CALMET Precision meter test equipment

Calmet Sp. z o.o.

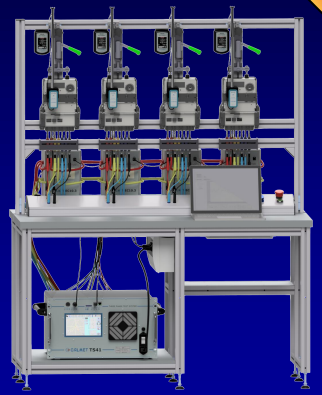
- Founded in 1989, roots come from LUMEL, big factory of measurement equipment in Poland, Zielona Gora
- Designing, production, selling and servicing new kind of calibrators and electric equipment testers
- Employs over 25 engineers, including 3 persons with Ph.D.
- Calmet = CALibrators + METrology
- Since 1996 – electricity metres 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
- Since 2015 – new group of Energy Meter Tester analysing
- Since 2019 – new group of Automatic Test Systems

Measurement Equipment since 1989

Customer Support in problems solving

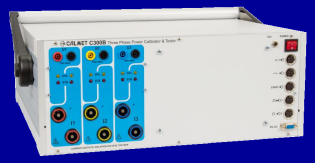
Energy meter testers, Current Transformers testers, Power quality analysers

TE30 Electricity Meters Tester cl. 0.05% or 0.1%

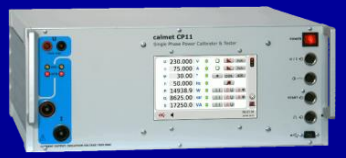


AC/DC Voltage, Current, Power & Test Benches

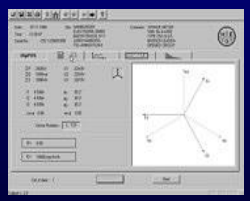
1 phase U,I,φ

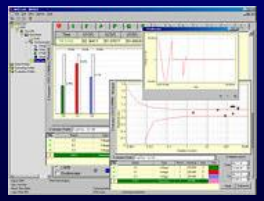


3 phase U,I,φ,P,Q,S,E

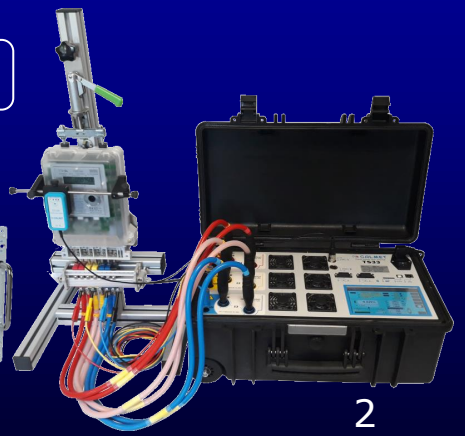


Control Software for measurement equipment





Test Systems



3-phase Meter Test Bench

Presentation target:

1.Meter Test on site equipment presentation

- Single phase energy meter testing
- Three phase directly connected energy meter testing
- Three phase, CT/VT connected, energy meter testing
- Current transformer (CT) & Potential transformer (PT) testing
- Power Quality Parameters influence for testing
- Basic technical parameters
- Standard (included in price) and optional accesories

2.Calibrators of current, voltage, power & energy

- Simple AC current source (1/3 phase)
- Single phase power calibrator
- 3-phase power calibrator
- Automatic testing of energy metres in full range of loads – expert Test Bench

3.Typical sets of equipment

4.Equipment presentation

IEC 62057-1 Test equipment, techniques and procedures for electrical energy meters

IEC 62057-2 Portable Test Equipment and Test Procedure for Electricity Meter and Electricity Meter Installation

Caltest 10 – Electricity meters tester

Energy Meter Tester and Power Network Analyser type Caltest 10

- **Accuracy 0.5% or 0.2%**
- **Voltage 85…265V AC**
- **Current range 0.01…100A (10A)(1000A)(3000A) with current clamp input enables connection without break in circuit**
- **Power up from measurement circuit**
- **Dummy load function**
- **Graphic LCD display**
- **Internal memory for results**
- **Thermal results printing**
- **PC Software for data analysis**

Caltest 10 – standard equipment

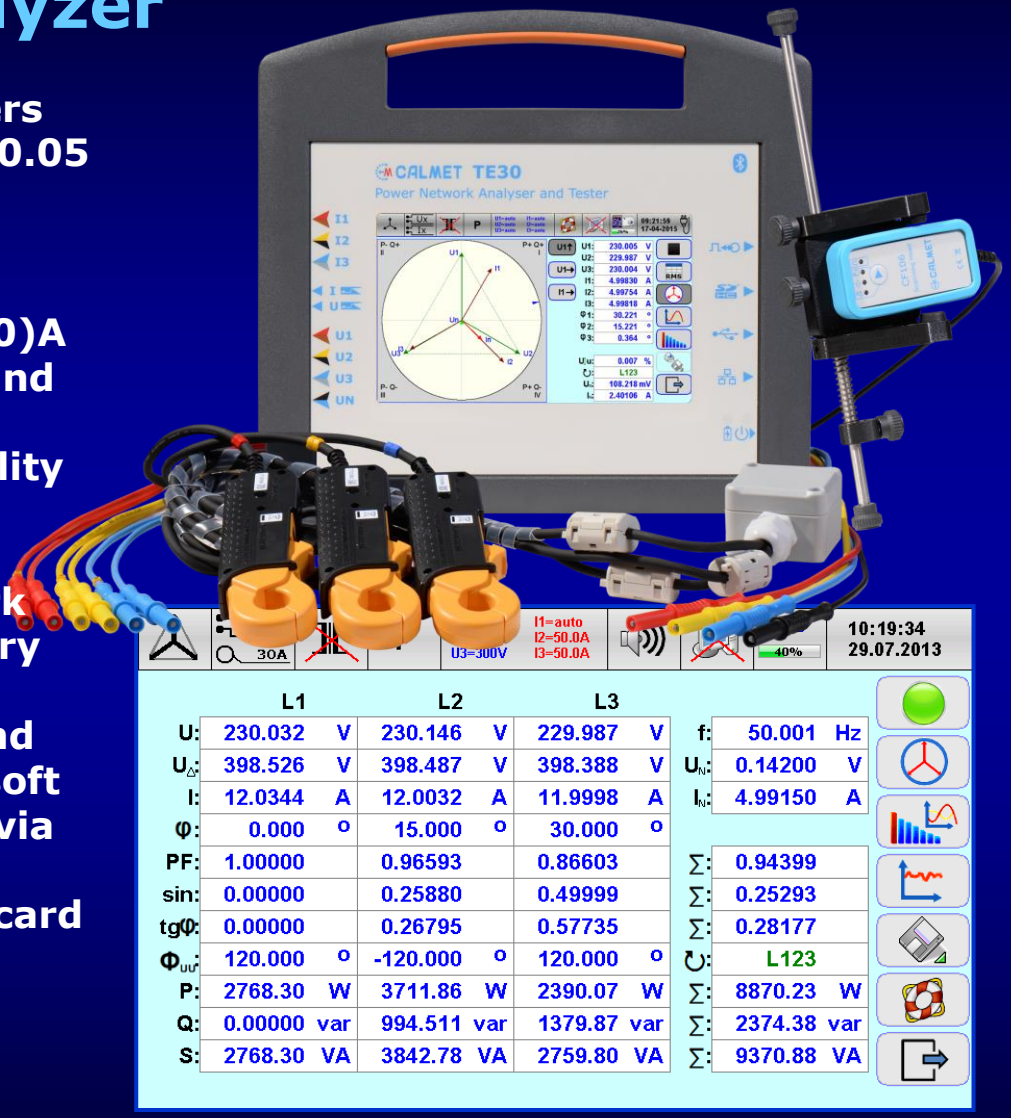
- Tester Caltest 10 accuracy cl. 0.2% or 0.5%
- Voltage cables (2) with set of replaceable tips (6)
- CT100A small current clamps up to 100A
- Interface RS232 cable & USB-RS232 adapter
- Calsoft 10 PC software
- CF106 Photo scanning head for LED Energy metres with UCF106 assembly device
- AD10 adapter for current source or printer power supply
- Transportation case, user manual
- Warranty card
- Manufacturer Calibration Certificate

Optional equipment

- CT10A small current clamps up to 10A
- CT1000A current clamps up to 1000A
- FCT3000A flexible clamps up to 30/300/3000A
- DR100 small thermal printer
- CC11 current source

TE30 Portable Three-Phase Working Standard and Power Quality Analyzer

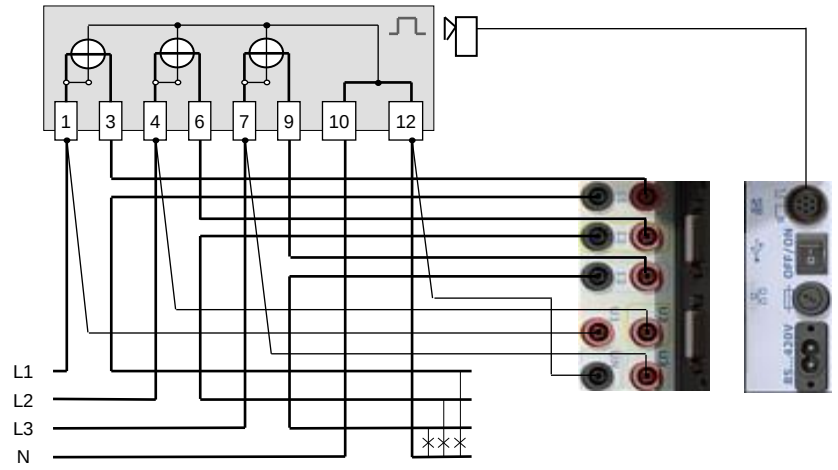
- Measure of power network parameters and Meters testing in accuracy class 0.05 or 0.1
- Voltage range 0.05...600V
- Current range 0,001...12(120)(1200)(30/300/3000)A
- Testing of energy metres, potential and current transformers (CT/PT)
- Recording and analyse of Power Quality
- Vector, oscillloscope, bar and trend charts of three phase network
- Powering from measurement network 50...450V AC and from internal battery with its own charger
- Big 7-inch full colour touch screen and computer software Calmet TE30 PC soft
- Reading data and remote controlled via USB, Ethernet, Bluetooth
- Recording data on flash memory SD card up to 32GB
- Calibration Certificate



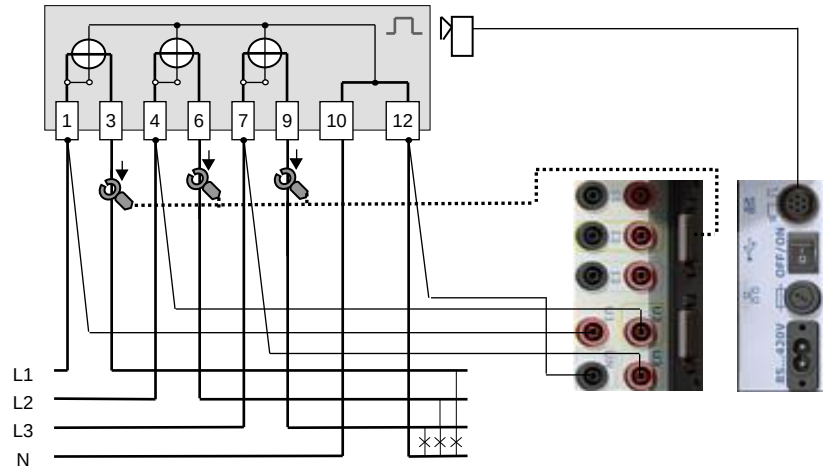
TE30 Electricity Meter Tester and Power Quality Analyzer

All possible types of connection: 1P2W, 3P4W, 3P3W, ... , direct or with clamps

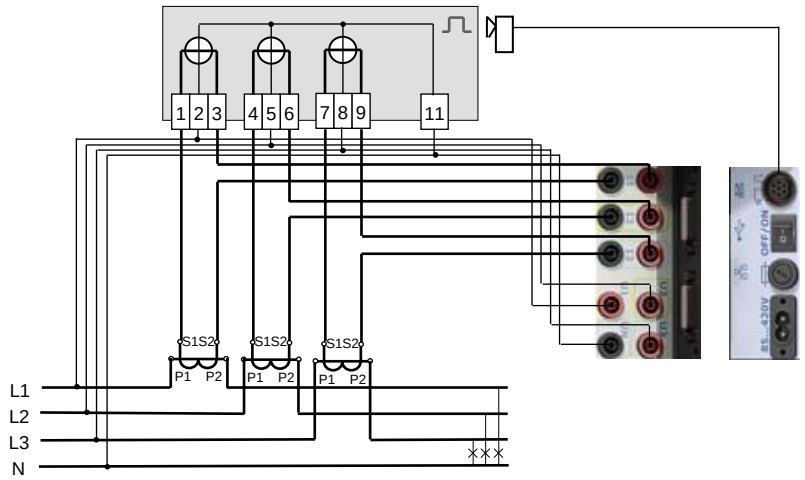
Electricity meter testing – direct connection



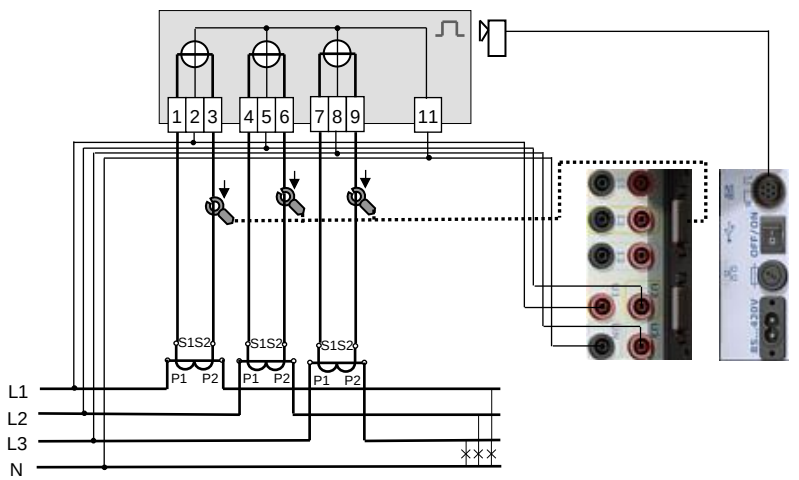
Electricity meter testing – connection with clamps



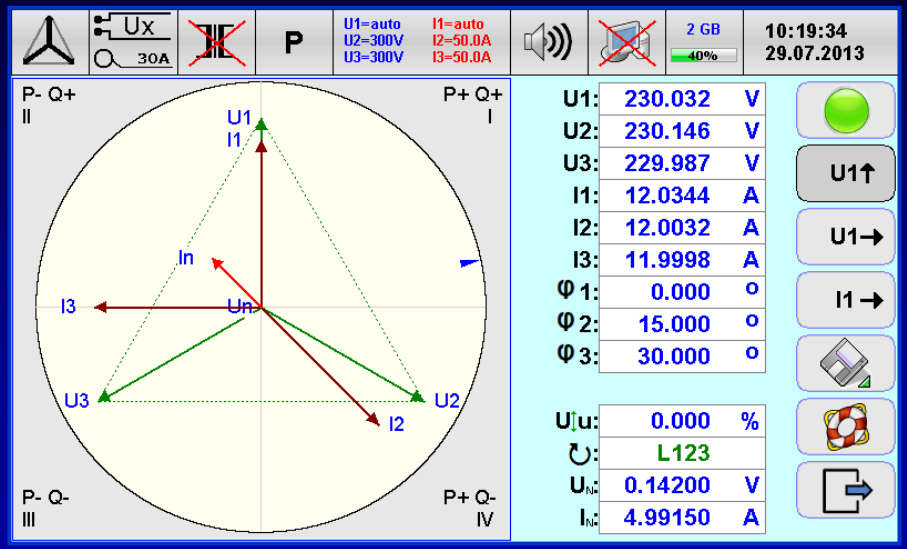
Electricity meter (CT) testing – direct connection

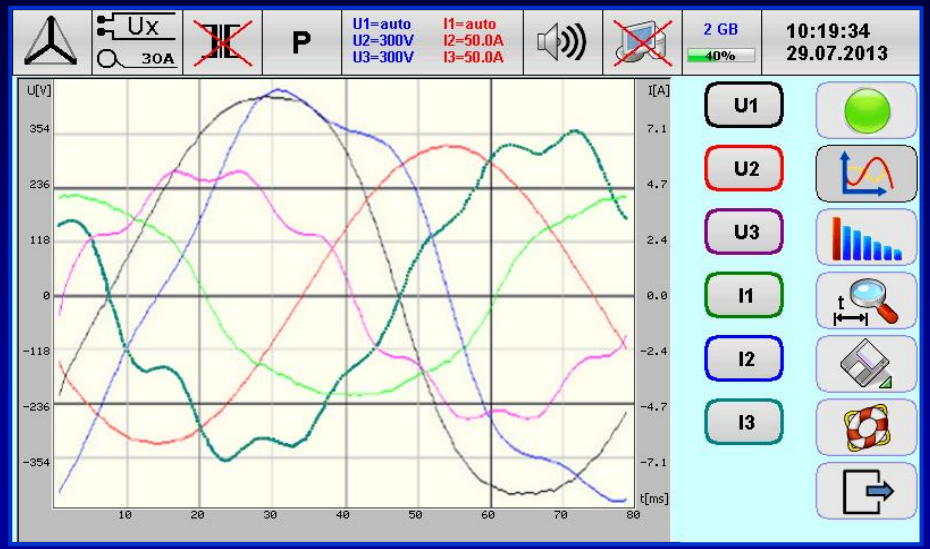


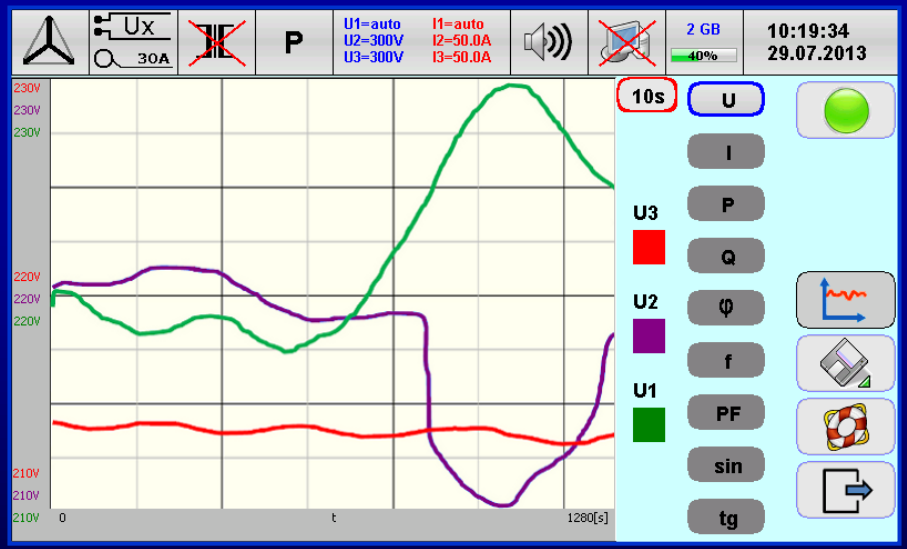
Electricity meter testing (CT) – connection with clamps

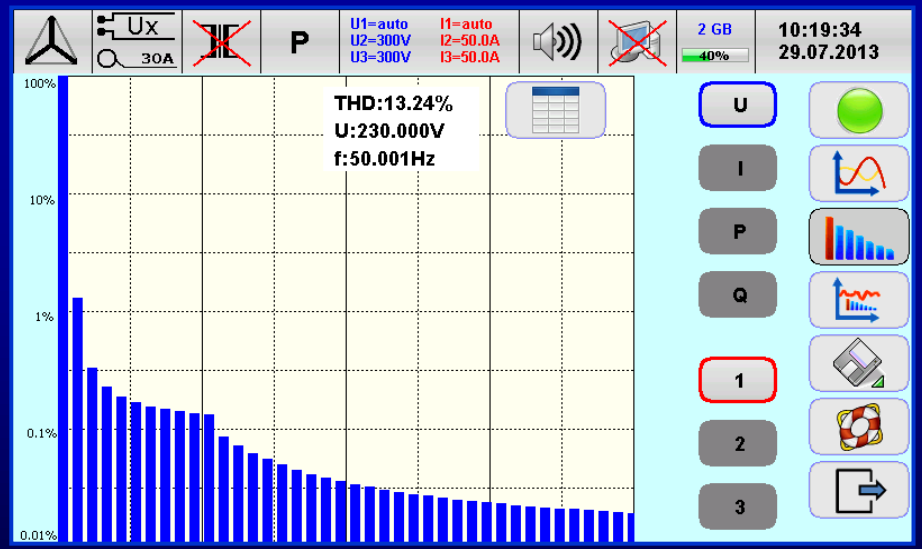


TE30 Electricity Meter Tester and Power Quality Analyzer



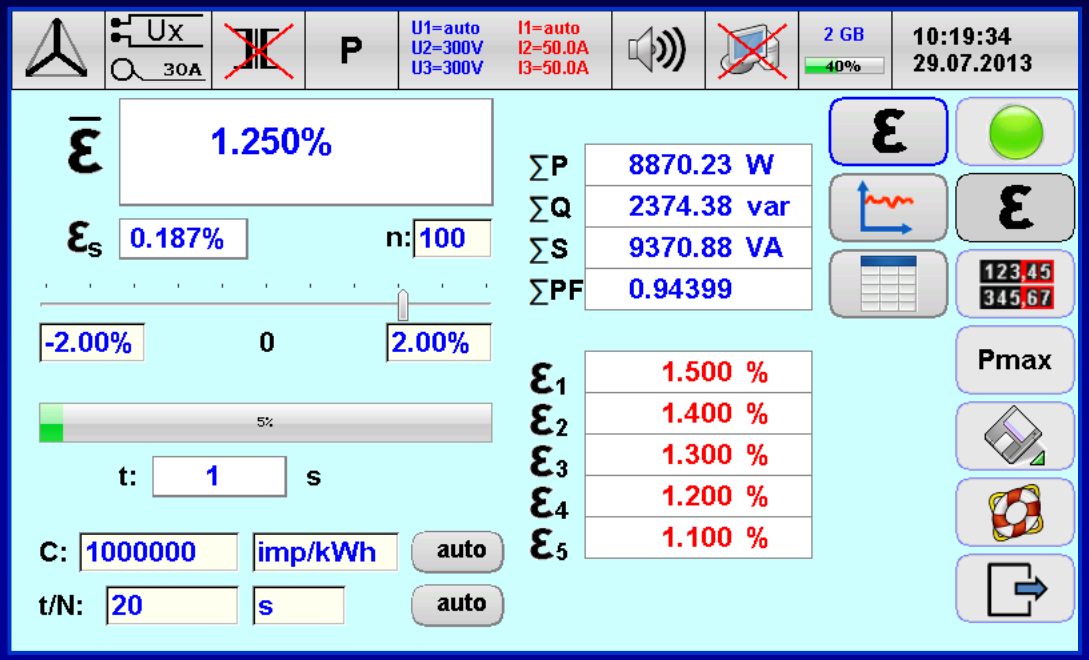






TE30 Electricity Meter Tester and Power Quality Analyzer

Energy meter Register testing on site and laboratory

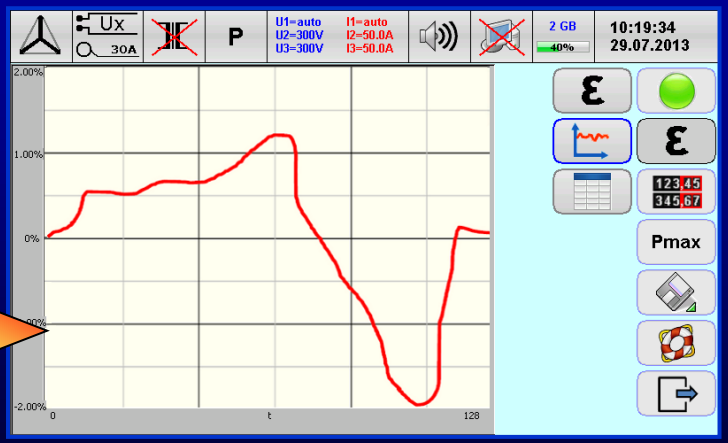


- Function of computing meter error (partial error, average error, standard deviation) directly in percentages [%] with method of setting time of measurement or numer of impulses
- Function of automatic identiffication Energy meter constant
- Function of automatic determining measurement time of numer of pulses

Results of testing are presented as:

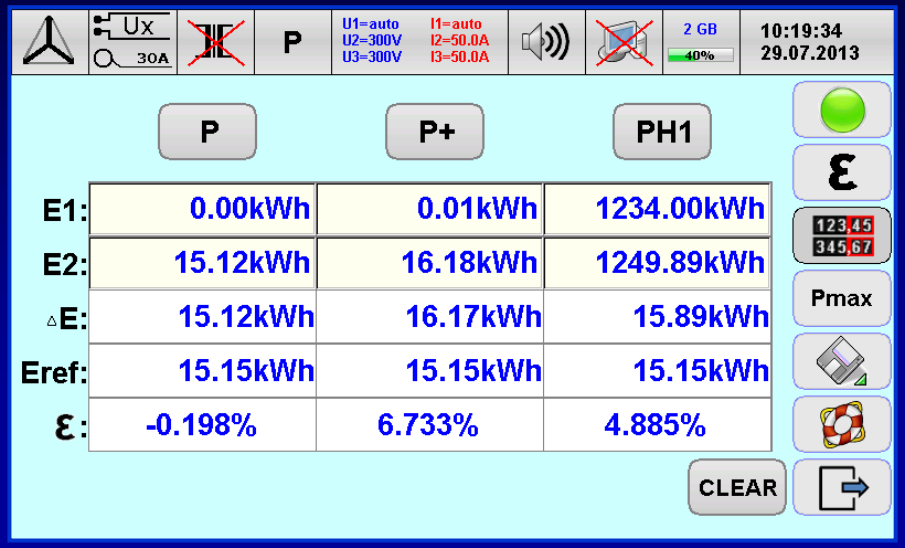
TABLE

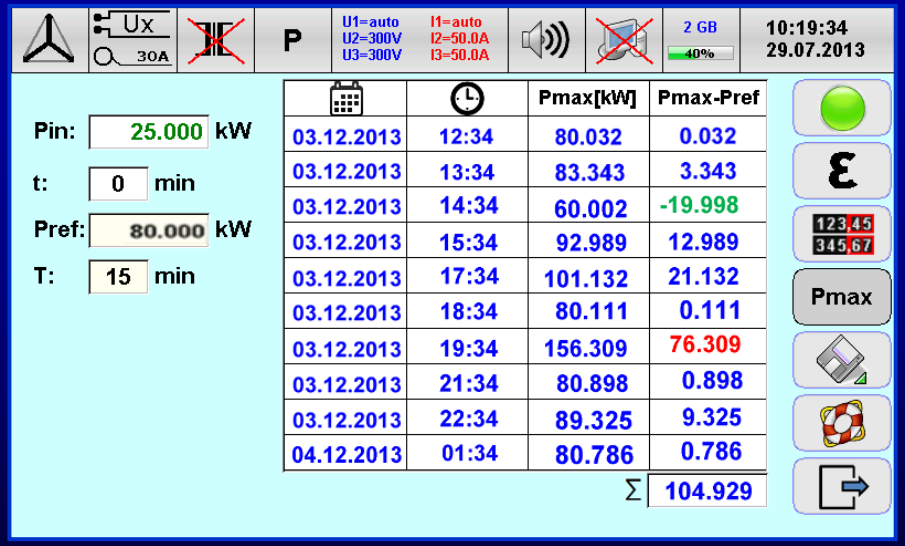
CHART



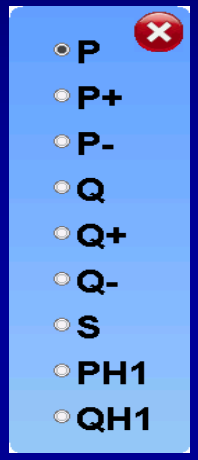
TE30 Electricity Meter Tester and Power Quality Analyzer

Energy meter Register testing on site and laboratory





Function of energy measurement with method of setting time periods for verification of Energy meter Register directly in percent [%]



Function of energy measurement for power P, P+, P-, Q, Q+, Q-, S

Function of energy measurement for the first (fundamental) harmonic of active power PH1 and reactive power QH1

IEC 62053-24/Ed.1 Static meters for reactive energy at fundamental frequency (classes 0,5 S, 1 S and 1)

Function of maximum power measuring for testing of maximum demand Energy meters

HARMONICS OF POWER

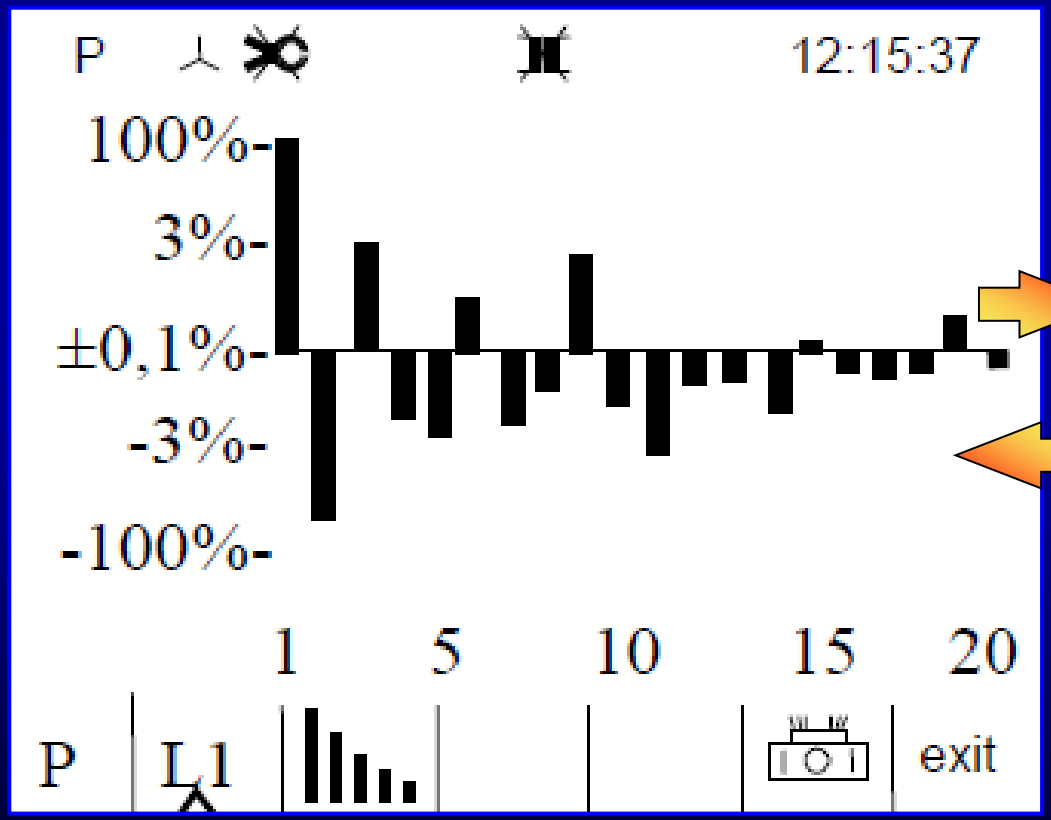
Active power harmonics are arisen as the product of the appropriate harmonic of voltage, current and the cosine of the phase shift angle between them

$$\checkmark P_i = U_i \times I_i \times cos\varphi_i$$

i – number of harmonic

$$\checkmark K_i = \frac{P_i}{S_1} \times 100\%$$

Ki – harmonic coefficient with respect to the first harmonic of the apparent power S1

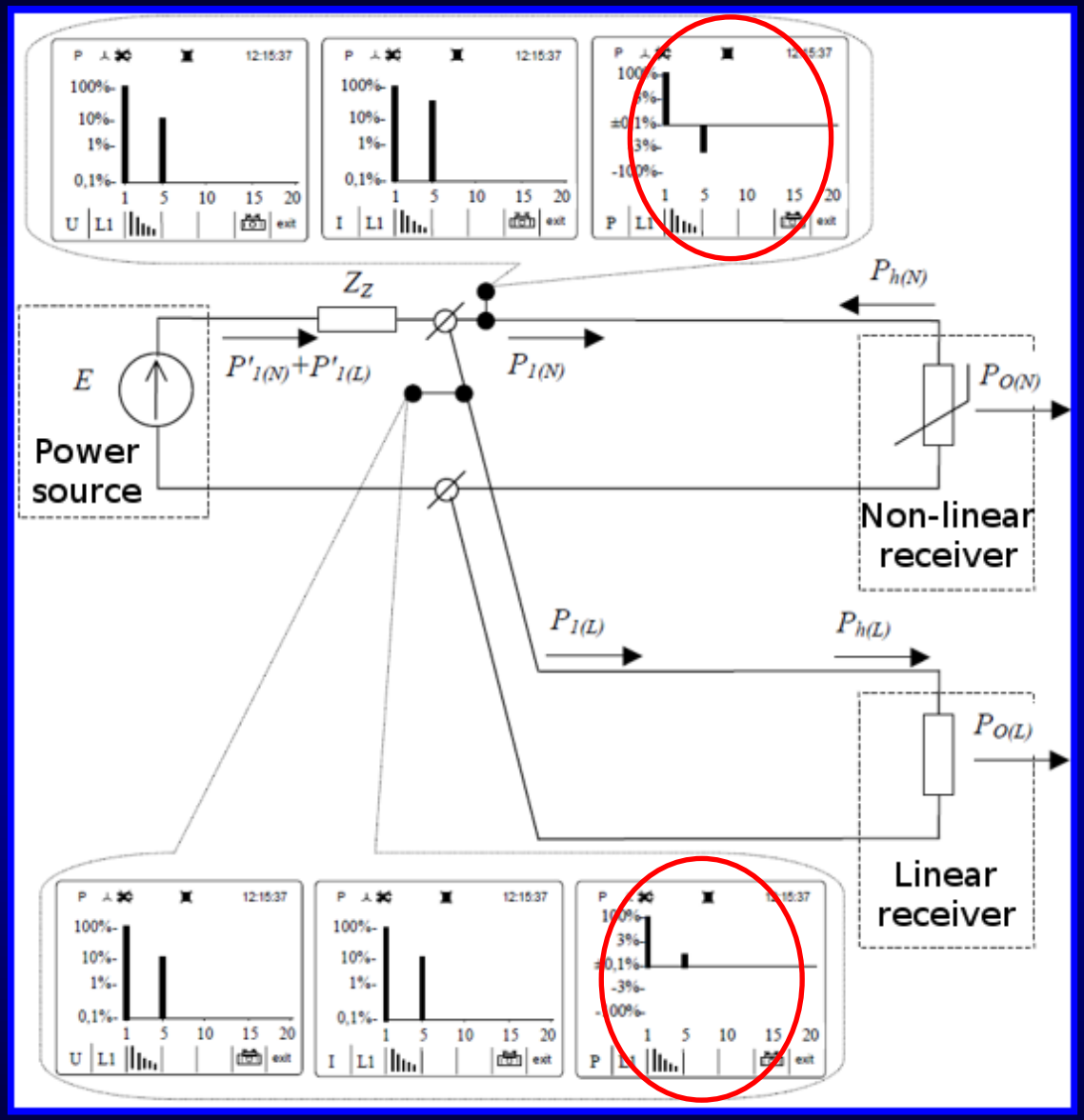


Identifying the source of harmonics

Provider → Consumer

Provider ← Consumer

HARMONICS OF POWER



Power flow in a circuit with a non-linear receiver

Po(N) – useful receiving power non-linear
Ph(N) – returned power in harmonics
P1(N) – 1st harmonic power supplied
Po(L) – useful receiving power linear
Ph(L) – absorbed power in harmonics
P1(L) – 1st harmonic power supplied

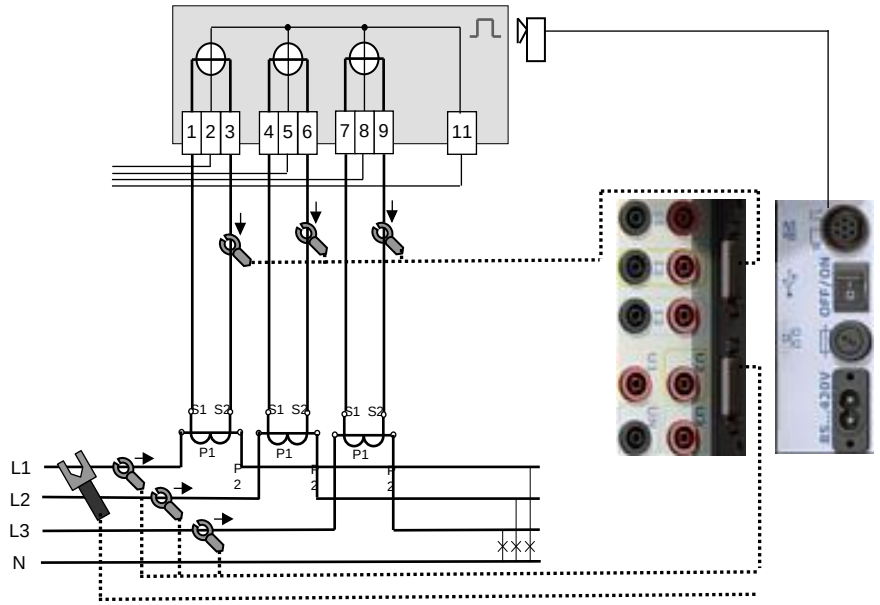
The user with a non-linear receiver will pay less and a user with a linear receiver will pay extra for unwanted harmonics

TE30 Electricity Meter Tester and Power Quality Analyzer

CT, PT Transformers testing (LV & MV, voltage and current, simultaneously in three phases) directly on site: ratio and phase shift error testing

Connection diagram

CT Ratio error and phase error testing

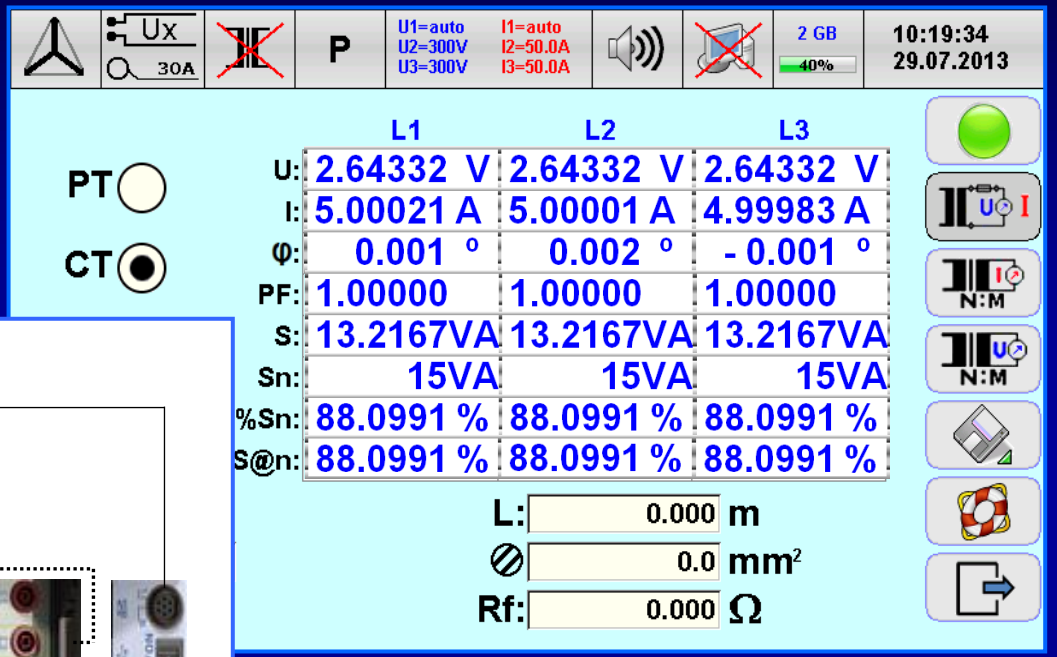


- **Function of computing transformer ratio error directly in percent [%]**
- **Function of computing phase shift error [°]**

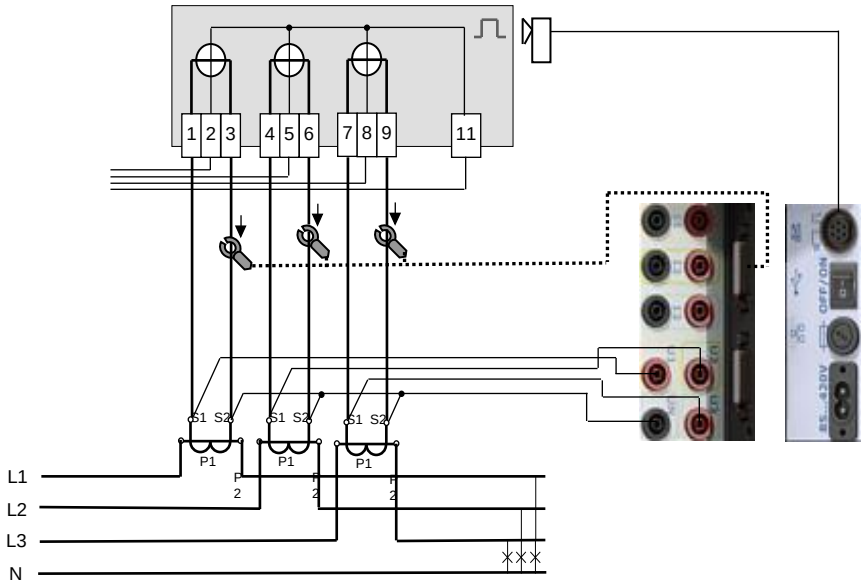
TE30 Electricity Meter Tester and Power Quality Analyzer

CT, PT Transformers testing (LV i MV, voltage and current, simultaneously in three phases) directly on site: CT/PT burden testing

Test can be done by taking into account the lenght (L) and cross-section of connection wires and serial fuse (Rf) resistance



CT Burden testing

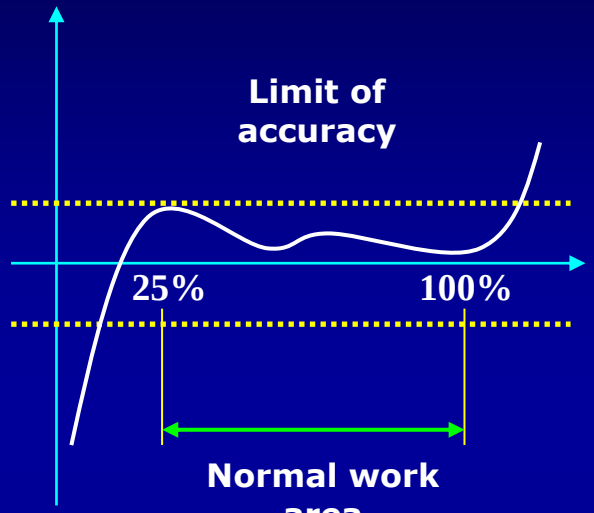


Why the transformer burden (load) is so important?

TE30 Electricity Meter Tester and Power Quality Analyzer

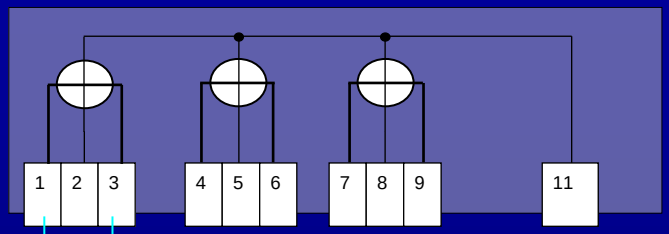
CT Transformer testing: burden testing

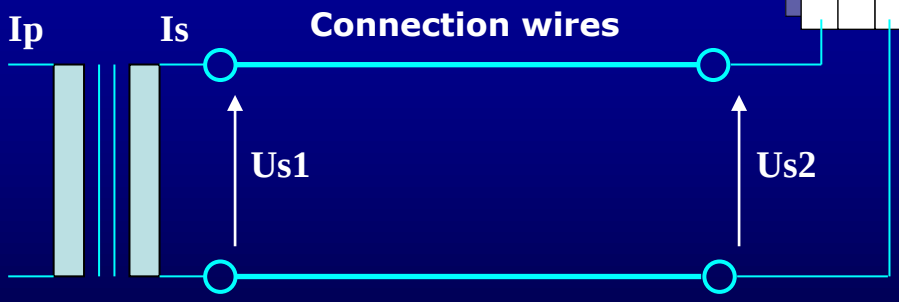
ε – ratio error [%]



CT – current transformer can operate with stated accuracy only between 25% - 100% of burden (load). In case of too long, or too thin wire dimension or too small load, the result, secondary current can be out of accuracy limits

[%] transformer power rating Sn





Current transformer

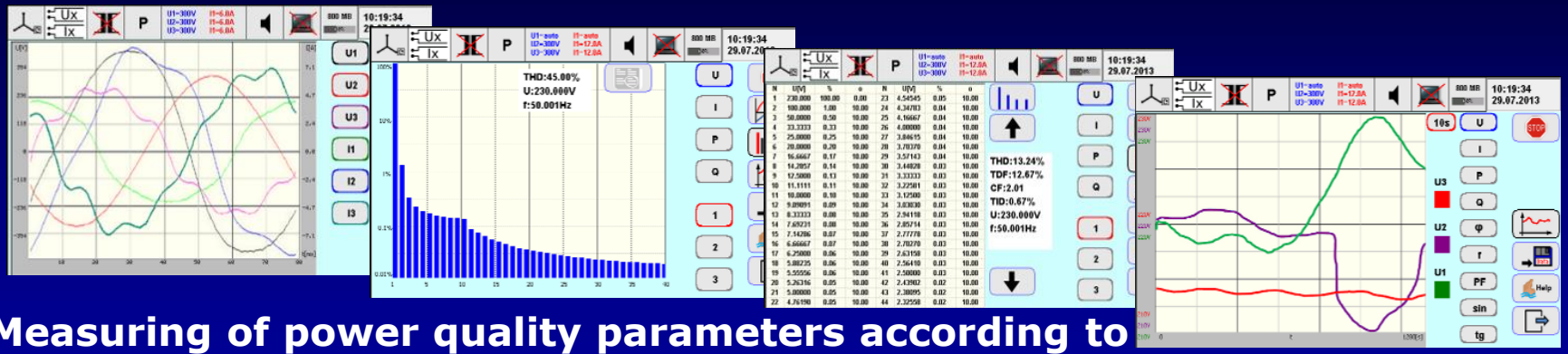
Example:

$$R_P = \frac{\rho_{CU} \cdot l}{S} = \frac{0,0175\Omega \frac{mm^2}{m} \cdot 2 \cdot 10m}{1mm^2} = 0,35\Omega$$

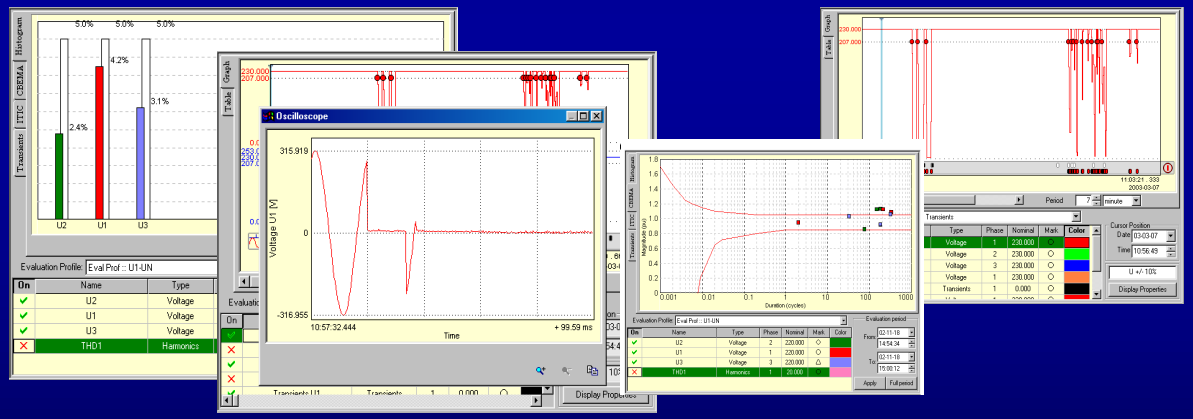
$$P_P = {I_2}^2 \cdot R_P = 5^2 A \cdot 0,35\Omega = 8,75VA$$

TE30 Electricity Meter Tester and Power Quality Analyzer

Function of power quality analyser + recording



- **Measuring of power quality parameters according to IEC 61000-4-30 class A with visualisation of measurement result in the real time mode**

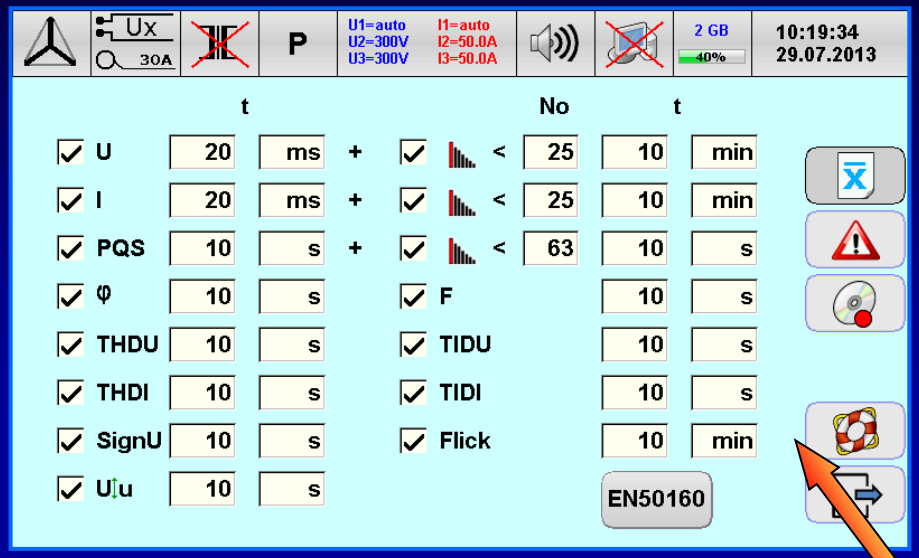


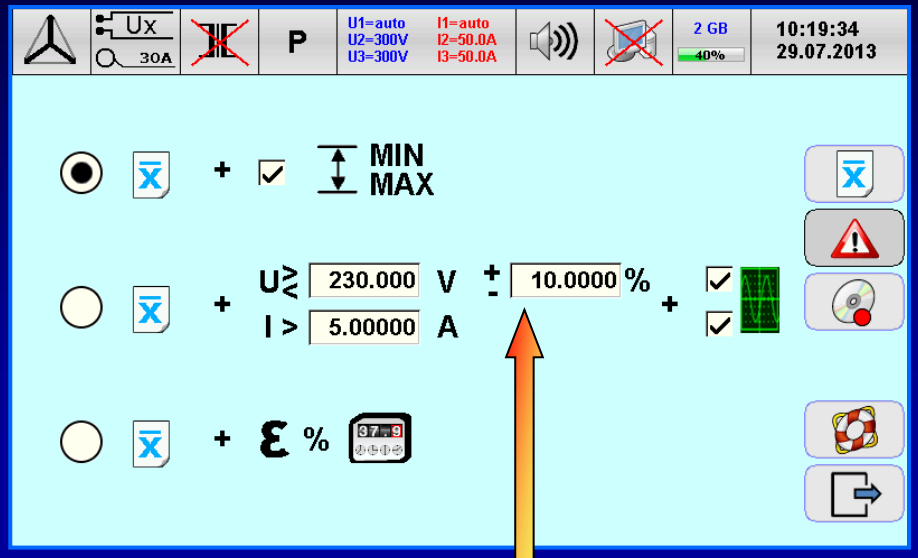
- **Analyzing of measurement result for EN 50160 compatibility or indywidual requirements of user**

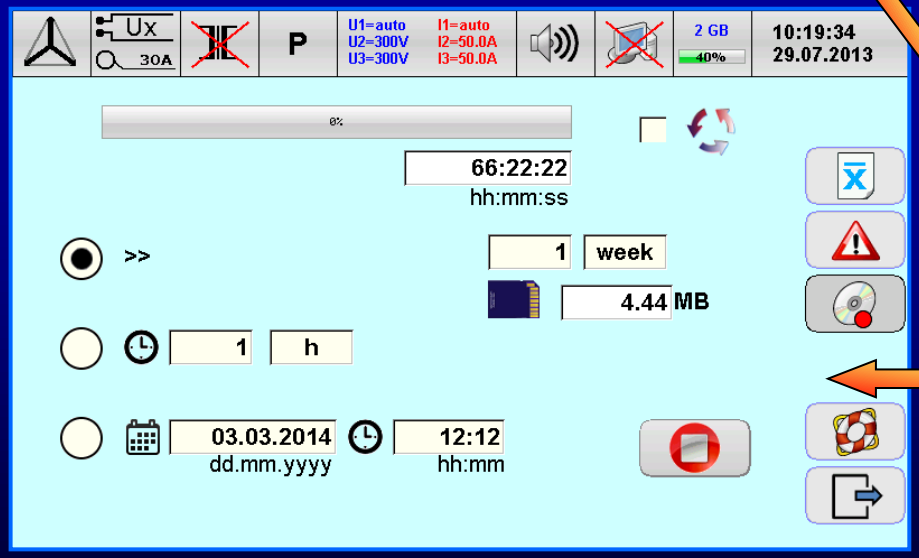
- **Recording of power network parameters in the SD Flash 4-32GB memory, which gives (8÷64)x10⁶ sets of network parameters or long-term registration of power quality**

TE30 Electricity Meter Tester and Power Quality Analyzer

Function of power quality analyser + recording







Selecting recording method: average value, max/min value, outside limits, every Energy Meter error

Selecting recorded parametrs and averaging times

Selecting time lenght of recording and start date & time

TE30 Electricity Meter Tester and Power Quality Analyzer

Equipment:

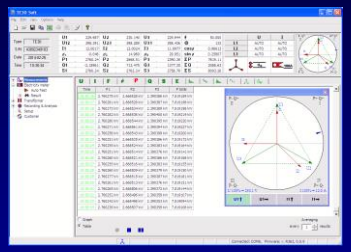
TE30 Analyzer`s equipment delivered in price:

- TE30 analyzer class 0.05% or 0.1% with Basic function
- power supply cord
- Fuse T250mA 250V (2units)
- Memory SD card (8GB)
- Operation manual of analyser
- Warranty card
- Manufacturer calibration certificate

TE30 Electricity Meter Tester and Power Quality Analyzer

TE30 Analyzer`s optional equipment:

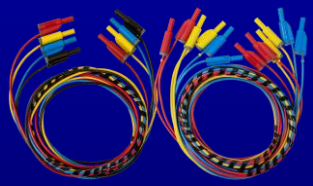
Calmet TE30 PC Soft with operation manual and USB Mini/USBA interface cable



REC function for recording of power network parameters

AD100EXT extension for powering from measurement network

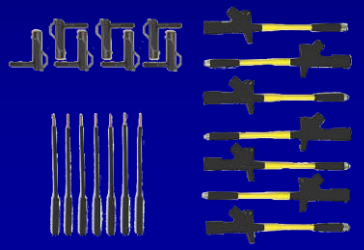
EA34 set of safety measurement cables (10pcs.)



DR200D miniature thermal printer with Bluetooth

CF106H photo head with holder for inductive meter and meter with LED

EA20 additional accessories (handlers and terminals 24pcs) of safety cables



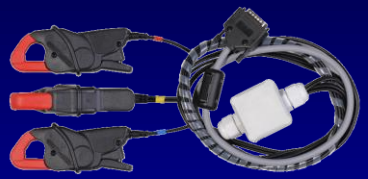
ET30 transportation case

ET32 transportation case for additional accessories

TE30 Electricity Meter Tester and Power Quality Analyzer

TE30 Analyzer`s optional equipment:

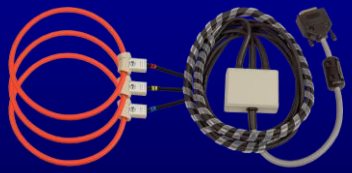
CT10AC electronic compensated clamps up to 12A (1set)



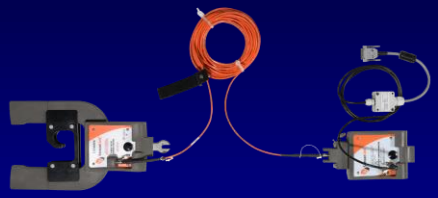
CT100AC electronic compensated clamps up to 120A (1set)

CT1000AC electronic compensated clamps up to 1200A (1set)

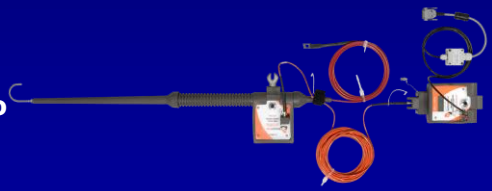
FCT3000AC.B electronic compensated flexible clamps in ranges 30/300/3000A (1set)



AmpLiteWire 2000A primary current sensors up to 2000A for LV and MV nets (1pc)



VoltLiteWire 40kVA primary sensors up to 40kV (1pc)



Rechargeable battery NiMH AA R6 1.2V 2700mAh (5pcs)

Calmet TE30 option set 01 (CalmetTE30+ET30+ CT100AC+CF106H+EA34 +EA20)

TE30 Electricity Meter Tester and Power Quality Analyzer

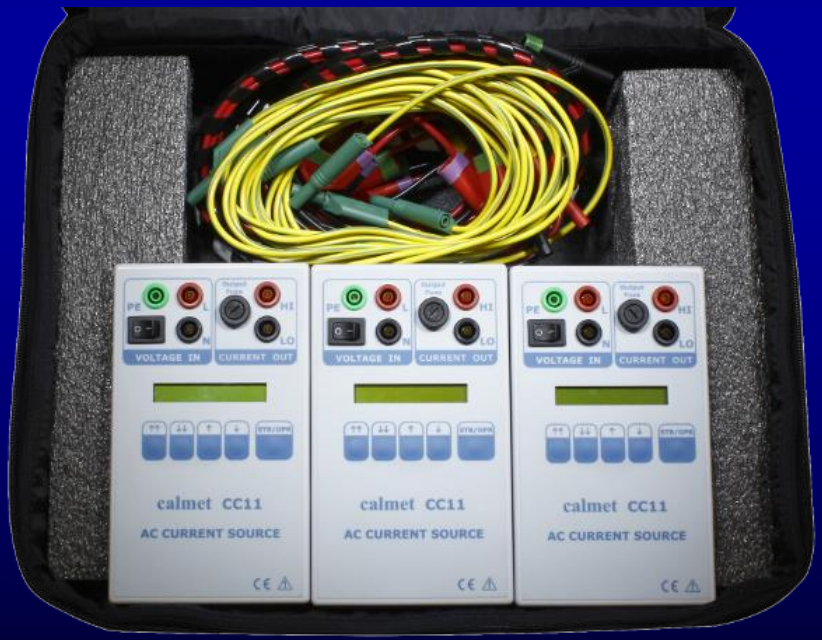
TE30 standard set:

Calmet TE30 option set 01 (CalmetTE30 + ET30 + CT100AC + CF106H + EA34 + EA20)

CC11 – small, portable electronic AC current source

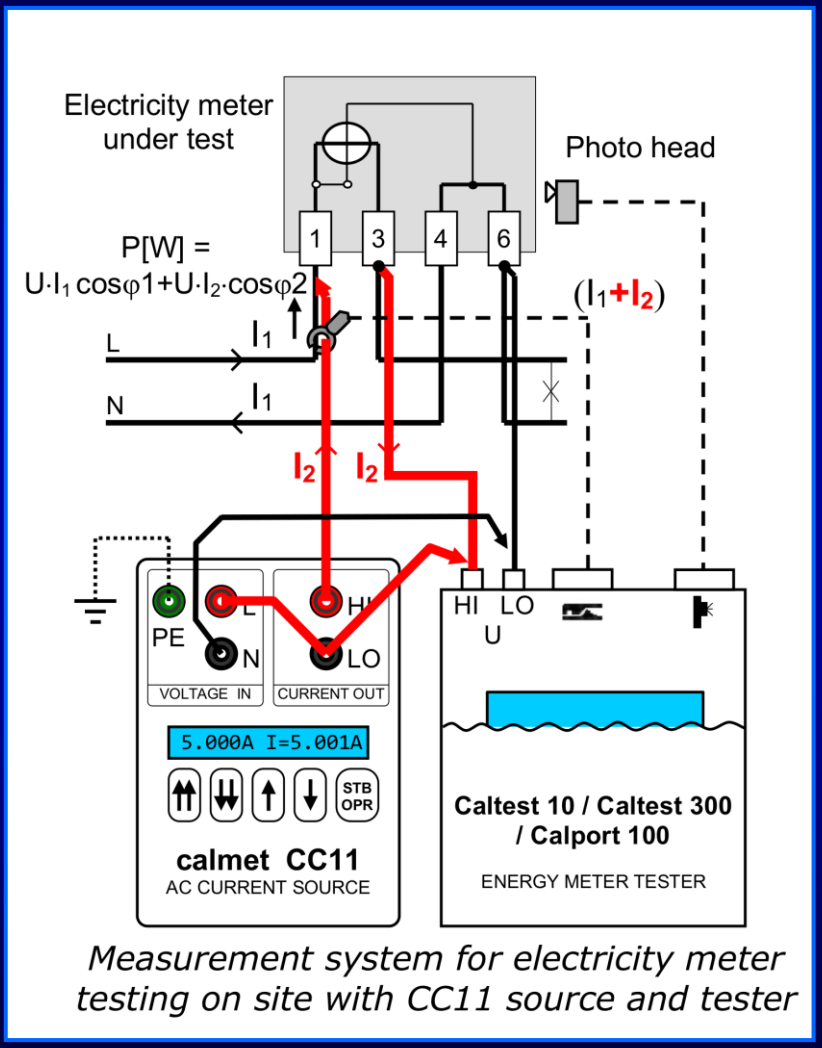
CC11 single phase AC source

- Can work as a programmable load for single and 3-phase Energy meters
- Range of current from 0.005 do 5.000A
- Digital measurement of input current
- Sillent work and no warm
- Operation without need of energy meter disconnection
- Powering from measurement circuit
- Insulated current output
- Accuracy class 0.2% for testing all kind of devices with current input



CC11 – small, portable electronic AC current source

Measurement system for electricity meter testing on site with CC11 source and tester



Measurement system for electricity meter testing on site with CC11 source and tester

Calmet CC11 Current Source`s Equipment

CC11 source`s set consist of:

- ❑ **CC11 AC current source**
- ❑ **Set of safety stackkable for safety cables (5)**
- ❑ **AKD11 accesories for safety cables (6) (safety test Clip Kleps (3), adapter with flexible Cu wire (2), safety crocodile test clip (1))**
- ❑ **Fuse FF6, 3A 250V, 5x20 (5)**
- ❑ **Fuse ZGTH – 0,25A/500V (2)**
- ❑ **Operation manual**
- ❑ **Guarantee certificate**
- ❑ **Manufacturer calibration certificate**

Optionally for CC11 source are available:

- ❑ **ZW100/10A coil**
- ❑ **ZW10/20A coil**

TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

Three-phase Fully Automatic Test System
0…560V, 0…120A
with Reference Standard and Integrated Current and Voltage Source
Accuracy: 0.02%, 0.04% or 0.1%

- **Easy verification of metres under precise load conditions, using integrated current and voltage source**
- **Automatic operation with predefined load points without the need of an external PC**
- **Modern SD flash memory card up to 32 GB for storage of customer data and measurement results**
- **Display of vector diagram, phase sequence, wave from oscilloscope, harmonics spectrum bar and trend charts for analysis of the mains conditions**
- **User-friendly system for data input and operation of combinated source and reference meter**

TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

Three-phase Fully Automatic Test System
0…560V, 0…120A
with Reference Standard and Integrated Current and Voltage Source
Accuracy: 0.02%, 0.04% or 0.1%

- **The system may be used either as a stand-alone reference standard meter class 0.02%, 0.04%, or 0.1%, or toghether with the integrated power source, or as a stand-alone three-phase power calibrator class 0.1%**
- **Data readout and test system control via USB, Ethernet and Bluetooth**

TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

Testing the entire Energy measurement system

Accuracy of all kinds of meters ε[%]

Electromechanical (Ferraris)

Electronic (static)

4-Quadrants Smart Meters

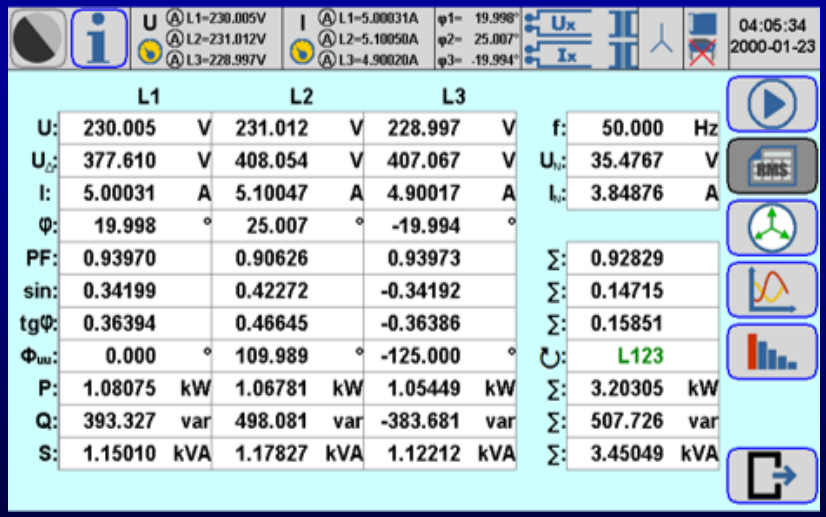
Max. demand

CT/PT burden, ratio, phase shift error

Wiring errors

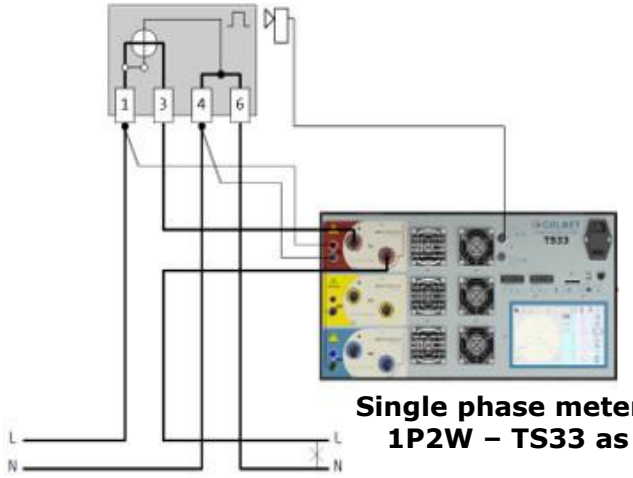
TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

- Easy verification of metres under precise load conditions, using integrated current and voltage source in class 0.02%, 0.04% lub 0.1%
- Voltage range 0,05...600V
- Current range 0.001...120A(12)(120)(1200)(30/300/3000)A
- Testing of energy meters, potential and current transformers (CT/PT)
- Automatic operation with predefined load points without the need of an external PC
- Vector, oscilloscope, bar and trend charts of three phase network
- Automatic Meter Constant recognition
- Automatic setting of measurement conditions (time, number of pulses)
- Big 7-inch full colour touch screen and computer software Calmet TS PC-Soft
- Reading data and remote controlled via USB, Ethernet, Bluetooth
- Recording data on flash memory SD card up to 32 GB
- Calibration Certificate

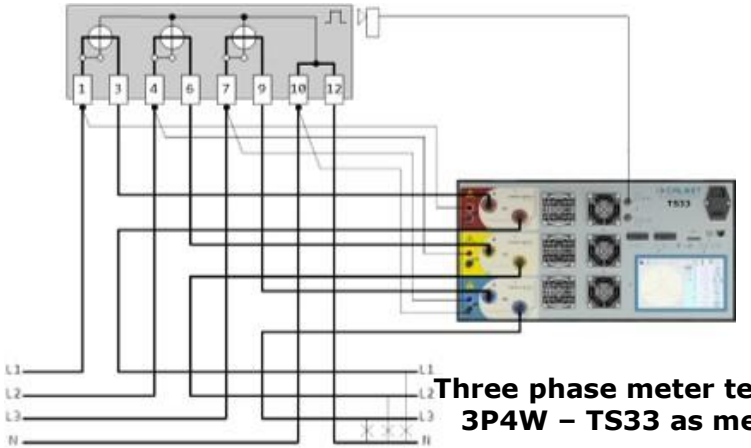


TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

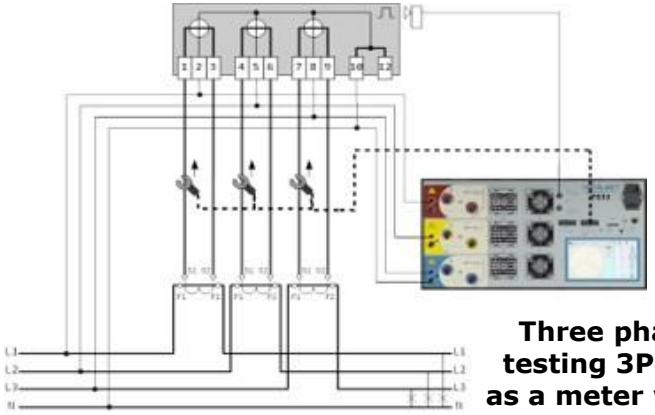
All possible types of connection: 1P2W, 3P4W, 3P3W,..., direct or with clamps



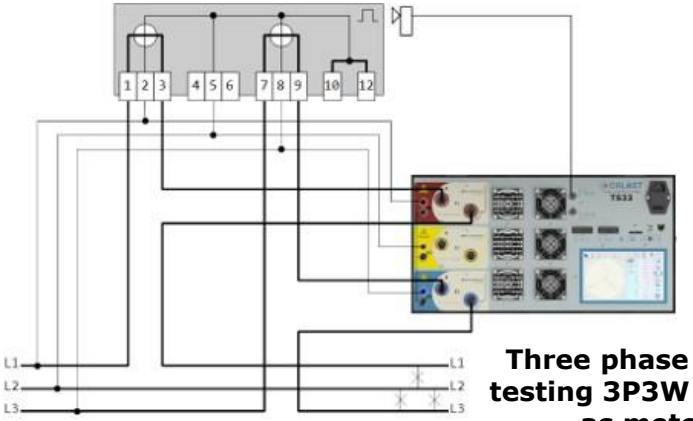
Single phase meter testing 1P2W – TS33 as meter



Three phase meter testing 3P4W – TS33 as meter



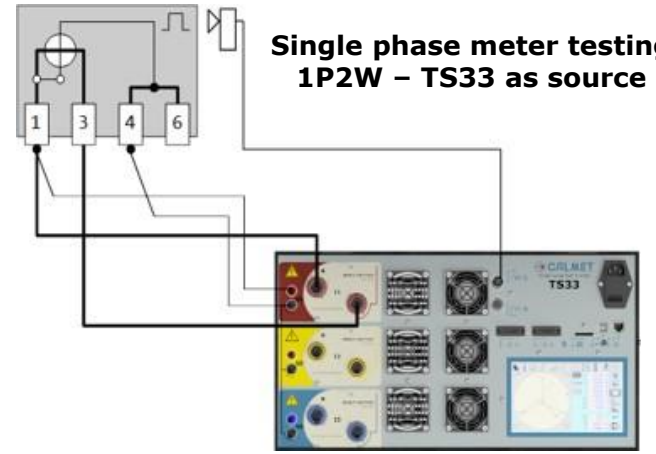
Three phase meter testing 3P4W – TS33 as a meter with clamps



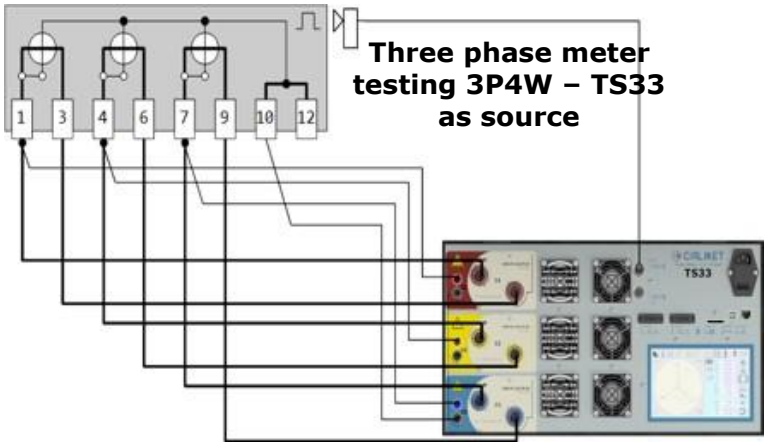
Three phase meter testing 3P3W – TS33 as meter

TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

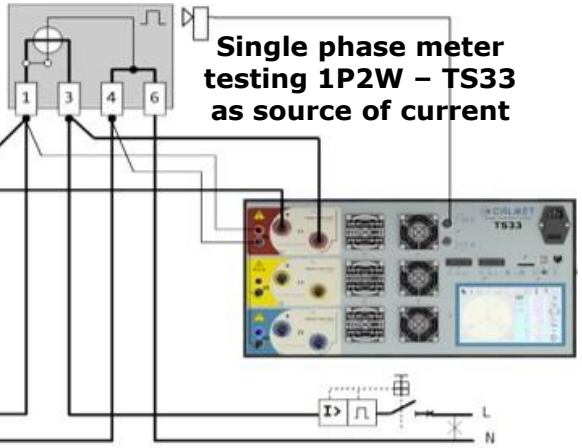
All possible types of metres: 1P2W, 3P4W, 3P3W. TS33 as source and reference



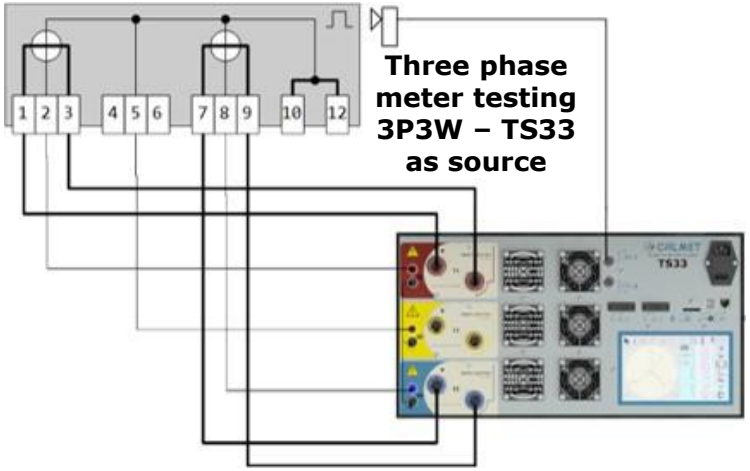
Single phase meter testing 1P2W – TS33 as source



Three phase meter testing 3P4W – TS33 as source



Single phase meter testing 1P2W – TS33 as source of current

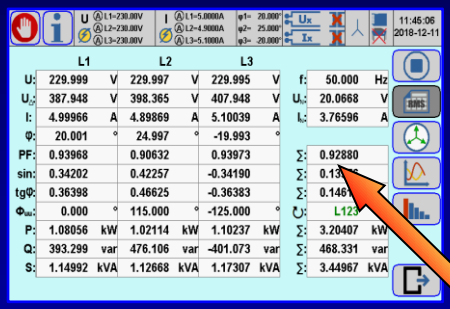


Three phase meter testing 3P3W – TS33 as source

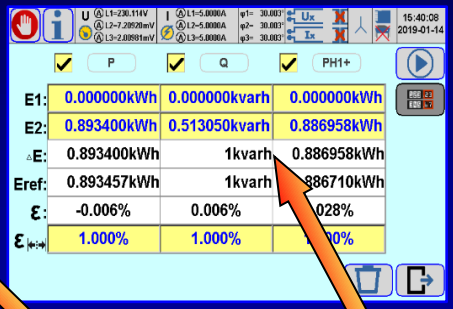
TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

TS33 reference meter mode: whole intallation measurement „as it is”

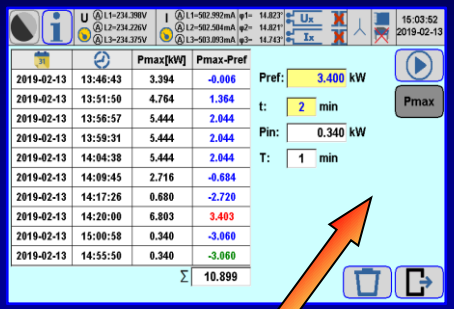
RMS values of U,I,φ,F,P,Q,S



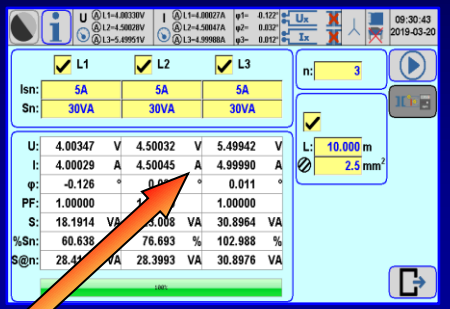
Counter (register) test



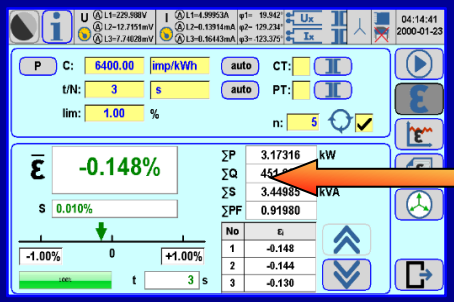
Maximum demand meter test

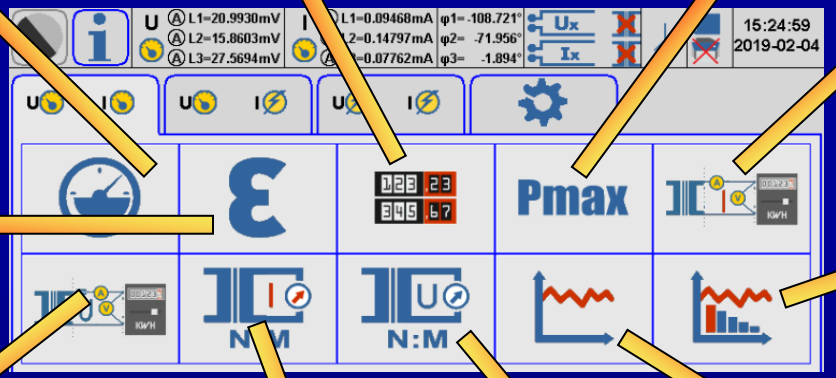


CT burden test

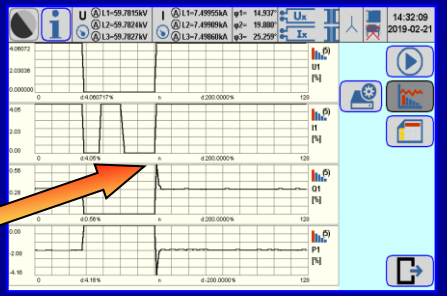


Meter error test in [%]

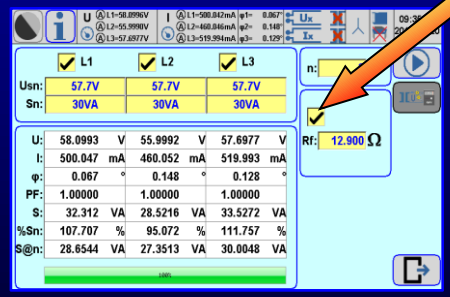




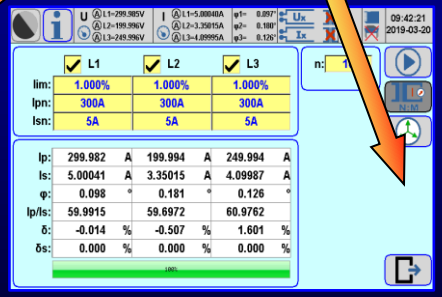
Harmonics trend test



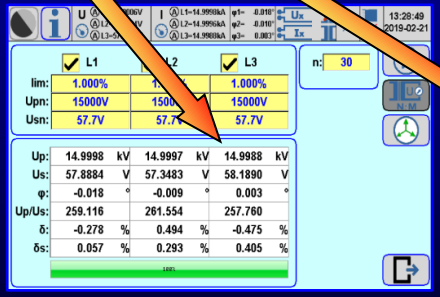
PT burden test



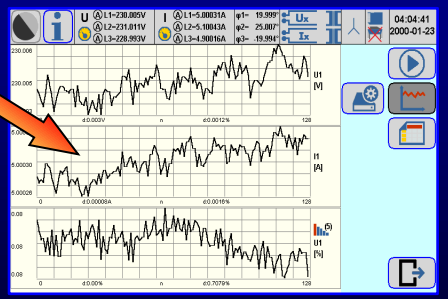
CT ratio test



PT ratio test



U,I,Φ,F,P,Q,S trend test



TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

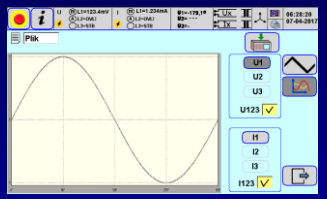
TS33 optional equipment

- Calmet TS33 test system class 0.02, 0.04 or 0.1 with Basic function
- Power cord
- Fuse T6A 250V (2pcs) i FF16A 500V (6pcs)
- Memory card SD 8GB
- EA31 set of safety measurement cables (12pcs)
- C091A T3475-001 plug Amphenol for Reference pulse output
- Operation manual
- Warranty card
- Calibration certificate

TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

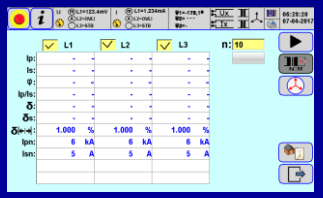
TS33 optional equipment

Calmet TS PC-Soft with operation manual and USB B/ USB A interface cable

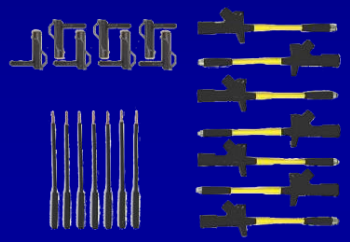


CF106H photo head with holder for inductive meter and meter with LED

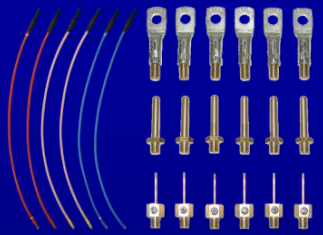
TT – function – Testing of CT and PT



EA20 additional accessories for safety cables



EA30 120A test leads (6pcs.) with terminals set (18pcs)



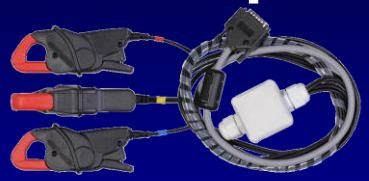
ER10H.3 1-position rack for hanging of meter with quick connection device 3-phase

DR200D miniature thermal printer with Bluetooth

TS33 – Three-phase Fully Automatic Test System with Reference Standard and Integrated Current and Voltage Source

TS33 optional equipment

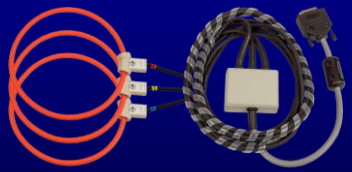
CT10AC error compensated clamps up to 12A (1set)



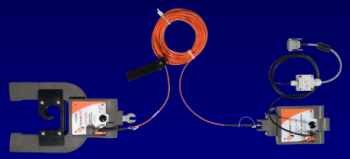
CT100AC error compensated clamps up to 120A (1set)

CT1000AC error compensated clamps up to 1200A (1set)

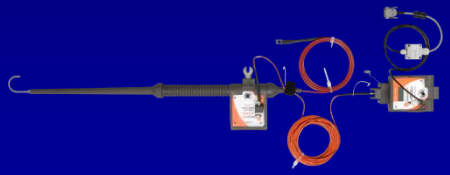
FCT3000AC.B error compensated flexible clamps 30/300/3000A (1set)



ALW2000AC.1 primary current sensor up to 2000A for LV and MV network (1pc)



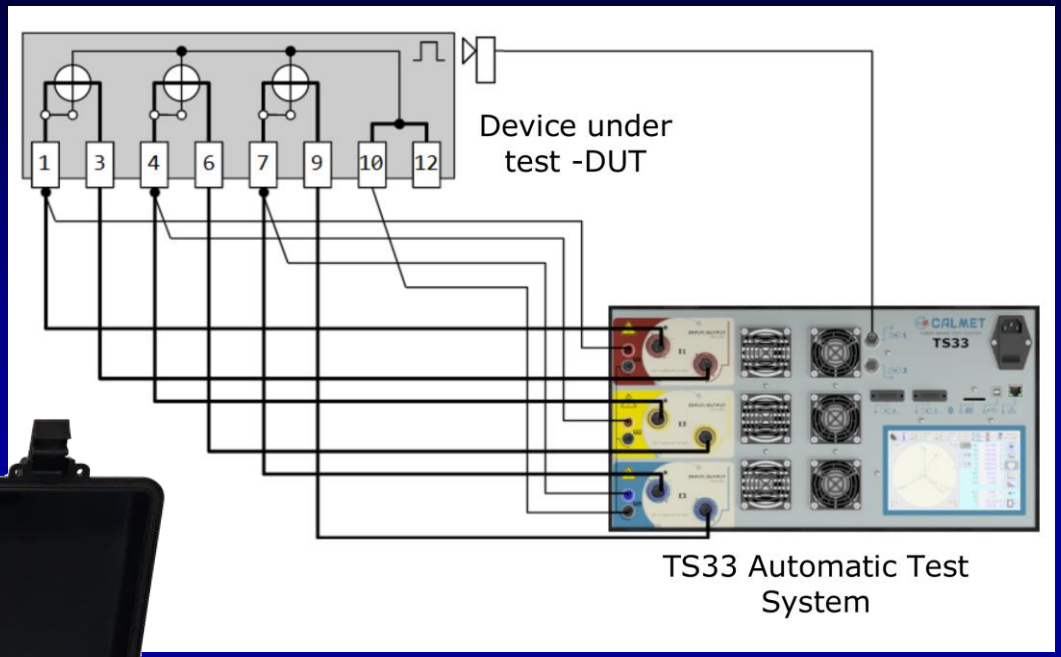
VLW40kVC.1 primary voltage sensor up to 40kV (1pc)

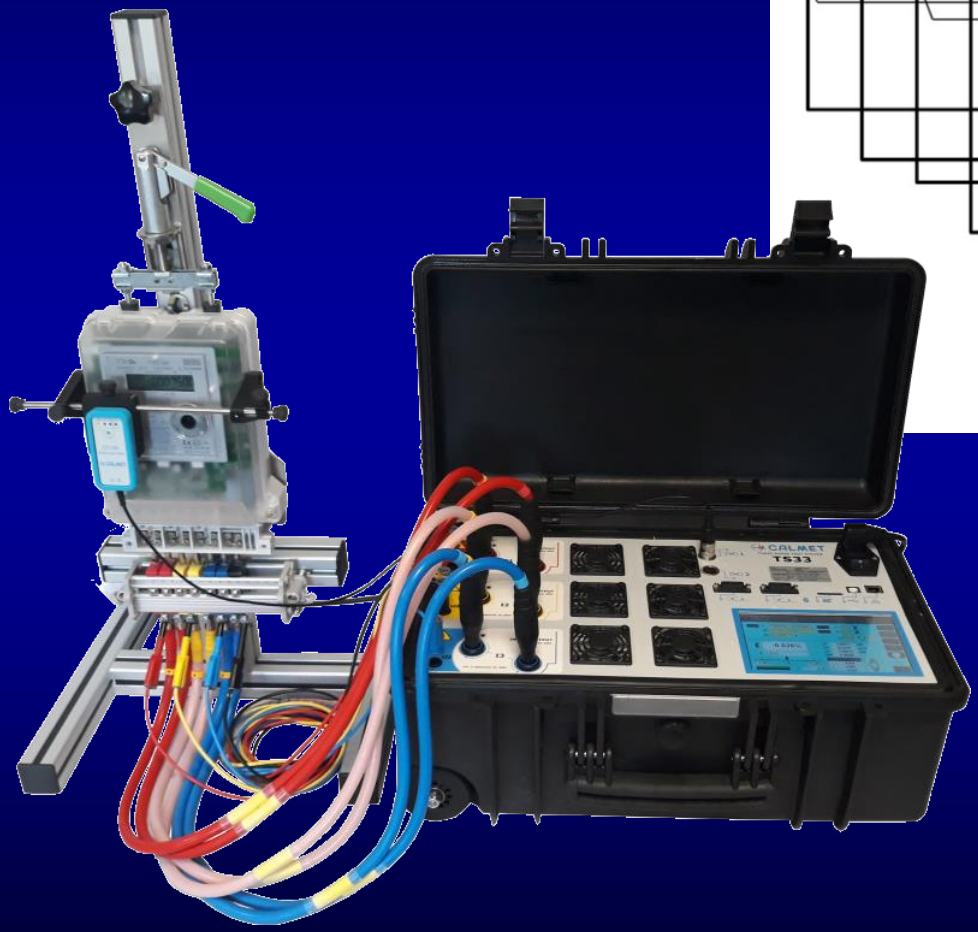


ET31 transportation case for additional accessories

Calmet TS33 option set 01 (CalmetTS33 + ET32 + CT100AC + CF106H + EA20)

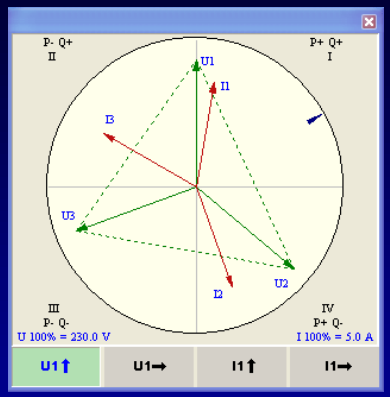
TS33 – option set TB1 – Three phase meter test station

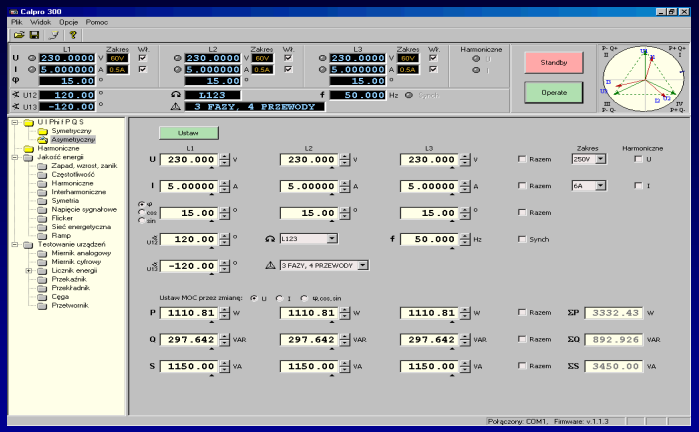


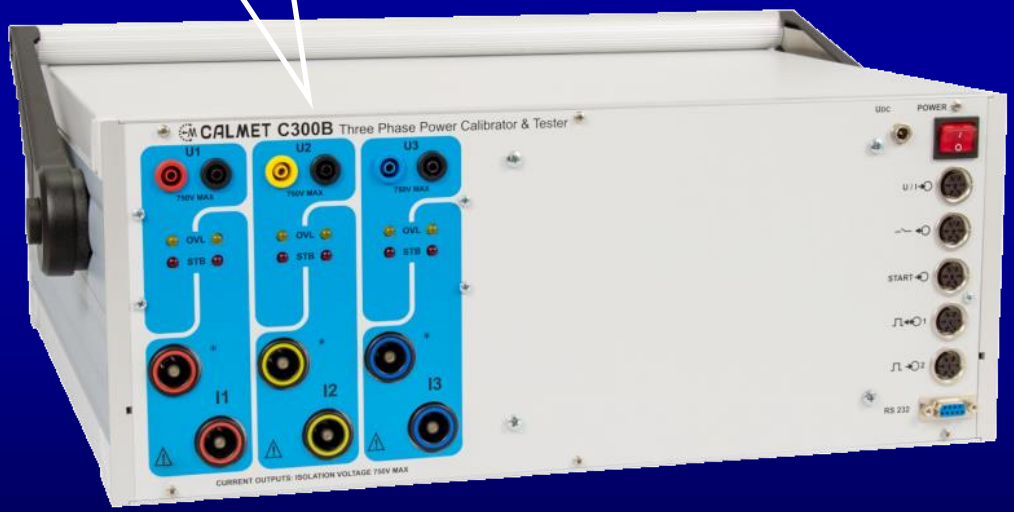


C300B – 3-Phase Power Calibrator and Tester of Power Engineering Devices

3-phase Calibrator
3x [0...560V, 0...120A]
with Reference Standard
Accuracy: 0.02%
or 0.05%







- ❑ **3-phase voltage source up to 560V**
- ❑ **3-phase current source up to 120A and 1-phase up to 360A**
- ❑ **Programming up to 64th voltage and current harmonics**
- ❑ **Power quality programming**
- ❑ **2 inputs for energy metres testing**
- ❑ **Start/stop inputs for protective relays testing**
- ❑ **AC inputs for measurement transformers and current clamp testing**
- ❑ **Manual mode and automatic test procedures**

C300B – 3-Phase Power Calibrator and Tester of Power Engineering Devices

Calibrator/tester C300B is used for adjusting, checking and verification of measuring instruments used in power engineering:

AC Voltmeter

AC Ammeter

Clamp Meter

Phase Meter

Power Factor Meter

AC Current Clamp

Transducer

Current Transformer

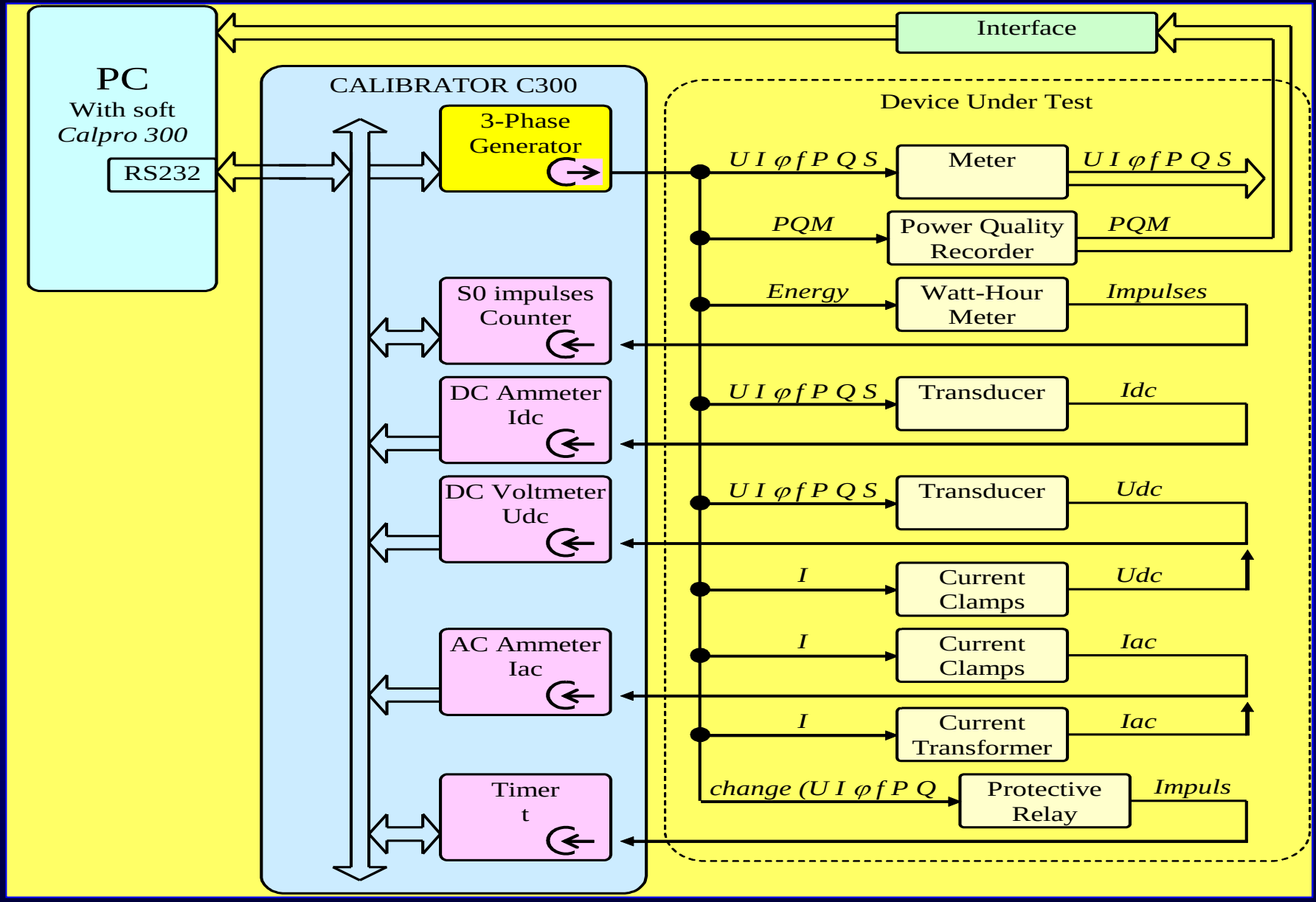
Power Meter P, Q, S

Protective Relay

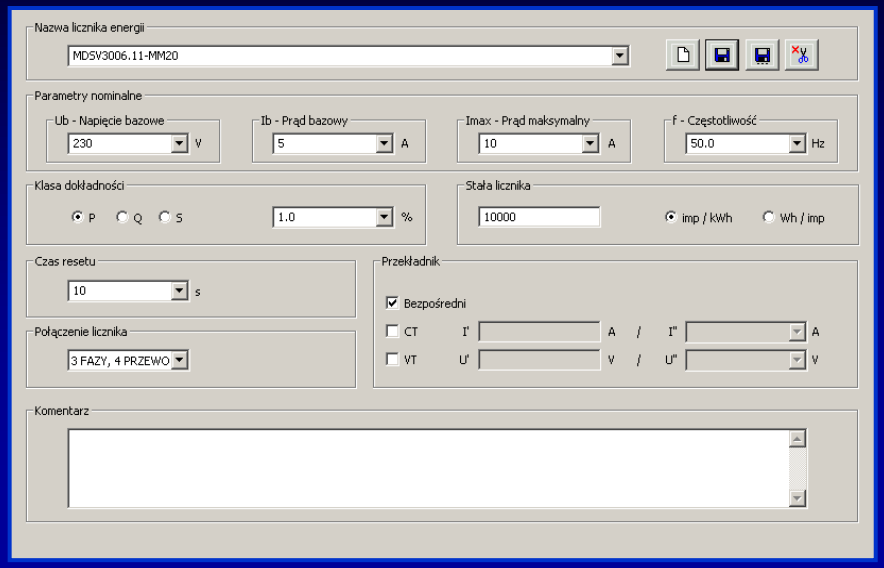
Power Quality Analyzer

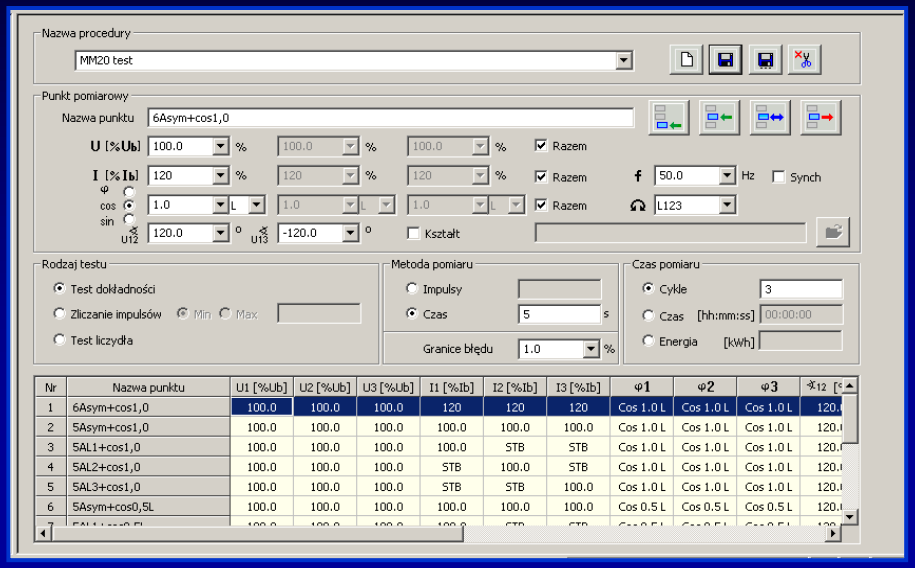
Electricity Meter

C300B – 3-Phase Power Calibrator and Tester – General Block Diagram



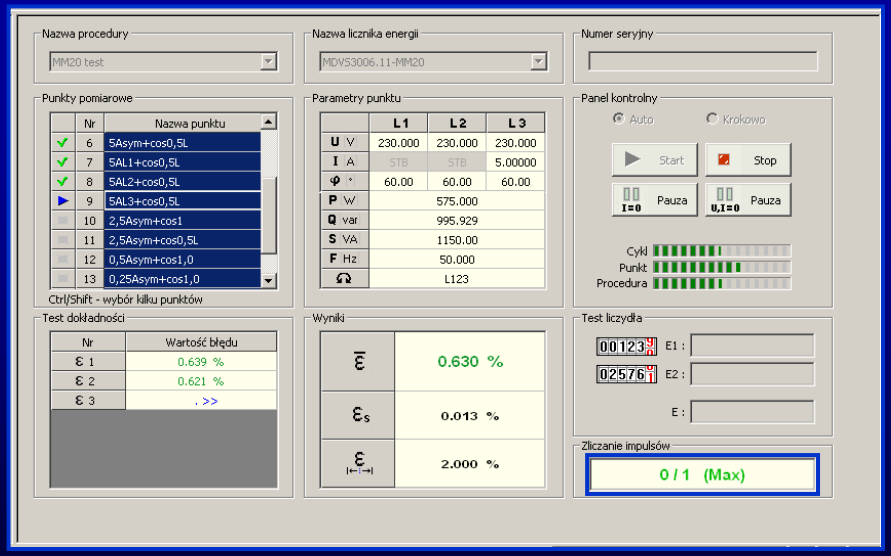
Testing meters in an automatic procedure





Meter type

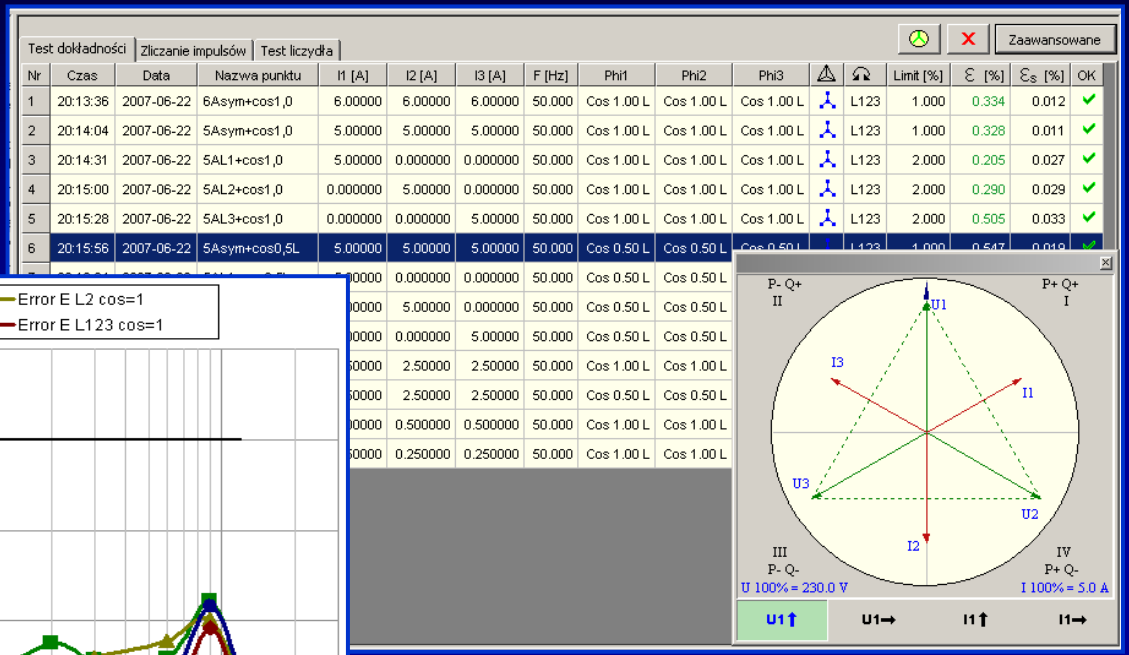
Measurement procedure



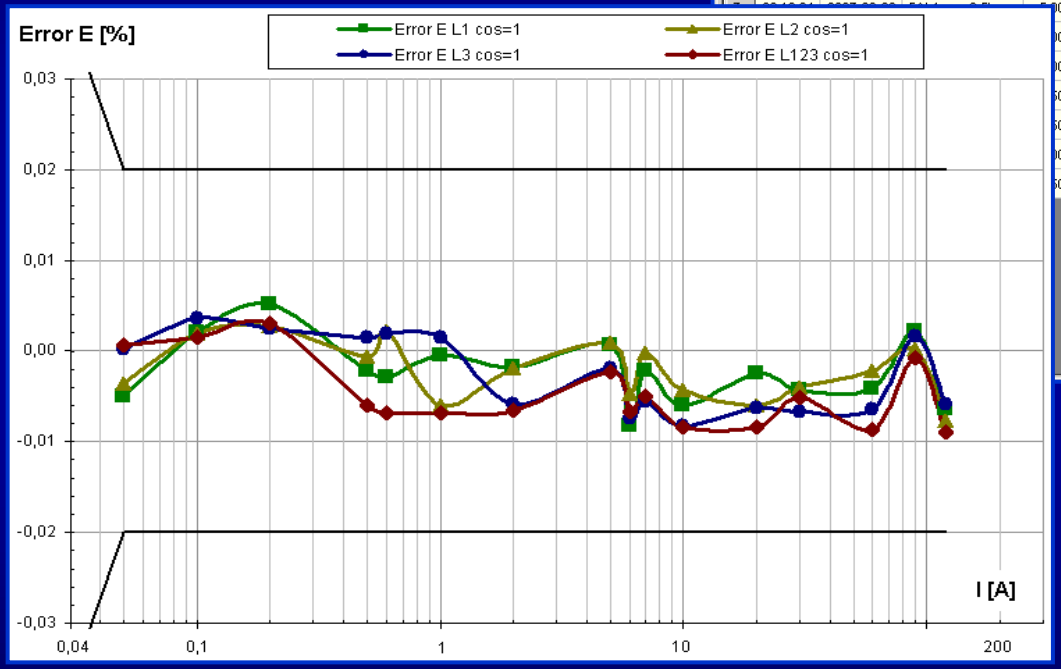
Auto Test

Testing of meter - results

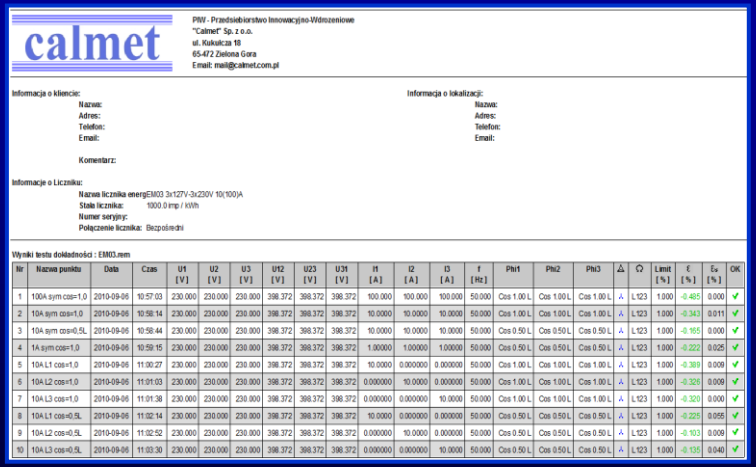
Table with the results and the posssibility of individual editing



Nr	Czas	Data	Nazwa punktu	I1 [A]	I2 [A]	I3 [A]	F [Hz]	Phi1	Phi2	Phi3	Limit [%]	OK
1	20:13:36	2007-06-22	6Asym+cos1,0	6.00000	6.00000	6.00000	50.000	Cos 1.00 L	Cos 1.00 L	Cos 1.00 L	L123	1.000	✔
2	20:14:04	2007-06-22	5Asym+cos1,0	5.00000	5.00000	5.00000	50.000	Cos 1.00 L	Cos 1.00 L	Cos 1.00 L	L123	1.000	✔
3	20:14:31	2007-06-22	5AL1+cos1,0	5.00000	0.000000	0.000000	50.000	Cos 1.00 L	Cos 1.00 L	Cos 1.00 L	L123	2.000	✔
4	20:15:00	2007-06-22	5AL2+cos1,0	0.000000	5.00000	0.000000	50.000	Cos 1.00 L	Cos 1.00 L	Cos 1.00 L	L123	2.000	✔
5	20:15:28	2007-06-22	5AL3+cos1,0	0.000000	0.000000	5.00000	50.000	Cos 1.00 L	Cos 1.00 L	Cos 1.00 L	L123	2.000	✔
6	20:15:56	2007-06-22	5Asym+cos0,5L	5.00000	5.00000	5.00000	50.000	Cos 0.50 L	Cos 0.50 L	Cos 0.50 L	L123	1.000	✔
				0000	0.000000	0.000000	50.000	Cos 0.50 L	Cos 0.50 L				
				0000	5.00000	0.000000	50.000	Cos 0.50 L	Cos 0.50 L				
				0000	0.000000	5.00000	50.000	Cos 0.50 L	Cos 0.50 L				
				0000	2.50000	2.50000	50.000	Cos 1.00 L	Cos 1.00 L				
				0000	2.50000	2.50000	50.000	Cos 0.50 L	Cos 0.50 L				
				0000	0.500000	0.500000	50.000	Cos 1.00 L	Cos 1.00 L				
				0000	0.250000	0.250000	50.000	Cos 1.00 L	Cos 1.00 L				



Eksport to Excel and graph



Direct print

C300B – 3-Phase Power Calibrator and Tester of Power Engineering Devices

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, 5x20A (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 + 12 units Cu)
- AD300 sockets adapter
- C091A T3475-001 Amphenol for Calibrator inputs
- Operation manual of calibrator and software (2units)
- Warranty card
- Calibration certificate

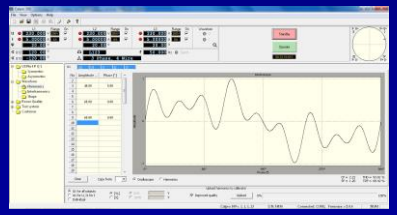
C300B – 3-Phase Power Calibrator and Tester of Power Engineering Devices

Optionally for Calmet C300B Calibrator are avaible:

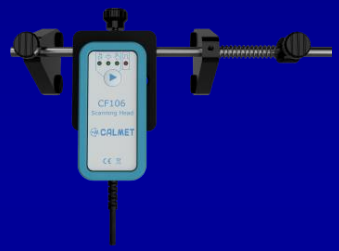
Computer Laptop

KAS300 transportation case for portable work

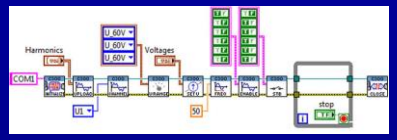
Calpro 300TS PC Soft for automatic test of electric equipment
Calpro 300PQ PC Soft for programming of Power Quality parmeters



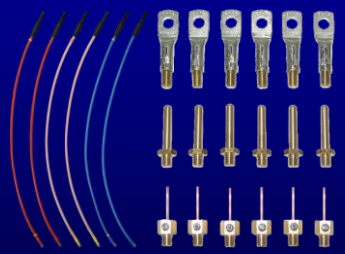
CF106H – photo head with holder for inductive meter and meter with LED



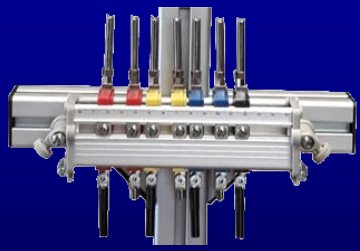
C300LabView – LabView Driver for C300B Calibrator



EA30 current cables up to 120A (6units) with set (18units) of replaceable terminals



EH10.3 –phase quick connection device



C300B – 3-Phase Power Calibrator and Tester of Power Engineering Devices

Optionally for Calmet C300B Calibrator are avaible:

RS232 – Bluetooth adapter for wireless connection

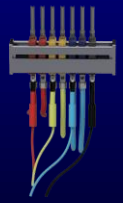
ZW100/10A – coil 100 turns/10A

ZW10/20A – coil 10 turns/20A

MPX8 – Eight Inputs Multiplekser with TB PC-Soft for simultaneously testing up to eight electricity meters

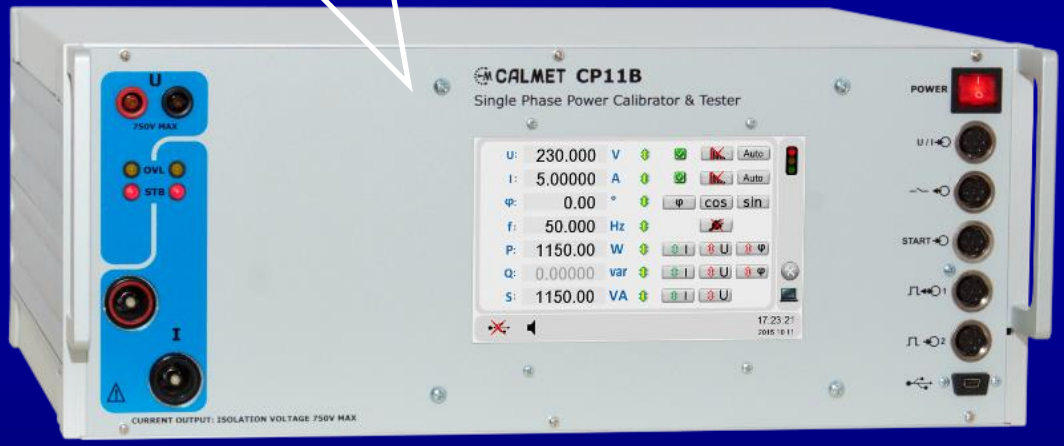
ER10 – rack for hanging of meter under test

EH10.3 – phase quick connection device



CP11B - Single Phase Power Calibrator and Tester of Power Engineering Devices

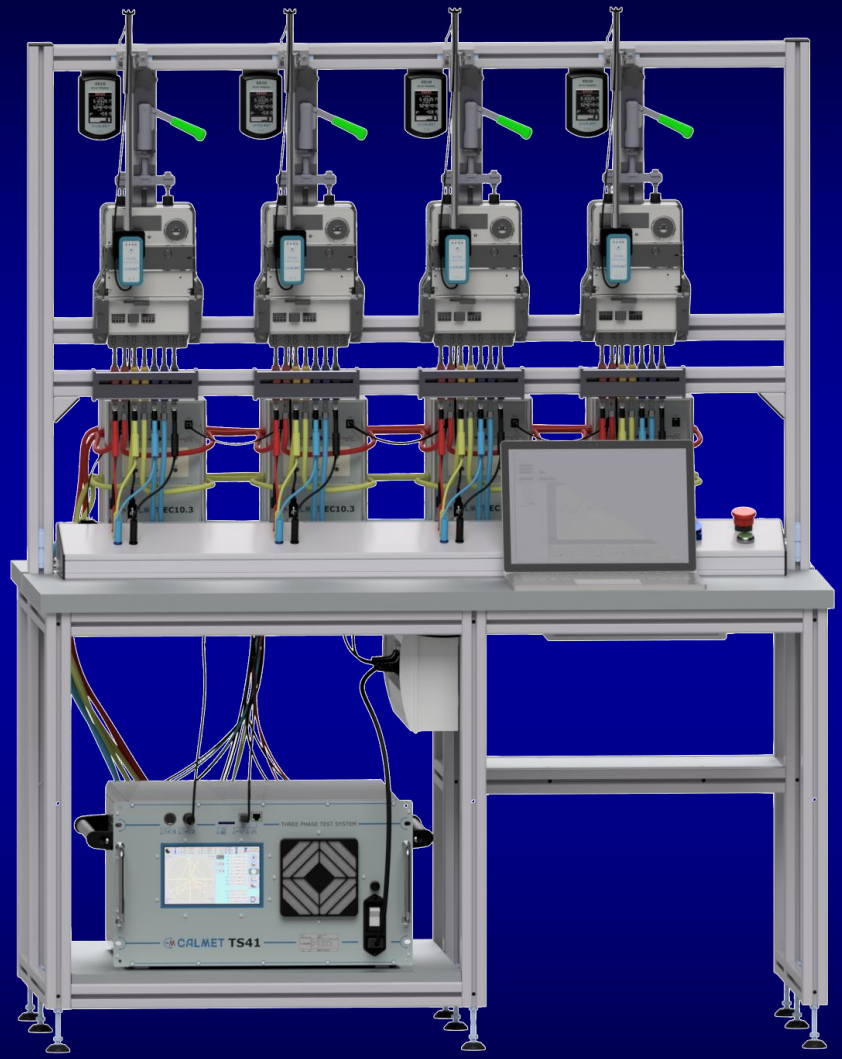
Single Phase Calibrator
0...560V, 0...120A
And Tester of Power Engineering Devices
Accuracy: 0.02% or 0.05%



- ❑ **Voltage source up to 560V**
- ❑ **Current source up to 120A with a single pair of current sockets**
- ❑ **Accuracy class 0.02% or 0.05% to calibrate digital instruments**
- ❑ **Single procuct in a single case without auxillary amplifiers**
- ❑ **High burden of outputs to drive older analogue instruments**
- ❑ **Large colour Touchscreen and Calpro300**
- ❑ **Manual mode and automatic test procedures**

TB41 Four Position Meter Test Bench for smart meters

- New generation of the automated Smart Meter Test Bench
- Accuracy class 0.02% or 0.04% with built in reference meter
- Extremely high accuracy class with external reference meter
- Automatic Test Procedures and Test Reports
- Simultaneously testing up to 4 electricity metres with different constants
- Programmed form (harmonics) & special shapes of currents and voltages
- Three-phase current and voltage source in range 0.001A...120A (300VA) and 20V...600V (150VA) per channel
- Signal generation without additional auxiliary amplifiers
- Compact module design, size and light weight
- AC single phase power supply operation only (<2000VA)
- Isolation transformers ICT for meter with „closed link” (IP link)



TB41 Four Position Meter Test Bench for smart metres

Standard equipment

- TS41 automatic test system class 0.02 or 0.04
- Mpx8 Eight Inputs Meter Calculator with TB PC Soft (for controlling the process of simultaneously testing up to 4 energy meters)
- ER41H.3 four position testing stand
- Computer Laptop PC with PC software
- CF106 photo head for inductive meter and meter with LED (4units)
- AD300 socket adapter
- Power cord (2units)
- Fuse T4A, 250V, 5x20 (2units)
- C091A T3475-001 plug Amphenol for Calibrator inputs
- Operation manuals and assembly manual
- Warranty card
- Manufacturer calibration certificate

TB41 Four Position Meter Test Bench for smart metres

Optionally equipment for TB41

EC10.3 ICT current isolation transformer up to 120A (4units) with EA38 set of current cables up to 120A (15units) for working with ICT

ED10 individual error display (4units) with cables

External high accuracy reference meter Radian Research

C091A T3475-001 plug Amphenol for TS41 system inputs

Energy Meter Testing Organization System

Site/Customer

Laboratory/Utility

Testers class 0.2%, 0.1%, 0.05%

Testers class 0.02%, 0.05%

„Transportation" error


More information on
www.calmet.com.pl/en