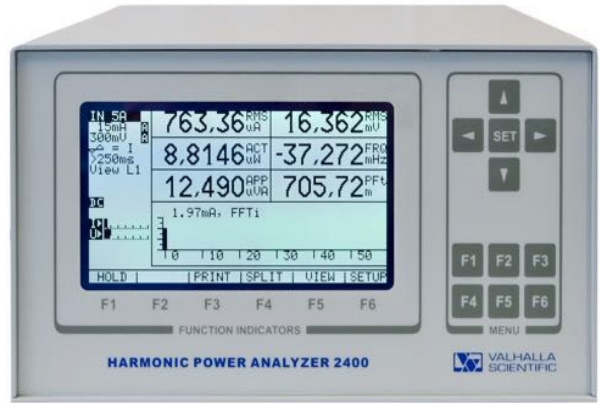


# Wideband Spectrum Power Analyzer & Wattmeter Single-to-3-Phase Precision Analysis

- Single-Phase and 3-Phase
- Perfect Resolution for Stand-by Power Measurements
- Suitable for frequency inverter drivers
- Large and bright display for up to 10 values
- Scope function
- Stores up to 20 setups
- Harmonics 1-99, Bar charts
- DC-300kHz, 15mA-40A, 0.3V-1000V
- 0.1% or 0.05% accuracy
- Interface: IEEE 488, RS 232, Centronics



Valhalla's state of the art 2400 Series Power Analyzers offer high performance in both single and three-phase. Unlike other instruments at this price level the 2400 is designed to operate with extreme signals generated on frequency inverter drivers. These analyzers provide precise reliable measurements for any waveform. Large clear monitor lets you read displayed values from a distance of four meters.

## COMPUTED VALUES

The new 2400 power analyzer measures, computes, and displays all of your critical power variable to let you concentrate on more efficient reliable testing. It is available in single or three phase versions and combines a wattmeter, oscilloscope, and a power spectrum analyzer in a single compact package. From the simultaneous and precise voltage and current measurements, you can measure and monitor all of the power parameters you need. You can display them in the format that fits your application.

**Current and Voltage:** RMS, Peak and Harmonics through the 99th order.

**Power:** Watts, VA, VAR, and Power Factor

**Integrated Measurements:** Watt-Hours, VA Hours, VARH and Amp Hours

**General Values:** Frequency, Harmonic Distortion, Crest Factor, Form Factor, and Oscilloscope Display

## SIMPLE TO USE:

Checking power to determine the pertinent power parameters of a frequency inverter driven system is simple. All values display large letters easily read even in dark rooms. The user menu makes operation easy.

## MEASURED VALUES CAN BE:

- Printed, (Centronics Printer Interface)
- Sent to a PC via IEEE-488 or RS232 interface.
- Sent to a chart recorder via the analog outputs.
- You can have all available options installed in your instrument.



## EXTRAORDINARY FEATURES, ATTRACTIVE DISPLAY:

- Much effort went into the design of the 2400 Power Analyzers to give the highest performance at low costs.
- The analyzer inputs are all galvanically isolated.
- Broad band DC-300kHz.
- Wide input range (0.3V - 1000V, 15mA - 40A).
- Exceptional common mode rejection for use in frequency inverter driven systems.
- The accuracy is 0.1% (0.05% versions are available).
- The bright LCD monitor displays up to 10 measured values in well legible 9mm high numbers.
- The Three-Phase Power Analyzer puts up to 32 measured values on the screen.
- You have the choice to visualize wave forms, bar graphs or trend plots. A unique feature of these instruments allows a combination of meter mode and graphic mode.

## VOLTAGE

Ranges	.3V, 1V, 3V, 10V, 30V, 100V, 300V, 1000V
Frequency Range	DC, 0.1Hz-300kHz
Crest Factor	4:1 at 50% full scale (fs)
Input Impedance	>1MΩ
Common Mode-50Hz/100kHz	155dB/95dB
Standard Accuracy 23°C	rms, mean, rectified mean; 0.3V, 1V typ
1Hz-1kHz	±(0.1%rdg + 0.1% range)
DC, 1kHz-10kHz	±(0.2%rdg + 0.2% range)
10kHz-100kHz 100kHz-	±(0.3%rdg + 0.04% range)
300kHz Improved	±(0.2%rdg + 0.2% range)
Accuracy	±(0.05%rdg + 0.05% range)

## CURRENT

Ranges	15mA, 50mA, 150mA, 500mA, 1.5A, 5A, 1A, 3A, 10A, 30A, 100A, 300A
Frequency Range	DC, 0.1Hz-300kHz
Crest Factor	4:1 at 50% full scale (fs)
Common Mode-50Hz/100kHz	160dB/120dB
Standard Accuracy 23°C ±C°K 5A Input/Shunt Input	

1Hz-1kHz	±(0.1%rdg + 0.1% range)
DC, 1kHz-10kHz	±(0.2%rdg + 0.2% range)
10kHz-100kHz 100kHz-	±(0.3%rdg + 0.04% range)
300kHz Improved	±(0.3%rdg + 0.04% range)
Accuracy	±(0.05%rdg + 0.05% range)
Standard Accuracy 23°C ±C°K 30A Input	

1Hz-1kHz	±(0.1%rdg + 0.1% range)
DC, 1kHz-10kHz	±(0.9%rdg + 0.2% range)
10kHz-100kHz 100kHz-	±(0.3%rdg + 0.5% range)
300kHz Improved	±(0.3%rdg + 0.5% range)
Accuracy	±(0.05%rdg + 0.05% range)

## POWER

Ranges	80 Ranges corresponding to the products VxA
Frequency Range	DC, 0.1Hz-300kHz
Standard Accuracy 23°C ±3°C – Add accuracy % of I and V	
1Hz-1kHz	PF = 0 to ±1
DC, 1kHz-10kHz	PF = 0 to ±1
10kHz-100kHz	PF = 1

## FREQUENCY

0.1Hz-300kHz, A or V triggered Accuracy	±0.1%
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## COMPUTED VALUES

Accuracy; Reactive Power,  $Var = \pm(VA2-W2)$ ; Apparent Power:  $VA = ArmsVrms$ ;  
Power Factor:  $PF = W/VA$ ;  
Crest Factor:  $CF = Ap/Arms$ ,  $Vp/Vrms$ ; Form Factor:  $FF = At/Arms$ ,  $Vt/Vrms$ ;  
Impedance:  $Z = Vrms/Arms$ ;  
Total Harm Dist:  $THD = (Irms2 - Ifund2) / Irms$

## INTEGRATOR

Energy, Charge; Accuracy - Wh, Vah, Varh, Ah; Basic accuracy of integrated quantity.

## HARMONIC

Frequency range of fundamental - 2.5Hz - 100kHz

## ANALYSIS

Accuracy, Harmonic current and voltage	
2Hz-1kHz 1kHz-10kHz	±(0.2% rdg + 0.1% range)
10kHz-100kHz	±(0.5% rdg + 0.5% range)
	±(0.7%range + 0.1%/kHz rdg)

## DISPLAY

Blue liquid crystal graphic display with FL back light; 64x120mm; 128x240 pixels

## POWER

AC, 50-400Hz;  
85V-240V; 2AF/30VA

## DIELECTRIC STRENGTH

Input to case or power supply	2.5kV/50Hz/1minute
Line input to case	1.5kV/50Hz/1minute
Input to Input	4kV/50Hz/1minute

## DIMENSIONS

H 150mm x W 235mm x D 320mm

Weight 4Kg

### Power Analyzers

2410-1S Single Phase Basic Model, 0.1% accuracy

2410-1HS Single Phase Power Analyzer, w/Harmonics & Scope 0.1% accuracy 2410-1HE Single Phase Power Analyzer, w/ Harmonics or Scope, 0.05% accuracy 2430-3S Three-Phase Basic Model, 0.1% accuracy

2430-3HS Three-Phase Power Analyzer, w/Harmonics & Scope 0.1% accuracy 2430-3HE Three-Phase Power Analyzer, w/ Harmonics or Scope, 0.05% accuracy

### Accessories

ACS1 Current clamp with connector to 106A shunt input; 0-200A / 0-1000A, DC- 1kHz, 2 %, other ranges and accuracies on request

ACS2 Portable printer (106 x 180 x 88mm) with Centronics interface and cable (weight 400gr.)

ACS3 Soft carrying case for 2400

ACS4 Set of test leads, max. 32A, 1.5m (2 red, 2 black)

ACS5 Shunt input connector

ACS6 Service Manual

ACS7 Rack Mounting Kit

### Options

Opt-01 RS-232 Interface and Centronics printer output including Windows Operating Software (95, 98, NT, 2000, ME, XP) to control, read, and store data

Opt-02 RS-232- and IEEE-488 Interface, Centronics printer output including Windows Operating Software (95, 98, NT, 2000, ME, XP) to control, read, and store data

Opt-03 RS-232- and IEEE-488 Interface, Centronics printer output, and 4 analog outputs, 8 analog inputs including Windows Operating Software (95, 98, NT, 2000, ME, XP) to control, read, and store data, read analog inputs. inputs

Opt-03A RS-232 and IEEE-488 Interface, Centronics printer output 4 analog outputs with provision to also output total power, 8 analog inputs including Windows Operating Software (95, 98, NT, 2000, ME, XP) to control, read, and store data, read analog inputs. inputs

Opt-04 3-Phase current sensors model 0-100A (supply by 2400)

Opt-05 Operating software under DOS to control 2400, read data and store data via RS-232 or IEEE-488 (National, Keithly Interface)

Opt-06 2400 driver for Nat. Instrument LabView Opt-07

Standalone software based on LabView Opt-07M

Software for Motor Testing

Opt-07T Software for Transformer Testing

Opt-08 TTL-input for external synchronization

Opt-09 Network to form artificial neutral (mainly frequency inverter measurements) Opt-10 0-300A, 0-3000A flexible current clamps with connector to clamp input of Power Analyzer (1 per phase). 1% 50/60Hz.