Protection of bus

In early days only conventional over current relays were used for **busbar protection**. But it is desired that fault in any feeder or transformer connected to the busbar should not disturb busbar system. In viewing of this time setting of busbar protection relays are made lengthy.

So when faults occurs on busbar itself, it takes much time to isolate the bus from source which may came much damage in the bus system.

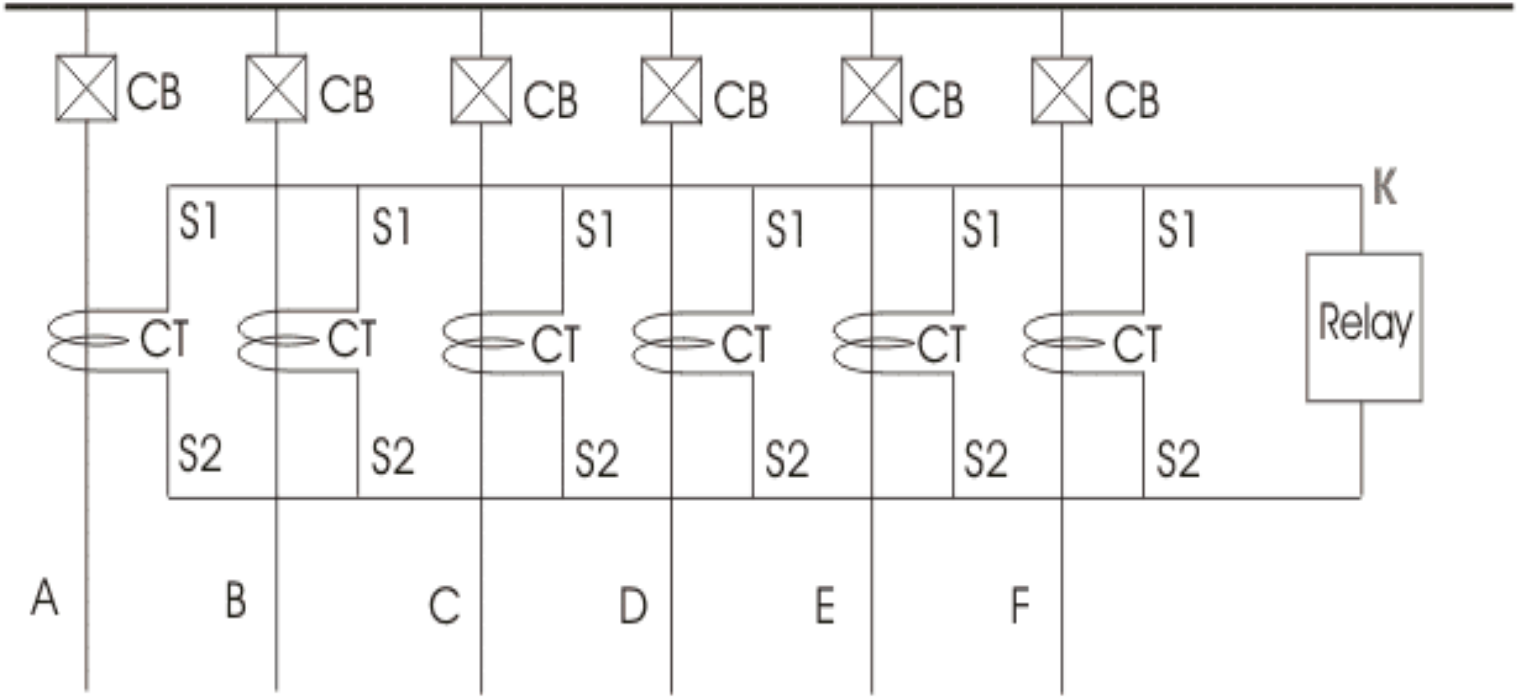
In recent days, the second zone distance protection relays on incoming feeder, with operating time of 0.3 to 0.5 seconds have been applied for **busbar protection**.

Differential Busbar Protection

Current Differential Protection

The scheme of **busbar protection**, involves, Kirchoff's current law, which states that, total current entering an electrical node is exactly equal to total current leaving the node. Hence, total current entering into a bus section is equal to total current leaving the bus section. The principle of differential busbar protection is very simple.

Here, secondaries of CTs are connected parallel. That means, S_1 terminals of all CTs connected together and forms a bus wire. Similarly S_2 terminals of all CTs connected together to form another bus wire. A tripping relay is connected across these two bus wires.


CB
CB
CB
CB
CB
CB
K
S1
S1
S1
S1
S1
S1
CT
CT
CT
CT
CT
CT
Relay
S2
S2
S2
S2
S2
S2
A
B
C
D
E
F

Here, in the figure above we assume that at normal condition feed, A, B, C, D, E & F carries current I_A, I_B, I_C, I_D, I_E and I_F.

Now, according to Kirchoff's current law,

$$I_A + I_B + I_C + I_D + I_E + I_F = 0$$

Essentially all the CTs used for differential busbar protection are of same current ratio. Hence, the summation of all secondary currents must also be equal to zero.