

USING EASYPower TO CALCULATE ARC FLASH INCIDENT ENERGY WITH THE MVCF SYSTEM

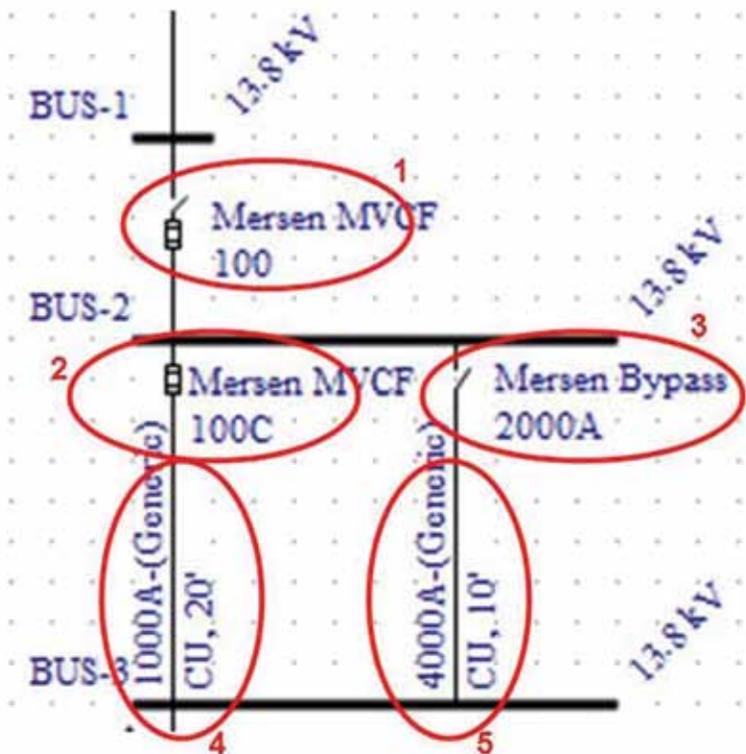


Figure 3. Modeling the MVCF.

MODELING THE MVCF IN EASYPower

Since there is no component for an integrated relay controlled fuse in the toolbox it needs to be built from existing components described in the 6 steps below for creating a 100A MVCF model.

Step 1. Model the MVCF with 5 discrete components. There is a main fuse (1 as shown in Figure 3), a controlled fuse (2) and a bypass switch (3). Since the fuse and bypass switch are zero ohms in the program, some impedance needs to be added in each leg. See (4) and (5) in the figure.

Step 2. Double click the main fuse (1) and select from the dialog as shown to the right.

Step 3. Double click the controlled fuse (2) and select from the dialog box. As can be seen, the controlled fuse is shown as a separate fuse without a switch. Click on the 'Fuse Only' check box under One-Line Graphics to properly display this fuse.

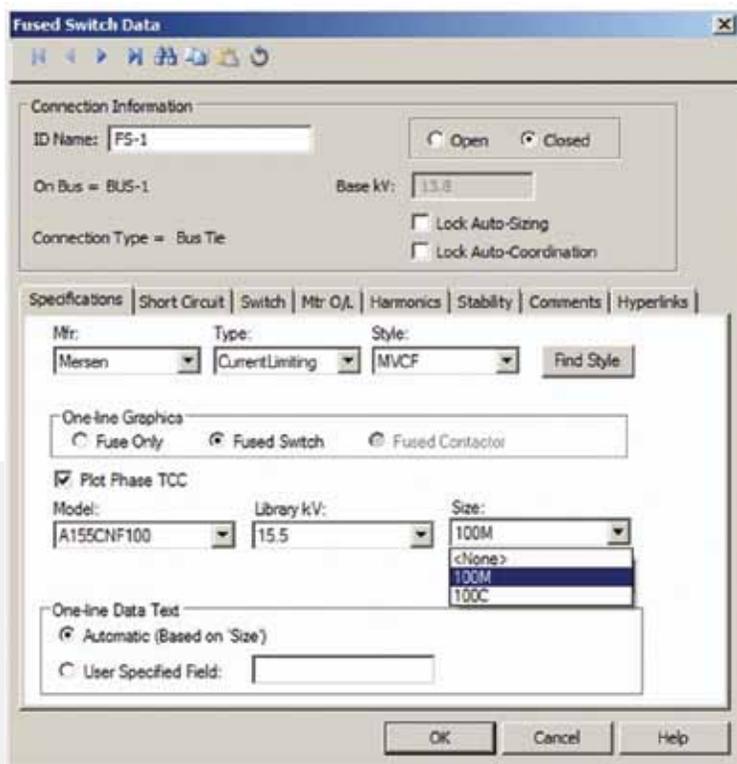


Figure 4

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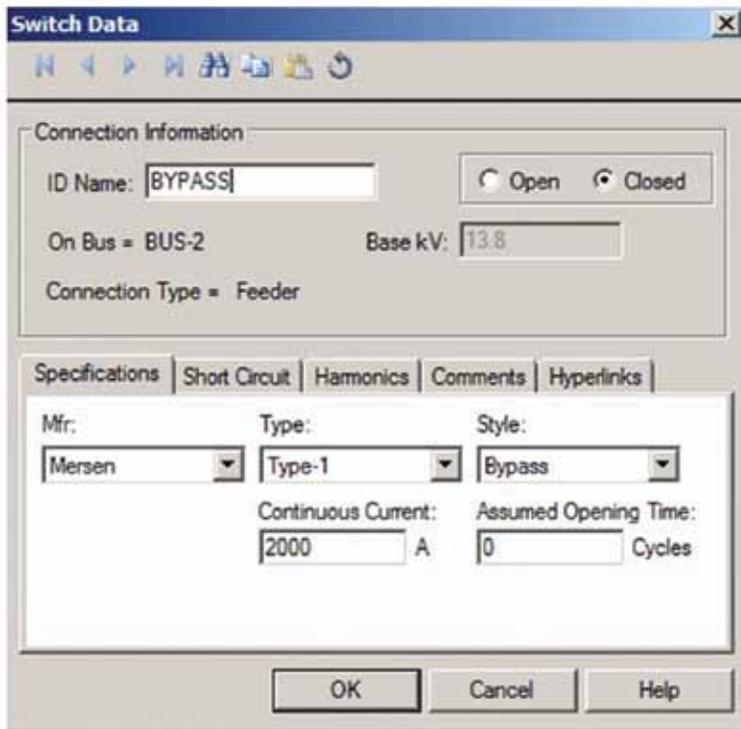


Figure 5. Selection of the bypass switch of the MVCF.

Step 4. The bypass switch is selected as a switch from the equipment tool box. Double click on the switch and make the proper selection as shown in Figure 5. Since the opening time of the bypass switch is built into the MVCF controlled fuse time current curves enter 0 cycles in the text box. Also check the 'Closed' check box.

Step 5. Select the conductors added in (4) and (5) for the MVCF model above. In this example, a 10' length (minimum allowed) of generic 4000A bus is recommended for the bypass switch leg. A 20' length of generic 1000A bus is recommended for the controlled fuse leg.

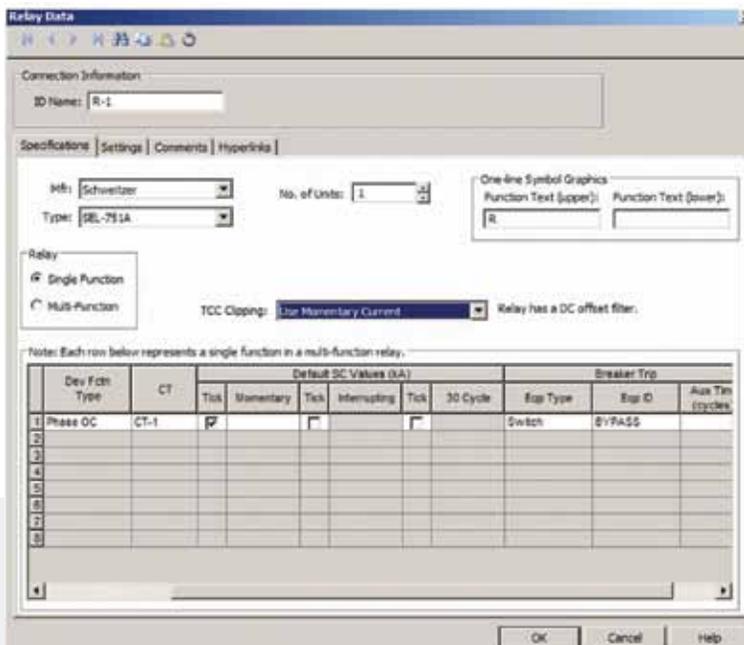


Figure 6a. Example of relay settings for controlling the MVCF.

Step 6. In the example, the relay connected to the CT installed on the transformer secondary needs to be set to control the bypass switch S-1. Use the the relay dialog box on the specification tab (see Figures 6a and 6b).

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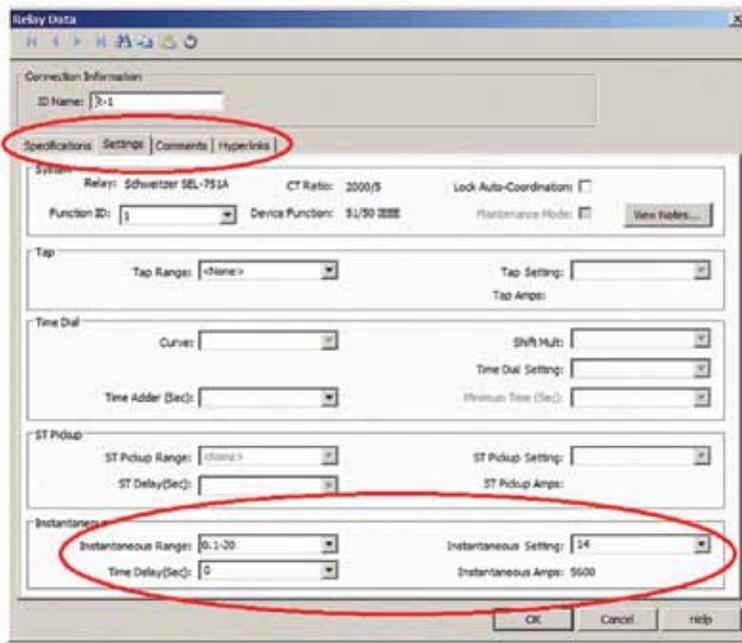


Figure 6b. Example of relay settings for controlling the MVCF.

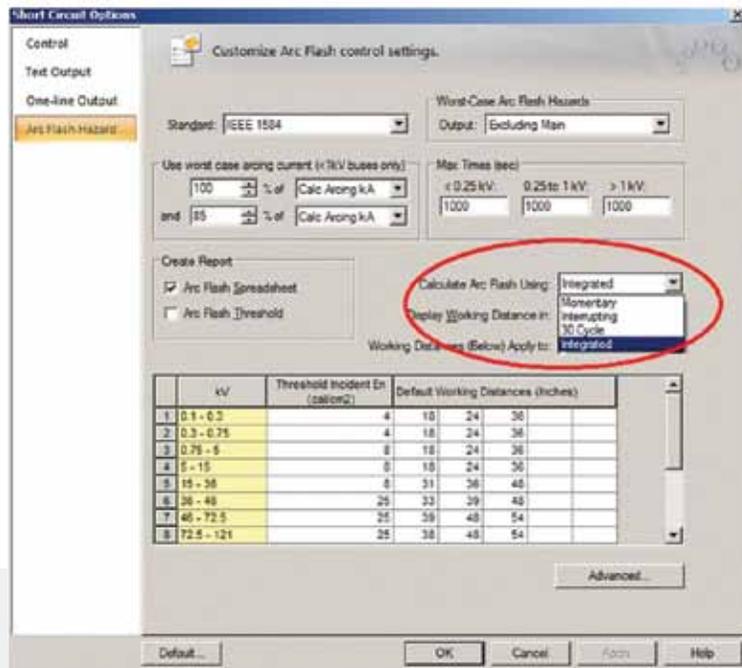


Figure 7. Running the arc flash study with integrated calculations.

Depending on the relay used and the desired tripping characteristics, the relay settings need to be chosen. For example, shown below on the settings tab of the specified SEL751A relay, the following settings were chosen: an instantaneous range of 0.1-20, an instantaneous setting of 14 and a delay of 0. This results in a pick up of 5600A.

RUNNING THE ANALYSIS

To get the correct calculations, selections are required in Short Circuit Mode. Standard arc flash calculations assume that the fault current is flowing through the protective device from the beginning of the event until the conclusion of the fault. As such, the program can read directly from the time current curve to get an arc duration. To account for the start of current flow through 100C after the relay has operated, the following selection needs to be made in a dialog box accessed from the SC Options button on the toolbar in Short Circuit Mode.

COORDINATION STUDIES

Currently it is not possible to plot a time current curve that is a sum of two time current curves from separate equipment. In our case the operating time of the programmable relay needs to be added to the time current curve of the fuse. The Relay Controlled Fuse Group feature will be available in the next release of EasyPower in 2015.

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