

FLUKE®

## Oscilloscopes for field applications

New



### Powerful ScopeMeter® test capabilities:

- From 20 to 200 MHz bandwidth and up to 2.5 GS/s real-time sampling
- Up to seven hours operating time
- Now with FFT Analysis, advanced triggering and 3k memory length

# All this power in your hand



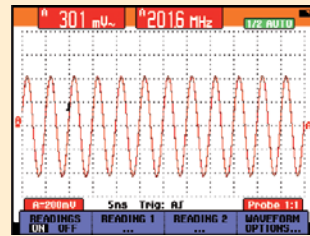
## ScopeMeter® 190C and 190B Series: Speed, performance and analysis power

For the more demanding applications, the ScopeMeter 190 Series high-performance oscilloscopes offer specifications usually found on top-end bench instruments. With up to 200 MHz bandwidth, 2.5 GS/s real-time sampling and a deep memory of 27,500 points per input, they're ideal for engineers who need the full capabilities of a high-performance oscilloscope in a handheld, battery powered instrument.

- Dual-input – 200, 100 or 60 MHz bandwidth
- Up to 2.5 GS/s real-time sampling per input
- Choice between a high-resolution color display (190C Series) or black-and-white display (190B Series)
- Connect-and-View™ automatic triggering and a full range of manual trigger modes
- Digital Persistence mode for analyzing complex dynamic waveforms like on an analog scope
- Fast display update rate for seeing dynamic behavior instantaneously
- Automatic capture and replay of 100 screens
- 27,500 points per input record length using ScopeRecord™ mode
- TrendPlot™ paperless chart recorder for trend analysis up to 22 days
- Waveform reference for visual comparisons and automatic pass/fail testing of waveforms
- $V_{rms}$  function for motor drive and frequency inverter applications
- Up to 1000 V independently floating isolated inputs for 1000 V CAT II and 600 V CAT III safety certification
- Four hours rechargeable NiMH battery pack



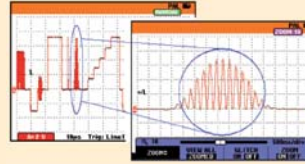
See an on-line demonstration, go to [www.fluke.com/scopemeter](http://www.fluke.com/scopemeter)



High sampling rates give you the required resolution for detailed signal analysis.

### See what's really happening

With a maximum real-time sampling rate of 2.5 GS/s per input, you can see what really happens, with 400 ps resolution. Both inputs have their own digitizer, so you can simultaneously acquire two waveforms and analyze them with the highest resolution and detail. If an anomaly flashes by on the screen, just press the Replay button to see it again. And thanks to the wider screen, you will always see a 12 divisions time window giving a far better overview of what's happening both before and after the trigger event!



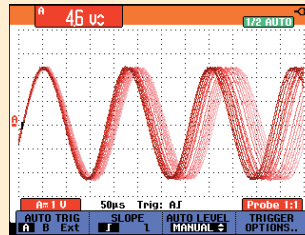
Thanks to the deeper memory, very small parts of the waveform can be studied in full detail using "zoom".

### Deeper waveform acquisition memory

The waveform memory of all oscilloscopes in both the 190B and 190C Series has been enlarged to allow as many as 3000 samples per channel to be acquired. You can use the ZOOM function to find tiny details in a long waveform, for example, the color burst in a video signal or a single impulse in a complex data-stream. All models also allow the high-resolution waveforms to be transferred to a PC for later detailed analysis using FlukeView™ ScopeMeter software.

### Easier identification of traces, everywhere

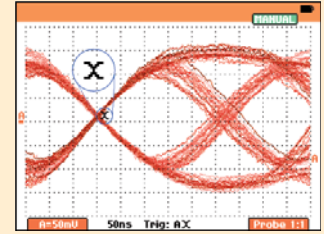
The full-color display makes identification of individual waveforms easier, particularly when displaying large amplitude or multiple overlapping waveforms on screen. On-screen color labels, measurements and warnings are clearly linked to specific waveforms.



Digital Persistence mode gives analog scope-like display of complex and modulated signals.

### See dynamic signal behavior instantaneously

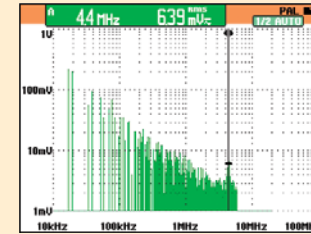
The Digital Persistence mode (Fluke 190C) helps to find anomalies and to analyze complex dynamic signals by showing the waveforms amplitude distribution over time. Digital Persistence uses multiple intensity levels and user selectable decay time—it's as if you're looking at the display of an analog, real-time oscilloscope! The fast display update rate that's standard on all models reveals signal changes instantaneously, useful for instance when making adjustments to a system under test.



Dual-slope triggering used to capture the eye-pattern on a digital datastream.

### Advanced trigger modes

The ScopeMeter 190 Series simplifies triggering with Connect-and-View™ automatic triggering. Two new modes—"n-cycle triggering" and "dual-slope triggering"—have been added to the Fluke 190C Series to help you isolate the phenomena of interest. N-cycle triggering ensures you get a stable live image of a signal, for example, in-frequency dividers and clocked (synchronous) digital systems, or to synchronize on bursts of pulses. Dual-slope triggering enables the oscilloscopes to trigger on both rising and falling edges alike. This means that any edge in the signal will act as a trigger event and initiate a new waveform acquisition, a most useful capability when making eye-patterns from digital data-streams, or in conjunction with single-shot phenomena. Manual modes include edge, delay, video and pulse width triggering. A fully isolated external trigger input is included for troubleshooting time relationships between two input signals synchronized to a third signal.

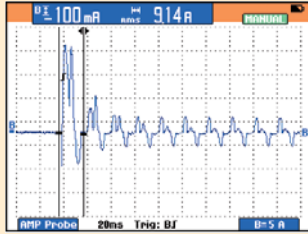


Frequency Spectrum shows an overview of frequencies contained in a signal.

### Frequency spectrum analysis

All 190C color ScopeMeter models now include Frequency Spectrum Analysis functionality based on Fast Fourier Transformation (FFT) analysis as a standard feature. This enables you to identify the individual frequency components contained in a signal. The spectrum analysis function is also handy for revealing the effects of vibration, signal interference or crosstalk. An automatic window function assures optimal windowing, although you may manually select your preferred time window.

# ScopeMeter® 190 Series



The inrush current is measured on the part of the waveform enclosed by the cursors.



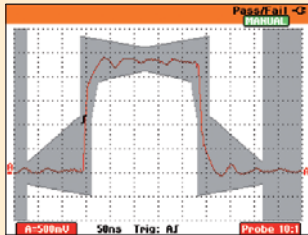
### Automatic capture and replay of 100 screens

Scope users know how frustrating it is to see a one-time anomaly flash. Not with the ScopeMeter 190 Series! Now you can look back in time with a touch of the replay button. In normal use, the instrument continuously memorizes the last 100 screens. Each time a new screen is acquired, the oldest is discarded. At any moment, you can "freeze" the last 100 screens and scroll through picture-by-picture or replay as a "live" animation. Cursors can be used for further analysis. Use the advanced trigger capabilities to capture up to 100 specific events.

Two sets of 100 captured screens with individual time stamps can be stored for later recall or download to a PC.

### Measure from mV to kV—fully isolated and safely!

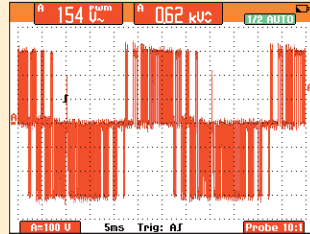
The ScopeMeter 190C and 190B series have three independently floating isolated inputs. While conventional oscilloscopes can only make measurements referenced to the line power ground, measurements on each of the Fluke ScopeMeter 190 series inputs can be referenced to a different "low" level. This enables measurements in mixed circuits having different ground references, and also eliminates the risk of accidental ground short circuits. All inputs are safety certified for measurements in 1000 V CAT II and 600 V CAT III environments. And the standard probes cover a wide application range from mV to kV, making the 190C and 190B ScopeMeter ideal for micro electronics to electrical applications.



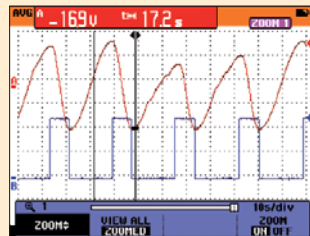
Pass/Fail testing of actual signal against a reference template

### Waveform Pass/Fail Testing

"Waveform reference" allows an acquired trace to be stored and designated "reference trace" for visual comparisons, or it can be used as the reference for automatic "Pass/Fail" testing (190C). Up to 100 individually matching ("Pass") or non-matching ("Fail") waveforms can be stored in the replay memory, allowing you to monitor your system's behavior over a long period of time, without having to be present!



Vpwm measures effective voltage on motor drive and frequency inverter outputs.

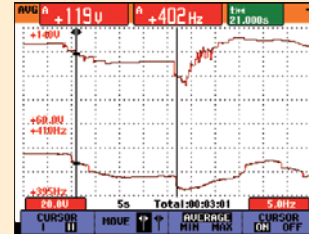


Use the 27,500 points memory of ScopeRecord and zoom in for maximum detail.

### Deep memory for high-resolution ScopeRecord™

The ScopeRecord memory stores 27,500 points per input or more, for high-resolution recording of events up to 48 hours, and captures fast intermittents and glitches as short as 50 ns. This continuous roll mode stores events like motion profiles, UPS, power supply and motor start-ups. All models also have a "Stop-on-Trigger" in the ScopeRecord mode, allowing the ScopeMeter to store waveform data until the instrument is triggered or until a repetitive trigger signal is interrupted. This way, the instrument will automatically recognize a power failure and store the waveform data preceding it. With 100 x zoom, you can look at the smallest details, like individual power cycles. Two of these 27,500 point recordings can be stored for later analysis.

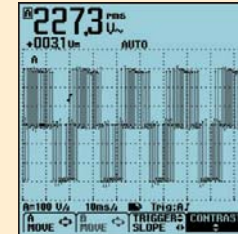
## ScopeMeter® 120 and 190 Series common functions Software and special value kits.



Cursors and zoom featured by the 190 Series help you to analyze the captured TrendPlot.

### Use TrendPlot™ to help find intermittents, fast

The toughest faults to find are those that happen only once in a while —intermittents. 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 a machine to stop. You may not be around to see it your Fluke ScopeMeter will. In this "paperless recorder" mode, you can plot the minimum and maximum peak values and average over time up to 16 days. The two inputs can plot any combination of volts, amps, temperature, frequency and phase – with time and date stamp – to help lead you to the cause of those faults quickly.



Connect-and-View captures even the most complex motor drive signals.

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

Scope users know how difficult triggering can be. Incorrect settings show unstable and sometimes incorrect results. The unique Connect-and-View function recognizes signal patterns and automatically sets up correct triggering. It provides a stable, reliable and repeatable display of virtually any signal, including motor drive and control signals, without touching a button. Signal changes are instantly recognized and settings adjusted for a stable display. Benefit from the speed and convenience when measuring a number of test-points in quick succession.



### ScopeMeter special value kit

FlukeView Software and the optically isolated interface cable come as separate items, or as part of the special value SCC-Kit. This kit contains:

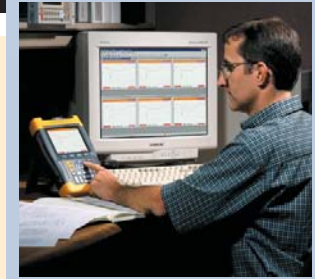
- FlukeView Software (SW90W)
- Optically Isolated Interface Cable (for USB)
- Protective Hard-Shell Carrying Case (C190 or C120)

The SCC-kit can be ordered separately, or with the main instrument by adding an "S" to the main instrument type number, e.g., Fluke 199C/S (see Ordering Information on back cover for more detailed information).



SCC190 Kit

SCC120 Kit



## FlukeView® Software for documenting, archiving and analysis

### FlukeView for Windows® helps you get more out of your ScopeMeter by:

- **Documenting** – transfer waveforms, screens and measurement data from the ScopeMeter to a PC. Print or import the data into your report.
- **Adding user text to individual ScopeMeter settings** – providing guidance to the operator when recalling a set-up.
- **Archiving** – create a library of waveforms with your comments for easy reference and comparison. Store complete Replay cycles for analysis of waveform changes. Store complete memory content of the ScopeMeter on your PC for back-up purposes.
- **Waveform compare** – store reference waveforms, add operator instructions, and send both to the ScopeMeter for waveform comparison and "Pass/Fail" testing.
- **Analysis** – use cursors, perform spectrum analysis or export data to other analysis programs.
- **Connection to a PC via an optically isolated interface cable** – Software and cable come as separate items or as part of a special value kit. This kit also includes a protective hard shell carrying case for safe and convenient storage of instrument and accessories.

# New! Fluke 125 Industrial ScopeMeter®

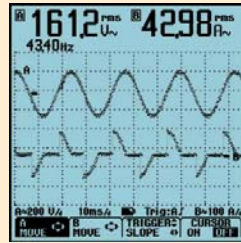


## ScopeMeter® 120 Series: As simple as one-two-three

The compact ScopeMeter 120 Series is the rugged solution for industrial troubleshooting and installation applications. It's a truly integrated test tool, with oscilloscope, multimeter and "paperless" recorder in one affordable, easy-to-use instrument. Find answers fast to problems in machinery, instrumentation, control and power systems.

- Dual-input 40 MHz or 20 MHz digital oscilloscope
- Two 5,000-count true-rms digital multimeters
- Automatic measurements
- A dual-input TrendPlot™ recorder
- Connect-and-View™ trigger simplicity for hands-off operation
- Shielded test leads for oscilloscope, resistance and continuity measurements
- 10:1 Voltage Probe included with Fluke 124 and 125 for reduced circuit loading
- Up to seven hours battery operation
- 600 V CAT III safety certified
- Optically isolated interface
- Rugged compact case
- New Fluke 125 gives bus health and power measurements

In today's complex systems, a meter measurement just doesn't give enough detail to determine the cause of a fault. Signal anomalies, dropouts and glitches that might cause a machine to go down are best captured with an oscilloscope. The ScopeMeter 120 Series meets today's need of simultaneously measuring and checking waveforms. The unique Connect-and-View™ triggering automatically displays stable waveforms of virtually any signal. It really is as easy as one-two-three!



Dual-input measurement shows both meter reading and waveform at the same time.

### Scope mode

With bandwidth of 20 MHz (Fluke 123) or 40 MHz (Fluke 124, 125) the Fluke 120 Series will capture and display almost any waveform found in today's state-of-the-art industrial electronic or electro-mechanical applications. Even complex signals like variable frequency motor drives. With Connect-and-View, it is as simple as connecting to the test point and letting the scope do the rest.

### Meter mode

You don't need to reach for another test tool to make a simple resistance measurement. The ScopeMeter 120 Series includes a multimeter on each input. Measure volts (ac or dc), resistance, capacitance, current via external clamp or shunt, temperature using an adapter or common time related measurements like frequency, duty cycle and more.

Working under time pressure and in cramped or difficult-to-reach locations means you want to focus on the job at hand, not on the test tool in your hand. That's why the ScopeMeter 120 Series has Connect-and-View automatic triggering. You don't have to worry about triggering and instrument settings and you have all the information on screen to do the job right.

### Battery powered mobility

Up to seven hours of battery operation frees you from mains outlets for true on-the-move working. The handheld format and the weight of just 1.2 kg (2.64 lbs) make the instrument easy to carry and to fit comfortably in your hand. The rugged and drip proof case assures long life and reliable operation in the harshest industrial environments. (See technical specifications for details on battery life.)

### Floating measurements, safety certified

While conventional oscilloscopes can only make measurements referenced to power line ground, the Fluke 120 Series makes floating measurements so there's no risk of an accidental ground short circuit when making a connection.

The Fluke ScopeMeter 120 Series test tools and the included shielded test leads are safety certified for measurements on 600 V CAT III industrial power systems. Using the VPS40 probe, measurements up to 1000 V CAT II are fully supported. Via the optically isolated interface, the ScopeMeter 120 can be safely connected to a printer for direct print-out or to a PC for later analysis and documentation using FlukeView® Software (for additional details about FlukeView software see page 5).

### Built to stand up to harsh environments

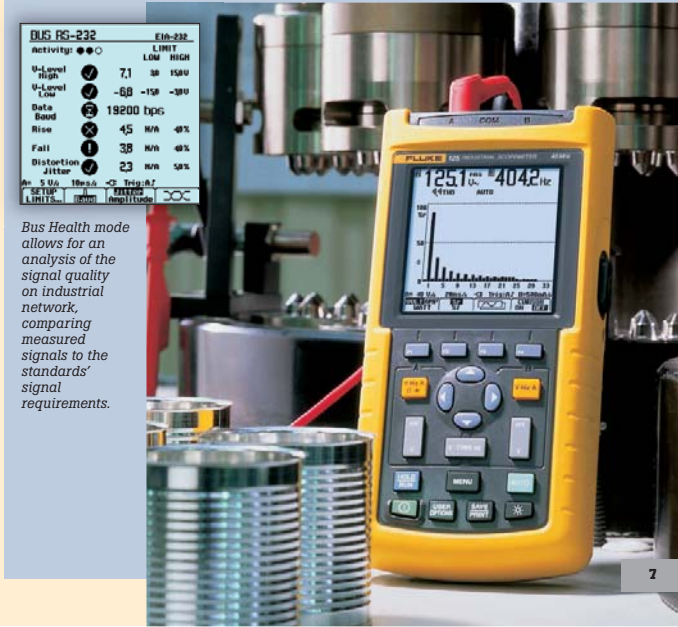
The 120 Series Scopemeter is built to hold up to every day use in the harshest of industrial environments. The case has been designed to withstand extreme shock of vibration levels tested to MIL-T-28800E Standards. The ScopeMeter is also rated IP51, dust and drip proof according to IEC 529.

**Fluke 125 is the ScopeMeter of choice for the maintenance engineer who deals with industrial machinery and the industrial network connecting his plant processing equipment and machinery.**

The Fluke 125 has all the functionality of the 124, plus it comes with the following extensions:

- **Bus Health mode** gives a clear "Good" / "Bad" indication for the electrical signals on industrial buses and networks, such as Foundation Fieldbus CAN-bus, Profibus, Ethernet, RS-232 and many more. The Fluke 125 validates the quality of the electrical signals on a network segment. It checks the signal levels and speed, transition times and distortion, and compares these to the appropriate standards to help you find errors like improper cable connections and terminators. It helps you find the source of error in case communication comes to a halt. All the commonly found industrial network types are supported!
- **Power measurements** for single phase and balanced three-phase systems. The Fluke 125 can display the Total Power (Watts), Apparent Power (VA), Reactive Power (VAR) and the Power Factor (PF), over a wide range of applied frequencies, including those seen with motor drives and inverters. As a result, you are able to easily see the effects on the various power measurements during start-up or under changing operational conditions. A current clamp is included as a standard.
- **Harmonics mode** graphically displays harmonics up to the 33rd harmonic to assist in fault-finding, e.g. with large non-linear loads.

See the technical datasheet at <http://us.fluke.com/user/products/Fluke+120.htm> for more details on the Fluke 125.



Bus Health mode allows for an analysis of the signal quality on industrial network, comparing measured signals to the standards' signal requirements.

**Selection Table**

**120 and 190 Series ScopeMeter® Test Tools**

	190C ScopeMeter Series			190B ScopeMeter Series			120 Series		
	Fluke 199C	Fluke 196C	Fluke 199B	Fluke 196B	Fluke 192B	Fluke 125	Fluke 124	Fluke 123	
Bandwidth	200 MHz	100 MHz	200 MHz	100 MHz	60 MHz	40 MHz	40 MHz	20 MHz	
Max. real time sample rate	2.5 GS/s	1.0 GS/s	2.5 GS/s	1.0 GS/s	500 MS/s	25 MS/s	25 MS/s	25 MS/s	
Equivalent time sample rate	(covered by real time sample rate)						2.5 GS/s	2.5 GS/s	1.25 GS/s
Max. record length (per input)	3000 points						512 points (min/max pairs)		
Number of inputs	2 scope inputs, 1 DMM input (all fully isolated from each other)						2 scope or DMM inputs		
Input sensitivity	2 mV/div. to 100 V/div.		5 mV/div. to 100 V/div.			5 mV/div. to 50 V/div.			
Independently floating isolated inputs	•		•			-			
<b>Display and Display Modes</b>	Color			Monochrome			Monochrome		
Display	Digital persistence with variable decay			On/Off			-		
Persistence	•		•			•			
Envelop Mode	•		•			•			
Waveform compare	visual + automatic		visual only			-			
FFT	•		-			harmonics mode		-	
Pass/Fail testing	•		-			-			
<b>Triggering</b>									
Connect-and-View™ Triggering	•		•			•			
Edge, single, free run	•		•			•			
Video	•		•			•			
Video line select	•		•			•			
Pulse width	•		•			-			
External	•		•			Using optional ITP120			
<b>Advanced Functions</b>									
Cursors	•		•			•	•	-	
Zoom	•		•			-			
Dual Input TrendPlot™	•		•			•			
ScopeRecord™ Mode	•		•			-			
Automatic capture and replay of last 100 screens	•		•			-			
Bus Health test mode	-		-			•	-	-	
Advanced Power Measurements	•		•			•	-	-	
Waveform mathematics	•		•			-			
Save set-ups and screens	10		10			20		10	
True-rms multimeter	5000 counts, measures volts – amps – ohms – continuity – diode – temperature								
<b>Safety, Power and Warranty</b>									
Safety (EN61010-1)	1000 V CAT II / 600 V CAT III certified						600 V CAT III certified <sup>(1)</sup>		
Battery	4 hours, NiMH						7 hours, NiMH		
Line power	Adapter/battery charger included								
PC and printer interface	Using optional Optically Isolated interface cable (either RS-232 or USB) or PAC91 printer adapter cable								
Warranty	Three years on instrument / One year on standard accessories								

<sup>(1)</sup> Maximum input voltage 1000 V CAT II with VPS40, 40 MHz, 10:1 Voltage Probe (standard included with Fluke 125 and Fluke 124). Detailed technical specifications and optional accessories can be found in the technical datasheet and on the Fluke web site.

**Ordering information**

Fluke 199C	Color ScopeMeter (200 MHz / 2.5 GS/s)
Fluke 199C/S	Color ScopeMeter (200 MHz / 2.5 GS/s) + SCC190
Fluke 196C	Color ScopeMeter (100 MHz / 1 GS/s)
Fluke 196C/S	Color ScopeMeter (100 MHz / 1 GS/s) + SCC190
Fluke 199B	ScopeMeter (200 MHz / 2.5 GS/s)
Fluke 199B/S	ScopeMeter (200 MHz / 2.5 GS/s) + SCC190
Fluke 196B	ScopeMeter (100 MHz / 1 GS/s)
Fluke 196B/S	ScopeMeter (100 MHz / 1 GS/s) + SCC190
Fluke 192B	ScopeMeter (60 MHz / 500 MS/s)
Fluke 192B/S	ScopeMeter (60 MHz / 500 MS/s) + SCC190
Fluke 125	Industrial ScopeMeter (40 MHz, with Bus Health)
Fluke 125/S	Industrial ScopeMeter (40 MHz, Bus Health) + SCC120 kit
Fluke 124	Industrial ScopeMeter (40 MHz)
Fluke 124/S	Industrial ScopeMeter (40 MHz) + SCC120 kit
Fluke 123	Industrial ScopeMeter (20 MHz)
Fluke 123/S	Industrial ScopeMeter (20 MHz) + SCC120 kit
SCC190	FlukeView® Software + Cable + Case (190 Series)
SCC120	FlukeView® Software + Cable + Case (120 Series)
OC4USB	Optically-isolated USB-interface cable
PM9080	Optically-isolated RS-232 adapter/cable
SW90W	FlukeView® ScopeMeter Software for Windows®

- ScopeMeter test tools come standard with a complete accessory package including line voltage adapter and battery pack (installed). ScopeMeter 190B and 190C Series come with probes, probe accessories and multimeter test leads.
- Optional accessories ordering information can be found in the technical datasheet or on the Fluke web site.

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

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