IMPLEMENTING RESISTANCE GROUNDING ON UNGROUNDED SYSTEMS

Resistance grounding protects a system against transient overvoltages caused by arcing ground faults and it provides adequate fault current for selective ground-fault detection and coordination.

Delta-connected supplies and wye-connected supplies with inaccessible neutrals cannot have neutral grounding resistors (NGR's) directly connected to them; however, resistance grounding can be achieved on an ungrounded system by establishing an artificial neutral with a zigzag transformer.

A zigzag transformer is a six-winding, three-phase transformer that is wye-connected with a pair of series-connected, phase-displaced windings symmetrically connected to each phase. It can be used to establish an artificial neutral for a three-phase system by connecting its neutral point to ground through a NGR. During normal operation the only current that flows in the zigzag transformer is an extremely small magnetizing current. When one phase is grounded, the NGR and the zigzag transformer provide a path for ground-fault current to flow. See Figure 1.

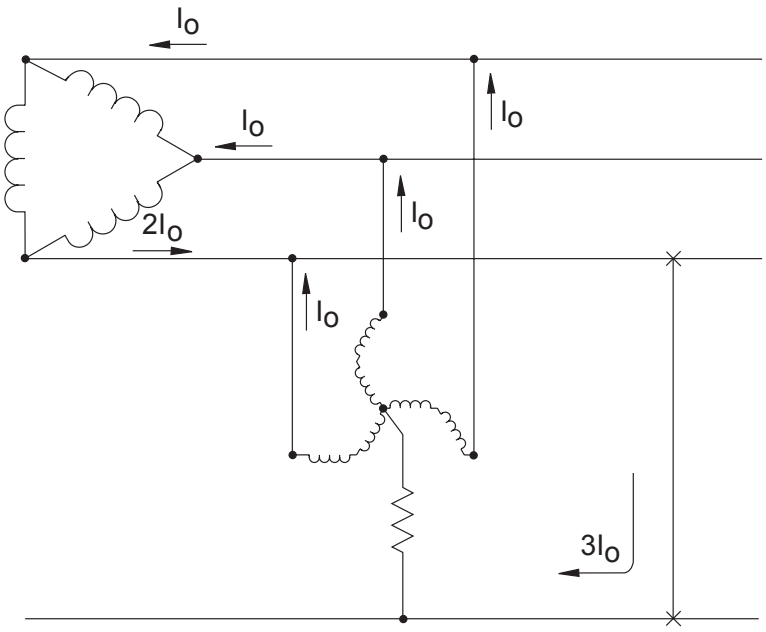


Figure 1

Note: Operation with one ground-fault on a resistance-grounded system is possible if the NGR is correctly sized and if it is allowable by Code for the installation.

Protection, coordination, and annunciation systems depend on the integrity of the NGR. Use a Littelfuse SE-330 or SE-325 to continuously monitor the NGR. See Figure 2, and Figure 3.

A pulsing NGR system can be used to modulate the ground-fault current to assist in locating a ground fault.

For more information about ground-fault protection and resistance-grounding, refer to the Littelfuse papers: Ground-Fault Protection and Ground-Conductor Monitoring for Mine Power Centres and Monitoring Neutral-Grounding Resistors. Littelfuse can provide application assistance and a custom designed, CSA-certified, "turn-key" package.

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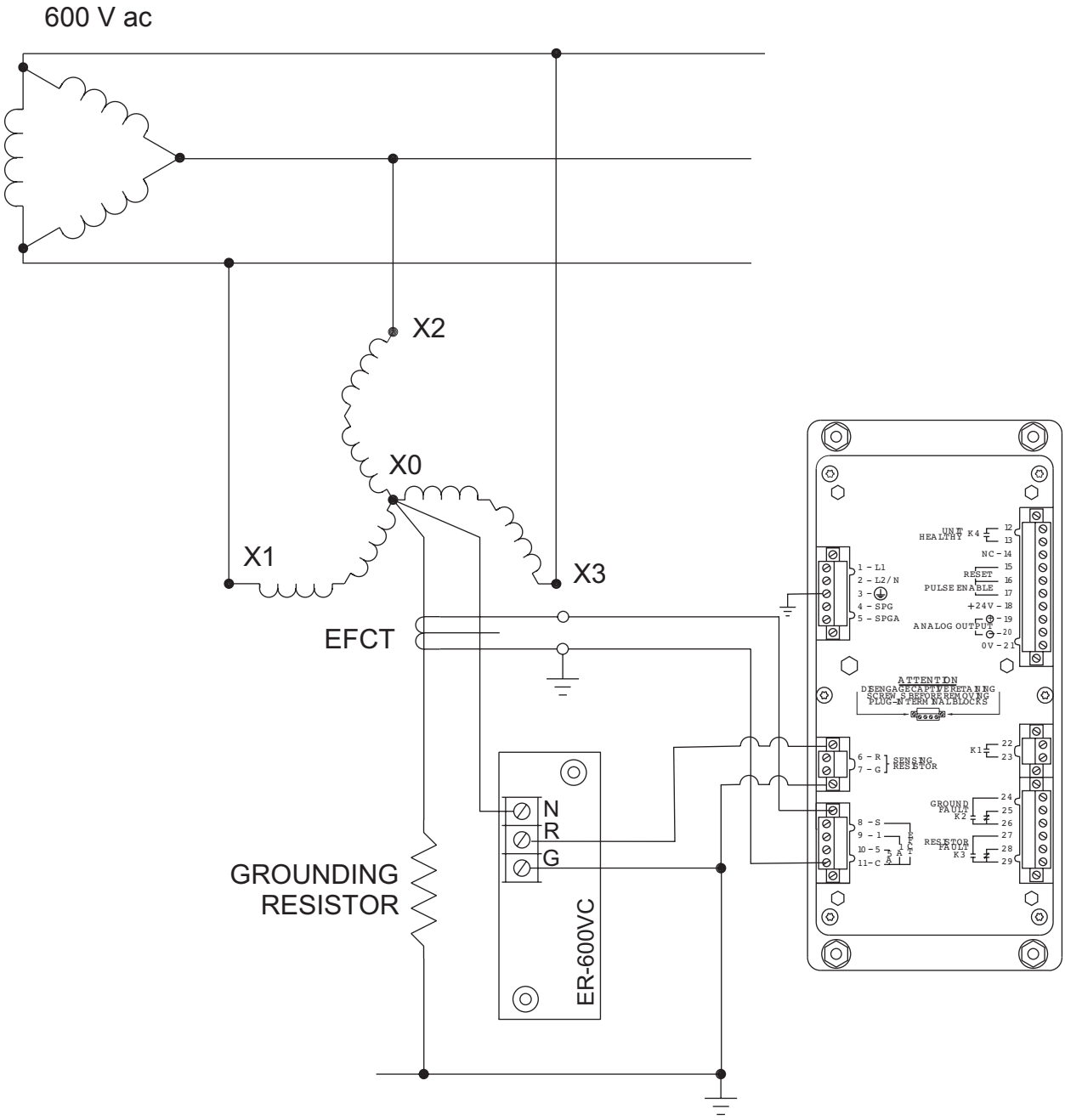


Figure 2

IMPLEMENTING RESISTANCE GROUNDING ON UNGROUNDED SYSTEMS

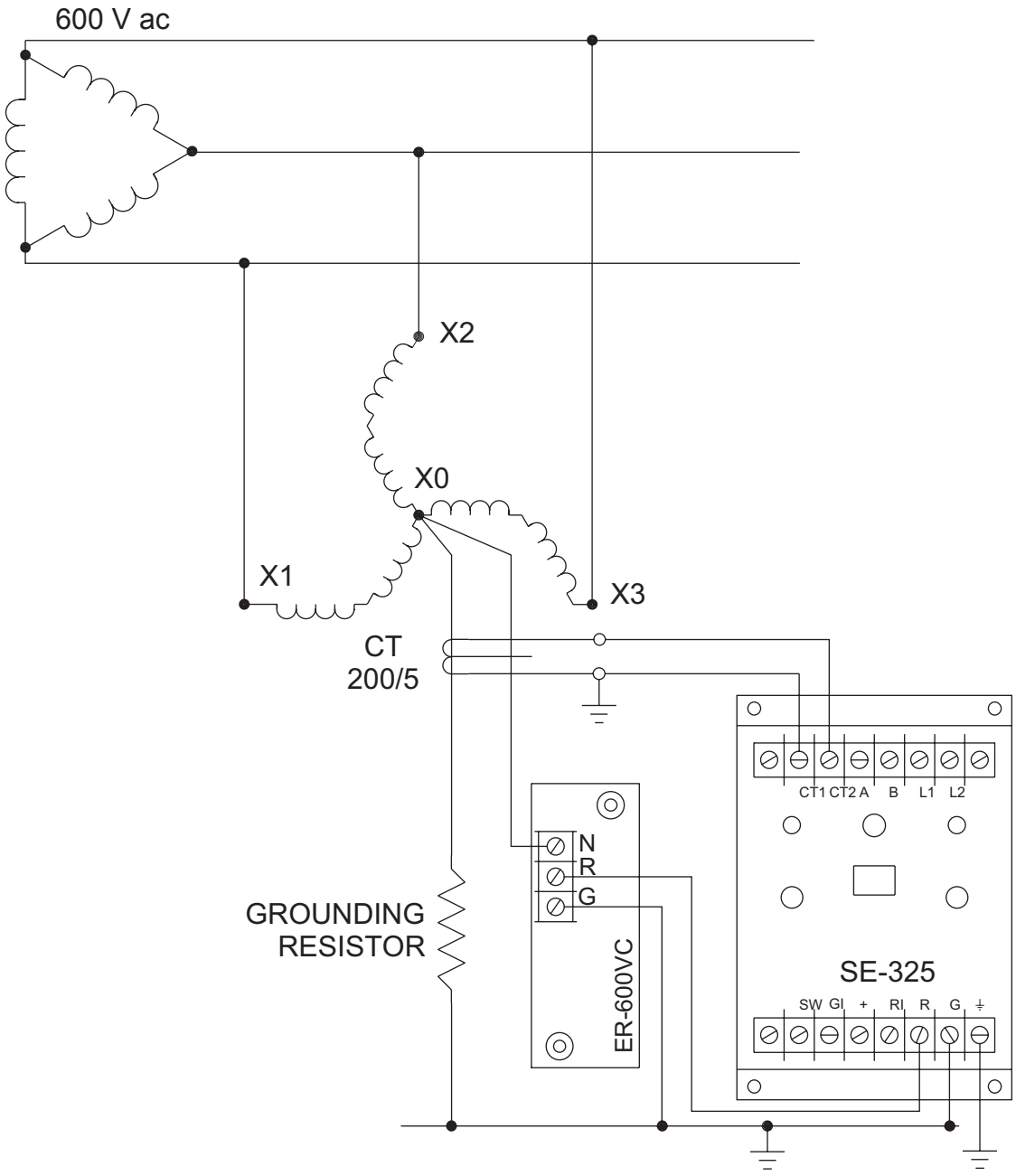


Figure 3

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