Assignment: Automatic thermal paste application

Type: Graduation assignment
Discipline: Mechatronics
Level: Bachelor's degree – Graduation Internship

Assignment description

At AME, two-component thermal paste is currently applied manually to a motor driver assembly, which consist of a PCBA mounted to a Heatsink. AME aims to fully automate this process using a compact, user-friendly mechatronic system. The system must dispense and apply the thermal paste to the specified locations in a controlled manner.

The goal of this graduation assignment is to develop a substantiated design and a working prototype. Once the product has been loaded and the cycle started, the setup will perform positioning, dispensing and application. You will investigate how to achieve repeatable quantities, positions and patterns, taking material behaviour, working time and maintenance into account. The selected solution must fit the available workspace and production process.

Result: A compact prototype that automatically applies the paste to a representative 2kW motor drive, with validated process settings and a design ready for handover.

Your activities

You will develop the mechanics, dispensing system, electronics and controls as an integrated system and justify your design choices. You will follow the V-model and link the requirements to verification tests.

- **Pre-study**
  - Investigate the AME products & processes defining bottlenecks and improvement possibilities
  - Define scope and primary use cases

- **Project definition**
  - Functional Specification containing all project & product requirements
  - Factory Acceptance Test (FAT) / validation plan and defining test criteria

- **Research and design**
  - Compare dispensing and compact motion concepts in terms of accuracy, cost, footprint and maintenance.
  - Select the required components and design a proof of concept

- **Realization**
  - Prototyping the defined system (proof-of-concept)
  - Develop a test plan using good and faulty products and define limits, edge cases and fault handling.

- **Testing and handover**
  - Verification of the solution against requirements
  - Deliver the design, test results and operating instructions, including recommendations for extending the solution to other products.