How to fix z-sensor triggered
FELIX Pro 2

FELIX
printers

1 Introduction

The FELIX Pro 2 features automatic calibration. This calibration heavily relies on a properly functioning probe switch, which is integrated in both hot-end.

Under normal circumstances this mechanism works properly. However, there are some cases where the probing mechanism can be falsely triggered. In this how-to, we'll explain the mechanism in a bit more detail and also show you what to do when an error occurs.

# 2 Inner workings of the probe mechanism

In short: The probe mechanism basically consists of a disc on top of the hot-end which is the switch. When the hot-end touches the bed, this disc is moved and an electrical contact gets broken. This is registered as a "z sensor triggered!" event.

If you see a "z sensor triggered!" message when the printer is idle, it means that one or both of the switches have broken the electrical contact.

Overview of the hot-end:

Top contact disc

Ball bearing

Heater cartridge + thermistor
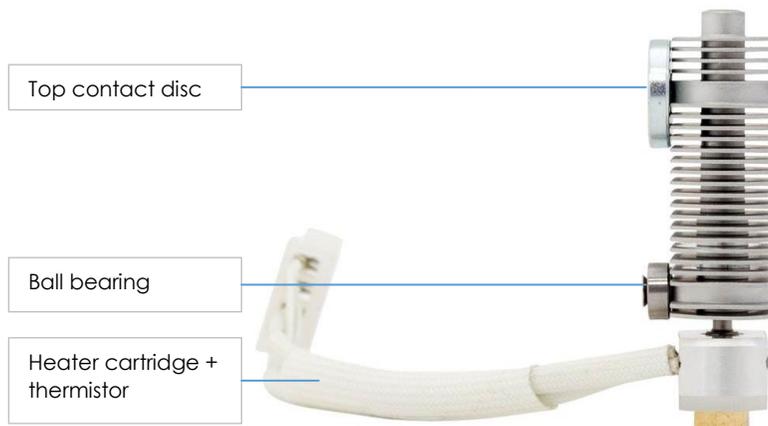
Overview of inner workings of probe mechanism:
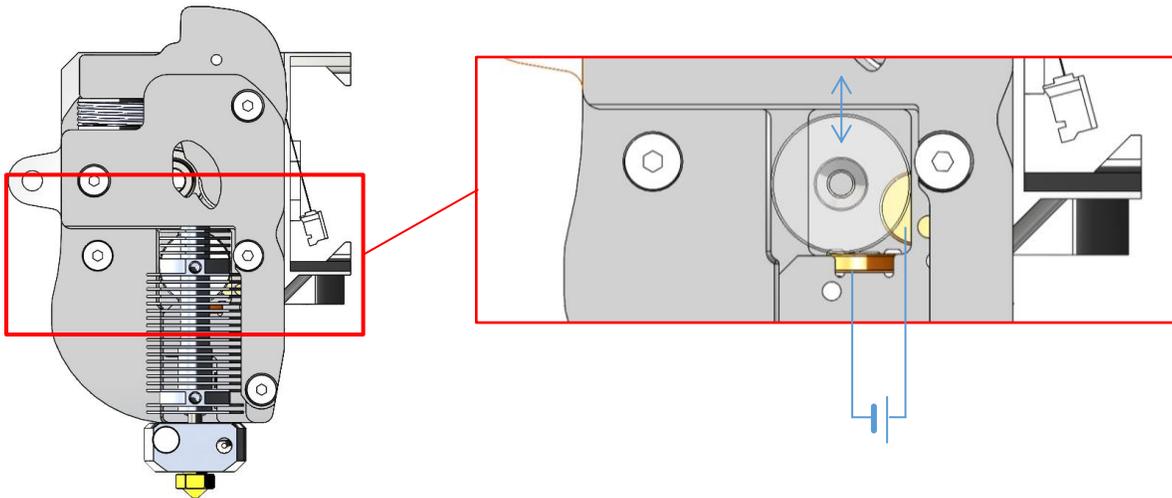
The disc on top of the hot-end touches two magnets which have two functions.

- Correct positioning of the hot-end. The hot-end gets firmly pulled to a in a defined position
- Reliable electrical connection to enable probe function.

When touching the bed the hot-end including the disc moves upwards wrt to the extruder housing. The disc moves away from the bottom contact magnet and the printer-controller detects at that moment that the currently active hot-end touches the bed.

The hot-end can physically move approx. 0.5mm up and down. But during normal operation that should be just 1 micrometer until it is detected by the printer controller.

3 Step by step troubleshooting:

The next chapters show step by step how to resolve the issue. Beginning with the most likely and simple solution first.

3.1 Check if z-sensor triggered goes away after heating both nozzles.

When the hot-ends are cold this message is not really a problem. In some cases cooled down filament in the (not)-used extruder pulls the hot-ends slightly upwards, causing a (sometimes constant) false trigger. To check if this is the case, heat both extruders to at least 180°C. Check if the message has disappeared once both extruders have reached their target temperature.

The latest firmware releases automatically heat the extruders to 185°C when performing probing actions, but you can still sometimes see the "triggered" message when the heads are cold.

3.2 Are the hot-ends fully pushed downwards against the contact points?

During transport or after pulling out the filament by hand sometimes the hot-ends can be detached from one of the magnetic contact points.

3.3 Use the latest and correct slicing settings.

Using sliced files not optimized for the FELIX Pro series can result in bad prints. To ensure proper probe action, in the startup g-code we have implemented some commands which force the hot-ends on their contacts prior to the start of a print job.

3.4 Detect which hot-end gives problems
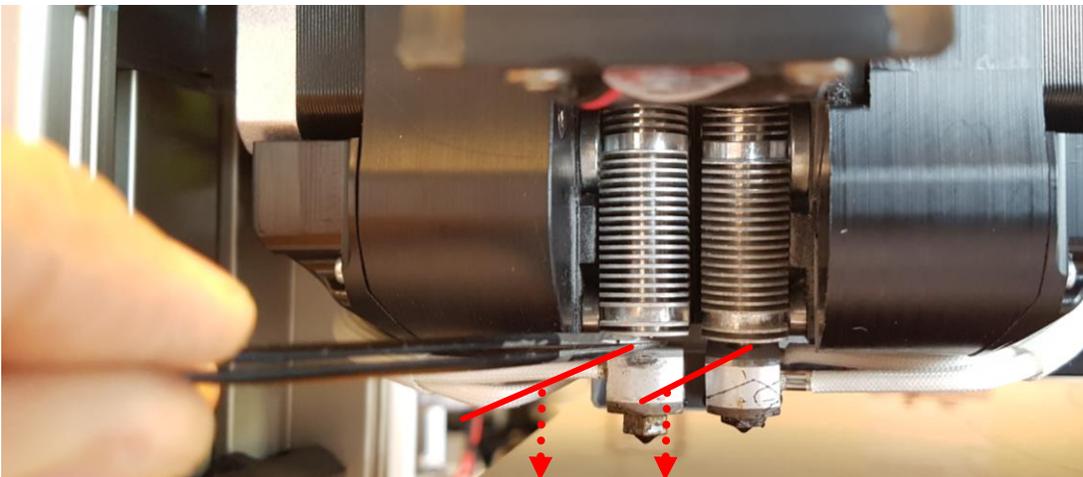
Pull down both hot-ends and check if the *z-sensor triggered* message goes away.

If the message does not go away, please check next step.

3.5 Dirt between contact points.

Another cause for errors can be dust, corrosion or chips of plastic or metal that are stuck between vital electrical contact areas of the print head. Also it is possible that debris can build up over time, especially when the printer is placed in a dusty environment.

To correct this, the following can be attempted:

1. Remove the hot ends (see the manual for the procedure).
2. Clean the metal disc. Especially the faces that make contact with the magnets. Recommended to use detergent like blue spirit, acetone, alcohol. After cleaning the disc should be free from dust, debris, metal filing….

Clean these points, from the black tarnish.

RECOMMENDED: Put non-electrically conducting teflon spray on the disc. This improves the probe working and also improves the electrical contact for the long term.
3. In the print head itself there are also areas of attention:
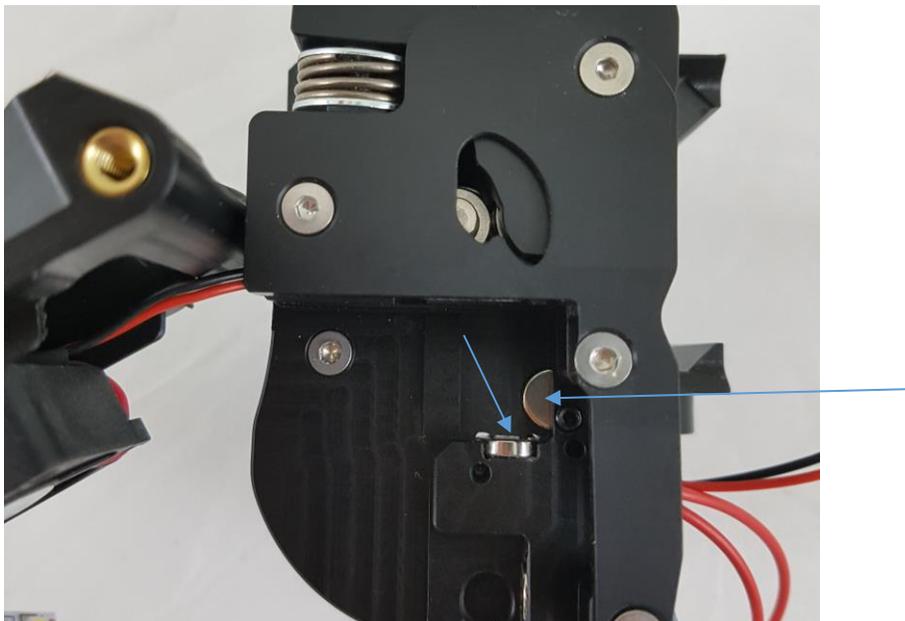
Clean the indicated surfaces with a Q-tip with a small amount of detergent.

4. Place back the hot-ends and see if the z-sensor triggered message is gone.

3.6   Check if hot-end disc is properly fastened.
Make sure the disc is firmly fastened to the hot-end body. Use a torx screwdriver to properly fix it.


Note: Also the bearing on the bottom should be properly fastened. This does not prevent z-sensor triggered message, but ensures proper operation of the printer.

3.7   Make sure the hot-end cabling is properly guided.
Bad cable guiding could cause the following.

- Inaccurate leveling.
- Z-sensor triggered warning

What could happen is that during a home-x action the hot-end cable can touch the side of the frame causing a sideways movement of the hot-end. This causes slight inaccuracy during homing.
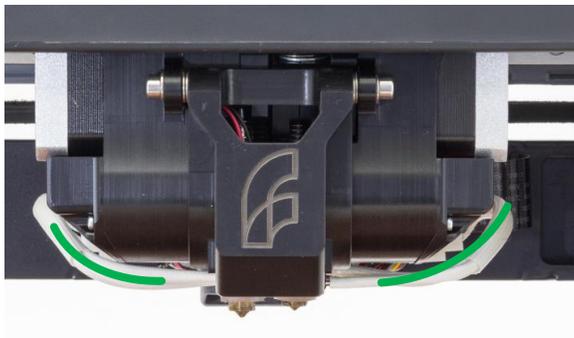
3.8 Hot-end does not automatically move towards it's contact points.

In some cases the hot-end cannot move downwards. The causes including fix are:

### 3.8.1 Excessive friction of hot-end with extruder body

The body of neck of the hot-end touches the extruder assembly. You can see this if there are some slided markings on the hot-end neck. Most likely the hot-end dimensions are out of spec.

3.8.2 After an upgrade the hot-end dimensions are not correct.

To compensate for production tolerances, shims are used between the disc and cooling ribs and between bearing and cooling ribs.

3.8.3 Production error, with too tight tolerances in either extruder or hot-end

The hot-end must comply to these measurements. In order for proper operation.
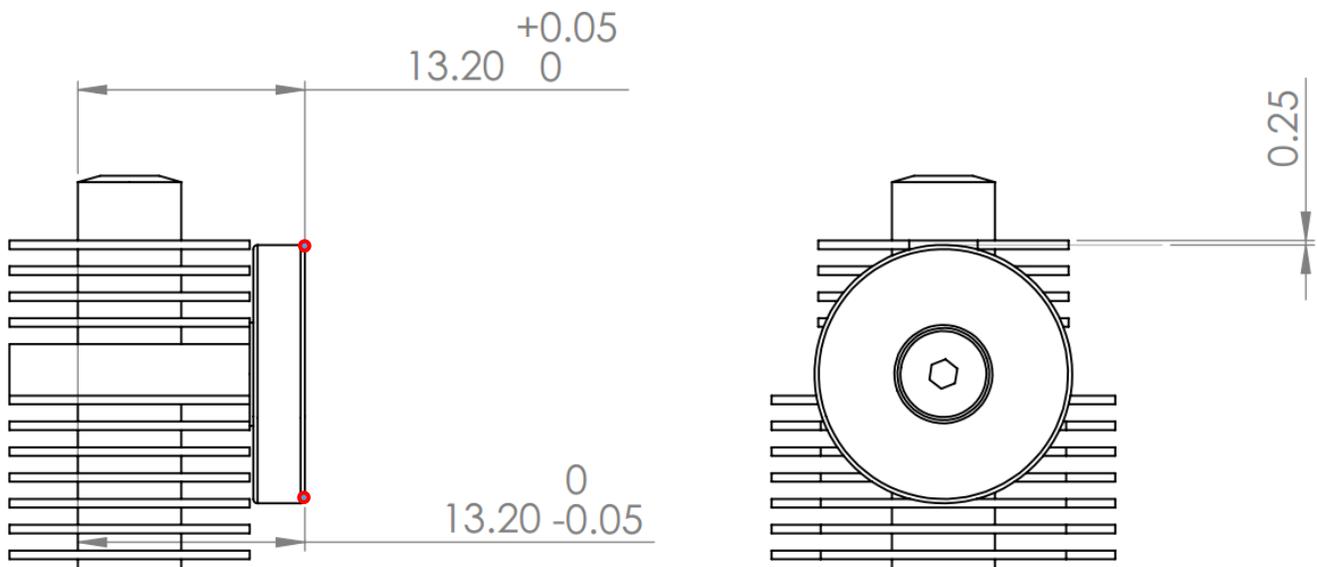
### 3.8.4 Scratches or dents on magnets or on extruder disc.

In some cases there could be a dent/bulge on the hot-end disc and on the magnets causing excessive friction.

To fix this issue, please inspect the surfaces for damage and replace the elements.

3.8.5 Hot-end still not comes back.

If above steps don't work, a little bit of grease on the magnet can provide a solution. It significantly lowers friction. Put a very small amount of grease on the magnet indicated below to signifantly lower friction. Do this with a q-tip.

Grease type: Thick grease (Ball bearing grease)
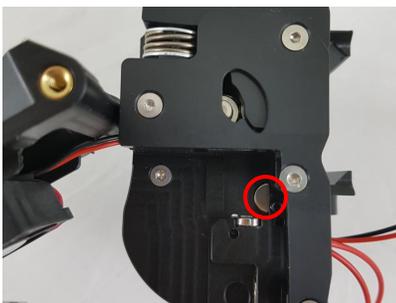
3.9 Wire breakage/ loose contact

Check in indicated **probe contact cables** are properly seated in their sockets.
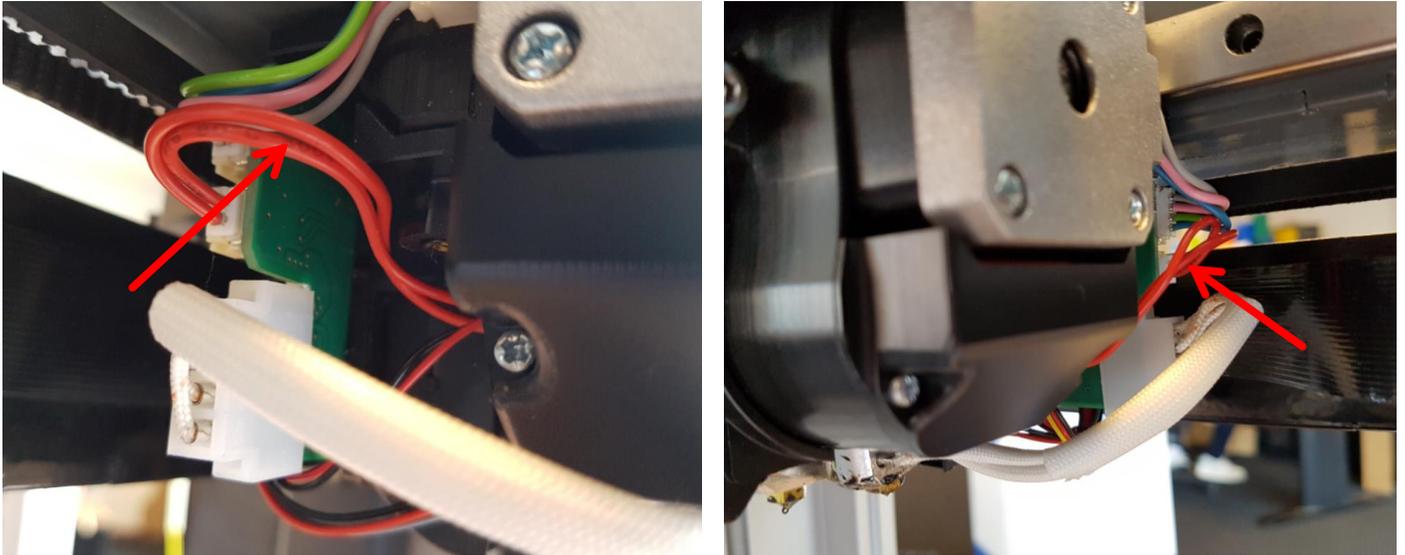
If cables are properly placed in their sockets, wiggle the cables to see if the message "z-sensor triggered" appears or disappears.

Inspect the **flat cables** if there are no folds and if they are properly seated in their connectors.
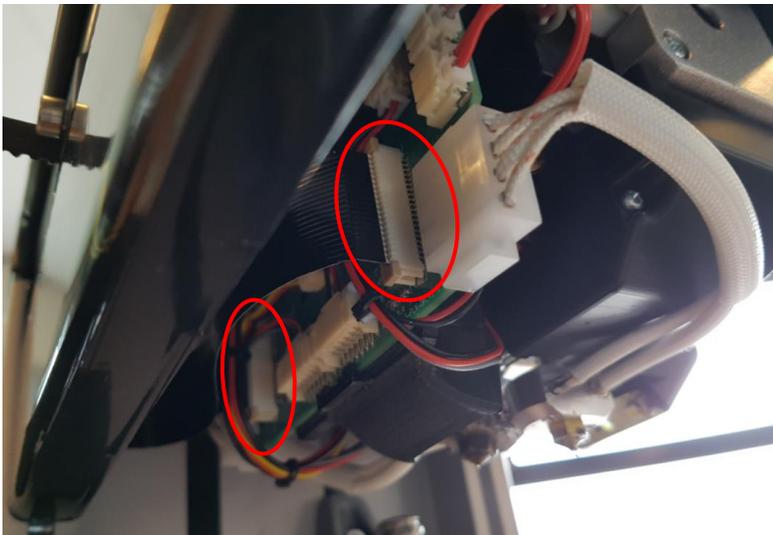
Worst case (and not a very likely to happen) is that the cables are broken or mounted contacts are loose.

Please contact our support department for further instructions.

If you are unable to continue or have any questions, you can check at the support section of our website or you can contact us directly:

Website: www.felixprinters.com/support

Email: support@felixprinters.com

Telephone: +31 (0)30 30 31 387

Address: Zeemanlaan 15, 3401MV IJsselstein, The Netherlands

Kind regards,

FELIXprinters