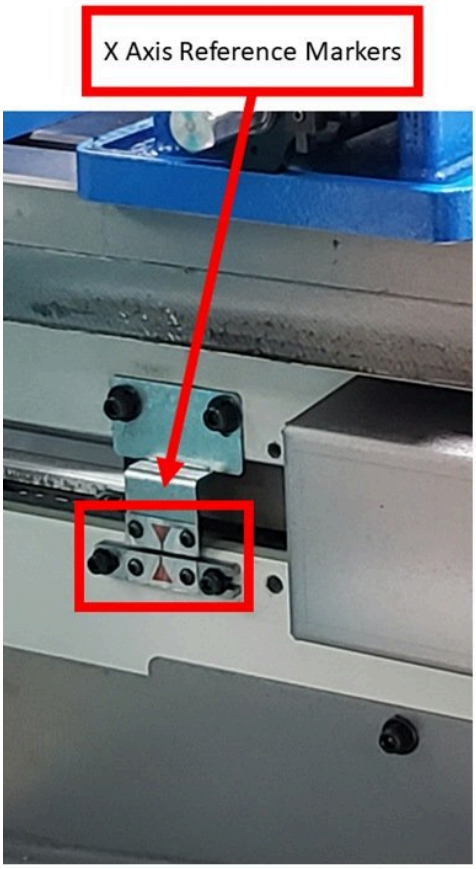
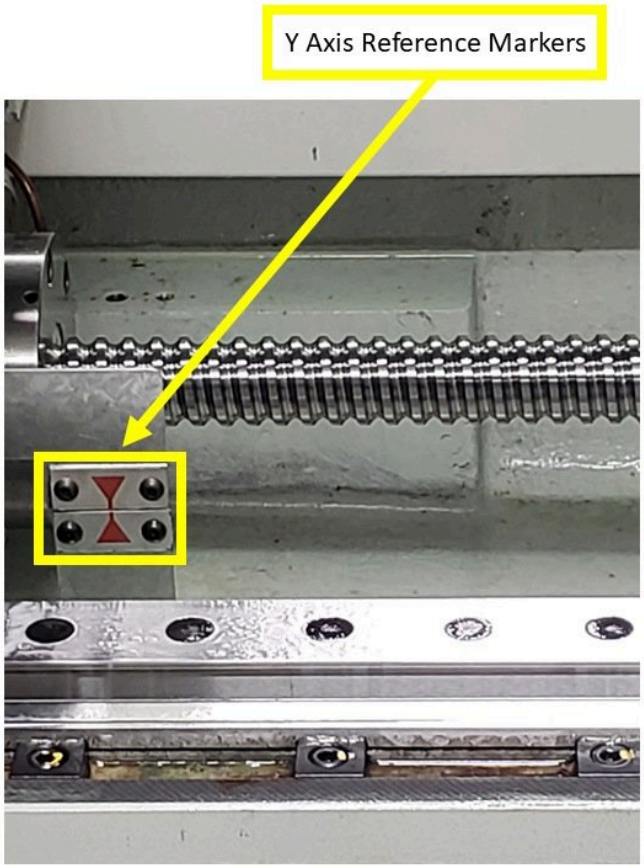
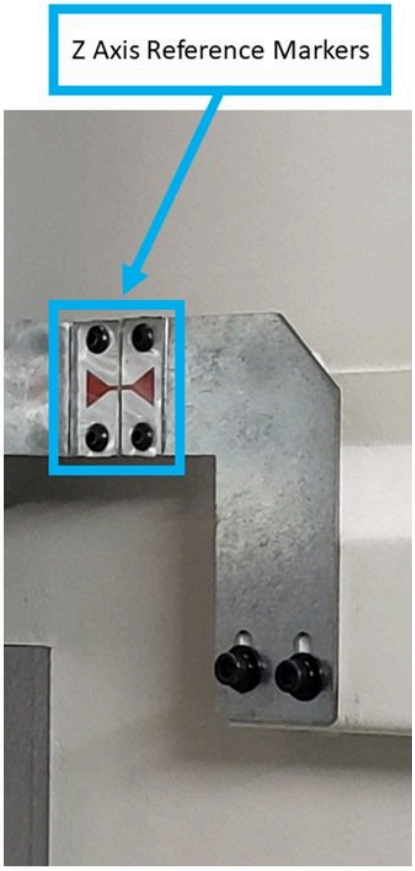
VMCsi - Reset Machine Absolute Zero for Each Axis

This guide details how to reset absolute zero for each axis for all VMCsi models.

Written By: Pat Fitzsimmons





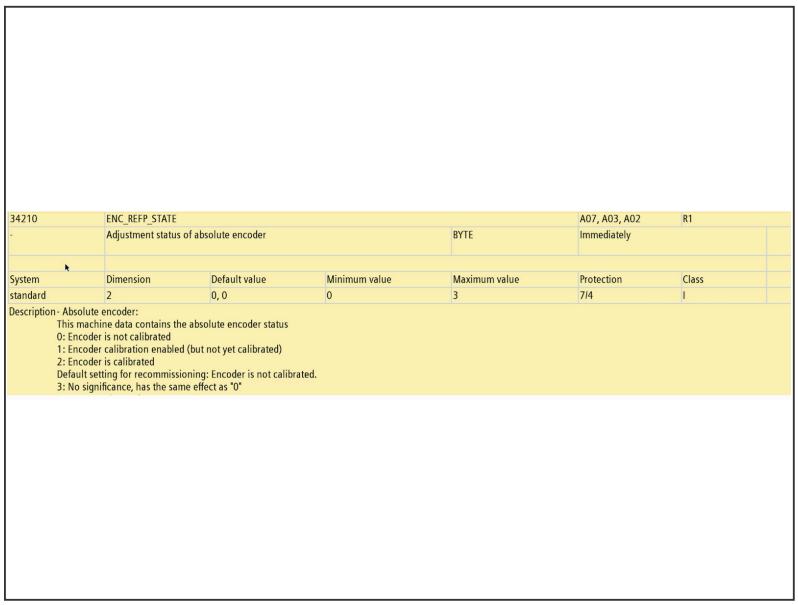


INTRODUCTION

This guide details how to reset absolute zero for each axis for all VMCsi models.

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Step 1 — Understanding MD34210: Encoder State

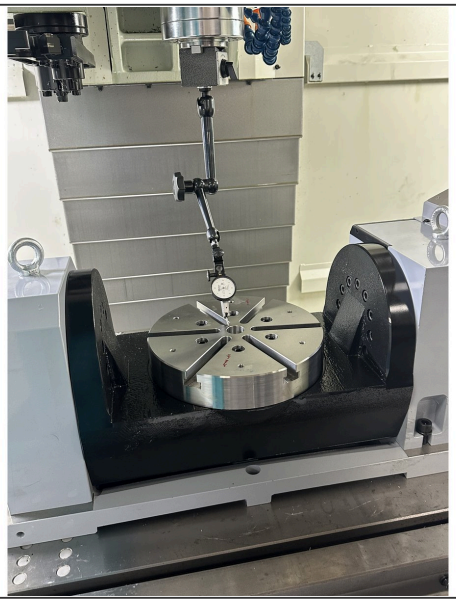


34210	ENC_REFP_STATE				A07, A03, A02	R1
-	Adjustment status of absolute encoder			BYTE	Immediately	
System	Dimension	Default value	Minimum value	Maximum value	Protection	Class
standard	2	0, 0	0	3	7|4	I

Description - Absolute encoder:
This machine data contains the absolute encoder status
0: Encoder is not calibrated
1: Encoder calibration enabled (but not yet calibrated)
2: Encoder is calibrated
Default setting for recommissioning: Encoder is not calibrated.
3: No significance, has the same effect as "0"

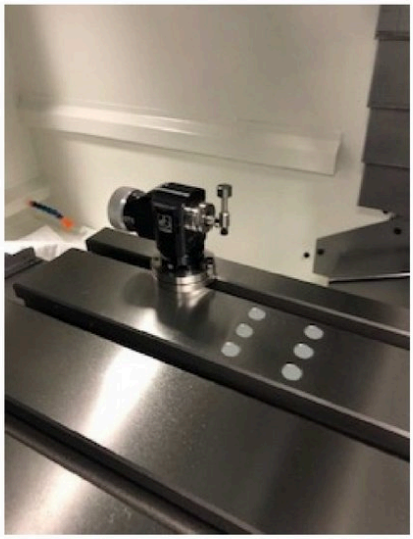
- Before an axis can be referenced, the control must be told the encoder's current state. This is tracked using MD34210, which determines whether the encoder is unreferenced, ready to calibrate, or already calibrated.
  - 34210 set as **0**: Encoder Not Calibrated. The encoder has no reference to the physical position. **Use this to clear or reset the reference.**
  - 34210 set as **1**: Calibration Enabled. Encoder is ready to establish a new reference. This is the manual setup state.
  - 34210 set as **2**: Encoder Calibrated. The encoder position is successfully established, and the machine recognizes the axis position.

Step 2 — VMCsi's with Trunnions or 4th Axis



- If the machine is equipped with a trunnion or 4th axis and the X, Y, or Z axis is re-referenced, the rotary axis must be re-referenced and any required calibration must be redone.
  - Trunnion (3+2) Calibration
  - 4th Axis Installation

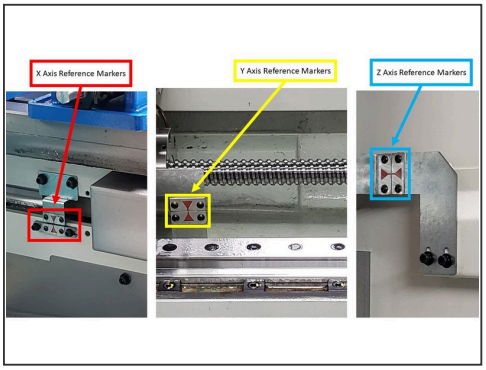
Step 3 — Recalibrate the Tool Setting Probe

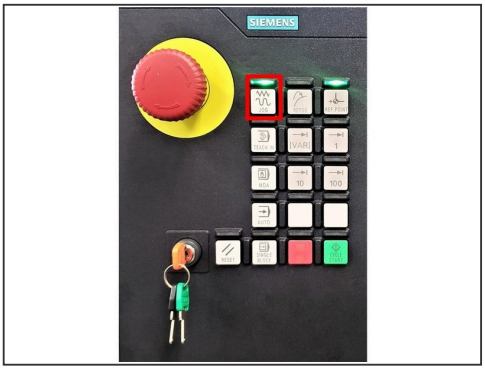


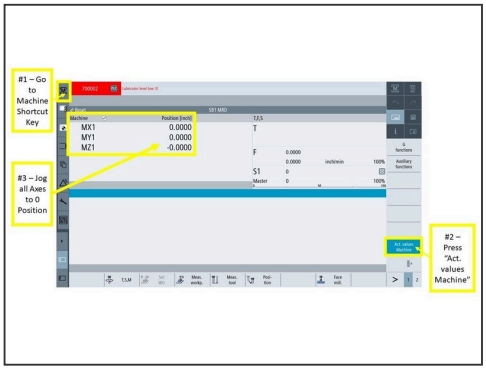
OPTICAL TOOL SETTING PROBE

- If the X, Y, or Z axis is re-referenced, the tool setting probe must be recalibrated before it is used again.
- Tool probe calibration is based on machine position, so changing machine absolute zero affects probe accuracy.
- Set Up & Calibrate Tool Setting Probe

Step 4 — Position the X, Y, and Z Axes to 0



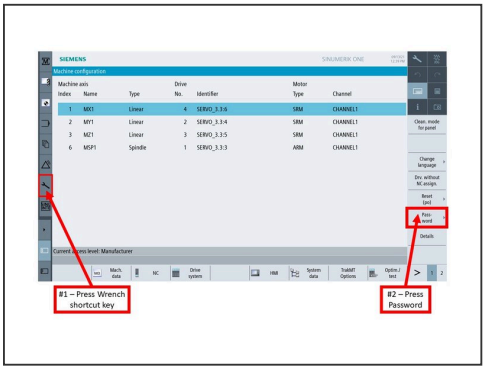


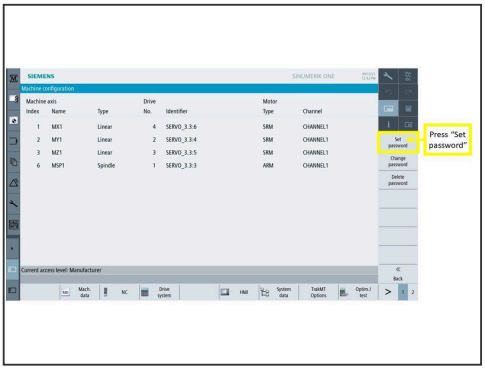


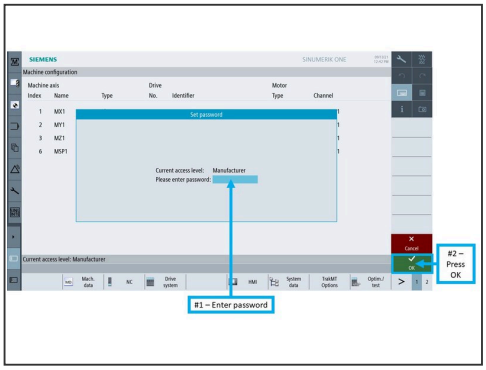
ⓘ If changing out a ballscrew or motor, set the position to zero to avoid software limit switch alarms.

- Press **[JOG]** on the MCP.
- On the touchscreen, press the **[Machine]** shortcut key in the top left corner of the screen.
- Next, press the Vertical Soft Key (VSK) labeled **[Act. values Machine]**.
  - ⓘ Make sure that VSK **[Act. values Machine]** remains highlighted on the screen during the next step.
- Jog the table, saddle, and head to the **0 reference position**, as shown on the image.

Step 5 — Enter Manufacturer Password

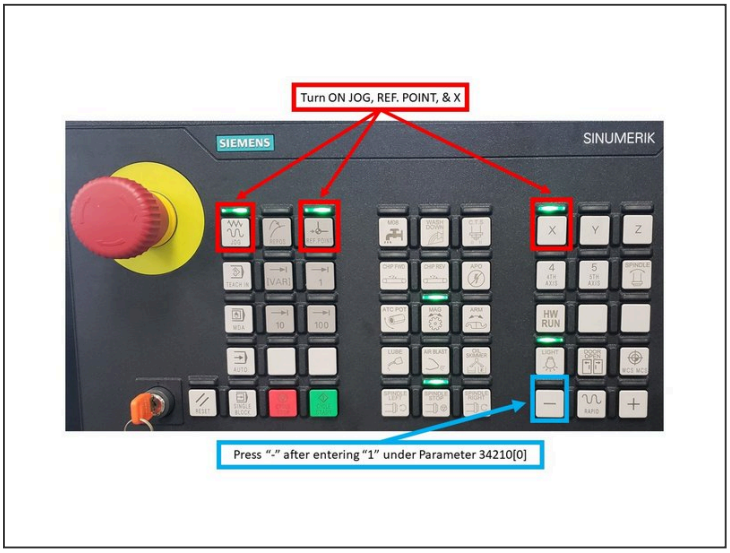


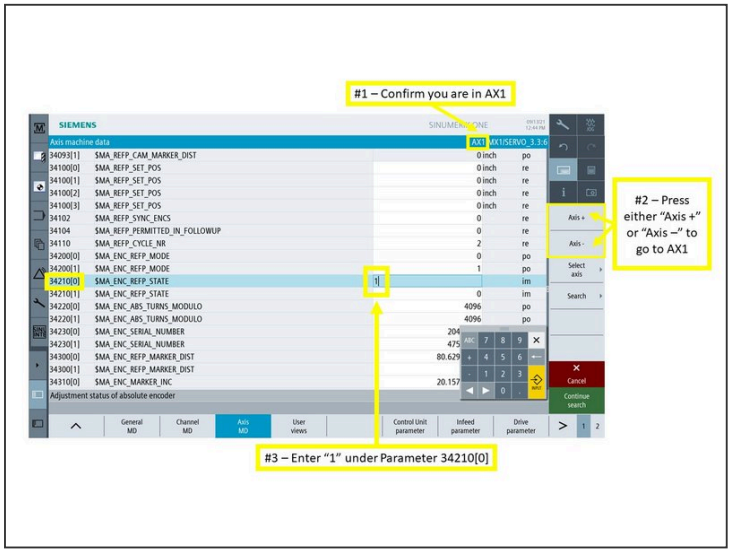




- **Manufacturer access level** is required in order to change machine settings. Enter the manufacturer login credentials via the following steps:
  - On the touchscreen, press the **[Wrench]** shortcut key on the left side of the screen.
  - The **[Setup]** window appears. Press VSK **[Password]** on the right side of the screen.
  - On the next screen, press VSK **[Set password]**.
  - Enter the appropriate password when prompted, and then press **[OK]**.

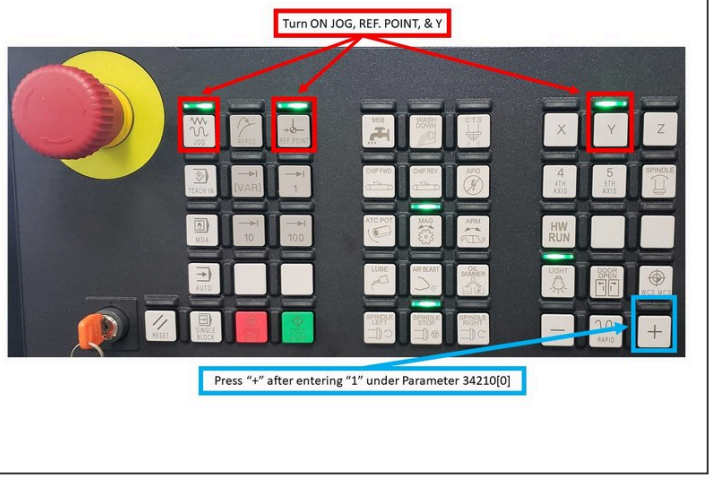
Step 6 — Reference Absolute Encoder for X-Axis

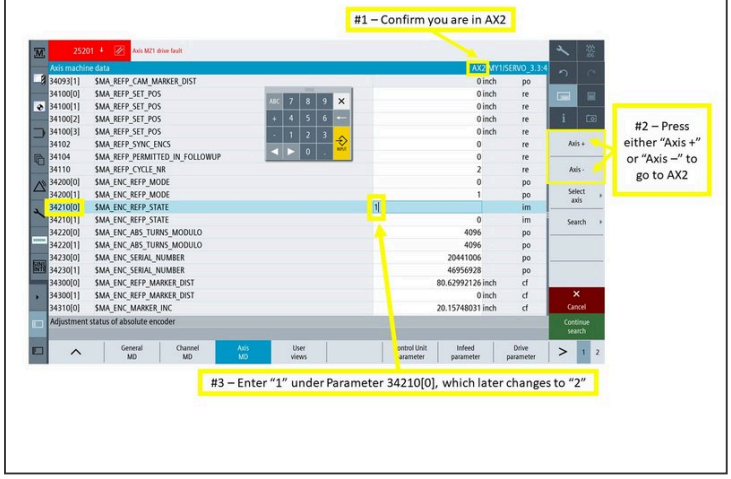




- Go to **[Setup]** → **[Mach. Data]** → **[Axis MD]** → **[Select Axis]** → **[AX1:MX1]**
- **[Search]** for **34210**.
- On the **Axis MD** window, confirm that you are under **AX1:MX1** .
- Turn on the **[JOG]**, **[REF. POINT]**, and **[X]** buttons on the MCP.
- Set **MD34210[0]** = **1**
  - ⓘ Parameter 34210 set to 1 means the encoder is ready to establish a new reference, indicating the manual setup state.
- Press the "**[-]**" button on the MCP. The value for Parameter **34210**[0] should change from "1" to "2" automatically.
  - ⓘ The changing of the value to "2" means that the referencing process is complete for that particular axis.

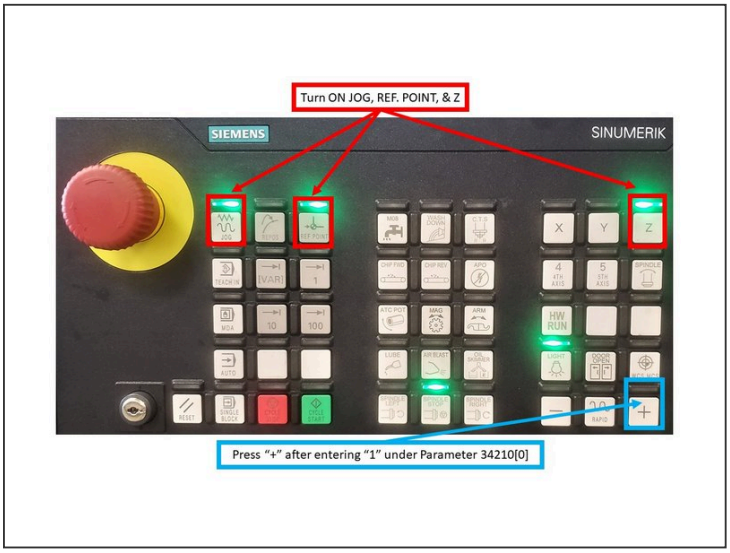
Step 7 — Reference Absolute Encoder for Y-Axis

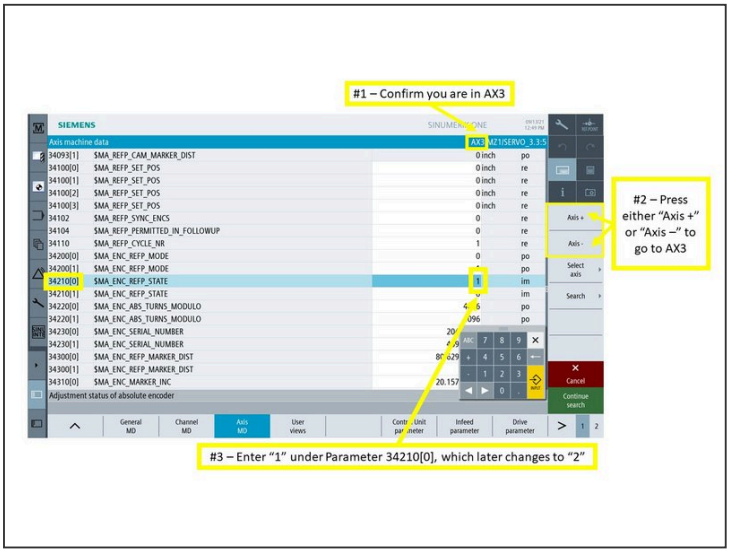




- Go to **[Setup]** → **[Mach. Data]** → **[Axis MD]** → **[Select Axis]** → **[AX2:MY1]**
- **[Search]** for **34210**.
- On the **Axis MD** window, confirm that you are under **AX2:MY1**.
- Turn on the **[JOG]**, **[REF. POINT]**, and **[Y]** buttons on the MCP.
- Change Parameter 34210 to "**1**"
  - ⓘ Parameter 34210 set to 1 means the encoder is ready to establish a new reference, indicating the manual setup state.
- Press the "**[+]**" button on the MCP. The value for Parameter **34210**[0] should change from "1" to "2" automatically.
  - ⓘ The changing of the value to "2" means that the referencing process is complete for that particular axis.

Step 8 — Reference Absolute Encoder for Z-Axis





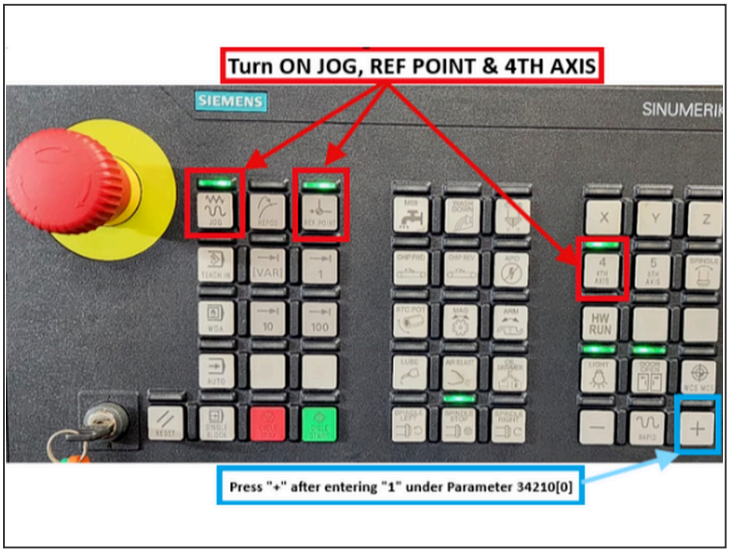
- Go to **[Setup]** → **[Mach. Data]** → **[Axis MD]** → **[Select Axis]** → **[AX3:MZ1]**
- **[Search]** for **34210**.
- On the **Axis MD** window, confirm that you are under **AX3:MZ1** .
- Turn on the **[JOG]**, **[REF. POINT]**, and **[Z]** buttons on the MCP.
- Change Parameter 34210 to "**1**"
  - ⓘ Parameter 34210 set to 1 means the encoder is ready to establish a new reference, indicating the manual setup state.
- Press the "**[+]**" button on the MCP. The value for Parameter **34210**[0] should change from "1" to "2" automatically.
  - ⓘ The changing of the value to "2" means that the referencing process is complete for that particular axis.

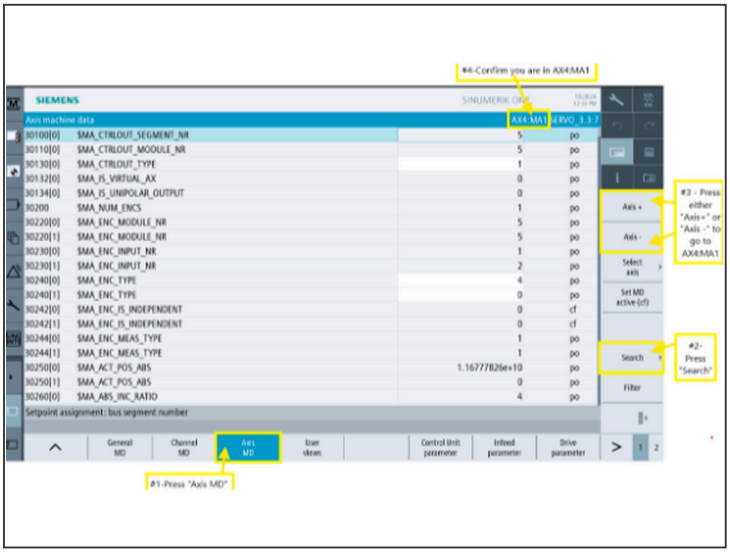
Step 9 — Reset the Z Tool Change Height Position



- If the Z axis is re-referenced, confirm and reset the Z tool change height position before returning the machine to service.
- This position is tied to machine zero, so an incorrect value may cause improper tool change position or interference.
- VMCsi - Set Orientation Angle & Tool Change Height

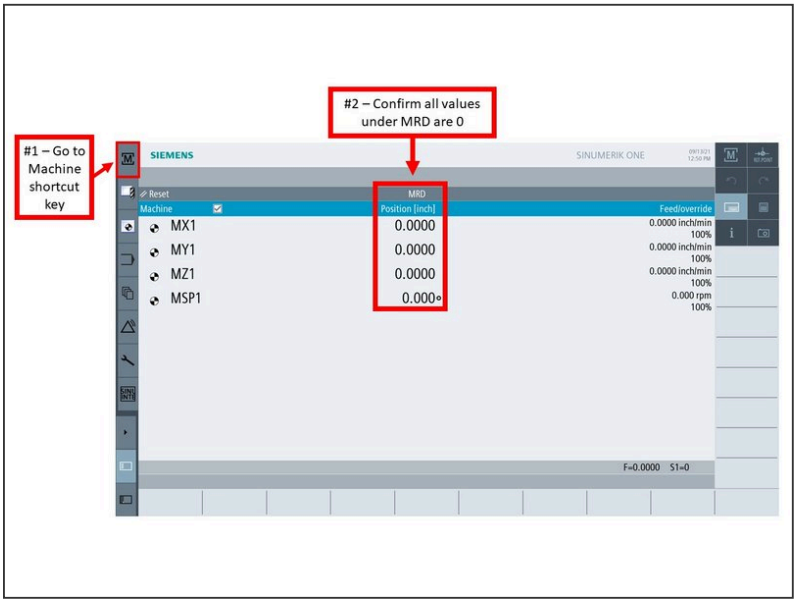
Step 10 — Reference Absolute Encoder for A-Axis





- Go to **[Setup]** → **[Mach. Data]** → **[Axis MD]** → **[Select Axis]** → **[AX4:MA1]**
- **[Search]** for **34210**.
- On the **Axis MD** window, confirm that you are under **AX4:MA1**.
- Turn on the **[JOG]**, **[REF. POINT]**, and **[4]** buttons on the MCP.
- Change Parameter 34210 to "**1**"
  - ⓘ Parameter 34210 set to 1 means the encoder is ready to establish a new reference, indicating the manual setup state.
- Press the "**[+]**" button on the MCP. The value for Parameter **34210**[0] should change from "1" to "2" automatically.
  - ⓘ The changing of the value to "2" means that the referencing process is complete for that particular axis.

Step 11 — Confirm Final Values



- Make sure that the **[REF. POINT]** button on the MCP remains ON for the next step.
- On the touchscreen, press the **Machine** shortcut key on the top left corner of the screen.
- As shown on the image, confirm that all values under the **Measuring Result Display (MRD)** column are "**0**."