



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

Davis Calibration

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CALIBRATION

Valid to: February 26, 2013

Certificate Number: AC - 1315

I. Electromagnetic - DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source	Up to 220 mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV 100 V to 100 kV	8 μ V/V + 600 nV 7 μ V/V + 1 μ V 7 μ V/V + 3.5 μ V 7 μ V/V + 6.5 μ V 8 μ V/V + 80 μ V 9 μ V/V + 500 μ V 17 V	Fluke 5700A/5725A Julie Research Divider w/ REC Voltmeter	OEM, GIDEP, and Laboratory Developed Calibration Procedures
DC Voltage - Measure	(10 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV 100 V to 100 kV	7 μ V/V + 300 nV 6 μ V/V + 300 nV 6 μ V/V + 500 nV 8 μ V/V + 30 μ V 8 μ V/V + 100 μ V 17 V	HP 3458A Opt 002 Julie Research Divider w/ REC Voltmeter	
DC Current - Source	Up to 220 μ A 220 μ A to 2.2 mA (2.2 to 22) mA (22 to 100) mA (100 to 220) mA 220 mA to 1 A (1 to 2.2) A	50 μ A/A + 8 nA 50 μ A/A + 8 nA 50 μ A/A + 80 nA 60 μ A/A + 800 nA 60 μ A/A + 800 nA + (200 x I ²) μ A/A 80 μ A/A + 2.5 mA 80 μ A/A + 2.5 mA + (10 x I ²) μ A/A	Fluke 5700A/5725A	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Current - Source (cont.)	(2.2 to 3) A (3 to 11) A (11 to 20.5) A	380 µA/A + 40 µA 360 µA/A + 480 µA 1 mA/A + 750 µA	Fluke 5520A-SC1100 Fluke 5700A/5725A Fluke 5520A-SC1100	OEM, GIDEP, and Laboratory Developed Calibration Procedures
DC Current – Measure	100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 20) A	25 µA/A + 5 nA 25 µA/A + 50 nA 40 µA/A + 500 nA 115 µA/A + 1 mA 100 µA/A	HP 3458A Opt 002 Fluke Y5020	
AC Voltage - Source	Up to 2.2 mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (2.2 to 22) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (22 to 220) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	550 µV/V + 4.5 µV 210 µV/V + 4.5 µV 105 µV/V + 4.5 µV 370 µV/V + 4.5 µV 850 µV/V + 7 µV 1.1 mV/V + 13 µV 1.7 mV/V + 25 µV 3.4 mV/V + 25 µV 550 µV/V + 5 µV 210 µV/V + 5 µV 105 µV/V + 5 µV 370 µV/V + 5 µV 850 µV/V + 7 µV 1.1 mV/V + 12 µV 1.7 mV/V + 25 µV 3.4 mV/V + 25 µV 550 µV/V + 13 µV 210 µV/V + 8 µV 105 µV/V + 8 µV 320 µV/V + 8 µV 850 µV/V + 25 µV 1.1 mV/V + 25 µV 1.7 mV/V + 35 µV 3.4 mV/V + 80 µV	Fluke 5700A/5725A	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Source (cont.)	220 mV to 2.2 V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	500 μV/V + 80 μV 160 μV/V + 25 μV 75 μV/V + 6 μV 120 μV/V + 16 μV 250 μV/V + 70 μV 430 μV/V + 130 μV 1.05 mV/V + 350 μV 2.2 mV/V + 850 μV	Fluke 5700A/5725A	OEM, GIDEP, and Laboratory Developed Calibration Procedures
	(2.2 to 22) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	500 μV/V + 800 μV 160 μV/V + 250 μV 75 μV/V + 60 μV 120 μV/V + 160 μV 250 μV/V + 350 μV 500 μV/V + 1.5 mV 1.25 mV/V + 4.3 mV 2.7 mV/V + 8.5 mV		
	(22 to 220) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	500 μV/V + 8 mV 160 μV/V + 2.5 mV 80 μV/V + 800 μV 220 μV/V + 3.5 mV 500 μV/V + 8 mV 1.5 mV/V + 90 mV 4.7 mV/V + 90 mV 11.5 mV/V + 190 mV		
	220 V to 1.1 kV (15 to 50) Hz 50 Hz to 1 kHz	400 μV/V + 16 mV 80 μV/V + 3.5 mV		
	60 Hz 100 V to 100 kV	130 V	Julie Research Divider w/ REC Voltmeter	



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AC Voltage - Measure	<p>(1 to 2.2) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz</p> <p>(2.2 to 7) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz</p> <p>(7 to 22) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz</p> <p>(22 to 70) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz</p>	<p>1.7 mV/V + 1.3 μV 740 μV/V + 1.3 μV 420 μV/V + 1.3 μV 810 μV/V + 2 μV 1.2 mV/V + 2.5 μV 2.3 mV/V + 4 μV 2.4 mV/V + 8 μV 3.5 mV/V + 8 μV</p> <p>850 μV/V + 1.3 μV 370 μV/V + 1.3 μV 210 μV/V + 1.3 μV 400 μV/V + 2 μV 600 μV/V + 2.5 μV 1.2 mV/V + 4 μV 1.3 mV/V + 8 μV 2.3 mV/V + 8 μV</p> <p>290 μV/V + 1.3 μV 190 μV/V + 1.3 μV 110 μV/V + 1.3 μV 210 μV/V + 2 μV 310 μV/V + 2.5 μV 810 μV/V + 4 μV 890 μV/V + 8 μV 1.7 mV/V + 8 μV</p> <p>240 μV/V + 1.5 μV 120 μV/V + 1.5 μV 65 μV/V + 1.5 μV 130 μV/V + 2 μV 260 μV/V + 2.5 μV 510 μV/V + 4 μV 670 μV/V + 8 μV 1.1 mV/V + 8 μV</p>	Fluke 5790A Opt 03	OEM, GIDEP, and Laboratory Developed Calibration Procedures

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Measure (cont.)	(70 to 220) mV			
	(10 to 20) Hz	210 µV/V + 1.5 µV		
	(20 to 40) Hz	85 µV/V + 1.5 µV		
	40 Hz to 20 kHz	38 µV/V + 1.5 µV		
	(20 to 50) kHz	69 µV/V + 2 µV		
	(50 to 100) kHz	160 µV/V + 2.5 µV		
	(100 to 300) kHz	250 µV/V + 4 µV		
	(300 to 500) kHz	380 µV/V + 8 µV		
	500 kHz to 1 MHz	1 mV/V + 8 µV		
	(220 to 700) mV			
	(10 to 20) Hz	210 µV/V + 1.5 µV		
	(20 to 40) Hz	76 µV/V + 1.5 µV		
	40 Hz to 20 kHz	33 µV/V + 1.5 µV		
	(20 to 50) kHz	51 µV/V + 2 µV		
(50 to 100) kHz	79 µV/V + 2.5 µV			
(100 to 300) kHz	180 µV/V + 4 µV			
(300 to 500) kHz	300 µV/V + 8 µV			
500 kHz to 1 MHz	960 µV/V + 8 µV			



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AC Voltage - Measure (cont.)	(7 to 22) V			
	(10 to 20) Hz	200 µV/V		
	(20 to 40) Hz	67 µV/V		
	40 Hz to 20 kHz	27 µV/V		
	(20 to 50) kHz	48 µV/V		
	(50 to 100) kHz	81 µV/V		
	(100 to 300) kHz	190 µV/V		
	(300 to 500) kHz	400 µV/V		
	500 kHz to 1 MHz	1.2 mV/V		
	(22 to 70) V			
	(10 to 20) Hz	200 µV/V		
	(20 to 40) Hz	68 µV/V		
	40 Hz to 20 kHz	32 µV/V		
	(20 to 50) kHz	57 µV/V		
	(50 to 100) kHz	94 µV/V		
	(100 to 300) kHz	200 µV/V		
	(300 to 500) kHz	410 µV/V		
	500 kHz to 1 MHz	1.2 mV/V		
	(70 to 220) V			
	(10 to 20) Hz	200 µV/V		
	(20 to 40) Hz	68 µV/V		
	40 Hz to 20 kHz	31 µV/V		
(20 to 50) kHz	69 µV/V			
(50 to 100) kHz	98 µV/V			
(100 to 300) kHz	210 µV/V			
(300 to 500) kHz	500 µV/V			
(220 to 700) V				
(10 to 20) Hz	200 µV/V			
(20 to 40) Hz	99 µV/V			
40 Hz to 20 kHz	41 µV/V			
(20 to 50) kHz	130 µV/V			
(50 to 100) kHz	500 µV/V			
700 V to 1 kV				
(10 to 20) Hz	200 µV/V			
(20 to 40) Hz	99 µV/V			
40 Hz to 20 kHz	38 µV/V			
(20 to 50) kHz	130 µV/V			
(50 to 100) kHz	500 µV/V			



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AC Voltage - Measure (cont.)	<p>60 Hz 100 V to 100 kV</p> <p>Up to 10 mV (1 to 4) MHz (4 to 8) MHz</p> <p>(10 to 100) mV (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz</p> <p>100 mV to 1V (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz</p> <p>(1 to 10) V (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz</p>	<p>130 V</p> <p>70 mV/V + 7 µV 200 mV/V + 8 µV</p> <p>15 mV/V + 10 µV 40 mV/V + 70 µV 40 mV/V + 80 µV 150 mV/V + 100 µV</p> <p>15 mV/V + 100 µV 40 mV/V + 70 µV 40 mV/V + 800 µV 150 mV/V + 1 mV</p> <p>15 mV/V + 1 mV 40 mV/V + 700 µV 40 mV/V + 8 mV 150 mV/V + 10 mV</p>	<p>Julie Research Divider w/ REC Voltmeter</p> <p>HP 3458A Opt 002</p>	<p>OEM, GIDEP, and Laboratory Developed Calibration Procedures</p>
AC Current - Source	<p>(9 to 220) µA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>220 µA to 2.2 mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p>	<p>700 µA/A + 25 nA 350 µA/A + 20 nA 140 µA/A + 16 nA 600 µA/A + 40 nA 1.6 mA/A + 80 nA</p> <p>700 µA/A + 40 nA 350 µA/A + 35 nA 140 µA/A + 35 nA 600 µA/A + 400 nA 1.6 mA/A + 800 nA</p>	<p>Fluke 5700A/ 5725A</p>	



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<p>AC Current - Source (cont.)</p> <p>Clamp On Ammeters</p>	<p>(2.2 to 22) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>(22 to 220) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>220 mA to 2.2 A 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>(2.2 to 11) A 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>(11 to 20.5) A (40 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz</p> <p>(10 to 1 025) A (45 to 65) Hz (65 to 440) Hz</p>	<p>700 µA/A + 400 nA 350 µA/A + 350 nA 140 µA/A + 350 nA 600 µA/A + 4 µA 1.6 mA/A + 8 µA</p> <p>700 µA/A + 4 µA 350 µA/A + 3.5 µA 140 µA/A + 3.5 µA 600 µA/A + 40 µA 1.6 mA/A + 80 µA</p> <p>650 µA/A + 35 µA 750 µA/A + 80 µA 8.5 mA/A + 160 µA</p> <p>460 µA/A + 170 µA 950 µA/A + 380 µA 3.6 mA/A + 750 µA</p> <p>1.2 mA/A + 5 mA 1.5 mA/A + 5 mA 30 mA/A + 5 mA</p> <p>2.8 mA/A + 5 mA 5.2 mA/A + 5 mA</p>	<p>Fluke 5700A/ 5725A</p> <p>Fluke 5520A w/ Coil</p>	<p>OEM, GIDEP, and Laboratory Developed Calibration Procedures</p>
<p>AC Current - Measure</p>	<p>(5 to 100) µA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz</p>	<p>4 mA/A + 30 nA 1.5 mA/A + 30 nA 605 µA/A + 30 nA 605 µA/A + 30 nA</p>	<p>HP 3458A Opt 002</p>	



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AC Current - Measure	100 µA to 1 mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz (1 to 10) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz (10 to 100) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz 100 mA to 1 A (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	4 mA/A + 200 nA 1.5 mA/A + 200 nA 605 µA/A + 200 nA 305 µA/A + 200 nA 605 µA/A + 200 nA 4 mA/A + 400 nA 5.5 mA/A + 1.5 µA 4 mA/A + 2 µA 1.5 mA/A + 2 µA 605 µA/A + 2 µA 305 µA/A + 2 µA 605 µA/A + 2 µA 4 mA/A + 4 µA 5.5 mA/A + 15 µA 4 mA/A + 20 µA 1.5 mA/A + 20 µA 605 µA/A + 20 µA 305 µA/A + 20 µA 605 µA/A + 20 µA 4 mA/A + 40 µA 5.5 mA/A + 150 µA 4 mA/A + 200 µA 1.6 mA/A + 200 µA 805 µA/A + 200 µA 1 mA/A + 200 µA 3 mA/A + 200 µA 10 mA/A + 400 µA	HP 3458A Opt 002	OEM, GIDEP, and Laboratory Developed Calibration Procedures
Resistance - Measure	Up to 10 Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	18 µΩ/Ω + 50 µΩ 15 µΩ/Ω + 500µΩ 13 µΩ/Ω + 500 µΩ 13 µΩ/Ω + 5 mΩ 13 µΩ/Ω + 50 mΩ 18 µΩ/Ω + 2 Ω 53 µΩ/Ω + 100 Ω 503 µΩ/Ω + 1 kΩ 5 mΩ/Ω + 10 kΩ		



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Resistance - Source	1 Ω	95 μΩ	Fluke 5700A/ 5725A	OEM, GIDEP, and Laboratory Developed Calibration Procedures
	1.9 Ω	181 μΩ		
	10 Ω	280 μΩ		
	19 Ω	532 μΩ		
	100 Ω	1.7 mΩ		
	190 Ω	3.2 mΩ		
	1 kΩ	13 mΩ		
	1.9 kΩ	24.7 mΩ		
	10 kΩ	120 mΩ		
	19 kΩ	228 mΩ		
	100 kΩ	1.4 Ω		
	190 kΩ	2.7 Ω		
	1 MΩ	20 Ω		
	1.9 MΩ	40 Ω		
	10 MΩ	400 Ω		
	19 MΩ	893 Ω		
100 MΩ	11 kΩ			
	(100 to 110) MΩ	500 μΩ/Ω + 3 kΩ	Fluke 5520A-SC1100	
	(110 to 330) MΩ	3 mΩ/Ω + 100 kΩ		
	330 MΩ to 1.1 GΩ	15 mΩ/Ω + 500 kΩ		
	(1.1 to 10) GΩ	50 MΩ	IET HRRS-B-7-100K-5KV	
	(10 to 100) GΩ	1 GΩ		
	100 GΩ to 1 TΩ	10 GΩ		
Electrical Simulation of Thermocouples				
Type B	(600 to 800) °C	0.44 °C	Fluke 5520A-SC1100	
	(800 to 1 000) °C	0.34 °C		
	(1 000 to 1 550) °C	0.3 °C		
	(1 550 to 1 820) °C	0.33 °C		
Type C	(0 to 150) °C	0.3 °C		
	(150 to 650) °C	0.26 °C		
	(650 to 1 000) °C	0.31 °C		
	(1 000 to 1 800) °C	0.5 °C		
	(1 800 to 2 316) °C	0.94 °C		

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Electrical Simulation of Thermocouples (cont.)				
Type E	(-250 to -100) °C	0.5 °C		
	(-100 to -25) °C	0.16 °C		
	(-25 to 350) °C	0.14 °C		
	(350 to 650) °C	0.16 °C		
	(650 to 1 000) °C	0.21 °C		
Type J	(-210 to -100) °C	0.27 °C		
	(-100 to -30) °C	0.16 °C		
	(-30 to 150) °C	0.14 °C		
	(150 to 760) °C	0.17 °C		
	(760 to 1 200) °C	0.23 °C		
Type K	(-200 to -100) °C	0.33 °C		
	(-100 to -25) °C	0.18 °C		
	(-25 to 120) °C	0.16 °C		
	(120 to 1 000) °C	0.26 °C		
	(1 000 to 1 372) °C	0.4 °C		
Type L	(-200 to -100) °C	0.37 °C		
	(-100 to 800) °C	0.26 °C	Fluke 5520A-SC1100	OEM, GIDEP, and Laboratory Developed Calibration Procedures
	(800 to 900) °C	0.17 °C		
Type N	(-200 to -100) °C	0.4 °C		
	(-100 to -25) °C	0.22 °C		
	(-25 to 120) °C	0.19 °C		
	(120 to 410) °C	0.18 °C		
	(410 to 1 300) °C	0.27 °C		
Type R	(0 to 250) °C	0.57 °C		
	(250 to 400) °C	0.35 °C		
	(400 to 1 000) °C	0.33 °C		
	(1 000 to 1 767) °C	0.4 °C		
Type S	(0 to 250) °C	0.47 °C		
	(250 to 1 000) °C	0.36 °C		
	(1 000 to 1 400) °C	0.37 °C		
	(1 400 to 1 767) °C	0.46 °C		
Type T	(-250 to -150) °C	0.63 °C		
	(-150 to 0) °C	0.24 °C		
	(0 to 120) °C	0.16 °C		
	(120 to 400) °C	0.14 °C		
Type U	(-200 to 0) °C	0.56 °C		
	(0 to 600) °C	0.27 °C		

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Electrical Simulation of RTDs				
Pt 385 (100 Ω)	(-200 to 0) °C	0.05 °C	Fluke 5520A-SC1100	OEM, GIDEP, and Laboratory Developed Calibration Procedures
	(0 to 100) °C	0.07 °C		
	(100 to 300) °C	0.09 °C		
	(300 to 400) °C	0.1 °C		
	(400 to 630) °C	0.12 °C		
	(630 to 800) °C	0.23 °C		
Pt 3926 (100 Ω)	(-200 to 0) °C	0.05 °C		
	(0 to 100) °C	0.07 °C		
	(100 to 300) °C	0.09 °C		
	(300 to 400) °C	0.1 °C		
	(400 to 630) °C	0.12 °C		
	(630 to 800) °C	0.23 °C		
Pt 3916 (100 Ω)	(-200 to -190) °C	0.25 °C		
	(-190 to -80) °C	0.04 °C		
	(-80 to 0) °C	0.05 °C		
	(0 to 100) °C	0.06 °C		
	(100 to 260) °C	0.07 °C		
	(260 to 300) °C	0.08 °C		
	(300 to 400) °C	0.09 °C		
	(400 to 600) °C	0.1 °C		
	(600 to 630) °C	0.23 °C		
	(630 to 800) °C	0.23 °C		
Pt 385 (200 Ω)	(-200 to 100) °C	0.04 °C		
	(100 to 260) °C	0.05 °C		
	(260 to 300) °C	0.12 °C		
	(300 to 400) °C	0.13 °C		
	(400 to 600) °C	0.14 °C		
	(600 to 630) °C	0.16 °C		
	(630 to 800) °C	0.23 °C		
	(800 to 1000) °C	0.23 °C		
Pt 385 (500 Ω)	(-200 to -80) °C	0.04 °C		
	(-80 to 100) °C	0.05 °C		
	(100 to 260) °C	0.06 °C		
	(260 to 400) °C	0.08 °C		
	(400 to 600) °C	0.09 °C		
	(600 to 630) °C	0.11 °C		
Pt 385 (1 000 Ω)	(-200 to 0) °C	0.03 °C		
	(0 to 100) °C	0.04 °C		
	(100 to 260) °C	0.05 °C		
	(260 to 300) °C	0.06 °C		
	(300 to 600) °C	0.07 °C		
	(600 to 630) °C	0.23 °C		
PtNi 385 (120 Ω)	(-80 to 100) °C	0.08 °C		
	(100 to 260) °C	0.14 °C		
	(260 to 300) °C	0.14 °C		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
<p>Oscilloscopes</p> <p>Amplitude DC Signal into 50 Ω Load into 1 MΩ Load</p> <p>Amplitude Squarewave 50 Ω Load</p> <p>1 MΩ Load</p> <p>Leveled Sine Wave - Flatness Relative to 50 kHz [5 mV to 5.5 V]</p> <p>[5 mV to 3.5 V]</p> <p>Time Marker into 50 Ω Load-Source</p> <p>Edge Specs into 50Ω Load-Source Rise Time Amplitude Frequency</p> <p>Wave Generator -Source Amplitude (10 Hz to 10 kHz) Square, Sine, Triangle into 1 MΩ into 50 Ω</p>	<p>(-6.6 to 6.6) V (-130 to 130) V</p> <p>1 mV to 6.6 V p-p 10 Hz to 10 kHz</p> <p>1 mV to 130 V p-p 10 Hz to 10 kHz</p> <p>50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz 600 MHz to 1.1 GHz</p> <p>5 s to 50 ms 20 ms to 100 ns (50 to 20) ns 10 ns (5 to 1) ns</p> <p>≤ 300 ps 5 mV to 2.5 V 1 kHz to 10 MHz</p> <p>1.8 mV to 55 V p-p 1.8 mV to 2.5 V p-p</p>	<p>2.5 mV/V + 40 μV 500 μV/V + 40 μV</p> <p>2.5 mV/V + 40 μV</p> <p>1 mV/V + 40 μV</p> <p>15 mV/V + 100 μV 20 mV/V + 100 μV 40 mV/V + 100 μV 50 mV/V + 100μV</p> <p>(25 + 1 000t) μs/s 2.5 μs/s 2.5 μs/s 2.5 μs/s 2.5 μs/s</p> <p>0 ps /-100 ps 20 mV/V + 200 μV 2.5 μHz/Hz</p> <p>30 mV/V + 100 μV 30 mV/V + 100 μV</p>	<p>Fluke 5520A-SC1100</p>	<p>OEM, GIDEP, and Laboratory Developed Calibration Procedures</p>



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
<p>Oscilloscopes (cont.) Frequency</p> <p>Pulse Generator - Source Width Period</p>	<p>10 Hz to 100 kHz</p> <p>4 ns to 500 ns 20 ms to 200 ns (50 Hz to 5 MHz)</p>	<p>25 µHz/Hz + 15 mHz</p> <p>50 ms/s + 2 ns 2.5 µs/s</p>		
<p>DC Power - Source 33 mV to 1.02 kV</p>	<p>330 µA to 330 mA 330 mA to 3 A (3 to 20.5) A</p>	<p>0.023 % of Watts Output 0.022 % of Watts Output 0.07 % of Watts Output</p>		
<p>AC Power - Source (45 to 65) Hz, P=1</p>	<p>(33 to 330) mV (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (330 to 900) mA 900 mA to 2.2 A (2.2 to 4.5) A (4.5 to 20.5) A 330 mV to 1.02 kV (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (330 to 900) mA 900 mA to 2.2 A (2.2 to 4.5) A (4.5 to 20.5) A</p>	<p>0.14 % of Watts Output 0.1 % of Watts Output 0.14 % of Watts Output 0.1 % of Watts Output 0.13 % of Watts Output 0.11 % of Watts Output 0.13 % of Watts Output 0.11 % of Watts Output</p> <p>0.12 % of Watts Output 0.08 % of Watts Output 0.12 % of Watts Output 0.08 % of Watts Output 0.11 % of Watts Output 0.09 % of Watts Output 0.12 % of Watts Output 0.1 % of Watts Output</p>	<p>Fluke 5520A-SC1100</p>	<p>OEM, GIDEP, and Laboratory Developed Calibration Procedures</p>



II. Electromagnetic - RF/Microwave

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power - Source 50 Ω Load	(1 to 8) dB (0.001 to 100) kHz 100 kHz to 20 MHz (+10 to -110) dB (10 to 50) MHz 50 MHz to 2.6 GHz (2.6 to 18) GHz (18 to 20) GHz (20 to 26.5) GHz	0.2 dB 0.6 dB 0.91 dB 0.61 dB 0.48 dB 0.74 dB 0.93 dB	HP 3325B HP 8657B, HP 8673D with HP 8902A, HP 11722A, HP 11792A, and 11793A	OEM, GIDEP, and Laboratory Developed Calibration Procedures
RF Power - Measure 50 Ω Load	(+10 to -20) dB 10 MHz to 2.6 GHz (2.6 to 18) GHz (18 to 20) GHz (20 to 26.5) GHz (+10 to +20) dB 10 MHz to 18 GHz (18 to 26.5) GHz (-20 to -70) dB 10 MHz to 6 GHz (6 to 15) GHz (17 to 18) GHz (-30 to +20) dB 100 kHz to 4.2 GHz	0.07 dB 0.1 dB 0.12 dB 0.13 dB 0.08 dB 0.12 dB 0.1 dB 0.1 dB 0.11 dB 0.07 dB	HP 8902A w/ HP 11793A, HP 11722A, HP 11792A HP 438A w/ HP 8481A HP 438A w/ HP 8485A HP 438A w/ HP 8481D HP 438A w/ HP 8482A	
Power Reference 1 mW	50 MHz	0.015 dB (3.4 μW)	HP 435B K06	
Phase Modulation - Measure 150 kHz to 10 MHz 10 MHz to 26.5 GHz	200 Hz to 10 kHz 200 Hz to 20 kHz	5 % 4 %	HP 8902A w/ HP 11722A HP 8902A w/ HP 11793A	
Amplitude Modulation - Source Rate: 50 Hz to 10 kHz Depths: 5 % to 99 %	(100 to 1 280) MHz	2.3 %	HP 8902A w/ HP 8657B	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Amplitude Modulation - Measure 20 Hz to 10 kHz, to 99 % 50 Hz to 10 kHz, 5 % to 99 % 20 Hz to 10 kHz, to 99 % 50 Hz to 10 kHz, 5 % to 99 %	150 kHz to 10 MHz 150 kHz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 1.3 GHz	3.5 % 2.3 % 3.5 % 1.2 %	HP 8902A w/ HP 11722A HP 8902A w/ HP 11793A	OEM, GIDEP, and Laboratory Developed Calibration Procedures
Frequency Modulation - Source 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	250 kHz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 1.3 GHz	2.4 % 1.3 % 5.8 %	HP 8902A w/ HP 8657B	
Frequency Modulation - Measure 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	250 kHz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 1.3 GHz	2.4 % 1.3 % 5.8 %	HP 8902A	
Insertion Loss (0 to 110) dB	2.5 MHz to 26.5 GHz	0.13 dB	HP 8902A w/ 11793A, HP 11722A, HP 11792A	

III. Time & Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency - Source*	10 MHz	3.6 parts in 10 ⁻⁶	Agilent 53132A	OEM, GIDEP, and Laboratory Developed Calibration Procedures
Frequency - Measure*	DC to 225 MHz	3.6 parts in 10 ⁻⁶		

IV. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature - Source	(-25 to 140) °C	0.24 °C	Hart 9105	OEM, GIDEP, and Laboratory Developed Calibration Procedures
Temperature - Measure	(-196 to 420) °C	0.16 °C	Hart 5627-12 PRT	

V. Mechanical

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure Gages and Transducers	(3 to 10 000) psig (1 to 300) psig (0 to 10) in H ₂ O (0 to 500) psig	1.84 psig 0.06 psig 0.001 in H ₂ O 0.41 psig	Pressurements M2200/3P Ametek RK300 Mensor 2101 Fluke 744 w/ modules	OEM, GIDEP, and Laboratory Developed Calibration Procedures
Pressure Gages and Transducers*	(1 to 500) psig	0.06 psig	Ruska 7010-11D	
Torque Tools	(5 to 50) lbf·in (50 to 250) lbf·in (250 to 1000) lbf·in (20 to 250) lbf·ft	0.37 lbf·in 1.82 lbf·in 7.28 lbf·in 1.82 lbf·ft	CDI 950DT	
Torque Tools*	(250 to 1000) lbf·ft (1000 to 2 500) lbf·ft	4.57 lbf·ft 11.43 lbf·ft	AKO TSD1200	
Scales and Balances ⁵	Up to 100 g (100 to 200) g Up to 5 lb (5 to 20) lb (20 to 50) lb (50 to 100) lb	0.33 mg 0.46 mg 0.0026 lb 0.011 lb 0.026 lb 0.054 lb	Class 1 Weights	

VI. Dimensional

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Micrometers	Up to 4 in (4 to 20) in	69 µin 211 µin	Grade 2 Gage Blocks, Optical Flats	OEM, GIDEP, and Laboratory Developed Calibration Procedures
Calipers	Up to 4 in (4 to 20) in	123 µin 602 µin	Grade 2 Gage Blocks and Accessories	
Height Gages	Up to 20 in	171 µin	Grade 2 Gage Blocks, Surface Plate	
Indicators	Up to 4 in	71 µin		
Surface Plate - Flatness	Up to 12 ft	(35 + 25L) µin	Federal Leveling System	
Optical Comparators	Up to 30 in	38 µin	Glass Scales	
Rulers/ Tape Measures	Up to 12 in	0.0115 in	Grade 2 Gage Blocks	

Notes:

1. Calibration and Measurement Capabilities (CMC) (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
2. This laboratory offers calibration service in its laboratory and on-site at customer-designated locations. Since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
3. Capabilities denoted by an asterisk (*) are laboratory-only, not available for on-site calibration activity.
4. CMC for Electromagnetic - DC/Low Frequency and RF/Microwave do not include possible contributions to uncertainty caused by a "best available" unit under test.
5. The CMC for Electromagnetic - RF/Microwave do not include possible contributions to uncertainty caused by mismatch.
6. The use of (L) signifies Length in inches.
7. The use of (t) refers to Time in seconds.
8. This scope is part of and must be included with the Certificate of Accreditation No. AC - 1315.



Vice President