

Uncommanded Spindle Acceleration in PCNC 440™

Date: 07/12/2016

Product Identification: PCNC 440 Mill (PN 37236)

Purpose: This document details an issue and resolution related to uncommanded spindle acceleration on a PCNC 440 mill.

Tormach Technical Support

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Issue Description



WARNING! Uncommanded Spindle Acceleration Hazard: Do not operate PCNC 440 with Dropbox™ installed. Uncommanded spindle acceleration could occur if correct power off/power on procedure is not followed. Failure to do so could result in serious injury and/or death.

The PCNC 440 spindle exhibits uncommanded acceleration to 10,000 RPM when the PathPilot® controller is powered on but the PathPilot software application is not running. This may happen in the following scenarios:

- The correct power off/power on procedure was not followed (e.g., PCNC 440 is turned on before PathPilot application is loaded and running).
- PathPilot application crashes due to a software error. In particular, using Dropbox while running PathPilot has resulted in software lockups for some users.

Technical Details

PathPilot uses a watchdog signal to inform the machine tool that the software is in control of the system. The MX3660 driver and I/O module (manufactured by our supplier, Leadshine®) receives this watchdog signal and uses it to determine whether or not it is appropriate to move the motors or change the state of the outputs. Due to a design flaw in the initial production run of MX3660 boards, the watchdog signal was only used to allow or prevent axis motion and it did not control the state of the spindle outputs. As a result, if the controller is powered on but PathPilot is not running, there may be 5V signals present on some of the wires in the DB-25 communication cable. The MX3660 module incorrectly interprets these 5V signals as a spindle run command even though the watchdog signal is missing. This issue was brought to our attention after a customer experienced a PathPilot crash due to a bad interaction between Dropbox and PathPilot.

Issue Resolution

1. Follow the *Power Off/On Procedure*, detailed below:

Power Off/On Procedure

Power Off	1. Push red <i>E-stop</i> button in	
	2. Click <i>Exit</i> on screen; when prompted click <i>OK</i> to power off	
	3. Turn PathPilot® Controller power strip off	
	4. Turn Main Disconnect <i>Off</i> (see image at right)	
Power On	1. Turn PathPilot Controller power strip on	
	2. After software loads, turn Main Disconnect <i>On</i> (see image at right)	
	3. Turn red <i>E-stop</i> button clockwise to release	
	4. Press green <i>Start</i> button	
	5. Click <i>Reset</i> on screen	

2. All Tormach PCNC 440 owners should immediately remove the Dropbox feature in PathPilot. To do so, type *ADMIN DROPBOX REMOVE* in the MDI line. Alternately, you may download and install PathPilot update v1.9.6b – this version does not include the Dropbox feature.



WARNING! Automated Motion Hazard: *Automatically controlled devices may start at any time; moving parts can entangle, pinch, or cut. Keep hands, feet, hair, and clothing away from moving parts when motion is possible. Open the spindle door to remove power from the spindle drive before reaching near tooling or spindle – regardless of whether the machine is in motion or not. Failure to do so could result in death and/or serious injury.*

3. Always open the spindle door (which removes power from the spindle drive) prior to reaching near the spindle to complete a tool change or perform other maintenance procedures.
4. Leadshine has designed a fix that will be incorporated in the production of new MX3660 drivers going forward. As soon as these drivers are available, Tormach will recall and replace all MX3660 drivers currently installed in affected PCNC 440s at no cost to the customer. Currently, we expect this to occur in August of 2016. If your PCNC 440 is subject to this recall, you will receive additional information on the specifics of the recall when parts are available to ship.
5. Tormach software developers are working on a solution for PathPilot crashes caused by Dropbox. Until we are able to replace the MX3660 drivers, we recommend against using Dropbox for file transfers to the PathPilot controller. In the interim, use a USB drive for file transfers.
6. Print and attach this service bulletin to a clearly visible location near the PCNC 440 to ensure all users are informed of the uncommanded spindle acceleration issue.