

MT1010 Power Analyzer

*Optimize
Power
Harmonic
Analysis*



MT1010 Power Analyzer

Nowadays, many household appliances and similar electrical equipments draw current from power supply system in a very non-linear manner and therefore, inevitable introduce disturbances especially harmonics of supply frequencies into the power system to which they are connected. However, such equipment should not adversely affect the characteristics of power supplies system, the supply voltage, or the performance of any other equipment connected to the power supply system. Given that the members of electronic devices connected to systems seems to increase, the control of harmonic emissions is an obvious requirement. Therefore, electricians or electrical engineers need not only a tester that would be able to measure, voltage, current and power but a power analyzer that can optimize the harmonic analysis as well. MT1010, is a handheld Power Analyzer designed with powerful DSP techniques, to provide precise performance of power harmonic analysis to meet the professional needs. The need to quickly and at the same time accurately analyze your specific power problems and identify the problem sources is what prompted Motech industries to introduce this new class of instruments.

Available Parameters :

◆ Harmonic Analysis

- up to 40th harmonic
- total harmonic distortion (% THD)
- % fundamental and degree for 1st to 40th harmonic
- RMS value

◆ Power Analysis

- total energy consumption (KWH)
- apparent power (KVA), real power (KW), reactive power (KVAR)
- true power factor, displacement angle

◆ Voltage & Current

- frequency
- true RMS
- peak to peak, peak
- crest factor

Additional features:

- ◆ Inrush current & voltage measurements
- ◆ 14 bit resolution with 1W, 1mV, and 1mA
- ◆ 0.2% basic accuracy
- ◆ Accepts inputs directly from Load Adaptor or shunts, CT's and VT's
- ◆ Standard infrared interface (RS232C)
- ◆ AC, DC, AC+DC coupling for power, voltage, and current measurements
- ◆ Autorange measurement

Applications:

- ◆ Energy consumption of electrical appliances
- ◆ Measurement of maximum and minimum energy demand
- ◆ Harmonic analysis of power factor correction capacitors, variable speed motor drives and solid- state lighting ballasts.
- ◆ Efficiency measurements
- ◆ Measurement of Inrush current at switch on
- ◆ Determining power factor and PF correction requirements

Low Current Measurement

An optional load Adapter MT11A can be used with MT1010 for the measurement of low current for appliances such as Cell-Phone Charger, AC-to-DC Adapter, UPS, and so on. With the load Adapter, the MT1010 can measure the low current as minimal as mA level. Thus, makes it a very useful instrument applicable to variety of fields. (Remarks: The LCD display readings must be converted into 3 decimal points to get the actual value of the measurement)



Optimize Power Harmonic Analysis

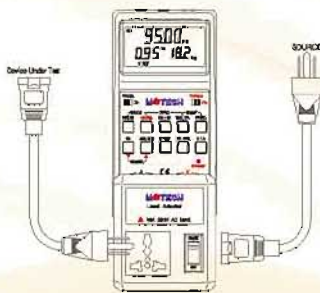
Direct Measurement Inputs

Standard load adapter MT10A is designed to use along with MT1010 for direct measuring input current and voltage during running operations, without interrupting the current path. With this option, users can easily and safely handle the measurement of input current and voltage simultaneously.

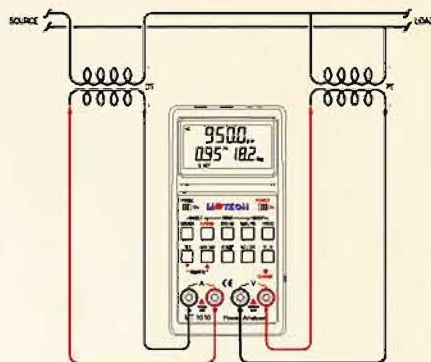


Test Lead Connection

◆ Connections when Load Adapter is used



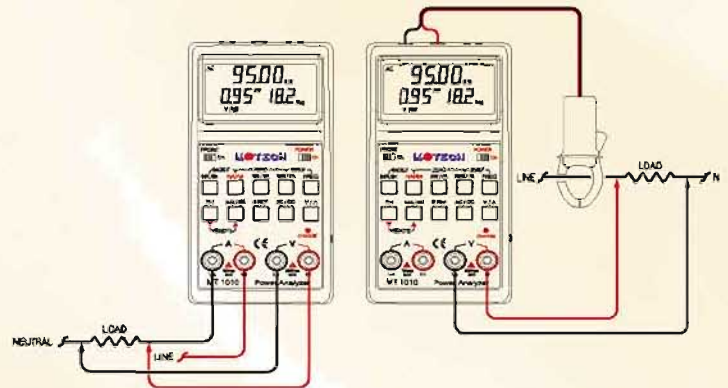
◆ Connections when CT and PT are used in the measurement



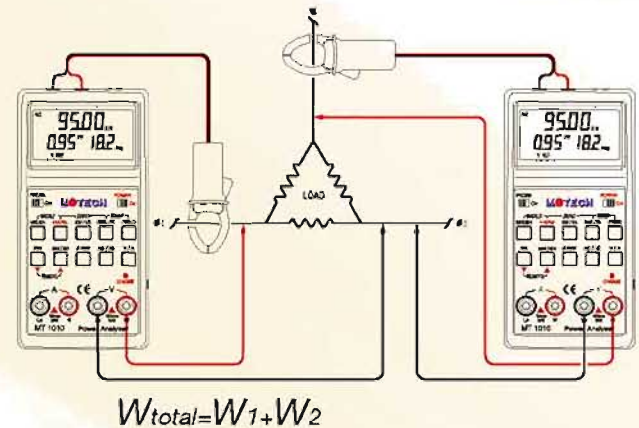
Note:

- (a) When Current Transformer (CT) is used, the secondary shall not open.
- (b) When Potential Transformer (PT) is used, the secondary shall not short.
- (c) Users shall calculate the ratio when CT and/or PT are used.

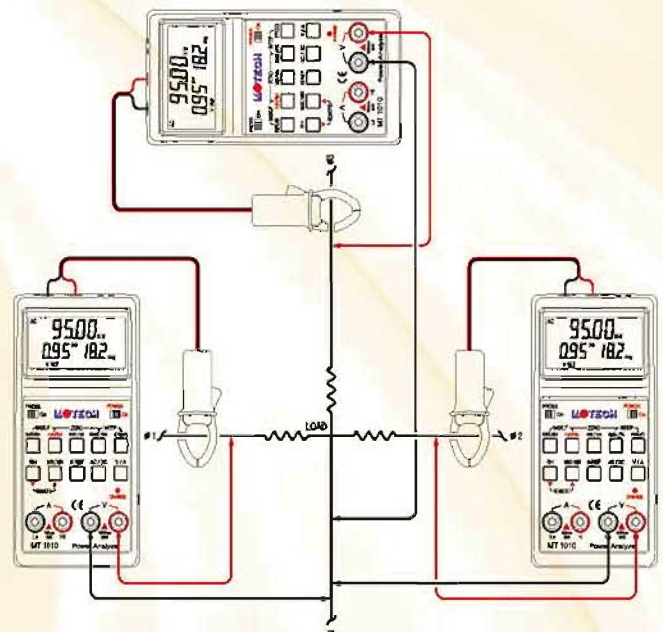
◆ Single-Phase Power Measurements



◆ Three-Phase Power Measurements(Δ or Y)



◆ Three-Phase, 4 wires Power Measurements



$W_{total} = W_1 + W_2 + W_3$

Specifications

Frequency measurements:

Range (fundamental) : dc, ac (10 ~ 100 Hz)
 Accuracy : $\pm(0.1\% + 2 \text{ digits})$
 Bandwidth (harmonic) : dc, ac (10 Hz ~ 4 KHz)

True rms voltage measurements:

Input range : 2.5 V to 900 Vrms (ac + dc)
 : $\pm 5.0 \text{ V to } \pm 1400 \text{ V (peak)}$

Basic accuracy

dc or rms (ac or ac+dc) : $\pm (0.2\% + 2 \text{ digits})$
 Crest factor : 1.00 ~ 5.00
 Accuracy : $\pm(2\% + 5 \text{ digits})$

True rms current measurements:

Direct Current Input:

Input range : 250 mA to 30 Arms (ac + dc)
 : $\pm 500 \text{ mA to } \pm 50 \text{ A (peak)}$

Basic accuracy

dc or rms (ac or ac+dc) : $\pm (0.2\% + 5 \text{ digits})$
 Crest factor : 1.00 ~ 5.00
 Accuracy : $\pm (2\% + 5 \text{ digits})$

Isolated Current Input (1 mVrms / Arms):

Input range : 10.0 mVrms (A) to
 1400 mVrms (A) (ac + dc)
 : $\pm 20.0 \text{ mV to } \pm 2200 \text{ mV (peak)}$

Basic accuracy

dc or rms (ac or ac+dc) : $\pm (0.2\% + 2 \text{ digits}) + \text{probe specs}$
 Crest factor : 1.00 ~ 5.00
 Accuracy : $\pm (2\% + 5 \text{ digits})$

Inrush measurements:

Voltage Input:

Input Ranges : 1400V, 640.0V, 160.0V, 40.00V,
 10.00V, and 2.500V

Sampling Interval

: 12.5 μs

Samplings

: 16000

Trig Level

: > 1/3 Full Range

Direct Current Input:

Input Ranges : 90.00A, 76.80A, 19.20A, 4.800A,
 1.200A, and 0.300A

Sampling Interval

: 12.5 μs

Samplings

: 16000

Trig Level

: > 1/3 Full Range

Battery Operating Time

: 2.5 Hours typical

Power measurements:

Direct Current Input:

Range : 0.001 KVA to 27.00 KVA
 Accuracy : $\pm (0.5\% + 10 \text{ digits})$
 PF : - 1.00 to 1.00 (+ = leading PF,
 - = lagging PF)

Accuracy

Deg ($\theta \text{ v} - \theta \text{ I}$) : - 180 to + 180 degree

Accuracy

: $\pm (2\% + 5 \text{ digits})$



ISO 9001/2000

Isolated Current Input (1 mV / A):

Range : 0.025 KVA to 1260 KVA
 Accuracy : $\pm (0.5\% + 10 \text{ digits}) + \text{probe specs}$
 PF : - 1.00 to 1.00 (+ = leading PF,
 - = lagging PF)

Accuracy

: $\pm (2\% + 3 \text{ digits}) + \text{probe specs}$

Deg ($\theta \text{ v} - \theta \text{ I}$)

: - 180 to + 180 degree

Accuracy

: $\pm (2\% + 5 \text{ digits}) + \text{probe specs}$

Harmonics measurements:

Voltage Input:

Range : DC and fundamental to 40th harmonic

Max harmonic

: 4 KHz

Accuracy

Fundamental : $\pm (0.2\% + 4 \text{ digits})$

Harmonics

: $\pm (2\% + 4 \text{ digits})$

% THD

: $\pm (3\% + 0.03 \times \text{reading})$

Deg ($\theta \text{ FUND} - \theta \text{ HARM}$):

- 180 to + 180 degree

Accuracy

: 2nd ($\pm 1 \text{ degree}$) ~ 40th ($\pm 20.0 \text{ degree}$)

Direct Current Input:

Range : DC and fundamental to 40th harmonic

Max harmonic

: 4 KHz

Accuracy

Fundamental : $\pm (0.2\% + 4 \text{ digits})$

Harmonics

: $\pm (4\% + 4 \text{ digits})$

% THD

: $\pm (4\% + 0.03 \times \text{reading})$

Deg ($\theta \text{ FUND} - \theta \text{ HARM}$):

- 180 to + 180 degree

Accuracy

: 2nd ($\pm 1 \text{ degree}$) ~ 40th ($\pm 20.0 \text{ degree}$)

Isolated current Input:

Range

: DC and fundamental to 40th harmonic

Accuracy

: 4 KHz

Fundamental

: $\pm (0.2\% + 4 \text{ digits}) + \text{probe specs}$

Harmonics

: $\pm (2\% + 4 \text{ digits}) + \text{probe specs}$

% THD

: $\pm (3\% + 0.03 \times \text{reading}) + \text{probe specs}$

Deg ($\theta \text{ FUND} - \theta \text{ HARM}$):

- 180 to + 180 degree

Accuracy

: 2nd ($\pm 1 \text{ degree}$) ~ 40th ($\pm 20.0 \text{ degree}$)

General:

Temperature : 0°C to 40°C (Operating)

- 20°C to 70°C (Storage)

Relative Humidity

: UP to 85%

Battery Type

: Ni-Mh or Alkaline (2xAA size)

Battery Charge

: Constant current 160mA

approximately

Battery Operating Time

: 2.5 Hours typical

AC Operation

: 110V/220V AC, 60/50Hz with

proper Adapter

Low Power Warning

: under 2.2V

Dimensions

: 6.9" x 3.4" x 1.9" (LxWxH)

(174mm x 86mm x 48mm)

Weight

: 470 g

Standard/Optional Test Fixtures / Accessories, Part No., and Pictures

Standard Accessories

1. MT10A Load Adaptor (AC16A 250V w/o shunt)

2. MT10C AC current clamp

3. Test leads ZTP-101MT-1

4. Test leads ZTP-101MT-3

5. Test leads ZTP-101MT-4

6. Clamp-Type clips XTB-1010B&R

7. AA-Size rechargeable battery

8. Carry Case ZCC-200MT-1

9. DC 6V power adaptor

Optional Accessories

10. MT11A Load Adaptor (for low current AC1.6A 250V w/o shunt)

11. Test leads ZTP-101MT-2

12. RS232C to Infrared adapter

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