1320/1330

DIGITAL MULTIMETER

Operation Manual

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1320/1330 DIGITAL MULTIMETER

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Safety Instruction

- Before operating this product, please read carefully the safety symbols and definitions described here.
- This product complies with class Ⅰ safety specifications.
- Installation category (overvoltage category)：ClassⅡ.
- Before operating this product, please check the voltage requirements and specifications as described in this operating manual.
- Proper grounding refers to the proper connection from the grounding point of the power source to the grounding terminal of this product.

Safety Symbols


Earth (Ground) Terminal


Protective Conductor Terminal

ON(SUPPLY)

OFF(SUPPLY)


Caution, risk of electric shock


Caution (refer to accompanying words)

Warning

- Any grounding terminal or earth terminal can generate electrical conductivity that may harmor endanger the user.
- When operating this product, please place it in a well-ventilated environment.
- Do not place this product in an area that is directly exposed to sunlight or under high humidity.
- When you need to clean the outer surface of the product, use a clean and dry cloth.

1320/1330 DIGITAL MULTIMETER

1. Overview

The **1320/1330** is a portable, bench type digital multimeter with 3 1/2 digits / 4 1/2 digits LED display.

It measures DC voltage, AC voltage, DC current, AC current, ohm and also tests diode with 2K Ω range suggested. The basic accuracy of **1320** is 0.1% and that of **1330** is 0.03%.

1.1 Introduction

The **1320/1330** has the following features

- Total 28 ranges for measurements.
- Current measurement up to 20A.
- AC voltage measurement up to 50KHz and AC current measurement up to 20KHz.
- True RMS for AC measurements.
- AC or AC+DC can be selected.
- All ranges with over protection. The current measurement at 2A terminal is also protected by a

2A/250V fuse. The current measurement at 20A terminal is also protected by a 20A/250V fuse.

- Overrange can be indicated by continuously flashing the display.
- Negative polarity can be displayed.
- Meets EMC requirements (CE marked).

1.2 Unpacking and Checking

Your **1320/1330** is packed in polyfoam to protect it during shipment. You should keep this material, as well as the shipping box, in case the unit must be moved or shipped again.

The box should include the following items:

Model **1320/1330** Function Generator

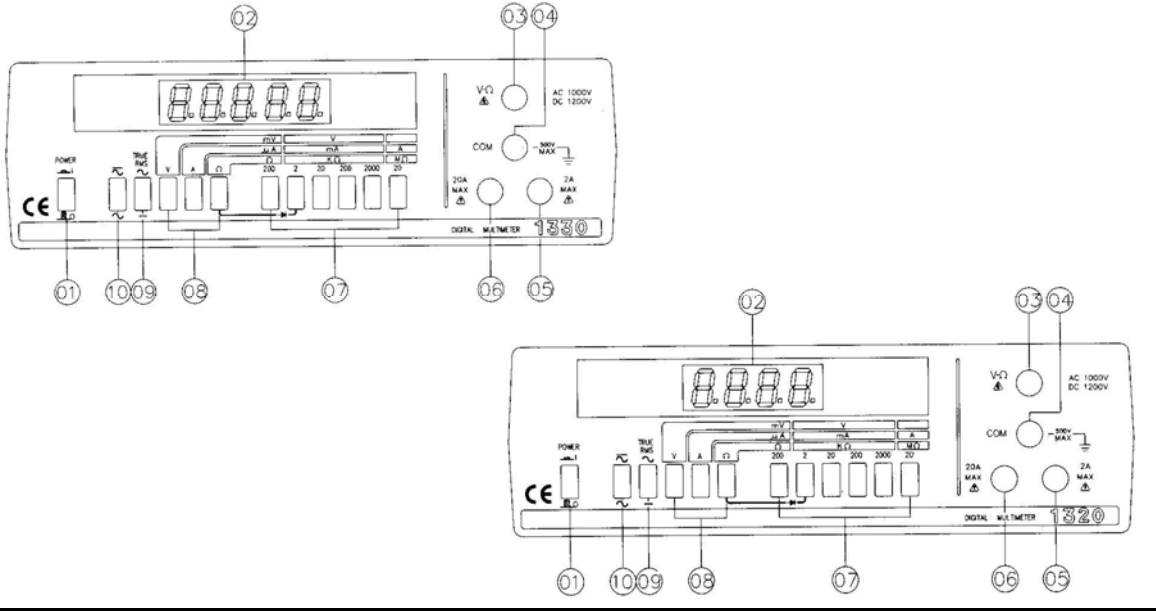
Removable AC line cord

Banana-Probe ACS-018

Operation manual

Please check to see that all of the above items are included. You should contact your sales if anything is missing.

2. Front and Rear Panels



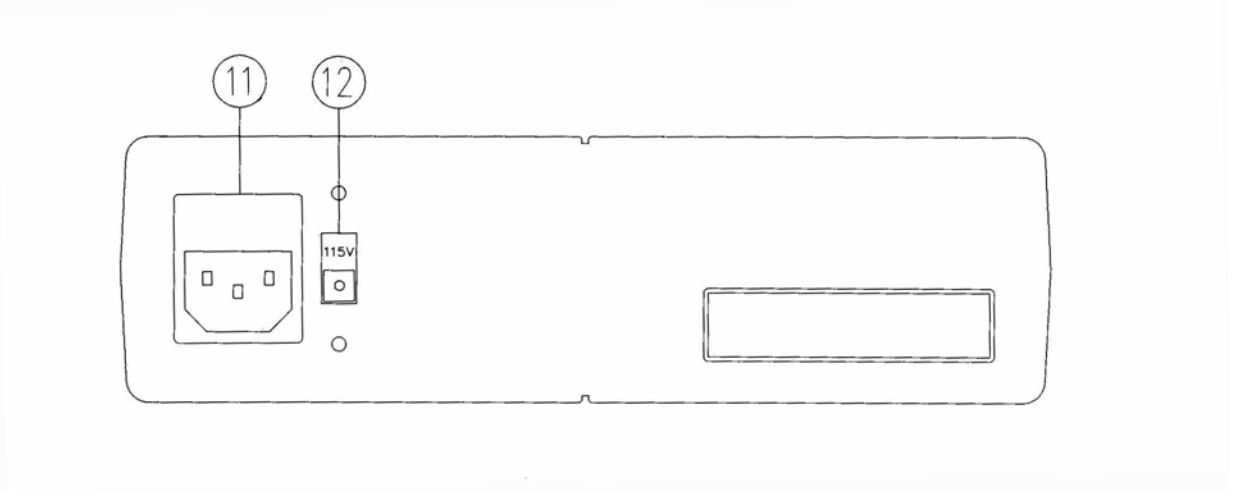


Figure 1 Front and Rear Panels

The following is an explanation of the function of each of the front and rear panel controls and connectors. You should refer to Figure 1 for the location of each control /connector.

1320/1330 DIGITAL MULTIMETER

1. POWER

This is the main power switch.

2. DISPLAY

These are 0.5", green 7-segment LEDs. The **1320** has 3 1/2 digits to display the full scale of 1999 or -1999, while the **1330** has 4 1/2 digits to display the full scale of 19999 or -19999. When overrange, all the digits continuously flash.

3. V-Ω

This is input terminal for measuring voltage and ohm. The maximum input voltage is 1200VDC or 1000VAC.

4. COM

This is common terminal for all the **V-Ω(3)**, **20A(6)**, **2A(5)** terminals. The maximum voltage between this terminal and earth(ground) is 500V.

5. 2A

This is current input terminal for ranges under 2000mA. It is 2A fuse protected and the maximum input current is 2A.

6. 20A

This is current input terminal only for 20A range. It is 20A fuse protected and the maximum input corrent is 20A.

7. RANGE

This bank of switches is used to select the measurement range of **V/A/Ω(8)** mode, please refer to *Table 1-1* for 1320 & *Table 1-2* for 1330.

full scale / unit display	200	2	20	200	2000	20
mV. V	199.9mV	1.999V	19.99V	199.9V	1200V(DC) 1000V(AC)	×
uA. mA. A	199.9μA	1.999mA	19.99mA	199.9mA	1999mA	19.99A
Ω. KΩ. MΩ	199.9Ω	1.999KΩ	19.99KΩ	199.9KΩ	1999KΩ	19.99MΩ

Table 1-1

full scale / unit / display	200	2	20	200	2000	20
mV. V	199.99mV	1.9999V	19.999V	199.99V	1200.0V(DC) 1000.0V(AC)	×
uA. mA. A	199.99μA	1.9999mA	19.999mA	199.99mA	19999mA	19.999A
Ω. KΩ. MΩ	199.99Ω	1.9999KΩ	19.999KΩ	199.99KΩ	19999KΩ	19.999MΩ

Table 1-2

8. V/A/Ω

This bank of switches is used to select the measurement mode of voltage/current/ohm.

9. TRUE RMS ∿/ ⎓

When the switch is pushed in, it is True RMS AC voltage or AC current measurement. When pushed out, it is DC voltage or DC current measurement. This selectable function is available when V or A is selected at **V/A/Ω(8)** switch.

10. ⎓/ ∿

When the switch is pushed in, both the AC component and DC component are measured and displayed by the True RMS (Root Mean Square) converter. When pushed out, the DC component is blocked and only AC component is measured and displayed by the True RMS converter. This selectable function is only available in AC voltage and AC current measurement modes.

11. POWER SOCKET WITH FUSE HOLDER

There are two fuses in side the fuse holder. One of them is for spare use.

12. POWER VOLTAGE SELECTOR

There are two voltages 115V and 230V can be selected. The tolerance is ±10%.

3. Operation

3.1 Instrument Turn-on

WARNING

Before applying power to your **1320/1330** , make sure that the **POWER VOLTAGE SELECTOR(12)** is correctly set for your power source.

3.2 Operation Procedure

A. Push on the **POWER(1)** switch, The **DISPLAY(2)** will light.

B. Select measurement mode at the **V/A/Ω(8)** switch.

C. Set AC measurement or DC measurement at the **TRUE RMS ∿ / ⎓ (9)** switch.

D. If AC measurement is set, please make sure whether you want to measure all the AC+DC voltage by setting **∿ (10)** or AC component only by setting the **∿ (10)**.

E. Select the **RANGE(7)** switch to get a suitable range for measurements, please refer to *Table 1-1* & *Table 1-2*.

F. Use **V-Ω(3)** terminal and **COM(4)** terminal to measure voltage and ohm. Use **2A(5)** terminal and **COM(4)** terminal to measure current under 2000mA range. Use **20A(6)** terminal and **COM(4)** terminal to measure current at 20A **RANGE(7)**.

G. If you want to measure the resistance of a diode, 2KΩ range is suggested because the output current is 1mA.

4. Operation Cautions

A. To assure operation within the listed specifications, allow the unit to warm up and stabilize for at least 20 minutes.

B. Do not measure DCV over 1200V or ACV over 1000V at **V-Ω(3)** terminal when measure DCV or ACV.

C. Do not measure current over 2A at **2A(5)** terminal. The circuit is protected by a 2A fuse on PCB. Be careful that sometimes the circuit is damaged by over current before the fuse is blown out.

D. Do not measure current over 20A at **20A(6)** terminal. When you measure current over 5A, please shorten the measuring time as quickly as possible. The circuit is protected by a 20A fuse on PCB.

E. Do not supply voltage over 250V at **V-Ω(3)** terminal when measure ohm.

F. For keeping the best measuring condition, the following datas should be noted.
Input resistance: 10MΩ for all DCV ranges.
Input impedance: 10MΩ//100pF for all ACV ranges.

Internal resistance:
for current measurement

ranges	200uA	2mA	20mA	200mA	2A	20A
Internal resistance	1KΩ	100Ω	10Ω	1Ω	0.1Ω	0.01Ω

Table 2

Measuring current:
for ohm measurement

ranges	200Ω	2KΩ	20KΩ	200KΩ	2000KΩ	20MΩ
Measuring current	1mA	1mA	100μA	1μA	1μA	0.1μA

Table 3

5. Maintenance

5.1 Cleanness

Please clean outer casing with dry cloth and do not release the outer casing except maintenance staffs.

5.2 Changing the Fuse

A. The current range protection fuse.
This fuse is located on the PCB. In case it is blown out, please change a new one with the same specification(F1:T2.0A/250V, F3:T20A/250V).

B. The power fuse.
Replace the fuse with one of the same rating. Refer to *Table 4* for the type of fuse used for different input voltage.

NOTE: Unplug the power cord before you change the fuse.

5.3 Changing the Input Voltage

To change the voltage, follow these steps:

1. Use a flathead screwdriver to switch the **POWER VOLTAGE SELECTOR(12)** to meet the correct AC input voltage.
2. Refer to the correct fuse rating on *Table 4*. Use a flathead screwdriver to open the **cover of FUSE HOLDER(11)** and change the correct fuse.

Model	Fuse Time-Delay Type 5x20mm	
	115V	230V
1320/1330	T125mA/250V	T80mA/250V

Table 4 Fuse Specification

5.4 Environment

Operating temperature : + 5℃ ~ + 40℃
Operating moisture : 80% (+ 5℃ ~ + 31℃) , 50% (+ 31℃ ~ + 40℃)
Storage temperature : -20℃ ~ + 70℃
Storage moisture : under 80%

6. Specifications

ITEM	1320	1330
EMC Requirements	Yes	
DC VOLTAGE MEASUREMENT		
Range	±199.9mV, ±1.999V, ±19.99V, ±199.9V, ±1200V, 5 Ranges	±199.99mV, ±1.9999V, ±19.999V, ±199.99V, ±1200V 5 Ranges
Accuracy	±(0.1%＋1d)	±(0.03%＋4d)
Input Impedance	10MΩ	
AC VOLTAGE MEASUREMENT（AC or AC＋DC True RMS）		
Range	199.9mV, 1.999V, 19.99V, 199.9V 1000V 5 Ranges	199.99mV, 1.9999V, 19.999V, 199.99V 1000V 5 Ranges

Accuracy	199.9mV ~ 199.9V 4 Ranges 45Hz ~ 2KHz ±(0.5%＋1d), 2KHz ~ 10KHz ± (1%＋1d), 10KHz ~ 20KHz ±(2%＋ 1d), 1000V Range 45Hz ~ 1KHz ± (0.5%＋2d).	199.99mV ~ 199.99V 4 Ranges 45Hz ~ 2KHz ±(0.5%＋15d), 2KHz ~ 10KHz ± (1%＋15d), 10KHz ~ 20KHz ±(2%＋ 15d), 20KHz ~ 50KHz ±(5%＋30d), 1000V Range 45Hz ~ 1KHz ±(0.5%＋ 15d).
Input Impedance	10MΩ // 100pF	
DC CURRENT MEASUREMENT		
Range	±199.9μA, ±1.999mA, ±19.99mA, ±199.9mA, ±1999mA, ±19.99A, 6 Ranges	±199.99μA, ±1.9999mA, ±19.999mA, ±199.99mA, ±1999.9mA, ±19.999A, 6 Ranges
Accuracy	199.9μA ~ 199.9mA 4 Ranges ±(0.2% ＋1d) 1999mA ~ 19.99A 2 Ranges ±(0.3%＋ 1d)	199.99μA ~ 199.99mA 4 Ranges ± (0.2%＋2d) 1999.9mA ~ 19.999A 2 Ranges ±(0.3% ＋2d)

Protection	T2A/250V DC or RMS 【Fuse Protected】 for 199.9μA ~ 1999mA T20A/250V DC or RMS 【Fuse Protected】for 19.99A	T2A/250V DC or RMS【Fuse Protected】 for 199.99μA ~ 1999.9mA T20A/250V DC or RMS 【Fuse Protected】for 19.999A
AC CURRENT MEASUREMENT (AC or AC+DC True RMS)		
Range	199.9μA, 1.999mA, 19.99mA, 199.9mA, 1999mA, 19.99A 6 Ranges	199.99μA, 1.9999mA, 19.999mA, 199.99mA, 1999.9mA, 19.999A 6 Ranges
Accuracy	199.9μA ~ 199.9mA 4 Ranges 45Hz ~ 2KHz ±(0.5%＋1d), 2KHz ~ 10KHz ±(1%＋1d), 10KHz ~ 20KHz ±(2%＋1d) 1999mA ~ 19.99A 2 Ranges 45Hz ~ 2KHz ±(0.5%＋1d)	199.99μA ~ 199.99mA 4 Ranges 45Hz ~ 2KHz ±(0.5%＋15d), 2KHz ~ 10KHz ±(1%＋15d), 10KHz ~ 20KHz ±(2%＋15d) 1999.9mA ~ 19.999A 2 Ranges 45Hz ~ 2KHz ±(0.5%＋15d)

Protection	T2A/250V DC or RMS 【Fuse Protected】 for 199.9μA ~ 1999mA T20A/250V DC or RMS 【Fuse Protected】for 19.99A	T2A/250V DC or RMS【Fuse Protected】 for 199.99μA ~ 1999.9mA T20A/250V DC or RMS 【Fuse Protected】for 19.99A
OHM MEASUREMENT		
Range	199.9Ω, 1.999KΩ, 19.99KΩ, 199.9KΩ, 1.999MΩ, 19.99MΩ, 6 Ranges	199.99Ω, 1.9999KΩ, 19.999KΩ, 199.99KΩ, 1.9999MΩ, 19.999MΩ, 6 Ranges
Accuracy	199.9Ω Range ±(0.1%＋1d) 1.999KΩ ~ 1.999MΩ 4 Ranges ± (0.1%＋1d) 19.99MΩ Range ±(0.25%＋2d)	199.99Ω Range ±(0.1%＋4d) 1.9999KΩ ~ 1.9999MΩ 4 Ranges ± (0.1%＋2d) 19.999MΩ Range ±(0.25%＋2d)
Diode Test	Yes	
GENERAL		
Display	0.5", 3 1/2 Digits Green LED Display	0.5", 4 1/2 Digits Green LED Display

Power Source	ACV 115V / 230V, ±10%, 60Hz / 50Hz
DIMENSION	
Mchine(mm)	262×85×260
Package(mm)	387×192×347
Gross Weight	2.65Kg
Net Weight	1.8Kg
Accessories	ACS-018 X 1, Operation Manual X 1