

The Ashcroft Makers 3D Ribber Kit.



Disclaimer -

Any errors are mine and mine alone.

Names of products are copyright of their respective owners.

Target audience:

Self Builders of the Ashcroftmakers 3D CSM Kit.

Getting Help:

To reach the builder of Ashcroftmakers 3D CSM kits and maker of retail machines, email csmkit.support@ashcroftmakers.com - emails are answered in UK business hours and we will try to resolve any problems you may have in making, assembling and getting the ribber working.

Update History:

Revised January 2024, v1.1

If you spot any errors or omissions please let us know at csmkit.support@ashcroftmakers.com

Introduction

The ribber is an optional part of the Ashcroftmakers 3D CSM and is also part of the kit. The ribber is the same as the ribbers shipped to customers, however, needles for the ribber are only available from Ashcroftmakers

General Notes

The ribber requires approximately 300g of PLA or PLA+ filament.

It is critical that the ribber dial and tappet plate are finished flat on their mating surfaces and the ribber dial must rotate with minimal wobble at its outside circumference. [Allow the dial, whilst still on your printer to cool down to room temperature, this will help to prevent the dial from bending whilst soft] The dial must also be set to rotate as closely as possible to the tappet plate without ‘tilting’ away from the tappet plate. If this occurs it is highly likely that the needles will twist and jam the ribber, preventing the CSM from rotating.

The Dial print settings are critical to ensure the slots are the correct size without needing excessive clean-up after printing – the needles must slide easily with zero jamming, so the outer wall flow is reduced to keep the slots to size.

Setting the dial to rotate without fouling on the tappet plate by selecting the correct top spacer will help to minimise the gap. For MINOR adjustments, it is possible to reduce the height of the thinnest part of the stepped dial spacer – this retains the inner race of the bearing against the matching part of the bottom dial nut. Once set, avoid loosening the bottom nut if possible – treat the dial and nut / spacer assembly as one piece. You can obtain additional bearings from Ashcroftmakers or from any supplier of bearings although you might pay a premium for a single bearing. Our fitting kits are designed to make your life easier.

Section 1

Introduction

General Ribber Description

Ribber Parts Description

Part 1 - the beam - supports the dial assembly above the centre of the CSM, the beam has a bolt at each end, retained with spacers which set the height of the dial above the CSM. The central hole in the beam supports the tappet plate assembly with a threaded screw - this passes through the tappet plate spacer and into the dial assembly bearing spacer.

The matched pair of spacers can be replaced with other lengths of spacer if the beam is not in the correct position to knit properly. The height of the spacer is shown on the side, always use matching pairs.

Part 2 - the tappet plate assembly - comprises the tappet plate, gate cam [for ON/OFF] and the tension cam. Each cam is retained with a thumb knob and pointer which shows whether the gate is open or closed and the approximate tension setting.

Part 3 - the dial assembly - has the dial, with an appropriate number of slots from 24 to 36. Each dial is set up in the Ashcroftmakers workshop with the bearing assembly which supports the dial whilst knitting. The top spacer sets the bearing and dial clearance and the top of the spacer assembly has a captive nut which goes into the top knob and screw. The knurled spacer and bottom knob retain the

bearing which is captive between the dial and the bearing cover. The revised version has a bearing cover which is solvent welded to the bottom of the dial, make sure the bearing is pressed into the cover and the outer part of the cover fits fully flush with the base of the dial – if the cover isn't fitted properly, the bearing axis may not align with the dial axis – which results in the dial wobbling eccentrically, this may stop the ribber working as the clearance between dial and tappet plate must be minimal without fouling.

Part4 - ribber brackets - left hand and right hand, these replace the existing cam lift mechanism knob and clip.

Print the components, as with the CSM, the ribber kit includes STL's and 3MF files – the 3MF files are optimised for use on Creality Enter-3 machines with MicroSwiss hot ends, using bowden tube extruders.

The parts are grouped in the 3MF files according to common print settings, e.g. with or without support in the same file.

Some use has been made of per-model settings in order to minimise the number of separate print sessions necessary to print an entire ribber.

AshcroftMakers can supply a fixing kit with fixings, and bearing.

Ribber Parts List

Part Name	Part Number	Qty
Ribber Beam	Ribber_Part 1	1
Top Knob	Ribber_Part 1a	1
Tappet clamp	Ribber Part 1b	1
Tappet clamp knob	Ribber Part 1c	1
Slotted base feeder	Ribber Part 2	1, also in CSM kit as part9
Tappet plate	Ribber_Part 3a	1
Tappet plate spacer	Ribber_Part 3b	1
Bracket Knob	Ribber_Part 4	2
Gate knob	Ribber_Part 5	2
Tension Gate	Ribber_Part 6a	1
On-Off gate	Ribber_Part 6b	1
Pointer	Ribber_Part 7	2
Dial	Ribber_Part 8a	1 - multiple slot counts 24-36
Dial Fin	Ribber_Part 8b	1 per dial
Bottom bearing shell	Ribber_Part 8c	1 per dial
Bearing cover	Ribber Part 8d	1 per dial
Spacer 28mm	Ribber_Part 9	2 - multiple heights 26 - 30mm
Left Ribber Bracket	Ribber_Part 10a	1
Right Ribber Bracket	Ribber_Part 10b	1
Cam Lift Screw	Ribber_Part 10c	2 - common with CSM
Cam Lift Washer	Ribber_Part 10d	2 - common with CSM
Cam Lift Knob	Ribber_Part 10e	2 - common with CSM
Bracket Nut Retaining Cap	Ribber_Part 10f	2 – shared with CSM
Dial pusher frame	Ribber Part 11a	1
Dial pusher	Ribber Part 11b	1
Dial linker	Ribber_Part 12a	1 per dial
Dial ribbed spacer	Ribber_Part 12a	1 per dial
Dial spacer – 13.1mm	Ribber_Part 12b	1 per dial, multiple heights from 13.1 to 13.7, engraved

Fixings

All stainless steel, quantities are for one ribber, with additional quantities noted.

2 x M5 x 50mm hex head bolts – these have 20mm thread length

Used for the beam fixing to the CSM,

[you can use 60mm fully threaded M5 screws if necessary]

1 x M5 x 40mm hex head bolt – 20mm thread length

as used in CSM

Used for the pinch clamp

2 x M5 x 25mm hex head screw – fully threaded

one additional per dial assembly

8 x 3.5mm dia x 9.5mm (No6 x 3/8) blunt point self tapping screw

one per beam spacer, minimum 2 required,

[Ashcroftmakers fit all beam spacers with a screw during assembly]

two additional per dial assembly (for the fin)

2 x 2.9mm dia x 9.5mm (No4 x 3/8) blunt point self tapping screw

as used in CSM

for the gate and tension pivots

2 x 3.5mm dia x 19mm (No6 x 5/8) blunt point self tapping screw

as used in CSM

to attach the pusher to the spider

1 x M5 half nut

as used in CSM

for the top knob

5 x M5 full nuts

as used in CSM

two for the ribber brackets

one for the pinch clamp

two for the dial spacer

two additional per dial assembly

2 x M3 x 16 hexagonal headed screws

for the gate locking knobs

2 x M3 full nuts

for the gate locking knobs

2 x M3 washers, nylon or stainless, AshcroftMakers uses nylon washers
for the gate pivot screws

1 x 6900RS (22x10x6 outside dia, bore, width, with rubber shields),
bearing for the dial
one additional per dial assembly.

Tools

The same assembly tools as the AshcroftMakers CSM, the #1 and #2 Pozidrive screwdrivers and an 8mm nut driver or spanner.

Section 2 Printing

Ribber Dial 30.3MF contains:

- 30 slot dial

- Dial fin, which is screwed to the bottom of the dial

- Bottom knob

- Bearing cover

- Knurled knob – engraved with DO NOT UNSCREW

The full set of dial STL files: 24 ,26 ,28, 30, 32, 34, 36 can be imported into the slicer as you need.

Each dial requires these components and the supporting spacer assembly.

Ribber Beam Spider.3MF contains:

- Beam

- Clamp knob and grip

- Bottom knob

- Dial fin

- Top knob engraved with UNDO THIS KNOB TO CHANGE DIAL

- Spider and pusher

- Gate knobs

Print one set of this file.

Yarn Feeder_part9.3MF contains:

New Yarn Feeder with slotted base, this component is shared with the standard CSM.

Print one from this file.

Ribber Cam Lift.3MF contains:

- Right and left hand ribber mount brackets
- Left and right cam lift screws
- Two cam lift knobs
- Two cam lift washers
- Two nut retaining caps for mount brackets

N.B. Some of these components are shared with the AshcroftMakers CSM kit, the brackets replace the cam lift clips with the captive knob arrangement for the left hand threaded cam lift screws. All Ashcroft CSM's are shipped with the Ribber Brackets fitted.

Print one set of this file.

Ribber Tappet Plate.3MF contains:

- Ribber tappet plate
- Tappet plate spacer
- Two beam knobs

Print one set of this file.

Ribber Dial 30 3 part 3MF contains:

- 30 slot dial
- Bottom knob
- Bearing cover
- Dial fin

Print one set of this file per dial, replacing the dial STL model in the 3MF file. If only printing a single dial, you can remove the bottom knob and dial fin as these also print from the Beam Spider file.

Spacer Linker 3MF contains:

- Single model of bottom spacer;
- Multiple heights of top spacer;
- A single 'linker';

Other heights of top spacer are in the RIBBER PARTS directory.

Print one set from this file and select during assembly the correct top spacer length, see the assembly instructions below for more details.

Ribber Pointer.3MF

The file contains 3 pairs of pointer STL files, print in a contrasting colour to the Tappet Plate.

Print the 3MF as you see fit, the pointers are small and will disappear into inconvenient crevices – they will need a small amount of finishing so spares are always handy.

Ribber Gates.3MF

The file contains a pair of gates: On/Off and Tension.

The gates need to be smooth on both sides, so printing on PEX/PEI is preferable to a textured surface. Check the thickness of the finished parts, it should be not less than 4.8mm.

Bearing Assembly Press.3MF

Contains a number of ‘useful’ jigs and fixtures:

1. A rectangular based mounting cone – put an M5 hex head bolt up from below and fix with an M5 locknut from above, use as a general purpose nut puller and use it to finish the 30T gear when it has the bearings fitted.
2. A thin disc with a raised section – use this to ensure that the ribber dials have sufficient clearance to accept the bearing cover and be completely flush with the bottom face of the dial, if the bearing isn’t properly placed the dial will have a vertical wobble which will cause problems with running clearances and knitting. The dial MUST rotate with a minimal wobble.
3. There are two square bottomed [to hold in a vice] mounting pillars:

the first has a larger diameter surface at the bottom of the central pillar, this is an assembly aid for fitting the bearing cover properly to the dial, this has a number '1' on the side of the square

the second has a smaller diameter surface, this is a simple mount for the dial/bearing assembly to check whether the dial rotates without wobble. This has a number '2' on the side of the square

4. A thick washer, use the thick washer in conjunction with the number 2 pillar to press fit the bearing into the bearing cover.

5. A cylinder with a deep recess. Use this with the number one mounting pillar and an M5x40 hex head bolt to put the dial, bearing and bearing cover into compression so that you can solvent weld the bearing cover into the dial.

Section 3

Ribber Assembly

Refer to the annotated parts diagram – duplicated parts are not necessarily shown.

The assembly sequence does not necessarily coincide with the printing of components which are grouped by requirements for printing with support [for example].

Beam



- The beam is printed upside down to ensure the socket for the tappet plate and dial requires no post print cleaning up.
- Using a lever (we use a

sharpened 3d printer spatula), remove the central hexagonal support material, the text support material and lever off the support material at the ends. Remove the support material above the rectangular clamp opening.

- Finish each end to a good surface with a file so that the beam knob turns without snagging.
- Clean up the rectangular socket for the clamp and the clamp, making sure an M5 bolt passes through the hole and the clamp slides easily in the socket.
- Pull an M5 full nut into the clamping knob.
- Put an M5x40 bolt through the beam, put the clamp over the bolt, making sure the curved section is facing the large recess in the beam, then fit the clamping knob loosely onto the bolt.

Beam Knobs



- Using the 50mm hexagonal headed bolts, fit one to each beam knob, pulling the bolt

through until there is a minimum of 47mm of bolt shaft protruding from the end of the knob.

Beam Spacers

- The beam spacers – matched pairs of spacers – 26, 28 and 29mm high;
- Loosely fit each spacer with a 3.5mm x 9.5mm screw
- Using the 28mm spacers, ‘thread’ each spacer onto a mounting bolt, before tightening up the self tapping screw on the side, the spacers act as retainers for the beam mounting bolt;
- Additional heights of spacers are provided with all AshcroftMakers ribbers – the 28mm high version is always the size we find works during testing of ribbers prior to shipping.



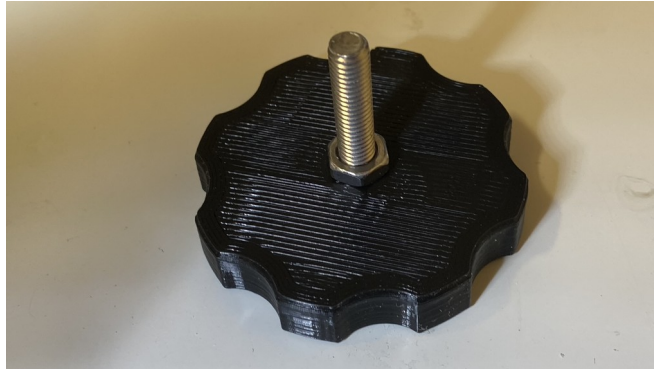
Beam Assembly

Push the beam knob/screw through the beam end, making sure the hexagonal recess is on the top, using a 28mm spacer, thread the spacer over the threaded portion and up the bolt, stop when the bolt turns easily and there is about 9mm of thread visible. Tighten the screws on the spacers. The spacer acts as a bolt retainer and the fit is tight to prevent the spacers rotating.



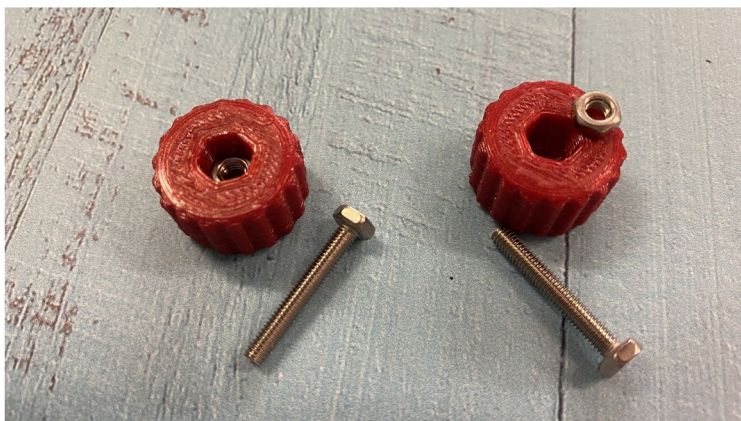
Top Knob

Put an M5x25 screw through the knob engraved with 'USE THIS KNOB TO CHANGE DIAL', place an M5 half nut over the screw from the other side and tighten the nut fully. This makes the M5 screw captive to the knob.



Gate Knobs

Pull an M3 nut into each of the small ribbed gate knobs, there is a taper in the hexagonal socket so the nut will pull in tight, there should be at least 3mm of socket above the top surface of the nut, if the nut is too close to the top, the gate screws may not be long enough to give proper engagement.

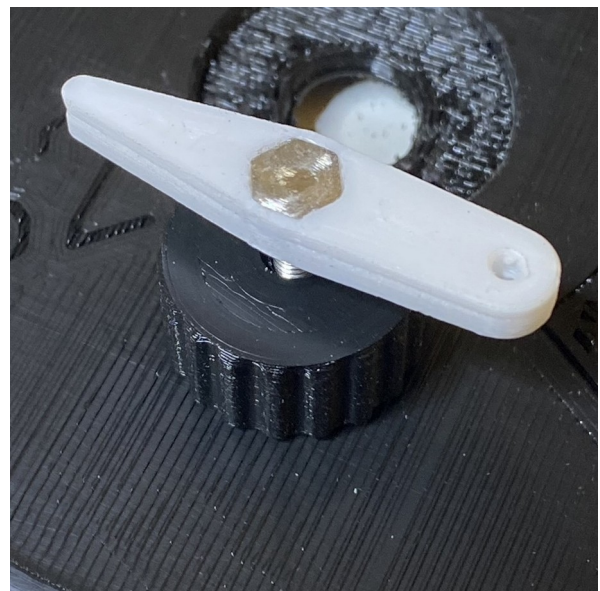


Pointers

Finish the pointers by removing any print artefacts and make sure an M3 bolt passes easily through the hole. The pointer should slide in the radial arc in the tappet plate.

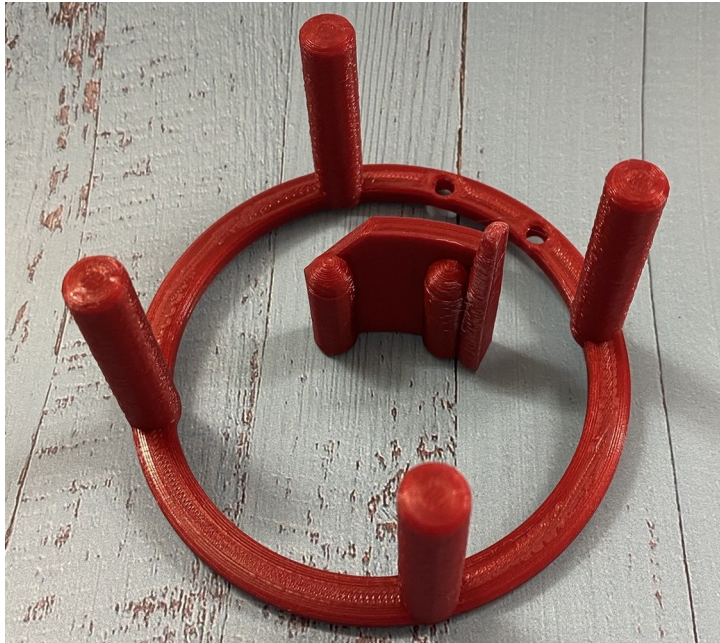
Gates

Polish the sides of the ON/OFF gate and the inside arc of the tension gate, make sure the hex head of the M3 screw fits the recess and open up the hole so that the screw goes through the gate and the head sits flush with the gate surface.



Spider and Pusher Assembly

Locate the spider and the pusher from the printed parts, polish the front of the pusher [the high end] to ensure the knit doesn't snag – the knit passes between the pusher and the fin on the dial [which should also be smooth].



Cam Lift and Ribber Mounting Brackets

Follow the CSM kit instructions for assembly of the cam lift knob and washer into the extended mounting brackets for the ribber.

At each end of the extended bracket is a socket for an M5 nut, insert an M5 full nut into the socket and push the cap over the nut onto the raised pillar. Make sure the cap goes fully down over the nut.



Tappet Plate and Spacer

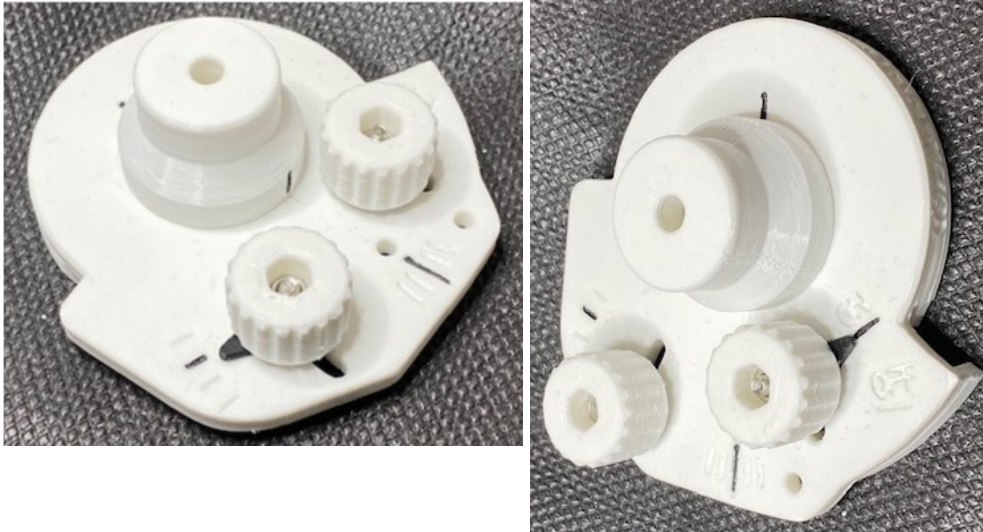
Flatten the non engraved side of the tappet plate – removing any ridges left from the printing stage. Do this in the recess and the surface which will be closest to the top of the dial.

The spacer should require no finishing and can be solvent welded into the tappet plate when the tappet plate is finished [it is easier to finish the tappet plate when it can be laid flat on the bench]. Be sure to align the markings on the tappet plate with the marking on the spacer so that the indexing marks on the tappet plate spacer line up with the marking on the beam. When using the ribber, alignment of the tappet plate with the CSM is critical, this is covered in the Ribber Manual as part of the instructions for using the ribber. AshcroftMakers paint fills the central line on the tappet plate and the lines which show where the pointers should be for correct tension and to open the On/Off gate.

Assembling the Tappet Plate

Put the bolts for each gate through the respective slot from below, put a pointer over the bolt and put the knob onto the screw, retaining the pointer in the process.

Using a 2.9 x 9.5mm self tapping screw and an M3 washer, put the screw through the gate pivot hole and attach the gate to the tappet plate. These screws don't need to be tight and must not protrude through the gate where they could snag on the top of the dial.



Dial Finishing and Assembly

There are half the number of slots in a dial plate to match a cylinder with half the cylinder needles removed. Each dial assembly is comprised of:

- the dial;
- the dial fin;
- the dial knob and spacer assembly, (spacers are in a separate 3MF file).

Using a sharp implement, remove the printed support in the base of the dial. Clean off any remaining material which will prevent the top part of the bearing seating into the recess, and finish off the top surface with a file / 500grit paper to make it flat, check every slot for smooth needle operation.

The bearing is a 6900 RS single row ball bearing, 22x6x10 [dia, width, bore].

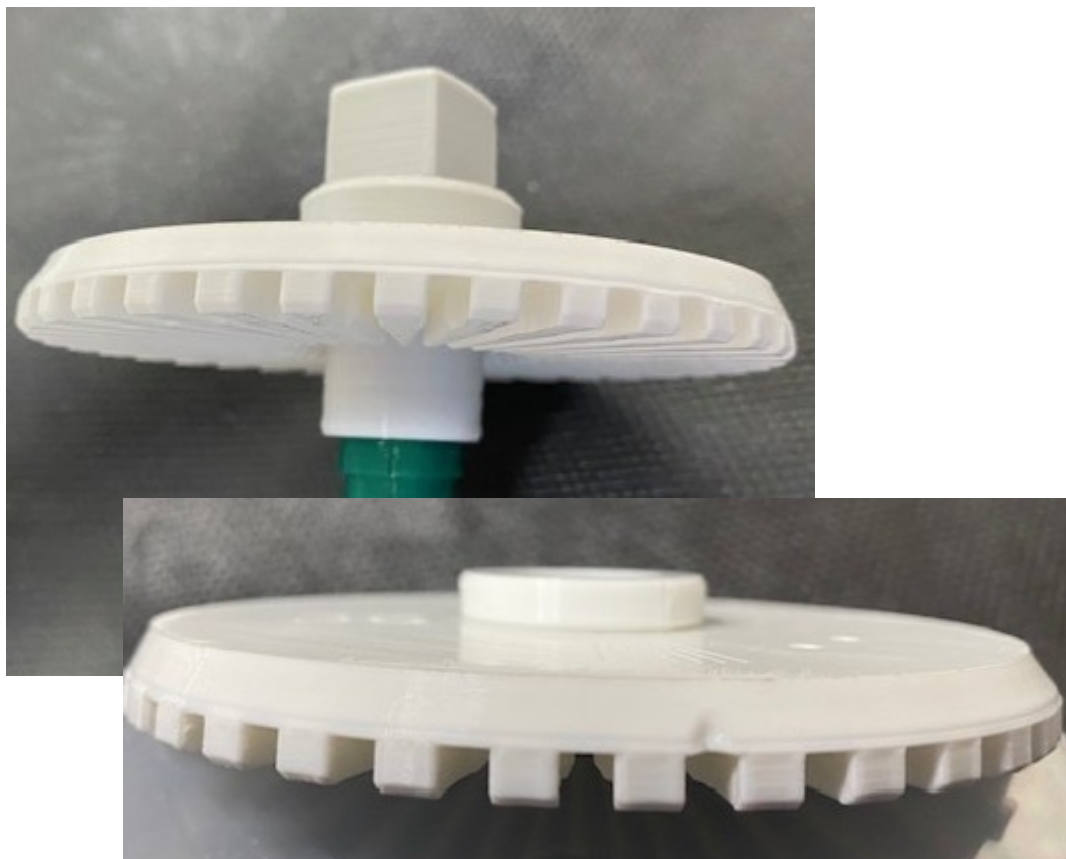
Find the bottom bearing knob in the printed parts, it is engraved with 'DO NOT LOOSEN THIS KNOB. Fit an M5 Hex head screw through the hole.

Press fit the bearing into the bearing cover, making sure the bearing is entirely recessed into the cover and the cover sits perfectly flush into the recess in the bottom of the dial.



Push the cover into the recess in the base of the dial after checking the recess is clear using the testing gauge which is printed along with the assembly fixtures.

Assemble the jig with the cover, dial, recessed washer and a knob/nut assembly from the CSM



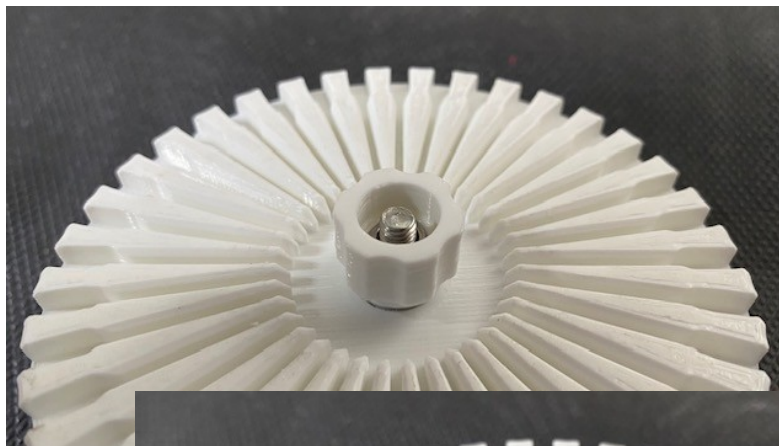
Solvent weld the dial to the bearing cover, this traps the bearing, which should have zero axial movement in the assembly. Set aside to dry after checking the rotation is wobble free by putting the assembly onto the assembly jig (with the '1' engraved on the sides) held vertically in a vice. Fit an M5 full nut to the spacer with the grooves in the side and put the dial over the screw onto the cage and spin the dial, making sure the dial rotates flat with no vertical wobble.

The inner bearing race is trapped between the bottom knob and the grooved spacer, as the bearing is always 6mm wide, this part of the assembly is a consistent dimension.

Each dial needs its own bearing, bearing cover and spacer assembly.

- Put a linker into the recess in the top of the dial spacer and solvent weld in. Leave to set.

Set aside the dial and bearing – final setting of each dial is the last stage of building the ribber.



Finally, polish the front edge of the fin and attach the fin to the bottom of the dial using 2 off 3.5 x 9.5 self tapping screws, the fin can be adjusted to set the 'timing' of the ribber needles with the cylinder needles. Setting the dial timing is covered in the Ribber User Guide.



Knurled spacer

Top spacer and

Linker [in red]

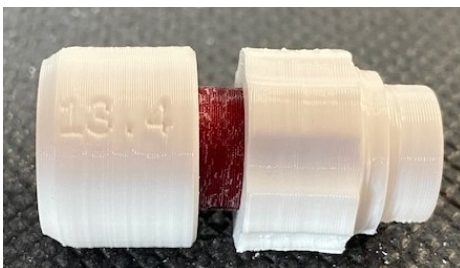


3 parts of the dial spacer, with top and knurled spacer fitted with nuts. The socket for the nut is tapered so that the nuts will be retained if you pull them in TIGHT.



Ribbed spacer with linker pushed into the top hole, thus retaining the nut.

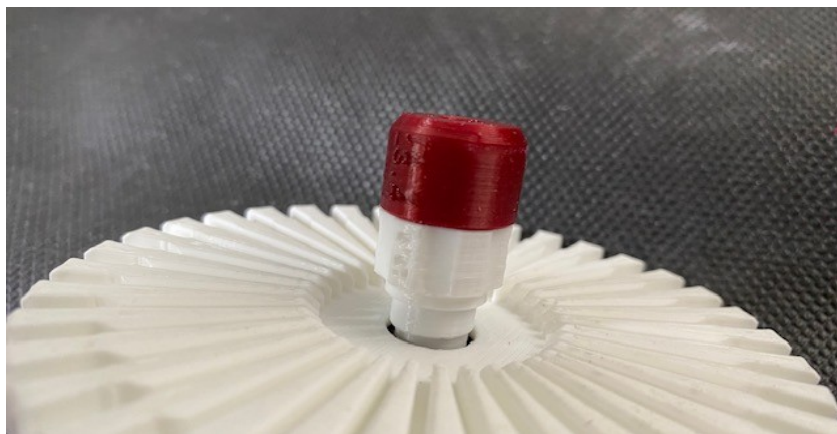
It is imperative that the linker is aligned properly into the hole in the spacer, any wobble or lean will stop the dial from keeping close contact with the tappet plate.



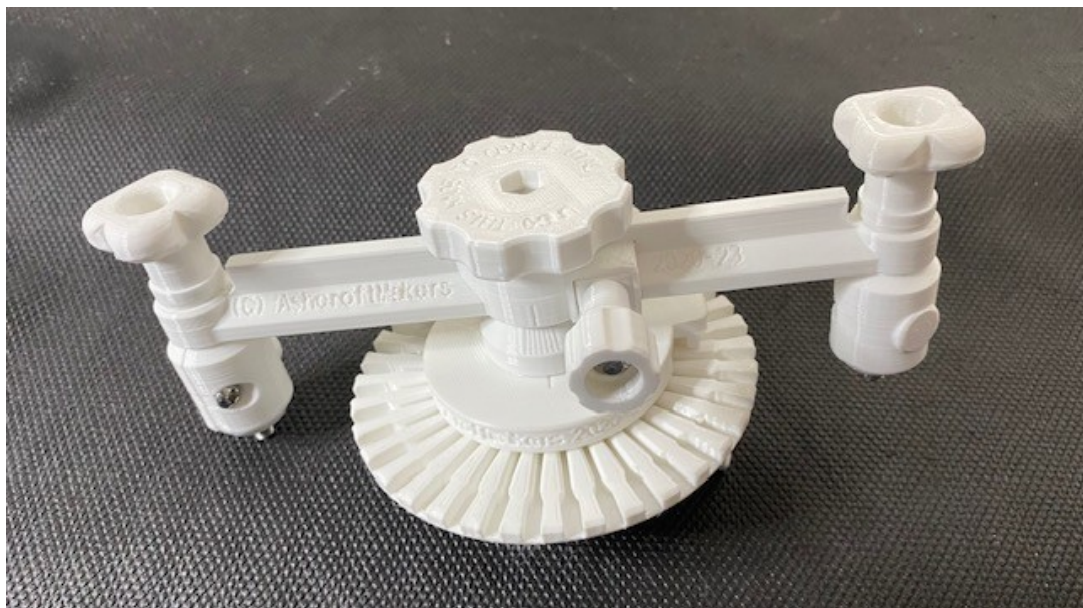
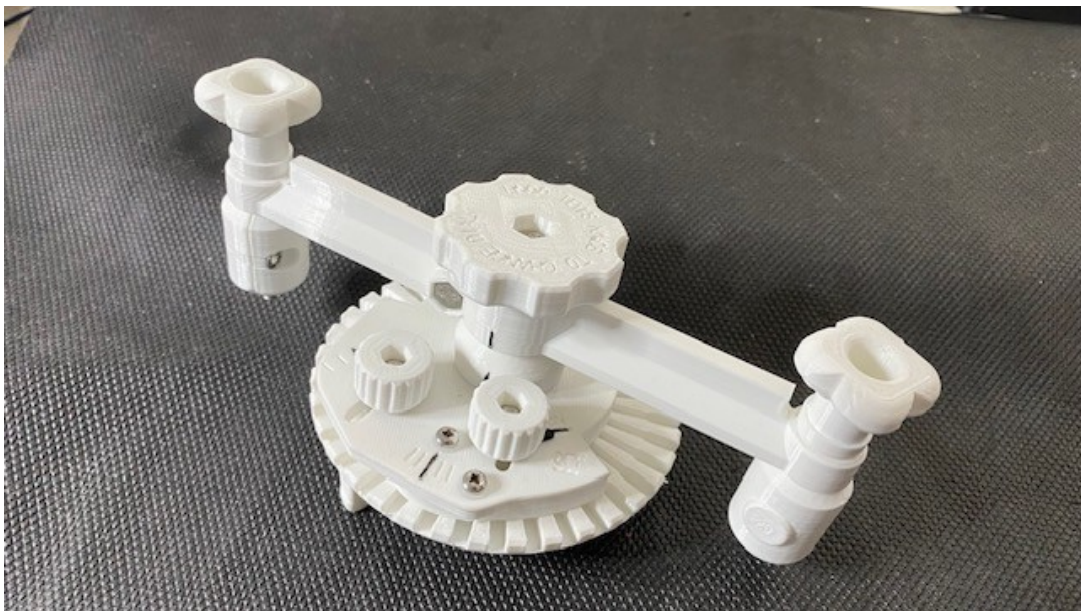
Spacer part assembled [no solvent welding] showing the length of the top spacer engraved on the side.

Final Assembly

- Take the beam and put the top knob through the centre hole.
- Take the tappet plate and put the tappet plate into the recess.
- Nip up the side knob to clamp the tappet plate into position.
- Set the dial:
 - Find the top spacers from the remaining parts – these are engraved on the side with a size, e.g. 13.5. Make sure the spacers fit into the socket in the centre of the tappet plate and can be removed easily.
 - Do a dry fit of the dial and spacer assembly - select a top spacer and pull an M5 full nut into the recess. Push the top spacer over the portion of linker protruding from the dial spacer and put the entire assembly into the socket in the tappet plate.
 - SPIN the dial and check the gap between the top face of the dial and the tappet plate. This gap must be set to an absolute minimum where the dial rotates smoothly without catching or binding on the tappet plate.
 - If there is a big gap, choose a shorter, say 13.3 engraved spacer and pull an M5 full nut into it. Experiment until you have a close, but not binding or catching setting.



- When you are satisfied with the fit and rotation, remove the dial and spacer assembly from the tappet plate, solvent weld and set aside.
- The dial spacer assembly must be vertical in respect of the dial so that the dial, when position into the tappet plate, has the same gap all around the tappet plate. Too much gap or tilting will result in the ribber needles twisting and their slots and jamming up the mechanism, this occurs during knitting rather than testing when the ribber is loaded with weight from below.



Section 4 Testing and Fault Finding

Refer to the Ribber User Guide for fitting and setting up the Ribber.

If the dial rotates smoothly without wobble and not catching on the tappet plate, the rest of the usage instructions will be found in the Ribber March 2022 guide which is in the DOC folder alongside this document.

