



VEBKO ONLINE HELP

Circuit Breaker Operation Minimum Voltage Test:

Category	tester
Section	Circuit Breaker Module
Language	English
Generated	2026-10-18

One of the most important tests that can be performed on circuit breakers is the “Circuit breaker operation minimum voltage test” or “Minimum Voltage” which is performed in “Minimum Voltage to Operate Circuit Breaker” tab. In this test, it is possible to find the minimum voltage which can cause the circuit breaker to operate by gradually increasing the voltage applied to the two ends of “Open” or “Close” bobbin.

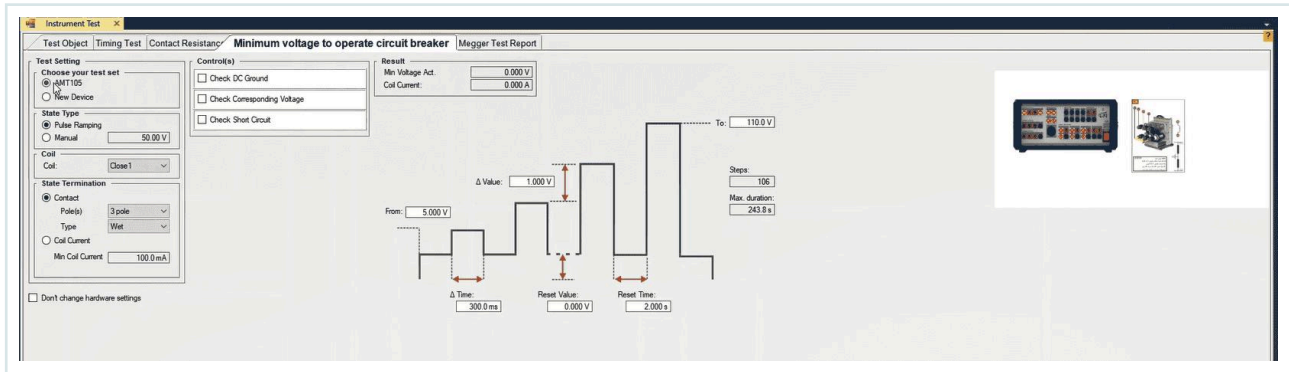


Figure 1

In the first step of this test, the equipment to be used in the test is selected from among “New Device” and “AMT105” which is set at “AMT105” by default and here we proceed without changing it. Then you need to specify that whether you are going to perform a “Close” test or an “Open” test. Note that since some circuit breakers have two “Open” and two “Close” bobbins, there are “Open1” and “Open2” as well as “Close1” and “Close2”. In this video we are going to perform the minimum voltage test once for “Close” mode and once more for “Open” mode.

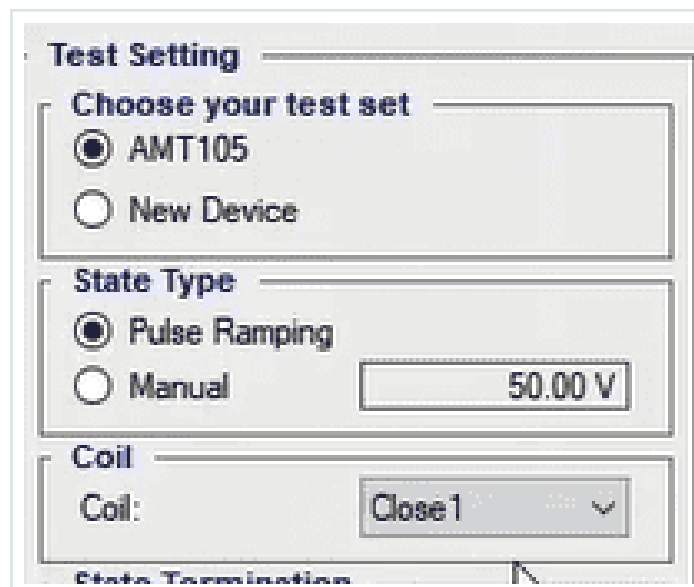


Figure 2

As the next step, you need to specify that whether the device is to detect the circuit breaker operation based on the contact reception or current drop; in this video we are using the former which is a more

accurate and reliable method. In this method you can also specify that whether the test is to be performed in three-phase or single phase mode; here three-phase is selected. "Wet" is selected as the contact type so that noises cannot cause any dysfunction in the process. Note that by selecting any of the options in this section, the wiring changes. For example, if single phase or "Dry" are selected, you can see the change in the wiring.

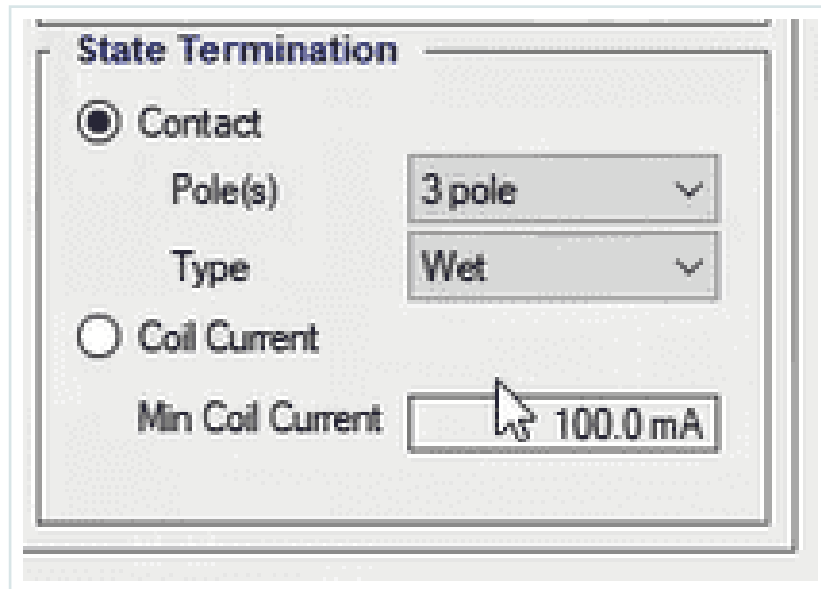


Figure 3

In this test two methods are available to apply voltage to stimulate the bobbin. Using the "Manual" method, you specify a particular voltage and after pressing "Init Test", apply that to the circuit breaker. But in "Pulse Ramping" method you can increase the voltage gradually and find the minimum voltage which can cause the circuit breaker to operate. By selecting "Pulse Ramping", a graphic figure is displayed whose different parameters must be specified. Let us explain this with an example.

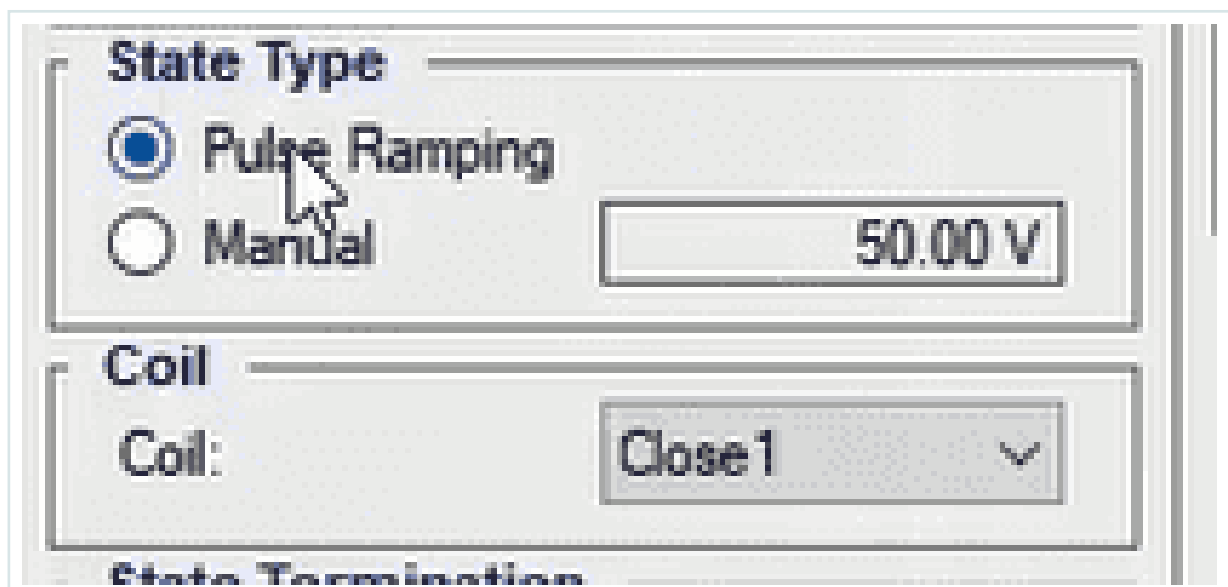


Figure 4

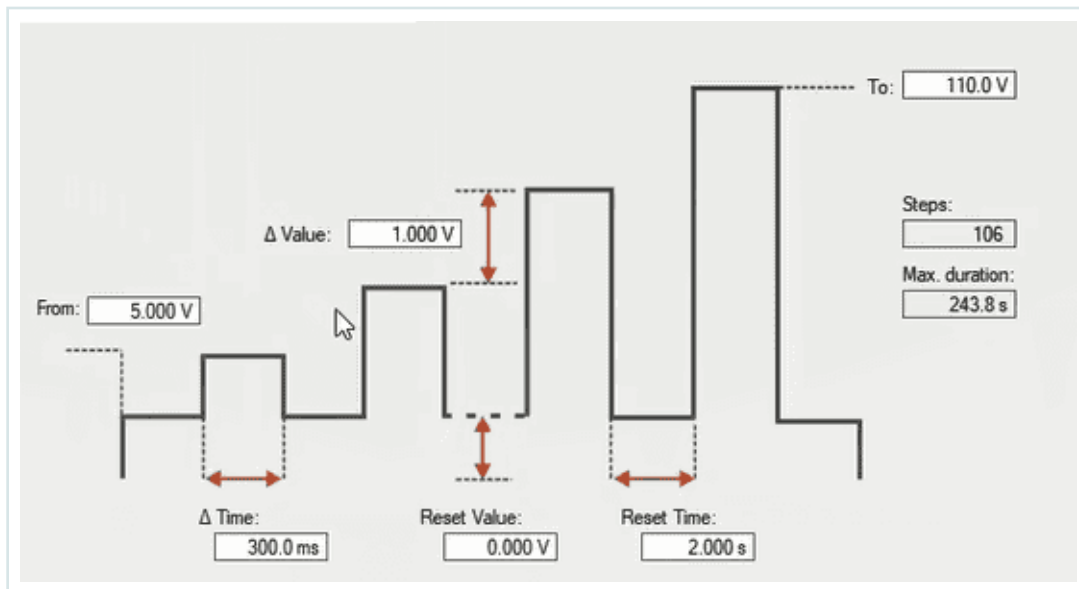


Figure 5

In this example the voltage is increased from 35 to 80 volts with 0.5 volt steps and each step takes 0.5 second. The value for "Reset" voltage is 5 volts and its application time is considered to be 0.5 second. After specifying these factors, the wiring is done according to the guide available in the picture. In this wiring, first, the two voltage sources are paralleled in order to use the maximum current of the device, and then they are connected to the control coil to apply the fed voltage. Afterward, in accordance with the number of contacts selected, (3 is selected in this test) L1, L2 and L3 contacts are connected to Binary Inputs to record the operation of the circuit breaker. After selecting "Coil Close1" and adjusting the wiring, "Init Test" is selected and the test runs. By opening the "Signal View" window you can view the applied voltage as well as the injected current. After the circuit breaker operates, the minimum operation voltage along with the amount of current drawn during the operation is displayed in "Result" section. By selecting "Add to Report" the test result is added to the output report. To test the "Open" bobbin of the circuit breaker, "Coil Open1" is selected and after pressing 'Init Test" the test is reruned and the results are added to the output report.

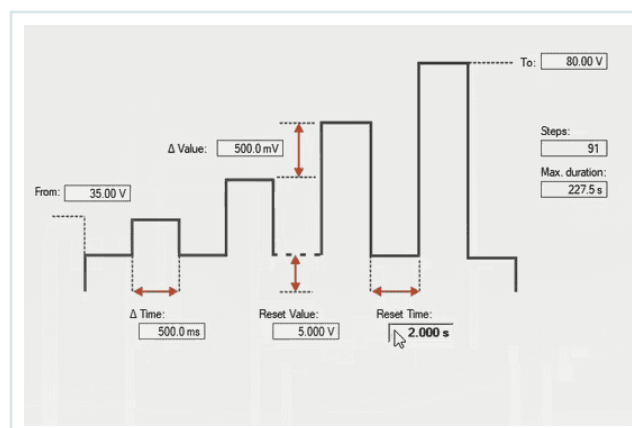


Figure 6

In using the “Coil current” method the wiring is changed and the circuit breaker operation is detected based on the current drawn from the resource. You need to specify the minimum current which is drawn from the device when the circuit breaker operates in “Min Coil Current” field. Here 1.5 amp is selected. For “Pulse Ramping” the same settings used in the previous example are used. After adjusting the wiring and pressing “Init Test” the test runs. In “Signal View” you can see that for every “Pulse”, current is drawn from the device and in current And voltage the test result is achieved and the results are recorded in “Result”. The results of this test are added to the report by selecting “Add to Report”.

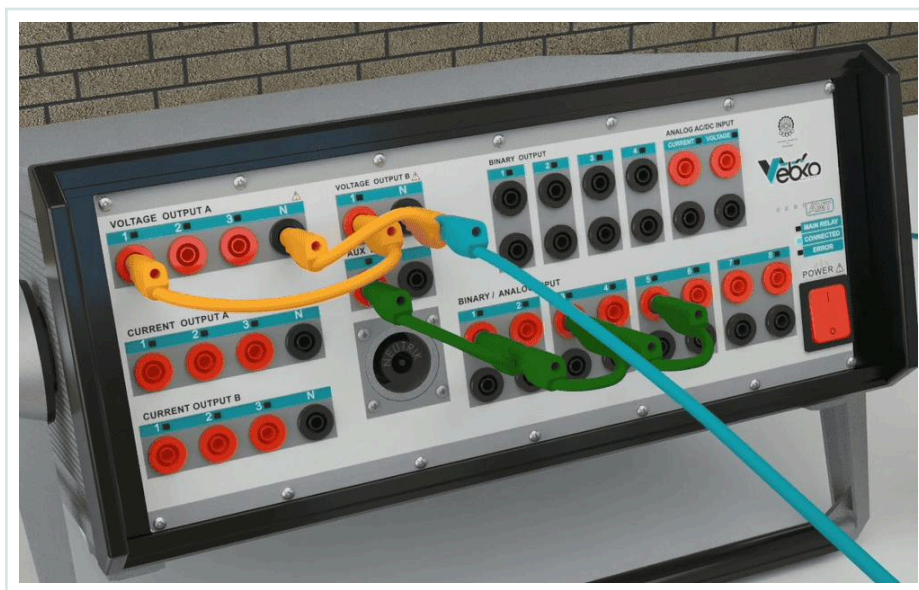


Figure 7

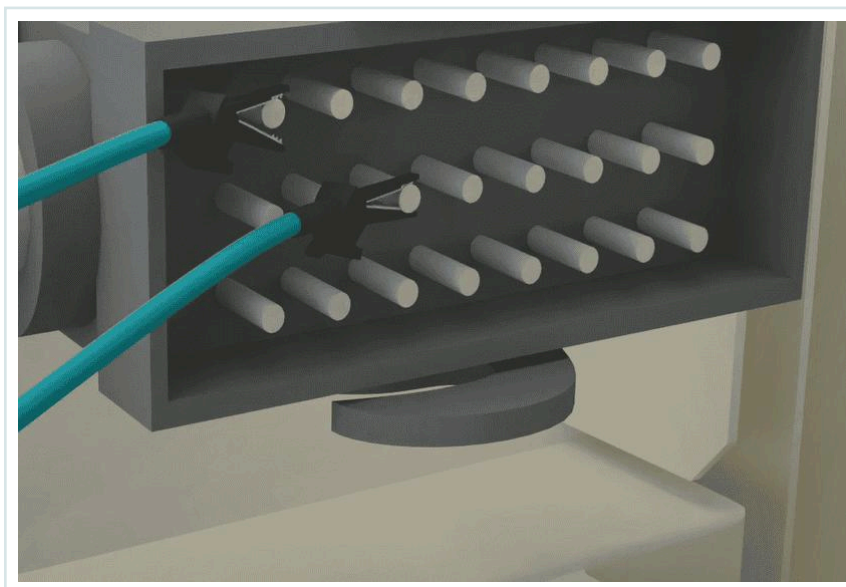


Figure 8

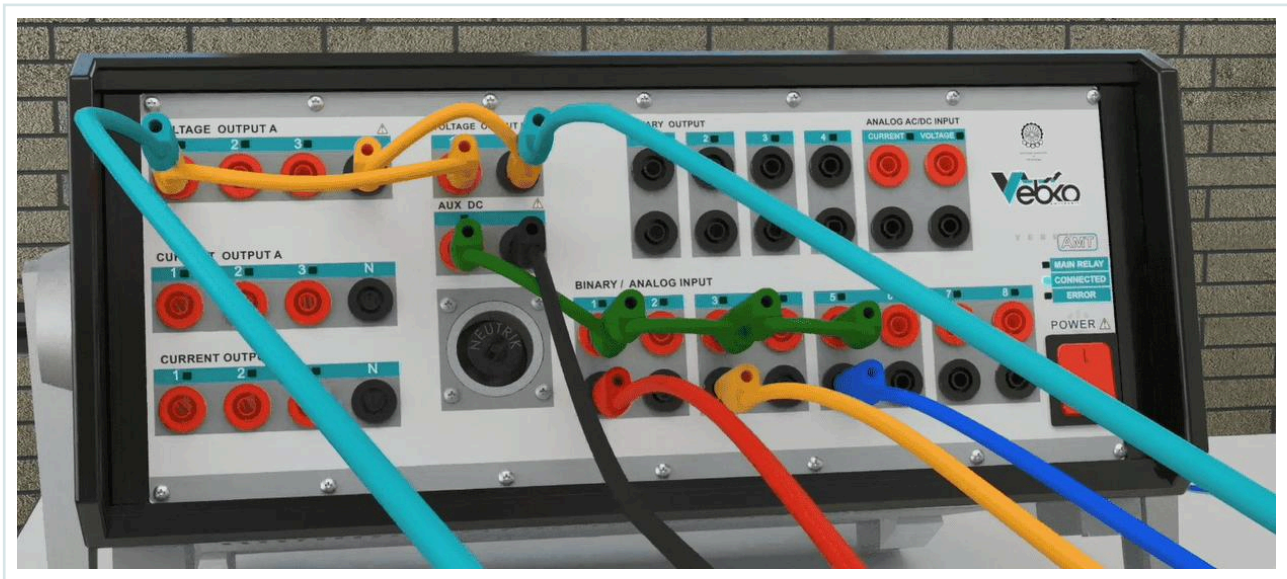


Figure 9

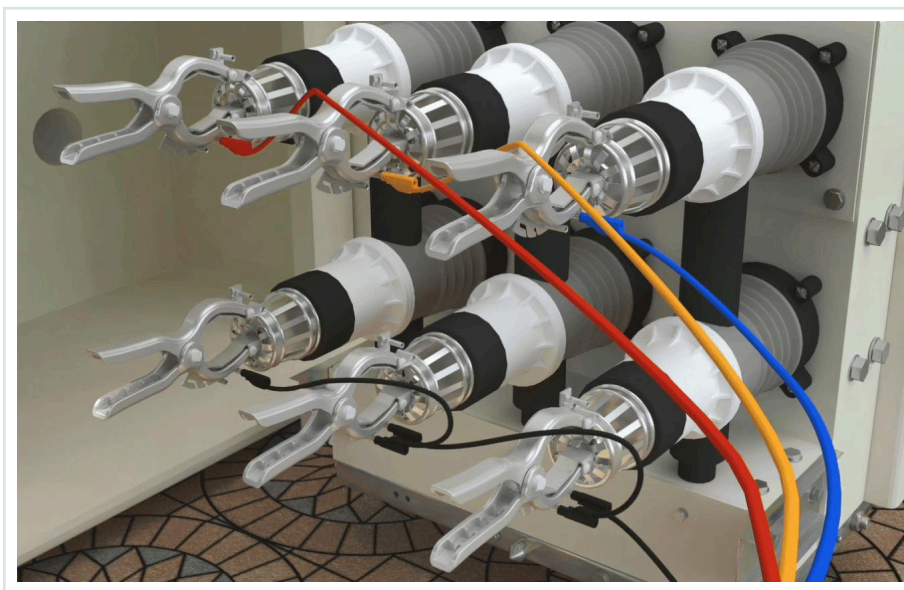


Figure 10

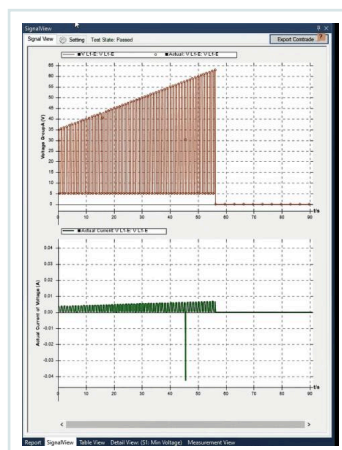


Figure 11

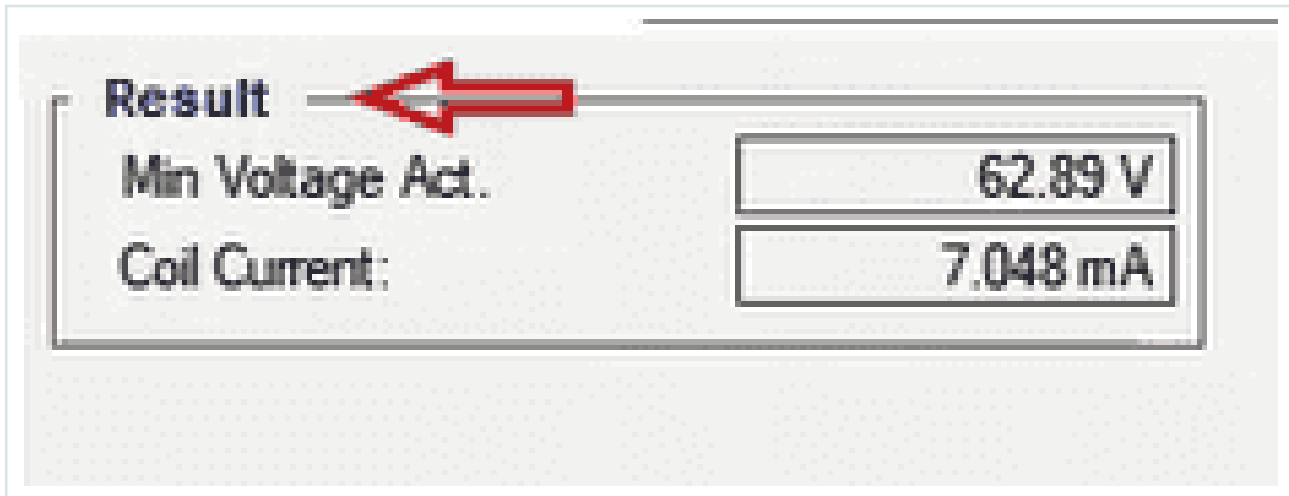


Figure 12



Figure 13

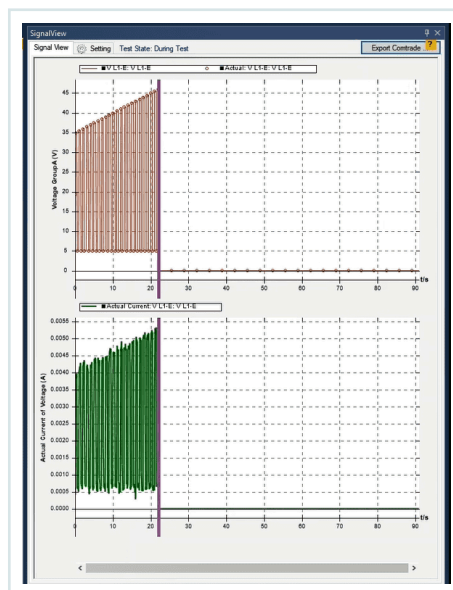


Figure 14

Post "DC" resource test: it is possible to perform the post "DC" resource test in "Check DC Ground"

section. In posts whose potential difference is provided by two resources, it is possible to examine the parallelism of the two. For example, if the post uses a positive 100 volts and a negative 100 volts resource to provide 200 volts of “DC” potential difference, by performing this test, it is possible to examine that how much is each of these two potentials deflected from the intended 100 volts. To do this test, you need to specify the nominal voltage and maximum allowed tolerance after checking “Check DC Ground”. Here “100 volts” and “%10” are entered as the required values and then the wiring is adjusted in accordance with the figure. After pressing “Init Test” and running the test, in “Plus Voltage” and “Plus Voltage dev”, the positive potential difference and its difference with “Nominal Voltage”, “Negative Voltage” and “Negative Voltage dev” as well as the negative potential and its difference with “Nominal Voltage” are displayed.

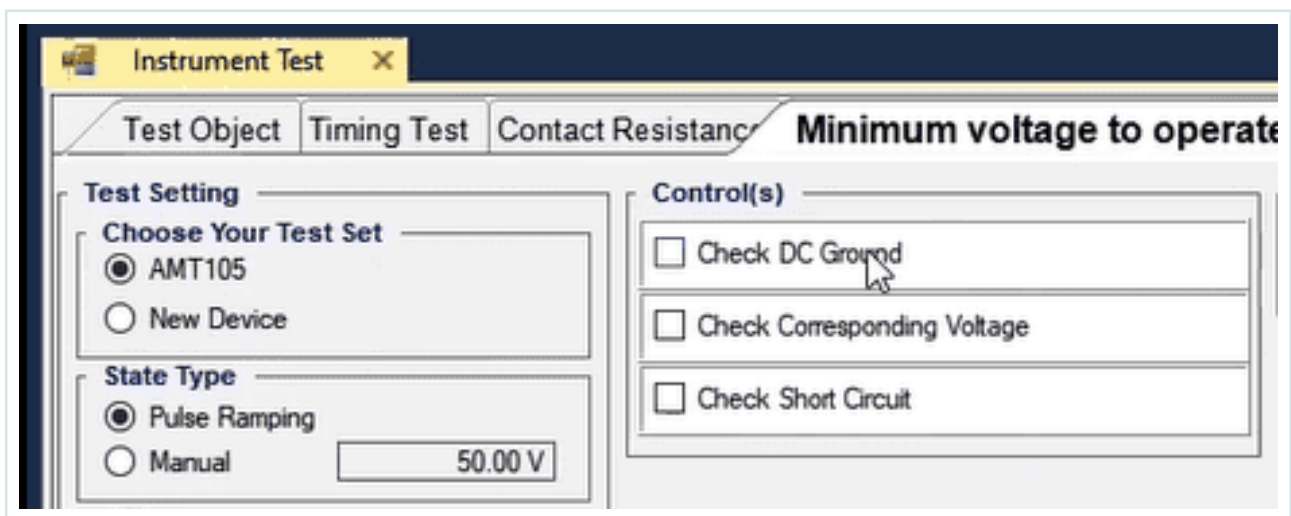


Figure 15

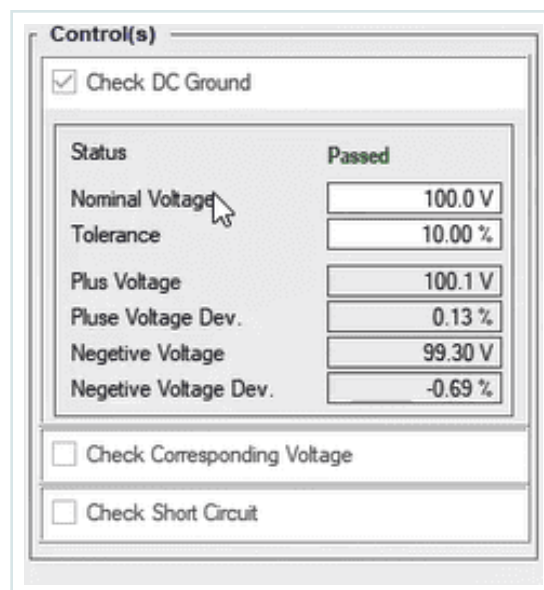
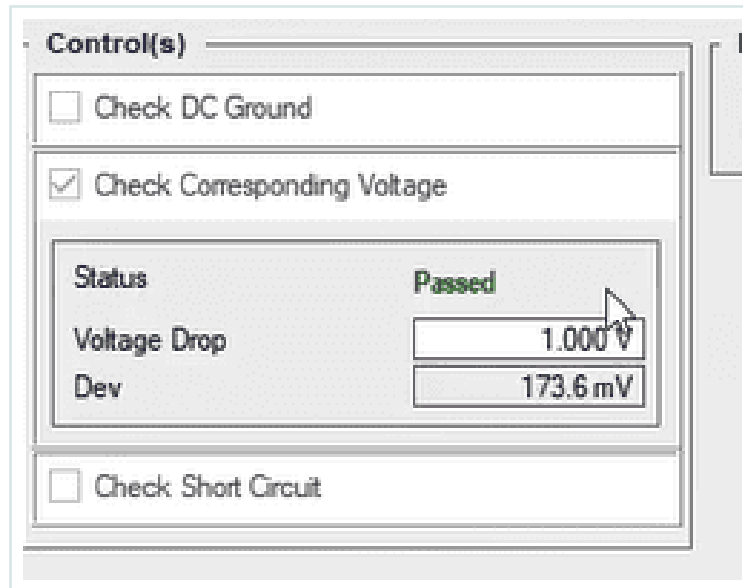


Figure 16

“Check Corresponding”: since in some electrical installations multiple voltage resources are used to

supply different equipment, it may be necessary to test the positive and negative potential of the existing cables so that no mistake occurs in terms of positive and negative potentials. For this test, the maximum voltage allowed between the two poles of the two resources is entered in "Voltage Drop" field. To be precise, suppose that two resources of "A" and "B" are being used to supply the equipment. Normally there should not be any potential difference between the positive "A" and negative "B" sides of the resources. If there is any potential difference between these two it means that they both belong to the same resource and can be used to supply the equipment.

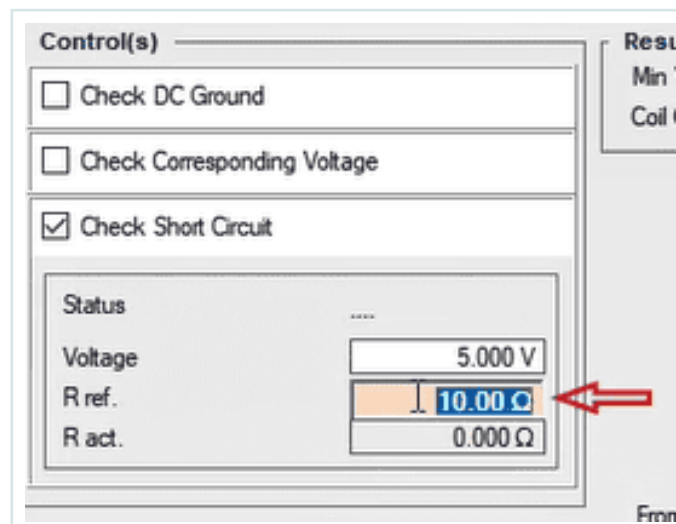


The screenshot shows the 'Control(s)' dialog box with the following settings:

- ☐ Check DC Ground
- ☒ Check Corresponding Voltage
- Status: Passed
- Voltage Drop: 1.000 V
- Dev: 173.6 mV
- ☐ Check Short Circuit

Figure 17

"Check Short Circuit": by doing this test you can test the health of a bobbin. To do so you need to specify a voltage and a reference resistance in "Voltage" and "Rref" fields respectively. After doing the wiring and running the test, the drawn current is measured and then the applied voltage is divided by the drawn current and the self-resistance is calculated. If this resistance is smaller than the reference resistance specified in "Rref" field, it means that the self is short circuited.



The screenshot shows the 'Control(s)' dialog box with the following settings:

- ☐ Check DC Ground
- ☐ Check Corresponding Voltage
- ☒ Check Short Circuit
- Status:
- Voltage: 5.000 V
- R ref.: 10.00 Ω (highlighted with a red arrow)
- R act.: 0.000 Ω

Figure 18

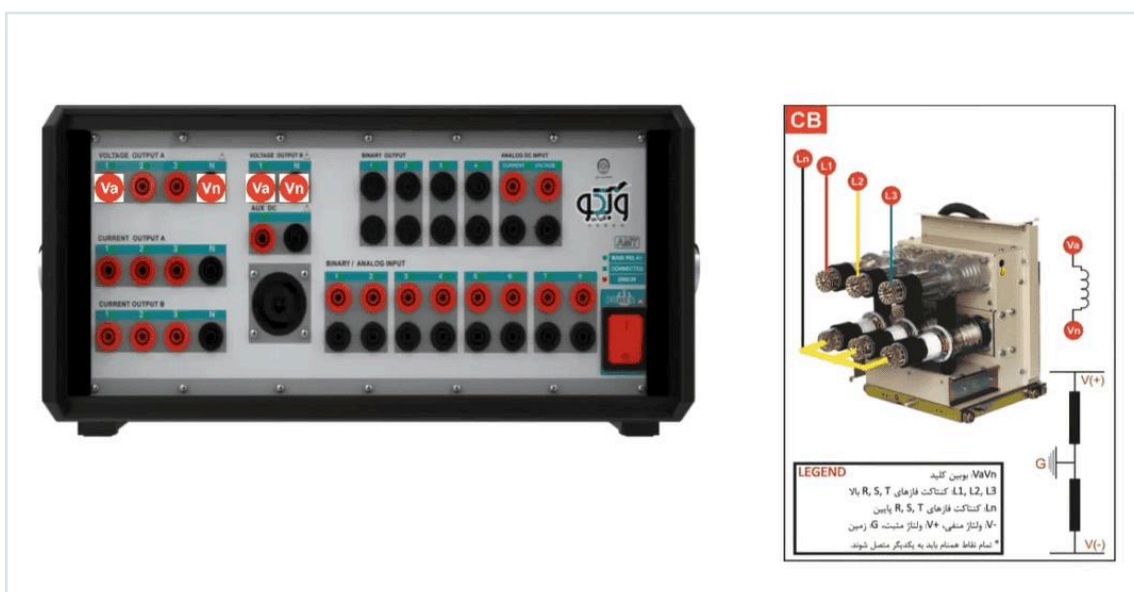


Figure 19

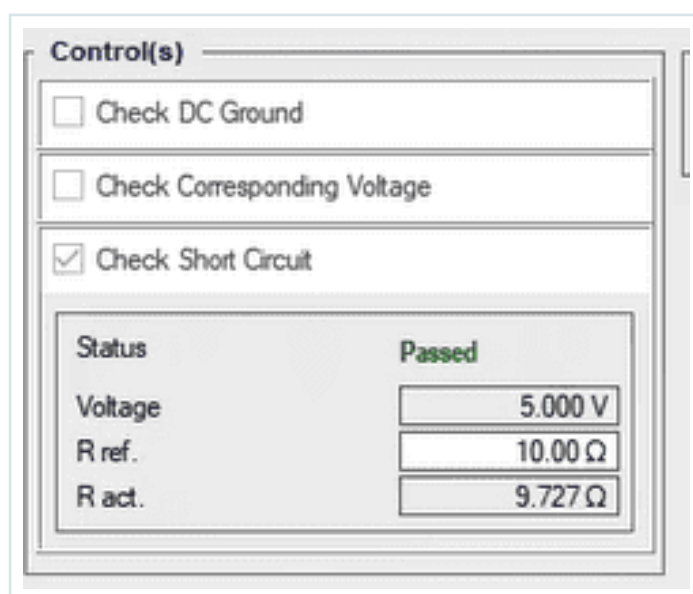


Figure 20

Since it may happen that some users have also performed “Megger” test for this equipment and they wish to have the results in a report, in this tab they can create their intended table by selecting their desired row and column and then “Insert”; after entering the test results and selecting “Add to Report”, the information will be added to the output report. Other options include “Delete Report” which is used to delete the information of this page from the report as well as “Export” and “Import” options which are used to export the information of this page or import them if necessary. Also, if you wish to set the characteristics entered for the created row and column as the default for this section of the room you can use “Set as Default” option.

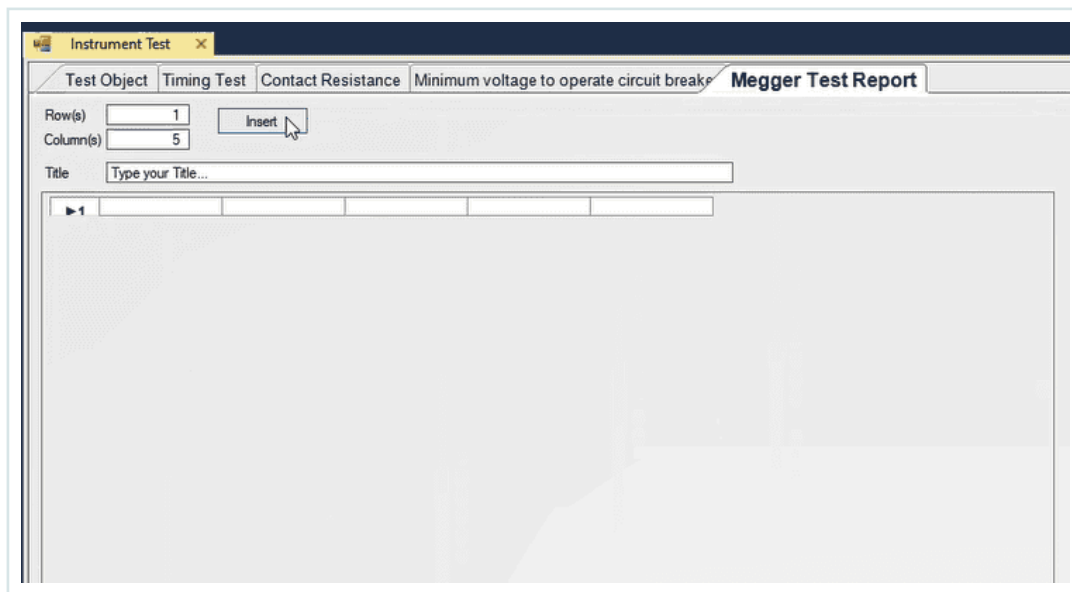


Figure 21

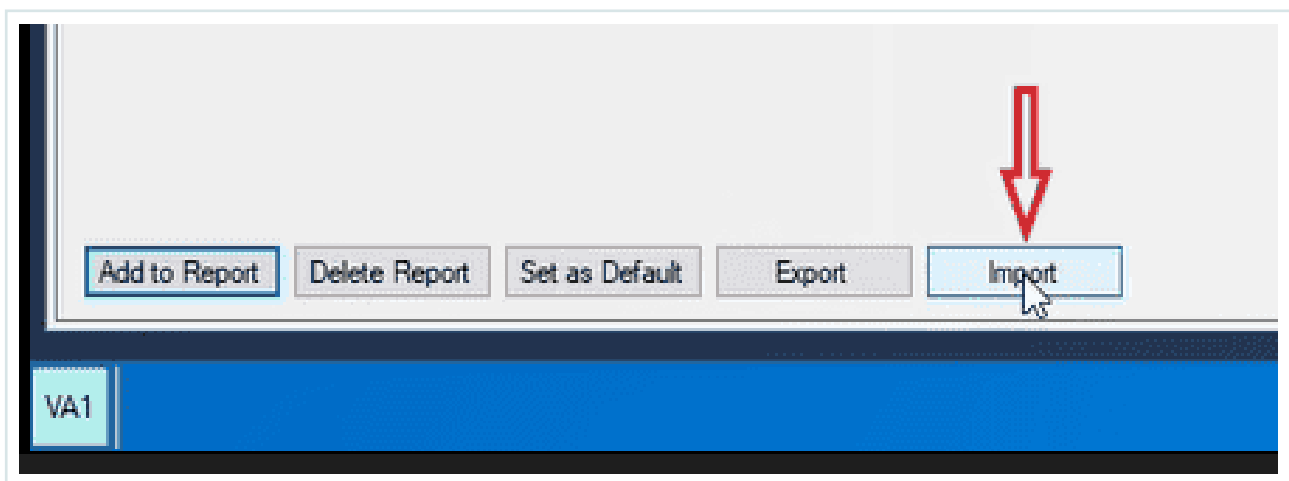


Figure 22

[jg1]Circuit_Breaker_Operation_Minimum_Voltage_Test