

Appendix to accreditation statement (scope of accreditation)

Normative document: EN ISO/IEC 17025:2017

Registration number: **K 139**

of **DEKRA Rail B.V.**
Calibration

This annex is valid from: **30-10-2024 to 01-11-2027** Replacese attachement dated: **21-12-2023**

Location(s) where activities are carried out under accreditation

Head office

Concordiastraat 67
3551 EM
Utrecht
Nederland

Location	Abbreviation
Concordiastraat 67 3551 EM Utrecht Nederland	UTR

HCS code	Measured unit, Measurement area	Frequency	CMC ¹	Comments	Location
LF 0 0	DC/LF units				
LF 1 1	DC Voltage				UTR
	10 mV – 330 mV		$1,7 \cdot 10^{-5} \cdot U + 4,0 \cdot 10^{-6} \text{ V}$	Generate	
	0,33 V – 3,3 V		$1,2 \cdot 10^{-5} \cdot U + 3,5 \cdot 10^{-6} \text{ V}$	Generate	
	3,3 V – 33 V		$1,4 \cdot 10^{-5} \cdot U + 2,3 \cdot 10^{-5} \text{ V}$	Generate	
	33 V – 330 V		$2,1 \cdot 10^{-5} \cdot U + 1,7 \cdot 10^{-4} \text{ V}$	Generate	
	330 V – 1000 V		$2,1 \cdot 10^{-5} \cdot U + 1,8 \cdot 10^{-3} \text{ V}$	Generate	

¹ Calibration and Measurement Capability (CMC): Demonstrated measurement uncertainty, with a probability of coverage of 95%, in a given measuring point or area. The measurement uncertainty, U , shall be calculated in accordance with EA-4/02 "Evaluation of the Uncertainty of Measurement in Calibration".

Deze bijlage is goedgekeurd door het bestuur van de Raad voor Accreditatie, namens deze,

mr. J.A.W.M. de Haas

from **DEKRA Rail B.V.**
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HCS code	Measured unit, Measurement area	Frequency	CMC ¹	Comments	Location
LF 2 1	Direct Current				UTR
	0,1 mA – 0,33 mA		$1,7 \cdot 10^{-5} \cdot I + 5,6 \cdot 10^{-7} \text{ A}$	Generate	
	0,33 mA – 3,3 mA		$4,8 \cdot 10^{-5} \cdot I + 5,5 \cdot 10^{-7} \text{ A}$	Generate	
	3,3 mA – 33 mA		$1,1 \cdot 10^{-4} \cdot I + 5,1 \cdot 10^{-7} \text{ A}$	Generate	
	33 mA – 330 mA		$1,2 \cdot 10^{-4} \cdot I + 2,9 \cdot 10^{-6} \text{ A}$	Generate	
	330 mA – 1,1 A		$2,3 \cdot 10^{-4} \cdot I + 4,7 \cdot 10^{-5} \text{ A}$	Generate	
	1,1 A – 3 A		$4,4 \cdot 10^{-4} \cdot I + 4,5 \cdot 10^{-5} \text{ A}$	Generate	
	3 A – 11 A		$5,8 \cdot 10^{-4} \cdot I + 5,7 \cdot 10^{-4} \text{ A}$	Generate	
	11 A – 20 A		$1,1 \cdot 10^{-3} \cdot I + 8,9 \cdot 10^{-4} \text{ A}$	Generate	
LF 3 1	Alternating Current				UTR
	100 mV – 330 mV	20 Hz – 45 Hz	$1,8 \cdot 10^{-4} \cdot U + 1,3 \cdot 10^{-4} \text{ V}$	Generate	
		45 Hz – 10 kHz	$5,2 \cdot 10^{-5} \cdot U + 1,4 \cdot 10^{-4} \text{ V}$	Generate	
		10 kHz – 20 kHz	$6,1 \cdot 10^{-5} \cdot U + 1,4 \cdot 10^{-4} \text{ V}$	Generate	
		20 kHz – 50 kHz	$2,2 \cdot 10^{-4} \cdot U + 1,3 \cdot 10^{-4} \text{ V}$	Generate	
		50 kHz – 100 kHz	$7,8 \cdot 10^{-4} \cdot U + 1,1 \cdot 10^{-4} \text{ V}$	Generate	
	0,33 V – 3,3 V	20 Hz – 45 Hz	$3,3 \cdot 10^{-4} \cdot U + 1,1 \cdot 10^{-4} \text{ V}$	Generate	
		45 Hz – 10 kHz	$1,6 \cdot 10^{-4} \cdot U + 1,4 \cdot 10^{-4} \text{ V}$	Generate	
		10 kHz – 20 kHz	$2,0 \cdot 10^{-4} \cdot U + 1,3 \cdot 10^{-4} \text{ V}$	Generate	
		20 kHz – 50 kHz	$3,3 \cdot 10^{-4} \cdot U + 1,1 \cdot 10^{-4} \text{ V}$	Generate	
		50 kHz – 100 kHz	$8,0 \cdot 10^{-4} \cdot U + 1,7 \cdot 10^{-4} \text{ V}$	Generate	
	3,3 V – 33 V	20 Hz – 45 Hz	$3,5 \cdot 10^{-4} \cdot U + 7,5 \cdot 10^{-4} \text{ V}$	Generate	
		45 Hz – 10 kHz	$1,7 \cdot 10^{-4} \cdot U + 7,0 \cdot 10^{-4} \text{ V}$	Generate	
		10 kHz – 20 kHz	$2,8 \cdot 10^{-4} \cdot U + 7,1 \cdot 10^{-4} \text{ V}$	Generate	
		20 kHz – 50 kHz	$4,0 \cdot 10^{-4} \cdot U + 7,0 \cdot 10^{-4} \text{ V}$	Generate	
		50 kHz – 100 kHz	$1,0 \cdot 10^{-3} \cdot U + 1,9 \cdot 10^{-3} \text{ V}$	Generate	

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HCS code	Measured unit, Measurement area	Frequency	CMC ¹	Comments	Location
	33 V – 330 V	45 Hz – 1 kHz	$2,2 \cdot 10^{-4} \cdot U + 2,3 \cdot 10^{-3} \text{ V}$	Generate	
		1 kHz – 10 kHz	$2,3 \cdot 10^{-4} \cdot U + 7,0 \cdot 10^{-3} \text{ V}$	Generate	
		10 kHz – 20 kHz	$2,9 \cdot 10^{-4} \cdot U + 7,0 \cdot 10^{-3} \text{ V}$	Generate	
		20 kHz – 50 kHz	$3,5 \cdot 10^{-4} \cdot U + 7,0 \cdot 10^{-3} \text{ V}$	Generate	
		50 kHz – 100kHz	$2,3 \cdot 10^{-3} \cdot U + 5,8 \cdot 10^{-2} \text{ V}$	Generate	
	330 V – 1000 V	45 Hz – 1 kHz	$3,5 \cdot 10^{-4} \cdot U + 1,1 \cdot 10^{-2} \text{ V}$	Generate	
		1 kHz – 5 kHz	$2,9 \cdot 10^{-4} \cdot U + 1,1 \cdot 10^{-2} \text{ V}$	Generate	
		5 kHz – 10 kHz	$3,5 \cdot 10^{-4} \cdot U + 1,1 \cdot 10^{-2} \text{ V}$	Generate	
LF 4 1	Alternating Current				UTR
	0,01 A – 0,033 A	20 Hz – 45 Hz	$7,7 \cdot 10^{-4} \cdot I + 1,8 \cdot 10^{-5} \text{ A}$	Generate	
		45 Hz – 1 kHz	$2,3 \cdot 10^{-4} \cdot I + 1,9 \cdot 10^{-5} \text{ A}$	Generate	
		1 kHz – 5 kHz	$6,6 \cdot 10^{-4} \cdot I + 1,7 \cdot 10^{-5} \text{ A}$	Generate	
		5 kHz – 10 kHz	$2,1 \cdot 10^{-3} \cdot I + 1,2 \cdot 10^{-5} \text{ A}$	Generate	
		10 kHz – 30 kHz	$4,5 \cdot 10^{-3} \cdot I + 9,6 \cdot 10^{-6} \text{ A}$	Generate	
	0,033 A – 0,33 A	20 Hz – 45 Hz	$1,0 \cdot 10^{-3} \cdot I + 2,7 \cdot 10^{-5} \text{ A}$	Generate	
		45 Hz – 1 kHz	$4,5 \cdot 10^{-4} \cdot I + 2,9 \cdot 10^{-5} \text{ A}$	Generate	
		1 kHz – 5 kHz	$1,2 \cdot 10^{-3} \cdot I + 6,0 \cdot 10^{-5} \text{ A}$	Generate	
		5 kHz – 10 kHz	$2,3 \cdot 10^{-3} \cdot I + 1,2 \cdot 10^{-4} \text{ A}$	Generate	
		10 kHz – 30 kHz	$4,6 \cdot 10^{-3} \cdot I + 2,3 \cdot 10^{-4} \text{ A}$	Generate	
	0,33 A – 3 A	20 Hz – 45 Hz	$2,1 \cdot 10^{-3} \cdot I + 1,1 \cdot 10^{-4} \text{ A}$	Generate	
	0,33 A – 1,1 A	45 Hz – 1 kHz	$5,8 \cdot 10^{-4} \cdot I + 1,2 \cdot 10^{-4} \text{ A}$	Generate	
	1,1 A – 3 A	45 Hz – 1 kHz	$6,9 \cdot 10^{-4} \cdot I + 1,2 \cdot 10^{-4} \text{ A}$	Generate	
	0,33 A – 3 A	1 kHz – 5 kHz	$6,9 \cdot 10^{-3} \cdot I + 1,2 \cdot 10^{-3} \text{ A}$	Generate	
	0,33 A – 3 A	5 kHz – 10 kHz	$2,9 \cdot 10^{-2} \cdot I + 5,8 \cdot 10^{-3} \text{ A}$	Generate	

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HCS code	Measured unit, Measurement area	Frequency	CMC ¹	Comments	Location
	3 A – 11 A	45 Hz – 100 Hz	$6,9 \cdot 10^{-4} \cdot I + 2,3 \cdot 10^{-3} \text{ A}$	Generate	
	3 A – 11 A	100 Hz – 1 kHz	$1,1 \cdot 10^{-3} \cdot I + 2,4 \cdot 10^{-3} \text{ A}$	Generate	
	3 A – 11 A	1 kHz – 5 kHz	$3,4 \cdot 10^{-2} \cdot I + 3,1 \cdot 10^{-3} \text{ A}$	Generate	
	11 A – 20 A	45 Hz – 100 Hz	$1,4 \cdot 10^{-3} \cdot I + 5,7 \cdot 10^{-3} \text{ A}$	Generate	
	11 A – 20 A	100 Hz – 1 kHz	$1,7 \cdot 10^{-3} \cdot I + 5,8 \cdot 10^{-3} \text{ A}$	Generate	
	11 A – 20 A	1 kHz – 5 kHz	$3,5 \cdot 10^{-2} \cdot I + 5,7 \cdot 10^{-3} \text{ A}$	Generate	
LF 6 2	DC Resistance				UTR
	1 Ω – 11 Ω		$4,0 \cdot 10^{-5} \cdot R + 1,2 \cdot 10^{-2} \Omega$	Generate	
	11 Ω – 33 Ω		$3,7 \cdot 10^{-5} \cdot R + 1,8 \cdot 10^{-2} \Omega$	Generate	
	33 Ω – 110 Ω		$3,2 \cdot 10^{-5} \cdot R + 1,8 \cdot 10^{-2} \Omega$	Generate	
	110 Ω – 1,1 k Ω		$3,2 \cdot 10^{-5} \cdot R + 2,3 \cdot 10^{-2} \Omega$	Generate	
	1,1 k Ω – 11 k Ω		$3,2 \cdot 10^{-5} \cdot R + 2,3 \cdot 10^{-1} \Omega$	Generate	
	11 k Ω – 110 k Ω		$3,2 \cdot 10^{-5} \cdot R + 1,2 \Omega$	Generate	
	110 k Ω – 1,1 M Ω		$3,7 \cdot 10^{-5} \cdot R + 12 \Omega$	Generate	
	1,1 M Ω – 3,3 M Ω		$6,9 \cdot 10^{-5} \cdot R + 1,7 \cdot 10^{+2} \Omega$	Generate	
	3,3 M Ω – 11 M Ω		$1,5 \cdot 10^{-4} \cdot R + 2,9 \cdot 10^{+2} \Omega$	Generate	
	11 M Ω – 33 M Ω		$4,0 \cdot 10^{-3} \cdot R + 4,0 \cdot 10^{+2} \Omega$	Generate	
	33 M Ω – 100 M Ω		$4,0 \cdot 10^{-3} \cdot R + 5,2 \cdot 10^{+2} \Omega$	Generate	

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HCS code	Measured units, Instrument, Measure	Measuring range	CMC ¹	Comments	Location
DM 0 0	Geometric units				UTR
	Tools / kalibers Distance of points	0 mm – 940 mm	6,2 µm + 7,8·10 ⁻⁶ ·l		
DM 3 0	Length measuring instruments, Indicating measuring instruments				UTR
	Caliper Railway wheels				
	Wheel flange caliper	0 mm – 90 mm	60 µm		
	Wheel tire thickness caliper	0 mm – 90 mm	120 µm		

Comments

The temperature of the environment in which the geometric calibrations are carried out is nominal 20,0 °C ± 3,0 °C.

The temperature of the environment in which the electrical calibrations are carried out is nominal 23 °C ± 3,0 °C.