

High performance handheld scopes BUILT TOUGH SOLUTIONS FOR EVERY NEED





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ScopeMeter[®] **Test Tool Selection Chart**

	Tec	Recommended ScopeMeter≋ Test Tool			
	Electrical	Switch gear, interlocks, motors, pumps, fans, furnaces, presses, mixers, refrigeration		123	
Industrial	Electro- Mechanical	Actuators, linear motors, pressure- level-flow-position sensors, packaging equipment	125	190-062	
	Electro- Mechanical	Industrial network physical layer signal integrity test		125	
	Process Control	Transducers/sensors, loop controllers, calibrators gauges	125	190-102	
Industrial	Automation	PLC's sensors, transducers, motion controllers, rotary encoders, scanners, readers, printers	190-202	190-204	
Electronics	Power Electrical Controllers	Inverters, based variable speed drive controllers, uninterruptable power supplies, solar inverters, backup power systems	190-502	190-204	
	Electrical	Three-phase electrical equipment	190-104	190-204	
	Medical Imaging	X–ray, MRI, ultrasound imaging equipment	199-202	190-502	
Electronics Field Service	Avionics	Flight line, navigation systems, communication systems, radar, on board aircraft control systems	199 - 202	190-502	
	A/V & Security Systems	Retail security devices, surveillance and monitoring equipment, RFID	190-202	190-502	

FLUKE ®

ScopeMeter[®] Test Tools designed for the way you work.

	120 Series			190 Series					
Model	123	124	125	190-062	190-0102	190-202	190-502	190-104	190-204
Features									
Bandwidth (MHz)	20	40	40	60	100	200	500	100	200
Sampling rate	25 MS/s Real time /1.25 Gs/S equivalent time	25 MS/s Real time /2.5 Gs/S equivalent time	25 MS/s Real time /2.5 Gs/S equivalent time	625 MS/s	1.25 GS/s	2.5 GS/s	5.0 GS/s	1.25 GS/s	2.5 GS/s
Scope input	2	2	2	2	2	2	2	4	4
Deadicated DMM	2	2	2	2	2	2	2	4	4
Dual Input Trendplot™	16 days	16 days	16 days	22 days	22 days	22 days	22 days	-	-
Four Input Trendplot™	-	-	-	-	-	-	-	> 22 days	> 22 days
ScopeRecord Mode	-	-	-	•	•	•	•	•	•
Automatic Capture and Replay mode	-	-	-	•	•	•	•	•	•
Cursors	-	٠	•	٠	•	٠	•	٠	•
Zoom	-	-	-	•	•	•	•	•	•
Bus health test mode	-	-	•	-	-	-	-	-	-
Advanced power measurements	-	-	•	•	•	•	•	•	•
Replay last 100 screens	-	-	-	•	•	•	•	•	•
Digital persistence	-	-	•	•	•	•	•	•	•
Pass fail test	-	-	•	•	•	•	•	•	•
FFT frequency Spectrum	-	-	•	•	•	•	•	•	•
Connect and View	•	•	•	•	•	•	•	•	•
EN61010-CAT III safety ratings	600 V	600 V	600 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
EN61010 CAT IV safety ratings	-	-	-	600 V	600 V	600 V	600 V	600 V	600 V
Other features									
Warranty (Years)	3-years 1-ye	s on main inst ear on accesso	rument, ries		3-years on	main instrum	ent, 1-year on	accessories	
IP Rating	-	-	-	IP-51	IP-51	IP-51	IP-51	IP-51	IP-51
Battery	7 hr NiMH	7 hr NiMH	7 hr NiMH	4 hr Li-Ion (8 hr Optional)	5 hr Li-Ion (8 hr Optional)	6 hr Li-Ion (8 hr Optional)	7 hr Li-Ion	7 hr Li-Ion	7 hr Li–Ion
Optical RS-232	•	•		-	-	-	-	-	-
Isolated USB	Optional	Optional	Optional	•	•	•	•	•	•
Isolated USB memory	-	-	-	•	•	•	•	•	•



Measure fast switching IGBT control circuits, output PWM signals simultaneously using four electrically isolated channels.

Oscilloscope two or four channels

Typical industrial electronic systems include input and output stimulus and precise feedback points to control process variables, devices or control a specific manufacturing process with a system of devices.

In order to ensure these systems operate according to specification or design, they require checking the interaction of these signals. By using a four channel oscilloscope you can easily inspect timing, amplitude and wave shape relationships uncovering time, phase or disturbances that cause degradation to a system performance and worse case device malfunction and process shutdowns.

Inverters or converters use fast switching Insulated Gate Bipolar Transistors (IGBT's) to control power to a variety of devices using pulse width modulated (PWM) techniques. Operating conditions, circuit impedances and other environmental factors can cause PWM signal disturbances like reflections, imbalance between three phases or harmonic distortions that cause insulation breakdown, overheating and potential load failures. Use a four channel oscilloscope to simultaneously inspect the three phase PWM signals identifying any signs of signal aberrations that cause load failures.





B= 1kU C= 1kU



A four channel oscilloscope

example on rotary encoders.

can inspect the timing and shape relationship for



Easily compare or check timing, amplitude and wave shape relationships across multiple test points simultaneously.

10ms Trig: AJ

Oscilloscope bandwidth, sample rate and resolution

The faster the oscilloscope sample rate, the greater the accuracy and clarity of shape and amplitude of unknown waveform phenomena like transients, induced noise and ringing or reflections.

Hi-tech electronics in today's medical, communications, navigation and military devices now routinely operate at high speeds requiring higher bandwidth. In order to correctly display at least the fifth harmonic component of a signal, a good rule of thumb is to select a scope with a bandwidth of at least five times the maximum clock rate of the device under test.

Fast digital circuits or inverter circuits producing pulses with fast edges contain an infinite spectrum of frequency components. To accurately capture and display these fast edges, another calculation to consider as a rule of thumb is the oscilloscope rise time specification should be \leq the Fastest Rise Time of Signal under test X 1/5. The new Fluke ScopeMeter test tool satisfies this with a rise time specification of 0.7 nano seconds.

When it comes to oscilloscopes, the adage is "the more you can see, the more you can fix."

Comparing the resultant complex waveform with and without the 5th harmonic reveals a significant difference in displayed shape.

To illustrate the difference between an oscilloscope with sample rate and bandwidth of 5 times the fundamental we can compare two pulses, one that includes the 5th harmonic component (blue trace) to one with up to the max frequency of only the 4th harmonic component (red trace).





48 ns HigH -328 V V2-AUTO

Blue trace includes frequency components of up to the 5th harmonic of the fundamental frequency, illustrating the significant difference in displayed shape and amplitude when compared to the red trace that includes only components up to the 4th harmonic. **FLUKE**

Blue trace includes frequency components of up to the 5th harmonic of the fundamental frequency, illustrating the significant difference in rise time and signal slew rate (dV/dt).

Accurately capture the fast pulse rising or falling edges with 5 GS/s, inspect edges for reflections or transients as a result of high speed semiconductor switches.



Built to withstand harsh environments with the highest safety ratings

Rated all the way to CAT IV

ScopeMeter test tools are rugged solutions built for industrial troubleshooting. The new Fluke 190 Series II are doubleinsulated floating oscilloscopes safety rated for measurements in CAT III 1000 V/CAT IV 600 V environments.

Measure from mV to kV safely

Independent isolated inputs allow you to make measurements in mixed circuits having different ground references reducing the risk of accidental short circuits.

Conventional bench oscilloscopes without special differential probes and isolation transformers can only reference measurements to line power earth ground.

With standard probes that cover a wide application range from mV to kV, you're ready for anything from microelectronics to heavy-duty higher voltage electrical applications.

IP-51 rated for harsh environments

Rugged and shock-proof, ScopeMeter portable oscilloscopes are built for dirty, hazardous environments. With its sealed case, it can endure dust, drips, humidity and airborne pollutants. Every time you reach for ScopeMeter you can be confident it will work reliably wherever your work takes you.

CAT IV

Overvoltage category	In brief	Examples			
CAT IV	Three-phase at utility connection, any outdoor conductors	 Refers to the "origin of installation," that is, where low-voltage connection is made to utility power Electricity meters, primary overcurrent protection equipment Outside and service entrance, service drop from pole to building, run between meter and panel Overhead line to detached building, underground line to well pump 			
CAT III	Three-phase distribution, including single- phase commercial lighting	 Equipment in fixed installations, such as switchgear and polyphase motors Bus and feeder in industrial plants Feeders and short branch circuits, distribution panel devices Lighting systems in larger buildings Appliance outlets with short connections to service entrance 			
CAT II	Single-phase receptacle connected loads	 Appliance, portable tools, and other household and similar loads Outlet and long branch circuits Outlets at more than 10 meters (30 feet) from CAT III source Outlets at more that 20 meters (60 feet) from CAT IV source 			
CAT I	Electronic	 Protected electronic equipment Equipment connected to (source) circuits in which measures are taken to limit transient overvoltages to an appropriately low level Any high-voltage, low-energy source derived from a high-winding resistance transformer, such as the high-voltage section of a copier 			

 Table 1. Overvoltage installation categories. IEC 61010 applies to low-voltage

 (< 1000 V) test equipment.</td>

Fluke. The Most Trusted Tools in the World.

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