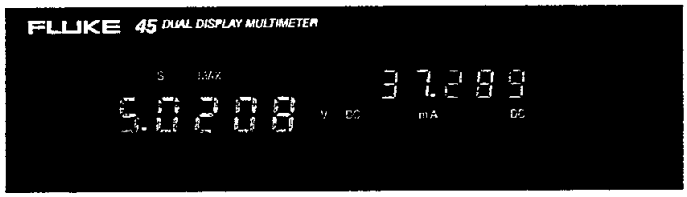
The Fluke 45 – A new standard in DMM performance, versatility and value...

. with two multifunction displays and 16 different measurement capabilities – but without the premium price.

If you need a single unit that does the work of a multitude of test instruments, then choose the feature-rich Fluke 45

The Fluke 45's multifunction dual display – another first from Fluke – opens up a whole new world of test flexibility This compact five-digit 100,000 count multimeter lets you measure two signal parameters from a single test connection – and view both measurements at the same time



The Fluke 45 delivers high performance and versatility for manufacturing test, depot and field service, as well as research and development applications You'll find features and functions usually found only in specialized, dedicated testers or larger, more expensive instruments Powerful features including

- 5-digit multifunction vacuum fluorescent dual display
- Selectable reading rates and resolutions
- True-rms voltage and current measurement, including AC + DC
- RS-232 interface standard, IEEE-488 2 option
- Frequency measurement to 1 MHz
- dB measurements with 21 selectable reference impedances from 2Ω to 8000Ω and audio power from 2Ω to 16Ω
- Compare (limits) function for quick intolerance tests
- Touch Hold®, Relative and Min/Max functions
- Closed-case calibration
- Optional rechargeable battery, carrying case, rack-mount kit and PC software

Dual display delivers concurrent views of the signal under test.

Fluke designed the 45 to satisfy virtually any measurement need The Fluke 45 allows you to select a wide variety of measurement combinations – particularly useful in applications requiring two different measurements of the same signal

Imagine, for example, being able to view the Vdc output of a power supply and the Vac ripple on the Vdc at the same time Or seeing the voltage drop across a load while measuring the current through the load

Versatile functions simplify complex measurements

The Fluke 45 has the power and the flexibility to address a complete range of measurements, including Compare (Hi/Lo/Pass) testing, audible continuity and diode testing, dB, audio power and Min/Max modes Touch Hold® and Relative make the Fluke 45 as easy to use as it is versatile

It's really a complete, turn-key measurement system – offered at a price that's much less than the host of instruments it replaces

Communications simplified through built-in interface.

The RS-232 interface, standard in each instrument, allows measurements to be printed, filed, manipulated or transmitted by modem (an optional IEEE-488 2 interface can be added without removing the RS-232 port) The "QuickStart 45" accessory software package allows effortless RS-232 communications between the Fluke 45 and an IBM PC® or compatible It also allows easy set-up of the 45 via pull-down menus and the automatic recording of data in Lotus 1-2-3™ format

Accuracy to get the job done right

The Fluke 45 is a true-rms meter, with 0 02% basic dc voltage accuracy and full five-digit, 1 μV resolution on both displays Basic dc current accuracy of 0 05% makes the Fluke 45 ideal for servicing 4-20 mA current loops

Closed-case calibration can be performed manually or over either the standard RS-232 or optional IEEE-488 2 interfaces, saving substantial time and expense, increasing uptime and calibration consistency

For special needs, add these easy-to-install options.

The Fluke 45 was designed to keep pace with your measurement needs on the bench, in a system, or in the field Without compromising accuracy or performance

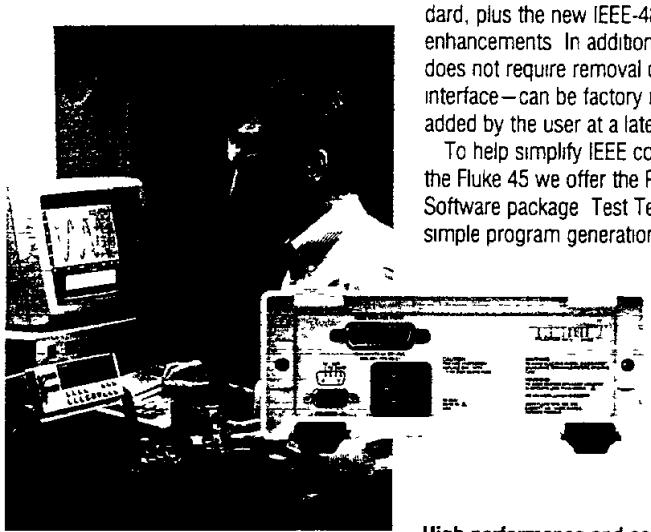
An optional rechargeable battery and soft case allow you to use the Fluke 45 in precision field-service applications A low-cost IEEE-488 2 interface and rack-mount kit are also available

Both the battery and the IEEE-488 2 options can be installed without sacrificing any of the Fluke 45's standard features

Quite simply, the Fluke 45 means precision, value and versatility

Today and tomorrow

The one meter that fits all your applications.



Standard and optional interfaces provide easy access to all functions.

Both the standard RS-232 and optional IEEE-488 2 interfaces provide total control of all Fluke 45 functions, ranges and modifiers In fact, both interfaces use the same syntax for ease of programming and consistency Either interface can also be used for closed-loop, closed-case calibration of the Fluke 45

RS-232 connection to your PC is easy.

The Fluke 45 makes an excellent stand-alone "PC instrument" for test and data acquisition applications The built-in RS-232 interface, with DB-9 connector, lets the Fluke 45 take automated measurements and down-load them directly to your PC for display, storage and processing Or it can send them via modem and phone lines to a central computer

The print mode automatically formats data for any RS-232-compatible printer for convenient printouts of your test measurements Rates for automated printing are adjustable from one reading every 5 6 hours to one every 50 ms The optional "QuickStart 45" Software Package allows automated communications and filing of measurements with the Fluke 45 and an IBM PC or compatible via RS-232

Add IEEE-488 2 capability for systems flexibility

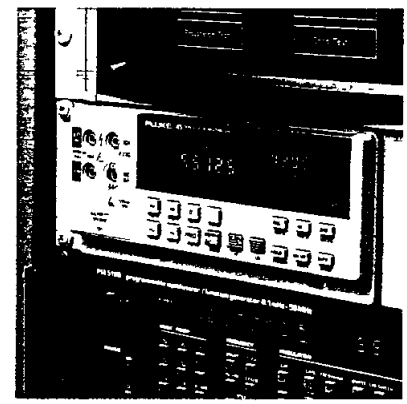
Fluke also makes an IEEE-488 2 interface and a rack-mount kit as low-cost options for IEEE system applications using the Fluke 45 The new IEEE-488 2 implementation used in the Fluke 45 covers the old IEEE-488 standard, plus the new IEEE-488 2 software enhancements In addition, this port—which does not require removal of the RS-232 interface—can be factory installed or easily added by the user at a later date

To help simplify IEEE communications for the Fluke 45 we offer the PM2240 Test Team Software package Test Team provides simple program generation for a wide array of Fluke and Philips test instruments with the National Instruments Labwindows™ programming environment for the PC

High performance and accuracy for field service.

Off the bench, the Fluke 45 gives you equally high performance Its rugged case construction and integrated bail allow you to take this instrument anywhere you need

For true portability, the optional recharge-able battery can be added without removing any other option The Fluke 45 uses lead-acid rather than nickel-cadmium batteries for bet-ter performance under a wide variety of operating conditions—whether you use the batteries a few minutes each day, or all day long The battery option offers a typical 8 hours of use between charges



For further convenience, the C40 soft carrying case includes a shoulder strap, manual compartment and a detachable pouch for test leads and accessories

High reliability and easy servicing—just what you'd expect from Fluke.

Built-in self-test functions aid in trouble-shooting and maintenance, keeping downtime to a minimum And when you need it, full product support is available through our worldwide network of technical centers

A full family of bench and system meters.

We offer a full line of multimeters for every application, no matter how specialized your needs

Fluke 8050A—True-rms with 4½ digits, 0 03% basic dc accuracy, and 9 functions including relative reference and dB

Fluke 8840A—5½ digits with 0 005% one-year basic dc volts accuracy and 0 013% basic ohms accuracy Up to 100 readings per second True-rms ac and IEEE-488 options

Fluke 8842A—5½ digits, 0 003% one-year basic dc volts accuracy with 100 nV resolution and 0 006% basic one-year ohms accuracy True-rms ac and IEEE-488 options

Philips PM2525 Multifunction Measurement Center—Volts ac and dc, current ac and dc, 2- and 4-wire ohms, frequency, capacitance, time and temperature (with optional probe)

Philips PM2534—Volts ac and dc, current ac and dc, 2- and 4-wire ohms, standard IEEE-488 interface and temperature (via the optional Pt-100 probe)

Philips PM2535—Scanner extension to the PM2534 for data collection, calculation and control capability

all the functions at your fingertips

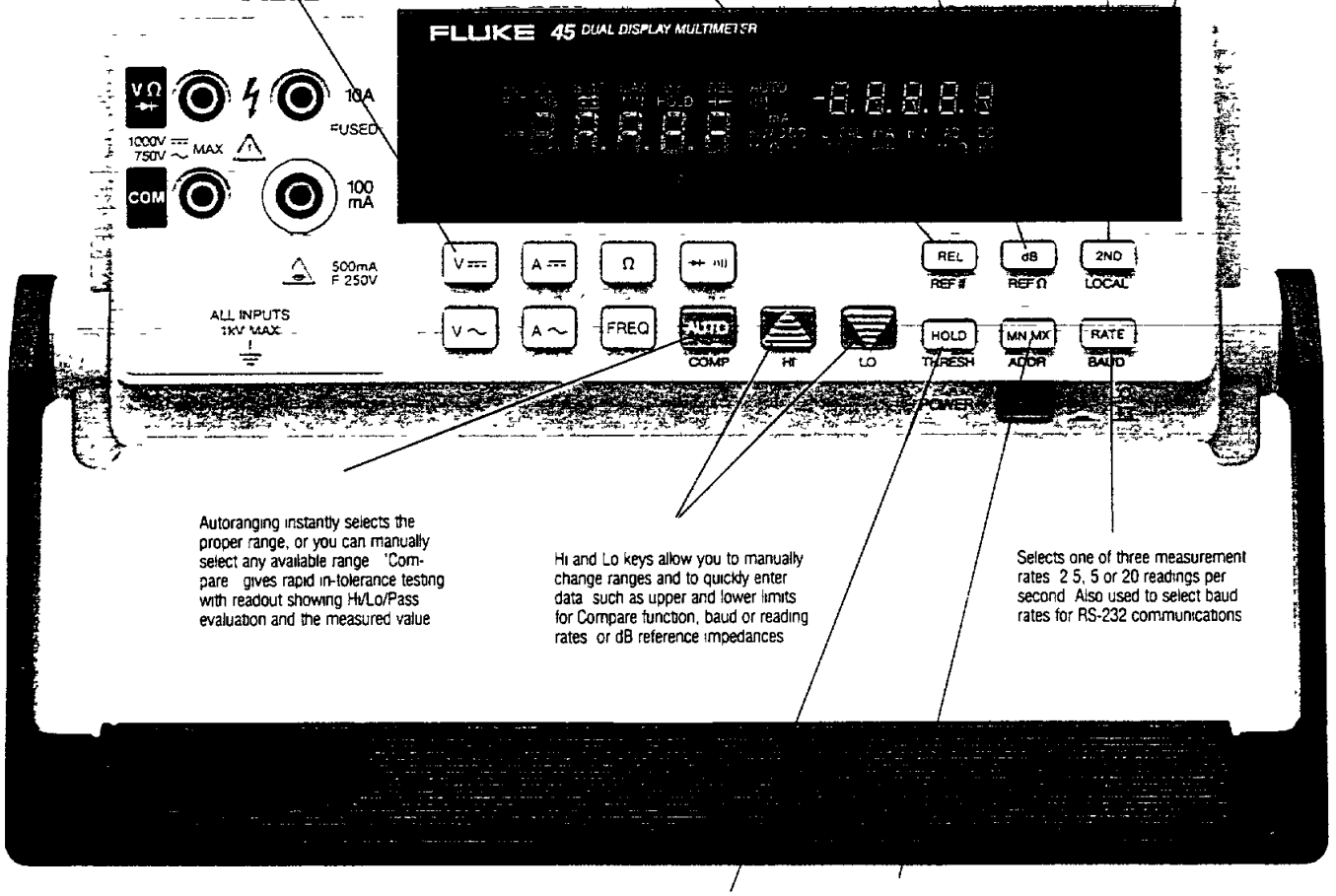
Measurements to 1000 Vdc and 750 Vac true-rms; dc and true-rms current with separate 10 mA, 30 mA, 100 mA and 10A ranges; resistance from 1 mΩ to 300 MΩ , audible continuity/diode test, 1 MHz frequency counter

The Relative mode shows changes relative to an earlier reading; test lead resistance can be nulled out during resistance measurements. Also allows entry of a specific relative reference number

Computes dB value of a measurement. Front panel selection of any of 21 reference impedances from 2Ω to 8 kΩ for decibel calculation. For 2Ω to 16Ω impedances, the meter automatically calculates and displays audio power in watts

Engages secondary display to show a measurement. Also re-selects front-panel (local) from rear-panel (remote) operation.

Large, bright vacuum fluorescent display makes reading easy in any viewing environment.



Autoranging instantly selects the proper range, or you can manually select any available range. 'Compare' gives rapid in-tolerance testing with readout showing Hi/Lo/Pass evaluation and the measured value

Hi and Lo keys allow you to manually change ranges and to quickly enter data such as upper and lower limits for Compare function, baud or reading rates or dB reference impedances

Selects one of three measurement rates: 2 5, 5 or 20 readings per second. Also used to select baud rates for RS-232 communications

Touch Hold® captures a measurement, beeps, and locks it on the display. This action is automatically repeated with each stable measurement. Also allows Touch Hold sensitivity selection

Min/Max records the highest and the lowest readings, both of which can be recalled and displayed at any time during a test. Controls setting of IEEE address and control of the data print rate over RS-232 to printer or terminal

Fluke 45 Specifications

Accuracy specifications are given as ± ([% of reading] + [number of least significant digits]) at 18°C to 28°C with relative humidity up to 90%, for a period of one year after calibration. Six months specifications are also provided for dc volts. Ac inputs are ac-coupled and true-rms responding.

Display

Dual vacuum fluorescent displays, 99,999 counts each display. Annunciators: m, M, k, V, A, Ω (ohms), Hz, →+← (diode test),))) (audible continuity), REMOTE, EXT TRIG, SMF (reading rates), MAX, MIN, dB, HOLD, REL, AUTO, ⊟ (low battery).

Resolution and accuracy are dependent on selectable reading rates of 2.5 (slow), 5 (medium) or 20 (fast) readings per second.

	Readings per Second	Full Range Display Counts
Slow	2.5	99 999
Medium	5	30,000
Fast	20	3 000

AC Voltage (true-rms, ac coupled)

Range	Resolution		
	Slow	Medium	Fast
300 mV	—	10 μV	100 μV
3V	—	100 μV	1 mV
30V	—	1 mV	10 mV
300V	—	10 mV	100 mV
750V	—	100 mV	1V
100 mV	1 μV	—	—
1000 mV	10 μV	—	—
10V	100 μV	—	—
100V	1 mV	—	—
750V	10 mV	—	—

Resolution – Decibels		
Slow/ Medium	Fast	
0.01 dB	0.1 dB	5% to full equivalent linear range
0.1 dB	1 dB	1% to 5% of equivalent linear range
1 dB	1 dB	below 1% of equivalent linear range

(AC + DC) Voltage (calculated):

Total measurement error will not exceed the sum of the separate ac and dc accuracy specifications, plus one display count.

DC Voltage

Ranges	Resolution			Accuracy (6 month)	Accuracy (1 year)
	Slow	Medium	Fast		
300 mV	—	10 μV	100 μV	0.02% + 2	0.025% + 2
3V	—	100 μV	1 mV	0.02% + 2	0.025% + 2
30V	—	1 mV	10 mV	0.02% + 2	0.025% + 2
300V	—	10 mV	100 mV	0.02% + 2	0.025% + 2
1000V	—	100 mV	1V	0.02% + 2	0.025% + 2
100 mV	1 μV	—	—	0.02% + 6	0.025% + 6
1000 mV	10 μV	—	—	0.02% + 6	0.025% + 6
10V	100 μV	—	—	0.02% + 6	0.025% + 6
100V	1 mV	—	—	0.02% + 6	0.025% + 6
1000V	10 mV	—	—	0.02% + 6	0.025% + 6

Input Impedance 10 MΩ in parallel with < 100 pF
Normal Mode Rejection Ratio. > 80 dB at 50 or 60 Hz, slow and medium rates
> 54 dB for frequencies between 50 and 440 HZ, slow and medium rates
> 60 db at 50 Hz, fast rate
Common Mode Rejection Ratio > 90 dB at dc, 50 or 60 Hz (1 kΩ unbalanced, medium and slow rates)
Overload Protection 1000V dc or peak ac on any range

AC Voltage (accuracy)

Frequency	Linear Accuracy			dB Accuracy		Power*	Maximum Input At Upper Frequency
	Slow	Medium	Fast	Slow/Med	Fast		
20-50 Hz	1%+100	1%+10	7%+2	0.15	0.72	2%+10	750V
50 Hz-10 kHz	0.2%+100	0.2%+10	0.5%+2	0.08	0.17	0.4%+10	750V
10-20 kHz	0.5%+100	0.5%+10	0.5%+2	0.11	0.17	1%+10	750V
20-50 kHz	2%+200	2%+20	2%+3	0.29	0.34	4%+20	750V
50-100 kHz	5%+500	5%+50	5%+6	0.70	0.78	10%+50	750V

* Error in power mode will not exceed twice the linear accuracy specification.

Accuracy specifications apply with the following limits, based on reading rate:
Slow—Between 15,000 counts and full range
Medium—Between 1,500 counts and full range
Fast—Between 150 counts and full range
Input Impedance 1 MΩ in parallel with < 100 pF
Maximum Crest Factor 3.0
Common Mode Rejection Ratio: > 60 dB at 50 or 60 Hz (1 kΩ unbalanced medium rate)
Maximum Input: 750V rms, 1000V peak
2×10^7 volt-hertz product on any range, normal mode input
1×10^6 volt-hertz product on any range, common mode input

Ohms

Range	Resolution			Accuracy	Typical Full Scale Voltage	Maximum Current Through The Unknown
	Slow	Medium	Fast			
300 Ω	—	10 mΩ	100 mΩ	0.05%+5+0.02Ω	0.25	1 mA
3 kΩ	—	100 mΩ	1Ω	0.05%+2	0.24	120 μA
30 kΩ	—	1Ω	10Ω	0.05%+2	0.29	14 μA
300 kΩ	—	10Ω	100Ω	0.05%+2	0.29	1.5 μA
3 MΩ	—	100Ω	1 kΩ	0.06%+2	0.30	150 nA
30 MΩ	—	1 kΩ	10 kΩ	0.25%+3	2.25	320 nA
300 MΩ	—	100 KΩ	1 MΩ	2%	2.90	320 nA
100Ω	1 MΩ	—	—	0.05%+8+0.02Ω	0.09	1 mA
1000Ω	10 MΩ	—	—	0.05%+8+0.02Ω	0.10	120 μA
10 KΩ	100 MΩ	—	—	0.05%+8	0.11	14 μA
100 KΩ	1Ω	—	—	0.05%+8	0.11	1.5 μA
1000 KΩ	10Ω	—	—	0.06%+8	0.12	150 nA
10 MΩ	100Ω	—	—	0.25%+6	1.50	150 nA
100 MΩ	100 KΩ	—	—	2%+2	2.75	320 nA

Open Circuit Voltage 3.2V maximum on 100Ω, 300Ω, 30 MΩ, 100 MΩ and 300 MΩ ranges, 1.5V maximum on all other ranges
Input Protection. 500V dc or ac rms on all ranges

DC Current

Range	Resolution			Accuracy	Typical Full Scale Burden Voltage
	Slow	Medium	Fast		
30 mA	—	1 μA	10 μA	0 05%+3	0 45V
100 mA	—	10 μA	100 μA	0 05%+2	1 4V
10A	—	1 mA	10 mA	0 2%+5	0 25V
10 mA	100 nA	—	—	0 05%+20	0 14V
100 mA	1 μA	—	—	0 05%+5	1 4V
10A	100 μA	—	—	0 2%+7	0 25V

Maximum Input· To be used in protected low-energy circuits only, not to exceed 250V or 4800 volt-amps
mA—300 mA dc or ac rms Protected with a 500 mA, 250V, IEC 127 sheet fast blow fuse
A—10A dc or ac rms continuous or 20A dc or ac rms for 30 seconds maximum Protected with a 15A, 250V 10,000A interrupt rating fast blow fuse

AC Current (true-rms, ac coupled)

Range	Resolution			Typical Full Scale Burden Voltage
	Slow	Medium	Fast	
10 mA	100 nA	—	—	0 14V
30 mA	—	1 μA	10 μA	0 45V
100 mA	1 μA	10 μA	100 μA	1 4V
10A	100 μA	1 mA	10 mA	0 25V

Range	Frequency	Accuracy		
		Slow	Medium	Fast
mA	20-50 Hz	2%+100	2%+10	7%+2
mA	50 Hz-10 kHz	0 5%+100	0 5%+10	0 8%+2
mA	10-20 kHz	2%+200	2%+20	2%+3
A	20-50 Hz	2%+100	2%+10	7%+2
A	50 Hz-2 kHz	1%+100	1%+10	1 3%+2
A (0 5A to 1A)	20-50 Hz	2%+300	2%+30	7%+4
A (0 5A to 1A)	50 Hz-2 kHz	1%+300	1%+30	1 3%+4

Accuracy specifications apply within the following limits, based on reading rate
Slow—Between 15,000 counts and full range
Medium—Between 1,500 counts and full range
Fast—Between 150 counts and full range
Maximum Input: To be used in protected, low-energy circuits only, not to exceed 250V or 4800 volt-amps
mA—300 mA dc or ac rms Protected with a 500 mA, 250V, IEC 127-sheet fast blow fuse
A—10A dc or ac rms continuous or 20A dc or ac rms for 30 seconds maximum Protected with a 15A, 250V, 10,000A interrupt rating fast blow fuse
Maximum Crest Factor 3 0

(AC + DC) Current (calculated):

Total measurement error will not exceed the sum of the separate ac and dc accuracy specifications, plus one display count

Diode Test/Continuity

	Maximum Reading	Resolution
Slow	999 99 mV	10 μV
Medium	2 5V	100 μV
Fast	2 5V	1 mV

Test Current· Approximately 0 7 mA when measuring forward bias junction
Audible Tone Continuous tone for continuity Brief tone for normal forward biased diode or semiconductor junction
Open Circuit Voltage 3 2V maximum
Continuity Capture Time 50 μs maximum, 10 μs typical
Input Protection. 500V dc or ac rms

Frequency

Frequency Range· 5 Hz to > 1 MHz
Accuracy 0 05% + 1,
except 1000 Hz range, 0 05% + 2

Range	Resolution	
	Slow/Medium	Fast
1000 Hz	10 mHz	100 mHz
10 kHz	100 mHz	1 Hz
100 kHz	1 Hz	10 Hz
1000 kHz	10 HZ	100 Hz
1 MHz*	100 Hz	1 kHz

*Specified to 1 MHz, but will measure above 1 MHz

Sensitivity of AC Voltage	
Frequency	Level
5 Hz-100 kHz	30 mV rms sinewave
100 kHz-300 kHz	100 mV rms sinewave
300 kHz-1 MHz	1 V rms sinewave
above 1 MHz	Not specified

Sensitivity Level of AC Current		
Frequency	Input	Level
5 Hz-20 kHz	100 mA	> 3 mA rms sinewave
45 Hz-2 kHz	10A	> 3A rms sinewave