GF-08 : SE-601 DC GROUND-FAULT PROTECTION WITH ASYMMETRICAL SE-GRM

The SE-601 DC Ground-Fault Monitor is used with an SE-GRM Ground-Reference Module to detect ground faults on an ungrounded dc system. Two identical resistors in a standard SE-GRM equally divide the bus voltage (e.g. ±62.5 V on a 125-V system) and limit ground-fault current to 25 mA. A ground reference is created by connecting the S terminal to an SE-601. The SE-601 trip level is selectable from 1 to 20 mA. For details on SE-601 operation, see the product manual and Technical Information 10.7.

An asymmetrical ground reference can assist in troubleshooting, as both the polarity and magnitude of the bus voltage are different. For example, a 75:25 ratio results in +94 V and -31 V to ground on a 125-V system.

An SE-601 and SE-GRM can be used in an asymmetrical-ground-reference application. An SE-GRM125 contains two 5-kΩ resistors. To create a 75:25 ratio, install a 10-kΩ 5-Watt resistor in series with the SE-GRM125, as shown in Fig. 1.
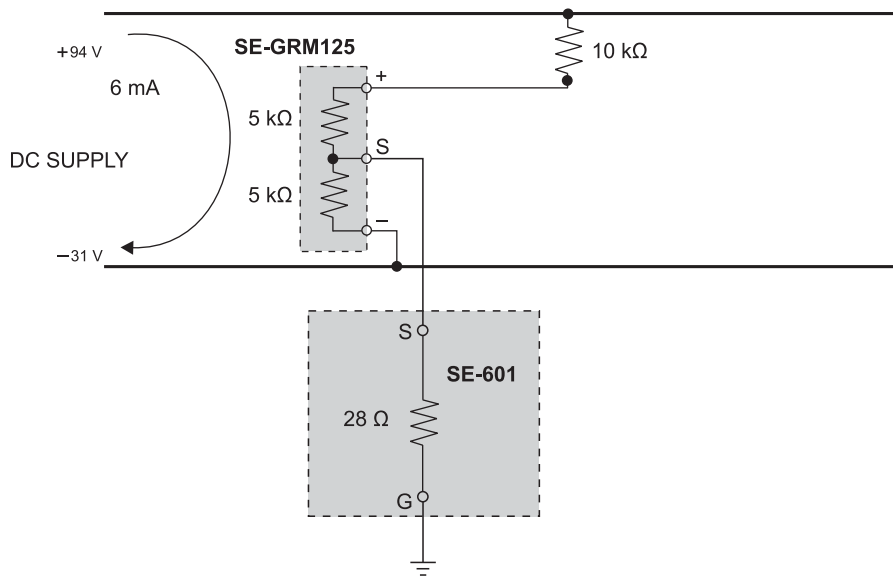

Figure 1: Unfaulted Asymmetric 125-V System

If a bolted ground fault occurs on the positive bus, the fault current will be 25 mA, as shown in Fig. 2. If a bolted ground fault occurs on the negative bus the larger resistance limits the fault current to 8 mA, as shown in Fig. 3. Therefore, the ground-fault-trip level must be set at or below 8 mA to detect ground faults on both busses. One problem is that the level of detection is also asymmetric. In this example, if the SE-601 is set at 8 mA, only a bolted fault would be detected on the negative bus. On the positive bus, higher-resistance faults can be detected at this setting.
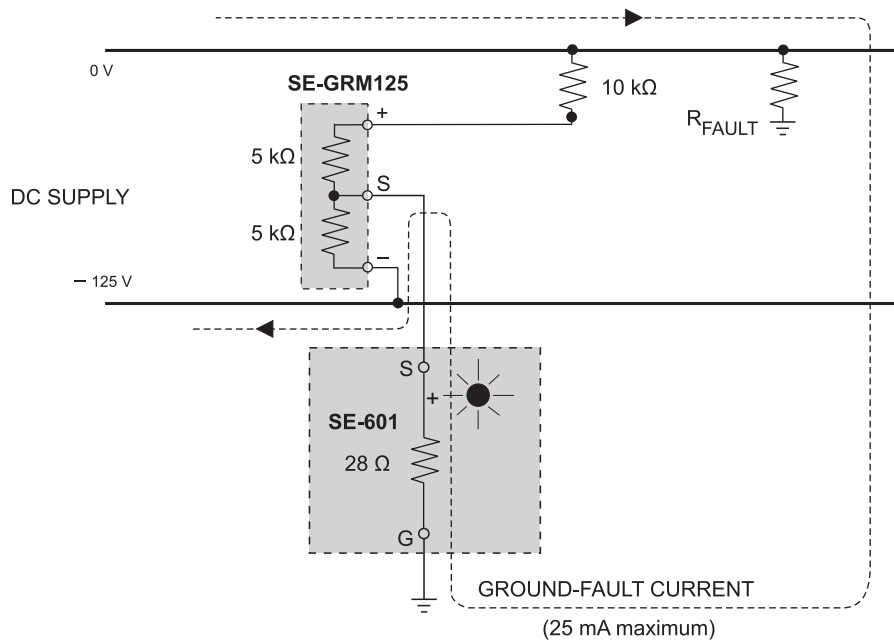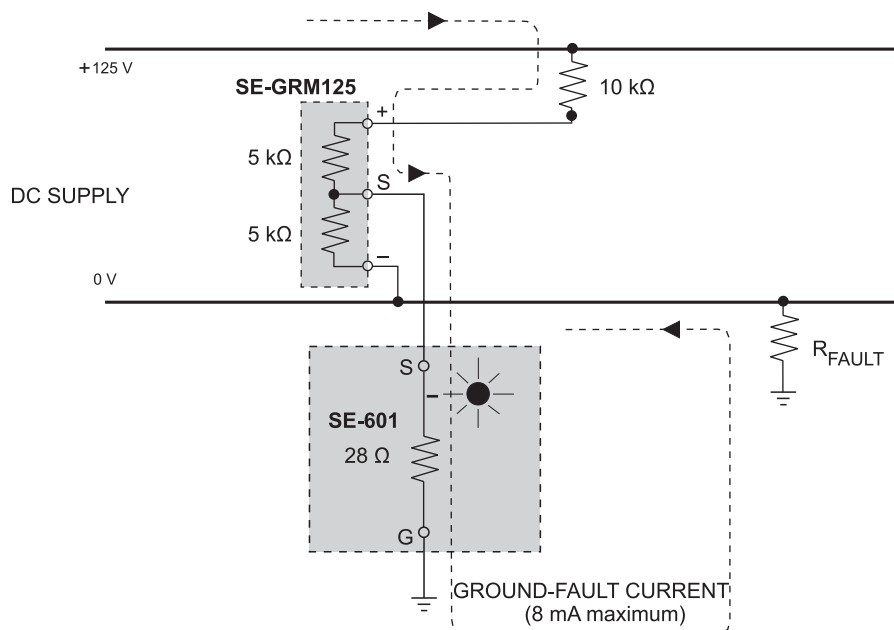
Figure 2: Fault on Positive Bus

Figure 3: Fault on Negative Bus