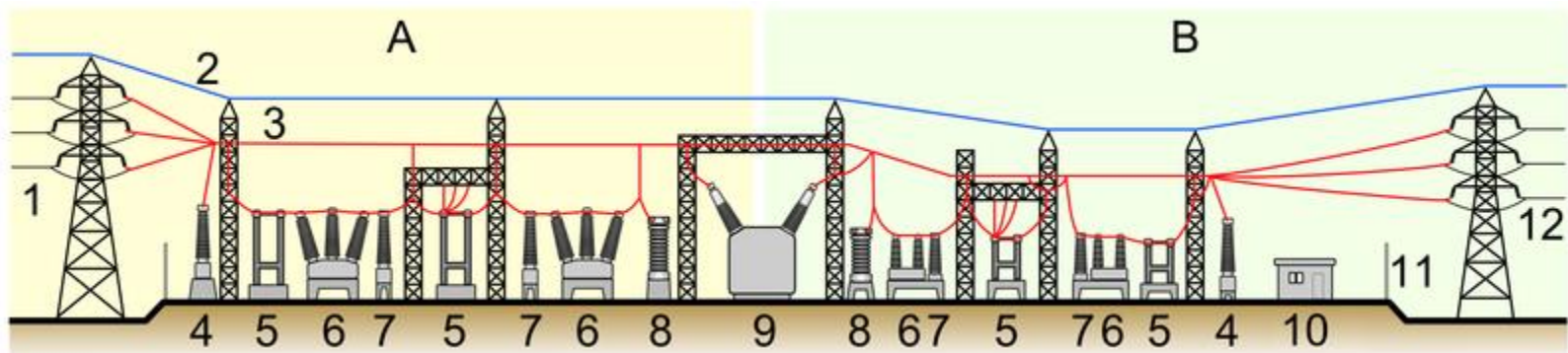


# **Substation Layout and Elements**

- | A substation is a part of an electrical generation, transmission, and distribution system. Substations transform voltage from high to low, or the reverse, or perform any of several other important functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels. A substation may include transformers to change voltage levels between high transmission voltages and lower distribution voltages, or at the interconnection of two different transmission voltages
- | Transmission substation, distribution substation, collector substation, converter substation are few types of substations

# Elements of Substation

| Transformers, Buses, Circuit Breakers, Fuses, Isolators, Grounding Mechanisms, Control Equipment, Measuring Instruments (Current transformers, Potential transformers), Control Units (SCADA, PLCs) etc...





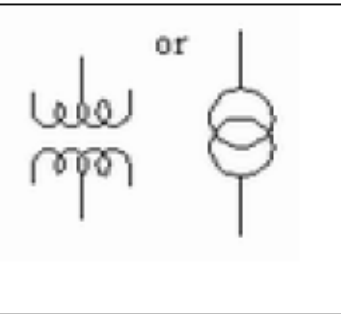
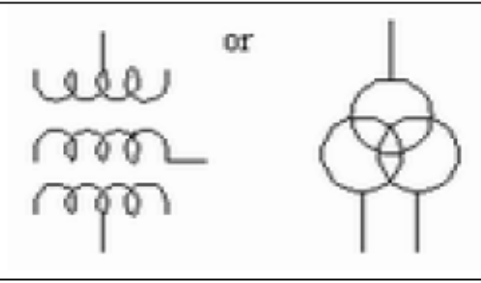
A: Primary power lines' side B: Secondary power lines' side

1. Primary power lines 2. Ground wire 3. Overhead lines 4. Lightning arrester 5. Disconnect switch 6. Circuit breaker 7. Current transformer 8. Transformer for measurement of electric voltage 9. Main transformer 10. Control building 11. Security fence 12. Secondary power lines


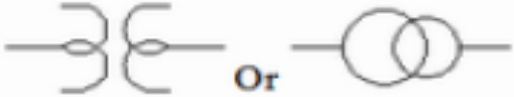
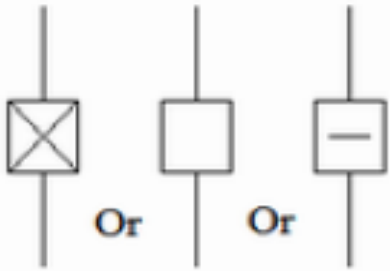


# Isolator

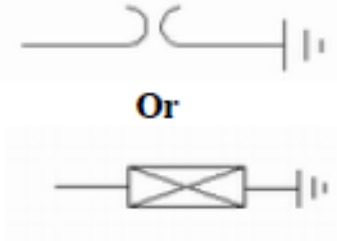
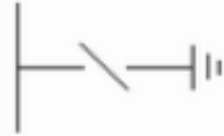


| Isolator is a manually operated mechanical switch which separates a part of the electrical power. Isolators are used to open a circuit under no load. Its main purpose is to isolate one portion of the circuit from the other and is not intended to be opened while current is flowing in the line. Isolators are generally used on both ends of the breaker in order that repair or replacement of circuit breaker can be done without and danger



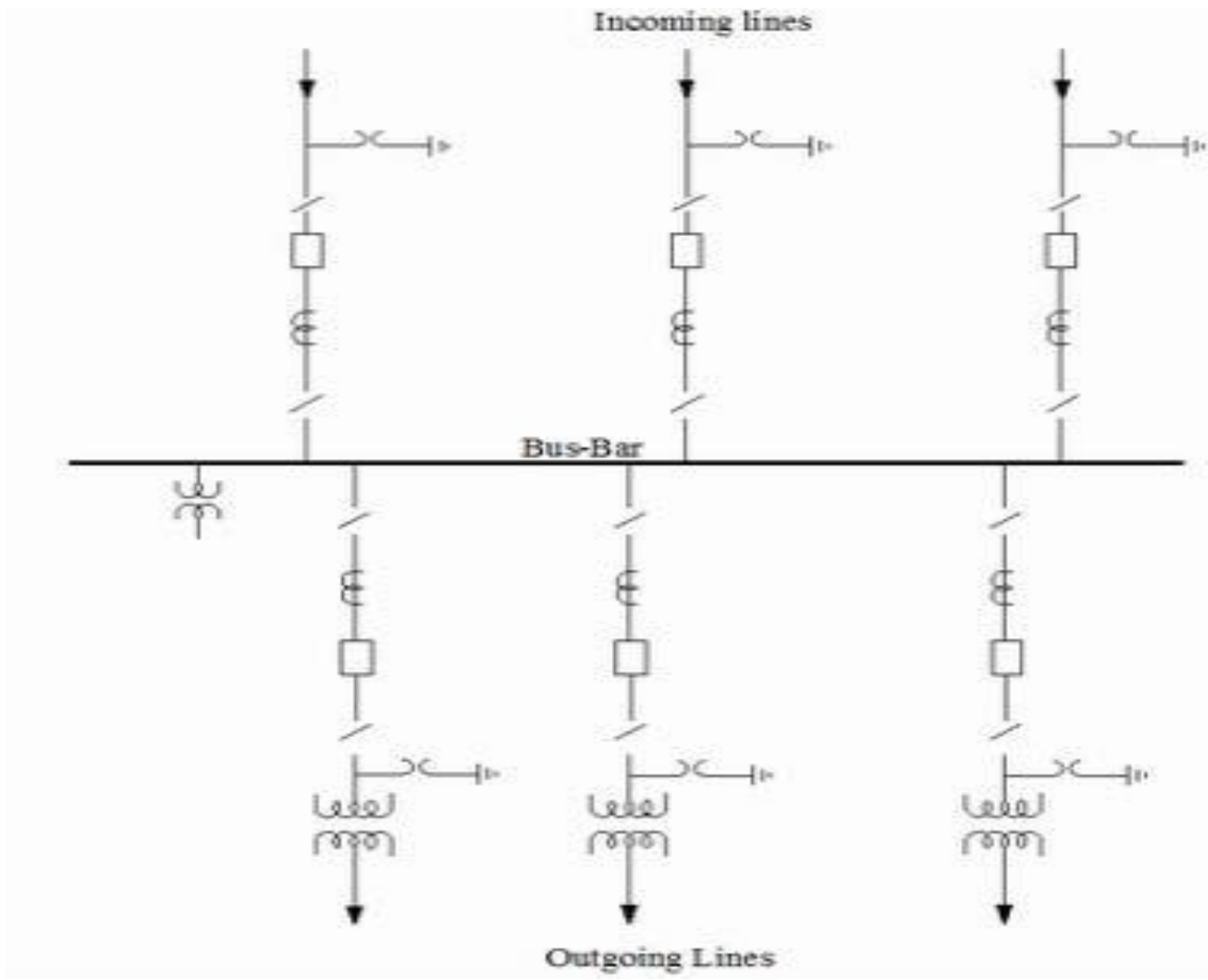
Sl No	Electrical components	Symbols
1	AC Generator	
2	Bus Bar	
3	Power transformer -Two winding	
4	Three winding transformer	

# Symbols

5	<b>Current Transformer (CT)</b>	
6	<b>Voltage transformer or Potential transformer (PT)</b>	
7	<b>Circuit Breaker (CB)</b>	
8	<b>Circuit breaker with isolator</b>	
9	<b>Isolator or Group Operating Switch(GOS)</b>	

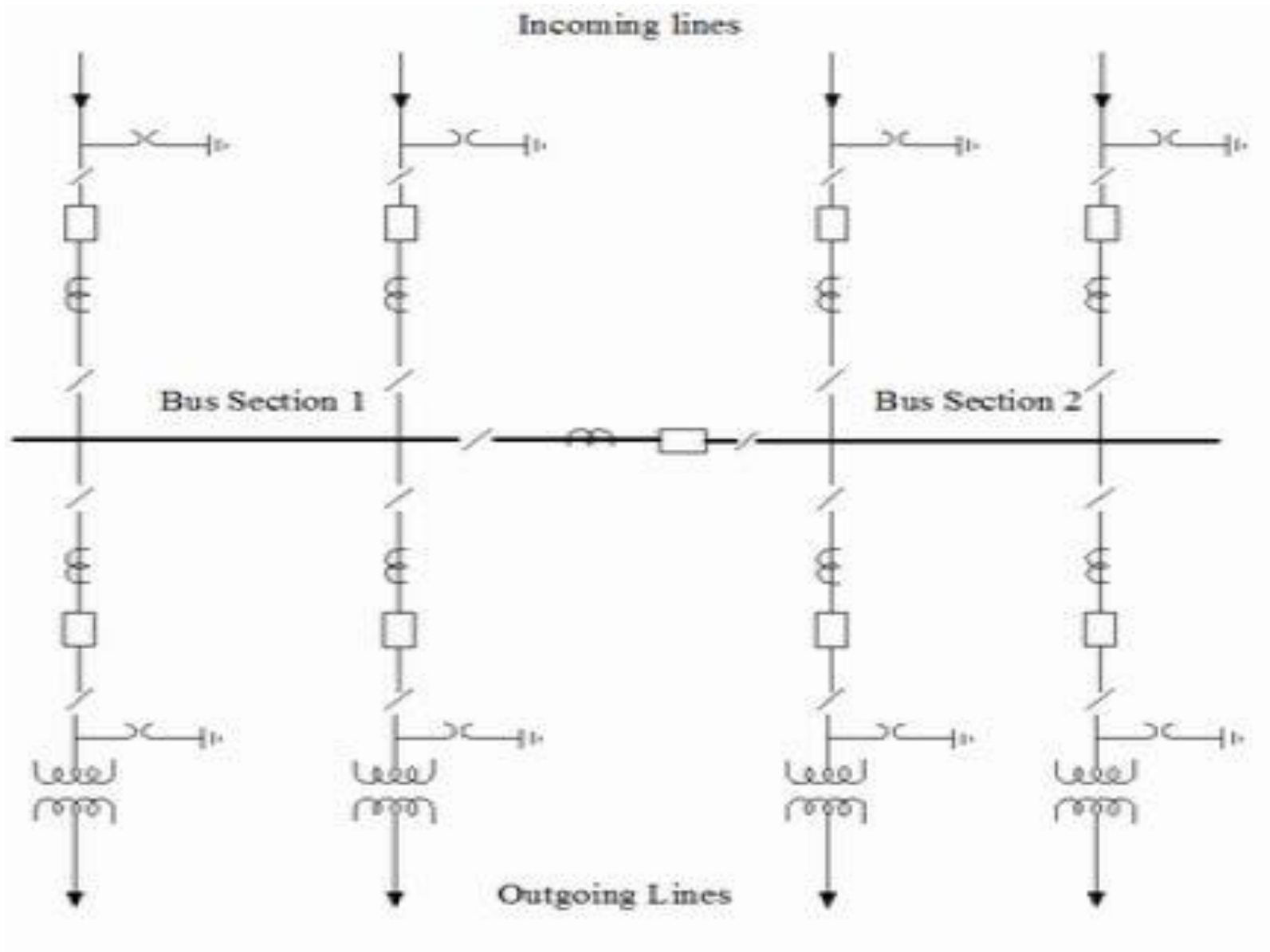
<b>10</b>	<b>Lighting Arrestor (LA)</b>	
<b>11</b>	<b>Earth Switch (ES)</b>	
<b>13</b>	<b>Wave or Line trap</b>	
<b>14</b>	<b>Coupling Capacitor (CC)</b>	

# Single Bus Bar System

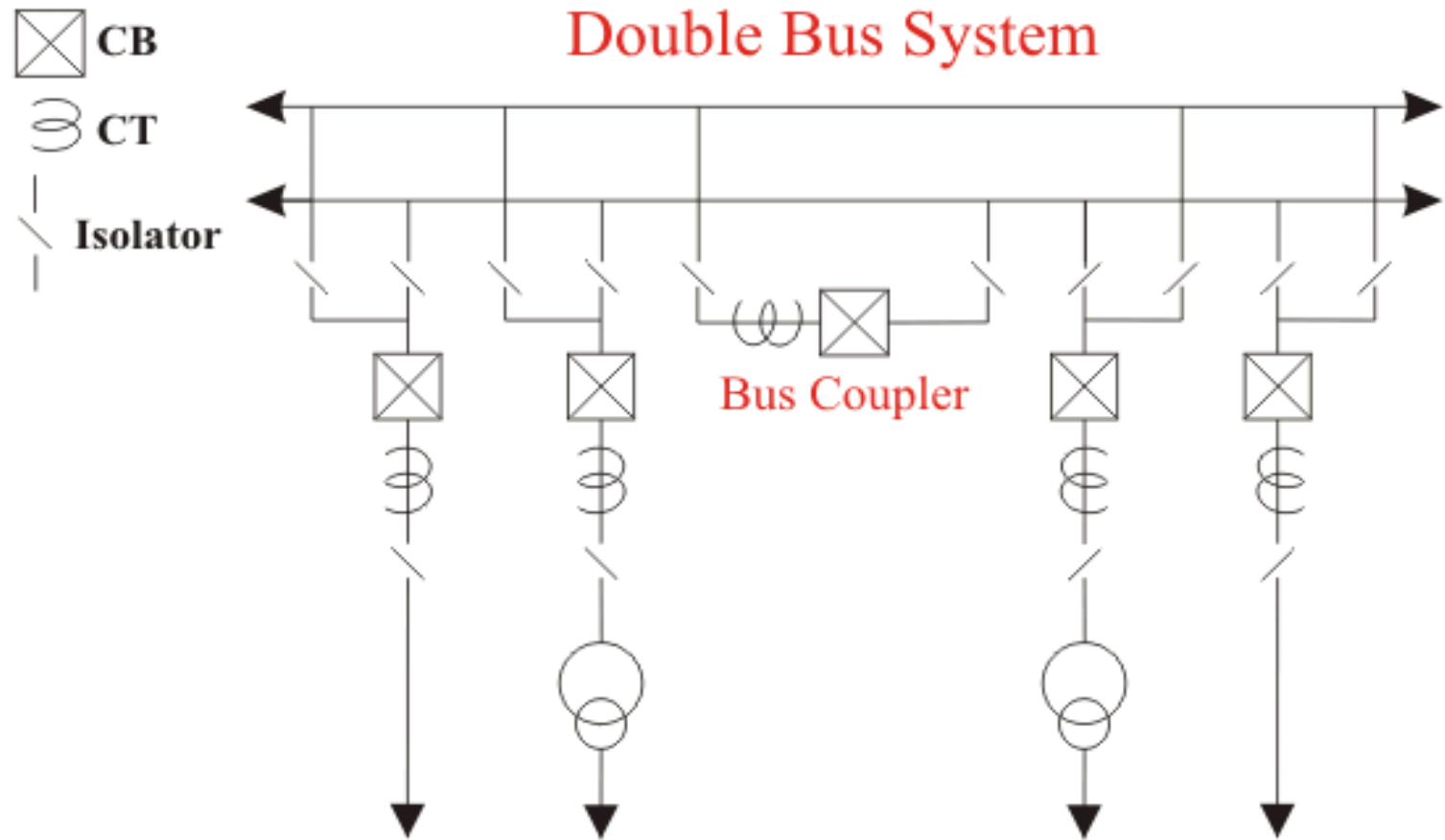




# Single Bus Bar with Sections



# Double Bus Bar System



# Double Breaker Bus System

