FLUKE®

Fluke 430 Series

Three-Phase Power Quality Analyzers

Technical Data

Pinpoint power problems faster, safer and in greater detail

The Fluke 434 and 435 three-phase power quality analyzers help you locate, predict, prevent and troubleshoot problems in three- and single-phase power distribution systems. Troubleshooting is faster with on-screen display of trends and captured events, even while background recording continues. The new IEC standards for flicker, harmonics and power quality are built right in to take the guess work out of power quality.

- **Troubleshoot real-time:** Analyze the trends using the cursors and zoom tools-even while background recording continues
- **Highest safety rating in the industry:** 600 V CAT IV/1000 V CAT III rated for use at the service entrance
- **Automatic Transient Mode:** Capture 200 kHz waveform data on all phases simultaneously up to 6 kV
- **Fully Class-A compliant:** Conduct tests according to the stringent international IEC 61000-4-30 Class-A standard
- **Measure all three phases and neutral:** With included four current probes
- **AutoTrend:** Every measurement you see is always automatically recorded, without any setup
- **System-Monitor:** Up to ten power quality parameters on one screen according to EN50160 power quality standard
- **Inrush mode:** For troubleshooting nuisance circuit breaker tripping
- **View graphs and generate reports:** With included analysis software
- **Logger function:** Configure for any test condition with memory for over 400 parameters at user defined intervals
- **Mains signaling:** Measure interference from ripple control signals at specific frequencies
- **Battery Life:** Seven hours operating time per charge on NiMH battery pack
- **Warranty:** Rugged, handheld troubleshooter with Fluke three-year warranty

Applications

Frontline troubleshooting – quickly diagnose problems on-screen to get your operation back online
Predictive maintenance – detect and prevent power quality issues before they cause downtime
Quality of service compliance – validate incoming power quality at the service entrance
Long-term analysis – uncover hard-to-find or intermittent issues
Load studies – verify electrical system capacity before adding loads
Energy assessments – quantify energy consumption before and after improvements to justify energy saving devices

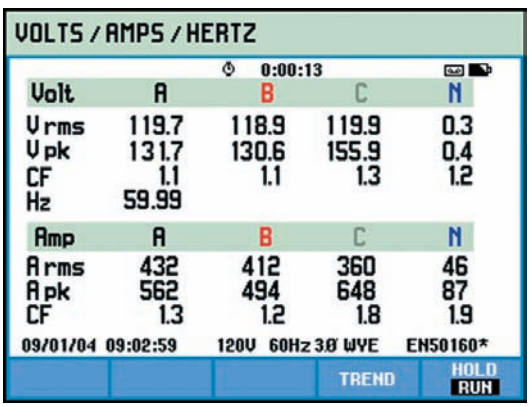
Measure all power parameters, find events and anomalies in seconds

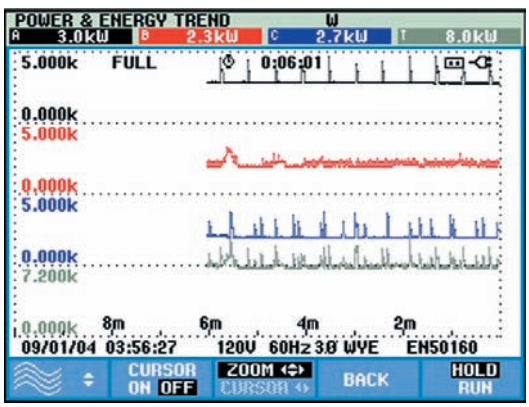
CAT IV 600 V and CAT III 1000 V safety rating

Designed to help protect you and your equipment, the Fluke 430 Series analyzers and accessories are all certified to meet the stringent standards for use in CAT IV 600 V and CAT III 1000 V environments. They are the first tools of their kind to carry the CAT IV rating for use in power connections and outlets throughout a low-voltage power distribution system.

Troubleshoot real-time

AutoTrend feature provides fast insight into changes over time. Every displayed reading is automatically recorded without having to set thresholds or intervals. Analyze the trends using the cursors and zoom tools—even while background recording continues.





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.

What is Class-A conformity?

Power quality measurement is a relatively new, and quickly evolving field. There are hundreds of manufacturers around the world with unique measurement methodologies. Whereas basic single- and three-phase electrical measurements like rms voltage and current were defined long ago, many power quality parameters were not previously defined, forcing manufacturers to develop their own algorithms. With so much variation between instruments, electricians tend to waste too much time trying to understand an instrument's capabilities and measurement algorithms instead of understanding the quality of the power itself!

The new IEC 61000-4-30 Class-A standard takes the guesswork out of selecting a power quality instrument. The standard IEC 61000-4-30 defines the measurement methods for each parameter to obtain reliable, repeatable and comparable results. In addition, the accuracy, bandwidth and minimum set of parameters are all clearly defined.

Fully Class-A compliant

The Fluke 435 is fully compliant with the new IEC 61000-4-30 Class-A standard. With this powerful capability, all measurements will be consistent and reliable in accordance with the latest international standard.

IEC 61000-4-30 Class-A Compliance

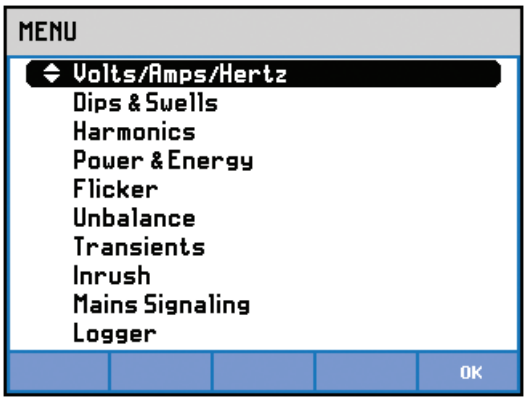
	435	434
Measurement algorithms	•	•
Voltage accuracy	0.1 % of Vnom	0.5 % of Vnom
Time synchronization	optional with GPS430 accessory	

Measures everything

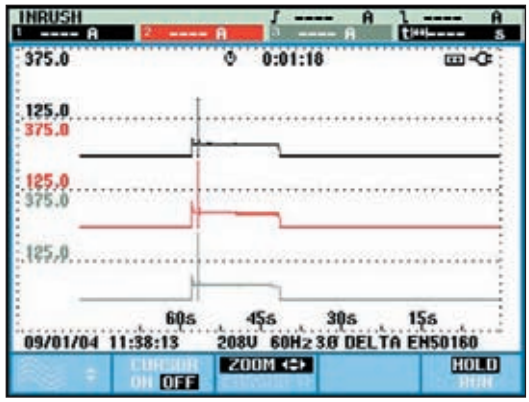
Measure true-rms and peak voltage and current, frequency, dips and swells, transients, interruptions, power and power consumption, peak demand, harmonics up to the 50th, interharmonics, flicker, mains signaling, inrush and unbalance.

Logger: record the detail you need

User-configurable, long-term recording of MIN, MAX and AVG readings for up to 100 parameters on all 4 phases. Enough memory is available to record 400 parameters for up to a month with 10 minute resolution, or capture smaller variations with resolution down to 0.5 seconds.



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



Inrush function automatically triggers off of current, and captures start up measurements on motors and other devices to help determine trip levels.

Automatic transient display

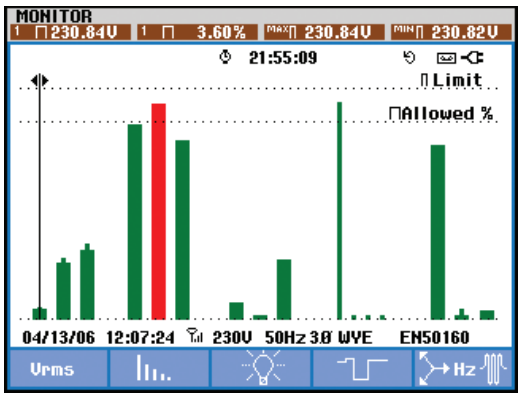
Every time an event or voltage distortion is detected, the instrument triggers and automatically stores voltage and current waveforms on all three phases and neutral. The analyzer will also trigger when a certain current level is exceeded. Up to 40 dips, swells, interruptions and transients can be captured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

System-Monitor: Summary screen of overall power quality health

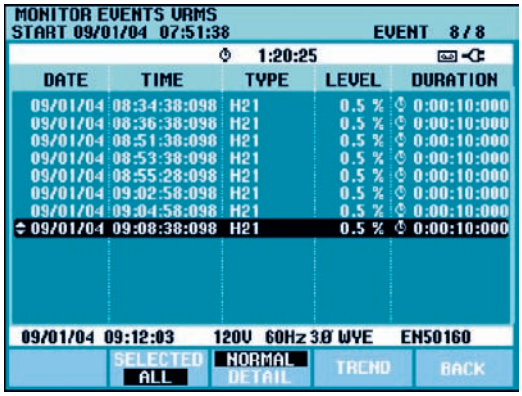
A single push of the MONITOR button delivers a dashboard display of rms voltage, harmonics, flicker, interruptions, rapid voltage changes, swells, unbalance, frequency and mains signaling. The dashboard is updated live, showing compliance of each parameter to EN50160 limits or your own limits. Color-coded bars clearly show which parameters are inside (pass) or outside limits (fail). During a monitor session, you can easily drill down to more detail of any parameter to view and capture its trend for a report.

Extensive data analysis possibilities

The Fluke 430 Series provides three ways to analyze measurements. Cursors and zoom tools can be used 'live' while taking measurements, or 'off line' on stored measurement data. Additionally, the stored measurements can be transferred to a PC with the included software to perform custom analysis and create reports. Measurement data can also be exported to common spreadsheet programs. Store up to 10 measurement datasets and up to 50 screen captures for use in reports.



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

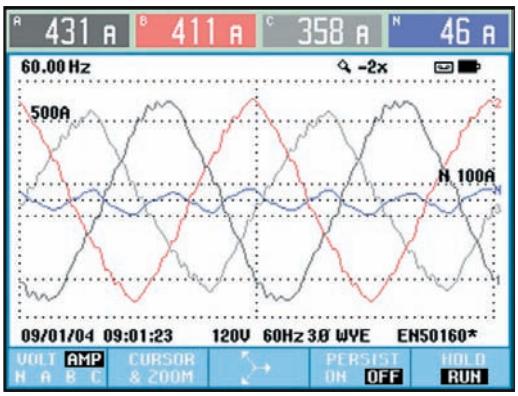


A detailed list is given of all events falling outside the set limits. By scrolling through the events list and selecting an event, the event can be analyzed in detail.

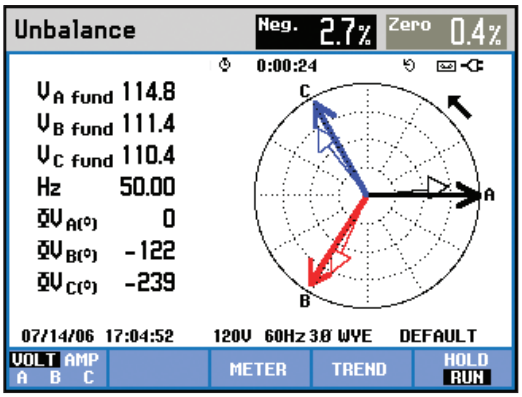
Perform custom analysis and create reports with included software. Measurement data can also be exported to common spreadsheet programs.

Easy-to-use

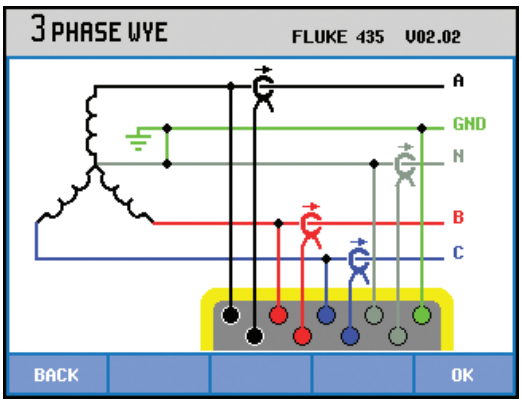
Pre-programmed setups and user-friendly screens make power quality testing as simple as you would expect from Fluke. The high-resolution color screen updates every 200 mS and displays waveforms and wiring diagrams color coded to industry standards. Handy on-screen wiring diagrams for all commonly used three-phase and single-phase configurations guide you through connections.



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



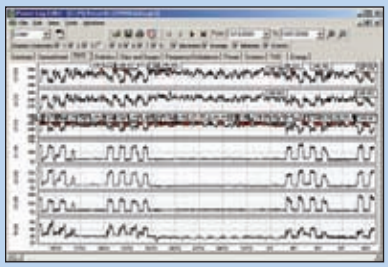
Phasor diagram shows voltage and current unbalance, and helps verify connections.



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

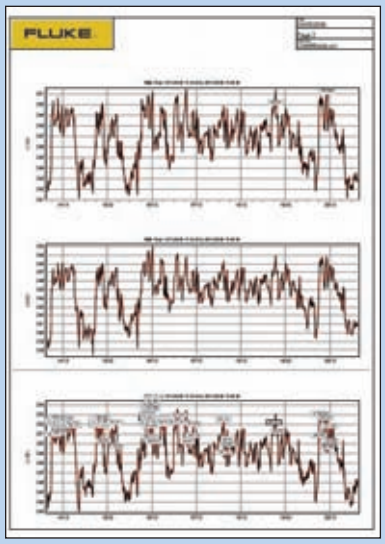
Generate reports and view graphs with Fluke Power Log Software

Designed to quickly view recorded data, the included Power Log software displays all recorded parameters on interactive trends. Generate a professional report with the 'Report Writer' function, or copy and paste images into report document manually.



View recorded data in simple graphs and tables.

Easily customize the report by selecting time period and measurements to include.



Create professional reports quickly and easily.

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Technical specifications

The specifications of the instrument are verified using the "implementation verification" table 3 as specified in IEC 61000-4-30 2002 Chapter 6.2. Accuracy is specified in % of reading unless otherwise specified. Specifications are valid for models Fluke 435 and Fluke 434 unless otherwise specified.

Input characteristics

Voltage inputs	
Number of inputs	4 (3 phases + neutral) dc-coupled
Maximum input voltage	1000 Vrms
Nominal voltage range	50 V to 500 V according IEC 61000-4-30. Selectable from 1 V to 1000 V.
Maximum peak measurement voltage	6 kV
Input impedance	4 MΩ//5 pF
Bandwidth	> 10 kHz, up to 100 kHz for transient display
Scaling	1:1, 10:1, 100:1, 1000:1 and variable
Current inputs	
Number of inputs	4 (3 phases + neutral) dc-coupled
Type	Clamp on current transformer with mV output
Range	1 Arms to 400 Arms with included clamps (i400s/Fluke 434) 30 A to 3000 Arms with included clamps (i430-flex/Fluke 435) 1 Arms to 3000 Arms with optional clamps
Input impedance	50 kΩ
Bandwidth	> 10 kHz
Scaling	0.1, 1, 10, 100, 1000 mV/A, variable, i5s and i430-flex
Nominal frequency	40 Hz to 70 Hz
Sampling system	
Resolution	16 bit analog to digital converter on 8 channels
Maximum sampling speed	200 kS/s on each channel simultaneously
RMS sampling	5000 samples on 10/12[2] cycles according IEC 61000-4-30
PLL synchronization	4096 samples on 10/12[2] cycles according IEC 61000-4-7

Display modes

Waveform display	Available in Scope and Transient mode Captures 8 waveforms simultaneously Display update rate 5x per second Up to 10/12[2] times horizontal zoom Cursors: single vertical line showing min, max, avg reading at cursor position
Phasor	Shows real time phasor diagram Available in Scope and Unbalance mode Display update rate 5x per second
Meter readings	Available in Volts/Amps/Hertz, Harmonics, Power and Energy, Flicker, Unbalance and Logger[4] mode
AutoTrend graph	Available in Volts/Amps/Hertz, Dips and Swells, Harmonics, Power and Energy, Flicker, Unbalance, Inrush, Mains Signaling[4] Logger[4] and Monitor mode Cursors: single vertical line showing with min, max, avg reading at cursor position
Bargraph	Available in Harmonics and Monitor mode
Event list	Available in Dips and Swells, Mains Signaling[4], Logger[4] and Monitor mode

Measurement modes

Scope	Vrms, Arms, Vcursor, Acursor, Vfund, Afund, Hz, V phase angles, A phase angles
Volts/Amps/Hertz	Vrms, Vpk, V Crest Factor, Arms, Apk, A Crest Factor, Hz
Dips and swells	Vrms ½, Arms ½ Captures up to 1000 events with date, time, duration, magnitude and phase identification with programmable thresholds
Harmonics dc, 1 to 50	Harmonic Volts, THD Volt, Harmonic Amps, THD Amps, K Amps, Harmonic Watts, THD Watts, K Watts, Interharmonic Volts[4], Interharmonic Amps[4] (relative to fundamental or to total rms)
Power and energy	Watts, VA, VAR, Power factor, Cos φ/DPF, Arms, Vrms, kWh, kVAh, kVARh, peak demand interval using trend, KYZ revenue meter verification via optional input.
Flicker	$Pst(_{1min})$, Pst, Plt, PF5, Vrms ½, Arms ½, Dc, Dmax, TD
Unbalance	Vneg, Vzero, Aneg, Azero, Vfund, Afund, Hz, V phase angles, A phase angles
Transients	Vrms, Arms, Vcursor, Acursor
Inrush currents	Inrush Current, Inrush duration, Arms ½, Vrms ½
Mains signaling[4]	Relative signaling voltage and absolute signaling voltage averaged over three seconds for two selectable frequencies
Logger[4]	Measures and records up to 100 parameters on all 4 phases simultaneously with selecable averaging time Captures up to 10000 events with date, time, duration, magnitude and phase identification with programmable thresholds
System monitor	Vrms, Arms, Harmonic Volts, THD Volts, Plt, Vrms ½, Arms ½, Vneg, Hz, dips and swells, unbalance All parameters are measured simultaneously in accordance with EN50160 Using Flagging to indicate unreliable readings according IEC61000-4-30

Accuracy, resolution and range

	Measurement range	Resolution	Accuracy
Volt/Amps/Hertz			
Vrms (ac+dc) Fluke 435	1 Vrms to 600 Vrms 600 Vrms to 1000 Vrms	0.01 Vrms 0.01 Vrms	± 0.1 % of nominal voltage ± 0.1 %
Fluke 434	1 Vrms to 1000 Vrms	0.1 Vrms	± 0.5 % of nominal voltage
Vpk	1 Vpk to 1400 Vpk	1 V	5 % of nominal voltage
Voltage Crest Factor (CF)	1.0 to > 2.8	0.01	± 5 %
Arms (ac+dc) Fluke 435	0 kArms to 20.00 kArms[1]	0,001 Arms to 10 Arms[1]	± 0.5 % ± 5 counts[3]
Fluke 434	0 kArms to 20.00 kArms[1]	0,001 Arms to 10 Arms[1]	± 1 % ± 5 counts[3]
Fluke 434 with i400s	0 Arms to 40/400 Arms	0.1 and 1 Arms	± 1 % ± 5 counts[3]
Fluke 435 with i430Flex	30 Arms to 3000 Arms	1 Arms	± 0.5 % ± 20 counts[3]
Apk using 1 mV/A scaling	0 Apk to 5500 Apk	1 A	± 5 %
A Crest Factor (CF)	1 to 10	0.01	± 5 %
Hz[5] Fluke 435 @ 50 Hz nominal	42.500 Hz to 57.500 Hz	0.001 Hz	± 0.01 Hz
Fluke 435 @ 60 Hz nominal	51.000 Hz to 69.000 Hz	0.001 Hz	± 0.01 Hz
Fluke 434 @ 50 Hz nominal	42.50 Hz to 57.50 Hz	0.01 Hz	± 0.01 Hz
Fluke 434 @ 60 Hz nominal	51.00 Hz to 69.00 Hz	0.01 Hz	± 0.01 Hz
Dips and swells			
Vrms½ (ac+dc) Fluke 435	0.0 % to 200 % of nominal voltage	0.1 Vrms	± 0.2 % of nominal voltage ± 1 % of nominal voltage
Fluke 434	0.0 % to 200 % of nominal voltage	0.1 Vrms	
Arms½ (ac+dc) Fluke 435	0 Arms to 20,000 Arms[1]	0,001 Arms to 10 Arms	± 1 % ± 10 counts[3]
Fluke 434	0 Arms to 20,000 Arms[1]	0,001 Arms to 10 Arms	± 2 % ± 10 counts[3]
Fluke 434 with i400s	0 Arms to 400 Arms	0.1 Arms and 1 Arms	± 2 % ± 10 counts[3]
Fluke 435 with i430Flex	30 Arms to 3000 Arms	1 Arms	± 1 % ± 20 counts[3]
Threshold levels	Programmable thresholds in percent of nominal voltage Event detection based upon ½ cycle rms voltages Captures dips, swells, interruptions and rapid voltage changes		
Duration	hhh,mm,ss,mmm	Half cycle	One cycle

Accuracy, resolution and range cont.

	Measurement range	Resolution	Accuracy
Harmonics			
Harmonic order (n)	DC, 1 to 50 grouping: harmonic groups according to IEC 61000-4-7		
Inter-Harmonic order	Off, 1 to 49 grouping: harmonic and interharmonic subgroups according to IEC 61000-4-7		
Vrms Relative (%f): Fluke 435 Absolute: Fluke 434 Absolute:	0.0 % to 100.0 % 0.0 Vrms to 1000 Vrms 0.0 Vrms to 1000 Vrms	0.1 % 0.1 Vrms 0.1 Vrms	± 0.1 % ± n x 0.1 % (± 0.4 % for %r) ± 0.05 % of nominal voltage if < 1 % of nominal voltage ± 5 % if ≥ 1 % of nominal voltage ± 5 % ± 2 counts
Arms Relative (%f): Absolute:	0.0 % to 100.0 % 0.0 mV to 4000 mV x clamp scaling	0.1 % 1 mVrms x clamp scaling	± 0.1 % ± n x 0.1 % (± 0.4 % for %r) ± 5 % ± 5 counts
Watts Relative: (Harmonics only) Absolute:	0.0 % to 100.0 % depends on clamp and voltage scaling	0.1 %	± n x 2 % ± 5 % ± n x 2 % ± 10 counts
DC Relative: Fluke 435 Absolute V: Fluke 434 Absolute V: Absolute A: Absolute W:	0.0 % to 100.0 % 0.0 V to 1000 V 0.0 V to 1000 V 0.0 mV to 4000 mV x clamp scaling depends on clamp and voltage scaling	0.1 % 0.1 V 0.1 V 1 mVrms x clamp scaling 0.1 V depends on scaling	± 0.1 % V and A (± 2 % Watt) ± 0.2 % of nominal voltage ± 5 % ± 10 counts ± 5 % ± 10 counts ± 5 % ± 10 counts
$THD_{(n=40)}$ (relative %f or %r)	0.0 % to 100.0 %	0.1 %	± 2.5 % V and A (± 5 % Watt)
Hz	0 Hz to 3500 Hz	1 Hz	± 1 Hz
Phase angle Fluke 435 Fluke 434	-360 ° to +0 ° -360 ° to +0 °	1 ° 1 °	± n × 1 ° ([8]) ± n × 1.5 ° ([8])
Power and energy			
Watt (VA, VAR) Fluke 435 Fluke 434	1.0 MW to 20.00 MW[1] 1.0 MW to 20.00 MW[1]	0.1 kW to 1 kW[1] 0.1 kW to 1 kW[1]	± 1 % ± 10 counts[3] ± 1.5 % ± 10 counts[3]
kWh[6] (kVA[6], kVAR[6])	00.00 kWhr to 200.0 GWhr[1] 00.00 kWhr to 200.0 GWhr[1]	0.01 Xhr to 100 Whr[1] 0.01 Whr to 100 Whr[1]	± 1 % ± 10 counts[3] ± 1.5 % ± 10 counts[3]
Power Factor	0 to 1	0.01	± 0.033
Cos φ/DPF	0 to 1	0.01	± 0.033
Flicker			
Pst (1min), Pst, Plt, PF5 instantenous Flicker	0.00 to 20.00	0.01	Within ± 5 % of tabulated values according IEC61000-4-15
Dc%, Dmax% and Time d(t) exceeds limits as described per IEC 61000-3-3	0.0 % to ± 100.0 % for Dc% and Dmax% and 0.000 s to 9.999s for Time	0.1 % for Dc% and Dmax% and 10 ms for Time	± 1 % for Dc% and Dmax% and 20 ms for Time
Unbalance			
Volts Fluke 435 (neg. and zero seq.) Fluke 434 (neg. and zero seq.)	0.0 % to 5.0 % 0.0 % to 5.0 %	0.1 % 0.1 %	± 0.15 % ± 0.5 %
Current (neg. and zero seq.)	0.0 % to 20 %	0.1 %	± 1 %
Phase angle volts current	-360.0 ° to 0.0 ° -360.0 ° to 0.0 °	0.1 ° 0.1 °	± 2 counts ± 5 counts[3]
Transient capture			
Volts cursor reading rms reading	± 6000 Vpk 10 Vrms to 1000 Vrms	1 V 1 V	± 15 % of cursor reading ± 2.5 % of Vnominal
Minimum detect duration	5 µs		
Sampling rate	200 kS/s		
Inrush mode			
Arms (ac+dc)	0.000 kArms to 20.00 kArms[1]	0.001 Arms to 10 Arms[1]	± 1 % of meas ± 5 counts
Inrush Duration	mm:ss:mmm between 7.5 s to 30 minutes selectable	10 ms	± 20 ms (Fnominal = 50 Hz)
Mains Signaling[4]			
Threshold levels	Thresholds, limits and signaling duration is programable for two independent signaling frequencies		
Signaling frequency	60 Hz to 3000 Hz	0.1 Hz	
Relative V%	0 % to 100 % of Vnominal	0.1 %	± 0.4 %
Absolute V3s (3 second average)	0.0 V to 1000 V	0.1 V	± 5 % of nominal voltage

Trend recording

Method	AutoTrend automatically records min, max and average values over time for all readings being displayed for the 3 phases and neutral simultaneously										
Volts/Amps/Hertz, Harmonics, Power and Energy, Flicker, Unbalance and Mains Signaling[4] mode											
Sampling	5 readings/sec continuous sampling per channel										
Recording time	From 30 min with 1 second display resolution up to 450 days with 6 hour display resolution.										
Zoom	Up to 6x horizontal zoom										
Memory	1800 min, max and avg points for each reading										
Duration	30 min.	2.5 hrs	7.5 hrs	15 hrs	30 hrs	150 hrs	450 hrs	900 hrs	75 d	225 d	450 d
Resolution	1 s	5 s	15 s	30 s	60 s	5 min.	15 min.	30 min.	1 hr	3 hrs	6 hrs
Dips and Swells mode											
Sampling	100/120[2] readings/sec continuous sampling per channel										
Recording time	From 90 sec with 25 msec display resolution up to 450 days with 3 hr display resolution										
Zoom	Up to 12x horizontal zoom										
Memory	3600 min, max and avg points for each reading										
Duration	90 s	180 s	6 min.	12 min.	30 min.	1 hr	2.5 hrs	7.5 hrs	15 hrs	30 hrs	
Resolution	25 ms	50 ms	100 ms	200 ms	500 ms	1s	2.5 s	7.5 s	15 s	30 s	
Inrush currents and flicker PF5 mode											
Sampling	100/120[2] readings/sec continuous sampling per channel										
Recording time	From 7.5 sec with 25 msec display resolution up to 30 min with 500 msec display resolution for Inrush measurements and up to 2 hr with 2.5 sec display resolution for PF5 recordings										
Zoom	Up to 12x horizontal zoom										
Memory	3600 min, max and avg points for each reading										
Duration	7.5 s	15 s	30 s	90 s	180 s	6 min.	12 min.	30 min.			
Resolution	25 ms	25 ms	25 ms	25 ms	50 ms	100 ms	200 ms	500 ms			
Logger mode											
Sampling	Combination of 5 readings/sec and 100/120[2] readings/sec continuous sampling per channel depending on the parameter measured										
Recording time	Depends on selected readings and averaging time										
Zoom	Two zoom positions, display all or 1x										
Memory	User configurable shared memory, up to 15 MB on Fluke 435, up to 7 MB on Fluke 434[4]										
No. of readings on 3 phases + N	1			10			100				
Averaging time	0.5 s	10 min.	2 hrs	0.5 s	10 min.	2 hrs	0.5 s	10 min.	2 hrs		
Max[7] duration using 15 MB	66 hrs	9 years	100 years	6 hrs	333 days	10 years	18 min.	31 days	1 year		
Monitor mode											
Sampling	Combination of 5 readings/sec and 100/120[2] readings/sec continuous sampling per channel depending on the parameter measured										
Recording time	Up to 1 week with 10 min resoluton										
Memory	1008 min, max and avg points for each reading, 10 minute resolution										
Limits	According EN50160 or customer definable										

Measurement method

Vrms, Arms	10/12[2] cycle contiguous non overlapping intervals using 500/416[2] samples per cycle in accordance with IEC 61000-4-30
Vpeak, Apeak	Absolute highest sample value within 10/12[2] cycle interval with 40 µs sample resolution
V Crest Factor	Measures ratio between the Vpeak and Vrms
A Crest Factor	Measures ratio between the Apeak and Arms
Hz	Measured every 10 sec in accordance with IEC61000-4-30
Vrms½, Arms½	Value is measured over 1 cycle, commencing at a fundamental zero crossing, and refreshed each half-cycle. This technique is independent for each channel in accordance with IEC 61000-4-30.
Harmonics	Calculated from 10/12-cycle gapless harmonic group measurements on Voltage and Amps according to IEC 61000-4-7
Watt	Selectable Total or Fundamental real power display Calculates average value of instantaneous power over 10/12 cycle period for each phase Total Active Power $P_T = P_1 + P_2 + P_3$

Measurement method cont.

VA	Selectable total or fundamental apparent power display Calculates apparent power using Vrms x Arms value over 10/12 cycle period Total apparent power is root mean square of real and reactive power
VAR	Selectable total of fundamental reactive power display Calculates reactive power as root of VA squared minus watt squared over 10/12 cycle period Capacitive and inductive load is indicated with capacitor and inductor icons
Power Factor	Calculated watt/VA
Cos φ/DPF	Cos of angle between fundamental voltage and current
Unbalance	The supply voltage unbalance is evaluated using the method of symmetrical components according to IEC61000-4-30
Flicker	According to IEC 61000-4-15 flickermeter—functional and design specification Includes 230 V 50 Hz lamp and 120 V 60 Hz lamp models
Transient capture	Captures waveform triggered on signal envelope Additionally triggers on dips, swells, interruptions and Amps level as specified by IEC61000-4-30
Inrush current	The inrush current begins when the Arms half cycle rises above the inrush threshold, and ends when the Arms half cycle rms is equal to or below the inrush threshold minus a user-selected hysteresis value. The measurement is the square root of the mean of the squared Arms half cycle values measured during the inrush duration. Each half-cycle interval is contiguous and non-overlapping as recommended by IEC 61000-4-30. Markers indicate inrush duration. Cursors allow measurement of peak Arms half cycle.
Mains signaling	Measurements are based on: either the corresponding 10/12-cycle rms value interharmonic bin or the rms of the four nearest 10/12-cycle rms value interharmonic bins per IEC 61000-4-30 Limit setup for Monitor mode follows EN50160 "Meistercurve"
Time synchronization	Optional GPS430 timesync module provides time uncertainty ≤ 20 ms or ≤ 16.7 ms^2 for time tagging of events and time aggregated measurements. When synchoronisation becomes unavailable, time tolerance is ≤ 1-s/24h

Wiring configurations

1Ø + NEUTRAL	Single phase with neutral
1Ø SPLIT PHASE	Split phase
1Ø IT NO NEUTRAL	Single phase system with two phase voltages without neutral
3Ø WYE	Three phase four wire system WYE
3Ø DELTA	Three phase three wire system Delta
3Ø IT	Three phase system without neutral WYE
3Ø HIGH LEG	Four wire three phase Delta system with center tapped high leg
3Ø OPEN LEG	Open delta three wire system with 2 transformer windings
2-ELEMENT	Three phase three wire system without current sensor on phase L2/B (2 watt meter method)
2½-ELEMENT	Three phase four wire system without voltage sensor on phase L2/B

General specifications

Case	
Design	Rugged, shock proof with integrated protective holster
Drip and dust proof	IP51 according to IEC60529 when used in tilt stand position
Shock and vibration	Shock 30 g, vibration: 3 g sinusoid, random 0.03 g^2/Hz according to MIL-PRF-28800F Class 2
Display	
Type	Bright full-color LCD with CCFL backlight, 80 cd/m^2
Size	115.2 mm x 86.4 mm (4.5 in x 3.4 in)
Resolution	320 x 240 pixels
Contrast and brightness	User-adjustable, temperature compensated
Memory	
Screens	50 screen memories
Data	10 data memories for storing data including recordings
Logger	User configurable shared memory, up to 15 MB on Fluke 435, Up to 7 MB on Fluke 434[4]
Limit templates	2 preprogrammed, 2 administrator (programmable via FlukeView®), 2 user locations
Real-time clock	Time and date stamp for AutoTrend, Transient display and SystemMonitor

General specifications cont.

Mechanical	
Size	256 mm x 169 mm x 64 mm (10 in x 6.5 in x 2.5 in)
Weight	2 kg (4.5 lb)
Power	
Line power	Switchable 115 V, 230 V adapter with country specific plug
Power adapter output voltage	15 V dc to 23 V dc; use only power adapter BC430
Battery power	Rechargeable NiMH BP190 (installed)
Battery operating time	> 7 hours
Battery charging time	4 hours, 8 hours for/006 version (instrument off)
Power saving	Adjustable time for dimmed backlight with on screen power indicator
Standards	
Measurement methods used	IEC 61000-4-30 Class-A
Measurement performance	Fluke 435 IEC 61000-4-30 Class-A, Fluke 434 IEC 61000-4-30 Class-B
Power quality	EN 50160
Flicker	IEC 61000-4-15
Harmonics	IEC 61000-4-7
Cross talk	
Between V inputs	-60 dB @ nominal frequency
Voltage to current input	-95 dB @ nominal frequency
Safety	
Compliance	IEC/EN 61010-1-2001 CAN/CSA C22.2 No 61010-1-04 UL std No 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General requirements Rated: 600 V CAT IV/1000 V CAT III Pollution Degree 2
Max voltage on banana input	1000 V CAT III/600 V CAT IV
Max voltage on current BNC input	42 Vpeak
Environmental	
Operating temperature	0 °C to +50 °C (32 °F to 122 °F) battery only, 0 °C to +40 °C (32 °F to 104 °F) with adapter, within spec +15 °C to +35 °C (59 °F to 95 °F)
Storage temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Humidity	10 °C to 30 °C: 95 % RH non-condensing; 30 °C to 40 °C: 75 % RH non-condensing; 40 °C to 50 °C: 45 % RH non-condensing battery only
Maximum operating altitude	3000 m. Derate to 1000 V CAT II/600 V CAT III/300 V CAT IV above 2000 m
Maximum storage altitude	12 km
Warranty	Three-years on mainframe, one-year on included accessories
Printers and Interface	
Type	Serial, optically isolated. Compatible with PM9080 (RS-232) or OC4USB (USB)
Baud rate	1200, 2400, 9600 to 115 kB
Print out facility (B&W only)	Via optional adapter PM9080 or PAC 91
Print protocol	Epson FX/LQ, Deskjet, LaserJet , DPU-414 or PostScript

Electro Magnetic Compatibility (EMC)

Emission and immunity	EN61326-1	Fluke 434/435, including standard accessories, conforms with the EEC directive 89/336 for EMC immunity, as defined by EN61326, with the addition of the table below
Frequency	**Disturbance < 0.5 %**	**Disturbance < 10 %**
80 MHz to 400 MHz	All ranges	
400 MHz to 600 MHz	All other ranges	125 V range
600 MHz to 1 GHz	All ranges	
The Analyzer is susceptible for RF fields with a field strength of 10 V/m, between 400 MHz and 600 MHz (Performance criteria B).		

[1]Depending on clamp scaling, volt scaling 1:1
[2]50 Hz/60 Hz nominal frequency according to IEC 61000-4-30
[3]Add clamp accuracy and phase shift
[4]The logger and mains signaling function are optional for the Fluke 434 and standard on the Fluke 435
[5]Measured on reference voltage input A/L1
[6]Maximum time 9999 hours
[7]Estimated duration
[8]Add ±(n-1) x 2.5 ° for amplitude when using i430-flex-4pk

FLUKE®

Power quality analyzer selection table

	435	434*
Measures voltage, current, dips, swells, interruptions, harmonics, inter-harmonics, flicker, power, energy, transients, frequency, unbalance, inrush, EN50160 overview	•	•
Logger function with multi-parameter logging	•	optional*
Mains signaling	•	optional*
Memory size	16 MB	8 MB
Current probes	3000 A flexible (4)	40 A/400 A clamp (4)
Carrying case	water-tight hard case with rollers	rugged hard case
Software	Fluke Power Log and FlukeView®	FlukeView®

*Optional functionality can be added with upgrade kit.

Ordering information

Fluke-435	Three-Phase Power Quality Analyzer
Fluke-434	Three-Phase Power Quality Analyzer

Optional accessories

i400s	40 A/400 A switchable current clamp (included w/434)
I5sPQ3	3 pack of 5 A precision current clamps
i430-flex-4pk	4 pack of 3000 A flexible current probes (included w/435)
C435	Water-tight hard case with rollers (included w/435)
GPS430	GPS time synchronization module for Fluke 430 series
Fluke 434/LOG	Upgrade kit for 434, includes Power Log software and enables logger and mains signaling function (accuracy and memory not upgradeable)

435 Includes: Hard carrying case with rollers, four flexible current probes (i430-flex), five test leads and clips, battery charger, FlukeView software, Power Log software, optical USB cable, color localization set, Getting Started manual, Users manual on CD-ROM.

434 Includes: Hard carrying case, four current probes (i400s), five test leads and clips, battery charger, FlukeView software, optical USB cable, color localization set, Getting Started manual, Users manual on CD-ROM.

Fluke. *Keeping your world up and running.™*

Componentes Electrónicos y Dispositivos Especiales s.a. de c.v

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