Adding Home Sensors to a RF-30 Mill/Drill, Version 1.3

By R. G. Sparber

This is a magnetic proximity switch[2]. When iron or steel gets close to the end of the blue cap, it responds by pulling its output wire near ground. Remove the metal and the output becomes an open circuit.

These devices are surprisingly good. In a recent test, I let the software find home and then I checked a location along the X axis with a finger Dial Test Indicator able to read out in tenths of a thousandth. Over five cycles, I read an error of ± 0.0002 inches. This isn't enough data to prove long term stability but is far better than I expected.

You can see the Home function in action at

https://www.youtube.com/watch?v=U9rVSKpGN58

and

https://www.youtube.com/watch?v=DRH3-7y ... e=youtu.be

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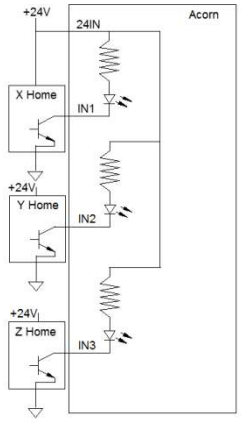
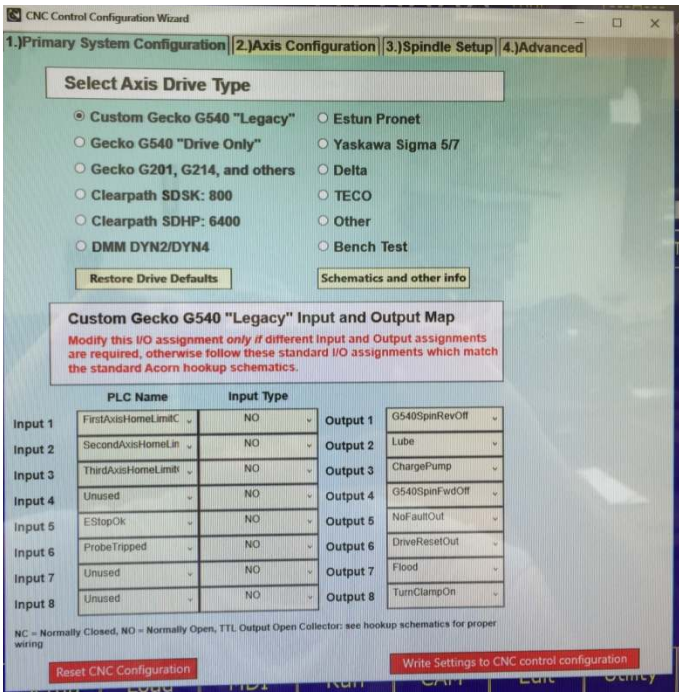
[2] Bought on eBay for $3 each. Search for Inductive Proximity Sensor Detection Switch NPN DC6-36V LJ12A3-4-Z/BX

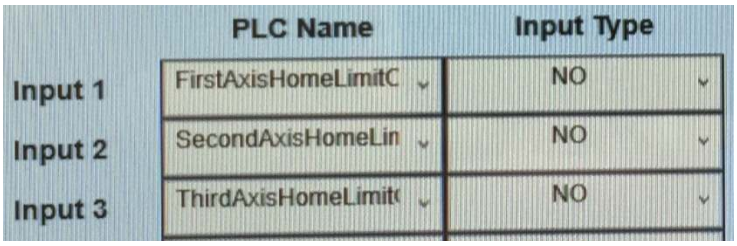


My Centroid Acorn board is powered by a 24VDC power supply. It has sufficient extra capacity to also powering these proximity switches.

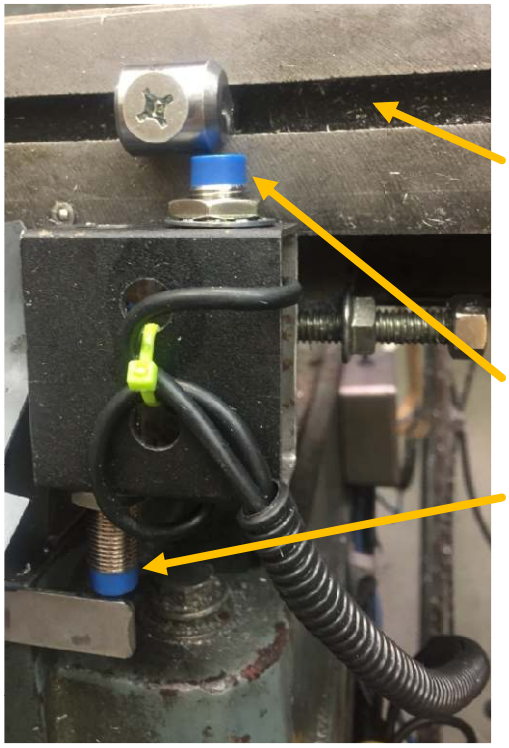
On each proximity switch, the blue wire goes to COM, the brown ties to +24V, and the black wire goes to an input of the Acorn board.



Using the Centroid Wizard, I defined input 1 as my X axis home switch. It is set to NO (Normally Open) because the sensor's output is an open circuit when no metal is near. Input 2 was set to my Y axis home and input 3 is my Z axis home. I did not install a home switch on my A axis at this time.



These sensors are resistant to oil and coolant so only need to be supported and protected from mechanical impacts.



I mounted the X and Y home sensors on the front right corner of the apron.

A slot in the table let me install a slug of steel that can be positioned anywhere along the X axis. It is set to the most negative X value I can have before hitting a mechanical stop.

The X home sensor just detected the steel slug and told the CNC software to stop moving the table.

Pointing down is my Y axis home sensor. A strip of steel bolted to the front face of the base is sufficient to trip this sensor. Trip is when the table is at the positive most position. This puts the front edge of the table as close as possible to the user. Makes it easier to bolt things down on the table.

By having both the X and Y sensors in the same piece of rectangular steel tubing, dressing the two cables out to a junction box was clean.

The Z axis home sensor uses the lower bearing support as steel to detect. I attached an aluminum angle across the bottom of the head and cut a slot for the sensor. The slot lets me adjust the height of the sensor with respect to the top of the table. The sensor was adjusted to detect when the quill has retracted to about 0.1" before an audible alarm sounds. Another 0.1" and the limit switch is depressed and the eStop circuit enabled.

When I am ready to power down my CNC system, I press the Park button. This quickly moves the table and quill to within ¼ motor revolution of Home. The next time I power up, the system is ready to find Home. I press Cycle Start and within a few seconds I have arrived at XYZ home. Nice.

Acknowledgments

I wish to thank Corey Renner for talking me into buying these sensors. Thanks to Tim Coppage for inspiring me to install them.

I welcome your comments and questions.

If you wish to be contacted each time I publish a CNC related article, email me with just "CNC Alias" in the subject line.

Rick Sparber
Rgsparber.ha@gmail.com
Rick.Sparber.org