HITECH

ADP Software Quick Manual

1. INSTALLATION 1-1

1.1. INSTALLATION PROCEDURES 1-1

2. ADP PROGRAM ENVIRONMENT AND OBJECTS OVERVIEW 2-1

2.1. ADP PROGRAM ENVIRONMENT 2-1
2.2. ADP MENU BAR 2-2
2.3. FILE 2-2

2.3.1 New *2-2*

2.3.2 Open *2-2*

2.3.3 Close *2-3*

2.3.4 Save *2-3*

2.3.5 Save As *2-3*
2.3.6 Print *2-3*
2.3.7 Upload Application *2-3*
2.3.8 Download Application From *2-3*
2.3.9 Upload Recipes *2-3*
2.3.10 Download Recipes *2-3*
2.3.11 Download Source *2-4*
2.3.12 Upload Source *2-4*
2.3.13 Files 1 ~ 4 ..... *2-4*

2.4. EDIT 2-4

2.4.1 Duplicate *2-4*

2.4.2 Decompose Shape *2-5*

2.4.3 Alignment *2-5*
2.4.4 Make Same Size *2-5*
2.4.5 Nudge *2-5*
2.4.6 Layer *2-5*

2.4.7 Group *2-5*

2.4.8 Ungroup *2-5*

2.5. VIEW 2-6

2.5.1 Whole Screen and I/O Labels *2-6*

2.5.2 *Languages 1~5* 2-6
2.5.3 *Zoom* 2-6
2.5.4 *Touch Grid* 2-6
2.5.5 *Toolbars* 2-6
2.6. SCREEN 2-6
2.6.1 *New Screen* 2-6
2.6.2 *Open Screen* 2-6
2.6.3 *Close Screen* 2-7
2.6.4 *Open Macro* 2-7
2.6.5 *Close Macro* 2-7
2.6.6 *Cyclic Macro* 2-7
2.6.7 *Properties* 2-7
2.7. DRAW 2-8
2.8. OBJECT 2-9
2.8.1 *Push Buttons* 2-9
2.8.2 *Numeric Entry* 2-13
2.8.3 *Character Entry* 2-13
2.8.4 *Indicators* 2-14
2.8.5 *Numeric Display* 2-14
2.8.6 *Character Display* 2-14
2.8.7 *Message Display* 2-14
2.8.8 *Bar Graph* 2-15
2.8.9 *Trend Graph* 2-17
2.8.10 *X-Y Chart* 2-18
2.8.11 *Panel Meter* 2-19
2.8.12 *Pie Graph* 2-19
2.8.13 *Dynamic Graph* 2-19
2.8.14 *Historical Display* 2-21

2.8.15 Alarm Display *2-23*
2.8.16 Sub-Macro *2-25*
2.9. LIBRARY 2-25
2.9.1 Bitmap Library *2-25*
2.9.2 Save As Shape *2-27*
2.9.3 Shape Library Manager *2-27*
2.9.4 Text Pool *2-27*
2.10. APPLICATION 2-28
2.10.1 Workstation Setup *2-28*
2.10.2 Tag Table *2-30*
2.10.3 Set Alarm *2-31*
2.10.4 Common Keys *2-32*
2.10.5 System Messages *2-32*
2.10.6 Report format *2-33*
2.10.7 Initial Macro *2-35*
2.10.8 Background Macro *2-35*
2.10.9 Clock Macro *2-35*
2.10.10 Compile *2-35*
2.10.11 Download Appliction *2-35*
2.10.12 Download Firmware and Appliction *2-36*
2.10.13 File Protection *2-36*
2.11. TOOL 2-37
2.11.1 Off-line Simulation *2-37*
2.11.2 On-line Simulation *2-37*
2.11.3 View/Edit Recipes *2-37*
2.12. OPTIONS 2-38
2.12.1 Grid Attributes *2-38*
2.12.2 Transmission Setup *2-38*
2.12.3 Language Selection *2-38*
2.13. LADDERPLUS 2-40
2.13.1 Start Monitor *2-40*
2.13.2 Ladder *2-40*
2.13.3 Statement Lists *2-41*
2.13.4 Status Chart *2-41*

2.13.5 Initial Values *2-41*

2.14. WINDOW 2-42

2.15. HELP 2-42

3. EXERCISE: CREATE A SIMPLE APPLICATION 3-1

3.1. CREATE A NEW APPLICATION 3-1

3.2. DESIGN "MOTOR STARTUP AND SPEED MONITOR" SCREEN 3-2

3.2.1 Create "Motor Startup and Speed Monitor" Screen 3-2

3.2.2 Create "Motor Startup/Stop" Maintained Button 3-3

3.2.3 Create the "Motor Startup and Speed Monitor" Static Text 3-13

3.2.4 Create "Motor Speed" Numeric Display 3-15

3.2.5 Create "Motor Startup/Stop" Multistate Indicators 3-18

3.3. DESIGN THE "SET MOTOR SPEED" SCREEN 3-22

3.3.1 Create the "Set Motor Speed" Screen 3-22

3.3.2 Create "Motor Speed" Numeric Entry object 3-23

3.3.3 Create "Set Motor Speed" Static Text 3-25

3.3.4 Create "RPM" Static Text 3-25

3.4. DESIGN FOR SWITCHING SCREENS 3-26

3.4.1 Open Screen 3-26

3.4.2 Create "Goto Screen #2" Button 3-27

3.4.3 Create "Return to Screen #1" Button 3-30

3.4.4 Save File 3-30

3.4.5 Open Existed File 3-31

3.4.6 Compile 3-31

3.5. DOWNLOAD FROM PC TO HMI 3-33

3.5.1 PC/HMI Communication Cable 3-33

3.5.2 ADP Communication Settings 3-33

3.5.3 HMI Hardware Settings 3-34

3.5.4 Download 3-35

3.6. CONNECT HMI TO PLC 3-36

3.6.1 HMI/PLC Communication Cable 3-36

3.6.2 ADP Communication Settings 3-36

3.6.3 HMI Hardware Settings 3-37

3.6.4 Connecting HMI to PLC 3-38

3.6.5 Communication Error Code 3-38

1. Installation

ADP Software is compressed and requires installation before using it. Users may install the software from the CD or floppy disk.

The software is available from http://www.hitechsite.com.tw, or your local dealer.

1.1. Installation Procedures

1. Boot up your computer in Win95/98/Me/2000/XP environment.
2. If CD is used for ADP installation, select the "Run" option in the windows Start Menu. Click "Browse" and locate "ADP \disk1\Setup.exe" in the CD-Rom drive. Run the installation program (Setup.exe) See Fig 1-1.

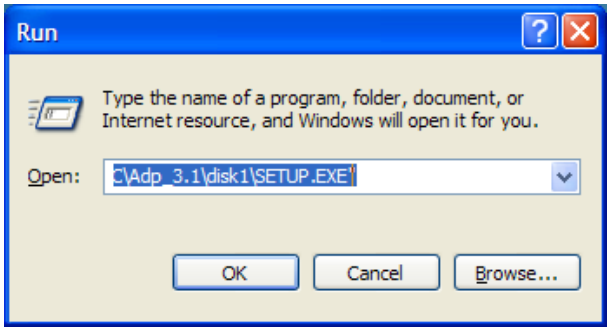


Fig 1-1 Run the installation program (Setup.exe) in Windows

3. Click "OK" button. System will prepare for installation. See Fig 1-2.

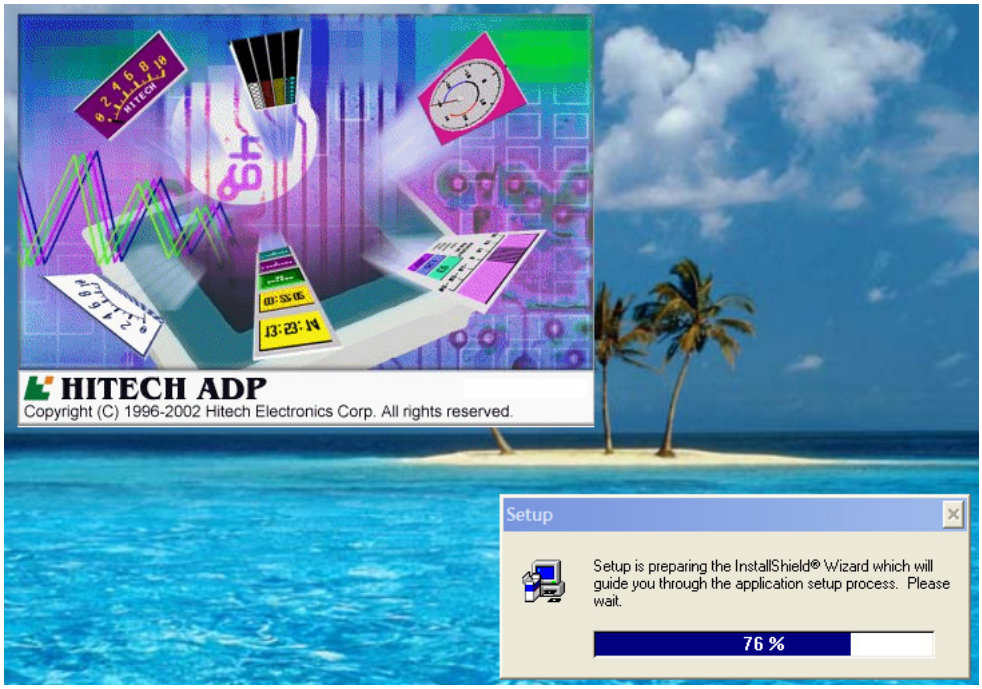


Fig 1-2 Installation process is started

4. First, a message is displayed in the center of the screen, asking user to confirm the destination hard drive and directory for ADP installation (See Fig 1-3). The default directory is C:\HITECH ADP. You may change hard drive and directory at this point by clicking on “Browse…” button.

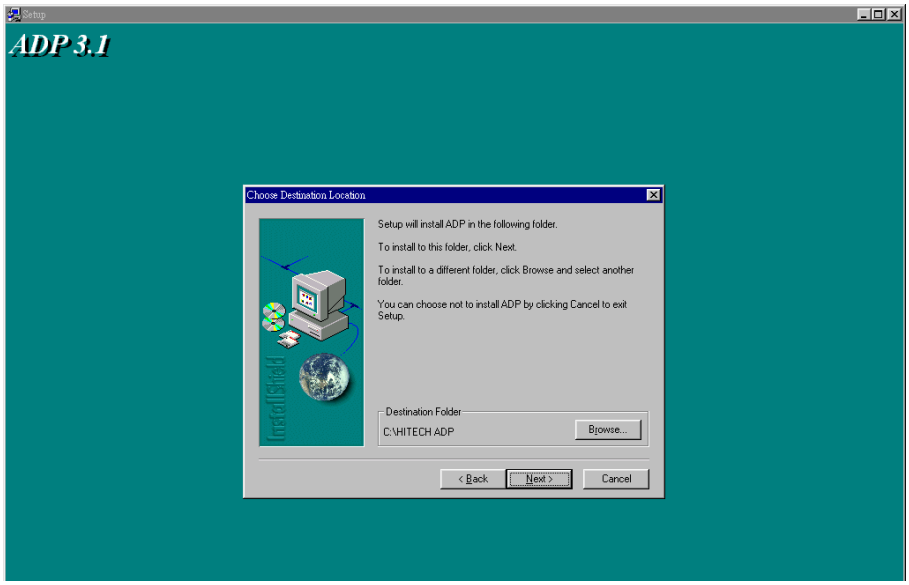


Fig 1-3 Destination hard drive and directory for ADP installation

5. After clicking “Next”, the system starts the installation automatically. (See Fig 1-4)

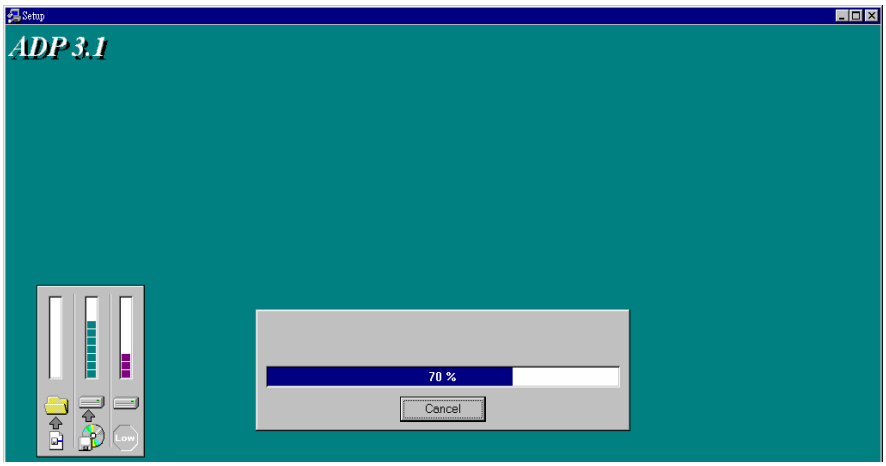


Fig 1-4 ADP software installs automatically

6. After installation is complete, the system creates an ADP icon automatically. (Fig. 1-5)

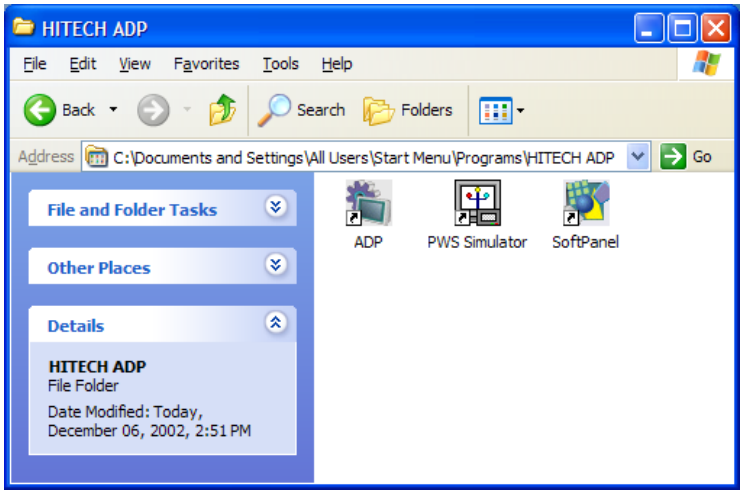
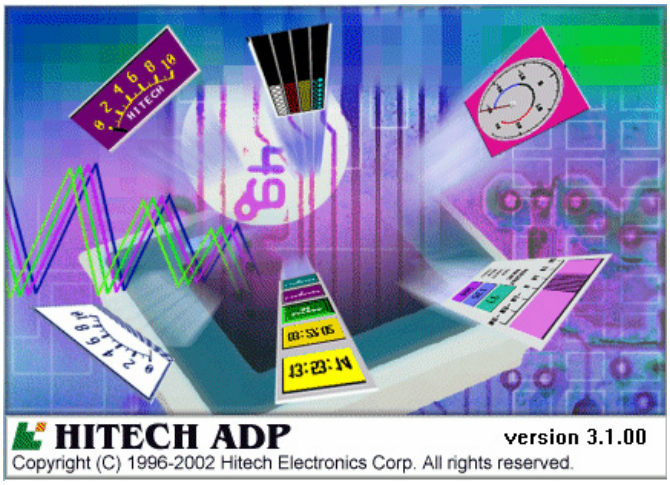


Fig. 1-5 The ADP icon

7. After installation is complete, the ADP software is located in the specified directory. To launch the ADP program, simply click on the ADP icon using the mouse.


HITECH ADP
version 3.1.00
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2. ADP Program Environment and Objects Overview

2.1. ADP Program Environment

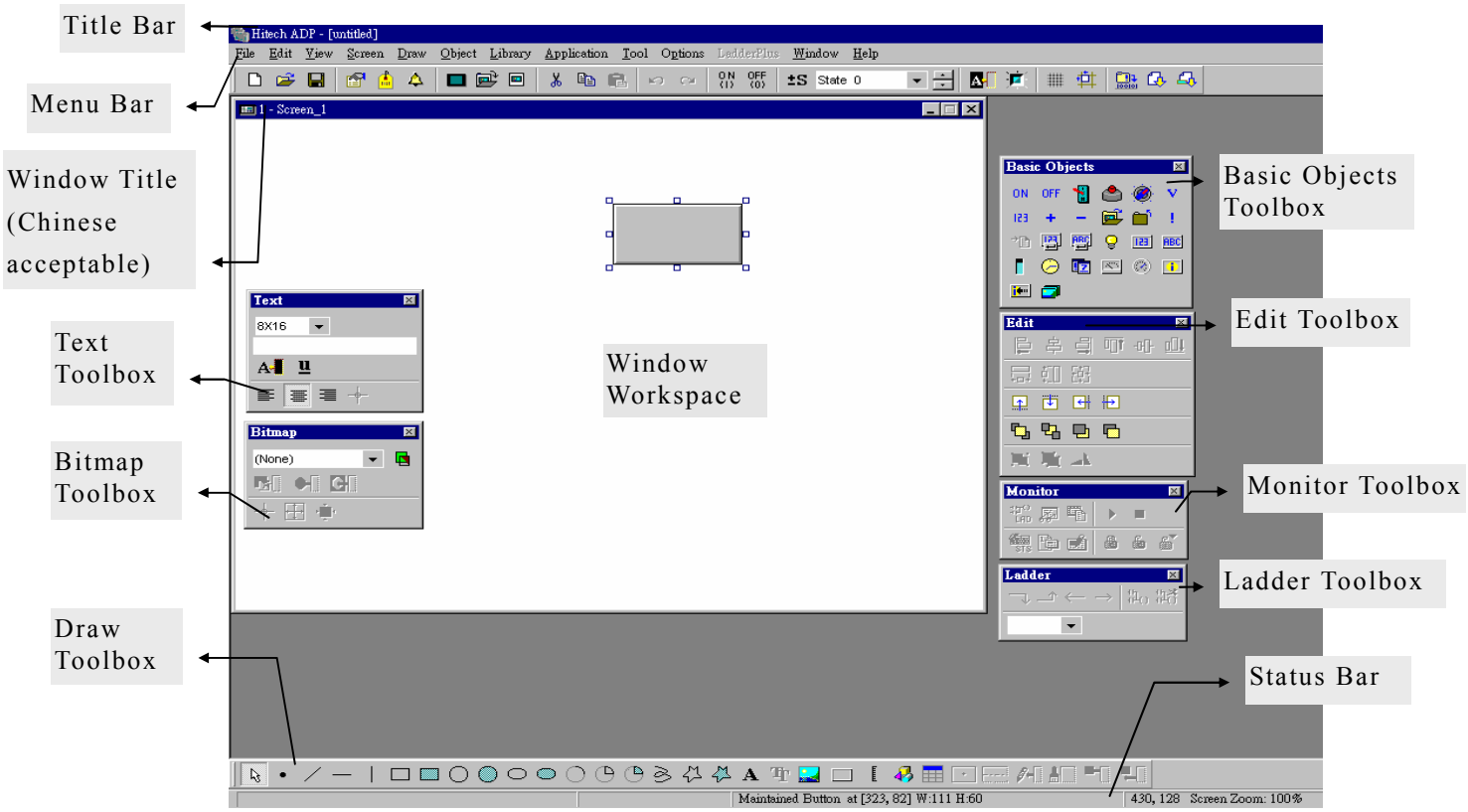


Fig. 2-1 ADP Program Environment overview

1. When entering the ADP program for the first time, and no new application file is open, only the “File” and “Help” menu items will be displayed in the ADP Program Window.

2. When starting ADP thereafter, the last saved application is opened and displayed automatically.

Title Bar

Window name and directory path of current working application. (If application file is not saved yet, the name of “untitled” will be

displayed.)

Menu Bar

There are 13 menus with pull-down lists: “File”, “Edit”, “View”, “Screen”, “Draw”, “Object”, “Library”, “Application”, “Tool”, “Options”, “LadderPlus”, “Window”, and “Help”.

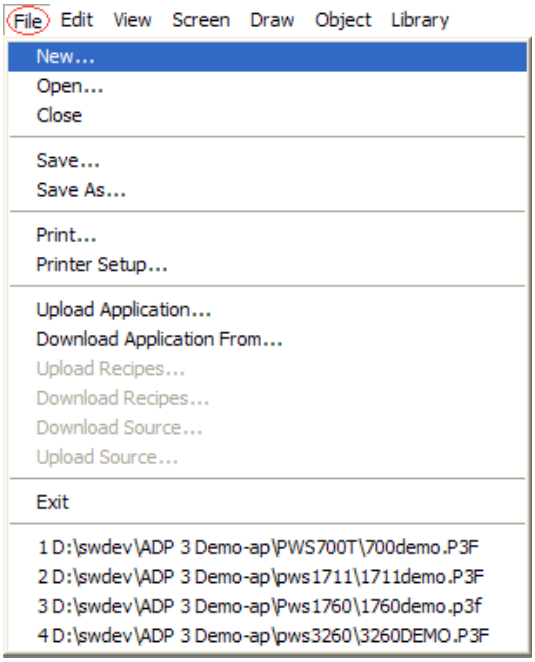
Window Workspace

Area to design and build Screens, i.e., design area for the actual screens shown on HMI.

2.2. ADP Menu Bar

There are 13 menus with pull-down lists in ADP software’s menu bar. This provides what designers need to design and edit HMI applications—designing objects, buttons, text display, graphics, and screen layout. The following sections individually introduce each menu and the functions of each menu provided in its pull-down list for ADP software operations. Refer to the **ADP Software User’s Manual** for detailed information.

2.3. File



File Menu provides the File Management System for the ADP applications.

2.3.1 New

Create a new application file.

2.3.2 Open

Open a previously designed application file. File types which could be opened include *.P3F and *.V3F.

Note: “*.P3F” application files are created by versions prior to ADP 3.0. “*.V3F” application files are created by ADP version 3.0 and after.

2.3.3 Close

Close the operation of current application file.

2.3.4 Save

Save the current application file directly using its original directory path and file name.

2.3.5 Save As

Save the application using a different file name. File type is set as "*.V3F".

2.3.6 Print

There are 7 printing options available: Workstation Setup, Screen Overview, Screen Image, Tags, Ladder, Status Chart, and Initial Values.

NOTE: The **"**Ladder", "Status Chart", and "Initial Values" options are only available for selecting PWS models with Ladder.

2.3.7 Upload Application

ADP will upload the application from HMI to PC and save it as a "*.AP1" or "*.AP2" file. ADP cannot open or edit files of these types.

2.3.8 Download Application From

ADP downloads a "*.AP1" or "*.AP2" file from PC to HMI.

2.3.9 Upload Recipes

ADP uploads the recipes from HMI to PC and saves it as an *.RCP file.

2.3.10 Download Recipes

ADP selects a recipe file with file extension *.RCP and downloads it to HMI.

Note: PWS500, PWS700, and PWS1711 do not support the recipe function and hence both commands are not supported.

2.3.11 Download Source

ADP downloads the source code of a HMI application to HMI and save it in the flash memory as a backup file.

2.3.12 Upload Source

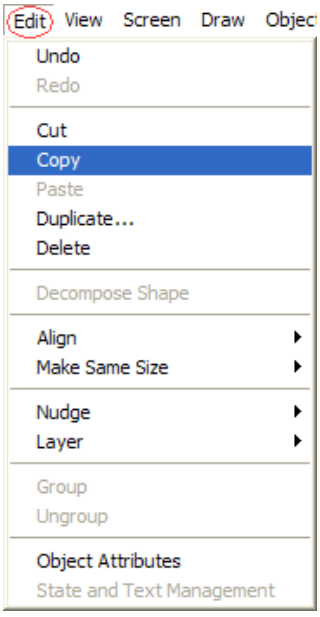
ADP uploads and restores the source code of a stored application from HMI to PC and saves it as a *.V3F file. Use this command to edit or save your application. Make sure the “Download Source” was executed before using this command, i.e., HMI must have the source codes of the application downloaded before it could be uploaded.

Note: Only PWS3760 series, PWS3260 series, PWS1760-xxxR support this function.

2.3.13 Files 1 ~ 4

The last four applications are listed at the bottom of the file menu’s pull-down list.

2.4. Edit



The Edit Menu provides the ADP a management system for objects with the following functions: “copy/delete”, “align/make same size”, “bring to next/send to previous”, and “edit”. The grayed-out items in the pull down menu are not available. (The icons in the description indicate shortcuts in the toolbar).

2.4.1 Duplicate

Make fast multiple copies of selected objects, such as Numeric Entry and Button objects. Not only the copied objects are distributed evenly, associated PLC data addresses are incremented accordingly, as in Fig. 2-3.

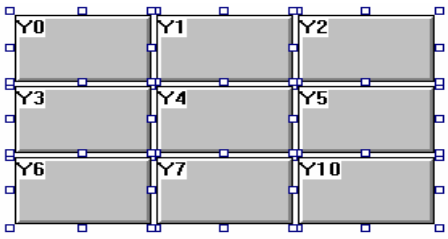


Fig. 2-3

2.4.2 *Decompose Shape*

Use this function to decompose a Shape object.

2.4.3 *Alignment*

Align objects to the left , horizontal center , right , top , vertical center , or bottom .

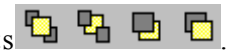
2.4.4 *Make Same Size*

Make objects the same width as specified by Width , or same height as by Height , or same Height and Width as by Both .

2.4.5 *Nudge*

Designer may nudge (move) the selected object left , right , up , or down and thus adjust its position in the display.

2.4.6 *Layer*

Adjust the layer of an object from other overlay objects  .

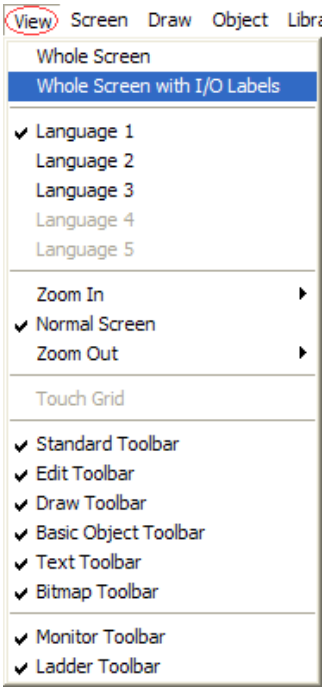
2.4.7 *Group*

Group selected objects as a set of objects making moving and copying easier.

2.4.8 *Ungroup*

Ungroup a group of objects back to individual objects.

2.5. View



The View Menu provides functions for Zooming, Language Selection 1 ~ 5, Whole Screen Display or Whole Screen Display with I/O labels.

2.5.1 Whole Screen and I/O Labels

Provides a whole screen view of screen objects and associated I/O labels.

2.5.2 Languages 1~5

The Languages 1 ~ 5 options under the View Menu could switch screen design from one language to another language.

2.5.3 Zoom

Zoom in or out the current screen.

2.5.4 Touch Grid

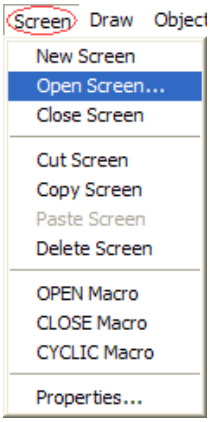
Display or hide the grid on touch panel.

> **Note: Only PWS700T supports this function.**

2.5.5 Toolbars

Display or hide various toolbars.

2.6. Screen



The Screen Menu provides functions to open a new/existing Screen, copy Screen, and for changing screen properties.

2.6.1 New Screen

Define the Screen name and number when create a new screen. For PWS500/700/1711 /2100/3700 the range of screen number is 1-255. For PWS1760/3160/3260/3760 the range of screen number is 1-999.

2.6.2 Open Screen

Open an existing screen, as in Fig. 2-6.

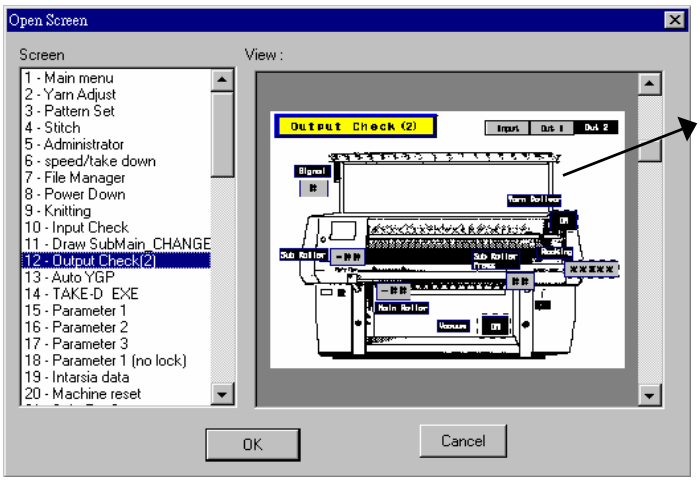


Fig.2-6 Open Screen

2.6.3 *Close Screen*

Close the Screen being designed.

2.6.4 *Open Macro*

When HMI switches to this screen, it will run the programs defined in the Open Macro once.

2.6.5 *Close Macro*

When HMI closes this screen, it will run the programs defined in the Close Macro once.

2.6.6 *Cyclic Macro*

When HMI stays in this screen, it will run periodically the programs defined in the Cyclic Macro.

2.6.7 *Properties*

This enables a designer to define or edit the current screen name and number, whether the screen is a base screen or sub-screen, printable areas, screen background style, read blocks, and auxiliary keys. See Fig.2-7.

Note: Only the PWS500S/PWS700X/PWS3760 models support auxiliary keys.

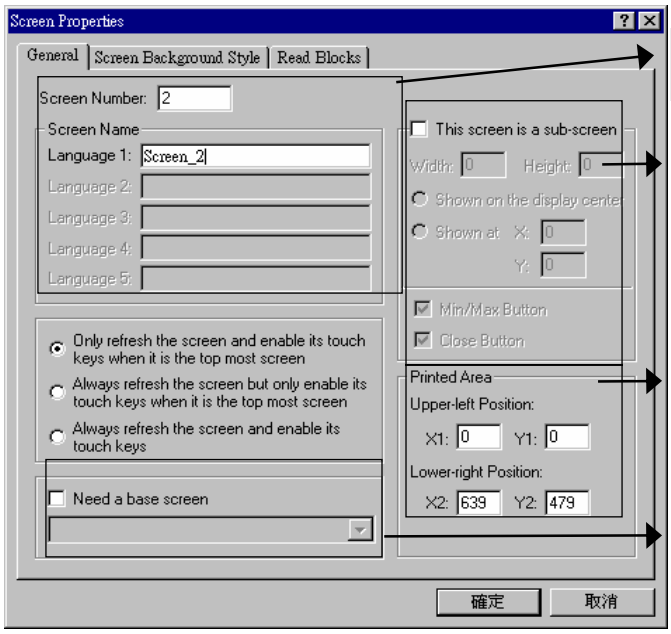


Fig. 2-7 Screen properties

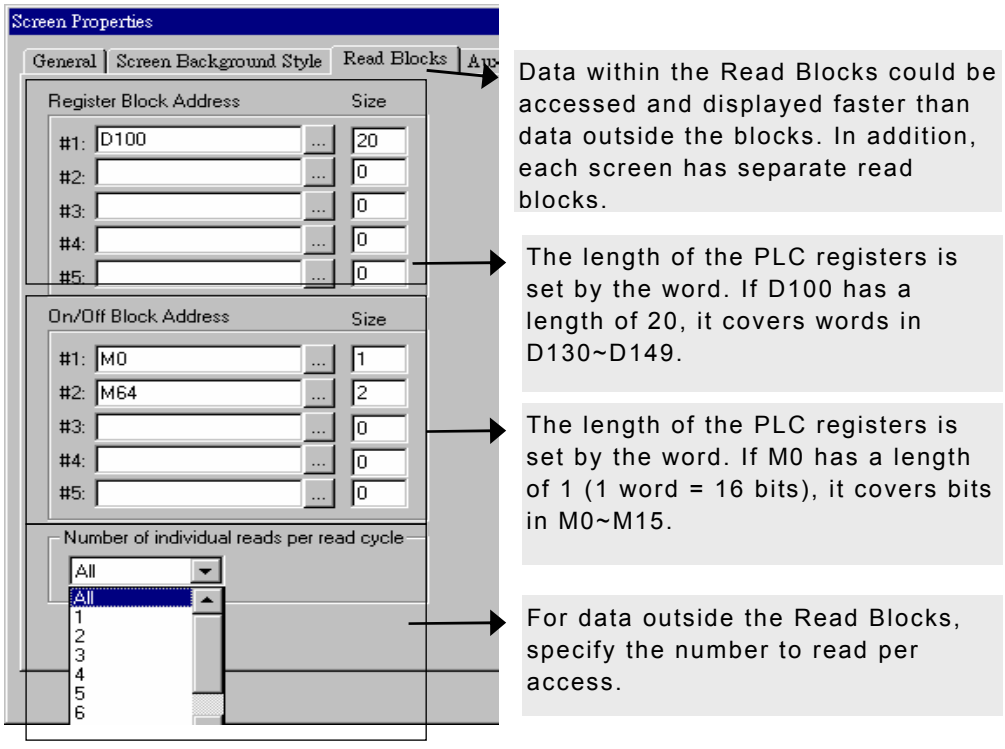


Fig.2-7 Read Blocks Settings Tab in Screen Properties dialog box

2.7. Draw

The Draw Menu provides an easy graphic drawing system, with lines, rectangles, circles, arcs, etc.

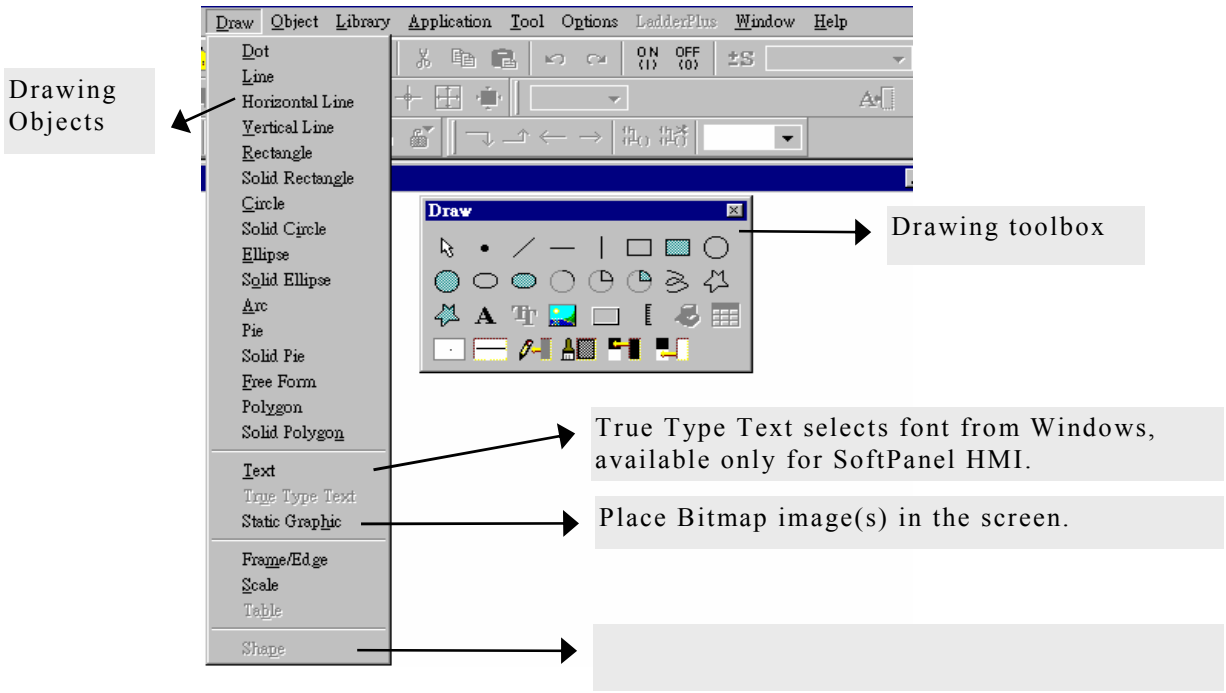
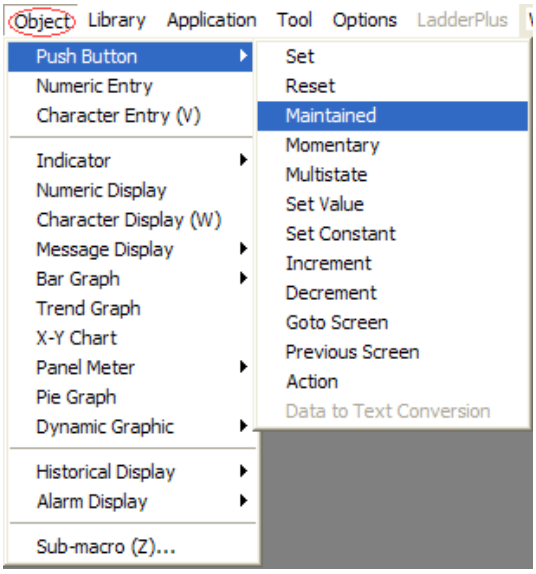


Fig.2-8 Draw menu

2.8. Object



The Object Menu provides an object design management system, with Buttons, Numeric Entry, Multistate, Indicators objects, etc.

2.8.1 Push Buttons

Several types of push buttons are available in the menu. Refer to Fig.2-10 for each menu item.

Push Button Type	Icon	Function
Set Button	ON	Sets contact to ON and remains ON upon releasing or depressing.
Reset Button	OFF	Resets contact to OFF and remains OFF upon releasing or depressing.
Maintained Button		Sets contact to ON and remains ON upon releasing; clicking once more to set contact to OFF.
Momentary Button		Hold button to turn ON, releasing turns it OFF.

Multistate Button		This button has 3 states; push once to send S_0 signal to PLC; pushing a second time sends an S_1 signal to PLC; pushing a third time sends an S_2 signal to PLC. This button cycles from $S_0 \rightarrow S_1 \rightarrow S_2 \rightarrow S_0$, or in reverse from $S_0 \rightarrow S_2 \rightarrow S_1 \rightarrow S_0$. The maximum number of states allowed is 256.
Set Value Button		Upon pressing, HMI displays the built-in 10-Key keypad on the screen for value input. When "Enter" is pressed, HMI sends the value to the related register in the PLC.
Set Constant Button		Upon pressing, HMI sends a specified constant to the related register in the PLC.
Increment/Decrement Buttons		Upon pressing, HMI first reads the PLC register content and increases/decreases by the specified value. The calculated result is write back to the register in the PLC.
Goto Screen Button		Pressing once directly switches HMI to a specified screen. Some important properties In the dialog box: "Enabled by"--switch screen only when the specified PLC register bit is ON. "Acknowledge Alarm"--HMI has acknowledged the current message alert. "Notify"→Upon switching screen, this triggers a related PLC register bit.
Previous Screen		Pressing once, HMI will switch back to the previously displayed screen.
Data to Text Conversion Button		Convert data from the Logging Buffers, Recipes, Alarm History file, and Alarm Frequency file into a text file (*.PRN) and save it. Data is accessible by word processing software such as Excel, Word, and Notepad. (Supported only by SoftPanel).
Action Button		17 actions could be defined from Action button.
Contrast Up		Press to increase screen contrast of HMI. (Not supported by SoftPanel)
Contrast Down		Press to decrease screen contrast of HMI. (Not supported by SoftPanel)
Save Contrast		Press for HMI to save contrast settings. (Not supported by SoftPanel)
Password Table		Pressing once displays a password table. Operation allowed when LEVEL= 1.
Reenter Password		Pressing once displays a window for re-entering the password.
Set Lowest User Level		Pressing once sets the security level to the lowest level, LEVEL=3.
Print Screen		Pressing once prints the specified Printable Area of the current screen. (Hardcopy Printing).
Goto System Menu		Pressing once switches back to the system's menu screen. Operation allowed when LEVEL= 1.
Turn off Backlight		Pressing once turns off the backlight. (Not supported by SoftPanel)
Alarm Ack		Pressing once acknowledges the alarm and puts the system back in operation.
Set Time & Date		Set the HMI system time, date and week. (Not supported by SoftPanel)
Select Languages 1~5		Switch the screen from the current language to the specified language.
Select Screen		Select a screen to switch to. (Supported only by SoftPanel)

Name Recipe		Name a recipe, either in English or Chinese. (Supported only by SoftPanel)
Select Recipe		Search for a recipe. (Supported only by SoftPanel)
Print Report		Print data from the Logging Buffers, including history, alarm history and recipes. (Supported only by SoftPanel)
Run Application		Run other Windows's executable program (*.exe). (Supported only by SoftPanel)

Fig.2-10 Object -> Push Button menu

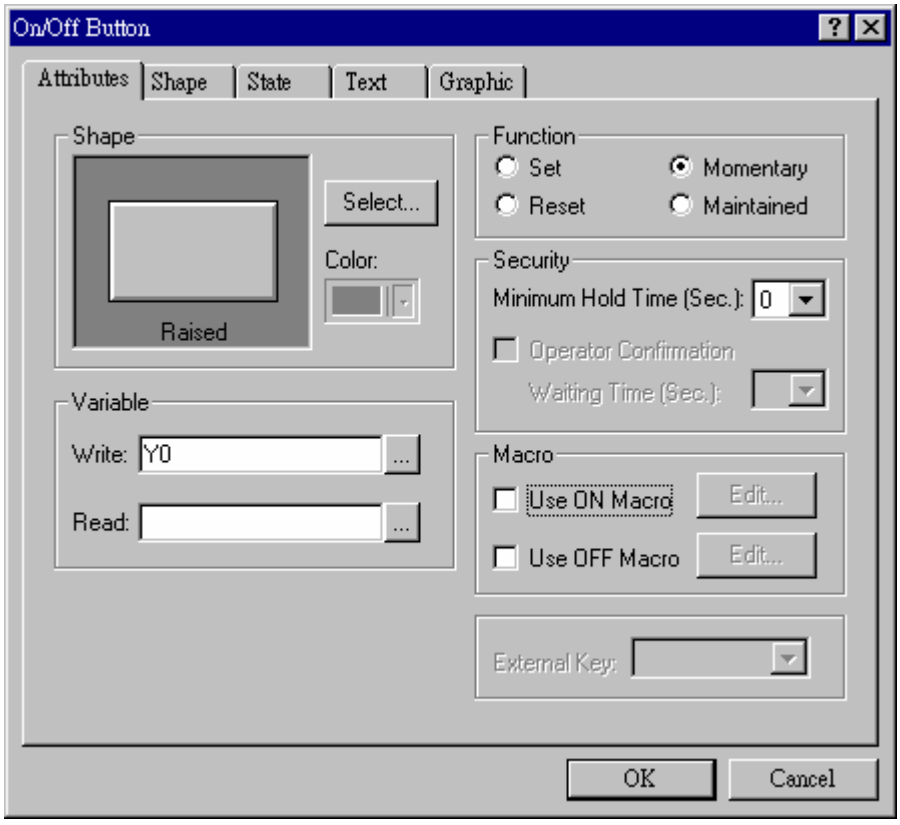


Fig.2-11 Button Properties dialog box and settings

Attributes Tab

Write	Write to related contact of PLC
Read	Read from the related PLC contact. If not specified, use the same location as "Write". A different location may be specified also.
Minimum Hold Time	Hold button for specified time, before HMI writes to the PLC.
Operator Confirmation	If selected, HMI will automatically request "confirmation". After "Yes" is pushed, HMI sends signal to PLC.
Use ON Macro	ON Macro: run programs in ON Macro when the button state is ON.
Use OFF Macro	OFF Macro: run programs in OFF Macro when the button state is OFF
External Key	Only PWS500S700X/ 2100 support external keys
Shape Tab	Frame and color of the button
State Tab	Add or delete a state of a button
Text Tab	Design text and font size of a button
Graphic Tab	Bitmap selection and setting of a button

2.8.2 *Numeric Entry*

By pressing this object, the HMI will display the built-in 10-key keypad from which you may input value(s). The HMI writes the value to the PLC register when ENTER is pressed.

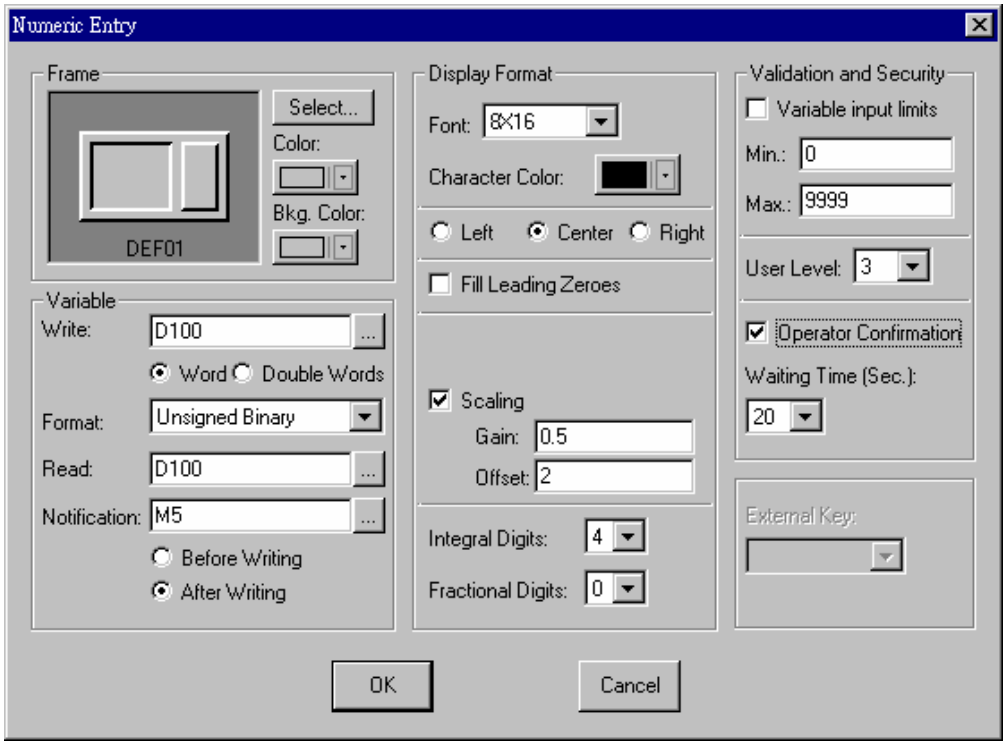


Fig.2-12 Numeric Entry Properties dialog box and settings

Before Writing	touch the value input button to notify contact that M5= on. When a value is entered and "ENTER" is pressed, notify that M5=off.
After Writing	When a value is entered and "ENTER" is pressed, notify that M5=on. Requires PLC program to reset.
Scaling	supported only for values of binary format, using the formula Y=aX+b. Y = HMI displayed value, X= PLC stored value, a=Gain, b=Offset. If a=0.5, b=2, when HMI inputs 10 (Y=10), PLC writes 16 (X=16).

2.8.3 *Character Entry*

Pressing the Character Entry object displays the system built-in ASCII keypad on screen with which you may enter ASCII characters. (The string has a maximum length of 28 characters.) When "Enter" is pressed, the ASCII code is sent to the register in the PLC.

Note: PWS500/PWS700/PWS2100 does not support this function.

2.8.4 Indicators

There are two types of indicators:

1. Multistate Indicators: HMI reads the contact status or register value from PLC and automatically displays corresponding designed content on the HMI screen. The maximum number of states is 256 (if “Value” selected) or 16 (if “LSB” selected) or 2 (if “Bit” selected).

2. Range Indicators: HMI reads register values from PLC and automatically calculates the difference according to the boundary value of the current status. Then the contents of the current status are displayed on the HMI screen, according to the calculated results.

2.8.5 Numeric Display

HMI reads the register value from the PLC and directly displays it on the HMI screen. (does not support input) See Fig. 2-13.

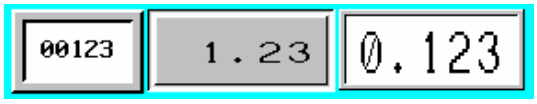


Fig.2-13 Numeric Display

2.8.6 Character Display

HMI reads the ASCII value of the register from the PLC and converts the ASCII code into alphanumeric characters for display on the HMI screen. (does not support input.) See Fig. 2-14.

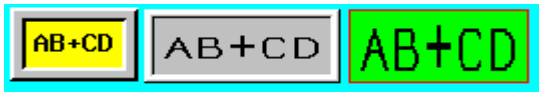


Fig.2-14 Character Display

2.8.7 Message Display

There are 5 types of Message Display. The difference between Message Display and Indicator is that Message Display contains only

text, no graphics, however Indicator could have both text and graphics.

Prestored Message Display

HMI reads the contact state or register value from the PLC and automatically displays designed content on the HMI screen according to the state/value. Maximum number of states is 256 (if “Value” selected) or 16 (if “LSB” selected) or 2 (if “Bit” selected.)

Moving Sign

HMI reads the contact state or register value from the PLC and automatically displays designed content on the HMI screen according to current state/value. The effect is revolving text display, moving from right to the left. “Number of text to be revolved at a time” and revolving speed are configurable at design time.

Time Display

HMI reads the time value of the internal REAL TIME CLOCK and displays the content directly on the HMI screen. (Not supported by PWS500/PWS700.)

Date Display

HMI reads the date value of the internal REAL TIME CLOCK and displays the content directly on the HMI screen. (Not supported by PWS500/PWS700.)

Day-of-Week Display

HMI reads the week value of the internal REAL TIME CLOCK and displays the content directly on the HMI screen. (Not supported by PWS500/PWS700.)

2.8.8 Bar Graph

There are 2 types of Bar Graph:

Normal Bar Graph

HMI reads values of the PLC register and converts data into Bar Graph for display on the HMI screen. See Fig. 2-15.

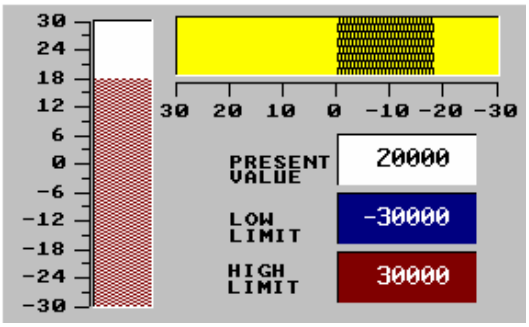


Fig.2-15 Normal Bar Graph

Note: Suppose the PLC D100 is specified for access. If the "Limits" and "Target/Objective Value" are checked, D101 is the Target Value, D102 the Lower Limit and D103 the Upper Limit.

Deviation Bar Graph

HMI reads values of the PLC register and compares them with the normal. Then converts the difference as Bar Graph and displays on the HMI screen. See Fig. 2-16 for settings. When the PLC register D100 has a value of 60 (D100=60), it displays the PLC Value (60) – Normal (50) = 10. See Fig. 2-17. When the PLC has a value of 80 (D100=80), it displays the PLC Value (80) – Normal (50) = 30. Since 30 is greater than the Upper Limit (25), the display color is changed. See Fig. 2-18.

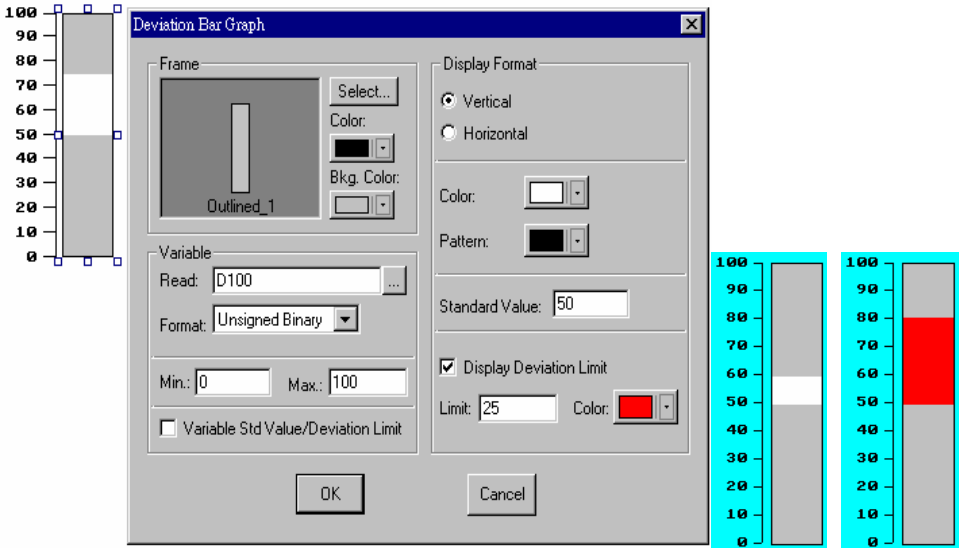


Fig. 2-16 Settings of Deviation Bar Graph Fig.2-17 Fig.2-18

2.8.9 *Trend Graph*

HMI reads a series of values from the related PLC register and converts them into Trend Graph for display on the HMI screen. See Fig. 2-19. A trend graph may have a maximum number of 4 curves on it.

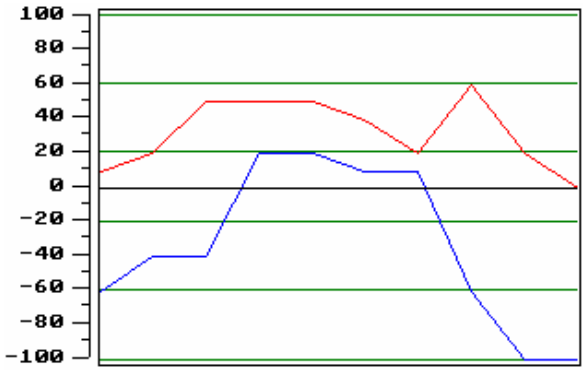


Fig. 2-19 Trend Graph Display

Note:

1. Information about Set Flag, Clear Flag, System Control, please refer to **ADP Software User's Manual.**
2. "Number of Points" indicates the maximum display points of the Bar Graph's X-Axis.
3. Sampling rule is described in the following. If the access field is D100 with 2 curves, then

D100=Sampling Number,
D101=1st dot on 1st curve,
D102=1st dot on 2nd curve,
D103=2nd dot on 1st curve,
D104=2nd dot on 2nd curve,
:
:
When Flag=ON, HMI converts the data stream into Trend Graph for display on the HMI screen.

2.8.10 X-Y Chart

HMI reads a series of values from the related PLC register. Then converts them into curves and displays on the HMI screen. See Fig. 2-20. An X-Y Chart may have a maximum number of 4 curves on it.

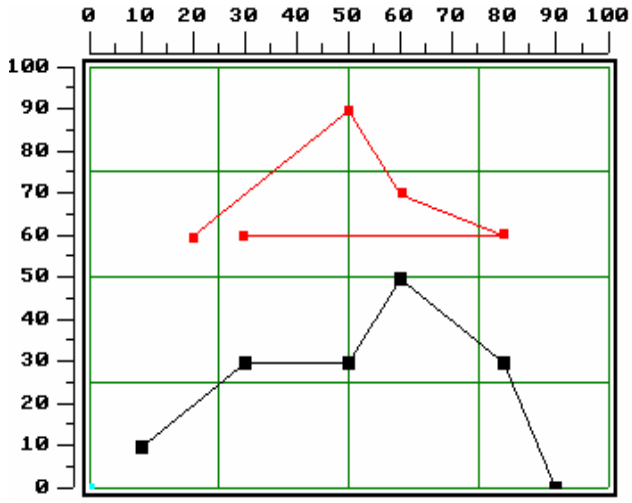


Fig.2-20 X-Y Chart display

Note:

1. Information about Set Flag, Clear Flag, System Control, please refer to **ADP User's Manual.**

2. Sampling rule is described as followings. If the access field is D100 with 2 curves, then

D100=Sampling Number,
D101=X-axis value of 1st point 1st curve
D102=Y-axis value of 1st point 1st curve
D103=X-axis value of 1st point 2nd curve
D104=Y-axis value of 1st point 2nd curve
D105=X-axis value of 2nd point 1st curve
D106=Y-axis value of 2nd point 1st curve

	D107=X-axis value of 2nd point 2nd curve D108=Y-axis value of 2nd point 2nd curve : : When Flag=ON, the HMI converts the data stream into curves for display on the HMI screen.

2.8.11 Panel Meter

Functions of the Panel Meter object Supported in ADP allows designer to build panel meters easier and faster. There are 2 types of Panel Meter, see Fig. 2-21.:

1. round

2. rectangular.

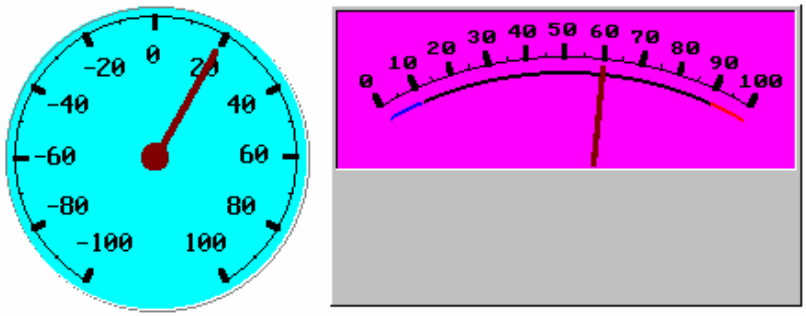


Fig. 2-21 Panel Meter object

	Note: Suppose D100 is specified for access. If the "Variable target/range Limits" is checked, D101 is the Target Value, D102 is the Lower Range and D103 Upper Range.

2.8.12 Pie Graph

HMI reads register values in the PLC. Converts values into a 360° pie graph and displays on the HMI screen.

2.8.13 Dynamic Graph

There are four types of Dynamic Graph:

Animated Graphic

PLC could control the graphic at an arbitrary position on the HMI screen. PLC could also control graphic movement along X-axis and Y-axis, and the display of different graphics.

Suppose D100 is specified for access. D100 controls the exchange of graphics; D101 controls movement along X-axis; D102 controls movement along Y-axis.

State Graphic

PLC could control the State Graphic at a fixed position on the HMI screen by changing to different graphics. (different graphic files)

Suppose D100 is specified for access. D100 controls the exchange of graphics.

Dynamic Rectangle

PLC could control the Rectangular Graphic at an arbitrary position on the HMI screen. It could also control movement along X-axis and Y-axis, and varies its size and color.

Suppose D100 is specified for access.

Re-position Re-size Re-coloring D100=Width D101=Height D102=X D103=Y D104=Color	Re-position Re-size Fix Color D100=Width D101=Height D102=X D103=Y	Fix Position Re-size Re-coloring D100=Width D101=Height D102=Color	Fix Position Re-size Fix Color D100=Width D101=Height	Re-position Fix Size Re-coloring D100=X D101=Y D102=Color	Re-Position Fix Size Fix Color D100=X D101=Y	Fix Position Fix Size Re-coloring D100=Color (Color Depth, 16 Colors=0-15, 256 Colors=0-255)

Dynamic Circle

PLC could control Dynamic Graphic at an arbitrary position on the HMI screen. It could also control movement along X-axis and Y-axis, and varying its radius and color.

Suppose D100 is specified for access.

Re-Center Re-Radius Re-Coloring D100=Radius D101=X D102=Y D103=Color	Re-Center Re-Radius Fix Color D100=Radius D101=X D102=Y	Fix Center Re-Radius Re-Coloring D100=Radius D101=Color	Fix Center Re-Radius Fix Color D100=Radius	Re-Center Fix Radius Re-Coloring D100=X D101=Y D102=Color	Re-Center Fix Radius Fix Color D100=X D101=Y	Fix Center Fix Radius Re-Coloring D100=Color (Color Depth, 16 Colors=0-15, 256 Colors=0-255)

2.8.14 Historical Display

There are three types of Historical Display. To display correctly, the user must first set the fields in Application Menu → Workstation Setup → Logging Buffers. Logging Buffers will contain data retrieved from specified PLC registers and could kept the data at Battery Backup RAM in the HMI. For information about Setting Logging Buffers, please refer to the **ADP Software User's Manual.**

Historical Trend Graph

HMI may set fixed sampling period or the PLC may as well initiate a data read from the specified registers and store the data into the Logging Buffers in the HMI memory. After a long period of sampling, data is converted into continuous curve(s) and is displayed on the HMI screen. See Fig. 2-22.

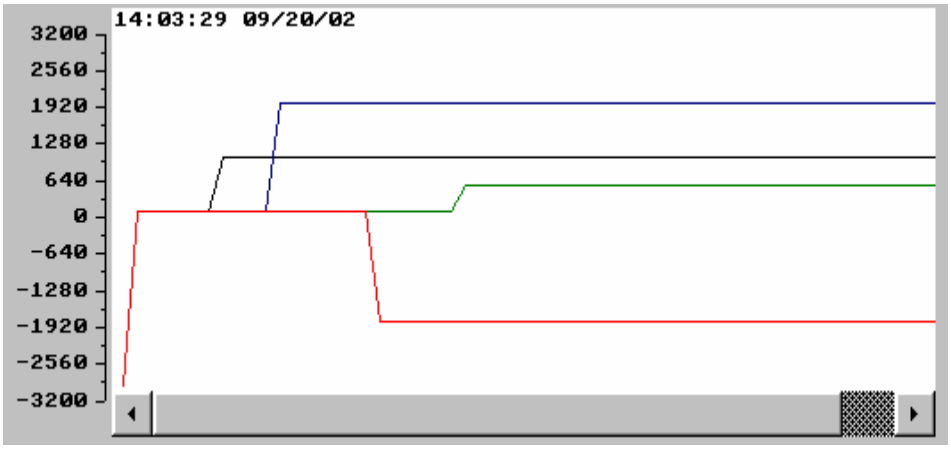
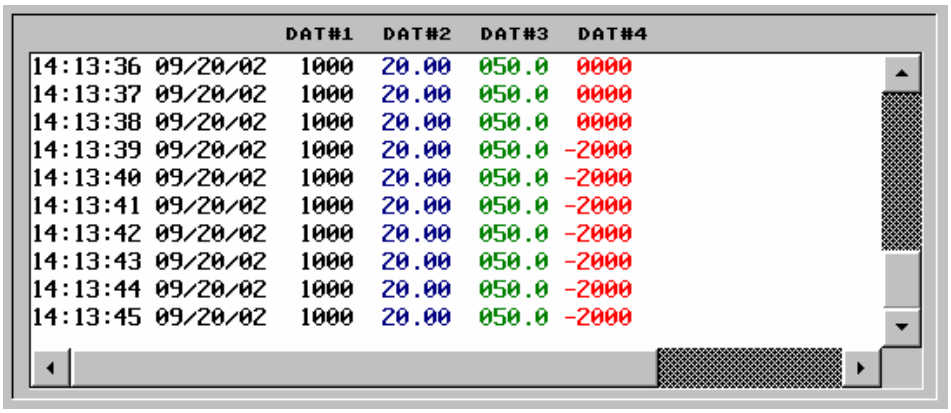


Fig.2-22 Historical Trend Graph

Historical Data Table

After a long period of data sampling, data is displayed on the HMI

screen as tabular format. See Fig. 2-23.



	DAT#1	DAT#2	DAT#3	DAT#4
14:13:36 09/20/02	1000	20.00	050.0	0000
14:13:37 09/20/02	1000	20.00	050.0	0000
14:13:38 09/20/02	1000	20.00	050.0	0000
14:13:39 09/20/02	1000	20.00	050.0	-2000
14:13:40 09/20/02	1000	20.00	050.0	-2000
14:13:41 09/20/02	1000	20.00	050.0	-2000
14:13:42 09/20/02	1000	20.00	050.0	-2000
14:13:43 09/20/02	1000	20.00	050.0	-2000
14:13:44 09/20/02	1000	20.00	050.0	-2000
14:13:45 09/20/02	1000	20.00	050.0	-2000

Fig.2-23 Historical Data Table

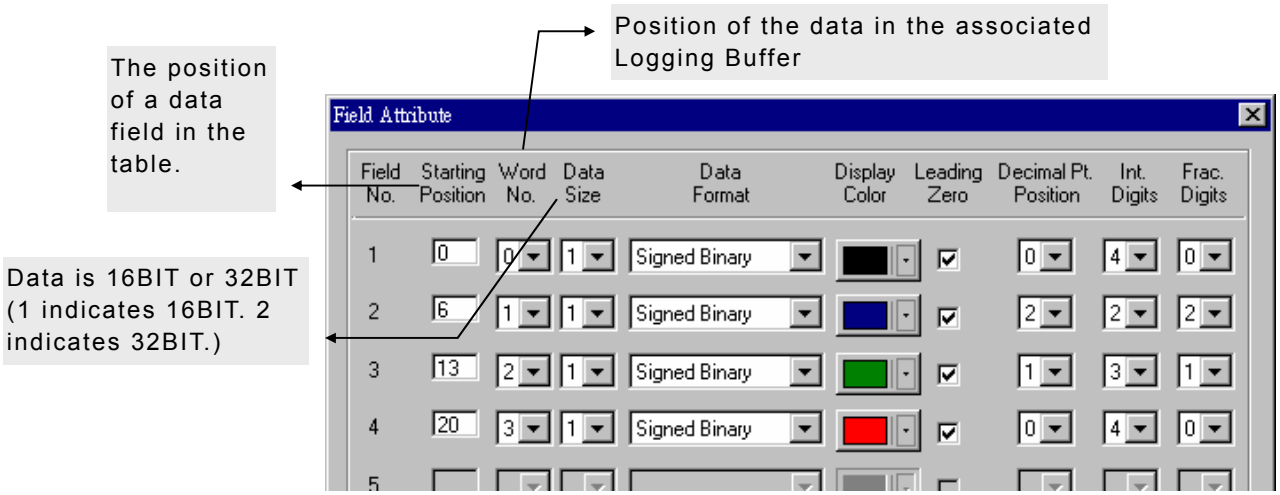


Fig.2-24 Column Properties settings in Historical Data Table

Historical Event Table

HMI may set fixed sampling period or the PLC may as well initiate a data read from specified registers or related bits in LSB. Data is converted into pre-defined message text(s), and then displays line-by-line on the HMI screen. See Fig. 2-25.

Fig.2-25 Historical Event Table

2.8.15 Alarm Display

There are four types of Alarm Display. To use these objects, designer must first set fields in Application Menu → Alarm Setup. An alarm address block in the Alarm Setup is a location in the PLC which HMI samples to ascertain the state of the alarms configured. For information about Alarm Display settings, please refer to **ADP Software User's Manual.**

Alarm History Table

HMI reads the reference bits in the PLC, activates the corresponding alarm massages, and shows them on the screen in a sequence as an alarm history table. See Fig. 2-25.

Fig.2-26 Alarm History Table

Note: There are ”S”, “A”, “C” symbols in the Alarm History Table, and they indicate:

”S”→Alarm state is unaccounted for during design
”A”→In the HMI operation, alarm is present
”C”→In the HMI operation, alarm was confirmed and canceled

Active Alarm List

HMI displays only alarm message of active alarms.

Alarm Frequency Table

HMI summarizes and displays alarm messages alone with their occurrences on the HMI screen. See Fig. 2-27.

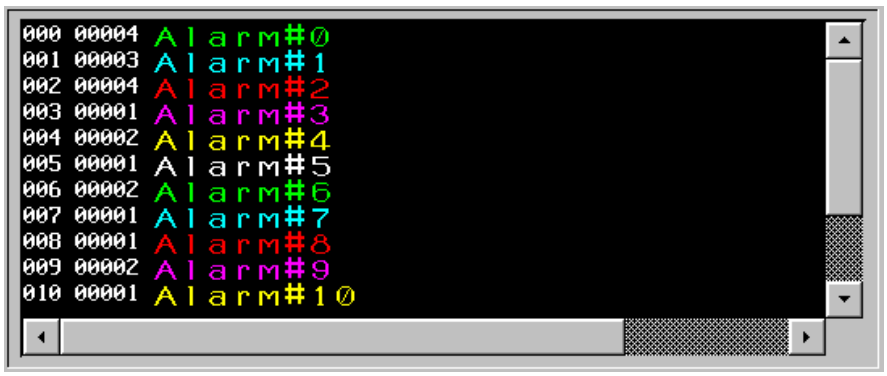


Fig.2-27 Alarm Frequency Table

Alarm Marquee

The HMI displays alarm messages of the active alarms as moving sign from right to left. See Fig. 2-27a.

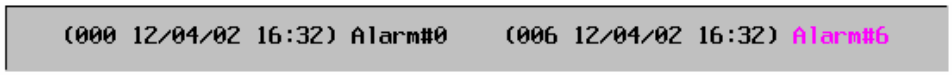
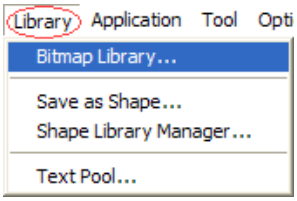


Fig.2-27a Alarm Marquee

2.8.16 Sub-Macro

It has the same meaning as "sub-routine" in macros and is used primarily for being called from macros. A set of macro commands, which is frequently used or used for repeated calculations, is usually placed in the sub-macro and stored. It can be used or called repeatedly in regular macros. The designer may design up to 512 sub-macros. For Macro design, please refer to **ADP Software User's Manual.**

2.9. Library



The Library Menu allows designers to manage Bitmap, Shape, and Text Libraries.

2.9.1 Bitmap Library

When designing a screen, load the Bitmap Library first in order to use stored bitmap files (*.bmp) or AutoCAD files (*.dwg). See Fig. 2-29.

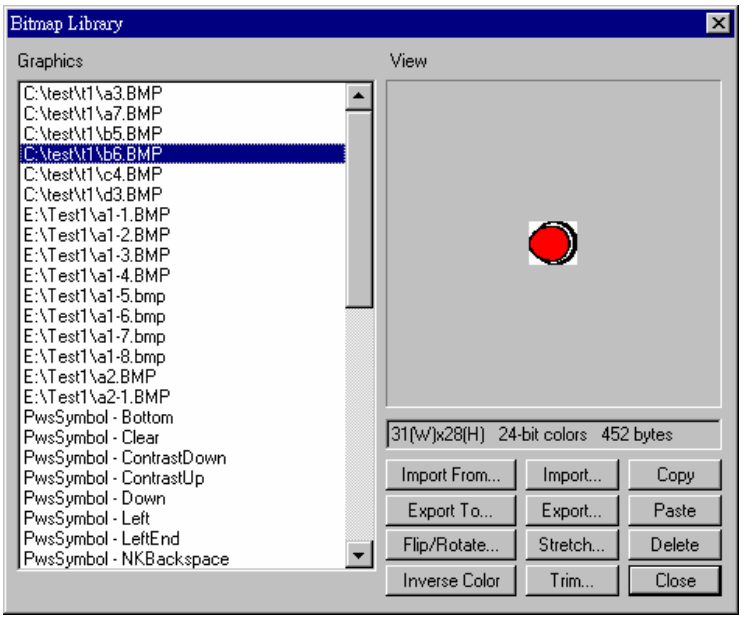


Fig. 2-29 Settings Dialog Box of the Bitmap Library

Import from

Import required graphics from ADP build-in graphic library (*.GBF). (Library path is C:/HITECH ADP/BmpLib/).

Export to

Export and save graphic in Bitmap Library as “*.GBF” file.

Import

Import a graphic created by other Graphing Software, such as Microsoft Paint, into the Bitmap Library. The following file types are currently supported: Bitmap images (*.BMP), ADP/ADP2 graphic files (*.BMG), and AutoCAD files (*.DWG/*.DXF).

Export

Export and save graphics in the Bitmap Library as a *.BMP file.

Flip/Rotate, Inverse Color, Trim, Stretch

Edit imported graphics. Suppose a graphic is used in several screens, when it is edited in the Bitmap Library and saved as the same name, all the graphics in various screens will be updated simultaneously.

2.9.2 Save As Shape

Shapes, created from ADP Draw objects, can be saved in a Shape library (*.SFL) file.

2.9.3 Shape Library Manager

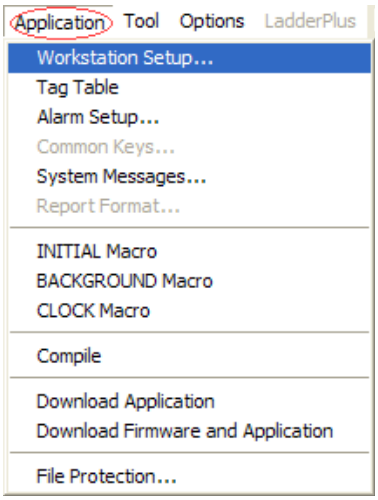
Modifies Properties of Shapes in a Shape library. For information about settings, please refer to the **ADP Software User's Manual.**

1. Shape: Build from basic static Draw objects, including lines, rectangles, ellipses, circles, polygons, free form, and curves. Excludes static text, dots, and static graphic.
2. A Shape may contain several states.
3. Unlike Bitmap, no distortion occurs when a Shape is resized.

2.9.4 Text Pool

Create commonly used texts in the Text Pool which then could be used on many objects requiring texts.

2.10. Application



The Application Menu provides the functions for application compiling/downloading to the HMI, file protection, system messages, etc.

2.10.1 Workstation Setup

This menu item provides parameter declarations for HMI and PLC, including the HMI model, make and model of the connected PLC, printer model, startup screen upon the HMI boot-up, enable/disable of multi-language support, and locations of controls and status blocks. See Fig. 2-31. For information about settings, please refer to the **ADP Software User's Manual.**

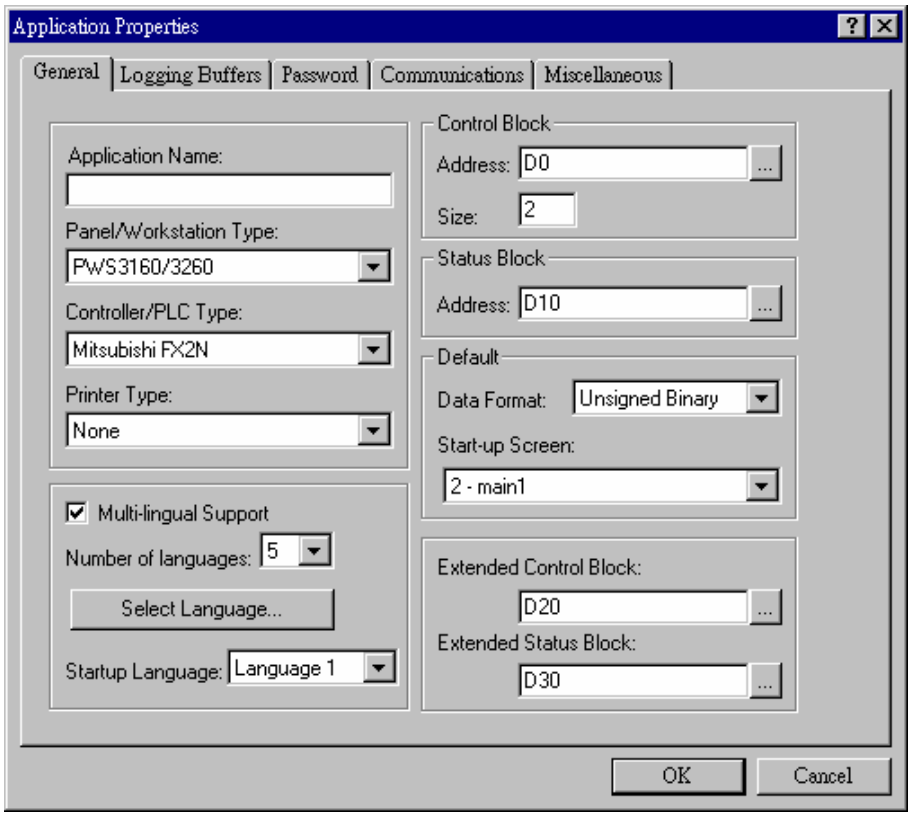


Fig.2-31 Dialog box of Workstation Setup

General

For information about specific meanings of each field, please refer to **ADP Software User's Manual.**

Control Block	Enable designers to control the HMI operation mode directly with the PLC program, e.g., screen switching, and hardcopy. The minimum length is 2 words, the maximum 32. The length increases proportionally with functions implemented. (For example, it requires a minimum of 6 words when using the Recipe function.
Status Block	Feed status of the screen back to the PLC register. It is a continuous data block with a fixed length of 6 words.
Expanded Control Block	Similar to the control block, except each word has a different meaning than that in control block. Only PWS1760 / 3160 / 3260 / 3760 / SoftPanel supports this function.
Expanded Status Block	Similar to status block, except each word has a different meaning than that in status block. Only PWS1760 / 3160 / 3260 / 3760 / SoftPanel supports this function.

Note: Expanded Control Block and Expanded Status Block do not support special functions currently.

Communications

Set parameters for the PLC connection. When HMI and PLC are connected together, their Transmission Setup must be identical to function correctly. Otherwise, the connection will fail. For example, set the communication format of the Mitsubishi FX2N PLC as 9600bps, 7, even, 1 stop bit, RS422, with the PLC station number=0. As well as set parameters for connections to other HMIs. For information about settings, please refer to the **ADP Software User's Manual.**

Miscellaneous

Set the recipe and calendar functions. For information about settings, please refer to the **ADP Software User's Manual.**

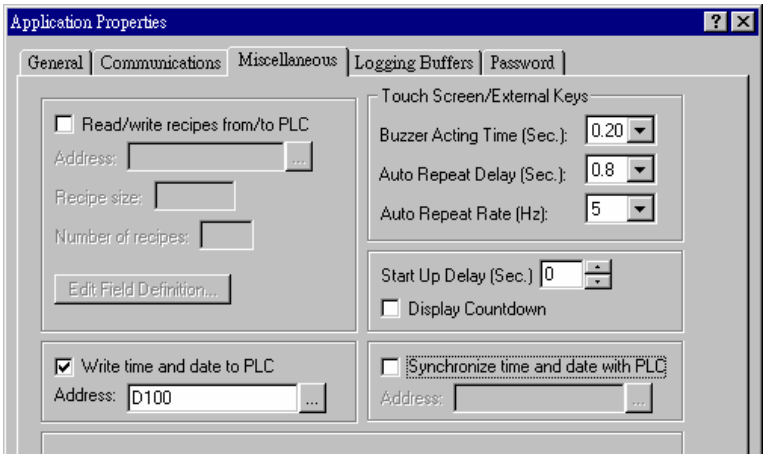


Fig. 2-32 Dialog box of Miscellaneous Settings

Note: Write Time and Date to the PLC at location D100.

Hour (BIT_{15-08} in **D100**)	Minute (BIT_{07-00} in **D100**)
Month (BIT_{15-08} in **D101**)	Day (BIT_{07-00} in **D101**)
Week (BIT_{15-08} in **D102**)	Year (BIT_{07-00} in **D102**)

Note: For the value of week:

PWS1711/3720 is 1-7 (Sunday-Saturday), and PWS1760/ 3260/3760/SoftPanel is 0-6 (Sunday-Saturday).

Logging Buffers

Before using the Historical Display objects, this area must be set first. There are 12 buffers available. For information about settings, please refer to the **ADP Software User's Manual.**

2.10.2 Tag Table

Enable the designer to use familiar language to define the association between PLC data addresses and HMI objects. Suppose the original push button is associated to PLC bit Y0. "Motor ON" could replace it. The designer can change the Tag Table easily. Only make changes to the Tag once and the objects in the entire application referring to the Tag is updated. It is not required to modify each object. Consistency check for PLC addresses and their usage can be made easily. See Fig. 2-33.

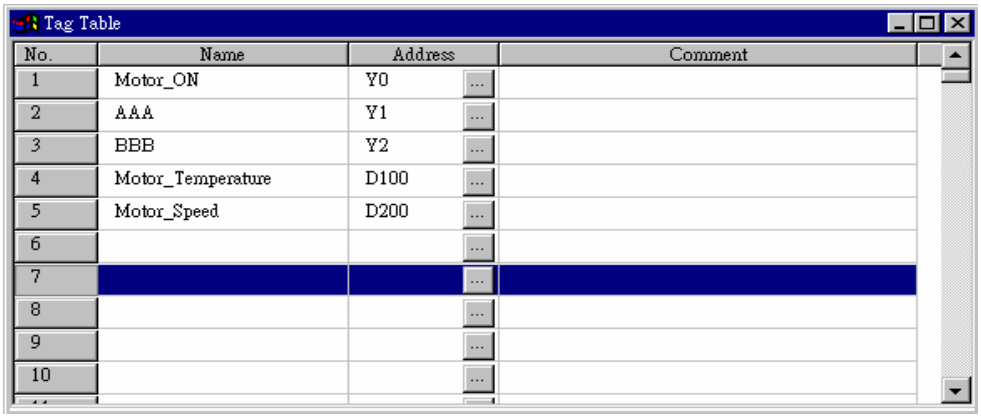


Fig.2-33 Dialog box of Tag Table

No	Tag numbers up to 1024 tags.
Name	Tag Name with max. length of 22 characters. The first character cannot be a number or special character and no space is allowed.
Address	PLC or HMI internal address which the Tag is referring to.
Comment	Description of a Tag with max. length of 255 characters.

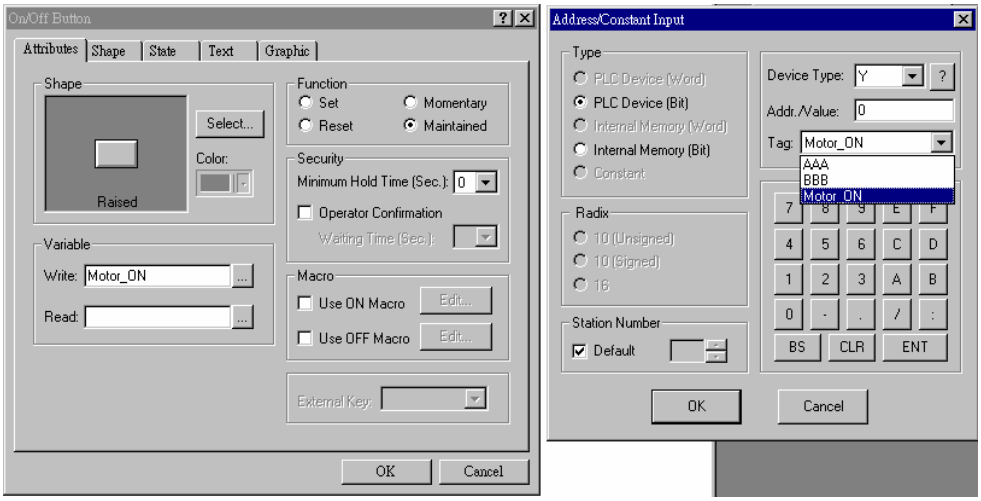


Fig.2-34 Example of using Tag Table in On/Off buttons

2.10.3 Set Alarm

This area must be set first before using the Alarm Display objects. See Fig. 2-35. There are maximum of 512 alarms could be define. For information about settings, please refer to **ADP Software User's Manual.**

Address of Alarm Block	specifies the starting address of a block of PLC registers for the HMI to monitor as the status of alarms.

Scan Time (second)	indicates time period, in which the HMI scans PLC for possible alarms. The unit for the Scan Time is second.
Number of Alarms	The maximum Alarm records: If it is 1000, upon the 1001st alarm occurrence, the first alarm will be replaced.

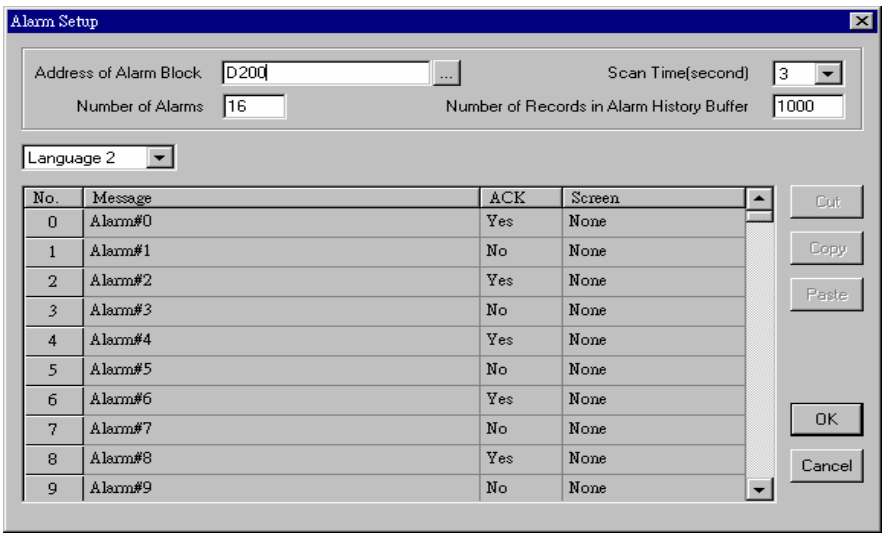


Fig.2-35 Dialog box of Alarm Setup

2.10.4 Common Keys

A common key has the same function, no matter operated in which screen. For example, define ”K1” as “switch to screen One”. No matter in any screen, whenever the operator presses the “K1” key, the screen switches to the screen One. In contrast, auxiliary keys defined in Screen Properties dialog box applies to the selected screen only. For example, define ”K1” as “switch to screen One” in the screen Five. When the operator presses the “K1” key, the screen switches to the screen One only in the screen Five. In all other screens, it does not work.

Note: PWS3760/PWS3720/2100/700X/500S support this function.

2.10.5 System Messages

It is used to define the HMI system messages and the messages could be changed as designer requested. See Fig. 2-36. There is a complete message system (*.PSM) in all 4 different languages under the “C:\HITECH ADP” directory.

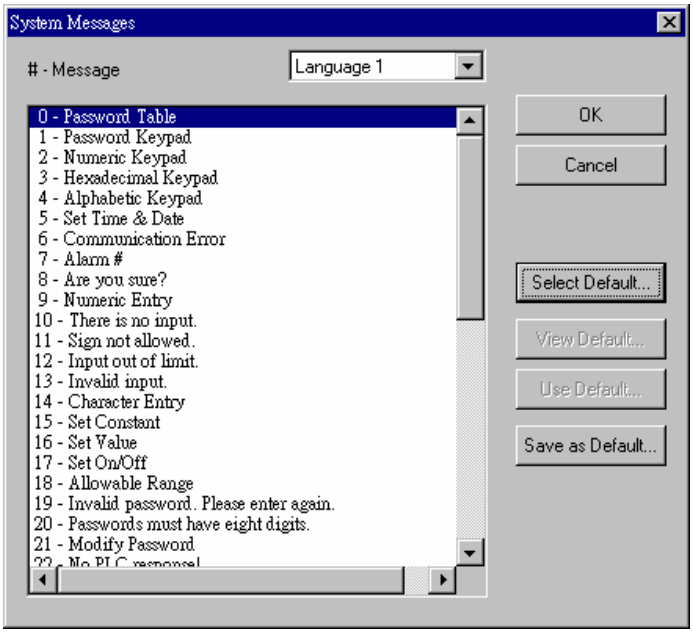


Fig.2-36 Dialog box of System Messages

2.10.6 Report format

Setting report format and then printing on Printer for data backup on collected History Data, Alarm Messages, and Recipes. For information about settings, please refer to the **ADP Software User's Manual.**

Note: Only SoftPanel supports this function currently.

There are 3 data resources:

1. Alarms – including Alarm History, Alarm Frequency, Active Alarm
2. Logging Buffers – Maximum of 12 buffers
3. Recipes

As a result, user must define data resource first. See Fig. 2-37. Secondly, add New Report and specify Settings in Report Format. See Fig. 2-38. Finally, use the Action button to select report format for printing. See Fig.2-39 for results.

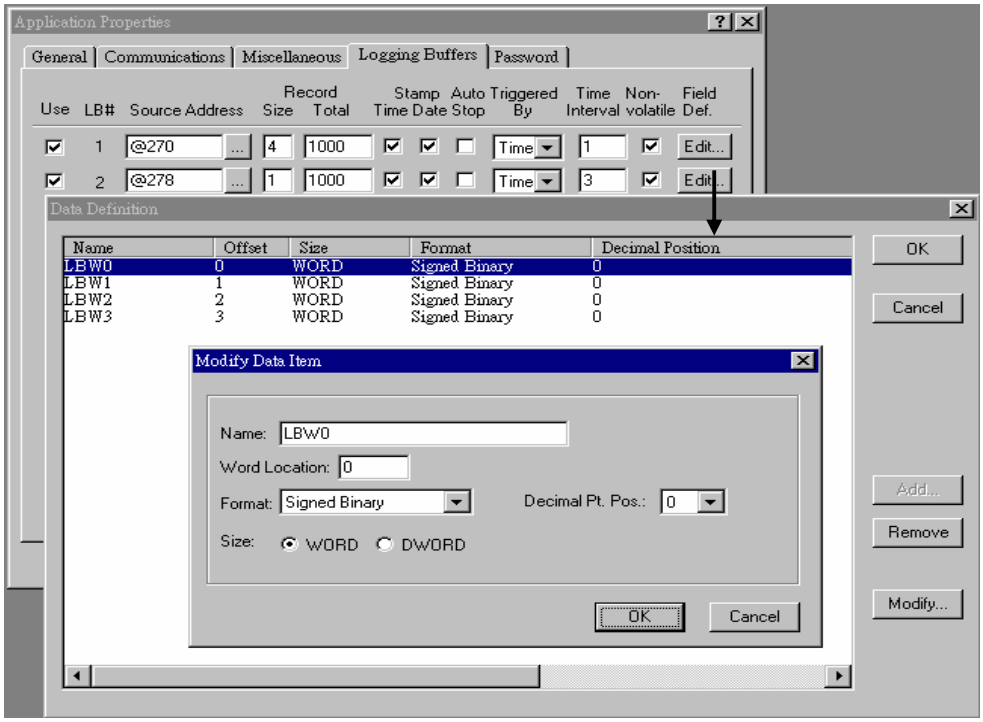


Fig.2-37 Dialog box for editing Logging Buffers

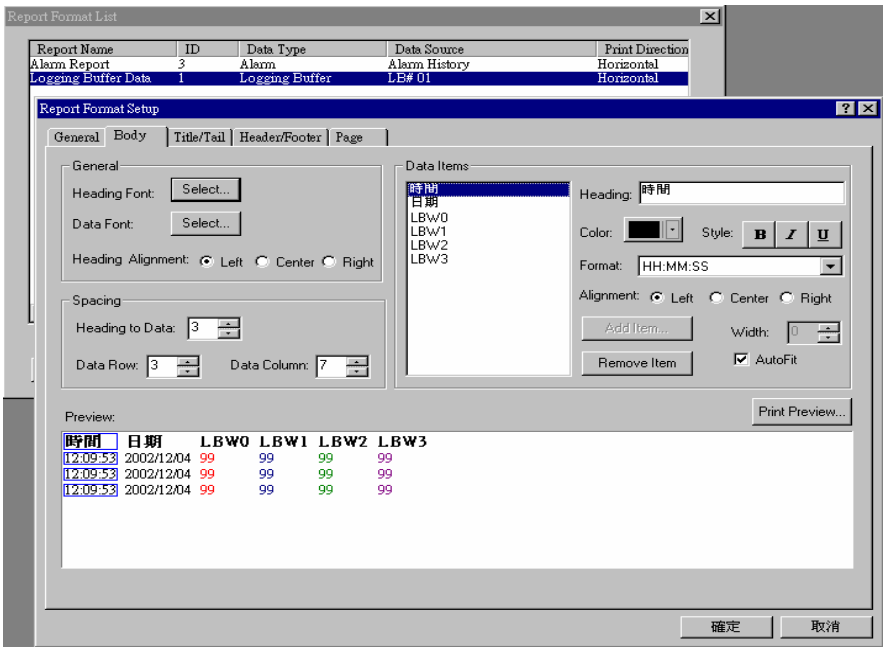


Fig. 2-38 Dialog box of editing Report Format

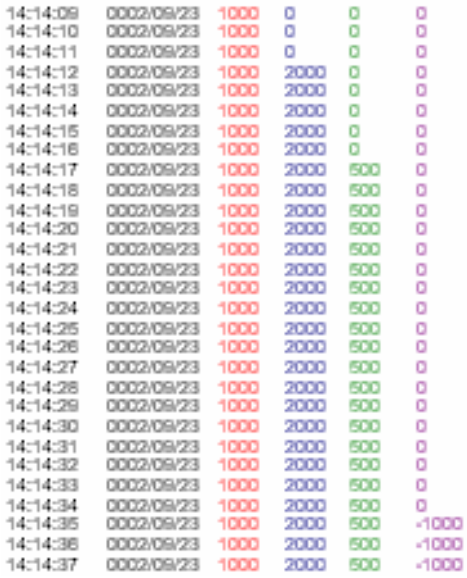


Fig.2-39 Printing result of Report Format

2.10.7 *Initial Macro*

For the first time HMI runs the application (usually after power failure, first time power up and run application), execute the commands in Initial Macro once.

2.10.8 *Background Macro*

When HMI runs the application, the commands in Background Macro are executed repeatedly. However, it runs only 30 lines of commands at a time. Furthermore, no matter HMI is in which screen, the Background Macro will always be executed.

2.10.9 *Clock Macro*

When HMI runs the application, the commands in clock macro are executed repeatedly every 500ms.

2.10.10 *Compile*

When an application is being compiled, compiling status is displayed on the screen. If there is any compiling error, click the “OK” button to display the error message. If there is any error, it requires correction and re-compile.

2.10.11 *Download Appliction*

ADP will download the current complete application to HMI, best for

downloading modified applications.

2.10.12 Download Firmware and Appliction

ADP will download both the application and firmware to HMI, best for first-time download or system parameter modification. (For example, change the PLC model).

Note: Application has to be compiled before being downloaded.

PWS500/700/1711 support only application download.

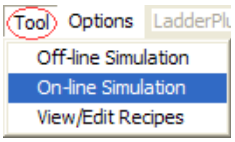
PWS1760/3160/3260/ 3760 support both.

2.10.13 File Protection

Designer may set password to protect an application. The maximum length of password is 10-character. Pay attention to the case of alphabet characters. Password is activated by the “Save File” action.

Note: If the password is lost, application can never be opened. Please keep the password safe.

2.11. Tool



The tool Menu provides On-line/Off-line management functions.

2.11.1 Off-line Simulation

Execute and verify an application on PC directly. Connection with the PLC is not required. Before purchasing HMI, you can simulate HMI operations and get to know HMI better.

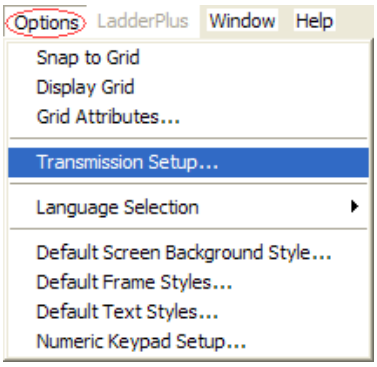
2.11.2 On-line Simulation

Using PC as HMI, simulate On-line operation by connecting PC and PLC via the communication ports. The simulation can only run for 60 minutes. If you need to continue the simulation, close the ADP software and restart ADP. For information about what PLCs On-line simulation supports, please refer to the **ADP Software User's Manual.**

2.11.3 View/Edit Recipes

Retrieve for editing and printing the *.RCP file, which is uploaded from HMI to PC. Note: Recipe data of *.RCP type must be uploaded from HMI and saved. As a result, length of recipe records and total number of recipes cannot be changed. For detailed information, please refer to the **ADP Software User's Manual.**

2.12. Options



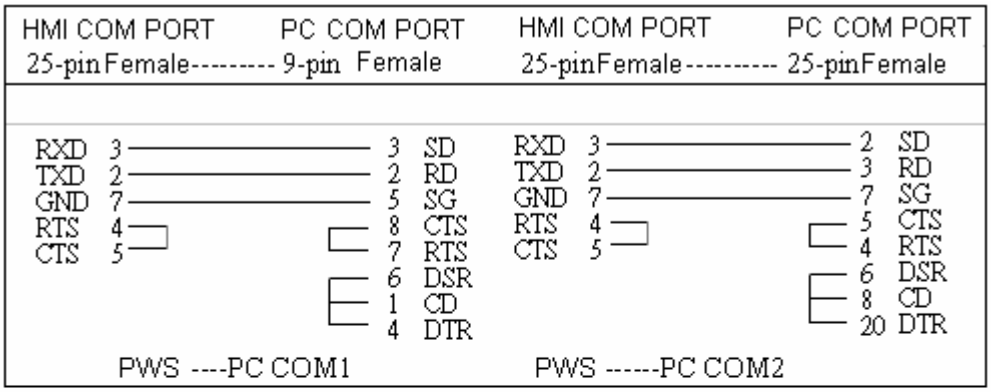
Options Menu provides the functions to manage transmission setup between PC and HMI, language selection for ADP Graphical User Interface environment.

2.12.1 Grid Attributes

User may define ADP to align objects to grids of the specified spacing according to the width of X and height of Y.

2.12.2 Transmission Setup

You can define the transmission parameters between PC and HMI through communication ports COM1~COM4 and its transfer rate. If you cannot download, please check if the COM port is already opened or the connection cable is of the right type. See Fig.2-42.



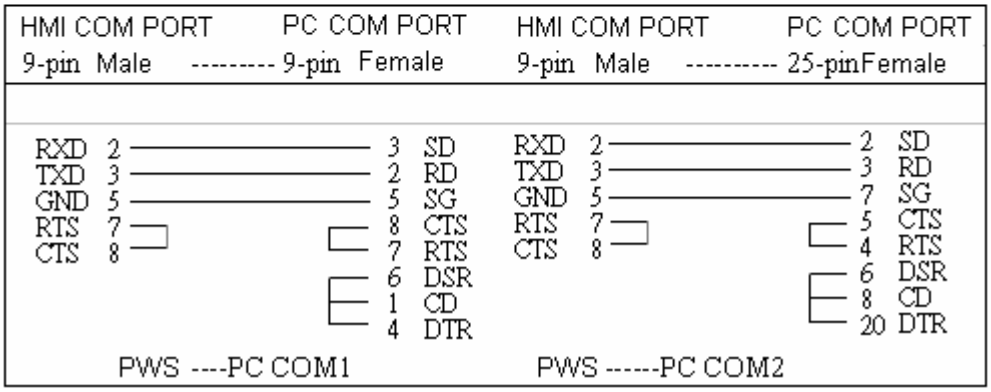


Fig.2-42 PC to HMI connection

2.12.3 Language Selection

You can select different languages for the ADP Graphical User

Interface environment. Currently, all language versions are integrated in the same ADP installation, and there is no need to install multiple versions of ADP for different languages. Simply use this option to change the language version of ADP.

Note: For changes to take effect, re-start ADP after changing the language.

2.13. LadderPlus

The main function of the LadderPlus Menu is to provide the functions for PC to monitor the Ladder Programs running in HMI and to switch to LadderPlus design window. For detail information, please refer to the **ADP Software User's Manual.**

2.13.1 Start Monitor

You may monitor or control I/O addresses and registers of PLC on the ADP windows. The connection used for monitoring is identical to that in Section 2-10, as in Fig. 2-42 shows. Sample rate of monitoring is fixed at 19200 bps.

Note: Currently only PWS500S-PLC model is supported.

2.13.2 Ladder

Switch to the LadderPlus design window, as in Fig. 2-44. For information about Statements, please refer to the **ADP Software User's Manual.**

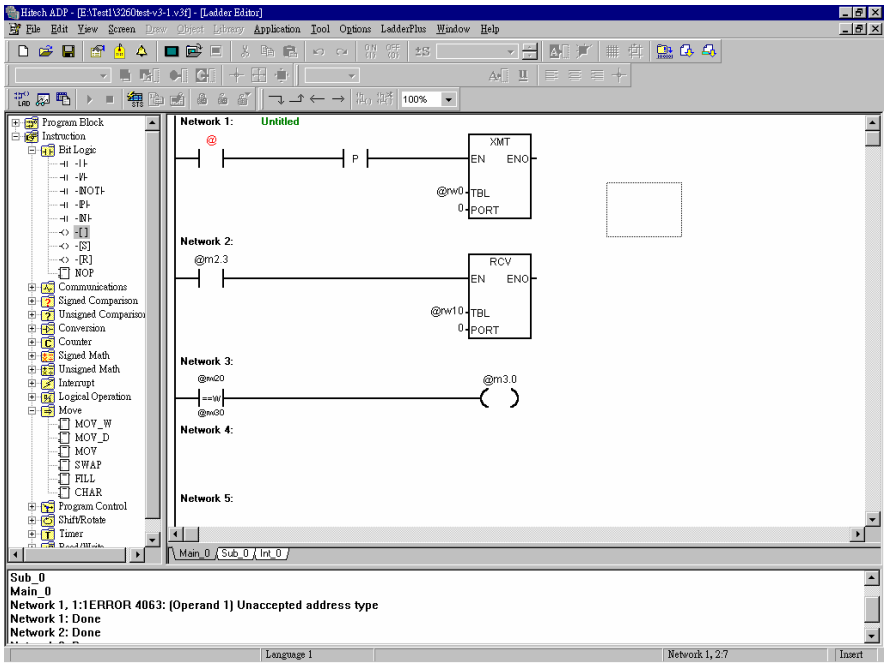


Fig.2-44 Ladder Design window

2.13.3 Statement Lists

Switch to “Statement Lists” window. Currently, a designer can only view the Ladder’s compiled STL program, input mode is not supported. See Fig. 2-45.

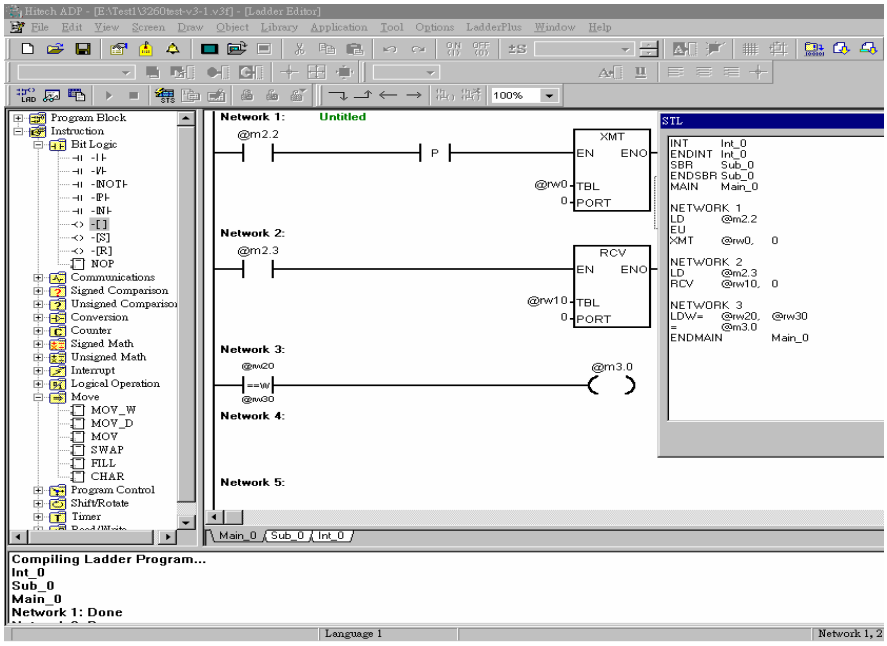


Fig.2-45 Statement Lists window

2.13.4 Status Chart

Switch to the Status Chart monitor window. This allows the designer to monitor or control I/O addresses and registers. See Fig.2-46.

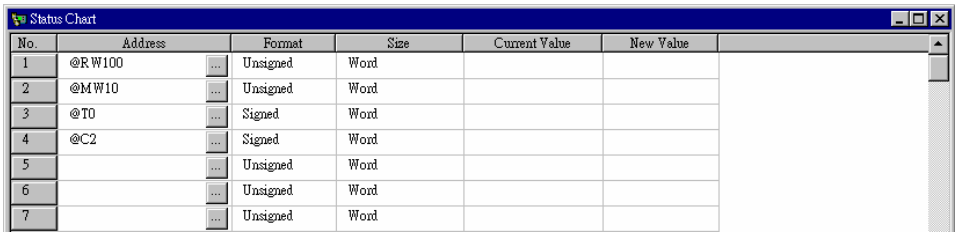


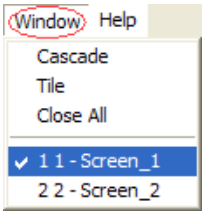
Fig.2-46 Status Chart window

2.13.5 Initial Values

Switch to the Initial Values settings window. Provide default internal register value for the HMI initialization. See Fig.2-47.

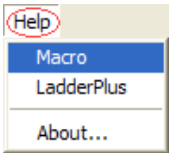
Fig. 2-47 Initial Values window

2.14. Window



Select Tile or Cascade display in the Window pull-down menu.

2.15. Help



Provide help for Macro command and LadderPlus.

Select About to see software version.

Fig.2-50 Software version and description

3. Exercise: Create a Simple Application

This section introduces procedures to design an application with screens and basic objects and to help a beginner complete a real design in a snap. It also provides step-by-step procedures for connecting HMI to PLC and cautions for setting parameters. The instructions here are intended for the Mitsubishi FX2N PLC and PWS1711-Macro HMI.

3.1. Create a New Application

There are 2 ways to create a new application: select “New” from file menu or short cut in the toolbar. A dialog box will pop up when a new application is created. See Fig. 3-1.

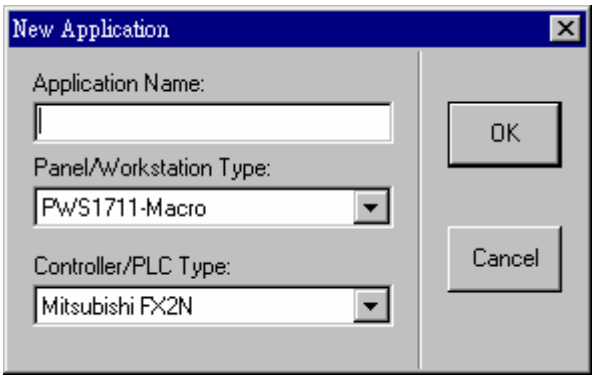


Fig.3-1 Dialog box for Creating a New Application

Application Name	Application Name is the description of an application, not the actual file name saw in file manager. Actual file name is the one that you used for saving application.
Panel/Workstation Type	Click the arrow to select PLC model from pull-down list (Mitsubishi FX2N is used as the example in this section).
Controller/PLC Type	Click on the arrow to select HMI model from the pull-down list (PWS1711-Macro is used as example in this section).

3.2. Design "Motor Startup and Speed Monitor" Screen

After entering the application name, the HMI model, and connected PLC, click the "OK" button and a window will pop up. See Fig.3-2. ADP opens the "screen #1" automatically.

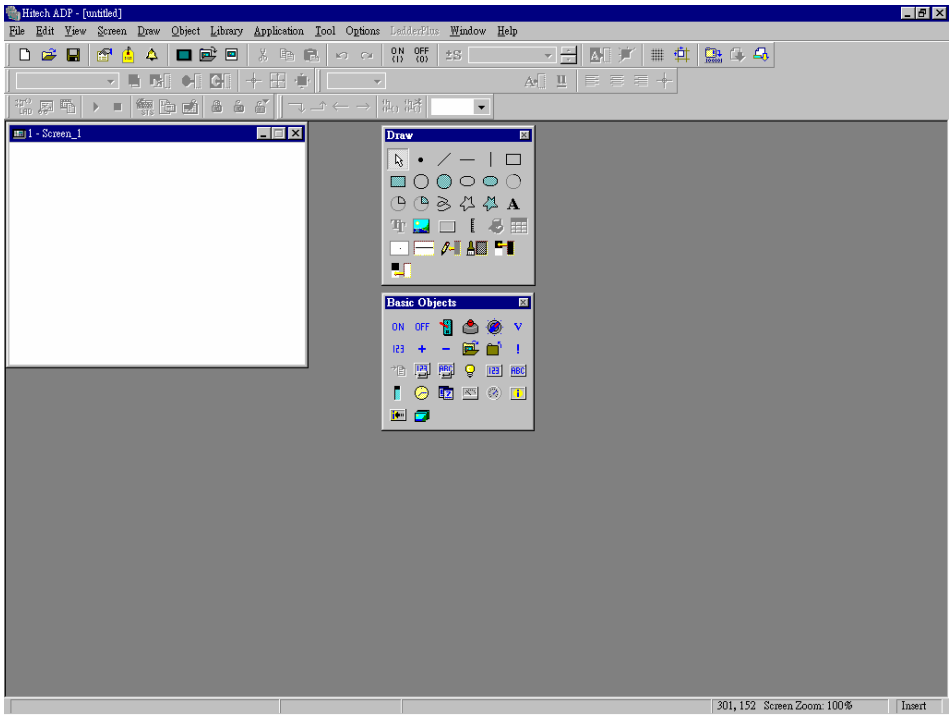


Fig.3-2 Create New Application window

3.2.1 Create "Motor Startup and Speed Monitor" Screen

Go to Properties option in Screen menu, as in Fig. 3-3. Change the screen name to "Motor Startup and Speed Monitor", as in Fig.3-4.

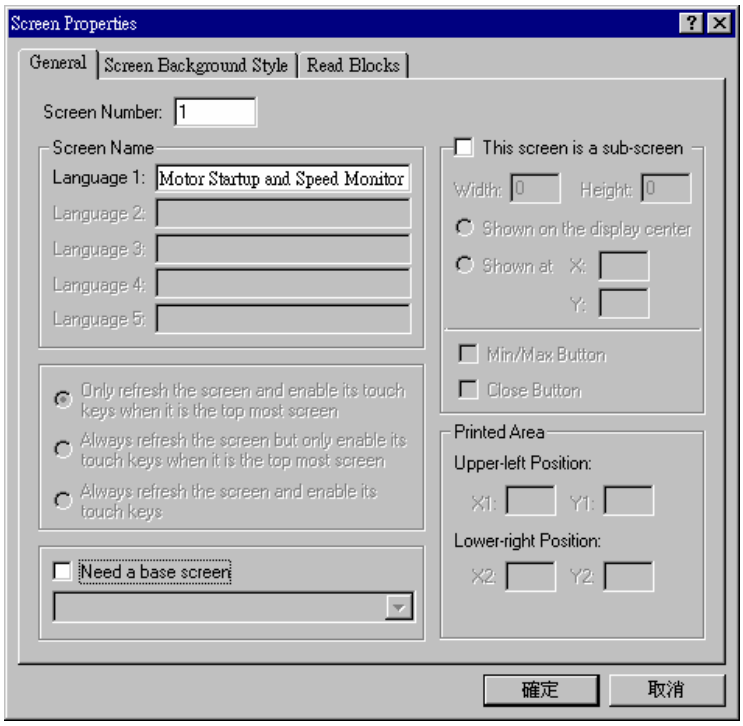


Fig. 3-3 Screen Properties dialog box

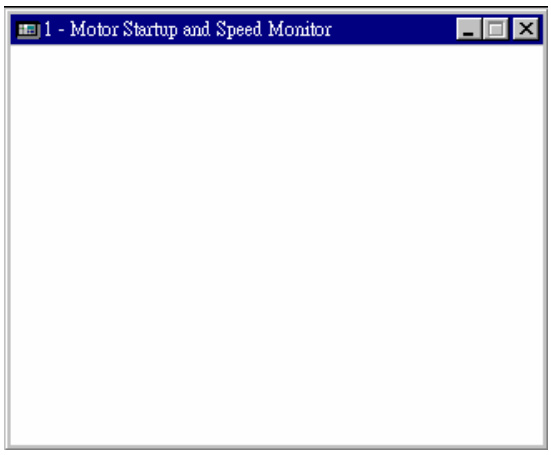


Fig.3-4 Screen #1 “Motor Startup and Speed Monitor”

3.2.2 Create “Motor Startup/Stop” Maintained Button

Place a Maintained button in screen #1 “Motor Startup and Speed Monitor.” The button has the following attributes:

1. Write: Y0 (Mitsubishi FX2N PLC Output contact)
2. Read: Y0
3. Operator Confirmation: when the button is clicked, it will ask the operator for confirmation prior to notifying the PLC. Set the maximum waiting time to 20 seconds.

4. Frame: “Raised”.
5. State 0 (OFF) displays “Motor Stopped” text. The font size is set as “8x16” with background color “white” and font Color “black”.
6. State 1 (ON) displays “Motor Started” text. The font size is set as “16x16” with background color “black” and font color “white”.
7. State 0 uses “Symbol001” in Bitmap library “SYMBOLS.GBF” as bitmap. The bitmap color is “white” and background color is “black”.
8. State 1 uses “Symbol001” in Bitmap library “SYMBOLS.GBF” as bitmap. The bitmap color is “black” and background color is “white”.

Design procedures are described in following sections.

Create “Motor Startup/Stop” Maintained Button

Select the Maintained button from Object menu’s pull-down, as shown in Fig. 3-5. Or select the icon from the Basic Objects toolbox.

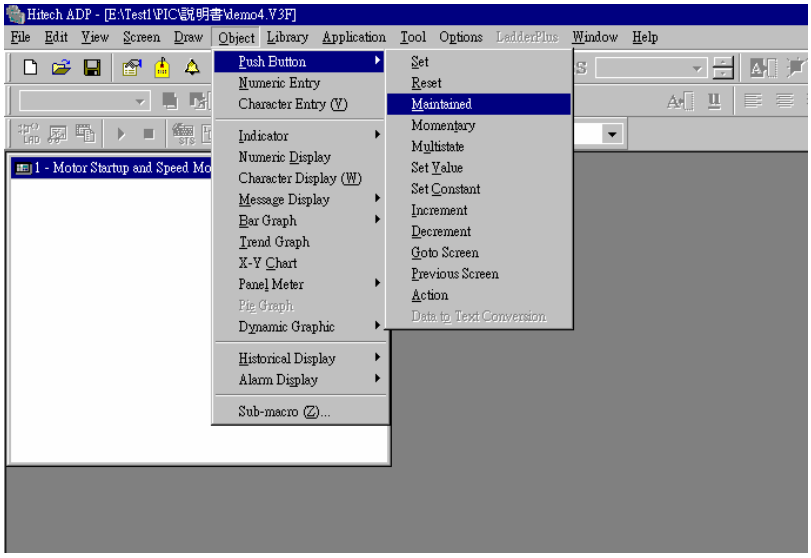


Fig.3-5 Selecting the Maintained button from the Object menu’s pull-down

After the Maintained button is selected, move the mouse pointer to the screen workspace. The pointing arrow becomes a cross, and you may now place an object on the window. See Fig.3-6.

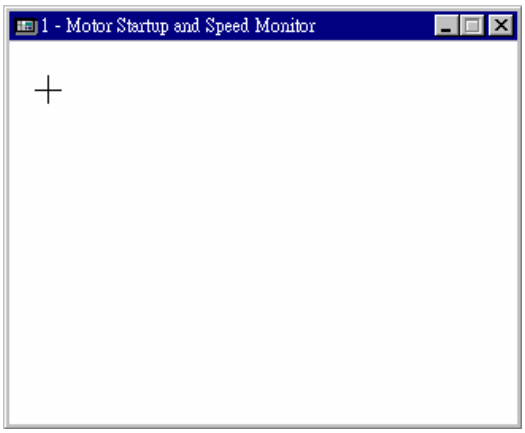


Fig.3-6 The mouse pointer becomes a cross after the button is selected

Move the cross to the place where you would like to place the button defining the upper left corner of the button. Click the left mouse button once and drag the mouse. A rectangle appears on the screen. See Fig. 3-7. Drag the mouse to adjust its size. When the desired size is reached, click the left mouse button once more. See Fig. 3-8. When the operation is completed, the mouse pointer returns from a cross back to an arrow. When this procedure is completed, both the button position and size are set.

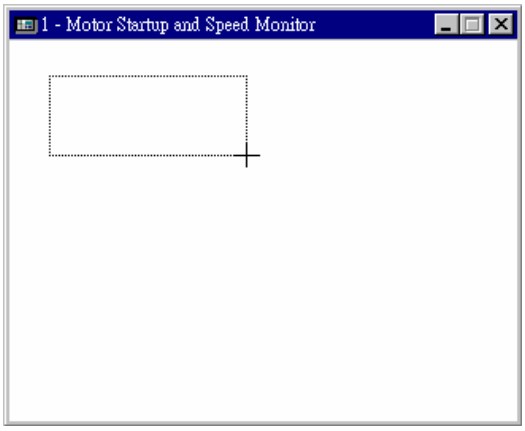


Fig.3-7 Hold the left mouse button and drag; a rectangle appears.

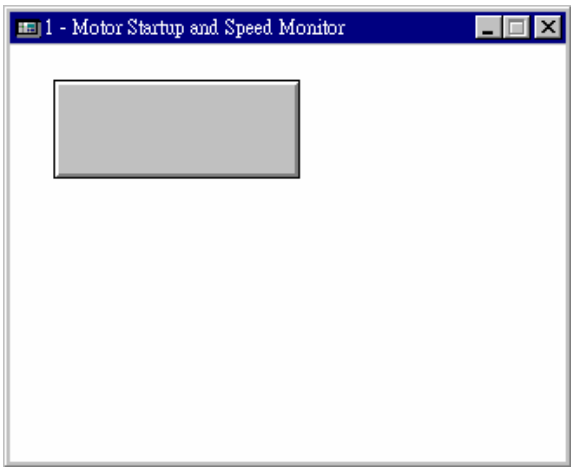


Fig.3-8 When the button is placed, the mouse pointer returns to an arrow

Set Attributes of the “Motor Startup/Stop” Maintained Button

Move the mouse pointer (↖) to an area within the button and double click the left mouse button. Or select the Object Attributes option from the Edit Menu. A dialog window pops up on screen, as in Fig. 3-9. On the Attributes tab, put Y0 in “Write” to indicate that the button controls the Y0 field in PLC. Put Y0 in “Read” to indicate that the button also reads state of Y0 from PLC. If “Read” field is not specified, the value in “Write” is applied. You are allowed to specify a different value. Check “Operator Confirmation” to indicate that the operator will be asked for confirmation when the button is pressed prior to notifying PLC. When button is pressed, HMI pops up with a ”Are you sure?” window. “Set waiting time to 20 seconds” means that ”Are you sure?” window will display for 20 seconds. If ”Yes” button is not pressed, after 20 seconds, ”Are you sure?” window is dismissed and no signal will be sent to PLC.

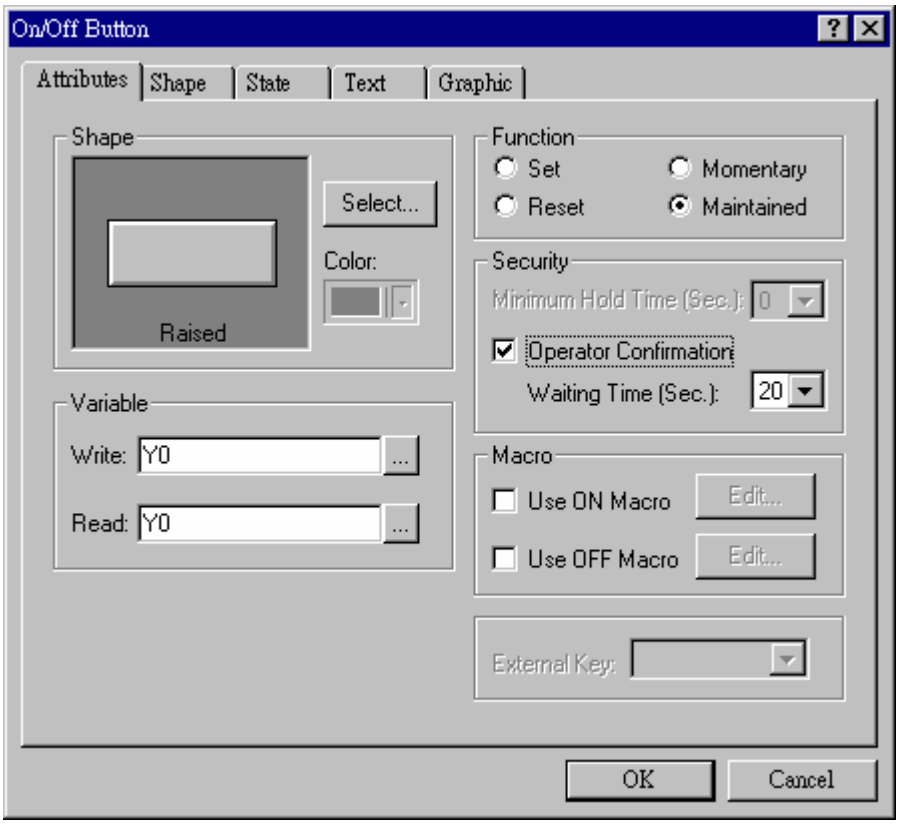


Fig.3-9. Attributes settings dialog box

Set Shape of "Motor Startup/Stop" Maintained Button

Select the Shape tab. Click the "Select" button to select the frame as "Raised," as shown in Fig. 3-10. Change the button's position on screen and button size in the "Outline" field. It is not required to close the "Properties" menu, when using this method to adjust the button's position and size. Click on "Redraw" to see the results. There is another way of doing this. To resize the button, close "Properties" menu and position the mouse pointer at any of the 8 tiny rectangles on the frame's border. The mouse pointer becomes a two-headed arrow (⇔). Click, hold the left mouse button and drag the mouse to resize the button. See Fig. 3-11. To relocate the button, move the mouse pointer to the area within the button. Click and hold the left mouse button and the cursor will become a moving pointer (✣). Move the mouse, and the button moves as well to the new location. See Fig. 3-12. Use the state tab to set icons, icon colors, background colors, and to enable blinking for the button.

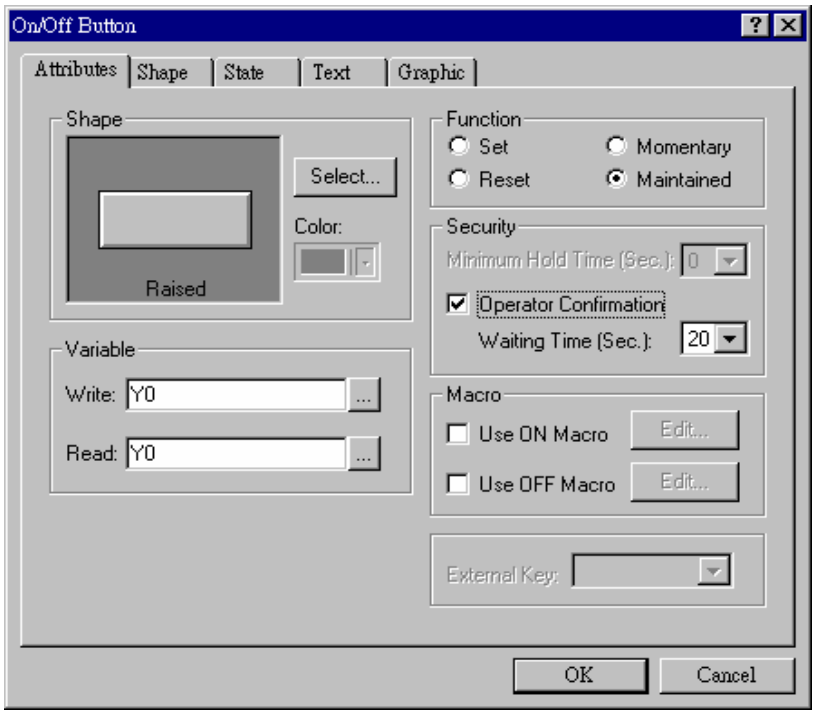


Fig.3-10 The Button Shape Settings dialog box

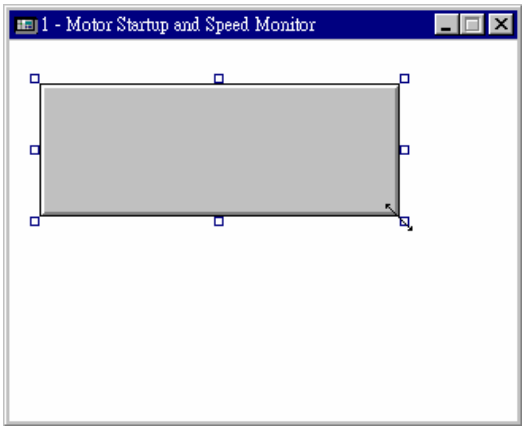


Fig. 3-11 Resizing the button

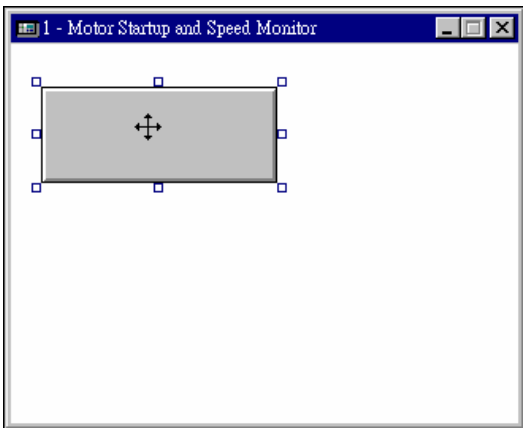


Fig. 3-12 Repositioning the button

Set States of the “Motor Startup/Stop” Maintained Button

Since there are only 2 states for a Maintained button, it is not required to add or delete state(s), as shown in Fig. 3-13.

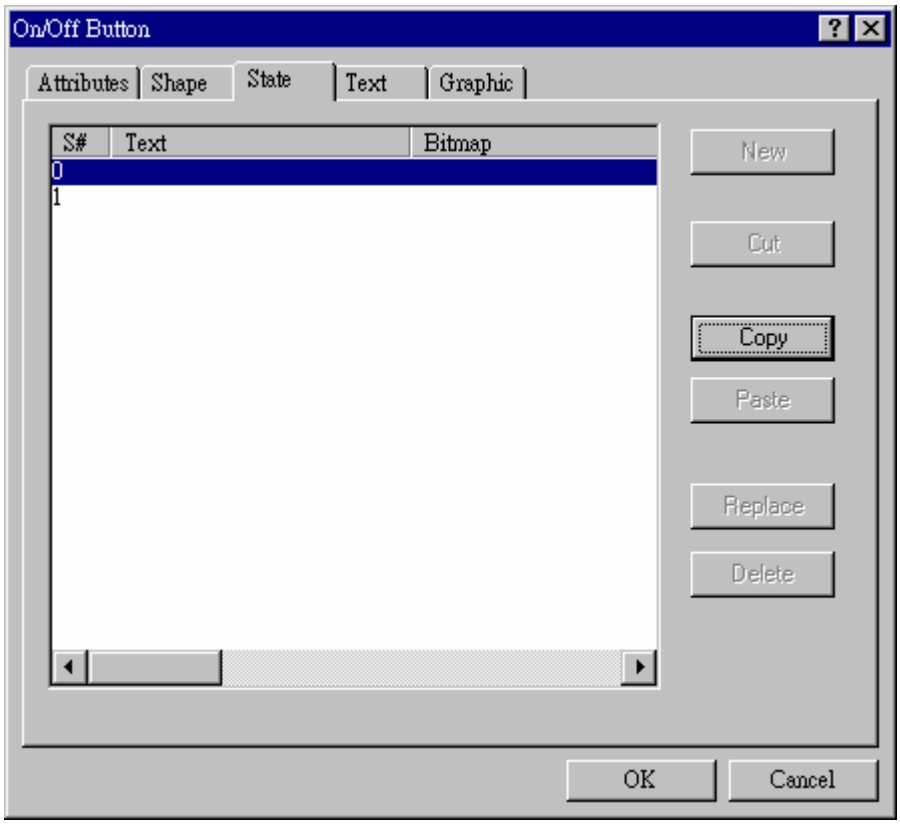


Fig.3-13 The Button State Settings dialog box

Set text for the “Motor Startup/Stop” Maintained Button

Type “Motor Stopped” in the text input field where state is 0, located in the text tab. Set the text size as “8x16,” with background color as “white” and text color as “black.” Type “Motor Started” in the text input field of state 1. Set the text size as “16x16,” with the background color as “black” and the text color as “white”, as in Fig. 3-14. **(Use a font size bigger than “16x16” for Chinese text.)**

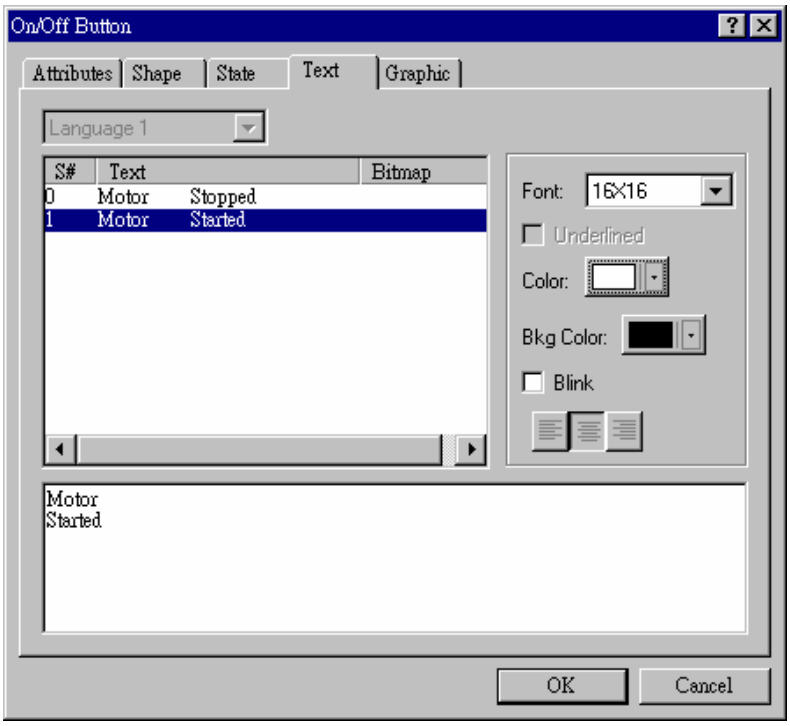


Fig.3-14 Text dialog box of the toggle button

Another way to input text is to input text in the Text Input field on the Text toolbar, as in Fig. 3-15.

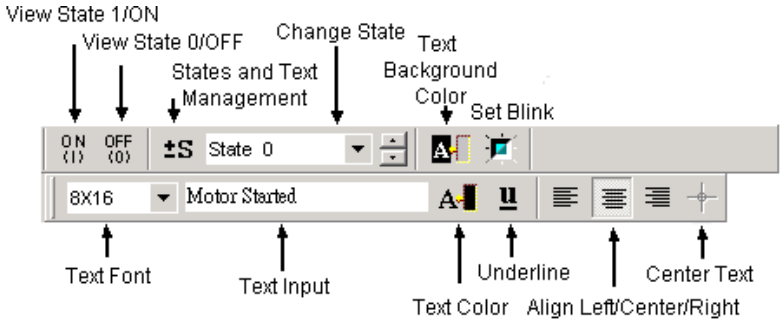


Fig.3-15 Text toolbar

To relocate the text display within the button, click on the button and 8 tiny rectangles appear on the frame's border. Click on the text and a dotted rectangle appears, as in Fig. 3-16. Hold the left mouse button and drag the mouse to move the text.

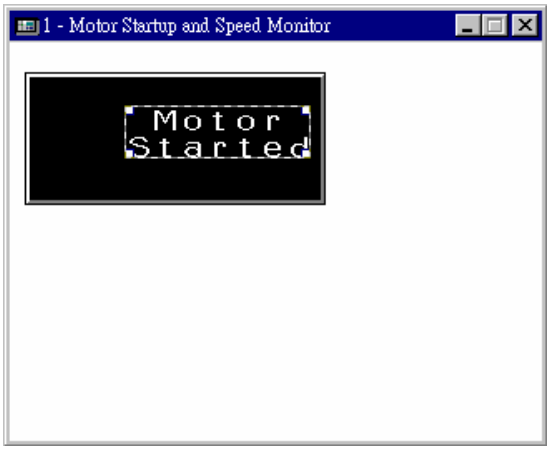


Fig.3-16 Relocate text display

Set Bitmap for the "Motor Startup/Stop" Maintained Button

Go to the Graphic tab and select "Symbol001" in the Bitmap library "SYMBOLS.GBF" as State 0 bitmap. Set the bitmap color as "white" and the background color as "black". For state 1, use "Symbol001" in the Bitmap library "SYMBOLS.GBF" as the bitmap. The bitmap color is "black" and the background color is "white". See Fig. 3-17.

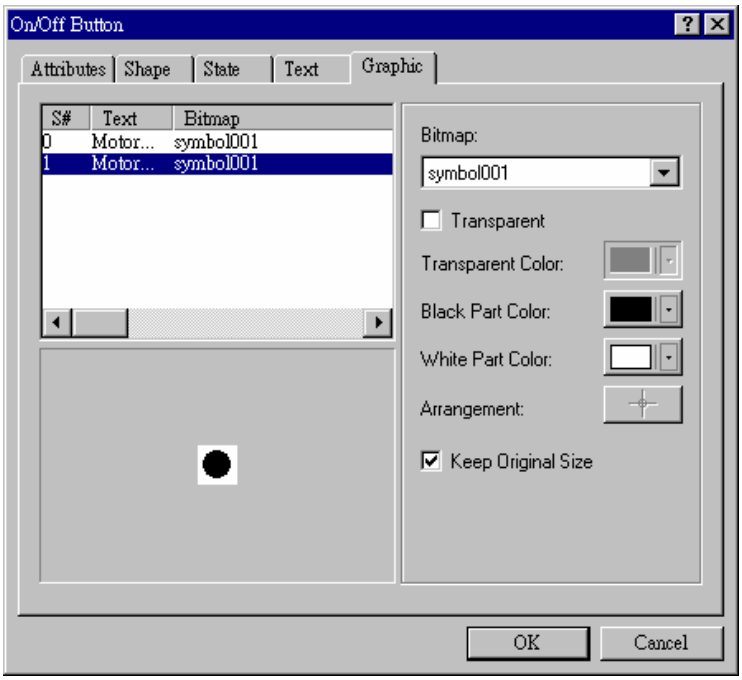


Fig.3-17 Momentary button Graphic settings dialog box

Another way to incorporate bitmap is to select an bitmap in the "Select bitmap" field in the Bitmap toolbar, as in Fig. 3-18. In this example, the ADP built-in Bitmap library is used. If the desired

bitmap is not in the Bitmap library, use the import option in the Bitmap Library menu.

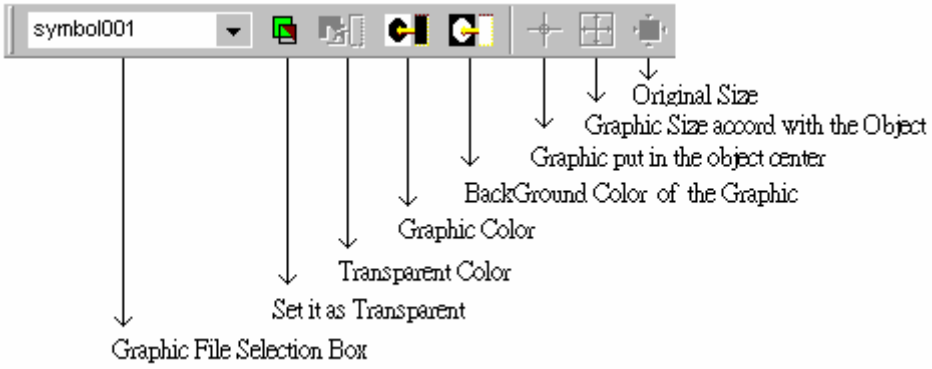


Fig.3-18 Bitmap Toolbar

To relocate an bitmap within the button, follow the same procedures for moving text, i.e., click on the button and 8 tiny rectangles will appear on the frame's border. Again, click on the bitmap and a dotted rectangle appears, as in Fig. 3-19. Hold the left mouse button and drag the mouse to move the bitmap.

Meanwhile, while the mouse pointer is positioned at any of the 8 tiny rectangles on the frame's border and the mouse pointer becomes a two-head arrow, (⇔), click and hold the left mouse button, and drag the mouse to resize the bitmap.

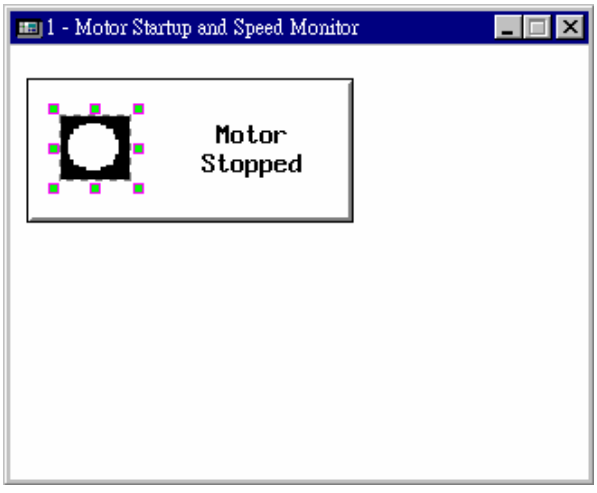


Fig.3-19 Relocating the bitmap

Complete the "Motor Startup/Stop" Maintained Button Design

The Maintained button design is now completed. States 0 and 1 have their own text and bitmap displays. See Fig. 3-20(a) for State 0

(OFF), and Fig. 3-20(b) for state 1 (ON).

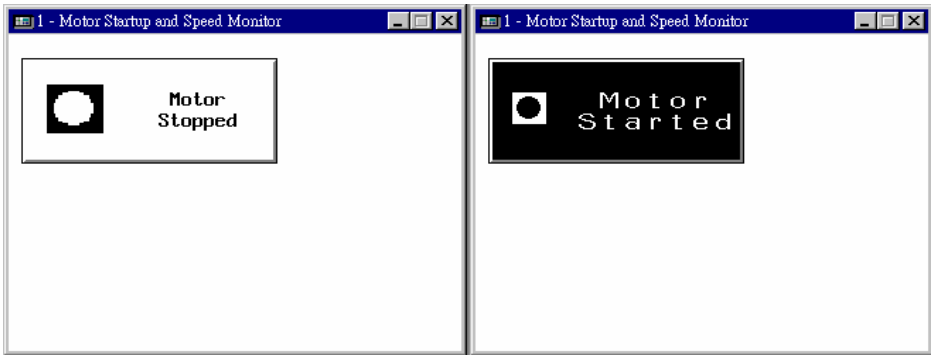


Fig. 3-20(a) Fig. 3-20(b)

3.2.3 *Create the "Motor Startup and Speed Monitor" Static Text*

Place a static text in screen #1 "Motor Startup and Speed Monitor," with text size "24x24" and color "black". Follow procedures listed in the following sections.

Setup the "Motor Startup and Speed Monitor" Static Text

In the Draw Menu, select static text, as in Fig. 3-21. Or click the A icon on the Draw toolbar.

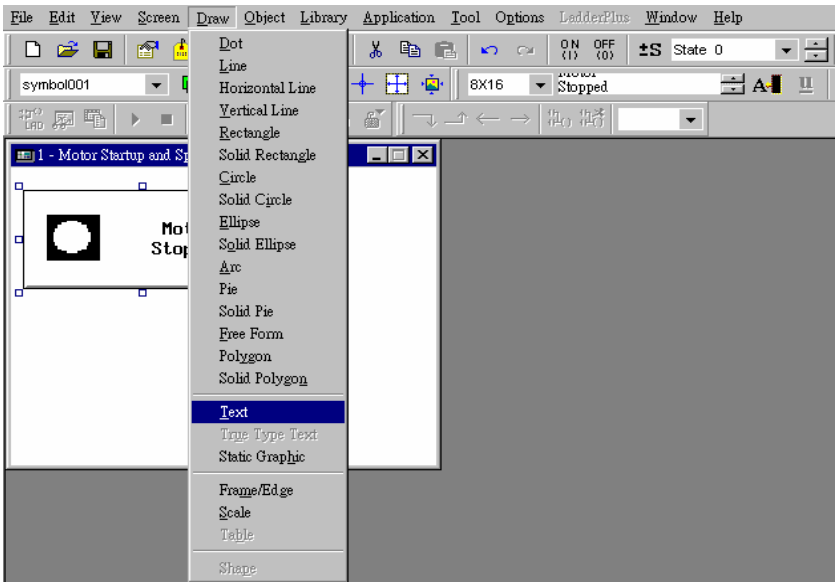


Fig.3-21 Select Static Text object in Draw Menu

When a selection is made, move the mouse pointer to the screen workspace. Click the left mouse button once to define the upper left corner of the button, then drag the mouse to adjust the size. Click the left mouse button once more until the desired size is reached, as in

Fig. 3-22.

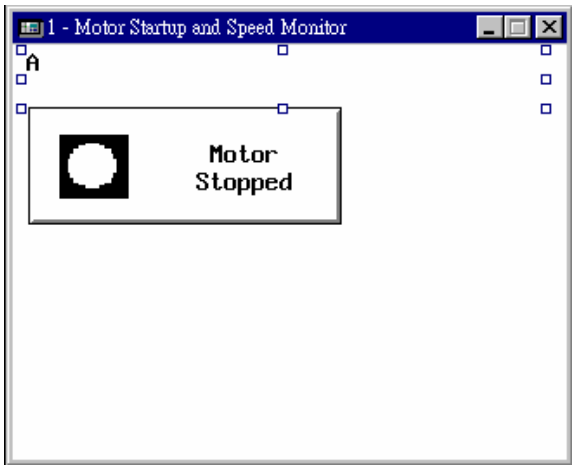


Fig.3-22 Display Static Text

Set Properties of "Motor Startup and Speed Monitor" Static Text

Move the mouse pointer to an area within the Static Text and double-click the left mouse button. Or select the Object Attributes from the EDIT menu's pull-down list. The screen displays the Static Text settings dialog box. See Fig. 3-23. Type "Motor Startup and Speed Monitor" in the Text field and select font size "8x16" and color "black".

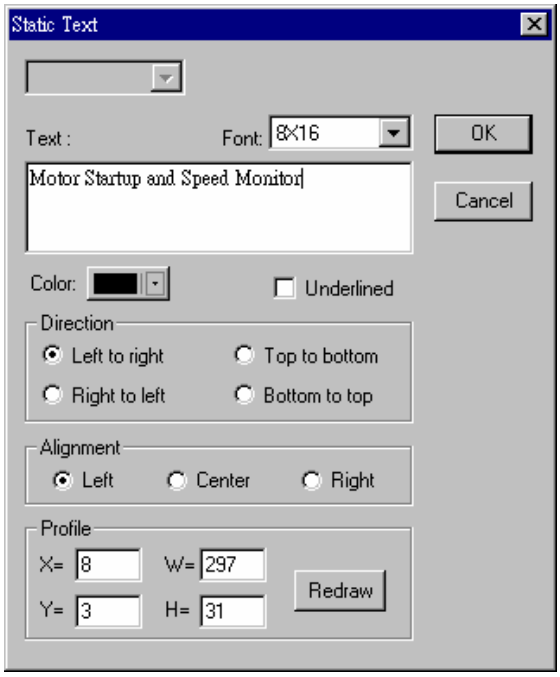


Fig.3-23 Static Text settings dialog box

Alternatively, use the text toolbar for input. See Fig. 3-15.

Complete the “Motor Startup and Speed Monitor” Static Text

The “Motor Startup and Speed Monitor” Static Text is now completed, as in Fig. 3-24. (Chinese text should use a font size larger than “16x16”)

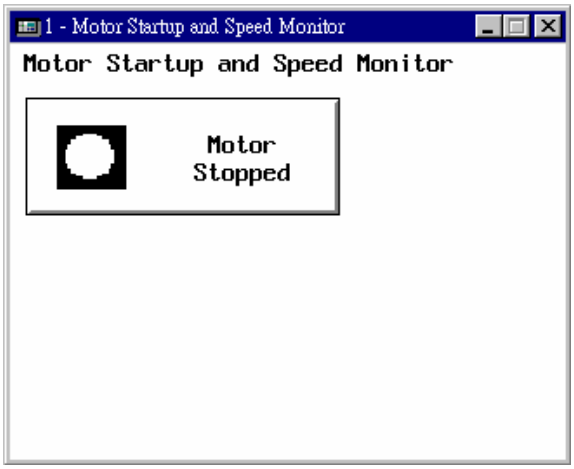


Fig.3-24 Static Text display

3.2.4 Create “Motor Speed” Numeric Display

Place the “Motor Speed” text display in screen #1 “Motor Startup and Speed Monitor.” The text display has the following attributes:

1. Read PLC data
2. Access D200 (register in Mitsubishi FX2N PLC), one word.
3. Data type: unsigned binary.
4. Text font 16x16.
5. Set 4 digits for integer.

Procedures are described as the following:

Setup the “Motor Speed” Numeric Display

Select Numeric Display in the Object Pull-down menu, as in Fig. 3-25. Or select the icon from the Basic Objects toolbox.

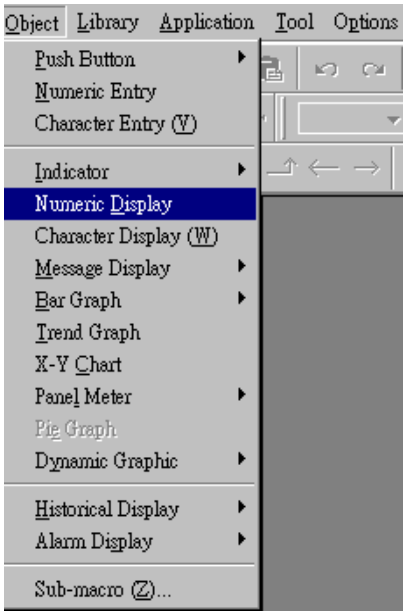


Fig.3-25 Select Numeric Display from Object Pull-down menu

When selection is done, move the mouse pointer to the screen workspace. Click the left mouse button once then drag to the desired size. Click the left mouse button once more upon completion, as in Fig. 3-26. ("####" appears as default display value.)

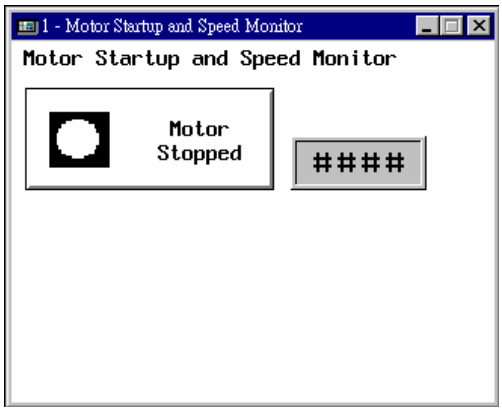


Fig.3-26 "Motor Speed" numeric display

Set Attributes for the "Motor Speed" Numeric Display

Move the mouse pointer into the Numeric Display object, and double click the left mouse button. Or select Object Attributes from the "EDIT menu" pull-down list. The Numeric Display settings dialog box will appear on the screen, as in Fig. 3-27. Enter "D200" in the "Read" field. Select "single word." Set "4" in "integer digits" field, and "16x16" in the "font " field.

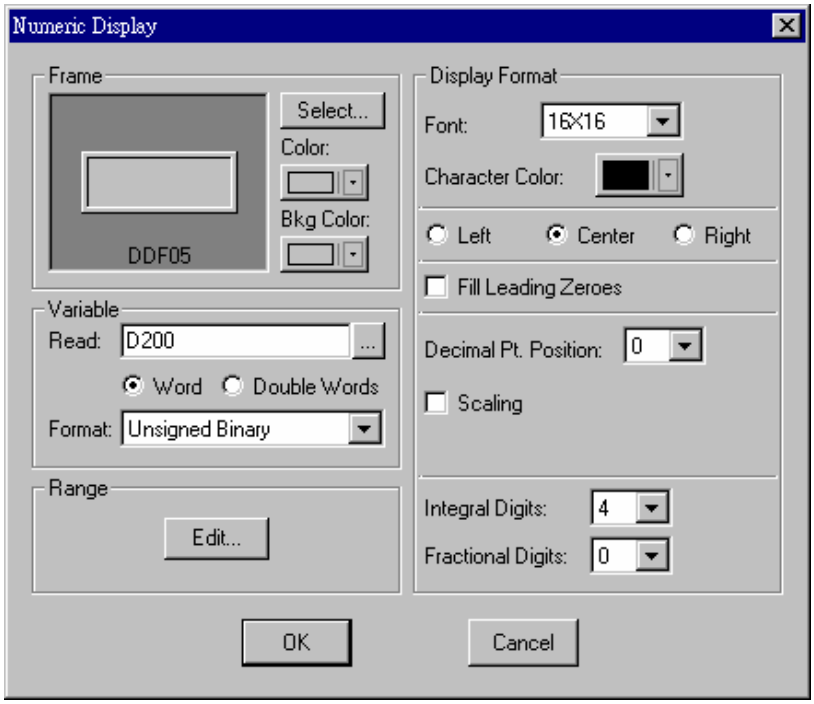


Fig.3-27 Numeric Display settings dialog box

Complete the "Motor Speed" Numeric Display

The design of the Numeric display object is now complete.

Create the "Motor Speed Display" Static Text

Follow the procedures described in section 3.2.3 for Static Text and build a "Motor Speed Display" Static Text with a font size of "8x16", positioned above the Numeric Display. Build an "RPM" Static Text with font size "8x16", located to the right of the Numeric Display. See Fig. 3-28.

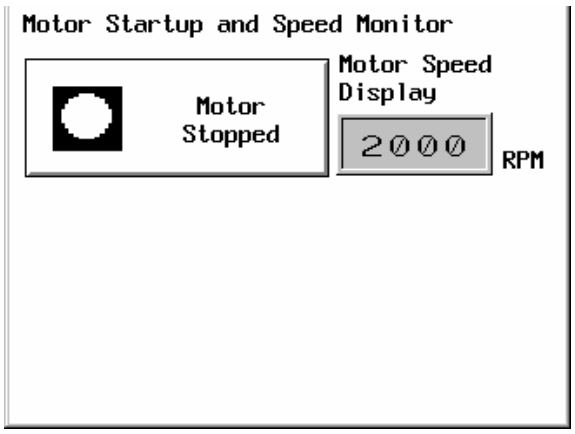


Fig.3-28 "Motor Speed Display" Static Text

3.2.5 *Create "Motor Startup/Stop" Multistate Indicators*

Place "Motor Startup/Stop" Multistate Indicators in screen #1 "Motor Startup and Speed Monitor." It has the following attributes:

1. Read: M0 (Contact in Mitsubishi FX2N PLC)
2. Data type: bit
3. Frame: "Round1"
4. No text display for both states 0 and 1
5. Use a monochromatic bitmap created by Windows paintbrush for graphic display

Procedures are described in the following:

Setup the "Motor Startup/Stop" Multistate Indicators

Select Indicator ->Multistate Indicator from the Object pull-down menu, as in Fig. 3-29. Or select the icon on the Basic Objects toolbox.

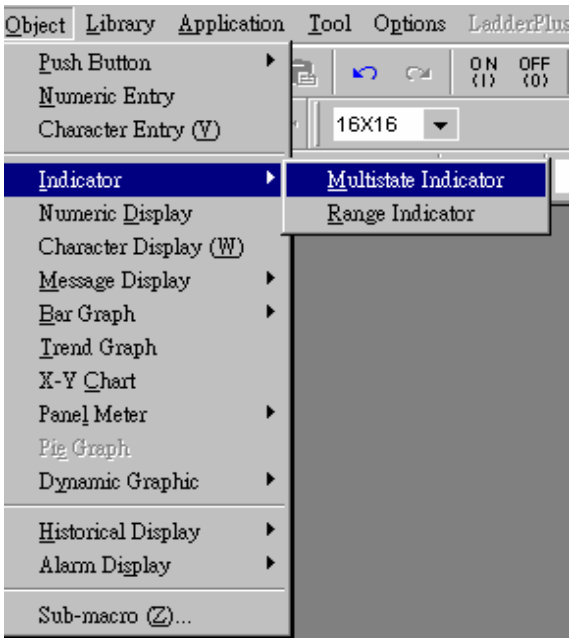


Fig.3-29 Select Multistate Indicator from the object pull-down menu

When the selection is done, move the mouse pointer to the screen workspace. Click the left mouse button once to define the button's upper left corner, then drag the mouse to the desired size. Click the left mouse button once upon completion, as in Fig. 3-30.

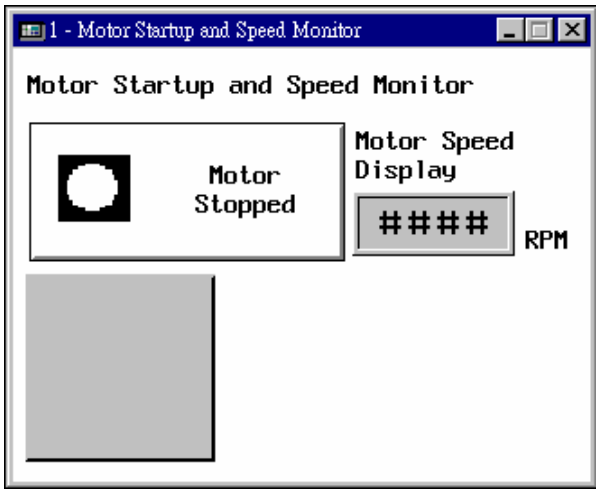


Fig. 3-30 Multistate Indicator object

Import Bitmap for the "Motor Startup/Stop" Multistate Indicator

Select the Bitmap Library in the Library pull-down menu, as in Fig. 3-31.

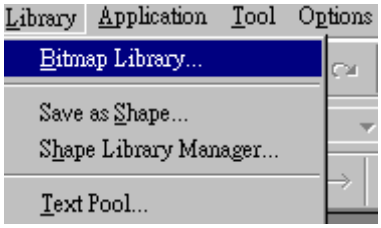


Fig.3-31 Bitmap Library in the Library pull-down menu

Click the "Import" button in the Bitmap Library dialog box. Select a monochromatic bitmap image created by Windows paint. When the conversion is done, enter a file name to save the bitmap in the "Bitmap Library", as in Fig.3-32. When this is done, click "Close" to return to screen workspace.

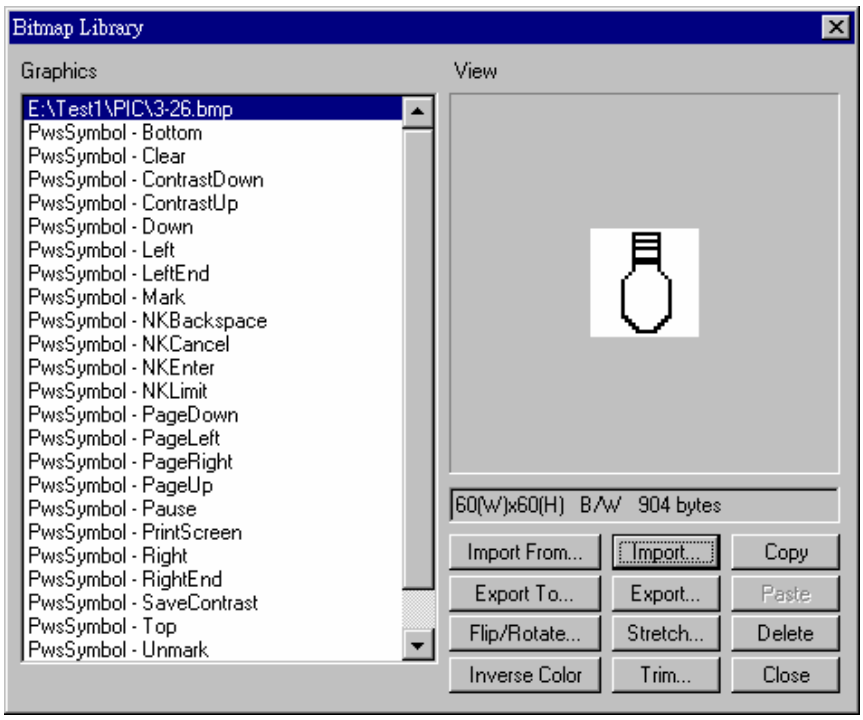


Fig. 3-32 Import bitmap image file (*.bmp)

Set Attributes of "Motor Startup/Stop" Multistate Indicator

Move the mouse pointer into the Multistate Indicator object, and double click the left mouse button. Or select Object Attributes from the EDIT pull-down menu. Multistate Indicator settings dialog box will appear on the screen. Put M0 (contact in FX2N PLC) in the "Read" field. Set the data format as "bit", frame as "Round1", as in Fig. 3-33.

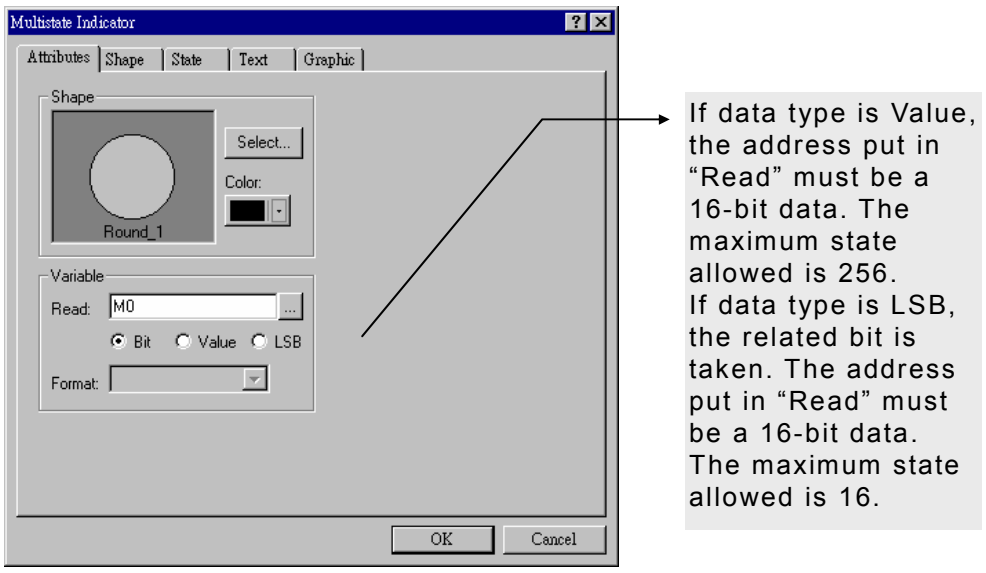


Fig.3-33 Dialog box of Multistate Indicator Attributes

Set Shapes of the "Motor Startup/Stop" Multistate Indicators

Switch to the shape tab; select the background color of state 0 as "white" and state 1 as "black", as in Fig.3-34.

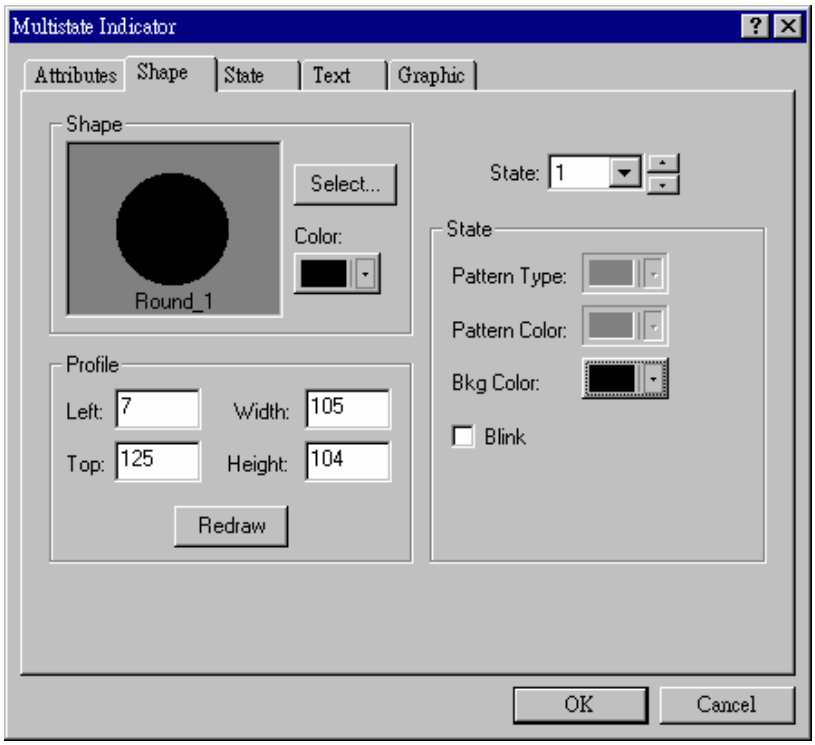


Fig.3-34 Multistate Indicator Shape dialog box

Setup Graphic of the "Motor Startup/Stop" Multistate Indicator

Switch to the Graphic tab, select bitmaps for states 0 and 1 by typing a file name in the Bitmap Image field, i.e., the bitmap imported in "Import bitmap for Motor Startup/Stop Multistate Indicator" section. Change the color of the bitmap as well, as in Fig. 3-35. Or use the Bitmap toolbar as in Fig. 3-18.

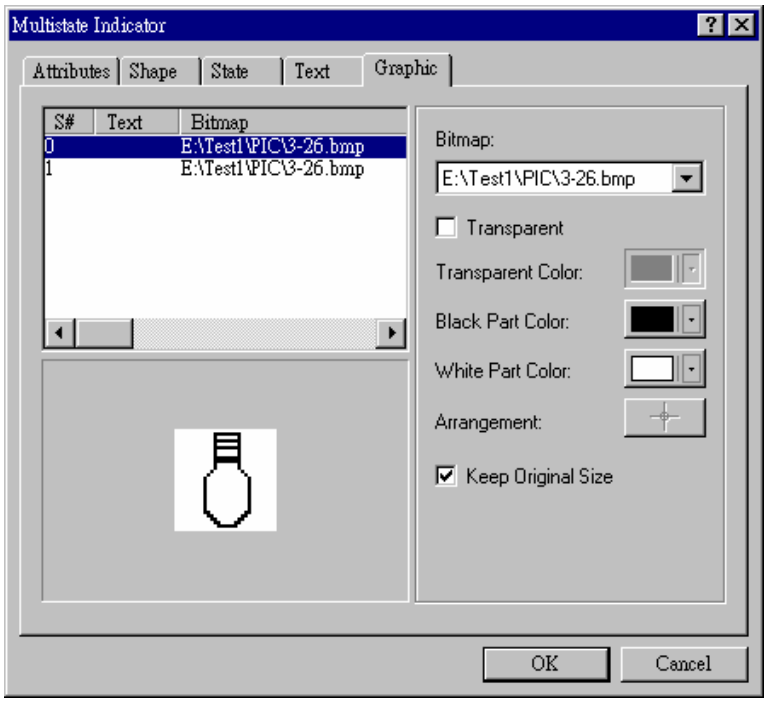


Fig.3-35 Multistate Indicator "Graphic" tab

Complete the "Motor Startup/Stop" Multistate Indicator Design

The "Motor Startup/Stop" Multistate Indicators design is completed. Fig. 3-36(a) is for state 0 (off), Fig. 3-36(b) for state 1 (on).

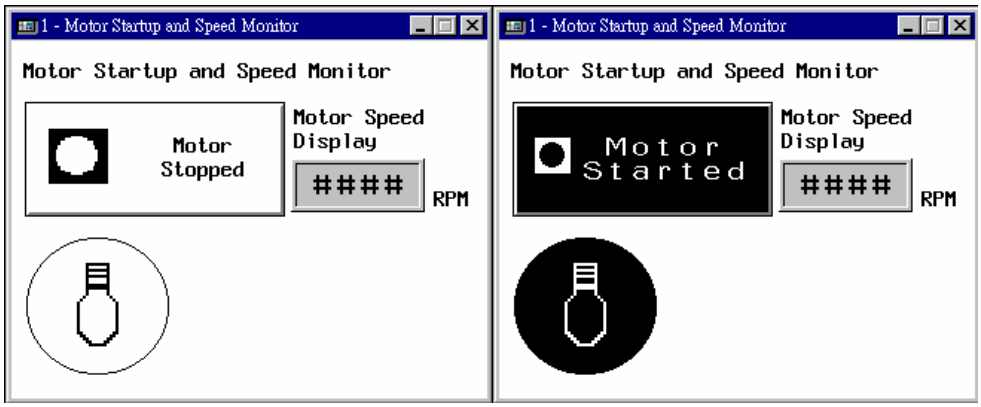


Fig.3-36 (a) Fig.3-36(b)

3.3. Design the "Set Motor Speed" Screen

3.3.1 Create the "Set Motor Speed" Screen

Select the new screen from the Screen Pull-down menu, as in Fig. 3-37. Or select the icon from the standard toolbar to create a

new screen. Set the “Screen Name” field as “Set Motor Speed” and “Number” as “2” as shown in Fig. 3-38.

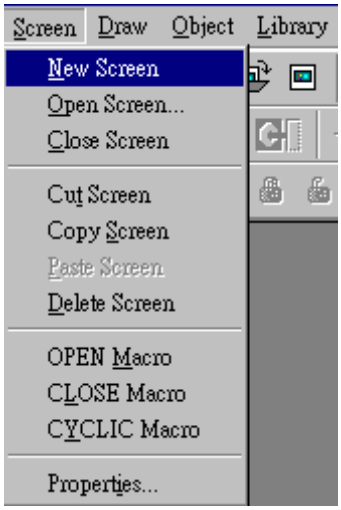


Fig. 3-37 The New screen in the Screen menu’s pull-down

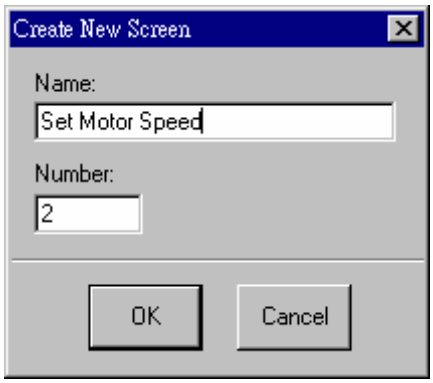


Fig.3-38 Create a New Screen

3.3.2 Create “Motor Speed” Numeric Entry object

Place a Numeric Entry object in screen #2 “Set Motor Speed.” It has the following attributes:

1. Write: D200 (register in Mitsubishi FX2N PLC), one word.
2. Read: D200
3. Data type: unsigned binary.
4. Notify: M20 (Contact in Mitsubishi FX2N PLC). Notify PLC when the input data value is ready.
5. Text font: 16x16.
6. Set 4 digits for the integer.

7. Input range: the upper and lower limits to qualify operator's input value. Lower limit is 0 and the upper limit is 3000, in this example.

Procedures are described as follows:

Setup the "Motor Speed" Numeric Entry object

Select the "Numeric Entry" in the Object pull-down menu, as in Fig. 3-39. Or select the icon on the Basic Objects toolbox.

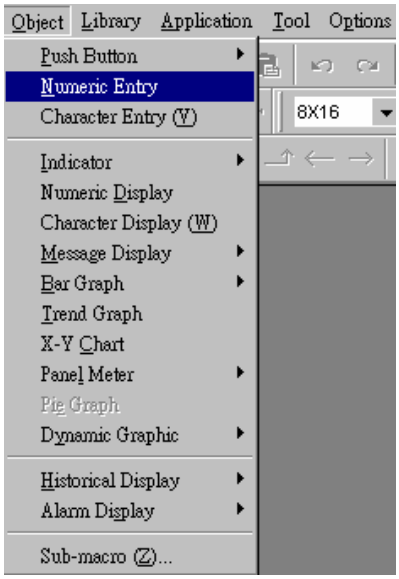


Fig.3-39 Select Numeric Entry from the Object pull-down menu

When selection is done, move the mouse pointer to the screen workspace. Click the left mouse button once to define the button's upper left corner, then drag the mouse to its desired size. Click the left mouse button once more upon completion, as in Fig. 3-40.

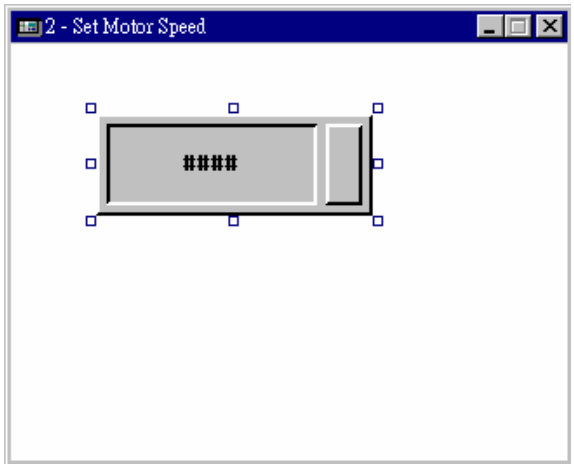


Fig.3-40 Numeric Entry object

Set Attributes of the "Motor Speed" Numeric Entry object

Move the mouse pointer into Numeric Entry object, and double click the left mouse button. Or select Object Attributes from the EDIT menu's pull-down list. The Numeric Entry settings dialog box will appear on screen. Put "D100" in the "Write" field, "D100" in the "Read" field, and "Unsigned Binary" in "Format". Set the "Frame" field as "DEF04", the "Notification" field as "M20", and select the "After Writing" option button. (Notify PLC when the data input is completed.) Set "Font" as "16x16", "Integral Digits" as "4", "Min" input limit as "0", and "Max" input limit" as "3000". See Fig. 3-41.

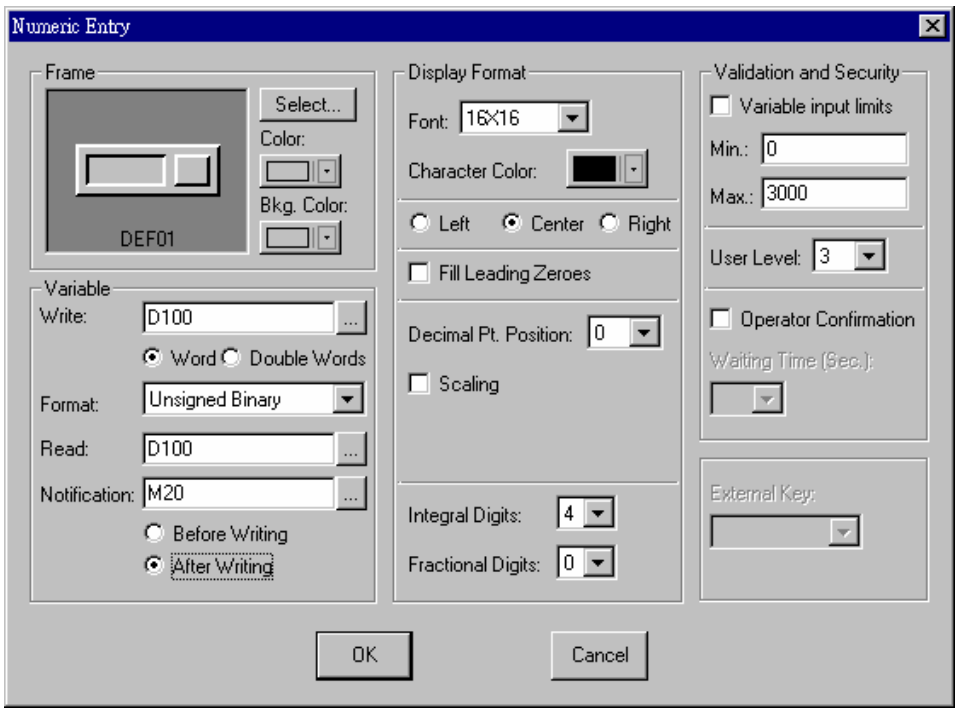


Fig.3-41 Numeric Entry object settings dialog box

3.3.3 Create "Set Motor Speed" Static Text

After setting up the Numeric Entry object using the procedures described in section 3.2.3 "Design Motor Startup and Speed Monitor Static Text," design a static text "Set Motor Speed." Set the font to "24x24" and place it above the Numeric Entry object.

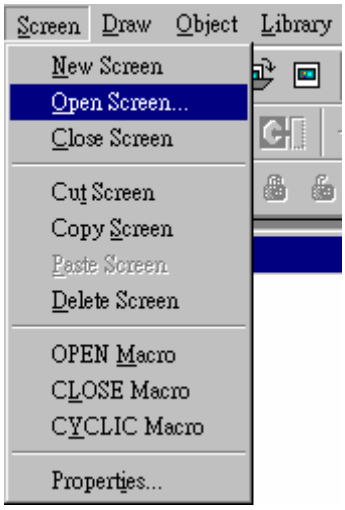
3.3.4 Create "RPM" Static Text

Again, design a static text "RPM" with font size "8x16" and place it to the right of the Numeric Entry object.

3.4. Design for Switching Screens

3.4.1 Open Screen

Select “Open” from the Screen pull-down menu, as in Fig. 3-42. Or select the icon on the standard toolbar. Open the previously saved Screen #1. A dialog box pops up for opening the existed screen, as shown in Fig. 3-43. The selected screen is displayed on the preview pane.



Fgi.3-42 Select “Open” from the “Screen” pull-down menu

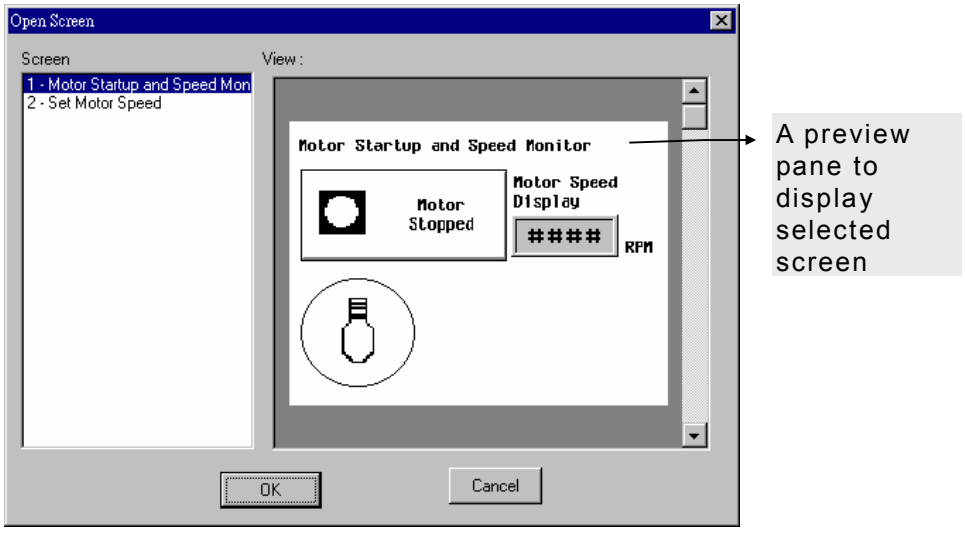


Fig.3-43 The Open Screen dialog box

Place a “Goto Screen” button in screen #1 “Motor Startup and Speed Monitor” to change screens. It has the following attributes:

1. Specify “Open/Go To” as “Set Motor Speed.”

2. Frame: “Raised.”

3. The text “Set Motor Speed” is displayed in the “Goto Screen” button. Set the font to “16x16”, the font color to “black” and the background color to “white”.

Procedures are described as follows:

3.4.2 Create “Goto Screen #2” Button

Select the “Goto Screen” from the “Push Button” sub menu in the Object Menu, as in Fig. 3-44. Or select the icon on the Basic Objects toolbox.

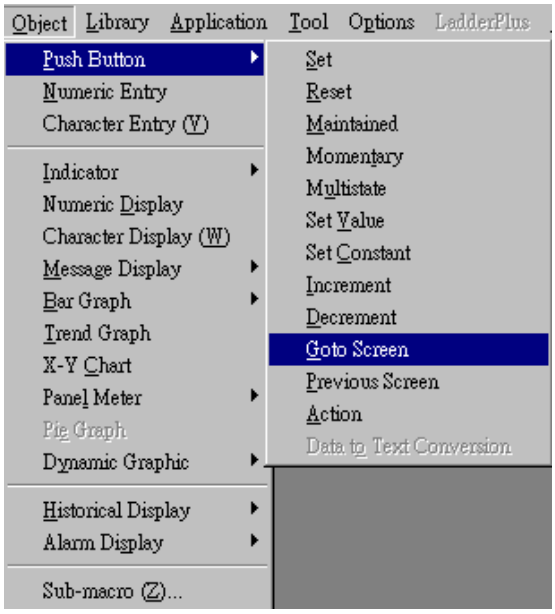


Fig.3-44 Select Object Menu -> Push Button -> Goto Screen

When a selection is made, move the mouse pointer to the screen workspace. Click the left mouse button to define the upper left corner, then drag the mouse to its desired size. Click the left mouse button once again upon completion, as in Fig. 3-45.

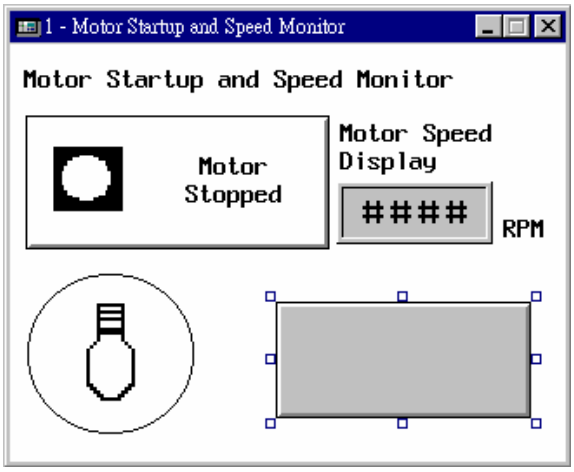


Fig.3-45 Goto Screen button

Set "Goto Screen" button attributes in the "Motor Startup and Speed Monitor" Screen

Double click the left mouse button on the Goto Screen button, which was created in section 3.4.2. Or select "Object Attributes" from the "EDIT" pull-down menu. "Goto Screen button attributes" dialog box will pop up on screen. Select "Open/Go To" as "2 – Set Motor Speed" and "frame" as "Raised", as in Fig. 3-46.

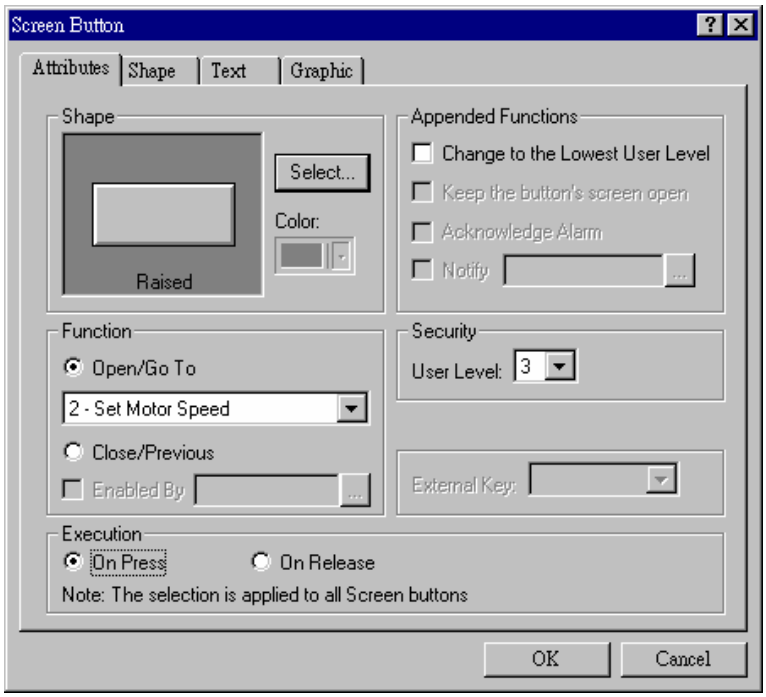


Fig.3-46 "Goto Screen" Button attributes dialog box

Set text of "Goto Screen" Button

Select text tab, type "Set Motor Speed" in the text field. Set the font to "8x16", the color to "black" and the background to "white." See Fig. 3-47. Or use the text toolbar to set it, as in Fig. 3-15.

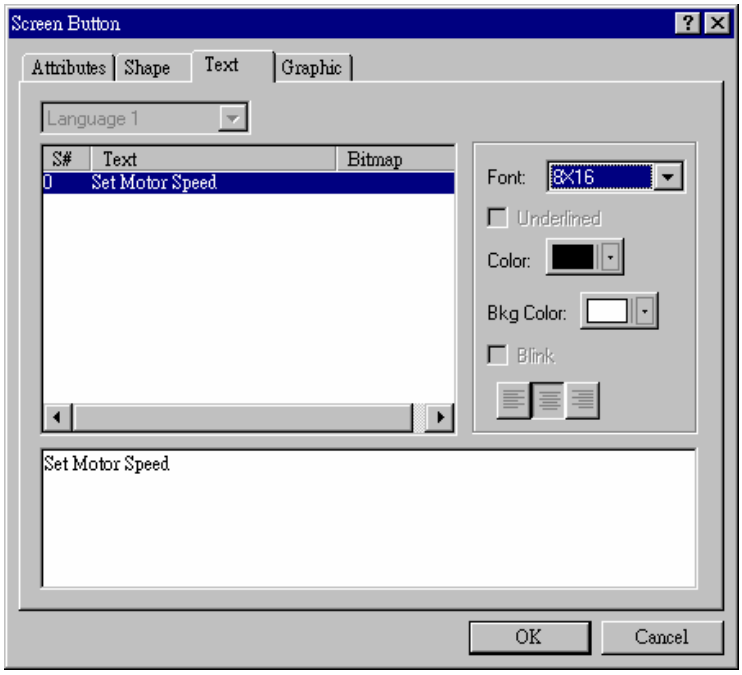


Fig.3-47 "Change Display Button" text dialog box

Complete "Goto Screen" Button design in "Motor Startup and Speed Monitor"

"Goto Screen" button in screen #1 "Motor Startup and Speed Monitor" is completed. See Fig. 3-48.

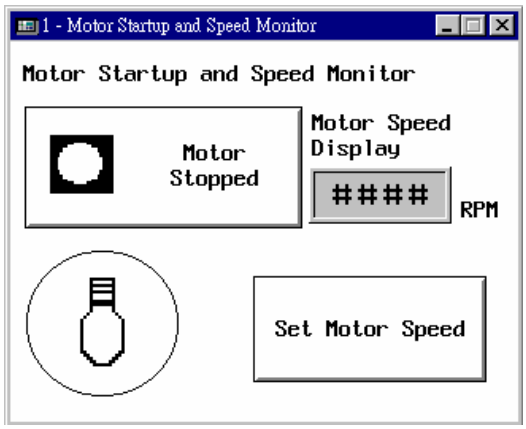


Fig. 3-48 "Goto Screen" button in screen #1 "Motor Startup and Speed Monitor"

3.4.3 *Create "Return to Screen #1" Button*

Place a Goto Screen button in screen #2 "Set Motor Speed" to return to screen #1 "Motor Startup and Speed Monitor," using procedures described in section 3.4.2. See Fig. 3-49.

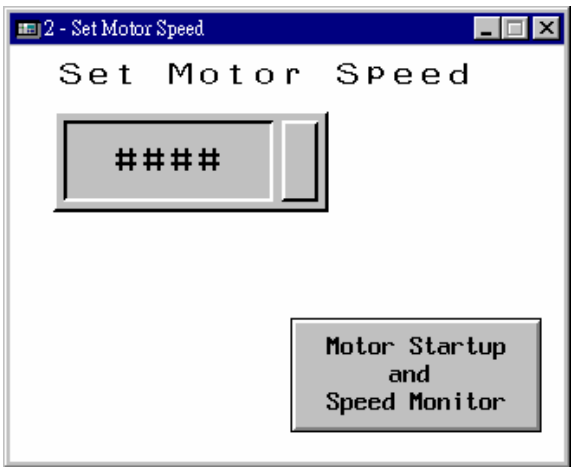


Fig. 3-49 Goto Screen button in screen #2 "Set Motor Speed"

When you complete designing a screen, it is recommended to save the application file immediately before you do anything else.

3.4.4 *Save File*

Select "Save" or "Save As" option from "File Menu" pull-down list, as shown in Fig. 3-50. Or select the icon on standard toolbar.

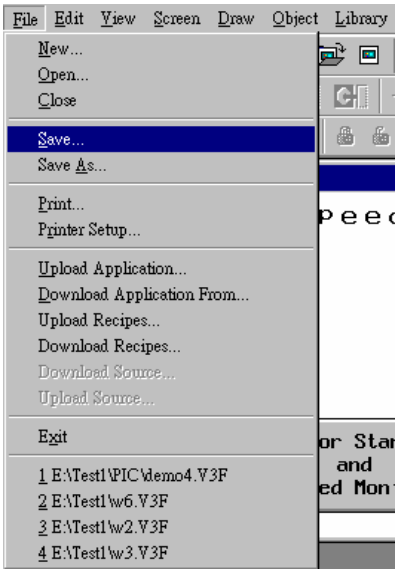


Fig. 3-50 Select "Save" or "Save As" from the "File Menu" pull-down list

3.4.5 *Open Existed File*

Select “Open” from “File Menu” pull-down list, as shown in Fig. 3-51. Or select the icon on the standard toolbar.

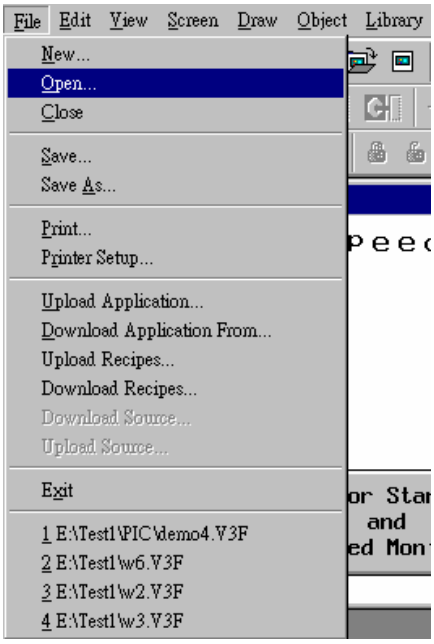


Fig. 3-51 Select “Open” from the “File Menu” pull-down list

3.4.6 *Compile*

When you complete designing an application, please compile it before downloading it to The HMI. Select the “Compile” option from the “Application” Menu pull-down list, as shown in Fig. 3-52. Or select the icon on the standard toolbar. When compiling an application, ADP displays a “compile status” window. Compilation results are displayed automatically. All error messages will be listed in the compile status window, if there are errors. See Fig. 3-53. If there are compilation errors, it must be fixed before recompiling. Results from compiling an application must be completely error free. Only then is the application ready for downloading to the Flash memory in The HMI for execution.

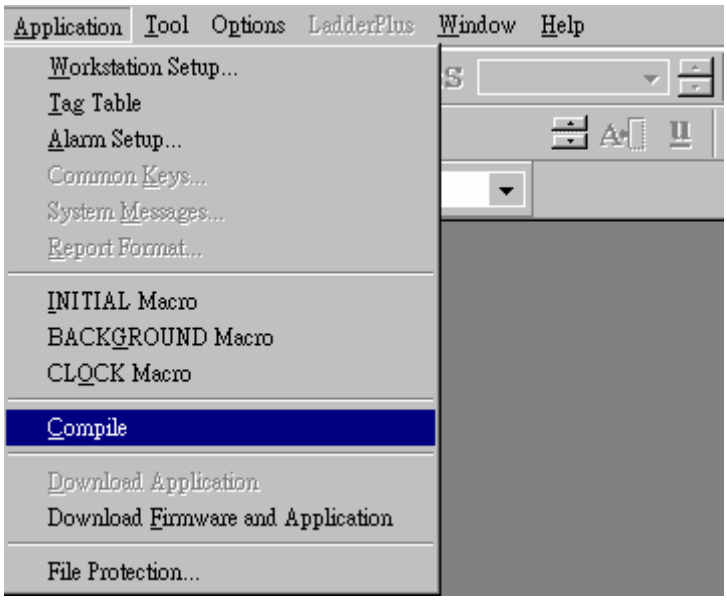


Fig. 3-52 Select “Compile” from the Application Pull-down menu

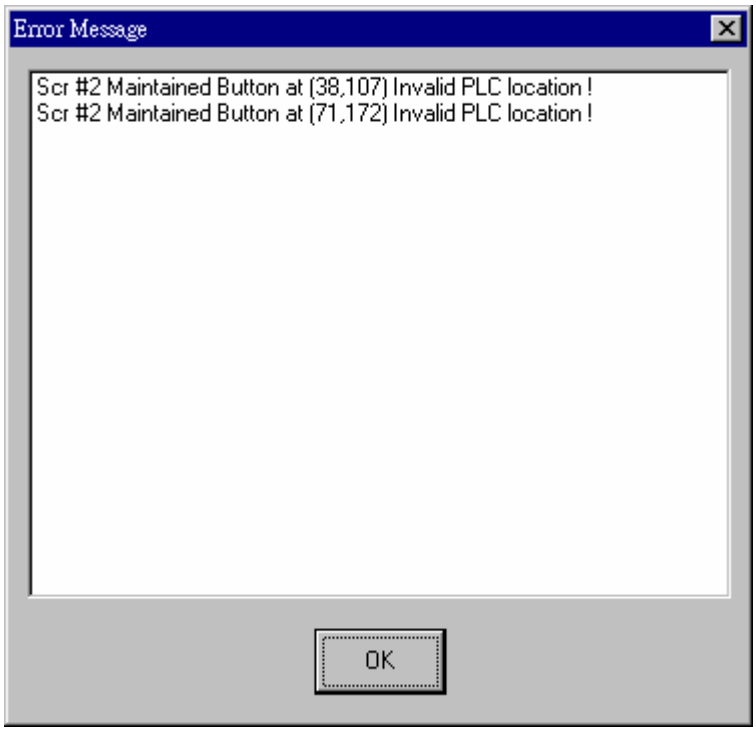


Fig. 3-53 Compilation Error Messages

3.5. Download from PC to HMI

Procedures for downloading an application to HMI, as well as cautions for setting parameters will be covered in this section.

3.5.1 PC/HMI Communication Cable

The "Download" process is where PC sends programs to HMI by means of communication media (RS232). As a result, you will need a communication cable. See Fig. 3-54 for the connection.

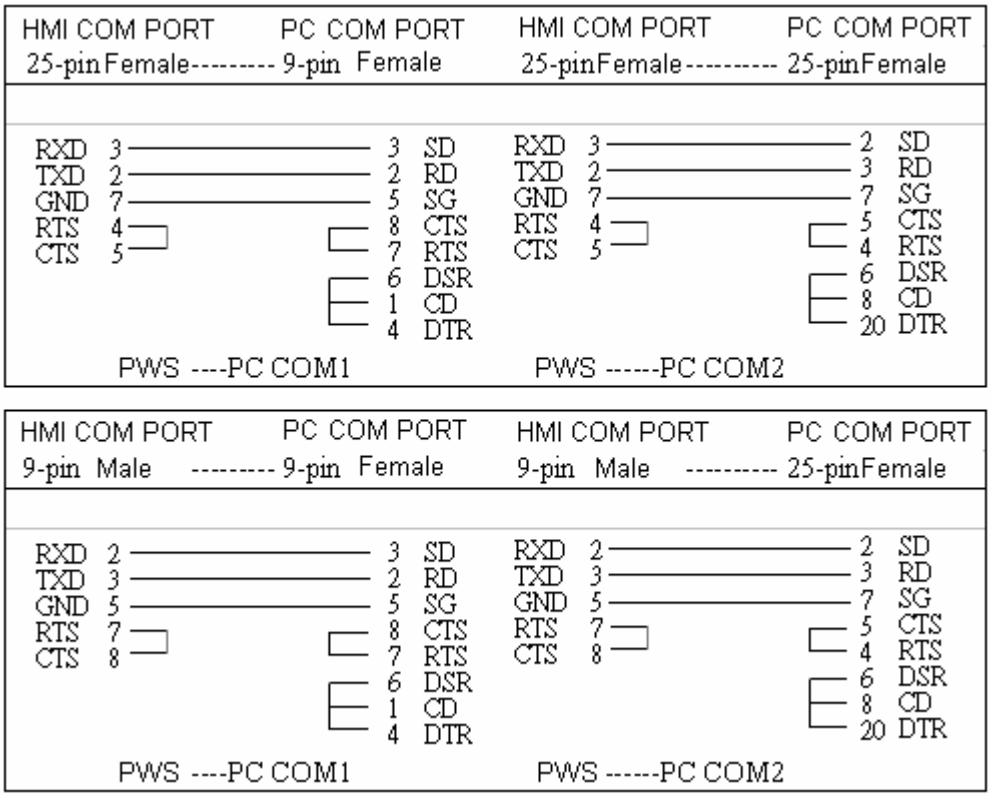


Fig.3-54 PC to HMI connection diagram

3.5.2 ADP Communication Settings

Select "Transmission Setup" in the "Options" menu pull-down, and a Transmission Setup dialog box will pop up, as in Fig. 3-55. In the Transmission Setup dialog box, the COM Port indicates the communication ports of the PC. Set the Baud Rate as required. If there are more than 8 characters in the directory name in which the file is saved or in the application file name itself, please change the selection to the "Windows Version" for application download.

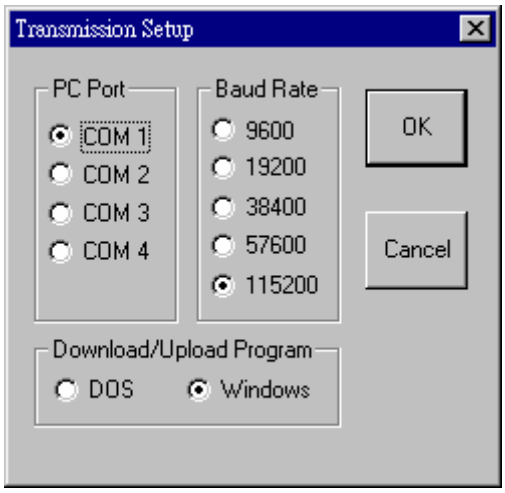


Fig.3-55 Transmission Setup window

3.5.3 HMI Hardware Settings

Adjust the DIP-switch located at the back of the HMI panel to SW7=ON. This enables the system menu to display and allows the application downloading at system boot-up. (Other DIP-switch locations, SW1~SW6 and SW8~SW10, use the manufacture's default settings.) When HMI is powered up (DC24V) and self-testing is completed, the system menu is displayed as in Fig. 3-56. Press "Configure" and a screen shows up, as in Fig. 3-57. In the "Download/Upload/Copy port" field, specify a HMI communication port for the PC to download the application to HMI. The COM2 communication port in the HMI is used here.

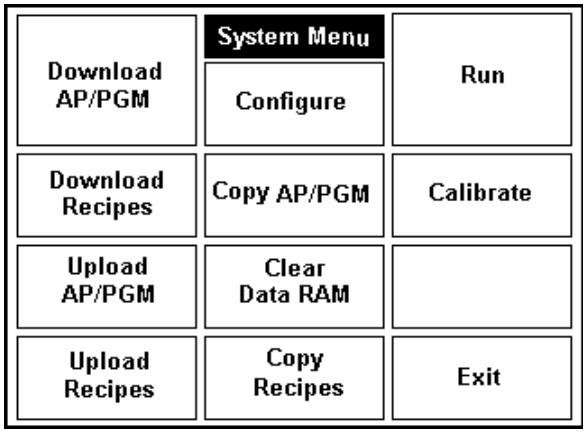


Fig. 3-56 System Menu of HMI

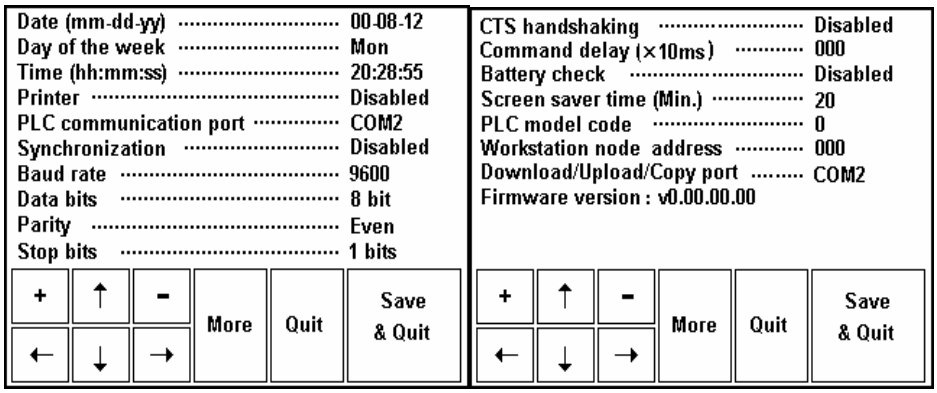


Fig. 3-57 Hardware settings

3.5.4 Download

After connecting the PC to the HMI with the communication cable, press the ”Download AP/PGM” button, located at the upper left of the HMI system menu. The HMI enters a receiving mode to download the application from the PC. “Waiting for downloading” is displayed. Select “Download Firmware and Application” from the ADP Application menu’s pull-down list. The application should now be downloading to the HMI.

Download Application

ADP should download only the application to the HMI. Suitable for downloading changed applications.

Download Firmware and Application (my note: see 2.10.12)

ADP downloads both the application and firmware to the HMI. Suitable for the first-time download.

PWS500/700/1711 supports only application download, and PWS1760/3160/3260/ 3760 supports both application and firmware download.

If the download is interrupted prior to completion, try to find the source that caused the failure, such as a connection to a wrong COM port. After the problem is fixed, go through the download process again. If the download is successful, the HMI will display “Downloading completed.”

3.6. Connect HMI to PLC

Procedures for connecting HMI to PLC, as well as cautions for setting parameters are covered in this section.

3.6.1 HMI/PLC Communication Cable

Before connecting HMI to PLC, please prepare a HMI/PLC communication cable. See Fig. 3-58. The PWS1711 HMI and Mitsubishi FX2N PLCs are used here. For more information about other PLC models, please refer to the **ADP Software User's Manual.**

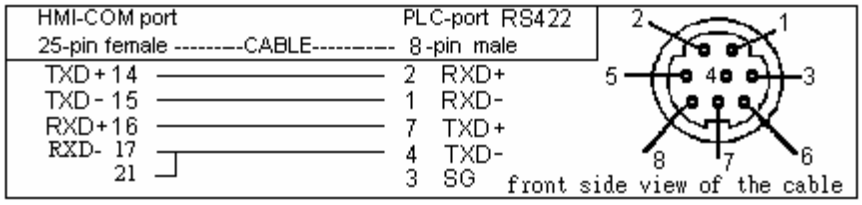


Fig. 3-58 Communication cable from PWS1711 COM2 to Mitsubishi FX2N PLC

3.6.2 ADP Communication Settings

Select "Workstation Setup" in the "Application" pull-down menu, and then click the "Communications" tab in the pop up dialog box, as shown in Fig. 3-59. In the dialog box, set the Controller/PLC station to "0", the HMI station to "0", the Baud Rate to "9600", Data Bits to "7 bits", Parity to "Even", Stop Bits to "1 bit", the PLC Communication Port to "COM2" port, Connection to "Normal". (If Transmission Setup in PLC are modified, set parameters accordingly).

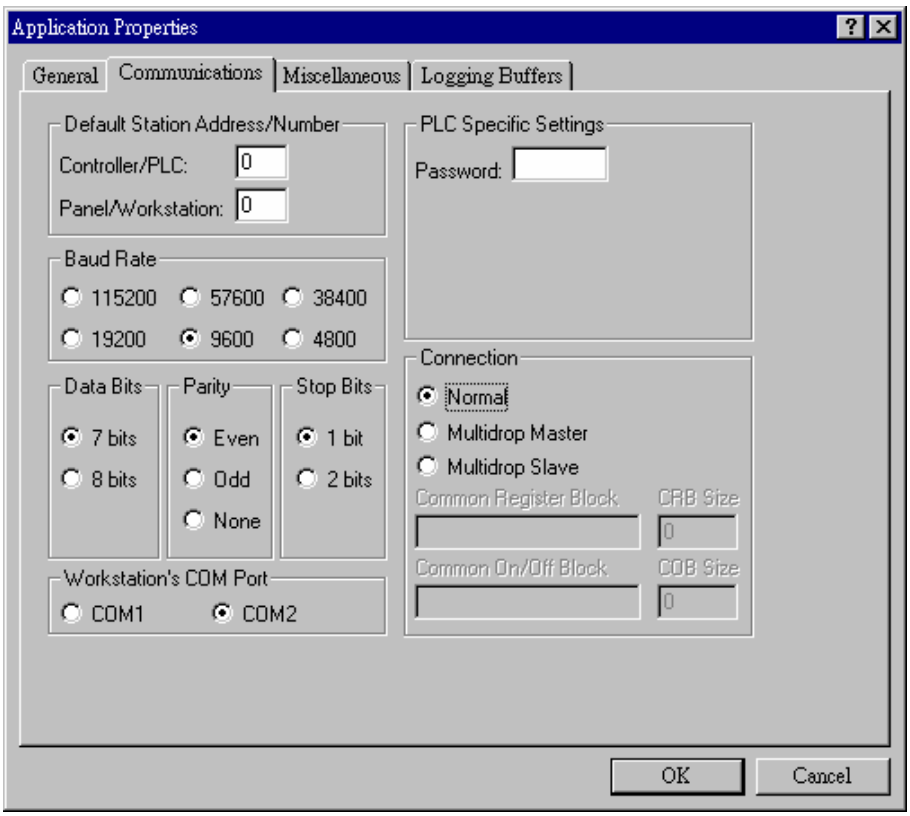


Fig. 3-59 Communications tab in Application -> Workstation Setup dialog box

3.6.3 HMI Hardware Settings

On the HMI system menu, displayed as in Fig. 3-56, press ”Configure” and a screen shows up, as in Fig. 3-57. Make adjustments as follows:

PLC Communication port → COM2

Baud rate → 9600

Data bits → 7

Parity → Even

Stop bits → 1

Workstation node address → 0

Note:

If the DIP-switch, located at the back panel of the HMI, is set to DIP-SW5=ON, then use the HMI Hardware Setting as described in section 3.6.3;

If the DIP-switch, located at the back panel of the HMI, is set to DIP-SW5=OFF, then use the ADP Communication Settings as described in section 3.6.2.

3.6.4 Connecting HMI to PLC

After connecting the PLC to the HMI via an appropriate communication cable, press “RUN” in the HMI’s system menu, The HMI will establish communication with the PLC.

(For practical HMI applications, the HMI establishes communication with the PLC automatically after powering up. Adjust the DIP-switch located at the back panel of The HMI to SW7=OFF.)

If the communication connection is established successfully, the communication LED on the HMI’s front panel flashes regularly and continuously. Data from PLC will be displayed correctly on the HMI screen. If the communication does not work normally, please verify if the cable is connected properly, transmission setup and station numbers are set to the same values accordingly.

3.6.5 Communication Error Code

Communication Errors may be classified into 3 categories as following. Communication Error Codes are tabulated as shown in Table 3-60.

1. HMI receives no message from the PLC. (Time out error, x008)
2. HMI receives an unrecognizable message from the PLC. (Unknown Message, x004)
3. HMI receives an error code message from the PLC, indicating that the command is not supported by the PLC, such as an out-of-bound PLC address or a non-existent address. An error Code will be generated, other than codes in categories 1 and 2.

For example, if error code 8004 is returned, then it is both a “Write Error“ and “Unknown Message/Response Error”.

Table 3-60 Communication Error Code table

Error Code	Causes
0002, 8002.	PLC returns CheckSumError
0004, 8004	Unknown Message/Response Error
0008, 8008	Communication Time Out/No response
0010, 8010	Invalid Function
0020, 8020	Invalid Address
0040, 8040	Invalid Data Value
0080, 8080	Invalid Range
00xx	Read Error

80xx	Write Error

NOTE:

1. The table is for PWS500/700/1711/2100/3100/3720
2. The table is NOT applicable to S7-200 PLC

Congratulations!! You have finished the basic ADP training and exercises.

Serious Warnings:

Shut off the HMI power before connecting communication cables. Otherwise, the electronic components in the communication module might be damaged!!