Application Note

Setting the PCD to Trip on an Overvoltage Condition and Reclose When the Voltage Level Returns to Normal

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Note: The settings in this application note are shown as an example only. It is the user's responsibility to determine proper settings and perform proper testing and validation for a given application.

Scope:
This application note applies to CPU Type 1 (firmware version 1.6 and later) and all Type 2 (current model) CPUs. This function permits the PCD to trip the recloser if an overvoltage condition exists on any or all phases. Upon overvoltage, the unit is set to switch to Alternate 1 (Alt 1) settings group (Alternate 2 (Alt 2) settings could be used instead) and immediately trip the unit. In Alt 1 settings, all settings are identical to Primary settings, except for the 79-1 OPEN TIME. Following the logic of this application, the 79-1 OPEN TIME sets the "allowable" time for the voltage to return to normal. If the voltage remains above the 59 setting, at the end of this time the unit will go into lockout state. If the voltage falls and stays below the 59 setting before the 79-1 OPEN TIME expires, the unit will reclose. However, it will wait the 79-1 OPEN TIME before closing.

An example of how this works, is as follows: An overvoltage occurs. The unit is set to switch to Alt 1 settings and trip in 2 seconds. Say the voltage goes back to normal 10 seconds later. If the setting for the 79-1 Open time is 30 seconds, the unit will reclose 40 seconds after opening.

STEP 1:
Set the 59 (Overvoltage) element in the Primary settings. An example setting is shown in Figure 1. Choose the setting appropriate for your application.

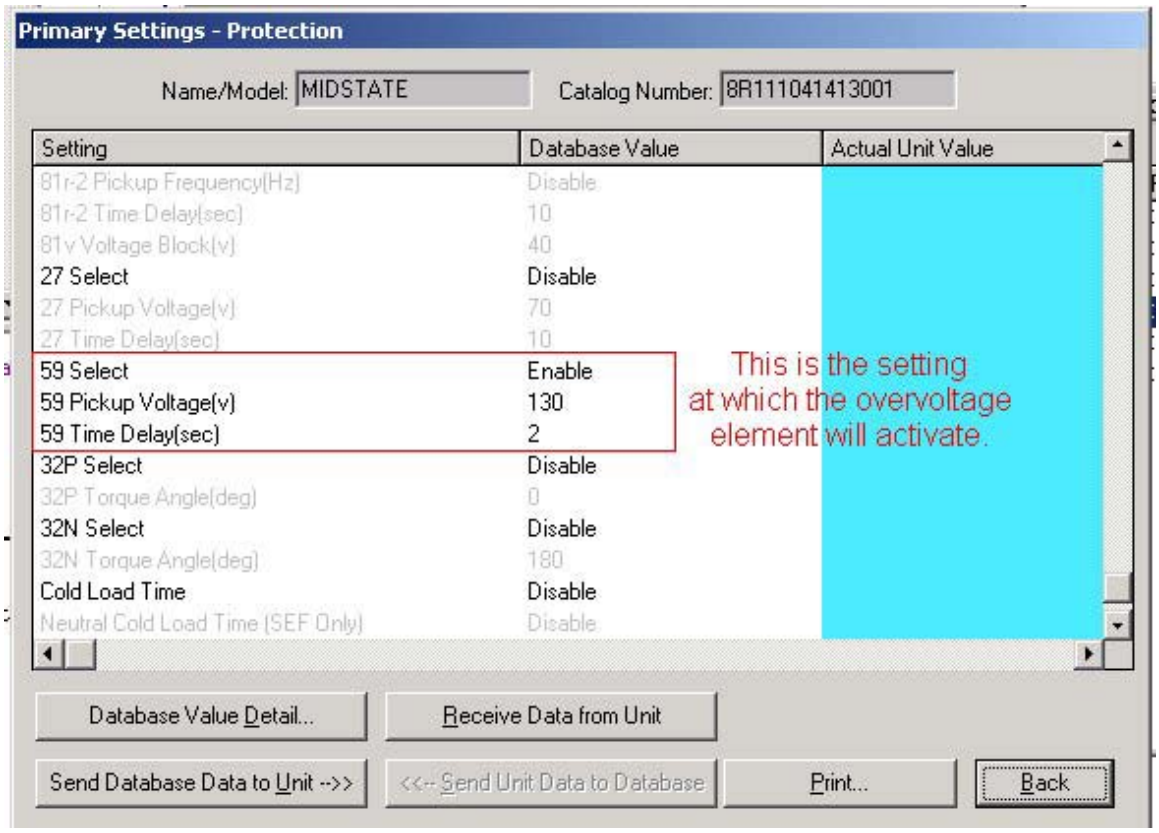

Figure 1

STEP 2:
Set Alt 1 (or Alt 2) Settings identical to the Primary settings, including the 59 element set in Step 1, except that the 79-1 OPEN TIME setting must be set to the “allowable” window for voltage to return to normal, for example the time required for regulators to bring the voltage back to normal level. The 79-1 OPEN TIME must not be set to Lockout or a reclose will not occur.

STEP 3:
Set the Programmable Outputs as shown in Figure 2.

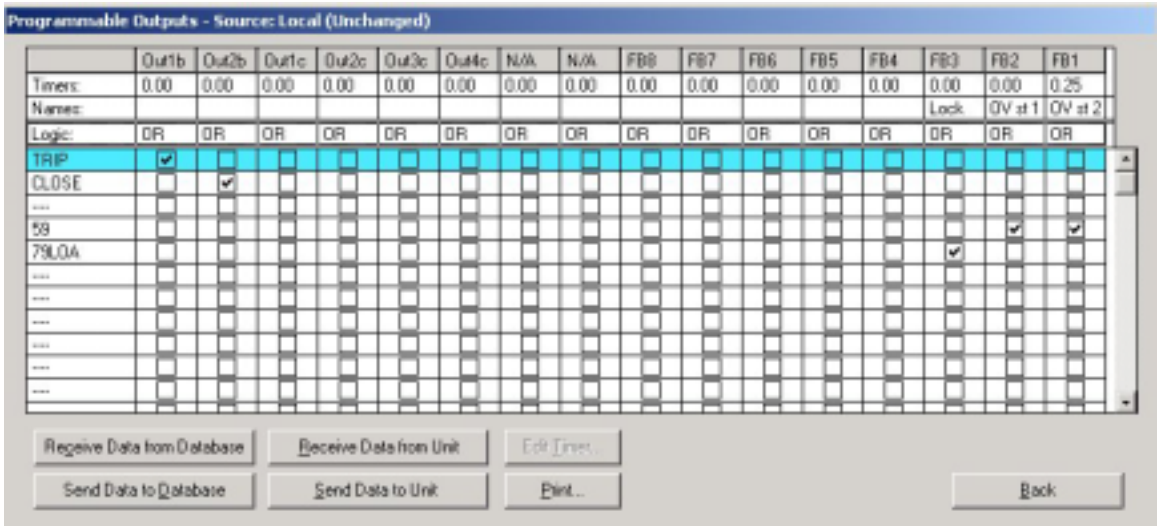

Figure 2

Using the 59 element, which activates when ANY phase goes above the 59 setting for the programmed time delay, set it to activate Feedback 2 (FB2) contact. Also, set it to activate Feedback 1 (FB1) contact .25 seconds later. If there is a lockout condition, FB3 is activated.

STEP 4:
Set the Programmable Inputs as shown in Figure 3.

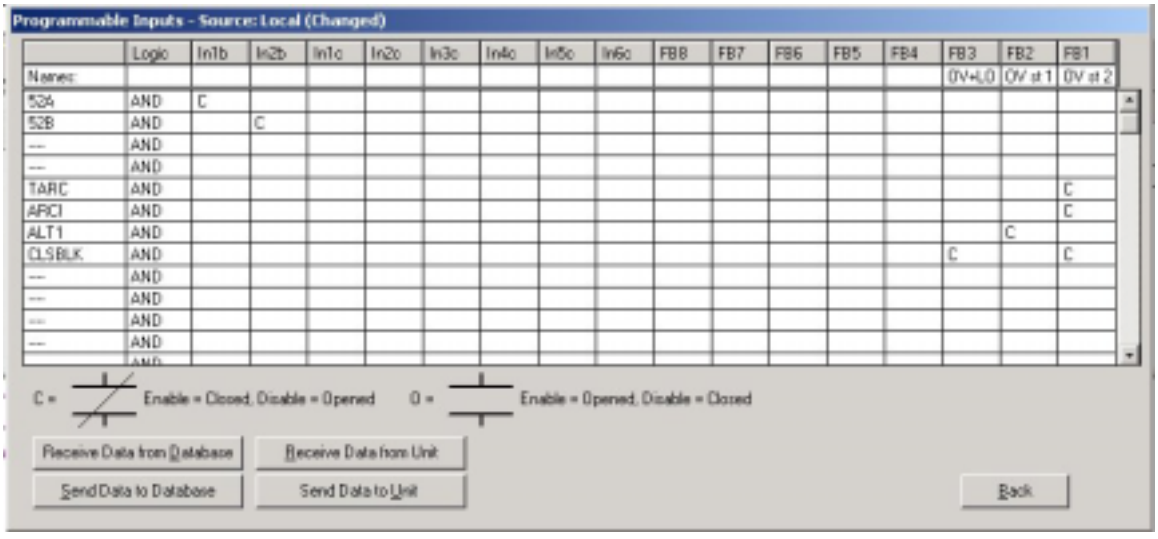

Figure 3

How the system works:
When there is an Overvoltage condition, the 59 element is activated. This element is mapped in the Programmable Outputs to activate the FB2 instantly, and the FB1 .25 seconds later. Going to the Programmable Inputs, first the FB2 input activates the Alt Settings 1 group, and then the FB1 input initiates a Trip and Automatic Reclose (TARC). This trips the unit and starts timing for a reclose (set by the Alt 1, 79-1 OPEN TIME setting). At the same time, the FB1 input activates the Automatic Reclose Inhibit (ARCI) function, which disallows the reclose until FB1 input drops out (the Overvoltage condition goes away).

If the FB1 input drops out before the Alt 1, 79 OPEN TIMER runs out, the unit will then count the 79 OPEN TIME and reclose. If the FB1 does not drop out before the Alt 1, 79 OPEN TIMER runs out, the unit stays open and locks out.

The Feedback 3 (FB3) input exists so that if the unit is Locked Out and in Overvoltage condition, the user cannot Close the unit by remote or local means until the Overvoltage condition is removed.

STEP 5:
Testing: Secure a test set capable of varying voltage. If a test set is not available, it is possible to "temporarily" set the 59 element at a lower value (for example 80 V), and run the test using a standard 120 VAC input. If the input is not applied, there is no overvoltage. If it is connected to the PCD inputs, it will be seen as an Overvoltage condition. Verify that desired timing is achieved and test with an Overvoltage applied less than the Alt 1, 79 OPEN TIME. Test again with an Overvoltage applied longer than the Alt 1, 79 OPEN TIME. Note that after you remove the voltage, the Alt 1 light will go off. However, since the unit is in an active reclose sequence, it will continue to use the Alt 1, 79 OPEN TIME interval.

The latest information on the PCD control can be found at our website at www.abb.com/mediumvoltage. (Select PCD from the dropdown Shortcuts menu.)

For additional support or information please call ABB Inc. at 1-800-929-7947 Ext. 5 or +1-407-732-2000 Ext. 5.