OpenVVVF

TEST REPORT

Power Resistor Sanity Check

> Sanity check of the resistance calibration routine using a known power-resistor load.

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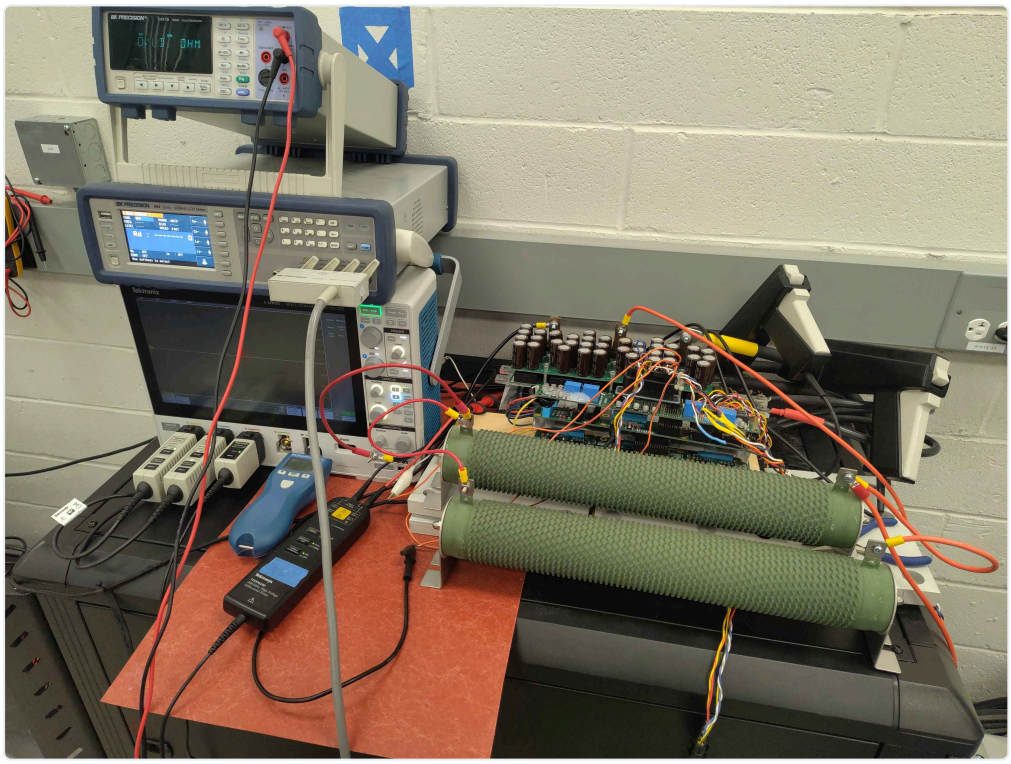
1. Power Resistor Sanity Check

This report checks that the `cal Motor.Resistance` routine returns a sensible value for a purely resistive, high-impedance load. A known power resistor was connected across two inverter phases; the routine's estimate is compared against a direct LCR measurement.

1.1. Test setup

- Load: 23 Ω power resistor tied across phases U and V.
- DC bus: ~121 V.
- Chassis: C2 test fixture.
- Command: `cal Motor.Resistance 8.0 --force`.



Power resistor connected to the C2 test fixture

1.2. Instrument reference

- **Instrument:** BK Precision 894 20 Hz - 500 kHz LCR Meter
- **Function:** DCR
- **Range:** AUTO
- **Speed:** FAST

Parameter	Value
Rd	23.3070 Ω

LCR meter DCR reading: Rd = 23.3070 Ω

1.3. Inverter-calibrated resistance

Parameter	Value
Calibrated UV line-to-line	20.94 Ω
Calibrated UV per-phase	10.47 Ω
Max current reached (UV)	0.345 A
Fit offset (V_off)	23.6 V
UW measurement	Failed (non-positive resistance)

OPEN TELEMETRY LOG:

View this calibration in the Telemetry Viewer

- Command log: PowerResistor-Command-Log.txt
- Raw telemetry: PowerResistor-Telemetry.jsonl

1.4. Analysis

The reading is about 9 % low (20.94 Ω vs 23.31 Ω reference). That is expected for this test point because the current was pushed down by the high resistance load.

At ~0.3 A the IGBTs are operating in the knee region, where

```
Vce ≈ Vf(knee) + Ic · Rce(on)
```

The knee voltage across the two conducting IGBTs is large compared with the ~6-7 V across the resistor, so the linear fit absorbs most of the knee as an offset. Because the knee is slightly curved, the slope is biased low. The 23.6 V fit offset is consistent with this explanation.

The UW phase failed because the resistor was not connected across U-W; the measured current had the wrong sign and the fit produced a negative resistance. This is normal for a single-pair measurement.

This result is not motor-grade accuracy, but it confirms the calibration is in the right decade and is not producing the milliohm-scale nonsense that appears when the routine is run without a real load.

1.5. Notes

- For a real motor with line-to-line resistance of a few ohms or less, the routine can push tens of amps, the IGBT knee becomes a small fixed offset, and the fit accuracy improves significantly.
- A repeat test with a lower-value resistor or higher bus voltage would move the operating point above the IGBT knee and give a closer match to the reference.