Vision Builder Inspection: Index Measurements

File Path: C:\\Documents\Index Measurements.vbai	Description:
	This inspection illustrates how to loop and branch to iteratively inspect the 9 pins on a serial connector. The **Acquire Image and Locate Pins** loads a new image and finds the position of all the pins. If all the pins are present, the **Inspect Pins 1-5** state goes through each of those pins in a loop to measure the distance. Once all the pin distances have been measured and pass, the inspection transitions to the **Reset Counter** state and then the **Inpsect Pins 6-9** state. If any pins are missing or the distance fails during any of these tests, the inspection transitions to the **Completed** state where the Pass/Fail result is overlayed before going back to the **Acquire Image and Locate Pins** state.

Inspection States

State 1	Select Inspection	No inspection step.		
State 2	Inspection Setup	No inspection step.		
State 3	Inspection Cleanup	No inspection step.		
State 4	Start			
State 5	End			
State 6	Acquire Image and Locate Pins	5 inspection steps.		Acquire the image, find all the pins, and determine if the expected number of pins is found. If so, start processing pins 1-5. If not, skip any processing an go to the **Completed** state.
	Inspection Steps	Name	Type	User Documentation
	Step 1	Acquire Image	Read Image File	
	Step 2	Locate Pins 1-5	Detect Objects	Finds the location of the top row of pins
	Step 3	Locate Pins 6-9	Detect Objects	Finds the location of the bottom row of pins
	Step 4	Check Number of Pins	Logic Calculator	Ensures that the top row and bottom row have the expected number of pins.
	Step 5	Initialize Globals	Set Variable	Reset the **Counter** global variable to 1 so we can start processing the first pin.
State 7	Inspect Pins 1-5	6 inspection steps.		Measure the distance between pin[i] and pin[i+1]. Overlay result, update the index counter, and repeat if there are more pins in this row to process. If the distance check failed, go to the **Completed** state since the part has failed. If there are no more pins to process, go to the **Reset Counter** state before we process Pins 6-9.
	Inspection Steps	Name	Type	User Documentation
	Step 1	Get Pin[i] Position	Array Operator	Get the location of pin[i] from the top row. Use the **Counter** variable as the index that increments after inspecting each pin gap.
	Step 2	Increment Counter	Set Variable	
	Step 3	Get Pin[i+1] Position	Array Operator	Get the location of pin[i+1] so we can measure the distance to pin[i].
	Step 4	Measure Distance	Geometry	The Geometry step measures the distance between the two pins and also gets the midpoint so the result overlay can be centered between the pins.
	Step 5	Update Pass/Fail	Set Variable	
	Step 6	Overlay Result	Custom Overlay	
State 8	Inspect Pins 6-9	7 inspection steps.		Measure the distance between pin[i] and pin[i+1]. Overlay result, update the index counter, and repeat if there are more pins in this row to process. If the distance check failed or there are no more pins to process, go to the Completed state.
	Inspection Steps	Name	Type	User Documentation
	Step 1	Get Pin[i] Position	Array Operator	Get the location of pin[i] from the bottom row. Use the **Counter** variable as the index that increments after inspecting each pin gap.
	Step 2	Increment Counter	Set Variable	
	Step 3	Get Pin[i+1] Position	Array Operator	Get the location of pin[i+1] so we can measure the distance to pin[i].

	Step 4	Measure Distance	Geometry	The Geometry step measures the distance between the two pins and also gets the midpoint so the result overlay can be centered between the pins.
	Step 5	Update Pass/Fail	Set Variable	
	Step 6	Overlay Result	Custom Overlay	
	Step 7	Compute Exit Condition	Logic Calculator	Exit if there is a failure or no more pins to process.
State 9	Completed	2 inspection steps.		The part is done being inspected. Update the inspection status, overlay the result, and use the **Display Result Image for this State** flag to display this image. This flag is located above the steps and under the main display window. This is the only state where this display flag is enabled for performance reasons to avoid unnecessary display updates in the other states where the processing isn't complete.
	Inspection Steps	Name	Type	User Documentation
	Step 1	Set Inspection Status	Set Inspection Status	
	Step 2	Overlay Pass/Fail	Custom Overlay	
State 10	Reset Counter	1 inspection step.		
	Inspection Steps	Name	Type	User Documentation
	Step 1	Reset Counter	Set Variable	Reset the counter to 1 so we can start processing the fist pin in the second row.

Inspection Transitions

Transition 1	Name: default	From State: Start	To State: Acquire Image and Locate Pins	Priority 1
	Transition always true.			
Transition 2	Name: # Pins < 9	From State: Acquire Image and Locate Pins	To State: Completed	Priority 1
	Transition active if:	Step Status is Equal to False	If there aren't enough pins, go directly to the **Completed** state.	
Transition 3	Name: default	From State: Acquire Image and Locate Pins	To State: Inspect Pins 1-5	Priority 2
	Transition always true.			
Transition 4	Name: Pins 1-5 Inspected	From State: Inspect Pins 1-5	To State: Reset Counter	Priority 2
	Transition active if:	Remaining Objects is Equal to 0	Keep executing this state while there are more pins to process.	
Transition 5	Name: Defect Found	From State: Inspect Pins 1-5	To State: Completed	Priority 3
	Transition active if:	Connector Pass/Fail is Equal to False	Go directly to the **Completed** state when there is a defect. This transition is evaluated first. To configure the order that transitions are evaluated, right-click on the **Inspect Pins 1-5** state and select **Set Transition Priorities**. The first transition to evaluate as true will be taken. If none of the transitions evaluate to true, the default transition is taken.	
Transition 6	Name: default	From State: Inspect Pins 1-5	To State: Inspect Pins 1-5	Priority 4
	Transition always true.			
Transition 7	Name: Pins 6-9 Inspected	From State: Inspect Pins 6-9	To State: Completed	Priority 1
	Transition active if:	Decision Result is Equal to True	Done processing pins. Either all have been processed or there was a defect.	
Transition 8	Name: default	From State: Inspect Pins 6-9	To State: Inspect Pins 6-9	Priority 2
	Transition always true.			
Transition 9	Name: default	From State: Completed	To State: End	Priority 1
	Transition always true.			
Transition 10	Name: default	From State: Reset Counter	To State: Inspect Pins 6-9	Priority 1
	Transition always true.			