



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Process Control Services, Inc.

401 Industrial Drive, Plymouth, MI 48170
 Ken Heywood & Gerald Frisina Phone: 734-453-0620

CALIBRATION

Valid to: March 29, 2011

Certificate Number: AC-1128

I. Electromagnetic DC / Low Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source	0 to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1 000) V	20 μ V/V + 1 μ V 11 μ V/V + 2 μ V 12 μ V/V + 20 μ V 18 μ V/V + 150 μ V 18 μ V/V + 1.5 mV	Fluke 5520A	OEM Method
DC Current - Source	0 to 330 μ A 330 μ A 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 20.5) A	150 μ A/A + 20 nA 100 μ A/A + 50 nA 100 μ A/A + 250 nA 100 μ A/A + 2.5 μ A 200 μ A/A + 40 μ A 380 μ A/A + 40 μ A 1 mA/A + 750 μ A	Fluke 5520A	OEM Method
Resistance - Source	0 to 11 Ω (11 to 33) Ω (33 to 110) Ω .110 Ω to 1.1 k Ω (1.1 to 11) k Ω (11 to 110) k Ω 110 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω	40 μ Ω / Ω + 1 m Ω 30 μ Ω / Ω + 1.5 m Ω 28 μ Ω / Ω + 1.4 m Ω 28 μ Ω / Ω + 2 m Ω 28 μ Ω / Ω + 20 m Ω 28 μ Ω / Ω + 200 m Ω 32 μ Ω / Ω + 2 Ω 60 μ Ω / Ω + 30 Ω 130 μ Ω / Ω + 50 Ω 250 μ Ω / Ω + 2.5 k Ω 500 μ Ω / Ω + 3 k Ω 3 m Ω / Ω + 100 k Ω	Fluke 5520A	OEM Method
Resistance - Measure	0 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	17 μ Ω / Ω + 4 μ Ω 9.5 μ Ω / Ω + 14 μ Ω 8 μ Ω / Ω + 50 μ Ω 8 μ Ω / Ω + 500 μ Ω 8 μ Ω / Ω + 5 m Ω 8 μ Ω / Ω + 50 m Ω 9 μ Ω / Ω + 1 Ω	Fluke 8508A	OEM Method



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Resistance – Measure (cont.)	(2 to 20) MΩ (20 to 200) MΩ 200 MΩ to 2 GΩ	20 μΩ/Ω + 100 Ω 120 μΩ/Ω + 10 kΩ 1 510 μΩ/Ω + 1 MΩ	Fluke 8508A	OEM Method
AC Voltage – Source	<p>(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz</p> <p>(33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz</p> <p>(0.33 to 3.3) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz</p> <p>(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz</p> <p>(33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz</p> <p>(330 to 1 000) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p>	<p>800 μV/V + 6 μV 150 μV/V + 6 μV 200 μV/V + 6 μV 1 mV/V + 6 μV 3.5 mV/V + 12 μV 8 mV/V + 50 μV</p> <p>300 μV/V + 8 μV 145 μV/V + 8 μV 160 μV/V + 8 μV 350 μV/V + 8 μV 800 μV/V + 32 μV 2 mV/V + 70 μV</p> <p>300 μV/V + 50 μV 150 μV/V + 60 μV 90 μV/V + 60 μV 300 μV/V + 50 μV 700 μV/V + 125 μV 2.4 mV/V + 600 μV</p> <p>300 μV/V + 650 μV 150 μV/V + 600 μV 240 μV/V + 600 μV 350 μV/V + 600 μV 900 μV/V + 1.6 mV</p> <p>190 μV/V + 2 mV 200 μV/V + 6 mV 250 μV/V + 6 mV 300 μV/V + 6 mV 2 mV/V + 50 mV</p> <p>300 μV/V + 10 mV 250 μV/V + 10 mV 300 μV/V + 10 mV</p>	Fluke 5520A	OEM Method



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AC Voltage – Measure	Up to 200 mV (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	165 $\mu\text{V}/\text{V} + 14 \mu\text{V}$ 140 $\mu\text{V}/\text{V} + 40 \mu\text{V}$ 115 $\mu\text{V}/\text{V} + 40 \mu\text{V}$ 110 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 135 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 340 $\mu\text{V}/\text{V} + 80 \mu\text{V}$ 765 $\mu\text{V}/\text{V} + 200 \mu\text{V}$	Fluke 8508A	OEM Method
	200 mV to 2 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	150 $\mu\text{V}/\text{V} + 120 \mu\text{V}$ 115 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 90 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 75 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 110 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 220 $\mu\text{V}/\text{V} + 20 \mu\text{V}$ 570 $\mu\text{V}/\text{V} + 200 \mu\text{V}$		
	(2 to 20) 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	150 $\mu\text{V}/\text{V} + 1.2 \text{ mV}$ 115 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 90 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 75 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 110 $\mu\text{V}/\text{V} + 200 \mu\text{V}$ 220 $\mu\text{V}/\text{V} + 400 \mu\text{V}$ 570 $\mu\text{V}/\text{V} + 2 \text{ mV}$		
	(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	150 $\mu\text{V}/\text{V} + 12 \text{ mV}$ 115 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 90 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 75 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 110 $\mu\text{V}/\text{V} + 2 \text{ mV}$ 220 $\mu\text{V}/\text{V} + 4 \text{ mV}$ 570 $\mu\text{V}/\text{V} + 20 \text{ mV}$		
	(200 to 1 000) V (1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	150 $\mu\text{V}/\text{V} + 140 \text{ mV}$ 120 $\mu\text{V}/\text{V} + 40 \text{ mV}$ 115 $\mu\text{V}/\text{V} + 40 \text{ mV}$ 225 $\mu\text{V}/\text{V} + 80 \text{ mV}$ 580 $\mu\text{V}/\text{V} + 400 \text{ mV}$		



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AC Current - Source	Up to 330 μA (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 1.6 mA/A + 400 nA	Fluke 5520A	OEM Method
	330 μA to 3.3 mA (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 + 150 nA 1.25 mA/A + 150 nA 1 mA/A + 150 nA 2 mA/A + 200 nA 5 mA/A + 300 nA 10 mA/A + 600 μ A		
	(3.3 to 33) mA (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	1.8 mA/A + 2 μ A 900 μ A/A + 2 μ A 400 μ A/A + 2 μ A 800 μ A/A + 2 μ A 2 mA/A + 3 μ A 4 mA/A + 4 μ A		
	(33 to 330) mA (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	1.8 mA/A + 20 μ A 900 μ A/A + 20 μ A 400 μ A/A + 20 μ A 1 mA/A + 50 μ A 2 mA/A + 100 μ A 4 mA/A + 200 μ A		
	(0.33 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.8 mA/A + 100 μ A 600 μ A/A + 100 μ A 6 mA/A + 1 mA 25 mA/A + 5 mA		
	(3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	600 μ A/A + 2 mA 1 mA/A + 2 mA 30 mA/A + 2 mA		
	(11 to 20.5) A (45 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		



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DC Current - Measure	Up to 200 μ A (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A (2 to 20) A	12 μ A/A + 4 μ A 12 μ A/A + 4 μ A 14 μ A/A + 4 μ A 48 μ A/A + 8 μ A 185 μ A/A + 16 μ A 400 μ A/A + 40 μ A	Fluke 8508A	OEM Method
Thermocouple Simulation Type B	(600 to 800) $^{\circ}$ C (800 to 1 000) $^{\circ}$ C (1 000 to 1 550) $^{\circ}$ C (1 550 to 1 820) $^{\circ}$ C	0.44 $^{\circ}$ C 0.34 $^{\circ}$ C 0.30 $^{\circ}$ C 0.33 $^{\circ}$ C	Fluke 5520A	OEM Method
Type C	(0 to 150) $^{\circ}$ C (150 to 650) $^{\circ}$ C (650 to 1 000) $^{\circ}$ C (1 000 to 1 800) $^{\circ}$ C (1 800 to 2 316) $^{\circ}$ C	0.30 $^{\circ}$ C 0.26 $^{\circ}$ C 0.31 $^{\circ}$ C 0.50 $^{\circ}$ C 0.84 $^{\circ}$ C	Fluke 5520A	OEM Method
Type E	(-250 to -100) $^{\circ}$ C (-100 to -25) $^{\circ}$ C (-25 to 350) $^{\circ}$ C (350 to 650) $^{\circ}$ C (650 to 1 000) $^{\circ}$ C	0.50 $^{\circ}$ C 0.16 $^{\circ}$ C 0.14 $^{\circ}$ C 0.16 $^{\circ}$ C 0.21 $^{\circ}$ C	Fluke 5520A	OEM Method
Type J	(-210 to -100) $^{\circ}$ C (-100 to -30) $^{\circ}$ C (-30 to 150) $^{\circ}$ C (150 to 760) $^{\circ}$ C (760 to 1 200) $^{\circ}$ C	0.27 $^{\circ}$ C 0.16 $^{\circ}$ C 0.14 $^{\circ}$ C 0.17 $^{\circ}$ C 0.23 $^{\circ}$ C	Fluke 5520A	OEM Method
Type K	(-200 to -100) $^{\circ}$ C (-100 to -25) $^{\circ}$ C (-25 to 120) $^{\circ}$ C (120 to 1 000) $^{\circ}$ C (1 000 to 1 372) $^{\circ}$ C	0.33 $^{\circ}$ C 0.18 $^{\circ}$ C 0.16 $^{\circ}$ C 0.26 $^{\circ}$ C 0.40 $^{\circ}$ C	Fluke 5520A	OEM Method
Type L	(-200 to -100) $^{\circ}$ C (-100 to 800) $^{\circ}$ C (800 to 900) $^{\circ}$ C	0.37 $^{\circ}$ C 0.26 $^{\circ}$ C 0.17 $^{\circ}$ C	Fluke 5520A	OEM Method
Type N	(-200 to -100) $^{\circ}$ C (-100 to -25) $^{\circ}$ C (-25 to 120) $^{\circ}$ C (120 to 410) $^{\circ}$ C (410 to 1 300) $^{\circ}$ C	0.40 $^{\circ}$ C 0.22 $^{\circ}$ C 0.19 $^{\circ}$ C 0.18 $^{\circ}$ C 0.27 $^{\circ}$ C	Fluke 5520A	OEM Method
Type R	(0 to 250) $^{\circ}$ C (250 to 400) $^{\circ}$ C (400 to 1 000) $^{\circ}$ C (1 000 to 1 767) $^{\circ}$ C	0.57 $^{\circ}$ C 0.35 $^{\circ}$ C 0.33 $^{\circ}$ C 0.40 $^{\circ}$ C	Fluke 5520A	OEM Method

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Thermocouple Simulation (cont.) Type S	(0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C	0.47 °C 0.36 °C 0.37 °C 0.46 °C	Fluke 5520A	OEM Method
Type T	(-200 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	Fluke 5520A	OEM Method
Type U	(-200 to 0) °C (0 to 600) °C	0.56 0.27	Fluke 5520A	OEM Method
Electrical Simulation of RTDs Type Pt 385 100 Ω	(Up to 32) °F (32 to 1 200) °F	0.44 °F 0.4 °F	Fluke 5520A	OEM Method
Electrical Simulation of RTDs - Measure Type Pt 385 100 Ω	(-200 to 0) °C (0 to 660) °C	0.05 °C 0.06 °C	Fluke 8508A	OEM Method

II. Mechanical

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure	(15 to 115) psia (115 to 1 015) psia	0.07 psi 0.5 psi	Mensor PCS400	OEM Method
Vacuum	(0 to 15) psia	0.026 psi	Mensor PCS400	OEM Method

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-1128



Vice-President