



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

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CALIBRATION

Valid to: April 17, 2012

Certificate Number: AC-1217

I. Electromagnetic - DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
DC Voltage - Source	Up to 220 mV 200 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV	7 µV/V + 600 nV 6 µV/V + 1 µV 6 µV/V + 3.5 µV 6 µV/V + 6.5 µV 7 µV/V + 80 µV 8 µV/V + 500 µV	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
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	530 µV/V + 4.5 µV 200 µV/V + 4.5 µV 100 µV/V + 4.5 µV 350 µV/V + 4.5 µV 800 µV/V + 7 µV 1.05 mV/V + 13 µV 1.6 mV/V + 25 µV 3.3 mV/V + 25 µV 530 µV/V + 5 µV 200 µV/V + 5 µV 100 µV/V + 5 µV 350 µV/V + 5 µV 800 µV/V + 7 µV 1.05 mV/V + 12 µV 1.6 mV/V + 25 µV 3.3 mV/V + 25 µV		



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AC Voltage - Source (cont.)	(22 to 220) mV		Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
	(10 to 20) Hz	530 $\mu\text{V/V} + 13 \mu\text{V}$		
	(20 to 40) Hz	200 $\mu\text{V/V} + 8 \mu\text{V}$		
	40 Hz to 20 kHz	100 $\mu\text{V/V} + 8 \mu\text{V}$		
	(20 to 50) kHz	350 $\mu\text{V/V} + 8 \mu\text{V}$		
	(50 to 100) kHz	800 $\mu\text{V/V} + 25 \mu\text{V}$		
	(100 to 300) kHz	1.05 $\text{mV/V} + 25 \mu\text{V}$		
	(300 to 500) kHz	1.7 $\text{mV/V} + 35 \mu\text{V}$		
	500 kHz to 1 MHz	3.3 $\text{mV/V} + 80 \mu\text{V}$		
	220 mV to 2.2 V			
	(10 to 20) Hz	480 $\mu\text{V/V} + 80 \mu\text{V}$		
	(20 to 40) Hz	150 $\mu\text{V/V} + 25 \mu\text{V}$		
	40 Hz to 20 kHz	70 $\mu\text{V/V} + 6 \mu\text{V}$		
	(20 to 50) kHz	115 $\mu\text{V/V} + 16 \mu\text{V}$		
	(50 to 100) kHz	230 $\mu\text{V/V} + 70 \mu\text{V}$		
	(100 to 300) kHz	420 $\mu\text{V/V} + 130 \mu\text{V}$		
	(300 to 500) kHz	1 $\text{mV/V} + 350 \mu\text{V}$		
	500 kHz to 1 MHz	2.1 $\text{mV/V} + 850 \mu\text{V}$		
	(2.2 to 22) V			
	(10 to 20) Hz	580 $\mu\text{V/V} + 800 \mu\text{V}$		
	(20 to 40) Hz	150 $\mu\text{V/V} + 250 \mu\text{V}$		
40 Hz to 20 kHz	70 $\mu\text{V/V} + 60 \mu\text{V}$			
(20 to 50) kHz	115 $\mu\text{V/V} + 160 \mu\text{V}$			
(50 to 100) kHz	230 $\mu\text{V/V} + 350 \mu\text{V}$			
(100 to 300) kHz	470 $\mu\text{V/V} + 1.5 \text{mV}$			
(300 to 500) kHz	1.2 $\text{mV/V} + 4.3 \text{mV}$			
500 kHz to 1 MHz	2.6 $\text{mV/V} + 8.5 \text{mV}$			
(22 to 220) V				
(10 to 20) Hz	480 $\mu\text{V/V} + 8 \text{mV}$			
(20 to 40) Hz	150 $\mu\text{V/V} + 2.5 \text{mV}$			
40 Hz to 20 kHz	75 $\mu\text{V/V} + 800 \mu\text{V}$			
(20 to 50) kHz	210 $\mu\text{V/V} + 3.5 \text{mV}$			
(50 to 100) kHz	480 $\mu\text{V/V} + 8 \text{mV}$			
(100 to 300) kHz	1.45 $\text{mV/V} + 90 \text{mV}$			
(300 to 500) kHz	4.6 $\text{mV/V} + 90 \text{mV}$			
500 kHz to 1 MHz	11.3 $\text{mV/V} + 190 \text{mV}$			
(220 to 250) V				
(15 to 50) Hz	380 $\mu\text{V/V} + 16 \text{mV}$			
50 Hz to 1kHz	75 $\mu\text{V/V} + 3.5 \text{mV}$			
250 V to 1.1 kV				
50 Hz to 1kHz	75 $\mu\text{V/V} + 3.5 \text{mV}$			

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DC Current - Source	Up 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 (2.2 to 11) A	45 µA/A + 8 nA 45 µA/A + 80 nA 55 µA/A + 800 nA 55 µA/A + 800 nA + [(200 x I ²) µA/A] 75 µA/A + 25 µA 75 µA/A + 25 µA + [(10 x I ²) µA/A] 350 µA/A + 480 µA	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
AC Current - Source	(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 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 2.2 mA to 22 mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (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 220 mA to 2.2 A 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (2.2 to 11) A 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	650 µA/A + 25 nA 330 µA/A + 20 nA 130 µA/A + 16 nA 550 µA/A + 40 nA 1.5 mA/A + 80 nA 650 µA/A + 40 nA 330 µA/A + 35 nA 130 µA/A + 35 nA 550 µA/A + 400 nA 1.5 mA/A + 800 nA 650 µA/A + 400 nA 330 µA/A + 350 nA 130 µA/A + 350 nA 550 µA/A + 4 µA 1.5 mA/A + 8 µA 650 µA/A + 4 µA 330 µA/A + 3.5 µA 130 µA/A + 3.5 µA 550 µA/A + 40 µA 1.5 mA/A + 80 µA 600 µA/A + 35 µA 700 µA/A + 80 µA 8 mA/A + 1.6 mA 440 µA/A + 170 µA 900 µA/A + 380 µA 3.5 mA/A + 750 µA		

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Resistance - Source	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 kΩ 1.9 kΩ 10 kΩ 19 kΩ 100 kΩ 190 kΩ 1 MΩ 1.9 MΩ 10 MΩ 19 MΩ 100 MΩ	85 μΩ/Ω 85 μΩ/Ω 27 μΩ/Ω 24 μΩ/Ω 15 μΩ/Ω 15 μΩ/Ω 11 μΩ/Ω 11 μΩ/Ω 10.5 μΩ/Ω 10.5 μΩ/Ω 12 μΩ/Ω 12 μΩ/Ω 17 μΩ/Ω 18 μΩ/Ω 34 μΩ/Ω 42 μΩ/Ω 105 μΩ/Ω	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
Capacitance - Source * 50 Hz to 1 kHz 50 Hz to 1 kHz 50 Hz to 1 kHz 50 Hz to 1 kHz 50 Hz to 1 kHz (50 to 400) Hz (50 to 400) Hz (50 to 200) Hz (50 to 100) Hz (50 to 100) Hz	330 pF to 11 nF (11 to 110) nF (110 to 330) nF 330 nF to 1.1 μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF 330 μF to 1.1 mF	5 mF/F + 10 pF 2.5 mF/F + 100 pF 2.5 mF/F + 300 pF 2.5 mF/F + 1 nF 3.5 mF/F + 3 nF 3.5 mF/F + 10 nF 4 mF/F + 30 nF 5 mF/F + 100 nF 7 mF/F + 300 nF 10 mF/F + 300 nF	Fluke 5500A	
Electrical Simulation of Thermocouples Type J Type K	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C	0.27 °C 0.16 °C 0.14 °C 0.17 °C 0.23 °C 0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.4 °C	Fluke 5500A	



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Electrical Simulation of Thermocouples (cont.) Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.16 °C 0.14 °C	Fluke 5500A	OEM and GIDEP Sourced Procedures
Electrical Simulation of RTDs Pt 385, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.05 °C 0.05 °C 0.07 °C 0.09 °C 0.1 °C 0.12 °C 0.23 °C		
Pt 3926, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C	0.05 °C 0.05 °C 0.07 °C	Fluke 5500A	OEM and GIDEP Sourced Procedures
Pt 3926, 100 Ω	(100 to 300) °C (300 to 400) °C (400 to 630) °C	0.09 °C 0.1 °C 0.12 °C		
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.25 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.1 °C 0.23 °C	Fluke 5500A	OEM and GIDEP Sourced Procedures
Pt 385, 200 Ω	(-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.02 °C 0.04 °C 0.04 °C 0.05 °C 0.12 °C 0.13 °C 0.14 °C 0.16 °C		

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Electrical Simulation of RTDs (cont.) Pt 385, 500 Ω	(-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.01 °C 0.05 °C 0.05 °C 0.06 °C 0.08 °C 0.08 °C 0.09 °C 0.11 °C	Fluke 5500A	OEM and GIDEP Sourced Procedures
Pt 385, 1000 Ω	(-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.01 °C 0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.07 °C 0.23 °C		
PtNi 385, 120 Ω	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.03 °C 0.04 °C 0.05 °C		
AC Power - Source (45 to 65) Hz	(3.3 to 330) mV Output (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 11) A 330 mV to 1.02 kV Output (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 11) A	0.4 % 0.25 % 0.35 % 0.25 % 0.35 % 0.25 % 0.35 % 0.25 % 0.25 % 0.25 % 0.15 % 0.25 % 0.15 % 0.25 % 0.15 % 0.2 % 0.15 %		



PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
DC Power - Source	33mV 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 11) A	0.04 % 0.03 % 0.04 % 0.03 % 0.08 % 0.06 % 0.12 % 0.09 %	Fluke 5500A	OEM and GIDEP Sourced Procedures
	Phase - Source (10 to 65) Hz	(0 to 179) °		
DC Voltage - Measure	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	11 µV/V + 300 nV 10 µV/V + 300 nV 10 µV/V + 500 nV 12 µV/V + 30 µV 12 µV/V + 100 µV	HP 3458A	
	(1 to 10) mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (10 to 100) mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz 100 mV to 1 V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz	302 µV/V + 3 µV 202 µV/V + 1.1 µV 302 µV/V + 1.1 µV 1 mV/V + 1.1 µV 5 mV/V + 1.1 µV 40 mV/V + 2 µV 72 µV/V + 4 µV 72 µV/V + 2 µV 142 µV/V + 20 µV 302 µV/V + 20 µV 802 µV/V + 20 µV 3 mV/V + 10 µV 10 mV/V + 10 µV 15 mV/V + 10 µV 72 µV/V + 40 µV 72 µV/V + 20 µV 142 µV/V + 200 µV 302 µV/V + 200 µV 802 µV/V + 200 µV 3 mV/V + 100 µV 10 mV/V + 100 µV 15 mV/V + 100 µV		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
AC Voltage - Measure (cont.)	(1 to 10) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (10 to 100) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz 100 V to 1 kV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	72 μV/V + 400 μV 72 μV/V + 200 μV 142 μV/V + 2 mV 302 μV/V + 2 mV 802 μV/V + 2 mV 3 mV/V + 1 mV 10 mV/V + 1 mV 15 mV/V + 1 mV 202 μV/V + 4 mV 202 μV/V + 2 mV 202 μV/V + 2 mV 352 μV/V + 2 mV 1.2 mV/V + 2 mV 4 mV/V + 10 mV 15 mV/V + 10 mV 402 μV/V + 40 mV 402 μV/V + 20 mV 602 μV/V + 20 mV 1.2 mV/V + 20 mV 3 mV/V + 20 mV	HP 3458A	OEM and GIDEP Sourced Procedures
DC Current - Measure	Up to 100 nA 100 nA to 1 μA (1 to 10) μA (10 to 100) μA 100 μA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	35 μA/A + 40 pA 25 μA/A + 40 pA 25 μA/A + 100 pA 25 μA/A + 800 pA 25 μA/A + 5 nA 25 μA/A + 50 nA 40 μA/A + 500 nA 115 μA/A + 10 μA		
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 + 500 μΩ 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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AC Current - Measure	<p>Up to 100 µA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz</p> <p>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</p> <p>(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</p> <p>(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</p> <p>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</p>	<p>4 mA/A + 30 nA 1.5 mA/A + 30 nA 600 µA/A + 30 nA 600 µA/A + 30 nA</p> <p>4 mA/A + 200 nA 1.5 mA/A + 200 nA 600 µA/A + 200 nA 300 µA/A + 200 nA 600 µA/A + 200 nA 4 mA/A + 400 nA 5.5 mA/A + 1.5 µA</p> <p>4 mA/A + 2 µA 1.5 mA/A + 2 µA 600 µA/A + 2 µA 300 µA/A + 2 µA 600 µA/A + 2 µA 4 mA/A + 4 µA 5.5 mA/A + 15 µA</p> <p>4 mA/A + 20 µA 1.5 mA/A + 20 µA 600 µA/A + 20 µA 300 µA/A + 20 µA 600 µA/A + 20 µA 4 mA/A + 40 µA 5.5 mA/A + 150 µA</p> <p>4 mA/A + 200 µA 1.6 mA/A + 200 µA 800 µA/A + 200 µA 1 mA/A + 200 µA 3 mA/A + 200 µA 10 mA/A + 400 µA</p>	HP 3458A	OEM and GIDEP Sourced Procedures

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Oscilloscopes				
Amplitude - DC Signal into 50 Ω Load into 1 MΩ Load	(-6.6 to 6.6) V (-130 to 130) V	2.5 mV/V + 40 μV 500 μV/V + 40 μV	Fluke 5500A	OEM and GIDEP Sourced Procedures
Amplitude - Square Wave 50 Ω Load	±1 mV to ± 6.6 V p-p 10 Hz to 10 kHz	2.5 mV/V + 40 μV		
1 MΩ Load	±1 mV to ± 130 V p-p 10 Hz to 1 kHz (1 to 10) kHz	1 mV/V + 40 μV 2.5 mV/V + 40 μV		
Leveled Sine Wave Relative to 50 kHz [5 mV to 5.5 V] p-p [5 mV to 3 V] p-p	50 kHz to 100 MHz (100 to 250) MHz (250 to 300) MHz	35 mV/V + 300 μV 40 mV/V + 300 μV 40 mV/V + 300 μV		
Time Marker into 50 Ω Load-Source	5 s to 100 μs (50 to 2) μs 1 μs to 20 ns 10 ns to 2 ns	(25 + 1 000t) μs/s (25 + 15 000t) μs/s 25 μs/s 25 μs/s		
Rise Time 50 Ω load Range (p-p) Frequency	≤ 1 ns 4.5 mV to 2.75 V 1 kHz to 1 MHz	(+0 /-100) ps 20 mV/V + 200 μV 25 μHz/Hz + 15 mHz		
Wave Generator – Amplitude (10 Hz to 10 kHz)				
Square, Sine, Triangle into 1 MΩ	1.8 mV to 55 V p-p	30 mV/V + 100 μV		
Square, Sine, Triangle into 50 Ω	1.8 mV to 2.2 V p-p	30 mV/V + 100 μV		

II. Electromagnetic - RF/Microwave

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Amplitude Modulation Carrier Frequency 150 kHz to 10 MHz (10 to 1 300) MHz	Modulation Rate 50 Hz to 10 kHz 5 % to 10 % Depth 10 % to 99 % Depth 20 Hz to 10 kHz 0 % to 10 % Depth 10 % to 99 % Depth 50 Hz to 50 KHz 5 % to 10 % Depth 10 % to 99 % Depth 20 Hz to 100 KHz 0 % to 10 % Depth 10 % to 99 % Depth	2 % of Reading + 0.01 % 2 % of Reading + 0.1 % 3 % of Reading + 0.01 % 3 % of Reading + 0.1 % 1 % of Reading + 0.01 % 1 % of Reading + 0.1 % 3 % of Reading + 0.01 % 3 % of Reading + 0.1 %	8901B	OEM and GIDEP Sourced Procedures
Frequency Modulation Rate 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	Frequency Range 250 kHz to 10 MHz 10 MHz to to 1.3 GHz 10 MHz to 1.3 GHz	2 % of Reading + 1 Hz 1 % of Reading + 10 Hz 5 % of Reading + 100 Hz		
RF Voltage and Flatness	10 Hz to 100 KHz 100 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz (30 to 70) MHz (70 to 100) MHz	0.04 % 0.08 % 0.14 % 0.27 % 0.8 % 1.7 %	3V Thermal Voltage Converter with Fluke 5500A	
RF Power Tuned (0 dB Reference) (0 to -30) dB (0 to -30) dB (-20 to -50) dB (0 to -30) dB	10 MHz to 18 GHz 2.5 MHz to 4.2 GHz 10 MHz to 18 GHz 10 MHz to 26.5 GHz	0.16 dB 0.27 dB 0.20 dB 0.16 dB	8901B w/ Power Sensor 8481A 8482A 8484A 8485A	

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RF Power Absolute Power Reference 1 mW, Type-N(f), 50 Ω (+20 to -30) dBm, 50 Ω	50 MHz 100 kHz to 300 kHz SWR <1.6:1 300 kHz to 1 MHz SWR <1.2:1 1 MHz to 2 GHz SWR <1.1:1 (2 to 4.2) GHz SWR <1.3:1 (2 to 12.4) GHz SWR <1.2:1 (12.4 to 18) GHz SWR <1.29:1 (18 to 26.5) GHz SWR <1.25:1	1.91 % 3.72 % 3.72 % 3.72 % 3.77 % 4.11 % 4.18 % 4.62 %	432A w/ 8478B 8901B w/8482A 8901B w/8481A 8901B w/8485A	OEM and GIDEP Sourced Procedures
RF Power Absolute (-20 to -60) dBm, 50 Ω	(10 to 30) MHz SWR <1.4:1 30 MHz to 4 GHz SWR <1.15:1 (4 to 10) GHz SWR <1.21:1 (10 to 15) GHz SWR <1.3:1 (15 to 18) GHz SWR <1.3:1	3.26 % 3.26 % 3.36 % 3.36 % 3.45 %	8901B w/8484A	



III. Time & Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Frequency Reference	100 kHz	5×10^{-10} Hz	LORAN-C Receiver	OEM and GIDEP Sourced Procedures
Frequency Standard	10 MHz	5×10^{-10} Hz/Day	Portable Frequency Standard	
Frequency Measure	Up to 1.3 GHz (1.3 to 26.5) GHz 100 kHz to 10 MHz	2×10^{-10} Hz ($2 \times 10^{-10} + 1$) Hz 2×10^{-11} Hz	LORAN-C / SR 620 Counter LORAN-C / EIP 578 Counter Phase Comparison / SR 620	

IV. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Temperature - Source	(0 to 100) °C (100 to 500) °C 0 °C 100 °C	0.026 °C 0.5 °C 0.02 °C 0.04 °C	PRTD / HP 3458A PRTD / HP 3458A Ice Point (Intrinsic Std) Steam Point (Intrinsic Std)	OEM and GIDEP Sourced Procedures
Temperature - Measure*	(0 to 100) °C (100 to 500) °C (-270 to 350) °C (350 to 1 372) °C	0.025 °C 0.026 °C 1.4 °C 0.004 °C	Burns PRTD/HP 3458A Burns PRTD/HP 3458A Type K Thermocouple/Indicator	
Humidity	(20 to 90) % Discreet Points	2 % 1.2 %	Wet/Dry Bulb Method Saturated Salt Solutions	

V. Mechanical

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Force - Source	(0 to 360) kg-f	0.01 %	Class F Weights	OEM and GIDEP Sourced Procedures
Force - Measure *	(1 000 to 50 000) lb·f	0.2 % of Value	Load Cell System	
Mass (Weights)	200 g to 4 kg (4 to 14.3) kg 50 lb weights	0.02 g 0.20 g 0.007 lb	Class F Weights and Balances	
Analytical Balances Class I*	Up to 210 g	2 mg	Class 3 or 4 Weights	NIST Handbook 44 OEM Specifications
Precision Balances Class I*	Up to 2 kg	20 mg	Class 3 Weights	
Industrial Balances Class II*	(2 to 12) kg	200 mg	Class 4 Weights	
Industrial Balances Class III*	Up to 1 000 lb	0.1 lb	Class F Weights	
Pressure *	Up to 10 000 psig	0.03 %	Deadweight Tester	OEM and GIDEP Sourced Procedures
Torque Transducers *	Up to 1 000 ft·lb	0.1 %	Torque Arms / Wheels / Weights	
Torque Wrenches	5 in·lb to 250 ft·lb (250 to 1 000) ft·lb	1.2 % 0.25 %	CDI 950DT Torque Calibrator CDI 5000ST Torque Cell/Indicator	
Vacuum *	(Up to 25) in Hg	0.3 %	Vacuum Test Gage	
Hardness Testers *	C Scales B Scales 15/30/45 N&T Scales	0.93 POH 1.31 POH 0.94 POH	Hardness Test Blocks	NIST Special Publication 960-5

VI. Dimensional

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Angle Blocks *	Up to 45 °	64 Arc Seconds	Sine Bar, Gage Blocks, Digital Indicator	OEM and GIDEP Sourced Procedures
Bore Gages *	Up to 4 in or Metric Equiv	123 μin	Grade 2 Gage Blocks	
Calipers *	Up to 12 in or Metric Equiv (12 to 30) in or Metric Equiv	668 μin 706 μin		
CMM * Linearity Articulated Arm CMM*	Up to 80 ft or Metric Equiv Up to 40 in or Metric Equiv	10.4 μin/ft 3 150 μin	Laser System Grade 2 Gage Blocks	
Height Gages *	Up to 12 in or Metric Equiv (12 to 40) in or Metric Equiv	326 μin 739 μin	Grade 2 Gage Blocks	
Indicators *	Up to 4 in or Metric Equiv	11 μin/in		
Length Standards	Up to 6 in or Metric Equiv (6 to 12) in or Metric Equiv (12 to 20) in or Metric Equiv	104 μin 171 μin 262 μin	MicTrac	
Measuring Wires	(120 to 5) TPI or Metric Equiv	46 μin		
Micrometers *	Up to 6 in or Metric Equiv (6 to 12) in or Metric Equiv	128 μin 154 μin	Grade 2 Gage Blocks	
Optical Comparators *	Up to 30 in Diameter	261 μin	Glass Scale	
Pin / Plug Gages	Up to 4 in or Metric Equiv	82 μin	MicTrac	
Plain Ring Gages	(Up to 4) in or Metric Equiv (4 to 12) in or Metric Equiv (12 to 20) in or Metric Equiv	82 μin 171 μin 262 μin	UMM	
Set Thread Plugs Major Diameter Pitch Diameter	Up to 4 in or Metric Equiv	83 μin 123 μin	MicTrac	
Protractors-Squares *	Up to 12 in or Metric Equiv	366 μin	Optical Comparator	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Rules/Tape Measures *	Up to 12 ft or Metric Equiv	0.0026 in	Gage Blocks	OEM and GIDEP Sourced Procedures
Surface Plates Flatness *	Up to 12 ft or Metric Equiv	15.4 µin/ft	Electronic Levels	
Thread Plug Gages Major Diameter Pitch Diameter	Up to 4 in or Metric Equiv	83 µin 123 µin	Mic Trac, Measuring Wires	
Thread Ring Gages	Up to 1.5 in or Metric Equiv	87 µin	Set Plugs	FED-STD H28/22A
Depth Micrometers *	Up to 6 in or Metric Equiv (6 to 12) in or Metric Equiv	315 µin 326 µin	Grade 2 Gage Blocks	OEM and GIDEP Sourced Procedures
Feeler Gages *	Up to 0.2 in or Metric Equiv	167 µin	Micrometer	
Gage Blocks	Up to 4 in or Metric Equiv (4 to 20) in or Metric Equiv	35 µin 166 µin	Grade 2 Gage Blocks, Gage Block Comparator	

Notes:

1. Calibration Measurement Capabilities (CMC)(Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of k=2.
2. This laboratory offers calibration surfaces 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. On-site calibrations are available for parameters identified with an asterisk (*).
4. The use of (t) signifies an expression of Time in seconds.
5. The uncertainties listed for Electromagnetic - DC/Low Frequency and RF/Microwave and for Mechanical - Scales & Balances do not include possible contributions to uncertainty from a "best available" unit under test.
6. The uncertainties listed for Electromagnetic - RF/Microwave do not include possible contributions to uncertainty caused by mismatch.
7. The use of (T) indicates the temperature reading of the indicator.
8. This scope is part of and must be included with the Certificate of Accreditation No. AC-1217.



Vice-President

