



**SCORPION**  
VISION SOFTWARE®

# GETTING STARTED TUTORIAL

## *Part 3 - Gauging*



## *Goals of this Tutorial*

- Developing a 'Washer Gauging (or Measurement) System' using Scorpion Vision Software and seeing it in action.
- The inspection set consists of washers with different inner diameters and different ovality. The 'Washer Gauging System' first detects the washers and then inspects every detected washer for 'minimum inner diameter' and 'minimum ovality'. Washers which have an 'inner diameter' or 'ovality' higher than the set up values are 'OK' and others are 'FAIL'.

## *Before Starting the Tutorial*

- Scorpion Vision Software version 7.2 or higher needs to be installed on the test machine and the license should be activated
- An actual camera is not needed since you will be using the 'simulator' feature available in Scorpion Vision Software
- The data files available with this tutorial should be copied to the test machine:  
(1) 'GettingStartedTutorial\_Part3\_Gauging.zip' which is a pre-configured profile
- It is assumed that the 'Getting Started Tutorial Part 2 – Classification' is already completed. This tutorial ('Getting Started Tutorial Part 3 – Gauging') uses the Scorpion Vision Software profile from 'Getting Started Tutorial Part 2 – Classification', as a starting point.

# Washer Gauging System

In this tutorial, we will be creating a 'Washer Gauging System' using the powerful, flexible, and easy to use Scorpion Vision Software. The 'Washer Gauging System' will have the following features:

- Set up 'minimum inner diameter' and 'minimum ovality' requirements.
- Periodically reviews the image captures from camera (or simulator image in case of this tutorial)
- Analyzes the image to understand washer presence or absence in the captured image
- If washer is present in the captured image, it is inspected for 'minimum inner diameter' and 'minimum ovality of inner circle'. Defective washers are those which have either 'inner diameter' or 'ovality of inner circle' lower than the configured thresholds.
- Displays the inspection result to the user and generates statistical data

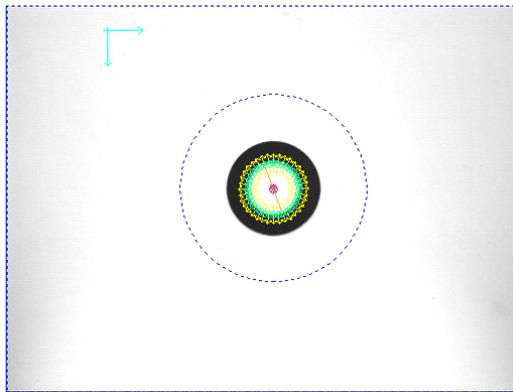


Figure 1: Image with good washer

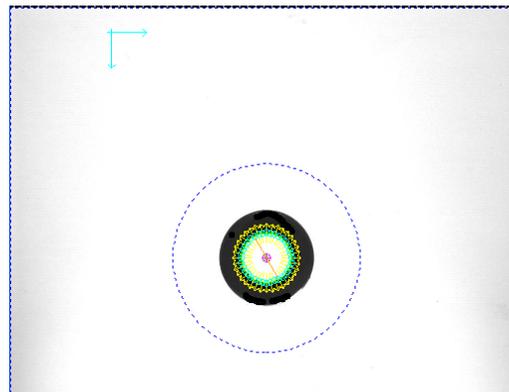


Figure 2: Image with defective washer

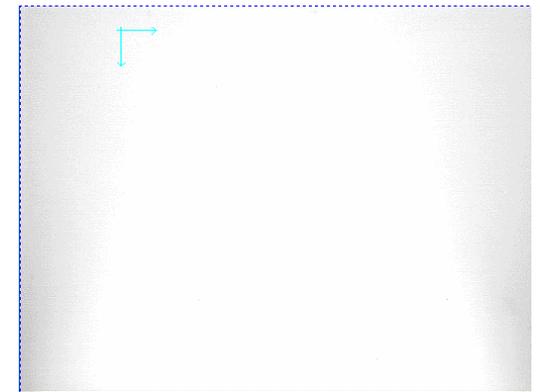


Figure 3: Image with no washer



Figure 4: 'OK' is the expected result after inspection by the system



Figure 5: 'FAIL' is the expected result after inspection by the system

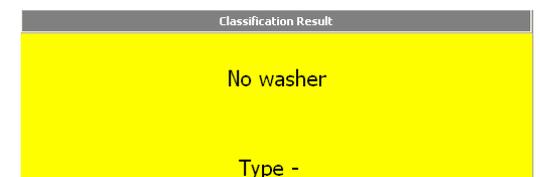


Figure 6: 'No washer' is the expected result after inspection by the system

In this inspection, the difference between a 'good washer' and 'defective washer' is so small, that a necked eye may not be able to distinguish between them. Scorpion is able to identify these differences and inspect washers properly.

Inspection set we have has small washers with expected inner diameter 10.5 mm. It also has large washers with expected inner diameter 14.5 mm. Ovality of inner circles of all washers is expected to be above 0.95 (1.00 ovality indicates perfect circle).

We have set up 'Calibrator' tool (in previous tutorials and continuing same in this tutorial), which uses reference image to understand conversion between image pixels to mm. So all inspection settings in Scorpion can be done in 'mm' units, instead of using 'pixel' units. This makes configuration in Scorpion very easy, since information about physical units of parts under inspection is always available from manufacturing specifications.

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## 1. *Pre-Configured Profile*

- The GettingStartedTutorial\_Part3\_Gauging.zip available with this tutorial is a pre-configured profile for the 'Washer Gauging System'
- This can be used on any computer to see the 'Washer Gauging' in action, without needing any additional changes.
- We will first try this pre-configured profile and see it in action
- Then later in this tutorial, we will create this same profile by making a few updates to the profile we have created in 'GettingStartedTutorial\_Part2\_Classification'.

## 2. Trying out the Pre-Configured Profile

Launch Scorpion Vision software from 'Start->All Programs->Tordivel Vision Solutions->Scorpion 7->Scorpion 7.2'

Right click on the application window and select the 'Restore' sub-menu. This will pop up the zip file selection dialog.



Figure 7: Restore Profile

Navigate to the directory where GettingStartedTutorial\_Part3\_gauging.zip is available, select it and click on 'Open' button. Scorpion will restore the profile and it will be added to the available list of profiles.

Right click on the new profile 'GettingStartedTutorial\_Part3\_Gauging' and click on 'Open' sub-menu to launch Scorpion vision software with this profile loaded.

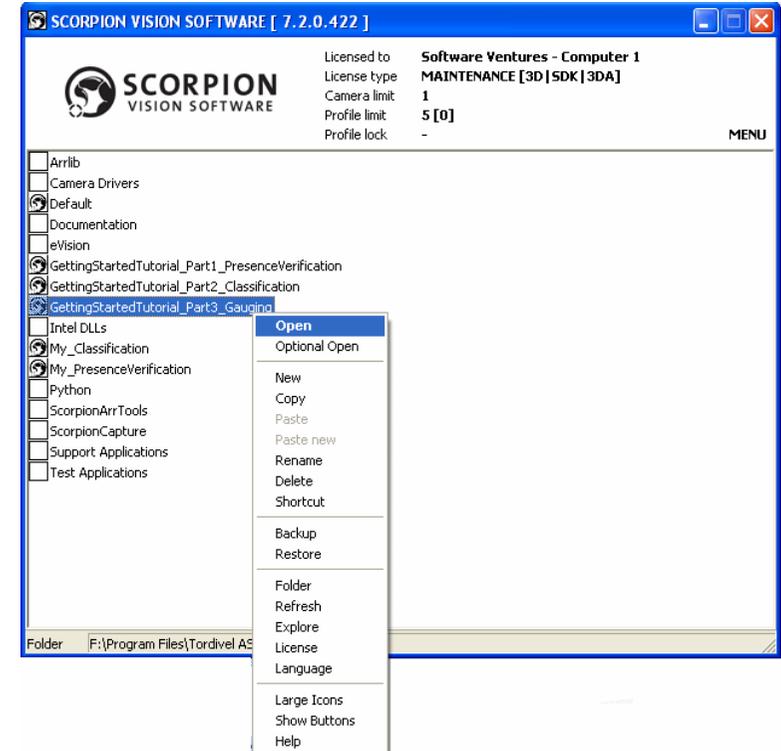


Figure 8: Open Profile

Scorpion has a toolbar available at the top for quick navigation to various commonly used features.

Click on the 'Start' button on the toolbar to start the inspection. Scorpion starts capturing images (from simulator configured in this profile) after every 1000 milliseconds, processes them and generates the results.

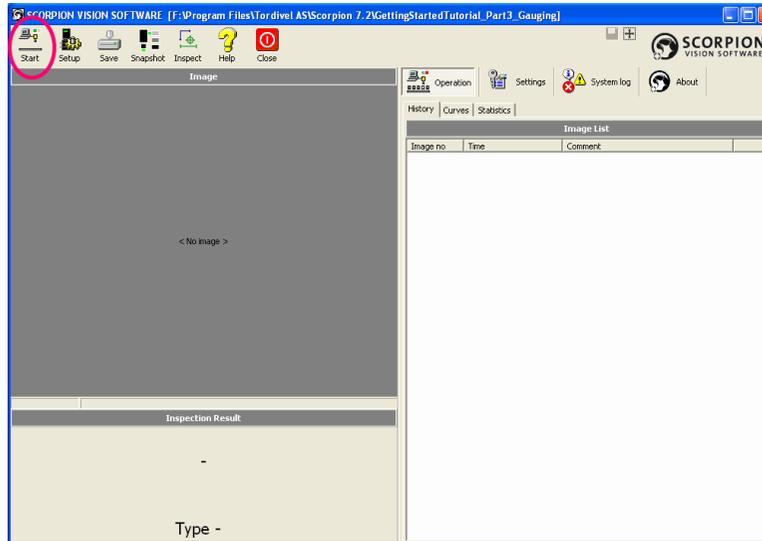


Figure 9: Start the inspection

There are some captured images which have good washers present, some captured images which have defective washers present and a few captured images which do not have any washer.

Scorpion analyses each captured frame and updates the result as 'OK' or 'FAIL' or 'No washer', and also updates the classification result as 'Small' or 'Large', in the inspection result panel visible in left bottom corner. The color of the inspection result panel also changes to green for 'OK', red for 'FAIL' and yellow for 'No washer' results.

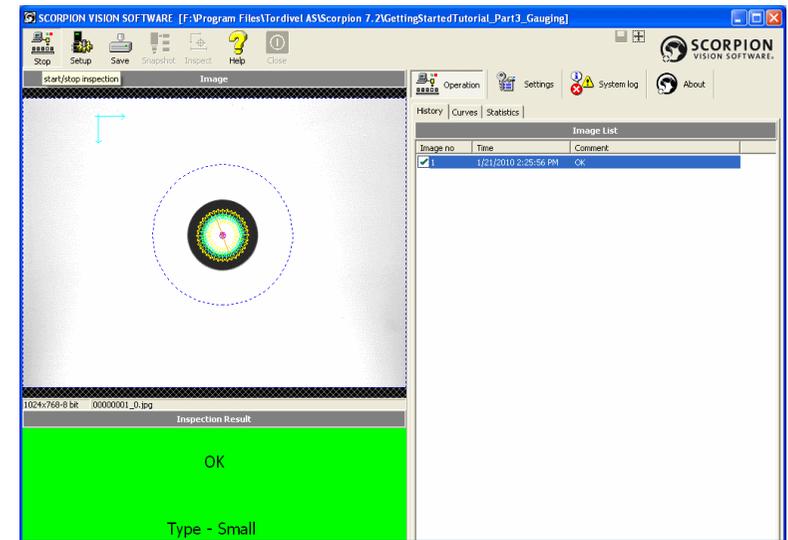


Figure 10: Result 'OK'

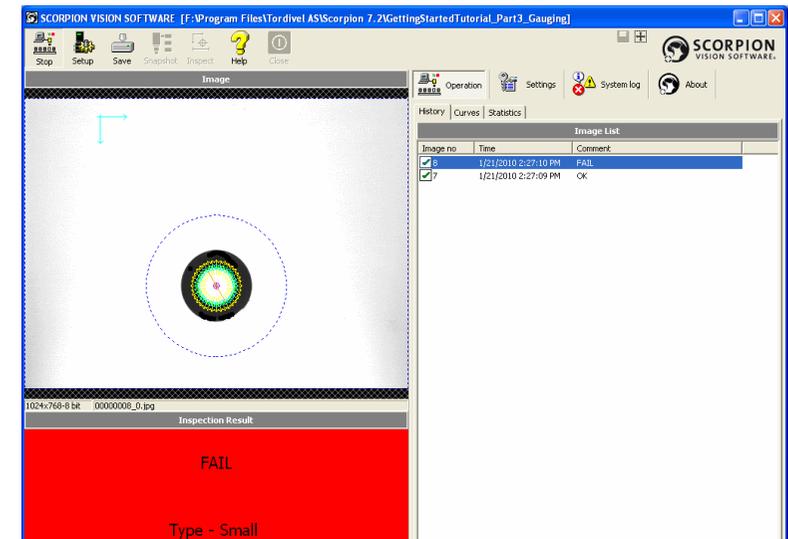


Figure 11: Result 'FAIL'

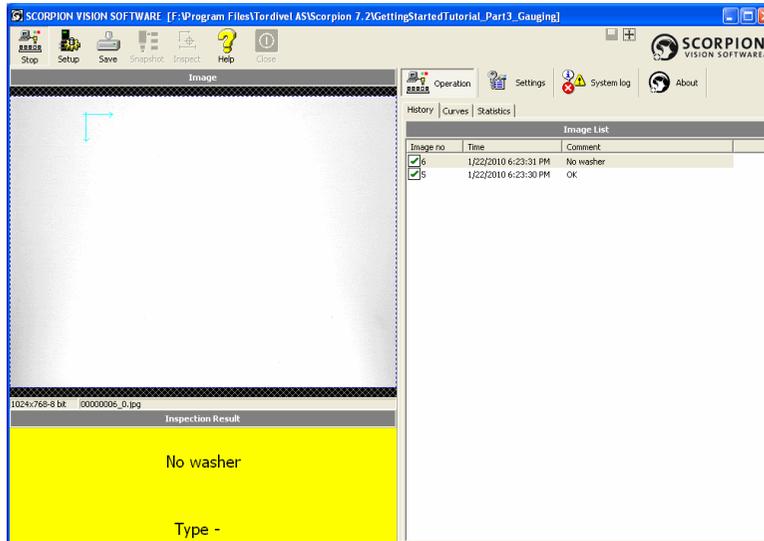


Figure 12: Result 'No washer'

Click on the 'Stop' toolbar button (previously available 'Start' button is changed to 'Stop' now) to stop the inspection.

Congratulations!

You have successfully used Scorpion Vision Software for 'Gauging'!

Now we are ready to update the profile we have created in 'GettingStartedTutorial\_Part2\_Classification' to get the same 'Gauging'.

### 3. Creating a New Profile and Copying Configurations

Close the Scorpion instance which had the pre-configured 'Gauging' profile loaded.

Launch Scorpion Vision software from 'Start->All Programs->Tordivel Vision Solutions->Scorpion 7->Scorpion 7.2'

Right click on the main dialog and click on the 'New' sub-menu. This will ask for a name of the new profile. Type 'My\_Gauging' (or you may choose any name of your choice) and click on the 'OK' button. This will add the new profile to the list.

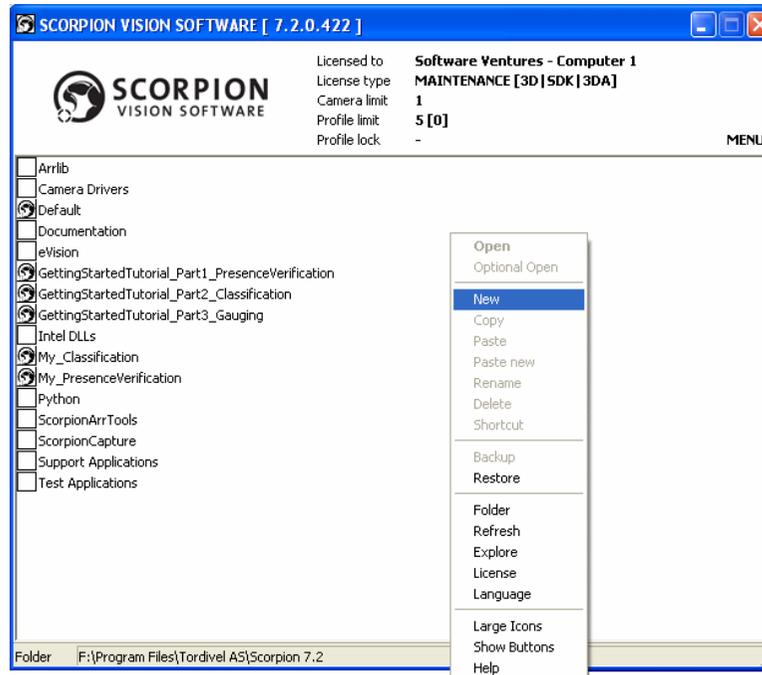


Figure 13: New profile

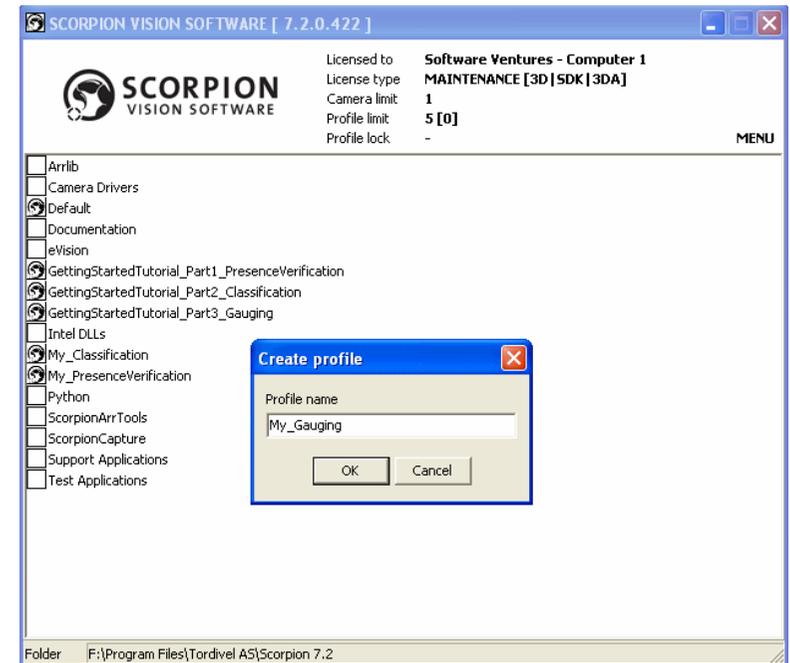


Figure 13: New profile name

Right click on the previously created profile 'My\_Classification' and click on 'Copy'.



Figure 15: Copy Profile Settings

Right click on the newly created profile 'My\_Gauging' and click on 'Paste'. Scorpion will pop up a confirmation dialog, click on the 'Yes' button to confirm pasting.

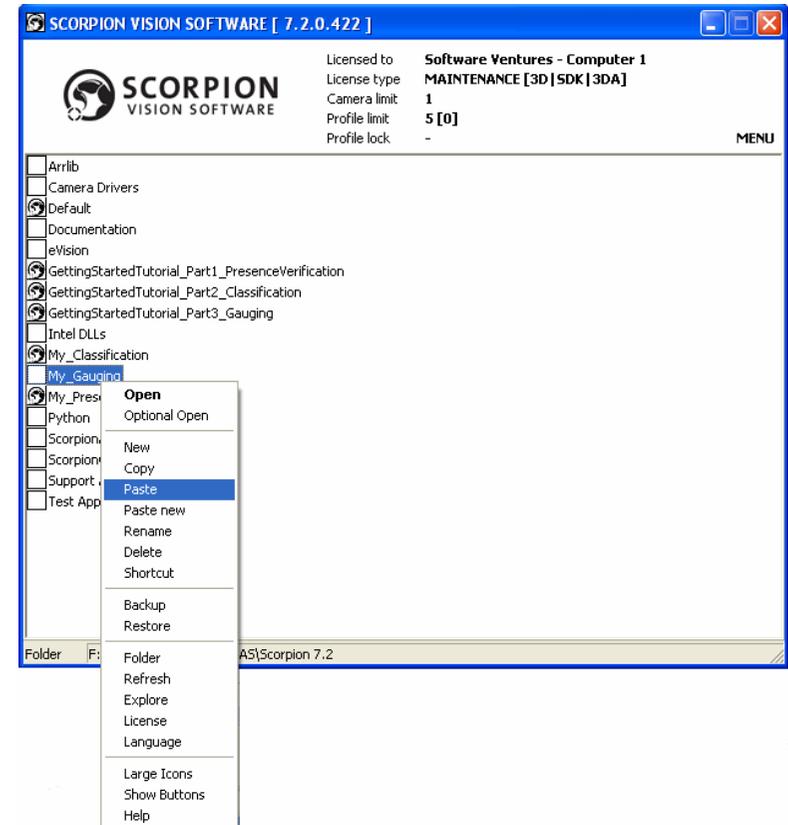


Figure 16: Paste Profile Settings

Right click on the newly created profile name in the list and click on 'Open'. This will also launch Scorpion with the new profile loaded.

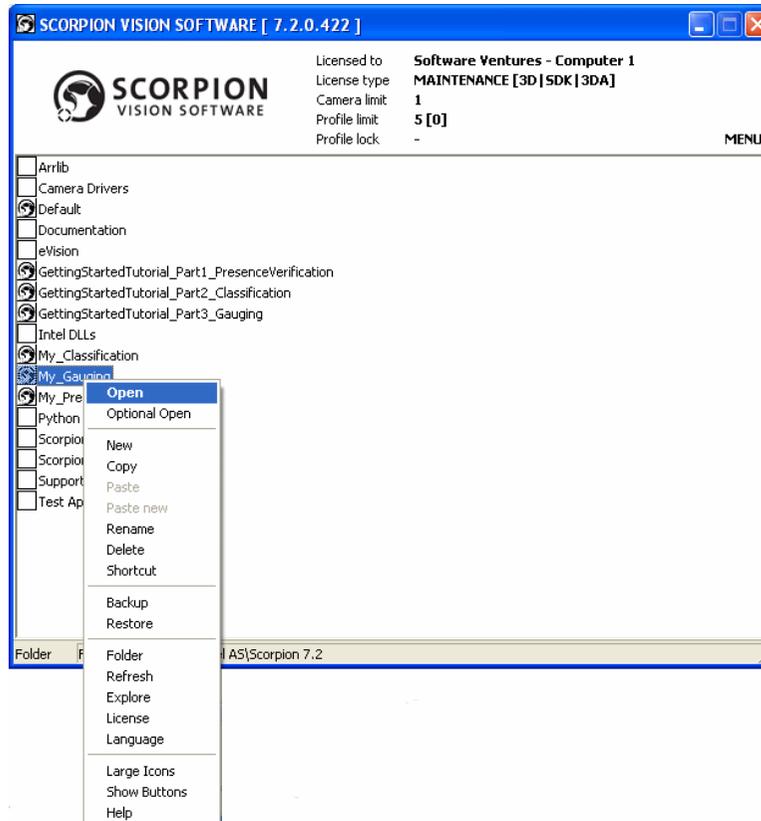


Figure 17: Open profile

Click on the 'Snapshot' tool bar button. This will capture an image and will display it in the Image panel. Click on the 'Inspect' toolbar button. This will do an inspection and will update results in the Result panel. This confirms that everything is fine and we can do the further configurations.

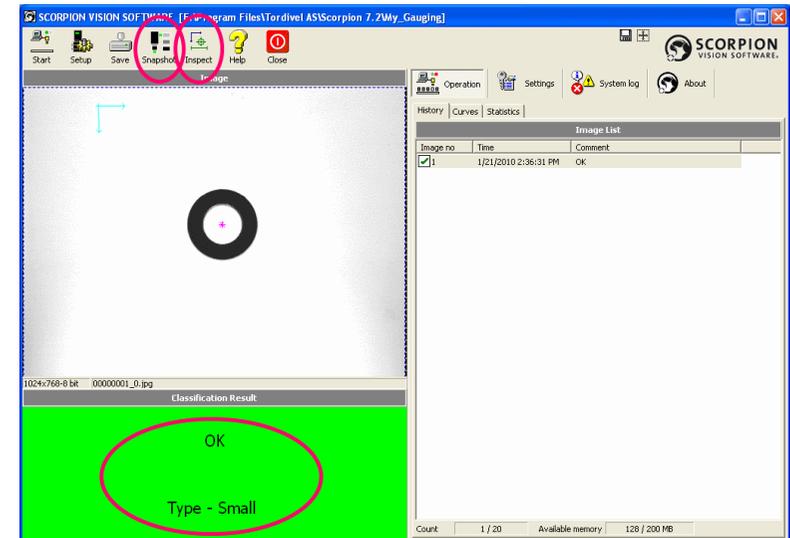


Figure 18: test inspection

Click on the 'Setup' tool bar button. This will pop up a password dialog. Type 911 and click on the 'OK' button. This will switch Scorpion to 'Service mode'

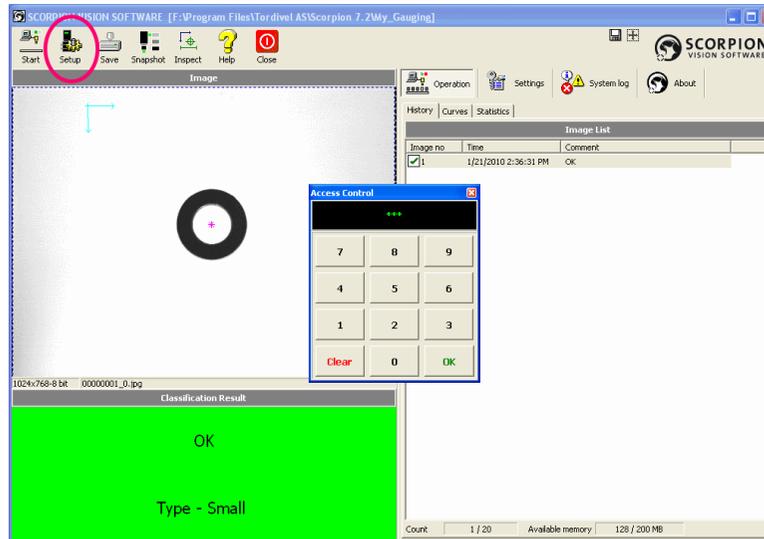


Figure 19: 'Service Mode Password'

Scorpion provides a very easy and convenient way to copy configuration from a profile to another profile. We have used the same to re-use configurations from a previously created profile, instead of doing all configurations once again.

## 4. Result Panel Updates

Right click anywhere in the 'Inspection Result' panel available at the left-bottom. Select the 'General' menu and 'Caption' sub-menu under it.

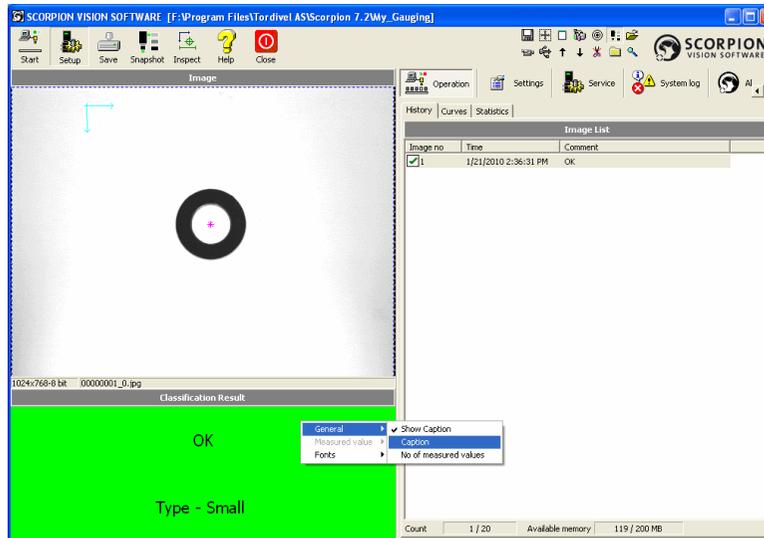


Figure 20: Result Panel Caption Change

This will pop up the 'Configuration' dialog. Type 'Caption' as 'Inspection Result'. Click on the 'OK' button to close the dialog.

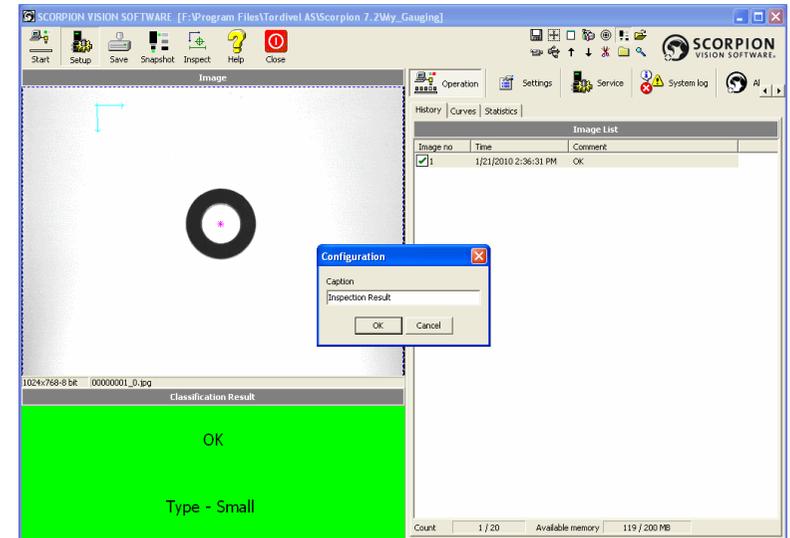


Figure 21: Result Panel New Caption

The result panel caption will now change to 'Inspection Result'.

## 5. Setting RadialArcFinder Tool

Go to 'Service' mode. Click on the 'Toolbox' tab

Click on the 'New' button to add a new tool. This will pop up the 'New Tool' dialog.

Type 'Name' as 'InternalRadius'

Set the 'Guard' to 'Present'

From 'Tools', select Category 'Edge' and select Tool 'RadialArcFinder'.

Click on the 'OK' button to close the 'New Tool' dialog box. This will add a new entry in the list of configured tools.

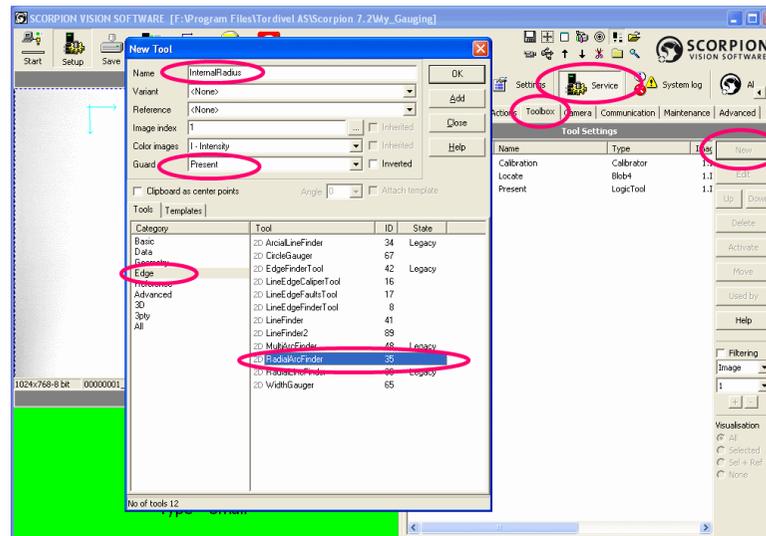


Figure 22: New Tool 'RadialArcFinder'

Select the newly added tool 'InternalRadius'. Click on the 'Edit' button which will pop up the 'Change InternalRadius' dialog box.

Under the 'Setup' tab, set 'Reference' to 'Locate'

Set 'Trace lines->Center-x' to 0

Set 'Trace lines->Center-y' to 0

Set 'Trace lines->Inner radius' to 0

Set 'Trace lines->Outer radius' to 20

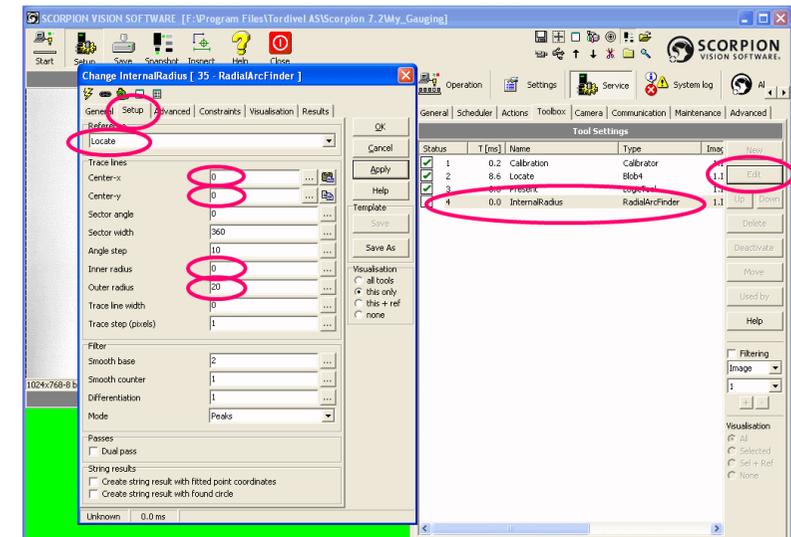


Figure 23: Edit Tool 'RadialArcFinder'

Under the 'Advanced' tab and 'Edge detection' group, set 'Polarity' as 'Light to Dark'.

Enable 'Percent Threshold'

Set 'Min threshold' to 1

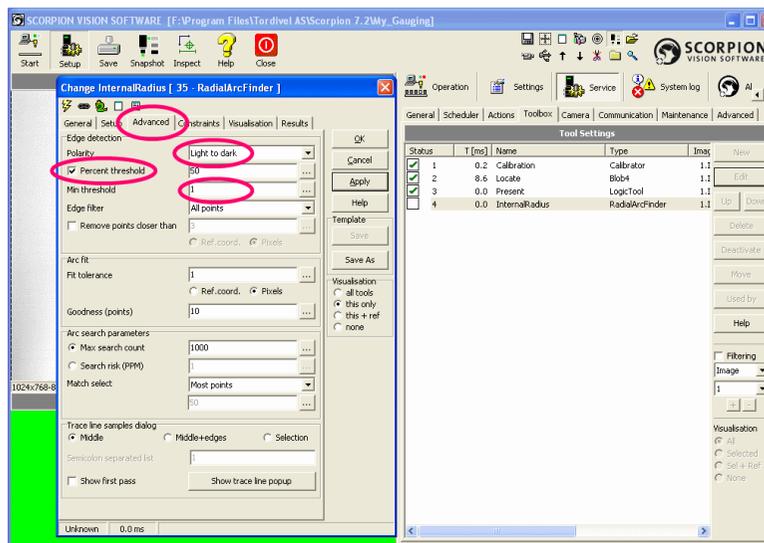


Figure 24: 'RadialArcFinder' Advanced Settings

Under the 'Visualization' tab, enable 'Center', 'Error' and 'ROI'. Disable all other visualizations.

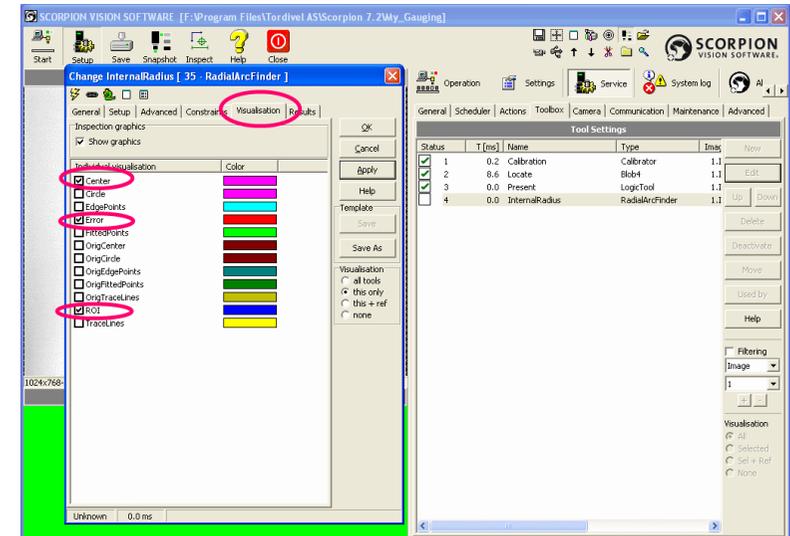


Figure 25: 'RadialArcFinder' Visualization Settings

Click on the 'OK' button to close the 'Change InternalRadius' dialog box.

Click on the 'Inspect' toolbar button. This will now do analysis for the newly added 'RadialArcFinder' tool and will draw a few additional indicators on the image, as per our 'Visualization' settings.

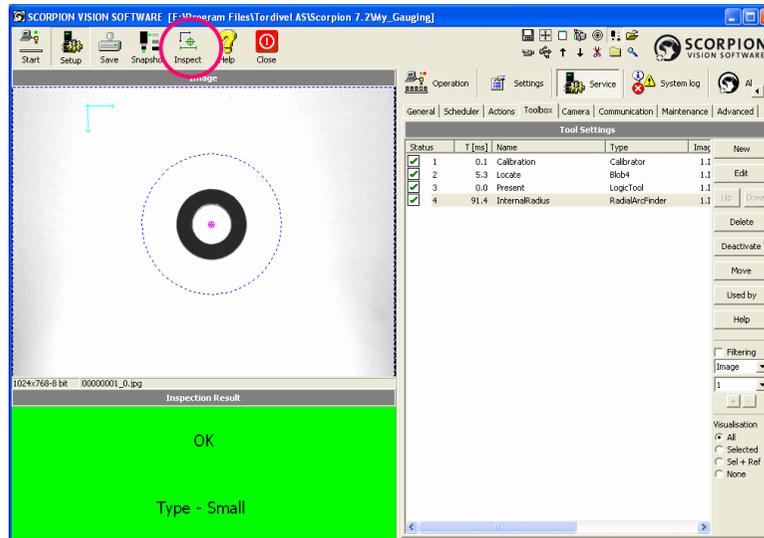


Figure 26: Inspect After 'RadialArcFinder' Setup

We have now set up the 'RadialArcFinder' tool. As its name suggests, this tool finds an arc (or complete circle when we get a complete 360 degrees arc) in the region of interest.

We have set 'Guard' as 'Present', so that this tool will be in action only when the 'LogicTool' named 'Present' has Result Value '1'. Which means 'RadialArcFinder' processing will happen only when a blob is detected in the captured image.

The 'Reference' is set to 'Locate', which means we would like to find an arc (or circle) in the detected blobs and not on the other parts of the captured image.

'Center-x' is set to 0 and 'Center-y' is set to 0 which means the center is set at the detected blob's center of gravity. (The center of the washer inner circle as well as the center of the washer outer circle, in case of this tutorial.)

The Inner Radius is set 0 and Outer Radius is set to 20, which means we would like to find an arc (or circle) which is at distance 0mm to 20 mm from the center. In other words, we would like to find an arc (or circle) which has a radius between 0mm to 20 mm and which has the same center as Center-x and Center-y specified in the 'RadialArcFinder' tool. This is based on the fact that the washers we have in the inspection set have expected diameters as 10.5 mm or 14.5 mm, and some tolerance is added on top of these values.

The 'RadialArcFinder' tool searches for 'edges' starting from a specified center outwards in the specified 'Inner Radius' to 'Outer Radius' range (in complete 360 degrees). All 'edge' points found are then analyzed to check whether they form an arc (or circle). Several settings are available for fine-tuning the 'RadialArcFinder' tool (Not in the scope of this tutorial). We have used the minimum required settings needed for this tutorial.

The 'Edge Detection' 'Polarity' is set as 'Light to dark', which means whenever there is a change from 'light' color (white) to 'dark' color (black), it is detected as an 'edge'. In our case the region near the washer center is 'light' (white), and the actual washer is 'dark' (black). As we move outwards from the center of the blob, the edge will be detected where 'light to dark' transformation happens, which is at the inner radius. (If we want to find the outer radius, we can use 'Dark to light' polarity)

We have set the 'Min threshold' for 'Edge detection' to 1, which is a small value. This means that the edge detection sensitivity is high. Whenever there is even a small change in intensity values from light to dark, the edge will be detected.

## 6. Setting the CircleGauger Tool

Click on the 'New' button to add a new tool. This will pop up the 'New Tool' dialog.

Type 'Name' as 'Measure'

From 'Tools', select Category 'Edge' and select Tool 'CircleGauger'.

Click on the 'OK' button to close the 'New Tool' dialog box. This will add a new entry in the list of configured tools.

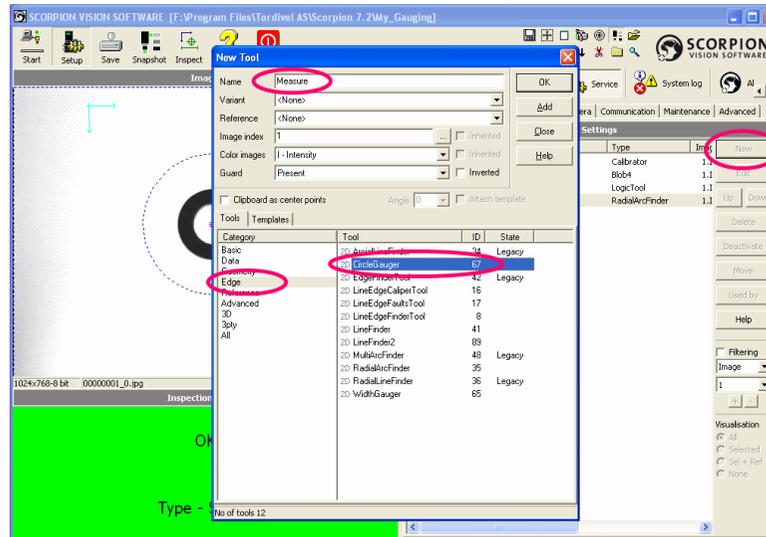


Figure 27: New Tool 'CircleGauger'

Select the newly added tool 'Measure'. Click on the 'Edit' button which will pop up the 'Change Measure' dialog box.

Under the 'Setup' tab, set 'Coordinate system' 'Reference' to 'InternalRadius'

Click on the '...' button available next to 'Circle' 'Radius'. This will pop up the 'Select.....' dialog box. Select 'InternalRadius' in the left panel and 'Radius' in the right panel and click on 'OK' button to close the 'Select.....' dialog box.

The value for 'Circle' 'Radius' is now set as 'InternalRadius.Radius'

Set 'Tracelines->Trace length (radius) Start' to -2

Set 'Tracelines->Trace length (radius) End' to 2

Set 'Edge detection->Polarity' to 'Negative (light to dark)'

Set 'Edge detection->Edge choice' to 'First'

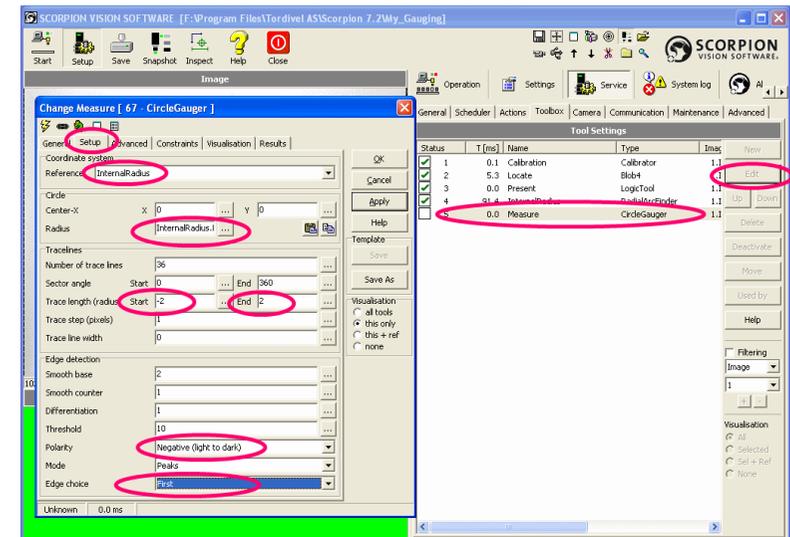


Figure 28: Edit Tool 'CircleGauger'

Under the 'Visualization' tab, enable 'BestCenter', 'Center', 'EdgePoints', 'MeanCircle', 'MinDiameter', 'TraceLines'. Disable all other visualizations.

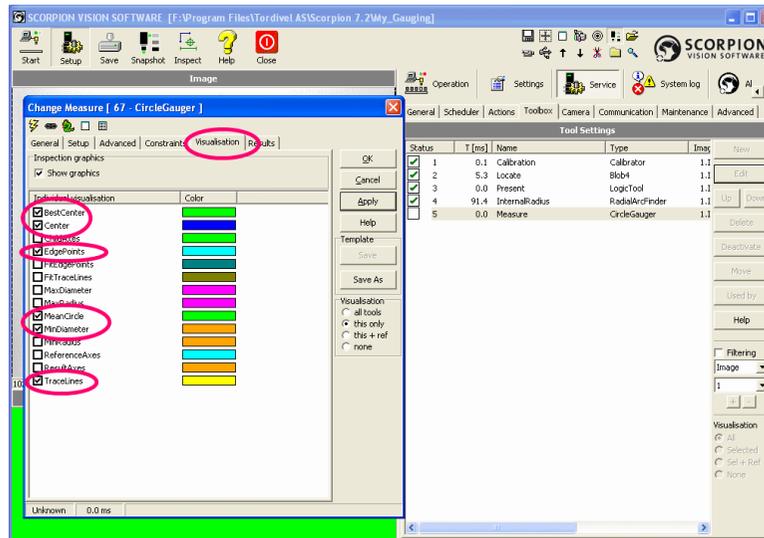


Figure 29: 'CircleGauger' Visualization Settings

Click on the 'OK' button to close the 'Change Measure' dialog box.

Click on the 'Inspect' toolbar button. This will now do analysis for the newly added 'CircleGauger' tool and will draw a few additional indicators on the image, as per our 'Visualization' settings.

We have now set up the 'CircleGauger' tool. This tool measures / gauges several properties of an arc (or circle). Properties like radius, ovality etc are included in this operation.

We have set the reference to the 'InternalRadius' tool set up in the previous section, which means we would like to measure the properties of an arc (or circle) detected by the 'InternalRadius' tool.

The expected radius of the arc (or circle) is set to the radius of the arc detected by the 'InternalRadius' tool.

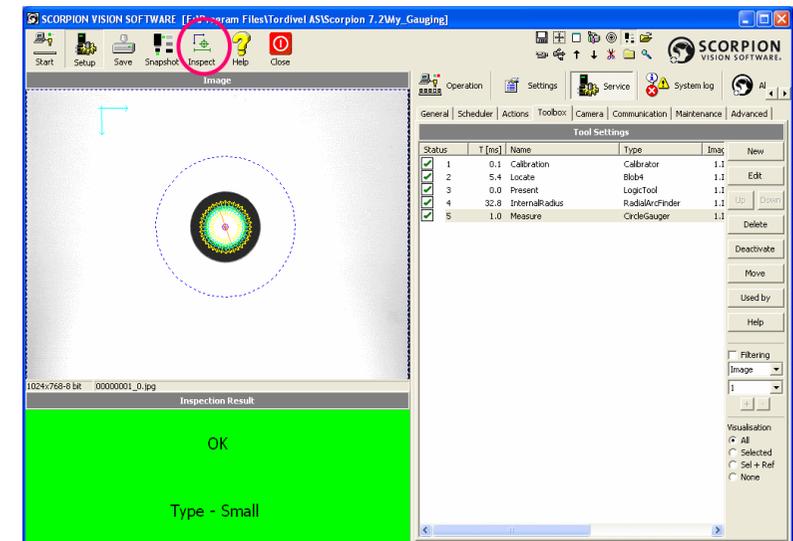


Figure 30: Inspect After 'CircleGauger' Setup

The CircleGauger tool searches for 'edges' starting from the center of the arc outwards in the specified 'inner radius' to 'outer radius' range (in complete 360 degrees). All 'edge' points found are then analyzed for getting good measurement values.

Difference between the CircleGauger tool and RadialArcFinder is that the RadialArcFinder detects the arcs and the CircleGauger does the measurements. The algorithms are different and are optimized for these functions, in the respective tools.

We have set 'Tracelines->Trace length (radius) Start' to -2 and 'Tracelines->Trace length (radius) End' to 2, which means the 'inner radius' for edge detection search is an 'expected radius - 2' mm and the 'outer radius' for edge detection search is an 'expected radius + 2' mm.

The 'Edge detection' 'Polarity' is set to 'Negative (light to dark)', so that the edge is detected when the pixel intensities change from light to dark.

The 'Edge detection' 'Edge choice' is set to 'First', so that the first edge pixel is used in all measurements.

## 7. Setting the LogicTool for Checking Minimum Inner Diameter

Click on the 'New' button to add a new tool. This will pop up the 'New Tool' dialog.

Type 'Name' as 'MinDiameterOK'

From 'Tools', select Category 'Basic' and select the Tool 'LogicTool'.

Click on the 'OK' button to close the 'New Tool' dialog box. This will add a new entry in the list of configured tools.

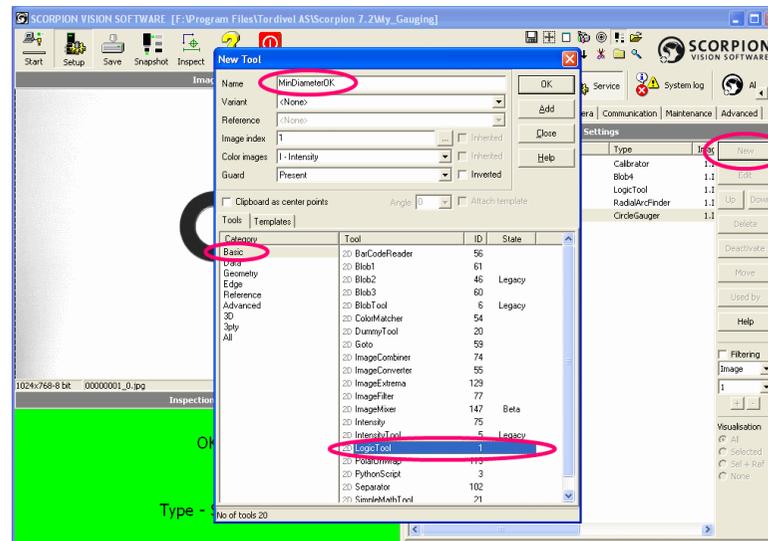


Figure 31: New 'LogicTool' 'MinDiameterOK'

Select the newly added tool 'MinDiameterOK'. Click on the 'Edit' button which will pop up the 'Change MinDiameterOK' dialog box.

Under the 'Setup' tab, click on the 'New' button. This will pop up the 'Logic Parameter' dialog box.

Select 'Measured value' -> 'Tool' As 'Measure'.

Select 'Measured value' -> 'Parameter' As 'Diameter min'.

Enable 'Condition' -> 'Minimum' and type value as '10.5'.

Click on the 'OK' button to close the 'Logic parameter' dialog.

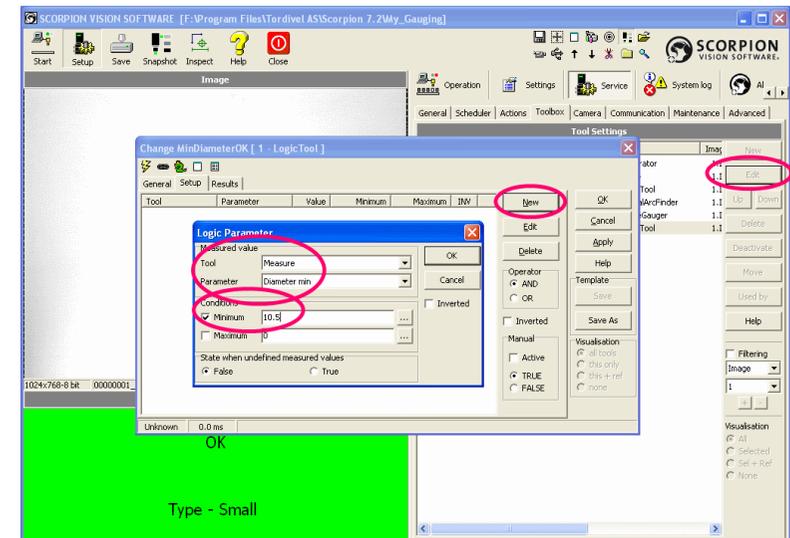


Figure 32: Edit 'LogicTool' 'MinDiameterOK'

The new entry will be added in the 'Setup' tab.

Click on the 'OK' button to close 'Change MinDiameterOK' dialog box.

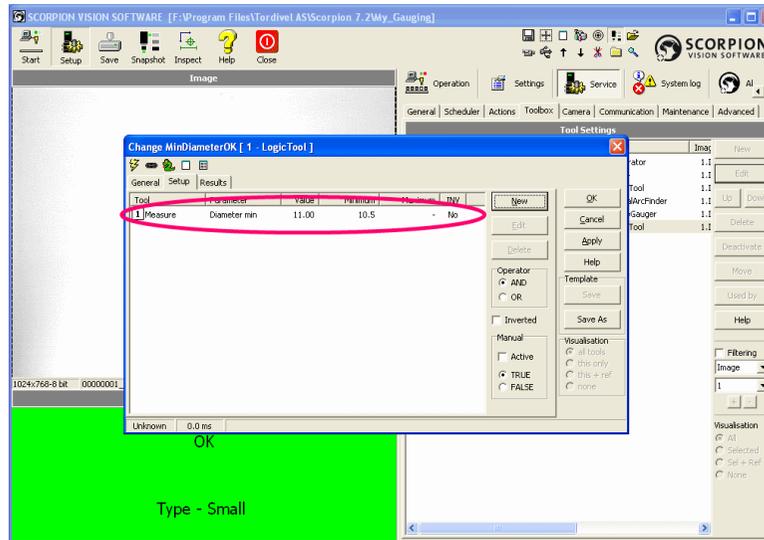


Figure 33: New Logic Parameter Added

We have now set up a Logic Tool, which checks whether the 'Minimum diameter' measured by 'CircleGauger' tool is 10.5 mm or not. If it is 10.5 mm or higher, the result of this newly set up Logic Tool is 1 (true), otherwise it is 0 (false).

In summary, we have set up a logic tool to check whether the minimum inner diameter of the washer detected in the captured image is 10.5 mm or not.

We know that washers in the sample set have an expected minimum inner diameter of 10.5 mm (for small washers) and 14.5 mm (for large washers), hence we have set up the minimum diameter check to 10.5 mm which will pass all washers.

(Ideally, for perfect inspection, we need to set up 2 different minimum inner diameter values – one for small washers and another one for large washers. This is not in the scope of this tutorial, however we will be including this configuration in the next tutorial 'Tutorial 4 – ProductVariantsAndDataInputPages')

## 8. Setting the LogicTool for Checking Ovality

Click on the 'New' button to add a new tool. This will pop up the 'New Tool' dialog.

Type 'Name' as 'OvalityOK'

From 'Tools', select Category 'Basic' and select the Tool 'LogicTool'.

Click on the 'OK' button to close the 'New Tool' dialog box. This will add a new entry in the list of configured tools.

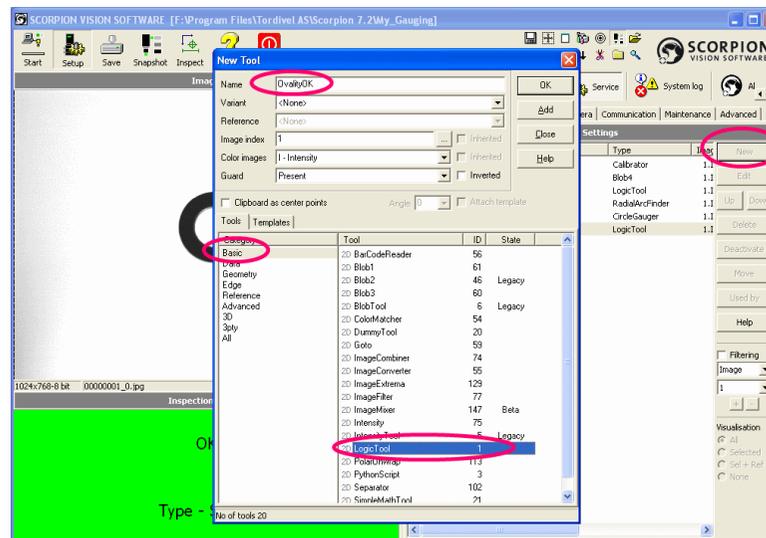


Figure 34: New 'LogicTool' 'OvalityOK'

Select newly added tool 'OvalityOK'. Click on 'Edit' button which will pop up 'Change OvalityOK' dialog box.

Under the 'Setup' tab, click on the 'New' button. This will pop up the 'Logic Parameter' dialog box.

Select 'Measured value' -> 'Tool' As 'Measure'.

Select 'Measured value' -> 'Parameter' As 'Ovality'.

Enable 'Condition' -> 'Minimum' and type value as '0.95'.

Click on the 'OK' button to close the 'Logic parameter' dialog.

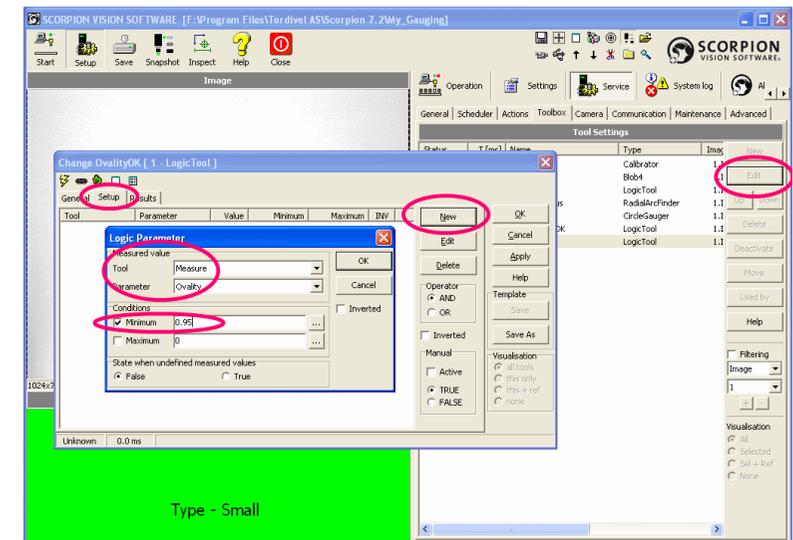


Figure 35: Edit 'LogicTool' 'OvalityOK'

A new entry will be added in the 'Setup' tab.

Click on the 'OK' button to close the 'Change OvalityOK' dialog box.

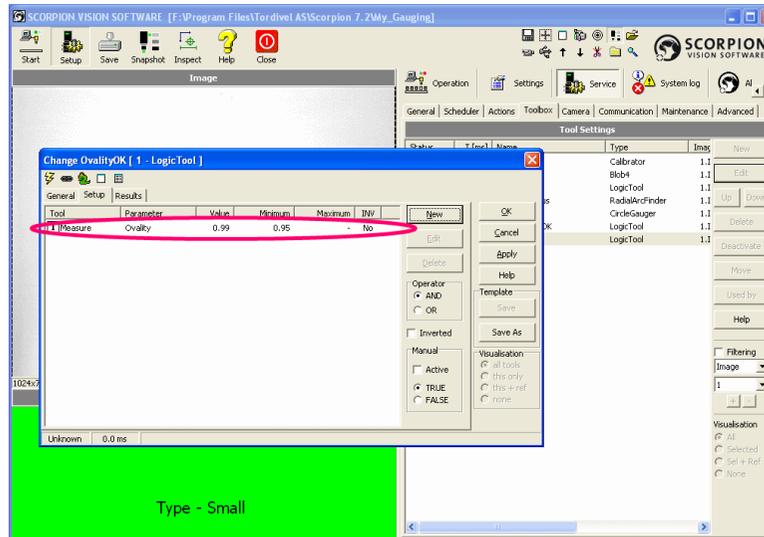


Figure 36: New Logic Parameter Added

We have now set up a Logic Tool, which checks whether 'Minimum Ovality' measured by the 'CircleGauger' tool is 0.95 or not. If it is 0.95 or higher, the result of this newly set up Logic Tool is 1 (true), otherwise it is 0 (false).

In summary, we have set up a logic tool to check whether the minimum ovality of the inner circle of the washer detected in the captured image is 0.95 or not.

We know that washers in the sample set have an expected minimum ovality of 0.95, hence we have used the same in the logic tool set up.

## 9. Setting the LogicTool for Checking OK/FAIL

Click on the 'New' button to add a new tool. This will pop up the 'New Tool' dialog.

Type 'Name' as 'OK'

From 'Tools', select Category 'Basic' and select the Tool 'LogicTool'.

Click on the 'OK' button to close the 'New Tool' dialog box. This will add a new entry in the list of configured tools.

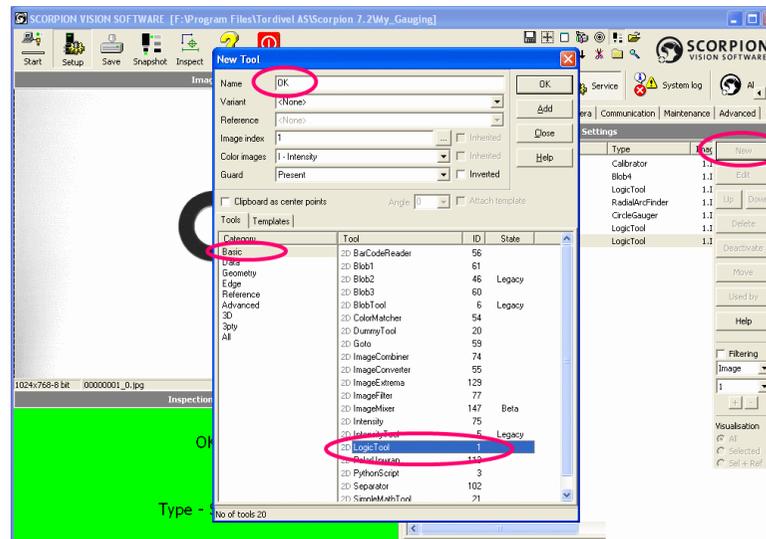


Figure 37: New 'LogicTool' 'OK'

Select the newly added tool 'OK'. Click on the 'Edit' button which will pop up the 'Change OK' dialog box.

Under the 'Setup' tab, click on the 'New' button. This will pop up the 'Logic Parameter' dialog box.

Select 'Measured value' -> 'Tool' As 'MinDiameterOK'.

Click on the 'OK' button to close the 'Logic parameter' dialog.

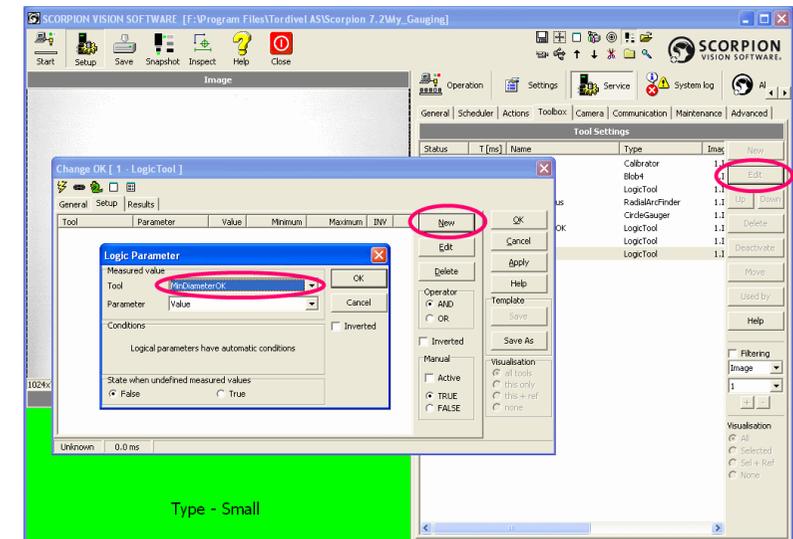


Figure 38: Edit 'LogicTool' 'OvalityOK'

Under the 'Setup' tab, click on the 'New' button. This will pop up the 'Logic Parameter' dialog box

Select 'Measured value' -> 'Tool' As 'OvalityOK'.

Click on the 'OK' button to close the 'Logic parameter' dialog.

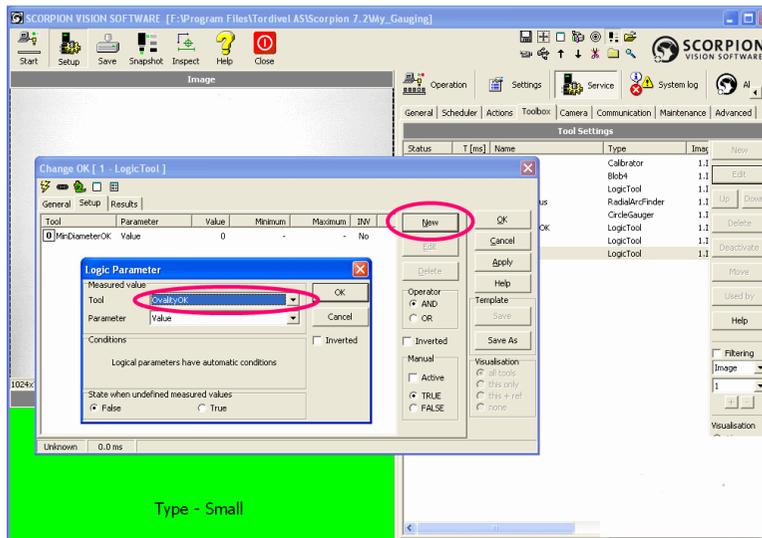


Figure 39: Add Second Logic parameter

A new entry will be added in the 'Setup' tab.

Click on the 'OK' button to close the 'Change OK' dialog box.

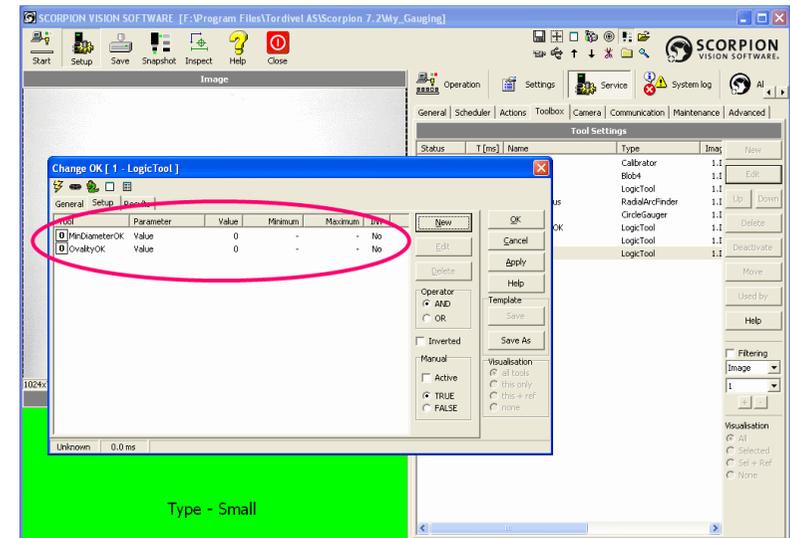


Figure 40: New Logic Parameters Added

We have now set up a Logic Tool, which checks OK / FAIL (pass / fail). Whenever both the constraints - 'Minimum inner diameter' and 'Minimum ovality of inner circle' are met, the result value of this new logic tool is 1 (true), however if any of these constraints is not met, the result value of this new logic tool is 0 (false).

Thus result from this logic tool can directly be used to indicate if the washer inspection result is OK or FAIL.

## 10. Inspection Results Handling

Click on the 'Settings' tab, which is one of the 5 main tabs on the right hand side configuration area and is just before the 'Service' tab

Select the 'OK' state from the 'List of States'

Click on the 'Edit' button. This will pop up the 'Settings for state OK' dialog box.

Under the 'Constraints' tab, click on the 'New' button. This will pop up the 'Guard' selection dialog box

Select 'OK' from the available list. Click on the 'OK' button to close the 'Guard' selection dialog.

A new constraint will be added to the list of constraints.

Click on the 'OK' button to close the 'Settings for state OK' dialog box.

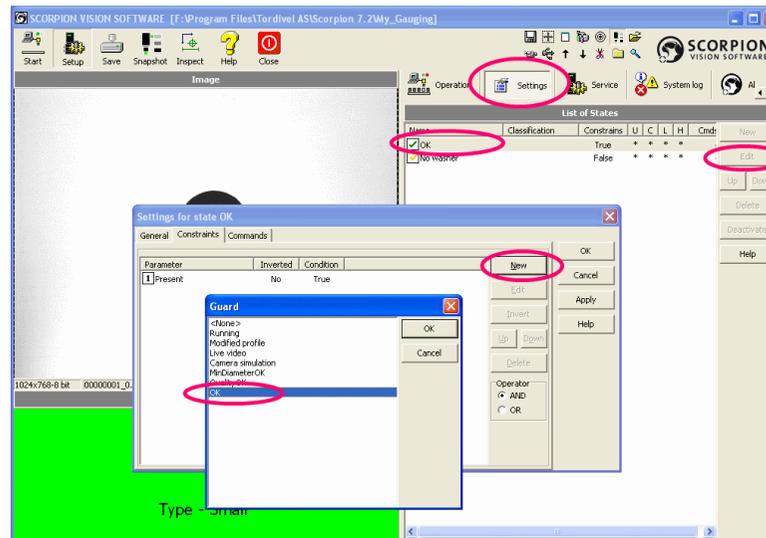


Figure 41: Edit State 'OK'

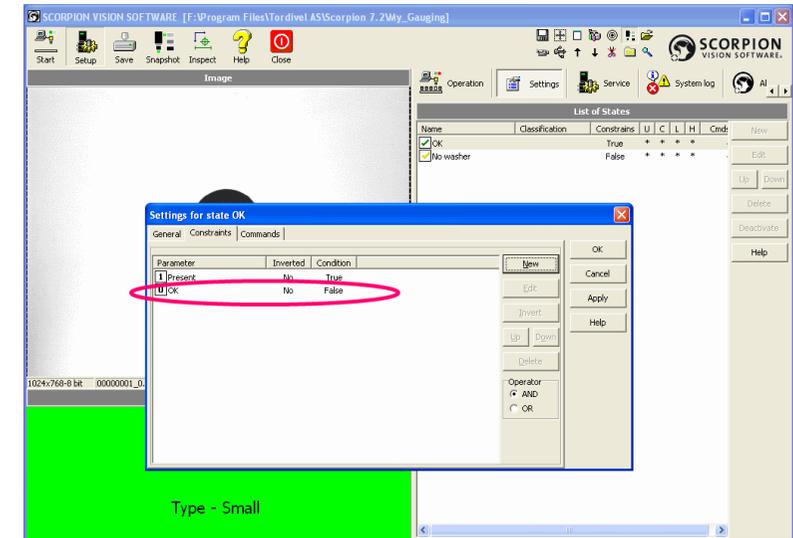


Figure 42: Updated Constraints for State 'OK'

Click on the 'New' button. This will pop up the 'Create new state?' dialog box.

Type 'Name' as 'FAIL'.

Click on the 'OK' button to close the 'Create new state?' dialog box.

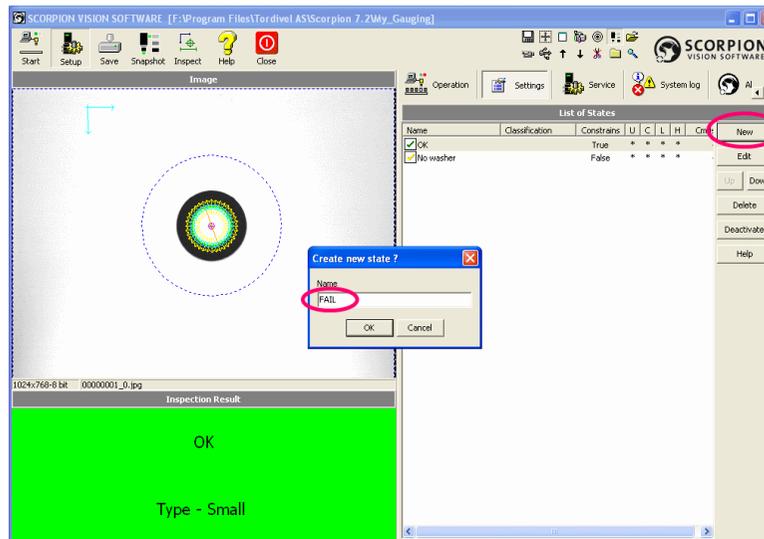


Figure 43: Add New State 'FAIL'

Select the newly added state 'FAIL' and click on the 'Edit' button. This will pop up the 'Setting for state FAIL' dialog box.

Under the 'General' tab, select 'Classification' as 'Fail'.

Click on the 'Back' button next to 'State colors'. This will pop up a color selection dialog.

Select a red color and click on the 'OK' button to close the color selection dialog.

This will show an updated red color background for the STATE text available in front of the 'State colors'.

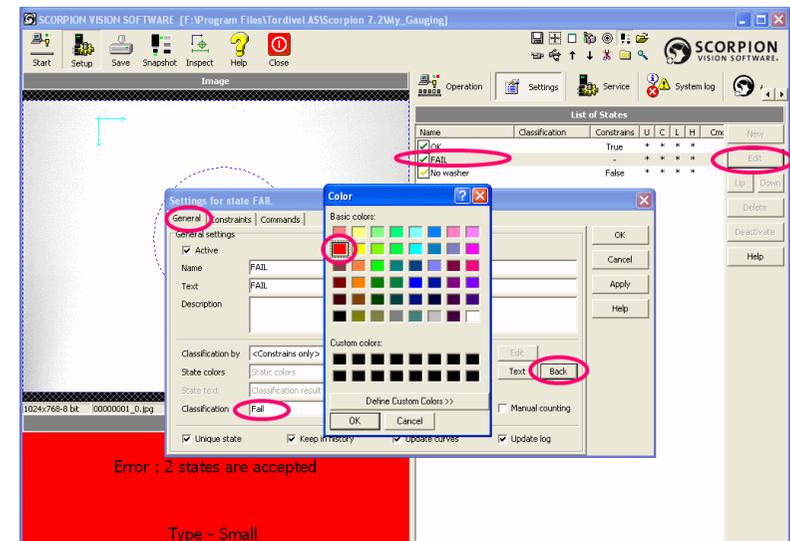


Figure 44: Edit State 'FAIL'

Under the 'Constraints' tab, click on the 'New' button. This will pop up the 'Guard' selection dialog.

Select 'Present' from the available list and click on the 'OK' button to close the 'Guard' selection dialog box.

The new constraint will be added to the list.

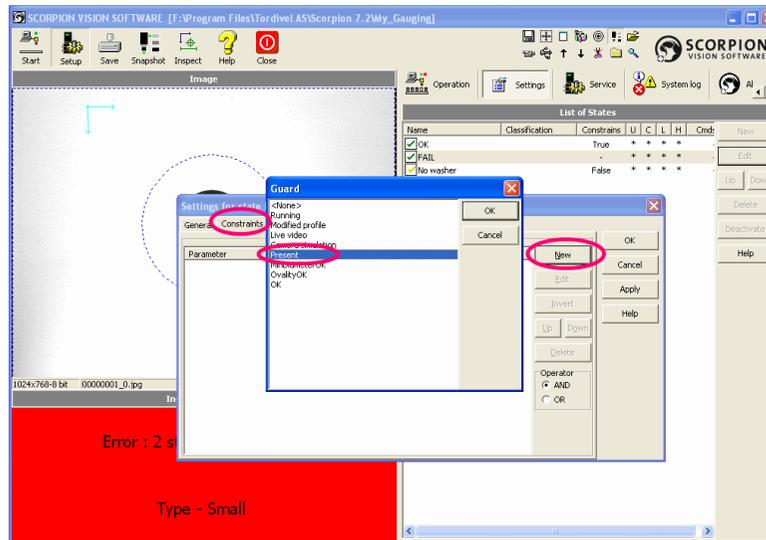


Figure 45: Add Constraint 'Present' for State 'FAIL'

Click on the 'New' button. This will pop up the 'Guard' selection dialog.

Select 'OK' from the available list and click on the 'OK' button to close the 'Guard' selection dialog box.

The new constraint will be added to the list.

Select the newly added constraint 'OK'. Click on the 'Invert' button to change 'Inverted' status from 'No' to 'Yes'.

Click on the 'OK' button to close the 'Setting for state FAIL' dialog box.

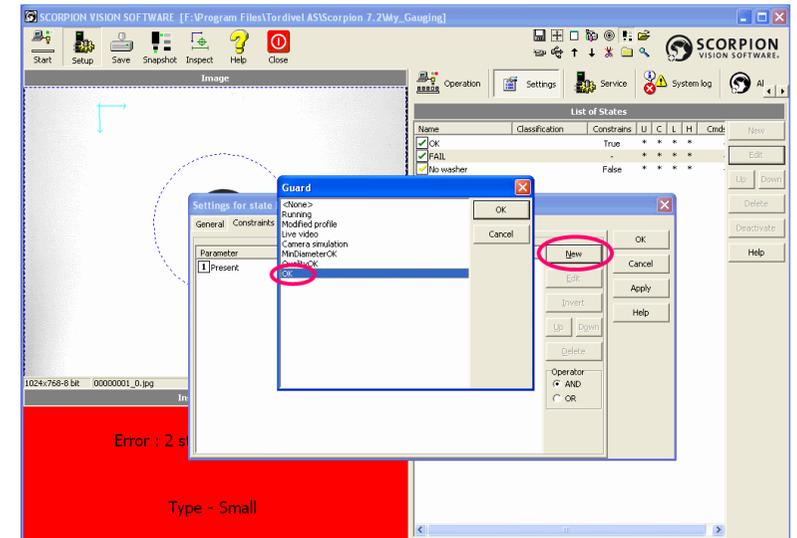


Figure 46: Add Constraint 'OK' for State 'FAIL'

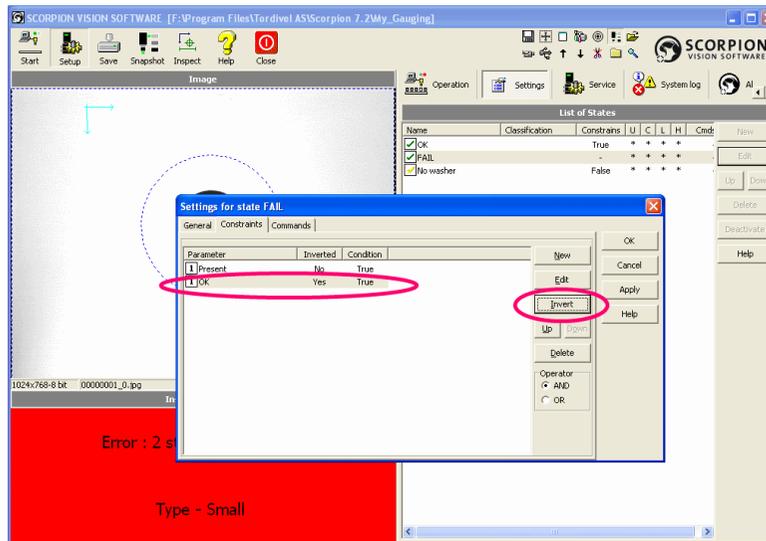


Figure 47: Invert Constraint 'OK'

We have updated the constraints for the state 'OK'. Now the state is 'OK' when a washer is present and the washer inspection result is OK – the 'inner diameter' is 10.5 mm or more and the 'ovality of the inner circle' is 0.95 or more.

We have also added a new state 'FAIL', which is indicated by a red color. The state is 'FAIL' when a washer is present and the washer inspection result is not OK – the 'inner diameter' is less than 10.5 mm or the 'ovality of inner circle' is less than 0.95.

We have set the 'Classification' for the 'FAIL' state as 'Fail'. This classification is related to the statistics ('Operation' mode 'Statistics' tab). We have set the 'FAIL' state to be associated to 'part rejected'. Every new state defined can be linked to any one of the 4 statistics classifications

- (a) Pass – This is default and indicates a positive inspection result and the part is accepted
- (b) Fail – This indicates a negative inspection result and the part is rejected
- (c) Ignore – This indicates that the state should be ignored from the statistics calculations
- (d) Error – This indicates error in the processing

The system is now ready for inspection.

## 11. Running the System

The set up is complete, and we are now ready to run the system.

Click on the 'Start' tool bar button. This will start capturing the images (from camera simulator as per our settings) and will also do the analysis for the 'Washer classification'.

The captured image is displayed below the toolbar buttons and it also has visualization updates done by Scorpion (center and ROI as set up during Blob4 tool set up).

When a washer is present in the captured image and its 'inner diameter' is 10.5 mm or more AND its 'inner circle Ovaliry' is 0.95 or more, the 'Result' panel shows green color with 'OK' text. The result panel also shows the classification result text as 'Type - Small' or 'Type - Large' depending on the washer classification.

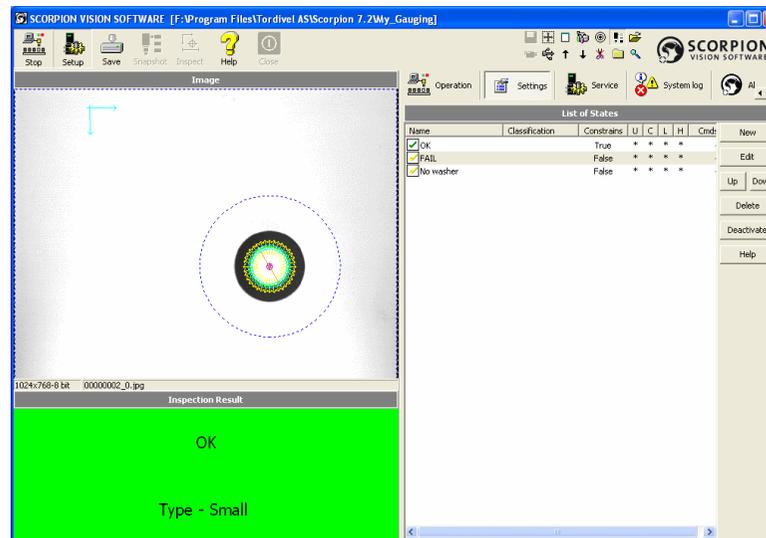


Figure 48: Result 'OK'

When a washer is present in the captured image and its 'inner diameter' is less than 10.5 mm or more OR its 'inner circle Ovaliry' is less than 0.95, the 'Result' panel shows red color with 'FAIL' text. The result panel also shows the classification result text as 'Type - Small' or 'Type - Large' depending on the washer classification.

Image '0000008.jpg' in the inspection set has an inner diameter 10.4 mm and will show the 'FAIL' state.

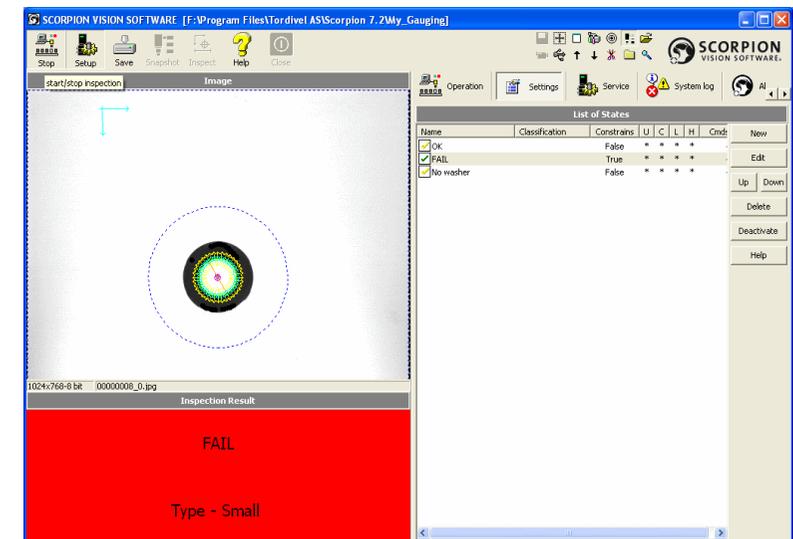


Figure 49: Result 'FAIL'

When a washer is not present in the captured image, the result panel shows a yellow color with 'No washer' text.

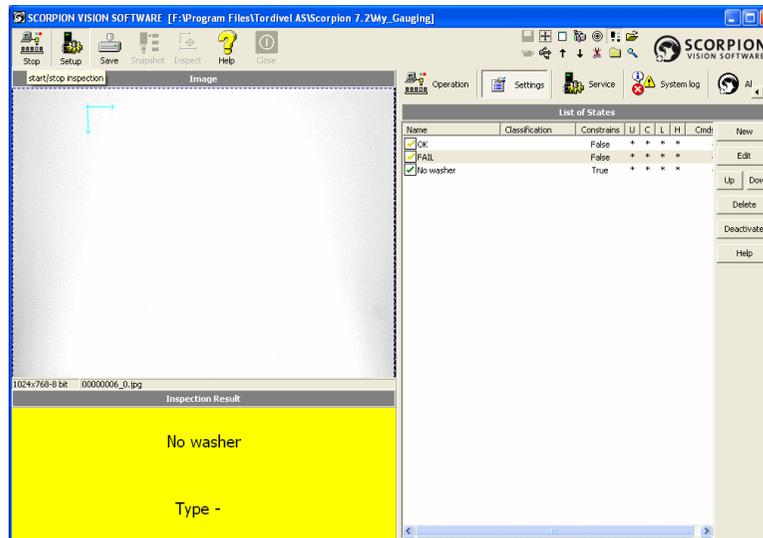


Figure 50: Result 'No washer'

Congratulations!  
You have successfully created a 'Gauging' system using Scorpion Vision Software!

## 12. *Tutorial Summary*

- We tried out the pre-compiled profile 'GettingStartedTutorial\_Part3\_Gauging' for a measurement based inspection of washers available in the images captured by Scorpion.
- Then we updated the 'Classification' profile from the last tutorial 'GettingStartedTutorial\_Part2\_Classification' and configured the 'Gauging' profile and saw it in action. The profile updates included setting up the new tool 'RadialArcFinder', the new tool 'CircleGauger', adding new logic tools, updating the state 'OK' and adding a new state 'FAIL'.