ZERA

Product Range 2012

Portable Reference Meters & Test Systems

Current & Power Sources

Stationary Meter Test Systems

Automatic and Semi-automatic Testing

Instrument Transformer Test Systems

CT/PT Test Components

Constant Current Source

Precision Power Calibration Systems

Further information to the products and product-lines presented in this catalogue can be found in the appropriate leaflet.
Visit our website: www.zera.de.

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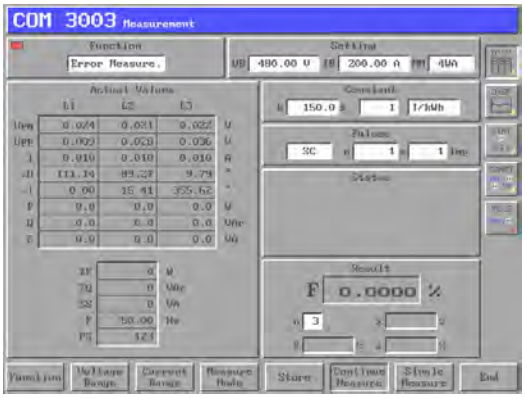
Portable Meter Testing | Moving Test

Portable meter test systems of ZERA covers reference meters, primary standards, test systems as well as current and power sources. All measurements can be performed according to IEC standard.
Reference meters with accuracy classes 0.2 to 0.02 are commonly used for testing of meter installations and for observing error limits of electricity meters on-site.
The primary standard with accuracy class 0.01 is used for very accurate testing of meters and reference meters.
Test systems are reference meters with integrated source. You can choose between systems with current source or current and voltage source. Test systems are especially useful if you need user-defined values for current and voltage while testing meter installation with only one device.

Primary standard with accuracy class 0.01



COM3003

- Comparator
- Accuracy class 0.01
- AC/DC reference standard
- Primary standard, e. g. for meteorological institutes and calibration laboratories.

- Functions amongst others:
  - Actual values
  - Vectorial display
  - Curve display
  - Harmonic measurement
  - Error measurement
  - Reference measurement

- Static and electromechanical power meters respectively instruments with power proportional frequency output can be tested in the menu “Error measurement“.
  The user can select between scanning head input or frequency input.

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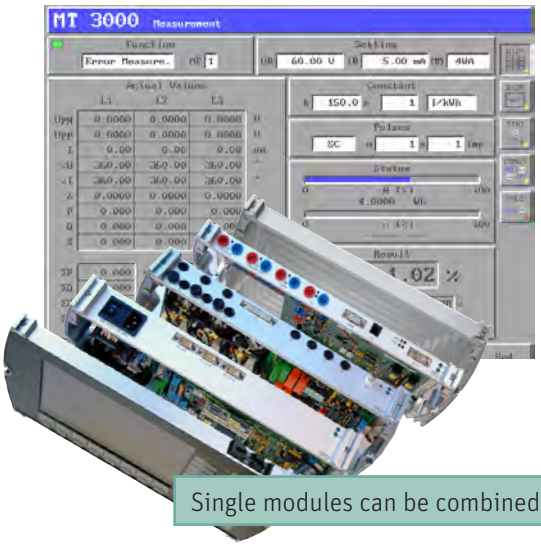
MT3000 Reference Meter

- Accuracy classes 0.02 and 0.05
- Coloured display
- Modular design
- System upgrade at any time
- Unique long-term and temperature stability of the measuring module
- Current measurement via AC-current clamps up to 300 A
- No additional error for reactive measurement
- Ratio test on PTs and CTs by simultaneous measurement of both primary and secondary values in CT connected metering systems
- Testing of voltage, current and power transducers
- Functions amongst others:
  - Harmonic measurement
  - Error measurement
  - Burden measurement
  - U/I transformer test
  - tm/te transmitter test
  - Long-time measurement
  - Selective power measurement
  - Data readout meter
  - Automatic operation (as option)



Single modules can be combined

NEW MT310-01 CAT IV

Also available with accuracy class 0.05

Also available as single-phase device

MT365

- Accuracy class 0.05
- Coloured display
- Functions amongst others:
  - Vector and curve display
  - Harmonic measurement
  - Error measurement
  - Service function
  - Automatic operation (as option)
- Also available with accuracy class 0.1 as **MT360**

MT310

- Accuracy class 0.1
- Functions amongst others:
  - Actual values
  - Vector and curve display
  - Error measurement
  - Harmonic measurement
  - Burden measurement
  - I transformer testing (as option)
- Also available with accuracy class 0.05 as **MT320**
- Also available as CAT IV device **MT310-01** NEW

MT30

- Accuracy class 0.2
- Functions amongst others:
  - Actual values
  - Error measurement
  - Vector and curve display
  - Harmonic measurement
- Also available as single-phase device **MT10**

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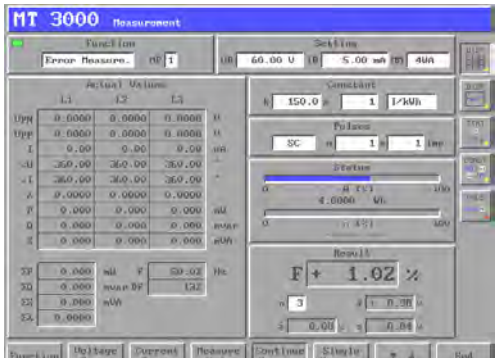
MT3000 Test System

- Accuracy classes 0.02 and 0.05
- Coloured display
- Reference meter with integrated current and voltage source
- Current generation from 4 mA up to 12 A (optional with booster up to 120 A, see below)
- Voltage generation from 40 V up to 300 V
- Modular design
- System upgrade at any time
- Unique long-term and temperature stability of the measuring module
- No additional error for reactive measurement
- Functions amongst others:
  - Harmonic measurement
  - Burden measurement
  - U/I transformer testing
  - tm/te transmitter test
  - Selective power measurement
  - Long-time measurement
  - Automatic operation

- With **MT3000 current booster** current generation up to 120 A

Similar to original product



MT3000 Current Booster

With integrated current and voltage source

MT78x/MT68x available with trolley

MT781

- Accuracy class 0.1
- Coloured display
- Three-phase fully automatic test system with integrated current source
- Current generation from 10 mA up to 100 A
- Voltage generation from 40 V up to 500 V
- Verification of the load conditions on metering installations
- Functions amongst others:
  - Vector display
  - Harmonic measurement
  - Error measurement
  - Automatic measurement
  - Selective power measurement (as option)
- Also available with accuracy class 0.05 as **MT786**

MT681

- Accuracy class 0.1
- Coloured display
- Three-phase fully automatic test system with integrated current source
- Current generation from 10 mA up to 100 A
- Verification of the load conditions on metering installations
- Functions amongst others:
  - Vector display
  - Harmonic measurement
  - Error measurement
  - Automatic measurement
  - Selective power measurement (as option)
- Also available as single-phase device **MT680**.

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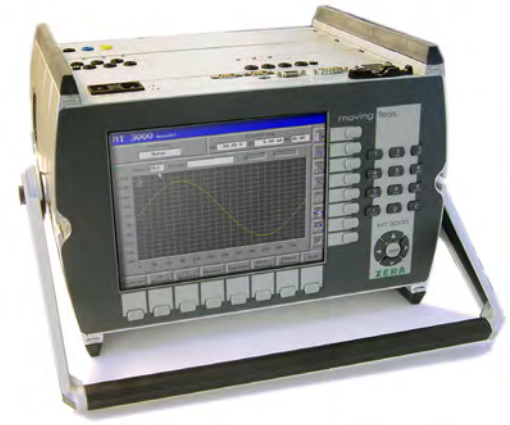
MT680s NEW

- Accuracy class 0.1
- Coloured display with touch screen
- Single-phase test system with integrated current source
- Testing of energy meters for accuracy classes 1 and 2 in 2-wire circuits
- Current generation from 10 mA up to 120 A
- Functions amongst others:
  - Error measurement
  - Vectorial display
  - Free programmable load point settings for current generation
  - Automatic operation
  - Selective power measurement (as option)

MT3606

- Accuracy class 0.1
- Coloured display
- Single-phase test system with integrated current and voltage source
- Testing of energy meters for accuracy classes 1 and 2 in 2-wire circuits
- Current generation from 10 mA up to 60 A
- Voltage generation from 40 V up to 300 V
- Functions amongst others:
  - Error measurement
  - Vectorial display
  - Free programmable load point settings for voltage and current generation
  - Automatic operation
  - Selective power measurement (as option)

Single-phase with integrated source



Three-phase load up to 120 A / 500 V

MT3000 Power Source

- Three-phase power source
- Current generation from 4 mA up to 12 A
- Voltage generation from 40 V up to 300 V
- Coloured display
- Can be combined with MT3000 reference meter
- Energy dosage
- Programmable phase shift, frequency and balance and unbalance load

MT551

- Three-phase power source
- Current generation up to 120 A
- Voltage generation up to 500 V
- 10,4″ touch screen
- Individual load point programming in four quadrants
- Automatic control via MT3000 or MT365 possible
- Energy dosage
- Available interfaces:
  - RS232
  - Bluetooth
  - USB

MT500

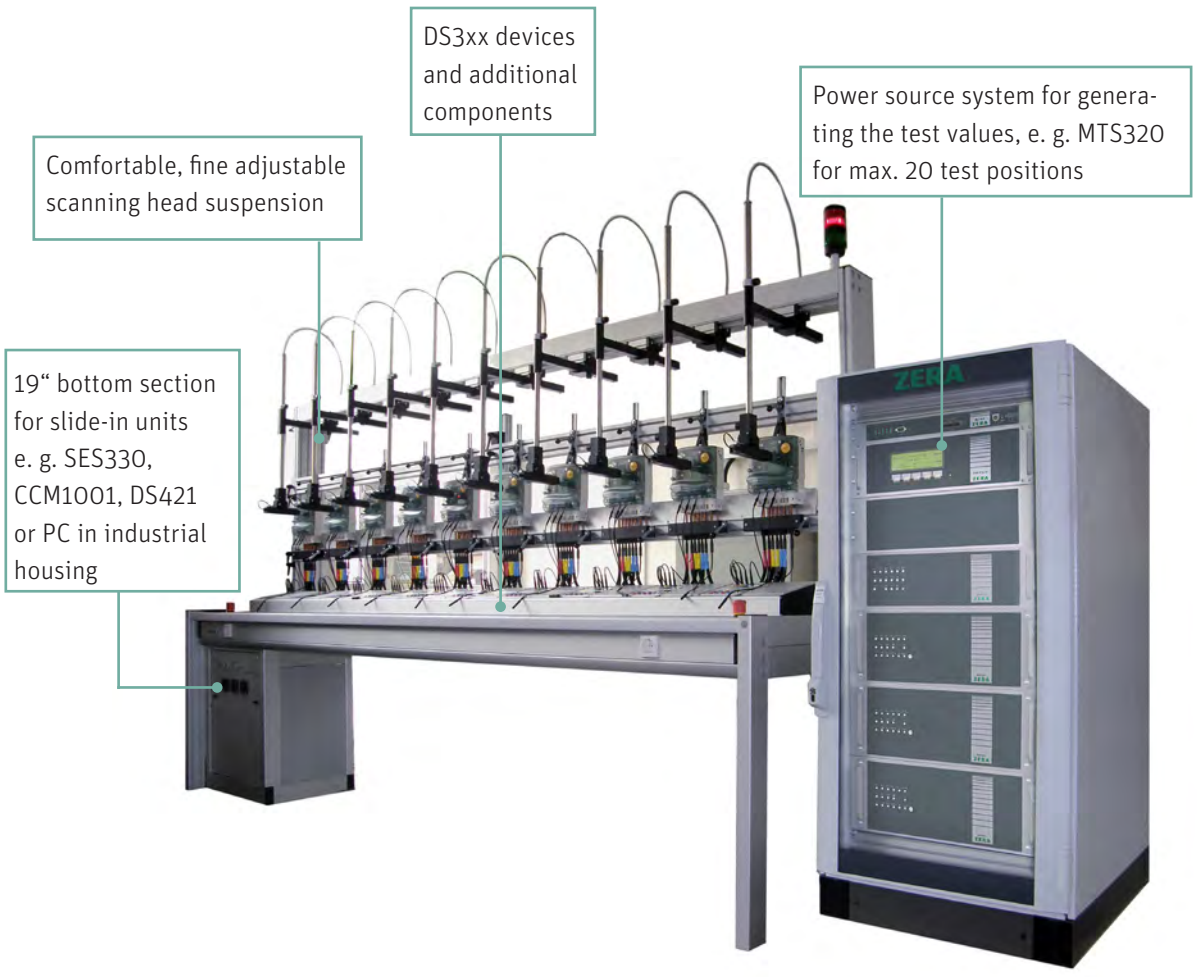
- Three-phase power source
- Current generation from 4 mA up to 12 A
- Voltage generation from 40 V up to 300 V
- Adjustable power factors
- Individual load point setting
- Functions amongst others:
  - Actual values
  - Vectorial display

MT400

- Three-phase current source
- Current generation from 4 mA up to 12 A
- Synchronization of the test currents on the existing test voltage phases of the meter under test
- Adjustable power factors
- Individual current load point setting
- Functions amongst others:
  - Actual values
  - Vectorial display

Stationary Meter Test System | MTS

Stationary meter test systems are suitable for economic testing of all types of meters as well as static meter of class 0.2. The wide range reference standard EPZ is used as working standard class 0.02 of the meter test system. If a higher accuracy is required the EPZ can be replaced by a comparator COM with accuracy class 0.01.
All measurements can be performed according to actual standards e.g. IEC. The modular system allows an individual and customized configuration for hard- and software.
A system upgrade is possible at any time.



Power Source Systems - MTS series

MTS340

MTS320

MTS140

Power Source Systems - MTS series

The product series MTS is based on digital switch mode amplifier modules and allows the combination of the different amplifiers with the function generator FG301 to a MTS-power source system.

ZERA provides three-phase sources MTS301, MTS310, MTS320 and MTS340 (for 1 up to 40 test positions) and single-phase sources MTS110 and MTS140. All source systems of the MTS3xx and MTS1xx series are also available with rolls.

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Frequency Generator

FG301 NEW

- Frequency generator FG301 as central unit of the synthetic waveform generation
- Generates the set points for the digital control of the power amplifier units
- Carries out the closed-loop control of the test settings and controls changeover operations during the test procedure.

NEW

Reference Meters

EPZ303 NEW

- Wide range substandard meters EPZ303 and EPZ103 as working standard of meter test systems
- Serves for power proportional pulse frequency
- Designed to measure actual values for test voltage, test current, test power and phase angle per phase
- Test values are indicated on an external monitor
- Accuracy class 0.02

NEW

COM3003

- Optional the reference standard EPZ303/ EPZ103 can be replaced by a comparator COM3003/1003
- Accuracy of the complete system will be increased to 0.01 %.
- Accuracy class 0.01

NEW

NEW

NEW

NEW

Amplifiers

VI201 NEW

- Test current amplifier VI201 for AC output currents up to 160 A
- Max. output power: 2000 VA

VI221 NEW

- Test current amplifier VI221 for AC output currents up to 120 A
- Max. output power: 600 VA

VUI301

- Combined single-phase current and voltage amplifier VUI301 for output voltages up to 320 V (only AC) and output currents up to 120 A (DC only up to 12 A).
- Max. output power voltage unit: 30 VA
- Max. output power current unit: 200 VA
- Used in MTS301 (single-position system)

VU211 NEW

- Test voltage amplifier VU211 for AC output voltages up to 480 V
- Max. output power: 1000 VA (optionally 1500 VA)

VU221 NEW

- Single- or three-phase test voltage amplifier VU221 for AC and DC output voltages up to 320 V
- Max. output power: 500 VA

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MTS-Components

SES330

- Measurement interface SES330 serves as a power supply for the DS3xx modules as well as for conversion of the RS232 interface in the PC to the system bus
- Control is accomplished by the FG301
- Only required if DS3xx modules are used

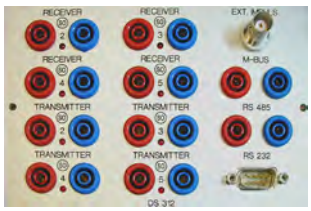
The following DS3xx error calculators are used per test position:

DS301

- Additional displaying of the measured error
- In-/output for testing of S0-pulse transmitter or receiver
- tm/te maximum demand time measuring
- testing of S0-pulse transmitter or receiver and bi-directional data transfer

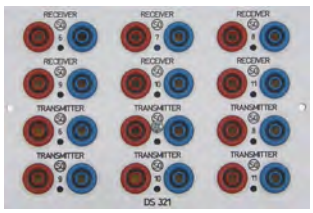
DS312

- Can be used additionally to DS301, DS321
- In-/outputs for testing of S0-pulse transmitter or receiver
- Interface multiplexer for communication with the unit under test via RS232 (IR), RS485 or M-bus



DS321

- Can be used additionally to DS312
- In-/outputs for testing of S0-pulse transmitter or receiver



MTS Components

DS421

- Multi-user error processor DS421 is designed as slide-in unit
- Used for testing up to 20 energy meters
- Can be combined with DSA400/DSA401
- Can not be combined with DS devices of the DS3xx series

DSA400

- LCD display unit DSA400 displays the error values during the test procedure
- Can be combined with DS421

DSA401

- LED display unit DSA401 displays the error values during the test procedure
- Can be combined with DS421

CCM1001

- Measuring and connecting adapter CCM1001 to inspect the test circuits for U-I-shorts before and during the test procedure
- Communication is performed via Win SAM

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Scanning Heads

The following scanning heads are used per test position:

TK325

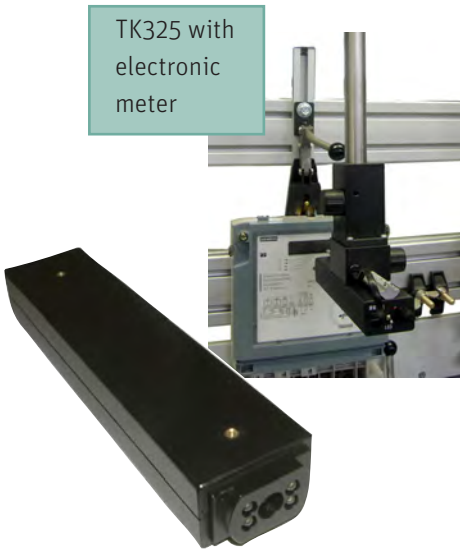
- Scanning head TK325 to scan rotor marks and LEDs of electronic meters
- The TK325 can detect the switching edge of a pulse and allows the automatic starting- and no load test on ZERA test systems
- Is used for advanced scanning head suspension.
- Can be combined with all DS devices

TK326

- Scanning head TK326 is able to scan rotor marks and LEDs of electronic meters
- The TK326 can detect the switching edge of a pulse and allows the automatic starting- and no load test on ZERA test systems
- Is used for simple scanning head suspension
- Can be combined with all DS devices

TK117

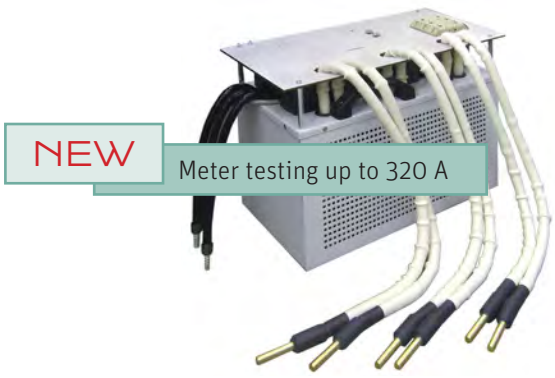
- Scanning head TK117 serves for data communication between the unit under test and the test system.
- Connection e. g. with error calculator DS301
- Can only be used with electronic meters
- Can only be used in combination with DS301 and DS311.

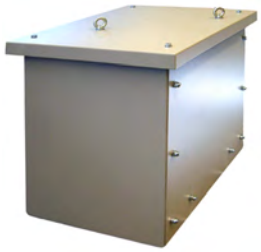


TK325 with electronic meter

TK326 with holding arrangement and Ferraris meter

TK117 with electronic meter





Transformers

ICT200

- Three-phase error-compensated isolated current transformer ICT200 to supply galvanic isolated test current to three-phase meters with closed link
- One ICT200 serves for one test position
- Ratio 1:1
- Max. current range 200 A

ICT123

- Three-phase error-compensated isolated current transformer ICT123 to supply galvanic isolated test current to meters with closed link.
- New compact design allows you to choose between stand-alone device or installation in a system
- Integrated self-protection
- Communication via WinSAM
- One ICT123 serves for one test position
- Ratio 1:1
- Max. current range 120 A

ICT125 NEW

- Three-phase error-compensated isolated current transformer ICT123 to supply galvanic isolated test current to meters with closed link
- Ratio 1:2
- Max. input current 160 A
- Max. output current 320 A

MSVT

- Multi secondary voltage transformer MSVT to supply galvanic isolated test voltage to single-phase meters
- The MSVT serves optionally for 10 or 20 test positions

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MTS Additional Components

HK301

- Auxiliary circuit module HK301 for switching auxiliary circuits in meter testing units
- Can only be used in combination with power source MTS301

BT301

- Special modul BT301 breakertest with LED status lamps for inspecting the contact condition of the unit under test

K118

- Adapter K118 to convert AC potential linked contacts to the required DC voltage level for the S0-Input of the DS301 or DS311

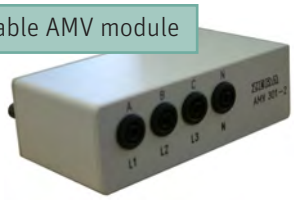
Test Point Buttons

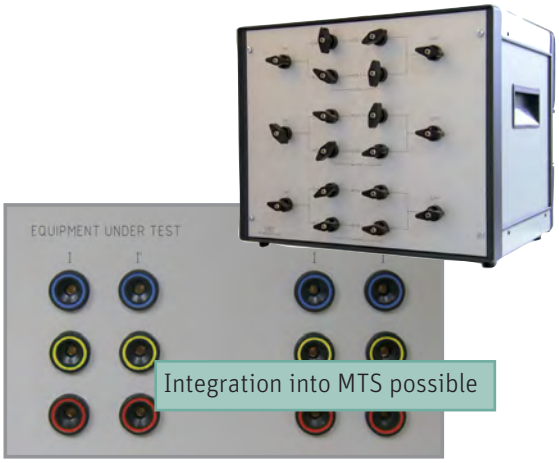
- Buttons to controll the automatic test procedure during adjustment of meters
- The sequence of measurements can be controlled by pressing the button (previous/next test point)

Automatic Rotor Mark Positioning AMV

- Built-in module AMV301 for automatic rotor mark positioning of Ferraris meters
- Advantageous before the starting or NO LOAD test
- This module is also available as pluggable unit
- Built-in and pluggable modules can only be used with DS301

Pluggable AMV module





MTS Additional Components

ET117

- Handheld terminal ET117 is used for entry and transfer of meter specific data, e. g. serial no., owner no. or counter states to the WinSAM-Software
- Scanning of 2D codes, e. g. at highly complex DataMatrix meters
- Data transfer to PC via Bluetooth

ET116

- Handheld scanner ET116 as addition unit for existing handheld terminal ET115
- Scanning of 2D codes, e. g. at highly complex DataMatrix meters
- Data transfer to PC via docking station

DR2791

- External field coil DR2791 to generate a magnetic field in combination with the voltage amplifier VU220-6
- Testing, if the magnetic field disturbs the measurement of the meter
- If required also available with one position meter rack/quick connecting device

ZZ8292

- Half-wave rectification ZZ8292 for separating the test current in positive and negative half-waves
- Available as stand-alone device or integrated into a system

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Scanning Head Suspension

Scanning Head Suspension – Advanced System

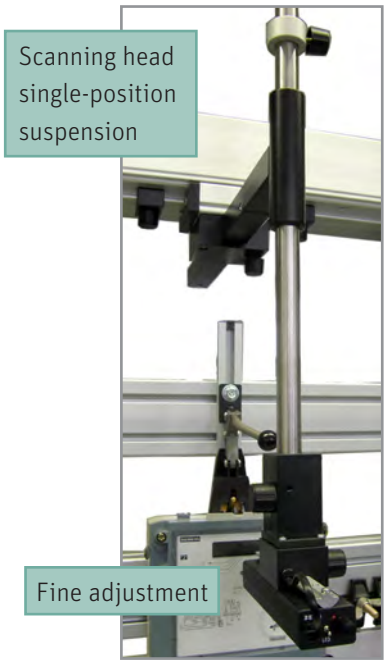
- Comfortable ball bearing suspension for scanning heads, adjustable in all positions
- Stoppers for safe guidance of the scanning head
- Quick height adjustment and fine adjustment for correctly positioning of the scanning head in front of the meter
- With single-position or multiple-position suspension
- Expansion possibilities of the measuring system are possible at any time
- Useable with scanning head TK325

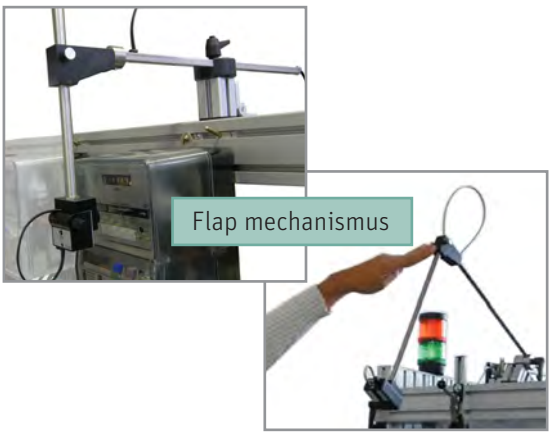
Scanning Head Suspension with moveable meter rack

- Moveable in all positions, e. g. for performing a type testing
- Quick and safe positioning of the meter under test
- Available for single- or multiple-position test systems
- Useable with scanning head TK325.

Basic Scanning Head Suspension

- Functional scanning head suspension, adjustable in all positions via flap mechanismus
- Expansion possibilities of this kind of system are limited
- Useable with scanning head TK326





Example: 10 position test bench

Moveable protective cover

Different Types of Test Benches

Multiple Position Test Bench

Test bench with:

- 10 test positions
- 19“ bottom section
- Scanning head suspension – basic system

- Standard test benches with 5, 10, 20 or 40 test positions
- Further designs available on request

Special Designs

Test bench with:

- 28 test position for single-phase meter testing of 14 meter simultaneously
- Pneumatically operated protective cover with integrated scanning heads for safe placement of meters while performing a test procedure.
- MSVT

- Further designs available on request

Single-position Test Bench

Test bench with:

- One test position
- DS3xx modules
- Scanning head suspension – advanced system

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Different Types of Test Benches

Tunnel and Trolley System

- A stationary tunnel system is connected to the power source
- The respective trolley system is connected to the test bench via plug connection
- Interlock mechanism for fixing the trolley at the tunnel system
- The test bench is equipped with scanning head suspensions and emergency-stop-push-buttons

Trolley System

- Trolley system with 20 test positions
- Flexible placement of the meters under test by the use of a second trolley system which safes tooling-time
- Trolley system is equipped with a quick-connecting device for meters

Side Cabinet

- Side cabinet e. g. for measuring and connecting adapter CCM1001 and calibration panel

Quick connecting via plug connection

Safe guidance at the floor

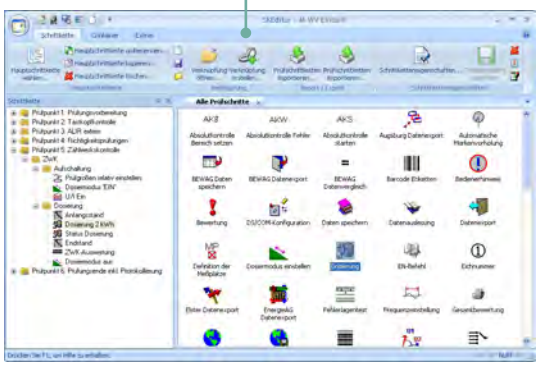
Flexibility with trolleys

Software for Controlling, Visualization and Simulation

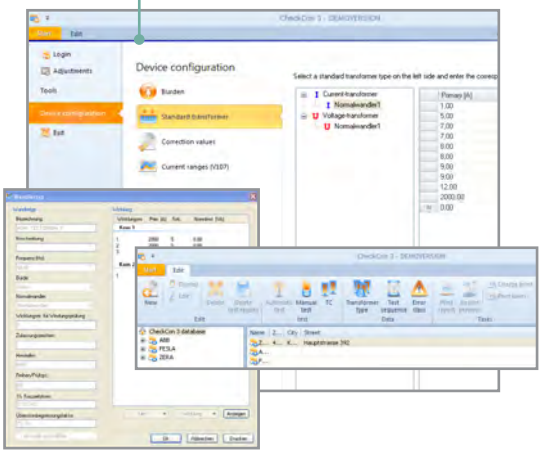
ZERA provides a series of software for simplifying the control of test sequences, visualization and management of measured data or simulating circuit errors.

Our main focus of controlling stationary Meter Test Systems is on WinSAM – with version 5 Windows-optimized. Data management between portable devices and a PC as well as visualization of data can be realized by MTVis. If you want to control portable devices via PC your prefered choice would be SSM3000. With CheckCon 3 you can control transformer testing system. In addition to data management of CT/PT under test and evaluation of test results a big range of individual adjustable features are offered in this software package.

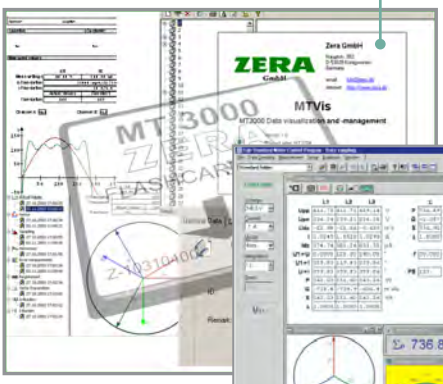
WinSAM 5 | Control stationary systems



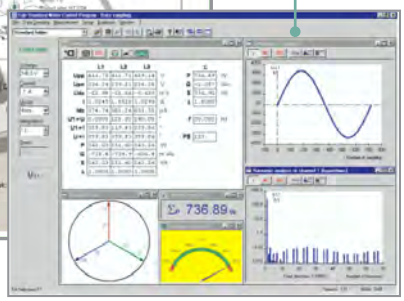
CheckCon 3 | Software for transformer testing



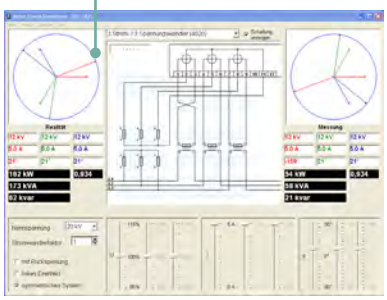
MTVis | Visualization and data management for portable devices

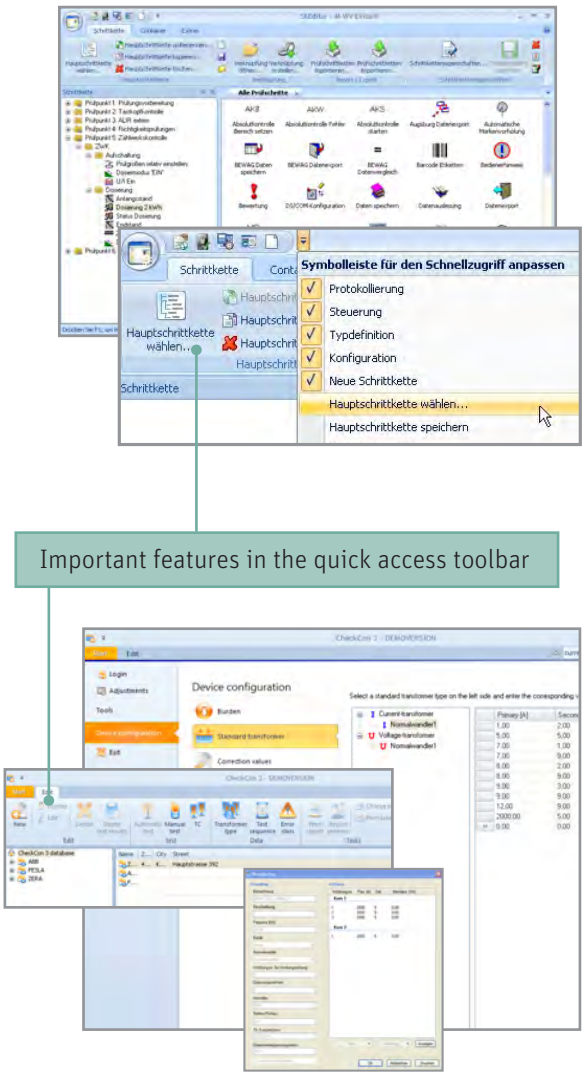


SSM3000| Control portable devices



MCS | Simulation of circuit errors





Software

WinSAM 5

- User interface for controlling Meter Test Systems
- Configuration of test device and system environment
- Compilation of individual test sequences and data logs
- Integrated generator to create defined test sequences (MID/PTB) NEW

CheckCon 3

- User interface for controllling transformer test systems
- Data management of CT/PT under test, test tables and test results will be done by integrated MS Access runtime module
- Manual or automatic control of test procedure depending on the hardware

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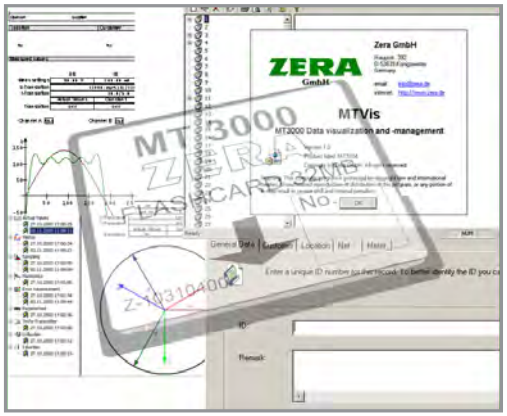
Software

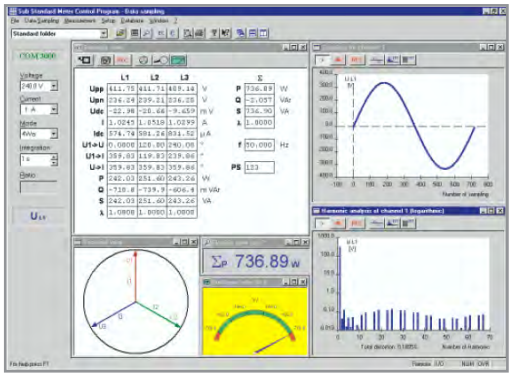
MTVis

- Data management software for data communication between device of the MT-series/COM3003 and a PC
- Visualization of stored measurement data
- Management of customer and meter data
- Import and export of Excel or XML-files



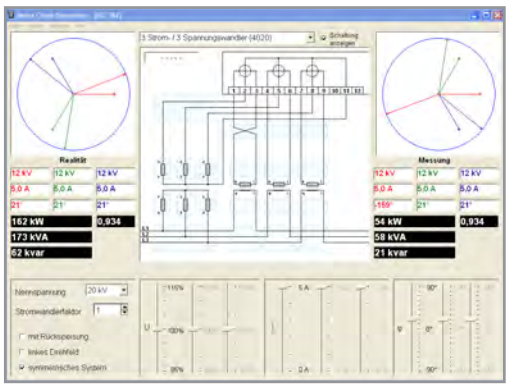
SSM3000

- Software to control devices of the serie MT and COM, RMM
- Automatic device identification
- Automatic storage of reference measurements possible
- Report during running test procedure selectable
- Direct repeatition of test points at automatic energy comparision and comparision measurement possible



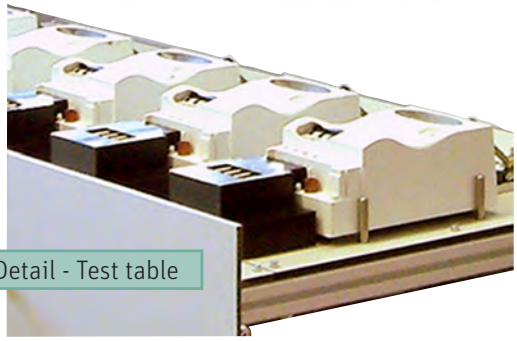
MCS | Meter Check Simulation

- Software for simulating circuit errors for training purposes
- Simulation of polarisation, exchange of voltage and current phases, bypass or wrong rotary field



Semi-automatic Test System

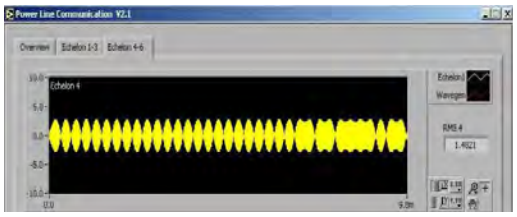
- Semi-automatic function test
- Manual load and unload of the units under test, automatic testing procedure.
- Drawers for two-way load
- No time-off for changing the units under test.
- While one lot of 6 meters is under test the other lot can be exchanged.



Detail - Test table

Test procedure

- Verification of power line communication (PLC)



Automatic Test System

- Automatic function test
- ZERA test systems can be integrated in customer production lines completely.
- Meters can be transported to the next test procedure via band conveyer.

ITTS – Stationary and Mobile Instrument Transformer Test Systems

Stationary and Mobile Instrument Transformer Test Systems from ZERA are developed for testing current transformers (CT) and voltage transformers (PT). Stationary test systems are available for manual or automatic operation.

Transformer testing serves for the accuracy test including polarity check and demagnetisation for current and voltage transformers in middle-voltage, high-voltage and extra-voltage grids according to IEC standard 60044-1, 60044-2, 60044-7, 60044-8 and 61850-9-2.

Stationary, automatic current and voltage transformer test system

Mobile current transformer test system

Voltage regulating transformer VRT for generating the required voltage

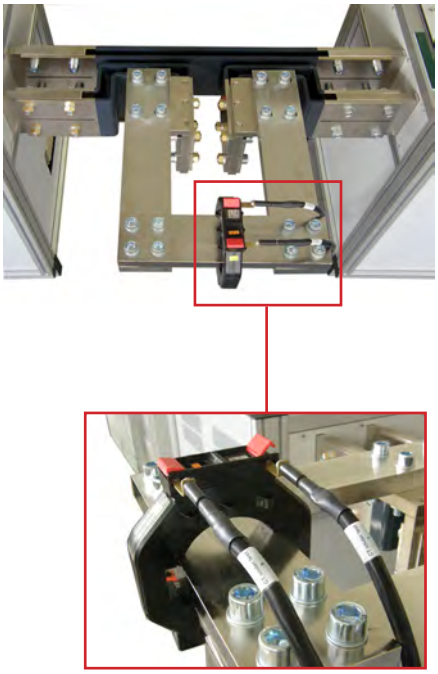
Standard current module SCM

Standard/High voltage transformer SVT/HVT

VRT36 SVT100

GCT6000 SCT6000

Example of current transformer testing from 4000 A up to 6000 A.



Detail of the CT under test connected at the secondary side.

Stationary ITTS

- Measuring of voltage/current transformers (low-, middle- and high-voltage)
- Accuracy test, polarity check, interturn insulation test and demagnetisation.
- CT one-by-one testing

Example for low and middle voltage instrument transformer CT/VT testing*:

- Mains voltage: 3 x 230 V/400 V, (50) 60 Hz
- Output voltage: 0 ... 400 V
- Output power: max. 30 kVA

- Suitable for the following CTs:
  - I_N = 5 ... 6000 A
  - Max. I_{Prim} = 120 % of I_N
  - Secondary current: 5 A
  - Max. burden of CT under test: 200 VA
- Suitable for the following VTs:
  - U_N = 120 V ... 100 kV
  - Max. U_{Prim} = 120 % of U_N
  - Secondary voltages: 120 V, 115 V, 69 V
  - Max. burden of VT under test: 200 VA

- Used components amongst others:
  - Regulating transformer (variac)
  - ESVB200/WM3000U
  - ESCB200/WM3000I
  - Generating current transformer GCT6000
  - Standard current transformer SCT6000
  - High voltage generating transformer HVT130
  - Standard voltage transformer e. g. SVT100

* other customer requirements on request

ZERA

ITTS mobil

- Testing of current and voltage transformers in middle-voltage, high-voltage and extra-high voltage grids
- Accuracy test, polarity check and demagnetisation
- Example voltage transformer:
  - U_N = 110/√3 kV
  - Max. U_{Prim} = 120 % of U_N
  - Secondary voltages 100/√3 V, 110/√3 V, 100 V, 110 V
  - Max. burden of the voltage transformer under test 158,75 VA
- Example current transformer:
  - I_N = 4000 A
  - Max. I_{Prim} = 120 % of I_N
  - Secondary currents: 5 A and 1 A
  - Max. burden of the current transformer under test 60 VA
- Used components amongst others:
  - Voltage Regulating Transformer VRT
  - SCM4000-120 (see page 35)
  - WM303-I
  - ESCB200 (see page 35)

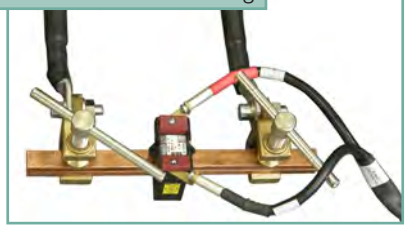
VRT

- Voltage Regulating Transformer VRT for supply of the high voltage or high current transformer with variable voltage for testing of CTs/VTs

Assembly for high voltage measurement

Remote control for safe operation

Detail current transformer testing



Voltage regulating transformer VRTm2-40-40

ITTS mobil

- Testing of current transformers in middle-voltage, high-voltage and extra-high voltage grids
- Accuracy test, polarity check and de-magnetisation
- Example current transformer:
  - I_N = 5 A up to 300 A
  - Max. I_{Prim} = 120 % of I_N
  - Secondary currents: 5 A and 1 A
  - Max. burden of the current transformer under test 30 VA
- Used components amongst others:
  - Voltage regulating transformer VRT
  - Standard current transformer SCT
  - Generating current transformer GCT
  - Measuring equipment ME

VRTm2-40-40

- Voltage regulating transformer VRT to transform a fixed input voltage (400 V) to a variable output voltage (0 ... 400 V)
- The VRT feeds the high current unit GCT as well as the transformer under test
- A control panel with all operating elements for the manual operation is placed on top of the VRT

MEm30

- The mobile measuring equipment MEm30 is equipped with
  - standard current burden SCB30
  - measuring bridge WM303-I
  - mobile PC

ZERA

CT/VT Testing Components

Conventional Burden | SCB/SVB

- Standard current/voltage burden for measuring current/voltage instrument transformers according to IEC 60044-1/2
- Standard Current Burden SCB with adjustable steps up to 60 VA (IEC) or 200 VA (ANSI)
- Standard Voltage Burden SVB with adjustable steps up to 318,75 VA (IEC) or 400 VA (ANSI)

Manual standard voltage burden

Electronical Burden | ESCB/ESVB

- Electronical compensated current or voltage burden ESCB/ESVB for manual and automatic test of current/voltage instrument transformers.
- User-friendly menu guidance
- 10,4" TFT-mono chrome display
- ESVB/ESCB with adjustable steps up to 200 VA (IEC and ANSI)

Standard Current Module | SCM

- Standard current module SCM consisting of generating current transformer GCT and standard current transformer SCT
- Cost-effective and space-saving combination of GCT and SCT
- Less wiring due to fixed wiring inside
- Time-saving due to one-off connection of GCT and SCT
- Example SCM3000-120*:
  - Max. current 3840 A
  - Max. output power 16 kVA

* other customer requirements on request

Generating Current Transformer | GCT

- The GCT for generating the test current for accuracy testing of current transformers
- Example GCT6000*:
  - Max. output power 36 kVA
  - Max. test current 6000 A

Standard Current Transformer | SCT

- The values of the CT under test will be compared with the values of the standard current transformer SCT.
- Example SCT6000*:
  - I_{Nsec} 5 A
  - Load range 1 ... 120 %
  - Max. current 7200 A

High Voltage Transformer | HVT

- High voltage transformer HVT for generating the test voltage for accuracy testing of voltage transformers.

Standard Voltage Transformer | SVT

- Standard voltage transformer SVT for testing voltage transformer with single and double-pole connections.

Measuring Bridge | WM

- The current/voltage measuring bridges WM3000I/U are high-precision compara tor units for comparing secondary signal from transformer under test (or digital information of non-conventional transformers) with a reference signal supplied by a standard device.
- Display of measuring values and control of the test procedure via touch screen.

* other customer requirements on request

Constant Current Sources

- MCCB testing
- Thermal and magnetic tripping test
- Line circuit breaker, motor circuit breaker
- Example for a constant current source:
  - Single-phase
  - Max. output power 11 kVA
  - Max. test current 200 VA
  - Current steps/output voltages: 200 A/55 V, 100 A/55 V, 50 A/55 V, 25 A/ 55 V, 5 A/55 V, 2,5 A/55 V

Constant Current Sources

- Constant current sources are typically used in testing and adjusting equipment
- The source provides a defined test current for the equipment
- The concrete value is specified by the needs of the unit under test and is the basis for the whole project planning

Control unit SES

- The communication between electronical source and equipment runs via the control unit SES
- In addition to the RS232 interface optically isolated in- and outputs for an SPC are provided
- The concrete test parameters are entered at the PC or at the SPS.

PPCS – Precision Power Calibration System

- high precision, traceable calibration of measuring devices (e.g. comparator)
- Lowest measuring uncertainty from < 10 x 10^{-6} (at 40 up to 60 Hz, relative to the nominal value of the apparent power)
- Output voltage from 60 V up to 480 V
- Output current from 0,1 A up to 100 A
- Used for highly accurate current, voltage and power calibration
- High measuring stability due to ZERA components that have been proven for many years
- High repeat accuracy of the measuring values
- Wide range of Harmonic generation and accurate measurement

PPCS Software

- Windows based software (precision power sampling system) to control the system
- Software controls the device under calibration and calculates error values and measurement uncertainty
- Result will be stored in the PC