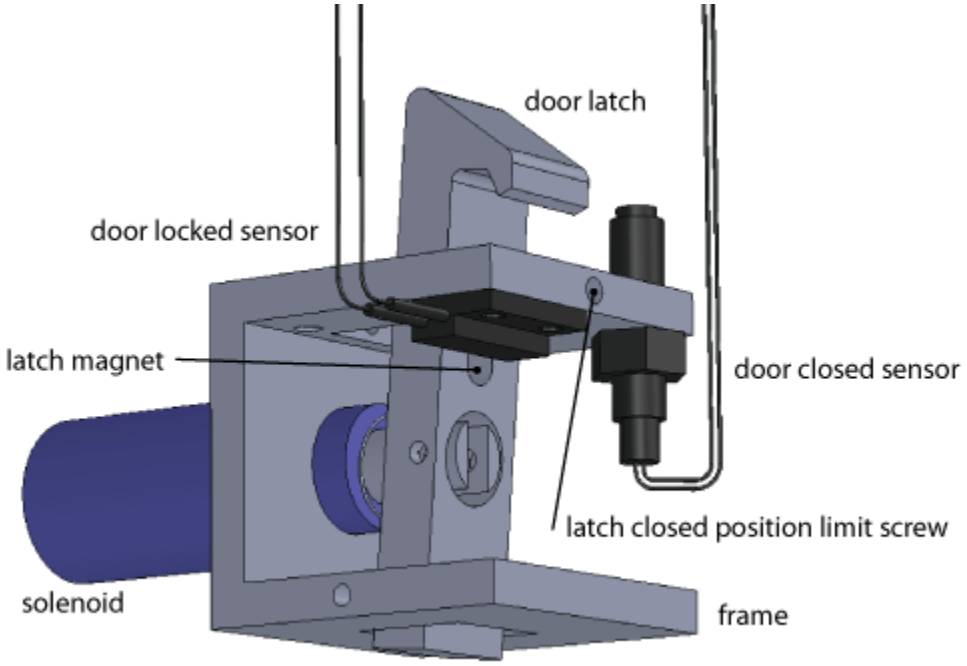
TechnoCNC Patriot

Door Lock Troubleshooting

Applies to Control Interface version 1.421 and above.



Version 4
April 2011

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Introduction

The Patriot door locking mechanism was designed to prevent unsafe machine operation. When set up correctly, pressing the “Door” button on the interface will unlatch the door, but it won't open automatically. You have to first release the latch, by pressing down on the door handle. You should hear the latch click away, and the door will open by lifting on the handle. When you first get your machine, the gas springs may be a bit stiff; after some use, they should loosen up and allow the door to open smoothly.

The teachers' key gives an administrator the ability to override the door latch safeties or force the door open. When the door safety is overridden, the spindle will operate even if the door is open.

To set up your interlocking mechanism for the first time, follow the first step in *Diagnosing Steps.*

Symptoms

When setting up the interlock, you may get an INT-1 or INT-2 or INT-3 error or an error message that begins with “Interlock not properly detected because...”, depending on the version of your software. These errors refer to a sensor that isn't being detected during the setup process, and can be caused by a misaligned or damaged sensor, improper setup procedures, or faulty assembly.

Explanation of Tools

Software Requirements

The first step is to make sure you have appropriate software. The TechnoCNC Control Interface that this document references is version 1.421. Anything later than that (1.422) will work just fine. You can download the latest version at technorouters.com (click on Control Interface in the menu to the left).

Diagnostics

The tool you'll use to help diagnose the problem can be found under Setup -> Diagnostics. The Diagnostics screen shows the status of the “door open” and “door locked” sensors under Ctrl Inputs. Note that the lock is wired such that it is impossible to have the door locked sensor be active without the door closed. In other words, it's impossible for the door to be locked, but not also closed.

Secondly, when the switch is activated, the door closed and door locked boxes will NOT be checked. These switches are flipped from normal input, so the absence of a red check box means the sensor has been activated. See images below for clarification.

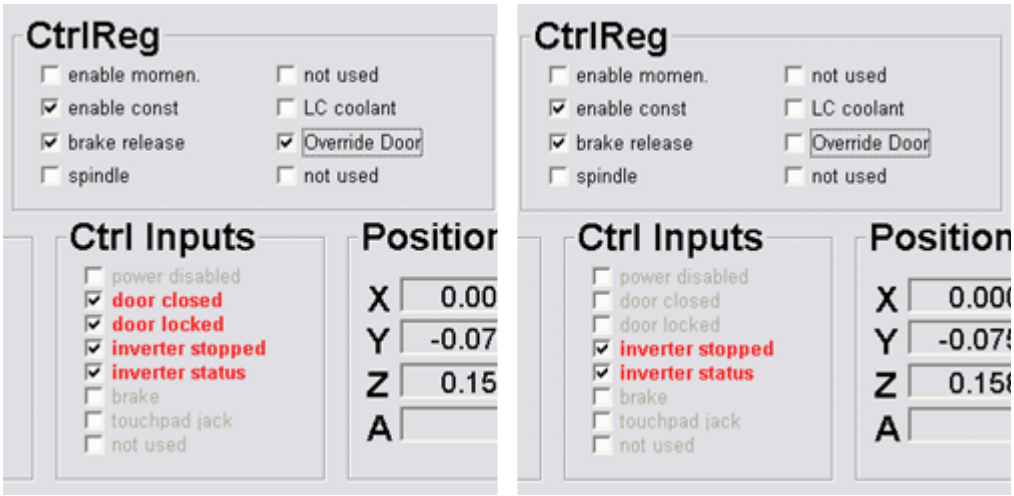

Illustration 1: On the left, the door is open and unlocked. On the right, the door is closed and locked. Note that Override Door needs to be checked to release the door latch and open the door.

Lastly, there is a check-box option under CtrlReg called “Override Door”. This will force the lock open or closed, regardless of the state of the interlock. Note that if you click on it, it will warn you before preceding. If you use the space bar to toggle the state of the check box after you've clicked once, it won't prompt you.

Tools

You may need a 3 mm hex wrench to remove the door lock assembly.

Diagnosing Steps

While there are multiple causes of these errors, some causes are more common than others.

1. Setup Procedure

The procedure for detecting the interlock can be difficult to follow if you're in a rush. Be sure to read all the prompts, and follow the instructions properly.

Go to Setup > Advanced > Hardware Switches and make sure Use Interlock is checked, and Auto Relatch is checked. Click on the Detect Interlock button to set up the interlock.

Illustration 2: Interlock Setup. Note that the text on the right may be cut off, depending on the version of the software you use.

2. Lock Mounting Procedure

Go to Diagnostics and un-check the Override Door checkbox. This will force the lock to move forward, into the lock position. Push the door down into the lock. Did the door properly push the lock aside, and settle in to the closed position, or did the lock get in the way?

If the door properly closed

The lock assembly is properly mounted. Go on to the next step.

If the lock got in the way

Loosen the four hex bolts that mount the lock in position, and slide thew hole lock assembly toward the back of the machine. Tighten the bolts, making sure that the lock is as far back as it will go. Repeat the procedure above. If the lock still hits the bottom of the door and doesn't allow the door to close, take note of how far back the lock should be to allow the door to close properly. It's probably on the order of a few millimeters.

Unbolt the four hex bolts, and remove the lock assembly through the bottom of the machine. If you have a stand, you can open the drawer to provide access. The lock assembly is connected via a white connector that you can disconnect if you need more room.

When you have the lock assembly out of the machine, take note of the small screw in the front. The more you tighten it, the further back the lock sits when it's in the locked position. For the door to close properly, the screw should be tightened so that the lock moves back a few millimeter or so. Move the lock back to a position you believe is adequate.

Remount the lock assembly. Be sure to reconnect the assembly to the controller! Slide the assembly as far toward the back of the machine as the four bolts will allow, and tighten them. When the lock is

properly seated, you should be able to close the door easily, even if the lock is in the locked position. The door will simply push the lock out of the way as it closes.

Try the interlock setup again. While the procedures above may not fix the problem, it's critical that the lock assembly be properly mounted because sensor adjustment relies on it.

3. Check Sensor Misalignment or Damage

The door closed sensor is a black tubular screw, that pokes up a bit above the surface of the lock assembly. There is a magnet mounted in the bottom of the door that activates the door sensor. Two things can go wrong here: either the sensor is damaged, or the sensor is simply misaligned.

Damaged Sensor

If the sensor is damaged, you may find scrapes and gashes in the top of the sensor, where it was knocked. A damaged sensor will exhibit strange behavior. In Diagnostics, you may find the door closed signal activated even when the door isn't closed. But then magically become deactivated for no apparent reason. Lightly flicking the top of the sensor with a finger can cause a damaged sensor to switch states. If you find this behavior, call Techno to get a replacement.

Misaligned Sensor

Because the door sensor is triggered by a magnet, all magnets in the area can potentially trigger the sensor. There are two other magnets; one inside the locking latch itself, and another in the solenoid that moves the lock into position. When the lock is in the forward position, the magnet in the latch can influence the door closed sensor. This won't be a problem if a) the magnet in the door is strong and properly mounted, and b) if the door closed sensor is mounted high enough to be above the influence of the lock magnet. Note that it can also be triggered because the lock moves forward too far, but if you've followed the steps in Section 2, this won't be a problem.

To align the door closed sensor, open the Diagnostics screen so you can see the status of door closed and door locked sensors. Open the door, and check Override Door such that the latch is in the locked position (forward). Reach under the door lock assembly, and find the black plastic nut that holds the door closed sensor in place. Unscrew this nut, and back the sensor out until the top of the sensor sits at the surface of the case floor. You will probably see both door closed and door locked sensors triggered. This is because the door closed sensor is being activated by the door locked magnet. Slowly screw the sensor until it starts moving up. At some point (perhaps a quarter inch above the floor), both door closed and door locked signals will turn off. This means that the door closed sensor is now positioned high enough to be out of the influence of the latch magnet. Screw the sensor up a tiny bit extra (just to be safe), and lock it into position using the black plastic nut.

Now close the door so that it is latched, but you aren't pushing on it. Verify that both the door closed and door latched signals indicate the door is closed and latched. If the door closed signal isn't being activated, keep the door closed while you screw the sensor up. Bring it up until it is activated (and then an extra bit just to be safe). Tighten the black nut to hold the sensor in place.

Press the door down and verify the sensor signals do not change. If they do change, you may need to prevent the door latch from moving too far forward. Tighten the screw that pushes back on the door latch, but not so far that the latch can't grab the door or activate the door locked sensor.

There's a good chance you've fixed your problem now. Rerun the Detect Interlock setup. If it fails with

an error, there are a few more possibilities that need checking. If it passes, verify the Door button on the front interface properly disables the latch, and that pushing down on the door releases the latch and allows the door to open. If you have Auto Relatch enabled, pushing the door closed will automatically engage the door latch.

Behavioral Issues

Door Latch Re-Engages Too Quick

If the latch releases, but then re-engages too quickly for the door to be released (you'll hear it clicking back and forth), the door closed sensor is disengaging when you push the door down, and then re-engaging when it moves back up, causing the software to believe the door was pushed closed. Raise the door closed sensor with the door in the fully locked and closed position, until the door closed signal is triggered. Push down on the door, and verify that the door closed signal does not go out.

There is a perfect area between the latch magnet triggering the door closed sensor (door closed sensor too low), and the door magnet passing by the door closed sensor (door closed sensor too high). This is the area where the door closed sensor should be mounted. When it's properly aligned, the door closed signal will be triggered when the door is closed, and when the door is pushed down to release the lock.

Spindle Doesn't Turn On

The spindle has been wired to operate only under safe conditions. If the interlock key is set in the Normal position, but the spindle doesn't turn on even when the door is closed and locked, the door closed sensor is likely not being seen. This is caused by the door closed sensor mounted too low for the magnet to trigger the sensor while it's hooked to the door latch. Moving the door closed sensor higher will fix this.

Door Locked Always On

If the door locked sensor is always on, regardless of the door and lock position, the lock assembly may have a diode installed incorrectly. This is a rare problem, but it's conceivable. The easiest thing to do in this case is have the entire lock assembly replaced.

I Can't Get It To Work!

The Patriots have gone through a few revisions since their introduction, and a few revisions to the door latch and magnet assembly were performed to make it easier to install. While all versions have been tested to ensure they work properly, shipping may cause misalignment or damage. As the machine is used, components can wear down, be misaligned or damaged. If you can't get the door to properly latch, or to properly detect the interlock, you may have damaged sensors, magnets, or even cable assemblies under then machine. In all these cases, it's best to call Techno for help. We'll help guide you through these instructions, and will be able to further diagnose damaged equipment.

Before you call, please double-check to make sure nothing is obstructing a sensor or other component, and that no component appears damaged.