

Annex to declaration of accreditation (scope of accreditation)
 Normative document: EN ISO/IEC 17025:2017
 Registration number: **K 038**

of **Stichting Koninklijk Lucht- en Ruimtevaartlaboratorium**
National Aerospace Laboratory
Facility Instrument Maintenance

This annex is valid from: **04-09-2024** to **01-09-2025**

Replaces annex dated: **20-07-2022**

Location(s) where activities are performed under accreditation

Head Office

Voorsterweg 31
 8316 PR
 Marknesse
 The Netherlands

| Location | Abbreviation/ location code |
|---|-----------------------------|
| Voorsterweg 31 8316 PR Marknesse The Netherlands | MA |

| HCS code | Measured quantity, Range | Frequency | CMC ¹ | Remarks | Location |
|----------|--------------------------|-----------|---|-----------|----------|
| LF 0 0 | DC/LF Quantities | | | | |
| LF 1 0 | DC Voltage | | | | MA |
| | 0 μ V - 10 μ V | | 0,2 μ V | Measuring | |
| | 10 μ V - 2 mV | | $3 \cdot 10^{-4} \cdot U + 0,2 \mu$ V | | |
| | 2 mV - 20 mV | | $2,5 \cdot 10^{-4} \cdot U + 0,2 \mu$ V | | |
| | 20 mV - 100 mV | | $2,5 \cdot 10^{-4} \cdot U$ | | |
| | 100 mV - 200 mV | | $3 \cdot 10^{-5} \cdot U$ | | |
| | 200 mV - 1 kV | | $2 \cdot 10^{-5} \cdot U$ | | |

¹ Calibration and Measurement Capability (CMC): Demonstrated measurement uncertainty, with coverage probability of 95%, in a given measurement point or measurement range. Measurement uncertainty, *U*, is calculated according to EA-4/02 "Evaluation of the Uncertainty of Measurement in Calibration".

This annex has been approved by the Board of the
 Dutch Accreditation Council, on its behalf,

J.A.W.M. de Haas

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|----------|-----------------------------------|------------------|--|---|----------|
| | 100 mV | | $1,5 \cdot 10^{-5} \cdot U$ | | |
| | 1/10/100/1000 V | | $6 \cdot 10^{-6} \cdot U$ | | |
| LF 1 0 | DC Voltage | | | | MA |
| | 0 μ V - 10 μ V | | 0,5 μ V | Generating | |
| | 10 μ V - 1 mV | | $2,5 \cdot 10^{-4} \cdot U + 0,5 \mu$ V | | |
| | 1 mV - 200 mV | | $2 \cdot 10^{-5} \cdot U + 0,5 \mu$ V | | |
| | 200 mV - 1 kV | | $1,5 \cdot 10^{-5} \cdot U$ | | |
| | 1 V ; 10 V | | $5 \cdot 10^{-6} \cdot U$ | | |
| | | | | | |
| LF 1 2 | DC Voltage Ratio | | | | MA |
| | 0 - 1,1 | | $(1 \cdot 10^{-6} \cdot U_i + 1 \mu$ V)/ U_i | 1 V < U_i < 100 V, stepsize $1 \cdot 10^{-7}$ | |
| | | | | | |
| LF 3 2 | AC Voltage ratio | | | | MA |
| | 0 - 1 | 400 Hz – 1kHz | $(1 \cdot 10^{-6} \cdot U_i)/U_i$ | In phase, 1V < U_i < 100V, stepsize $1 \cdot 10^{-7}$ | |
| | | | $(1 \cdot 10^{-6} \cdot U_i)/U_i$ | Quadrature, stepsize $1 \cdot 10^{-7}$ | |
| | 0 - 1 | 50 Hz – 5 kHz | $(5 \cdot 10^{-6} \cdot U_i)/U_i$ | In phase, 1V < U_i < 100V, stepsize $1 \cdot 10^{-7}$ | |
| | | | $(2 \cdot 10^{-5} \cdot U_i)/U_i$ | Quadrature, stepsize $1 \cdot 10^{-7}$ | |
| | $\pm 2,5$ mV/V In 350 Ω | (225 \pm 2) Hz | 0,10 μ V/V | Generating at 5 V Bridge Voltage | |
| | $\pm 2,5$ mV/V In 350 Ω | (225 \pm 2) Hz | 0,30 μ V/V | Measuring at 5 V Bridge Voltage | |
| | | | | | |
| LF 2 0 | DC Current | | | | MA |
| | 0 μ A – 10 μ A | | 5 nA | Measuring | |

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| | 10 μ A – 2 A | | $5 \cdot 10^{-4} \cdot I$ | | |
| | 2 A - 20 A | | $1 \cdot 10^{-3} \cdot I$ | | |
| LF 2 0 | DC Current | | | | MA |
| | 0 μ A – 10 μ A | | 15 nA | Generating | |
| | 10 μ A - 100 μ A | | $1,5 \cdot 10^{-3} \cdot I$ | | |
| | 100 μ A - 2 A | | $5 \cdot 10^{-4} \cdot I$ | | |
| | 2A - 20 A | | $1 \cdot 10^{-3} \cdot I$ | | |
| LF 3 0 | AC Voltage | | | Measuring en Generating | MA |
| | 0,5 V - 1 V | 50 Hz – 100 kHz | $2 \cdot 10^{-4} \cdot U$ | | |
| | 10 V | 400 Hz – 1 kHz | $2 \cdot 10^{-4} \cdot U$ | | |
| | 1 V | 10 Hz – 100 Hz | $3 \cdot 10^{-4} \cdot U$ | | |
| | 1 V | 100 kHz – 1 MHz | $1 \cdot 10^{-3} \cdot U$ | | |
| | 1 mV - 2 V | 50 Hz – 1 kHz | $(1 \cdot 10^{-3} - 3 \cdot 10^{-3}) \cdot U$ | | |
| | 2 V - 1000 V | 50 Hz – 1 kHz | $5 \cdot 10^{-4} \cdot U$ | | |
| | 0,2 V - 20 V | 50 Hz – 50 kHz | $1,5 \cdot 10^{-3} \cdot U$ | | |
| LF 4 0 | AC Current | | | | MA |
| | 10 μ A - 1 mA | 50 Hz – 1 kHz | $3 \cdot 10^{-3} \cdot I$ | Measuring | |
| | 1 mA - 20 A | 50 Hz – 1 kHz | $2 \cdot 10^{-3} \cdot I$ | | |
| | 10 μ A - 1 mA | 50 Hz – 1 kHz | $3 \cdot 10^{-3} \cdot I$ | Generating | |
| | 1 mA - 20 A | 50 Hz – 1 kHz | $2 \cdot 10^{-3} \cdot I$ | | |
| LF 6 1 | Resistance | | | | |
| LF 6 2 | DC Resistance | | | | MA |

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|----------|--------------------------|-----------|---|------------|----------|
| | 1 mΩ | | $2 \cdot 10^{-4} \cdot R$ | Generating | |
| | 10 mΩ | | $5 \cdot 10^{-5} \cdot R$ | | |
| | 100 mΩ | | $2 \cdot 10^{-5} \cdot R$ | | |
| | 1 Ω | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 1,9 Ω | | $5 \cdot 10^{-5} \cdot R$ | | |
| | 10 Ω | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 19 Ω | | $2,5 \cdot 10^{-5} \cdot R$ | | |
| | 100 Ω | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 190 Ω | | $1,5 \cdot 10^{-5} \cdot R$ | | |
| | 1 kΩ | | $5 \cdot 10^{-6} \cdot R$ | | |
| | 1,9 kΩ | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 10 kΩ | | $3 \cdot 10^{-6} \cdot R$ | | |
| | 19 kΩ | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 100 kΩ | | $5 \cdot 10^{-6} \cdot R$ | | |
| | 190 kΩ | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 1 MΩ | | $1,5 \cdot 10^{-5} \cdot R$ | | |
| | 1,9 MΩ | | $3 \cdot 10^{-5} \cdot R$ | | |
| | 10 MΩ | | $5 \cdot 10^{-5} \cdot R$ | | |
| | 19 MΩ | | $1 \cdot 10^{-4} \cdot R$ | | |
| | 0.1 Ω – 200 Ω | | $5 \cdot 10^{-5} \cdot R + 1 \text{ m}\Omega$ | | |
| | 200 Ω - 19 kΩ | | $2 \cdot 10^{-5} \cdot R$ | | |
| | 0 mΩ - 0,1 mΩ | | 0,06 μΩ | Measuring | |
| | 1 mΩ | | $5 \cdot 10^{-5} \cdot R$ | | |
| | 10 mΩ | | $2,5 \cdot 10^{-5} \cdot R$ | | |
| | 100 mΩ | | $1,5 \cdot 10^{-5} \cdot R$ | | |
| | 1 Ω | | $1 \cdot 10^{-5} \cdot R$ | | |
| | 10 Ω | | $1 \cdot 10^{-5} \cdot R$ | | |

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|----------|--------------------------|-----------|-----------------------------|---------|----------|
| | 100 Ω | | $5 \cdot 10^{-6} \cdot R$ | | |
| | 1 kΩ | | $5 \cdot 10^{-6} \cdot R$ | | |
| | 10 kΩ | | $3 \cdot 10^{-6} \cdot R$ | | |
| | 100 kΩ | | $5 \cdot 10^{-6} \cdot R$ | | |
| | 1 MΩ | | $5 \cdot 10^{-6} \cdot R$ | | |
| | 10 MΩ | | $1,5 \cdot 10^{-5} \cdot R$ | | |
| | 0,1 mΩ - 2 mΩ | | $6 \cdot 10^{-4} \cdot R$ | | |
| | 2 mΩ - 20 mΩ | | $1,5 \cdot 10^{-4} \cdot R$ | | |
| | 0,02 Ω - 1 Ω | | $1 \cdot 10^{-4} \cdot R$ | | |
| | 1 Ω - 10 Ω | | $8 \cdot 10^{-5} \cdot R$ | | |
| | 10 Ω - 20 Ω | | $4 \cdot 10^{-5} \cdot R$ | | |
| | 20 Ω - 200 kΩ | | $2 \cdot 10^{-5} \cdot R$ | | |
| | 200 kΩ - 2 MΩ | | $4 \cdot 10^{-5} \cdot R$ | | |
| | 2 MΩ - 20 MΩ | | $1,5 \cdot 10^{-4} \cdot R$ | | |

Remarks:

The ambient temperature during the calibration within the laboratory is nominal 23 °C.
 All calibrations mentioned in this scope are carried out at the laboratory of NLR in Marknesse, Netherlands