

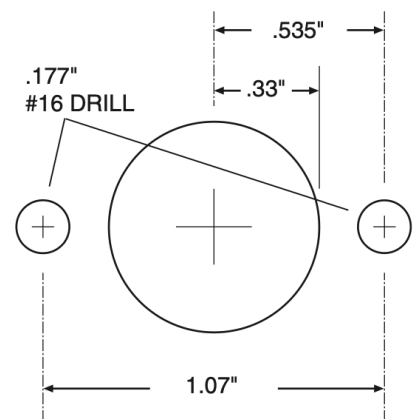
# CHEMINERT® MODELS C1 & C1CF INSTALLATION, USE & MAINTENANCE

## Technical Note 802

### PANEL MOUNTING

1. Drill the mounting holes according to Figure 1.
2. Unscrew the knurled Syringe Injection Port and remove the knob by pulling it outward, away from the valve body.
3. Remove and discard the right-angle mounting bracket furnished with the valve, but save the 8-32 x 1/2" screws.
4. Put the two screws through the small holes in the panel and screw them into the valve to secure it to the panel.
5. Push the knob back onto the valve and screw the Syringe Injection Port part way into the knob. Insert a syringe into the injection port and continue screwing until the syringe feels snug. Do not overtighten.

**FIGURE 1: Panel mounting dimensions**



### FITTING CONNECTIONS



**WARNING: If this valve is replacing a Rheodyne model, do not use the fittings made up in the original valve. The difference in pilot depth yields unswept volume.**

1. Connect the loop to the ports 1 and 4. Typically, the pump is connected at port 2 and the column at port 3.
2. If the syringe port will be backflushed with mobile phase, connect a piece of PTFE or stainless steel tubing from port 5 to a small bottle of mobile phase. If the port will vent to atmosphere, use the vent tube supplied.
3. Connect a piece of PTFE or stainless steel tubing to port 6 to carry waste to a containment vessel appropriate to the sample.

### SAMPLE LOADING

The loop on a Model C1 Front-Loading Valve is loaded by using a syringe with a 2" or longer flat end #22 gauge needle. (0.028" O.D.) The loop may be either partially-filled with a sample volume as low as .1 µl, or completely filled, up to the capacity of the loop.

When the handle is turned all the way counterclockwise, the valve is in the LOAD position. Turning the handle clockwise moves it to the INJECT position.

## **PARTIAL-FILL METHOD**

On the first sample insertion, be certain that an extra .1  $\mu\text{l}$  is loaded into the loop to allow for the small amount of sample which will remain between the needle and the stator. Before a different sample is loaded, this remaining sample must be cleared out by following a simple procedure:

1. With the valve still in the INJECT position, draw at least 1  $\mu\text{l}$  of solution back into the syringe. (Use air if no flush solvents are connected to port 5.)
2. Withdraw the syringe from the valve and turn the valve handle back to the LOAD position, ready for the next injection.

This effectively clears out the remaining sample and flushes the space between the needle and the stator with mobile phase. Since there is no opportunity for contamination, there is no need to flush the needle port before proceeding with the next sample injection. If no flush solvent is provided, a minute amount of sample may remain on the fill port walls but will not usually be a problem. An alternate method of effectively cleaning the remaining sample is to use a syringe to flush out the syringe port with either mobile phase or a solvent while the valve is in the INJECT position. A few microliters is often sufficient.

## **PARTIAL-FILLING WITH THE "BUBBLE METHOD"**

It has been demonstrated that laminar flow mixing of the sample and mobile phase in the loop can be controlled by the introduction of an air bubble between the sample and the mobile phase. The reliability of this technique arises from the excellent seal formed around the needle during loading.

To use the "bubble method" when the same sample will be re-injected:

1. Physically remove the syringe from the syringe port while the valve is in the INJECT position to allow the port to be exposed to the atmosphere.
2. Turn the handle to the LOAD position and then reinsert the syringe into the syringe port. This will cause a 1  $\mu\text{l}$  bubble to develop.

To use the "bubble method" with a new sample:

Flush the syringe port first, and then follow Steps 1 and 2 as above.

## **COMPLETE LOOP FILLING**

On the first insertion, use a syringe which exceeds the volume of the loop so fluid will overflow into the waste tube in port 6. Removing the syringe prior to loading the loop will form an air bubble, insuring that there can be no mixing of the sample with the mobile phase. If this is done, laminar flow distortion is minimized and only a slight excess of sample will be required to overfill the loop.

Before a different sample is loaded, this remaining sample may be cleared out by following a simple procedure:

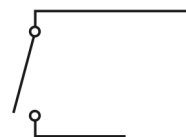
1. Place a syringe filled with the new sample material into the syringe port while the valve is still in the INJECT position.
2. Purge the old sample out of the port hole by inserting  $>.1 \mu\text{l}$  of new sample. The plug of air resulting from the simple insertion of the needle into the valve port will force any old sample out of the port: however, a residue may adhere to the walls.
3. Move the handle to the LOAD position and inject the exact amount of sample. (An air bubble will not be

present using this method unless the syringe is removed after clearing the old sample from the port and then replaced after the valve is turned to its LOAD position.)

## REMOTE START VIA POSITION FEEDBACK

When the handle is moved to the inject position, the remote start mechanism incorporated into the handle provides a contact closure that can be used to start the LC and/or data system. Position feedback is via permanent contact closure for TTL logic signals at Position B (inject). The valve wiring is typically connected to "Remote Start" or "Start in" on the instrument, but be sure to refer to the instrument manual before making any connections. When correctly connected, the instrument or integrator will start automatically when the injection valve is switched from Load to Inject position.

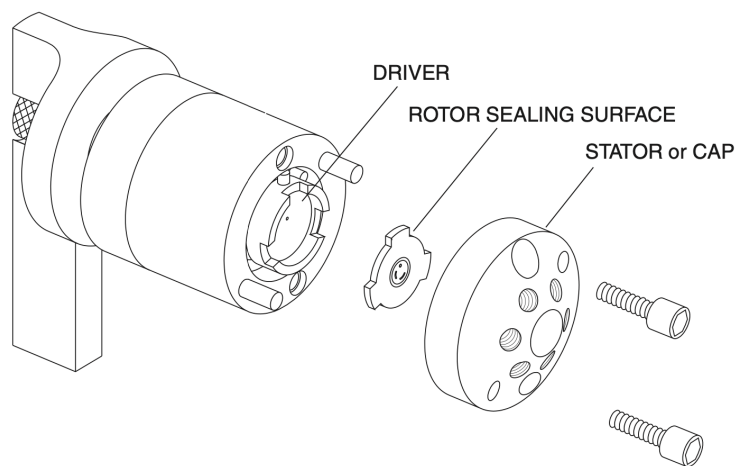
**Contact Signal Specifications:**      **Maximum voltage: 48 VAC/VDC**  
   **Maximum amperage: 0.1 A**  
   **Maximum power: 5 W**



## MAINTENANCE

Cleaning a valve can often be accomplished by flushing all the lines with appropriate solvents. Do not disassemble the valve unless system malfunction is definitely isolated to the valve.

**FIGURE 2: Exploded view of the Model C1 valve**



### DISASSEMBLY (REFER TO FIGURE 2)

1. Use a 9/64" hex driver to remove the socket head screws which secure the stator on the valve.
2. To ensure that the sealing surface of the stator is not damaged, rest it on its outer face. Or, if the tubing is still connected, leave it suspended by the tubing.
3. With your fingers or a small tool, gently pry the rotor away from the driver.
4. Examine the rotor and stator sealing surfaces for scratches. If scratches are visible to the naked eye, the part must be replaced. If no scratches are visible, clean all the parts thoroughly with an appropriate solvent, taking care that no surfaces get scratched. (The most common problem in HPLC is the formation of buffer crystals, which are usually water-soluble.) It is not necessary to dry the rotor.

### REASSEMBLY

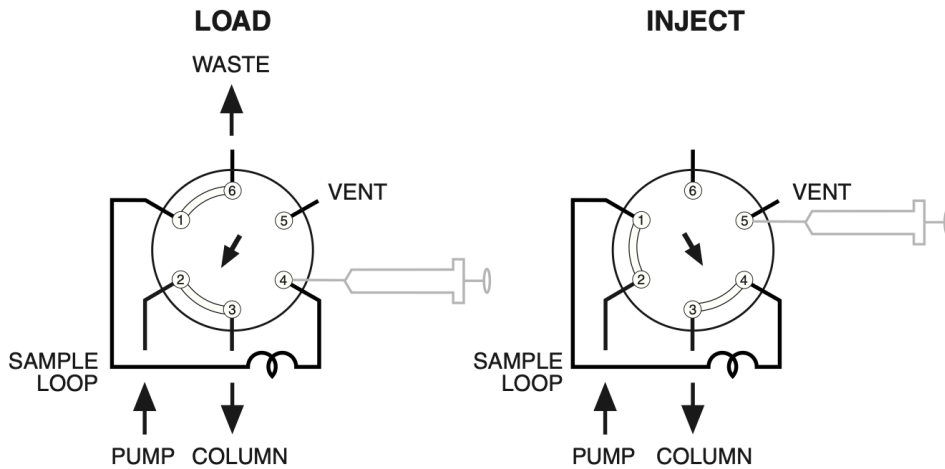
1. Replace the rotor in the driver, making sure that the rotor sealing surface with its engraved flow passages is facing out. The pattern is asymmetrical to prevent improper placement.
2. Replace the stator. Insert the two socket head screws and tighten them gently until both are snug. Do

not overtighten them – the screws simply hold the assembly together and do not affect the sealing force, which is automatically set as the screws close the cap against the valve body.

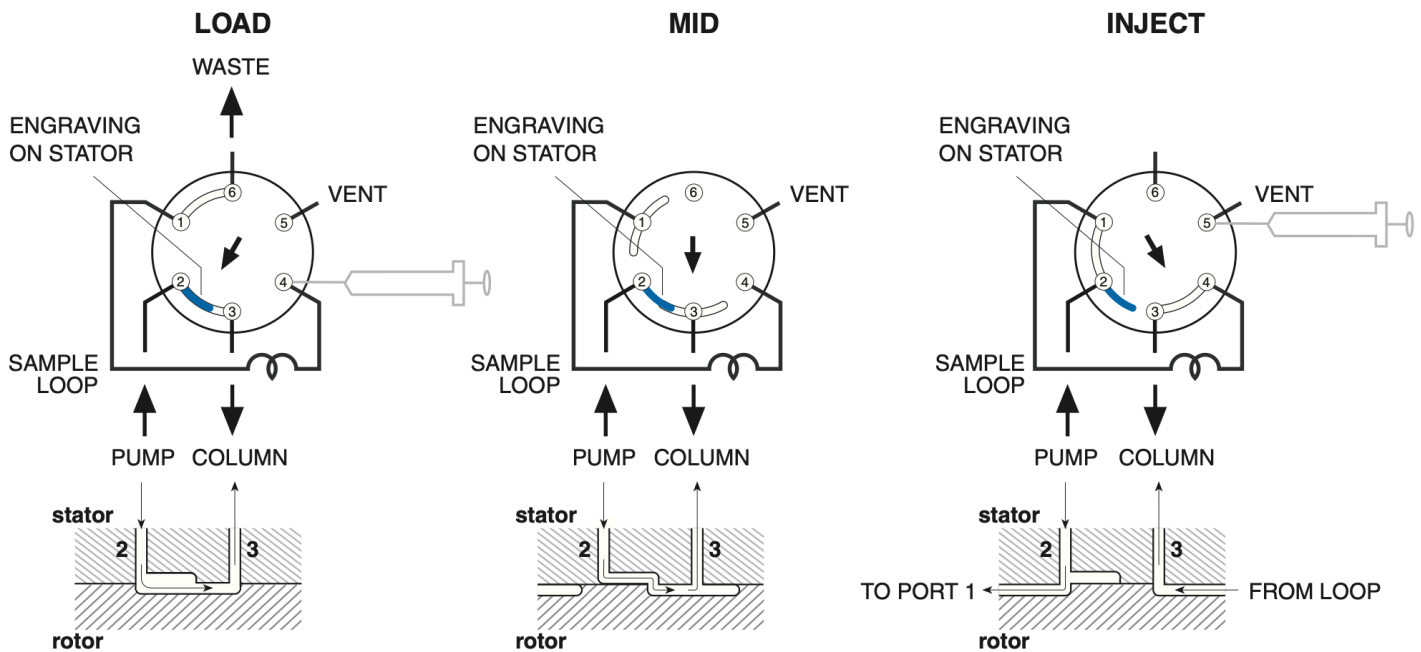
3. Test the valve by pressurizing the system. If it doesn't hold pressure, the valve should be returned to the factory for repair. (Call for a return authorization number.)

## SCHEMATICS

### Model C1



### Model C1CF



The Cheminert Model C1CF has an engraving on the stator which extends from port 2 part of the way to port 3, as illustrated in the schematic above. This stator channel maintains pump flow between ports 2 and 3 during most of the switching cycle, virtually eliminating pressure spikes.