

# Research On The Fusing System Of A Business Machine

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**Abstract**—the main function of the fusing system of a business machine is to state the related motor drive system that is based on the user's command to perform the user's standard operating procedure. The structure of the fusing system of a business machine is similar to the fusing design in military weapons. The fusing design of military weapons focuses on size, price, accuracy, safety and reliability. Errors are not allowed. The fusing system of a business machine is different from the fusing design of the military weapon in that it does not need to ignite the battery, it is completely activated by AC power and the structure is greatly simplified. At the same time, the fusing system of a business machine still requires reasonable price, accuracy, safety and reliability. The most critical mechanism of the fusing system is the numerical control sensor, which converts the user's instructions into alternating currents of different strengths and weaknesses to start other electromechanical hardware devices.

**Keywords**—*fusing design, reliability, numerical control sensor, electromechanical hard devices.*

## I. Introduction:

The main components of the fusing system of a business machine are as follows: ①Fusing pressure release sensor ②The sensor of lower shield position ③

The sensor of upper shield position ④The thermopile of edge ⑤The thermopile of center ⑥The fusing exit sensor ⑦The shield drive motor ⑧The fusing heater ⑨The thermistor of center ⑩The thermostat of edge ⑪The thermostat of center ⑫The numerical control sensor of center ⑬The numerical control sensor of edge ⑭The thermistor of edge ⑮The shield sensor of half 1/2. These structures have their very important functions to maximize their benefits ⑯Imaging IOB (Input output buffer) ⑰Development motor: cyanic +magenta+ yellow ⑱Development motor: black ⑲PCU black/Image transfer motor ⑳Paper feed motor ㉑Transport motor ㉒Registration motor ㉓PCU motor: cyanic +magenta +yellow ㉔Phase sensor ㉕Fusing motor ㉖Paper exit/pressure release motor

## II. Literature review:

For the research on the fusing system of a business machine, here are some papers as examples. In literature [1], Ricoh Taiwan company has finished a completely operation manual of the company's business machine, which is very detailed. In literature [2], Zheng Linlun graduate student published "Under different leadership styles, the influence of personality traits of business personnel on the performance of professional work—tacking the business machine industry as an example". This paper is used to illustrate the influence of personality traits on the business performance. How to deal with customer's picky habits? How to speed up the replenishment of consumable

materials? How to teach customers to do the simplest and basic maintenance work? How to troubleshoot the emergency fault (paper jam or motor fault) that is displayed on the LCD screen?

**III. Explanation of principle:**



Fig.1 The appearance of a business machine [1]

**A. The position of the fusing system in the overall business machine**

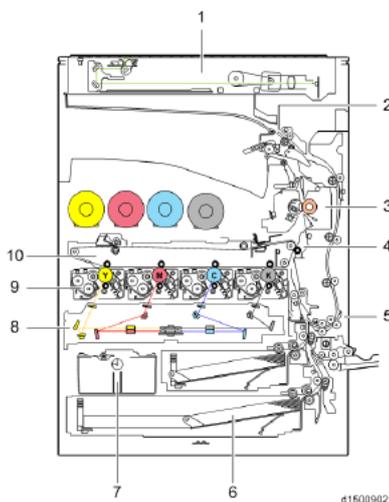


Fig.2 The major structure of a business machine [1]

**3. Fusing system**

**B. The fine construction of the fusing system:**

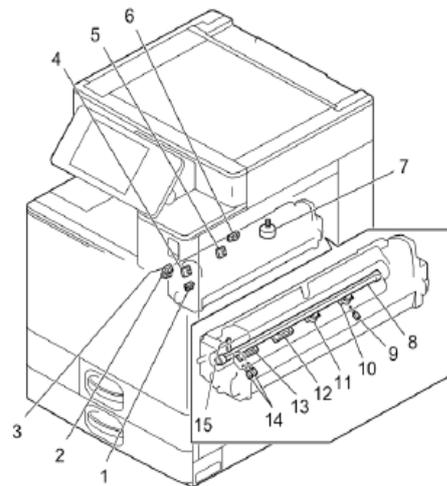


Fig.3 The fusing system [1]

- 1.Fusing pressure release sensor
2. Shield position sensor (lower)
3. Shield position sensor (upper)
- 4.Thermopile (edge)
- 5.Thermopile (center)
- 6.Fusing exit sensor
- 7.Shield drive motor
- 8.Fusing heater
- 9.Thermistor (center)
- 10.Thermostat (edge)
- 11.Thermostat (center)
12. Numerical control sensor (center)
13. Numerical control sensor (edge)
14. Thermistor (edge)
- 15.Shield sensor (1/2)

**C. The drive unit of the fusing system:**

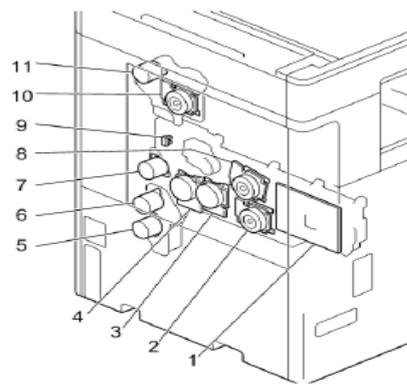


Fig.4 The drive force of the fusing system [1]

1. Imaging Input/output buffer (IOB)
2. Development motor: cyanic +magenta + yellow
3. Development motor: black
4. PCU: black/Image transfer motor
5. Paper feed motor
6. Transport motor
7. Registration motor
8. PCU motor: cyanic +magenta +yellow
9. Phase sensor
10. Fusing motor
11. Paper exit/pressure release motor

#### IV. The practical operation of the fusing system of a business machine:



Fig.5 The inspection of the fusing system



Fig.6 The troubleshooting of the fusing system

#### V. The result of experiments of the fusing system:



Fig.7 The fusing system that has been inspected



Fig.8 The fusing pressure release sensor and the edge thermopile and the fusing exit sensor that are inspected

#### VI. Conclusion:

Comparing the new business machine with the old business machine, the new business machine has been improved a lot about the fusing system:

- (1) Changing the material of the fusing sleeve (roller) to an alloy of nickel and copper instead of the traditional stainless steel material can improve the heat dissipation problem. Although the copper conducts heat faster than the stainless steel, but the price of copper is very high, so we add a small amount

of nickel to reduce the cost.

(2) On the pressure rollers and bushings, the use of metal single-purpose grease to replace the traditional plastic special-purpose grease can reduce the amount of grease and improve the lubrication ability.

(3) There is only one way to open the pressure release motor of the new machine. It can replace the pressure release motor of the traditional machine that has two opening methods to simplify operation steps.

## VII. Reference:

[1] (2015), "Service manual of Ricoh university: learning, knowledge, performance", page 1-1~1-44, Ricoh Americas corporation, 1st edition.

[2] Zheng L.L., (2007), "Under different leadership styles, the influence of personality traits of business personnel on the performance of the professional work-tacking the business machine industry as an example", master's dissertation, Taipei, Taiwan, national Taipei university, department of enterprise management.

[3] Xu A.Y., (2006), "The influence of word –of –mouth effect on the organization's purchase intention – taking the multifunctional business machine as an example", master's dissertation, Taipei, Taiwan, national university of science and technology, department of enterprise management.