



Municipal Affairs and Environment

***2026 Water & Wastewater Workshop
@ Quality Hotel Gander***

Electrical Hazards – Improperly Grounded Water Pipes

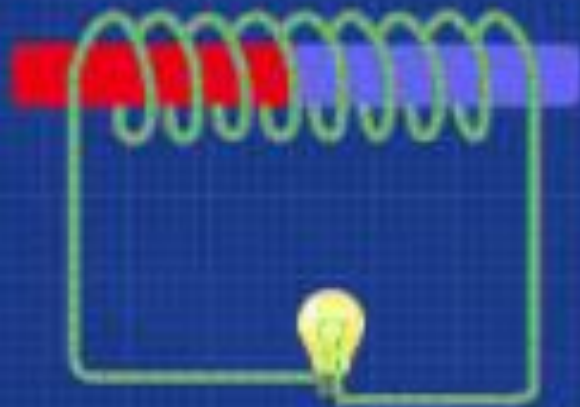
Presenter: Dave Galbraith



How Electricity Works

Types Of Electricity

There are two types of current electricity



Alternating Current (AC)

In AC the current moves back and forth with the changing magnetic field
This is the type of electricity from wall sockets in your home



Direct Current (DC)

In DC the current travels only in one direction
This is the type of electricity in batteries

Typical Power Supply from Hydro "The Power Company"

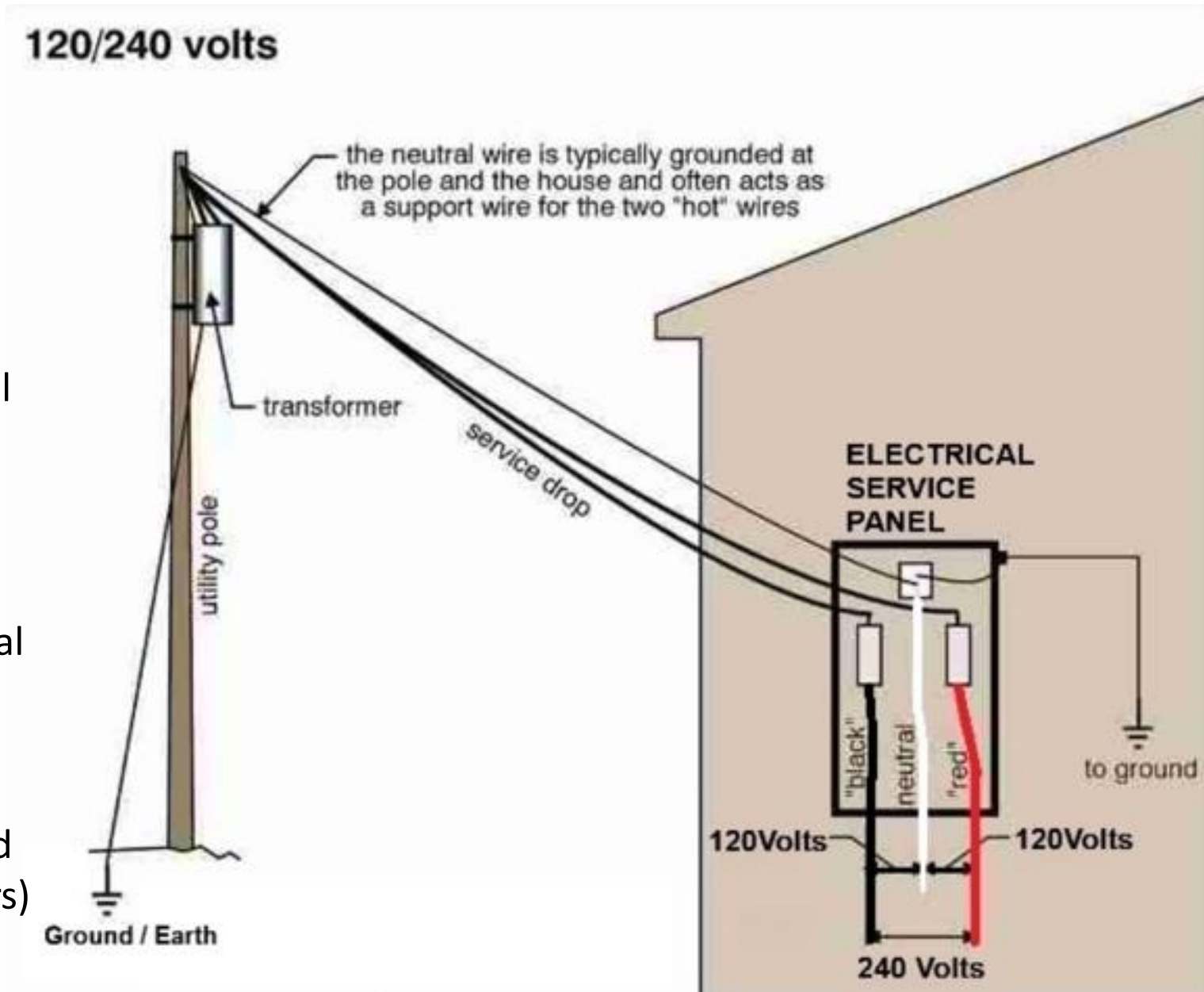
Example:

120/240VAC Single Phase 60Hz

Single Phase: Two Hot Wires & One Neutral
Red, Black & White
plus a Ground (Green or Bare)

Three phase: Three Hot Wires & One Neutral
Red, Black, Blue & White
plus a Ground (Green or Bare)

Neutral Wires are grounded at the Pole and
the Electrical Panel (Fuses or Circuit Breakers)



Fuse Panel “old”



Single Phase

120/240VAC ~ 60 or 100 Amps

(possible water pipe used as ground rod)

Circuit Breaker Panels



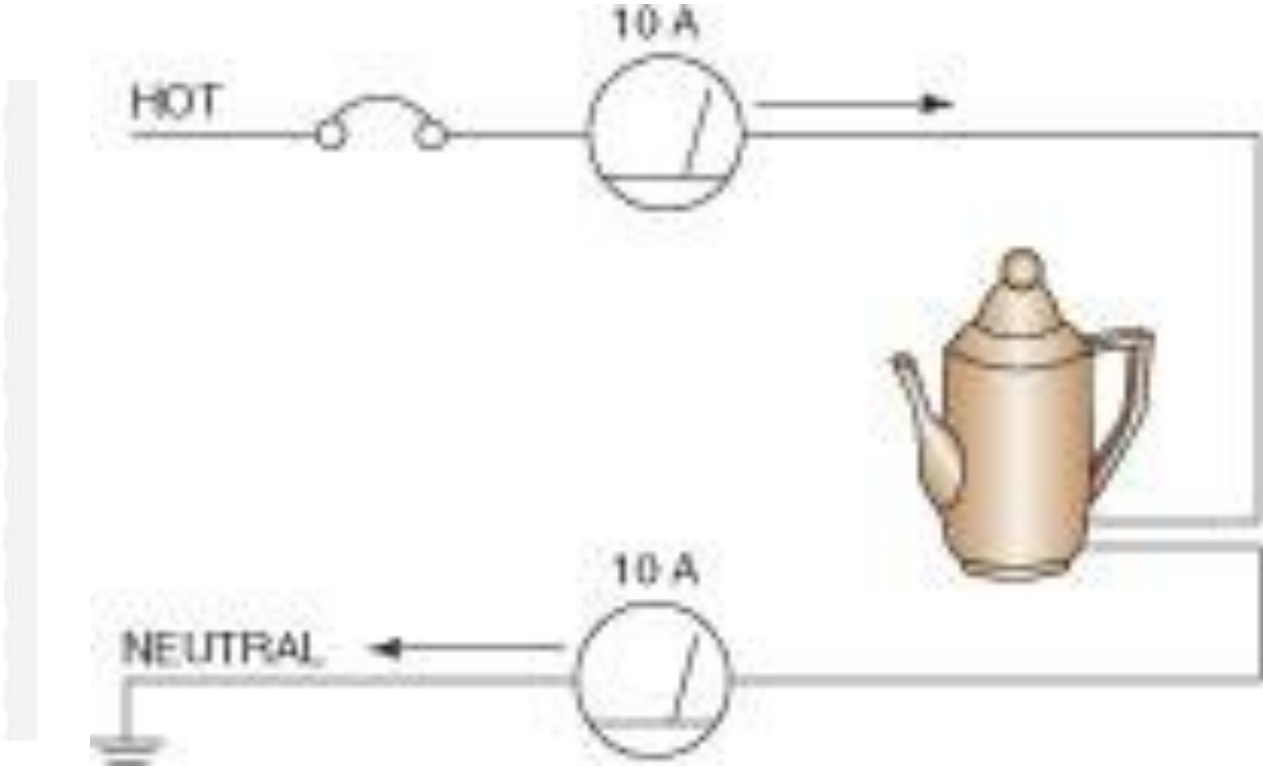
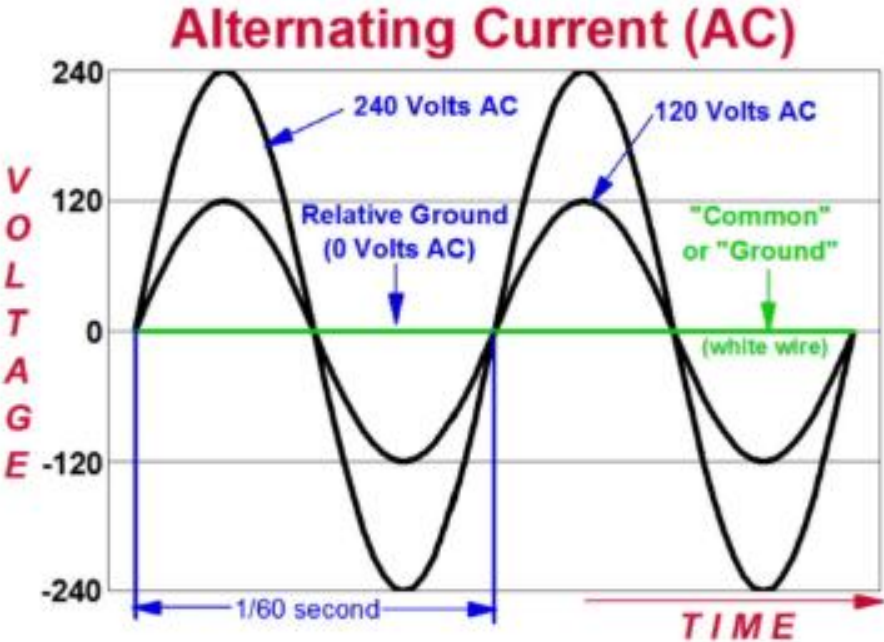
Single Phase 120/240VAC ~ 100 - 200 Amps

Three Phase 120/208VAC ~ 100 Amps Plus

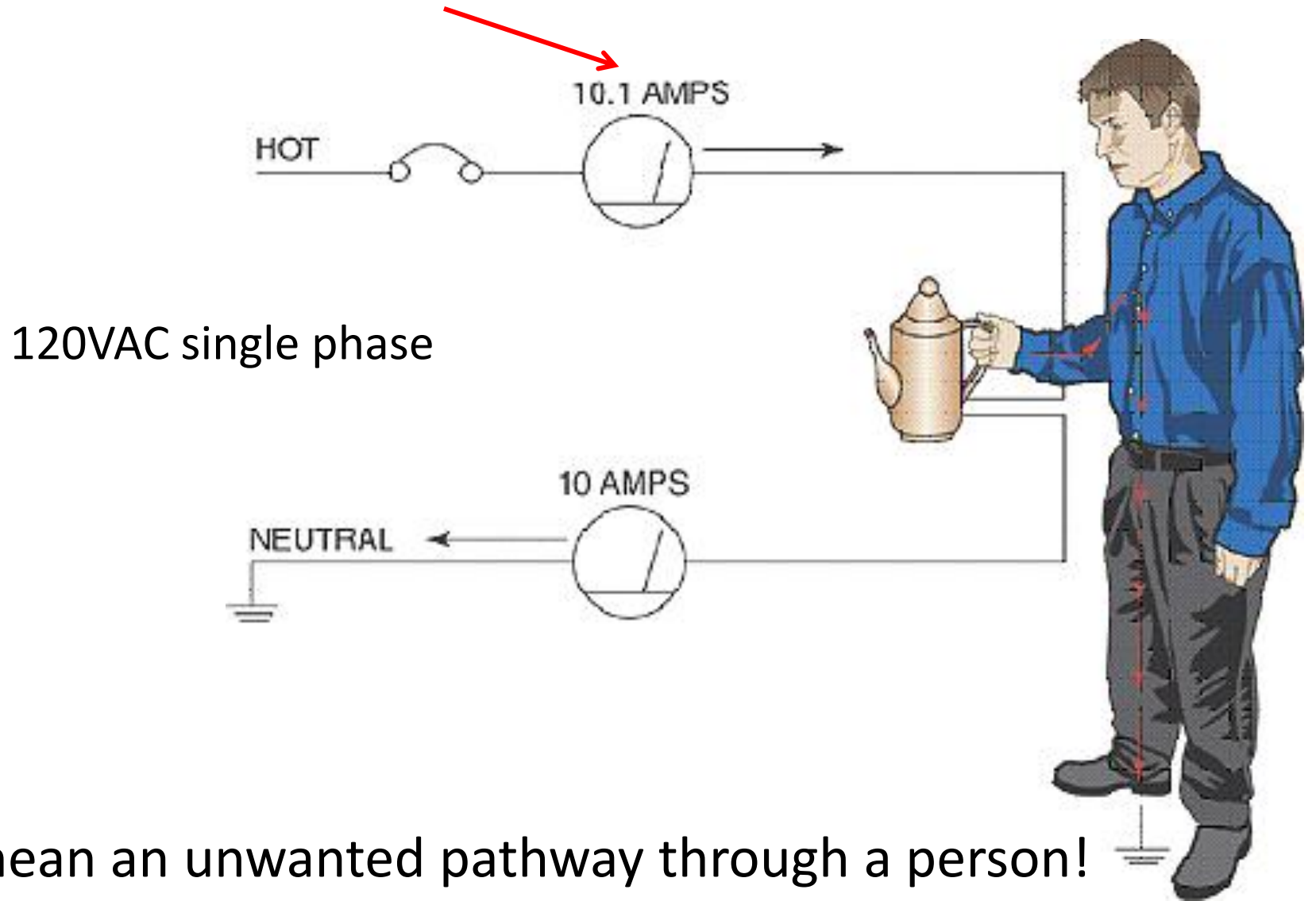
Three Phase 347/600VAC ~ 100 Amps Plus

AC – Alternating Current

flows through our power wires from Hydro



AC uses a Hot & Neutral wire for 120VAC circuits.
These currents should be equal



Unequal currents may mean an unwanted pathway through a person!

... This is a ground fault.... But it is only 0.1 Amps, right?



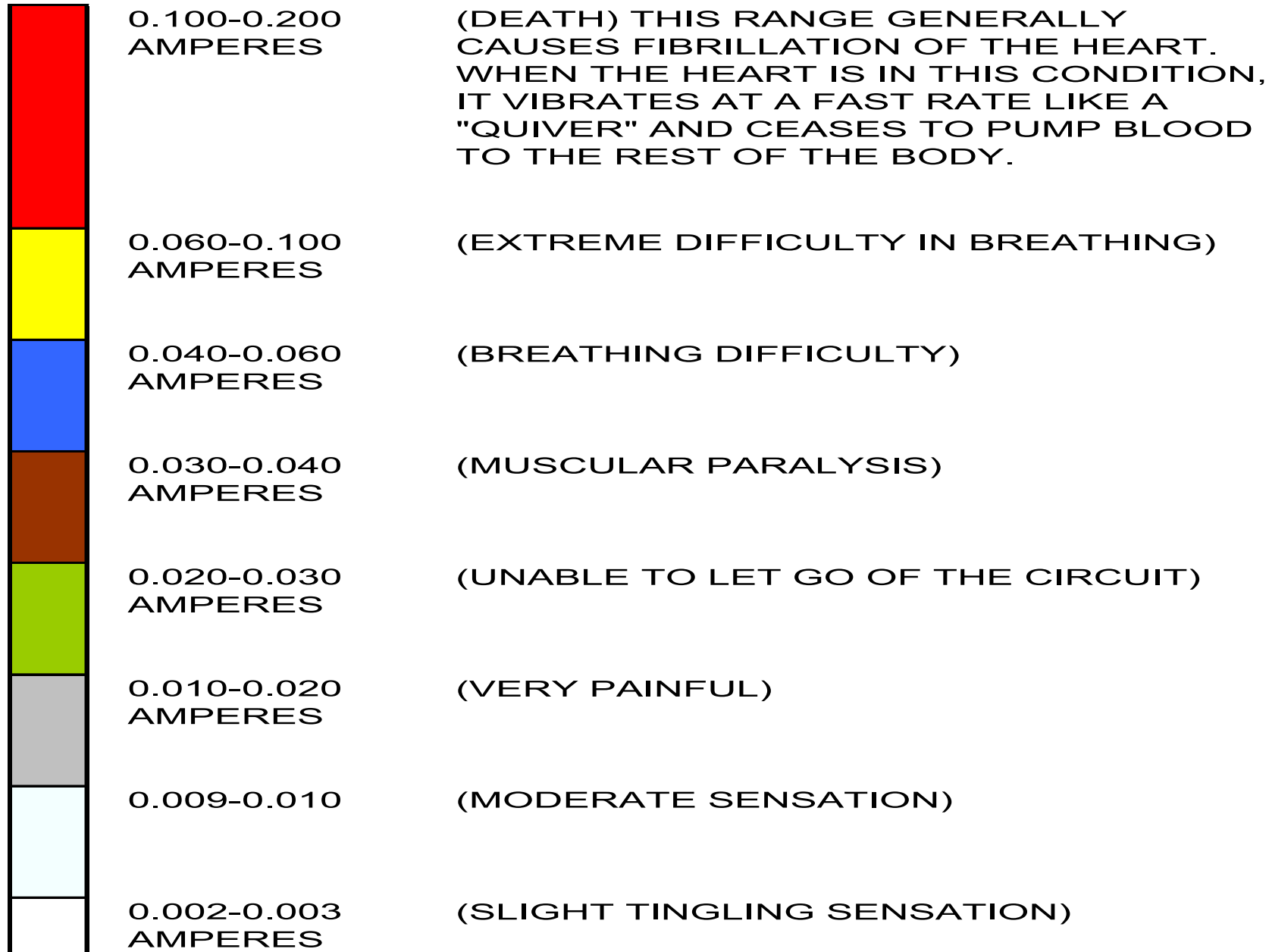
Typical Car or Truck Battery is 12VDC - “Direct Current”
the current flows from Positive (RED) to Negative (Black) *aka Ground*
How much current is available *aka Cold Cranking Amps* ?
Its only 12Volts, Right?

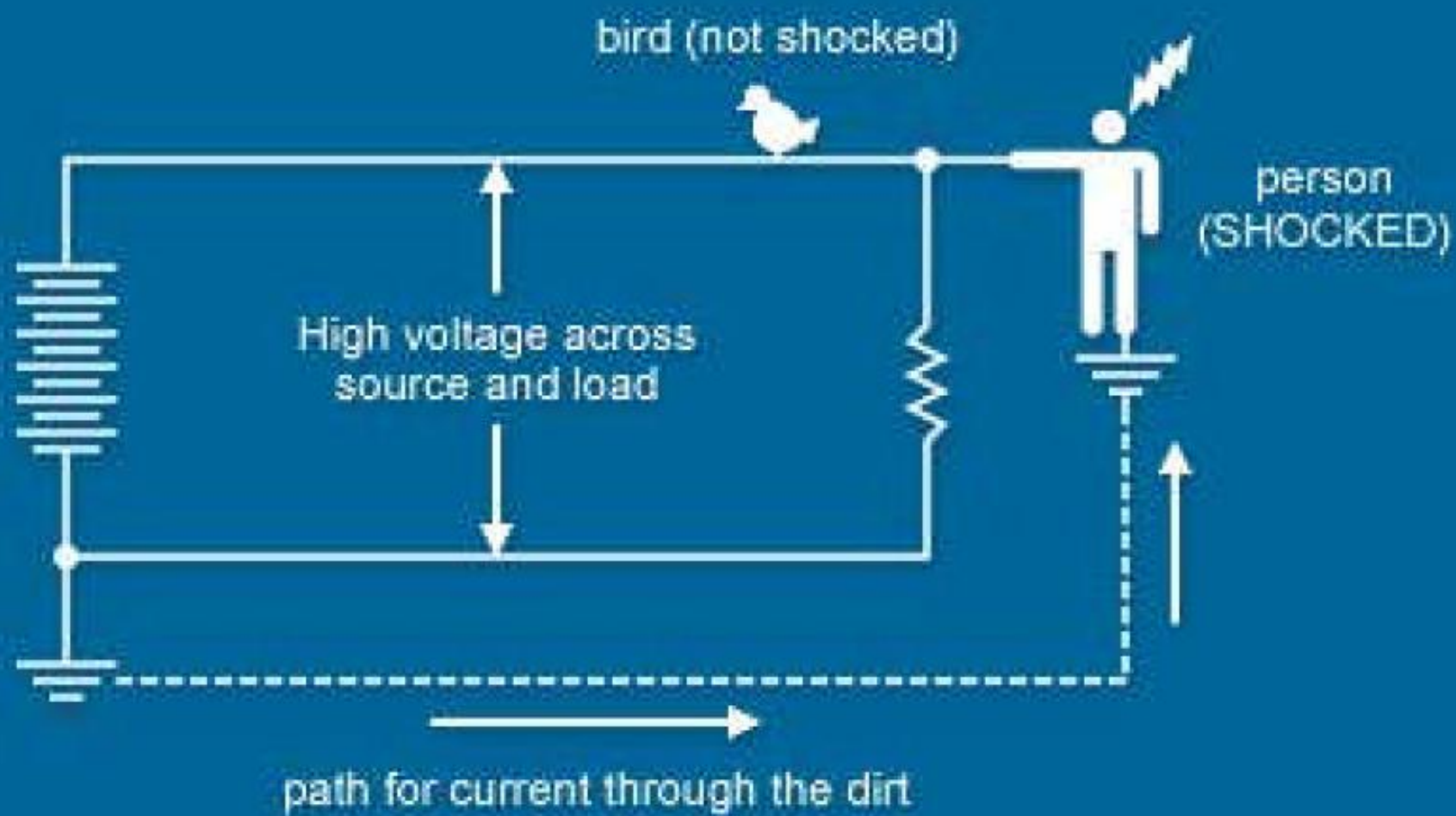


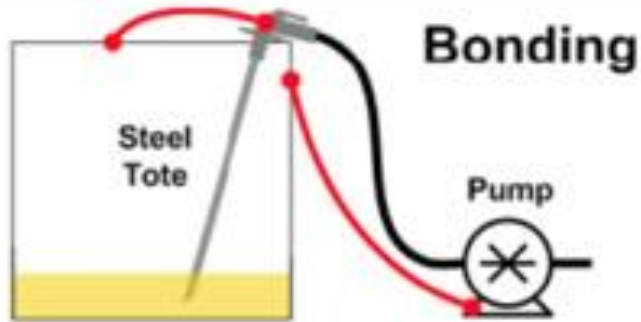
NOTE: Trailers or back yard mechanics may use different colour wires...

This may happen to you if you short out the Positive Battery post to the Chassis – Ground of your vehicle

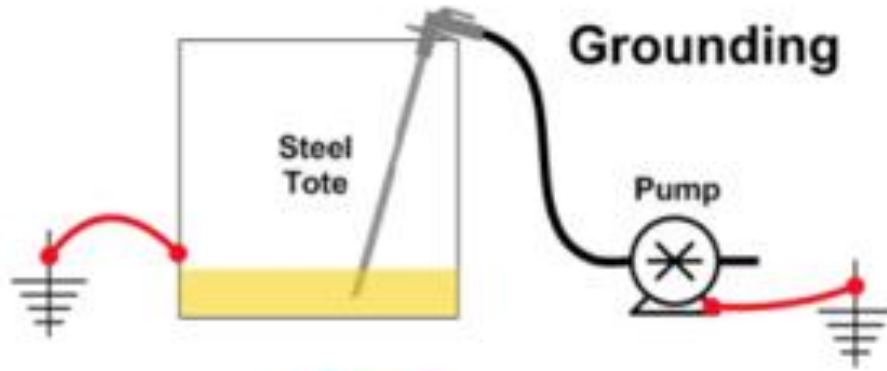
Effects of electric current on the human body.



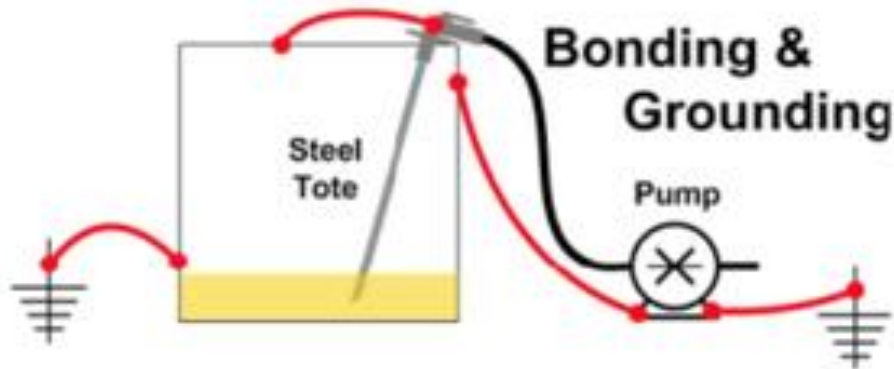




Bonding only
potential for a shock

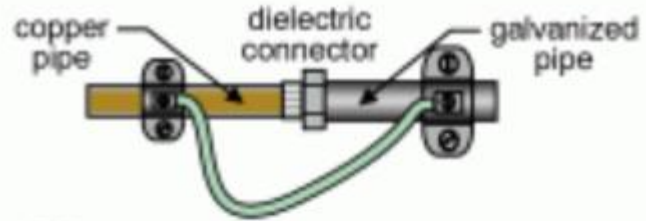


Grounding only
potential for ground loop path
between grounds

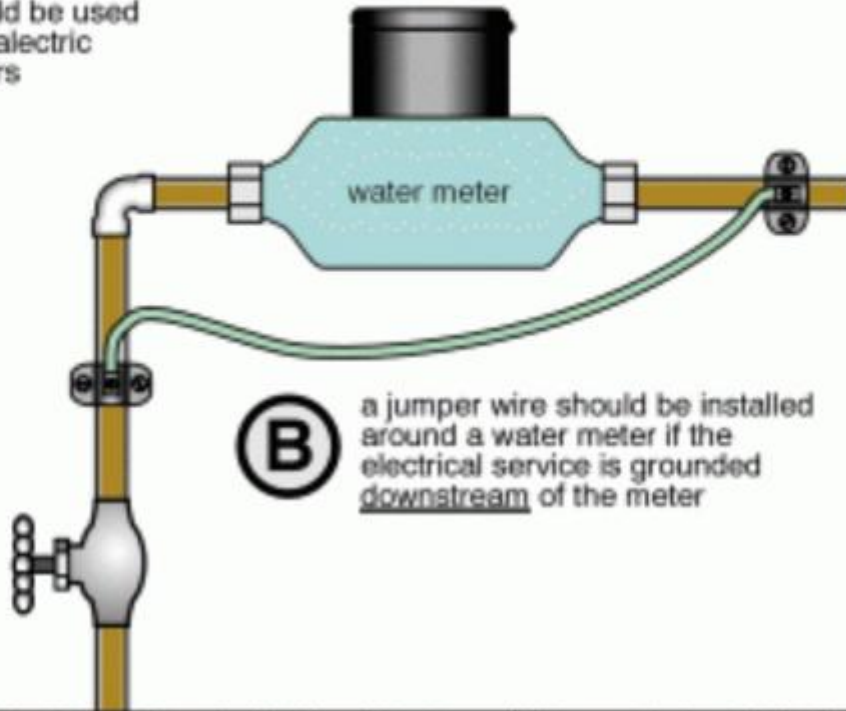


Bonding & Grounding
low potential for a ground loop -
highly unlikely for a shock.

Jumper wires

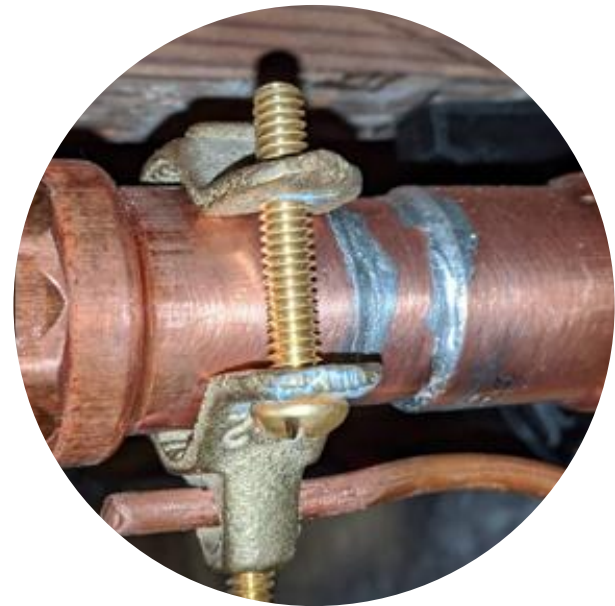
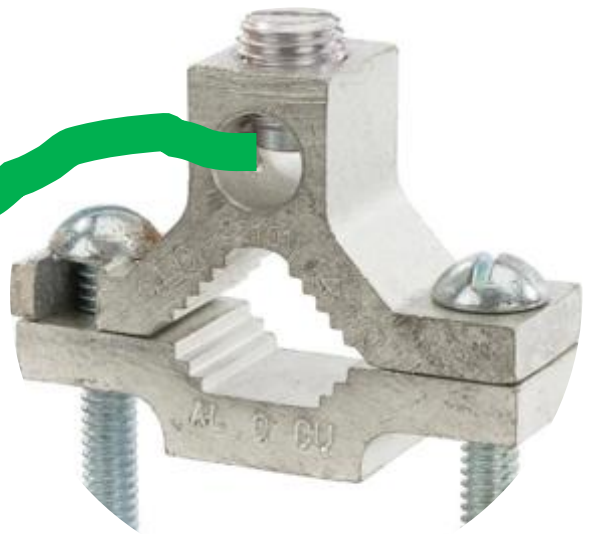


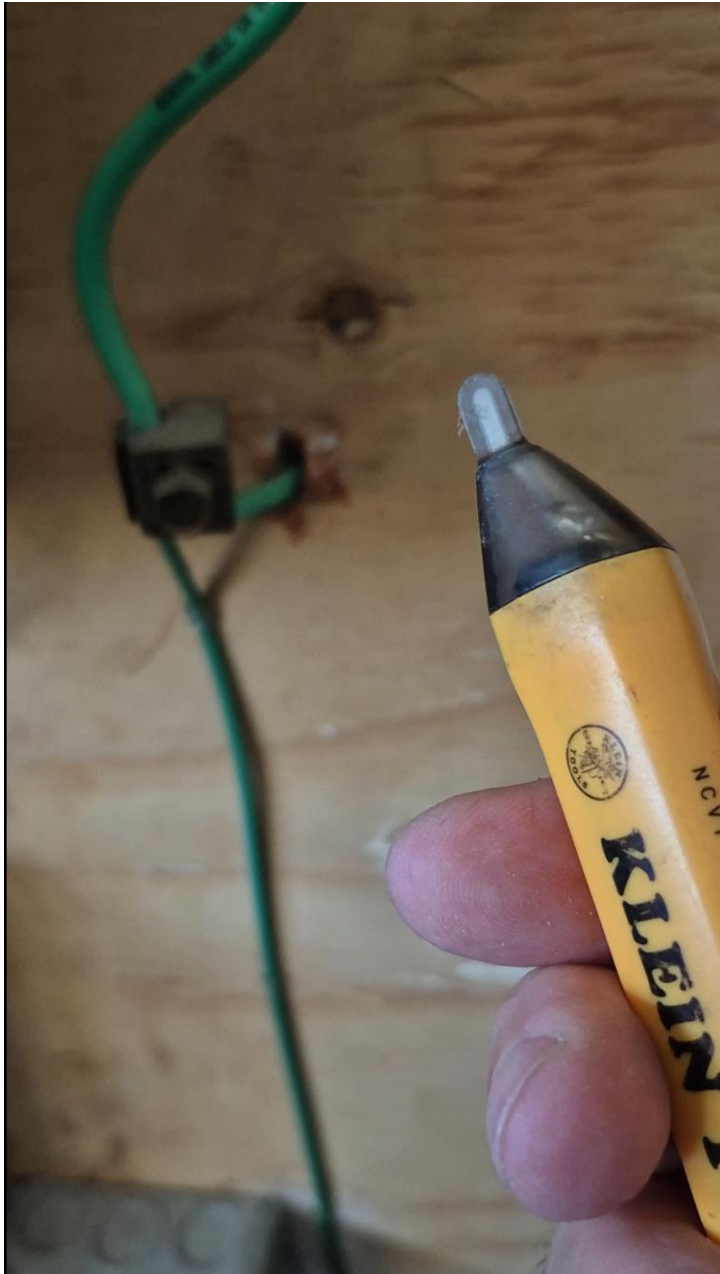
A a jumper wire should be used to bridge around dielectric plumbing connectors



B a jumper wire should be installed around a water meter if the electrical service is grounded downstream of the meter





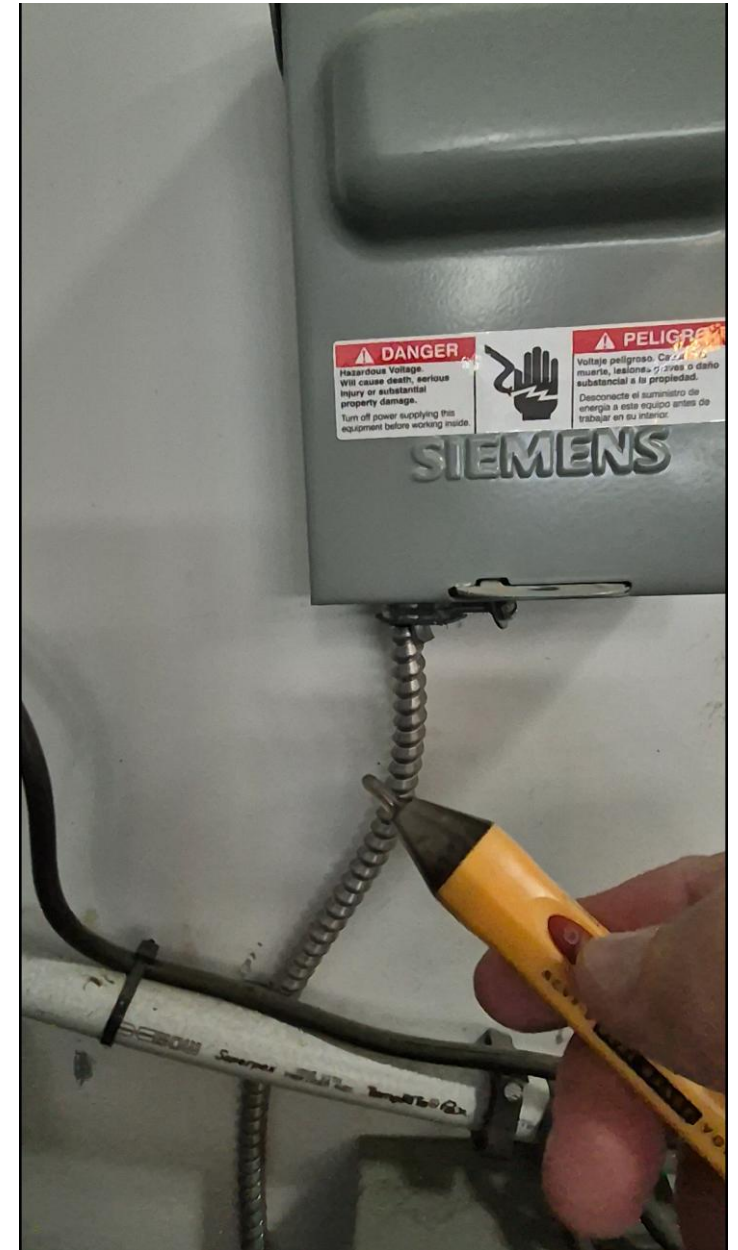


CSA Voltage Tester

Quick method of checking for voltage...

Always verify if voltage is present with a known live source.

CSA Approved Pocket Tester is a non-contact safe method of checking for voltage in the wires.





CSA Approved High Voltage Rubber Gloves aka “Hot Gloves” can touch live wires up to 1000VAC without the user receiving a shock.

Must be tested and certified by the Utility... NS Power, NL Hydro, etc. several times per year.

The outer Leather Glove Protector prevents the Rubber Gloves from being damaged.



Example of Voltage paths...

Bonding & Grounding

Thank you

Questions?