

Induction Motor Resistance Calibration Validation

Validation of the inverter motor-resistance calibration routine on a TECO MAX-IE3 induction motor.

Supported by



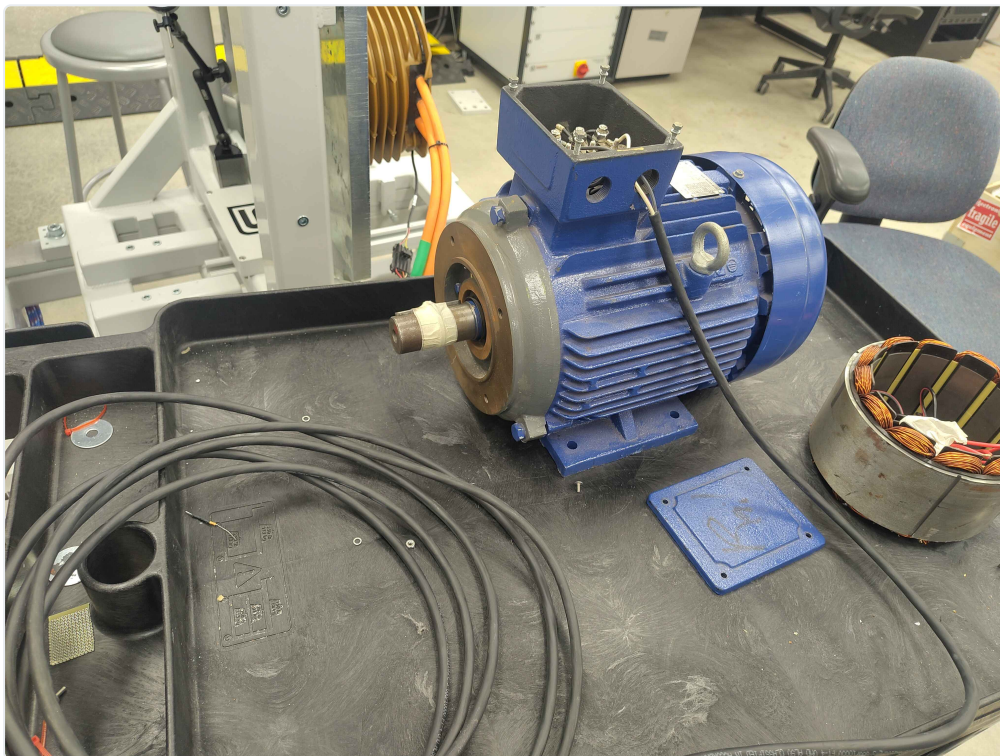
SendCutSend

1. Induction Motor Resistance Calibration Validation

This report validates the inverter's `cal Motor.Resistance` routine on a TECO MAX-IE3 7.5 kW induction motor. The test is run on the C2 chassis test fixture; the routine itself is shared across all OpenVVF chassis.

1.1. Test setup

The motor is a TECO Westinghouse MAX-IE3 3-phase induction motor. Phase leads are accessed at the conduit box for direct LCR measurement.



TECO MAX-IE3 motor on the test bench

1.2. Nameplate data

Parameter	Value
Manufacturer	TECO Westinghouse
Model	MAX-IE3 3-phase induction motor
Power	10 HP / 7.5 kW
Frequency	60 Hz base
Voltage	208 V network
Current	26.3 A
Enclosure	TEFC



TECO MAX-IE3 nameplate

1.3. Reference measurement

Parameter	Value	Instrument settings
Rd (line-to-line)	415.730 mΩ	FUNC: DCR, RANGE: AUTO, SPEED: FAST
Rd (per-phase, estimated)	~207.9 mΩ	-



LCR meter DCR reading: $R_d = 415.730 \text{ m}\Omega$

1.4. Inverter calibration result

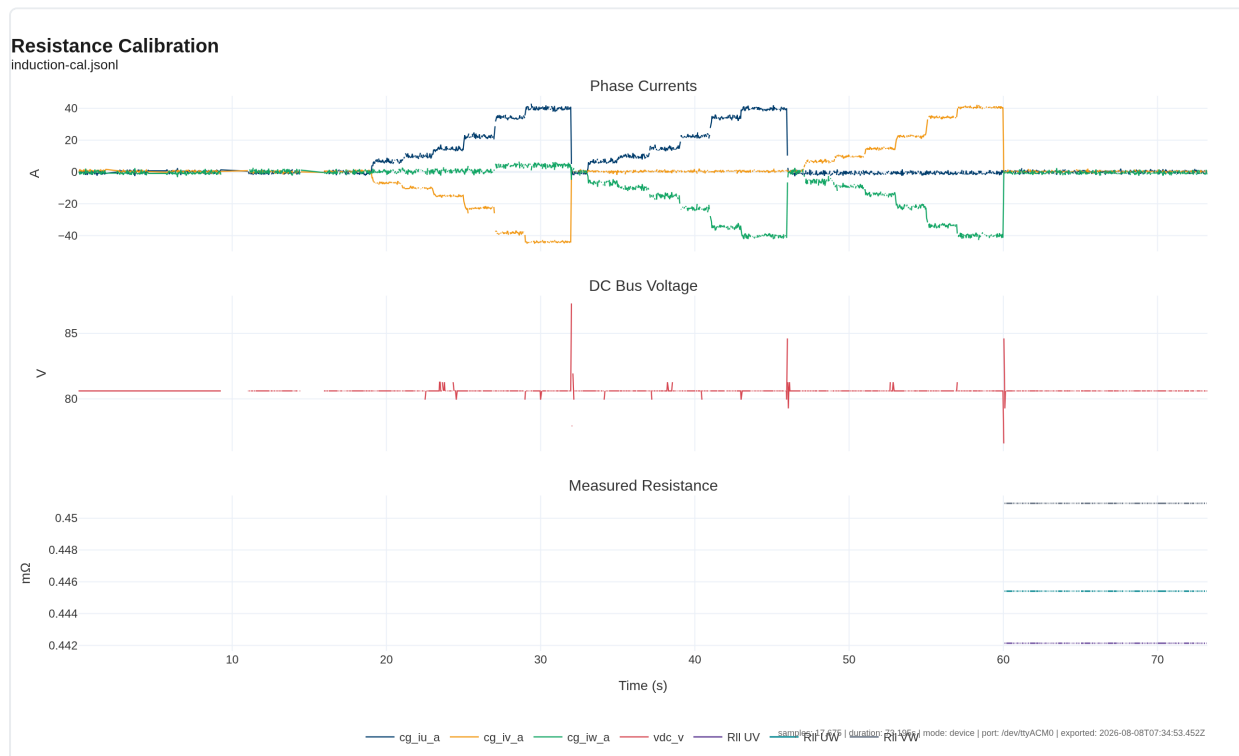
Command: `cal Motor.Resistance`

Test conditions:

Parameter	Value
DC bus voltage	~80.6 V
Maximum current reached	~40 A per phase pair
Duty limit	25 % (voltage-limited by low bus)
Calibration points	7 per phase pair (UV, UW, VW)

Reported line-to-line resistances:

Phase pair	Rll (mΩ)	R_phase (mΩ)	V_offset (V)
UV	442.14	221.07	2.65
UW	445.41	222.71	2.54
VW	450.94	225.47	2.02
Average	446.16	223.08	2.40



Telemetry from the resistance calibration run

OPEN TELEMETRY LOG:

View this calibration in the Telemetry Viewer

1.5. Comparison and conclusion

Quantity	LCR reference	Inverter estimate	Difference
Line-to-line	415.73 mΩ	446.16 mΩ	+7.3 %
Per-phase	207.9 mΩ	223.1 mΩ	+7.3 %

The inverter estimate is about 7 % higher than the LCR reference. This is consistent with the operating conditions: the low DC bus voltage limited the calibration current to roughly 40 A, so the IGBT knee voltage and switching dead time contribute a non-negligible offset to the V/I fit. At the currents used, the voltage across the motor winding is small compared with the combined semiconductor drop in the measurement path, which biases the slope estimate upward.

For the intended application (motor resistance in the hundreds of milliohms, running currents of tens of amperes), this is an acceptable first-pass estimate. A higher-current rerun at a higher bus voltage would move the estimate closer to the Kelvin reference.

1.6. Artifacts

- Command log
- Telemetry log (JSONL) - open in Telemetry Viewer
- Static resistance plot (PNG)

1.7. Notes

- The DCR reading is the DC resistance measured directly by the meter.
- The line-to-line resistance is twice the per-phase value reported by the calibration routine.
- This motor is an induction machine, not a PMSM, so it is tracked separately from the PMSM calibration report.