V2 Demo Part-Spiral

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Revision History:

First Release: June 2019 (QR)

Introduction:

This tutorial will walk a user through setting up and running the Pocket NC V2-10 or V2-50 to produce a part that demonstrates 4+1 machining. No CAM work is necessary for this tutorial. **It is highly recommended that the [Pocket NC User's Manual](#) be read all the way through before running the machine.**

Required items

To run this part you will need the following:

- Pocket NC V2-10 *OR* V2-50
- Computer
- ER40 collet fixture and wrench
- 1" ER40 collet
- 1" diameter Delrin rod
- ⅛" single flute endmill
- V2-10 Tooling
  - Pocket NC extended tool holder
  - ⅛" ER11 collet
  - Pocket NC spindle wrench
  - 3mm hex driver
- Appropriate PPE or Enclosure

Step 1: Fixture Installation

After making sure the Pocket NC machine is in its home position, begin by installing the ER40 collet fixture. The collet fixture should be installed using the following steps:

1. With the threads up, insert and thread the "tall" ring all the way into the B-table of the machine. This should be possible to do by hand, if significant resistance is encountered make sure the ring is not cross threaded.
2. Place the ER40 collet into the newly inserted ring.

3. Place the "short" ring over the ER40 collet with the taper down to match the top of the collet. Begin to thread the ring on, but only enough to start the threads.

The photos below show the final step and position of the ER40 collet fixture installation
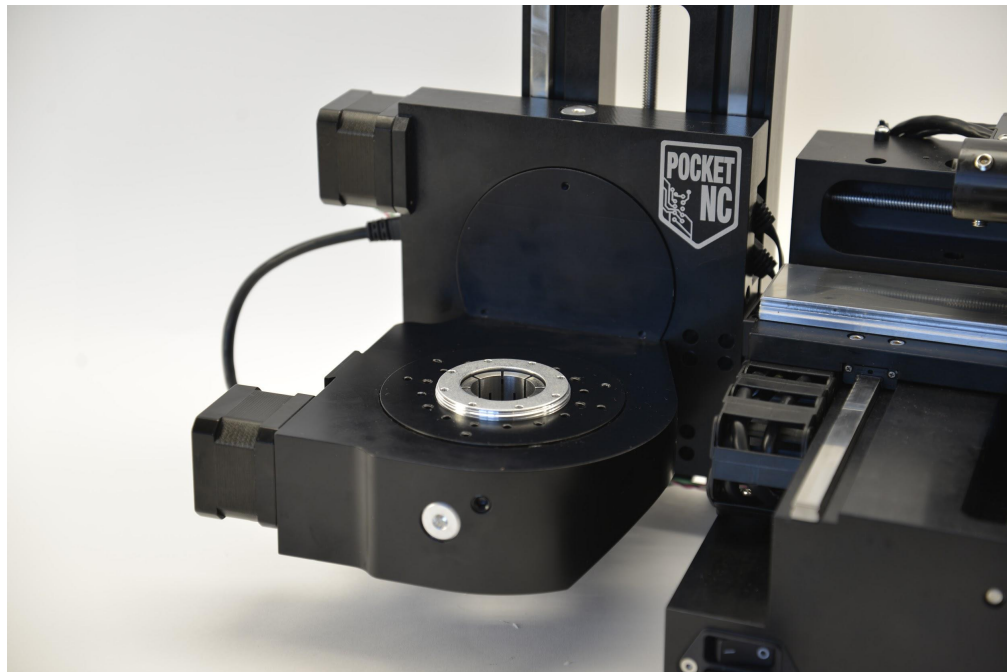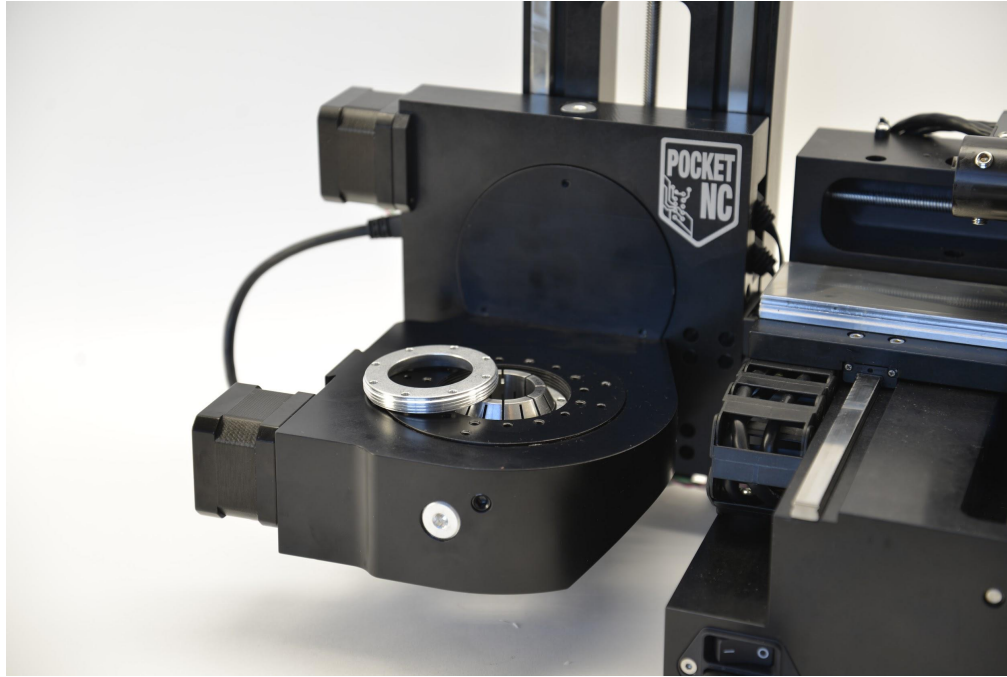
Step 2: Machine Startup

The Pocket NC must be connected to a computer to be operated. Please watch the [Pocket NC V2-10 Startup and Shutdown](#) video on our Youtube channel to see the connection process.

If this is the first time connecting to the machine and the user interface is not showing up or is not showing "connected" in the bottom left corner, please [contact us](#).

Step 3: Loading "Spiral Part" G-code

The Pocket NC uses a series of G and M codes (G-code) to move its axes around and cut a part out of the selected material (stock). The specific G-code for a part must be uploaded to the Pocket NC via its user interface.

First, the ["Spiral Part" G-code](#) must first be downloaded to the computer being used to run the Pocket NC. Then, to upload the "Spiral Part" G-code to the Pocket NC, simply click on the "Upload New File" button in the UI. From there, the "Spiral Part" G-code may be selected from its saved location on the computer. The UI will show the progress of the upload as well as produce a notification when the upload is finished. The code will also be visible towards the bottom of the screen where each line can be individually examined.
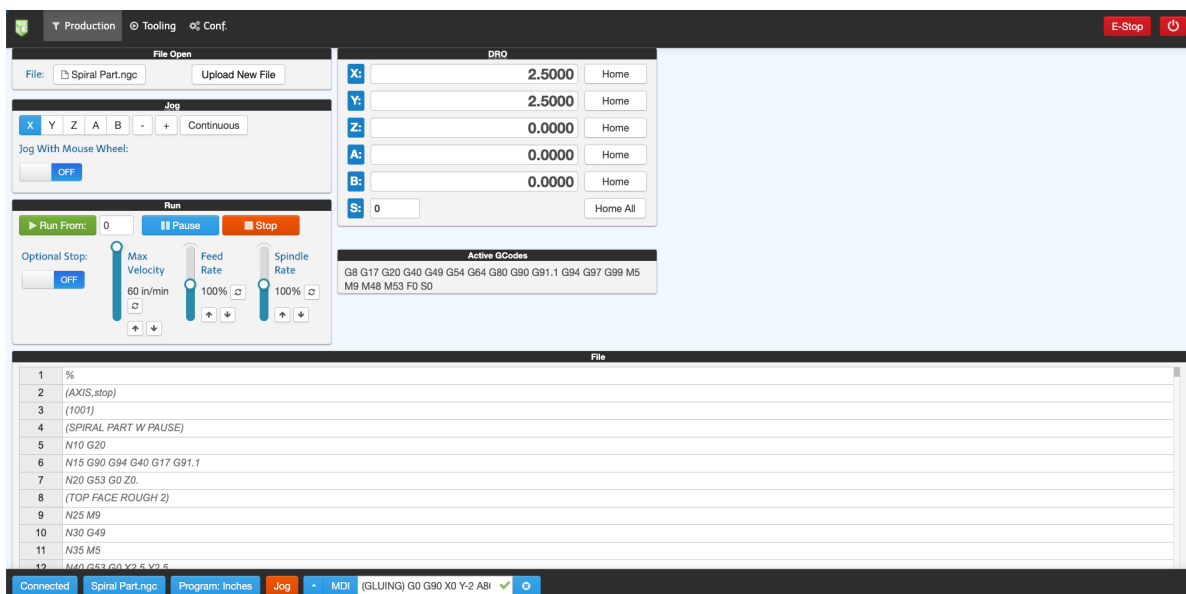
Step 4: Tooling Setup

Loading the correct tool, the correct way, is crucial in getting the Pocket NC to run and produce a good part. This "Spiral Part" uses the ⅛" single flute endmill that was provided with the machine. It should be tool number 10 in the G-code.

Please watch the [Pocket NC V2-10 Tool Setup](#) or [Pocket NC V2-50 Tool Setup](#) on our Youtube channel to see the tool setup process in detail. Then set up your tool with the cutting edge plus about an ⅛" sticking out of the collet. **Do not forget to measure the tool before moving forward.**

Step 5: Pocket NC Simulator

It is good practice to check a program or G-code before running it. The Pocket NC simulator allows this to be done with ease. It can be found at sim.pocketnc.com. Please watch the [Pocket NC Simulator](#) videos to see how to use the simulator and then use it to check this code.

*Note- To get the most accurate simulation of the Pocket NC running this G-code, the "Z offset" value found when the tool was measured must be input into the simulator. As seen below in the bottom right corner, the correct V2 model must also be selected.
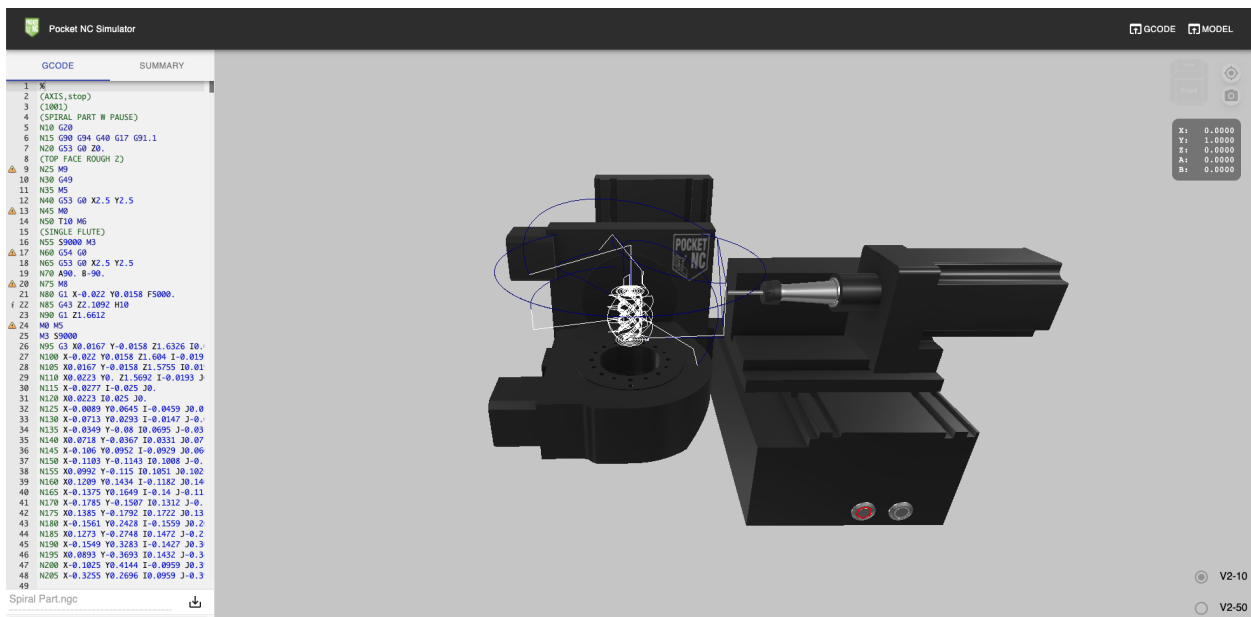
Because this part's G-code has been proven many times, the use of the simulator here is mainly to show the part that will be made and demonstrate how the machine will move. Take note of

the first few moves of the machine. If errors do pop up when this G-code is run through the simulator, they will likely be a tool or tool holder issue, so make sure those values and settings are correct.

Step 4: Running the "Spiral Part"

Before running any program on the Pocket NC the following items should be double checked:

- The appropriate fixture has been installed, correctly, for the stock being used
- The Pocket NC has been started up and homed
- The correct G-code program has been uploaded to the machine and selected for use
- The correct tool has been loaded into the machine and set up for the right tool number according to the G-code.
- The code has been run through the Pocket NC simulator to check for errors or crashes
- Proper safety precautions have been put in place (PPE, enclosure, etc.)

Only after all of the above have been checked, can the part be run. For this part, the program will be started before any stock, or material, is installed. This is to make sure that there is plenty of clearance for the first and final moves of the machine.

First, start the program by clicking the "Run From" button in the user interface (see step 3 photo). If it is not there already, the machine will move to its home position. Once the machine is in its home position, the right, silver "Start/Pause" button will blink green. With one finger over the red, E-stop button, press the green, blinking button. The machine's spindle will turn on and the machine will begin to move. Make sure that the first couple of moves match the ones noted when running the code in the simulator. If they don't, pause the machine, stop the program, rehome the machine and determine what was different and why.

As long as the first couple of machine moves match what you expected, let the machine run. After some positioning, the machine movement will pause and the spindle will turn off. The material can now be loaded. Insert the 1" Delrin rod into the backside of the collet and push it until it touches the tip of the tool, as shown in the picture below.
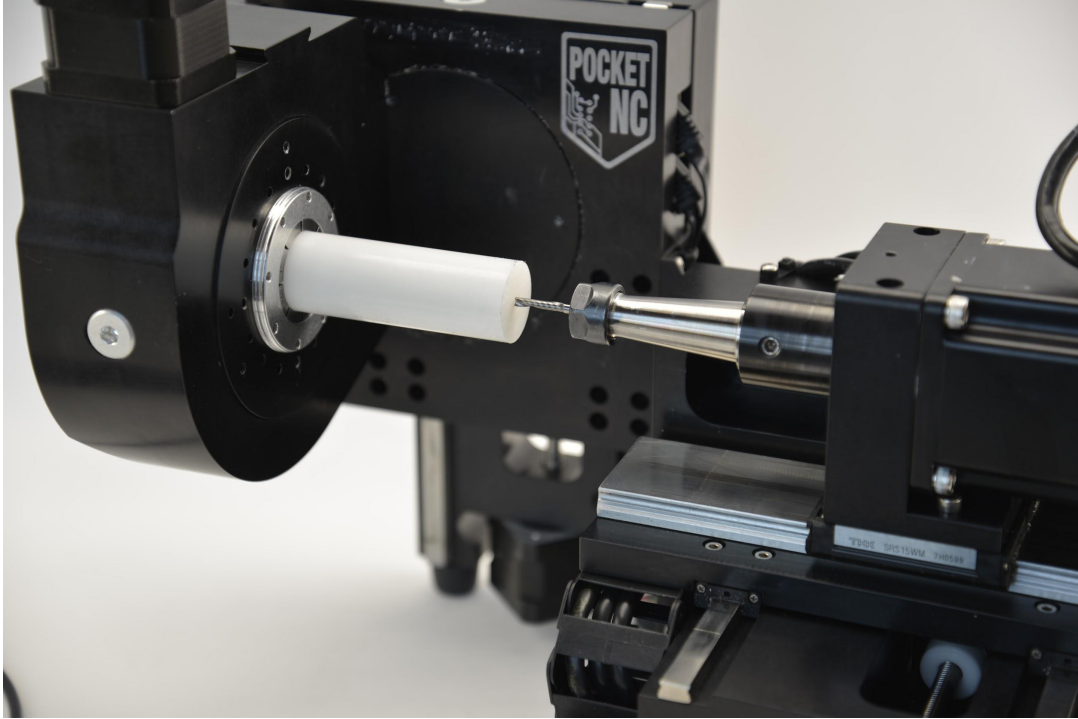
While keeping the material in contact with the tip of the tool, use the ER40 fixture wrench to tighten the top collet ring and secure the material. Shown in the picture below.
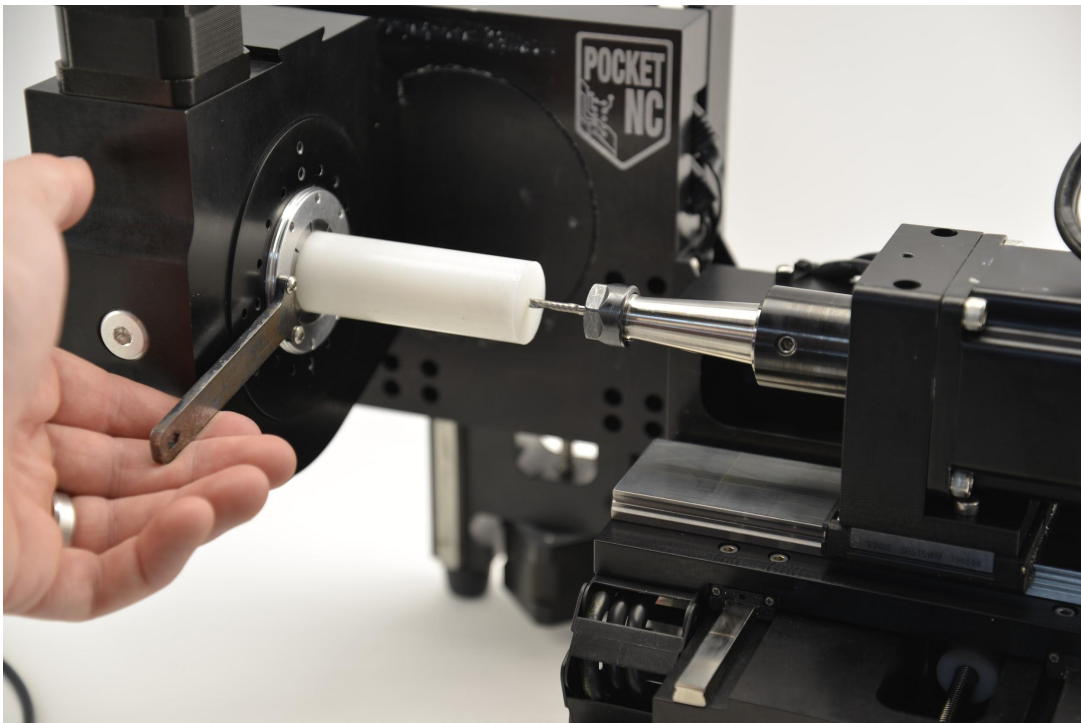
With the material tight and a finger over the E-stop button, press the blinking Start button to let the machine begin cutting the face of the part. From there the program should run smoothly, following the tool paths shown in the simulator. The operator just needs to be ready to stop the machine (finger over E-stop) in case of any of the following:

- The tool breaks
- The spindle stalls
- An axis stalls
- The spindle gets too hot
- The material begins to move in the fixture
- The tool begins to pull out of the holder
- Any odd or violent noises are heard

The program can be paused (axis movement stopped, spindle still running) anytime using the green button on the front of the machine.

When the machine has finished running the program it will return to its home position and the spindle will turn off. Depending on a few variables, the part may have been completely cut off or may need to be broken off of the remaining stock.
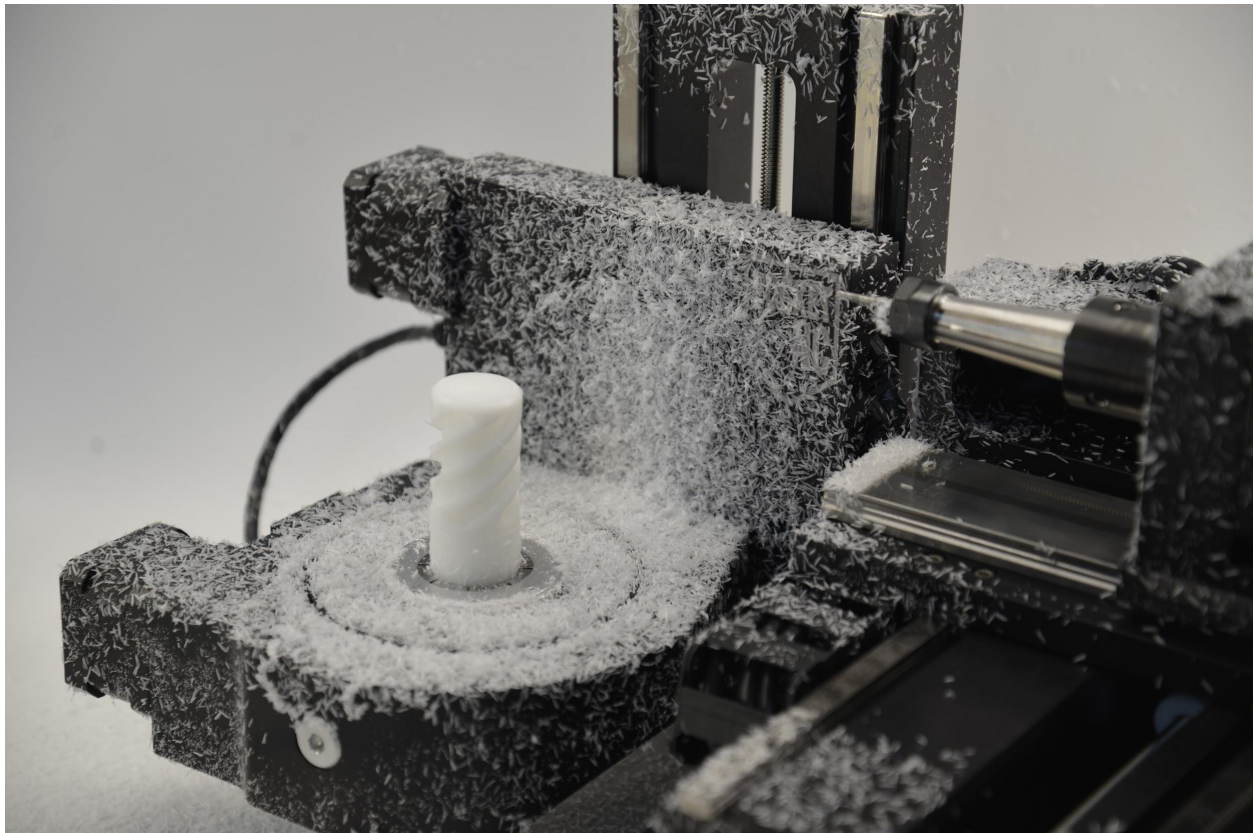
Congrats! You have now successfully run a part on the Pocket NC!