



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

International Process Solutions

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CALIBRATION

Valid to: June 22, 2011

Certificate Number: AC-1400

I. Electromagnetic – DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	BEST 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 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	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 1MHz (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 – 1MHz (1 to 4) MHz (4 to 8) MHz (8 to 10) MHz	300 μ V/V + 3 μ V 200 μ V/V + 1.1 μ V 300 μ V/V + 1.1 μ V 1mV/V + 1.1 μ V 5 mV/V + 1.1 μ V 40 mV/V + 2 μ V 12 mV/V + 5 μ V 70 mV/V + 7 μ V 200 mV/V + 8 μ V 72 μ V/V + 4 μ V 72 μ V/V + 2 μ V 142 μ V/V + 2 μ V 302 μ V/V + 2 μ V 802 μ V/V + 2 μ V 3 mV/V + 10 μ V 10 mV/V + 10 μ V 15 mV/V + 10 μ V 40 mV/V + 8 μ V 150 mV/V + 100 μ V	HP 3458A Opt 002	Manufacturer/ GIDEP/Customer Specific



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage – Measure (Cont.)	<p>100 mV to 1V (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 (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 1MHz (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 1MHz</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 $\mu\text{V}/\text{V} + 40 \mu\text{V}$ 72 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 142 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 302 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 802 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 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 $\mu\text{V}/\text{V} + 400 \mu\text{V}$ 72 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 142 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 302 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 802 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 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</p> <p>200 $\mu\text{V}/\text{V} + 4 \text{ mV}$ 200 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 200 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 350 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 1.2 mV/V + 2 mV 4 mV/V + 10 mV 15 mV/V + 10 mV</p> <p>400 $\mu\text{V}/\text{V} + 40 \text{ mV}$ 400 $\mu\text{V}/\text{V} + 20 \text{ mV}$ 600 $\mu\text{V}/\text{V} + 20 \text{ mV}$ 1.2 mV/V + 20 mV 3 mV/V + 20 mV</p>	HP 3458A Opt 002	Manufacturer/ GIDEP/Customer Specific
Resistance - Measure	Up to 10 Ω (10 to 100) Ω 100 Ω to 1 k Ω (1 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1 M Ω (1 to 10) M Ω (10 to 100) M Ω 100 M Ω to 1 G Ω	18 $\mu\Omega/\Omega + 50 \mu\Omega$ 13 $\mu\Omega/\Omega + 500 \mu\Omega$ 11 $\mu\Omega/\Omega + 500 \mu\Omega$ 11 $\mu\Omega/\Omega + 5 \text{ m}\Omega$ 11 $\mu\Omega/\Omega + 50 \mu\Omega$ 15 $\mu\Omega/\Omega + 2 \Omega$ 53 $\mu\Omega/\Omega + 100 \Omega$ 503 $\mu\Omega/\Omega + 1 \text{ k}\Omega$ 5 m $\Omega/\Omega + 10 \text{ k}\Omega$	HP 3458A Opt 002	Manufacturer/ GIDEP/Customer Specific

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
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	HP 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>	HP 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 1100) 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	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Source	<p>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</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 $\mu\text{V/V} + 4.5 \mu\text{V}$ 210 $\mu\text{V/V} + 4.5 \mu\text{V}$ 105 $\mu\text{V/V} + 4.5 \mu\text{V}$ 370 $\mu\text{V/V} + 4.5 \mu\text{V}$ 850 $\mu\text{V/V} + 7 \mu\text{V}$ 1.1 $\text{mV/V} + 13 \mu\text{V}$ 1.7 $\text{mV/V} + 25 \mu\text{V}$ 3.4 $\text{mV/V} + 25 \mu\text{V}$</p> <p>550 $\mu\text{V/V} + 5 \mu\text{V}$ 210 $\mu\text{V/V} + 5 \mu\text{V}$ 105 $\mu\text{V/V} + 5 \mu\text{V}$ 370 $\mu\text{V/V} + 5 \mu\text{V}$ 850 $\mu\text{V/V} + 7 \mu\text{V}$ 1.1 $\text{mV/V} + 12 \mu\text{V}$ 1.7 $\text{mV/V} + 25 \mu\text{V}$ 3.4 $\text{mV/V} + 25 \mu\text{V}$</p> <p>550 $\mu\text{V/V} + 13 \mu\text{V}$ 210 $\mu\text{V/V} + 8 \mu\text{V}$ 105 $\mu\text{V/V} + 8 \mu\text{V}$ 320 $\mu\text{V/V} + 8 \mu\text{V}$ 850 $\mu\text{V/V} + 25 \mu\text{V}$ 1.1 $\text{mV/V} + 25 \mu\text{V}$ 1.7 $\text{mV/V} + 35 \mu\text{V}$ 3.4 $\text{mV/V} + 80 \mu\text{V}$</p> <p>500 $\mu\text{V/V} + 80 \mu\text{V}$ 160 $\mu\text{V/V} + 25 \mu\text{V}$ 75 $\mu\text{V/V} + 6 \mu\text{V}$ 120 $\mu\text{V/V} + 16 \mu\text{V}$ 250 $\mu\text{V/V} + 70 \mu\text{V}$ 430 $\mu\text{V/V} + 130 \mu\text{V}$ 1.1 $\text{mV/V} + 350 \mu\text{V}$ 2.2 $\text{mV/V} + 850 \mu\text{V}$</p> <p>500 $\mu\text{V/V} + 800 \mu\text{V}$ 160 $\mu\text{V/V} + 250 \mu\text{V}$ 75 $\mu\text{V/V} + 60 \mu\text{V}$ 120 $\mu\text{V/V} + 160 \mu\text{V}$ 250 $\mu\text{V/V} + 350 \mu\text{V}$ 500 $\mu\text{V/V} + 1.5 \text{mV}$ 1.3 $\text{mV/V} + 4.3 \text{mV}$ 2.7 $\text{mV/V} + 8.5 \text{mV}$</p>	Fluke 5700A Series II	Manufacturer/ GIDEP/Customer Specific

PARAMETER / EQUIPMENT	RANGE	BEST 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 kHz to 5 kHz 5 kHz to 10 kHz 220 μA to 2.2 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 $\mu\text{A/A} + 25 \text{ nA}$ 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	BEST 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 μ A/A + 400 nA 350 μ A/A + 350 nA 140 μ A/A + 350 nA 600 μ A/A + 4 μ A 1.6 mA/A + 8 μ A	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 μ A/A + 4 μ A 350 μ A/A + 3.5 μ A 140 μ A/A + 3.5 μ A 600 μ A/A + 40 μ A 1.6 mA/A + 80 μ A		
	22 mA to 2.2A 20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	650 μ A/A + 35 μ A 750 μ A/A + 80 μ A 8.5 mA/A + 160 μ A		
Resistance Source	100 Ω	1.1 m Ω	GE Sensing Calibration Module V2020	Manufacturer/ GIDEP/Customer Specific

II. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	BEST 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		

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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	BEST 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)	0.010 in 0.250 in 0.250 in 0.500 in 1.000 in	25 μin 25 μin 75 μin 76 μin 76 μin	Mitutoyo Laser Scan Micrometer LSM-6100 Measurement Head 501H Measurement Head 506H	GIDEP T.O. 33K6-4-121-1

Notes:

1. Best 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

