

Work Instruction – Bolt Drag Chain Replacement

Model	Bolt	Date	24-05-2017
Prepared by	Maurits Hartman		

Short title	Replace Drag Chains			
Classification	Troubleshooting		Firmware	Version control
	Software		Part information	Action required
	Mechanical	X	Electrical	Service manual revision
	Filament path		Transmit / receive	Retrofit information
	Product safety		Other ()	Packaging

Prerequisites

- Cutter
- Flat-head Screwdriver
- Hex key 3mm
- Bolt Drag chain replacement set, containing:
 - 2 Drag chains with cables
 - 2 Black RJ-45 inserts
 - 12 Tie-wraps
 - 2 Self-adhesive mounts

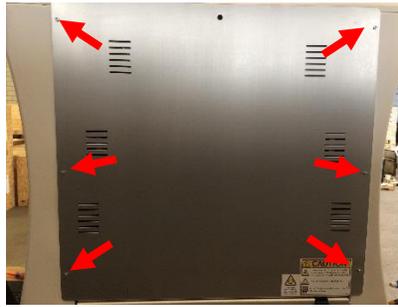


General information

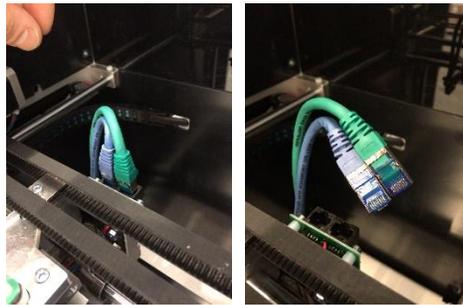
This document should be used to replace both drag chains and cables in a Leapfrog Bolt 3D Printer. Great care should be taken to **follow these instructions carefully**, as improper installation of the cables can damage other electronic parts of the machine. Installation time should be around 30 minutes.

Instruction Steps

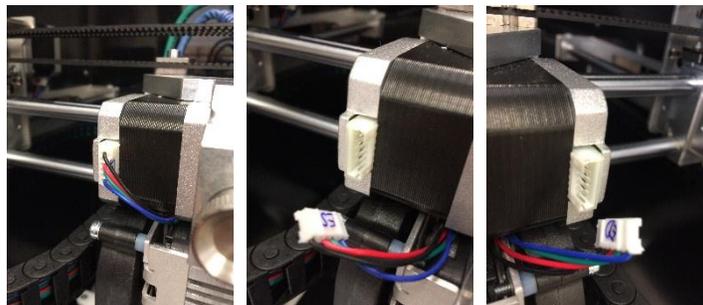
- 1 Remove all power from the Bolt, and unplug the mains cable. Place the Bolt on a firm surface, and then remove the aluminium back plate by unscrewing six screws using a 3mm hex key:



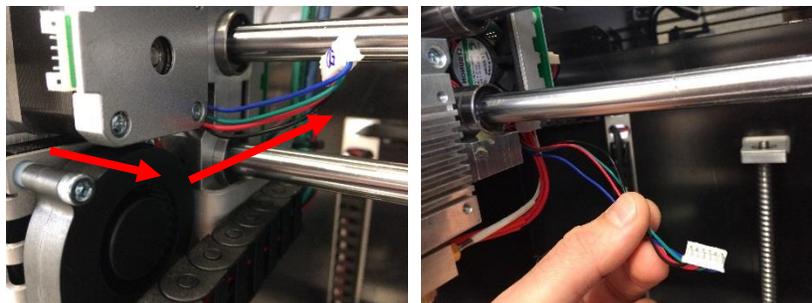
- 2 After removing the back plate, unplug the green and blue cables from **both the extruders heads**:



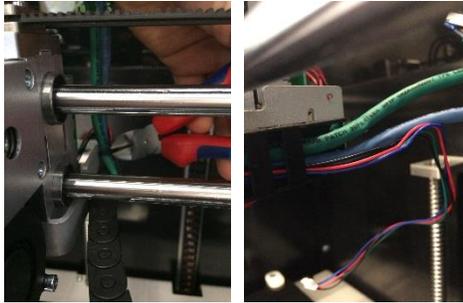
- 3 Unplug the white 6-pin connector from **both** the left and right extruder motors:



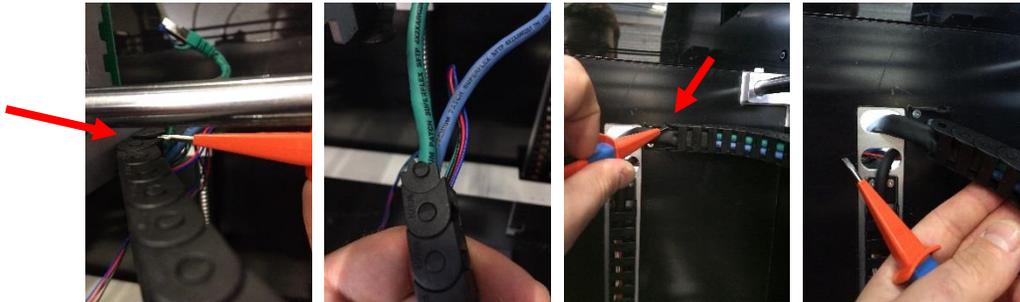
- 4 Move the motor cable and plug to the side of the extruder head, and then pull through the bearing and cooling block:



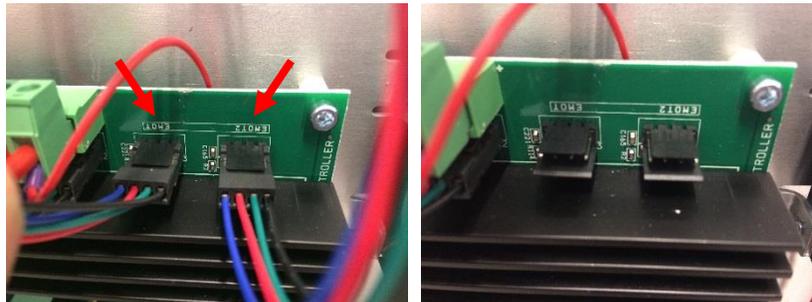
- 5 Cut the tie-wraps on the side of the extruder which hold all the cables:



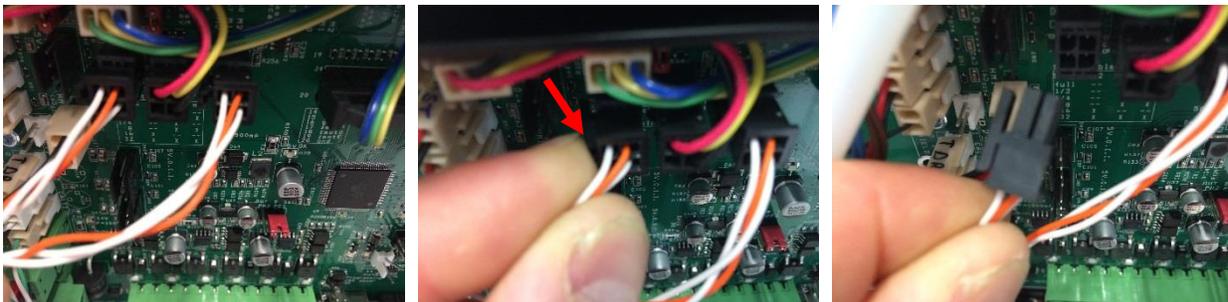
- 6 Using a flat-head screwdriver, open the second to last shackle of the drag chain to loosen it from the last (fixed) shackle. Also, loosen the second to last shackle in the back of the machine, so the whole drag chain is loose:



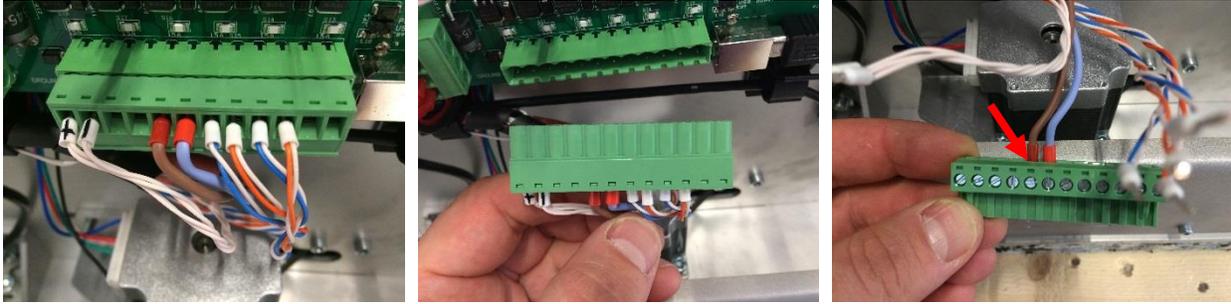
- 7 Repeat for both drag chains, then move to the back of the machine. Unplug the two rightmost motor connectors (labelled EMOT and EMOT2):



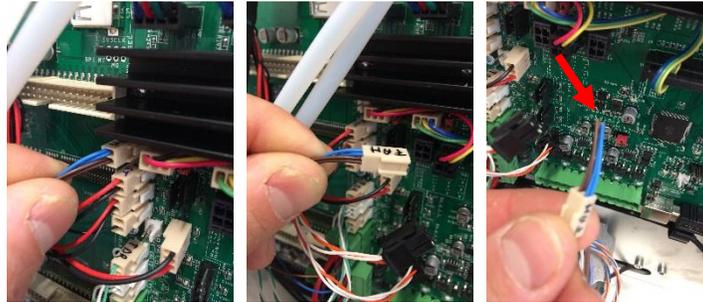
- 8 Unplug the two black square connectors in the middle of the electronics board. These connectors have white and orange cables going into them. Loosen the retainer plug of the connector and then gently pull them back:



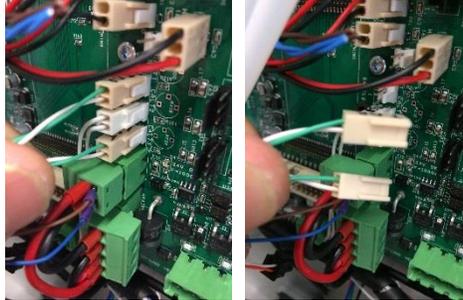
- 9 Unplug the broad green connector on the bottom of the electronics boards. **Gently wiggle** it loose. Unscrew, using a flat-head screwdriver, all cables from the green connector, except for the thick blue and brown wires:



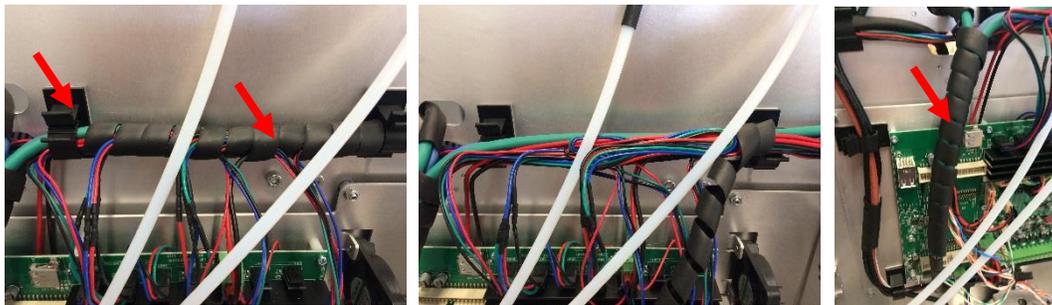
- 10 Unplug the small white connector on the left side of the electronics board with the thin blue and brown cables going into it. Cut the wires as well:



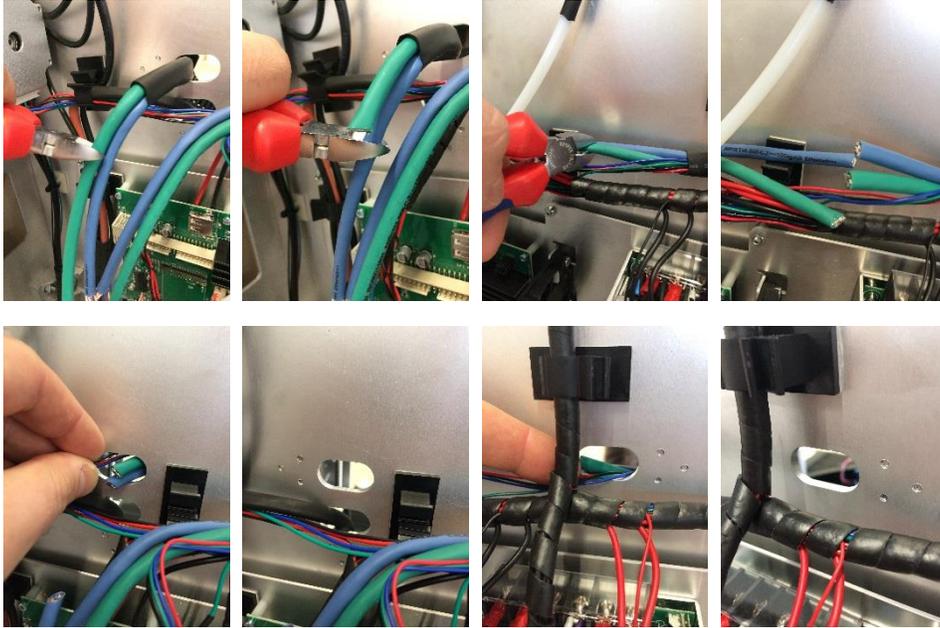
- 11 Unplug the two small white connectors on the left side of the electronics board with the thin white and green cables going into them:



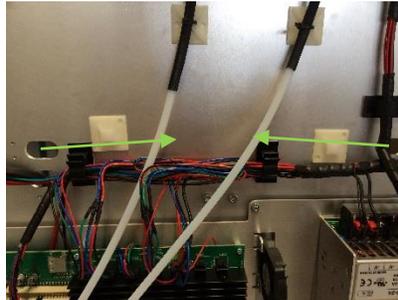
- 12 Open the black cable retaining clips to free up the cable. Then remove the black spiral wrap (save the spiral wrap) around the cables in the following places:



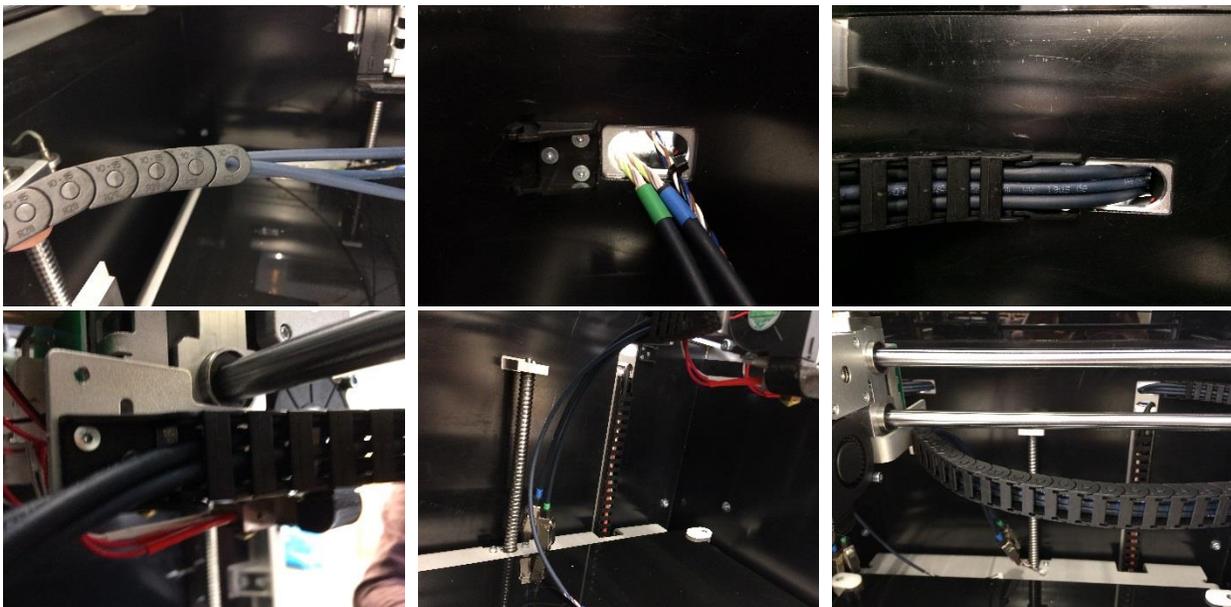
- 13 Cut the blue and green cables. Free up the motor cables that you just unplugged (EMOT and EMOT2) and push them through the holes in the back. This way you can completely remove and dispose of the old drag chain and cable:



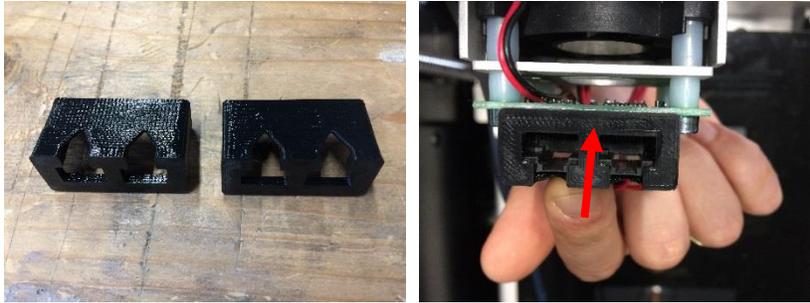
- 14 At this point, the old cables and drag chains are completely removed. Unpack the new drag chains set.
15 Take the self-adhesive mounts and glue them in the position as shown. The goal is to have them as close to the openings in the back as possible, so allowing the cable to enter in a horizontal line:



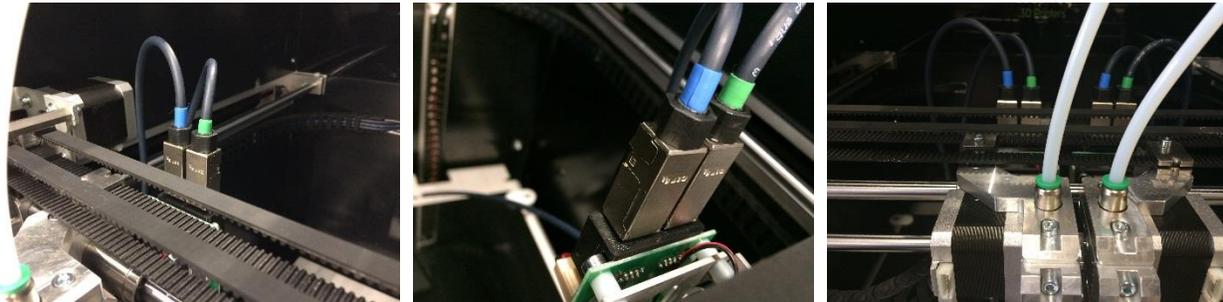
- 16 Click the drag chains into the still present shackles, both on the extruder ends as well as the back:



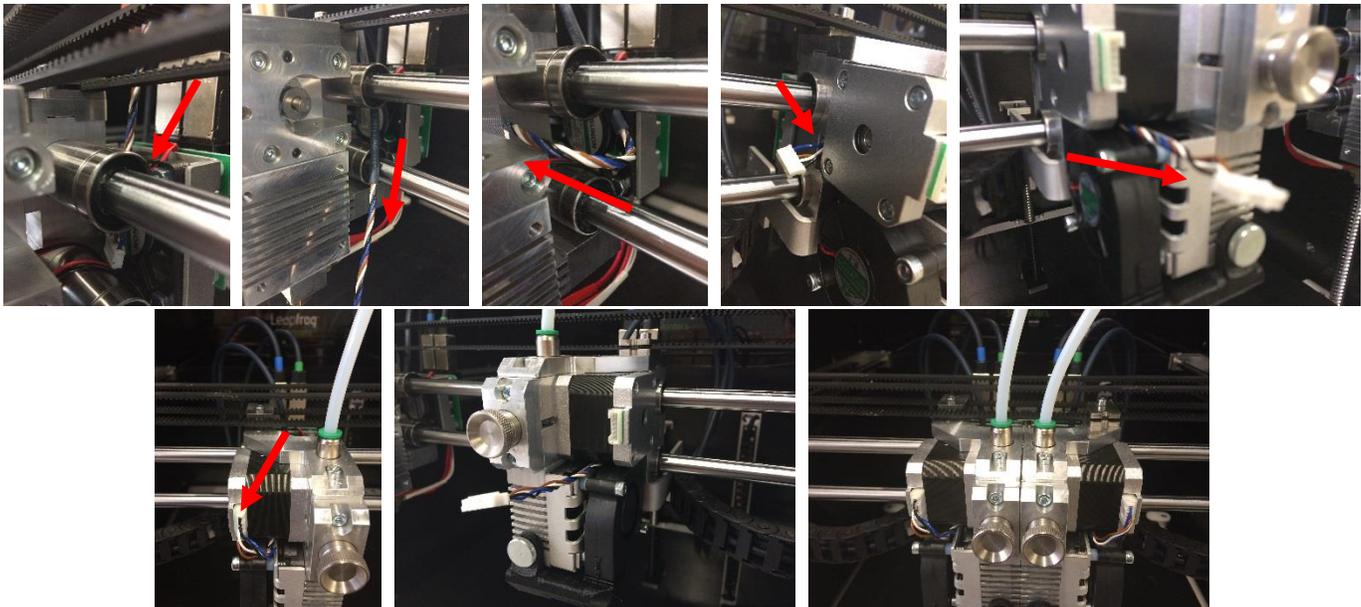
- 17 Slide the black RJ45 inserts over the RJ45 connector on both the extruders:



-  18 Insert the four RJ45 connectors into the electronics boards. **Pay specific attention to the order of the coloring: blue on the left, green on the right. This is the same for both the left and right extruder:**



- 19 Take the new motor cable (white-black-brown-blue) with the white connector, and put it from the top in between the top bearing and rear cooling fan. Then, guide it over the bottom bearing, and through the side of the extruder (i.e. to the left in the left extruder). Then, guide it in between the radial cooling fan and the extruder motor to the front. Finally connect it to the extruder motor. Do this for both extruders:



- 20 For both extruders, apply tie-wraps to the cables and the aluminium strut at the bottom of the extruders:



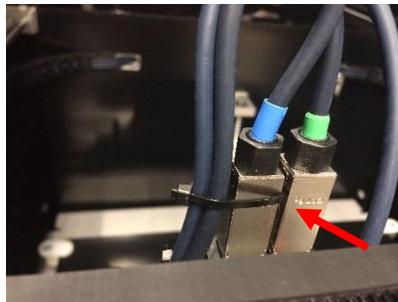
- 21 For both extruders, apply a tie-wrap to the three cables almost at the top of the arc:



- 22 For both extruders, apply a tie-wrap in between the electronics board and the cables in order to pull them to the side:



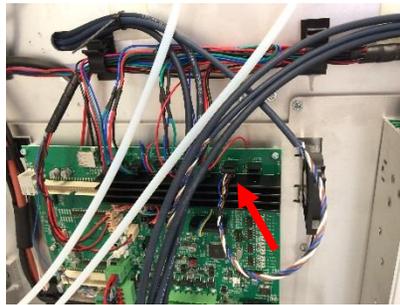
- 23 Only for the left extruder: apply a tie-wrap on the left RJ45 connectors in order to pull the cables closer to the extruder head (i.e. pull the cable against the blue RJ45 connector). Make sure when sliding the left extruder all the way to the left, that the cables are not touching the left side of the carriage with the X-motors:



- 24 Cut the tie-wrap ends to size. Move to the back of the printer. Apply tie-wraps to the cables in order to fix them to the self-adhesive mounts. Make sure the cables are behind the white filament tubes and other cables. Make sure the three new cables run straight and parallel to each other:



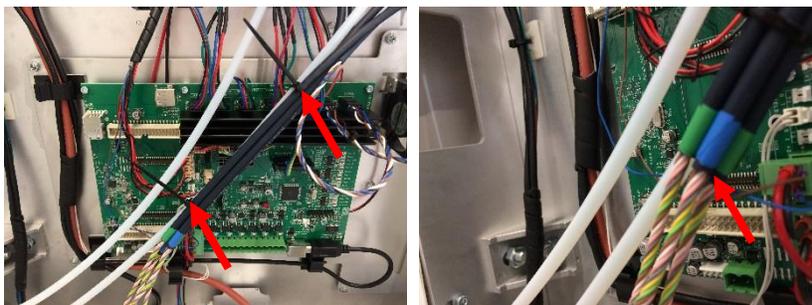
- 25 Connect the left motor cable (when viewed standing in the back of the machine) to the EMOT connector on the electronics board. See the schematic at the end of this document (page 11) for a complete overview:



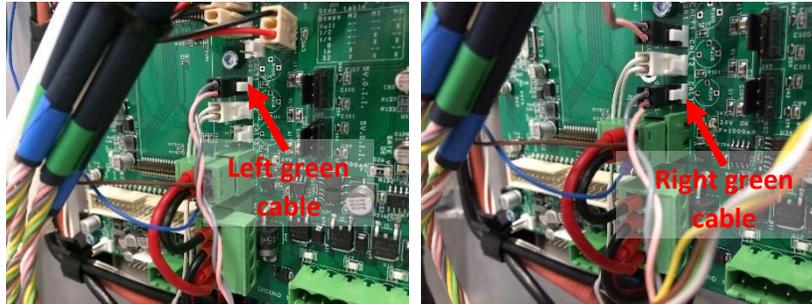
- 26 Then connect the right motor cable to the EMOT2 connector on the electronics board:



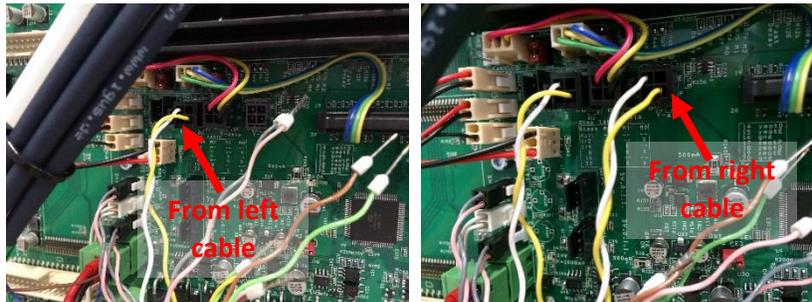
- 27 Using two tie-wraps, fix the four remaining cables to one of the white filament tubes. Don't tighten the tie-wraps too much (they will stay in place due to friction with the mantle of the cable). Make sure the ends of the cables line up:



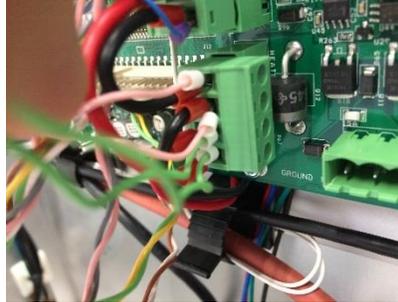
- 28 Connect the black two-pin thermistor from the left green cable into the top thermistor slot. Connect the black two-pin connector from the right green cable into the bottom thermistor slot:



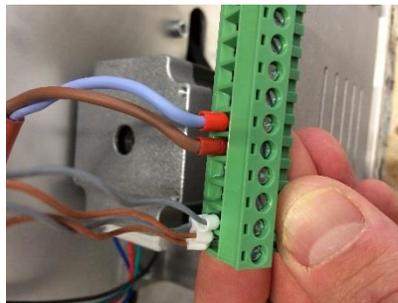
- 29 Connect the black four-pin connector into the left square black connector on the electronics board. Connect the same connector from the right cable on the right black connector:



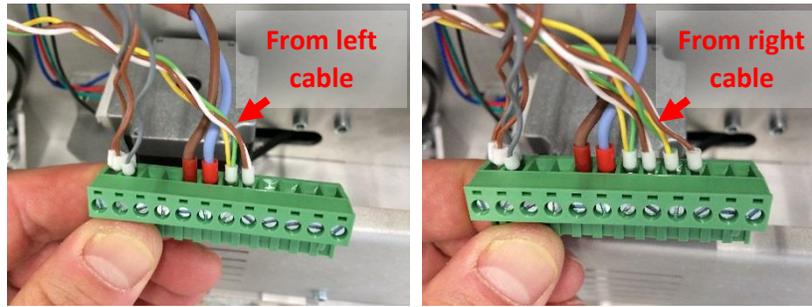
- 30 Connect the **single green** and **single pink** cables into the big green screw terminal on the bottom left side of the electronics board:



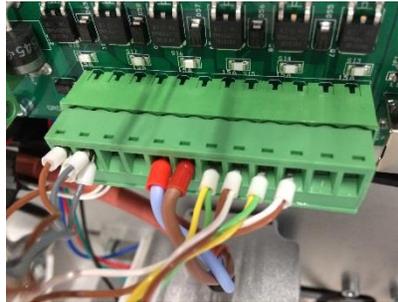
- 31 Connect the **single brown** and **grey wires** into the big wide green connector. The two brown wires go together in the leftmost slot, the grey wires go together in the second slot (as seen from the left):



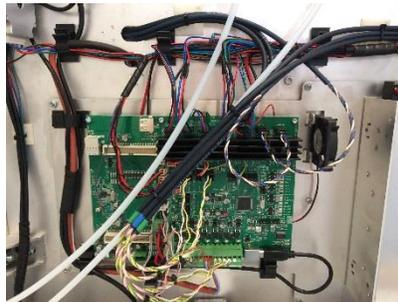
- 32 From the **left cable** (as seen from behind the printer), connect the **yellow-green wire pair** and **white-brown wire pair** into the big green connector. Then, also connect the yellow-green wire pair and white-brown wire pair from the **right cable** into the big green connector:



- 33 Connect the big green connector carefully back into the electronics board:



- 34 The wiring is now done (see end result below), and the back cover can be placed back using the six 3mm bolts.



- 35 The power plug can be put back in and the machine can be tested by checking the following:

- Permanent fans are blowing on both extruders
- Left hotend heats up properly when trying to 'swap filament' left
- Right hotend heats up properly when trying to 'swap filament' right

Appendix

Bolt LMC connector schematic (note wiring colors). Perspective: L(ef) and R(ight) are as seen from the front of the machine:

