



VEBKO ONLINE HELP

AMT Ar Room

Category	tester
Section	AMT AR Room
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Various studies have shown that around 70 to 90 percent of the faults in overhead power lines are transient. At lower-level voltages such as distribution, there are fewer and about 80 percent transient faults while in higher-level voltages such as transmission, this value is about 90 percent.

Thunder is one of the most common reasons for a fault to occur. The swinging of the wires or short-circuit of the grid with sundry objects is another cause for the occurrence of transient faults. Most faults can be solved by correctly using the trip process or reconnection so that the grid disconnection time reaches a minimum. To test any type of reclosers, its exclusive room which is AMT AR can be used.

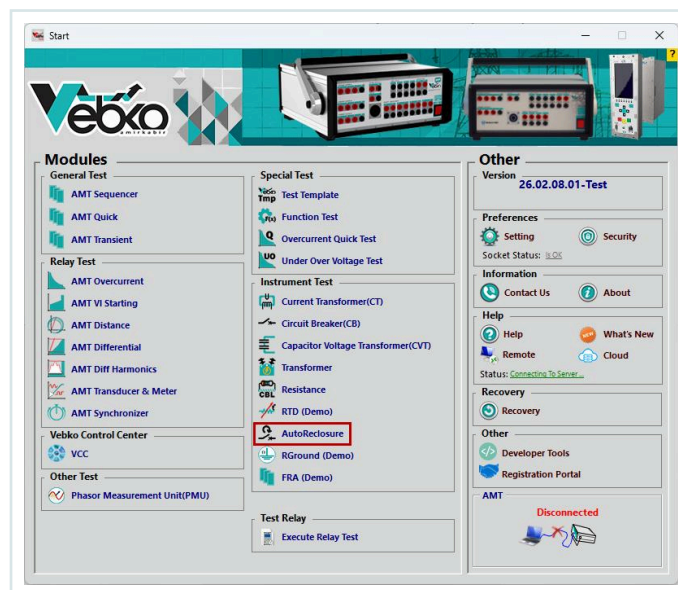


Figure 1

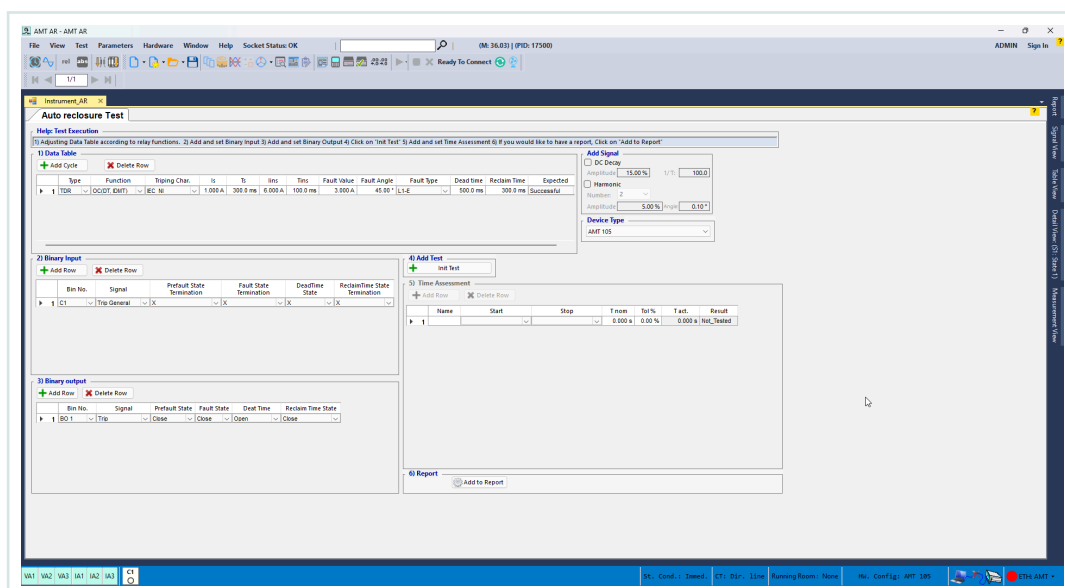


Figure 2

The main window of this room is Instrument AR. Also, it is possible to access other windows from the View menu or the bar on the right side of this page. To begin the test, first, the user needs to insert the functions that need the reconnection process to be examined for them into the Data Table. Therefore, it is possible to examine and assess the action or inaction of the AR for different functions.

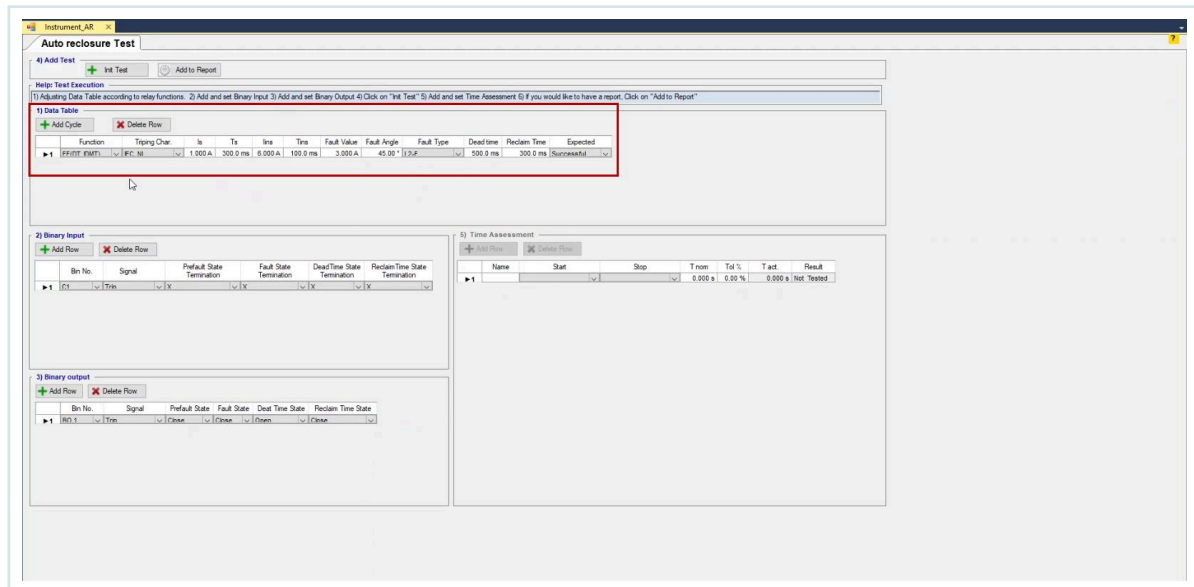


Figure 3

By clicking on “Add Cycle”, the next rows are added so that the reconnection is examined after the selected functions.

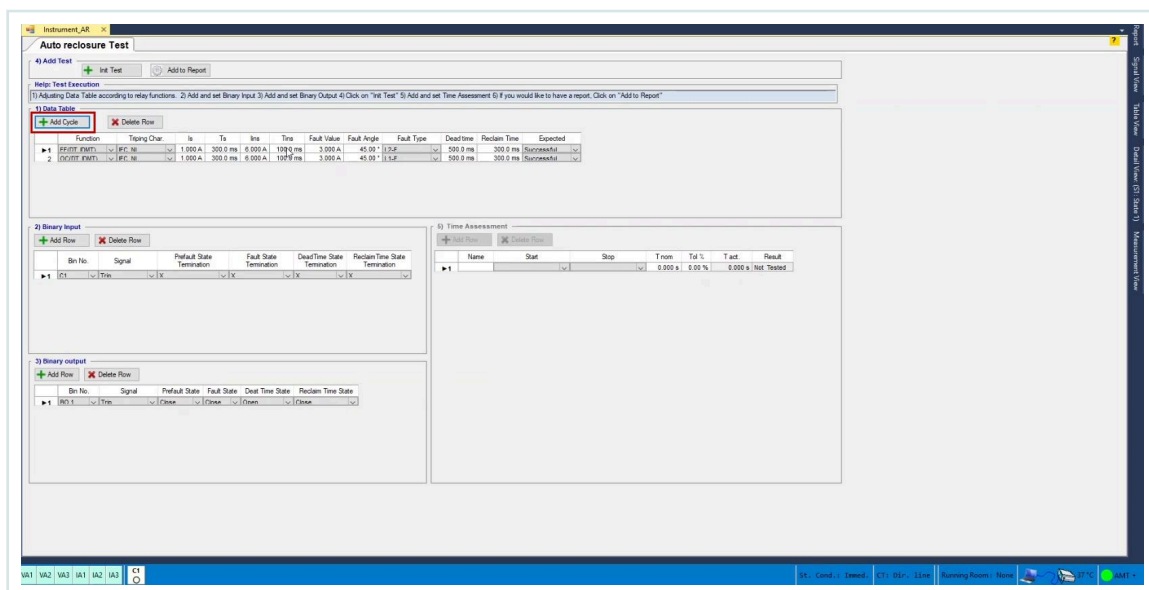


Figure 4

After selecting the title of the function, the user only needs to enter the performance characteristic

and its settings for the delay and instantaneous units. After that, the amount of the injected current and the fault angle are entered so that the time duration for different states is determined in accordance with the selected Curve.

Function	Taping Char	Is	Ts	Irs	Time	Fault Value	Fault Angle	Fault Type	Dead Time	Reclaim Time	Expected
1	FFFFF.FFFFF	1.000 A	300.0 ms	0.000 A	100.0 ms	3.000 A	45.00°	3.000 A	100.0 ms	300.0 ms	Successful
2	FFFFF.FFFFF	1.000 A	300.0 ms	0.000 A	100.0 ms	3.000 A	45.00°	3.000 A	100.0 ms	300.0 ms	Successful

Figure 5

Dead Time and Reclaim Time are two other options that are used to speed up making the states.

Function	Taping Char	Is	Ts	Irs	Time	Fault Value	Fault Angle	Fault Type	Dead Time	Reclaim Time	Expected
1	FFFFF.FFFFF	1.000 A	300.0 ms	0.000 A	100.0 ms	3.000 A	45.00°	3.000 A	100.0 ms	300.0 ms	Successful
2	FFFFF.FFFFF	1.000 A	300.0 ms	0.000 A	100.0 ms	3.000 A	45.00°	3.000 A	100.0 ms	300.0 ms	Successful

Figure 6

Finally, in the Expected section, the user needs to specify their expectation from the success or failure of the recloser after the action of the specified function.



Figure 7

In the next step, the user needs to specify the necessary Binary Inputs and Binary Outputs in accordance with the elements required for the recloser test. It should be noted that for the convenience of the users, the important signals are available in the drop-down list by default.

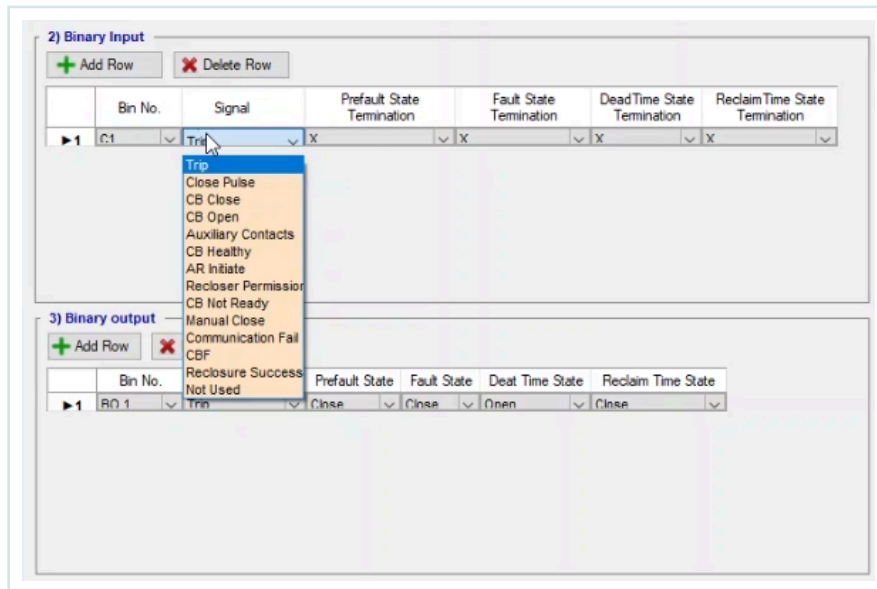


Figure 8

In this section, by selecting Add Row and Delete Row options, it is possible to add a row to add the binaries and delete the selected row, respectively.

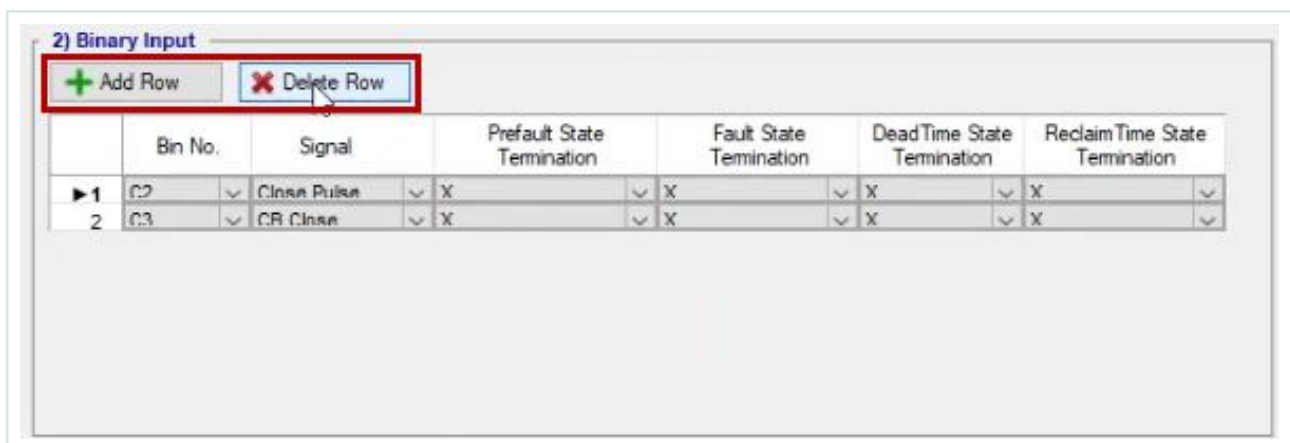


Figure 9

Considering the two types of the reclose test including laboratory testing (simulation of the binary of the outputs by the test device and receiving the binaries by the device) and testing in power stations (receiving binary of the inputs by the device and presence of the binary outputs through the wiring post), some of the titles are common between the two lists of inputs and outputs.

After selecting the number of the binary input and signal, it is possible to specify its influence on the current states including PreFault, Fault, Dearthime and Reclaim time. In other words, the condition for ending every state is determined by the binary inputs.

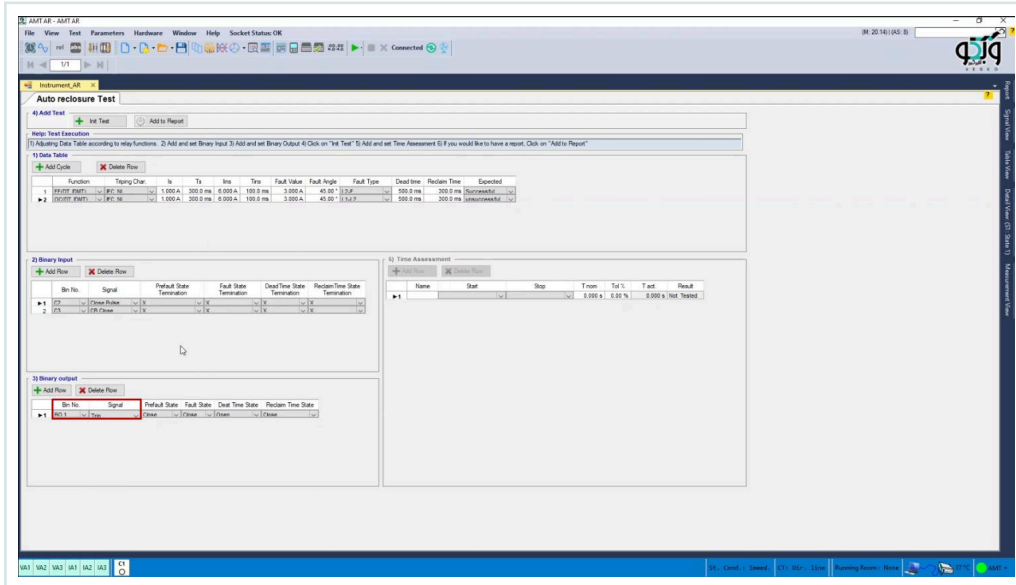


Figure 10

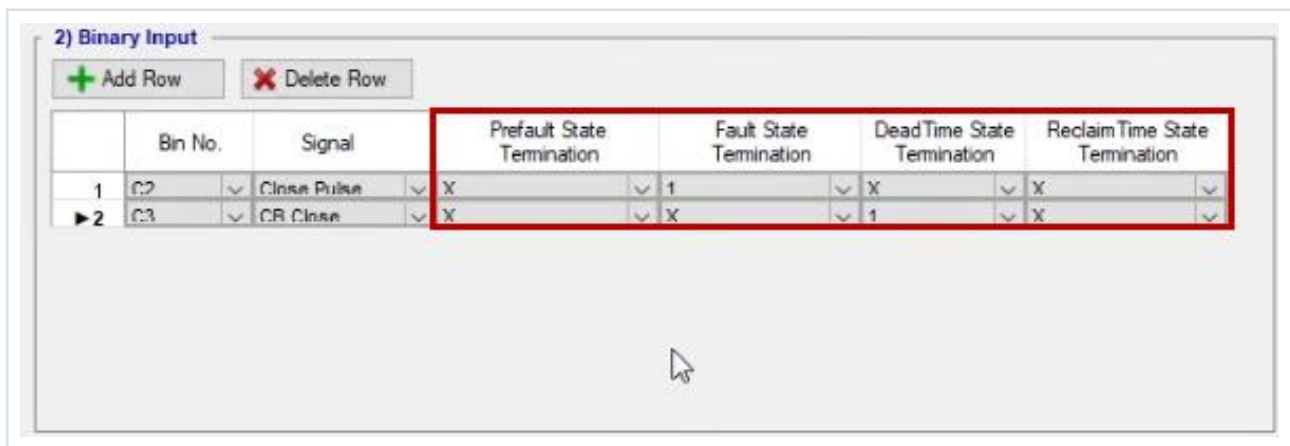


Figure 11

In the next step, after selecting the number of the binary output and its signal, the user only needs to specify its condition for every state. This is most useful in cases where, for example, signals such as CB Ready or Close and Open are needed and testing the relay in the laboratory is intended.

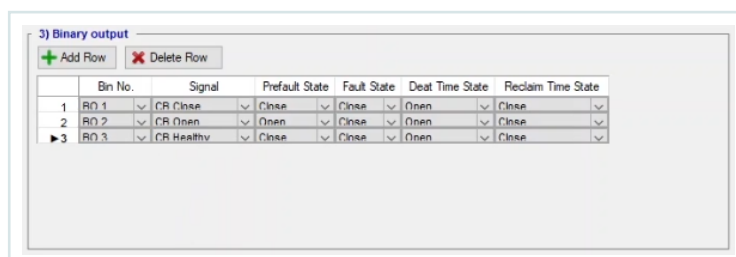


Figure 12

After adjusting the settings, by clicking on Init Test option, the states are created. These states can be viewed from Table View section. Also, it is possible to compare the different settings and elements of every state with more details in Detail View section.

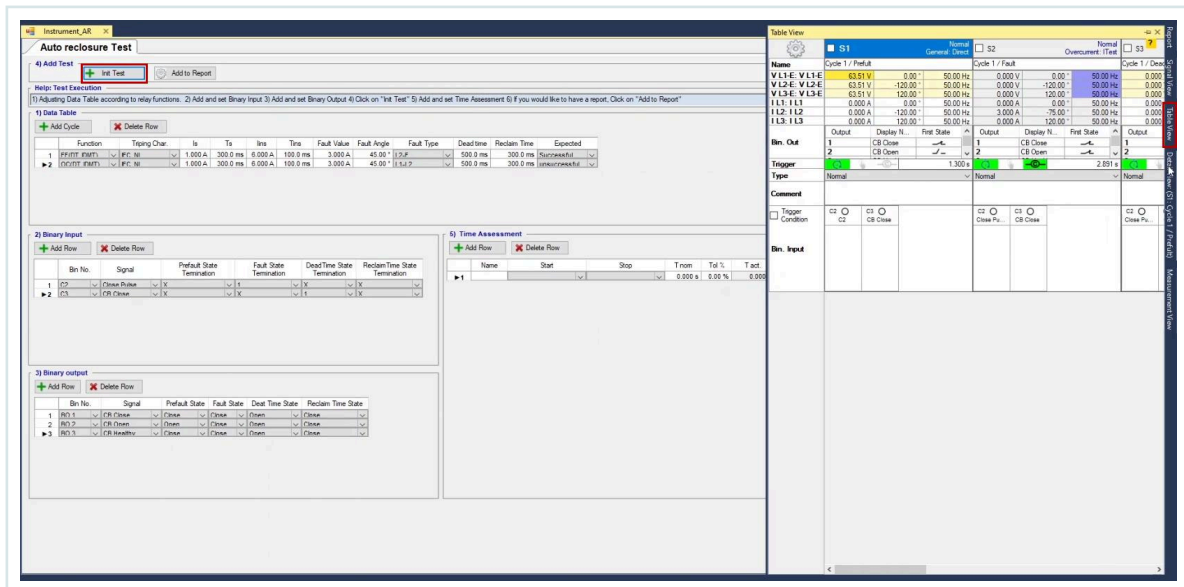


Figure 13

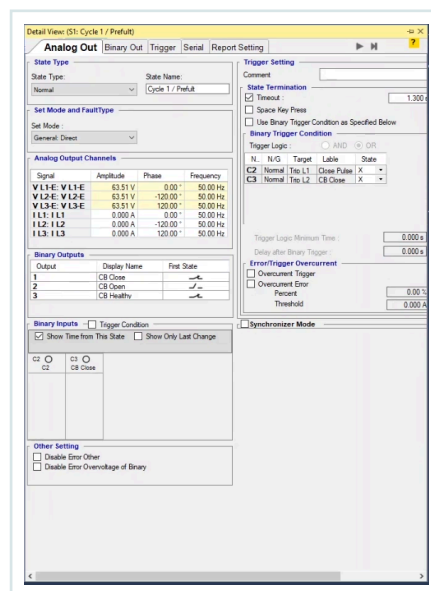
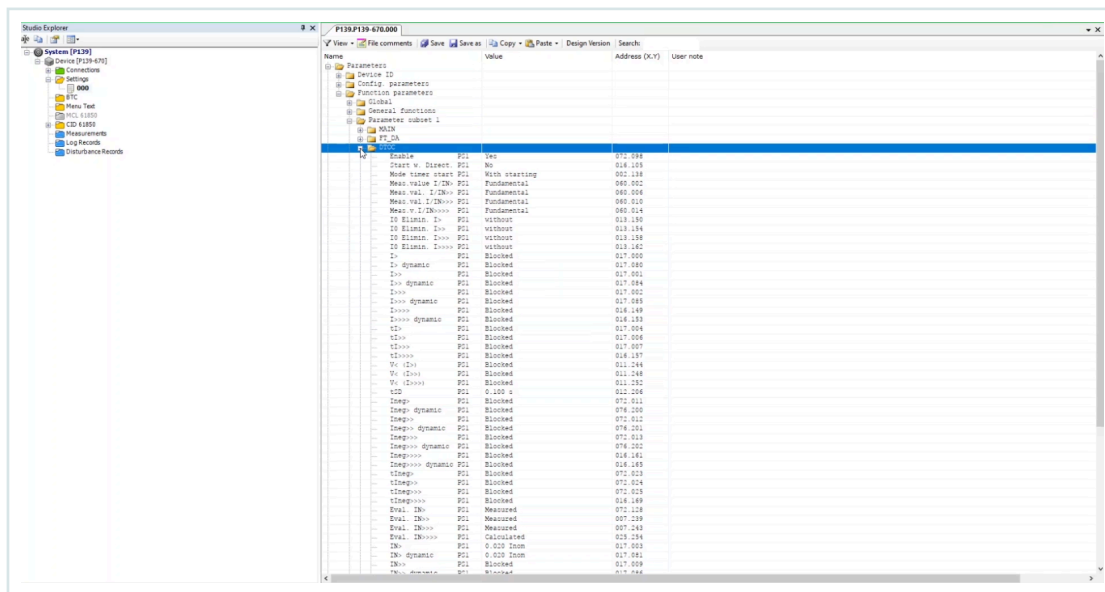


Figure 14

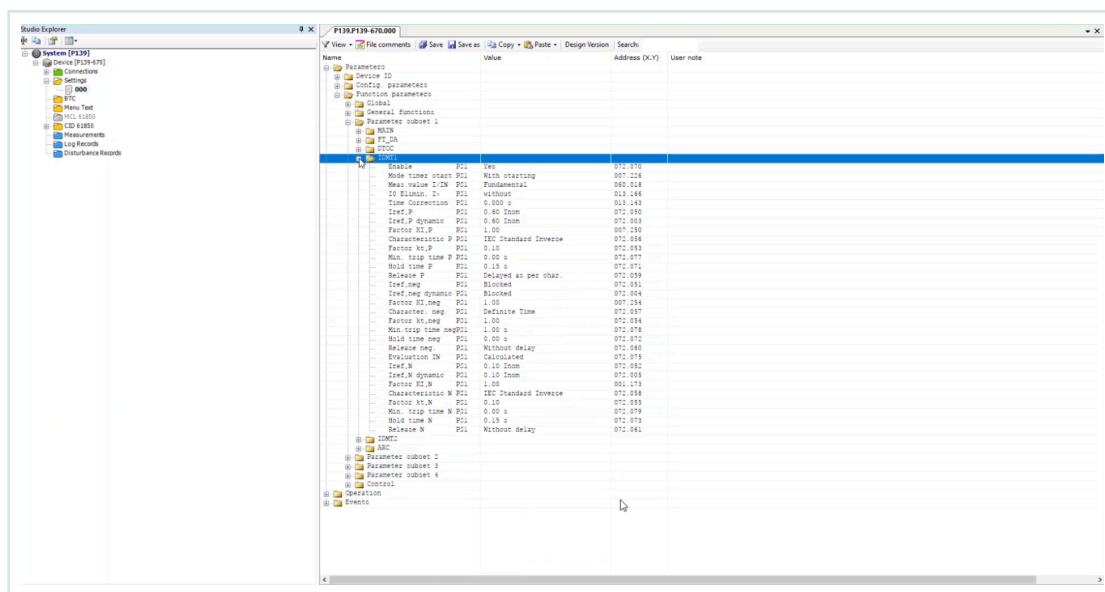
In this video, the AR function test for the MiCOM P139 relay is going to be performed. In this test, the recloser function is activated after the occurrence of the earth fault. To begin, the user needs to go to the settings section of the relay and set the parameters related to the functions. Here, in the subcategory number one of parameters, function DTOC is assigned to SEF protection..



Name	Value	Address (X.Y)	User note
Enable	Yes	012.018	
Start v. Direct	No	014.105	
Mode timer start	With starting	002.138	
Mean value I/2W	Fundamental	060.022	
Mean val. I/2W	Fundamental	060.006	
Mean val. I/2W	Fundamental	060.010	
Mean v. I/2W	Fundamental	060.014	
10 Elimina. I>	Without	012.150	
10 Elimina. I>>	Without	012.154	
10 Elimina. I>>>	Without	012.158	
10 Elimina. I>>>>	Without	012.162	
I>	Blocked	017.000	
I> dynamic	Blocked	017.080	
I>>	Blocked	017.001	
I>> dynamic	Blocked	017.084	
I>>>	Blocked	017.002	
I>>> dynamic	Blocked	017.088	
I>>>>	Blocked	014.149	
I>>>> dynamic	Blocked	014.153	
I>>	Blocked	017.004	
I>>>	Blocked	017.006	
I>>>>	Blocked	017.007	
I>>>>>	Blocked	014.157	
VI (I>)	Blocked	012.144	
VI (I>>)	Blocked	012.148	
VI (I>>>)	Blocked	012.152	
I>P	0.10 s	012.204	
I>mp>	Blocked	072.011	
I>mp> dynamic	Blocked	072.009	
I>mp>>	Blocked	072.012	
I>mp>> dynamic	Blocked	072.010	
I>mp>>>	Blocked	072.013	
I>mp>>> dynamic	Blocked	072.007	
I>mp>>>>	Blocked	014.161	
I>mp>>>> dynamic	Blocked	014.159	
I>mp>>	Blocked	072.023	
I>mp>>>	Blocked	072.024	
I>mp>>>>	Blocked	072.025	
I>mp>>>>>	Blocked	014.169	
Eval. I>	Measured	072.128	
Eval. I>>	Measured	007.239	
Eval. I>>>	Calculated	007.243	
Eval. I>>>>	Calculated	022.154	
I>N	0.020 Inom	017.003	
I>N dynamic	0.020 Inom	017.041	
I>N>	Blocked	017.009	
VI (I>N dynamic)	Blocked	012.144	

Figure 15

In IDMT1 section, the protections of OC and EF are of the delay type while in IDMT2 section, the protections of OC and EF are set at the instantaneous type..



Name	Value	Address (X.Y)	User note
Enable	Yes	012.070	
Mode timer start	With starting	007.124	
Mean value I/2W	Fundamental	060.018	
10 Elimina. I>	Without	012.144	
Time correction	0.000 s	012.143	
Iref.P	0.80 Inom	072.030	
Iref.P dynamic	0.80 Inom	072.009	
Factor K1.P	1.00	007.230	
Characteristic P	IEC Standard Inverse	072.034	
Factor K1.P	0.10	072.033	
Min. trip time P	0.00 s	072.077	
Hold time P	0.15 s	072.071	
Release P	Delayed as per char.	072.039	
Iref.neg	Blocked	072.031	
Iref.neg dynamic	Blocked	072.034	
Factor K1.neg	1.00	007.234	
Characteristic neg	Definite Time	072.037	
Factor K1.neg	1.00	072.034	
Min. trip time neg	1.00 s	072.078	
Hold time neg	0.00 s	072.072	
Release neg	Without delay	072.040	
Evolution I>	Calculated	072.079	
Iref.N	0.10 Inom	072.032	
Iref.N dynamic	0.10 Inom	072.005	
Factor K1.N	1.00	001.173	
Characteristic N	IEC Standard Inverse	072.036	
Factor K1.N	0.10	072.035	
Min. trip time N	0.00 s	072.079	
Hold time N	0.15 s	072.073	
Release N	Without delay	072.041	

Figure 16

Now, by going to the ARC section, the settings related to the auto-recloser are adjusted. Here, the TDR option refers to recloser with time delay; Dead Time and Reclaim Time are set at 4 and 20 seconds, respectively, but it is also possible to activate the HSR which is the high-speed recloser..

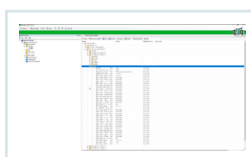


Figure 17

Next, the outputs are configured. Moreover, in INP section, the inputs needed for the assessment and the test are configured. By referring to the relay manual, it is possible to view an outline of the behavior of the P131 recloser function.

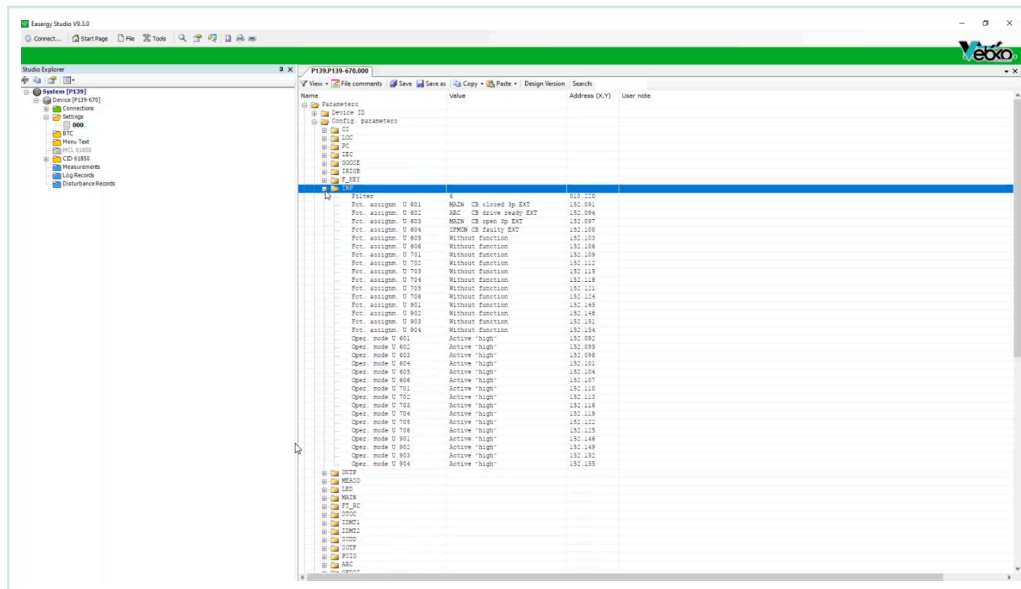


Figure 18

In certain situations such as cases where there is a manual close, external signal, ARC function deactivation, and manual trip and protection deactivation, the recloser will be blocked. It is possible for the user to examine these signals in the AR room of the AMPro software. The user can begin the test after ensuring that the necessary conditions for the recloser to perform are met; these conditions include activating the protection, not blocking the ARC function, and being able to open and close the breaker and have the close state of the key. To adjust the relay wiring, the user can use the connection diagram from the manual.

The user needs to go to the AMT AR room one more time and add the two functions of earth fault and overcurrent. It should be noted that in the first step, reconnection is tested for the earth fault function. This step must be passed successfully and receiving the close signal or the connection needs to happen as well. After specifying the settings related to this function in the first row, single-phase fault to earth is selected and Dead Time and Reclaim Time values are entered.

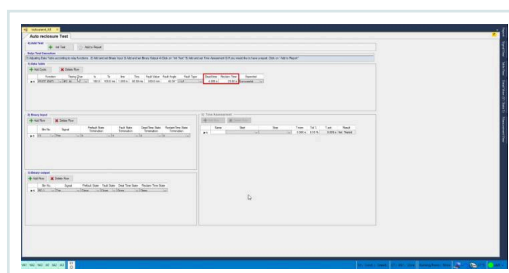


Figure 19

Also, in the Expected section, the expectation from the act of reconnection is set at successful. In the next row, OC function is added. Similarly, the settings related to the delay and instantaneous stages as well as the fault current value, fault type, Deadtime value and Reclaim Time value are entered. In this section, we expect the act of reconnection to be unsuccessful..

Figure 20

Now it is time to configure the input binaries. In this section, connection trip and pulse are selected from the list in this exact order. Here, trip is selected as the finisher element for the Fault state. It is also possible to select Close Pulse or Reclosure Successful as the finisher element for the Deadtime state. This should be noted that the “PreFault” state time is automatically longer than the “Reset Time” or “Reclaim Time”.

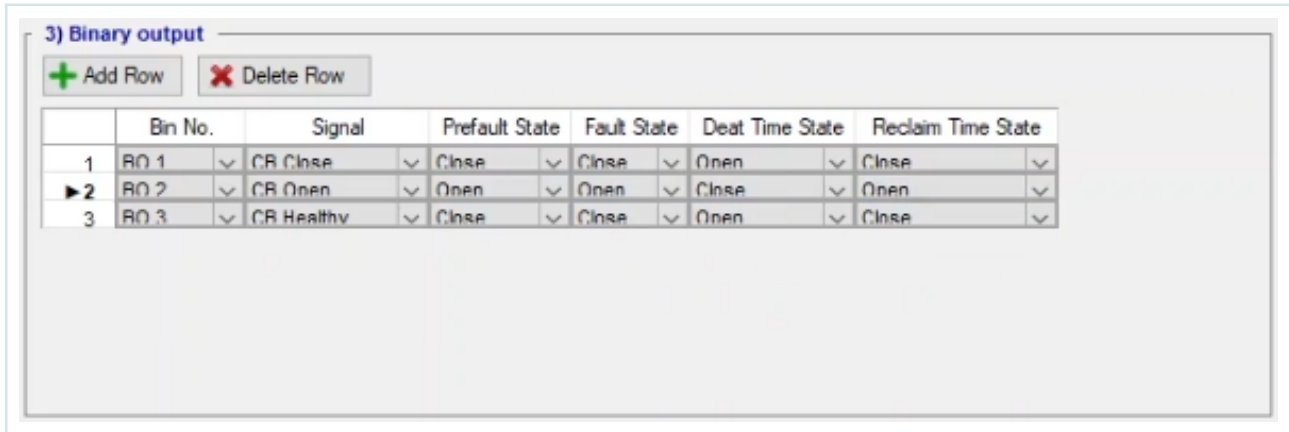
2) Binary Input

➕ Add Row ✖ Delete Row

	Bin No.	Signal	Prefault State Termination	Fault State Termination	DeadTime State Termination	ReclaimTime State Termination
1	C1	Trin	X	1	X	X
▶ 2	C2	Close Pulse	X	X	1	X

Figure 21

In the binary outputs section, three signals of CB Close, CB Open and CB Healthy or AR Ready are added. Here it is possible to specify the status of every signal for different states ranging from “PreFault” to “Fault”, “Dead Time”, and “Reclaim Time”.



	Bin No.	Signal	Prefault State	Fault State	Deat Time State	Reclaim Time State
1	BO 1	CB Close	Close	Close	Open	Close
2	BO 2	CB Open	Open	Open	Close	Open
3	BO 3	CB Healthy	Close	Close	Open	Close

Figure 22

Finally, the “States” are created by clicking on “Init Test” option. The user can view the created states by opening the Table View window.

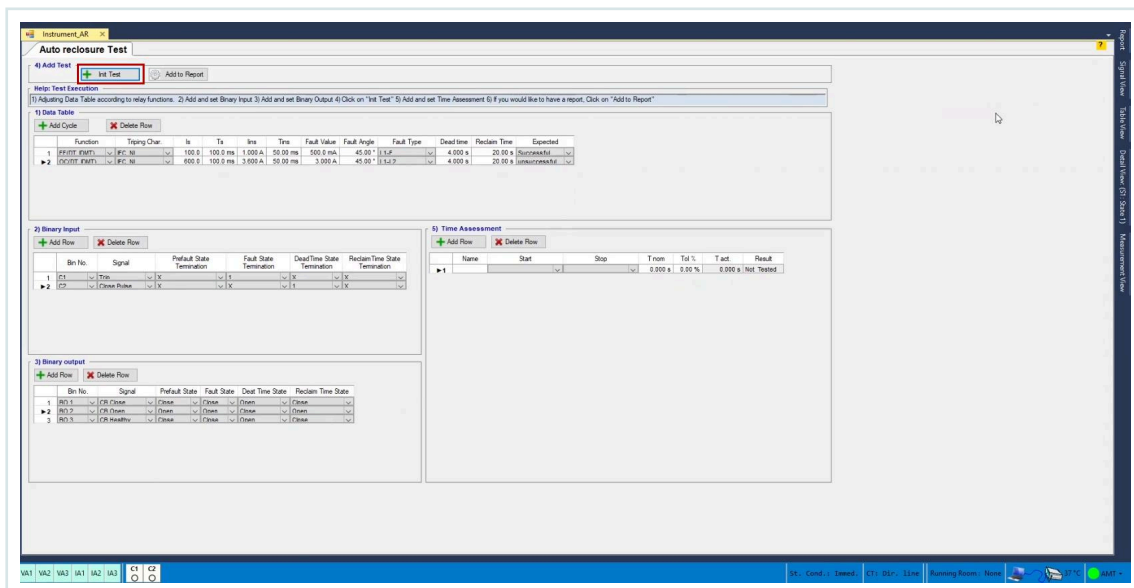


Figure 23

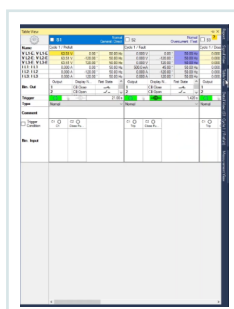


Figure 24

After creating the states, it is possible to adjust the necessary settings for the assessment in the “Assessment” section. Also, after performing the test, it is possible to assess the performance of the recloser for these two functions. In the end, by clicking on “Add to Report” option, the test result is added to the created report. View window.

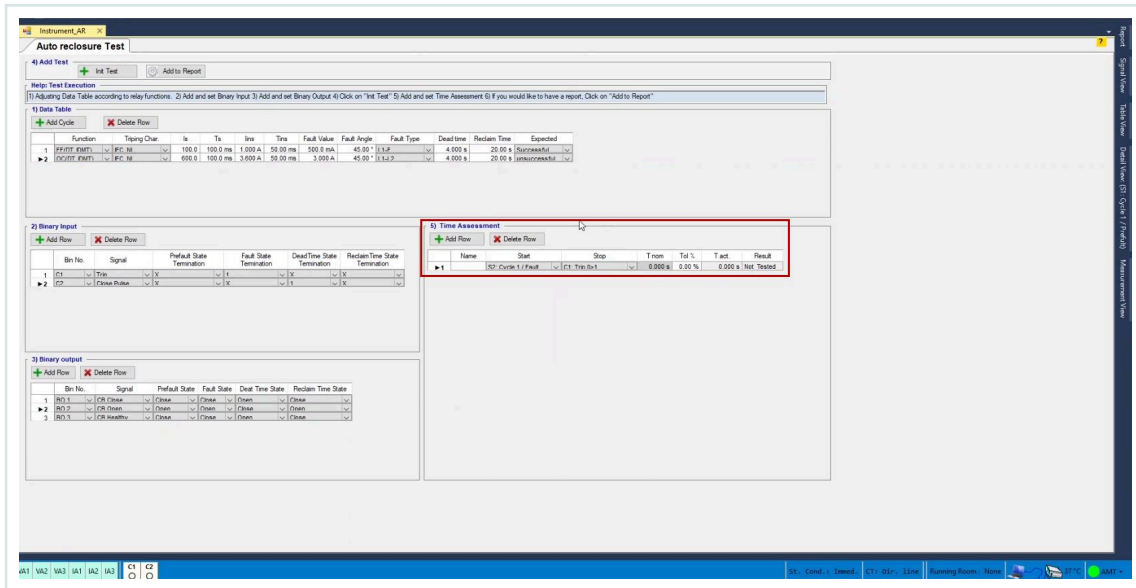


Figure 25

[jg1]AMT_AR_Room