



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

Davis Calibration

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CALIBRATION

Valid to: December 24, 2010

Certificate Number: AC-1363

I. Electrical – DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source	(0 to 220) mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1 100) V	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	Fluke 5700A	OEM and GIDEP Sourced Calibration Procedures
DC Voltage – Measure	(10 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1 000) V	5.5 μ V/V + 300 nV 5.1 μ V/V + 300 nV 4.6 μ V/V + 500 nV 6.5 μ V/V + 30 μ V 16.5 μ V/V + 100 μ V	HP 3458A Opt 002	
DC Current - Source	(0 to 220) μ A 220 μ A to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A (2.2 to 11) 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 80 μ A/A + 25 μ A 360 μ A/A + 480 μ A	Fluke 5700A Fluke 5700A w/5725A	
Clamp-On	(0 to 11) A (11 to 20.5) A 10A to 1 000A	500 μ A/A + 500 μ A 1000 μ A/A + 750 μ A 5.5 mA/A	Fluke 5520A Fluke 5520A with coil	
DC Current - Measure	(10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	20 μ A/A + 800 pA 20 μ A/A + 5 nA 20 μ A/A + 50 nA 35 μ A/A + 500 nA 105 μ A/A + 10 μ A	HP 3458A Opt 002	



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AC Voltage – Source	<p>(0 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 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 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</p> <p>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</p> <p>(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</p>	<p>550 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 210 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 105 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 370 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 850 $\mu\text{V}/\text{V} + 7 \mu\text{V}$ 1.1 $\text{mV}/\text{V} + 13 \mu\text{V}$ 1.7 $\text{mV}/\text{V} + 25 \mu\text{V}$ 3.4 $\text{mV}/\text{V} + 25 \mu\text{V}$</p> <p>550 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 210 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 105 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 370 $\mu\text{V}/\text{V} + 5 \mu\text{V}$ 850 $\mu\text{V}/\text{V} + 7 \mu\text{V}$ 1.1 $\text{mV}/\text{V} + 13 \mu\text{V}$ 1.7 $\text{mV}/\text{V} + 25 \mu\text{V}$ 3.4 $\text{mV}/\text{V} + 25 \mu\text{V}$</p> <p>550 $\mu\text{V}/\text{V} + 13 \mu\text{V}$ 210 $\mu\text{V}/\text{V} + 8 \mu\text{V}$ 105 $\mu\text{V}/\text{V} + 8 \mu\text{V}$ 320 $\mu\text{V}/\text{V} + 8 \mu\text{V}$ 850 $\mu\text{V}/\text{V} + 25 \mu\text{V}$ 1.1 $\text{mV}/\text{V} + 25 \mu\text{V}$ 1.7 $\text{mV}/\text{V} + 35 \mu\text{V}$ 3.4 $\text{mV}/\text{V} + 80 \mu\text{V}$</p> <p>500 $\mu\text{V}/\text{V} + 80 \mu\text{V}$ 160 $\mu\text{V}/\text{V} + 25 \mu\text{V}$ 75 $\mu\text{V}/\text{V} + 6 \mu\text{V}$ 120 $\mu\text{V}/\text{V} + 16 \mu\text{V}$ 250 $\mu\text{V}/\text{V} + 70 \mu\text{V}$ 430 $\mu\text{V}/\text{V} + 130 \mu\text{V}$ 1.1 $\text{mV}/\text{V} + 350 \mu\text{V}$ 2.2 $\text{mV}/\text{V} + 850 \mu\text{V}$</p> <p>500 $\mu\text{V}/\text{V} + 800 \mu\text{V}$ 160 $\mu\text{V}/\text{V} + 250 \mu\text{V}$ 75 $\mu\text{V}/\text{V} + 60 \mu\text{V}$ 120 $\mu\text{V}/\text{V} + 160 \mu\text{V}$ 250 $\mu\text{V}/\text{V} + 350 \mu\text{V}$ 500 $\mu\text{V}/\text{V} + 1.5 \text{mV}$ 1.3 $\text{mV}/\text{V} + 4.3 \text{mV}$ 2.7 $\text{mV}/\text{V} + 8.5 \text{mV}$</p>	Fluke 5700A	OEM and GIDEP Sourced Calibration Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage – Measure (cont)	<p>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 4) MHz (4 to 8) MHz (8 to 10) MHz</p> <p>(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 4) MHz (4 to 8) MHz (8 to 10) MHz</p> <p>(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</p> <p>(100 to 1000) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz</p>	<p>72 $\mu\text{V}/\text{V}$ + 40 μV 72 $\mu\text{V}/\text{V}$ + 20 μV 142 $\mu\text{V}/\text{V}$ + 20 μV 302 $\mu\text{V}/\text{V}$ + 20 μV 802 $\mu\text{V}/\text{V}$ + 20 μV 3 mV/V + 100 μV 10 mV/V to 100 μV 15 mV/V + 100 μV 40 mV/V + 800 μV 150 mV/V + 1 mV</p> <p>72 $\mu\text{V}/\text{V}$ + 400 μV 72 $\mu\text{V}/\text{V}$ + 200 μV 142 $\mu\text{V}/\text{V}$ + 20 μV 302 $\mu\text{V}/\text{V}$ + 20 μV 802 $\mu\text{V}/\text{V}$ + 20 μV 3 mV/V + 100 μV 10 mV/V to 100 μV 15 mV/V + 100 μV 40 mV/V + 800 μV 150 mV/V + 1 mV</p> <p>200 $\mu\text{V}/\text{V}$ + 4 mV 200 $\mu\text{V}/\text{V}$ + 2 mV 200 $\mu\text{V}/\text{V}$ + 2 mV 350 $\mu\text{V}/\text{V}$ + 2 mV 1.2 mV/V + 2 mV 4 mV/V + 10 mV 15 mV/V + 10 mV</p> <p>400 $\mu\text{V}/\text{V}$ + 40 mV 400 $\mu\text{V}/\text{V}$ + 20 mV 600 $\mu\text{V}/\text{V}$ + 20 mV 1.2 mV/V + 20 mV 3 mV/V + 20 mV</p>	HP 3458A Opt 002	OEM and GIDEP Sourced Calibration Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current – Source	<p>(0 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>(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 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>(2.2 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>(3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz</p> <p>(11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz</p> <p>(20.5 to 150) A (45 to 65) Hz (65 to 440) Hz</p> <p>(150 to 1 000) A (45 to 65) Hz (65 to 440) Hz</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>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>1.8 mA/A + 100 μA 600 μA/A + 100 μA 6 mA/A + 1 mA 25 mA/A + 5 mA</p> <p>600 μA/A + 2 mA 1 mA/A + 2 mA 30 mA/A + 2 mA</p> <p>1.2 mA/A + 5 mA 1.5 mA/A + 5 mA 30 mA/A + 5 mA</p> <p>6.3 mA/A 17.5 mA/A</p> <p>6.4 mA/A 26 mA/A</p>	<p>Fluke 5700A</p> <p>Fluke 5520A</p> <p>Fluke 5520A with coil</p>	<p>OEM and GIDEP Sourced Calibration Procedures</p>



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current – Measure	<p>(5 to 100) μA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 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 μA 1.5 mA/A + 200 μA 600 μA/A + 200 μA 300 μA/A + 200 μA 600 μA/A + 400 μA 4 mA/A + 400 μA 5.5 mA/A + 1.5 mA</p> <p>4 mA/A + 2 mA 1.5 mA/A + 2 mA 600 μA/A + 2 mA 300 μA/A + 2 mA 600 μA/A + 2 mA 4 mA/A + 4 mA 5.5 mA/A + 15 mA</p> <p>4 mA/A + 20 mA 1.5 mA/A + 20 mA 600 μA/A + 20 mA 300 μA/A + 20 mA 600 μA/A + 20 mA 4 mA/A + 40 mA 5.5 mA/A + 150 mA</p> <p>4 mA/A + 200 mA 1.6 mA/A + 200 mA 800 μA/A + 200 mA 1 mA/A + 200 mA 3 mA/A + 200 mA 10 mA/A + 400 mA</p>	HP 3458A Opt 002	OEM and GIDEP Sourced Calibration Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)	
Resistance – Source	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω 110 Ω to 1.1 kΩ (1.1 to 11) kΩ (11 to 110) kΩ 110 kΩ to 1.1 MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ 330 MΩ to 1.1 GΩ	40 μΩ/ Ω + 1 mΩ 30 μΩ/ Ω + 1.5 mΩ 28 μΩ/ Ω + 1.4 Ω 28 μΩ/ Ω + 2 mΩ 28 μΩ/ Ω + 20 mΩ 28 μΩ/ Ω + 200 mΩ 32 μΩ/ Ω + 2 Ω 60 μΩ/ Ω + 30 Ω 130 μΩ/ Ω + 50 Ω 250 μΩ/ Ω + 2.5 kΩ 500 μΩ/ Ω + 3 kΩ 3 mΩ/ Ω + 100 kΩ 15 mΩ/ Ω + 500 kΩ	Fluke 5520A/SC1100	OEM and GIDEP Sourced Calibration Procedures	
Resistance – Fixed Points	1 mΩ 10 mΩ 100 mΩ 1 Ω 10 Ω 100 Ω	170 nΩ 1.2 μΩ 12 μΩ 120 μΩ 1.2 mΩ 12 mΩ	L&N 4223B JG Biddle 601235 JG Biddle 601230 Rubicon 10hm L&N 4025B L&N 100 OHM		
Resistance – Measure	(0 to 10) Ω (10 to 100) Ω 100 Ω 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 13 μΩ/ Ω + 500 μΩ 11 μΩ/ Ω + 5 mΩ 11 μΩ/ Ω + 50 mΩ 15 μΩ/ Ω + 2 Ω 53 μΩ/ Ω + 100 Ω 503 μΩ/ Ω + 1 kΩ 5 mΩ/ Ω + 10 kΩ	HP 3458A Opt 002		
Capacitance – Source	(190 to 400) pF 400 pF to 1.1 nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 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 (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz	5 mF/F + 10 pF 5 mF/F + 10 pF 5 mF/F + 10 pF 5 mF/F + 10 pF 2.5 mF/F + 100 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 4.5 mF/F + 3 μF 4.5 mF/F + 10 μF 7.5 mF/F + 30 μF 11 mF/F + 100 μF	Fluke 5520A	



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Electrical Simulation of Thermocouple Indicators				
Type B	(600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C	0.51 °C 0.39 °C 0.35 °C 0.38 °C	Fluke 5520A	OEM and GIDEP Sourced Calibration Procedures
Type C	(0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C (1 800 to 2 316) °C	0.35 °C 0.3 °C 0.36 °C 0.58 °C 0.97 °C		
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C	0.58 °C 0.19 °C 0.16 °C 0.19 °C 0.24 °C		
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C	0.32 °C 0.19 °C 0.17 °C 0.2 °C 0.27 °C		
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C	0.38 °C 0.21 °C 0.19 °C 0.3 °C 0.46 °C		
Type L	(-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.43 °C 0.3 °C 0.2 °C		
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1 300) °C	0.46 °C 0.25 °C 0.22 °C 0.21 °C 0.31 °C		
Type R	(0 to 250) °C (250 to 400) °C (400 to 1 000) °C (1 000 to 1 767) °C	0.66 °C 0.4 °C 0.38 °C 0.46 °C		

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Type S	(0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C	0.54 °C 0.42 °C 0.43 °C 0.53 °C	Fluke 5520A	OEM and GIDEP Sourced Calibration Procedures
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C 120 to 400) °C	0.73 °C 0.28 °C 0.19 °C 0.17 °C		
Type U	(-200 to 0) °C (0 to 600) °C	0.65 °C 0.31 °C		
Electrical Simulation of RTDs				
Pt 385 (100 Ω)	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.06 °C 0.08 °C 0.1 °C 0.12 °C 0.14 °C 0.27 °C		
Pt 385 (200 Ω)	(-200 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.05 °C 0.06 °C 0.14 °C 0.15 °C 0.16 °C 0.18 °C		
Pt 385 (500 Ω)	(-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 400) °C (400 to 600) °C (600 to 630) °C	0.05 °C 0.06 °C 0.07 °C 0.09 °C 0.1 °C 0.13 °C		
Pt 385 (1 000 Ω)	(-200 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 600) °C (600 to 630) °C	0.03 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.27 °C		

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of RTDs (cont.) 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	0.29 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.1 °C 0.12 °C 0.27 °C	Fluke 5520A	OEM and GIDEP Sourced Calibration Procedures
Pt 3926 (100 Ω)	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.06 °C 0.08 °C 0.1 °C 0.12 °C 0.14 °C		
PtNi 385 (120 Ω)	(-80 to 100) °C (100 to 260) °C	0.09 °C 0.16 °C		
Oscilloscopes				
DC Signal into 50 Ω Load into 1 MΩ Load	0 V to ± 6.6 V 0 V to ± 130 V	2.5 mV/V + 40 μV 500 μV/V + 40 μV	Fluke 5520A/SC1100	
Amplitude Squarewave 50 Ω Load	1 mV to 6.6 Vp-p 10 Hz to 10 kHz	2.5 mV/V + 40 μV		
1 MΩ Load	1 mV to 130 Vp-p 10 Hz to 1 kHz (1 to 10) kHz	1 mV/V + 40 μV 2.5 mV/V + 40 μV		
Leveled Sine Wave – Flatness	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	35 mV/V + 300 μV 40 mV/V + 300 μV 60 mV/V + 300 μV		
Relative to 50 kHz [5 mV to 5.5 V]				
5 mV to 3.5 V	(600 to 1100) MHz	50 mV/V + 100 μV		
Time Marker into 50 Ω Load	5 s to 50 ms 20 ms to 2 ns	(25 + 1 000t) parts in 10 ⁶ 2.5 parts in 10 ⁶		
Edge Specs into 50 Ω Load – Source Rise Time Amplitude	350 ps 5 mV to 2.5 V	0 ps/-100 ps 2 % + 200 μV		

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Oscilloscopes (cont.) Wave Generator – Source Amplitude (10 Hz to 10 kHz)			Fluke 5520A/SC1100	OEM and GIDEP Sourced Calibration Procedures
Square,Sine,Triangle into 1 MΩ	1.8 mV to 55 Vp-p	30 mV/V +100 μV		
Square,Sine,Triangle into 50 MΩ	1.8 mV to 2.5 Vp-p	30 mV/V +100 μV		
Frequency	10 Hz to 100 kHz	25 X10 ⁶ + 15 mHz		
Pulse Generator – Source				
Width Period	4 ns to 500 ns 20 ms to 200 ns	5 % ± 2 ns 2.5 X 10 ⁶		
DC Power – Source	33 mV to 1 000 V 330 μA to 330 mA 330 mA to 3 A (3 to 20.5) A	2.3 mV/V of Watts Output 2.2 mV/V of Watts Output 0.7 mV/V of Watts Output		
AC Power – Source (45 to 65)Hz PF=1	(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 (0.33 to 1 000) V (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	1.4 mV/V of Watts Output 1 mV/V of Watts Output 1.4 mV/V of Watts Output 1 mV/V of Watts Output 1.3 mV/V of Watts Output 1.1 mV/V of Watts Output 1.3 mV/V of Watts Output 1.1 mV/V of Watts Output 1.2 mV/V of Watts Output 0.8 mV/V of Watts Output 1.2 mV/V of Watts Output 0.8 mV/V of Watts Output 1.1 mV/V of Watts Output 0.9 mV/V of Watts Output 1.2 mV/V of Watts Output 1 mV/V of Watts Output		

II. Time and Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency – Source*	10 MHz	2.31 parts in 10 ¹²	Datum FTS4040A/AR Cesium time standard	OEM and GIDEP Sourced Calibration Procedures
	0.001 Hz to 20 MHz	2.31 parts in 10 ¹²	With HP 3325B	
	10 MHz to 50 GHz	2.31 parts in 10 ¹²	With Agilent 83650B	
Frequency – Measure*	0.1 Hz to 12.4 GHz	1.15 parts in 10 ¹¹	Datum FTS4040A/AR Cesium time standard w/53132A opt 124	
	10 Hz to 46 GHz	1.15 parts in 10 ¹⁰	w/HP 5352B opt 005	

III. Electromagnetic – RF/Microwave

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power – Source 50 ohm load	0.001Hz to 100 kHz			OEM and GIDEP Sourced Calibration Procedures
	(23.98 to 13.52) dBm	0.1 dB	HP 3325B	
	(13.52 to -56.02) dBm	0.2 dB		
	100 kHz to 20 MHz		HP 3325B	
	(23.98 to 13.52) dBm	0.4 dB		
	(13.52 to -16.02) dBm	0.6 dB		
	100 kHz to 10 MHz			
	(-16.02 to -56.02) dBm	0.6 dB	HP 8662A	
	(10 to 20) MHz			
	(-16.02 to -56.02) dBm	0.9 dB		
	100 kHz to 1.28 GHz			
	+13 dBm to -120 dBm	1 dB	HP 83650B	
	-120 dBm to -130 dBm	3 dB		
	10 dBm to -9.99 dBm			
	10 MHz to 2 GHz	0.6 dB		
	2 GHz to 20 GHz	0.7 dB		
	20 GHz to 40 GHz	0.9 dB		
40 GHz to 50 GHz	1.7 dB			
-10 dBm to -59.99 dBm				
10 MHz to 2 GHz	0.9 dB			
2 GHz to 20 GHz	1.0 dB			
20 GHz to 40 GHz	1.2 dB			
40 GHz to 50 GHz	2.0 dB			
-60 dBm to -110 dBm				
10 MHz to 2 GHz	1.4 dB			
2 GHz to 20 GHz	1.5 dB			
20 GHz to 40 GHz	1.7 dB			
40 GHz to 50 GHz	2.5 dB			

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power - Measure	+10 dBm to -20 dBm 100 kHz to 2.6 GHz 2.6 GHz to 18 GHz 18 GHz to 20 GHz 20 GHz to 26.5 GHz +10 dBm to +20 dBm 100 kHz to 4.2 GHz 10 MHz to 18 GHz 18 GHz to 26.5 GHz 26.5 GHz to 50 GHz -20 dBm to -70 dBm 10 MHz to 18 GHz 18 GHz to 50 GHz Power Reference (1mW)	 0.07 dB 0.11 dB 0.14 dB 0.14 dB 0.05 dB 0.06 dB 0.11 dB 0.18 dB 0.11 dB 0.18 dB 3.5 uW	HP 8902A w/ 11722A HP 8902A w/11792A HP EPM-442A (E4419A) w/8482A HP EPM-442A (E4419A) w/ 8481A HP EPM-442A (E4419A) w/ 8485A HP EPM-442A (E4419A) w/ 8487A HP E4419A w/ 8484A HP E4419A w/ 8487D HP 478A-H75 w/ 432A and 3458A	OEM and GIDEP Sourced Calibration Procedures
Amplitude Modulation – Measure Rate: 50 Hz to 10 kHz (5 to 99) % 20 Hz to 10 kHz to 99 % 50 Hz to 50 kHz (5 to 99) % 20 Hz to 100 kHz to 99 %	 150 kHz to 10 MHz 150 kHz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 1.3 GHz	 2 % of reading + 1 digit 3 % of reading + 1 digit 1 % of reading + 1 digit 3 % of reading + 1 digit	HP 8902A	
Frequency Modulation – Measure Rate: 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	0.25 MHz to 10 MHz 10 MHz to 1 300 MHz 10 MHz to 1 300 MHz	2 % of reading + 1 digit 1 % of reading + 1 digit 5 % of reading + 1 digit		



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Attenuation - Measure	2.5 MHz to 26.5 GHz			OEM and GIDEP Sourced Calibration Procedures
	(0 to -10) dB	0.02 dB	HP 8902A w/11722A, 11792A, 11793A	
	(-10 to -40) dB	0.05 dB		
	(-40 to -50) dB	0.12 dB		
	(-50 to -80) dB	0.15 dB		
	(-80 to -90) dB	0.25 dB		
	(-90 to -110) dB	0.27 dB		
	(-110 to -127) dB	0.42 dB		
	26.5 GHz to 40 GHz		HP 8902A w/ Miteq DB0250LW1V mixer	
	(0 to -10) dB	0.02 dB		
	(-10 to -40) dB	0.05 dB		
	(-40 to -50) dB	0.12 dB		
	(-50 to -80) dB	0.15 dB		
(-80 to -90) dB	0.25 dB			
(-90 to -110) dB	0.27 dB			
40 GHz to 50 GHz		0.18 dB	HP 8902A or EPM-442A (E4419A) w/ 8487A HP 8902A or EPM-442A (E4419A) w/ 8487D	
(0 to -20) dB				
	(-20 to -70) dB	0.18 dB		

IV. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature- Measure	(0 to 100) °C	0.06 °C	Hart 5611T with Hart 1521	OEM and GIDEP Sourced Calibration Procedures
	(-100 to 156) °C	0.08 °C	Hart 5623B with Hart 1521	

V. Mechanical

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure	(5 to 10 000) psi/psig	0.12 %	Ametek R-100 Deadweight Tester	OEM and GIDEP Sourced Calibration Procedures
	(-15 to 30) psi	0.05 %	Fluke Pressure Modules With Fluke 743B 700PD Series 700P0x Series 700P29	
	(0 to 1 500) psi (1 500 to 3 000) psi	0.05 % 0.08 %		
Torque	(5 to 50) in lb	0.3 %	Sturtevant Richmond Model 10052	
	(30 to 300) in lb	0.3 %		
	(300 to 3 000) in lb	0.3 %		
Scales and Balances	Up to 100 lb (100 to 200) lb	0.026 lb 0.033 lb	Class F Weights	
Tension and Push/Pull Gages	Up to 100 lb (100 to 200) lb	0.026 lb 0.033 lb		
Load Cells	Up to 100 lbf (100 to 200) lbf	0.026 lb 0.033 lb		

VI. Dimensional

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Micrometers	Up to 4 in (4 to 20) in	(85 + 2.7L) μ in (102 + 7.2L) μ in	Grade 2 Gage Blocks Surface Plate	OEM and GIDEP Sourced Calibration Procedures
Calipers	(0.05 to 20) in	(152 + 1.6L) μ in	Grade 2 Gage Blocks	
Height Gages	(0.05 to 20) in	(52 + 8L) μ in	Grade 2 Gage Blocks Surface Plate	
Indicators	(0.05 to 20) in	(52 + 8L) μ in	Grade 2 Gage Blocks	

Notes:

1. Best Measurement Uncertainties (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
2. This laboratory's capabilities include in-laboratory and (field) on-site calibration services. Since field (on-site) conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected in the field (on-site) than what is reported on the accredited scope.
3. Capabilities denoted by an asterisk (*) are laboratory-only, not available for field (on-site) calibration activity.
4. The use of (t) signifies an expression of Time in seconds.
5. The use of (L) signifies an expression of Length in inches.
6. This scope is part of and must be included with the Certificate of Accreditation No. AC -1363

Karl Greenway

Vice President