AUTOMATED ALARM INTEGRATION FOR CLOG DETECTION IN POLYIMIDE COATER CLEANING STAGES

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ABSTRACT

The invention aims to address the frequent problem with polyimide coating machine specifically with insufficient or no polyimide on wire due to insufficient cleaning brought about by clogged nozzle cleaning stage. The problem became the top issue affecting company KPI in terms of quality and productivity specially that this machines are running with igniter products.

The team generated a project to effectively eliminate such issue through integration of pressure switch connected in series with the cleaning stage system and in this way ensuring good vacuum pressure will ensure that no clogged nozzle and irregular dispensing will be encountered. The project is consist of a pressure sensor that will detect the actual vacuum pressure of the cleaning stage base from the set allowable minimum and maximum pressure. Beyond the set value pressure sensor will send a 24v signal to trigger the latch relay to notify operator that nozzle is already clogged through buzzer and red light combination. Latch relay is also connected to the main system of the machine restricting operator to start the machine without checking the actual condition of the cleaning stage and resetting the alrm when done.

1. 0 INTRODUCTION

Polyimide coating is very essential to strengthen the wirebonded units from external force causing it to lift and fail that will cause cathastrophy specially when already installed at customer products. Insufficient polymide and no polyimide at all is one of the main problem of equipment engineering for polyimide machines not only generating downtime loss but also quality.

The current machine capability is not enough to ensure that the polyimide coating was applied 100% into the specific gold/aluminum wires to ensure wire stability. As per design machine do not have the capabilities such as 1. Machine do not have the capability to detect whether cleaning stage is already clogged and 2. Machine do not have inspection camera after dispensing to detect whether application of polymide is complete and worst, detection of insufficient and no polyimide is after oven cure resulting to multiple lots on hold due to this issue.

Proposed project before was to use a new camera system coming from Keyence but as per thorough checking, project was turn down due to high cost and limited machine space at output rail so the team conceptualized an alternative solution that is more cost efficient but can be comparable in terms of effectiveness.

The team introduced the polyimide coating clog vacuum stage alarm system through the use of readily available parts from salvaged usable parts from scrap machiness such as pressure sensor, buzzer, tower light, relay and switch making it as a costless but effective project.

2. 0 REVIEW OF RELATED WORK

There is no any related literature applicable to this work.

3.0 METHODOLOGY

The team conducted a study how we can detect the actual vacuum pressure from the vacuum stage itself and come up with the idea to use a pressure sensor connected in series with the vacuum stage hose going to the vacuum ejector. We have studied also the optimal pressure where we can set the value to determine that the cleaning stage is already clogged.

1.1 Materials needed to make the project

The team gathered materials collected from scrap machines such as relay, pressure sensor, push buttons, tower light and the like

1.2 How the project works

Condition 1:
Pressure setting was initialy set to optimal range base from the studied pressure ≥0.61 Mpa. If during auto nozzle cleaning and the pressure sensor detected that the actual value is beyond the set value the pressure sensor will send a signal

to turn on the relay 1 (latch ckt) relay 2 will then activate to trigger an alarm with tower light in RED indicating that the cleaning stage is already beyond the set limit and need to be cleaned to bring back the desired vacuum pressure during nozzle cleaning.remember that machine is utilizing green color for normal and red color for error. During the error operator should call the attention of technician in charge to check the actual condition of the cleaning stage and will perform necessary cleaning. After the cleaning was properly performed the technician will then press the reset botton to disengage the latch circuit so that the alarm will be turned off and green light will be light up. Please see figure 2 diagram

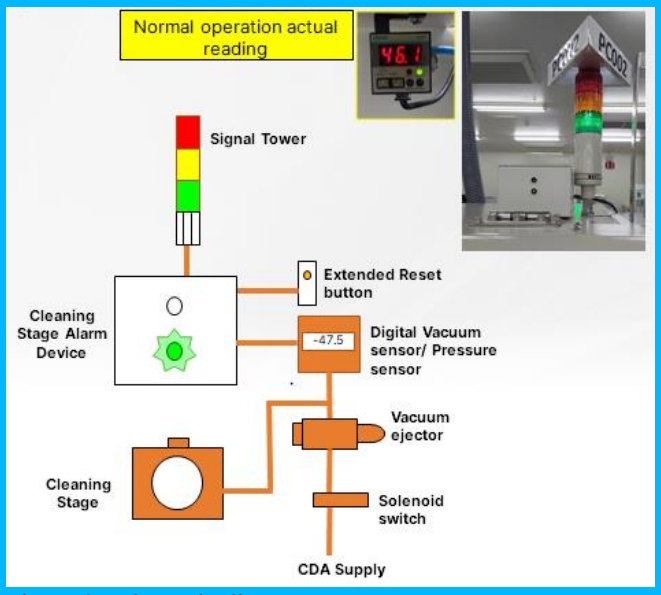


Figure 2: schematic diagram

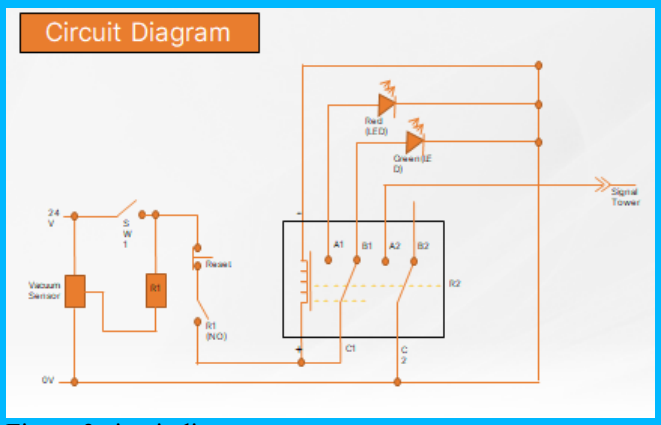
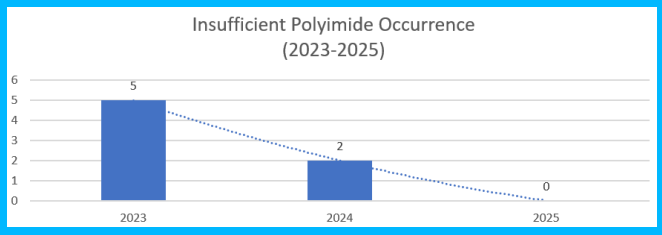


Figure 3 circuit diagram

4.0 RESULTS AND DISCUSSION

- Eliminate the risk of insufficient polyimide
- Realtime notification that the cleaning stage is abnormal
- Auto machine stop when cleaning stage is abnormal



5.0 CONCLUSION

Base from the data gathered we reduced the occurrence of insufficient polyimide after installing this project.

6.0 RECOMMENDATIONS

Install additional sensor at cleaning stage in addition to the current project and in that way without pulling the actual main stage vacuum due to clogging machine cannot be started

7.0 ACKNOWLEDGMENT

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8.0 REFERENCES

There is no related references applicable to this work.

9.0 ABOUT THE AUTHORS

Franklin Berndt Silveri M. Yuhmo, Electronics and Communication Engineer. Graduated at Saint Mary's University at Bayombong, Nueva Vizcaya year 2013. He is connected to ON Semiconductor Philippines Corporation for 12 years now where he started as an Equipment Engineer and currently functioning as WB PM Team Lead for LSI/QFN.

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10.0 APPENDIX

This paper did not use the appendix section. All figures and chart are already incorporated in the main sections of this paper.