Tech Sheet

Instructions for Calibrating Multiple Probes

When multiple probes are being used, each with a potential of numerous tip angles, the time required to calibrate all the probes and angles could be significant. Additionally, if measurements are performed using a combination of these probes, the calibration data must relate. If a single probe is damaged and replaced, or even a single tip angle added, recalibrating the entire rack of probes is not practical.

In order to maintain integrity between all the probes when calibrating only a few, the below rules must be followed.

Rules:

- Designate one tip as a Master Tip. This could be *any* tip; however it is typically at A=0 / B=0 and is short, stiff and robust. In this example, the 2x20 tip at A=0 / B=0 in slot 1 will be designated the master, since that is also the recommended tip to calibrate the rack.
- Ideally the Master Tip is not used for other measurements, however it can be if necessary. Keep in mind though, if the Master Tip gets damaged or replaced, all probes in the rack must be recalibrated.
- The Master Tip is the *only tip* that would be used to locate the calibration sphere.
- When calibrating the other probes (2 through 6), the "<u>No</u>" option **MUST BE SELECTED**.



- Qualification Tool Moved

 Has the qualification tool been moved, or has the Machine zero point changed?

 For a small position change where the last known position is still very close to the current position, it may be possible to locate the tool in DCC mode without needing a Manual hit.

 For a newly defined tool or a significant position change, a Manual hit will be needed to locate it.

 Image: I
- If the Qualification Sphere is moved, use the master tip to refind the sphere (Qual Sphere Moved is Yes). The relationship between it and the other probes has not changed so the other probes do not otherwise need to be recalibrated.







Examples:

	Case	CMM has been rehomed <u>or</u> Qualification Sphere moved.	CMM has NOT been rehomed <u>and</u> the Qualification Sphere has NOT moved.
1	Add a new Tip Angle to an existing probe	Recalibrate the Master Tip and then the new Tip Angle	Calibrate the new Tip Angle
2	Probe 4 is Replaced/Repaired	Recalibrate the Master Tip and then Probe 4	Calibrate Probe 4
3	Master Probe is Replaced	Recalibrate all probes	Recalibrate all probes

Note: A calibration Check program could be additionally used as verification that all probes are properly related. For example, if a single feature (usually a sphere) is measured with 1 tip from each probe, the XYZ coordinates should be identical. Although this check is not required, it may inspire confidence in the rack integrity.

Two levels of automation could be implemented to simplify this process.

- 1. Using Parameter Sets and Auto Calibrate.
 - Use Parameter Sets as defined from the Measure Probe dialog when calibrating.
 - For example:
 - The probe angles & calibration parameters for Probe 1 are stored in SET1.
 - The probe angles & calibration parameters for Probe 2 are stored in SET2.

Parameter sets	
Name:	Save
SET2	Delete

- o Etc.
- An AutoCalibrate Probe command could then be used to perform the calibration.

AUTOCALIBRATE/PROBE, PARAMETER_SET=**SET2**, QUALTOOL_MOVED=**NO**, SHOW_SUMMARY=NO, OVERWRITE_RESULTSFILE=YES

- The Help Files will provide additional information on this topic. This procedure is also taught in detail in the PC-DMIS for CMM 201 course.
- 2. Use a Custom Form.
 - A Form could be created to manage this process. PC-DMIS would monitor the Form selections and use basic logic commands to calibrate only those probes desired.
 - Logic commands and custom Form creation are taught in the PC-DMIS for CMM 301 course.

Calibrate the Probes				
obes to Calibrate	-Master Tip			
Master Tip	Qualification Tool Moved?			
Probe 1 Probe 2	C No C Yes (Manual hit for location) C Yes (DCC hits for location)			
Probe 3				
Probe 4	-Report Options			
Probe 5				
Probe 6	U overwrite results logfile			

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