

REPAIR

CAFÉ

TORONTO

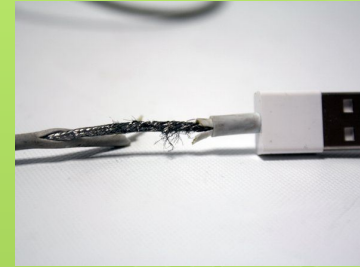
**Repair Techniques Workshop:
Common Failure Mechanisms
for small appliances
and other electrical devices
and soldering**

Today:

- First** – Discuss some common failure mechanisms
- Second** - talk about how they can be repaired or replaced
- Next** - review safety when working with electricity
- Finally** - look at some specific examples you want to discuss

Common Failure Mechanisms

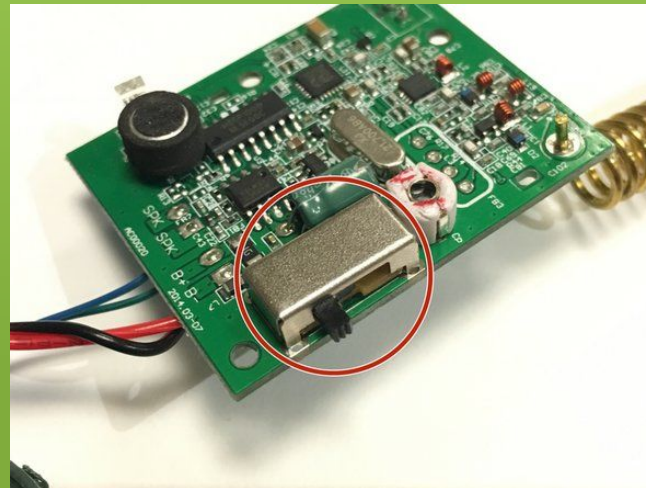
- broken wires or loose connections



- blown fuses

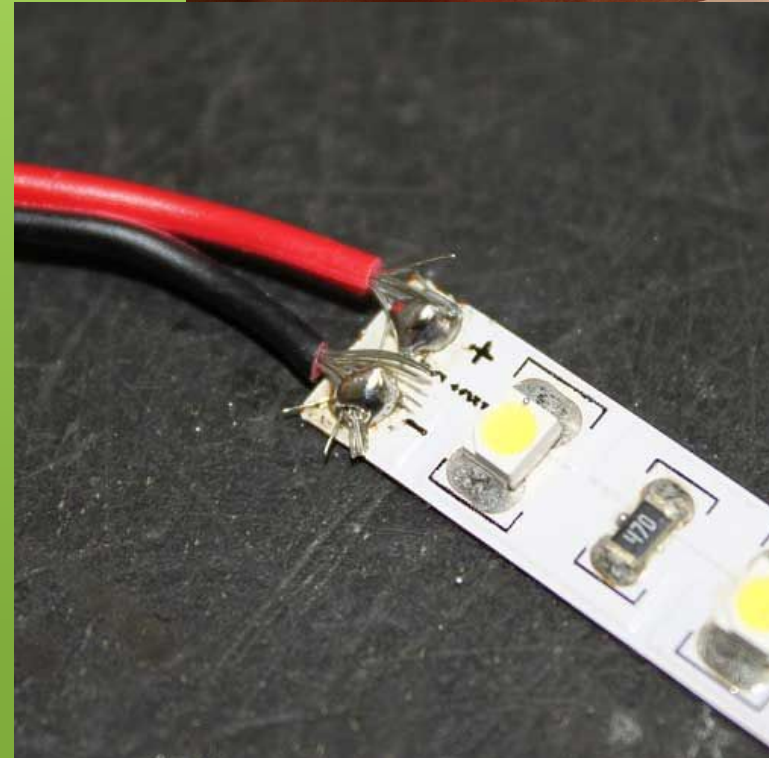
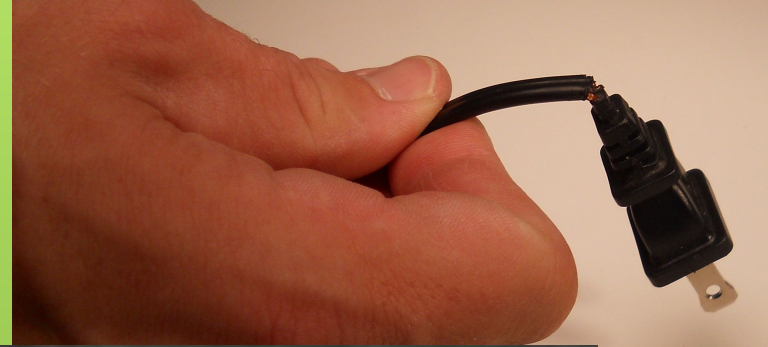
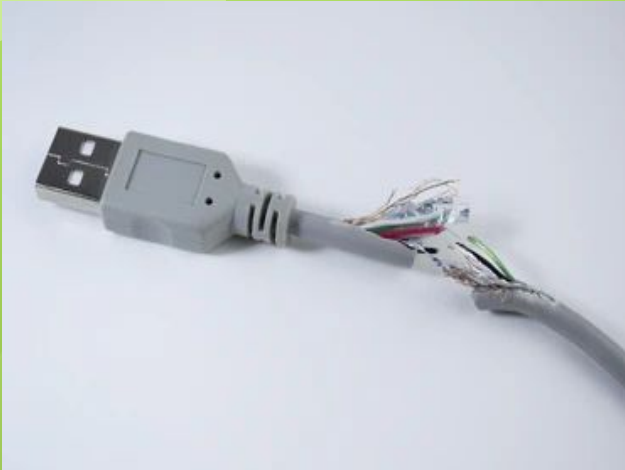


- broken or dirty switches



Broken wires or broken connections

- What do wires do and how are they designed?
- What causes them to break or disconnect?

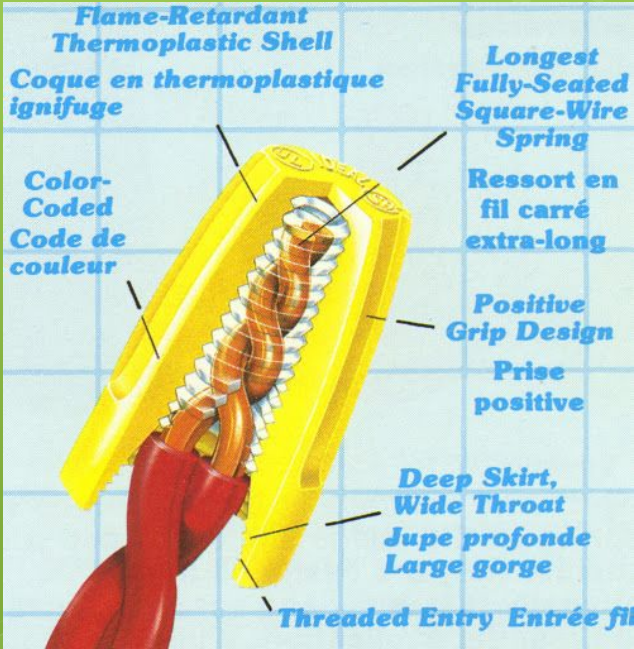
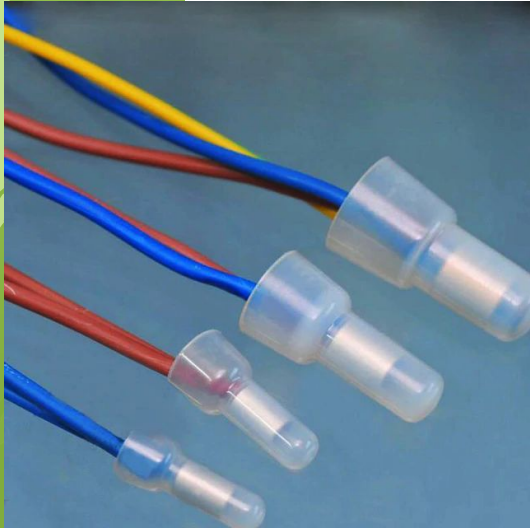


Safety first!

Never fix a wire when connected to power!

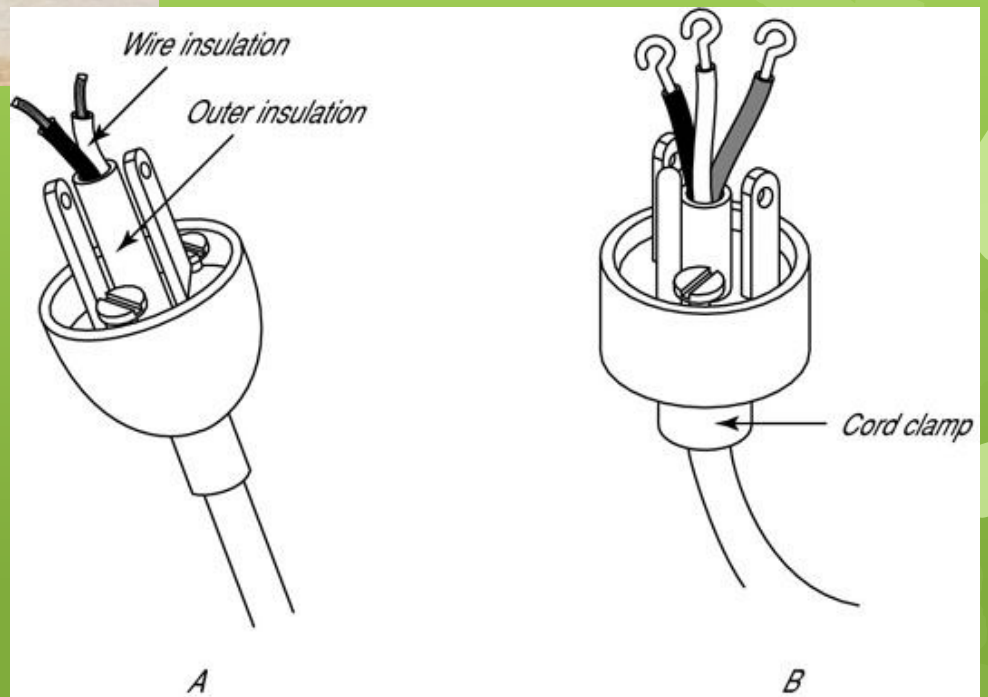


How to fix broken wires





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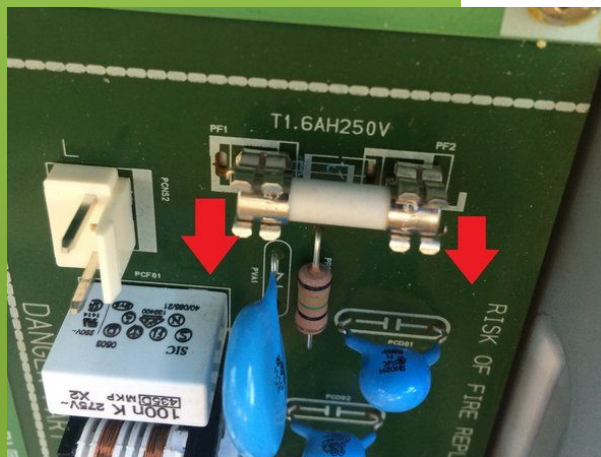
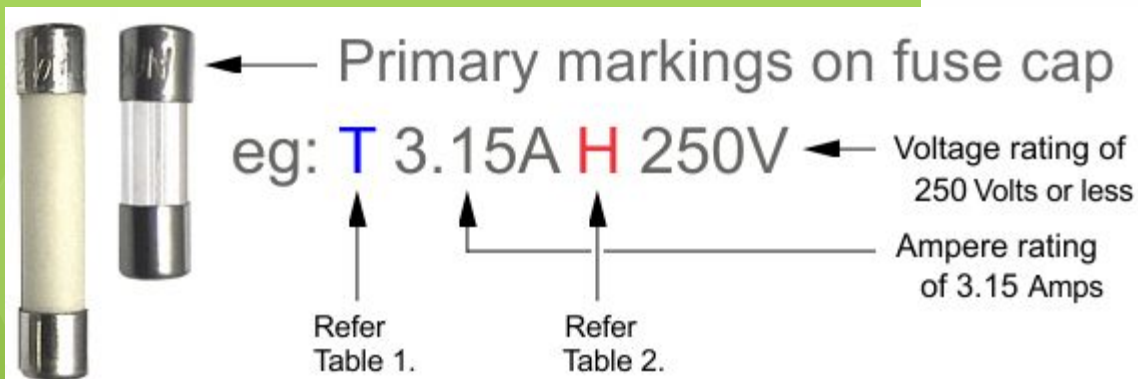
Fuses

- What do fuses do and how are they designed?
- What causes them to blow?



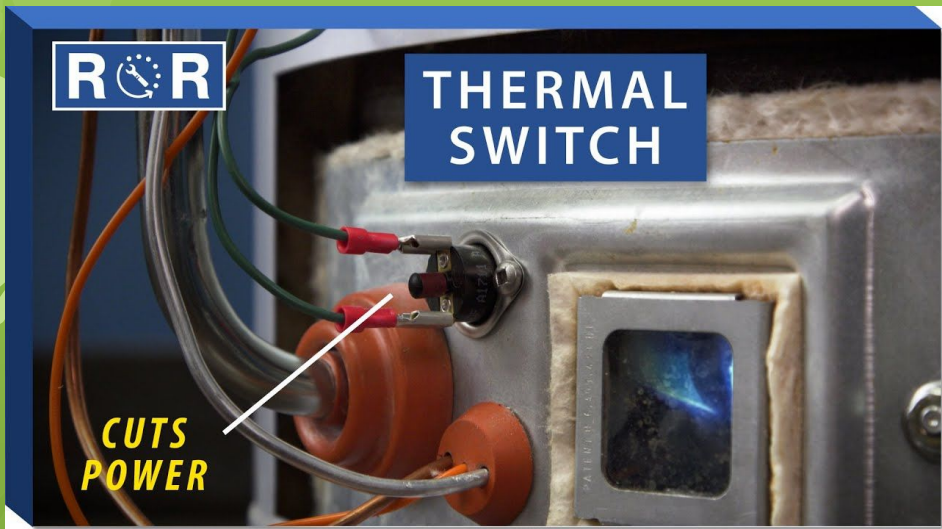
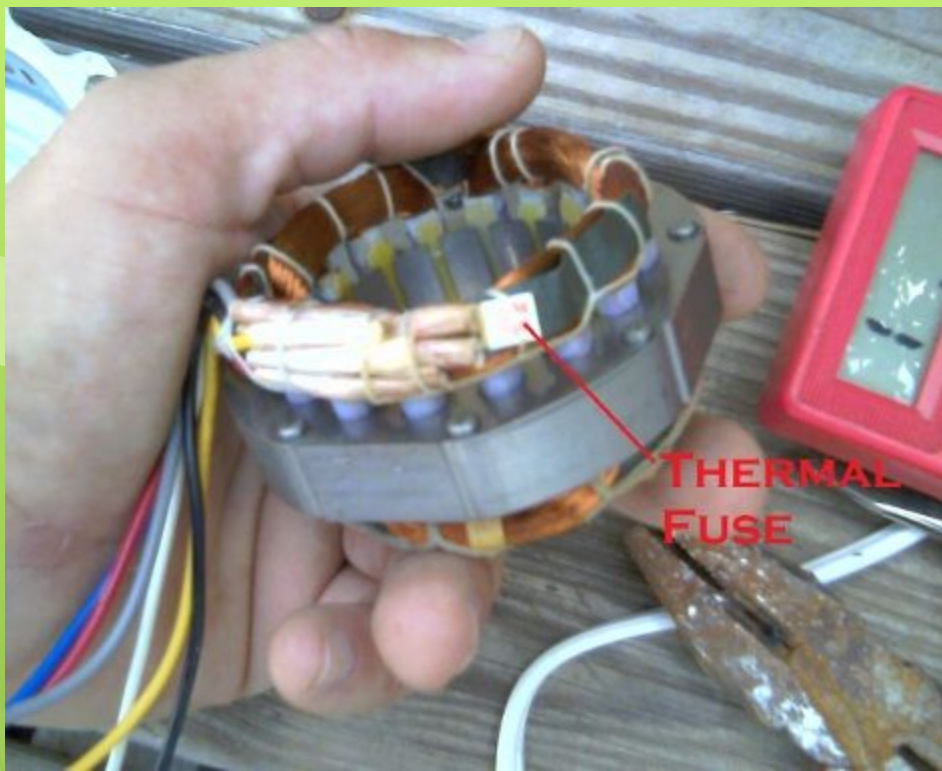
Fuse Specifications

- 1 current rating - amps
- 2 voltage rating - volts
- 3 physical size
- 4 material - glass, ceramic, paper, electronic, resettable



Thermal Fuses





Can we fix broken fuses?

Safety first!

Never bypass a fuse - they must be replaced with one that has the same specifications!

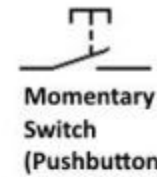
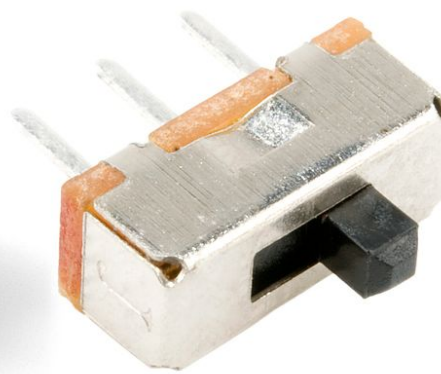


Caution! Measuring Voltage

To measure voltage, the equipment under test is plugged in.

- **Voltage coming out of your outlet is very dangerous. Be careful measuring 120V.**
- **Never** allow the two parts of the outlet or plug to be connected together.
- **Never** touch any electrical conductor directly with your hands.
- **Never** hold two ends of an electrical circuit with your bare hands.

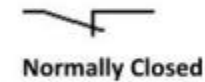
Switches



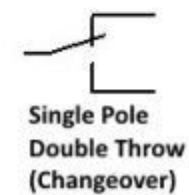
Momentary
Switch
(Pushbutton)



Normally Open

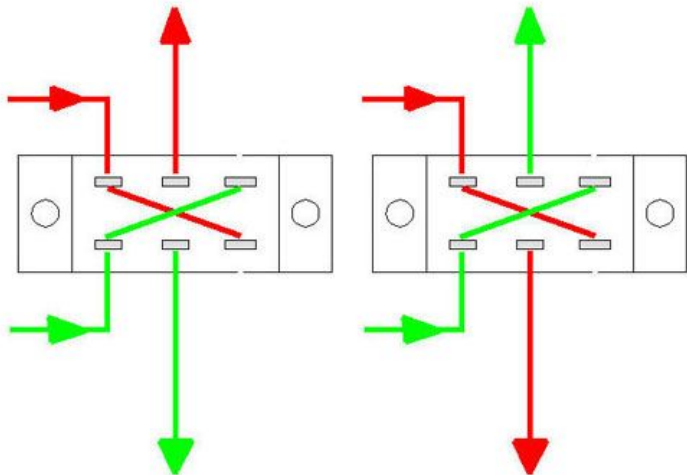
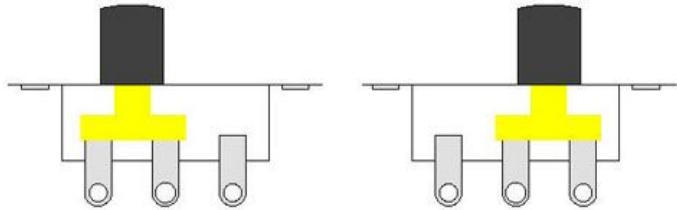
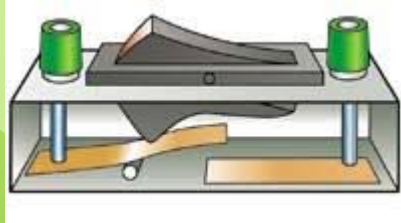


Normally Closed



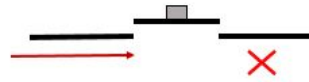
Single Pole
Double Throw
(Changeover)

Switches



Normally open pushbutton

Button not pressed



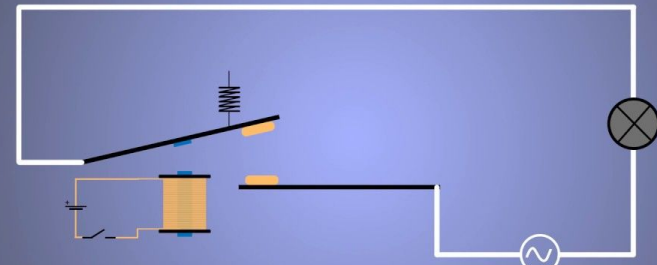
Current **not** flowing

Button pressed



Current **flowing**

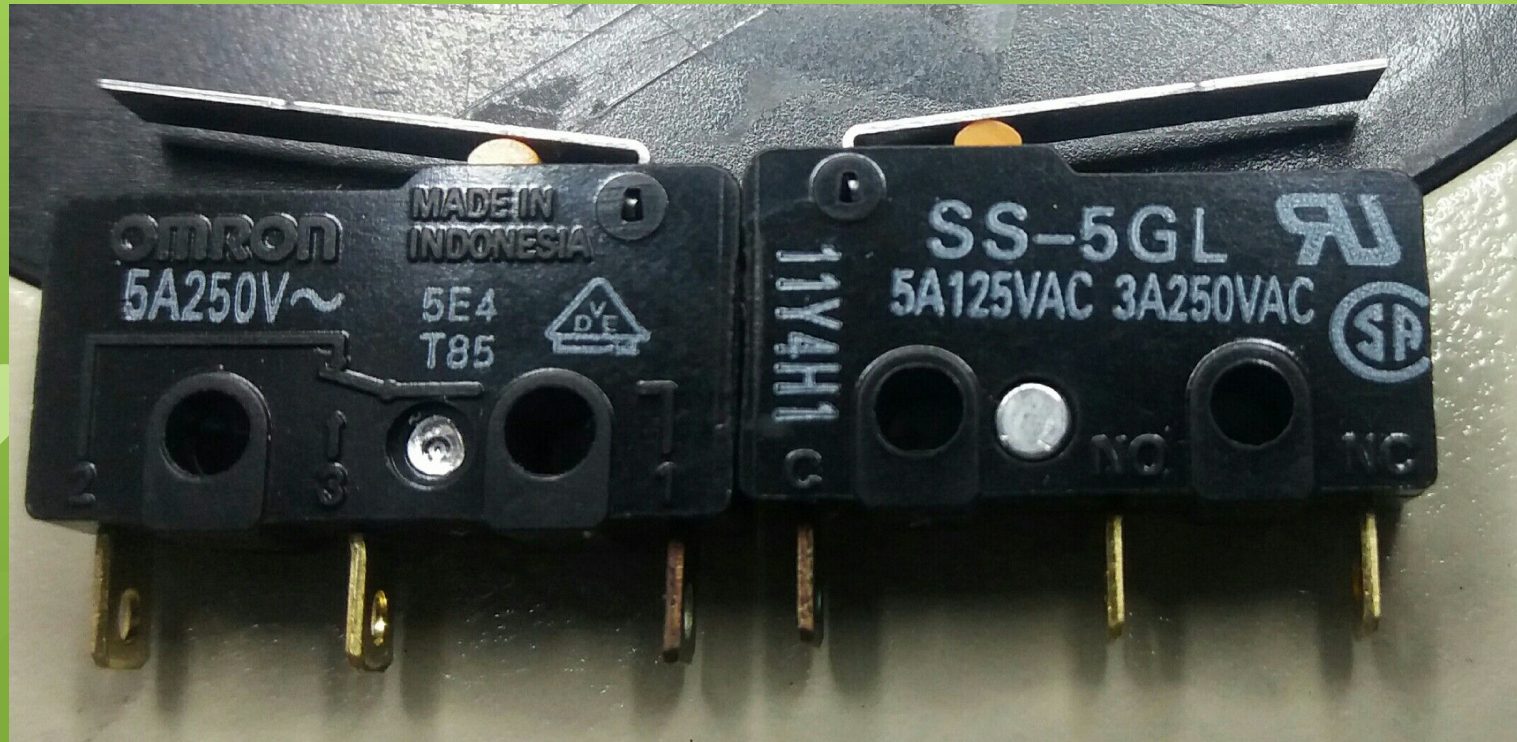
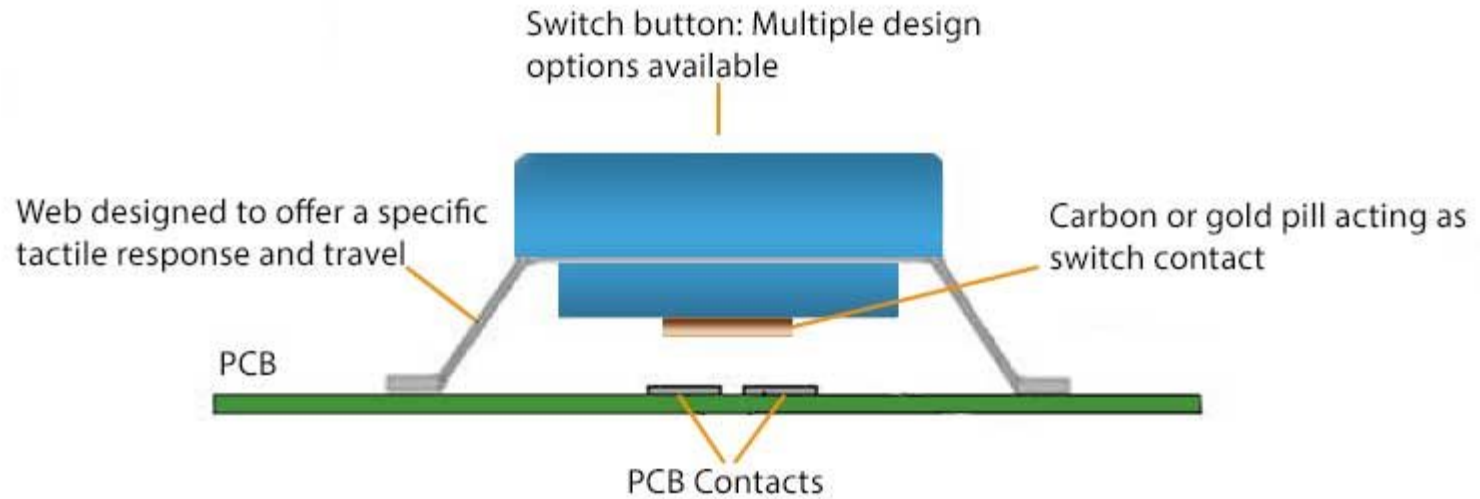
HOW DOES IT WORK?



220V AC

When the control switch is **turned ON** current starts flowing through a coil, it generates magnetic field that

Basic Silicone Keypad Switch Design

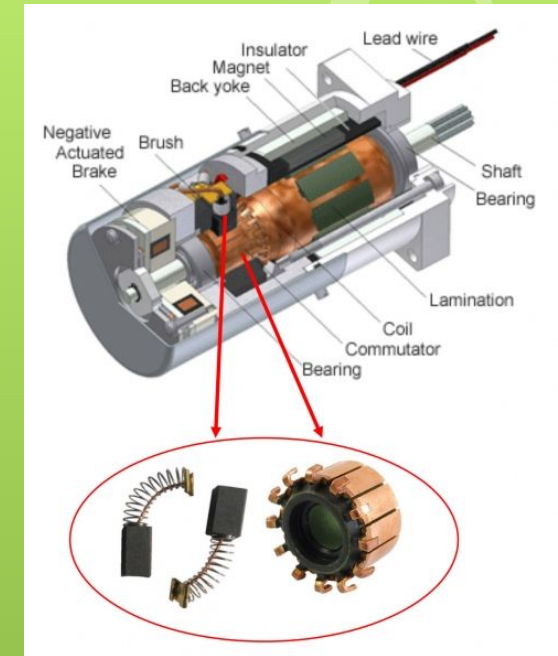


Other less common failure mechanisms

- motor failures - dirty brushes, broken or burnt windings
- relays - dirty or stuck contacts, burnt contacts
- heating elements



- rechargeable batteries



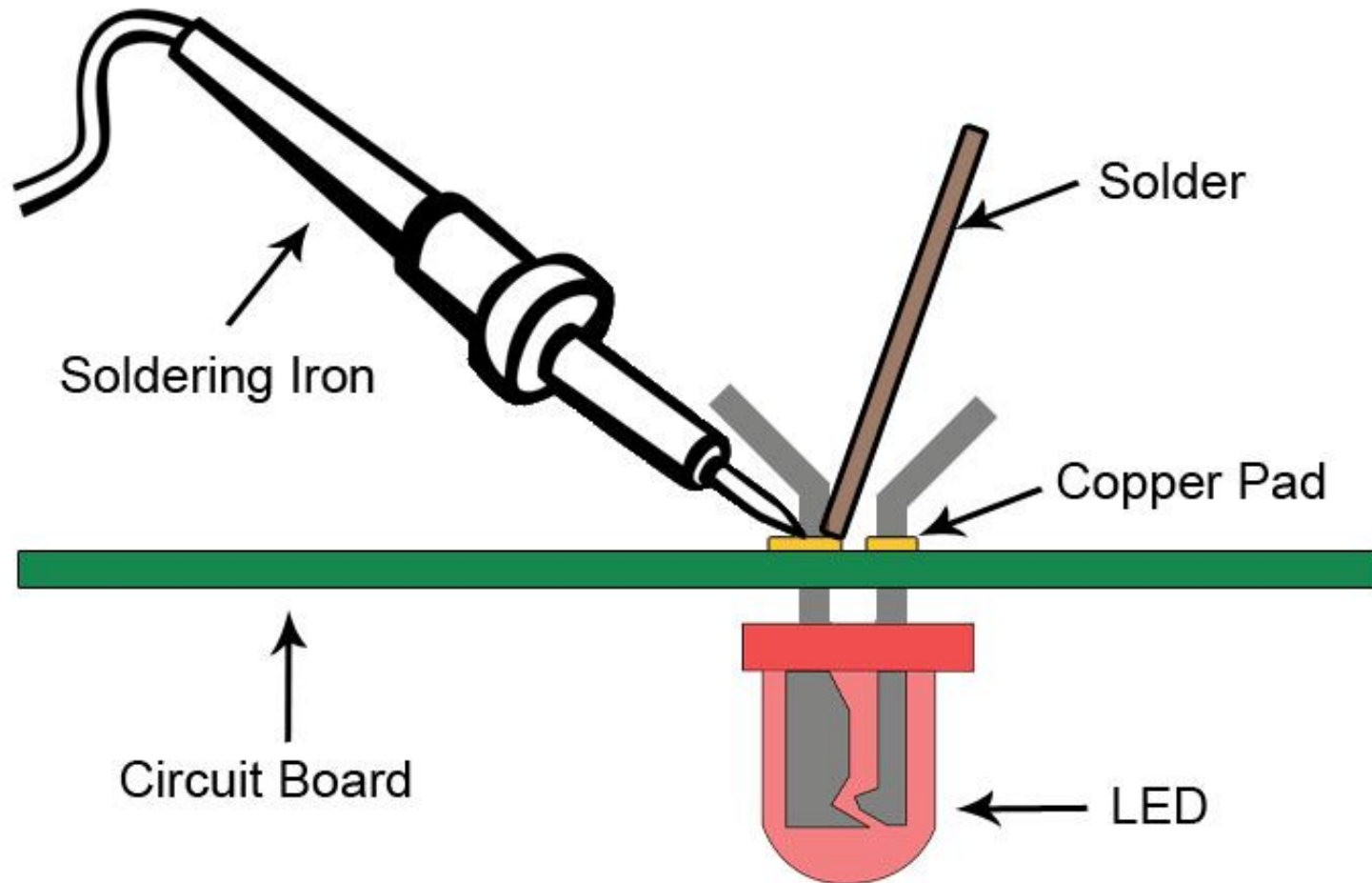
Soldering

Soldering is a process in which two or more metal items are joined together by melting and then flowing a filler metal into the joint

The filler metal having a relatively low melting point. ...
The metal to be soldered is heated with a soldering iron and then solder is melted into the connection.

Never use a solder joint to physically hold components together – it is an electrical connection only and cannot bear any weight.

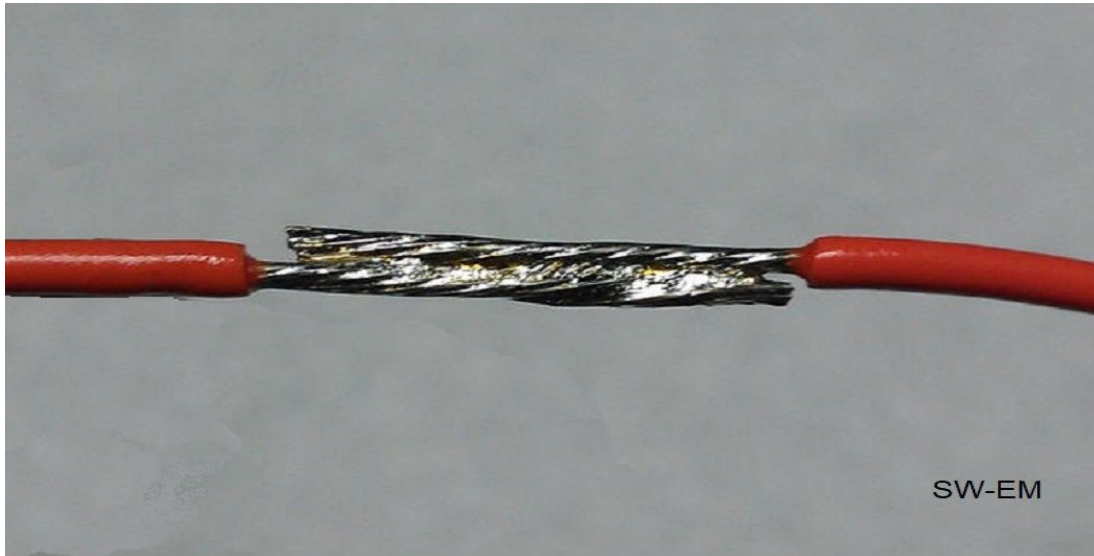
How To Solder



YES

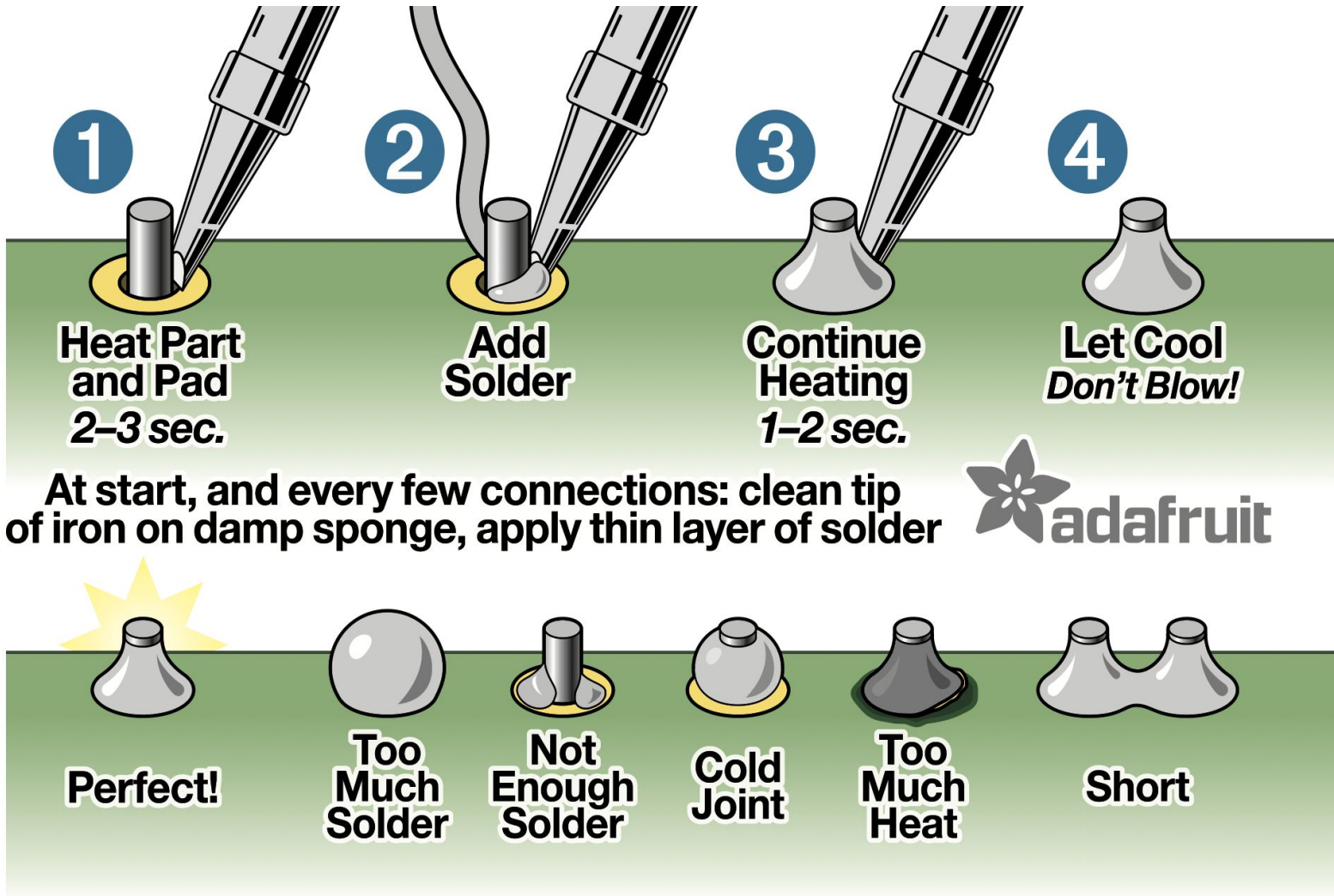


NO



SW-EM

SOLDERING

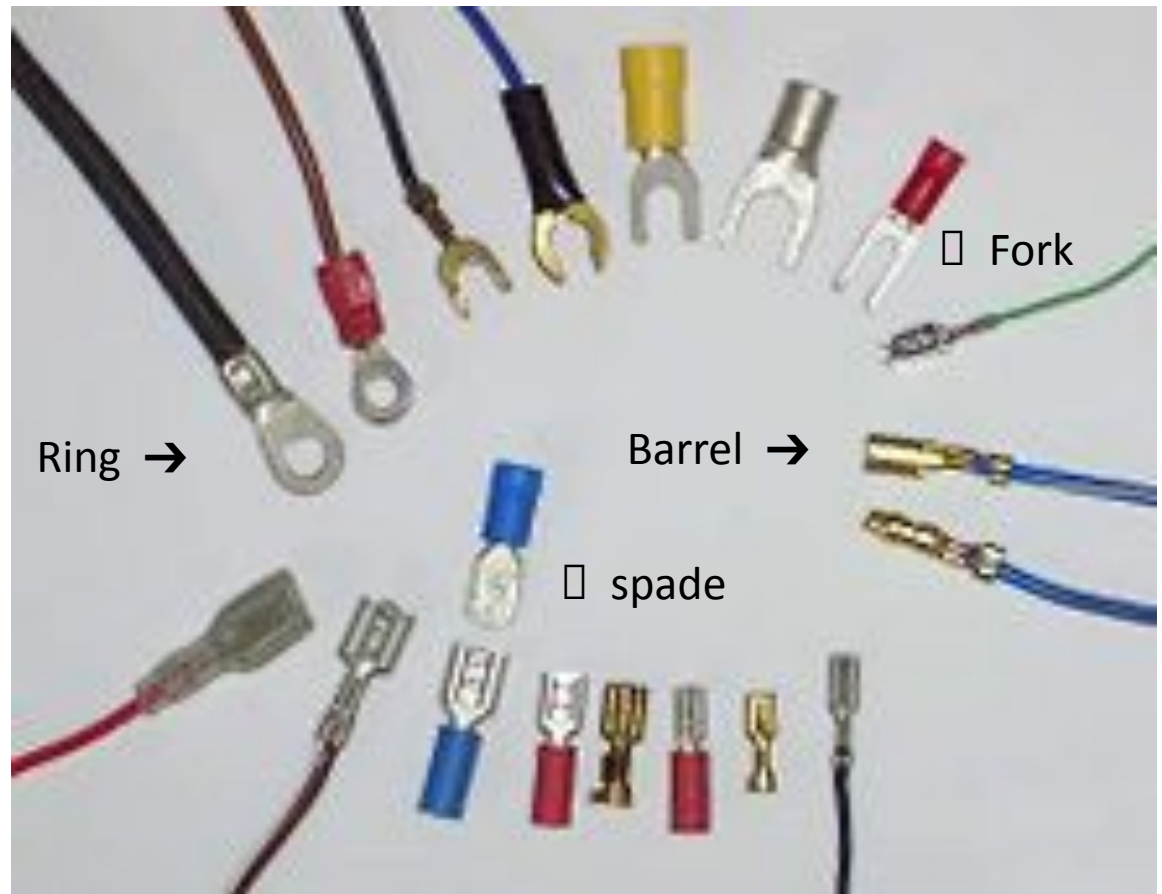


Crimping

- Crimping is an alternative way of connection wires. It is a solderless method.
- Crimps are metal tubes or barrels such that a wire can be place inside and then the barrel is squeezed or crimped tight over the wire. Two wires can be connected together using crimps. Or, a crimp connector can be attached to the end of a wire.



Different types of crimp connectors.





**INTRO
TYPES
& USES**



**CRIMP
CONNECTORS**





Match the correct size crimp to the wire being used.