1.0 INTRODUCTION

The Visual Quick Code (VQC) Probing System consists of a spindle probe, a contact tool setting probe and an optical receiver. The probe system uses programming system and graphical interface which utilizes a question/answer format to create G-code programs.

Note: Contact your dealer to obtain the latest software version of VQC for the probing system.

1.1 EQUIPMENT SETUP

Both probes will need to be calibrated before use. See the calibration section for instructions.

Spindle Probe

The spindle probe can be placed in any pocket of the tool changer. The control will ask for the tool pocket number when you start the alignment procedure.

1. Remove the six locking set screws to gain access to the six setscrews in the probe unit (screws “A” and “B”). Note that the “A” screws have a pointed end and that the “B” screws do not.

2. Place an indicator stand on the table. Set the indicator on the side of the stylus ball. Jog each axis to find the high spot (maximum diameter) of the stylus ball.

3. Rotate the spindle by hand to find the run out of the ball. The run out must be within .01”. To adjust the alignment of the stylus, loosen or tighten the four “B” set screws.

4. Once aligned, securely tighten the four set screws “B” and the two mounting screws “A”. Check the run out again to verify correctness.

Table Probe (TS27R)

The table probe is shipped installed except for the VF-2TR and EC-400. On all other mills remove probe shipping bracket before using. To prepare the VF-2TR table probe for use, loosen the probe mounting bracket and remount it 2.5 inches from the left side of the table (see figure). To prepare the EC-400 table probe for use, install the extension between the break stem and the probe body (see figure). The EC-500 requires two (2) extensions.

Alignment

1. Tighten the "C" screws (shown in the illustration) all the way down. Leave the "A" screws loose at this time.

2. Adjust the front to back levelling: Tighten the "A" screws alternately. Adjust the side to side levelling: tighten the grubscrews "B" alternately.

3. When flatness of .0004 is achieved, tighten screws "A" and "B".

4. Recheck flatness. Adjust as necessary.
1.2 **Probe Visual Quick Code Programming**

From the Edit page, press PRGM/CONVRS three times to enter Visual Quick Code. Press F2 and select the program 009996 Haas VQC Probe. This page gives the programmer four categories from which to select. The first two selections are used to find the different edges and bores of a part. The next probe option is tool setting. The final selection is probe calibration.

**Select a Category**

Select the probe category of the operation and press Write/Enter. To return to the Category page press Cancel.

**Select a Probe Template.**

Use the arrow keys to select a probe template and press Write/Enter, or press Cancel to return to the list of categories. The description of what each template will do is described on the lower right of the screen.

**Enter the Data.**

The control will prompt the operator for the necessary information. Once the data is entered, the control displays a prompt asking where the programming code is to be placed. If placed in an existing option, the control will place the new code where the cursor is currently in the program. Be aware of this and, if necessary, move the cursor to the desired location of the program.

The on-screen instructions tell the operator to position the probe within a specific distance of the part, or the spindle a specific distance from the tool probe. If the distance is too great, the machine will not reach the desired point and an alarm will be generated.

The following diagrams detail the required steps when using the VQC templates, and demonstrate how the machine will automatically move once the data is entered.

**Probe**

```
<table>
<thead>
<tr>
<th>Actions Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Diameter</strong> - The user must input the approximate diameter of the feature.</td>
</tr>
<tr>
<td><strong>Input Workoffset</strong> - The user must input the work offset being written eg “55” is G55. Extended work offsets may also be used.</td>
</tr>
<tr>
<td><strong>Jog</strong> - The user must jog the probe stylus to the approximate X/Y center of the bore, positioning the stylus inside the bore in Z.</td>
</tr>
</tbody>
</table>
```

**Probe Center of Block**

```
<table>
<thead>
<tr>
<th>Actions Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input X Width</strong> - The user must input the approximate width of the block along the X-axis.</td>
</tr>
<tr>
<td><strong>Input Y Depth</strong> - The user must input the approximate depth of the block along the Y-axis.</td>
</tr>
<tr>
<td><strong>Input Z Depth</strong> - The user must input the approximate height (e.g. -.05) the stylus is from the work piece.</td>
</tr>
<tr>
<td><strong>Input Workoffset</strong> - The user must input the work offset being written eg “55” is G55. Extended work offsets may also be used.</td>
</tr>
<tr>
<td><strong>Jog</strong> - The user must jog the probe stylus to the approximate X/Y center of the block, positioning the stylus above the block in the Z-axis by approximately .4”.</td>
</tr>
</tbody>
</table>
```
Probe Vise Corners

**Actions Required**
- **Input X Width** - The user inputs the approx. block width (X-axis).
- **Input Y Depth** - The user inputs the approx. block depth (Y-axis).
- **Input Z Depth** - The user inputs the approximate height the stylus is from the work piece.
- **Input Workoffset** - The user must input the work offset being written eg "55" is G55. Extended work offsets may also be used.

**Jog** - The user must jog the probe stylus below the surface of the block and at the approximate left rear of the block.

### 1.3 Tool Setting

The first and second figures are the templates for finding the length only of a tool. Once selected and the data entered, the machine will automatically move the table probe below the spindle and touch off the tool. The third template finds both the length and diameter of a tool.

If using cutters with multiple inserts, the second template should be used. To get an accurate reading from the probe, the spindle needs to be jogged to the position shown and the spindle turned by hand, such that when lowered, a cutting insert will touch the stylus.

### 1.4 Calibration

Probe calibration will identify and compensate for any deviation from the probe trigger point to the machine axis system. Calibration will compensate for system variations by giving an effective working diameter of the stylus ball, (the electronic centerline of the probe stylus). Calibration will also allow the machine tool to know the position of the stylus center in relation to the machine home position.

It is recommended that the alignment be checked during routine machine maintenance, or anytime system performance is in question.

The following are instructions for using the calibration templates.

#### Spindle Probe X,Y Calibration

This cycle calibrates the OMP-40 in X and Y axis only. You will need an internal diameter of a known size such as a set ring or a bored hole.

**Actions Required**
- **Diameter** - Enter the known size of the diameter.
- **Jog** the probe to approximate X/Y center of diameter, position stylus inside bore in Z.

Machine motion will repeat.
Spindle Probe (Z Calibration)

This cycle calibrates the OMP-40 in Z-axis only. You will need to identify the Z location you want to set as Z zero.

**Actions Required**

**Work Offset** - Input the work offset being used. (54=G54)

**Z Position** - Enter the Z value to be set (in most cases this is zero).

**Jog** the probe to approximate .400 above surface in Z above the TS-27R.

Machine motion will repeat.

Calibrate TS-27R (Tool Probe)

This cycle calibrates the TS27R. To calibrate the tool probe you will need a tool or ground bar of a known length and diameter.

**Actions Required**

**Tool Length** - Enter the known tool length.

**Tool Diameter** - Enter the known tool diameter.

**Side** - Define location of TS27R. If the TS27R is on the left side of the table enter -2; if on the right side enter 2. This is viewed from the front of the machine.

**Jog** the tool over the center of disk at .400 above the disk.

Once calibrated, the control automatically stores the values in macro variables within the control's register. These values are referenced during probing operations. If the macro variables are adjusted, cleared, or written over, the probe must be calibrated again.

**Warning:** The probe will need recalibrating if the Dimension setting (setting 9) is changed.

### Z Offset

Run the tool setting program for auto length for the part probe. When the Tool Setting templates are run, a positive value showing actual tool length is displayed. Run the Probe Z surface routine. This will enter a large negative value in work Offset Z.

<table>
<thead>
<tr>
<th>OFFSET (MEM)</th>
<th>O91002</th>
<th>N00000</th>
<th>WORK ZERO OFFSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOOL POSITION</td>
<td>COOLANT</td>
<td>LENGTH</td>
<td>WEAR</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>5.3735</td>
<td>0.</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0.</td>
<td>0.</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0.</td>
<td>0.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OFFSET (MEM)</th>
<th>O91002</th>
<th>N00000</th>
</tr>
</thead>
<tbody>
<tr>
<td>G CODE X</td>
<td>Y</td>
<td>Z</td>
</tr>
<tr>
<td>G54</td>
<td>0.</td>
<td>0.</td>
</tr>
<tr>
<td>G55</td>
<td>0.</td>
<td>0.</td>
</tr>
<tr>
<td>G56</td>
<td>0.</td>
<td>0.</td>
</tr>
</tbody>
</table>

### 1.5 Troubleshooting

Refer to the Renishaw User Guide, included with the probe.

Some common, simple problems are weak or dead batteries, and dirty probe assemblies.

Batteries are an easy solution, and LEDs on the probe give an indication to the voltage. If the indicator shows that the batteries are weak, replace them. Refer to the Renishaw Installation and User’s Guide for battery replacement instruction. Once the batteries have been replaced, re-establish communication between the probe and the OMI unit by resetting the probe: Select MDI mode, enter M53 and press Cycle Start. The green light on the OMI will come ON.

The stylus, if dirty, will give inaccurate measurements or poor repeatability. Carefully wipe grime from the stylus. Also check the part being probed, this should be clean as well.

Ensure that the face of the OMI unit is clean and that the line-of-sight from the OMI to the spindle probe is maintained.
1.6 Probe Care and Maintenance

The OMI unit is very durable and only needs the occasional cleaning of the glass to ensure proper transmission and receiving of data. LEDs in the face of the unit can display problems.

The tool probe stylus should be kept clean to ensure accurate readings. A clean rag should be used to wipe down the unit. Check the cable occasionally for damage and the routing of the cable to avoid abrasion. The spindle probe is delicate, especially the stylus. The stylus is ceramic and therefore brittle, careful handling and storage is of paramount importance. The probe unit should be kept clean, since it transmits and receives data like the OMI unit. The LEDs in the unit can tell of potential problems.

2.0 Retrofitting Instructions

This option is only compatible with machines built after January 2000 (I/O PCB rev "S" or later). Additionally the software must be a minimum of 12.02. If the machine has an earlier software revision than 12.02, the software will need to be upgraded.

Vertical Mills (except GR Series)

OMI Mounting

1. Drill a 17/64 (.266" [6.75mm]) hole in the back sheet metal. The figure illustrates a typical mounting position and the table gives specific dimensions for VF series machines.

<table>
<thead>
<tr>
<th>Mill Model</th>
<th>Dimensions</th>
<th>Mill Model</th>
<th>Dimensions</th>
<th>Mill Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini Mill</td>
<td>A1=12&quot;</td>
<td>VF 1-4</td>
<td>A1=16&quot;</td>
<td>VF 5/5XT</td>
<td>A1=18&quot;</td>
</tr>
<tr>
<td></td>
<td>B1=14&quot;</td>
<td>incl APC</td>
<td>B1=14&quot;</td>
<td>B1=14&quot;</td>
<td></td>
</tr>
<tr>
<td>VF6-11</td>
<td>A2=36.5&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B2=14&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VS Series</td>
<td>3&quot; from the right</td>
<td>Toolroom Mill</td>
<td>A2=14&quot;</td>
<td>4&quot; from bottom of head cover</td>
<td>A2=14&quot; (to the top of the back sheet metal)</td>
</tr>
<tr>
<td></td>
<td>and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Attach one of the brackets to the sheet metal using one 1/4-20 x 5/8 SHCS, washer and nut. Set the initial Z angle between 10° and 20°. Mount the OMI to the other bracket using (2) 10-32 x 3/8 bolts. Fasten the OMI/bracket to the bracket on the back panel using (2) 8-32 x 3/8 bolts.

3. Route the cable as shown in the previous figure using clamps and the existing screws. The cable will be routed out of the machine and to the top of the control cabinet. The cable is connected to the control cabinet as described in the Electrical Connections section.
Tool Setting Probe

The tool setting probe mounts on the back edge of the table. This is out of the way for most machining operations. It must be positioned within the work envelope so that a tool in the spindle will be able to reach it.

Pay attention to the use of cable ties, cable clamps and their positions. **IMPORTANT:** Any extra table probe cable should not be allowed to hang in to the work area or on the pan enclosure.

At the start of each installation, determine where the table probe will enter the machine; for example, the left or right side of the column. Move the table to the opposite side and forward of the cable entry. (For example, if the VF-1 cable enters the machine on the right of the column, the table will need to be moved all the way to the left and forward.) This will ensure full travel can be achieved without damaging the cable.

Once installed, carefully check for full axis travel; be sure that all cables are properly secured, that there is no slack, the cable does not catch on the corners of the way covers, etc.

Note that for VF-10, VF-11, and VR-11, **DO NOT** allow probe cable to contact the linear guide on the outrigger.

Installation (non-trunnion/APC mills)

1. Remove the four (4) bolts which hold the probe to the base, using the 3mm hex key provided.
2. Fasten base to table using a T-nut and a 1/2-13 x 1 SHCS. Align probe to base mounting bolts parallel to the T-slot. Bolt the probe back to its base. The arm of the probe stylus should be parallel to the T-nut.
3. Jog the table to the end of travel, positioning the probe as far from the spindle as possible (both X and Y axes). Route the probe cable to the back of the machine, then up and out the top of the rear sheet metal. Leave very little slack in the cable (the cable should be almost tight), secure it to the table and the back sheet metal using cable clamps and the existing screws.
4. The probe cable is connected to the control cabinet as described in the Electrical Connections section.
OMI Mounting

1. Jog the X-axis to the farthest point from the control pendant.

2. Mount one of the brackets with a 1/4-20 SHCS to the underside of the bridge. It may be necessary to drill and tap one 1/4-20 x 1/2" hole; see the following figure for location. Align the bracket as shown; the alignment is important. Fasten the OMI unit to the other bracket using two (2) 10-32 x 3/8 SHCS.

3. Mount the OMI/bracket to the column bracket using two (2) 10-32 x 3/8 SHCS. Angle the OMI unit so that the two brackets are almost touching, as shown in the figure.

4. Route the cable as shown. Connect the end of the extension cable labeled HAAS PRB HRNSS to the I/O board in the control cabinet (see the Electrical Connections section). The cable is positioned in the upper section of the X-axis cable carrier. **Note that on machines built before July 1, 2003, replace the cable carrier with one equipped with separators.**

5. Connect the extension cable to the OMI cable: The OMI cable must be routed through the hole in the column. The end of the extension cable labeled OMI CONN BRDG connects to the OMI cable. Fasten the cable to the cover plate with two (2) cable clamps. Use the existing screws on the cover plate.
**Tool Setting Probe**

The tool setting probe on the gantry mill is mounted using one screw. The location for the hole is 4" from the back of the machine and 6" from the left side (**not** the operator’s side) of the machine. The hole needs to be drilled and tapped to 1/2-13. Once mounted, the probe stylus will face the front of the machine.

**EC-400/EC-500**

**OMI Mounting**

1. Mount the OMI unit (P/N 32-0682) on the top cover as shown. Attach one of the brackets to the top cover. Mount the OMI to the other bracket using (2) 10-32 x 3/8 bolts (P/N 40-0037). Fasten the OMI/bracket to the bracket using (2) 8-32 x 3/8 bolts (P/N 40-1801).

2. Remove the plug in the top cover and route the cable through the top cover to the control cabinet. See the Electrical Connections section for the location of the OMI cable socket. Install the grommet (P/N 59-7224) (must be cut) into the 1" hole on the top cover.

**Tool Setting Probe**

1. Jog the Z-axis towards the load station. Remove the Z-axis way cover, closest to the spindle, from the rotary table, and slide back.

2. Mount the probe arm (P/N 20-2332) with the mounting block (P/N 20-2331B - EC-400) (P/N 20-3218 - EC-500) to the side of the table (as shown in the following Tool Setting Probe illustration) using two 3/8-16 x 5" [127mm] SHCS (P/N 40-16439) and lock washers (P/N 45-1681). The mounting arm should be parallel to the Y-axis ±.02" [.508mm].

3. Mount the base plate (P/N 20-2333A) to the arm using two (2) 5/16-18 x 1 1/4" [31.75mm] SHCS (P/N 40-1667) and lock washers (P/N 40-1600). Mount the table probe (P/N 32-0681) to the base plate. See the table probe alignment section.

4. Remove the chip shield from the Z-axis and remove the plug. Remove the nut and lock washer from the probe cable fitting assembly. Insert the cable (P/N 33-1910A) through the hole and reassemble the nut with lock washer. Note that more cable will be required for the EC-500 due to the longer mounting block.
5. Fasten the probe arm reinforcement (P/N 25-5660) over the probe cable on the arm with 10-32 x 3/8" [9.52mm] SHCS.

6. Mount the probe chip shield (P/N 25-5305C) to the arm with four (4) 10-32 x 1" [25.4mm] SHCS (P/N 40-2026).

7. Run the cable to the control cabinet as shown. See the Electrical Connections section.
OMI Mounting

1. Mount the OMI unit on the sheet metal as shown. Attach one of the brackets to the sheet metal. Mount the OMI to the other bracket using (2) 10-32 x 3/8 bolts. Fasten the OMI/bracket to the bracket using (2) 8-32 x 3/8 bolts.

2. Remove the plug in the sheet metal, install the grommet (must be cut) into the 1" hole, connect an extension to the OMI cable, and route the cable through the sheet metal to the control cabinet.

3. Route the OMI cable behind the SMTC mount, into the base cable tray, then through the access holes in the control panel.

Tool Setting Probe

1. Install bracket onto APC and torque fasteners.

2. Route cable along the side of the APC, into the opening in the panel, and onto the roof.

3. Make sure to route the cable when installing sheetmetal enclosure panels.
EC-1600/EC-3000

OMI Mounting

1. Attach one of the brackets to the sheet metal using one 1/4-20 x 5/8 SHCS. Mount the OMI to the other bracket using (2) 10-32 x 3/8 bolts. Fasten the OMI/bracket to the bracket on the back panel using (2) 8-32 x 3/8 bolts. Set the bracket angle at a 1/2 inch.

2. Route the cable using clamps and the existing screws. The cable will be routed out of the machine and to the top of the control cabinet. The cable is connected to the control cabinet as described in the Electrical Connections section.

Tool Setting Probe

1. The tool setting probe for the EC-1600/3000 is mounted to the table using a specific bracket that positions the probe toward the front left of the machine. This bracket is mounted to the table using the (two) 2 SCHS 1/2-13 x 1 1/2 and t-slot nuts.

2. Mount the table probe to the probe mounting bracket as shown. See the table probe alignment section for proper alignment instructions.

3. Run the cable to the control cabinet as shown. Run the probe cable along the iside of the machine to the retractor using the retractor cable clamp for clearance as shown. Bolt the probe cable to the sheet metal using every other, existing, sheet metal screws. See the Electrical Connections section. Install the grommet (must be cut) into the 1" hole on the top cover.
The tool setting probe is mounted to the table using a specific bracket that positions the probe towards the front left of the machine. This bracket is mounted to the table using the existing bolt holes as shown in the following figure.
VS SERIES MILLS

1. Mount the table probe with riser at the dimension shown. Insert the T-nut and turn it 90°.

2. Drill one 1 5/16" [33mm] hole as shown. Be sure to deburr.

Warning: Machines with pallet changers have an unusable area on each pallet. Fixtures or parts, taller than 3.25", passing within these zones, will collide with the probe mounting bracket.
3. Run the cable through the individual pieces of the pipe assembly. Continue the cable through the 15/16 [33mm] hole. Note that the locknut goes below the table gutter. Cut the rubber inside the cord grip.

4. Assemble the cord grip, elbow, pipe nipple, and hub. Use sealant to prevent leaks. Do not tighten down the hub to the sheet metal; this will be done at a later step.

5. Fasten the support bracket to the two mounting brackets using four (4) 1/4-20 x 5/8” SHCS and 1/4” split lock washers. See the following illustration.

6. Remove the two (2) left screws from the cover plate on the front of the base casting. Mount the right end of the support bracket assembly to these holes using 1/4-20 x 5/8” SHCS and split lock washers. (Do not tighten screws all the way at this stage.)

7. Holding the left end of the support bracket against the base, mark the base for the two left end mounting holes. Make sure that the support bracket assembly is level.

8. Drill and tap two (2) 1/4-20 x 1/2” mounting holes in the base where marked.

9. Fasten the bracket assembly to the base using two (2) 1/4-20 x 5/8” with 1/4” split lock washers.

10. Mount the cable carrier guide where shown in the following illustration, using two existing holes for the table cover.

11. Remove the mounting ends of the cable carrier. Turn them 180 degrees and reinstall. This will be the proper orientation for the installation.

12. Fasten the cable carrier to the mounting brackets using four (4) 10-32 x 5/8 FHCS.

   **NOTE:** For VS-3, combine two cable carriers for a total of 52 links, in addition to two (2) end pieces.

13. Mount the pipe assembly. **Apply Sikaflex** – The hole must not leak. See the pipe assembly illustration.

14. Route the cable as shown in the illustration. See the Electrical Connections section in this document for the cable connection.
2.1 Electrical Connections

The OMI and Tool Probe cables are attached to the control cabinet at the spare #1 and spare #2 mount holes at the side of the cabinet. Some machines may need the 8M relay board installed; see the following section.

1. Power down the machine and open the control cabinet. Remove the cover plates, by drilling out the rivets, which secure the cover plates to the cabinet.

2. Attach the slotted cover plate to the fittings at the ends of the OMI and Tool Probe cables. To do this, remove the steel locknut on the fitting and slip the inner cable through the slot in the cover plate. Place the plate over the threads and tighten the steel locknut.

3. Feed the smaller, inner cable of the OMI and Tool Probe through the holes on the side of the cabinet. Orient the cover plate so that the slot points down, and attach the slotted cover plates to the side of the cabinet using (2) 8-32x1/2 bolts and nuts.

4. Remove the left, center, and upper wire channel covers. Place the smaller, inner cables from the OMI and Tool Probe into the wire channel along the left side, routing them toward the bottom of the cabinet.

Note: For newer I/O boards using P77, skip the following steps.

5. Install the 24V probe power supply at the bottom right of the cabinet using hook and loop fasteners. Route the probe power supply cable through the wire channel toward the top of the cabinet and then left, through the channel on the top edge of the I/O PCB. The cable is then routed down toward the bottom of the cabinet on the left side of the I/O PCB.

6. Plug the power supply source cable to P3 on the power supply PCB. Place the cable in the center wire channel. Plug the power supply into the source cable from P3 on the power supply PCB.

7*. Install the probe harness to P22 (bottom left), M22 and M23 (top center) on the I/O PCB, and place the harness inside the wire channel. *If the machine is not equipped with an optional relay board, install it now.

8. The connectors from the 24V power supply, the OMI, the tool probe, and the harness are now next to each other inside the left wire channel. Join the cable connectors. There are three unique connectors, one two-pin, one three-pin, and one four-pin. Fit the connections into the wire channel and replace all wire channel covers.
2.2 8M Option Installation

1. Connect the 8M harness to P22 (1070 Skip) on the I/O PCB. Route the harness up through the left-side wire channel, continuing through the wire channel along the top edge of the I/O PCB, and then through the wire channel toward the top of the cabinet.

2. There is a gap on the right side of the center wire channel just below the power supply PCB. Route the harness through this area, toward the right side of the cabinet. Use cable ties to hold the harness to nearby wire bundles.

3. The M Code Relay Board will be mounted on the right side of the cabinet. Insert the stripped ends of the 8M wire harness directly into the connector strip on the M Code Relay Board at the appropriate locations for M22 and M23, and tighten the screws. Pay close attention that the M22 and M23 connections are made properly.

**Warning**

If the M22 and M23 connections are reversed, and power is applied to the machine, the OMI may be damaged.

4. There are MCD address selector jumpers near the center of the M Code Relay Board. Make sure there is a pin jumper on the following pairs of pins: MCD (24-31) and I/O PCB JP5.

5. Set Parameter 352, Relay Bank Select, to 2. Note that before any parameter can be changed, Setting 7 must be changed to OFF. If the machine has the key switch option, the key must be turned to the unlock position before the setting can be changed. Replace all wire channel covers.

2.3 Activating the Probe

Once installation has been completed, the unit may be turned on at the control pendant by using an M-code.

**Spindle Probe:** In MDI mode, type M53, press Reset, then press Cycle Start. This M-code will toggle the probe on or off. Before removing the spindle probe from the machine or storing it in the tool changer, make sure the probe has been turned off with an M53.

**Table Probe:** In MDI mode, type M52, press Reset, then press Cycle Start. This M-code will toggle the probe on or off.

2.4 Software Installation

Install the Visual Quick Code (VQC) probe templates. Contact your dealer to obtain the latest software version of VQC.

Setting 33 needs to be changed to "Fanuc", and change Parameter 57 bit 13 (Skip Oversht) to 1 and bit 23 (Invert Skip) to 0.

2.5 OMI and Probe Alignment Verification

1. Assemble the spindle probe as described in the operating instructions, and load the probe into the spindle.

2. Select MDI mode, enter M53 and press Cycle Start. The green light on the OMI should be ON. If not, adjust the aim of the OMI unit.

3. Jog the Z-axis up and down the full travel. The green light should be ON for the complete range. **GR mills:** Jog the X-axis as well, verify the green light stays on for the complete range of travel.

4. Select MDI mode and press Reset and then Cycle Start. Doing so will turn the probe off. The light on the OMI unit should change from green to red.