



Mill X- and Y-Axis Positions Do Not Repeat Within Specification

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Translation Available



Setting 191 (Default Smoothness) Has an Incorrect Value

This setting defines the smoothness setting between Rough, Medium, or Finish. Each of these options represents a set of values for feed acceleration and deceleration.

The Rough option uses the least restrictive values to decelerate faster into corners, change direction more quickly, and accelerate faster out of corners to reduce cycle time, at the expense of part finish and machine accuracy. Use this option to rough out a part, or to decrease cycle times when part finish and accuracy are not critical.

The Medium option uses the machine's default values.

The Finish option uses the most restrictive values to decelerate more slowly into corners, change directions more slowly, and accelerate more slowly out of corners to improve finish, at the expense of a longer cycle. Use this option for finish cuts on complicated shapes or when part finish and accuracy are critical.

Helpful Hints

You can use G187 to temporarily change the default smoothness in a program. The P address with G187 commands the temporary smoothness level: Command P1 for **Rough**, P2 for **Medium**, and P3 for **Finish**.

More information is available on [G187](#) and [Setting 191](#), or refer to your Operator's Manual.

Setting 85 (Maximum Corner Rounding) Has an Incorrect Value - Mill

Setting 85 defines the machining accuracy tolerance around corners. The default value is 0.025" (0.635 mm). If the value of Setting 85 is too low, the control may interpret exact stops between lines of code. This can cause jerky motion, finish problems, and repeatability problems.

The control can cut corner [1] within tolerance at a higher feedrate than it can cut corner [2].



Use this setting to smooth out the motion of the machine in corners, or to make the machine more accurate when trying to hold a close tolerance.

A higher value for this setting lets the machine maintain higher feedrates through a corner for decreased cycle times, but it allows more deviation from the programmed path. A lower value reduces deviation, but also reduces the feedrate for increased cycle times.

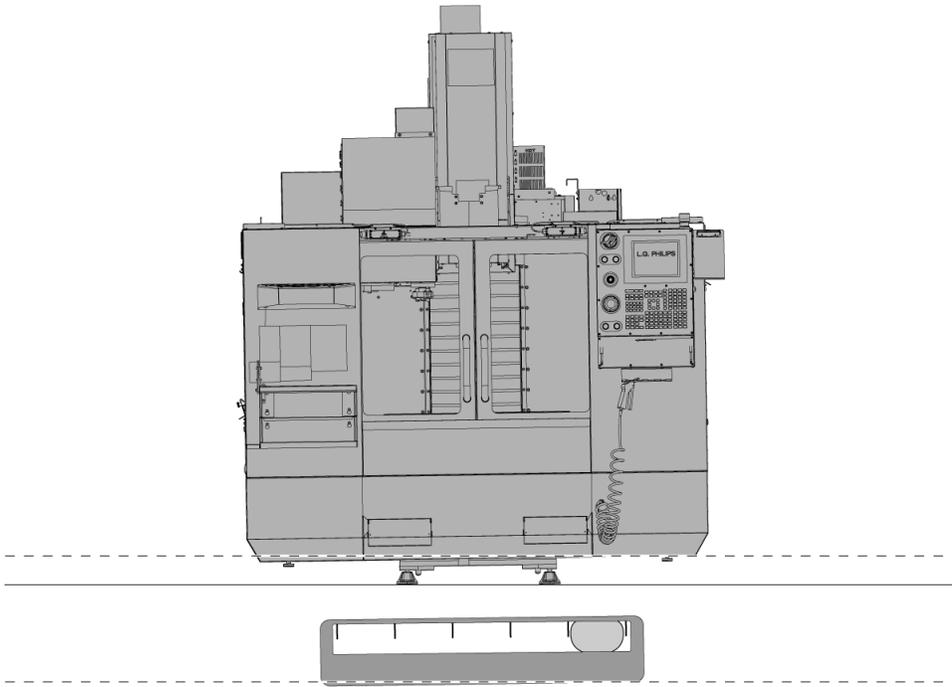
Note: Setting 191 affects Setting 85. For example, when Setting 191 is **ROUGH**, the value of Setting 85 is multiplied by 4. When setting 191 is **FINISH**, the value of Setting 85 is divided by 4.

Helpful Hint:

You can use G187 to temporarily override Setting 85 in a program. The E address with G187 commands the temporary corner rounding value. For example, **G187 E0.005** temporarily sets the corner rounding value to 0.005. Refer to your Operator's Manual for more information about [G187](#), [Setting 191](#) and [Setting 85](#).

The Machine is Not Level - Mill

To operate correctly, the machine must be level. An out-of-level machine can have problems such as poor surface finish, accuracy and repeatability issues, out-of-round circular motion, and out-of-true linear motion.



Watch the [VMC Leveling](#) video to learn how to properly level your Haas VMC, or contact your Haas Factory Outlet to have your machine's level checked.

Thermal Growth During Warm Up Period - Mill

Most thermal distortion effects occur during a "warm-up period," when you use the machine for the first time after it has stood idle for many hours. The Haas control has a feature to compensate for thermal growth during this time.

There are (4) settings that control thermal growth compensation:

[Setting 109](#) specifies the duration of the warm-up period, in minutes.

[Settings 110, 111, and 112](#) specify the amount of compensation that the control applies during the warm-up period.

Electronic Thermal Compensation - Mill

Electronic Thermal Compensation (ETC) uses a proprietary algorithm to compensate for the expansion and contraction in linear axes

caused by the heating and cooling of the ballscrews. The ETC algorithm uses a model of the ballscrew, and it estimates expansion or contraction based on the distance traveled and the torque applied to the motor. Heat is represented by a thermal coefficient of expansion, and the axis distance is multiplied by the coefficient to get the amount of correction needed. A real-time clock monitors in-motion time and non-motion time (e.g., lunch, breaks), and compensates accordingly.

Remember that ETC does not correct for thermal growth due to changes in ambient temperature, growth due to part expansion, or growth due to spindle expansion/contraction.

Settings

The X, Y, and Z Screw Thermal Comp % settings let you adjust the existing screw thermal compensation by -30% to +30%. If these values are incorrect, you can have accuracy errors.

Start each setting with a value of zero, and then adjust as needed.

These are the settings:

Setting 158 - X Screw Thermal Comp % (-30 to 30)

Setting 159 - Y Screw Thermal Comp % (-30 to 30)

Setting 160 - Z Screw Thermal Comp % (-30 to 30)

Parameters

If the parameter values used in the ETC algorithm are incorrect, you can have accuracy errors.

If you suspect the ETC parameters are incorrect, have the machine parameters checked and corrected if needed.

Excessive Backlash - Mill

Excessive backlash or lost motion in a machine axis can cause accuracy errors. Haas machines use mechanical adjustments and Electronic Backlash Compensation together to adjust for backlash and keep the machine accurate.

Mechanical Backlash is lost motion caused by excessive gaps or clearances between parts in the axis drive system. The Electronic Backlash Compensation uses parameters to compensate for the small amount of mechanical backlash when an axis changes direction.

You can use the [VMC - Axis Ballscrew - Backlash Test](#) or [HMC - Axis Ballscrew - Backlash Test](#) procedure to inspect the backlash on your machine.

If you find that your machine has excessive backlash, inspect your machine for:

- A damaged ballscrew coupling
- Loose screws on the ballscrew, nut or the nut housing
- A loose lock nut on the end of a ballscrew
- A waycover that does not move freely.
- Excessive wear on a ballscrew or nut

Run a ball bar plot to check for issues with the Electronic Backlash Compensation parameters.

High-Speed Machining (HSM) not Activated

High Speed Machining (HSM) uses a unique "look ahead" function to anticipate machine motion.

In traditional machining, the axis motor must decelerate at the end of each programmed move. Without the ability to look ahead, the machine slows at a consistent rate throughout the program. HSM "looks ahead" through the next 80 lines of code, which lets the control anticipate upcoming movements and vary the deceleration rate. This lets the machine complete the program much more quickly. The control calculates the angle of intersection between the linear and/or the circular motion strokes to maintain the maximum possible velocity through the stroke transition.

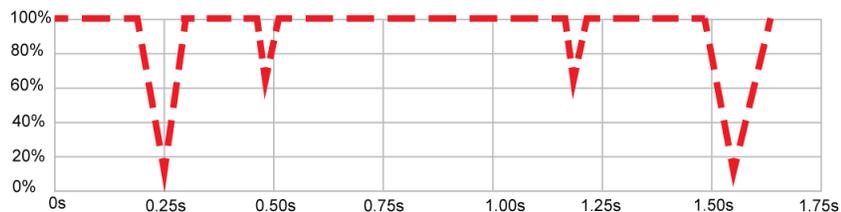
The machine can move through wide-angle direction changes more quickly. The greater the change in direction, the slower the machine must go to make the corner, down to a minimum velocity of zero for a direction change of 90 degrees or greater.



1



2



HSM Example

1. Without HSM, the machine decelerates at the same rate at every change in direction, regardless of the width of the angle.
2. With HSM's unique ability to look ahead in the program, the deceleration is variable. Thus, the part is completed faster.