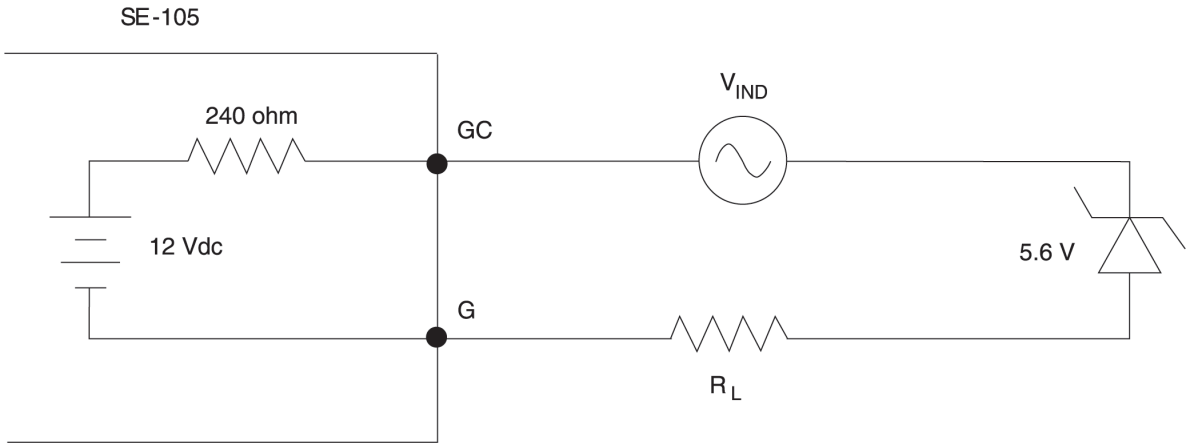
SE-105 & SE-107 GROUND-CHECK THEORY OF OPERATION



The ground-check circuit has an open-circuit voltage of 12 Vdc and an operating output resistance of 240 ohms. When non-fluctuating 5.6 volts is measured at terminals GC and G, the SE-105's two-level drive will recognize a valid completion and approximately 25 mA will flow in the ground-check loop. If the ground-check loop resistance (R_L) increases to 50 ohms or more, loop current will be below the open-circuit threshold and the loop will not be valid. Similarly, the loop will not be valid if loop current increases above the short-circuit threshold. When the loop is valid and if the ground-fault circuit is not tripped, the output relay will be energized if the undervoltage mode is selected. In the shunt-trip mode, the output relay will be energized when the loop is not valid. An SE-107 operates only in the undervoltage mode.

The undervoltage mode is referred to as fail-safe and is recommended because:

- undervoltage devices release if supply voltage fails, and
- undervoltage ground-check circuits do not allow cable couplers to be energized until the ground-check loop is verified.

A 5.6-volt Zener termination is the only passive device that the ground-check circuit recognizes as a valid end-of-line completion. A Zener characteristic is used as a termination device to clamp induced voltages and allow induced currents to flow in the ground-check loop so that loop measurements are independent of current in the phase conductors. Only a Littelfuse Startco termination is qualified to provide specified performance characteristics. These include 1N5339B, SE-TA6, SE-TA6-SM, SE-TA6A, SE-TA6A-WL, SE-TA6ASF, and SE-TA6ASF-WL.

To ensure reliable operation, redundant circuits are used so that the ground-check circuit will trip or continue to operate safely if any component, other than relay contacts, fails in any of its defined failure modes.

A similar description applies to the SE-134C and SE-135 except open-circuit voltage, loop current, the termination device, the maximum loop resistance, and induced-ac withstand are specific to the model. See Technical Note GC-05 Ground-Fault Ground-Check Comparison Sheet and the product manuals for more information.

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