European Standards Laboratory
Yokogawa Europe Solutions B.V.
Amersfoort, The Netherlands

CALIBRATION-CERTIFICATE

Example

Certificate number 60220P10185

Applicant	*Applicant* *Applicant* *Applicant* *Applicant*	
Instrument	Current Sensor Element	
	Manufacturer	Yokogawa
	Type	760903
	Serial number	C2ZH29075V
	Inventory number	CCE_1_1930
Calibration method	The calibration is performed at the permanent laboratory in Amersfoort. The Powermeter was compared to the Yokogawa Power Calibration System via a phantom technique. During the calibration the distortion of the applied voltage were below 0.1 % up to 50 kHz and <0.3 % at 100 kHz. For current <0.8 % up to 10 kHz. <1 % at 50 kHz and <3 % at 100 kHz in 2 MHz BW Before calibration the device was powered on for at least 12 hours.	
Average Environmental conditions during calibration	Temperature	(23.0 ± 1.0) ºC
	Relative Humidity	(42 ± 4) %rh
Date of Calibration	02 October 2023	
Result	The results of the calibration are shown on the next pages. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor 2 such that the coverage probability corresponds to approximately 95 %. The standard uncertainty of measurement has been determined in accordance with the EA-4/02M:2013. The long term stability of the calibrated object is not included in the reported expanded uncertainty measurement. This certificate of calibration is issued in compliance with ISO/IEC 17025:2017 The reported results do only apply to the instrument calibrated.	
Traceability	The measurements have been executed using standards for which the traceability to (inter)national standards has been demonstrated towards the RvA.	
Date	03 October 2023	
Name	E.J. Kroon	
Function	Manager European Standards Laboratory	

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The Raad voor Accreditatie is member of the European Co-operation for Accreditation (EA) and is one of the signatories to the ILAC Mutual Recognition Arrangements (MRA) for the mutual recognition of calibration Certificates.

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YOKOGAWA

Example

1 MHz Line filter set.

Voltage Calibration DC

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.50000	1.49997	0.00002	V DC	-0.002
1.5 V	-1.50000	-1.50003	0.00002	V DC	0.002
3 V	3.00000	2.99991	0.00004	V DC	-0.003
3 V	-3.00000	-3.00012	0.00002	V DC	0.004
6 V	6.00000	5.99989	0.00006	V DC	-0.002
6 V	-6.00000	-6.00016	0.00006	V DC	0.003
10 V	10.0000	9.9998	0.0002	V DC	-0.002
10 V	-10.0000	-10.0002	0.0002	V DC	0.002
15 V	15.0000	14.9997	0.0004	V DC	-0.002
15 V	-15.0000	-15.0005	0.0004	V DC	0.003
30 V	30.0000	29.9994	0.0005	V DC	-0.002
30 V	-30.0000	-30.0014	0.0005	V DC	0.005
60 V	60.0000	60.0002	0.0007	V DC	0.000
60 V	-60.0000	-60.0017	0.0006	V DC	0.003
100 V	110.000	109.998	0.002	V DC	-0.002
100 V	-110.000	-110.003	0.002	V DC	0.003
100 V	100.000	99.999	0.002	V DC	-0.001
100 V	-100.000	-100.003	0.002	V DC	0.003
100 V	50.000	49.998	0.002	V DC	-0.003
100 V	-50.000	-50.003	0.002	V DC	0.006
100 V	10.000	9.998	0.002	V DC	-0.023
100 V	-10.000	-10.002	0.002	V DC	0.023
100 V	1.000	0.997	0.002	V DC	-0.333
100 V	-1.000	-1.003	0.002	V DC	0.300
150 V	150.000	149.999	0.007	V DC	-0.001
150 V	-150.000	-150.003	0.007	V DC	0.002
300 V	300.000	299.996	0.011	V DC	-0.001
300 V	-300.000	-300.011	0.011	V DC	0.004
600 V	600.000	599.993	0.018	V DC	-0.001
600 V	-600.000	-600.028	0.019	V DC	0.005
1000 V	1.0000	1.0000	0.0002	kV DC	-0.001
1000 V	-1.0000	-1.0000	0.0002	kV DC	0.005

Voltage Calibration 10 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.50000	1.50004	0.00026	V AC	0.002
3 V	3.0000	3.0000	0.0009	V AC	0.001
6 V	6.0000	6.0002	0.0010	V AC	0.004
10 V	10.0000	9.9998	0.0013	V AC	-0.002
15 V	15.000	15.001	0.005	V AC	0.004
30 V	30.000	30.000	0.010	V AC	0.001
60 V	60.000	60.000	0.015	V AC	0.000
100 V	100.000	99.999	0.016	V AC	-0.001

Voltage Calibration 60 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.50000	1.49986	0.00029	V AC	-0.009
3 V	3.0000	2.9998	0.0006	V AC	-0.008
6 V	6.0000	5.9995	0.0013	V AC	-0.008
10 V	10.0000	10.0000	0.0008	V AC	0.000
15 V	15.0000	14.9998	0.0010	V AC	-0.001
30 V	30.0000	29.9999	0.0027	V AC	0.000
60 V	60.000	59.999	0.004	V AC	-0.002
100 V	110.000	109.999	0.009	V AC	-0.001
100 V	100.000	100.000	0.008	V AC	0.000
100 V	50.000	50.000	0.004	V AC	0.000
100 V	10.000	10.004	0.002	V AC	0.044
100 V	1.000	1.000	0.002	V AC	0.005
150 V	150.000	150.001	0.010	V AC	0.001
300 V	300.000	299.997	0.027	V AC	-0.001
600 V	600.00	599.99	0.05	V AC	-0.002
1000 V	1.000	0.997	0.004	kV AC	-0.272

Voltage Calibration 1 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.5000	1.5002	0.0003	V AC	0.012
3 V	3.0000	3.0003	0.0007	V AC	0.008
6 V	6.0000	6.0006	0.0010	V AC	0.010
10 V	10.0000	10.0010	0.0006	V AC	0.010
15 V	15.0000	15.0007	0.0008	V AC	0.005
30 V	30.0000	30.0016	0.0016	V AC	0.005
60 V	60.0000	60.0025	0.0028	V AC	0.004
100 V	100.000	100.004	0.006	V AC	0.004
150 V	150.000	150.010	0.008	V AC	0.007
300 V	300.000	300.013	0.018	V AC	0.004
600 V	600.00	600.02	0.05	V AC	0.003
1000 V	1.000	1.006	0.012	kV AC	0.632

Voltage Calibration 10 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.50000	1.50126	0.00007	V AC	0.084
3 V	3.00000	3.00183	0.00014	V AC	0.061
6 V	6.0000	6.0026	0.0003	V AC	0.043
10 V	10.0000	10.0027	0.0007	V AC	0.027
15 V	15.0000	15.0012	0.0009	V AC	0.008
30 V	30.0000	30.0010	0.0017	V AC	0.003
60 V	60.000	59.999	0.007	V AC	-0.002
100 V	100.000	99.999	0.008	V AC	-0.001
150 V	150.000	149.995	0.009	V AC	-0.004
300 V	300.00	299.96	0.13	V AC	-0.012
600 V	600.00	599.52	0.04	V AC	-0.080

Voltage Calibration 50 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.50000	1.49868	0.00016	V AC	-0.088
3 V	3.0000	2.9970	0.0004	V AC	-0.102
6 V	6.0000	5.9926	0.0007	V AC	-0.123
10 V	10.0000	9.9852	0.0015	V AC	-0.148
15 V	15.0000	14.9777	0.0021	V AC	-0.149
30 V	30.000	29.951	0.010	V AC	-0.163
60 V	60.000	59.906	0.019	V AC	-0.156
100 V	100.00	99.85	0.03	V AC	-0.152
150 V	150.00	149.62	0.05	V AC	-0.251
300 V	300.00	298.13	0.23	V AC	-0.625

Voltage Calibration 100 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1.5 V	1.5000	1.4949	0.0006	V AC	-0.339
3 V	3.0000	2.9891	0.0014	V AC	-0.362
6 V	6.0000	5.9776	0.0020	V AC	-0.374
10 V	10.000	9.960	0.004	V AC	-0.401
15 V	15.000	14.932	0.006	V AC	-0.453
30 V	30.00	29.85	0.04	V AC	-0.503
60 V	60.00	59.72	0.07	V AC	-0.468
100 V	100.00	99.52	0.10	V AC	-0.475
150 V	150.00	149.01	0.11	V AC	-0.661
300 V	300	293	3	V AC	-2.359

Current Calibration DC

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 100 mA	100.000	99.997	0.005	mA DC	-0.003
10 Ohm 100 mA	-100.000	-99.998	0.005	mA DC	-0.002
5 Ohm 100 mA	100.000	100.001	0.005	mA DC	0.001
5 Ohm 100 mA	-100.000	-99.996	0.005	mA DC	-0.004
1.5 Ohm 167 mA	200.000	199.988	0.012	mA DC	-0.006
1.5 Ohm 167 mA	-200.000	-199.998	0.012	mA DC	-0.001
1.5 Ohm 167 mA	100.000	99.994	0.005	mA DC	-0.006
1.5 Ohm 167 mA	-100.000	-100.000	0.006	mA DC	0.000
1.5 Ohm 167 mA	10.000	9.996	0.002	mA DC	-0.039
1.5 Ohm 167 mA	-10.000	-10.003	0.002	mA DC	0.032
1 Ohm 100 mA	100.000	99.987	0.005	mA DC	-0.013
1 Ohm 100 mA	-100.000	-100.010	0.005	mA DC	0.010
1 Ohm 1A	1.00000	0.99998	0.00004	A DC	-0.002
1 Ohm 1A	-1.00000	-1.00003	0.00006	A DC	0.003

Current Calibration AC at 10 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 100 mA	100.000	99.997	0.018	mA AC	-0.003
10 Ohm 100 mA	100.000	99.998	0.018	mA AC	-0.002
1.5 Ohm 167 mA	100.000	99.997	0.018	mA AC	-0.003
1 Ohm 100 mA	100.000	99.997	0.018	mA AC	-0.003
1 Ohm 1A	1.00000	1.00004	0.00021	A AC	0.004

Current Calibration AC at 60 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 5 mA	5.0000	4.9995	0.0016	mA AC	-0.011
10 Ohm 10 mA	10.0000	9.9995	0.0013	mA AC	-0.005
10 Ohm 25 mA	20.000	19.998	0.003	mA AC	-0.009
10 Ohm 50 mA	50.000	49.999	0.005	mA AC	-0.001
10 Ohm 100 mA	100.000	99.997	0.009	mA AC	-0.003
5 Ohm 5 mA	5.0000	4.9997	0.0016	mA AC	-0.007
5 Ohm 10 mA	10.0000	9.9995	0.0013	mA AC	-0.005
5 Ohm 20 mA	20.000	19.998	0.003	mA AC	-0.008
5 Ohm 50 mA	50.000	49.998	0.005	mA AC	-0.003
5 Ohm 100 mA	100.000	100.000	0.009	mA AC	0.000
5 Ohm 200 mA	200.00	200.00	0.04	mA AC	-0.002
1.5 Ohm 6.67 mA	5.0000	4.9995	0.0017	mA AC	-0.009
1.5 Ohm 16.7 mA	10.0000	9.9999	0.0013	mA AC	-0.001
1.5 Ohm 33.3 mA	20.000	19.998	0.003	mA AC	-0.012
1.5 Ohm 66.7 mA	50.000	49.999	0.005	mA AC	-0.003
1.5 Ohm 167 mA	200.00	199.99	0.04	mA AC	-0.003
1.5 Ohm 167 mA	100.000	99.996	0.009	mA AC	-0.004
1.5 Ohm 167 mA	20.000	19.998	0.004	mA AC	-0.012
1.5 Ohm 167 mA	5.000	5.000	0.002	mA AC	-0.009
1.5 Ohm 333 mA	200.00	200.00	0.04	mA AC	-0.001
1.5 Ohm 667 mA	0.50000	0.50004	0.00009	A AC	0.007
1 Ohm 10 mA	10.000	10.000	0.002	mA AC	-0.002
1 Ohm 25 mA	20.000	19.998	0.004	mA AC	-0.009
1 Ohm 50 mA	50.000	50.000	0.005	mA AC	0.000
1 Ohm 100 mA	100.000	99.997	0.009	mA AC	-0.003
1 Ohm 250 mA	200.00	200.00	0.04	mA AC	-0.002
1 Ohm 500 mA	500.00	500.04	0.08	mA AC	0.008
1 Ohm 1A	1000.00	1000.07	0.14	mA AC	0.007

Current Calibration AC at 1 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 50 mA	50.000	49.998	0.009	mA AC	-0.004
5 Ohm 100 mA	100.000	100.003	0.010	mA AC	0.003
1.5 Ohm 333 mA	200.00	200.00	0.04	mA AC	0.000
1 Ohm 10 mA	10.000	10.000	0.002	mA AC	0.001
1 Ohm 100 mA	100.000	100.003	0.010	mA AC	0.003
1 Ohm 250 mA	200.00	200.00	0.04	mA AC	0.000
1 Ohm 500 mA	500.00	500.05	0.09	mA AC	0.010
1 Ohm 1A	1000.00	1000.07	0.19	mA AC	0.007

Current Calibration AC at 10 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 50 mA	50.000	50.003	0.004	mA AC	0.005
5 Ohm 10 mA	10.000	10.000	0.002	mA AC	0.003
5 Ohm 100 mA	100.000	100.007	0.009	mA AC	0.007
1.5 Ohm 16.7 mA	10.0000	10.0006	0.0018	mA AC	0.006
1.5 Ohm 66.7 mA	50.000	50.000	0.004	mA AC	0.000
1.5 Ohm 333 mA	200.00	200.02	0.05	mA AC	0.009
1 Ohm 10 mA	10.000	10.000	0.002	mA AC	-0.001
1 Ohm 100 mA	100.000	100.005	0.009	mA AC	0.005
1 Ohm 250 mA	200.00	200.01	0.05	mA AC	0.007
1 Ohm 500 mA	500.00	500.08	0.09	mA AC	0.017
1 Ohm 1A	1000.00	1000.10	0.17	mA AC	0.010

Current Calibration AC at 50 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 50 mA	50.000	49.957	0.009	mA AC	-0.086
5 Ohm 100 mA	100.000	99.918	0.013	mA AC	-0.082
1.5 Ohm 66.7 mA	50.000	49.955	0.009	mA AC	-0.089
1.5 Ohm 333 mA	200.00	199.90	0.14	mA AC	-0.052
1 Ohm 100 mA	100.000	99.914	0.013	mA AC	-0.086
1 Ohm 500 mA	500.0	499.8	0.3	mA AC	-0.044

Current Calibration AC at 100 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
10 Ohm 50 mA	50.000	49.820	0.012	mA AC	-0.360
5 Ohm 100 mA	100.000	99.643	0.022	mA AC	-0.357
1.5 Ohm 333 mA	200.0	199.6	0.8	mA AC	-0.199
1 Ohm 50 mA	50.000	49.819	0.013	mA AC	-0.361
1 Ohm 250 mA	200.0	199.6	0.8	mA AC	-0.200
1 Ohm 500 mA	500.0	499.0	2.0	mA AC	-0.193
1 Ohm 1A	1000	998	3	mA AC	-0.182

Probe Current Calibration DC. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1 V	1.00000	1.00001	0.00009	A DC	0.001
1 V	-1.00000	-0.99997	0.00008	A DC	-0.003

Probe Current Calibration 10 Hz. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1 V	1.00000	0.99998	0.00021	A AC	-0.002

Probe Current Calibration 60 Hz. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 mV	100.00	99.93	0.12	mA AC	-0.074
200 mV	200.00	199.97	0.09	mA AC	-0.016
1 V	1.00000	0.99997	0.00015	A AC	-0.003

Probe Current Calibration 1 kHz. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 mV	100.00	99.93	0.13	mA AC	-0.074
200 mV	200.00	199.96	0.18	mA AC	-0.018
1 V	1.00000	1.00005	0.00013	A AC	0.005

Probe Current Calibration 10 kHz. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1 V	1.00000	1.00043	0.00018	A AC	0.043

Probe Current Calibration 50 kHz. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1 V	1.00000	0.99935	0.00014	A AC	-0.065

Probe Current Calibration 100 kHz. For current 1V/A is set.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
1 V	1.00000	0.99750	0.00024	A AC	-0.250

Power Calibration DC Constant 100 V

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 10 Ohm 100 mA	10.000	9.999	0.002	W	-0.012
100 V & 10 Ohm 100 mA	-10.000	-10.000	0.002	W	-0.001
100 V & 5 Ohm 100 mA	10.000	10.000	0.002	W	0.001
100 V & 5 Ohm 100 mA	-10.000	-10.000	0.002	W	-0.001
100 V & 1.5 Ohm 167 mA	1.000	1.000	0.002	W	-0.034
100 V & 1.5 Ohm 167 mA	-1.000	-1.000	0.002	W	0.049
100 V & 1.5 Ohm 167 mA	10.000	9.999	0.002	W	-0.011
100 V & 1.5 Ohm 167 mA	-10.000	-10.000	0.002	W	0.001
100 V & 1.5 Ohm 167 mA	20.000	19.997	0.004	W	-0.015
100 V & 1.5 Ohm 167 mA	-20.000	-20.003	0.004	W	0.013
100 V & 1 Ohm 100 mA	10.000	9.999	0.002	W	-0.014
100 V & 1 Ohm 100 mA	-10.000	-10.001	0.002	W	0.012
100 V & 1 Ohm 1A	100.00	99.99	0.04	W	-0.012
100 V & 1 Ohm 1A	-100.00	-100.01	0.04	W	0.005

Power Calibration DC Constant 1 A

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	110.00	109.98	0.04	W	-0.014
100 V & 1 Ohm 1A	-110.00	-109.99	0.04	W	-0.011
100 V & 1 Ohm 1A	50.000	49.997	0.018	W	-0.007
100 V & 1 Ohm 1A	-50.000	-50.000	0.019	W	0.001
100 V & 1 Ohm 1A	10.000	9.996	0.004	W	-0.040
100 V & 1 Ohm 1A	-10.000	-10.006	0.004	W	0.055
100 V & 1 Ohm 1A	1.000	0.998	0.002	W	-0.184
100 V & 1 Ohm 1A	-1.000	-1.001	0.002	W	0.136
15 V & 1 Ohm 1A	15.000	14.998	0.006	W	-0.011
15 V & 1 Ohm 1A	-15.000	-14.999	0.006	W	-0.008
150 V & 1 Ohm 1A	150.00	149.98	0.05	W	-0.010
150 V & 1 Ohm 1A	-150.00	-149.99	0.06	W	-0.009
1000 V & 1 Ohm 1A	1000.0	999.9	0.4	W	-0.013
1000 V & 1 Ohm 1A	-1000.0	-999.9	0.4	W	-0.011

Power CalibrationAC Constant 100 V at Frequency 10 Hz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	100.000	100.004	0.021	W	0.004

Power Calibration AC Constant 100 V at Frequency 60 Hz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 10 Ohm 5 mA	500.00	500.15	0.17	mW	0.030
100 V & 10 Ohm 10 mA	1.00000	1.00010	0.00025	W	0.010
100 V & 10 Ohm 25 mA	2.0000	2.0002	0.0004	W	0.010
100 V & 10 Ohm 50 mA	5.0000	5.0000	0.0007	W	0.001
100 V & 10 Ohm 100 mA	10.0000	9.9993	0.0012	W	-0.007
100 V & 5 Ohm 5 mA	500.00	500.16	0.17	mW	0.032
100 V & 5 Ohm 10 mA	1.00000	1.00012	0.00025	W	0.012
100 V & 5 Ohm 20 mA	2.0000	2.0002	0.0004	W	0.012
100 V & 5 Ohm 50 mA	5.0000	4.9998	0.0007	W	-0.004
100 V & 5 Ohm 100 mA	10.0000	9.9995	0.0012	W	-0.005
100 V & 5 Ohm 200 mA	20.000	19.998	0.003	W	-0.012
100 V & 1.5 Ohm 6.67 mA	0.50000	0.50015	0.00017	W	0.030
100 V & 1.5 Ohm 167 mA	0.5000	0.5001	0.0002	W	0.023
100 V & 1.5 Ohm 16.7 mA	1.00000	1.00012	0.00025	W	0.012
100 V & 1.5 Ohm 33.3 mA	2.0000	2.0002	0.0004	W	0.009
100 V & 1.5 Ohm 167 mA	2.0000	2.0002	0.0004	W	0.009
100 V & 1.5 Ohm 66.7 mA	5.0000	4.9997	0.0007	W	-0.005
100 V & 1.5 Ohm 167 mA	10.0000	9.9991	0.0012	W	-0.009
100 V & 1.5 Ohm 333 mA	20.000	19.997	0.003	W	-0.013
100 V & 1.5 Ohm 667 mA	50.000	50.004	0.008	W	0.008
100 V & 1 Ohm 10 mA	1.00000	1.00014	0.00025	W	0.014
100 V & 1 Ohm 25 mA	2.0000	2.0003	0.0004	W	0.013
100 V & 1 Ohm 50 mA	5.0000	4.9999	0.0007	W	-0.002
100 V & 1 Ohm 100 mA	10.0000	9.9993	0.0012	W	-0.007
100 V & 1 Ohm 250 mA	20.000	19.998	0.003	W	-0.011
100 V & 1 Ohm 500 mA	50.000	50.002	0.008	W	0.005
100 V & 1 Ohm 1A	100.000	100.006	0.015	W	0.006

Power Calibration AC Constant 1 A at Frequency 60 Hz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	110.000	110.007	0.016	W	0.006
100 V & 1 Ohm 1A	50.000	50.003	0.008	W	0.006
100 V & 1 Ohm 1A	10.000	10.000	0.002	W	0.002
100 V & 1 Ohm 1A	1.000	1.000	0.002	W	-0.027
1.5 V & 1 Ohm 1A	1.5000	1.5000	0.0005	W	-0.002
3 V & 1 Ohm 1A	3.0000	3.0000	0.0010	W	0.001
6 V & 1 Ohm 1A	6.0000	6.0000	0.0021	W	0.000
10 V & 1 Ohm 1A	10.0000	10.0007	0.0015	W	0.007
15 V & 1 Ohm 1A	15.0000	15.0010	0.0022	W	0.007
30 V & 1 Ohm 1A	30.000	30.002	0.004	W	0.006
60 V & 1 Ohm 1A	60.000	60.004	0.008	W	0.007
150 V & 1 Ohm 1A	150.000	150.012	0.022	W	0.008
300 V & 1 Ohm 1A	300.00	300.02	0.05	W	0.008
600 V & 1 Ohm 1A	600.00	600.04	0.08	W	0.007
1000 V & 1 Ohm 1A	1.00000	1.00006	0.00015	kW	0.006

Power Calibration AC Constant 100 V at Frequency 1k Hz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 10 Ohm 50 mA	5.0000	5.0003	0.0010	W	0.006
100 V & 5 Ohm 100 mA	10.0000	10.0008	0.0011	W	0.008
100 V & 1.5 Ohm 333 mA	20.000	20.001	0.004	W	0.007
100 V & 1 Ohm 10 mA	1.00000	1.00007	0.00013	W	0.007
100 V & 1 Ohm 100 mA	10.0000	10.0007	0.0011	W	0.007
100 V & 1 Ohm 250 mA	20.000	20.001	0.004	W	0.005
100 V & 1 Ohm 500 mA	50.000	50.007	0.006	W	0.015
100 V & 1 Ohm 1A	100.000	100.015	0.022	W	0.015

Power Calibration AC Constant 1 A at Frequency 1 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
3 V & 1 Ohm 1A	3.00000	3.00055	0.00026	W	0.018
6 V & 1 Ohm 1A	6.0000	6.0012	0.0018	W	0.020
10 V & 1 Ohm 1A	10.0000	10.0022	0.0022	W	0.022
15 V & 1 Ohm 1A	15.000	15.002	0.003	W	0.014
30 V & 1 Ohm 1A	30.000	30.005	0.007	W	0.016
60 V & 1 Ohm 1A	60.000	60.008	0.012	W	0.013
150 V & 1 Ohm 1A	150.00	150.02	0.03	W	0.016
300 V & 1 Ohm 1A	300.00	300.04	0.07	W	0.015
600 V & 1 Ohm 1A	600.00	600.08	0.13	W	0.013
1000 V & 1 Ohm 1A	1.00000	1.00014	0.00022	kW	0.014

Power Calibration AC Constant 100 V at Frequency 10 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 10 Ohm 10 mA	1.0000	1.0002	0.0007	W	0.020
100 V & 10 Ohm 50 mA	5.000	5.001	0.003	W	0.029
100 V & 5 Ohm 10 mA	1.0000	1.0002	0.0007	W	0.019
100 V & 5 Ohm 100 mA	10.000	10.003	0.006	W	0.026
100 V & 1.5 Ohm 16.7 mA	1.0000	1.0002	0.0007	W	0.023
100 V & 1.5 Ohm 66.7 mA	5.000	5.001	0.003	W	0.025
100 V & 1.5 Ohm 333 mA	20.000	20.005	0.013	W	0.024
100 V & 1 Ohm 500 mA	50.000	50.018	0.028	W	0.036
100 V & 1 Ohm 100 mA	10.000	10.003	0.006	W	0.029
100 V & 1 Ohm 250 mA	20.000	20.005	0.013	W	0.023
100 V & 1 Ohm 500 mA	50.000	50.014	0.027	W	0.028
100 V & 1 Ohm 1A	100.00	100.03	0.05	W	0.025

Power Calibration AC Constant 1 A at Frequency 10 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
15 V & 1 Ohm 1A	15.000	15.004	0.005	W	0.025
30 V & 1 Ohm 1A	30.000	30.009	0.016	W	0.029
60 V & 1 Ohm 1A	60.00	60.01	0.03	W	0.024
150 V & 1 Ohm 1A	150.00	150.10	0.22	W	0.067
300 V & 1 Ohm 1A	300.00	300.02	0.20	W	0.006
600 V & 1 Ohm 1A	600.0	599.9	0.4	W	-0.019

Power Calibration AC Constant 100 V at Frequency 50 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 10 Ohm 50 mA	5.000	4.989	0.007	W	-0.210
100 V & 5 Ohm 100 mA	10.000	9.980	0.015	W	-0.201
100 V & 1.5 Ohm 333 mA	20.00	19.96	0.03	W	-0.180
100 V & 1 Ohm 500 mA	50.00	49.92	0.12	W	-0.170
100 V & 1 Ohm 100 mA	10.000	9.979	0.015	W	-0.207
100 V & 1 Ohm 250 mA	20.00	19.96	0.03	W	-0.182
100 V & 1 Ohm 500 mA	50.00	49.92	0.12	W	-0.169
100 V & 1 Ohm 1A	100.00	99.83	0.16	W	-0.169

Power Calibration AC Constant 1 A at Frequency 50 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
15 V & 1 Ohm 1A	15.000	14.961	0.025	W	-0.260
30 V & 1 Ohm 1A	30.00	29.94	0.05	W	-0.186
60 V & 1 Ohm 1A	60.00	59.90	0.10	W	-0.170

Power Calibration AC Constant 100 V at Frequency 100 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 10 Ohm 50 mA	5.000	4.957	0.009	W	-0.858
100 V & 5 Ohm 100 mA	10.000	9.917	0.017	W	-0.828
100 V & 1.5 Ohm 333 mA	20.00	19.86	0.05	W	-0.690
100 V & 1 Ohm 500 mA	50.00	49.69	0.15	W	-0.627
100 V & 1 Ohm 100 mA	10.000	9.918	0.017	W	-0.822
100 V & 1 Ohm 250 mA	20.00	19.86	0.05	W	-0.695
100 V & 1 Ohm 500 mA	50.00	49.68	0.15	W	-0.636
100 V & 1 Ohm 1A	100.0	99.3	0.4	W	-0.732

Power Calibration AC Constant 1 A at Frequency 100 kHz PF=1

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
15 V & 1 Ohm 1A	15.00	14.89	0.05	W	-0.711
30 V & 1 Ohm 1A	30.00	29.80	0.09	W	-0.681
60 V & 1 Ohm 1A	60.00	59.63	0.18	W	-0.622

For current 1V/A is set in the instrument. Constant 60 V

Probe Current Power Calibration DC.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 1V	60.000	60.000	0.005	W	-0.001
60 V & 1V	-60.000	-60.004	0.007	W	0.007

External Current Power Calibration 10 Hz. PF=1.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 1V	60.000	60.001	0.006	W	0.002

Probe Current Power Calibration 60 Hz. PF=1.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 100 mV	6.0000	5.9985	0.0007	W	-0.025
60 V & 500 mV	30.0000	30.0005	0.0027	W	0.002
60 V & 200 mV	12.0000	11.9995	0.0014	W	-0.004
60 V & 1V	60.000	60.002	0.005	W	0.004
60 V & 5V	300.000	300.006	0.024	W	0.002
60 V & 10V	300.000	300.004	0.024	W	0.001

Probe Current Power Calibration 1 kHz. PF=1.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 100 mV	6.0000	5.9990	0.0014	W	-0.017
60 V & 500 mV	30.0000	30.0034	0.0022	W	0.011
60 V & 200 mV	12.0000	12.0003	0.0013	W	0.003
60 V & 1V	60.000	60.006	0.003	W	0.009
60 V & 5V	300.000	300.028	0.018	W	0.009
60 V & 10V	300.000	300.037	0.015	W	0.012

Probe Current Power Calibration 10 kHz. PF=1.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 1V	60.000	60.030	0.011	W	0.050
60 V & 5V	300.000	300.133	0.021	W	0.044

Probe Current Power Calibration 50 kHz. PF=1.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 1V	60.000	59.876	0.007	W	-0.206
60 V & 5V	300.00	299.12	0.03	W	-0.294

Probe Current Power Calibration 100 kHz. PF=1.

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
60 V & 1V	60.00	59.57	0.13	W	-0.709
60 V & 5V	300.0	297.5	0.6	W	-0.821

Power Calibration 60Hz PF=0 lag. Constant 1 A

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
15 V & 1 Ohm 1A	0.000	0.000	0.006	W	-
100 V & 1 Ohm 1A	0.000	-0.002	0.011	W	-
150 V & 1 Ohm 1A	0.000	-0.001	0.016	W	-

Power Calibration 60Hz PF=0 Lead Constant 1 A

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
15 V & 1 Ohm 1A	0.000	0.000	0.006	W	-
100 V & 1 Ohm 1A	0.000	0.001	0.011	W	-
150 V & 1 Ohm 1A	0.000	0.001	0.016	W	-

Power Calibration 1 kHz PF=0 lag

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.00	0.01	0.25	W	-

Power Calibration 10 kHz PF=0 lag

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.0	0.1	0.4	W	-

Power Calibration 50 kHz PF=0 lag

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.0	0.7	1.3	W	-

Power Calibration 100 kHz PF=0 lag

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.0	1.3	2.5	W	-

Power Calibration 1 kHz PF=0 lead

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.00	0.00	0.09	W	-

Power Calibration 10 kHz PF=0 lead

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.0	-0.1	0.3	W	-

Power Calibration 50 kHz PF=0 lead

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.0	-0.7	1.3	W	-

Power Calibration 100 kHz PF=0 lead

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	0.0	-1.3	2.5	W	-

6th Voltage Harmonic (60 Hz) synchronized to 10 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V	100.000	99.997	0.009	V AC	-0.003

20th Voltage Harmonic (1 kHz) synchronized to 50 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V	100.000	100.003	0.006	V AC	0.003

25th Voltage Harmonic (10 kHz) synchronized to 400 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V	100.00	100.01	0.05	V AC	0.006

20th Voltage Harmonic (50 kHz) synchronized to 2.5 kHz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V	100.00	99.86	0.13	V AC	-0.143

6th Current Harmonic (60 Hz) synchronized to 10 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
P1 V	1.00000	0.99985	0.00012	A AC	-0.015

20th Current Harmonic (1 kHz) synchronized to 50 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
P1 V	1.00000	1.00005	0.00012	A AC	0.005

25th Current Harmonic (10 kHz) synchronized to 400 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
P1 V	1.00000	1.00040	0.00017	A AC	0.040

1st Power Harmonic synchronized to 60 Hz

Range	Applied	Measured	±Uncertainty	Unit	Deviation %
100 V & 1 Ohm 1A	100.000	100.006	0.015	W	0.006

Comments : No comment

For information, the deviation is given as a percentage (in %) of the mAeasured
value to the applied value. % =((Measured-Applied)/Applied)·100%
Capacitive loads are leading (current leads voltage), and inductive loads are lagging (current lags voltage).

For harmonics to be measured, the fundamental period that will be used to analyze the harmonics must be determined.
The signal for determining the fundamental period is the PLL source. That is calibrated by e.g. the fundamental
signal applied to the voltage input, the x harmonics will be applied to the current input by using sinewaves.