



VEBKO ONLINE HELP

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# Ratio Tab

|           |                                      |
|-----------|--------------------------------------|
| Category  | <b>tester</b>                        |
| Section   | <b>capacitor voltage transformer</b> |
| Language  | <b>English</b>                       |
| Generated | <b>2026-10-18</b>                    |

## 1 Imported Content

In this tab, CVT turn ratio test is performed where the voltage is given to the CVT primary and measured from the secondary. By dividing the primary and secondary values, turn ratio is obtained and the obtained value can be compared with the nominal value on the plate. For medium and high-voltage CVTs it is possible to perform this test by applying a low voltage or approximately 400 volts to the primary. If there are multiple measuring and protection secondary, it is necessary to measure voltages of all secondaries and obtain all their turn ratios.

The screenshot shows the 'Ratio' tab in the 'Instrument Test' software. The 'State Settings' section includes fields for V test (50.00 V), V actual (0.000 V), State Time (300.0 ms), and Analog Input (1). The 'Turns Ratio Result' section shows V calc (0.000 V), V meas (0.000 V), Ratio nom (0.0000), Ratio act (0.0000), and Ratio dev (0.00 %). The 'Phase' section shows Phase nom (0.00 °), Phase act (0.00 °), and Phase dev (0.0000 min). The 'Assessment' section has radio buttons for Protection (selected), Measuring, and Pro. / Meas. The 'Result' table has columns for Core No., Phase, V test act, V calc., V meas., Ratio nom, Ratio act, Ratio dev, Phase nom, Phase act, Phase dev, Pol. Check, and Assessment.

Figure 1

According to the IEC 60044-2 standard, the allowed error percentage is set in accordance with the accuracy class of the CVT. The first column of this accuracy class table and the turn ratio error percentage accuracy column are also available. In the following table, the mentioned error percentages are for cases where the voltage is higher than 2 percent of the nominal voltage. In accordance with the table related to protection CVTs, for example, if the accuracy class is 3P, its allowed error percentage in 2 percent of the nominal voltage is 6 percent and in 100 percent of the nominal voltage is 3 percent.

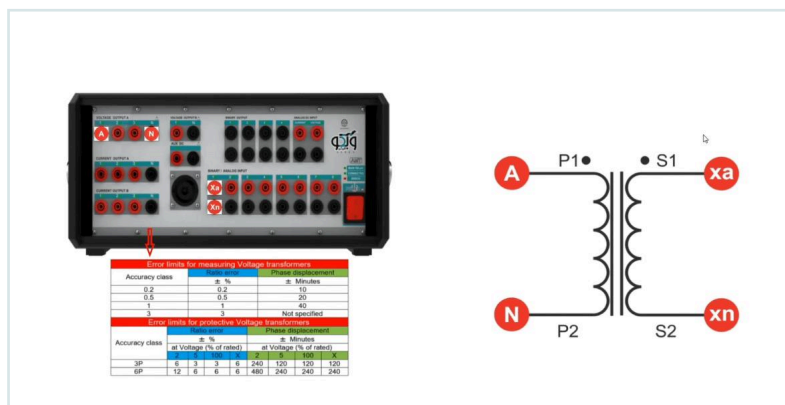


Figure 2

To perform this test, first, fields of “State Settings” section are introduced. In “V test”, “V actual”, “State Time” and “Analog Input” fields, the amount of test voltage, the actual applied voltage, the duration of the test and the input intended for transformer secondary voltage measurement are specified, respectively. It should be mentioned that inputs number 1 to 8 and input10 are used for voltage measurement.

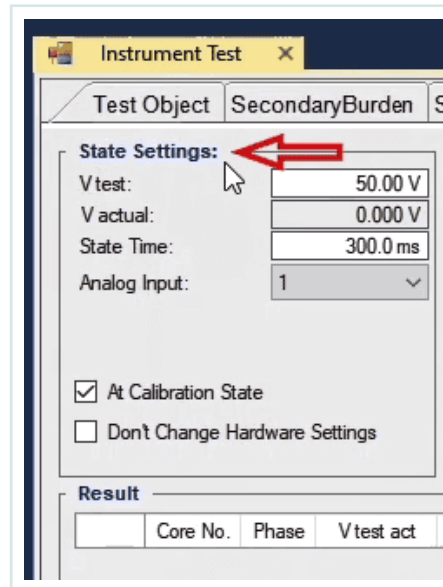


Figure 3

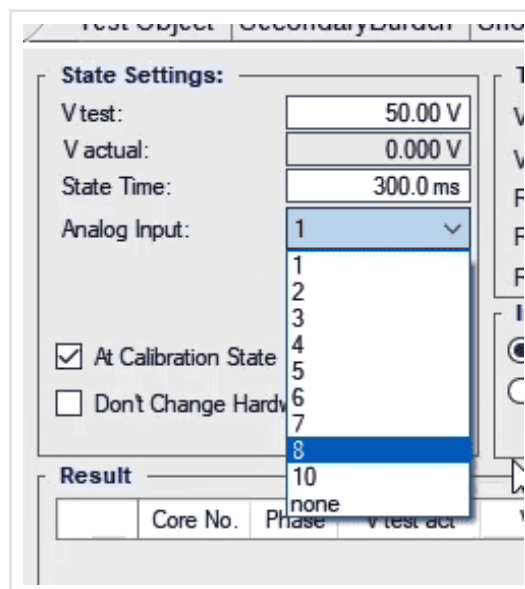
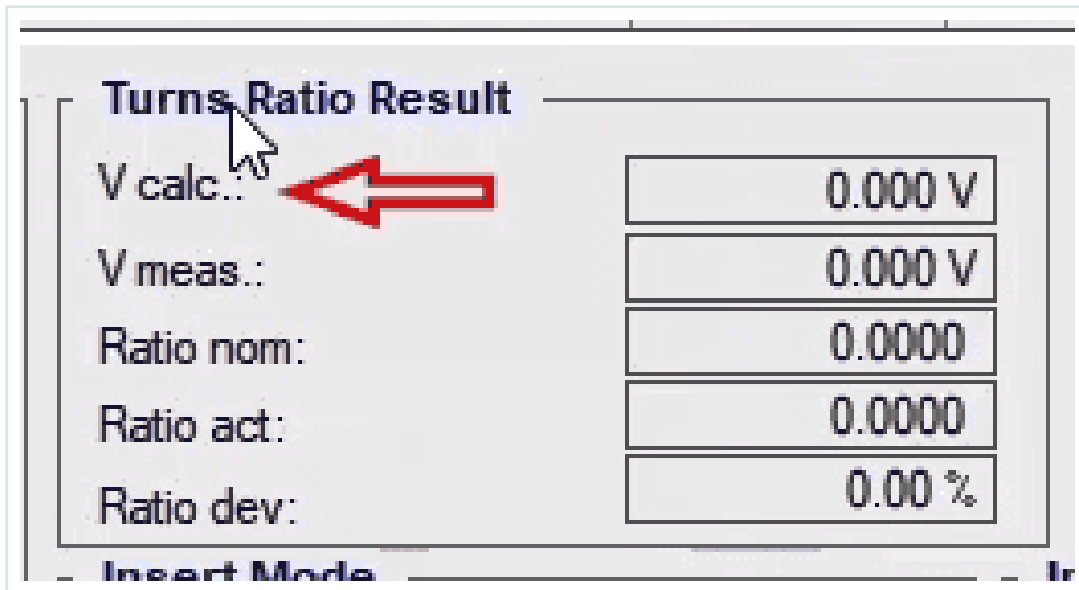


Figure 4

In noisy environments, there is some voltage on the inputs of the device and to increase accuracy, by selecting “At calibration state” option, at the beginning of the test, another state with zero as its value

is created and in the end, this measured voltage will be reduced from the final result.

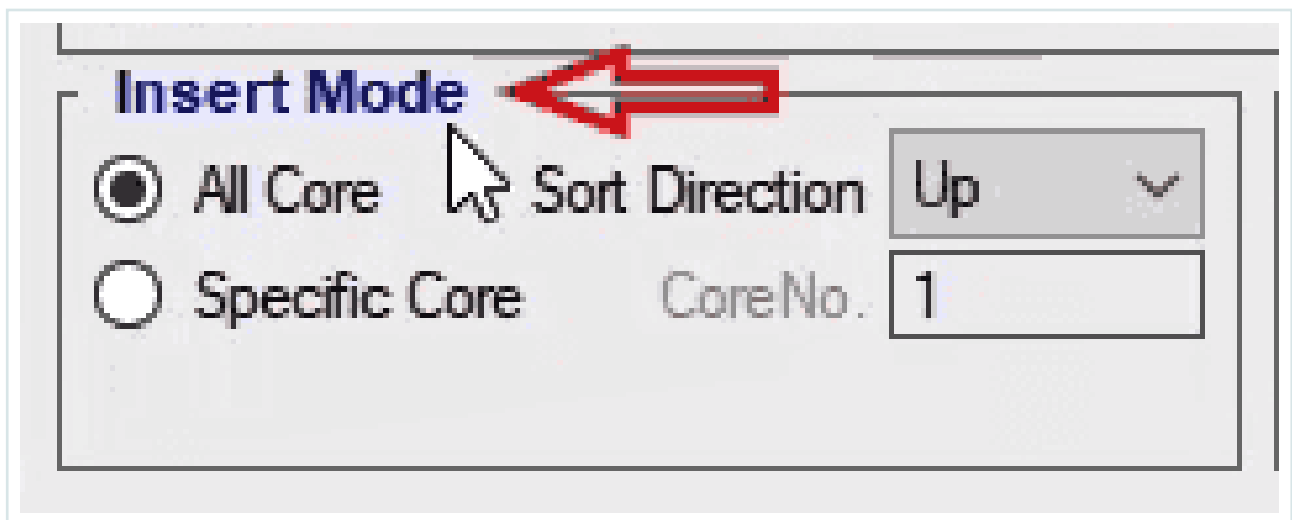
In "Turns Ratio Result", the results of turn ratio test of every core are displayed after performing the test. In "V calc" field, the secondary voltage is calculated by the software in accordance with the values entered in "Test Object" and in "V test" field. In "V meas", "Ratio Nom." and "Ratio Act.", the voltage measured by the input, the nominal turn ratio and the actual turn ratio are calculated by the software, respectively.



| Turns Ratio Result |         |
|--------------------|---------|
| V calc..           | 0.000 V |
| V meas.:           | 0.000 V |
| Ratio nom:         | 0.0000  |
| Ratio act:         | 0.0000  |
| Ratio dev:         | 0.00 %  |

Figure 5

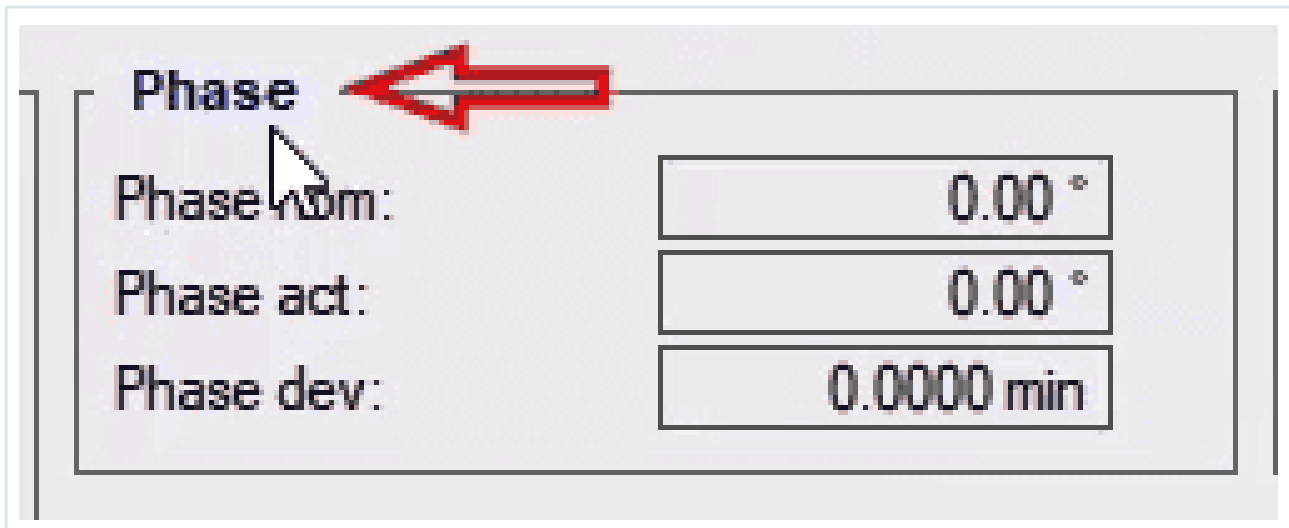
The insertion position of the cores is specified in "Insert Mode" in a way that by selecting "All Core", all cores are added to the "Result" table based on the selection between "Up" or "Down". Also, by selecting "Specific core", a specific core is added to the table in accordance with the choice of the user.



| Insert Mode                               |                    |
|-------------------------------------------|--------------------|
| <input checked="" type="radio"/> All Core | Sort Direction: Up |
| <input type="radio"/> Specific Core       | CoreNo.: 1         |

Figure 6

In "Phase" section, in "Phase Nom" field, the amount of applied voltage to the CVT and in "Phase Act" the phase difference between the two sides of the transformer are displayed. In "Phase Dev" the deviation of the measured phase in relation to the applied phase is recorded in terms of minutes (one degree equals 60 minutes). Finally, the results of the evaluation are determined in accordance with the type of the core which can be protection, measurement or protection/measurement and also in accordance with what the user selects in "Assessment".



**Phase**

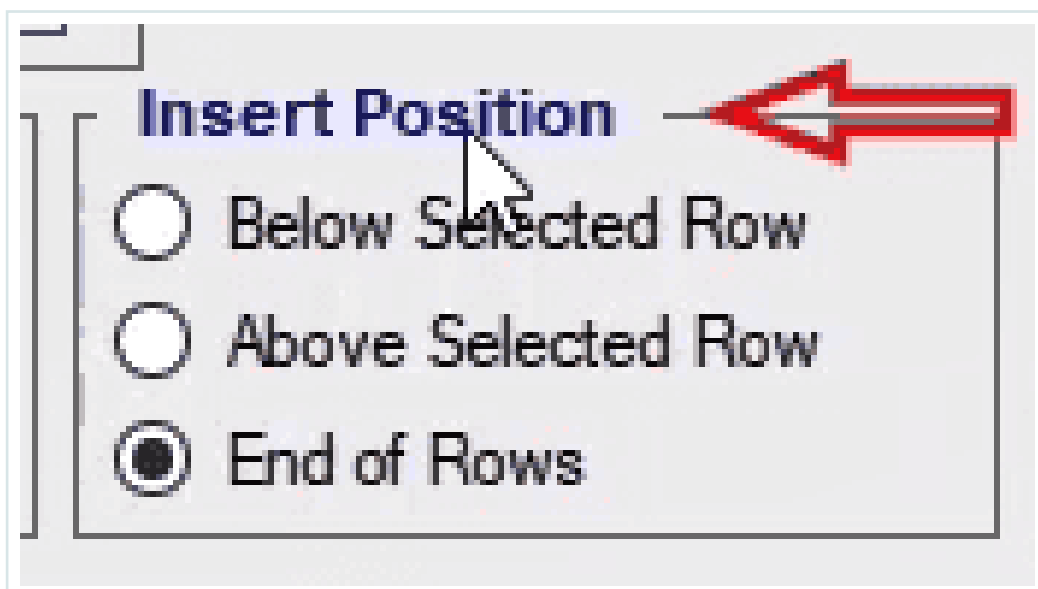
Phase nom: 0.00 °

Phase act: 0.00 °

Phase dev: 0.0000 min

Figure 7

The insertion position of the cores in the table is specified by selecting the options available in "Insert Position". Tables can be added by pressing "Insert Rows" button.



**Insert Position**

☐ Below Selected Row

☐ Above Selected Row

☒ End of Rows

Figure 8



Figure 9

To perform the test, as an example, 100 volts and 300 milliseconds are entered as the test voltage and State time, respectively. The CVT is Protection type and only Core1 is going to be tested as an example. After pressing "Insert Rows", since there are 3 cores, 9 rows are inserted which in accordance with the test voltage and the CVT turn ratio

to

, the nominal turn ratio value and Vcalc are 181.8 and 550mV respectively.

$$\frac{20KV}{\sqrt{3}}$$

Figure 10

$$\frac{110V}{\sqrt{3}}$$

Figure 11

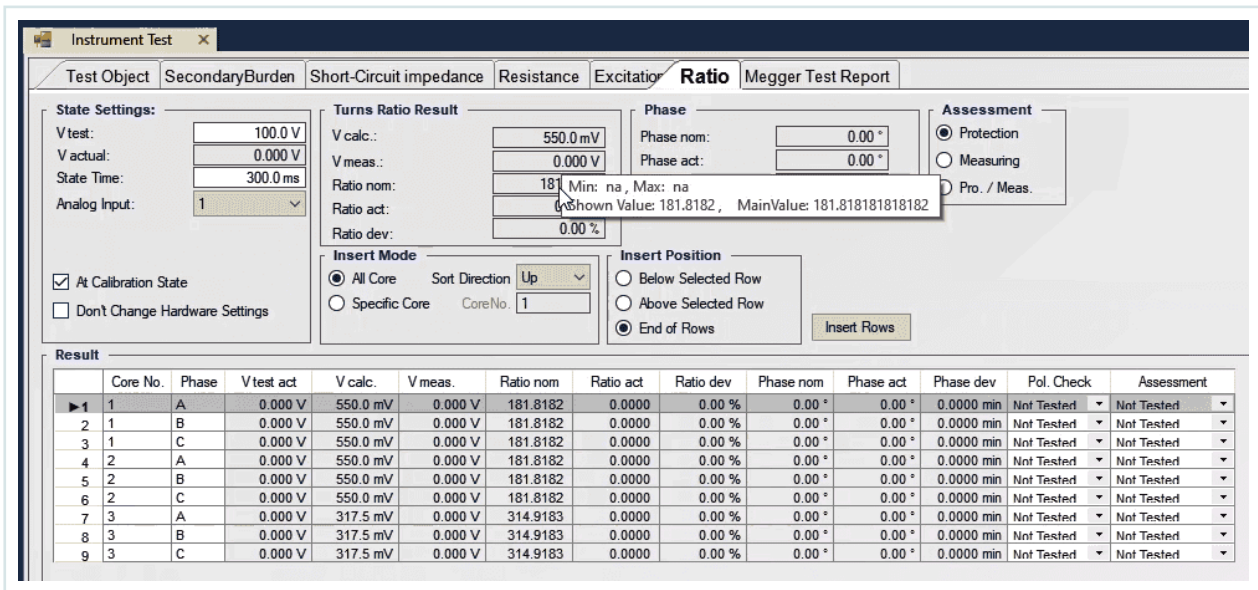


Figure 12

To perform the test, the voltage of group A is connected to the CVT primary and the Input1 is connected to the CVT secondary to measure the voltage. To view the primary and secondary voltages during the test, Signal view is used. In the end, the intended row is selected and after right-clicking on it, Apply Test is selected. After the test, it can be seen that the test results are recorded in the table and since the angle fault and the turn ratio are within the range allowed in the standard, the test is passed. Other cores and phases are tested following the same procedure.

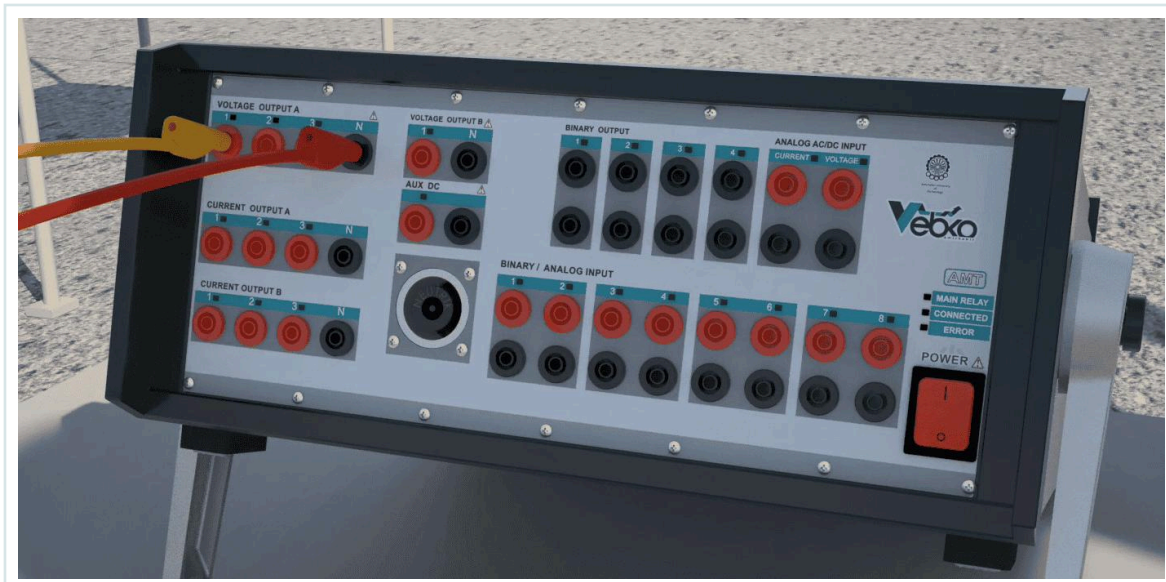


Figure 13

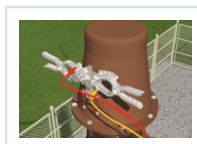


Figure 14

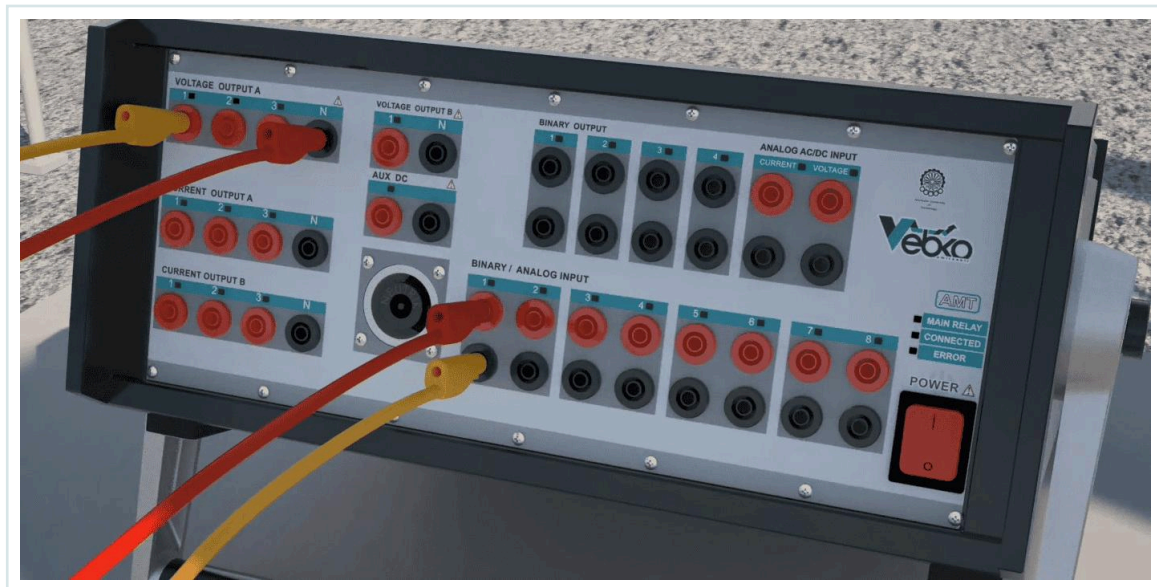


Figure 15

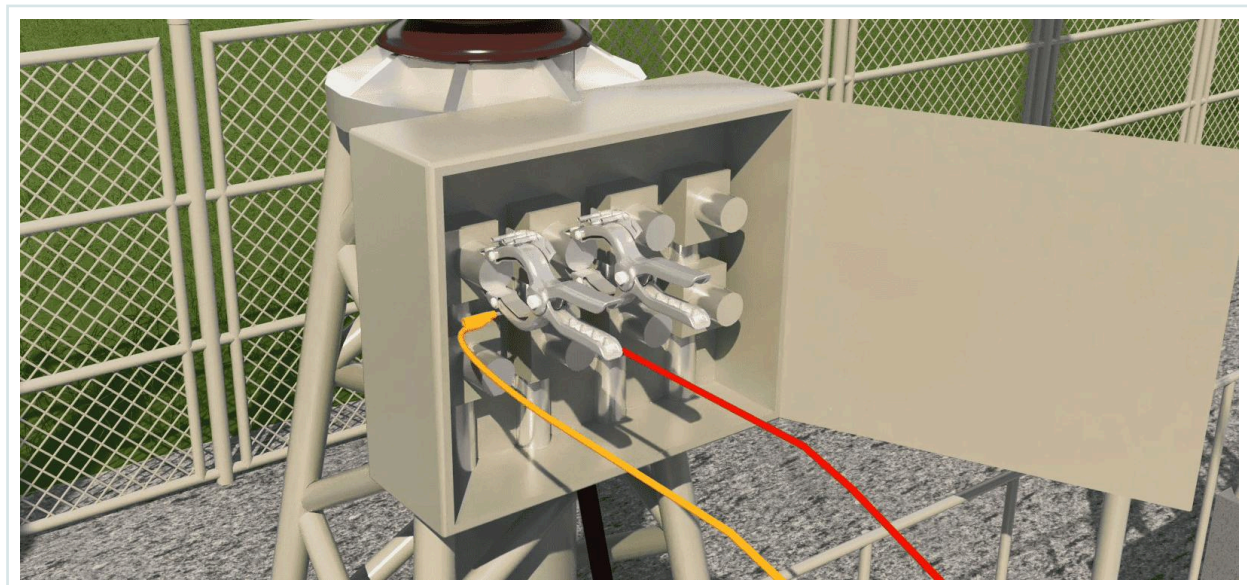


Figure 16

☒ At Calibration State  
☐ Don't Change Hardware Settings

**Insert Mode**  
☒ All Core    Sort Direction: Up  
☐ Specific Core    Core No: 1

**Insert Position**  
☐ Below Selected Row  
☐ Above Selected Row  
☒ End of Rows

| Result | Core No. | Phase | V test act | V calc.  | V meas.  | Ratio nom | Ratio act | Ratio dev | Phase nom | Phase act | Phase dev  | Pol. Check | Assessment |
|--------|----------|-------|------------|----------|----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|
| ▶ 1    | 1        | A     | 99.98 V    | 550.0 mV | 552.5 mV | 181.8182  | 180.7891  | -0.57 %   | -0.01 °   | -0.12 °   | 6.6772 min | Passant    | Passant    |
| ▶ 2    | 1        | B     | 0.000 V    | 550.0 mV | 0.000 V  | 181.8182  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 3    | 1        | C     | 0.000 V    | 550.0 mV | 0.000 V  | 181.8182  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 4    | 2        | A     | 0.000 V    | 550.0 mV | 0.000 V  | 181.8182  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 5    | 2        | B     | 0.000 V    | 550.0 mV | 0.000 V  | 181.8182  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 6    | 2        | C     | 0.000 V    | 550.0 mV | 0.000 V  | 181.8182  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 7    | 3        | A     | 0.000 V    | 317.5 mV | 0.000 V  | 314.9183  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 8    | 3        | B     | 0.000 V    | 317.5 mV | 0.000 V  | 314.9183  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |
| ▶ 9    | 3        | C     | 0.000 V    | 317.5 mV | 0.000 V  | 314.9183  | 0.0000    | 0.00 %    | 0.00 °    | 0.00 °    | 0.0000 min | Not Tested | Not Tested |

Figure 17

After the test is finished, to add the results to the report “Add to Report” option can be used. Also, by using the cog next to this option, you can remove the items that do not wish to be added to the report before selecting “Add to Report” option.

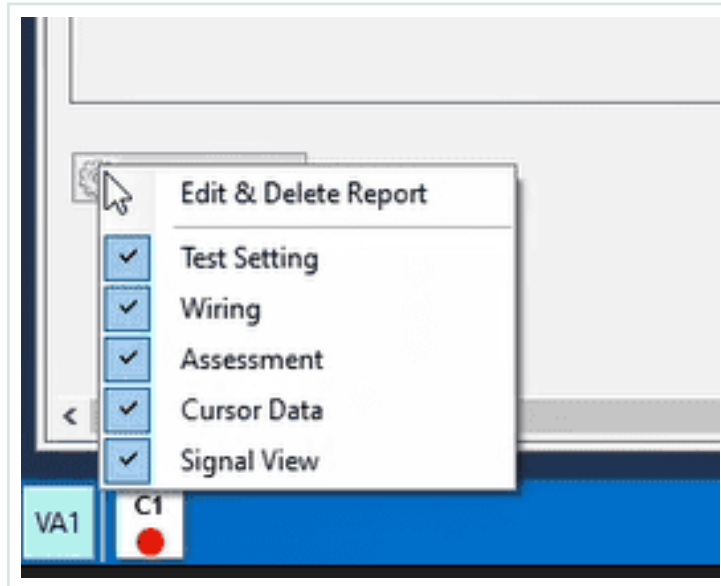


Figure 18

If, for any reason, wish to modify the wiring of the device, first they need to apply the test once and then check “Don’t Change Hardware Setting” option and select a different output from “Hardware Configuration” window and then set the Output Target at “VL1-E” and run the test after changing the wiring. To select other inputs, it should be noted that the selected Binary Input Target must be in accordance with the default “Binary Input Target”. For this, it is suggested to right-click on “Input1” row and “Cut” the information and “Paste” it in the intended row.

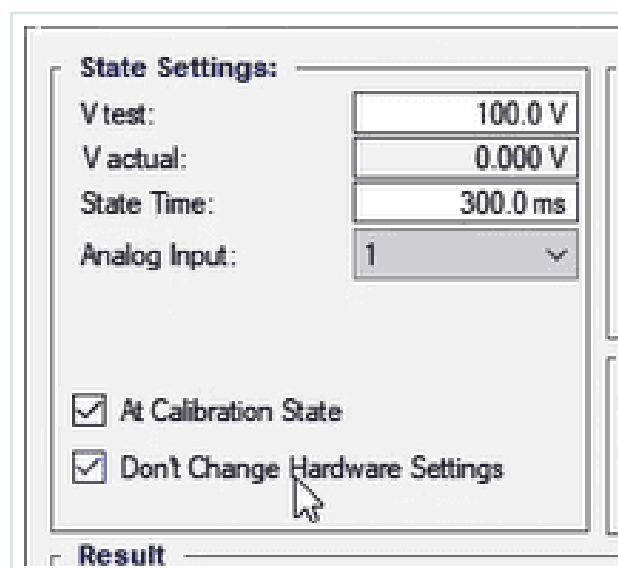


Figure 19

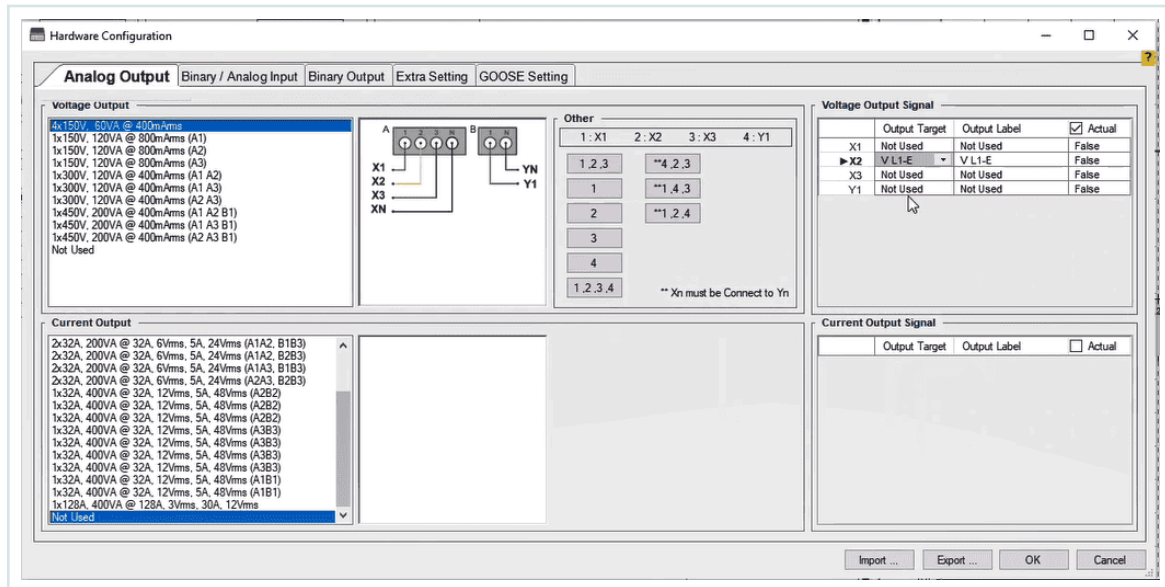


Figure 20

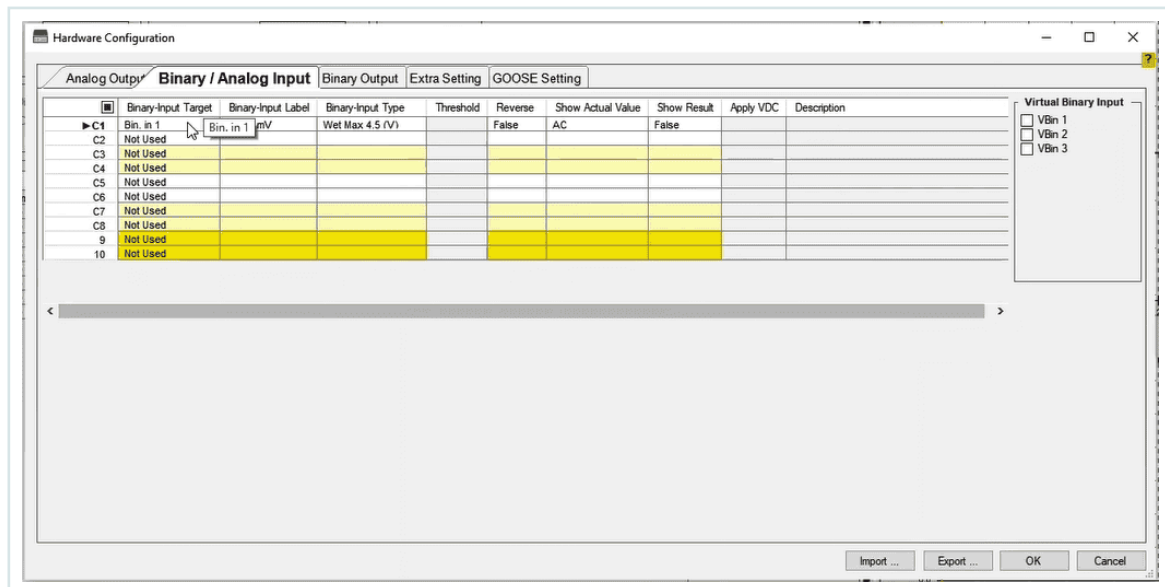


Figure 21

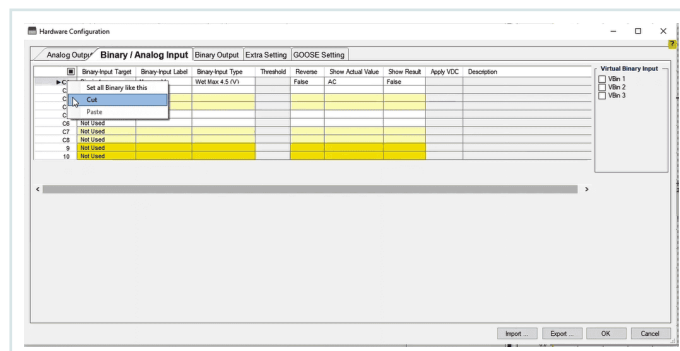


Figure 22

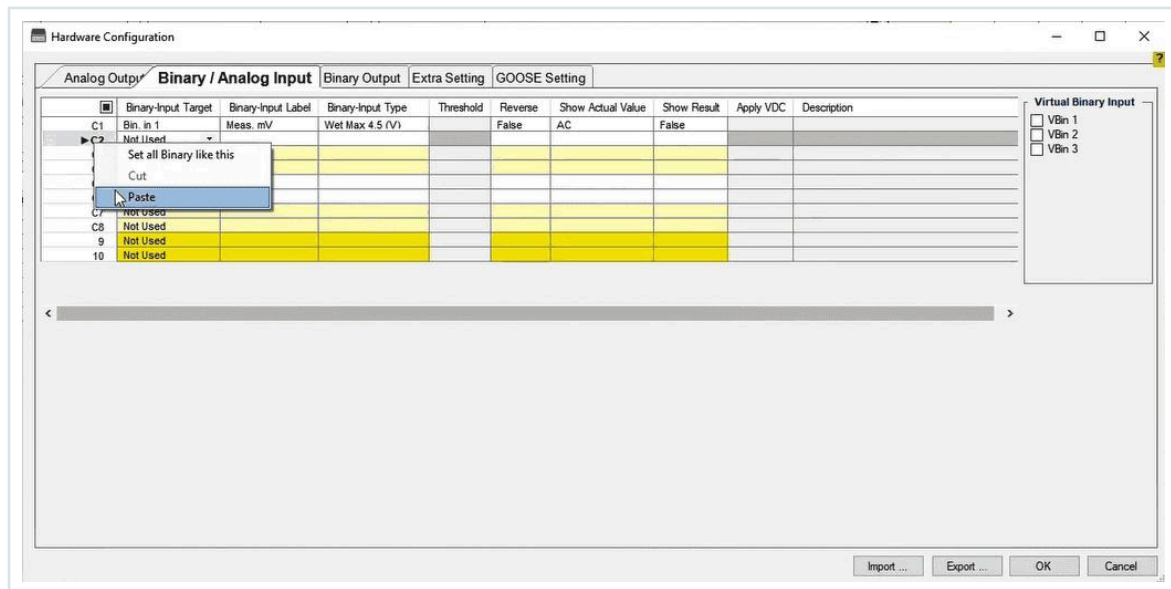


Figure 23

Since it is possible that some users have also performed a “Megger” test for this equipment and they wish to have its results in a report, in “Megger Test Report” tab, they can select their intended row and column and by pressing “Insert”, created their required table and after inserting the test results and selecting “Add to Report”, add the information to the output report. Other options such as “Delete Report” are used to delete information of this page from the report. Also, “Export” and “Import” options are used to export the information of this page as an output file and import it if necessary. If the user wishes to set the characteristics of the created row and column as default for this section of the room, they can use “Set as Default” option.

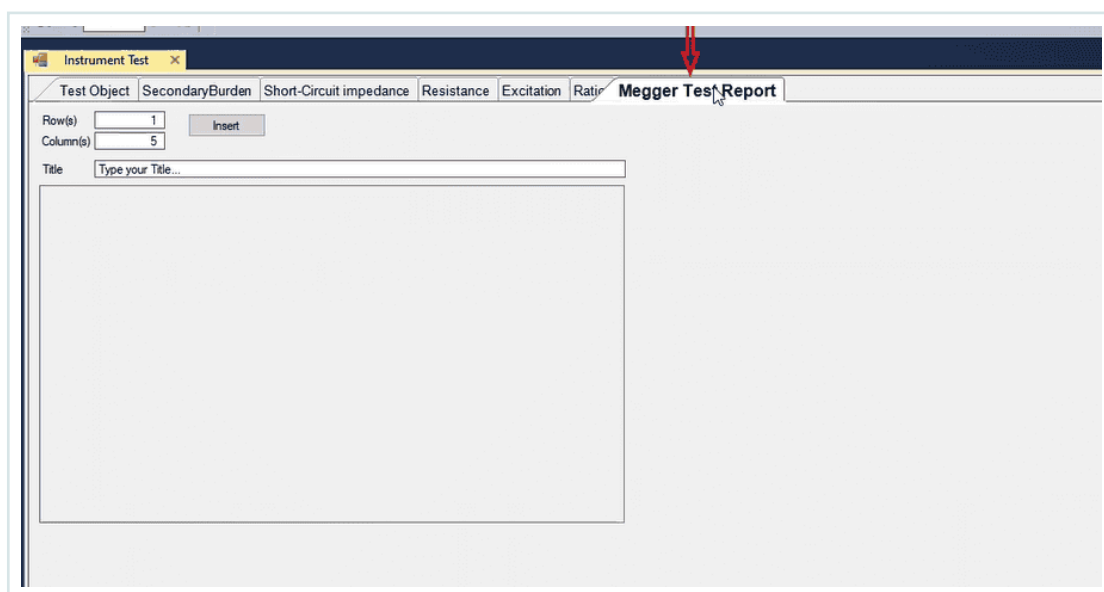


Figure 24

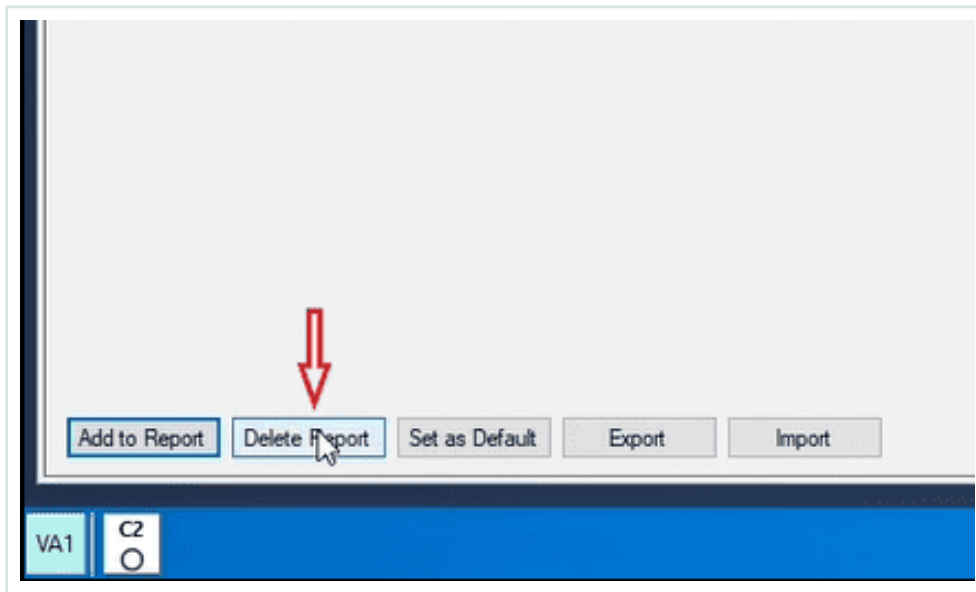


Figure 25

[jg1]Ratio\_Tab\_setting\_Register