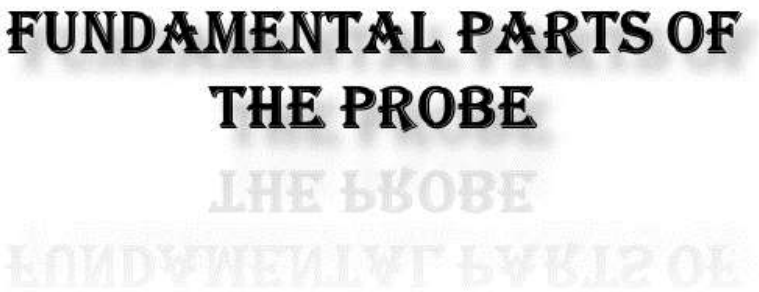
WIPS & Inspection Plus

Training course

For Next Generation Control

Table Of Contents — Pages

- These are the fundamental parts of the probe that are in your machine
- Testing the probes



[What is Probing? - Video]

OMI (OPTICAL MACHINE INTERFACE)

The OMI is connected directly to your Haas Machine

It communicates with the other two probes by infrared light

It acts as a receiver and sends the signal back to the machine control that the probes have been triggered

`

OMP (Optical Machine Probe)

The OMP is a 3D touch triggered probe that is mounted to a machine tool holder. It is used to set up work offsets and inspect parts on your Haas machine. The OMP is usually in a standby mode until it receives a signal to turn on from the OMI.

OTS (Optical Tool Setter)

The OTS is 3D touch-trigger tool setter with optical signal transmission used for broken tool detection and rapid measurement of tool lengths and diameters on a wide range of tools.

Testing Probes

The following program, when run in MDI, will turn on the OTS probe

M59 P2 (OTS Probe)
G04 P1.
M59 P3

When you begin this test the tool probe's LEDs will be blinking green

Tapping the probe with your finger will simulate a hit and the LEDs on the OMI will go from green to red

When you press reset the probe will shut off

The following program, when in MDI mode, will turn on the Spindle Probe

M69 P2 (Spindle Probe)
M59 P3

When you begin this test the tool probe's LEDs will be blinking green

The second line of code will cause the machine to begin moving in the x direction.

Tapping the probe with your finger will simulate a hit and the LEDs on the OMI will go from green to red and will also stop the machine's motion

When you press reset the probe will shut off

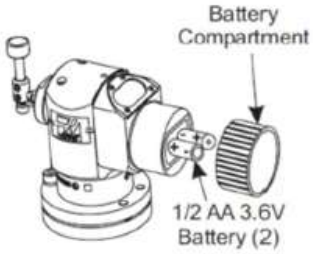
- General battery information
- Spare parts for the probes

[Troubleshooting your Probe Part 1 - Video]

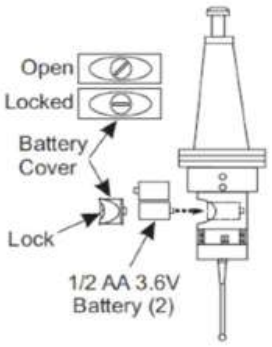
[Troubleshooting your Probe Part 2 - Video]

Batteries

The OMP and OTS each contain (2) ½ AA 3.6V batteries



Renishaw Table Probe



Renishaw Spindle Probe

Checking your Batteries

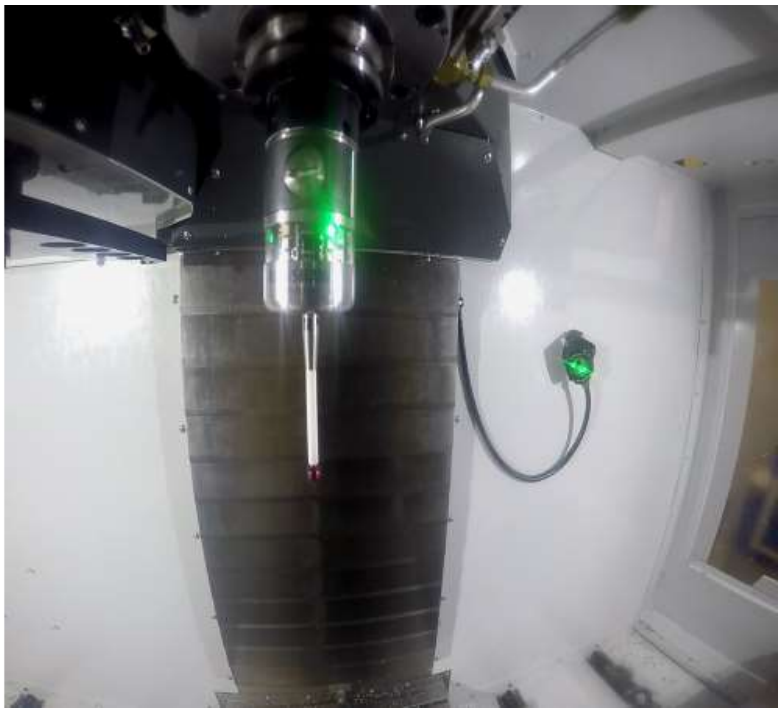
1. Remove batteries
2. Wait 5 seconds
3. Put in batteries and close cap
4. Count LED sequence, at the end of the sequence. (Good batteries will display 5 quick GREEN flashes

Battery life depends on how much the probe is used. The probe only turns on when it's being used. After the probe is done being used in a probing cycle it shuts off to conserve battery life.

Average life of a battery is 250 days if left in standby by mode.

Average life of a battery with it being in continuous use is 230 hours.

Majority of probing problems stem from batteries dying. With the average battery life lasting as long as 3 to 4 months, it is good idea to keep spare batteries on hand.



Spare Parts

Spare/Replacement parts include:

1. Ceramic Stylus (Spindle Probe) - 60-0026

2. Disk Stylus (Table Probe) - 60-0028

3. Stylus Holder (Table Probe) – 60-0029

4. Link Break Protect (Table Probe) – 60-0030

5. Extension (Table Probe) – 60-0034

1. (60-0026)

4. (60-0034)

2. (60-0028)

5. (60-0030)

3. (60-0029)

- How to level and align your probe
- How to calibrate your probe

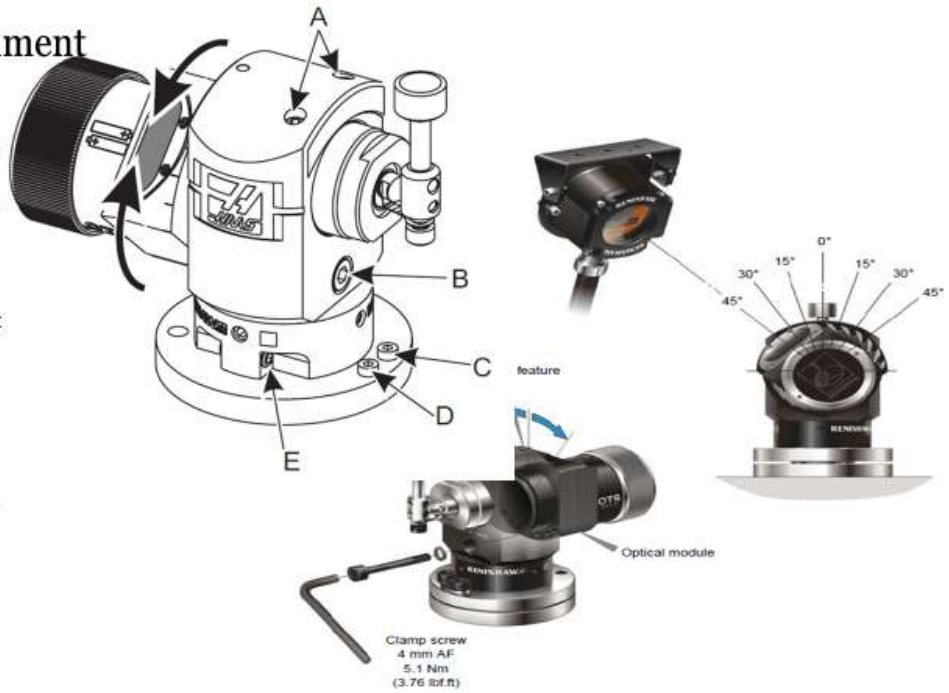
PROBE ALIGNMENT AND STANDARD CALIBRATION

Probe Alignment

The probe can be rotated in increments of 15° and can go up to 45° in either direction to ensure the optical module is pointing towards the receiver by removing bolt B

When making a front to back adjustment, you must loose screw C then use screw D to change the height of the front of the stylus

Be sure to retighten screws after adjustment



Probe Alignment

Side to side adjustment of the stylus can be achieved by adjusting screws A

Stylist should be level within 0.0002”

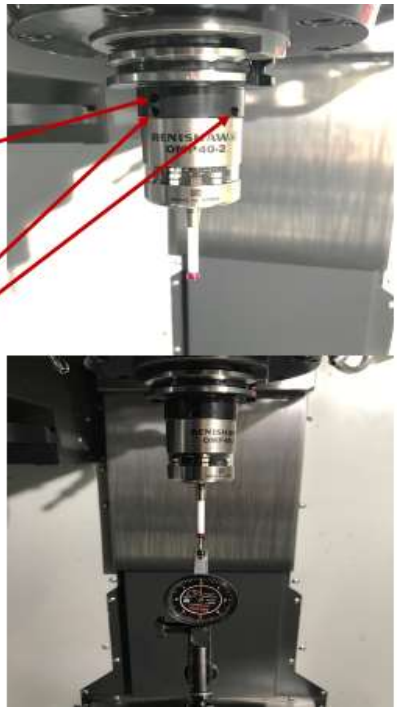
To align OMP you must place an indicator on the ruby and loosen the top two screws and lightly tighten them

Rotate the spindle until the high side is facing you

Set indicator to the High Spot of the Ruby in the Z and X axis

Then loosen the bolt in the back and tighten the bolt in the front (there are 4 total screws used for run-out adjustment)

Repeat until the run-out is less than 0.0002"



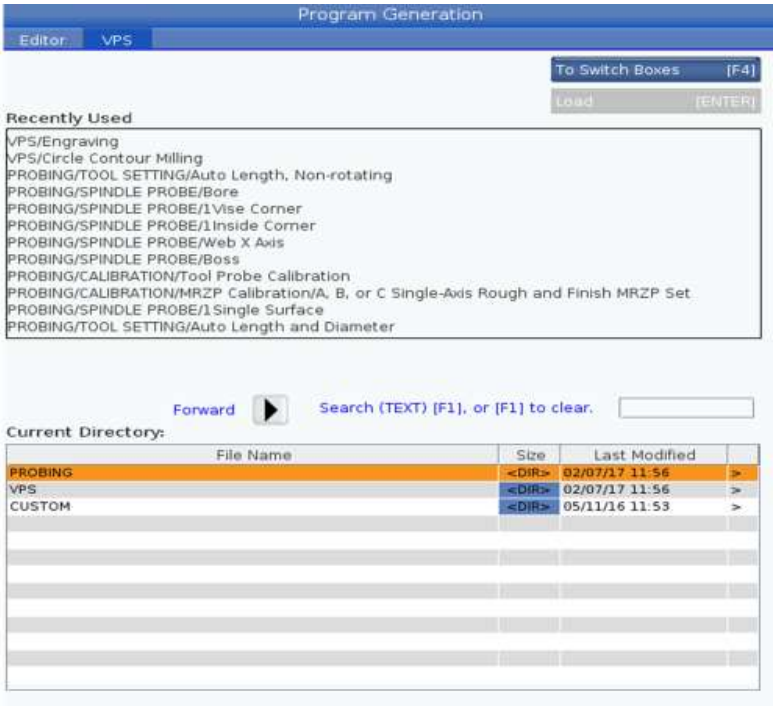
VPS

"Virtual Programming System" is used to calibrate and use the probes in your machine

VPS can be reached in your HAAS controller by going to the edit menu, curser up to the top tabs and going over to VPS

Then you can go down to the directory where you can access probing, VPS and custom

Here you can go down to "PROBING" and curser to the right



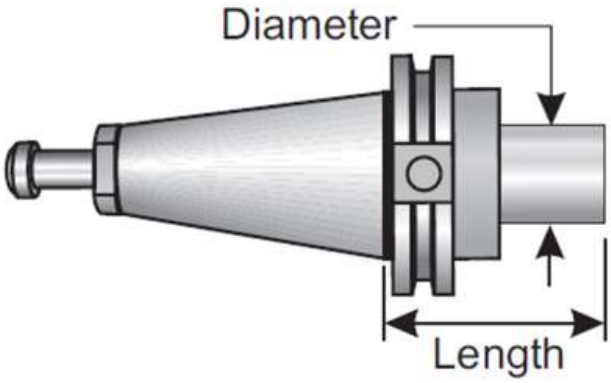
Probe Calibration - Video

Probe Calibration

The first calibration that needs to be done is "Tool Probe Calibration". To begin "Tool Probe Calibration" you must use a calibration bar of a known gauge length and diameter.

This can be easily made using a gauge pin in a tool holder

Position master gauge over OTS stylus about 0.25"



Calibration Bar

Probe Calibration

L: The gauge length of the calibration bar

S: The tool diameter

D: The direction of the OTS

Once these are filled out you hit "CYCLE START" to bring you to MDI mode where you can begin the calibration cycle

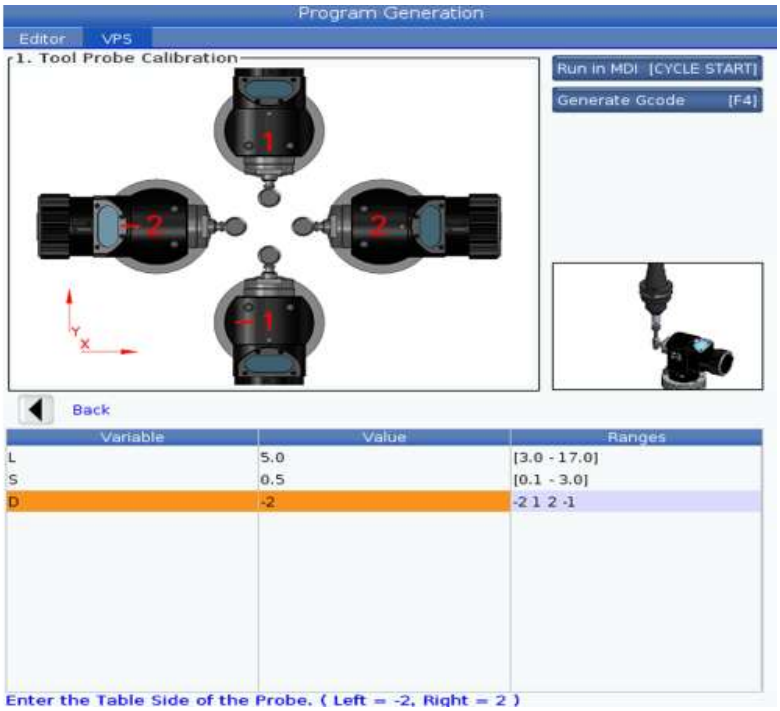
When selecting a direction for your OTS it is important to note the direction of your stylus:

1: The stylus is towards the front of the machine

2: The stylus is towards the left of the machine

-1: The stylus is towards the back of the machine

-2: The stylus is towards the right of the machine



Note: When setting the OTS on the table you should ±2.0" of travel from the stylus. No part of the OTS should be sticking past the rear table.

After you complete "Tool Probe Calibration" you have to go back to the calibration page and go to "Spindle Probe Length Calibration"

Once you select this option you will require to put in:

T: Tool Number

Once selected you can "CYCLE START" to run the "Spindle Probe Length Calibration" in MDI mode

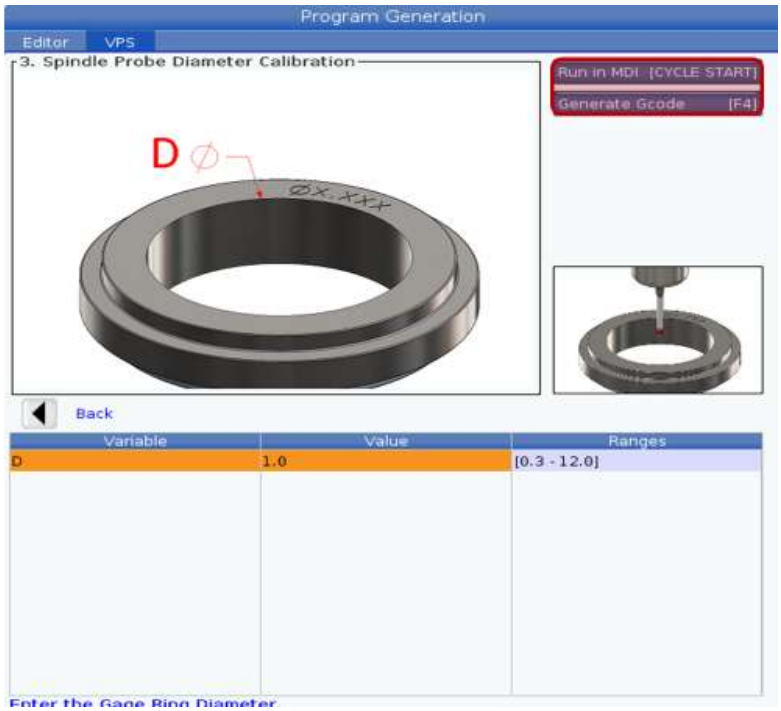
Once that is compete you must go down to the next option, “Spindle Probe Diameter Calibration”. To do this you will need a ring gauge with a known diameter

Be sure to position the probe inside the ring gauge. Bring the probe down approximate center of the gauge and enough that the ruby will measure on its widest diameter

Once you select this option you will be required to input:

D: The inner diameter of the gauge

Once the diameter is put in you can hit “CYCLE START” to run the “Spindle Probe Diameter Calibration”



Below the “Spindle Probe Diameter Calibration” you have the option to do a “Complete Probe Calibration”. This option is an alternative to running through the previous 3 steps.

You will have to bring the Calibration Bar to 0.25” above the OTS stylus

Once you select the “Complete Probe Calibration” you will have to input all of the information from “Tool Probe Calibration” and “Spindle Probe Length”

The probe will use the OTS stylus to check the diameter instead of a ring gauge

- This section will go through the various probing templates built into your HAAS machine

VPS PROBE TEMPLATES

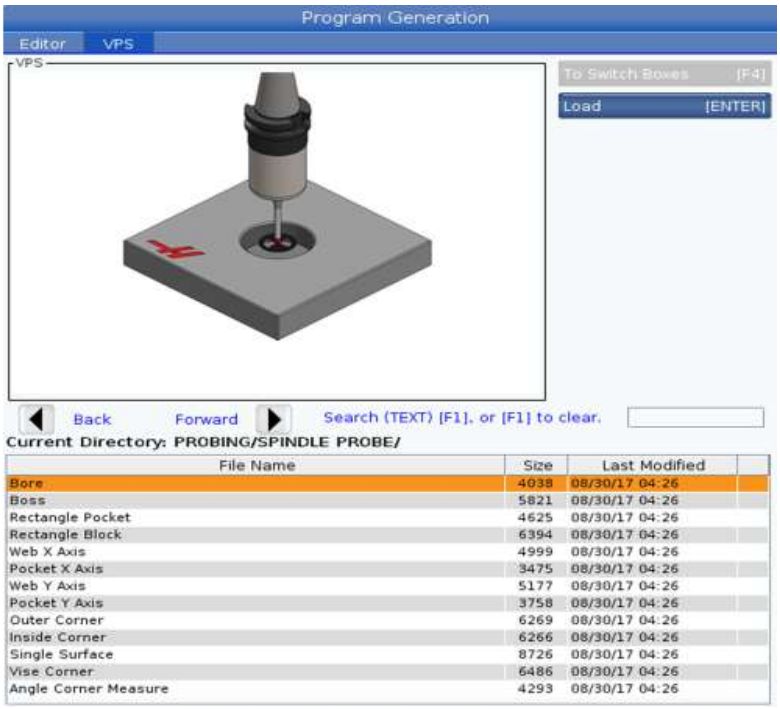
VPS Templates

On NGC: If you return to VPS, curser over to the probing section, you can then select "SPINDLE PROBE"

Once "SPINDLE PROBE" is highlighted curser to the right

Here you will be given a variety of options that will allow to you to set a zero position on your part

On the NGC you can fill out a template, go to handle jog to go to the required location and then return to the template. The template will remain filled out



Setting Work Offsets - Video

Bore is used for finding the center of circular pocket

Before you select this option, you need to position the probe in the approximate center of the circle and low enough that the entire diameter of the ruby will touch

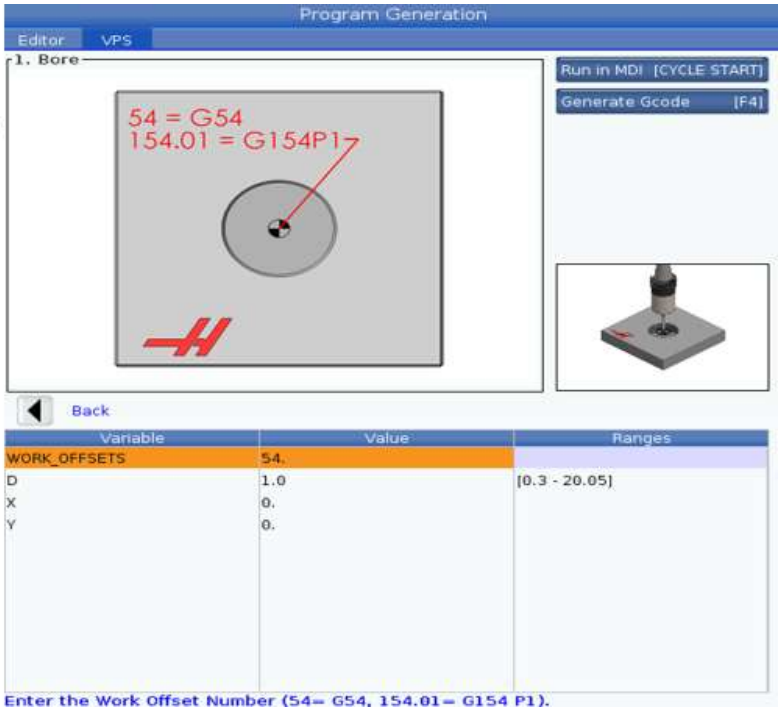
Once selected you be required to input:

WORK_OFFSETS: The work offset you want to work in

D: The diameter of circular pocket that you are probing

X: The distance you want the zero to offset in the X-direction in reference to the center of the circle

Y: The distance you want the zero to offset in the Y-direction in reference to the center of the circle



Boss is used to find the center of an extruded circle

The probe should be placed in the approximate center with an approximate known distance of clearance

Once selected you will have to input:

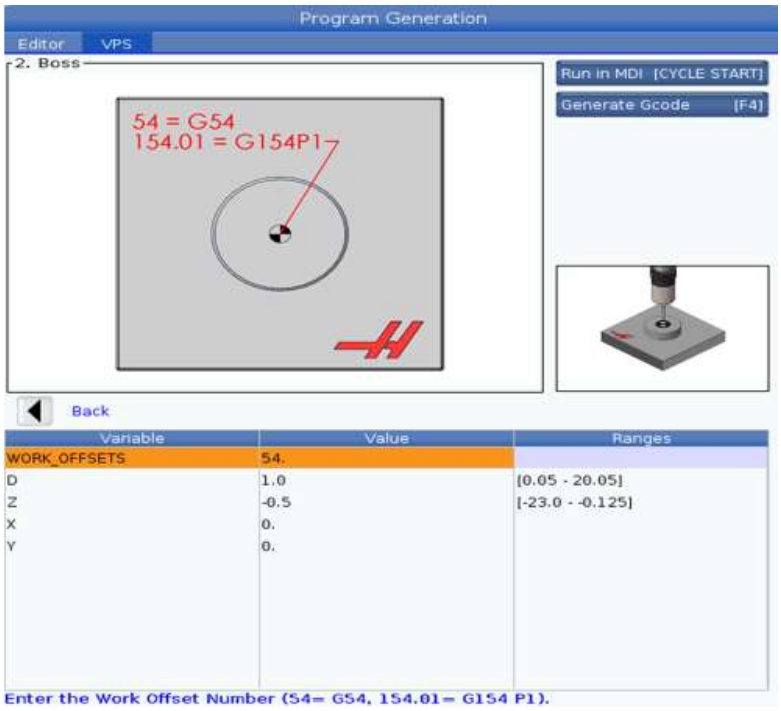
WORK_OFFSETS: The work offset you want to work in

D: The diameter of the extruded circle

Z: The distance the probe needs to go for the largest diameter of the ruby to hit

X: The distance you want the zero to offset in the X-direction in reference to the center of the circle

Y: The distance you want the zero to offset in the Y-direction in reference to the center of the circle



Rectangular pocket is used to find the center of a pocketed rectangle

Before you begin, the probe should be positioned approximately in the center of X and Y and low enough for the ruby's entire diameter to hit

Once selected you will have to input:

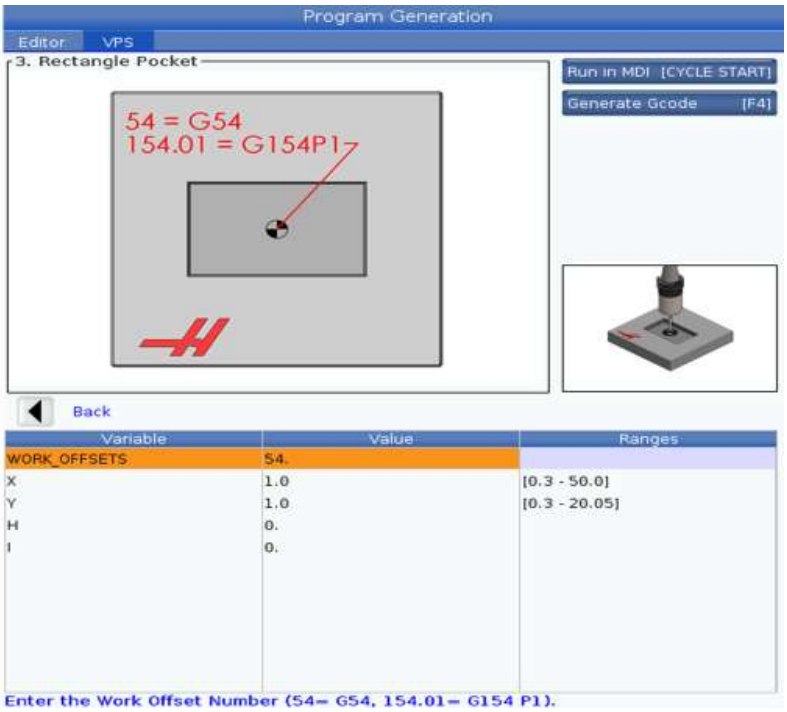
WORK_OFFSETS: The work offset you want to work in

X: The length in the X-direction

Y: The length in the Y-direction

H: The distance you want the zero to offset in the X-direction in reference to the center of the rectangular pocket

I: The distance you want the zero to offset in the Y-direction in reference to the center of the rectangular pocket



Rectangular Block is used to find the center of an extruded rectangle

Before beginning, the probe should be positioned in the approximate center of X and Y with a known clearance above the part

Once selected you will have to input:

WORK_OFFSETS: Your work offset number

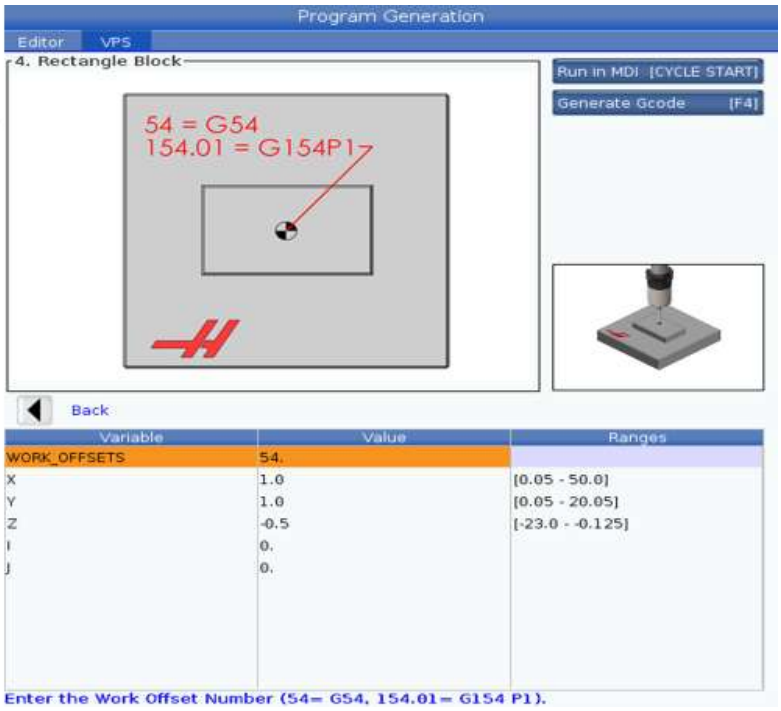
X: The length of the block in the X-direction

Y: The length of the block in the Y-direction

Z: The distance the probe needs to go for the largest diameter of the ruby to hit

I: The distance you want the zero to offset in the X-direction in reference to the center an extruded rectangle

J: The distance you want the zero to offset in the Y-direction in reference to the center an extruded rectangle



Web X Axis is used to find the center of an extruded rectangle in the X-direction

Before beginning, the probe should be positioned in the approximate center of X with a known of clearance above the part

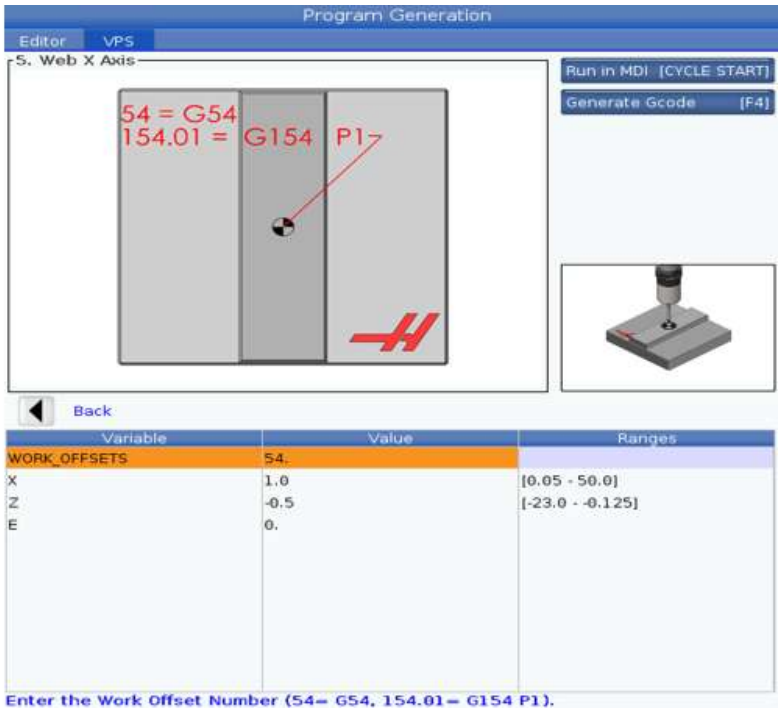
Once selected you will have to input:

WORK_OFFSETS: The work offset you want to work in

X: The length of the feature in the X-direction

Z: The distance the probe needs to go for the entire diameter of the ruby to hit

E: The distance you want the zero to offset in the X-direction in reference to the center an extruded rectangle



Pocket X Axis is used to find the center of X in a rectangular pocket

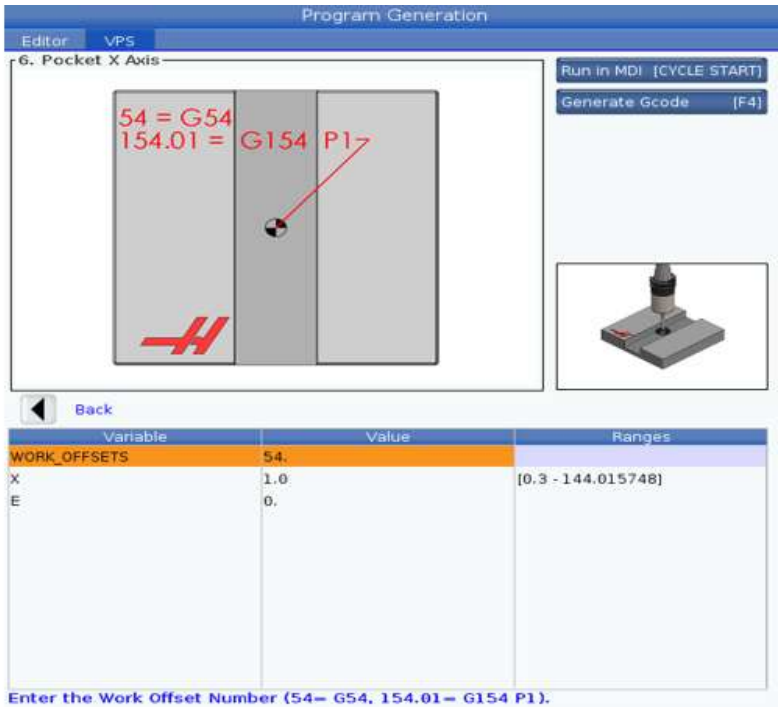
Before you begin, the probe should be positioned approximately in the center of X and low enough for the ruby's entire diameter to hit

Once selected you will have to input:

WORK_OFFSETS: The work offset you want to work in

X: The length of the feature in the X-direction

E: The distance you want the zero to offset in the X-direction in reference to the center an extruded rectangle



Web Y Axis is used to find the center of Y on an extruded rectangle

Before you begin, the probe should be positioned approximately in the center of Y and a known distance above the part

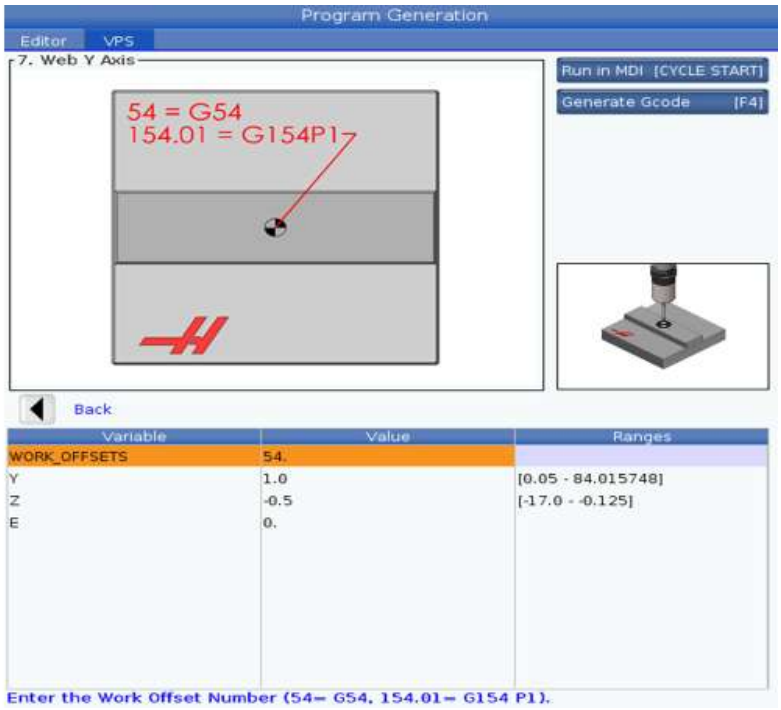
Once selected you will have to input:

WORK_OFFSETS: The work offset you want to work in

Y: The length of the feature in the Y-direction

Z: The distance the probe needs to go for the entire diameter of the ruby to hit

E: The distance you want the zero to offset in the Y-direction in reference to the center an extruded rectangle



Pocket Y Axis is used to find the center of Y in a rectangular pocket

Before you begin, the probe should be positioned approximately in the center of Y and low enough for the ruby's entire diameter to hit

Once selected you will have to input:

WORK_OFFSETS: The work offset you want to work in

Y: The length of the feature in the Y-direction

E: The distance you want the zero to offset in the Y-direction in reference to the center of the rectangular pocket

Outer Corner is used to find the corner between the X and Y Axis

Before beginning, the probe should be positioned a known height above the corner being probed

Once selected you will have to input:

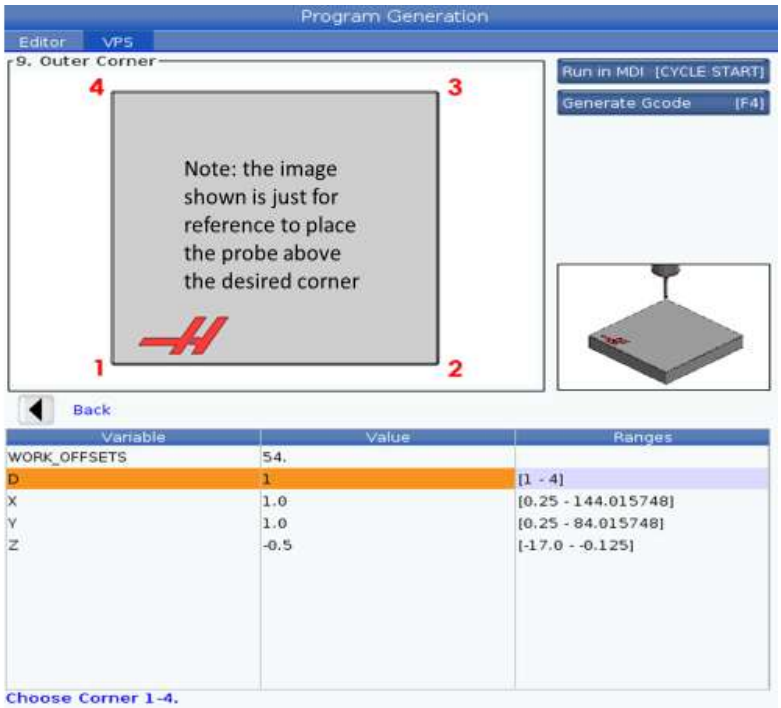
WORK_OFFSETS: The work offset you want to work in

D: The corner you are trying to measure (as shown)

X: The distance you need to travel in the X direction to hit a flat surface

Y: The distance you need to travel in the Y direction to hit a flat surface

Z: The distance you need to go down for the ruby's largest diameter to hit



Inside Corner is used to find the corner between the X and Y Axis

Before beginning, the probe should be positioned a known distance above the corner being probed

Once selected you will have to input:

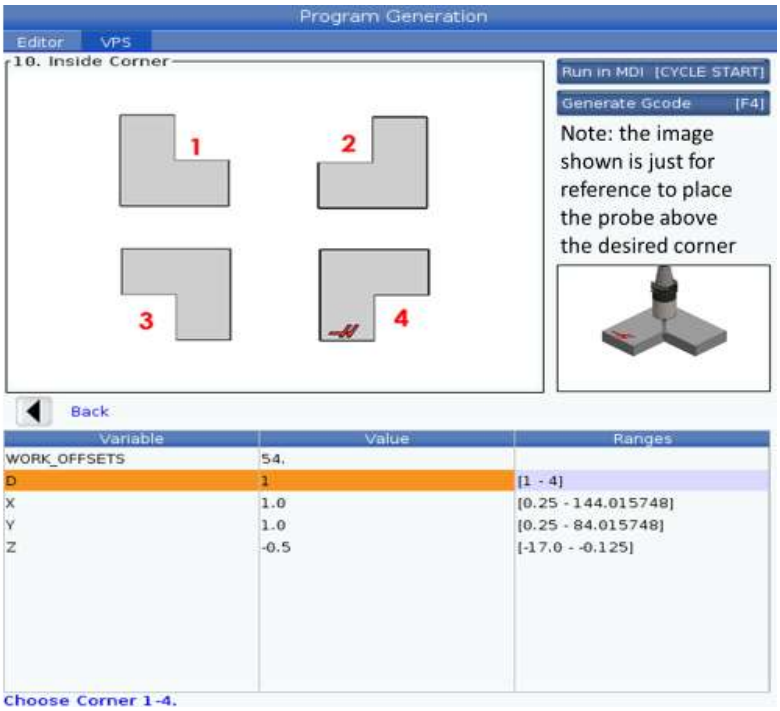
WORK_OFFSETS: The work offset you want to work in

D: The corner you are trying to measure (as shown)

X: The distance you need to travel in the X direction to hit a flat surface

Y: The distance you need to travel in the Y direction to hit a flat surface

Z: The distance you need to go down for the ruby's largest diameter to hit



Single Surface is used to touch off on one surface at a time. It can be used for the X, Y or Z axis

Before you begin, position the probe a known distance away from the surface you want to probe

Once select you will have to input:

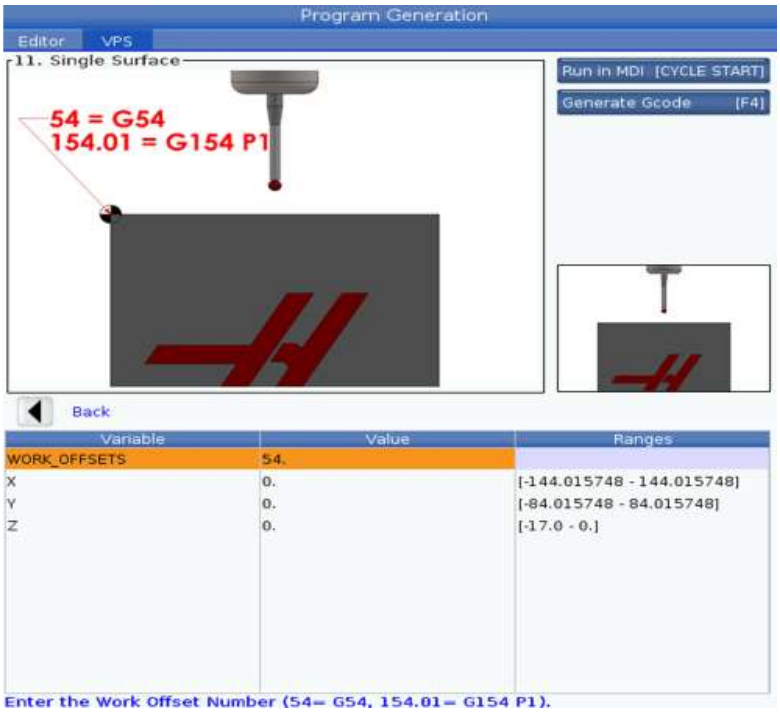
WORK_OFFSETS: The work offset you want to work in

And the axis the surface is parallel to:

X: The distance to the surface

Y: The distance to the surface

Z: The distance to the surface



Vice Corner is used to find the top corner of part

Before beginning, position the probe a known distance over the corner that you want to probe

Once selected you will have to input:

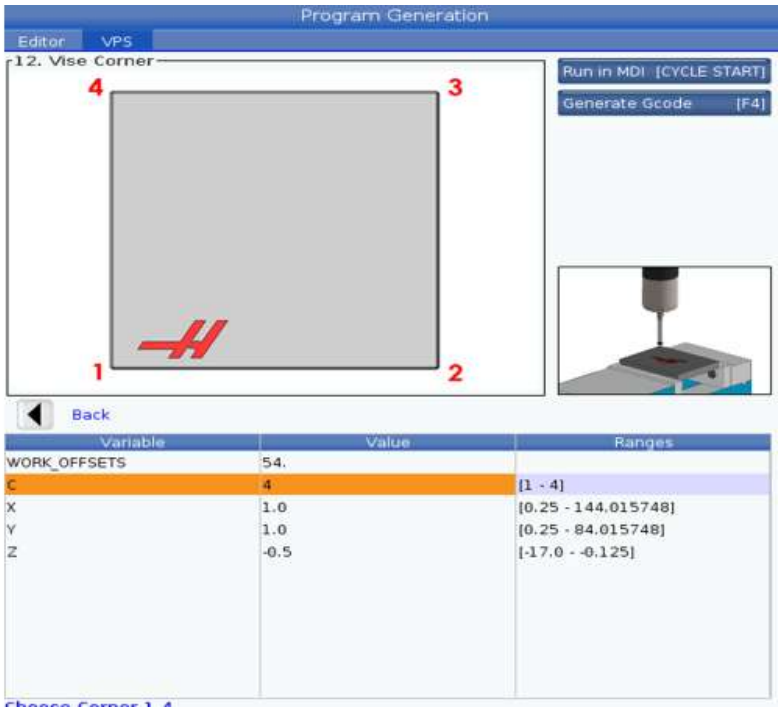
WORK_OFFSETS: The work offset you want to work in

C: The position of the corner you want to probe (as shown)

X: The distance needed to touch a flat surface in the X-direction

Y: The distance needed to touch a flat surface in the Y direction

Z: The distance need to travel to ensure the ruby touches at its max diameter



Angle Measure Probing

Angle Corner Measure is used to measure the angle between to entities in reference to X+ which can be shown with the Macro variables highlighted

Before beginning, position the probe in the corner between the 2 angles. Make sure the entire diameter of the ruby will hit when running

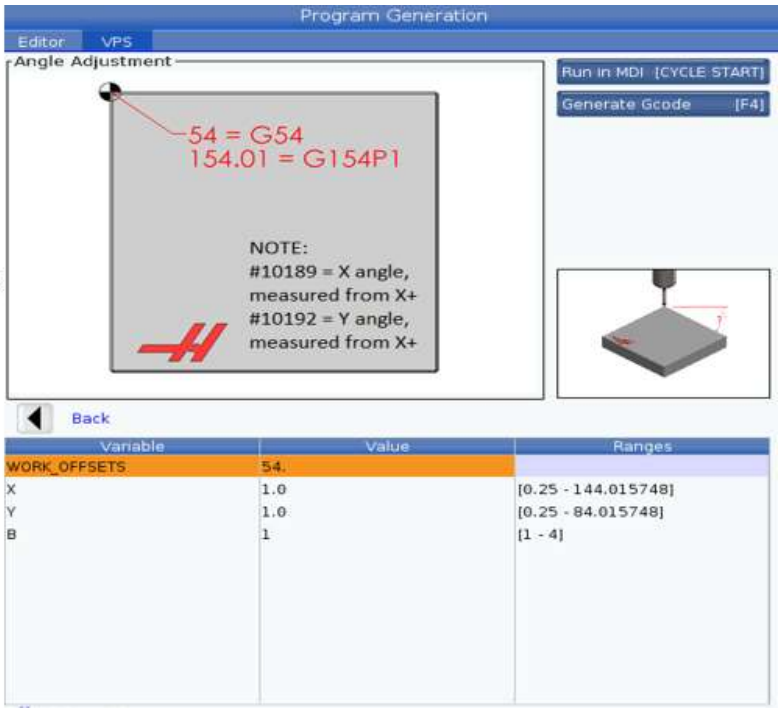
Once selected you will have to input:

WORK_OFFSETS: The work offset you want to work in

X: The total amount of distance you want to travel in the X direction

Y: The total amount of distance you want to travel in the Y direction

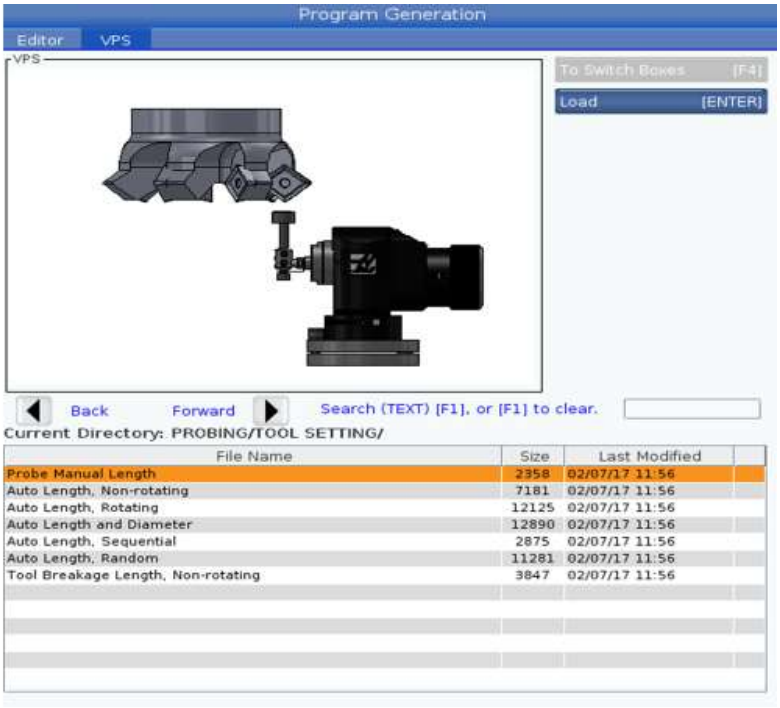
B: Allows you to choose where the corner of the angle is located



[Setting Tool Offsets - Video]

[Tool Offsets Explained - Video]

Setting Tool Offsets



If you return to VPS, curser over under the probing section again you then can select "TOOL SETTING"

Once "TOOL SETTING" is highlighted curser to the right

Here you will be given a variety of options for measuring and setting your tool length and diameter

Probe Manual length allows you to measure the tool length with the OTS manually

In order to do this you must manually bring the tool to the OTS then position the tool about 0.4" above the stylus

Set the tool number you want to indicate

The program will bring the tool down to the stylus a lightly touch it

Auto Length. Non-rotating is used for finding a tool's length when one edge is being measured

Once selected you will have to input:

T: The tool number of the tool you would like to probe

T_T: The type of tool from the ones listed

L: The approximate gauge length of the tool

D: The diameter of the tool

Auto Length. Rotating is used to find the length of a tool and find the lowest point on a tool that has multiple edges

Once selected you will have to input:

T: The tool number of the tool you would like to probe

T_T: The type of tool from the ones listed

L: The approximate gauge length of the tool

D: The diameter of the tool

Auto Length and Diameter is used to find the length of the tool and diameter of the tool

Once selected you will have to input:

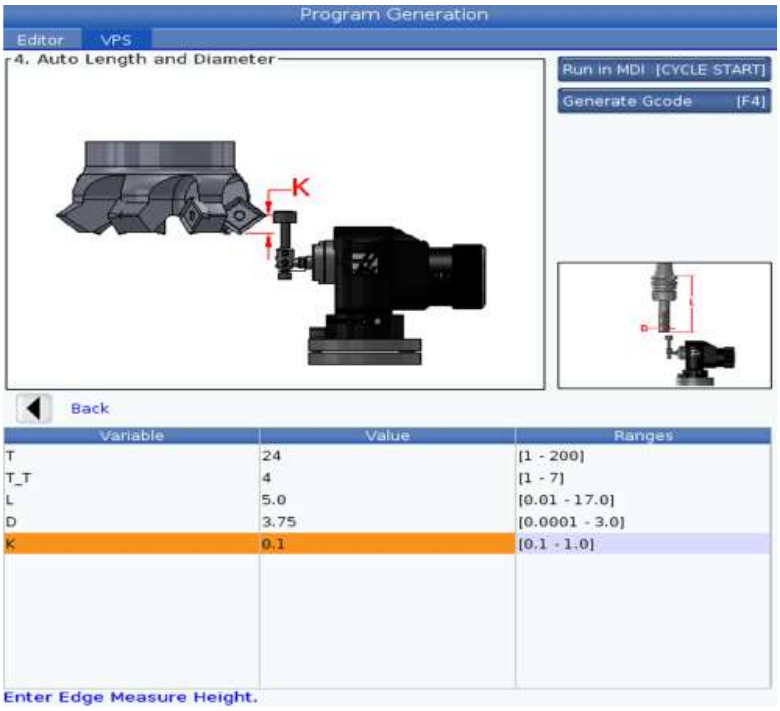
T: The tool number of the tool you would like to probe

T_T: The type of tool from the ones listed

L: The approximate gauge length of the tool

D: the diameter of the tool

K: The distance your cutter needs to go down, in reference to the stylus top, to measure the max diameter

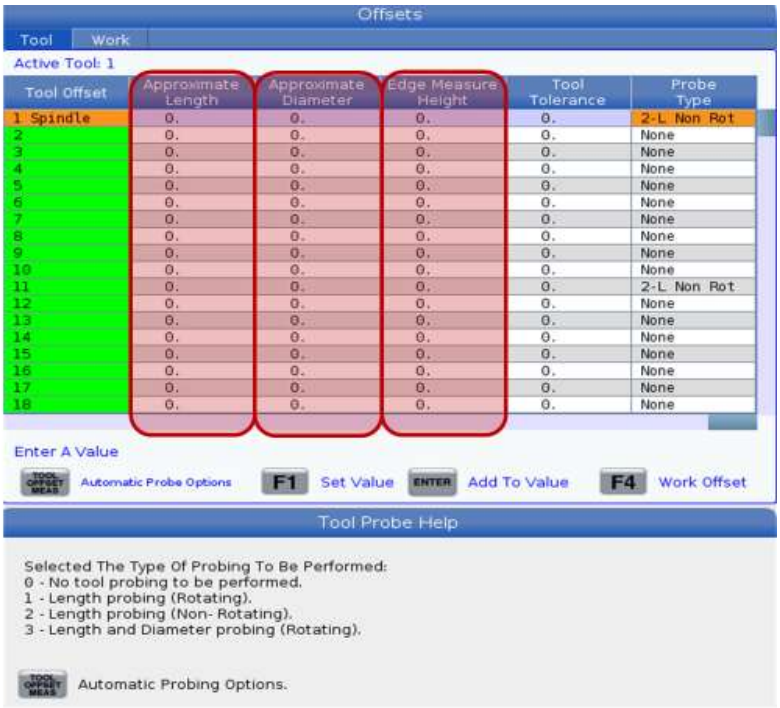


"Probe Manual Length", "Auto Length. Rotating", "Auto Length. Non-rotating" and "Auto Length and Diameter" can be setup from the offsets page.

Filling out the "Approximate Length" will allow you to preform an "Auto Length. Non-Rotating"

Filling out the above and "Approximate Diameter" will allow you to preform an "Auto Length. Rotating"

Filling out the above and the "Edge Measure Height" will allow you to preform an "Auto Length and Diameter"



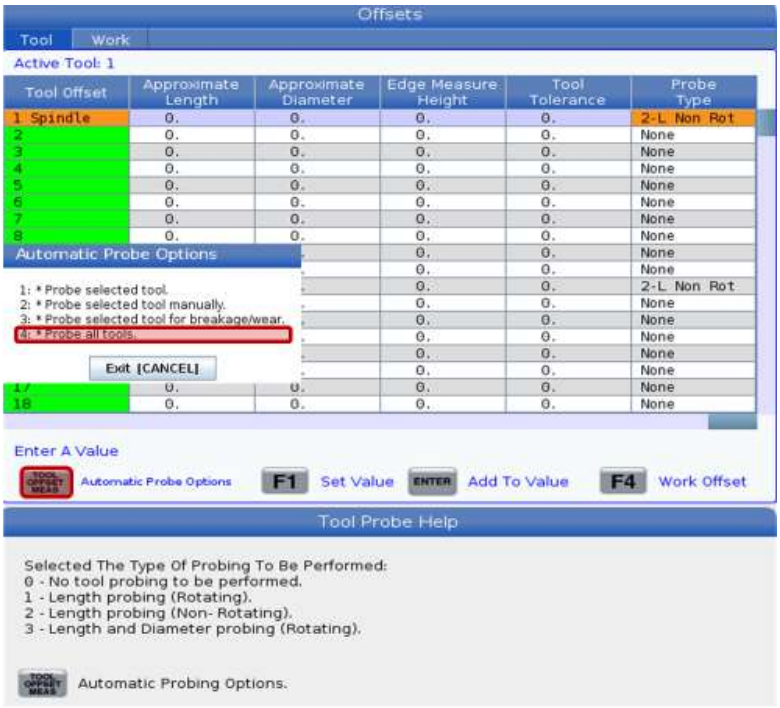
With all tools filled out with a probe type and the required information you can:

Press “Tool Offset Meas”

Then press “4”

Then press “Cycle Start” to begin the probing

This option will “Probe all tools.” in your tool carousel. Any tools with a “Probe Type” left on “None” will be skipped

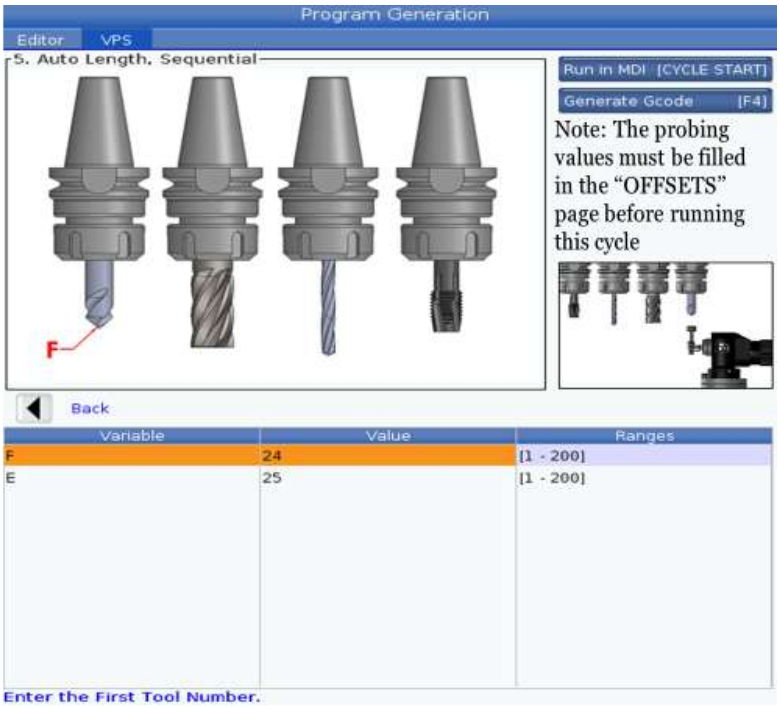


Auto Length. Sequential will allow you to measure multiple tools in a row in the order they are in (cannot be done with shell mills)

Once selected you will have to input:

F: The tool number you’d like to start probing with

E: The tool number you’d like to end probing with



Auto Length. Random will allow you to probe multiple tools of your choice (cannot be done with shell mills)

Once selected you will have to input:

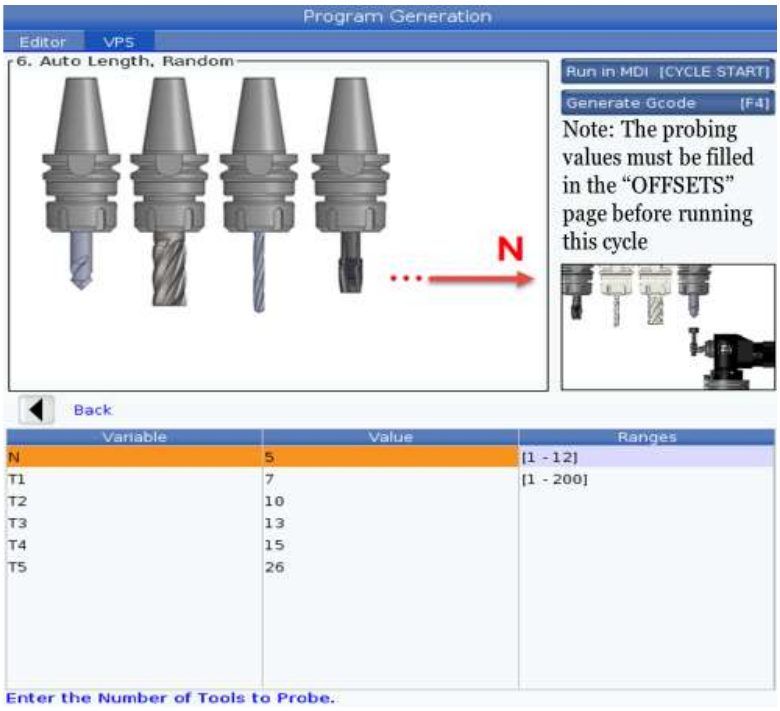
N: The number of tools you would like to measure, 12 tools can be done in one cycle

T1: The tool number of the first tool you want to measure

T2: The tool number of the second tool you want to measure

T3: The tool number of the third tool you want to measure

.
.
.



Tool Breakage length. Non-rotating is used to check and see if the tool is broken.

Once selected you will have to input:

T: The tool number of the tool you'd like to probe

H: This is the variance the tool can have

Using the tool breakage is especially useful while running a program where the tool may wear down quickly or break easily

Instead of pressing "CYCLE START" you can press "F4"

This will give you additional options shown:

By pressing "1" it will create the G-code and put it in the clipboard. This will allow you to paste it into a program

By pressing "2", the code will automatically be put into MDI mode where you will be able to hit "Cycle Start" and run it in MDI mode

By pressing "3" you will be given a prompt for a save location and then you will be instructed to give the new program an O number, file name and file comment

This can be used after filling out any of the templates in the VPS mode

By pressing "1" you will be brought to the editor where the G-code will be displayed in the "Clipboard" on the bottom of the screen

EX1) In this example a tool breakage cycle was inserted to the clipboard for tool 3.

1. Scroll down to the line before where you want to input your probing cycle
2. Press "F4" to paste information from clipboard
3. Once it has been pasted you can scroll down to look at the code. Press "Cancel" in order to deselect the text
   - If you press "Enter" or "F4" the text will be pasted again