

TECHNICAL DATA

1770 Series Three-Phase Power Quality Analyzers



AUTOMATICALLY MEASURE POWER AND POWER QUALITY PARAMETERS

Critical power quality data is captured as soon as you begin a session, without extensive setup or selections

INTUITIVE USER INTERFACE

The streamlined user interface makes it easy to navigate between measurement parameters like V/A/Hz, power, dips and swells, harmonics, or power quality health at the push of a button

HIGH-SPEED VOLTAGE TRANSIENT CAPTURE

Capture damaging high-speed transients so you can mitigate their effects before equipment fails

ANALYSIS AND REPORTING

Comes standard with Fluke Energy Analyze Plus software giving you the ability to create customized reports, or leverage built-in one-click reporting to industry standards like EN 50160, IEEE 519 and GOST 33073

Automatic measurements. More flexibility. Better power quality troubleshooting.

Fluke 1770 Series Three-Phase Power Quality Analyzers eliminate the complexities of power quality logging, troubleshooting, and analysis. Engineered to be the faster, easier way to perform power quality studies, the 1770 Series offers automatic measurements, a straightforward user interface and setup, best-in-class specifications, and a simplified reporting platform. The instrument can also be powered directly from the measurement circuit, eliminating the need to find a power outlet or use a lengthy extension cord.

With the 1770 Series you'll never miss a critical power quality event—from fast transients up to 8 kV, harmonics up to 30 kHz, dips and swells, as well as the voltage, current, and power measurements that enable you to characterize your electrical system.

Automatic measurement capture

Whether you're performing a quick system check or a detailed power quality study, consistent data is key. The Fluke 1770 Series offers a unique automatic measurement capture system that helps ensure you're collecting the right data every time, while still giving you the flexibility to select and adjust specific parameters as needed. More than 500 power quality parameters are captured by default and the guided setup makes it easy to select the right parameters for the system you're working on. Logged data is instantly viewable, downloadable, and shareable with Fluke Energy Analyze Plus software so you never need to wait to finish a session before reviewing results or analyzing data.

Ultimate measurement confidence

The Fluke 1770 Series are 2-in-1 devices that combine the troubleshooting functionality of a power quality meter with the robust analysis and logging capabilities of a standalone power quality analyzer—in a single, easy-to-use, handheld device.

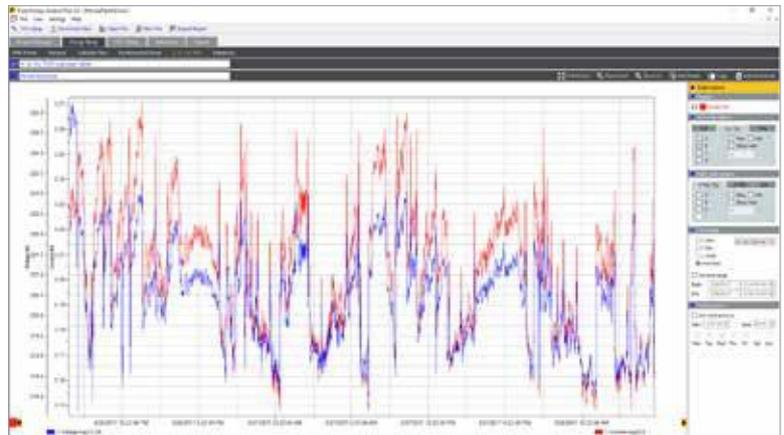
The 'PQ Meter' function gives you immediate access to live on-screen data in the field so you can quickly identify potential problems while troubleshooting. The detailed 'PQ Logging and Analysis' function eliminates the complexity of performing power quality studies by guiding you through the setup process ensuring you're capturing the right data every time. Couple these measurement modes with a unique measurement connection autocorrect function and you can be confident that you never need to worry about going back for a second measurement—even if you were unsure about what to look for when you started.

Powerful analysis software with easy-to-create reports

Fluke 1770 Series Power Quality Analyzers come standard with the powerful Fluke Energy Analyze Plus software, designed to eliminate the hassles found with other multi-purpose application software. Energy Analyze Plus helps you evaluate power quality data right out of the box and without extensive training.

Download, analyze, track, and report power quality and energy data easier than ever. Quickly compare results to historical values, benchmark against industry norms, compare measured data to local conditions, and create a more complete picture of what’s occurring across your facility, even as the data is still being collected. Energy Analyze Plus offers unified support for the Fluke 1730 Series Energy and Power Loggers, 1740 Series Power Quality Loggers, and 1770 Series Power Quality Analyzers.

- “In-workshop” and “in-the-field” download through PC application software
- Simple data downloads using USB memory stick, WiFi, LTE, wired Ethernet, or USB cable
- Analyze every measured detail of energy consumption and power quality state-of-health with automated reporting
- One-touch reporting creates standardized reports conforming to standards like EN 50160, IEEE 519, GOST 33073 IEC 61000-2-2, or export data in PQDIF or NeQual compatible format or CSV for use with third-party software
- Advanced analysis allows the user to choose any available logged parameter and create a highly customized view of measurements for advanced data correlation



Fluke Energy Analyze Plus: Energy study tab



Fluke Energy Analyze Plus: Power quality health summary

High-speed voltage transient capture

Transients negatively impact otherwise healthy systems every day and their potential to damage your equipment can't be underestimated. Whether your system is experiencing impulsive or oscillatory transients, the results can be devastating and cause problems ranging from insulation failures to total equipment failures. The Fluke 1775 and Fluke 1777 incorporate advanced transient capture technology to help you clearly identify high-speed voltage transients, so you have the data you need to stop them in their tracks. The Fluke 1775 Power Quality Analyzer has 1MHz sampling capability to capture fast transients, while the Fluke 1777 Power Quality Analyzer has 20MHz sampling capability to capture the fastest transients in high detail.



View real-time voltage transitory events while logging for faster troubleshooting

From traditional industrial systems to renewable energy systems to electric vehicles, we've got you covered

The Fluke 1770 Series was designed to be safe and easy to use in any measurement environment. The 1770 Series allows you to capture a full range of power quality variables as well as high-speed waveforms, high-speed transients, and higher frequency harmonics, all of which are instantly viewable on the large, high-resolution screen. With a best-in-class CAT IV 600 V / CAT III 1000 V overvoltage rating, these analyzers can be used at the service entrance or downstream, measuring AC and DC inputs, and harmonics measuring up to 30 kHz. With the 1770 Series you can be confident that you'll capture the data you need to make better maintenance decisions no matter the task.



A full range of harmonics are available from the first 50 integer harmonics and from 2 kHz to 30 kHz

Applications	1773	1775	1777
Energy surveys and load testing	•	•	•
Harmonic surveys	•	•	•
Nuisance circuit breaker tripping		•	•
Power utility power quality surveys		•	•
Discovery of equipment failures caused by transients		•	•

Compliant to international standards

The Fluke 1770 Series offers the best-in-class accuracy you've come to expect from a Fluke Power Quality Analyzer in a IEC 61000-4-30 Class A edition 3 compliant package. On top of that, the 1770 Series has been engineered to meet the future requirements of Class A edition 4, for conformance to EN 50160 and IEEE 519, so you'll be prepared to tackle tomorrow's measurement requirements, today.

Work where, when, and how you want

No two days in the field are the same. You need a power quality analyzer that can go where you go and do what you need it to when you get there. With a full range of accessories and built-in features the Fluke 1770 Series makes it easier to get your job done. The slim ergonomic design and integrated hand strap make it easy to hold and the included hanging kit makes it easy to secure your analyzer inside a cabinet. The integrated internal power supply allows the unit to be powered directly from the measured circuit, while a 90-minute battery helps ensure you can still access and review data even when you aren't connected to a live system.

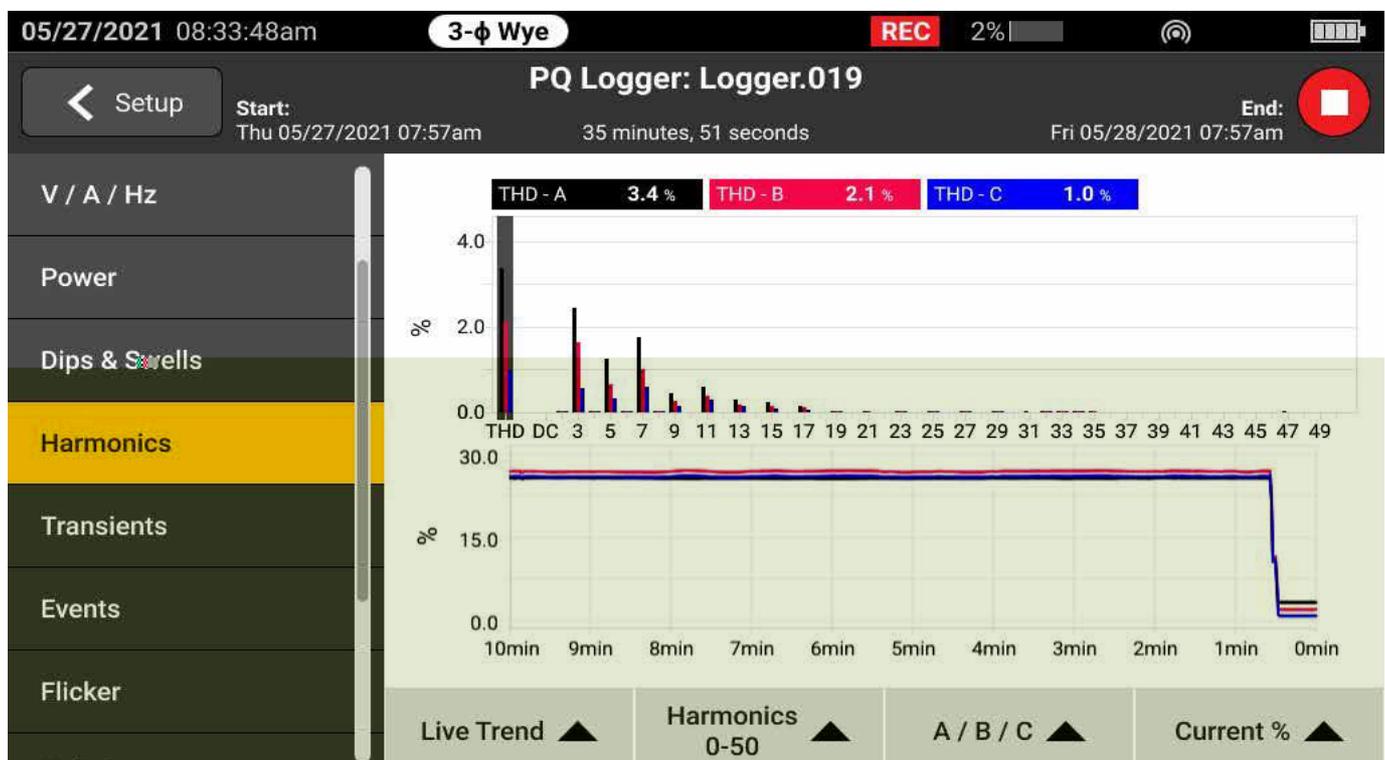
Quickly and easily transfer data to your PC using the USB C, USB A, Ethernet, WiFi, cellular network support options, depending on your requirements. With an internal GPS module and an optional double insulated external antenna, you can time sync your data for more accurate troubleshooting and analysis.

Calculate current harmonics limits

When downloading data from the Fluke 1770 Series Power Quality Analyzers the included Energy Analyze Plus software package can compare measured voltage and current harmonic statistical data to different standards, like EN 50160 or IEEE 519, to determine if they exceed compliance limits. This powerful predictive maintenance feature enables current harmonics to be observed before distortion appears in the voltage allowing you to prevent unexpected failures or non-compliance situations and increase system uptime. With the proliferation of inverter-based loads and power generation, keeping current harmonics in check is becoming increasingly critical to ensure reliable power quality and avoid system downtime.



Easily navigate using the large color touchscreen



Individual harmonics can be easily selected to view trend data as loads change

Specifications

Key features		1770 Series Three-Phase Power Quality Analyzers
Voltage inputs		
Number of inputs	4 inputs, 3 phases and neutral referenced to PE (5 connectors)	
Measurement category	1000 V CAT III / 600 V CAT IV	
Maximum input voltage	1000 V rms / 1000 V dc (1700 Vpk)	
Nominal voltage range	Wye and single phase: variable (50 V – 1000 V) Delta: Variable (100 V – 1000 V) IEC 61000-4-30 Class A compliance for the nominal voltages (V_{din}) 100 V – 690 V	
Input impedance	10 M Ω between P-P and P-N, 5 M Ω between P-PE and N-PE	
Bandwidth	DC to 30 kHz for PQ measurements, excluding transients	
Resolution	24-bit synchronous sampling	
Sampling frequency	80 kS/s at 50/60 Hz	
Scaling	1:1, variable for use of potential transformers	
Voltage transients		
Measurement range	± 8 kV	
Sampling rate	1775: 1 MS/s 1777: 1 MS/s, 20 MS/s	
Bandwidth	DC to 1 MHz	
Trigger	Adjustable trigger level. Triggers on high-frequency components > 1.5 kHz	
Resolution	14-bit synchronous sampling	
Current inputs		
Number of inputs	4 inputs 3 phases and Neutral, range selected automatically to attached sensor	
Range	AC	1 A to 1500 A with i17XX-FLEX1500 12 1 A to 1500 A with i17XX-FLEX1500 24 3 A to 3000 A with i17XX-FLEX3000 24 6 A to 6000 A with i17XX-FLEX6000 36 40 mA to 40 A with clamp i40s-EL 4 A to 400 A with clamp i400s-EL
	DC	20 A to 2000 A with 80i-2010-EL clamp
Bandwidth	DC to 30 kHz	
Resolution	24-bit synchronous sampling	
Sampling frequency	80 kS/s at 50/60 Hz	
Scaling	1:1, variable	
Input voltage	Clamp: 50 mV / 500 mV rms; CF 2.8 Rogowski Coil: 15 mV / 150 mV rms at 50 Hz, 18 mV / 180 mV rms at 60 Hz; CF 4 all at nominal probe range	
Input impedance	11 k Ω	
Aux inputs		
Wired connection with 17xx-AUX adapter		
Number of inputs	2	
Input range	Direct: 0 V dc to ± 10 V dc 0 V to 1000 V dc	
Input impedance	Direct: 2.92 M Ω	
Scale factor	Format: mx + b (gain and offset) user configurable	
Displayed units	User configurable (up to 8 characters, for example °C, psi, or m/s)	

Specifications continued

Key features		1770 Series Three-Phase Power Quality Analyzers
Data acquisition voltage and current		
Input mains frequency	DC, 50/60 Hz ±15 % (42.5 Hz ... 57.5 Hz, 51 Hz ... 69 Hz)	
Topologies	1-φ, 1-φ IT, Split phase, 3-φ delta, 3-φ wye IT, 3-φ Aron/Blondel (2 element delta), 3-φ delta open leg, 3-φ high leg delta	
Data storage	Fluke 1773/1775: 8 GB internal (expandable with microSD card) Fluke 1777: 32 GB microSD card (installed)	
Memory size	Typical 10 logging sessions of 8 weeks with 1-minute intervals and 100 events. The number of possible logging sessions and logging period depends on user requirements.	
Real-time accuracy	Internal: 3 ppm (0.26 s per day, 8 s per month) NTP (internet time): Depending on internet latency, typical < 0.1 s absolute to UTC GPS: < 1 ms absolute to UTC	
Trend interval		
Measured parameter	See operator manual	
Trend interval	User selectable: 1 sec, 3 sec, 5 sec, 10 sec, 30 sec, 1 min, 5 min, 10 min, 15 min, 30 min	
Averaging interval min/max values	Voltage, Current: ½ cycle RMS (20 ms at 50 Hz, 16.7 ms at 60 Hz) Aux, Power: 200 ms	
Total harmonic distortion	THD for voltage and current is calculated on 50 harmonics	
Power quality measurements		
Measured parameter	See operator manual	
Harmonics	h0 ... h50 % fund and RMS for voltage, current and power Phase angles for voltage and current up to h11	
Interharmonics	ih0... ih50 % fund and RMS for voltage and current	
Supraharmonics	2–9 kHz with 200 Hz bins 9–30 kHz with 2 kHz bins RMS for voltage and current	
Harmonics measurement method	Grouped, sub-grouped and single harmonic bins according to IEC 61000-4-7. Method selected automatically based on configured PQ standard or user configurable	
Total harmonic distortion	Calculated on up to 50 harmonics (depends on selected PQ standard)	
Mains signaling	2 frequencies in the range from 110 Hz to 3000 Hz	
Events	Voltage	Dip, swell, interruption, rapid voltage change, mains signaling, waveshape deviation, transients
	Current	Inrush current
Triggered recordings	Half cycle RMS of voltage and current for 10 s Waveform of voltage and current for 10/12 cycles Mains signaling: 200 ms RMS of mains signaling voltage up to 120 s Transients: Waveform of voltage (Fluke 1777: 1 MS/s or 20 MS/s, 500,000 pts, Fluke 1775: 1 MS/s, 25,000 pts)	
Standard compliance		
Power	IEEE 1459	
Harmonics	IEC 61000-4-7: Class 1 IEEE 519 (short time and very short time harmonics)	
Flicker	IEC 61000-4-15 Class F1	
Power quality	IEC 61000-4-30 Class A, IEC 62586 PQI-A-PI	
Power quality compliance	EN 50160 + GOST + NEQUAL + NETCODE + FOL	

Specifications continued

Key features	1770 Series Three-Phase Power Quality Analyzers
Interfaces	
Ethernet	1 Gbit/s 1000BASE-T
USB type A	USB 2.0 high speed for USB flash drives to transfer measurement data, firmware updates and license installation. Max. supply current: 500 mA
USB-C	USB 2.0 high speed for data download to PC and calibration (requires USB type A to USB-C or USB-C to USB-C cable) Auxiliary power supply for the Analyzer (requires USB C power adapter PD 2.0 or higher with 9 V 1.8 A support) USB 3.0 super-speed for USB-C flash drives to transfer measurement data, firmware updates and license installation. Max. supply current: 900 mA
WiFi/BLE module ¹	802.11 ac 2.4 GHz / 5 GHz, support for concurrent access point and client mode Bluetooth 5.0/BLE Antenna: Internal and external ²
LTE/4G module ³	LTE-A Cat 12 Worldwide LTE-A and UMTS/HSPA+ coverage Antenna: External ²
GPS	MCX connector to attach a GNSS antenna for GPS/GLONASS ²

¹ Not in 177X/BASIC versions

² Requires 5 m i17XX-FLEX5M-EXT extension cable

³ Availability and supported providers vary by country. Check with your local Fluke representative.

Electrical measurement accuracy

Parameter	Range	Resolution	Intrinsic Accuracy at Reference Conditions % of Reading + % of Full Scale	
Voltage	1000 V	0.1 V	0.1 % of nominal voltage in accordance with IEC 61000-4-30 Class A ^{1,2} ± (0.04 % + 0.004 %) ³	
Voltage dips and swells	-	0.1 V	0.2 % of Vnom ^{1,2}	
Voltage transients	±8 kVpk	-	± (5 % + 0.25 %)	
Voltage harmonics/interharmonics	100 %	0.1 % / 0.1 mV	≥1 % Vnom ¹ : ±2.5 % of rdg. <1 % Vnom ¹ : ±0.025 Vnom	
THD on voltage	100 %	0.1 % / 0.1 V	±(2.5 % + 0.5 %)	
Voltage distortions 2-9 kHz	Max 100 V	0.1 mV	±(2.5 % + 0.1 V)	
Voltage distortions 9-30 kHz	Max 100 V	0.1 mV	±(2.5 % + 0.1 V)	
Current (Rogowski clamp mode)	With iFlex 1500 A, i17XX-FLEX1500 24	150 A 1500 A	0.01 A 0.1 A	±(1 % + 0.02 %)
	With iFlex 3000 A, i17XX-FLEX3000 24	300 A 3000 A	0.01 A 0.1 A	±(1 % + 0.03 %)
	With iFlex 6000 A, i17XX-FLEX6000 36	600 A 6000 A	0.1 A 1 A	±(1.5 % + 0.03 %)
	With AC clamp 40 A, i40s-EL	4 A 40 A	0.001 A 0.01 A	±(0.7 % + 0.02 %)
	With AC clamp 400 A, i400s-EL	40 A 400 A	0.01 A 0.1 A	±(2 % + 0.2 %) ±(0.7 % + 0.1 %)
	With AC/DC clamp 2000 A, 80i-2010s-EL	200 A 2000 A	0.01 A 0.1 A	±(0.8 % + 0.2 %)
Current min/max	100 %	defined by accessory	x2 of intrinsic accuracy	
Current harmonics/interharmonics	100 %	0.1 % / 0.01 A	≥3 % Inom: ±2.5 % of rdg. ⁴ <3 % Inom: ±0.15 % of Inom	

General specifications

Key features	1770 Series Three-Phase Power Quality Analyzers
Warranty	Analyzer: 2 years (battery not included) Accessories: 1 year (including battery)
Calibration cycle	2 years
Size (L X W X HD)	28.0 cm x 19.0 cm x 6.2 cm (11.0 in x 7.5 in x 2.4 in)
Weight	2.1 kg (4.6 lb)
Anti-theft protection	Slot to support Kensington lock
Environmental specifications	
Operating temperature range	-10 °C to 50 °C
Storage temperature range	-20 °C to 60 °C
Operating humidity	IEC 60721-3-3: 3K5, modified: -10 °C to 30 °C: ≤95 %, no condensation or ice 35 °C: 70 % 40 °C: 55 % 50 °C: 35 %
IP Rating	IEC 60529: IP50
Vibration	IEC 60721-3-3 / 3M2
Power supply	
Voltage range	100 V – 600 V -15 % / +10 % (85 V ... 660 V)
Power consumption	Max. 40 VA
Mains frequency	50/60 Hz (42.5 Hz ... 69 Hz)
UPS	Li-Ion battery BP1770 with extended temperature range, customer replaceable On-battery runtime: 1.5 hours
Safety	
General	IEC 61010-1: Pollution Degree 2
Power supply	Overvoltage Category IV 600 V With Mains Adapter MA-C8: Overvoltage Category II 300 V
Measurement	IEC 61010-2-030: CAT IV 600 V, CAT III 1000 V
Altitudes 2000 m to 4000 m	Derate to: Power Supply: Category IV 300 V With MA-C8 Adapter: Category II 150 V Measurement: CAT IV 300 V, CAT III 600 V, CAT II 1000 V



Fluke 1777 Power Quality Analyzer. Note: Included items vary by model and are listed in the “Ordering information” table.

Ordering information¹

Quantity	Model	FLUKE-1773	FLUKE-1773/BASIC	FLUKE-1775	FLUKE-1775/BASIC	FLUKE-1777	FLUKE-1777/BASIC
1	FLUKE-1773, POWER QUALITY ANALYZER	•	•				
1	FLUKE-1775, POWER QUALITY ANALYZER			•	•		
1	FLUKE-1777, POWER QUALITY ANALYZER					•	•
4	i17XX-FLEX1500 24, FLUKE-17XX IFLEX 1500 A 24 IN, 2.0 M	•		•		•	
1	FLUKE-17XX, FLAT CABLE, VOLTAGE TEST LEAD 3-PHASE+N	•	•	•	•	•	•
4	AC285, BLACK ALLIGATOR CLIP	•	•	•	•	•	•
1	AC285, GREEN ALLIGATOR CLIP	•	•	•	•	•	•
1	BLACK 1 M USB-C CABLE	•	•	•	•	•	•
1	LINE CORD	•	•	•	•	•	•
1	FLK-17XX 0.18 M TEST LEAD SET, NONSTACK/STACK	•	•	•	•	•	•
1	GREEN TEST LEAD	•	•	•	•	•	•
1	MP1-3R/1B, MAGNET PROBE 1, 3 RED / 1 BLACK MAGNET PROBES FOR 4 MM BANANA			•		•	
1	FLUKE-174X-HANGER KIT			•		•	
1	FLUKE-177X-4204 WIFI/BLE MODULE			•		•	
1	CABLE MARKER SET (FOR VOLTAGE AND CURRENT)	•	•	•	•	•	•
1	FLUKE-174X-MA-C8 WALL OUTLET ADAPTER	•	•	•	•	•	•
1	STATEMENT OF CALIBRATION PRACTICES	•	•	•	•	•	•
1	BLACK SOFT CASE			•	•		
1	FLUKE-1777 HARDCASE					•	•

¹ Standard units include i17XX-FLEX1500 24¹ current probes and a WiFi/BLE adapter. /BASIC models do not include current probes or WiFi/BLE adapters.

Accessories

Model	Description
i17XX-FLEX1.5KIP	FLUKE-17XX IP65 flexible current probe 1.5 KA 24 IN / 60 CM
i17XX-FLEX3KIP	FLUKE-17XX IP65 flexible current probe 3 KA 24 IN / 60 CM
i17XX-FLEX6KIP	FLUKE-17XX IP65 flexible current probe 6 KA 36 IN / 90 CM
I40S-EL3X	FLUKE-17XX I40S-EL clamp-on current transformer
FLUKE-I400S-EL	17XX 400 A current clamp
80i-2010s-EL	2000 A AC/DC current clamp
MP1-3R/1B	Magnet probe 1, 3 red / 1 black magnet probes for 4 mm banana
FTP17XXPQ	Fused test probe set, 3 red/1 black
FLUKE MA-C8	Wall outlet adapter, FLUKE-174X
i17XX-FLEX5M-EXT	FLUKE-17XX IFLEX extension cable 5 M
FLUKE-177X WIFI/BLE module	WiFi/BLE module
BP1770	Battery pack (50 °C ambient)
FLUKE-17XX AUX	Auxiliary input adapter, 17XX
Black soft case	Soft case
FLUKE-1777 hardcase	IP67 rated hard case with wheels
FLUKE-PQ400	FLUKE-PQ400 POWER QUALITY WINDOW

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