

A10-067

作品名稱

A.I.省能高低溫乾衣機**Artificial-Intelligence high/low-temperature energy-saving clothes dryer**

隊伍名稱

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由於全球都會人口聚集，居住環境普遍狹隘，曬衣較不雅觀且空間受到限制。乾衣機有方便、省時、衣服乾衣後較不繃和較不受污染等優點，因此乾衣機成為都會富裕家庭必備設備。綜觀目前市面上所販售乾衣機均採定時停機控制設計。定時的缺點在於，當使用者烘乾衣物數量和材質之不同時，環境的相對濕度和溫度的高低與所需烘乾衣物的時間也不盡相同。當乾衣時間設定過長，導致耗能和損壞衣物；設定過短，容易造成衣物未烘乾必再重新加時，不但不便最後必超過所需時間。在停止加熱器之冷卻防皺處理過大多固定為15分鐘。當衣服過多時必因冷卻時間不足，易造成取出衣物會燙手且易產生靜電和易皺等缺點。而市售「自動洗衣乾衣機」之「自動乾衣功能」採為差動判斷方式，而且其設計為密閉式的熱循環系統，其入風與出風口之出入氣量較小，造成衣物在乾衣過程中水氣無法快速被排出，而導致乾衣時間拉長，造成時間與能源上的浪費。

為了改善以上之缺點，本團隊根據乾衣的科學原理，並且依據衣物材質之不同，研發適合各種不同材質衣物之「A.I.省能高低溫乾衣機」。其主要原理乃利用乾衣機之排氣口溫度之變化，進而判斷衣服是否已乾。也就是乾衣槽衣服中之水份在熱空氣中蒸發會將降低空氣溫度，

故排出氣體溫度會降低，當衣服已乾無水份可蒸發，排氣溫度保持高溫不變。故在排氣口安裝溫度感測器，結合單晶片微處理器、介面電路及功率晶體，研發出智慧型溫度梯度自動控制方法，偵測到衣物烘乾時，會自動停止加熱器的工作，但馬達及風扇繼續運轉，以快速冷卻衣服，乾衣機由於水蒸發為汽態會膨脹數百倍將衣服撐開而不繃，快速冷卻衣服有防皺效果，當衣物溫度接近機外空氣溫度自動停機，冷卻防皺時間隨衣物多寡自動調整，讓使用者取衣不燙手及低靜電之優點。

依照上述可將本產品特色整理出以下五項重點：

- 1.省能且省時：自動調整乾衣時間，有效烘乾衣物。
- 2.較不損壞衣服：可針對衣服材質作高低溫選擇，乾衣時間恰恰好，較不損壞衣服。
- 3.使用方便：不必傷腦筋對乾衣時間判斷，按下開始按鈕即可。
- 4.防皺確實：冷卻防皺時間隨著衣物多寡自動調整。
- 5.人性化：智慧型控制，取衣不燙手及低靜電。

本作品其省能效果不但達到綠色能源標準，並超越目前所有知名品牌20%

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Abstract

The present electric clothes dryers in market are all using timer to control the clothes drying time. Because the clothes drying time is related to the ambient temperature, relative humidity, the material and amount of clothes tightly. If the drying time is set too short, it results in the clothes not dry enough and must set the drying time again, thus the drying time will be over what it needs. If the drying time set too long, it results in clothes damage by the over drying with the high-temperature dry air. The above setting methods are result in energy and time consumption.

If the dried clothes are cooled rapidly by enough cool air, it can destroy the fiber memory not contract back then reaching the less wrinkle effect. Therefore, the design the drying process of clothes dryer, it first cuts off the heater at the end of drying time, then the fan and clothes rotator is keep operating to introduce the ambient air to cool down the dry clothes. The "cooling prevent wrinkle time" of the present clothes dryers all are fixed about 15 minutes. The shortage of the fixed "cooling prevent wrinkle time" will result in the effect of prevent wrinkle, reducing temperature and static electricity will be not good enough in the situation of big amount drying clothes. Pinpoint the above shortages of the present clothes dryer, the intelligent energy-saving clothes dryer uses the physical

principle- the evaporated vapor from the water containing in wet clothes will absorb the energy from the air and thus it will reduce the temperature of the air, when the clothes is dry enough and no water can be evaporated and thus the exhaust air will keep constant high temperature. From this, the temperature sensor is set at the exhaust pipe to detect the temperature of exhaust air, by using the suitable auto control method as well as integrating the technologies of single-chip microprocessor, interface-circuit and power transistor, while the exhaust air becomes constant high temperature and represents the clothes dry enough; the heater is control to stop; but the fan and clothes rotator is keep operating to introduce the ambient air to cool down the dry clothes until the exhaust air temperature close to the ambient air then cut off the power. The user puts the wet clothes into the present dryer then starts the machine, the clothes is dried with suitable drying time and cooled with suitable cooling time automatically. Therefore, it reaches the purposes of energy-saving and time-saving; less damage of clothes and user friendly.

Its energy-saving effect has reached the green energy standard and 20% energy-saving more than the present famous products.

