ZERA

MT300 Series

Moving Test - MT300/MT310

Portable Working Standard Meter Cl. 0.1

Precise Measurement
Combined with Innovative Design

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MT300 Series

The System Concept

The MT300/MT310 is a portable working standard based on newest technology in power and energy measurement. Various measuring features combined with its easy operation concept provide the greatest possible flexibility for a comprehensive testing of metering installations on site.
Its stable housing made of aluminium (MT300) respective double isolated plastic (MT310) already reveals the high quality of the system.
The MT300 system is distinguished by its exemplary combination of functionality and design. The equipment is offering optimal ergonomics and functionality combined with an excellent menu guided operation via built-in soft-keys and a 6.4" LCD-display.

Features

- Excellent user-guidance
- Many configuration possibilities by adding various measuring adapters
- Unique long-term and temperature stability of the measuring module
- Current measurement up to 120 A with error compensated Clip-on CTs
- Internal memory to store measurement results and customer data
- Windows based data management software MTVis for evaluation of the test results
- External system control via PC with windows based control software
- Current measurement up to 10000 A by using a required current sensor
- Voltage measurement up to 40000 V by using a high voltage stick
- No additional error for reactive measurement
- Accuracy class 0.1

Functions

The working standard is providing the following functions:

- Testing of electricity meter installations with 2-wire, 3-wire and 4-wire circuits
- Testing of energy and power registers
- Power and energy measurement of active, reactive and apparent energy
- 4 quadrant measurement
- Frequency-, phase angle- and power factor measurement
- Harmonic waveform analysis for voltage and current up to the 40^{th} THD
- Distortion factor measurement
- Vector diagram display
- Waveform sampling
- Rotary field display
- Determination of the operating burden on instrument transformers for CT and PT
- * Ratio test by simultaneous measurement of both primary and secondary currents in CT connected metering systems
- * Selective power measurement
- * External thermal-printer for presentation of the measuring results at customer site
- * Energy dosage
- ** Operation without mains power supply possible

* optional function, not serially
** only MT310

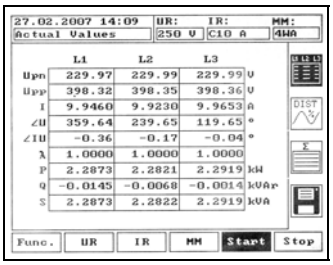
Data Management

After measurement the stored data can be sent to an external PC.
The data management software MTVis provides the ability to transfer data from the internal memory to an external PC where the data can be represented.
The stored data can be summarized to a measuring report or be exported for further applications.

Actual Values Measurement

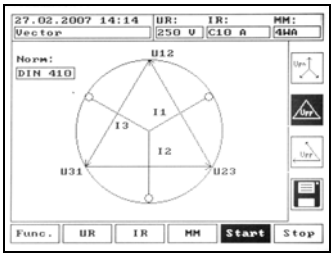
All instantaneous values are displayed simultaneously in a summary:

- RMS values of all voltage and current phases
- All phase angles between voltage and current
- Phase angles between the voltages
- Currents for all 3 phases
- Active, reactive and apparent power
- Frequency and phase rotation
- Power factor (cos φ)



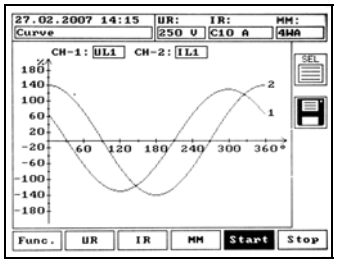
Vector Display

The vector diagram display makes it very easy to detect wiring faults in the voltage and current circuits of a meter installation.



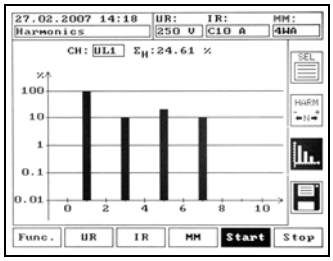
Waveform Display

The waveform display for voltage and current serves for analysing the signal quality. Two channels can be measured and displayed simultaneously. The measured waveform can be stored in the internal memory of the system according to the customer information data.



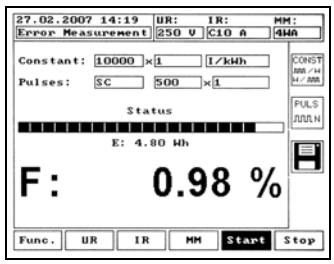
Harmonic Measurement

The MT300/310 can measure harmonics in voltage and current up to the 40th THD (conform to the voltage quality norm DIN EN 50160) which is possible by the high scanning rate of the working standard. The measured harmonic spectrum can be displayed in a chart or in a diagram.



Error Measurement

By entering all relevant parameter like meter constant and the number of pulses, the system can perform the error measurement on electricity meters. The system is able to determine the percentage error and the operator can store it according to the customer information data.
To be informed about the status of the measurement a bar graph indicates continuously the registered energy.



Optional Features

- Various mains cables for each country
- Test cable set
- Quick connecting cable set
- Photo electric scanning head
- Pulse converter
- Error compensated clip-on CT for 12 A measurement
- Error compensated clip-on CT for 120 A measurement
- Clip-on CT for 1000 A measurement
- Flexible current sensor for 10000 A measurement
- High voltage stick for 40000 V primary measurement
- High current stick for 2000 A primary measurement
- External thermal printer

Technical Data

MT300/MT310 Portable Working Standard	Accuracy Class 0.1

General	
Power supply	85 - 132 VAC / 170 - 265 VAC, 47… 63 Hz
Power consumption	approx. 22 VA
Temperature range	-15° … + 45° C
Relative humidity (not condensing)	max. 95 %
IP class	30
Dimensions (HxWxD)	220 x 290 x 80 mm
Weight	approx. 3 kg
Reference Meter	
Measuring modes	4-wire active / -reactive / -apparent 3-wire active / -reactive 2-wire active / -reactive
Fundamental frequency	15 … 70 Hz
Accuracy class for measuring of power / energy	0.1
Voltage measurement	100 mV … 300 V
Voltage ranges	5 – 250 V
Voltage measurement accuracy [3 5]	< 0,05 %
Voltage measurement temperature drift [3]	< 15 x 10^{-6}/K
Voltage measurement stability [1]	< 50 x 10^{-6}
Voltage measurement long term stability [2 3]	< 100 x 10^{-6}/year
Current measurement	1 mA … 12 A (for direct measurement) 5 mA … 120 A (for measurement with clip-on CT)
Current ranges	50 - 100 - 250 - 500 mA 1 - 2.5 - 5 - 10 A
Current measurement accuracy [4 5]	< 0.05 % (for direct measurement up to 12 A) (10 mA ... 12 A) < 0.2 % (for direct measurement up to 12 A) (5 mA ... 10 mA) < 0.15 % (for measurement with clip-on CT) (500 mA ... 120 A) [7] < 0.3 % (for measurement with clip-on CT) (100 mA ... 500 mA) [7]
Current measurement temperature drift [4]	< 15 x 10^{-6}/K (for direct measurement up to 12 A) < 50 x 10^{-6}/K (for measurement with clip-on CT) [7]
Current measurement stability [1]	< 70 x 10^{-6}
Current measurement long term stability [2 4]	< 100 x 10^{-6}/year (for direct measurement up to 12 A) < 600 x 10^{-6}/year (for measurement with clip-on CT) [7]
Angle measurement error [3 4]	< 0.015° (for direct measurement up to 12 A) < 0.1° (for measurement with clip-on CT) [7]
Frequency measurement error	± 0,01 Hz
Harmonic measurement error	< 0,15 %
Power/energy measurement error [3 4 5 6]	< 0.1 % (for direct measurement up to 12 A) < 0.2 % (500 mA ... 120 A) (for measurement with clip-on CT) [7]
Power/energy measurement temperature drift [3 4]	30 x 10^{-6}/K (for direct measurement up to 12 A) 65 x 10^{-6}/K (500 mA ... 120 A) (for measurement with clip-on CT) [7]
Power/energy measurement stability [1]	< 100 x 10^{-6}

Status: 18. February 2008

1 stability over 1 hour (every minute one measurement with ti=60 s)
2 stability over 1 year (every mounths one measurement with ti=60s)
3 from 30 V to 300 V
4 from 10 mA to 12 A
5 related of end of range
6 related of apparent power
7 only error compensated CT's

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