Use of the Form-A Contact in UR Relays

GE Publication No. GET-8436

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TYPICAL APPLICATION

Form-A contacts are designed primarily for operating circuit breaker trip and close coils. These contacts come in three configurations as shown in the following diagram:

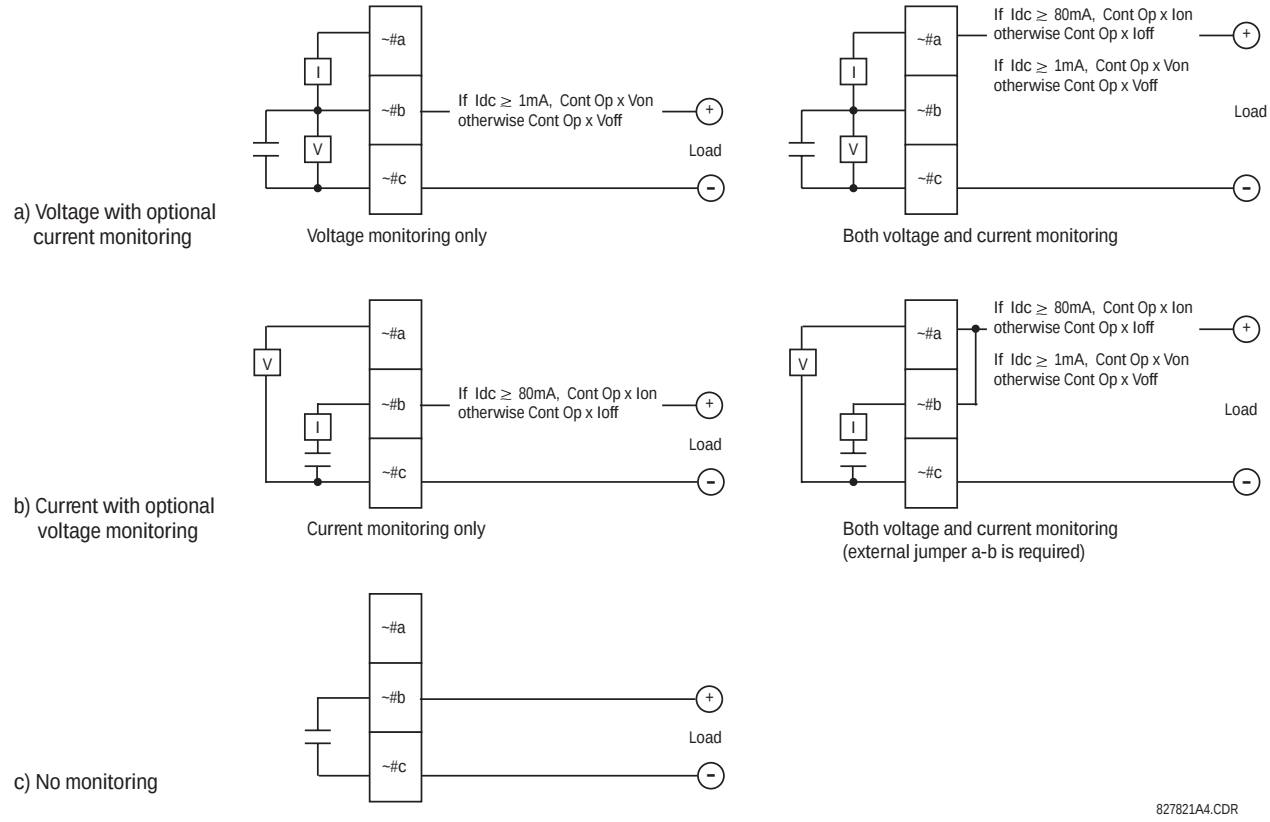
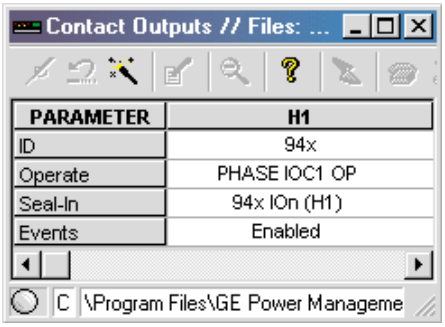


FIGURE 1. Form-A Contact Functions

Configurations A and B have integral current and voltage monitors. The current monitor can be used to protect the contact from the interruption of excessive current. When the current through the monitor is greater than 80 mA, the corresponding FlexLogic™ operand (`Cont # Ion`) will be asserted. This operand can be assigned to the Seal-In setting of the contact as shown below:



Once the contact has operated, the current monitor picks up and the contact remains sealed-in until the current is extinguished by the circuit breaker auxiliary contact.

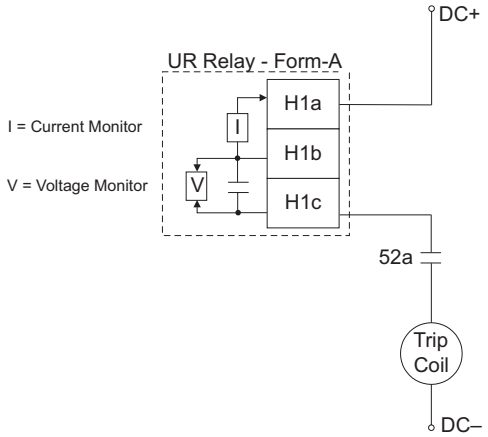
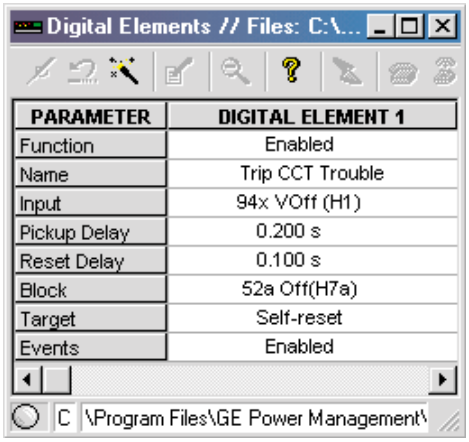


FIGURE 2. Trip/Close Circuit Example

The voltage monitor is designed to monitor the overall integrity of the trip/close circuit. The voltage monitor is an active circuit that attempts to inject a current of approximately 2 mA into the external circuit. If successful, this current produces a voltage drop within the voltage monitor circuitry that asserts the corresponding FlexLogic™ operand (`Cont # Von`). If there is no path for the injected current, then the FlexLogic™ operand (`Cont # Voff`) is asserted. In this way the voltage monitor can monitor the health of the

coil, fuses, and external circuit. It is typically used in conjunction with a FlexElement™ as follows:



APPLICATION WITH HIGH IMPEDANCE INPUTS

If the Form-A contact is to be used to drive high impedance inputs then either configuration B or C of Figure 1 is recommended. If configuration A is used, then a resistor must be placed across the input to ensure the injected current will not cause the input to switch on. The resistor size is calculated as follows:

1. Determine the minimum voltage (V_{op}) required to turn on the input. This may be determined by direct measurement or may be referenced in the input specifications.
2. Calculate the resistance necessary to limit the voltage to ½ V_{op} (when the contact is open) as follows:

$$R = \frac{V_{op}}{2} \times \frac{1}{2\ \text{mA}} \qquad \text{(EQ 1)}$$

3. When the contact is closed the battery voltage will appear across the resistor. The wattage rating of the resistor should then be:

$$P_R = 1.3 \times \frac{V_{batt}^2}{R} \qquad \text{(EQ 2)}$$

For example, assume the V_{op} is 80 volts and V_{batt} is 125 volts. Then

$$R = \frac{V_{op}}{2} \times \frac{1}{2\ \text{mA}} = \frac{80\ \text{V}}{2} \times \frac{1}{0.002\ \text{A}} = 20\ \text{k}\Omega$$

and

$$P_R = 1.3 \times \frac{V_{batt}^2}{R} = 1.3 \times \frac{(125\ \text{V})^2}{20000\ \Omega} \approx 1\ \text{watt}$$