



VEBKO ONLINE HELP

Overvoltage 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.

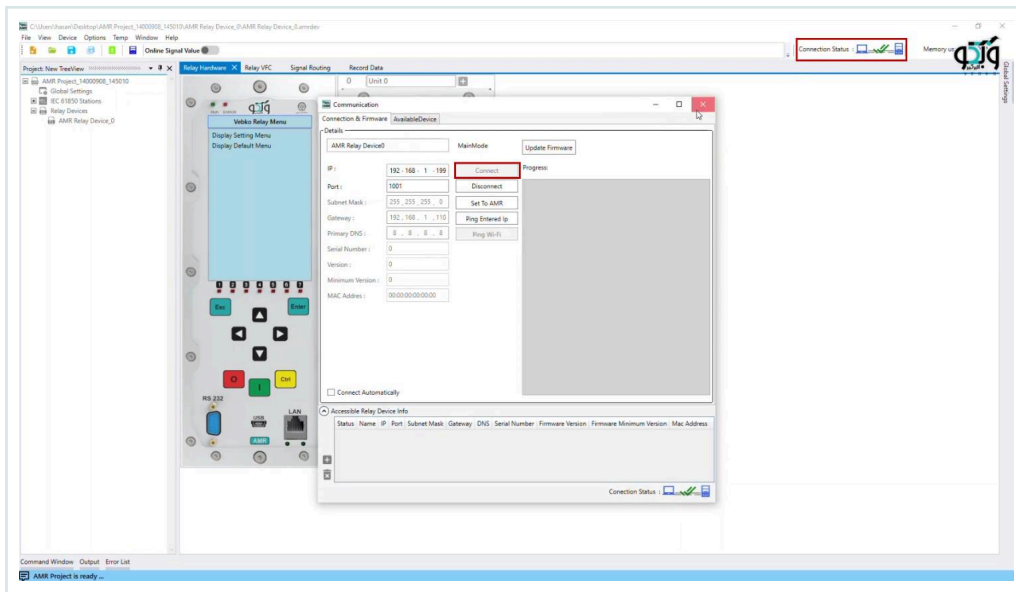


Figure 1

The default password is 123456 to receive elements.

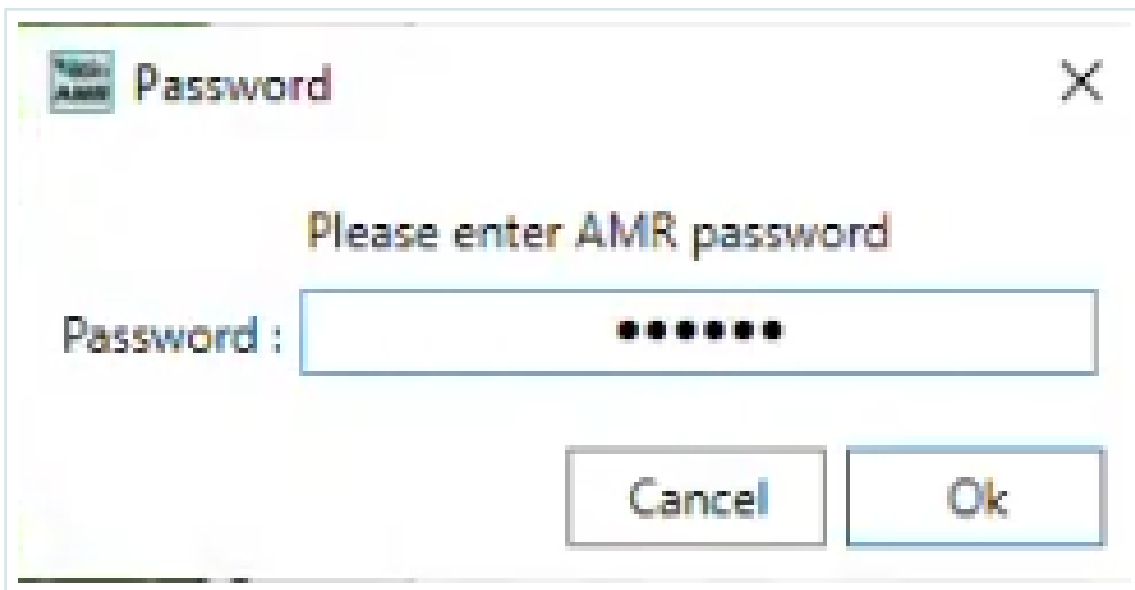


Figure 2

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.

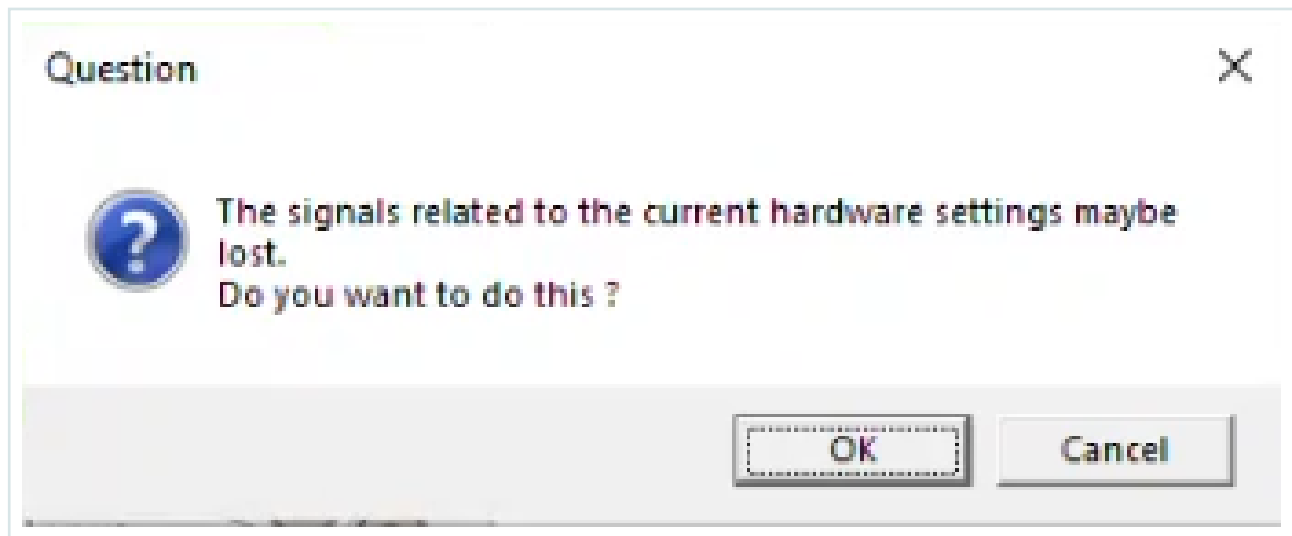


Figure 3

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 the current card conversion is 200A to 1A and the voltage card conversion ratio is 63,000 to 100V.

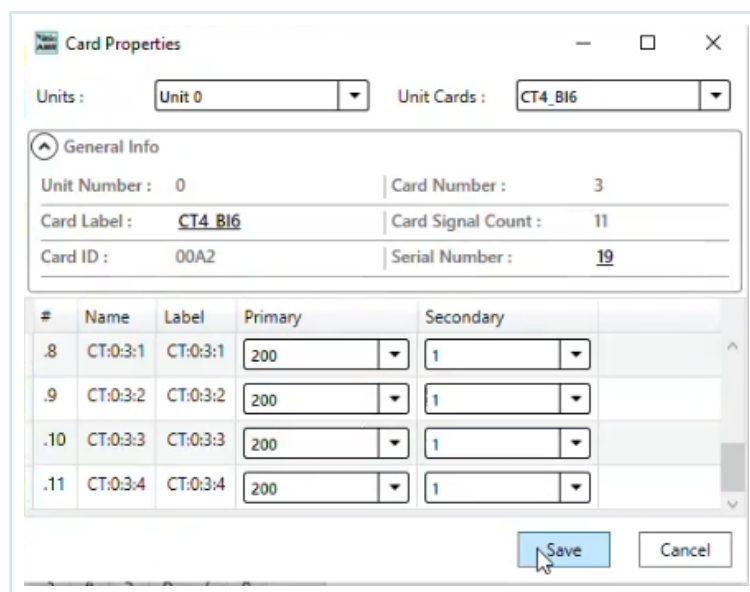


Figure 4

(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.

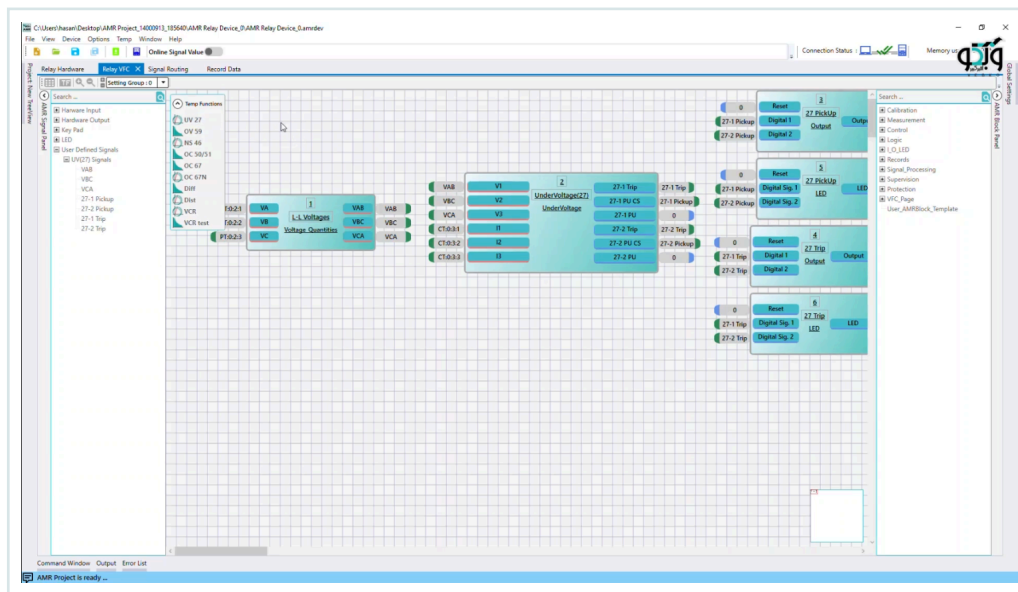


Figure 5

Here the overvoltage function displayed with the name OV 59 is selected. In the config of this function, to calculate the line-by-line voltages, First the relay voltage card signals are assigned to the Voltage Quantities block inputs and then assigned to the Overvoltage block. Finally, overvoltage output signals are assigned to Binary Output and relay LEDs by Output and LED blocks. Since the purpose is to test the overvoltage function with OR logic, analog signals related to the voltage sample must be applied directly to the overvoltage block to increase the voltage of each phase, the relay function should occur.

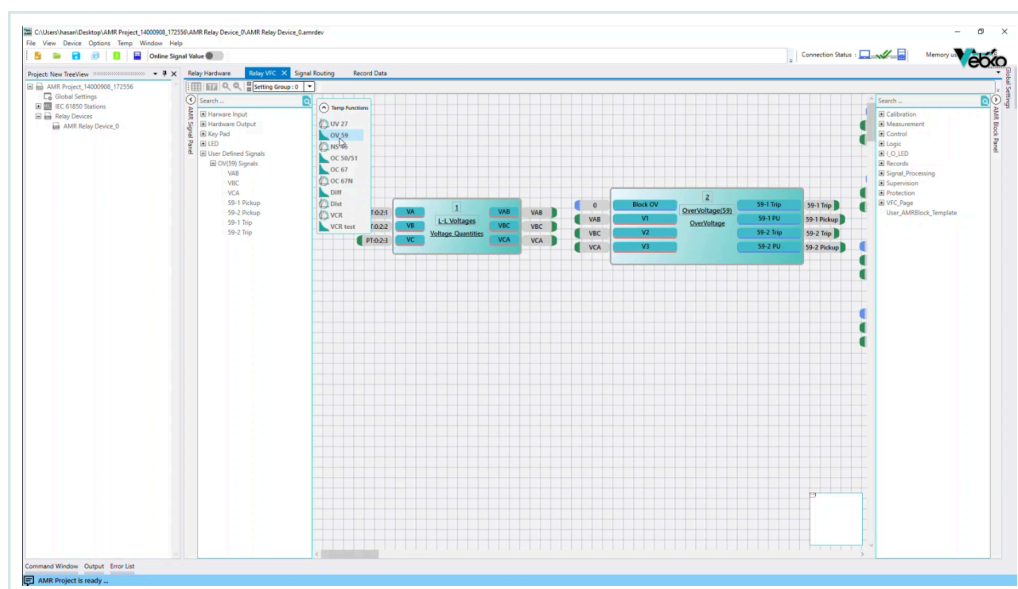
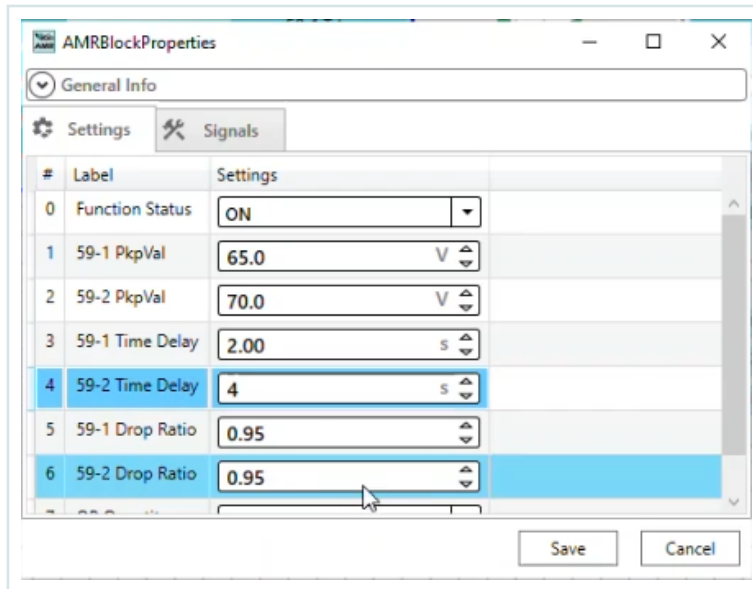


Figure 6

By double-clicking the Overvoltage block, two stages will be defined here. The first stage with a 65V set, performance time of 2 seconds and a second stage with a 70V set and a performance time of 4

seconds.



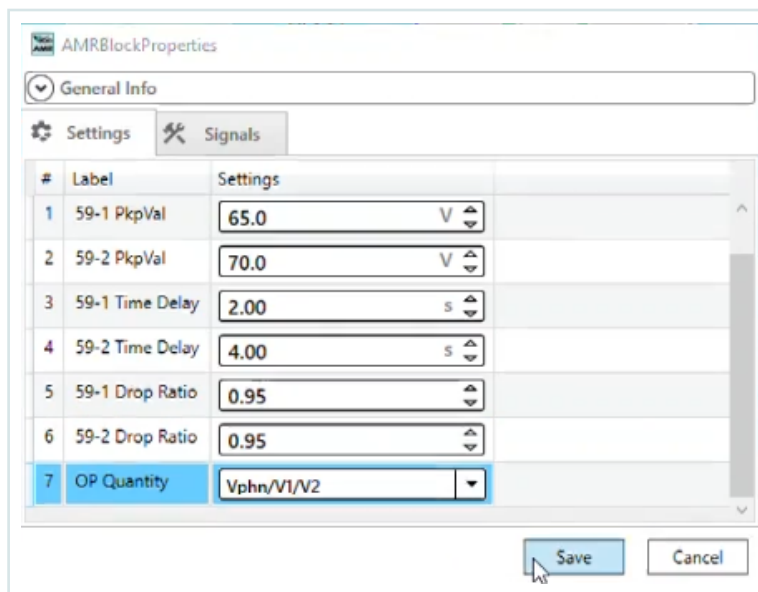
The AMRBlockProperties dialog box is shown with the 'Settings' tab selected. The 'General Info' section is expanded. The settings table is as follows:

#	Label	Settings
0	Function Status	ON
1	59-1 PkpVal	65.0 V
2	59-2 PkpVal	70.0 V
3	59-1 Time Delay	2.00 s
4	59-2 Time Delay	4 s
5	59-1 Drop Ratio	0.95
6	59-2 Drop Ratio	0.95

The 'Save' and 'Cancel' buttons are at the bottom right.

Figure 7

In addition, Operation Quantity is placed on Vphn/V1/V2 to include single-phase performance.



The AMRBlockProperties dialog box is shown with the 'Settings' tab selected. The 'General Info' section is expanded. The settings table is as follows:

#	Label	Settings
1	59-1 PkpVal	65.0 V
2	59-2 PkpVal	70.0 V
3	59-1 Time Delay	2.00 s
4	59-2 Time Delay	4.00 s
5	59-1 Drop Ratio	0.95
6	59-2 Drop Ratio	0.95
7	OP Quantity	Vphn/V1/V2

The 'Save' and 'Cancel' buttons are at the bottom right.

Figure 8

Finally, the changes are sent to the relay.

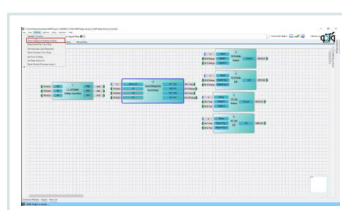


Figure 9

In the next step, by running AMPro software and opening the AMT Under/Over Voltage Test, simply go to the Object Parameters test section and enter the basic information. Testing this function can also be performed in AMT sequencer room, but in order to make the states and test management more comfortable, this process is performed in the AMT Under/Over Voltage Test.

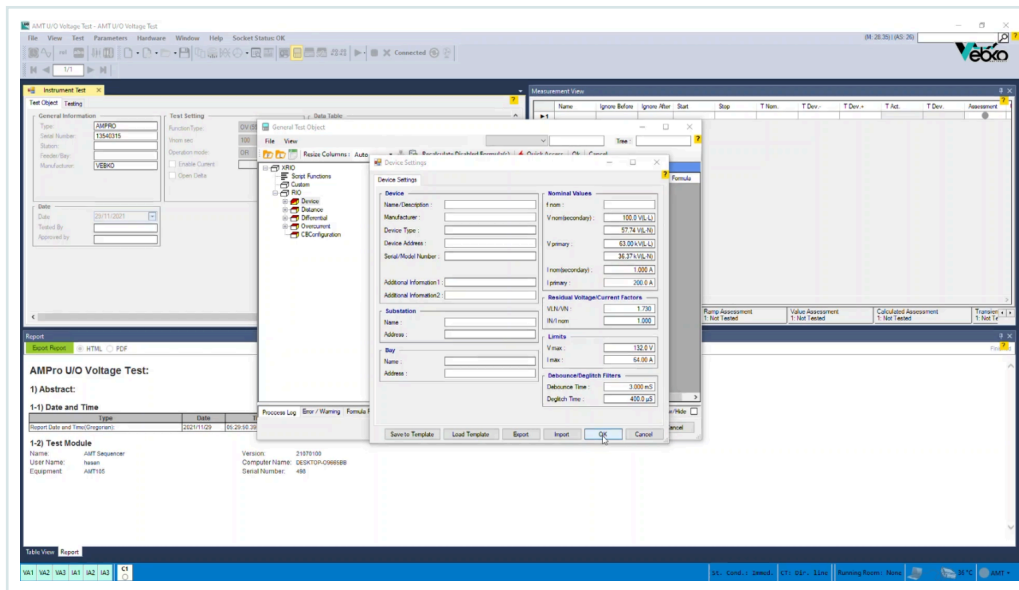


Figure 10

Firstly, the information is entered in the General Information section. This information can include relay type, serial number and other information such as post name and feeder/b number.

In the Test Setting section, the OV (59) option is selected. Here Vnom sec, 100 volts is selected. Also, the performance mode is located on the OR logic to increase the voltage of each phase from the specified value to provide the test.

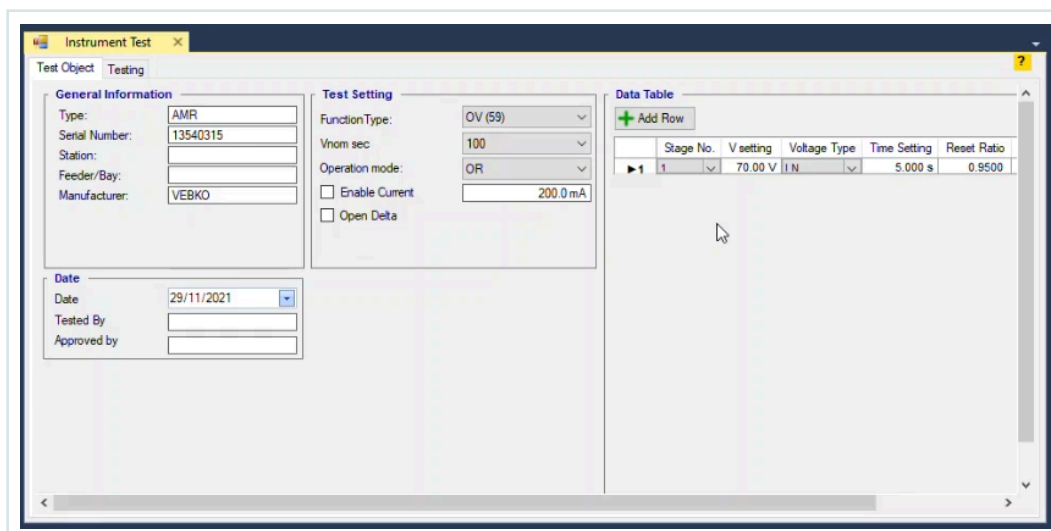
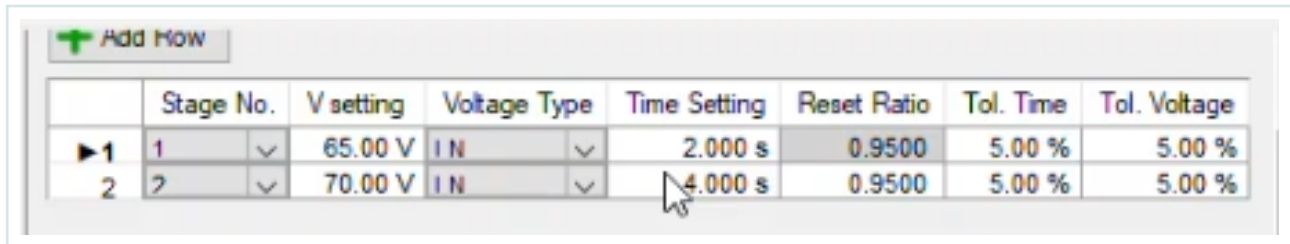


Figure 11

In order to evaluate the performance of overvoltage protection, two time tests (Trip time) and Voltage Performance Test (pickup/drop-off) are performed.

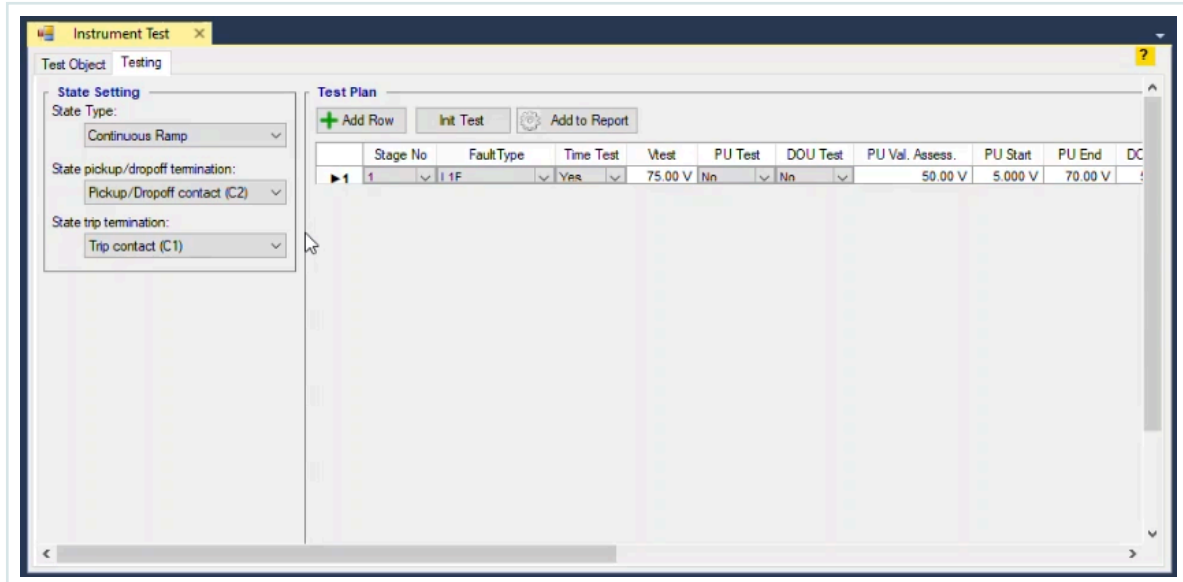
Assuming two performance stages for overvoltage protection, regulatory voltage value, voltage type, performance time and more are entered in the Data Table section for both stages of operation.



	Stage No.	V setting	Voltage Type	Time Setting	Reset Ratio	Tol. Time	Tol. Voltage
► 1	1	65.00 V	I N	2.000 s	0.9500	5.00 %	5.00 %
2	2	70.00 V	I N	4.000 s	0.9500	5.00 %	5.00 %

Figure 12

After this, to be more accurate in testing, continuous ramp option is selected in state setting section; then C1 and C2 contacts are considered for trip diagnosis and pickup/drop-off, respectively. The status of the relay pickup can be recorded with LED in addition to contact, or even adjusting to instantaneous over-voltage protection.



State Setting
State Type:
Continuous Ramp
State pickup/dropoff termination:
Pickup/Dropoff contact (C2)
State trip termination:
Trip contact (C1)

Test Plan
+ Add Row Int Test Add to Report

Stage No	Fault Type	Time Test	Vtest	PU Test	DOU Test	PU Val. Assess.	PU Start	PU End	DC
► 1	1 1F	Yes	75.00 V	Nn	Nn	50.00 V	5.000 V	70.00 V	

Figure 13

By entering the necessary settings in the Test Plan section, schedule the test in a way that both time test and voltage performance testing are performed. In fault type, by selecting L1E, L2E and L3E, states are created to test the function based on the voltage increase of each phase independently. By enabling Time Test, the state related to the performance time check is created. Vtest is the voltage value at which the performance of the function in each stage is guaranteed. By selecting yes for PU

Test and DOU Test elements, it will be confirmed to perform pickup drop-off tests. In the PU Val. Assessment section, the evaluation of the pickup value of the function, in the PU Start section, the initial voltage of the pickup process, in the PU end section, the final voltage limit for the pickup test, and in the DOU End section, the final value for the drop-off test is entered. In the Total section, the total duration of the test is entered.

	Stage No	Fault Type	Time Test	Vtest	PU Test	DOU Test	PU Val. Assess.	PU Start	PU End	DOU End	Total
► 1	1	11F 12F 13F	Yes	70.00 V	Yes	Yes	65.00 V	60.00 V	80.00 V	60.00 V	10.00 s
2	2	11F 12F 13F	Yes	75.00 V	Yes	Yes	70.00 V	65.00 V	80.00 V	65.00 V	10.00 s

Figure 14

By Clicking on the Init Test option, states are created based on user-imported settings. These states can be seen in the Table View window. This way, the test can be performed to evaluate the necessary items.

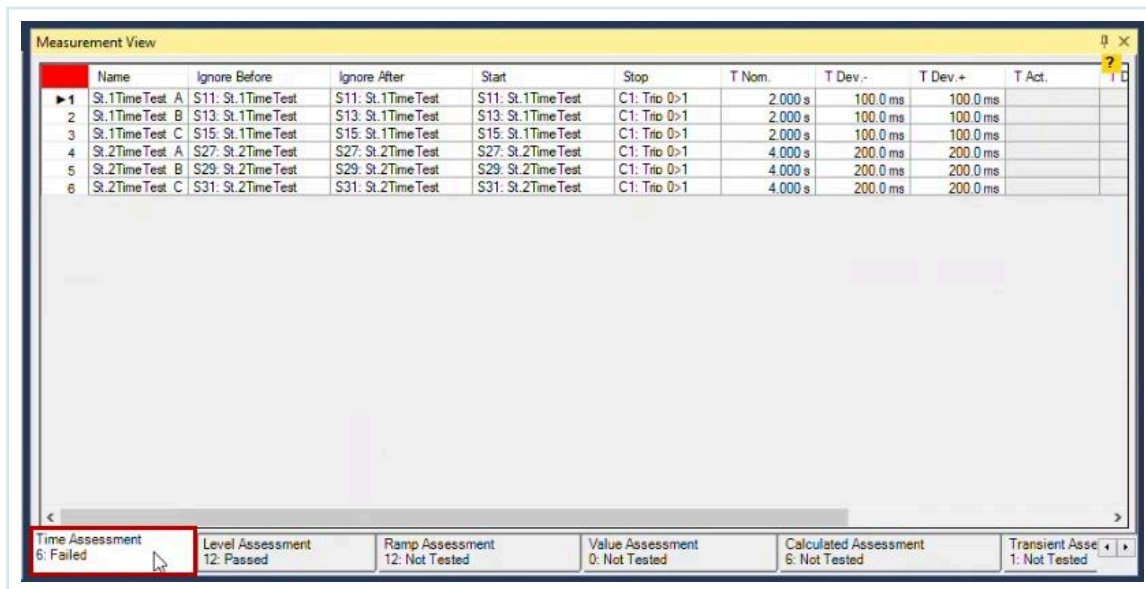
[illegible]

Figure 15

In the Measurement View section, in Assessment ramp, the assessment of the pickup drop-off can be seen. In the Time Assessment tab, the performance time assessments of each stage can be observed.

[illegible]

Figure 16

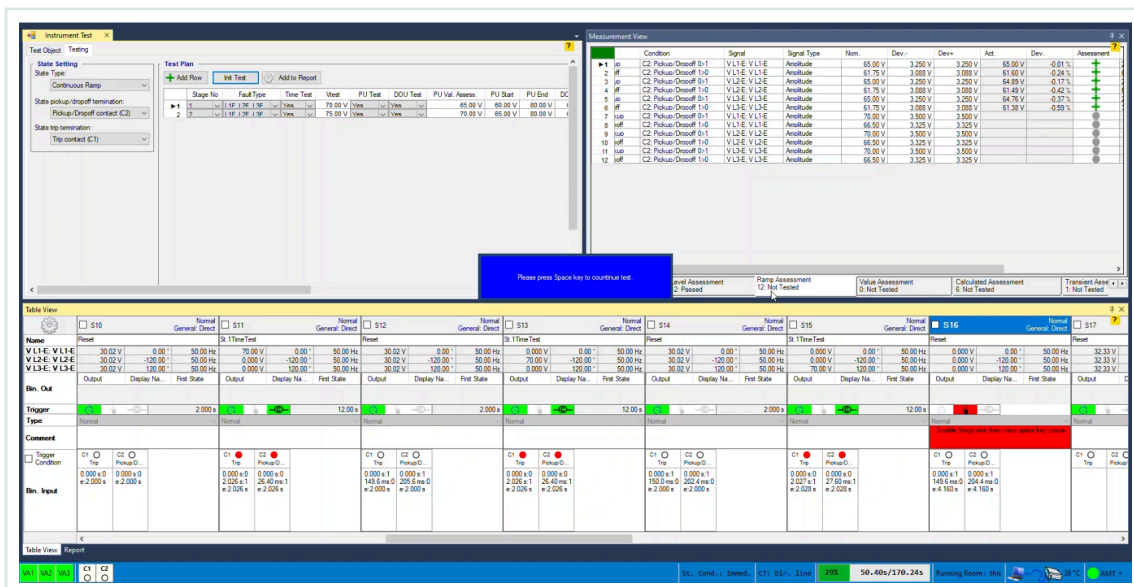


	Name	Ignore Before	Ignore After	Start	Stop	T Nom.	T Dev. -	T Dev. +	T Act.
1	St.1TimeTest A	S11: St.1TimeTest	S11: St.1TimeTest	S11: St.1TimeTest	C1: Trio 0>1	2,000 s	100.0 ms	100.0 ms	
2	St.1TimeTest B	S13: St.1TimeTest	S13: St.1TimeTest	S13: St.1TimeTest	C1: Trio 0>1	2,000 s	100.0 ms	100.0 ms	
3	St.1TimeTest C	S15: St.1TimeTest	S15: St.1TimeTest	S15: St.1TimeTest	C1: Trio 0>1	2,000 s	100.0 ms	100.0 ms	
4	St.2TimeTest A	S27: St.2TimeTest	S27: St.2TimeTest	S27: St.2TimeTest	C1: Trio 0>1	4,000 s	200.0 ms	200.0 ms	
5	St.2TimeTest B	S29: St.2TimeTest	S29: St.2TimeTest	S29: St.2TimeTest	C1: Trio 0>1	4,000 s	200.0 ms	200.0 ms	
6	St.2TimeTest C	S31: St.2TimeTest	S31: St.2TimeTest	S31: St.2TimeTest	C1: Trio 0>1	4,000 s	200.0 ms	200.0 ms	

Time Assessment 6: Failed | Level Assessment 12: Passed | Ramp Assessment 12: Not Tested | Value Assessment 0: Not Tested | Calculated Assessment 6: Not Tested | Transient Assessment 1: Not Tested

Figure 17

Keep in mind that when the test reaches the second stage assessment section, a message has appeared to tell the user to disable the first stage in order to provide the conditions for non-interference.



Please press Space key to continue test

Table View	S10	S11	S12	S13	S14	S15	S16	S17
Name	Reset	St.1TimeTest	Reset	St.1TimeTest	Reset	St.1TimeTest	Reset	St.1TimeTest
V1E: V1E	30.02 V	0.00 V	30.02 V	0.00 V	30.02 V	0.00 V	30.02 V	0.00 V
V2E: V2E	30.02 V	0.00 V	30.02 V	0.00 V	30.02 V	0.00 V	30.02 V	0.00 V
V3E: V3E	30.02 V	0.00 V	30.02 V	0.00 V	30.02 V	0.00 V	30.02 V	0.00 V
Bin. Out	Output	Display No.	Output	Display No.	Output	Display No.	Output	Display No.
Trigger	Normal	2,000 s	Normal	12,00 s	Normal	2,000 s	Normal	12,00 s
Type	Normal	2,000 s	Normal	12,00 s	Normal	2,000 s	Normal	12,00 s
Comment								
Bin. Input	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s	C1: 0.000 ± 0.000 s e=2.000 s

Figure 18

This can be done by removing elements related to the first stage from the blocks associated with pickup and trip. Another solution is to equalize the setting of two stages. For this purpose, once again refer to AMR software, set the first stage equal to the second stage settings and the settings are sent to the relay.

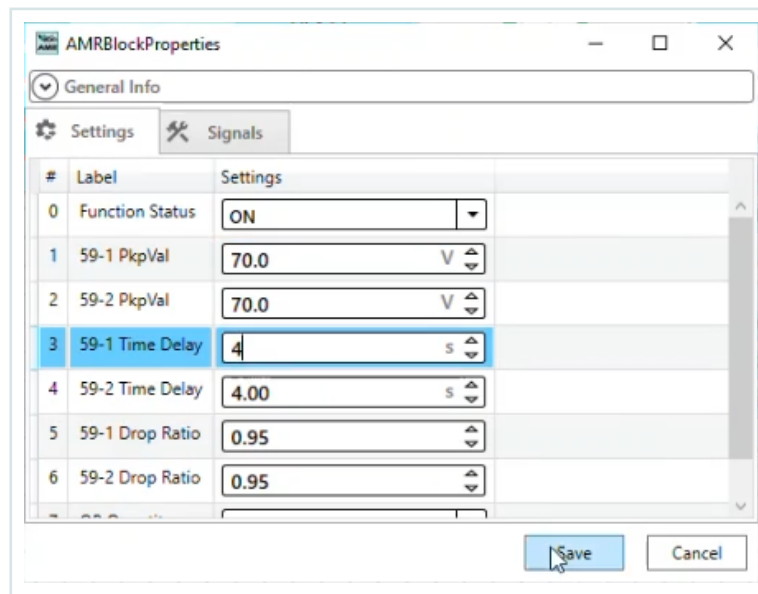


Figure 19

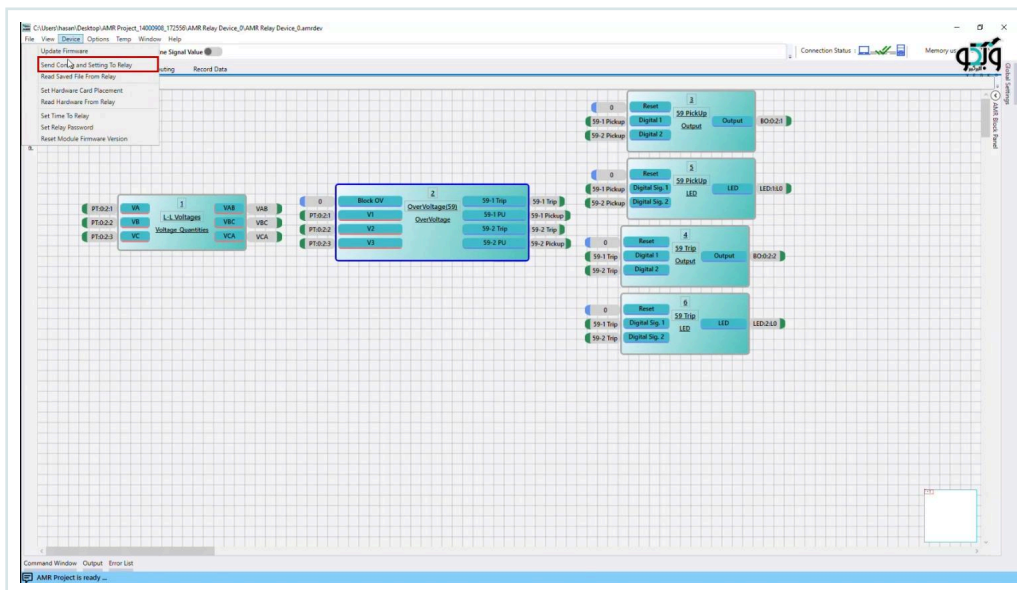


Figure 20

In the end, the results are added to the report by clicking on the Add to Report option. The results are visible in the Report window.

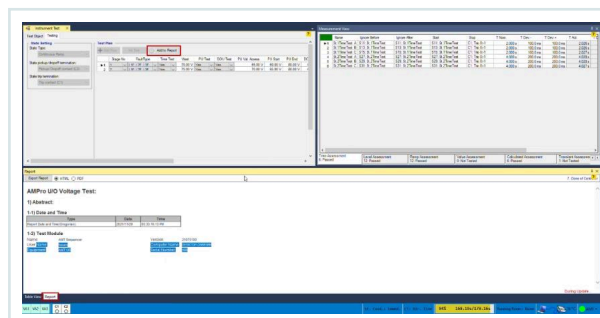


Figure 21

[jg1]Over_Voltage_protection_test_in_AMR_relay