SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19EE605 PROTECTION AND SWITCHGEAR

III YEAR /VI SEMESTER

Unit 3- APPARATUS PROTECTION

Topic: Bus Bar Protection

Introduction

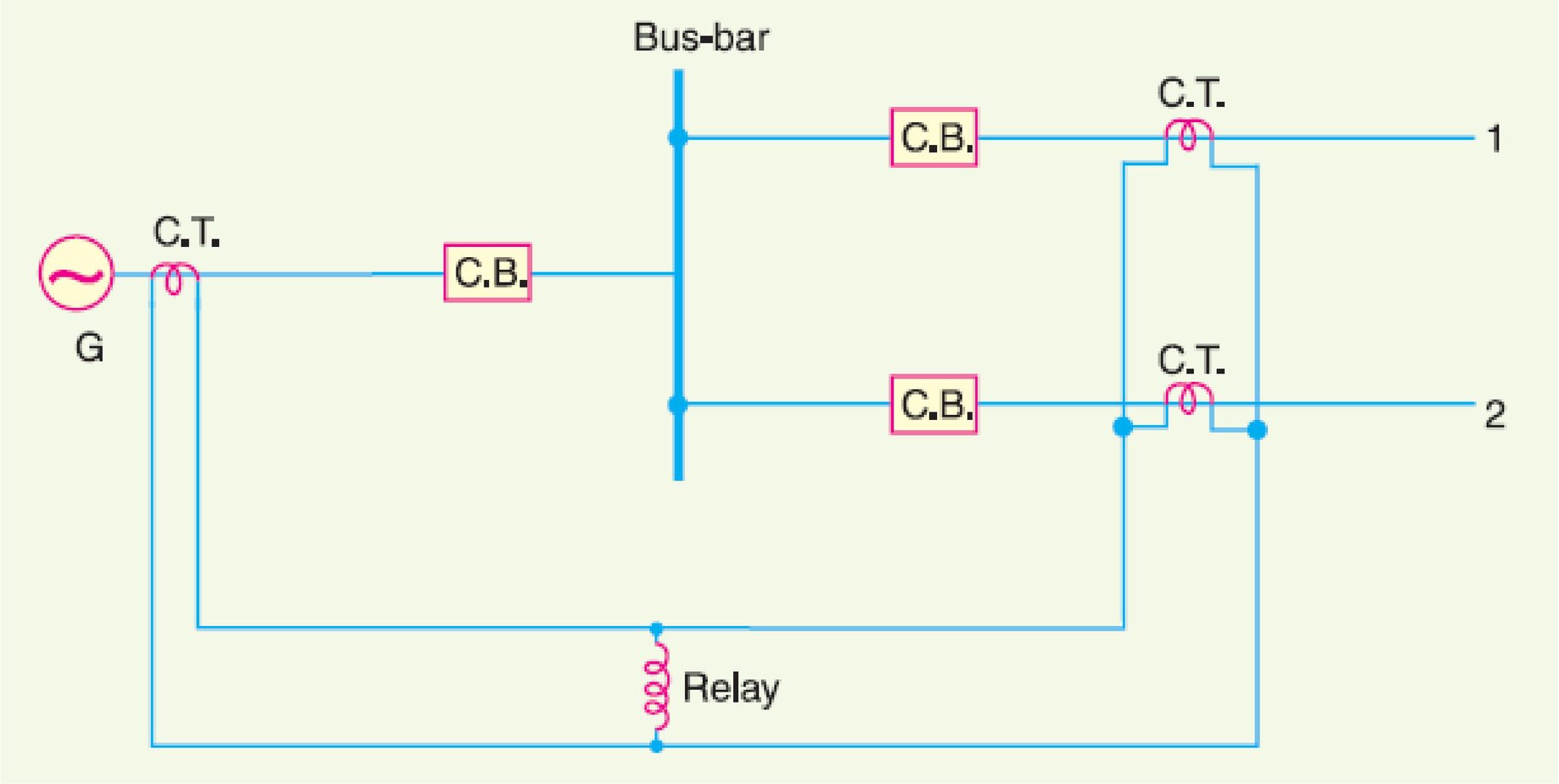
- Busbars in the generating stations and sub-stations form important link between the incoming and outgoing circuits.
- If a fault occurs on a busbar, considerable damage and disruption of supply will occur unless some form of quick-acting automatic protection is provided to isolate the faulty busbar.
- The busbar zone, for the purpose of protection, includes not only the busbars themselves but also the isolating switches, circuit breakers and the associated connections.
- In the event of fault on any section of the busbar, all the circuit equipments connected to that section must be tripped out to give complete isolation.

- The standard of construction for busbars has been very high, with the result that bus faults are extremely rare.
- However, the possibility of damage and service interruption from even a rare bus fault is so great that more attention is now given to this form of protection.
- Improved relaying methods have been developed, reducing the possibility of incorrect operation.
- The two most commonly used schemes for busbar protection are :

(*i*) Differential protection

(*ii*) Fault bus protection

Differential protection



Differential protection

- The basic method for busbar protection is the differential scheme in which currents entering and leaving the bus are totalised.
- During normal load condition, the sum of these currents is equal to zero.
- When a fault occurs, the fault current upsets the balance and produces a differential current to operate a relay.
- The busbar is fed by a generator and supplies load to two lines. The secondaries of current transformers in the generator lead, in line 1 and in line 2 are all connected in parallel.

Differential protection

- The protective relay is connected across this parallel connection.
- All *CT*s must be of the same ratio in the scheme regardless of the capacities of the various circuits.
- Under normal load conditions or external fault conditions, the sum of the currents entering the bus is equal to those leaving it and no current flows through the relay.
- If a fault occurs within the protected zone, the currents entering the bus will no longer be equal to those leaving it.
- The difference of these currents will flow through the relay and cause the opening of the generator, circuit breaker and each of the line circuit breakers.

Assessment

Which of the following relay is used for the protection of feeders and large busbars?

A. Under frequency relay

B. Buchholz relay

C. Distance relay

D. Differential relay.

References

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3. Badriram, Vishwakarma B.H, “Power System Protection and Switchgear”, New Age International Pvt Ltd Publishers, 2nd Edition 2017.

Thank You