MA190 Accessory Kit
Accessory set for use with Fluke 190 Series ScopeMeter, containing the following accessories:
- 50 Ω BNC feedthrough terminator (max. input voltage 5 V rms) in safety designed enclosure
- 50 Ω BNC feedthrough terminator, provides 10:1 signal attenuation (max input voltage 5 V rms), in safety designed enclosure
- 1 Ω current shunt, 500 mA rms max, in safety designed BNC feedthrough enclosure
- Safety designed BNC to BNC cable (50 Ω), 1.5 m (5 ft)
- Female-BNC to 4 mm banana plug adapter, safety designed
- 4 mm banana to banana adapter for interconnection to male banana test points and test leads

Instrument configuration
Included with the Fluke 190M Series ScopeMeter test tools are:
- Main instrument—200 MHz or 100 MHz ScopeMeter, Fluke 190C Series Color ScopeMeter or 190B Series ScopeMeter
- C190 Hard Shell Carrying Case
- SW90W FlukeView ScopeMeter software
- PM9080 Serial interface adapter cable (optically isolated)
- BP190 NiMH Battery Pack (installed)
- MA190 Medical Accessory Kit (see above)
- BC190 Battery Charger/Line Voltage Adapter
- 10:1 Voltage Probes set (1 red, 1 gray) including hook clip, ground lead with mini alligator clip, ground lead with hook clip, 4 mm add-on probe tip, ground lead to 4 mm banana plug
- User manual on CD-ROM, in 9 languages (English, French, German, Spanish, Portuguese, Italian, Chinese, Korean, Japanese).
- 'Getting Started' booklet (in English)

Ordering information

Fluke 190CM models:

Fluke 199CM	Color ScopeMeter (200 MHz / 2.5 GS/s), medical version
Fluke 196CM	Color ScopeMeter (100 MHz / 1 GS/s), medical version

Fluke 190BM models:

Fluke 199BM	ScopeMeter (200 MHz / 2.5 GS/s), medical version
Fluke 196BM	ScopeMeter (100 MHz / 1 GS/s), medical version

Accessories

MA190	Medical Accessory Kit (included in 190M Series ScopeMeter)
SCC190	ScopeMeter carrying case, including PM9080 Serial Interface Adapter Cable (optically isolated) and SW90W FlukeView ScopeMeter Software (included in 190M Series ScopeMeter)
SW90W	FlukeView® ScopeMeter® Software for Windows®. Provides documenting, archiving and analysis capabilities using the PC. Stores and prints waveform information, screen copies and measurement results. Plots measurement data into other application programs using DDE (Direct Data Exchange). Allows for reference waveforms and user defined settings to be sent to the ScopeMeter test tool (included in 190M Series ScopeMeter).

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Fluke ScopeMeter® 190M Series

ScopeMeters for Medical Equipment Applications

Technical Data

Connect and View

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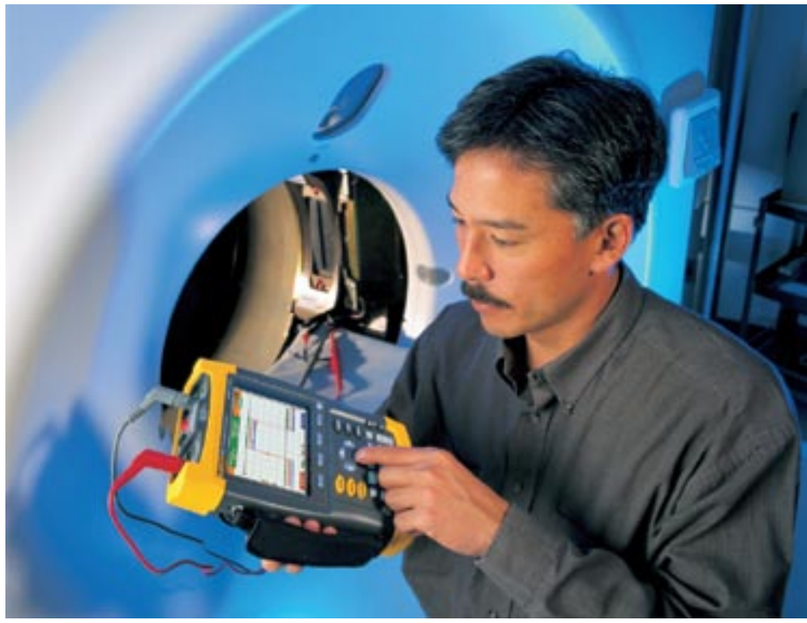


Speed, performance and analysis power of the ScopeMeter® 190 Series—extended for use on medical and video applications

The ScopeMeter 190M Series are high-performance oscilloscopes in a rugged, handheld and battery powered package, offering specifications typically found on top-end bench instruments only:
- Dual-input—200 MHz or 100 MHz bandwidth
- Up to 2.5 GS/s real-time sampling per input
- Choice between a high-resolution Color display (190CM Series) or a Black & White display (190BM Series)
- Digital Persistence for analyzing complex dynamic waveforms like on an analog scope
- Fast display update rate for seeing dynamic signal behavior instantaneously
- Automatic capture and replay of 100 screens
- Connect-and-View™ automatic triggering and a full range of manual trigger modes
- Automatic and cursor measurements
- 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
- Up to 1,000V independently floating isolated inputs
- 1,000 V CAT II and 600 V CAT III safety certified
- Four hours rechargeable Ni-MH battery pack

The Fluke 190M Series offer additional capabilities targeting the service engineer dealing with Medical Imaging Equipment and Video Display Systems.

For use on medical imaging equipment and high resolution video systems, the Fluke 190M Series offer capabilities not normally found on an oscilloscope:

Current-over-Time measurement giving mAs read-out.
Using the cursors, you can measure directly the amount of radiation produced by X-ray systems or the total amount of charge applied to a system. Dual channel operation is supported, so that a secondary signal may be used for determining the cursor position and timing the measurement period. Short duration overloads, which might occur due to the cable charge current peak, are automatically ignored so as not to disrupt the measurement result.

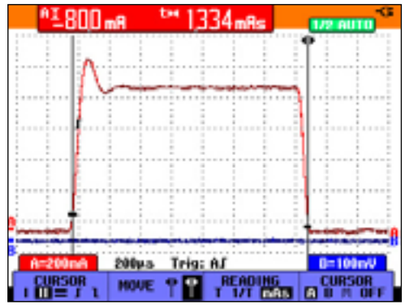
Extended Video Triggering
On top of the triggering capabilities for standard interlaced video systems that are part of the standard 190 Series, the medical extension supports triggering on high-resolution non-interlaced video systems. The 190M Series allows for detailed analysis of video information on any user selected video line (line number 1….2800), or triggering on 'all lines' from a high resolution video system.

Smart averaging
The smart averaging of the 190M Series gives an averaged curve over successive waveform acquisitions, thereby reducing noise in the displayed waveform. Thanks to smart averaging, you can also see an incidental curve of different waveshape with no effect on the averaged curve! This allows you to see the averaged curve of a sequence of video lines, for example, while also seeing the incidental fly-back line flash by! Smart averaging allows the oscilloscope to give an immediate response when the signal makes large changes, for instance when probing around different test points, while retaining the benefits associated with averaging!

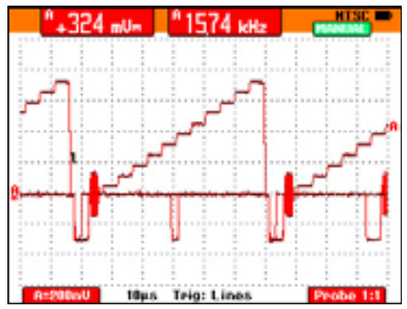
Extended offset
Vertical offset is extended in the 190M Series to a maximum of 16 divisions, allowing vertical zoom-in for study of small details of the larger amplitude signal or when a larger DC-component is included.

Digital persistence mode
The digital persistence mode that is part of the standard 190C Series gives the ScopeMeter screen a decay similar to the decay of a traditional oscilloscope's phosphor—yet the decay time is selectable! In medical applications, this feature is most beneficial when working on complex and modulated signals and for displaying the envelopes of pulsed RF-carriers, like those encountered in MRI-systems.

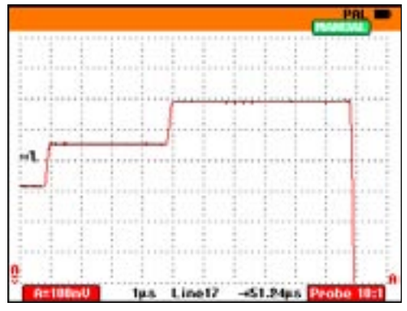
Additional accessory set MA190, suiting the specific needs of the medical imaging and video industries.
The set includes three BNC feed-through adapters, each in a safety designed and isolated enclosure: a current shunt for easy mAs-measurements, a 50 ohm terminator to provide proper termination of video output signals, and a 50 ohm terminator with 10:1 signal attenuation that ensures optimal benefit of the extended offset range of the 190M Series ScopeMeter models.
Furthermore, the set includes a safety designed BNC-cable, and test cable adapters.



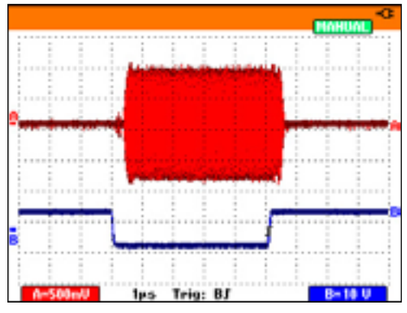
Current-over-time measurement using cursors, in dual channel mode on the Fluke 199CM



Smart averaging shows the averaged curve of repeated signal parts, as well as incidental deviations



Extended Offset is used here to zoom in a detail of a video reference line.



Persistence mode (190CM) allows for capturing the envelope of RF-pulses

Specification changes and additions
For instruments that have the Medical extension installed, the full specification of the Fluke 190C Series or Fluke 190B Series ScopeMeters applies, with the following alterations. For full details compare to the technical datasheet of the Fluke 190 Series.

Oscilloscope mode	
Acquisition and Display	
Extended offset	Max offset for positive going signals *(Fluke 190CM Series):* 16 divisions for input sensitivity settings 2 … 50 mV/div (20 … 500 mV/div when 10:1 voltage adapter or probe is used); Max offset for positive going signals *(Fluke 190BM Series):* 16 divisions for input sensitivity settings 5 … 50 mV/div (50 … 500 mV/div when 10:1 voltage adapter or probe is used); Max offset for other input sensitivity settings and for negative going signals: 8 divisions *(Fluke 190M)*
Display modes	• Glitch detect on/off • Averaging off / 2x / 4x / 8x / 64x, normal averaging or smart averaging • Digital persistence—as per main instrument • Dot join on / off *(Fluke 190CM-Series)* • Envelope on / off
Smart averaging	Displays averaged curve; incidental waveforms that differ too much from the average result waveform are displayed immediately but are not taken into account for the averaging process
Selectable persistence *Fluke 190C and 190CM Series only*	Decay time: off / short / medium / long / infinite Can be used with *dots only* or with *dot join* mode
Trigger and Delay	
Video Triggering	
Interlaced *all Fluke 190 models*	NTSC, PAL, PALplus, SECAM, positive or negative polarity Select field 1, field 2, all lines or user-selected video line
Non-interlaced *Fluke 190M models only*	For line rates up to 2800 lines per frame and scan rates up to 65 kHz; positive or negative polarity; triggers on field, on lines or on user-selected video line
Cursor Measurements	
Source	Input A, Input B, or the Mathematical result trace
Dual horizontal lines	Voltage at cursor 1 and 2, voltage between cursors
Dual vertical lines	• Time between cursors, • 1/T between cursors (in Hz), • Voltage between markers, • Risetime with markers, falltime with markers, • mVs between markers, • mAs between markers (if input channel is used in current reading mode), • kWs between markers (if used on mathematical result trace)
Single vertical line	• Min-Max and Average voltage at cursor position
Zoom	
Horizontal zoom	Up to 8x
Vertical zoom	Using position control (offset) and vertical sensitivity controls