

EC CablingNews

Testing of connecting hardware for ability to deliver power over Ethernet

By Erik Bech – 5 March 2012

Local area networks, which deliver Ethernet services have for a long time been designed to also deliver power to attached equipment. This usage of the network gives great savings for a lot of equipment, because the mains supply can be omitted. The recent specification for power over Ethernet, PoE+ delivers 55 V, 0.6 A in a twisted pair. Concern has been raised if the connecting hardware can withstand this voltage and current during disconnection. During circuit break an arc is developed and if this arc causes breakage of the gold plating of the contacts, it may be expected that contact resistance will increase due to corrosion of the contact material. How arching and wear can deteriorate the gold plating of a contact is shown in Figure 1.

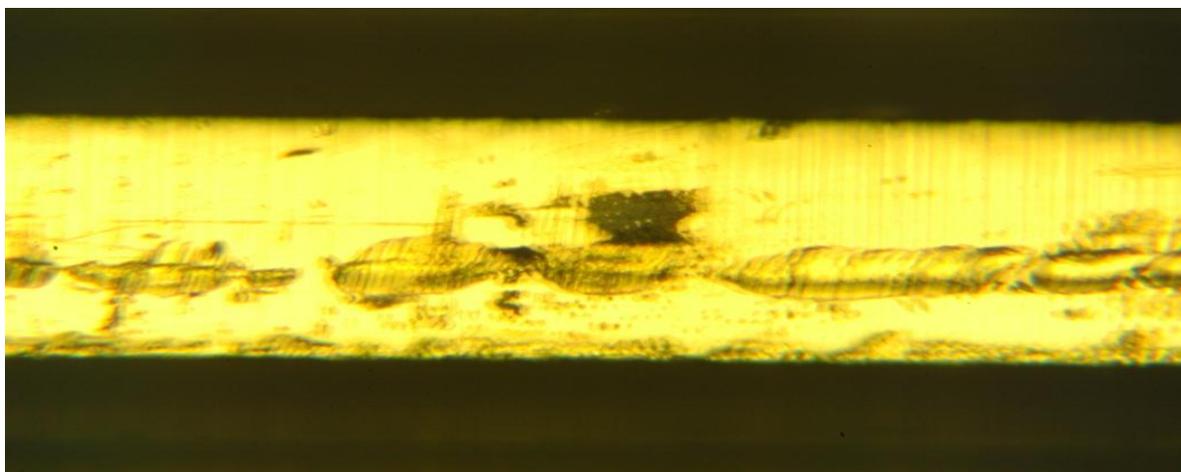


Figure 1. Wear and hole in plating caused by the arching. This picture was taken after 750 operations.

The arching originates from a voltage spike, which is caused by breaking an inductive load. Figure 2 shows the measured voltage during break.

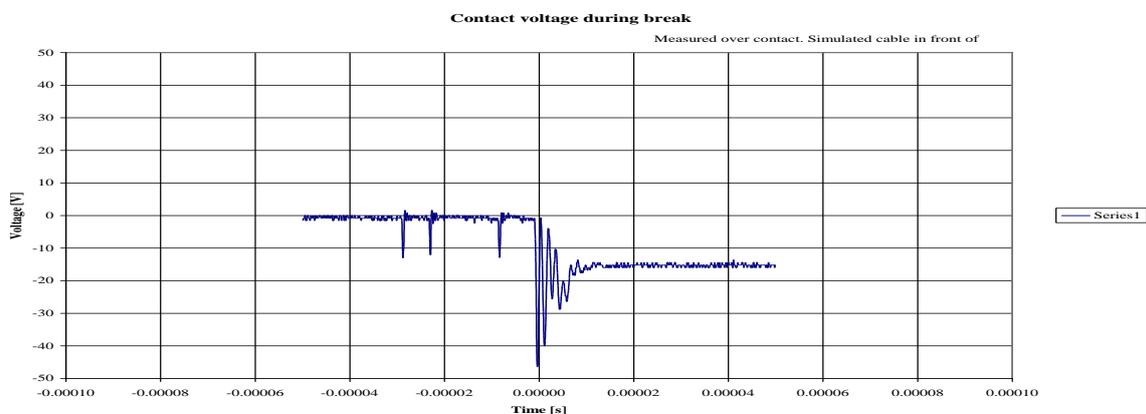


Figure 2. Measured voltage over contact during break

In order to test connector performance for circuit breakage under load, a development of a test standard has taken place. This standard is now on the committee draft for vote stage. This means that the technical content should be finalized. DELTA has followed and contributed to the development of the standard during the years of development, and is now ready to perform the testing according to the latest requirements.

The test standard will be: IEC 60512-99-001 Ed. 1.0: Test schedule for engaging and separating connectors under electrical load-Part 60512-99-001: Connectors used in twisted pair communication cabling with remote power.

The idea of the testing is to separate the connector a certain number of times under load. Then apply a mixed flowing gas test in order to make the contacts corrode, if the gold plating is broken. After that the connector is separated under load condition again, and then finally the performance of the connector is measured. The performance parameters, which are measured, are voltage proof, insulation resistance, and contact resistance. Of these parameters, contact resistance is the most important, because this is the parameter, which is expected to be influenced by the testing.

Specification for the testing:

Voltage: 55 V. Current: 0.6 A for each connection (8 times in a four pair connector).

Number of mating cycles before and after mixed flowing gas application: 25 (one polarity) and 25 (the other polarity)

Load circuit: Inductor of 100 μ H in series with a resistor of 92 Ω in parallel with a capacitor of 5 μ F.

DELTA is ready to perform the testing. Equipment for operation of the connector is shown in Figure. 3.

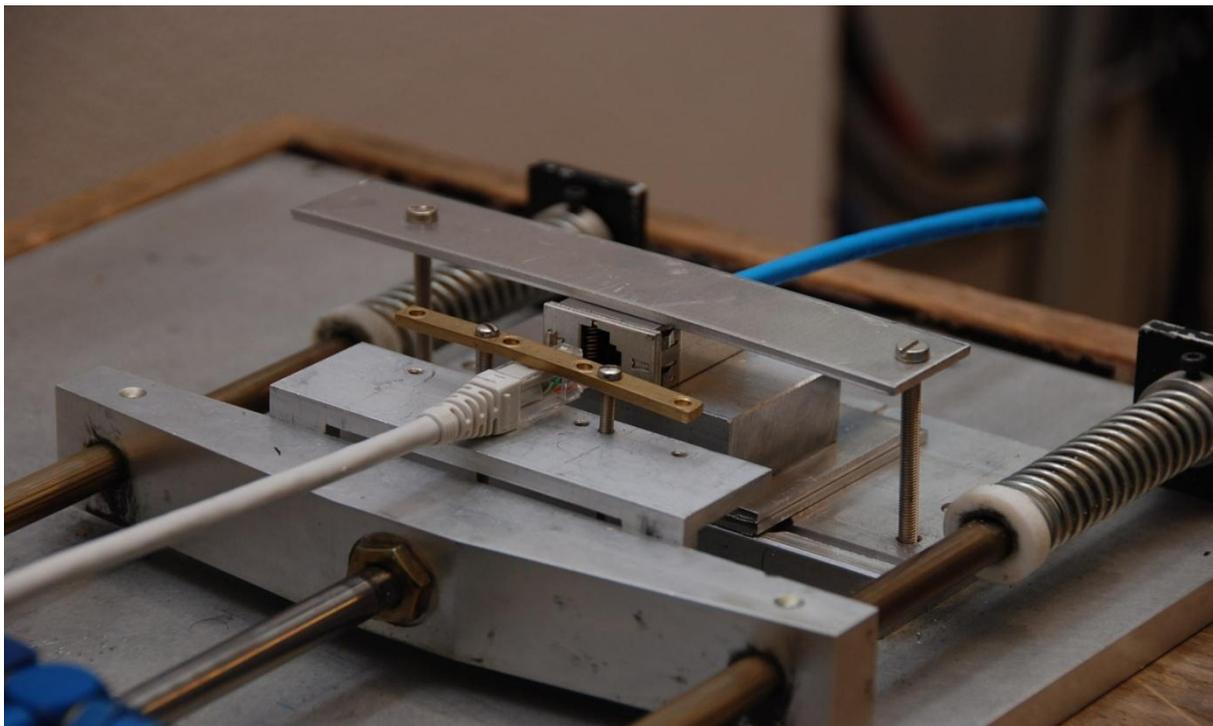


Figure 3. Apparatus for engaging and disengaging a connector.

References:

48B/2245/ CDV Draft for IEC 60512-99-001.

DELTA technical note April 2007 Power over Ethernet Plus (PoEP). Connecting hardware issues.

