

Sample Packing System (SPS) Instructions for 2.0mm through 4.0mm Rotors

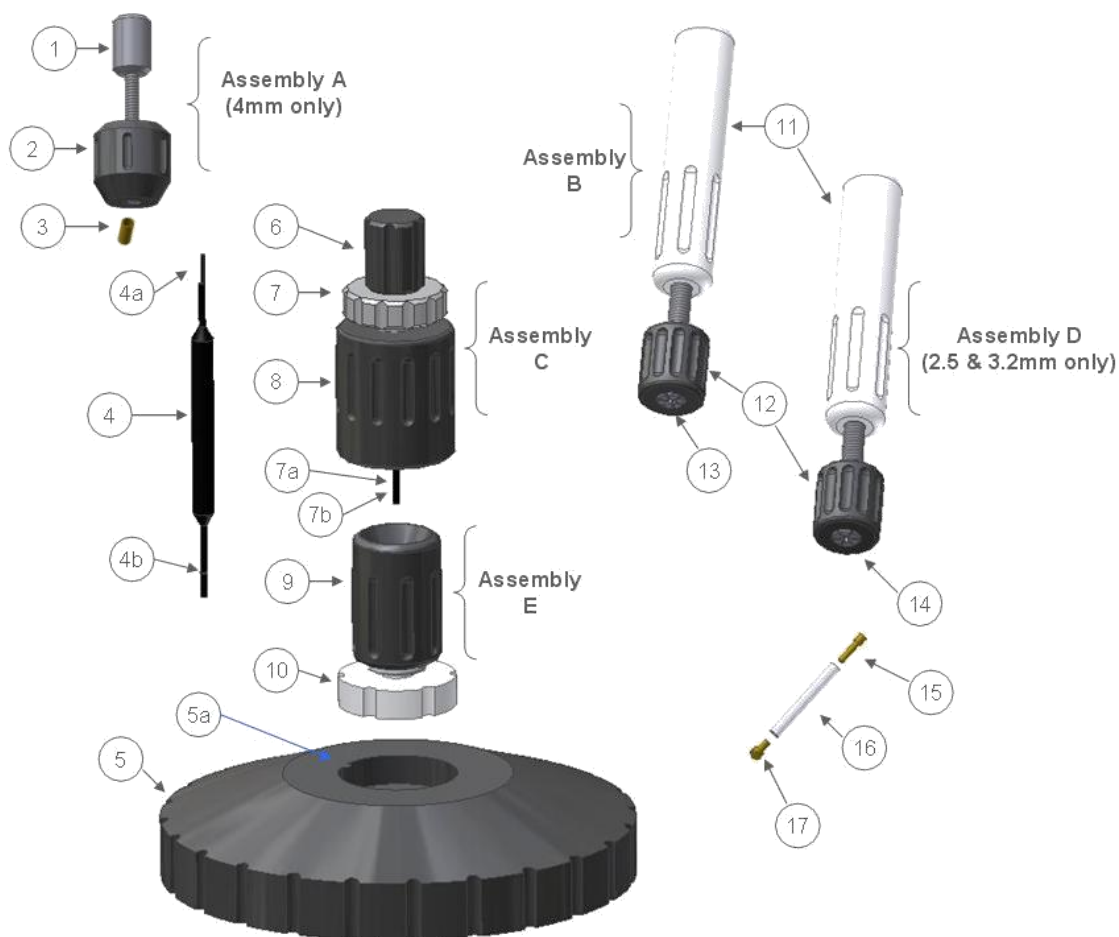


Figure 1, Sample packing system.

Item #	Description	Item #	Description
1	Top cap extractor knob	11	Extractor Handle
2	Top cap extractor body	12	Compression nut
3	Top cap (4.0mm only)	13	Drive cap extractor tip
4	Sample scraper/tamper	14	Top cap extractor tip
5	Sample scraper base	15	Top cap (2.5 & 3.2mm only)
5a	Sample scraper base locking pin	16	Rotor Sleeve
6	Scraper drill knob	17	Drive cap
7	Scraper sleeve knob	Assembly A	Top cap extractor tool assembly
7a	Scraper drill sleeve	Assembly B	Drive cap extractor tool assembly
7b	Drill bit	Assembly C	Sample scraper tool assembly
8	Scraper body	Assembly D	Top cap extractor tool assembly
9	Sample extractor body	Assembly E	Sample funnel/collet assembly
10	Collet		

PLEASE READ THE FOLLOWING INSTRUCTIONS COMPLETELY AND FAMILIARIZE YOURSELF WITH THE COMPONENTS OF THE SAMPLE PACKING SYSTEM BEFORE ATTEMPTING TO PERFORM ANY OF THE OPERATIONS DESCRIBED.

1. **Drive cap removal** (See figure 1 and 2).
 - 1.1. Loosen the **collet (10)** on the **sample extractor body (9)**.
 - 1.2. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.
 - 1.3. Tighten the **collet (10)** until the rotor is secure.
 - 1.4. Loosen the **compression nut (12)** on the **turbine cap removal tool assembly (B)**.
 - 1.5. Insert the **drive cap (17)** that is secured within the **collet/sample extractor body assembly (E)** into the **drive cap extractor tip (13)**.
 - 1.6. Tighten the **compression nut (12)** until the **drive cap (17)** is secure.
 - 1.7. Pull and twist the **turbine cap extractor tool assembly (B)** away from the **sample funnel/collet assembly (E)** until the **drive cap (17)** is extracted from the **rotor Sleeve (16)**. Be careful not to spill your sample.
 - 1.8. Pour any loose sample from the **rotor sleeve (16)** into the **sample scraper base (5)**.
 - 1.9. Loosen the **compression nut (12)** until the **drive cap (17)** is released.



Figure 2, Drive cap, and 2.5, & 3.2mm top cap removal.

2. **Top cap removal for 2.5 & 3.2mm rotors** (See figure 1 and 2).
 - 2.1. Loosen the **collet (10)** on the **sample extractor body (9)**.
 - 2.2. Insert the bottom (Drive cap end) of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.

- 2.3. Tighten the **collet (10)** until the **rotor sleeve (16)** is secure.
- 2.4. Loosen the **compression nut (12)** on the **top cap removal tool assembly (D)**
- 2.5. Insert the **top cap (15)** that is secured within the **sample funnel/collet assembly (E)** into the **top cap extractor tip (14)**.
- 2.6. Tighten the **Compression nut (12)** until the **top cap (15)** is secure.
- 2.7. Pull and twist the **top cap removal tool assembly (D)** away from the **sample funnel/collet assembly (E)** until the **top cap (15)** is extracted from the **rotor Sleeve (16)**.
- 2.8. Loosen the **compression nut (12)** until the **top cap (15)** is released. Be careful not to spill your sample.

3. **Top cap removal for 4.0mm rotors** (See figure 1 and 3).

- 3.1. Loosen the **collet (10)** on the **sample extractor body (9)**.
- 3.2. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.
- 3.3. Tighten the **collet (10)** until the **rotor sleeve (16)** is secure.
- 3.4. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
- 3.5. Unscrew the **top cap extractor knob (1)** until its tip is flush with the end of the **top cap extractor body (2)**.
- 3.6. Insert the **top cap extractor tool assembly (A)** into the **sample funnel/collet assembly (E)**.
- 3.7. Screw the **top cap extractor knob (1)** into the **top cap (15)** of the **rotor sleeve (16)**.
- 3.8. Apply downward pressure and rotate the **top cap extractor body (2)** clockwise until the **top cap (15)** is removed from the **rotor sleeve (16)**.
- 3.9. Retreat the **top cap extractor body (2)** until the **top cap (15)** is accessible.
- 3.10. Unscrew the **top cap (15)** from the **top cap extractor tool assembly (A)**.

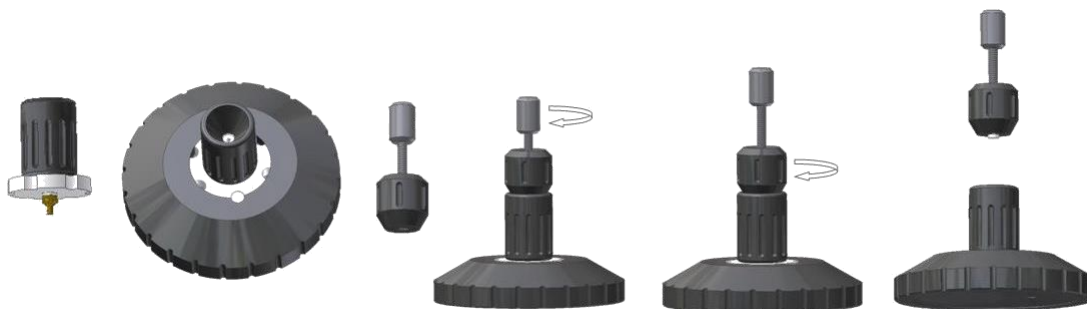


Figure 3, Drive cap removal for 4.0mm rotors.

4. **Sample removal method one** (See figure 1 and 4).

- 4.1. Remove the **top cap (3, 15)** and **drive cap (17)** as described earlier.
- 4.2. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
- 4.3. Insert the **sample tamper (4b)** into the **rotor sleeve (16)**.
- 4.4. Push down on the **sample tamper (4b)** until the sample is extruded into the **sample scraper base (5)**.

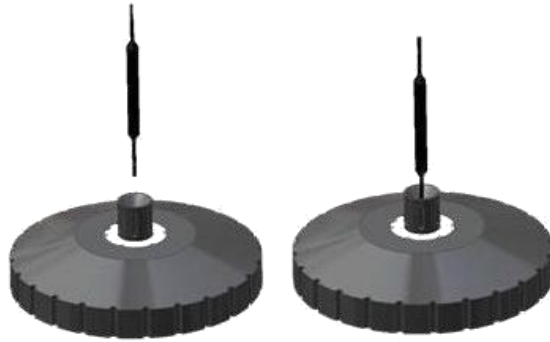


Figure 4, Sample removal, method one.

5. **Sample removal method two** (See figure 1 and 5).

- 5.1. Remove the **top cap (3, 15)** and **drive cap (15)** as described earlier.
- 5.2. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
- 5.3. Insert the **sample scraper (4a)** into the **rotor sleeve (16)**.
- 5.4. Rotate and push down on the **sample scraper (4a)** in order to break the sample apart.
- 5.5. Remove the **sample funnel/collet assembly (E)** from the **sample scraper base (5)**.
- 5.6. Pour the loose sample into the **sample scraper base (5)**.
- 5.7. Repeat the above steps until all sample has been removed, or until you can use the **sample tamper (4)** as described in method 1.

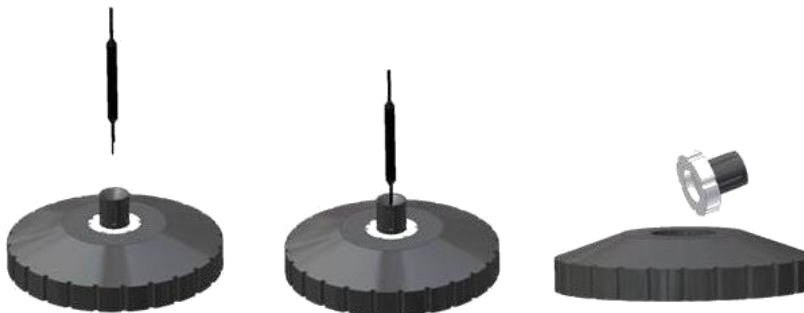


Figure 5, Sample removal, method two.

6. **Sample removal method three** (See figure 1 and 6).
 - 6.1. Remove the **top cap (3, 15)** and **drive cap (17)** as described earlier.
 - 6.2. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
 - 6.3. Insert the **sample scraper tool assembly (C)** into the **sample funnel/collet assembly (E)**.
 - 6.4. Rotate and push down on the **drill scraper knob (6)** in order to break the sample apart.
 - 6.5. Remove the **sample scraper tool assembly (C)** and the **sample funnel/collet assembly (E)** from the **sample scraper base (5)**.
 - 6.6. Pour the loose sample into the **sample scraper base (5)**.
 - 6.7. Repeat the above steps until all sample has been removed, or until you can use the **sample tamper (4)** as described in method 1.

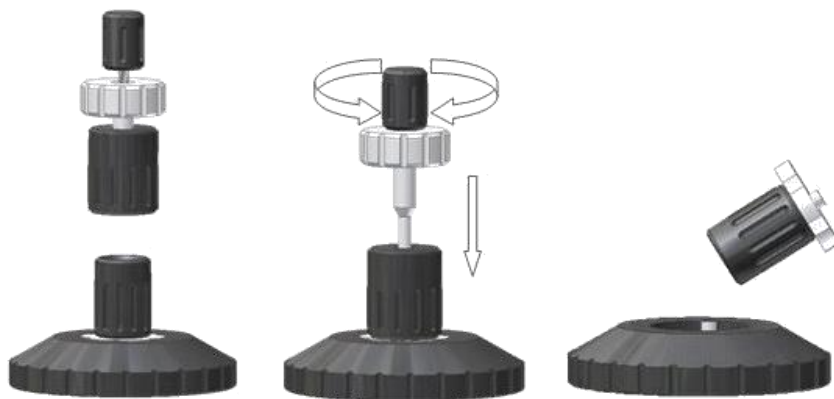


Figure 6, Sample removal, method three.

7. **Drive cap, sample, and top cap insertion** (See figure 1 and 7).
 - 7.1. With the **rotor sleeve (16)** and **drive cap (17)** between your fingertips, insert the **drive cap (17)** into the **rotor sleeve (16)**. Press in the **drive cap (17)** until it is flush with the **rotor sleeve (16)**. If the **drive cap (17)** is not flush with the **rotor sleeve (16)**, then place the **drive cap (17)** onto the **sample scraper base (5)** and apply a downward pressure until the **drive cap (17)** is flush with the **rotor sleeve (16)**. **NOTE: You should not have to use excessive force or nitrogen cooling to insert the drive cap (17) into the rotor sleeve (16).**
 - 7.2. Loosen the **collet (10)** on the **sample extractor body (9)**.
 - 7.3. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.
 - 7.4. Tighten the **collet (10)** until the **rotor sleeve (16)** is secure.
 - 7.5. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
 - 7.6. Insert a small amount of sample into the **rotor sleeve (16)**.

- 7.7. Use the **sample tamper (4b)** to compress the sample.
- 7.8. Repeat the previous two steps until the **sample tamper top cap marker (4b)** is flush with the top of the **rotor sleeve (16)**.
- 7.9. Insert the **top cap (15)** into the **rotor sleeve (16)**.
- 7.10. Remove the **rotor sleeve (16)** from the **sample funnel/collet assembly (E)**.
- 7.11. Push the **top cap (15)** into the **rotor sleeve (16)** until it is flush with the end of the **rotor sleeve (16)**.
- 7.12. If the **top cap (15)** is not flush with the **rotor sleeve (16)**, then place the **top cap (15)** onto the **sample scraper base (5)** and apply a downward pressure until the **top cap (15)** is flush with the **rotor sleeve (16)**. **NOTE: You should not have to use excessive force or nitrogen cooling to insert the top cap (17) into the rotor sleeve (16).**

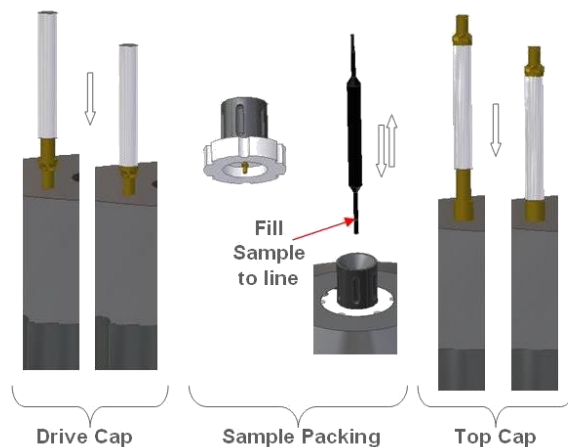


Figure 7, Drive cap, sample, and top cap insertion.

8. Revolution NMR sample packing system assembly part numbers:

AMP4131-001	2.0mm, 11ul, SPS
AMP4029-001	2.5mm, 11ul, SPS
AMP4031-001	3.2mm, 11ul, SPS
AMP4032-001	3.2mm, 22ul, SPS
AMP4033-001	3.2mm, 36ul, SPS
AMP4034-001	3.2mm, Allul, SPS
AMP4036-001	4.0mm, 52ul, SPS
AMP4037-001	4.0mm, 83ul, SPS