

Procedure Name.

Tool-Setter Calibration Pin Setup.

Procedure Description.

Setup of the Calibration Pin after removal.

Supplementary Documentation.

None

Procedure Details.

The following makes the assumption that the Spindle, Tooling Plate, and Horizontal Calibration Artifact is mechanically in position and requires the software position to be found, and that the X and Z-axis have been homed.

Z-Axis.

1. Jog the slides into a position where the distance between the “Cal-Pin” and the “Spindle Face“ can be measured in the Z direction. (Fig.1.)
2. Make a note of the current position of the Z-axis. (Ignore the negative sign in front of the Z-axis position value).
3. Measure the distance between the “Cal-Pin” and the “Spindle Face” in mm, using a Vernia Caliper.
4. Add the measurement found above, to the current Z-axis position found in 2 above, this is the new Z-axis “Cal Pin” value.
5. If you are using the “Selectable Tool Software, go to the F3 “Setup” screen page 4. Set the “Z @ SPIN NOSE” item under the heading “CAL PIN” to the new value. This value **must be entered as a negative**. See Fig.3.
 - 5.1. If you are using the standard machine control software, go to the F3 “Setup” screen page 3. Set the “CAL PIN” item under the heading “Z SLIDE (@ SPIN NOSE)” to the new value. This value **must be entered as a negative**. See Fig.4.
6. Insert a ¼” diameter 1” to 2” long dowel pin into the collet, and continue with the X-Axis “Cal-Pin” setting.

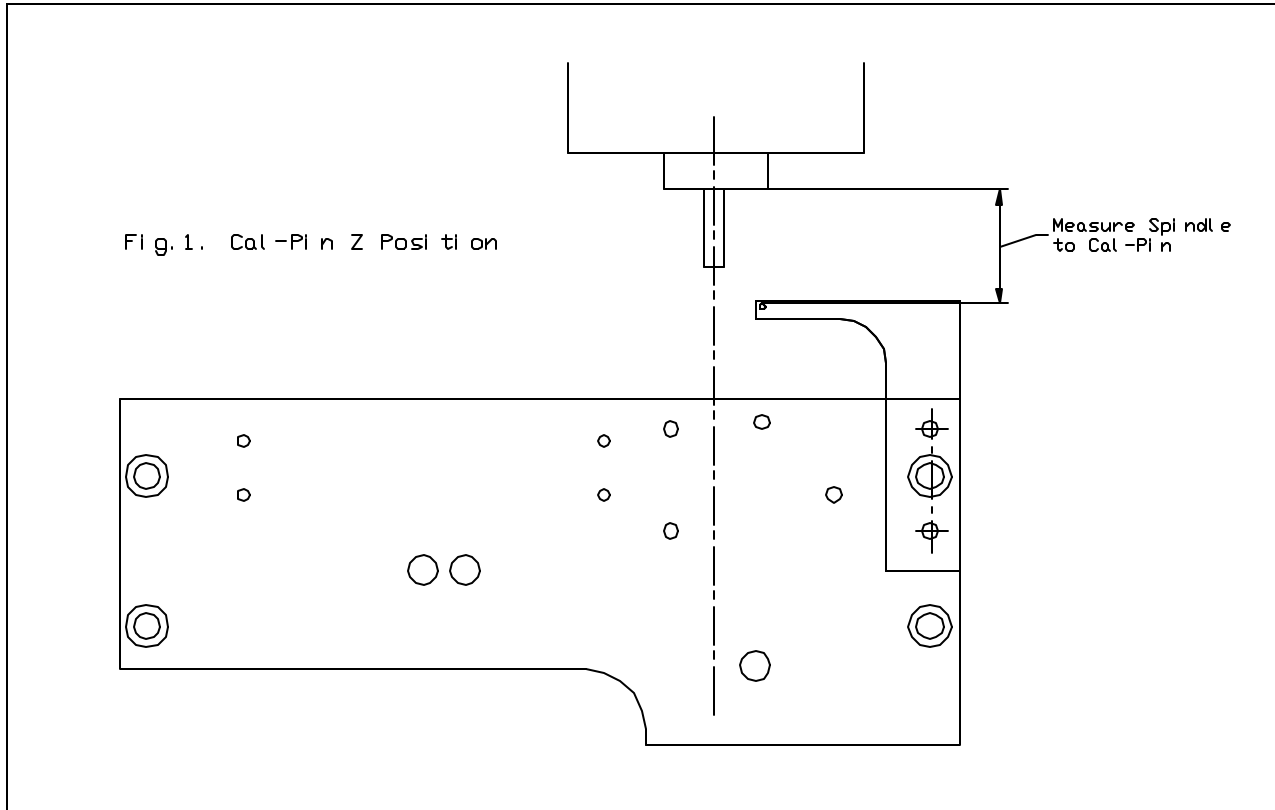
X-Axis.

1. Measure the diameter of the dowel pin in mm and divide by 2, (The result should be close to 3.175mm) and make a note of it.
2. Measure the diameter of the “Cal-Pin” in mm and divide by 2, (The result should be close to 0.8mm) and make a note of it.
3. Jog the slides into a position where the distance between the “Cal-Pin” and the dowel pin can be measured in the X direction. (Fig.2.)
4. Make a note of the current position of the X-axis.
5. Measure the distance between the “Cal-Pin” and the dowel pin in mm, using a Vernia Caliper, and make a note of it.
6. Add the following values together, half the dowel pin diameter (step 1 above) + half the “Cal-Pin” diameter (step 2 above) + the current X position (step 4 above) + the distance measured. The result will be the new X “Cal-Pin” value.
7. If you are using the “Selectable Tool Software, go to the F3 “Setup” screen page 4. Set the “X @ SPIN CL” item under the heading “CAL PIN” to the new value. See Fig.3.
 - 7.1. If you are using the standard machine control software, go to the F3 “Setup” screen page 3. Set the “CAL PIN” item under the heading “X SLIDE (@ SPINDLE CL)” to the new value. See Fig.4.
8. Remove the dowel pin.
9. Insert the tool setter, and manually position the ruby 0.5mm in front of the “Cal Pin”
10. Note the X and Z slide positions.
11. If you are using the “Selectable Tool Software, go to the F3 “Setup” screen page 4. Under the heading “Cal Pin” adjust the “X Probe Pos” and “Z Probe Pos” values so that they are the same as the values notes in step 10.
 - 11.1. If you are using the standard machine control software, go to the F3 “Setup” screen page 3. Under the heading “X Tool Probe Positions” adjust the X “Cal Pin” value to the value found in 10 above. Under the heading “Z Tool Probe Positions” adjust the Z “Cal Pin” value to the value found in 10 above.
12. Probe the “Cal-Pin” and set a rough and finish tool as normal.

Final Setting.

1. Write down the x position and tool tip radius of the finish tool. These are the “original” values.
2. From this point, a rough and finish tool should be set, and a simple sphere cut. Manually adjust the x position and tool tip radius of the tools until a good sphere and part radius is established.
3. Write down the new x position and tool tip radius of the finish tool.

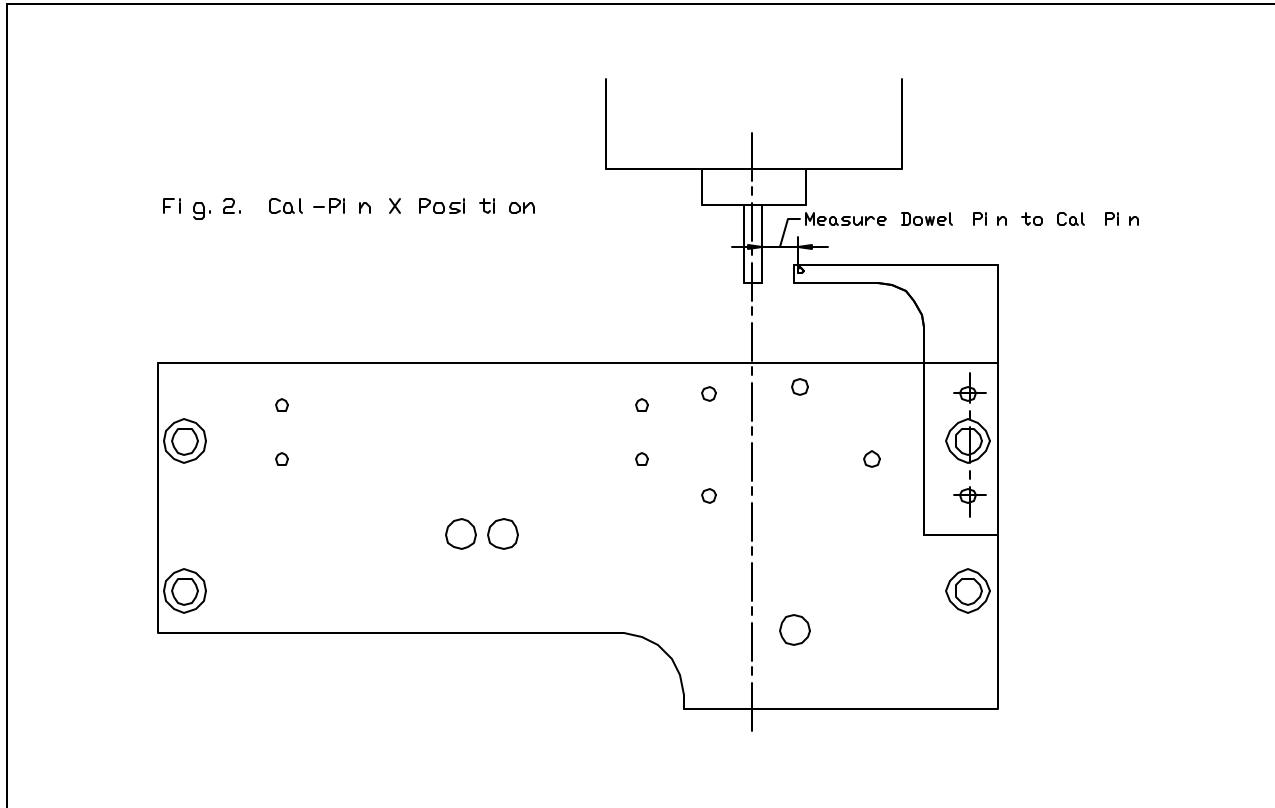
4. If the new finish tool x position is greater than the original, make the “Cal-Pin” x position smaller by the amount of “New tool x position” – “Original tool x position”.
5. If the new finish tool x position is smaller than the original, make the “Cal-Pin” x position greater by the amount of “Original tool x position” – “New tool x position”.
6. If the new finish tool tip radius is greater than the original, make the “Cal-Pin” radius smaller by the amount of “New tool tip radius” – “Original tool tip radius”.
7. If the new finish tool tip radius is smaller than the original, make the “Cal-Pin” radius greater by the amount of “Original tool tip radius” – “New tool tip radius”.
8. Re-probe the “Cal-Pin”.
9. Re-probe the rough and finish tools.
10. Make sure the finish tool X and tool tip radii are close to the new values found in step 3 above. If not, make any minor adjustments as required from step 4 above.

Fig.1.

The Z “Cal-Pin” position =

Current Z position +
The measured distance from the spindle to the “Cal-Pin”.

The Z “Cal-Pin” position is always negative, and will be approximately $-100\text{mm} \pm 5\text{mm}$.

Fig.2.

The X “Cal-Pin” position =

Current X position +
 The measured distance between the dowel pin and the “Cal-Pin” +
 Half the diameter of the dowel pin +
 Half the diameter of the “Cal-Pin”.

The X “Cal-Pin” position is always positive, and will be approximately 180mm ±5mm.

Fig.3.

SET-UP (4 of 4) PROBES		OPTOFORM 30	
TOOL PROBE		CAL PIN	
X @ Spin CL	25.73536	X @ Spin CL	182.93800
Z @ Spin Nose	75.95404	Z @ Spin Nose	-95.10200
Probe Radius	1.48086	Radius	0.81500
45' Radius Offs	0.00635	X Probe Pos	157.20023
45' Center Offs	0.00238	Z Probe Pos	-18.44700
PART PROBE		VERTICAL PROBE	
X @ Spin CL	77.40000	Null Offset	0
Part Trip	-79.24487		
Cal Trip	-96.61024		
Z Cal Start Pos	-96.00000		
Cal Offset	0.00000		
F1 SYSTEM F2 RUN F3 SETUP F4 MAINT F5 PROD F6 TC/CAL			
Move cursor & enter new values. Page to next screen			

Fig.4.

SET-UP (3 of 4) CONVEX TOOLS		OPTOFORM 50 DE	
X SLIDE (@ Spindle CL)		X TOOL PROBE POSITIONS	
Rough Tool	107.44176	Rough Tool	81.53159
Finish Tool	140.31804	Finish Tool	114.40790
Edge Tool	200.00000	Edge Tool	0.00000
Cal Pin	179.33400	Cal Pin	153.42333
Z SLIDE (@ Tool Probe)		Z TOOL PROBE POSITIONS	
Rough Tool	-20.04528	Rough Tool	-19.17417
Finish Tool	-19.28850	Finish Tool	-18.33378
Edge Tool	-20.00000	Edge Tool	0.00000
		Cal Pin	-28.99892
Z SLIDE (@ Spin Nose)			
Cal Pin	-102.22363		
TIP RADII		PART PROBE POSITIONS	
Rough Tool	0.48767	X @ Spin CL	82.52626
Finish Tool	0.48750	Part Trip	0.00000
Edge Tool	0.00000	Cal Trip	-95.88104
Tool Probe	1.52974	Z Cal Start Pos	-95.00000
Cal Pin	0.77400		
F1 SYSTEM F2 RUN F3 SETUP F4 MAINT F5 PROD F6 TC/CAL			
Move cursor & enter new values. Page to next screen			