

FLUKE®

Power Quality



Pinpoint power quality problems faster

Fluke 430 Series three-phase and Fluke 43B single-phase Power Quality Analyzers

Analyze your power network quickly

Measure all power parameters, find events and anomalies in seconds

In industry, healthcare, and business – in fact wherever electrical and electronic equipment is indispensable – power quality plays a critical role in maintaining continuity.

Non-linear loads, switching, load changes and equipment problems can result in poor power quality. Poor power quality is not only costly in terms of wasted energy and unnecessary downtime, it's also dangerous and increases risk of equipment failure.

Fluke has an unrivalled range of power quality analyzers to help you maintain high-quality power systems. The tools give you the power to analyze every parameter, power-related event or anomaly faster, safer and in more detail than ever before.

The range comprises the Fluke 430 Series three-phase power quality analyzers and the 43B single-phase power quality analyzer.

Choose the right tool for your power quality test requirements

	434	433	43B
Application	Three-phase		Single-phase
Inputs	4 voltage and 4 current (for 3 phases and neutral)		1 voltage and 1 current
Measurements			
Vrms, Arms, Hz, W, VAR, VA, PF, Cos ϕ (DPF), Crest Factors	●	●	●
Harmonics and THD (V,A,W), k-factor	●	●	●
Inter-harmonics	●	Optional*	
kWh and kVARh, kVAh, demand interval	●	Optional*	-
Flicker (Plt, Pst, PF5)	●	●	-
Unbalance	●	●	-
Recorder/AutoTrend	●/●	●/●	●/-
System-Monitor	●	●	-
Real time scope/Phasor diagrams	●/●	●/●	●/-
Dips and swells/Half cycle based	●/●	●/●	●/-
Transient display	●	Optional*	●
Inrush current	●	Optional*	●
EN50160 compliance	●	●	-
IEC61000-4-30, -4-7, -4-15 compliance	●	●	-
Built-in general purpose Scope and DMM	-	-	●
Memory (screens/data)	50/10	25/5 standard 50/10 optional*	20 for screens and data
FlukeView software and interface cable	●	Optional*	Depending on configuration
EN61010 safety rating	600 V CAT IV/1000 V CAT III		600 V CAT III

* Optional functionality can be added with upgrade kit. For details see ordering information.

The Fluke 434 and 433 three-phase power quality analyzers help you locate, predict, prevent and troubleshoot problems in power distribution systems. These easy-to-use handheld tools have many innovative features to give you the details to pinpoint problems faster and safer.

- **Complete three-phase troubleshooting tool: measure everything!**

Measure virtually every power system parameter. The Fluke 430 Series measure voltage, current, frequency, power, power consumption (energy), unbalance and flicker, tracks harmonics, inter-harmonics and capture events like dips and swells, transients, interruptions and rapid voltage changes with fast 5 μ s resolution.

- **AutoTrend: don't waste time setting up recordings!**

Ever look at measurement data and wonder how it changes over time? Just press a single button to get a

trend overview. No need to start a separate measurement since every measurement you see is always automatically recorded. Instantly zoom in on details and use cursors to analyze while recording continues.

- **System-Monitor: quickly check system performance**

One comprehensive overview gives immediate insight into your power system's quality, checking conformity to limits specified in EN50160 or to your own custom limits. You can instantly see which parameters fall outside the limits and drill down into detailed event tables and trend graphs.

- **Automatic transient display: don't miss an event**

Capture up to 40 dips, swells, interruptions or transients automatically. When an event occurs, voltage and current waveform data are stored for all three phases and neutral allowing you to analyze timing relationships and perform a cause and effect analysis.

- **Four current and four voltage channels**

Simultaneously measure voltage and current on all three phases and neutral. The instrument supports all common wiring schemes.

- **Highest safety rating**

Meets the stringent 600 V CAT IV safety standard required for measurements at the service entrance.

- **Fast and easy to use**

Menu-driven interface on the high-resolution color screen simplifies operation.

- **Rugged, handheld and ready for action**

Built to survive in tough industrial environments, the Fluke 430 Series analyzers are easy to carry around and provide over seven hours operation per battery charge.



se power quality analyzers

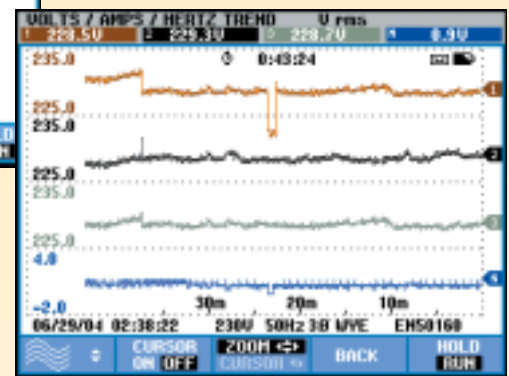
reater detail

Quickly see the trend

Unique AutoTrend gives you fast insight into changes over time. Every displayed reading is automatically and continuously recorded without having to set up threshold levels or interval times, or having to manually start the process. You can quickly view trends in voltage, current, frequency, power, harmonics or flicker on all three phases plus neutral. And you can analyze the trends using the cursors and zoom function – even while background recording continues.

VOLTS / AMPS / HERTZ				
	L1	L2	L3	N
U _{rms}	228.6	230.7	228.9	1.0
U _{pk}	315	324	323	2
CF	1.4	1.4	1.4	1.9
Hz	50.01			
A _{rms}	75.0	53.2	30.2	0.5
A _{pk}	122	86	53	1
CF	1.6	1.6	1.8	1.9
06/29/04 02:10:02 230V 50Hz 3Ø WVE ENS0160				
TREND				HOLD RUN

AutoTrend automatically records all displayed parameters in the background. Toggle between data and trend view and use cursors and zoom to analyze measurements without interrupting the recording.

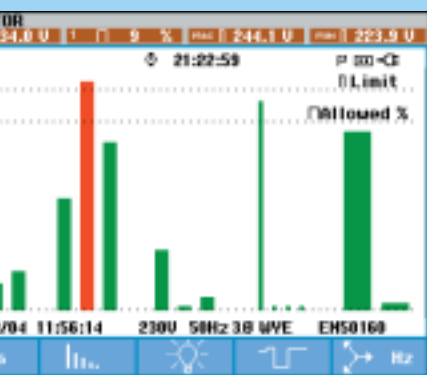


Check performance against 50160 with ease

With a single push of a button, the unique System-Monitor gives you an overview of the power system performance, and checks the compliance of incoming power to EN50160 standards or to your own custom specifications. The overview is shown on a single screen,

with color-coded bars clearly indicating which parameters fall outside the limits. A list of each event falling outside these limits is generated. You can easily drill down into a particular event by viewing the voltage, current, flicker, frequency, harmonics and unbalance trend recordings for the individual phases. Again, cursors and zoom allow

detailed analysis of the timing relationships between the different phases and simplifies 'cause and effect' analysis.



The System-Monitor overview screen gives you insight into whether the voltage, current, harmonics, flicker, frequency and the number of sags and swells fall outside the set limits.

MONITOR EVENTS WVRMS				
START 08/12/04 19:55:12 EVENT 52/306				
DATE	TIME	TYPE	LEVEL	DURATION
08/13/04	12:06:08:433	HO	0.5 %	2.0
08/13/04	12:06:08:433	HO	0.5 %	2.0
08/13/04	12:06:18:433	HO	0.5 %	2.0
08/13/04	12:06:18:433	L1 RMS	0.9 U	0:00:30:000
08/13/04	12:06:18:433	L1 RMS	207.0 U	%
08/13/04	12:06:18:433	L1 RMS	195.5 U	%
08/13/04	12:06:18:433	L2 RMS	0.9 U	0:00:30:000
08/13/04	12:06:18:433	L2 RMS	207.0 U	%
08/13/04	12:06:18:433	L2 RMS	195.5 U	%
08/13/04	12:06:18:433	L3 RMS	0.9 U	0:00:30:000
08/13/04	12:06:18:433	L3 RMS	207.0 U	%
08/13/04	12:06:18:433	L3 RMS	195.5 U	%
08/23/04 20:10:37 230V 50Hz 3Ø WVE ENS0160				
SELECTED				ALL
NORMAL				DETAIL
TREND				BACK

A detailed list is given of all events falling outside the set limits. By scrolling through the event list and selecting an event, the event can be analyzed in detail.



All relevant parameters are recorded so each event can be analyzed in detail. Cursors are automatically positioned at the selected event to easily view timing relationships.



600 V CAT IV safety rating

Designed to help protect you and your equipment against electrical shock and fire, the Fluke 430 Series analyzers, accessories and charger are all certified to meet the stringent safety standards for use in 600 V CAT IV and 1000 V CAT III environments. They are the first tools of their kind to carry the CAT IV rating and can therefore be used at virtually all power connections and outlets in low-voltage power distribution systems.



One tool to do the job

The Fluke 430 Series provide all the measurement power to locate, predict, prevent and troubleshoot problems in your power distribution systems.

Measures everything

With a Fluke 430 Series, you can measure true RMS voltage and current, frequency, dips and swells, transients, interruptions, power and power consumption, peak demand interval, (inter-)harmonics, flicker and unbalance according to the latest IEC61000-4-30 standard.

The Fluke 430 Series can also verify KYZ pulse output revenue meters using an optional pulse input accessory.

Automatic transient display

Every time an event or distortion on the voltage waveform is detected, the instrument triggers and automatically stores voltage and current waveforms on all three phases and neutral. The instrument can also trigger when a certain current value level is exceeded. Up to 40 dips, swells, interruptions and transients can be captured in this way. You can see voltage transients as high as 6 kV and as fast as 5 microseconds.

Easy to use

Thanks to thoughtful features like a user-friendly menu in local language and handy on-screen wiring diagrams for all commonly used three-phase and single phase configurations, the 430 Series Power Quality Analyzers are easy to use.

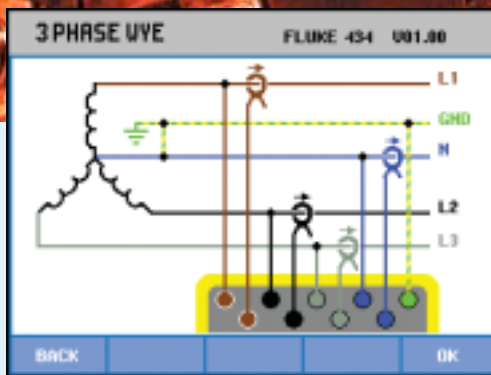
Handheld unit delivered as a complete package

The Fluke 430 Series includes four 400A clamps and five voltage test leads and clips, and a line adapter/battery charger – all supplied in a hard case. You just have to take it out of the box to start tackling your most challenging power quality problems. The rugged construction and battery operation make it ideal for demanding field work.

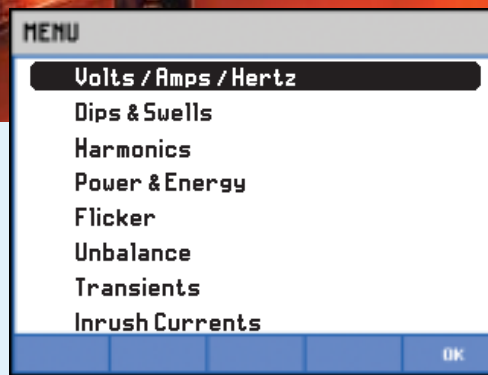
Extensive data analysis possibilities

The Fluke 430 Series provides three ways to analyze the measurements. Cursors and zoom can be used 'live' while taking the measurements, or 'offline' on stored measurement data. The stored measurements can also be transferred to a PC with FlukeView. This software's 'view' mode allows cursors and zoom to be used on stored measurements as if actually working with the instrument. To perform custom analysis and to create reports, measurement data can be exported to common spreadsheet programs. The instrument can store up to 10 measurements, where each measurement can contain up to 32 parameters recorded for more than a year, and up to 50 screens.

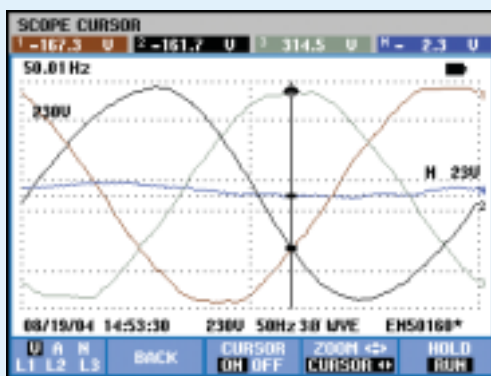




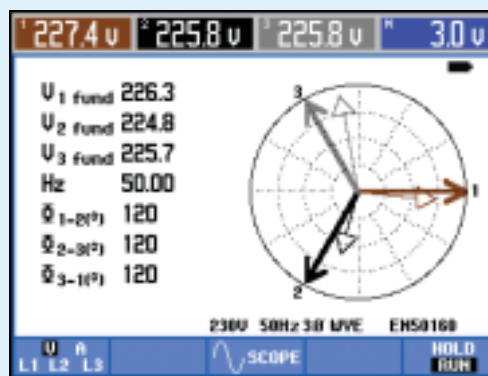
The full color display uses industry-standard color-coding (user selectable) to correlate measurements with actual wiring.



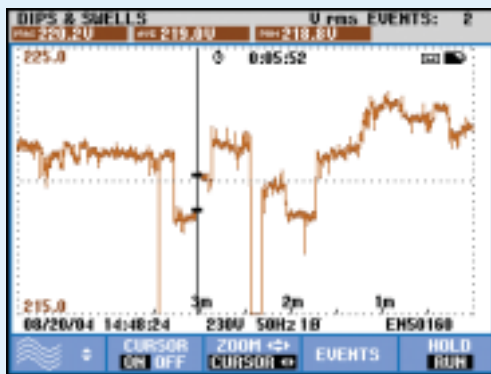
Simple menu structure with logical function grouping gives fast access to key measurements.



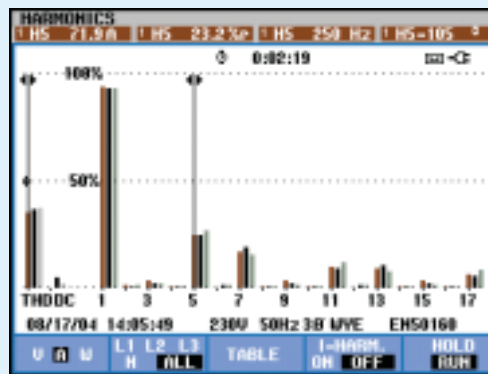
Scope view shows voltage and current waveforms for all three phases. You can toggle to a phasor diagram at any time.



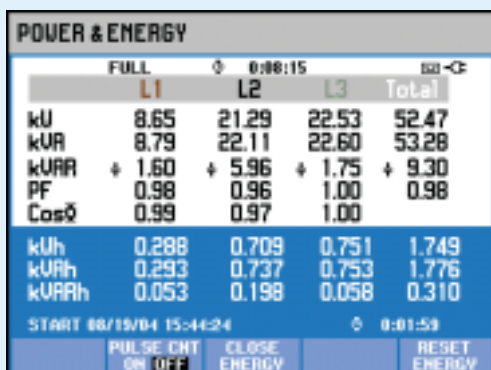
Phasor diagram shows voltage and current unbalance, and helps verify connections.



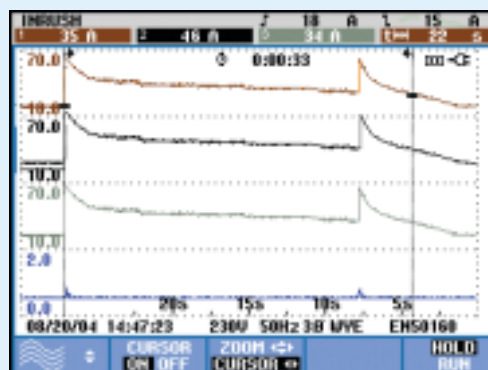
Record dips and swells as short as one half-cycle with min/max/avg readings.



Track harmonics up to the 50th, and measure and record THD in accordance with IEC61000-4-7 requirements.



Measure and record power (W), VA, and VARs. The 434 adds the ability to record energy consumption.



Inrush function captures starting current on motors and other devices to help determine trip levels.

Fluke 43B power quality analyzer

**The perfect tool for tracking down
single-phase power-related problems**

The 43B is the choice for diagnosing and troubleshooting power quality and general equipment failures. Easy to use thanks to menu selection of the power quality modes, it combines the capabilities of a power quality analyzer, a 20 MHz oscilloscope, a multimeter and a data recorder in a single instrument.

Power quality analyzer

- Measure power (W, VA, VAR) and power factor (PF, DPF)
- Calculate power and power factor on balanced 3-phase loads
- Measure voltage, current and power harmonics
- Measure dips and swells on a cycle-by-cycle basis for up to 24 hours
- Automatically capture up to 40 transients
- Measure motor inrush current and analyze using cursors



- Watts, power factor, displacement power factor ($\cos \phi$), VA and VAR
- Voltage and current waveforms

- Broad frequency range (10 to 400 Hz) for aviation, marine and railway applications
- Store up to 20 screens in memory

Oscilloscope

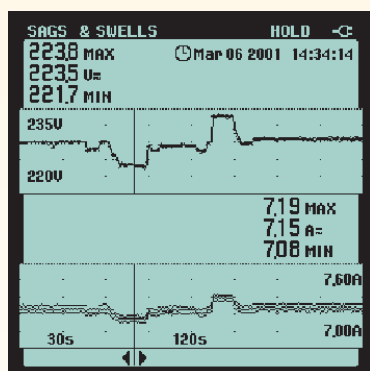
- Dual-channel, 20 MHz bandwidth digital oscilloscope
- 'Connect-and-view' automatic triggering for instant waveform display

Multimeter

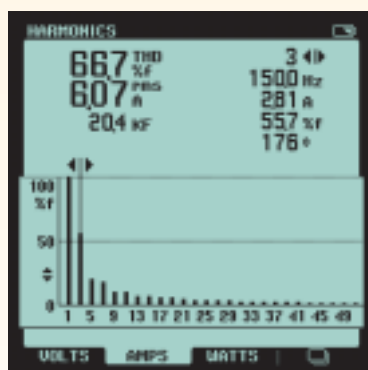
- Measure resistance, continuity and capacitance, and test diodes
- Measure temperature with optional temperature probe

Recorder

- Record 2 parameters for up to 16 days
- Record voltage, current, frequency, power, harmonics and all scope measurements
- Add cursors to analyze the trend



- Continuously measure volts and amps on a cycle-by-cycle basis for up to 16 days
- Use cursors to read time and data of dips and swells



- Voltage, current and power harmonics
- Up to the 51st harmonics
- Total harmonic distortion
- Phase angle and individual harmonics



- Connect-and-View™ scope for quick waveform display
- View voltage and current channels simultaneously



A choice of three configurations

	43Basic	43B	43Kit
Current Clamp	200 A AC	500 A AC	500 A AC
SW43W FlukeView Software		•	•
PM9080 Serial Interface Adapter Cable		•	•
C120 Hard Case		•	•
VPS40 Voltage Probe		•	
Fluke 61 IR Thermometer		•	
VR101S Voltage Event Recorder			•

All configurations are delivered with test leads, probes, clips, battery pack, banana-to-BNC adapter and line voltage adapter/battery charger.

Fluke VR101S

The smart tool for system voltage event monitoring

The VR101S is designed for electricians and technicians who need to be able to detect dips, swells, transients down to 1 μ s, outages and frequency variations on single-phase mains. Featuring user-selectable capture limits that are downloaded from a PC using Fluke EventView™ software and optical interface cable (both supplied), the VR101S is simply plugged into the outlet under test.

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It can store as many as 4000 out-of-limits events, which can be uploaded to the PC for a complete history of voltage events that occurred since the unit was plugged into the outlet. A voltage event recorder is available separately (without software and interface cable).

Ordering information

Detailed specifications, included and optional accessories can be found in the technical datasheet and on the Fluke website.

Fluke 433UGK Upgrade Kit for the Fluke 433

- Advanced functions upgrade (Inter-harmonics, energy, transient display and inrush current, data memory extension)
- FlukeView SW43W
- USB Optical Cable OC4USB

Fluke 433AF Advanced functions upgrade for the Fluke 433

- Advanced functions upgrade (Inter-harmonics, energy, transient display and inrush current, data memory extension)

Fluke 433	Power Quality Analyzer (three-phase)
Fluke 434	Power Quality Analyzer (three-phase)
Fluke 433UGK	Upgrade Kit for Fluke 433
Fluke 433AF	Advanced Functions Upgrade Kit for Fluke 433
Fluke 43Basic	Power Quality Analyzer (single-phase)
Fluke 43B	Power Quality Analyzer (single-phase)
Fluke 43Kit	Power Quality Analyzer (single-phase)
OC4USB	Serial Interface Adapter/Cable (USB)
PM9080	Serial Interface Adapter/Cable (RS232)
SW43W	FlukeView Software
Fluke VR101	Voltage Event Recorder
Fluke VR101S	Voltage Event Recorder System



Fluke 43B plus included accessories



Fluke 434 plus included accessories



Fluke has a wide understanding of power quality applications. Our broad range includes power quality calibrators, 3-phase power recorders and handheld power quality analyzers.

Fluke. Keeping your world up and running.

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