IGBT environmental triggers

Reconditioning for ACS800 drives

Background

Recommended maintenance intervals and component replacements are based on specified operational and environmental conditions. ABB recommends annual drive inspections to ensure the highest reliability and optimum performance. Long term operation near or over the maximum specified ratings or environmental conditions may require shorter maintenance intervals. To minimize the risk of failures in the frequency converter, ABB recommends including IGBT modules as part of the maintenance program.

ABB recommends a module Reconditioning at the authorized Drives Service Workshop. Reconditioning restores all the drive's aging components to their latest version and revisions, improves the drive's reliability, and extends its lifetime.

Environmental triggers for IGBT aging

IGBT change is recommended as a reconditioning service if two or more of the following criteria are fulfilled:

- Drive is continuously operating at air temperature close to +50 °C (122 °F).
- Drive is continuously operating at high relative humidity close to 95% (No condensation allowed).
- Drive is used in places full of corrosive gases such as (sea breeze, Cl2, H2S, NH3, SO2, and NOX.)
- Drive operates near or exceeds permitted vibration limits.
- Drive is used in a not controlled, outdoor or in an environment with impurities, no conductive dust allowed.
- Drive is used in an application which causes an extremely cyclic temperature profile.
    - Potentially heavy IGBT thermal cycling applications are crane, centrifuge, compressor, elevator, mixer, stirrer, elevator, extruder and testbench.
    - ABB Ability Condition Monitoring services for powertrain are available to find out the stress level of application.
- Drive is used under extensive electrical load (ie. used beyond permitted limits) exposing IGBTs to various thermomechanical stresses that cause strain, thermal fatigue, deterioration, degradation and thermo-mechanical stress in IGBT module material interfaces.

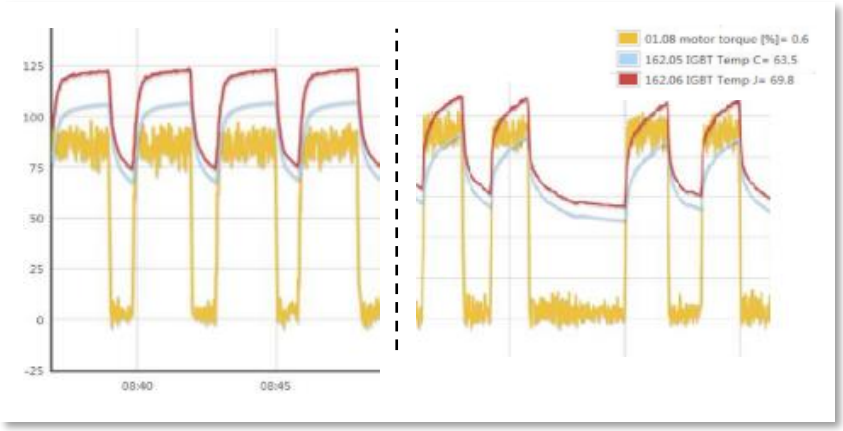

Figure 1. A typical example of an extremely cyclic temperature profile. Temperature fluctuation is the main accelerator factor for IGBT aging and wearing out.