



VEBKO ONLINE HELP

Directional Overcurrent Protection Test in AMR Relay (Simple Test Using Templates)

Category	tester
Section	Testing of relays protection functions
Language	English
Generated	2026-10-18

1 Imported Content

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.

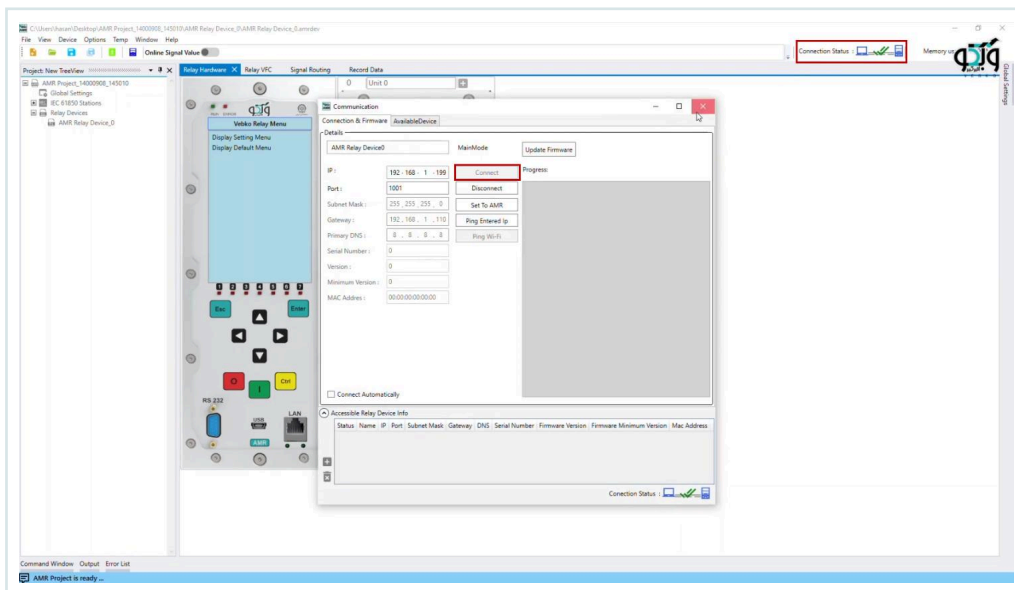


Figure 1

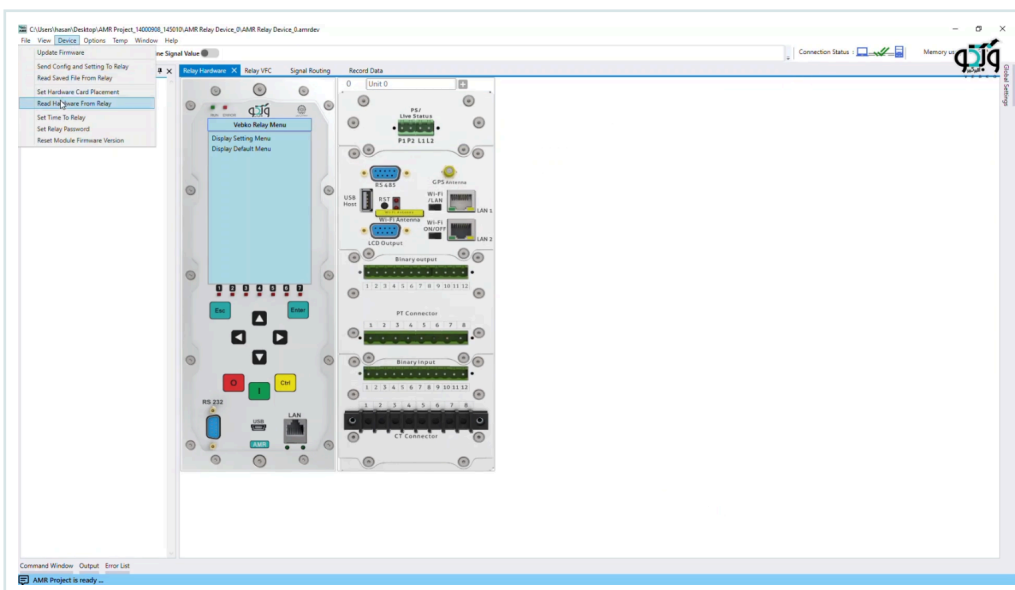


Figure 2

The default password is 123456 in order to receive elements.

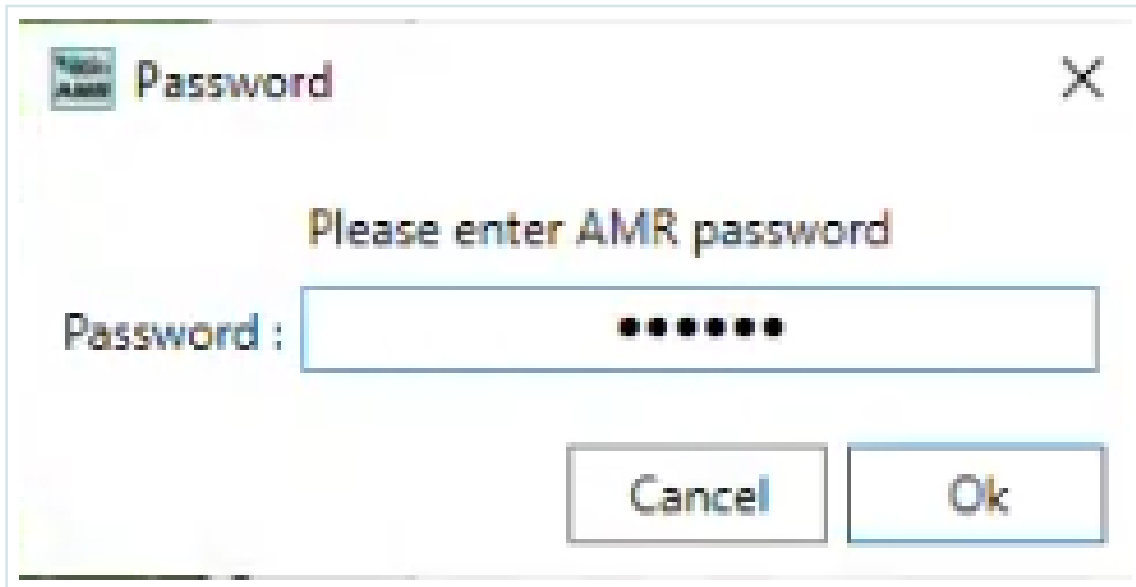


Figure 3

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.

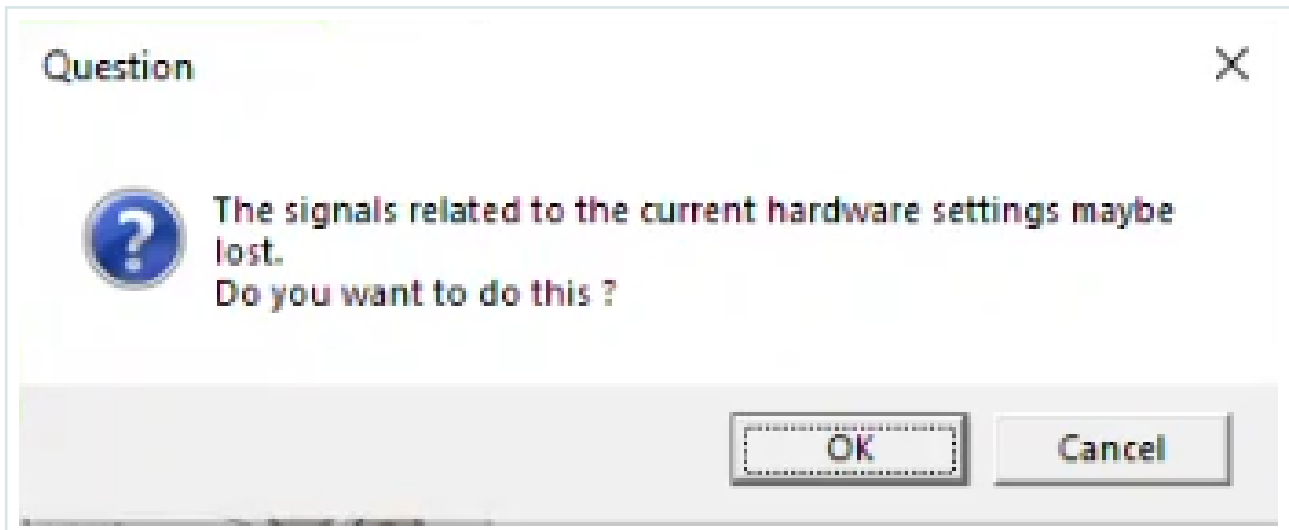


Figure 4

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

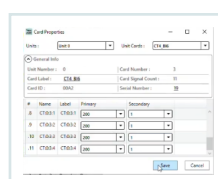


Figure 5

(First, enter the VFC page): As mentioned earlier in the AMR software, configuring some of the most widely used functions as examples are placed in the software and 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.

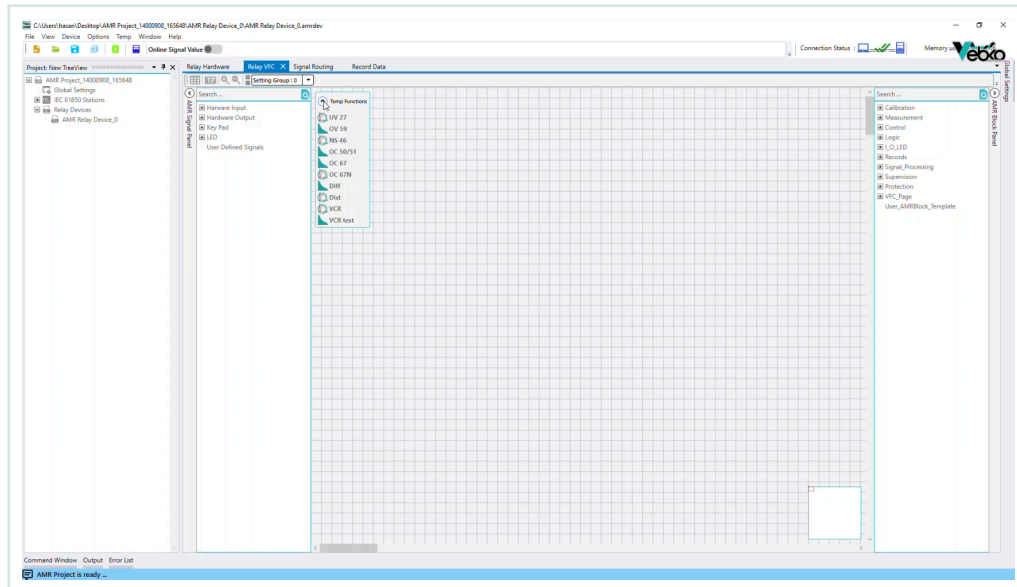


Figure 6

Here the directional overcurrent function displayed with the name OC 67 is selected. In Configuring, this function uses an OC Inverse block and two OC Definite blocks that have different settings and the signals of a current card are assigned to their input (from a measuring point). Finally, output signals are assigned to Binary Outputs and relay LEDs by Output and LED blocks.

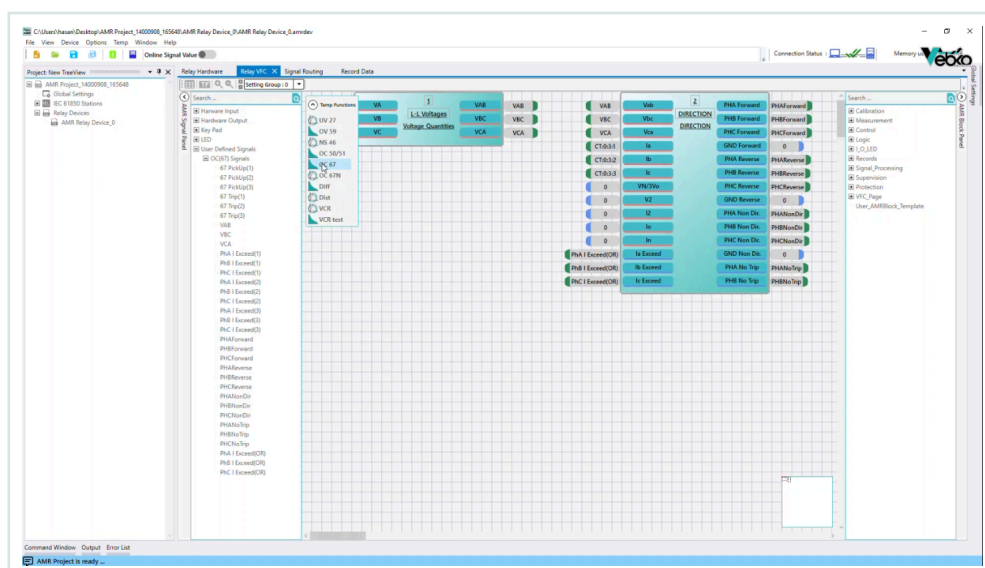


Figure 7

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

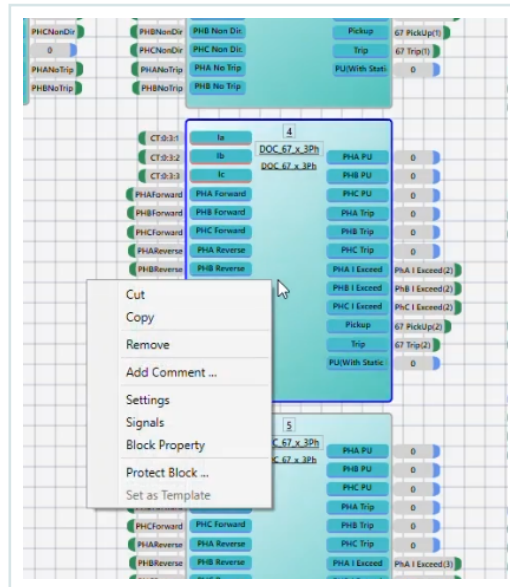


Figure 8

Finally, the changes are sent to the relay.

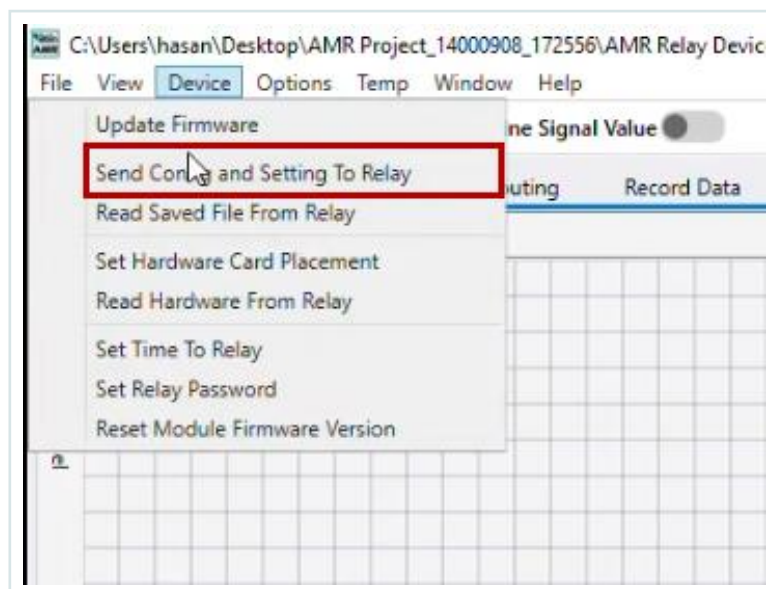


Figure 9

In this video, by double-clicking on blocks that contain constant time stages for the directional overcurrent function, disables them



Figure 10

and define the 1A and TMS current settings equal to 0.1 by double-clicking on the first stage, which is defined as reverse time. By double-clicking on the Direction block, the elements related to the directional function include rotation angle and ground polarization.

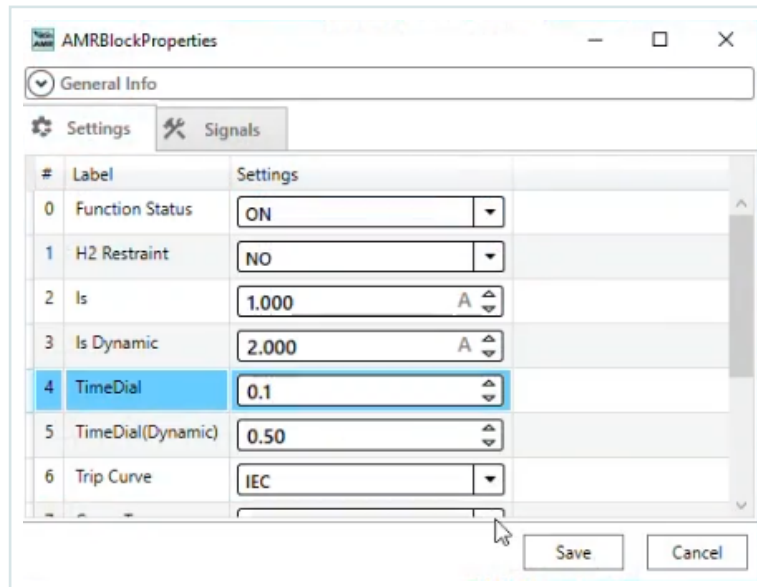


Figure 11

After this, the changes will be sent to the relay by selecting send config and setting to relay option.

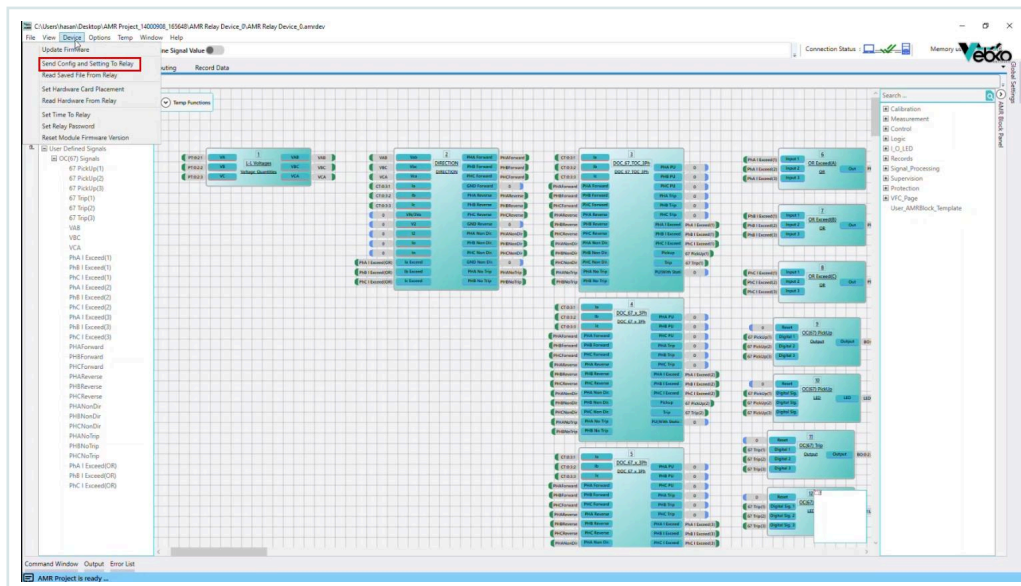


Figure 12

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

information.

Keep in mind that it is also possible to test this function using the Xrio file. Here, the current setting value is equal to 1 amp, TMS is 0.1.

In the overcurrent test, it is required to set two parameters maximum torque angle and sector operation. To do this from the Overcurrent window and the Relay Parameters tab, the directional option is selected

and from the Element tab, the Directional section is placed on forward. Then enter under the Define Element Directional Behavior tab and the maximum torque angle and Sector operation parameters are equal to -45 and 172 degrees, respectively.

In directional overcurrent relays, In order to better performance of relay, in orientation and reaching the MTA value ,the rotation of the reference voltage angle is used.. The performance area or forward area in this relay is set from -131 degrees to +41 degrees.

In order to investigate the directional overcurrent function, in addition to the time of operation and current, the angle of performance should also be investigated. For this purpose, performance time tests are performed along with amplitude and phase tests.

In the time test, the accuracy of the performance time is investigated and in the amplitude and phase test, the detection and evaluation of the accuracy of the actual current and the actual angle of the performance threshold and reset threshold are considered.

Cross Polarized method is used in AMR Vebko relay, i.e. using healthy phases to detect fault direction. For example, in case of faults in phase A, the relay uses VBC reference voltage and IA current to detect the fault current direction. The Forward or Reverse area means the part where the relay must detect the fault will be determined by the start angle and end angle.

Test Test

In order to test the DOC function, three states are considered. The first state for 500 milliseconds, normal conditions this means that it will inject a nominal voltage with zero current.

In the second state, the fault conditions are applied and the current is selected for all phases of L1E-L2E-L3E in the range of 2 to 4 times the nominal current. The duration of this state should be greater than the nominal time of the relay trip.

The third state will also be activated as post-Fault with zero voltage and current for 500 milliseconds. In order to see better performance of the function, from the View menu, the Detail View window opens.

After adding double points and four times the regulatory current at the best possible angle in terms of performance of the function i.e. -45 degrees for the L1E-L2E-L3E fault types, a point in the No Trip area (here at an angle of 135 degrees) is tested.

Due to the nature of the two-phase fault, the currents in this fault will have a phase difference of 180 degrees so that the 3I0 current is not created and the 67N function is not activated.

Pickup-Drop off Test

In order to perform the Pickup-Drop off test, you can also use a relay or LED contact and even a setting change to instantaneous the function.

For this purpose, three states are needed for example in the first state, the normal network conditions, applied, in the second state the pickup test and in the third state the drop-off test is performed. In the second state, for pickup and drop-off test of angle, the current value will be twice the regulatory current. these states are performed in the Overcurrent room automatically by entering the settings by the user.

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, the Imin value is set to 1.1 Iref.

In the next step, the current adjustment value for the pickup test of the current value is placed on $1.1 \times 1 = 1.1$ amps. This test is performed at the best possible angle in terms of relay performance i.e. -45 degrees.

After the current pick up-drop off, it is time to Pick up-drop off on the angle. For this purpose, as mentioned above, the current value is applied twice as much as the regulatory current, and once the trend is performed for the upper limit of the angle, i.e. 41 degrees, and once for the lower limit of the angle, i.e. -131 degrees.

By adding the necessary tests and performing, you can finally add favorites items to the report.

[\[jg1\]Directional_Overcurrent](#)

© 2021 Vebko. All rights reserved.

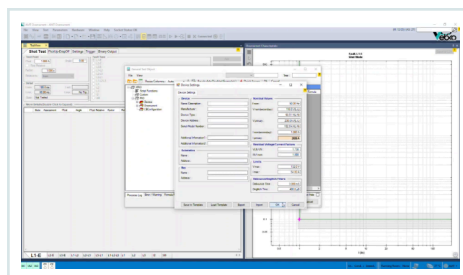


Figure 13

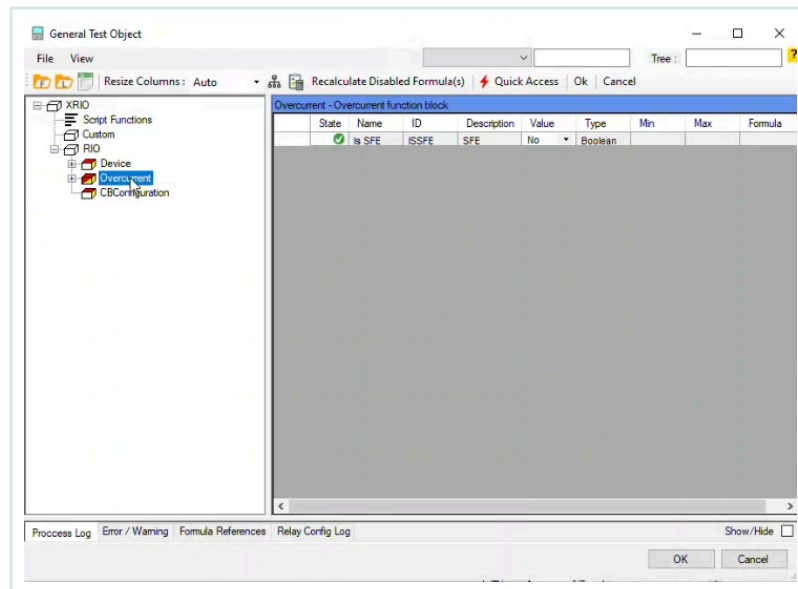


Figure 14

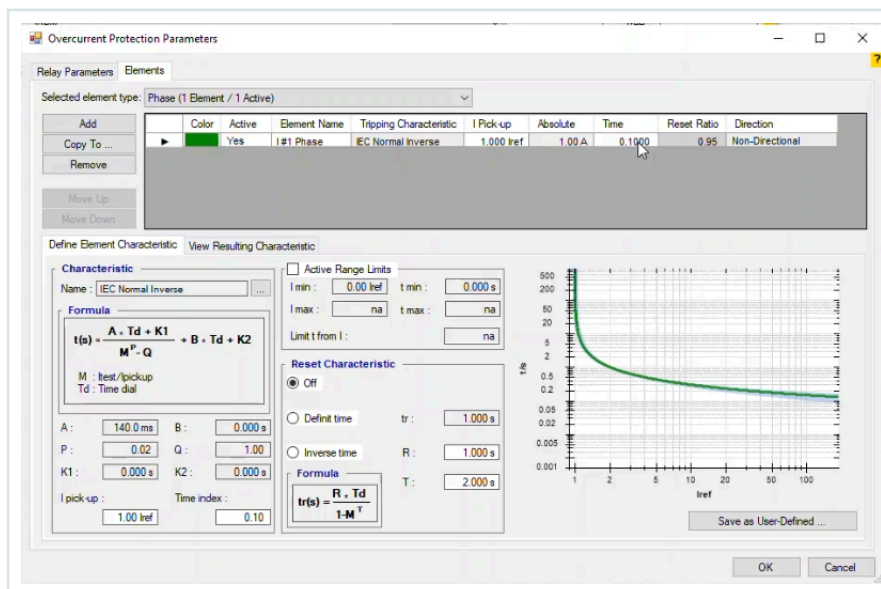


Figure 15

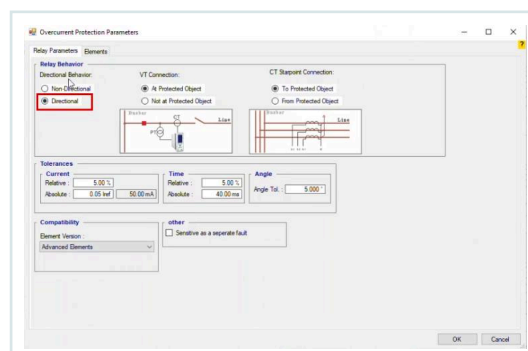


Figure 16

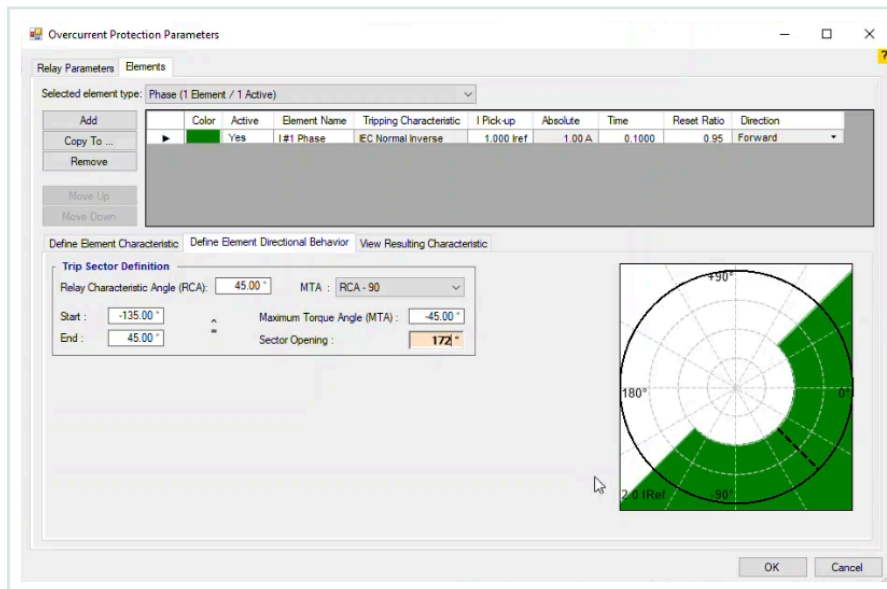


Figure 17

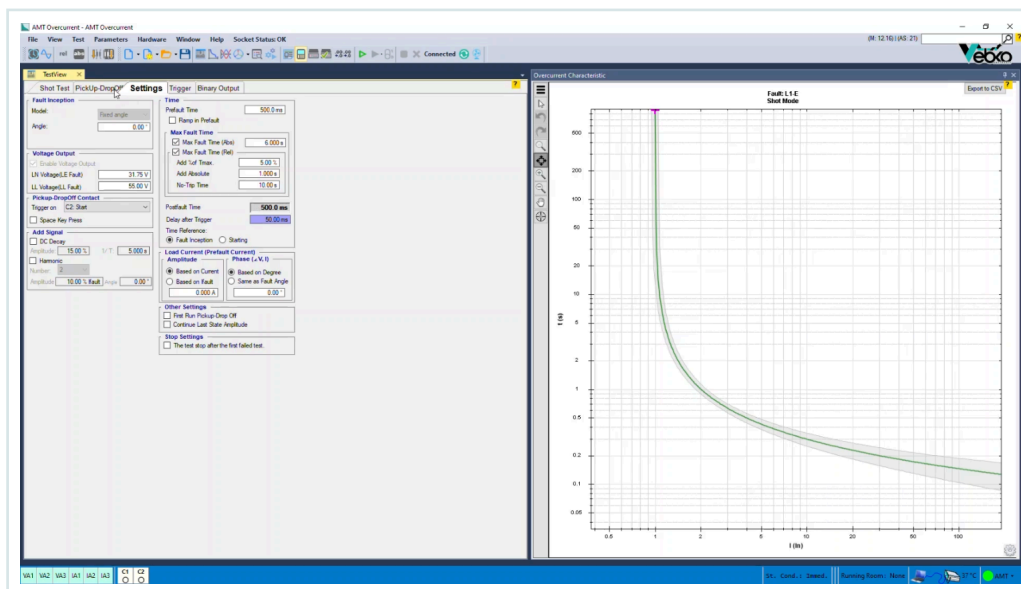


Figure 18

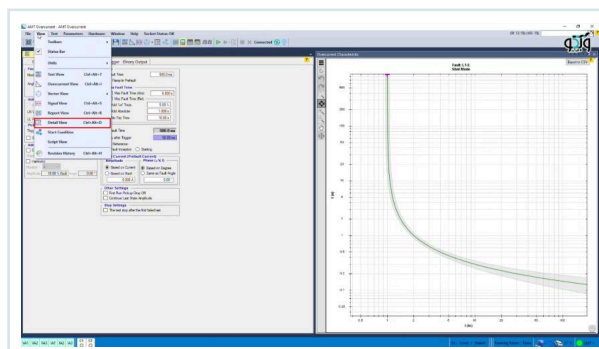


Figure 19

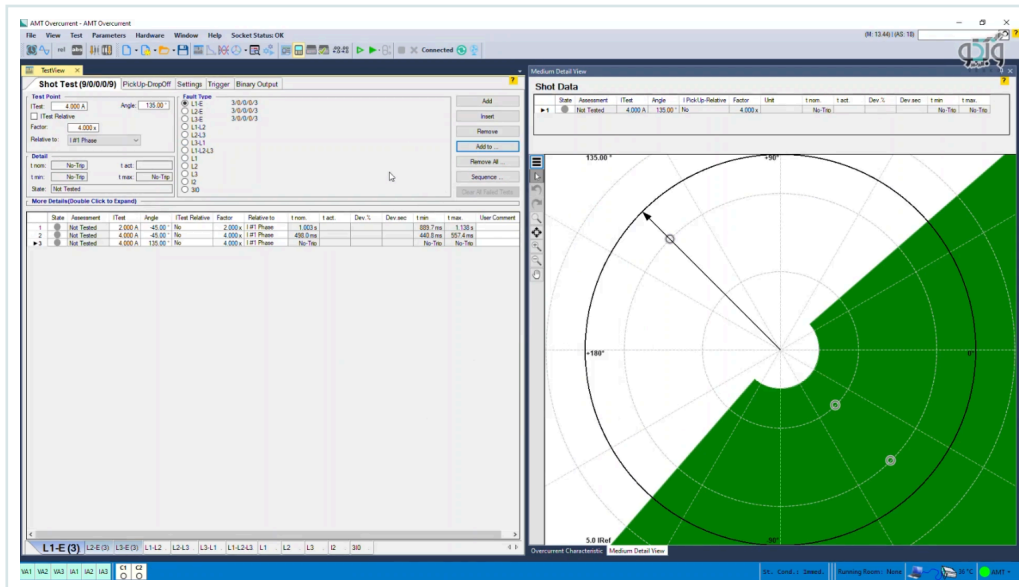


Figure 20

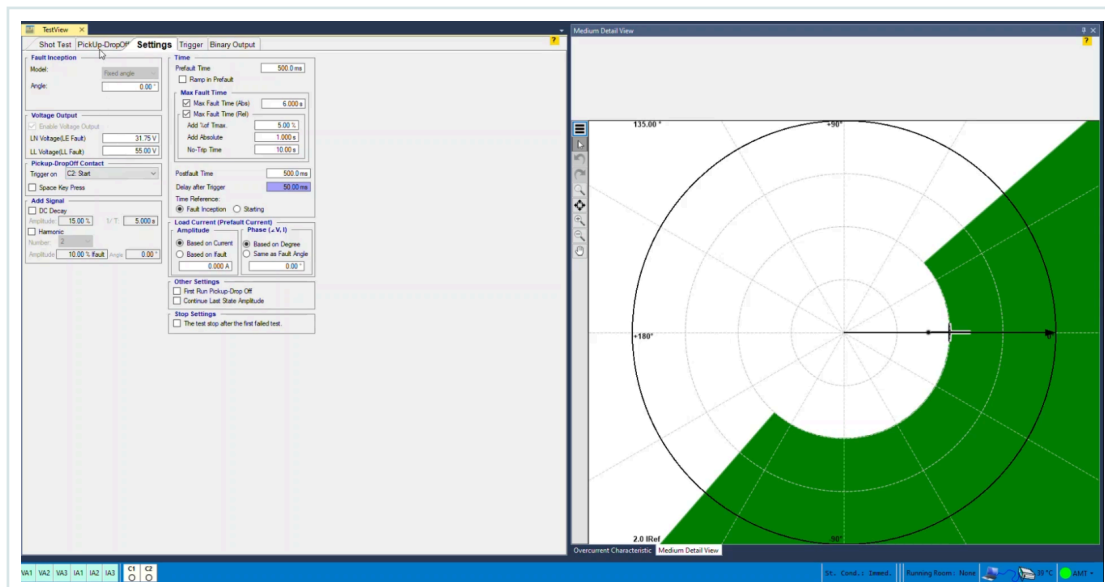


Figure 21

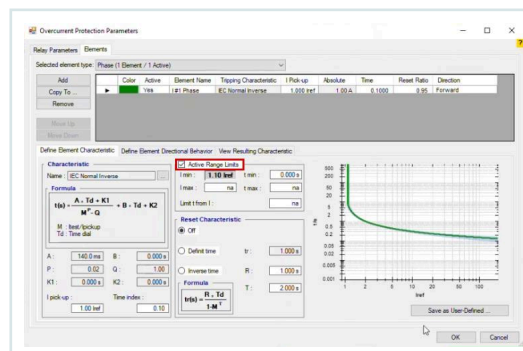


Figure 22

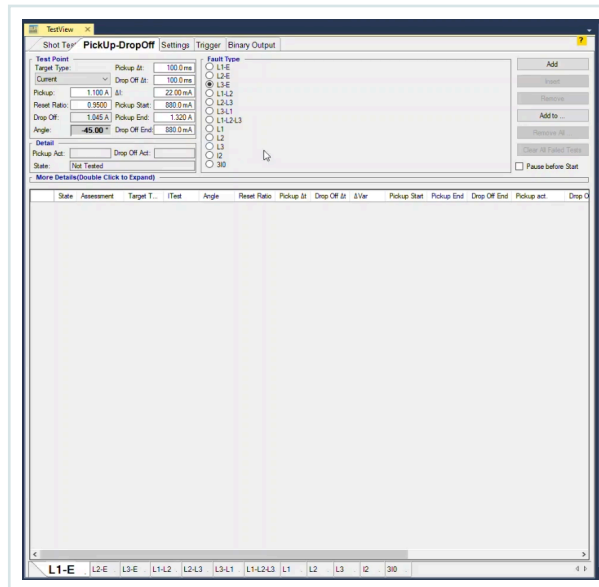


Figure 23

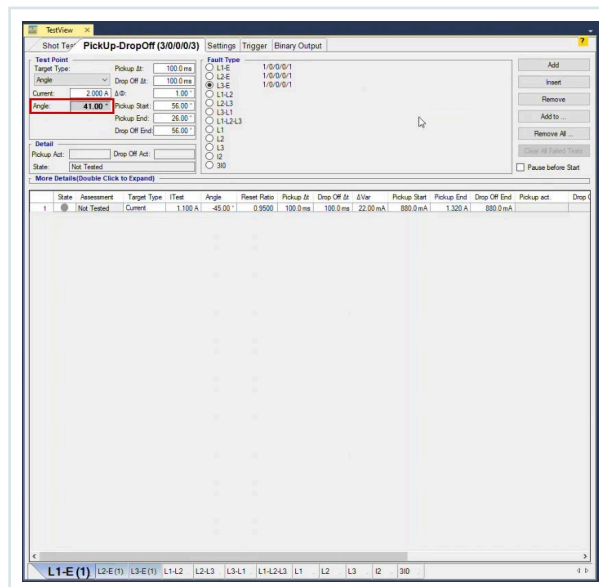


Figure 24

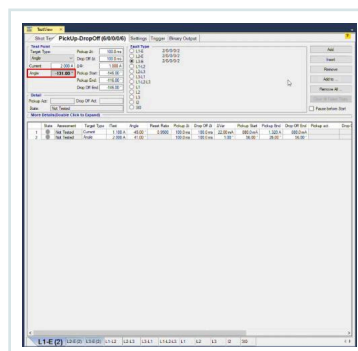


Figure 25

Report

Report

HTML

PDF

PostUp: On/Off

s

s

s

s

7: Close of Conf.

1-2) Date and Time

Type	Date	Time
Start Date and Time (Trace)	14/05/2018	05:07:56.81 PM
Start Date and Time (Operation)	20/11/2018	05:07:56.81 PM
End Date and Time (Trace)	14/05/2018	05:09:04.00 PM
End Date and Time (Operation)	20/11/2018	05:09:04.00 PM
Time Elapsed (Operation)		00:01:07
Report Date and Time (Trace)	14/05/2018	05:09:35.44 PM
Report Date and Time (Operation)	20/11/2018	05:09:35.44 PM

1-3) Location

Longitude: 0°

Latitude: 0°

1-4) Test Module

Name: AMT Overcurrent

User Name: Hasan

Equipment: AMT100

Version: 21870100

Computer Name: DESKTOP-Q98858B

Serial Number: 488

2) Test Object - General Data:

2-1) Device Settings:

2-1-1) Nominal Value

f nom:	50.00 Hz	V nom (secondary):	110.0 V
V nom (primary):	230.0 kV	I nom (secondary):	1.000 A
I nom (primary):	200.0 A		

2-1-2) Residual Voltage/Current Factors

VLN / VLN	1.732	IN / I nom:	1
-----------	-------	-------------	---

2-1-3) Limits

V max:	132.0 V	I max:	64.00 A
--------	---------	--------	---------

2-1-4) Debounce/Deadtime Filters

Debounce time:	0.000 ms	Deadtime time:	400.0 µs
----------------	----------	----------------	----------

2-2) Other RIO Functions

Description	Name	Value
CB trip time	CB trip time	50.00 ms
CB close time	CB close time	150.0 ms
CB lock %	CB lock %	10.00 %

3) Test Object - Overcurrent Parameters:

3-1) Elements

3-1-1) Elements - Phase:

<

>

During Update

Figure 26