



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

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**CALIBRATION**

Valid to: April 17, 2010

Certificate Number: AC-1217

**I. Electromagnetic DC/Low Frequency**

<b>PARAMETER / EQUIPMENT</b>	<b>RANGE</b>	<b>BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]</b>	<b>REFERENCE STANDARD OR EQUIPMENT</b>	<b>METHODS</b>
DC Volts - Source	(0 to 220) mV 200 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1 100) V	9 $\mu$ V/V + 0.80 $\mu$ V 8 $\mu$ V/V + 1.2 $\mu$ V 8 $\mu$ V/V + 4 $\mu$ V 8 $\mu$ V/V + 8 $\mu$ V 9 $\mu$ V/V + 100 $\mu$ V 11 $\mu$ V/V + 600 $\mu$ V	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
DC Current - Source	(0 to 2.2) mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A (2.2 to 11) A	60 $\mu$ A/A + 10 nA 60 $\mu$ A/A + 100 nA 70 $\mu$ A/A + 1 $\mu$ A 95 $\mu$ A/A + 30 $\mu$ A 360 $\mu$ A/A + 0.48 mA	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
AC Voltage - Source	<b>(0 to 2.2) mV</b> (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	600 $\mu$ V/V + 5 $\mu$ V 240 $\mu$ V/V + 5 $\mu$ V 120 $\mu$ V/V + 5 $\mu$ V 410 $\mu$ V/V + 5 $\mu$ V 950 $\mu$ V/V + 8 $\mu$ V 1 300 $\mu$ V/V + 15 $\mu$ V 1 800 $\mu$ V/V + 30 $\mu$ V 3 600 $\mu$ V/V + 30 $\mu$ V	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
AC Voltage - Source	<b>2.2 mV to 22 mV</b> (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	600 $\mu$ V/V + 6 $\mu$ V 240 $\mu$ V/V + 6 $\mu$ V 120 $\mu$ V/V + 6 $\mu$ V 410 $\mu$ V/V + 6 $\mu$ V 950 $\mu$ V/V + 8 $\mu$ V 1300 $\mu$ V/V + 15 $\mu$ V 1800 $\mu$ V/V + 30 $\mu$ V 3 600 $\mu$ V/V + 30 $\mu$ V	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
AC Voltage - Source	<b>(22 to 220) mV</b> (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	600 $\mu\text{V}/\text{V} + 16 \mu\text{V}$ 240 $\mu\text{V}/\text{V} + 10 \mu\text{V}$ 110 $\mu\text{V}/\text{V} + 10 \mu\text{V}$ 360 $\mu\text{V}/\text{V} + 10 \mu\text{V}$ 900 $\mu\text{V}/\text{V} + 30 \mu\text{V}$ 1 100 $\mu\text{V}/\text{V} + 30 \mu\text{V}$ 1 800 $\mu\text{V}/\text{V} + 40 \mu\text{V}$ 3 600 $\mu\text{V}/\text{V} + 100 \mu\text{V}$	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
	<b>220 mV to 2.2 V</b> (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	600 $\mu\text{V}/\text{V} + 100 \mu\text{V}$ 180 $\mu\text{V}/\text{V} + 30 \mu\text{V}$ 85 $\mu\text{V}/\text{V} + 7 \mu\text{V}$ 140 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 280 $\mu\text{V}/\text{V} + 80 \mu\text{V}$ 480 $\mu\text{V}/\text{V} + 150 \mu\text{V}$ 1 200 $\mu\text{V}/\text{V} + 400 \mu\text{V}$ 2 400 $\mu\text{V}/\text{V} + 1 \text{ mV}$	Fluke 5700A/5725A	
	<b>(2.2 to 22) V</b> (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	600 $\mu\text{V}/\text{V} + 1 \text{ mV}$ 180 $\mu\text{V}/\text{V} + 300 \mu\text{V}$ 85 $\mu\text{V}/\text{V} + 70 \mu\text{V}$ 140 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 280 $\mu\text{V}/\text{V} + 400 \mu\text{V}$ 600 $\mu\text{V}/\text{V} + 1.7 \text{ mV}$ 1 400 $\mu\text{V}/\text{V} + 5 \text{ mV}$ 3 000 $\mu\text{V}/\text{V} + 9 \text{ mV}$	Fluke 5700A/5725A	
	<b>(22 to 220) V</b> (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	600 $\mu\text{V}/\text{V} + 10 \text{ mV}$ 180 $\mu\text{V}/\text{V} + 3 \text{ mV}$ 90 $\mu\text{V}/\text{V} + 1 \text{ mV}$ 250 $\mu\text{V}/\text{V} + 4 \text{ mV}$ 600 $\mu\text{V}/\text{V} + 10 \text{ mV}$ 1 600 $\mu\text{V}/\text{V} + 110 \text{ mV}$ 5 400 $\mu\text{V}/\text{V} + 110 \text{ mV}$ 1.30% + 220 mV	Fluke 5700A/5725A	
	<b>(220 to 1100) V</b> 40 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz	90 $\mu\text{V}/\text{V} + 4 \text{ mV}$ 165 $\mu\text{V}/\text{V} + 6 \text{ mV}$ 600 $\mu\text{V}/\text{V} + 11 \text{ mV}$	Fluke 5700A/5725A	

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AC Current - Source	<p><b>(0 to 220) <math>\mu</math>A</b>  (10 to 20) Hz  (20 to 40) Hz  40 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz</p> <p><b>220 <math>\mu</math>A to 2.2 mA</b>  (10 to 20) Hz  (20 to 40) Hz  40 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz</p> <p><b>2.2 mA to 22 mA</b>  (10 to 20) Hz  (20 to 40) Hz  40 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz</p> <p><b>(22 to 220) mA</b>  (10 to 20) Hz  (20 to 40) Hz  40 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz</p> <p><b>220 mA to 2.2 A</b>  40 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz</p> <p><b>(2.2 to 11) A</b>  40 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz</p>	<p>800 <math>\mu</math>A/A + 30 nA  420 <math>\mu</math>A/A + 25 nA  160 <math>\mu</math>A/A + 20 nA  700 <math>\mu</math>A/A + 50 nA  1 800 <math>\mu</math>A/A + 100 nA</p> <p>800 <math>\mu</math>A/A + 50 nA  420 <math>\mu</math>A/A + 40 nA  160 <math>\mu</math>A/A + 40 nA  700 <math>\mu</math>A/A + 500 nA  1 800 <math>\mu</math>A/A + 1 <math>\mu</math>A</p> <p>800 <math>\mu</math>A/A + 500 nA  420 <math>\mu</math>A/A + 400 nA  160 <math>\mu</math>A/A + 400 nA  700 <math>\mu</math>A/A + 5 <math>\mu</math>A  1 800 <math>\mu</math>A/A + 10 <math>\mu</math>A</p> <p>800 <math>\mu</math>A/A + 5 <math>\mu</math>A  420 <math>\mu</math>A/A + 4 <math>\mu</math>A  180 <math>\mu</math>A/A + 4 <math>\mu</math>A  700 <math>\mu</math>A/A + 50 <math>\mu</math>A  1 800 <math>\mu</math>A/A + 100 <math>\mu</math>A</p> <p>750 <math>\mu</math>A/A + 40 <math>\mu</math>A  850 <math>\mu</math>A/A + 100 <math>\mu</math>A  10 mA/A + 200 <math>\mu</math>A</p> <p>460 <math>\mu</math>A/A + 170 <math>\mu</math>A  950 <math>\mu</math>A/A + 380 <math>\mu</math>A  3 600 <math>\mu</math>A/A + 750 <math>\mu</math>A</p>	<p>Fluke 5700A/5725A</p> <p>Fluke 5700A/5725A</p> <p>Fluke 5700A/5725A</p> <p>Fluke 5700A/5725A</p> <p>Fluke 5700A/5725A</p> <p>Fluke 5700A/5725A</p>	<p>OEM and GIDEP Sourced Procedures</p>



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
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	110 μΩ/Ω 110 μΩ/Ω 33 μΩ/Ω 31 μΩ/Ω 20 μΩ/Ω 20 μΩ/Ω 15 μΩ/Ω 15 μΩ/Ω 14 μΩ/Ω 14 μΩ/Ω 16 μΩ/Ω 16 μΩ/Ω 23 μΩ/Ω 24 μΩ/Ω 46 μΩ/Ω 55 μΩ/Ω 130 μΩ/Ω	Fluke 5700A/5725A	OEM and GIDEP Sourced Procedures
Capacitance Source *	(0 to 11) nF 11 nF to 1.1 μF (1.1 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF 330 μF to 1.1 mF	5 mF/F + 0.01 nF 2.5 mF/F + 1 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	OEM and GIDEP Sourced Procedures
Thermocouple Simulation				
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C	0.27 °C 0.16 °C 0.14 °C 0.17 °C 0.23 °C	Fluke 5500A	OEM and GIDEP Sourced Procedures
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	0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.40 °C		
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		



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RTD Simulation Pt 385, 100 Ω	(-200 to -80) °C	0.05 °C	Fluke 5500A	OEM and GIDEP Sourced Procedures
	(-80 to 0) °C	0.05 °C		
	(0 to 100) °C	0.07 °C		
	(100 to 300) °C	0.09 °C		
	(300 to 400) °C	0.10 °C		
	(400 to 630) °C	0.12 °C		
	(630 to 800) °C	0.23 °C		
Pt 3926, 100 Ω	(-200 to -80) °C	0.05 °C		
	(-80 to 0) °C	0.05 °C		
	(0 to 100) °C	0.07 °C		
Pt 3926, 100 Ω	(100 to 300) °C	0.09 °C		
	(300 to 400) °C	0.10 °C		
	(400 to 630) °C	0.12 °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	0.10 °C			
Pt 385, 200 Ω	(-190 to -80) °C	0.02 °C		
	(-80 to 0) °C	0.04 °C		
	(0 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			
Pt 385, 500 Ω	(-190 to -80) °C	0.01 °C		
	(-80 to 0) °C	0.05 °C		
	(0 to 100) °C	0.05 °C		
	(100 to 260) °C	0.06 °C		
	(260 to 300) °C	0.08 °C		
	(300 to 400) °C	0.08 °C		
	(400 to 600) °C	0.09 °C		
(600 to 630) °C	0.11 °C			



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
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	Fluke 5500A	OEM and GIDEP Sourced Procedures
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		
DC Power - Source	33mV to 1020 V (3.3 to 330) mA (0.33 to 11) A	0.05 % 0.14 %	Fluke 5500A  PF = 1	OEM and GIDEP Sourced Procedures
AC Power - Source	<b>(45 to 65) Hz</b> (3.3 to 330) mV Output (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (0.33 to 0.9) A (0.9 to 2.2) A (2.2 to 4.5) A (3.5 to 11) A  (0.33 to 1 020) V Output (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (0.33 to 0.9) A (0.9 to 2.2) A (2.2 to 4.5) A (3.5 to 11) A	0.40 % 0.25 % 0.35 % 0.25 % 0.35 % 0.25 % 0.35 % 0.25 %  0.25 % 0.15 % 0.25 % 0.15 % 0.25 % 0.15 % 0.20 % 0.15 %	Fluke 5500A  PF = 1	OEM and GIDEP Sourced Procedures
Phase - Source	10 Hz to 65 Hz (0 to 179) Degrees	0.15 Degree	Fluke 5500A	OEM and GIDEP Sourced Procedures
DC Volts - Measure	100 mV 1.0 V 10 V 100 V 1000 V	11 μV/V + 1 μV 10 μV/V + 1 μV 10 μV/V + 2 μV 12 μV/V + 30 μV 12 μV/V + 100 μV	HP 3458A	OEM and GIDEP Sourced Procedures

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AC Voltage - Measure	<b>(0 to 10) mV</b>	% Reading. + % Range	HP 3458A	OEM and GIDEP Sourced Procedures
	(1 to 40) Hz	0.03 + 0.03		
	40 Hz to 1 kHz	0.02 + 0.011		
	(1 to 20) kHz	0.03 + 0.011		
	(20 to 50) kHz	0.10 + 0.011		
	(50 to 100) kHz	0.50 + 0.011		
	(100 to 300) kHz	4.0 + 0.02		
	<b>10 mV to 10 V</b>	% Reading. + % Range		
	(1 to 40) Hz	0.007 + 0.004		
	40 Hz to 1 kHz	0.007 + 0.002		
	(1 to 20) kHz	0.014 + 0.002		
	(20 to 50) kHz	0.03 + 0.002		
	(50 to 100) kHz	0.08 + 0.002		
	(100 to 300) kHz	0.30 + 0.01		
	300 kHz to 1 MHz	1.00 + 0.01		
	(1 to 2) MHz	1.5 + 0.01		
<b>(10 to 100) V</b>	% Reading. + % Range			
(1 to 40) Hz	0.02 + 0.004			
40 Hz to 1 kHz	0.02 + 0.002			
(1 to 20) kHz	0.02 + 0.002			
(20 to 50) kHz	0.035 + 0.002			
(50 to 100) kHz	0.12 + 0.002			
(100 to 300) kHz	0.4 + 0.01			
300 kHz to 1 MHz	1.5 + 0.01			
<b>(100 to 1 000) V</b>	% Reading. + % Range			
(1 to 40) Hz	0.04 + 0.004			
40 Hz to 1 kHz	0.04 + 0.002			
(1 to 20) kHz	0.06 + 0.002			
(20 to 50) kHz	0.12 + 0.002			
(50 to 100) kHz	0.30 + 0.002			
DC Current - Measure	100 nA	30 $\mu$ A/A + 0.04 nA	HP 3458A	OEM and GIDEP Sourced Procedures
	1 $\mu$ A	20 $\mu$ A/A + 0.04 nA		
	10 $\mu$ A	20 $\mu$ A/A + 100 nA		
	100 $\mu$ A	20 $\mu$ A/A + 800 nA		
	1 mA	20 $\mu$ A/A + 5 $\mu$ A		
	10 mA	20 $\mu$ A/A + 50 $\mu$ A		
	100 mA	35 $\mu$ A/A + 500 $\mu$ A		
	1 A	110 $\mu$ A/A + 0.10 mA		



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
AC Current - Measure	<b>(0 to 100) <math>\mu</math>A</b> (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz  <b>(0.1 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  <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	% Reading + % Range 0.4 + 0.02 0.15 + 0.02 0.06 + 0.02 0.06 + 0.02  0.4 + 0.02 0.15 + 0.02 0.06 + 0.02 0.03 + 0.02 0.06 + 0.02 0.4 + 0.04 0.55 + 0.15  0.4 + 0.02 0.16 + 0.02 0.08 + 0.02 0.1 + 0.02 0.3 + 0.02 1 + 0.04	HP 3458A	OEM and GIDEP Sourced Procedures
Resistance - Measure	10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$ 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$	15 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 12 $\mu\Omega/\Omega$ + 0.5 m $\Omega$ 10 $\mu\Omega/\Omega$ + 0.5 m $\Omega$ 10 $\mu\Omega/\Omega$ + 5 m $\Omega$ 10 $\mu\Omega/\Omega$ + 50 m $\Omega$ 15 $\mu\Omega/\Omega$ + 2 $\Omega$ 50 $\mu\Omega/\Omega$ + 100 $\Omega$ 500 $\mu\Omega/\Omega$ + 1K $\Omega$ 5 000 $\mu\Omega/\Omega$ + 10K $\Omega$	HP 3458A	OEM and GIDEP Sourced Procedures



## II. Time & Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Frequency Reference	100 kHz #	5 parts in 10E10 Short Term	LORAN-C Receiver System	OEM and GIDEP Sourced Procedures
	100 kHz #	5 parts in 10E11 Long Term	LORAN-C Receiver System	
Frequency Standard	10 MHz	5 parts in 10E10/Day	Portable Frequency Standard	OEM and GIDEP Sourced Procedures
Frequency Measure	(0 to 1.3) GHz	2 parts in 10E10	LORAN-C / SR 620 Counter	OEM and GIDEP Sourced Procedures
	(1.3 to 26.5) GHz	1 part in 10E10 + 1 Hz	LORAN-C / EIP 578 Counter	
	100 kHz to 10 MHz	1 part in 10E(11)	Phase Comparison / SR 620	

## III. Electromagnetic RF/Microwave

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS	
Amplitude Modulation Carrier Frequency 150 kHz to 10 MHz	<b>Modulation Rate</b> 50 Hz to 10 kHz	2 % of Reading + 0.01 % 2 % of Reading + 0.1 %	8901B <b>Modulation Depth</b> 5 % to 10 % 10 % to 99 %	OEM and GIDEP Sourced Procedures	
	20 Hz to 10 kHz	3 % of Reading + 0.01 % 3 % of Reading + 0.1 %			
	(10 to 1 300) MHz	50 Hz to 50 KHz 20 Hz to 100 KHz			1 % of Reading + 0.01 % 1 % of Reading + 0.1 % 3 % of Reading + 0.01 % 3 % of Reading + 0.1 %
Frequency Modulation Carrier Frequency 250 kHz to 10 MHz	<b>Modulation Rate</b> 20 Hz to 10 kHz	2 % of Reading + 0.001 kHz 2 % of Reading + 0.01 kHz 2 % of Reading + 0.1 kHz	8901B <b>Frequency Deviation</b> ≤3.5 kHz 3.5 kHz to 35 kHz 35 kHz to 40 kHz	OEM and GIDEP Sourced Procedures	
	(10 to 1 300) MHz	50 Hz to 100 kHz			1 % of Reading + 0.001 kHz 1 % of Reading + 0.01 kHz 1 % of Reading + 0.1 kHz 1 % of Reading + 1 kHz
	20 Hz to 200 kHz	5 % of Reading + 0.001 kHz 5 % of Reading + 0.01 kHz 5 % of Reading + 0.1 kHz 5 % of Reading + 1 kHz			≤ 3.5 kHz 3.5 kHz to 35 kHz 35 kHz to 350 kHz 350 kHz to 400 kHz

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
RF Voltage	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 % 0.80 % 1.70 %	3V Thermal Voltage Converter with Fluke 5500A	OEM and GIDEP Sourced Procedures
RF Power Tuned 0 dB, Reference 0 dB to -30 dB 0 dB to -30 dB -20 dB to -50 dB 0 dB to -30 dB	2.5 MHz to 26.5 GHz 10 MHz to 18 GHz 2.5 MHz to 4.2 GHz 10 MHz to 18 GHz 10 MHz to 26.5 GHz	0.00 dB 0.16 dB 0.27 dB 0.20 dB 0.16 dB	8901B w Power Sensor  8481A 8482A 8484A 8485A	OEM and GIDEP Sourced Procedures
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 %  Without Mismatch 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	3.26 %  3.26 %	8901B w/8484A	OEM and GIDEP Sourced Procedures



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RF Power Absolute (-20 to -60) dBm, 50 Ω (cont.)	(4 to 10) GHz SWR<1.21:1	3.36 %	8901B w/8484A	OEM and GIDEP Sourced Procedures
	(10 to 15) GHz SWR<1.3:1	3.36 %		
	(15 to 18) GHz SWR<1.3:1	3.45 %		

#### IV. Thermodynamic

<b>PARAMETER / EQUIPMENT</b>	<b>RANGE</b>	<b>BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]</b>	<b>REFERENCE STANDARD OR EQUIPMENT</b>	<b>METHODS</b>
Temperature – Source	(0 to 100) °C	0.026 °C	PRTD / HP 3458A PRTD / HP 3458A Ice Point (Intrinsic Std) Steam Point (Intrinsic Std)	OEM and GIDEP Sourced Procedures
	(100 to 500) °C	0.50 °C		
	0 °C	0.02 °C		
	100 °C	0.04 °C		
Temperature - Measure*	(0 to 100) °C	0.025 °C	Burns PRTD/HP 3458A Burns PRTD/HP 3458A Type K Thermocouple/Indicator	OEM and GIDEP Sourced Procedures
	(100 to 500) °C	0.026 °C		
	(-270 to 350) °C	1.4 °C		
	(350 to 1 372) °C	0.004T °C		
Humidity	(20 to 90) %	2 %	Wet/Dry Bulb Method Saturated Salt Solutions	OEM and GIDEP Sourced Procedures
	Discreet Points	1.2 %		

## V. Mechanical

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Force - Source	(0 to 360) kgf	0.01 % w/Gravity Corr	Class F Weights	OEM and GIDEP Sourced Procedures
Force - Measure *	(1 000 to 50 000) lb·f	0.2 % of Value	Load Cell System	OEM and GIDEP Sourced Procedures
Mass Working Standards (Weights)	(0.2 to 4) kg	0.02 g	Class F Weights and Balances	OEM and GIDEP Sourced Procedures
	(4 to 14.3) kg	0.20 g		
	50 lb weights	0.03 lb		
Pressure *	Up to 10 000 psig	0.025 %	Deadweight Tester	OEM and GIDEP Sourced Procedures
Torque- Measure *	(0 to 1 000) ft·lb	0.1 %	Torque Arms / Wheels / Weights CDI 950DT Torque Calibrator CDI 5000ST Torque Cell/Indicator	OEM and GIDEP Sourced Procedures
	5 in-lbs to 250 ft·lb	1.2 %		
	(250 to 1 000) ft·lb	0.25 %		
Vacuum *	(Up to 25) in Hg	0.3 %	Vacuum Test Gage	OEM and GIDEP Sourced Procedures

## VI. Dimensional

PARAMETER / EQUIPMENT	RANGE	BEST 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	Class 2 Gage Blocks	OEM and GIDEP Sourced Procedures
Calipers *	Up to 12 in or Metric Equiv	668 μin	Class 2 Gage Blocks	OEM and GIDEP Sourced Procedures
	(12 to 30) in or Metric Equiv	706 μin		
CMM * Linearity	Up to 80 ft or Metric Equiv	10.4 μin/ft	Laser System	OEM and GIDEP Sourced Procedures
Depth Micrometers *	Up to 6 in or Metric Equiv	315 μin	Class 2 Gage Blocks	OEM and GIDEP Sourced Procedures
	(6 to 12) in or Metric Equiv	326 μin		
Feeler Gages *	Up to 0.2 in or Metric Equiv	167 μin	Micrometer	OEM and GIDEP Sourced Procedures
Gage Blocks	Up to 4 in or Metric Equiv	35 μin	Class 2 Gage Blocks, Gage Block Comparator	OEM and GIDEP Sourced Procedures
	(4 to 20) in or Metric Equiv	166 μin		

<b>PARAMETER / EQUIPMENT</b>	<b>RANGE</b>	<b>BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]</b>	<b>REFERENCE STANDARD OR EQUIPMENT</b>	<b>METHODS</b>
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
Height Gages *	Up to 12 in or Metric Equiv (12 to 40) in or Metric Equiv	326 μin 739 μin	Class 2 Gage Blocks	OEM and GIDEP Sourced Procedures
Indicators *	Up to 4 in or Metric Equiv	11 μin	Class 2 Gage Blocks	OEM and GIDEP Sourced Procedures
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	OEM and GIDEP Sourced Procedures
Measuring Wires	(120 to 5) TPI or Metric Equiv	46 μin	MicTrac	OEM and GIDEP Sourced Procedures
Micrometers *	Up to 6 in or Metric Equiv (6 to 12) in or Metric Equiv	128 μin 154 μin	Class 2 Gage Blocks	OEM and GIDEP Sourced Procedures
Optical Comparators *	Up to 30 in Diameter	261 μin	Glass Scale	OEM and GIDEP Sourced Procedures
Pin / Plug Gages	Up to 4 in or Metric Equiv	83 μin	MicTrac	OEM and GIDEP Sourced Procedures
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	OEM and GIDEP Sourced Procedures
Set Thread Plugs Major Diameter Pitch Diameter	Up to 4 in or Metric Equiv	83 μin 123 μin	MicTrac	OEM and GIDEP Sourced Procedures
Protractors-Squares *	Up to 12 in or Metric Equiv	366 μin	Optical Comparator	OEM and GIDEP Sourced Procedures
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	OEM and GIDEP Sourced Procedures
Thread Plug Gages Major Diameter Pitch Diameter	Up to 4 in or Metric Equiv	83 μin 123 μin	Mic Trac, Measuring Wires	OEM and GIDEP Sourced Procedures

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHODS
Thread Ring Gages	Up to 1.5 in or Metric Equiv	87 $\mu$ in	Set Plugs	FED FED-STD H28/22A

**Notes:**

1. Best Measurement Uncertainties (Expanded Uncertainty) are based on approximately a 95% confidence interval, using a coverage of  $k=2$
2. Onsite Services available with Parameters/Equipment denoted by \*. 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. T= temperature reading of indicator
4. This scope is part of and must be included with the Certificate of Accreditation No. AC-1217




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Vice-President

