



*No. 77, Dated 22 December 2014*

## **HCS Category 6A Shielded Jacks DELTA-EC Verified to PoE+**



IEEE 802.2at (PoE+) increased the power transmitted over LAN cabling from 13W (Type 1) to 30W (Type 2). Typical applications may need 50V (55V max.) and 600mA. This substantial upgrade exposes all cabling components to various risks. The risk of overheating the cables conductors is discussed in numerous papers, being the most evident challenge. One of the less-discussed problems is the effect this increase may have on the connecting hardware.

It is evident that each time the plug is pulled out from the jack under load an ark (or spark) is created. This ark may not be visible to the naked eye but it does exist and it may cause a certain damage to the gold-plating on the jacks' contacts. The extent of this damage depends on the gold plating quality and the design of the jack.

DELTA test house (Hørsholm, Denmark) proposed a method to test the amount of damage caused by repeated disconnections, which was subsequently adopted by IEC and ratified as IEC 60512-99-001 (Published August 2012). The relevant Delta paper is attached to this newsletter, explaining the phenomenon and showing the test instrument used and the damage that may be caused.

As shown, if the gold plating is damaged, the exposed metal under it may rapidly corrode and cause disconnections and link failures.

Until recently very few connecting hardware manufacturers bothered to submit their jacks for testing, as this test is not yet a mandatory part of any LAN cabling standard, but as PoE+ is gaining popularity it is highly recommended to verify that all jacks used can perform properly and maintain circuit integrity during their lifetime.

**HCS Category 6A Shielded jack P/N J6A-00826 is now officially DELTA-EC verified to support PoE+ after 50 cycles, turning HCS to be one of the few manufacturers offering such connector.**

**A copy of the certificate is attached to this newsletter.**

**Whenever selecting a jack make sure it is also verified according to IEC 60512-99-001, in addition to all standard transmission properties.**

For detailed information on HCS products please browse the HCS Online Catalog or contact us at HCS Istanbul.  
***HCS is the No.1 Turkish supplier of high- performance fiber optic and twisted pair LAN Cabling Systems.***

### **HCS – HES Cabling Systems**

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*Connecting Networks*

# 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.

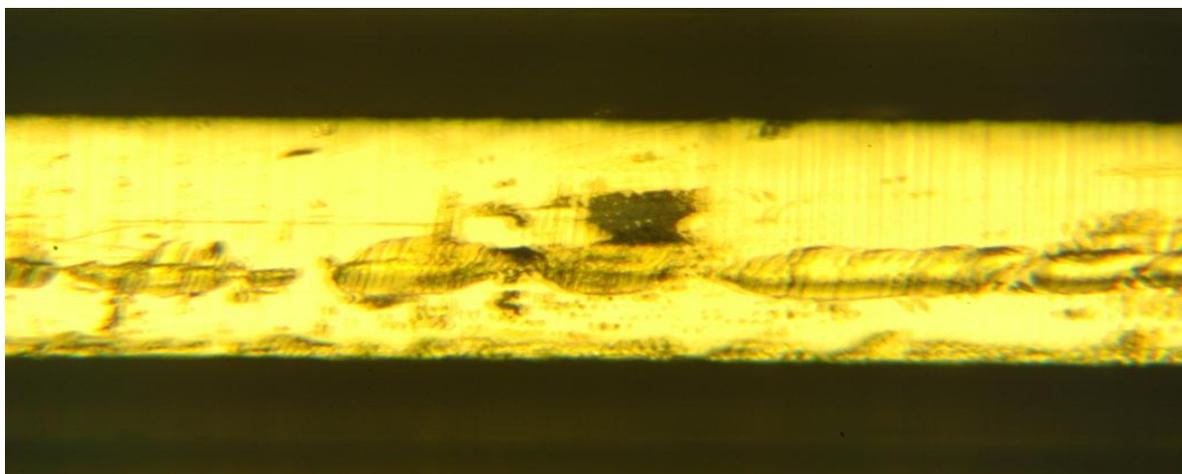


Figure 1. Wear and hole in plating caused by the arching. This picture was taken after 750 operations.

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

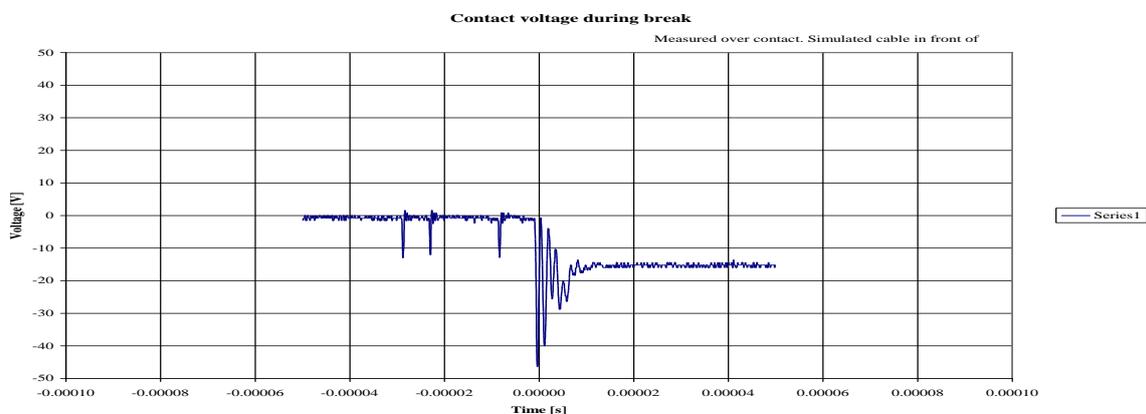


Figure 2. Measured voltage over contact during break

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  $\mu$ H in series with a resistor of 92  $\Omega$  in parallel with a capacitor of 5  $\mu$ F.

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

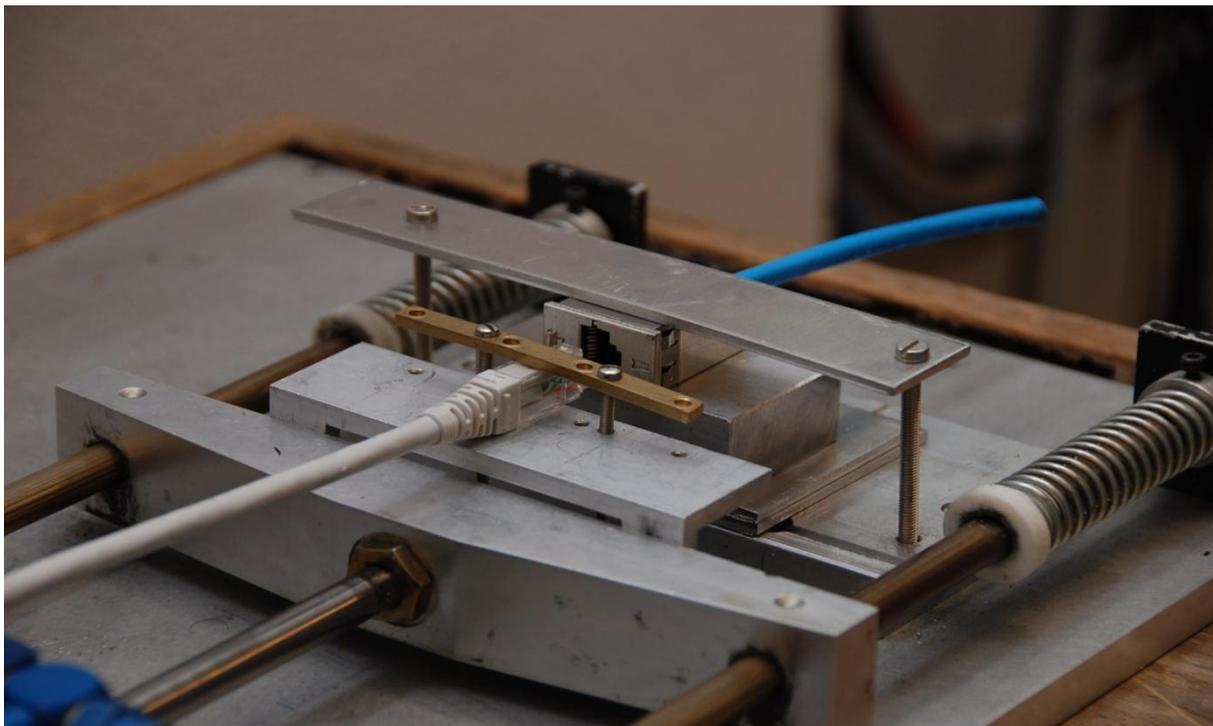


Figure 3. Apparatus for engaging and disengaging a connector.

References:

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

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





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# Compliance Statement

No. 2014-473A

## Connecting Hardware, Category 6<sub>A</sub> Including Power over Ethernet Plus (Mating and un-mating connectors under electrical load)

### Company

HCS - HES Cabling Systems  
Turgutreis Mah. Barbaros Cad.  
Giyimkent Kooperatif Ici Vadi Bulvari No:1  
Esenler  
Istanbul  
Turkey

### Product description

Screened Category 6<sub>A</sub> RJ45 Jack and Patch Panel characterised up to 500 MHz, 100 Ω

### Product identification

- 8P8C RJ-45 Shielded Augmented Category 6 Keystone Jack. Part Number: J6A-0082X (X denotes color)
- Keystone Jack 19" Blank Metal Patch Panel. Part Number: P00-0xx20-1U (xx denotes number of ports)

### Generic cabling and cabling components standards - Category 6<sub>A</sub> connector requirements

- ISO/IEC 11801:2011 (Ed. 2.2)
- IEC 60512-99-001:2012 (Ed. 1.0)
- IEC 60603-7-51:2010
- EN 50173-1:2011
- EN 50173-2:2007 including amendment A1:2010
- ANSI/TIA-568-C.2:2009

including all connector alien crosstalk parameters (PS ANEXT and PS AFEXT)

### Technical report

DELTA-T209812, DANAK-19/14686

### EC Cabling product ID

5273

### CS valid until

11 November 2015

This product has been tested by DELTA EC Cabling Group and complies with the electrical requirements of the above specified standards and "Terms and conditions for the EC VERIFIED programme for Generic and Coaxial Cabling", DQP231006. The testing included measurement of NEXT with a compliant test plug and calculation of all the 14 test cases in both measurement directions. The product takes part in a maintenance of certification schedule, which implies that DELTA EC Cabling performs a quality audit of the manufacturer's production and QA sites. The maintenance testing of the product is performed on a sample basis once a year. This CS has been revised.

Hørsholm, 11 December 2014

  
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