

# Generator and Motor Protection

The protection of generators involves the consideration of more possible abnormal operating conditions than the protection of any other system element. In unattended stations, automatic protection against all harmful abnormal conditions should be provided

But much difference of opinion exists as to what constitutes sufficient protection of generators in attended stations. Such difference of opinion is mostly concerning the protection against abnormal operating conditions, other than short circuits, that do not necessarily require the immediate removal from service of a machine and that might be left to the control of an attendant.

# **SHORT-CIRCUIT PROTECTION OF STATOR WINDINGS:**

**(BY PERCENTAGE-DIFFERENTIAL RELAYS)**

It is the standardized practice of manufacturers to recommend differential protection for generators rated 1000 kva or higher,<sup>2</sup> and most of such generators are protected by differential relays.

Above 10,000 kva, it is almost universally the practice to use differential relays.<sup>9</sup> Percentage-differential relaying is the best for the purpose, and it should be used wherever it can be justified economically. It is not necessarily the size of a generator that determines how good the protection should be;

The arrangement of CTÖs and percentage-differential relays is shown in Fig. 1 for a wye connected machine, and in Fig. 2 for a delta machine. If the neutral connection is made inside the generator and only the neutral lead is brought out and grounded through low

Impedance, percentage-differential relaying for ground faults only can be provided. The connections for a so-called unit generator-transformer arrangement are. notice that the CTs on the neutral side may be used in common by the differential-relaying equipments of the generator and the transformer.

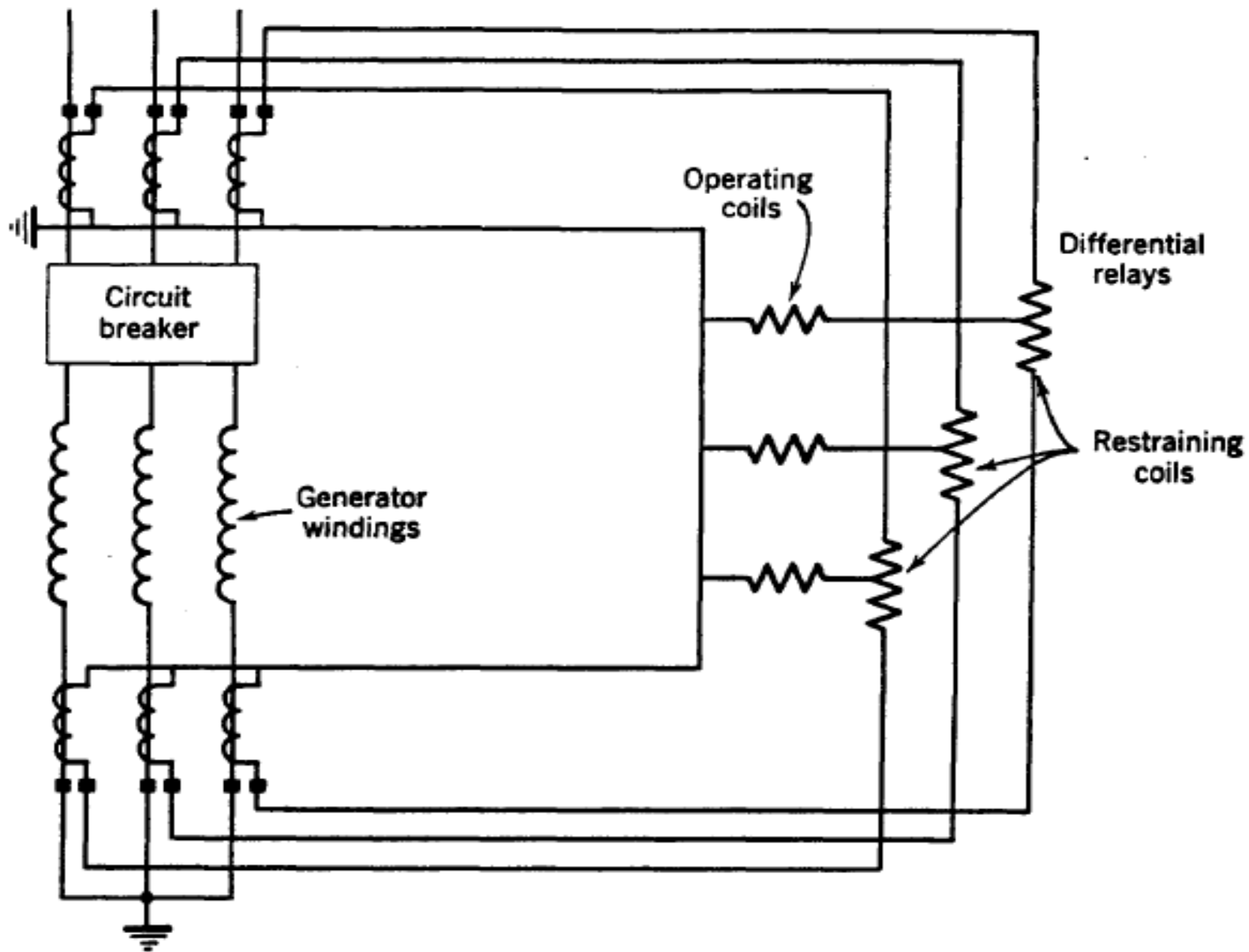


Fig. 1. Percentage-differential relaying for a wye-connected generator.



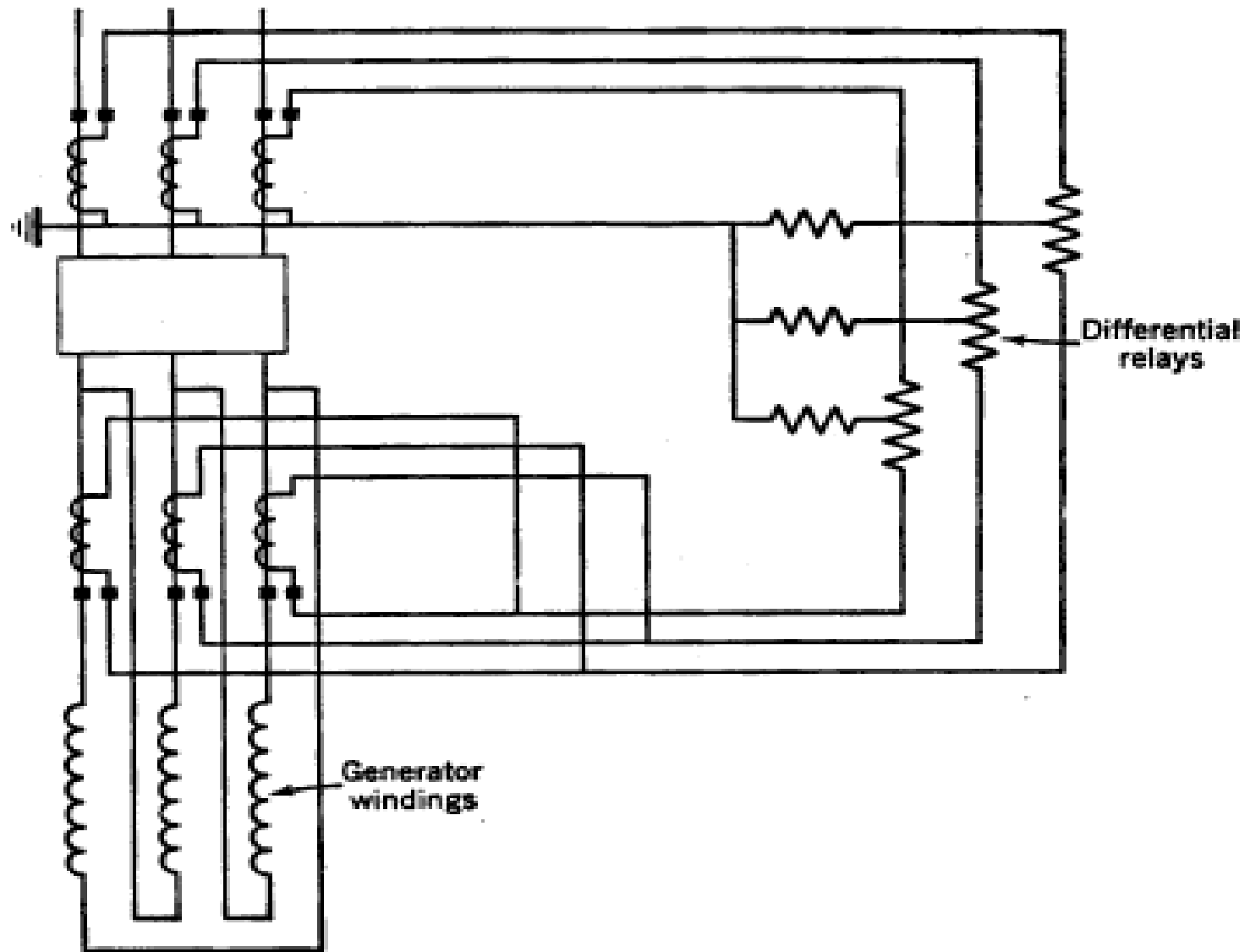


Fig. 2. Percentage-differential relaying for a delta-connected generator.