

# 3D PRECISION

## PRINTING UND ASSEMBLY GUIDE

### Smart Rewinder



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Version 3.00



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## Table of Contents

1	Preface .....	5
1.1	.... <i>Retaining instructions</i> .....	5
1.2	.... <i>Obtaining documentations and information</i> .....	5
1.2.1	Internet .....	5
1.2.2	Documentation feedback.....	5
2	Safety instructions and advice.....	6
2.1	.... <i>Personal safety</i> .....	6
2.2	.... <i>Work area safety</i> .....	6
3	Pre-condition and assumptions.....	7
4	Introduction .....	8
4.1	.... <i>Descriptions of the system and components</i> .....	8
4.1.1	Rewinder-Chassis .....	8
4.1.2	Mainboard housing .....	8
4.1.3	Display housing .....	8
4.1.4	Circuit boards (PCB) .....	8
4.2	.... <i>Druck und Bau</i> .....	9
4.3	.... <i>Electronic</i> .....	9
4.4	.... <i>Technical data</i> .....	9
5	Required tools .....	10
6	Bill of material .....	11
6.1	.... <i>Overview of used types of materials</i> .....	11
6.1.1	Mechanical.....	11
6.1.2	Elektronik .....	13
7	Preparation of the print parts .....	15
7.1	.... <i>Printing the parts</i> .....	15
7.2	.... <i>Prepared printing plates</i> .....	17
8	Assembly .....	21
8.1	.... <i>Description and naming of the parts and material</i> .....	21
8.2	.... <i>Assembling and soldering the circuit boards</i> .....	21
8.3	.... <i>Material, parts, and assembly steps for the components</i> .....	21



8.3.1	Rewinder Chassis .....	21
8.3.2	Housing for main circuit board V1.0/2.0 “free-standing” .....	38
8.3.3	Housing for main circuit board V3.0 “free-standing” .....	41
8.3.4	Display housing .....	43
8.3.5	Final steps power supply cable, PTFE tubing, mounting base, and calibration .....	45
9	Troubleshooting .....	48
9.1	.... <i>Identifying and resolving problems</i> .....	48
9.1.1	Troubleshooting and resolution during printing and assembly .....	48
9.1.2	Troubleshooting and resolutions during normal operation.....	48
10	Final remark .....	49
10.1.1	Printer calibration.....	49
10.1.2	About this guide .....	49
11	References.....	50
11.1	. <i>Figures</i> .....	50
11.2	. <i>Tables</i> .....	52



## 1 Preface

### 1.1 Retaining instructions

Read and understand this manual and its safety instructions before assembling and using this product. Failure to do so can result in injury or product failure.

Keep all safety information and instructions for future reference and pass them on to subsequent users of the product.

### 1.2 Obtaining documentations and information

#### 1.2.1 Internet

For more information, visit our website: <https://www.3dprecision.de>

and our Discord community: <https://discord.gg/hNZkaaDxHN>

The latest version of the documentation is available on Printables.com. Detailed links see below.

#### 1.2.2 Documentation feedback

Feedback is always welcome. Any comments can be submitted via messenger or comment on Printables.com. We absolutely appreciate and value your comments. Detailed links see below



## 2 Safety instructions and advice

### 2.1 Personal safety

- Drink enough water to remain alert and avoid dehydration.
- Ensure sufficient air ventilation (1 – 2 air changes/ hour).
- Taking regular breaks allows your body to recover from the tasks at hand.

### 2.2 Work area safety

- Keep your workplace clear from clutter.
- Always wear the necessary safety equipment.
- Make sure that the tools used are working well and are in good condition.
- Use ergonomic desks or workbenches to avoid straining your wrists and arms.



## 3 Pre-condition and assumptions

We tested everything with several original Prusa Core One and MMU3 systems with the latest FW and without any technical modifications or special settings in the Prusa Slicer.

The MMU3 upgrade to the Nextrunder according to the Prusa documentation should be done.

For the sake of completeness on both of our Core Ones is Advanced Filtration and Buddy Cam installed, but it's not a pre-requisite.

We use the DIN (German Industry Standard) definition for screw designations, i.e., the length specification refers to the thread. Some Chinese suppliers use the length specification to refer to the total screw length.



## 4 Introduction

### 4.1 Descriptions of the system and components

Smart Rewinder is an active microcontroller-controlled filament spool management system for DIY construction. It was designed for Prusa printers equipped with MMU3, such as CORE One, MK4, and MK3, but it will certainly work with other printers as well. It reacts to filament movement in both directions and rotates the spools accordingly so that the filament is always free of pressure and tension. It is an innovative alternative to the somewhat impractical and cumbersome filament buffer and is much more advanced and reliable than passive/mechanical rewinders. The system can be operated as a stand-alone unit, but thanks to its modular design, it can also be integrated into filament storage systems such as CORE-CUBE. Up to 5 spools can be connected.

It is operated via a small touch display, which also shows the current direction and speed of the filament movement. You can switch to manual mode for loading.

Currently, German and English are supported. We are happy to expand this upon request. Please contact us for more information.

#### 4.1.1 Rewinder-Chassis

The rewriter chassis is the actual spool holder, which is equipped with a stepper motor and a motion sensor. It is connected directly to the MMU3 via a PTFE tube. Normal and small spools are supported. The standard maximum spool width is approx. 72 mm. The chassis can be equipped with various feet.

#### 4.1.2 Mainboard housing

Used to house the main circuit board and connects the microcontroller with the display and the individual rewinders. This is also where the 12V power connection and voltage regulation take place.

#### 4.1.3 Display housing

The display housing contains the ESP32-S3 with the 1.9-inch touch display.

#### 4.1.4 Circuit boards (PCB)

The steps for assembling and soldering the PCBs, as well as a list with descriptions of all electrical components, can be found in the document “Controller and Electronics Assembly Manual.”



## 4.2 Druck und Bau

All parts are designed to be printed on the Prusa CORE One or MKS4.

No special printing or technical knowledge or special tools are required. Basic soldering skills and experience are required to build the circuit boards yourself. Details on the tools can be found in the “Tools” section of this document (see Table 2 on page 10).

The difficulty level of the build is moderate. The assembly time for a rewinder chassis is approximately 30-45 minutes, excluding soldering. This document describes the entire process step by step.

## 4.3 Electronic

Only conventional (no SMD) components with a pitch of  $\geq 2.54$  mm were used for the circuit boards to enable even beginners and less experienced hobbyists to build them.

## 4.4 Technical data

Table 1 Technical data





Parameter	Unit
Dimensions	Rewinder-Chassis (H x W x D): 10.5 cm x 8.0 cm x 29.0 cm Mainbord housing (H x W x D): 4.0 cm x 10.0 cm x 9.5 cm Display-Gehäuse (H x W x D): 4.5 cm x 7.0 cm x 7.7 cm
Weight	Ca. 1 kg ( depending on variant and configuration )
Material	PETG has been tested and is recommended, TPU for tire sleeves
Power supply	12V DC, 3A



## 5 Required tools

Apart from the correct screwdriver and/or Torx/Allen key for the screws you have chosen, no special tools are required. We only use metric screws, and for most of them, the tools supplied with the printer should be sufficient. In addition to the tools listed, however, a slow cordless screwdriver can be useful, but you should be careful that the screws do not overheat due to friction.

Table 2 Tools.

Tool	Illustration	Comment
Screwdriver		Depending on the screws used.
Allen key , 2.0 or 2.5 mm Torx key T8/10		Depending on the screws used.
Pliers		
Cutter		



## 6 Bill of material








Besides the 3D-printed parts, further components such as screws, ball bearings, etc. are required. I tried to use commonly available standard components at a reasonable cost without compromising on the overall quality and performance.

Most of the material can be ordered on Amazon, eBay or AliExpress. However, some components are not available to purchase as single parts (mainly due to the low value per piece). Others offer significant discounts on larger quantities. We have provided links for many items, some of which are affiliate links.

### 6.1 Overview of used types of materials

#### 6.1.1 Mechanical

Table 3: List of mechanical materials.

ID	Description	Illustration	Comment
S3x6	Screw M3 x 6 mm		<b>Total amount: 39</b> Purchase: Amazon various sets
S3x8	Screw M3 x 8 mm		<b>Total amount: 17</b> Purchase: Amazon various sets
S3x10	Screw M3 x 10 mm		<b>Total amount: 20</b> Purchase: Amazon various sets
S2x6	Screw M2 x 6 mm		<b>Total amount: 4</b> Purchase: Amazon various sets
CS3x6	Countersunk head screw M3 x 6 mm		<b>Total amount: 111</b> Purchase: Amazon various sets
CS3x8	Countersunk head screw M3 x 8 mm		<b>Total amount: 78</b> Purchase: Amazon various sets
CS3x18	Countersunk head screw M3 x 18 mm		<b>Total amount: 5</b> Purchase: Amazon various sets



ID	Description	Illustration	Comment
MS3x4	Grub screw M3 x 4 mm		<b>Total amount: 75</b> Purchase D/EU: <a href="https://amzn.to/3JJCx6i">https://amzn.to/3JJCx6i</a> Global: <a href="https://www.aliexpress.com/item/32982295134.html">https://www.aliexpress.com/item/32982295134.html</a>
B688	Bearing 688ZZ (8 x 16 x 5 mm)		<b>Total amount: 25</b> Purchase D/EU: <a href="https://amzn.to/49YJxXs">https://amzn.to/49YJxXs</a>
B685	Bearing 685ZZ (5 x 11 x 5 mm)		<b>Total amount: 20</b> Purchase D/EU: <a href="https://amzn.to/4rbiTB4">https://amzn.to/4rbiTB4</a>
PC4x6	PTFE-Connector M6 x 4 mm		<b>Total amount: 5</b> Source: Amazon
PTFE	4 mm PTFE tube with 2,5 mm inner diameter		<b>Total amount: 250 cm</b> 5 x ca. 37 mm for each Rewinder. You also need the connection from the rewinder to the MMU3 Purchase D/EU: <a href="https://amzn.to/4oOrWGH">https://amzn.to/4oOrWGH</a>
ROD8	Aluminum rod 60 x 8 mm hollow or solid		<b>Total amount: 10</b> Purchase D/EU: <a href="https://amzn.to/48jpSQJ">https://amzn.to/48jpSQJ</a>
GT2P	GT2 pulley, 20 teeth, 5 mm bore, 6 mm width		<b>Total amount: 5</b> Purchase D/EU: <a href="https://amzn.to/43A7P6d">https://amzn.to/43A7P6d</a>
GT2B	Timing belt GT2 6 mm wide, 200 mm long		<b>Total amount: 5</b> Purchase D/EU: <a href="https://amzn.to/3K5HBIs">https://amzn.to/3K5HBIs</a> , <a href="https://amzn.to/4i8KTRz">https://amzn.to/4i8KTRz</a> , <a href="https://amzn.to/483VTuZ">https://amzn.to/483VTuZ</a> Global: <a href="https://www.aliexpress.com/item/1005008834290222.html">https://www.aliexpress.com/item/1005008834290222.html</a>
RB13	Self-adhesive rubber feet Bumpon SJ5012 (12,7 x 3,5 mm)		Optional for freestanding version, 8 x per System, 4 x for each Rewinder




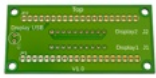
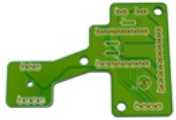
## 6.1.2 Elektronik

The list is only an excerpt. The steps for assembling and soldering the PCBs, as well as a complete list with descriptions of all electrical components, can be found in the document “Controller and Electronics Assembly Manual.”

**Table 4 List of electronic components**

ID	Description	Illustration	Comment
ESP32T	Waveshare ESP32-S3 Development Board with Touch Screen 1.9inch LCD Display, 170x320 262k Color, 240MHz LX7, Dual-Core, Wi-Fi & BLE		<p><b>Total amount: 1</b></p> <p>Purchase D/EU: <a href="https://amzn.to/49kqJBM">https://amzn.to/49kqJBM</a></p> <p>Global: <a href="https://www.waveshare.com/esp32-s3-lcd-1.9.htm?sku=30939">https://www.waveshare.com/esp32-s3-lcd-1.9.htm?sku=30939</a>  <a href="https://www.aliexpress.com/item/1005008853704674.html">https://www.aliexpress.com/item/1005008853704674.html</a></p>
AS56	AS5600 12-bit magnetic encoder		<p><b>Total amount: 5</b></p> <p>Purchase D/EU: <a href="https://amzn.to/3LLnXM9">https://amzn.to/3LLnXM9</a>,  <a href="https://amzn.to/486Kk6j">https://amzn.to/486Kk6j</a></p> <p>Global: <a href="https://www.aliexpress.com/item/1005007960154822.html">https://www.aliexpress.com/item/1005007960154822.html</a></p>
NEMA	Stepper motor NEMA17 42 x 23 mm (17HS4023) 1.5A-3.8V, 2 phases, 1.8°		<p><b>Total amount: 5</b></p> <p>Purchase D/EU: <a href="https://amzn.to/4oLF4Mr">https://amzn.to/4oLF4Mr</a>,  <a href="https://amzn.to/4ihup9W">https://amzn.to/4ihup9W</a></p>
MSWR	Micro limit switch		<p><b>Total amount: 5</b></p> <p>Purchase D/EU: <a href="https://amzn.to/4oLRRyd">https://amzn.to/4oLRRyd</a>,  <a href="https://amzn.to/4piQ2J2">https://amzn.to/4piQ2J2</a>,  <a href="https://amzn.to/3M9CJMF">https://amzn.to/3M9CJMF</a></p> <p>Global: <a href="https://www.aliexpress.com/item/1005008652274058.html">https://www.aliexpress.com/item/1005008652274058.html</a></p>
PCB1.1	Mainboard PCB V1.0 or V2.0		<p><b>Total amount: 1</b></p> <p>Source: <a href="https://pcbway.com/g/80Xmy9">https://pcbway.com/g/80Xmy9</a>  (\$5 discount for new customer)</p>



ID	Description	Illustration	Comment
PCB1.3	Mainboard V3.0		<b>Total amount: 1</b> Source: <a href="https://pcbway.com/g/80Xmy9">https://pcbway.com/g/80Xmy9</a> (\$5 discount for new customer)
PCB2	ESP32/Display PCB		<b>Total amount: 1</b> Source: <a href="https://pcbway.com/g/80Xmy9">https://pcbway.com/g/80Xmy9</a> (\$5 discount for new customer)
PCB3	Rewinder control PCB		<b>Total amount: 5</b> Source: <a href="https://pcbway.com/g/80Xmy9">https://pcbway.com/g/80Xmy9</a> (\$5 discount for new customer)



## 7 Preparation of the print parts

All parts can be downloaded on [Printables.com](https://www.printables.com). However, the advanced and professional variant are paid models, and the design needs to be purchased upfront.

We recommend printing the parts in PETG filament. The models used in the photos are printed with Prusament PETG Galaxy Black, PETG Orange and/or GEEETech PETG filament from Amazon.

Printing all parts requires approx. 1 kg of filament. Total print time on a CORE One is approximately (still need to calculate it) hours.

### 7.1 Printing the parts

General print setting:

- Layer height: 0,2 mm
- Perimeters : 3–4 (3 is recommended and sufficient)
- Infill : 10–20 %
- Infill pattern : Cubic
- Support : none (for most of the parts, see some exception below)
- XY separation between an object and its support: 1 mm

Support on build plate is necessary for certain parts.

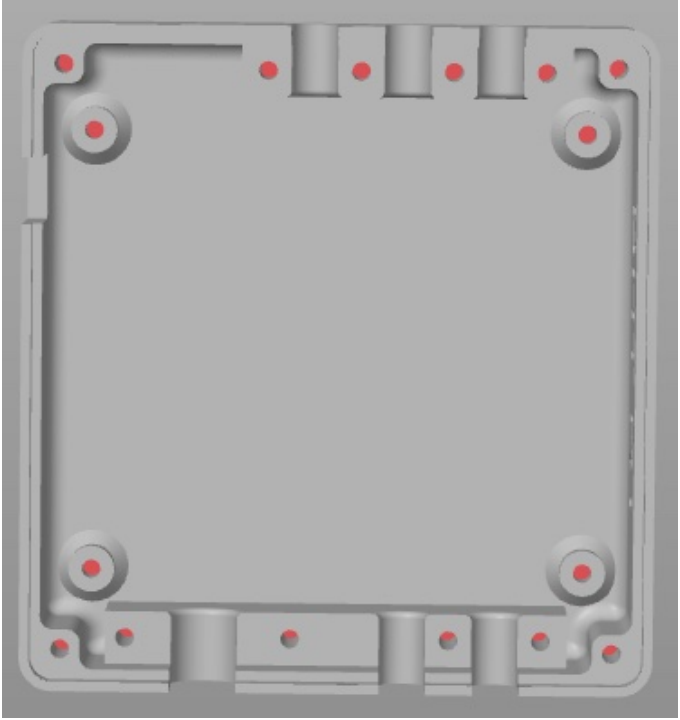
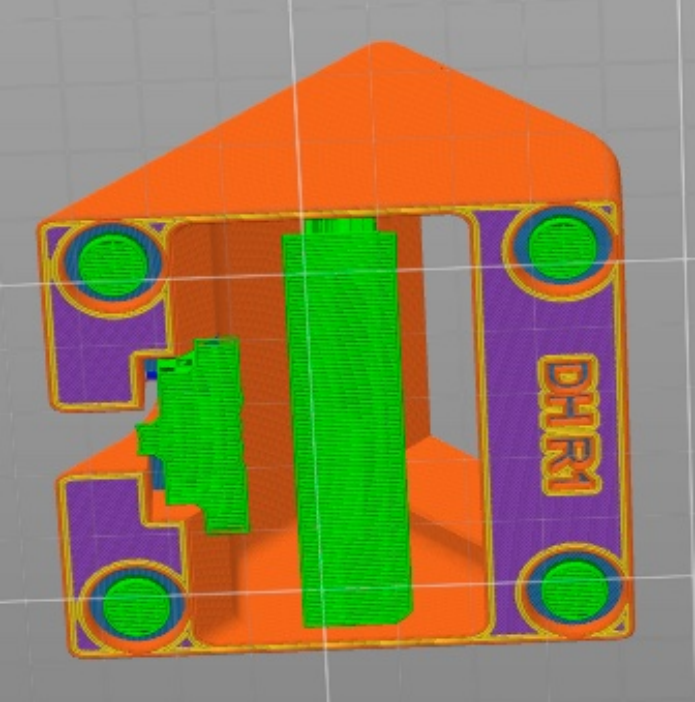
The wheel sleeves are special. They are printed in TPU in “spiral vase mode” with “fuzzy skin.” In vase mode, only one element can be printed at a time.

Further hints on the print settings for individual components can be found in the table below.

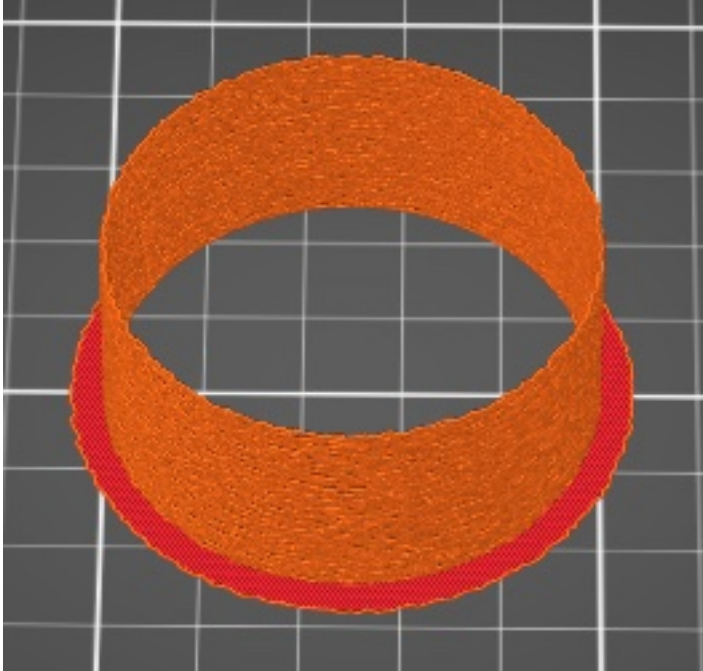
Note: The print files for CORE-CUBE integration are included in the CORE-CUBE Professional model.



Table 5 Printed parts.

Part	Illustration	Comment/hint
BHT		<p>Orientation Inside facing down</p> <p>Support only on the pressure plate</p> <p>Block support in the screw holes</p>
DH		<p>Support only on the pressure plate</p>



Part	Illustration	Comment/hint
WS		Finalemtn: Generic FLEX Spiral-Vasen Modus Fuzzy-Skin

## 7.2 Prepared printing plates

In addition, prepared printing plates are available for download.



Figure 1 Prepared printing plate Rewinder chassis 1.

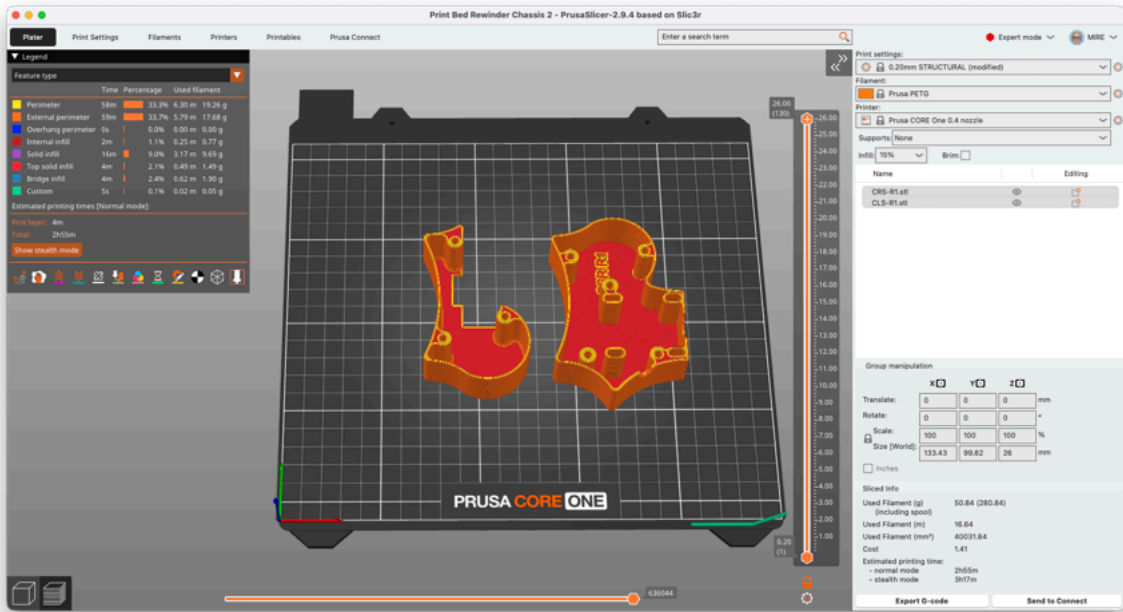


Figure 2 Prepared printing plate Rewinder chassis 2.

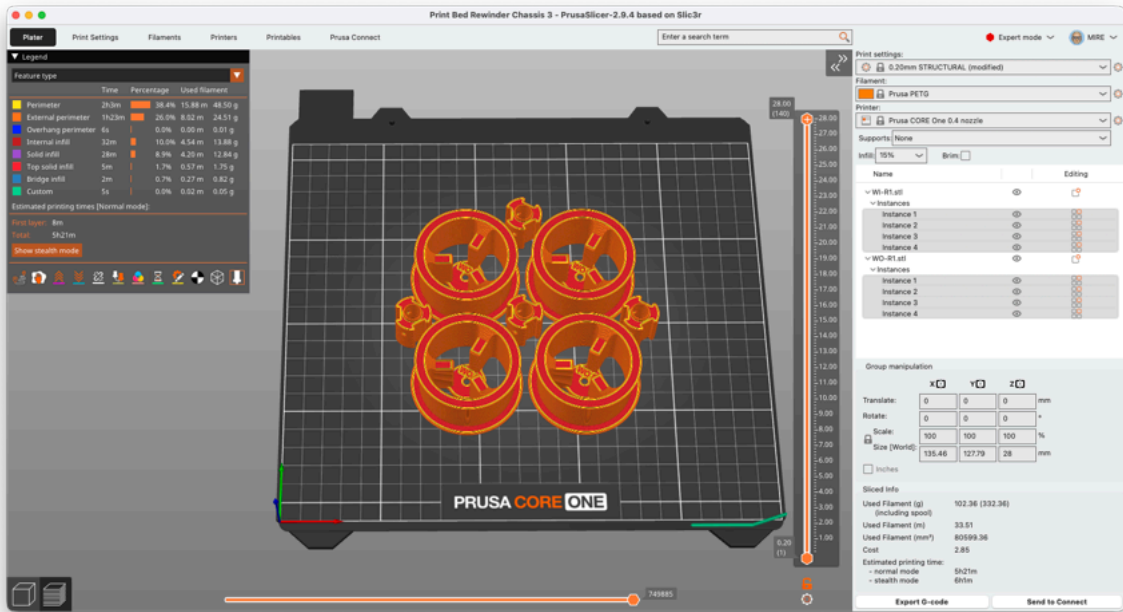


Figure 3 Prepared printing plate Rewinder chassis 3.

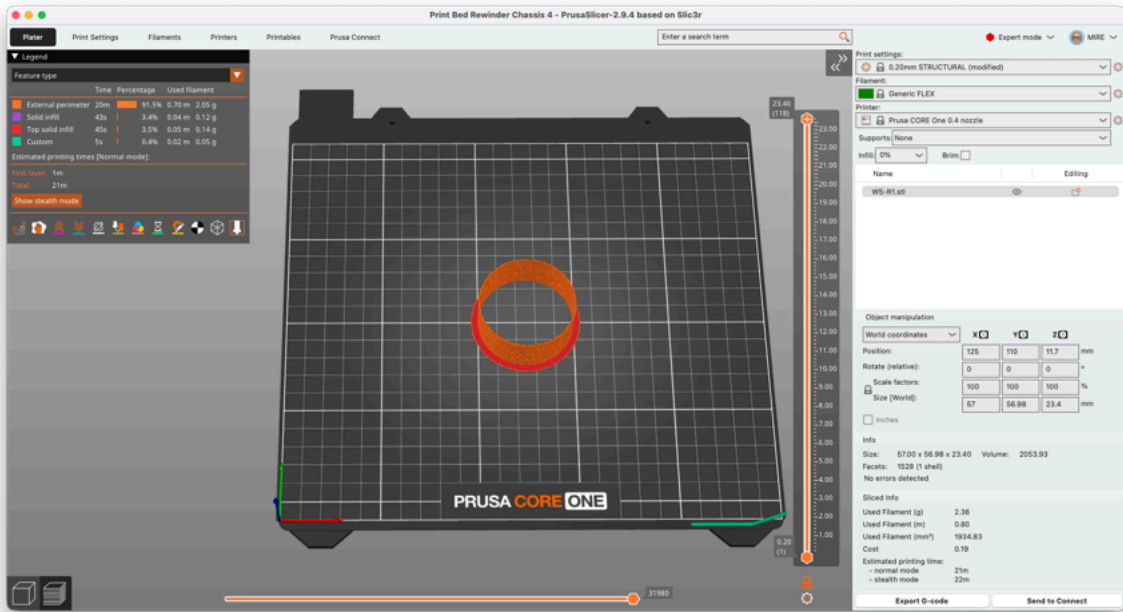


Figure 4 Prepared printing plate Rewinder chassis 4.

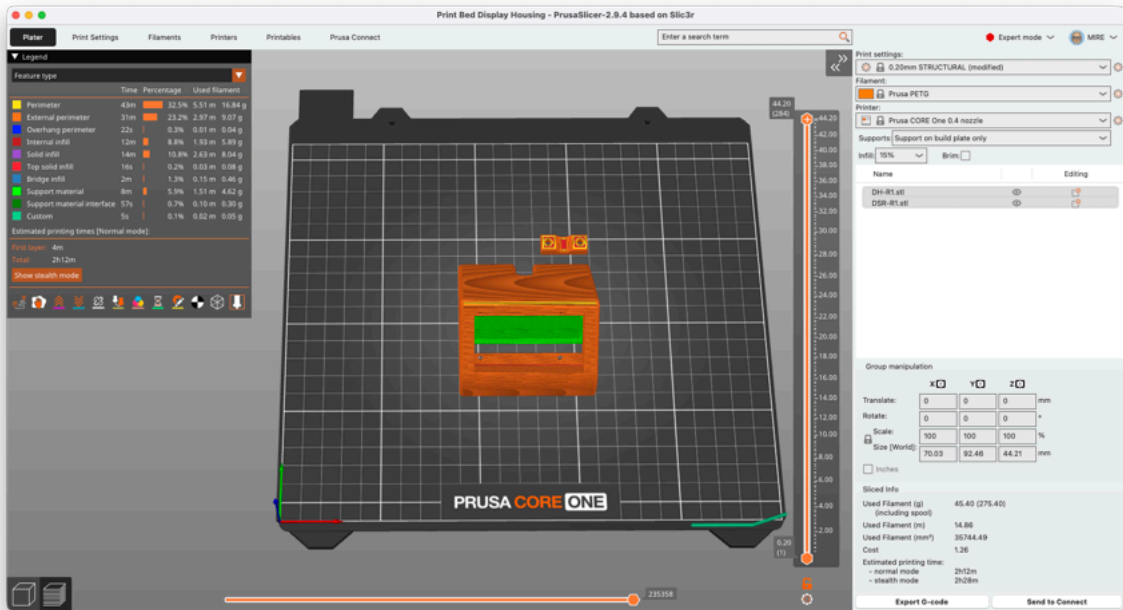


Figure 5 Prepared printing plate display housing.

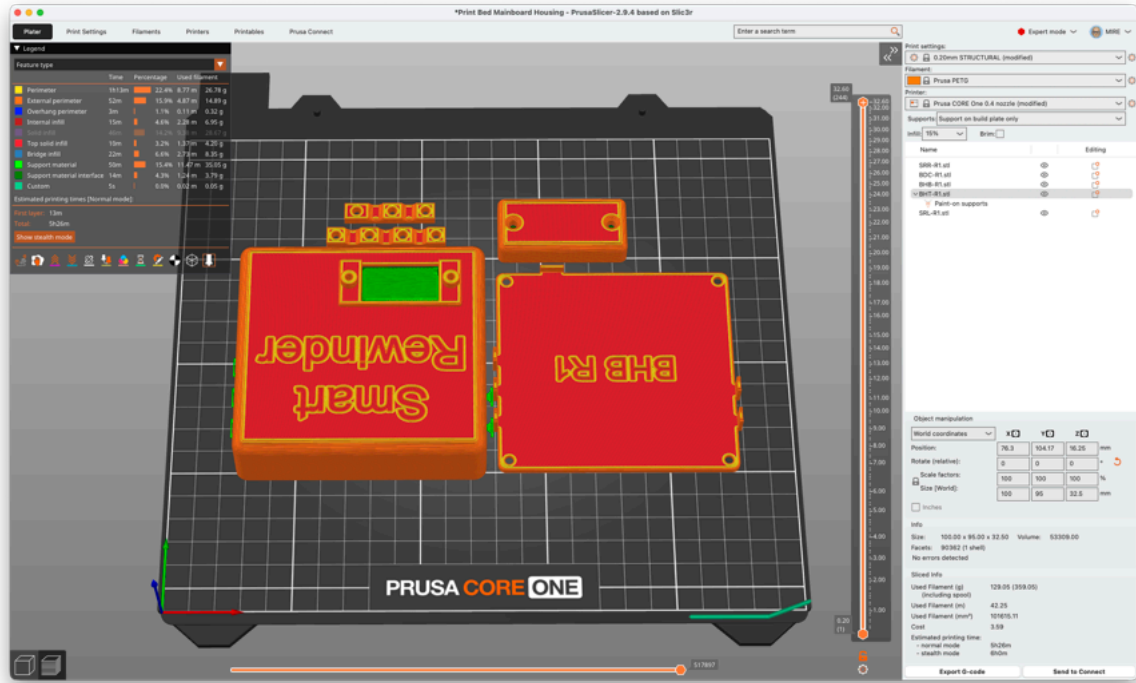


Figure 6 Prepared printing plate mainboard housing.



## 8 Assembly

Before starting the assembly process, it is recommended that you read the entire document first.

The assembly of the model is moderate but in principle straight forward as it has only a few different parts compared to its size and features.

I avoided to use threaded inserts and only use self-tapping holes for the screws. This turns out more than sufficient and reduces the efforts and cost a lot. Just make sure you do not over-tighten the screws. After a few screws you will get a good feeling for the right force. A small advice: I recommend being very cautious when using a power drill to turn in the screw. Most of them are just too fast and it will heat up the screws from friction and I guess you can imagine what heat does to plastic. I use the Bosch Professional GO 3, which is basically okay. If you make some shorts breaks in-between or switch between the screws after a few turns it works quite well. I put the torque setting on almost the lowest level. The final turns I do by hand.

### 8.1 Description and naming of the parts and material

All components have a 2 or 3 letter tag, which is also embossed into the part for identification (except if not possible due to the size of the part). It is followed by the revision number, for example "WI R1" or "MBL R1". The parts in the download are named also according, just using a "-" instead of the space.

In this document we are only using the part name without the revision. It refers always to the latest revision, exceptions will be mentioned. For the material the ID assigned in the material overview.

### 8.2 Assembling and soldering the circuit boards

The steps for assembling and soldering the PCBs, as well as a list with descriptions of all electrical components, can be found in the document "Controller and Electronics Assembly Manual."

### 8.3 Material, parts, and assembly steps for the components

#### 8.3.1 Rewinder Chassis

##### 8.3.1.1 *Materials and parts*

The parts list used is for a Rewinder chassis.



Table 6 Material quantities for Rewinder chassis.

ID	Qty.	Purpose / Comment
MS3x4	15	Wheel hubs and rear timing belt gear.
S3x6	7	
S3x8	2	Strain relief and Filament tension limit switch calibration.
S3x10	4	For stepper motor
CS3x6	21	Frame
CS3x8	14	Filament lever und sensor housing
CS3x18	1	
B685	4	
B688	5	
PC4x6	1	
MEMA	1	Incl. cable
GT2P	1	
GT2B	1	
PTFE	1	37 mm
ROD8	2	60 mm
SDRV	1	
AS56	1	Pre-soldered with magnet. Header pins mounted on the back side.
MSWR		Soldered to JCX0210
JCX0210		Soldered to MSWR
PCB3		Rewinder PCB prepared with all components soldered in place

Table 7 Printed parts and quantities for Rewinder chassis.

Part	Qty.	Description
MBL	1	Frame left
MBR	1	Frame right
MSF	1	Middle space bottom
MST	1	Middle spacer top
FGF	1	Filament guide front
FLL	1	Filament lever left
FLR	1	Filament lever right



Part	Qty.	Description
FSL	1	Filament sensor left side
FSR	1	Filament sensor right side
MSR	1	Filament sensor Rotor
WGR	1	Timing belt gear
SHL	1	Filament tension limit switch left
SHR	1	Filament tension limit switch right
CSR	1	Strain relief
CLS	1	Cover left
CRS	1	Cover right
WI	4	Wheel hub
WO	4	Wheel
WS	4	Wheel sleeve

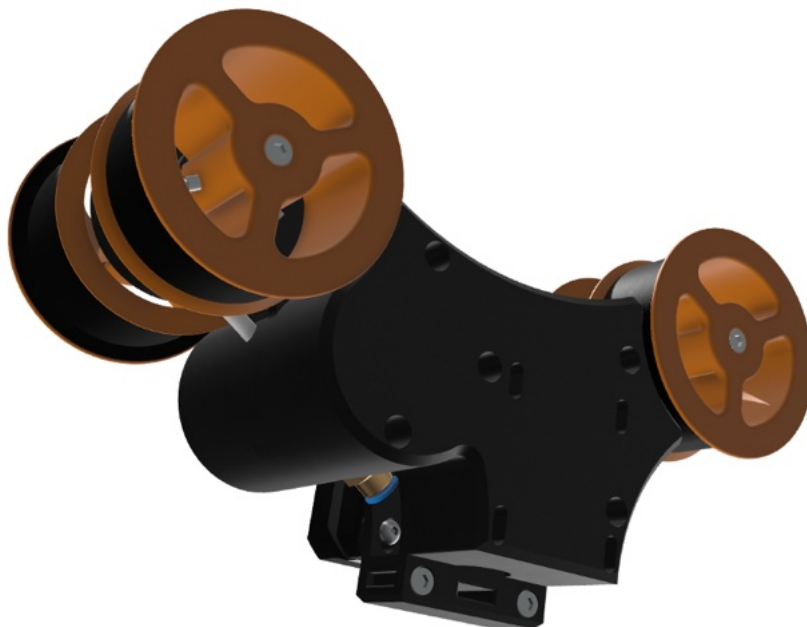


Figure 7 Assembled Rewinder Chassis.



### 8.3.1.2 Assembly steps

First, press two B688 ball bearings into the recesses provided in the left-hand MBL frame. The best way to do this is to carefully insert the bearings by hand and then press them from the other side onto a flat surface, such as a pad of paper. The bearings must be flush with the shell.



Figure 8 Rewinder Chassis assembly step 1.

Next, the FGF, MSF, and MST parts are mounted on the other side of the MBL.

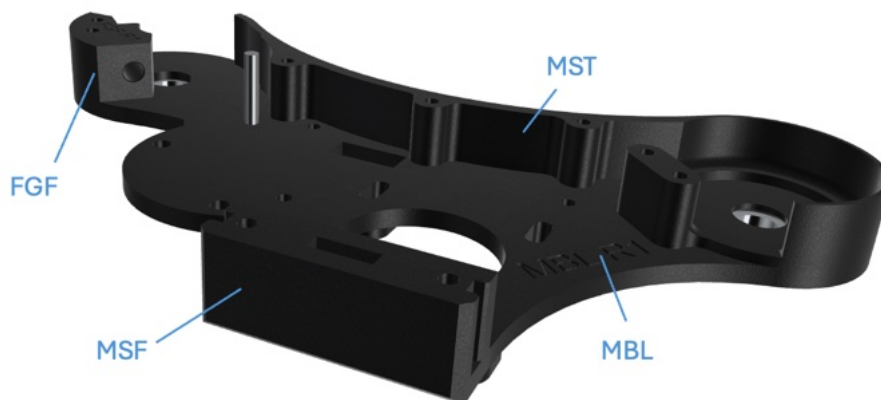


Figure 9 Rewinder Chassis assembly step 2.

Secure these parts with 7 CS3x6 screws. Finally, insert a CS3x18 screw from the same side as shown.



Figure 10 Rewinder Chassis assembly step 3.

Now we prepare the NEMA stepper motor. To do this, place the GT2 gear GT2P on the shaft. A distance of approx. 0.5 mm must be maintained between the gear and the motor. When tightening the grub screw in the gear, make sure that it is aligned precisely with the **flattened side of the shaft**. Tighten it slightly first to ensure that it is correctly aligned. Now tighten the second screw, before the other screw can also be tightened completely.

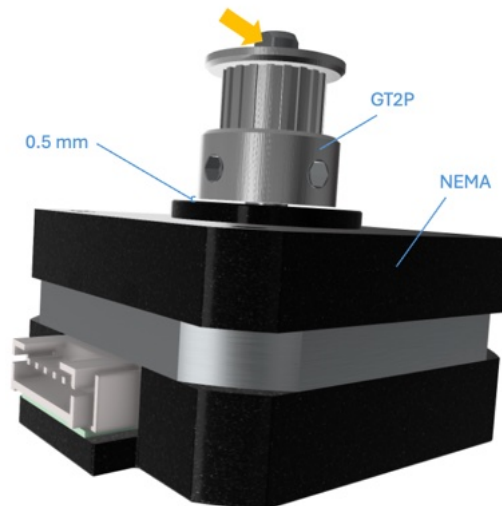


Figure 11 Rewinder Chassis assembly step 4.

Place the NEMA stepper motor on the previously prepared left frame MBL from the outside.

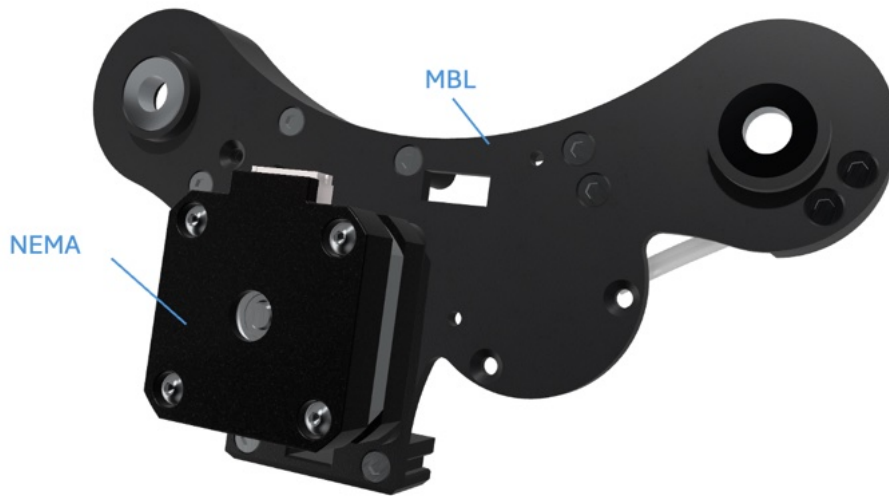


Figure 12 Rewinder Chassis assembly step 5.

Secure the motor with four S3x10 screws from the inside. Then feed the stepper motor cable through the **recess in the MBL marked with an arrow**. You can also do this later.

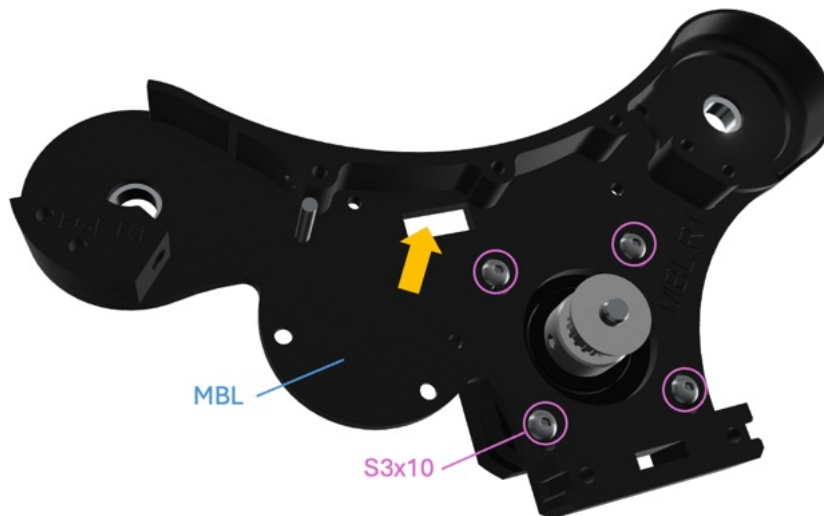


Figure 13 Rewinder Chassis assembly step 6.

Push the axle ROD8 through the rear ball bearing into a wheel hub WI. Place the gear WGR with the flat side facing the open end onto the axle and press it in until it is fully seated.

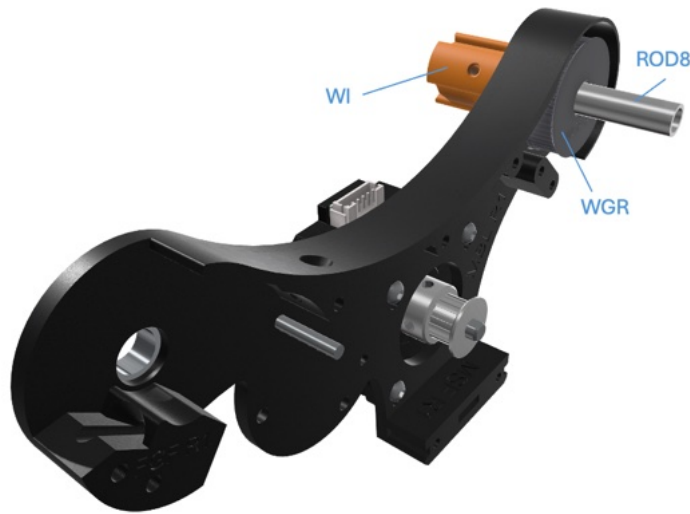


Figure 14 Rewinder Chassis assembly step 7.

Now pull out the ROD8 axle with the WGR gear again without moving the gear wheel on the rod. Now secure the gear wheel with three MS3x4 grub screws.

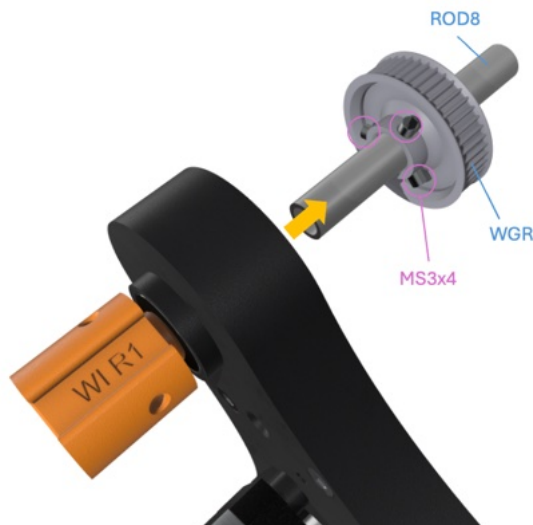


Figure 15 Rewinder Chassis assembly step 8.

Push the axle ROD8 with the gear WGR back into the ball bearing. Place the belt GT2B around the pulley GT2P and the gear WGR. The belt does not need to be tensioned at this stage.

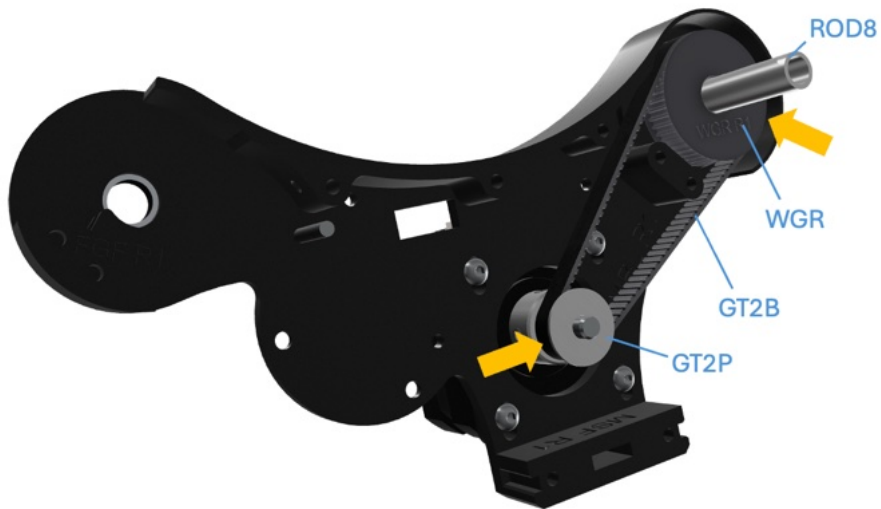


Figure 16 Rewinder Chassis assembly step 9.

Now insert the wheel hub WI from the other side and secure it with three grub screws MS3x4



Figure 17 Rewinder Chassis assembly step 10.

Now repeat this for the front axle, but without the gear wheel.

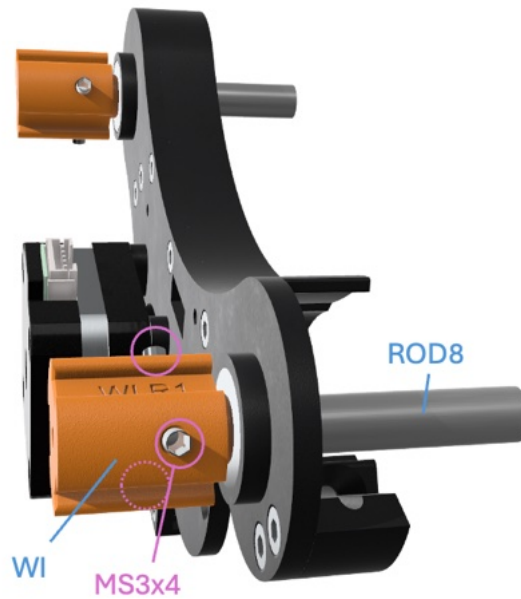


Figure 18 Rewinder Chassis assembly step 11.

Then lay the component on its side and slide the lever part FFL with the open side still facing up onto the axle. Insert a ball bearing B685.

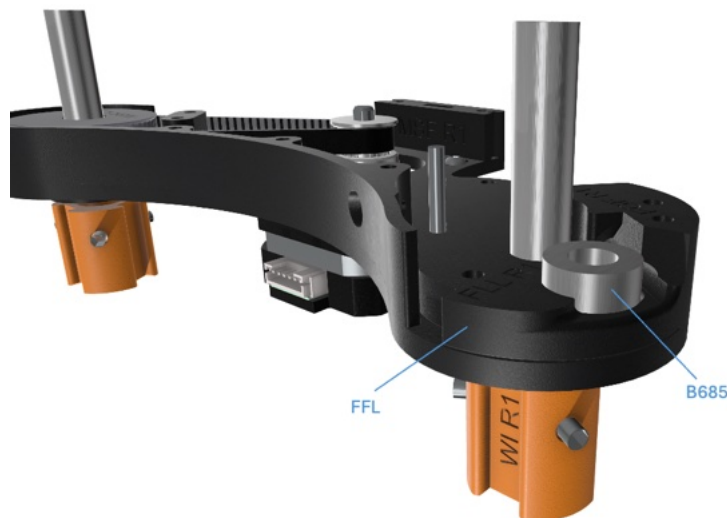


Figure 19 Rewinder Chassis assembly step 12.

Slide the right side of the FFR lever onto the axle and screw both parts together with two CS3x8 screws. The lever should then move very smoothly on the axle.

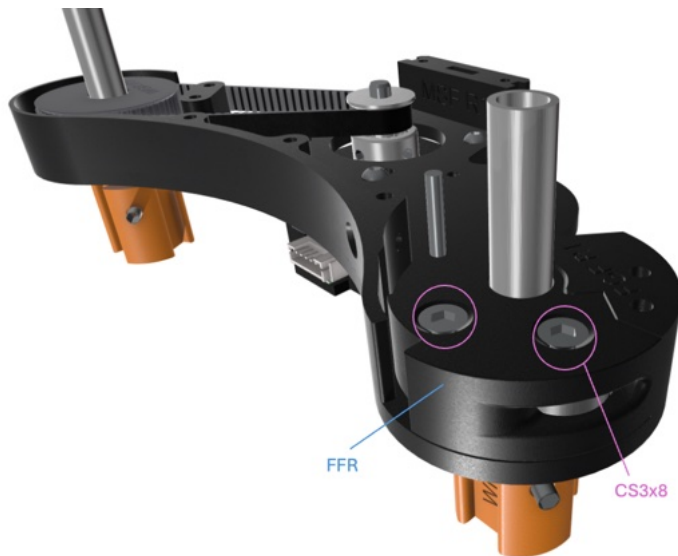


Figure 20 Rewinder Chassis assembly step 13.

Now let's turn our attention to the filament sensor. Insert three B685 ball bearings into the left half of the sensor housing FSL. Secure only the central bearing with a CS3x6 countersunk head screw.

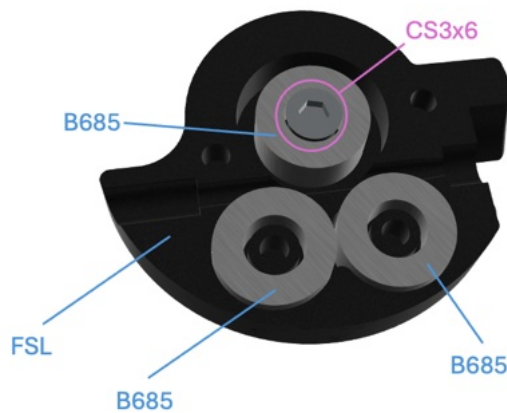


Figure 21 Rewinder Chassis assembly step 14.

Carefully press the magnet supplied with the AS56 module into the MSR rotator. This magnet has a special polarity. Do not lose or damage it, as it cannot be replaced with a normal magnet. Then insert the rotator MSR as far as it will go onto the ball bearing that we secured with a screw in the previous step.

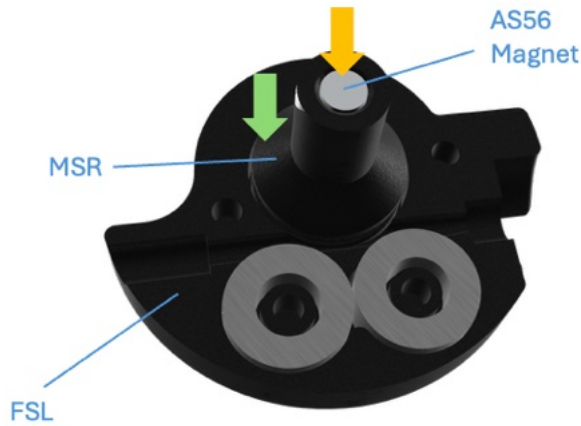


Figure 22 Rewinder Chassis assembly step 15.

Snap the right side of the housing FSR onto the left side FSL and connect them with four countersunk head screws CS3x8. The rotator should then be able to rotate freely and smoothly.



Figure 23 Rewinder Chassis assembly step 16.

Screw the PTFE tube connector PC4x6 straight onto the right-hand side.

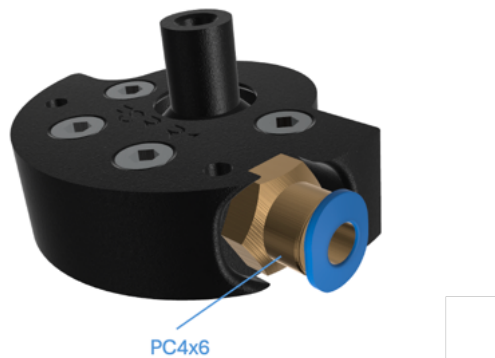


Figure 24 Rewinder Chassis assembly step 17.



On the left side, insert a 37 mm long piece of PTFE tube until it stops.



Figure 25 Rewinder Chassis assembly step 18.

Push the other end of the PTFE tubing into the FGF and align the unit flush against the left frame.

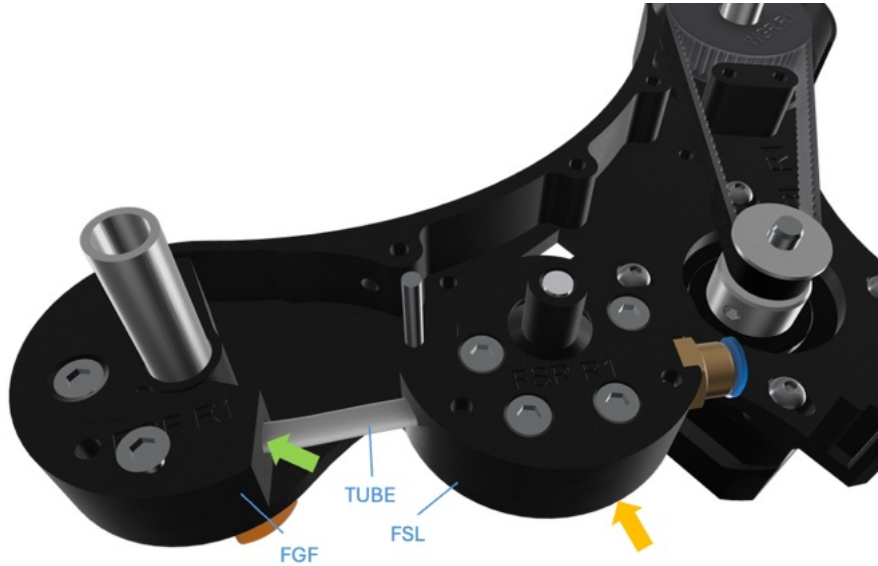


Figure 26 Rewinder Chassis assembly step 19.

From the outside, secure both with two CS3x6 countersunk head screws.

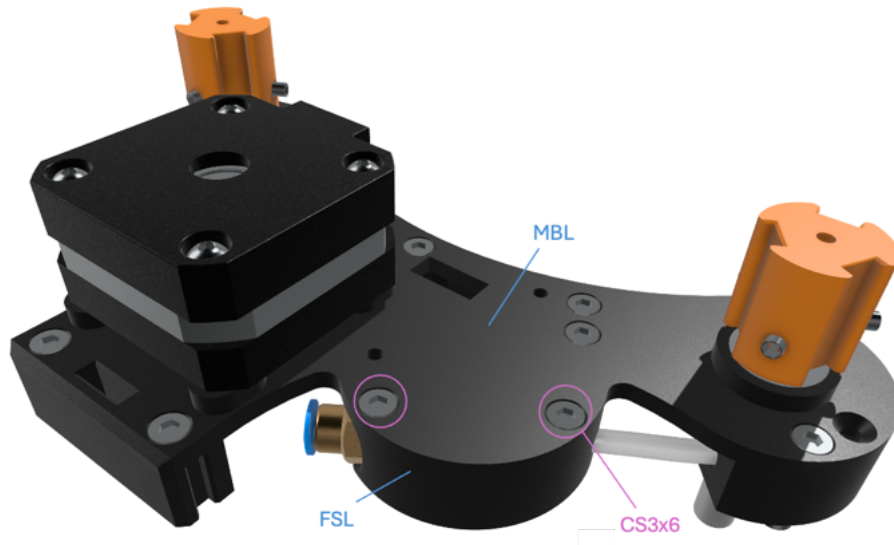


Figure 27 Rewinder Chassis assembly step 20.

Insert the MSWR micro limit switch, prepared with cables, between SHL and SHR and attach it to the previously screwed-in CSx18 countersunk head screw as shown in the figure.



Figure 28 Rewinder Chassis assembly step 21.

Now let's prepare the right frame MBR. To do this, insert three B688 ball bearings into the designated sockets. One is inserted from the inside.

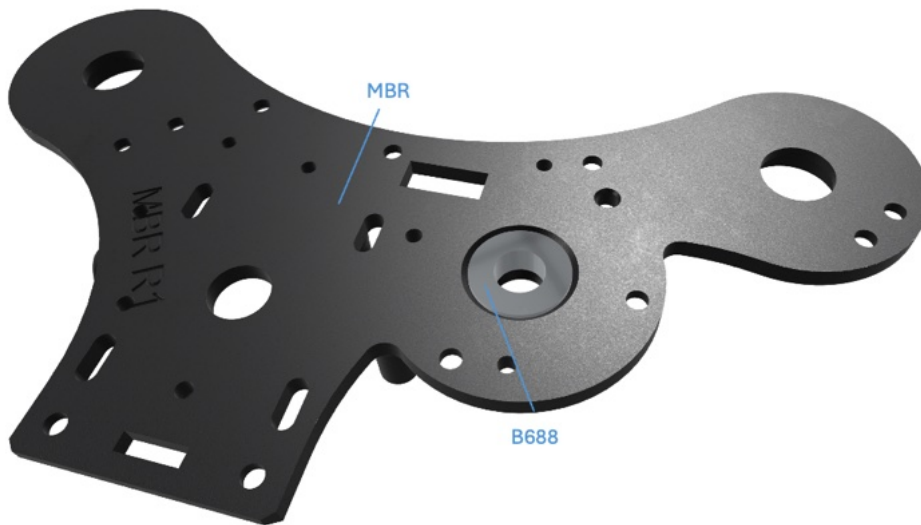


Figure 29 Rewinder Chassis assembly step 22a.

The other two ball bearings are inserted from the outside. Then pull the cables from the stepper motor and the limit switch through the marked slot.

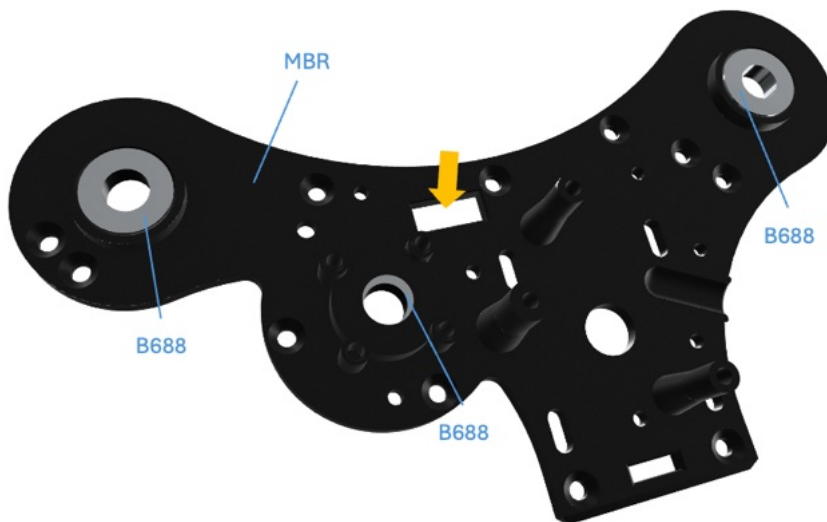


Figure 30 Rewinder Chassis assembly step 22b.

Slide the right frame part onto the axles of the left frame and ensure that the rotor slides into the middle bearing with the magnet. Ensure that the cables are not in the way or pinched. Now connect everything with 11 countersunk head screws CS3x6.



Figure 31 Rewinder Chassis assembly step 23.

Place two WI wheel hubs on both axles and secure them with six MS3x4 grub screws.

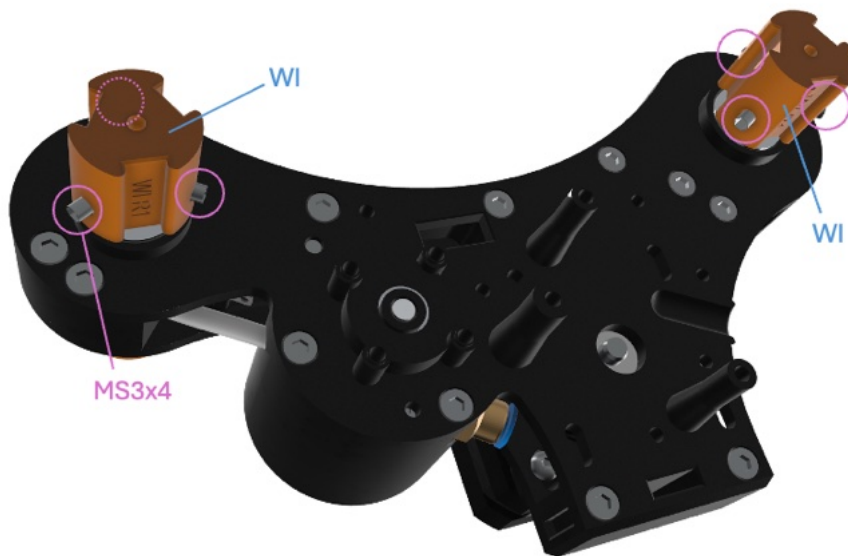


Figure 32 Rewinder Chassis assembly step 24.

Insert the prepared AS56 magnetic encoder as shown and secure it with four S3x6 screws. Ensure that the **side with the three pins is facing downwards**.

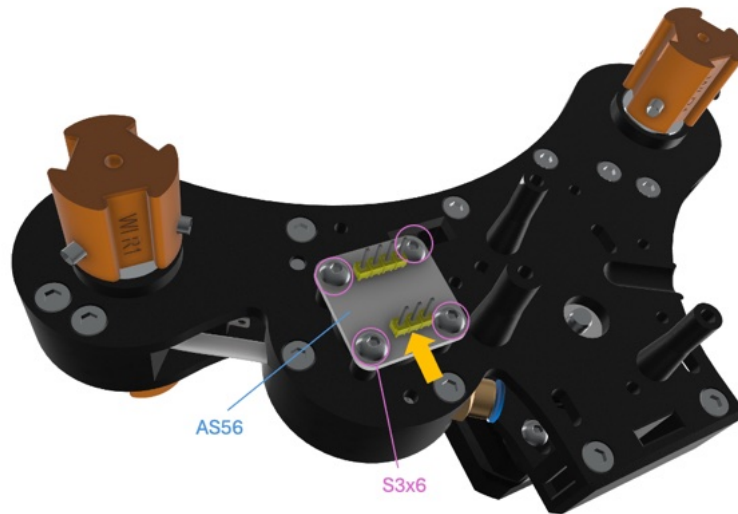


Figure 33 Rewinder Chassis assembly step 25.

Now connect the cables from the stepper motor and limit switch to the rewinder circuit board. Also plug in the 30 cm cable with sheathing for the main circuit board. Plug this into the encoder and secure the board with three S3x6 screws. Place the cable for the main board in the recess and secure it with the CSR strain relief and an S3x8 screw.

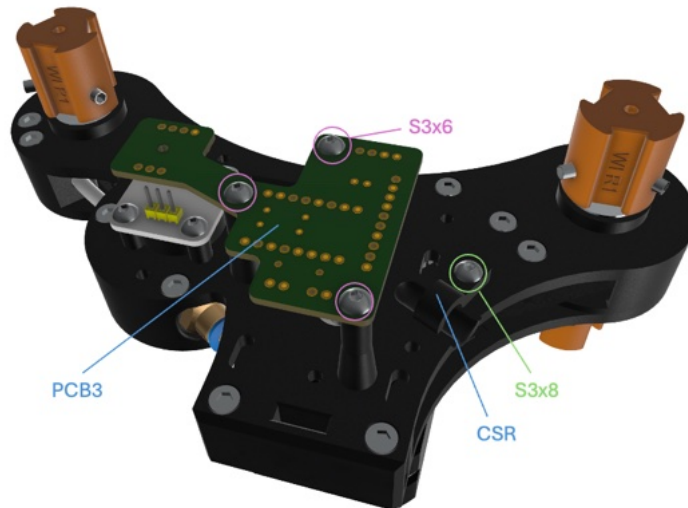


Figure 34 Rewinder Chassis assembly step 26.

The right cover CRS is fastened with five countersunk head screws CS3x8.

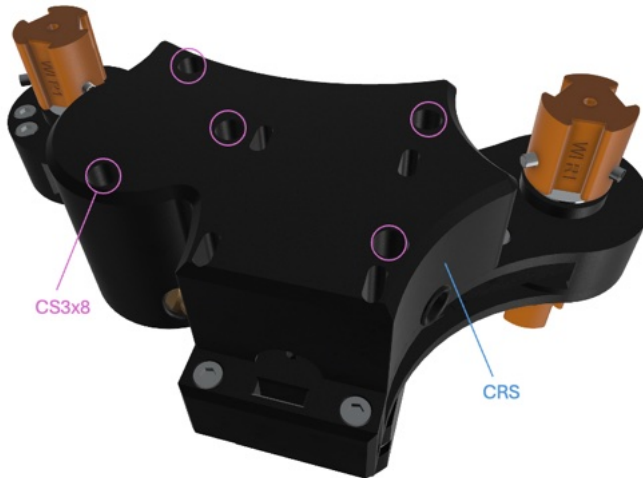


Figure 35 Rewinder Chassis assembly step 27.

Stow the remaining cable of the stepper motor in the left cover CLS and secure it with three countersunk head screws CS3x8.

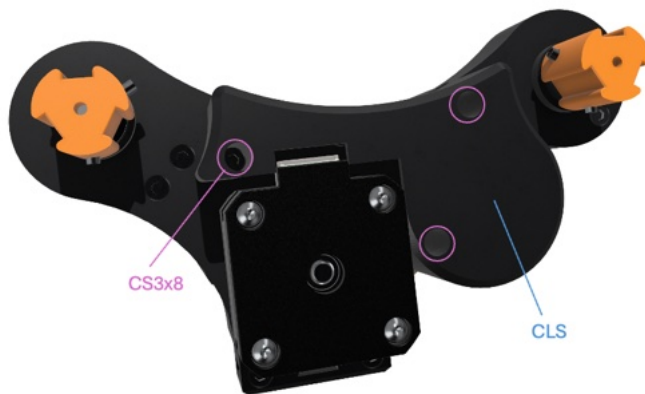


Figure 36 Rewinder Chassis assembly step 28.

Finally, pull the four rubber rings WS onto the wheels WO (paying attention to the wide side) and fasten them to the wheel hubs with four countersunk head screws CS3x6. Insert the calibration screw S3x8. This is used to adjust the limit switch.

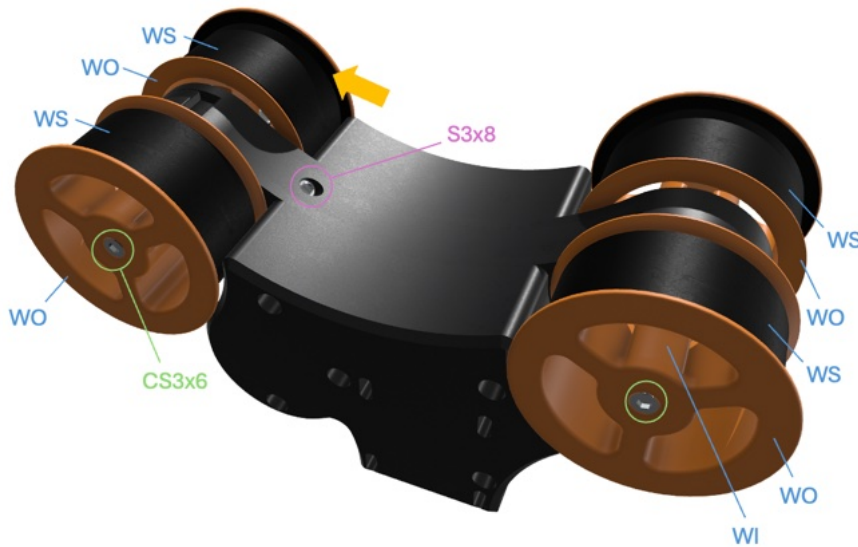


Figure 37 Rewinder Chassis assembly step 29.

### 8.3.2 Housing for main circuit board V1.0/2.0 “free-standing”

#### 8.3.2.1 Materials and parts

Table 8 Material quantities for main circuit board V1.0/2.0 housing “free-standing”.

ID	Qty.	Purpose / Comment
S3x6	4	For main circuit board
S3x10	7	Strain relief
CS3x8	6	Bottom cover und cover for display cable
PCB1.1	1	Main circuit board prepared with all components soldered in place

Table 9 Printed parts and quantities for main circuit board V1.0/2.0 housing “free-standing”.

Part	Qty	Description
BHT	1	Housing top
SRL	1	Strain relief piece
SLL	1	Strain relief piece
BHB	1	Housing bottom cover
BDC	1	Cover for display cable



Figure 38 Assembled housing for main circuit board V1.0/2.0 "free-standing".

### 8.3.2.2 Assembly steps

Place the main circuit board with the soldered components in the upper part of the BHT housing and secure it with four S3x6 screws. Insert the cable connections for the rewinders as labeled and route the cables through the openings provided for this purpose to the outside. Secure the cables with the strain relief pieces SRR and SRL and six screws S3x8.

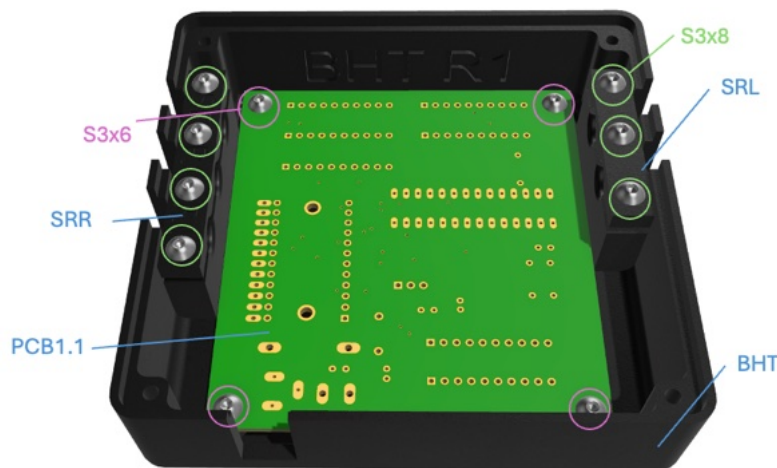


Figure 39 Main circuit board V1.0/2.0 housing "free-standing" assembly step 1.

Close the housing with the base BHB and secure it with four countersunk head screws CS3x8. Optionally, you can glue self-adhesive rubber feet RB13 Bumpon SJ5012 (12.7 x 3.5 mm) from M3 into the recesses provided for this purpose.



Figure 40 Main circuit board V1.0/2.0 housing "free-standing" assembly step 2.

Turn the housing over and plug the **display 1** and **display 2** cables into the cable connectors on the main PCB1 from above.

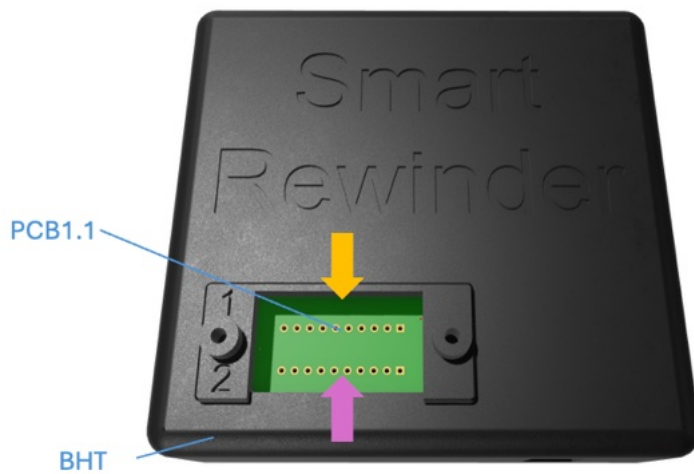


Figure 41 Main circuit board V1.0/2.0 housing "free-standing" assembly step 3.

Finally, place the cable cover BDC for the display cables and **feed the cable through the recess to the front**. Secure the cover with two countersunk head screws CS3x8.



Figure 42 Main circuit board V1.0/2.0 housing “free-standing” assembly step 4.

### 8.3.3 Housing for main circuit board V3.0 “free-standing”

#### 8.3.3.1 Materials and parts

Table 10 Material quantities for main circuit board V3.0 housing “free-standing”.

ID	Qty.	Purpose / Comment
S3x6	4	For main circuit board
S3x10	7	Strain relief
CS3x8	6	Bottom cover und cover for display cable
PCB1.3	1	Main circuit board V3.0 prepared with all components soldered in place

Table 11 Printed parts and quantities for main circuit board V3.0 housing “free-standing”.

Part	Qty	Description
BYT	1	Housing top
SRL	1	Strain relief piece
SLL	1	Strain relief piece
BYB	1	Housing bottom cover



Figure 43 Assembled housing for main circuit board V3.0 “free-standing”.

### 8.3.3.2 Assembly steps

Connect the cables for Display 1 and 2 to the designated connectors on the mainboard PCB1.3. Place the mainboard with the soldered components into the upper housing part BYT. **Route the display cable through the designated opening** and secure the board with four S3x6 screws.

Connect the cables for the rewinders as labeled and route them through the designated openings to the outside. Secure the cables using the strain relief parts SRR and SRL with six S3x8 screws.

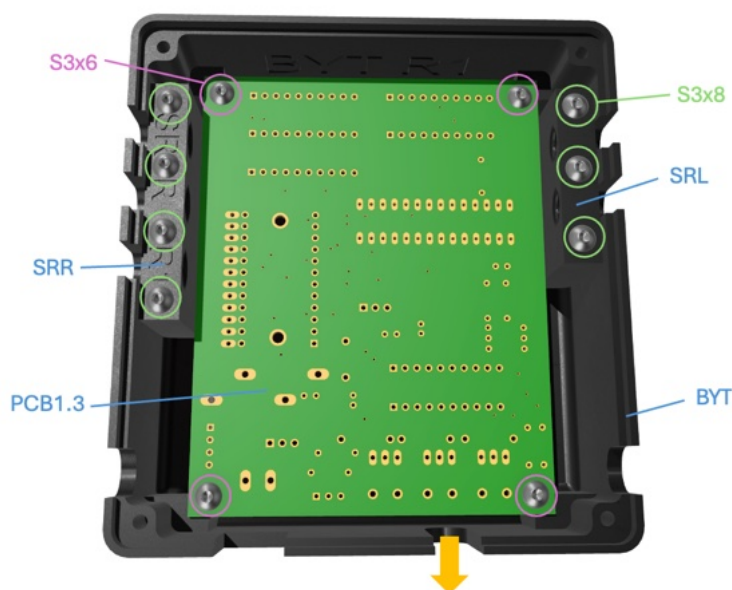


Figure 44 Main circuit board V3.0 housing “free-standing” assembly step 1.



Close the housing with the base BYB and secure it with four countersunk head screws CS3x8. Optionally, you can glue self-adhesive rubber feet RB13 Bump on SJ5012 (12.7 x 3.5 mm) from M3 into the recesses provided for this purpose.

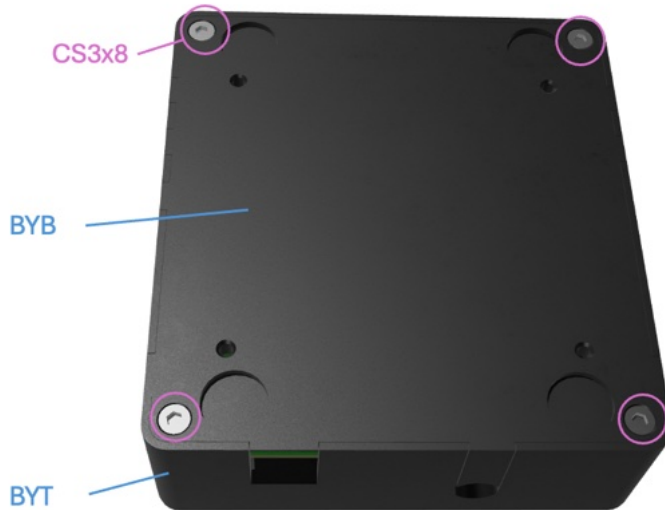


Figure 45 Main circuit board V3.0 housing “free-standing” assembly step 2.

## 8.3.4 Display housing

### 8.3.4.1 Materials and parts

Table 12 Material quantities for display housing

ID	Qty.	Purpose / Comment
S2x6	4	For display
SC3x8	2	For strain relief
PCB2	1	Display circuit board prepared with all components soldered in place
ESP32T	1	Flash firmware before installation, see chapter Fehler! Verweisquelle konnte nicht gefunden werden. on page Fehler! Textmarke nicht definiert.

Table 13 Printed parts and quantities for display housing.

Teil	Qty.	Description
DH	3	Display housing
DSR	1	Strain relief



Figure 46 Assembled display housing.

#### 8.3.4.2 Assembly steps

First, insert four S2x6 screws into the holes in the display recess of the DH housing from the inside. Insert the ESP32T display into the opening from the front with the **USB port on the right-hand side**. Tighten the four screws from the inside.

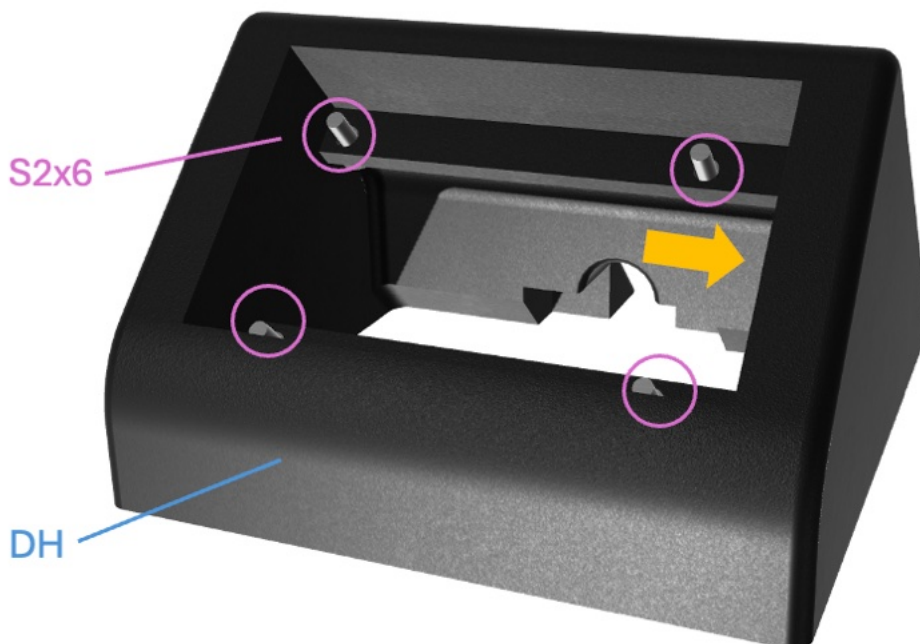


Figure 47 Display housing assembly step 1.

Insert the pre-assembled display circuit board PCB2 from the inside. Pay attention to the labeling for the USB port on the circuit board. The USB port is on the left when viewed from the front inside. Feed the two display cables with sleeve in the recess provided on the DH housing. Secure the cable



with the DSR strain relief and two CS3x8 countersunk head screws. It is best to mark the connectors with a dot or two dots on both sides beforehand to avoid confusion.

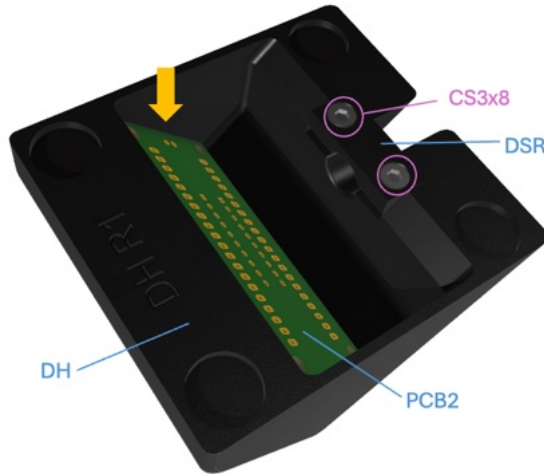


Figure 48 Display housing assembly step 2.

Optionally, you can stick self-adhesive rubber feet Bumpon SJ5012 (12.7 x 3.5 mm) from M3 into the recesses provided for this purpose.

### 8.3.5 Final steps power supply cable, PTFE tubing, mounting base, and calibration

#### 8.3.5.1 Materials and parts

Table 14 Material quantities for final steps.

ID	Qty.	Purpose / Comment
PTFE	1-5	For each Rewinder
SAS		Optional, depending in setup
CCS		Optional, depending in setup

#### 8.3.5.2 Connection and routing of power supply

Once everything is assembled and connected, plug the cable for the 12V power supply into the socket on the main circuit board.

When integrating into the CORE-CUBE, please follow the cable routing guide in the CORE-CUBE manual.

Remove the cover of the cable channel on the back of the CORE One, as with the normal MMU3 installation. Please consult the official Prusa documentation if necessary. Then push the small plug through the opening directly above it and guide it through the space in the corner behind the



stepper motor. Use the recess for the BuddyCam in the cover of the cable channel to guide the cable out of the channel at the rear.

### **8.3.5.3 Connecting the PTFE tubes**

Cut PTFE tubes to the desired length to connect the individual rewriter chassis to the MMU3.

The procedure for integrating into CORE-CUBE is like that for installing the Filamentalist Rewinder.

Try to avoid sharp bends when laying the tubes and accept a slightly longer length instead.

### **8.3.5.4 Mounting base**

To enable flexible use/integration, there are various bases available for the Rewinder chassis. The chassis is simply plugged in. The download includes two variants, and others may be available for download from [Printables.com](https://www.printables.com). Additional variants can also be developed if required.

With the freestanding version, you can optionally stick self-adhesive rubber feet RB13 Bumpon SJ5012 (12.7 x 3.5 mm) from M3 into the recesses provided for this purpose. To use the Twin-Drive functionality, you can connect the base stands using spacer pieces.



**Figure 49 Freestanding mounting base.**

When integrating into CORE-CUBE, make sure that the side with the **wide gap is at the front**. The mounting positions in CORE-CUBE and the alignment procedure are identical to those for the Filamentalist stands.



Figure 50 Mounting base for CORE-CUBE integration.

### 8.3.5.5 Calibrating the Rewinder chassis

Use the **calibration screw** to adjust the sensitivity of the filament tension lever. By manually **moving the lever**, you can feel when the limit switch is triggered. The switch should be set so that it triggers as early as possible but still switches back safely.

Loosen the four screws on the stepper motor and push it down gently until the **timing belt that drives the rear wheels** is slightly taut.

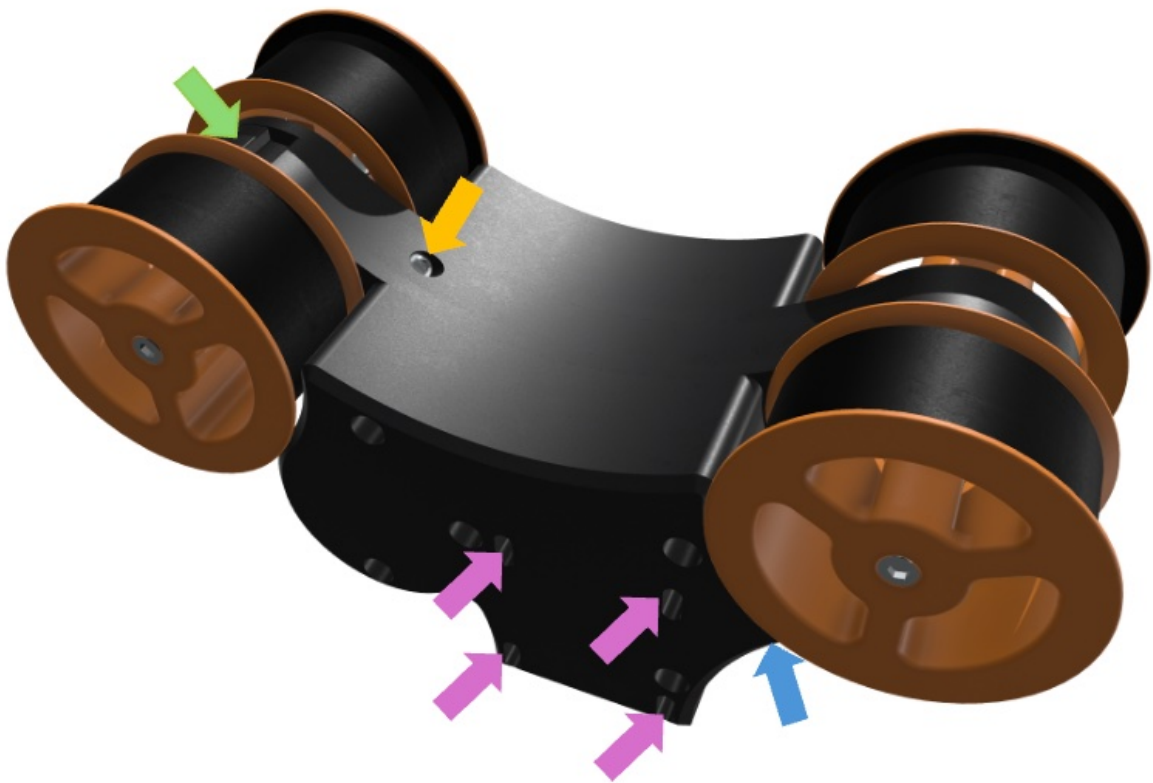


Figure 51 Calibration of the Rewinder chassis



## 9 Troubleshooting

### 9.1 Identifying and resolving problems

#### 9.1.1 Troubleshooting and resolution during printing and assembly

Table 15 Selected problems and resolutions during printing and assembly

Problem	Possible cause	Solution

To be continued ...

#### 9.1.2 Troubleshooting and resolutions during normal operation

Table 16 Selected problems and resolutions during normal operation

Problem	Possible cause	Solution
Stepper motor does not turn or is powerless.	The current is too low.	Adjust the current limit using the potentiometer on the driver breakout board. Turning the potentiometer to the left increases the current. The setting is very sensitive. Usually, only a few degrees are sufficient.
Stepper motor switches off after running for a short time	This is a protective mechanism of the stepper motor drivers, which is designed to prevent overheating	Adjust the current limit using the potentiometer on the driver breakout board. Turning the potentiometer to the right reduces the current. The setting is very sensitive. Usually, only a few degrees are sufficient.

To be continued ...



## 10 Final remark

### 10.1.1 Printer calibration

We know calibration can be an issue on such large builds, but we tried to avoid it, because the issue is where to start and where to end on future mods, upgrades, etc. On all of our three Prusa XL, two Core Ones and the MK3s the print results were the identical.

### 10.1.2 About this guide

We tried to make this guide simple but focused on the essential and hope it's sufficient. However, nobody is perfect, hence we are very happy for feedback and suggestions. In case of questions please do not hesitate to contact me.

We wish you a lot of fun and good success for your build.



## 11 References

### Index

Allen key	10
Assembly	21
Assembly time	9
Assumptions	7
Ball bearing	11
Bearing	12
Bill of material	11
Build plate	15
Calibrating	47
calibration	45
Chassis	21
Components	8
CORE One	7, 9
Countersunk head screw	11
Countersunk head screw	11
Cutter	10
Dimensions	9
Display	43
Documentation	5
Download	15
Electronic	9
Feedback	5
Filament	15
Grub screw	12
Housing	43
Housing	38, 41
Infill	15
Infill pattern	15
Layer height	15
main circuit board V1.0/V2.0	38
main circuit board V3.0	41
Material	9, 11
MK4S	9
Mounting base	45, 46
Naming	21
Nextruder	7
Part ID	21
Perimeters	15
PETG	15
Pliers	10
Power drill	21
power supply	45
Power supply	9
Pre-condition	7
Print setting	15
Print support	15
Print time	15
Printer calibration	49
Problem	48
Problem resolution	48
Prusa Slicer	7
PTFE	12
PTFE tube	12, 45
PTFE tubes	46
Required Tools	10
Revision number	21
Rewinder chassis	47
Rewinder-Chassis	8
Rubber feet	12
Safety	5, 6
Screw	11, 21
Screwdriver	10
Self-tapping holes	21
Technical data	9
Technical knowledge	9
Tests	7
Threaded inserts	21
Tools	9
Trademarks	2
Troubleshooting	48
Weight	9

### 11.1 Figures

Figure 1 Prepared printing plate Rewinder chassis 1.....	17
Figure 2 Prepared printing plate Rewinder chassis 2.....	18
Figure 3 Prepared printing plate Rewinder chassis 3.....	18
Figure 4 Prepared printing plate Rewinder chassis 4.....	19



Figure 5 Prepared printing plate display housing. ....	19
Figure 6 Prepared printing plate mainboard housing. ....	20
Figure 7 Assembled Rewinder Chassis. ....	23
Figure 8 Rewinder Chassis assembly step 1. ....	24
Figure 9 Rewinder Chassis assembly step 2. ....	24
Figure 10 Rewinder Chassis assembly step 3. ....	25
Figure 11 Rewinder Chassis assembly step 4. ....	25
Figure 12 Rewinder Chassis assembly step 5. ....	26
Figure 13 Rewinder Chassis assembly step 6. ....	26
Figure 14 Rewinder Chassis assembly step 7. ....	27
Figure 15 Rewinder Chassis assembly step 8. ....	27
Figure 16 Rewinder Chassis assembly step 9. ....	28
Figure 17 Rewinder Chassis assembly step 10. ....	28
Figure 18 Rewinder Chassis assembly step 11. ....	29
Figure 19 Rewinder Chassis assembly step 12. ....	29
Figure 20 Rewinder Chassis assembly step 13. ....	30
Figure 21 Rewinder Chassis assembly step 14. ....	30
Figure 22 Rewinder Chassis assembly step 15. ....	31
Figure 23 Rewinder Chassis assembly step 16. ....	31
Figure 24 Rewinder Chassis assembly step 17. ....	31
Figure 25 Rewinder Chassis assembly step 18. ....	32
Figure 26 Rewinder Chassis assembly step 19. ....	32
Figure 27 Rewinder Chassis assembly step 20. ....	33
Figure 28 Rewinder Chassis assembly step 21. ....	33
Figure 29 Rewinder Chassis assembly step 22a. ....	34
Figure 30 Rewinder Chassis assembly step 22b. ....	34
Figure 31 Rewinder Chassis assembly step 23. ....	35
Figure 32 Rewinder Chassis assembly step 24. ....	35
Figure 33 Rewinder Chassis assembly step 25. ....	36
Figure 34 Rewinder Chassis assembly step 26. ....	36
Figure 35 Rewinder Chassis assembly step 27. ....	37
Figure 36 Rewinder Chassis assembly step 28. ....	37
Figure 37 Rewinder Chassis assembly step 29. ....	38
Figure 38 Assembled housing for main circuit board V1.0/2.0 “free-standing”. ....	39
Figure 39 Main circuit board V1.0/2.0 housing “free-standing” assembly step 1. ....	39
Figure 40 Main circuit board V1.0/2.0 housing “free-standing” assembly step 2. ....	40
Figure 41 Main circuit board V1.0/2.0 housing “free-standing” assembly step 3. ....	40
Figure 42 Main circuit board V1.0/2.0 housing “free-standing” assembly step 4. ....	41
Figure 43 Assembled housing for main circuit board V3.0 “free-standing”. ....	42
Figure 44 Main circuit board V3.0 housing “free-standing” assembly step 1. ....	42
Figure 45 Main circuit board V3.0 housing “free-standing” assembly step 2. ....	43
Figure 46 Assembled display housing. ....	44
Figure 47 Display housing assembly step 1. ....	44



Figure 48 Display housing assembly step 2.....	45
Figure 49 Freestanding mounting base. ....	46
Figure 50 Mounting base for CORE-CUBE integration. ....	47
Figure 51 Calibration of the Rewinder chassis.....	47

## 11.2 Tables

Table 1 Technical data .....	9
Table 2 Tools. ....	10
Table 3: List of mechanical materials.....	11
Table 4 List of electronic components.....	13
Table 5 Printed parts.....	16
Table 6 Material quantities for Rewinder chassis.....	22
Table 7 Printed parts and quantities for Rewinder chassis.....	22
Table 8 Material quantities for main circuit board V1.0/2.0 housing “free-standing”.....	38
Table 9 Printed parts and quantities for main circuit board V1.0/2.0 housing “free-standing”.....	38
Table 10 Material quantities for main circuit board V3.0 housing “free-standing”.....	41
Table 11 Printed parts and quantities for main circuit board V3.0 housing “free-standing”.....	41
Table 12 Material quantities for display housing.....	43
Table 13 Printed parts and quantities for display housing. ....	43
Table 14 Material quantities for final steps. ....	45
Table 15 Selected problems and resolutions during printing and assembly .....	48
Table 16 Selected problems and resolutions during normal operation .....	48