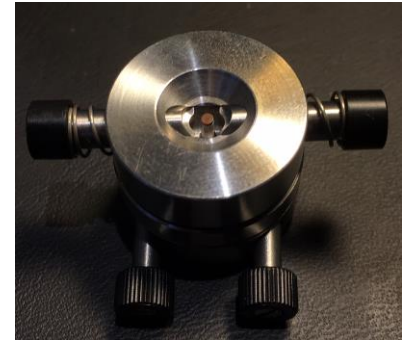
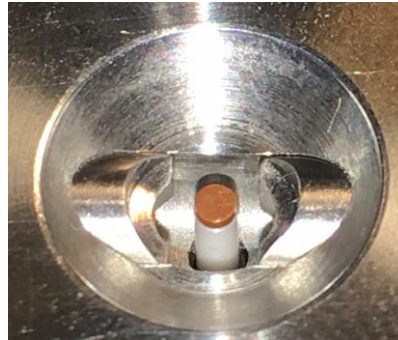


1.3 Rotor Cap Remover

User Instructions.

Part Number: RS-301-1180



Expanded view of the three main parts

Expanded view of the sharp fingers

Top view with the rotor installed

The most difficult part of this procedure is to move the end cap or base plug relative to the rotor, even if only a few tenths of a mm. Once this is achieved, two things occur: The gap is now bigger between the rotor and the cap, and as the molecular bond between the cap shaft and the inner wall of the rotor is temporarily disturbed, the cap shaft can move easier. As this particular rotor including its turbine caps and plugs cost significantly more than this tool be very, very careful as then your chances dramatically increase as to how many times you can remove the end caps or plugs without any damage.

- I. Completely unscrew the finger part of the tool relative to the clamp part of the tool by rotating the two parts relative to each other in a counter clockwise motion. In the middle of the tool you will find a specially designed mini clamp held in place by the main clamp whose control screws are on the outside of the lower section. If the mini clamp is not easily removable, remove the clamping force by turning one of the main clamp thumbscrews in a counter-clockwise motion.
- II. Insert the rotor into this middle mini-clamp. If it's too tight hold the 4mm diameter lower part in your fingers and un-screw the top cap clamp in a counter clockwise motion. Just a few degrees should be enough to insert the 1.3mm rotor easily. Inside this mini-clamp is a polymer sleeve to protect the rotor from the hard metal. Once the rotor is inside the clamp tighten this cap clamp a little so it just holds the rotor in place and not much more. Just how deeply you insert the rotor is best established empirically but if both top and bottom caps and plugs are in place it's almost all the way in. If one side has been removed already then it's a mm or two off the bottom.
- III. Insert this assembly into the top part via the rear where the sharp fingers are and see if you can see or 'feel' the gap until the gap (if at all visible) between the rotor and the cap is positioned under the fingers. Slightly depress the fingers carefully until the gap can be 'felt' using your own fingers to hold the rotor via the mini-clamp. Once you are **100% certain** you have the spot between the rotor and the cap apply significantly more pressure on the fingers of the tool until a 'click' is heard, or you can actually see the cap move, or see the gap widen or appear. Some gaps are so small they are hardly if at all visible to the naked eye. Using a large scale magnifying glass may help here or a low cost pair of low magnification reading glasses, even if you have good sight, can help quite some.

- IV. Remove the rotor with its mini-clamp, insert it into the lower clamp and secure with the two external clamp thumb screws. Try have the gap on either side of the mini-rotor clamp symmetrical on either side of the middle by looking at the tool from the bottom as then the force on the mini-clamp holding the rotor is also symmetrical. Re-assemble the tool so that the gap achieved in step III above is just a little higher than the tips of the fingers as viewed from the front. (See example in expanded view of the sharp fingers above.) If the rotor has been inserted too deeply or not enough in step II unscrew the tool, adjust the depth of the rotor accordingly in the mini-clamp and re-assemble the tool. If the gap is indeed slightly higher than the fingers you can now unscrew the top finger part from the lower clamp part until the sharp fingers align with the gap. Once you have mastered this procedure it's normally just a few degrees of rotation required before you are certain the fingers align with the gap.
- V. Once you are certain the cap remover fingers are indeed in the gap you can now increment the force on the fingers of the cap remover to the point where the fingers in the tool are back in the gap between the cap (or base plug). You can now 'unscrew' the cap from the rotor under total control and at exactly zero degrees relative to each other. Viewed another way you are holding the cap and unscrewing the rotor from the cap. All things are relative.

Technical Note: **Practice the procedure many times with the least amount of force on the rotor and turbine cap and or base plug.** This is the best way to apply the instructions here as you will very quickly get a 'feeling' for just how this new tool works. Breaking a single cap is enough to really upset your colleagues and superiors so it's worth making this investment now and becoming an expert in removing the 1.3mm turbine caps and plugs without any damage.

As the original turbine caps and base plugs have a tiny hole in the middle even with the greatest of care they can only be removed approximately 10 – 20 times before the shaft breaks off from the turbine cap or base plug. You can of course push this shaft out by opening the other side and inserting a rod with an OD of 0.8mm (or slightly less than the rotor ID of 0.9mm so as not to scratch the inner rotor wall). We will in time be making our own versions of these parts WITHOUT this hole in the middle so they should last way, way longer than the originals. Some of the sample also gets into these holes if the particle size is small enough so they need to be kept clean. Bear this in mind when changing samples.

Should you have any comments about this or any of our other products, be they good or bad, we would greatly appreciate hearing from you!

Yours sincerely,

David H. Cross