Electrical Switches

Electrical Switches

Objectives: At the completion of this lesson you will be able to:

- Explain the difference between the various types of switching devices
- Explain the operating principles for the various types of switches
- Determine application criteria as it relates to the various switching devices
- Properly diagnose problems with switching devices and their related circuits

Electrical Switches

Terms To Know:

- ✓ "SPST" – Single Pole / Single Throw
- ✓ "SPDT" – Single Pole / Double Throw
- ✓ Ganged Switch (MPMT)
- ✓ Mercury Switch
- ✓ Electromagnetic Switch
- ✓ Position Switch
- ✓ Pressure Switch

Electrical Switches

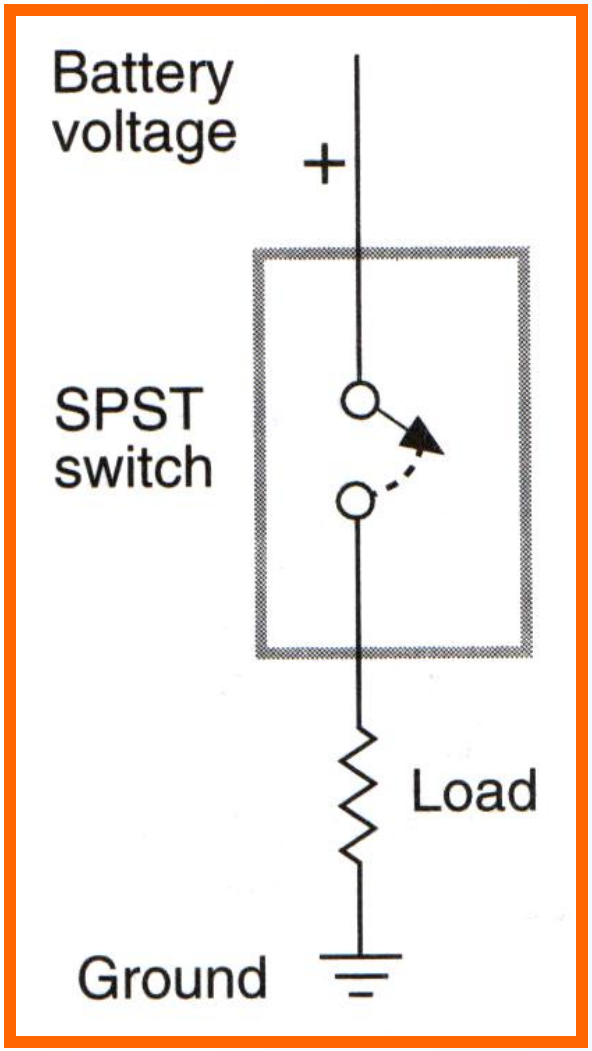
Introduction:

- Commonly used to control the “on/off function” of a component and/or circuit
- Also used to “direct the current” in an electrical circuit
- May also be used as “momentary contact” switches
- The term “pole(s)” refers to the number of input circuits of the switch
- The term “throw(s)” refers to the number of output circuits of the switch
- Switches may be “normally open” (NO), or “normally closed” (NC) depending upon the application
- May be used on either power or ground side of circuit

Electrical Switches

Classifications of Switches

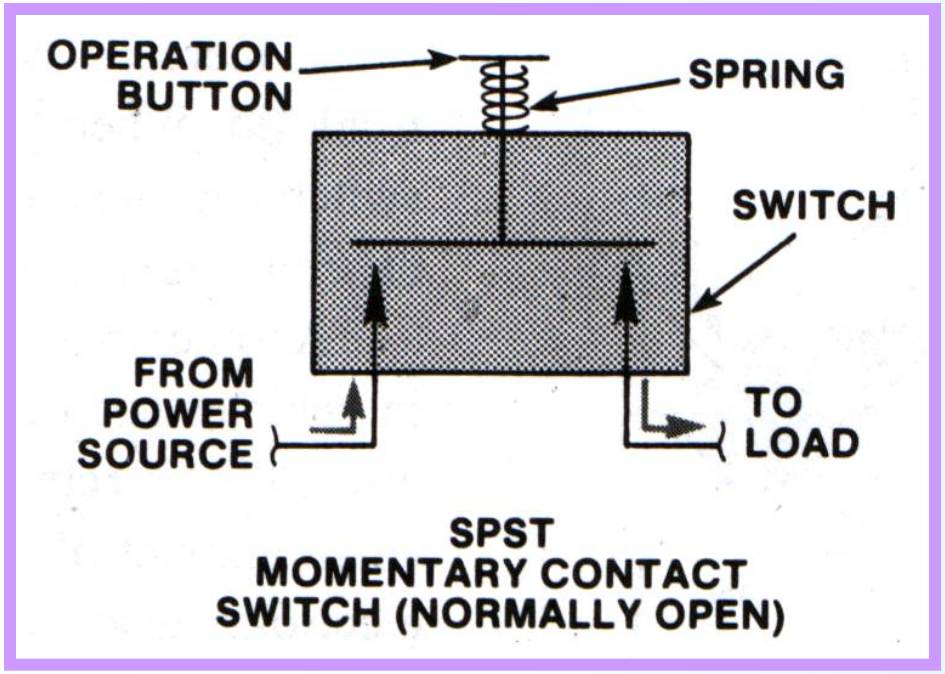
Electrical Switches



SPST Switches

- Single pole input
- Single pole output
- A set of contacts inside the switch opens or closes the circuit
- The contacts carry the current load of the circuit when closed

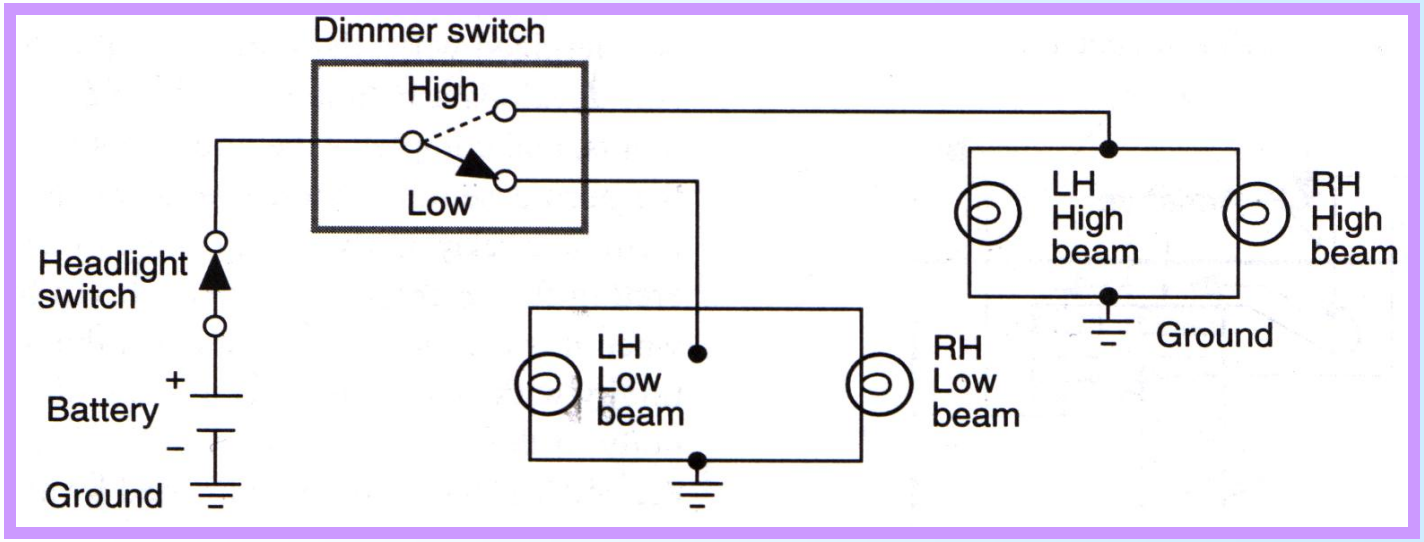
Electrical Switches



The "Momentary" Switch

- A SPST type switch
- Switch contacts are spring loaded
- Closing the circuit requires overcoming spring pressure
- Circuit is opened by spring
- Switch is (NO)

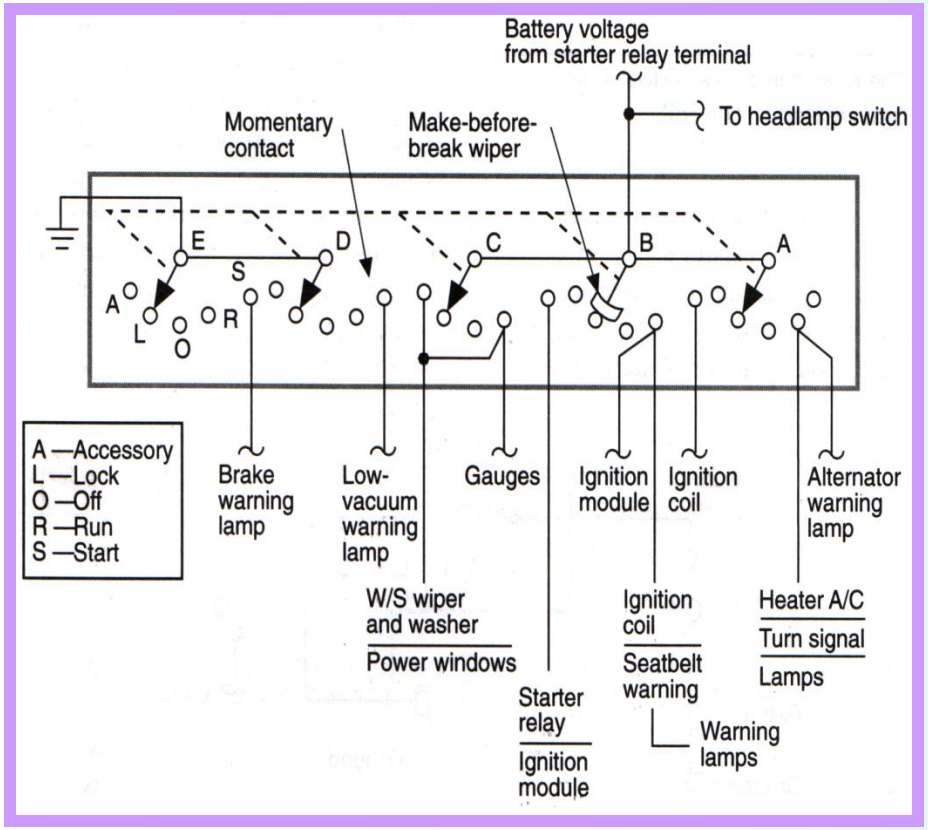
Electrical Switches



SPDT Switches

- One input circuit (pole)
- Two output circuits (throws)
- Only one output is energized at a time
- Contacts carry the current load of circuit

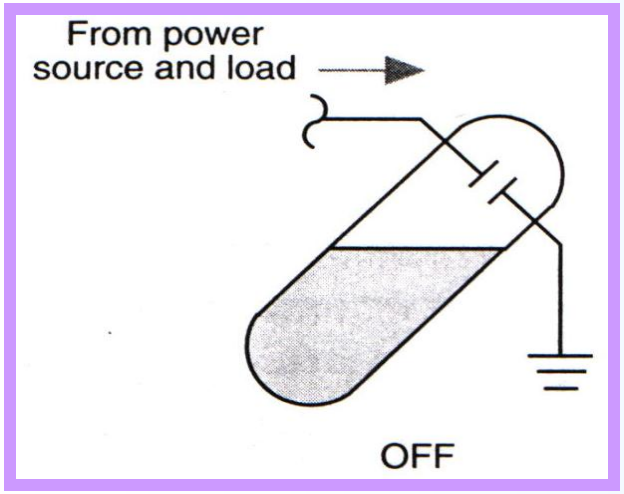
Electrical Switches

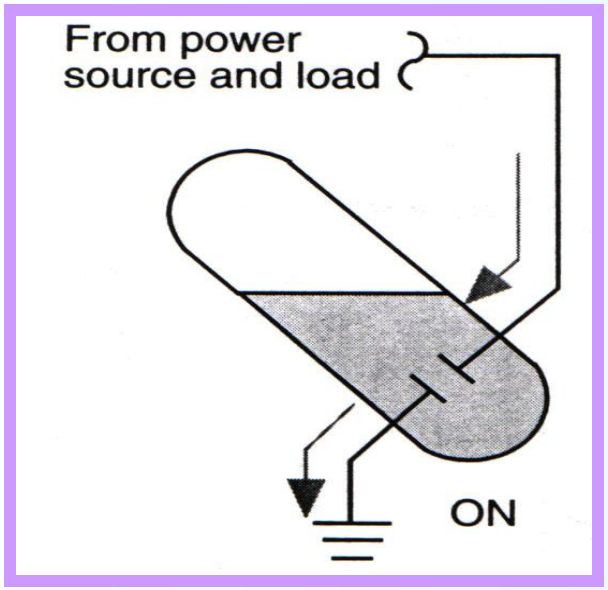


Ganged Switches (MPMT)

- Contain multiple “wipers” that operate in unison
- Contacts may carry current load of circuit
- Contacts may supply current to an “electromagnetic switch”

Electrical Switches

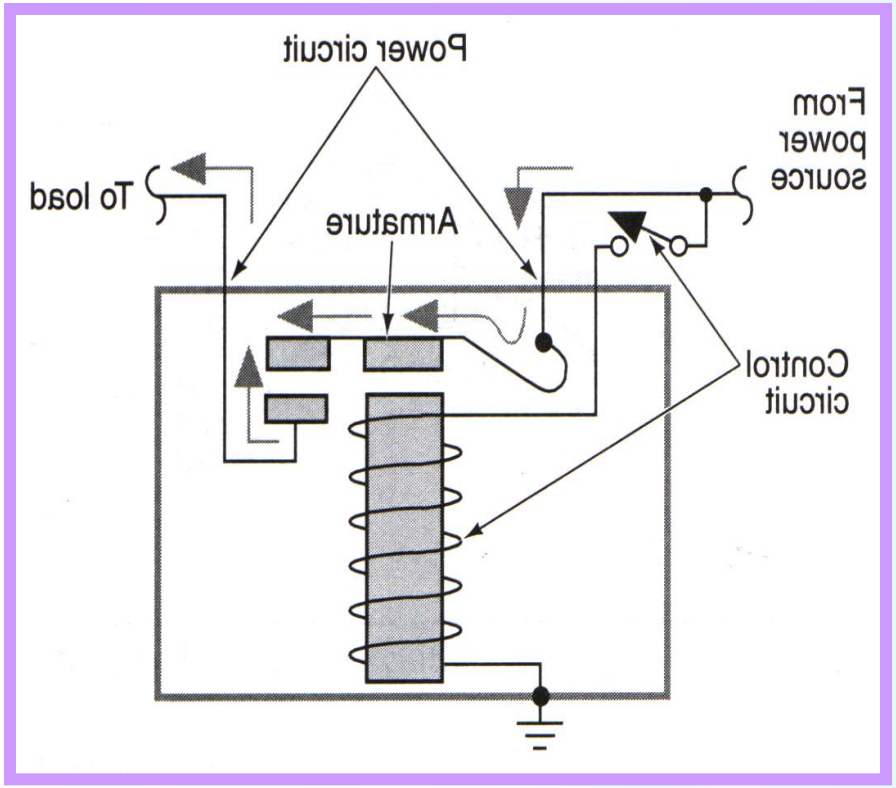




Mercury Switches

- A SPST type switch
- Uses mercury as the conductor for the contacts
- Accurate mounting of mercury switches is essential to proper operation
- Used on ground side of circuit

Electrical Switches

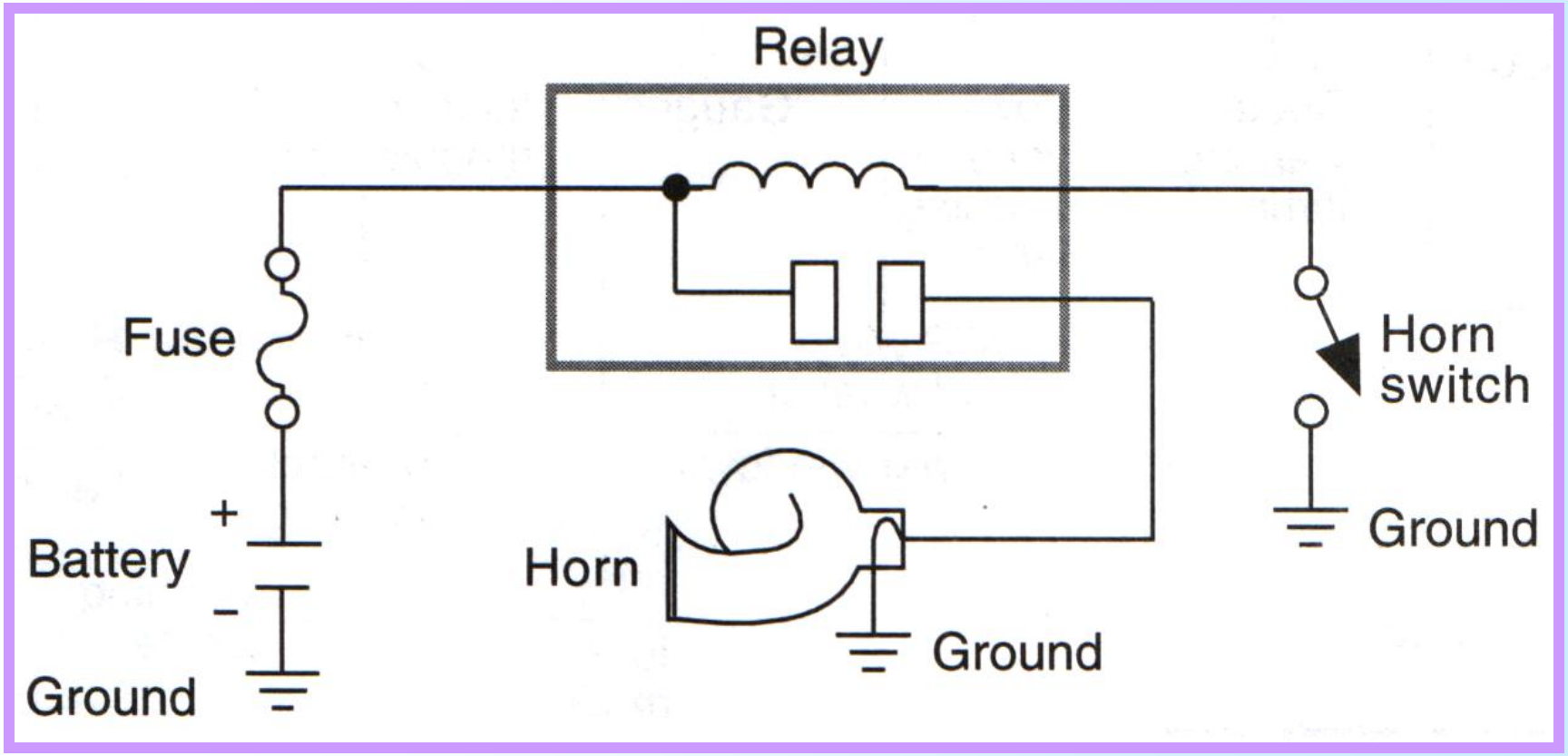


Electromagnetic Switches

- Also called a “relay”
- Uses a small amount of current to control a higher amperage circuit
- Relays are (NO) type circuits
- Often controlled by low amperage switch circuit

Electrical Switches

An Electromagnetic Switch in a Horn Circuit



Electrical Switches

Position Switches

- May be used on power or ground side of circuit
- Used to indicate whether a component is in the on or off position
- Only provides a “high/low” signal to a solid state control device
- A low current circuit

Electrical Switches

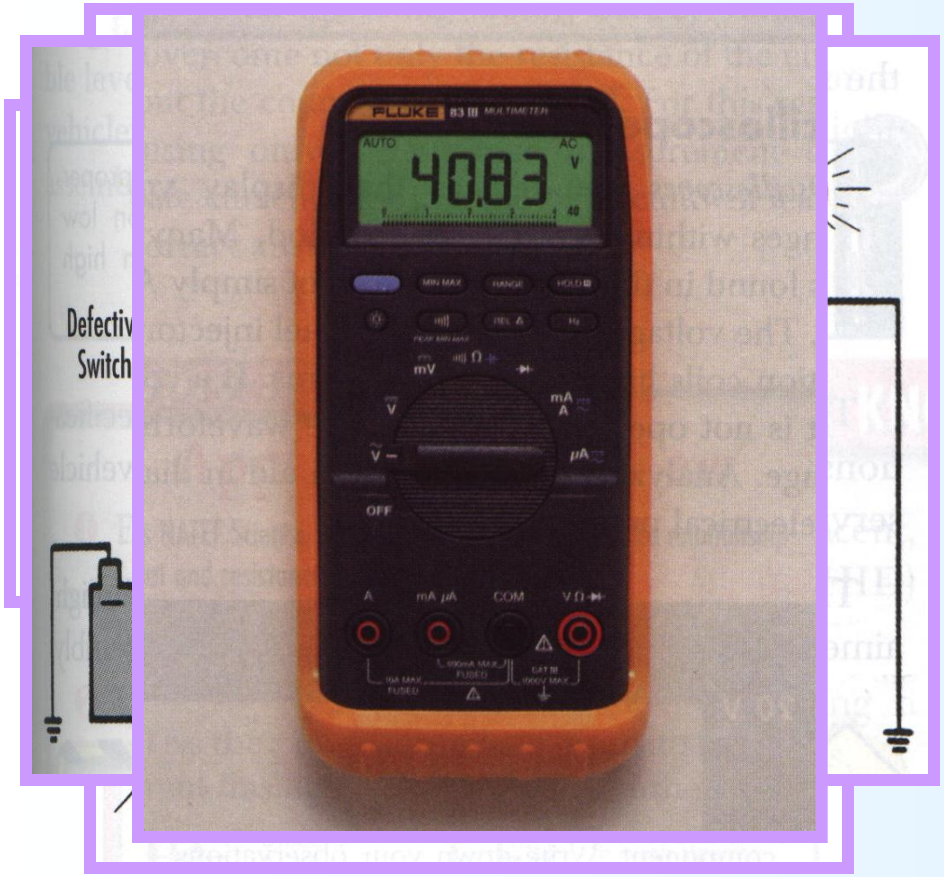
Pressure Switches

- Can be used on either power or ground side of circuit
- Switch is turned on/off by “pressure” rather than a component’s movement
- Switch may carry current load of circuit
- Switch may be used as a type of position switch for a solid state control device

Electrical Switches

Switch/Circuit Diagnosis

Switch/Circuit Diagnosis

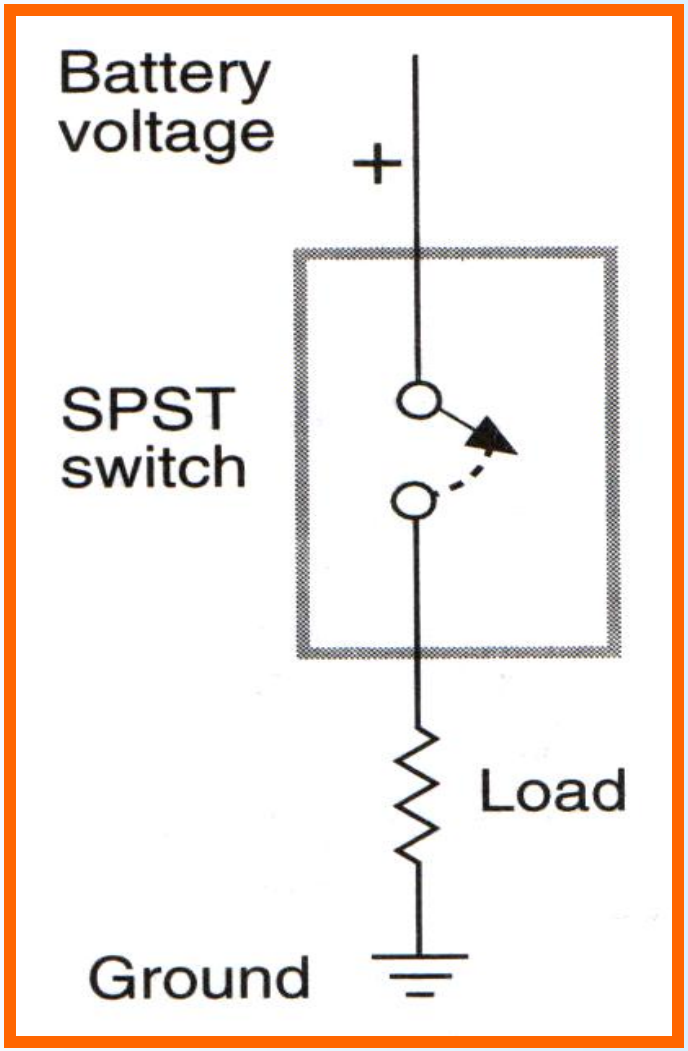


Tools and Methods:

- Test Light
- Continuity Light
- Jumper Wire
- DVOM

Switch/Circuit Diagnosis

SPST Switches



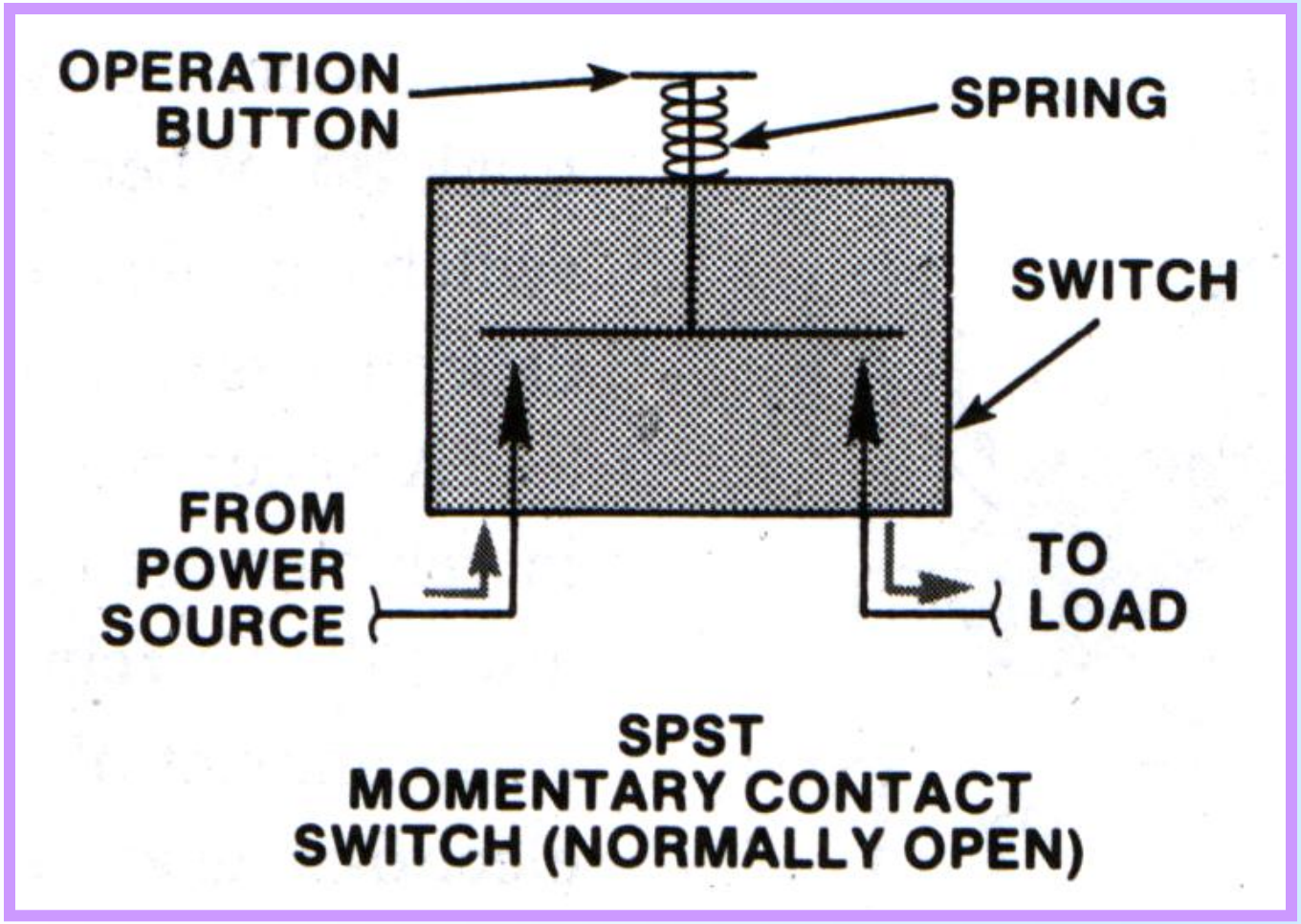
Switch/Circuit Diagnosis

Position Switches / Pressure Switches

- Basically a SPST switch
- Can be tested using SPST methods
- Always refer to appropriate wiring diagrams for the current flow information
- It is a good idea to remove the switch from the circuit before testing to prevent accidental damage to solid state components

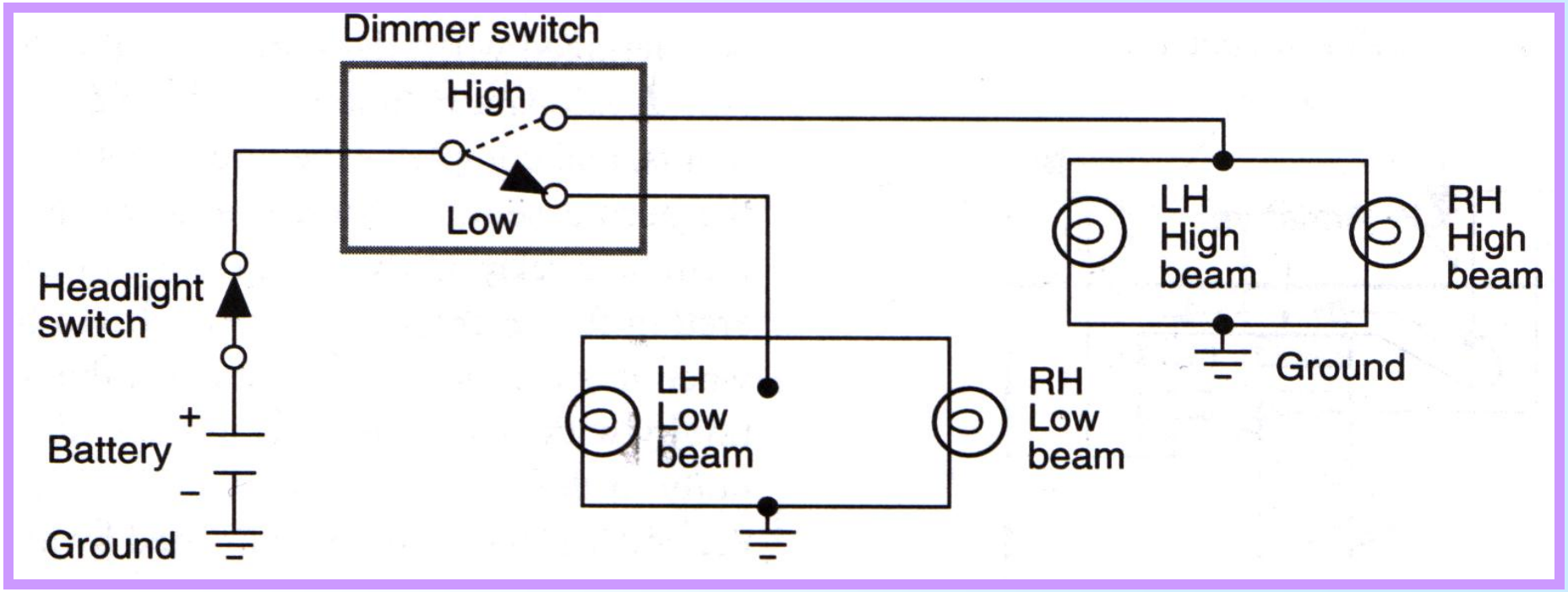
Switch/Circuit Diagnosis

SPST Momentary Switches



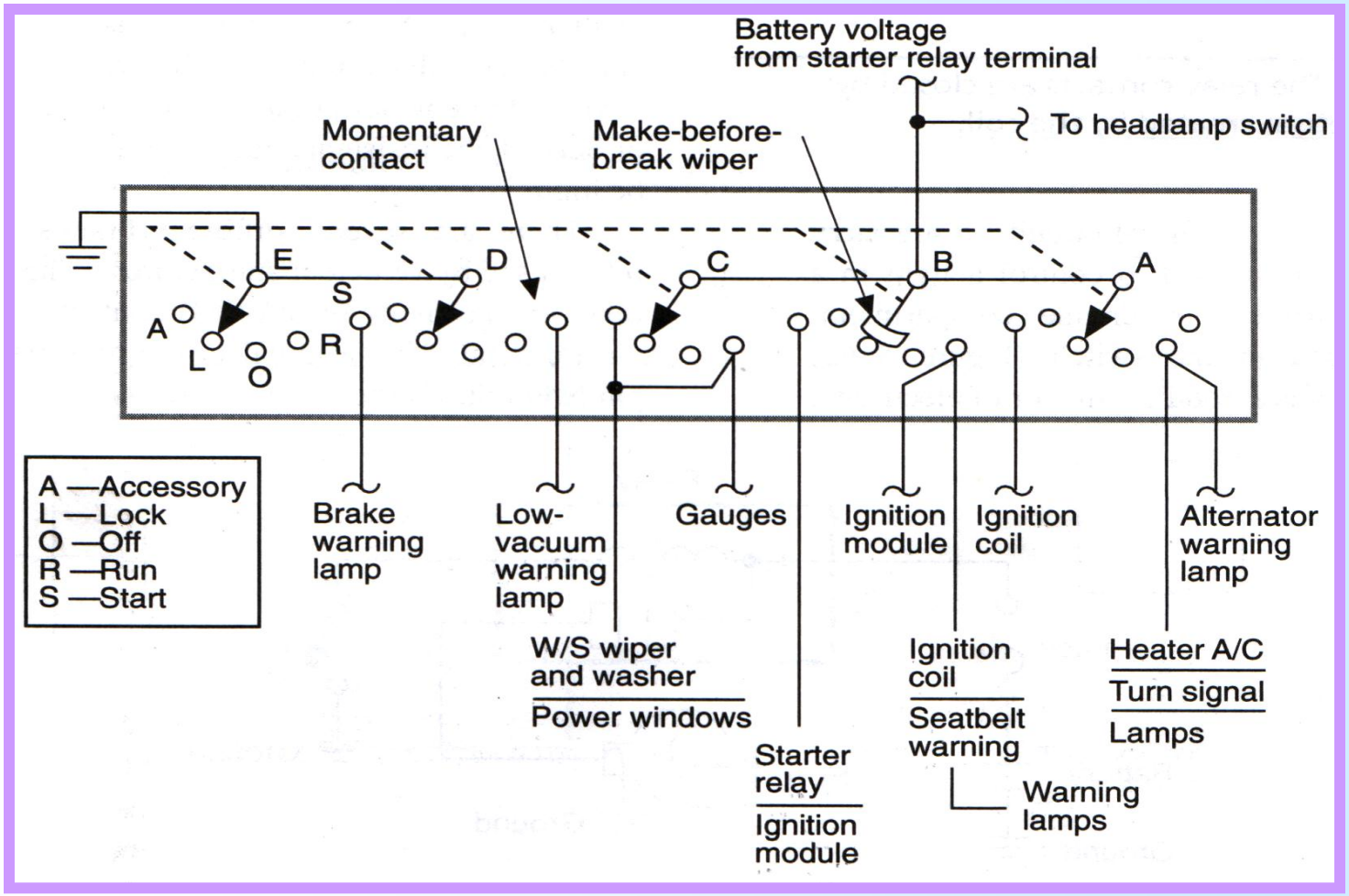
Switch/Circuit Diagnosis

SPDT Switches



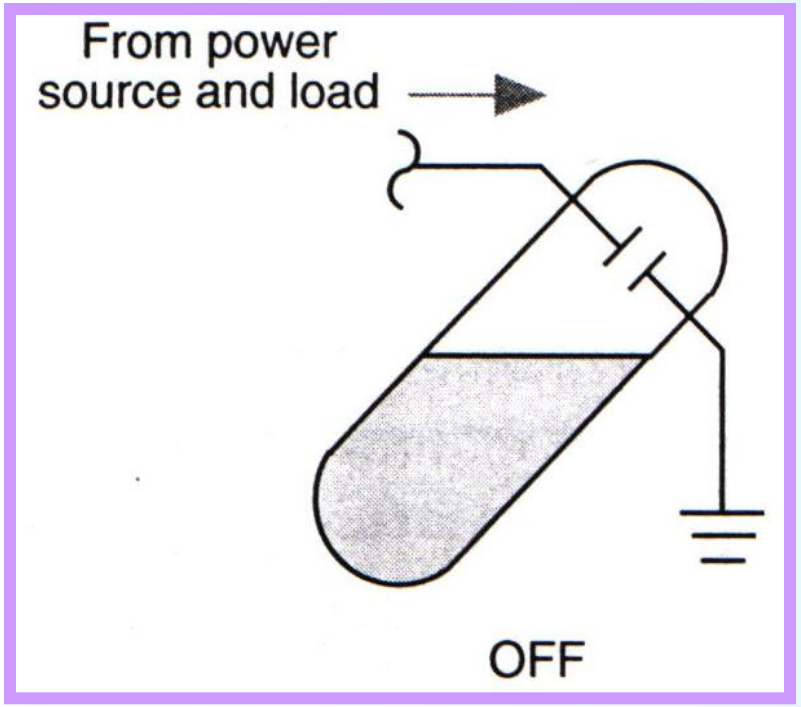
Switch/Circuit Diagnosis

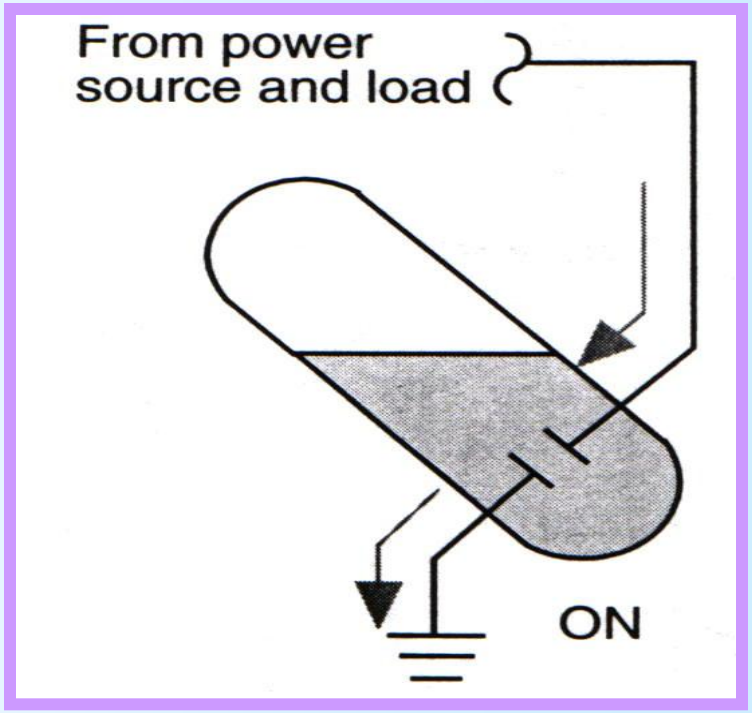
“Ganged” / MPMT Switches



Switch/Circuit Diagnosis

Mercury Switches





Switch/Circuit Diagnosis

Electromagnetic Switches