# Moving Test – MT781/MT786

Three-phase Fully Automatic Test System with
Integrated Current and Voltage Source

MT781 – Accuracy Class 0.1
MT786 – Accuracy Class 0.05

## General

The state of the art test system MT781 consist of a class 0.1 reference meter (MT786 class 0.05) with built-in voltage/current source (up to 500 V/120 A). The system is particularly designed for analysis of complete metering installations and local mains conditions.

The equipment offers high functionality combined with an excellent menu guided operation via built-in soft-keys and colored 10.4" LCD-display.


## Features

- Verification of the load conditions on metering installation
- Verification of the energy registration
- 4 quadrant measurement
- Frequency-, phase angle- and power factor measurement
- Testing of 3 or 4 wire systems with pulse output
- Harmonic spectrum analysis
- Wave form analysis
- Available with:
  - Accuracy class 0.1 (MT781)
  - Accuracy class 0.05 (MT786)


Available with trolley (option)

## Functions

- User friendly menu guided operation
- Vector diagram display and phase sequence indication on integrated colored screen
- Extendable compact flash memory for storage of customer data and measurement results
- Easy verification and analysis of meter installations
- No additional error for reactive measurements
- Automatic operation without need of an external PC

## Data Management

For later download on a PC, the operator can store all test results and measuring values on a Compact-Flash-Memory-Card. The data management software MTVis provides the ability to transfer the data between MT78x and an external PC.

All test results can be summarized and printed in a test report by putting the compact-flash-memory card into an external PC.

## Actual Values Measurement

All instantaneous values are displayed simultaneously in a summary:

- RMS values of voltage and current
- Phase angle between voltage and current
- Active, reactive and apparent power
- Test frequency
- Power factor (cos φ)

## Vector Display

The colored vector diagram display for voltage and current makes it very easy to detect wiring faults in voltage and current circuits.

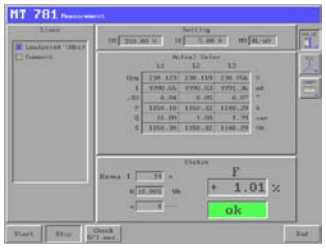
All measured values can be stored on the Compact-Flash-Memory according to the customer information data.

## Error Measurement

By entering all relevant test parameters, like meter constant and the number of pulses, the system can perform the error measurement on electricity meters. The percentage error including all statistical values can be stored according to the customer information data. In order to inform the operator about the status of the measurement a bar graph indicates continuously the measured energy as well as the detected metrology pulses from the unit under test.

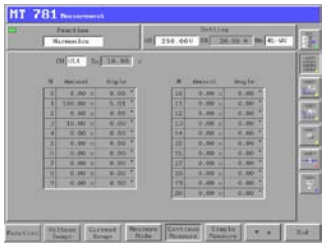
## Automatic Operation

By using predefined test routines the MT78x system can operate automatically without need of an external PC.



## Harmonic Measurement

Due to the high sampling rate of the working standard the MT78x is able to measure harmonics in voltage and current up to the 40$^{th}$ 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.



**Technical Data**

# Portable Test System with integrated Source

| | MT781 | MT786 |
|---|---|---|
| **General** | | |
| Power supply | 85 … 265 V, 47 … 63 Hz | |
| Power consumption | max. 500 VA | |
| Temperature range, operation | -10° … + 50° C | |
| Temperature range, storage | -15° … + 65° C | |
| Relative humidity (not condensing) | max. 95 % | |
| Dimensions (DxWxH) | 206 x 524 x 428 mm | |
| Weight | ~ 20 kg | |
| **Safety** | | |
| IP class according to DIN EN 60529 | IP30 | |
| Declaration of conformity | CE conform | |
| Protection class according to DIN EN 61140 | I | |
| **Reference meter** | | |
| Measuring modes | 2WA / 2WR / 2WAP<br>3WA / 3WR / 3WRCA / 3WRCB / 3WAP<br>4WA / 4WAb / 4WR / 4WRb/ 4WRC / 4WAP / 4WAPb | |
| Fundamental frequency | 45 .. 65 Hz | |
| Bandwidth | 3000 Hz | |
| Sampling | 16 bit 504 | |
| Accuracy class for measuring of power / energy | 0.1 | 0.05 |
| Angle measurement accuracy 3) 4) | < 0.015° | |
| Frequency measurement deviation | ± 0.01 Hz | |
| **Voltage Measurement** | | |
| Voltage measurement | 5 mV ... 500 V | |
| Voltage range(s) | 250 mV, 5 V, 60 V, 125 V, 250 V, 420 V | |
| Voltage measurement accuracy 5) | < 0.05 % @ 30 V .. 500 V<br>< 1 % @ 50 mV .. < 30 V<br>< 3 % @ 5 mV .. < 50 mV | < 0.03 % @ 30 V .. 500 V<br>< 1 % @ 50 mV .. < 30 V<br>< 3 % @ 5 mV .. < 50 mV |
| Voltage measurement temperature drift 3) | < 15 x 10 E-6 / K | < 10 x 10 E-6 / K |
| Voltage measurement stability 1) 3) | < 60 x 10 E-6 | < 60 x 10 E-6 |
| Voltage measurement long term stability 2) 3) | < 100 x 10 E-6 | < 50 x 10 E-6 |
| **Current measurement** | | |
| Current measurement | 1 mA ... 120 A | |
| Current range(s) | 100 A, 50 A, 20 A, 10 A, 5 A, 2 A, 1 A,<br>0.5 A, 0.2 A, 0.1 A, 0.05 A, 0.02 A | |
| Current measurement accuracy 5) | < 0.05 % @ 10 mA ... 120 A<br>< 0.2 % @ 5 mA ... < 10 mA | < 0.025 % @ 10 mA ... 120 A<br>< 0.2 % @ 5 mA ... < 10 mA |
| Current measurement temperature drift 4) | < 20 x 10 E-6 / K | < 15 x 10 E-6 / K |
| Current measurement stability 1) 4) | < 70 x 10 E-6 | < 70 x 10 E-6 |
| Current measurement long term stability 2) 4) | < 100 x 10 E-6 | < 80 x 10 E-6 |
| **Power Measurement** | | |
| Power/energy measurement accuracy 3) 4) 6) | < 0.1 % | < 0.05 % |
| Power/energy measurement temperature drift 3) 4) | < 35 x 10 E-6 / K | < 25 x 10 E-6 / K |
| Power/energy measurement stability 1) 3) 4) | < 100 x 10 E-6 | < 100 x 10 E-6 |
| Power/energy measurement long term stability 2) 3) 4) | < 200 x 10 E-6 | < 100 x 10 E-6 |
| **Source** | | |
| Voltage min. max. | 20 V … 500 V | |
| Voltage range(s) | 60 V, 125 V, 250 V, 420 V | |
| Voltage max. output power 8) | 30 VA | |
| Voltage distortion 3) | < 0.5 % | |
| Current min. max. | 1 mA … 120 A | |
| Current range(s) | 100 A, 50 A, 20 A, 10 A, 5 A, 2 A, 1 A,<br>0.5 A, 0.2 A, 0.1 A, 0.05 A, 0.02 A | |
| Current max. voltage per range | 0.6 V (100 A .. 10 A), 2.7V (5 A),<br>8V (2 A .. 0.02 A) | |
| Current max. output power 8) | 60 VA | |
| Current distortion | < 0.5 % @ 50 mA … 120 A | |
| Frequency range | 45 … 65 Hz | |
| Frequency accuracy | 0.01 Hz | |
| Phase angle setting range | 0.00 … 359.99° | |
| Phase angle accuracy | < 0.015° | |
| Phase angle stability 9) | < 0.01 ° | |

1: Stability over 1 hour (every minute one measurement with ti = 60 s)
2: Stability over 1 year (every month one measurement with ti = 60 s)
3: From 30 V … 500 V
4: From 10 mA … 120 A
5: Related to the read value at optimum range selection
6: Related of apparent power
7: of range 30 % … 120 %
8: Related of end of maximum range and end of range and ohmic load
9: Stability over 1 hour (measurement with ti = 10 s)

25.02.2013

Subjects to alteration.

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