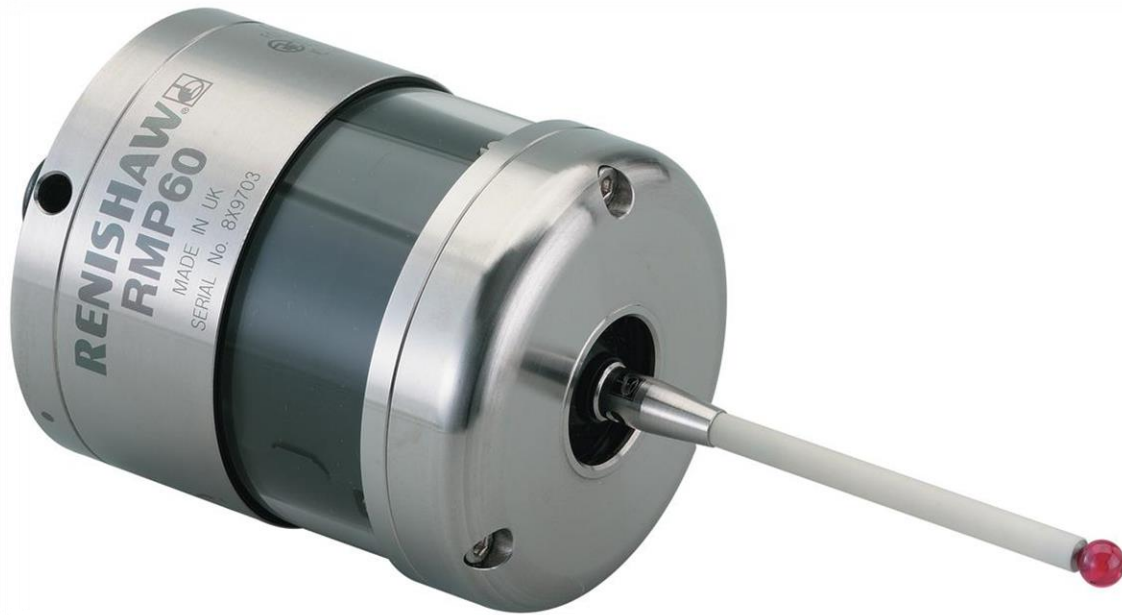


Powered by: **RENISHAW** 



Spindle Probe



This presentation will give you step by step instructions on how to setup and (re)calibrate your spindle probe.

N320(CALIBRATE PROBE X-Y)
(SN= 201608090)
(MM= 38.1081)
(IN= 1.50031)
(D=EXACT DIAMETER OF RING)
(B=NOMINAL DIAMETER OF RUBY)
(U=OPTIMISE CALIBRATION 1=YES 0=NO)
G65P9901M102.V1.D1.50037B.07874U0.
M30

At the end of O8025 if the XY
calibration has a U value, you have
standard [Supatouch](#)

N340 (PROBE OPTIMIZATION)
(B=NOMINAL DIAMETER OF RUBY)
(A=DIRECTION POSITION)
G65P9901M110B.23622A1.

At the end of O8025 if the
Optimization is a stand-alone cycle,
you have [Supatouch.V2](#)

At the end of O8025 if the XY
calibration uses G175, you have
[Inspection Plus / Rengage](#)

(CALIBRATE PROBE X-Y)
(SN= 201506093)
(MM= 38.16655)
(IN= 1.50262)
(D=DIAMETER OF RING)
(S=WORK OFFSET SET FOR CENTER POSITION)
G175D1.5S6
M30

What Software do I have?

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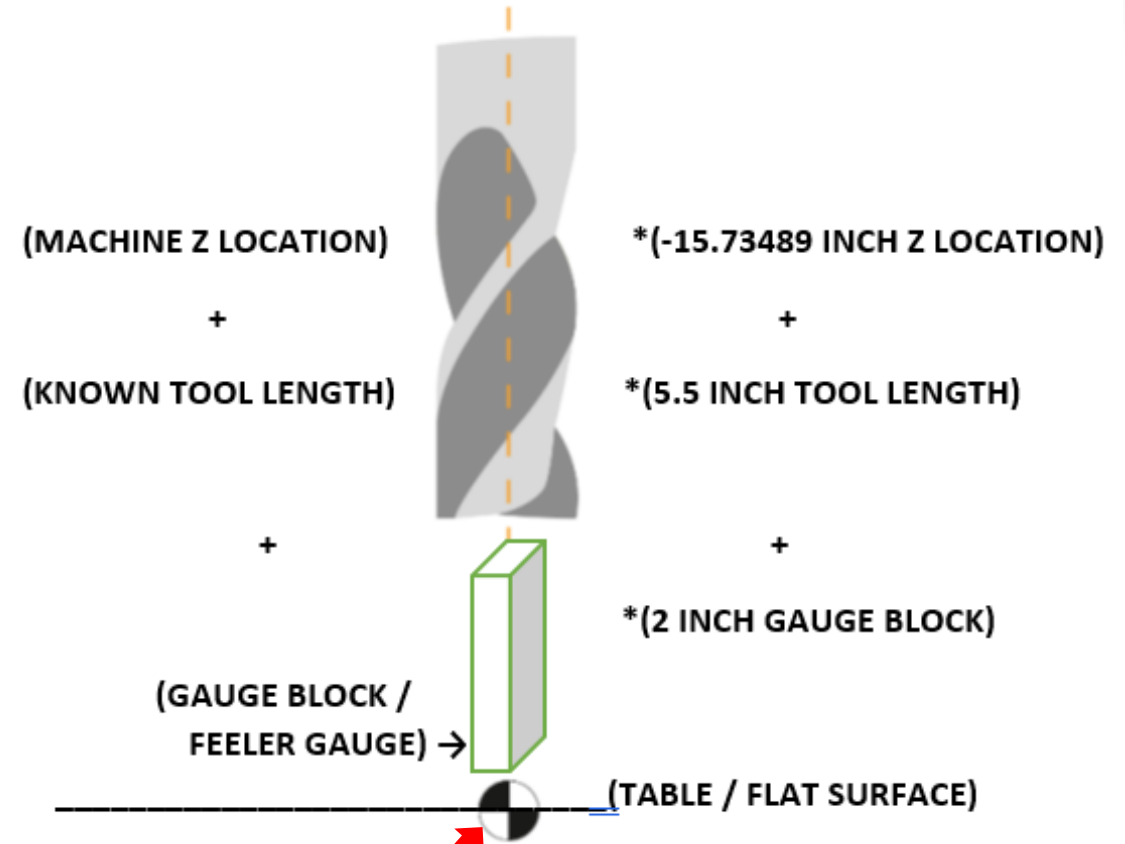
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***PQI SUGGESTS ALWAYS
CALIBRATING XY BEFORE Z***

Create Z Work Offset

We must create an initial Z work offset in order to properly run probe length calibration.

- Using:
 - Tool of known length
 - Feeler gauge / gauge block of known size
- Find a flat perpendicular surface to your Z axis
- Be sure applicable axis is not skewed
- Manually touch off your 'feeler gauge' so it has just enough contact between your tool and surface that your feeler gauge can move but not bounce around
 - *you can also just use a known Z location in your machine if you have one
- Now that we have touched off the tool **do not move the machine Z axis**
- We now must create a Z work offset using our known values




CALIBRATE FROM THIS SURFACE!

(REMOVE GAGEBLOCK / FEELER GAGE WHEN CALIBRATING Z)

• **Example:**


- Z machine location = -15.73489 inch
 - Tool length = 5.5 inch
 - Feeler gauge = 2 inch gauge block
 - We need to select a work offset to set... don't overwrite important existing offset numbers!
 - G54 Z location
 - Add all 3 known numbers together
 - $(-15.73489) + (-5.5) + (-2.0) = (-23.23489)$
 - *Depending on machine control type you may have to add the values differently, as to make your numbers always more negative
 - Be sure to calculate in appropriate machine units
 - Our new Z position in G54 is -23.23489 (inch) this is the number that the Z calibration cycle will use to calculate the new probe length
- Be sure you change the offset callout from the length calibration program to match this offset!
- **Calibrate directly on your Z-zero known surface! (remove gage block or feeler gage when calibrating)**



 (CALIBRATE PROBE LENGTH)
 (T=TOOL OFFSET FOR PROBE)
 G59(KNOWN Z SURFACE WORK OFFSET)
 N170G170T1
 M30

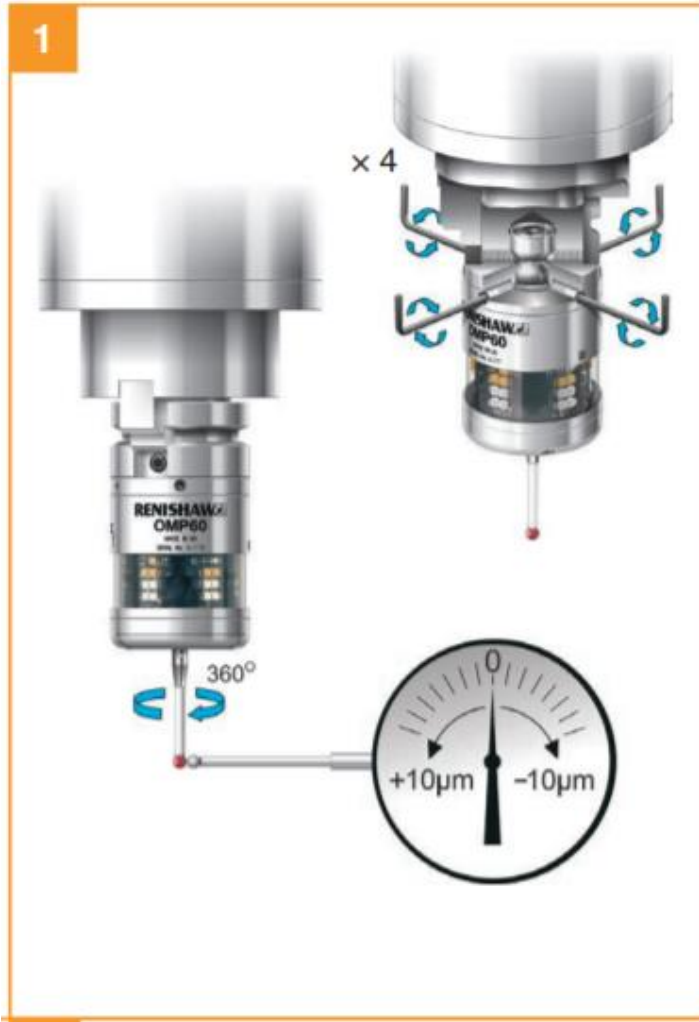
Inspection Plus / Rengage

Supatouch

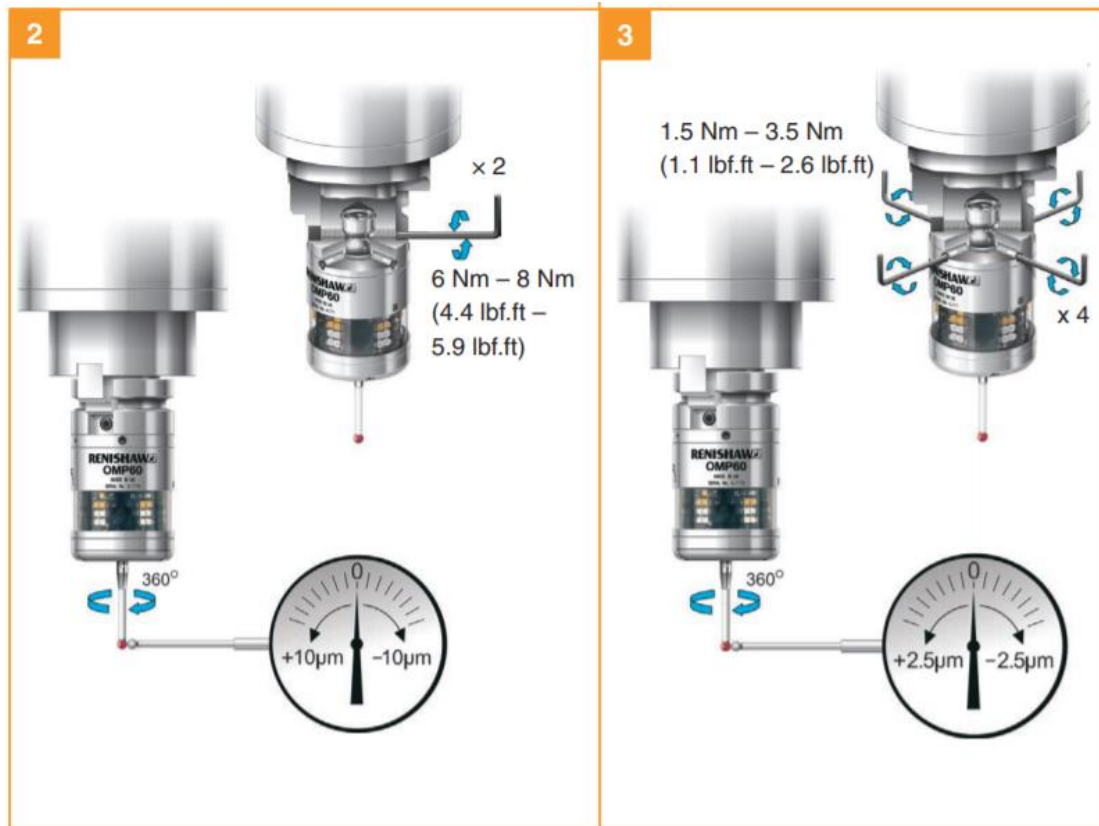


 N330 (CALIBRATE PROBE LENGTH)
 (B=NOMINAL DIAMETER OF RUBY)
 (T=TOOL OFFSET FOR KNOWN TOOL)
 (Z=REFERANCE SURFACE POSITION)
 G54 (KNOWN Z WORK OFFSET)
 G65P9901M104Z0.B.07874
 M30

Stylus Runout



- Any time you **break** or **replace** a stylus, you must redo your runout.
- Some ways of achieving this are with a dial indicator or a tool pre-setter.
 - Parlec, Zoller, Sperroni, etc.
- Per Renishaw Specification keep the runout below +/- .010 mm (.0004 in)
 - Ideally keep it below +/- .0025 mm (.0001 in)
 - The closer to zero the better



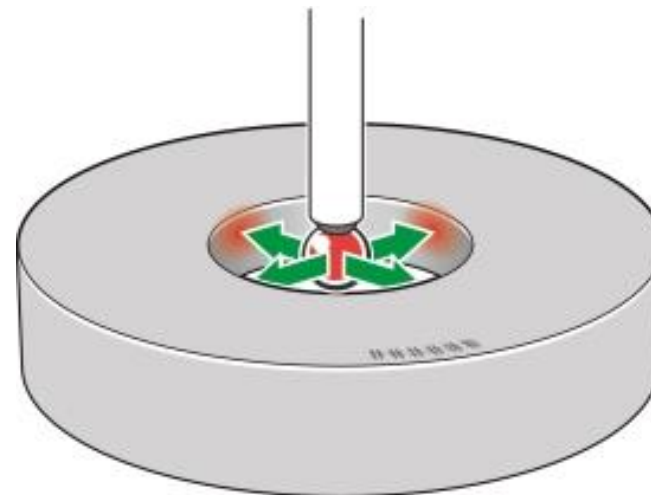
- The 2 screw holes nearest the tool holder are pointed set screws and hold the Probe into the Tool Holder, these must remain tight.
 - (Figure 2)
- The 4 screw holes nearest the Probe body are your XY Runout adjustment screws. (they may be ON the probe body)
 - (Figure 3)
- Rotate and make small adjustment to (4) adjustment screws every 180°
 - similar like how you would use a 'Four Jaw Chuck'
- When you get an acceptable number, make sure **all** screws are tight
 - no need to overtighten

Supatouch XY Calibration



- This cycle is in program O8025 line N320
 - Or MDI Template Programs
- Ensure the D (exact diameter of feature) and B (nominal diameter of Stylus ruby) values are correct and in machine units
- Manually drive the spindle probe roughly centered into your calibration ring or feature, making sure the ruby is fully inside
- Run the cycle
- If your probe macro variables start at 540 (standard)
 - Stylus X runout is in 542
 - Stylus Y runout is in 543
 - All Supatouch calibration data is in Metric

```
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M30
```

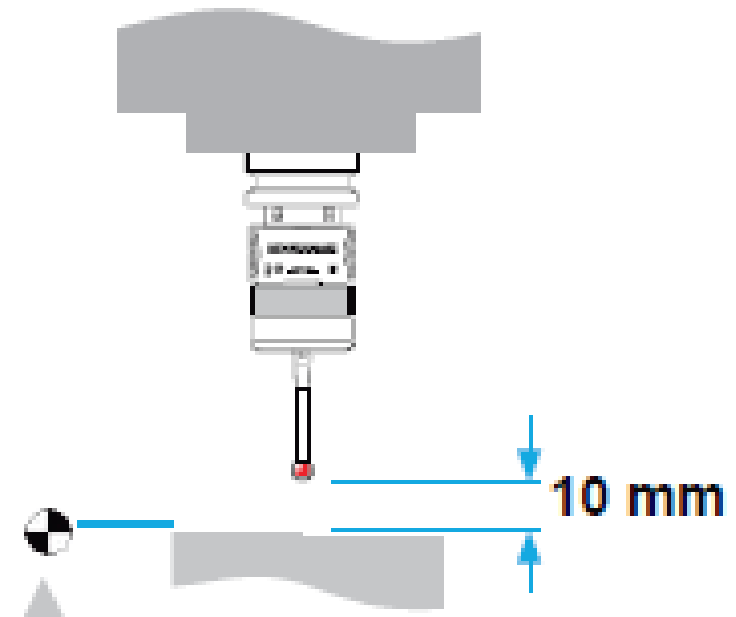


Supatouch Z Calibration



- This cycle is in program O8025 line N330
 - Or MDI Template Programs
- Ensure that the T (Tool number if not using H1 style tool offsets) and B (nominal diameter of Stylus ruby) values are correct and in machine units
- Manually drive the probe about half an inch above the point you touched off your tool
 - be sure applicable axis are at not at a skewed angle
- Don't forget to match the programs work offset callout to the one you set
- Run the cycle
 - This will update probe length in 3 spots
 - Tool data
 - Tool offset (T number in program)
 - Macro variable for probe calibration

```
N330 (CALIBRATE PROBE LENGTH)  
(B=NOMINAL DIAMETER OF RUBY)  
(T=TOOL OFFSET FOR KNOWN TOOL)  
(Z=REFERANCE SURFACE POSITION)  
G54 (KNOWN Z WORK OFFSET)  
G65P9901M104Z0.B.07874  
M30
```



*If Z moves positive and alarms when cycle starts,
the active Fanuc Offset Length may be longer than actual length. Zero out offset and run again*

Standard Supatouch Probe Optimization_(not required)



- Optimization **only suggested** to be run:
 - During initial probe setup
 - After drastically changing stylus length / ruby size
 - After probe body crash
 - After major machine service
- To reoptimize the spindle probe, delete Macro Variable #545 (assuming standard base number for calibration data)
 - You can check where the base number is by looking in O9424
- **If you delete Variable #545, you MUST calibrate XY then Z on the probe**
 - It will now force the Optimization cycle
 - The XY cycle will touch 40 times in X
 - Then the Z cycle will do 40 touches during Z Calibration
 - It does this at different feed rates to tell the probe the optimum feeds / speeds to move and take measurements in XYZ



O9424(REN*SETTINGS)
(PQI-MAKINO 8/17/2017)
#111=540(BASE*NO)
#100-[DPM[6000 211

Supatouch.V2

Probe Optimization (not required)

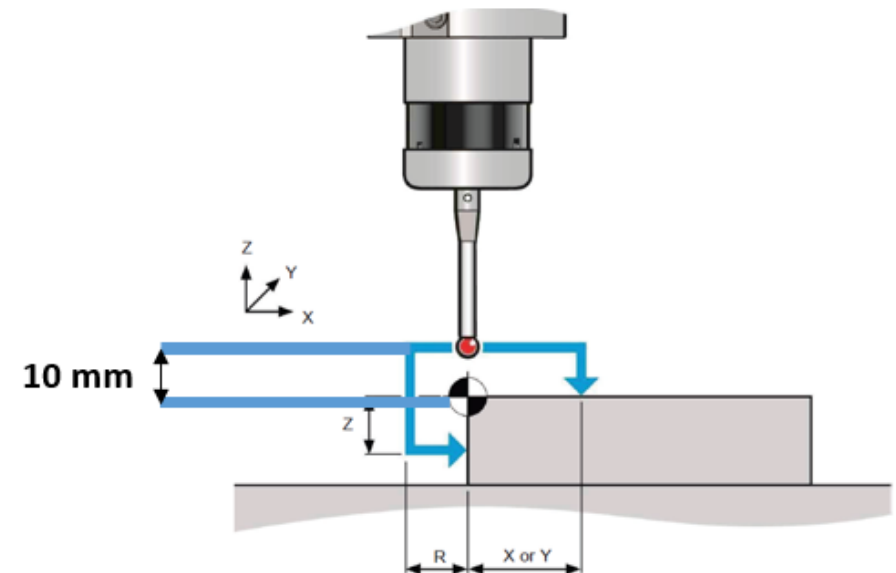


- This stand-alone cycle is in program O8025 line N340 in the newest Supatouch Software
 - Or MDI Template Programs
- Optimization **only suggested** to be run:
 - During initial probe setup
 - After drastically changing stylus length / ruby size
 - After probe body crash
 - After major machine service
 - **If you run probe optimization, you MUST calibrate XY and Z on the probe**
- You can change the 'A' value to change what direction the probe will take its point in either X or Y
 - Start about half an inch above the edge of a 90° corner
 - You do not need to have a calibrated probe to run this cycle
- The XY cycle will touch 40 times, the direction is specified by the 'A' value
- Then the Z cycle will do 40 touches in Z
 - It does this at different feed rates to tell the probe the optimum feeds / speeds to move and take measurements in XYZ

N340 (PROBE OPTIMIZATION)
(B=NOMINAL DIAMETER OF RUBY)
(A=DIRECTION POSITION)
G65P9901M110B.23622A1.

*Note

- A1. = Axis 1 positive (X+)
- A-1. = Axis 1 negative (X-)
- A2. = Axis 2 positive (Y+)
- A-2. = Axis 2 negative (Y-)



Supatouch.V2

Probe Optimization (Continued)



- When prompted check #100 - #102
 - While in “input mode” you may manually lower the values below if you want to slow down probe movement speeds in the specified axis, however, do not increase the predetermined values.
 - If you are satisfied with the pre-determined values, hit cycle start twice then fully recalibrate your probe.
 - MF#100 = Measure Feedrate
 - Maximum permissible measuring feedrate (machine units)
 - If this number is set below your current software’s minimal single touch speed (about 30-40 inch per min), then your probe measurements will default to 2 touch probing. This is Okay!
 - ZPF#101 = Z position Feedrate
 - Maximum permissible Z-axis positioning feedrate (machine units)
 - XYPF#102 = XY Position Feedrate
 - Maximum permissible X or Y-axis positioning feedrate (machine units)
- When you are satisfied with the values in #100-#102, hit cycle-start. Then you will be prompted to calibrate XY and Z on the probe, hit cycle-start to end the optimization program.
- At this point you MUST calibrate XY and Z to be able to use your spindle probe.

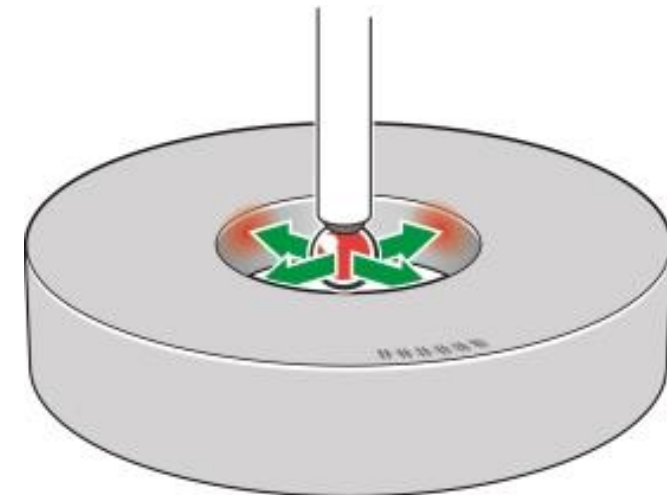
Numbe	Value	Memo
100	50.0000	
101	150.0000	
102	250.0000	
Operator Message		
MF#100*ZPF#101*XYPF#102*CYC*START*T O*SAVE		
<input type="button" value="Close"/>		
112	0.0000	

Inspection Plus / Rengage XY Calibration



- This cycle is at the end of program O8025
- Ensure that the D (exact diameter of feature) and S (work offset for center position) values are correct and in machine units
 - S value will update an XY position for center of the ring / feature, to your specified offset
- Manually drive the spindle probe roughly centered into your calibration ring or feature, making sure the ruby is fully inside
- Run the cycle

```
(CALIBRATE PROBE X-Y)  
(SN= 201506093)  
(MM= 38.16655)  
(IN= 1.50262)  
(D=DIAMETER OF RING)  
(S=WORK OFFSET SET FOR CENTER POSITION)  
G175D1.5S6  
M30
```

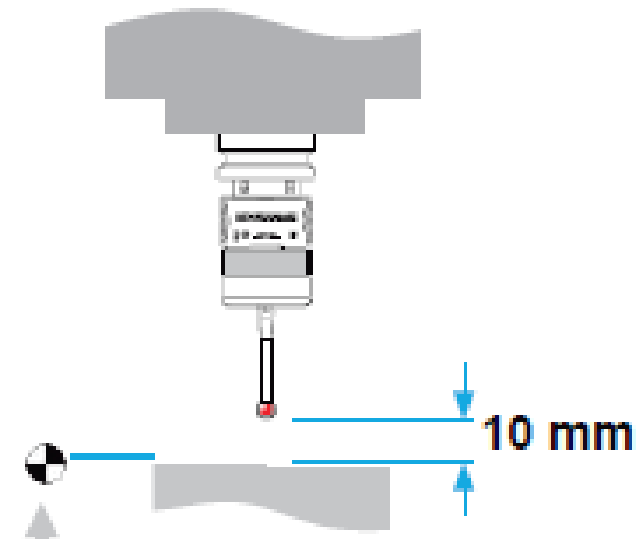


Inspection Plus / Rengage Z Calibration



- This cycle is at the end of program O8025
- Ensure that the T (Tool number of probe) value is correct
- Manually drive the probe about half an inch above the point you touched off your tool
 - be sure applicable axis are at a skewed angle
- Don't forget to match the programs work offset callout to the one you set
- Run the cycle
 - This will update probe length in 3 spots
 - Tool data
 - Tool offset (T number in program)
 - Macro variable for probe calibration

(CALIBRATE PROBE LENGTH)
(T=TOOL OFFSET FOR PROBE)
→ G59(KNOWN Z SURFACE WORK OFFSET)
N170G170T1
M30

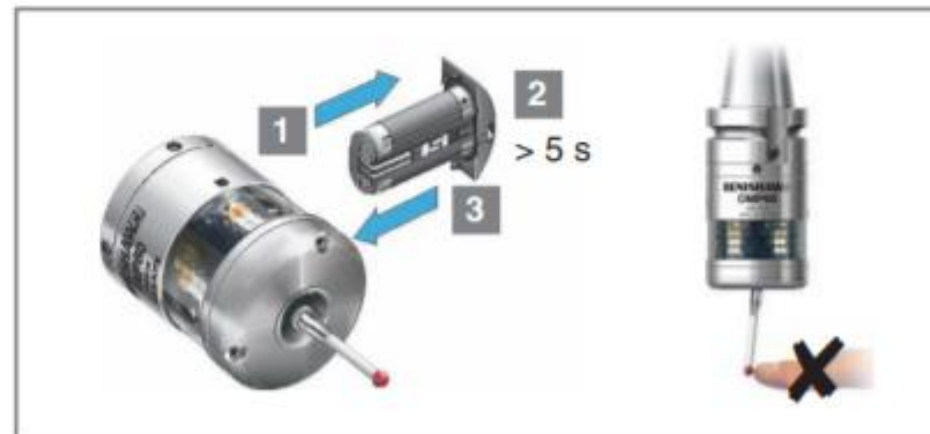


*If Z moves positive and alarms when cycle starts,
the active Fanuc Offset Length may be longer than actual length. Zero out offset and run again*

Batteries



- **DO NOT** buy cheap batteries, it will affect probe potential runtime.
 - Consult your small Renishaw (probe specific) manual for best batteries to use.
- After changing the battery it is **not** required to recalibrate the probe.
 - All calibration information is stored in the machine control
- After the new batteries are in the probe **don't** deflect the stylus. Let the LEDs complete their light cycle.
 - This short light cycle is the settings inside the probe.
 - The lights will Blink Green at the end if you put acceptable batteries in.







Renishaw suggested batteries






OMP40

	
Ecocel: TC-4511, TC-4521, TC-4531 Saft: LS 14250 C, LS 14250 Sonnenschein: SL-750 Xeno: XL-050F	Dubilier: SB-AA02 Maxell: ER3S Sanyo: CR 14250 SE Sonnenschein: SL-350, SL-550 Tadiran: TL-4902 TL-5902, TL-2150, TL-5101 Varta: CR 1/2 AA

RMP60

Battery types		
Alkaline x2	Lithium Thionyl Chloride x2	Nickel Cadmium/Nickel Metal Hydride x2
AA 1.5 V 	Saft: LS 14500  Sonnenschein: SL-760/S  Tadiran: TL-5903/S, TL-2100/S Xeno: XL-060F	AA 1.2 V 

RMP600

Battery types		
Alkaline x 2	Lithium-thionyl chloride x 2	Nickel Cadmium / Nickel Metal Hydride x 2
AA 1.5 V 	Saft: LS 14500 Tadiran: SL-760/S  TL-5903/S, TL-2100/S Xeno: XL-060F	AA 1.2 V 

OMP400 / RMP400

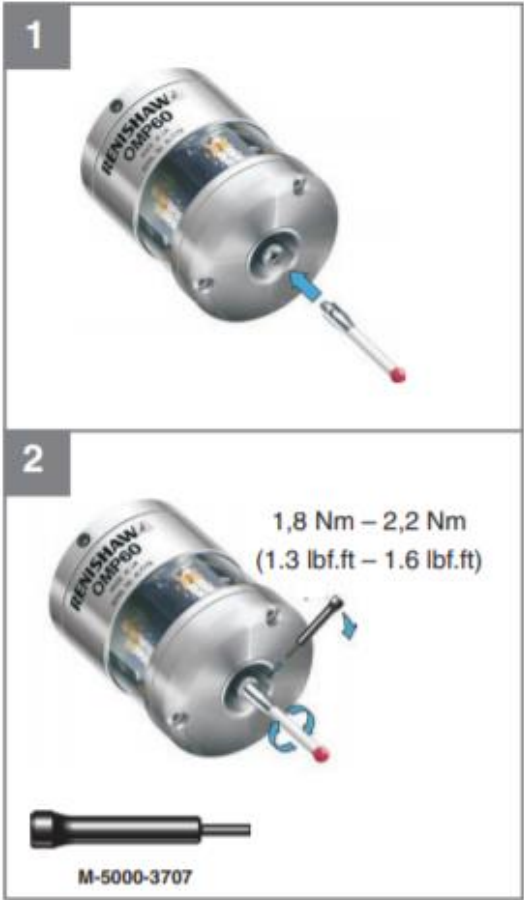
Battery type: 1/2 AA Lithium Thionyl Chloride (3.6 V) x 2

	Ecocel: EB 1425, EB1426 Saft: LS 14250 C, LS 14250 Sonnenschein: SL-750 Xeno: XL-050F		Dubilier: SB-AA02 Maxell: ER3S Sanyo: CR 14250 SE Sonnenschein: SL-350, SL-550 Tadiran: TL-4902 TL-5902, TL-2150, TL-5101, SL-750 Varta: CR 1/2 AA
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Changing Stylus



- To replace a stylus, simply, unscrew the old / broken stylus (using the Renishaw tool, paperclip, etc.) then, install the new one.
 - These styli have fine threads and probes have sensitive triggers so **do not** overtighten
- With **every** stylus change, you must:
 - Redo your Runout
 - Redo XY & Z calibration
- *PQI supplies a variety of different styli



Basic Troubleshooting



- Probe will not turn on / blinking green-blue when on
 - Change batteries
- Probe beginning to record odd values
 - Recalibrate probe XY & Z
- Probe not repeatable
 - Ensure stylus is not loose
 - Recalibrate probe XY & Z
- Probe blinking Red when not triggered
 - Restart probe
 - Contact PQI
 - Office: 763-249-7149
 - Toll Free: 800-772-0620

