

氣壓致動器之新型流量控制閥設計與定位控制系統之研製

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摘要

許多工廠之自動化設備中，當其需要氣壓系統作位置控制時，需要精密的流量控制閥等零組件來配合定位控制器；一般實際應用上都使用價格很高的進口定位控制器(例如，德國FASTO流量控制閥)，使得氣壓系統之應用大大受限。有鑑於此，本文致力於新型流量控制閥之開發設計與其定位控制系統之研究；經實驗證明已成功開發完成一種低價的精密氣壓定位控制之實務方法，其位置控制的精密度可達0.2mm，而且只使用市面上極易取得的控制元件，本文之成果很有實際應用價值。首先，本文設計一個可調整流量大小的新型流量控制閥，這個新型流量控制閥已經同時獲得台灣與中國大陸新型流量控制閥之專利(台灣專利：流量控制閥之結構，專利號碼M280442；中國大陸新型專利已通過，發證中)。另外，一種液氣壓缸定位控制結構之設計也已完成，並且也獲得台灣新型定位控制結構之專利(伸縮桿之定位控制結構，專利號碼M281096)。機械製造精度的需求日益精細，液氣壓控制的技術越趨複雜，所以必須藉由電氣方式做一複雜控制。在控制系統上，我們使用比例積分控制理論和可變結構系統的控制理論，配合DSP為主體的系統控制單元，實現精確的空壓致動器的定位控制器。不但可以得到精確的位置控制，而且元件取得容易，價格低廉，降低製造成本，提升企業市場競爭力，這也是本文研究的主要目的。

關鍵詞：氣壓致動器,流量控制閥,比例積分控制器,可變結構控制器

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