SECTION I
GENERAL INFORMATION

1-1. DESCRIPTION

1-2. The Model 4328A Milliohmmeter (Fig. 1-1) is a portable instrument designed to measure low resistance with speed and accuracy. Covering a resistance range of .001Ω to 100Ω, the instrument uses a Kelvin Bridge method to obtain high sensitivity. Although the 4 terminal method is used to insure accuracy, only 2 probes placed on each end of the sample are used in the actual measurement.

1-3. To avoid measurement errors due to thermal emfs, contact potential differences and electrolytic polarization, the measurement utilizes a 1kHz signal, and is insensitive to d. c. errors.

1-4. In the measurement of contact resistance of components used in low level signal circuits, switches, relays and connectors, the measurement voltage applied should be less than 20mV peak so that thin insulating films are protected from breakdown. With the 4328A, voltage across samples is less than 200μV peak on any range (when proper range setting used), and a maximum voltage of 20mV if incorrect range settings are used.

1-5. The 4328A can be used to measure heat-sensitive samples because the power dissipation in samples is very low. Voltage applied to samples is automatically limited to permit safe measurement of fuses and explosives.

1-6. A unique phase discriminator in the meter circuit insures accurate measurement of samples with series reactance up to twice full scale resistance.

1-7. 150V superimposed dc bias may be present on samples during measurement. Thus, direct measurement of incremental resistance of back biased diodes may be performed, permitting use of the 4328A in the design of semiconductor circuitry.

1-8. Complete specifications of the Model 4328A are given in Table 1-1.

1-9. ACCESSORIES FURNISHED

1-10. Model 16005A Clip-type probe, 16006A Pin-type probe and 16007A B Test Leads are furnished; these probes or test leads may be "mixed or matched" in any configuration determined by the form of the sample to be measured. Also detachable power cord is supplied with the Model 4328A Milliohmmeter.

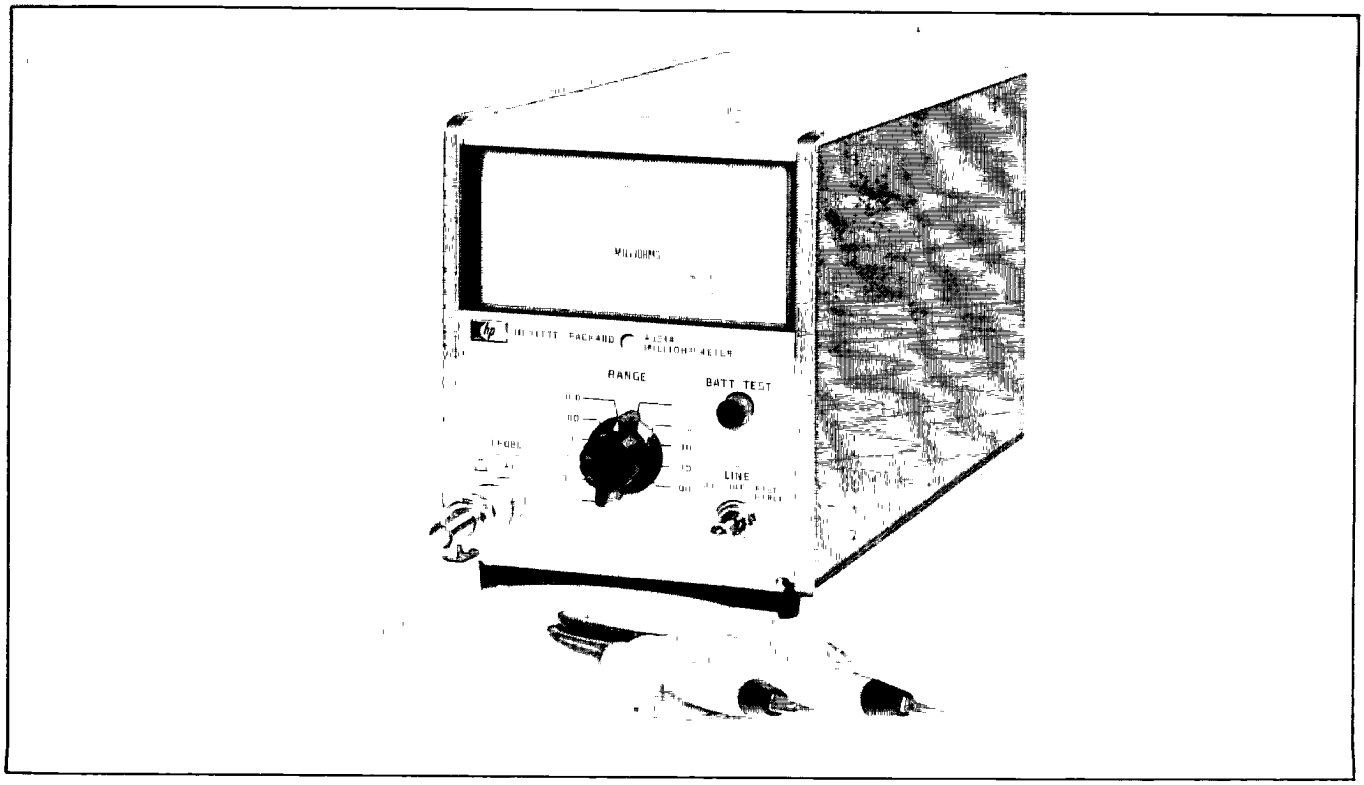

Figure 1-1. Model 4328A Milliohmmeter

1-11. INSTRUMENT IDENTIFICATION

1-12. Hewlett-Packard uses a two-section nine-character (0000J00000) or eight-character (000-00000 or 000J00000) serial number. The first three or four digits (serial prefix) identify a series of instrument; the last five digits identify a particular instrument in that series. A letter placed between the two sections identifies the country where the instrument was manufactured. The serial number appears on a plate located on the rear panel. All correspondence with Hewlett-Packard Sales/Service Offices with regard to an instrument should refer to the complete serial number.

1-13. MANUAL CHANGES

1-14. This manual provides operating and service information for the HP Model 4328A a portable instrument for measurement of low resistances. Information in this manual applies directly to instruments (as manufactured) with serial numbers prefixed by the three digits indicated on the title page. If the serial prefix of the instrument is above that on the title page, a "Manual Change" sheet supplied will describe changes which will adapt this manual to provide correct coverage. Technical correction (if any) due to known errors in print are called Errata and are shown on the change sheet. And if the serial prefix or number of the instrument is below that on the title page, see SECTION VII MANUAL CHANGES AND OPTIONS. For information on manual coverage of any HP instrument, contact the nearest HP Sales/Service Office (addresses are listed at the rear of this manual).

Table 1-1. Specifications

Resistance Range: 0.001 to 100 ohms in a 1, 3, 10 sequence.

Resolution: max. resolution 0.02 on 0-1 scale.
0.05 on 0-3 scale.

Accuracy: ±2% of full scale. Accuracy is unaffected by series reactance of samples with magnitude of up to 2 times full-scale resistance value.

Measuring Frequency: 1000Hz ±100Hz

Voltage across sample: 200μV peak at full scale.

Maximum voltage across sample: 20mV peak in any case.

Measuring current and power dissipation in sample.

Range (ohms)	* Applied Current (mA)	** Maximum Dissipation in Samples (μW)
0.001	150	23
0.003	50	8
0.01	15	2.3
0.03	5	0.8
0.1	1.5	0.23
0.3	0.5	0.08
1	0.15	0.023
3	0.05	0.008
10	0.015	0.0023
30	0.005	0.0008
100	0.0015	0.00023

* Constant for each range.
** Proportional to meter deflection, full scale values given.

Superimposed DC: 150V dc maximum may be superimposed on samples from an external source.

Recorder Output: 0.1V dc output at full scale meter deflection. Output resistance approx. 1k ohm.

Operating Temperature Range: 0 to 55°C.

Power: 115/230V ±10%, 50 to 60Hz, 2 W Optional rechargeable battery provides up to 15 hours continuous operation. Automatic battery recharge.

Weight: 7 lbs (3.2kg)

Accessories Furnished: 16005A Clip-type Probes
16006A Pin-type Probes
16007A Test Lead
16007B Test Lead
Detachable Power Cord
16143A Probe Cable

Accessories Available:
5060-0797 Rack Adapter Frame (holds three instruments the size of the 4328A.
16459A Carrying Case
11056A Handle Kit

Combining Cases.
1051A 11 - 1/4 in. (286mm) deep
1052A 16 - 3/8 in. (416mm) deep
The combining cases accept the 1/3 -module HP instruments for bench use or rack mounting. See 1051A data sheet for detail.

Options:
001: Rechargeable battery installed, provides up to 15 hours continuous operating.

Dimensions: