Four Position Meter Test Bench

The Calmet TB40 Four Position Meter Test Bench is used for calibration and testing of single and three phase electromechanical and electronic active and reactive electricity meters and portable test equipment.

The TB40 Test Bench comprises:

- three phase voltage and current power source with internal reference 0.05 accuracy class. Three phase power source generates voltage up to 560V and current up to 120A with programmable shapes, frequency in 40…500Hz range and phase shifts in 0…±360°range,
- four position testing stand with photo scanning heads and cables,
- eight inputs multiplexer for received impulses from scanning heads,
- PC with *Mpx8 PC software* and *Calpro 300 software*.

The TB40 Test Bench, using *Mpx8 PC software*, performs the following automatic and simultaneous tests of 4 electricity meters:

- measure the basic error characteristics and repeatability,
- checking the starting current,
- checking the no-load run,
- measure the influence of frequency, voltage, self-heating, distortion and special shapes of currents and voltages, reversed phase sequence,
- checking the impulse output and energy meter counter,
- checking the maximum power indicator.

The TB40 Test Bench, using *Calpro 300 software*, enables additionally to test the following devices:

- protection relays,
- current transformers,
- current clamps,
- measurement transducers,
- Power Quality measurement devices.

The TB40 Test Bench employs modern precision power source with internal reference without need to use additional external reference energy meter with additional cables. By this conception of the TB40 Test Bench may be achieved simultaneously extremely compact size, light weight, high metrological properties at reasonable price.

The TB40 Test Bench is controlled by means of personal computer with installed *Mpx8 PC software* and *Calpro 300 software* in Windows operating system.

TB40 three phase 4- position meter test bench

TB40 Four Position Meter Test Bench
• New generation of the Meter Test Bench
• 0.05 accuracy class up to 3x120A and 3x560V
• Programmed form and special shapes of currents and voltages
• Automatic test procedures
• Extremely compact design size and light weight
• AC single phase power supply operation only

Mpx8 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, for example manual input of register value by operator,
- the manual mode - direct execution of single test step. It offers an ideal solution for tests and evaluation of entire specifications for meter under test without generating the complete test procedure,
- computer database of customers, meters, measurement procedures and results, diagrams, tables of results and reports edition.

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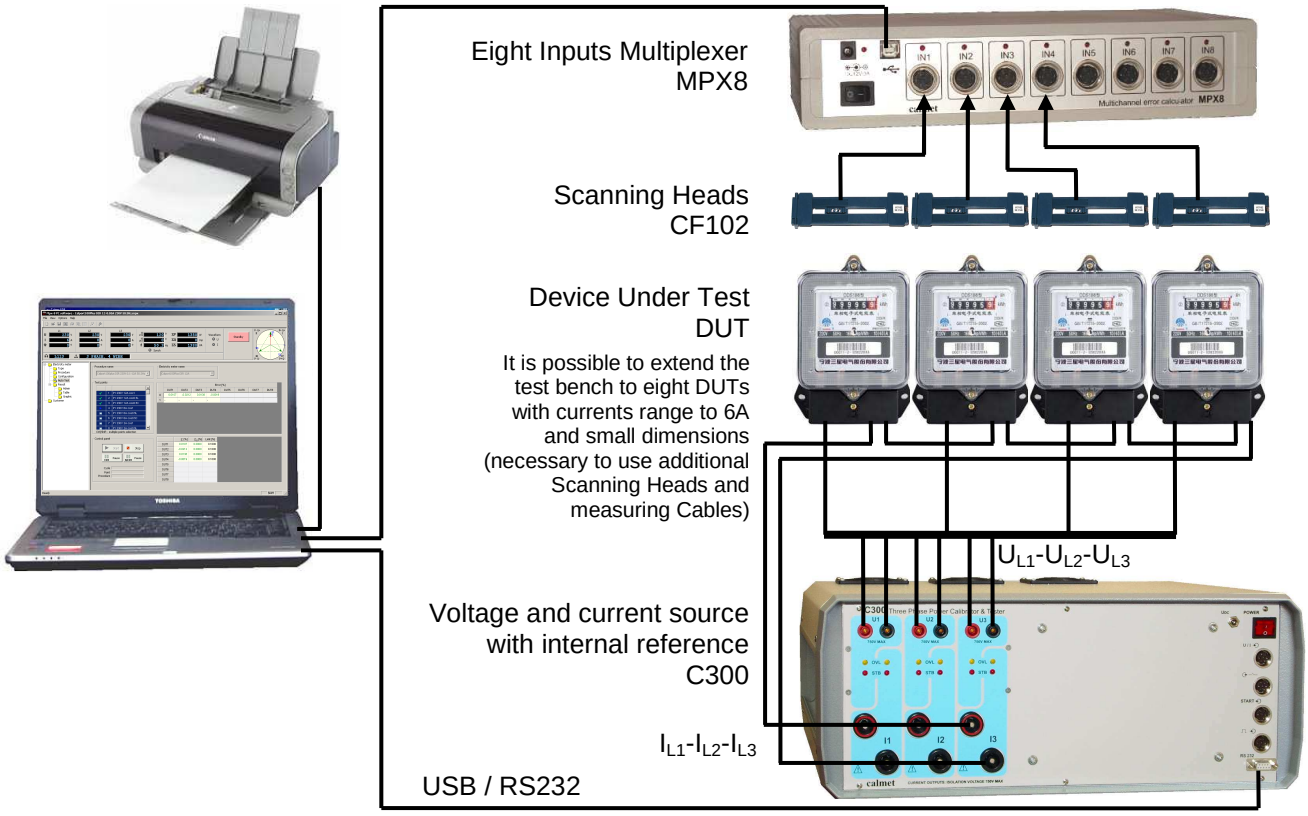
Configuration of the TB40 Test Bench



Technical parameters of the TB40 Test Bench

Power source with reference				
Parameter	**Setting range**	**Accuracy** [1)3)]	**Stability/1h** [1)3)]	**Maximum Load**
Voltage U	30.0000...560.000V 0.5000…30.0000V	±0.05% ±0.05%*	±0.01% ±0.01%*	30VA per phase
Current I	0.050000...120.000A 0.005000…0.050000A	±0.05% ±0.05%*	±0.01% [5)] ±0.01%*	80VA per phase
Frequency f	40.000...99.999Hz 100.000...500.000Hz	±0.002Hz ±0.01Hz		
Phase shift φ	0.00...±360.00°	±0.1° [2)]	±0.03° [2)]	
Active Power P	0...3x50000.0W	±0.05% [2)]	±0.01% [2)]	
Reactive Power Q	0...3x50000.0var	±0.05% [2)]	±0.01% [2)]	
Apparent Power S	0...3x50000.0VA	±0.05% [2)]	±0.01% [2)]	
Time (for energy dosage)	1...36000s	±0.01% ± 0.001s		
Energy	calc. from settings of power and time	±0.05% [2)]	±0.01% [2)]	
Distortion U and I	0.1%			
Harmonics	0…100% and 0…360° up to 31st or 3200Hz	±0.02% and ±0.5° [4)]	independent superposition of harmonic components in each phase of current and voltage	
Special shapes	Phase Fired and Burst acc. to EN50470			
Power supply	single phase 230V±10% / 45…65Hz / 900VA acc. to IEC 60359 for group I			
Dimensions and weight	(width 530 x height 200 x depth 560)mm and 32kg			
Testing stand				
Test rack	Four position test rack is made of light aluminum profiles dimensions (width 1260 x height 1600 x depth 550)mm and weight 50kg			
Set of cables	Set of safety voltage cables (16 units), set of safety current cables up to 20A (15 units) and up to 120A (15 units), and set of accessories for safety cables (56 units)			
Photo scanning heads				
	Photo scanning heads type CF102 (4 units) which detect the disc movement or the LED flash of the meter			
Multiplexer				
Impulse input	Eight impulse inputs IN_L 0...2V, IN_H 4...27V up to 200kHz			
Power supply	9…12…18V and 1A@12V			
Dimensions and weight	(width 290 x height 70 x depth 200)mm and 1.3kg with cables			

[1)] – % - related to the measuring value, %* - related to the measuring final value
[2)] – in 0.05…120A current range and in 30…560V voltage range and in 45…65Hz frequency range
[3)] – power end energy errors related to apparent power
[4)] – 0.02% of output and 0.5° for 2nd harmonic with linear rise up to 0.10% of output and 2° for 31st harmonic
[5)] – 0.01% for I≤20A with linear rise up to 0.03% for I=120A

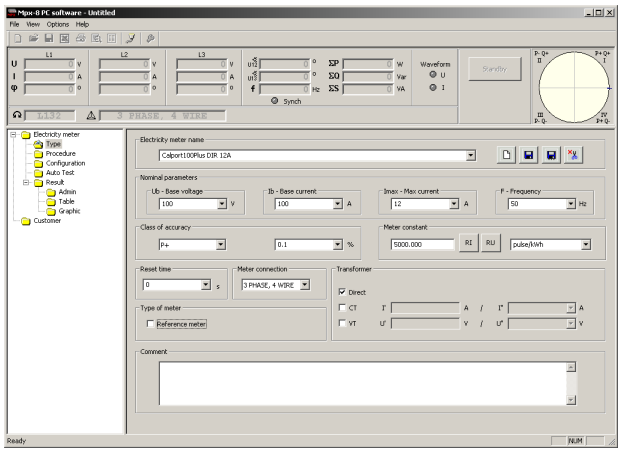
Mpx8 PC software package for Windows

Advantages of *Mpx8 PC software*

- user-friendly operation,
- database for meters and test procedures,
- fully-automatic test procedures for meter testing,
- continuous monitoring of the test,
- tables and graphics for presentation of results,
- operator interface available in several languages.

Meter type window

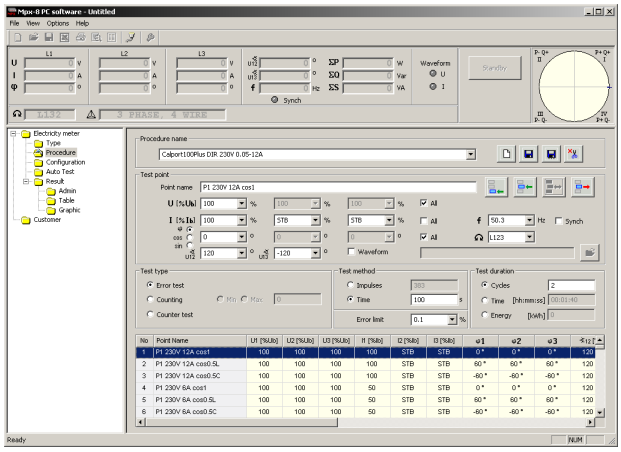
The meter type window for entering data to tested devices database, contains the electrical and functional definitions of the device under test – DUT (base voltage and current values, maximal current value, accuracy class of the DUT, meter constant, meter connection,…).



Procedure window

The procedure window for entering data to measuring procedures database, describes the order and content of the various test steps in a sequence. For each test step are specified following data:

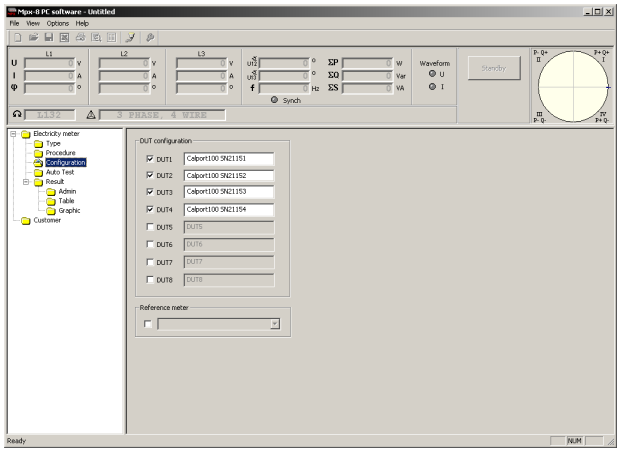
- parameters of test point (point name, percentage value of the base voltage and current, phase angle or power factor, frequency, waveform of the voltages and currents,…),
- test type (error test, counting test, counter test),
- test method (impulses counting or time counting for error test) and percentage error limit of the DUT,
- test duration for calculate the standard deviation of error (number of cycles, time of the test point, energy dosage to counting),



Configuration window

The configuration window describes configuration of the MPX8 Multiplexer inputs (active / not active) and description of connected DUT (name, serial number and other necessary information).

Additionally the configuration window allows to set the external reference meter (option) connected to the 8th of the MPX8 input.



Autotest window

The autotest window for performing test of the DUT (tests of accuracy at reference conditions, repeatability, meter constant, starting and no-load condition, effect of influence quantities and tests of effect of disturbances of long duration as reversed phase sequence, voltage unbalance, self-heating, odd harmonics, even harmonics, sub-harmonics,…) according to measuring procedure in the manual mode or in the automated mode. The autotest function allow to allocates to a measurement procedure a meter type and selects a test sequence.

During the test, the operator will be informed about:

- point status (passed / not passed, active point),
- progress indicator (cycle, point and procedure)
- error values for all DUTs in consecutive cycles,
- values of average error, standard deviation and error limit for all DUTs,

Additionally, in any time, the operator can pause or stop a procedure and repeat selected point.

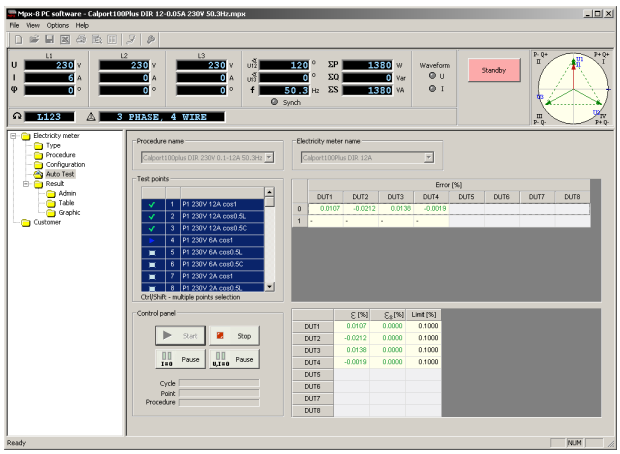


Table result window

The table result window makes possible visualization and edition measured results in form of table and consists of measured results of DUTs in two kinds of table: table of individual DUTs results and table of all DUTs results.

The table result is fully customizable. The operator can change:

- add or hide columns in the table,
- resolution of any value,
- the order of columns.

During an automatic test sequence it is possible to view test results and after executing an automatic test sequence all saved results are available for further data processing (printing and exporting data to MS Excel).

Table of individual DUTs results

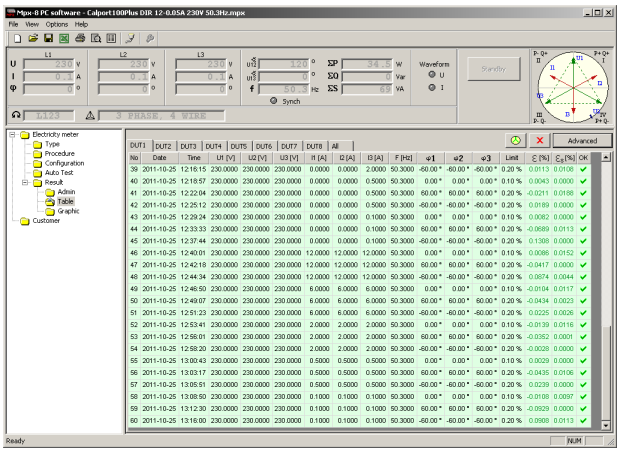
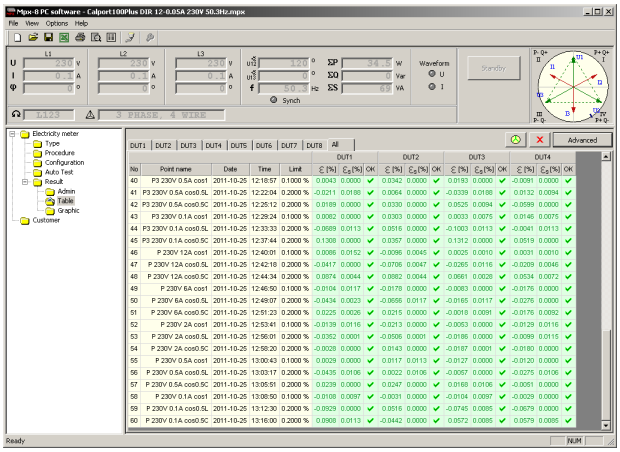


Table of all DUTs results

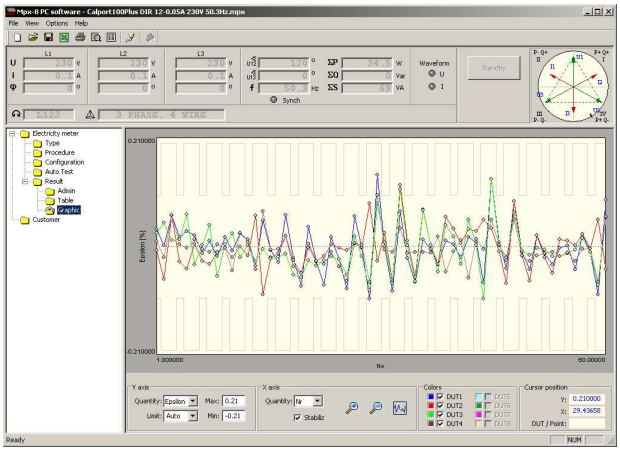


Graphic result window

The graphic result window makes possible visualization of measured results in form of diagram of error function with error limits.

The graphic result is fully customizable. The operator can change:

- add or hide graph of selected DUT to diagram,
- color of any graph,
- quantity of X axis (no, time, current, voltage,…),
- zoom in and out of diagram.



Additional standard functions

Mpx8 PC software meets the following requirements:

- demonstration software allow training to be given before delivery of the test system,
- standardized meter type and test sequence definitions considerably reduce the need for extensive training and familiarization,
- the operator interface is available in many different languages,
- generation of harmonics,
- generation of special test signals and wave forms according to the IEC 62052-11 and EN 50470-1, 2, 3,
- with customers window the operator can in simply and fast way build a customers database, which will be used to reports.

TB40 Test Bench's equipment

All completed TB40 Test Bench's set consists of:

- C300 calibrator as power source with reference,
- Calmet ER10 testing stand including: test rack with set of safety voltage cables (16 units), set of safety current cables up to 20A (15 units) and up to 120A (15 units), and set of accessories for safety cables (56 units),
- CF102 miniature photo head for inductive meters and meters with LED (4 units),
- MPX8 Eight Inputs Multiplexer,
- computer Laptop,
- *Mpx8 PC software*,
- *Calpro 300* Soft – Basic Version,
- *Calpro 300TS* PC Soft for automatic test of electric equipment,
- *Calpro 300PQ* PC Soft for Power Quality measurement devices testing,
- RS232 interface cable socket-plug,
- power cords (2 units),
- AD300 sockets adapter,
- fuse T4A, 250V, 5x20 (2 units),
- operation manuals (6 units), mounted manual,
- guarantee certificate, calibration certificate.

Optionally for TB40 Test Bench are available:

- CF101 – miniature photo head for inductive meter,
- CF100 – miniature photo head for meter with LED,
- UCF100 – holder for CF100 and CF101 photo heads,
- C091A T3475-001 plug Amphenol for Calibrator inputs.