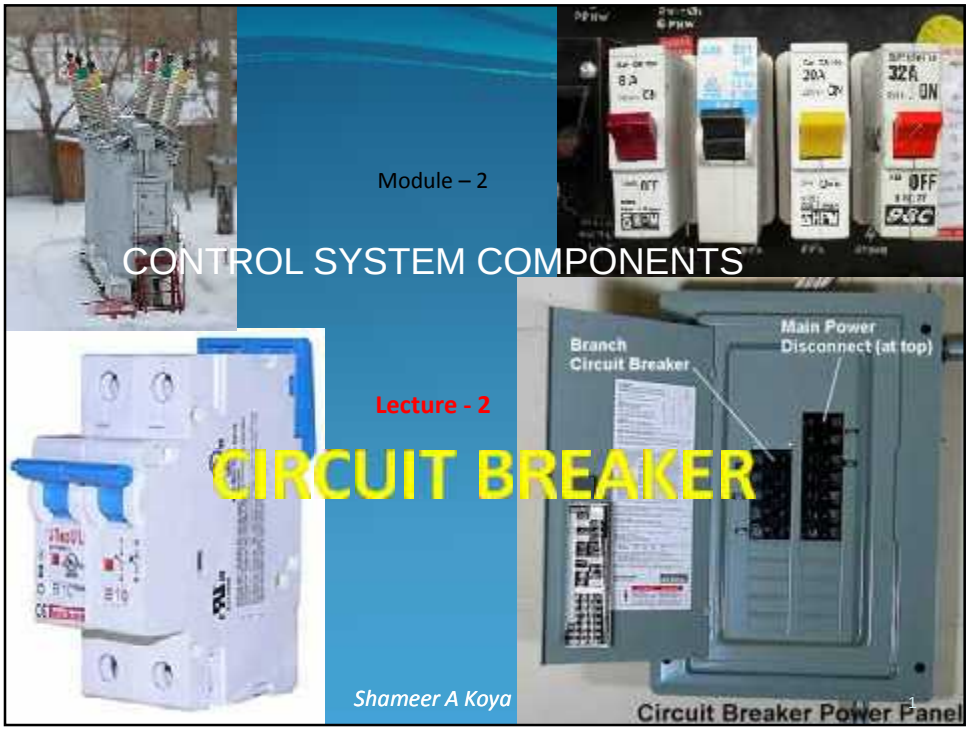
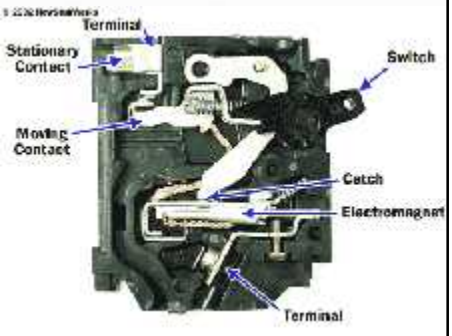


Introduction

- A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit.
- The function of the circuit breaker corresponds basically to that of a switch in combination with a fuse.
- A circuit breaker (CB) will automatically interrupt current flow when the conditions are abnormal without damage to itself.
- Unlike a fuse, a circuit breaker can be reset (either manually or automatically) to resume normal operation
- The circuit breaker mechanism is set to interrupt the current at a particular overload / short circuit value.



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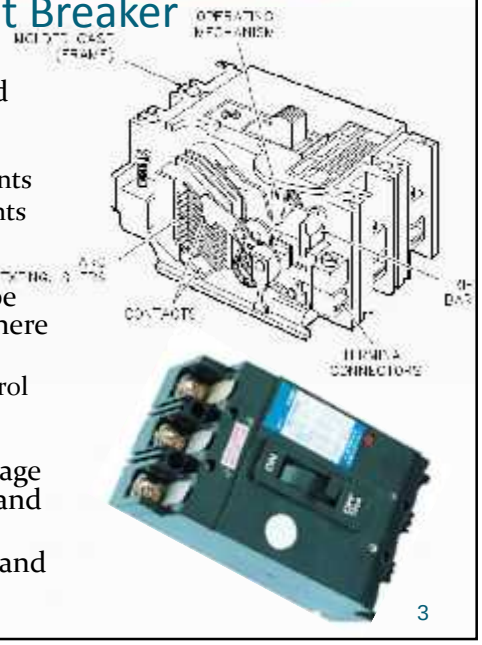
Molded Case Circuit Breaker

- Circuit breaker mechanism is normally contained in the molded case housing.
  - serves as the physical means of positioning the breaker components
  - protects the functional components from outside damage and contamination.
- Molded-case circuit breaker can be applied in any electrical circuit where protection is required
  - switchboards, panel-boards, control centers, combination starters, individual enclosures, etc.
- for AC service are available in voltage ratings of 120/240, 240, 277, 480, and 600 volts.
- for DC service are available in 125 and 250 volt ratings.



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Types of Circuit Breakers

- The automatic circuit opening action of a circuit breaker is accomplished in several ways
- by thermal release, magnetic action, the combination of both thermal release and magnetic action, hydraulic means, and pneumatic means.

- Based on Voltage:
  - Low Voltage
  - Medium Voltage
  - High Voltage
  - SF6 (EHV)
- Based on Interrupting type:
  - Thermal Circuit Breaker
  - Magnetic Circuit Breaker
  - Thermal-Magnetic Circuit Breaker
  - Ambient Compensating Circuit Breaker

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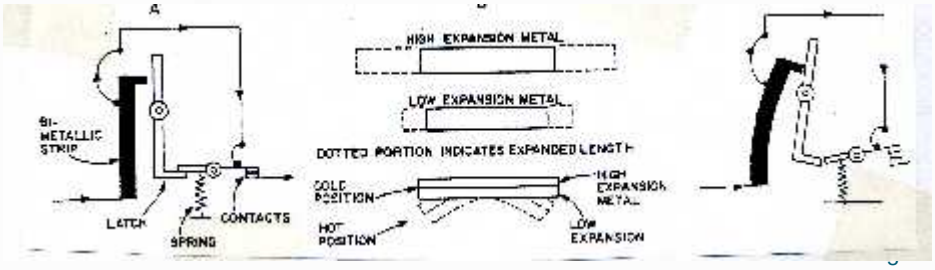
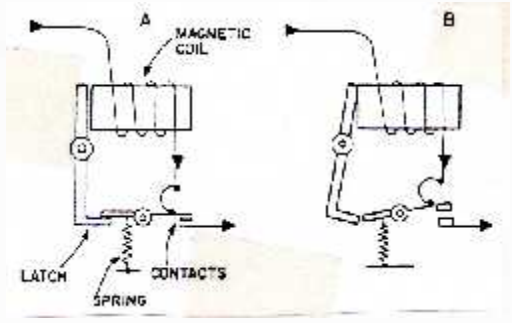
Thermal Circuit Breakers

- Thermal (heat) type air circuit breakers are used primarily for protection against over-current.
- A typical thermal circuit breaker, operates on the principle of metal expanding when heated
- If the current becomes excessive for a prolonged period of time, the bimetallic strip becomes hot and bends because of different expansion rates of the two metals.
- When the strip bends sufficiently, it trips the latch and opens the contacts



Magnetic Circuit Breaker

- Magnetic circuit breakers use a solenoid (electromagnet) whose pulling force increases with the current.
- The circuit breaker contacts are held closed by a latch.
- As the current in the solenoid increases beyond the rating of the circuit breaker, the solenoid's pull releases the latch, which lets the contacts open by spring action.



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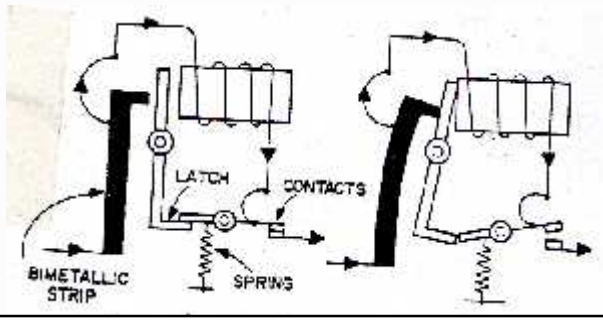
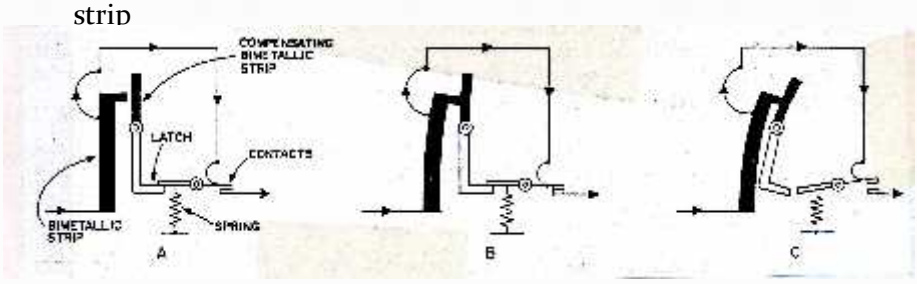
Thermal - Magnetic Circuit Breaker

- A thermal-magnetic circuit breaker incorporates both a thermal strip and a magnetic coil.
- The thermal strip provides a time delay for momentary overloads.
- The magnetic coil provides instantaneous trip on high or short circuit currents



Ambient Compensating

- The ambient-compensated circuit breaker has an overload bimetallic strip, and a compensating bimetallic strip.
- Compensating bimetallic strip expands and contracts with changes in the ambient temperature around the breaker.
- Both elements bend with an increase in ambient heat but only the overload element responds to the current.
- The breaker trips only when the excessive current through the overload strip causes it to bend more than the compensating strip




Next Lecture:
Magnetic Contactors
Thank You
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