

Optimized Contact Erosion by Using Electronegative Gases in Telecom Relays

Werner Johler, Member IEEE

AXICOM Ltd. Seestrasse. 295, CH 8804 Au – Waedenswil, Switzerland

Abstract

Although Telecom or Signal relays are mainly used to switch low level signals, they frequently have to handle higher dc as well as ac loads. Depending on the voltage or current applied, significant contact erosion and/or material transfer can cause sticking. The investigations were performed at typical loads for the most often used contact material – AgPd60 in a nitrogen (N₂) switching ambient, compared with the new erosion resistant material PdRu10, in a nitrogen as well as in Sulphurhexafluorid (SF₆) atmospheres with 30 and 100% SF₆.

The investigations showed higher material transfer on make than on break contacts. The reason for the higher contact erosion during the make operation is due to bouncing, because a make operation consists of several make and break operations in sequence.

PdRu10 and AgPd60 in N₂ ambient showed by far the highest material transfer with craters and spikes in the range of up to 120 µm and 75 µm respectively. PdRu10 in SF₆ showed significantly less material transfer (factor 3) and therefore also no sticking.

Replacing the most commonly used combination of AgPd60 operating N₂ with PdRu10 in SF₆, results in a significant performance increase. Considering all the other advantages especially the excellent dielectric performance of SF₆, PdRu10 working in an SF₆ ambient results in a very good switching performance.

Key words: Telecom relays, contact material, contact erosion, material transfer, SF₆.