Excellence in Resistance

CALIBRATION REPORT

ORDER NO.

JUNE 18, 2019

MANUFACTURER: OHM-LABS
DESCRIPTION: CURRENT SHUNT
MODEL: CSA-20
SERIAL:

PROCEDURE: CS CAL
LAB ENVIRONMENT: 23.6 °C / 46 %RH
CALIBRATION DATE: 18/JUN/2019

DC MEASUREMENT DATA – AS FOUND & AS LEFT		
APPLIED CURRENT	MEASURED VALUE	UNCERTAINTY
4 A	49.122 5 mΩ	16 µΩ/Ω
8	49.130 3	37
12	49.137 8	51
16	49.146 7	10
20	49.157 7	49

NOTES:
SHUNT WAS ALLOWED TO FULLY STABILIZE AT EACH APPLIED CURRENT.

STANDARDS USED

ID	DESCRIPTION	MAKE & MODEL	CAL DUE
AS3021	RESISTANCE STANDARD	OHM-LABS 202	31/MAR/2020
AS3403	RESISTANCE BRIDGE	GUILDLINE 9975	28/FEB/2020
AS3407	RANGE EXTENDER	GUILDLINE 9923	28/FEB/2020

COMMENTS:

OHM-LABS, INC. CERTIFIES THAT THIS CALIBRATION IS TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST), OR ANOTHER RECOGNIZED NATIONAL MEASUREMENT INSTITUTE, OR DERIVED BY A RATIO TYPE SELF-CALIBRATION TECHNIQUE, AND IS ACCREDITED TO ISO/IEC 17025. OHM-LABS' QUALITY CONTROL SYSTEM MEETS THE REQUIREMENTS OF ANSI/NCSL Z540-1-1994. THE REPORTED UNCERTAINTIES REPRESENT EXPANDED UNCERTAINTIES EXPRESSED AT A CONFIDENCE LEVEL OF APPROXIMATELY 95 %, USING A COVERAGE FACTOR OF K=2. THIS UNCERTAINTY IS AT THE TIME OF TEST ONLY AND DOES NOT TAKE INTO ACCOUNT TRANSIT, USAGE, DRIFT OVER TIME, OR OTHER FACTORS AFFECTING STABILITY. THIS DOCUMENT CERTIFIES THAT THE ITEMS IDENTIFIED HEREIN COMPLY WITH ALL REQUIREMENTS OF THE ABOVE PURCHASE ORDER, AND THAT THE CALIBRATION PERFORMED WAS IN ACCORDANCE WITH THE CURRENT REVISION LEVEL OF OHM-LABS' QUALITY CONTROL SYSTEM. TRAINED AND QUALIFIED PERSONNEL PERFORMED THE CALIBRATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ISO/IEC 17025. THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION BY OHM-LABS, INC.

PERFORMED BY

REVIEWED BY:

A2LA ACCREDITED
CERTIFICATE #2481.01

MANUFACTURER: OHM-LABS MODEL: CSA-20 SERIAL:

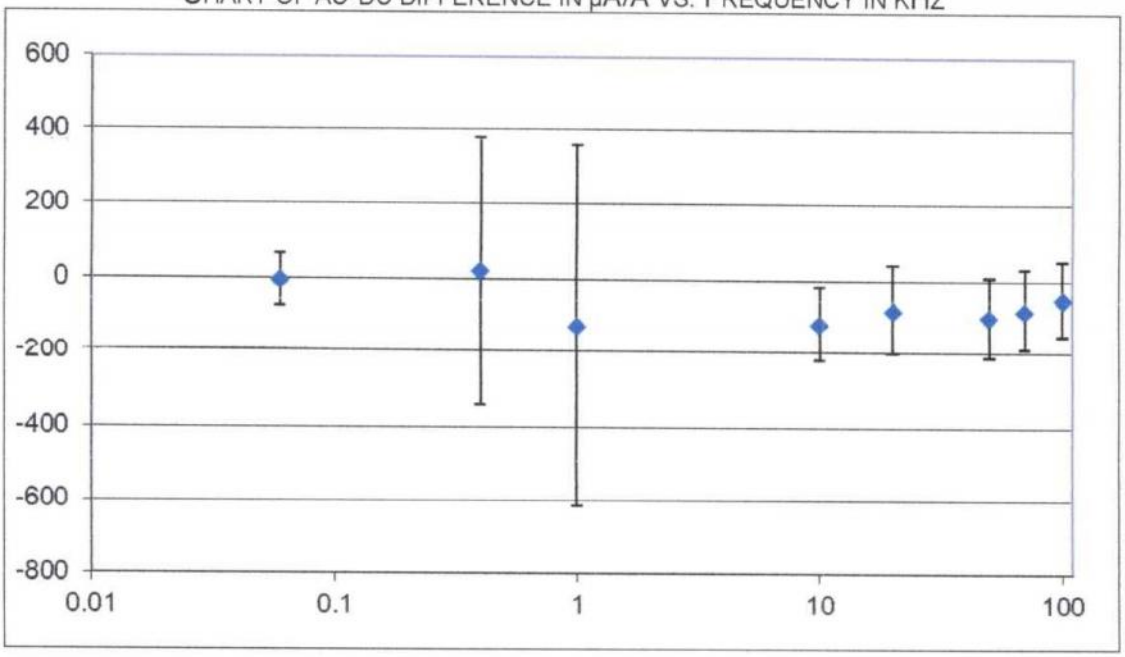
NOTE: AC-DC DIFFERENCE WAS MEASURED AT APPROXIMATELY 100 % RATED CURRENT OF THE SHUNT.

AC-DC DIFFERENCE DATA: AS-FOUND & AS-LEFT

APPLIED FREQUENCY	AC-DC DIFFERENCE	UNCERTAINTY
60 Hz	-10 µA/A	70 µA/A
400	+20	360
1 kHz	-130	490
5	-120	100
10	-80	120
20	-100	110
50	-80	110
70	-50	100
100	-60	70

AC-DC DIFFERENCE = (IAC – IDC) / IDC. A POSITIVE SIGN INDICATES THAT MORE AC CURRENT THAN DC CURRENT IS NECESSARY TO PRODUCE THE SAME VOLTAGE OUTPUT ON THE SHUNT UNDER TEST. THE SHUNT UNDER TEST WAS MEASURED IN SERIES WITH A STANDARD SHUNT, AND THE OUTPUTS OF THE STANDARD AND THE UUT WERE MEASURED WITH THERMAL VOLTAGE CONVERTERS.

CHART OF AC-DC DIFFERENCE IN µA/A VS. FREQUENCY IN kHz



STANDARDS USED FOR AC-DC DIFFERENCE MEASUREMENTS

ID	DESCRIPTION	MAKE & MODEL	CAL DUE
AS3821-3	STANDARD AC SHUNT	OHM-LABS CSA-20	30/MAY/2020
AS3840	STD THERMAL CONVERTER	PTB/IPHT MJTVC	16/NOV/2021
AS3841	UUT THERMAL CONVERTER	PTB/IPHT MJTVC	15/NOV/2021

END OF REPORT