

# PMSM Inductance Calibration Validation

Validation of the inverter motor-inductance calibration routine against a bench LCR reference.

Supported by



# 1. PMSM Inductance Calibration Validation

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This report validates the inverter's motor-inductance calibration routine by comparing its estimate against a direct bench LCR measurement of the test motor. The test was run on the C2 chassis test fixture, but the routine itself is shared across all OpenVVVF chassis; motor-specific validation is only needed when a different motor or harness is used.

Resistance reference measurements are kept in the PMSM Resistance Calibration Validation report.

A separate induction-machine test report is in Induction Motor Testbed.

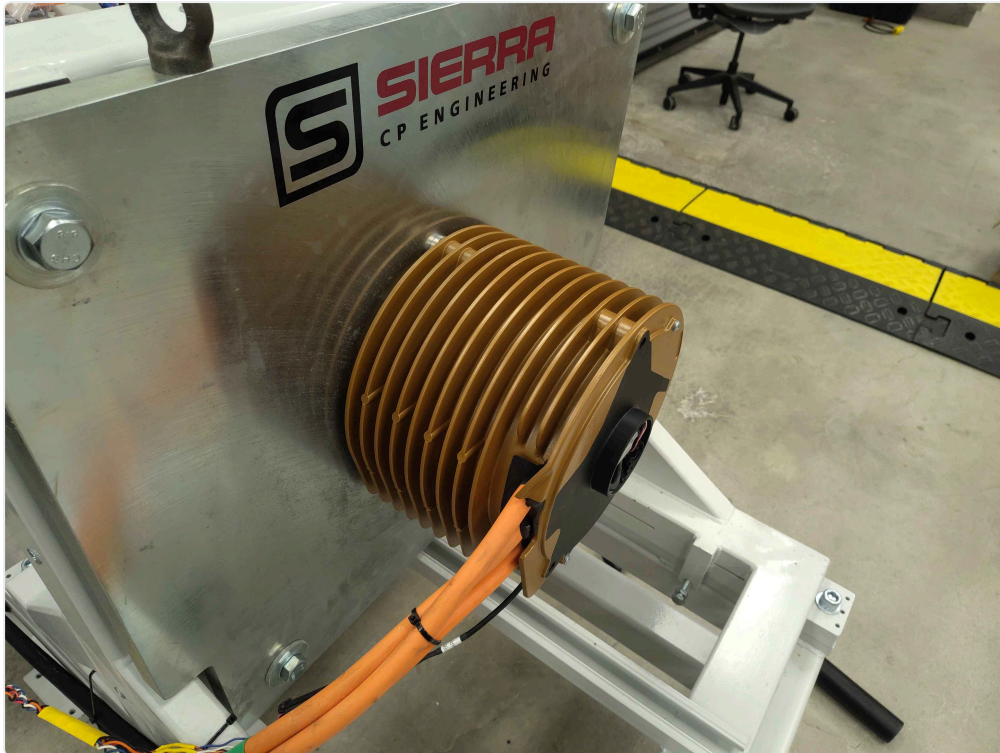
## 1.1. Test setup

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The motor is mounted on the Sierra CP Engineering test fixture with phase leads accessible for direct LCR measurement.



Motor mounted on the Sierra CP Engineering test fixture



Side view of the motor and fixture

## 1.2. Instrument

- **Instrument:** BK Precision 894 20 Hz - 500 kHz LCR Meter
- **Test frequency:** 1.000 kHz
- **Test level:** 2.000 V
- **Bias:** 0.00 mV
- **Range:** AUTO

## 1.3. Measurements

### 1.3.1. Phase inductance and series resistance (Ls-Rs)

Two Ls-Rs readings were captured at 1.000 kHz.

| Reading | Ls              | Rs               | Instrument settings                                    |
|---------|-----------------|------------------|--------------------------------------------------------|
| 1       | 71.2980 $\mu$ H | 0.02817 $\Omega$ | FUNC: Ls-Rs, FREQ: 1.000 kHz, LEVEL: 2.000 V, RANGE: / |
| 2       | 34.6583 $\mu$ H | 0.00974 $\Omega$ | FUNC: Ls-Rs, FREQ: 1.000 kHz, LEVEL: 2.000 V, RANGE: / |

LCR meter Ls-Rs reading 1:  $L_s = 71.2980 \mu\text{H}$ ,  $R_s = 0.02817 \Omega$ LCR meter Ls-Rs reading 2:  $L_s = 34.6583 \mu\text{H}$ ,  $R_s = 0.00974 \Omega$



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## 1.4. Inverter-calibrated inductance

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The inverter's inductance calibration routine will be run and its output compared against the LCR reference readings above. Add the command log, telemetry, and comparison table here.

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## 1.5. Notes

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- The Ls-Rs readings are series inductance and resistance at 1 kHz.
- Which phase pair or winding configuration each Ls-Rs reading corresponds to should be recorded when the calibration routine results are compared against these reference values.