

HARMONICS TESTER

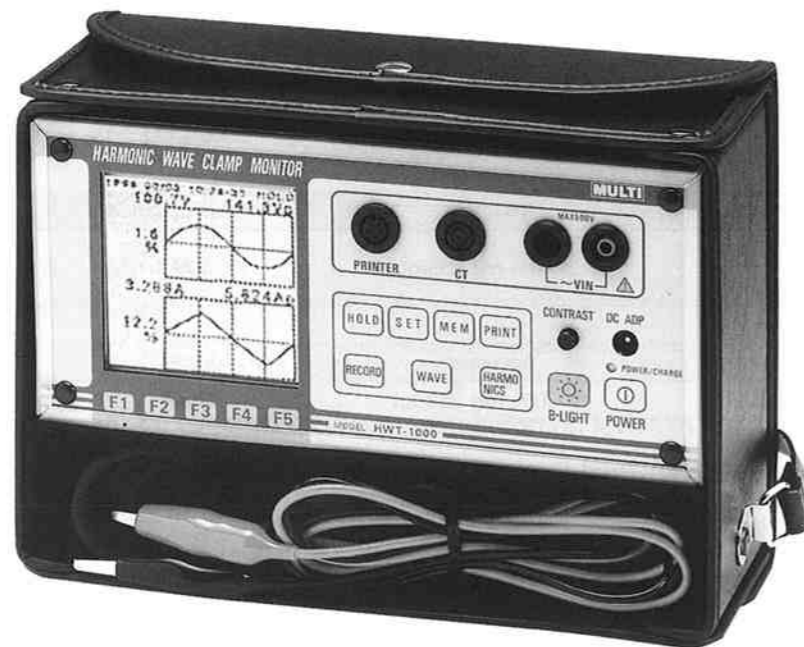
Model **HWT-1000**

The HWT-1000 is a harmonics tester that measures harmonic components on a commercial power line and performs such measurements as that of the direction of generation of these components. It has one channel each of voltage and current input, and the PT ratio and CT ratio of each can be set, enabling first order conversion of the measured value. The HWT-1000 is capable of measurements from the fundamental frequency up to the 40th harmonic.

Measurements can be made on single -phase, single-phase/3-wire, three-phase/3-wire, and three-phase/4-wire power lines, and measurement items are as follows.

- Measurement and digital display of voltage/current values, active/reactive power, phase/power factor
- Waveform display of voltage/current
 - ★ Voltage/current harmonic spectrum display
 - ★ Harmonic power/direction spectrum display
 - ★ List of content and phase of each harmonic
 - ★ List of rms value and phase of each harmonic

Measurement results can be stored within the HWT-1000 and can also be printed on a printer. Because the current input is made using a clamp-type current transducer, it is possible to make measurements without disturbing live wires.



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SPECIFICATIONS

Functional Specification

Input Section

Voltage Input

Number of input channels : 1
 Input ranges : 150/500 Vrms
 Usable input ranges : 150-Vrms range: 10 to 160 Vrms
 500-Vrms range: 30 to 500 Vrms
 Range switching : Manual
 Input impedance : 1MΩ

Current Input

Number of input channels : 1
 Input ranges : 0.5/5/50/300 Arms
 Usable input ranges : 0.5-Arms range: 0.05 to 0.6 Arms
 5-Arms range: 0.5 to 6 Arms
 50-Arms range: 5 to 60 Arms
 300-Arms range: 30 to 300 Arms
 Range switching : Manual
 Input method : Current transducer clamp
 Fundamental frequency input range : 45 to 65 Hz
 Sync method : Voltage-input priority
 (Syncing on current alone is also possible)

Measurement Section

Measurement method : True rms measurement
 Maximum input peak voltage/current : 1.7 times each range value
 Basic measurement accuracy (At 23°C ± 5 °C and 80% maximum relative humidity) : (See table below)

Measurement function	Range	Resolution	Accuracy
AC current	0.5A	0.1mA	± 1% rdg ± 5 digits
	5A	1mA	
	50A	10mA	
AC voltage	300A	100mA	0 to 200A : ±1.0 rdg ±5 digits 200A to 250A : -3.0 rdg ±5 digits 250A to 300A : -3.0 rdg ±5 digits
	150V	0.1V	± 1% rdg ± 5 digits
	500V	0.1V	± 1% rdg ± 5 digits

Harmonic Analysis Section

Range of analyzed orders : Fundamental to 40th harmonic
 Analysis results displayed items : Voltage/current value and Vn-In phase for each order
 Voltage/current value content and Vn-In phase for each order
 Analysis reference phase : Voltage (Or current for current-only input)

Analysis Level Accuracy (For a fundamental input level of 30% of the input range)

Voltage input Fundamental to 10th harmonic : ± 1.5% of rdg ± 3 digits
 11th to 20th harmonic : ± 5% of rdg ± 3 digits
 21st to 30th harmonic : ± 10% of rdg ± 3 digits
 31st to 40th harmonic : ± 20% of rdg ± 3 digits
 Current input Fundamental to 10th harmonic : ± 3% of rdg ± 3 digits
 11th to 20th harmonic : ± 6% of rdg ± 3 digits
 21st to 30th harmonic : ± 15% of rdg ± 3 digits
 31st to 40th harmonic : ± 30% of rdg ± 3 digits

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Analysis phase accuracy
(For a fundamental input level of 30% of the input range)

1st to 10th harmonic	: ± 3 deg
11th to 20th harmonic	: ± 5 deg
21st to 30th harmonic	: ± 15 deg
31st to 40th harmonic	: ± 30 deg

Analysis results display
(Spectrum display for each order level)

- List display of content and phase for each order
- List display rms value and phase for each order

Power Measurement Section

Measurement display items	: Active power, reactive power, phase, power factor
Analysis results display	: Power/direction spectrum display for each order harmonic

Waveform Display Section

Analog display	: One-period display voltage and current
Digital display	: Distortion factor of voltage/current Peak voltage/current values

Measurement Data Processing Functions

Measurement data output	: Output to an external printer via RS-232c
Measurement data storage	: 100 set
Measurement data printing	: Printing of selected measurement data Printing of held measurement data

Other Functions

A/D conversion resolution	: 16 bits
Sampling rate	: 256 samples/period
Averaging	: Selectable: 1, 2, 4, 8, 16 periods
Power supply polarity correction	: Automatically corrected by fundamental voltage/current phase difference.
3-phase capability	: Power and phase compensation provided for 3-phase, 3-wire lines.
Automatic power-off function	: In the P-OFF mode, power is shut off after approximately 15 minutes with no key operations.

General Specifications

Power supply	: Ni-CD battery drive (Charger)
Continuous operation	: Approx. 16 hr (Measurement only) after a full battery charge.
Operating environment	: Temperature: 5 to 35 °C Humidity : 80% max. relative humidity (Non-condensing)
Storage environment	: Temperature: -10 to +50 °C Humidity : 70% max. relative humidity (Non-condensing)
Withstanding voltage	: 2000 VAC for 1 minute (Approximate sine wave at 50/60 Hz between all measurement terminals and case)
Insulation resistance	: 10 MΩ min. (Measured using a 500-VDC insulation tester)
Size	: 200 (W) × 100 (H) × 81 (D) mm (Main unit only)
Weight	: Approx. 1.7 kg (Main unit only)
Accessories	: Carrying case Instruction manual Voltage pickup cable set Current detection CT
Optional accessories	: Charger (Optional made) BS-80TSL Printer LAD-1000H High-voltage clamp adaptor