Overview of Current Research into Low-Voltage Circuit Breakers

Low Voltage Circuit Breakers:

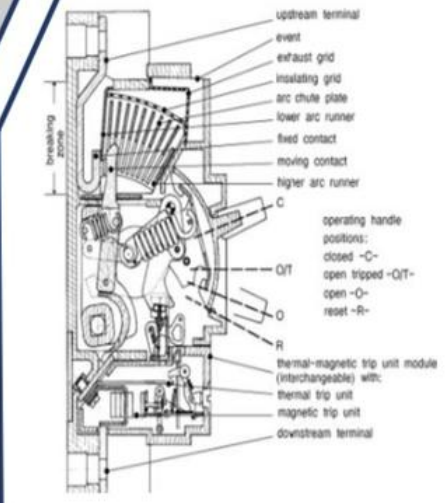
- Turn on and break load circuits
- Control motors that do not start regularly
- Protective functions
- High interruption ability
- Safety

Primary components:

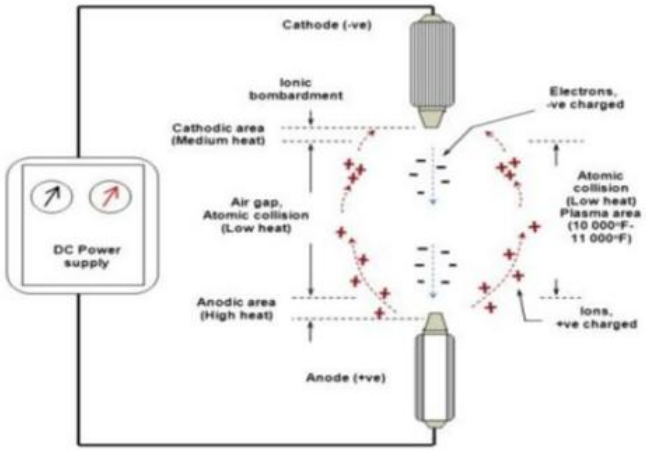
- Microprocessor
- Signal detection
- Acquisition unit
- Switch input unit
- Display
- Keyboard unit
- Executive output unit
- Communication interface
- Power supply

Circuit overloaded:

- Thermal release's heat element causes the bimetal sheet to bend and the free release mechanism to move
- Coil is turned off
- If distance control is required starting button is pressed to electrify the coil.
- Armature moves the free tripping mechanism



Arc in a Low-Tension Circuit Breaker



Arc** is a **physically incandescent gas column** with an almost **straight trajectory** between electrodes (anode and cathode) and temperatures between **6000 and 10000 °C.

Two phenomena when creating the arc:

1. Gas conduction of electricity
2. Emission of electrons by metals

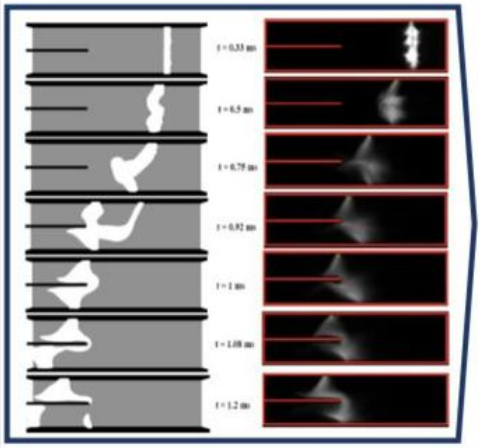
*Electric arc operates as **a conductor** as a result of these **ionization processes**, with the conductivity of the plasma column in the arc ranging from 10-100 S/cm, depending on the temperature value.*

3 methods to initiate an electric arc

CREATING VOLTAGE:
an electron which will move from the electric field, tear off the charges and therefore create a producing channel

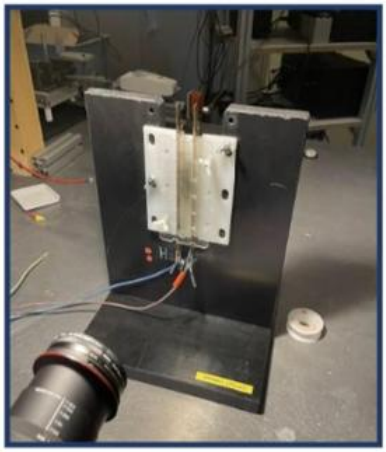
CONTACT METHOD:
current created a confusion which became an electric vapor and allow the creation of an arc in the air.

FUSE WIRE METHOD:
pass currents of several kiloamperes in a 0.1mm diameter wire and watch the electric arc using the camera



THE EXPERIMENT

1. ***charged** the capacity electric bench at **300V***
2. ***moved away** from the model to avoid receiving ultraviolet light.*
3. ***locked** the switch*
4. *heard the creation of an **electric arc noise***
5. *watched on the PC the **analysis of the electric arc** taken by the camera*



UNIVERSITÉ TOULOUSE III PAUL SABATIER

CMI Figure
CURSUS MASTER EN INGÉNIERIE

By:
AKIN Emre
GATTI Lorem
HADDAD MEhdi