

Ender 3

Table of contents in order of appearance

- Unit 1 Nozzle clog or filament drag issues
- Unit 2 X axis tuning
- Unit 3 X axis under tensioned
- Unit 4 Y axis belt tension
- Unit 5 ENDER 3 bed leveling/ traming techniques with mechanical modification to stabilize bed
- Unit 6 Z Shaft Alignment/Bind correction
- Unit 7 Nozzle leaking filament
- Unit 8 Stepper dampener installation series X Y E
- Unit 9 Start and End G code scripts
- Unit 10 Settings related issue
- Unit 11 **Issue** slicer bed origin settings
- Unit 12 **Issue** Cura setting defaults to concentric fill
- Unit 13 **Y axis eccentric nut adjustment with pictures of what eccentric nuts look like.**
- Unit 14 **Issue** Case fan not running
- Unit 15 **Issue** Dust on rails or roller wheels
- Unit 16 **Issue** Visually unpleasing diagonal lines on top or bottom layers of print.
- Unit 17 **Issue** Bed is warped on delivery, is this normal?
- Unit 18 **Question** Why should I update Firmware?
- Unit 19 **Issue** Filament is being fed backwards out of the extruder.
- Unit 20 **Question** How can my brand-new printer have a clog or jam?
- Unit 21 **Question** Why is first layer so ugly/not sticking?

Unit 22 **Question** My printer won't store the settings (e-steps) in the eeprom. What could be the problem?

Unit 23 **Question** I ran my printer into bed, could I have damaged the nozzle?

Unit 24 **Question** What are the best replacement couplers for the Bowden tube and their catalogue numbers?

Unit 25 **Question** Why is axis X,Y,Z not homing with a home all?

Unit 26 **Question** How do I calculate e steps for my extruder?

Unit 27 **Question** Why did my printer, layer shift over, back feed filament, stall or??

Unit 28 **Question** I have this weird pattern in the X or Y axis, what is causing it?

Unit 29 **Videos about Ender 3 to watch**

Unit 1

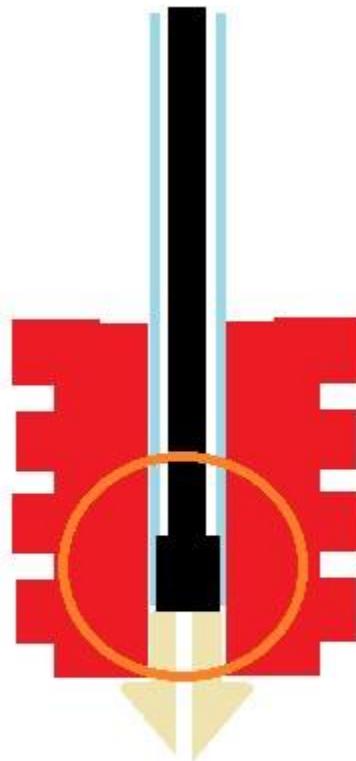
Nozzle clog or filament drag issues

Symptoms;

Clog or full stoppage, inconsistent extrusion, blockage, retraction no stopping stringing. Infill not complete. Inconsistent outer wall surface.



Stock Ender 3 hot end with insulation and Kapton tape wrap.



Reason this occurred.

Why am I getting nozzle clog or restricted filament advancement? The most common cause is that the PTFE tube pushed back away from nozzle inside the hot end. As illustrated in this cut away drawing.

Continued next page



Figure 1 The PTFE pulled away about 2.5mm from nozzle in this discovery picture.

You now have a void space that once heat creep sets in or it gets to full operating temperature, melting the plastic into void. This can cause drag, the filament can harden over time restricting the path to the nozzle creating back pressure, often causing stepper skipping, or also variations in flow. Once there is a gap the retraction, it can act on the melted filament to hydraulically push it further away or back into the Bowden connector. There are very specific tasks on re-assembly, **if you do not read to the end**, and just re-assemble, you will likely see this happen again. Can take minutes or days to re manifest.

Solution;

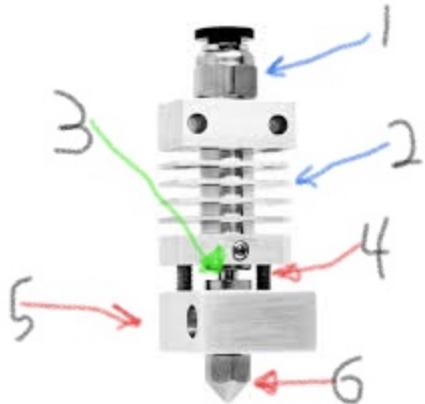
First disassemble the hot end.

!!!!This is a **Hazardous Task**, as you most likely will need to work with the **hot end** at temperature for parts of disassembly and cleaning. !!!!

Tools needed, pliers or crescent wrench to support heat block, nozzle wrench or socket that fits nozzle. Additional tools that can help, 2 pairs of pliers, heat gun, nozzle cleaner from the Ender 3 tool kit, tooth picks, anything that you can scrape, heat or otherwise clean up filament with.

First remove both the part and hot end fans, and pull them back and out of the way.

Continued next page



1. Bowden coupler 2. Cooling body 3. Throat

4. Assembly screws 5. Heat block 6. Nozzle

To disassemble. While cold, insert the two screws between the heat block and cooling body. If you have removed them prior re- install them.

(Note opinions vary on whether to remove these in normal use, Author prefers to remove them as in my opinion it moves un-needed heat to cooling body causing heat creep.)

Heat up hot end, pull any remaining filament out from the Bowden tube.

Then support heat block, removing nozzle. You can choose to let heat block melt/drip away some of the filament. **Warning this can cause hazardous fumes.** Once nozzle is removed, remove grub screw holding the throat end while holding on to the heat block with pliers.

Now clean all plastics out of throat, inside cooling body and the nozzle.

Assembly process

Because of filament residue in threads, this is best accomplished with nozzle temperature set to 180°C to 250°C depending on what polymer of filament you use.

Screw nozzle into heat block until it bottoms out against its shoulder.

Tighten the nozzle while supporting the heater block

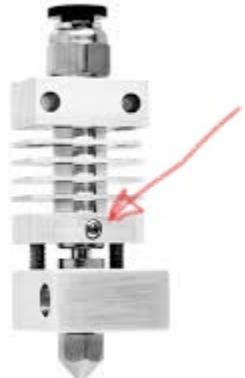
Using the two assembly screws push throat into cooling body.

Ensuring that the heat block is parallel to the bed.

*** Tighten the grub screw now, without stripping it out***

If you have a matching socket headed cap screw with an better socket, replace it. Check clearance of all shrouds and covers prior to full re assembly to check for interference.

Remove the installation screws and set aside for later hot end maintenance work.

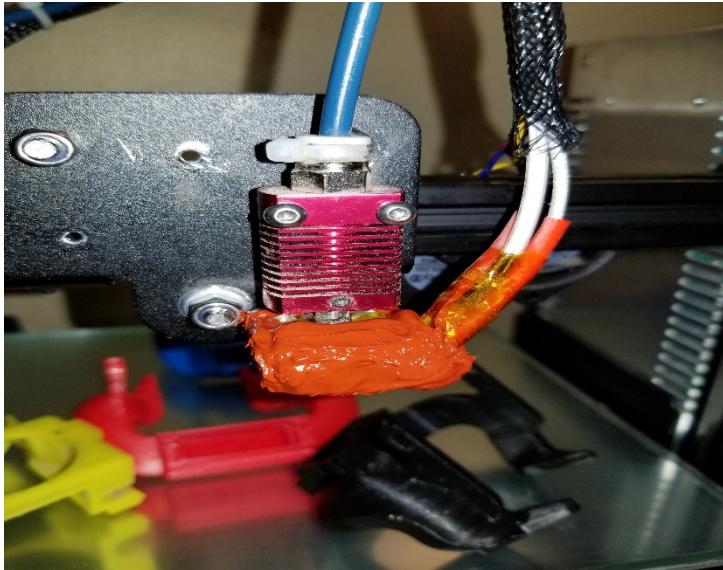


Heat up hot end to 10 degrees above the hottest working temperature you work at.

For author that is 255c.

While supporting heat block tighten nozzle firmly now.

In preparation for Bowden tube installation, pre mark your ptfe with a marker or piece of tape at 51mm from end for a depth check after tightening. Back off the Bowden coupler $\frac{3}{4}$ to 1&3/4 turn. Then push PTFE tubing firmly seated to a stop inside the hot end against the back of nozzle. Now while continuing to push in, pull back on Bowden locking collar and lock in place with zip tie, or a printed clip.



Now tighten Bowden coupler.

This has ensured it is seated against the nozzle.

Feed filament until it oozes some outset control to cool down.

Re assemble the fans and shrouds .

You should now be on to printing without mechanically induced clogs.

Unit 2

X axis tuning

Symptoms;

No repeatability in bed level or first layer adhesion.

Occasionally varied layer heights if arm is catching and then releasing.

There are three possible mechanical causes for this if bed stabilization has been modified per tutorial here.

Issue One;

Improperly adjusted Y axis bed carriage/trolley wheel bearing rollers.

Fix

With the bed tensioner removed, the bed should move fore and aft freely, and no wobble if gently rocking side to side across the carriage.

To adjust, loosen the two eccentric nuts until carriage is loose. Slowly adjust one till the play just goes away, now adjust second till it snugs up and you can just cause it to slip pulling on the wheel radially with your fingers with carriage held in place.



Issue Two;

Symptom;

X axis drag of arm, due to not fully tightening the cross-extrusion bolts between x motor bracket and the cross extrusion. Or cross extrusion was not parallel at time of assembly

Fix

Loosen the X gantry extrusion bolts on the extruder frame

Set extrusion parallel to lower frame by measuring from x extrusion to top of frame

Re-tighten the bolts.

Issue Three;

Symptom;

X Axis has right side catching or lagging/ canting as Z height moves causing bed leveling to not repeat and layer thickness/height issues.

Adjustment procedure;

How to make X axis wheel adjustments to right guide bracket



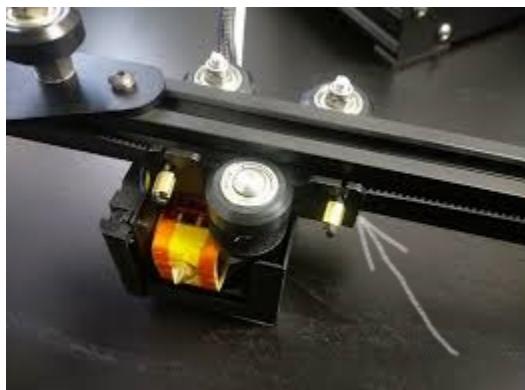
Step One

Remove the belt by loosening tensioner



Continued next page

Step Two



Then pulling belt out of retainer groove

Step Three

Unbolt the right-side bearing plate from cross arm.

(shown off printer for clarity)



Step Four

Adjust the eccentric wheel until the play just goes away.



As you move it up and down right vertical extrusion you should be able to lightly spin each wheel with your fingers, while holding plate in place, but feel drag of it trying to move assembly.

Photo step 4

Re attach and assemble in reverse order. See also X belt tensioning.

If problem is still there, check straightness of the two vertical extrusions. Also check if top and side extrusions are square. Also see Z axis bind if this doesn't resolve your issue.

Unit 3

X axis Belt under tensioned

Symptom;

Ghosting in X axis vertical face of prints.

Oval circles.

Corner over run



Option One.

Loosen the two smaller screws, push sideway with hand against idler arm, while tightening first screw. Tighten both screws now. This should be enough tension to properly operate. A plucking of belt should give a slight twang. Check that belt is running in into the extrusion without rubbing on it. You may need to shim towards right end between bracket and extrusion to square idler bearing to the extrusion.

Option Two, (Perform Option One first so you can print option two) print

<https://www.thingiverse.com/thing:2986144>



Unit 4

Y axis belt tension

Symptoms;

Evidence of ringing in vertical walls

Ghosting

oblong holes oval in Y plane

Option One



To tension Y axis you must loosen the four t-nut screws on either side of the y axis extrusion. Pull or very lightly leverage tension on belt tightening one screw each side. Move bed in and out. If belt not running true, you must adjust one of the two side plates to get the belt running true in the middle of the extrusion.

Option Two (Perform Option One First)

Print thingiverse.com file <https://www.thingiverse.com/thing:2986144>

And use tension ring to tighten belt until it is under moderate tension.

If belt not running true, shim between face of extrusion and the tensioner on the side the belt is tracking towards.



2018-7-1 22:49

Unit 5

ENDER 3

Bed modification to stabilize adjustment screws

Followed by bed leveling , with two options



A tech tip for bed adjustments.

The goal

Stabilizing the screws that cause bed level to shift often, also to secure the screws so they do not spin when attempting to tighten adjustment knobs.

Process: Take the knobs off, lift bed up and remove the springs. Take care to not stress the heater wires as you flip over the bed to work on it.

Add four 4mm jam nuts to lock the screws to the bed surface.



You will need to stop screw from rotating with a pliers as you tighten nut against back of bed surface.

Holding bed level test fit the bed into the Y mounting plate making sure screws freely move through that plate. If not, slightly enlarge holes, or loosen and shift screws so they do not hang up when moving up and down.

Continued next page

Now put springs on, tightening springs till about 70% compressed.

Turn on printer and home all axis. Turn machine off or disable steppers.



Now loosen both screws on the Z end stop lowering it so it is not hit while you move the x carriage over the front right corner, using the nozzle wrench as a guage set nozzle height its thickness above bed. Now take the z liit switch and slowly move up until you hear the

microswitch click, and tighten the stop bracket down.

Your now ready to move on to tram or "level" the bed to the nozzle and X axis .

Bed leveling procedures

Option 1;

Conventional manual level, must complete process highlighted in red above before proceeding!

Tram the bed after homing all axis and disabling stepper motors. Pre heat bed and nozzle to your normal working temperatures. 200`c and 60`c avg. Then move to each of the four corners using the paper till it drags method to bring bed up to the. You should move to each of the 4 corners in rotation making two or three trips around until you are confident the 4 corners are equal. The author finds that using notebook paper if you tighten while sliding paper in and out under nozzle, when the paper folds on the push, that will be near .25mm from the bed. Once this is done you can measure your skirt on your first print to make adjustment to Z height. The thread pitch for the 4mm screws is .7mm per revolution. This nets movement of .0875 per 1/8 turn, .175 per ¼ turn, .35 per half turn.....and so on. If you have reached the set value in your slicer for first layer height. And your filament is not sticking to the bed. Leave Z height here. Use the first layer flow to add "squish" until you are happy with the adhesion to the bed. 104 to 112% would be a normal range for that value.

Option 2; G code assisted level with a confirmation test print as continuation of the program.

Go to Thingiverse and download the files for <https://www.thingiverse.com/thing:2987803>.

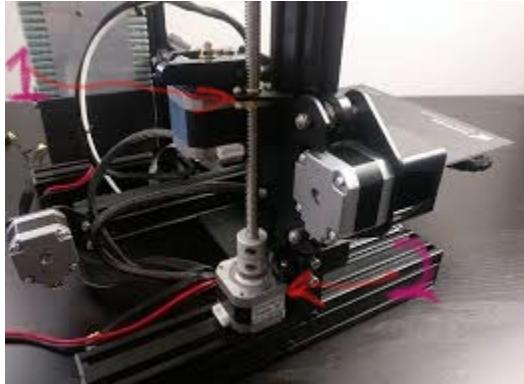
You need to perform must complete process **highlighted in red** above before proceeding!

The g code will pre heat nozzle and bed. Then move over front left corner and park. Using paper, adjust up till the paper gets to the point where it drags on pulling, and folds when pushed forward. Push knob to move to next step. Note, if you work both front adjustment wheels together, it will help keep the opposite side from restricting the move up. Hit button on printer. It will go up in z and move over to come down on right side. Have paper under as it comes down. Adjust up if paper is loose, down if trapped. This same sequence will happen on back 2 corners. Then it will make another or second round of the 4 corners to fine tune the level. After the last manual level, it prints a skirt and 5 round circles. They should all measure. 3mm if the leveling went well. If the center disc is off from the outsides, minor corrections can be made for a difference of up to .1mm, much more and you may need to look at a replacement bed surface. Note the adjustment screws have a thread pitch of .5 mm. That means .125mm per 1/4 turn of the adjustment knob. You can fine tune without running full program if you're printed pads are too thin or thick. The author prefers to see the skirt at .27 to .33 with a set value of .3mm for first layer in the slicing software.

Unit 6

Z Shaft Alignment/Binding correction

Symptoms; Prints are too short/compressed in height, varying thickness of layers throughout the part, occasionally Z axis motor clicking/skipping.



Procedure. You are now going to align the Z stepper motor to the Z drive screw. Support X axis just off bed. Remove the Z rod from the coupler, using the top two grub screws. Remove the 2 bolts holding the stepper motor to the frame. Now insert the shaft into the stepper and measure the gap from bracket to the extrusion. A shim of that thickness between stepper motor and frame is needed. List of shims and printable stepper holders below.

If you currently are not able to print a solution, a nut put on both bolts in between the stepper and the extrusion can temporarily reduce binding. Then you can print a shim to fix properly.

Find the right shim thickness you need on [www.thingiverse.com](https://www.thingiverse.com/thing:3124959) or here's a couple I have found.

<https://www.thingiverse.com/thing:3124959>, <https://www.thingiverse.com/thing:2526607>,

<https://www.thingiverse.com/thing:2925230>, <https://www.thingiverse.com/thing:2907882>

<https://www.thingiverse.com/thing:3115362>

Alternate methods

Option 1

If your bracket is bent so much that the shim does not fully correct this issue. You can thru drill the bushing and bracket at 3mm, using longer 3mm screws and nyloc nuts, or doubled nuts jammed together. Take till tight, then back off 1 turn. The 2 nut jam will be hard to accomplish, but not all have access to nyloc 3mm nuts at home depot, so this option is included.

Option two;

Remove the x gantry , strip all parts from bracket holding the z nut. Put bracket in vice bending to 90` using a crescent wrench.

Unit 7

Nozzle leaking filament

Symptoms;

Burnt filament deposited in prints. Blobs of filament on top of heat block making it encapsulated. Thick or thin wisps of filament that did not originate from nozzle tip. Heat block covered in filament.

Fix

Pre heat hot end to 20` hotter than your planned working temperature.

Use a wrench or pliers to stabilize hot end.

Firmly tighten nozzle using supplied wrench or an socket that fits nozzle on a nut driving handle or ratchet.

Unit 8

Stepper dampener installation series X Y E

Stepper dampeners; these are used to significantly reduce the electronic stepper noise that is resonated through the aluminum extrusions. This guide will show how to install on X Y and E axis. The E axis has the least effect on overall noise.

Note, for my installation I had to cut some screws down, as they were bottoming out before tightening dampeners to the steppers. In the end, there were enough of the shorter screws, that are displaced by going from 4 screws to 2, in all 3 axis to possibly not do this, but I did them one at a time, so realized it after the fact. Just know you may need to adjust, purchase, or modify some screws.

Step one

Y axis

Step 1

To release tension on Y axis belt tensioner. Loosen the t nut screws that hold the 2 side support brackets to the extrusion.



Step 2

Take belt off the stepper drive pulley. Remove pully off the stepper shaft using the 2 grub screws. Unbolt the 4 bolts of the stepper motor from the bracket.

Continued next page



Step 3

Now mark the amount of material to remove from the Y frame.

****Alternate use a printed adjustable Y axis end stop mount.**** This reduces available bed surface in Y by a few mm.
<https://www.thingiverse.com/thing:298746>



Step 4

Cut out the excess material from the Y plate.

Extra style points for using a 3d printed sawzall blade handle to perform the cuts.



Use 2 screws to attach dampener to the stepper motor (note: you may need to use shorter screws if the stock ones bottom out or use Dremel to cut them down). Use 2 factory screws to mount dampener bracket to the stepper bracket. Then align pully to the extrusion. You can re attach the tensioner loosely on other end to allow you to run carriage in and out and check that belt is running in the proper position.

Step 5

Perform final tensioning of the Y belt. Taking care to make sure the belt does not try to run off the side of pulley. You can use the side plate on the side that belt is moving towards and add tension till it runs true.



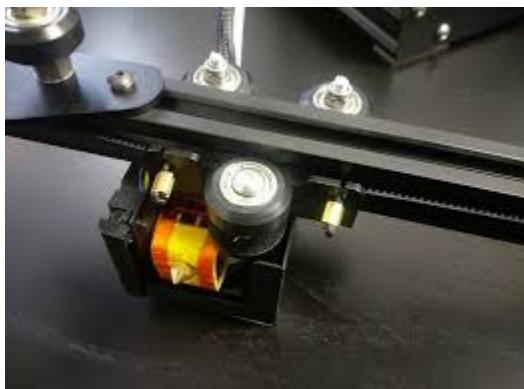
X axis stepper dampener installation

Step 1

Loosen the 2 screws that hold the plate of the X roller bearing support to take tension off the belt.



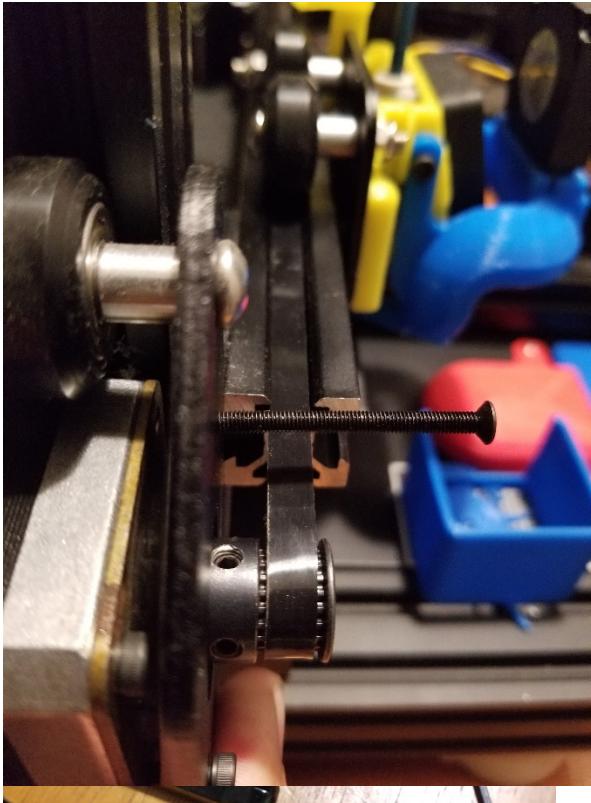
Then remove one side of belt catch on the x axis trolley



Step 2

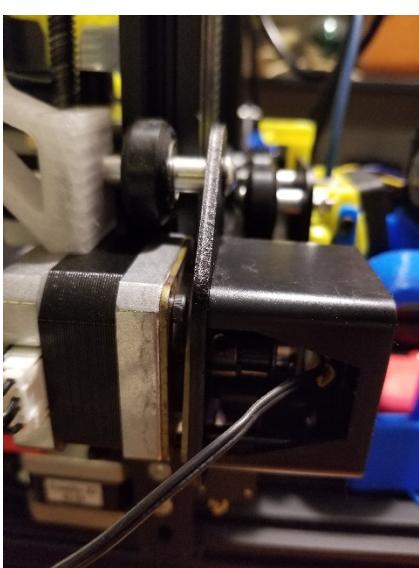


Now you are ready to remove the 4 screws holding the dust cover with x end stop off. Have a hold of stepper as these through bolt holding it to the frame. You must remove the QR code sticker to access screw heads.



Step 3

Now loosen and remove the drive cog from the stepper and mount the stepper dampener with the 2 screws to the stepper. Ensure the cover screws and the stepper screws leave the stepper plug pointing away from printer when installed.



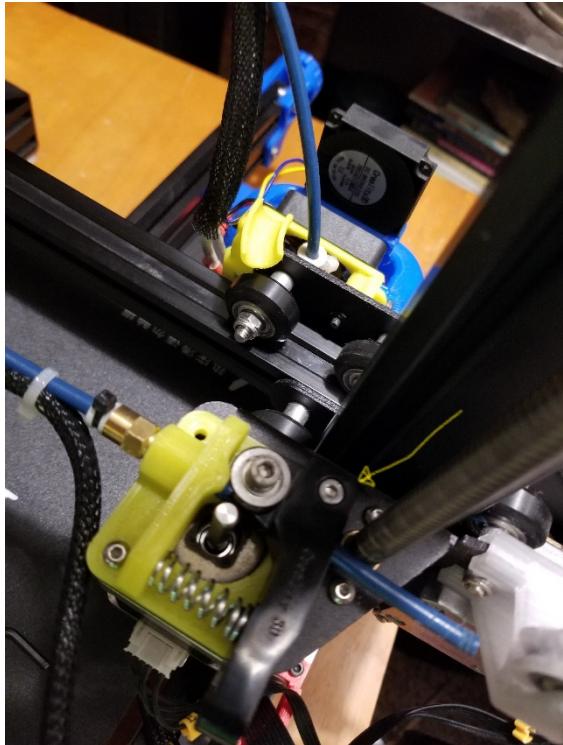
Step 4

Now remove temp screw and install 2 of the original 4 screws through the plastic end stop housing and into the x stepper dampener. (end stop cable goes in from below, was testing install before I re-routed it)

Step 5

Re-install the belt to carriage and use tensioner pulley to re-tension the x axis belt.

E axis

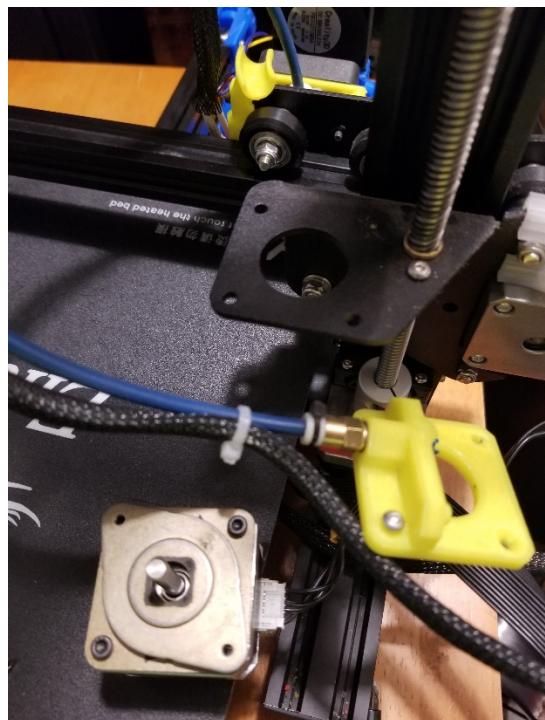


First remove any filament from printer.

Now remove the screw that holds the idler bearing arm to the stepper

Caution, you are releasing the pressure on a compressed spring. Safety glasses would be prudent. You can put a rag over it so it doesn't fly, or use pliers to remove prior to the arm removal.

Now undo last 3 bolts holding extruder drive frame and stepper on the bracket.

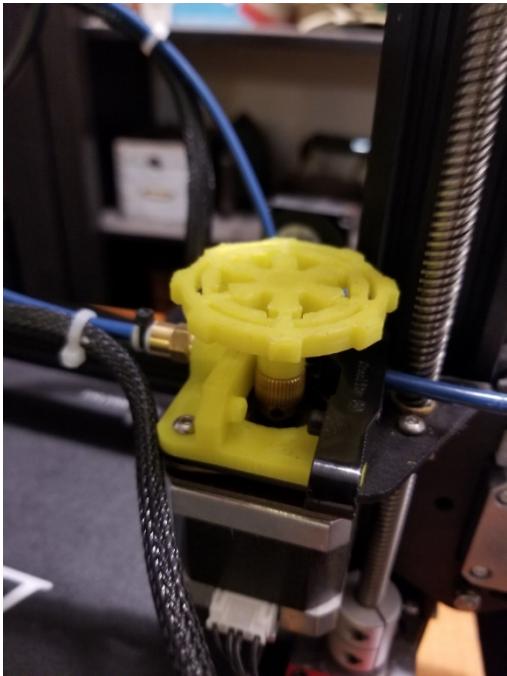


Then bolt the dampener to the stepper motor. Orient so that stepper plug is pointed to back of printer, and the dampener mount plate will be under the pivot arm bolt location shown previously

Install the screw diagonal across from pivot arm to affix the extruder drive body to the stepper.

Then install pivot screw. While compressing spring with arm. **Alternately** install arm, then use pliers to put spring in place.

Install drive gear. You are now done.



End of project check list

1. All end stops mounted and plugged in
2. All stepper motors wires are installed
3. All motion systems can reach, and touch end stops
4. All wires are back in restraints or looms
5. Test each axis before a home all
6. Enjoy your now significantly quieter printer.

Unit 9

Start and End G code scripts

Their purpose. The start code rapidly purges filament as a nozzle cleaning exercise, to prevent build up and clogging. The end code purpose is getting the nozzle off the part and presenting the bed forward for print removal.

;Start gcode

M107 ;turn off fan

G28 X0 Y0 Z0 ; home X, Y and Z axis end-stops

G0 X0 Y0 F9000 ; Go to front

G0 Z0.15 ; Drop to bed

G92 E0 ; zero the extruded length

G1 X40 E45 F300 ; Extrude 25mm of filament in a 4cm line

G92 E0 ; zero the extruded length

G1 E-1 F500 ; Retract a little

G04 S10 ;Dwell 8 seconds

G1 X80 F4000 ; Quickly wipe away from the filament line

G1 Z0.3 ; Raise and begin printing.

;End gcode

G91;

G1 F1800 E-3; retract filament

G1 F3000 Z10; move z 10mm above print finish height

G90;

G28 X0 ; home x

G1 F3000 Y200; bring bed forward

M104 S0 ; turn off extruder

M140 S0 ; turn off bed

M84 ; disable motors

M4 60000; dwell to cool hot end

M106 S0 ; turn off cooling fan

Unit 10

Combing settings related issue

Symptom;

Missing layers and wall defects.

Causes

It can be from combing. Disabling Combing and activating "Retract before outer wall can get rid of the missing layers. Issue initially thought to be a clog with layer separation.

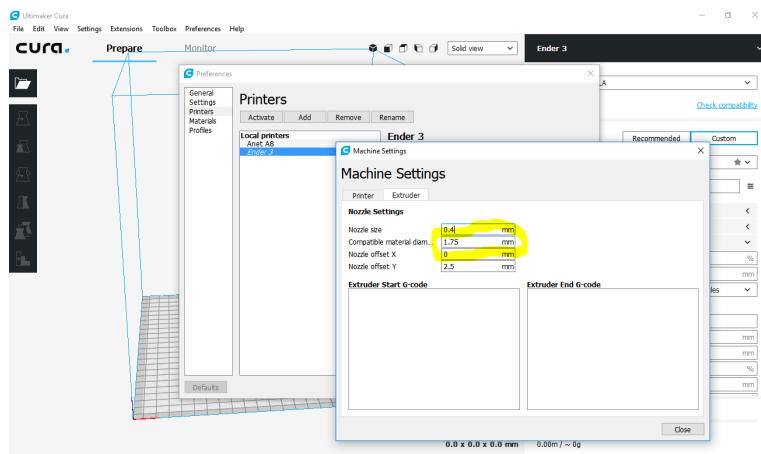
Massive under extrusion. [See also nozzle clog or filament drag](#)

Symptom;

Looks like extrusion set to .4mm layer with a .4mm nozzle. Filament size / looks like under extrusion or z drag.

Cause

Reason/ fix go to Cura, the filament diameter is set at 2.8 from the initial printer model you based the profile on. Change to 1.75 or measured filament diameter.



Unit 11

Issue slicer bed origin settings

Symptom

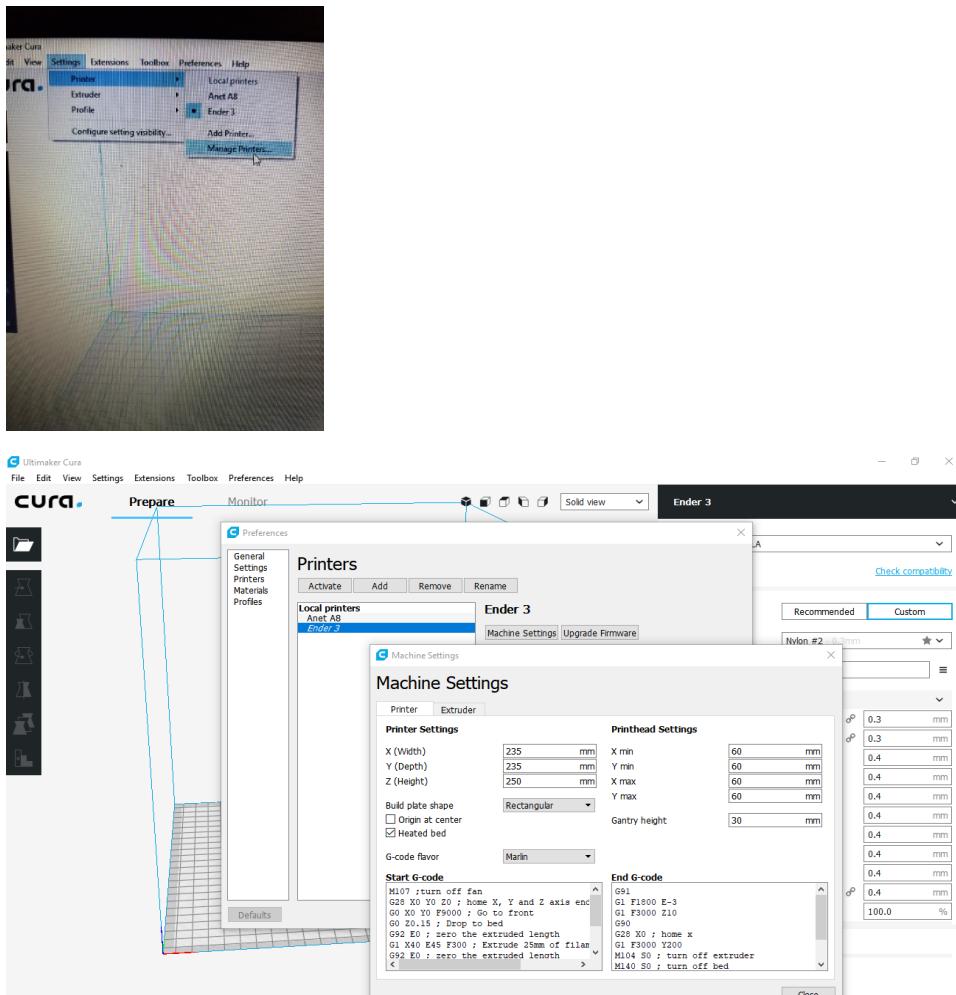
Parts do not align to bed from slicer, not able to use whole build surface. Initial set up of Profile in Cura or another slicer.

There are two places that the Slicer needs information to properly orient your parts to the bed.

First

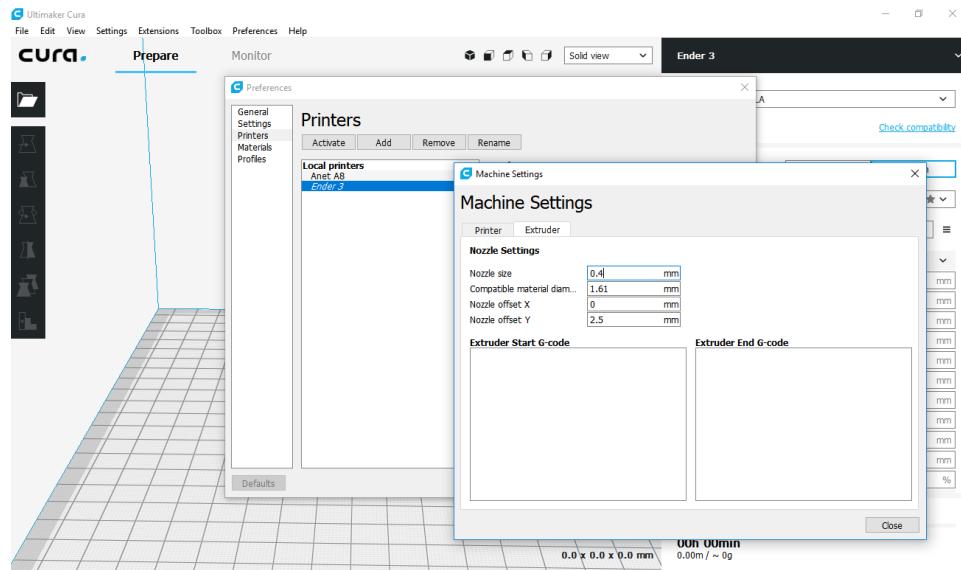
In the machine settings section (Cura referenced, but all slicers will have something similar)

Set the machine dimensions at X235.0, Y235.0, Z250.0



Second;

Under the extruder settings, in offset you need to set value for the nozzle sitting at lower left corner of the bed. To find your number, home all, then use manual position move with the controller. Or you can try the X0. Y2.5 that the authors stock Ender 3 set up produced.



Unit 12

Issue

Cura setting defaults to concentric fill

Symptom;

Holes in portions of top infill of test cube or other part.

Fix

Go to Cura/shells/topbottompattern/ select Line or Zig Zag instead of Concentric

Examples;



Unit 13

Y axis eccentric nut adjustment with pictures of what eccentric nuts look like.

Issue

Bed rollers not properly tensioned to v groove

Symptoms;

Too Loose;

Bed has excessive rock or wobble when gently rocking across X axis, bed leveling does not repeat,

layer lines have waves in them.

Too Tight;

stepper straining, a pronounced flat spot develops on wheels when left un used for a while.
Type 1 bed skewed away from square in Y axis.

Fix;

Condition bed is Too Loose; **Type 2**

Tip machine up or lay on side. Use eccentric nuts (Shown exposed in photos below) on the one side to adjust. Rotate first nut until it just stops excessive movement. Second eccentric nut tightening till there is some resistance to turning rubber wheel while holding carriage in place.

Condition bed is Too Loose; **Type 1**

Tip machine up or lay on side. Use eccentric nuts to adjust. Rotate first nut 1 or 3, until it just stops excessive movement. Second eccentric nut, 2 or 4, tighten till there is some resistance to turning rubber wheel while holding carriage in place. **!! Warning over tightening this outside wheel can and will cause bed to be skewed to the y axis.!! Do not over tighten.!!**

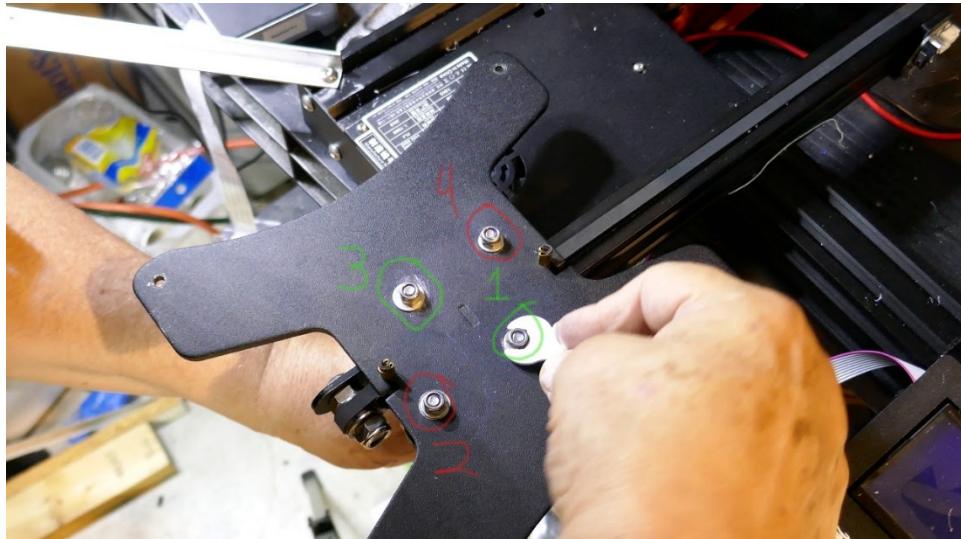
Too Tight;

Rotate both eccentrics till bed is loose to v grooves. Then use “Too loose” procedure to set the eccentric wheels".

Continued next page

Type1

First design offset wheel pattern.



Note the hand is tightening the compression nut, Not the Eccentric nut.

Type 2 later production" fixed offset issue"

This is eccentric nut (with wheel removed for clarity) in the fully tight position



Continued next page



This is the eccentric wheel in the fully loose position where through bolt is furthest away from the fixed idler wheels (left side in photo).

Unit 14

Issue

Case fan not running

Symptom;

Case fan observed to not be running when printer turned on.

Fix

The fan is only set by Creality to run when the software turns on the part cooling fan.

Option One

Do nothing as this was the factory design.

Option Two

Modification;

Unhook wires or fan from control board. Extend wires to run to the 24v terminals of the power supply,

adding a fuse to protect against shorting.

Unit 15

Issue;

Dust on rails or roller wheels

Symptoms;

Dust or debris seen on wheels or rails

Fix

Option One

Do nothing but clean the offending dust off of printer. There is static electricity created as wheels roll on the aluminum rails, which attracts dust.

Option Two

Check that wheels are adjusted properly on X and Y carriages. If Wheel damage is verified, replace rollers and see Y bed carriage wheel adjustment procedure for proper adjustment guide.

This is authors Y carriage just before performing maintenance (adding dampeners) 2 months accumulation, no wheel wear noted.



Unit 16

Issue

Visually unpleasing diagonal lines on top or bottom layers of print.

Fix

Change infill pattern and or Shells/ TopBottomPattern/ to Concentric, line, or zig zag

Unit 17

Issue

Bed is warped on delivery, is this normal?

Fix.

On machines with an overall flatness of >.15mm, after trammimg bed, with the height difference split, it is capable of usable prints for most users with manual leveling techniques

With a Flatness of .15 to >.27mm, using mesh bed leveling, or an aftermarket probe and software correction. These can still be used.

<.27mm or greater and for any bed where the 3d operator is not able or willing to adjust for an out of flat bed.

Mirror or Glass cut to 235 by 235 can be cut and clamped to bed for a flatter surface. In some cases, capton tape may be needed to be applied to the bed to keep these add on surfaces supported and flat.

There is a myriad of other magnetic and other types of bed materials available, I encourage you to research what you think will work for you on your own. As this is a very personal choice. And to Authors knowledge no surface covers every polymer available.

Question

Is anyone using Cura? Are there any good profiles?

Answer;

Seek out Facebook groups, or Internet 3d printing forums, and search their files or file archive sections for a profile that may suit the style of printing you are performing. For example, a Miniatures profile, or a file tuned for an specialty filament like Nylon or Abs, or? It's up to you, your materials used and your imagination.

The authors profiles are listed on the 5 groups I participate in, look for Luke Hatfield

Unit 18

Question

Why should I update Firmware?

Answer;

Option 1

As shipped the Marlin version that Creality purchased shipped with High temperature run away disabled. That is a fire hazard. Purchase boot loader to be able to flash firmware with a safe Marlin version.

Option 2

Skip update, do not print un-attended.

Unit 19

Issue

Filament is being fed backwards out of the extruder.

Commonly this is on a new build. The X and E stepper cables are reversed. Rumors of occasional label swap, also reports of cables landed to the wrong mosfet on control board by factory.

Fix

Reverse the stepper cables,

With others contact Creality support to get wiring diagram and put wires back in proper order.

Unit 20

Question

How can my brand-new printer have a clog or jam?

Answers

The stock PTFE couplers are often of poor quality. They allow the ptfe to back away from the nozzle creating a void.

The mfg does not give a method to add more than hand pressure to installing ptfe.

The material in void does not flow through, over time hardening and eventually causing drag on the remaining path for the filament to travel.

See the nozzle clog section for repair process as fix for all these issues.

Unit 21

Question

Why is first layer so ugly/not sticking?

Answer

I could write a separate book on all the factors that can cause a poor first layer bond to not stick. But will take a swing at some commonly found issues that people new to the hobby, and some veterans fall victim to....=)

Oils from your hands. This to a polymer is like putting Crisco oil on a frying pan and trying to get something to stick.....Use Isopropyl Alcohol, 70 to 94 %. Author prefers 94 % as the water percentage is less to evaporate before printing may commence after cleaning. Some removable surfaces like glass, borosilicate, PEI, glue or hairspray on many of these previous, Build Tack, Kapton tape, and blue painters tape. All these have different methods to clean or prepare for a new print.

Bed temperature that is above the glass transition temperature of the filament. These are technical words that boil down to, do not exceed bed temperatures that are generally recommended by the community or manufactures for a given polymer, and expect that being hotter will not necessarily give better results.

Nozzle height from bed surface, this is often referred to as needing leveled.....adjusting height is not leveling, If you are too far from the nozzle to bed, it will have a negative effect on trying extrude material with adhesion.

Using a bed material that is not compatible with a given filament, too many variables to list here. See YouTube and google for recommended compatibility.

Mechanical issues such as bed is trammed to be level, but the x arm and bed are not on same plane after a positional move, so now it's too high, low, skewed to get an even first layer for the part.

Material is Hygroscopic, another big word. This means it can collect moisture from the air around the filament.

This causes steam while extruding that causes uneven flow, bubbling, and often very poor adhesion factor compared to a dry sample of the material.

We covered cleaning hand oils, so for those who are a Houdini and do not touch the bed, or who knows use gloves. The bed still needs cleaned of dust and remnants of prior prints. Or an application of any agents used to assist in the bonding process.

Glues, some glues do very well in assisting adhesion. But others or even good ones, can have a cure time while they off gas water and certain chemicals that before the surface is cured, working against adhesion.

Place holder, because I assure you there is more.....

Unit 22

Question

My printer won't store the settings (e-steps) in the eeprom. What could be the problem?

Answer

You must have a bootloader to flash eeprom on an Ender 3. As shipped there is **No bootloader** or way to set the eeprom through the serial port that is on the printer.

Unit 23

Question

I ran my printer into bed, could I have damaged the nozzle?

Answer

Yes. There have been several reported in forums that were damaged, also creating an issue diagnosing extrusion problems as an oval, or rolled lip on a nozzle does some very erratic things while extruding. You may have also bent the throat which will be evident if heat block is skewed.

Unit 24

Question

What are the best replacement couplers for the Bowden tube and their catalogue numbers?

Answer (this was volunteered by another, cannot vouch for validity of claims)

The M6 threaded one (PC4-M6) if you want to replace the hot end one as well, that is a PC4-M10x0.9-4.1 (the tube goes through) If you aim for the stars, go with Festo couplers/fittings but that's might be over the top.

Unit 25

Question

Why is axis X,Y,Z not homing with a home all?

Answer

The wire to the axis end stop is unplugged

The stepper motor is un plugged

On build X and E stepper reversed causing X to not be powered

Unit 26

Question

How do I calculate e steps for my extruder?

Answer

<https://www.3dhubs.com/talk/t/howto-calibrate-tune-and-fine-tune-your-printer-and-filament/5695>

Thank 3dhubs for a great tutorial article on e step calculation.,

Or

Use basic method. Run 100mm of material through extruder while its disconnected from hot end

Measure the actual length extruded. Take measured result (R) divide by 100 divide the result by current E steps

Example. You extruded 103mm of filament, your current e step is 97.

Divide 103 by 100 that equals 1.03, 97 divided by 1.03 equals 94.17

Author recommends that you round off to a full step value.

Unit 27

Question

Why did my printer, layer shift over, back feed filament, stall or??

Answer

Sd Card has been corrupted. Not always easy to diagnose, but opening gcode from the card in text editor often shows weird characters that do not belong in the coding.

Cause, Stock SD card is junk. The printer writes to the SD card once a layer for the power outage recovery function, wearing them out quickly...some in a day or days.

Unit 28

Question

I have this weird pattern in the X or Y axis, what is causing it?

Answer

Failed bearing, see picture of my personal bearing failure recently.



Unit 29

Videos about Ender 3 to watch

Not every one has time, but the author learned much of his 3d printing knowledge from YT videos. Try to be specific in topic you want to study when searching.

7 easy 3D printed upgrades for your Ender 3

<https://www.youtube.com/watch?v=fq2IKp3jeaY>

7 more easy 3D printed upgrades for your Ender 3

<https://www.youtube.com/watch?v=DxopTyCCkOU>

Fixing a Filament Flow Problem on CR-10 mini, CR-10 or Ender 3

https://www.youtube.com/watch?v=x35aWmnZ_A0&app=desktop

Fixing a Filament Flow Problem on CR-10 mini, CR-10 or Ender3

https://www.youtube.com/watch?v=x35aWmnZ_A0&app=desktop

updating firmware without a bootloader

<https://www.youtube.com/watch?v=oZVTYpHnplw&feature=youtu.be>

building video

<https://www.youtube.com/watch?v=VHHxkOULP5Q&feature=youtu.be>

Nerys ender 3 misc videos

<https://www.youtube.com/watch?v=ffVe-lr0La0&t=>

<https://www.youtube.com/watch?v=fn9vo2XiqLY&t=63s>

<https://www.youtube.com/watch?v=4dTmKPZA0dw&t=14369s>

easy live leveling

<https://www.youtube.com/watch?feature=youtu.be&v=gkZUAYTxU1Q&app=desktop>

unboxing and assembly guide

https://www.youtube.com/watch?feature=youtu.be&v=Fzc_e51vIIA&app=desktop

bootloader and firmware update

<https://www.youtube.com/watch?v=fI15X2ffdyo&feature=youtu.be>

bed leveling

<https://www.youtube.com/watch?v=RZRY6kunAvs>

ABL usage demo

<https://www.youtube.com/watch?v=p5iH3y20MQE>