



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION

Valid To: August 31, 2013

Certificate Number: 2734.03

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage – Measure, Fixed Points ³	(0 to 300) mV (0.3 to 3) V (3 to 30) V (30 to 300) V (300 to 1000) V	0.029 % + 23 µV 0.029 % + 230 µV 0.029 % + 2.3 mV 0.029 % + 23 mV 0.029 % + 230 mV	Fluke 45 “medium” refresh rate, Fluke 8846A, Agilent 34401A & 34410A
Resistance – Measure, Fixed Points ³	(0 to 300) Ω (0.3 to 3) kΩ (3 to 30) kΩ (30 to 300) kΩ (0.3 to 3) MΩ (3 to 30) MΩ	0.071 % + 23 mΩ 0.061 % + 230 mΩ 0.058 % + 2.3 Ω 0.058 % + 23 Ω 0.070 % + 230 Ω 0.29 % + 3.5 kΩ	Fluke 45 “medium” refresh rate, Fluke 8846A, Agilent 34401A & 34410A



Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage – Measure, Fixed Points ³			
(0 to 300) mV	(20 to 50) Hz 50 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	1.2 % + 120 μV 0.23 % + 120 μV 0.58 % + 120 μV 2.3 % + 230 μV 5.8 % + 580 μV	Fluke 45 “medium” refresh rate, Fluke 8846A, Agilent 34401A & 34410A
(0.3 to 3) V	(20 to 50) Hz 50 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	1.2 % + 1.2 mV 0.23 % + 1.2 mV 0.58 % + 1.2 mV 2.3 % + 2.3 mV 5.8 % + 5.8 mV	
(3 to 30) V	(20 to 50) Hz 50 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	1.2 % + 12 mV 0.23 % + 12 mV 0.58 % + 12 mV 2.3 % + 23 mV 5.8 % + 58 mV	
(30 to 300) V	(20 to 50) Hz 50 Hz to 10 kHz	1.2 % + 120 mV 0.23 % + 120 mV	

II. Magnetic (Eddy Current Instrumentation)

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Receiver Amplifier Linearity ³ – Eddy Current Instrumentation	(0 to 100) % of Full Scale	0.44 %	Agilent 33250A & 33120A
Receiver Quadrature ³ – Eddy Current Instrumentation	(0 to 360)°	0.022°	Agilent 33250A, ZETEC ACM/frequency, Tektronix TDS-3032, 3034, 3052, & 3054 (A, B, or C)

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Receiver Gain ³ – Eddy Current Instrumentation	(0 to 80) dB	0.27 %	Agilent 33250A, ZETEC ACM/frequency, Tektronix TDS-3032, 3034, 3052, & 3054 (A, B, or C)

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Coil Driver Frequency ³ – Eddy Current Instrumentation	10 Hz to 6 MHz	0.13 %	Agilent 53132A, ZETEC ACM/frequency, Tektronix TDS-3032, 3034, 3052, 3054 (A, B, or C), & Fluke 45
Receiver Frequency Bandwidth ³ – Eddy Current Instrumentation	(8 to 5000) Hz	0.2 %	Agilent 33250A, ZETEC ACM/frequency, Tektronix TDS-3032, 3034, 3052, & 3054 (A, B, or C)

III. Time and Frequency

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Frequency – Measure ³ (10 to 100) mV _{rms}	(3 to 5) Hz	1.2 %	Fluke 8846A, Agilent 34401A & 34410A
	(5 to 10) Hz	0.59 %	
	(10 to 40) Hz	0.36 %	
	40 Hz to 300 kHz	0.069 %	
> 100 mV _{rms}	(3 to 5) Hz	0.17 %	Fluke 8846A, Agilent 34401A, 34410A, & 53132A
	(5 to 10) Hz	0.13 %	
	(10 to 40) Hz	0.11 %	
	40 Hz to 300 kHz	0.0070 %	

IV. Time and Frequency (Ultrasound Instrumentation)

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Pulse Rate Frequency ³ – Ultrasound Instrumentation	0.1 Hz to 40 kHz	0.058 %	Tektronix TDS-3032, 3034, 3052, 3054 (A, B, or C), ZETEC ABUXE127A
Receiver Filter ³ – Ultrasound Instrumentation			
Low Cutoff	(0 to 1) MHz (> 1 to 15) MHz	4.0 % 2.0 %	Agilent 33250A, Tektronix TDS-3032, 3034, 3052, 3054 (A, B, or C), ZETEC ABUXE127A, ZETEC TESET037C
High Cutoff	(0 to 25) MHz	3.5 %	
Bandwidth	(0 to 25) MHz	6.0 %	
Center	(0 to 20) MHz	2.5 %	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Time Base ³ – Ultrasound Instrumentation			
Accuracy	(0.001 to 10) ms	0.058 %	Agilent 33250A, ZETEC ABUXE127A
Delay	(0.001 to 10) ms	0.068 %	
Linearity	(0.001 to 10) ms	0.058 %	
Pulser ³ – Ultrasound Instrumentation			
Amplitude	(25 to 250) V	2.6 %	Agilent 33250A, Tektronix TDS-3032, 3034, 3052, 3054 (A, B, or C), ZETEC ABUXE127A, ZETEC TESET037C
Overshoot	(0 to 10) %	0.83 %	
Rise Time	(0 to 50) ns	1.3 ns	
Width	(25 to 1000) ns	1.0 ns	
Delay	(0 to 50) ns	1.0 ns	

Parameter/Equipment	Range	CMC ^{2, 4} (\pm)	Comments
Receiver ³ – Ultrasound Instrumentation			
Delay	(0 to 50) ns	2.2 ns	Agilent 33250A, ZETEC ABUXE127A, ZETEC TESET037C
Gain Accuracy	(0 to 20) dB (0 to 60) dB	0.55 dB 0.55 dB	Agilent 33250A, ZETEC ABUXE127A, attenuator 50BR-10-017, ZETEC TESET037C
Vertical Linearity	$\leq 50\%$ $> 50\%$	2.7 % 3.0 %	Agilent 33250A, ZETEC ABUXE127A, attenuator 50BR-10-017
Noise	(0 to 200) nV _{pp} /Hz ^{0.5}	18 nV _{pp} /Hz ^{0.5}	ZETEC ABUXE127A, ZETEC OPUX062A

¹ This laboratory offers commercial and field calibration service.

² Calibration and Measurement Capability (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ In the statement of CMC, percentages are to be read as percent of reading unless otherwise noted.



The American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

ZETEC, INCORPORATED

Quebec, QC, G1N 2C9, CANADA

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets additional program requirements in the field of calibration. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 26th day of September 2011.



A handwritten signature in black ink, appearing to read "Peter M. ...", written over a horizontal line.

President & CEO
For the Accreditation Council
Certificate Number 2734.03
Valid to August 31, 2013

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.