

YOKOGAWA

PZ4000

The Yokogawa PZ4000 is a high-performance precision power analyzer designed for research and development. It features a wide measurement bandwidth of DC to 2 MHz and high-speed sampling up to 5 MS/s, enabling accurate capture of fluctuating voltage and current waveforms. With support for up to 4 input elements, advanced harmonic analysis up to the 500th order, and FFT capability, it provides comprehensive power calculations and spectral analysis for modern electrical and electronic systems.

SPECIFICATIONS

General

Interfaces	GPIB, RS-232, External Trigger, VGA Output, 3.5-inch FDD
Display	10.4-inch color TFT LCD (640 x 480 pixels)

Physical

Power Supply	100 to 120 VAC / 200 to 240 VAC, 50/60 Hz, max. 300 VA
Operating Temperature	5 to 40 °C °C
Dimensions (W×H×D)	426 x 177 x 430 mm mm
Weight	Approx. 15 kg kg

Input Module Specifications

Maximum Number of Input Elements	4
A/D Converter Resolution	12-bit
Maximum Sampling Rate	5 MS/s
Measurement Frequency Bandwidth	DC, 0.1 Hz to 2 MHz
Voltage Input Impedance	Approx. 10 MOhm (parallel with approx. 35 pF)
Voltage Crest Factor	3 (at rated input)
Current Crest Factor	3 (at rated input)
Voltage Measurement Ranges (Direct)	30 V, 60 V, 100 V, 150 V, 300 V, 600 V, 1000 V (RMS)
Current Measurement Ranges (Direct, 5A Module)	100 mA, 200 mA, 500 mA, 1 A, 2 A, 5 A (RMS)
Current Measurement Ranges (Direct, 30A Module)	1 A, 2 A, 5 A, 10 A, 20 A, 30 A (RMS)
External Current Sensor Input Ranges	100 mV, 200 mV, 500 mV, 1 V, 2 V, 5 V, 10 V
Maximum Allowed Input Voltage (Direct)	1000 Vrms or 1500 Vpeak
Standard Memory Depth	100 kwords/channel
Optional Memory Depth (/M1)	1 Mwords/channel
Optional Memory Depth (/M2)	4 Mwords/channel

Measurement Accuracy & Range

Basic Voltage Accuracy	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$ at 50/60 Hz
Basic Current Accuracy	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$ at 50/60 Hz
Basic Active Power Accuracy	$\pm(0.1\% \text{ of reading} + 0.05\% \text{ of range})$ at 50/60 Hz
Influence of Power Factor	$\pm 0.15\%$ of apparent power (at $\cos \phi = 0$, 50/60 Hz)
Temperature Coefficient	$\pm 0.03\%$ of range/ $^{\circ}\text{C}$
Frequency Measurement Range	0.1 Hz to 2 MHz

Measurement Parameters & Functions

Measured Parameters	U, I, P, S, Q, λ , ϕ , f, Up+, Up-, Ip+, Ip-
Integration Parameters	Ah (current integration), Wh (active power integration)
Integration Modes	Standard, Continuous, Real-time (with timer control)
Measurement Update Rate	Approx. 100 ms to 20 s
Line Filter Cutoff Frequencies	500 Hz, 2 kHz, 20 kHz, 100 kHz, Off
Frequency Filter Cutoff Frequencies	500 Hz, 2 kHz, Off

Harmonic & Spectral Analysis

Harmonic Measurement Method	PLL synchronization or External clock
Fundamental Frequency Range	10 Hz to 1.2 kHz
Maximum Measured Harmonic Order	500th order
FFT Points	Up to 100,000 points
FFT Window Functions	Rectangular, Hanning
Harmonic Analysis Parameters	Harmonic components of U, I, P, ϕ , and THD

Motor Evaluation Functions (Optional)

Torque Input Type	Analog (voltage) or Pulse (with /MTR option)
Speed Input Type	Analog (voltage), Pulse, or Phase A/B (with /MTR option)

Display & User Interface

Display Type	10.4-inch Color TFT LCD
Display Resolution	640 x 480 pixels
Waveform Display Formats	Voltage, current, and power waveforms with zoom and split screen
Vector Display Capabilities	Vectorial representation of voltage, current, and phase angle
Bar Graph Harmonic Display	Displays harmonic levels up to 500th order as a bar graph

Interfaces & Connectivity

GPIO Interface	IEEE-488 compliant, standard
VGA/Video Output Port	D-sub 15-pin, standard
External Trigger Input/Output	BNC connectors, standard (for Master-Slave synchronization)
Supported Storage Media Slot	3.5-inch Floppy Disk Drive (FDD), PCMCIA (PC Card) slot (standard)
D/A Output Channels	16 channels (with optional /DA)

Power Supply & Environmental

Rated Supply Voltage Range	100 to 120 VAC / 200 to 240 VAC
Power Supply Frequency Range	50/60 Hz
Power Consumption	Max. 300 VA (fully configured)
Operating Temperature Range	5 to 40 °C
Operating Humidity Range	20% to 80% RH (non-condensing)
Storage Temperature Range	-25 to 60 °C
Warm-up Time	30 minutes

Safety & Compliance

Safety Standards	EN61010-1 compliant
EMC Standards	EN55011, EN50082-2

Physical Characteristics

Dimensions (Width x Height x Depth)	426 x 177 x 430 mm (excluding feet and projections)
Weight (Fully Populated Mainframe)	Approx. 15 kg (with 4 modules)
Weight (Empty Mainframe)	Approx. 11 kg

Measurement Inputs

Current Input Impedance (5A Module)	Approx. 100 mΩ in series with 0.07 μH
Current Input Impedance (30A Module)	Approx. 5 mΩ in series with 0.07 μH
Maximum Continuous Input Current (5A Module)	7 Arms
Maximum Continuous Input Current (30A Module)	40 Arms

Options

Built-in Printer Option (/B5)	Thermal line-dot system, 112 mm paper width
SCSI Interface Option (/C2)	SCSI-2 compliant, half-pitch 50-pin connector
Internal HDD Option (/C8)	2.5-inch IDE hard disk drive
Ethernet Interface Option (/C10)	10BASE-T, RJ-45 connector
User-Defined Computation Option (/G5)	Enables custom equations and math operators
Motor Evaluation Option (/H3)	Motor Evaluation Option (/MTR) = Calculates motor efficiency using analog/pulse torque and speed inputs
Analog Speed/Torque Input Range (Option /H3)	Analog Speed/Torque Input Range (Option /MTR) = ± 1 V, ± 2 V, ± 5 V, ± 10 V, ± 20 V
Pulse Speed/Torque Input Frequency (Option /H3)	Pulse Speed/Torque Input Frequency (Option /MTR) = 2 Hz to 1 MHz

Triggering

Trigger Modes	Auto, Auto Level, Normal, Single
Trigger Sources	Voltage (U1-U4), Current (I1-I4), External (EXT)

Physical / Mechanical

Weight of 5A Input Element (Model 253710)	Approx. 0.9 kg
Weight of 30A Input Element (Model 253752)	Weight of 30A Input Element (Model 253750/253751) = Approx. 1.0 kg

General Specifications

Number of Input Element Slots	4
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Interfaces

RS-232 Baud Rates	1200, 2400, 4800, 9600, 19200, 38400 bps
RS-232 Connector Type	D-Sub 9-pin (male)
GP-IB Address Range	0 to 30

PC Card Slot

PC Card Slot Type	Type II (PCMCIA)
Number of PC Card Slots	1

Floppy Disk Drive

Floppy Disk Drive Media Support	3.5-inch 2HD/2DD floppy disks
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Option /B5 (Built-in Printer)

Printer Type	Thermal line dot printing
Printer Paper Width	112 mm
Printer Effective Recording Width	104 mm

Option /C2 (SCSI Interface)

SCSI Standard	SCSI-2 compliant
SCSI Connector	Amphenol half-pitch 50-pin (pin type)

Option /C10 (Ethernet Interface)

Ethernet Physical Layer	10BASE-T
Ethernet Connector	RJ-45

D/A Output

D/A Output Voltage Range	±5 V FS
D/A Output Resolution	12-bit

Inputs & Outputs

External Clock Input Level	TTL
External Start/Stop Input Level	TTL

Environmental & Safety

Overvoltage Category	CAT II
Pollution Degree	2
Maximum Operating Altitude	2000 m

TECHNOLOGY

Digital Sampling Power Analyzer

APPLICATIONS

R&D power analysis, motor drive evaluation, inverter efficiency measurement, high-frequency power spectrum analysis

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