TECHNICAL DATA

Fluke 120B Series Industrial ScopeMeter® handheld Oscilloscopes

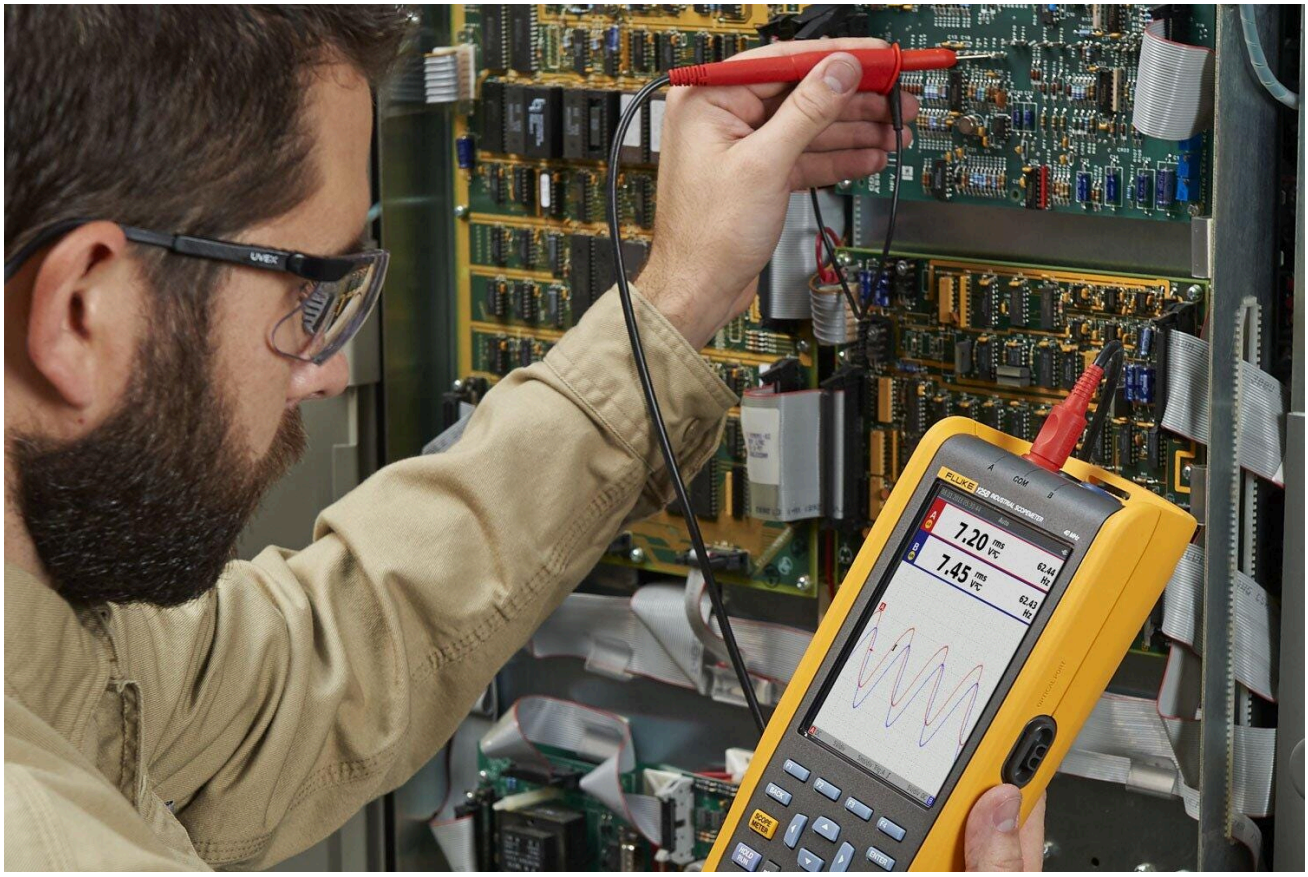
Key features

- Dual-input digital oscilloscope and multimeter in a ScopeMeter® test tool
- Available with a 40 MHz or 20 MHz oscilloscope bandwidth
- Features Connect-and-View™ trigger simplicity for hands-off operation
- Includes IntellaSet™ technology to automatically and intelligently adjust numerical readout based on measured signal
- Provides a dual-input waveform and meter reading recorder for trending data over extended periods

Product overview: Fluke 120B Series Industrial ScopeMeter® handheld Oscilloscopes

Simplified testing, more insight

The compact ScopeMeter® 120B Series, is the rugged oscilloscope solution for industrial electrical and electro-mechanical equipment troubleshooting and maintenance applications. It's a truly integrated test tool, putting the functions of an oscilloscope, multimeter, and high-speed recorder into one, easy-to-use instrument. The ScopeMeter 120B Series also integrates with Fluke Connect® mobile app and FlukeView® for ScopeMeter software to enable further collaboration, data analysis, and archiving of critical test information.



Faster electro-mechanical troubleshooting

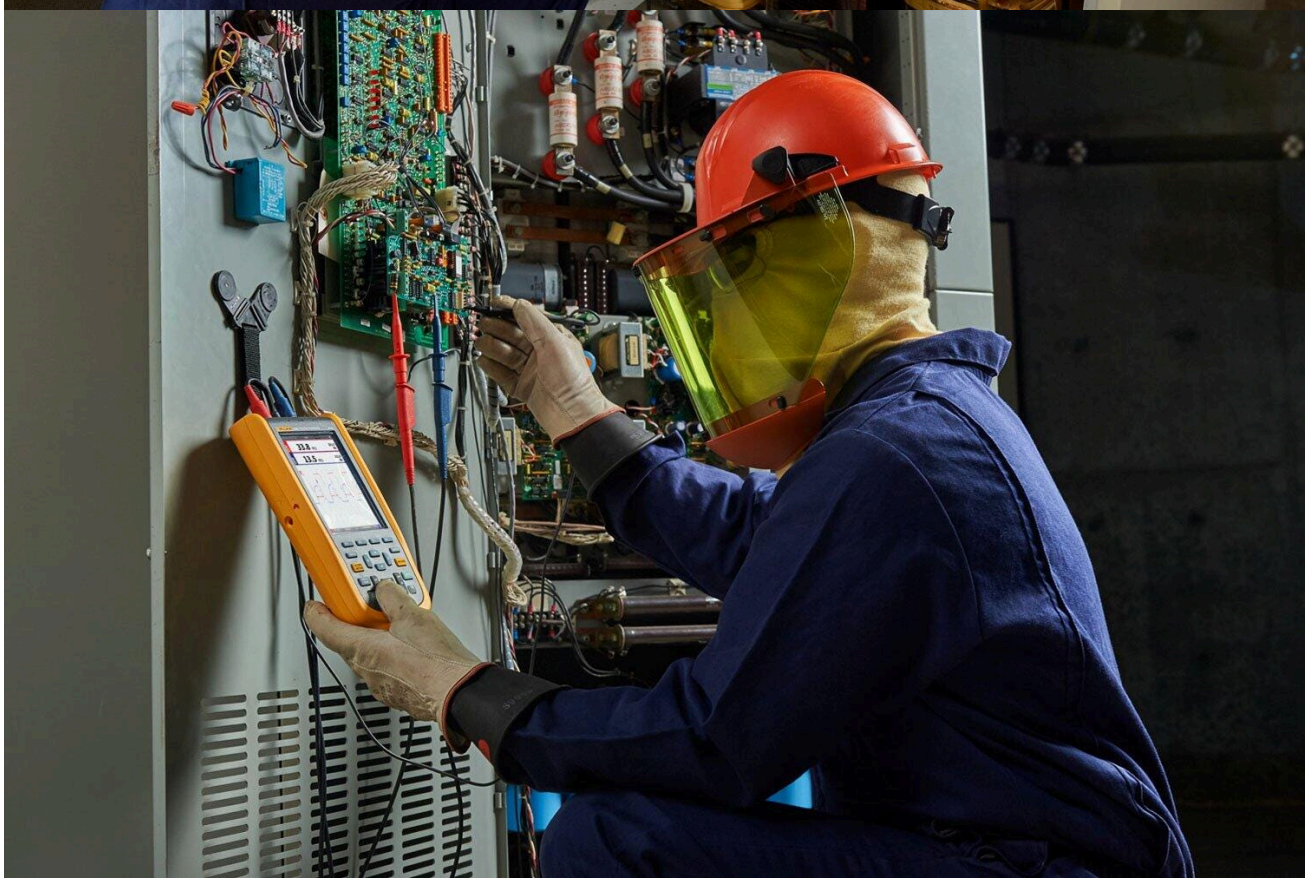
Troubleshoot faster and get the answers you need to keep systems up and running. Display waveforms with Connect and View™ trigger and setup technology. Automatically view related numerical measurements using Fluke IntellaSet™ technology, all without making manual measurement adjustments. With Recorder Event Detect capabilities, elusive intermittent events are captured and logged for easy viewing and analysis.

Connect-and-View™ triggering for an instant, stable display

Oscilloscope users know how difficult triggering can be. Using the wrong settings can lead to unstable waveform captures, and sometimes, even the wrong measurement data. Fluke's unique Connect-and View™ triggering technology recognizes signal patterns, and automatically sets up the correct triggering to provide a stable, reliable, and repeatable display.

Connect-and-View™ triggering is designed to work with virtually any signal, including motor drives and control signals—without adjusting parameters, or even touching a button. Signal changes are instantly recognized, and settings are automatically adjusted providing a stable display even when measuring multiple test points in quick succession.

L6
L5
L4
L9
L8
L7

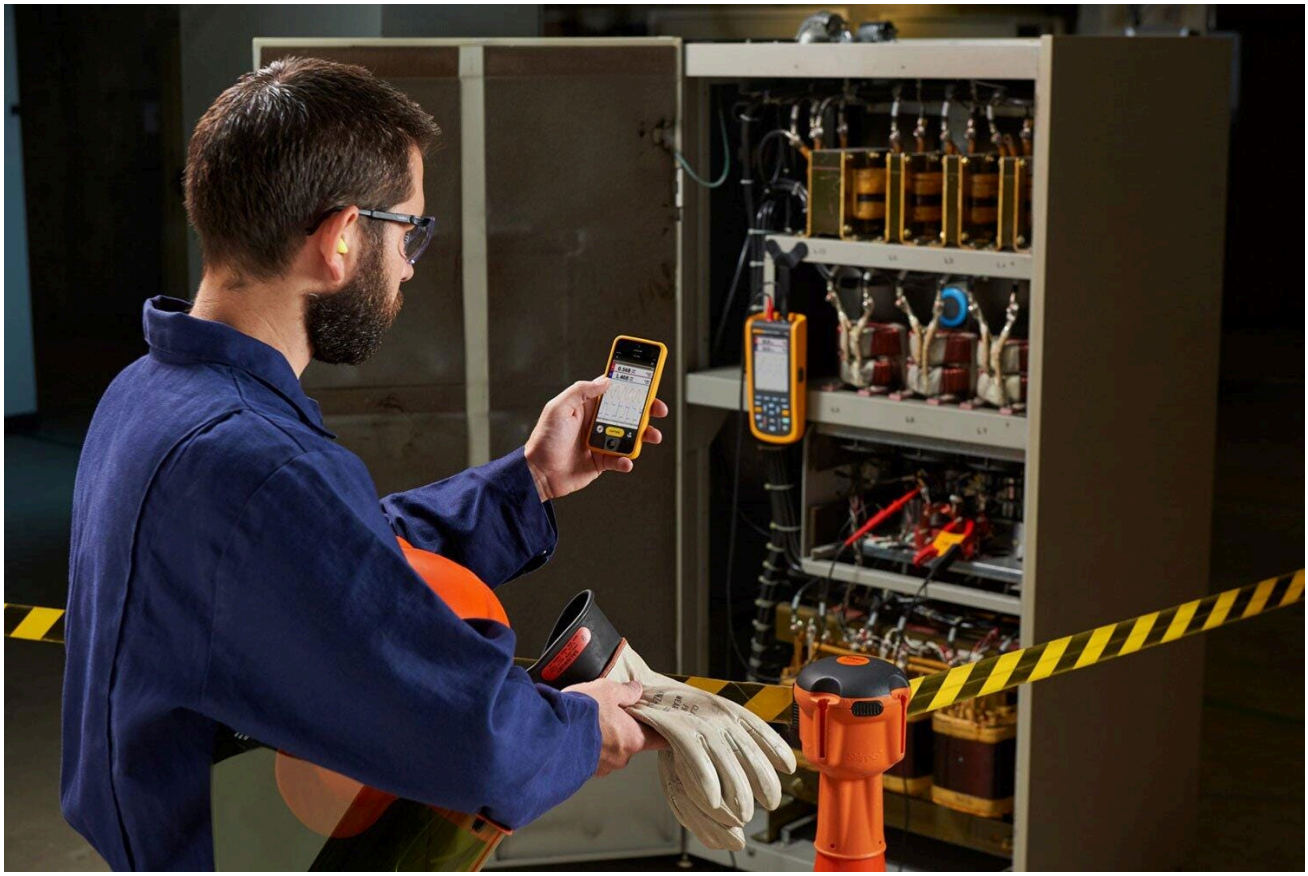


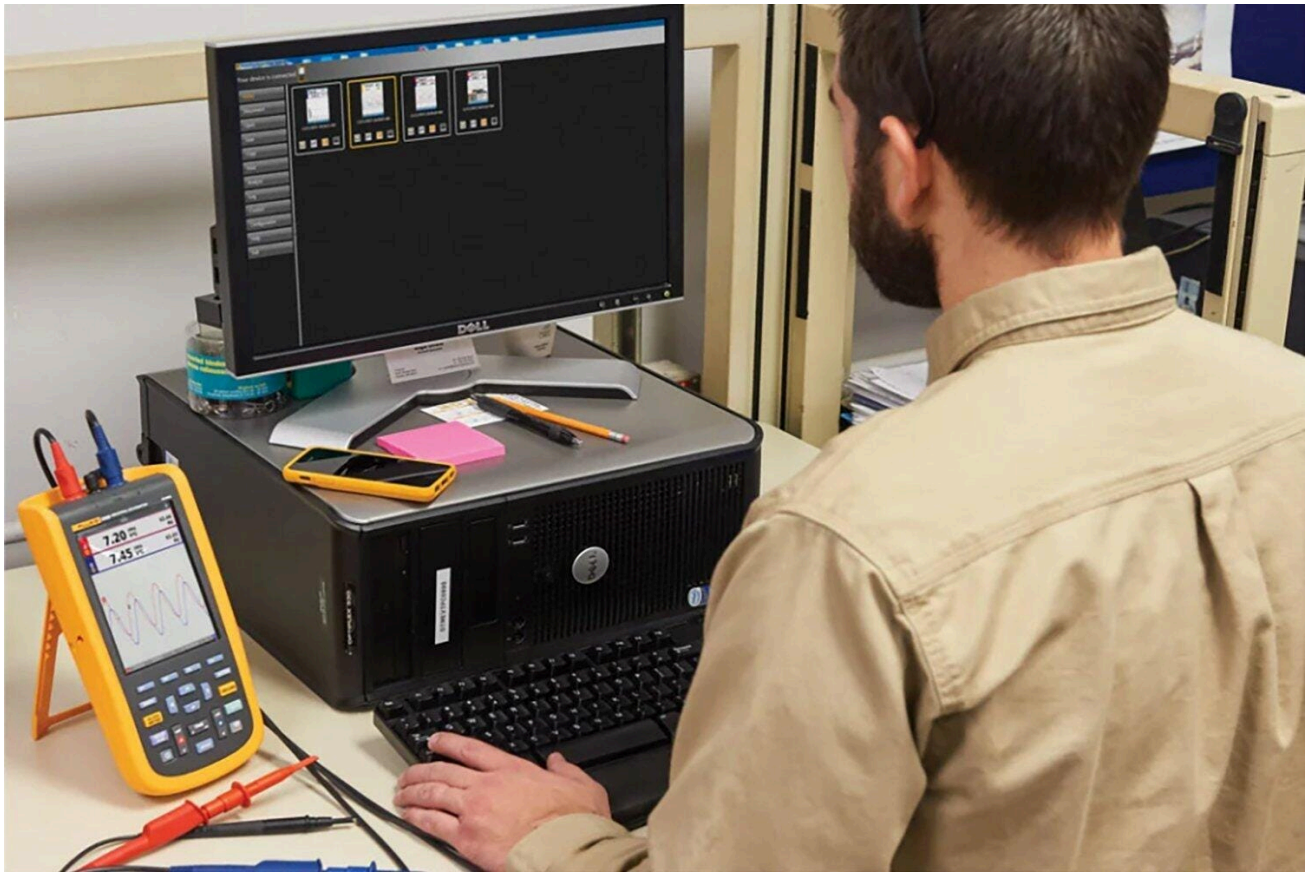
IntellaSet™/AutoReading

The Auto Readings function with Fluke IntellaSet™ technology uses proprietary algorithms to intelligently analyze the measured waveform and automatically display the most appropriate numerical measurements on-screen, so you can get the data you need easier than ever before. For example, when the measured waveform is a line voltage signal, the V rms and Hz readings are automatically displayed, whereas if the measured waveform is a square wave, the V peak-peak and Hz readings are automatically displayed. Using IntellaSet™ technology in conjunction with Connect and-View™ automatic triggering you can be sure you're seeing not only the correct waveform, but the appropriate numerical reading as well. All without touching a button.

Harmonics function measures periodic distortions

Harmonics are periodic distortions of voltage, current, or power sine waves. Harmonics in power distribution systems are often caused by non-linear loads such as switched mode dc power supplies and adjustable speed motor drives. Harmonics can cause transformers, conductors, and motors to overheat. In the Harmonics function, the Test Tool measures harmonics to the 51st. Related data such as dc components, THD (Total Harmonic Distortion), and K factor are measured to provide a complete insight into the electrical state of health of your loads.





Comprehensive recorder modes help find intermittent faults

The toughest faults to find are those that happen only once in a while—intermittent events. They can be caused by bad connections, dust, dirt, corrosion or simply broken wiring or connectors. Other factors, like line outages and sags or the starting and stopping of a motor, can also cause intermittent events resulting in equipment shutdowns. When these events happen, you may not be around to see it. But your Fluke ScopeMeter Test Tool will.

You can either plot the minimum and maximum peak measurement values or record the waveform trace. And, with expandable microSD memory, recording sessions can be done for up to 14 days. This recorder is even more powerful with the addition of Recorder Event Detect, which makes detecting and logging intermittent faults easier than ever. Just set a threshold on a meter reading or scope trace and deviations are tagged as unique events. You no longer need to search through masses of data to pinpoint faults and can quickly step from one tagged event to the next, while still having access to the full data set.

*Not all models are available in all countries. Check with your local Fluke representative.

Specifications: Fluke 120B Series Industrial ScopeMeter® handheld Oscilloscopes

Oscilloscope mode
Vertical

Frequency response - dc coupled	Without probes and test leads (with BB120)	123B: dc to 20 MHz (-3 dB) 124B and 125B: dc to 40 MHz (-3 dB)
	With STL120-IV 1:1 shielded test leads	DC to 12.5 MHz (-3 dB) / dc to 20 MHz (-6 dB)
	With VP41 10:1 Probe	123B: dc to 20MHz (-3 dB) 124B and 125B: dc to 40 MHz (-3 dB)
Frequency response - ac coupled (lf roll off)	Without probes and test leads	<10 Hz (-3 dB)
	With STL120-IV 1:1 shielded test leads	<10 Hz (-3 dB)
	With VP41 10:1 Probe	<10 Hz (-3 dB)
Rise time, excluding probes, test leads	123B <17.5 ns 124B and 125B <8.75 ns	
Input impedance	Without probes and test leads	1 MΩ//20 pF
	With BB120	1 MΩ//24 pF
	With STL120-IV 1:1 shielded test leads	1 MΩ//230 pF
	With VP41 10:1 Probe	5 MΩ//15.5 pF
Sensitivity	5 mV to 200 V/div	
Analog bandwidth limiter	10 kHz	
Display modes	A, -A, B, -B	
Max. input voltage A and B	Direct, with test leads, or with VP41 Probe	600 Vrms Cat IV, 750 Vrms maximum voltage.
	With BB120	600 Vrms
Max. floating voltage, from any terminal to ground	600 Vrms Cat IV, 750 Vrms up to 400Hz	
Horizontal		
Scope modes	Normal, Single, Roll	
Ranges (normal)	Equivalent sampling	123B: 20 ns to 500 ns/div,
		124B and 125B: 10 ns to 500 ns/div
	Real time sampling	1 µs to 5 s/div
	Single (real time)	1 µs to 5 s/div
	Roll (real time)	1s to 60 s/div
Sampling rate (for both channels simultaneously)	Equivalent sampling (repetitive signals)	Up to 4 GS/s
	Real time sampling 1 µs to 60 s/div	40 MS/s
Trigger		
Screen update	Free run, on trigger	
Source	A, B	

Sensitivity A and B	@ DC to 5 MHz	0.5 divisions or 5 mV
	@ 40 MHz	123B: 4 divisions
		124B and 125B: 1.5 divisions
	@ 60 MHz	123B: N/A
		124B and 125B: 4 divisions
Slope	Positive, negative	
Advanced scope functions		
Display modes	Normal	Captures up to 25 ns glitches and displays analog-like persistence waveform
	Smooth	Suppresses noise from a waveform
	Glitch off	Does not capture glitches between samples
	Envelope	Records and displays the minimum and maximum of waveforms over time
Auto set (Connect-and-View™)	Continuous fully automatic adjustments of amplitude, time base, trigger levels, trigger gap, and hold-off. Manual override by user adjustment of amplitude, time base, or trigger level.	
Dual input meter		
The accuracy of all measurements is within ±(% of reading + number of counts) from 18 °C to 28 °C.		
Add 0.1x (specific accuracy) for each °C below 18 °C or above 28 °C. For voltage measurements with 10:1 probe, add probe uncertainty +1%. More than one waveform period must be visible on the screen.		
Input A and input B		
DC voltage (VDC)		
Ranges	500 mV, 5 V, 50 V, 500 V, 750 V	
Accuracy	±(0.5% +5 counts)	
Common mode rejection (CMRR)	>100 dB @ dc, >60 dB @ 50, 60, or 400 Hz	
Full scale reading	5000 counts	
True-rms voltages (V ac and V ac+dc)		
Ranges	500 mV, 5 V, 50 V, 500 V, 750 V	
Accuracy for 5% to 100% of range (DC coupled)	DC to 60 Hz (V ac+dc)	±(1% +10 counts)
	1 Hz to 60 Hz (V ac)	±(1% +10 counts)
Accuracy for 5% to 100% of range (AC or dc coupled)	60 Hz to 20 kHz	±(2.5% +15 counts)
DC rejection (only VAC)	>50 dB	
Common mode rejection (CMRR)	>100 dB @ dc	
	>60 dB @ 50, 60, or 400 Hz	
Full scale reading	5000 counts, reading is independent of any signal crest factor.	
Peak		

Modes	Max peak, Min peak, or pk-to-pk	
Ranges	500 mV, 5 V, 50 V, 500 V, 2200 V	
Accuracy	Accuracy Max peak or Min peak	5% of full scale
	Accuracy Peak-to-Peak	10% of full scale
Full scale reading	500 counts	
Frequency (Hz)		
Ranges	123B: 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz,1 MHz, 10 MHz, and 50 MHz	
	124B and 125B: 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz, 10 MHz, and 70 MHz	
Frequency range	15 Hz (1 Hz) to 50 MHz in continuous autoset	
Accuracy @1 Hz to 1 MHz	±(0.5% +2 counts)	
Full scale reading	10,000 counts	
RPM		
Max reading	50.00 kRPM	
Accuracy	±(0.5% +2 counts)	
Duty cycle (PULSE)		
Range	2% to 98%	
Frequency range	15 Hz (1 Hz) to 30 MHz in continuous autoset	
Pulse width (PULSE)		
Frequency range	15 Hz (1 Hz) to 30 MHz in continuous autoset	
Full scale reading	1000 counts	
Amperes (AMP)		
With current clamp	Ranges	Same as V dc, V ac, V ac+dc, or PEAK
	Scale factors	0.1 mV/A, 1 mV/A, 10 mV/A, 100 mV/A, 400 mV/A, 1 V/A, 10 mV/mA
	Accuracy	Same as V dc, V ac, V ac+dc, or PEAK (add current clamp uncertainty)
Temperature (TEMP) with optional temperature probe		
Range	200 °C/div (200 °F/div)	
Scale factor	1 mV/°C and 1 mV/°F	
Accuracy	As V dc (add temp. probe uncertainty)	
Decibel (dB)		
0 dBV	1 V	
0 dBm (600 Ω /50 Ω)	1 mW referenced to 600 Ω or 50 Ω	
dB on	V dc, V ac, or Vac+dc	
Full scale reading	1000 counts	

Crest factor (CREST)		
Range	1 to 10	
Full scale reading	90 Counts	
Phase		
Modes	A to B, B to A	
Range	0 to 359 degrees	
Resolution	1 degree	
Power (125B only)		
Configurations	1 phase / 3 phase 3 conductor balanced loads (3 phase: fundamental component only, AUTOSET mode only)	
Power factor (PF)	Ratio between watts and VA range - 0.00 to 1.00	
Watt	RMS reading of multiplying corresponding samples of input A (volts) and input B (amperes)	
	Full scale reading	999 counts
VA	Vrms x Arms	
	Full scale reading	999 counts
VA reactive (var)	$\sqrt{((VA)^2-W^2)}$	
	Full scale reading	999 counts
Vpwm		
Purpose	To measure on pulse width modulated signals, like motor drive inverter outputs	
Principle	Readings show the effective voltage based on the average value of samples over a whole number of periods of the fundamental frequency	
Accuracy	As Vrms for sinewave signals	
Input A to common		
Ohm (Ω)		
Ranges	123B and 124B	500 Ω , 5 kΩ, 50 kΩ, 500 kΩ, 5 MΩ, 30 MΩ
	125B	50 Ω, 500 Ω , 5 kΩ, 50 kΩ, 500 kΩ, 5 MΩ, 30 MΩ
Accuracy	±(0.6% + 5 counts) 50 Ω ±(2% + 20 counts)	
Full scale reading	50 Ω to 5 MΩ - 5000 counts, 30 MΩ - 3000 counts	
Measurement current	0.5 mA to 50 nA, decreases with increasing ranges	
Open circuit voltage	<4 V	
Continuity (Cont)		
Beep	<(30 Ω ±5 Ω) in 50 Ω range	
Measurement current	0.5 mA	
Detection of shorts of	≥1 ms	

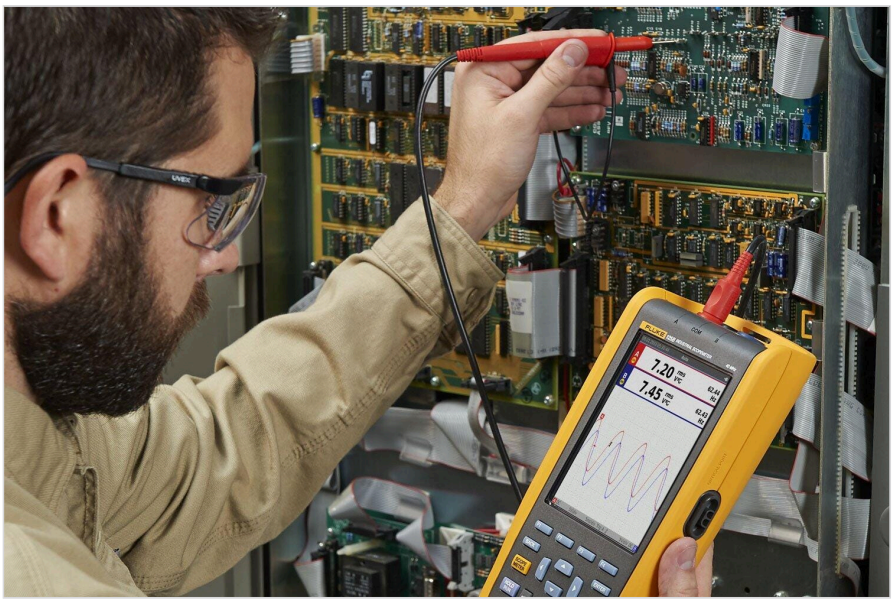
Diode		
Measurement voltage	@0.5 mA	>2.8 V
	@open circuit	<4 V
Measurement current	0.5 mA	
Polarity	+ on input A, - on COM	
Capacitance (CAP)		
Ranges	50 nF, 500 nF, 5 µF, 50 µF, 500 µF	
Full scale reading	5000 counts	
Measurement current	500 nA to 0.5 mA, increases with increasing ranges	
Advanced meter functions		
Zero Set	Set actual value to reference	
AutoHold (on A)	Captures and freezes a stable measurement result. Beeps when stable. AutoHold works on the main meter reading, with thresholds of 1 Vpp for AC signals and 100 mV for DC signals.	
Fixed decimal point	Activated by using attenuation keys	
Cursor Readout (124B and 125B)		
Sources	A, B	
Single vertical line	Average, min and max readout	
	Average, min, max and time from start of readout (in ROLL mode; instrument in HOLD)	
	Min, max and time from start of readout (in RECORDER mode; instrument in HOLD)	
	Harmonics values in POWER QUALITY mode.	
Dual vertical lines	Peak-peak, time distance and reciprocal time distance readout	
	Average, min, max and time distance readout (in ROLL mode; instrument in HOLD)	
Dual horizontal lines	High, low and peak-peak readout	
Rise or fall time	Transition time, 0%-level and 100%-level readout (manual or auto leveling; auto leveling only possible in single channel mode)	
Accuracy	As oscilloscope accuracy	
Recorder		
The recorder captures meter readings in Meter Recorder mode or continuously captures waveform samples in Scope Recorder mode. The information is stored on internal memory or on optional SD card (with the 125B or 124B).		
The results are displayed as Chart recorder display that plots a graph of min and max values of Meter measurements over time or as a waveform recorder display that plots all the captured samples.		
Meter readings		
Measurement Speed	Maximum 2 measurement/s	
Record Size (min, max, average)	2 M readings for 1 channel	

Recorded Time Span	2 weeks	
Maximum number of events	1024	
Waveform record		
Maximum sample rate	400 K sample/s	
Size Internal memory	400 M samples Recorded Time	
Span internal memory	15 minutes at 500 µs/div 11 hours at 20 ms/div	
Record Size SD card	1.5 G samples	
Recorded Time Span SD card	11 hours at 500 µs/div 14 days at 20 ms/div	
Maximum number of events	64	
Power Quality (125B only)		
Readings	Watt, VA, var, PF, DPF, Hz	
Watt, VA, var ranges (auto)	250 W to 250 MW, 625 MW, 1.56 GW	
	When selected: total (% r)	±(2% + 6 counts)
	When selected: fundamental (% f)	±(4% + 4 counts)
DPF	0.00 to 1.00	
PF	0.00 to 1.00, ±0.04	
Frequency range	10.0 Hz to 15.0 kHz 40.0 Hz to 70.0 Hz	
Number of Harmonics	DC to 51	
Readings / Cursor readings (fundamental 40 Hz to 70 Hz)	Vrms / Arms /Watt	Each harmonic from fundamental maybe selected for individual readings
Includes frequency of fundamental, phase Angle and K-factor (in Amp and Watt)		
BusHealth tester (Fluke 125B only)		
Type	Subtype	Protocol
AS-i	NEN-EN50295	
CAN	ISO-11898	
Interbus S	RS-422	EIA-422
Modbus	RS-232	RS-232/EIA-232
	RS-485	RS-485/EIA-485
Foundation Fieldbus	H1	61158 type 1, 31.25 kBit
Profibus	DP	EIA-485
	PA	61158 type 1
Miscellaneous		
Display	Type	5.7-inch color active matrix TFT
	Resolution	640 x 480 pixels

Waveform Display	Vertical	10 div of 40 pixels
	Horizontal	12 div of 40 pixels
Power	External	Via Power Adapter BC430
	Input voltage	10 V DC to 21 V DC
	Power consumption	5 W typical
	Input connector	5 mm jack
	Internal	Via Battery Pack BP290
	Battery power	Rechargeable Li-Ion 10.8 V
	Operating time	7 hours with 50% backlight brightness
	Charging time	4 hours with test tool off, 7 hours with test tool on
	Allowable ambient temp	0 to 40 °C (32 to 104 °F) during charging
Memory	Internal memory can store 20 data sets (screen waveform and setup)	Micro SD card slot with optional SD card (max size of 32 GB)
Mechanical	Size	259 x 132 x 55 mm (10.2 x 5.2 x 2.15 in)
	Weight	1.4 kg (3.2 lb) including battery pack
Interface	Optically isolated	Transfer screen copies (bitmaps), settings and data
	USB to PC/laptop	OC4USB optically isolated USB adapter/cable, (optional), using FlukeView® software for Windows®.
	Optional WiFi adapter	Fast transfer of screen copies (bitmaps), settings and data to PC/laptop, tablet, smartphone, etc. A USB port is provided for attaching the WiFi dongle. Do not use the USB port with a cable for safety reasons.
Environmental		
Environmental	MIL-PRF-28800F, Class 2	
Temperature	Battery Operation	0 to 40 °C (32 to 104 °F)
	Power Adapter Operation	0 to 50 °C (32 to 122 °F)
	Storage	-20 to 60 °C (-4 to 140 °F)
Humidity (Operating)	@ 0 to 10 °C (32 to 50 °F)	Non-condensing
	@ 10 to 30 °C (50 to 86 °F)	95%
	@ 30 to 40 °C (86 to 104 °F)	75%
	@ 40 to 50 °C (104 to 122 °F)	45%
Storage	@ -20 to 60 °C (-4 to 140 °F)	Non-condensing

Altitude	Operating at 3 km (10,000 feet)	CAT III 600 V
	Operating at 2 km (6,600 feet)	CAT IV 600 V
	Storage	12 km (40,000 feet)
EMC electromagnetic compatibility	International	IEC 61326-1: Industrial, CISPR 11: Group 1, Class A
	Korea (KCC)	Class A Equipment (Industrial Broadcasting & Communication Equipment)
	USA (FCC)	47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.
Wireless radio with adapter	Frequency range	2412 MHz to 2462 MHz
	Output power	<100 mW
Enclosure protection	IP51, ref: EN/IEC60529	
Safety	General	IEC 61010-1: Pollution Degree 2
	Measurement	IEC 61010-2-033: CAT IV 600 V/CAT III 750 V
Max. input voltage input A and B	Direct on input or with leads	600 Vrms CAT IV for derating
	With Banana-to-BNC Adapter BB120	600 Vrms for derating
	Max. floating voltage from any terminal to ground	600 Vrms Cat IV, 750 Vrms up to 400 Hz

Ordering information



FLUKE-125B/NA

Fluke 125B Industrial ScopeMeter® Hand-Held Oscilloscope (40 MHz), North America version

Part#: 4755829
UPC#: 095969814898

Includes:

- Fluke 125B Hand-Held Oscilloscope
- Shielded Test Leads with Black Ground Leads
- Test Lead Black (for Grounding)
- Hook Clips (red, blue)
- Banana-to-BNC Adapters (black, x1)
- 10:1 Voltage Probe
- i400s AC Current Clamp
- USB Angled Adapter
- WiFi USB Adapter*
- Switch Mode Power Supply, Adapter/Battery Charger
- Rechargeable Li-ion Battery Pack

FLUKE-123B/NA/S

Fluke 123B Industrial ScopeMeter® Hand-Held Oscilloscope (20 MHz), North America version, with Soft Carrying Case, Magnetic Hanger, FlukeView® ScopeMeter® Software for Windows®, Screen Protector

Part#: 4755909
UPC#: 095969814973

Includes:

- Fluke 123B Hand-Held Oscilloscope
- Shielded Test Leads with Black Ground Leads
- Test Lead Black (for Grounding)
- Hook Clips (red, blue)
- Banana-to-BNC Adapters (black, x1)
- USB Angled Adapter
- WiFi USB Adapter*
- Switch Mode Power Supply, Adapter/Battery Charger
- Rechargeable Li-ion Battery Pack
- Soft Carrying Case
- Magnetic Hanger
- FlukeView® ScopeMeter® Software for Windows®
- Screen Protector

FLUKE-123B/NA

Fluke 123B Industrial ScopeMeter® Hand-Held Oscilloscope (20 MHz), North America version

Part#: 4755667
UPC#: 095969814737

Includes:

- Fluke 123B Hand-Held Oscilloscope
- Shielded Test Leads with Black Ground Leads
- Test Lead Black (for Grounding)
- Hook Clips (red, blue)
- Banana-to-BNC Adapters (black, x1)
- USB Angled Adapter
- WiFi USB Adapter*
- Switch Mode Power Supply, Adapter/Battery Charger
- Rechargeable Li-ion Battery Pack

FLUKE-124B/NA

Fluke 124B Industrial ScopeMeter® Hand-Held Oscilloscope (40 MHz), North America version

Part#: 4755746
UPC#: 095969814812

Includes:

- Fluke 124B Hand-Held Oscilloscope
- Shielded Test Leads with Black Ground Leads
- Test Lead Black (for Grounding)
- Hook Clips (red, blue)

- Banana-to-BNC Adapters (black, x1)
- 10:1 Voltage Probe
- USB Angled Adapter
- WiFi USB Adapter*
- Switch Mode Power Supply, Adapter/Battery Charger
- Rechargeable Li-ion Battery Pack

FLUKE-124B/NA/S

Fluke 124B Industrial ScopeMeter® Hand-Held Oscilloscope (40 MHz), North America version, with Soft Carrying Case, Magnetic Hanger, FlukeView® ScopeMeter® Software for Windows®, Screen Protector

Part#: 4755982
UPC#: 095969815055

Includes:

- Fluke 124B Hand-Held Oscilloscope
- Shielded Test Leads with Black Ground Leads
- Test Lead Black (for Grounding)
- Hook Clips (red, blue)
- Banana-to-BNC Adapters (black, x1)
- 10:1 Voltage Probe
- USB Angled Adapter
- WiFi USB Adapter*
- Switch Mode Power Supply, Adapter/Battery Charger
- Rechargeable Li-ion Battery Pack
- Soft Carrying Case
- Magnetic Hanger
- FlukeView® ScopeMeter® Software for Windows®
- Screen Protector

FLUKE-125B/NA/S

Fluke 125B Industrial ScopeMeter® Hand-Held Oscilloscope (40 MHz), North America version, with Soft Carrying Case, Magnetic Hanger, FlukeView® ScopeMeter® Software for Windows®, Screen Protector

Part#: 4756068
UPC#: 095969815130

Includes:

- Fluke 125B Hand-Held Oscilloscope
- Shielded Test Leads with Black Ground Leads
- Test Lead Black (for Grounding)
- Hook Clips (red, blue)
- Banana-to-BNC Adapters (black, x1)
- 10:1 Voltage Probe

- i400s AC Current Clamp
- USB Angled Adapter
- WiFi USB Adapter*
- Switch Mode Power Supply, Adapter/Battery Charger
- Rechargeable Li-ion Battery Pack
- Soft Carrying Case
- Magnetic Hanger
- FlukeView® ScopeMeter® Software for Windows®
- Screen Protector

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

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