



Certificate 4044.01

Certificate of Calibration
no. 20200205**Client:** Sample with equipment list on page 2.**Calibration location:** CNS Inc. accredited calibration lab.**Calibration date:** Feb. 10, 2020**Calibrated by:** Mathieu van den Bergh**Environmental temp:** 22 ° ± 2 °C**Humidity:** 40 % RH ± 3 %**Equipment type(s):** Harmonics & Flicker test system plus impedance unit**Manufacturer(s):** Teseq / Ametek**Model no(s):** NSG1007-5, CCN1000-1, INA 2152**Serial no(s):** 58157, 72573, 72253**Software version(s):** WIN2100V4 - 4.23**Firmware version(s):** 4.30 (source)**Calibration standard(s):** IEC 61000-3-2, IEC 61000-3-3, IEC 61000-4-7, IEC 61000-4-15.*Note; Unless otherwise indicated, standards referenced are the latest versions in effect at the date of calibration.***Calibration procedure(s):** C005**Equipment status:** Yes NoReceived in tolerance ☒ X ☐

Returned in tolerance

Yes No

☒ X ☐

Returned with limited calibration

☐**Calibration due date:** User discretion**Approved by**Mathieu van den Bergh, Quality Manager
February 13, 2020**Computer & Networking Services Inc.**Office: Crystal View Lane – Poway CA 92064
Cal. Lab. 12625 # 112 Danielson Ct.
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Calibration data file as part of this certificate: XXXXXX Calibration certificate 20200205

CNS Inc. provides supporting calibration data reports with standard data formats for each procedure, in accordance with the calibration procedures listed on page 1 of this certificate.

Uncertainties for all calibrations (K=2 / 95 % confidence);

Voltage: 0.1 %

Current: 0.2 %

Frequency: 0.05 %

Timing: 0.5 μ S or \pm 1% of target value

Calibration uncertainty:

The above calibration data file lists the uncertainties for each of the measured/reported parameters. Uncertainties per each procedure are determined based on instrumentation specifications and actual instrumentation calibration data, using standard methodology, and applying a coverage factor K=2, for a 95 % confidence interval. The instrumentation used for calibrations is listed below, and the instrumentation is calibrated in regular intervals in accordance with ISO/IEC-17025 (2005) requirements.

Calibration equipment used:

Model #	Serial #	Equipment type	ISO Trace #	Cal due date
Keithley 2000	0641161	6.5 digit Multimeter	BA8112	02/07/2021
Fluke 8845A	1998007	6.5 Digit Multimeter	CT5792	06/21/2020
Agilent 34410A	MY45002306	6.5 Digit Multimeter,	BL2709	02/07/2021
Agilent 34410A	1998007	6.5 Digit Multimeter,	CT5792	06/21/2020
TDS2004B	C034121	Digital storage scope	AX6159	02/07/2021
TDS2014C	C011624	Digital Storage scope	CN7004	12/06/2021
DS6062V	1301058	Digital storage scope	AX6160	02/07/2021
570A	103381623	Handheld DVM	CN7003	01/07/2021
570A	104480961	Handheld DVM	DL9756	04/05/2021
2558 Standard	2558CA001	Voltage & Current Std.	N/A	04/04/2020
7003-257	0724	Shunt 100 m Ω	BL7118	02/25/2021
SH100A-10	143070	Shunt 10 m Ω	CV4985	12/06/2021
100 AMP	None	Shunt 10 m Ω	N/A	08/08/2021
HFCIII	1406	Calibrator	NA- verified with above equipment	

Calibration traceability:

CNS Inc. is accredited to ISO/IEC 17025 (2005). The above equipment is traceable to ISO/IEC 17025. Supporting documentation and/or instrumentation calibration certificates as they relate to traceability are available upon request.

Limited calibration, out of tolerance explanation and decision rules:

In the event that equipment is returned out of tolerance, or with a limited calibration, the above listed calibration data file will provide specific detail as to the reasons why the out of tolerance or limited calibration condition(s) apply. CNS Inc. uses the following decision rules to evaluate test results for acceptance intervals (V-nom, I-nom, Δ -t, are target test parameters); Decision rules are as follows;

If the measured parameter is within the range of V-nom, I-nom, Δ -T, plus-or-minus the above listed uncertainties, the tested equipment passes. If the reading is outside of the permitted acceptance interval, the tested product is listed as out-of-tolerance. The acceptance interval values are listed below.

Voltage V-nom \pm 1.8 %, standards permit \pm 2 % for harmonics & flicker, and \pm 5 % for power line immunity testing) - uncertainty is \pm 0.1%

Current I-nom \pm (0.3% + 5 mA) standard permits \pm (1 % + 10 mA). If the measured parameter is within (\pm 0.3 % + 5 mA) of I-nom, the tested equipment passes.

Timing: T-nom \pm 0.5 μ S \pm or within \pm 1% (standards permit 20 μ S to 2000 μ S). If the measured equipment is within \pm 0.5 μ S or within \pm 1 %, the equipment passes.

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