

Flip Fixture Program Support

Overview

"Flip Fixture" programming involves programming the inspection machine in a way that allows the user to inspect one side of many parts before flipping them over and inspecting another side of the same part. This speeds up the process of inspection by measuring the same side of all parts before turning the parts over and continuing with the inspection on the reverse side. This is very useful with video inspection since the camera is usually limited to straight down inspection. This supplemental document defines what flip fixture inspection is and how to use it with QC-CALC.

Flip Fixture Limitations

Number of parts = unlimited
Number of sides per fixture = 10
Number of dimensions per side = 3000 all sides

Example

Before getting into the details of how to use flip fixture inspection, we will explain the expected data flow based on a simple example. We will limit the discussion to a two sided fixture (side A and side B), but keep in mind that up to ten sided fixtures are supported.

In our example, let's assume that you have a fixture that holds 4 parts and the fixture can be flipped over from side A to side B. Further, let's assume that side A has 3 dimensions to inspect on each part and 2 dimensions per part on side B. The programmer wants to inspect the first three dimensions on side A on all four parts then flip the fixture over to side B and inspect the other two features on all four parts. The inspection machine will generate the data in the following order:

Example Sequence
Part 1 Side A
Dim #1
Dim #2
Dim #3
Part 2 Side A
Dim #1
Dim #2
Dim #3
Part 3 Side A
Dim #1
Dim #2
Dim #3
Part 4 Side A
Dim #1
Dim #2
Dim #3
Part 1 Side B
Dim #4
Dim #5
Part 2 Side B
Dim #4
Dim #5
Part 3 Side B
Dim #4
Dim #5
Part 4 Side B
Dim #4
Dim #5

Advanced Topics

Normally, QC-CALC would have problems with receiving information in this format. Historically, all data must be received on an entire part before moving to the next part. When you use the Flip Fixture option QC-CALC temporarily saves side A's data and later joins it with side B's data forming a complete part and saved as a record.

Details

The task of inspecting can be achieved with no operator involvement during inspection but the programmer must setup the Micro-Vu part routine to "tell" QC-CALC four (4) important things. QC-CALC must know:

- Start of Flip Fixture usage
- The number of parts on the fixture
- The number of sides on the fixture
- Where one part ends and the next part begins

These four parameters are programmed into the Micro-Vu part routine, eliminating operator involvement with QC-CALC and are now explained.

START of Flip Fixture Command

You must add a special Text Command containing the word "FLIPFIXTURESTART" as the first step to produce Stats output in your part routine. All upper case letters are required.

Insert a Text command **Feature – Insert – Text**).

- Enter **FlipFixtureStart** in the text box.
- Click **OK** button
- Right click on the **Text** command in your feature list and select **Export**.
- Check the **Text** checkbox under the **Export Property?**
- Check the **Export Labels** checkbox
- Enter **USER,FLIPFIXTURE** in the label area.
- Click **Close**.

The Number of Parts on the Fixture

Next, QC-CALC looks for the number of parts. The Micro-Vu part routine must contain another Text Command containing text **NOOFPARTS=2** (or whatever is the correct value) immediately after the FlipFixtureStart command above. The entered value is equal to total number of parts on the fixture. This value is passed to QC-CALC during each inspection.

Insert another Text command **Feature – Insert – Text**).

- Enter **NOOFPARTS=2** in the text box. This example is for 2 parts, adjust to your situation.
- Click **OK** button
- Right click on the **Text** command in your feature list and select **Export**.
- Check the **Input** checkbox under **Export Property?**
- Check the **Export Labels** checkbox
- Enter **USER,FLIPFIXTURE** in the label area.
- Click **OK**.

Advanced Topics

The Number of Sides on the Fixture

Next, the Micro-Vu part routine must contain another Text command indicating how many sides you will be inspecting. Enter the text **NOOFSIDES=3** or whatever the correct number is for your situation.

Insert another Text command **Feature – Insert – Text**).

- Enter **NOOFSIDES=3** in the text box. This example is for 3 sides, adjust to your situation.
- Click **OK** button
- Right click on the **Text** command in your feature list and select **Export**.
- Check the **Text** checkbox under **Export Property?**
- Check the **Export Labels** checkbox
- Enter **USER,FLIPFIXTURE** in the label area.
- Click **Close**.

Where One Part Ends and the Next Part Begins

Lastly, your Micro-Vu part routine must contain a Text Command with the text **NEXTPART** between parts. QC-CALC counts the number of dimensions on each part by watching for the **NEXTPART** label. When QC-CALC receives the expected number of parts it prepares to receive the next side. The number of **NEXTPART** Text Commands should be equal to **NOOFPARTS x NOOFSIDES = 4** in this example.

Insert another Text command **Feature – Insert – Text**).

- Enter **NEXTPART** in the text box.
- Click **OK** button
- Right click on the **Text** command in your feature list and select **Export**.
- Check the **Text** checkbox under **Export Property?**
- Check the **Export Labels** checkbox
- Enter **USER,FLIPFIXTURE** in the label area.
- Click **Close**.

QC-CALC only uses the presence of the label to determine when the part routine is moving from one part to the next. It should be obvious that the number of dimensions within a side must be identical on all parts but the number of dimensions from one side to another can be different. QC-CALC saves all data from all sides and reassembles the data into individual parts at the conclusion of inspecting all parts.

With these 4 additional parameters added to the Micro-Vu part routine, the setup and running of a flip fixture part program eliminates the need for any question & answering while running QC-CALC.

Pseudo Example

These two columns should provide an insight into QC-CALC's flip fixture operation. The D's indicate measured dimensions.

Inspection Machine Output To QC-CALC	QC-CALC Internal Flip Fixture Interpretation
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Advanced Topics

FLIPFIXTURESTART	
NOOFPARTS = 2	
NOOFSIDES = 2	
D1	D1 PART1
D2	D2 PART1
NEXTPART	D3 PART1
D1	
D2	D1 PART2
NEXTPART	D2 PART2
D3	D3 PART2
NEXTPART	
D3	
NEXTPART	

A Simple Part Program

This Inspec part program is inspecting 2-parts with 2 sides. It inspects 1 dimension on side 1 and 3 dimensions on side 2. Each Text command is highlighted in black with explanations shown on the right side. Hopefully, this example makes the usage of FlipFixtures on a Micro-Vu machine clear. The programming is a little tricky but once complete, the operation is fully automatic.

Running QC-CALC with Flip Fixture Option

There is no extra action required when creating a QC-CALC database. The operator has nothing extra to do when a part routine contains flip fixture statements. However, no QC-CALC graphic update occurs until the entire fixture is inspected. This concludes this special manual.