

一、摘要

1. 中文摘要

本研究為針對內燃機引擎之燃燒效率進行改善，利用熱電晶片輸入電能可在晶片上下面產生低溫與高溫兩種溫差之技術，將本研究裝設於內燃機引擎之進氣歧管處，透過本研究額外增加進氣空氣之方式，提高進入引擎燃燒室之空氣量，同時透過熱電晶片所產生之低溫效果並利用熱脹冷縮之原理，強制將額外進入進氣歧管之空氣的溫度降低，使該額外進氣空氣之密度提高，如此方式可提高引擎燃燒混合氣之氧氣密度而達到燃燒完全之目的。本研究採用空氣冷卻方式針對熱電晶片之致熱面進行散熱，而熱電晶片之致冷面則透過旁通空氣能量交換管強制對額外空氣進行降溫，尤其藉由多片之能量交換鰭片的方式增加空氣接觸面積以加速致冷效率，而冷卻後之低溫額外空氣透過進氣導管與輔助進氣歧管之間隙加速流入進氣歧管，藉由進氣空氣從進氣導管一側流入進氣歧管時所產生之渦流帶動輔助進氣歧管內部之空氣加速前進而產生一增壓效果，如此方式不僅可降低進入引擎室之空氣溫度減少氮氧化物之廢氣產生，更可增加進氣密度與壓力改善燃燒環境提高燃燒效果。

關鍵字：熱電晶片，進氣系統、渦輪增壓、空氣旁通、氣冷系統。

2. 英文摘要

This paper presents a new device for the internal combustion to increase the combustion efficiency and improve the exhaust gas emissions. An additional cooled air is input to the inlet manifold by the device to provide more comburent or combustibles for the engine. The device is set between the intake valve and the throttle. A reinforced air fan is designed in the device to input the additional air to the inlet manifold from the side of the manifold. The additional air not only increases the capacity of comburent or combustibles but also speeds up the flow velocity of the intake air which is similar to the air multiplier technology. Because of no blades on the inlet manifold, the intake airflow can be accelerated smoothly instead of the problem of the turbo lag in a turbo-charger engine. The thermoelectric module is applied in the device to cool the additional intake airflow which can increase the oxygen density for combustion of the engine by the physical property of thermal expansion and contraction.

keywords : thermoelectric module, intake air system, turbo charger, by-pass, air-cooling system