PVA

PVA5000

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The PVA5000 meets all requirements for highly demanding semi-conductor packaging and surface mount dispensing applications in a highly robust package.

ROBOTIC PLATFORM

A welded steel frame contains a highly accurate brushless DC servo motor drive system for precision-grade ball screw slides across three-axes. The PVA5000 provides continuous, coordinated, motion across all three-axes simultaneously without steps, allowing the user to create seamless 3D line motion. Closed-loop optical encoder feedback on all axes and a stabilizing rack system allows the PVA5000 to remain one of the most accurate and reliable motion platforms in the industry (X-Y-Z accuracy rated at +/- 0.025 mm (0.001 in)). The PVA5000 features a large 400 mm x 400 mm x 100 mm (15.75 in x 15.75 in x 3.94 in) work area.

DISPENSING METHOD

Ideal for underfill, dam & fill, and glob top dispensing applications, PVA's syringe pump technology reliably applies adhesives and pastes resulting in repeatable system throughput. Syringe sizes from 1cc to 30 cc are available for use with this dispenser. PVA's syringe pump works on the same premise as a piston pump. PVA offers closed-loop servo control over the piston movement down to +/- 0.015 mm (0.00059 in). Accuracy of the syringe pump is 1.7% at dispense volumes of at least 10 mg (see Figure 1).

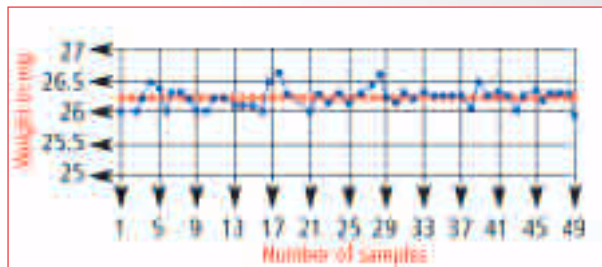## PVA SYRINGE PUMP VOLUME ACCURACY (mg/shot)

Figure 1

In addition to the syringe pump, many other PVA valves are available for use on the PVA5000, including:

SV100 - Rotary Auger Valve

The SV100 provides servo motor auger control for high viscosity solder pastes, damming fluids, and abrasive bonding materials.

FC100 - Stainless Steel Front Closing Valve

The FC100 is an excellent general use valve for filling, bead, and dot applications.

PROGRAMMING SOFTWARE

The PVA5000 is fully supported by PathView™ programming software. PathView is PVA's proprietary Windows®-based system control software for the PVA5000. A simple menu based selection format greatly simplifies the programming task. Independent speed and acceleration values may be specified for each individual program line. PathView controls and monitors process heating as well as fiducial recognition and correction functions. PathView also features security paramters to personalize individual user accounts. All SPC data including fiducial failures, heating faults, machine errors, and total boards processed are collected in a simple text file.

The PVA5000 employs a highly functional and robust onboard computer system with a color LCD flat panel display.

PATHVIEW™

PVA5000 STANDARD FEATURES

The PVA5000 is easily configurable for any underfill, dam and fill, or glob top dispensing application. Solder pastes, solder masks, RTVs, or surface mount adhesives can also be processed. The PVA5000 employs a number of standard features that greatly enhance the dispensing process.
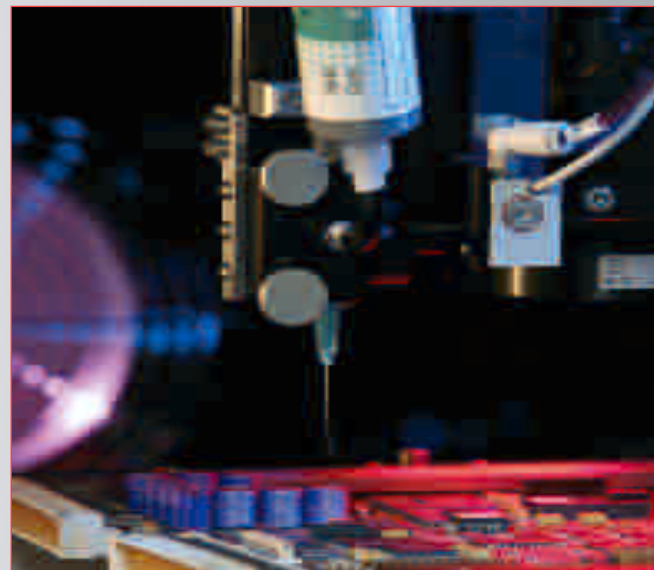
Vision Correction and Lighting

The PVA5000 vision system is comprised of a 640 x 480 pixel CCD camera with a red LED diffused light ring. The standard vision system field of view is 12.7 mm (0.5 in). Fiducial recognition allows XY and rotational correction up to 10 degrees.

Laser Height Sensor

A class 2 laser height sensor is featured on all PVA5000 platforms. The sensor utilizes an RS485 bus to communicate with PathView. A wide range of board sizes can be processed using height detection as the laser has an above board range of 30 mm - 130 mm (1.18 in - 5.12 in) and a resolution of 0.06 mm (0.002 in).

Needle Calibration

PVA's needle calibration system automatically coordinates the x, y, and z-axes by use of fiber-optic sensors. As the tip is introduced to the calibration block, the sensors detect the needle position in each axis and PathView adjusts the zero location for any variances. Calibration of the needle position produces accuracy in each axis to 0.022 mm (0.0008 in) assuring repeatable material placement.

Heat Control

The PVA5000 offers both contact and non-contact substrate heating within the dispensing process. Up to three heated zones can be utilized for advanced process control. PathView's closed loop feedback controls and monitors each zone's custom heating parameters. Once a set point for each heating zone is derived, a process tolerance of +/- 2 degrees Celsius is maintained.

Fluid heating is also available to lower the viscosity of the material. Less viscous materials flow faster and more evenly under a device while enhancing the capillary action of the adhesive.

Conveyor Transport

The PVA5000 features a three-zone, independent edge belt conveyor system. Conveyor parameters including transport speed and direction are easily managed through PathView. The standard conveyor configuration requires a 3.5 mm (0.138 in) edge clearance requirement.

The PVA5000 is engineered for easy integration into all worldwide production environments by maintaining SMEMA industry standard interface and CE compliance.

PVA5000
SPECIFICATIONS

MOTION PLATFORM

X-Y-Z Axes
Brushless DC servo motor driven precision ball screw with closed-loop, high-resolution encoder feedback

Encoder Resolution
0.005 mm (0.0002 in)

X-Y-Z Accuracy
+/-0.025 mm (0.001 in)

Dispense Area
400 mm x 400 mm (15.75 in x 15.75 in)

Z-Axis Travel
100 mm (3.94 in)

VISION AND LIGHTING

Vision
640 x 480 pixels CCD with automatic fiducial recognition featuring XY and rotational correction

Lighting
LED diffused red ring light

Field of View
12.7 mm (0.5 in)

HEIGHT SENSOR

Type
Class 2 laser

Range
30 mm to 130 mm (1.18 in to 5.12 in)

Resolution
0.06 mm (0.002 in)

CONVEYOR

Transport
Independent three-zone edge carrying belt conveyor

Compatibility
SMEMA

Edge Clearance
3.5 mm (0.138 in) standard
6.5 mm (0.256 in) with edge clamp option

Drive
Variable speed and direction

Height
Adjustable between 940 mm and 965 mm (37 in and 38 in)

COMPUTER

System
WinSystems® PC104, Intel Pentium 700 Mhz with 2GB hard drive and 128MB RAM. CD-ROM and 3.5" floppy drives

User Interface
381 mm (15 in) color LCD flat panel display and Microsoft trackball

SOFTWARE

User Environment
PathView™ for Windows®

Operating System
Windows® 2000

FLUID DELIVERY

PVA syringe pump, SV100, and/or FC100

FACILITY REQUIREMENTS

Footprint displayed in illustration

Power
220V AC @ 35 amps

Air
80 psi, dry, unlubricated air

System Weight
544 kg (1200 lbs)

48.000
38.566
43.752

65.816