TB127 (Rev2) - Homing to Reference Marks with Software Travel Limits

If you are looking for directions on how to set up software travel limits and are <u>not</u> using reference homing marks, please see Technical Bulletin #289
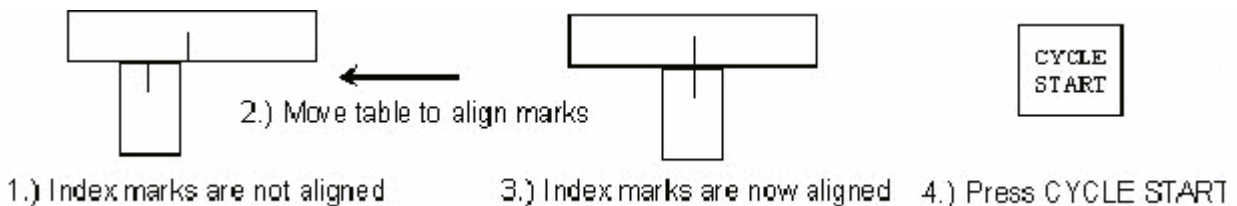
Software Version 7.14 and Later

Although Centroid strongly recommends the use of limit switches, Reference Mark Homing has its advantages with **"No limit switch"** operation of the machine. This feature provides the same convenience that physical home switches provide (No need to reset WCS zero position each time the power is removed from the control)

The main advantage of "Home to Reference Marks" is: no need for physical limit/home switches. This yields quicker and less expensive control installation, it also eliminates the possibility of any errors due to faulty switches or wiring. It is however important that the home to reference marks feature is set up correctly because machine damage can result from improperly set travel limits. The reference marks for homing are typically set near the center of the table travel and the software limits are set for both positive and negative travel from that mark. The Z-axis alignment mark should be at the maximum Z height allowed by the hardware. The alignment marks can be scribed permanently into the machine casting, or made from tags applied to the casting. Below is a typical setup of alignment mark application for a knee mill.

To set the control for Reference Mark Homing:

- Press **F1 - Setup**

- Press **F3 - Config**

- Enter the password **137** press - **Enter**

- Press **F1 - Control**

- Cursor down to **"Machine Home At Pwrup"** and select **"Ref Mark - HS"**

- Press **F10 - Save**

The use of alignment marks for homing is basically the same as the use of limit switches, however, instead of the machine moving the axes until it detects a limit switch, the machine operator must first move the table to pre-determined marks, and then home the machine. (See illustration below). The control will look for the first marker pulse coming from the encoder, and set home there. Just as the axis travels in one specified direction to find a limit switch, it will travel from the alignment mark to the marker pulse in the specified direction every time.

1.) Index marks are not aligned   2.) Move table to align marks   3.) Index marks are now aligned   4.) Press CYCLE START

Note: After the machine completes it homing function, the lines may appear to be misaligned slightly. This is dependant on where the index pulse on the encoder is in reference to the alignment marks on the machine. This is normal.
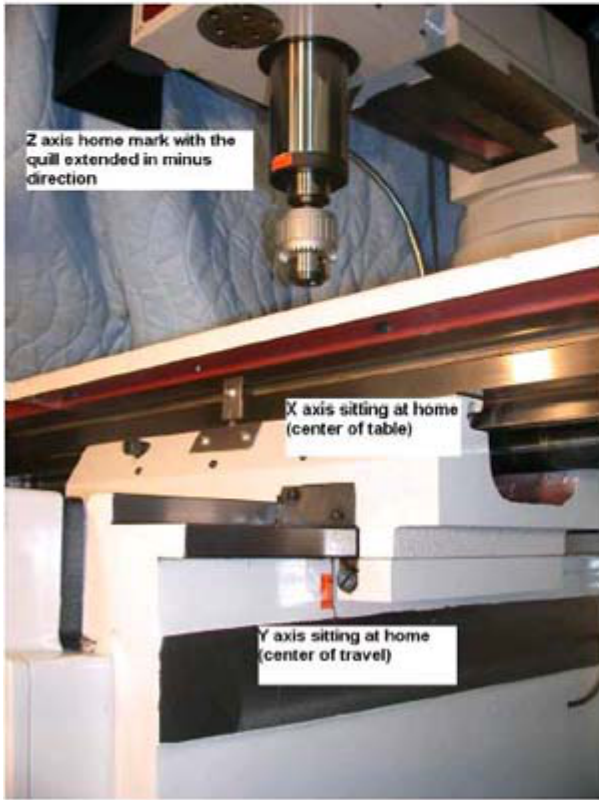
To setup the control for positive and negative travel limits:

- Press **F1 - Setup**

- Press **F3 - Config**

- Enter the password **137** press - **Enter**

- Press **F2 - Machine**

- Press **F1 - Jog**

This will highlight the first axis to be changed. Use the arrow keys to cursor over to the (Travel -) field. Enter the amount of travel the table can move from the home position to the end of the ball screw, without the ball screw bottoming out against the end stop. This amount can be found by going into the Machine Coordinate screen by depressing the **ALT + D** keys, jogging the axis in the minus direction close to the end of travel, then depress the **E-STOP** to release the power to the motors, and moving the table by hand until the end is reached. Record the number on the DRO. Subtract about .25 inches (6.35 mm) from this number and enter it into the (Travel -) field as a negative number. Repeat this procedure for the plus travel, only enter a positive number in the field. Repeat this for all other axes. If the Z axis homes at the top limit of its travel, only the (Travel -) field

The **F10 - Park function** (Dos) and **F1 - Park** (Linux) , allows for quick and easy homing of the machine before machine shutdown.

When the operator wants to shut the machine down, depressing the **F10** (or **F1** - Linux) - **Park** key will send the axes back to within 1/4 revolution of the homing marks. The alignment marks are now aligned for the next day. When the machine is turned on, visually inspect the alignment marks to make sure the axes haven't been moved, and then press **CYCLE START** to home the machine. Homing will be very quick since the motors are only 1/4 turn off of the marker pulse.

X axis home marks

Y axis home mark

Z axis home mark with the quill extended in minus direction

X axis sitting at home (center of table)

Y axis sitting at home (center of travel)

Z quill setting at the home position

HOME