GPD Global Dispense Technology

PCD4 Volumetric Dispensing

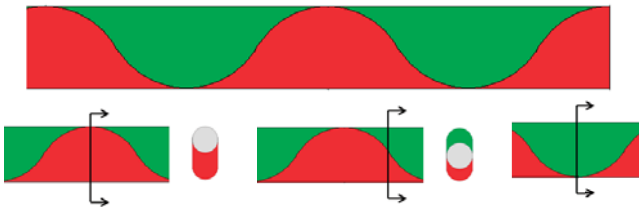
Continuous Volumetric Dispensing

Progressive Cavity Displacement (PCD) is an innovation in volumetric dispensing for a wide range of fluids. PCD technology can dispense fluids ranging in viscosity from water up to thick pastes without a configuration change.

The principle of fluid movement is to transmit uniform, sealed cavities of fluid through the displacement mechanism. Exceptionally high dispense rates can be achieved due to the movement of the individual cavities through the displacement chambers. Abrasive materials are pushed rather than sheared or impacted, maximizing the life of the displacement components. The fluid transfer mechanism consists of a surgical stainless steel surface (rotor) that mates with a high durometer rubber (stator).

PCD volumetric dispensing has a great advantage with materials that change viscosity over time or with a change in temperature. Since the fluid is transferred continuously in constant cavities, you will always get the same volume for as long as you need to dispense. This is of great interest when using materials such as underfill or encapsulants; no recharging of the pump is needed. Also, since the fluid is pushed without the chance of material separation, material can be ejected from the nozzle up to 2 mm above the work surface. This height is key during the underfill process to position the flow of fluid close to sensitive components, as well as to avoid the potential for contact.

Continuous volume cavities with constant volume at any point in the dispensing motion.



The PCD4 has a wide range of dispense rates and is able to maintain accuracy and repeatability throughout its entire range. At maximum speed, 6 ml/min can be reached while the lower end of 0.01 ml/min can be programmed. Large areas can be dispensed in a fraction of the time required by other methods and small volumes can be dispensed with an unmatched repeatability. Fluid can be presented to the pump with standard hardware in reservoirs between 10 cc and 70 cc. Bulk feeding is also possible by connecting directly to the material chamber. Variations in incoming fluid pressure do not affect the dispense quality; this means consistent results from full-to-nearly empty reservoirs. Other dispense methods will have volumetric variation under these conditions.

PCD dispense technology yields excellent benefits over existing dispense technology:

1) Continuously volumetric
2) No drip with any viscosity of material
3) Not subject to wear from abrasive materials
4) Does not damage or break fillers
5) Adjustable flow rates up to 6 ml/min
6) Low maintenance

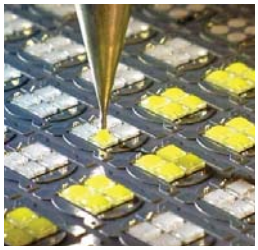
Materials to Dispense

The PCD achieves unparalleled levels of repeatability over the full pot-life of a wide range of fluids without calibration.

PCD is ideally suited to low viscosity liquids such as fluxes, encapsulants, and underfills. Thicker fluids up to 65,000 cps such as greases, gasketing, and damming materials do not affect the performance of the valve. The motion of filled fluids through the stator does not damage or smash silver flake or phosphor found in some LED encapsulants.

Conductive Adhesive

LED Encapsulation



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High Flow Rate, Low Pressure Nozzles

Utilizing unique, long-draw tapered-tip nozzles improves flow rate and material control. The designed taper close to the tip funnels fluid to the work surface under less pressure than with a standard tube-type needle. The final I.D. is at the last 1.5 mm of the nozzle. A thin wall of 0.002" (.051 mm) allows the pump to get close to components. The nozzle has a luer fitting for quick, easy setup and is disposable.

Integration Opportunities

Offline Operations or System Integration

Full controller for use with offline operations or easy system integration. Users can program the pump for a desired volume, dispense time, or flow rate and can be triggered by a foot switch or controller button for repetitive operations. Alternatively, this controller may be interfaced with a robotic system to control the pump on/off and (optionally) the flow rate. The robot system may also trigger a specific volume or time to dispense.

General PCD Specifications

PCD4	
• Dimensions . . . . . Height 228.8 mm, dia. 34.80 mm (Height 9.008", dia. 1.370")	• Medium temperature ° C . . . . . .+10 to +40
• Weight . . . . . approx. 420 g (.9 lbs)	• Storage conditions / temperature ° C . . . dry & dust free, +10 to +40
• Dispensing volume, approx. per rotation . . . . . theoretically 0.05 ml/rotation	• Motor rotating speed, per minute . . . . . 0-120 rpm
• Theoretical flow rate per minute*** . . . . . 0.004 to 6.0 ml/min	• Cable length . . . . . 250 mm (10"), extension cable available
• Minimum volume ml** . . . . . 0.004 ml	• Stator material . . . . . Inert Elastomer
• Precision ml ±, absolute** . . . . . .±1%	• Maximum viscosity . . Determined by nozzle pressure below 20 bar*
• Maximum primary pressure (input pressure) . . . . . .6 bar (87 psi)	• Nozzle type . . . . . Luer or Precison
• Maximum dispensing pressure . . . . . .20 bar (290 psi)	• Thread used - medium input. . 1/8" cylindrical Whitworth pipe thread
• Operating ambient conditions . . . . . +10° to +40° C non-condensing air pressure 1 bar.	• Thread used - nozzle connection . . . . . Luer Lock DIN EN 1707
	• Material reservoir . . . . . up to 55 cc with standard mounting. Bulk feeding possible.

* High viscosity materials may be run but a lower flow rate than low viscosity. Dependent on nozzle size and flow rate.
** Reference medium approx. 1.000 mPas at 20° C.
*** Depending on the viscosity and primary pressure of the medium. All pressure details are maximum values for low-to-medium viscosity media (20,000 mPas).

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