Shunt Trip Connection

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NK Technologies manufactures ground fault sensors, which can be used in a wide range of applications, from operating a shunt trip circuit breaker to providing an alarm contact or analog signal to a programmable logic controller. Many models are UL recognized as a component under UL1053, ground fault sensing and relaying equipment. Others are UL listed under UL508. Contact the factory for any needed clarification.

The drawing on the right (Fig. 1) shows an NK AG series ground fault sensor powered from a separate circuit. The sensor selected can be powered by 120 VAC or 24 VAC or DC, but in this example, the shunt trip and sensor use the same power supply voltage. The output of the sensor is a single-pole, double throw relay, so when used to operate a shunt trip circuit breaker operating mechanism, the normally open contact of a normally de-energized (DEN) model would be the best choice. With the -DEN model contact action, the sensor operates the output relay only when fault over the setpoint occurs. When power is applied to the sensor, an indicating LED will light, and another LED will indicate when the sensor has tripped.

The normally-energized version (-ENE in the model number) causes the output relay to change state as soon as power is applied to the sensor terminals, so the shunt trip solenoid would be connected between terminals 4 and 5.

The voltage of the primary circuit can be up to 600 volts AC and meet the specifications of UL. Remember that all current-carrying conductors must pass through the sensing aperture, including the neutral if the load uses one. The latching output is more commonly used to control the power to a contactor coil. Shunt trip operating solenoids are designed for momentary energization.

The lower drawing (Fig. 2) shows the larger AGL series in the same application but powered with the primary (load carrying) circuit through a control power transformer. The sensor can be powered by 120 VAC or 24 VAC or DC. The terminal markings are different than the AG series above. The power supply is connected to terminals 1 and 2. Terminals 3 and 4 are open when the product is taken out of the box. The -DEN contact action allows this set of contacts to remain open when power is applied to the sensor, and to close when a fault to earth is detected. Terminals 5 and 6 are closed, opening on a detected fault. The -ENE contact action closes 3 to 4 and opens 4 to 5. When a fault is sensed or when power is removed from the sensor, terminals 3 to 4 open and 4 to 5 close.

There is no connection from the sensor power to the output relay contacts. This allows different voltages to be used to power the sensor than the voltage that will be controlled with the output relay.

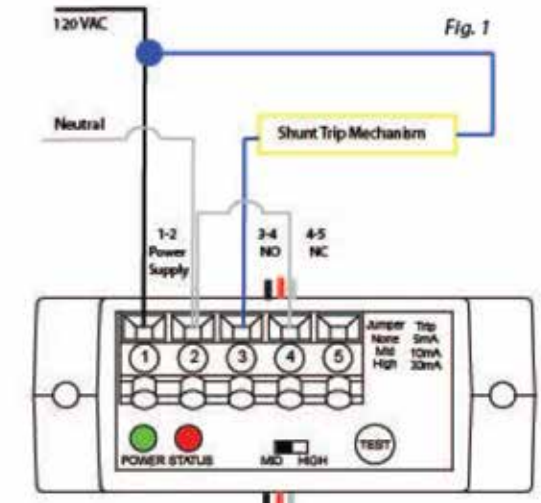

Fig. 1

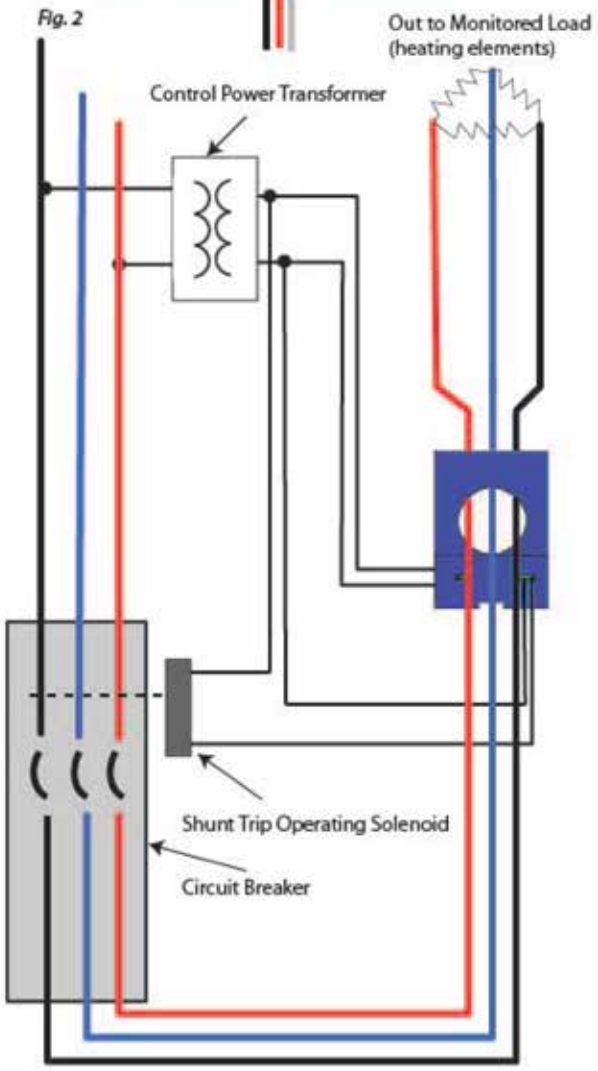

Fig. 2

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APPLICATION NOTE

5 mA Ground Fault Circuit Interrupter Solutions for Single or Three Phase Circuits up to 100 Amps

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