



Software Manual

HMI

V230-21-G23 Rev: 12/04



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VisiLogic Software Manual - HMI Displays

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HMI Displays

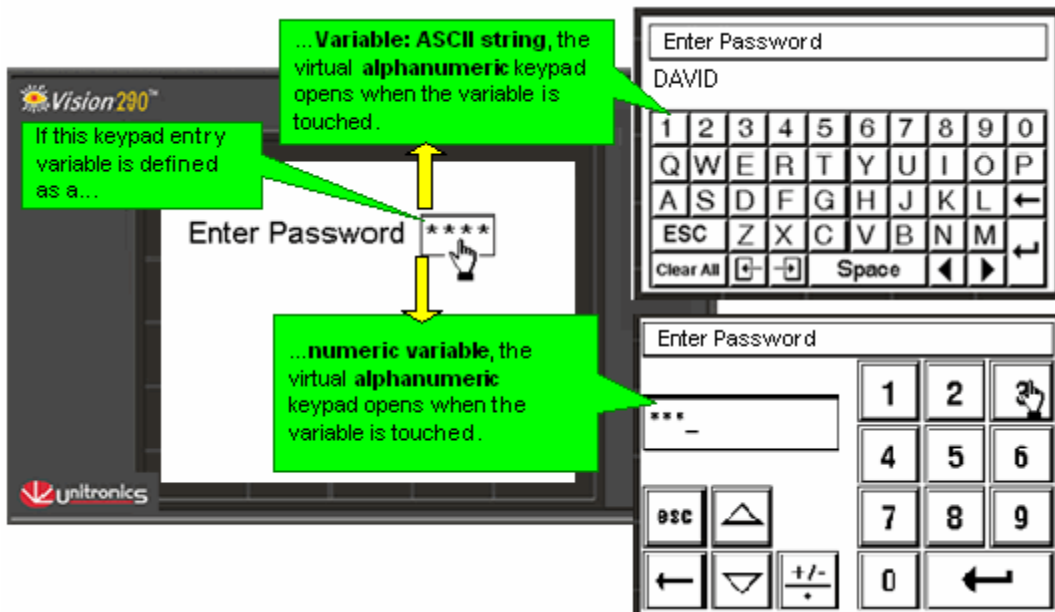
About the HMI Display and Keypad

All Vision controllers offer an integrated HMI operating panel that includes an LCD screen and a keypad. The screen size, type and keypad vary. Exact specifications regarding Vision operating panels are included in the user's manuals.

'Touchscreen' controllers

There are 2 types of Vision touch-screen models:

- Models which comprise only a virtual keypad (V290). In these models, the virtual keypad opens whenever the user touches a keypad entry variable that is currently displayed on the screen.



- Models which comprise both an HMI function keypad and a virtual keypad (V280). However, in these models, the virtual keypad must be activated by turning SB 22 Enable Virtual Keypad ON. This must be done at power-up, or before the Display containing the keypad variable is entered. In addition, the Keypad entry variable must be assigned a Touch Property.

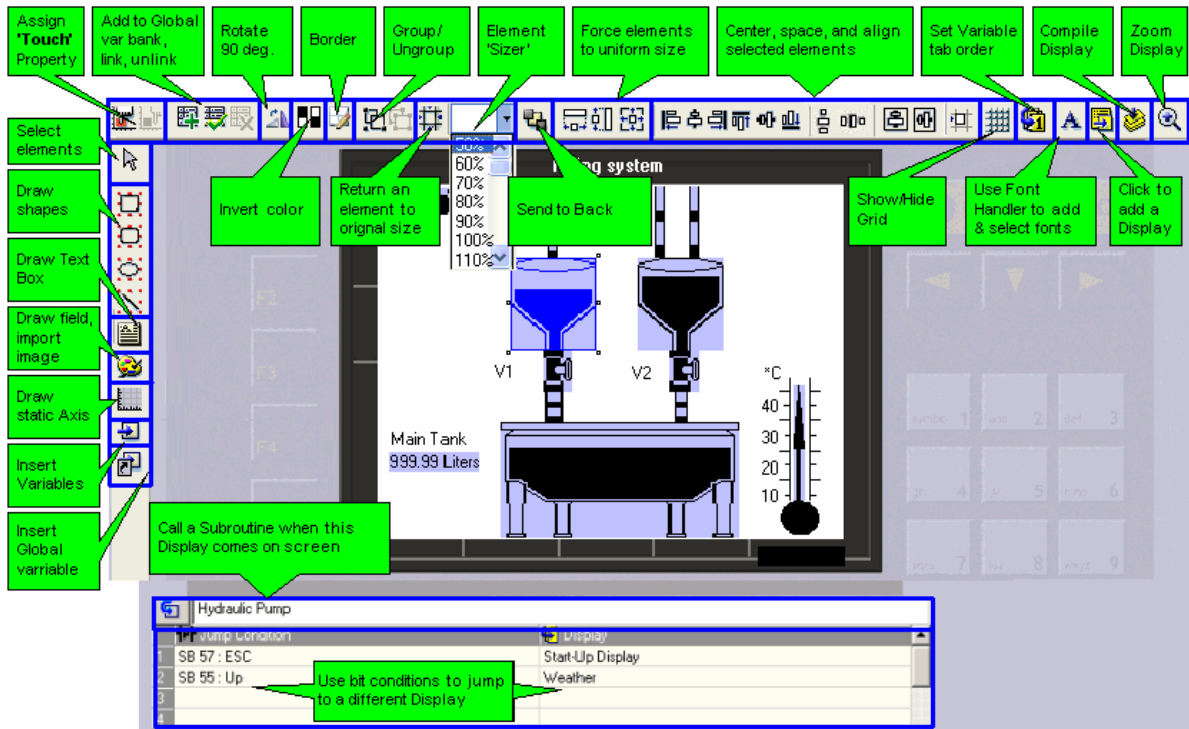
HMI Display Editor

Use the HMI Display Editor to create the Displays that are shown on the controller screen after the program is downloaded. When you select HMI from the Project Explorer tree, a Display replica opens. The size of this replica reflects the type of Vision controller you have selected in your project's Hardware Configuration.

Displays tell your operators what to do. You can have your operators log in with a password, enter setpoints and other data, and instruct the operator what to do in case of a system problem or alarm. A Display can contain both text and images. Text and images can be both fixed and/or variable.

Variables are inserted into a Display to:

- Show run-time values as integers
- Represent run-time values with either text, images, or bar graphs
- Show text messages that vary according to runtime conditions.



Variables

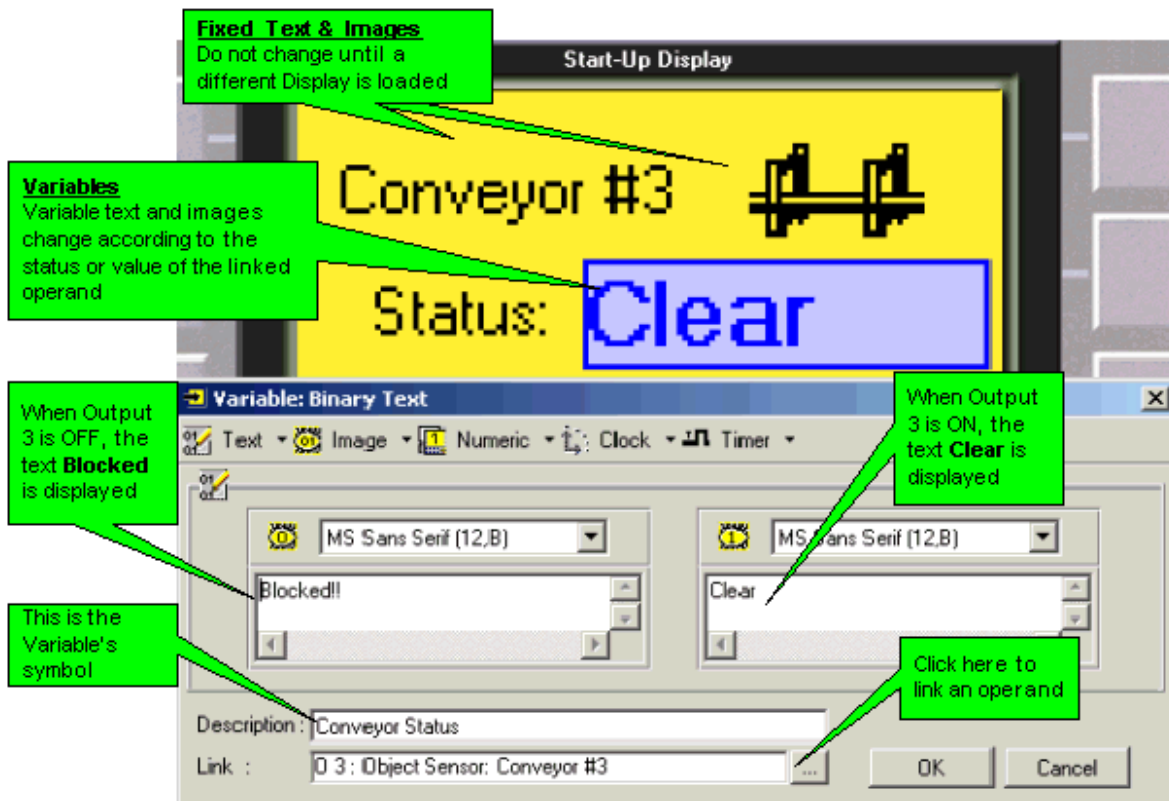
Variables enable you to show run-time values, text, images, and graphs on the controller's screen in response to run-time conditions. Bit, or binary text variables, for example, display text messages on the controller's LCD screen according to the status of a bit operand.

A Display may contain up to 24 variables.

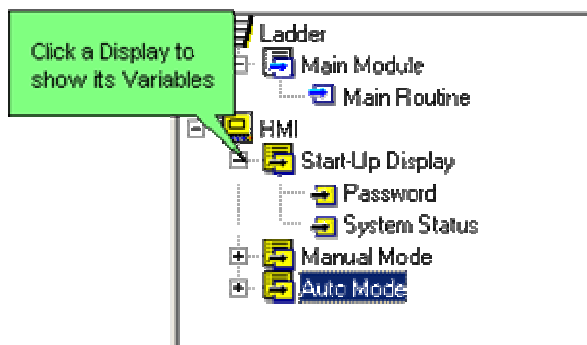
You can also use Keypad Entry Variables to enable an operator to enter a password, or data such as setpoints from the controller's keyboard.

Variable Editor

When you insert a variable into a display, the Variable Editor opens, showing you the options that are relevant for that type of Variable.



After you have inserted Variables into a display, they are shown with that display in the Project tree.



Inserting a Variable into a Display

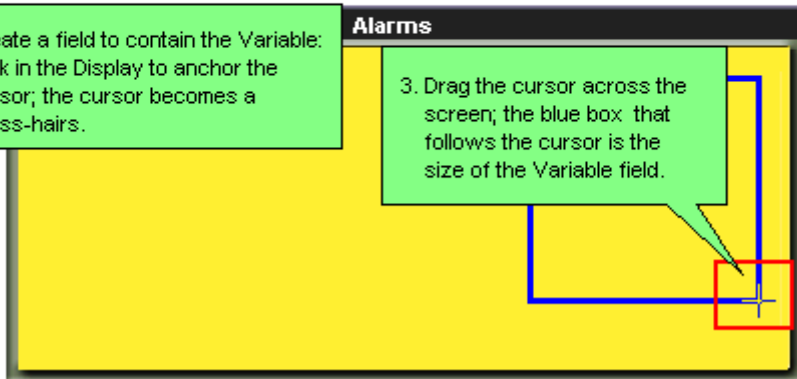
To show variable data, you first create a field in the Display. The field is a container that holds the data.

1. Click on the Variable button.

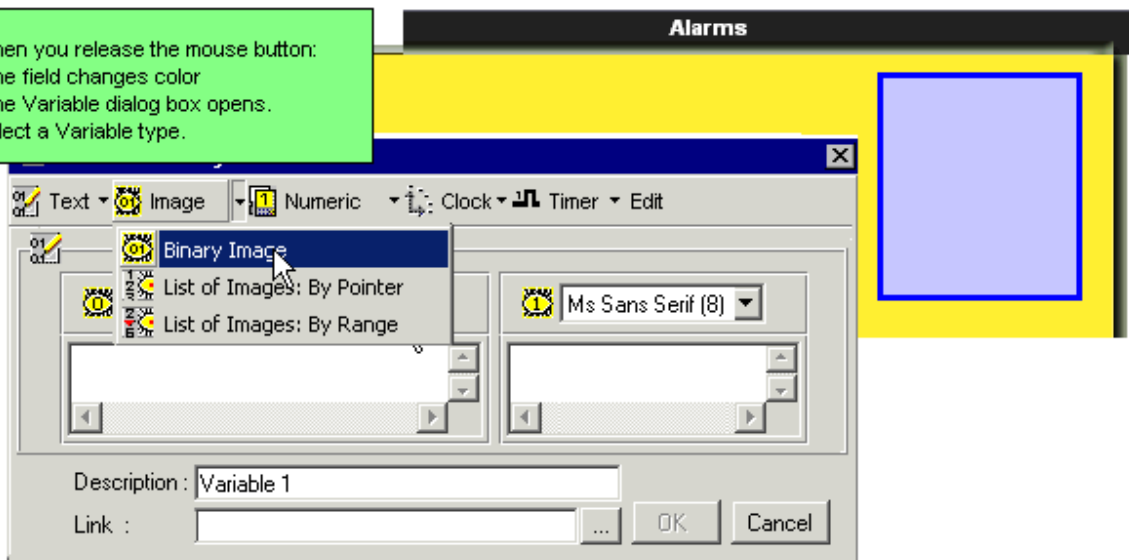


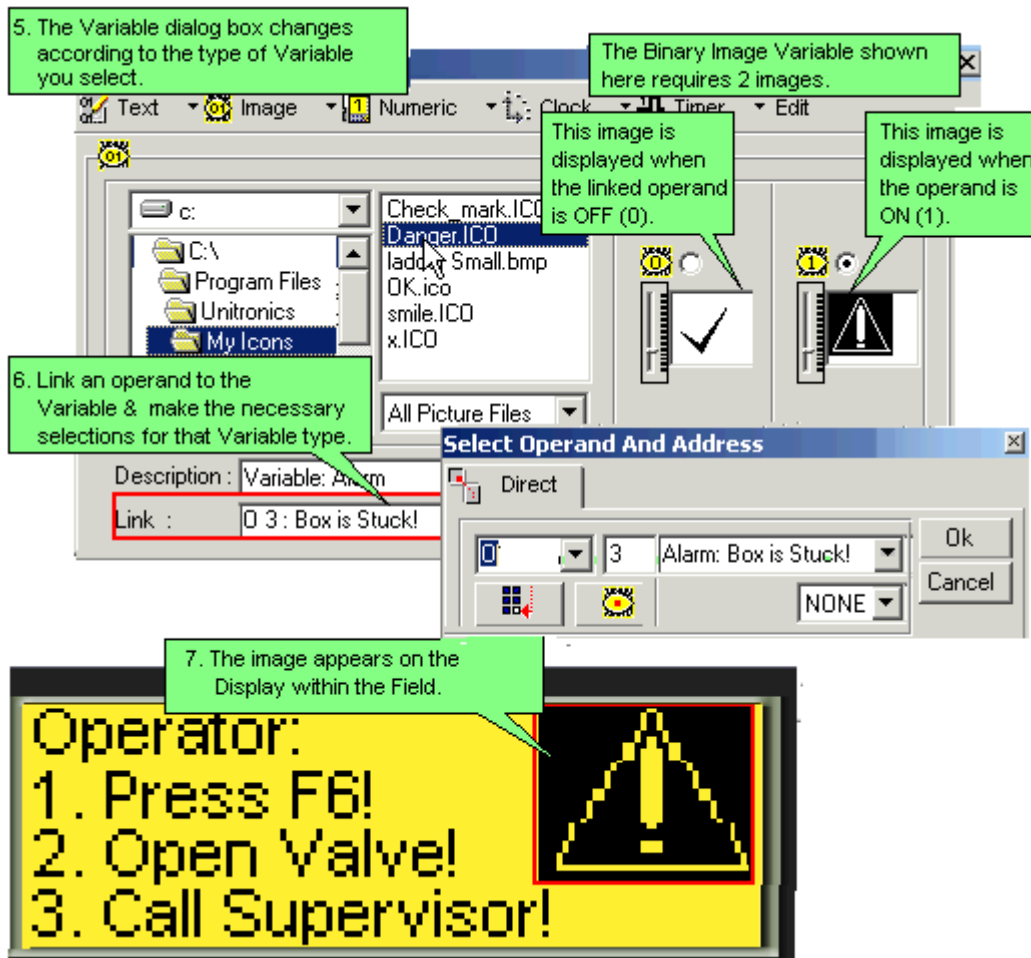
2. Create a field to contain the Variable: click in the Display to anchor the cursor; the cursor becomes a cross-hairs.

3. Drag the cursor across the screen; the blue box that follows the cursor is the size of the Variable field.

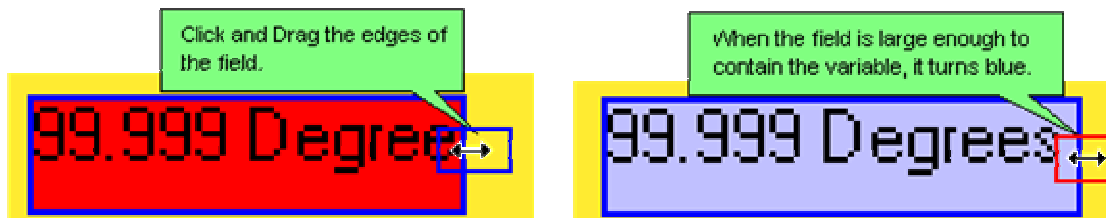


4. When you release the mouse button:
- the field changes color
- the Variable dialog box opens.
Select a Variable type.





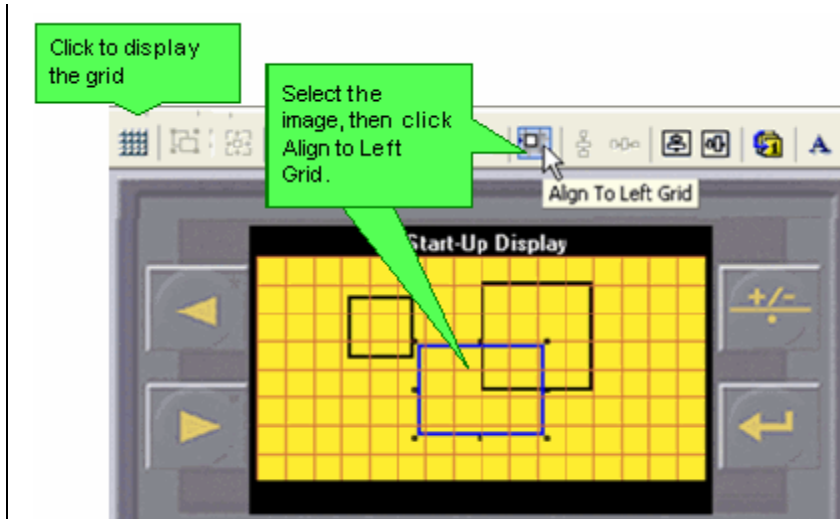
A field that is not big enough to contain its data is red. To resize a field, click it and drag the edges.



Align, Space & Center Display Elements

When you align, space, and center elements, be careful not to make them the same size and align them one on top of the other. If elements are 'fused' together in this way, they cannot be separated.

- Note •** The HMI display uses a grid which spaces the lines 8 pixels apart. To optimize Displays and shorten the PLC cycle time, images and variables should be aligned to grid.



Integer Variables (MI, SI, ML, SL, DW, SDW)

You can represent integer values by showing a numeric value on screen, or by showing text messages, images, or bar graphs. You can also enable data and passwords to be entered into the system via the controller keyboard.

Global HMI Variable Bank

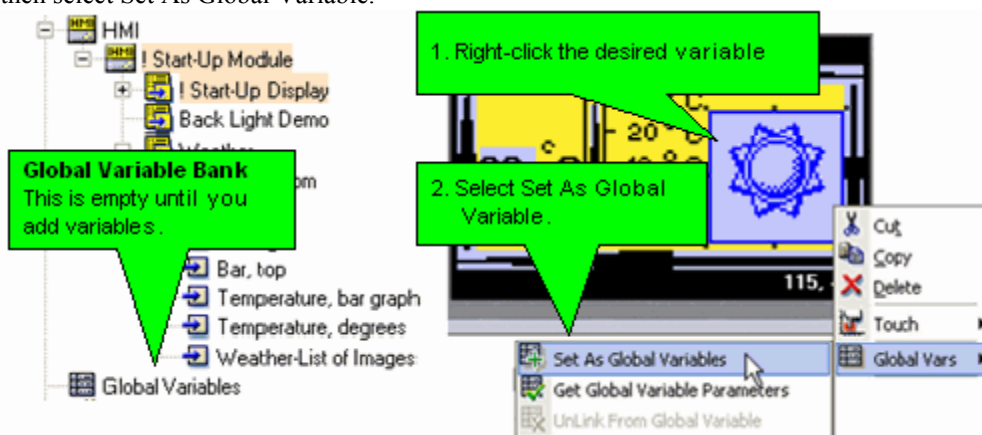
The Global HMI Variable bank can contain any type of HMI variable. When you open a VisiLogic project, the bank is empty. You enter variables in the bank by first creating a variable, such as a List of Images variable, and then adding it to the bank. Once a variable is in the bank, you can refer to it from any HMI Display; although you can change the linked operand, the rest of the parameters remain the same.

Why use Global Variables?

Variables take up space in the controller's Flash memory. In some applications, you may copy and paste a variable to a number of Displays, changing operand links where required. In these applications, you can save a great deal of space--and download time--by using a Global Variable, and referring to it as required. No matter how many times you refer to a Global Variable, it is a single variable.

Creating and Using Global Variables

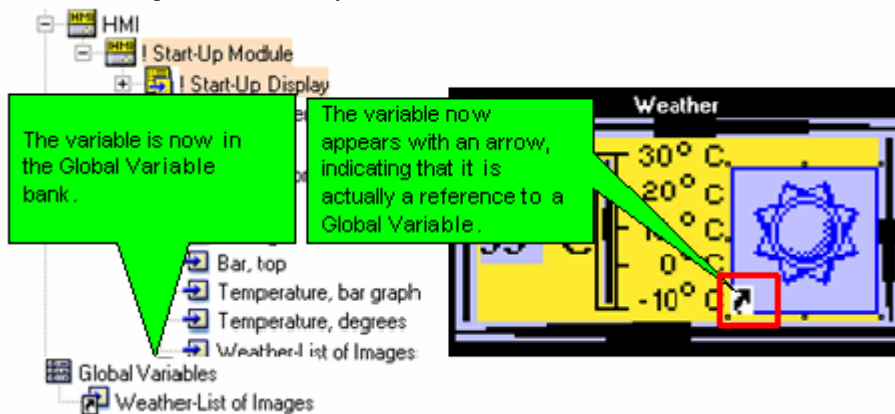
1. Either create a new variable and then right-click on it, or right-click on an existing variable, then select Set As Global Variable.



2. Enter a name for the Global Variable, then click OK.



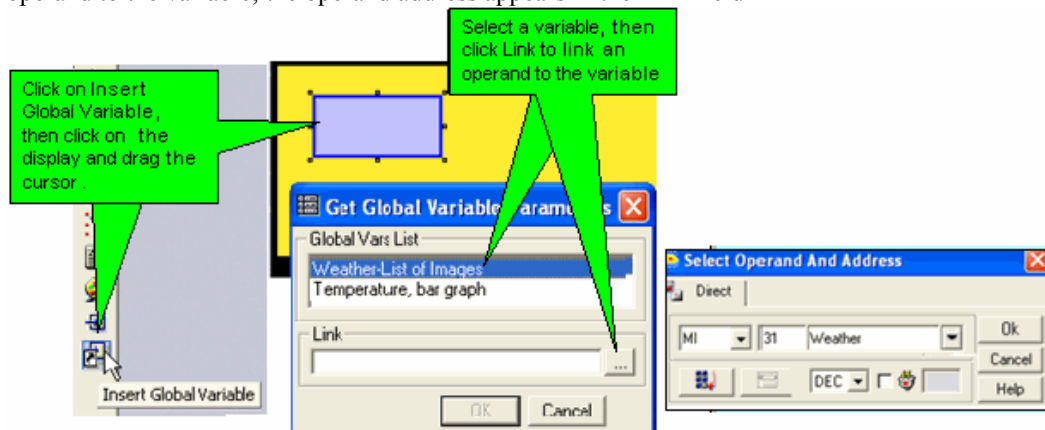
3. The variable is now part of the Global Variable bank; in the Display, the variable now appears with an arrow, indicating that it is actually a reference to a Global Variable.



Referring to a Global Variable

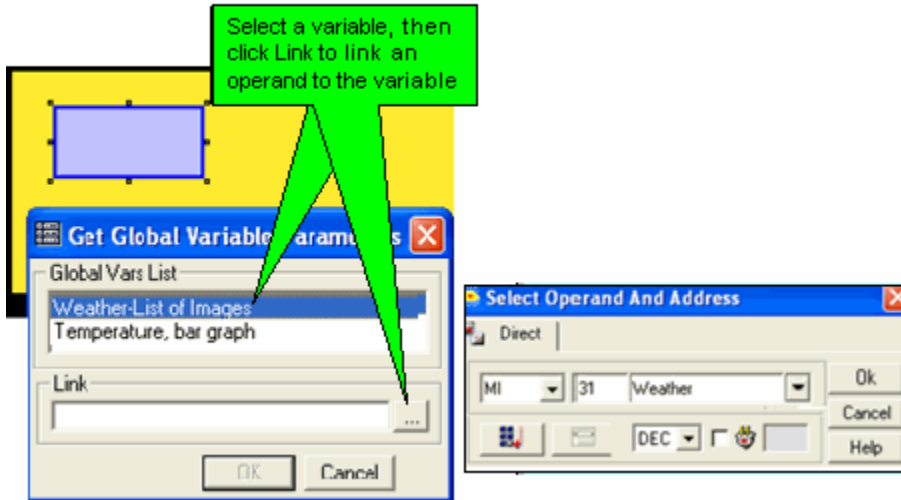
Once the variable is in the bank, you can refer to it from any HMI Display.

- To insert a Global Variable
 1. Click on Insert Global Variable, then click on the display and drag the cursor; the Get Global Variable box opens.
 2. Select a variable, then click Link to open the Select Operand and Address box and link an operand to the variable; the operand address appears in the Link field

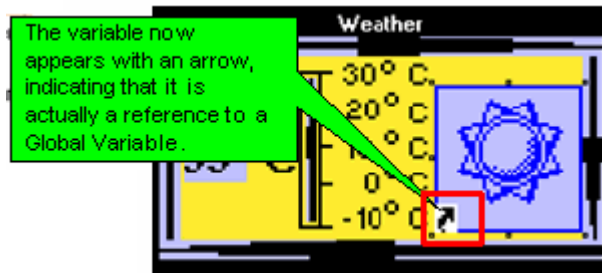


3. Click OK, then the variable now appears with an arrow, indicating that it is actually a reference to a Global Variable.
- To link an existing variable to a global variable.
 1. Right-click the variable and select Get Global Variable; the Get Global Variable box opens.

2. Select a variable, then click Link to open the Select Operand and Address box and link an operand to the variable; the operand address appears in the Link field



3. Click OK, then the variable now appears with an arrow, indicating that it is actually a reference to a Global Variable.



- Note •** | A Global variable cannot be resized.
- | Deleting the last link to a Global Variable also deletes the Global Variable.

Changing Displays (Jumps)

To change between Displays, set Jumps. A Jump contains a Jump condition, which is linked to a bit operand, and a destination Display. You can also load a Display by placing a function in a Ladder net.

Setting Jumps

1. Open a Display.
2. Click on a Jump Condition field, and select an operand.
3. Click on Display field, and select a destination Display.

To edit a Jump, click the desired field and make a new selection.

- Note •** | When an HMI keypad entry variable is active, and the Enter key is pressed on the controller keypad, SB 30 HMI Keypad Entries Completed turns ON. This can be used as a Jump condition.
- | To see a list of Displays in a project together with their Display numbers, select HMI Information from the View menu.

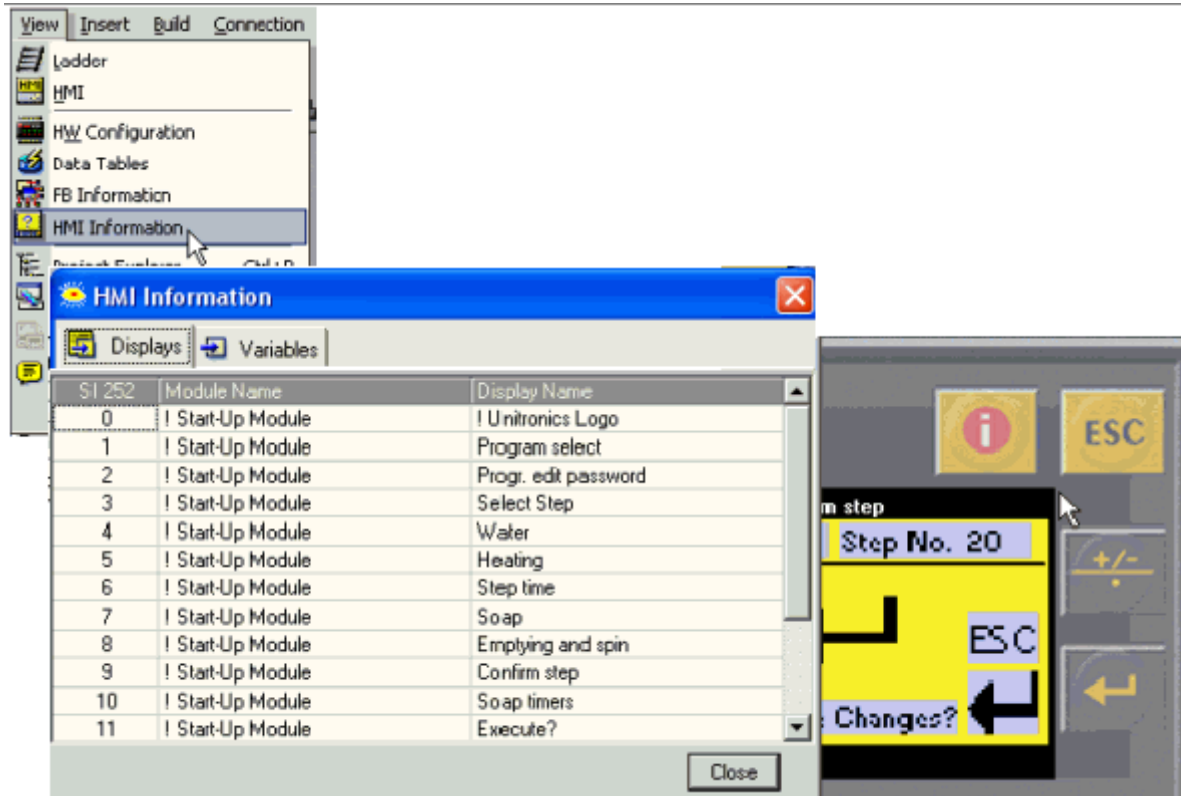
Calling a Subroutine via Display

You can use a specific Display to call a specific Subroutine. This Subroutine will run during the time that the Display is shown on the controller's LCD.



HMI Information

To see a list of Displays in a project together with their Display numbers, select HMI Information from the View menu. To see keypad entry variable ID numbers, click the variable tab.



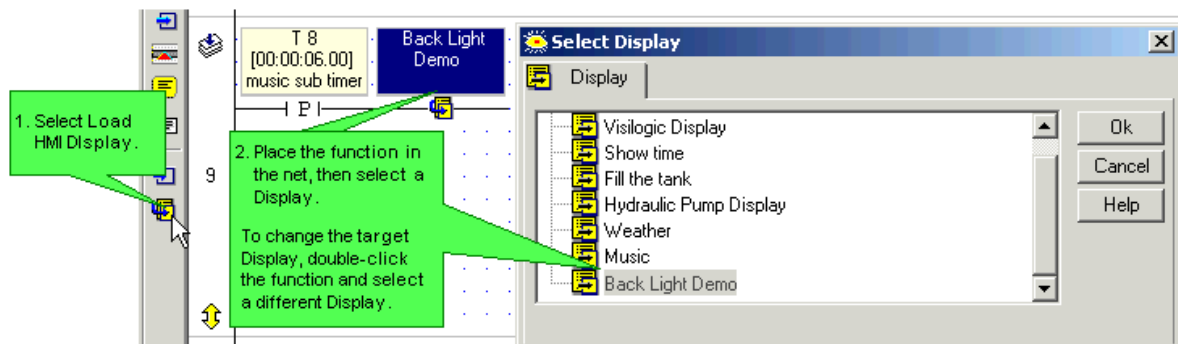
HMI-Ladder: Load HMI Display: Functions

These Ladder functions call HMI Displays.

- Note •** Load Display functions should not be placed directly on the Ladder rail, or called by conditions that continually call the Display when it is still loaded on the controller screen. Use these functions to initially load the Display, then to refresh it when your application requires, as, for example, when you want to update variable display.

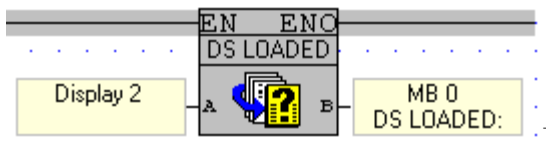
Load HMI Display

Causes a Display to be shown on the controller's LCD as a response to a Ladder Condition.



HMI Display Loaded

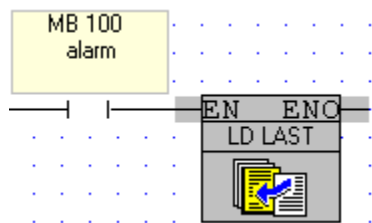
This turns a linked MB ON when a specific Display begins loading. HMI Display Loaded is located on the Calls menu.



Load Last Display

Loads the last Display loaded by the application. The function works according to LIFO list comprising the last 24 active Displays.

This function is located on the Calls menu.

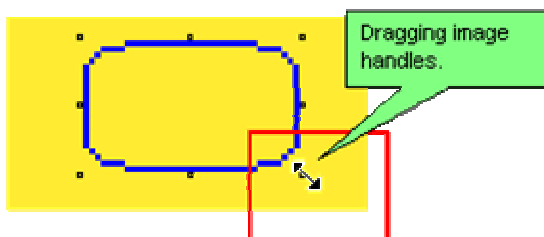


To see a list of HMI Displays in a project, together with the Display number, select HMI Information from the View menu.

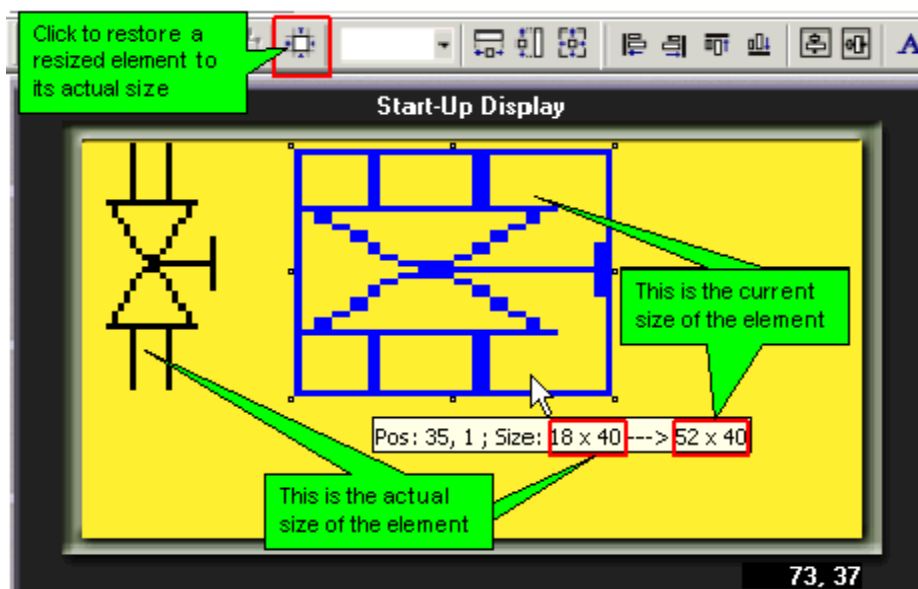
Resizing HMI Elements

Resize an element by selecting it, then:

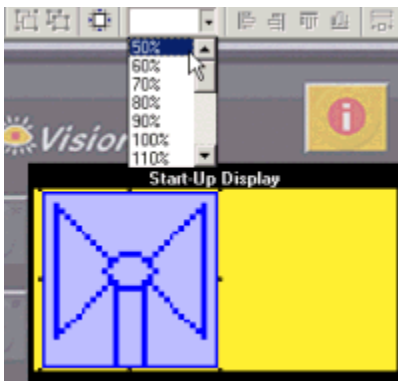
- Dragging the image handles.



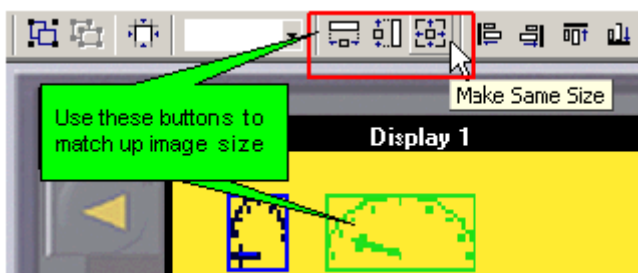
- Clicking the Fit to Original Size button.



- Clicking the Element Resizer, then selecting the desired size.

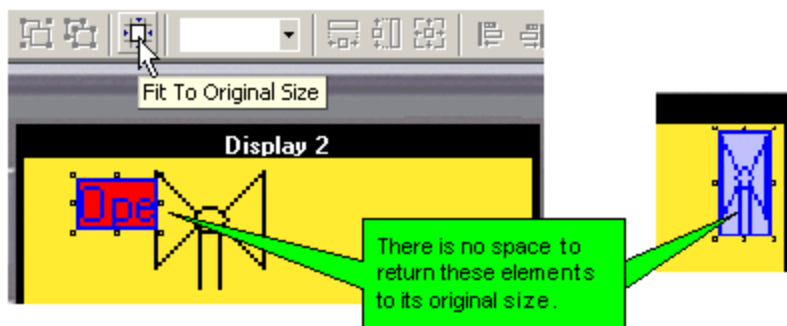


- Selecting more than one element, then make them of uniform size via the Resize buttons.

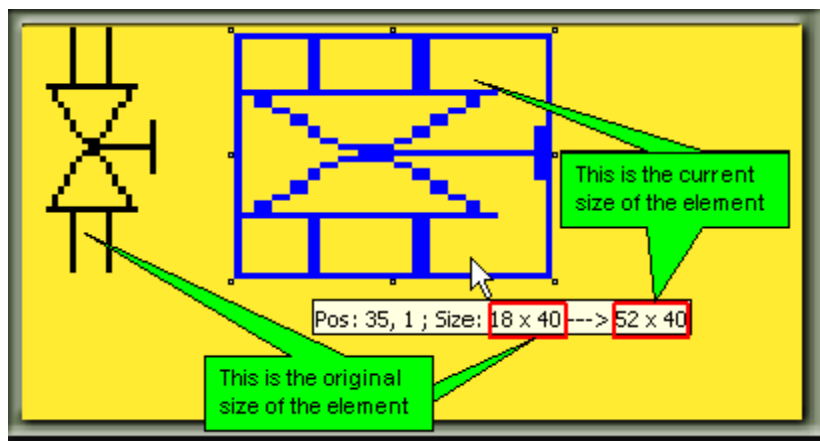


HMI Element Resizing/Rotating Limitations

Elements 'grow' down, and to the right. If resizing/rotating will cause Variable elements to collide, or any element to extend beyond the boundaries of the Display, the element cannot be returned to its original size, or resized to a larger size.



- | | |
|-------------|---|
| Note | • 'Original size' is the actual size of the element as it appears in the element's ToolTip. |
| | • 'Original size' cannot be used to resize Variable elements if the elements have differing original sizes. |



- Note**
- Although an imported image can be resized, resizing may result in some degree of distortion. To avoid this, use images that are created to match the required size.
 - Resizing text elements changes the size of the text field, but does not affect font size.
 - Fit to Original Size does not affect geometric shapes that are drawn on the Display.
 - Shapes that are imported are resized in proportion to their original size.

HMI SB and SIs

Keypad keys

SB 40	Key: # 0
SB 41	Key: # 1
SB 42	Key: # 2
SB 43	Key: # 3
SB 44	Key: # 4
SB 45	Key: # 5
SB 46	Key: # 6
SB 47	Key: # 7
SB 48	Key: # 8
SB 49	Key: # 9
SB 50	Plus/Minus
SB 51	Left Arrow
SB 52	Right Arrow
SB 53	ENTER
SB 54	Key <i> (ON when in Info mode, may also be turned ON in order to enter Info mode, via Remote Access or user program)
SB 55	Up
SB 56	Down

SB 57	ESC
SB 58	F1
SB 59	F2
SB 60	F3
SB 61	F4
SB 62	F5
SB 63	F6
SB 64	F7
SB 65	F8
SB 66	F9
SB 67	F10
SB 68	F11
SB 69	F12
SB 70	F13
SB 71	F14
SB 72	F15

#	Description	Turned ON	Turned Off	Comments
SB 6	Keyboard is active			
SB 16	Touchscreen Active, V280 only	When LCD is touched	When LCD is not touched	The touch property must be assigned to a variable. If this property is assigned, touching the variable activates it, causing it to be marked by the blinking cursor.
SB 17	Enable/Disable Touchscreen indication (Message Board function)			Enables a message to be handwritten on the touch-screen with a stylus
SB 22	Enable Virtual Keypad	ON by default in Touchscreen-only models (V290)	Off by default in models with Touchscreen + HMI keypad	<ul style="list-style-type: none"> - In Touchscreen + HMI keypad models (V280), user turns ON to enable Virtual keypad. When ON, the normal alphanumeric keypad is suspended. - May be turned OFF by user.

SB 26	Exiting OS Draw Mode (ON for 1 cycle after OS draw) OS Draw Mode means that the controller's Operating System takes control of the LCD screen: <ul style="list-style-type: none"> • During Info Mode • When a Display is entered • When the Virtual Keypad (touch-screen models) is displayed 	By OS	By OS	Turns ON for a single cycle when SB 28 turns OFF. This happens at the following times: <ul style="list-style-type: none"> • When the PLC exits Info Mode. • Rises the cycle after a Display is entered. • When Virtual Keypad mode exits.
SB 27	Enter Display without active Keypad Entry Variables	By program	By program	If SB 27 is ON when a Display is shown: <ul style="list-style-type: none"> ▪ The user cannot navigate through the variables using the Enter or Right-arrow keys. ▪ No Keypad Entry Variable will be marked by the blinking cursor. In this case, a variable may be activated by: <ul style="list-style-type: none"> ▪ Touch (V280 only)--assuming it has been assigned the Touch property. ▪ By writing the variable ID # into SI 250, either via Info or Online mode.
SB 28	LCD: controlled by OS (OS drawing on LCD) Any Ladder- drawn elements (ex. Draw Axis, Trends, Draw Pixel/Line), are cleared when SB 28 turns ON; the programmer may use the Negative Transition of SB 28 to refresh these elements on the LCD.	By OS	By OS	Turns ON whenever the OS enters a drawing mode, remains ON during the drawing task: <ul style="list-style-type: none"> ▪ ON when the PLC is in Info Mode. ▪ Rises when a Display is entered. ▪ When the V290 enters Virtual Keypad mode and displays the virtual keypad on the LCD Turns OFF when the OS exits the drawing mode: <ul style="list-style-type: none"> ▪ PLC exits Info Mode ▪ After a Display is entered. ▪ When Virtual Keypad mode exits
SB 29	Sets SB 30 (HMI keypad entries complete)	By program	By program	Turn SB 29 ON after data is keyed into any variable, to enable the user to skip keying in data for all of the variables on-screen. Also refreshes all Display variables on-screen.
SB 30	HMI keypad entries completed	By OS, by SB29, by program	By OS, by program	<ul style="list-style-type: none"> • When a variable is active, pressing the Enter button on the keypad signals that the user has finished entering the value. • When the Enter button has been pressed for each Variable, SB 30 turns ON. Note •Turning this SB OFF, via program or Info, enables the variables to be reactivated.
SB 31	Refresh current LCD screen display variables	By program	By program	Turning this ON reloads the display, initializing all Keypad Entry variables.

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SB 32	HMI keypad entry in progress	By OS	By OS	This turns ON automatically when the blinking cursor is on an active variable.
SB 33	Display, Call Sub The positive status of SB33 is visible within the specific subroutine only when it runs. Use it to initialize operands in the HMI subroutine.	By OS	By OS	When a Display containing a Call Sub starts loading, ON for a single scan cycle.
SB 34	Display Exit	By OS	By OS	Turns ON for a single scan cycle when a display is exited.
SB 36	INFO mode	By OS, Remote Access, or program	Turns OFF when user exits Info Mode	
SB 37	Exclude last Display from FIFO	By Remote Access, or program	OS	Enables user to skip going back to certain Displays.
SB 38	Invert Touchscreen element pixels (Text, images)	By program	By program	If a Touchscreen text or image element is touched and this bit is on, the pixels in the element reverse color.
SB 110	Draw: Out of Range	The OS attempts to draw a line or pixel outside of the legal limits of the controller's LCD.	At the beginning of every cycle	OS
SB 250	Keypad entry within limits	By OS	By OS	Turns ON for one scan when the entered value is within the Min/Max limits set in the variable's parameters.
SB 251	Keypad entry exceeds limits	By OS	By OS	Is ON when the entered value is within the Min/Max limits. Note • When this SB is ON, the blinking cursor remains on the active variable even after the user presses Enter.

SI 6	Current key pressed
SI 7	LCD Contrast Control: 0=Minimal Contrast, 50=Medium Contrast, 100=Maximal Contrast
SI 9	LCD Backlight intensity
SI 40	Touchscreen is being touched- X coordinates If the screen is touched, SI 40 shows the current location on the X axis.
SI 41	Touchscreen is being touched-Y coordinates If the screen is touched, SI 41 shows the current location on the Y axis.
SI 50	INFO delay time - Default by O/S (every power up) = 4 seconds. <ul style="list-style-type: none"> Units: seconds. Legal values: 0, 3 to 20. If you force or store '0' into equal Zero – INFO is disabled. For V290 – Touching the <i> key on the touch screen starts Info Mode – Touching a legal Ladder application variable clears the INFO time.
SI 249	Last Active Keypad Entry Variable Contains the ID number of the last active variable.
SI 250	Currently active keypad entry, read/write. When either SB 250' Keypad Entry Within Limits' or SB251 'Keypad Entry Exceeds Limits' turn ON, the index number of the variable is stored here. As you navigate between variables, as for example with the right-left arrow keys, SI 250 will show only the numbers of variables that have not been completed. Note • A value of -1 indicates that, in this particular display, the user has pressed Enter for all the Keypad Entry variables in the Display.
SI 251	Previous HMI Display Number
SI 252	Current HMI Display Number. To see a list of Displays in a project together with their Display numbers, select HMI Information from the View menu.

#	Description	Value	Comments
SDW 10	Keypad entry variable value		When a keypad entry variable value is entered, this SDW 10 holds the value.
SDW 30	Variable display bitmap, 0=Normal, 1=Inverse (or negative)	The value is checked when a display is entered. It is initialized to 0: - At Power-up. - When the program exits the Display.	When a bit is ON, the corresponding variable is displayed in inverted (negative) color; black pixels are changed to white and white to black.
SDW 31	Hide Var	The value is checked when a display is entered. It is initialized to 0 at: - Power-up. - When the program exits the Display.	When a bit is ON, the corresponding variable is hidden

Images

Graphic Images in Displays

Simple geometric shapes can be drawn on a Display.

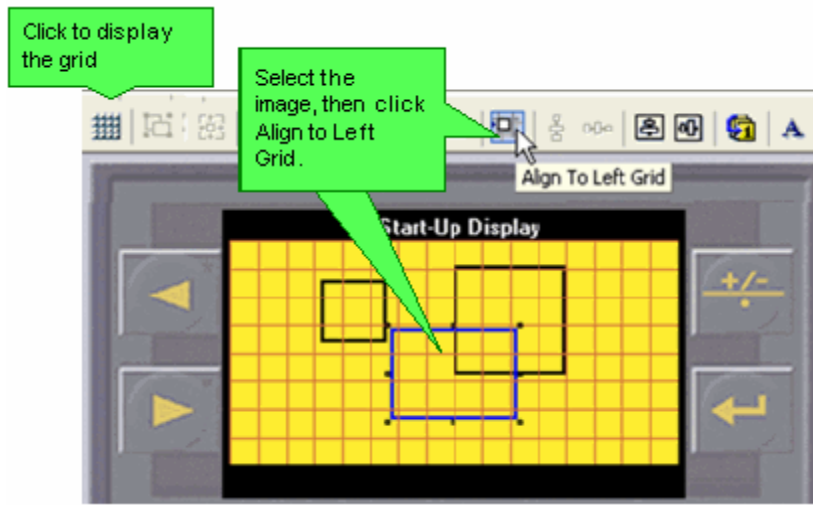
Graphic images can be imported from the Image Library, or created with a program such as Microsoft Paint and then imported.

- Fixed graphic images
This type of image stays on the screen and does not change until a different Display is loaded by the program.
- Variable graphic images
Variable images change according to the value of a linked operand. Binary Image Variables are linked to bit operand status (MB, SB, I, T, O). List Image Variables are linked to integers (MI, SI, ML, SL)

You can draw graphic images directly on a Display, or import images.

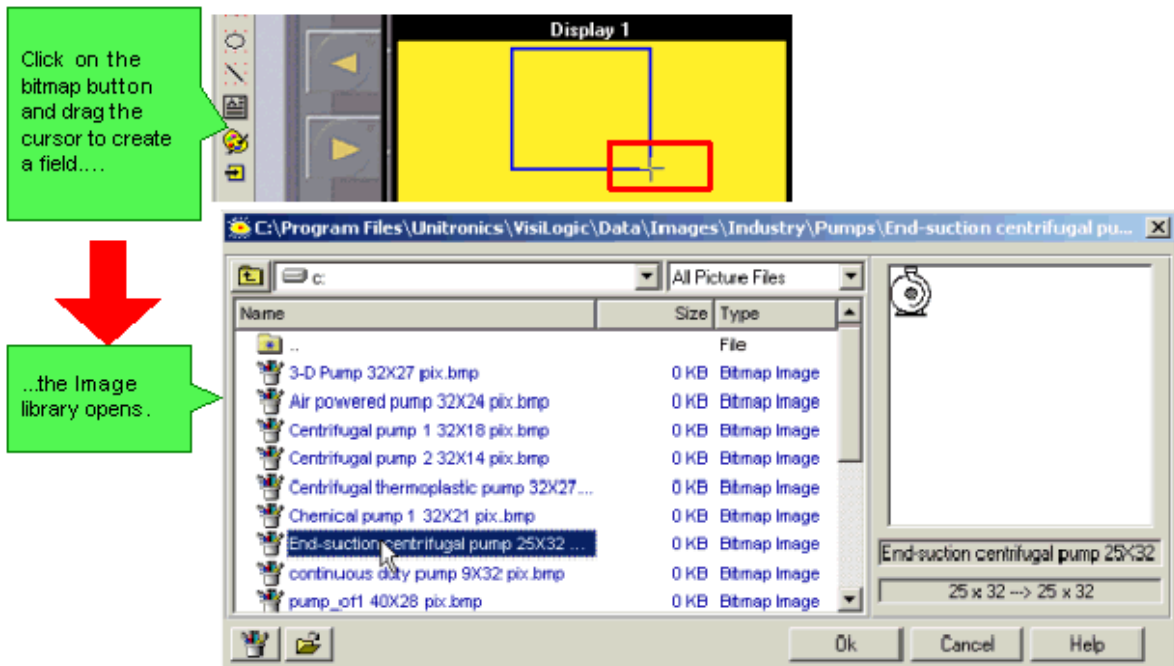
Note • Although an imported image can be resized, resizing may result in some degree of distortion. To avoid this, use images that are created to match the required size.

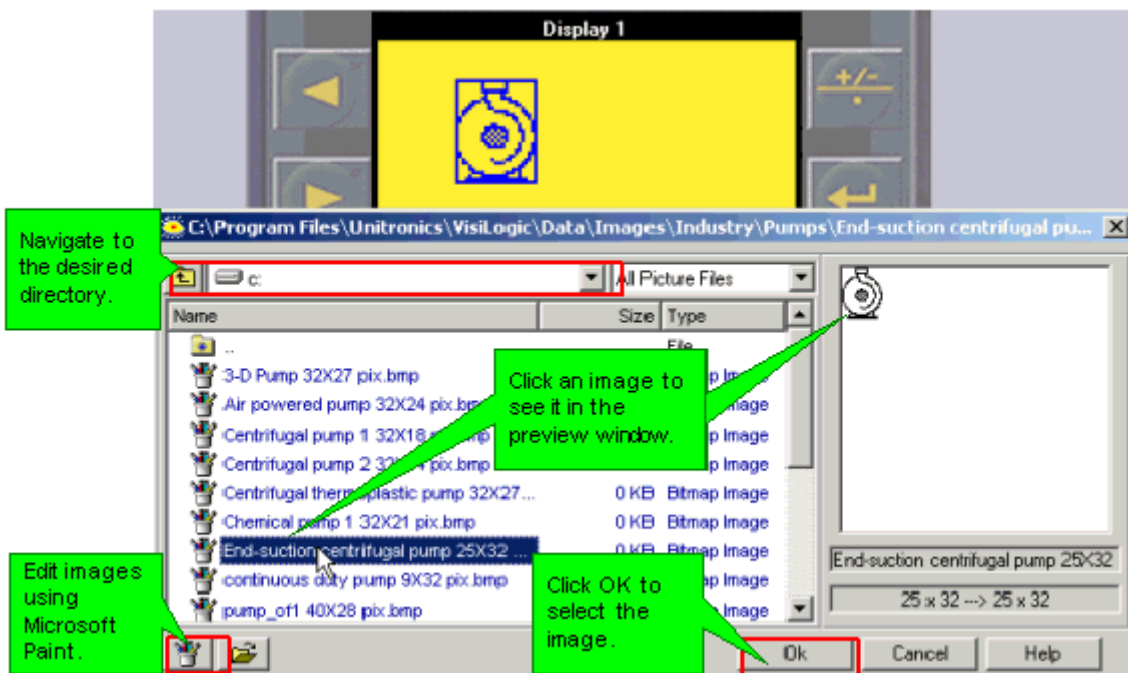
- The HMI display uses a grid which spaces the lines 8 pixels apart. To optimize Displays and shorten the PLC cycle time, images and variables should be aligned to grid.



Images: Fixed

This type of image stays on the screen until a different Display is loaded by the program.



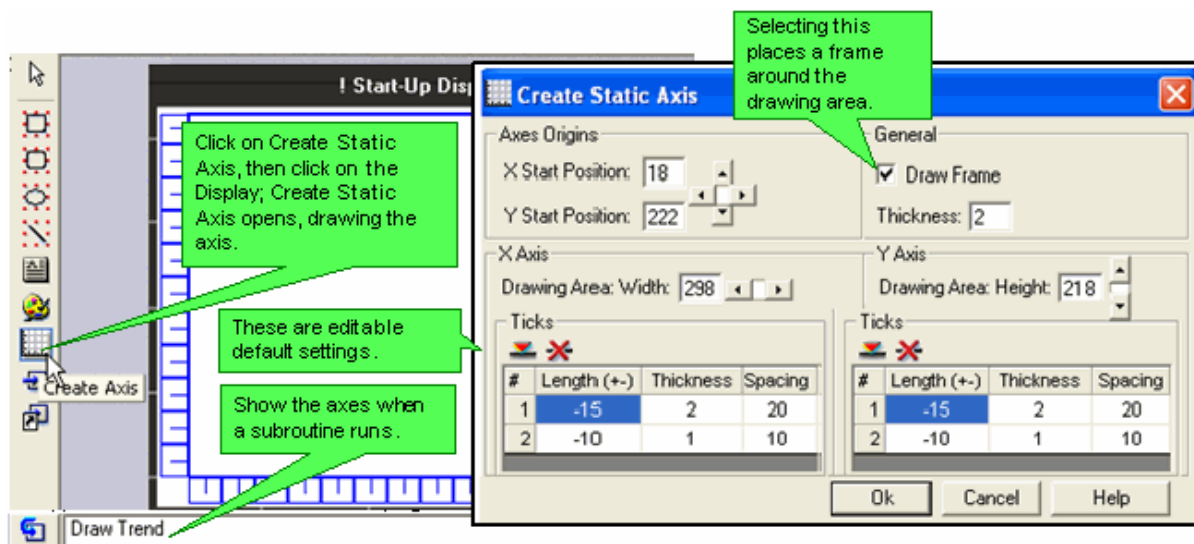


Draw Static Axis

This HMI utility enables you to place background axes for graphs.

1. Click on Create Static Axis, then click on the Display.
2. Create Static Axis opens, drawing the axis and showing the default settings.
3. Edit the default settings, if desired, then click OK.

The default settings may be edited; you can also select whether to place a frame around the Draw area.



Variable Images

Variable images change according to the value of a linked integer.

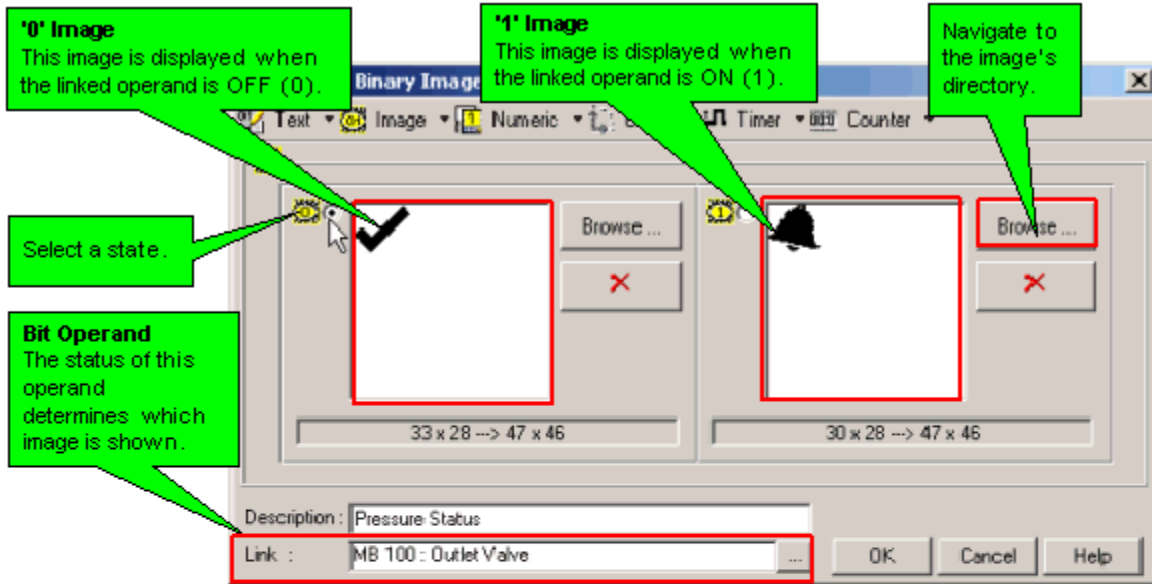


Image Library

A library containing hundreds of images can be found in the Unitronics folder on your hard drive (Unitronics\VisiLogic\Data\Images).

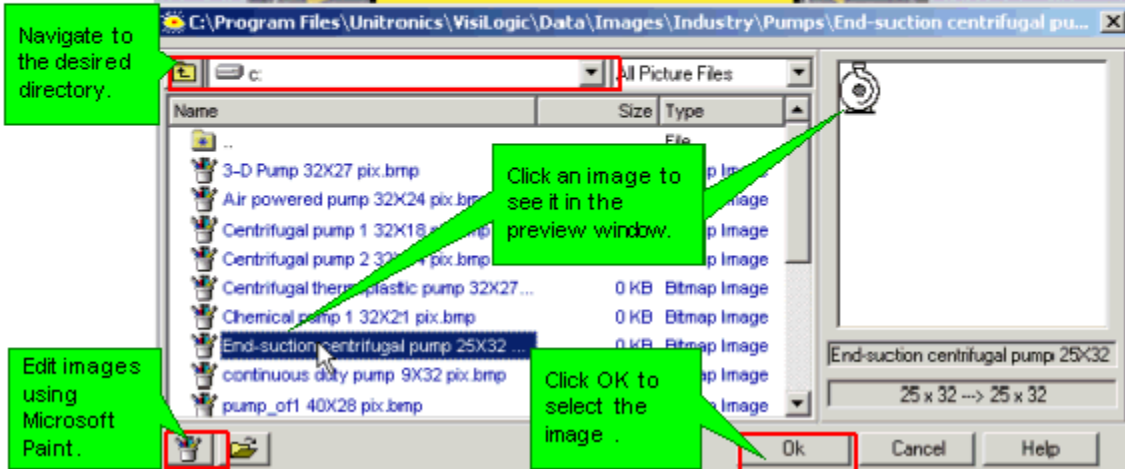
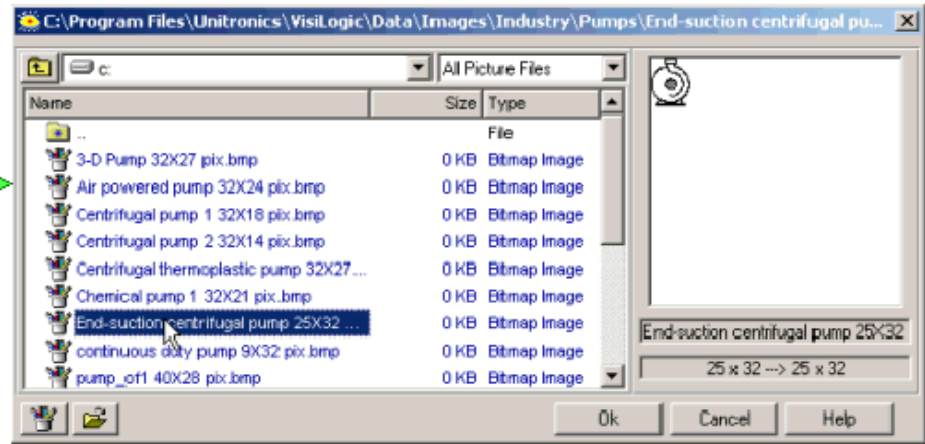
This makes it easy to locate and import images into your displays.

- Note**
- An imported image cannot exceed the size of the controller's display screen listed in the model's technical specifications. For example, the V230's Display screen is 128x64 pixels, therefore an image of 100x100 pixels cannot be used unless it is resized in a third-party utility such as Paint.
 - Clicking any HMI image in a Display will open the Image Library; to open the image for editing in Paint, click the Paint icon on the lower left side of the Library frame.

For tips on how to edit images to best suit the controller's Display screen, first read the Help Topic Creating Images with Microsoft Paint, and then view two .avi files located on the VisiLogic setup CD: Edit Image Collections with Paint Step 1.avi and Edit Image Collections with Paint Step 2.avi.



...you can use the images in the Image library.



Display Variable Types

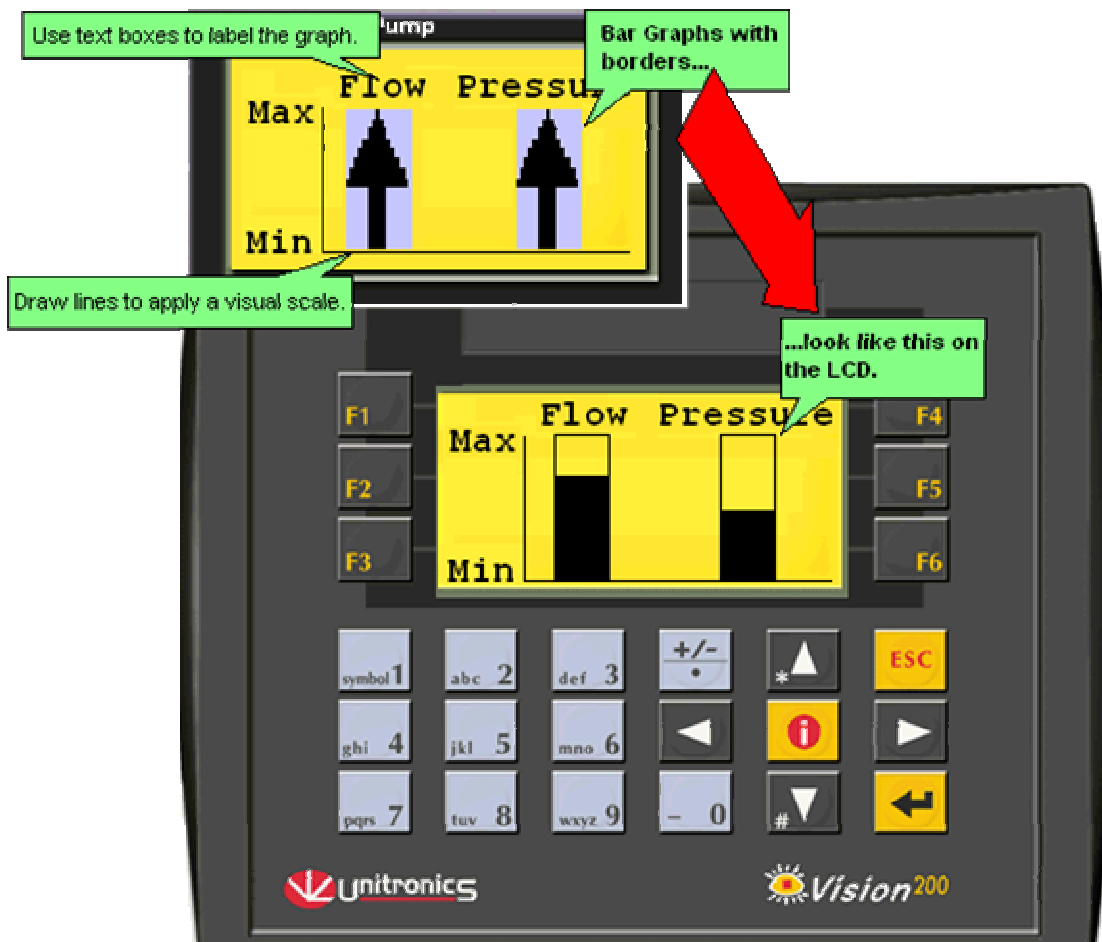
Variable Types: Table

Text Variable	Image Variable	Numeric Variable	Clock Variable	Timer /Counter Variable
Binary(bit) Text	Binary Image	Number	Real Time Clock	Timer
List of Texts: by Pointer	List of Images: by Pointer	Password	Clock Variables	Counter
List of Texts: by Range	List of Images: by Range	Bar/Shape Graph	Clock Variable: View\Enter RTC\UTC Value	
ASCII String				
Display RTC (ASCII)				

Graphs: Displaying Values

Bar and Shape graphs can be used to show how values progress. You can use them together with other Display elements to help operators track system progress and status.

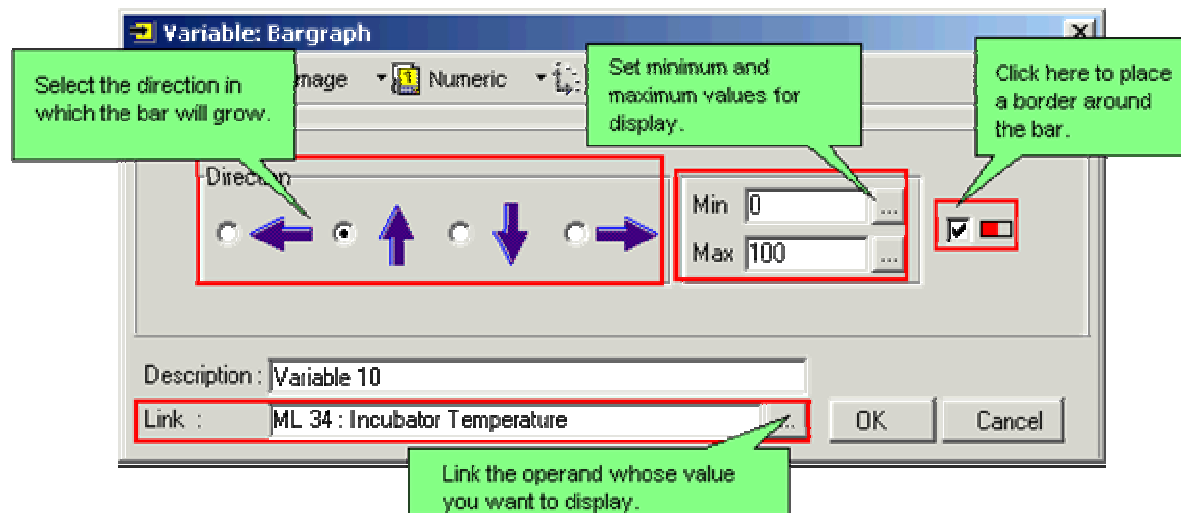
This is a sample of an HMI Display and how its elements can look on the controller's LCD.



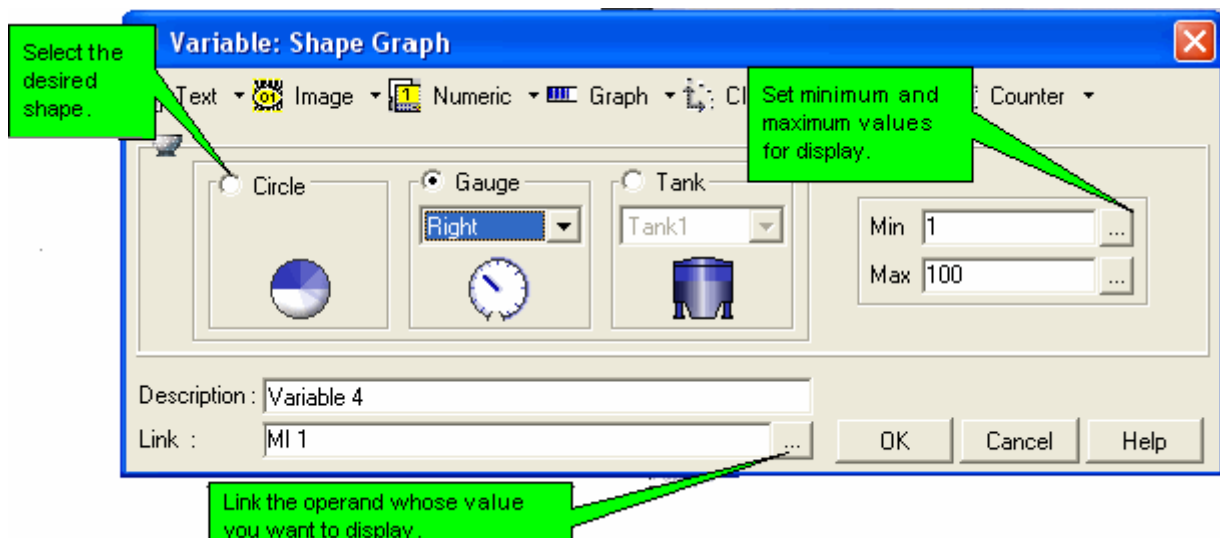
Inserting and Defining the Variable

1. Create a Variable field, and then select Graph.

Bar graph

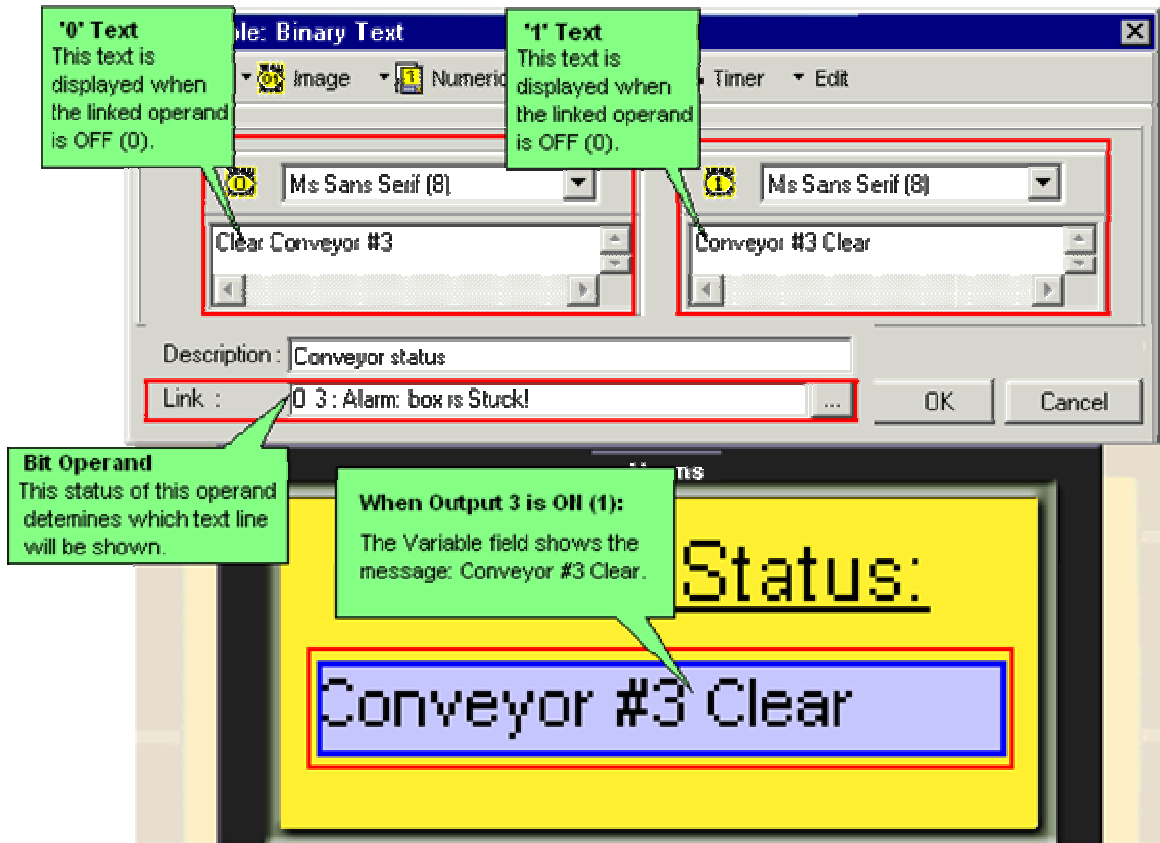


Shape graph



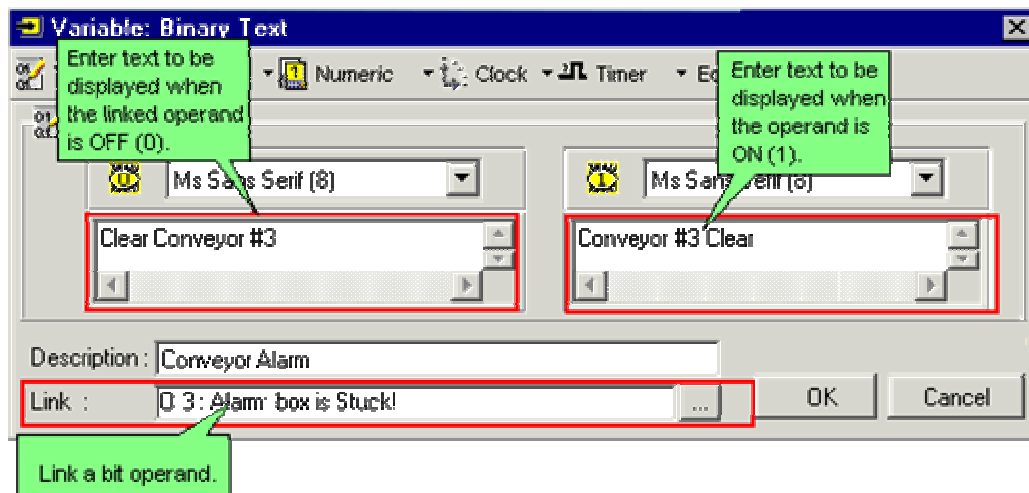
Bit (Binary) Text Variable

This type of variable displays a different text message on the controller's LCD screen according to the status of a bit operand.



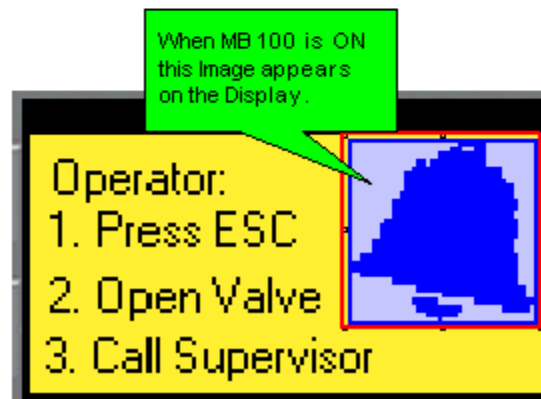
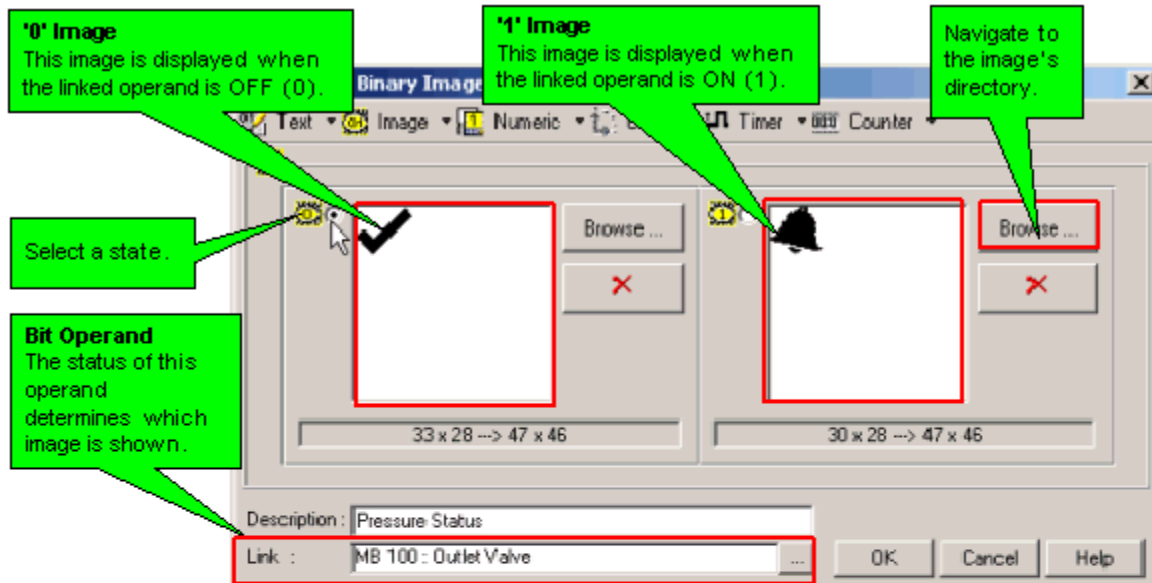
Inserting and Defining the Variable

1. Create a Variable field, and then select Binary Text from the Text menu.
2. Link a bit operand, and enter text for both bit states.



Bit (Binary) Image Variable

This type of variable displays a different image on the controller's LCD screen according to the status of a bit operand.



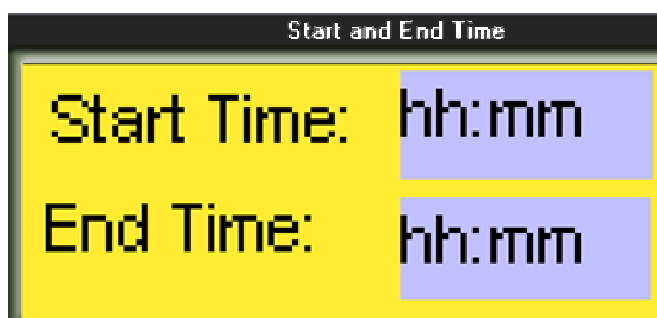
Inserting and Defining the Variable

1. Create a Variable field, and then select Binary Image from the Image menu.
2. Link a bit operand, and select images for both bit states.

Clock Variables

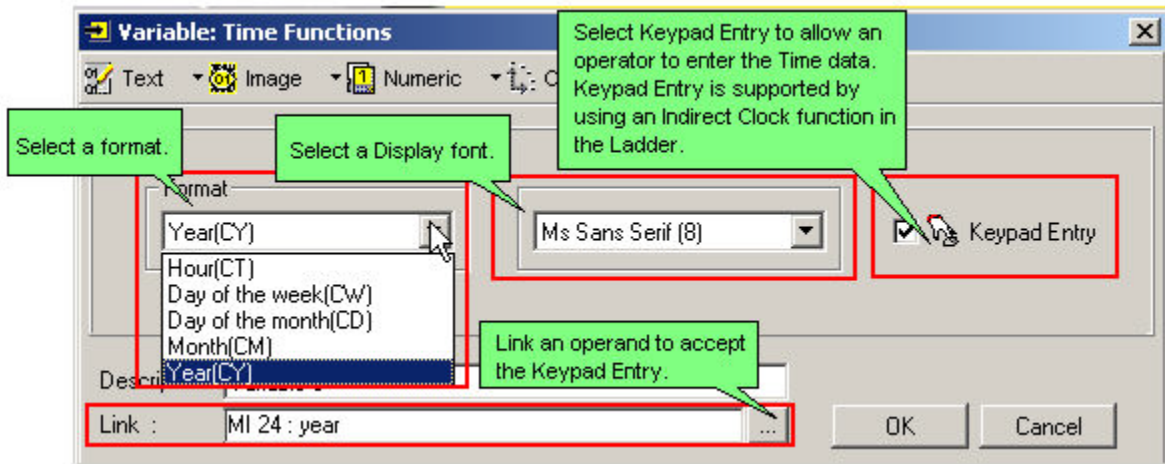
Place Clock Variables in Displays to show times and dates. In addition to showing RTC values, use Clock Variables in conjunction with Indirect time functions to enable an operator to set times via the controller keypad.

A keypad-enabled Clock Variable accepts a number entered via the controller keyboard, and stores the number in the operand linked to the Variable.



Inserting and Defining a Keypad Entry Clock Variable

- Create a Variable field and select a Clock function, then select the format and display font.



Note • Step-by-step instructions on how to use Keypad Entry Clock Variable values are provided in the Indirect Clock function example.

Clock Variable: View/Enter RTC\UTC Values

The Real-Time-Clock value in the controller can be shown in a Display.

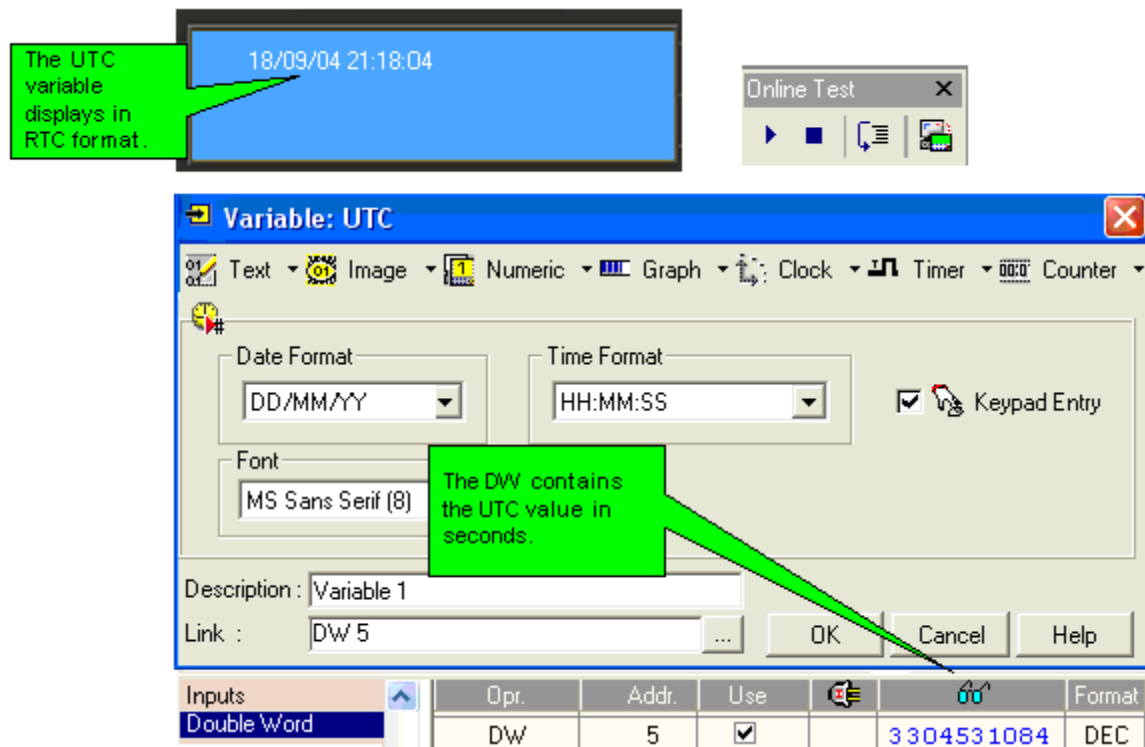
Inserting and Defining the Variable

- Create a Variable field and select Real Time Clock, then define the Variable by selecting the time format and display font. You do not link an operand because this variable is already linked to the RTC.

Note • Only full format variables, hh.mm.ss can be set as keypad entry.

UTC Variables

Placing a UTC variable displays the value of the linked operands as an RTC value.



Note that if you select to display SI 30, the variable will display the full RTC value.

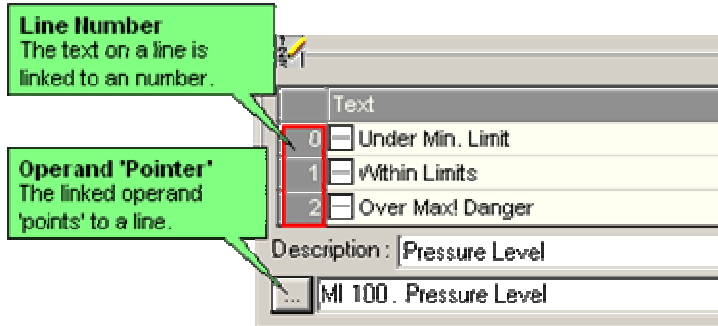
Keypad Entry

On the screen, the variable is shown in Time format, according to your selection.

- DW
The 32-bit binary number contains the UTC value in seconds, where 1900-01-01 = 00:00.00 UTC.
- SI
To set the RTC from the HMI, link the UTC variable to SI 30; the value entered via keypad is written to RTC system operands SI 30-34.
- MI
Linking an MI causes the UTC value entered via keypad to be written to a vector of 4 MIs, where the selected MI is the start of the vector.

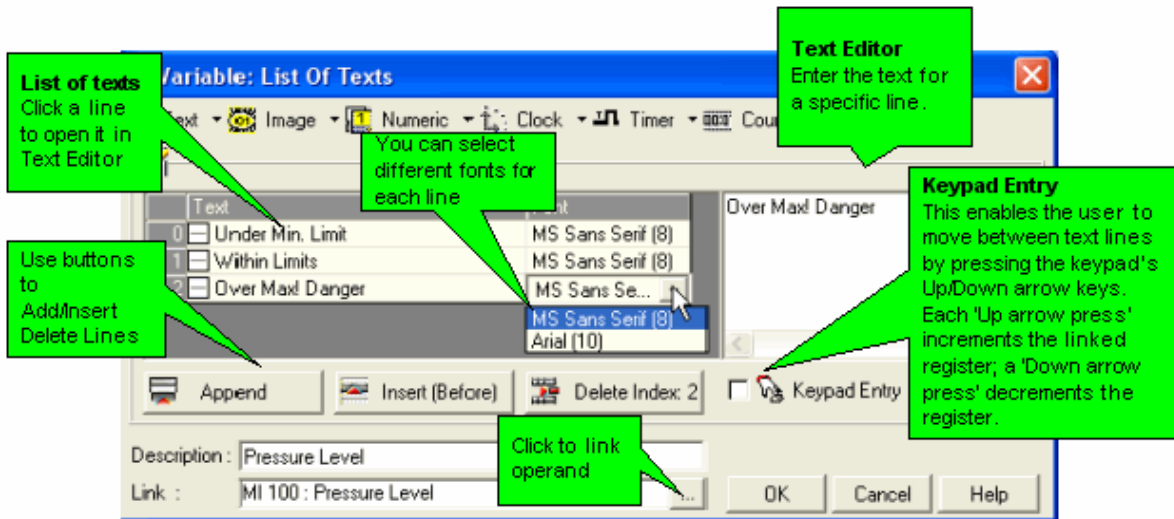
List of Texts: by Pointer

This type of Variable contains numbered lines of text. You link the Variable to an operand. The value within that operand 'points' to the number of a line within the list. When the operand value is equal to a particular line number, the text of that line is shown in the Display.



Inserting and Defining the Variable

1. Create a Variable field, and then select List of Texts: by Pointer.
2. Define the Variable by entering lines of text and linking an operand.



- Note •**
- By using the Keypad Entry Option, you can also enable the user to select a line using the Up/Down keypad arrows.
 - The Keypad Entry option is not supported for Touchscreen-only models (V290).

List of Images: by Pointer

This type of Variable contains a list of numbered images. You link the Variable to an operand. The value within that operand 'points' to the number of an image within the list. When the operand value is equal to a particular image's number, that image is shown in the Display.

Image Number
Each image is linked to a number in the List of Images. The number of an image appears under that image.

Keypad Entry
This enables the user to move between images by pressing the keypad's Up/Down arrow keys. Each 'Up arrow press' increments the linked register; a 'Down arrow press' decrements the register.

Operand Pointer
The value of this operand determines which image in the list is displayed. For example, when MI0 contains 4, Image 4 is displayed.

Note • By using the Keypad Entry Option, you can also enable the user to select a line using the Up/Down keypad arrows.

- The Keypad Entry option is not supported for Touchscreen-only models (V290).

Inserting and Defining the Variable

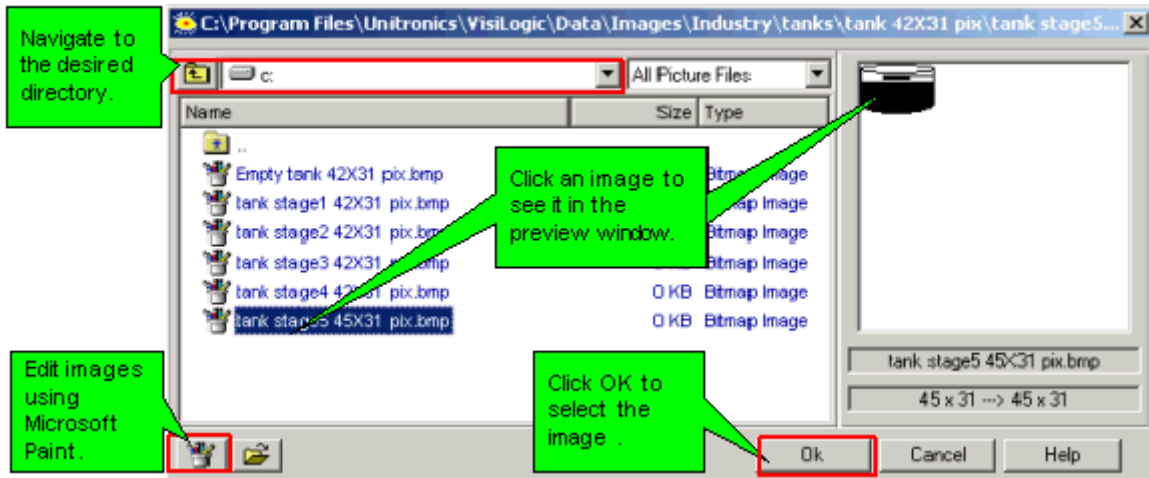
1. Create a Variable field, and then select List of Images: by Pointer.
2. Define the Variable by adding images to the List of Images and linking an operand.

List Manager
Use the buttons to:
- Include the image shown in the Preview pane in the list.
- Edit the existing list by selecting an image in the list, then using the buttons to make changes

Open the **Image Library**, locate images, then add them to the list.

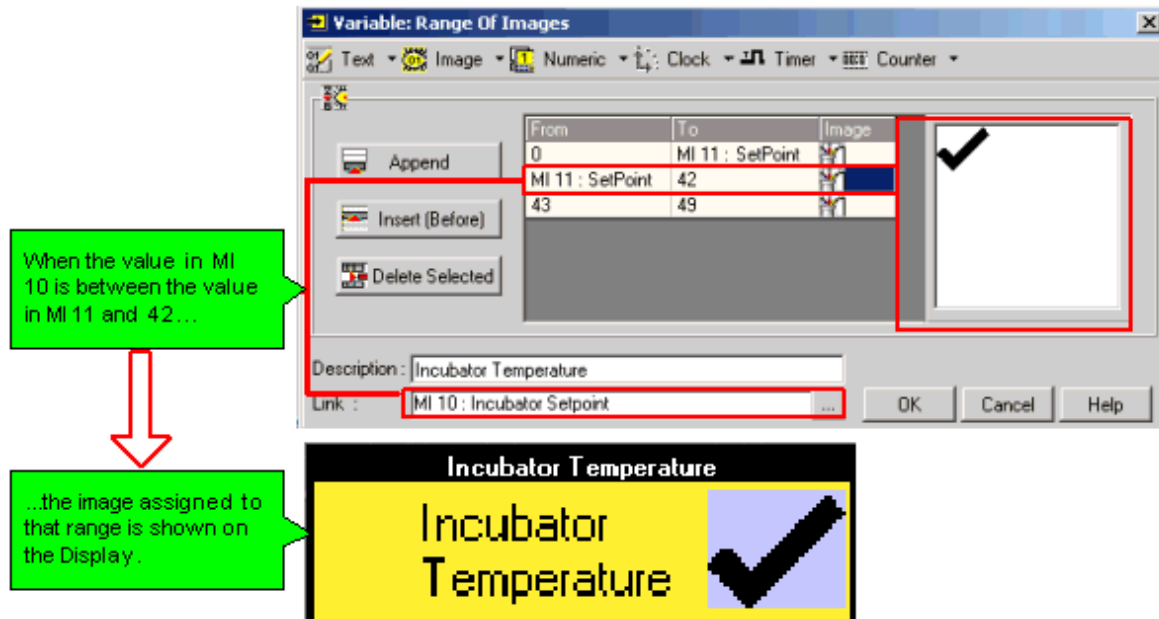
Click to select an image.

Locating Images



List of Images: by Range

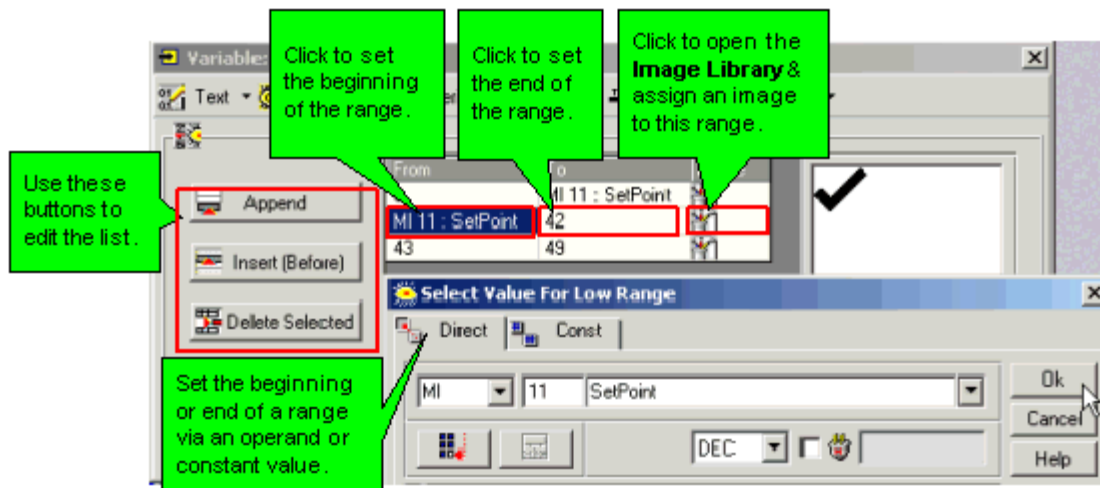
This type of Variable contains a list of images. You define a range of values for each image and link the Variable to an operand. The value within this operand is compared to the range you have defined for each image. When the operand value falls within a specified range, the image assigned to that range is shown in the Display.



Note that you can define the beginning and end of a range using either a Constant value or an MI.

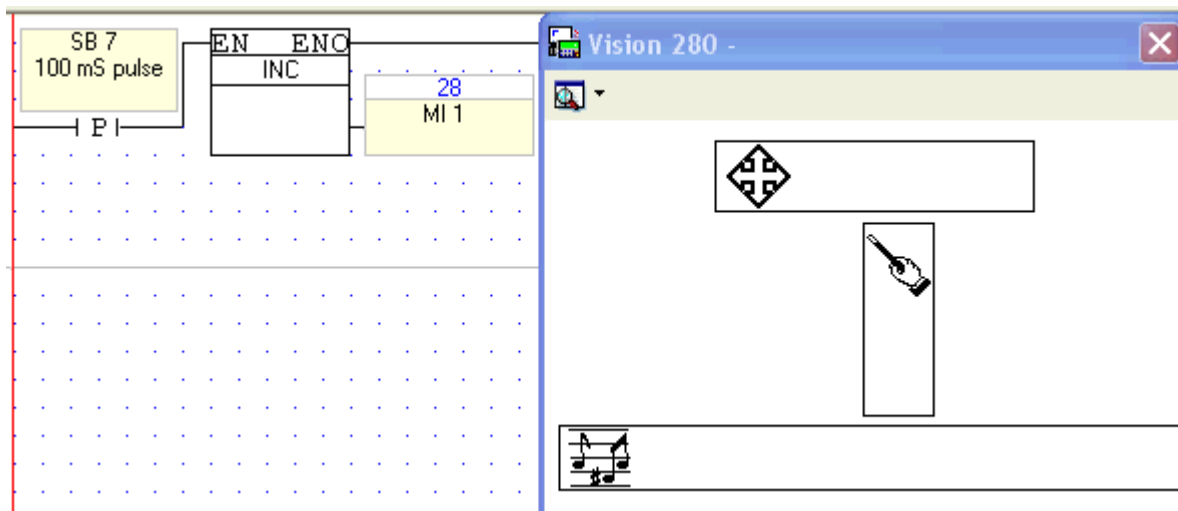
Inserting and Defining the Variable

1. Create a Variable field, and then select Range of Images: by Pointer.
2. For each line: define the beginning of the range, the end of the range, and assign an image.

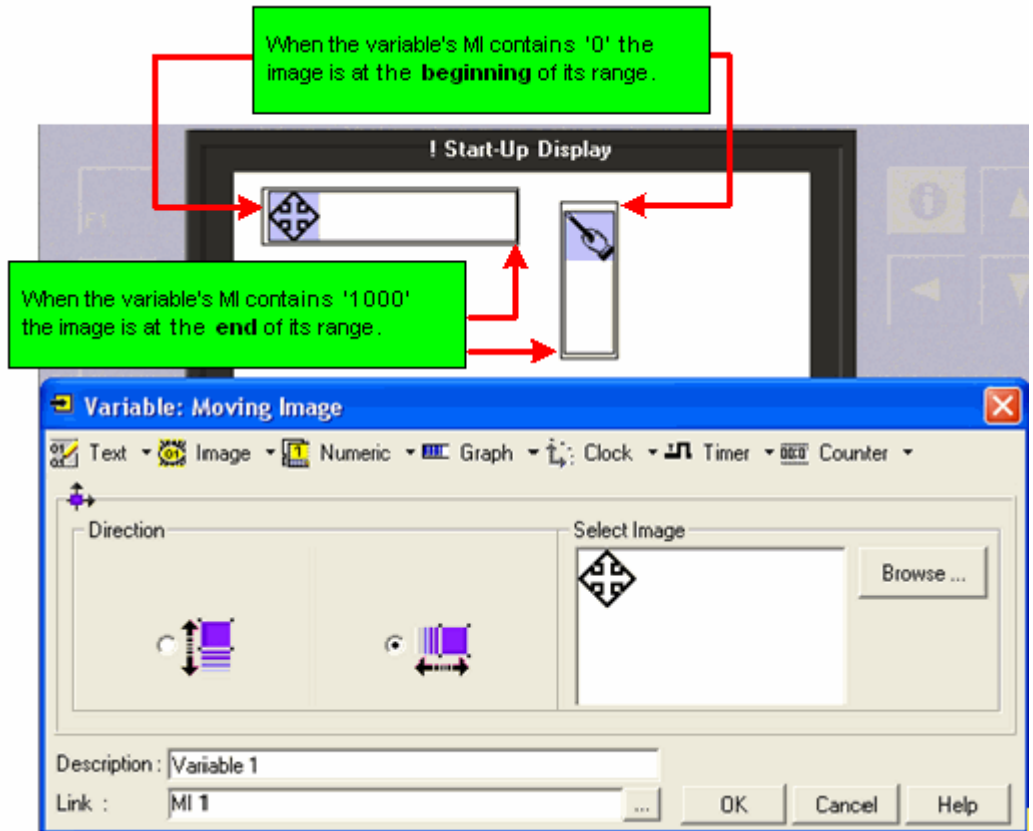


Moving Image

This type of variable displays a moving image on the controller's LCD screen; the image moves according to the value of the linked MI.

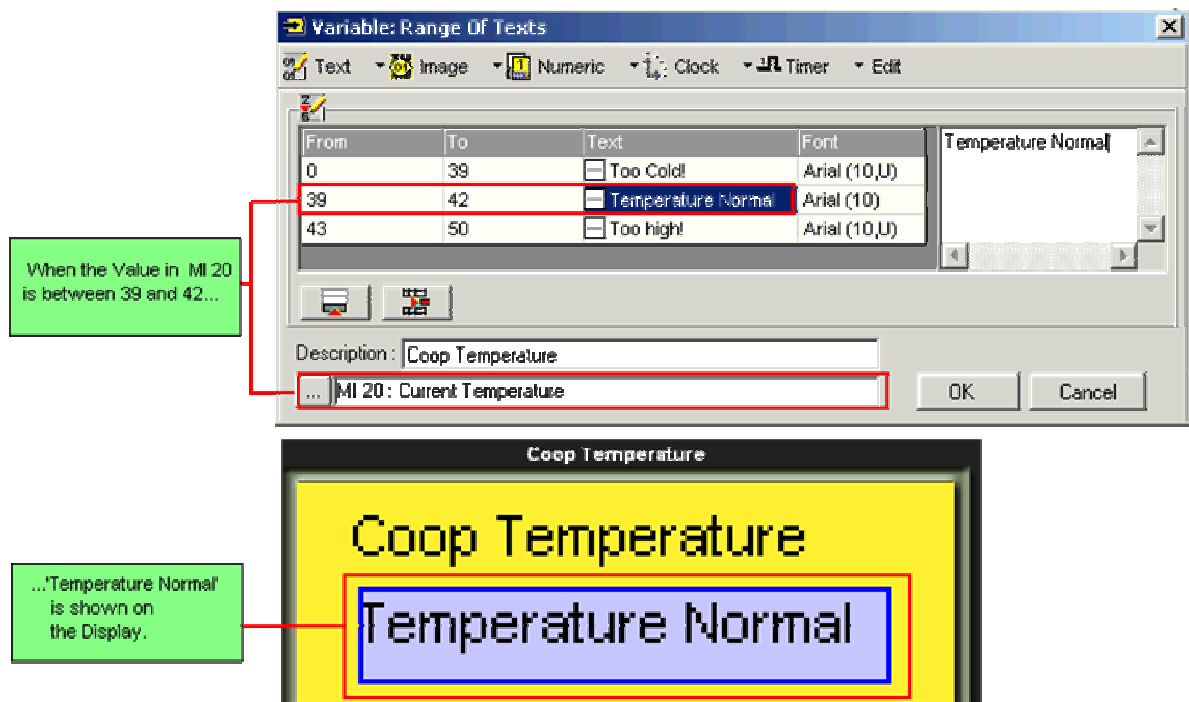


Note that all of the moving images in the above picture are linked to MI 1. When MI 1 holds 0, the images are at the start of their 'containers'. When MI 1 increments to 1000, the images are at the end of their 'containers'. The 'containers' set the size of the field in which the image can move. The range of movement for the field is 0 - 1000--no matter how long the field is.



List of Texts: by Range

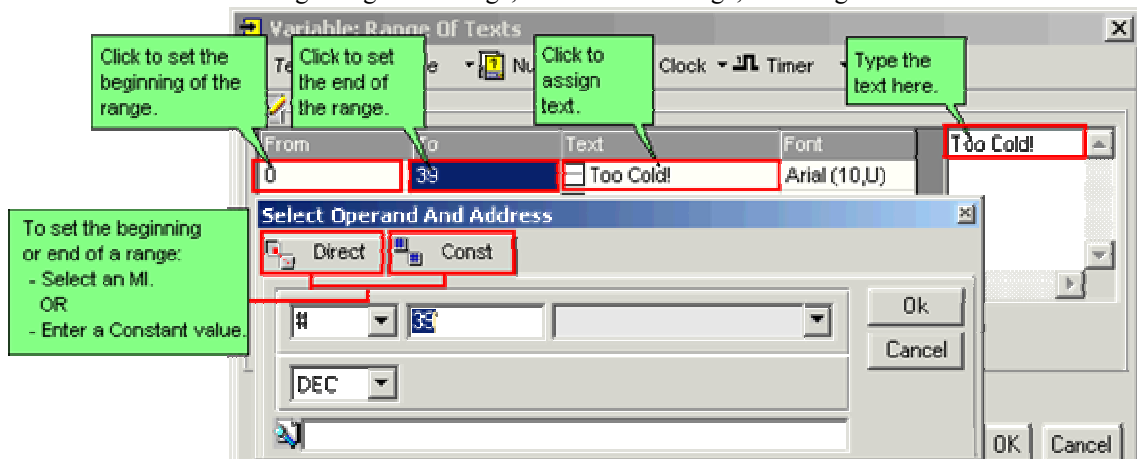
This type of Variable contains lines. You define a range and enter text for each line, and link the Variable to an operand. The value within this operand is compared to the ranges you have defined for each line. When the operand value falls within a specified range, the text assigned to that range is shown in the Display.



Note that you can define the beginning and end of a range using either a Constant value, or an MI.

Inserting and Defining the Variable

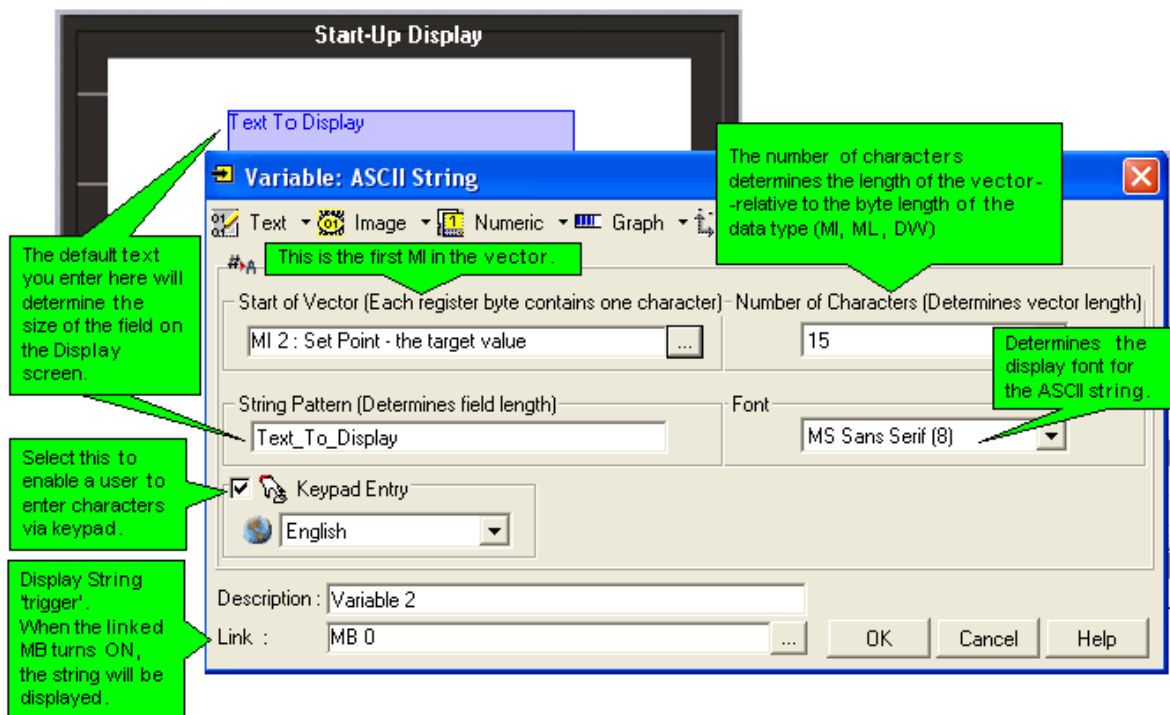
1. Create a Variable field, and then select Range of Texts: by Pointer.
2. For each line: define the beginning of the range, the end of the range, and assign text.



3. Use the Add Line button and Delete Line button as needed.

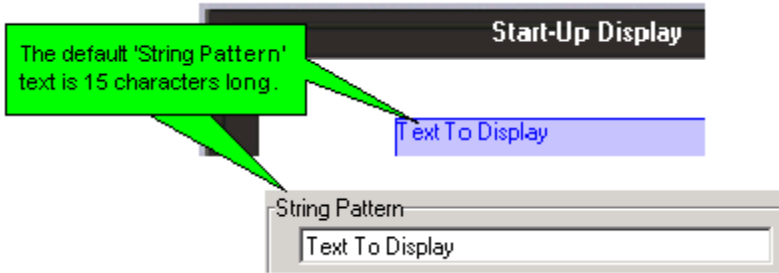
ASCII String

You can display a vector of MI, ML, or DW values as an ASCII string. The value of each byte in the vector is displayed as an ASCII character. You can also enable a user to enter characters directly into the variable by pressing keys on the Vision keypad. ASCII String is located on the Text Variable menu.



The Display String 'trigger' MB is set and reset by the user. Note that the OS refreshes the string and resets the MB when the MB turns ON. If the MB is continuously set by the application, the change in status will not occur and the string will not be refreshed.

Note • String Pattern defines the size of the text field. The default string 'Text To Display' will provide a field long enough to contain most strings.



To create a field that contains enough bytes to provide for the width of the ASCII characters in a variable string, enter a line of text in String Pattern that contains characters of the necessary width.

These are the ASCII values of 'Text To Display' text—but in capital characters.

MI	4	5	6	7	8	9	10	11								
ASCII value	45	54	54	58	54	20	20	4F	49	44	50	52	41	4C	4F	

Because the characters are wider, this ASCII string is much longer than the default text.

The character 'W' is generally the widest character in a font set.

This ASCII string is much longer than the default text.

Note • A vector is read either until the end of the defined vector length, or until a 'null' character is encountered. By adding a null character to the end of the stream, you can mark the end of a data string. This can prevent other data, that might be present in a vector, from being added to the data string when the vector is read.

Entering ASCII via keypad

When you select Keypad Entry, the user can enter upper and lower case characters as well as symbols.

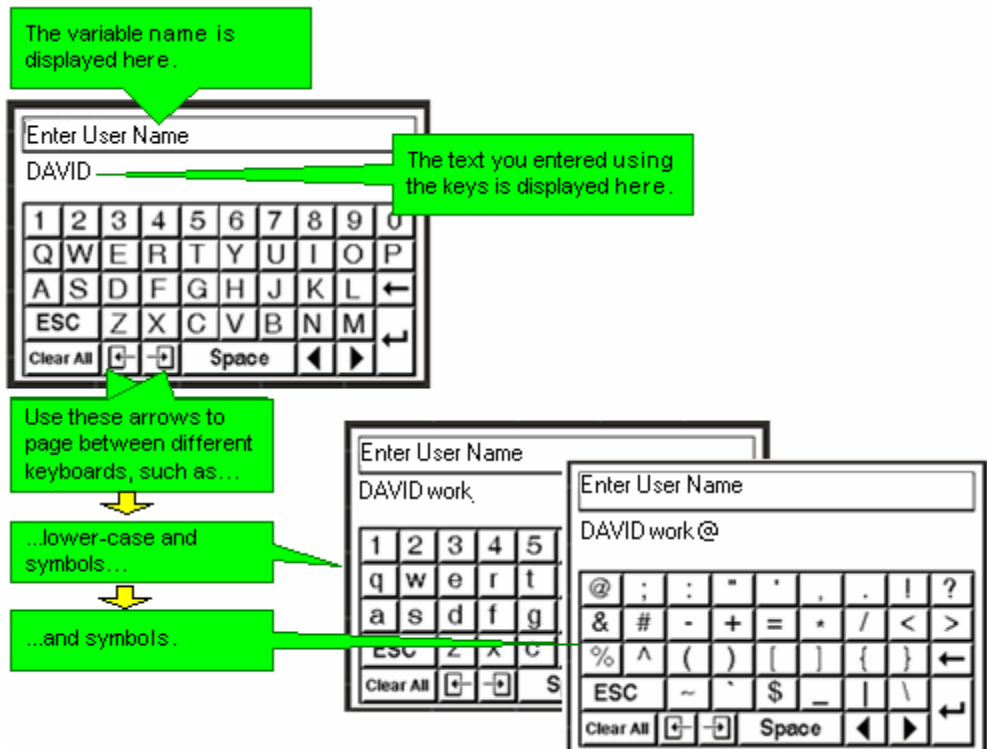
Vision: Standard Keypad



Vision: Touchscreen models

There are 2 types of Vision touch-screen models:

- Models which comprise both an HMI function keypad and a virtual keypad (V280).
- Models which comprise only a virtual keypad (V290).



Note • | In models which comprise only a virtual keypad (V290), the virtual keypad opens whenever the

user touches a keypad entry variable that is currently displayed on the screen.
 However, in models which comprise both an HMI function keypad and a virtual keypad (V280), the virtual keypad must be activated by turning SB 22 Enable Virtual Keypad ON. This must be done at power-up, or before the Display containing the keypad variable is entered.
 In addition, the Keypad entry variable must be assigned a Touch Property.

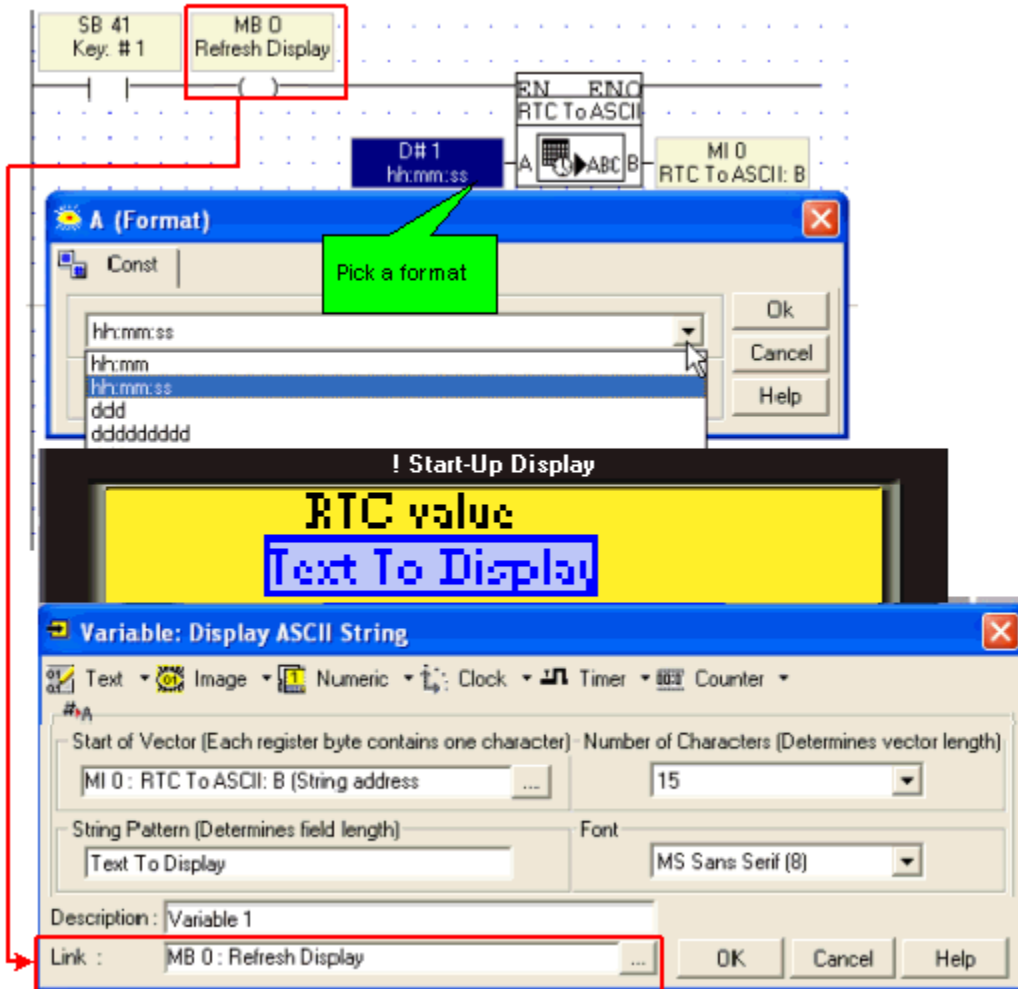
Strings: Display RTC (ASCII)

You can display an RTC value as an ASCII string by using the RTC to ASCII function together with the Display ASCII String variable.

To use Display RTC:

1. Select RTC to ASCII from the String menu on the Ladder toolbar.
2. Place the function in the net, and select a display format; both European and American format are available.
3. In the HMI Display, select Display RTC from the Text Variable menu.

When the program shown below is downloaded, pressing key 1 on the Vision's keypad will display the current time on the Vision's LCD.



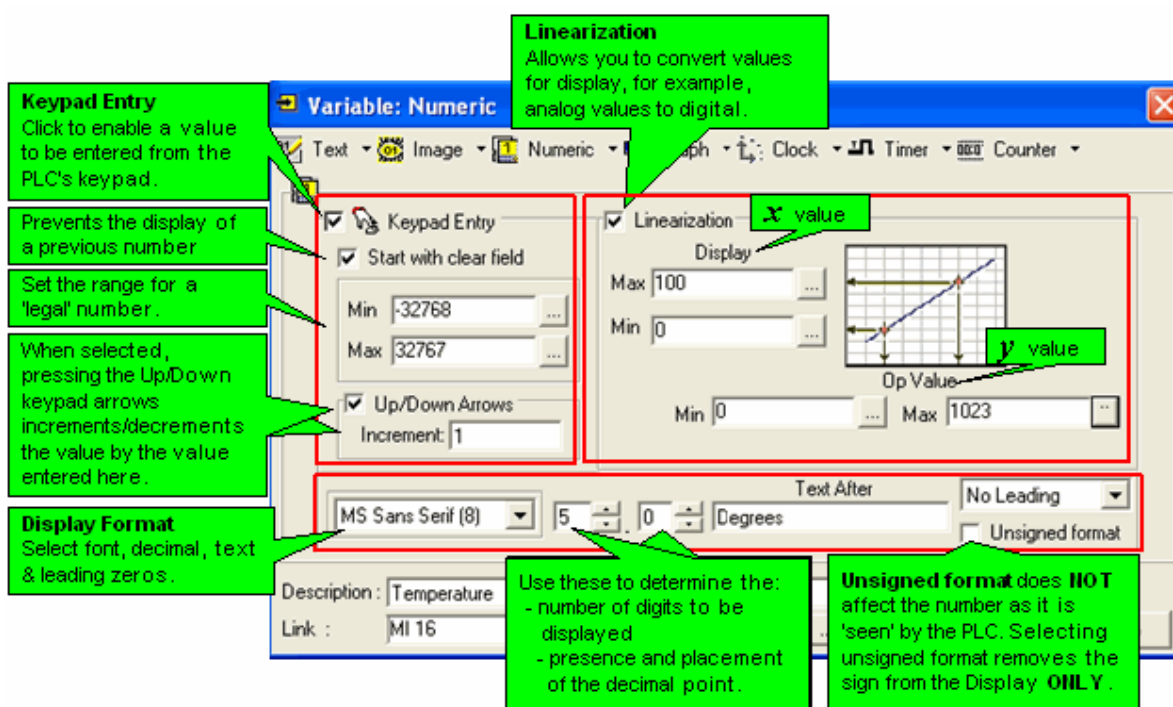
Numeric (Number) Variable

A Number Variable enables you to:

- Show any numeric value within a Display.
- Control the format in which that value is shown, including the placement of a decimal point and leading zeros.
- Use Linearization to show a converted value, such as an analog temperature converted to degrees Celsius.
- Allow the operator to use the controller keypad to enter a number, such as a setpoint, via a Keypad Entry Variable.

Inserting and Defining the Variable

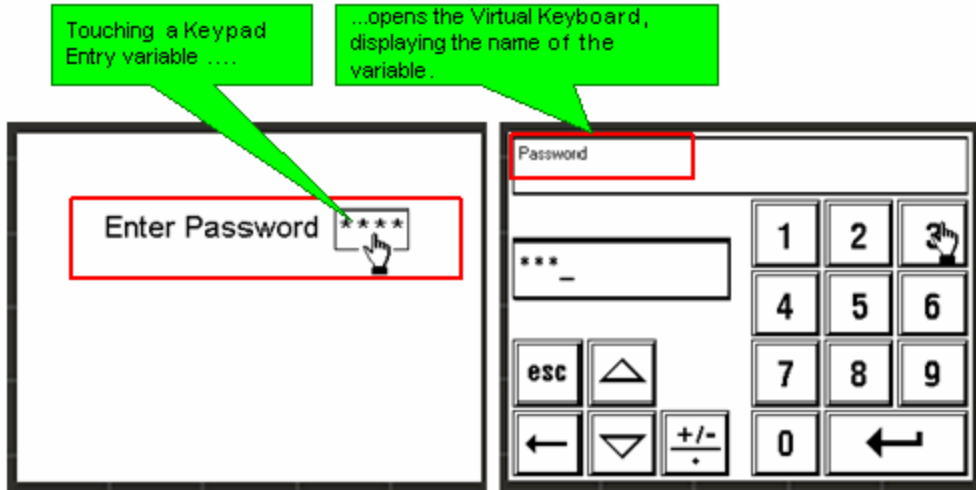
1. Create a Variable field, and then select Number.
2. Select from the features and formats shown below.



To see how to use Keypad Entry Variables, refer to the Indirect Clock example.

Touchscreen-only models (V290)

These models have a 'virtual' keyboard. After a keypad entry variable is touched on the screen, the keyboard is automatically displayed, enabling the value to be entered. Note that you can set a font for variable display in Font Handler.



- Note •** When an HMI keypad entry variable is active, and the Enter key is pressed on the controller keypad, SB 30 HMI Keypad Entries Completed turns ON. This can be used as a Jump condition.
- SB 250, Keypad Entry within Limits, turns ON when a legal value is entered; SB 251, Keypad entry exceeds limits, turns ON when a value is out of range. You can use the status of these bits, for example, to provide a jump condition to another Display. When either of these SBs turns ON, the index number of the active variable is stored in SI 249.

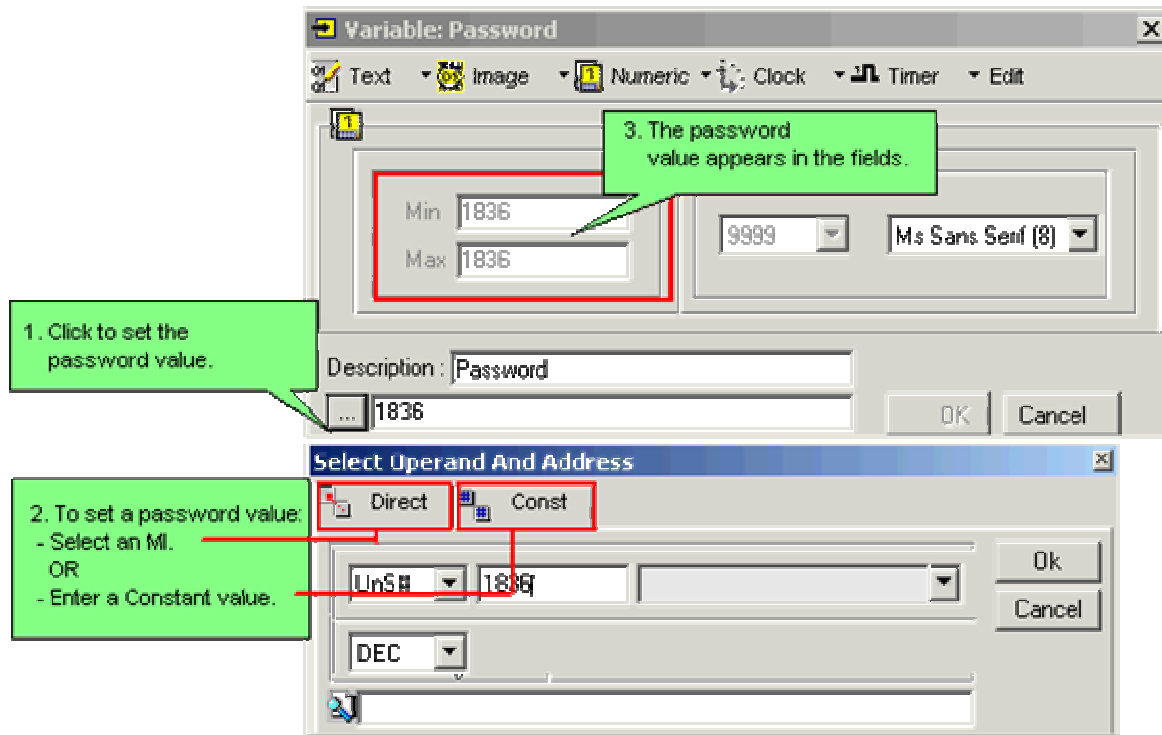
Password: Keypad Entry

You can insert a Password Variable that requires operators to enter a password via the controller's keyboard.

- Note •** SB 250, Keypad Entry within Limits, turns ON when a password is correctly entered; SB 251, Keypad entry exceeds limits, turns ON when a password is incorrect. You can use the status of these bits, for example, to provide a jump condition to another Display. When either of these SBs turns ON, the index number of the active variable is stored in SI 249.

Inserting and Defining the Variable

1. Create a Variable field, and then select Password from the Numeric menu.
2. Enter a password as shown below.

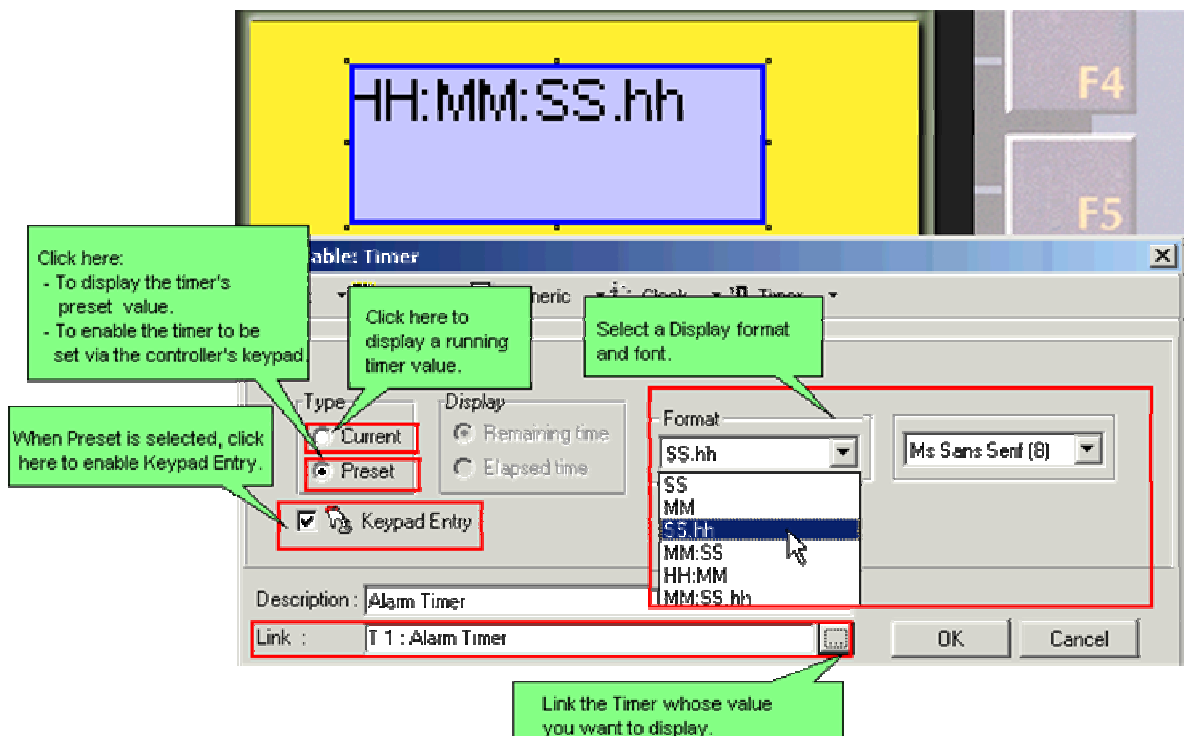


Note • When an HMI keypad entry variable is active, and the Enter key is pressed on the controller keypad, SB 30 HMI Keypad Entries Completed turns ON. This can be used as a Jump condition.

Timers: Displaying Values

A Timer Variable shows a timer's value in a Display.

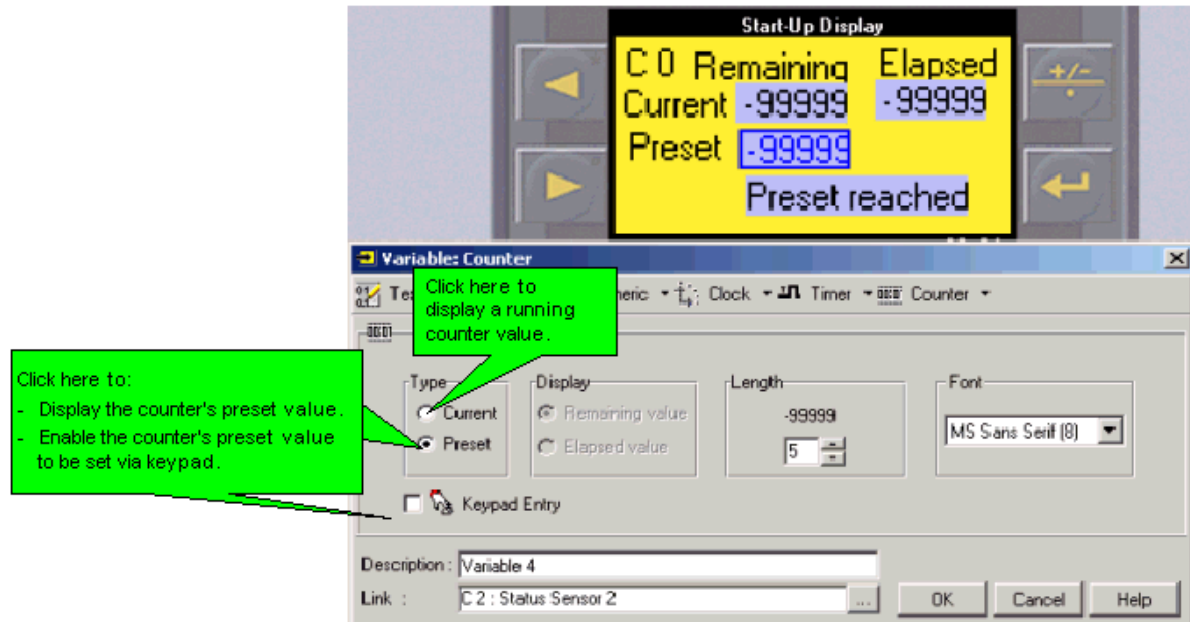
1. Create a Variable field, and then select Timer.
2. Select from the features and formats shown below.



Display/Preset Counter Values

A Counter Variable shows a counter's value in a Display. You can also use this variable to enter a

1. Create a Variable field, and then select Counter.
2. Select from the features and formats shown below.

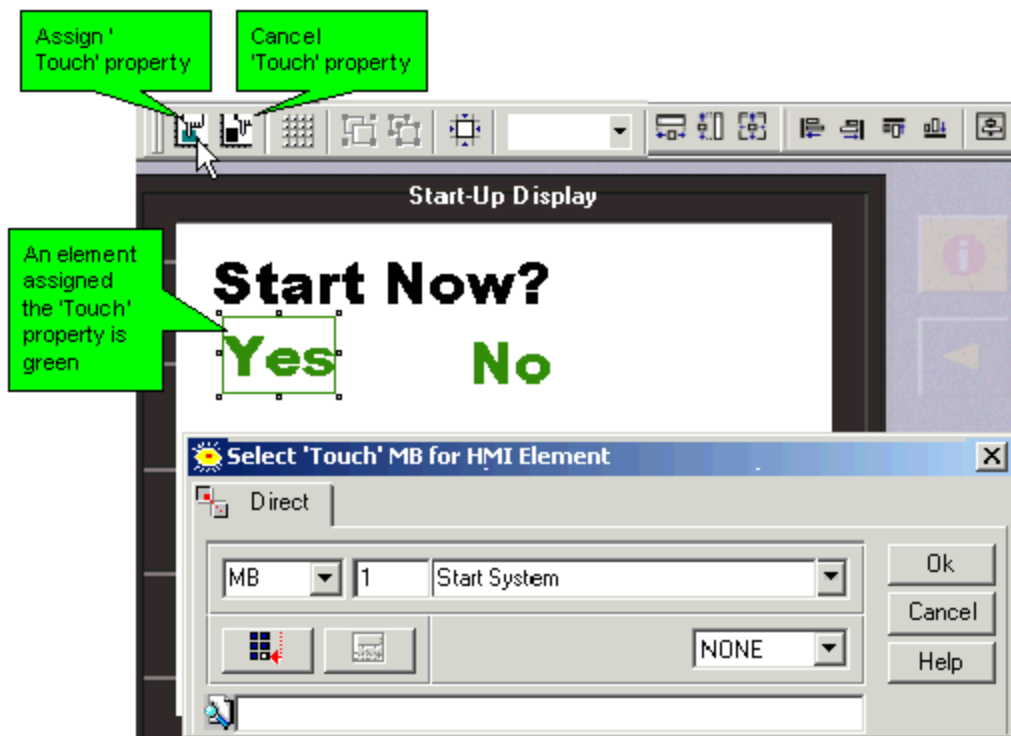


'Touch' Property (Touchscreen models only)

When the a touchscreen controller, such as the V280, is selected in Hardware Configuration, you can assign Touch properties to any screen element.

1. Select any screen element, then click the Assign Touch Property button; the Select Operand box opens, enabling you to link an MB.

When this element is touched, the linked MB will turn ON, when the element is not touched, the MB will be OFF.



To edit the MB that is already linked to the Touch element, select the element and then click the Assign 'Touch' Property icon; the Select Operand box opens.

- Note** • An MB that is linked to a 'Touch' element cannot be linked to any other element on the Display. The MB may be linked to 'Touch' elements in different Displays.

Text

Fonts

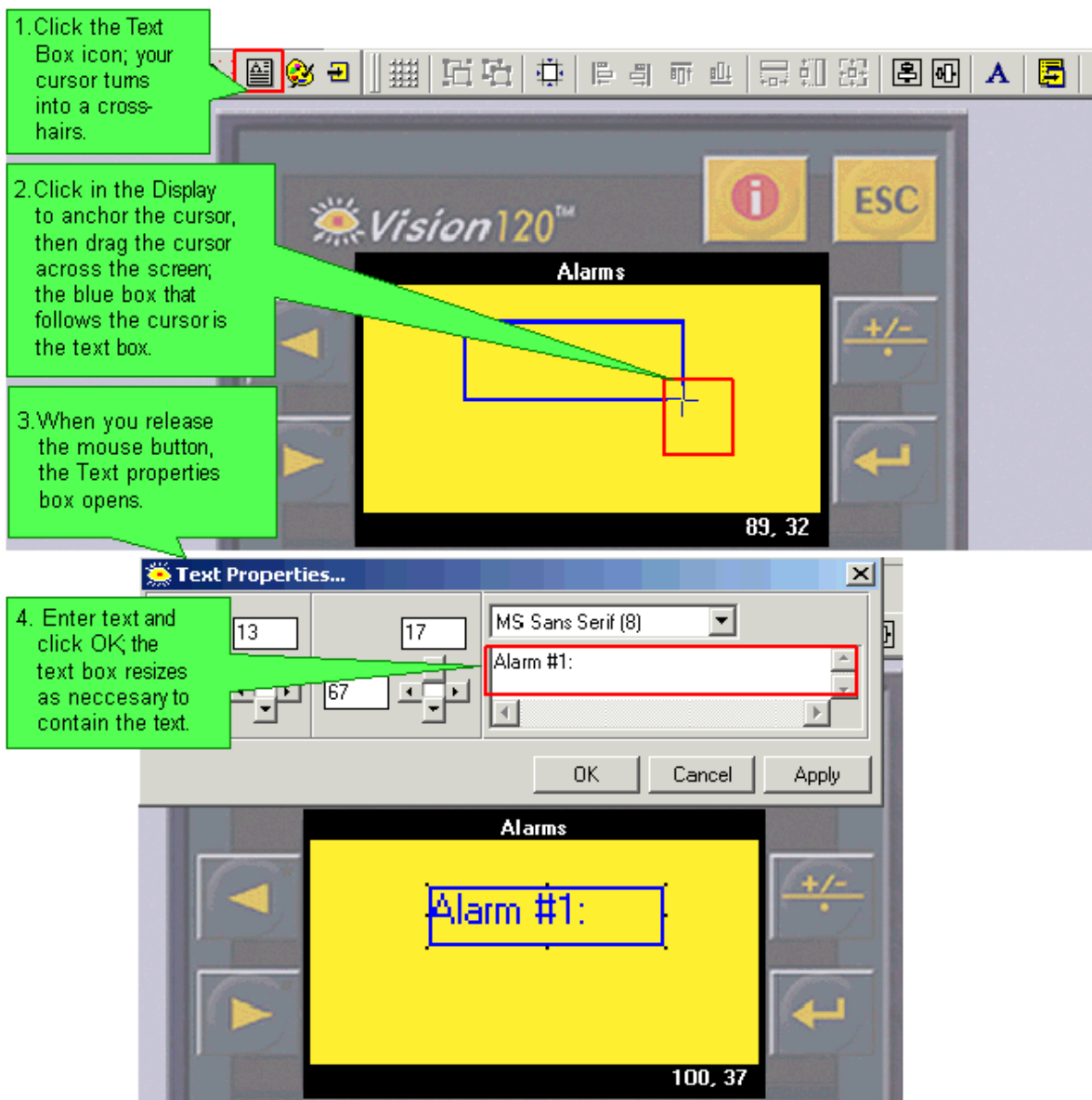
Fonts are used in text boxes and to display Variable data.

- Note •** Fonts are not standardized. For example, two different PCs may both contain a font called Arial. Displays created on one PC using that font may look different or distorted when opened on the other PC. This can be fixed by opening the application and replacing the font; you may replace the font with a font of the same name to solve this problem.

Text: Fixed

Fixed (constant) text does not change according to run-time conditions.

To place fixed text messages in a Display:



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