PULSING GROUND-FAULT SYSTEMS

A ground fault can be located in a resistance-grounded system by tracing a pulsing ground-fault current with a clip-on ammeter and/or analog output on the SE-701, SE-703 and SE-704 Ground-Fault Monitors. Pulsing ground-fault current can be generated with a timer-controlled contactor that shorts series resistance or adds shunt resistance as shown in Figure 1.

In certain process industries, a system must not trip in the event of a ground fault—rather, operation must continue to the end of the cycle when the fault can be cleared. Systems permitted to remain operating in the presence of ground faults are usually limited to medium-voltage (5 kV) systems with charging currents of 5.5 A or less resulting in ground-fault currents of 8 A or less. (Canadian Electrical Code, Part 1, 2018, Section 10 1102 states that a system can continue to operate during a ground fault provided the electrical system is operating at 5 kV or less, and that the ground-fault current is controlled at 5 A or less.) Systems in excess of these limits have a maximum fault removal time and a minimum ground-fault escalation time that are unacceptable.

A single-line diagram of a pulsing ground-fault system with a fault on feeder 3 is shown in Figure 1. The location of the ground fault can be determined by observing the zero-sequence currents:

- The CTs on the unfaulted feeders will detect the charging currents of their respective feeders.
- The CT on the faulted feeder will detect the sum of the charging currents of the unfaulted feeders and the resistor current. When the pulsing contactor is turned on, this CT will detect a modulating current that indicates the faulted feeder.
- A clip-on ammeter can be used to pin point the fault by measuring the sum of the current in the phase conductors at a few locations on the faulted feeder. Modulation will not be observed if the ammeter is downstream from the fault.

For more information about ground-fault protection and resistance-grounding, refer to the following publications: *Ground-Fault Protection and Ground-Conductor Monitoring for Portable Mine-Power Centres, Monitoring Neutral-Grounding Resistors, and Implementing Resistance Grounding on Ungrounded Systems*.

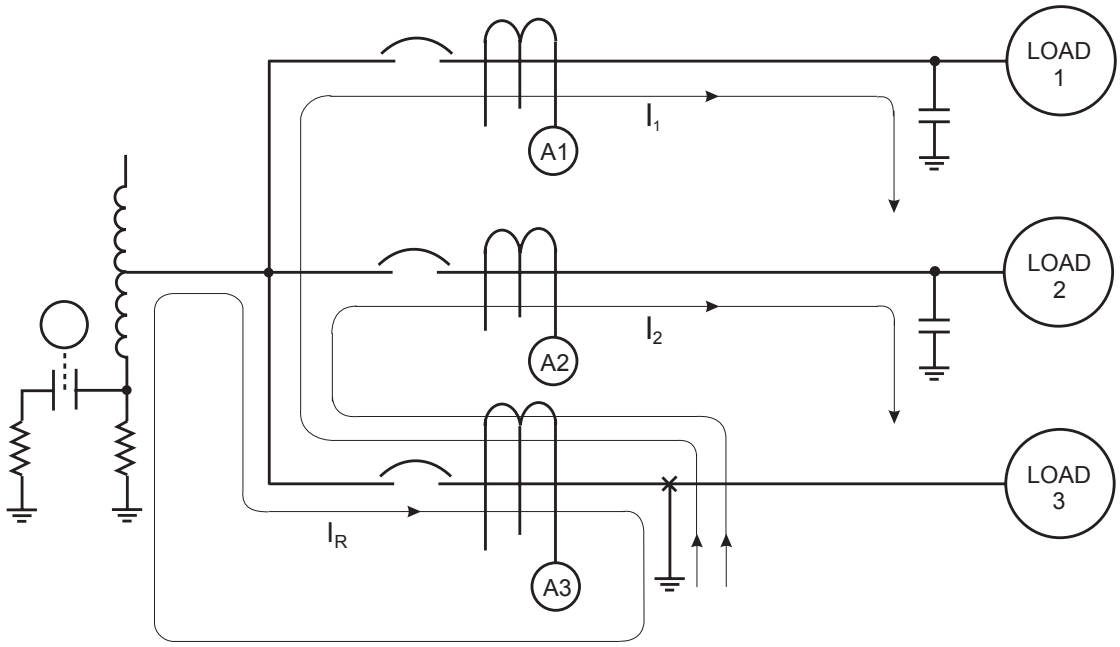


Figure 1

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