高精密微型零件注塑機
High Precision Plastic Micro-injection Molding Machine for Production of Miniaturized Parts

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結合了由下而上注射方法及無閥門設計的嶄新注塑技術
A new injection molding technology that integrates bottom-up injection and valve-less design

專利申請編號及國家：16438702（日本）11 2005 001 718.4（德國）A9285/2005 (奧地利）
PCT/CN2005/000889（PCT） 7,258,543（美國） 200410071333.X（中國）

全球首部由下至上注射的高精密微注塑機，主要應用於生產高精密的微型化部件，如微型生物裝置、醫療部件、晶片等。製造高精密微部件，最具挑戰性的是在於高精確度的轉達及擠量的控制。目前的機器只試圖把固有的機器尺寸減少，沒有解決微型化的問題。然而，我們的機器則透過簡單的機械設計，向上射膠，避免空氣受困於熔融內，亦無需以閥門控制熔融的輸出。於鎖模的四個角落均設有伺服器，能自動調節鎖模的壓力，以盡量減少鎖模變型。兩組線性電動馬達能高速射膠，精密度比毫克更小。即時的壓力分析更能進一步提高精密度，偵測任何變化。另外，把軟件升級，即能提升機器的效能，既環保又能減低成本。

SP-5型號微注塑機
SP-5 Micro Injection Molding Machine

A first bottom-up high precision plastic micro-injection molding machine which helps the miniaturization of products and producing high precision micro plastic parts such as micro bio-mechanisms, micro-pumps, micro nozzle, medical parts, micro lenses and optical connectors. Other machines only attempt to reduce the size of conventional designs while our machine adopts a revolutionary upward injection design eliminating the air entrapment problem and the need for shutoff valves that restricts melt flow. There are four servos each at the four corners of the mold clamping to automatically adjust clamping pressure for minimum mold distortion. Two linear motors are used to propel the plastic into the mold giving unmatched acceleration and precision well below milligram level. The precision is further enhanced by real-time pressure signature analysis to account for any variations. The mechanical design is simple with mechatronic control for future performance optimization through software upgrades.

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特色與優點

- 自適應垂直鎖模 - 確保有效的模具閉合
- 向上射膠 - 避免空氣受困於熔融內
- 高射膠加速度 / 減速度 - 更精密的熔融流程及擠量控制
- 無閥門塑化器 - 消除潛在的物料變質
- 簡單的機械設計 - 以軟件提升機器性能
- 簡易伺服操縱

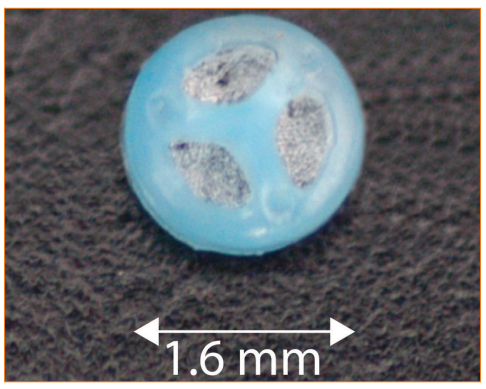
應　用

這部注塑機適用於所有生產微細部件的工業，例如：

- 用於汽車工業的微型開關、感應器
- 電腦市場裏噴墨印表機的噴嘴
- 電子工業用的線路板微件
- 醫學科技上的助聽器或植入件
- 光學儀器所用的微型鏡頭
- 用於鐘錶業的微型齒輪及彈簧鎖等

獎　項

第三十五屆瑞士日內瓦國際發明及創新技術與產品展金獎
(2007年4月)



微形過濾原件
Micro Filter

Patent Application No: 16438702(Japan) 11 2005 001 718.4(Germany) A9285/2005(Austria)
PCT/CN2005/000889(PCT) 7,258,543(USA) 20041007133.X(China)

Special Features and Advantages

- Adaptive vertical mould clamping – assures effective mold closure
- Upward injection – avoids air entrapment
- High acceleration / deceleration of injection speed – allows precision melt flow and volume controls
- Valve-less plasticizer – eliminates material degradation
- Simple mechanical design – allows future improvement through software upgrade
- Menu-driven servo control

Application

This invention is designed to produce precision micro components, such as micro switch and sensor for automotive industry, inkjet printer nozzle for computer industry, hearing aids or implants for bio-medical industry, micro lens for optics industry, gear wheel, latches and micro transmission for watch industry.

Award

Gold Medal, 35th International Exhibition of Inventions New Techniques & Products, Geneva (April 2007)

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