

Repairing the High-pressure Motorized Valves

Service Procedure

This procedure describes how to repair the high-pressure motorized valves (HPMV) (Figure 1) in the 717plus Autosampler and the Alliance 2695 Separations Module. The procedure must be performed and verified by a Waters field service engineer.

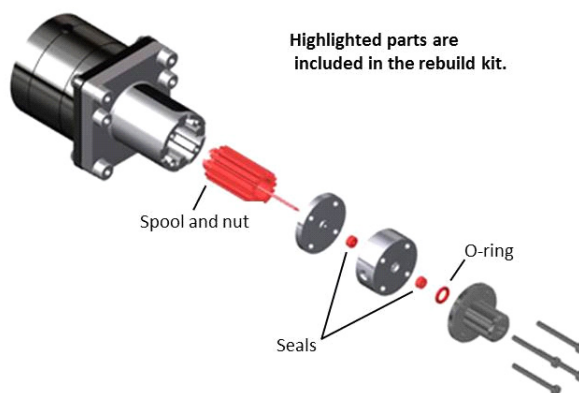


Figure 1 – HPMV parts

Procedure information

Table 1: Procedure information

Revision date	December 2016		
Instruments	717plus Autosampler - Alliance 2695 Separations Module		
Average time to perform	30 minutes - 1 hour		
Required parts	HP Valve Rebuild Kit	WAT045424 (includes spool and nut assembly, Teflon® O-ring) 700005019 (HPMV seal kit, 2 pk)	Vlv Rebuild Kit
	HPMV Tool Kit	WAT045427 (includes insertion bullet, seal guide, seal punch, wood screw)	Vlv Tool Kit (715)
	Note: For the latest part numbers, check the part locator on the Waters portal.		
Required tools and materials	- Methanol - Screwdrivers (flat-blade, Phillips®) - Wrenches (5/16-inch open-end, Torx® T10 and T25)		

Safety advisories

Review the safety advisories before beginning the procedure.

- ! **Warning:** To prevent personal contamination with biologically hazardous or toxic materials, carefully dispose of the replaced component in the appropriate waste container.
- ! **Warning:** To avoid contact with solvents, wear suitable gloves and safety glasses.
- ! **Warning:** To avoid electric shock when performing any maintenance, remove power to the unit by powering-down and disconnecting the power cord.
- ! **Warning:** Dispose of components in accordance with local or customer regulations. If the component comes with a Waters Corporation return sheet, follow its instructions.
- ! **Important:** Always observe Good Laboratory Practice and, when handling Waters Critical Clean™ parts, refer to [Controlling Contamination in LC/MS Systems – Best Practices](#) or [Controlling Contamination in UPC²/MS Systems](#).

Disassembling the HPMV

Follow the steps for the applicable system:

- [Disassemble the 717plus Autosampler HPMV \(page 3\)](#)
- [Disassemble the Alliance 2695 Separations Module HPMV \(page 4\)](#)

Disassemble the 717plus Autosampler HPMV

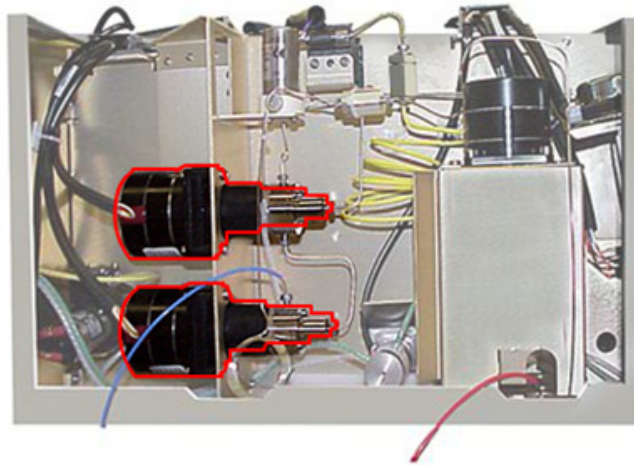


Figure 2 – HPMV location in the 717plus Autosampler

1. Remove the top cover from the instrument.
2. Disconnect the tubing connections at the valve ports.
3. Cut the cable ties that hold the valve cables together.
4. Remove the valve assembly by removing the two T25 Torx-head screws on the side of the Fluid Pak bracket.
5. Using a T10 Torx wrench, remove the four mounting screws on the face of the valve.
6. Remove the nose cap from the valve by gently pulling it forward.
7. Remove the seal body and backing plate in the same manner.
8. Starting at the Main menu: press **Diag Page** key, then press the **Service Page** key.
9. Enter the Service Diagnostics code: **1147**, then press **Enter**.
10. Move the cursor to Hardware Tests Menu, then press **Enter**.
11. Move the cursor to Valve 1 & 2 Rebuild Operations, then press **Enter**.
12. Use the arrow key to highlight the valve you are rebuilding: Valve 1 or Valve 2.
13. Press the **Valve Reverse** key three times to move the spool forward.
14. Remove the spool from the valve housing.
15. Place a new spool and nut assembly into the housing so the slot in the plastic housing aligns with the pin inside the valve housing.

16. Press the **Valve Forward** key three times to draw the spool into the valve housing.

Disassemble the Alliance 2695 Separations Module HPMV

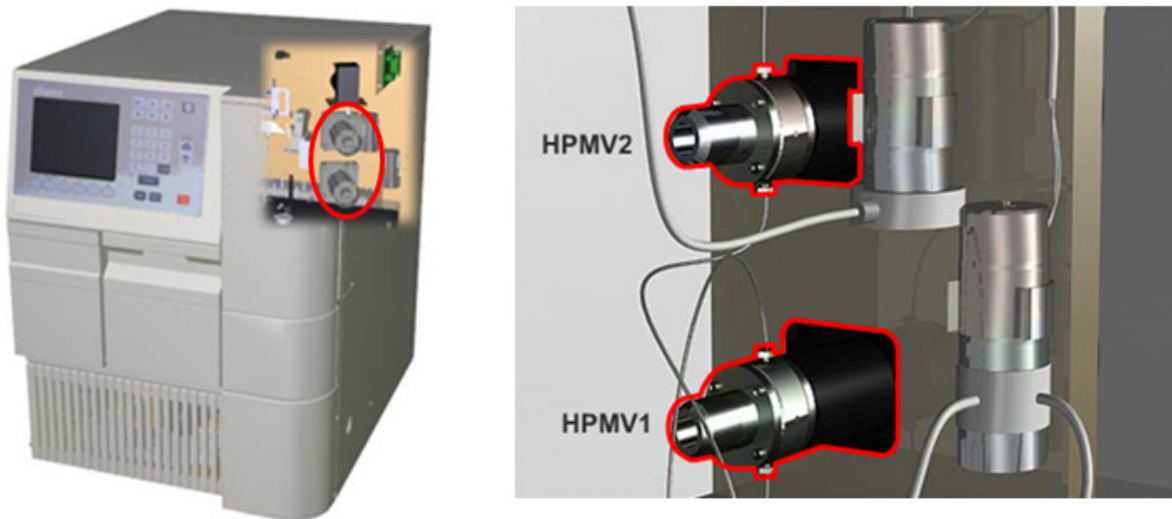


Figure 3 – HPMV location in the Alliance 2695 Separations Module

1. Remove the top and right-side panels from the instrument.
2. Disconnect the tubing connections at the appropriate HPMV ports.
3. Using a T10 Torx wrench, remove the four mounting screws on the face of the HPMV.
4. Remove the nose cap from the valve by gently pulling it forward.
5. Remove the seal body and backing plate in the same manner.
6. From the Main Idle screen, select **Diag Page**. The Diag window opens.
7. Select **Other Tests**.
8. Move the cursor to Rebuild Injector Valves, then press **Enter**.
9. Use the arrow key to select Valve 1 or Valve 2.
10. Press the **Valve Reverse** key three times to move the spool forward. Remove the spool from the valve housing.
11. Place a new spool and nut assembly into the housing so the slot in the plastic housing aligns with the pin inside the valve housing.
12. Press the **Valve Forward** key three times to draw the spool into the valve housing.

Reassembling the HPMV

Follow the steps for the applicable system:

- [Reassemble the 717plus Autosampler HPMV \(page 5\)](#)
- [Reassemble the Alliance 2695 Separations Module HPMV \(page 6\)](#)

Reassemble the 717plus Autosampler HPMV

Refer to [Figure 2](#) (page 3) for location of the HPMVs.

! **Caution:** Be careful not to scratch the new spool during installation.

1. Reinstall the backing plate with the small, raised-diameter side facing out. Align the holes in the plate with the mounting hole in the housing.

Note: It is important to orient the backing plate with the small, raised-diameter side facing out to properly support the seal in the seal body.

2. Place the insertion bullet into the end of the spool.
 - a. Remove old seals from the seal body by screwing the wood screw into a seal, then pulling the seal out, being careful not to scratch the seal body.
 - b. Place the seal guide over the valve body.
 - c. Place a seal onto the seal punch, with the O-ring side of the seal facing away from the punch.
 - d. Place a small amount of methanol into the seal body and onto the seal.
 - e. Carefully insert the seal into the valve body.
 - f. Turn the valve body over and repeat for the second seal.
3. Dip the body with seals into methanol to wet the sealing surfaces.
4. Taking care not to exert any side force on the spool, slide the new seal body over the spool.
5. Remove the insertion bullet from the end of the spool.
6. Remove the O-ring from the nose cap of the valve using a small, pointed object, being careful not to scratch the sealing surface.
7. Wet the new Teflon O-ring in methanol and press it onto the small, raised diameter on the nose cap.
8. Slide the nose cap over the spool, being careful not to disturb the O-ring placement.
9. Align the ports vertically in the valve body.
10. Align the mounting holes in all parts, reinstall the four mounting screws, and tighten them evenly.

11. Slide the valve assembly into the Fluid Pak bracket, and fasten that into place with the two Torx-head screws.
12. Reconnect the tubing to the valve.
13. Secure the valve cabling with a cable tie.
14. Power-off the instrument.
15. Replace the top cover on the instrument.

Reassemble the Alliance 2695 Separations Module HPMV

Refer to [Figure 3](#) (page 4) for location of the HPMVs.

! **Caution:** Be careful not to scratch the new spool during installation.

1. Reinstall the backing plate with the small, raised-diameter side facing out. Align the holes in the plate with the mounting holes in the housing.

Note: It is important to orient the backing plate with the small, raised-diameter side out to properly support the seal in the seal body.

2. Place the insertion bullet into the end of the spool.
 - a. Remove old seals from the seal body by screwing the wood screw into a seal, then pulling the seal out, being careful not to scratch the seal body.
 - b. Place the seal guide over the valve body.
 - c. Place a seal onto the seal punch. The O-ring side of the seal should be facing away from the seal punch.
 - d. Place a small amount of methanol into the seal body and onto the seal.
 - e. Carefully insert the seal into the valve body.
 - f. Turn the valve body over and repeat for the second seal.
3. Dip the body with seals into methanol to wet the sealing surfaces.
4. Taking care not to exert any side force on the spool, slide the new seal body over the spool.
5. Remove the insertion bullet from the end of the spool.
6. Remove the Teflon O-ring from the nose cap of the valve using a small, pointed object, being careful not to scratch the sealing surface.
7. Wet the new Teflon O-ring in methanol and press it onto the small, raised diameter on the nose cap.
8. Slide the nose cap over the spool, being careful not to disturb the O-ring placement.
9. Align the ports vertically in the valve body.
10. Align the mounting holes in all parts, reinstall the four mounting screws, and tighten them evenly.

11. Slide the valve assembly into the Fluid Pak bracket, and fasten that into place with the two Torx-head screws.
12. Reconnect the tubing to the valve.
13. Power-off the instrument.
14. Replace the top and right-side panels on the instrument.

Verifying the procedure

1. Power-on the instrument.
2. Ensure the initialization process completes without errors.
3. Run a purge-and-compression test to verify proper operation of the HPMVs.