Three Phase Power Calibrator and Power Engineering Devices Tester

C300   3- phase source up to 120A (1- phase up to 360A) and 560V

Option with Netbook 10" mounted with using magnets and with wireless communication

Calibrator / tester C300 is used for adjusting, checking and verification of measuring instruments used in power engineering. These include electricity meters, frequency, voltage and current protective relays, current transformers and clamps, active and reactive power meters, phase meters, frequency meters, ammeters, voltmeters, transducers, monitoring systems and power quality analyzers.

Calibrator C300 is three phase source of AC current and voltage with programmable value of harmonics. It generates voltage up to 560V in subranges 70–140–280–560V, current up to 120A in subranges 0.5–6–20–120A, frequency in range 40…500Hz and phase shift in range 0…±360°. In one phase connection it can generate current up to 360A.

Calibrator C300 has possibility to get error characteristics of tested equipment in function of measurement value and tripping level / time characteristics of protection relays in automatic way. For electricity meter testing is used impulse input S0 standard with possibility of photo scanning head connection. Testing of transducers, current transformers and clamps is made by means of DC input with ranges 10V/20mA and AC input with ranges 10V/100mA/5A. For protective relay testing are used three timers with start/stop inputs and resolution 1ms. Two additional binary outputs are used for operate/standby calibrator state signalling.

Calibrator C300 is controlled by means of personal computer with installed software *Calpro 300* in Windows operating system.

Calibrator C300 is constructed in a standard 19" rack-mount size case.

Calibrator C300 together with MPX8 Multiplexer is used for testing and calibration simultaneously up to four electrical energy meters.

C300   Three and One Phase Power / Energy Calibrator and Tester

- Voltage source up to 560V
- 3- phase current source up to 120A and 1- phase up to 360A
- Programmed form and special shapes of current and voltages
- Power quality parameters simulation
- Impulse input for electricity meters testing
- Start / stop inputs for protective relay testing
- AC measurement input for transformers and clamps testing
- DC measurement input for transducer testing
- Manual mode and automatic test procedures

Calpro 300 PC software features:

- using a modern concept, which allows the operator to create own test procedures - this is very important because new requirements for new meter generations can be realized easily without changing the complete software,

- the automated mode - direct execution of the complete test procedure automatically and requires no more additional handling by operator unless it will not be defined in the test procedure,

- the manual mode - direct execution of single test step. It offers an ideal solution for tests and evaluation of entire specifications for devices under test without generating the complete test procedure,

- computer database of customers, devices, measurement procedures and results, diagrams, tables of results and reports edition,

- traditional manual settings the value of all parameters of output signals.

TECHNICAL PARAMETERS OF C300 CALIBRATOR

Parameter	Range	Setting range	Resolution	Uncertainty [1]		Maximum load
				class 0.02	class 0.05	
Voltage U	70V	0.5000...70.0000V	0.0001V	±0.02% [2]	±0.05% [2]	560mA@70V
	140V	1.000...140.000V	0.001V			280mA@140V
	280V	2.000...280.000V	0.001V			140mA@280V
	560V	5.000...560.000V	0.001V			70mA@560V
Current I	0.5A	0.005000...0.500000A	0.000001A	±0.02% [2]	±0.05% [2]	17V@0.5A
	6A	0.05000...6.00000A	0.00001A			8.5V@6A
	20A	0.2000...20.0000A	0.0001A			3.3V@20A
	120A	1.000...120.000A	0.001A			0.95V@60A 0.70V@120A
Frequency f		40.000...99.999Hz	0.001Hz	±0.002Hz	±0.002Hz	
		100.000...500.000Hz	0.001Hz	±0.010Hz	±0.010Hz	
Phase shift φ		0.00...±360.00°	0.01°	±0.05° [2]	±0.10° [2]	
Active Power P		0...3x67200.0W	0.00001-1W	±0.02% [2] [3]	±0.05% [2] [3]	
Reactive Power Q		0...3x67200.0var	0.00001-1var	±0.02% [2] [3]	±0.05% [2] [3]	
Apparent Power S		0...3x67200.0VA	0.00001-1VA	±0.02% [2]	±0.05% [2]	
Time (for energy dosage)		1...36000s	1s	±0.01% ±0.001s	±0.01% ±0.001s	
Energy		calc. from settings and resolution of power and time		±0.02% [2] [3]	±0.05% [2] [3]	
Harmonics		amplitude and phase of harmonic in range 0...100% and 0...360° up to 31 of harmonics or to 3200Hz				

[1] Absolute extended uncertainty under confidence level of 95% including stability in 12 months in frequency range 45-65Hz,
[2] from 10% of current range and 30% of voltage range,
[3] uncertainty of power P(Q) under cosφ(sinφ)=1.

Specifications of calibrator's inputs for automatic tests		
Impulse Input for counting pulses from electricity meter or photo scanning head	range of input current and voltage	0…2mA/10…27mA and 0...2V/4...30V
	frequency of impulses	up to 100Hz
DC Current and Voltage Input	range of input current and voltage	0...20.000mA and 0...10.0000V
	error of measurement	0.02% of range
AC Current and Voltage Input	range of input current and voltage	0...100.00mA or 0...5.000A and 0...10.000V
	error of measurement	0.1% of range
Start/Stop Input for time measurement	number of inputs	3
	range of time measurement	0.001...100.000s
	error of time measurement	0.001s
	range of input voltage	15...250V DC/AC
Binary output of operate/standby for signalling state of Calibrator	number of outputs	2
	output load	250VDC/0.5A/10VA

General parameters	
Weight and dimensions (width x height x depth)	32kg and (478x194x490)mm
Power supply	90V…264V / 47...63Hz / 900VA
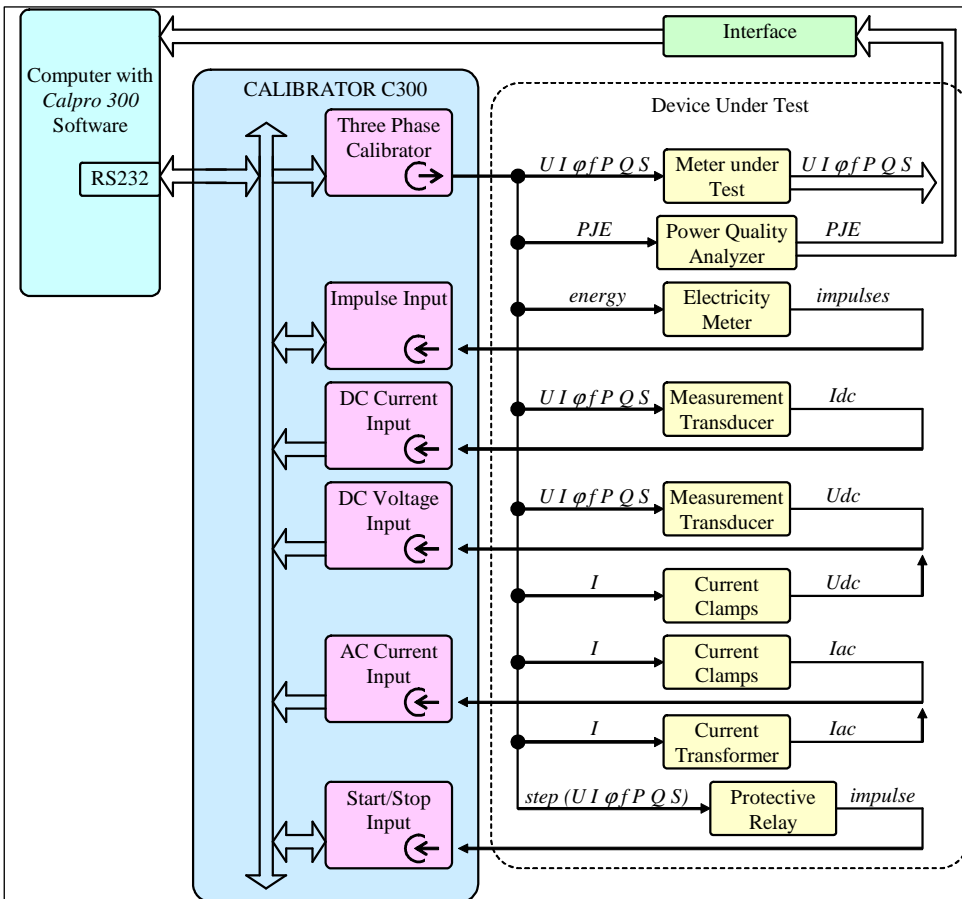
AUTOMATIC TESTING SYSTEM consists of:

- C300 Calibrator / Tester,
- computer with *Calpro 300* soft,
- device under test.

C300 Calibrator has three phase generator with auxiliary measurement inputs:

- Impulse Input for counting pulses from electricity meter or photo scanning head,
- DC Current Input for current measurement Idc from the output of measurement transducer,
- DC Voltage Input for voltage measurement Udc from the output of measurement transducer or current clamp,
- AC Current Input for current measurement Iac from output of current transformer or clamp,
- Start/Stop Input for tripping level and tripping time measurement of protective relays.

Calpro 300 PC software package for Windows

Advantages of *Calpro 300 PC software*
- user-friendly operation,
- database for devices and test procedures,
- fully-automatic test procedures,
- continuous monitoring of the test,
- tables and graphics for presentation of results,
- operator interface available in several languages,
- automatic measurements report generation.

Calpro 300 Basic version enables:
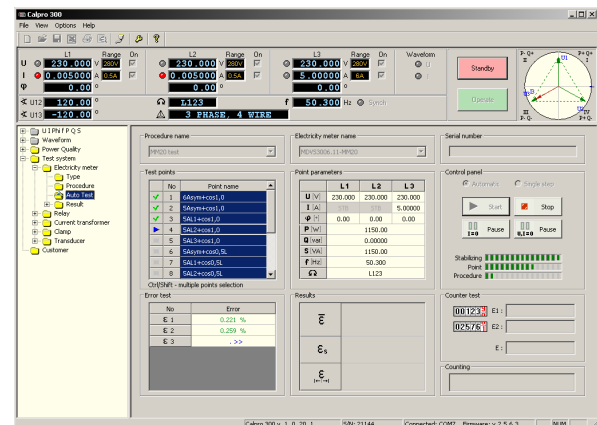- setting the value of U+I+φ+f+P+Q+S in symmetric and asymmetric circuit of connection,
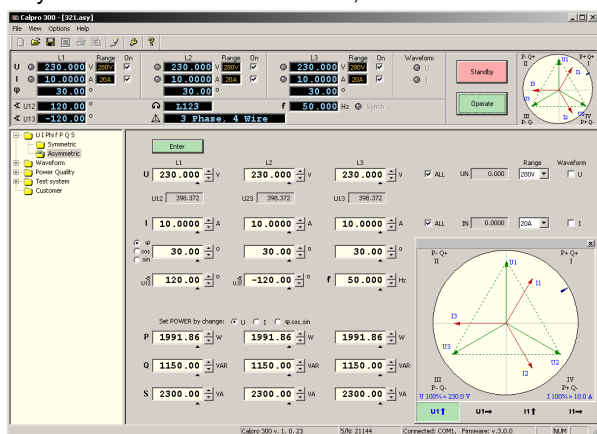
- setting the wave shape of voltage and current with using harmonics, interharmonics and shape function.
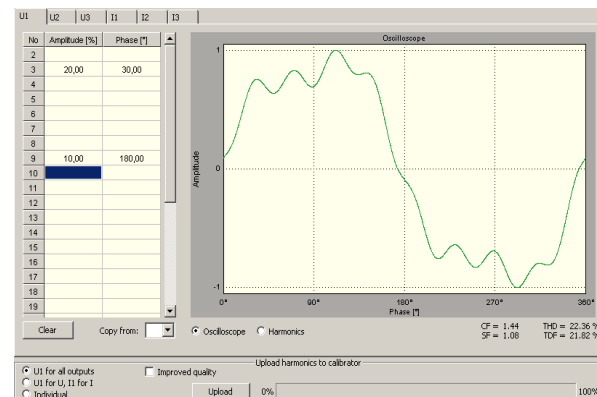
Calpro 300 Basic + TS (Test System) version enables automatic testing the following devices:
- electricity meters,

- protection relays (*Quick* function for quick relay's testing, *Trigger Time* function for tripping time testing and *Trigger Level* function for tripping level testing),
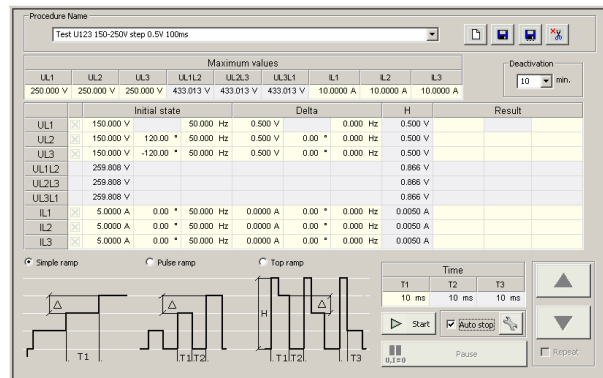

- current transformer,
- current clamps,
- measurement transducers.

Calpro 300 Basic + PQ (Power Quality) version enables testing meters, recorders and power quality analyzers with the following functions:
- *Slow Ramp* for generate voltage and current which value is changed relative slow to the time,
- *Fast Ramp* for generate voltage and current which value is changed relative fast to the time,
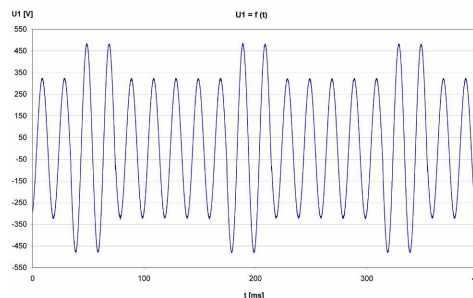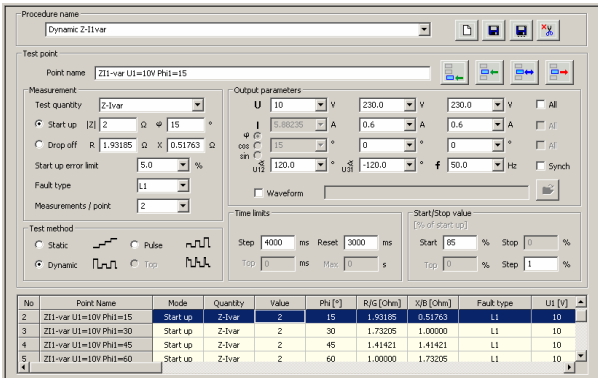

- *Flicker* for generate voltage fluctuation (Flicker) levels expressed in Plt and Pst coefficients.
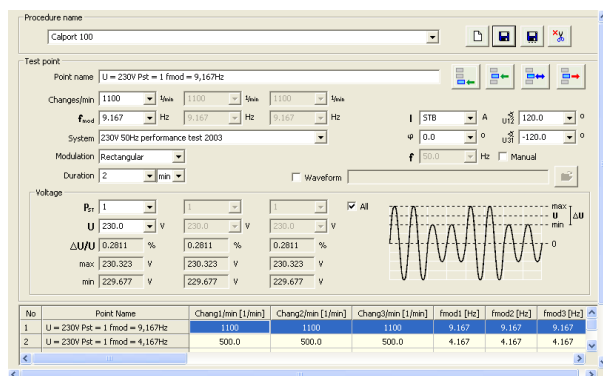
*Calpro 300 Basic + TS* and *Calpro 300 Basic + PQ* have the following functions:

- *Type* for entering data to testing devices database,
- *Procedure* for entering data to measuring procedures database,

- *Auto Test* for performing automatic test of device,
- *Result* for visualization, edition and storing measurements results in form of tables and diagrams, easy Report generation, printing and exporting data to MS Excel,
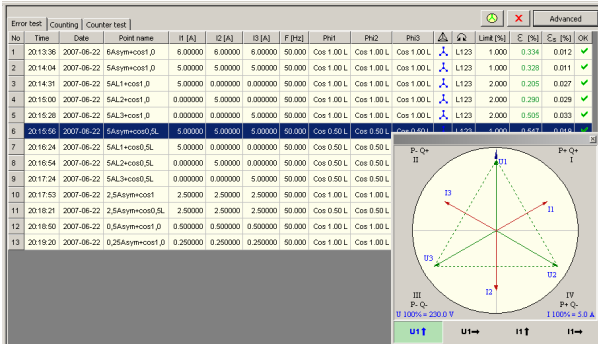
- *Client* function for collecting data in clients database and *Admin* function for using clients database during reports edition.
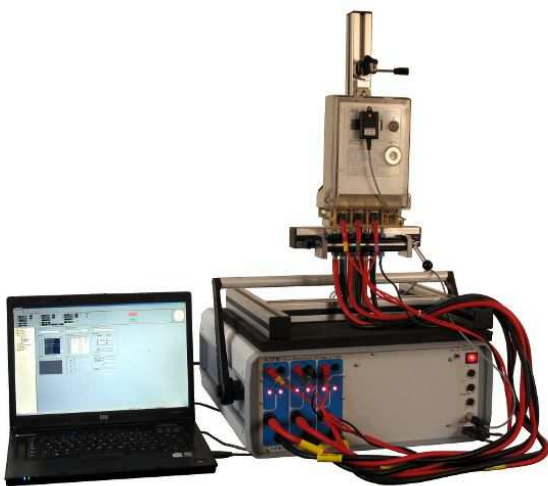
C300 applications: fully automated 0.02 or 0.05 accuracy class system for electricity meters testing

C300 CALIBRATOR'S EQUIPMENT

All completed C300 Calibrator's set consists of:

- C300 calibrator case class 0.02 or 0.05,
- power cord,
- *Calpro 300* Soft – Basic Version,
- RS232 interface cable socket – plug,
- USB-RS232 adapter,
- fuse T4A, 250V, 5x20,
- set of safety voltage cables (6units),
- set of safety current cables up to 20A (6units),
- 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),
- guarantee certificate,
- calibration certificate.

Optionally for C300 Calibrator are available:

- computer Laptop,
- computer Netbook 10'',
- *Calpro 300TS* PC Soft for automatic test of electric equipment,
- *Calpro 300PQ* PC Soft for Power Quality measurement devices testing,
- AKD300 current cables up to 120A (6units) with set (18units) of replaceable terminals,
- KAS300 transportation case for portable work,
- CF100 scanning head for sensing impulses LED from electricity meters with UCF100 holder,
- CF101 scanning head for counting rotation of electricity meter's rotor (Ferrari meter) with UCF100 holder,
- UCF100 holder for CF100 and CF101 photo heads,
- MPX8 Eight Inputs Multiplexer,
- RS232-Bluetooth adapter for wireless connection.
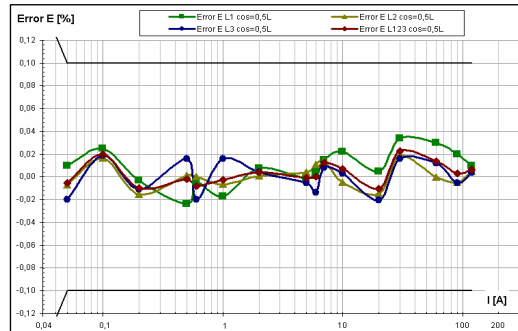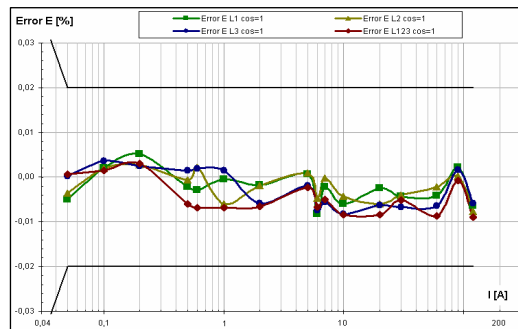
Energy error diagrams of C300 Calibrator class 0.02 as a function of current settings for balanced and unbalanced loads at 230V/50Hz and power factor cosφ=1 and 0.5L, achieved in automatic test procedure using Calpro300TS software and reference meter Radian RD31