



VEBKO ONLINE HELP

End-to-End Test

Category	tester
Section	Testing of relays protection functions
Language	English
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One of the most essential tests to be performed on the lines that are protected by relays on both sides is an "End to End test". To perform this test, both devices on the sides of the line must be synchronized and inject the required signals into the relays simultaneously.

The first step is the stability test. There are two things to consider for this test: first, the transformation ratio of CTs and second, the polarity of CTs.

For example, suppose that the transformation ratio of CT in post A is 1000/1 and in substation B is 800/1 and the polarity of both substations is toward object. If the current in the line is assumed to be 1000 amps, then the current of the relays of the substation A and substation B will be 1 and 1.25 amperes respectively. Also because the polarity of both CTs is toward object, there will be a 180 degree phase difference in the corresponding phases.

The "AMT Sequencer" room is used for performing the stability test. In this room, 6 current phases must be activated. To do this, go to the "Hardware Configuration" page and deactivate the voltage phases. Then all the 6 current phases will be activated in the "Current Output Signal" section. Considering what was said in the preceding example, 3 balanced 1 amp phase current and three balanced 1/25 amp phase which have a 180 degree phase difference with their corresponding phase toward each other, will be entered in the "Table View" tab.



Figure 1

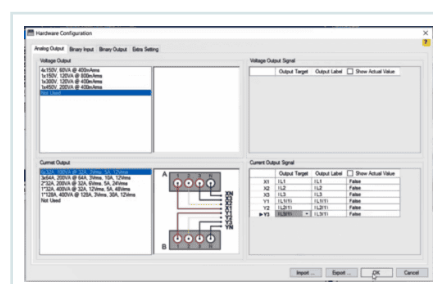
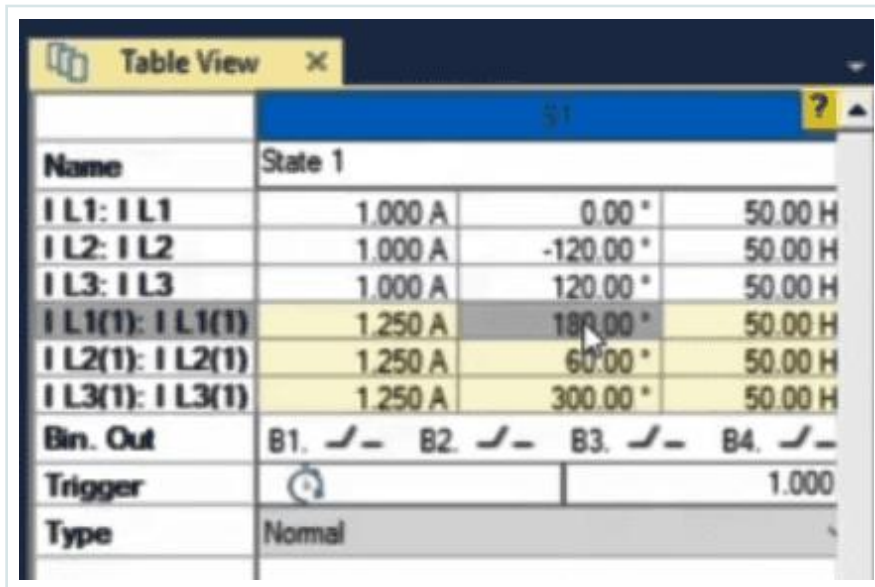


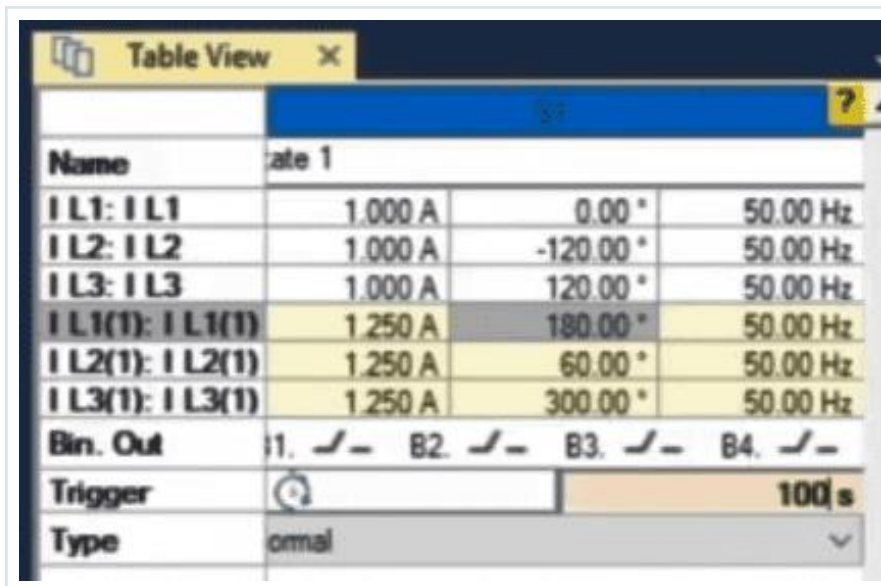
Figure 2



Name	State 1		
I L1: I L1	1.000 A	0.00 °	50.00 H
I L2: I L2	1.000 A	-120.00 °	50.00 H
I L3: I L3	1.000 A	120.00 °	50.00 H
I L1(1): I L1(1)	1.250 A	180.00 °	50.00 H
I L2(1): I L2(1)	1.250 A	60.00 °	50.00 H
I L3(1): I L3(1)	1.250 A	300.00 °	50.00 H
Bin. Out	B1. ☒ -	B2. ☒ -	B3. ☒ - B4. ☒ -
Trigger	1.000		
Type	Normal		

Figure 3

Injecting these currents into the relays will take 100 seconds. During this time, the "Idiff" of the relay, visible on the measurement panel in front of the relay, must be zero.



Name	State 1		
I L1: I L1	1.000 A	0.00 °	50.00 Hz
I L2: I L2	1.000 A	-120.00 °	50.00 Hz
I L3: I L3	1.000 A	120.00 °	50.00 Hz
I L1(1): I L1(1)	1.250 A	180.00 °	50.00 Hz
I L2(1): I L2(1)	1.250 A	60.00 °	50.00 Hz
I L3(1): I L3(1)	1.250 A	300.00 °	50.00 Hz
Bin. Out	B1. ☒ -	B2. ☒ -	B3. ☒ - B4. ☒ -
Trigger	100 s		
Type	Normal		

Figure 4

The second step is the characteristic curve test. In this room, first, the 'XRio' file of the differential relay which is being tested will be imported. To do this, go to the "Test Object" page and click on the "Import from list" option to open the "Template" list of the relays. For example, "7sd" is searched and its "Template" is selected. Then from the "File" menu, click on "Load Relay Setting" and the "XRio" of the relay of the post A which is exported from the "DIGSI" software is entered. A very important point

to note in this section is that, also, the post B relay settings should be entered in the "XRio" of the post A relay. Because the curve of the differential of this relay is related to the settings of both relays, it is necessary that the settings of both relays are available in one file so that the curve is created correctly. To do this, open "XRio" from the subdirectory of "7sd" and then open "Additional Information". After that, select "Relay Parameter Section (Remote Relay)".

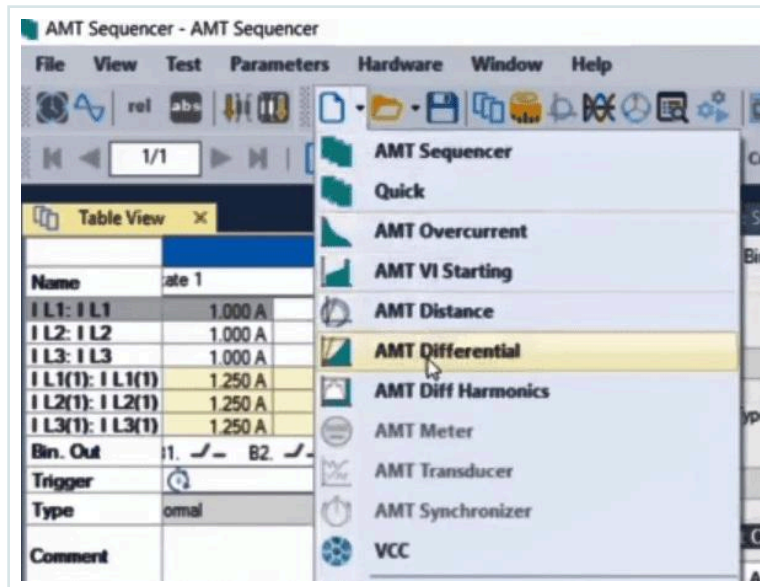


Figure 5

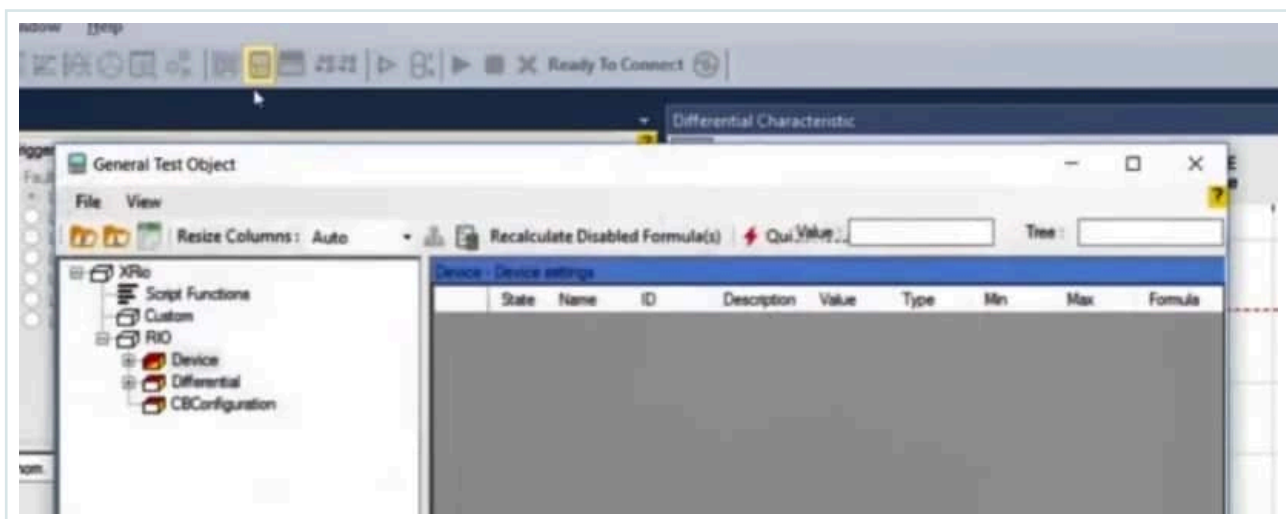


Figure 6

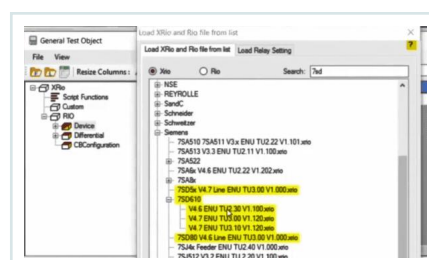


Figure 7

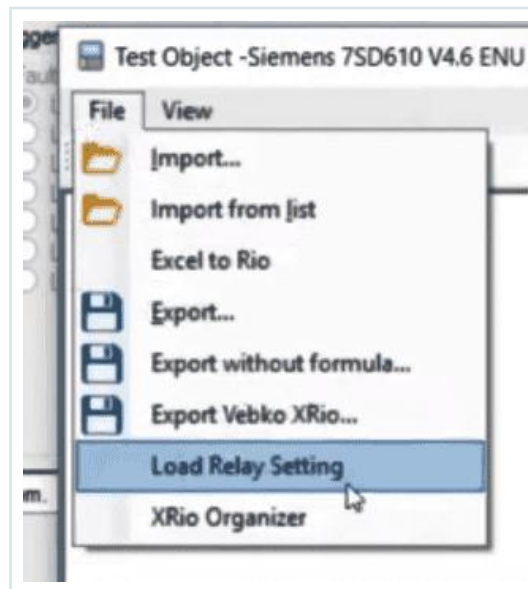


Figure 8

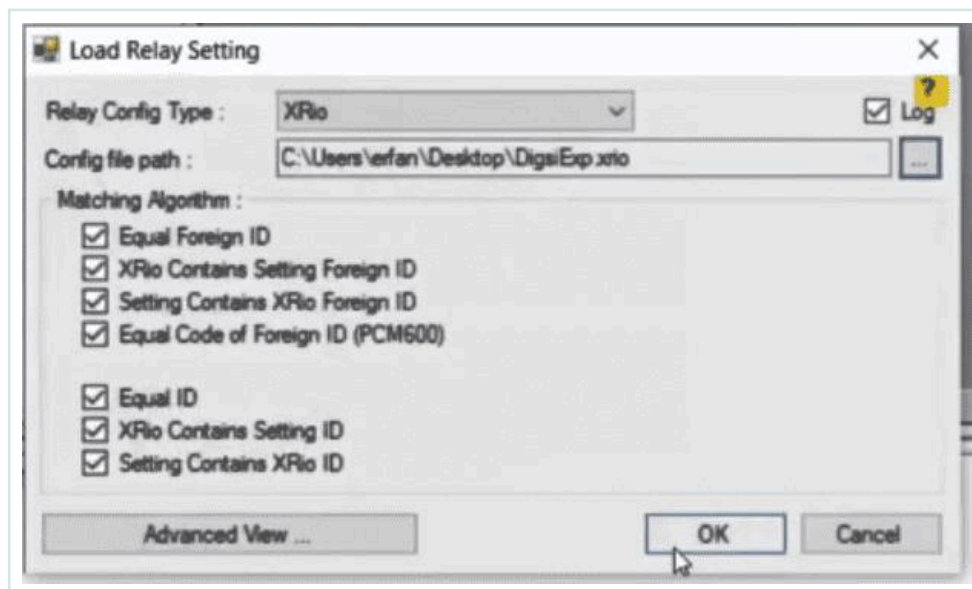


Figure 9

In this section, in order to enter the information of the other side, the information on the parameters that are green in the "State" column, must be entered in the "XRio" of the relay. This information can be entered in two ways: if the file of the relay is available in the "DIGSI" software, the information is imported from the software. Otherwise, the other person in the post B should read this information from the relay and announce it. After entering the information, the characteristics of the curve of the relay will be created in the post A.

The same steps are taken from the "Import from list" point to the end in the post B and in the

"Additional information" section, the relay information of the Post A must be entered so that the curve is created in the Post B too.

By double-clicking on the "Line Differential" option, the "Differential Protection Parameters" page opens. The point to note on this page is to enter the post A relay information in both posts A and B of the "Primary" Column and enter relay information of the post B in the "Secondary" column. It should also be noted that the information of "Protection Device" tab, "Idiff" section and also "Characteristic Definition" tab must be exactly the same on both sides.

After the relay curve is made, the person on the side of the relay A must flow the 3 upper phases and short circuit the lower 3 phases. Meanwhile, the person on the side of the relay B must flow the 3 lower phases and short circuit the 3 upper phases of the current.

Once the curve is made and it has been made sure that everything is the same on both sides, such as the transformer's differential test and "Check" test, then the "Shot" and "Search" are performed. The point is that every test and "Fault Type" which is added to the test table on one side, must be exactly repeated, with the same values, on the other side in the "Fault Type".

To perform this test, it is necessary to perform the test simultaneously on both sides. For this purpose, it is essential to connect the "GPS" antenna to the back of both devices first. Then go to the "Start-Condition Repetition" page and select "On GPS" option in the "Start Condition" tab. On this page, by activating the "Start Time" option, both devices show a specific time in the time field on their front. By doing this, both devices will, at the specified time, simultaneously start injecting the flow to run the test and recording the results.

[jg1]End_to_End_Test