C300 3-Phase Power Calibrator and Tester

3 x 0...560V, 3 x 0...120A, 40...500Hz
0°...±360°

Accuracy:
0.02% or 0.05%

www.calmet.com.pl
Calmet sp. z o.o.

- Calmet = CALibrators + METrology
- founded in 1989, roots come from LUMEL, big factory of measurement equipment in Poland, Zielona Gora
- designing, production, selling and servicing new kind of calibrators and electric equipment testers
- employs over 25 engineers, including 3 with Ph.D.
- cooperates with University of Zielona Gora; common projects and lectures
- since 1996 – electricity meters testing and power network parameters analysing
- since 2002 – generating and measuring network quality parameters
- since 2006 – automation of electro-utility automatic protective equipment testing
- since 2011 – automatic Test Benches for energy meter testing
C300 3-Phase Power Calibrator and Tester

Measurement Equipment since 1989

Energy meter testers, Current Transformers testers, Power quality analysers

AC/DC Voltage, Current, Power & Resistance Calibrators, Test Benches

Customer Support in problems solving

Control Software for measurement equipment

1 phase
3 phase
3 phase, 120A
3 phase, 0.05%

3 phase U,I,φ,P,Q,S,E
1 phase U,I,φ,P,Q,S,E
1 phase U,I,φ,F
Multifunctions DC/AC

3 phase Test Bench

1 / 3phase Phatnom Load 0...5A

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Mesurement Equipment since 1989
C300 3-Phase Power Calibrator and Tester
General view and functionality

In Manual Mode it is possible to set:
- Voltages up to 3 x 560V
- Currents up to 3 x 120A (360A in single phase connection)
- Frequency in range 40...500Hz
- Phase angles in range 0...360°
- Wave shapes of signals
- Signal changes in time

Settings by PC

In Automated Mode it is possible to test:
- Electricity meters
- Protective relays
- Current transformers
- Current clamps
- Measurement transducers

Only in Automated Mode

Device Under Test
Voltage:
- range: 0.5000V ... 560.0000V
- uncertainty: ±0.02%
- short term stability: ±0.005%
- long term stability: ±0.01%
- temp. drift: ±0.0005%/1°C

Maximum load:
- 560mA@70V
- 280mA@140V
- 140mA@280V
- 70mA@560V
- sin distortion: 0.05%

Frequency:
- range: 40.000Hz... 500.000Hz
- uncertainty: ±0.005%

Phase shift:
- range: 0.00°... ±360.00°
- uncertainty: ±0.05°

Current:
- range: 0.001000A ... 120.0000A
- uncertainty: ±0.02%
- short term stability: ±0.005%
- long term stability: ±0.01%
- temp. drift: ±0.0005%/1°C

Maximum load:
- 17V@0.5A
- 8.5V@6A
- 3.3V@20A
- 0.70V@120A
- sin distortion: 0.1%

Power:
- range: 0...3 x 67200 W,var,VA
- resolution: 0.00001

Waveform: harmonics (up to 3200Hz)

Waveform: interharmonics (up to 9kHz)
Example of E/P characteristics PF=1 & PF=0.5L
Single Voltage Dip (100ms)

Periodic Voltage Swells (2 periods)

Single Voltage Interruption (100ms)

Single Current Shock (1 period)
C300 3-Phase Power Calibrator and Tester
Calpro300 PC Software - Basic

**C300 is controlled via RS232/USB by PC Software**
The transmission protocol (simple text eg.: U_230,57.70,1[CR][LF]) is available for customers

**Calpro 300 Basic version enables setting:**
- voltages, currents, frequency, phase angles and powers (Symmetric and Asymmetric)
- Harmonics, Interharmonics and Special Shapes of signals

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**Function field**
- **Calibrator status field**
- **Operation field**

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**Calpro 300**
- S
- I
- P
- Q
- S
- Power Quality
- Test system
- Customer
Calpro 300 PC Software allows to create Data Base with:
- Type of Device Under Test – properties of device like meter constant, range, class of accuracy etc.
- Procedure – set of load points for testing (settings of U, I, φ, f, P, Q, S, harmonics, no. of impulses...)
and then to perform testing:
- Auto Test – automatic testing based on Type and Procedure
and Result evaluation:
- Result – presentation in form of Table (user editable) or Diagram with possibility of printout or export to Excel
Calpro 300 TS (Test System) version enables automatic testing the following devices:

- **Electricity meter** function for automatic testing of meters
- **Relay** function for automatic testing of protective relays
- **Current transformer** function for automatic testing of current transformers
- **Clamp** function for automatic testing of current clamps
- **Transducer** function for automatic testing of measurement transducers
Testing Energy meter with C300 as a Source and Reference

Reference Energy is calculated on base of equation:

\[ E_{\text{Ref}} = U \times I \times \cos\phi (\sin\phi) \times t \]

Where:
- \( E_{\text{Ref}} \) – reference energy
- \( U \) – set value of voltage
- \( I \) – set value of current
- \( \cos\phi/\sin\phi \) – power factor
- \( t \) – time of impulses counting
Testing Energy meter with C300 as a Source and Error Calculator with external Reference Meter

Reference Energy is calculated on base of number of impulses and constant of any Reference Meter (Radian, ZERA, MTE....)
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Current Transformer and Clamps Testing

Ipmax=120A when using current I1 only
Ipmax=360A when shorted I1, I2 and I3 HI terminals and I1, I2, I3 LO terminals

Up to 360A in parallel

1000A clamp and sum of currents
1000A clamp with 100 turns coil
100A clamp and 100A cable

CT 100A / 5A
All completed Calmet C300B Calibrator’s set consists of:

- C300B calibrator class 0.02 or 0.05,
- power cord,
- Calpro 300 Soft – Basic PC Soft,
- USB / RS232 adapter,
- fuse T4A, 250V, 5x20 (2units),
- EA36 set of safety voltage cables (6units) and current cables up to 20A (6units),
- EA21 set of accessories for safety cables (12units banana plug +12units Cu),
- AD300 sockets adapter,
- C091A T3475-001 plug Amphenol for Calibrator inputs,
- operation manual of calibrator and software (2units),
- warranty card,
- calibration certificate.
Optionally for Calmet C300B Calibrator are available:

• computer Laptop
• Calpro 300TS PC Soft for automatic test of electric equipment,
• Calpro 300PQ PC Soft for programming of Power Quality parameters,
• C300LabView-LabView Driver for C300B Calibrator,
• AKD300 current cables up to 120A (6 units) with set (18 units) of replaceable terminals,

• KAS300 transportation case for portable work,

• CF106H photo head with holder for inductive meter and meter with LED,
Optionally for Calmet C300B Calibrator are available:

- MPX8 Eight Inputs Multiplexer with MPX8 PC Soft for simultaneously testing up to eight electricity meters,
- ER10 rack for hanging of meter under test,
- ER10H.3 rack for hanging of meter with 3-phase quick connection device,
- ZW100/10A coil 100 turns / 10A,
- ZW10/20A coil 10 turns / 20A,
- RS232 – Bluetooth adapter for wireless connection.