

YOKOGAWA

WT310E

The Yokogawa WT310E is a highly accurate, single-phase digital power meter designed for measuring standby power, power consumption, and efficiency of electrical devices. With its broad range capabilities and 100 kHz bandwidth, it serves as an industry-standard tool for testing household appliances, office automation, and industrial equipment.

SPECIFICATIONS

General

Interfaces	USB (standard); GP-IB or RS-232 (selectable); Ethernet (option / C7)
Display	4-screen 7-segment LED

Physical

Power Supply	100 to 240 VAC, 48 to 63 Hz, maximum power consumption 50 VA
Operating Temperature	5 to 40 °C
Dimensions (W×H×D)	213 × 88 × 379 mm
Weight	3.0 kg

Input Specifications

Number of Phases	1 phase, 2 wire (1P2W)
Number of Input Channels	1
Voltage Input Terminal Type	Safety terminal (banana jack)
Current Input Terminal Type	Safety terminal (banana jack)
Voltage Input Impedance	Approx. 2 M Ω , approx. 13 pF
Current Input Impedance (Direct 5 mA to 200 mA ranges)	Approx. 500 m Ω
Current Input Impedance (Direct 0.5 A to 20 A ranges)	Approx. 6 m Ω
Current Input Impedance (External Sensor)	Approx. 1 M Ω
Maximum Input Voltage (Continuous)	1000 Vrms or 1500 Vpeak
Maximum Input Voltage (1 second)	1000 Vrms or 2000 Vpeak
Maximum Direct Input Current (Continuous)	22 Arms or 100 Apeak
Maximum Direct Input Current (1 second)	30 Arms or 150 Apeak
Crest Factor Rating	3 or 6 (selectable)
A/D Converter Resolution	16-bit
Voltage Input Capacitance	Approx. 13 pF
External Current Sensor Input Capacitance	Approx. 10 pF
Voltage Input Type	Floating input, resistive voltage divider
Current Input Type	Floating input, shunt input

Measurement Ranges & Bandwidth

Voltage Measurement Ranges (Crest Factor 3)	15 V, 30 V, 60 V, 150 V, 300 V, 600 V
Voltage Measurement Ranges (Crest Factor 6)	7.5 V, 15 V, 30 V, 75 V, 150 V, 300 V
Current Direct Input Ranges (Crest Factor 3)	5 mA, 10 mA, 20 mA, 50 mA, 100 mA, 200 mA, 0.5 A, 1 A, 2 A, 5 A, 10 A, 20 A
Current Direct Input Ranges (Crest Factor 6)	2.5 mA, 5 mA, 10 mA, 25 mA, 50 mA, 100 mA, 0.25 A, 0.5 A, 1 A, 2.5 A, 5 A, 10 A
Frequency Bandwidth	DC, 0.5 Hz to 100 kHz
Sampling Rate	Approx. 100 kS/s
Line Filter Cutoff Frequency	Selectable (OFF, 500 Hz, 5.5 kHz)

Measurement Accuracy

Basic Power Accuracy (50/60 Hz)	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$
Basic Voltage Accuracy (50/60 Hz)	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$
Basic Current Accuracy (50/60 Hz)	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$
Power Accuracy (DC)	$\pm(0.1\% \text{ of reading} + 0.2\% \text{ of range})$
Voltage Accuracy (DC)	$\pm(0.1\% \text{ of reading} + 0.2\% \text{ of range})$
Current Accuracy (DC)	$\pm(0.1\% \text{ of reading} + 0.2\% \text{ of range})$
Power Accuracy (45 Hz to 66 Hz)	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$
Temperature Coefficient	$\pm 0.03\% \text{ of reading}/^{\circ}\text{C}$ (at 5 to 18°C or 28 to 40°C)

Measured Parameters & Functions

Voltage Parameters	Urms, Umn, Udc, Urmn, Uac
Current Parameters	Irms, Imn, Idc, Irmn, Iac
Power Parameters	P (Active Power), S (Apparent Power), Q (Reactive Power)
Phase and Frequency Parameters	lambda (Power Factor), phi (Phase Angle), fU (Voltage Frequency), fI (Current Frequency)
Peak Parameters	Upk+ (Voltage Peak High), Upk- (Voltage Peak Low), Ipk+ (Current Peak High), Ipk- (Current Peak Low)
Crest Factor Parameters	CfU (Voltage Crest Factor), CfI (Current Crest Factor)
Integration Parameters	Wp (Active Power Integration), Wp+ (Charge Power Integration), Wp- (Discharge Power Integration), q (Current Integration), q+ (Charge Current Integration), q- (Discharge Current Integration)

Integration (Energy) Specifications

Integration Modes	Standard, Continuous, Real-Time, Real-Time Continuous
Integration Time Range	00:00:00 to 9999:59:59
Auto-Ranging Integration	Supported
Integration Timer Accuracy	$\pm 0.02\% \text{ of reading}$

Harmonic Measurement (Option /G5)

Maximum Harmonic Order	50th
FFT Window Width	1024 points
Fundamental Frequency Range	10 Hz to 1.2 kHz
Measured Parameters (Harmonic)	Uh (Harmonic Voltage), Ih (Harmonic Current), Ph (Harmonic Active Power), Uh% (Harmonic Voltage Ratio), Ih% (Harmonic Current Ratio), Ph% (Harmonic Active Power Ratio), Total Harmonic Distortion (THD)

Display & User Interface

Display Update Rate	0.1 s, 0.2 s, 0.5 s, 1 s, 2 s, 5 s (selectable)
Display Resolution	Maximum 99999 counts
Number of Displayed Items	Up to 4 physical values shown simultaneously

Interfaces & Options

USB Port	USB Type B (Device, USB 2.0 compliant)
GP-IB Interface	Selectable option (GP-IB or RS-232)
RS-232 Interface	Selectable option (GP-IB or RS-232)
Ethernet Interface (Option /C7)	100BASE-TX/10BASE-T
D/A Output (Option /DA4)	4 channels (± 5 V FS, 12-bit D/A resolution)
Modbus/TCP Support	Supported via Ethernet interface (Option /C7)
External Trigger Input	Supported via optional D/A connector

Safety, Environmental & Physical

Safety Standard	EN61010-1, EN61010-2-030
EMC Standard	EN61326-1 Class A, EN55011 Class A
Environmental Compliance	RoHS Directive compliant
Warm-up Time	Approx. 30 minutes
Operating Humidity Range	20% to 80% RH (no condensation)
Storage Temperature Range	-25 °C to 60 °C
Storage Humidity Range	20% to 80% RH (no condensation)

Frequency Measurement

Frequency Measurement Range	0.1 Hz to 100 kHz
Frequency Measurement Accuracy	$\pm(0.06\%$ of reading)

Performance & Accuracy

Effective Input Range (Crest Factor 3)	1% to 110% of the measurement range
Effective Input Range (Crest Factor 6)	2% to 110% of the measurement range
Influence of Common Mode Voltage (50/60 Hz)	$\pm 0.01\%$ of range or less with 600 Vrms applied
Influence of Common Mode Voltage (50 kHz)	$\pm 0.1\%$ of range or less with 600 Vrms applied
Maximum Common-Mode Voltage	600 Vrms (CAT II) / 300 Vrms (CAT III)

Withstand Voltage & Insulation

Withstand Voltage (Power to Case)	1500 VAC for 1 minute
Withstand Voltage (Input Terminals to Case)	4000 VAC for 1 minute (50/60 Hz)
Withstand Voltage (Input to Outputs/Comm)	4000 VAC for 1 minute (50/60 Hz)
Insulation Resistance (Power to Case)	50 M Ω or more at 500 VDC
Insulation Resistance (Input Terminals to Case)	50 M Ω or more at 500 VDC

D/A Output (Option /DA4)

D/A Output Channels	4 channels
D/A Output Resolution	12-bit
D/A Output Voltage Range	±5 V FS (approx. ±7.5 V maximum)
D/A Output Accuracy	±(Measurement accuracy + 0.2% of FS)
D/A Output Update Rate	Same as the display update rate

Interfaces & Control

Remote Control I/O Connector (Option /DA4)	15-pin D-Sub (female)
Remote Control I/O Signals	EXT HOLD, EXT SINGLE, EXT START, EXT STOP, INTEG BUSY
External Trigger Input Level	TTL (0 to 5 V)
External Trigger Connector Type	BNC
USB Port Connector	Type B (USB 2.0 compliant)
GP-IB Connector	24-pin ribbon (IEEE 488 compliant)
RS-232 Connector	9-pin D-sub (male)

General & Environmental

Operating Altitude	2000 m or less
Maximum Power Consumption	50 VA

Measurement System

Measurement Method	Digital sampling method
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Communication & Interfaces

USB Compliance	USB 2.0 compliant (Full Speed)
RS-232 Baud Rates	9600, 19200, 38400, 57600, 115200 bps
Ethernet Interface Speed	10BASE-T/100BASE-TX (Option /C7)

Power Supply

Allowed Supply Voltage Range	90 VAC to 264 VAC
Allowed Supply Frequency Range	48 Hz to 63 Hz

Software

Included Software	WTViewerFreePlus
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TECHNOLOGY

Digital Power Meter

APPLICATIONS

Power consumption measurement, standby power measurement, and energy efficiency testing

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