WESTERN UNDERGROUND COMMITTEE
GUIDE 2.11 (2.11/01/0790)

APPLICATION GUIDE FOR FAULT INDICATORS

NOTE: This "Guide" summarizes the opinions, recommendations, and practices of the Western Underground Committee members and is issued only to assist these members in preparing their own specifications, or in making recommendations to specification agencies. Thus, this "Guide" may not reflect the complete requirements of each individual utility and is not binding upon them.

1.0 SCOPE

This guide is to aid in the selection of and in the placement of fault indicators, both automatic and manual reset, to assist in locating failures on an electrical circuit. The Guide may be applied to an overhead, underground or padmount type, and single-phase or multi-phase circuit.

2.0 DESCRIPTION

A fault indicator is a current sensitive device and is designed to function when subjected to a specified minimum value of current. Unlike a fuse or a sectionalizer, fault indicators do not isolate a circuit, but only indicate that a current in excess of the specified value has passed through a section of the circuit, thus assisting the trouble-shooter in locating the failure.

3.0 SELECTION

Fault indicators must be properly selected to coordinate with the other protective devices on the circuit. The general trip ratings are 200, 400, 600, 800, 1000 and 1200 amperes(or as specified) with a tolerance as specified by the utility.

In order to properly select the correct rating of fault indicator, the following information must be known:

1. The minimum value of fault current at the point the indicator is to be installed.

2. If manual indicators are, used consideration should be given to inrush current.

3. The maximum load current the circuit will carry at the point the indicator is to be installed.

4. Time-current curves for the protective device ahead of the fault indicator.

5. Time-current curves for the fault indicator.

The rating of the indicator must be less than the minimum fault current and exceed the maximum inrush current as well as be properly coordinated with the other protective devices on the circuit.

As an example, assume we want to install an automatic fault indicator on a circuit, which carries a peak load of 190 amperes, has a fault current of 5000 amperes and is protected with a 200E S&C SM power fuse. (Time-current curve for the fuse, as well as four indicators, is shown in Figure 1, page 4).

First considering the lower limit with a 10% tolerance, the 200-amp indicator could trip at 180 amperes. Therefore, the 200-amp indicator will not work because it could trip on maximum load current. Considering the upper limit, the 1200 amp indicator could take 1320 amperes to trip; therefore, any of the trip rating would work adequately on the fault current of 5000 amperes.

With the range of 400 through 1200 ampere units to select from, these must all be superimposed on the time-current curves as in Figure 1 to see which size will best coordinate with the fuse protecting circuit.

4.0 LOCATION

To make the most effective use of the fault indicator is should be installed at selected sectionalizing points and at all pole risers, where fuses, reclosers or sectionalizers are not used. For example, they should be installed on all switches, except fused switches, on up and down pole risers, where only a solid blade or a switch is installed, on 3- and 4-way cable taps, at separable splices, and on the load side of all padmounted terminating enclosures, etc.

Fault indicators are normally installed on the load side, or the outgoing cable; however, on a loop-operated system this rule would not always apply.

5.0 INSTALLATION

The fault indicator must be installed so that the current passes without cancellation through the current sensing device of the indicator. Therefore, the neutral conductor, or the return path for the fault current must bypass the current-sensing device of the fault indicator. This may be accomplished by several different methods, i.e.: for concentric neutral cable: (1) by-pass the current-sensing device of the indicator with the neutral; (2) if the neutral does pass through the current-sensing device, double it back so it passes back through, thus canceling itself out; (3) shunt a portion of the fault current around the current-sensing part of the unit. When this method is applied, the unit must then be based on the division of the current through shunt and the sensing coil.

Fault indicators must be installed in such a manner so they are visible and are easy to read.

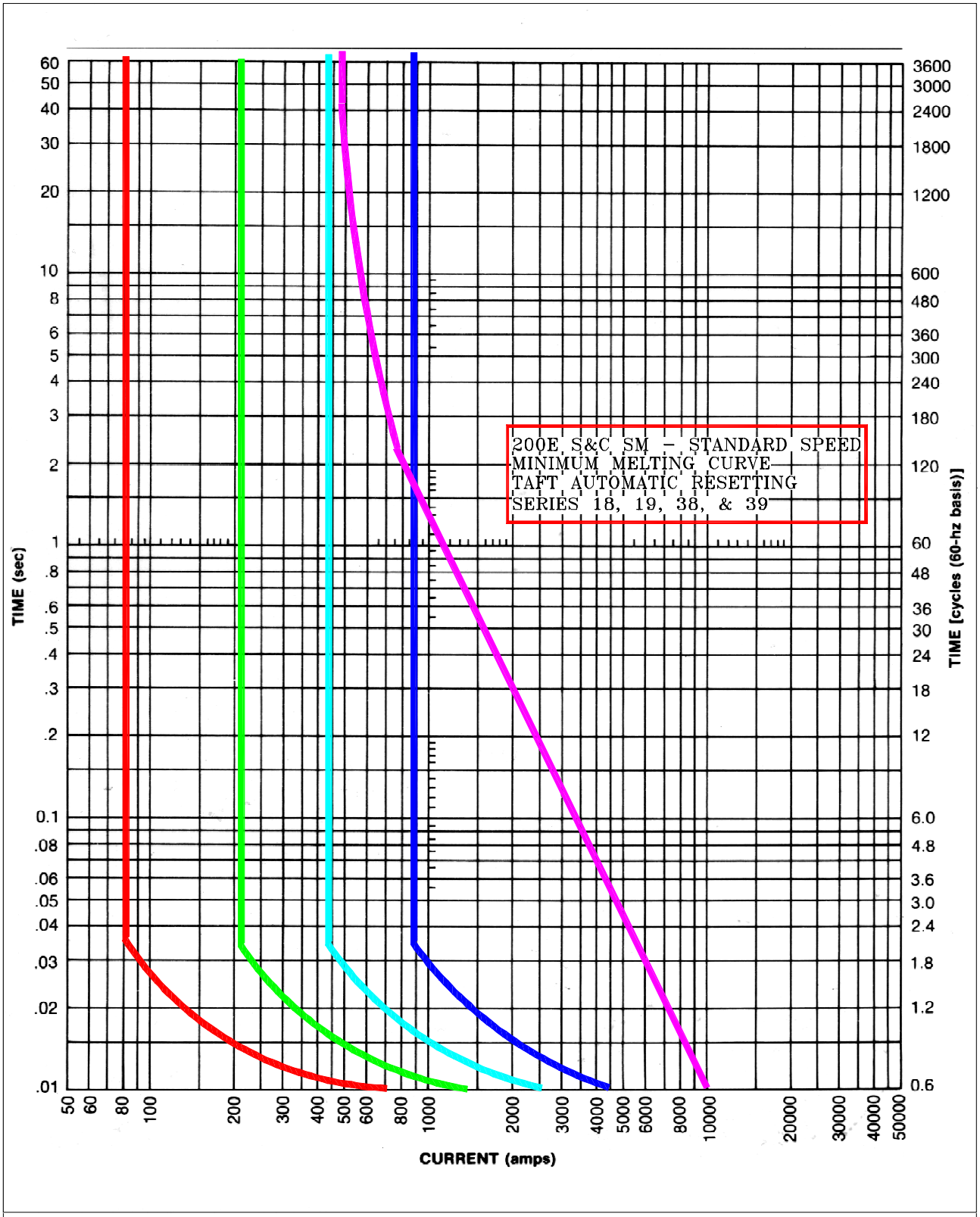

FIGURE 1

APPLICATION FOR FAULT INDICATORS