



## Arc Resistance Calculator Help Documentation

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This calculator is used to calculate arc resistance values for use in setting protective relays. Two (2) of the leading methods for calculating arc resistance are incorporated into the calculator for flexibility and for determining worst case values.

In order for the calculator to function properly, all input values must be filled in. The required input values are the following:

- Arc Length – This value is the length in feet that the arc will propagate. For phase to phase faults, typically the phase spacing is used since this will provide the most conservative value.
- Arc Current – This value is the current which is flowing in the arc in amperes.

When the Calculate button is depressed, the results for the two different calculation methods are presented. The formulas used by the calculator are the following:

### ***A.R. Van C. Warrington Formula***

$$R_a = \frac{28,710 L}{I^{1.4}}$$

Where

R<sub>a</sub> = arc resistance in ohms

L = arc length in meters

I = arc current in amperes

Note that the calculator tool automatically converts the arc length input value from feet to meters.



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### ***J. Lewis Blackburn Formula***

$$R_a = \frac{440L}{I}$$

Where

$R_a$  = arc resistance in ohms

$L$  = arc length in feet

$I$  = arc current in amperes

### **Reference Information**

1. Protective Relays Application Guide, GEC Alstom Protection & Control Limited, St Leonards Works, Stafford ST17 4LX, England, copyright 1987
2. Protective Relaying Principles and Applications, J. Lewis Blackburn, Marcel Dekker, Inc, copyright 1987



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