

High Viscosity Liquid Jet Dispensing Head Design Technology

Dr. Young-Bog Ham
Department of Thermal Systems
T. +82 - 42 - 868 - 7157
E. hyb665@kimm.re.kr

⇒ This technology is a piezoelectric-driven jet dispensing head mechanism design technology that can generate 2D and 3D pattern at a high speed by dispensing viscous liquid at a fixed amount with ultra-fine precision.

Client / Market

- Fields requiring precise, fixed-amount dispensing of high viscosity liquid
 - High viscosity epoxy precision dispensing: epoxy jet dispensing for semiconductor component bonding process
 - Functional paste precision dispensing: Paste jet dispensing for LED chip packaging process
 - Lubricant dispensing: Grease and jetting for high value-added components requiring continuous supply of the minimum amount of lubricant

Necessity of this Technology

- Mostly, the pneumatic pressure-solenoid type dispenser is used, but precision industries like semiconductor packing uses imported piezoelectric jet dispenser from advanced countries like Germany and the USA.
- Existing pneumatic pressure dispenser uses the pneumatic pressure as its power source that the pressure supply is unstable due to the compressibility of air, which causes a decline in precision level, and it is difficult to dispense high viscosity liquid
- The fluid path is opened with the solenoid valve, but a delay occurs due to its low response, which makes high-speed driving and droplet formation difficult.

Technical Differentiation

- High-speed driving is possible using piezoelectric actuator with response dozen times higher compared to solenoid.
- Droplets are formed with the high force of piezoelectric actuator that high viscosity droplets can be dispensed.
- While ascending the tappet by extending displacement of piezoelectric actuator, the liquid is injected through the nozzle and the tappet descends at a high speed for instant high pressurization to dispense fine droplets.

DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other

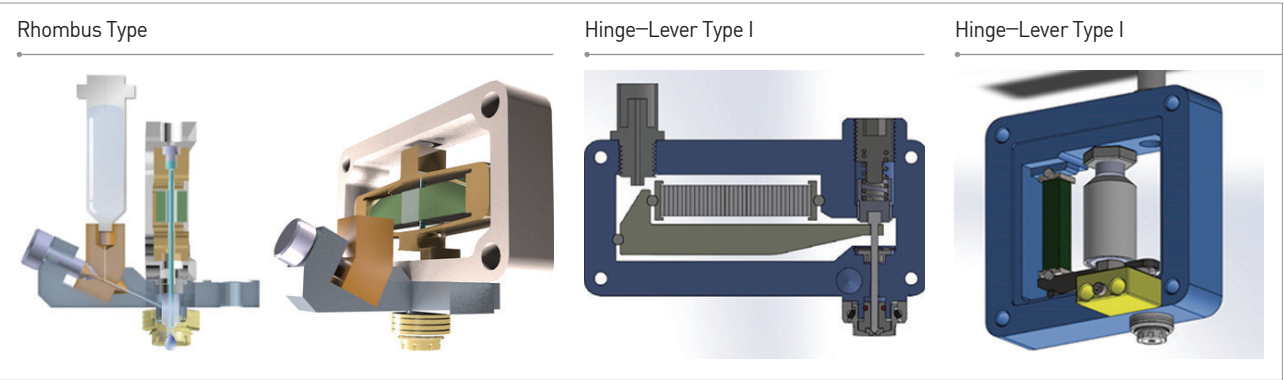


TECHNOLOGY READINESS LEVEL [TRL]



Excellence of Technology

- The problems of limitations with viscosity, speed, and micro droplet formation of existing piezoelectric dispenser are overcome, and independent design of piezoelectric jet dispenser mechanism of the same level as foreign products became possible.
- Can reduce cost occurring from drug loss and purchasing expensive imported products



Current Intellectual Property Right Status

PATENT

- Jet Dispenser Using Hinge Lever Type Displacement Extension (KR2016-0064095)
- Bimorph Piezoelectric Actuating Dispenser with Cutting Jet Type (KR1190080)
- Cutting Jet Type Dispenser Using Pressurized Area Amplified Displacement (KR1190119)
- Cutting Jet Type Dispenser Using Amplified Perpendicular Displacement (KR1190083)
- Cutting Jet Type Dispenser Using Hinge Lever (KR1059746)

KNOW-HOW

- Stacking type piezoelectric actuator mounting jig design technology
- Stacking type piezoelectric actuator initial compressibility setting design
- Nozzle & tappet end contact and sealing mechanism design technology
- Viscosity control technology for high viscosity liquid
- Stacking type piezoelectric actuator driving control technology for droplet formation