



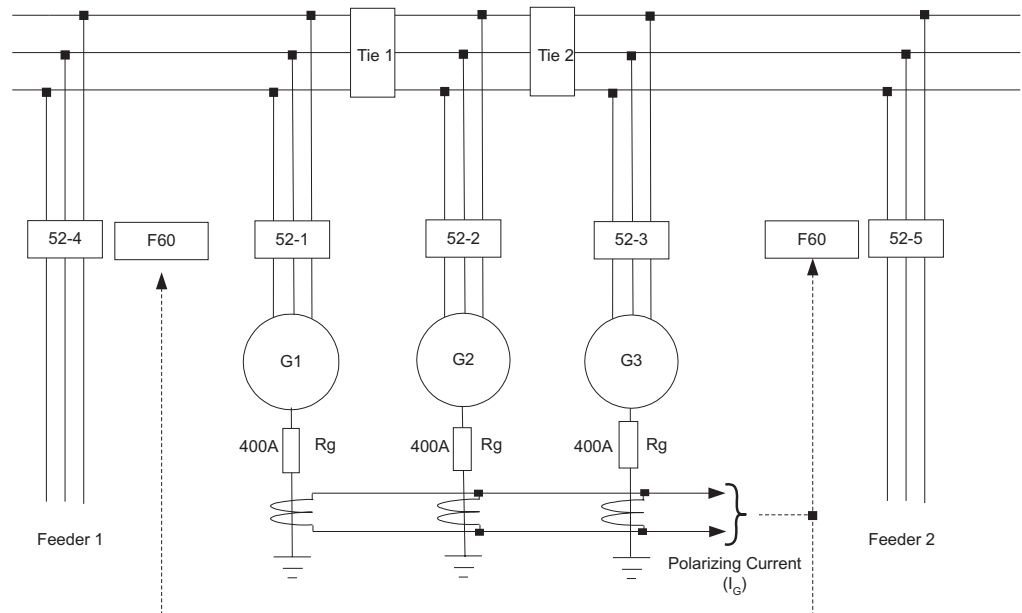
# Multiple Ground Polarizing Current Sources in the F60

GE Publication No. GET-8396

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Where there is more than one polarizing current source in a substation, CTs are often paralleled from each available source. This permits any of these sources to be taken out of service without affecting the directional neutral relays. The CT ratios used in this case should be low enough to produce adequate polarizing current for remote fault current when some sources are unavailable and high enough to prevent excessive currents during close-in faults. Select the CT ratios for the polarizing sources to provide approximately equal secondary currents to minimize the effect of the outage of one source.

The following is an example where polarizing current is taken from the paralleled CT's on the grounded neutral of three identical generators connected to a common bus. Consider the following scheme:



In this scheme, the generators can be all online and synchronized together, or the tie breakers between them can be open. Normal operation is all online with the ties closed. The problem is to determine a proper source for polarizing the neutral directional elements of the loads connected to the generating bus and equipped with F60 relays.

A proper source could be one generator's ground current. However one generator can from time to time be out of service for maintenance or repair and the polarizing source would be lost. In this situation, a good solution appears is to use the ground current from all generators in parallel as polarizing current.

In addition, the polarizing voltage can be provided from a Wye connected voltage transformer on the bus.