

CERTIFICATE OF CALIBRATION

Date of issue: 22 February 2016

Certificate Number: CT/155/2016

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CALIBRATION OBJECT Name: Three Phase Power Calibrator and Power Engineering Apparatus Tester
Model: C300B class 0.02
Serial No.: 26070
Manufacturer: Innovative-Developing Enterprise Calmet Ltd.
Poland, 65-472 Zielona Gora, Kukulcza Street 18

APPLICANT

████████████████████
████████████████████
████████████████████
████████████████████

CALIBRATION METHOD Method of Direct Comparison - according to a procedure CT-PW-02-04

ENVIRONMENTAL CONDITIONS Calibration was performed in +23°C±2°C ambient temperature and 35...60% relative humidity

CALIBRATION DATE 19 February 2016

TRACEABILITY This instrument was calibrated by a Three-phase Electricity Standard Radian RD-33-223 SN 301589, which is traceable to the National Institute of Standards and Technology (NIST).
For calibration was also used Keysight 3458A Multimeter SN MY45051722

CALIBRATION RESULTS The calibration results are presented on the next pages of this certificate including uncertainty of measurement


UNCERTAINTY OF MEASUREMENT Uncertainty of measurement has been evaluated in compliance with EA-4/02.
The expanded uncertainty assigned corresponds to a coverage probability of 95% and the coverage factor k=2

COMPLIANCE WITH THE REQUIREMENTS As a result of calibration, it has been found, that the instrument listed above meets metrological requirements specified in manufacturer documentation

DECLARATION This is to confirm, that Calmet's Laboratory of Measurement meets requirements of the EN ISO/IEC 17025:2005 standard

Przedsiębiorstwo Innowacyjno Wdrożeniowe
CALMET Spółka z o.o.
ul. Kukulcza 18, tel. +48 68 324 04 56
65-472 ZIELONA GÓRA

PREZES ZARZADU


inż. Adam Stugocki
Stamp and signature

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 Calmet Ltd. in Zielona Gora Poland

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CALIBRATION RESULTS

The results are presented below

ID.	Function symbol Range	Setting				Uncertainty of calibrator	Measurement results			Uncertainty of measurement
		U	I	f	φ		Errors in phase			
		[V]	[A]	[Hz]	[°]		L1	L2	L3	
1	U 70V	3.0	50	50		±0.0042V	+0.0006V	+0.0007V	+0.0006V	0.0040V
2		20.0				±0.0042V	-0.0005V	-0.0006V	-0.0005V	0.0046V
3		65.0				±0.0130V	-0.0014V	-0.0014V	-0.0013V	0.0038V
4	U 140V	40				±0.008V	-0.001V	-0.001V	-0.001V	0.003V
5		130				±0.026V	-0.002V	-0.002V	-0.002V	0.008V
6	U 280V	85				±0.017V	-0.003V	-0.002V	-0.002V	0.005V
7		260				±0.052V	-0.004V	-0.004V	-0.003V	0.015V
8	U 560V	170				±0.034V	-0.004V	-0.004V	-0.003V	0.010V
9		510				±0.102V	-0.006V	-0.008V	-0.005V	0.029V
10	I 0,5A	0.020	±0.000010A	-0.000001A	-0.000002A	-0.000001A	0.000002A			
11		0.125	±0.000025A	+0.000003A	-0.000003A	+0.000004A	0.000007A			
12		0.480	±0.000096A	-0.000012A	-0.000013A	-0.000012A	0.000028A			
13	I 6A	0.5	±0.00012A	+0.00004A	-0.00002A	+0.00003A	0.00003A			
14		1.5	±0.00030A	+0.00003A	+0.00000A	+0.00004A	0.00009A			
15		5.8	±0.00116A	-0.00013A	-0.00018A	-0.00017A	0.00034A			
16	I 20A	5	±0.0010A	+0.0000A	-0.0002A	+0.0000A	0.0003A			
17		10	±0.0020A	-0.0004A	-0.0006A	-0.0003A	0.0006A			
18		19	±0.0038A	-0.0003A	-0.0004A	-0.0002A	0.0011A			
19	I 120A	30	±0.006A	+0.001A	+0.000A	+0.001A	0.001A			
20		60	±0.012A	-0.001A	-0.002A	-0.002A	0.004A			
21		115	±0.023A	-0.001A	-0.002A	-0.002A	0.007A			
22	f		50	±0.0020Hz	-0.0002Hz	-	-	0.0031Hz		
23			60	±0.0020Hz	+0.0000Hz	-	-	0.0037Hz		
24	φ	230	5	50	0	±0.05°	+0.01°	+0.00°	+0.00°	0.02°
25					+90	±0.05°	+0.01°	+0.00°	+0.01°	0.02°
26					-90	±0.05°	-0.01°	+0.00°	-0.01°	0.02°

ID.	Function symbol [unit]	Setting				Uncertainty of calibrator	Measurement results				Uncertainty of measurement
		U	I	f	φ		Errors in phase				
		[V]	[A]	[Hz]	[°]		L1	L2	L3	L123	
1	P [W]	100	1	50	0	±0.020%	+0.001%	-0.005%	+0.000%	+0.000%	0.006%
2					60	±0.150%	-0.006%	-0.029%	+0.020%	+0.005%	0.007%
3					-60	±0.150%	+0.009%	-0.026%	-0.023%	-0.014%	0.007%
4		200	2		0	±0.020%	+0.004%	+0.001%	+0.006%	+0.003%	0.006%
5					60	±0.150%	-0.026%	+0.025%	+0.002%	+0.003%	0.007%
6					-60	±0.150%	-0.010%	-0.021%	-0.018%	-0.010%	0.007%
7		400	10		0	±0.020%	-0.004%	-0.006%	-0.002%	-0.002%	0.006%
8					60	±0.150%	+0.016%	-0.016%	-0.013%	-0.004%	0.007%
9					-60	±0.150%	-0.023%	-0.033%	-0.032%	-0.030%	0.007%
10	Q [var]	200	2	90	±0.020%	+0.005%	+0.003%	+0.006%	+0.005%	0.007%	
11				150	±0.150%	-0.003%	+0.008%	-0.016%	-0.004%	0.007%	
12				30	±0.150%	+0.018%	-0.023%	+0.026%	+0.007%	0.007%	
13	S [VA]	100	1	0	±0.020%	+0.001%	-0.004%	+0.002%	-0.002%	0.006%	
14		200	2	0	±0.020%	+0.005%	+0.003%	+0.006%	+0.004%	0.006%	
15		400	10	0	±0.020%	-0.004%	-0.006%	-0.001%	-0.004%	0.006%	

Measured by:

Kuszyk

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 Calmet Ltd. in Zielona Gora Poland

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CALIBRATION RESULTS

The results are presented below

ID.	Function symbol [unit]	Results of test active, reactive and apparent energy accuracy in four wire, star connection										
		Setting				Uncertainty of calibrator	Measurement results				Uncertainty of measurement	
		U	I	f	φ		Errors in phase					
		[V]	[A]	[Hz]	[°]		L1	L2	L3	L123		
1	EP [Wh]	57	5	50	0	±0.020%	+0.004%	-0.002%	+0.000%	+0.001%	0.006%	
2					60	±0.150%	-0.016%	-0.011%	-0.026%	-0.017%	0.007%	
3					-60	±0.150%	+0.003%	+0.010%	-0.012%	-0.003%	0.007%	
4					0	±0.020%	+0.005%	-0.001%	+0.002%	+0.002%	0.006%	
5					110	60	±0.150%	+0.014%	-0.007%	-0.028%	-0.007%	0.007%
6						-60	±0.150%	+0.022%	+0.007%	-0.022%	-0.002%	0.007%
7		0	±0.020%			+0.006%	+0.000%	+0.004%	+0.003%	0.006%		
8		0	±0.020%			+0.000%	-0.005%	-0.003%	-0.003%	0.006%		
9		0.1	60			±0.150%	+0.014%	-0.002%	-0.014%	-0.002%	0.007%	
10			-60			±0.150%	-0.034%	-0.040%	-0.038%	-0.037%	0.007%	
11			0		±0.020%	+0.005%	+0.000%	+0.002%	+0.004%	0.006%		
12			0		±0.020%	-0.003%	-0.006%	-0.003%	-0.005%	0.006%		
13			1		0	±0.020%	+0.001%	-0.004%	+0.001%	+0.000%	0.006%	
14					0	±0.020%	+0.005%	+0.002%	+0.005%	+0.004%	0.006%	
15		230			0	±0.020%	+0.005%	-0.001%	+0.002%	+0.002%	0.006%	
16					60	±0.150%	-0.018%	-0.016%	+0.014%	-0.006%	0.007%	
17					-60	±0.150%	+0.024%	-0.009%	-0.027%	-0.004%	0.007%	
18					0	±0.020%	+0.000%	-0.006%	-0.001%	-0.003%	0.006%	
19			0		±0.020%	+0.000%	-0.005%	+0.000%	-0.004%	0.006%		
20			0.5		0	±0.020%	+0.000%	-0.004%	-0.001%	-0.002%	0.006%	
21		0			±0.020%	+0.000%	-0.004%	-0.003%	-0.002%	0.006%		
22		120			60	±0.150%	+0.016%	+0.014%	-0.013%	+0.004%	0.007%	
23					-60	±0.150%	+0.028%	-0.017%	-0.028%	+0.003%	0.007%	
24					0	±0.020%	+0.003%	-0.003%	+0.002%	+0.000%	0.006%	
25	400			60	±0.150%	-0.017%	-0.015%	-0.009%	-0.013%	0.007%		
26			-60	±0.150%	-0.001%	+0.011%	-0.015%	-0.002%	0.007%			
27			90	±0.020%	+0.006%	+0.001%	+0.004%	+0.004%	0.007%			
28		57	150	±0.150%	+0.014%	+0.017%	-0.016%	+0.006%	0.007%			
29			30	±0.150%	-0.041%	-0.040%	-0.051%	-0.044%	0.007%			
30			230	90	±0.020%	+0.005%	+0.001%	+0.006%	+0.004%	0.007%		
31	150			±0.150%	+0.013%	-0.003%	+0.002%	+0.004%	0.007%			
32	30			±0.150%	-0.016%	-0.034%	-0.031%	-0.026%	0.007%			
33	57			0	±0.020%	+0.005%	-0.001%	+0.004%	+0.002%	0.006%		
34		110		0	±0.020%	+0.006%	+0.001%	+0.004%	+0.003%	0.006%		
35				1	0	±0.020%	+0.004%	-0.001%	+0.005%	+0.002%	0.006%	
36			230		5	±0.020%	+0.005%	+0.000%	+0.005%	+0.003%	0.006%	
37					10	±0.020%	+0.000%	-0.004%	+0.000%	-0.002%	0.006%	
38					50	±0.020%	+0.006%	-0.001%	+0.005%	+0.003%	0.006%	
39	100				±0.020%	+0.004%	-0.001%	+0.006%	+0.003%	0.006%		

Measured by:

Kuszyk