

IEEE 802.3da Single Pair Multidrop Enhancements SPE Connector Resistance

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Background

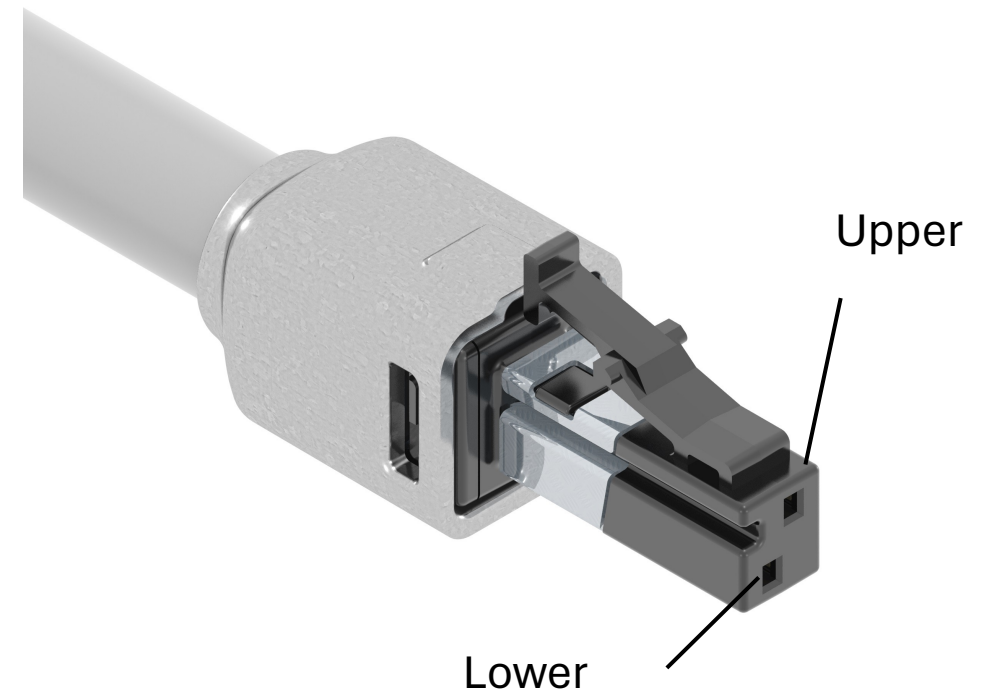
- Connector resistance can be a significant portion of the mixing segment budget
- Examination of channel resistance stack-up predicated on an estimated 200mΩ T-connector resistance
https://www.ieee802.org/3/da/public/1123/Paul_01_da_2023_1_13.pdf
- This contribution provides measured resistance values for mated and unmated SPE connectors compliant with IEC 63171-1 standard

IEC 63171-1 SPE Connector

IEC 63171-1, detail specification for 2-way, shielded or unshielded, free and fixed connectors

NOTE: Connector tested with 18AWG SPE cabling

50 connectors tested



Connector Resistance, Plug Only

Sample Identity	Plug Resistance milliohms		Shield Resistance milliohms
	Upper	Lower	Shield
BP-31	8.12	8.34	8.71
BP-32	8.30	9.49	7.75
BP-33	8.49	9.17	8.08
BP-34	8.33	8.16	4.65
BP-35	8.47	9.08	4.78
BP-36	8.52	8.43	8.16
BP-37	8.07	7.86	2.98
BP-38	8.99	8.86	7.09
BP-39	9.22	8.08	6.67
BP-40	8.79	8.42	6.67

Connector Resistance, Mated w/MDI

Sample Identity <i>Partial data, n = 50</i>	Mated Resistance milliohms	
	Upper	Lower
BP-31	10.83	10.44
BP-32	11.23	12.07
BP-33	11.77	11.47
BP-34	11.95	10.62
BP-35	11.45	11.19
BP-36	12.46	12.75
BP-37	11.12	10.72
BP-38	11.59	11.05
BP-39	11.85	10.77
BP-40	11.28	11.86

- Measurements made in accordance with IEC 60512 – 2a, Contact Resistance
- Max. resistance, upper = 14.31 mΩ
- Median resistance, upper = 11.97 mΩ
- Min. resistance, upper = 10.39 mΩ
- Max. resistance, lower = 13.35 mΩ
- Median resistance, lower = 11.46 mΩ
- Min. resistance, lower = 10.07 mΩ

Conclusions

- **Mated connector resistance measurement using production SPE connectors**
- **There is additional margin available in the channel resistance budget, e.g., connector resistance values are lower than prior estimates**