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How to replace a Z-axis motor (XL)

help.prusa3d.com/g507165

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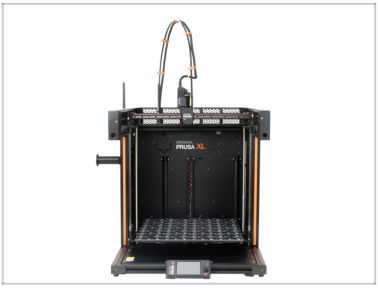
STEP 1 Introduction



- This guide will take you through the replacement of the **Z-axis motor** on the **Original Prusa XL**.

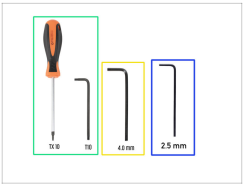
  The following instructions are compatible with all Original Prusa XL versions.

- All necessary parts are available in our eshop prusa3d.com.

Note that you have to be logged in to have access to the spare parts section.

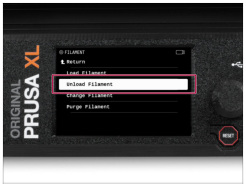
This manual is for both Z-axis motors on the XL printer.

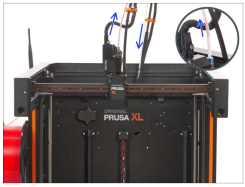
STEP 2 Necessary tools

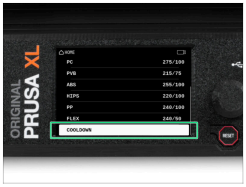



- **For this guide, please prepare:**
- T10 screwdriver or key
- 4mm Allen key
- 2.5mm Allen key
- Cable cutter (this tool is not included with the Original Prusa XL)
- Zip ties (2x)

STEP 3 Unloading filament





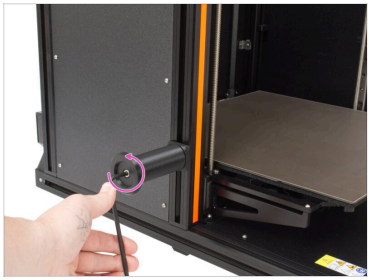


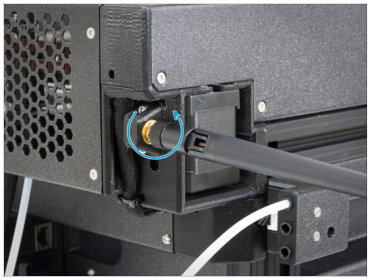
- If you have loaded the filament, unload it from the hotend. On the screen, navigate to *Filament -> Unload Filament*.

⚠ **WARNING: The hotend and heatbed are very HOT. Do not touch these parts!!!**

- Remove the filament from the hotend. It is necessary to completely remove it from the printer.
- Cooldown the printer, navigating to *Preheat > Cooldown*.

STEP 4 Preparing the printer - removing side accessories



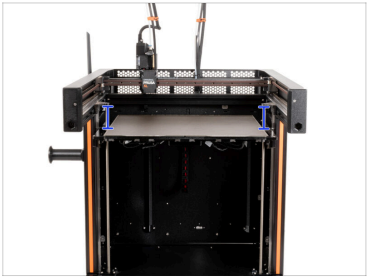


See if the side of the motor you will change has an antenna, spool holder, or filament sensor. In case any of those is present, follow the instructions below to remove it.

- Use a 4 mm Allen key to unscrew the M5x85 screw that holds the spool holder to the side of the printer.
- Unscrew the antenna by hand and remove it.

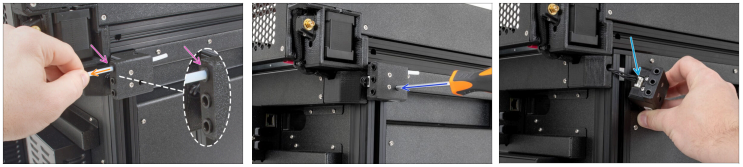
  If you have the antenna at the back of the printer, there is no need to remove it.

STEP 5 Printer preparing



- Auto home your printer. Navigate to *Control -> Auto home*.
- Move the Z-axis 5 cm under the Nextruder. Navigate to *Control -> Move Axis -> Move Z.*
- From the rear side, turn the power switch OFF (symbol "O").
- Unlug the power cable.

STEP 6 Disassembling side filament sensor



The following step is necessary only if the filament sensor is on the same side as the motor that is being replaced.

- With two fingers, push the black collet on the rear of the filament sensor assembly.
- At the same time, gently pull out the extruder PTFE tube from the filament sensor assembly.

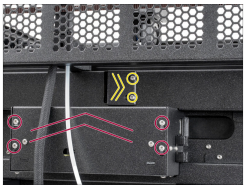
The connector has a safety latch. **It is necessary to press the latch before disconnecting**. Otherwise, the connector may get damaged.

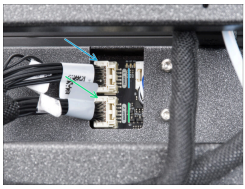
- Detach the filament sensor from the M3nEs nut using a T10 screwdriver.
  - The filament sensor might be attached with a hex screw instead. In that case, detach the filament sensor from the M3nEs nut using a 2.5mm Allen key.
- Press the latch to disconnect the filament sensor cable.

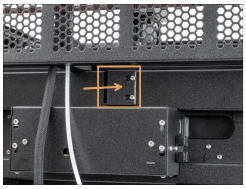
STEP 7 Removing the frame-rear-cover

- Using the 2.5mm key, loosen the screw holding the frame-rear-cover.
- Carefully slide out the frame-rear-cover.

STEP 8 Disconnecting the electronics







- Using the T10 key, loosen the XLBuddy-cover.
- Using the T10 key, loosen the bolts slightly, to slide and remove the XL-rear-cable-management-plug.

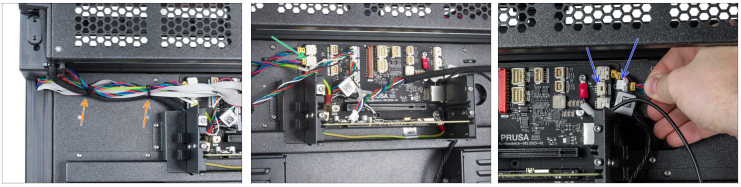
⚠ Each connector has a safety latch. It is necessary to press the latch before disconnecting. Otherwise, the connector may get damaged.

- Disconnect the Dwarf 1 cable.
- If you have a multi-tool version of the XL, disconnect the Dwarf 2 cable.
- Slide back the XL-rear-cable-management-plug.

STEP 9 Uncovering the electronics

- Using a T10 screwdriver, loosen the four M3x5rT screws. **Do not throw them away! We'll use them later.**
- Carefully pull out the rear-cable-management-upper.

STEP 10 Disconnecting the Z-axis motor cable



⚠ Be careful and avoid damaging the cables using the cable cutter!

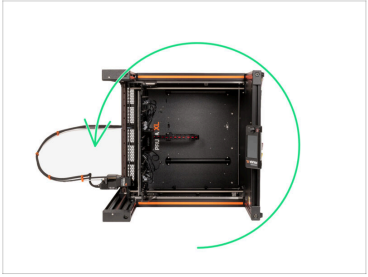
- Using a cable cutter, carefully cut the two zip ties on the side of the motor to be replaced.

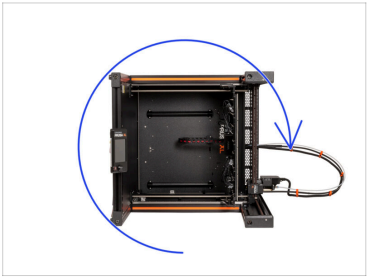
  ⓘ The procedure is equivalent, but on the rear right, in case of replacing the right Z-axis motor.

⚠ Each connector has a safety latch. It is necessary to press the latch before disconnecting. Otherwise, the connector may get damaged.

- Disconnect the motor cable from the motor that will be replaced.
  - Left Z-axis motor
  - Right Z-axis motor

STEP 11 Placing the printer



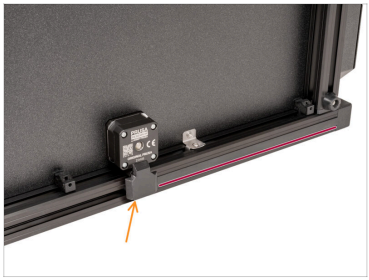


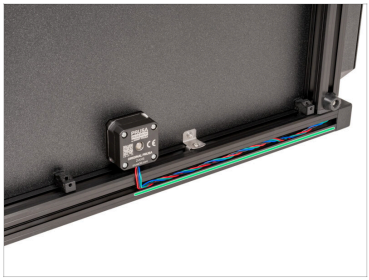
- Turn the printer to the left side if the motor to replace is on the left side.
- If the motor to replace is on the right side, turn the printer to the right side.

  The following steps will be the same for replacing the Z-axis motor on either side.

Do not move the printer before the replacement is finalized.

STEP 12 Uncovering the Z-axis motor cable - bottom





- Take a look at the bottom of the printer and locate:
  - Extrusion cover 243mm
  - Z-motor-cable-bottom-cover
- Remove both covers from the printer.

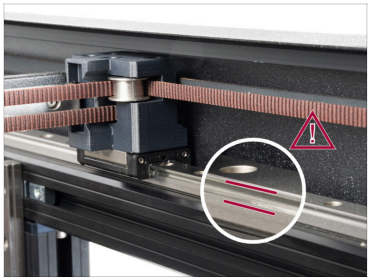
The bottom of the printer is ready.

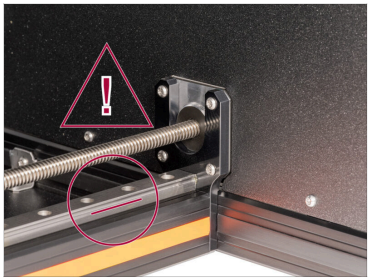
STEP 13 Uncovering the Z-axis motor cable - rear

- Locate the rear extrusion cover 354mm, and remove it.

The printer is now ready for releasing the motor.

STEP 14 CAUTION: Lubricant Handling

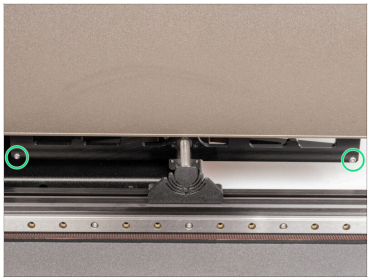




⚠ **CAUTION: Avoid direct skin contact with the lubricant used for the linear rails** in this printer. If a contact occurs, **wash your hands immediately. Especially before eating, drinking, or touching your face.**

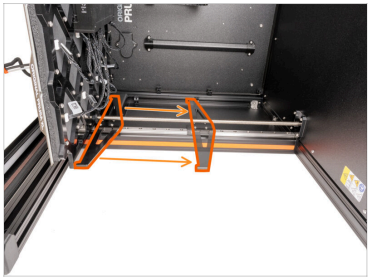
- Lubricant accumulates mainly in the linear rail channels on the linear sides.

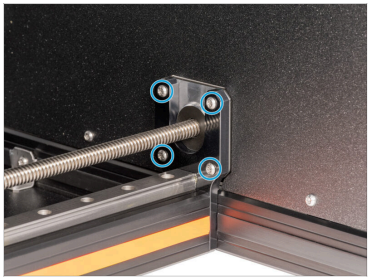
STEP 15 Releasing the Z-axis motor - part 1



- Using a T10 screwdriver, remove two M4x10rT screws and remove them. **Do not throw them away! We'll use them later.**
- Using a T10 screwdriver, remove the indicated two M3x12rT screws from the heatbed frame. **Do not throw them away! We'll use them later.**

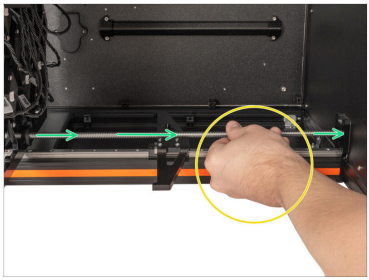
STEP 16 Releasing the Z-axis motor - part 2





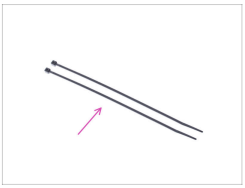
- Slide the bed-frame-mount to the middle of the linear rail.
- Using a T10 screwdriver, remove four M3x8rT screws to release the Z motor. Do not throw them away! We'll use them later.

STEP 17 Pulling out the Z-axis motor



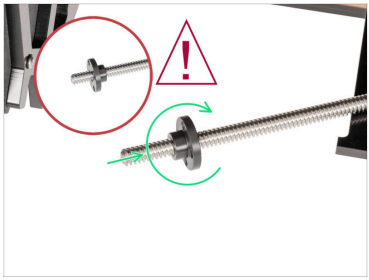
- Hold the Z-axis motor with your hand. **Don't pull out yet!**
- Grab the threaded rod with your other hand.
- Gently pull out the motor from the Bed-frame.

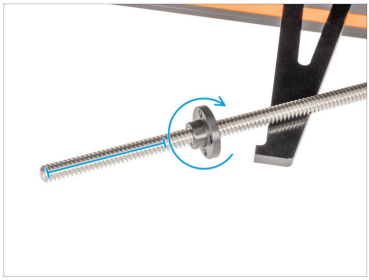
STEP 18 New motor: parts preparation



- For the following steps, prepare the following parts:
- Z-axis motor (1x)
- Trapezoidal nut (1x)
- Zip ties (2x)

STEP 19 Installing the trapezoid nut: installing the nut



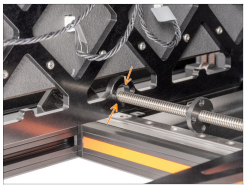
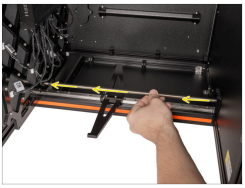


- Attach the new trapezoidal nut onto the Z-axis threaded rods, only a few centimeters in.

  Double-check the correct orientation of the nut! See the picture carefully.

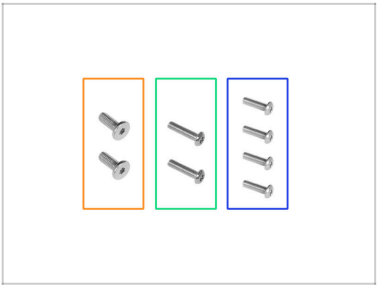
- Screw the trapezoid nut 6 cm from the top of the Z-axis motor.

STEP 20 Installing the trapezoid nut: Z-axis motor attaching

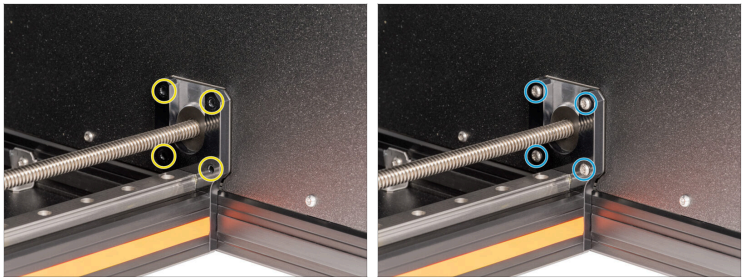
- Using one hand, take the Z-axis motor and keep it in a row.
- Using the second hand, insert gently the Z-axis motor back through the Bed-frame.
- Move the Z-axis motor to the side through the Bed-frame.

STEP 21 Securing the Z-axis motor: parts preparation



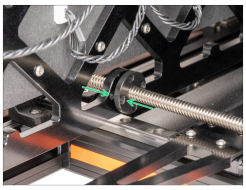
- For the following steps, please prepare:
  - M4x12rT screw (2x)
  - M3x12rT screw (2x)
  - M3x10rT screw (4x)

STEP 22 Securing the Z-axis motor



- Insert four M3x10rT screws into the four holes in Z-motor-mount.
- Tighten the screws with a T10 screwdriver.

STEP 23 Securing the trapezoid nut



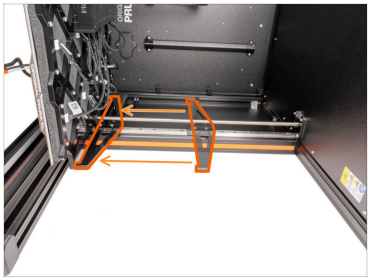
⚠ **Do not move the Bed-frame! Move only the trapezoid nut.**

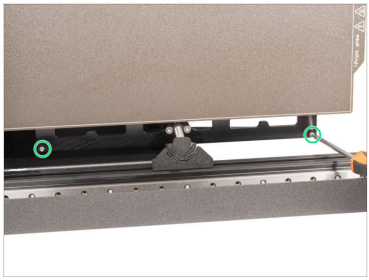
- From the bottom side of the heatbed:
  - **Line up the threaded hole in the trapezoid nut with the hole in the Bed-frame** by turning it clockwise.
- From the upper side of the heatbed:
  - Locate two holes next to the threaded rod.

⚠ Be really careful, you can easily turn the screw and damage the thread in the trapezoid nut.

  - Insert two M4x12rT screws and **gently** tighten them using a T10 screwdriver.

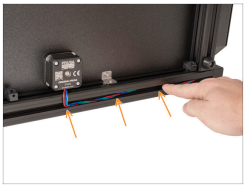
STEP 24 Securing the Bed-frame

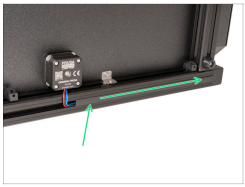




- Manually slide the bed-frame-mount towards the heatbed.
- Secure the Bed-frame-mount to the Bed-frame with two M3x12rT screws using a T10 screwdriver.

STEP 25 Covering the Z-axis motor - bottom





- Take a look at the bottom of the printer.

⚠ Be careful, don't pinch any cables!

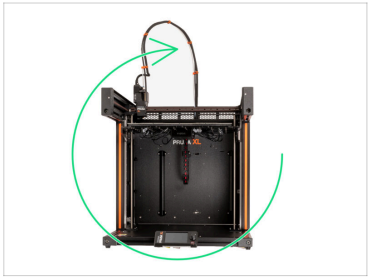
- Insert the motor cable in the extrusion. Make sure it goes perpendicular from the motor to the extrusion first.
- Insert the Extrusion cover 243mm. Push and slide it to the right.
- Push the Z-motor-cable-bottom-cover into the frame.

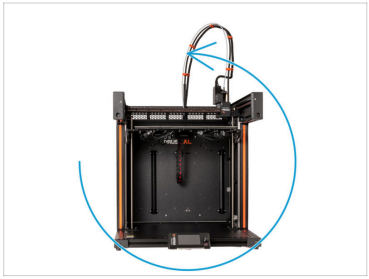
STEP 26 Covering the Z-axis motor - rear

⚠ Be careful, don't pinch any cables!

- Insert the motor cable in the extrusion.
- Insert the Extrusion cover 354 mm.

STEP 27 Turning the printer





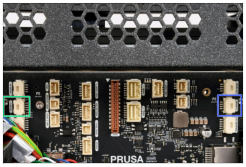
- Turn the printer to the right side on its feet.
- If the replaced Z-axis motor was on the other side, turn the printer to the left side on its feet.

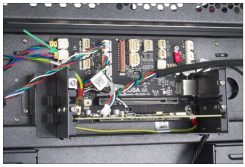
STEP 28 Tightening the frame-rear-cover

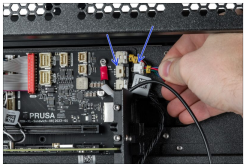
⚠ Do not pinch the cables!

- Carefully slide in the frame-rear-cover.
- Tighten the M3x12 screw using the 2.5mm key.

STEP 29 Connecting the Z-axis motor cable

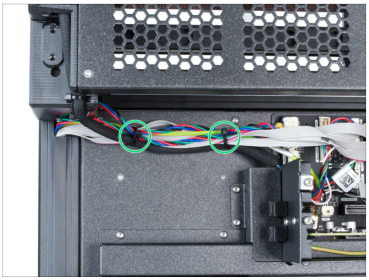






- Connect the new Z-axis motor according to the wiring diagram in the picture.
  - Left Z motor
  - Right Z motor

STEP 30 Securing cables (left)



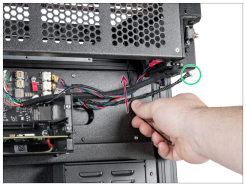
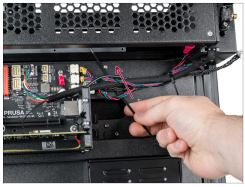
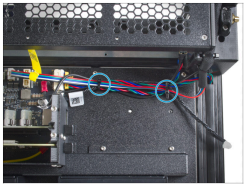
If you are replacing the Z-axis motor on the left side, follow this step.

If you are replacing the Z-axis motor on the right side, skip this step and proceed with step 26.

ATTENTION: Do not overtighten the zip ties! Otherwise, you risk damaging the cables.

- Under the cables, there are two perforations in the metal sheet.
- Insert two zip ties through the perforations in the metal sheet to secure the cables. Tighten them gently.
- Cut the excess of the zip ties.

STEP 31 Securing cables (right)

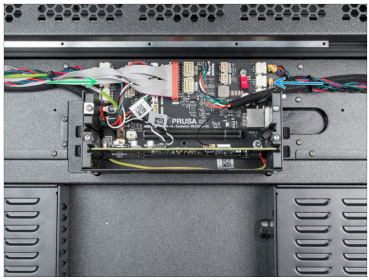




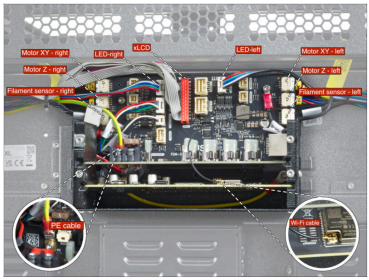
If you are replacing the Z-axis motor on the right side, follow this step.

ATTENTION: Do not overtighten the zip ties! Otherwise, you risk damaging the cables.

- Insert two zip ties through the perforations in the metal sheet to secure the cables. **Tighten them gently**.
- Cut the excess of the zip ties.

STEP 32 Overview of electronics wiring





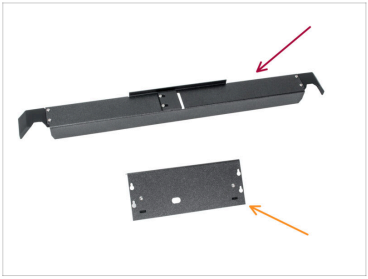
⚠ Before proceeding to the next step, check the cable connections according to the picture.

- Left Z motor cable
- Right Z motor cable

ⓘ In the second picture the full wiring diagram is shown. Only the 'Motor Z - left' and 'Motor Z - right' have been disconnected and reconnected during this guide.

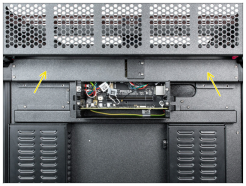
- Double-check all the connections before proceeding to the next step.

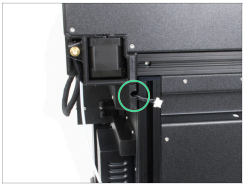
STEP 33 Electronics cover back: parts preparation

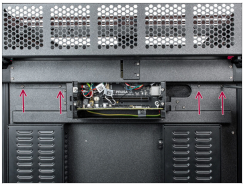


- **For the following steps, please prepare:**
- Rear-cable-management-upper (1x)
- XL-buddy-box-cover (1x)
- M3x5rT screw (4x)

STEP 34 Covering the electronics



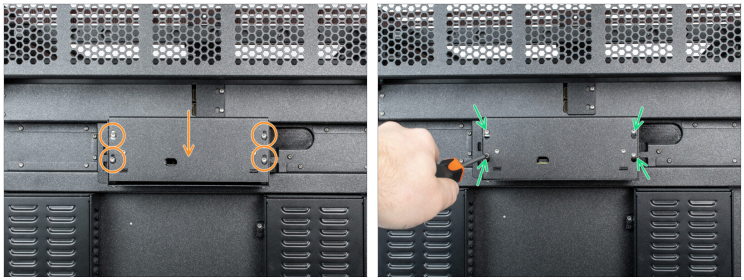




⚠ **Be careful, don't pinch any cables.**

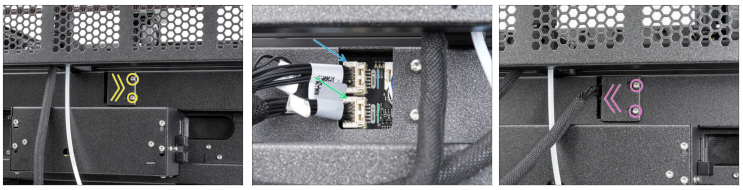
- Gently attach the Rear-cable-management-upper on the rear side.
- Make sure that no cable is pinched.
- Secure it with four M3x5rT screws using a T10 screwdriver.

STEP 35 Covering the XLBuddy



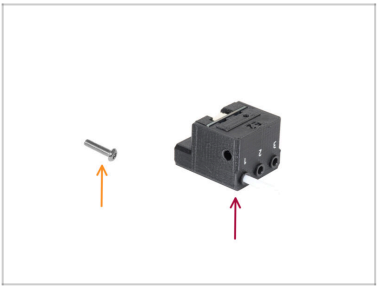
- Attach the XL-buddy-box-cover to the screws on the electronics box. Slide it down to lock it on the screws.
- Tighten the screws with a T10 screwdriver.

STEP 36 Connecting the Nextruder cable



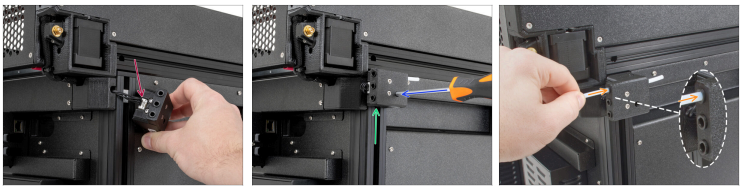
- Locate the xl-rear-cable-management-plug (cover) on the rear of the printer.
- Loosen two screws on the cover slightly. No need to remove them completely. Push the cover to the right and remove it from the printer.
- Connect the extruder cable to the upper slot labeled DWARF 1.
- In case the printer is a multi-tool XL, connect the cable from tool 2 to the lower slot labeled DWARF 2.
- Attach the connectors cover to the screws. Push it all the way to the right and tighten the screws.

STEP 37 Preparing the Filament sensor



- **For the following steps, please prepare:**
  - M3x12rT screw (1x)
  - Filament sensor assembly

STEP 38 Attaching the filament sensor



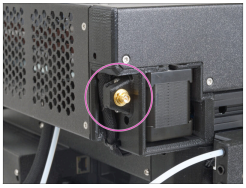
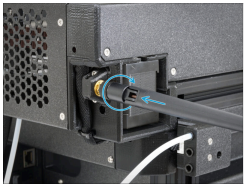
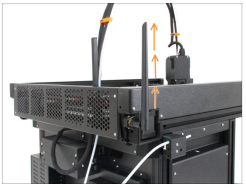
- Connect the filament sensor cable to the filament sensor assembly.
- Move the filament sensor assembly to the top of the extrusion and align the M3nEs nut so that it aligns with the opening on the filament sensor assembly.
- Attach the filament sensor to the M3nEs nut using the M3x12rT screw and T10 screwdriver.
- Insert the PTFE tube from the extruder into to the first collet on the rear of the filament sensor assembly.

STEP 39 Installing the Wi-Fi antenna: parts preparation

- **For the following steps, please prepare:**
  - Wi-Fi antenna (1x)

The Original Prusa XL is shipped with two versions of the Wi-Fi antenna, each with a different shape. The functionality is the same.

STEP 40 Installing the Wi-Fi antenna

This step is necessary only if you have the antenna on the left side of the printer.

- Locate the Wi-Fi antenna connector on the right rear corner of the printer.
- The antenna can be rotated around and bent in two directions.
- We recommend pointing the antenna straight upwards.

STEP 41 Assembling the spool holder: parts preparation

- **For the following steps, please prepare:**
  - Spool-holder-slider (1x)
  - Spool-holder-base (1x)
  - Spool-holder-mount (1x)
  - M5x85 screw (1x)

STEP 42 Assembling the spool holder

- Insert the spool-holder-base into the spool-holder-slider. The narrower part of the base should go in first. Push it all the way in.
- Attach the spool-holder to the spool-holder-mount.
- Insert the M5x85 screw into the spool holder assembly.

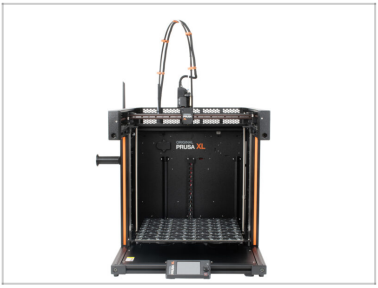
STEP 43 Mounting the spool holder assembly

- Turn the printer to the left side facing you.
- Using the 4mm Allen key, attach the spool holder assembly to the M5nEs nut on the printer.
- Note that there is a protrusion on the spool-holder-mount, which fits into the groove in the extrusion.

STEP 44 XYZ calibration

- From the rear side, plug in the power cable.
- Turn the power switch ON (symbol "I").
- Turn the printer's front side facing you.
- On the screen, go to *Control -> Auto Home* and let the printer calibrate.

STEP 45 Good Job!



- Well done, you successfully replaced the Z-axis motor on your Original Prusa XL!

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