

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: **20-07-2022** to **01-09-2025**

Replaces annex dated: **19-08-2021**

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 μV - 10 μV		0,2 μV	Measuring	
	10 μV - 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		$2 \cdot 10^{-5} \cdot U$		
	100 mV		$1,5 \cdot 10^{-5} \cdot U$		

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

J.A.W.M. de Haas

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".

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HCS code	Measured quantity, Range	Frequency	CMC ¹	Remarks	Location
	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 – 50 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 $1 \cdot 10^{-7}$	
LF 2 0	DC Current				MA
	0 μ A – 10 μ A		5 nA	Measuring	
	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	

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	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
	1 m Ω		$2 \cdot 10^{-4} \cdot R$	Generating	
	10 m Ω		$5 \cdot 10^{-5} \cdot R$		
	100 m Ω		$2 \cdot 10^{-5} \cdot R$		
	1 Ω		$1 \cdot 10^{-5} \cdot R$		
	1,9 Ω		$5 \cdot 10^{-5} \cdot R$		

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	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		$1 \cdot 10^{-5} \cdot R$		
	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		$5 \cdot 10^{-6} \cdot R$		

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	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