



VEBKO ONLINE HELP

Negative Sequence Overcurrent Protection Test in AMR Relay (Simple Test Using Templates)

Category	tester
Section	Testing of relays protection functions
Language	English
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AMR modular relay of Vebko company supports various protection functions. Explanations of the capabilities and software environment of this relay have already been presented in the video related to differential protection test.

After connecting to the AMR relay at first, simply load the device's hardware configuration from the Device menu by selecting the Read Hardware from Relay option.

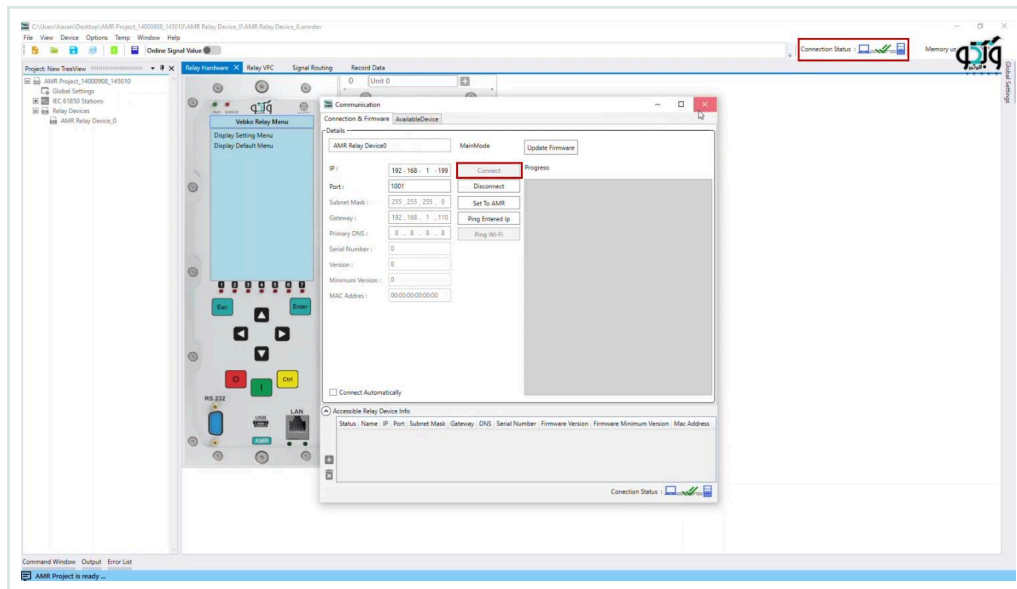


Figure 1

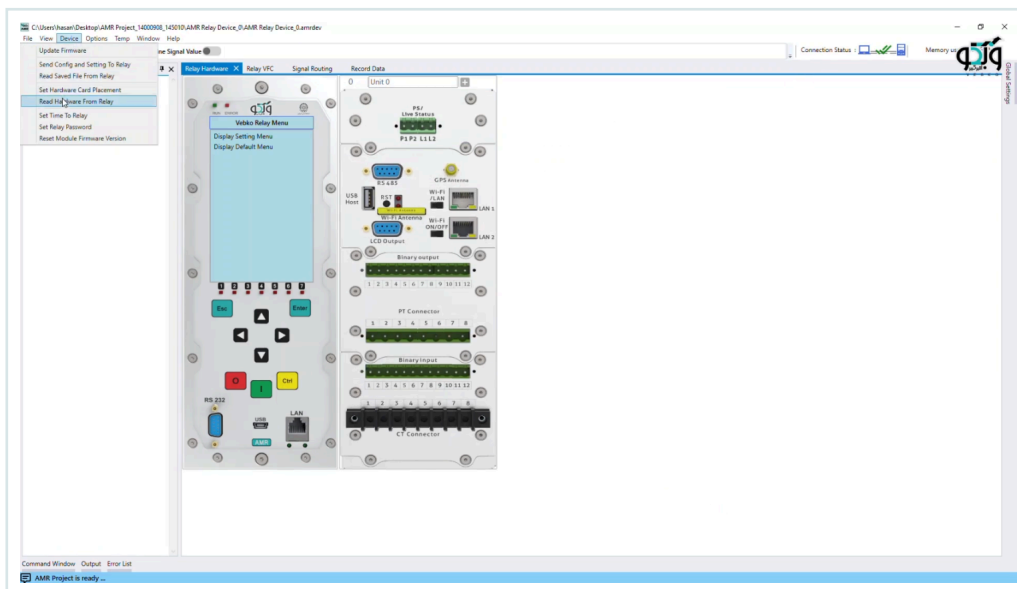


Figure 2

The default password is 123456 to receive elements.

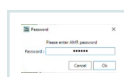


Figure 3

At this point, a message is given to remove the signal, which if confirmed, if the current hardware is not the same as the relay hardware, the current hardware signals used in the VFC section are deleted.

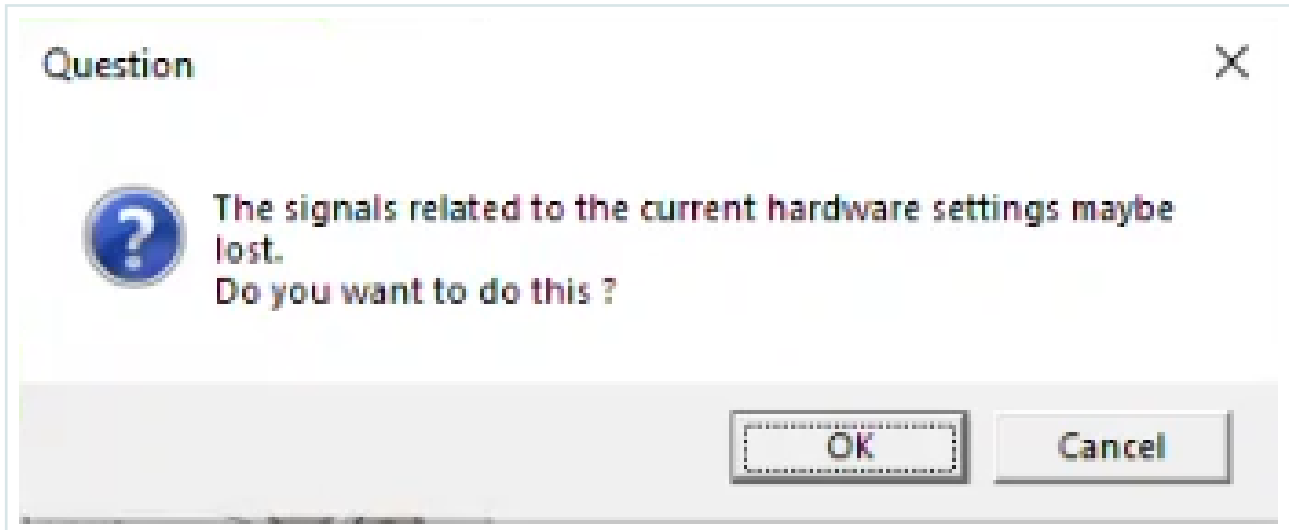
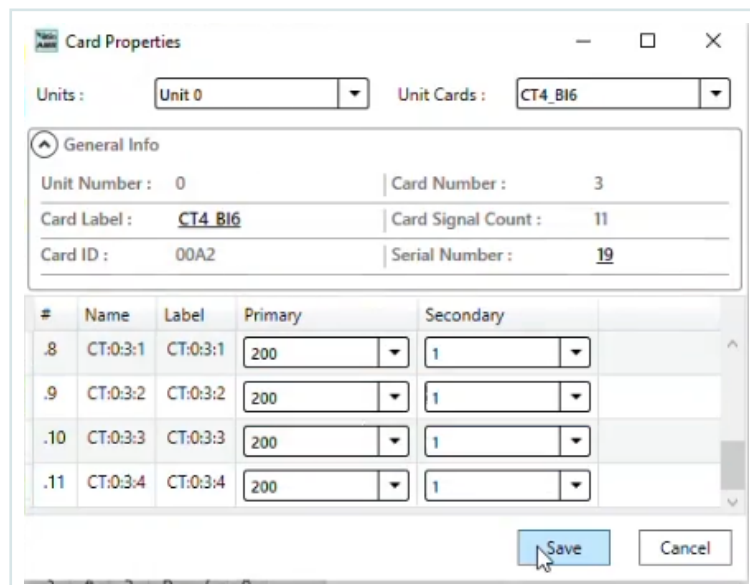


Figure 4

It should be noted that the settings for the conversion ratio of voltage and current transformers are determined in the related card. Here, current card conversion ratio is 200A to 1A and voltage card conversion ratio is 63,000 to 100V.



#	Name	Label	Primary	Secondary
.8	CT:0:3:1	CT:0:3:1	200	1
.9	CT:0:3:2	CT:0:3:2	200	1
.10	CT:0:3:3	CT:0:3:3	200	1
.11	CT:0:3:4	CT:0:3:4	200	1

Figure 5

(First, enter the VFC page): As mentioned earlier in the AMR software, configuring some of the most widely used functions are placed in the software as samples the user can send new settings to the

relay by selecting each of them and applying the desired changes. For this purpose, a set of functions can be seen in the Relay VFC tab and in the Temp Functions section. It should be noted that by selecting each Temp Function, the blocks in the VFC are removed.

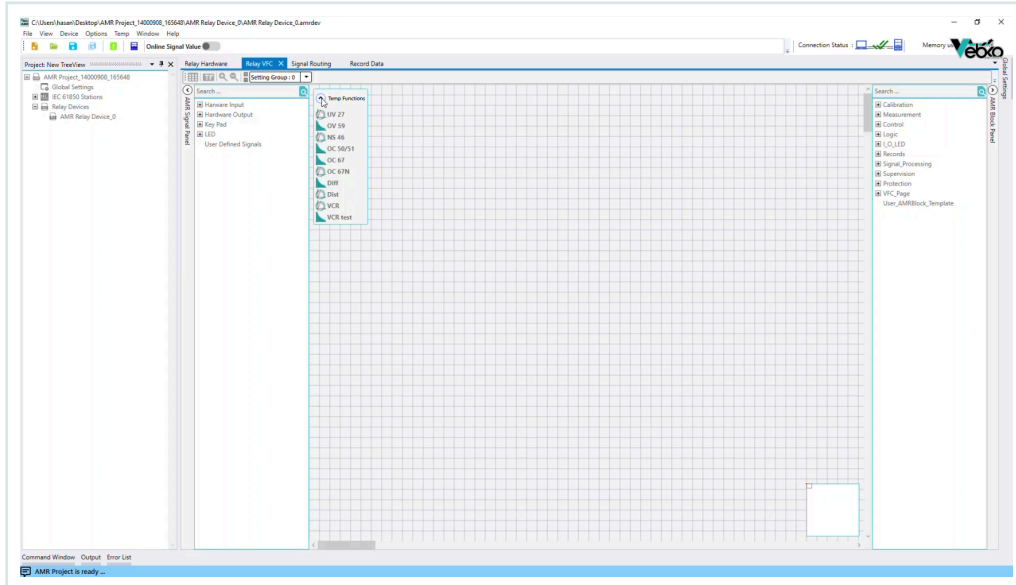


Figure 6

Here the negative sequence overcurrent function displayed with the name NS 46 is selected. In this template, first, the signals of a current card are given to the Current Quantities block to create different current sequences in its output. In the default config of the Negative Sequence function, a block with different stages and signals of a current card with negative sequence is assigned to its input. Finally, output signals are assigned to Binary Outputs and relay LEDs by Output and LED blocks.

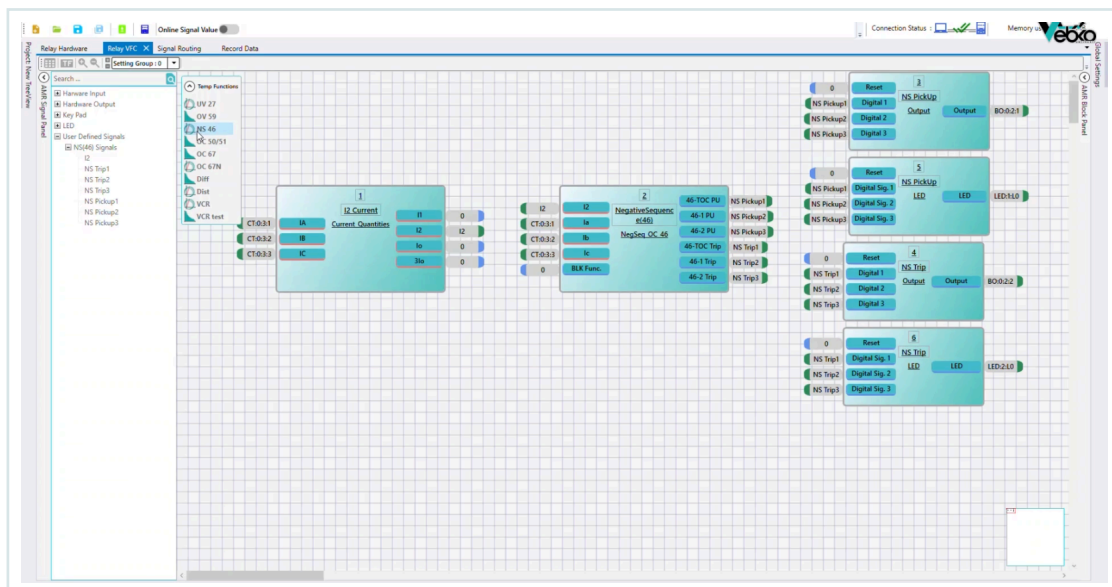


Figure 7

To change the settings, simply right-click on each block to access a set of options.

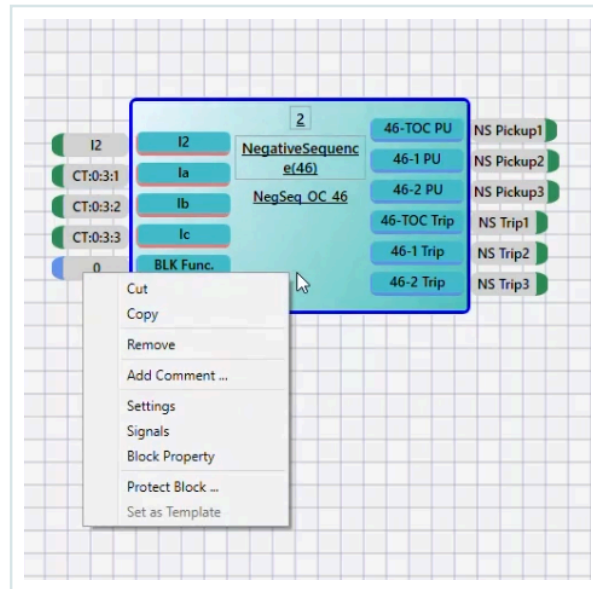


Figure 8

By double-clicking on the Negative Sequence block, the settings for its various stages are visible. Here, the first stage with normal Inverse setting characteristic has a current of 0.1 amps, the TMS equals 1, and the two constant time stages with a current setting of 0.2 and 0.5A have a time setting of 1.5 and 0.5 seconds, respectively.

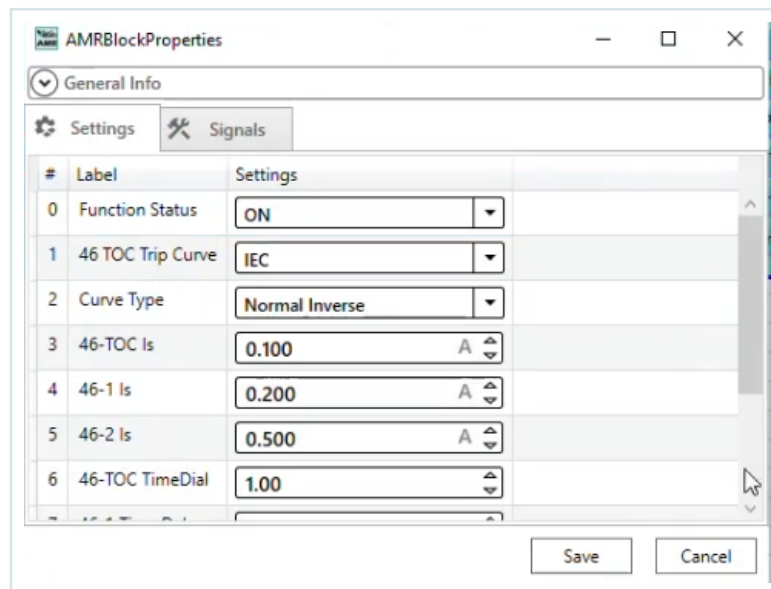


Figure 9

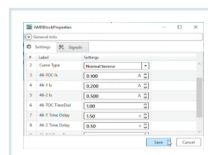


Figure 10

By making these changes, simply select Send Config and Setting to Relay from the Device menu again. This way, the settings and applied configuration are moved to the relay. (Cut from this part until the overcurrent room opens).

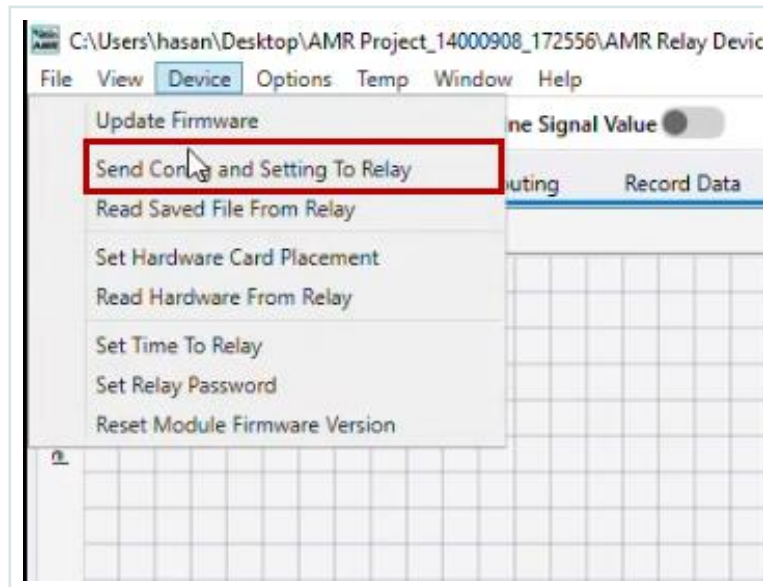


Figure 11

In the next step, by running AMPro software and opening the AMT Overcurrent room, it is enough to go to the Test Object Parameters section and create the test characteristic after entering the information.

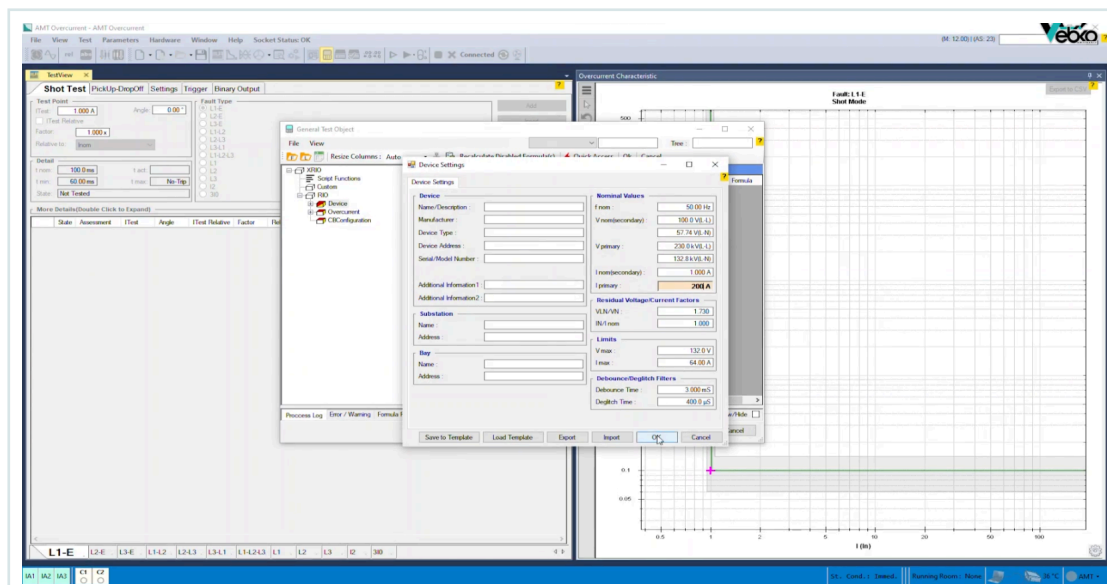


Figure 12

The test characteristic is created in the Elements tab in the Negative Sequence section. Therefore, the default characteristic in this section is removed first.

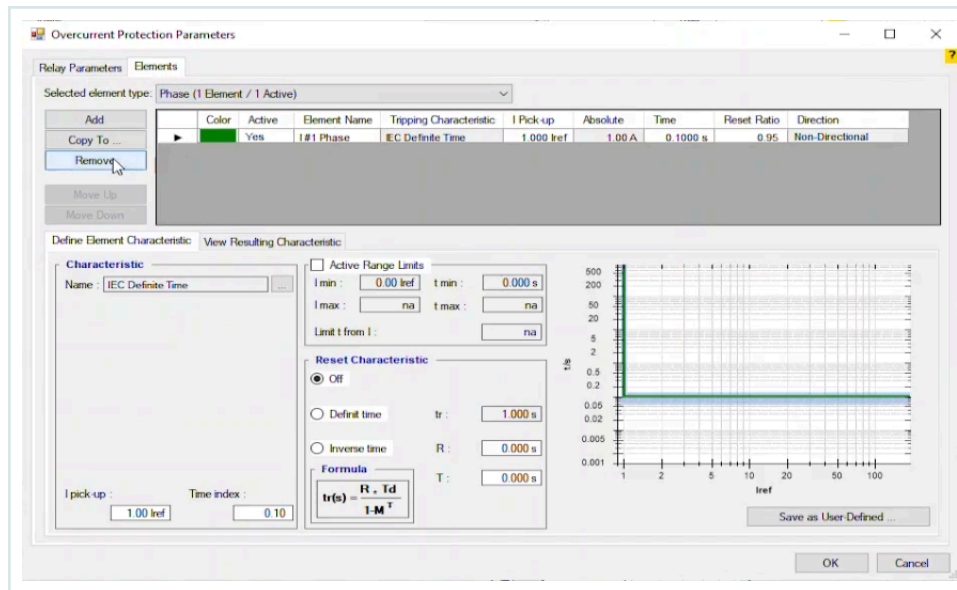


Figure 13

First, a reverse time characteristic is created with a current setting of 0.1 amps and TMS=1.

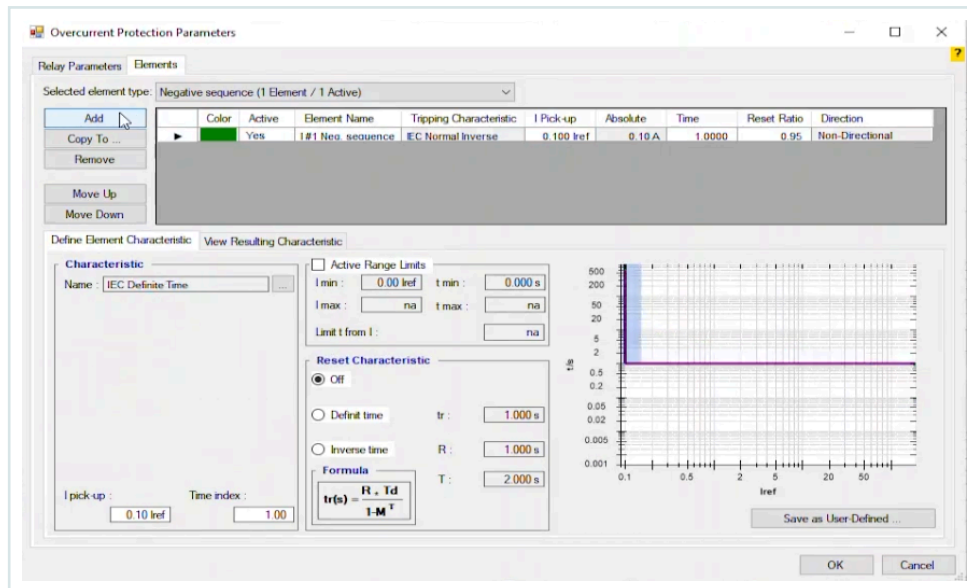


Figure 14

The next characteristic is created by current setting of 0.2 and a time of 1.5 seconds.

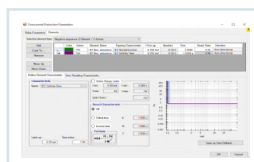


Figure 15

Finally, the third characteristic is created by adjusting the current setting of 0.5 and the time of 0.5 seconds. Keep in mind that it is also possible to test this function using the Xrio file.

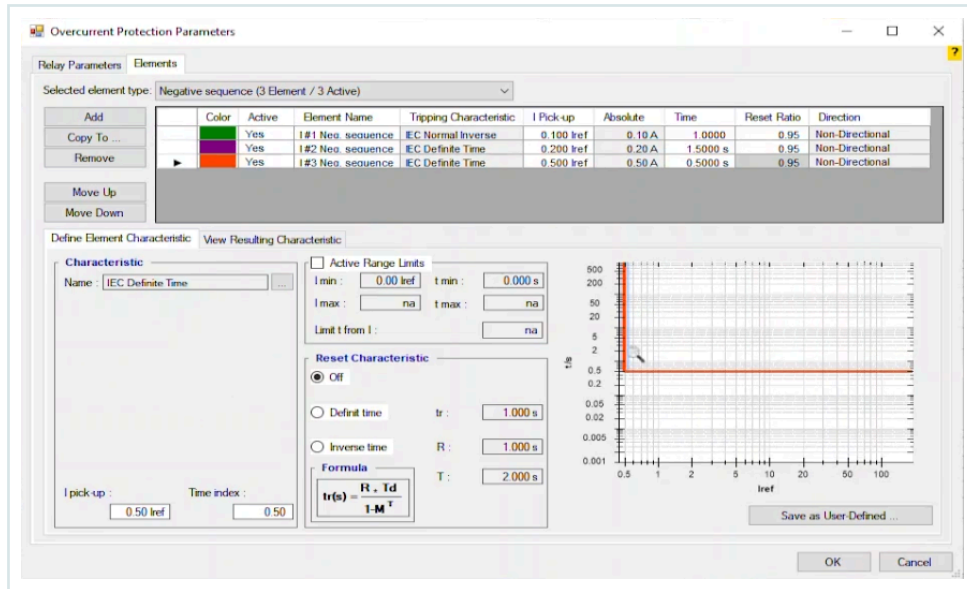


Figure 16

In order to evaluate the performance of negative sequence overcurrent function, two Trip Time and Pickup-Drop Off tests are performed. The purpose of Trip Time is to detect and evaluate the accuracy of the performance time of this function and the purpose of pickup-drop off test is to detect and evaluate the accuracy of the actual current of the performance threshold and the reset threshold of this function.

1 Trip Test

To perform this test three states ones including PreFault, Fault and PostFault are required. PreFault time is suitable for 500 milliseconds, fault time should be greater than the maximum trip time, and Post Fault time is at least 500 milliseconds. PostFault time should be increased if the drop-off is not instantaneous.

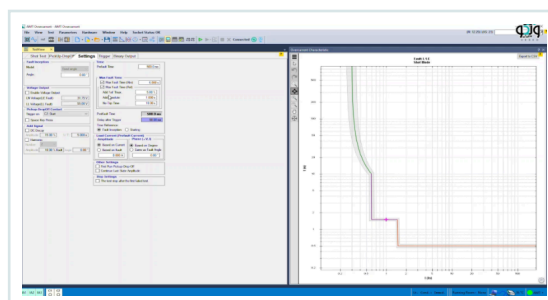


Figure 17

The suggested points for reduced time functions are 1.5 times, 2 times and 4 times the regulatory current, and for constant time curves, 1.5 and 2 times the regulatory current. These points are added to the fault type 12 to prepare the test. Keep in mind that due to the existence of three different characteristic, in some cases, the added points with the mentioned coefficients fall on the other characteristic. In these cases, other points are manually added on each characteristic to ensure accurate time performance.

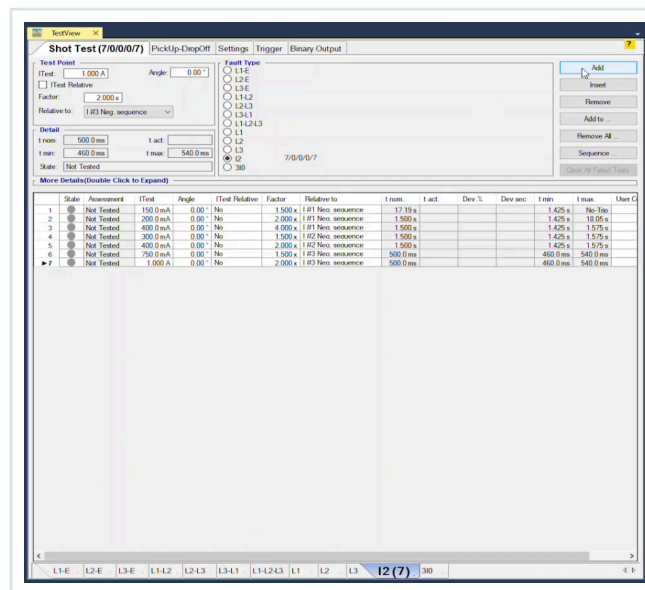


Figure 18

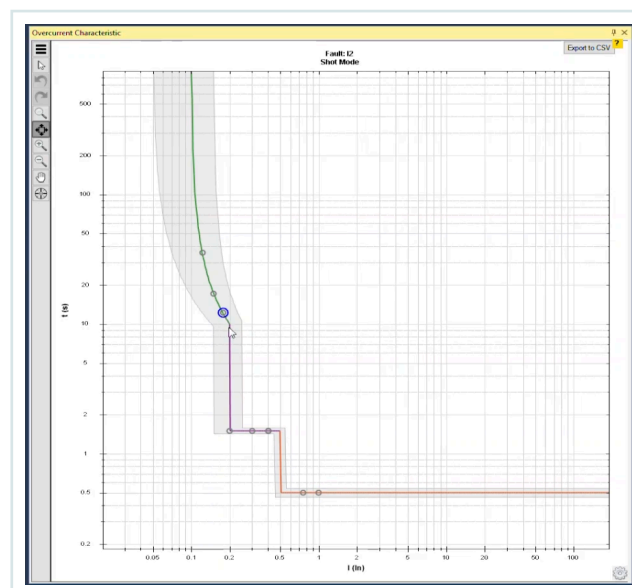


Figure 19

To detect the regulatory current of the second and third units, two points can be added to 90 and 110

percent of the regulatory current of these units in order to perform a kind of pickup drop-off test for these characteristics. Once again, the Max Fault Time value is set based on the highest number inserted in the t nom section.

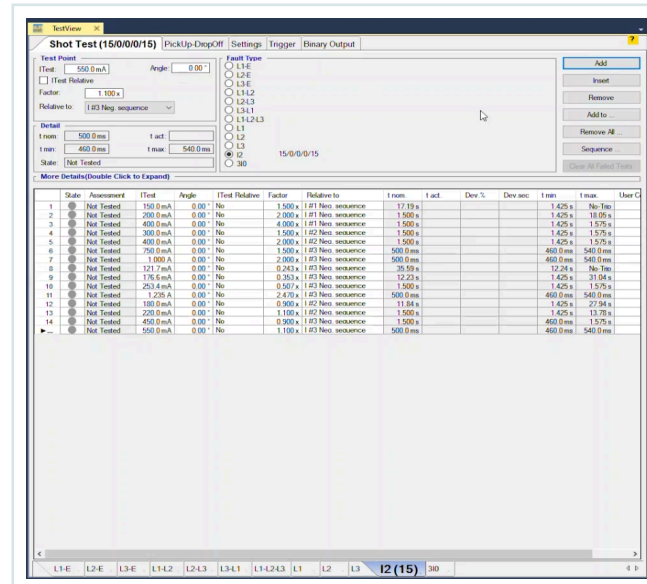


Figure 20

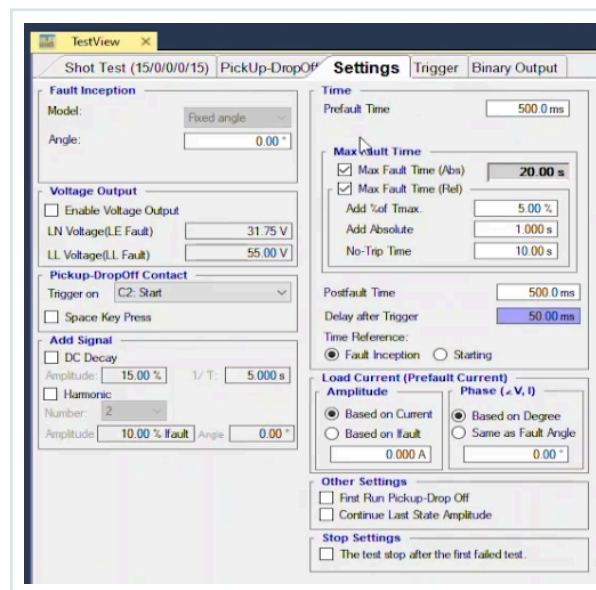


Figure 21

By adding points, perform the test to check the performance of this function from the point of view of time accuracy.

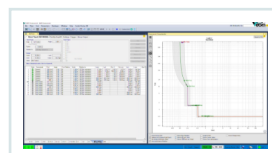


Figure 22

2 Pickup/Drop-off Test

In order to perform this test, it is first to determine how the diagnosis of pickup and drop-off is performed. This process can be done through a separate contact, like Start, Relay LED viewing, or changing the setting for the instantaneous of the function and using the trip contact. Here we used the relay pickup contact. You can also put the current fault value in the desired range.

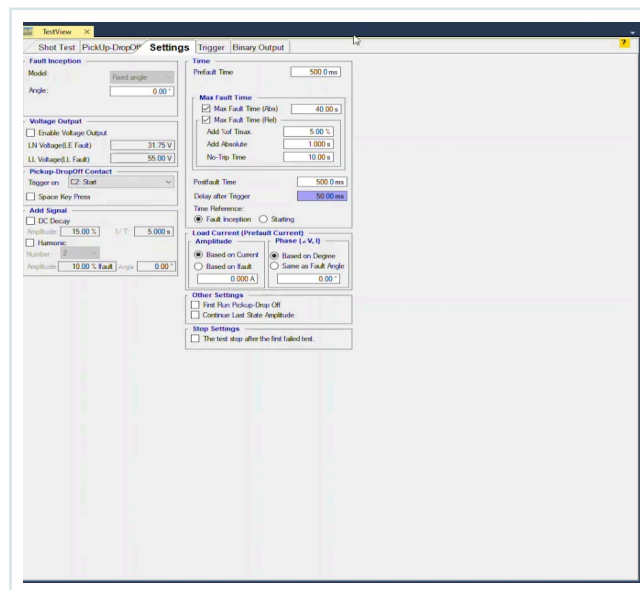


Figure 23

Here the fault value is considered 5% by default. The performance range of overcurrent curves in the AMR relay starts from 1.1 regulatory current in the relay. Therefore, first, by enabling the Active Range Limits option in the Overcurrent Protection Parameters window, Imin value are determined to be $1.1 \times 0.1 = 0.11 \text{ Iref}$.

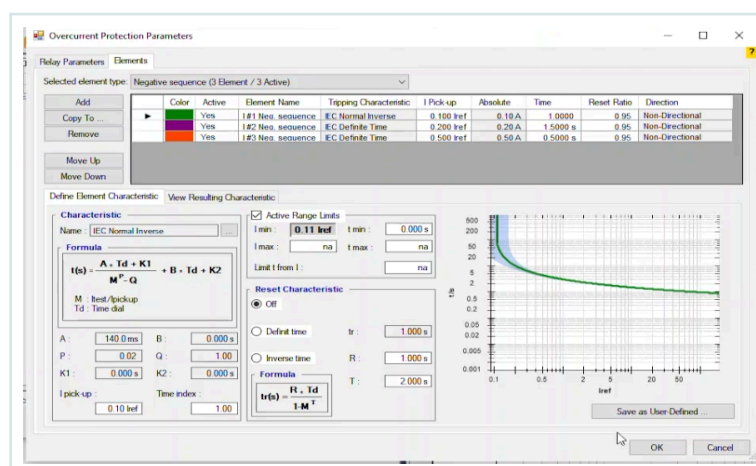
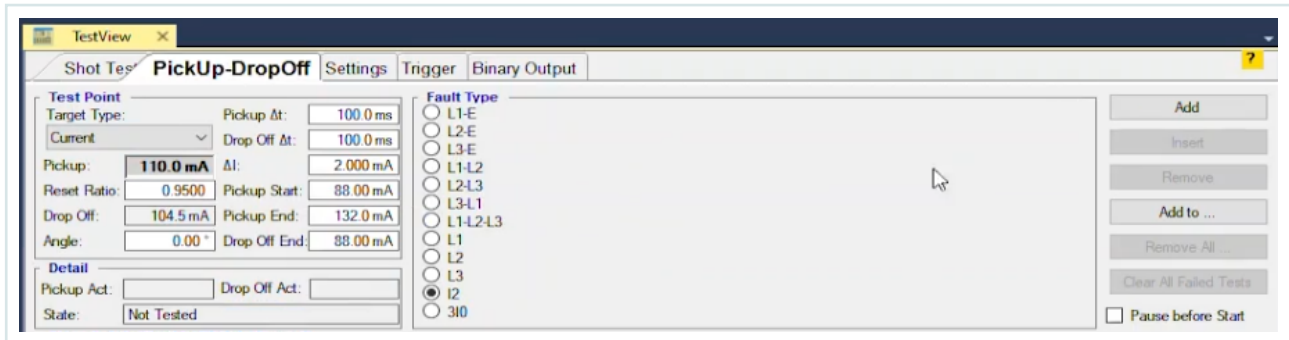


Figure 24

In the next step, the current adjustment value for the pickup is placed on $0.1 \times 1.1 = 0.11$ amps.



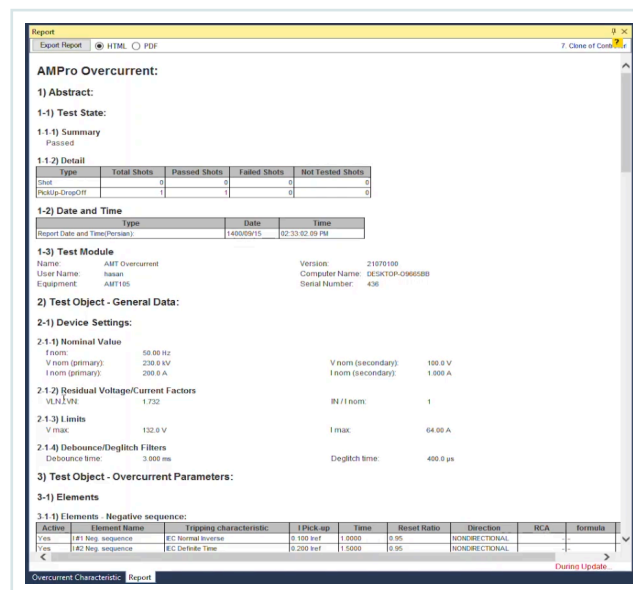
The screenshot shows the 'TestView' application window with the 'PickUp-DropOff' tab selected. The 'Test Point' section on the left contains the following settings:

- Target Type: Current
- Pickup: 110.0 mA
- Reset Ratio: 0.9500
- Drop Off: 104.5 mA
- Angle: 0.00 °
- Pickup Δt: 100.0 ms
- Drop Off Δt: 100.0 ms
- ΔI: 2.000 mA
- Pickup Start: 88.00 mA
- Pickup End: 132.0 mA
- Drop Off End: 88.00 mA
- Detail: Pickup Act: , Drop Off Act: , State: Not Tested

The 'Fault Type' section on the right shows a list of fault types with radio buttons. The 'I2' option is selected. On the far right, there are buttons for 'Add', 'Insert', 'Remove', 'Add to ...', 'Remove All ...', 'Clear All Failed Tests', and a checkbox for 'Pause before Start'.

Figure 25

By adding this point, it is enough to perform the test and add the necessary elements to the report when it is finished.



The screenshot shows the 'Report' window with the 'HTML' tab selected. The report content is as follows:

AMPro Overcurrent:

1) Abstract:

1-1) Test State:

1-1-1) Summary

Passed

1-1-2) Detail

Type	Total Shots	Passed Shots	Failed Shots	Not Tested Shots
Shot	0	0	0	0
PickUp-DropOff	1	1	0	0

1-2) Date and Time

Type	Date	Time
Report Date and Time(Person)	14000915	02:33:02 PM

1-3) Test Module

Name	Version
AMT Overcurrent	21070100

User Name	Computer Name
Isaan	DESKTOP-0985580

Equipment	Serial Number
AMT195	436

2) Test Object - General Data:

2-1) Device Settings:

2-1-1) Nominal Value

Item	Value
f nom	50.00 Hz
V nom (primary)	230.0 kV
I nom (primary)	200.0 A
V nom (secondary)	100.0 V
I nom (secondary)	1.000 A

2-1-2) Residual Voltage/Current Factors

Item	Value
V/L1-V/L2	1.732
BL / I nom	1

2-1-3) Limits

Item	Value
V max	132.0 V
I max	64.00 A

2-1-4) Debounce/Degitch Filters

Item	Value
Debounce time	3.000 ms
Degitch time	400.0 μs

3) Test Object - Overcurrent Parameters:

3-1) Elements

3-1-1) Elements - Negative sequence:

Active	Element Name	Tripping characteristic	I Pickup	Time	Reset Ratio	Direction	NCA	Formula
Yes	I#1 Neg. sequence	EC Normal Inverse	0.100 ref	1.0000	0.95	NONDIRECTIONAL	-	-
Yes	I#2 Neg. sequence	EC Definite Time	0.200 ref	1.5000	0.95	NONDIRECTIONAL	-	-

Overcurrent Characteristic Report

Figure 26

[jg1]Directional_overcurrent_protection_test