



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

**Davis Calibration**

171 South Gary Avenue Carol Stream, IL 60188  
Jeffrey Cea Phone: 630-933-7905

CALIBRATION

Valid to: June 12, 2012

Certificate Number: AC-1271

**I. Electrical - DC/Low Frequency**

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	20 $\mu$ V/V + 1 $\mu$ V 11 $\mu$ V/V + 2 $\mu$ V 12 $\mu$ V/V + 20 $\mu$ V 18 $\mu$ V/V + 150 $\mu$ V 18 $\mu$ V/V + 1.5 mV	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed 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	5.5 $\mu$ V/V + 300 nV 5.1 $\mu$ V/V + 300 nV 4.6 $\mu$ V/V + 500 nV 6.5 $\mu$ V/V + 30 $\mu$ V 16.5 $\mu$ V/V + 100 $\mu$ V	HP 3458A Opt 002	
DC Current - Source	Up to 330 nA 330 nA to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	150 $\mu$ A/A + 20 nA 100 $\mu$ A/A + 50 nA 100 $\mu$ A/A + 250 nA 100 $\mu$ A/A + 2.5 $\mu$ A 200 $\mu$ A/A + 40 $\mu$ A 380 $\mu$ A/A + 40 $\mu$ A 500 $\mu$ A/A + 500 $\mu$ A 1 mA/A + 750 $\mu$ A	Fluke 5520A-SC1100	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Current - Measure	(10 to 100) $\mu$ A 100 $\mu$ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	20 $\mu$ A/A + 800 pA 20 $\mu$ A/A + 5 nA 20 $\mu$ A/A + 50 nA 35 $\mu$ A/A + 500 nA 105 $\mu$ A/A + 10 $\mu$ A	HP 3458A Opt 002	
AC Voltage - Source	<b>Up to 33 mV</b> (10 to 45) Hz 45 to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz <b>(33 to 330) mV</b> (10 to 45) Hz 45 to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz <b>330 mV to 3.3 V</b> (10 to 45) Hz 45 to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz <b>(3.3 to 33) V</b> (10 to 45) Hz 45 to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz <b>(33 to 330) V</b> (10 to 45) Hz 45 to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	550 $\mu$ V/V + 4.5 $\mu$ V 210 $\mu$ V/V + 4.5 $\mu$ V 105 $\mu$ V/V + 4.5 $\mu$ V 370 $\mu$ V/V + 4.5 $\mu$ V 850 $\mu$ V/V + 7 $\mu$ V 1.1 mV/V + 13 $\mu$ V  300 $\mu$ V/V + 8 $\mu$ V 145 $\mu$ V/V + 8 $\mu$ V 160 $\mu$ V/V + 8 $\mu$ V 350 $\mu$ V/V + 8 $\mu$ V 800 $\mu$ V/V + 32 $\mu$ V 2 mV/V + 70 $\mu$ V  300 $\mu$ V/V + 50 $\mu$ V 150 $\mu$ V/V + 60 $\mu$ V 190 $\mu$ V/V + 60 $\mu$ V 300 $\mu$ V/V + 50 $\mu$ V 700 $\mu$ V/V + 125 $\mu$ V 2.4 mV/V + 600 $\mu$ V  30 $\mu$ V/V + 650 $\mu$ V 150 $\mu$ V/V + 600 $\mu$ V 240 $\mu$ V/V + 600 $\mu$ V 350 $\mu$ V/V + 600 $\mu$ V 900 $\mu$ V/V + 1.6 mV  190 $\mu$ V/V + 2 mV 200 $\mu$ V/V + 6 mV 250 $\mu$ V/V + 6 mV 300 $\mu$ V/V + 6 mV 2 mV/V + 50 mV	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed Procedures



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Source (cont.)	<b>220 V to 1.1 kV</b> 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	300 $\mu$ V/V + 10 mV 250 $\mu$ V/V + 10 mV 300 $\mu$ V/V + 10 mV	Fluke 5520A-SC1100	
AC Voltage - Measure	<b>(1 to 10) mV</b> (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 <b>(10 to 100) mV</b> (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 <b>100 mV to 1 V</b> (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	300 $\mu$ V/V + 3 $\mu$ V 200 $\mu$ V/V + 1.1 $\mu$ V 300 $\mu$ V/V + 1.1 $\mu$ V 1 mV/V + 1.1 $\mu$ V 5 mV/V + 1.1 $\mu$ V 40 mV/V + 2 $\mu$ V 12 mV/V + 5 $\mu$ V 70 mV/V + 7 $\mu$ V 200 mV/V + 8 $\mu$ V  72 $\mu$ V/V + 4 $\mu$ V 72 $\mu$ V/V + 2 $\mu$ V 142 $\mu$ V/V + 2 $\mu$ V 302 $\mu$ V/V + 2 $\mu$ V 802 $\mu$ V/V + 2 $\mu$ V 30 mV/V + 10 $\mu$ V 10 mV/V + 10 $\mu$ V 15 mV/V + 10 $\mu$ V 40 mV/V + 8 $\mu$ V 150 mV/V + 100 $\mu$ V  72 $\mu$ V/V + 40 $\mu$ V 72 $\mu$ V/V + 20 $\mu$ V 142 $\mu$ V/V + 20 $\mu$ V 302 $\mu$ V/V + 20 $\mu$ V 802 $\mu$ V/V + 20 $\mu$ V 3 mV/V + 100 $\mu$ V 10 mV/V + 100 $\mu$ V 15 mV/V + 100 $\mu$ V 40 mV/V + 800 $\mu$ V 150 mV/V + 1 mV	HP 3458A Opt 002	OEM or GIDEP Sourced or Locally Developed Procedures



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Measure (cont.)	<b>(1 to 10) V</b> (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 <b>(10 to 100) V</b> (1 to 40) Hz 40Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz <b>100 V to 1 kV</b> (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	72 $\mu$ V/V + 400 $\mu$ V 72 $\mu$ V/V + 200 $\mu$ V 142 $\mu$ V/V + 200 $\mu$ V 302 $\mu$ V/V + 200 $\mu$ V 802 $\mu$ V/V + 200 $\mu$ V 3 mV/V + 1 mV 10 mV/V + 1 mV 15 mV/V + 1 mV 40 mV/V + 8 mV 150 mV/V + 10 mV  0.2 mV/V + 4 mV 0.2 mV/V + 2 mV 0.2 mV/V + 2 mV 0.35 mV/V + 2 mV 1.2 mV/V + 2 mV 4.0. mV/V + 10 mV 15 mV/V + 10 mV  400 $\mu$ V/V + 40 mV 400 $\mu$ V/V + 20 mV 600 $\mu$ V/V + 20 mV 1.2 mV/V + 20 mV 3 mV/V + 20 mV	HP 3458A Opt 002	OEM or GIDEP Sourced or Locally Developed Procedures
AC Current - Source	<b>(29 to 330) <math>\mu</math>A</b> (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	2 mA/A + 100 nA 1.5 mA/A +100 nA 1.25 mA/A + 100 nA 3 mA/A + 150 nA 8 mA/A +200 nA 16 mA/A + 400 nA	Fluke 5520A-SC1100	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current - Source (cont.)	<b>330 <math>\mu</math>A to 3.3 mA</b>	2 mA/A + 150 nA	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed Procedures
	(10 to 20) Hz	1.25 mA/A + 150 nA		
	(20 to 45) Hz	1 mA/A + 150 nA		
	45 Hz to 1 kHz	2 mA/A + 200 nA		
	(1 to 5) kHz	5 mA/A + 300 nA		
	(5 to 10) kHz	10 mA/A + 600 nA		
	(10 to 30) kHz			
	<b>(3.3 to 33) mA</b>	1.8 mA/A + 2 $\mu$ A		
	(10 to 20) Hz	900 $\mu$ A/A + 2 $\mu$ A		
	(20 to 45) Hz	400 $\mu$ A/A + 2 $\mu$ A		
	45 Hz to 1 kHz	800 $\mu$ A/A + 2 $\mu$ A		
	(1 to 5) kHz	2 mA/A + 3 $\mu$ A		
	(5 to 10) kHz	4 mA/A + 4 $\mu$ A		
	(10 to 30) kHz			
	<b>(33 to 330) mA</b>	1.8 mA/A + 20 $\mu$ A		
	(10 to 20) Hz	900 $\mu$ A/A + 20 $\mu$ A		
	(20 to 45) Hz	400 $\mu$ A/A + 20 $\mu$ A		
	45 Hz to 1 kHz	1 mA/A + 50 $\mu$ A		
	(1 to 5) kHz	2 mA/A + 100 $\mu$ A		
	(5 to 10) kHz	4 mA/A + 200 $\mu$ A		
	(10 to 30) kHz			
<b>330 mA to 1.1 A</b>	1.8 mA/A + 100 $\mu$ A			
(10 to 45) Hz	500 $\mu$ A/A + 100 $\mu$ A			
45 Hz to 1kHz	60 mA/A + 1 mA			
(1 to 5) kHz	25 mA/A + 5 mA			
(5 to 10) kHz				
<b>(1.1 to 3) A</b>	1.8 mA/A + 100 $\mu$ A			
(10 to 45) Hz	600 $\mu$ A/A + 100 $\mu$ A			
45 Hz to 1kHz	60 mA/A + 1 mA			
(1 to 5) kHz	25 mA/A + 5 mA			
(5 to 10) kHz				
<b>(3 to 11) A</b>	600 $\mu$ A/A + 2 mA			
(40 to 100) Hz	1 mA/A + 2 mA			
100 Hz to 1 kHz	30 mA/A + 2 mA			
(1 to 50 kHz)				

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current - Source (cont.)	<b>(11 to 20.5) A</b> (40 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	1.2 mA/A + 5 mA 1.5 mA/A + 5 mA 30 mA/A + 5 mA	Fluke 5520A-SC1100	
AC Current - Measure	<b>(5 to 100) <math>\mu</math>A</b> (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz <b>100 <math>\mu</math>A to 1 mA</b> (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 <b>(1 to 10) mA</b> (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 <b>(10 to 100) mA</b> (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	4 mA/A + 30 nA 1.5 mA/A + 30 nA 600 $\mu$ A/A + 30 nA 600 $\mu$ A/A + 30 nA 4 mA/A + 200 nA 1.5 mA/A + 200 nA 600 $\mu$ A/A + 200 nA 300 $\mu$ A/A + 200 nA 600 $\mu$ A/A + 200 nA 4 mA/A + 400 nA 5.5 mA/A + 1.5 $\mu$ A 4 mA/A + 2 $\mu$ A 1.5 mA/A + 2 $\mu$ A 600 $\mu$ A/A + 2 $\mu$ A 300 $\mu$ A/A + 2 $\mu$ A 600 $\mu$ A/A + 2 $\mu$ A 4 mA/A + 4 $\mu$ A 5.5 mA/A + 15 $\mu$ A 4 mA/A + 20 $\mu$ A 1.5 mA/A + 20 $\mu$ A 600 $\mu$ A/A + 20 $\mu$ A 300 $\mu$ A/A + 20 $\mu$ A 600 $\mu$ A/A + 20 $\mu$ A 4 mA/A + 40 $\mu$ A 5.5 mA/A + 150 $\mu$ A	HP 3458A Opt 002	OEM or GIDEP Sourced or Locally Developed Procedures

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current - Measure (cont.)	<b>100 mA to 1 A</b> (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 $\mu$ A 1.6 mA/A + 200 $\mu$ A 800 $\mu$ A/A + 200 $\mu$ A 1 mA/A + 200 $\mu$ A 3 mA/A + 200 $\mu$ A 10 mA/A + 400 $\mu$ A	HP 3458A OPT 002	OEM or GIDEP Sourced or Locally Developed Procedures
Resistance - Source	Up to 11 $\Omega$ (11 to 33) $\Omega$ (33 to 110) $\Omega$ (110 to 330) $\Omega$ 330 $\Omega$ to 1.1 k $\Omega$ (1.1 to 3.3) k $\Omega$ (3.3 to 11) k $\Omega$ (11 to 33) k $\Omega$ (33 to 110) k $\Omega$ (110 to 330) k $\Omega$ 330 k $\Omega$ to 1.1 M $\Omega$ (1.1 to 3.3) M $\Omega$ (3.3 to 11) M $\Omega$ (11 to 33) M $\Omega$ (33 to 110) M $\Omega$ (110 to 330) M $\Omega$ 330 M $\Omega$ to 1.1 G $\Omega$	40 $\mu\Omega$ / $\Omega$ + 1 m $\Omega$ 30 $\mu\Omega$ / $\Omega$ + 1.5 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 1.4 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 2 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 2 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 20 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 20 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 200 m $\Omega$ 28 $\mu\Omega$ / $\Omega$ + 200 m $\Omega$ 32 $\mu\Omega$ / $\Omega$ + 2 $\Omega$ 32 $\mu\Omega$ / $\Omega$ + 2 $\Omega$ 60 $\mu\Omega$ / $\Omega$ + 30 $\Omega$ 130 $\mu\Omega$ / $\Omega$ + 50 $\Omega$ 250 $\mu\Omega$ / $\Omega$ + 2.5 k $\Omega$ 500 $\mu\Omega$ / $\Omega$ + 3 k $\Omega$ 3 m $\Omega$ / $\Omega$ + 100 k $\Omega$ 15 m $\Omega$ / $\Omega$ + 500 k $\Omega$	Fluke 5520A-SC1100	
Resistance - Measure	Up to 10 $\Omega$ (10 to 100) $\Omega$ 100 $\Omega$ to 1 k $\Omega$ (1 to 10) k $\Omega$ (10 to 100) k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ (1 to 10) M $\Omega$ (10 to 100) M $\Omega$ 100 M $\Omega$ to 1 G $\Omega$	18 $\mu\Omega$ / $\Omega$ + 50 $\mu\Omega$ 13 $\mu\Omega$ / $\Omega$ + 500 $\mu\Omega$ 11 $\mu\Omega$ / $\Omega$ + 500 $\mu\Omega$ 11 $\mu\Omega$ / $\Omega$ + 5 m $\Omega$ 11 $\mu\Omega$ / $\Omega$ + 50 m $\Omega$ 15 $\mu\Omega$ / $\Omega$ + 2 $\Omega$ 53 $\mu\Omega$ / $\Omega$ + 100 $\Omega$ 503 $\mu\Omega$ / $\Omega$ + 1 k $\Omega$ 5 m $\Omega$ / $\Omega$ + 10 k $\Omega$	HP 3458A Opt 002	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of Thermocouple Indicators				
Type B	(600 to 800) °C	0.51 °C		
	(800 to 1 000) °C	0.39 °C		
	(1 000 to 1 550) °C	0.35 °C		
	(1 550 to 1 820) °C	0.38 °C		
Type C	(0 to 150) °C	0.35 °C		
	(150 to 650) °C	0.3 °C		
	(650 to 1 000) °C	0.36 °C		
	(1 000 to 1 800) °C	0.58 °C		
	(1 800 to 2 316) °C	0.97 °C		
Type E	(-250 to -100) °C	0.58 °C		
	(-100 to -25) °C	0.19 °C		
	(-25 to 350) °C	0.16 °C		
	(350 to 650) °C	0.19 °C		
	(650 to 1 000) °C	0.24 °C		
Type J	(-210 to -100) °C	0.32 °C		
	(-100 to -30) °C	0.19 °C	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed Procedures
	(-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		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of Thermocouple Indicators (cont.)				
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		
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		
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	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed Procedures
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 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		

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND 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-SC1100	OEM or GIDEP Sourced or Locally Developed 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 -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		
PtNi 385 (120 Ω)	(-80 to 100) °C (100 to 260) °C	0.09 °C 0.16 °C		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Capacitance - Source 10Hz to 10kHz 10Hz to 10kHz 10Hz to 3kHz 10Hz to 1kHz 10Hz to 1kHz 10Hz to 1kHz 10Hz to 1kHz (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	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 $\mu$ F (1.1 to 3.3) $\mu$ F (3.3 to 11) $\mu$ F (11 to 33) $\mu$ F (33 to 110) $\mu$ F (110 to 330) $\mu$ F 330 $\mu$ F to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	5 mF + 10 pF 5 mF + 10 pF 5 mF + 10 pF 5 mF + 10 pF 2.5 mF + 100 pF 2.5 mF + 100 pF 2.5 mF + 300 pF 2.5 mF + 1 nF 3.5 mF + 3 nF 3.5 mF + 10 nF 4 mF + 30 nF 5 mF + 100 nF 7 mF + 300 nF 10 mF + 300 nF 4.5 mF + 3 $\mu$ F 4.5 mF + 10 $\mu$ F 7.5 mF + 30 $\mu$ F 11 mF + 100 $\mu$ F	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed Procedures
<b>Oscilloscopes</b> Amplitude DC Signal into 50 $\Omega$ Load into 1 M $\Omega$ Load  Amplitude Square Wave 50 $\Omega$ Load  1 M $\Omega$ Load  Leveled Sine Wave - Flatness Relative to 50 kHz [5 mV to 5.5 V]  [5 mV to 3.5 V]	(-6.6 to 6.6) V (-130 to 130) V  1 mV to 6.6 V p-p 10 Hz to 10 kHz  1 mV to 130 V p-p 10 Hz to 10 kHz  50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz 600 MHz to 1.1 GHz	2.5 mV/V + 40 $\mu$ V 500 $\mu$ V/V + 40 $\mu$ V  2.5 mV/V + 40 $\mu$ V  1 mV/V + 40 $\mu$ V  15 mV/V + 100 $\mu$ V 20 mV/V + 100 $\mu$ V 40 mV/V + 100 $\mu$ V 50 mV/V + 100 $\mu$ V		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
<b>Oscilloscopes (cont.)</b> Time Marker into 50 $\Omega$  Edge Specs into 50 $\Omega$ Rise Time Amplitude Frequency  Wave Generator - Amplitude (10 Hz to 10 kHz) Square, Sine, Triangle into 1 M $\Omega$ Square, Sine, Triangle into 50 $\Omega$ Frequency	5 s to 50 ms 20 ms to 100 ns (50 to 20) ns 10 ns (5 to 1) ns  $\leq$ 300 ps 5.0 mV to 2.5V 1 kHz to 10 MHz  1.8 mV to 55 V p-p 1.8 mV to 2.5 V p-p 10 Hz to 100 kHz	(25 + 1 000t) parts in 10 <sup>6</sup> 2.5 parts in 10 <sup>6</sup> 2.5 parts in 10 <sup>6</sup> 2.5 parts in 10 <sup>6</sup> 2.5 parts in 10 <sup>6</sup>  0 ps /-100 ps 20 mV/V + 200 $\mu$ V 2.5 parts in 10 <sup>6</sup> of setting  30 mV/V + 100 $\mu$ V 30 mV/V + 100 $\mu$ V 25 parts in 10 <sup>6</sup> + 15 mHz	Fluke 5520A-SC1100	OEM or GIDEP Sourced or Locally Developed Procedures
DC Power - Source 33 V to 1 kV	330 $\mu$ A to 330 mA 330 mA to 3 A (3 to 20.5) A	0.02 % of Watts Output 0.02 % of Watts Output 0.07 % of Watts Output		
AC Power - Source (33 to 330) mV  330 mV to 1.02 kV	<b>(45 to 65) Hz, P=1</b> (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  (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	0.14 % 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  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		



## II. Time and Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency - Source	0.01 Hz to 2 MHz 10 MHz	2.6 $\mu$ Hz/Hz + 5 $\mu$ Hz 1 part in $10^{-9}$	Fluke 5520A-SC1100 Efratom M100	OEM or GIDEP Sourced or Locally Developed
Frequency - Measure	DC to 1.3GHz	1 part in $10^{-9}$	Efratom M100 w/ HP 53132A	

## III. Dimensional

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY ( $\pm$ )]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Micrometers	Up to 12 in (12 to 36) in	(60 + 5L) $\mu$ in (120 + 8L) $\mu$ in	Grade 2 Gage Blocks	OEM or GIDEP Sourced or Locally Developed Procedures
Calipers	Up to 12 in (12 to 40) in	150 $\mu$ in (150 + 10L) $\mu$ in		
Indicators	Up to 6 in	(50 + 0.5L) $\mu$ in	Pratt & Whitney Supermicrometer with Grade 2 Gage Blocks	
*Plain Plug and Pin Gages	Up to 8 in	(35 + 4L) $\mu$ in		
*Thread Plugs	Up to 5 in	150 $\mu$ in	Pratt & Whitney Supermicrometer with Grade 2 Gage Blocks and Thread Wires	

**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 services 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 does not include estimated contributions to uncertainty from a "best available" unit under test.
5. The use of (L) signifies an expression of Length in inches.
6. The use of (t) signifies an expression of Time in seconds.
7. This scope is part of and must be included with the Certificate of Accreditation No. AC-1271.

*Karl Greenway*

\_\_\_\_\_  
Vice President