VEBKO ONLINE HELP

“Vector Group, Turns Ratio and No Load” Tab

Category	**tester**
Section	**Transformer Module**
Language	**English**
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1 Imported Content

In the device and the software provided by Vebko Company, turns ratio, vector group and no load current tests are performed simultaneously. To perform this test, the voltage is applied from high voltage side and the voltage of low voltage side is measured using binary inputs. In measuring the LV side, the voltage and its angle are measured at the same time. Also, to measure no load current, actual current of voltage outputs are used. To perform this test, first, the test method must be selected from among "LL" and "LN" from "Test Setting" section in field "Test Method". In fact these methods determine the type of voltage applied to the primary; in "LL" the voltage applied is three phase while in "LN" the voltage is applied in form of phase to null or coil to coil. Note that in both of these methods, the secondary voltage measurement is done in coil to coil form. In "Direction" section, the direction of the conversion ratio test is specified; the conversion ratio test direction for a three-coil transformer is "Primary to Secondary" for a conversion ratio test between primary and secondary while it is "Primary to Tertiary" for a conversion ratio test between primary and tertiary. The test voltage is specified in "VLL" field while its corresponding phase voltage is specified in "VLE" field. In "Stage Time" section, the time of voltage application is specified; this time for "LL" method is the time of test while for "LN" method, this time equals the time of voltage application to each of the coils.

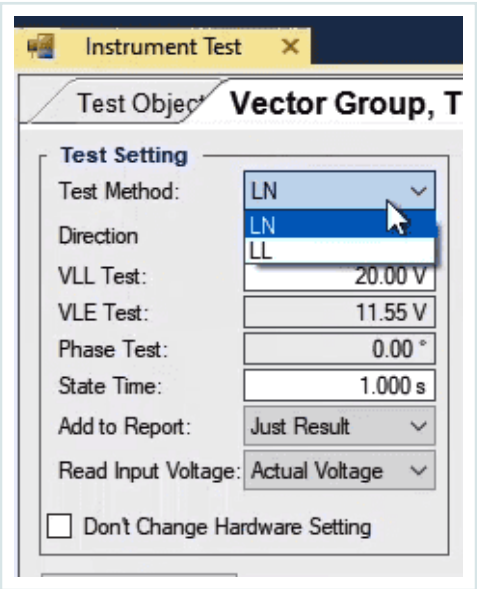

Figure 1

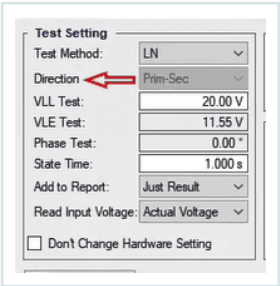

Figure 2

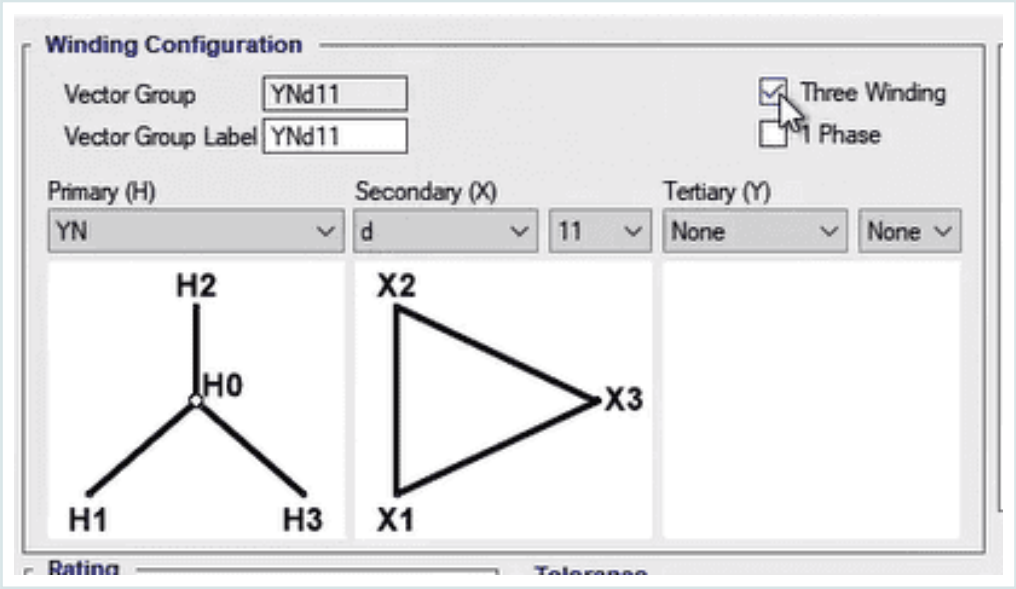

Figure 3

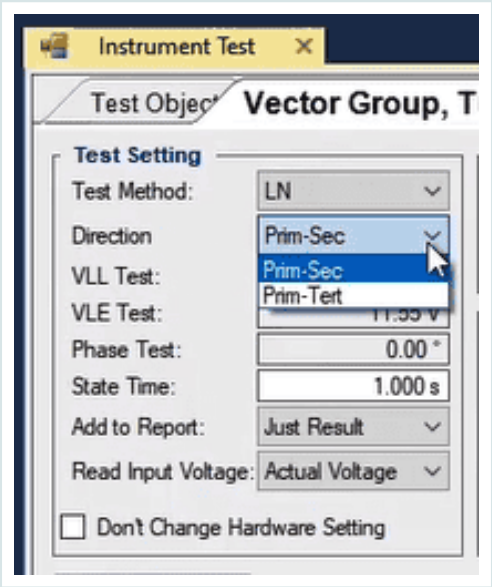

Figure 4

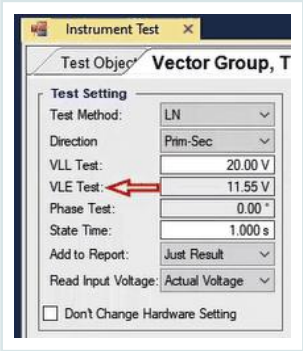

Figure 5

You can see two options of "Just Result" and "All Table" in "Add to Report" drop-down field. By selecting "Just Result", only those parts of the table whose test has been performed are added to the report. But if "All Table" is selected, the whole test table is added to the report.

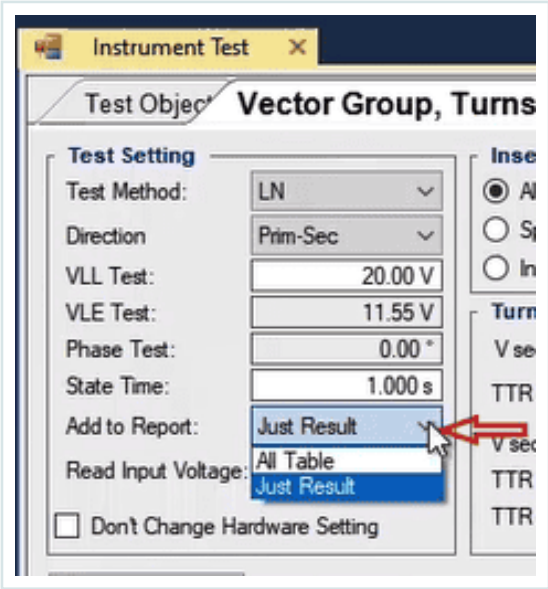

Figure 6

In "Read Input Voltage" field, the measurement method for the actual voltage applied from the device is specified which can be selected from among "Actual Voltage" and "Binary Input" of the device. In "Insert Mode" section, the settings related to inserting the number of "Taps" are adjusted. If you wish to insert all of the taps, you need to select "All Tap" and in "Sort Direction" field, specify that whether the taps are to be inserted from top to down or down to top by selecting "Up" or "Down". If you wish to test a specific tap, you need to select "Specific Tap" and then enter the number of your intended tap. Also, if you wish to insert a specific number of taps, you need to select "In Range" and then specify your intended range. After specifying the mentioned information, by selecting "Insert Rows", rows are inserted in the test table in accordance with the number of taps of the transformer. If you wish to insert a number of taps in a specific position in the table, you can use "Insert Position" section. For example, here taps number one and two are inserted above tap number one.

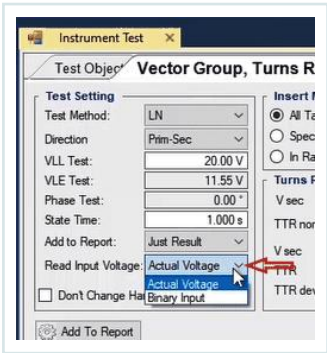

Figure 7

Figure 8

Figure 9

Performing a test for a transformer with off-load tap changer: to make a test file for a "Dyn11" transformer with three taps and "Offload" tap changer, "LL" should be selected as the "Test Method" and 50 volts line to line should be selected as the test voltage and "Up" should be selected as the "Sort Direction" for the taps. Then, by selecting "Insert Rows", the test table is created. To perform the test, first, you need to adjust the wiring in accordance with the picture. In this wiring, the voltage resources are connected to the primary side of the transformer and to measure the voltage, the secondary of the transformer is connected to the inputs of the device according to the picture. Next, "Apply Test" must be selected after selecting the intended row in the software. Here, all three rows of a "Tap" are selected and then by pressing "Apply Test" the test is performed and the results are recorded. The results of this test are recorded in "I Prim. Meas.", "V Sec. Meas.", "TTR Act.", "TTR Dev.", "Phase Meas." and "Phase Dev." columns respectively. The mentioned parameters stand for no load current, the measured secondary voltage, the measured actual conversion ratio, the diversion of the conversion ratio from the specified value, the measured phase and its diversion from the actual value respectively. After performing the test, the results of the test are assessed in "Assessment" column based on the factors entered in "Tolerance" section. Considering these factors, the maximum allowed conversion ratio fault is 0.5 percent and the maximum allowed phase diversion is 5 degrees;

since the conversion ratio fault of phase number two is above the specified amount, the assessment of this row fails and the two other phases pass. It is possible to view the result for any of the phases categorized as "Turn Ratio Result", "Vector Group Result" and "Current" by selecting its corresponding row.

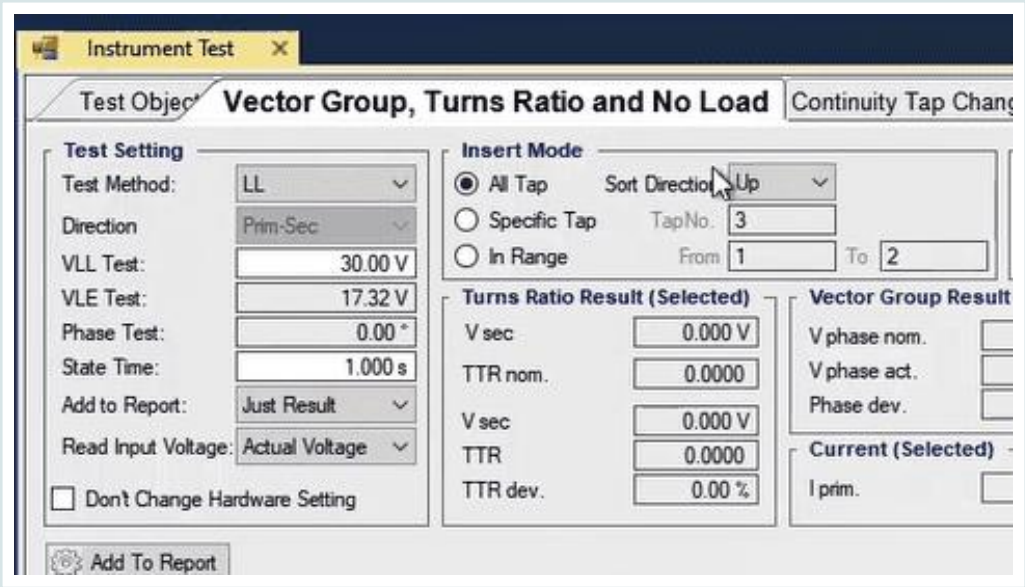

Figure 10

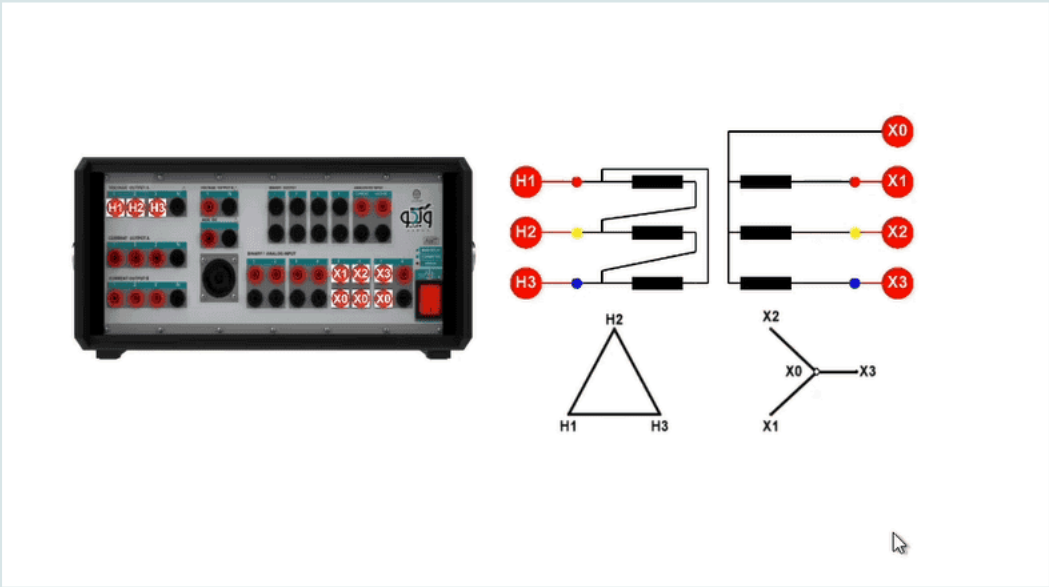

Figure 11

Figure 12

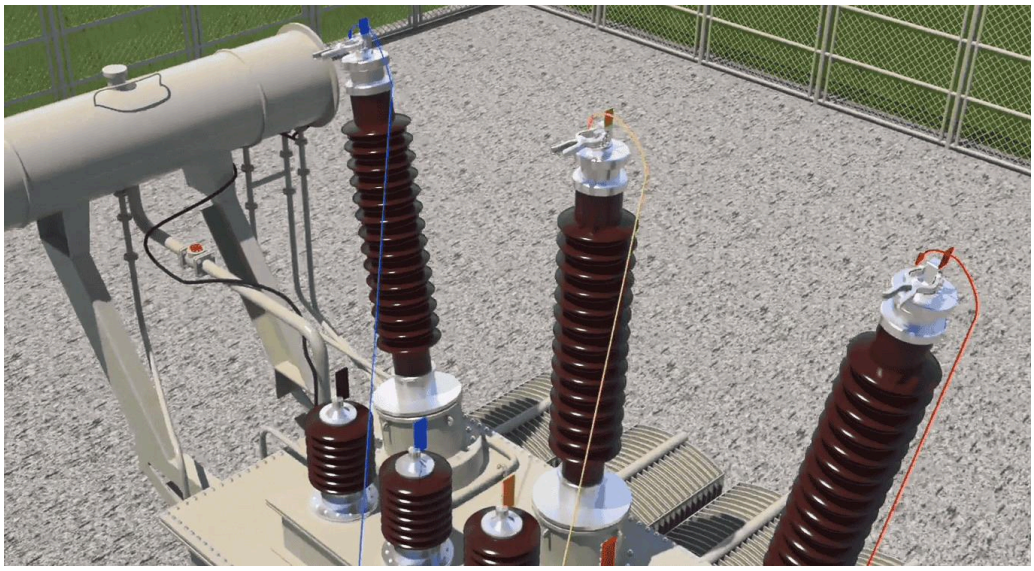

Figure 13

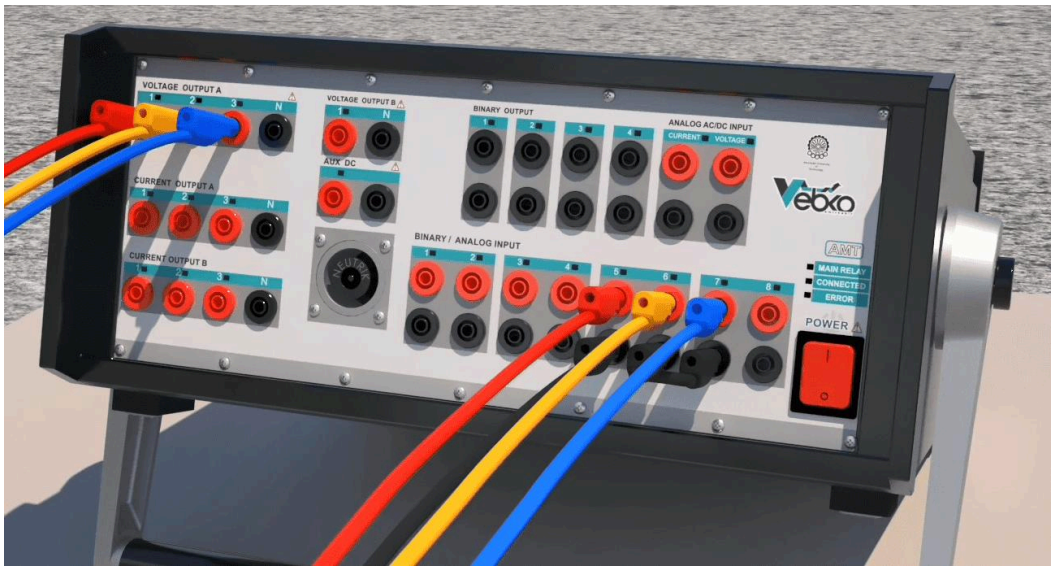

Figure 14

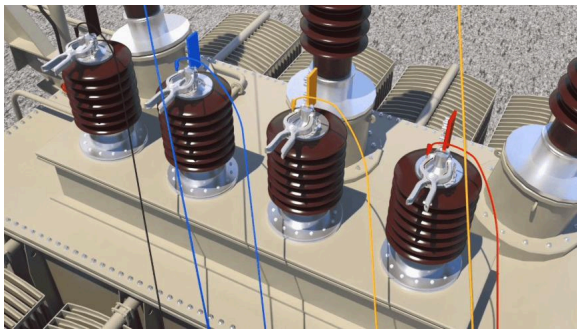

Figure 15

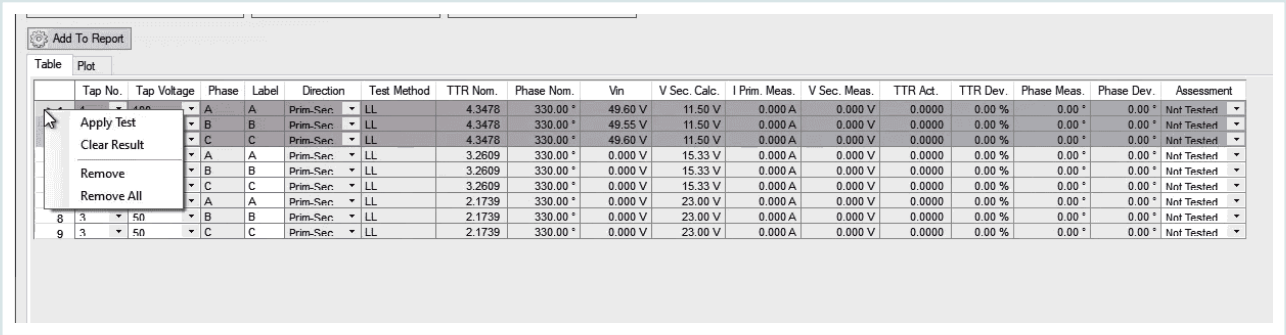

Figure 16

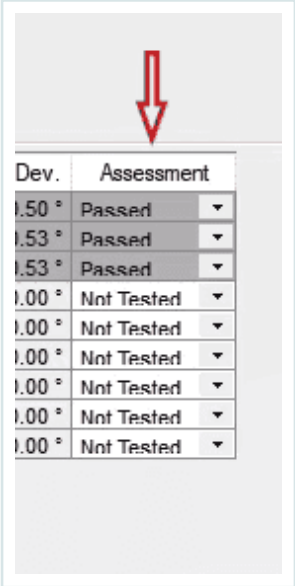

Figure 17

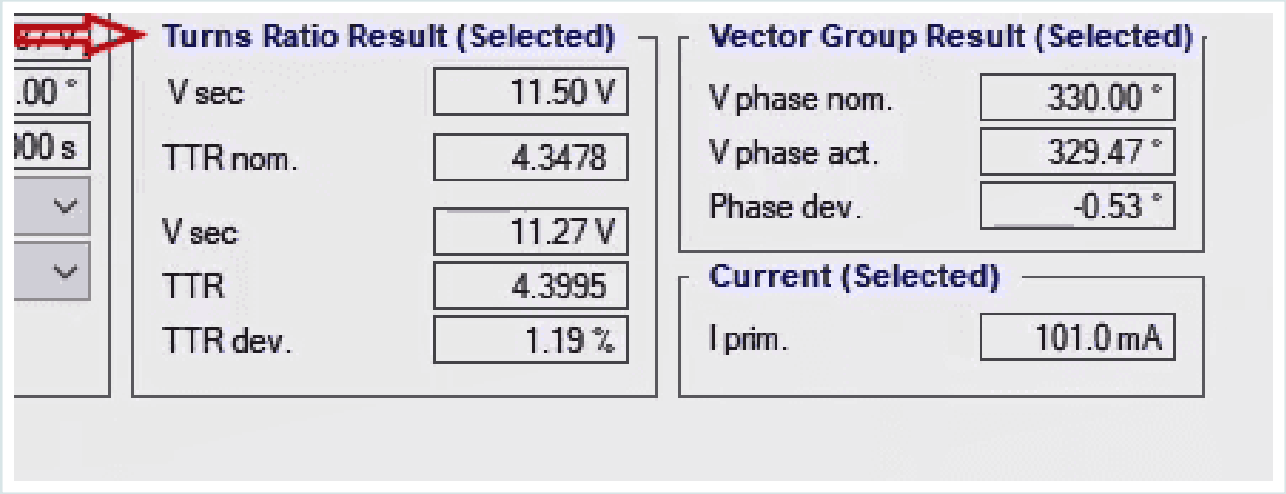

Figure 18

Also in "Plot" section, the results of the test as well as the changes of the parameters measured in different taps are displayed in form of diagrams. In this section, "TTR", "Ratio dev", "V phase", "Phase dev" and "No load Current" diagrams are displayed for every phase and it is possible to remove the diagram by unchecking it.

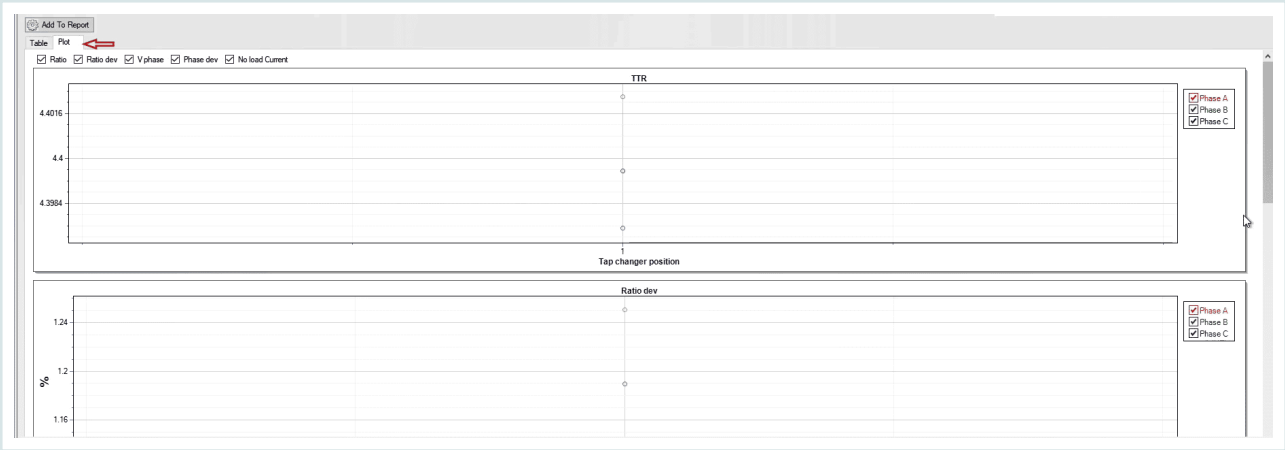

Figure 19

Performing the test for a transformer with "On Load" tap changer: There are three methods to perform a test for a transformer with "On Load" tap changer. "Manual" method: in this method, it is possible to select all rows of the table and then "Apply the Test". After the test is finished for every tap, a message stating that "To Continue the Test, Press the Space Button" appears. In this case, you need to change the transformer tap manually and then continue the test by pressing the space button. This procedure continues until the last tap is tested.

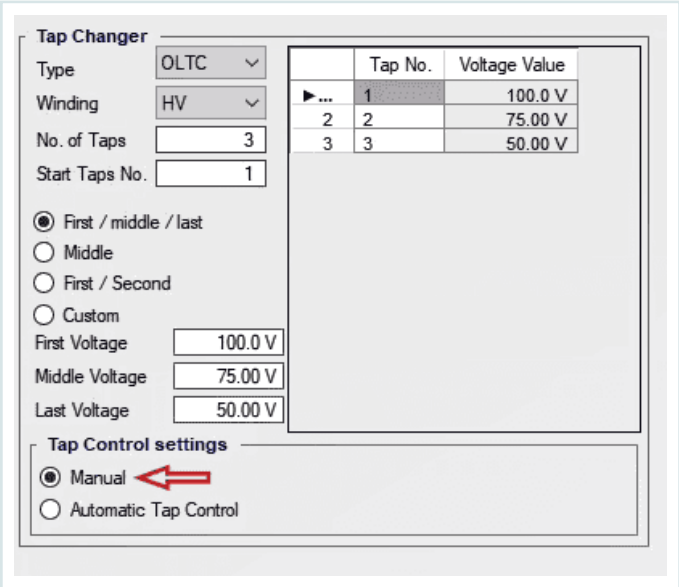

Figure 20

"Automatic Tap Control, By time" method: in this method which has its own wiring, from the "Tap

Changer" command panel, you should take two contacts of "Raise" and "Lower" to the binary out of the device in accordance with what can be seen in the wiring so that after testing every "Tap", the command is applied to "Tap Changer" as long as the value specified in "Impulse" field and the "Tap" change operation begins. By applying the "Tap" change command, after the time specified in "Time" field, the next "Tap" test begins. This time is allocated for waiting for the "Tap Changer" to settle on the next "Tap" of the transformer. This procedure continues until the last "Tap" test is performed. In performing this test, just like the "Manual" method, "Apply Test" is selected after selecting all of the rows. After applying, the test begins automatically.

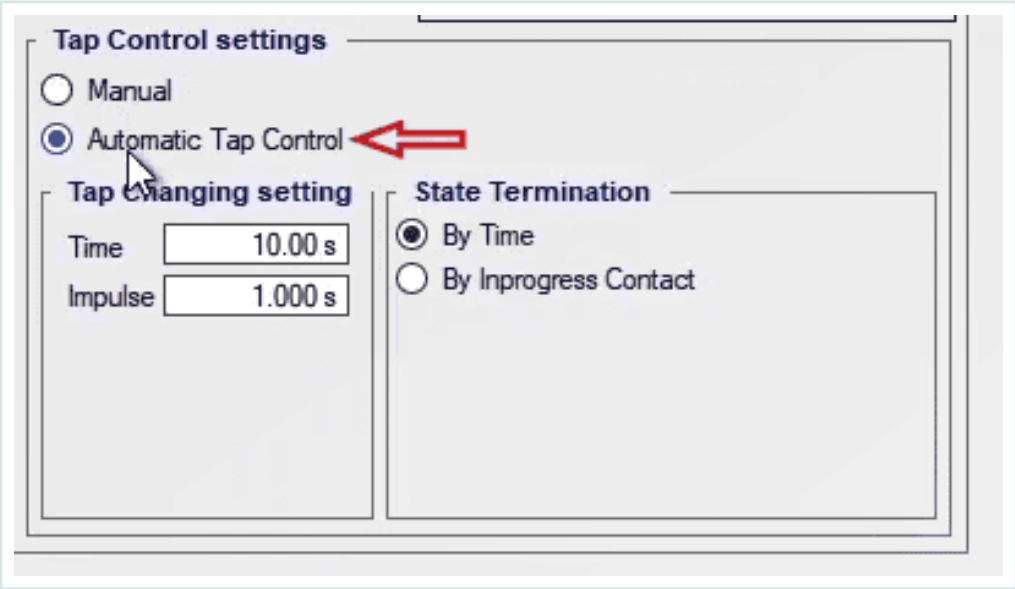

Figure 21

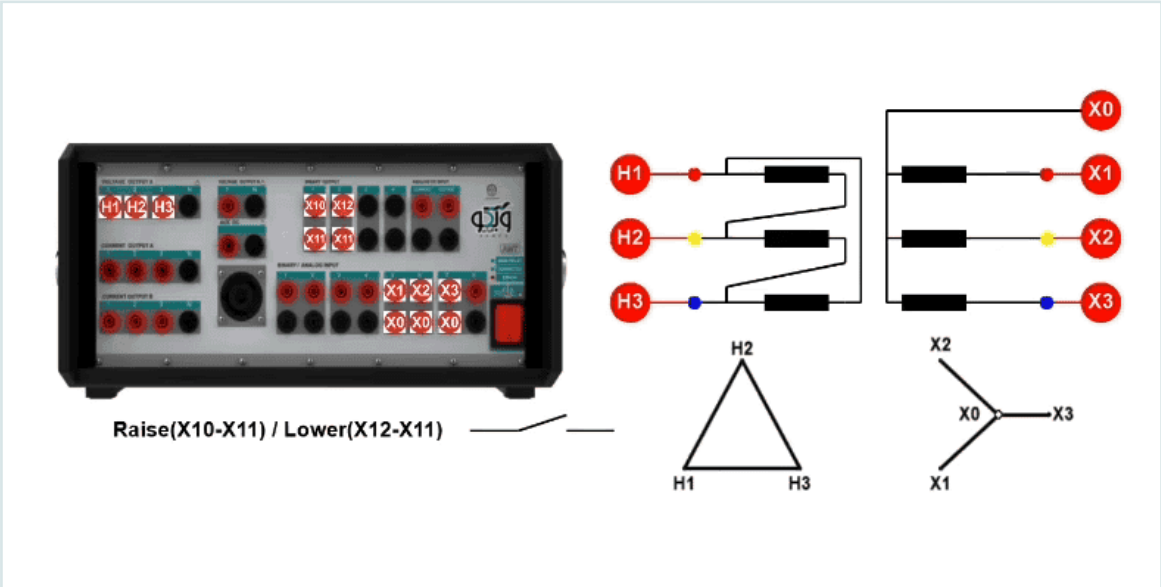

Figure 22

"Automatic Tap Control, By Inprogress" method: this method has one more step of wiring than the

previous method and in addition to time, it has the condition of contact reception. This means that, from the command panel, two contacts that indicate the state of "Tap Changer" should be brought to the input number 8 of the device so that if the "Tap" change occurs before the specified time, the next "Tap" test begins. In performing this test, like other methods, "Apply Test" is selected after selecting all of the rows. After applying the test, it begins automatically.

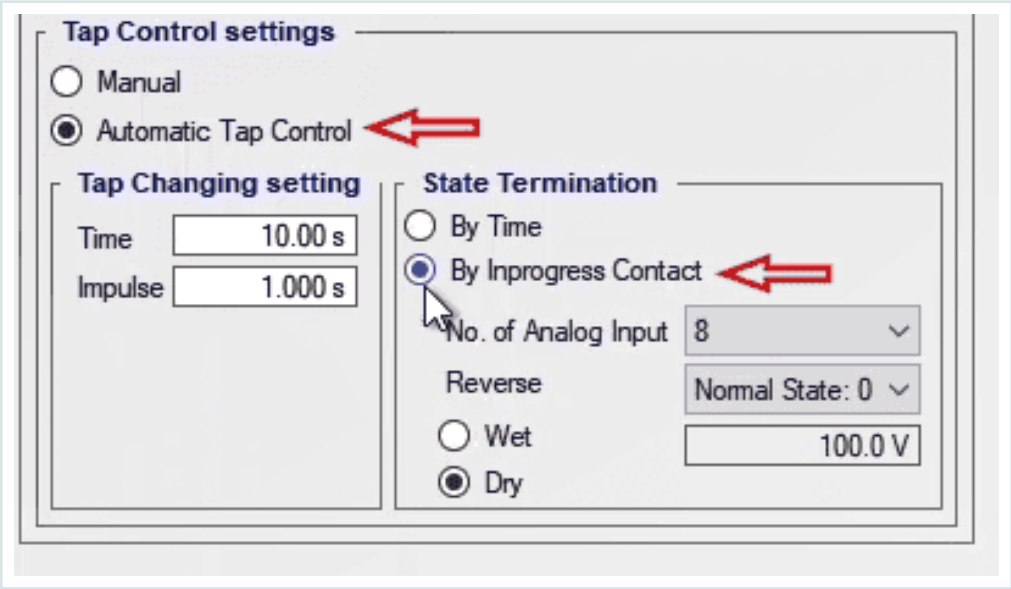

Figure 23

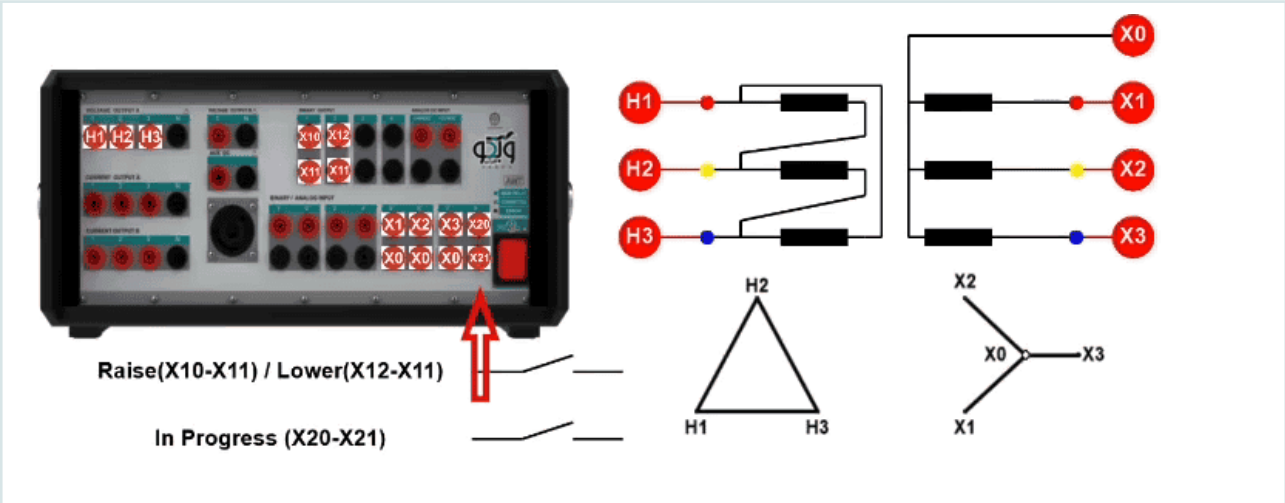

Figure 24

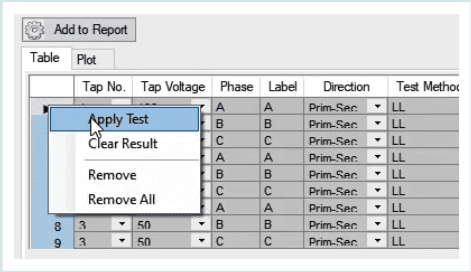

Figure 25

[jg1]Vector_group_conversion_ratio_and_no_load_current_tests