Inconsistency of Resistance Readings with Several "Calibrated" Valhalla 32 Series Meters

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Dennis Gaw and several of the General Dynamics technicians brought to my attention a discrepancy of 15 mOhm between two Valhalla meters, both recently "calibrated", on a coil resistance reading ~1070 mOhm (an inner coil.) I then had them measure a 1 Ohm standard resistor with three Valhalla meters, with and without "temperature compensation." The results are shown in the table below. All numbers have uncertainties of about ±0.1 mOhm.

Valhalla Meter Number	w/ Temperature Compensation	no Temperature Compensation
32 839	999.8 mOhm	1005.3 mOhm
32 852	990.4 mOhm	1005.4 mOhm
	991.8 mOhm (different temperature "sensor")	
32 972	989.9 mOhm	1005.5 mOhm

It appears that the readings **without** temperature compensation are in excellent agreement, but that the temperature compensators of the various meters force the readings out of agreement. On meter 32 852 we tried two different temperature "sensors." The two sensors give readings that are inconsistent, but neither of the readings is consistent with the temperature-compensated reading of meter 32 839.

We need to understand these inconsistencies if resistance readings with temperature compensation are to be taken seriously at the 10 mOhm level. Barring that, we should give up using the internal temperature compensation capability of these meters, and simply record the temperature each time a reading is taken, as is the current practice.

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