

Rheodyne® Sample Injectors for HPLC

7725, 7725i, 7725i-188

Front-loading manual sample injection valves enable the addition of fluid samples into a high pressure liquid chromatography flow stream. After the operator injects the sample into the valve by syringe, the injection valve holds the specific volume of sample and mobile phase in a volume-controlled sample loop attached to ports on the valve stator. When the operator turns the handle, the sample injector valve introduces the sample into the mobile phase for movement into the column for separation and detection.

Higher Pressure Operation

- ▶ 5000 (345 bar) to 8700 psi (600 bar)
- ▶ Two-position, six-port design
- ▶ 20 µL sample loop included

Sample Injection

The needle port of each injector is built into the valve's handle. When the injector is mounted on a panel, the handle and needle port are in front (Fig. 1). In back of the panel are the body and the stator. The stator contains six tubing ports (Fig. 1) for connecting the pump, column, sample loop, and vent lines.

Make-Before-Break Architecture

To maintain a constant, desired high-pressure flow, Rheodyne's Make-Before-Break (MBB®) design creates continuous flow between the LOAD and INJECT positions that virtually eliminates pressure transient shock to the system. A passage in the stator face makes a new connection before old connections break. The MBB design—an improvement over bypass-style injectors—does not dilute the sample and is easy to maintain and troubleshoot.

Position-Sensing Switch

The 7725i and 7725i-188 have a built in position sensing switch. Turning the valve to INJECT closes a built-in position sensing switch, which remains closed until the valve is returned to LOAD. When the position sensing switch wires are attached to a chromatograph, the switch provides the system with a reproducible start signal.

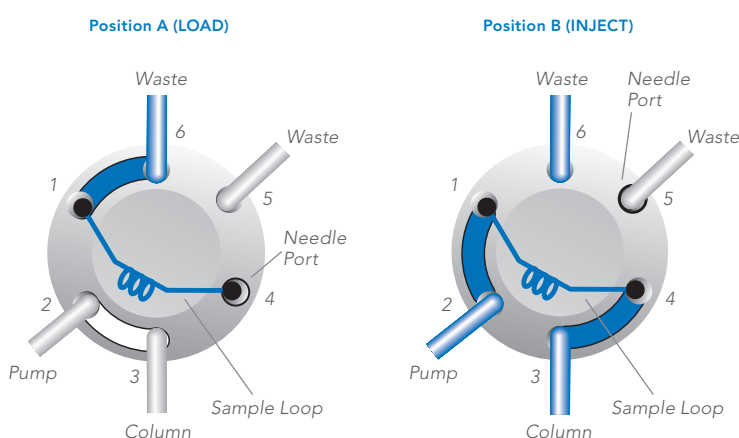


Figure 1: Illustrations of flow paths during LOAD and INJECT as viewed from the rear of the valve. Flow passages at the interface of the rotor seal and ceramic stator face are shown as grooves. The needle port connection is shown as a dark circle. MBB passages are below the plane of the interface and are not shown.

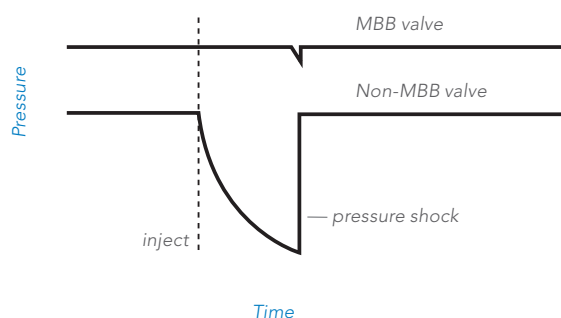


Figure 2: Rheodyne's MBB 7725 and 9725 series sample injectors virtually eliminate pressure transients characteristic of non-MBB sample injectors.

Zero Sample Waste

A syringe needle with a flat end (square cut) must be used. When the needle is inserted into the needle port, the tip of the needle passes through a seal inside the rotor seal, and then contacts the ceramic stator face. This direct connection between the tip of the needle and the end of the loop eliminates sample holdup. All sample leaving the needle enters the loop, so there is zero sample waste.

Leak-Tight Needle Seal

The needle seal is a Teflon sleeve that is built into the rotor seal. It grasps the tip of the needle, aligning it with the loop passage, and assures that all sample dispensed from the syringe enters the loop. The seal is under compression from an internal spring, which maintains a leak-tight, self-adjusting seal around the needle.

Versatile Injection Methods

Rheodyne front loading injection valves operate as follows: Sample is first **LOADED** into the sample loop by dispensing it from a syringe or by pulling it through a dip tube using a Suction Needle Adapter. Sample is then **INJECTED** onto the column by turning the handle, which connects the loop to the high-pressure mobile phase stream. These versatile injectors offer a choice of three loading methods: Complete, Partial, and Suction.

Sample Injection: Complete Filling

When injection volumes do not often change, or when sample conservation is not required, complete filling is the method of choice. The complete fill method produces excellent volumetric precision, typically about 0.1% relative standard deviation. Sample is dispensed from a syringe, using an excess amount (at least 3 times the loop volume) to displace all the mobile phase in the loop. The loop sets the volume injected; the volume is varied by changing the loop size. Since the loop sets the volume, this method does not require precise use of the syringe.

Sample Injection: Partial Filling

Applications where injection volumes change frequently, or when sample conservation is important, partial filling is the method of choice. Volumetric accuracy and precision depend on the operator's ability to read and use the syringe, typically about 1%. The volume injected is determined by the amount dispensed into the loop by the syringe. The amount dispensed must be less than half of the total loop volume. The partial fill method does not waste sample, and allows the volume to be continuously varied without changing the loop.

In partial filling (load no more than 50% of the loop volume), all of the sample dispensed from the syringe needle enters the loop, even with samples as small as 0.1 μL . There is zero sample waste.

Specifications

Maximum Pressure: 5000 – 8700 psi (345 – 600 bar, 35 – 60 MPa)

Wetted Surfaces: 316 stainless steel, alumina ceramic, and an inert polymer

pH Range: 0 – 14

Maximum Temperature: 80°C

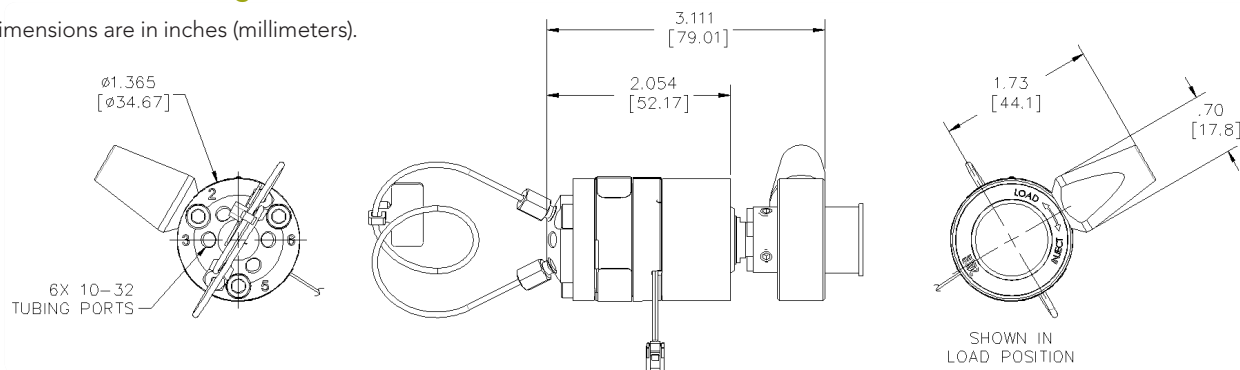
Flow Passage Diameters: 0.6 mm (0.024") and 0.5 mm (0.018")

Supplied: 20 μL sample loop, SST fitting set for all ports, hex keys, needle port cleaner, mounting screws, and vent tubes

NOTE: Shipping, storing or operating this valve below 0°C with water in the fluid passages may cause failure of the sealing surfaces.

Dimensional Drawing

Dimensions are in inches (millimeters).



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www.idex-hs.com | North/South America +1 866 339 4653 | Europe +49 1801 808 800 | Asia +86 10 6566 9090