

Research on Field Failure Accelerated and Failure Mechanism for Smart Electricity Meters

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Abstract

The study was conducted in order to solve the problem of smart electricity meters failure in the application, improve product quality and ensure the reliability of the smart electricity meters on the scene. Through statistical analysis of smart electricity meters failure data in the field confirm the statistical characteristics. Carry out failure mechanism analysis on the typical failure mode of failure meters to clear failure mechanism. Investigation and research on environmental profile and mission profile in which the meters used summing up the typical climate stress type, stress level and distribution characteristics. Analyze the intensity and duration of various types stress to figure out correlation between different stress and the main failure mode. Design the object and test scheme of the field failure accelerated testing method based on the statistical analysis of failure data, the failure mechanism of main failure mode and the results of the stress analysis. Finally propose the failure accelerated test method of smart electricity meters in the field. Use this test method to expose or reproduce the failure phenomenon of operating meter on the scene. Further establish the main failure mode Fault Tree of meters and confirm the failure mechanism and influencing factors of critical meters materials. Thereby, provide methods and technical basis for finding potential defects and weaknesses of smart electricity meters.