⚠ Safety Note

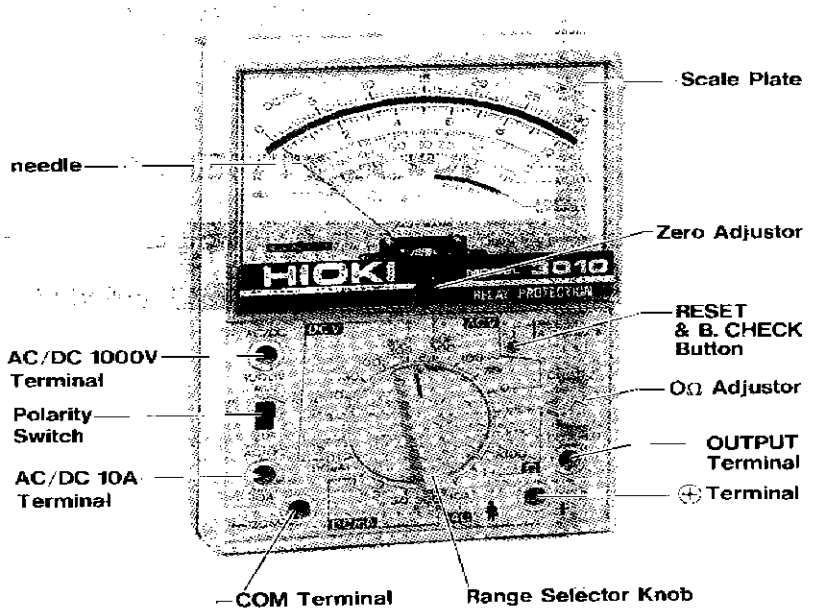
This multimeter cannot be used with any power line of greater than 250V. Such power lines may involve spikes of several times the rated voltage. For such power lines, use a multimeter with an overcurrent protector for preventing short-circuit accidents.
Hioki's 3008 multimeter is recommended.

Note: power lines include lines supplying power to motors and industrial equipment in factories and office buildings, but do not include domestic in-house lines, which are protected with circuit breakers or the like.

⚠ WARNING

This instrument is designed to prevent accidental shock to the operator when properly used. However, no engineering design can render safe an instrument which is used carelessly. Therefore, this manual must be read carefully and completely before making any measurement. Failure to follow directions can result in a serious or fatal accident.

NAME OF PARTS



SPECIFICATIONS

DC Voltage:	0.1 · 1 · 3 · 10 · 30 · 100 · 300 · 1000V 100kΩ/V, ± 2.5% of F.S.
DC Current:	10μ · 1m · 3m · 30m · 300m · 10A 250mV drop, ± 3% of F.S.
AC Voltage:	10 · 30 · 100 · 300 · 1000V 10kΩ/V, ± 2.5% of F.S. (10V range: ±3.5%)
AC Current:	10A, ±4% of F.S.
Resistance:	3k · 300k · 3M · 30M (mid-scale: 30Ω) ± 3% of Scale Length
Low Freq.	
Level:	−20 ~ +22dB
Batteries:	SUM-3(AA) 1pc., 006P 9V 2Pcs.
Meter:	Self-shielded, diode overload protected TAUT BAND movement
Circuit:	Relay and Fuse Protected
Temperature:	−5°C ~ 40°C, operating; −10°C ~ 50°C, storage
Dimensions:	167 H × 114 W × 56.5Dmm
Weight:	Approx. 505g
Accessories:	Test Leads 1 set, Spare Fuse (2A, 15A) 2 pcs.

● **Optional Accessories**

9016	DC 30kV High Voltage Probe
9085	Carrying Case

GENERAL CAUTIONS CONCERNING USE

1) Turn the zero adjuster and adjust the needle to the O position on the left hand side of the dial.
2) Before using the tester, check the battery by using either the DC or the AC voltage range to make sure that the [Batt OK] band is indicated showing that the condition of the 006P relay drive battery is good.
3) When the relay operates, the meter needle goes overrange to the extreme right and when that happens reset the relay means of the [RESET & B. CHECK] button.
4) Before measuring, do not fail to make sure that the correct range has been selected and it is necessary to remove the test prods from the circuit being tested before changing the range.
5) Avoid testing high frequency components of electronic cooking ranges and other appliances with high output and high frequency because resistance is only a fraction of the usual figure for appliances and shock can easily result.
6) When storing or carrying the tester about after use, because there is no OFF range, always turn the range selector to the AC10A range and make sure that the relay is not functioning. When storing for a long period of time, do not fail to remove the relay drive battery.

HOW TO TAKE MEASUREMENTS

Measuring DC Voltage (DC V)

1) Plug the black test lead into the ⊖ COM terminal and the red lead into the ⊕ terminal.
2) Slide the Polarity switch to the [+ DC. AC. Ω] position.
3) Turn the range selector knob to the most suitable DVC range for use and if the user has no idea how great the voltage may be, select the highest range to begin with.
4) Connect the test prods in parallel to the voltage being tested, having the black lead connected to the ⊖ side and the red lead to the ⊕ side before taking a reading.
5) If the meter needle deflects in reverse, either reverse the test prod connections or slide the polarity switch to the [- DC] position.
6) To measure more than 300V DC, plug the red test lead in to the [AC/DC 1000V] terminal and turn the range selector knob to the DCV range 300 & UP position.

Measuring DC Current (DC mA)

1) After carrying out the first two steps set out in the procedure for measuring DC voltage, turn the range selector knob to a suitable DCmA range for the current being tested, connect the test leads in series: the red test prod to the ⊕ side and the black prod to the ⊖ side and take a reading.
2) If the meter needle deflects in reverse, as in the case of the measurement of DC voltage, slide the polarity switch to the [- DC] position.
3) For DC 10A measurements, plug the red test lead into the AC/DC 10A terminal, turn the range selector knob to 300 & 10A on the DCmA range and take readings.

Measuring AC Voltage (AC V)

1) Prepare in the same way as for the measuring of DC voltage. Turn the range selector knob to a suitable range for the voltage to be measured, connect in parallel to the circuit and take a reading.
2) To measure 300V AC or more, plug the red test lead into the [AC/DC 1000V] terminal, turn the range selector knob to the ACV range 300 & UP and take a reading.

Measuring AC Current (AC A)

1) Plug the black test lead into the [- COM] terminal and the red lead into the [AC/DC 10A] terminal.
2) Slide the polarity switch to [+ DC.AC.Ω] and the range knob to the [AC10A] range.
3) Without any need to take polarity into account, connect in series to the circuit being tested.

* Do not fail to switch off the power before connecting to measure the current.

* Because heating will result if too much time is taken in measuring either AC or DC 10A, do the work as quickly as possible.

* There is a condenser in the AC 10A range to restrain relay action and, although the meter needle may deflect if a switch is made to the AC 10A range from another and result in the meter being charged by the condenser, this will not affect measurements.

Measuring Resistance (Ω)

1) After carrying out the first two steps set out in the procedure for measuring DC voltage, turn the range selector knob to a suitable Ω range.
2) Short the tips of the test prods and adjust the OΩ ADJ knob to bring the meter needle to indicate OΩ. If the needle fails to go to the OΩ position, this shows that the battery is exhausted and needs to be replaced.
3) After completing the OΩ adjustment, connect the test prods to the resistance to be measured.

* When measuring resistance in circuits, do so only after removing or switching off the power.

Using the OUTPUT Terminal in Measuring

There is a DC blocking condenser connected to this terminal which makes it possible to measure AC voltage only when testing circuits in which there is DC as well as AC voltage present.

Measuring Decibels (dB)

There is a dB scale provided (OdB = 1mW,600Ω as a standard) and it is handy to use in measuring the output of amplifiers, etc. For ranges AC 30V or over, to the figures on the AC 10V dB scale add the amounts shown in Table 1, below.

Table 1

ACV Range	30V	100V	300V
Amount to be Added	9.5	20	29.5

If output impedance is other than 600Ω, the reading shown cannot be taken, as it is, to be the power value but compensation has to be made to adjust the dB value to the actual impedance involved.

Table 2

Load Resistance (Ω)	3	4	8	16	50	75	150	300
Amount Added (dB)	20.3	21.8	18.8	15.7	10.8	9.03	6.02	3.01
Load Resistance (Ω)	1k	2.5k	5k	7k	10k	12k	30k	50k
Amount Added (dB)	−2.22	−6.20	−9.21	−10.7	−12.2	−13.0	−17.0	−19.2

Relay Type Circuit Protection

A relay type circuit protection is used in the 3010 to protect the tester circuit against the effects of incorrect use. When the relay functions, the meter needle deflects all the way across to the right hand side of the scale (RELAY'S WORKING!). When this happens, reset can be carried out by simply pushing the RESET & B.CHECK button. Added safety if provided by having a 2A fuse to protect the relay, but sometimes overload will result in the fuse blowing or the resistor burning out and for this reason the user must always make sure to see that the correct range has been selected before proceeding with measurements.

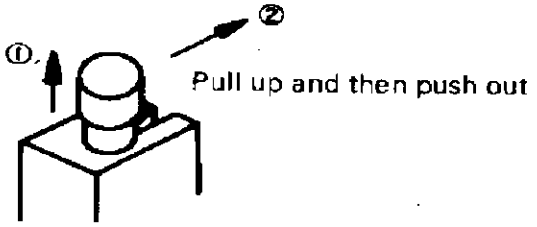
Concerning Relay Type Circuit Protection

Relay type circuit protection is employed in the 3010. The basic principle of operation involves the incorporation of a transistor switching circuit into the basic circuit of the 3010 detecting the presence of overload voltage in the basic circuit and causing the relay to function, operation taking place when DC and AC is about 4 or 5 times that of the basic circuit about 2.6 times. In turn a fuse is employed to protect the relay contacts but, depending on how great the overload is, sometimes the fuse will blow or the resistor will burn out and for this reason care must always be taken to make sure that the most suitable range has been chosen for the purpose.
Also remember that carrying the tester about or shock or vibration may case the relay to operate. However, the AC 10A.

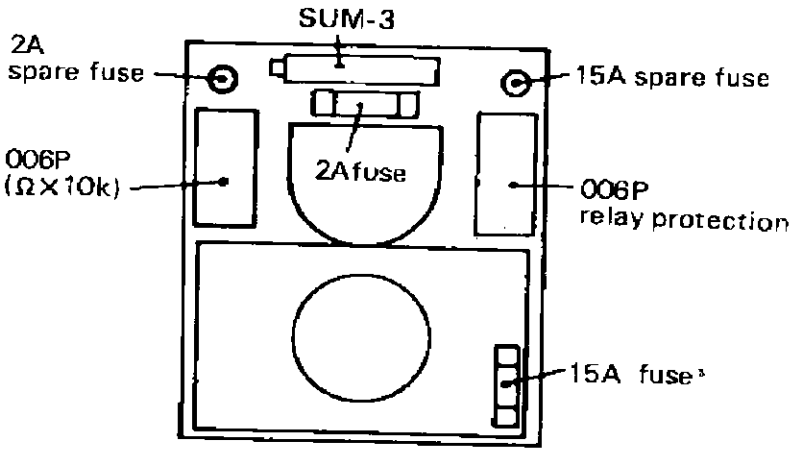
range (mark) withstands relay operation and therefore the user should switch to that range before moving the tester about.

CHANGING THE BATTERIES AND FUSE

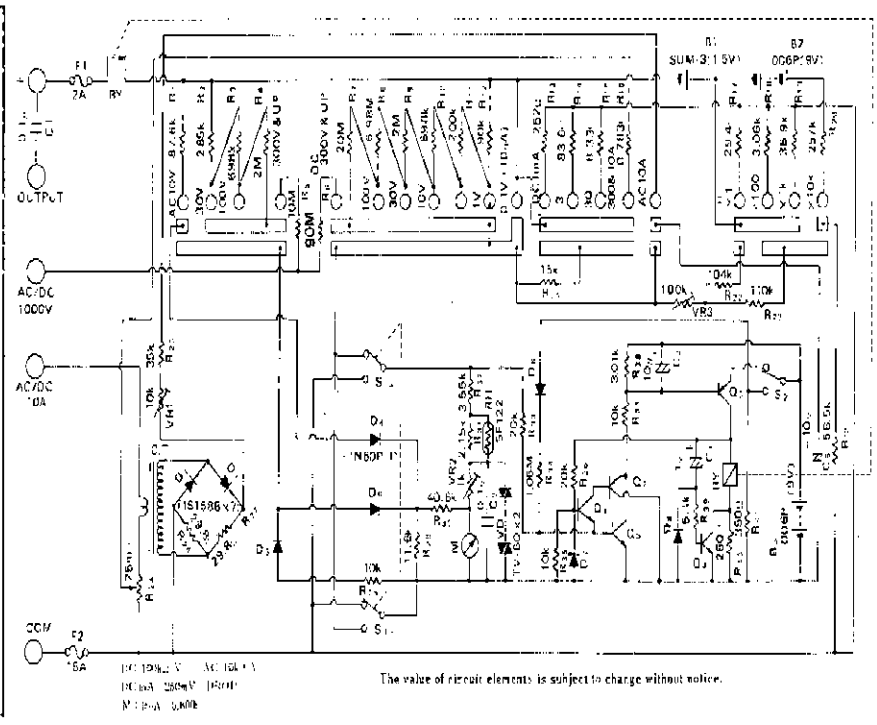
1) Use a coin or other suitable implement to unscrew the decorative screw holding the back of the case and remove this case back.
2) Take the sketches as a guide and change the parts.



* How to remove the spare fuse



CIRCUIT DIAGRAM



The value of circuit elements is subject to change without notice.

HIOKI E.E. CORPORATION

P.O. BOX 1, Sakaki Nagano, 389-06, JAPAN
TEL. 0268-82-3030 FAX. 0268-82-3215

3010A2-86M-0601 Printed in Japan