

Information Note

Unique Laboratory of Power Network Parameters and Power Quality

Calmet Laboratory offers calibration (checking, testing) of measuring instruments and calibrators of electro-energetic values such as: DC and AC voltage and current, phase angle and power factor, frequency, power, energy, resistance and impedance.

There are many accredited and non-accredited laboratories to offer these services, but Calmet offers a unique calibration services in the following scope:

- ▶ accuracy of voltage, current, power and energy at the level 0.007% for currents up to 3x120A AC,
- ▶ distorted signals as harmonic of voltage, current and power, interharmonics, subharmonic,
- ▶ time-varying signals as flicker, dips, sags, overvoltages, inrush current,

which means, that **we specialize in:**

- ▶ **highest accuracy,**
- ▶ **power quality parameters.**

Who needs us?

Power engineering and industries associated with it, where are used voltmeters, ammeters, clamp meters, frequency meters, phase meters, meters of power network parameters, watt-meters, electricity meters, power quality analyzers, calibrators of voltage, current and power, reference meters and testers of electrical devices, protection relays, measurement transducers, ...

What we offer?

1. Standardization of power quality parameters acc. to EN 61000-4-7, EN 61000-4-15, EN 61000-4-30 and EN 50160 made it possible to assess the power quality using the power quality analyzers, which should be tested periodically. Since 2002, we calibrated power quality analyzers only of our production - after 10 years we are extending our offer for power quality analyzers calibration of other manufacturers.
2. Increasing energy prices resulted in need of electricity meter testers with high accuracy classes from 0.5% to 0.02% inclusive. These testers are working under difficult conditions on site and the measurement results carry the big financial consequences, so there is a need of periodical checking these testers. So far we calibrated testers only of our production, and now we also offer calibration of testers (reference meters) of other manufacturers.
3. For more than 20th years, we have manufactured several thousand of electrical standards that determine the Calibration and Measurement Capability (CMC) of many domestic and foreign laboratories, and which for many years regularly calibrated and maintain. During this time our staff has acquired a lot of experience, which is the basis for the submission of proposals for calibration in difficult cases, impossible to achieve in other laboratories.

Hardware base

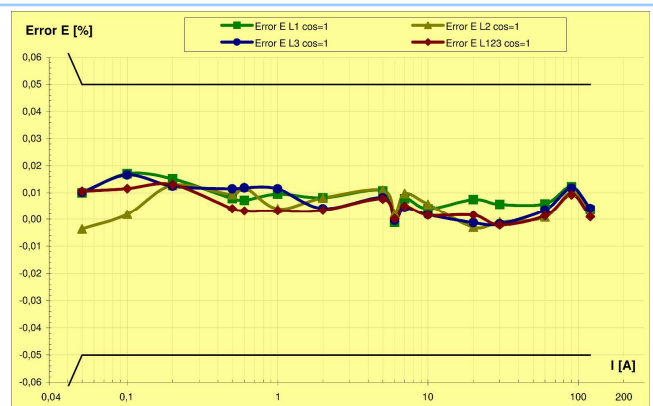
It is obvious, that for calibration is required in addition to the competence the necessary equipment.

We have automatic measuring stations for calibration the Three Phase Power Calibrators and reference meters, including 0.02% accuracy class manufactured by us. We have obtained such high level of automation, that it is possible to use these systems for calibrating instruments from other manufacturers.

The diagram shows an example of the error characteristics of the energy as a function of current (50mA-120A) of the C300 Calibrator for balanced and unbalanced loads, which was obtained in fully automatic way.

We have semi-automatic measuring stations for calibration the Multifunction Calibrators 0.05% accuracy class manufactured by us and we have other instruments too.

In the adjustment and calibration on the design, production and maintenance process we meet the requirements of EN ISO / IEC 17025 with traceability to the Polish National Standards, PTB or NIST.



Physical value	Parameter	Measuring range	CMC ¹⁾	Conditions	Note
Calibration of DC and AC voltage and current meters and calibrators – Multimeters and Multifunction Calibrators with CMC up to 0,007% at AC and 0,001% at DC.					
AC Voltage	RMS value	30-525V	0,007%	50Hz and 60Hz	
		0,01-700V	0,020%	40-50000Hz	
AC Current	RMS value	0,02-120A	0,007%	50Hz and 60Hz	
		0,001-120A	0,020%	45-500Hz	
		0,00001-3A	0,050%	45-5000Hz	
DC Voltage	RMS value	0,01-0,1V	0,010%		
		0,1-900V	0,001%		
DC Current	RMS value	0,00001-20A	0,010%		
Calibration of phase angle, power factor, frequency meters and calibrators in wide current range with CMC up to 0.010° at power frequency.					
Phase Angle between Voltage and Current. Phase Angle between Voltages		0-360°	0.010°	0,02-120A / 30-525V 50Hz and 60Hz	
			0.020°	0,001-120A / 30-520V 40-70Hz	
			0.040°	0,001-120A / 30-520V 45-500Hz	
Power factor		0,5-1	0,020%	0,02-120A / 30-525V 50Hz and 60Hz	
		0,1-0,5	0,050%		
Frequency		0,04-100kHz	0,001%		
Calibration of watt-meters, power calibrators, power instrument transducers in single phase and three phase configurations for balanced and unbalanced loads in wide current and voltage range up to 3x120A and 3x560V. For this purpose Calmet has a system with 0.007% uncertainty at the power frequency and systems with 0.040% uncertainty at 45-500Hz frequency.					
Electrical Power	Active, reactive, apparent power	0,02-120A / 30-525V	0,007%	50Hz & 60Hz / PF=0,5-1	
		0,001-120A / 30-520V	0,040%	45-500Hz / PF=0,5-1	
Calibration of electricity meters, electricity meter testers and power calibrators in single phase and three phase configurations for balanced and unbalanced loads in wide current and voltage range up to do 3x120A and 3x560V. For this purpose Calmet has a system with 0.007% uncertainty at the power frequency and systems with 0.040% uncertainty at 45-500Hz frequency. All systems are automatic and use comparison method of pulse output, and enable testing instruments using sinusoidal signals and distorted with harmonics and subharmonics according to the EN 50470.					
Electricity	Active, reactive, apparent energy	0,02-120A / 30-525V	0,007%	50Hz & 60Hz / PF=0,5-1	
		0,001-120A / 30-520V	0,040%	45-500Hz / PF=0,5-1	
Calibration of Power Quality Analysers and Power Quality Calibrators including flickermeters acc. to EN 61000-4-15 and analyzers class A acc. to the EN 61000-4-30 and EN 50160. For this purpose Calmet has systems for measurement and generation of signals with different shapes (harmonics, interharmonics) and time-varying signals with 0,050% uncertainty for the amplitude and 1ms for the time.					
Power Quality	Voltage harmonics	0-100%	0,020%	30-525V / 50Hz & 60Hz	to 64th
		0-360°	0,5°		to 31st
	Voltage THD	0-100%	0,020%	30-525V / 50Hz & 60Hz	
	Voltage asymmetry	100%	0,050%	30-525V / 50Hz & 60Hz	
	Voltage interharmonics	30%	1,000%	16Hz-9kHz	
	Voltage dips and interruptions	0-100%	0,050%		
		0,01-999s	0,001s		
	Overvoltage	0-200%	0,050%		
		0,01-999s	0,001s		
	Flicker Pst and Plt	0,2-40	1,000%		
	Current harmonics	0-100%	0,020%	0,02-120A / 50Hz & 60Hz	to 64th
0-360°		0,5°	to 31st		
Current THD	0-100%	0,020%	0,02-120A / 50Hz & 60Hz		
Current interharmincs	30%	1,000%	16Hz-9kHz		
Inrush current	0-500%	0,050%			
	0,01-9s	0,001s			
Calibration of resistance and impedance meters and calibrators at DC and power frequency.					
Resistance		1mΩ-10Ω	0,020%		
		10Ω-10MΩ	0,010%		
		10MΩ-10GΩ	0,100%		
Impedance		1mΩ-10kΩ	0,030%	50Hz	

¹⁾ Calibration and Measurement Capability CMC is the expanded uncertainty for a coverage factor k=2, which corresponds to the level of confidence of approximately 95% and is expressed as a percentage of measured values or in the same units as the measurement range.

Calmet Ltd
 Kukulcza 18, 65-472 Zielona Gora, Poland
 Phone +48 68 324 04 56 Fax +48 68 324 04 57
 E-mail: mail@calmet.com.pl Web access: http://www.calmet.com.pl