

Proposed inclusion to TinyG wiki

G38.2 probe for a position is referenced in [Coordinate-Systems](#), but never discussed.

Add a line in the [Gcode Support](#) | Cheat Sheet for G38.2

Gcode	Parameters	Command	Description
G38.2	Axes, F	Straight probe	Probe to locate tool position in specified axis (ex. Z). Linear axes are optional except that at least one must be used.

New page definitions for G38.2

G38.2 Straight Probe

The G38.2 command will move the specified axis in a straight line until the Z-min limit switch is triggered. This allows for the addition of a touch plate to be connected to the TinyG controller to locate the bottom of an end mil or other tool and apply a work coordinate offset to define Z-zero at the bottom of the tool.

Format is:

```
G38.2 Xn Yn Zn Fn
```

Overview

The probe command is run under the controller's absolute coordinate system (G53) and base units (mm). Linear axis words are optional, except at least one must be defined. The TinyG controller will accept multiple linear axes in the block and move in a straight line from the current position to the defined linear axes point. It is recommended to only define a single linear axis word.

When the command is invoked, the machine will move in a straight line from current position to the programmed point, at the programmed feed rate. The movement stops when the programmed point is reached, or when the limit switch is triggered.

Touch plate wiring; connect the touch plate to Z-min, and connect the end mill to ground (gnd). The touch plate forms a NO circuit. Machine homing and limit switches are generally wired as NC. During execution of the G38.2 command, the firmware changes to switch settings to NO. Upon completion of the command, the firmware changes the setting back to NC.

Execution

The G38.2 command will successful operation under both G21 and G21 unit modes, but the preferred mode is G21 [mm]. G38.2 runs under the machine absolute coordinate system and works across all work coordinate systems. Applying a G91 [relative position mode] has no effect on the execution.

The programmed axis word(s) are considered the target point and the machines current position is the start point. When the command is invoked, the machine will move from the start point (defined in the absolute coordinate system) and will move in a straight line to the target point (defined in the absolute coordinate system).

Example: current position (machine coordinates) X=10.000, Y=5.000, Z=-20.000

Command line is G38.2 Z-22 F25

The controller will change to the machine coordinate system and move in a straight line from Z-20 to Z-22, at a feed rate of 25 mm/min.

If axis word value (Zn) is greater than the current position axis value, the machine head will rise. If the axis word is less than then current position axis value, the machine head will lower.

In G20 [inch] mode, the controller will convert the values to the machine base unit [mm] before starting execution.

Limitations

- Rotational axes (A, B, C) are not allowed as probe target values
- Cannot accept inverse time mode (G93), feed rate must be G94
- At least one linear axis target value is required (X, Y, Z)
- Minimum probe travel is 0.254mm (note: minor bug, in G20 minimum is 0.254 inches, and mX=mY=0)
- Feed rate must be defined in command string (note: minor bug, feed rate is modal, if omitted from string, command will use last defined Fn)