

Geomet

Universal CMM Software

Installation and Setup Guide for Renishaw Probing Systems

MCR20 Stylus Change Rack PH9/10/50 Motorized Probe

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Geomet

MCR20 Setup

Introduction

Geomet provides support, through Direct Computer Control, of the Renishaw MCR20 Stylus Rack. The MCR20 allows access for up to six interchangeable modules for the TP20 Touch Probe.

Hardware and Software Setup

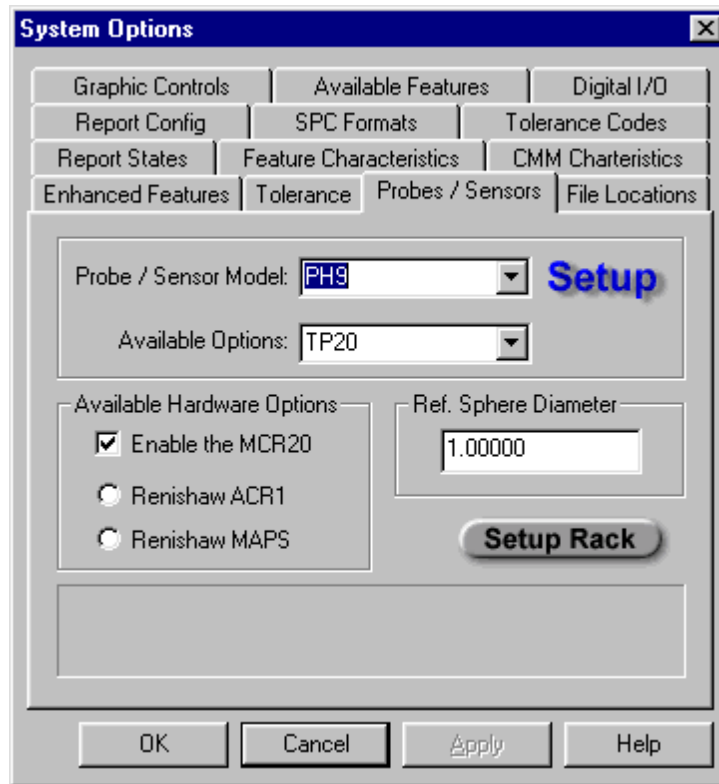
The MCR20 Rack is considered a passive device. There exists no communication between the operations of the rack and the host CMM software. Therefore it is the responsibility of the CMM software to provide all actions and safeguards for your probe system.

In order to activate the MCR20 support you must first enter your Access Code into Geomet to activate it. This is accomplished by simultaneously pressing the <Ctrl> + <Alt> + <u> keys down. An Access Code dialog will be displayed waiting for your entry.



If you do not have your access code please contact Helmel Engineering. Once you have entered your code press <Accept> and Geomet will reconfigure its hardware configuration files allowing access to the controls for the MCR20.

The second phase of integration requires that you install the proper Probe Head Model and Probe Model into the System Options. To access the System Options press the <F9> key and select the Probes / Sensors tab.



System Options – Probes / Sensors

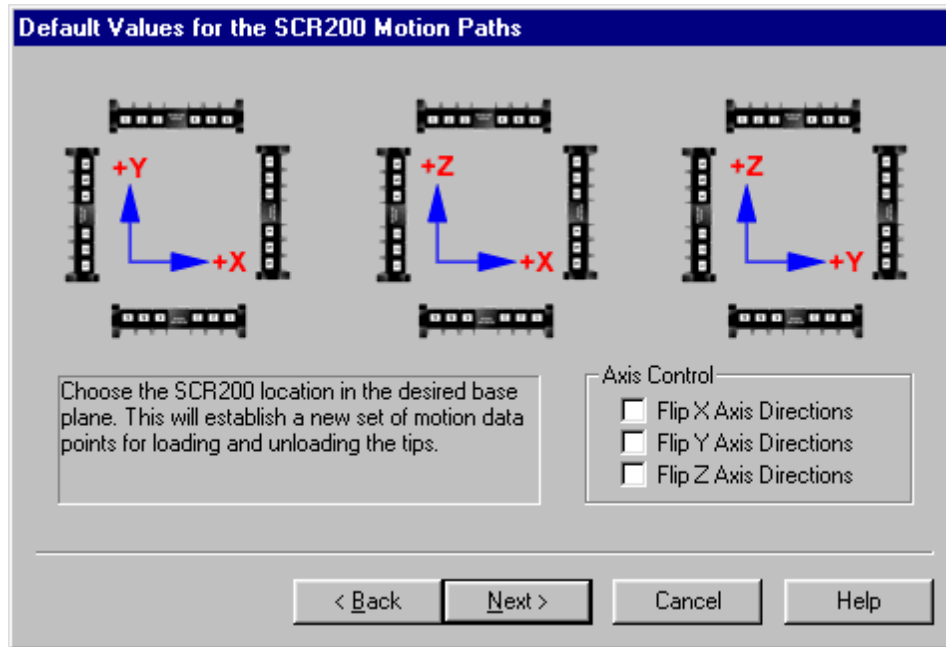
Select from the drop down menu the proper Probe Head Model. Next select from the Available Options drop down menu “TP20”. This will activate the “Enable the MCR20” check box. Place a check in the assigned box and the <Setup Rack> button will appear. The setup button provides access to the steps required locating and establishing the orientation for the MCR20.

Setup Procedure

Orientation and Base Plane Selection

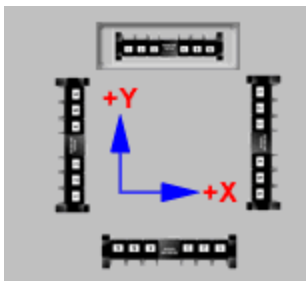
For proper operations Geomet must know the location and orientation of the MCR20 Rack. To access this operation click on the <Setup Rack> button located in System Options->Probes / Sensors as described above.

The first dialog you will encounter is used to identify the orientation and base plane for the MCR20 rack.



MCR20 Orientation and Base Plane Selection

Your CMM has three base planes XY, YZ and ZX. Within each base plane you can orient your MCR20 to allow maximum access to the rack and your inspection process. The location of the MCR20 must be completely within the motion cube of your CMM.



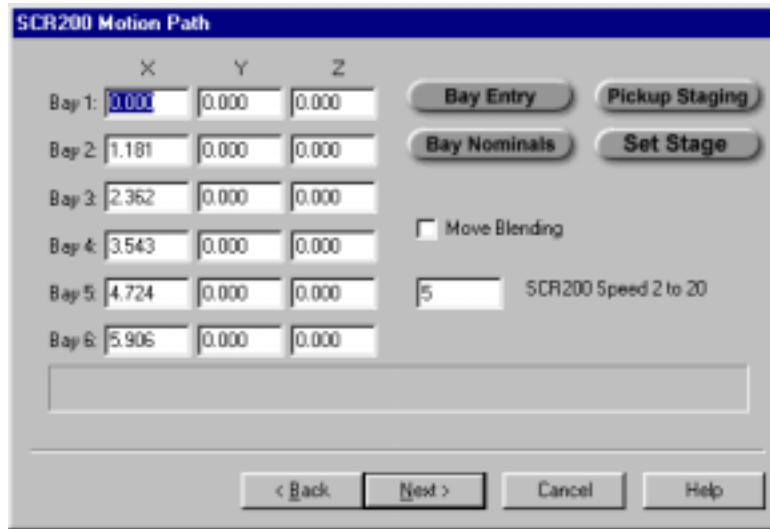
For Example, this selection shows the MCR20 Rack located in the rear of the CMM in the XY plane. The access to the bays is in the +Y direction. The miniature symbols are selectable buttons, which are selected by left clicking on the symbol with your left mouse button. Once you have selected the proper orientation, Geomet will configure the motion path required to access each bay.

The twelve choices displayed are the most common positions for the MCR20. However there are certain conditions such as having a CMM with switched X-Y axis or positioning the rack on the left YZ plane versus the right YZ plane that will require the use of the Axis Control check boxes. For example, if you mount the rack in the YZ plane as shown in the selection graphics it is assumed you are looking at it from the +X direction and the default motion paths will be established accordingly. But if you mount the rack where you must access it from the -X direction you will be required to check the Flip Z and Y Axis Directions check box.

After you have made your selections press the <Next> button to continue the setup.

Motion Path Coordinates

This dialog provides you direct access to the underlying motion coordinates associated with the four positions for each bay.



The dialog box is titled "SCR200 Motion Path". It features a table with columns for X, Y, and Z coordinates for six bays. To the right of the table are buttons for "Bay Entry", "Pickup Staging", "Bay Nominals", and "Set Stage". Below these buttons is a checkbox for "Move Blending" and a speed selector set to "5" with the text "SCR200 Speed 2 to 20". At the bottom are navigation buttons: "< Back", "Next >", "Cancel", and "Help".

	X	Y	Z
Bay 1:	0.000	0.000	0.000
Bay 2:	1.181	0.000	0.000
Bay 3:	2.362	0.000	0.000
Bay 4:	3.543	0.000	0.000
Bay 5:	4.724	0.000	0.000
Bay 6:	5.905	0.000	0.000

Motion Path Editor

This dialog displays the coordinates in the MCR20 coordinate system for the four positions associated with each bay. These positions are defined as the Bay Entry, Bay Nominals, Pickup Staging and Set Stage.

Bay Nominal: This is the position where the probe has a module attached and is in the bay.

Bay Entry: This position is directly above the Bay Nominal and has no module attached. It is the position the probe head will move to disconnect from a module when dropping off the module.

Pickup Staging: This position is outside the bay, before it moves to the Bay Entry position.

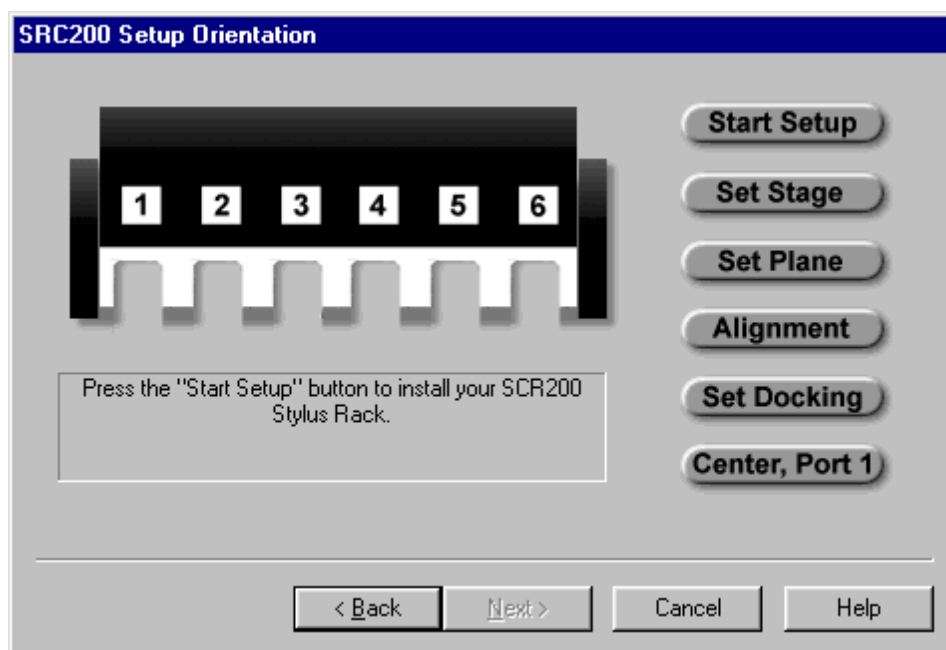
Set Stage: Is the position after extracting the module outside the rack.

To switch between the values select the button associated with the position.

From here you can establish the speed the CMM will operate when performing MCR20 operations. The Move Blending check box is used to allow smooth operations during transitions between different positions. We do not recommend the use of motion blending when you have speeds over 5 inches per second.

After reviewing the coordinates, press <Next> to proceed to the next phase of the setup operations.

MCR20 Coordinate System Setup



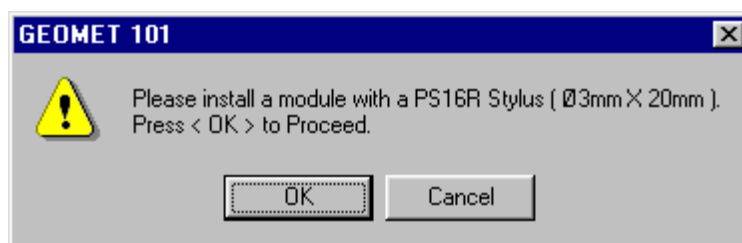
MCR20 Setup Opening Dialog

From this dialog you will be prompted to perform the necessary steps. Those steps are listed on the right side of the dialog.

To start the setup left click on the <Start Setup> button as indicated in the message under the graphics of the rack.

Step 1 – Attach Stylus

You will be prompted to load a PS16R Stylus onto the Probe Head. It is important that only this Stylus model be used with no extensions as the resulting coordinate transformations are based on the specifics of this model.

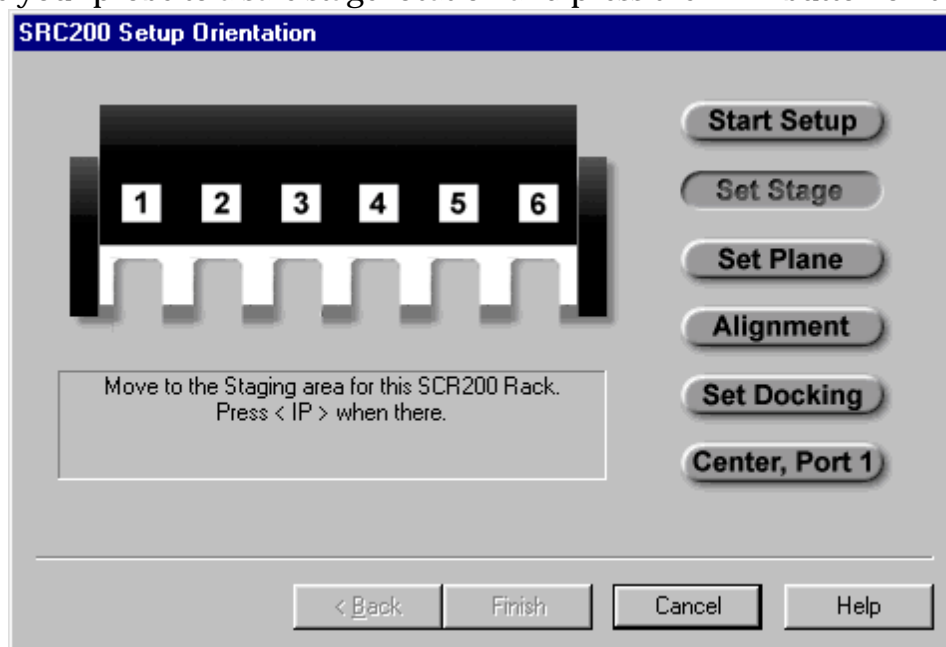


Once this has been completed, press <OK> to proceed.

Step 2 – Set Staging Position

This is the safe position that is set for all MCR20 operations. This position should be established that would allow safe transition to the bay staging coordinates and allow rotation of any motorized probe head operation if you have one installed.

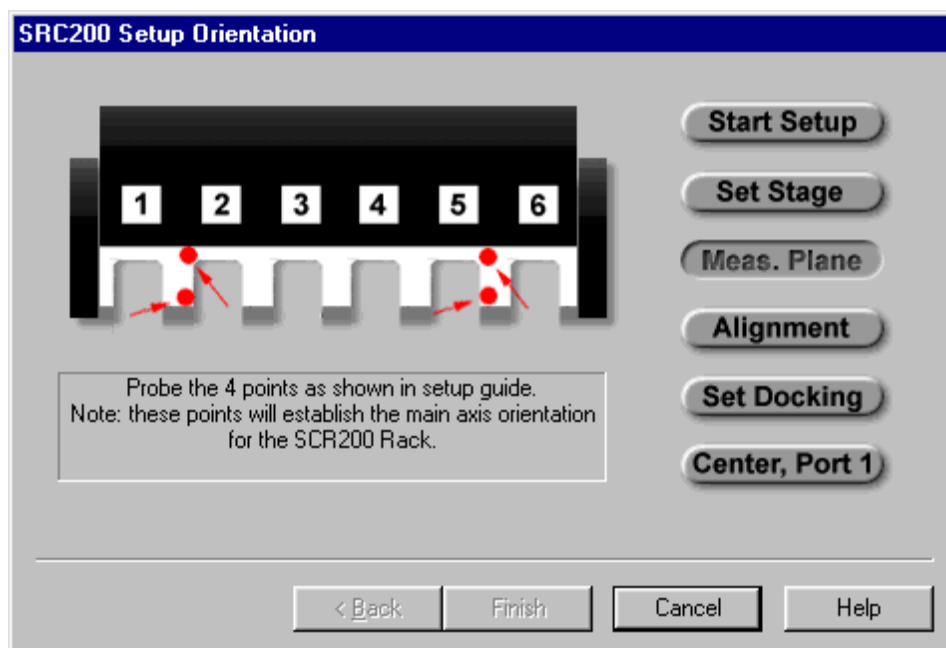
Move your probe to a safe stage location and press the <IP> button on the



joystick.

Step 3 – Establish Orientation

At this time you should slide the access covers back on bay 1,2,5 and 6. Make sure they are locked back exposing the bays.

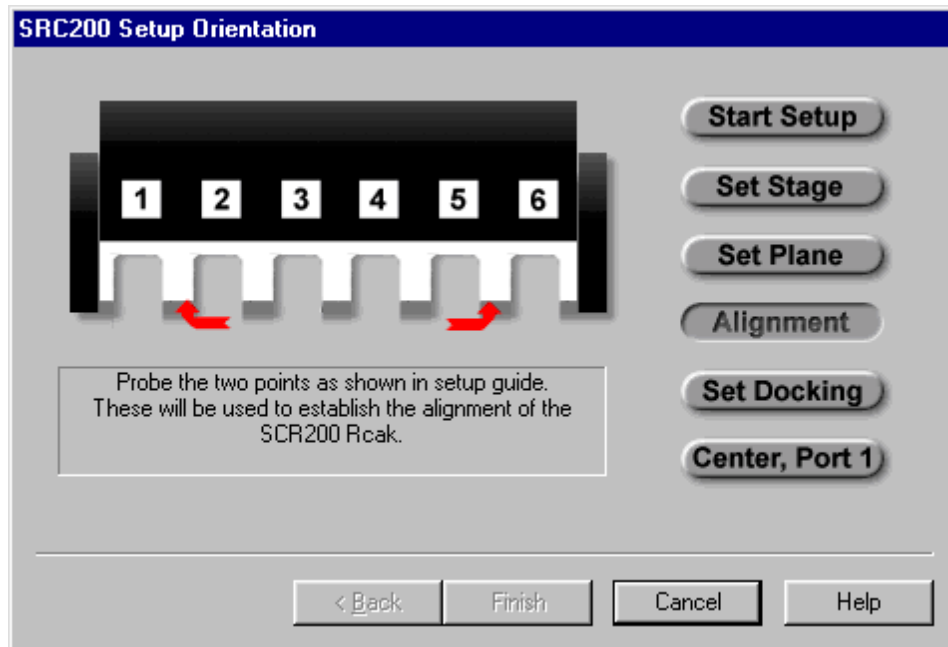


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A prompt will appear asking for the probing direction for the four points required for establishing the orientation of the rack. Once you have selected the direction, the setup screen will flash in red the position you should capture.

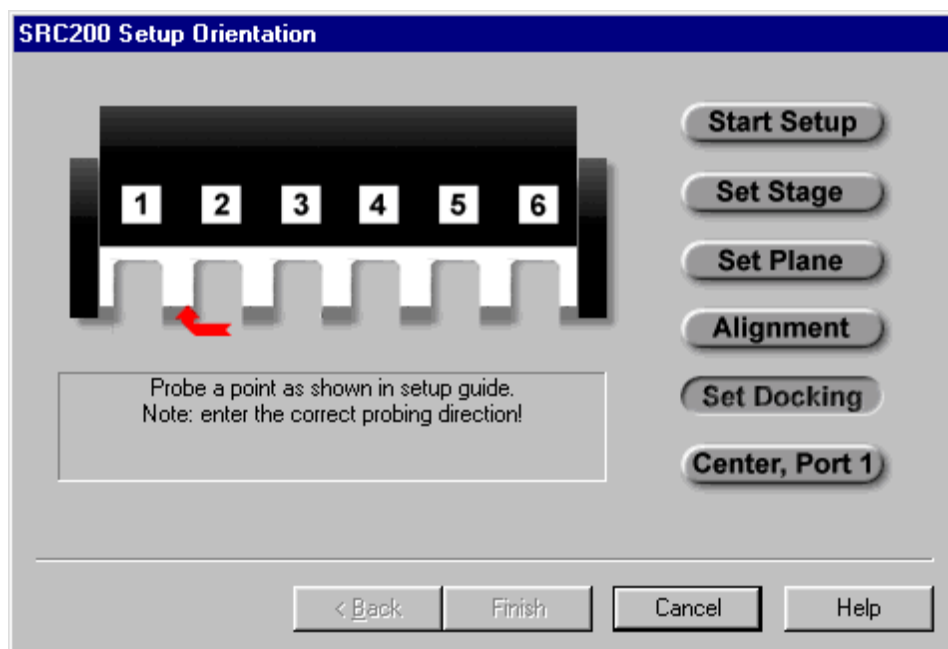
Step 4 – Establishing Alignment

After Orientation has been completed, you will be prompted to enter a probing direction for alignment. You will capture two data points in the location shown by the flashing points.



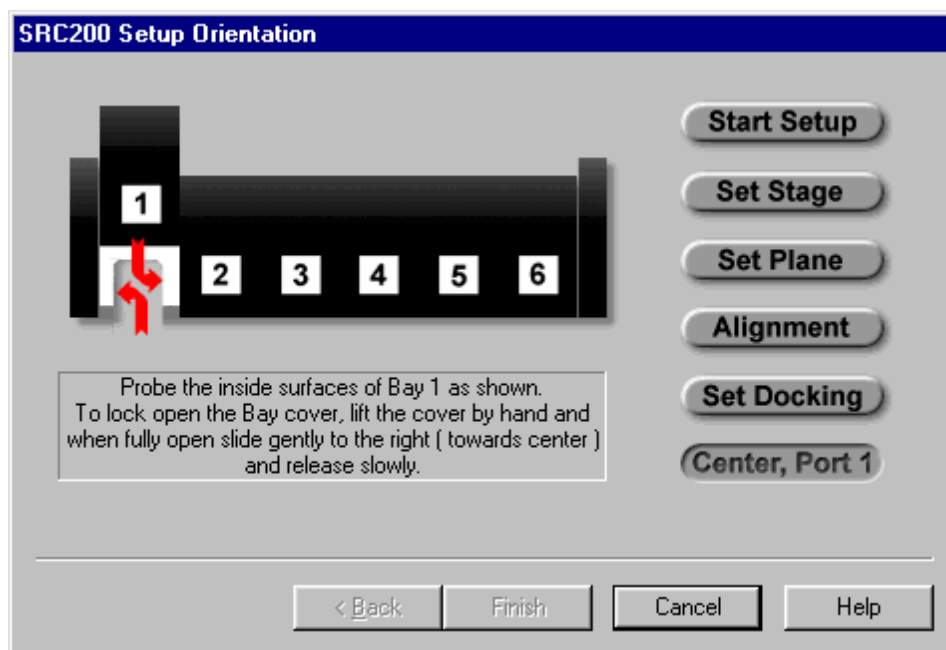
Step 5 – Establishing the Bay Depth Position

Next you will capture one data point on the front surface of the bay as shown below.



Step 6 – Bay One Position

The final step required is to establish the center of Bay 1. To do this capture two data points inside the bay as shown below.



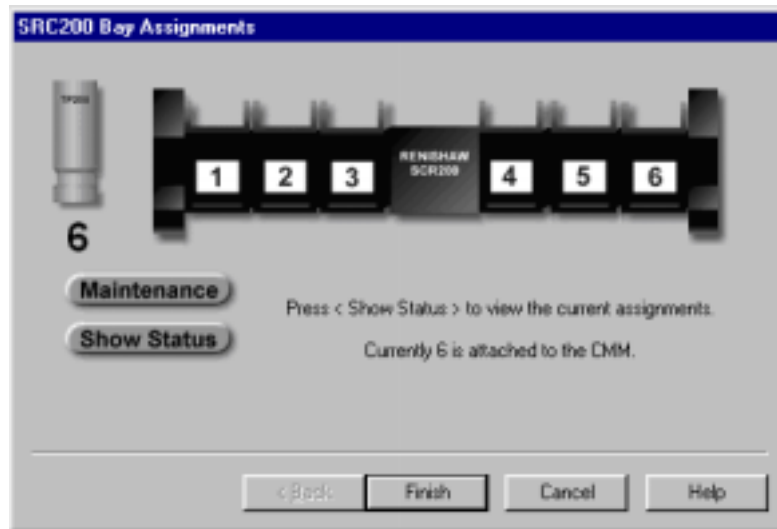
Upon completion of these steps, Geomet will prompt you to press the <Finish> button that will return you to the System Option dialog and your setup on the MCR20 is complete.

Geomet

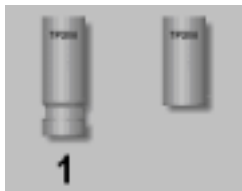
MCR20 Maintenance Operations

Geomet provides access to MCR20 through Maintenance Operations and the Stylus Manager. Each method has unique capabilities in the operation of Geomet.

The Maintenance mode is primarily used to test the rack and change assigned locations, clean styli or replace damaged styli. It is important that the modules are not placed into the bays by hand. *Each module must be aligned accurately to allow the probe head to reseat the module.*



To start the Maintenance mode press the <Alt< + <w> keys on the keyboard. From this dialog you can control the operations of the MCR20 outside of part inspection programs.



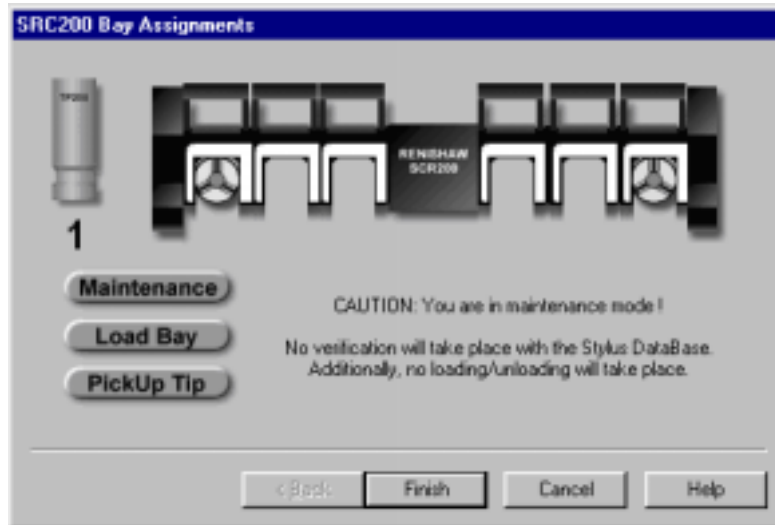
This graphic shows a Touch Probe and the current status of the module. The graphic on the left indicates that the module assigned to a bay number one is attached to the touch probe. The graphic on the right indicates that no module is attached to the touch probe. You have the ability to change the module assignment by left clicking on the graphic of the touch probe, which will remove the module. *Please note that this will not perform the motion to park the module into the assigned bay, this will only remove it and its reference from Geomet.*

This manual adjustment should only be used under certain conditions such as removing all bay assignments.

The two buttons shown <Maintenance> and <Show Status> provide additional functions when selected.

Maintenance

This function will allow you direct access to performing motion in assigning and pre-loading MCR20 bays.



When <Maintenance> has been selected the visual appearance of the graphic changes to show you the current status of the bays. Two additional buttons will appear, <Load Bay> and <Pickup Tip>. These control the CMM operations in accessing the MCR20 bays.

Change Bay Assignments without CMM Control

To assign or remove an assignment of a module to a bay without performing motion left click of the bay graphic. For example to add a module to bay number two, left click on bay two and a module will appear. To remove that module, left click on the module and it will disappear.

Load Bay under CMM Controls

To load a bay under CMM control, select the button <LoadBay> followed by a left click on the bay to load. If it is empty, you will be prompted to load a new module onto the touch probe and when complete click on <OK>. Geomet will then drive to the staging position and proceed to load the module into the assigned bay. The module will then disconnect and the touch probe will extract to the staging area for the bay. *Note: The touch probe will not leave the staging area for that bay as leaving the confines will cause a false trigger.*

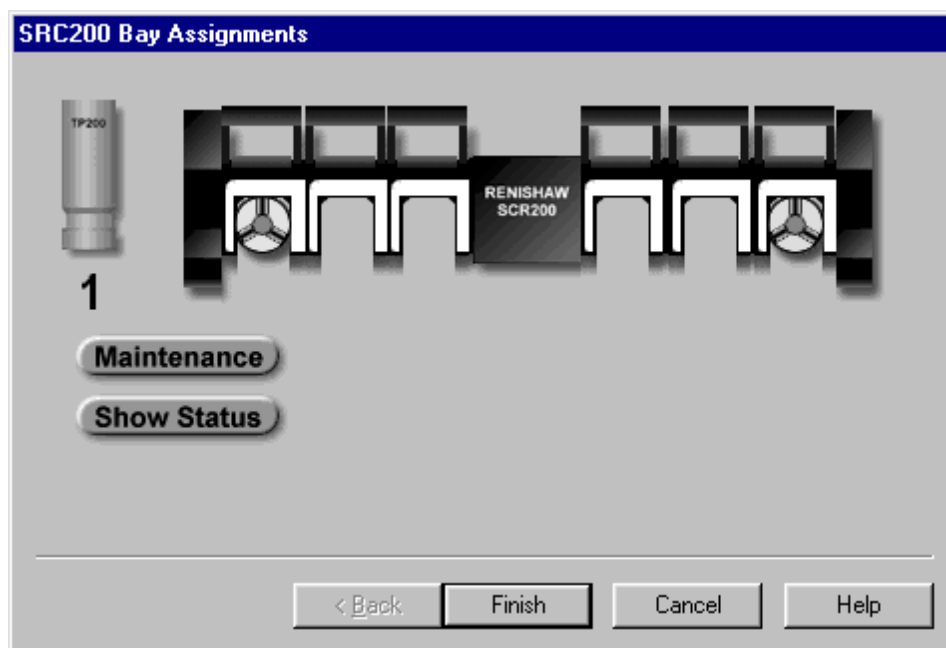
You can then continue to load other bays by repeating the loading procedure.

Pickup Modules under CMM Control

Select the <Pickup Tip> button followed by a left click on a bay selection. This will cause the CMM to retrieve the selected module and return to the staging area. If the touch probe has a module already attached, the CMM will park that tip before retrieving the selected module.

Show Status

The <Show Status> button provides a graphical representation of the touch probe and bay assignments.



NOTE on using the Maintenance Modes

These modes should be used with caution. It is primarily designed for the experienced operator who wants to perform maintenance on installed modules such as cleaning or replacing tips. The assigning of bays from this mode does not provide any means to qualify the styli or provide access to motorized probe heads such as a PH9.

It is not necessary to use this mode for populating and qualifying your styli. The Stylus Manager will handle all operations of assignments and qualifying your styli.

Geomet

Renishaw PH9/10/50 Setup

Introduction

Geomet provides support for Renishaw Motorized Probe Heads. This support allows you to attach a motorized probe head onto your CMM for greater flexibility when running part programs. Geomet can incorporate motorized probe heads with stylus change racks for added functionality.

Hardware and Software Setup

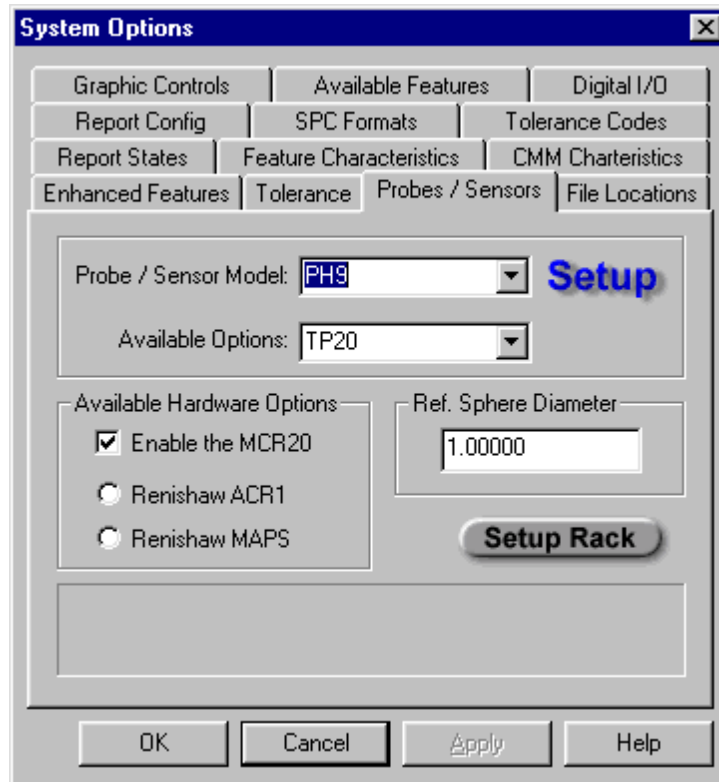
Geomet must be configured to activate the functions required for motorized probe heads. In order to activate this support you must first enter your Access Code into Geomet.



This is accomplished by simultaneously pressing the <Ctrl> + <Alt> + <u> keys down. An Access Code dialog will be displayed waiting for your entry.

If you do not have an access code please contact Helmel Engineering. Once you have entered your code press <Accept> and Geomet will reconfigure its hardware configuration files allowing access to these new functions.

The second phase of integration requires that you install the proper Probe Head Model and Probe Model into the System Options. To access the System Options press the <F9> key and select the Probes / Sensors tab.



System Options – Probes / Sensors

Select from the drop down menu the proper Probe Head Model. Next select from the Available Options drop down menu the touch probe model attached to the PH9/10/50.

Communication Setup of the PH9/10/50

Once the model specifications have been set, select “Setup” located next the PH9 listing. This will provide you access to the communication configurations required for the motorized probe head operations.

At this time check your cable connects to identify which port your Probe Head Controller is attached to. For this example we will use Com Port 2. Make sure your controller is turned on and that the hand control (if included) is active and you can manually rotate the head.

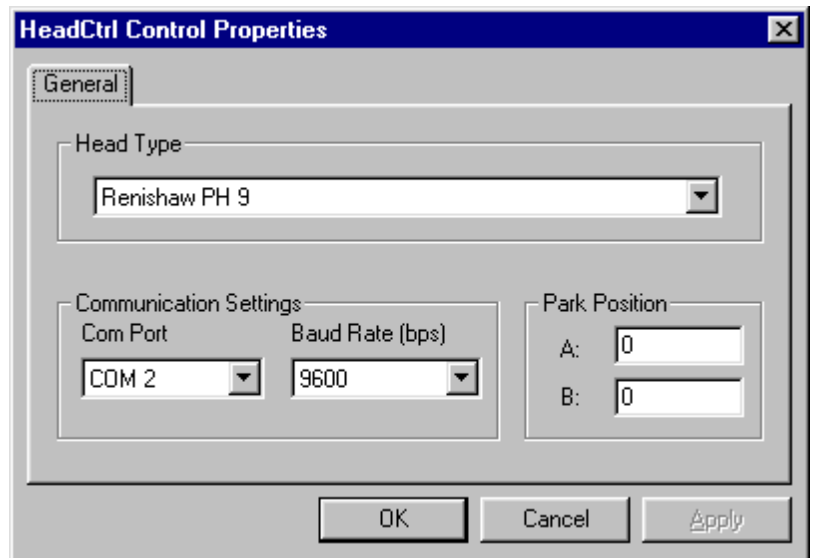
After selecting “Setup” the following dialog will appear which you will place your setting into.

Under “Head Type” choose the model attached to your CMM. Next select the Com Port and Baud Rate. The controller will run a test and inform you if no connection was made.

Certain model years use different baud settings, you may be required to test different speed until the match is found.

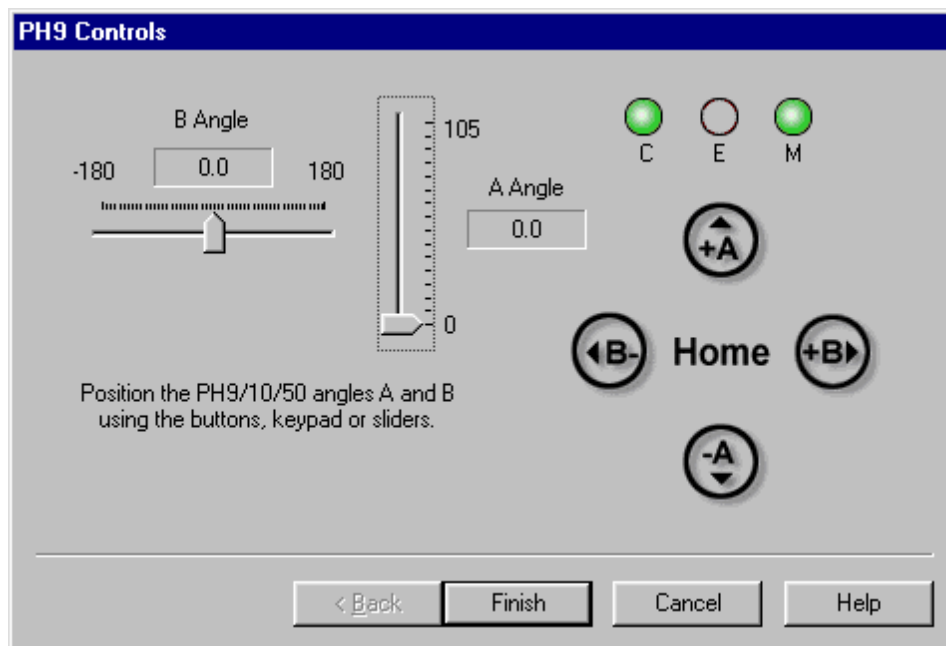
The Park Position section is currently not active for this release.

When this is completed your motorized probe head will be available to Geomet under program control.



Manual Operations in Geomet

Geomet provides a means to access the positioning controls of the A/B angles. To activate this function simultaneously press <Shift> + <W>.



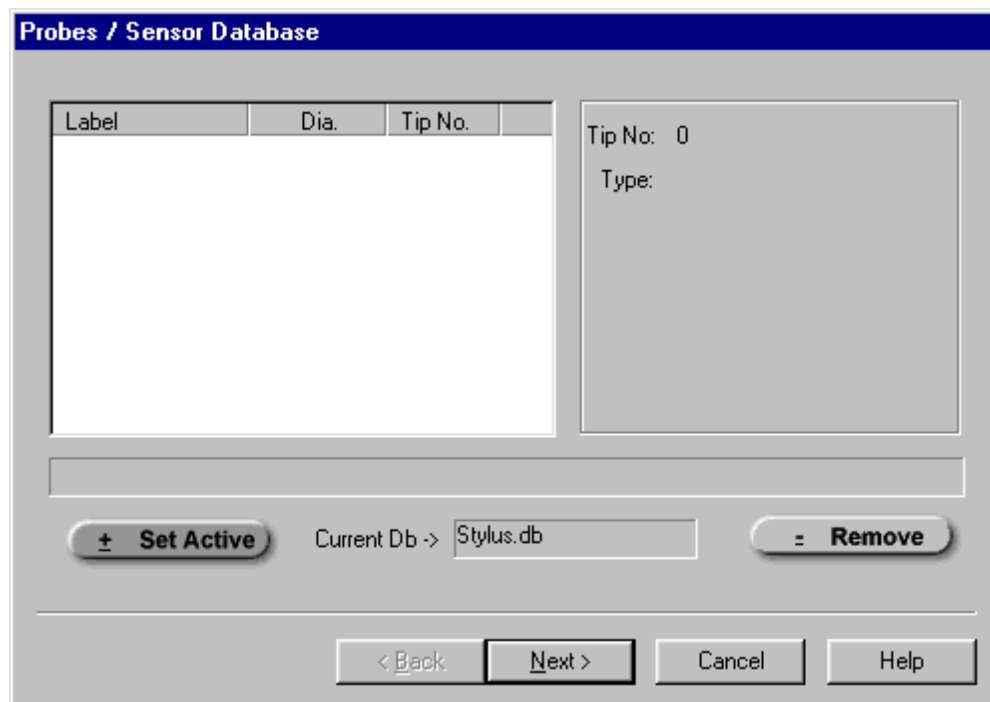
From this control you can left click on the +A -A +B -B or Home buttons. This also maps the number pad on your keyboard as 8 for +A, 2 for -A, 6 for +B, 4 for -B and 5 for Home.

The head will rotate to the new position one second after your last key press. Approximately 3 seconds after the motion is complete, the sliders will update as it reads from the controller the current position. Due to limitations in the RS232 and controller combinations we have placed a timer in the software to update once every three seconds and you should wait this time before leaving this dialog.

Note: if you are manually changing the A/B angles you must qualify the position before using it. We provide the means to change the position for single piece inspections and testing access angles into production parts. When you change the A/B angles from the Stylus Manager function it will become part of the qualified styli.

Qualifying Styli with Motorized Probe Heads

Before Geomet can provide inspection results, all styli required for the inspection must be qualified. This is provided through the Stylus Manager which is activated by pressing the <w> key. You can also select the Stylus Manager from the pull down menu Qualify->Stylus Manager or from the toolbar icon (if activated).



Geomet allows qualifying of multiple styli with any combination of clusters and positions. In order to provide interchangeable styli, Geomet uses the first qualified stylus as the Primary tip. All remaining styli will be referenced back

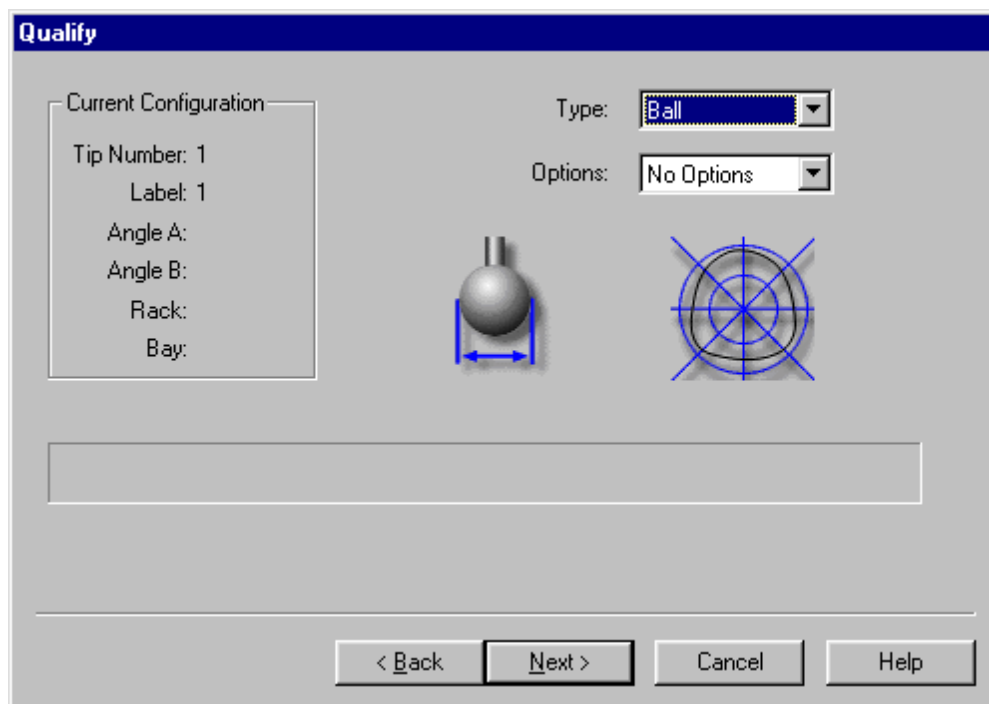
to the primary tip to allow no shift in values resulting from using multiple styli in your inspection.

The Stylus Manager is self configured based on the hardware attached to your CMM and assigned in the System Option. For example, if you have a basic fixed probe head and one stylus, the manager will take you directly to the qualification operation. However, if you have a motorized probe and a stylus change rack the manager will step you through the rack bay selection then the motorized head angle selection and finally to the qualification operation.

Each qualified styli will retain all characteristics of how it was qualified and by selecting a stylus as the active tip, Geomet will acquire any bay and position changes automatically.

Qualifying Step 1 – Motorized Probe Heads

The Stylus Manager as shown on the previous page has no qualified position available. To start assigning a stylus and perform the qualification press the <Next> button which will take you to the Qualify Method dialog.

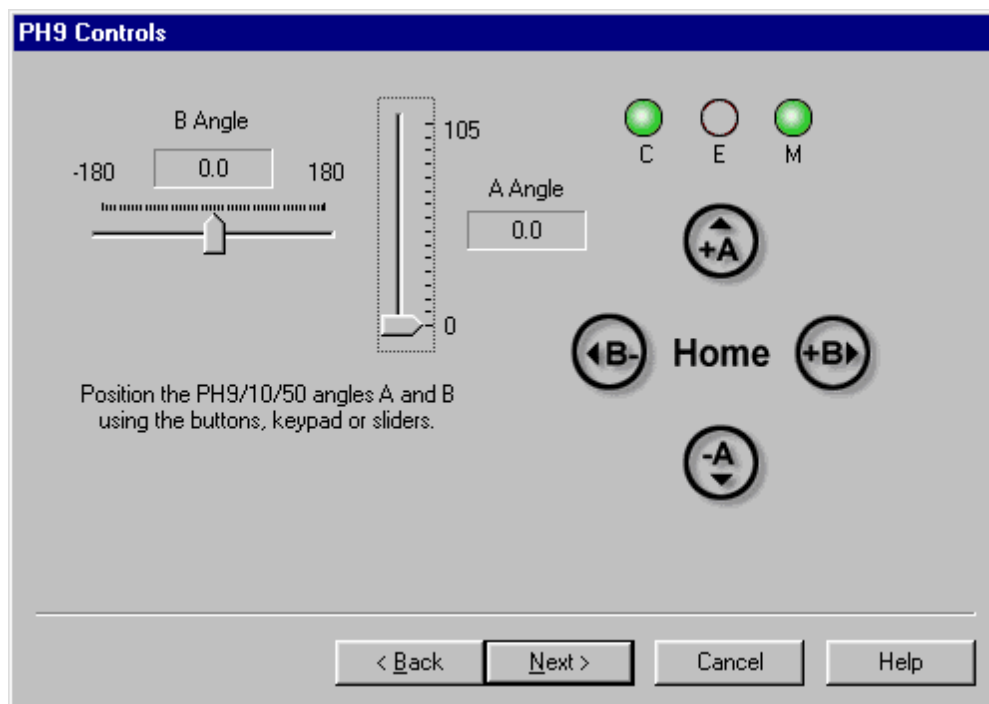


From here you will assign the type of qualification required. In most cases it is a ball stylus and no entry is required. Press <Next> to proceed to the next step.

Note: it is not required to use the mouse to select the <Next> button, by default it is also the <Enter> key on your keyboard.

Qualifying Step 2 – Motorized Probe Heads

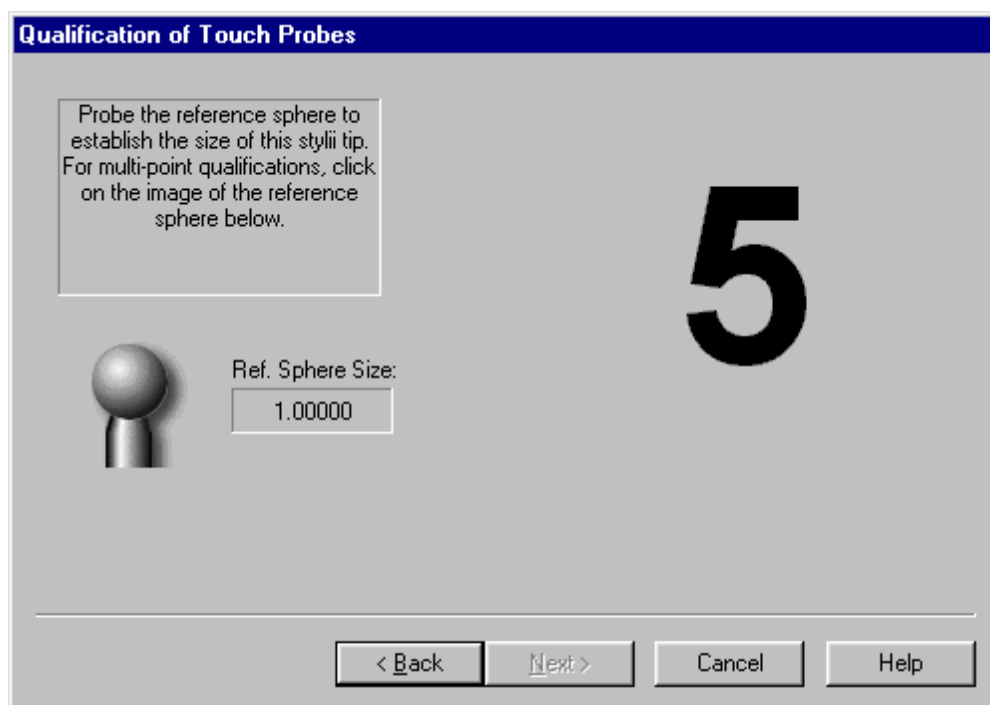
This step allows you to assign the correct A/B angles associated with this qualification.



Rotate the motorized head to the desired location and press the <Next> button. *See timing issues in PH9 Setup.*

Qualifying Step 3 – Motorized Probe Heads

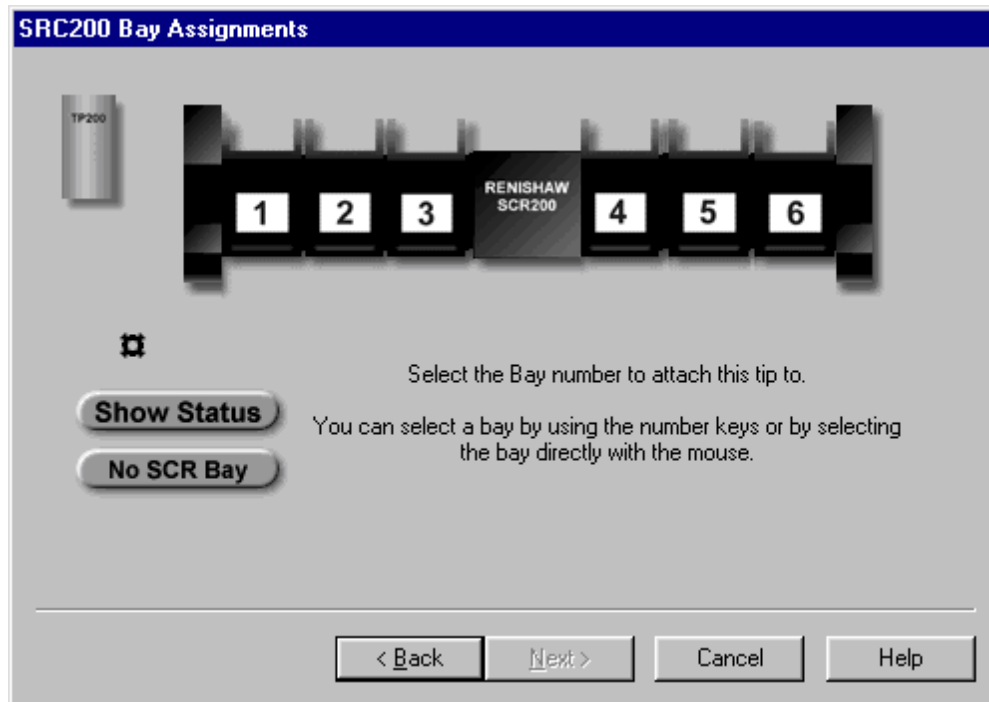
The next operation is the actual probing of the reference sphere. Gather the required number of data points and upon completion you will return to the first page of the Stylus Manager for further qualifications.



Renishaw PH9/10/50 -6

Qualifying with Stylus Racks

When you are incorporating a Stylus Change Rack with motorized probe heads and additional step is required to assign which bay will be used. The same steps will be used as described above except after the Qualification Method has been chosen you will be taken to the bay assignment screen.



Once you have selected a bay, Geomet will prompt you to attach the module to the touch probe and proceed with the qualification. If a previously qualified module is currently attached, Geomet will prompt you for a clear path to the staging area and proceed to park the current tip.

Steps Required to Qualify

