PLC.

Window #6 is designated as the **HMI Response** window, which will pop up automatically if the HMI loses communications with another HMI that is remotely connected.

Window #7 is designated as the **Password Restriction** window, which will pop up when access is attempted on a protected object without the proper password. The **Display warning message if access denied** checkbox must be enabled in the **Security** tab > **User restriction** section of the object.

Window #8 is designated as the **Storage Space Insufficient** window, which will pop up when the available memory in the HMI, USB Flash drive, or SD card is running low. The following Reserved Local Bits indicate insufficient memory conditions:

LB-9035	HMI free space insufficient alarm (when ON)
LB-9036	SD Card free space insufficient alarm (when ON)
LB-9037	USB free space insufficient alarm (when ON)
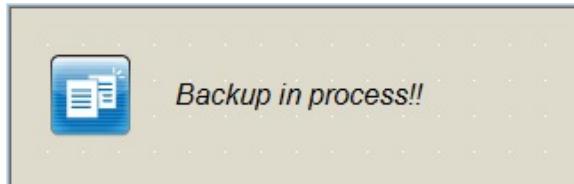
The amount of available memory is indicated by the following Reserved Local Words:

LW-9072	HMI free space available in KB (32-bit)
LW-9074	SD Card free space available in KB (32-bit)
LW-9076	USB free space available in KB (32-bit)

☞ The default trigger value for the insufficient memory warning is stored in LW-9070 (in MB). This is a "read-only" register and cannot be modified.

Window #9 is designated as the **Backup** window, which will pop up when the Backup object has been triggered to copy files from the HMI to an external memory location such as an SD card or USB flash drive.

☞ This window pops up in a Direct Window located on the Common Window (window 4), triggered by System Bit LB-9039, which turns ON when a backup is in process. When the backup is complete, the bit turns OFF and the Direct Window closes.

Chapter 8 – Using the Shape Manager, Picture Manager, and Group Library

EZwarePlus provides a number of Shape Libraries (*.plb), Picture Libraries (*.flb), and Group Libraries (*.glb) with images that can be used to represent objects on the screen (Bit Lamps, Toggle Switches, etc.). These are stored in the Library folder in the EZPlus folder (C:\MapleSystems\EZPlus\library). These shapes and pictures can be linked to the EZwarePlus project (Library tab) or they can be stored in the project file itself (Project tab). In either case, the shapes and pictures are embedded in the compiled file (*.exob or *.cxob) that is downloaded to the HMI/RMI.

If the shapes and pictures are linked to the project using the Library tab in the Shape or Picture Manager, use the Compress utility under the Tools menu in EZwarePlus to transfer the project from one computer to another. The compressed file (*.ecmp or *.ccmp) contains the project file and the library files that are linked to the project. Uncompress the file on the destination computer to load the project and library files into the appropriate folders on the computer.

If the shapes and pictures are stored on the Project tab in the Shape or Picture Manager, then they are saved in the project file (*.emtp or *.cmtp) and the project can be transferred from one computer to another and retain the shapes and pictures.

⊞ Saving the shapes and pictures to the Project tab will increase the file size of the EZwarePlus project.
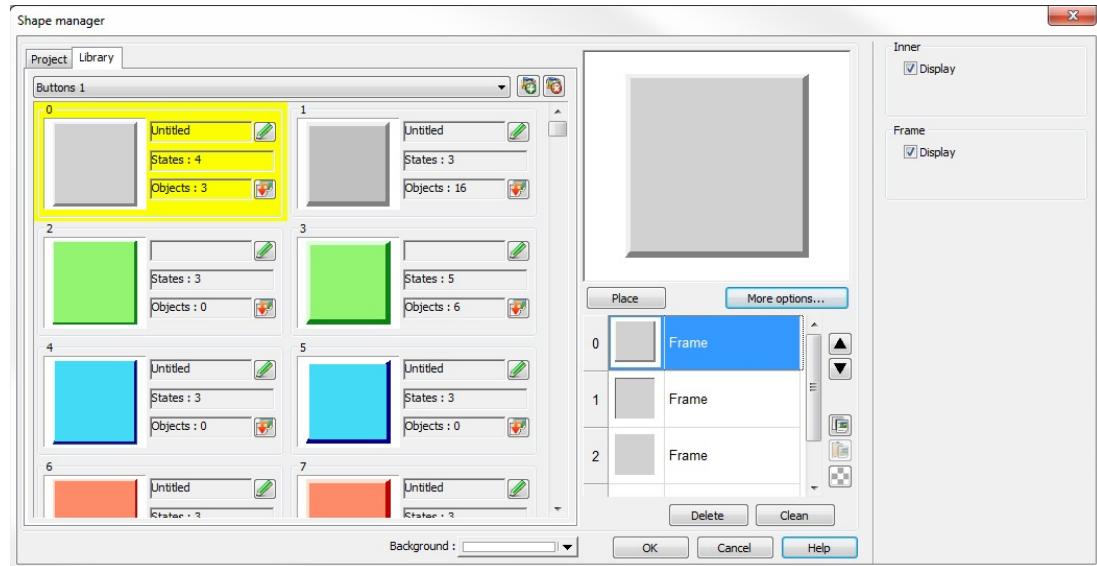
Shape Manager

Shapes are vector graphics constructed of lines, curves, or polygons. You can create new shapes using the drawing tools under the **Draw** menu.

An individual shape can have more than one state (up to 256 states).
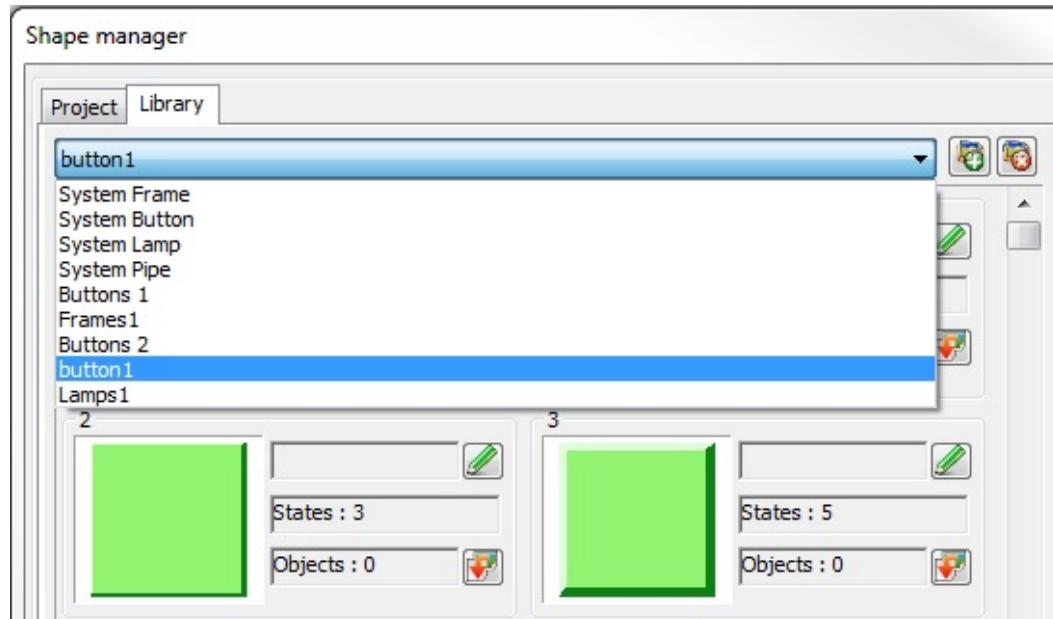
To open the Shape Manager, click on the **Library** menu and select **Shape > Call up library**.

Library Tab

The drop-down list at the top of the Library tab shows the currently open library files in the project.

▤ There are four system libraries (System Frame, System Button, System Lamp, and System Pipe) that are unique and behave differently from the other library files. They can be used to quickly assign a two-state shape to an object, having a different color for each state by using the **Inner** and **Frame** color palettes. Note that the system libraries cannot be modified by adding additional states and they cannot be unattached from a project.

New library

Click the **New library** button to open an existing library or create a new one. To create a new, empty library, enter a new file name and click **Open**. Up to 40 library files can be open in a single project.

▦ When adding modified or new shapes, it is best to create a new shape library rather than modify a standard library that is included in EZwarePlus. This will avoid accidentally overwriting a modified standard library file when upgrading EZwarePlus.

Unattach library

Closes an open library in the project. EZwarePlus will warn you if the library is being used in the project.

Rename shape

Click to rename the shape in the selected library.
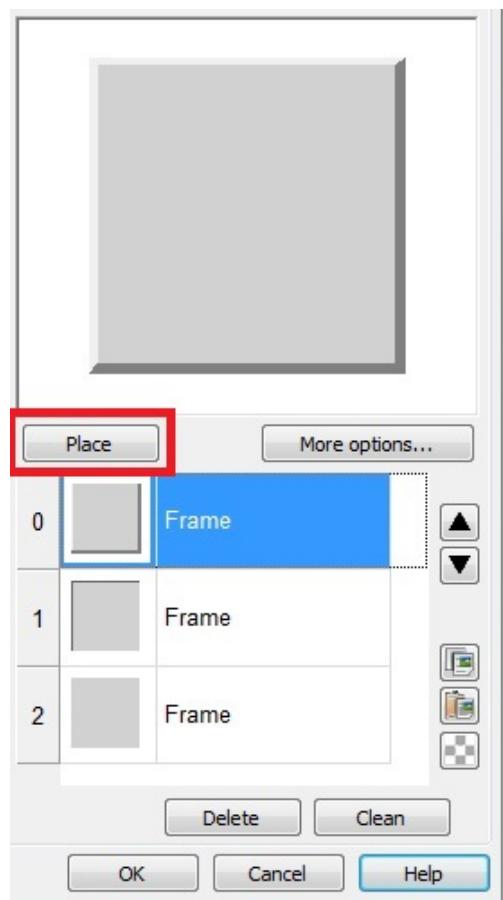
Copy to project

Copies the selected shape to the Project tab. Shapes that are copied to the Project tab are saved in the project file rather than linked to the library file. Up to 1000 shapes can be added to the Project tab.

▦ Shapes in the System Libraries cannot be copied to the Project tab.

Background

Selects the background color for the shapes in the selected library. The color is only displayed in the Shape Manager dialog box and is not displayed when placing the object on the screen.

Place

Copies the selected shape to the currently open window in the project. This is useful for modifying a shape and importing it back into the Shape library.

Up/Down

Move the shape's selected state to the previous or next state in the list.

Copy

Copy the current state of the selected shape to the clipboard.

Paste

Paste the shape from the clipboard to the selected shape (adds it to the next state after the selected state).

Insert Transparent State

Inserts a blank state after the selected state.

Delete

Deletes the selected state of the shape.

Clean

Deletes all the states of the selected shape.

OK

Confirms saving the edited shape.

Cancel

Cancels the editing event.
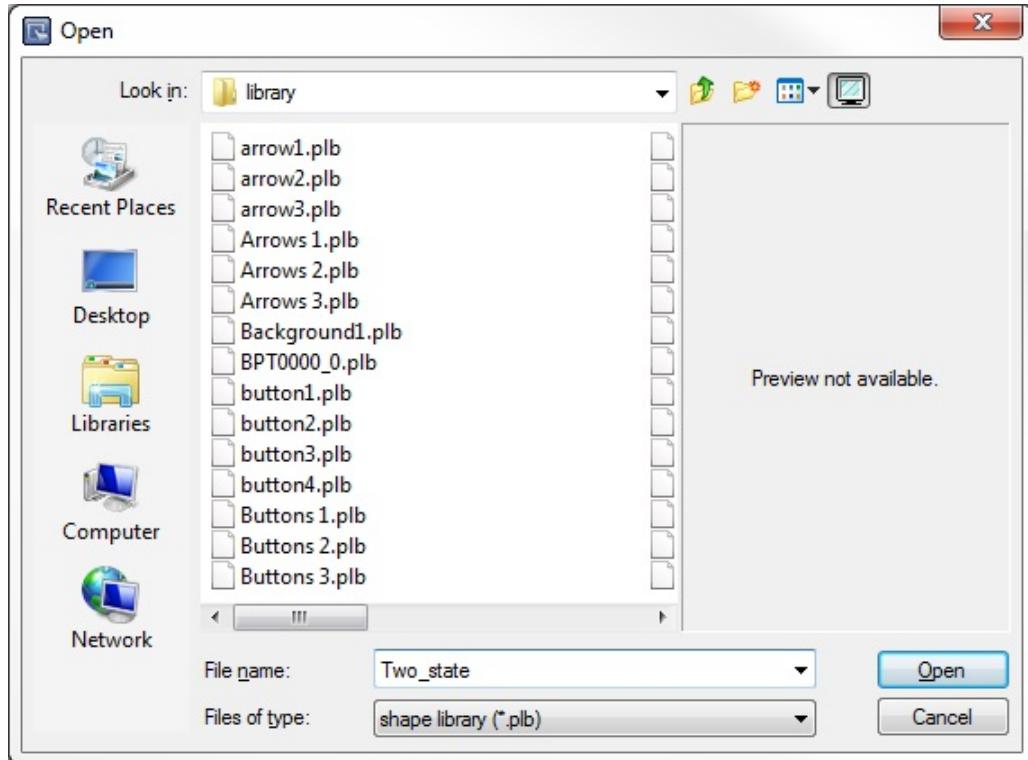
Help

Opens the Help file for the Shape Manager.
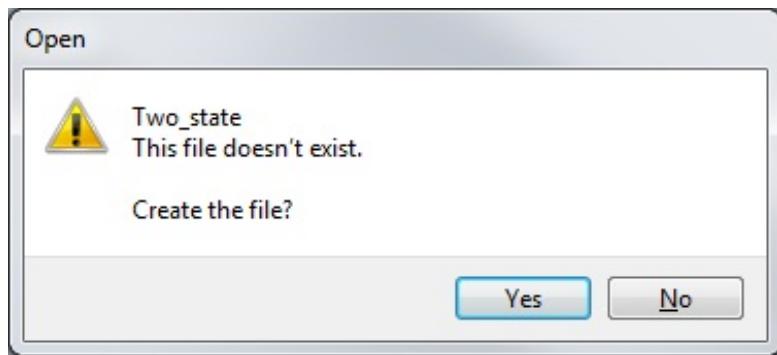
Creating a New Shape Library

This describes how to create a new Shape Library and add a shape with two states into the library.
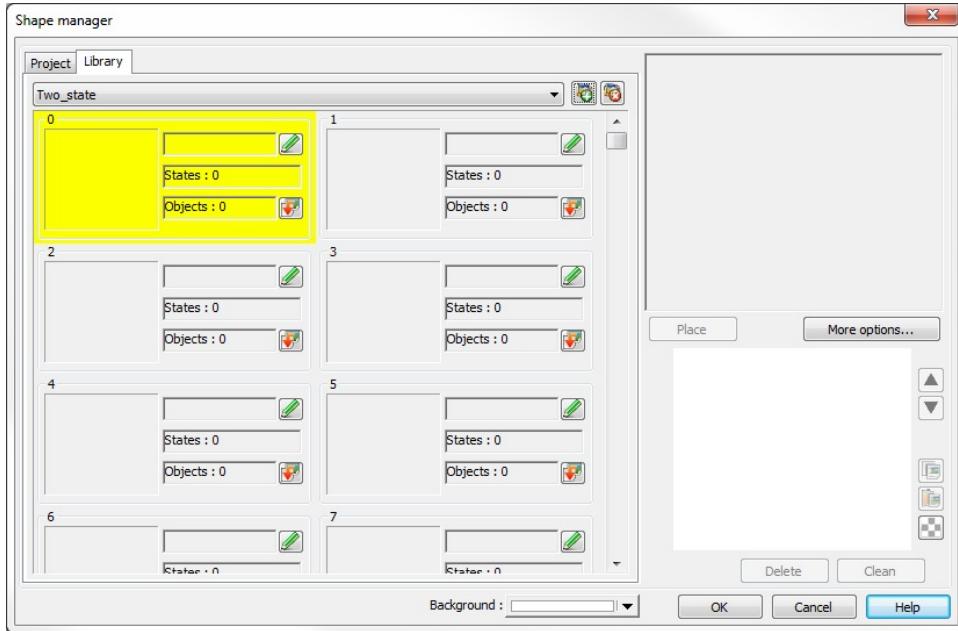
1. Click the **New library** button and enter the name of the new Shape Library in the **File name** field of the **Open** window.

2. Click **Open** and a dialog box opens to confirm creating a new library file.

3. Click **Yes** and a new empty library is opened (called Two_state in this example).
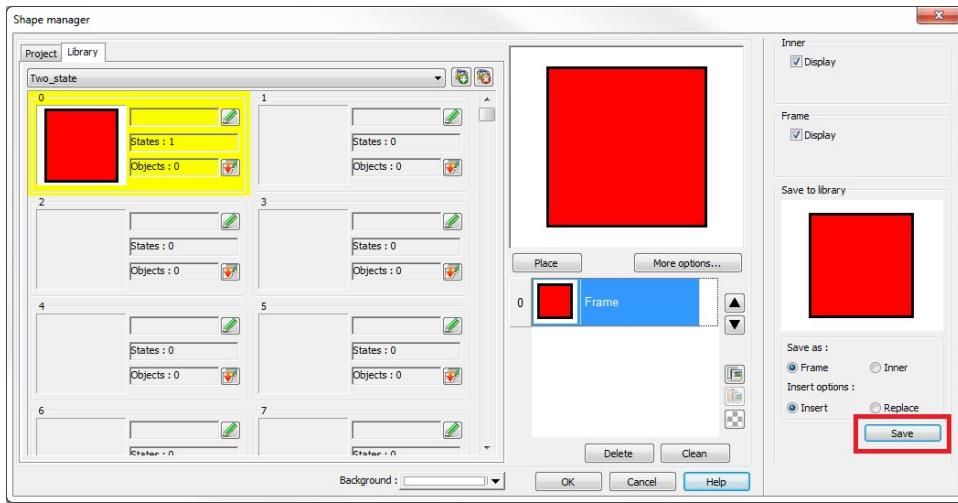
4. Click **OK** to close the new library. To add a new shape to the library, use the drawing tools under the **Draw** menu to create a new shape on a window in the EZwarePlus project.

    ⌨ Alternately, you can select a shape from an existing library and use the Place button to copy it to the currently open window in the project. You can then edit its shape and color.

    With the entire shape selected, click on the **Library** menu and select **Shape > Save to library**.
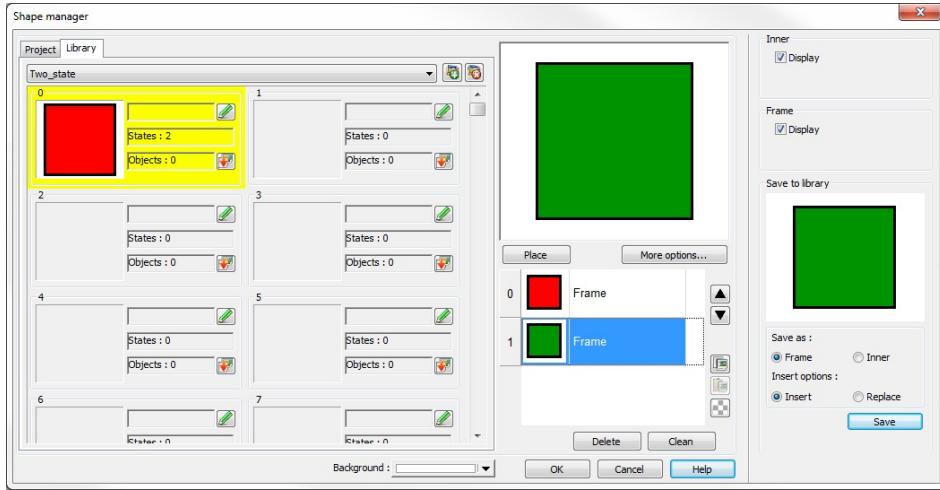
5. Select the new library in the Shape Manager and click the **Save** button to save the shape into state 0 of shape 0.

6. Click **OK** to close the library.
    To create a second state, edit the shape and color of the new shape on the EZwarePlus window.
    With the entire shape selected, click on the **Library** menu and select **Shape > Save to library**.

7. Select the new library in the Shape Manager and click the **Save** button to save the shape into state 1 of shape 0.
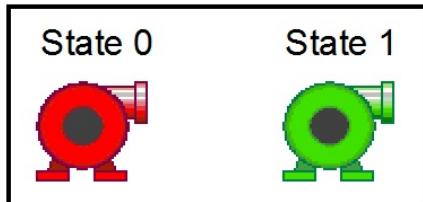
8. Repeat for as many states as required for your application (up to 256 states).

Picture Manager

Pictures are bitmap graphics constructed of individual pixels. Supported picture formats include .bmp, .jpg, .gif, .dpd, .svg, and .png.

An individual picture can have more than one state (up to 256 states).
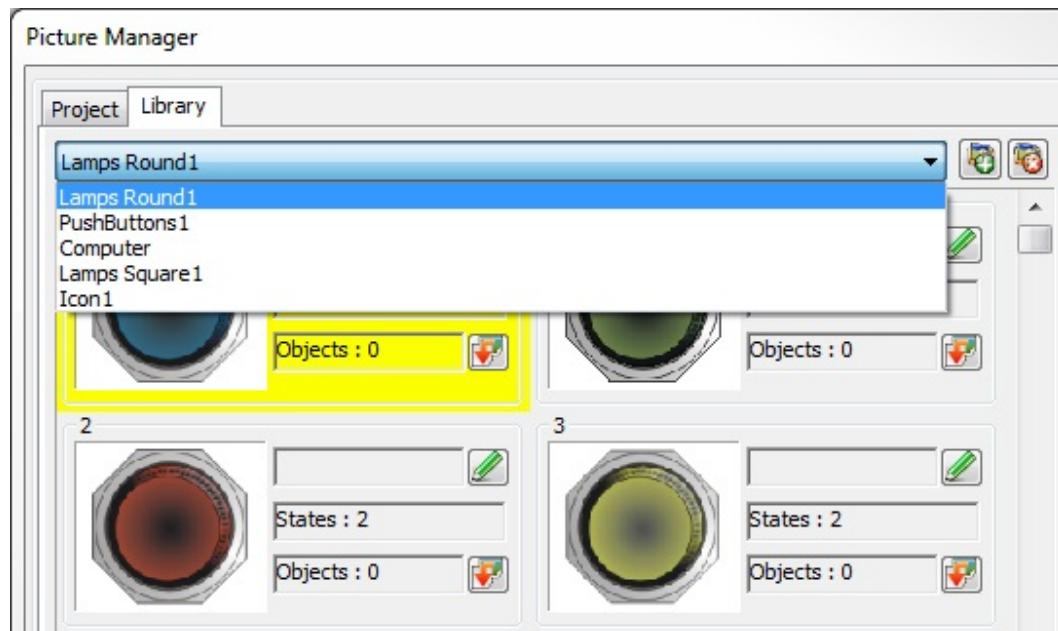
To open the Picture Manager, click on the **Library** menu and select **Picture > Call up library**.

Library Tab

The drop-down list at the top of the Library tab shows the currently open library files in the project.

New library

Click the **New library** button to open an existing library or create a new one. To create a new, empty library, enter a new file name and click **Open**. Up to 40 library files can be open in a single project.

📝 When adding modified or new pictures, it is best to create a new picture library rather than modify a standard library that is included in EZwarePlus. This will avoid accidentally overwriting a modified standard library file when upgrading EZwarePlus.

Unattach library

Closes an open library in the project. EZwarePlus will warn you if the library is being used in the project.

Rename shape

Click to rename the picture in the selected library.

Copy to project
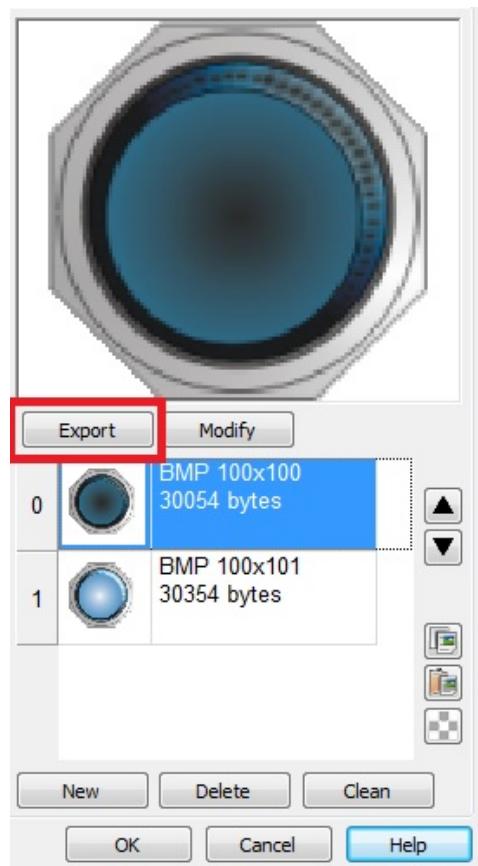
Copies the selected picture to the Project tab. Pictures that are copied to the Project tab are saved in the project file. Up to 1000 pictures can be added to the Project tab.

Background

Selects the background color for the pictures in the selected library. The color is only displayed in the Picture Manager dialog box and is not displayed when placing the object on the screen.

Export

Exports the selected picture to a directory on the PC. This is useful for modifying a picture in an external graphics program and importing it back into the Picture library.

Modify

Imports a picture from a directory on the PC and replaces the selected picture in the library.

Up/Down

Move the picture's selected state to the previous or next state in the list.

Copy

Copy the current state of the selected picture to the clipboard.

Paste

Paste the picture from the clipboard to the selected picture (adds it to the next state after the selected state).

Insert Transparent State

Inserts a blank state after the selected state.

Delete

Deletes the selected state of the picture.

Clean

Deletes all the states of the selected picture.

OK

Confirms saving the edited picture.

Cancel

Cancels the editing event.
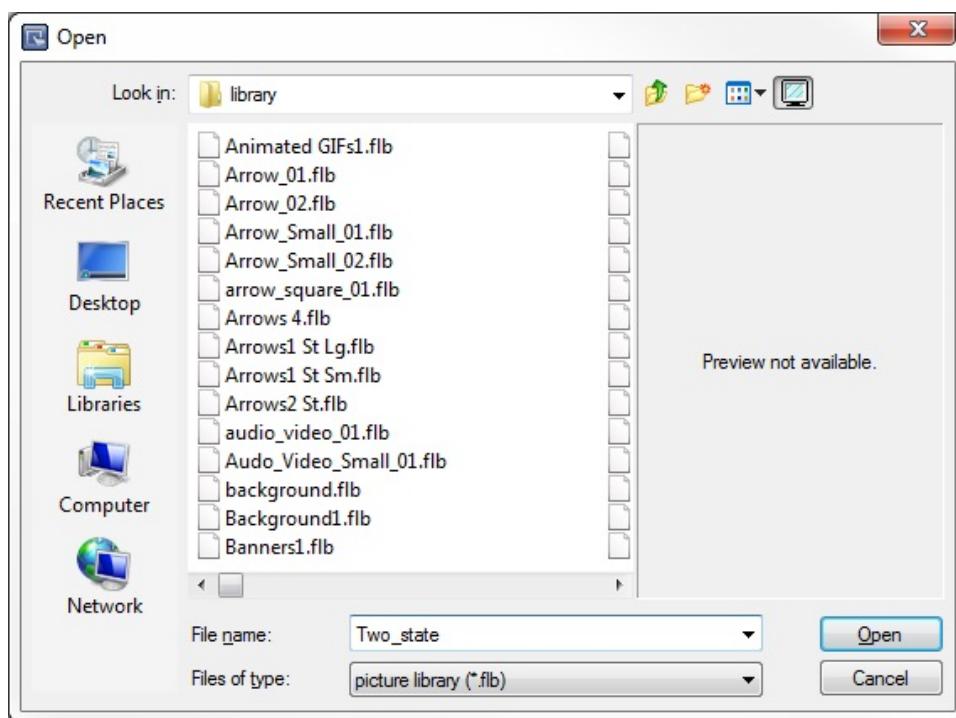
Help

Opens the Help file for the Picture Manager.
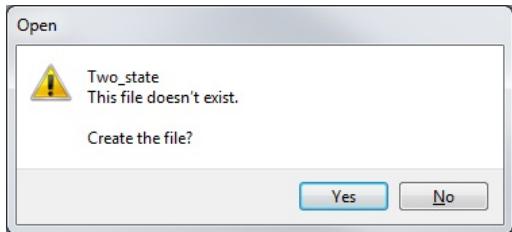
Creating a New Picture Library

This describes how to create a new Picture Library and add a picture with two states into the library.
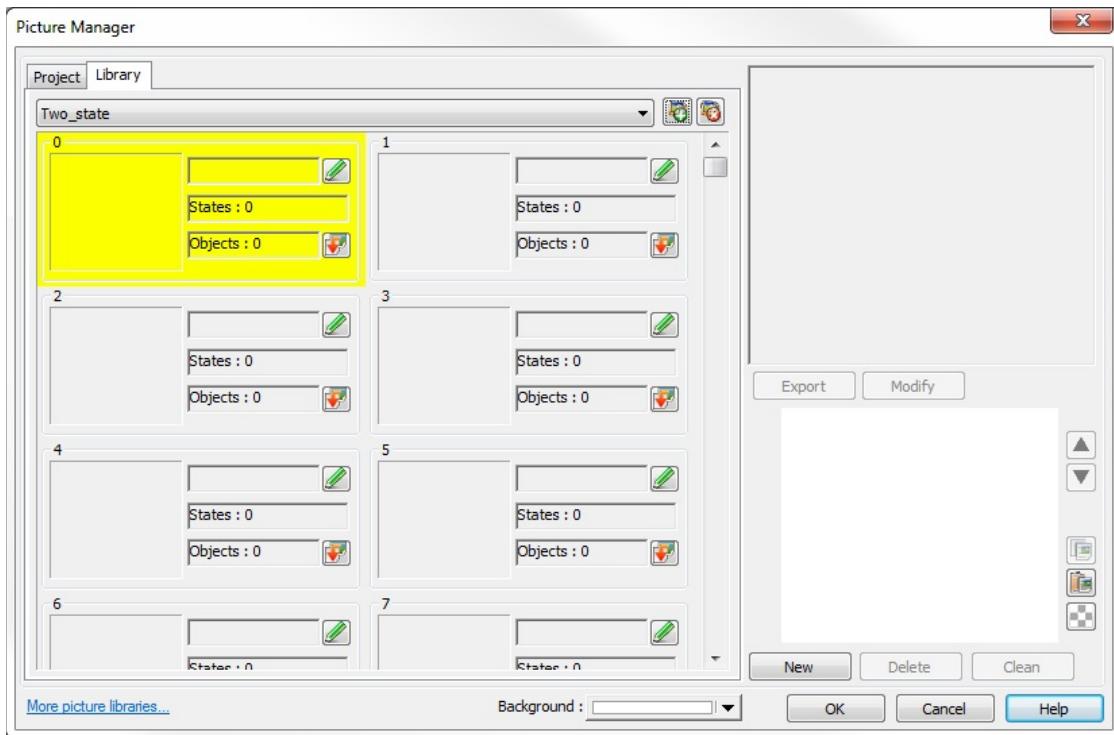
1. Click the **New library** button and enter the name of the new Picture Library in the **File name** field of the **Open** window.
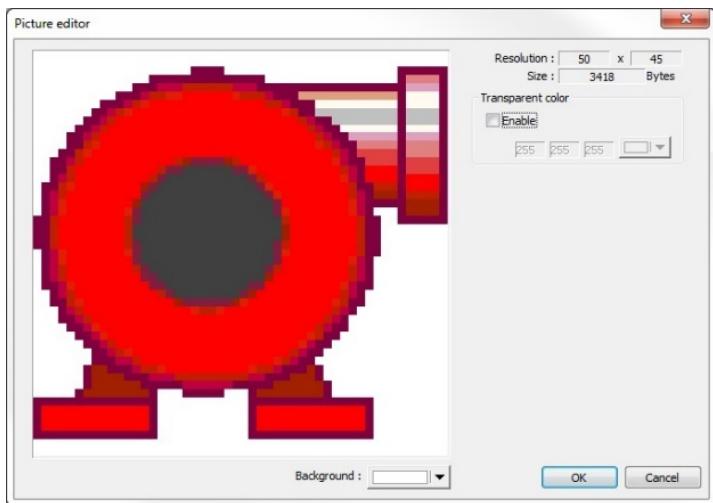
2. Click **Open** and a dialog box opens to confirm creating a new library file.

3. Click **Yes** and a new empty library is opened (called Two_state in this example).
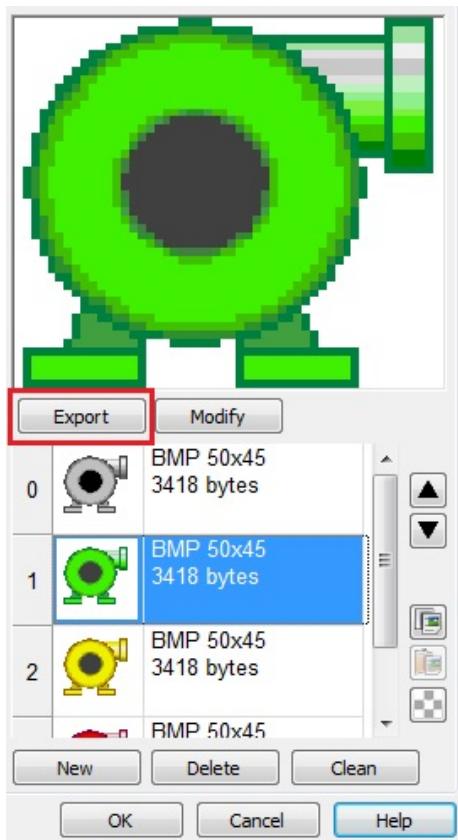
4. To add a new picture to the library, click the **New** button and navigate to the picture you wish to bring in to the Picture library.

5. Click **Open** and the Picture Editor opens.
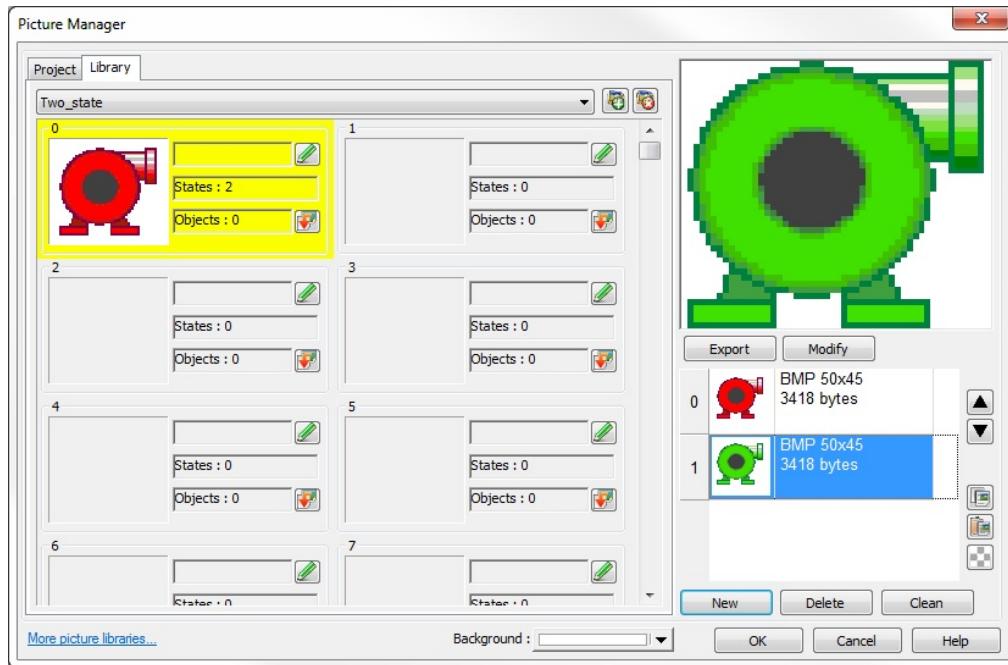
When the **Enable Transparent Color** option is checked you can select which color the HMI will treat as transparent. This is a useful feature when adding multiple images together or placing dynamic graphs onto pictures so that the graph can show through.

Click **OK** to save the picture into state 0 of picture 0.

⬚ Alternately, you can export a picture from an existing library and import it into a new library. Open the library that contains the picture you want to use, select the picture, and click the **Export** button. The **Export** button can also be used to export an image and edit it in a graphics editing program before importing it back into EZwarePlus.

6. To add a second state to the picture, click **New** and select a second picture to add to the Two_state library. Follow the instructions in steps 4 and 5 above, and click **OK** to save the picture into state 1 of picture 0.
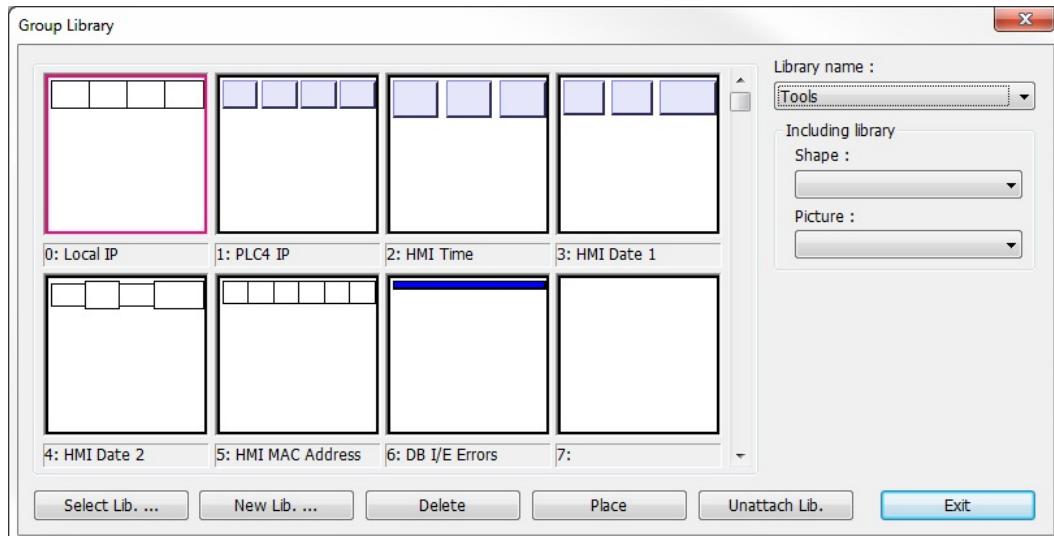
7. Use the **Modify** button to replace the currently selected state of the picture with another image file on the PC.

8. Repeat for as many states as required for your application (up to 256 states).
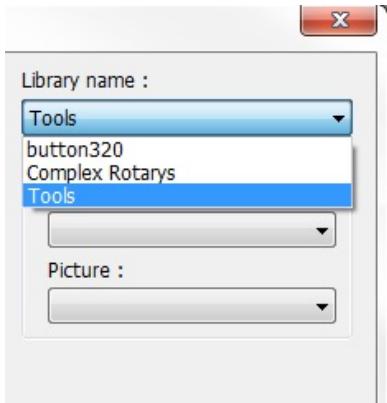
Group Library

The Group Library is used to store grouped objects in a library file. Individual objects in the grouped object may have multiple states, but each group in the Group Library has only one state.

1. To open the Group Library, click on the **Library** menu and select **Group > Call up library**.

2. The drop-down list under Library name shows the currently open Group library files in the project.

3. To open an existing library, click on the **Select Lib. …** button. Select the Group library file from the EZPlus/library folder you wish to use and click **Open**.

4. To create a new library, click on the **New Lib. …** button, enter the name of the library and click **OK**.

5. To add a new group to the library, group the objects that you want to include using the **Group** option under the **Edit** menu. With the grouped object selected, click on the **Library** menu and select **Group > Save to library**.

6. Select the new **Group library** and the **Group no.** where you want to save the grouped object and click **OK**.

7. To place an object from the Group library on a window in your EZwarePlus project, open the Group library containing the object, click the **Place** button, and it will appear in the upper-left corner of the currently open window.

Chapter 9 – Creating and Using the Label Library, String Table, and Address Tag Library

EZwarePlus includes the ability to create and use a Label Library, String Table, and Tag Address Library.

The Label Library is a database of text labels. Once created, the label database provides a method for assigning labels to individual objects from the Label Library. The Label text may also be represented in up to eight languages, each selectable for display.

The String Table is similar to the Label Library but has extended features such as the ability to create different sets (sections) of text and dynamically change the text being displayed.

The Tag Address Library is a database of HMI and PLC register addresses. Once created, the tag database provides a method for assigning addresses to individual objects from the Tag Address Library.

Creating the Label Library

The Label library is a database of text Labels, for use with objects utilizing text labels descriptive of their status or condition. Each label can consist of multiple unique text strings (determined by the maximum number of states available per label), displayable in up to 24 separate languages.

🗐 The number of states for each label is determined by the number of languages selected.
1 language = 256 states
2 languages = 256 states

4 languages = 192 states
8 languages = 96 states
16 languages = 48 states
24 languages = 32 states
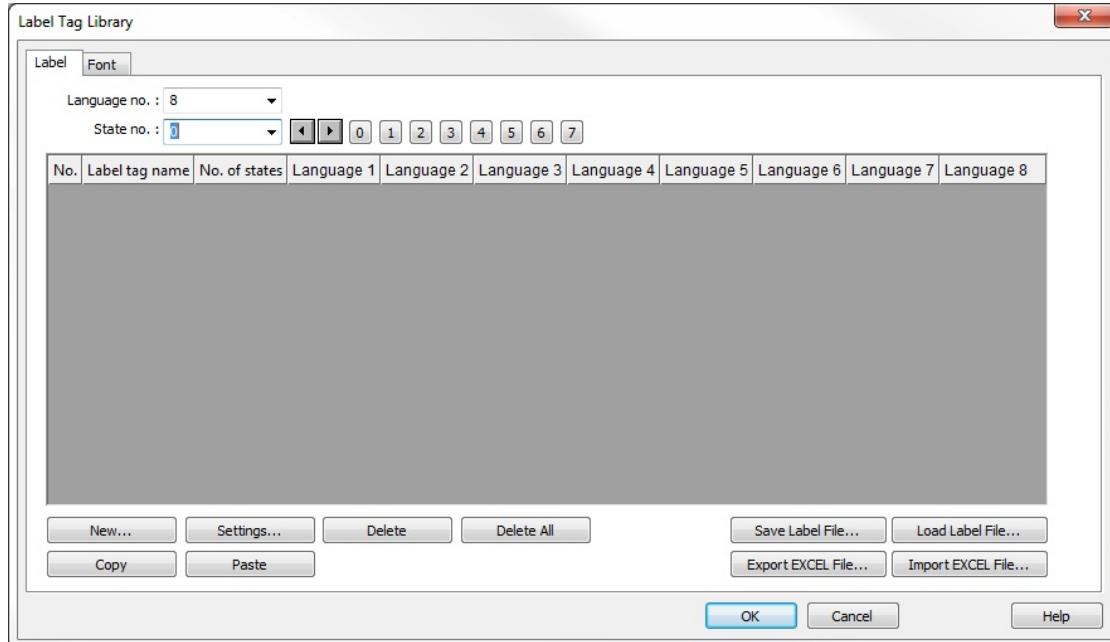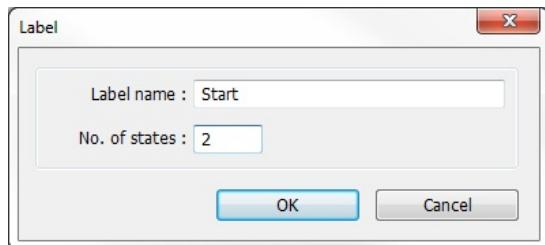
▸ *To create a label text database library*:

1. From the **Library** menu, click **Label...**, or click the Label Library Manager icon from the Library toolbar. The Label Library dialog box appears.
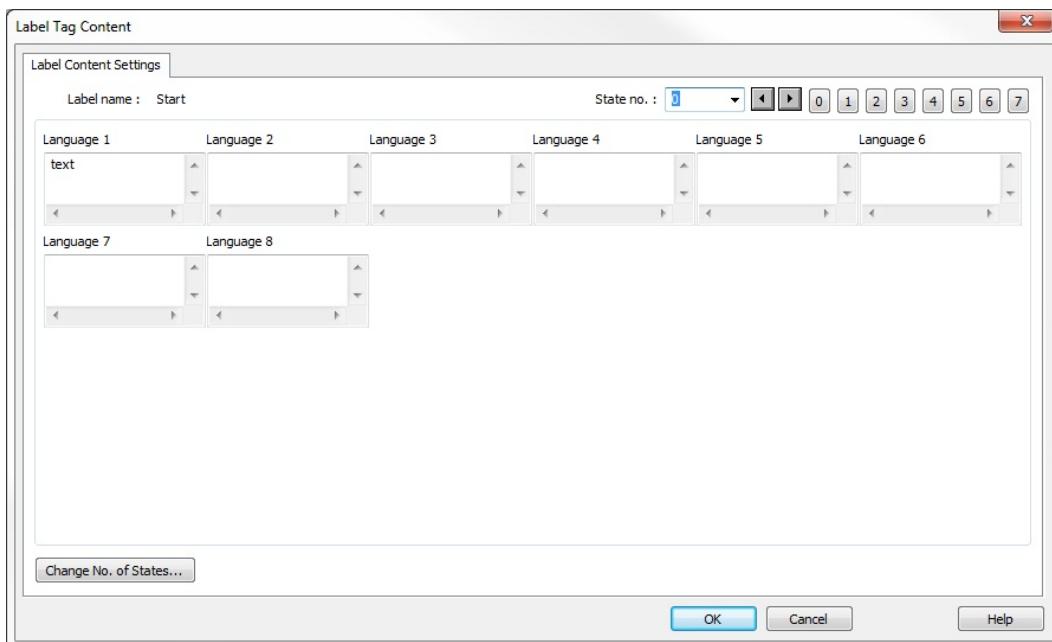
2. Create a label by clicking the **New...** button to display the Label dialog.

3. Enter the **Label name** for the label, and how many states the new label requires. For example, a label titled "Start" requires 2 states to represent separate conditions, where condition one status is "START" and condition two is "STOP."

4. Click the **OK** button, and the new label is added to the database. The Name will appear in a selectable listing of available Labels for use with objects that support text field labeling.

5. The new label is still selected. Click the Settings… button to display the Label Tag Content dialog. In the **State No.** list pull-down box, select the state that the text is representing.
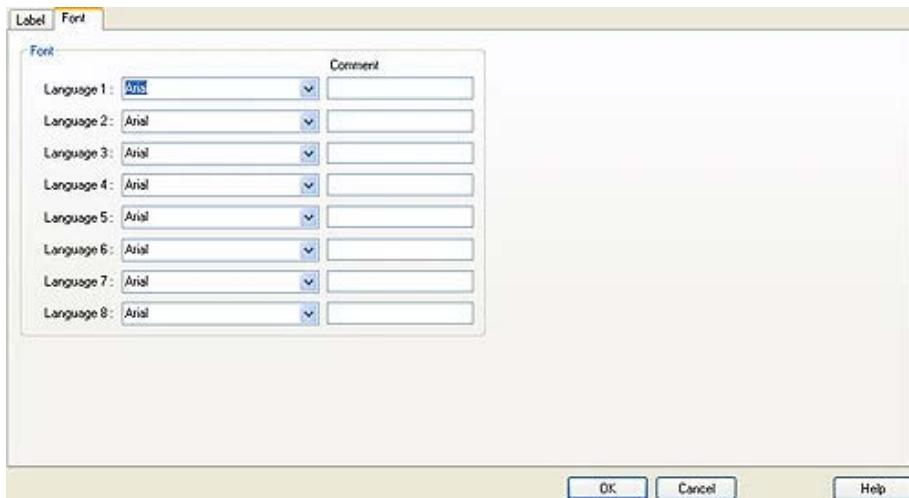
6. In each Language box, as needed, enter the text representing that state in each language.

7. If further text labeling is required to represent conditions or status in additional states, while still in the **Settings...** mode for Label Content Settings, select the state requiring text labeling. Enter the text in the Language boxes as above.

    📝 There is no inter-language conversion or translation capability. Entries must be made using the correct wording for the language designated, to display as entered.

8. Continue to add state descriptive text labeling as required.

9. When all text has been entered for all states desired, click **OK**. The Label is now contained in the Label Library and displayed when the Library is opened. View text labels for the various states of each label in the Library by selecting the State to display in the pull down box.

10. Once a label text has been created and you wish to change the number of states, you may do so by double-clicking on the desired label text. On the Label Tag Content dialog box, click the **Change No of States...** button, and then enter the No. of states desired for the label.

Setting Different Fonts for Different Languages

If you would like to use different fonts for different languages, for instance, if the language you are using requires special characters or Unicode fonts, you can select a different font for each language using the label library.

To set a different font for each language:

1. From the **Library** menu, click **Label...**, or click the Label Library Manager icon from the Library toolbar. The Label Library dialog box appears.

2. Select the **Font** tab.

3. Select the font for each language from the drop-down menu. Note that the fonts must be available to you in your **Windows > Fonts** folder.

4. Click **OK**.

Importing and Exporting the Label Library

This feature allows you to save the labels from the label library into a .lbl file format. Once saved, the file can be loaded into another project.

To save the label library:

1. Click on **Save Label File...** The open dialog box appears.

2. Enter the name of the file and where you wish to save the data.

3. Click **Open**.

To load the label library from an existing .lbl file:

1. Click **Load Label File...** The Open dialog box appears.

2. Browse for the .lbl file that contains the labels.

3. Click **Open**.

The .lbl file format cannot be edited.

The label library can also be imported and exported using an Excel (*.xls) file format or comma-separated variable (*.csv) file format. These formats are very useful if you need to make several changes to the
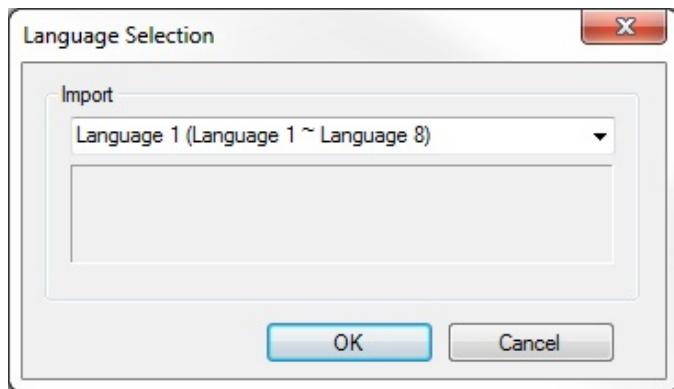
database. When creating a new project, it is easier and faster to create and edit labels in Excel or as *.csv files.

To export the label library:

1. Click **Export EXCEL File…** The Open dialog box appears.

2. Enter the name of the file and where you wish to save the data.

3. Select the type of file; *.xls or *.csv.

4. Click **Open**.

To import the label library:

1. Click Import EXCEL File….

2. The Language count dialog box appears. Select the number of languages (1-8) you wish to use in the Label Library. Click OK.

3. The Open dialog box appears.

4. Select the type of file; *.xls or *.csv.

5. Browse for the file that contains the labels.

6. Click **Open**.

Using the Label Library

Once entries have been made to the Label Library, they can be used with any object that supports text field labeling.

1. Select an object that supports text field labeling as required. On the Label tab for the object's Attributes, check the **Use label library** checkbox. The Label Index list will be enabled, containing all of the labels in the database.

2. Select the applicable label from the **Label tag** drop-down menu. The label will display on the object, representative for states and languages as entered in the Label Library dialog.

3. Once created with Labels assigned, objects can be viewed displaying the various text labeling in each of the states detailed, in each of the languages utilized. To view, on EZwarePlus State and

Test Toolbars, select the state and language for objects displayed on the window. The object's text labeling display will change according to the state and language selected for viewing.

4. To use the multiple language feature of the Label Library to display object labels in languages other than the default language (Language 0), the function must be enabled. Enable the multiple language capability as detailed below.

Using Languages with the Label Library

The HMI5000 Series supports up to 24 languages for use with the Label Library text labeling. In order to use the multiple language feature, a label configured in multiple languages must be created and stored in the Label Library, as detailed above. The language displayed is selected through Internal Local Word Control, LW-9134.

1. Text Labels in any of up to 24 languages can be displayed, as configured in the Label Library. In LW-9134, a value of 0 enables Language 1 as configured in the Label Library, a value of 1 enables Language 2, a value of 2 enables Language 3, and a value of 3 enables Language 4, etc.

2. The appropriate value must be written to LW-9134 to enable a designated language to display. For example, a series of set word objects writing a value to LW-9134 could be placed on a setup screen. Each set word might be labeled with the Language to be enabled, and the appropriate value addressed to LW-9134. If Set Word #0 enables English and English is the configured Language 1 in the Label Library, pressing the English Set Word Object writing a 0 to LW-9134 will enable label text to display in English. If Set Word #1 enables French and French is the configured Language 2 in the Label Library, pressing the French Set Word object writing a 1 to LW-9134 will enable text to display in French. Continue for all languages configured in the Label Library.

LW-9134 is the System Tag Language Mode.
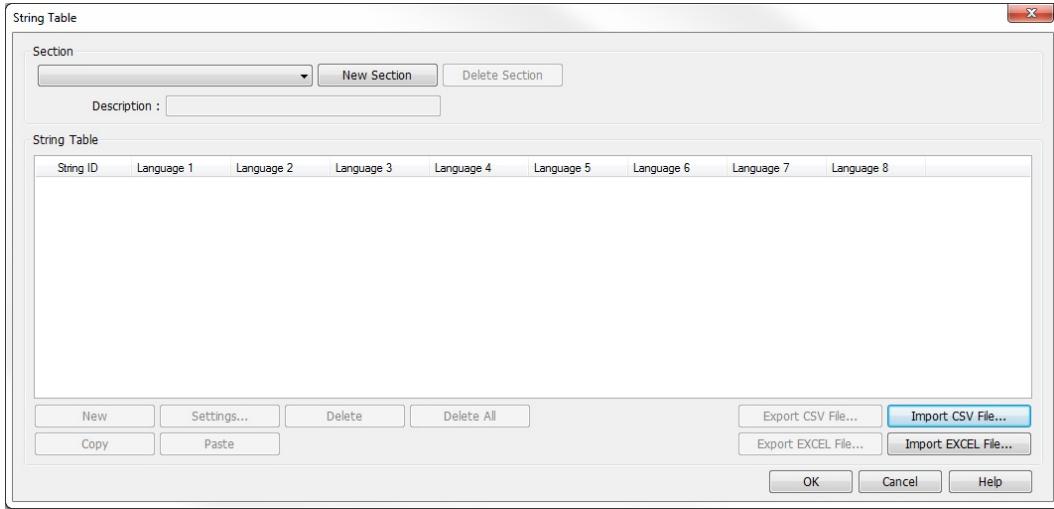
Note: Although up to 24 languages can be created in the Label Library, only eight languages can be selected and used in a project at one time.

Creating and Using the String Table
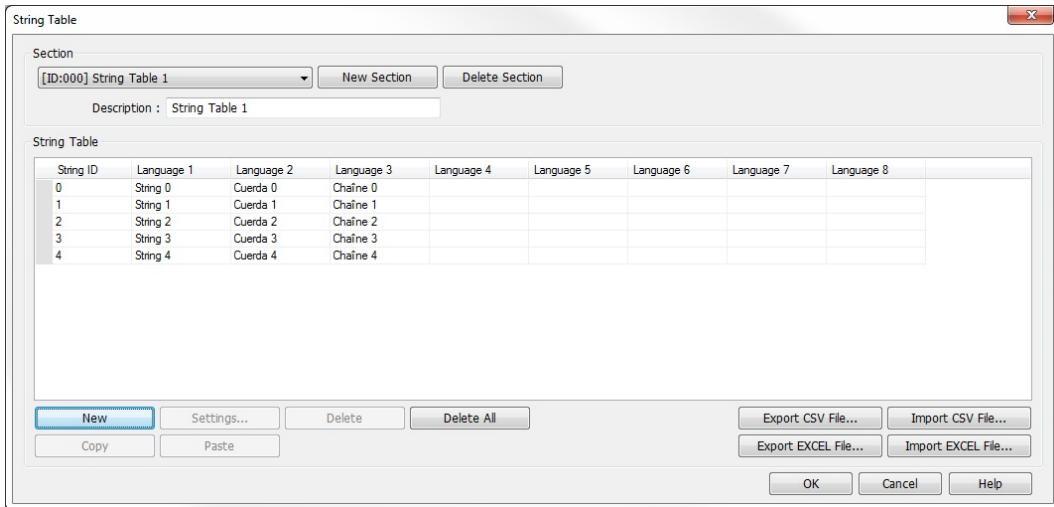
The String Table is a database of text strings, which can be assigned to a Text object or an event/alarm message in the Event/Alarm Log. The String Table allows you to create multiple sections or sets of text that can be assigned to individual Text objects and Event/Alarm messages. In addition, it is not limited to a certain number of states based on the number of languages selected (like the Label Library), so you can create more than 256 text strings if required for your application.

To create a String Table Library:
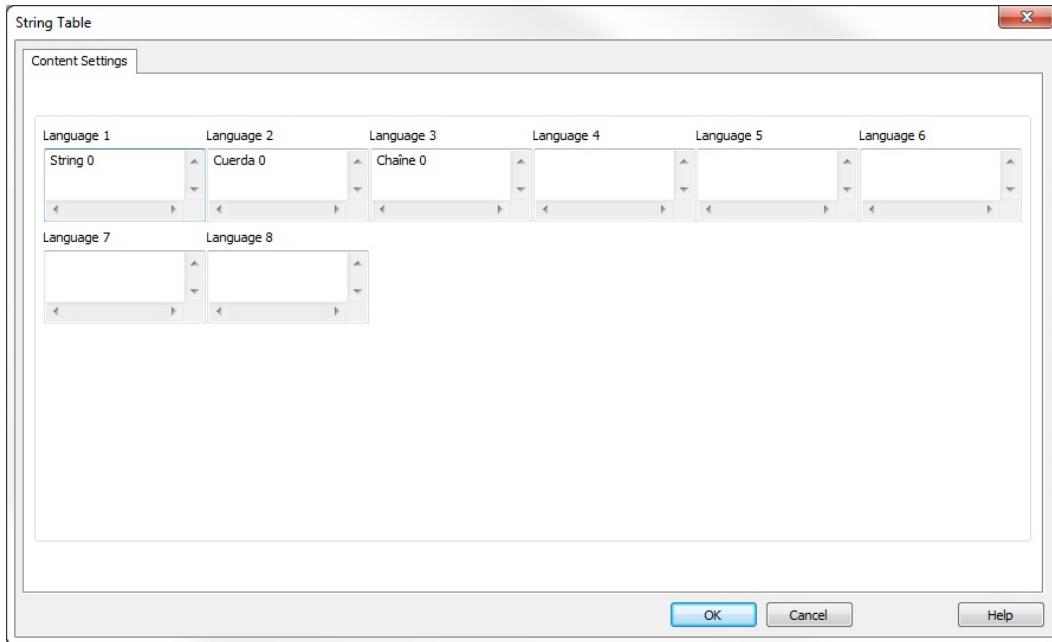
1. From the **Library** menu, click **String Table...**, or click the String Table Manager button from the Library toolbar. The String Table dialog appears.
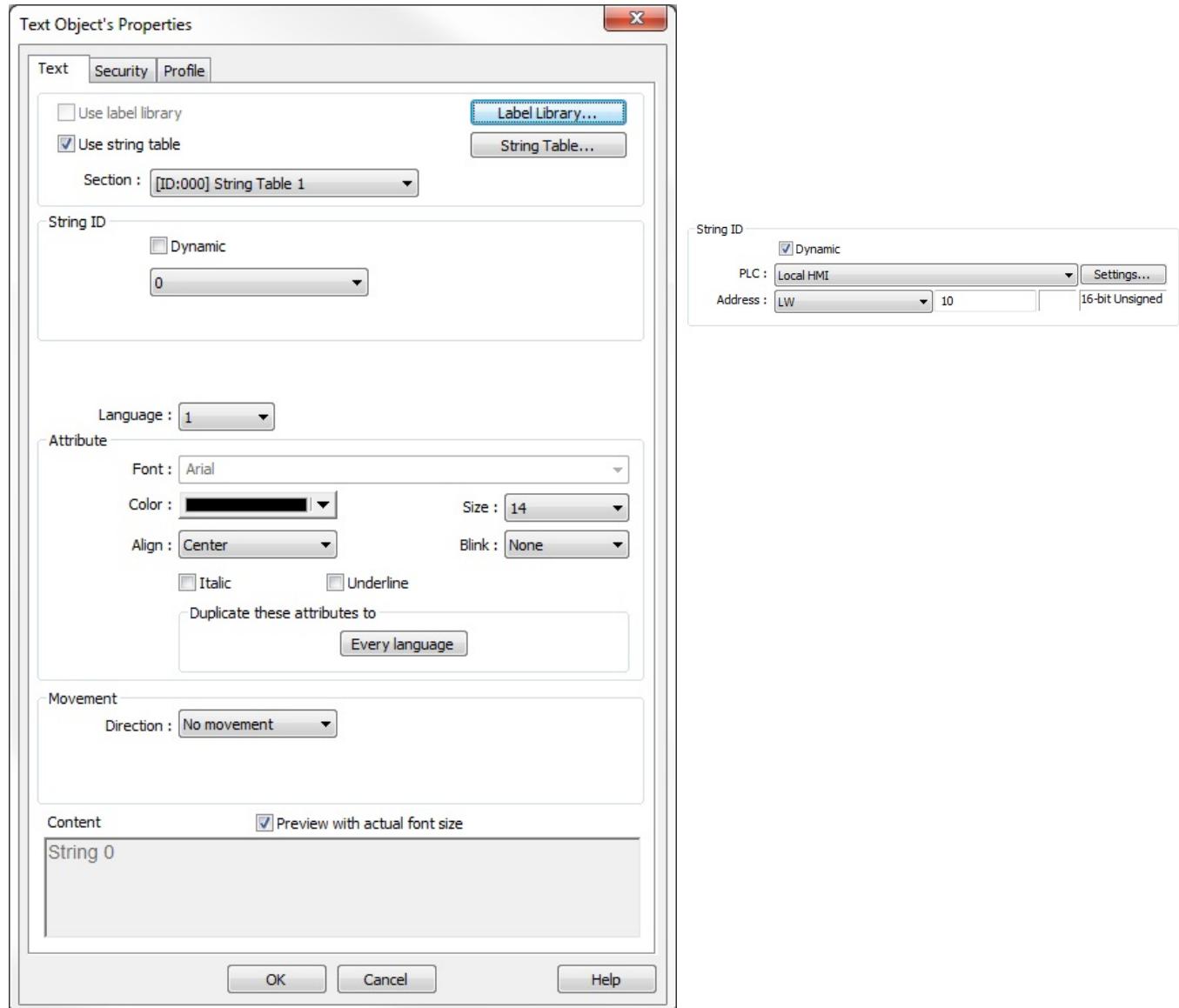
2. Create a new table by clicking the **New Section** button. Enter a name for the new table in the **Description** field. Multiple sections can be created, each with its own set of text strings.
3. Click the **New** button to create a new text string. A text string can be created for one or more languages. The number of languages is determined by the settings in the Label Library and the language displayed is determined by the language mode system register LW-9134 (see "Using Languages with the Label Library in the previous section).
4. Additional text strings can be added by clicking the **New** button again.

5. Text can be entered directly in the **String Table** dialog window or by clicking the **Settings** button for the selected string to open the **Content Settings** window.
   The font for each language for the text string is determined by the font setting in the Label Library. The font size is determined by the individual text object or Event/Alarm message setting.
   A carriage return can be entered in the text string from the **Content Settings** window to create multiple lines of text for a single text string.

6. Once a String Table is created, it can be assigned to a Text object or an Event/Alarm message. Select "Use string table" to enable the String Table for the text.

7. Select which string section you wish to use in the **Section** drop-down. The individual string can be selected in the **String ID** section. The string can be selected dynamically by selecting **Dynamic** in the **String ID** section. The assigned register is used to select the string displayed by its ID number. The value written to the register will display the corresponding string in the text object or Event/Alarm message.

Importing and Exporting the String Table Library

This feature allows you to save the strings from the String Table library into a CSV file format or XLS file format. Once saved, the file can be loaded into another project.

To save the String Table library:

1. Click on **Export CSV File** or **Export EXCEL File**. The **Save As** dialog box appears.

2. Enter the name of the file (File name) and where you wish to save the data.

3. Click **Save**.

To load the String Table library from an existing CSV or XLS file:

4. Click **Import CSV File** or **Import EXCEL File**. The **Open** dialog box appears.

5. Browse for the CSV or XLS file that contains the String Table.

6. Click **Open**.
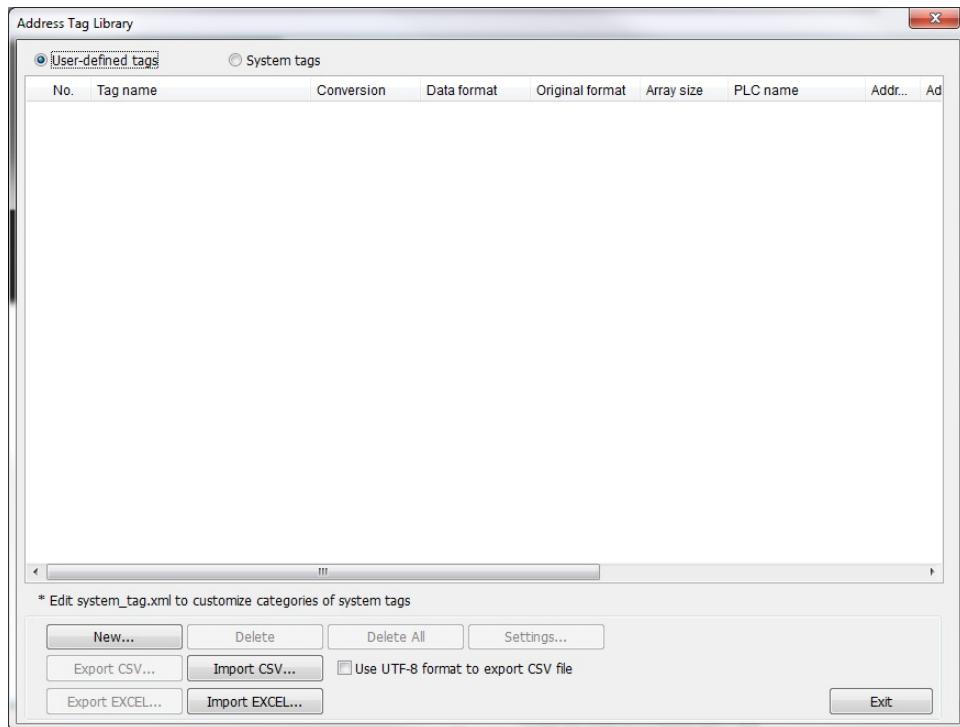
The label library can also be imported and exported using an Excel (*.xls) file format or comma-separated variable (*.csv) file format. These formats are very useful if you need to make several changes to the database. When creating a new project, it is easier and faster to create and edit labels in Excel or as *.csv files.

Creating and Using the Tag Library
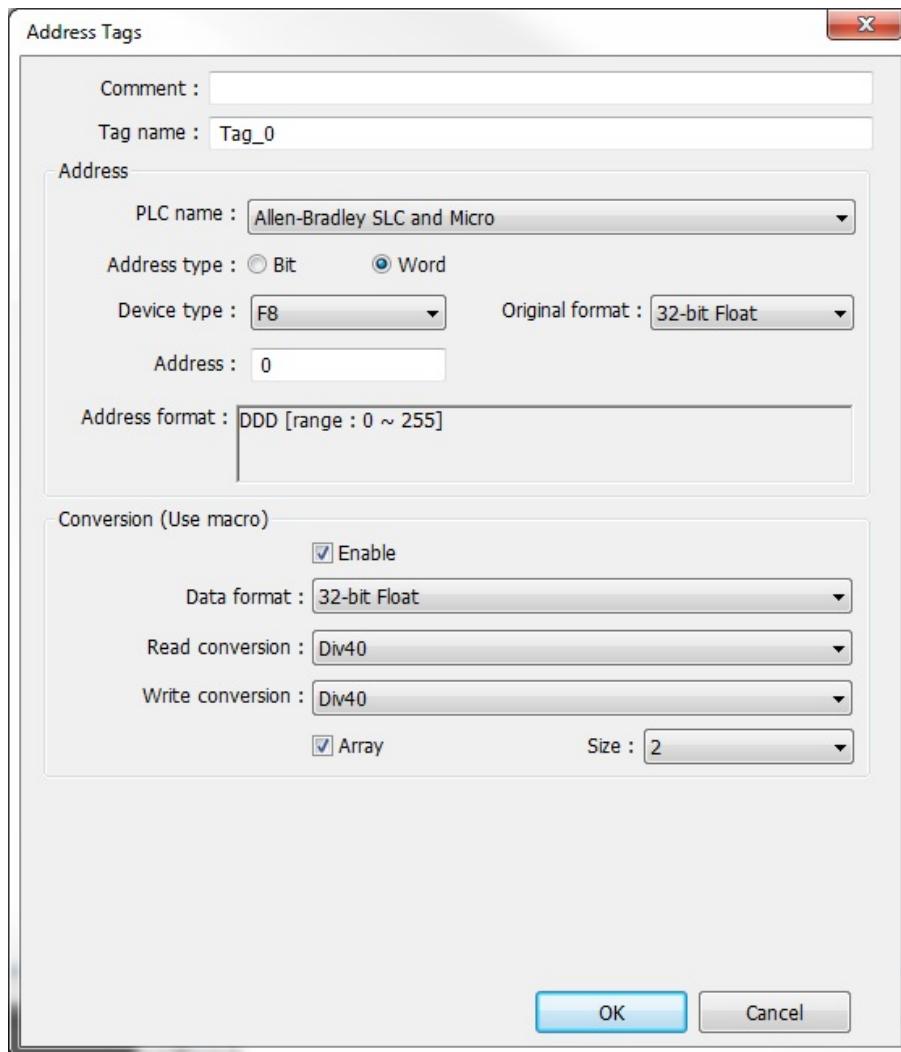
The Tag Library is a database of register addresses, with each tag representing a single address. EZwarePlus gives you the option of using either Customized or System tags. Customized tags are tags that you build yourself. System tags are predefined tags that allow access to certain built-in functions and settings (see "Appendix A – Reserved Local Memory" for more information). You can select whether you will be using customized or system tags in the **Address Tag Library** dialog. The Tag listing does not contain display information, as display attributes are set when the individual object using the Tag listing is created.

To create a Tag Database Library:

4. From the **Library** menu, click **Address...**, or click the Address Tag Library Manager button from the Library toolbar. The Address Tag Library dialog appears.

5. To create a new Tag listing, click the **New…** button to display the Tag dialog.

6. Enter the new **Tag name**. Tag names may be up to 100 characters, any character.

7. Select the **PLC name:** as configured in the Device Table from the drop-down menu.

8. Select the **Address type** (Bit or Word). If **Word** is selected, an additional **Data format** option will be displayed. When the tag is assigned to an object, the data format of that object will be preset to the data format selected for the tag.

9. Select the Device type from the drop-down menu.

10. Enter the Register **Address**.

11. **Conversion (Use macro)**: This provides the option of converting the data format of the data being displayed and of using a macro to scale the value when reading and writing values for the selected tag address. The macros must be stored in the Macro Function Library as a subroutine. Only macro subroutines with the same data format as the address tag can be selected.

12. Click **OK**.

13. Make additional entries to the database by repeating the procedure.

To delete a tag:

1. Open the Tag Library as directed above.

2. Select the tag to delete.

3. Click the **Delete** button.

To modify a tag:

1. Open the Tag Library as directed above.

2. Select the tag to edit.

3. Click the **Settings...** button.

4. Edit as applicable and then click **OK**.

Importing and Exporting the Tag Library

This feature allows tags from the tag library to be imported and exported into a comma-separated variable (*.csv) file format or Excel (*.xls) file format. These formats are very useful if you need to make several changes to the database; or, if creating a new project, it is easier and faster to create and edit the tags in a .csv or .xls file.

📝 The *.tgl file format from previous versions of EZwarePlus is no longer supported.

To export the tag library to a .csv file or .xls file:

1. Click **Export CSV** or **Export EXCEL**. The Open dialog box appears.

2. Enter the name of the file where you wish to save the data.

3. Click **Open**.
    📄 If the **Use UTF-8 format to export CSV file** option is selected, the .csv file will be exported in UTF-8 (character encoding) format. Otherwise, it will be exported in ANSI format.
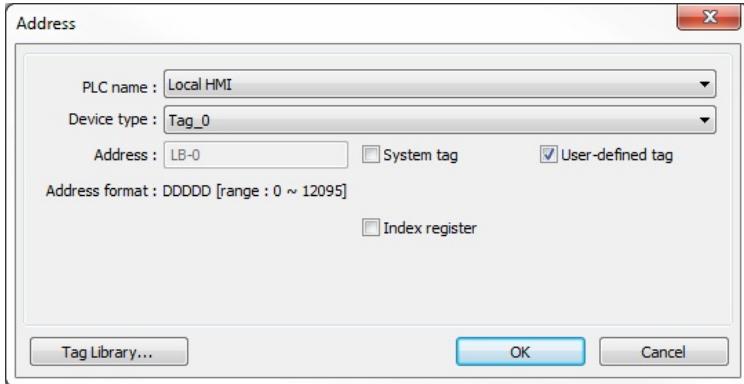
To import the tag library from a .csv file or .xls file:

1. Click **Import CSV** or **Import EXCEL.** The open dialog box appears.

2. Brows for the CSV or XLS file containing the tags.

3. Click **Open**.
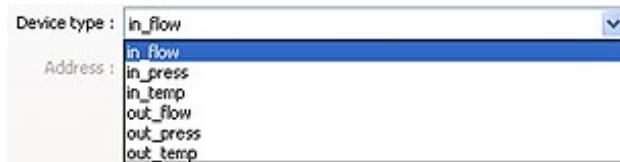
Using the Tag Library

Once the Tag Database has been created, individual objects can use the Library to assign a Tag to the object, referenced to the PLC register address.

1. On addressable objects, once the Tag Database has been created, a User-defined tag checkbox is available. This box is not available if no tags have been configured in the Database Library.

2. Check **User-defined tag** checkbox. The **Device Type** list will be filled with a list of available tags. Objects addressable as Register-type objects will display Tags configured as Word; Objects addressable as Bit-type objects will display Tags configured as Bit.

3. Select the desired Tag from the Device Type list to address the Object to the referenced Register Address.

Chapter 10 – Creating and Using Keypads

The HMI operator must have a keypad available to enter new data when using the Numeric Input Object or the ASCII Input Object. EZwarePlus includes group libraries that contain sample keypads to be placed onto a window screen. You can also create your own custom keypads. This chapter focuses on how to create keypads, display them on the window screen, and use them for entering data into PLC registers.
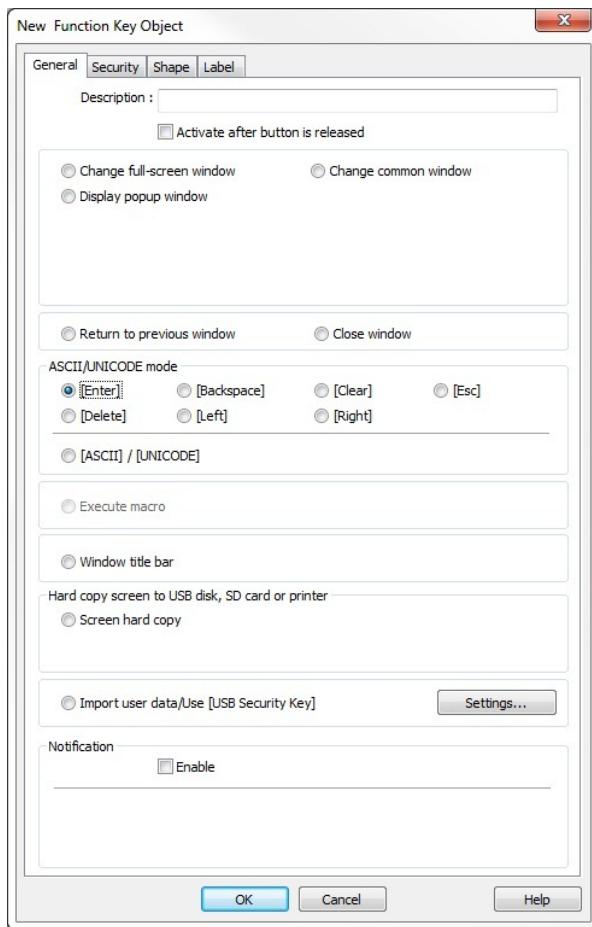
How to Create a Keypad

Any keypad that you create is actually composed of keys using the Function Key Object. The Function Key Object can create alphanumeric keys as well as control keys, (i.e., Delete, Enter, Clear, etc.)

To create a Function Key Object:

1. From the **Objects** menu, click **Button > Function Key** or click the Function Key icon in the Object 1 toolbar. The New Function Key Object dialog box appears.

2. Use the **Description:** box to enter a title for the Function Key part. A description is not necessary but does help you identify the purpose of the part.

3. In the **ASCII/UNICODE mode** section, there are seven control key options. Control keys are used during data entry to perform a specific function.

Function	Description
[ENTER]	Configures the Function Key as an Enter key. When pressed, it will write the alphanumeric characters entered into a Numeric Input Object or ASCII Input Object to the target PLC register.
[BACK SPACE]	Configures the Function Key as a Delete key. When pressed, it will delete the alphanumeric character to the left of the cursor in the Numeric Input object.
[CLEAR]	Configures the Function Key as a Clear key. When pressed, it will clear the data displayed in the Numeric Input Object or ASCII Input Object. Note: this key does not clear the actual target PLC register until the Enter key is pressed.
[ESC]	Configures the Function Key as an Escape key. When pressed, it will exit the editing mode.
[Delete]	Configures the Function Key as a Delete key. When pressed, it will delete the alphanumeric character to the right of the cursor in the Numeric Input object.
[Left]	Configures the Function Key as a Left Arrow key. Moves the cursor in the Numeric Input object to the left one space.
[Right]	Configures the Function Key as a Right Arrow key. Moves the cursor in the Numeric Input object to the right one space.

4. Just below the four control key options, is the ASCII/UNICODE checkbox. Select this when you want to configure the Function Key to enter an alphanumeric character. When this checkbox is selected, the character box is activated. Use this box to enter the ASCII character you want to use.

5. Click the Shape tab to select either a shape or bitmap to represent the Function Key.

6. Click the Label tab to display the Label for the Function Key. Click the **Use label** checkbox to use a label.

7. Click **OK**. The New Function Key Object dialog closes and the main screen of EZwarePlus appears with the cursor tied to a rectangular outline of the part you just created at the upper left corner of the screen. Move the part to the desired location on the window and click the mouse to place it.

8. Once the part is placed onto the window, you can adjust the location of the label inside the part by clicking once on the label. This will highlight the entire object. Now click on the label again. Now only the label is highlighted, allowing you to move it without moving the part.

9. Create a Function Key for each number, Enter, Back Space, Clear, and Escape key.

10. Add a display to the keypad by selecting **Objects > Numeric/ASCII > ASCII Display**. Configure the ASCII Display with a Read Address of LW-9150, and six words (No. of words). Place the ASCII Display above the Function Keys to complete the keypad.

To create a custom keypad, group all of the keypad objects together on a window. You can then save the keypad to a group library for later use in other projects. Several predefined keypads are included with EZwarePlus. To use these keypads, click **Library > Group > Call up Library** in EZwarePlus and access the keypad library.

Alternately, you can create a custom keypad in a graphics program such as Paint and import it into the Picture Library. Place the picture on a window using the **Draw > Picture** tool, and overlay the Function Keys and ASCII Display on top of the picture. The computer.flb library has some keypad pictures you can use (picture no. 35 and 36).

⌨ Once a new keypad is created, it must be added to the Keyboard list in the **System Parameters > General** tab.

Displaying and Using a Keypad

Let's go through a sample project that uses one of the predefined keypads included in EZwarePlus to enter values in a Numeric Input Object and an ASCII Input Object. This example will show you how to place these objects on a window screen, and then use the keypad to edit the data registers.

To create a sample keypad entry screen:

1. Start a **New** project file in EZwarePlus.

2. From the **Objects** menu, select **Numeric**. The **New Numeric Input Object** properties box appears.

3. Create a Numeric Input Object with the following parameters:

Tab	Section	Parameter	Value
General	Description		Numeric Input Object
	Read Address	PLC Name:	Local HMI
		Device Type:	LW
		Address:	0
Data Entry	Keyboard (Select Use a popup keypad)	Window No.	60: ASCII Middle
		Popup position	Lower, right-hand column
Numeric Format	Display	Data Format	16-bit signed
	Number of Digits	Left of Decimal Pt.	5

> **Note:** In the **Numeric Object Properties – Numeric Format** tab in the **Display** section you can select how many digits before and after the decimal place, and the data format. These settings will determine the allowable values that can be entered by the **Numeric Object**. The user can also further restrict the allowable inputs on the same **Numeric Format** tab under the **Limits** section. If the operator tries to input a value outside of the allowable range the register will retain its current value.

4. From the **Objects** menu, select **ASCII**. The **New ASCII Object** properties box appears.

5. Create an ASCII Input Object with the following parameters:
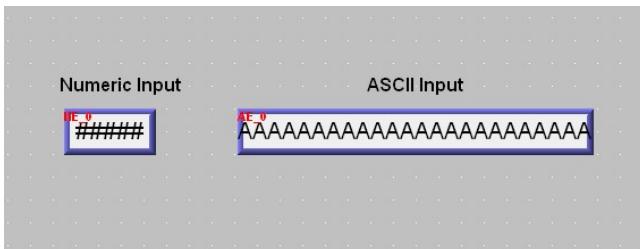
Tab	Section	Parameter	Value
General	Description		ASCII Input Object
	Read Address	PLC Name:	Local HMI
		Device Type:	LW
		Address:	1
		No. of words:	12
Data Entry	Keyboard (Select Use a popup keypad)	Window No.	60. ASCII Middle
		Popup position	Lower, right-hand column

>   **Note:** In the **ASCII Object Properties – General** tab, in the **Read Address** section select **Settings**
>   to input the desired register address and the size of the reserved storage (**No. of words**). Each 16-
>   bit word can contain two ASCII characters.

6. Create two text boxes; one to identify the Numeric Input register, and one to label the ASCII Input
    register. Place the text boxes and the Numeric Input and ASCII Input objects near the top of the
    window.

Editing data registers using a keypad:

1. Save and compile the new project, then test the operation of the keypad by either running in
    Simulation mode or by downloading the project to the HMI.

2. The following screen will appear:

3. Change the value of the Numeric Input register. Touch the Numeric Input Object to activate the edit
    mode. The keypad will pop up.

4. Using the keypad, enter digits 1, 2, 3, 4, and 5. As you enter the digits, each one should appear in
    the Numeric Input Object box.

5. Press the Backspace key to delete digit 5.

6. Try pressing any of the alpha characters (A-Z). Notice that alpha characters are not accepted into a
    Numeric Input Object register.

7. Press the Clear key. Notice that the entire register is cleared to 0.

8. Enter digits 5, 4, 3, 2, 1, and then press the Enter key. The keypad closes but the value was not
    accepted. This indicates that the value entered is out-of-range. Touch the numeric input object
    again. Press the Clear key and enter 32767. Press the Enter key. Notice that this value is accepted
    and blinking stops.

9. Touch the Numeric Input Object register again to activate editing mode. Enter five more digits then
    press the Esc key. Notice that the entry is cancelled and the previous number 32767 is restored.

10. Change the value of the ASCII Input register. Touch the ASCII Input Object to activate the edit
    mode.

11. Using the keypad, enter the character string "HELLO WORLD". As you enter the characters, each
    one should appear in the ASCII Input Object box. Press the Enter key to send the characters to the
    HMI internal data register.

The above example uses a popup keypad that can be moved onscreen by touching the title bar and
dragging it around. You can create a fixed keypad without a title bar by selecting **Hide title bar** in the
Numeric Input or ASCII Input object's **Data Entry** tab.

To create a fixed keypad on a window instead of using a popup keypad or Direct Window:

1. In the above sample project, create a new Numeric Input Object and deselect **Use popup keypad** on the **Data Entry** tab. Click **OK** to close the Properties window.

2. Copy your custom keypad into the window, or open Window 50 and copy the keypad over to Window 10.

3. You must click or touch the Numeric Input Object first to activate it, enter a number using the keypad, and then press Enter on the keypad to write the value to the register.

Chapter 11 – Bar Graphs and Meters

This chapter focuses on two special graphic objects, which can be used to display PLC data registers. You've learned how to use shapes and bitmaps to represent the data in PLC registers as states. You've also learned how to use alphanumeric data fields to display the contents of PLC registers as either numbers or ASCII characters. We now introduce two more options to display the data in PLC registers: Bar Graphs and Meter Display. In Chapter 12 we will introduce the Trend Display, another method of displaying data in PLC registers.
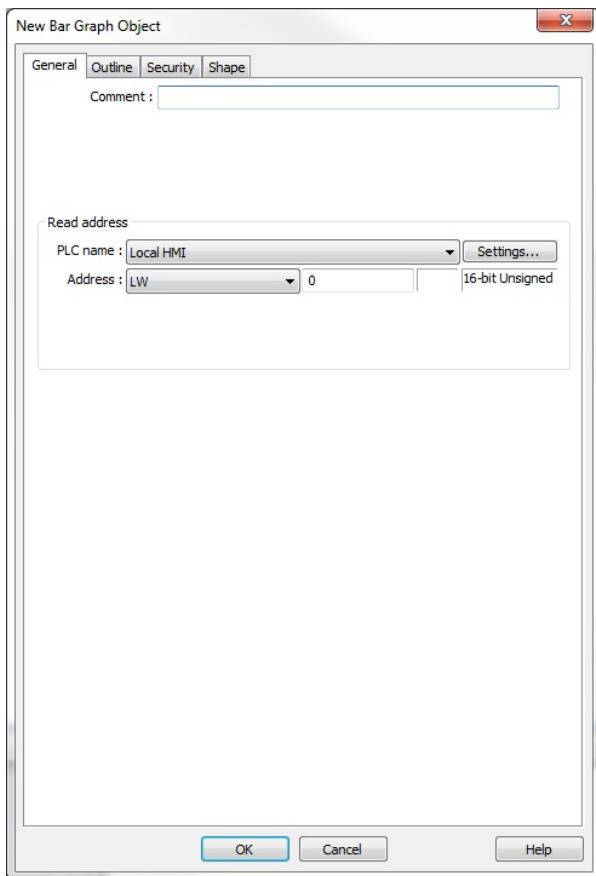
Creating Bar Graphs

The Bar Graph Object is used to represent the data in a 16-bit or 32-bit PLC register as a bar graph. You can configure the bar graph to move up, down, right, or left. The bar graph can be configured with any base number that represents 0 level and any span range. You can create the bar graph with an alarm low and high setting to indicate to the HMI operator that an underflow/overflow alarm condition exists. In addition, you can set the alarm low and high limits to be controlled by two additional PLC registers so that the low and high limits are variable. Bar graphs can even be constructed with a shape or bitmap overlaying the bar graph to create flow tanks, temperature gauges, etc.
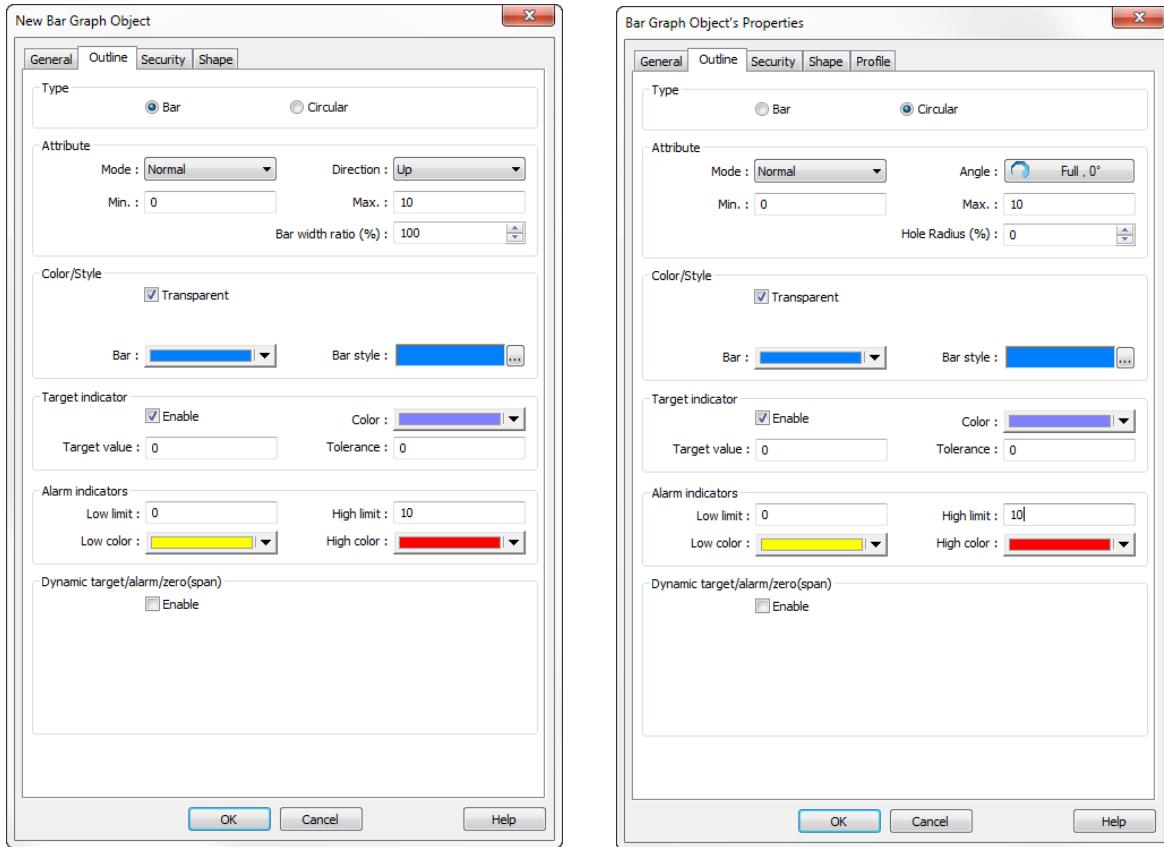
To create a Bar Graph Object:

1. From the **Objects** menu, click **Bar Graph**, or click the Bar Graph icon in the Object 2 toolbar. The New Bar Graph Object dialog box appears.

2. Use the **Comment:** box to enter a title for the Bar Graph object. A comment/description is not necessary but does help you identify the purpose of the part.

3. Click the **Setting…** button in the **Read address** frame. Select the device type from the drop-down menu, and then indicate the PLC register address. Select the data format.

4. Click on the **Outline** tab to display the outline form.
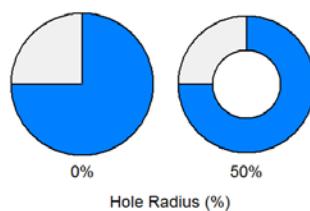
5. Under **Type** select either **Bar** or **Circular**

6. In the **Attribute** section, select how the Graph is to operate.

Bar Type Function	Option	Description
Mode	Normal	The bar starts at one end of the object, and moves to the other end.
	Offset	The bar starts at some non-zero point defined by the Origin, and moves through the origin as the value changes.
Min.		The PLC Register values corresponding to an unfilled bargraph.
Origin		The starting point of the bar when the Type is set to Offset.
Direction	Up	The bargraph starts at the bottom of the object, and moves up as it fills.
	Down	The bargraph starts at the top of the object, and moves down as it fills.

	Right	The bargraph starts at the left of the object, and moves right as it fills.
	Left	The bargraph starts at the right of the object, and moves left as it fills.
Max.		The PLC Register values corresponding to a completely filled bargraph.
Bar Width Ratio (%)		The percent of the object's width that the bar occupies.

Circular Type

Function	Option	Description
Mode	Normal	The bar starts at one end of the object, and moves to the other end.
	Offset	Circular bar graph does not support **Offset Mode**
Min.		The PLC Register values corresponding to an unfilled graph.
Angle	Clicking the **Angle** menu button opens the **Degree** dialog, shown below.	
	Clockwise	The graph starts at the **Start** angle and moves clockwise as it fills.
	Counter-clockwise	The graph starts at the **Start** angle and moves counter-clockwise as it fills.
	Full Circle	When checked the graph will fill 360°.
	Start	The starting point of the graph in degrees.
	End	If Full Circle is unchecked this sets the end point of the graph in degrees.
Max.		The PLC Register values corresponding to a completely filled graph.
Hole Radius (%)		The ratio of the radius of the center hole to the outer radius of the graph. 0% 50% Hole Radius (%)

7. The **Bar color/style** determines the appearance of the Bar Graph.

	Description
	Set the color of the outside of the bar graph.
	Set the color of the filled part of the bar.
	Set the color of the unfilled part of the bar.
	Set the pattern of the filled part of the bar.

Degree

Direction

Degree

Start

8. Set up the **Target indicator**. This selects the color of the filled part of the bar when it reaches a preset value.

Function	Description
Enable	When checked, the Target Indicator is active.
Color	Set the color to change the bar when the value is equal to the Target Value.
Target Value	The value at which to change the color of the bar.
Tolerance	Set a tolerance for the Target Value. When the value is less than or greater than the Target Value by this value, the bar will remain in the selected color.

9. Select the **Alarm indicators** colors.

Function	Description
Low Limit	The value at which the bar will change to the Low Color.
Low Color	The color to change the bar when the value reaches the Low Limit.
High Limit	The value at which the bar will change to the High Color.
High Color	The color to change the bar when the value reaches the High Limit.

10. Set up **Dynamic target/alarm/zero (span) address**. When checked, this option allows certain alarm limits to be read from the PLC / Controller. The **Target value**, **Low limit**, and **High limit** fields are disabled. When **Dynamic zero/span** is checked, the **Min.** and **Max.** (and **Origin** in offset mode) fields are disabled. Data is read from the PLC as follows:

Specified Address	Low Limit
Specified Address + 1	High Limit
Specified Address + 2	Target Value
Specified Address + 3	Min. Value
Specified Address + 4	Max. Value
Specified Address + 5	Origin Value

11. Once the part is placed onto the window, you can adjust the attributes of the Bar Graph by double-clicking on the part.
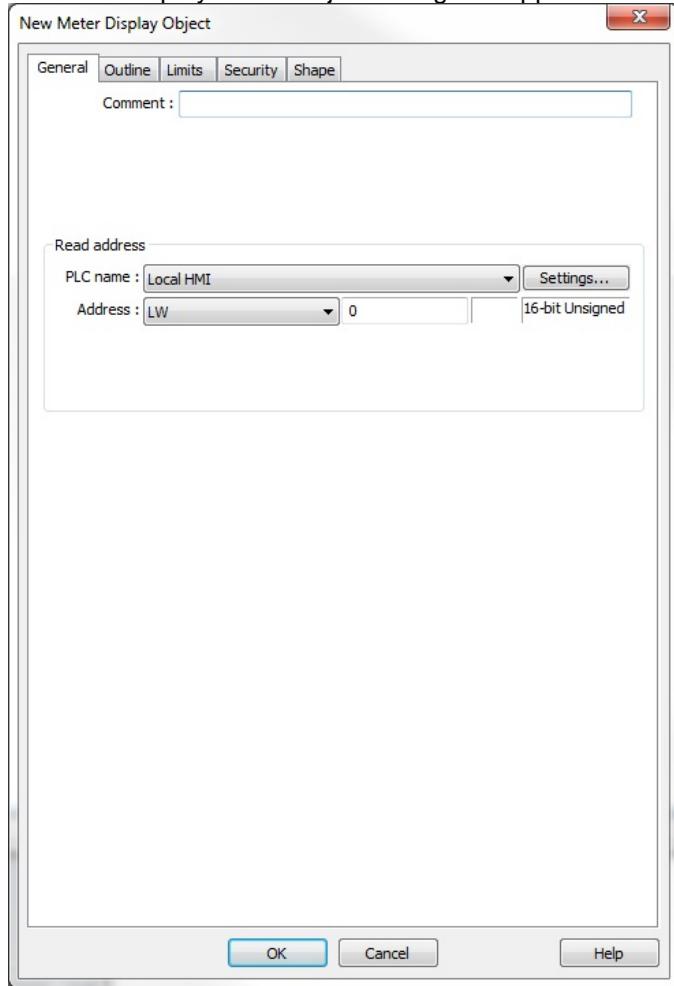
Creating Meter Displays

The Meter Display Object is used to represent the data in a 16-bit or 32-bit PLC register as a scaled meter. The meter can be easily customized to the look that you want. The Meter Display can be configured with any base number that represents 0 level and any span range.
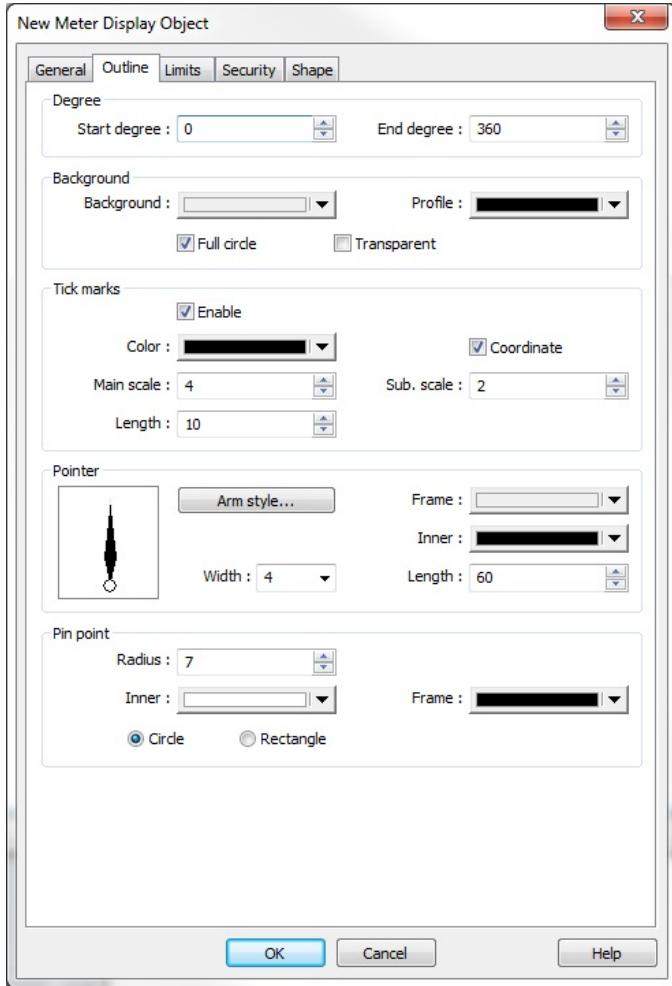
To create a Meter Display Object:

1. From the **Objects** menu, click **Meter Display**, or click the Meter Display icon in the Object 2 toolbar. The New Display Meter Object dialog box appears.

2. Use the **Comment:** box to enter a title for the Meter Display object. A comment/description is not necessary but does help you identify the purpose of the part.

3. Click the **Setting…** button in the **Read address** frame. Select the Device type from the drop-down menu, and then specify the PLC register address. Select the data format.

4. Click the **Outline** tab. This is where you will configure all of the attributes of your meter.
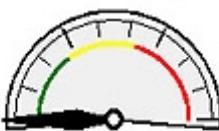
5. In the **Degree** section, you can select the range of your meter, where the range is 0 to 360. The **Start degree** 0 is at 12:00. Below are four examples of start and end degrees for different meters:
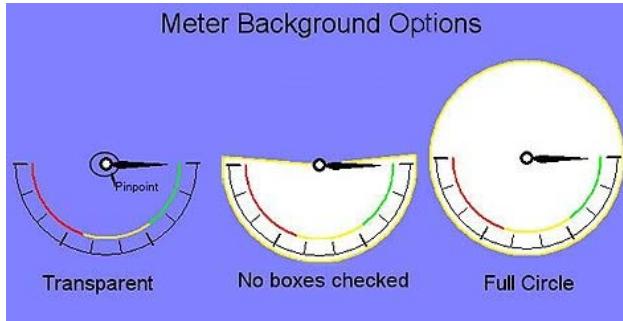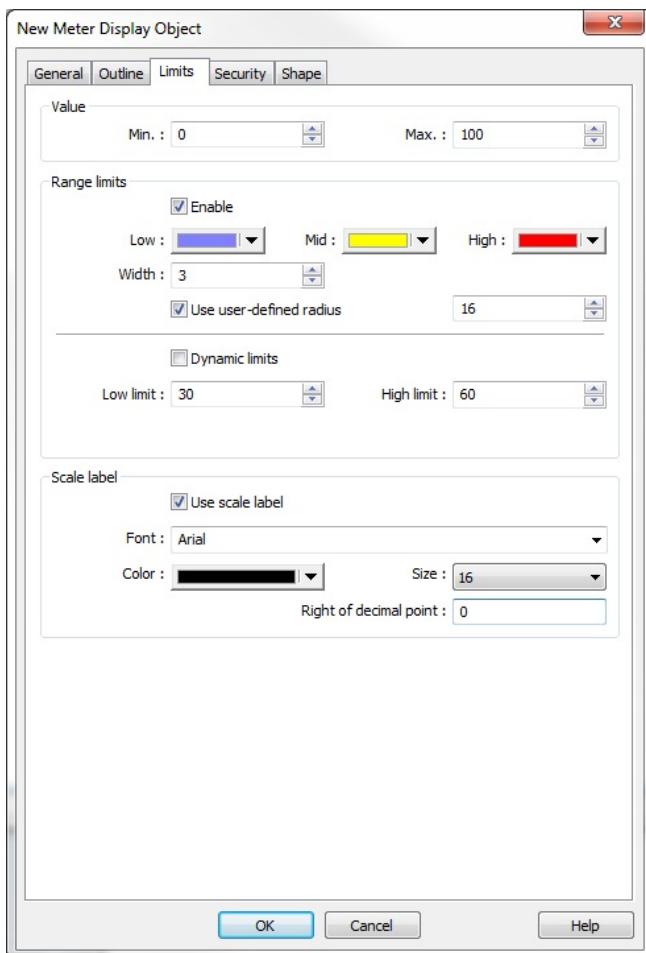
🗐 Note that meters can have any start and end degree between 0 and 360.

6. The **Background** section allows you to select background options for the meter. The following illustrations show how your meter will appear with different options checked:

Meter Background Options
Transparent   No boxes checked   Full Circle

7. The **Tick marks** section allows you to configure the length, scale and sub-scale of the tick marks.

8. In the **Pointer** section, select arm style, color, length, and width.

9. The **Pin point** section allows you to adjust the style and size of the pinpoint. See the illustration above to see the pinpoint (the center of the meter).

10. Select the **Limits** tab. In this section, you can configure a scale that goes on the face of the meter that shows by a color indication when high and low limits have been exceeded. If you look at the above examples, you will see this is represented on the face of the meter as a red, yellow and green strip.

11. In the **Value** section, select the Min. and Max. values. These are the PLC register values that represent the zero and full-scale deflection of the meter's arm.

12. In the **Range limits** section, click the enable check box to enable the limits. Select the colors for low, mid and high. Select the width, in pixels, of the color band. The values from zero to low limit will be on the 'low' color band; values from low limit to high limit will be on the 'mid' color band; and values greater than high limit will be on the 'high' color band.

13. Select the **Low limit** and **High limit**. These are the values used for the range limit color bands. Click the **Dynamic lim**its check box to allow PLC registers to determine the low and high limits. The low limit is the specified register, and the high limit is the next consecutive register.

14. The **Scale label** section allows you to enable labeling on the "main scale tick marks" inside the meter. You can select the font, color, size, and number of digits to the right of decimal point.

15. If you'd like a background shape to appear with your meter, click the **Shape** tab and select a shape.

16. Click **OK**. The meter appears on the work area of EZwarePlus. Click to drag and place your meter on your work area. If you need to reconfigure any of the properties, deselect the meter and then double click on it and the properties dialog box will reappear.

Chapter 12 – Data Sampling, Trend Displays, and History Data Displays

Creating Data Sampling Objects and Trend Displays
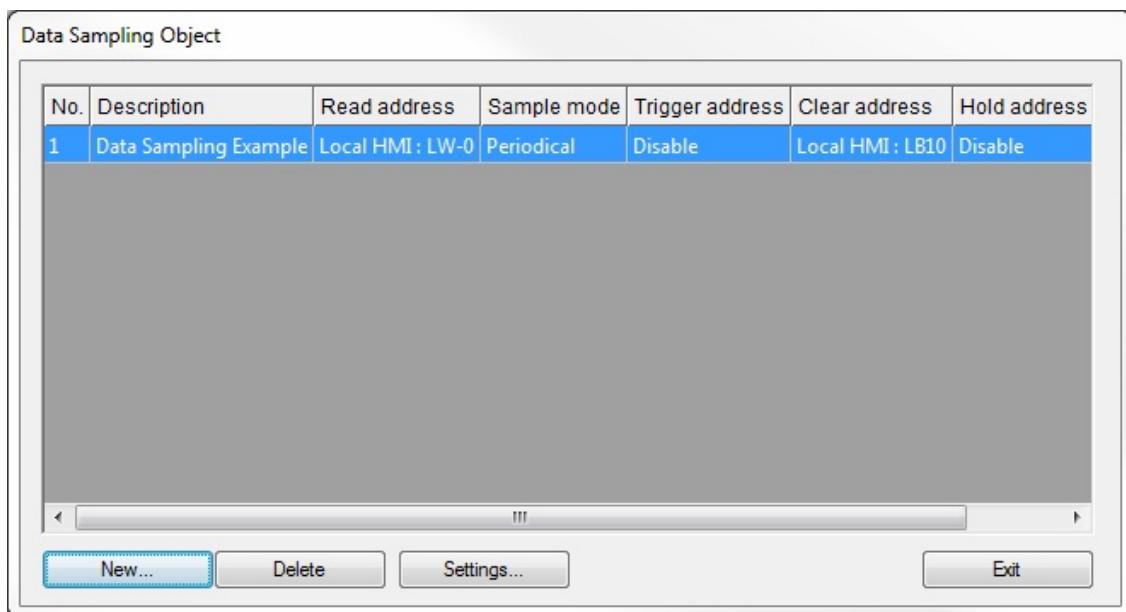
Data Sampling objects can be used to log historical data. Once data is historically logged, it can be saved to the HMI's internal memory, or to an external memory source such as USB, an SD card, or backed up to a PC.

The Trend Display Object is used to display the sampled data in single or consecutive PLC registers and plot this data on a time graph. You can display a maximum of 64 channels with varying pen colors to distinguish the channels. Data can be displayed in Real-time mode or in History mode, which provide the option of displaying previous days' data. Finally, a hold feature allows you to 'freeze' the graph, and a Watch line allows you to display the data at a particular point in time.

In order to create a Trend Display object, you must first create one or more Data Sampling objects from which to display the trends. Up to 40 Data Sampling objects may be created.
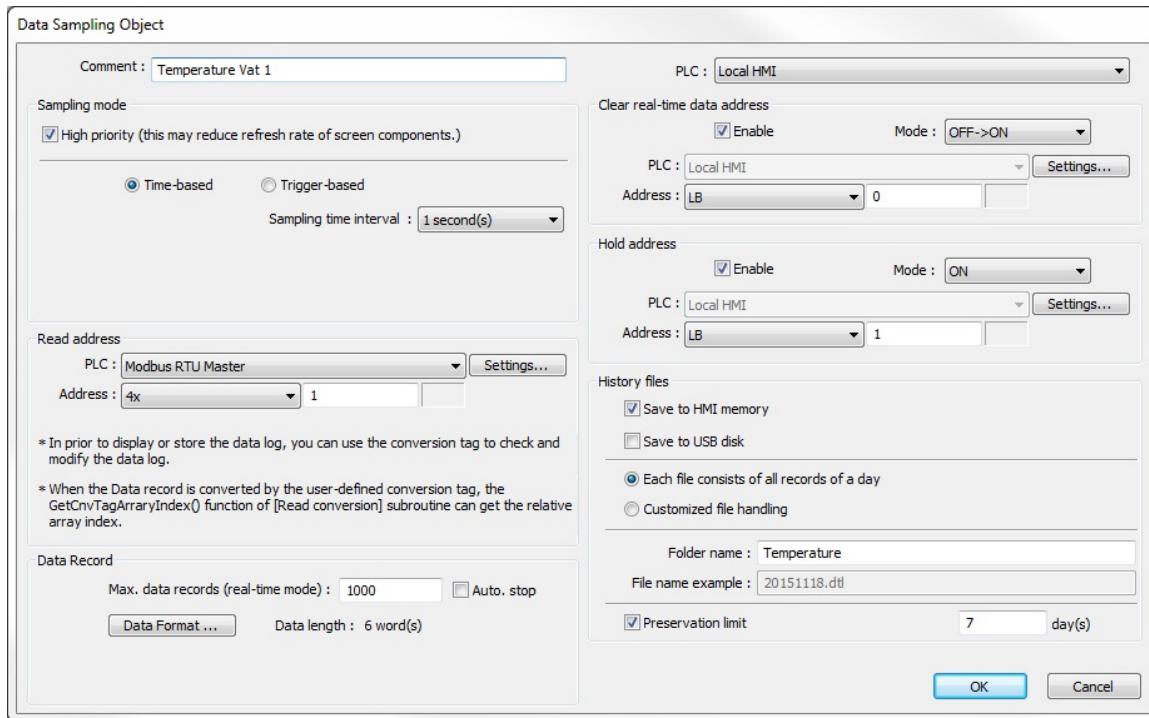
To create a data sampling object:

1. From the Objects menu, select **Data Logging > Data Sampling**.

2. The Data Sampling Object Dialog appears.

3. Click **New…** to create a new data sampling object.
   These steps are for the P and L series. For the RMI series, the configuration is slightly different – see below.
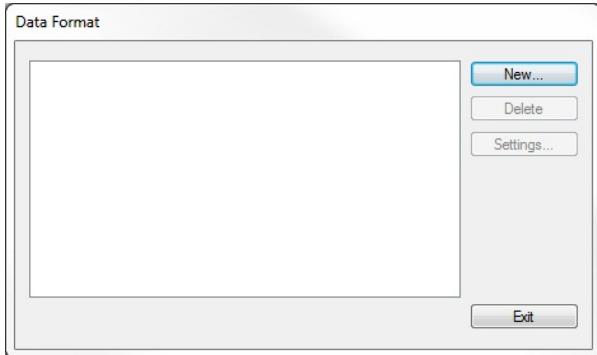
4. **Comment:** Enter a name for the object. This isn't necessary, but will help in later identification of the Data Sampling object when configuring the Trend Display.

5. **Sampling Mode:** This can be either Time-based or Trigger-based. With Time-based selected, the sampling interval can range from 0.1 seconds to 120 minutes. With Trigger-based selected, a PLC bit-address can be configured to trigger each sample. The Mode can be OFF > ON, ON > OFF, or OFF <-> ON (toggle).
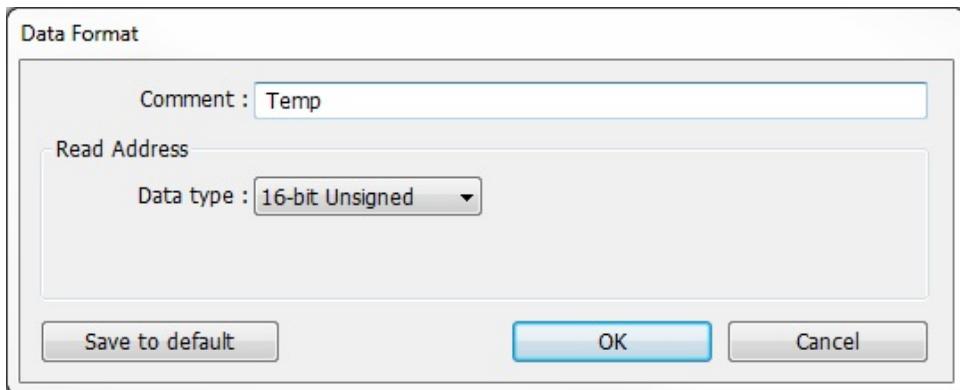
   The **High Priority** option enables the HMI to place a higher priority updating a Data Sampling object than objects displayed on the HMI screen. This helps to ensure that the sampling time interval is met. Note that enabling the High Priority option on many Data Sampling objects may slow down the update rate for other objects.

6. The **Read address** is the PLC register being sampled. Click the **Setting…** button to select the Device Type and Address for the Data Sampling Object.

7. **Max data records (real-time mode):** Sets the maximum number of records to display in the Trend Display (Real-time mode), up to 86,400 (1 sample/sec * 24 hr). If **Auto. stop** is selected, data sampling automatically stops when the number of records in Max data records has been reached. Otherwise, the existing logged data will continue to be recorded in the data log file beyond the number of records (samples) configured in the **Max data records** field.

8. Click the **Data Format...** button to configure the format of each logged item. The Data Format dialog appears.

9. Click **New...** to call the Data Format configuration dialog.

10. Enter a description for the data format in the **Comment** field and then select the **Data type**. Click **OK** to return to the **Data Format** dialog and then **Exit** to return to the **Data Sampling Object**.

   📃 **Note:** You must have at least one Data type configured in the Data Format list. If you want to display multiple channels in a Trend Display, you must configure multiple Data types in the Data Format list, one for each channel. The Data Sampling Object will sample data in consecutive registers starting with the register configured in the Read address of the Data Sampling Object, with the number of consecutive registers determined by the number of Data types in the Data Format list.
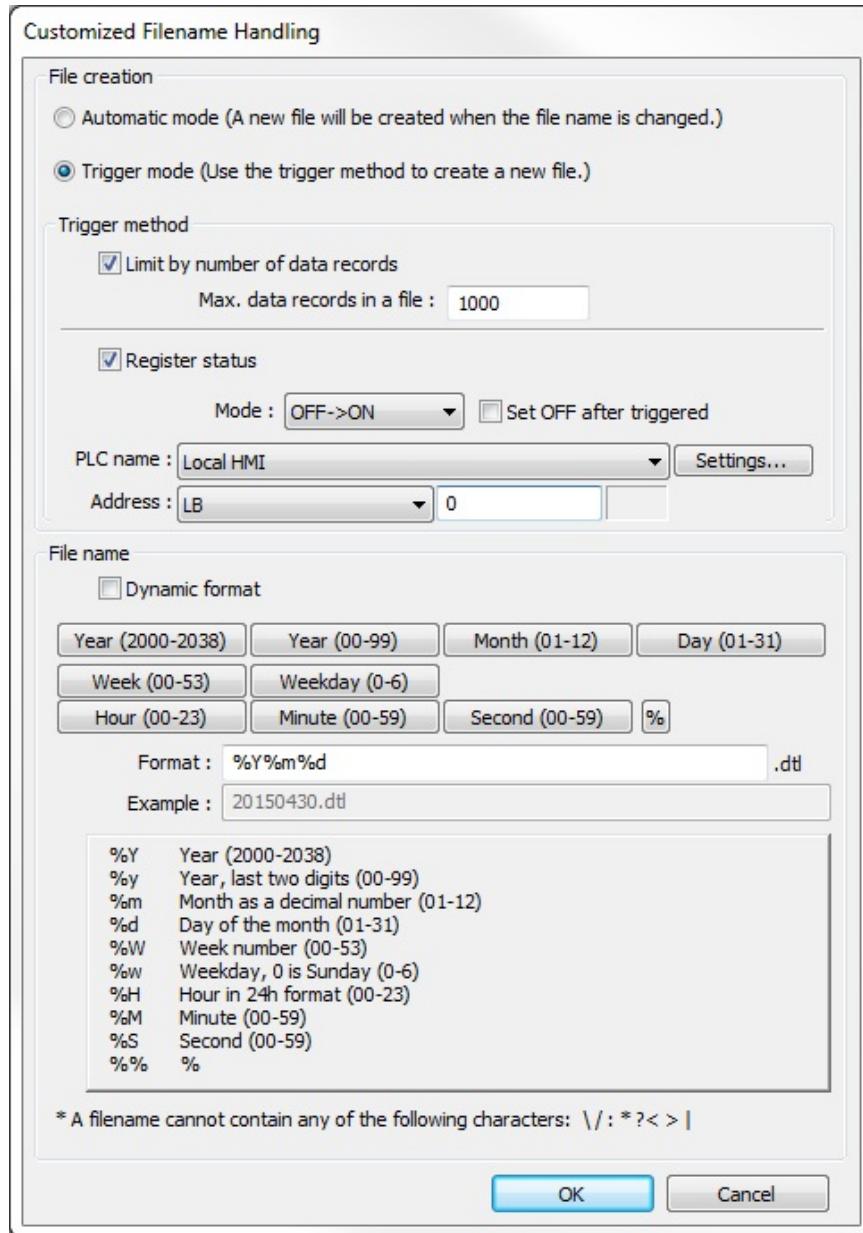
11. Click the **Enable** check box in the **Clear real-time data address** section if you would like the data samples to be cleared when the bit is momentarily set. If enabled, specify the **Mode** (OFF -> ON or ON -> OFF), PLC address and device type.

   ☞ The **PLC name** should be selected at the top of the dialog box.

12. Click the **Enable** check box in the **Hold address** section if you would like to pause the data sampling as long as the specified bit is set. If enabled, specify the **Mode** (ON or OFF), PLC address and device type.

13. In order to display history data files in a Trend Display or History Data Display, the sampled data must be saved to memory. Select the type of memory to which you would like to save the data files, and then specify the folder in which the data will be saved. The **Preservation limit** option allows you to specify the number of days of data files to save before they are deleted from memory.

▦ Normally, the HMI creates a new data file every 24 hours at midnight (00:00), with a filename corresponding to the current day (YYYYMMDD.dtl). Select **Each file consists of all records of a day** for this option.

EZwarePlus provides an option for **Customized file handling**. Select this option and click on the **Settings** button to customize when a new data log file is created and how it is named.

```
Customized Filename Handling
┌─ File creation ─────────────────────────────────────────────┐
│                                                              │
│  ○ Automatic mode (A new file will be created when the file name is changed.) │
│                                                              │
│  ● Trigger mode (Use the trigger method to create a new file.) │
│                                                              │
│  ┌─ Trigger method ─────────────────────────────────────┐   │
│  │    ☑ Limit by number of data records                 │   │
│  │            Max. data records in a file :  1000       │   │
│  │                                                      │   │
│  │    ☑ Register status                                 │   │
│  │            Mode :  OFF->ON  ▼    ☐ Set OFF after triggered │
│  │  PLC name : Local HMI              ▼    Settings...  │   │
│  │  Address : LB        ▼   0                           │   │
│  └──────────────────────────────────────────────────────┘   │
├─ File name ──────────────────────────────────────────────────┤
│    ☐ Dynamic format                                          │
│                                                              │
│  [ Year (2000-2038) ] [ Year (00-99) ] [ Month (01-12) ] [ Day (01-31) ] │
│  [ Week (00-53) ] [ Weekday (0-6) ]                          │
│  [ Hour (00-23) ] [ Minute (00-59) ] [ Second (00-59) ] [ % ] │
│       Format :  %Y%m%d                         .dtl          │
│      Example :  20150430.dtl                                 │
│  ┌──────────────────────────────────────────────────────┐   │
│  │ %Y    Year (2000-2038)                                │   │
│  │ %y    Year, last two digits (00-99)                   │   │
│  │ %m    Month as a decimal number (01-12)               │   │
│  │ %d    Day of the month (01-31)                        │   │
│  │ %W    Week number (00-53)                             │   │
│  │ %w    Weekday, 0 is Sunday (0-6)                      │   │
│  │ %H    Hour in 24h format (00-23)                      │   │
│  │ %M    Minute (00-59)                                  │   │
│  │ %S    Second (00-59)                                  │   │
│  │ %%    %                                               │   │
│  └──────────────────────────────────────────────────────┘   │
│  * A filename cannot contain any of the following characters: \ / : * ? < > | │
│                                                              │
│                      [ OK ]        [ Cancel ]               │
└──────────────────────────────────────────────────────────────┘
```

File Creation: Select **Automatic mode** to create a new file each time the file name changes. The format of the file name is specified in the **File name** section. Select **Trigger mode** to create a new file based on the **Trigger method** option.

Trigger method: When **Trigger mode** is selected for the **File creation**, these settings determine when a new data log file is created. Select **Limit by number of data records** to set the maximum number of records to be contained in a file. When the number of records exceeds this value, a new file will be created. Select

Register status to create a new file when a bit changes state. Enable **Set OFF after triggered** to return the bit to its original state after the new file is created.

📝 If both options are selected, either condition will result in a new data log file.

File name: Use the buttons to construct the structure of the data log file name. As buttons are clicked, the file name structure will appear in the **Format** box. The **Example** box will update with the actual file name, based on the current time and date of the PC. If **Automatic mode** is selected, a change in any of the selected file name fields will result in a new file being created.

If **Dynamic format** is selected, specify the starting address and number of words of ASCII data containing the file name in a string. Any valid string can be used, except for the illegal characters noted below.

If multiple data log files are going to be created in the same day, be sure to construct a file name format that will be unique for each capture. Otherwise, a new file may overwrite an existing file. For example, instead of using the default format of %Y%m%d, use %Y%m%d_%H%M%S. This will name the file <year><month><day>_<hour><minute><second>.

📑 These characters cannot be used in a file name:
/ \ : * ? < > |
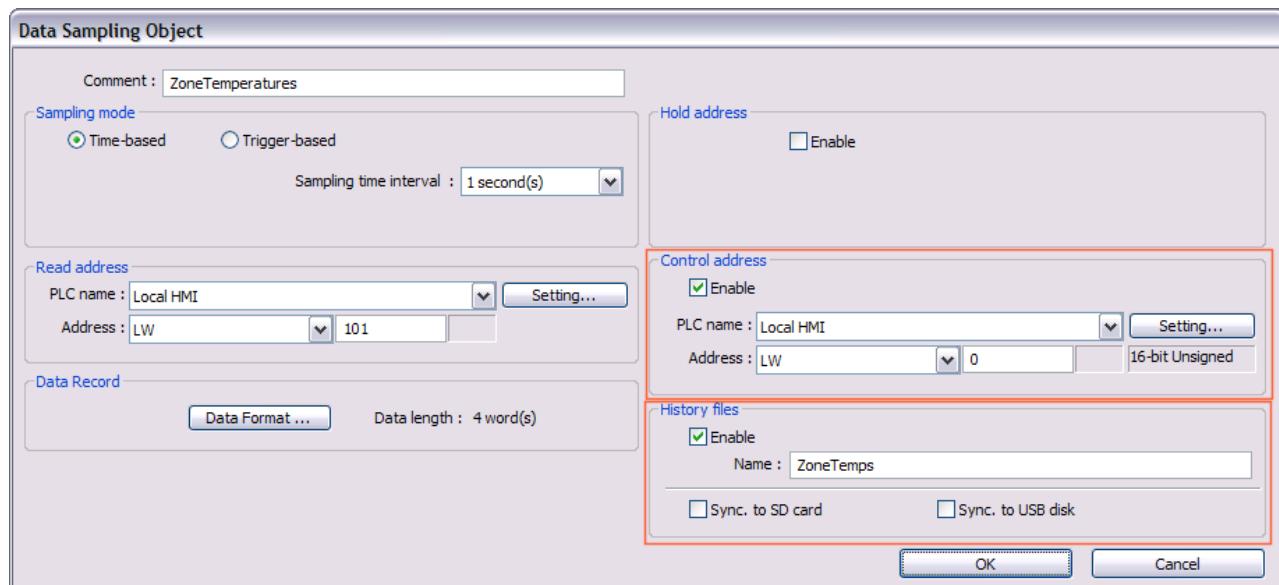
14. Click **OK**.

15. Follow steps 2-13 to create additional Data Sampling Objects.

16. Click **Exit** to exit the Data Sampling Object.

To create a data sampling object with the RMI5010:

Configuration is very similar to the steps outlined above. There are two differences:
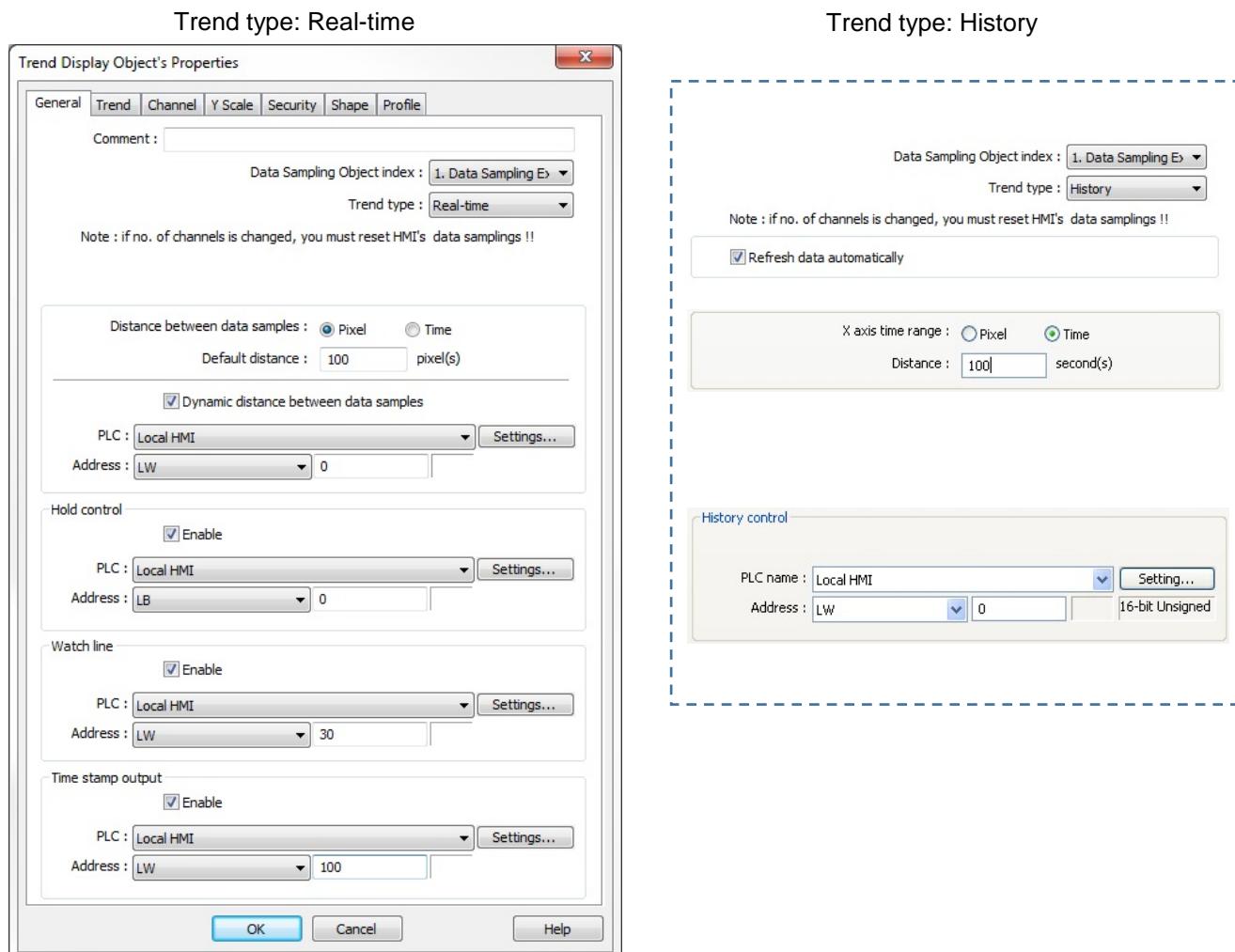
1. The value in the **Control address** manages data logged by the Data Sample:
   Write '1' to clear the data from the RMI memory.
   Write '2' to write the data to the SD or USB device.
   Write '3' to write the data to the SD or USB device, then clear the RMI memory.

2. **History files** can be automatically synchronized to an SD card or USB flash drive. If selected, the RMI will automatically save the logged data to the specified device when 10,000 records have been saved. The oldest 1,000 records will then be deleted from storage in the RMI. If data already exists on the SD or USB device, the new data will be appended to the existing data.

    ▤ The RMI will always delete the oldest 1,000 records from HMI memory when 10,000 records have been saved, whether a **Synchronize** option has been selected or not.

To create a Trend Display Object:

1. From the **Objects** menu, select **Data Logging > Trend Display**, or click the Trend Display icon in the Object 2 toolbar. The New Trend Display Object dialog box appears.

    ▤ A Data Sampling Object must be configured before you can create a Trend Display.

<div align="center">Trend type: Real-time   Trend type: History</div>

2. In the **Data Sampling Object Index**, select the data sampling object from the drop-down menu whose data is to be displayed.

3. For **Trend type**, select whether the data showing will be historical data or real-time data.
    ▱ When **Real-time** is selected, the Trend Display reads data stored in RAM memory, so it can only display data since the HMI was powered up. When **History** is selected, the Trend Display reads data

from the data log file (*.dtl) in memory. History mode can display data in real-time as well (select the **Refresh data automatically** option), but has the additional capability of displaying data from previous days using the **History control** register.

4. The **Distance between data samples** option allows you to configure how the data is displayed in the X-axis on the Trend Display. When **Pixel** is selected, enter the number of pixels between data samples in the **Distance** field. When Time is selected, enter the number of seconds from left to right on the X-axis in the **Distance** field. To allow the distance between data samples to be adjusted at runtime, click the **dynamic distance between data samples** checkbox. Select the register used to control this value. This creates a 'zoom in' feature on the trend, adjustable by the user.

5. Check the **Enable** checkbox in the **Hold control** section (Real-time mode only) if you'd like the trend to pause when a specified bit is set, and then configure the PLC address and device type.

6. Configure the **History control** section (History mode only) to designate a register used to select the data log file to display in the Trend Display Object.

    ▤ The Option List (**Objects** menu > **Button > Option List**) can be used to select the data log file to display in the History Trend Display by its date. Select **Dates of historical data** for the **Source of item data** attribute in the **Option list** tab and assign the Option List **Monitor address** to the same register as the **History Control** register in the History Trend Display.
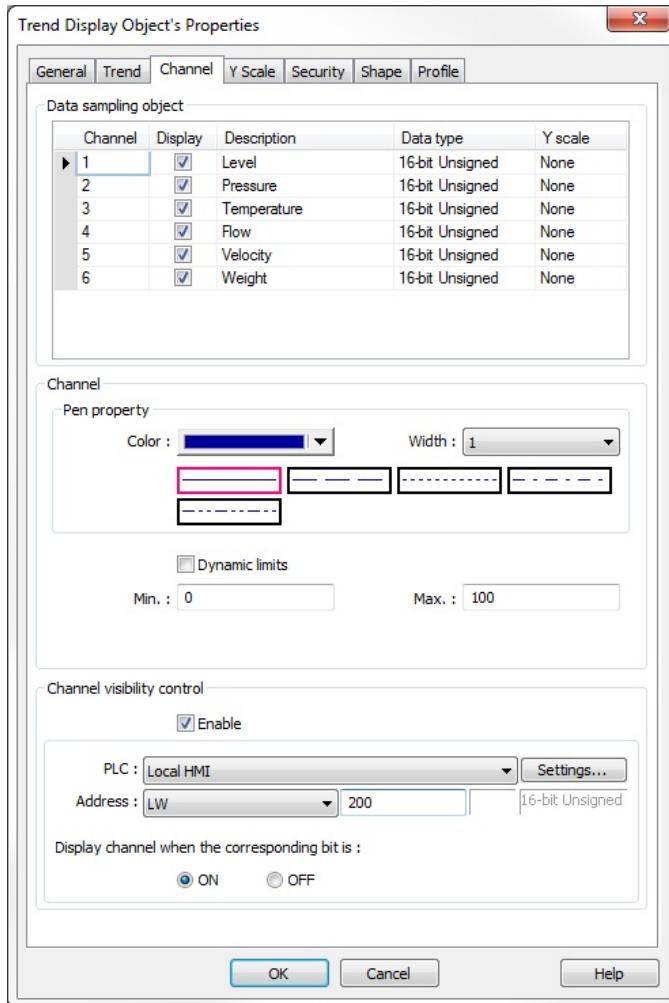
7. Click the **Enable** checkbox in the **Watch line** section if you'd like to place a watch line on the trend that writes the value at that point to a specific register or registers, and then configure the PLC address and device type. If the selected Data Sampling Object is sampling two or more consecutive registers, the watch line will reserve the same number of consecutive registers as the number of registers being sampled, beginning with the specified register.

8. Use the **Time Stamp Output** to monitor the elapsed time where the Watch Line crosses the X-axis. The specified register contains a 32-bit value representing the number of seconds from the start of the trend to the current location of the Watch Line. The next register contains a 32-bit value representing the time elapsed since the trend started. If the Trend tab Relative Time mode setting is enabled, the value is expressed as:
[(Hour * 3600) + (Minute * 60) + Seconds].

9. Click on the **Trend** tab to display the Trend dialog box.
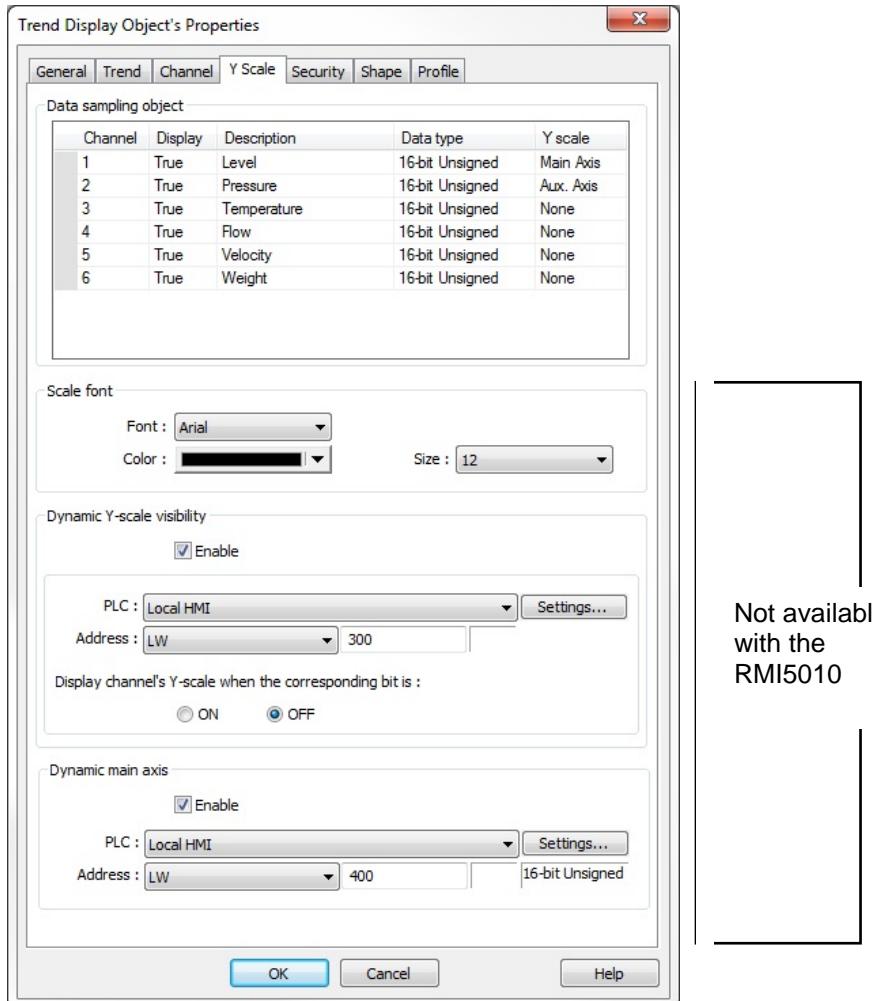
10. Select the **Frame** color and the **Background** color for the trend from the drop-down menus.

11. Check the **Show scroll controls** checkbox to enable the left and right scroll controls on the Trend Display.

12. Check the **Transparent** checkbox to allow the Trend Display to be transparent. This allows you to overlay two Trend Displays, one on top of the other, and see the channels in both displays. By stacking Trend Displays, you can show data from non-consecutive registers on one display. **Note:** The scroll controls are not linked when stacking Trend Displays.

13. Check the **Enable** checkbox in the **Grid** section if you would like the trend to display a grid. The **Y-axis** determines the number of divisions from bottom to top. The **X-axis interval: second(s)** determines the number of divisions from left to right. For example, if the X-axis is configured for time = 100 seconds, setting the **X-axis interval** to 10 seconds creates 10 divisions from left to right on the Trend Display.

14. Check the **Time scale Enable** checkbox (only visible when the **X-axis time range** is set to **Time**) to display a time stamp at each division along the X-axis. Select the **Format** (HH:MM or HH:MM:SS) and the **Font, Size**, and **Color**.

15. Check the **Relative time mode** box to display the horizontal axis as elapsed time rather than time-of-day.

16. Check the **Time** and **Date** checkboxes in the **Time/Date** section to display the current time and date in the upper-left corner of the Trend Display, and then select the format in which you'd like the time and date displayed.

17. Click on the **Channel** tab to display the Channel dialog box.

18. In the **Data sampling object** section, select the channels you want to display by clicking the checkboxes under **Display**. Select the pen properties for the selected channel in the **Channel** section.

19. Next, select the value at which the pen will be at the bottom of the display (**Min.**) and where the pen will be at the top of the display (**Max.**). If **Dynamic limits** is selected, the **Min.** and **Max.** values are read from the designated register and the next consecutive register, respectively.
Note: These parameters are set independently for each channel.

20. The **Channel visibility control** allows individual trend lines to be shown or hidden at runtime. Each bit of the word in the specified register corresponds to a channel in the Trend Display. Bit 0 corresponds to Channel 0, bit 1 to Channel 1, etc. Bit 0 in the next consecutive register corresponds to Channel 16, etc. Channel visibility can be configured to show the trend line when the corresponding bit is **ON** or **OFF**.

21. Click on the **Y Scale** tab to display the Y Scale dialog box.
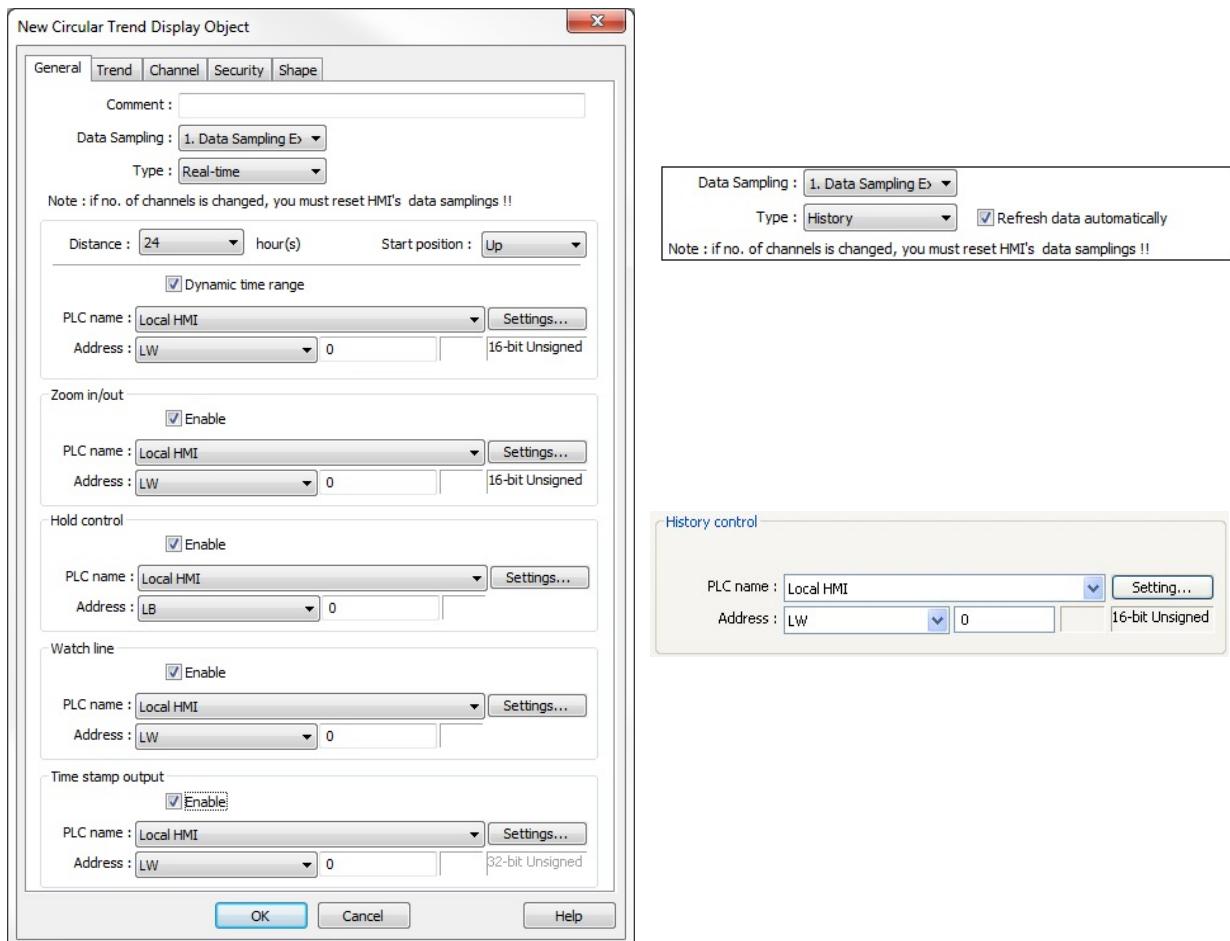
22. In the **Data sampling object** section, the **Display** column indicates whether the channel has been selected to display in the Channel tab (True). The **Y scale** column is used to select whether that channel's scaling is used as the Main Axis, the Aux Axis, or None (not displayed). The Main Axis appears to the immediate left of the Trend Display's Y-axis, while the Aux Axes appear further to the left of the Trend Display. Only one channel can be assigned to the Main Axis.

23. In the **Scale font** section, you can select the attributes of the font to use for the Y-axis scale.

24. Enable **Dynamic Y-scale visibility** to dynamically show or hide the Y-scaling for each channel. If the control address is LW-300, then the first channel's Y-axis scale is controlled by LW_Bit-30000, the second channel is controlled by LW_Bit-30001, etc.

25. Enable **Dynamic main axis** to dynamically change which channel is on the Main axis (closest to the Y-axis on the Trend Display). If the control address is LW-400, write a 1 into LW-400 for Channel 1 to be the Main axis; write a 2 into LW-400 for Channel 2 to be the Main axis, etc.

26. Click on the **Security** tab to enable **User restriction** to control the visibility of the Trend Display.

27. Click the **Shape** tab to configure a different frame style or color for the display, if desired.

28. Click **OK** and place the Trend Display on the EZwarePlus work area. If you'd like to reconfigure any of its properties, double-click on the trend to display the Trend Display Object's Properties Dialog. Click the **Profile** tab if you'd like to resize or re-position your trend using the Width/Height and X/Y position boxes instead of dragging and placing it in the work area.

To create a Circular Display Object: ⊕

1. From the **Objects** menu, select **Data Logging > Circular Trend Display**, or click the Circular Trend Display icon in the Object 2 toolbar. The New Circular Trend Display Object dialog box appears. ☞ (This option is not available with the **RMI5010**.)

   ▤ A Data Sampling Object must be configured before you can create a Circular Trend Display.

2. In the **Data Sampling Object Index**, select the data sampling object from the drop-down menu whose data is to be displayed.

3. For **Trend type**, select whether the data showing will be historical data or real-time data. ☞ When **Real-time** is selected, the Circular Trend Display reads data stored in RAM memory, so it can only display data since the HMI was powered up. When **History** is selected, the Circular Trend Display reads data from the data log file (*.dtl) in memory. History mode can display data in real-time as well (select the **Refresh data automatically** option), but has the additional capability of displaying data from previous days using the **History control** register.

≡ The Option List can be used to select the data log file to display in the History Circular Trend Display by its date. Select **Dates of historical data** for the **Source of item data** attribute in the **Option list** tab and assign the Option List **Monitor address** to the same register as the **History Control** register in the History Circular Trend Display.
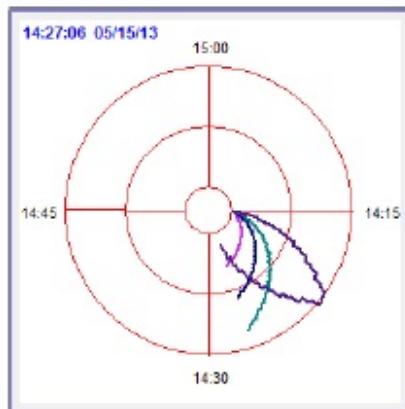
4. The **Distance** option allows you to configure how many hours of data is represented by the full circumference of the circle. To adjust the number of hours at runtime, click the **dynamic time range** checkbox. Select the register used to control this value (range 1-24).

The **Start position** setting determines the position from where to start drawing the trend curve.
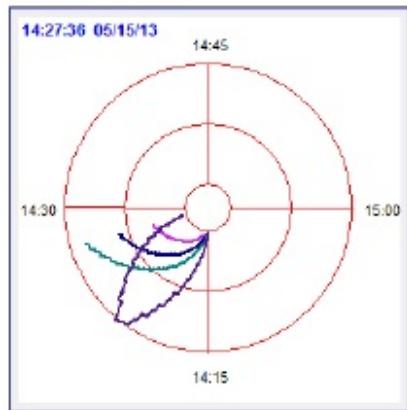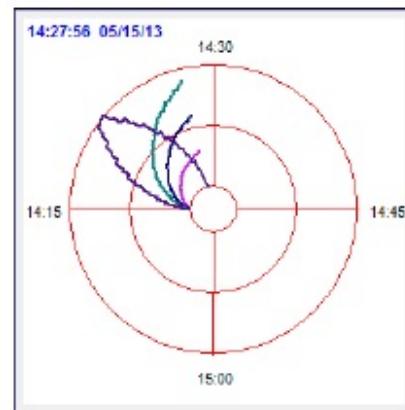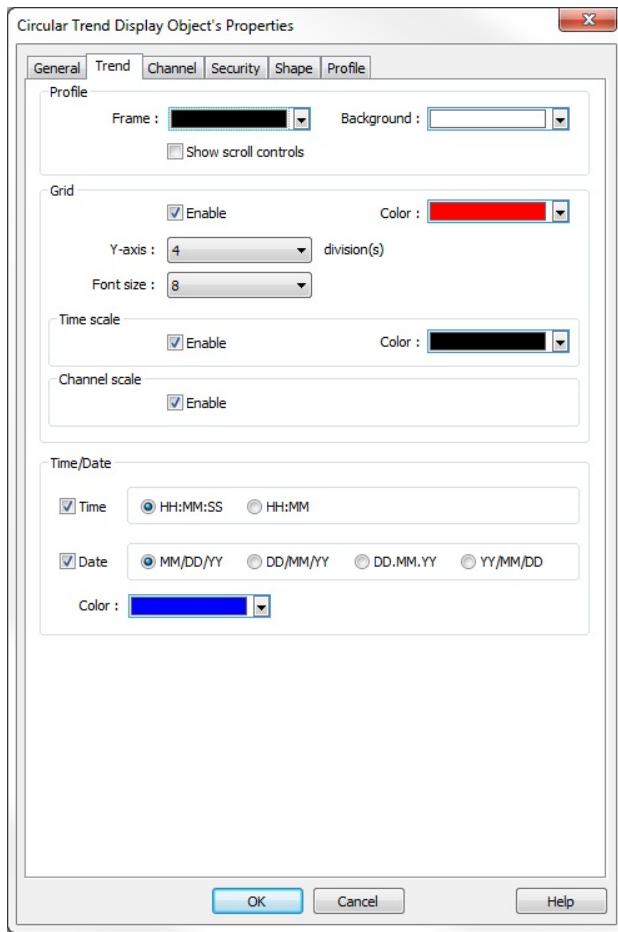
5. Check the **Zoom in/out Enable** checkbox to enlarge and reduce the magnification of the object on the HMI screen during runtime. The maximum size is 10 times larger. If a larger number is entered, it will remain at 10x. When magnified, use the scroll controls to navigate around the Circular Trend Display.

6. Check the **Enable** checkbox in the **Hold control** section (Real-time mode only) if you'd like the trend to pause when a specified bit is set, and then configure the PLC address and device type.

7. Configure the **History control** section (History mode only) to designate a register used to select the data log file to display in the Circular Trend Display Object.

☞ The Option List can be used to select the data log file to display in the History Trend Display by its date. Select **Dates of historical data** for the **Source of item data** attribute in the **Option list** tab and assign the Option List **Monitor address** to the same register as the **History Control** register in the History Trend Display.

8. Click the **Enable** checkbox in the **Watch line** section if you'd like to place a watch line on the trend that writes the value at that point to a specific register or registers, and then configure the PLC address and device type. If the selected Data Sampling Object is sampling two or more consecutive registers, the watch line will reserve the same number of consecutive registers as the number of registers being sampled, beginning with the specified register.

9. Use the **Time Stamp Output** to monitor the elapsed time at the point of the Watch Line. The specified register contains a 32-bit value representing the number of seconds from the start of the trend to the current location of the Watch Line. The next register contains a 32-bit value representing the time elapsed since the trend started.

10. Click on the **Trend** tab to display the Trend dialog box.
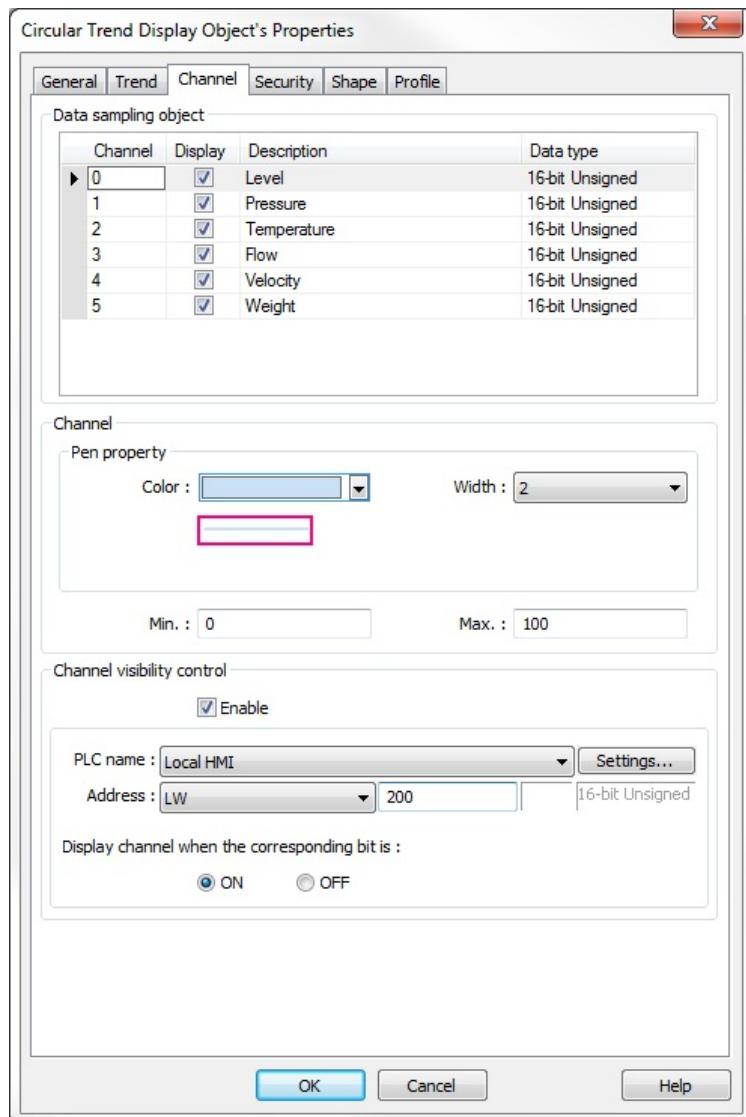
11. Select the **Frame** color and the **Background** color for the trend from the drop-down menus.

12. Check the **Show scroll controls** checkbox to enable the left and right scroll controls on the Circular Trend Display. These are used to view data earlier than the time specified in the **Distance** field.

13. Check the **Enable** checkbox in the **Grid** section if you would like the trend to display a grid. The **Y-axis division(s)** determines the number of divisions from center to outer circumference. The **Font size** sets the size of the font for the **Time scale** or **Channel scale**.

    Check the **Time scale Enable** checkbox to display a time stamp at each scale division around the circumference. When the **Distance** (time length) is 2-24 hours, the scale division is one hour. When the **Distance** is set to 1 hour, the scale division is 15 minutes.

    Check the **Channel scale Enable** checkbox to display the value at each Y-axis division. The color of the font that labels the channel scale corresponds to the setting of the trend curve for each channel.

14. Check the **Time** and **Date** checkboxes in the **Time/Date** section to display the current time and date in the upper-left corner of the Trend Display, and then select the format in which you'd like the time and date displayed. The **Color** bar selects the color of the text for the time and date.

15. Click on the **Channel** tab to display the Channel dialog box.
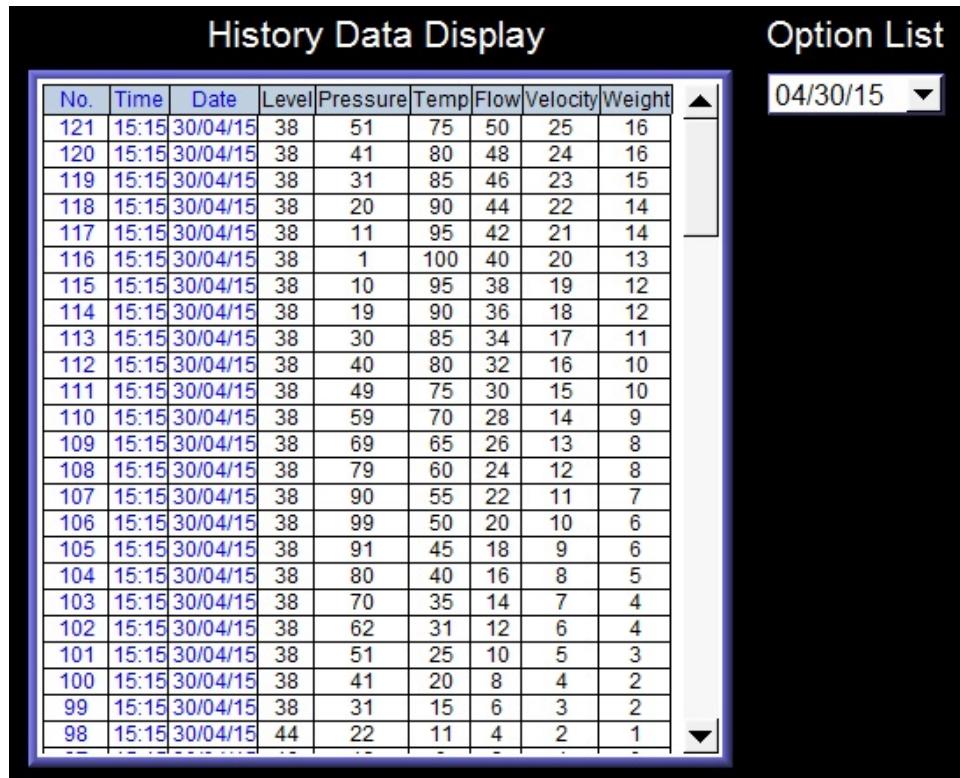
16. In the **Data sampling object** section, select the channels you want to display by clicking the checkboxes under **Display**. Select the pen properties for the selected channel in the **Channel** section.

17. Next, select the value at which the pen will be at the center of the display (**Min.**) and where the pen will be at the outside circumference of the display (**Max.**).

18. The **Channel visibility control** allows individual trend lines to be shown or hidden at runtime. Each bit of the word in the specified register corresponds to a channel in the Trend Display. Bit 0 corresponds to Channel 0, bit 1 to Channel 1, etc. Bit 0 in the next consecutive register corresponds to Channel 16, etc. Channel visibility can be configured to show the trend line when the corresponding bit is **ON** or **OFF**.

19. Click the **Shape** tab to configure a different frame style or color for the display, if desired.

20. Click **OK** and place the Circular Trend Display on the EZwarePlus work area. If you'd like to reconfigure any of its properties, double-click on the trend to display the Circular Trend Display Object's Properties Dialog. Click the **Profile** tab if you'd like to resize or re-position your trend using the Width/Height and X/Y position boxes instead of dragging and placing it in the work area.

History Data Display

The History Data Display shows data captured by the Data Sampling object.

Data is displayed in tabular format with the option to show the time and date of when data was captured. A control register is used to determine which historical data record is displayed (i.e., most recent, yesterday, two days ago, etc.) based upon date of capture.

The HMI reads from the Data Sampling Object data log file (*.dtl) immediately after the screen that contains the History Data Display object is displayed.

▤ The data is only read and updated whenever the screen is first displayed. Data recorded to the data log file (*.dtl) after the History Data Display object is shown will not appear on the History Data Display object until the screen is refreshed (closed, then opened again). A maximum of 64 channels can be displayed.

To create a History Data Display Object:

1. From the **Objects** menu, select **Data Logging > History Data Display**, or click the History Data Display icon in the Object 2 toolbar. The New History Data Display dialog box appears:

2. **Data Sampling Object index:** Select from drop-down list which data file to use. Data files are created using the Data Sampling object.

3. **Refresh data automatically:** When selected, the History Data Display will update in real-time when displaying data from the current day.

4. **Grid:** Displays grid lines on the data table.
    a. **Enable:** Check to enable grid lines.
    b. **Color:** Select color used for grid lines.
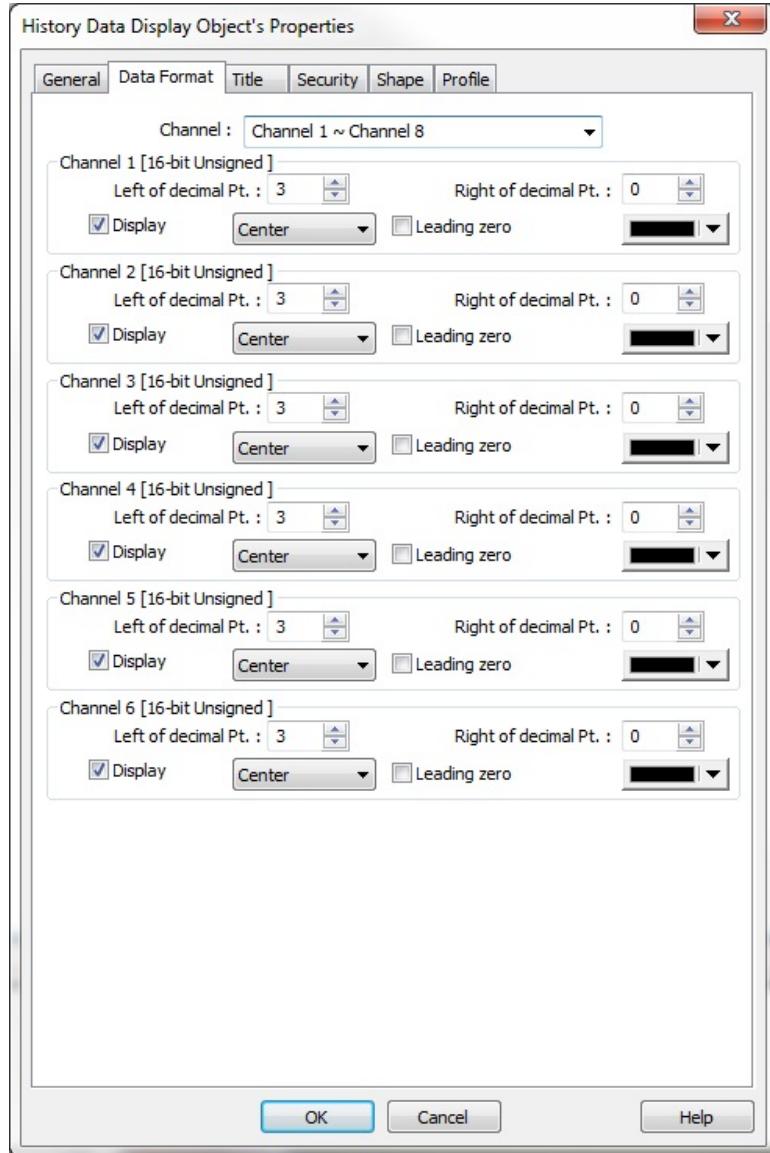
       c.   **Column Interval:** Enter the number of pixels that separate each column of data.

5. **Profile color:** Determines the color of the background of the object.
       a.   **Transparent:** Enable if you do not want a background color or frame to appear.
       b.   **Frame:** Color for the perimeter frame.
       c.   **Background:** Color for the background of the object.

6. **Text:** Select the font and size for all text that appears.
       a.   **Font:** Select the True type font for the text.
       b.   **Size:** Select the size of the font.

7. **Time:** Enable to display the time when the data was captured by the Data Sampling object.
       a.   **Style:** Select from HH:MM:SS, HH:MM, DD:HH:MM, or HH.
       b.   **Color:** Determines the color used to display the time.

8. **Date:** Enable to display the date when the data was captured by the Data Sampling object.
       a.   **Style:** Select from MM/DD/YY, DD/MM/YY, DD.MM.YY or YY/MM/DD.
       b.   **Color:** Determines the color used to display the date.
       c.   **Move column [Date] to the front of column [Time]:** By default, the Time appears before the Date in the display. Select this option to display the Date before the Time.

9. **Sequence no:** Enable to display a sequence number of when the data was captured by the Data Sampling object.
       a.   **Color:** Determines the color used to display the sequence number.

10. **Time ascending** or **Time descending:** Determines the order in which the data is displayed.

11. **History Control:** Use to select the target PLC or internal HMI register that is used to determine which data log file is displayed.

For example, suppose we have data log files that were recorded during a four day period- 20090615.dtl (June 15th), 20090616.dtl (June 16th), 20090617.dtl (June 17th), and 20090618.dtl (June 18th).

We choose to use internal HMI memory address LW100 for the History Control address. If the value in LW100 = 0, then the History Data Display object will display the most recent data log record- in this example, 20090618.dtl (June 18th). If the value in LW100 = 1, then 20090617.dtl (June 17th) is displayed, and so on.

Note: The Option List can be used to select the data log file to display in the History Data Display by its date. Select **Dates of historical data** for the **Source of item data** attribute in the **Option list** tab and assign the Option List **Monitor address** to the same register as the **History Control** register in the History Data Display.

Data Format tab: Used to configure how the data appears for each column:
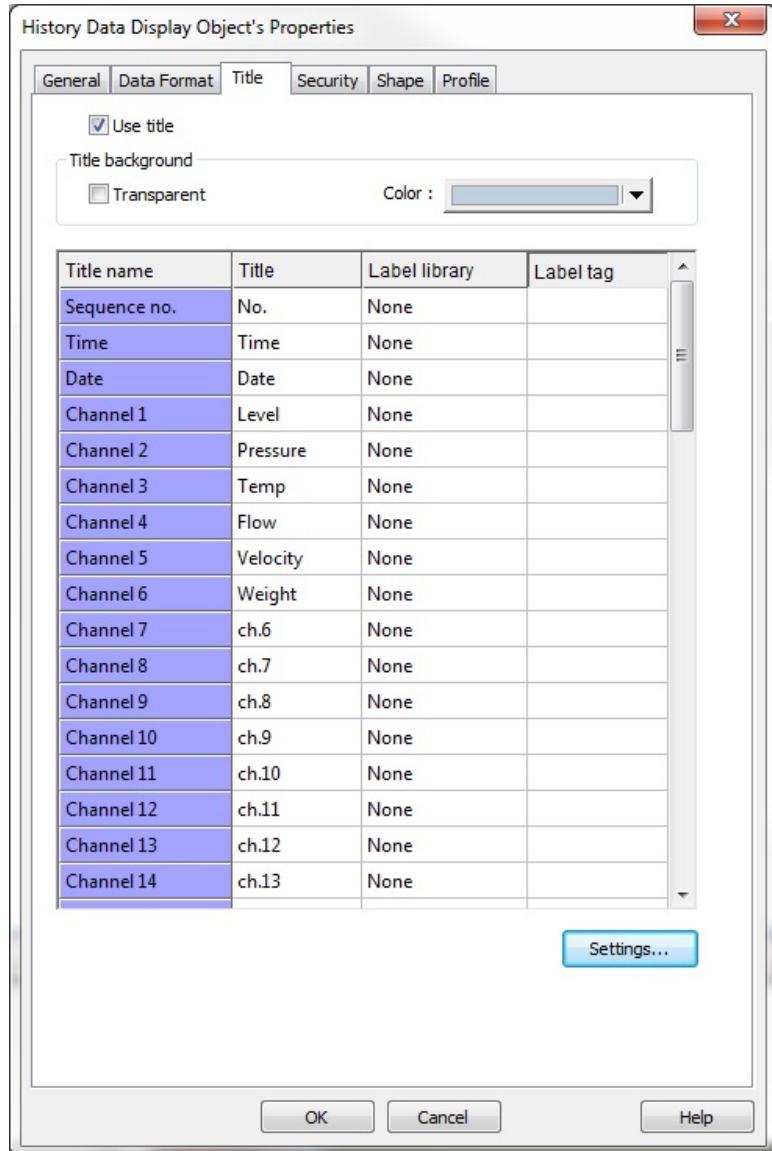
1. **Channel:** Channels are configured in groups of eight (maximum of 64 channels). Use this pull-down box to select each group.

2. **Channel #0-63** (description in parentheses tells you what format is used for that data variable).

3. **Display** checkbox: Check to enable viewing that data variable.

4. **Left of decimal Pt.:** Determines the number of digits that can be displayed to the left of the decimal point.

5. **Right of decimal Pt.:** Determines the number of digits that can be displayed to the right of the decimal point.
    📄 If 0, then no decimal point is displayed.

6. Alignment: Options are center, right, and left justified.

7. **Leading zero:** Check to display leading zeroes

8. Color: Select the color used to display the data.

Title tab: Used to configure a title bar or legend at the top of the data columns:

1. **Use title:** Check to use the Title bar option.

2. **Title background:** Determines color of background on title bar.
   a. **Transparent:** Check to remove background color.
   b. **Color:** Select from drop-down color box.

3. **Title name:** Default name of each column.

4. **Title:** Name assigned to appear at the top of each column. This is assigned in the Data Sampling Object > Data Format list. It can be changed by directly entering a new title or by clicking the **Settings** button at the bottom for the selected channel.

5. **Label library:** None = not used, Used = Label Library used instead of direct text entry. To assign a Label Tag, highlight the channel you wish to modify and click on the **Setting…** button.

   ☞ For more information on using Label Libraries, see "Chapter 9 – Creating and Using the Tag Library and Label Library".

6. **Label** tag: Blank = not used, or the particular name of the label tag used.

Shape tab: Use to configure the frame and background color of the display.

Chapter 13 – Capturing Alarms and Events

This chapter looks at how the HMI5000 Series uses alarms and events.

Using Alarm/Events

EZwarePlus has four parts that are used to perform alarm/event functions: the Event (Alarm) Log object, the Alarm Display object, the Alarm Bar object, and the Event Display object. The Event (Alarm) Log object monitors alarm/event conditions and alerts the Alarm Display object, the Alarm Bar object, and the Event Display object when an alarm/event condition occurs. Use the Alarm Display object if you want to display a scrollable list of all alarm/events that are active. Use the Alarm Bar object to display all active alarm/events on a single horizontally scrolling line (like a marquee). Use the Event Display object to display all alarm/events and their status (active alarm/events, acknowledged alarm/events, returned to normal alarm/events),
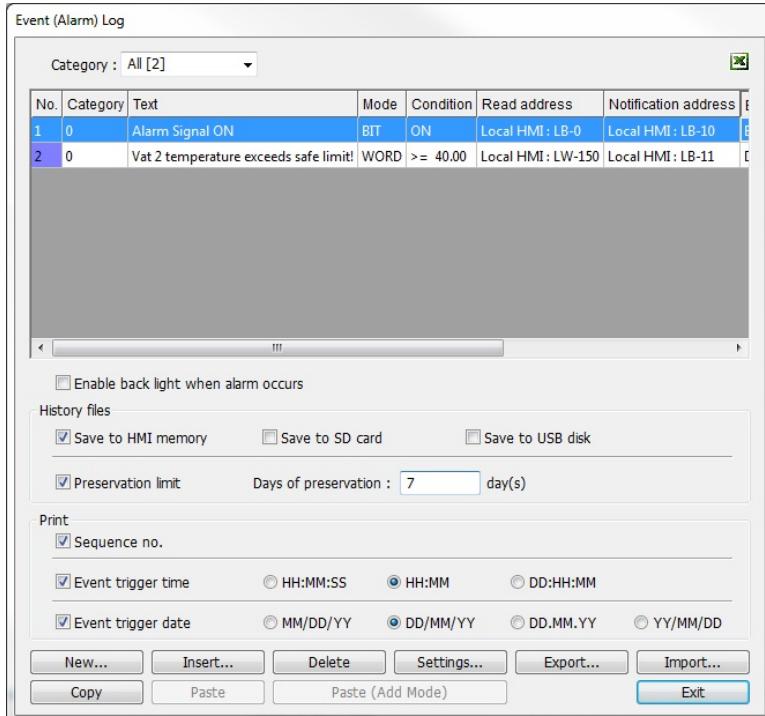
Note: Alarms and events are handled in the same way by EZwarePlus, so reference will be made to alarms only rather than alarm/events for the remainder of this chapter, except for reference to the Event (Alarm) Log.

Monitoring Alarms with the Event (Alarm) Log

The Event (Alarm) Log continuously monitors PLC coils and registers to determine if an alarm condition has occurred. Once an alarm is active, the Event (Alarm) Log directs a string of characters associated with that alarm to the Alarm Display object, the Alarm Bar object, and the Event Display object for display on the HMI screen.

To create an Event (Alarm) Log:
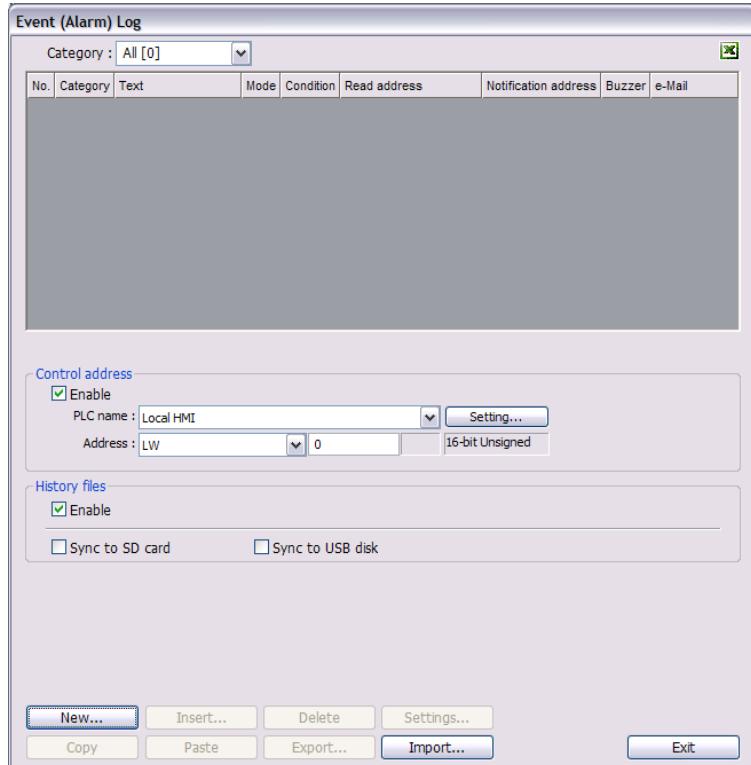
1. From the **Objects** menu, select **Alarm > Event (Alarm) Log**, or click the Event (Alarm) Log icon in the PLC toolbar. The Event (Alarm) Log dialog box appears.

Check **Enable back light when alarm occurs** to turn on the HMI backlight when an alarm is detect.
To have the HMI save historical alarm data, check one of the locations under **History files**. No historical data will be retained without one of these options selected.
The **Preservation limit** determines how long historical data is saved before being overwritten with new data.
Under **Print**, select the information to be printed to the connected printer. If no printer has been configured in the project, the Print option will not be available.

For the RMI5010, the configuration options are slightly different:

To save historical data, the **Enable** box in the **History files** section must be checked, and at least one of the **Sync to SD card** or **Sync to USB disk** must be selected. If not checked, no historical data will be saved.

If enabled, the **Control Address** allows the application to save historical data on demand:
Write '1' to clear the data from the RMI memory.
Write '2' to write the data to the SD or USB device.
Write '3' to write the data to the SD or USB device, then clear the RMI memory.
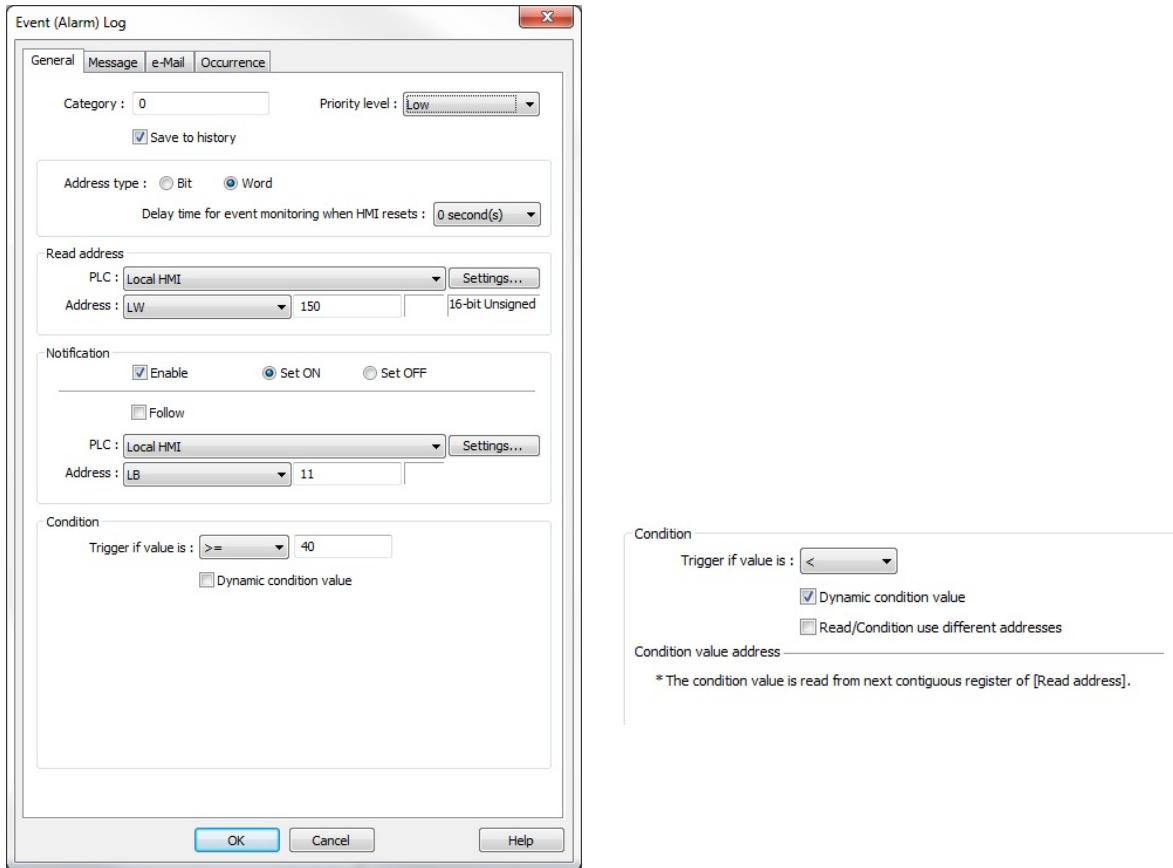
If not enabled, the RMI will automatically save the data to the selected destination when 10,000 records have been logged. At that point, the oldest 1,000 records will be deleted from RMI storage.

The RMI will store a maximum of 10,000 records. Even if **History files** is not enabled, the most recent 1,000 records will be deleted when 10,000 records have been stored. If **History files** is not enabled, those 1,000 records cannot be recovered.
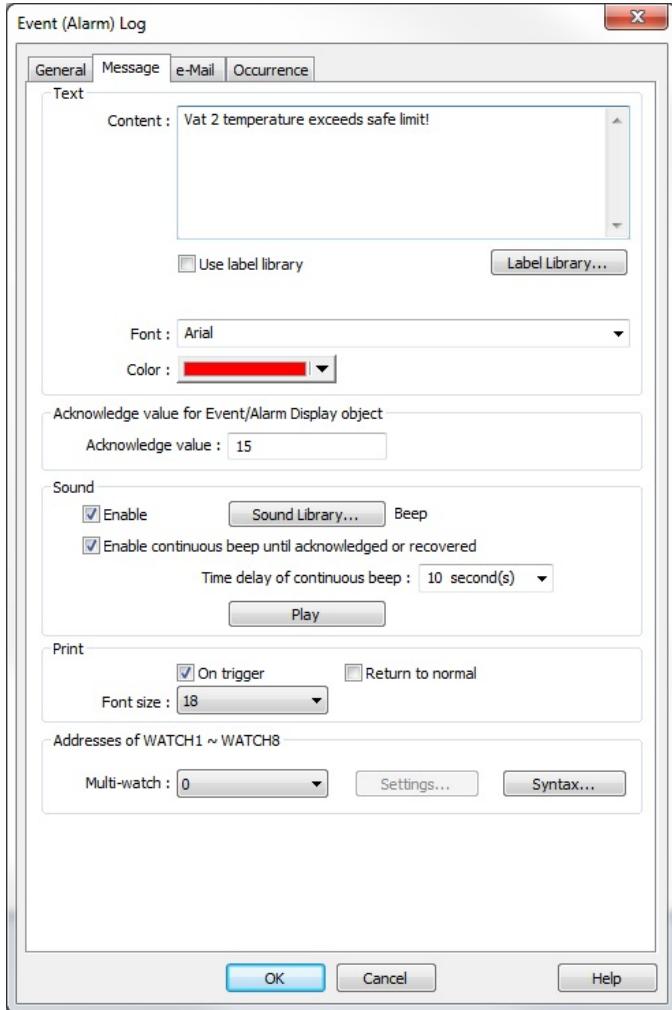
2. Click the **New...** button. The Event (Alarm) Log Properties dialog appears.

3. On the **General** tab, set the **Category** for the alarm. The Alarm Bar, Alarm Display, and Event Display can filter the alarms based on the category selected (range 0-255).

4. Select a **Priority level** from the drop-down menu (Low, Middle, High, Emergency). The alarms are sorted by priority in the Alarm Bar and the Alarm Display with the highest priority shown on top (or first, in the case of the Alarm Bar).

5. When the **History files** option is selected in the Event (Alarm) Log dialog box, the **Save to history** option provides independent control for saving an individual alarm to the history files.

6. Select either Bit or Word from the **Address type** drop-down menu.

7. **Delay time for event monitoring when HMI resets**: Provides an option for specifying a time interval for the HMI to wait after it starts up before it begins to monitor the alarm.

8. Click **Setting…** and select the PLC name, device type and read address, as well as the numeric format in the **Read address** section.

9. Click the **Enable** checkbox in the **Notification** section to have a specific bit set or cleared when the alarm condition is reached. If the **Follow** checkbox is not checked, the Notification bit will stay ON after the alarm condition is cleared. Select the **Follow** option to automatically turn OFF the notification bit when the alarm condition is cleared.

10. Set the **Condition** to trigger the alarm (depends on Word or Bit selected for Address type).
    ▤ When **Word** is selected, the Trigger value can be preset or dynamic. Selecting **Dynamic condition value** assigns the next consecutive address after the Read address to contain the Trigger

value. Select **Read/Condition use different addresses** to select a different address for the Trigger value. The data at the specified address must have the same format as the Read address.
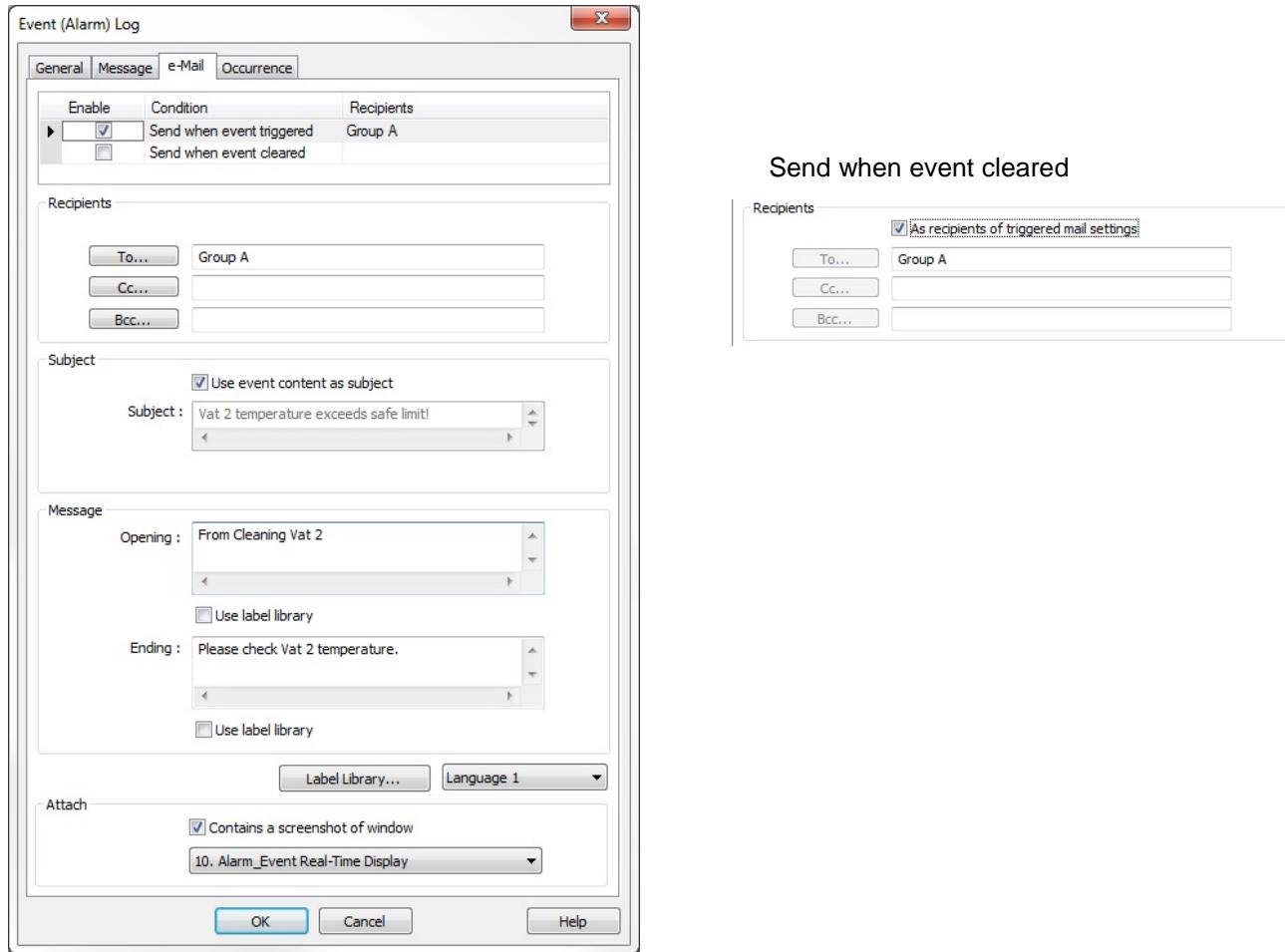
11. Click the **Message** tab to display the Message dialog.

12. Enter the message to display when the alarm or event is triggered in the **Content** box. If you would like to configure the message in different languages, click **Label** and follow the instructions in "Chapter 9 - Creating and Using the Tag Library and Label Library." Select the **Font** and **Color** to use for the message being displayed.

13. In the **Acknowledge value** field, enter the window number to display once the alarm or event is acknowledged. This value is entered into the register configured in the Event Display's **Write address** on the **General** tab.

14. Click the **Enable** checkbox in the **Sound** section to have the HMI play a sound when the alarm is triggered (for models with audio output connector only). Click the **Sound Library...** button to select a sound from the sound libraries. If no sound is selected, the default sound is a beep. Click **Play** to preview the sound.

15. Click the **Enable continuous beep until acknowledged or recovered** to have the HMI emit a beep periodically until the alarm condition is acknowledged or cleared. Select the **Time delay of continuous beep** in seconds to set the amount of time between beeps (1 – 255 seconds).

16. If a local printer has been enabled in the **System Parameters > Model** tab, you can send the alarm message to a printer. Click the **On trigger** box to print when the alarm is triggered, and **Return to normal** box to print when the alarm condition has been resolved.

17. **Multi-watch:** The values of up to 8 data registers can be displayed in an Alarm/Event Message. Select the number of registers to be displayed. Click the **Syntax…** button to display a dialog explaining the syntax of embedding watch registers in an Alarm/Event Message.

18. Click the **e-Mail** tab to display the e-Mail dialog.

📝 The **e-Mail** tab is not visible unless e-Mail has been enabled in the **System Parameters > e-Mail** tab.
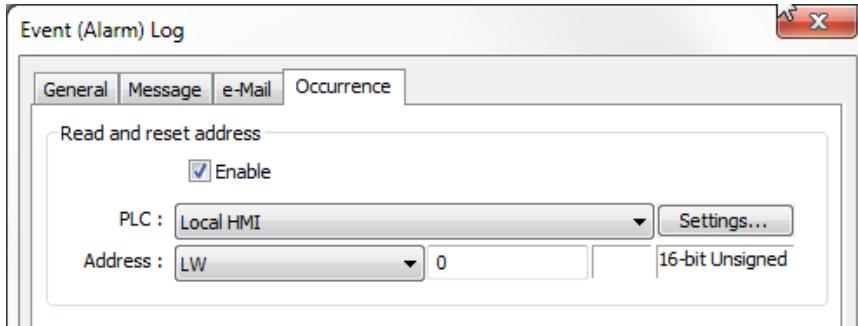
19. Select **Send when event triggered** to send an email when the event/alarm is triggered, and select **Send when event cleared** to send an email when the event/alarm is cleared. The settings for **Send when event triggered** and **Send when event cleared** can be set independently by selecting one or the other at the top of the e-Mail dialog.

20. Under **Recipients**, select the e-Mail Group you wish to send the email to. You can send the e-Mail to multiple groups under the category of **To, Cc**, and **Bcc**.

    Select **As recipients of triggered mail settings** to send the *event cleared* e-Mail to the same recipients as the *event triggered* e-Mail. If unchecked, the *event cleared* e-Mail can be sent to different recipients.

📝 E-Mail Groups are configured in the **System Parameters > e-Mail** tab.

21. Under **Subject**, select **Use event content as subject** to use the event/alarm message that appears in the Alarm Display in the subject line of the e-Mail. If unchecked, enter a custom subject line message.

22. Under **Message**, enter the **Opening** message and the **Ending** message for the e-Mail. Check **Use label library** if the messages are already preconfigured in the Label Library, or click the **Label Library** button to enter the messages directly in the Label Library.

23. Under **Attach**, select **Contains a screenshot of window** to include a screenshot of the alarm window with the e-Mail. This only available for the *event triggered* e-Mail.

    Click the **Occurrence** tab. When **Read and reset address** is enabled, the HMI will record the number of times that the alarm was triggered in the designated address. The value can be overwritten by the user and it will continue counting from the new value. This would allow the user to reset the counter or continue the count from a user defined number.

24. Click **OK** to return to the Alarm (Event) Log dialog. You may select a location to save History files by selecting one of the check boxes. You may also configure additional Event (Alarm) Log items here. If a printer has been enabled in the **System Parameters > Model** tab, you can choose the items to include in the printed message when an alarm triggers a print command (configured on the alarm's **Message** tab).

25. Click **Exit** when you are finished.
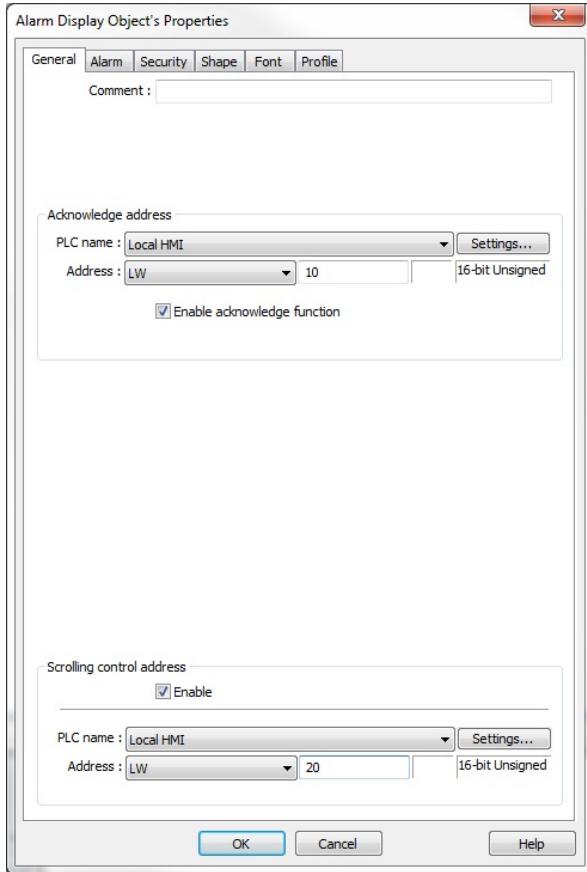
Displaying Alarms using the Alarm Display Object

Though the Event (Alarm) Log object continuously monitors the PLC for alarms, it cannot display the alarms without the Alarm Display object, the Alarm Bar object, or the Event Display object. The Alarm Display object takes the alarm strings sent to it from the Event (Alarm) Log object and displays them on a window screen as a list. The list contains all of the active alarms occurring with the most recently activated alarm, and highest priority, at the top of the list.

▸ *To create an Alarm Display Object:*

1. From the **Objects** menu, click **Alarm > Alarm Display** or click the Alarm Display icon in the Object 2 toolbar. The New Alarm Display Object dialog box appears.
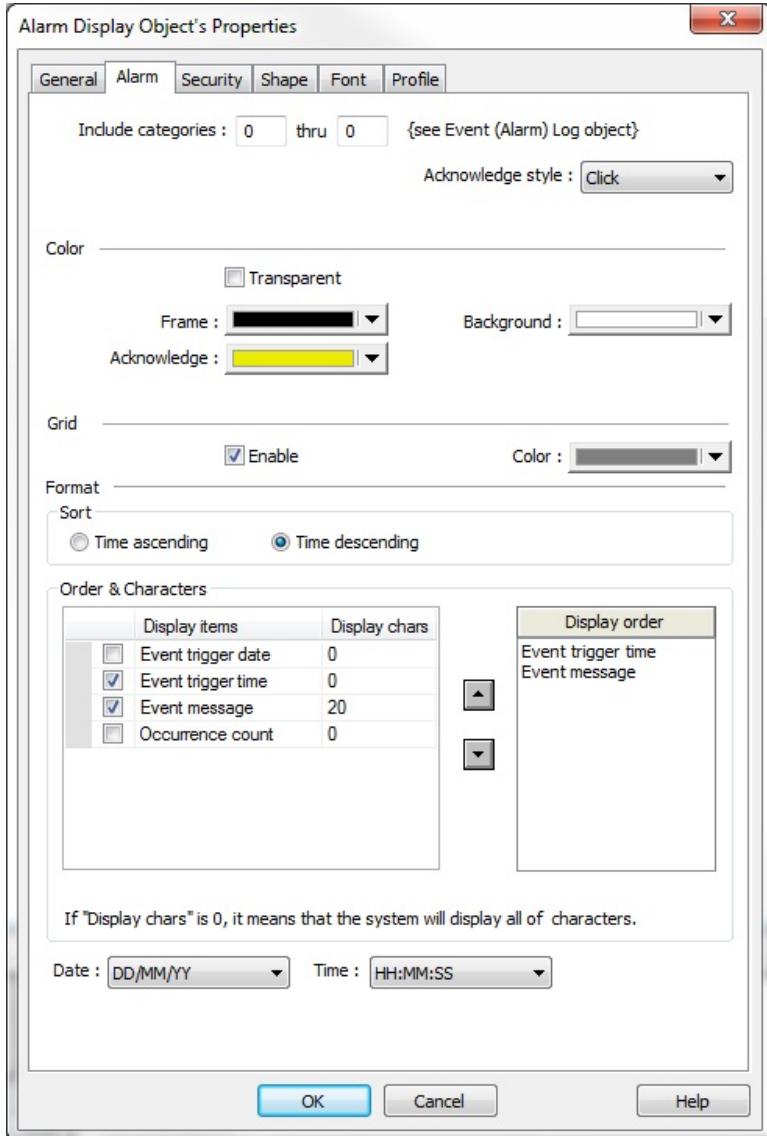
2. **Enable acknowledge function**: Select this to enable the acknowledge feature for the Alarm Display. Use the acknowledge function to open an Indirect Window with instructions for the operator about what to do to remedy the alarm condition.

    The **Acknowledge address** is the register where the alarm or event writes the window number to open an Indirect Window when the operator touches the Alarm Display to acknowledge the alarm or event. This is configured in the Event (Alarm) Log on the Message tab (**Acknowledge value for Event/Alarm Display object**).

    Scrolling control address: Enable this option to allow dynamic control of the Alarm Display's scrolling feature. The value in the designated address determines the number of lines the Alarm Display will be scrolled down (0 = first line).

    ◻ For the RMI5010, press and hold the alarm in the Alarm Display to acknowledge the alarm. Drag a finger on the Alarm Display to scroll.

3. Click the **Alarm** tab to configure the parameters for the Alarm Display.

4. **Include categories:** To include all categories, set this at 0 to 0.

5. **Acknowledge style:** Select either **Click** or **Double click** for the acknowledge style.

6. Select the **Frame** and **Background** colors from the drop-down menus. Select **Transparent** for no frame or background.

7. Select **Grid Enable** to include a grid in the Alarm Display.

8. Select the sort order in which the alarms will appear, either **Time ascending** or **Time descending**.

9. Check the **Event trigger date**, **Event trigger time**, **Event message** and **Occurrence count** checkboxes to include them in the Alarm Display. Use the **Display order** list to arrange the order in which the selected event information is displayed.

10. Select the format for how the date and time is displayed in the **Date:** and **Time:** drop-down boxes.

11. Click the **Shape** tab to configure a background shape, if you'd like one.

12. Click the **Font** tab to configure the size of the font.

13. Click **OK** and click in the work area of EZwarePlus to place the Alarm Display. Drag it to place it in the desired location.
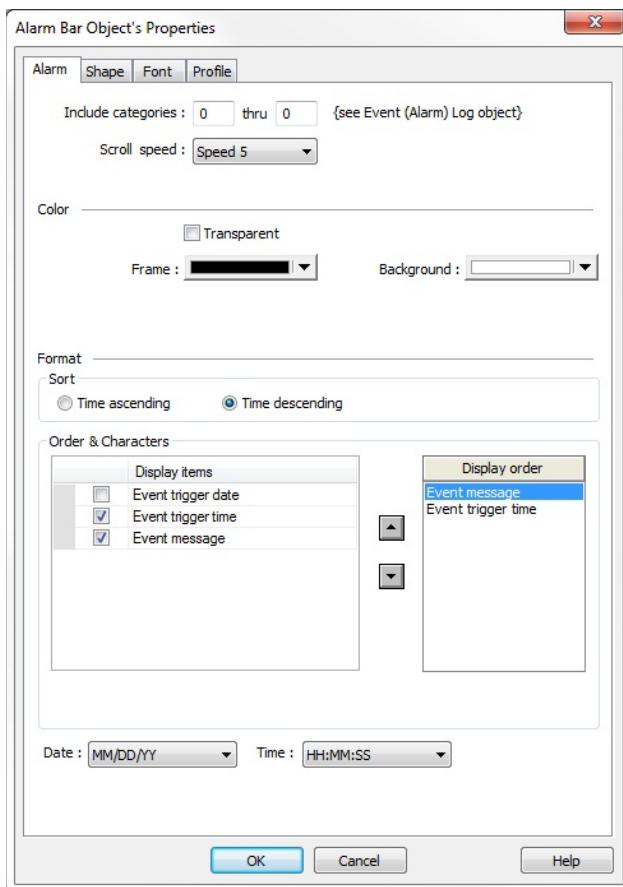
Displaying Alarms using the Alarm Bar Object

The Alarm Bar Object displays alarms scrolling horizontally along a single line. The alarm bar continuously scrolls each alarm until the alarm is no longer active. If more than one alarm is active, the Alarm Bar Object appends each alarm to the string of characters scrolled. This part can be used on window screens where space is very limited. It also allows you to display long alarm text strings that are too long to be shown in the Alarm Display Object.

To create an Alarm Bar Object:

1. From the **Objects** menu, click **Alarm > Alarm Bar** or click the Alarm Bar icon in the Object 2 toolbar. The New Alarm Bar Object dialog box appears.

2. **Include categories:** To include all categories, set this at 0 to 0.

3. Select **Scroll speed** from the drop-down menu to adjust the speed at which the message scrolls across the alarm bar (1 = slowest; 10 = fastest).

4. Select the **Frame** and **Background** colors from the drop-down menus. Select **Transparent** for no frame or background.

5. Select the sort order in which the alarms will appear, either **Time ascending** or **Time descending**.
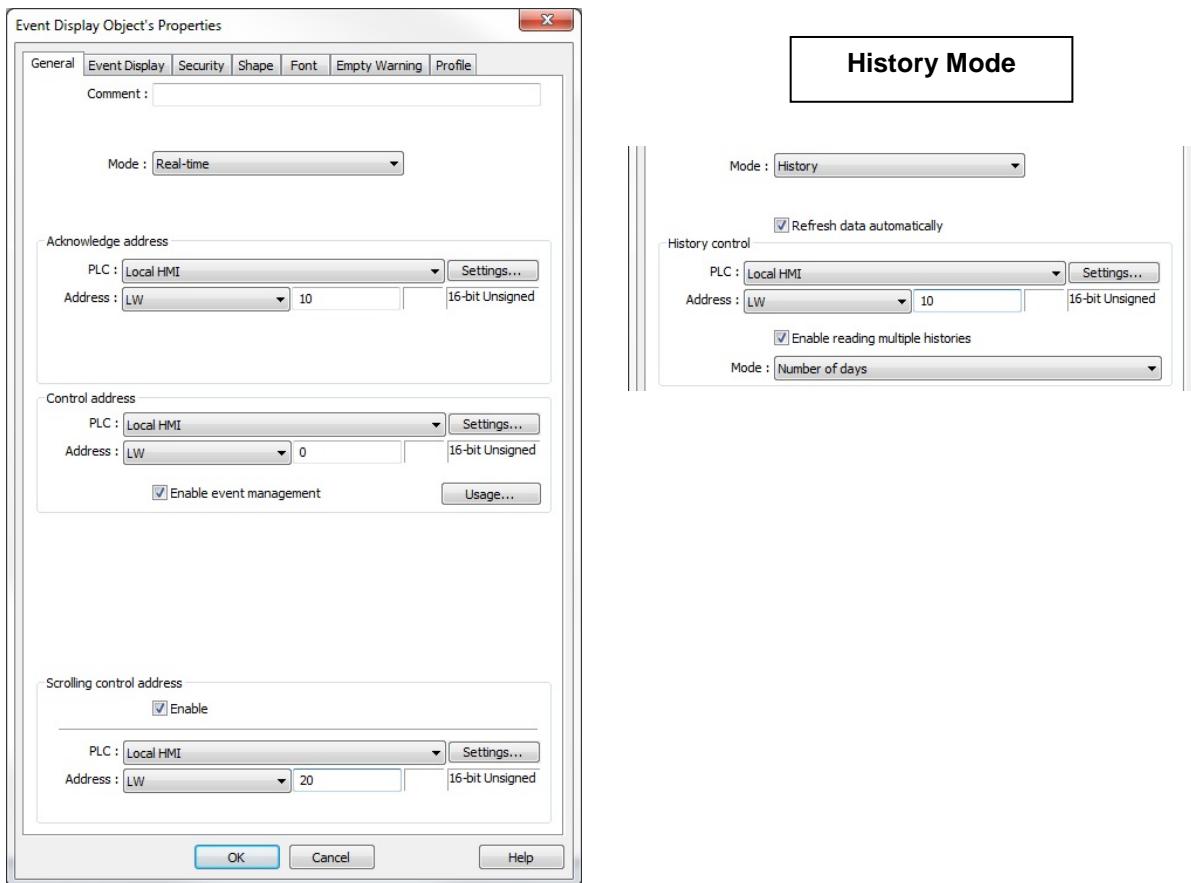
6. Check the **Event trigger date**, **Event trigger time**, and **Event message** checkboxes to include them in the Alarm Bar. Use the **Display order** list to arrange the order in which the selected event information is displayed.

7. Select the format for how the date and time is displayed in the **Date:** and **Time:** drop-down boxes.

8. Click the **Shape** tab to configure a background shape, if you'd like one.

9. Click the **Font** tab to configure the size of the font.

10. Click **OK** and click in the work area of EZwarePlus to place the Alarm Bar. Drag it to place it in the desired location.

Displaying Alarms Using the Event Display Object

The Event Display Object takes the event strings sent to it from the Event (Alarm) Log Object and displays them on a window screen as a list. The list contains all of the events that have occurred with the most recently triggered event at the top of the list. You do not have to display the entire list of events on a window screen. You can limit the viewable events to a 'scrollable window' that displays a given number of lines. An acknowledge feature allows the HMI operator to touch an event recorded in the event list to display a popup window. The popup window can then be used to display further instructions to the HMI operator or to perform some operation.

To create an Event Display Object:

1. From the **Objects** menu, click **Alarm > Event Display** or click the Event Display icon in the Object 2 toolbar. The New Event Display Object dialog box appears.

2. Use the **Comment:** box to enter a title for the Event Display object. A comment is not necessary but does help identify the purpose of the part.

3. Select either Real-time or History as the mode for the events to be displayed.
    In **Real-time** mode, the **Acknowledge address** is the register where the alarm or event writes the window number to open an Indirect Window.
    In **History** mode, the **History control** address is the register used to select the history file to display, where 0 displays the most recent events, 1 displays yesterday's events, 2 displays the events from two days ago, etc. Select **Enable reading multiple histories** to display more than one history file at a time.
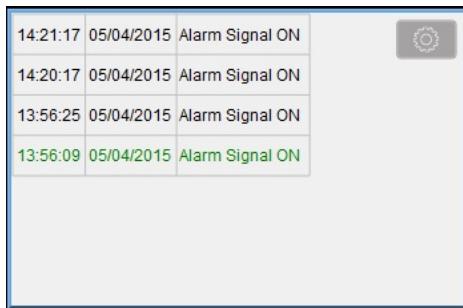
    ☞ When **Real-time** is selected, the Event Display reads data stored in RAM memory, so it can only display data since the HMI was powered up. When **History** is selected, the Event Display reads data from the event log file (*.evt) in memory. History mode can display data in real-time as well, but has the additional capability of displaying data from previous days using the **History control** register.
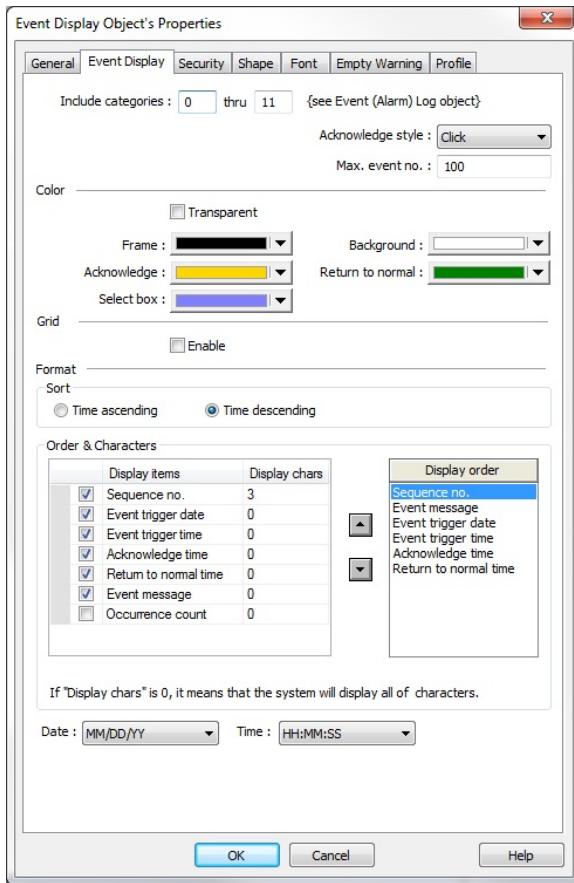
4. Select **Enable event management** to configure a register to control the events that are displayed (see "Chapter 6 – Using EZwarePlus > EZwarePlus Features > Objects Summary > Event Display" for more information).

    ☞ The RMI5010 displays all events and updates in real-time. Touch the filter icon in the upper-right corner of the Event Display to set the start and end dates for displaying events.

14:21:17	05/04/2015	Alarm Signal ON	⚙
14:20:17	05/04/2015	Alarm Signal ON	
13:56:25	05/04/2015	Alarm Signal ON	
13:56:09	05/04/2015	Alarm Signal ON	
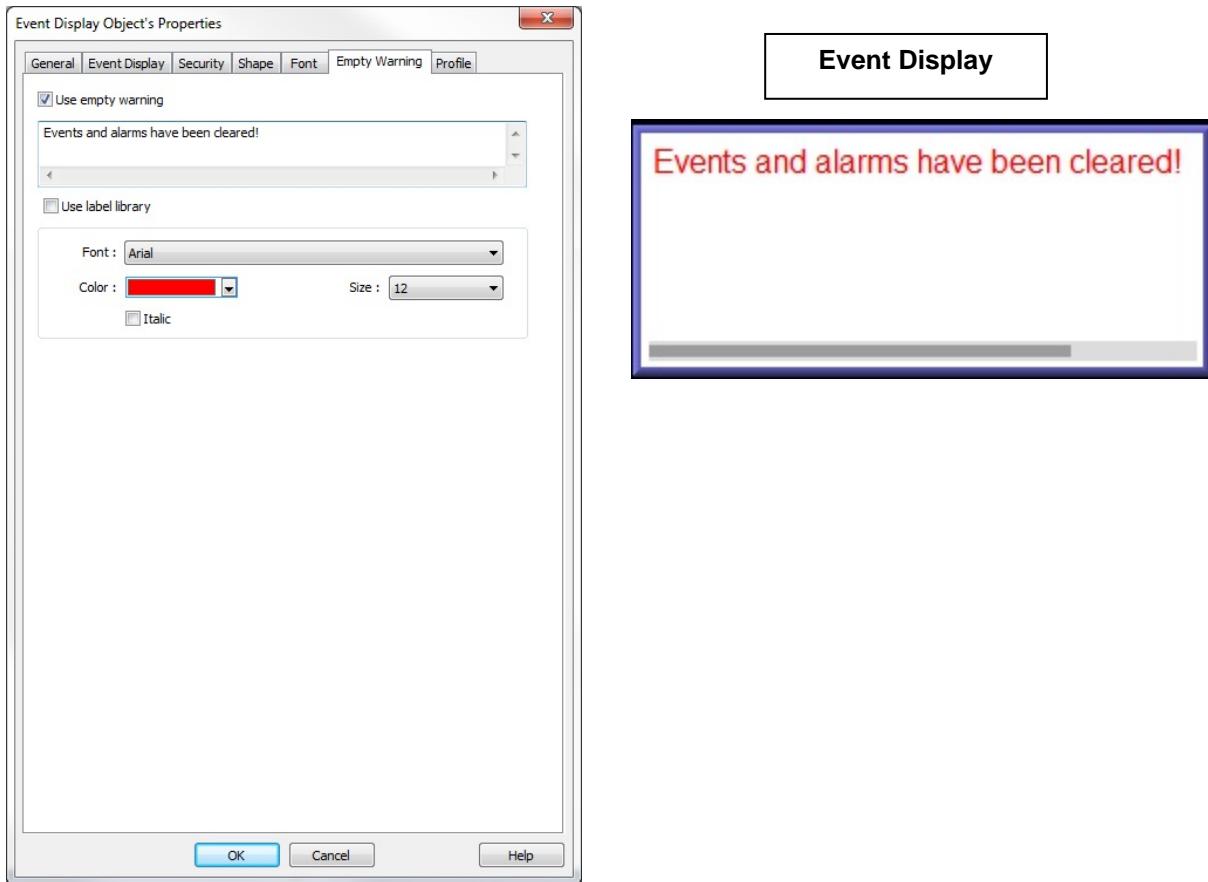
5. **Scrolling control address:** Enable this option to allow dynamic control of the Event Display's scrolling feature. The value in the designated address determines the number of lines the Event Display will be scrolled down (0 = first line). (Not available for the RMI5010.)

6. Click on the **Event Display** tab to display the Event Display dialog.

7. **Include categories:** To include all categories, set this at 0 to 0.

8. Select **Click** or **Double-click** in the **Acknowledge style** drop-down menu to acknowledge an event with a single or double touch. Then select the maximum number of events to display in the Event Display (applies to Real-time mode only). The valid range is 10-1000. (Not available for the RMI5010.)

9. Select colors for Background, Frame, Select box, Acknowledge, and Return to normal.

10. Select **Grid Enable** to include a grid in the Alarm Display.

11. Select the order in which events will be sorted, **Time ascending** or **Time descending**.

12. Check the **Sequence no.** check box to add a unique serial number to each event. Select the **Event trigger date** and **Event trigger time** to have the date and time the event is triggered added to each event. Select **Acknowledge time** and **Return to normal time** to have those times added to each event, and select **Event message** to include the message defined for the alarm/event appear in the display. Select **Occurrence count** to display the number of times that the alarm was triggered throughout the day (not available for the RMI5010).

13. Use the **Display order** list to arrange the order in which the selected event information is displayed, and select the format for how the date and time is displayed in the **Date:** and **Time:** drop-down boxes.

14. Click the **Shape** tab to configure a background shape (if desired). Click the **Font** tab to configure the size of the font.

15. Click the Empty Warning tab to enable displaying a message in the Event Display when there are no events or alarms displayed.
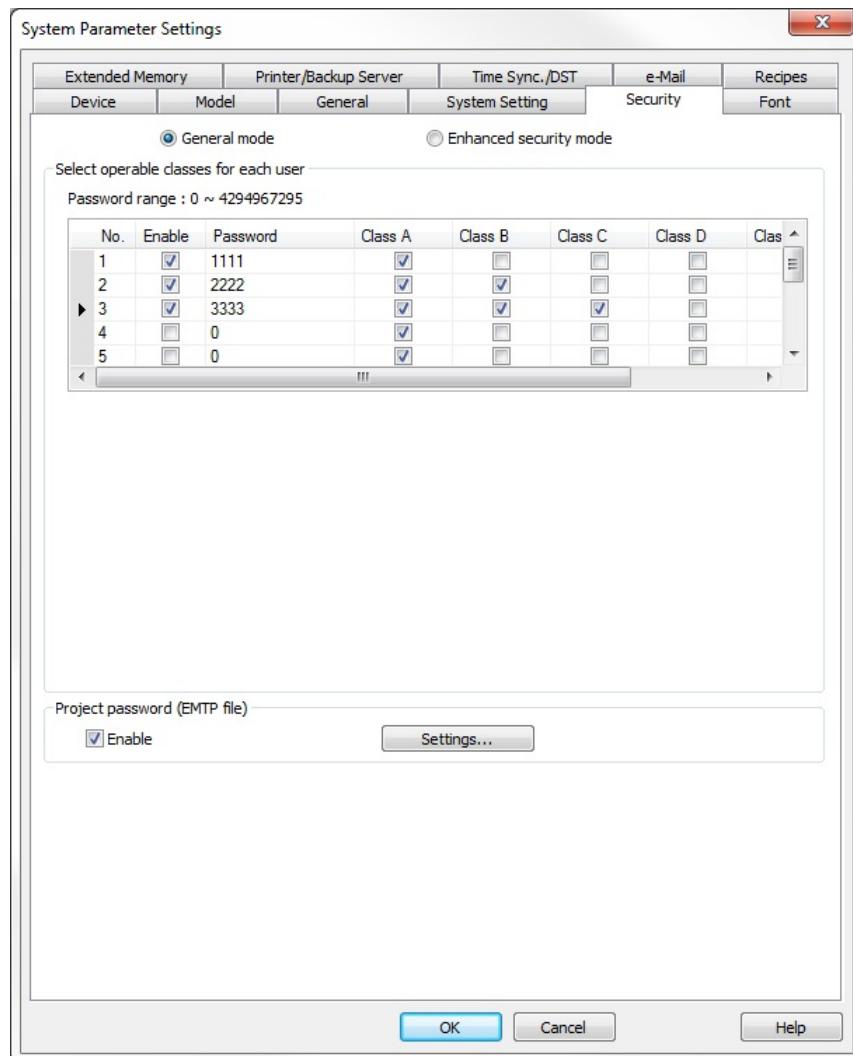
16. Click **OK** and click in the work area of EZwarePlus to place the Event Display. Drag it to place it in the desired location. Click and drag the corners to resize it.

Chapter 14 – Security

The security feature in EZwarePlus allows you to create up to 12 users with individual passwords and assign different access levels to each user. Access to windows and even individual objects can be secured so only individuals logged in with the correct access levels can operate certain functions.

System Parameter Settings Security tab

The security feature is enabled in the **System Parameters**. Open the **System Parameter Settings** (Edit > System Parameters) and click on the **Security** tab. Check the Enable box for each user you want to configure with security access. Enter a password for each user and check the boxes for the access level assigned to each user.

Note: There is no priority in assigning access levels. For example, access level F doesn't automatically provide access to levels A-E. In many cases, you will want higher security levels to include access to lower security levels. In the screen shot above, Users 1 – 6 are assigned increasingly higher security levels, with each security level including access to the security levels below it.

There are two security modes in EZwarePlus, **General mode** and **Enhanced Security mode**. General mode operates the same as the security feature in EasyBuilder-5000, so projects created in EasyBuilder-5000 will default to the General mode when opened in EZwarePlus. Enhanced Security mode provides additional features and user account management for improved security and runtime editing of user accounts.

General Mode

When **General mode** is selected (not available for the RMI5010), up to 12 users can be individually enabled, and each has a unique password and combination of any six access classes (A-F). Only numbers are allowed for passwords. When an object is created, it can be assigned an access class. When that object is activated (for example, a button is touched), the HMI compares the access classes allowed for the currently logged-in user to the access class specified for the object. If the access class of the object is within the classes allowed, the object's action is executed.
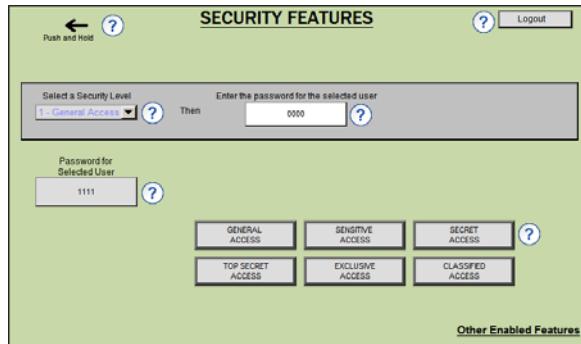
In order for a user to login, they must first enter their user number into reserved local word LW-9219. Then they must enter their password into reserved local word LW-9220 (32-bit unsigned).

There are several other reserved local words and bits that can add functionality to your security implementation.

Reserved Local Memory	Function
LW-9219	Enter user number
LW-9220	Enter user password
LW9222	Displays the access levels assigned to the currently logged-in user in binary format (16-bit binary) Bit 0: A, Bit 1: B, Bit 2: C, Bit 3: D, Bit 4: E, Bit 5: F
LW9500-LW9523 (32-bit unsigned)	Stores user passwords 1-12
LB9050	Logs out user and resets password to zero when bit is set (HMI resets bit to zero)
LB9060	Indicates when an invalid password has been entered (bit resets to zero when valid password is entered)
LB9061	Set to update user passwords when changed locally (LW9500-LW9523) Use momentary style
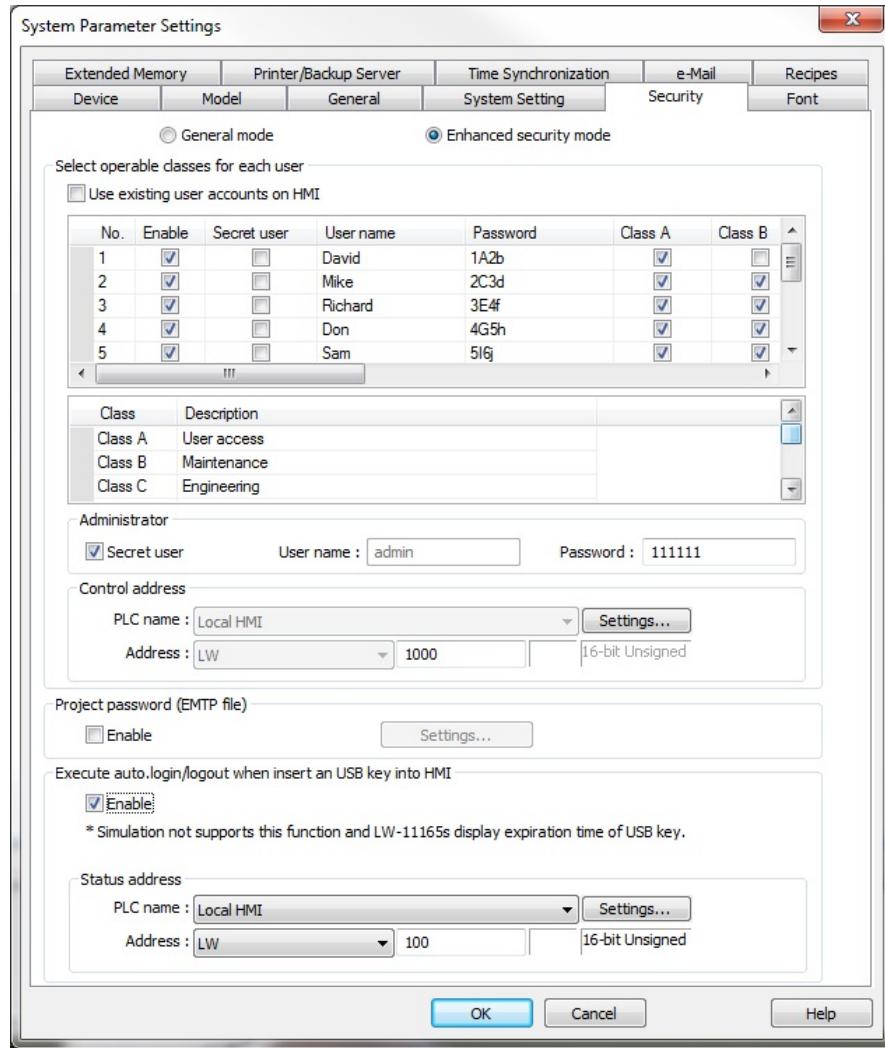
Refer to the Security Sample Project on our website to see how to employ the above reserved local memory bits and registers in a security implementation:

http://www.maplesystems.com > Support Center > Sample Projects > HMI5000 Series > Sample Prj: Security

Enhanced Security Mode

When **Enhanced security mode** is selected, up to 11 users can be enabled along with a default Administrator. Each user can be assigned up to twelve access classes (A-L). The Administrator has full access (all access classes). Passwords and User Names can be alphanumeric, and the currently logged-in user's password and user name are stored in local memory as assigned by the Control address (see below for a description of the Control address). The **Option List** object can be configured to display the User Names, providing a quick way to select a user to log-in.
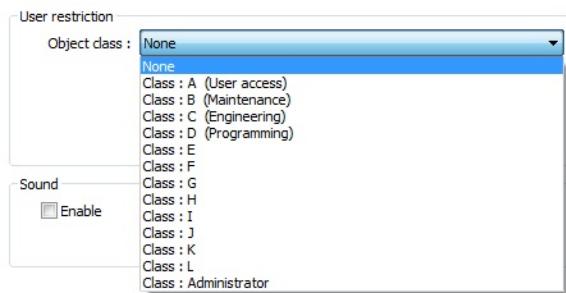
Use existing user accounts on HMI: User accounts can be created and stored on a USB flash drive or SD card using the Administrator Tools and imported into the HMI via a Function Key. Check **the Use existing user accounts on HMI** checkbox to use the user accounts already stored in the HMI. This disables the user selection capability in the Security tab.

When **Use existing user accounts on HMI** is unchecked, you can enable users by selecting the Enable checkbox for each user. Enter the **User name** and **Password**, and select the access classes for each user. User names and passwords can be alphanumeric and up to 16 characters long. Passwords are case sensitive.

Selecting **Secret user** will hide the User name from being displayed in the Option List. The User name would then have to be manually entered to log in that user. (**Note:** The Option List does have a Secret User override.)

The access classes can be assigned descriptions, which appear in the **Object class** drop-down when enabling the **User restriction** on an object's **Security** tab.

Administrator: The administrator's user name is admin by default and cannot be changed. Enter the administrator's password and select **Secret user** to hide the admin user name in the Option List.

Control Address: The control address defines the area of memory containing the control registers and user account data. This reserves 20 consecutive registers beginning with the register designated in the **Control address** area. The addresses are allocated as follows:

Address	Length (Words)	Description
Control Address	1	Command (see below)
Control Address + 1	1	Command result (see below)
Control Address + 2	1	Selected Item Index (used with the Option List object)
Control Address + 3	1	Privilege (bit 0 = Class A; bit 1 = Class B; bit 2 = Class C; etc.
Control Address + 4	8	User Account Name
Control Address + 12	8	Password

Command (Control Address)[1]	Function
1	Log in with current name (Control Address + 4) and password (Control Address + 12).
2	Log in with current index from the Option List (Control Address + 2).
3	Log out.
4	Change password of currently logged-in user account. The new password must be written to Control Address + 12 prior to execution.
5	Add a new permanent user account, with the new name in Control Address + 4 and password in Control Address + 12.

6	Add a new temporary user account, with the new name in Control Address + 4, password in Control Address + 12, privilege in Control Address + 3, and duration of account in minutes in Control Address + 2. If duration is 0, the new temporary account will be active until the next HMI power cycle. **Note:** All temporary accounts are deleted when power is removed from the HMI.
7	Delete user account by name selected in Control Address + 4. Note: The currently logged-in user account cannot be deleted.
8	Delete user account by Option List index (Control Address + 2). Note: The currently logged-in user account cannot be deleted.
9	Change the privilege level of the selected user account by name (Control Address + 4). The new privilege value must be entered in Control Address + 3 prior to execution.
10	Change the privilege level of the selected user account by Option List index (Control Address + 2). The new privilege value must be entered in Control Address + 3 prior to execution.
11	Change the password of the selected user account by name (Control Address + 4). The new password must be entered in Control Address + 12 prior to execution.
12	Change the password of the selected user account by Option List index (Control Address + 2). The new password must be entered in Control Address + 12 prior to execution.
13	Read user account privilege by account name in Control Address + 4. Result is returned in Control Address + 3.
14	Read user account privilege by Option List index in Control Address + 2. Result is returned in Control Address + 3.

[1]Note: The Control Address is reset to 0 when the command is completed.

Result (Control Address + 1)	Description
1	Success
2	Command error
4	Account already exists (when adding a new account)
8	Account does not exist
16	Password error
32	Current command cannot be executed
64	Invalid account name
128	Invalid account password
256	The imported data is invalid
512	Not within the effective time limit (when using the USB Security Key to log in)

To log in from a keypad:

1. Create an ASCII Input object, addressed to ([Control Address] + 4), length 8 words, for the User Name.

2. Create an ASCII Input object, addressed to ([Control Address] + 12), length 8 words, for the Password.

3. Create a Set Word object, addressed to (Control Address), configured to write a constant value of 1.

4. When the project is run, enter the User Name and Password, then touch the Set Word object.

To log in from an Option List:

1. Create an Option List with **User account** selected for the **Source of item data**. Configure the **Monitor Address** as ([Control Address] + 2).

2. Create an ASCII Input object, addressed to ([Control Address] + 12), length 8 words, for the Password.

3. Create a Set Word object, addressed to (Control Address), configured to write a constant value of 2.

4. When the project is run, choose the desired User Name from the Option List, enter the Password, Then touch the Set Word object.

To add a permanent user at runtime:

1. Create an ASCII Input object, addressed to ([Control Address] + 4), length 8 words, for the User Name.

2. Create an ASCII Input object, addressed to ([Control Address] + 12), length 8 words, for the Password.

3. Create 12 Toggle Switch objects, addressed to ([Control Address] + 3), bits 00 to 12.

4. Create a Set Word object, addressed to (Control Address), configured to write a constant value of 5.

5. When the project is run, enter the User Name and Password, set the appropriate bits for the Access Class privileges, then touch the Set Word object.

To add a temporary user at runtime:

1. Create an ASCII Input object, addressed to ([Control Address] + 4), length 8 words, for the User Name.

2. Create an ASCII Input object, addressed to ([Control Address] + 12), length 8 words, for the Password.

3. Create a Numeric Input object, addressed to ([Control Address] + 2), 1 word, 16-bit Signed, for the Duration.

4. Create 12 Toggle Switch objects, addressed to ([Control Address] + 3), bits 00 to 12.

5. Create a Set Word object, addressed to (Control Address), configured to write a constant value of 6.

6. When the project is run, enter the User Name, Password, and Duration, set the appropriate bits for the Access Class privileges, then touch the Set Word object.

Note: All temporary accounts are deleted when power is removed from the HMI.

To delete a user by name:

1. Create an ASCII Input object, addressed to ([Control Address] + 4), length 8 words, for the User Name.

2. Create a Set Word object, addressed to (Control Address), configured to write a constant value of 7.

3. When the project is run, enter the User Name, then touch the Set Word object.

To delete a user by Option List:

1. Create an Option List with **User account** selected for the **Source of item data**. Configure the **Monitor Address** as ([Control Address] + 2).

2. Create a Set Word object, addressed to (Control Address), configured to write a constant value of 8.

3. When the project is run, select the desired User Name from the Option List, then touch the Set Word object.

Project password (EMTP file): When enabled, the project file is password protected and requires entering the designated password in order to open the project file (EMTP) in EZwarePlus.

Execute auto. Login/logout when insert an USB key into the HMI: When enabled, a user can log in by inserting a USB flash drive configured with log in information (see "Chapter 15 – Administrator Tools – USB Security Key" for more information).

The **Status address** reflects the status of the log in:
0 = No action
1 = Log in successful
4 = Log in failed
8 = Log out successful
16 = Log out failed
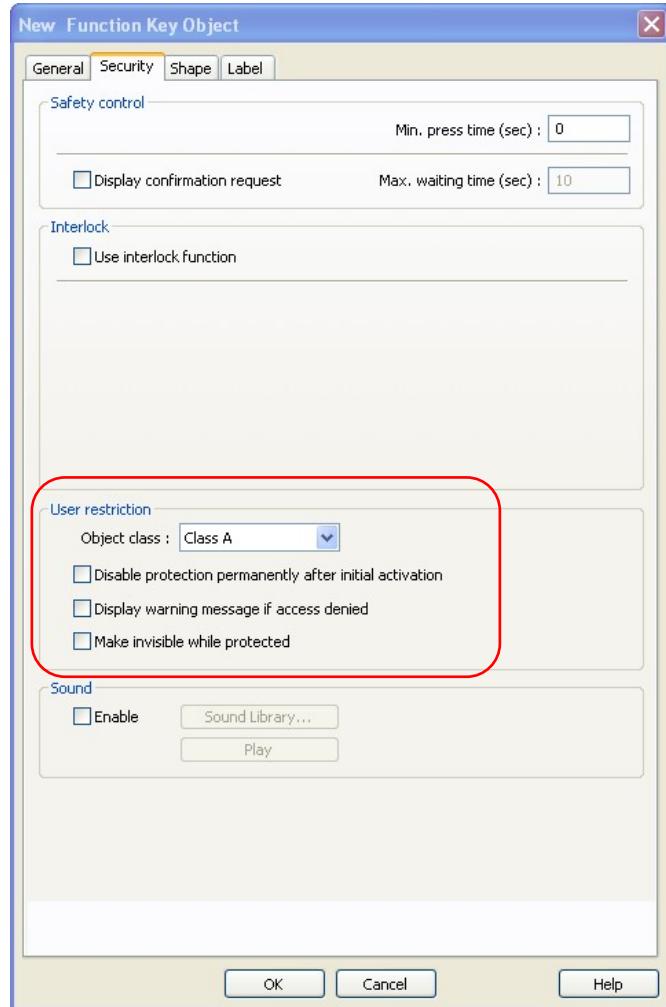
▤ Execute auto. Login/logout when insert an USB key into HMI is not supported in the RMI5010.

Object Security

Many objects in EZwarePlus can be secured using the Security tab in the object's properties window. For example, a Function Key can be secured so that only user's with a specified access class can operate the Function Key and open a particular window.

User Restriction

The User restriction area is where the security class for the object is set.

Once an *Object class* is selected in the *User restriction* area, three options become available. With no option checked, the object simply will not operate when touched unless a user with the correct access class is logged in.

Disable protection permanently after initial activation: This option removes the user restriction from the object once the object has been activated by a user with the correct access class, even after that user logs out. The protection is disabled until the HMI is rebooted.

Display warning message if access denied: This option causes the message in Window 7 (Password Restriction) to popup when a user with an incorrect access class attempts to activate the object.

Make invisible while protected: This option causes the object to be invisible on the screen until a user with the correct access class is logged in.

Safety Control

The Safety control area is used to prevent an operator from activating a button or switch by accidentally touching it.

Min. press time (sec): This sets the minimum amount of time in seconds that the object needs to be pressed in order to activate it.
▣ This option is not available when *Display confirmation request* is enabled.
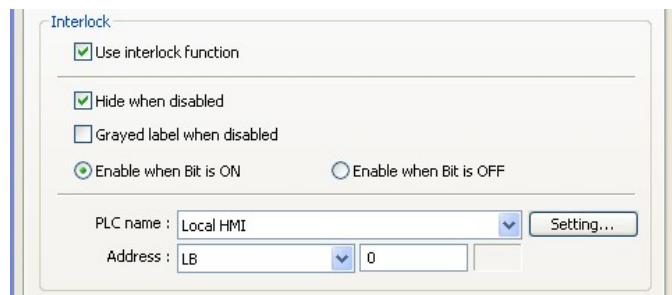
Display confirmation request: When enabled, the HMI will display a confirmation window before executing the action. The message in the confirmation window is configured in Message 0 of the System Message object (Objects > System Message).

Max. waiting time (sec): This sets the maximum amount of time in seconds that the confirmation window stays on the screen. If the time expires, the confirmation window closes and the action is not executed.
▣ This option is available only if *Display confirmation request* is enabled.

Interlock

The interlock feature uses the state of a bit to enable or disable the action of the object. When Interlock is enabled, the following options are available:

Hide when disabled: When this box is checked, the object is invisible on the screen until the designated bit is in the enable state.

Disabled   Enabled

Grayed label when disabled: When this box is checked, the object's label is grayed out until the designated bit is in the enable state.
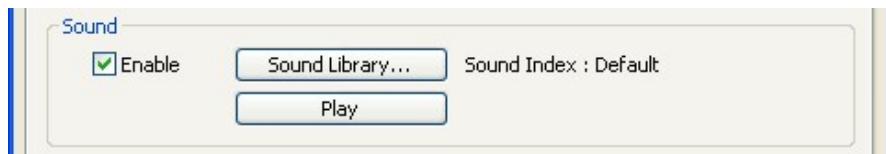
Disabled   Enabled

Enable when Bit is ON/Enable when Bit is OFF: Choose the state of the designated bit that will enable the action of the object.

Sound
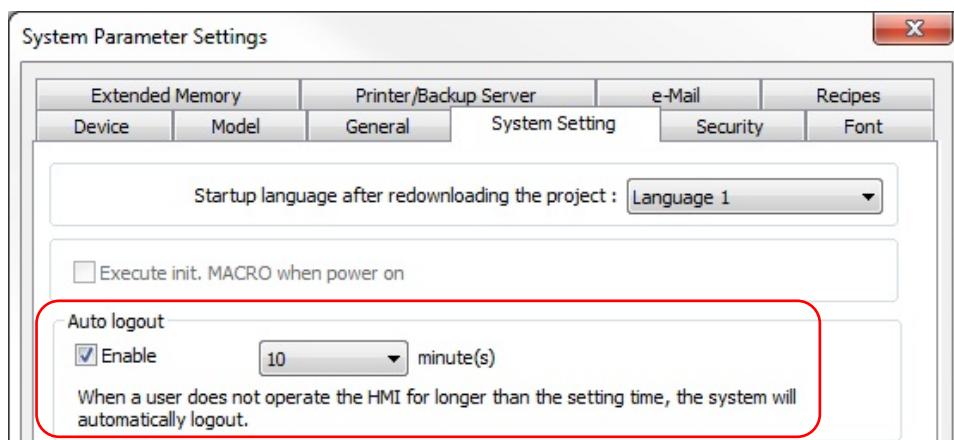
Enable the Sound option to play a sound when the object is activated.

The default sound is the HMI's beep. For models equipped with an audio output jack, you can select other sounds from the sound libraries to play when the object is activated.

Auto logout

There is an **Auto logout** feature in the System Parameters on the System Setting tab (**Edit** menu > **System Parameters > System Setting** tab).
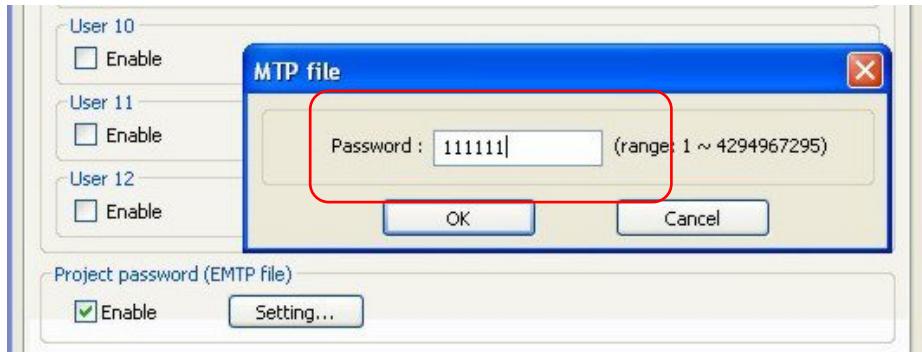
When this feature is enabled, you can select the number of minutes of inactivity before the HMI will automatically logout the user. This avoids a situation where a user logs in and forgets to log out before leaving the HMI (use LB-9050 to manually logout a user).

Additional Security Features
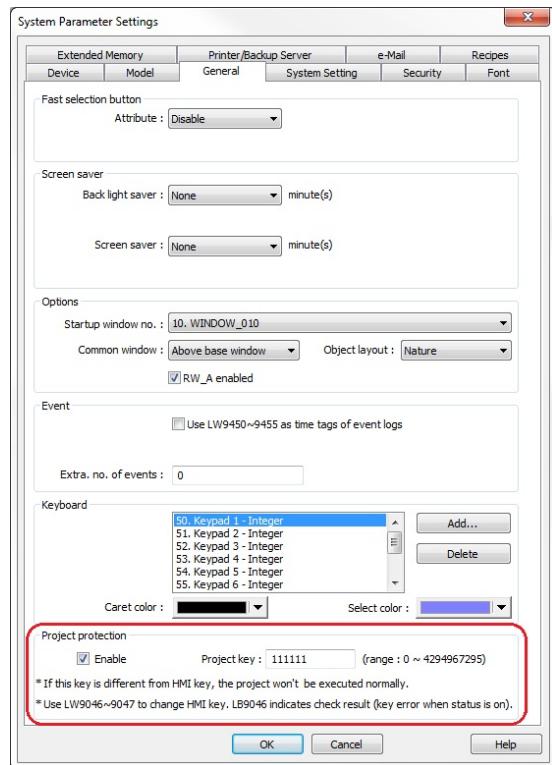
Project Password (EMTP file)

Enable the Project Password in the System Parameter settings (**Edit > System Parameters > Security** tab). This secures a project and prevents it from being modified without the proper password. When the Project Password is enabled, you must enter the correct password in order to open the project in EZwarePlus.
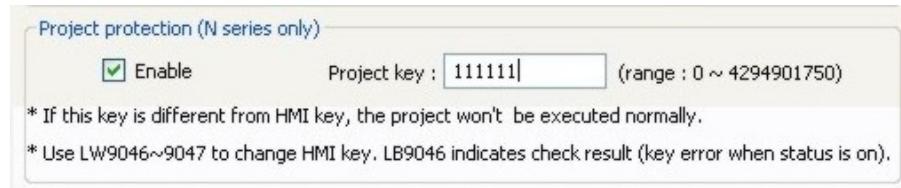
Project Protection

Enable Project Protection in the System Parameter settings (**Edit > System Parameters > General** tab). Use the Project Protection feature to set a unique password (Project key) in the project that will cause the project to run only on specific HMIs that have a matching password (HMI key).
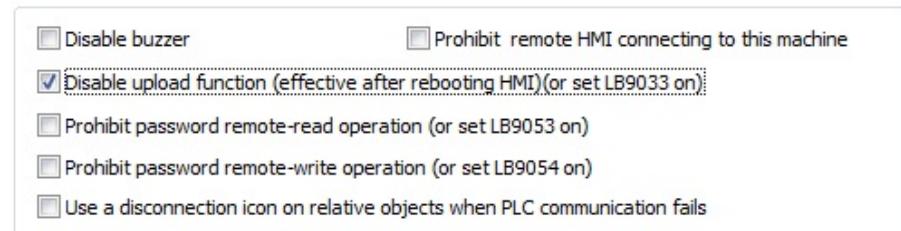
A developer can set the HMI key in the reserved local memory of the HMI (LW9046 configured for 32-bit unsigned numeric format). This value is stored in non-volatile memory, and once it is set, the value is hidden and cannot be read using a numeric display. In this way, only HMIs with the correct HMI key will be able to run the project. If the Project key does not match the HMI key, local bit LB9046 is set and the driver is disabled and will not communicate with the PLC.

🖺 The HMI must be rebooted in order for the HMI key setting to take effect.
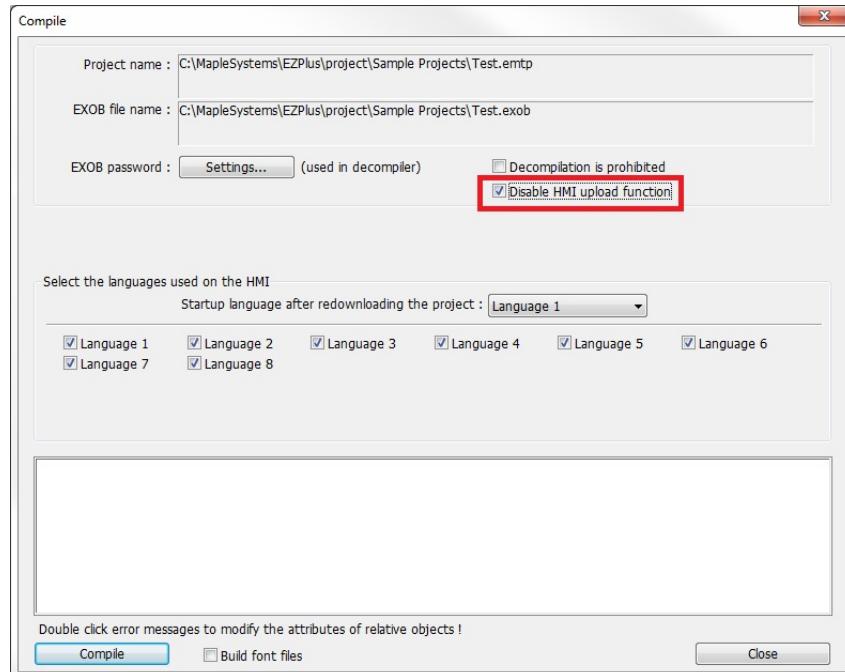
Disable Upload Function

Activate the Disable Upload Function in the System Parameter settings (Edit > System Parameters > System Setting tab). Alternately, you can set LB9033 in the local reserved memory of the HMI to disable the upload function and prevent a project from being uploaded from the HMI.
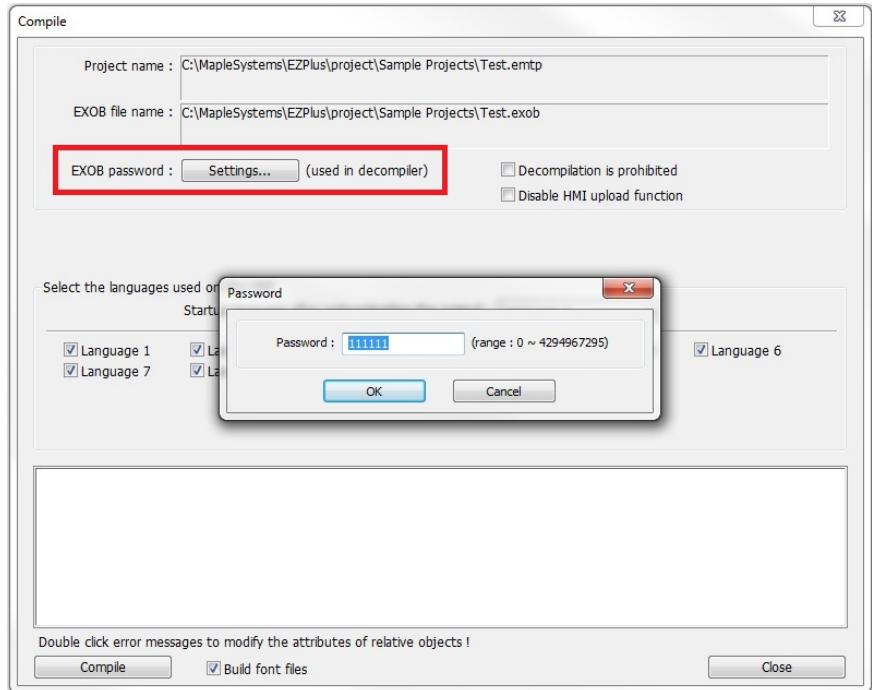
🖺 The HMI must be rebooted after downloading the project in order for the Disable Upload Function to take effect.

This function can also be enabled in the Compile window (not available for the RMI5010).
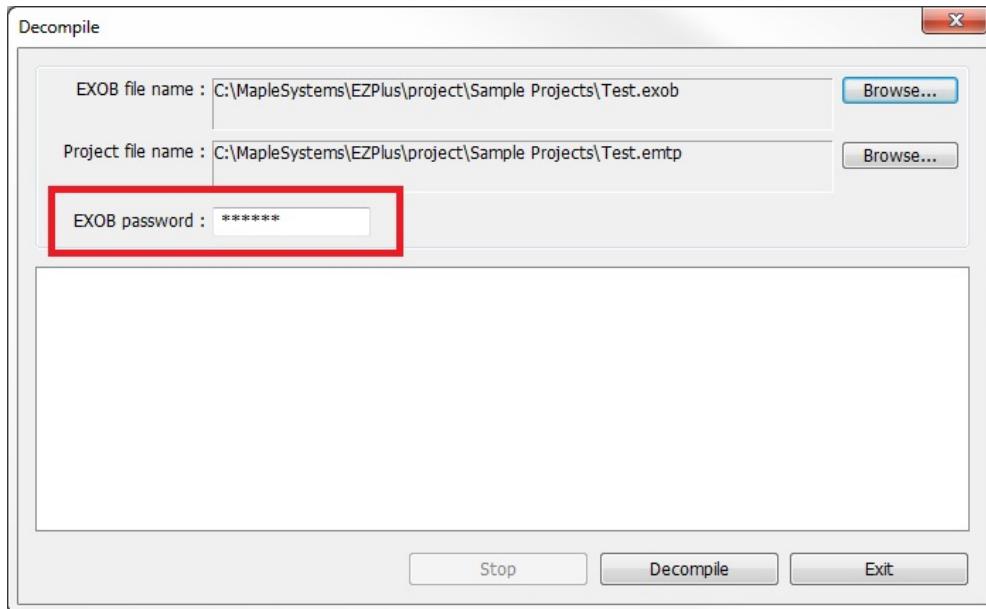
EXOB Password

A project (*.emtp) must be compiled (*.exob) before it can be downloaded to an HMI. When compiling a project, you have the option to change the default password (111111) to a unique number.
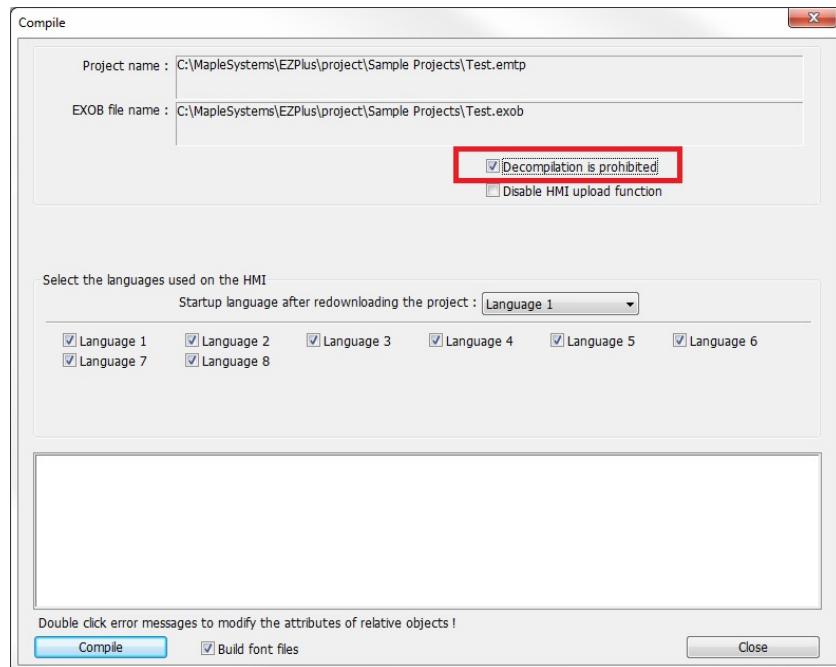
You must enter the correct password before you can decompile the file and open it in EZwarePlus or you will get a decompiling error.

Decompiling Prohibited

Click the **Decompilation is prohibited** checkbox in the **Compiling** window to prevent the compiled project from being decompiled.

⊞ Once a project is compiled with the **Decompilation is prohibited** option checked, it cannot be decompiled. There is no "backdoor" password to override it.

System Passwords

The System Setup Toolbar in the HMI has the option of changing several passwords from their default setting of 111111 to another number.

Open the System Setup Toolbar and click the System Settings icon.

A dialog will be displayed requesting the Local password. The default password is 111111.

⊞ You may have to move windows around a bit to gain access to the virtual keyboard. You may also have to click inside the password field again.

Once the correct password has been entered, the System Settings dialog is displayed. Click on the **Security** tab to display the security settings dialog. Here, you can select and modify your system passwords.
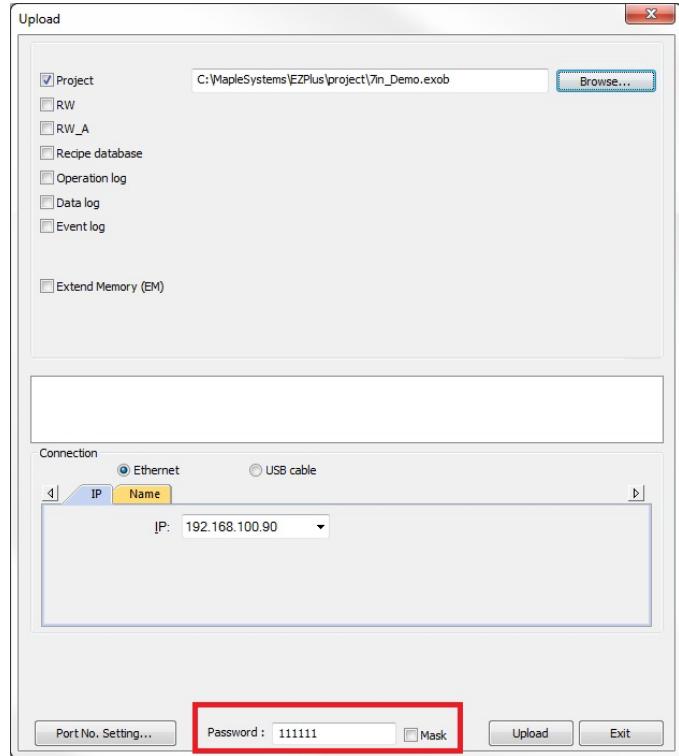
To change a system password, the new password must be entered, and then entered again to confirm. As the password is entered into the confirm field, an indicator will show if the two passwords match.

Local Password: The password required to enter local setup on the HMI.

Upload Password: The password required to upload data from the HMI to a PC or memory module.
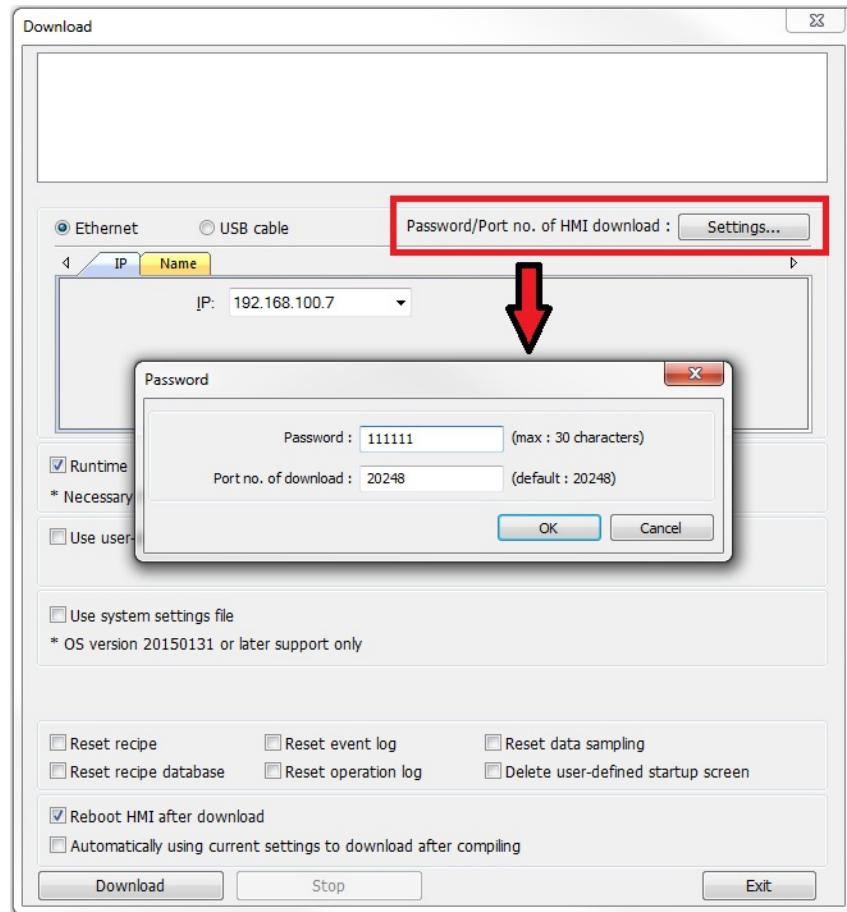
Upload to a PC using Utility Manager

Upload to a USB Flash or SD Card

Download Password: The password required to download data to the HMI from a PC or memory module.

Download from a PC to an HMI

Download from a USB Flash or SD Card

Upload (History) Password: The password required to upload history files from the HMI to a memory module.
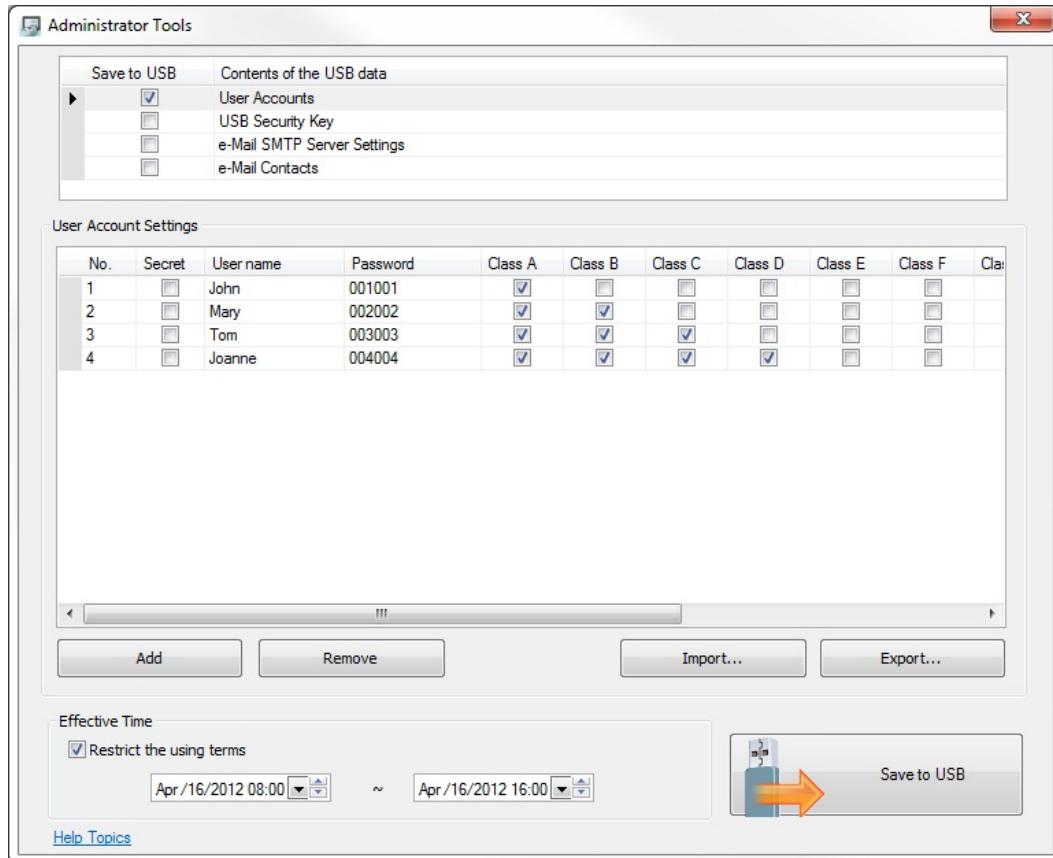
Upload to a USB Flash or SD Card

Chapter 15 – Administrator Tools

The Administrator Tools is a separate utility that allows storing data to a USB flash drive or SD card for specific functions including User Accounts, USB Security Key, e-Mail SMTP Server Settings, and e-Mail Contacts. The stored data can then be loaded into an HMI.

To open the Administrator Tools, click **Tools > Administrator Tools** in EZwarePlus.

User Accounts
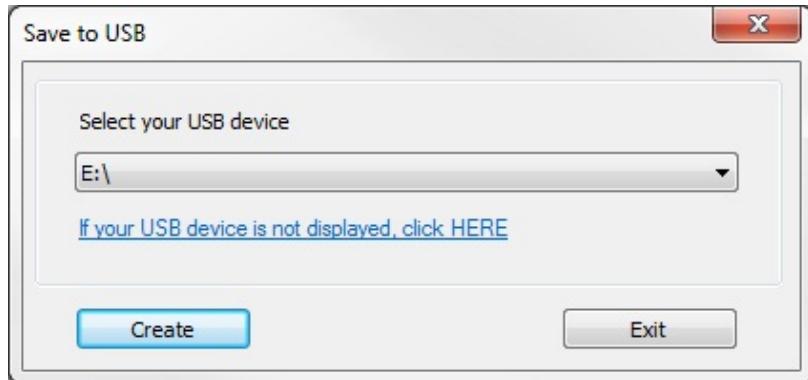
🖅 The project in the HMI must have **Enhanced Security mode** selected in the **System Parameters > Security** tab for the User Accounts data to be implemented in the HMI.
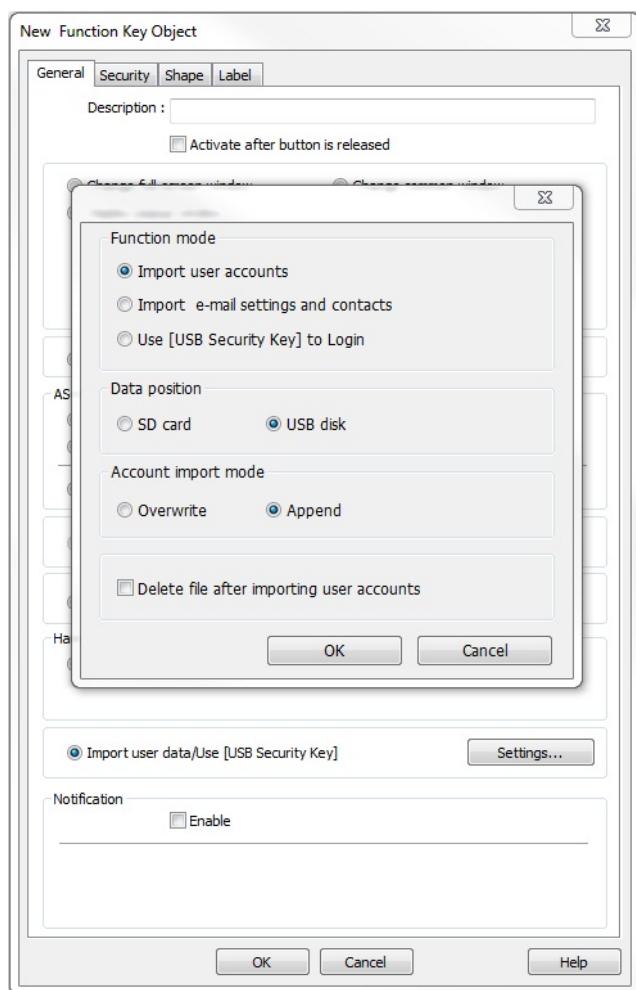
Selecting **User Accounts** allows creating and saving new user accounts to the HMI during runtime, without having to change the project in EZwarePlus and download it to the HMI. Use the **Add** button to create new user accounts. Up to 127 new accounts can be added in this way. Check the **Effective Time: Restrict the using terms** checkbox to put a time limit on when the data can be uploaded to the HMI. If not checked, the data can be uploaded at any time. Once the data is uploaded, the account data is stored in the HMI until power is removed.

Click the **Export** button to save the User Accounts in a EUA (EZware User Accounts) file. Click the **Import** button to import a list of User Accounts from a EUA file.

Select **Save to USB** to save the User Account data to the USB flash drive or SD card. Navigate to the USB flash drive or SD card connected to your PC and click **Create**.
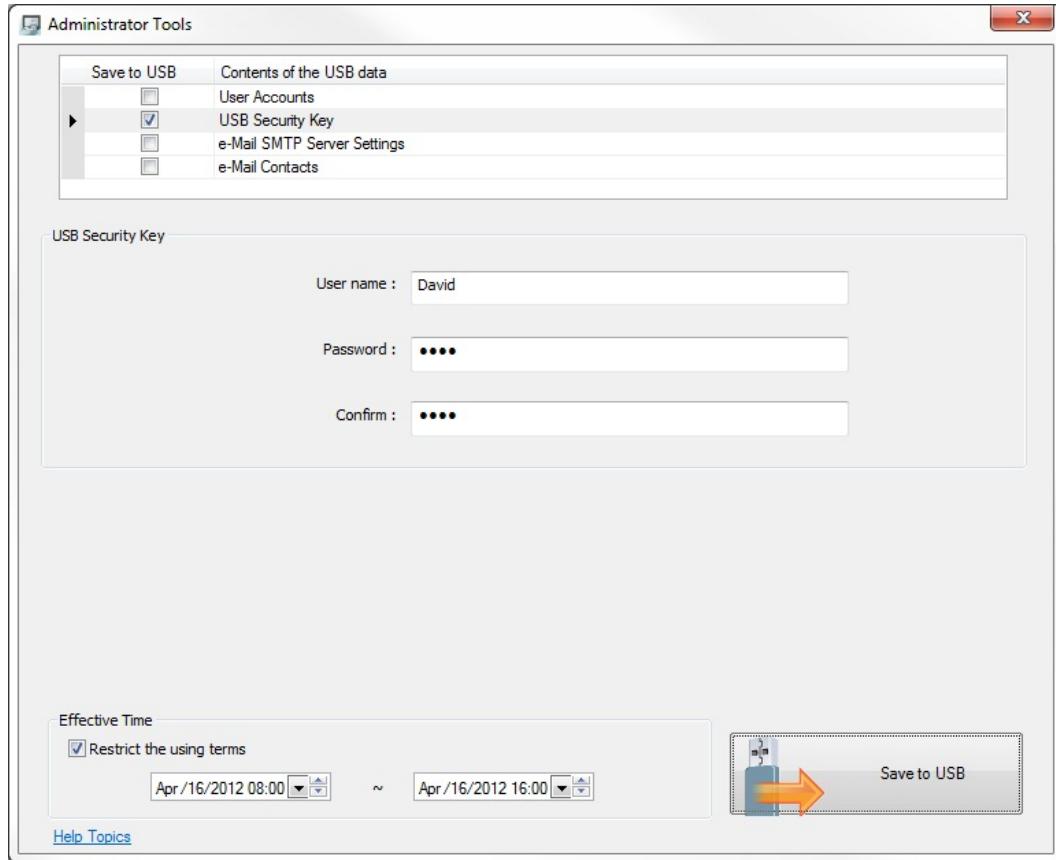
To upload the data to the HMI, you must have a Function Key configured to import the user data.

In the Function Key object's properties, select **Import user data/Use [USB Security Key]** and click the **Settings** button. Select **Import user accounts** under **Function mode**. Select the **Data position** (SD card or USB disk) and the **Account import mode** (Overwrite or Append). Select **Delete file after importing user accounts** to delete the file from the SD card or USB flash drive after importing the data to the HMI. Click **OK** and select an appropriate shape and label for the Function Key. Pressing the Function Key on the HMI during runtime will import the User Account data from the USB flash drive or SD card connected to the HMI.

✏ For the RMI5010, new User Accounts can be added in the **Configuration Page > Enhanced Security** tab.
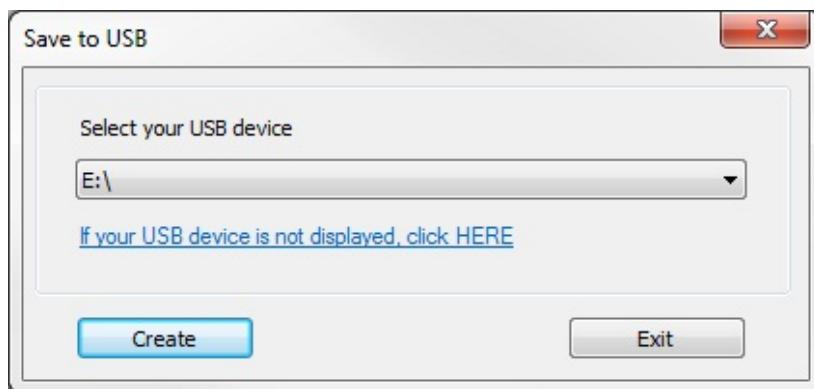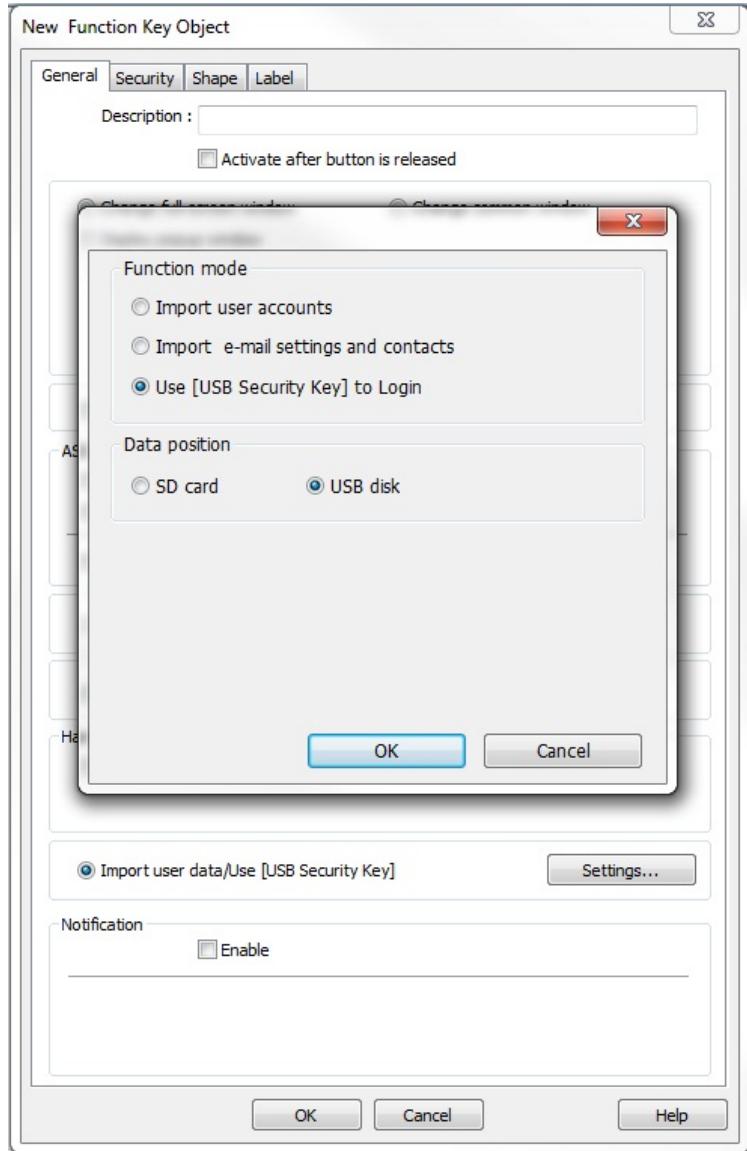
USB Security Key

 The project in the HMI must have **Enhanced Security mode** selected in the **System Parameters > Security** tab for the USB Security Key data to be implemented in the HMI.

Selecting **USB Security Key** allows a user to log-in automatically by pressing a Function Key that is configured to **Use [USB Security Key] to Login**. Enter the User name and Password of the user account. *The User name and Password must match an existing account in the HMI.* Check the **Effective Time: Restrict the using terms** checkbox to put a time limit on when the USB Security Key data can be used.

Select **Save to USB** to save the USB Security Key data to the USB flash drive or SD card. Navigate to the USB flash drive or SD card connected to your PC and click **Create**.
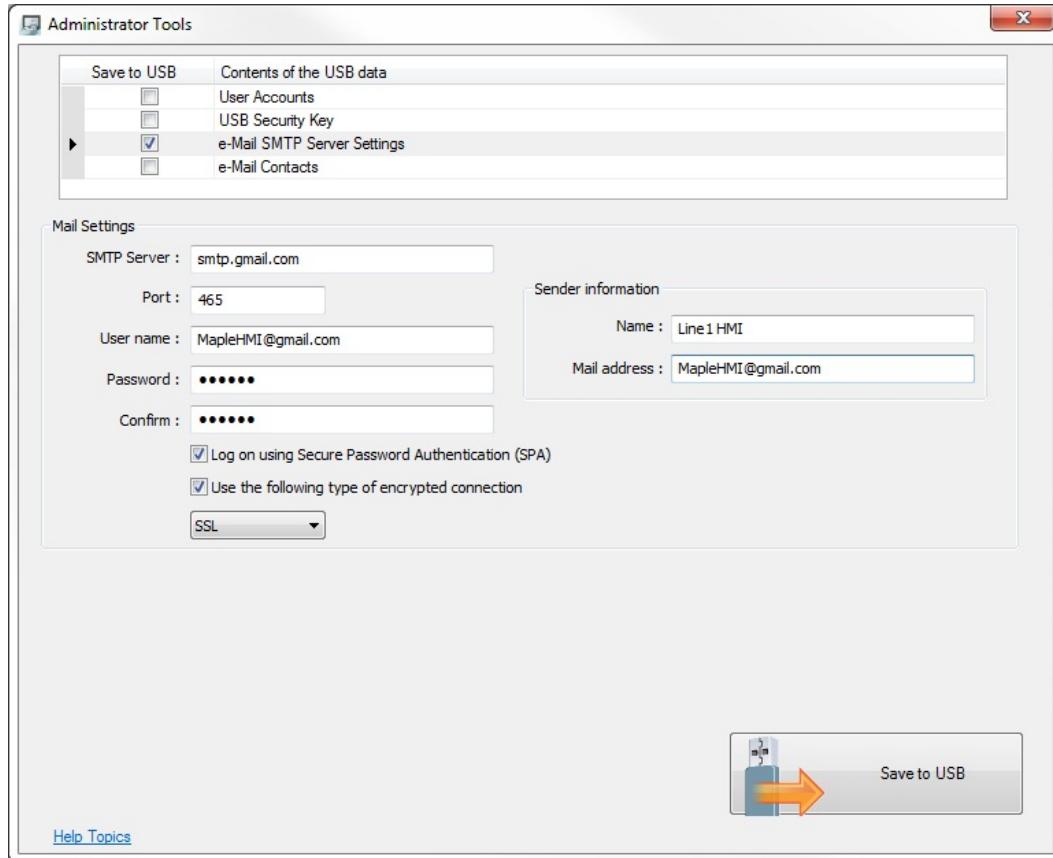
To log-in the user, you must have a Function Key configured to **Use [USB Security Key] to Login**.

In the Function Key object's properties, select **Import user data/Use [USB Security Key]** and click the **Settings** button. Select **Use [USB Security Key] to Login** under **Function mode**. Select the **Data position** (SD card or USB disk). Click **OK** and select an appropriate shape and label for the Function Key. Pressing the Function Key on the HMI during runtime will log-in the designated user account on the USB flash drive or SD card connected to the HMI.
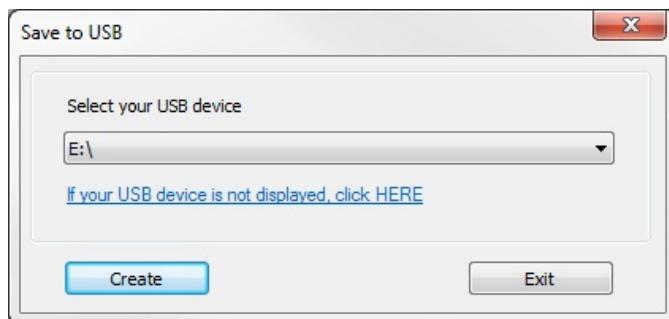
☞ This option is not supported in the RMI5010.

e-Mail SMTP Server Settings
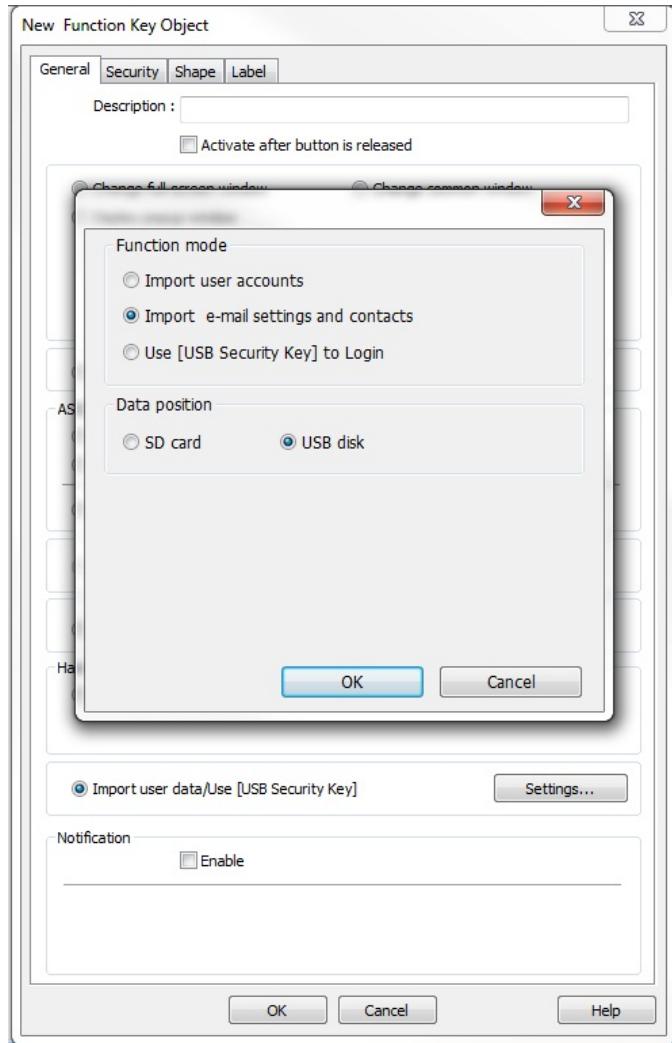
Selecting **e-Mail SMTP Server Settings** allows the e-Mail server settings to be changed in the HMI during runtime without having to change the project in EZwarePlus and download it to the HMI. Enter the SMTP Server settings that you want to import into the HMI.

Select **Save to USB** to save the e-Mail SMTP Server Settings data to the USB flash drive or SD card. Navigate to the USB flash drive or SD card connected to your PC and click **Create**.

To update the HMI, you must have a Function Key configured to **Import e-mail settings and contacts**.

In the Function Key object's properties, select **Import user data/Use [USB Security Key]** and click the **Settings** button. Select **Import e-Mail settings and contacts** under **Function mode**. Select the **Data position** (SD card or USB disk). Click **OK** and select an appropriate shape and label for the Function Key. Pressing the Function Key on the HMI during runtime will import the new e-mail SMTP settings to the HMI.

📝 This option is not supported in the RMI5010.

e-Mail Contacts

Selecting **e-Mail Contacts** allows the e-Mail contacts in the HMI to be changed without having to change the project in EZwarePlus and download it to the HMI.

Click the **Add** button to add a **Contact Name** and Mail Address to the list of contacts. Up to 256 contacts can be created.

Select the **No. of groups** to use for the assigned e-Mail recipients. Up to 16 groups can be created.
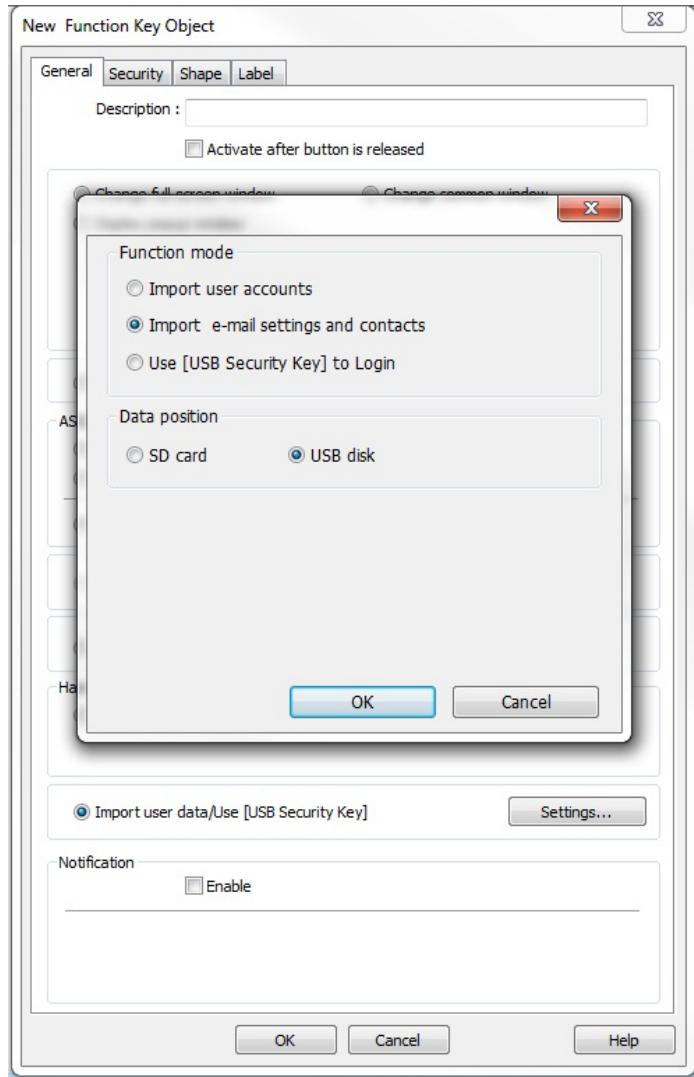
Select a group under **Current group** to add contacts to the group. Select the contact under **Contacts** and click the right-arrow button to add that contact to the selected group.

Click the **Export** button to save the e-Mail Contacts in a CSV file. Click the **Import** button to import a list of e-Mail Contacts from a CSV file.

Select **Save to USB** to save the e-Mail Contact data to the USB flash drive or SD card. Navigate to the USB flash drive or SD card connected to your PC and click **Create**.

To update the HMI, you must have a Function Key configured to **Import e-mail settings and contacts**.

In the Function Key object's properties, select **Import user data/Use [USB Security Key]** and click the **Settings** button. Select **Import e-mail settings and contacts** under **Function mode**. Select the **Data position** (SD card or USB disk). Click **OK** and select an appropriate shape and label for the Function Key. Pressing the Function Key on the HMI during runtime will import the new e-mail contacts to the HMI.

✍ This option is not supported in the RMI5010

Chapter 16 – Recipes
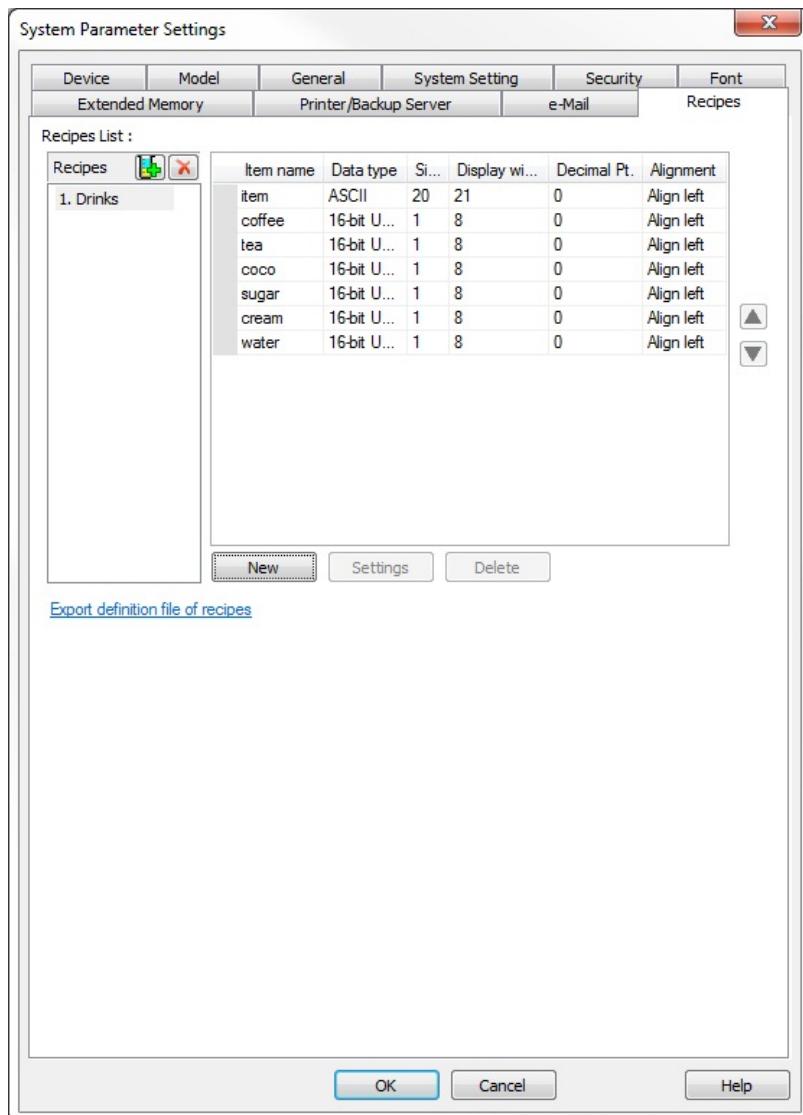
EZwarePlus supports creating and using recipes in the HMI5000P/L and RMI Series. EZwarePlus supports the RW/RW_A mechanism from the EZware5000 software. This allows projects created in EasyBuilder-5000 to be opened in EZwarePlus without having to modify the recipe structure.

EZwarePlus also supports a new method of creating and using recipes, which stores the recipe data in the EMTP/EXOB file itself or creates a separate recipe database file that can be uploaded or downloaded to the HMI using the Utility Manager.

This chapter will focus on the new method of creating and using recipes. Please refer to the EZwarePlus Help file for information on creating and using recipes with the RW memory in the HMI and the Recipe/Extended Memory Editor (*Help > Help Topics > How Do I…Use Recipes?*).

Creating a Recipe

Recipes are created in the Recipes tab of the System Parameters in EZwarePlus (**Edit > System Parameters > Recipes** tab).

Click the "Add new recipe" button ![icon] to create a new recipe in the Recipes list.

Click the **New** button to add an item to the recipe. An item represents an ingredient or variable in the recipe that may change from one recipe record to another. Each item has the following parameters that can be configured independently.

Item name: This is the name that appears at the top of the column in the Recipe View that describes the particular ingredient or variable for each item in the recipe. Usually, this is alphanumeric.

Data type: If the data in the column is alphanumeric, choose ASCII as the data type. If the data is numerical, you can select from a variety of numeric formats (16-bit signed or unsigned, 32-bit signed or unsigned, 32-bit float, etc.).

Size: Choose how many characters wide the column requires.
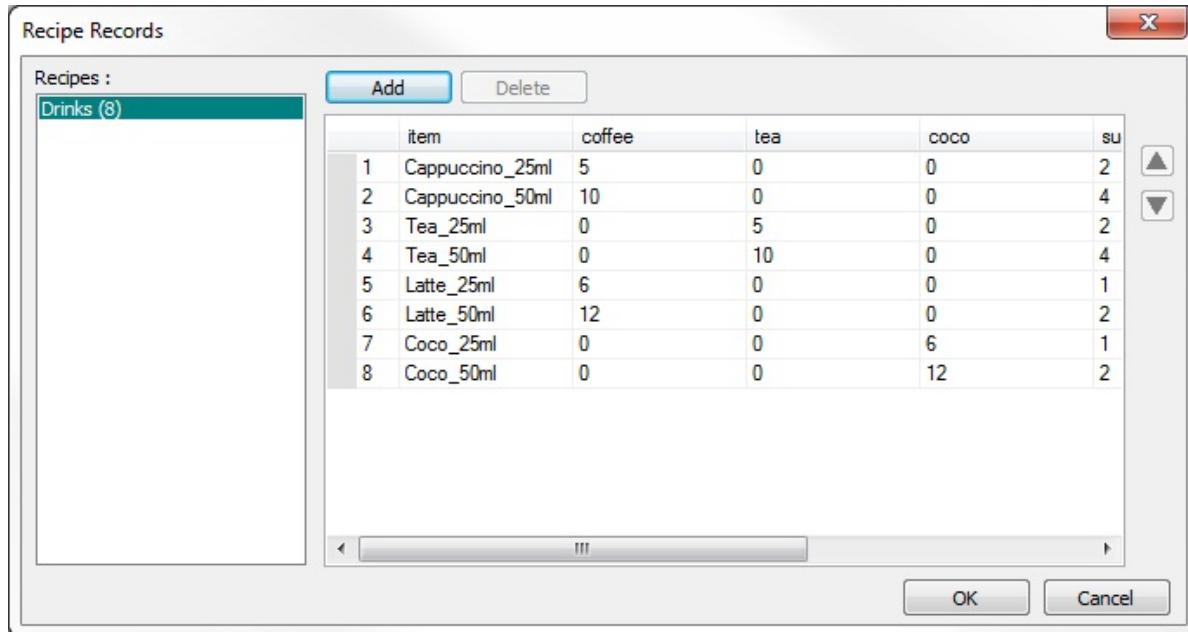
Decimal Pt.: Determines how many digits to the right of the decimal point is displayed.

Alignment: Align left, center, or right.

Once the recipe format has been configured, you can select **Export definition file of recipes** to save the recipe format in a recipe definition file (*.rdef). This is imported by the **Recipe Database Editor** for editing recipes and saving as a recipe database file (*.db) (see "Adding and Editing Data in a Recipe in the Recipe Database Editor" below). Otherwise, the recipe can be edited using the **Recipe Records** Library, which reads the recipe formats directly from the System Parameters > Recipes tab.

Adding and Editing Data in a Recipe in EZwarePlus

Open the Recipe Records Library (Library > Recipe Records) to edit the recipe data in EZwarePlus.
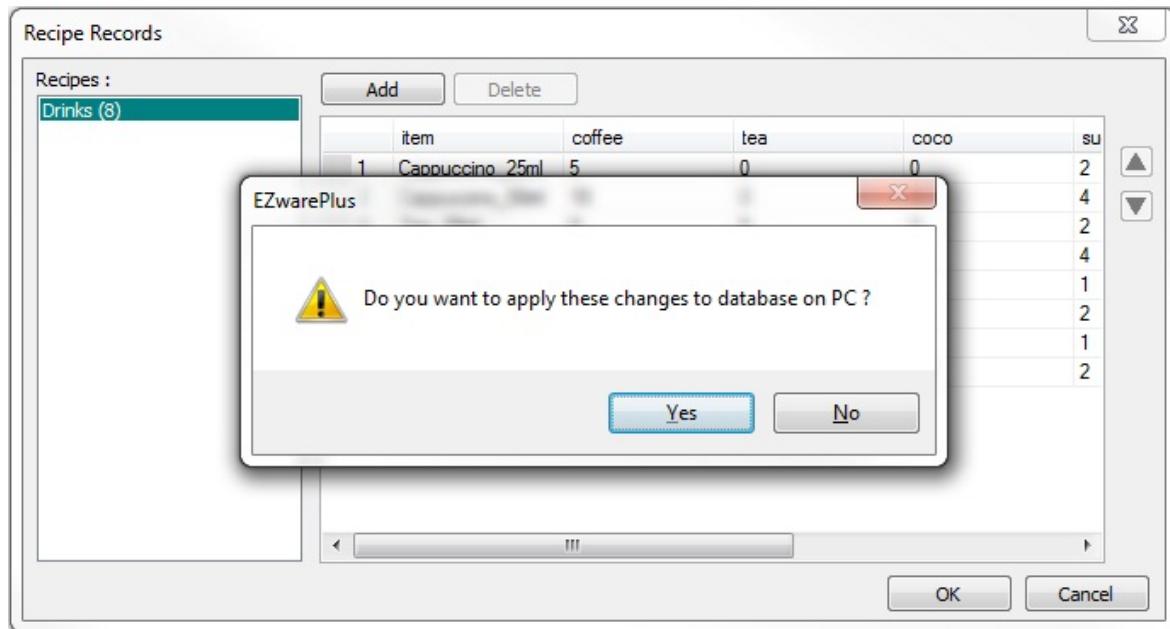
The recipe formats that were created in the System Parameters > Recipes tab will appear in the **Recipes** list on the left side of the **Recipe Records** dialog. Select a recipe in the **Recipes** list to edit the data. The Item names that were created for the recipe in the System Parameters appear along the top of the Recipe Records dialog.

Click the **Add** button to add records to the recipe. Enter the data for each column. In this example, the first column is the name of the recipe record and subsequent columns represent the ingredients used, with the data entered representing the amount of each ingredient.
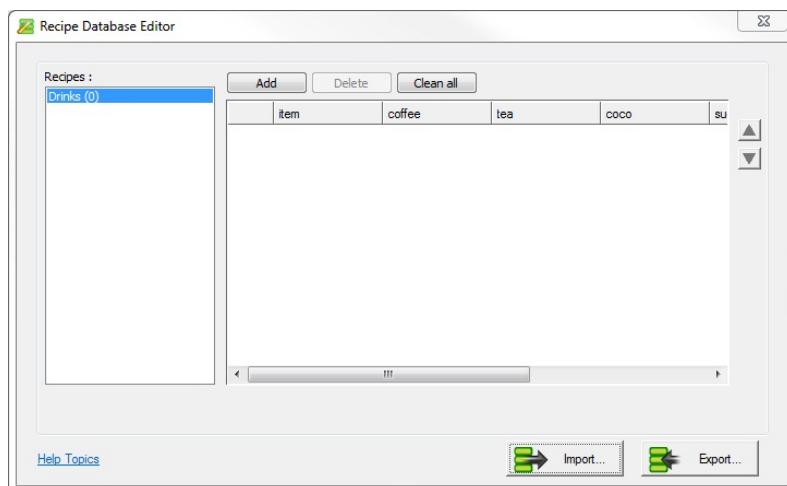
You can use the up/down arrow buttons to move a selected recipe record up and down in the list. When all the recipe records have been created and the data entered, click the **OK** button to close the Recipe Records dialog.

When changes have been made, a popup window will ask if you want to apply the changes to the recipe database. If you select **Yes**, the recipe database file will be updated with the changes. This is stored as *recipe.db* in the EZPlus > HMI_memory > Recipe folder. If you select **No**, the database file will not be updated but the data is stored in the MTP file (and the XOB file when compiled).
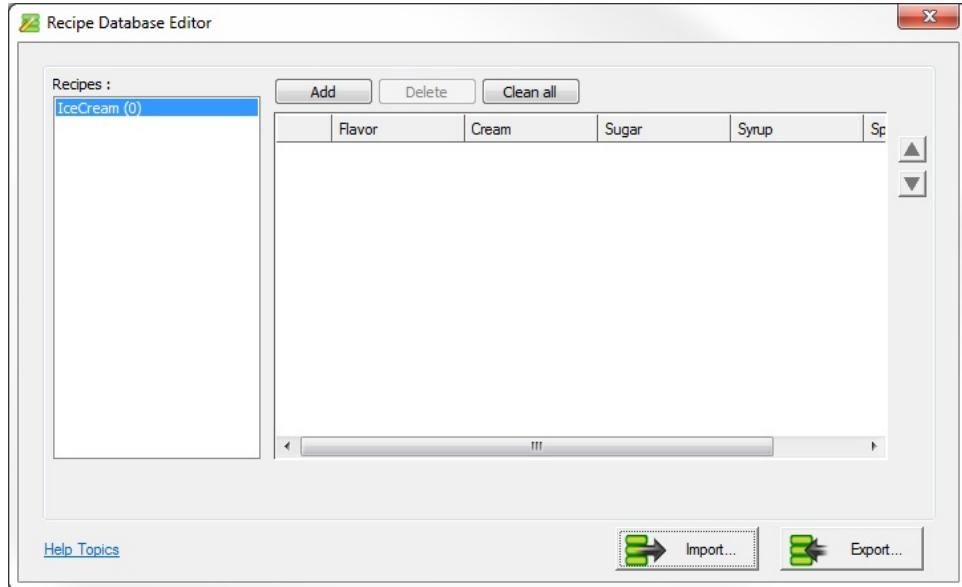
Adding and Editing Data in a Recipe in the Recipe Database Editor

The Recipe Database Editor can be used to enter data in a recipe. To open the Recipe Database Editor, click on the **Tools** menu in EZwarePlus and select **Recipe Database Editor**.

Click the **Import** button to import a recipe definition file (*.rdef saved from the *System Parameters > Recipes* tab) or a recipe database file (*.db).

The recipe definition file contains the structure of the recipe, but no recipe data. The Item names that were created for the recipe in the *System Parameters > Recipes* tab appear along the top of the Recipe Database Editor.

The recipe database file contains both the structure and the data. This file is created when the project is run in the Online or Offline Simulator. The file is located in the HMI_memory > recipe folder (C:\MapleSystems\EZPlus\HMI_memory\recipe). The *.db file can also be uploaded from the HMI using the Utility Manager (see "Chapter 6 – Using EZwarePlus" for information on the Utility Manager).

Click the **Add** button to add records to the recipe. Enter the data for each column. In this example, the first column is the name of the recipe record and subsequent columns represent the ingredients used, with the data entered representing the amount of each ingredient.

You can use the up/down arrow buttons to move a selected recipe record up and down in the list. When all the recipe records have been created and the data entered, click the **Export** button to save the recipe database file (*.db).

If a recipe database file has already been created (for example, by saving it from the Recipe Records dialog), it can be opened in the Recipe Database Editor, edited, and saved.

Important: Once the data has been edited in the Recipe Database Editor and saved to the database file, you must download the database file (*.db) to the HMI using Utility Manager. The database file is not included in the XOB file that is downloaded to the HMI and any changes are not reflected in the Recipe Records Library.
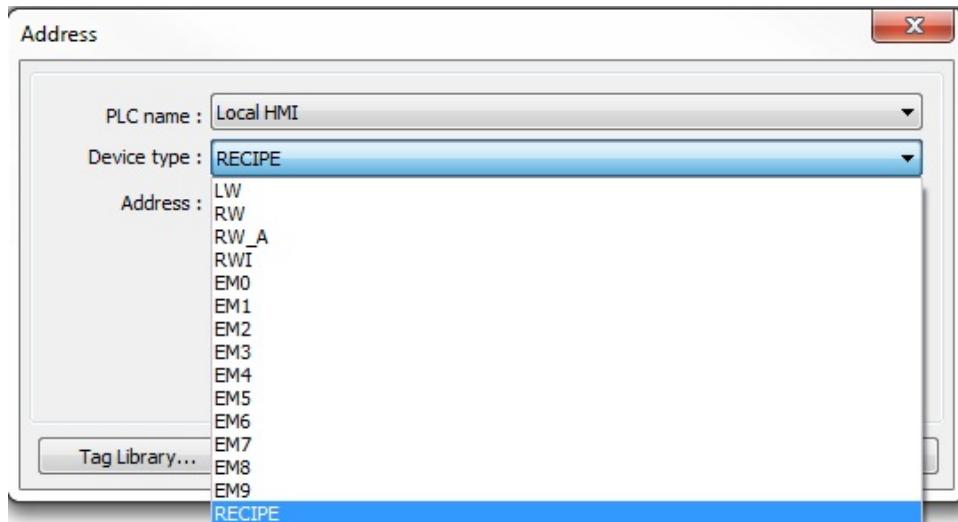
Adding and Editing Data in the Recipe Database File in the HMI

You can view the recipe data on the HMI screen using the **Recipe View** object. You cannot edit the recipe data in the **Recipe View** object directly. However, you can select individual recipe records within the Recipe View and display and edit the data using Numeric and ASCII Input objects.
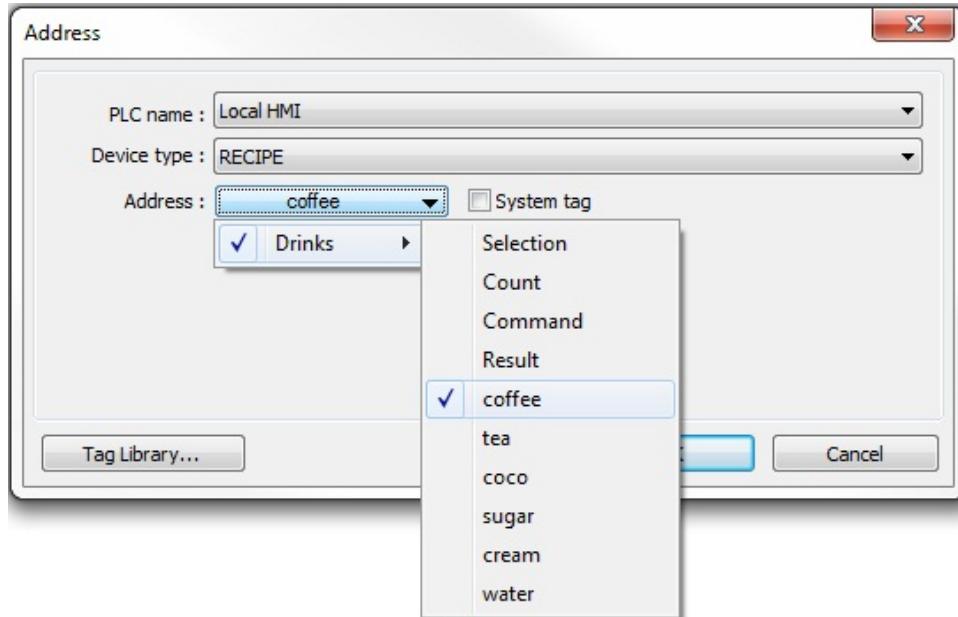
Create a new Numeric Input or ASCII Input object and select **Recipe** for the **Device type**.

🖅 A recipe must be created in the *System Parameters > Recipes* tab for the **Recipe** Device type to be available.

Select the individual item in the Address field. If the item is ASCII, it will only be available in the ASCII Input object. If the item is numeric, it will only be available in the Numeric Input object.

When a recipe record is selected (highlighted) in the Recipe View object on the HMI or when running the Simulator, the data for the selected recipe record will appear in the various ASCII and Numeric Input objects on the screen.

There are four additional choices in the Address field for the Recipe Device type in a Numeric Input object.

Selection: This displays the zero-based index of the selected record. Writing a value into this field will set the Recipe View to that record.
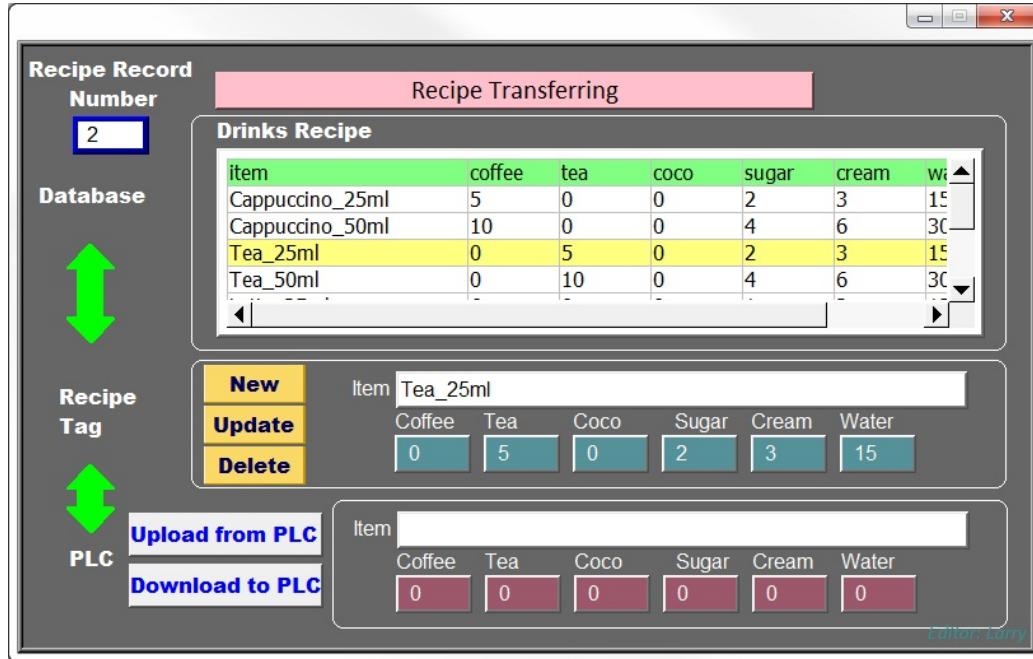
Count: Displays the number of records in the selected recipe.

Command: Performs an action on the recipe based on the value entered.

1. Add a new record. The selected record is duplicated and added to the end of the list where it can be edited.
2. Update the selected record with new data.
3. Delete the selected record.

Result: Displays the result of the action performed with the Command field.

1. Success
2. The selected record does not exist.
3. Unknown command.
4. The recipe has reached the limit of 10,000 records. No new records can be added.
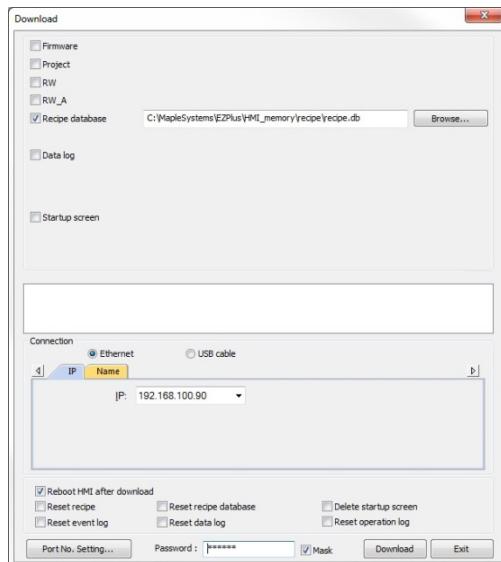
In this example, the selected record is highlighted in yellow (Tea_25ml). The **Recipe Record Number** in the upper-left corner is displaying the index number of the selected record in the list, counting from "0." Entering a different number in this Numeric Input will cause the corresponding recipe record to be highlighted.

The **Recipe Tag** section displays the selected record's name with an ASCII Input object and the item data with Numeric Input objects.

Clicking the **New** button writes a "1" to the Recipe Command register and creates a new recipe record at the end of the list. When data is changed in the selected record using the Numeric Input objects, clicking the **Update** button writes a "2" to the Recipe Command register and updates the recipe database file in the HMI and updates the Recipe View. Clicking the **Delete** button writes a "3" to the Recipe Command register and deletes the selected record.

Upload/Download Recipe Data Using Utility Manager

The recipe data can be uploaded from and downloaded to the HMI using the Utility Manager.

Import/Export Recipe Data Using CSV Files

The **Recipe Import/Export** object along with the File Browser object can be used to create a convenient way of loading and retrieving recipe data.

Create a **Recipe Import/Export** object (**Objects** menu > **Recipe Import/Export**). Click **New**.

1. **File Position:** select where the CSV file will reside, the SD or USB device.
2. **Control Address:** specify a register to control the import/export.
3. **File Name Address:** select a starting address and size for a string containing the name and path of the CSV file. Check the **Include Folder Path** box to have the file name *and* path in the same string. Otherwise, specify the string locations and sizes for the name and path.

Create a **File Browser** object (**Objects** menu > **File Browser**).

1. If using **Include Folder Path** above, check the **Full (folder + file name) address** box, and set the address and size to the same as the Import/Export object. Otherwise, check the **Folder path address** and **File name address** boxes, and set the addresses as specified for the Import/Export object above.
2. On the **Outline** tab, set the **File Position** to the same SD or USB as the Import/Export object.
3. Set the **File Type** to CSV.

Create Control buttons.

1. Create ASCII objects for each address used in the File Browser, for the file name and/or path.
2. Create Set Word objects, addressed to the Import/Export Object's Control Address.
   Write a 1 to import a file;
   Write a 2 to export a file without overwriting;
   Write a 3 to export a file and allow overwriting.
3. Monitor [Control Address+1] for the status: 0=idle, 1=busy.
4. Monitor [Control Address+2] for the result: 1= success; any other value is an error. Please refer to EZwarePlus Help for a list of error codes.

CSV File Format

The first line of the file must contain the field names as defined in the Recipe. The remaining lines contain the data, where each line is a single record. The HMI will import data formatted with each item contained within double-quotation marks (space between each field), or without double-quotation marks (no space).

With double-quotation marks and space:
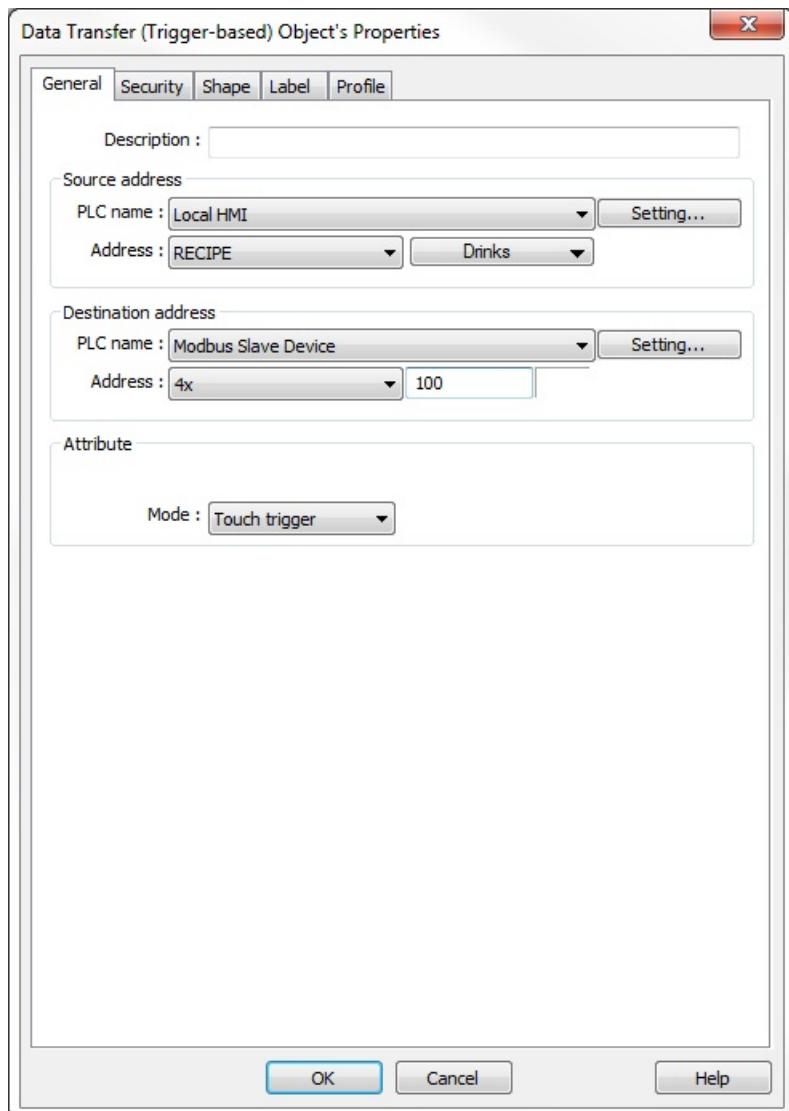
"item", "coffee", "tea", "coco", "sugar", "cream", "water"
"Cappuccino_25ml", "5", "0", "0", "2", "3", "15"
"Cappuccino_50ml", "10", "0", "0", "4", "6", "30"
"Tea_25ml", "0", "5", "0", "2", "3", "15"
"Tea_50ml", "0", "10", "0", "4", "6", "30"
"Latte_25ml", "6", "0", "0", "1", "2", "15"
"Latte_50ml", "12", "0", "0", "2", "4", "30"
"Coco_25ml", "0", "0", "6", "1", "2", "15"
"Coco_50ml", "0", "0", "12", "2", "4", "30"

Without double-quotation marks and no space:

item,coffee,tea,coco,sugar,cream,water
Cappuccino_25ml,5,0,0,2,3,15
Cappuccino_50ml,10,0,0,4,6,30
Tea_25ml,0,5,0,2,3,15
Tea_50ml,0,10,0,4,6,30
Latte_25ml,6,0,0,1,2,15
Latte_50ml,12,0,0,2,4,30
Coco_25ml,0,0,6,1,2,15
Coco_50ml,0,0,12,2,4,30

Upload / Download Recipe Data To/From the PLC

The **Upload from PLC** and **Download to PLC** buttons are Data Transfer (Trigger-based) objects that transfer the recipe data to and from the PLC. For **Download to PLC**, select the recipe in the **Source address** and select the PLC in the **Destination address** (this is the beginning address where the recipe data will be written).

Important: When the recipe data has been edited in the Simulator, the changes are stored in the database file on the PC (EZPlus > HMI_memory > Recipe > recipe.db). This database file must be downloaded to the HMI using Utility Manager in order for the HMI to reflect the changes made in the recipe.

When the recipe data is edited in the HMI, the changes are stored in the database file in the HMI. The database file must be uploaded from the HMI using Utility Manager and stored in the Recipe folder on the PC in order for the EZwarePlus project to reflect the changes made in the recipe. The changes are reflected in the Recipe View object when running the Simulator but not in the Recipe Records Library.
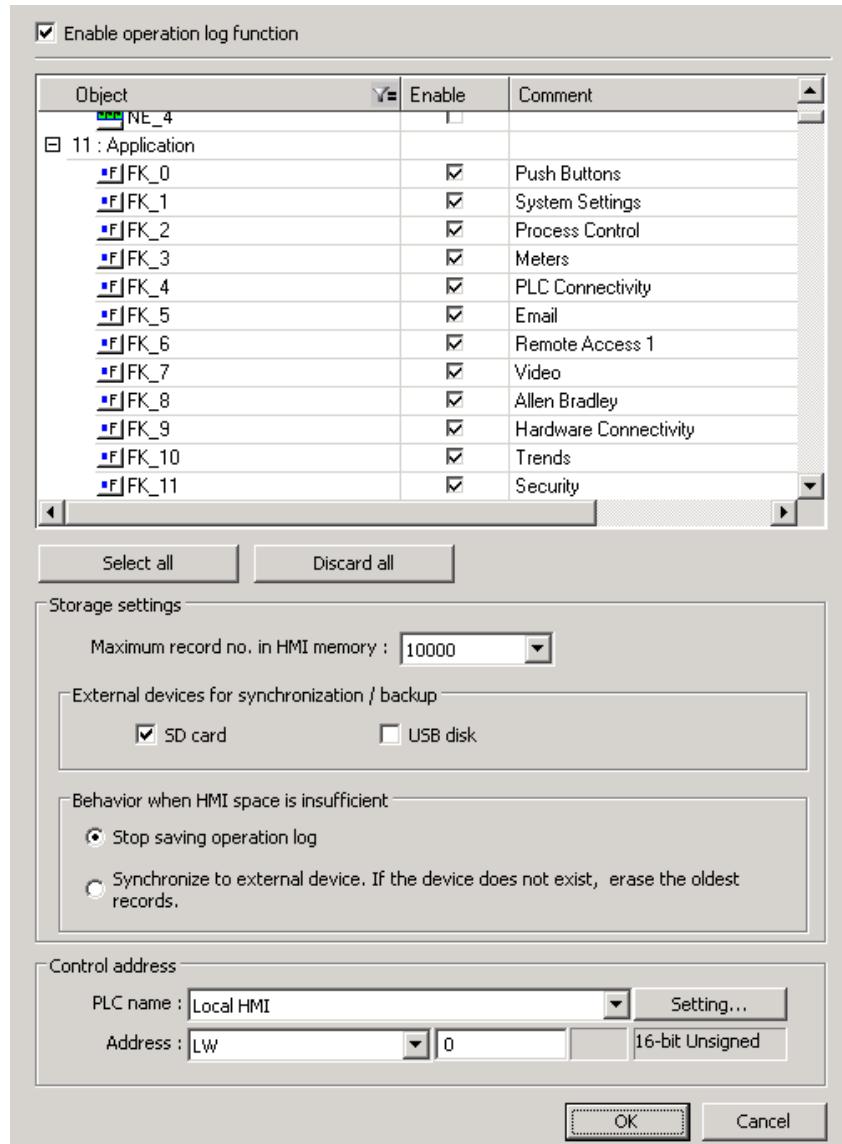
Chapter 17 – Operation Log

The Operation Log is a mechanism that records operator actions to an SQLite database file. Only user-triggered actions can be logged, such as a Set Bit, Function Key, Numeric Input, etc. The Operation Log consists of two parts – Configuration and View.

🖅 The RMI Series does not support the Operation Log.

Configuration Settings

Click the 🔧 button or, from the Objects menu, select Operation Log, Operation Log Settings.

The text in the Comment column is recorded in the log, along with date/time, value, and certain other information. The Comment text is the same text as that which appears as the Comment in the object's Properties dialog.

1. Check the **Enable Operation Log Function** checkbox. The object list displays all objects available for recording in the Operation log. Use the filter button [Y≡] to select the type of object(s) that appear in the list.

2. Check the **Enable** box for each object to be recorded. Click the **Select All / Discard All** buttons to select or deselect all objects shown in the list.

3. Use the **Storage Settings** section to determine how much data is stored in HMI internal memory, and when to archive data to an SD or USB device.

Maximum Record No. in HMI Memory	Select the maximum number of records to store in HMI memory. This memory is shared with Data Sampling and Alarm/Event logging. This is *not* the maximum amount of data to log.
External Devices for Synchronization/Backup	Select whether to archive to an SD or USB device.
Behavior when HMI Space is Insufficient	*Stop Saving Operation Log*: No more data is saved, and no archiving is done.
	Synchronize to External Device: The data is archived to the SD or USB device. If previous data exists on the SD/USB device, the new data is merged with the existing data. If there is sufficient storage space in the HMI, half of the data in the log is erased to make room for more data. If there is insufficient storage space in the HMI, all of the data in the log is erased.
	Note: If the specified SD or USB device does not exist, old data is erased from the log to make room for new data.
Control Address	Specifies the first of two addresses that allow commands to be sent to the Operation Log:
	[Specified Address] : Command
	1 – Clear all records 2 – Copy all records to the USB device 3 - Copy all records to the SD device. 4 - Copy all records to the USB device, and clear all records from the log. 5 - Copy all records to the SD device, and clear all records from the log.
	[Specified Address + 1] : Result
	0 – Processing the command 1 – Command Successful 2- The device does not exist 3 -The records does not exist 4 – Unknown error.
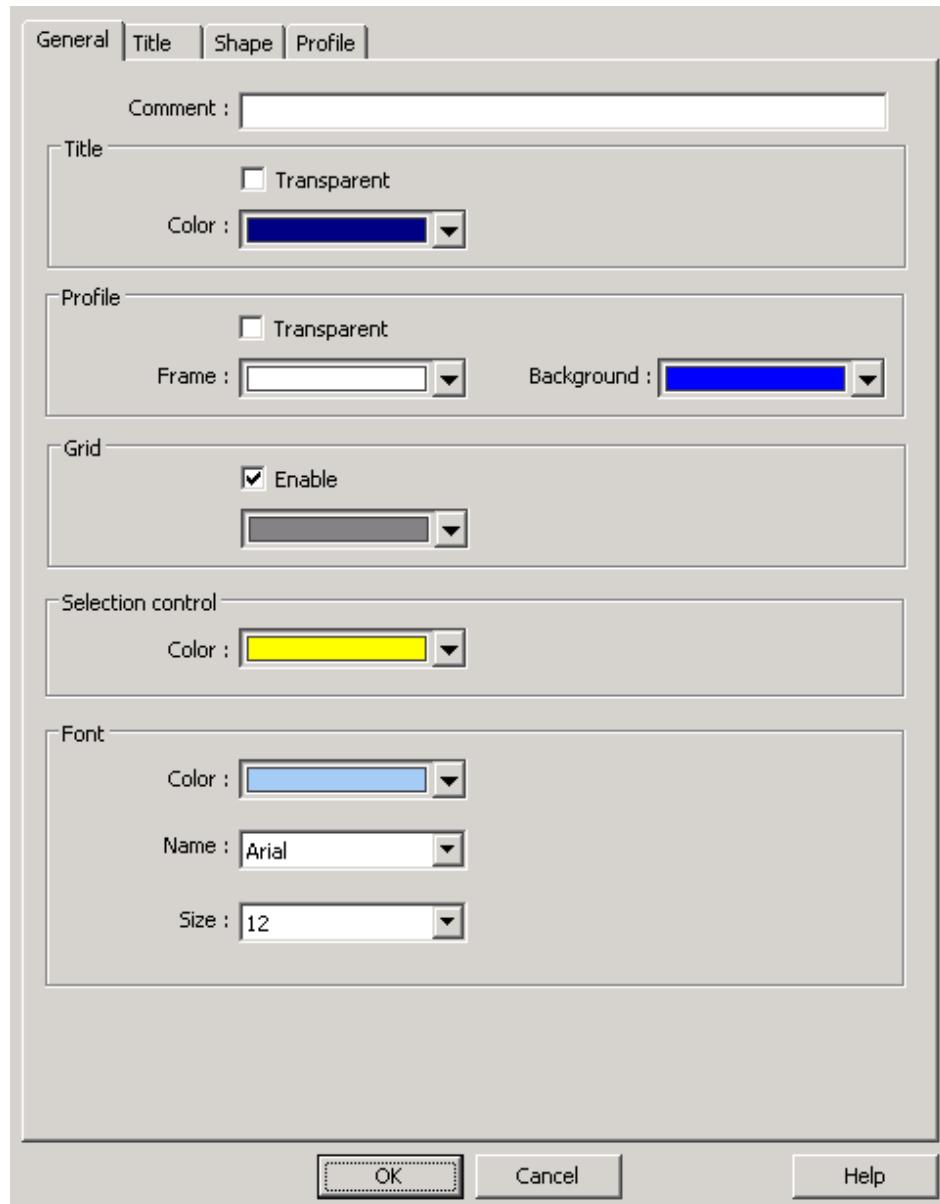
View Settings

The Operation Log View displays data recorded by the Operation Log object in a spreadsheet-like format. The Operation Log View will display data from the current database file, plus any data archived to the SD or USB device. Click the 🔣 button or, from the Objects menu, select Operation Log, Operation Log View.

General Tab

The General tab sets up the basic appearance of the Operation Log View.
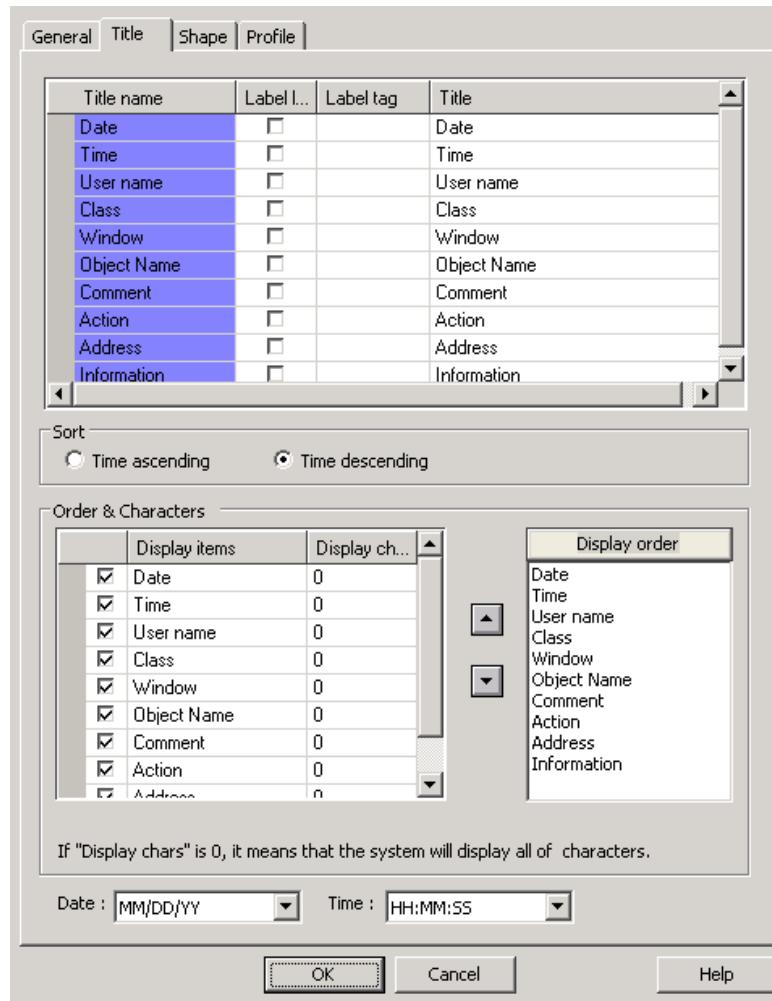
1. **Comment**: Enter a text description of the object (optional).

2. **Title**: Specify how the title of the object is to appear. The title is the header that appears above each column in the view. Click the Transparent checkbox to have the background of the title be the same as the color of the window. If the Transparent box is unchecked, select a background color for the title. The foreground color of the title text is the same as that selected for the data.

3. **Profile**: Specify the background color of the view. If the Transparent box is checked, the background color is the same as the color of the window. If the Transparent box is unchecked, select a background color for the view

4. **Grid**: Check the Enable box to display gridlines on the view. If checked, specify a color for the gridlines.

5. **Selection Control**: Specify a highlight color for the selected row.

6. **Font**: Specify a Color, Style, and Size for the font used in the view. The title row and data rows all use the same font.

Title Tab

The Title tab sets up which fields are displayed in the Operation Log View.

1. In the top section, enter the text to display in the Title row for each field. The default text is the field name. If a label database exists in the EZware project, the Label Library checkbox may be checked and a Label Tag may be selected. The Label Library and Label Tag columns are visible only if a label database exists in the EZwarePlus project.

2. **Sort**: Select whether the view is to sort the data in Ascending or Descending chronological order.

3. **Order & Characters**: Specify which database fields are to be displayed, the character length of each field, and the order in which to display the contents of each field. In the Display Order box, click on a field name and use the up/down buttons to change its position. The field at the top of the list is displayed left-most in the view.

4. **Date/Time:** Select the format in which to display the Date and Time.

Chapter 18 – EasyDiagnoser and Easy Watch
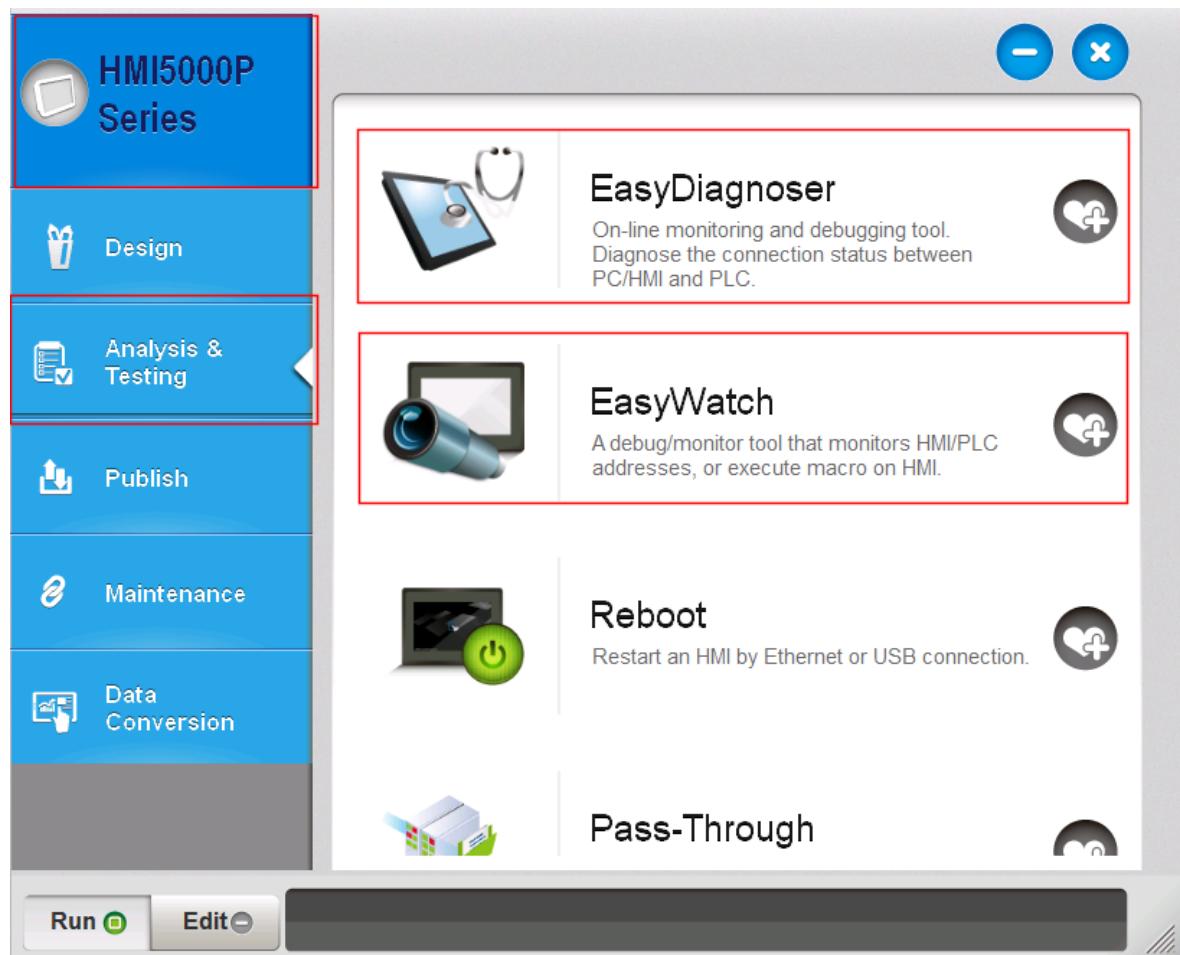
EasyDiagnoser is a diagnostic utility that monitors the read and write commands between the HMI and the PLC and indicates when an error occurs in the communication.

EasyWatch provides a method of displaying and editing registers in the HMI and PLC in a tabular format. An existing macro in an HMI can also be triggered with EasyWatch for troubleshooting and debugging purposes.

🗐 EasyDiagnoser and EasyWatch require an Ethernet connection between the PC and HMI. Therefore, these utilities are not compatible with the HMI5070NL.
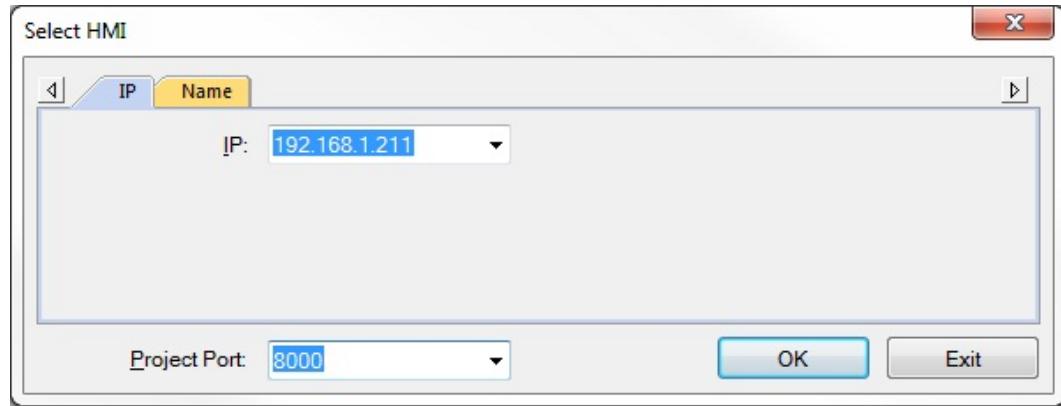
Both EasyDiagnoser and EasyWatch can be started from the Utility Manager. First select the product series from the top left corner of the dialog. Then Select **Analysis & Testing** from the menu on the left. The EasyDiagnoser and EasyWatch options will be displayed.

(Not available for the RMI5010 Series.)
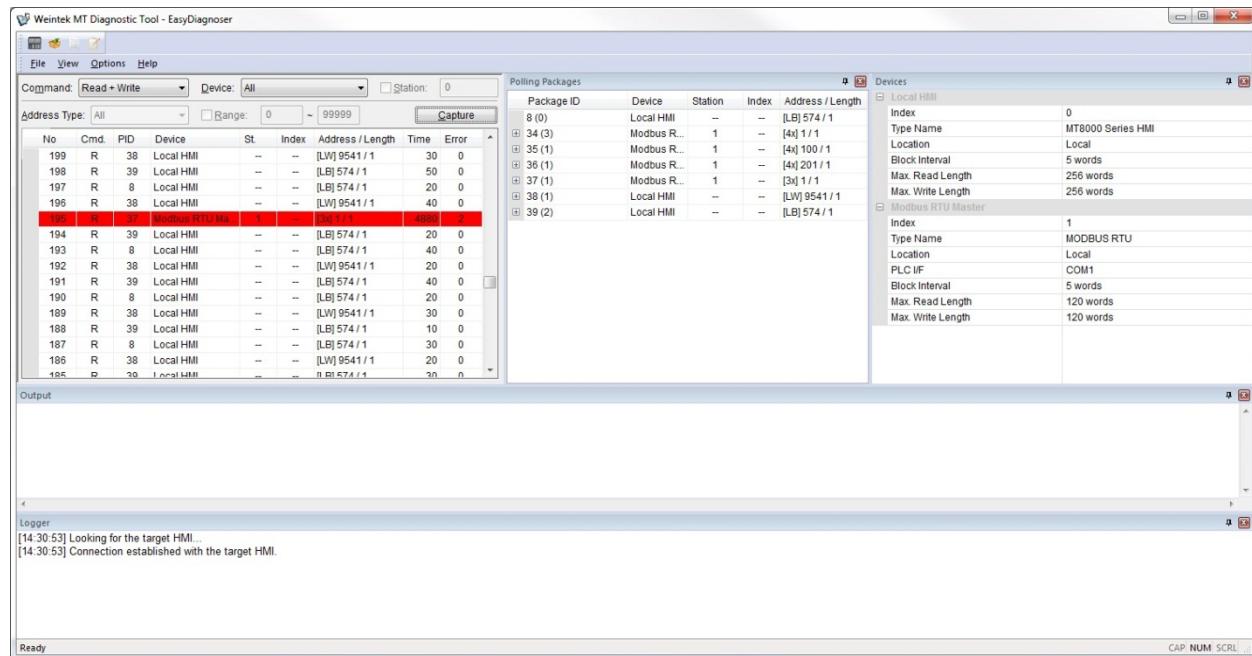
EasyDiagnoser

Enter the IP address of the HMI that you want to monitor.
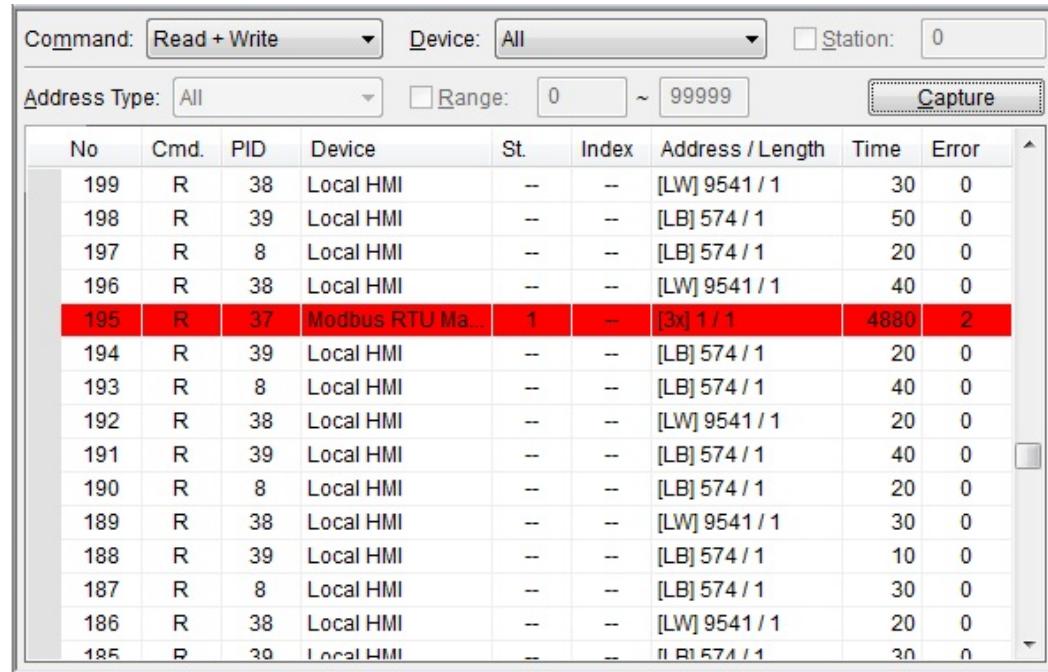
EasyDiagnoser will open and attempt to connect to the HMI through the Ethernet port on the PC. The Logger window will display "Connection established with the target HMI" when the connection is made.

Main Window

The main window in EasyDiagnoser is where you set the parameters for monitoring the communications and see the results.

To begin monitoring communications:

1. From the **Command** drop-down list, select whether to monitor Read and Write commands, Read commands only, or Write commands only. The default is Read + Write commands.

2. In the **Device** drop-down list, select which device to monitor. Local HMI will always be an option, along with the other controllers and protocols configured in the HMI project. The default is **All**.

3. If **Devic**e is set to something other than **All**, a unique Station Number can be selected. If enabled, EasyDiagnoser will monitor communications to the controller with the specified station number only.

4. Select which **Address Type** to monitor. If **All** is selected, communications to every address used in the project will be monitored. The drop-down list will present every available address type, based on the selection in the Device drop-down list. The default is **All**. This option is available only when the Device selection is something other than **All**.

5. If **Address Type** is set to something other than All, a range of addresses to monitor can be selected. If enabled, communications are monitored only for the selected Address Type and Range.

6. Click the **Capture** button to start monitoring communications. Click the **Capture** button again to stop.

Interpreting the Communication Status:
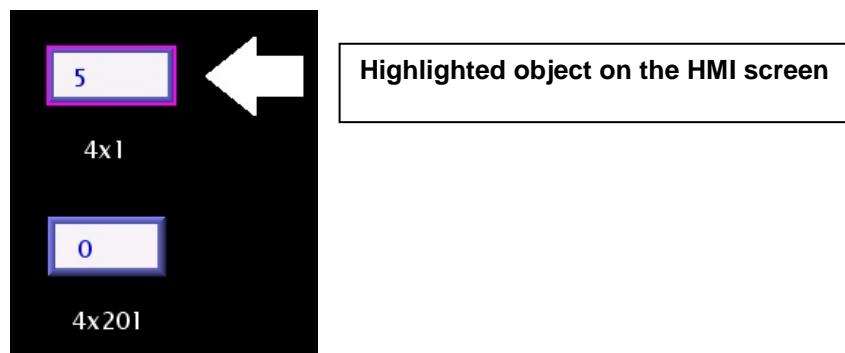
•   Each line in the table represents a data read or write command.

•   Any line in red indicates a communications error. The Error column indicates the type of error (see below).

- The **No** column is a sequential number for that read or write command.

- The **Cmd** column is R for Read, W for Write.

- The **PID** column is the Package ID number for the Polling Package containing the object's address. Look for that number in the **Package ID** column in the **Polling Packages** window to see the details for that Polling Package. Double-clicking an object in the Polling Package window will highlight the object in the HMI or simulator.

- The **St.** column represents the Station Number of the PLC that the Polling Package is associated with.

- The **Index** column represents the index of the Polling Package.

- The **Address / Length** column indicates the starting address of the Polling Package, and how many addresses are in the Polling Package.

- The **Time** column indicates how long the HMI took to respond to the request (in milliseconds).

- The **Error** column indicates if any errors occurred.
  - 0 = No Error
  - 1 = Time Out
  - 2 = Fail
  - 12 = Ignore

Polling Packages

Package ID	Device	Station	Index	Address / Length
8 (0)	Local HMI	--	--	[LB] 574 / 1
⊟ 34 (3)	Modbus R...	1	--	[4x] 1 / 1
Numeric Display		10	8	[4x] 1
Numeric Input		10	7	[4x] 1
Numeric Input		10	0	[4x] 1
⊞ 35 (1)	Modbus R...	1	--	[4x] 100 / 1
⊞ 36 (1)	Modbus R...	1	--	[4x] 201 / 1
⊞ 37 (1)	Modbus R...	1	--	[3x] 1 / 1
⊞ 38 (1)	Local HMI	--	--	[LW] 9541 / 1
⊞ 39 (2)	Local HMI	--	--	[LB] 574 / 1

The **Package ID** column lists the numbers assigned to each Polling Package. The number in parenthesis represents the number of objects contained in the Polling Package. Click on the "+" in front of the Polling Package to see the objects within it. Double-click on an object to highlight it in the HMI or Simulator.

Highlighted object on the HMI screen

The **Device** column lists which device the Polling Package is assigned to, either Local HMI or the PLC device name.

The **Station** column lists the Station Number assigned to the Device (if applicable). When the objects within a Polling Package are displayed, it shows the window number where the object is located.

The **Index** column shows the Index number assigned to the Polling Package. When the objects within a Polling Package are displayed, it shows the Object ID assigned to the individual objects by EasyDiagnoser. These can be viewed on the HMI or Simulator by selecting **Show Object ID (HMI)** under the **Options** menu.

The **Address / Length** column lists the addresses assigned to the Polling Packages and the length of each address in words.

Devices

Devices		⇩ ☒
⊟ Local HMI		
Index	0	
Type Name	MT8000 Series HMI	
Location	Local	
Block Interval	5 words	
Max. Read Length	256 words	
Max. Write Length	256 words	
⊟ Modbus RTU Master		
Index	1	
Type Name	MODBUS RTU	
Location	Local	
PLC I/F	COM1	
Block Interval	5 words	
Max. Read Length	120 words	
Max. Write Length	120 words	

Shows the devices that the HMI is communicating with, including the Local HMI.
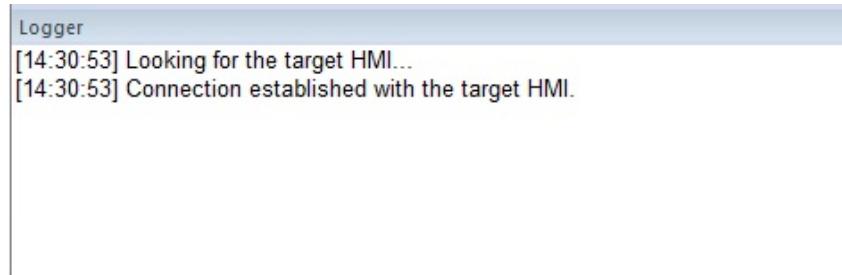
Output

Output
[ID 1, Ln 0] Value is 0
[ID 1, Ln 0] Value is 58
[ID 1, Ln 0] Value is 2547

The **Output** window displays messages generated with the macro TRACE command. The macro TRACE command uses a syntax like the *c printf* statement to display text and values in EasyDiagnoser. The macro ID number and the line in the macro where the TRACE command resides is shown in brackets. This example was generated with the following command:
TRACE ("Value is %d", value)

Logger
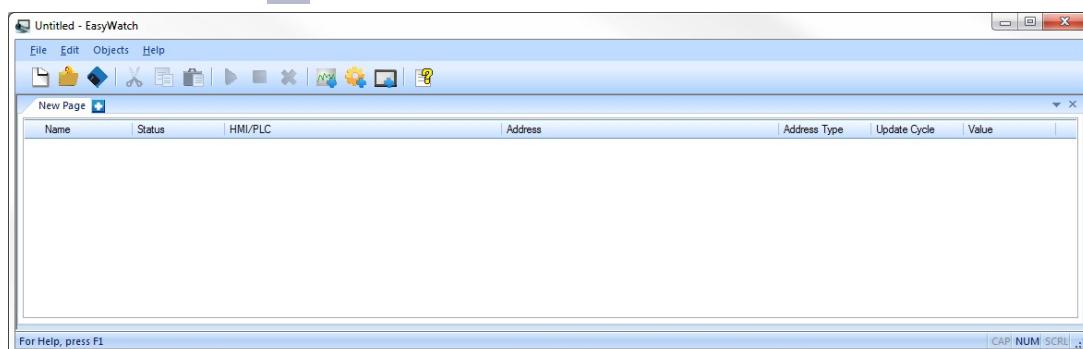
The Logger window show events that occur in EasyDiagnoser.

📝 EasyDiagnoser does not support monitoring PLCs using the tag import feature such as Siemens S7-1200 and Allen-Bradley CompactLogix/ControlLogix – Free Tags.

EasyWatch

EasyWatch is a utility that allows you to display and edit registers in the HMI and PLC in a spreadsheet-style format. It also provides a method of triggering an existing macro in the HMI for troubleshooting and debugging purposes.
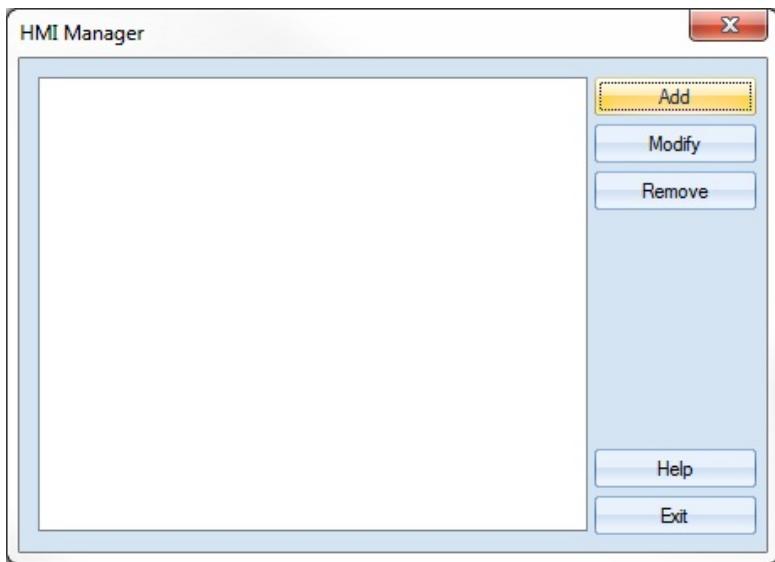
Open EasyWatch from the **Tools** menu (**Tools > EasyWatch**). You can also open it from the Project Toolbar by clicking on 🔲 EasyWatch icon.
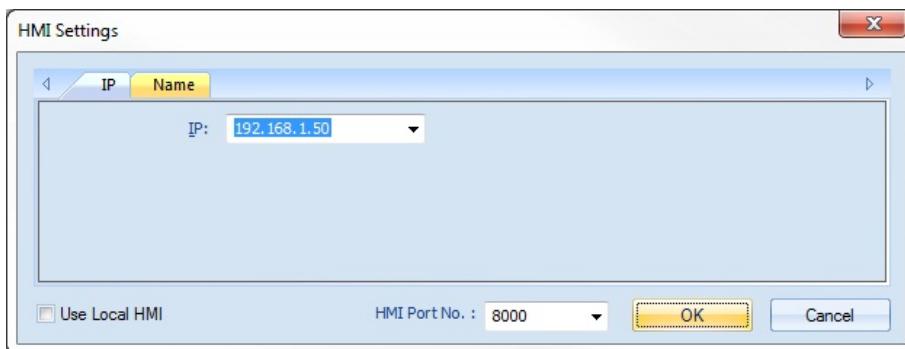
The first step in creating an EasyWatch project is to add one or more HMIs to the HMI Manager list.

To add an HMI to the project:

1. Open the HMI Manager by clicking on the **Objects** menu and selecting **HMI Manager**, or by clicking on the HMI Manager icon in the toolbar.
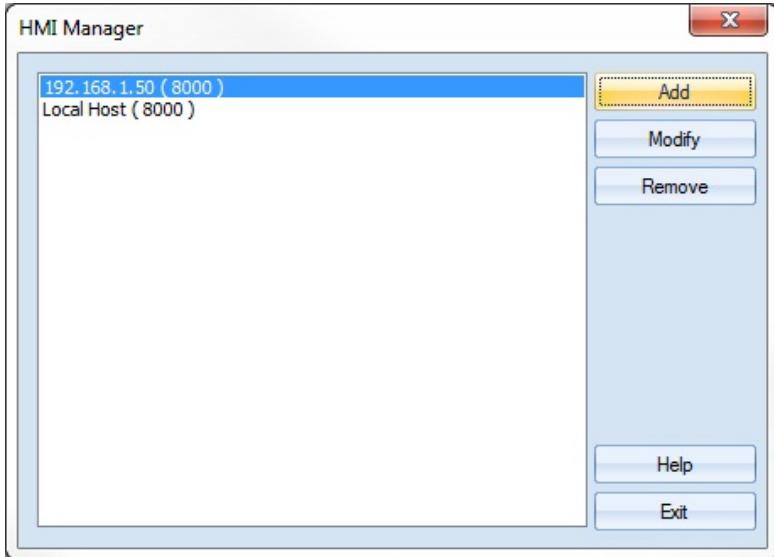
2. Click the **Add** button. Enter the IP address and Port No. of the HMI. The IP address of the HMI is configured in the System Settings window in the HMI. The Port No. is configured in the EZwarePlus project's System Parameters > Model tab.

Check **Use Local HMI** to connect to an Online or Offline Simulator running on the PC. It will appear as Local Host in the HMI Manager list. Click **OK** to add the HMI to the HMI Manager list.
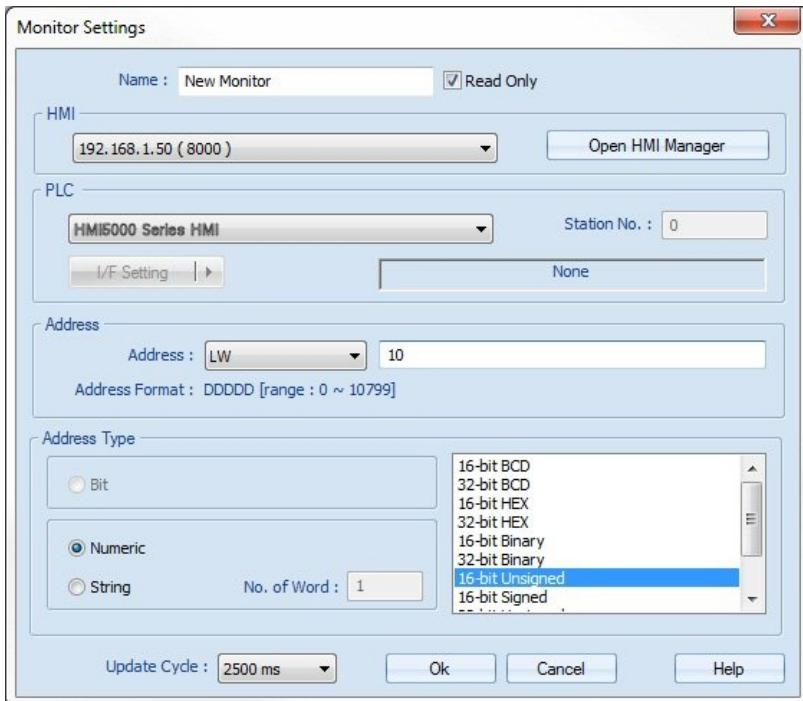
3. Repeat to add more HMIs to the list. Click **Exit** when completed.

The next step is to add address monitors in the EasyWatch window to view registers in an HMI and PLC.
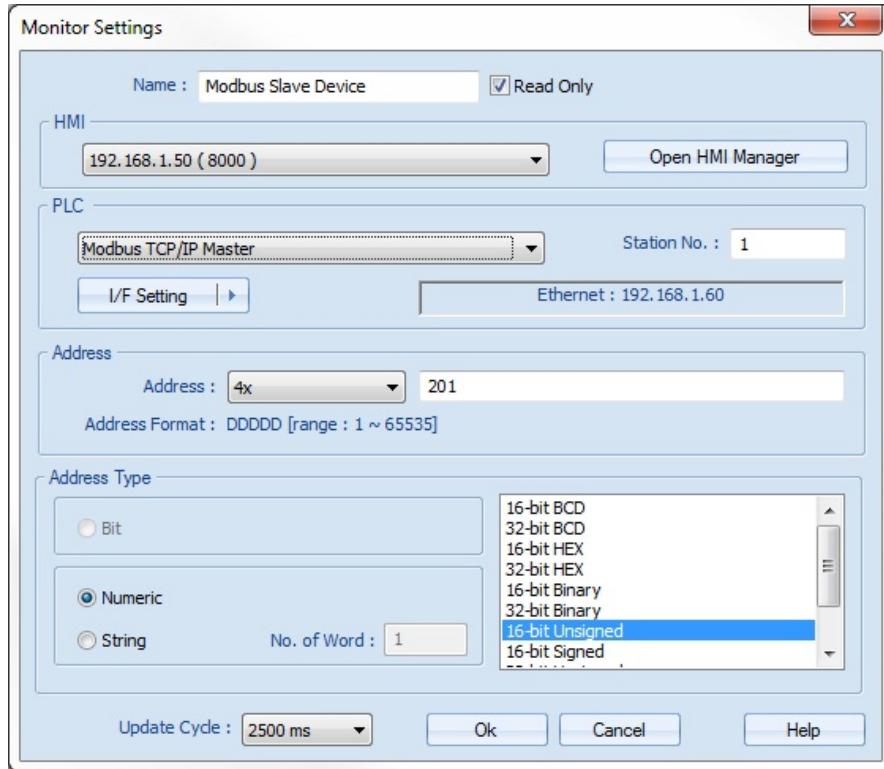
▸ *To add a Monitor object to the project*:

1. Open the Monitor Settings window by clicking on the **Objects** menu and selecting **Add Object > Add Monitor**, or by clicking on the Add New Address Monitor icon in the toolbar.

2. Enter a name for the Monitor object or use the default.
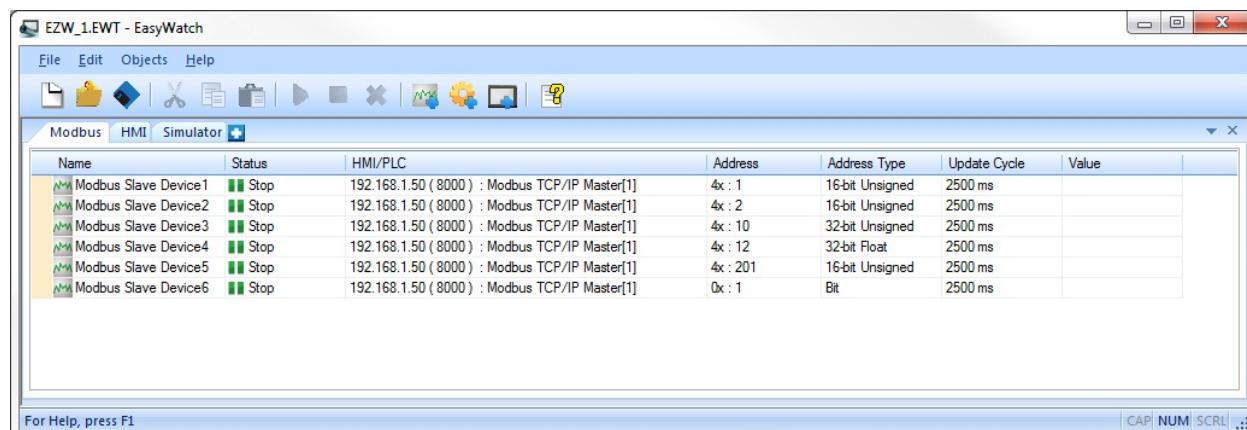
3. Uncheck the **Read only** checkbox if you want to modify the value in the register using EasyWatch.

4. Select the HMI to connect through. All of the HMIs configured in the HMI Manager are available in the drop-down list.

5. Select the PLC to monitor. If you want to monitor a register in the HMI, select **HMI5000 Series HMI**. If you want to monitor a register in a PLC connected to the HMI, select the PLC type from the drop-down list and enter the appropriate communication settings.
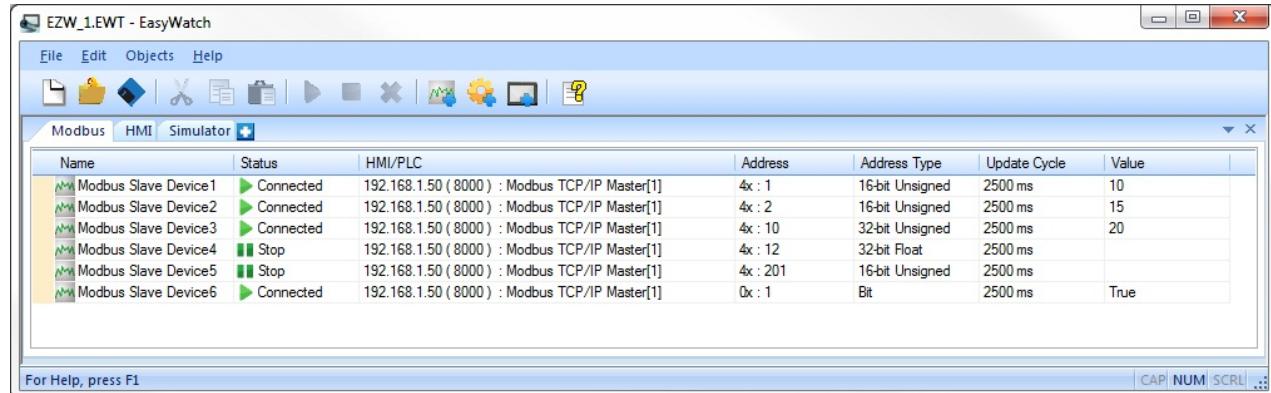
6. Select the **Address** you wish to monitor and the appropriate **Address Type**.

7. Select the **Update Cycle**. This determines how often the monitor is updated in EasyWatch, with a range from 500 ms to 5000 ms.

8. Click **OK** and repeat for each register you want to monitor.

You can create multiple pages in EasyWatch. Click the "**+**" tab at the top of EasyWatch to create additional pages. Double-click on the tab name to rename it. In this example, three pages have been created to monitor a Modbus TCP device, the local HMI, and a Simulator running on the PC.
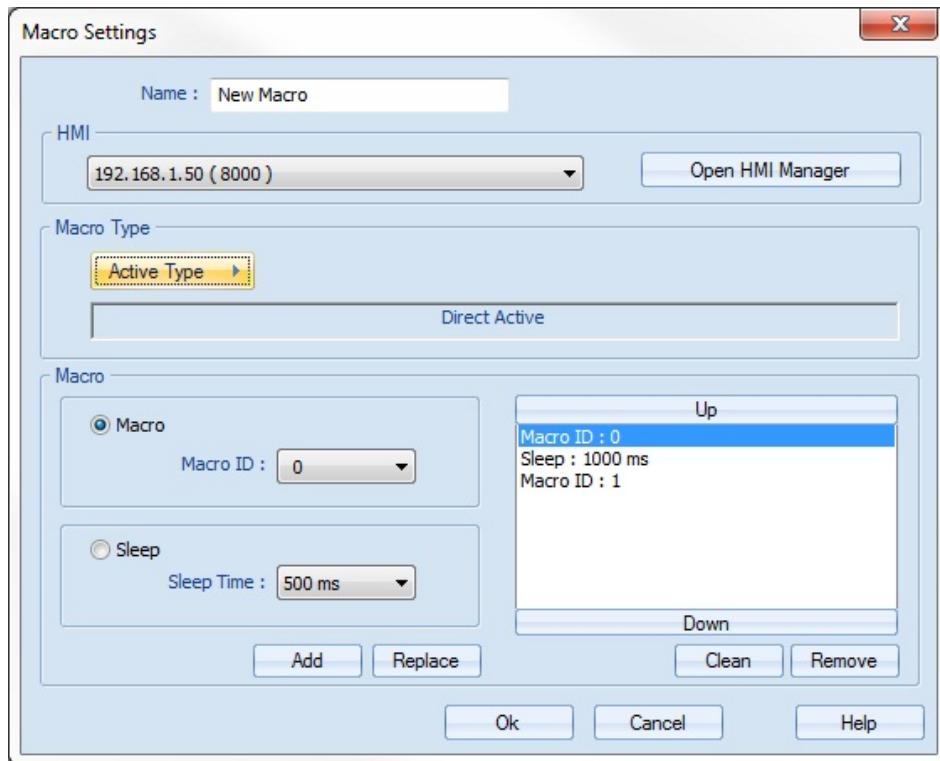
To begin monitoring data:

1. Select one or more monitor objects in the list (hold the shift key to select multiple objects) and click the **Run** button in the toolbar. The status indicator for each selected monitor object will change from **Stop** to **Connected** and the **Value** column will display a number or state.
    If the red **Address Error** is displayed under the **Status** column, check the communication settings, address syntax, and physical connection to the device.

To add a Macro object to the project:

1. Open the Macro Settings window by clicking on the **Objects** menu and selecting **Add Object > Add Macro**, or by clicking on the Add New Macro icon in the toolbar.

2. Enter a name for the Macro object or use the default.
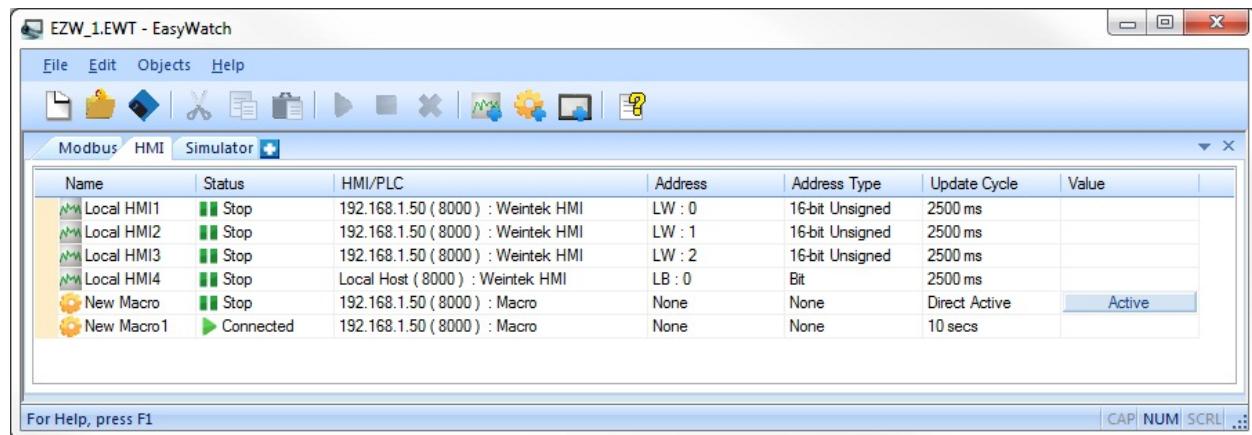
3. Select the HMI on which the macro resides.

4. Select the **Macro Type** by clicking the **Active Type** button.

    Direct Active: The selected macro object is triggered by a button in EasyWatch. An **Active** button appears in the **Value** column, which is used to trigger the macro object manually.

    Cycle Active: The selected macro object is triggered periodically. Click the **Active Type** button again to select the time period to wait before running the macro object again (range is 1 – 255 seconds).

5. Select the macro to run by selecting the **Macro ID** number. Each macro in the HMI project has a unique ID number to identify it in addition to the name of the macro. Select the **Macro ID** number and click the **Add** button to add it to the list of macros. More than one macro can be run sequentially by adding them to the list.

6. Select the **Sleep** button and **Sleep Time** to insert a delay between each macro (range 500 ms to 5000 ms).

7. Click the **Up** and **Down** buttons to move an item up and down in the list.

8. Click **OK** when finished.

9. For macro objects configured for **Cycle Active**, select the macro object and click the Run button in the toolbar to start running the macro object periodically. For macro objects configured for **Direct Active**, click the **Active** button to run the macro object once.

An EasyWatch project can be saved by clicking **File > Save As** at the top of EasyWatch. The project is saved with a *.EWT extension, which allows it to be opened again at any time.

Chapter 19 – Using the Modbus Gateway

The Modbus Gateway allows any ModbusTCP Master to request HMI data using standard Modbus commands. The HMI uses the *ModbusRTU/TCP Slave* protocol to pass Modbus requests to any non-tag-based PLC or controller connected to the HMI, or the HMIs internal storage.

⌨ Tag-based PLCs are those that use named tags instead of addresses, such Allen Bradley Compact and Control Logix , Siemens S7-1200, and BACnet.

For example, the Modbus Gateway would allow a SCADA system to obtain data from a device that is not supported by the SCADA system, but is supported by the HMI. The Modbus Gateway also allows serial-connected devices access to the SCADA system.

The Modbus Gateway support the following Modbus function codes (decimal):
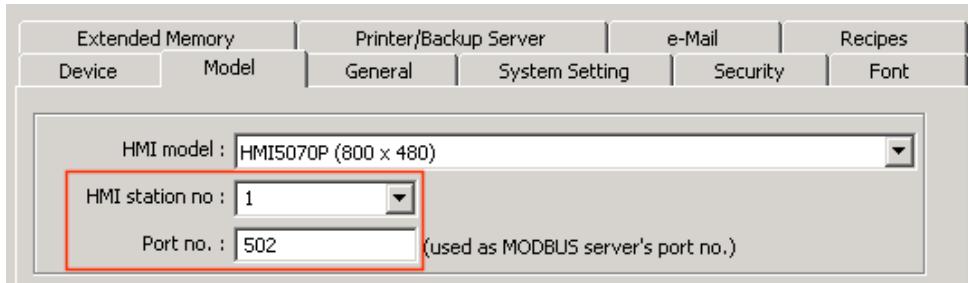
Code	Definition
1	Read Coil Status
2	Read Input Status
3	Read Holding Registers
4	Read Input Registers
5	Force Single Coil
6	Preset Single Register
15	Force Multiple Coils (LB addresses in the HMI only, not compatible with bits in a PLC)
16	Preset Multiple Registers

HMI Local Word LW-9288 indicates Modbus communication errors:

Value	Error
0	No error
1	Attempt to read/write an undefined register
2	Illegal Data Value
3	Bad Command Format
4	Attempt to write to a Read-only register
5	Attempt to read from a Write-only register
6	Timeout
7	Invalid Function Code
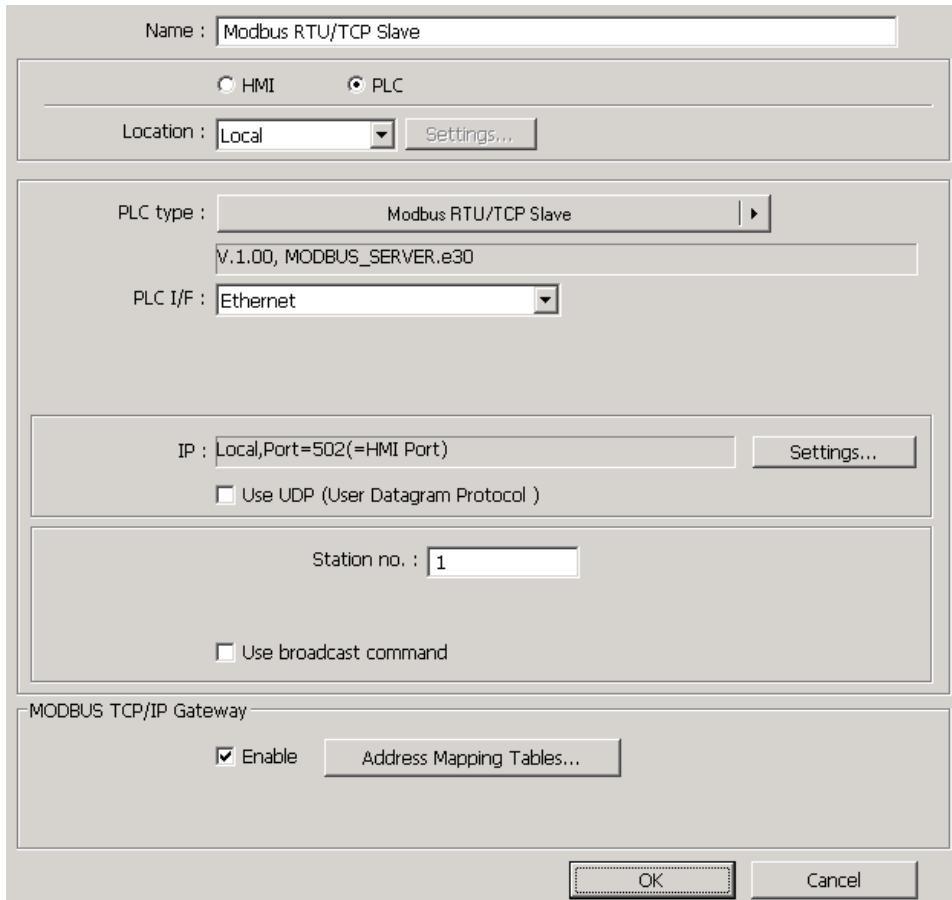
Configuring the Modbus Gateway

1. Configure the PLC to which Modbus registers will be mapped. Refer to the *System Parameter Settings* section at the end of Chapter 6.

2. On the Model tab of the System Parameter dialog, change the HMI Station Number to the Modbus Unit Number desired for the HMI.

3. Change the Port Number to the port used by the ModbusTCP Master. Typically, port 502 is used.
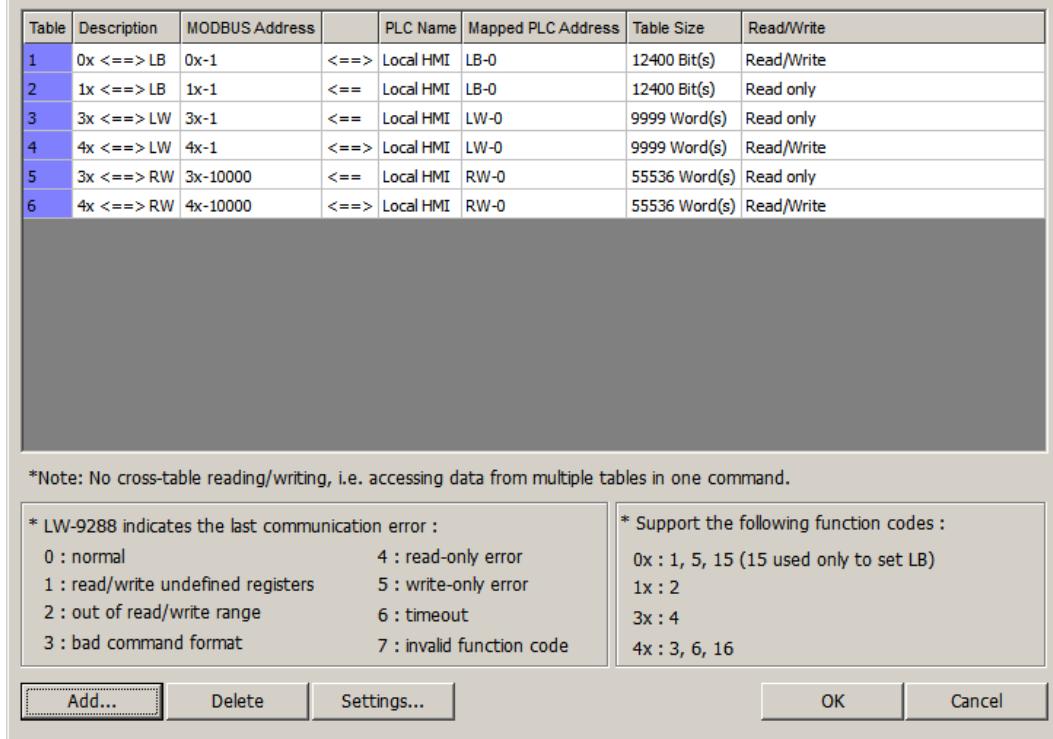
Add the Modbus RTU/TCP Slave protocol to the project, and set the **PLC I/F** to *Ethernet.* Refer to the *System Parameter Settings* section at the end of Chapter 6.

1. Check the **Enable** checkbox in the *MODBUS TCP/IP* Gateway section.
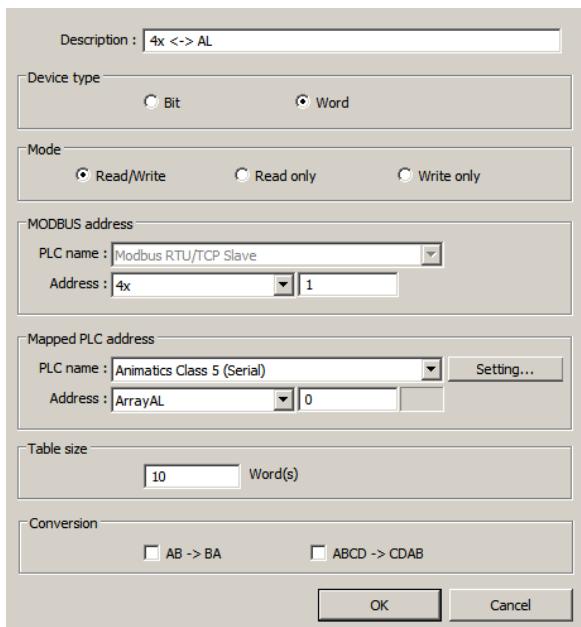
This example will show how to use the Modbus Gateway to obtain data from an Animatics Smartmotor.

1. Click the **Address Mapping Tables** button.

Table	Description	MODBUS Address		PLC Name	Mapped PLC Address	Table Size	Read/Write
1	0x <==> LB	0x-1	<==>	Local HMI	LB-0	12400 Bit(s)	Read/Write
2	1x <==> LB	1x-1	<==	Local HMI	LB-0	12400 Bit(s)	Read only
3	3x <==> LW	3x-1	<==	Local HMI	LW-0	9999 Word(s)	Read only
4	4x <==> LW	4x-1	<==>	Local HMI	LW-0	9999 Word(s)	Read/Write
5	3x <==> RW	3x-10000	<==	Local HMI	RW-0	55536 Word(s)	Read only
6	4x <==> RW	4x-10000	<==>	Local HMI	RW-0	55536 Word(s)	Read/Write

*Note: No cross-table reading/writing, i.e. accessing data from multiple tables in one command.

* LW-9288 indicates the last communication error :

0 : normal	4 : read-only error
1 : read/write undefined registers	5 : write-only error
2 : out of read/write range	6 : timeout
3 : bad command format	7 : invalid function code

* Support the following function codes :

0x : 1, 5, 15 (15 used only to set LB)
1x : 2
3x : 4
4x : 3, 6, 16

[Add...]   [Delete]   [Settings...]   [OK]   [Cancel]

By default, Modbus registers are mapped to HMI local storage. These should be deleted to create a new Modbus address mapping table.

2. Click the **Delete** button to remove the selected entry.

3. Click the **Add** button to map a Modbus register.

Description : 4x <-> AL

Device type
○ Bit   ● Word

Mode
● Read/Write   ○ Read only   ○ Write only

MODBUS address
PLC name : Modbus RTU/TCP Slave
Address : 4x   1

Mapped PLC address
PLC name : Animatics Class 5 (Serial)   Setting...
Address : ArrayAL   0

Table size
10   Word(s)

Conversion
☐ AB -> BA   ☐ ABCD -> CDAB

[OK]   [Cancel]

In this example, Modbus registers are being mapped to array elements in an Animatics Smartmotor controller.

Description: Enter a text description for this mapping.
Device Type: Select whether the mapped data is a *Bit* or *Word* address.
Mode: Configure the access privileges.
MODBUS address: Specify the Modbus address.
Mapped PLC address: Specify the PLC and address to which the Modbus address will be mapped. In this example, Modbus registers are being mapped to the AL[] array in the Animatics Smartmotor.
Table size: Specify how many words or bits are to be mapped. The table starts with the addresses configured above. In this example, 10 Modbus addresses are being mapped.
Conversion: *AB -> BA* swaps the byte order during the mapping, *ABCD -> CDAB* swaps the word order.

4. Click the **OK** button.

5. Repeat for each address type to be mapped.

Configuring the ModbusTCP Master

The ModbusTCP Master must be configured to communicate with the HMI.

In general, there will be a one-to-one matching of the Modbus address and the address mapped in the PLC. If 32-bit types are used on one side, and 16-bit types are used on the other, addresses may be skipped.

When the ModbusTCP Master requests data, the HMI will send the request to the mapped device, and return the data to the ModbusTCP Master. In the Animatics example, when the ModbusTCP Master requests register 4x1, the HMI will request the data from Animatics register ArrayAL[0], and return the data to the ModbusTCP Master.

Chapter 20 - Configuring the MQTT Protocol

The MQTT protocol is a new addition to EZwarePlus in v5.03.02. This protocol is a lightweight protocol used for the IIoT (Industrial Internet of Things).

The MQTT protocol works between clients and a broker (server) on a publish/subscribe basis.

- The HMI can host the MQTT broker (server) on the HMI hardware
- The HMI client capabilities only allow the HMI to publish tags to a broker
- The HMI does not have the ability to subscribe to a tag
- Tags can be published when the value changes (poll by exception) or on a time base
- Authentication is available through Username and Password
- The QoS (Quality of Service) is fixed at QoS2
- Compressed messages are compressed/uncompressed through Zlib compression algorithms

The MQTT configuration dialog is found in the Objects menu of EZwarePlus. To configure the MQTT protocol, first click on the settings button; this will display the dialog box used to target the IP address of the MQTT broker.

To host the MQTT broker on the HMI, click on the Localhost checkbox. When this is done, the HMI publishes tags to a broker hosted locally on the HMI. Other clients can publish data to a broker hosted on a separate HMI, and the broker can publish the data out to subscribers.

1. Set the IP address for the MQTT broker
2. The port number is generally set to 1883
3. Set the Registration ID
4. Set the Username and Password if Authentication is used
5. Enter a Keep Alive Time to keep the HMI connected to the broker for a period of time if no messages are received by the HMI

The address tab allows the programmer the ability to configure the register that is used for the HMI to MQTT broker connection status, and the control address at the bottom of the window can be enabled to gain access to items like the IP address, Port number and other settings from the General tab through registers of the HMI.

Once the server address has been configured, the topics (the name used for tags or registers in MQTT) can be configured by clicking on the New button on the MQTT dialog box.

The MQTT Topic configuration dialog appears. The nickname is used for the programmer to easily identify what data is included in this topic. The topic name follows the format xxxxx/xxxxxx/xxxxxx/xxxxxx. For instance, the programmer may call a topic HMI1/Processing/Oven/Temperature. There are no limitations to the naming convention, but you can find best practices for MQTT topic naming here: http://www.hivemq.com/blog/mqtt-essentials-part-5-mqtt-topics-best-practices
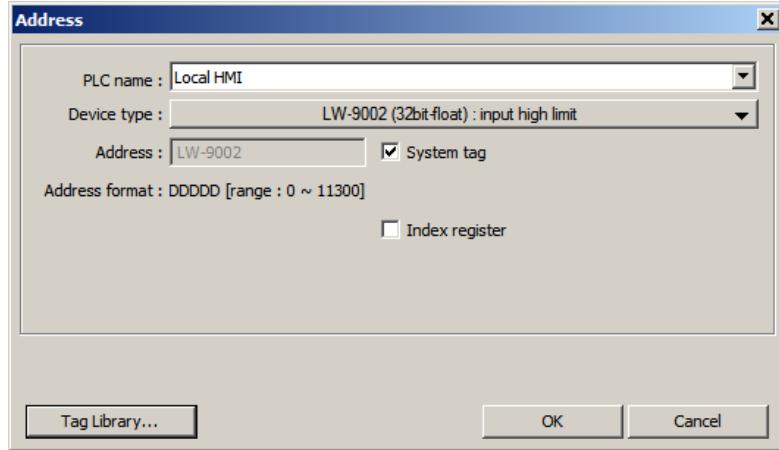
Topics can be configured to send the data on a time-base (resent on a timed interval) or trigger-based (message is automatically sent when content changes).

The Compressed Transmission selection compresses the message payload with the Zlib compression library.

The Retain Message selection: if the publisher disconnects with the broker and reconnects, the latest data will be automatically published to the broker.

Appendix A – Reserved Local Memory
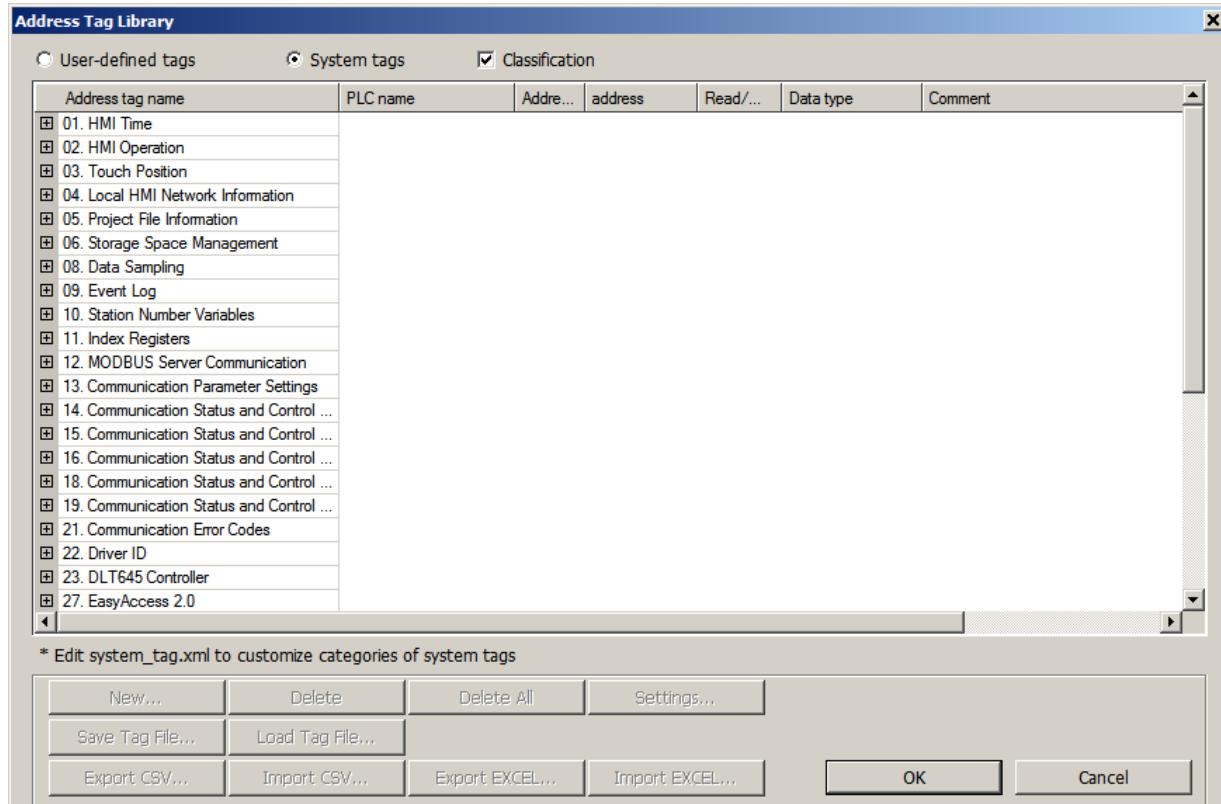
EZwarePlus reserves some Local Words (LW) and Local Bits (LB) in the HMI for system use. These can be accessed with objects in EZwarePlus by selecting the **System Tag** checkbox in the Address window.

They can also be accessed from the Tag Library by selecting the **System tags** radio button.

A categorized, expandable list of the System Tags can be viewed by checking the **Classification** checkbox.

Following is a list of the current system tags in EZwarePlus. As new versions of EZwarePlus are released, these may change. You can export a list of the System Tags by selecting the **Export EXCEL** button in the Tag Library with the System Tags selected.

Reserved Local Bits
LB-9000 : initialized as ON
LB-9001 : initialized as ON
LB-9002 : initialized as ON
LB-9003 : initialized as ON
LB-9004 : initialized as ON
LB-9005 : initialized as ON
LB-9006 : initialized as ON
LB-9007 : initialized as ON
LB-9008 : initialized as ON
LB-9009 : initialized as ON
LB-9010 : data download indicator
LB-9011 : data upload indicator
LB-9012 : data download/upload indicator
LB-9013 : FS window control (hide when ON, show when OFF)
LB-9014 : FS button control (hide when ON, show when OFF)
LB-9015 : FS window/button control (hide when ON, show when OFF)

Reserved Local Bits
LB-9016 : status is on when a client connects to this HMI
LB-9017 : disable write-back in PLC control's [change window]
LB-9018 : disable mouse cursor (set ON)
LB-9019 : disable/enable buzzer
LB-9020 : show (set ON)/ hide (set OFF) system setting bar
LB-9021 : reset current event log (set ON)
LB-9022 : delete the earliest event log file on HMI memory (set ON)
LB-9023 : delete all event log files on HMI memory (set ON)
LB-9024 : refresh event log information on HMI memory (set ON)
LB-9025 : delete the earliest data sampling file on HMI memory (set ON)
LB-9026 : delete all data sampling files on HMI memory (set ON)
LB-9027 : refresh data sampling information on HMI memory (set ON)
LB-9028 : reset all recipe data (set ON)
LB-9029 : save all recipe data to machine (set ON)
LB-9030 : update COM 1 communication parameters (set ON)
LB-9031 : update COM 2 communication parameters (set ON)
LB-9032 : update COM 3 communication parameters (set ON)
LB-9033 : disable(when on)/enable (when off) HMI upload function
LB-9034 : save event/data sampling to HMI, USB disk, SD card (set ON)
LB-9035 : HMI free space insufficiency alarm (when ON)
LB-9036 : SD card free space insufficiency alarm (when ON)
LB-9037 : USB disk free space insufficiency alarm (when ON)
LB-9039 : status of file backup activity (backup in process if ON)
LB-9040 : backlight up (set ON)
LB-9041 : backlight down (set ON)
LB-9042 : acknowledge all alarm events (set ON)
LB-9043 : unacknowledged events exist (when ON)
LB-9044 : disable remote control (when ON)
LB-9045 : memory-map communication fails (when ON)
LB-9046 : project key is different from HMI key (when ON)
LB-9047 : reboot HMI (set ON when LB9048 is on)
LB-9048 : reboot-HMI protection
LB-9049 : enable (set ON)/disable (set OFF) watch dog
LB-9050 : user logout
LB-9051 : disconnect (set OFF)/connect (set ON) EasyAccess server
LB-9052 : status of connecting to EasyAccess server
LB-9053 : prohibit password remote-read operation (when ON)
LB-9054 : prohibit password remote-write operation (when ON)
LB-9055 : MODBUS server (COM 1) receives a request (when ON)
LB-9056 : MODBUS server (COM 2) receives a request (when ON)
LB-9057 : MODBUS server (COM 3) receives a request (when ON)
LB-9058 : MODBUS server (ethernet) receives a request (when ON)
LB-9059 : disable macro TRACE function (when ON)
LB-9060 : password error
LB-9061 : update password (set ON)
LB-9062 : open hardware setting dialog (set ON)
LB-9063 : disable(set ON)/enable(set OFF) popuping information dialog while finding an USB

Reserved Local Bits
LB-9064 : enable USB barcode device (disable keyboard) (when ON)
LB-9065 : disable/enable COM 1 broadcast station no.
LB-9066 : disable/enable COM 2 broadcast station no.
LB-9067 : disable/enable COM 3 broadcast station no.
LB-9068 : auto. connection for remote HMI 1 (when ON)
LB-9069 : auto. connection for remote HMI 2 (when ON)
LB-9070 : auto. connection for remote HMI 3 (when ON)
LB-9071 : auto. connection for remote HMI 4 (when ON)
LB-9072 : auto. connection for remote HMI 5 (when ON)
LB-9073 : auto. connection for remote HMI 6 (when ON)
LB-9074 : auto. connection for remote HMI 7 (when ON)
LB-9075 : auto. connection for remote HMI 8 (when ON)
LB-9099 : auto. connection for remote HMI 32 (when ON)
LB-9100 : remote HMI 1 status (set on to retry connection)
LB-9101 : remote HMI 2 status (set on to retry connection)
LB-9102 : remote HMI 3 status (set on to retry connection)
LB-9103 : remote HMI 4 status (set on to retry connection)
LB-9104 : remote HMI 5 status (set on to retry connection)
LB-9105 : remote HMI 6 status (set on to retry connection)
LB-9106 : remote HMI 7 status (set on to retry connection)
LB-9107 : remote HMI 8 status (set on to retry connection)
LB-9148 : remote HMI 49 status (set on to retry connection)
LB-9149 : forced to reconnect remote HMI when IP changed on-line (set ON)
LB-9150 : auto. connection for PLC 1 (COM 1) (when ON)
LB-9151 : auto. connection for PLC 2 (COM 2) (when ON)
LB-9152 : auto. connection for PLC 3 (COM 3) (when ON)
LB-9153 : auto. connection for PLC 4 (ethernet) (when ON)
LB-9154 : auto. connection for PLC 5 (ethernet) (when ON)
LB-9155 : auto. connection for PLC 6 (ethernet) (when ON)
LB-9156 : auto. connection for PLC 7 (ethernet) (when ON)
LB-9157 : auto. connection for PLC 8 (ethernet) (when ON)
LB-9158 : auto. connection for PLC 9 (ethernet) (when ON)
LB-9189 : auto. connection for PLC 40 (ethernet) (when ON)
LB-9190 : auto. connection for PLC (USB) (when ON)
LB-9191 : PLC status (USB), set on to retry connection
LB-9192 : disable USB PLC's "PLC No Response" dialog (when ON)
LB-9196 : local HMI supports monitor function only (when ON)
LB-9197 : support monitor function only for remote HMIs (when ON)
LB-9198 : disable local HMI to trigger a macro (when ON)
LB-9199 : disable remote HMI to trigger a macro (when ON)
LB-9200 : PLC 1 status (SN0, COM 1), set on to retry connection
LB-9201 : PLC 1 status (SN1, COM 1), set on to retry connection
LB-9202 : PLC 1 status (SN2, COM 1), set on to retry connection
LB-9203 : PLC 1 status (SN3, COM 1), set on to retry connection
LB-9204 : PLC 1 status (SN4, COM 1), set on to retry connection
LB-9205 : PLC 1 status (SN5, COM 1), set on to retry connection
LB-9206 : PLC 1 status (SN6, COM 1), set on to retry connection

Reserved Local Bits
LB-9207 : PLC 1 status (SN7, COM 1), set on to retry connection
LB-9455 : PLC 1 status (SN255, COM1), set on to retry connection
LB-9460 : EM0's storage device (SD card) does not exist (when ON)
LB-9461 : EM1's storage device (SD card) does not exist (when ON)
LB-9462 : EM2's storage device (SD card) does not exist (when ON)
LB-9463 : EM3's storage device (SD card) does not exist (when ON)
LB-9464 : EM4's storage device (SD card) does not exist (when ON)
LB-9465 : EM5's storage device (SD card) does not exist (when ON)
LB-9466 : EM6's storage device (SD card) does not exist (when ON)
LB-9467 : EM7's storage device (SD card) does not exist (when ON)
LB-9468 : EM8's storage device (SD card) does not exist (when ON)
LB-9469 : EM9's storage device (SD card) does not exist (when ON)
LB-9470 : EM0's storage device (USB disk) does not exist (when ON)
LB-9471 : EM1's storage device (USB disk) does not exist (when ON)
LB-9472 : EM2's storage device (USB disk) does not exist (when ON)
LB-9473 : EM3's storage device (USB disk) does not exist (when ON)
LB-9474 : EM4's storage device (USB disk) does not exist (when ON)
LB-9475 : EM5's storage device (USB disk) does not exist (when ON)
LB-9476 : EM6's storage device (USB disk) does not exist (when ON)
LB-9477 : EM7's storage device (USB disk) does not exist (when ON)
LB-9478 : EM8's storage device (USB disk) does not exist (when ON)
LB-9479 : EM9's storage device (USB disk) does not exist (when ON)
LB-9500 : PLC 2 status (SN0, COM 2), set on to retry connection
LB-9501 : PLC 2 status (SN1, COM 2), set on to retry connection
LB-9502 : PLC 2 status (SN2, COM 2), set on to retry connection
LB-9503 : PLC 2 status (SN3, COM 2), set on to retry connection
LB-9504 : PLC 2 status (SN4, COM 2), set on to retry connection
LB-9505 : PLC 2 status (SN5, COM 2), set on to retry connection
LB-9506 : PLC 2 status (SN6, COM 2), set on to retry connection
LB-9507 : PLC 2 status (SN7, COM 2), set on to retry connection
LB-9755 : PLC 2 status (SN255, COM2), set on to retry connection
LB-9800 : PLC 3 status (SN0, COM 3), set on to retry connection
LB-9801 : PLC 3 status (SN1, COM 3), set on to retry connection
LB-9802 : PLC 3 status (SN2, COM 3), set on to retry connection
LB-9803 : PLC 3 status (SN3, COM 3), set on to retry connection
LB-9804 : PLC 3 status (SN4, COM 3), set on to retry connection
LB-9805 : PLC 3 status (SN5, COM 3), set on to retry connection
LB-9806 : PLC 3 status (SN6, COM 3), set on to retry connection
LB-9807 : PLC 3 status (SN7, COM 3), set on to retry connection
LB-10055 : PLC 3 status (SN255, COM3), set on to retry connection
LB-10069 : forced to reconnect remote printer/backup server when IP changed on-line (set ON)
LB-10070 : forced to reconnect PLC 4 (ethernet) when IP or system parameters changed on-line (set ON)
LB-10071 : forced to reconnect PLC 5 (ethernet) when IP or system parameters changed on-line (set ON)
LB-10072 : forced to reconnect PLC 6 (ethernet) when IP or system parameters changed on-line (set ON)

Reserved Local Bits

LB-10073 : forced to reconnect PLC 7 (ethernet) when IP or system parameters changed on-line (set ON)
LB-10074 : forced to reconnect PLC 8 (ethernet) when IP or system parameters changed on-line
LB-10075 : forced to reconnect PLC 9 (ethernet) when IP or system parameters changed on-line
LB-10099 : forced to reconnect PLC 33 (ethernet) when IP or system parameters changed on-
LB-10100 : PLC 4 status (ethernet), set on to retry connection
LB-10400 : PLC 5 status (ethernet), set on to retry connection
LB-10700 : PLC 6 status (ethernet), set on to retry connection
LB-11000 : PLC 7 status (ethernet), set on to retry connection
LB-11300 : PLC 8 status (ethernet), set on to retry connection
LB-11600 : PLC 9 status (ethernet), set on to retry connection
LB-11900 : PLC 10 status (ethernet), set on to retry connection
LB-11901 : PLC 11 status (ethernet), set on to retry connection
LB-11902 : PLC 12 status (ethernet), set on to retry connection
LB-11903 : PLC 13 status (ethernet), set on to retry connection
LB-11904 : PLC 14 status (ethernet), set on to retry connection
LB-11905 : PLC 15 status (ethernet), set on to retry connection
LB-11906 : PLC 16 status (ethernet), set on to retry connection
LB-11939 : PLC 49 status (ethernet), set on to retry connection
LB-11940 : delete the earliest event log file on SD card (set ON)
LB-11941 : delete all event log files on SD card (set ON)
LB-11942 : refresh event log information on SD card (set ON)
LB-11943 : delete the earliest event log file on USB disk (set ON)
LB-11944 : delete all event log files on USB disk (set ON)
LB-11945 : refresh event log information on USB disk (set ON)
LB-11949 : delete the earliest data sampling file on SD card (set ON)
LB-11950 : delete all data sampling files on SD card (set ON)
LB-11951 : refresh data sampling information on SD card (set ON)
LB-11952 : delete the earliest data sampling file on USB disk (set ON)
LB-11953 : delete all data sampling files on USB disk (set ON)
LB-11954 : refresh data sampling information on USB disk (set ON)
LB-11958 : time setting error (when ON)
LB-11959 : LED indicator control
LB-11960 : disable PLC 1's "PLC No Response" dialog (when ON)
LB-11961 : disable PLC 2's "PLC No Response" dialog (when ON)
LB-11962 : disable PLC 3's "PLC No Response" dialog (when ON)
LB-11963 : disable PLC 4's "PLC No Response" dialog (when ON)
LB-11964 : disable PLC 5's "PLC No Response" dialog (when ON)
LB-11965 : disable PLC 6's "PLC No Response" dialog (when ON)
LB-11966 : disable PLC 7's "PLC No Response" dialog (when ON)
LB-11967 : disable PLC 8's "PLC No Response" dialog (when ON)
LB-12023 : disable PLC 64's "PLC No Response" dialog (when ON)
LB-12030 : COM 1 status (OFF : normal, ON : open failed)
LB-12031 : COM 2 status (OFF : normal, ON : open failed)
LB-12032 : COM 3 status (OFF : normal, ON : open failed)
LB-12033 : COM 4 status (OFF : normal, ON : open failed)
LB-12034 : COM 5 status (OFF : normal, ON : open failed)
LB-12035 : COM 6 status (OFF : normal, ON : open failed)

Reserved Local Bits
LB-12036 : COM 7 status (OFF : normal, ON : open failed)
LB-12037 : COM 8 status (OFF : normal, ON : open failed)
LB-12038 : COM 9 status (OFF : normal, ON : open failed)
LB-12040 : remote printer/backup server disconnection alarm (when ON)
LB-12041 : refresh HMI IP (LW-9129~9132) (set ON)
LB-12042 : open/close [System information] dialog (set ON/set OFF)
LB-12048 : USB disk status (exists when ON)
LB-12050 : SD card status (exists when ON)
LB-12051 : buzzer status (active when ON)
LB-12052 : MODBUS server status (disabled when ON)
LB-12053 : Failed to send an [Event Log] e-Mail (when ON)
LB-12054 : Failed to send an [Backup Object] e-Mail (when ON)
LB-12055 : failed to execute time synchronization (when ON)
LB-12056 : the user touches an unauthorized object (when ON)
LB-12080 : auto. connection for PLC (CAN Bus) (when ON)
LB-12081 : PLC status (CAN Bus), set on to retry connection
LB-12082 : disable CAN Bus device's "PLC No Response" dialog (when ON)
LB-12088 : enable VNC monitor mode (when ON)
LB-12089 : VNC password free (when ON)
LB-12090 : a VNC client connecting to HMI (when ON)(OS version 20120621 or later supports
LB-12091 : disable auto-logout function when a VNC client connecting to HMI (when ON)(OS
LB-12092 : enable VNC (set ON), disable VNC (set OFF)
LB-12093 : VNC connection mode (OFF : single connection, ON : multi. connection)(OS version
LB-12100 : pause CAN Bus device 1 communication (when ON)
LB-12101 : pause CAN Bus device 2 communication (when ON)
LB-12102 : pause CAN Bus device 3 communication (when ON)
LB-12103 : pause CAN Bus device 4 communication (when ON)
LB-12104 : pause CAN Bus device 5 communication (when ON)
LB-12105 : pause CAN Bus device 6 communication (when ON)
LB-12106 : pause CAN Bus device 7 communication (when ON)
LB-12107 : pause CAN Bus device 8 communication (when ON)
LB-12108 : pause CAN Bus device 9 communication (when ON)
LB-12109 : pause CAN Bus device 10 communication (when ON)
LB-12354 : pause CAN Bus device 255 communication (when ON)
LB-12355 : daylight saving time period (when ON)

Reserved Local Words
LW-9002 (32bit-float) : input high limit
LW-9004 (32bit-float) : input low limit
LW-9006 (16bit) : connected client no.
LW-9008 (32bit-float) : battery voltage
LW-9010 (16bit-BCD) : local second
LW-9011 (16bit-BCD) : local minute
LW-9012 (16bit-BCD) : local hour
LW-9013 (16bit-BCD) : local day

Reserved Local Words
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-9024 (16bit) : memory link system register
LW-9025 (16bit) : CPU loading (x 100%)
LW-9026 (16bit) : OS version (year)
LW-9027 (16bit) : OS version (month)
LW-9028 (16bit) : OS version (day)
LW-9030 (32bit) : system time (unit : 0.1 second)
LW-9032 (8 words) : folder name of backup history files to SD, USB memory
LW-9040 (16bit) : backlight index
LW-9041 (16bit) : touch status word (a user is touching the screen when bit 0's status is ON))
LW-9042 (16bit) : touch x position
LW-9043 (16bit) : touch y position
LW-9044 (16bit) : leave x position
LW-9045 (16bit) : leave y position
LW-9046 (32bit) : HMI key
LW-9048 (16bit) : time (0 : AM, 1 : PM)
LW-9049 (16bit) : local hour (12-hour format)
LW-9050 (16bit) : current base window ID
LW-9051 (16bit) : audio volume (0 ~100)
LW-9052 (32bit-float) : the previous input value of the numeric input object
LW-9060 (16bit) : no. of event log files on HMI memory
LW-9061 (32bit) : size of event log files on HMI memory
LW-9063 (16bit) : no. of data sampling files on HMI memory
LW-9064 (32bit) : size of data sampling files on HMI memory
LW-9070 (16bit) : free space insufficiency warning (Mega bytes)
LW-9071 (16bit) : reserved free space size (Mega bytes)
LW-9072 (32bit) : HMI current free space (K bytes)
LW-9074 (32bit) : SD current free space (K bytes)
LW-9076 (32bit) : USB disk current free space (K bytes)
LW-9080 (16bit) : backlight saver time (unit : minute)
LW-9081 (16bit) : screen saver time (unit : minute)
LW-9082 (16bit) : auto logout time (unit : minute, 0 : disable the function)
LW-9100 (14 words) : project name
LW-9116 (32bit) : project size in bytes
LW-9118 (32bit) : project size in K bytes
LW-9120 (32bit) : EZwarePlus version
LW-9122 (16bit) : project compiled date [year]
LW-9123 (16bit) : project compiled date [month]

Reserved Local Words
LW-9124 (16bit) : project compiled date [day]
LW-9125 (16bit) : HMI ethernet gateway 0 (machine used only)
LW-9126 (16bit) : HMI ethernet gateway 1 (machine used only)
LW-9127 (16bit) : HMI ethernet gateway 2 (machine used only)
LW-9128 (16bit) : HMI ethernet gateway 3 (machine used only)
LW-9129 (16bit) : HMI ethernet IP 0 (machine used only)
LW-9130 (16bit) : HMI ethernet IP 1 (machine used only)
LW-9131 (16bit) : HMI ethernet IP 2 (machine used only)
LW-9132 (16bit) : HMI ethernet IP 3 (machine used only)
LW-9133 (16bit) : ethernet port no.
LW-9134 (16bit) : language mode
LW-9135 (16bit) : media access control (MAC) address 0
LW-9136 (16bit) : media access control (MAC) address 1
LW-9137 (16bit) : media access control (MAC) address 2
LW-9138 (16bit) : media access control (MAC) address 3
LW-9139 (16bit) : media access control (MAC) address 4
LW-9140 (16bit) : media access control (MAC) address 5
LW-9141 (16bit) : HMI station no.
LW-9150 (32 words) : keyboard's input data (ASCII)
LW-9199 (16bit) : external keyboard layout : 0 (QWERTY), 1 (AZERTY)
LW-9200 (16bit) : address index 0
LW-9201 (16bit) : address index 1
LW-9202 (16bit) : address index 2
LW-9203 (16bit) : address index 3
LW-9204 (16bit) : address index 4
LW-9205 (16bit) : address index 5
LW-9206 (16bit) : address index 6
LW-9207 (16bit) : address index 7
LW-9208 (16bit) : address index 8
LW-9209 (16bit) : address index 9
LW-9210 (16bit) : address index 10
LW-9211 (16bit) : address index 11
LW-9212 (16bit) : address index 12
LW-9213 (16bit) : address index 13
LW-9214 (16bit) : address index 14
LW-9215 (16bit) : address index 15
LW-9216 (16bit) : the result of importing e-Mail data
LW-9219 (16bit) : user no. (1~12)
LW-9220 (32bit) : password
LW-9222 (16bit) : classes can be operated for current user (bit 0:A, bit 1:B,bit 2:C, ...)
LW-9230 (32bit) : address index 16
LW-9232 (32bit) : address index 17
LW-9234 (32bit) : address index 18
LW-9236 (32bit) : address index 19
LW-9238 (32bit) : address index 20
LW-9240 (32bit) : address index 21
LW-9242 (32bit) : address index 22

Reserved Local Words
LW-9244 (32bit) : address index 23
LW-9246 (32bit) : address index 24
LW-9248 (32bit) : address index 25
LW-9250 (32bit) : address index 26
LW-9252 (32bit) : address index 27
LW-9254 (32bit) : address index 28
LW-9256 (32bit) : address index 29
LW-9258 (32bit) : address index 30
LW-9260 (32bit) : address index 31
LW-9270 (16bit) : request's function code - MODBUS server (COM 1)
LW-9271 (16bit) : request's starting address - MODBUS server (COM 1)
LW-9272 (16bit) : request's quantity of registers - MODBUS server (COM 1)
LW-9275 (16bit) : request's function code - MODBUS server (COM 2)
LW-9276 (16bit) : request's starting address - MODBUS server (COM 2)
LW-9277 (16bit) : request's quantity of registers - MODBUS server (COM 2)
LW-9280 (16bit) : request's function code - MODBUS server (COM 3)
LW-9281 (16bit) : request's starting address - MODBUS server (COM 3)
LW-9282 (16bit) : request's quantity of registers - MODBUS server (COM 3)
LW-9285 (16bit) : request's function code - MODBUS server (ethernet)
LW-9286 (16bit) : request's starting address - MODBUS server (ethernet)
LW-9287 (16bit) : request's quantity of registers - MODBUS server (ethernet)
LW-9288 (16bit) : last error code - MODBUS server (ethernet)
LW-9300 (16bit) : driver ID of local PLC 1
LW-9301 (16bit) : driver ID of local PLC 2
LW-9302 (16bit) : driver ID of local PLC 3
LW-9303 (16bit) : driver ID of local PLC 4
LW-9331 (16bit) : driver ID of local PLC 32
LW-9350 (16bit) : pending command no. in local HMI
LW-9351 (16bit) : pending command no. in PLC 1 (COM 1)
LW-9352 (16bit) : pending command no. in PLC 2 (COM 2)
LW-9353 (16bit) : pending command no. in PLC 3 (COM 3)
LW-9354 (16bit) : pending command no. in PLC 4 (ethernet)
LW-9355 (16bit) : pending command no. in PLC 5 (ethernet)
LW-9356 (16bit) : pending command no. in PLC 6 (ethernet)
LW-9357 (16bit) : pending command no. in PLC 7 (ethernet)
LW-9389 (16bit) : pending command no. in PLC 39 (ethernet)
LW-9390 (16bit) : pending command no. in PLC (USB)
LW-9392 (16bit) : pending command no. in PLC (CAN Bus)
LW-9400 (16bit) : error code for PLC 1* (see Communication Error Codes next)
LW-9401 (16bit) : error code for PLC 2*
LW-9402 (16bit) : error code for PLC 3*
LW-9403 (16bit) : error code for PLC 4*
LW-9404 (16bit) : error code for PLC 5*
LW-9405 (16bit) : error code for PLC 6*
LW-9406 (16bit) : error code for PLC 7*
LW-9407 (16bit) : error code for PLC 8*
LW-9449 (16bit) : error code for PLC 50*

Reserved Local Words
LW-9450 (16bit) : time tag of event log - second
LW-9451 (16bit) : time tag of event log - minute
LW-9452 (16bit) : time tag of event log - hour
LW-9453 (16bit) : time tag of event log - day
LW-9454 (16bit) : time tag of event log - month
LW-9455 (16bit) : time tag of event log - year
LW-9490 (16bit) : error code for USB PLC*
LW-9491 (16bit): error code for CANbus PLC*
LW-9500 (32bit) : user 1's password
LW-9502 (32bit) : user 2's password
LW-9504 (32bit) : user 3's password
LW-9506 (32bit) : user 4's password
LW-9508 (32bit) : user 5's password
LW-9510 (32bit) : user 6's password
LW-9512 (32bit) : user 7's password
LW-9514 (32bit) : user 8's password
LW-9516 (32bit) : user 9's password
LW-9518 (32bit) : user 10's password
LW-9520 (32bit) : user 11's password
LW-9522 (32bit) : user 12's password
LW-9530 (8 words) : VNC server password
LW-9540 (16bit) : reserved for caps lock
LW-9541 (16bit) : MODBUS/ASCII server station no. (COM 1)
LW-9542 (16bit) : MODBUS/ASCII server station no. (COM 2)
LW-9543 (16bit) : MODBUS/ASCII server station no. (COM 3)
LW-9544 (16bit) : MODBUS/ASCII server station no. (ethernet)
LW-9550 (16bit) : COM 1 mode (0:RS232,1:RS485 2W,2:RS485 4W)
LW-9551 (16bit) : COM 1 baud rate
LW-9552 (16bit) : COM 1 databits (7 : 7 bits, 8 : 8 bits)
LW-9553 (16bit) : COM 1 parity (0:none, 1:even, 2:odd, 3:mark, 4:space)
LW-9554 (16bit) : COM 1 stop bits (1 : 1 bit, 2 : 2 bits)
LW-9555 (16bit) : COM 2 mode (0:RS232,1:RS485 2W,2:RS485 4W)
LW-9556 (16bit) : COM 2 baud
LW-9557 (16bit) : COM 2 databits (7 : 7 bits, 8 : 8 bits)
LW-9558 (16bit) : COM 2 parity (0:none, 1:even, 2:odd, 3:mark, 4:space)
LW-9559 (16bit) : COM 2 stop bits (1 : 1 bit, 2 : 2 bits)
LW-9560 (16bit) : COM 3 mode (0:RS232,1:RS485 2W)
LW-9561 (16bit) : COM 3 baud rate
LW-9562 (16bit) : COM 3 databits (7 : 7 bits, 8 : 8 bits)
LW-9563 (16bit) : COM 3 parity (0:none, 1:even, 2:odd, 3:mark, 4:space)
LW-9564 (16bit) : COM 3 stop bits (1 : 1 bit, 2 : 2 bits)
LW-9565 (16bit) : COM 1 broadcast station no.
LW-9566 (16bit) : COM 2 broadcast station no.
LW-9567 (16bit) : COM 3 broadcast station no.
LW-9570 (32bit) : received data count (bytes) (COM 1 MODBUS server)
LW-9572 (32bit) : received data count (bytes) (COM 2 MODBUS server)
LW-9574 (32bit) : received data count (bytes) (COM 3 MODBUS server)

Reserved Local Words
LW-9576 (32bit) : received data count (bytes) (Ethernet MODBUS server)
LW-9600 (16bit) : PLC 4's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9601 (16bit) : PLC 4's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9602 (16bit) : PLC 4's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9603 (16bit) : PLC 4's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9604 (16bit) : PLC 4's port no.
LW-9605 (16bit) : PLC 5's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9606 (16bit) : PLC 5's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9607 (16bit) : PLC 5's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9608 (16bit) : PLC 5's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9609 (16bit) : PLC 5's port no.
LW-9610 (16bit) : PLC 6's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9611 (16bit) : PLC 6's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9612 (16bit) : PLC 6's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9613 (16bit) : PLC 6's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9614 (16bit) : PLC 6's port no.
LW-9615 (16bit) : PLC 7's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9616 (16bit) : PLC 7's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9617 (16bit) : PLC 7's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9618 (16bit) : PLC 7's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9619 (16bit) : PLC 7's port no.
LW-9620 (16bit) : PLC 8's (IP address = IP0:IP1:IP2:IP3)
LW-9621 (16bit) : PLC 8's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9622 (16bit) : PLC 8's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9623 (16bit) : PLC 8's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9624 (16bit) : PLC 8's port no.
LW-9625 (16bit) : PLC 9's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9626 (16bit) : PLC 9's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9627 (16bit) : PLC 9's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9628 (16bit) : PLC 9's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9629 (16bit) : PLC 9's port no.
LW-9765 (16bit) : PLC 37's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9766 (16bit) : PLC 37's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9767 (16bit) : PLC 37's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9768 (16bit) : PLC 37's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9769 (16bit) : PLC 37's port no.
LW-9770 (16bit) : remote printer/backup server IP0 (IP0:IP1:IP2:IP3)
LW-9771 (16bit) : remote printer/backup server IP1 (IP0:IP1:IP2:IP3)
LW-9772 (16bit) : remote printer/backup server IP2 (IP0:IP1:IP2:IP3)
LW-9773 (16bit) : remote printer/backup server IP3 (IP0:IP1:IP2:IP3)
LW-9774 (6 words) : remote printer/backup server user name
LW-9780 (6 words) : remote printer/backup server password
LW-9800 (16bit) : remote HMI 1's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9801 (16bit) : remote HMI 1's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9802 (16bit) : remote HMI 1's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9803 (16bit) : remote HMI 1's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9804 (16bit) : remote HMI 1's port no.

Reserved Local Words

LW-9805 (16bit) : remote HMI 2's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9806 (16bit) : remote HMI 2's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9807 (16bit) : remote HMI 2's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9808 (16bit) : remote HMI 2's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9809 (16bit) : remote HMI 2's port no.
LW-9810 (16bit) : remote HMI 3's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9811 (16bit) : remote HMI 3's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9812 (16bit) : remote HMI 3's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9813 (16bit) : remote HMI 3's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9814 (16bit) : remote HMI 3's port no.
LW-9815 (16bit) : remote HMI 4's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9816 (16bit) : remote HMI 4's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9817 (16bit) : remote HMI 4's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9818 (16bit) : remote HMI 4's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9819 (16bit) : remote HMI 4's port no.
LW-9820 (16bit) : remote HMI 5's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9821 (16bit) : remote HMI 5's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9822 (16bit) : remote HMI 5's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9823 (16bit) : remote HMI 5's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9824 (16bit) : remote HMI 5's port no.
LW-9825 (16bit) : remote HMI 6's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9826 (16bit) : remote HMI 6's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9827 (16bit) : remote HMI 6's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9828 (16bit) : remote HMI 6's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9829 (16bit) : remote HMI 6's port no.
LW-9830 (16bit) : remote HMI 7's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9831 (16bit) : remote HMI 7's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9832 (16bit) : remote HMI 7's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9833 (16bit) : remote HMI 7's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9834 (16bit) : remote HMI 7's port no.
LW-9835 (16bit) : remote HMI 8's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9836 (16bit) : remote HMI 8's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9837 (16bit) : remote HMI 8's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9838 (16bit) : remote HMI 8's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9839 (16bit) : remote HMI 8's port no.
LW-9895 (16bit) : remote HMI 20's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9896 (16bit) : remote HMI 20's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9897 (16bit) : remote HMI 20's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9898 (16bit) : remote HMI 20's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9899 (16bit) : remote HMI 20's port no.
LW-9900 (16bit) : HMI run mode (0 : normal mode, 1~3 : test mode (COM 1~COM 3))
LW-9901 (16bit) : pass-through source COM port (1~3 : COM 1~COM 3)
LW-9902 (16bit) : pass-through destination COM port (1~3 : COM 1~COM 3)
LW-9903 (16bit) : pass-through control (0 : normal, 1 : pause, 2 : stop communications between
LW-9904 (16bit) : pass-through server port no. (2000~2100)
LW-9905 (16bit) : remote HMI 21's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9906 (16bit) : remote HMI 21's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9907 (16bit) : remote HMI 21's IP2 (IP address = IP0:IP1:IP2:IP3)

Reserved Local Words

LW-9908 (16bit) : remote HMI 21's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9909 (16bit) : remote HMI 21's port no.
LW-9910 (16bit) : remote HMI 22's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9911 (16bit) : remote HMI 22's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9912 (16bit) : remote HMI 22's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9913 (16bit) : remote HMI 22's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9914 (16bit) : remote HMI 22's port no.
LW-9915 (16bit) : remote HMI 23's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9916 (16bit) : remote HMI 23's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9917 (16bit) : remote HMI 23's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9918 (16bit) : remote HMI 23's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9919 (16bit) : remote HMI 23's port no.
LW-9920 (16bit) : remote HMI 24's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9921 (16bit) : remote HMI 24's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9922 (16bit) : remote HMI 24's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9923 (16bit) : remote HMI 24's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9924 (16bit) : remote HMI 24's port no.
LW-9925 (16bit) : remote HMI 25's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9926 (16bit) : remote HMI 25's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9927 (16bit) : remote HMI 25's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9928 (16bit) : remote HMI 25's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9929 (16bit) : remote HMI 25's port no.
LW-9930 (16bit) : remote HMI 26's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9931 (16bit) : remote HMI 26's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9932 (16bit) : remote HMI 26's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9933 (16bit) : remote HMI 26's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9934 (16bit) : remote HMI 26's port no.
LW-9935 (16bit) : remote HMI 27's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9936 (16bit) : remote HMI 27's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9937 (16bit) : remote HMI 27's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9938 (16bit) : remote HMI 27's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9939 (16bit) : remote HMI 27's port no.
LW-9940 (16bit) : remote HMI 28's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9941 (16bit) : remote HMI 28's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9942 (16bit) : remote HMI 28's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9943 (16bit) : remote HMI 28's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9944 (16bit) : remote HMI 28's port no.
LW-9945 (16bit) : remote HMI 29's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9946 (16bit) : remote HMI 29's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9947 (16bit) : remote HMI 29's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9948 (16bit) : remote HMI 29's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9949 (16bit) : remote HMI 29's port no.
LW-9950 (16bit) : remote HMI 30's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9951 (16bit) : remote HMI 30's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9952 (16bit) : remote HMI 30's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9953 (16bit) : remote HMI 30's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9954 (16bit) : remote HMI 30's port no.

Reserved Local Words
LW-9955 (16bit) : remote HMI 31's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9956 (16bit) : remote HMI 31's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9957 (16bit) : remote HMI 31's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9958 (16bit) : remote HMI 31's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9959 (16bit) : remote HMI 31's port no.
LW-9960 (16bit) : remote HMI 32's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9961 (16bit) : remote HMI 32's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9962 (16bit) : remote HMI 32's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9963 (16bit) : remote HMI 32's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9964 (16bit) : remote HMI 32's port no.
LW-9995 (16bit) : remote HMI 39's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-9996 (16bit) : remote HMI 39's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-9997 (16bit) : remote HMI 39's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-9998 (16bit) : remote HMI 39's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-9999 (16bit) : remote HMI 39's port no.
LW-10000 (16bit) : var0 - station no variable (usage : var0#address)
LW-10001 (16bit) : var1 - station no variable (usage : var1#address)
LW-10002 (16bit) : var2 - station no variable (usage : var2#address)
LW-10003 (16bit) : var3 - station no variable (usage : var3#address)
LW-10004 (16bit) : var4 - station no variable (usage : var4#address)
LW-10005 (16bit) : var5 - station no variable (usage : var5#address)
LW-10006 (16bit) : var6 - station no variable (usage : var6#address)
LW-10007 (16bit) : var7 - station no variable (usage : var7#address)
LW-10008 (16bit) : var8 - station no variable (usage : var8#address)
LW-10009 (16bit) : var9 - station no variable (usage : var9#address)
LW-10010 (16bit) : var10 - station no variable (usage : var10#address)
LW-10011 (16bit) : var11 - station no variable (usage : var11#address)
LW-10012 (16bit) : var12 - station no variable (usage : var12#address)
LW-10013 (16bit) : var13 - station no variable (usage : var13#address)
LW-10014 (16bit) : var14 - station no variable (usage : var14#address)
LW-10015 (16bit) : var15 - station no variable (usage : var15#address)
LW-10050 (16bit) : IP0 of the HMI connecting to remote PLC 1 (IP address = IP0:IP1:IP2:IP3)
LW-10051 (16bit) : IP1 of the HMI connecting to remote PLC 1 (IP address = IP0:IP1:IP2:IP3)
LW-10052 (16bit) : IP2 of the HMI connecting to remote PLC 1 (IP address = IP0:IP1:IP2:IP3)
LW-10053 (16bit) : IP3 of the HMI connecting to remote PLC 1 (IP address = IP0:IP1:IP2:IP3)
LW-10054 (16bit) : port no. of the HMI connecting to remote PLC 1
LW-10055 (16bit) : IP0 of the HMI connecting to remote PLC 2 (IP address = IP0:IP1:IP2:IP3)
LW-10056 (16bit) : IP1 of the HMI connecting to remote PLC 2 (IP address = IP0:IP1:IP2:IP3)
LW-10057 (16bit) : IP2 of the HMI connecting to remote PLC 2 (IP address = IP0:IP1:IP2:IP3)
LW-10058 (16bit) : IP3 of the HMI connecting to remote PLC 2 (IP address = IP0:IP1:IP2:IP3)
LW-10059 (16bit) : port no. of the HMI connecting to remote PLC 2
LW-10060 (16bit) : IP0 of the HMI connecting to remote PLC 3 (IP address = IP0:IP1:IP2:IP3)
LW-10061 (16bit) : IP1 of the HMI connecting to remote PLC 3 (IP address = IP0:IP1:IP2:IP3)
LW-10062 (16bit) : IP2 of the HMI connecting to remote PLC 3 (IP address = IP0:IP1:IP2:IP3)
LW-10063 (16bit) : IP3 of the HMI connecting to remote PLC 3 (IP address = IP0:IP1:IP2:IP3)
LW-10064 (16bit) : port no. of the HMI connecting to remote PLC 3
LW-10065 (16bit) : IP0 of the HMI connecting to remote PLC 4 (IP address = IP0:IP1:IP2:IP3)

Reserved Local Words

LW-10066 (16bit) : IP1 of the HMI connecting to remote PLC 4 (IP address = IP0:IP1:IP2:IP3)
LW-10067 (16bit) : IP2 of the HMI connecting to remote PLC 4 (IP address = IP0:IP1:IP2:IP3)
LW-10068 (16bit) : IP3 of the HMI connecting to remote PLC 4 (IP address = IP0:IP1:IP2:IP3)
LW-10069 (16bit) : port no. of the HMI connecting to remote PLC 4
LW-10205 (16bit) : IP0 of the HMI connecting to remote PLC 32 (IP address = IP0:IP1:IP2:IP3)
LW-10206 (16bit) : IP1 of the HMI connecting to remote PLC 32 (IP address = IP0:IP1:IP2:IP3)
LW-10207 (16bit) : IP2 of the HMI connecting to remote PLC 32 (IP address = IP0:IP1:IP2:IP3)
LW-10208 (16bit) : IP3 of the HMI connecting to remote PLC 32 (IP address = IP0:IP1:IP2:IP3)
LW-10209 (16bit) : port no. of the HMI connecting to remote PLC 32
LW-10300 (16bit) : remote PLC 1's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-10301 (16bit) : remote PLC 1's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-10302 (16bit) : remote PLC 1's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-10303 (16bit) : remote PLC 1's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-10304 (16bit) : remote PLC 1's port no.
LW-10305 (16bit) : remote PLC 2's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-10306 (16bit) : remote PLC 2's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-10307 (16bit) : remote PLC 2's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-10308 (16bit) : remote PLC 2's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-10309 (16bit) : remote PLC 2's port no.
LW-10310 (16bit) : remote PLC 3's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-10311 (16bit) : remote PLC 3's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-10312 (16bit) : remote PLC 3's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-10313 (16bit) : remote PLC 3's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-10314 (16bit) : remote PLC 3's port no.
LW-10315 (16bit) : remote PLC 4's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-10316 (16bit) : remote PLC 4's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-10317 (16bit) : remote PLC 4's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-10318 (16bit) : remote PLC 4's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-10319 (16bit) : remote PLC 4's port no.
LW-10455 (16bit) : remote PLC 32's IP0 (IP address = IP0:IP1:IP2:IP3)
LW-10456 (16bit) : remote PLC 32's IP1 (IP address = IP0:IP1:IP2:IP3)
LW-10457 (16bit) : remote PLC 32's IP2 (IP address = IP0:IP1:IP2:IP3)
LW-10458 (16bit) : remote PLC 32's IP3 (IP address = IP0:IP1:IP2:IP3)
LW-10459 (16bit) : remote PLC 32's port no.
LW-10480 (16bit) : no. of event log files on SD card
LW-10481 (32bit) : size of event log files on SD card
LW-10483 (16bit) : no. of event log files on USB disk
LW-10484 (32bit) : size of event log files on USB disk
LW-10489 (16bit) : no. of data sampling files on SD card
LW-10490 (32bit) : size of data sampling files on SD card
LW-10492 (16bit) : no. of data sampling files on USB disk
LW-10493 (32bit) : size of data sampling files on USB disk
LW-10500 (16bit) : PLC 1 timeout (unit : 100ms)
LW-10501 (16bit) : PLC 1 turn around delay (unit : ms)
LW-10502 (16bit) : PLC 1 send ACK delay (unit : ms)
LW-10503 (16bit) : PLC 1 parameter 1
LW-10504 (16bit) : PLC 1 parameter 2

Reserved Local Words
LW-10505 (16bit) : PLC 2 timeout (unit : 100ms)
LW-10506 (16bit) : PLC 2 turn around delay (unit : ms)
LW-10507 (16bit) : PLC 2 send ACK delay (unit : ms)
LW-10508 (16bit) : PLC 2 parameter 1
LW-10509 (16bit) : PLC 2 parameter 2
LW-10510 (16bit) : PLC 3 timeout (unit : 100ms)
LW-10511 (16bit) : PLC 3 turn around delay (unit : ms)
LW-10512 (16bit) : PLC 3 send ACK delay (unit : ms)
LW-10513 (16bit) : PLC 3 parameter 1
LW-10514 (16bit) : PLC 3 parameter 2
LW-10515 (16bit) : PLC 4 timeout (unit : 100ms)
LW-10516 (16bit) : PLC 4 turn around delay (unit : ms)
LW-10517 (16bit) : PLC 4 send ACK delay (unit : ms) (SIEMENS S7/400 Link type)
LW-10518 (16bit) : PLC 4 parameter 1 (SIEMENS S7/400 rack)
LW-10519 (16bit) : PLC 4 parameter 2 (SIEMENS S7/400 CPU slot)
LW-10520 (16bit) : PLC 5 timeout (unit : 100ms)
LW-10521 (16bit) : PLC 5 turn around delay (unit : ms)
LW-10522 (16bit) : PLC 5 send ACK delay (unit : ms) (SIEMENS S7/400 Link type)
LW-10523 (16bit) : PLC 5 parameter 1 (SIEMENS S7/400 rack)
LW-10524 (16bit) : PLC 5 parameter 2 (SIEMENS S7/400 CPU slot)
LW-10525 (16bit) : PLC 6 timeout (unit : 100ms)
LW-10526 (16bit) : PLC 6 turn around delay (unit : ms)
LW-10527 (16bit) : PLC 6 send ACK delay (unit : ms) (SIEMENS S7/400 Link type)
LW-10528 (16bit) : PLC 6 parameter 1 (SIEMENS S7/400 rack)
LW-10529 (16bit) : PLC 6 parameter 2 (SIEMENS S7/400 CPU slot)
LW-10530 (16bit) : PLC 7 timeout (unit : 100ms)
LW-10531 (16bit) : PLC 7 turn around delay (unit : ms)
LW-10532 (16bit) : PLC 7 send ACK delay (unit : ms) (SIEMENS S7/400 Link type)
LW-10533 (16bit) : PLC 7 parameter 1 (SIEMENS S7/400 rack)
LW-10534 (16bit) : PLC 7 parameter 2 (SIEMENS S7/400 CPU slot)
LW-10535 (16bit) : PLC 8 timeout (unit : 100ms)
LW-10536 (16bit) : PLC 8 turn around delay (unit : ms)
LW-10537 (16bit) : PLC 8 send ACK delay (unit : ms) (SIEMENS S7/400 Link type)
LW-10538 (16bit) : PLC 8 parameter 1 (SIEMENS S7/400 rack)
LW-10539 (16bit) : PLC 8 parameter 2 (SIEMENS S7/400 CPU slot)
LW-10655 (16bit) : PLC 32 timeout (unit : 100ms)
LW-10656 (16bit) : PLC 32 turn around delay (unit : ms)
LW-10657 (16bit) : PLC 32 send ACK delay (unit : ms)
LW-10658 (16bit) : PLC 32 parameter 1
LW-10659 (16bit) : PLC 32 parameter 2
LW-10700 (4 words) : DLT_645 operator (COM 1)
LW-10704 (4 words) : DLT_645 password (COM 1)
LW-10708 (6 words) : DLT_645 address (COM 1)
LW-10715 (4 words) : DLT_645 operator (COM 2)
LW-10719 (4 words) : DLT_645 password (COM 2)
LW-10723 (6 words) : DLT_645 address (COM 2)
LW-10730 (4 words) : DLT_645 operator (COM 3)

Reserved Local Words
LW-10734 (4 words) : DLT_645 password (COM 3)
LW-10738 (6 words) : DLT_645 address (COM 3)
LW-10750 (16bit) : HMI ethernet netmask 0 (machine used only)
LW-10751 (16bit) : HMI ethernet netmask 1 (machine used only)
LW-10752 (16bit) : HMI ethernet netmask 2 (machine used only)
LW-10753 (16bit) : HMI ethernet netmask 3 (machine used only)
LW-10754 (8 words) : current user name
LW-10804 (16bit) : HMI ethernet domain name system (DNS) server IP 0 (OS version 20131106 or later supports only)
LW-10805 (16bit) : HMI ethernet domain name system (DNS) server IP 1 (OS version 20131106 or later supports only)
LW-10806 (16bit) : HMI ethernet domain name system (DNS) server IP 2 (OS version 20131106 or later supports only)
LW-10807 (16bit) : HMI ethernet domain name system (DNS) server IP 3 (OS version 20131106 or later supports only)
LW-10812 (16bit) : obtain an IP address automatically (DHCP => 0 : off, 1 : on)
LW-10814 (16bit) : connecting to a Weintek HMI (0:none, 1:connecting)
LW-10815 (16bit) : link speed of ethernet 1 (0:failure, 10 (10M), 100 (100M), 1000 (1G))
LW-10816 (16bit) : link speed of ethernet 2 (0:failure, 10 (10M), 100 (100M), 1000 (1G))
LW-10820 (16bit) : disable (set 0)/enable (set 1) (EasyAccess 2.0)
LW-10821 (5 words) : session ID (EasyAccess 2.0)
LW-10826 (2 words) : password (EasyAccess 2.0)
LW-10828 (16bit) : execution status (EasyAccess 2.0)
LW-10829 (16bit) : the last error code (EasyAccess 2.0)
LW-10850 (16bit) : disable/enable (0 : disable, 1 : normal, 2 : IP limited) (siemens pass-through)
LW-10851 (16bit) : destination COM port (siemens pass-through)
LW-10852 (16bit) : destination PLC station no. (siemens pass-through)
LW-10853 (16bit) : communication protocol (0 : invalid, 1 : PPI, 2 : MPI) (siemens pass-through)
LW-10854 (16bit) : IP0 of connecting client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10855 (16bit) : IP1 of connecting client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10856 (16bit) : IP2 of connecting client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10857 (16bit) : IP3 of connecting client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10858 (16bit) : IP0 of designated client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10859 (16bit) : IP1 of designated client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10860 (16bit) : IP2 of designated client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10861 (16bit) : IP3 of designated client (IP address = IP0:IP1:IP2:IP3) (siemens pass-through)
LW-10862 (16bit) : connection status (0 : ready, 1 : client connecting) (siemens pass-through)
LW-10863 (16bit) : execution status (0 : normal, 1 : error) (siemens pass-through)
LW-10864 (16bit) : the last error code (siemens pass-through)
LW-10884 (16 words) : HMI name
LW-10900 (16bit) : macro 0 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10901 (16bit) : macro 1 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)

Reserved Local Words
LW-10902 (16bit) : macro 2 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10903 (16bit) : macro 3 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10904 (16bit) : macro 4 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10905 (16bit) : macro 5 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10906 (16bit) : macro 6 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10907 (16bit) : macro 7 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10908 (16bit) : macro 8 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-10909 (16bit) : macro 9 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-11154 (16bit) : macro 254 status (0:ready, 3:executing, 5:waiting response, 9:waiting sync, 17:delay)
LW-11155 (32bit) : the total size of HMI memory (unit : KB)
LW-11157 (32bit) : the free size of HMI memory (unit : KB)
LW-11159 (16bit) : memory loading (x 100%)
LW-11160 (16bit) : start time of USB security key - year
LW-11161 (16bit) : start time of USB security key - month
LW-11162 (16bit) : start time of USB security key - day
LW-11163 (16bit) : start time of USB security key - hour
LW-11164 (16bit) : start time of USB security key - minute
LW-11165 (16bit) : expiration time of USB security key - year
LW-11166 (16bit) : expiration time of USB security key - month
LW-11167 (16bit) : expiration time of USB security key - day
LW-11168 (16bit) : expiration time of USB security key - hour
LW-11169 (16bit) : expiration time of USB security key - minute
LW-11170 (16bit) : Proxy Disable/Enable (0:disable, 1:enable) (EasyAccess 2.0)
LW-11171 (16bit) : Proxy Type (0:HTTP, 1:SOCKSv4, 2:SOCKSv5) (EasyAccess 2.0)
LW-11172 (16bit) : Proxy Server IP0 (EasyAccess 2.0)
LW-11173 (16bit) : Proxy Server IP1 (EasyAccess 2.0)
LW-11174 (16bit) : Proxy Server IP2 (EasyAccess 2.0)
LW-11175 (16bit) : Proxy Server IP3 (EasyAccess 2.0)
LW-11176 (16bit) : Proxy Server Port (EasyAccess 2.0)
LW-11177 (16bit) : Proxy authentication (0:disable, 1:enable) (EasyAccess 2.0)
LW-11178 (16 words) : Proxy username (EasyAccess 2.0)
LW-11194 (16 words) : Proxy password (EasyAccess 2.0)
LW-11210 (20 words) : Hardware key (EasyAccess 2.0)
LW-11260 (16bit) : enable/disable the daylight saving time (DST) (0:disable, 1:enable)
LW-11261 (16bit) : hour of the DST bias
LW-11262 (16bit) : minute of the DST bias

Reserved Local Words
LW-11263 (16bit) : month of the year when DST starts
LW-11264 (16bit) : week of the month when DST starts (1~5)
LW-11265 (16bit) : day of the week when DST starts (0~ 6)
LW-11266 (16bit) : hour of local time when DST starts
LW-11267 (16bit) : minute of local time when DST starts
LW-11268 (16bit) : month of the year when DST ends
LW-11269 (16bit) : week of the month when DST ends (1~5)
LW-11270 (16bit) : day of the week when DST ends (0~6)
LW-11271 (16bit) : hour of local time when DST ends
LW-11272 (16bit) : minute of local time when DST ends
LW-11273 (16bit) : enable/disable time synchronization via NTP (Network Time Protocol) server
LW-11274 (16bit) : execute time synchronization when HMI starts (0:disable, 1:enable)
LW-11275 (16bit) : server response time has been adjusted in accordance with DST (0:disable,
LW-11276 (16bit) : HMI time zone (unit : minute)
LW-11277 (16bit) : server response time (server time zone) (unit : minute)
LW-11278 (16bit) : IP 0 of network time server 1 (IP address = IP0:IP1:IP2:IP3)
LW-11279 (16bit) : IP 1 of network time server 1 (IP address = IP0:IP1:IP2:IP3)
LW-11280 (16bit) : IP 2 of network time server 1 (IP address = IP0:IP1:IP2:IP3)
LW-11281 (16bit) : IP 3 of network time server 1 (IP address = IP0:IP1:IP2:IP3)
LW-11282 (16bit) : IP 0 of network time server 2 (IP address = IP0:IP1:IP2:IP3)
LW-11283 (16bit) : IP 1 of network time server 2 (IP address = IP0:IP1:IP2:IP3)
LW-11284 (16bit) : IP 2 of network time server 2 (IP address = IP0:IP1:IP2:IP3)
LW-11285 (16bit) : IP 3 of network time server 2 (IP address = IP0:IP1:IP2:IP3)
LW-11286 (16bit) : IP 0 of network time server 3 (IP address = IP0:IP1:IP2:IP3)
LW-11287 (16bit) : IP 1 of network time server 3 (IP address = IP0:IP1:IP2:IP3)
LW-11288 (16bit) : IP 2 of network time server 3 (IP address = IP0:IP1:IP2:IP3)
LW-11289 (16bit) : IP 3 of network time server 3 (IP address = IP0:IP1:IP2:IP3)
LW-11290 (16bit) : IP 0 of network time server 4 (IP address = IP0:IP1:IP2:IP3)
LW-11291 (16bit) : IP 1 of network time server 4 (IP address = IP0:IP1:IP2:IP3)
LW-11292 (16bit) : IP 2 of network time server 4 (IP address = IP0:IP1:IP2:IP3)
LW-11293 (16bit) : IP 3 of network time server 4 (IP address = IP0:IP1:IP2:IP3)
LW-11294 (32bit) : update interval (time synchronization interval) (10 ~ 86400, unit : second)
LW-11296 (16bit) : Location of EasyAccess 2.0 server (0 : Global, 1 : China)

*Communication Error Codes (LW-9400 to LW-9449; LW-9490 to LW-9491)
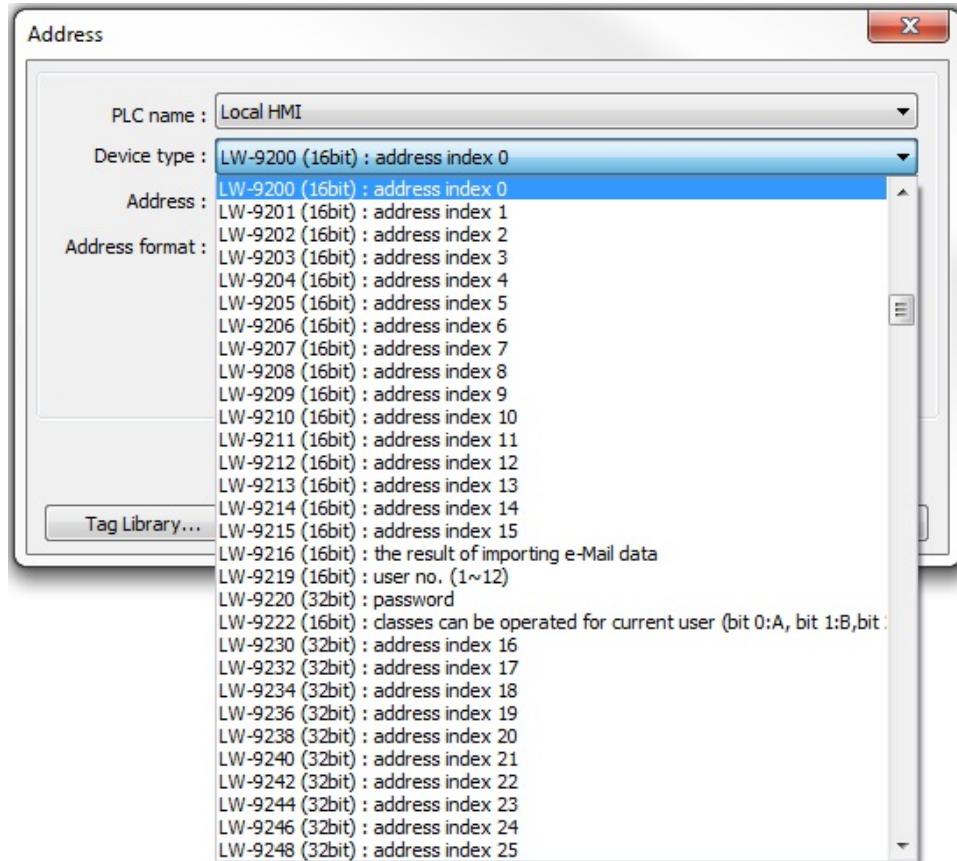
Error Code	Cause of Communication Error
0	Normal
1	The device is busy and not yet ready to process a command.
2	Communication error due to unexpected reason.
3	The device does not exist.
4	The device using the spec ified station number does not exist.
5	Incorrect address format.

6	Read/Write unsupported address.
7	The driver of the device does not exist.
8	The COM port does not exist.
9	Incorrect IP address or unable to connect to the device.
10	Checksum error.
11	Unidentified command.
12	Ignore.
20	The USB device is improperly connected.
21	The CANbus device is improperlyconnected.
22	No reply from the device.
23	Insufficient data read from the device during timeout.
24	The Conversion Tag used by the object does not exist or the content is incorrect.
25	HMI is not accepting any commands from a remote HMI.
251	Read/Write exceeding number of words from/to the register of the Modbus device.
252	The Modbus device replies incorrect data format.
253	Modbus device checksum error.

Appendix B – Index Registers

EZwarePlus provides Index Registers for changing addresses during runtime. The Index Register feature allows an object's read/write address to be changed on the HMI screen while the project is running.

There are 32 Index Registers available (sixteen are 16-bit registers and sixteen are 32-bit registers).
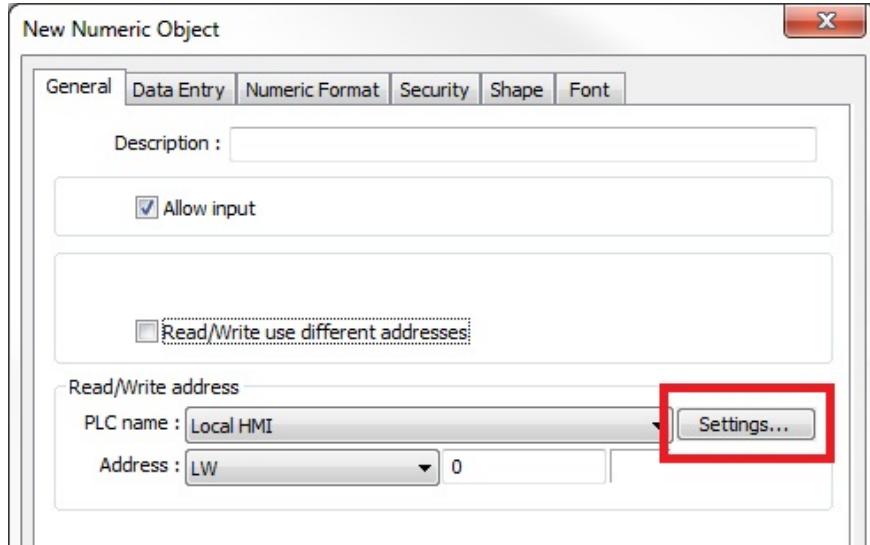
LW-9200 through LW-9215 are 16-bit Index Registers that correspond to **INDEX 0-15**.
They have a maximum offset range of 65536 words ($2\wedge16$).
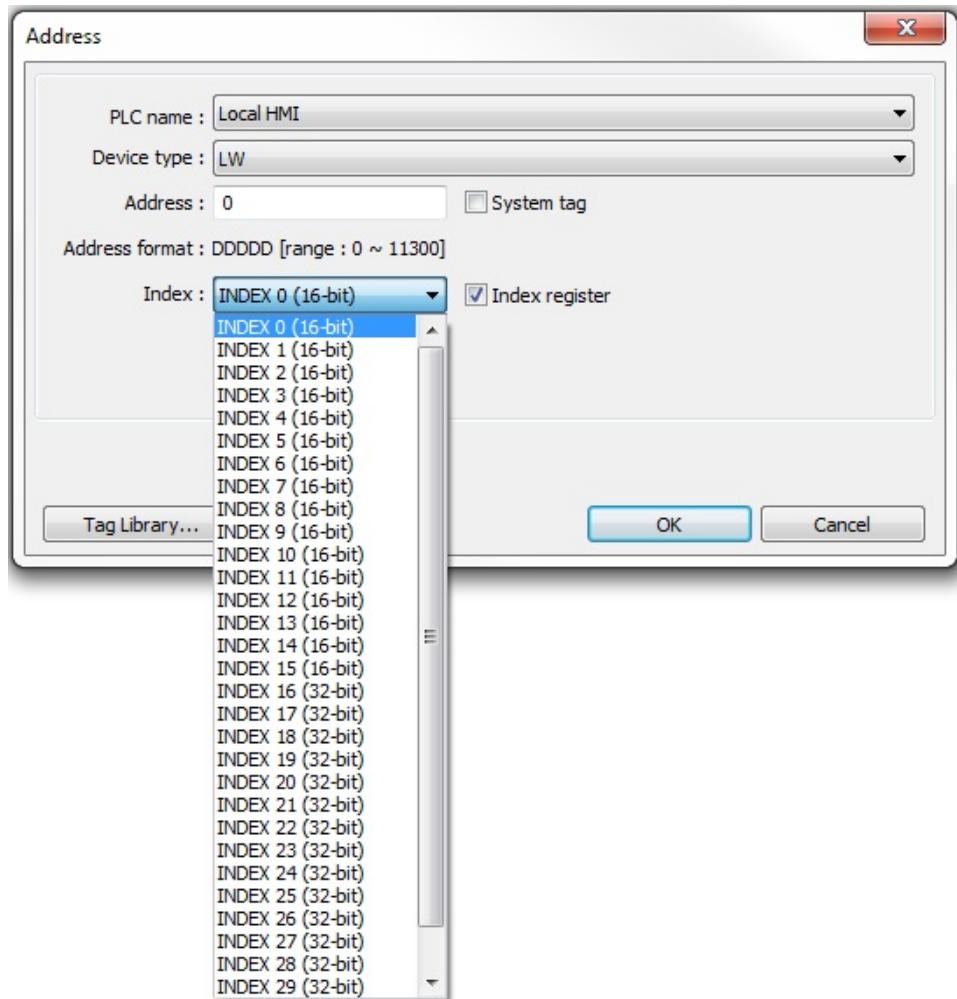
LW-9230 through LW-9260 are 32-bit Index Registers that correspond to **INDEX 16-31**.
They have a maximum offset range of 4,294,967,296 words ($2\wedge32$).

To use an Index Register

1. Next to the Read/Write address in an object's properties window, click on the **Settings** button to open the Address window.

2. Select the **Index register** checkbox and select the Index register to be used (**INDEX 0** through **INDEX 31**).

3. When using the Index Register for an object's read/write address, the value in the Index Register is added to the designated read/write address.

For example, if the designated read/write address of a Numeric object is LW-10 and a "5" is written to the Index Register, the Numeric object will read and write to LW-15 [R/W register address + Index Register value].

▤ Index Registers can also be used with bit addresses. However, adding a "1" to the Index Register will offset the bit address by 16.

For example, if the designated read/write address of a Toggle Switch object is LB-10 and a "1" is written to the Index Register, the Toggle Switch will read and write to LB-26 [(R/W register address) + (Index Register value x 16)].
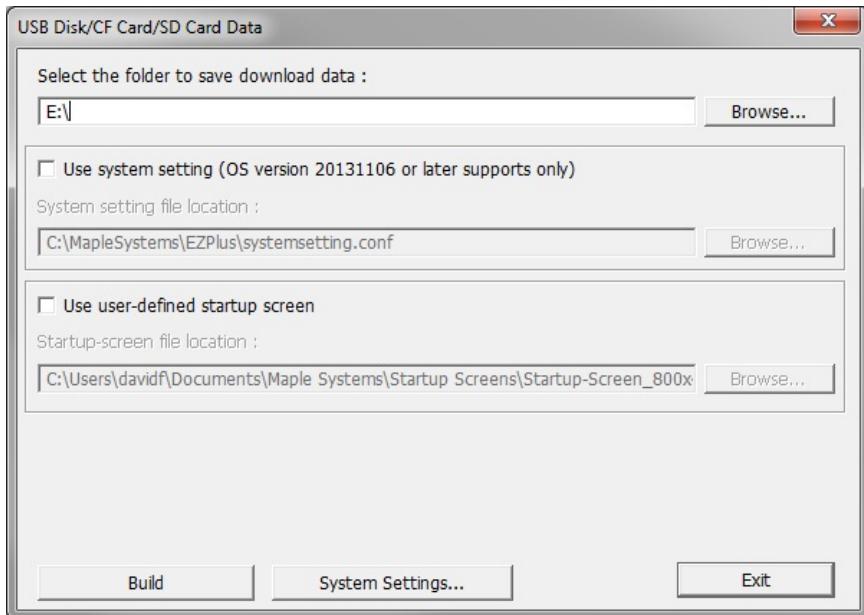
Appendix C – Downloading a Project to the HMI from a USB Drive or SD Card

A project can be loaded onto a USB flash drive or SD card and downloaded to an HMI.

⊞ This feature is not supported in the **RMI5010**.

To download a project to the HMI from a USB drive or SD card:

1. Open the project in EZwarePlus and compile the project (**Tools > Compile**).

2. Select **Build Data for USB Disk or CF Card Download** from the Tools menu.

3. In the **USB Disk/CF Card/SD Card Data** dialog box, under **Select the folder to save download data:** use the **Browse** button to select the location to save the project. Click **Build**. When the process is complete, the message "Creating successful!" appears. Click **OK** and click **Exit**.
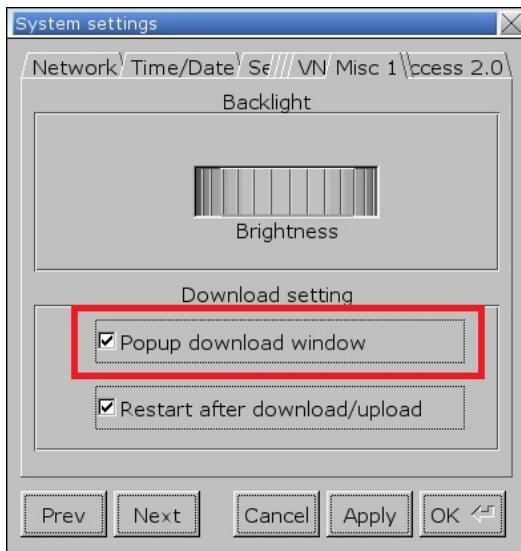
4. A folder named mt8000ie (or emt3000, depending on the model) will be created on the root (main) directory of the USB flash drive or SD card.

5. Remove the flash drive from your computer and connect it to the HMI. When a flash drive is inserted into the HMI5000 Series, the following dialog is displayed:

Download	Transfer data from the flash drive to the HMI.
Upload	Transfer data from the HMI to the flash drive.
Restart Project and Exit	Close the dialog and restart the HMI.
Cancel	Close the dialog without transferring.
Time Remaining	The dialog will automatically close after 10 seconds if no selection is made; shows the time remaining.

⌨ The **Download/Upload** dialog box can be disabled. If it does not pop up when the USB flash drive or SD card is installed, open the System Settings in the HMI and enable it on the **Misc 1** tab.
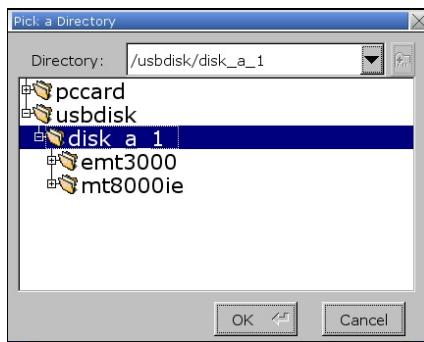
When Download is selected, a dialog box appears requesting the Download password and what data to download. The default password is 111111.
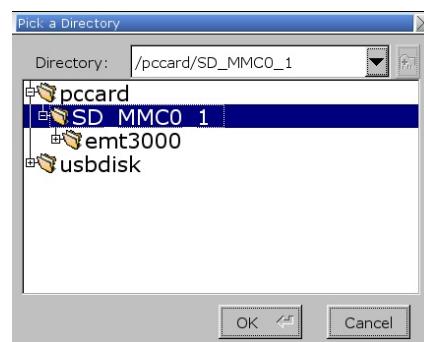
Password	Enter the Download password.
Download Project Files	When checked, the HMI checks the specified folder for project data and transfers it if it exists.
Download History Files	When checked, the HMI checks the specified folder for history data and transfers it if it exists (includes data log files, event log files, and recipe files).
Clear History Files	When checked, clears all history files in the HMI (includes data log files, event log files, and recipe files).

If a USB flash drive is being used to download the project, select the folder under the **usbdisk** folder (disk_a_1) and then click **OK**. If an SD card is being used, select the folder under the **pccard** folder (SD_MMCO_1). If the project is in a folder on the USB drive or SD card, select the folder just above the mt8000ie or emt3000 folder.

🖅 Do not select the mt8000ie or emt3000 folder, but the folder just above the mt8000ie or emt3000 folder.

      USB flash drive   **SD card**

Click **OK** to download the project from the USB drive or SD card to the HMI. When the download is complete, the HMI automatically reboots and runs the project.

📑 The storage device can be left with the HMI as a backup should the project need to be downloaded to the HMI again.
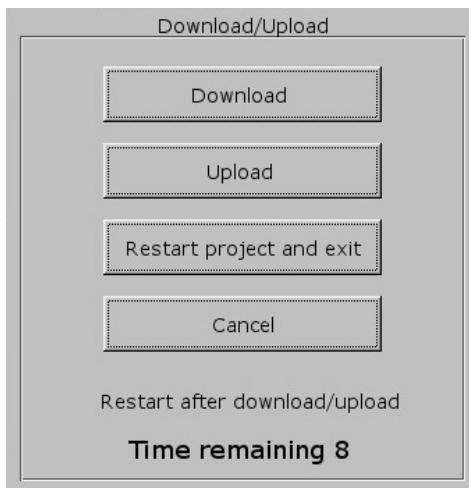
Appendix D – Uploading a Project from the HMI to a USB Drive or SD Card

A project can be uploaded from an HMI5000 Series to a USB flash drive or SD card and transferred to a PC.

⊞ This feature is not supported in the **RMI5010**.
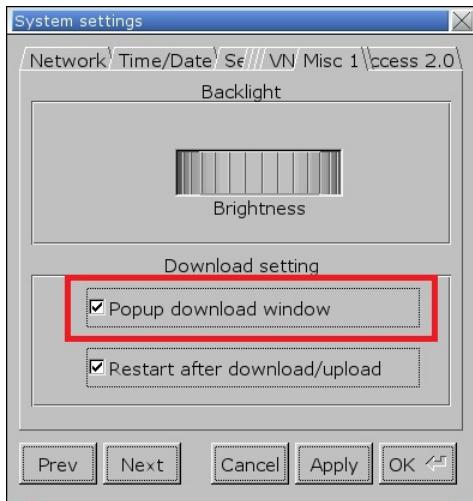
To upload a project from the HMI to a USB drive or SD card:

1. Insert the USB flash drive in the HMI's USB port or insert the SD card in the HMI's SD card slot. The **Download/Upload** dialog box will appear.

Download	Transfer data from the flash drive to the HMI.
Upload	Transfer data from the HMI to the flash drive.
Restart Project and Exit	Close the dialog and restart the HMI.
Cancel	Close the dialog without transferring.
Time Remaining	The dialog will automatically close after 10 seconds if no selection is made; shows the time remaining.

⊞ The **Download/Upload** dialog box can be disabled. If it does not pop up when the USB flash drive or SD card is installed, open the System Settings in the HMI and enable it on the **Misc 1** tab.
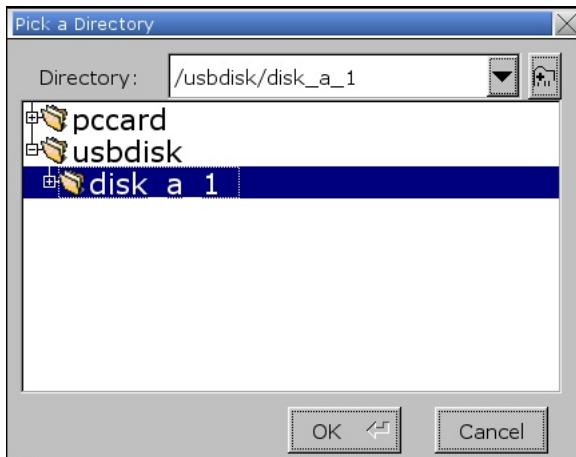
2. Select **Upload** and enter the upload password (the default password is 111111).
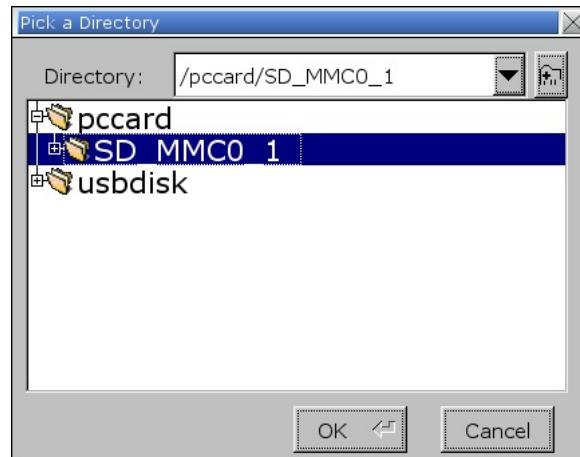
Password	Enter the Upload password.
Upload project[1]	When checked, the HMI uploads the compiled project file from the HMI (*.exob).
Upload all project files	When checked, the HMI uploads the compiled project file along with all the associated files (firmware, fonts, drivers).
Upload history Files	When checked, the HMI uploads history files (includes data log files, event log files, recipe files, and operation log files).

[1] **Note**: Older models do not have the "Upload project" option available.

3. In the **Pick a Directory** window, select the location where you want the data to be stored.
    For a USB flash drive, touch the "+" sign in front of **usbdisk** and select **disk_a_1**.
    For an SD card, touch the "+" sign in front of **pccard** and select **SD_MMCO_1**.

USB flash drive   **SD card**

4. Click **OK** to upload the files from the HMI to the USB drive or SD card. When the upload is complete, the HMI automatically reboots and resumes operation.

5. Remove the storage device from the HMI and connect it to a PC.

6. If **Upload project** is selected, the compiled project file (*.exob) will be copied to the root directory of the USB flash drive or SD card. Using Windows Explorer, copy the file to the Project folder in the EZPlus folder (C:\MapleSystems\EZPlus\Project), open EZwarePlus and select the **Decompile** option under the **Tools** menu. The decompiler will create a new file with a *.emtp extension that can be opened in EZwarePlus.

7. If **Upload all project files** is selected, a folder named **mt8000ie** (or **emt3000**, depending on the model) will be created by the HMI on the root directory of the USB flash drive or SD card. Using Windows Explorer, open the "001" folder in the mt8000ie or emt3000 folder on the USB flash drive or SD card. Add a .exob extension to the mt8000 file or emt3000 file and copy it to the Project folder in the EZPlus folder (C:\MapleSystems\EZPlus\Project). Open EZwarePlus and select the **Decompile** option under the **Tools** menu. The decompiler will create a new file with a *.emtp extension that can be opened in EZwarePlus.

    If **Upload history files** is selected, a folder named **history** will be created by the HMI on the root directory of the USB flash drive or SD card containing all the data log files, event log files, recipes, and operation log files from the HMI.
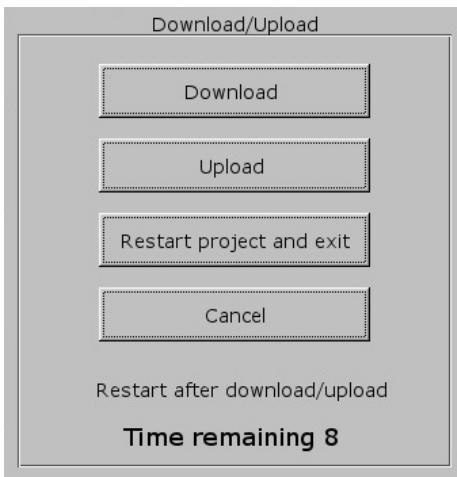
Appendix E – Transferring a Project from one HMI to another with a USB Drive or SD Card

A project can uploaded to a USB flash drive or SD card from an HMI5000 series and downloaded to another HMI of the same type without requiring the EZware programming software.
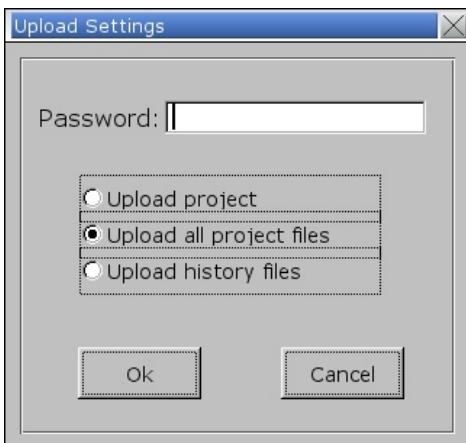
⌨ This feature is not supported in the **RMI5010**.

To transfer a project from one HMI to another with a USB drive or SD card:
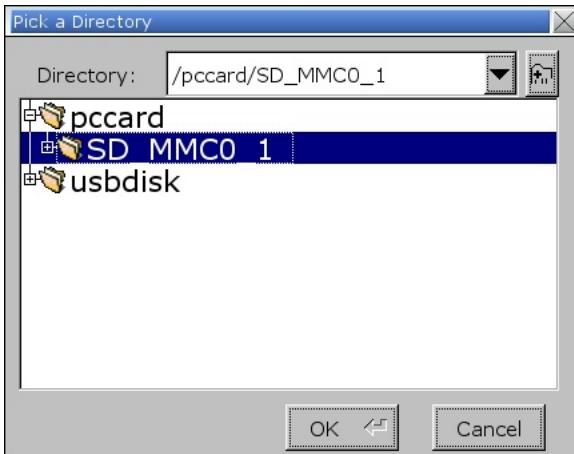
1. Insert the USB flash drive in the HMI's USB port or insert the SD card in the SD card slot. The Download/Upload dialog box will appear.
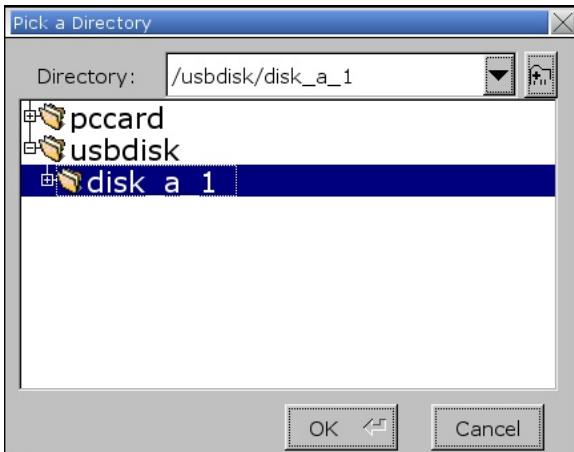
2. Select **Upload.** In the Upload Settings window, select **Upload all project files** and enter the Upload password (111111 is the default).

3. In the **Pick a Directory** window, select the location where you want the data to be stored.
   For an SD card: Touch the "**+**" sign in front of **pccard**, select **SD_MMCO_1** and select **OK**.

For a USB flash drive: Touch the "**+**" sign in front of **usbdisk**, select **disk_a_1** and select **OK**.

4. A folder named *mt8000ie, mt8000xe, or emt8000* will be created by the HMI on the root (main) directory of the USB flash drive or SD card.

5. Remove the storage device from the HMI and connect it to the second HMI.

Note: Some models can have the same project downloaded to them. Here is a list of HMI5000 Series models programmed with EZwarePlus. Those listed on the same line can share the same project:

HMI5043L/HMI5043LB
HMI5070NL
HMI5070NLv2
HMI5070L/HMI5070LB/HMI5070R/HMI5100L
HMI5070DL
HMI5070P
HMI5121P/HMI5150P
HMI5121XL/HMI5150XL
HMI5097NXL/HMI5097XL
HMI5097DXL
RMI5001
RMI5010

6. The Download/Upload window will appear on the screen.

7. Select **Download** and enter the Download password (111111 is the default).
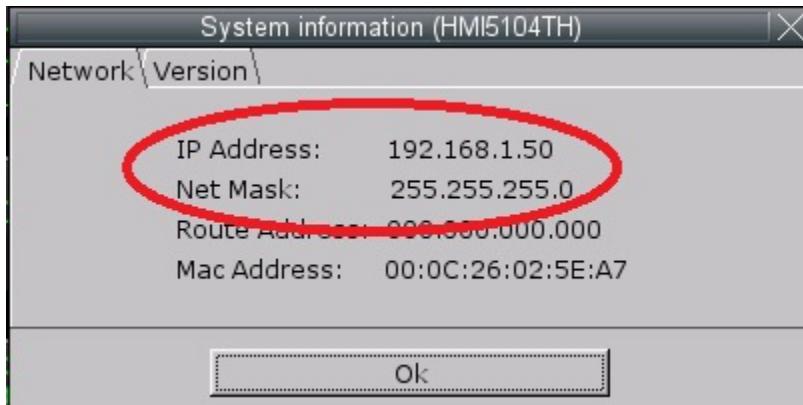
8. If a USB flash drive is being used to download the project, select the folder under the **usbdisk** folder (disk_a_1) and then click **OK**. If an SD card is being used, select the folder under the **pccard** folder (SD_MMCO_1).

   📝 Do not select the mt8000ie/mt8000xe/emt8000 folder, but the folder just above the mt8000ie/mt8000xe/emt8000 folder.

Appendix F – Accessing the FTP Server in an HMI

This describes how to log-in to the FTP server on the RMI5000/HMI5000 Series in order to access data files, event files, recipe files, and operation log files stored in the internal memory or on an external memory card (USB flash drive or SD card).

1. Determine the IP address of the HMI. You can find the IP address by opening the "System Information" window from the System Toolbar on the HMI.
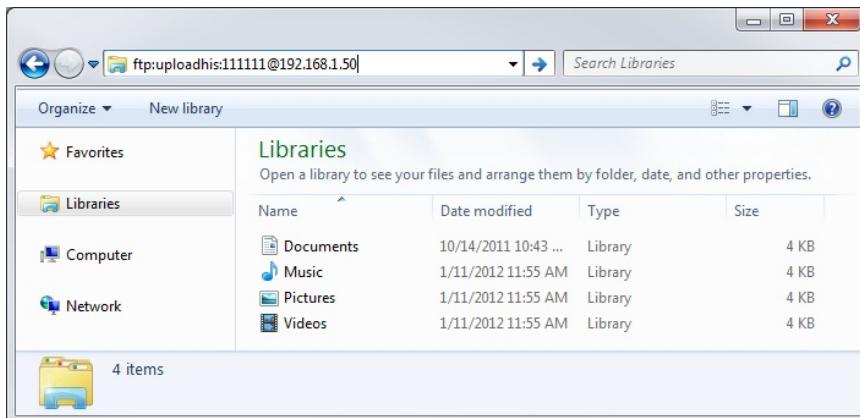

2. Make sure your computer is connected to the same local area network as the HMI.
   Note: If you are connecting the HMI directly to the Ethernet port on your computer, you must use an Ethernet crossover cable. If going through an Ethernet switch, you can use a straight-thru or crossover cable.

From Windows Explorer:

3. Enter the following address, using the IP address of the HMI:
   ftp://uploadhis:111111@192.168.1.50
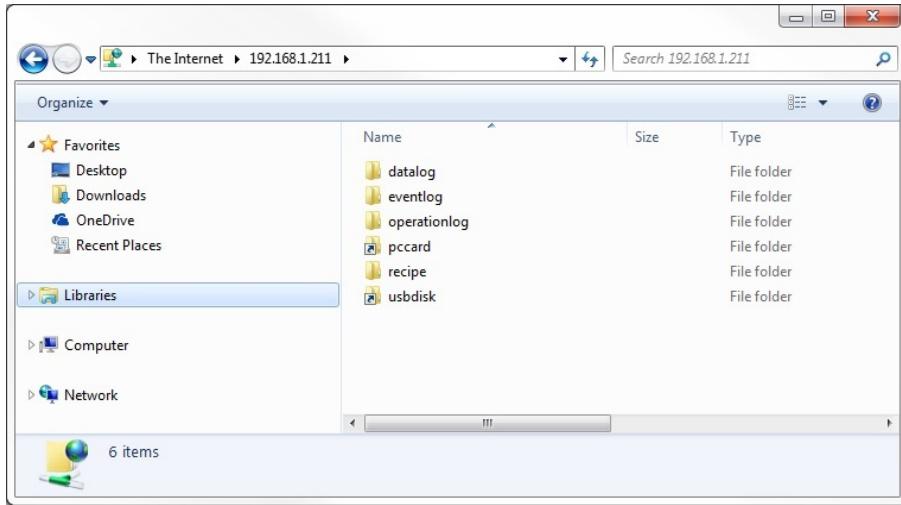
   Note: 111111 is the default "Upload history" password. If the password is different in the HMI, use that password instead.


4. Press "Enter" (or the right-arrow button).
   ftp://192.168.1.50 is shown in the address window for Windows XP (The Internet > 192.168.1.50 for Windows 7) and the data log, event log, recipe, operation log, pccard, and usbdisk folders appear in
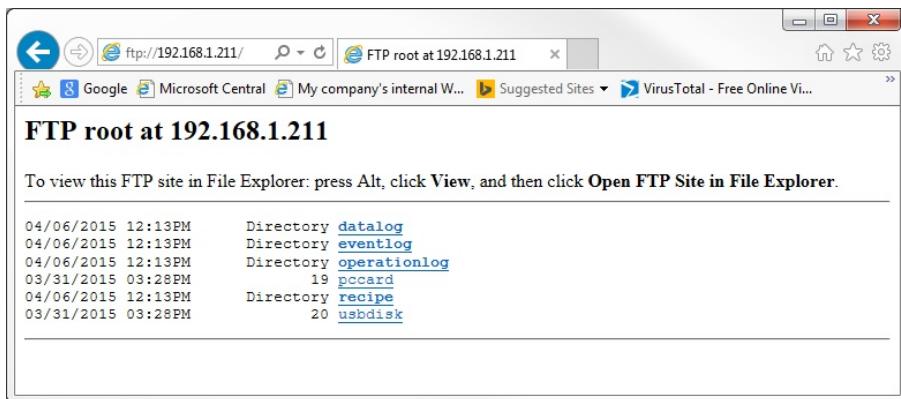
the view pane. You can open each folder and copy-and-paste or drag the contents to your computer's hard drive without interrupting the operation of the HMI.

From Internet Explorer:

5. Enter the following address, using the IP address of the HMI:
   ftp://uploadhis:111111@192.168.1.50

6. **Note:** 111111 is the default "Upload history" password. If the password is different in the HMI, use that password instead.

7. Press "Enter." The data log, event log, recipe, operation log, pccard, and usbdisk folders appear in the view pane.

8. Click on the folder names (Directory) to access the individual files. Click on a file name to download it to your computer.

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