



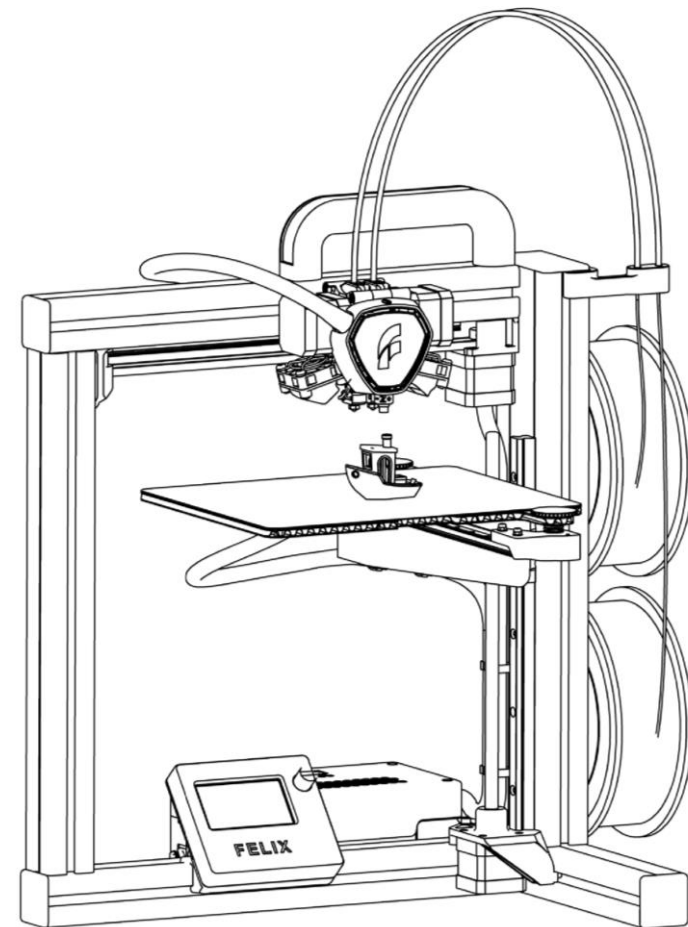
Assembly Manual

FELIX Tec 4.1

30 November 2020
Revision 06

www.felixprinters.com
support@felixprinters.com

Zeemanlaan 15
3401 MV IJsselstein
The Netherlands



1 Introduction

Dear Customer,

Thank you for choosing FELIXprinters!

To get your Felix 3D printer up and running as fast and painlessly as possible please follow this manual carefully. Please don't take any shortcuts. It's better to spend a few minutes extra on reading, than to wait a week for new parts.

When things are unclear or if you have any remarks or tips, please contact us:

Website: www.felixprinters.com/support

Email: support@felixprinters.com

Telephone: +31 (0)30 30 31 387

Address: Zeemanlaan 15, 3401MV IJsselstein, The Netherlands

We also recommend looking on our forum and getting yourself a forum account. You will benefit from the ability to get downloadable and printable upgrades for your printer. Also it is a great source to obtain and share knowledge about your 3D printer and 3D printing in general.

Have fun building!












Kind regards,

FELIXprinters

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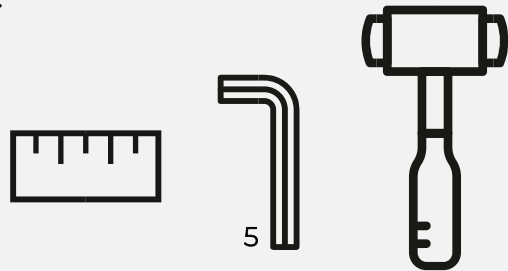
3 Required Tools

	Allen key 1.5, 2, 2.5, 3, 4 and 5
	Wrench 5.5, 7 and 12
	Cutter
	Tweezer
	Screwdriver flat head
	Screw driver Philips head
	Knife
	Rubber hammer
	Ruler
	Detergent
	Grease/Lubricant

4 Frame assembly

30 minutes


Tools:



1

(1x) Profile 4
(2x) Bolt M8 x 20
(2x) Frame Connector

Tools



2

(1x) Profile 1

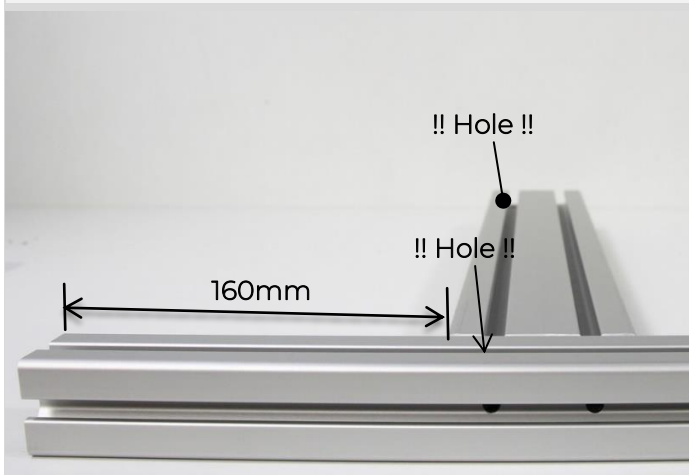


3

160mm

!! Hole !!


!! Hole !!



4

(1x) Profile 4
(1x) Bolt M8 x 20
(1x) Frame Connector

!! Hole !!

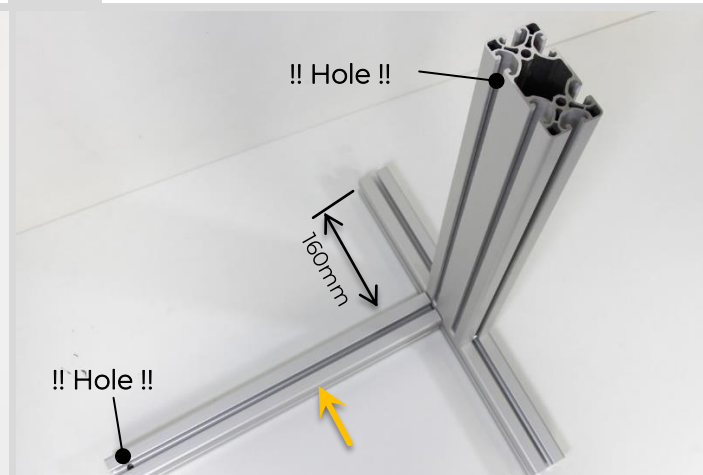


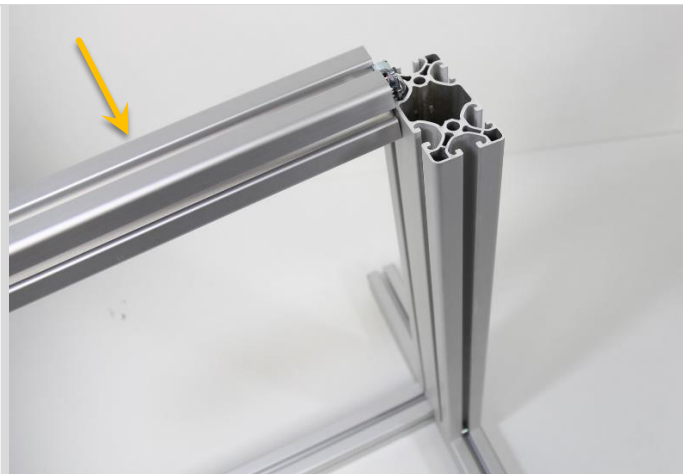
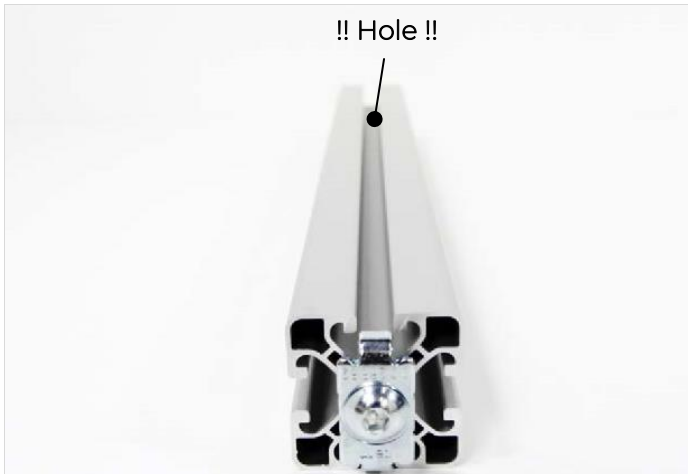
5

160mm

!! Hole !!

!! Hole !!





6 (1x) Profile 2
(1x) Bolt M8 x 20
(1x) Frame Connector

Tools

7

8 (1x) Profile 3
(2x) Bolt M8 x 20
(2x) Frame Connector



9

10 Make sure the profiles are properly aligned. If not untighten the screws and re-adjust the profiles

11 (4x) End Cap Square
(1x) End Cap Rectangle

5 Z-axis

45 minutes

Tools:



12

Example – Insert T-Nut:
Insert the nut into the slot

Tools



13

Example – Insert T-Nut:
Insert the key into the threaded hole and rotate the nut into position

14

(4x) CSK Bolt M3 x 8
(1x) Motor
(1x) Z-Axis Motor Bracket

15

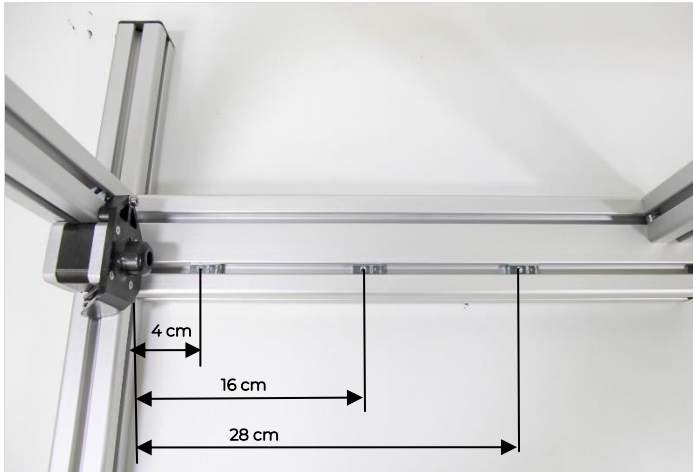
(1x) Cable Stepper Z

16

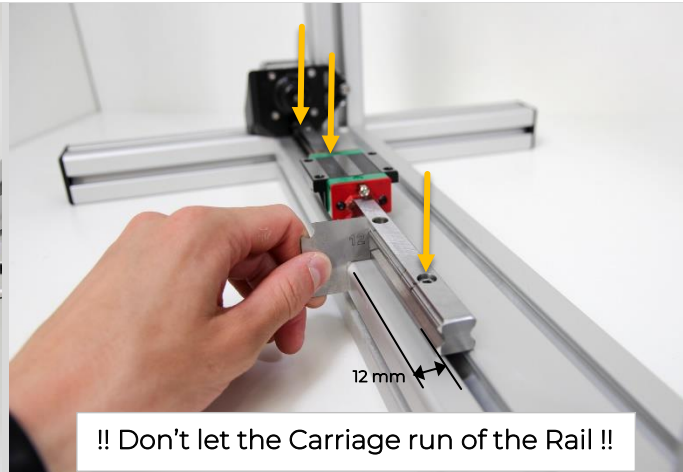
(1x) Motor Assembly
(2x) T-Nut M4
(2x) Bolt M4 x 20
(2x) Small Washer M4

Tools:





17 (3x) T-Nut M4
Tools: 2



18 (3x) M4 x 20
(1x) Linear Guide HGW15
Tools: 3

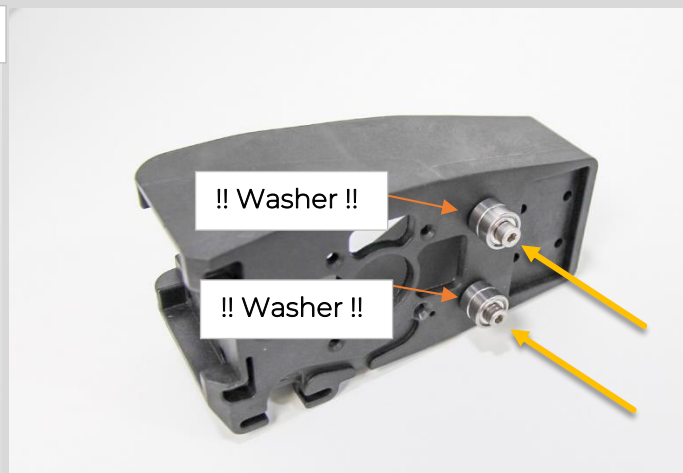


19 (1x) Z-axis lift
(1x) Hexagon Nut

!! Remove Bolts after pulling Locknuts into Z-Axis Lift !!



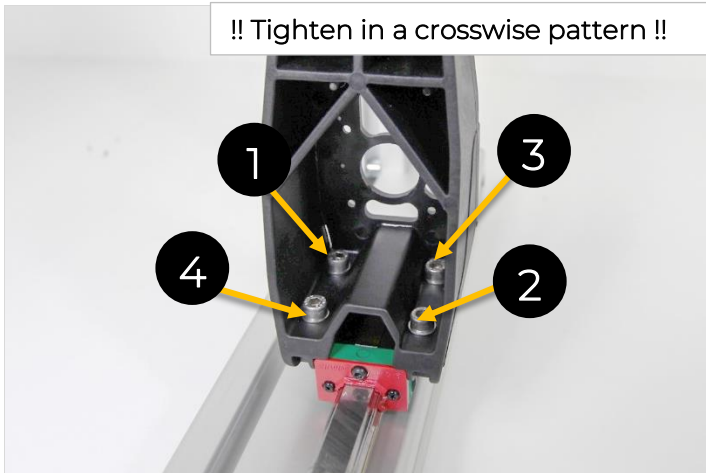
20 (2x) Bolt M4 x 40
(2x) Locknut M4




21 (4x) Bearing
(2x) Bolt M4 x 25
(2x) Small Washer M4

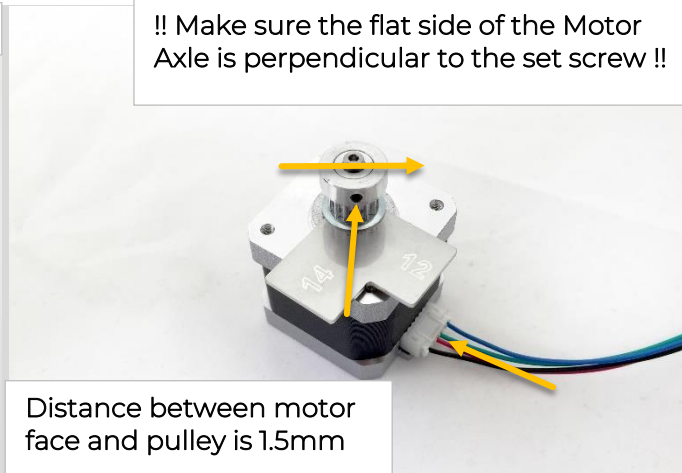


22




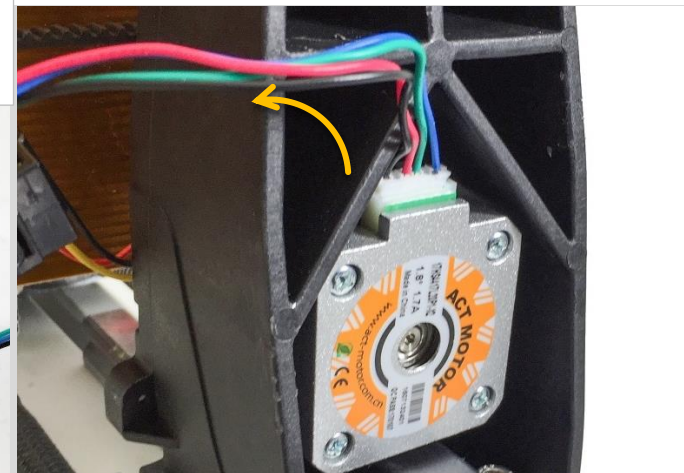
23 (1x) Z-Axis Lift Assembly
(4x) Bolt M5 x 16
(4x) Small Washer M5

Tools:  4

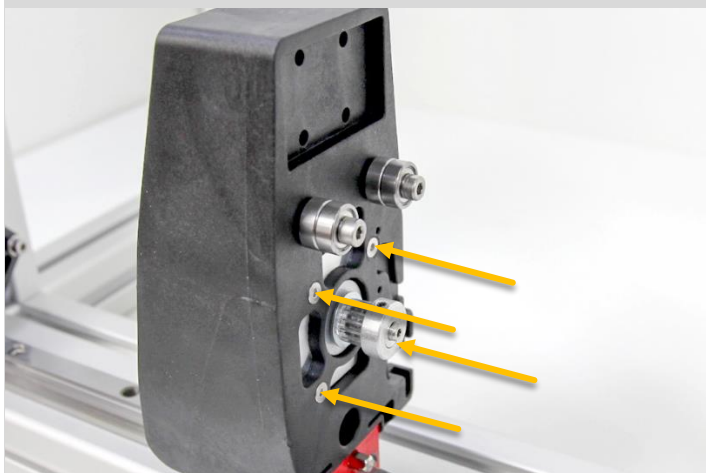


24 (1x) Motor
(1x) Pulley
(1x) Set Screw M3 x 6
(1x) Cable Stepper Y


Tools:  1.5

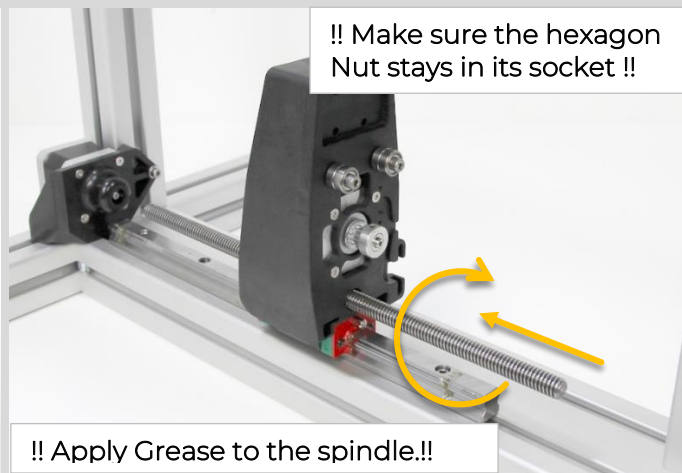


25 (1x) Cable Stepper Y



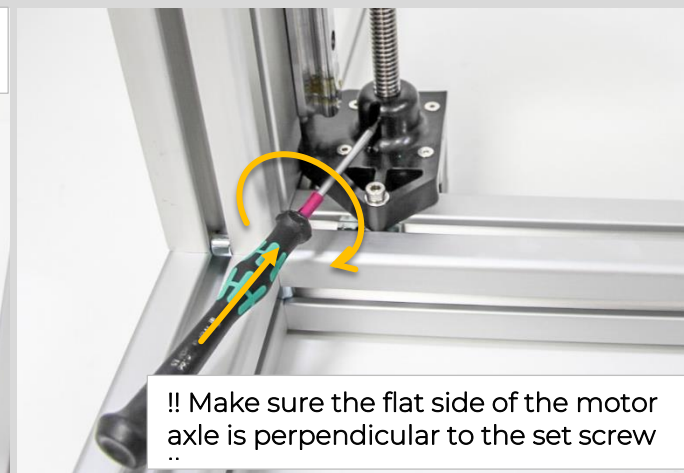
26 (1x) Motor
(4x) CSK Bolt M3 x 8

Tools:  2




27 (1x) Spindle

Tools: 



28 (1x) Set screw M3 x 6

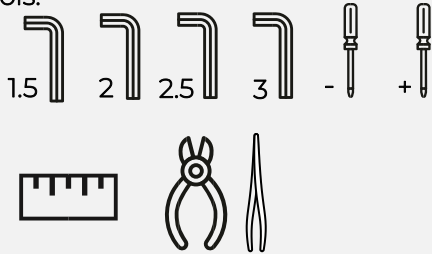
Note: use a high quality and sharp 1.5mm allen key to properly fix the spindle of the motor

Tools:  1.5

6 X-axis

60 minutes

Tools:



29 (1x) T-Nut M4

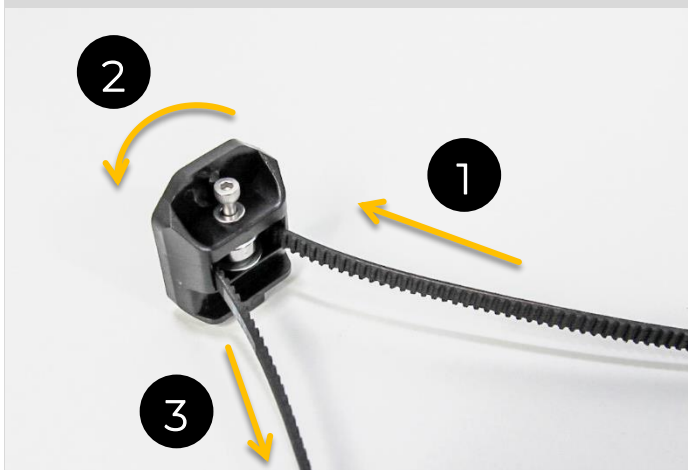
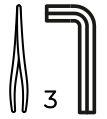
Tools



30

(2x) Bearing
(1x) Small Washer M4
(1x) X-axis Belt mount
(1x) Bolt M4 x 40

Tools



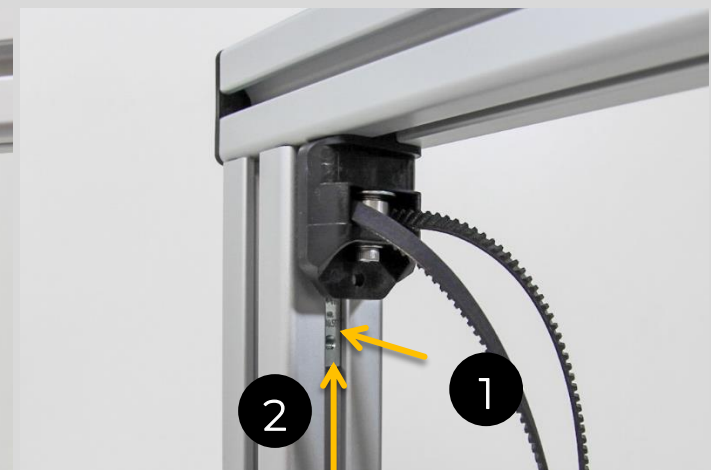
31

(1x) Belt



32 (1x) X-axis belt mount assembly

Tools




33

(1x) T-Nut M4


Tools

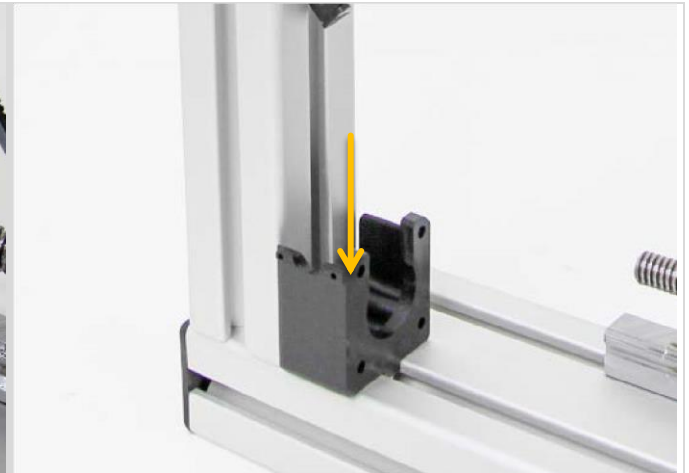




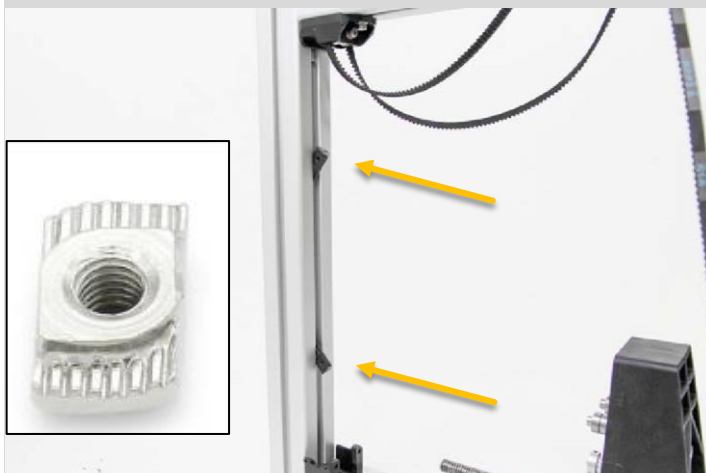
34 (1x) Bolt M4 x 16
(1x) Small Washer M4
Tools:  3




35 (1x) T-Nut M4
Tools:  2



36 (1x) Bolt M4 x 16
(1x) Small Washer M4
(1x) X-axis Motor Bracket




37 (2x) T-hammer nut M3
Tools:  2



38 (1x) Linear Guide MGN 12
!! Reposition the safety plugs as shown!!



39 (2x) Bolt M3 x 12
(1x) Linear Guide MGN12
Tools:  2.5
!! Distance between edge of rail and beam = 14mm!!

!! Make sure to position the Rail against X-axis belt mount!!



40

Tools:



2.5

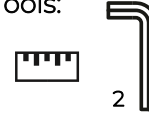


Distance between motor face and pulley is 1.5mm

41

- (1x) Motor
- (1x) Pulley
- (1x) Set screw M3 x 6

Tools:



2



42

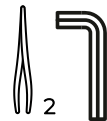
- (1x) Cable Stepper X



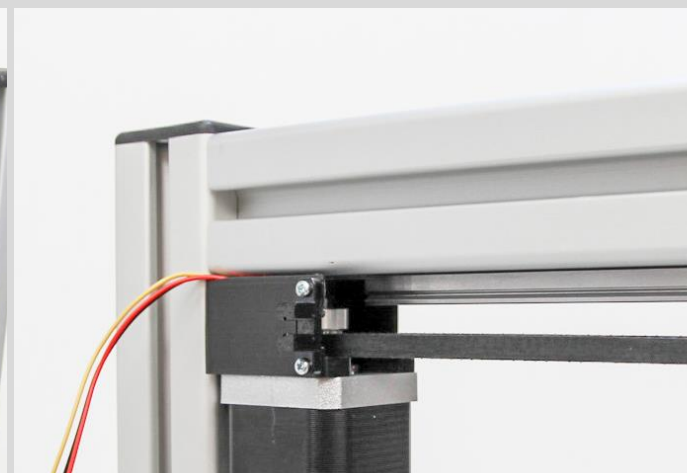
43

- (1x) Motor Assembly
- (4x) CSK Bolt M3 x 8

Tools:



2



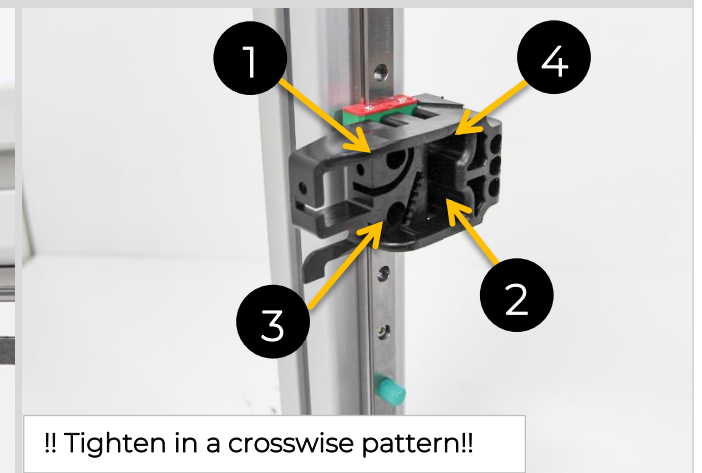
44

- (2x) Small Screw 2.2 x 8
- (1x) Opto Sensor X

Tools:



+



!! Tighten in a crosswise pattern!!

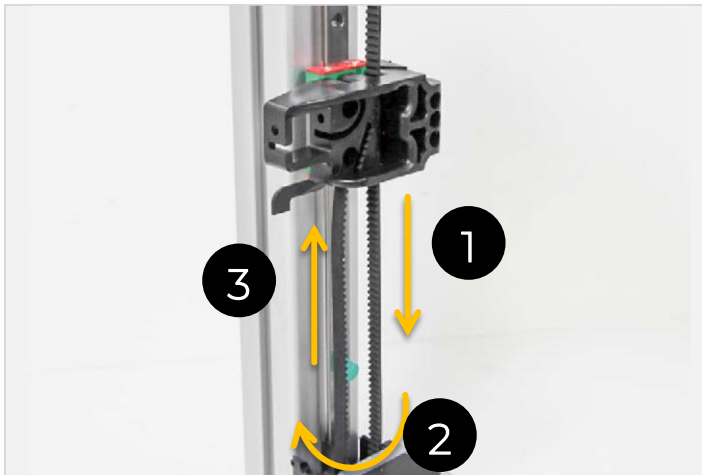
45

- (4x) CSK M3 x 6
- (1x) Extruder Base

Tools:



2

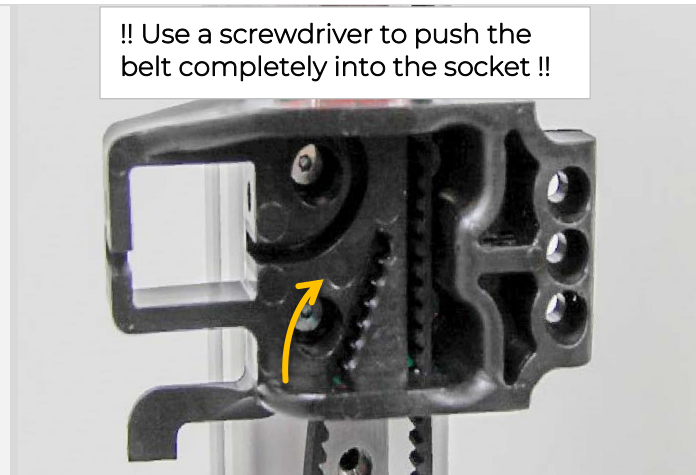


46

Tools

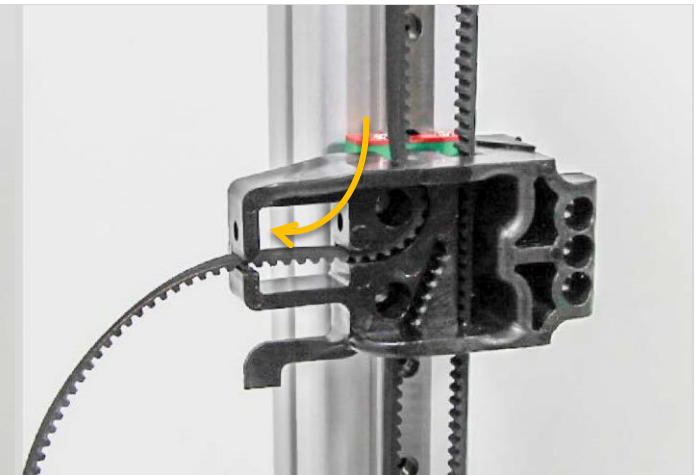


2.5



47

Tools:



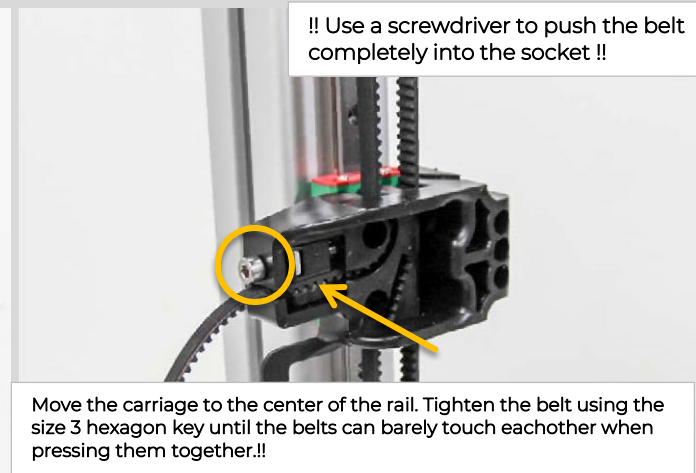
48



49

(1x) Tension bracket
(1x) Square nut M4

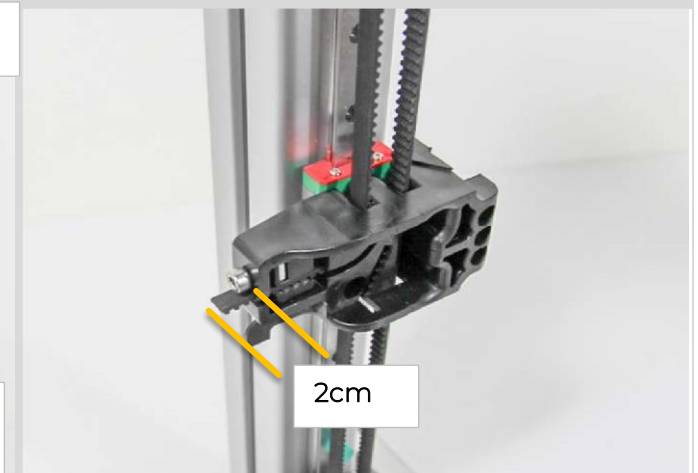
Tools:



50

(1x) Tension bracket assembly
(1x) Bolt M4 x 25

Tools:



51

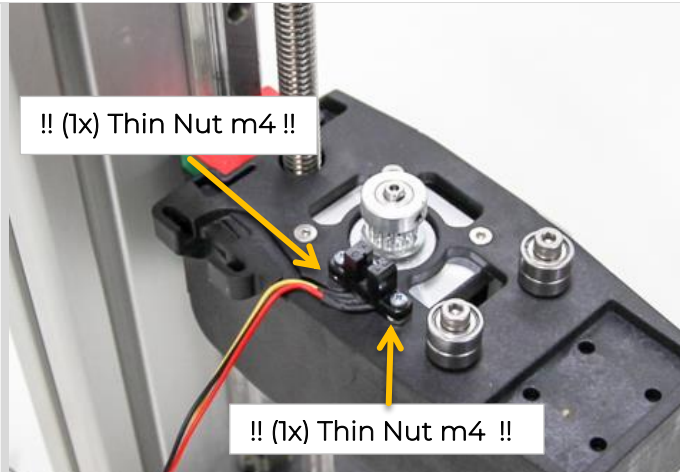
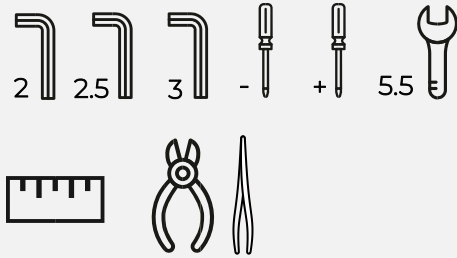
Tools:



7 Y-axis

30 minutes

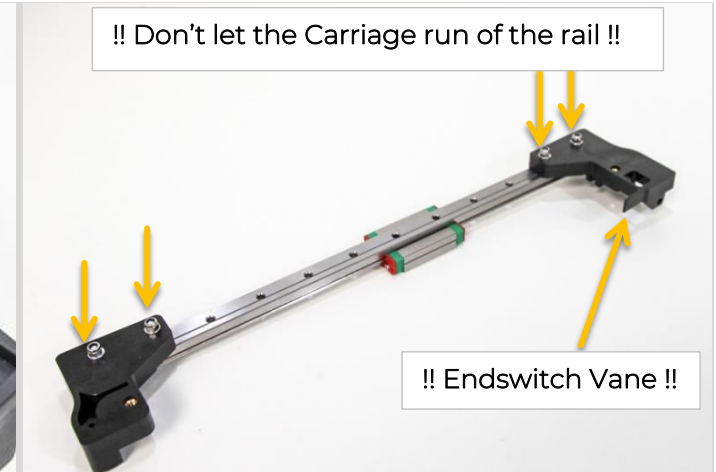
Tools:



52

- (2x) Small Screw 2.2 x 8
- (2x) Thin Nut M4
- (1x) Opto Sensor Y

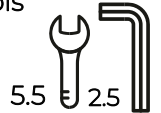
Tools



53

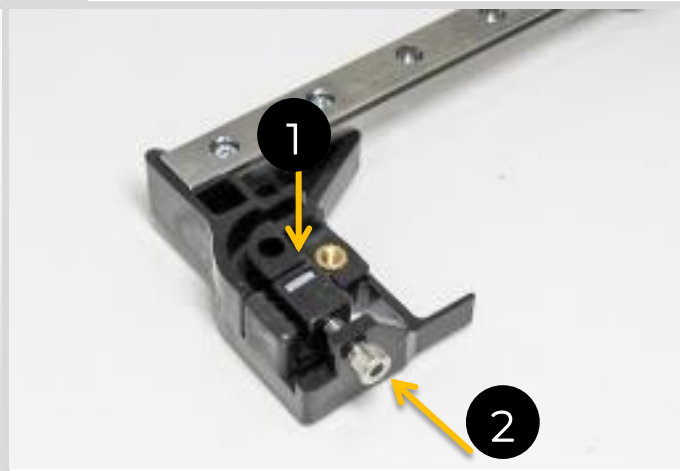
- (4x) Bolt M3 X 16
- (4x) Locknut M3
- (4x) Small washer M3
- (1x) Y-stage bracket Pt.1
- (1x) Y-stage bracket Pt.2
- (1x) Linear Guide MGN12

Tools



54

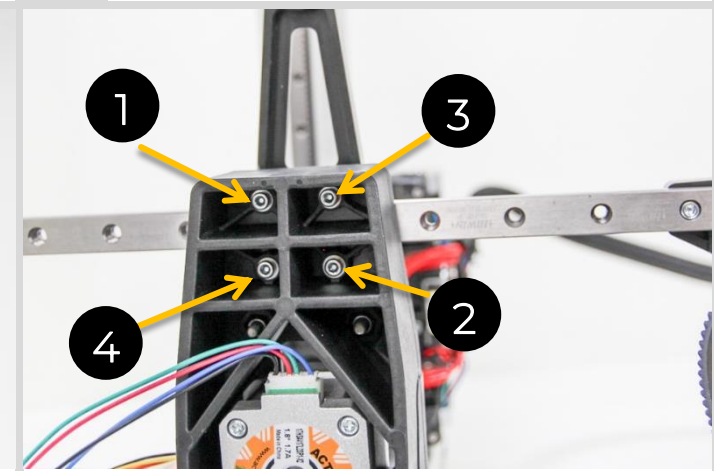
- (2x) Bolt M3 x 12
- (1x) Y-Stage bracket



55

- (1x) Tension Bracket
- (1x) Bolt M4 x 25
- (1x) Square Nut M4

Tools



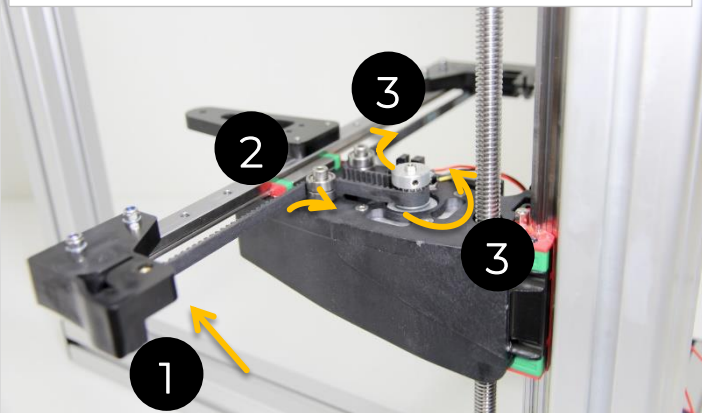
56

- (4x) Bolt M3 x 16
- (4x) Small Washer M3
- (1x) Y-stage Assembly

Tools



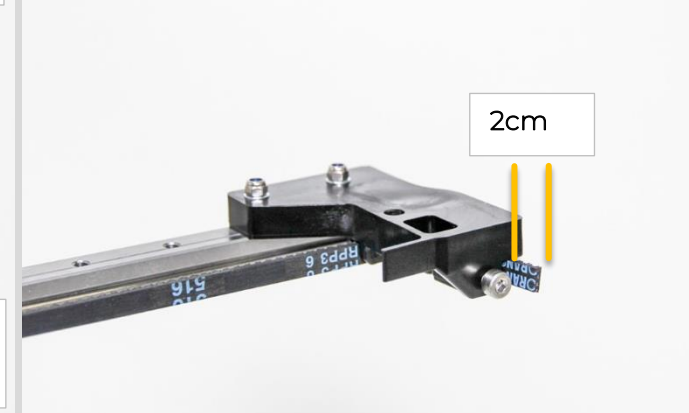
!! Use the screwdriver to push the belt completely into the socket !!



!! Use the screwdriver to push the belt completely into the socket !!



Tensioning the belt:
Move the y-axis completely to one end. Tighten the belt using the size 3 hexagon key until the belt can barely touch the rail of the y-axis.



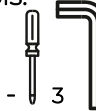
57 (1x Belt

Tools:



58

Tools:



59

Tools:



60 (1x) Build Platform
(1x) Short wire sleeve

Tools:

61 (2x) Knurled thumb screw
(2x) Set screw m4 x 30
(2x) Thin nut M4

Tools:





62 Fix the set screw into the thumb screw. Put m4 thin nut onto the set screw.

Tools:






63 Lock the set screw by fixing the nut onto the thumb screw. While fixing the nut keep set screw in place with allen key.

Tools:  




64 (2x) Thumb screw
(2x) Spring
(1x) Build platform assembly

Tools: 




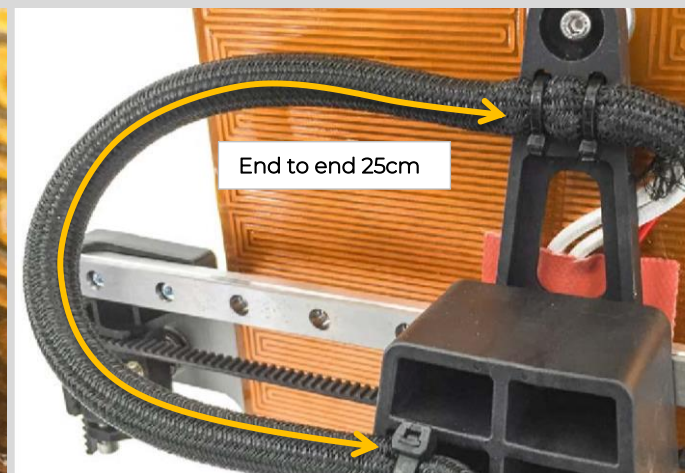
65 (2x) Cable tie

Tools: 





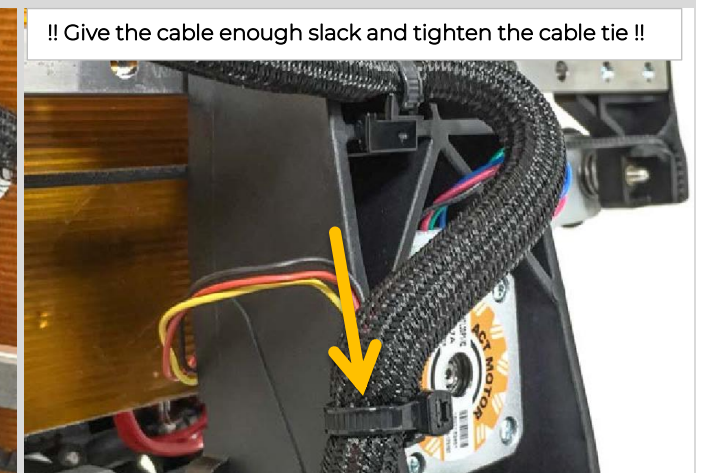
66 (1x) Bolt M4 x 12
(1x) Spring

Tools: 




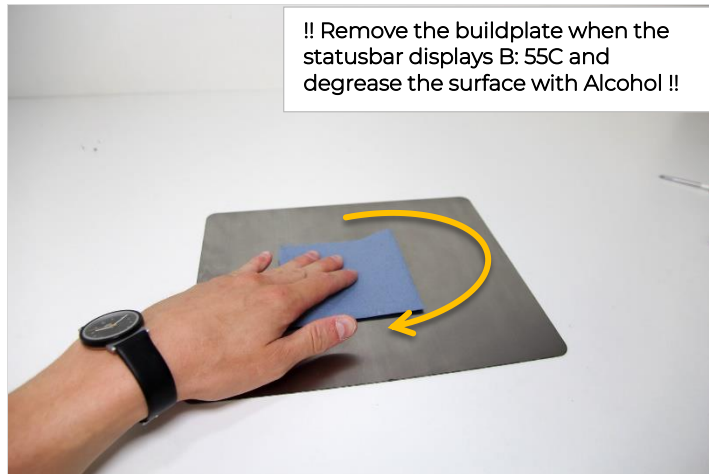
67 (1x) Cable ties for mounting cables on z bracket.

Tools:  



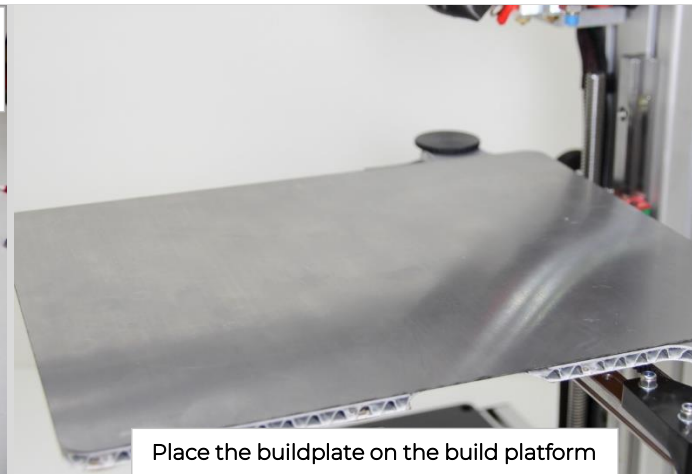
68 (1x) Cable ties for mounting cables on z-bracket.

Tools: 



69 (1x) Flexible buildplate
Clean thoroughly to remove any grease of the plate

Tools:

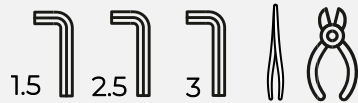



70 (1x) Flexible build plate
Place the buildplate on the build platform

8 Print Head

90 minutes

Tools:



For dual head: repeat this step



For dual head: repeat this step



- 71** (2x) Large washer M4
(1x) Bolt M4 x 12
(1x) Thin Nut M4
(1x) Spring

Tools



- 72** (1x) Extruder Arm Pt 1
(1x) Bearing

For dual head: repeat this step



For dual head: repeat this step



Make sure the flat side of the Motor Axle is Perpendicular to the Set Screw

- 74** (1x) Motor
(1x) Extruder drive wheel

Tools



This step is mainly to determine initial distance of extruder drive wheel

2X



- 73** (1x) Extruder Arm Pt 2

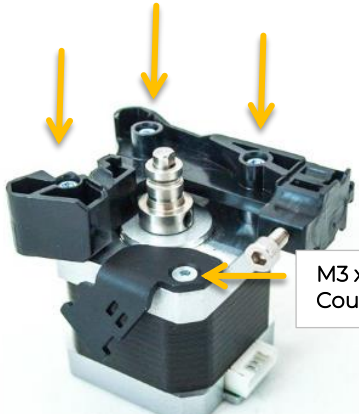
- 75** (1x) L-Bracket
(1x) Square nut m4

76 **2x**



(1x) Bolt M4 x 20
Bolt is used to keep square nut in place during assembly

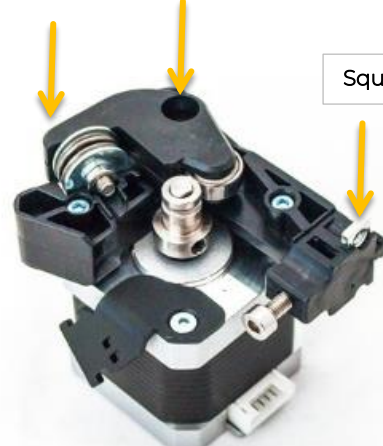
77



(1x) Motor
(3x) Bolt m3 x 16
(1x) L-bracket assembly
(1x) bracket
(1x) Bolt M3 x 6 Countersunk

Tools:
2 2.5


78



(1x) Square Nut M4
(1x) Extruder arm assembly
(1x) Spring assembly

Tools:

79



(1x) L-bracket

Tools:

For Single head assembly continue on next page

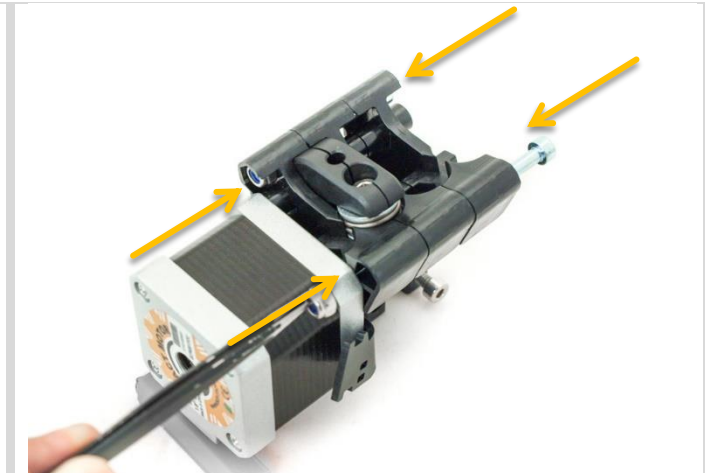
For Dual head assembly continue to next sub chapter

8.1 For single head assembly




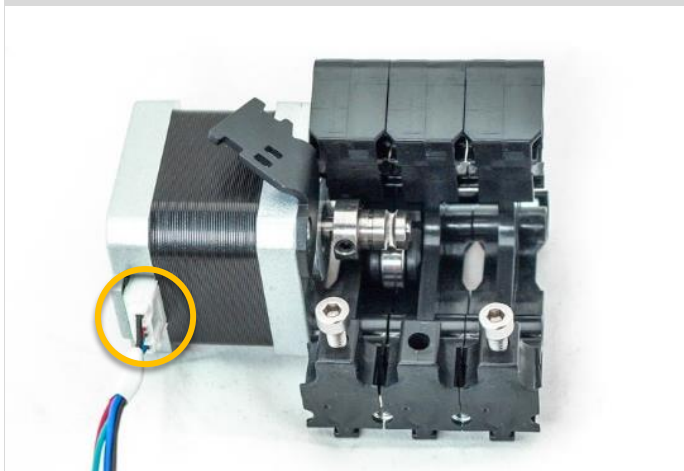
80 (1x) Plastic part
Slide part onto the assembly.
Make sure the square nut is placed correctly.

Tools

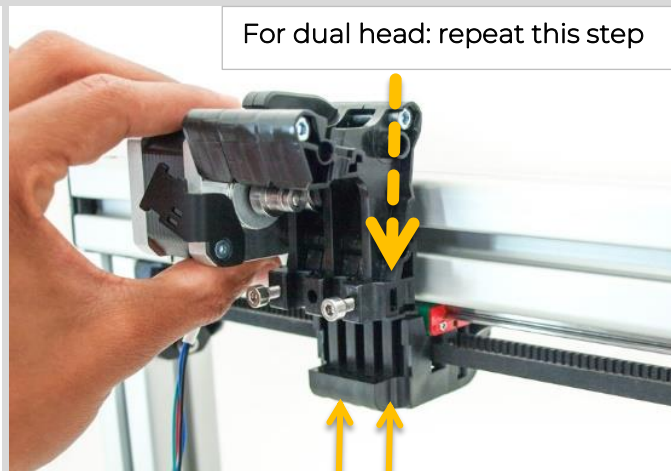


81 (2x) Bolt M4 x 40 1
(2x) Locknut M4

Tools:  3

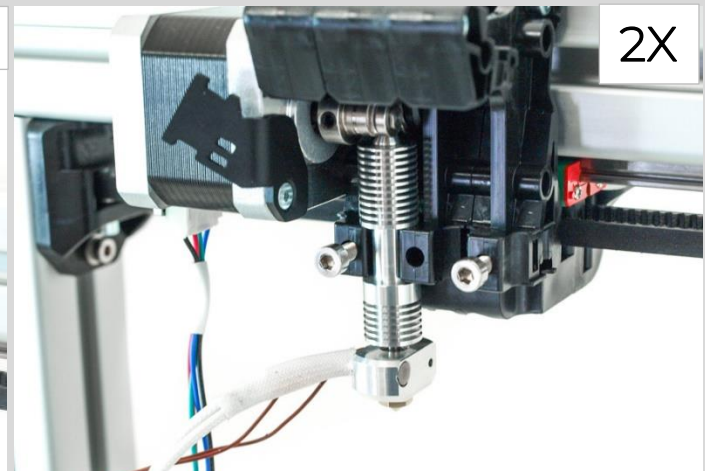


82 (1x) Cable stepper E1
Connect cable to stepper motor



For dual head: repeat this step

83 Slide extruder assembly onto X carriage.
(2x) M4 x 12 bolts



84 (1x) Left Hot-end
Place hot-end in the left socket.

8.2 For Dual head assembly

Skip to next section in case of single head printer



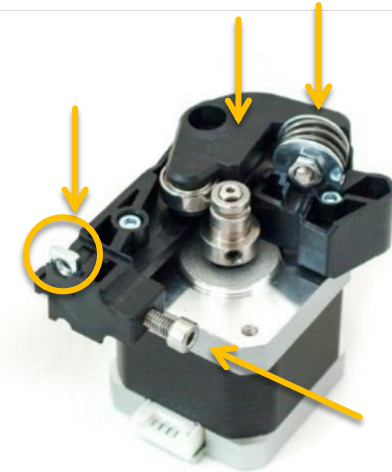
85

- (3x) Bolt M3 x 16
- (1x) L-bracket Assembly
- (1x) Motor

Tools

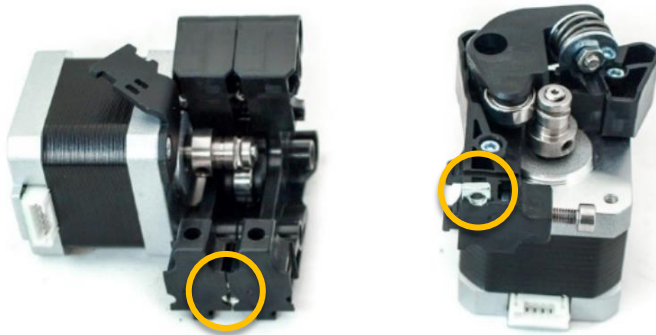


2.5



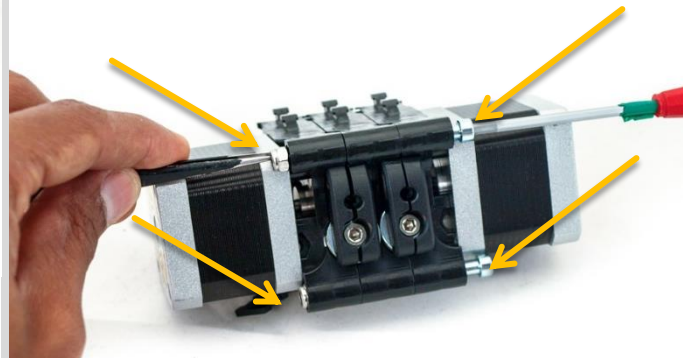
86

- (1x) Square Nut M4
- (1x) Bolt M4 x 20
- (1x) Extruder Arm Assembly
- (1x) Spring assembly



87

Make sure the square nuts are in place.



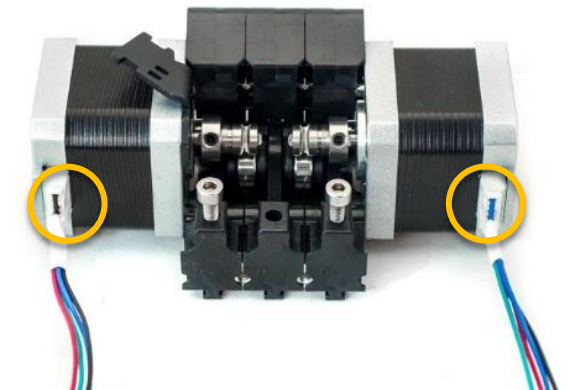
88

- (2x) Bolt M4 x 40
- (2x) Locknut M4
- (1x) Left Extruder
- (1x) Right Extruder

Tools:

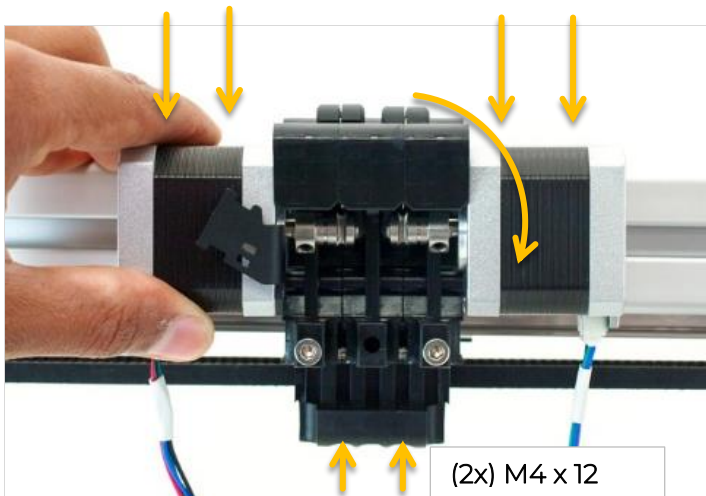


3



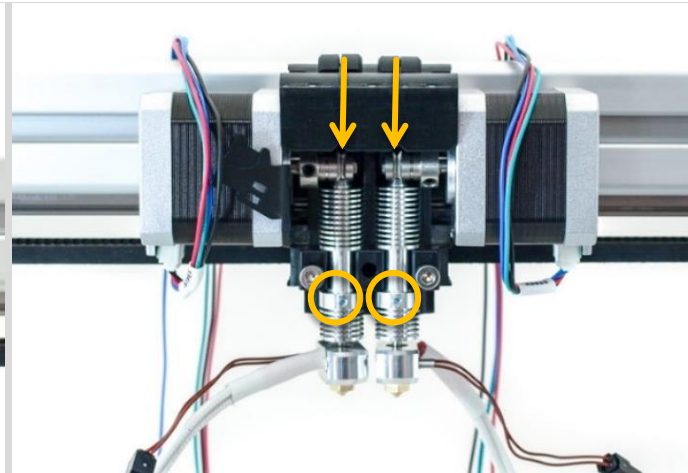
89

Connect motor cables.
NOTE: make sure to label each cable.
(Write with a marker on connectors)
Left:0 Right:1



90

Slide extruder assembly onto x-carriage.
(2x) M4 x 12 Bolts



91

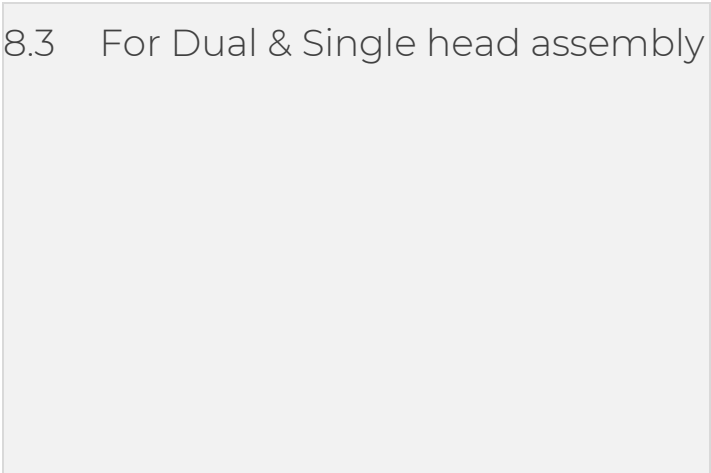
Place hot-ends in the sockets. If possible: make sure the set screws of the hot-ends are facing towards you. This will help to make maintenance easier.

Also make sure to check the orientation of the cables.

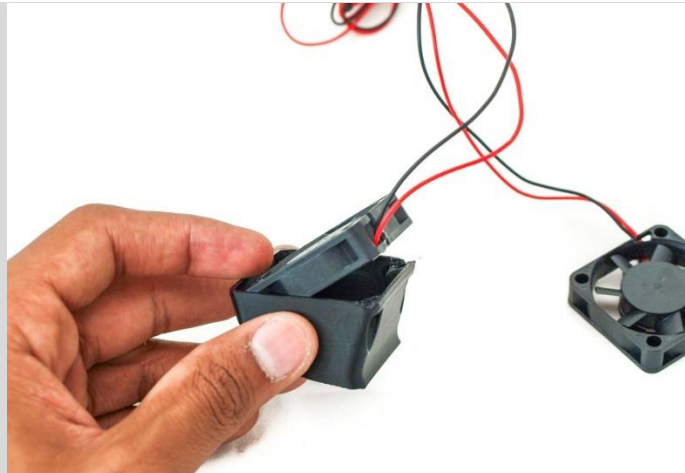
This is where single / dual come together. Continue with next step

8.3 For Dual & Single head assembly

92

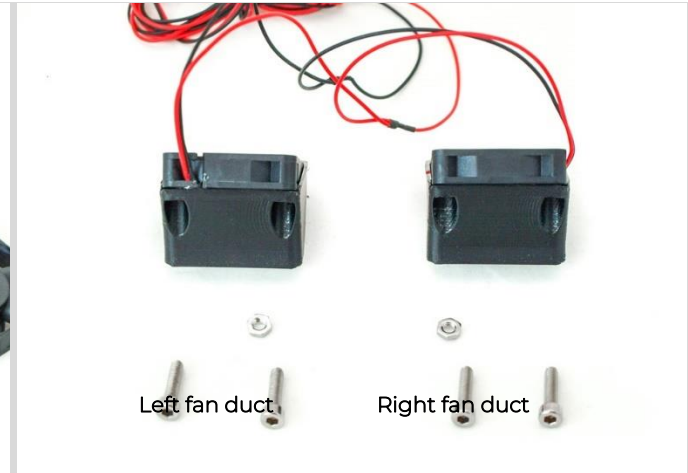


93



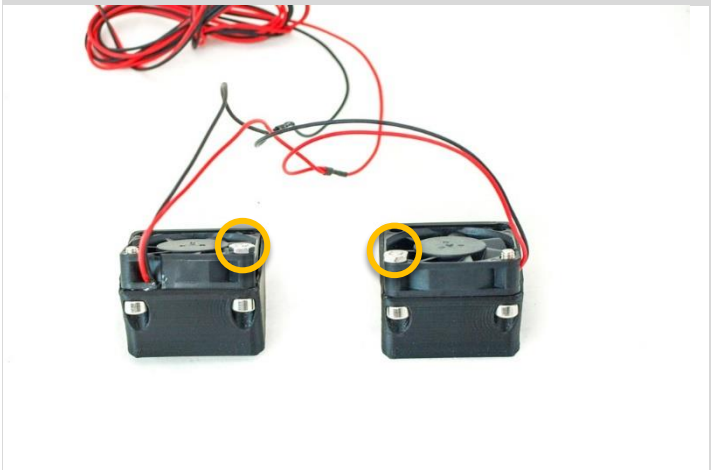
(2x) Slide dual fan into fan duct :
NOTE: Sticker on fan should face inwards

94



Parts Needed for fan duct assembly:
(4x) M4 x 16 bolts
(2x) M4 thin nuts

95



(2x) assemble fan ducts
Make sure nut is on the correct bolt and check the orientation of the cables.



96



(1x) M3 x 20 bolt
(1x) Lock nut M3
(1x) Mover
(1x) Main extruder bracket

Tools:



97



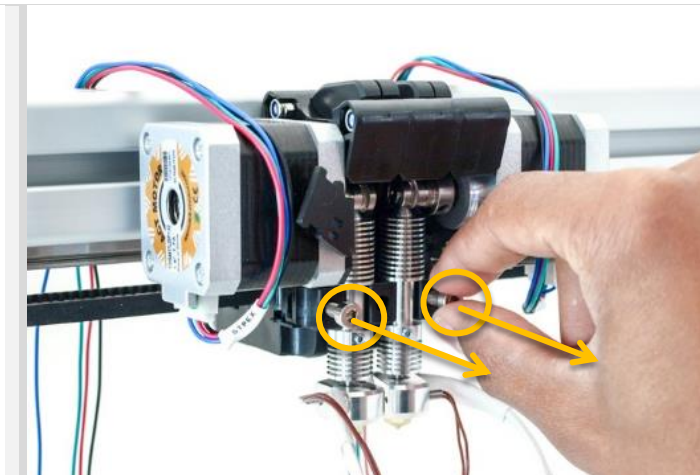
Overview of the assembly



98

Mount both fan duct assemblies to bracket.

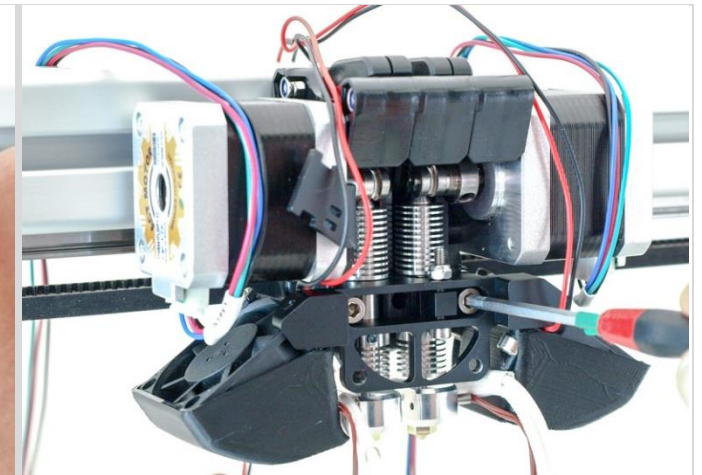
Note: Double check wire orientation



99

Take out M4 x 20 bolts

Tools:



100

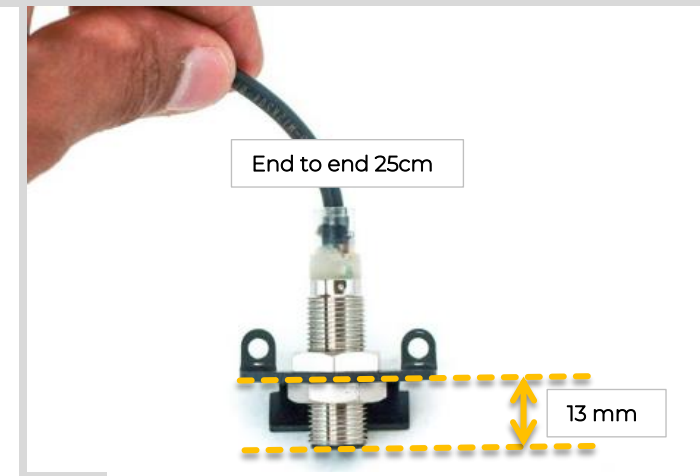
Place bracket and connect with the M4 x 20 bolts removed in previous step.

Tools:



101

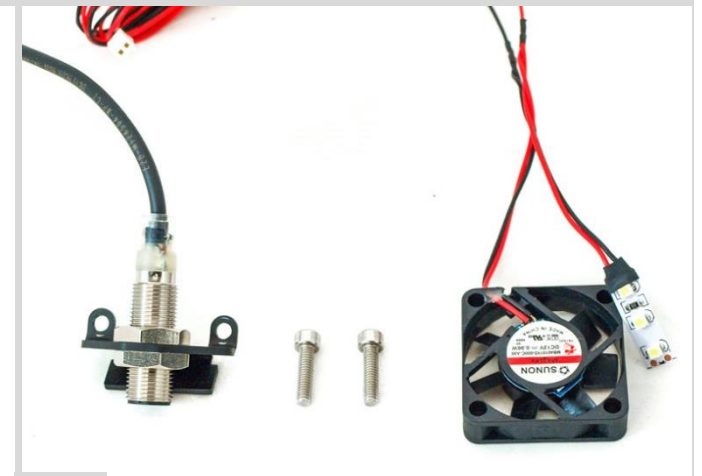
(1x) Z-sensor
(1x) Z-sensor bracket
(1x) Z-sensor mounting nuts.



102

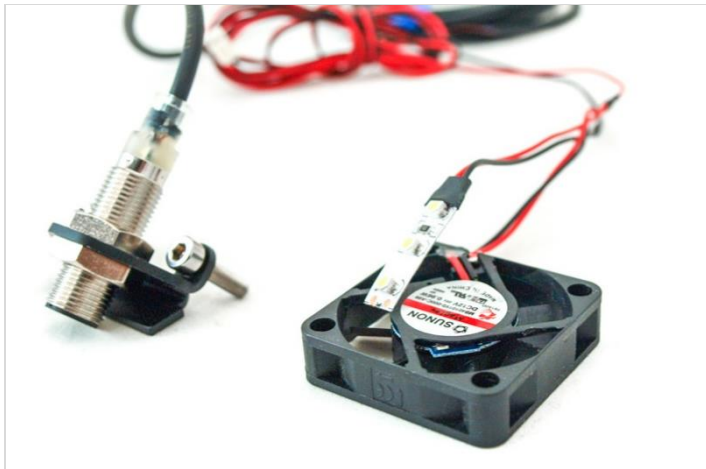
Assemble z-sensor as above
Make sure distance as shown above is achieved

Tools:



103

(1x) Z-sensor assembly
(2x) M4 x 16 bolts
(1x) Fan + LED



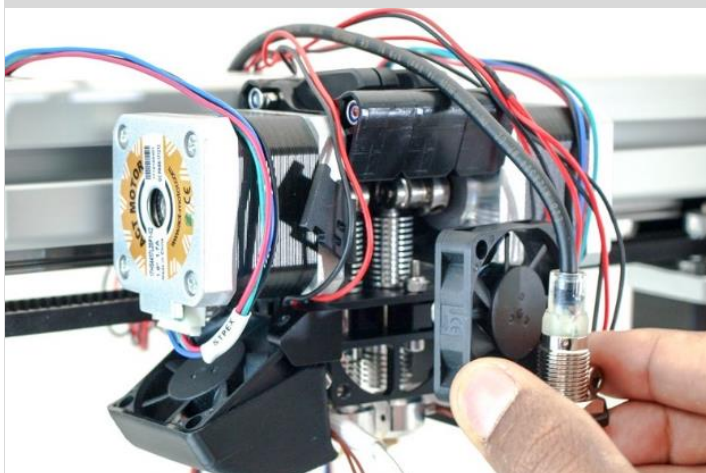
104 Place bolts in sockets of the Z-sensor assembly



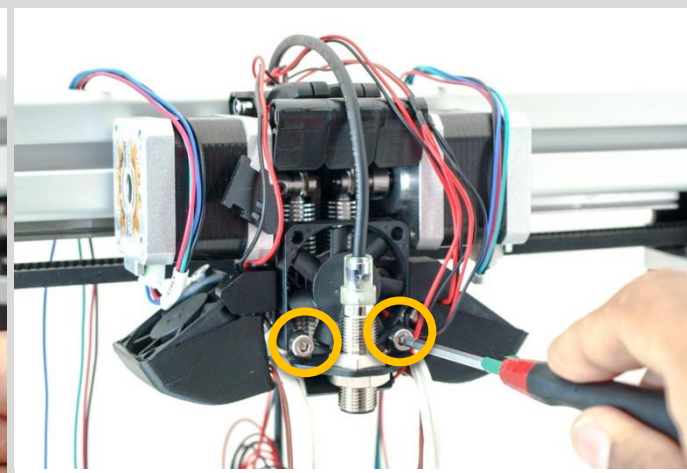
105 Place fan as shown in the image. NOTE the orientation of the fan and als the position of the cable



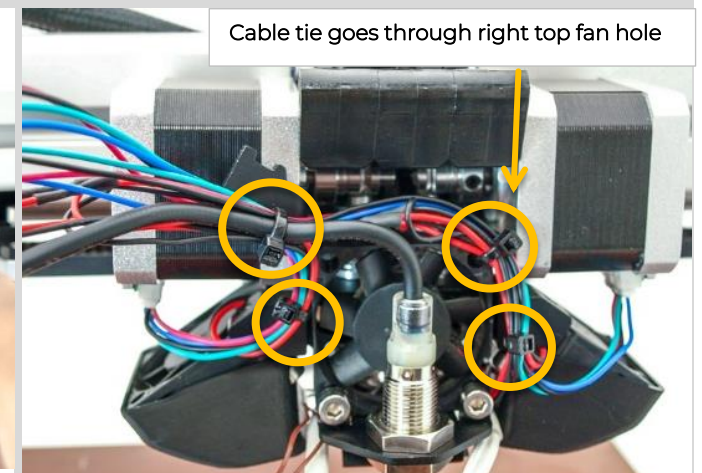
106 Remove adhesive backing of the LED strip. Place LED-strip onto the bracket.




107 Place Fan & Z-sensor assembly onto extruder.

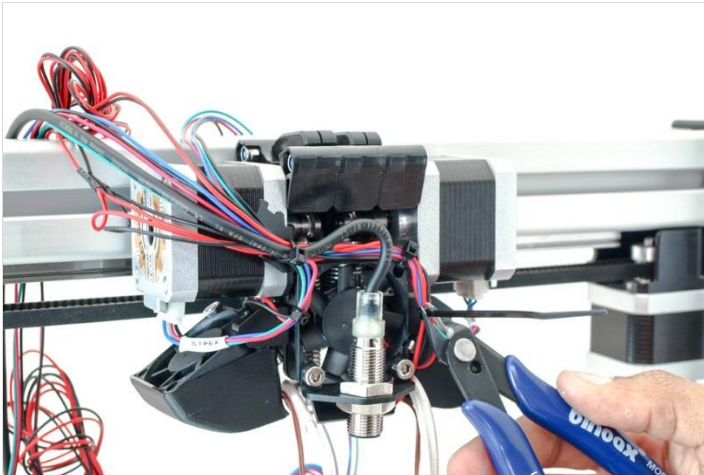


108 Tighten the M4 x 16 bolts



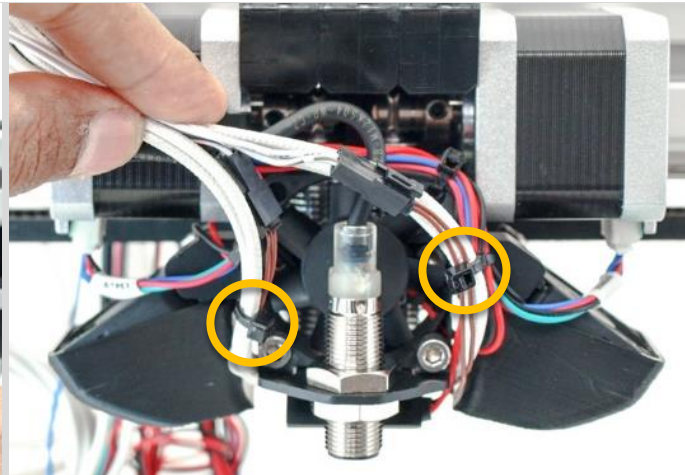
109 Place (4x) cable ties on the places shown in the image. NOTE: Only fan + Motor cables are bundled

Tools:

 3

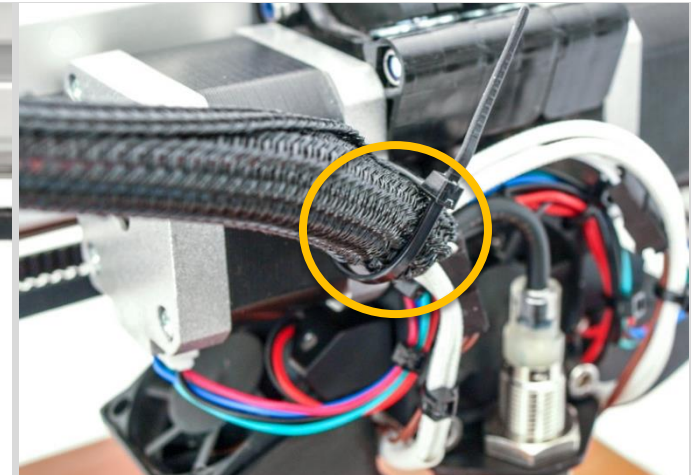


110 Cut off tie-wrap ends

Tools:

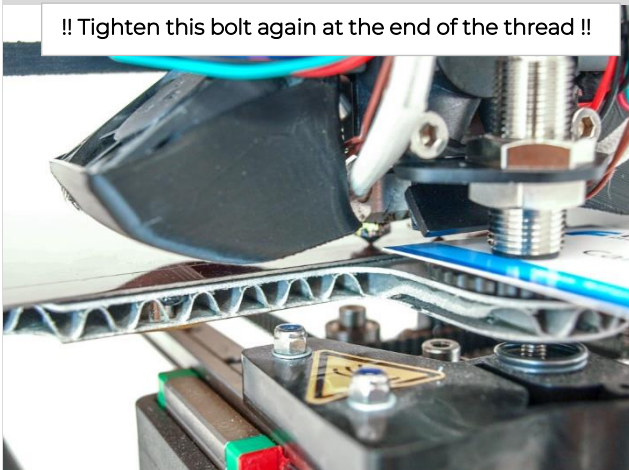


111 Bundle heater + Thermistor with cable ties.
Note: Do NOT bundle them with the other cables for easier maintenance in the future maintenance

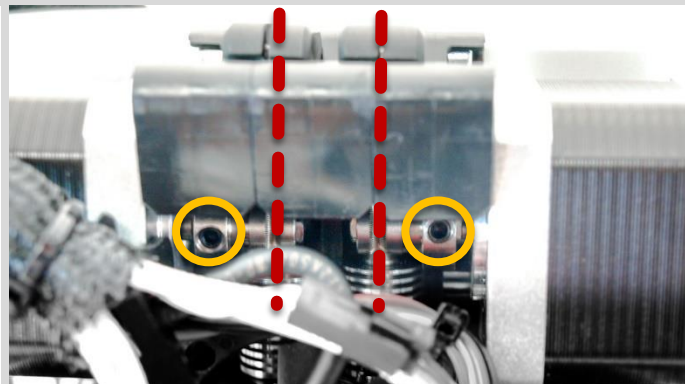


112 Place sleeve and tighten with cable tie to the bracket.
Cut off end of cable tie.

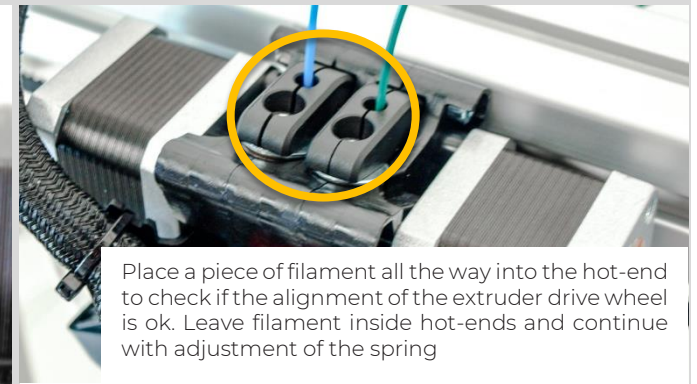
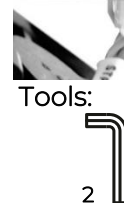
Tools:



113 Move z-sensor right above front adjustment wheel
Between one or two calibration cards should fit between sensor and wheel while the nozzles touch the plate



114 (Do a visual inspection and make sure the extruder drivewheel is aligned with the hot-end)
If not: Loosen extruder drive wheel



Place a piece of filament all the way into the hot-end to check if the alignment of the extruder drive wheel is ok. Leave filament inside hot-ends and continue with adjustment of the spring

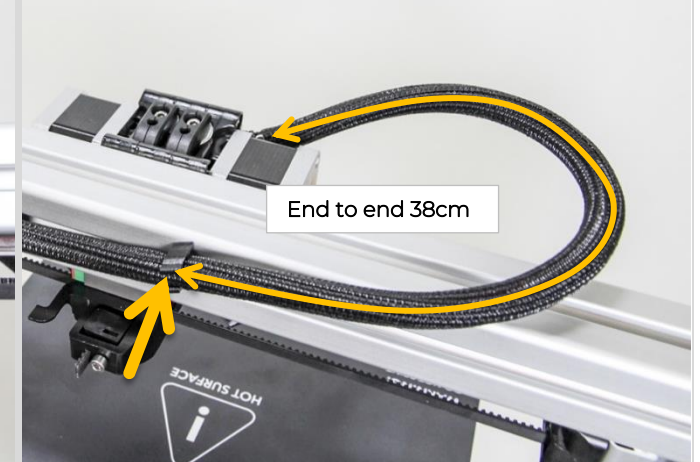
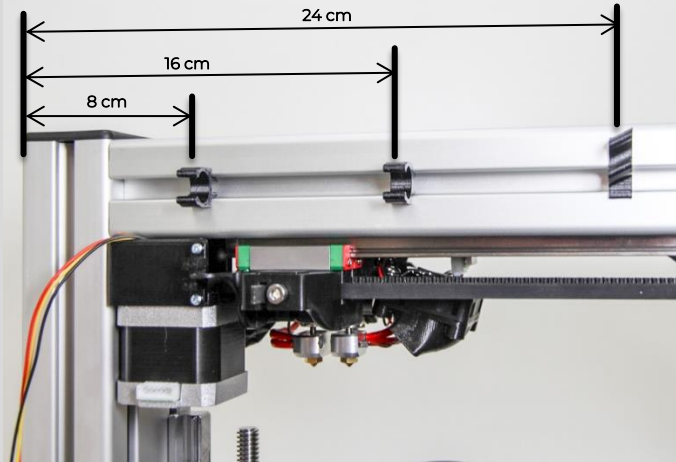
Adjust spring as follow:
1. completely tighten bolt(s)
2. Loosen bolt(s) until you feel the pressure on the bolt is reducing.

115 Explanation of extruder arm mechanism
Clockwise: reduce pressure on filament.
Counter clockwise: increase pressure on filament

9 Wiring

60 minutes

Tools:



116

117

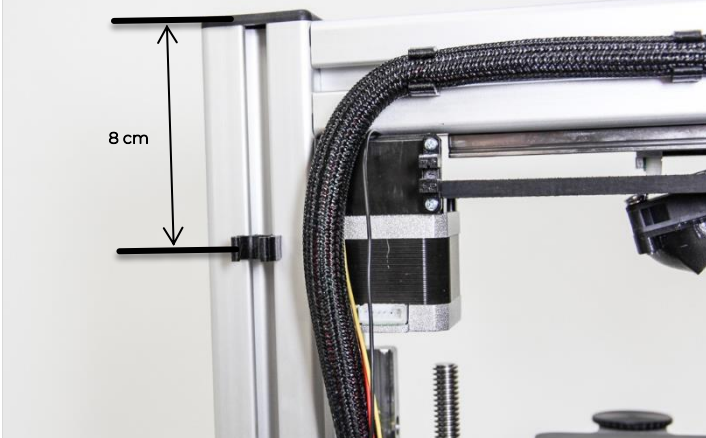
(2x) Single cable clip
(1x) Angled cable clip

Tools:

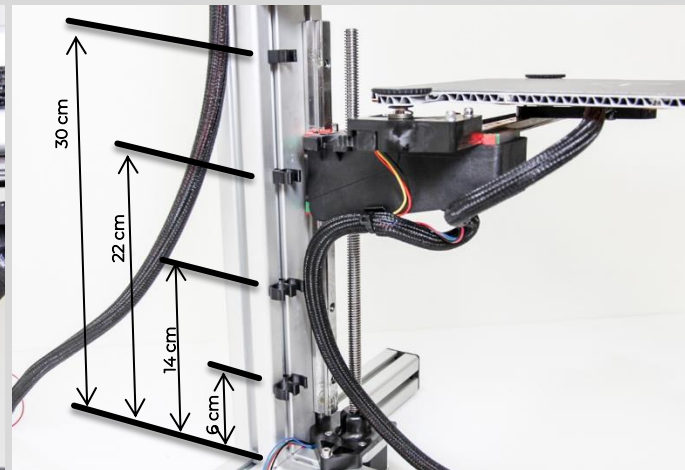


118

Tools:



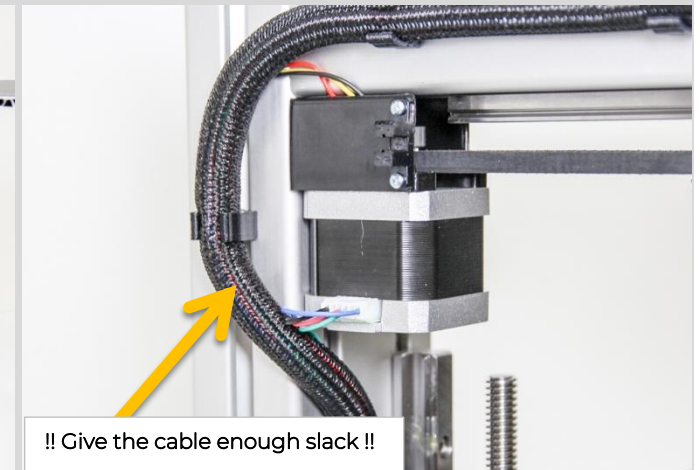
119



120

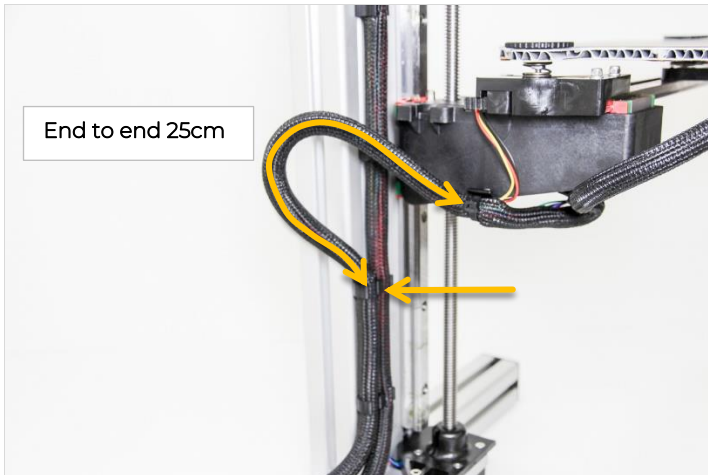
(2x) Single cable clip
(2x) Dual cable clip

Tools:

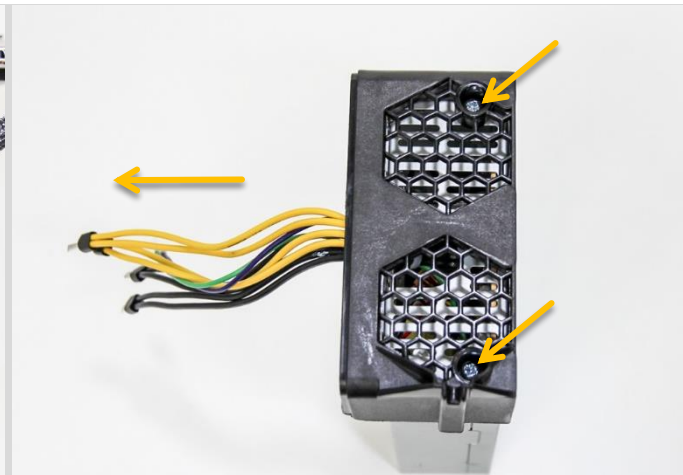


121

Tools:



122



123

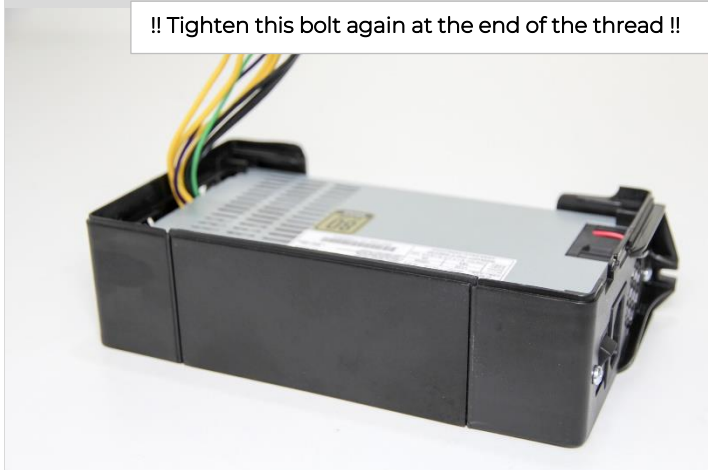
- (2x) Power supply screw
- (1x) Power supply
- (1x) Electronic enclosure pt 2

Tools:



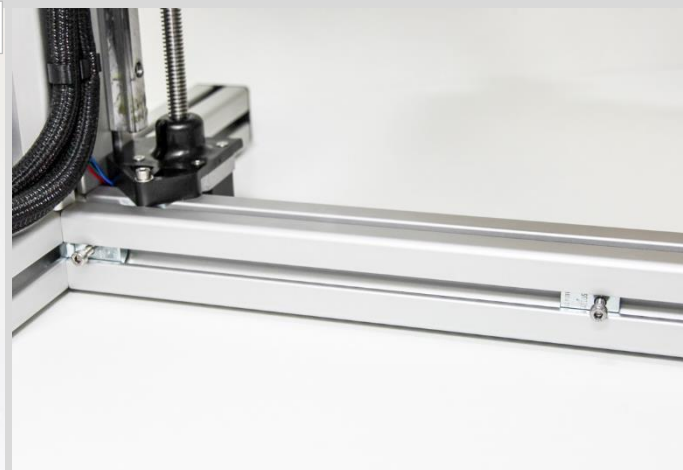
124

- ((2x) Power supply screw
- (1x) Electronic enclosure pt 1



125

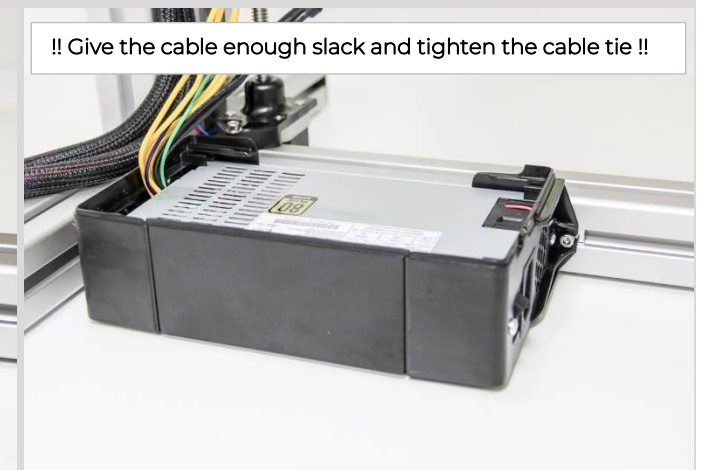
- (1x) Electronic enclosure
- Cover plate



126

- (2x) T-nut m4
- (2x) Bolt M4 x 12

Tools:



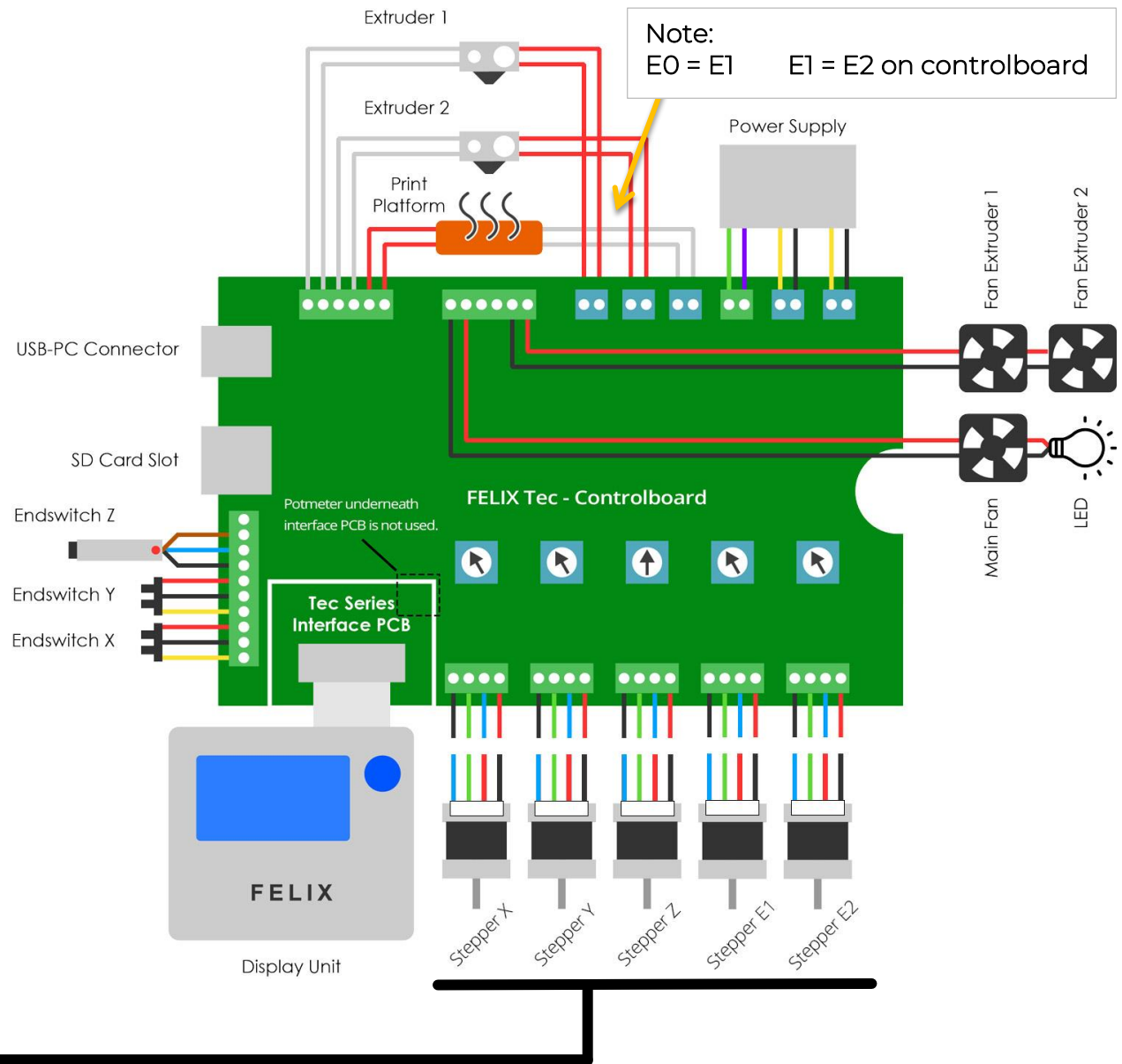
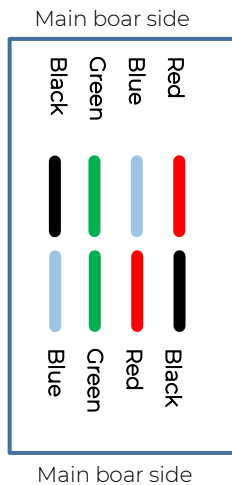
127

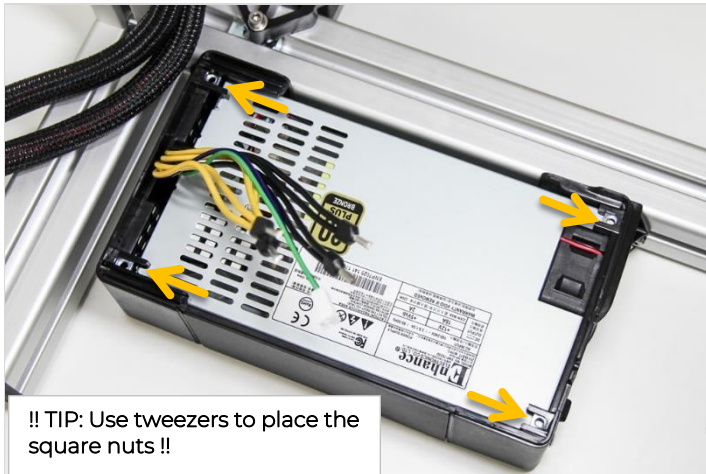
- (1x) Electronic enclosure assembly

Overview: Control board

Important:

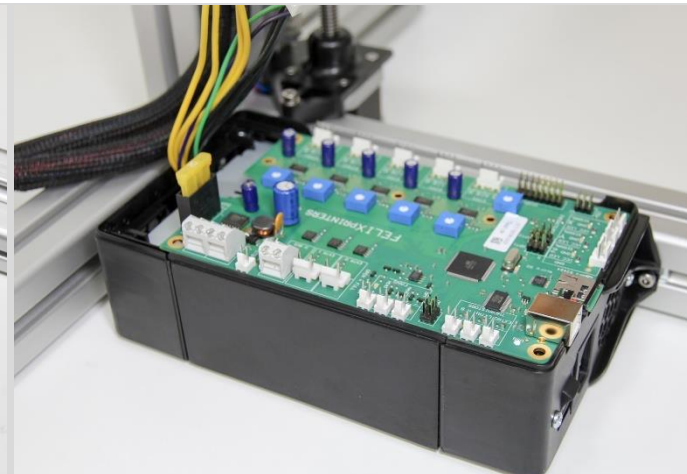
1. Set the Blue Potentiometers to the correct value as shown in the overview.
2. Tighten the screw terminals with force to ensure a good connection.
3. Make sure the Control board is positioned correctly, so that the underside doesn't touch the power supply.



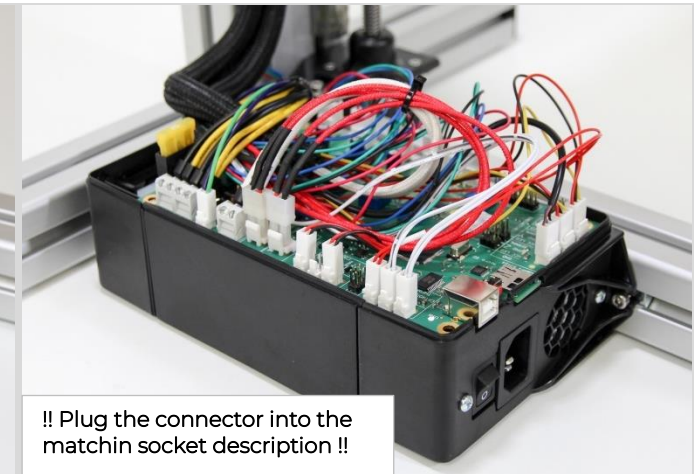


!! TIP: Use tweezers to place the square nuts !!

128 (4x) Square Nut M4

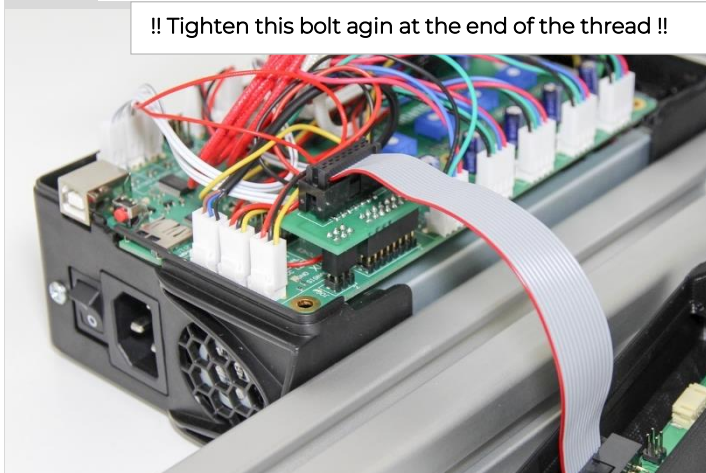


129 (1x) Control Board



!! Plug the connector into the matchin socket description !!

130 End X = Endswitch X (opto sensor)
End Y = Endswitch Y (opto sensor)
Z sensor cable has no label



!! Tighten this bolt agin at the end of the thread !!

131 (1x) Display interface PCB
(1x) Display Assembly



!! Connect the display to the frame !!

132

10 Upload Firmware

Download the Firmware:

Download the latest FELIX Tec 4 firmware version from:

<https://www.felixprinters.com/downloads>

Upload the Firmware to the Control Board:

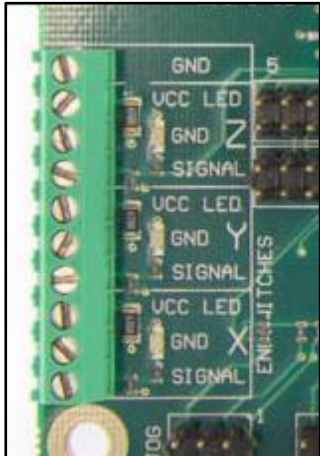
1. Unzip the downloaded file to a convenient location.
(Note: if you click on the zip file from within the Windows explorer, it will NOT be unzipped. You just view the content of the zip. You need to select the files and drag them to the desired location.)
2. Connect your printer to your computer and turn it on. Do not make a connection at this time with the printer with programs like Repetier-Host or Simplify3D.
3. Start the batch file "upload_automatic.bat". A script will start in a command window.
4. The script will try to detect what COM port your printer is using. Check if this is correct, and then proceed by entering 'Y' in the command window.
5. The firmware is uploaded when "Programming finished!" is displayed, this may take a few minutes.
6. Press any key to continue. The FELIX TEC 4 firmware is now successfully uploaded.

Note for Experienced Users: Due to compatibility issues with linux based systems, the baudrate for all felixprinters are lowered to 115200. In case you are used to older FELIXprinter models, make sure to adjust the settings in the used software accordingly.

11 Functional Test

In order to make sure all motors, sensors and LCD panel are connected properly, the following tests need to be performed

Check Sensor Connections:



Main board Tec 4

Z-sensor

The z-sensor can be tested by holding a metal object underneath the sensor. Check if the z-sensor LED turns off. When the z-sensor indication LED on the main board switches off, the sensor is activated.

Y-sensor

Manually move the bed to its end position to activate the y-sensor. Check if the y-sensor LED turns off. When the y-sensor indication LED on the main board switches off, the sensor is activated.

X-sensor

Manually move the extruder to its end position to activate the x-sensor. Check if the x-sensor LED turns off. When the x-sensor indication LED on the main board switches off, the sensor is activated.

Check Heaters:

IMPORTANT: Keep hand near ON/OFF switch of printer, in case things go wrong.

Warm up left extruder (E1).

Note: The hot-ends might smell a bit the first time heating. This is because of a small amount of oil within certain parts.

Click rotary button to enter the main menu --> Control --> scroll down to heater --> Click on E1 and rotate until setpoint temperature increases to about 100 °C. Then check if temperature for that heater goes up.

Repeat these steps for the right extruder (E2) and for the Bed (55 °C)

Check Motor Cable Connections:

IMPORTANT: Keep hand near ON/OFF switch of printer, in case things go wrong.

X-axis motor

To make sure the wires are connected as required it is important to test all connections.

To do so for the x-axis: enter menu by pushing the rotary button --> Control --> Move --> Home X

Y-axis motor

To test the y-axis: enter menu by pushing the rotary button --> Control --> Move --> Home Y

Z-axis motor

NOTE: When doing home z, extruders heat up to 120° C to prevent possible filament blobs from scratching the Kapton surface layer.

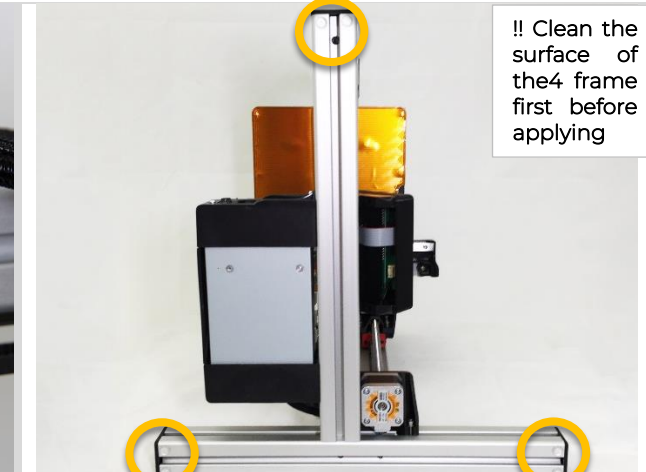
Important: ensure flex plate is placed on the print bed.

To test the z-axis: enter menu by pushing the rotary button --> Control --> Move --> Home Z

12 Finishing Touches

15 minutes

Tools:



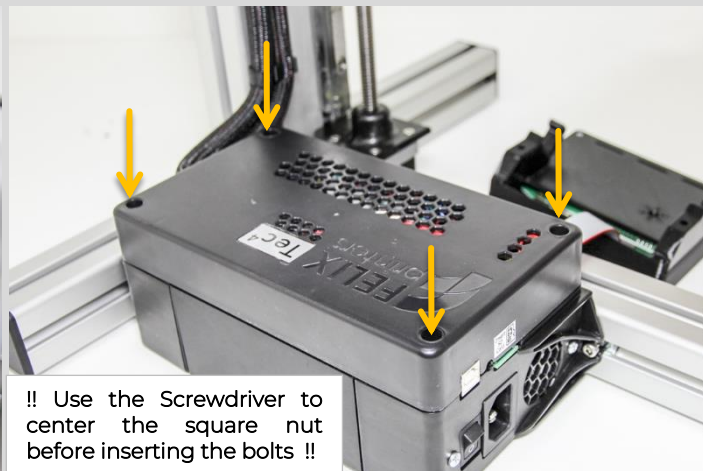
!! Clean the surface of the 4 frame first before applying

133

134 (1x) FELIX Tag

135 ((6x) Damping feet

Tools:



!! Use the Screwdriver to center the square nut before inserting the bolts !!

136 (1x) Main Fan Cover

137 (4x) M4 x 12
(1x) Electronic Enclosure Cover

Tools:

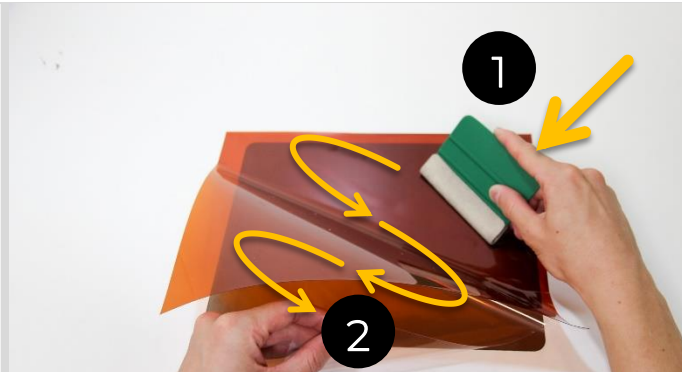
+ 3

138

Tools:

Connect the fan cover onto the extruder unit

Preheat your buildplate to 60 °C
To make sure the Kapton foil will have good
adhesion to the flexible plate



!! Continue peeling off the protective sheet and at the same time stick the foil to the Build Plate using a soft object in a zigzag motion to avoid air bubbles !!



139

140 (1x) Kapton Foil

141

Tools:



13 Checklist

	Frame	Check		Build platform	Check
1.	Frame bolts (6x) are properly fixed.		1.	Bolt (1x) center of build platform is properly fixed.	
2.	Frame profiles are perpendicular and propely aligned.		2.	Build surface doesn't contain air bubbles.	
3.	Damping feet are placed underneath the printer.			Print head	
	X-axis		1.	Extruder drive wheels properly aligned.	
1.	X-axis rail is properly aligned.		2.	Bolts (2x) connecting print head to X-axis carriage are properly fixed.	
2.	Bolts (2x) X-axis rail are properly fixed.		3.	Bolts (2x) sensor bracket are properly fixed.	
3.	X-axis belt pushed fully into bracket and tensioner.			Electrical	
4.	Belt remains at same height during moving the X-axis.		1.	Wire harness properly fixed without rubbing against parts.	
5.	Set screw (1x) for pulley is fixed at the correct height with set screw		2.	Wire harness loop for X, Y, Z-axis are at the correct length	
6.	X-axis belt tensioned properly		3.	do not get pulled under full extension.	
	Y-axis		4.	Cables are not under tension and have enough slack.	
1.	Bolts for stacked bearings (4x) guiding the belt are properly fixed		5.	Cable ties neatly cut off.	
2.	Y-axis carriage is properly aligned in the Z-axis lift.		6.	Connectors properly connected in sockets.	
3.	Bolts (4x) of the Y-axis carriage are properly fixed.		7.	Potentiometers on control board are set to the correct values.	
4.	Y-axis belt pushed fully into bracket and tensioner.		8.	Control board contains the correct Tec 4 firmware version.	
5.	Belt remains at same height during moving the Y-axis.		9.	Wire colors are according to diagram.	
6.	Set screw (1x) for pulley is fixed at the correct height with set screw			Online Tests	
7.	Y-axis belt tensioned properly.		1.	Build platform heats up to 90 degrees C, move cable harness to check for wire breakage.	
	Z-axis		2.	Extruders heat up to 90 degrees C, move cable harness to check for wire breakage.	
1.	Z-axis rail is properly aligned.		3.	Hot-ends don't move during loading/unloading filament.	
2.	Bolts (3x) Z-axis rail are properly fixed.		4.	Check if filament gets pulled through firmly	
3.	Set screw (1x) Z-axis spindle is properly fixed.				
4.	Bolts (4x) connecting Z-axis carriage to the lift are propely fixed				
5.	Z-axis spindle nut is properly fitted in the Z-axis lift.				
6.	Z-axis spindle is greased over its entire length.				

Congratulations!

You have finished building the FELIX Tec.

Continue to the Quick Start Guide to start printing!

14 Bill Of Materials

14.1 FELIX Tec 4.1 DIY Kit - Base parts - 105 014.1

#		Part No.	Part	Quantity
1		105 050.0	Frame profile set Felix3/ Tec	1
2		135 002.0	Linear ball bearing - HGW15CC1R300Z0	1
3		135 062.0	Linear ball bearing - MGN12H1R0300Z1HM	2
4		105 056.1	spindle & nut combi	1
	4.1	130 017.0	Spindle - trapezium - Felix 3/Tec4/One - 03224_0	1
	4.2	130 018.0	Trapezium hexagon nut TR10x2 - Tec - 03225_0	1
5		105 055.0	Set motors for diy kit	1
	5.1	150 027.1	Stepper motor - Nema 17 - 40 mm	4
6		105 127.0	Assy build platform Felix Tec4 (heated bed)	1
	6.1	130 034.4	bare sandwich plate (heated bed) - F3 and TEC4 - 03127_4	1
	6.2	150 132.0	Foil heater Felix Tec4	1
	6.3	135 055.1	Magneet 8x5 Nickel Plated (heated bed)	12
	6.4	130 037.0	Build Platform sticker - Tec4 - 03138_0	1
	6.5	130 025.2	Aluminum insert for sandwich table - F3 & Tec - 03141_0	1
7		105 124.1	Hot-End - Tec4 v2	1
	7.1	130 110.0	Nozzle 0.35mm - Brass - Pro / Tec	1
	7.2	130 029.7	Hotend base Felix Tec4 - V2	1
	7.3	130 030.6	Heatbreak Felix Tec4 - V2 - 03113_6	1
	7.4	150 013.0	Felix 3 & Tec 4 - Heater Cartridge incl. connector	1
	7.5	130 109.0	Hot End - Heated Barrel - Pro 1/2 - 03004_1	1
	7.6	150 162.0	FELIX 3.1 & Tec4 - Thermistor incl. connector	1
	7.7	140 036.0	M3 x 4 - HEX Set screw - DIN 916	3
8		150 023.0	Powersupply - FELIX Tec Series	1
9		105 016.2	Bolts & nuts set Felix Tec 4.1	1
	9.1	110 114.0	T-hammer nut M3 for 40 serie profile	3
	9.2	140 011.0	M3 x 6 - Set screw - DIN 916	5

	9.3	140 012.0	M3 x 6 - HEX CSK - DIN 7991	6
	9.4	140 013.0	M3 x 8 - HEX CSK - DIN 7991	15
	9.5	140 016.0	M3 x 12 - HEX SOCKET - DIN 912	5
	9.6	140 017.0	M3 x 16 - HEX SOCKET - DIN 912	14
	9.7	140 018.0	M4 x 12 - HEX SOCKET - DIN 912	12
	9.8	140 019.0	M4 x 16 - HEX SOCKET - DIN 912	8
	9.9	140 020.0	M4 x 20 - HEX SOCKET - DIN 912	9
	9.1	140 021.0	M4 x 25 - HEX SOCKET - DIN 912	4
	9.11	140 022.0	M4 x 40 - HEX SOCKET - DIN 912	3
	9.12	140 023.0	M5 x 16 - HEX SOCKET - DIN 912	5
	9.13	140 024.0	M3 - Washer - DIN125A	10
	9.14	140 025.0	M4 - Washer - DIN125A	10
	9.15	140 026.0	M5 - Washer - DIN125A	5
	9.16	140 028.0	M4 - Large Washer Carrosserie ring - LL NF E25-513	2
	9.17	140 029.0	M3 - HEX LOCK NUT - DIN 985	6
	9.18	140 030.0	M4 - HEX LOCK NUT - DIN 985	6
	9.19	140 031.0	M4 - HEX THIN NUT - DIN 439B	10
	9.2	140 032.0	6/32 x 1/4 - Pozi steel - Powersupply screw - UNC	4
	9.21	140 037.0	M4 x 30 - HEX Set screw - DIN 916	2
	9.22	140 039.0	Spring Extruder & bed	4
	9.23	140 040.0	M4 - THIN SQUARE NUT - DIN 562	9
	9.24	140 070.0	2.2 x 9.5 - Parker - plaatschroef - DIN 7981F	6
	9.25	200 013.0	Assortment box 18 compartments, 210x120x36	1
10		105 020.1	Mechanic bag felix Tec4.1 diy	1
	10.1	135 004.0	Pulley motor - FELIX 3 and Pro series	2
	10.2	135 003.0	Tooth Belt (HTD 3M 6mm)	1.6
	10.3	135 005.0	bearing 624, 4x13x4	7
	10.4	130 141.0	Extruder drive wheel FELIX Pro	1
	10.5	130 035.0	Platform support - Tec4 - (Y-Bracket Tec 4) - 03125_3	1
	10.6	130 041.0	Knurled thumb knob - Tec4 - 03129_2	2

	10.7		130 043.1	Z-adjustment right hot-end - Tec 4.1	1
	10.8		130 044.1	Dual Extruder Front Bracket V2 - Tec 4.1	1
	10.9		130 147.0	Extruder cable flange - TEC 4.1 - 03162_0	1
	10.1		130 146.0	Z-sensor_LED_flange - TEC 4.1 - 03159_0	1
11			105 051.0	Frame bag FELIX 3/ Tec4	1
	11.1		110 017.0	frame connector set	6
	11.2		110 018.0	handle PA 160 for Felix3	1
	11.3		110 019.0	Protective cap, handle PA160, FELIX 3	1
	11.4		110 022.0	T-Slot Nut V 8 St M4	12
	11.5		110 024.0	T-Slot Nut V 8 St M8	2
	11.6		110 015.0	40x40 protective caps	4
	11.7		110 016.0	80x40 protective caps	1
	11.8		110 025.0	damping foot (felix 3)	6
	11.9		140 035.0	M8 x 16 - HEX BUTTON - ISO 7380	2
	11.1		200 025.0	Gripzakken 200 X 300 mm	1
12			105 130.1	LCD control cabinet Felix Tec4	1
13			105 021.0	Electronics bag Felix Tec4 - DIY kit	1
	13.1		150 155.0	Opto sensor X (Straight) FELIX 3/Tec4 incl connector	1
	13.2		150 156.0	Opto sensor Y (Angle) FELIX 3/Tec4 incl connector	1
	13.3		105 028.1	Z-sensor calibration unit Tec 4.1	1
		13.3.1	150 133.0	Proximity sensor M12 Omron Tec 4	1
		13.3.2	150 158.0	Main fan + LED + cable/ connector Tec4	1
		13.3.2.1	150 025.0	Cooling fan - 40 x 40 x 10 mm	1
		13.3.2.2	150 130.0	LED strip leds for extruder per led - 12V	3
	13.4		150 159.0	Double fan with cable and connector Tec4	1
		13.4.1	150 025.0	Cooling fan - 40 x 40 x 10 mm	2
	13.5		170 021.0	Cable ties for mounting cables on Z bracket	2
	13.6		170 015.0	Cable sleeve, nylon semi open set 95/ 115 cm	2.1
	13.7		150 150.0	Stepper Extruder cable Tec4	1
	13.8		150 152.0	Stepper X-axis cable Tec4	1

	13.9	150 153.0	Stepper Y-axis cable Tec4	1
	13.1	150 154.0	Stepper Z-axis cable Tec4	1
	13.11	105 128.0	set Tie wraps 20 (100x2.5mm) pieces in bag	1
14		105 019.0	Miscellaneous Bag - DIY kit	1
	14.1	150 018.0	USB cable 1.8m	1
	14.2	170 011.0	Tweezers	1
	14.3	170 019.1	Teflon Tube for Pro and 3 series - (55cm)	1
	14.4	170 023.1	Filament dust cleaner	1
	14.5	180 001.1	PLA sample - 50 gram - Random Colours	1
	14.6	122 045.0	Filament guide/ dust cleaner holder Felix3/ Tec (printed)	1
	14.7	122 044.0	Filament bracket Felix3 (printed)	1
	14.8	200 035.0	Calibration card	1
15		150 037.0	Controlboard Felix Tec4	1
17		130 032.0	Flex plate - Tec4 - 03130_1	1
18		170 024.0	Kapton sticker 270 mm x 300 mm (PRO/TEC)	1
21		170 033.0	USB reader for MicroSD card	1
22		170 032.0	MicroSD card 16GB (normal speed)	1

14.2 FELIX Tec 4.x Single to Dual Upgrade Kit - 105 031.0

#	Part No.	Part	Quantity
1	150 027.1	Stepper motor - Nema 17 - 40 mm	1
2	150 150.0	Stepper Extruder cable Tec4	1
3	130 141.0	Extruder drive wheel FELIX Pro	1
4	140 017.0	M3 x 16 - HEX SOCKET - DIN 912	3
5	105 124.1	Hot-End - Tec4 v2	1
6	140 039.0	Spring Extruder & bed	1
7	140 028.0	M4 - Large Washer Carrosserie ring - LL NF E25-513	2
8	140 018.0	M4 x 12 - HEX SOCKET - DIN 912	1
9	140 031.0	M4 - HEX THIN NUT - DIN 439B	1
10	135 005.0	bearing 624	1
11	170 019.1	Teflon Tube for Pro and 3 series - (55cm)	1
12	170 023.1	Filament dust cleaner	1
13	105 128.0	set Tie wraps 20 (100x2.5mm) pieces in bag	1
14	122 021.0	Extru_F3_0_arm_pt1_v1 - black	1
15	122 022.0	Extru_F3_0_arm_pt2_v1 - black	1
16	122 044.0	Filament bracket Felix3 (printed)	1

14.3 Set Plastic parts Felix Tec4.1 - 105 047.1

#	Part No.	Part	Quantity
1	122 012.0	X_stage_F3_0_belt_mount_v1 - black	1
2	105 064.0	Y stage bracket prt1 with inserts Felix Tec4 Black	1
3	105 065.0	Y stage bracket prt2 with inserts Felix Tec4 Black	1
4	122 215.0	Y_stage_F3_0_tensioning_bracket_v1 - blue	2
5	122 016.0	z_axis_F3_0_lift_part_v1 - black	1
6	122 017.0	z_axis_F3_0_motor_bracket_v1 - black	1
7	122 019.1	Extru_F3_1_base - black	1
8	122 020.1	Extru_F3_1_L_shape_bracket - black	3
9	122 021.0	Extru_F3_0_arm_pt1_v1 - black	2
10	122 022.0	Extru_F3_0_arm_pt2_v1 - black	2
11	122 025.0	Electronics_enclosure_F3_0_cap_pt1 - black	1
12	122 026.0	Electronics_enclosure_F3_0_cap_pt2 - black	1
13	122 028.0	Electronics_enclosure_F3_0_cover_plate_v1 - black	1
14	122 031.0	Electronics_enclosure Felix Tec4 Black	1
15	170 017.0	Sticker on control box	1
16	122 039.1	Air duct Tec4.1 - Black ABS-X (printed)	2
17	122 040.1	Fan front cover Tec4.1 - black	1
18	122 011.0	X_stage_F3_0_motor_bracket_v1 - black	1
19	122 042.0	cable clips set printed ABS	1