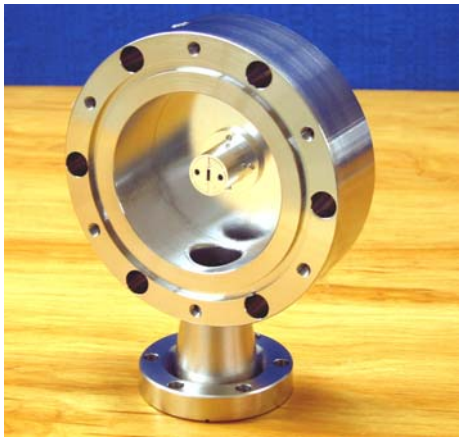
DP-100 Differential Pumping Section

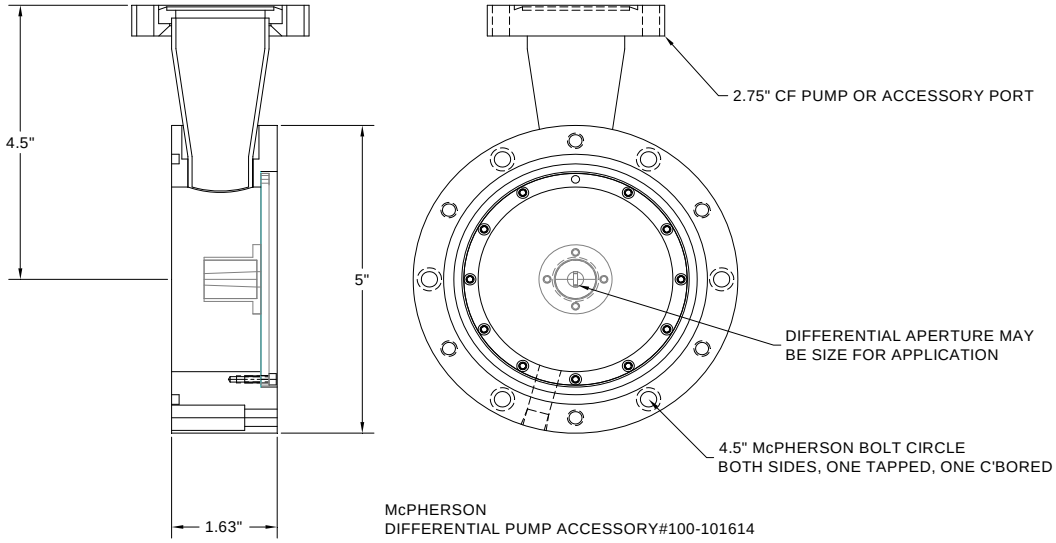


The Model DP-100 is a high vacuum pump port with a removable conductance limiting aperture. It may be used as a differential pumping section or as a more conventional pumping or gauging tee, gas inlet, electrical feed through, etc.

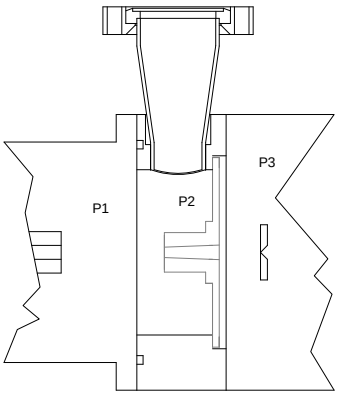
Used as a differential pumping section, the Model DP-100 can provide a transition between areas with different vacuum pressure. As an example, a windowless hollow cathode lamp is a useful light source for many deep and vacuum ultraviolet emission lines. To reliably operate, gas pressure of the Noble gas is often on the order one to 5*10E-1 torr. The cold gas escaping from the source at high pressure can interfere with experiments or prevent some types of detectors operating. Use of the Model DP-100 with conductance limiting aperture can create a transition area between the source's relatively high pressure and a vacuum spectrometer, or experimental chamber, at lower pressure.

With a 0.12 x 2 inch long aperture conductance is 0.063 liters per second for air. This provides a pressure differential of ~1,500 if the high vacuum side is pumped with a 100 liter per second pump. The pressure ratio increases linearly with the speed of the high vacuum pump.

Rectangular apertures can be provided to better match optical systems.



A general rule of thumb for estimating conductance of air considers the length (L) and cross section (D) of the limiting aperture. Then, conductance = $(73 * D^3) / L$. This approximation is valid for conductance of air and when the units for D and L are inches.



Using the previous example of a 0.12 x 2 inch limiting aperture we solve: conductance = $(73 * D^3) / L = (73 * 0.12^3) / 2 = 0.063$. If the speed of the high vacuum pump is 250 liters per second (at P3) then P2/P3 = 250/0.063 = pressure ratio of 3,960. If P2 is held at 5*10E-1 torr and we consider the pressure ratio 0.5 / 3,960, then P3 will be ~1.3*10E-4 torr.

7A Stuart Road ▪ Chelmsford, MA 01824 ▪ TEL: 978-256-4512 ▪ FAX: 978-250-8625 ▪ EMAIL: MCP@mcphersoninc.com