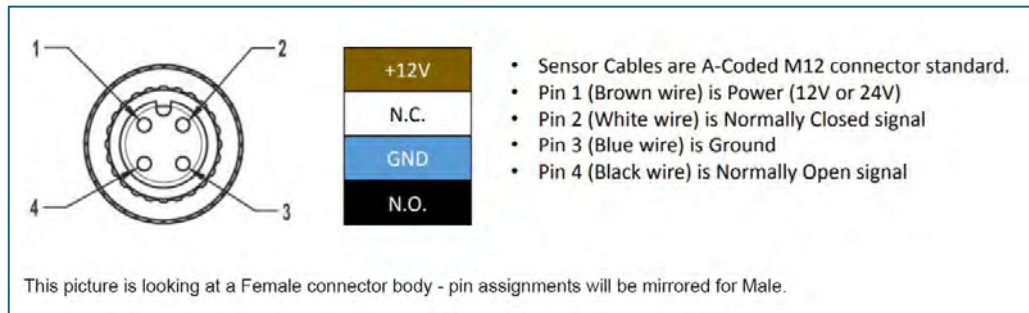


## AVID CNC + RAPIDCHANGE ATC TOOL SETTER WIRING.

The Avid CNC touch plate is a simple 'touch switch' connected to the Aux-1 port of the Avid CNC electronics enclosure using an A-Coded M12 connector. The M12 connector has the following wiring (*Source: AvidCNC Plug and Play CNC Controller Technical Manual*):



The magnet is connected to the ground wire (pin 3), and the brass touch plate to the Normally Open (NO) pin 4. Pins 1 and 2 are not used by the Avid CNC touch plate, but Pin 1 is still +12V.

Magnet attaches to tool, tool touches plate, and pin 4 (NO) is connected to pin 3 (GND) – and the 'switch' is closed.

Unfortunately, attaching a magnet to a tool doesn't really work for an ATC, so there are two options, depending on your spindle.

If you have one of the newer Hiteco spindles supplied by Avid, it may conduct through its bearings. The older GMT spindles don't.

Check if your spindle conducts through its bearings – see this thread on the AvidCNC forums:

<https://forum.avidcnc.com/t/touch-plate-ground-wire/2037/6>

If it does, and you're aware of the risks as discussed in the thread, you can use the standard Avid CNC touch plate with the RapidChange ATC. You will need to mount it in a fixed position on the spoilboard, and ground the Z axis. This way, the whole z-axis/spindle/tool will be ground, and when the tool touches the plate, the touch plate signal will be grounded.

The most elegant way to ground the Z axis is to attach an M12 Y-connector to the Z-axis proximity sensor, and add a connection from an M12 plug pin 3 to a bolt on the Z-axis. Refer to this picture from @eric (Avid CNC staff member on the Avid CNC forum):



If your spindle doesn't conduct, then you will need a separate tool setter. The following method piggy-backs onto the standard touch plate's wiring, so you can use Avid's touch plate for workpiece x,y and z zero, and the new tool-setter for the ATC.

#### PARTS NEEDED:

1. **RapidChange ATC's recommended tool setter: PG FUN CNC 3D Touch Probe**  
[https://www.amazon.com/dp/B0B3XMFDX5?ref=ppx\\_yo2ov\\_dt\\_b\\_product\\_details&th=1](https://www.amazon.com/dp/B0B3XMFDX5?ref=ppx_yo2ov_dt_b_product_details&th=1) (The ATC comes with an optional insert to hold this probe, and a little disk to replace the probe portion to convert it to a tool setter. You could however use any similar probe if you're happy mounting it outside of the ATC.)



2. **12V relay module:** eg <https://tinyurl.com/yp5ywanz> or any similar - they're widely available on Amazon, AliExpress, local electronic stores etc.  
Just make sure it is a **12V** module, and has a jumper to switch between a low and high trigger (top left of the picture marked 'H' and 'L').



3. **4-pin M12 hardware:** I got these from AliExpress, but if you are in freedomland, Avid CNC has them, as does Amazon. Make sure you select the correct variant if using the AliExpress links.
- Y-Splitter** – needs to be 4-pin, 2 female into 1 male - item code **M12Y-4 A-Code 441**  
<https://www.aliexpress.us/item/2251832676244796.html>



- 2m Extension cable:** M12 4-pin male female straight -  
<https://www.aliexpress.us/item/2251832676244796.html>



- M12 4-pin male plug:** M12 4-pin male straight PG7 (accepts up to 7mm cable) -  
<https://www.aliexpress.us/item/2251832657294984.html>



I found the AliExpress M12 connectors to be decent quality, and the pins are labelled correctly which makes them very easy to wire up. The terminal screws are a bit soft so be careful not to let your screwdriver slip.

You'll notice from the build pictures that I have M12 connectors on the input and the output of the relay, and on the probe itself – this is only because I have a couple of probes that I'm playing around with. You can just wire the probe directly to the relay module.

## WIRING

The probe needs a 12V to 24V power supply, and the relay needs 12V. As there is a 12V supply on pin 1 of the Avid Electronics box Aux 1 port, wiring is fairly simple.

The basic overview is:

- Remove the Avid CNC touch plate connector from the Aux 1 port of the electronics enclosure.
- Plug the Y-connector into the Aux 1 port, and the Avid CNC touch plate into one leg of the Y.
- Plug the 2m M12 male-female lead into the other leg of the Y
- Wire up the probe and relay as in the attached diagram, and connect it to the other end of the 2m lead. You now have the standard Avid CNC touch plate and the new probe connected to the Aux port.
- Make sure you change the relay module jumper to the 'L' position if using the probe suggested above. The probe has +12V on the signal wire which switches to ground (ie 'low') when pressed, so you need the relay to be triggered by the Low signal. If you have a different probe, you may need to set the relay to trigger on high. This makes the setup quite versatile – as long as the probe runs on 12V, you should be able to configure the relay to trigger appropriately.
- Test and go!

The relay modules have two LED's: a **red** one to indicate the module is powered, and a **green** one to indicate the relay has been activated. With everything powered up, you should see the module red power indicator on. Pressing the new tool setter should trigger the relay and you'll see the green LED come on. The tool setter's indicator ring should also change colour from green (inactive) to red (active).

Make sure the magnet is not sitting on the Avid Touch plate, so Mach 4 shows **INACTIVE** on the probe signal. Pressing the new probe, (or touching the magnet to the Avid touch plate) should change the Mach 4 indicator to **ACTIVE**.

The relay and probe wiring is shown on the attached diagram:

- Wire the probe positive and relay DC+ to pin 1 (+12V) of the male M12 connector.
- Wire the probe negative, relay DC- and relay COM to pin 3 (GND) of the male M12 connector.
- Wire the probe signal (yellow wire) to the IN connector of the relay
- Wire the NO connector of the relay to pin 4 (NO) of the male M12 connector.

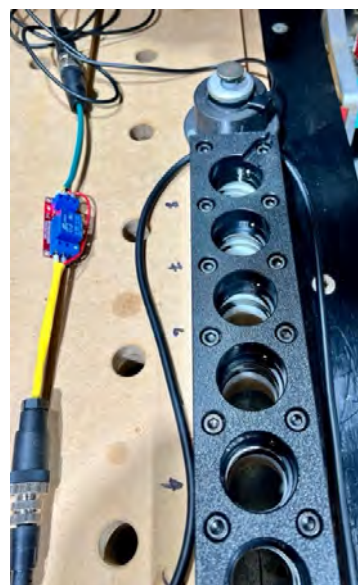
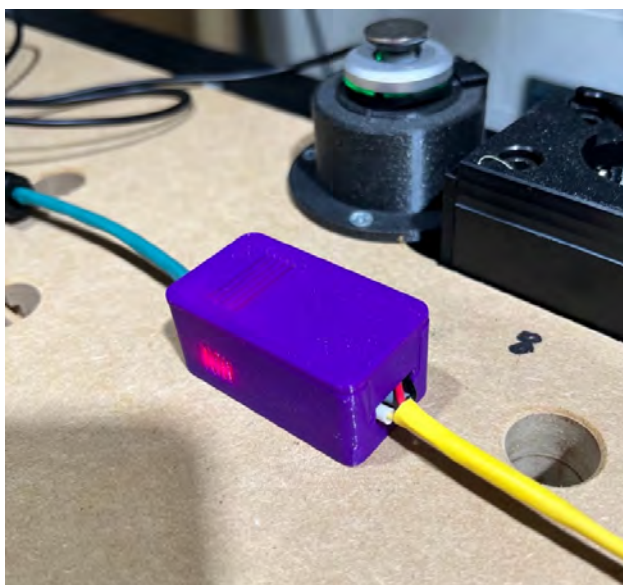
## OTHER RESOURCES:

**Youtubes** of the new tool setter in action: <https://youtu.be/rnEVADaseC8>

**Stand** for the tool setter (mine came with a right-angled connector so it won't fit in one of the tool slots in the ATC magazine. Besides, who wants to lose a tool slot?!): <https://www.printables.com/model/808378-cnc-3d-probe-tool-setter-stand>

**Box** for the relay module: <https://www.printables.com/model/808414-minimalist-tool-less-relay-module-box>

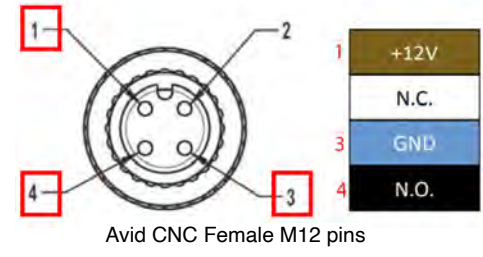
**Avid CNC forum RapidChange ATC thread:** <https://forum.avidcnc.com/t/rapidchange-atc-atc-for-er20-and-other-spindles/3002>



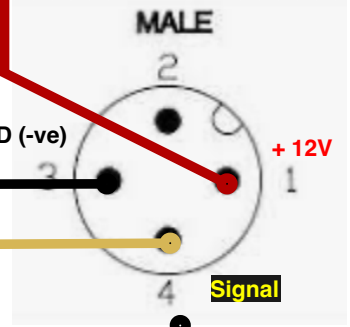


Red +ve  
Yellow Signal  
Black -ve

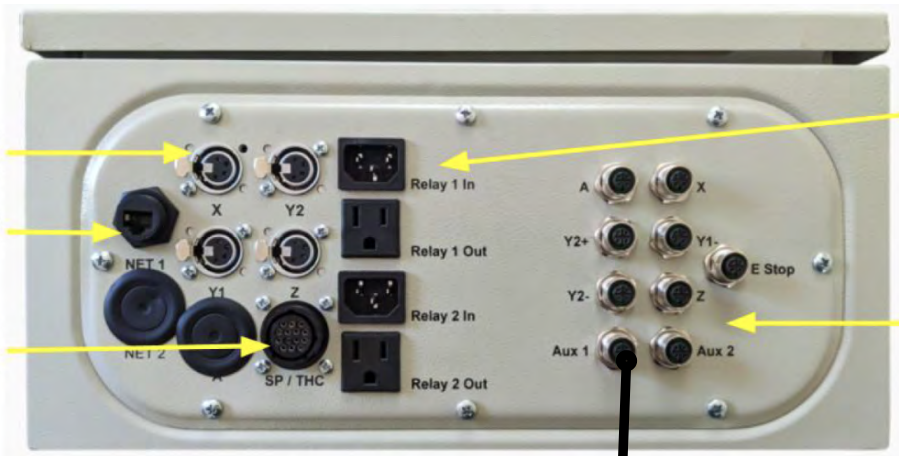
Set module jumper to L (low) position



Male M12 Plug



**Avid CNC additional tool probe/setter wiring**  
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M12 extension cable

Y-Connector to Aux 1 port

