Mill Operator Users Guide

HURCO®

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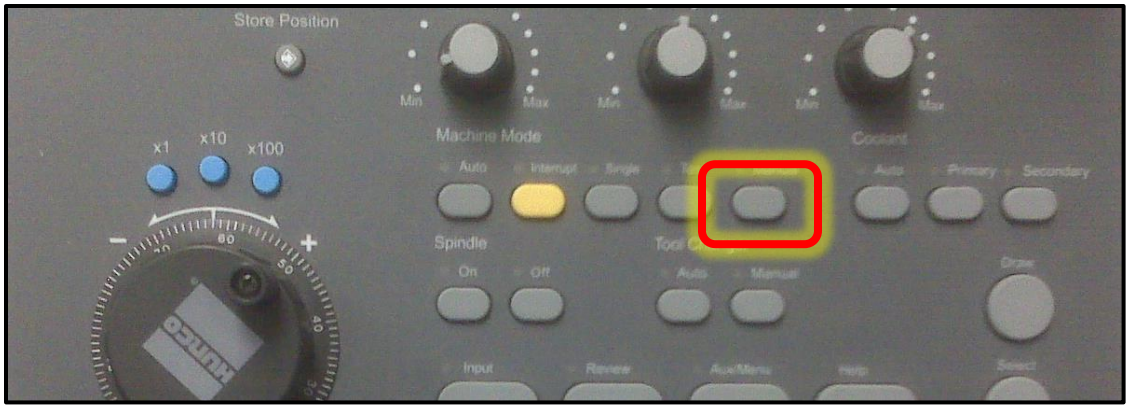
Performing a Toolchange

Performing a Manual Toolchange

1. Press the MANUAL mode button on the control panel
2. Press INPUT on control panel
3. Select TOOL REVIEW softkey
4. Select TOOL SETUP softkey
5. Enter the desired tool number and press ENTER

1



5

TOOL SETUP

	MACHINE	PART		
X	0.0000	0.0000	SPINDLE	0
Y	0.0000	0.0000	FEED (STOPPED)	0.0
Z	0.0000	0.0000	TOOL IN SPINDLE	0

TOOL NUMBER 1 LOCATION Manual MANUAL

TOOL TYPE END MILL

DIAMETER 0.5000 SPEED CW CAL 7639

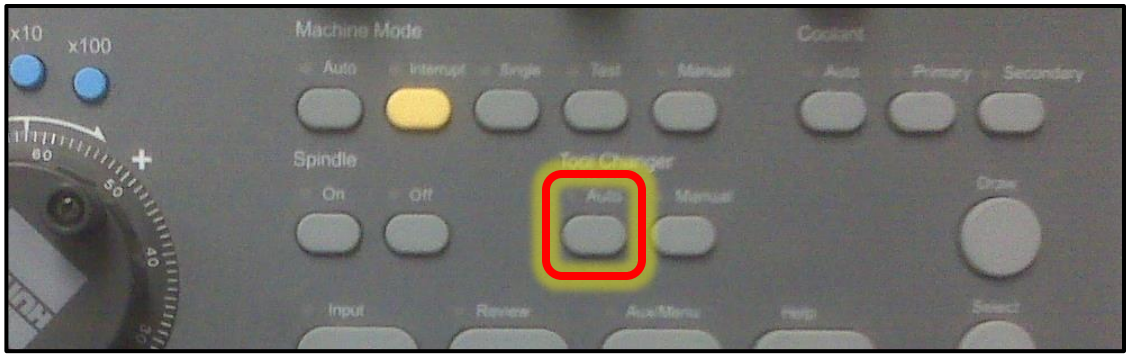
COOLANT PRIMARY

SURFACE SPEED 1000

Performing a Manual Toolchange

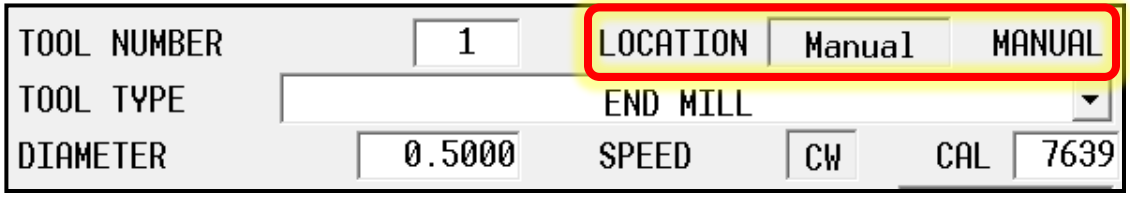
6. Press the Tool Changer AUTO button – START CYCLE should begin to flash
7. Press the flashing START CYCLE button
8. Verify the AUTO/MANUAL state of the current tool – use the Tool Changer Auto button to toggle the AUTO/MANUAL condition of the tool

6



7

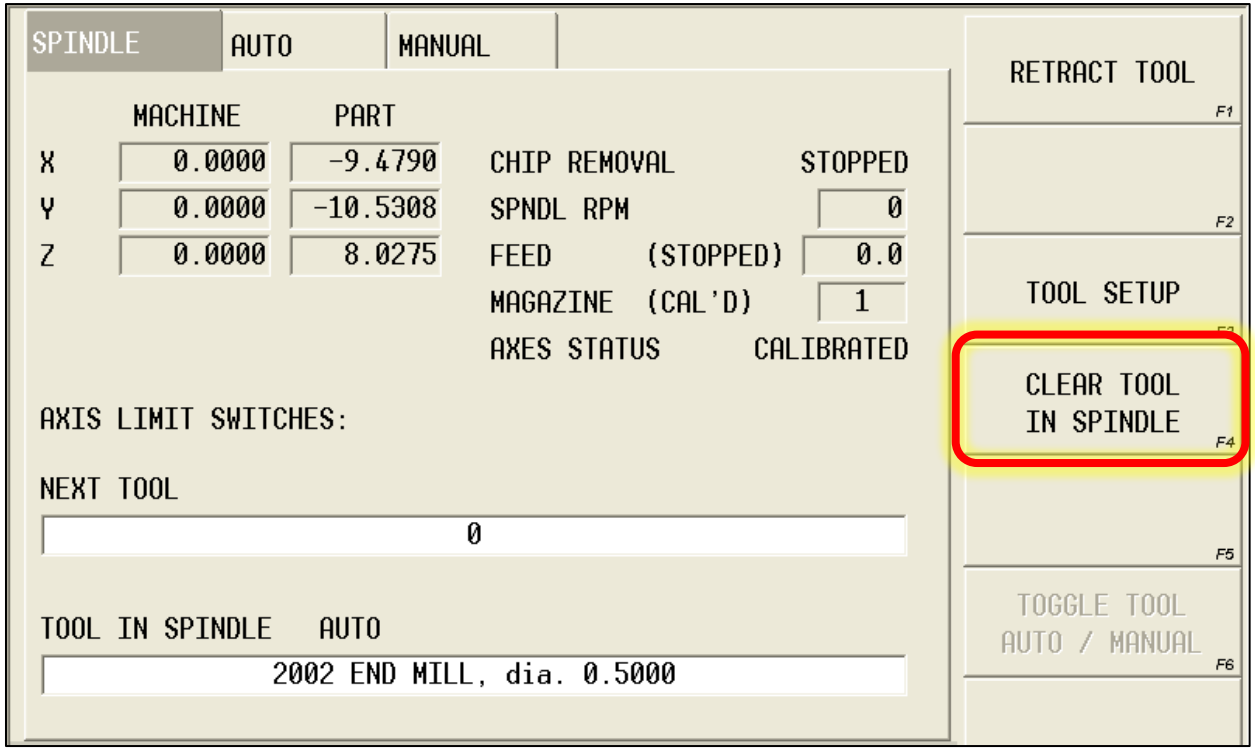
8



Clear Tool in Spindle

Clearing the Tool in Spindle

1. Press the MANUAL mode button on the control panel
2. Select TOOL MANAGEMENT softkey
3. Select CLEAR TOOLIN SPINDLE softkey
4. Press the flashing START CYCLE button



Tool Touch-off

Without Tool Touch Probe

Note: the tool setup and touch-off procedures in this manual assume that the machine control has been setup in ***Absolute Tool Length*** mode. Please refer to the separate section at the end of this document for more details.

TOOL SETUP

DELETE TOOL

F1

	MACHINE	PART		
X	0.0000	0.0000	SPINDLE	0
Y	0.0000	0.0000	FEED (STOPPED)	0.0
Z	0.0000	0.0000	TOOL IN SPINDLE	0

TOOL NUMBER 1 LOCATION Manual MANUAL

TOOL TYPE END MILL

DIAMETER 0.5000 SPEED CW CAL 7639

TOOL CAL LENGTH 6.2531

TOUCH-OFF DEVICE 1 GAUGE

CUTTING TIME 21

DIAMETER WEAR 0.0000

Amount of time in minutes that the tool has been in the rotating spindle.

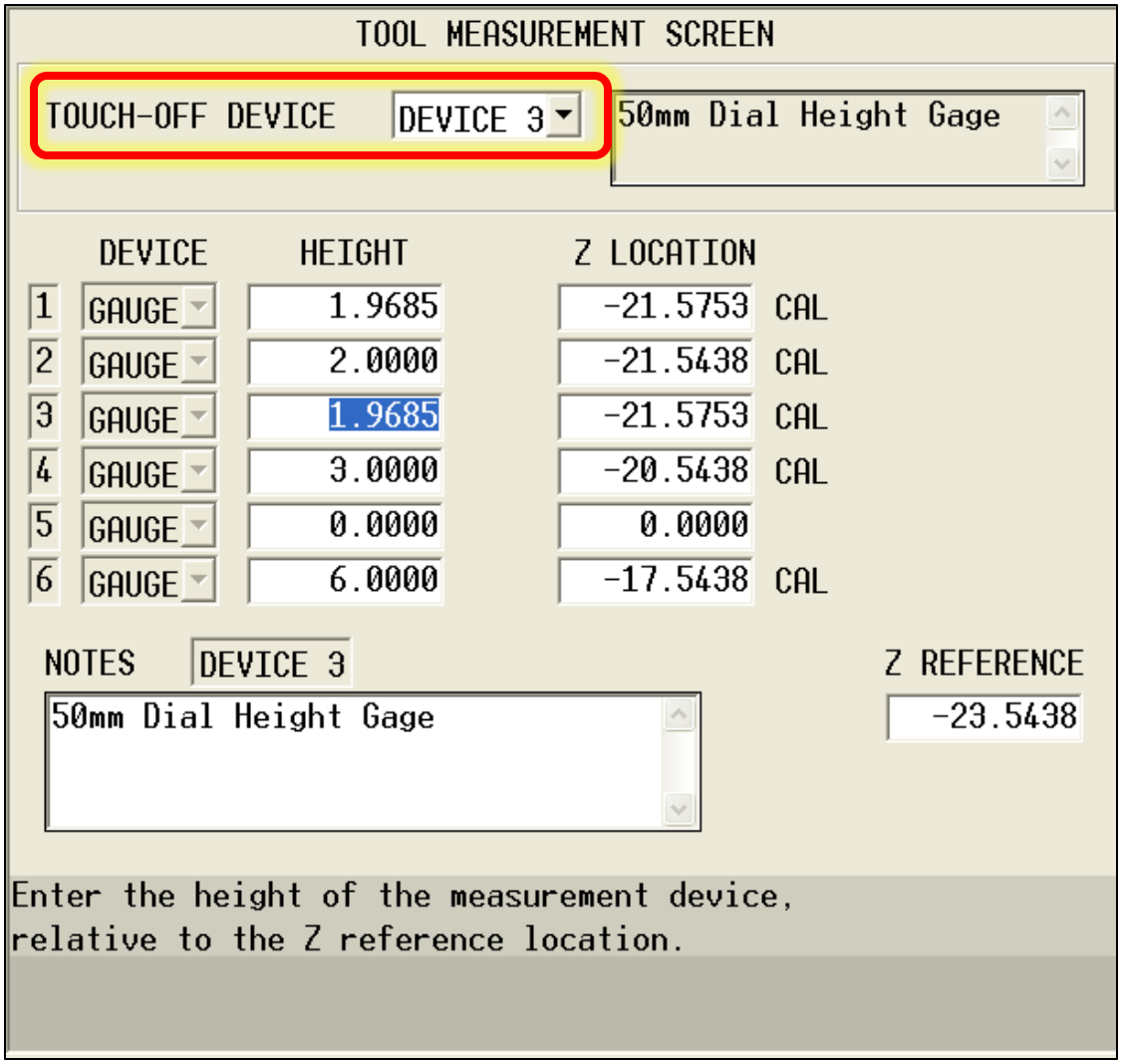
PRESS MANUAL MODE, POWER, AND START CYCLE TO RESTORE POWER.

The absolute length of the tool, measured from the spindle gage-line.

Step 1

Verify the Active Device

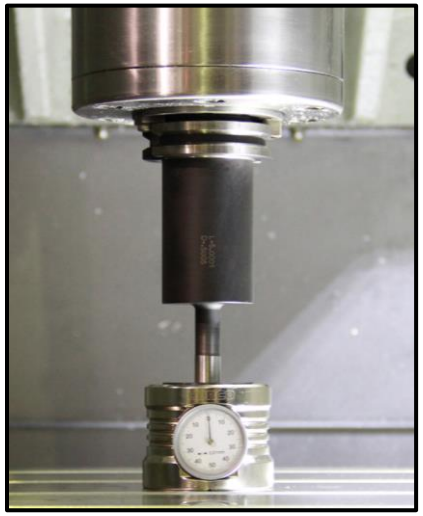
1. Press INPUT on control panel
2. Select TOOL REVIEW softkey
3. Select TOOL SETUP softkey
4. Select MORE softkey
5. Select TOOL MEASURMENT SETTINGS softkey
6. Select the active Touch-off device

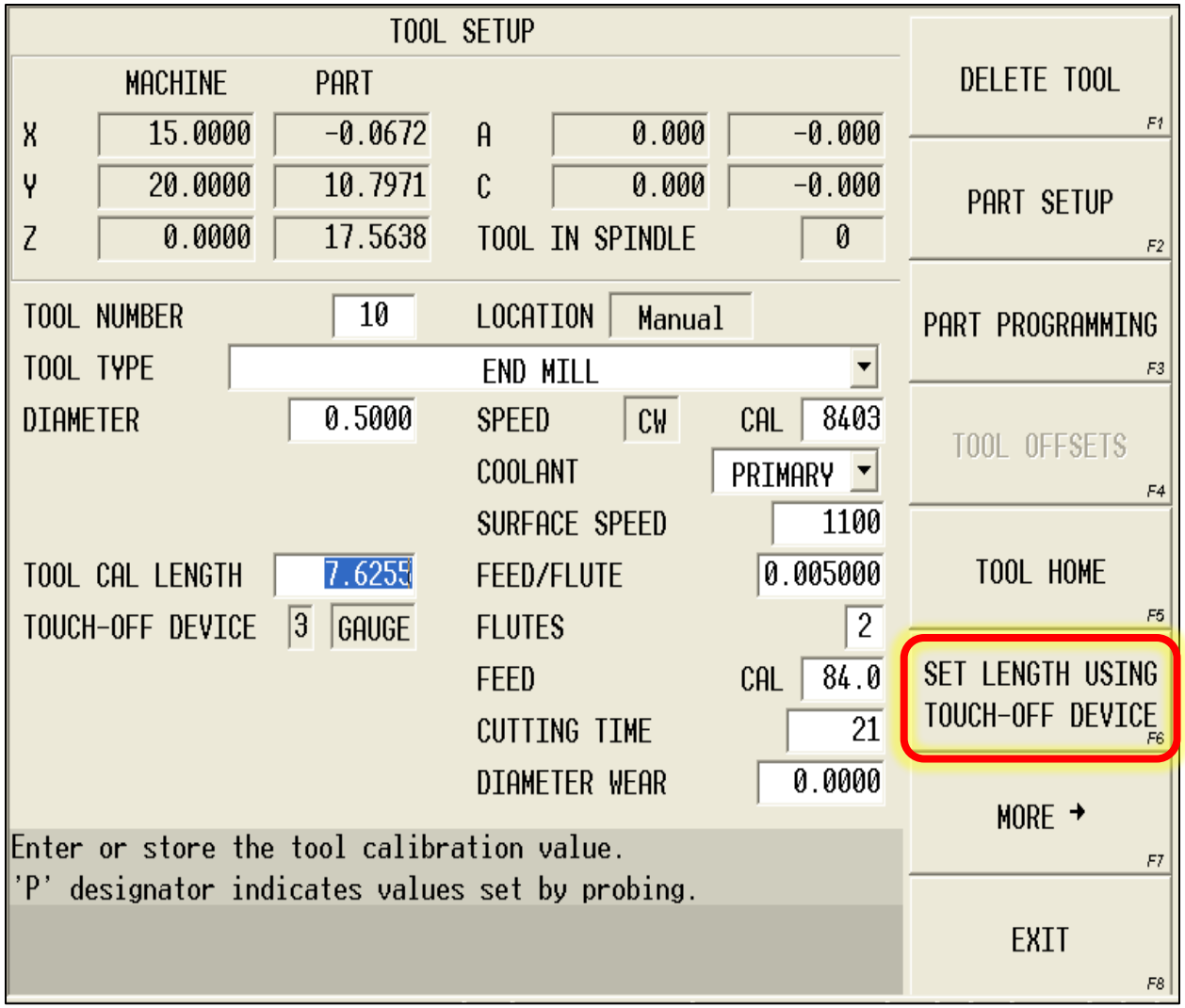


Step 2

Calibrate the Tool

1. Jog the tool into contact with the active touch-off device using the hand-wheel
2. Store the tool length by pressing the SET LENGTH softkey (F6)





Tool Touch-off

With Tool Touch Probe

Note: the tool setup and touch-off procedures in this manual assume that the machine control has been setup in ***Absolute Tool Length*** mode. Please refer to the separate section at the end of this document for more details.

TOOL SETUP

DELETE TOOL

F1

	MACHINE	PART		
X	0.0000	0.0000	SPINDLE	0
Y	0.0000	0.0000	FEED (STOPPED)	0.0
Z	0.0000	0.0000	TOOL IN SPINDLE	0

TOOL NUMBER 1 LOCATION Manual MANUAL

TOOL TYPE END MILL

DIAMETER 0.5000 SPEED CW CAL 7639

TOOL CAL LENGTH 6.2531

TOUCH-OFF DEVICE 1 GAUGE

CUTTING TIME 21

DIAMETER WEAR 0.0000

Amount of time in minutes that the tool has been in the rotating spindle.

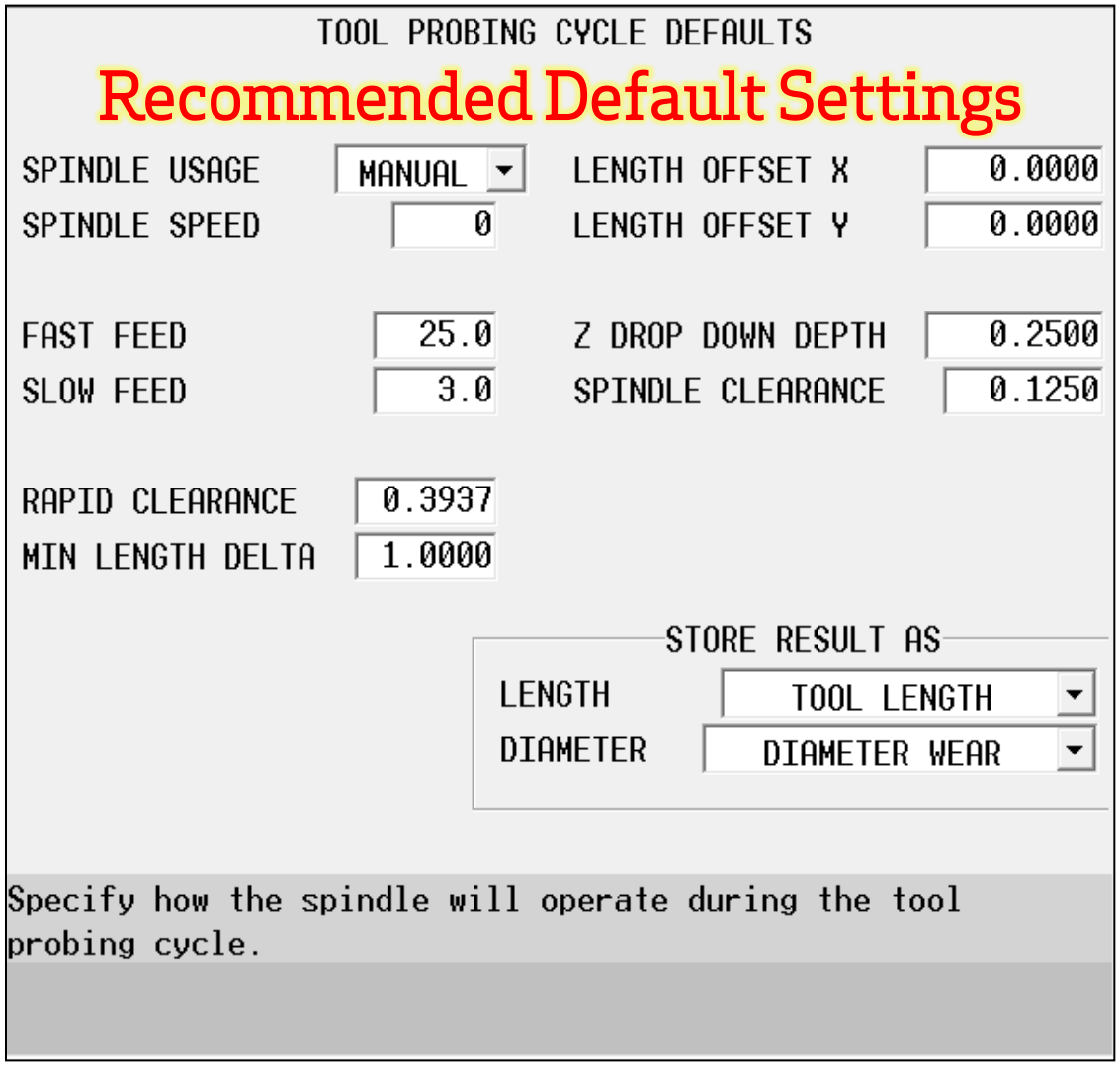
PRESS MANUAL MODE, POWER, AND START CYCLE TO RESTORE POWER.

The absolute length of the tool, measured from the spindle gage-line.

Step 1

Verify Probing Cycle Defaults

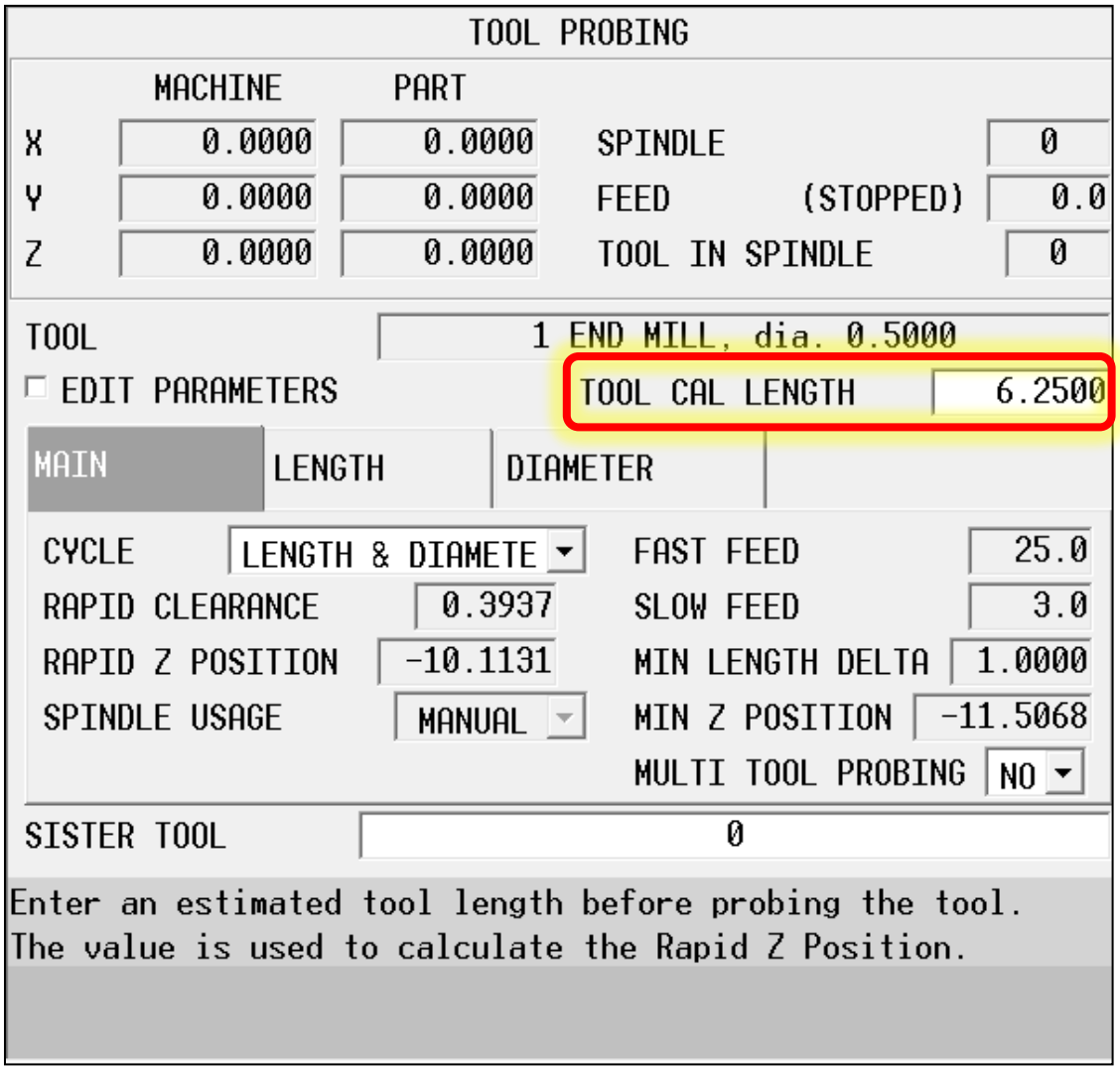
1. Press INPUT on control panel
2. Select TOOL REVIEW softkey
3. Select TOOL SETUP softkey
4. Select MORE softkey
5. Select TOOL PROBING softkey
6. Select TOOL PROBE SETUP softkey
7. Select TOOL PROBING CYCLE DEFAULTS softkey



Step 2

Probe the Tool

1. Press INPUT on control panel
2. Select TOOL REVIEW softkey
3. Select TOOL SETUP softkey
4. Select MORE softkey
5. Select TOOL PROBING softkey
6. Measure tool for reference length, and enter the value in the TOOL CAL LENGTH field

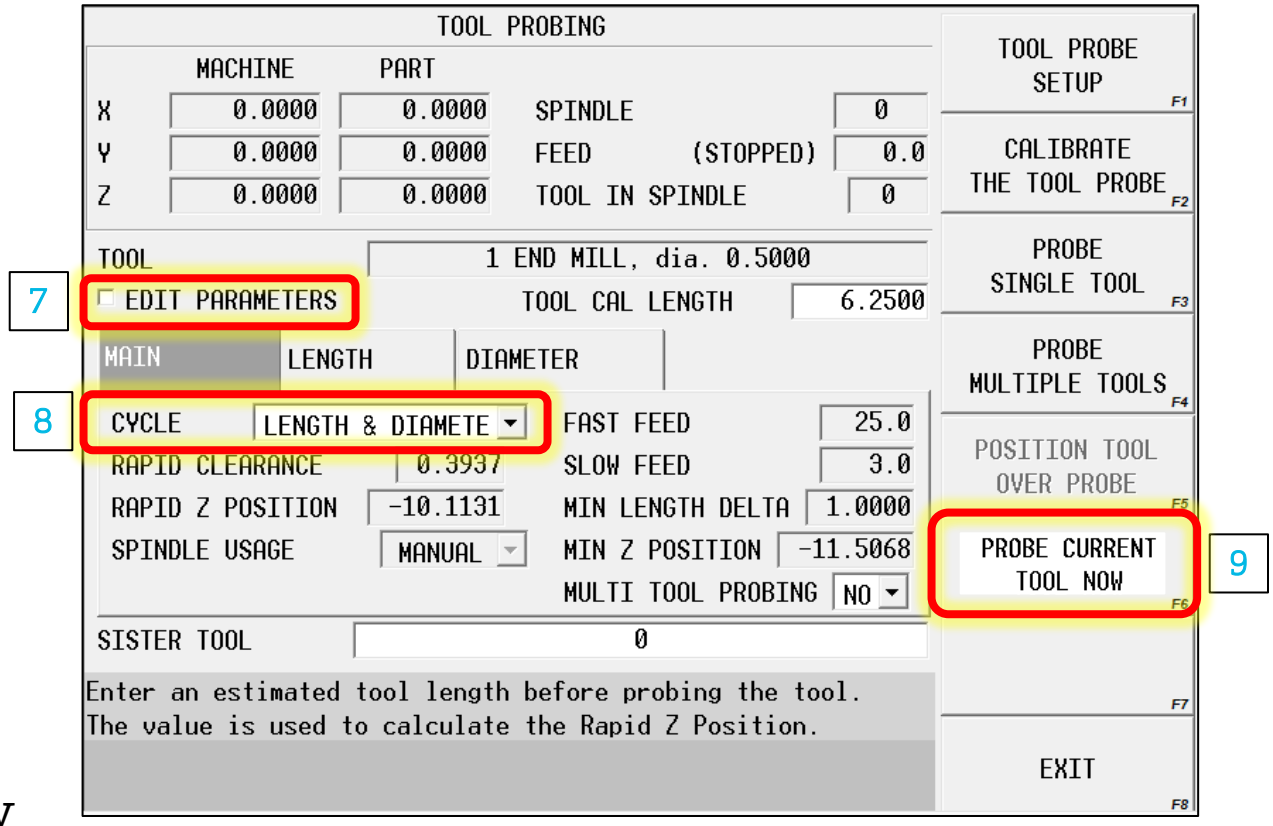


Step 2 - Continued

Probe the Tool

7. Check the EDIT PARAMETERS box to allow editing of the default probing parameters – **only if needed** – be sure to check all 3 tabs (Main, Length, Diameter).
8. Select the desired cycle type
9. Select the PROBE CURRENT TOOL NOW softkey

Note: the travel speed of the probe is controlled by the FEED knob only.

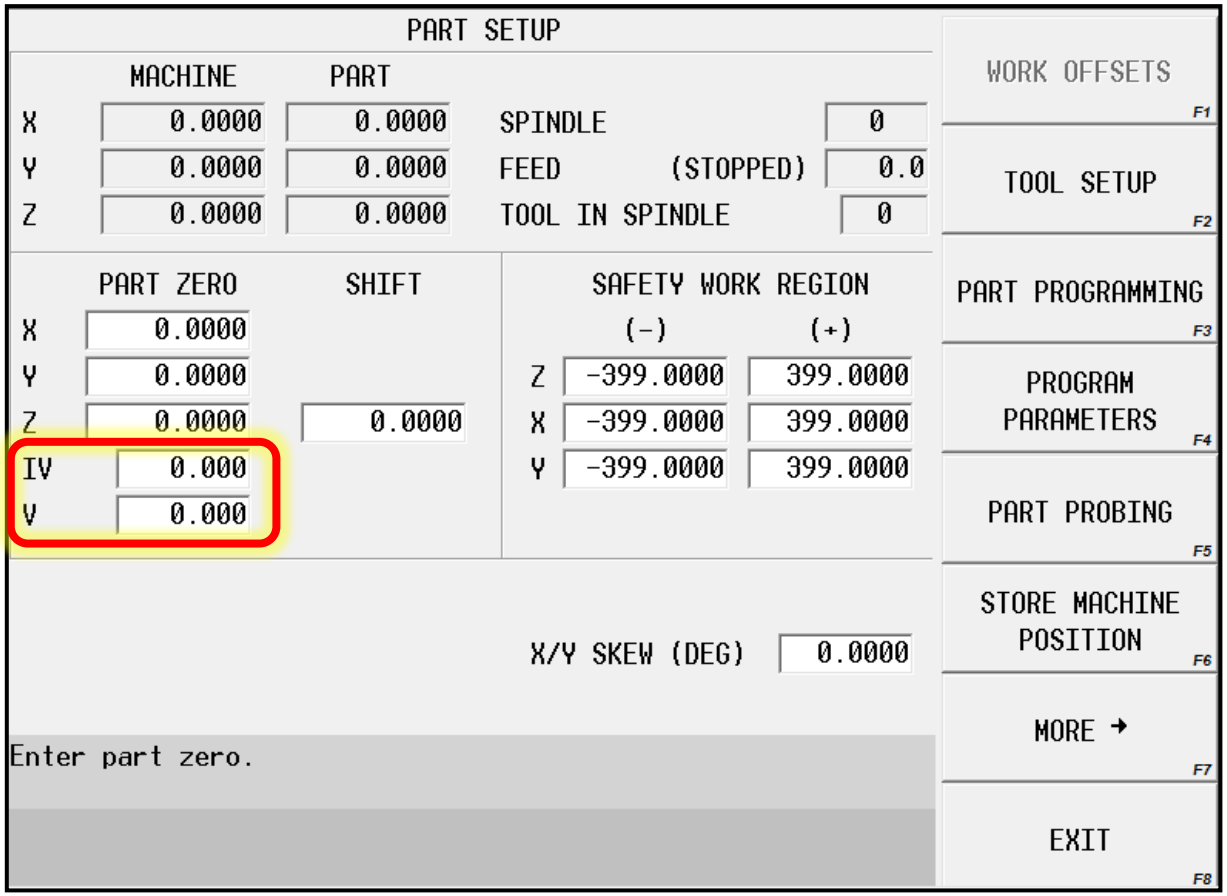


Part Setup

Without Part Probe

Part Setup Screen

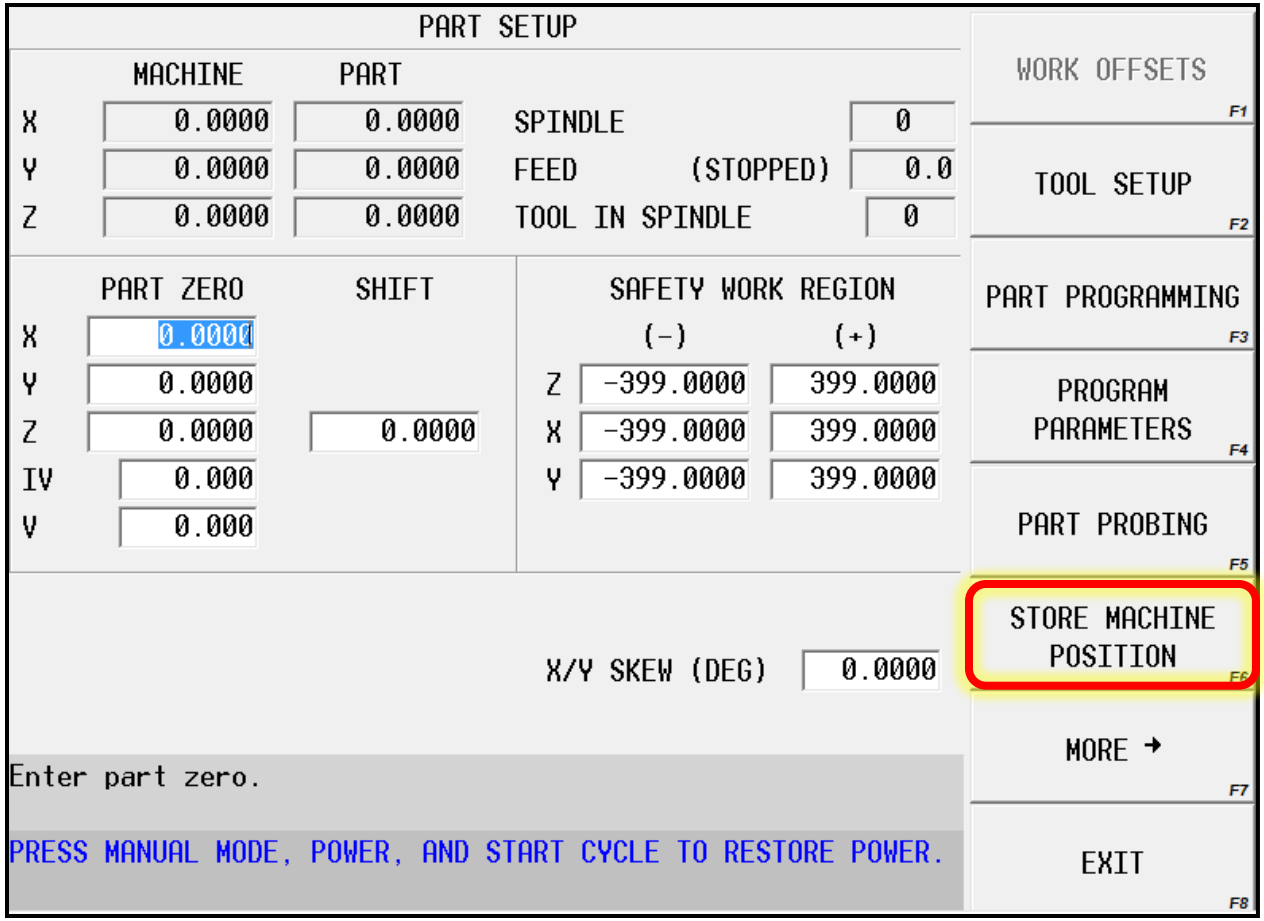
Note: the default configuration for the part setup screen is in the Universal Rotary setting. Regardless of the machine configuration (3-axis, 4-axis, or 5-axis) there will be data fields for a IV and V axis. This is normal, and the fields can be ignored for standard 3-axis machines.



Part Setup

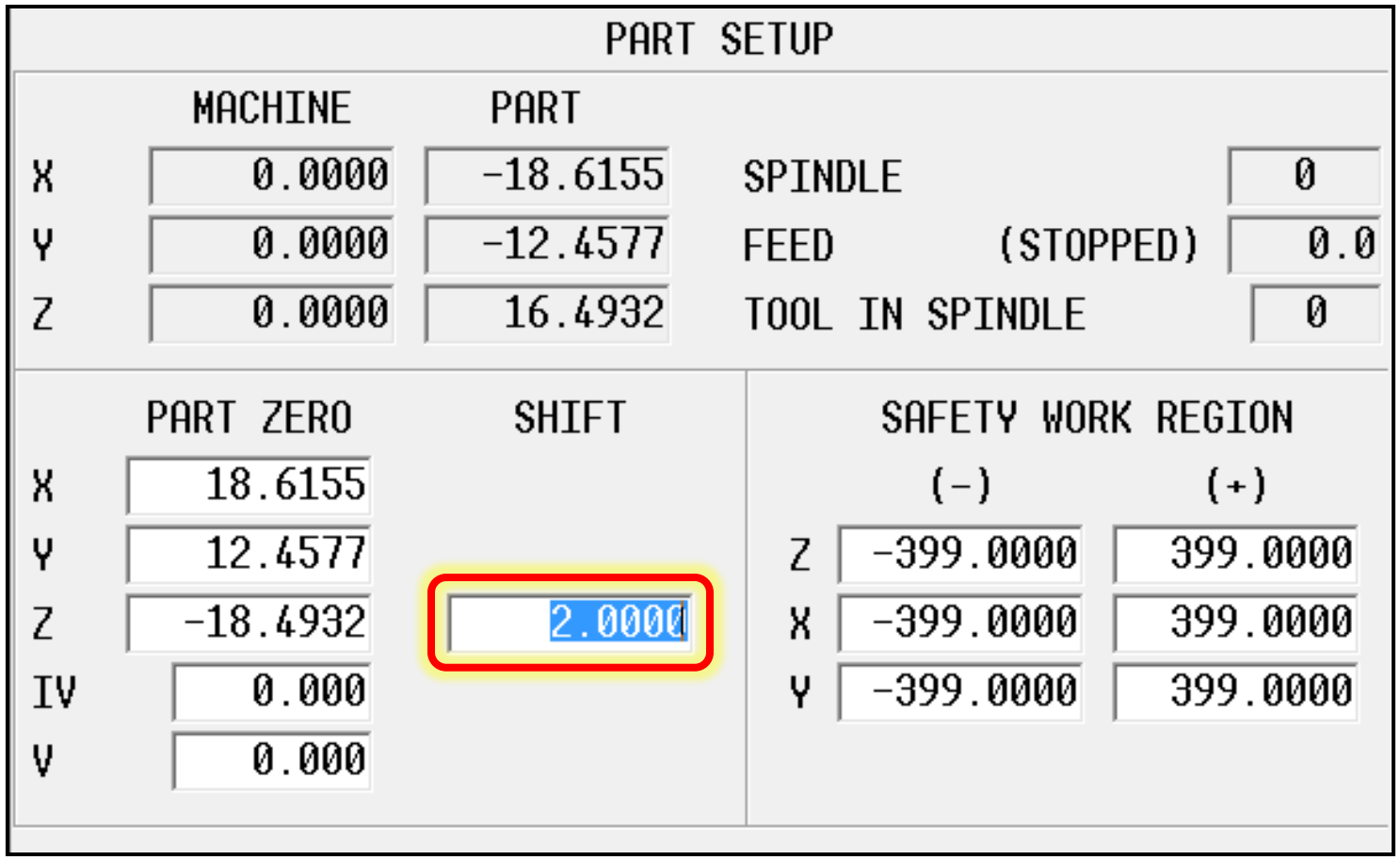
Without Part Probe

1. Press INPUT on control panel
2. Select PART SETUP softkey
3. Jog the desired axis into position using the handwheel
4. Place the cursor in the corresponding data field for the desired axis
5. Select the STORE MACHINE POSITION softkey
6. Verify the data is correct



Part Setup Screen

Note: the SHIFT field can be used to incrementally shift the Z-axis.
For example: a value of 2.0000" will shift the Z-axis zero in the positive direction by two inches. Both positive and negative values can be input.



Absolute Tool Length Calibration

HURCO®

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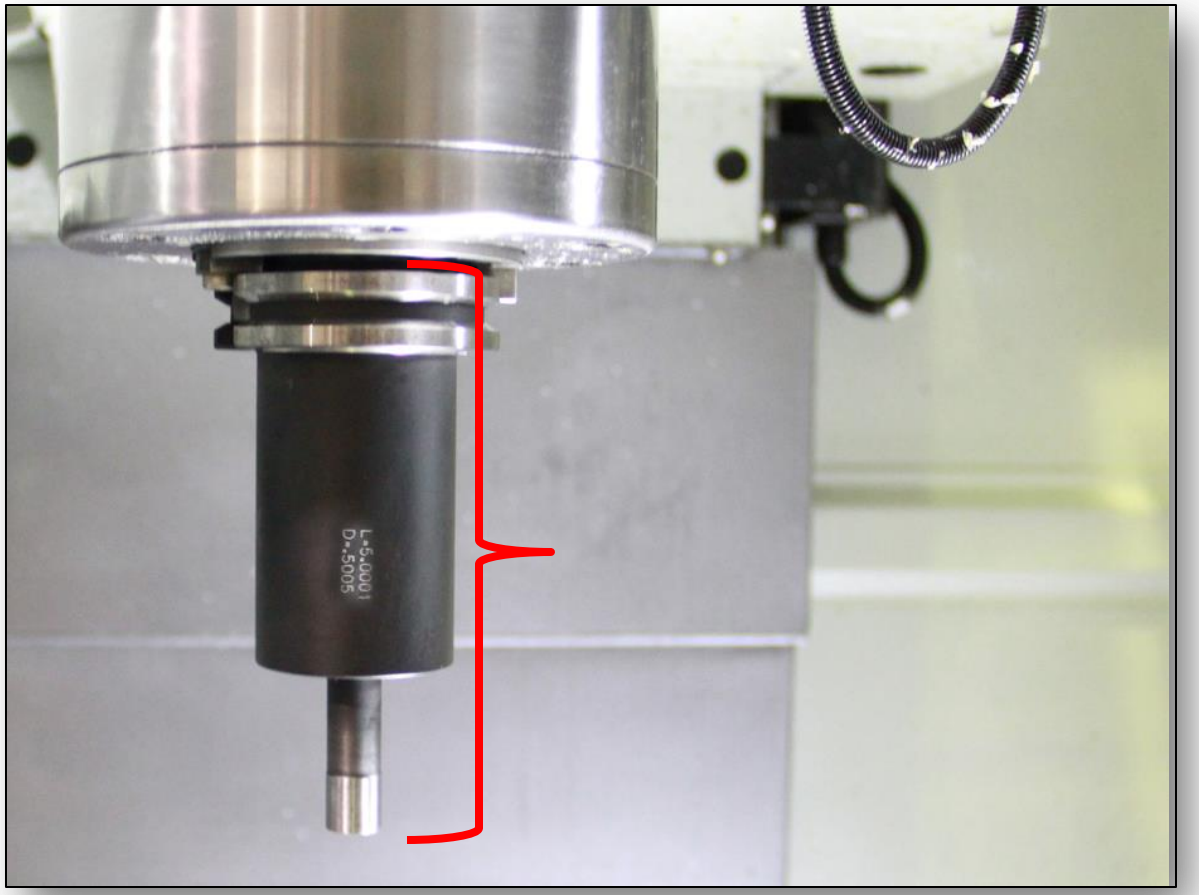
Contents

- What is Absolute Tool Length
- What is the Spindle Gage-line
- What is a Master Reference Tool
- How is the Gage-line calculated
- Why is it important to use the Gage-line for tool lengths
- How to establish a Probe or Gauge device.

Absolute Tool Length

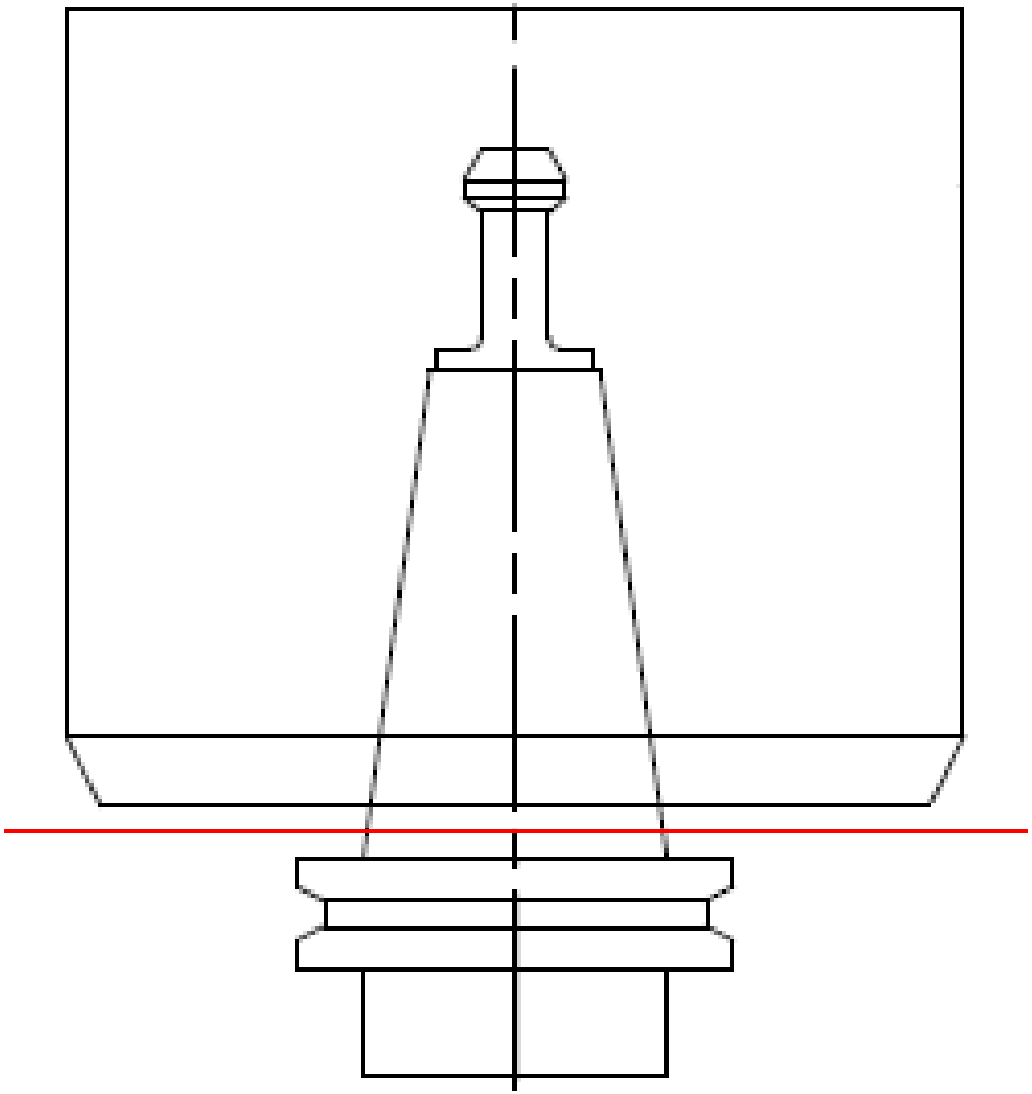
What is it?

Absolute Tool Length - is the actual measured length of a tool sticking out of the spindle, and is typically measured from the spindle gage-line.

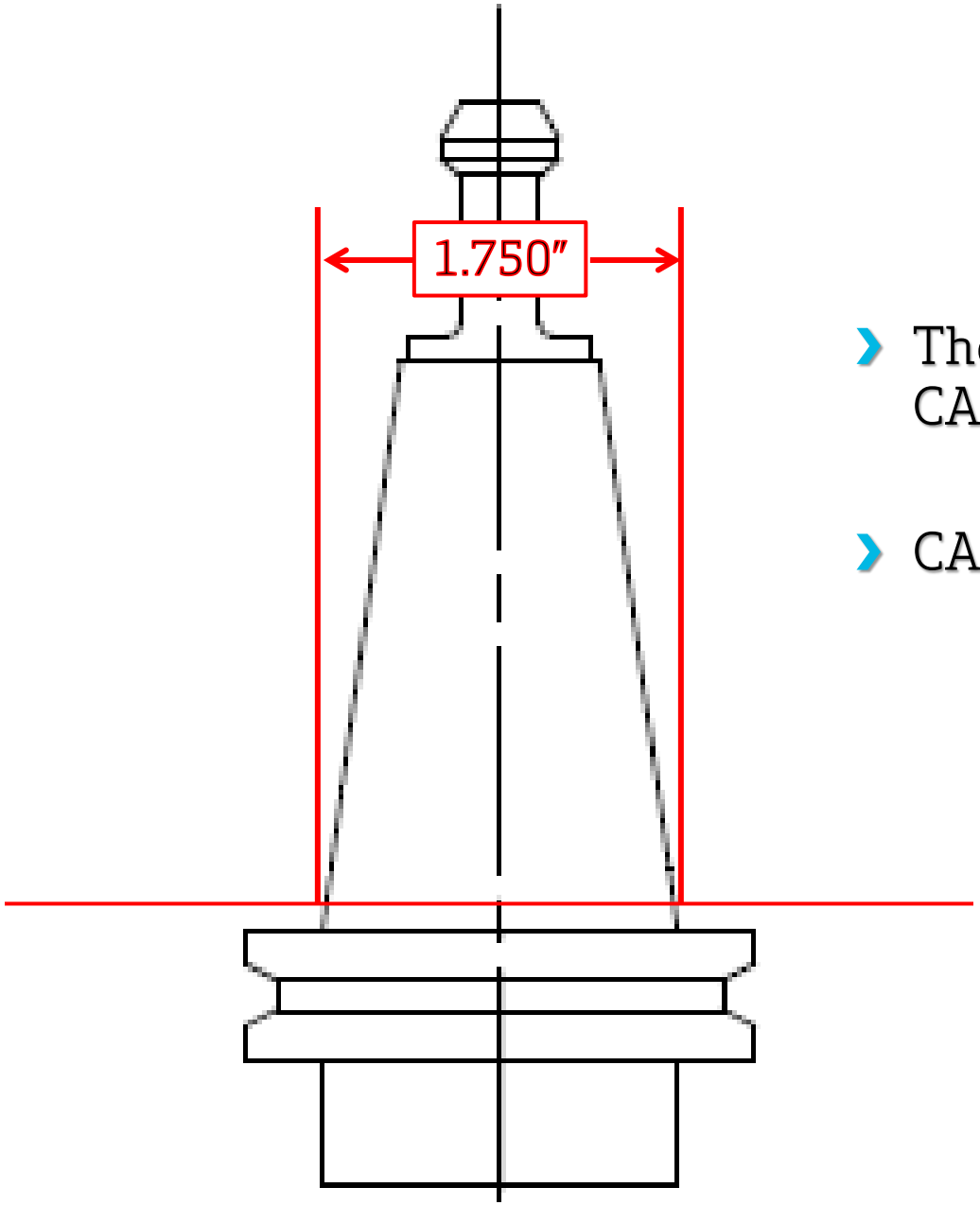


Spindle Gage-line

What is it?



- The spindle gage-line falls somewhere within the gap between the spindle nose face and the V-flange on the tool holder.
- The location is determined by a specified diameter along the ground taper of the tool.



- The specified diameter on a CAT40 holder is 1.75″ diameter
- CAT 50 is 2.75″ diameter

Master Reference Tool

What is it?

Master Reference Tool - is a tool of calibrated length that can be mounted in the spindle and used to accurately reference a machine's spindle gage-line. The length is stenciled on the body.

Purchase a Master Reference Tool

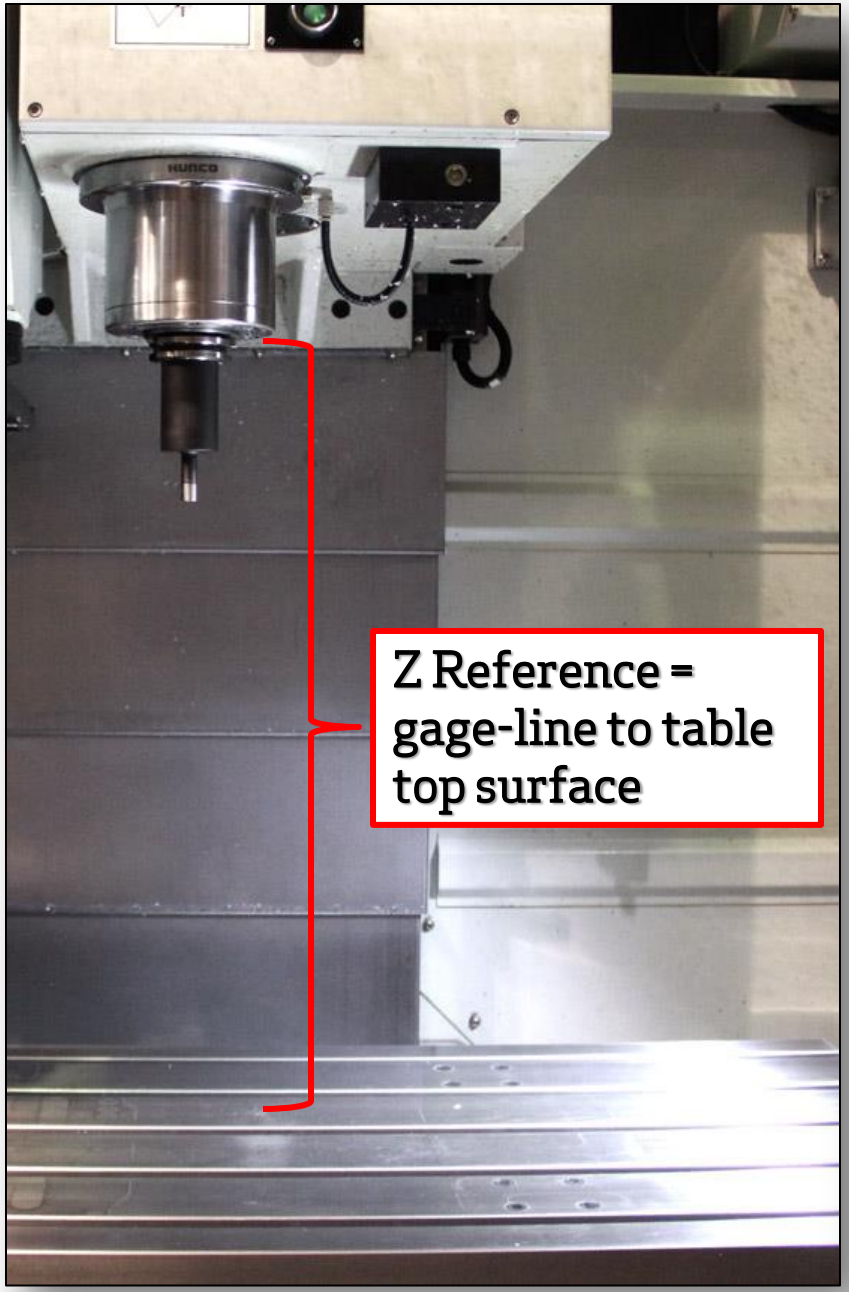
Renishaw, Inc. • 5277 Trillium Blvd. • Hoffman Estates, IL 60192 • 847-286-9953

www.renishaw.com

Description:	Part No.
CAT40 Calibration Master	M2253-0954
CAT50 Calibration Master	M2253-0955
BT30 Calibration Master	M2253-1562
HSK63 Calibration Master	M2253-1558

Setting the Z-Reference

Applying the gage-line



The Z-reference dimension is the measured distance between the spindle gage-line and the machine table surface.

TOOL MEASUREMENT SCREEN

TOUCH-OFF DEVICE: DEVICE 2

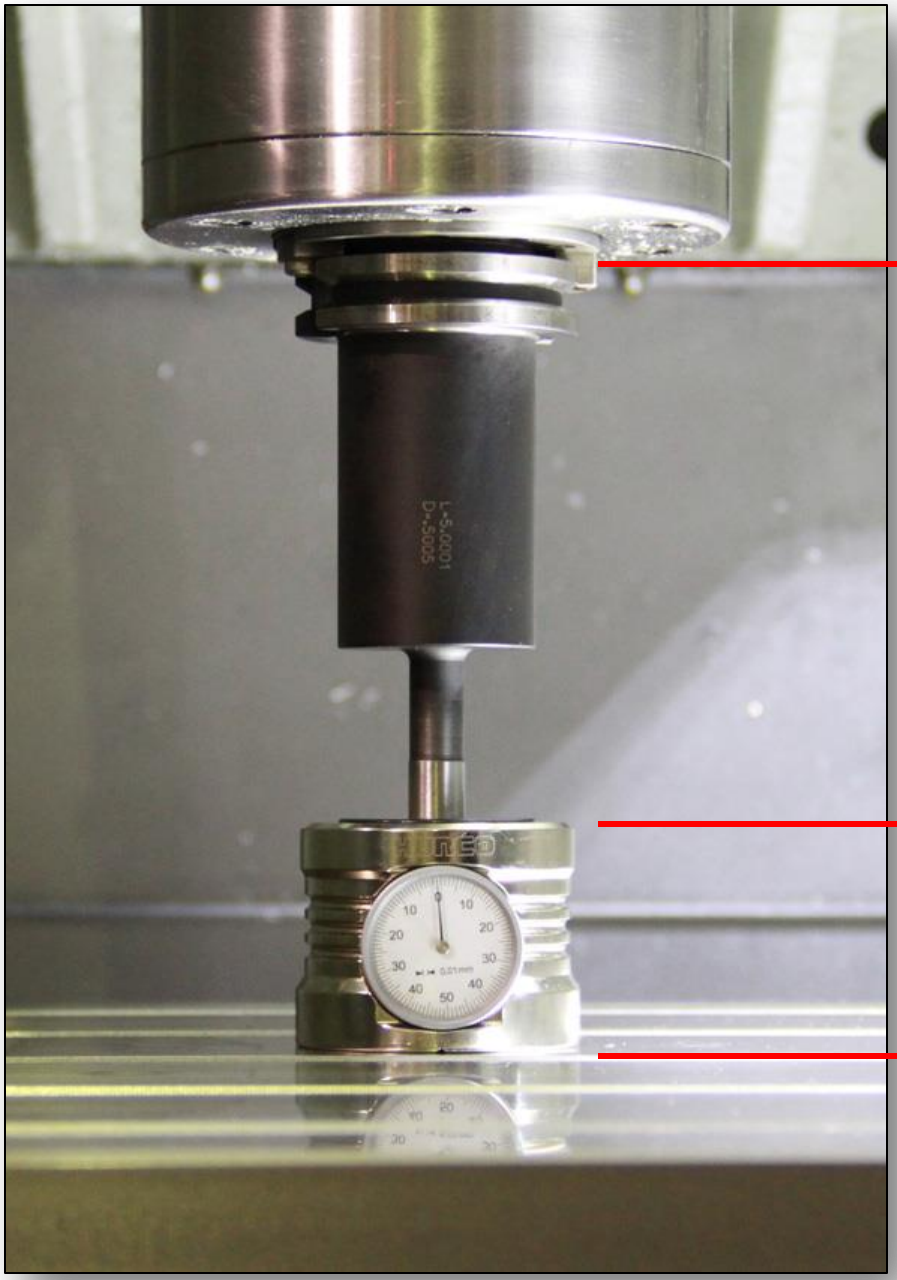
	DEVICE	HEIGHT	Z LOCATION	
1	PROBE	3.5966	-16.0389	CAL
2	GAUGE	1.9685	-17.6670	CAL
3	GAUGE	3.0000	-16.6355	CAL
4	GAUGE	0.0000	0.0000	
5	GAUGE	0.0000	0.0000	
6	GAUGE	0.0000	0.0000	

NOTES: DEVICE 1

Z REFERENCE: -19.6355

Measuring the Z-Reference

How is it calculated?



Z-axis Machine Position

+

Master Reference Tool Length

+

Dial Gage Height

=

Z- Reference Dimension

TOOL MEASUREMENT SCREEN

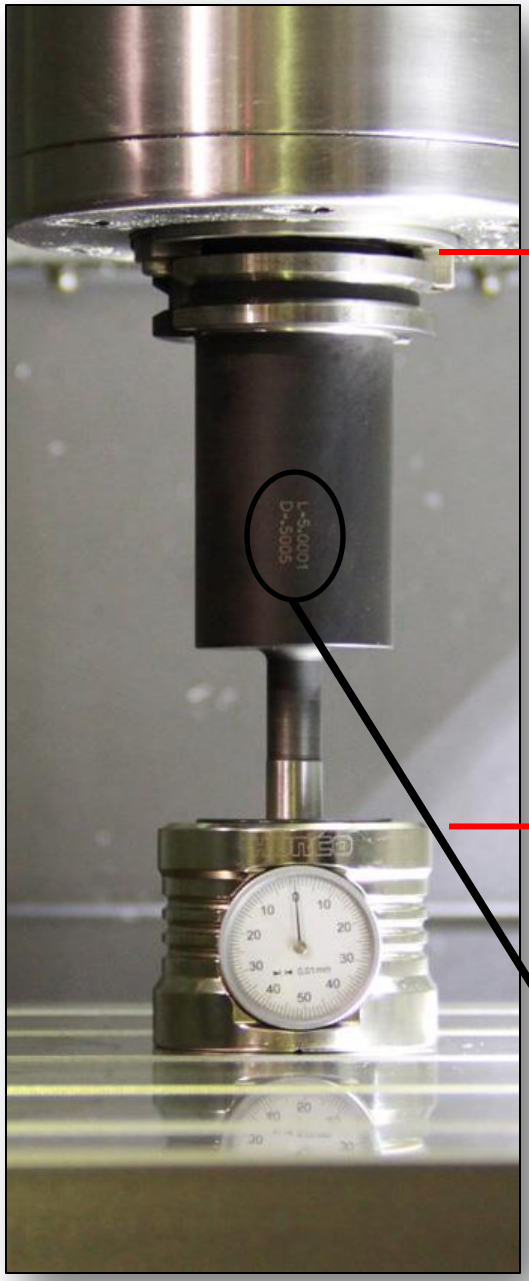
TOUCH-OFF DEVICE: DEVICE 2

	DEVICE	HEIGHT	Z LOCATION	
1	PROBE	3.5966	-16.0389	CAL
2	GAUGE	1.9685	-17.6670	CAL
3	GAUGE	3.0000	-16.6355	CAL
4	GAUGE	0.0000	0.0000	
5	GAUGE	0.0000	0.0000	
6	GAUGE	0.0000	0.0000	

Z REFERENCE: -19.6355

Top of active device = a calculated location

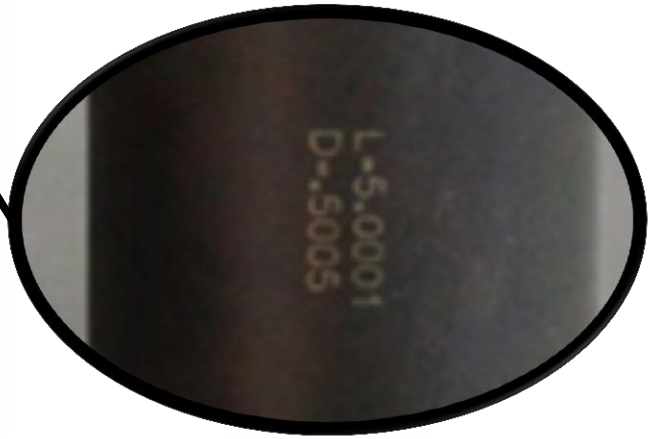
-19.6355 - 1.9685 = -17.6670



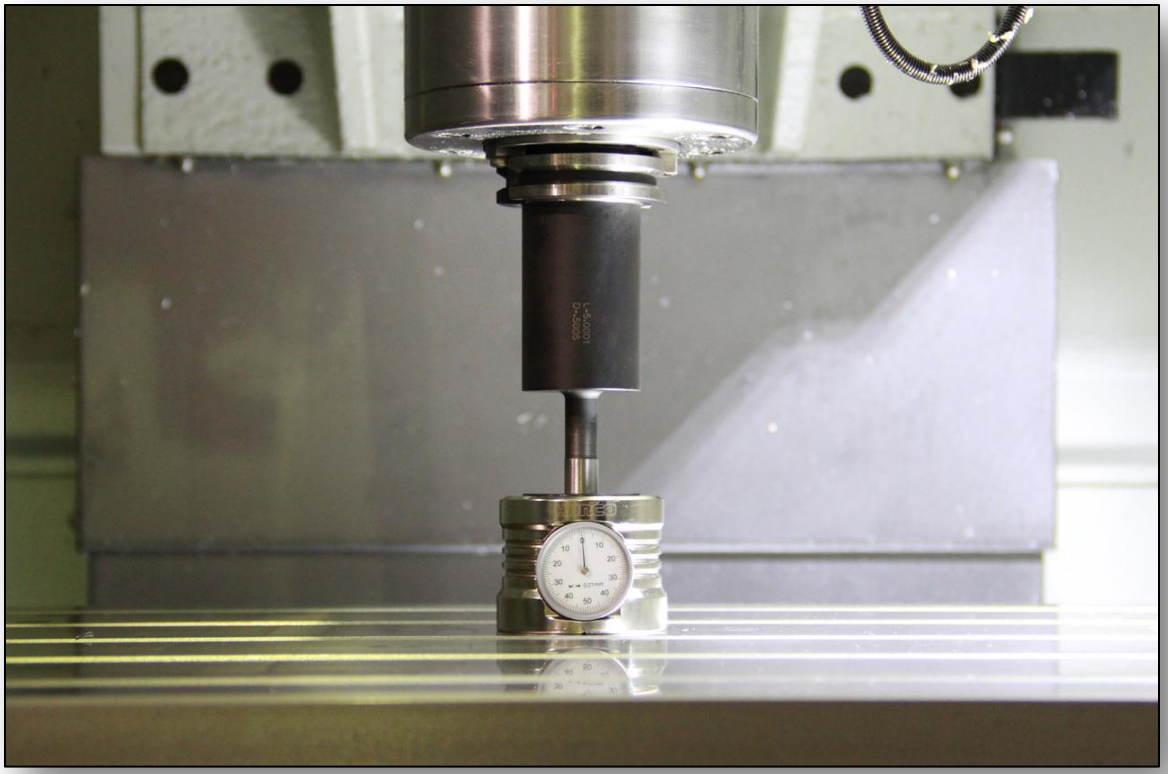
Z-axis Machine Position (-12.6669)

Tool Length (17.6670 – 12.6669 = 5.0001")

Calculated Device Location (-17.6670)



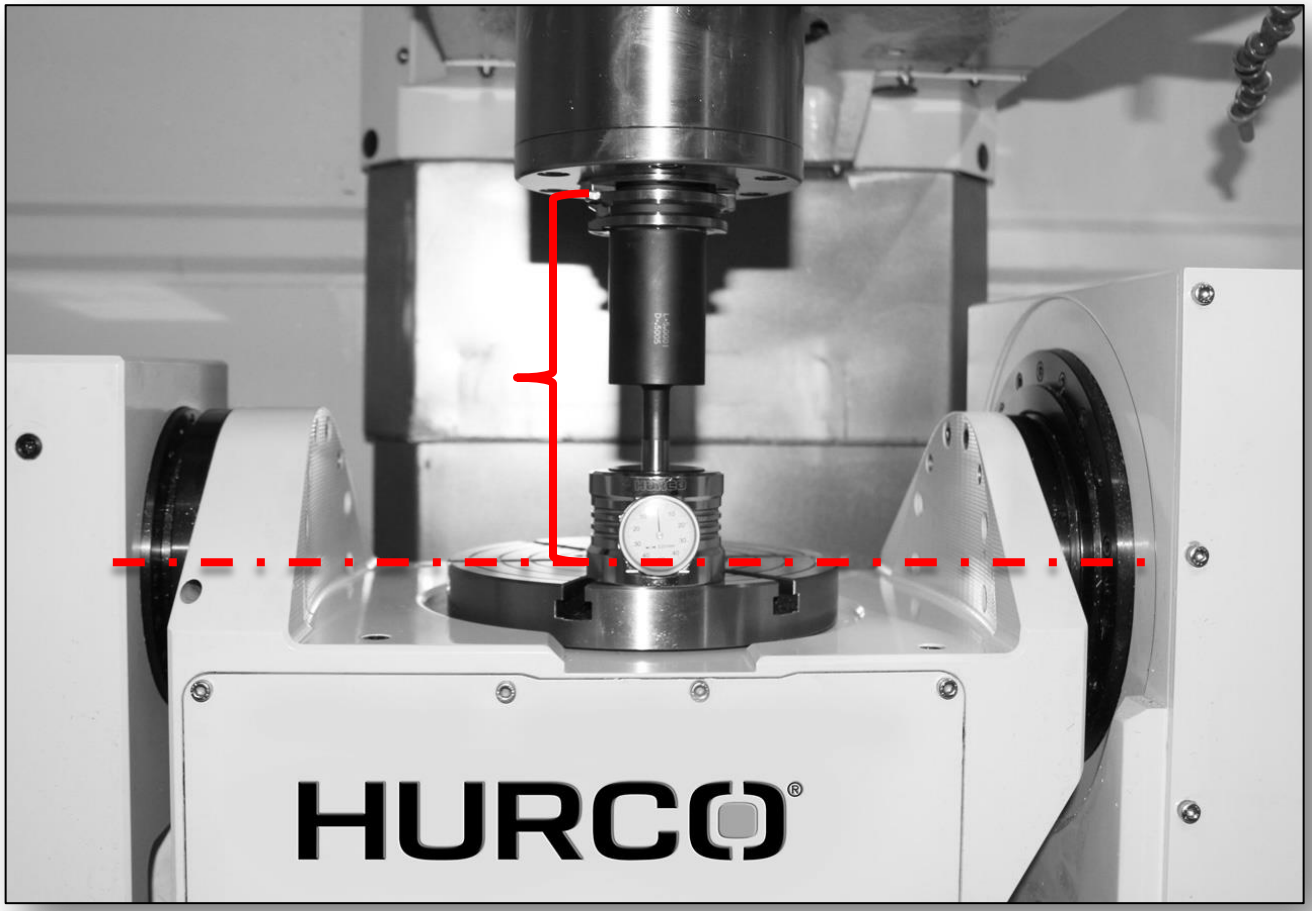
- In 3-axis setups the spindle nose CAN be used, but calculated tool lengths will be “machine specific”, and the tools cannot be shared between other machines.
- Also, offline tool pre-setters cannot be used if tool lengths do not reference the spindle gage-line.



Apply this to 5-axis

Measuring Centerlines

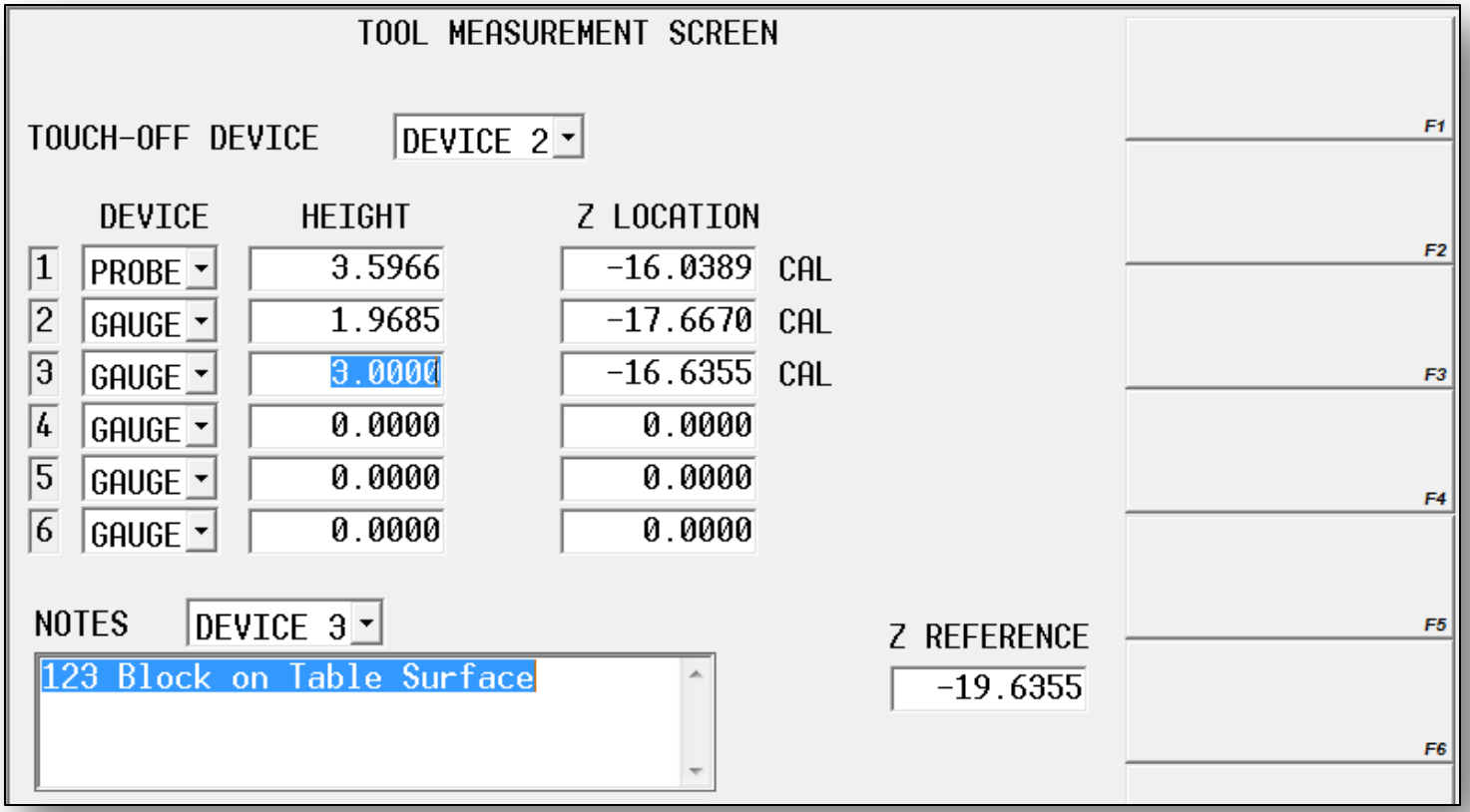
- Rotary axis centerlines are measured from the spindle gage-line in the Z-axis direction.
- Tool lengths **MUST** be measured from the same reference point - or positioning is off location when the part is rotated.



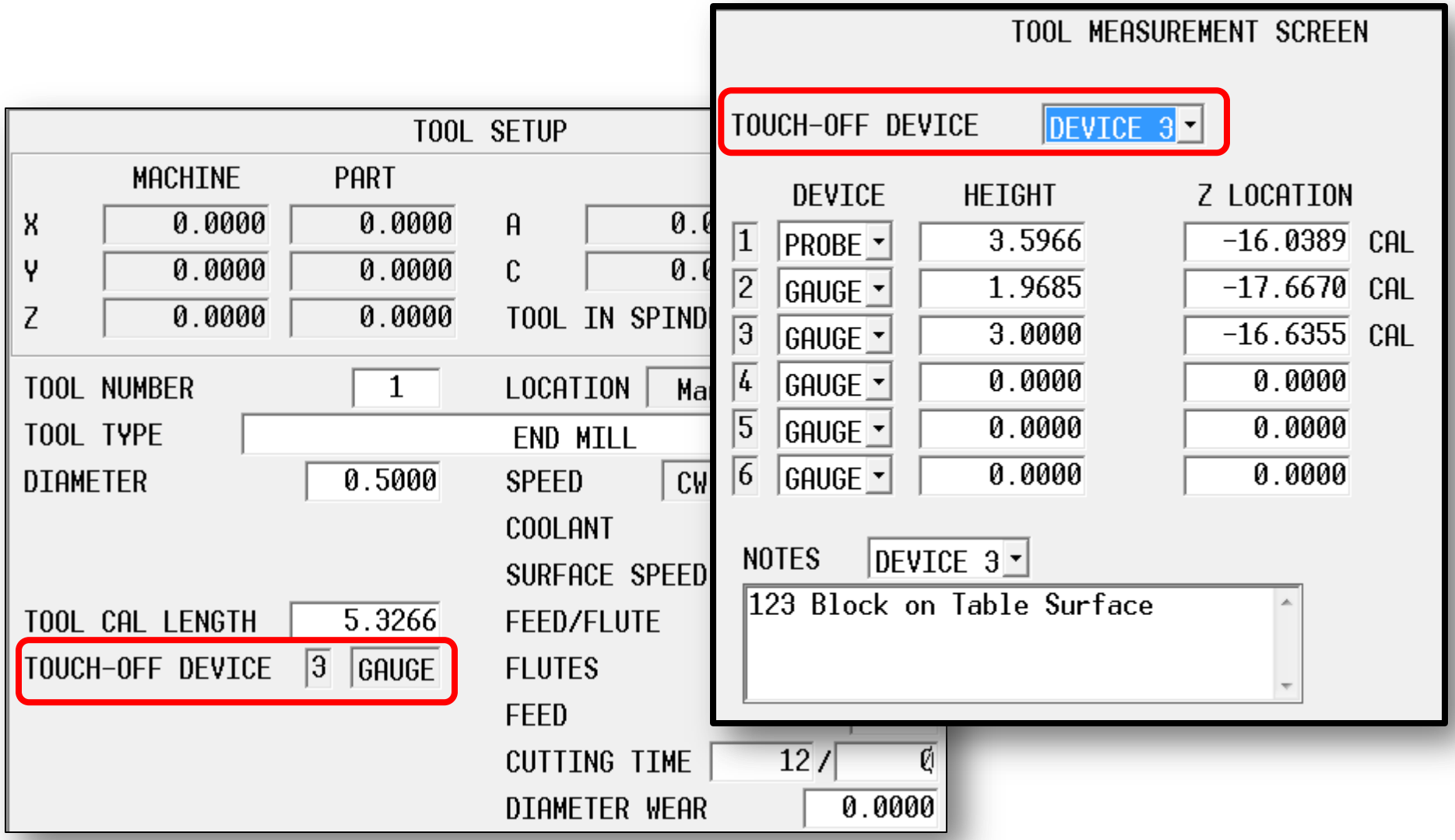
Establish a Setup Device

How do I?

- Absolute Tool Length allows the operator to define and use (6) six different devices to establish a tool's calibrated length.
- The device height is simply an actual measured height of any object to be used to touch-off tools (example: 123 block).



- Select the active Touch-Off Device.
- Verify the correct device is active when calibrating tools.



- If one of the devices to be used is a probe, the device type will be set to Probe instead of Gauge.
- Height is the distance from the table surface to the probe stylus surface or laser beam – should be established at install.