TechniCal note

Preventive Maintenance
PCBAs

Scope of this document

A PCB (Printed Circuit Board) is a bare board that physically supports and electrically connects electronic components together. PCB has conductive pathways, circuit traces and pads which are etched from layer(s) copper sheets and laminated onto a layer(s) of non-conductive substrate. A PCBA (Printed Circuit Board Assembly) is the process of soldering and mechanically assembling of electronic components to a PCB (Printed Circuit Board). After the assembly the electronic device is fully operational.

PCBAs have various functions in drives. All the basic functions such as drive control, safety functions, main functions, measurements interfaces, switching pulses to semiconductors, communications, optical to electrical conversion and much more are created via PCBAs. Maintenance strategies differ depending on the board and the environment it is used. Their reliability is crucial for essential operation of the drive. The lifetime of an PCBAs is highly dependent on the application conditions and is affected by both electrical and environmental factors. Common stresses that influence drive reliability are temperature, temperature change, humidity, humidity change, voltage, corrosion, vibration, mechanical shock and radiation.

Reasons for the preventive maintenance

A PCBA is an aging device. A PCBAs typically contain various components and technologies. Therefore, many different wear-out effects can take place causing a reduction in reliability over time.

Following effects are caused by PCBAs aging:
- Electrolytic capacitor dry-out and lose of capacitance
- Wear out of optical transmitters, LEDs and optocouplers
- Vibration related damages
- Dust causing short circuit and short-term condensing water
- Dielectric breakdown in insulators

Preventive maintenance is an undeniably critical part of any maintenance strategy. By taking necessary maintenance actions, failures can be prevented before they occur. Preventive maintenance is not only predictable, but also cheaper, than repairing already failed drive. It’s key for avoiding unfunctional drive, decreases unexpected downtime, reduces costly repairs, improves reliability, enhances drive life expectancy, increases safety and reduces risk of injury. If preventive maintenance action are not carried out, it can result in total breakdown of the drive.

ABB recommends changing wearing components to avoid risk of failures in frequency converter. Check maintenance schedule for recommended maintenance intervals and component replacements for a specific drive.