

The System Concept

The MT360/MT365 is a portable light weight working standard based on newest technology in power and energy measurement. Various measuring features combined with a user friendly operation concept are providing the greatest possible flexibility for a comprehensive testing of metering installations in the field. Its double isolated plastic already reveals the high quality of the system.



The equipment offers high functionality combined with a menu guided operation via built-in soft-keys and a colored 6.4" TFT-display.

Features

- Accuracy class 0.05 (MT365), accuracy class 0.1 (MT360)
- Easy user-guidance
- Unique long-term and temperature stability of the measuring module
- Current measurement up to 120 A with error compensated AC current clamps
- Especially configured USB-stick 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
- No additional error for reactive measurement
- Long-range applications by great offering of accessories

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 40th THD
- Determination of the operating burden on instrument transformer for CT and PT
- Distortion factor measurement
- Vector diagram display
- Waveform sampling
- Rotary field display
- Ratio test by simultaneous measurement of both primary and secondary currents in CT connected metering systems
- Selective power measurement
- Automatic meter testing*

* optional and in combination with ZERA source.

Data Management

For later download on a PC the operator can store all measuring values on an especially configured USB stick. The data management software MTVis provides the ability to transfer the data between PC and MT36x on a bi-directional way.

For data representation, the operator can print all results in a test report.

Measured Value Display

All relevant measurement values are displayed in a scheme simultaneously:

- RMS values for all 3 phases (U_{PN})
- Phase angles between all 3 phases (U_{PP})
- Currents for all 3 phases
- Phase angle between the voltages (balance measurement)
- All phase angles between voltage and current
- Active, reactive and apparent power
- Frequency and rotary field
- Power factors ($\cos \phi$)



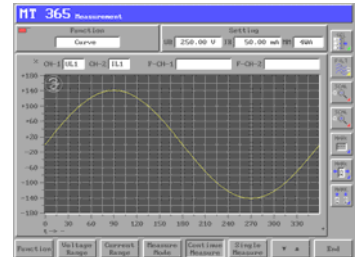
Vektor- diagramm

The vector diagram offers graphical information about phasing and voltages (RMS values and phase angles) and currents. Classification and balances can be detected very easily in order to identify wiring faults in the voltage and current circuits of a meter installation.



Curve Display

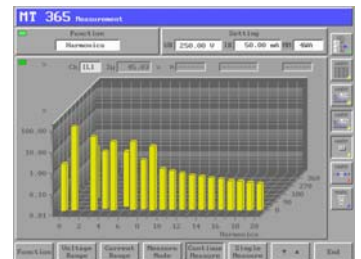
The curve display for voltage and current serves for analysing the signal quality. Two channels can be measured and displayed simultaneously. The measured curve can be stored on USB stick according to the customer information data.



Harmonic Measurement

Due to the high sampling rate of the working standard the MT36x can measure harmonics in current and voltage up to the 40th THD (conform to the voltage quality norm DIN EN 50160).

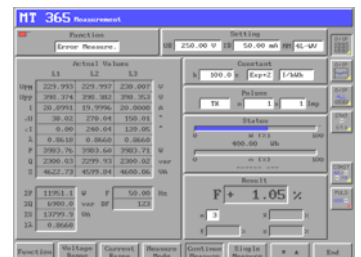
The measured harmonic spectrum can be displayed in a chart or in a logarithmic diagram.



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.



Options

- Cable set / Quick connecting cable set
- Photo electric scanning head / Pulse converter
- Error compensated current clamps for 120 A measurement
- AC current clamps for 1000 A measurement

Technical Data

	MT360 Class 0.1	MT365 Class 0.05
General		
Power supply	85 ... 265 V, 47 ... 63 Hz	
Power consumption	48 VA	
Temperature range, operation	-10° ... + 50° C	
Temperature range, storage	-15° ... + 65° C	
Relative humidity (not condensing)	max. 95 %	
Dimensions (DxWxH)	220 x 290 x 115 mm	
Weight	4.2 kg	
Safety		
IP class according to DIN EN 60529	IP30	
Declaration of conformity	CE conform	
Protection class according to DIN EN 61140	II	
Overvoltage category voltage measurement 16)	CAT III 300 V	
Overvoltage category current measurement	CAT III 300 V	
Reference meter		
Measuring modes	2WA / 2WR / 2WAP 3WA / 3WR / 3WAP / 3WRCA / 3WRCB 4WA / 4WAb / 4WR / 4WRb / 4WAP / 4WAPb / 4WRC	
Fundamental frequency	15 ... 70 Hz	
Bandwidth	3000 Hz	
Sampling	16 bit 504 samples/period	
Accuracy class for measuring of power / energy	0.1	0.05
Angle measurement accuracy 3) 4)	< 0.015° [< 0.1°]	< 0.010° [< 0.1°]
Frequency measurement deviation	± 0.01 Hz	
Voltage Measurement		
Voltage measurement	100 mV ... 300 V	
Voltage range(s)	250 V, 5 V	
Voltage channels input impedance (@ range)	245 kΩ @ 250 V 10 MΩ @ 5 V	
Voltage measurement accuracy 5)	< 0.05 % @ 30V ... 300 V < 0.2 % @ 500 mV ... < 30 V < 1 % @ 100 mV ... < 500 mV	< 0.03 % @ 30V ... 300 V < 0.2 % @ 500 mV ... < 30 V < 1 % @ 100 mV ... < 500 mV
Voltage measurement temperature drift 3)	< 15 x 10 E-6 / K	
Voltage measurement stability 1)	< 50 x 10 E-6	
Voltage measurement long term stability 2) 3)	< 100 x 10 E-6 / Year	
Current measurement		
direct or [with MT3430]		
Current measurement	1 mA ... 12 A [5 mA ... 120 A]	
Current range(s)	10 A, 5 A, 2.5 A, 1 A, 500 mA, 250 mA, 100 mA, 50 mA [100 A, 50 A, 10 A, 5 A, 1 A, 500 mA, 100 mA, 50 mA]	
Usage of ranges	10 ... 120 %	
Current channels input impedance (@ range)	~ 40 mΩ @ 50 mA ... 10 A	
Current measurement accuracy 5)	< 0.05 % @ 10 mA ... 12 A < 0.20 % @ 5 mA ... < 10 mA [< 0.15 % @ 500 mA ... 120 A] [< 0.3 % @ 100 mA ... < 500 mA]	< 0.03 % @ 10 mA ... 12 A < 0.2 % @ 5 mA ... < 10 mA [< 0.15 % @ 500 mA ... 120 A] [< 0.3 % @ 100 mA ... < 500 mA]
Current measurement temperature drift 4)	< 15 x 10 E-6 / K [< 50 x 10 E-6 / K]	
Current measurement stability 1)	< 70 x 10 E-6 [< 150 x 10 E-6]	
Current measurement long term stability 2) 4)	< 100 x 10 E-6 / Year [< 600 x 10 E-6] / Year	
Clamp for max. Ø	[12 mm]	
Power Measurement		
direct or [with MT3430]		
Power/energy measurement accuracy 3) 5) 6)	< 0.1 % @ 10 mA ... 12 A [< 0.2 % @ 500 mA ... 120 A]	< 0.05 % @ 10 mA ... 12 A [< 0.2 % @ 500 mA ... 120 A]
Power/energy measurement temperature drift 3) 4)	< 30 x 10 E-6 / K [< 65 x 10 E-6]	< 10 x 10 E-6 / K [< 65 x 10 E-6]
Power/energy measurement stability 1)	< 100 x 10 E-6 [< 200 x 10 E-6]	
Power/energy measurement long term stability 2)	< 150 x 10 E-6 / Year [< 700 x 10 E-6] / Year	

1: Stability over 1 hour (every minute one measurement with $t_i = 60$ s)
 2: Stability over 1 year (every month one measurement over one hour)
 3: From 30 V ... 300 V
 4: From 10 mA ... 12 A [500 mA ... 120 A]
 5: Related to the read value at optimum range selection
 6: Related of apparent power
 [] ± with AC current clamps MT3430
 16: Option CAT IV 300 V

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Subjects to alteration.

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