

## INTRODUCTION

Model 45 has maximum reading of 19,999 counts and 4-½ digits. This has extra large characters backlit LCD display with full function full measurement and full overload protection as well as a good product design outlook. In addition the conventional features include DC/AC voltage, DC/AC current, resistance, frequency, capacitance, temperature °C, Transistor hFE, diode and continuity buzzer.

## SAFETY INFORMATION

This Meter complies with the standards IEC61010-1 in pollution degree 2, overvoltage category (CAT II 1000V) and double insulation.

## GENERAL SPECIFICATION

- Maximum Voltage between terminal input and COM : 1000V ( except 200mV, 230V)
- $\mu$ A mA terminal input protection: (CE) 250mA 265V auto recovery fuse
- 10A terminal input protection: (CE) F1 (10A H 250V) Fast type melted fuse  $\Phi$ 5x20mm
- Resistance input protection: PTC/250V
- Capacitance input protection: (CE) F2, F3 (0.5A H 250V) Fast type melted fuse  $\Phi$ 5x20mm
- Frequency input protection: PTC/250V
- Temperature input protection: (CE) 250mA 265V fuse
- Terminal input protection: PTC/250V
- hFE input protection: (CE) 250mA 265V auto recovery fuse, F3 (0.5A H 250V) Fast type melted fuse  $\Phi$ 5x20mm
- Display: LCD full function signal display, maximum reading is 19999 Updates 2-3 times / second
- Range: Manual
- Data Hold to Freeze the displayed data
- Backlit LCD
- Polarity Display: Auto
- Overload indication: 1
- Battery Deficiency:



- Operating Temperature: 0 ~ 40°C (32°F ~ 104°F)
- Storing Temperature: -10 ~ 50°C (14°F ~ 122°F)
- Relative Humidity: 0°C ~ 30°C below  $\leq$ 75% 30°C~40°C  $\leq$ 50%
- Electromagnetic Field: Under 1V/m the influence of radiated radio-frequency electromagnetic field phenomenon, Total accuracy= specific accuracy+ measurement 5%, Over 1V/m radiated radio-frequency electromagnetic which do not have any reference data on this topic.
- Power: AC (external power adapter AC220V / DC9V-200mA) or DC (internal battery type 2 R14/1.5V 6 pieces)
- Product size: (300x245x105)mm
- Product Net Weight : About1500g (without the accessories)
- Safety Compliances : IEC 61010: CATII1000V

## ACCURACY SPECIFICATIONS

**Accuracy:**  $\pm$ (% reading + digits), guarantee for 1 year

**Operating temperature:** 18°C ~ 28°C

**Environmental humidity:** Less than 75%RH

\*Technical Specifications & Appearance are subject to change without prior notice

### DC Voltage

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
200mV	0.01V	$\pm(0.1\% + 5)$
2V	0.1mV	
20V	1mV	$\pm(0.1\% + 3)$
200V	10mV	
1000V	0.1V	$+(0.2\% + 5)$

**Input Impedance:** is average on 10M $\Omega$ .

**Maximum Voltage Input:** 1000V (Except 200mV, 250V)

### AC Voltage

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
2V	0.01mV	$+(0.5\% + 20)$
20V	1mV	
200V	10mV	$\pm(0.8\% + 40)$
1000V	0.1V	

**Input Impedance:** about 2M $\Omega$ .

**Maximum Voltage Input:** 750Vrms

**Frequency:** 45Hz ~ 400Hz

**Display:** True RMS

### DC Current

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
200 $\mu$ A	0.01 $\mu$ A	$\pm(0.5\% + 20)$
2mA	0.1 $\mu$ A	
20mA	1 $\mu$ A	
200mA	0.01mA	$\pm(1.5\% + 40)$
10A	1mA	

\*When  $\leq 5A$ , Continuous measurement less than 10 seconds at an interval more than 15 minutes.

### AC Current

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
2mA	0.1 $\mu$ A	$\pm(0.8\% + 40)$
20mA	1 $\mu$ A	
200mA	0.01mA	
10A	1mA	$\pm(2.0\% + 40)$

**Frequency:** 45Hz ~ 400Hz

\*When  $\leq 5A$ , Continuous measurement less than 10 seconds at an interval more than 15 minutes.

### Resistance

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
200 $\Omega$	0.01 $\Omega$	$\pm(0.5\% + 10)$
2k $\Omega$	0.1 $\Omega$	
20k $\Omega$	1 $\Omega$	
200k $\Omega$	10 $\Omega$	
2M $\Omega$	100 $\Omega$	
200M $\Omega$	10k $\Omega$	$\pm(5\% + 40)$

When  $>100M\Omega$  resistance measurement as reference purpose..

### Capacitance

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
20nF	1pF	$\pm(4\% + 10)$
2 $\mu$ F	100pF	
200 $\mu$ F*	10nF	$\pm(5\% + 10)$

\* $>40\mu$ F capacitance measurement as reference purpose.

### Frequency

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
2kHz	0.1Hz	$\pm(1.5\% + 5) \pm(1.2\% + 10)$
200kHz	10Hz	

### Input Amplitude a:

(2kHz range)  $50mV \leq a \leq 30Vrms$


(200kHz range)  $150mV \leq a \leq 30Vrms$

### Temperature

Range	Resolution	Accuracy Tolerance: $\pm(\% \text{ Reading} + \text{Digits})$
-40 ~ 20°C	0.1°C	$\pm(8\% + 40)$
$>-20^\circ C$ 0°C		$\pm(1.2\% + 30)$
$>0$ -100°C		$\pm(1.2\% + 25)$
$>100$ ~ 1000°C		$\pm(2.5\% + 20)$


\* Thermocouple: It is suitable to use K type thermocouple. This include point contact K type thermocouple can only be used on less than 230°C temperature measurement.

### Diode Test

Range	Resolution	Remarks
	0.1mV	Open circuit voltage is around 3V, Silicon junction drops between 0.5 ~ 0.8V as the normal value.

\* Thermocouple: It is suitable to use K type thermocouple. This include point contact K type thermocouple can only be used on less than 230°C temperature measurement.

### Continuity Test

Range	Resolution	Remarks
	0.1 $\Omega$ *	Open circuit voltage is approximate 3V

$\leq 10\Omega$ , buzzer beeps.

### Transistor hFE

Range	Resolution	Remarks
hFE	0.1 $\beta$ *	Ib0 is about 10 $\mu$ A, Vce is about 2.5V

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