IEEE802.3 4P Task Force Channel Pair To Pair Resistance Imbalance

Investigation of a low resistance connector

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IEC 60603-7 - Summary of specifications

› **Input to output d.c. resistance:**
  200mΩ maximum

› **Initial contact resistance:**
  20mΩ maximum

› **Input to output d.c. resistance unbalance:**
  50mΩ maximum

› **Environmental or mechanical "aging":**
  Contact resistance 20mΩ maximum change from initial

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IEC 60603-7

› For the worst case model of the Ad-hoc, (minimum resistance, maximum unbalance) the maximum values according 60603-7 (200$m\Omega$ / 50mΩ) are probably too high/not relevant.

But also a low resistance connector is affected by aging (environmental stress, mechanical operation,..) which would increase the initial resistance unbalance over lifetime.

› To increase the database for the Ad-hoc model, this document lists the resistance test data of a specific low resistance connector.
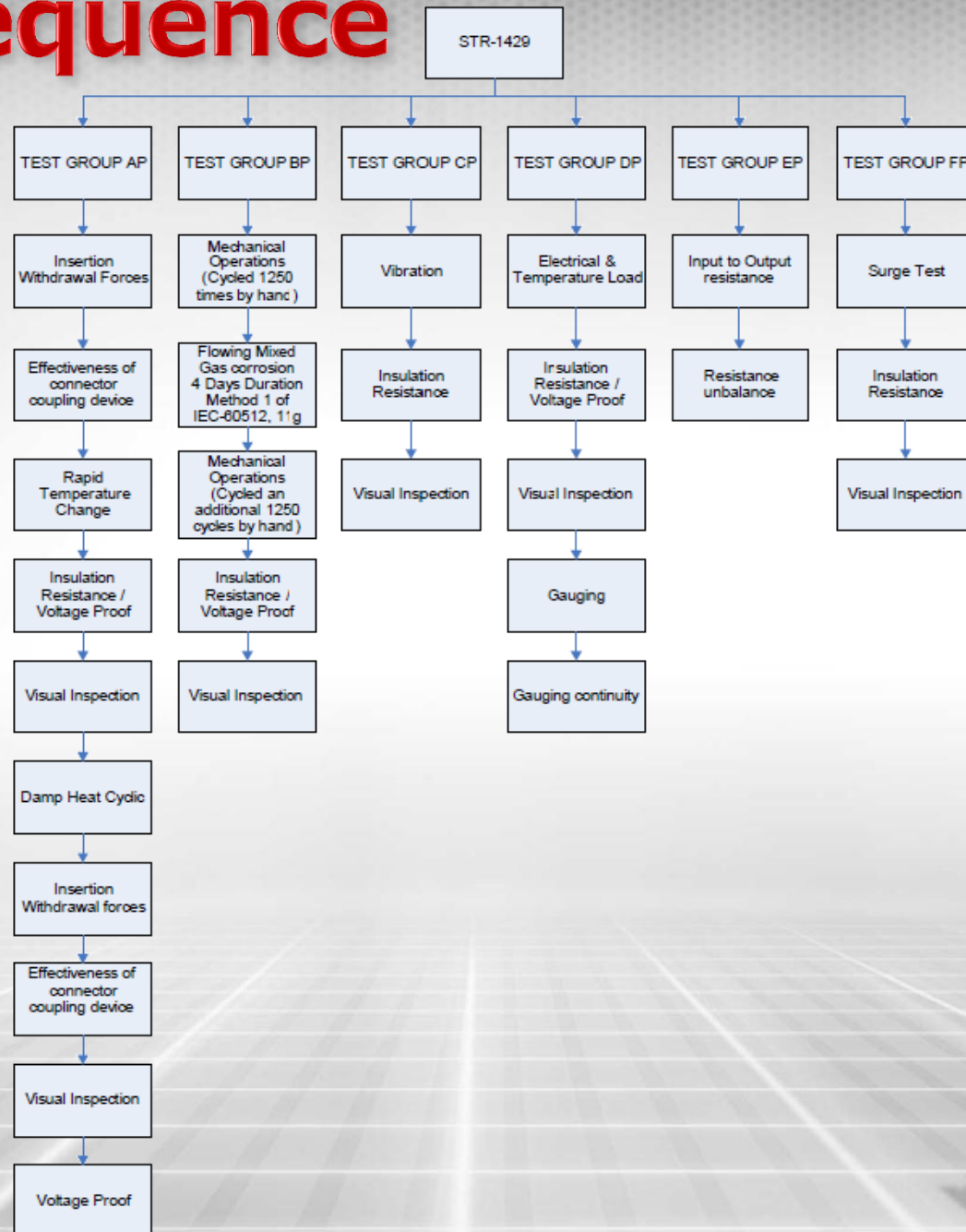
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Connector

› **Product:**
Short Top Entry
RJ-45 connector with low
input to output resistance.

› **Testing and test references**
according IEC 60603-7

› **Total quantity: 52 Samples:**

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Test Sequence

Results:

› **EP7 Input to output resistance:**
   23.34/20.19/19.14 (mΩ Max/Mean/Min)

› **EP8 Resistance unbalance (inital):**
   4.2 mΩ maximum

› **P3 Initial Contact Resistance:**
   11.1 / 7.9 / 6.9 (mΩ Max/Mean/Min)

› **AP**9 Thermal Stress / Damp heat
   Resistance change from initial:
   3.1 / 1.3 / -0.9 (mΩ Max/Mean/Min)

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Results:

› **BP**6 (FMG/Corrosion, mechanical operation)
   Resistance change from initial:
      3.1 / 1.3 / -0.9 (mΩ Max/Mean/Min)

› **CP**2 (Vibration)
      Resistance change from initial:
         0.3 / -0.4 / -1.3 (mΩ Max/Mean/Min)

› **DP**5 (Electrical load and temperature)
      Resistance change from initial:
         3.1 / 0.0 / -3.4 (mΩ Max/Mean/Min)

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Summary

› **Based on these test results the worst case would be:**

- – Minimum initial resistance: **19.14 mΩ**

- – Maximum initial resistance (23.34 mΩ) + maximum change after aging (3.1 mΩ*) = **26.44 mΩ** (7.3mΩ worst case resistance difference)

(*) It has to be considered that the investigated jack has NiPd plating which offers a high contact reliability.
A similar jack with a low quality plating could show a higher change of the contact resistance after aging.

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