



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

Davis Calibration

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CALIBRATION

Valid to: June 29, 2012

Certificate Number: AC-1279

I. Electromagnetic – DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	BEST 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	8 µV/V + 600 nV 7 µV/V + 1 µV 7 µV/V + 3.5 µV 7 µV/V + 6.5 µV 8 µV/V + 80 µV 9 µV/V + 500 µV	Fluke 5720A	OEM, GIDEP, and Locally Developed Calibration Procedures
DC Voltage - Measure	Up to 200 mV 200 mV to 2 V (2 to 20) V (20 to 200) V 200 to 1 kV	4.5 uV/V + 100 nV 3 uV/V + 400 nV 3 uV/V + 4 µV 4.5 uV/V + 40 µV 4.5 uV/V + 500 µV	Fluke 8508A Opt 01	
DC Current – Source	Up to 220 µA 220 µA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A (2.2 to 3) A (3 to 11) A (11 to 20.5) A (20.5 to 1 000) A	50 µA/A + 8 nA 50 µA/A + 8 nA 50 µA/A + 80 nA 60 µA/A + 800 nA 80 µA/A + 25 µA 380 µA/A + 40 µA 500 µA/A + 500 µA 1 mA/A + 750 µA 2.6 mA/A + 50 mA	Fluke 5720A Fluke 5520A Fluke 5520A w/ coil	



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Current – Measure	(10 to 100) μ A (100 to 200) μ A 200 μ A to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	20 μ A/A + 800 pA 12 μ A/A + 400 pA 12 μ /A + 4 nA 13 μ A/A + 40 nA 36 μ A/A + 800 nA 170 μ A/A + 16 μ A 380 μ A/A + 400 nA	HP 3458A Opt 002 Fluke 8508A OPT 01	OEM, GIDEP, and Locally Developed Calibration Procedures
Resistance – Source	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	95 $\mu\Omega$ 181 $\mu\Omega$ 280 $\mu\Omega$ 513 $\mu\Omega$ 1.7 m Ω 3.23 m Ω 13 m Ω 24.7 m Ω 120 m Ω 228 m Ω 1.4 Ω 2.66 Ω 20 Ω 40 Ω 400 Ω 893 Ω 11 k Ω	Fluke 5720A	
Resistance – Measure	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 k Ω (2 to 20) k Ω (20 to 200) k Ω 200 k Ω to 2 M Ω (2 to 20) M Ω (20 to 200) M Ω 200 M Ω to 2 G Ω	15 $\mu\Omega$ / Ω + 4 u Ω 9 $\mu\Omega$ / Ω + 14 u Ω 7.5 $\mu\Omega$ / Ω + 50 u Ω 7.5 $\mu\Omega$ / Ω + 500 u Ω 7.5 $\mu\Omega$ / Ω + 5 m Ω 7.5 $\mu\Omega$ / Ω + 50 m Ω 8.5 $\mu\Omega$ / Ω + 1 Ω 15 $\mu\Omega$ / Ω + 100 Ω 60 $\mu\Omega$ / Ω + 10 k Ω 525 $\mu\Omega$ / Ω + 1 M Ω	Fluke 8508A OPT 01	



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage – Source	<p>Up to 2.2 mV</p> <p>(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</p> <p>(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</p> <p>(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</p> <p>(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 $\mu\text{V}/\text{V}$ + 4.5 μV 210 $\mu\text{V}/\text{V}$ + 4.5 μV 105 $\mu\text{V}/\text{V}$ + 4.5 μV 370 $\mu\text{V}/\text{V}$ + 4.5 μV 850 $\mu\text{V}/\text{V}$ + 7 μV 1.1 mV/V + 13 μV 1.7 mV/V + 25 μV 3.4 mV/V + 25 μV</p> <p>550 $\mu\text{V}/\text{V}$ + 5 μV 210 $\mu\text{V}/\text{V}$ + 5 μV 105 $\mu\text{V}/\text{V}$ + 5 μV 370 $\mu\text{V}/\text{V}$ + 5 μV 850 $\mu\text{V}/\text{V}$ + 7 μV 1.1 mV/V + 12 μV 1.7 mV/V + 25 μV 3.4 mV/V + 25 μV</p> <p>550 $\mu\text{V}/\text{V}$ + 13 μV 210 $\mu\text{V}/\text{V}$ + 8 μV 105 $\mu\text{V}/\text{V}$ + 8 μV 320 $\mu\text{V}/\text{V}$ + 8 μV 850 $\mu\text{V}/\text{V}$ + 25 μV 1.1 mV/V + 25 μV 1.7 mV/V + 35 μV 3.4 mV/V + 80 μV</p> <p>500 $\mu\text{V}/\text{V}$ + 80 μV 160 $\mu\text{V}/\text{V}$ + 25 μV 75 $\mu\text{V}/\text{V}$ + 6 μV 120 $\mu\text{V}/\text{V}$ + 16 μV 250 $\mu\text{V}/\text{V}$ + 70 μV 430 $\mu\text{V}/\text{V}$ + 130 μV 1.1 mV/V + 350 μV 2.2 mV/V + 850 μV</p>	Fluke 5720A	OEM, GIDEP, and Locally Developed Calibration Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage – Source (cont.)	(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 (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 220 V to 1.1 kV (15 to 50) Hz 50 Hz to 1 kHz	500 $\mu\text{V}/\text{V}$ + 800 μV 160 $\mu\text{V}/\text{V}$ + 250 μV 75 $\mu\text{V}/\text{V}$ + 60 μV 120 $\mu\text{V}/\text{V}$ + 160 μV 250 $\mu\text{V}/\text{V}$ + 350 μV 500 $\mu\text{V}/\text{V}$ + 1.5 mV 1.3 mV/V + 4.3 mV 2.7 mV/V + 8.5 mV 500 $\mu\text{V}/\text{V}$ + 8 mV 160 $\mu\text{V}/\text{V}$ + 2.5 mV 80 $\mu\text{V}/\text{V}$ + 800 μV 220 $\mu\text{V}/\text{V}$ + 3.5 mV 500 $\mu\text{V}/\text{V}$ + 8 mV 1.5 mV/V + 90 mV 4.7 mV/V + 90 mV 115 mV/V + 190 mV 400 $\mu\text{V}/\text{V}$ + 16 mV 80 $\mu\text{V}/\text{V}$ + 3.5 mV	Fluke 5720A	OEM, GIDEP, and Locally Developed Calibration Procedures
AC Voltage – Measure	(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 300 kHz to 1MHz (1 to 4) MHz (4 to 8) MHz	300 $\mu\text{V}/\text{V}$ + 3 μV 200 $\mu\text{V}/\text{V}$ + 1.1 μV 300 $\mu\text{V}/\text{V}$ + 1.1 μV 1 mV/V + 1.1 μV 5 mV/V + 1.1 μV 40 mV/V + 2 μV 12 mV/V + 5 μV 70 mV/V + 7 μV 200 mV/V + 8 μV	HP 3458A Opt 002	



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage – Measure (cont.)	(20 to 200) V (1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz 200 V to 1 kV (1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	140 $\mu\text{V/V} + 12 \text{ mV}$ 105 $\mu\text{V/V} + 2 \text{ mV}$ 85 $\mu\text{V/V} + 2 \text{ mV}$ 65 $\mu\text{V/V} + 2 \text{ mV}$ 85 $\mu\text{V/V} + 2 \text{ mV}$ 205 $\mu\text{V/V} + 4 \text{ mV}$ 505 $\mu\text{V/V} + 20 \text{ mV}$ 3 $\text{mV/V} + 200 \text{ mV}$ 10 $\text{mV/V} + 2 \text{ V}$ 140 $\mu\text{V/V} + 70 \text{ mV}$ 110 $\mu\text{V/V} + 20 \text{ mV}$ 95 $\mu\text{V/V} + 20 \text{ mV}$ 205 $\mu\text{V/V} + 40 \text{ mV}$ 510 $\mu\text{V/V} + 200 \text{ mV}$	Fluke 8508A OPT 01	OEM, GIDEP, and Locally Developed Calibration 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 to 22) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	700 $\mu\text{A/A} + 25 \text{ nA}$ 350 $\mu\text{A/A} + 20 \text{ nA}$ 140 $\mu\text{A/A} + 16 \text{ nA}$ 600 $\mu\text{A/A} + 40 \text{ nA}$ 1.6 $\text{mA/A} + 80 \text{ nA}$ 700 $\mu\text{A/A} + 40 \text{ nA}$ 350 $\mu\text{A/A} + 35 \text{ nA}$ 140 $\mu\text{A/A} + 35 \text{ nA}$ 600 $\mu\text{A/A} + 400 \text{ nA}$ 1.6 $\text{mA/A} + 800 \text{ nA}$ 700 $\mu\text{A/A} + 400 \text{ nA}$ 350 $\mu\text{A/A} + 350 \text{ nA}$ 140 $\mu\text{A/A} + 350 \text{ nA}$ 600 $\mu\text{A/A} + 4 \mu\text{A}$ 1.6 $\text{mA/A} + 8 \mu\text{A}$	Fluke 5720A	



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AC Current -- Measure	Up to 200 μA (1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz 200 μA to 2 mA (1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz (2 to 20) mA (1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz (20 to 200) mA (1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz 200 mA to 2 A 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (2 to 20) A 10 Hz to 2 kHz (2 to 10) kHz	290 μ A/A + 20 nA 280 μ A/A + 20 nA 650 μ A/A + 20 nA 4 mA/A + 20 nA 290 μ A/A + 200 nA 280 μ A/A + 200 nA 650 μ A/A + 200 nA 4 mA/A + 200 nA 290 μ A/A + 2 μ A 280 μ A/A + 2 μ A 6.5 mA/A + 2 μ A 4 mA/A + 2 μ A 290 μ A/A + 20 μ A 250 μ A/A + 20 μ A 600 μ A/A + 20 μ A 600 μ A/A + 200 μ A 700 μ A/A + 200 μ A 3 mA/A + 200 μ A 800 μ A/A + 2 mA 2.5 mA/A + 2 mA	Fluke 8508A Opt 01	OEM, GIDEP and Locally developed Calibration Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
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 Up to 50 Hz Up to 20 Hz Up to 6 Hz Up to 2 Hz Up to 0.6 Hz Up to 0.2 Hz	5 mF/F + 10 pF 5 mF/F + 10 pF 5 mF/F + 10 pF 2.5 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 2.5 mF/F + 3 nF 2.5 mF/F + 10 nF 4 mF/F + 30 nF 4.5 mF/F + 100 nF 4.5 mF/F + 300 nF 4.5 mF/F + 1 μF 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	OEM, GIDEP, and Locally Developed Calibration Procedures
Electrical Simulation of Thermocouple Indicators Type B Type C Type E	(600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °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 (-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C	0.51 °C 0.39 °C 0.35 °C 0.38 °C 0.35 °C 0.3 °C 0.36 °C 0.58 °C 0.97 °C 0.58 °C 0.19 °C 0.16 °C 0.19 °C 0.24 °C		



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Electrical Simulation of Thermocouple Indicators (cont.)			Fluke 5520A	OEM, GIDEP, and Locally Developed Calibration Procedures
Type J	(-210 to -100) °C	0.32 °C		
	(-100 to -30) °C	0.19 °C		
	(-30 to 150) °C	0.17 °C		
	(150 to 760) °C	0.2 °C		
	(760 to 1 200) °C	0.27 °C		
Type K	(-200 to -100) °C	0.38 °C		
	(-100 to -25) °C	0.21 °C		
	(-25 to 120) °C	0.19 °C		
	(120 to 1 000) °C	0.3 °C		
	(1 000 to 1 372) °C	0.46 °C		
Type L	(-200 to -100) °C	0.43 °C		
	(-100 to 800) °C	0.3 °C		
	(800 to 900) °C	0.2 °C		
Type N	(-200 to -100) °C	0.46 °C		
	(-100 to -25) °C	0.25 °C		
	(-25 to 120) °C	0.22 °C		
	(120 to 410) °C	0.21 °C		
	(410 to 1 300) °C	0.31 °C		
Type R	(0 to 250) °C	0.66 °C		
	(250 to 400) °C	0.4 °C		
	(400 to 1 000) °C	0.38 °C		
	(1 000 to 1 767) °C	0.46 °C		



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Type S	(0 to 250) °C	0.54 °C	Fluke 5520A	OEM, GIDEP and Locally developed Calibration Procedures
	(250 to 1 000) °C	0.42 °C		
	(1 000 to 1 400) °C	0.43 °C		
Type "T"	(1 400 to 1 767) °C	0.53 °C		
	(-250 to -150) °C	0.73 °C		
	(-150 to 0) °C	0.28 °C		
	(0 to 120) °C	0.19 °C		
	(120 to 400) °C	0.17 °C		
Type "U"	(-200 to 0) °C	0.65 °C		
	(0 to 600) °C	0.31 °C		
Electrical Simulation of RTDs				
Pt 385 (100 Ω)	(-200 to 0) °C	0.06 °C		
	(0 to 100) °C	0.08 °C		
	(100 to 300) °C	0.1 °C		
	(300 to 400) °C	0.12 °C		
	(400 to 630) °C	0.14 °C		
	(630 to 800) °C	0.27 °C		
Pt 3926 (100 Ω)	(-200 to 0) °C	0.06 °C		
	(0 to 100) °C	0.08 °C		
	(100 to 300) °C	0.1 °C		
	(300 to 400) °C	0.12 °C		
	(400 to 630) °C	0.14 °C		
Pt 3916 (100 Ω)	(-200 to -190) °C	0.29 °C		
	(-190 to -80) °C	0.05 °C		
	(-80 to 0) °C	0.06 °C		
	(0 to 100) °C	0.07 °C		
	(100 to 260) °C	0.08 °C		
	(260 to 300) °C	0.09 °C		
	(300 to 400) °C	0.1 °C		
	(400 to 600) °C	0.12 °C		
	(600 to 630) °C	0.27 °C		



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of RTDs (cont.)			Fluke 5520A	OEM, GIDEP, and Locally Developed Calibration Procedures
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 080) °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		
PtNi 120 (120 Ω)	(-80 to 100) °C (100 to 260) °C	0.09 °C 0.16 °C		



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Calibration of 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 5520A/SC 1100	OEM, GIDEP, and Locally Developed Calibration Procedures
Amplitude Squarewave 50 Ω Load 1 MΩ Load	±1 mV to ±6.6 V p-p 10 Hz to 10 kHz ±1 mV to ±130 V p-p 10 Hz to 1 kHz (1 to 10) kHz	2.5 mV/V + 40 μV 1 mV/V + 40 μV 2.5 mV/V + 40 μV		
Rise Time	<300 ps	+0 ps/ -100 ps		
Leveled Sine Wave Relative to 50 kHz [5 mV to 5.5 V] p-p	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	35 μV/V + 300 μV 40 μV/V + 300 μV 60 μV/V + 300 μV		
Time Marker into 50 Ω Load-Source	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 50 Ω load Range (p-p)	≤ 350 ps 5 mV to 2.5 V	(0 /-100) ps 20 mV/V + 200 μV		
Wave Generator – Source Amplitude (10 Hz to 10 kHz) Square, Sine, Triangle into 1 MΩ Square, Sine, Triangle into 50 Ω	1.8 mV to 55 Vp-p 1.8 mV to 2.5 Vp-p	30 mV/V + 100 μV 30 mV/V + 100 μV		



II. Electromagnetic – RF/Microwave

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power – Source	(+13 to -120) dBm 10 kHz to 1.28 GHz (-120 to -130) dBm 10 kHz to 1.28 GHz	1.1 dB 3.1 dB	HP 8663A	OEM, GIDEP, and Locally Developed Calibration Procedures
RF Power – Measure	(+30 to -20) dBm 100 kHz to 2 GHz (2 to 26.5) GHz (+20 to -30) dBm 100 kHz to 4.2 GHz 50 MHz to 26.5 GHz (+35 to -10) dBm 10 MHz to 18 GHz (-20 to -70) dBm 10 MHz to 18 GHz	0.07 dB 0.08 dB 3.4 % 3.4 % 3.5 % 3.9 %	HP 8902A w/ HP 11722A HP 8902A w/HP 11792A and HP 11793A HP 438A w/ HP 8482A HP 438A w/ HP 8485A HP 438A w/ HP 8481H HP 438A w/ HP 8484H	
RF Attenuation – Measure (0 to -10) dBm (-10 to -40) dBm (-40 to -50) dBm (-50 to -80) dBm (-80 to -90) dBm (-90 to -110) dBm (-110 to -127) dBm	2.5 MHz to 26.5 GHz 2.5 MHz to 26.5 GHz 2.5 MHz to 26.5 GHz 2.5 MHz to 26.5 GHz 2.5 MHz to 26.5 GHz 2.5 MHz to 26.5 GHz 2.5 MHz to 26.5 GHz	0.02 dB 0.05 dB 0.12 dB 0.15 dB 0.25 dB 0.27 dB 0.42 dB	HP 8902A w/ HP 11722A, HP 11792A and HP 11793A	
Phase Modulation – Measure Rate: 200 Hz to 10 kHz Rate: 200 Hz to 20 kHz	150 kHz to 10 MHz 10 MHz to 26.5 GHz	4.2 % + 1 digit 3.3 % + 1 digit	HP 8902A w/ HP 11722A, HP 11792A and HP 11793A	
Amplitude Modulation – Measure Rate: 50 Hz to 10 kHz Depths: (5 to 99) % Rate: 20 Hz to 10 kHz Depths: (5 to 99) % Rate: 50 Hz to 50 kHz Depths: (5 to 99) % Rate: 20 Hz to 100 kHz Depths: (5 to 99) %	150 kHz to 10 MHz 150 kHz to 10 MHz 10 MHz to 1.3 GHz (1.3 to 26.5) GHz 10 MHz to 26.5 GHz	2 % + 1 digit 3.1 % + 1 digit 1 % + 1 digit 1.5 % + 1 digit 3.1 % + 1 digit	HP 8902A w/ HP 11722A HP 8902A w/ HP 11722A HP 8902A w/ HP 11722A, HP 11793A, HP 11792A HP 8902A w/ HP 11722A, HP 11793A, HP 11792A	

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency Modulation – Measure Rate: 20 Hz to 10 kHz Deviation: ≤40 kHz peak Rate: 50 Hz to 100 kHz Deviation: ≤400 kHz peak Rate: 20 Hz to 200 kHz Deviation: ≤400 kHz peak Rate: 50 Hz to 100 kHz Deviation: ≤400 kHz peak	250 Hz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 26.5 GHz 10 MHz to 26.5 GHz	2.1 % + 1 digit 1.1 % + 1 digit 5.1 % + 1 digit 1.1 % + 1 digit	HP 8902A w/ HP 11722A HP 8902A w/ HP 11722A HP 8902A w/ HP 11722A, HP 11793A, HP 11792A	OEM, GIDEP, and Locally Developed Calibration Procedures

III. Time & Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency – Source*	10 MHz	5.2 parts in 10^{-12}	Datum 9390	OEM, GIDEP, and Locally Developed Calibration Procedures
Frequency – Source	0.01 Hz to 2 MHz	2.6 μHz/Hz + 5 μHz	Fluke 5520A	
Frequency – Measure	150 kHz to 1.3 GHz Up to 200 MHz	0.7 μHz/Hz 0.09 μHz/Hz	HP 8902A HP 5335A	
Frequency – Measure	40 Hz to 10 MHz	100 μHz/Hz	HP 3458A	



IV. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature– Source*	(-20 to 300) °C	0.025 °C	Rosemount 162N PRT w/ Hart 1502A Tweener in liquid baths	OEM, GIDEP, and Locally Developed Calibration Procedures
Temperature– Measure*	(-40 to 420) °C	0.027 °C	Rosemount 162N PRT w/ Hart 1502A Tweener	
Temperature– Measure	(-10 to 60) °C	0.24 °C	HygroPalm 2	

V. Mechanical

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure – Nitrogen Pressure Standards*	(0.2 to 1 000) psi	0.0015 % of reading	Ruska 2465	OEM, GIDEP, and Locally Developed Calibration Procedures
Pressure Gages*	(100 to 4 000) psi (100 to 14 000) psi	0.006 % of reading 0.008 % of reading	Ruska 2452 w/ 2413 Separator	
Pressure Gages	(0 to 500) psi (0 to 1 000) psia	0.01 % of full scale 0.01 % of full scale	Mensor 5014	
Pressure – Hydraulic Pressure Standards* ⁶	(100 to 4 000) psi (400 to 40 000) psi	0.006 % of reading 0.008 % of reading	Ruska 2452	OEM, GIDEP, and Locally Developed Calibration Procedures
Pressure Gages* ⁶	(0 to 500) psi (0 to 1 000) psia	0.01 % of full scale 0.01 % of full scale	Mensor 5014	
Vibration* ⁶	(5 to 7) Hz (10 to 50) Hz (100 to 160) Hz (300 to 920) Hz (1.5 to 5.0) kHz (6.3 to 10.0) KHz	1.3 % 0.9 % 0.7 % 0.8 % 2.1 % 3.4 %	Standard Accelerometers	

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Scales and Balances	Up to 50 g (50 to 100) g (100 to 200) g (200 to 500) g 500 g to 1 kg (1 to 2) kg (2 to 5) kg (5 to 10) kg (10 to 20) kg	0.19 mg 0.29 mg 0.52 mg 1.94 mg 2.93 mg 5.23 mg 19.43 mg 29.3 mg 52.28 mg	Class 1 Weights	OEM, GIDEP, and Locally Developed Calibration Procedures

VII. Dimensional

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Micrometers	Up to 12 in (12 to 36) in	(30 + 3.1L) μ in (63 + 4.4L) μ in	Grade 2 Gage Blocks with Optical parallels	OEM, GIDEP, and Locally Developed Calibration Procedures
Calipers	Up to 12 in (12 to 40) in	(81 + 2L) μ in (95 + 4L) μ in	Grade 2 Gage Blocks	
Height Gages	Up to 24 in	(78 + 2.6L) μ in	Grade 2 Gage Blocks with Surface Plate	
Dial Indicators	Up to 0.2 in	48.6 μ in	Indicator Calibrator	

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 both in-laboratory and field (on-site) calibration services. Since field conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected in the field than what is reported on the accredited scope.
3. Capabilities denoted by an asterisk (*) are laboratory-only, not available for field calibration activity.
4. The use of (L) signifies an expression of Length in inches.
5. The use of (t) signifies an expression of Time in seconds
6. Calibrations are performed at the laboratory's facility located at 1 Newmann Way, Cincinnati, OH 45215.
7. This scope is part of and must be included with the Certificate of Accreditation No. AC-1279

Karl Greenway

Vice President

