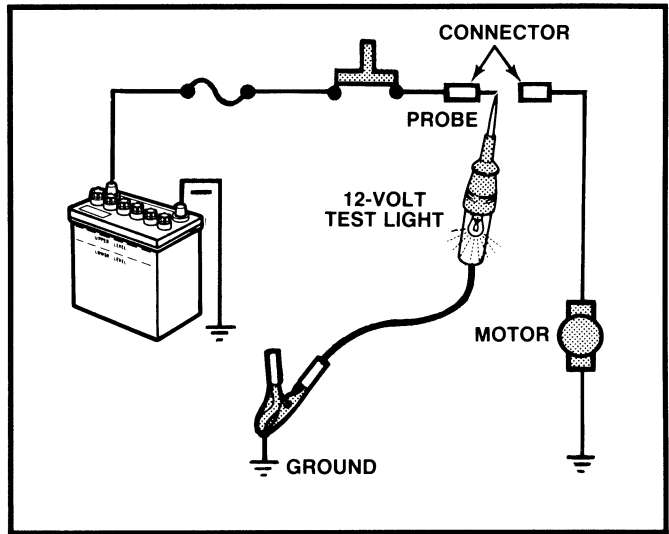
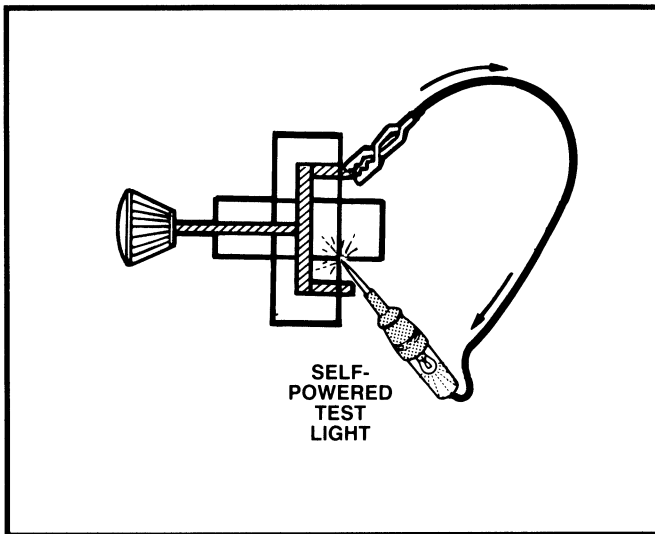
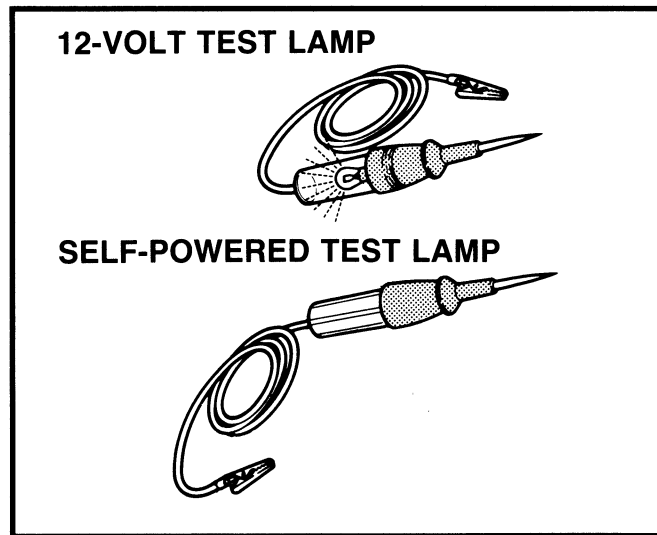


# DIAGNOSIS & TESTING

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Overhead Transparencies - B & W Masters

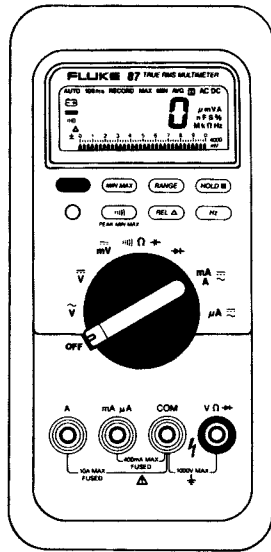
# DIAGNOSIS & TESTING



[WWW.AUTOSHOP101.COM](http://WWW.AUTOSHOP101.COM)  
Automotive Electronics Training and Resource Site

# DIAGNOSIS & TESTING

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## Diagnosis & Testing

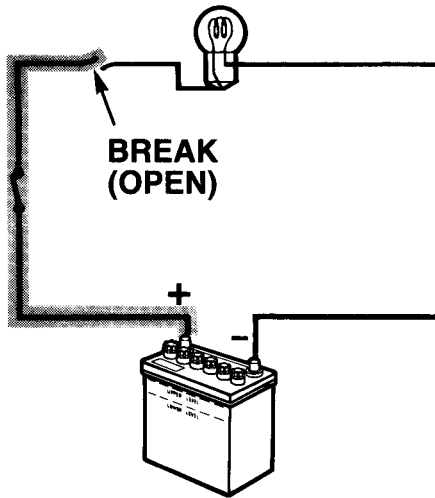
*Three basic types of electrical problems can occur. The causes of these problems can be identified using a logical troubleshooting plan and the correct test equipment.*

- High Resistance Fault
- Low Resistance Fault
- Component Fault

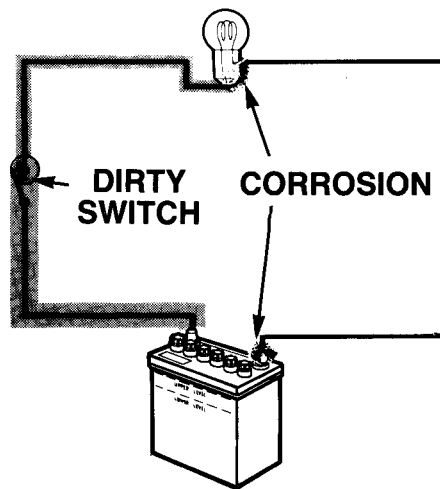
# DIAGNOSIS & TESTING

## HIGH-RESISTANCE FAULTS

### OPEN CIRCUIT



### HIGH RESISTANCE

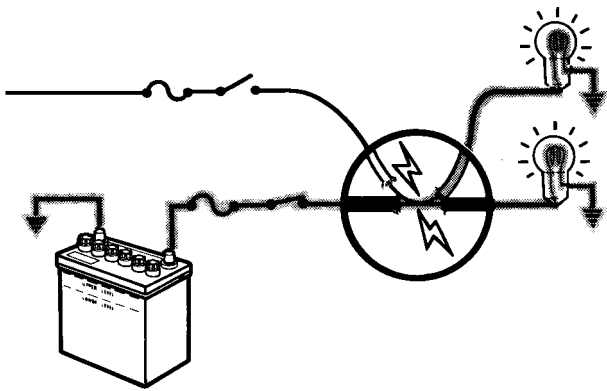


# DIAGNOSIS & TESTING

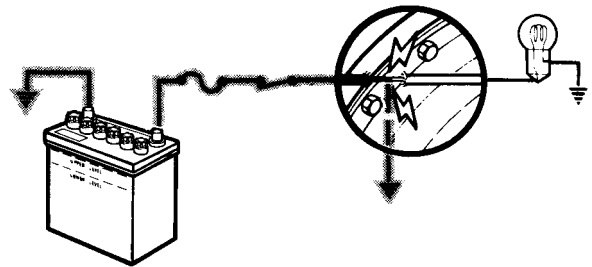
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## LOW-RESISTANCE FAULTS

### SHORT CIRCUIT



### UNINTENTIONAL GROUND

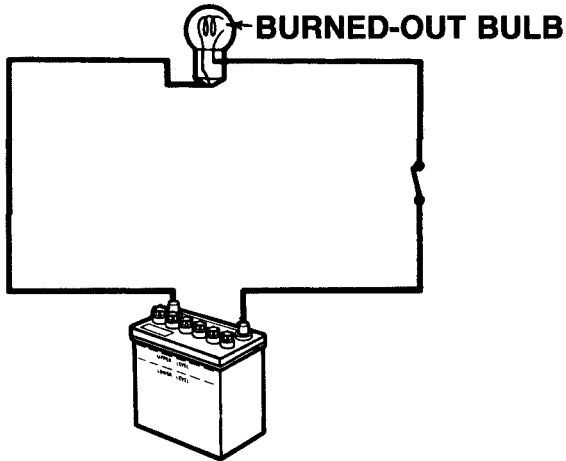


# DIAGNOSIS & TESTING

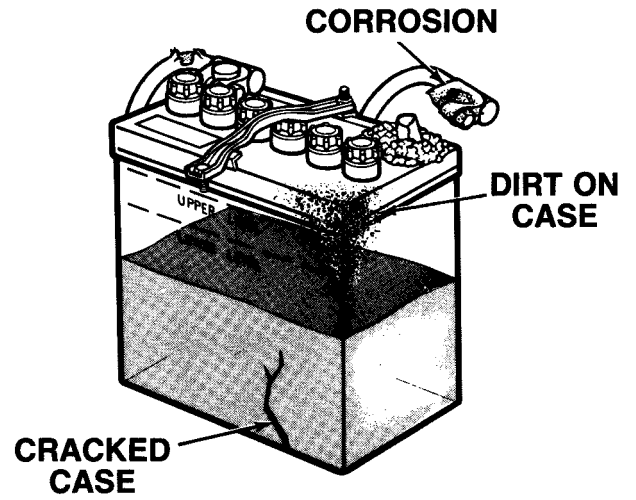
---

## COMPONENT FAULTS

### WEAR AND DEFECTS

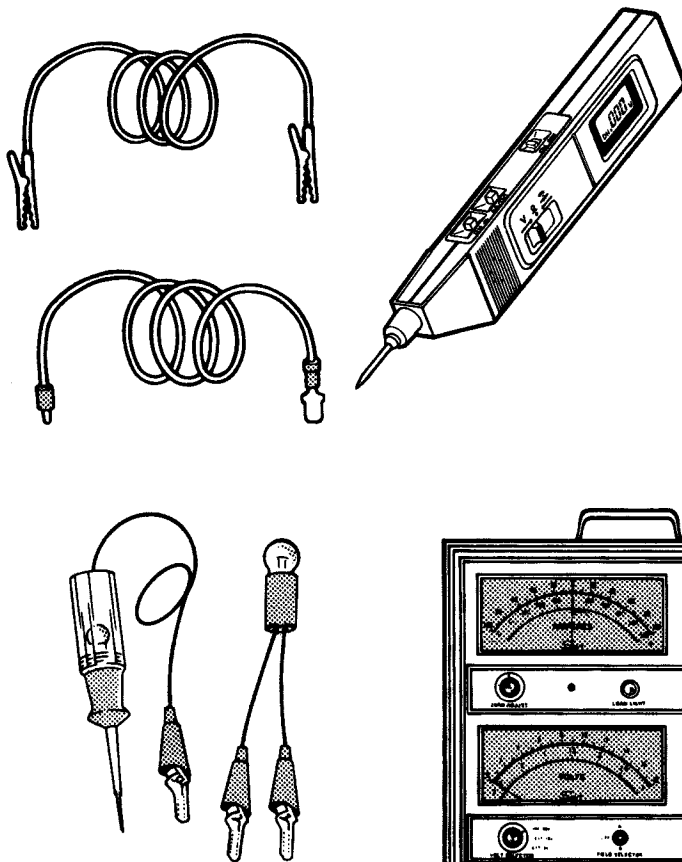


### LOSS OF POWER

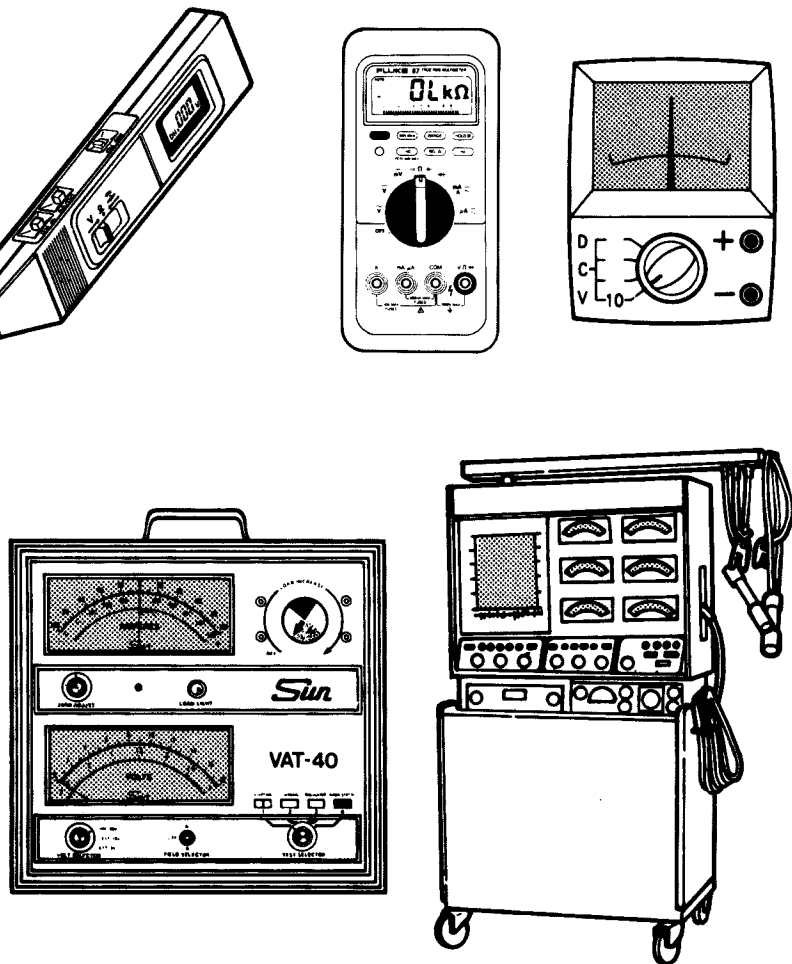


## TEST EQUIPMENT

### CHECK CIRCUIT CONTINUITY

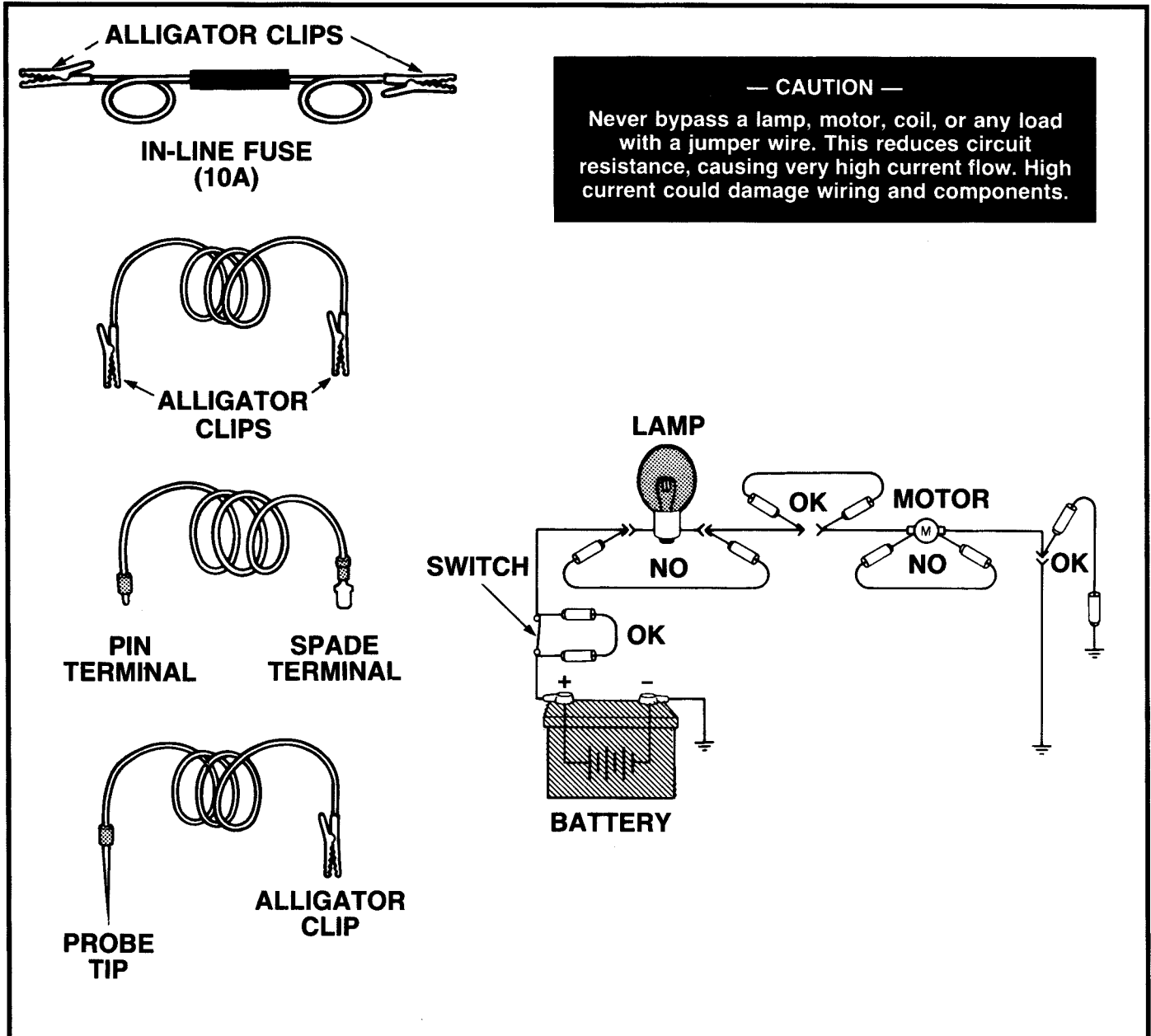


### CHECK CIRCUIT QUALITY

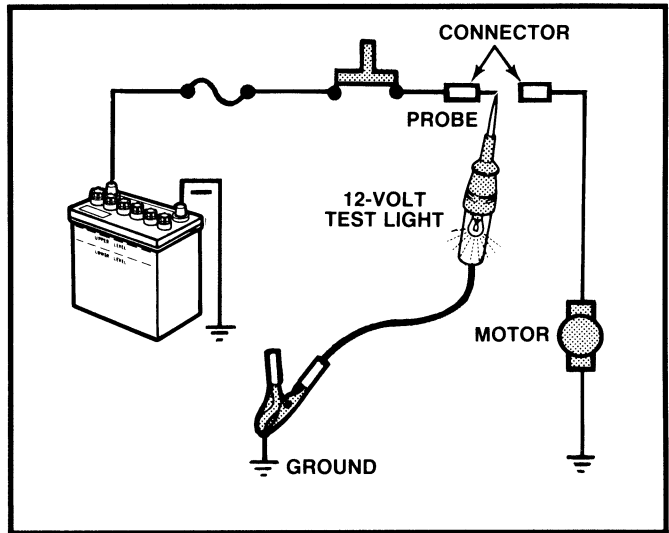
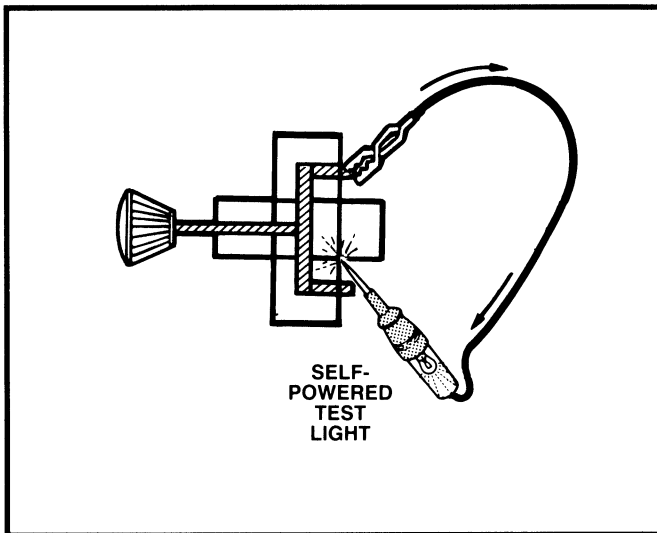
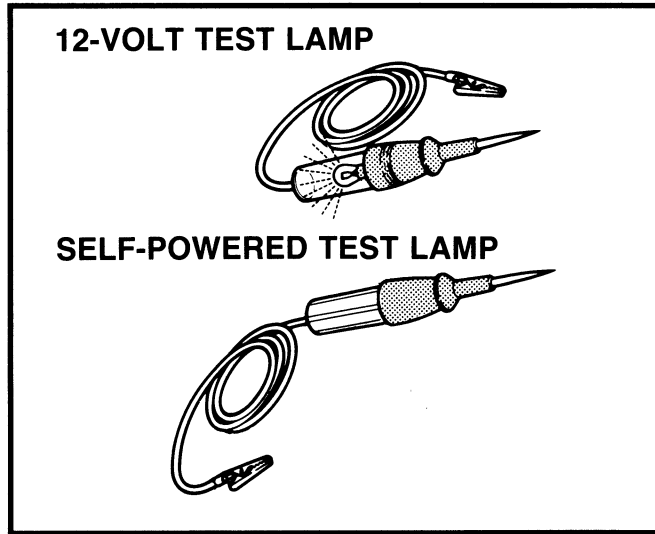


# DIAGNOSIS & TESTING

## JUMPER WIRES



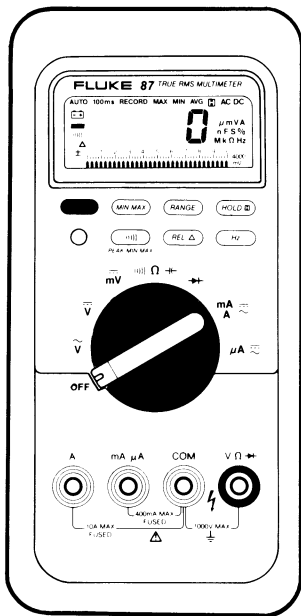
## TEST LAMPS



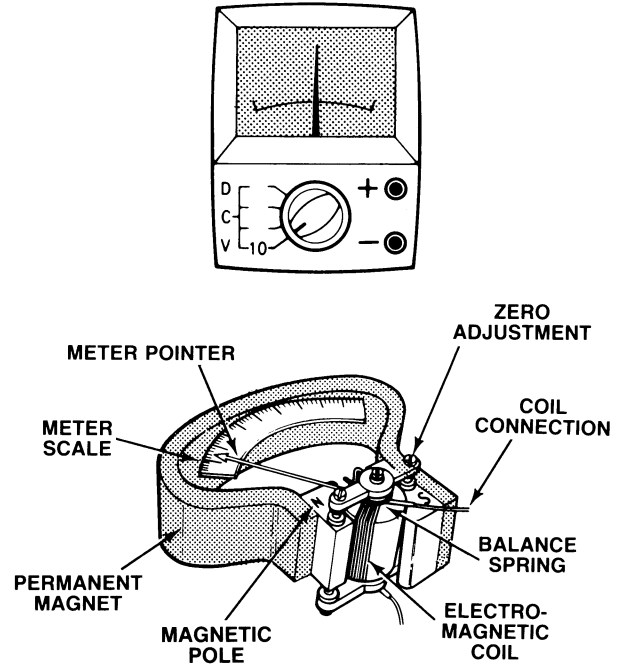


## BASIC TEST METERS

DIGITAL METER

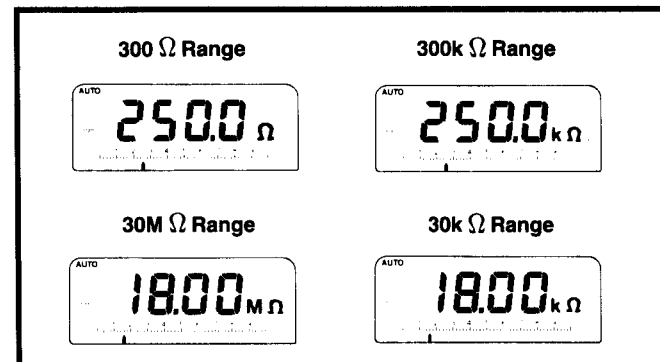
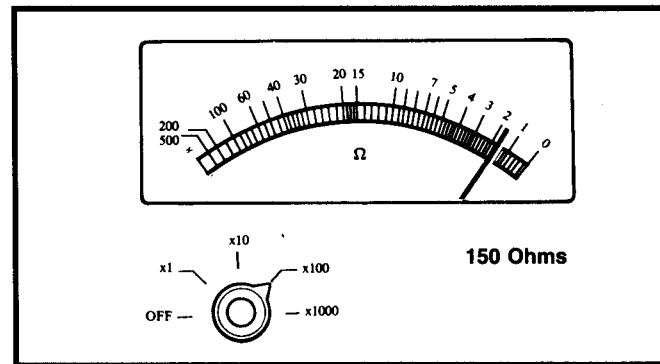
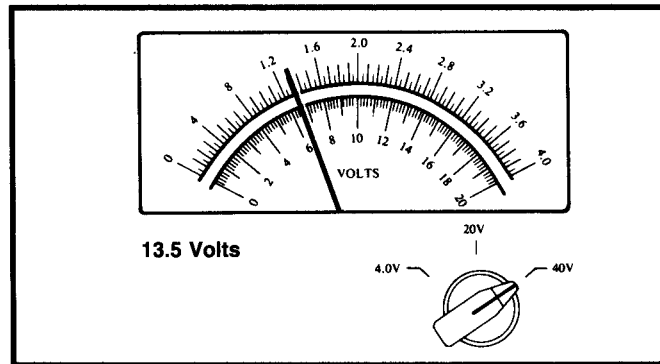


ANALOG METER



# DIAGNOSIS & TESTING

## READING METERS

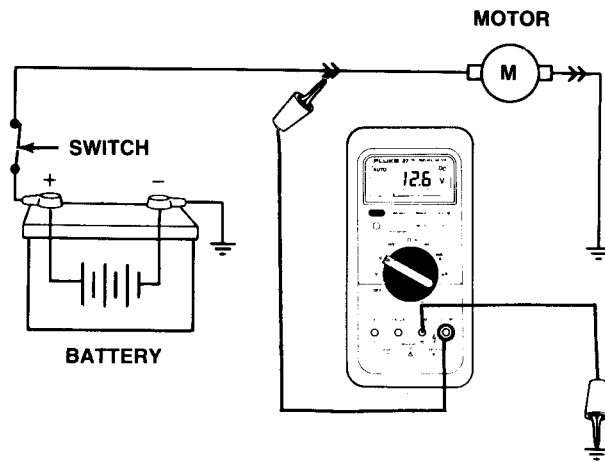


Functions	Range	Digital (d) Display
DCV/ACV	300 mV (DCV only)	ddd.d mV
	3 V	d.ddd V
	30 V	dd.dd V
	300 V	ddd.d V
	3000 V	dddd V
DCA/ACA	300 mA	ddd.d mA
	10 A	dd.dd A
k $\Omega$	300 ohm	ddd.d $\Omega$
	3 kohm	d.ddd k $\Omega$
	30 kohm	dd.dd k $\Omega$
	300 kohm	ddd.d k $\Omega$
	3000 kohm	dddd k $\Omega$
	30 megohm	dd.dd M $\Omega$

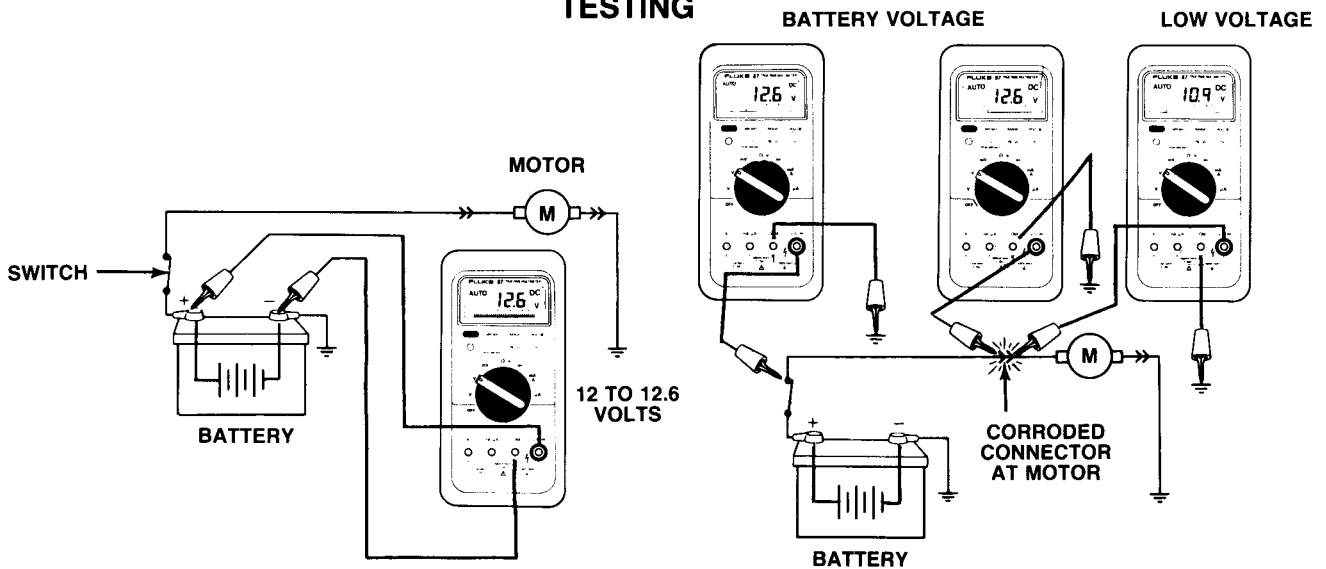
# DIAGNOSIS & TESTING

## VOLTMETER

**PROPER USE:  
ALWAYS CONNECT IN PARALLEL**



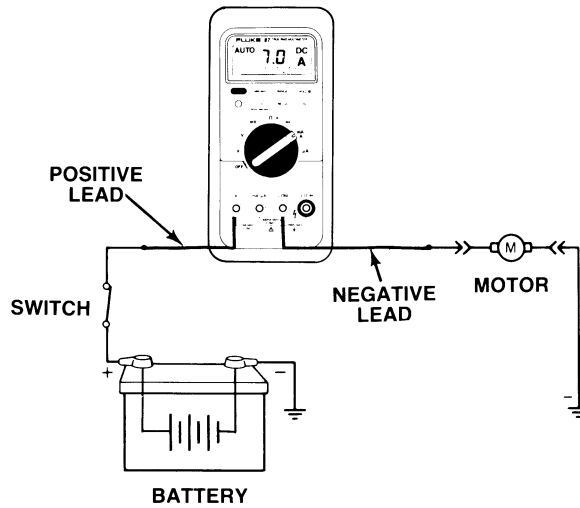
### TESTING



# DIAGNOSIS & TESTING

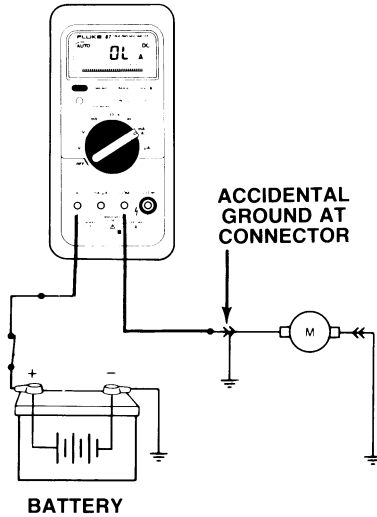
## AMMETER

**PROPER USE:  
ALWAYS CONNECT IN SERIES**

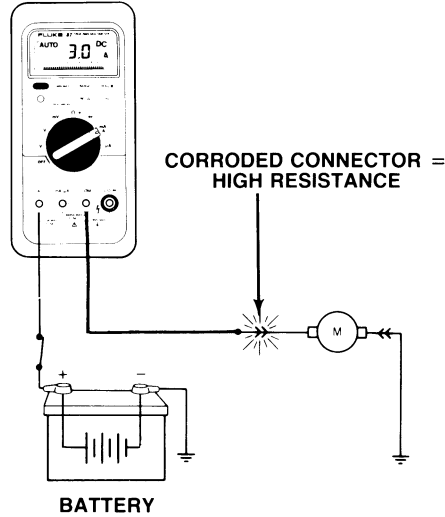


### TESTING

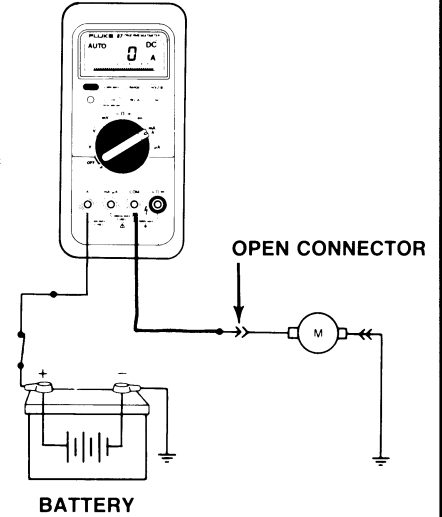
**HIGH CURRENT**



**LOW CURRENT**



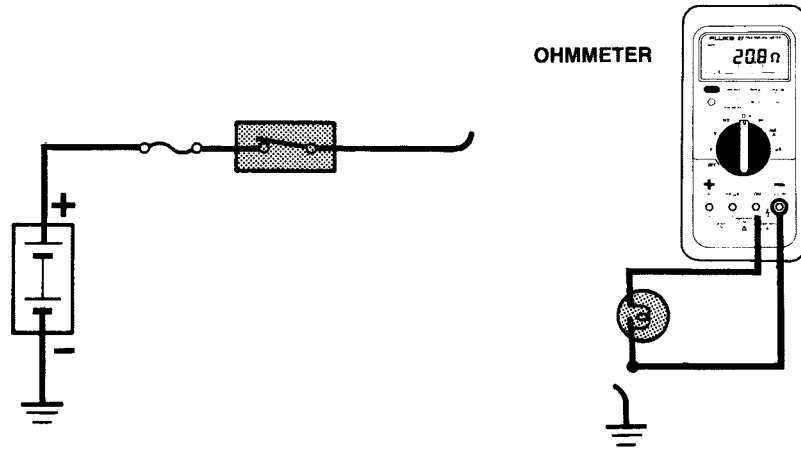
**NO CURRENT**



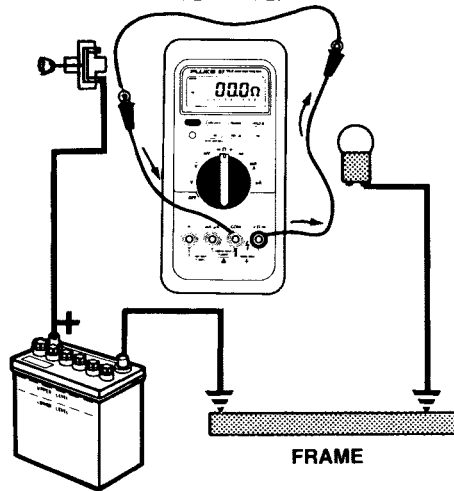
# DIAGNOSIS & TESTING

## OHMMETER

**PROPER USE:  
ALWAYS CONNECT WITH POWER "OFF"**

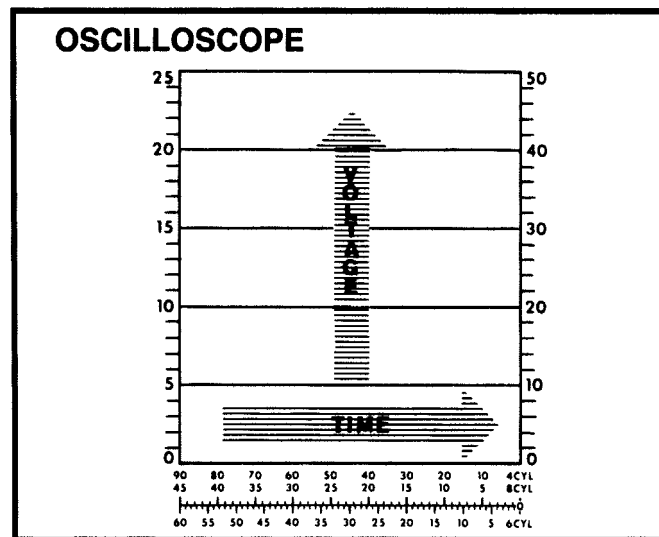
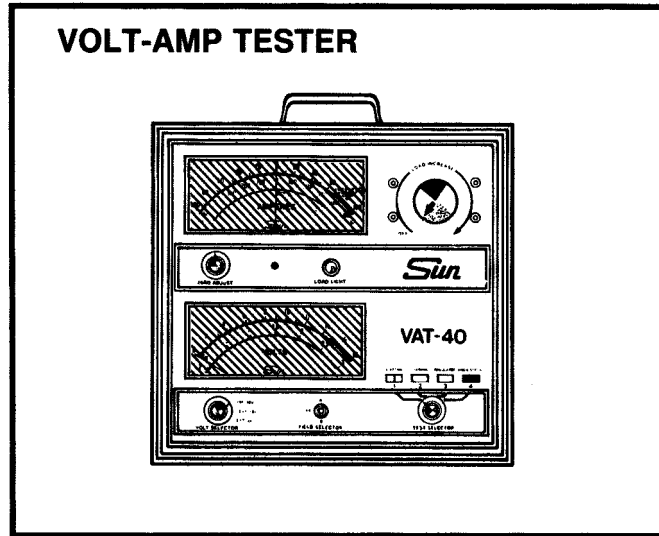


**TESTING**



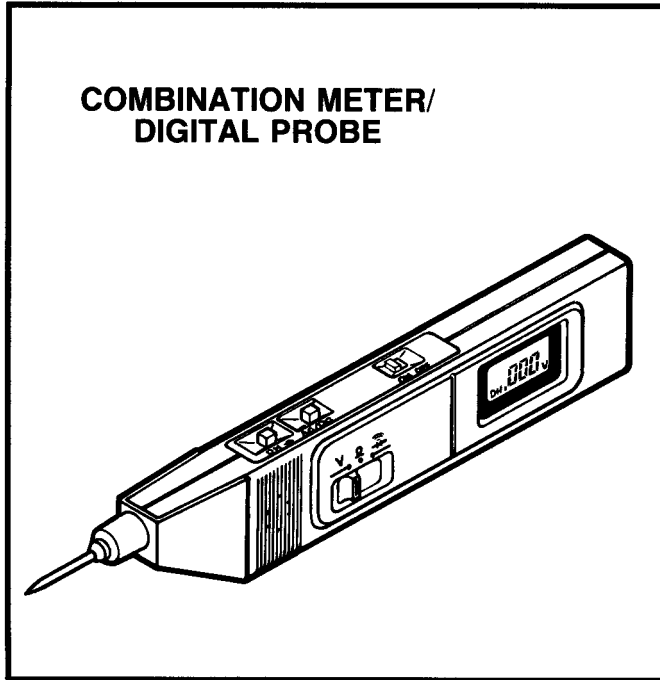
# DIAGNOSIS & TESTING

## SPECIAL TEST EQUIPMENT

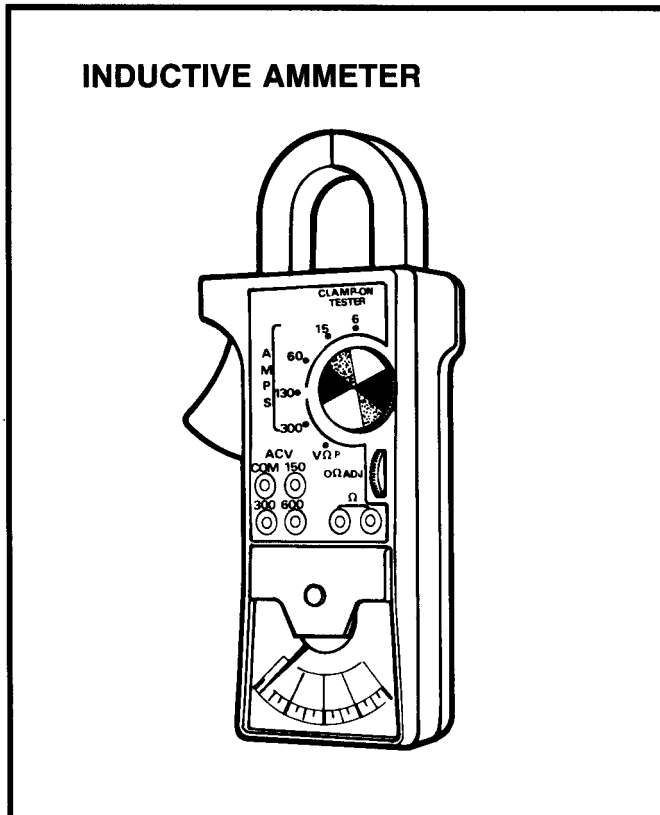


## SPECIAL TEST EQUIPMENT

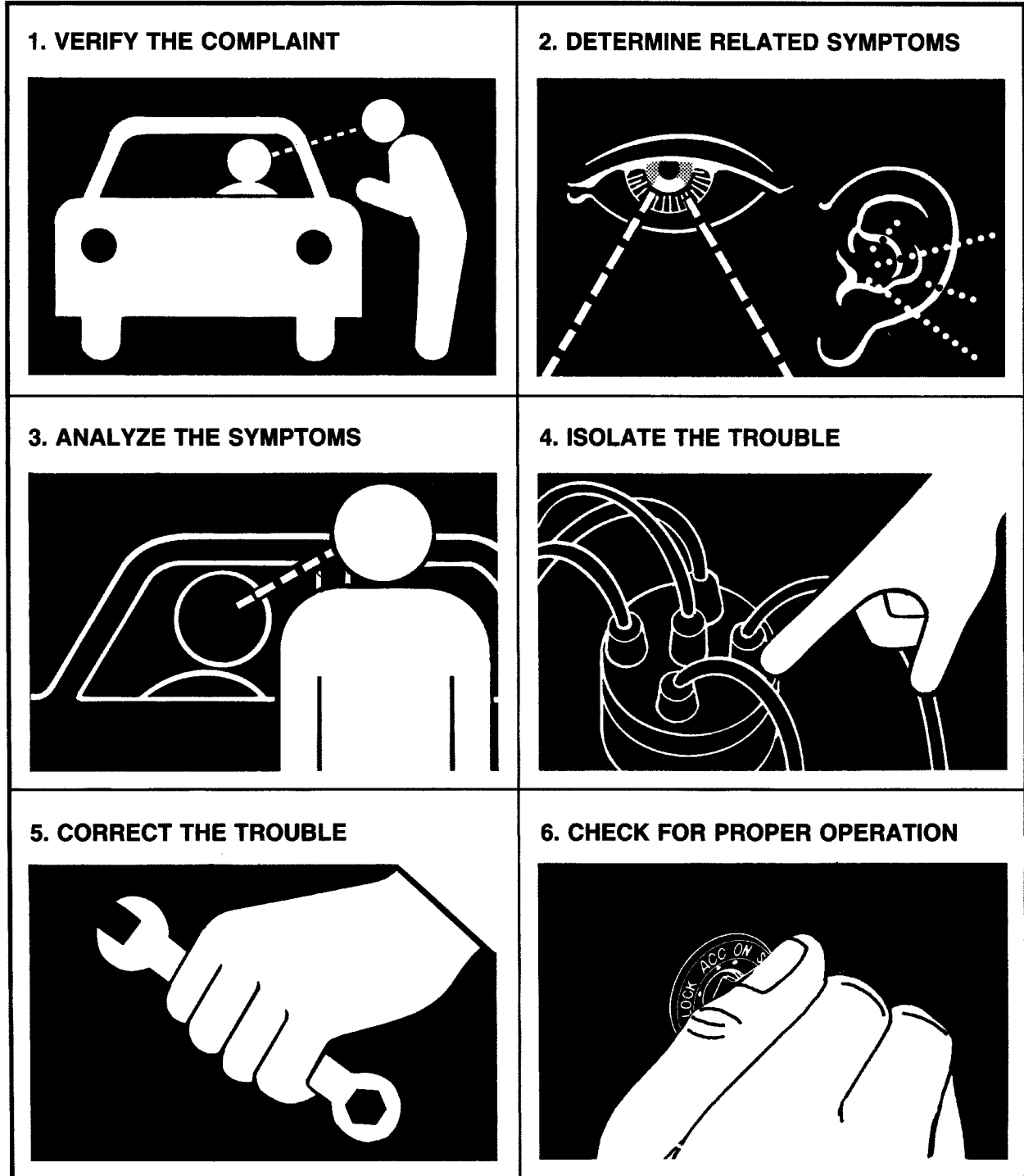
COMBINATION METER/  
DIGITAL PROBE



INDUCTIVE AMMETER



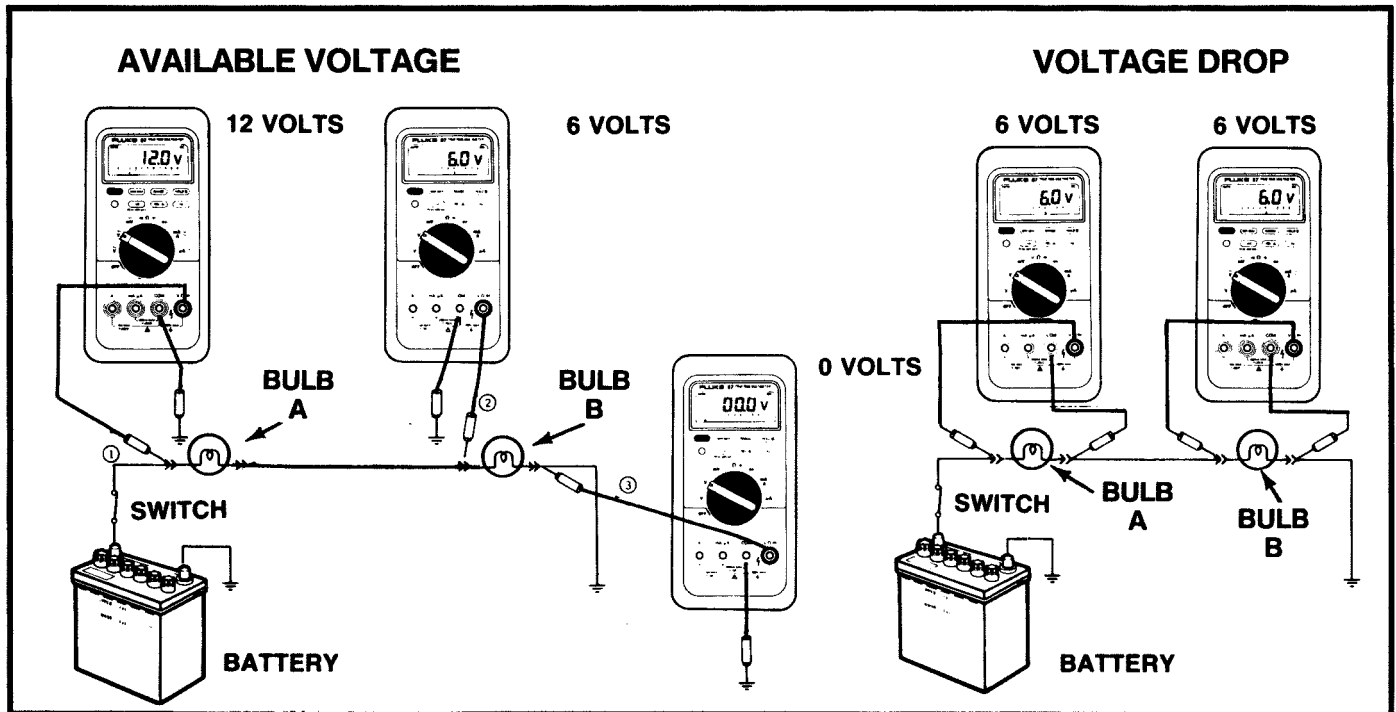
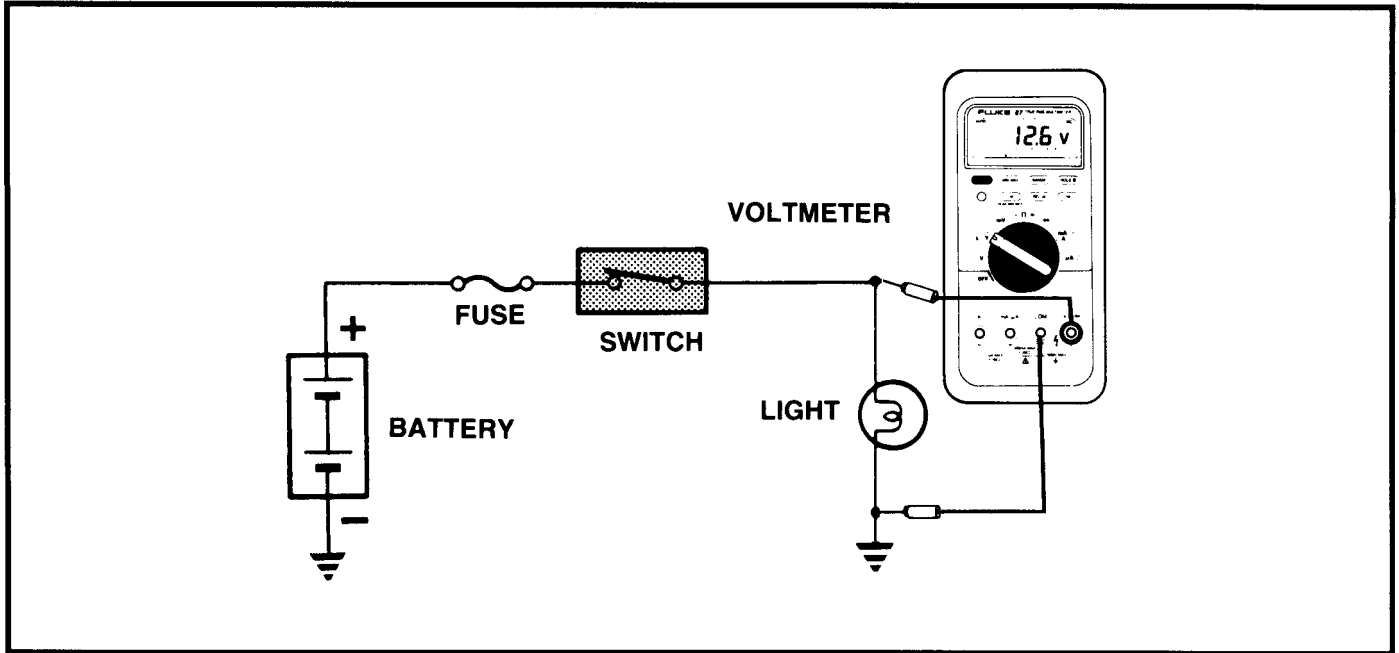
## THE SIX-STEP TROUBLESHOOTING PLAN



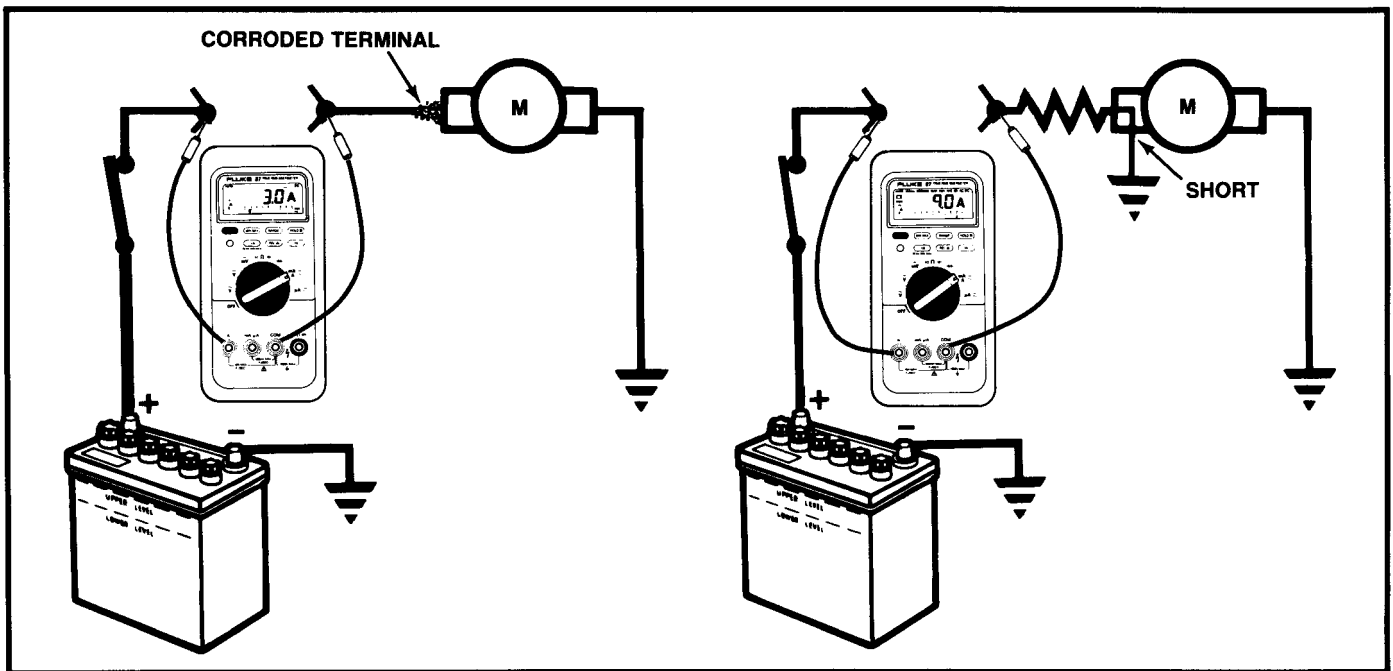


# DIAGNOSIS & TESTING

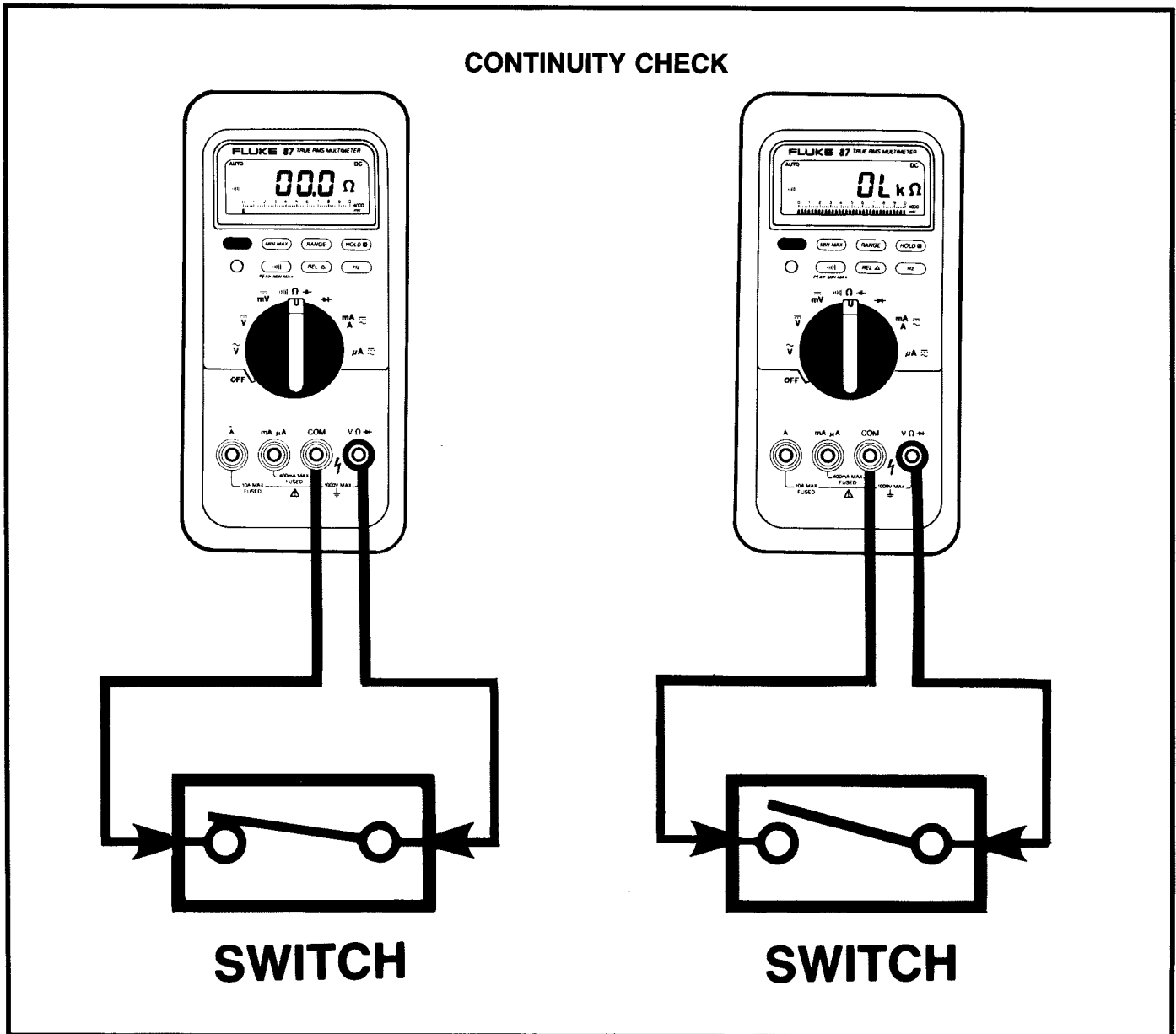
## MEASURING VOLTAGE



## MEASURING CURRENT



## MEASURING RESISTANCE



## CHECKING COMPONENT RESISTANCE

