# Calmet Calibration Laboratory

## 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 an 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?

- 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.

Error E L1 cos=1 Error E L2 cos= Error E [%] Error E L3 cos=1 Error E L123 cos=1 0,06 0,05 0,04 0,03 0,02 0.01 0,00 -0.01 -0,02 -0.03 -0,04 -0,05 I [A] -0,06 200

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.

## **Calibration scope of Calmet's Calibration Laboratory**



| Physical value   | Parameter   | Measuring range   | CMC /   | Conditions  | Note   |
|--|---|---|---|---|--|
| Calibration of DC and AC vo  | Itage and current meters a  | and calibrators – Multimeters   | s and Multifu   | nction Calibrators with CMC up to   | o 0,007% at  |
| AC and 0,001% at DC.   |   |   | 0.0070/   |   |  |
| AC Voltage   | RMS value   | 30-5257   | 0,007%  |   |  |
|  |   | 0,01-7000   | 0,020%  | 40-50000HZ  |  |
|  | 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, p  | ower factor, frequency me   | eters and calibrators in wide   | current rang  | e with CMC up to 0.010° at powe   | r frequency.   |
|  |   |   | 0.010°  | 0,02-120A / 30-525V   |  |
| Phase Angle between  | Angle between   |   | 0.010   | 50Hz and 60Hz   |  |
| Voltage and Current.   |   | 0-360°  | 0.0200  | 0,001-120A / 30-520V  |  |
| Phase Angle between  |   | 0-300   | 0.020   | 40-70Hz   |  |
| Voltages   |   |   | 0.0400  | 0,001-120A / 30-520V  |  |
|  |   |   | 0.040°  | 45-500Hz  |  |
|  |   | 0.5-1   | 0.020%  | 0.02-120A / 30-525V   |  |
| Power factor   |   | 0.1-0.5   | 0.050%  | 50Hz and 60Hz   |  |
| Frequency  |   | 0.04-100kHz   | 0.001%  |   |  |
| Calibration of watt-meters   | ower calibrators power in   | strument transducers in since   | le phase an   | d three phase configurations for h  | alanced and  |
| unbalanced loads in wide cu  | rrent and voltage range up  | to $3x120A$ and $3x560V$ . For  | or this purpos  | e Calmet has a system with 0.00   | 7%   |
| incertainty at the power freq  | uency and systems with 0  | .040% uncertainty at 45-500   | OHz frequence   | cv.   |  |
|  | Active, reactive,   | 0.02-120A / 30-525V   | 0.007%  | 50Hz & 60Hz / PF=0.5-1  |  |
| Electrical Power   | apparent power  | 0.001-120A / 30-520V  | 0.040%  | 45-500Hz / PF=0.5-1   |  |
| Calibration of electricity meter   | ars electricity meter tester  | s and power calibrators in s  | ingle phase a   | and three phase configurations for  | r balanced   |
| ind unbalanced loads in wid  | wanay and aveterna with 0   | 0400/ upportainty at 45 500   | OLL- from one   | N/ All avotama are automatia and  |  |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470  | uency and systems with 0<br>output, and enable testing  | 0.040% uncertainty at 45-500<br>g instruments using sinusoic  | 0Hz frequeno<br>lal signals ar  | cy. All systems are automatic and<br>ad distorted with harmonics and s  | use<br>ubharmonics   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.   | output, and enable testing  | .040% uncertainty at 45-500<br>g instruments using sinusoid   | 0Hz frequend<br>lal signals ar  | cy. All systems are automatic and distorted with harmonics and s  | use<br>ubharmonics   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity  | Active, reactive,   | 040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V   | 0Hz frequend<br>al signals ar<br>0,007%   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PE=0,5-1   | use<br>ubharmonics   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity  | Active, reactive,<br>apparent energy  | 040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic   | 0Hz frequend<br>al signals ar<br>0,007%<br>0,040%   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1   | use<br>ubharmonics   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at  | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur  | 040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems fo   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>exermeters ac<br>or measurem  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit   | use<br>ubharmonics<br>ers class A<br>n different                       |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.   | use<br>ubharmonics<br>ers class A<br>n different                       |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters a<br>or measurem<br>inty for the a<br>0,020%  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th            |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>exermeters a<br>or measurem<br>inty for the a<br>0,020%<br>0.5°   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz  | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics   | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>exermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>$0,5^{\circ}$<br>0.020%   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%   | 0Hz frequend<br>al signals ar<br>0,007%<br>0,040%<br>ckermeters a<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry   | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%   | 0Hz frequend<br>al signals ar<br>0,007%<br>0,040%<br>kermeters an<br>or measurem<br>inty for the a<br>0,020%<br>0,020%<br>0,050%  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz  | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%  | 0Hz frequend<br>al signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>0,050%<br>1,000%  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%  | 0Hz frequend<br>al signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>0,050%<br>1,000%  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics<br>Voltage dips and  | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-100%  | 0Hz frequend<br>al signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>0,050%<br>1,000%  | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics<br>Voltage dips and<br>interruptions   | 0.040% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s   | 0Hz frequence   lal signals ar   0,007%   0,040%   kermeters ar   or measurem   inty for the a   0,020%   0,050%   1,000%   0,050%   0,001s   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| And unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics<br>Voltage dips and<br>interruptions<br>Overvoltage  | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s<br>0-200%  | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>0,050%<br>1,000%<br>0,001s<br>0,050%   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| And unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics<br>Voltage dips and<br>interruptions<br>Overvoltage  | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s<br>0-200%<br>0,01-999s   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>0,050%<br>1,000%<br>0,001s<br>0,050%<br>0,001s   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| And unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interharm                                  | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s<br>0-200%<br>0,01-999s<br>0,2-40   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>0,050%<br>1,000%<br>0,001s<br>0,001s<br>1,000%   | cy. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| And unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interharm<br>Power Quality                 | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage<br>interharmonics<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s<br>0,200%<br>0,01-999s<br>0,2-40<br>0-100%   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,5°<br>0,020%<br>1,000%<br>0,050%<br>0,001s<br>0,050%<br>0,001s<br>1,000%<br>0,020%   | 29. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz   | use<br>ubharmonics<br>ers class A<br>n different<br>to 64th<br>to 31st |
| And unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interharr<br>Power Quality                 | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-100%<br>0,01-999s<br>0-200%<br>0,01-999s<br>0,2-40<br>0-100%<br>0-360°   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,05°<br>0,020%<br>1,000%<br>0,050%<br>0,001s<br>0,050%<br>0,001s<br>1,000%<br>0,020%<br>0,020%  | 2.2. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz                                     | to 64th<br>to 31st   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interharr<br>Power Quality                 | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage ainterharmonics<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-100%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>0-360°<br>0-100%<br>0-100%   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,05°<br>0,020%<br>1,000%<br>0,050%<br>0,001s<br>0,050%<br>0,001s<br>1,000%<br>0,020%<br>0,5°<br>0,020%  | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>0.02-120A / 50Hz & 60Hz                                    | to 64th<br>to 31st   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interharr<br>Power Quality                 | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-100%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>0-360°<br>0-100%   | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,05°<br>0,020%<br>0,050%<br>1,000%<br>0,001s<br>0,050%<br>0,001s<br>1,000%<br>0,020%<br>0,5°<br>0,020%  | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>0,02-120A / 50Hz & 60Hz                                    | to 64th<br>to 31st   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar                                   | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs                   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>0-360°<br>0-100%<br>30%   | 0Hz frequend   lal signals ar   0,007%   0,040%   kermeters ar   0,020%   0,05°   0,020%   0,050%   1,000%   0,050%   0,050%   0,050%   0,050%   0,001s   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   1,000%  | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | to 64th<br>to 31st   |
| Ind unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interharr<br>Power Quality                 | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs                   | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-100%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>30%<br>0-500%   | 0Hz frequend   lal signals ar   0,007%   0,040%   kermeters ar   0,020%   0,05°   0,020%   0,050%   1,000%   0,050%   0,050%   0,050%   0,050%   0,020%   0,050%   0,001s   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   1,000%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | to 64th<br>to 31st   |
| And unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interham<br>Power Quality                  | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs<br>Inrush current | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0.100%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-900%<br>0,01-00%   | 0Hz frequend<br>lal signals ar   0,007%   0,040%   kermeters ar   0,020%   0,05°   0,020%   0,050%   1,000%   0,050%   0,001s   0,020%   0,050%   0,001s   1,000%   0,020%   0,050%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,050%   0,050%   0,050%  | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | to 64th<br>to 31st   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar<br>Power Quality                  | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>internuptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs<br>Inrush current | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-995<br>0,01-95  | 0Hz frequencies   0,007%   0,040%   wermeters and the surement of the anor measurement of the ano | 29. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | use<br>ubharmonic:<br>ers class A<br>n different<br>to 64th<br>to 31st |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar<br>Power Quality                  | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>internuptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs<br>Inrush current | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>100%<br>30%<br>0-100%<br>0,01-999s<br>0-200%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-999s<br>0,2-40<br>0-100%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%<br>0,01-900%0,000%<br>0,000%0,000%<br>0,000%0,0 | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters an<br>or measurers an<br>or measurers<br>0,020%<br>0,050%<br>0,050%<br>0,050%<br>0,001s<br>0,050%<br>0,001s<br>0,050%<br>0,020%<br>0,5°<br>0,020%<br>1,000%<br>0,050%<br>0,020%<br>1,000%<br>0,050%<br>0,001s   | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | use<br>ubharmonic:<br>ers class A<br>n different<br>to 64th<br>to 31st |
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| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar<br>Power Quality<br>Power Quality | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs<br>Inrush current | 0.40% uncertainty at 45-500   g instruments using sinusoid   0,02-120A / 30-525V   0,001-120A / 30-520V   ality Calibrators including flic   pose Calmet has systems for   signals with 0,050% uncerta   0-100%   0-100%   0.01-999s   0.001-999s   0,01-999s   0,2-40   0.100%   0.2-00%   0,01-999s   0,2-40   0.100%   30%   0.500%   0,01-999s   0,2-40   0.100%   0.30%   0.500%   0,01-99   100%   0.500%   0,01-9   alibrators at DC and power f   1mΩ-10Ω   10Ω-10MΩ  | 0Hz frequend<br>lal signals ar<br>0,007%<br>0,040%<br>kermeters ar<br>or measurem<br>inty for the a<br>0,020%<br>0,050%<br>0,050%<br>0,001s<br>0,050%<br>0,001s<br>1,000%<br>0,020%<br>0,5°<br>0,020%<br>0,020%<br>1,000%<br>0,050%<br>0,001s<br>frequency.<br>0,020%   | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | to 64th<br>to 31st   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar<br>Power Quality<br>Power Quality | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs<br>Inrush current | $\begin{array}{r} 0.040\%  uncertainty at 45-500 g instruments using sinusoid of the second structure of th$  | 0Hz frequencies   0,007%   0,040%   0,040%   kermeters and the surrements   0,020%   0,5°   0,020%   0,050%   1,000%   0,050%   0,050%   0,050%   0,050%   0,050%   0,050%   0,050%   0,050%   0,050%   0,020%   0,5°   0,020%   0,050%   0,020%   0,050%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,010%   0,100%   | 2y. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz                         | to 64th<br>to 31st   |
| and unbalanced loads in wid<br>uncertainty at the power freq<br>comparison method of pulse<br>according to the EN 50470.<br>Electricity<br>Calibration of Power Quality<br>acc. to the EN 61000-4-30 at<br>shapes (harmonics, interhar<br>Power Quality<br>Power Quality | Active, reactive,<br>apparent energy<br>Analysers and Power Qua<br>nd EN 50160. For this pur<br>monics) and time-varying s<br>Voltage harmonics<br>Voltage THD<br>Voltage asymmetry<br>Voltage asymmetry<br>Voltage dips and<br>interruptions<br>Overvoltage<br>Flicker Pst and Plt<br>Current harmonics<br>Current THD<br>Current<br>interharmincs<br>Inrush current | 0.40% uncertainty at 45-500<br>g instruments using sinusoid<br>0,02-120A / 30-525V<br>0,001-120A / 30-520V<br>ality Calibrators including flic<br>pose Calmet has systems for<br>signals with 0,050% uncerta<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-100%<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0,01-999s<br>0,2-40<br>0-100%<br>0,360°<br>0-100%<br>0-360°<br>0-100%<br>30%<br>0-500%<br>0,01-9s<br>alibrators at DC and power f<br>1mΩ-10Ω<br>10Ω-10MΩ<br>10MΩ-10GΩ  | 0Hz frequend<br>lal signals ar   0,007%   0,040%   ermeters ar   or measurem<br>inty for the a   0,020%   0,5°   0,020%   0,050%   1,000%   0,050%   0,050%   0,050%   0,001s   1,000%   0,020%   0,05°   0,020%   0,050%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,020%   0,010%   0,010%   0,030%  | 29. All systems are automatic and<br>ad distorted with harmonics and s<br>50Hz & 60Hz / PF=0,5-1<br>45-500Hz / PF=0,5-1<br>cc. to EN 61000-4-15 and analyz<br>ent and generation of signals wit<br>mplitude and 1ms for the time.<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>30-525V / 50Hz & 60Hz<br>16Hz-9kHz<br>0,02-120A / 50Hz & 60Hz<br>16Hz-9kHz<br>16Hz-9kHz<br>30-50Hz | to 64th<br>to 31st   |

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