



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

International Process Solutions

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CALIBRATION

Valid to: June 22, 2013

Certificate Number: AC-1400

I. Electromagnetic – DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
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 μV/V + 300 nV 5.1 μV/V + 300 nV 4.6 μV/V + 500 nV 6.5 μV/V + 30 μV 16.5 μV/V + 100 μV	Agilent 3458A Opt. 002	Manufacturer / GIDEP / Customer Specific
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 1 MHz (1 to 4) MHz (4 to 8) MHz (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 4) MHz (4 to 8) MHz (8 to 10) MHz	300 μV/V + 3 μV 200 μV/V + 1.1 μV 300 μV/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 72 μV/V + 4 μV 72 μV/V + 2 μV 142 μV/V + 2 μV 302 μV/V + 2 μV 802 μV/V + 2 μV 3 mV/V + 10 μV 10 mV/V + 10 μV 15 mV/V + 10 μV 40 mV/V + 8 μV 150 mV/V + 100 μV	Agilent 3458A Opt. 002	Manufacturer / GIDEP / Customer Specific



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND 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 V –to1 kV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz</p>	<p>72 µV/V + 40 µV 72 µV/V + 20 µV 142 µV/V + 20 µV 302 µV/V + 20 µV 802 µV/V + 20 µV 3 mV/V + 100 µV 10 mV/V + 100 µV 15 mV/V + 100 µV 40 mV/V + 800 µV 150 mV/V + 1 mV</p> <p>72 µV/V + 400 µV 72 µV/V + 200 µV 142 µV/V + 200 µV 302µV/V + 200 µV 802 µV/V + 200 µV 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</p> <p>200 µV/V + 4 mV 200 µV/V + 2 mV 200 µV/V + 2 mV 350 µV/V + 2 mV 1.2 mV/V + 2 mV 4 mV/V + 10 mV 15 mV/V + 10 mV</p> <p>400 µV/V + 40 mV 400 µV/V + 20 mV 600 µV/V + 20 mV 1.2 mV/V + 20 mV 3 mV/V + 20 mV</p>	Agilent 3458A Opt. 002	Manufacturer / GIDEP / Customer Specific
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 13 µΩ/Ω + 500 µΩ 11 µΩ/Ω + 500 µΩ 11 µΩ/Ω + 5 mΩ 11 µΩ/Ω + 50 µΩ 15 µΩ/Ω + 2 Ω 53 µΩ/Ω + 100 Ω 503 µΩ/Ω + 1 kΩ 5 mΩ/Ω + 10 kΩ	HP 3458A Opt 002	Manufacturer / GIDEP / Customer Specific



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DC Current - Measure	(10 to 100) μ A 100 μ A to 1mA (1 to 10) mA (10 to 100) mA 1 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 110 μ A/A + 10 μ A	Agilent 3458A Opt. 002	Manufacturer / GIDEP / Customer Specific
AC Current - Measure	<p>(5 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</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</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>	Agilent 3458A Opt. 002	Manufacturer / GIDEP / Customer Specific
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 1 100) 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 Series II	Manufacturer / GIDEP / Customer Specific

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
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	550 µV/V + 4.5 µV 210 µV/V + 4.5 µV 105 µV/V + 4.5 µV 370 µV/V + 4.5 µV 850 µV/V + 7 µV 1.1 mV/V + 13 µV 1.7 mV/V + 25 µV 3.4 mV/V + 25 µV	Fluke 5700A Series II	Manufacturer / GIDEP / Customer Specific
	(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	550 µV/V + 5 µV 210 µV/V + 5 µV 105 µV/V + 5 µV 370 µV/V + 5 µV 850 µV/V + 7 µV 1.1 mV/V + 12 µV 1.7 mV/V + 25 µV 3.4 mV/V + 25 µV		
	(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	550 µV/V + 13 µV 210 µV/V + 8 µV 105 µV/V + 8 µV 320 µV/V + 8 µV 850 µV/V + 25 µV 1.1 mV/V + 25 µV 1.7 mV/V + 35 µV 3.4 mV/V + 80 µV		
	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	500 µV/V + 80 µV 160 µV/V + 25 µV 75 µV/V + 6 µV 120 µV/V + 16 µV 250 µV/V + 70 µV 430 µV/V + 130 µV 1.1 mV/V + 350 µV 2.2 mV/V + 850 µV		
	(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	500µV/V + 800 µV 160 µV/V + 250 µV 75 µV/V + 60 µV 120 µV/V + 160 µV 250 µV/V + 350 µV 500 µV/V + 1.5 mV 1.3 mV/V + 4.3 mV 2.7 mV/V + 8.5 mV		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage – Source (Cont.)	(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 2.2 V to 1.1 kV (15 to 50) Hz 50 Hz to 1 kHz	500 $\mu\text{V/V} + 8 \text{ mV}$ 160 $\mu\text{V/V} + 2.5 \text{ mV}$ 80 $\mu\text{V/V} + 800 \mu\text{V}$ 220 $\mu\text{V/V} + 3.5 \text{ mV}$ 500 $\mu\text{V/V} + 8 \text{ mV}$ 1.5 $\text{mV/V} + 90 \text{ mV}$ 4.7 $\text{mV/V} + 90 \text{ mV}$ 115 $\text{mV/V} + 190 \text{ mV}$ 400 $\mu\text{V/V} + 16 \text{ mV}$ 80 $\mu\text{V/V} + 3.5 \text{ mV}$	Fluke 5700A Series II	Manufacturer / GIDEP / Customer Specific
Resistance - Source	0 Ω 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	50 $\mu\Omega$ 95 $\mu\Omega$ 181 $\mu\Omega$ 280 $\mu\Omega$ 513 $\mu\Omega$ 1.7 m Ω 323 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 5700A Series II	Manufacturer / GIDEP / Customer Specific
DC Current - Source	Up to 220 μA 220 μA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 22 mA to 2.2 A	50 $\mu\text{A/A} + 8 \text{ nA}$ 50 $\mu\text{A/A} + 8 \text{ nA}$ 50 $\mu\text{A/A} + 80 \text{ nA}$ 60 $\mu\text{A/A} + 800 \text{ nA}$ 80 $\mu\text{A/A} + 25 \mu\text{A}$	Fluke 5700A Series II	Manufacturer / GIDEP / Customer Specific
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	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 $\text{mA/A} + 800 \text{ nA}$	Fluke 5700A Series II	Manufacturer / GIDEP / Customer Specific



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current – Source (Cont.)	(2.2 to 22) mA 10 to 20 Hz 20 to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	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	Fluke 5700A Series II	Manufacturer / GIDEP / Customer Specific
	(22 to 220) mA 10 to 20 Hz 20 to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	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		
	22 mA to 2.2A 20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	650 µA/A + 35 µA 750 µA/A + 80 µA 8.5 mA/A + 160 µA		
Resistance Source	100 Ω	1.1 mΩ	GE Sensing Calibration Module V2020	Manufacturer / GIDEP / Customer Specific

II. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)			
Relative Humidity	Temperature 10 °C 10 %RH 30 %RH 50 %RH 70 %RH 80 %RH	0.19 %RH 0.50 %RH 0.80 %RH 1.08 %RH 1.23 %RH	Thunder Scientific RH/Temp Chamber 2500	OEM Procedure / IPS – SOP CAL 0030			
	Temperature 21.11 °C 10 %RH 30 %RH 50 %RH 70 %RH 80 %RH	0.18 %RH 0.48 %RH 0.75 %RH 1.02 %RH 1.15 %RH					
	Temperature 50 °C 10 %RH 30 %RH 50 %RH 70 %RH 80 %RH	0.17 %RH 0.56 %RH 0.66 %RH 0.88 %RH 0.99 %RH					
	Temperature	(-196 to 0) °C (0 to 300) °C			0.01 °C 0.019 °C	GE Sensing Intelligent Probe 5690L	IPS Method / SOP CAL 0039



III. Dimensional

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Outside Diameter (Cylindrical gages)	(0.01 to 1) in	(21.7 + 0.3D) μin	Plug Gages Class XXX Pratt & Whitney Labmaster	OEM Procedures / GIDEP T.O. 33K6-4-121-1
Outside Diameter (Cylindrical gages)	0.01 in	25 μin	Mitutoyo Laser Scan Micrometer LSM-6100	GIDEP T.O. 33K6-4-121-1
	0.25 in	25 μin	Measurement Head 501H	
	0.25 in	75 μin	Measurement Head 506H	
	0.50 in	76 μin		
1.00 in	76 μin			

Notes:

1. Calibration and Measurement Capabilities (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
2. This scope is part of and must be included with the Certificate of Accreditation No. AC-1400



Vice President