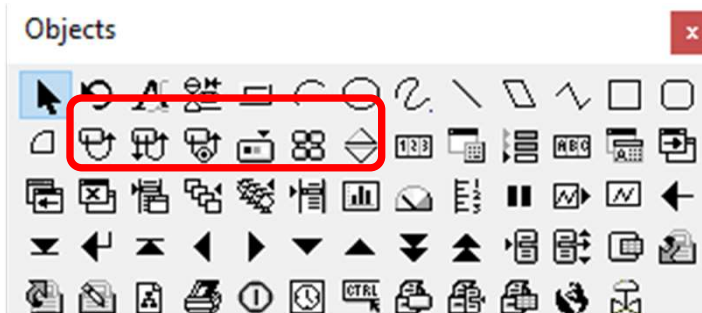
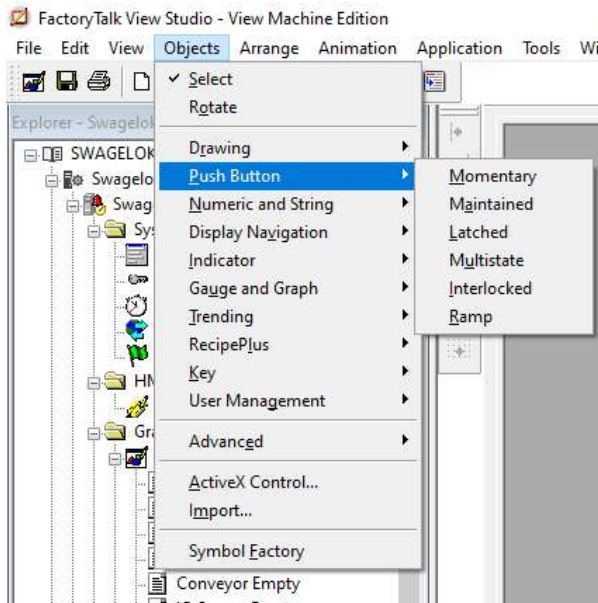


Creating Pushbuttons

Dan Kandray

January 30, 2020

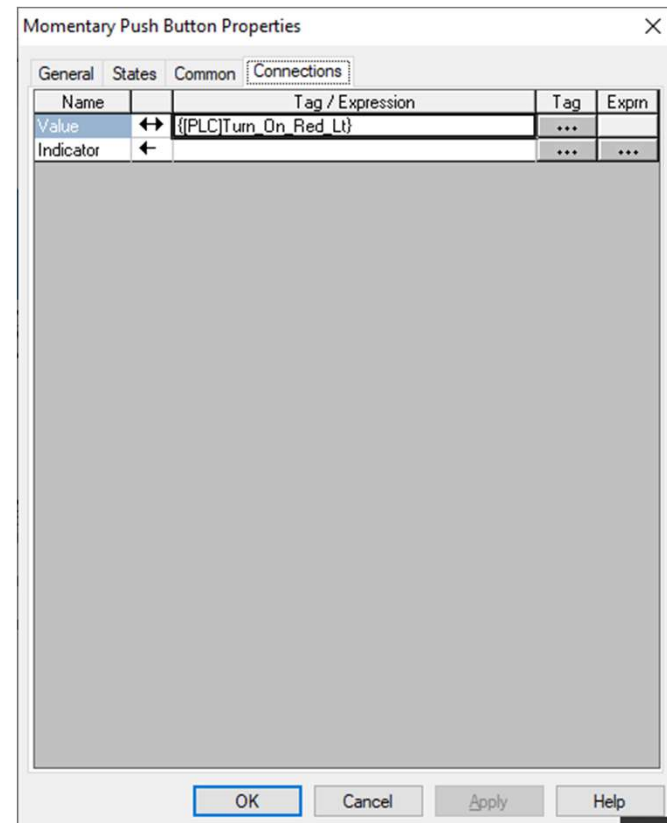
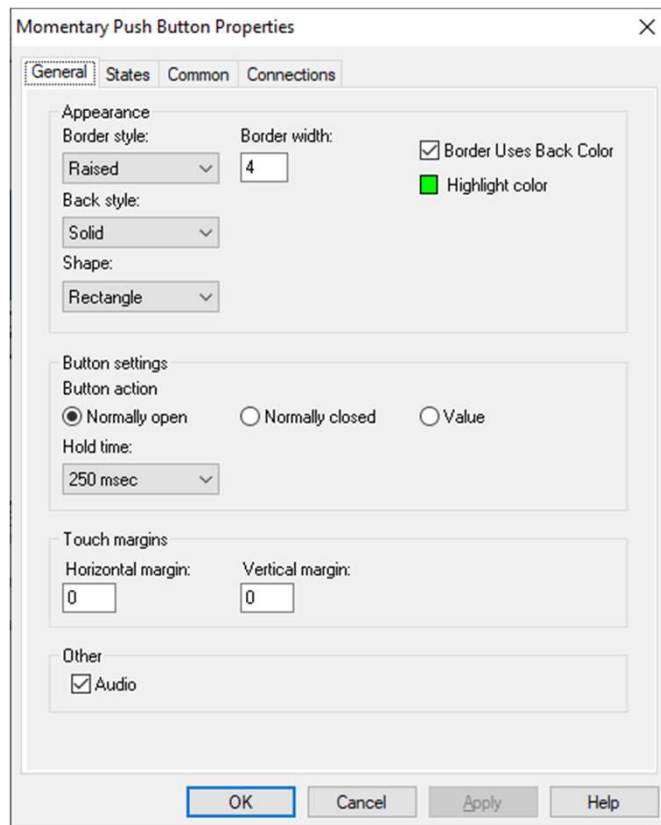
Pushbuttons



Use this graphic object	To do this
Momentary push button	Start a process or action by sending one value to the tag when pressed, and another value when released.
Maintained push button	Toggle between two values by sending one value to the tag when pressed, and a second value the next time the button is pressed and released. This button is useful for changing a setting within a machine or process, but not for starting the machine or process.
Latched push button	Start a machine or process. The button remains set (latched) until the process is complete. For example, use this button to start a bag filling machine. When the process is complete (the bag is full), the button is reset (unlatched) by the Handshake connection.
Multistate push button	Cycle through a series of values. Each time the operator presses the button, the value for the next state is sent to the tag. When the button is in its last state, pressing it changes the button to its first state and writes out the first state value. This button is useful when you want the operator to see and select multiple options in sequence, using a single button. The button shows the current state of an operation by showing a different color, caption, or image to reflect the different states.
Interlocked push button	Use a group of buttons to send values to the same tag. When the operator presses one button in the group, the button's value is sent to the tag, and the button remains highlighted as long as the tag value is the same as the button's value. Pressing another button in the group releases the first button, and sends a new value to the tag. You can also use a single Interlocked push button to send a value to a tag.
Ramp button	Increase or decrease the value of a tag by a specified integer or floating-point value. For example, use two Ramp buttons together to create a raise/lower control.

Pushbuttons

- Created the same way as other Graphic Objects
- Pushbuttons are configured using the Properties dialog box. The configurable properties vary based on the pushbutton being configured.



Assign tags and expressions to an object's connections

- Use the **Connections** tab of **Property Panel** to assign tags or expressions to the selected object's connections. If multiple objects are selected the tab is blank, because you can assign tags or expressions to only one object at a time.

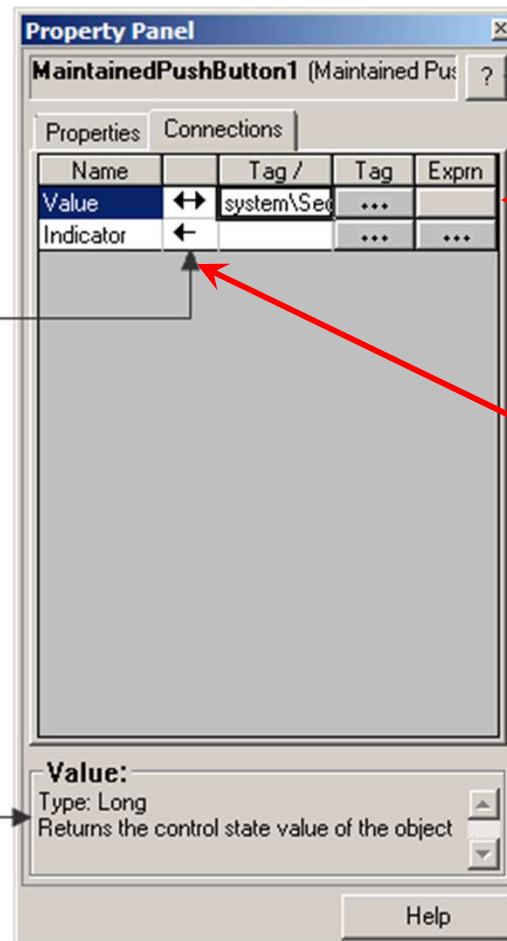
The arrows show the direction in which data flows between the connection and the data source.

If the connection is a read connection (arrow points left), data flows from the data source to the object.

If the connection is a write connection (arrow points right), data flows from the object to the data source.

If the connection is a read and write connection (double-headed arrow), data flows in both directions.

This box describes the selected connection and indicates the type of data the connection uses.



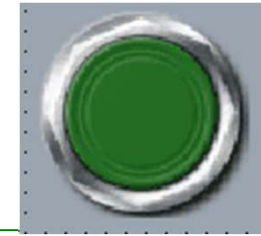
Click for help on the selected connection.

Use the **Value** connection to connect to the PLC Tag you wish to control from the HMI

Use the **Indicator** connection if the tag is also controlled by the PLC program in addition to the HMI



Momentary Pushbuttons



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- Use the Momentary Push button object to create a button that starts a process or action by sending a value to the data source.
- Momentary Push buttons send one value to the data source when pressed and another value when released.
- A Momentary Push button can perform three types of actions:
 - Normally open sends a value of 1 when the button is pressed, and a value of 0 when the button is released.
 - Normally closed sends a value of 0 when the button is pressed, and a value of 1 when the button is released.
 - Value sends the values you assign to the button press and release actions.
 - If the button's hold time is still in effect when the button is released, the second value is not sent until the hold time expires. You set up the hold time in the General tab.

Momentary Push Button Properties

General States Common Connections

Appearance

Border style: Raised Border width: 4 Border Uses Back Color

Back style: Solid Highlight color

Shape: Rectangle

Button settings

Button action

Normally open Normally closed Value

Hold time: 250 msec

Touch margins

Horizontal margin: 0 Vertical margin: 0

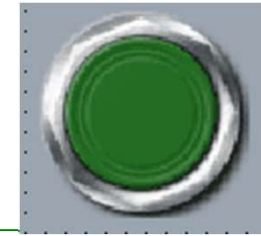
Other

Audio

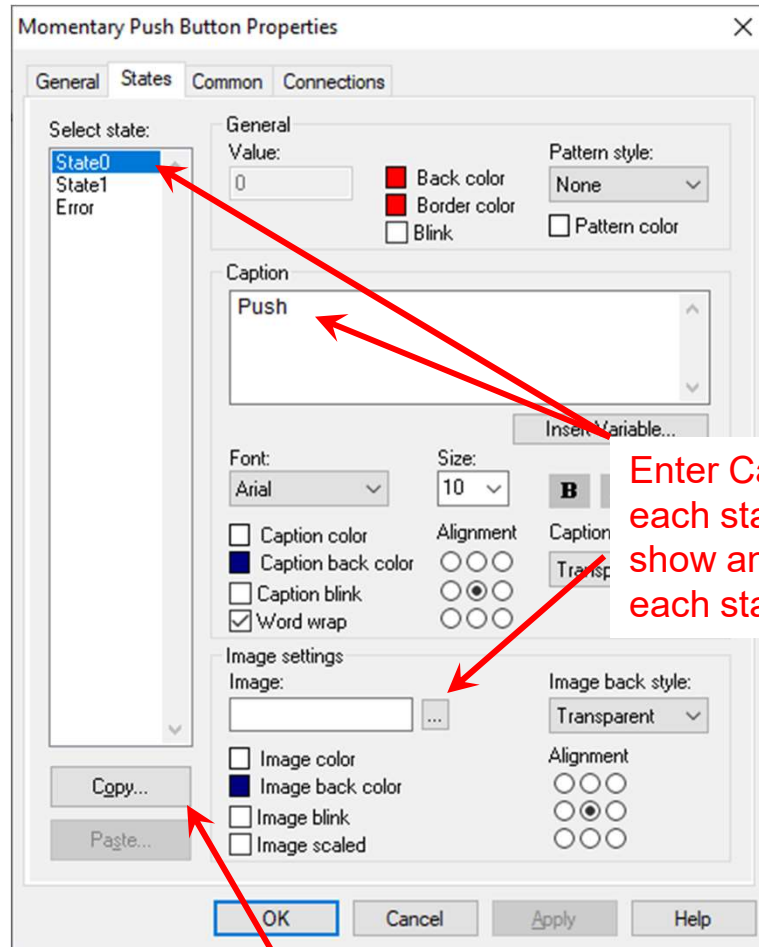
OK Cancel Apply Help



Momentary Pushbuttons

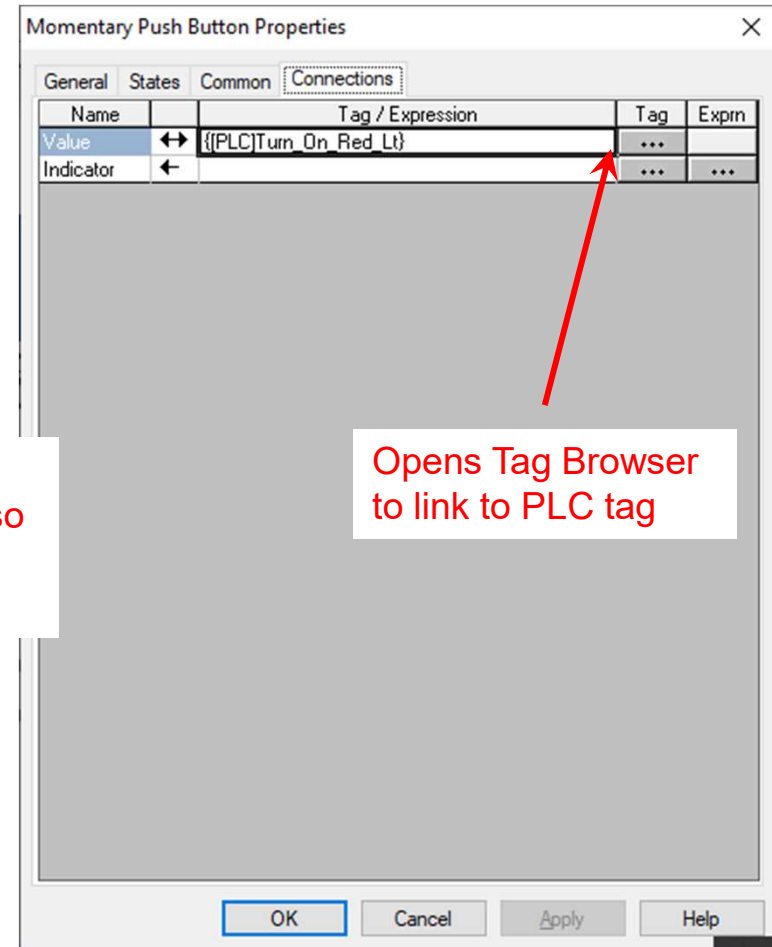


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Enter Caption for each state, can also show an image for each state

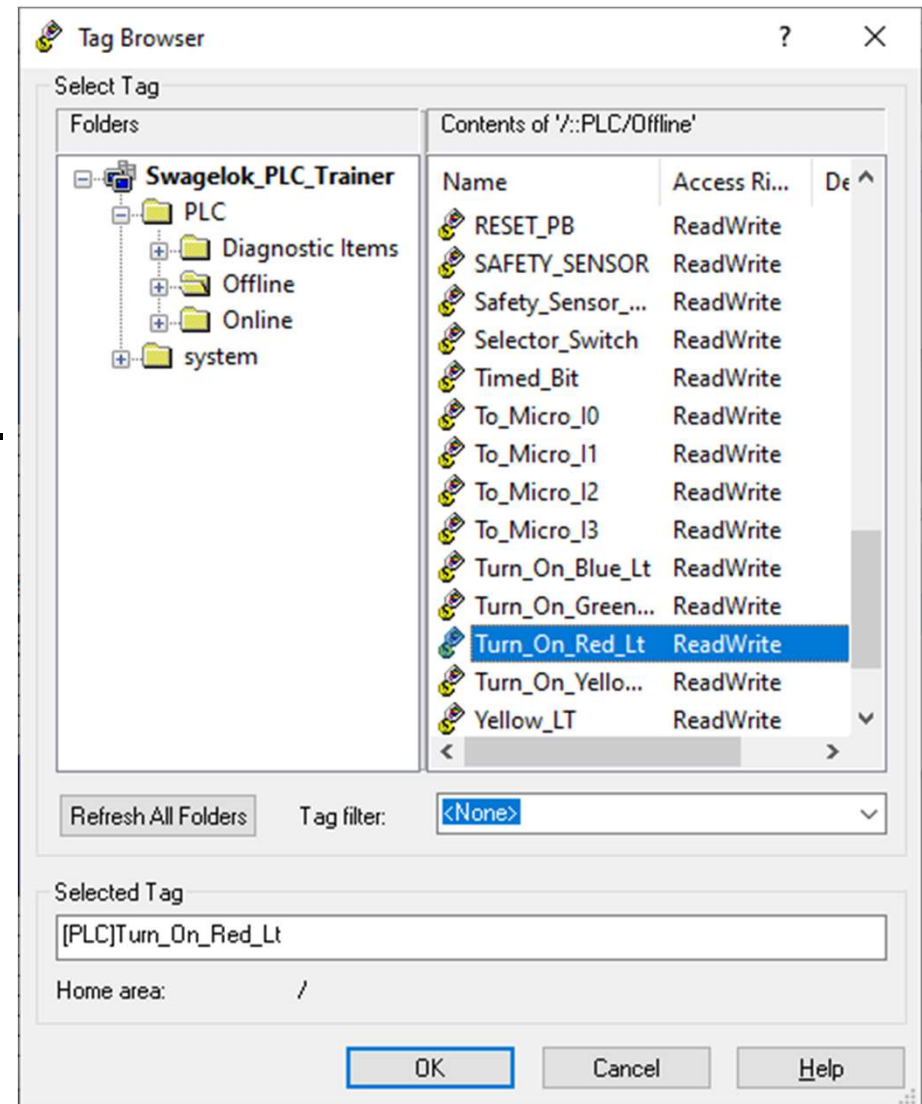
Use Copy and Paste to copy settings from one state to another



Opens Tag Browser to link to PLC tag

Tag Browser

- When configuring parameters in the Connections tab, the Tag Browser will help assign direct-reference, HMI, or system tags to a pushbutton.

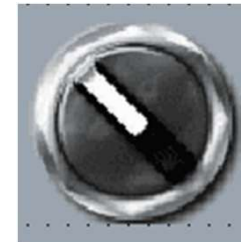




Maintained Push buttons

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- Toggles between two values.
- Useful for changing a setting within a machine or process, but not for starting the machine or process.
- A Maintained push button sends one value to the data source the first time it is pressed, and a second value the next time it is pressed and released.





Maintained Push buttons

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- Next state based on Select how the button changes states:
 - Current state - the application switches the button from the current state to the other state and writes out the other state value.
 - Value connection - the application reads the value of the Value connection, and, if the value matches one of the button's state values, changes the button to the other state and writes out the other state value.
 - Select this option if you want the button to base its state on external changes to the Value connection.
 - If the value does not match one of the button's state values, the application changes the button to State 0 and writes out the State 0 value.

Maintained Push Button Properties

General States E-Signature Common Connections

Appearance

Border style: Raised Border width: 4 Border uses back color

Back style: Solid Highlight color

Shape: Rectangle

State settings

Next state based on: Current State

Touch margins

Horizontal margin: 0 Vertical margin: 0

Other

Audio

OK Cancel Apply Help



Latched Pushbutton

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- Use the Latched push button object to create a button with a latched and unlatched state. This type of button is useful for starting a machine or process.
- For example, use the Latched push button when you want the Value connection to start a process within a programmable logic controller (PLC) and remain set until the process is completed. You can also use a latched push button when you have a PLC with a long program or long update times.
- See example on next slide
- Not a commonly used

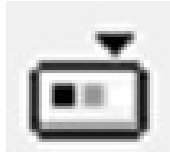


Latched Pushbutton

Swagelok

- In this example, the Latched push button controls the filling process for the bag filler machine.
- Create a Latched push button with the caption "Fill" for State 0 and "Filling" for State 1. Assign a tag called Fill to the Value connection. Assign a tag called Handshake to the Handshake connection.
- When the operator presses the button, the application sets the button to State 1 and the caption changes to Filling. The data source registers the state change for the Fill tag and starts the bag filler machine. When the machine finishes filling the bag, the data source momentarily sets the Handshake connection to a non-zero value. This unlatches the button, returning it to State 0.

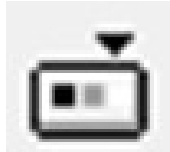




Multistate Pushbutton

Swagelok

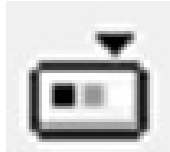
- Used when you want the operator to be able to show and select multiple options using a single button.
- The Multistate push button displays the current state of a process or operation by showing a different color, caption, or image to reflect different states.
- When the pushbutton reaches its last configured state, the next pushbutton press returns it to the initial state



Multistate Pushbutton

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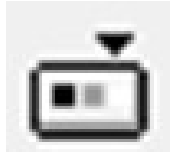
- Example:
 - A machine can operate manually or automatically, or it can be turned off.
 - Create a Multistate push button with the captions "Off" for State 0, "Manual" for State 1, and "Automatic" for State 2.
 - The application monitors the tag you assign to the Value connection to control the operation mode.
 - If the operator presses the button to change to the next mode, the Value connection value changes, and the machine switches modes.
 - Assign the same tag to the Value connection and the Indicator connection. This ensures that the Multistate push button always displays the current operation mode.



Multistate Pushbutton

Swagelok

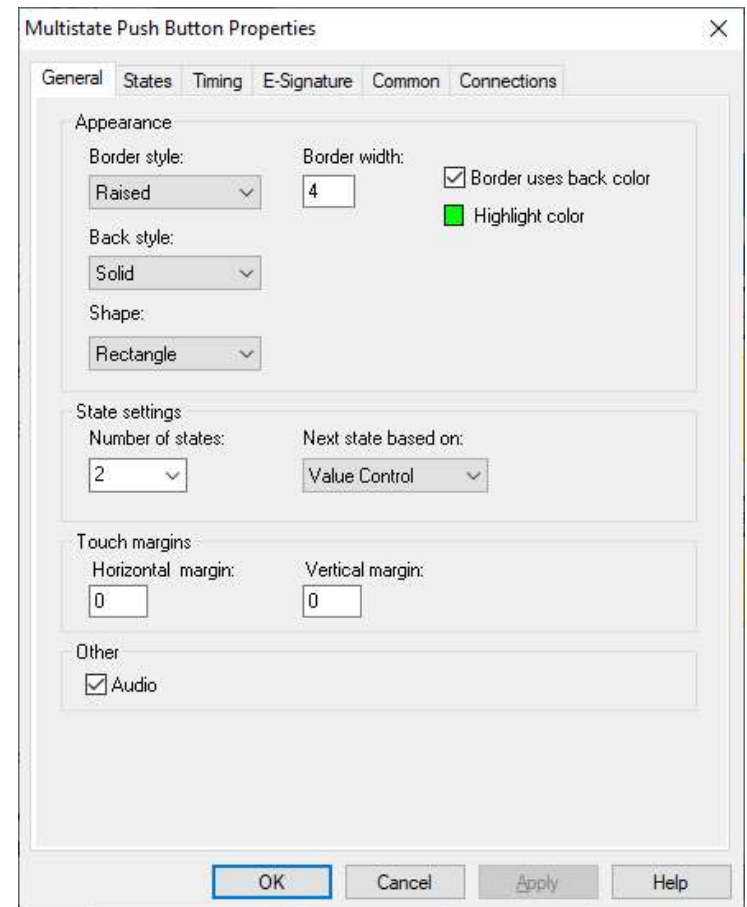
- Example:
 - A machine can operate manually or automatically, or it can be turned off.
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 - The application monitors the tag you assign to the Value connection to control the operation mode.
 - If the operator presses the button to change to the next mode, the Value connection value changes, and the machine switches modes.
 - Assign the same tag to the Value connection and the Indicator connection. This ensures that the Multistate push button always displays the current operation mode.

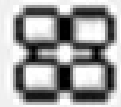


Multistate Pushbutton

Next state based on Select how the button changes states:

- Current state - the application switches the button from the current state to the next state and writes out the next state value.
- Value - the application reads the value of the Value connection, and, if the value matches one of the button's state values, changes the button to the next state and writes out the next state value.
 - Only Select this option if you want the button to base its state on external changes to the Value connection.
 - If the value does not match one of the button's state values, the application changes the button to State 0 and writes out the State 0 value.
 - When the button is in its last configured state, pressing it causes the button to change to State 0 and write out the State 0 value.

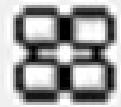




Interlocked Pushbuttons

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- An Interlocked push button is one of a group of buttons that have the same connection tag.
- The buttons function together in much the same way as the station selector buttons on a car radio: pressing one cancels the other and makes a new selection.
- Although Interlocked push button function as a group, you add them to the screen one at a time.
- When the operator presses the Interlocked push button, the application sends the button's value to the tag and highlights the selected button.
- The Interlocked push button remains highlighted as long as the value at the data source is the same as the button value. Therefore, only one button in the group is active and highlighted at any given time, unless you assign the same value to two or more Interlocked push buttons.



Interlocked push buttons Example

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- In this example, the Interlocked push buttons control the position of a guide that directs bottles from the main conveyor to one of three secondary conveyors. Only one secondary conveyor can be operational at any moment.
 1. Create an Interlocked push button with back color and border color for State 0 as red, and State 1 as green. Make the State 0 and State 1 captions "Conveyor 1." Assign a tag to the Value connection.
 2. Copy the Interlocked push button and paste two additional copies of it.
 3. For the first copy, change the button value property to 1 and the State 0 and State 1 captions to "Conveyor 2."
 4. For the second copy, change the value property to 2 and the State 0 and State 1 captions to "Conveyor 3."
- When the operator presses one of these three Interlocked push buttons the button's value property is written to the Value connection. The tag registers the value change and the appropriate conveyor becomes the active conveyor.



Ramp Pushbuttons

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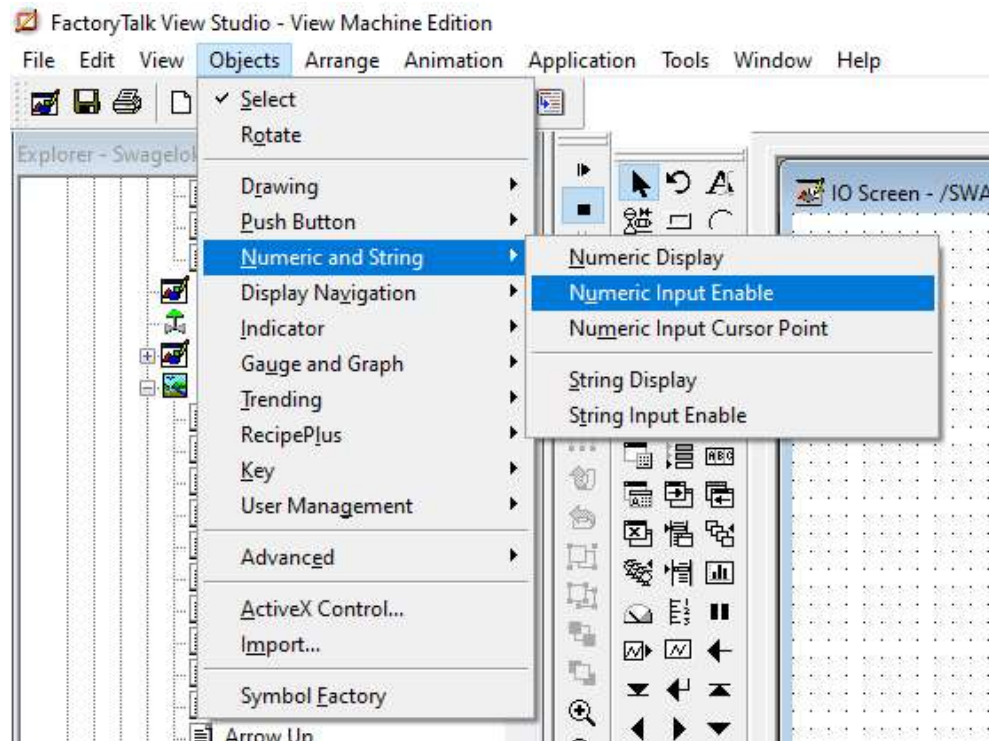
- Use the Ramp button to increase or decrease the value of a tag.
- Ramp buttons can change a value by either an integer or floating-point value.
- You can use two Ramp buttons together to create a raise/lower control.
- Tip:
 - Configure a numeric display object to display the value of the Ramp button's Value connection.



Numeric Input Enable Pushbuttons

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- Specialized pushbuttons that allow operators to write numeric data directly to a specified tag.
- When an operator pushes the pushbutton, a data-entry pad appears.



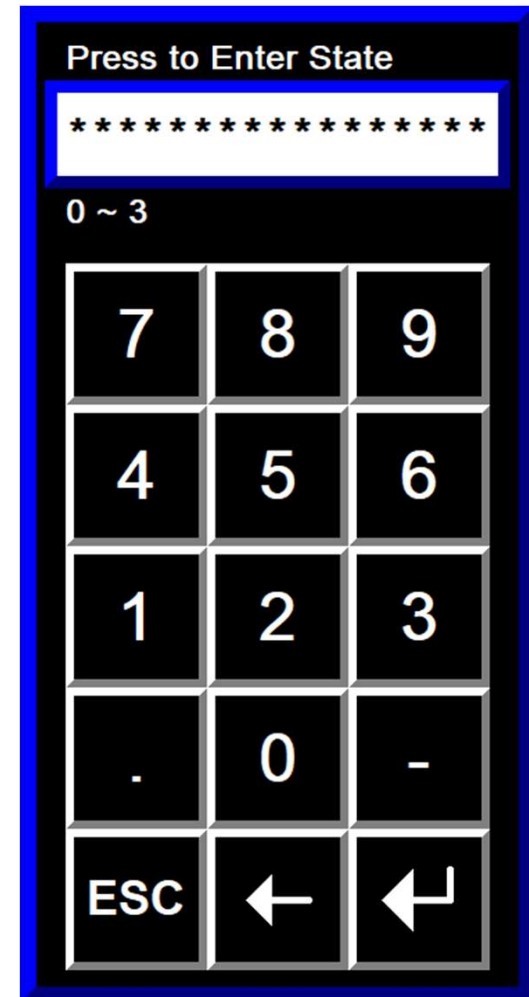


Numeric Input Enable Pushbuttons

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- When the operator presses the Numeric Input Enable button, the numeric **pop-up keypad** or **scratchpad**** opens.
- The operator types a numeric value in the pop-up and presses Enter. The value is sent to the Value connection at the data source.
- If a write expression is assigned, the application evaluates the expression and sends the expression value to the Value connection.

** - The numeric pop-up scratchpad is smaller than the numeric pop-up keypad, and does not contain any buttons. Therefore, the computer must have an external keyboard or keypad to use the numeric pop-up scratchpad. Otherwise the operator cannot enter values or close the scratchpad once it is opened.

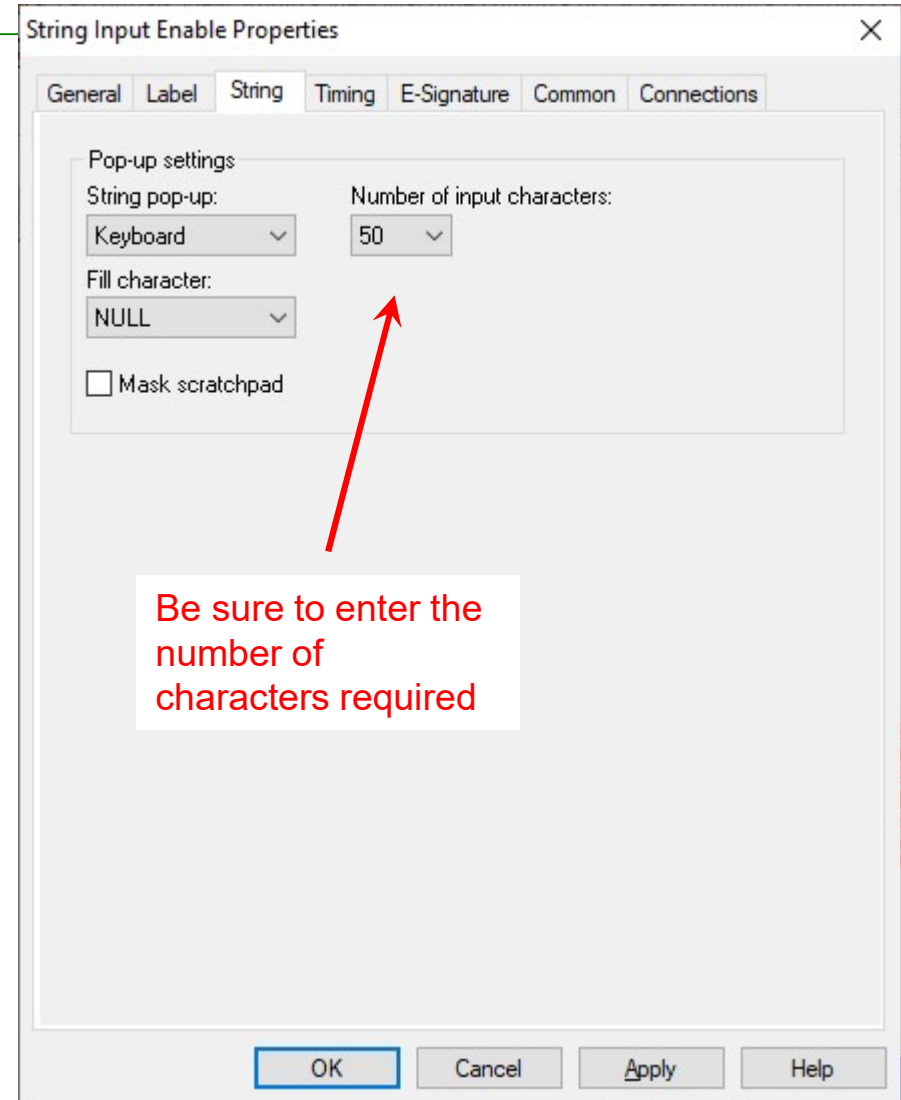
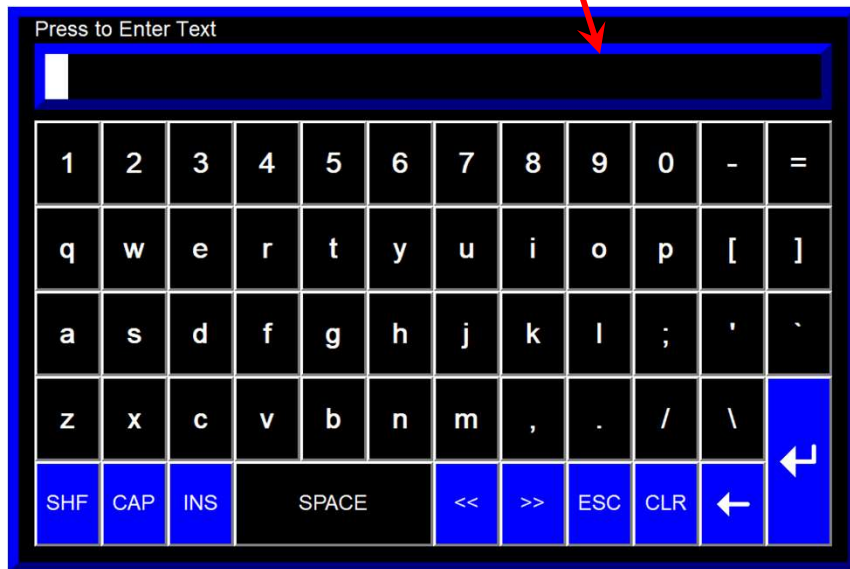




String Input Enable Pushbuttons

Swagelok

- At run time the operator can use the String Input Enable button to open a string pop-up keyboard or scratchpad.
- When the operator presses the button, the pop-up opens.
- The operator can use the pop-up to enter a string value to send to the Value connection at the data source.



Input Focus Objects

- Often Numeric and String Input Enable Pushbuttons will have a green border indicating the button has focus at runtime.
- This can be disabled from the Display Settings dialog box

