



VEBKO ONLINE HELP

“Winding Resistance” Tab

Category	tester
Section	Transformer Module
Language	English
Generated	2026-10-18

*One of the most common and important tests of transformers is the winding resistance test. In this test the amount of "DC" resistance or "Rmeas" is calculated by dividing the voltage measured through the binary inputs by the injected current. To perform this test, first, you need to specify the primary or secondary side among "HV" and "LV" in "Side" field. Note that, if the transformer has three windings, "TV" is added to the two mentioned options. Then, you need to specify the test time and current in "I Test" and "State Time" fields in "State Setting" section, respectively. Since transformers have a big self-inductance and core, in the beginning of DC injection, there is a huge difference between the actual current and the specified current and after some time, the actual current is equal to the specified time. This time is entered in the "Initiated Time" field. Due to the fluctuation in voltage and DC current during this time, the measured resistance has a lot of fluctuations. Since resistance measurement must happen in a situation with the least voltage and DC current fluctuations, the maximum allowed fluctuations of the impedance and the shortest time during which the measured impedance needs to fluctuate below the "Nominal Stability" value are specified in "Nominal Stability" and "Stable Time" fields, respectively. The current measurement mode is specified in "Current Measurement Mode" section and if the current is below 0.6 amps, "Analog Input" should be selected while if it is higher than 0.6 amps, "Actual Current" should be selected.

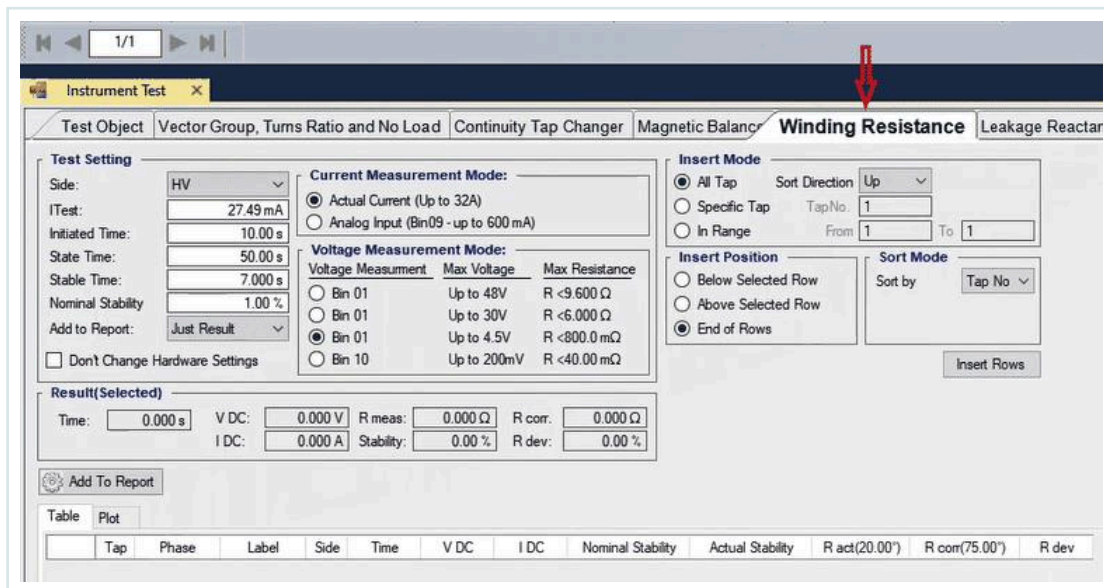


Figure 1

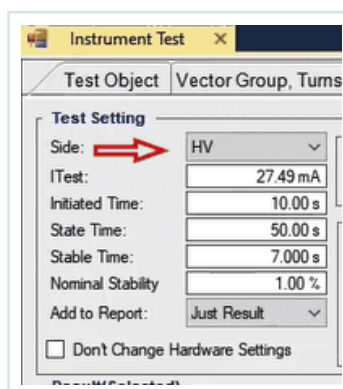
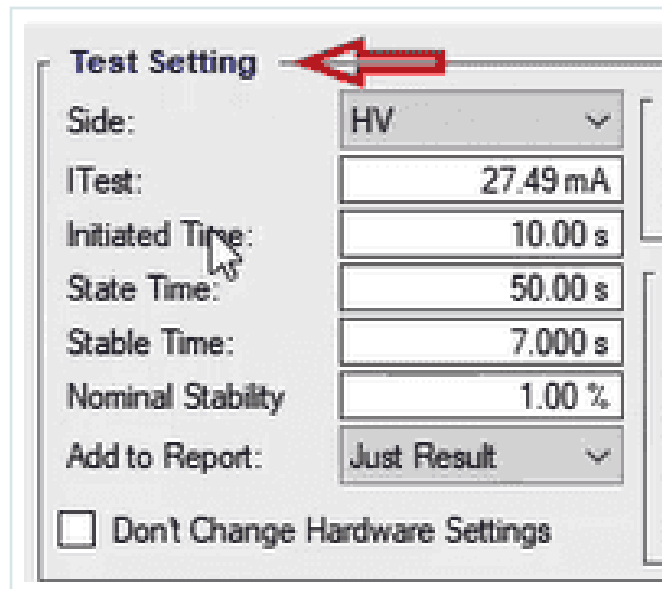


Figure 2



Test Setting

Side: HV

I Test: 27.49 mA

Initiated Time: 10.00 s

State Time: 50.00 s

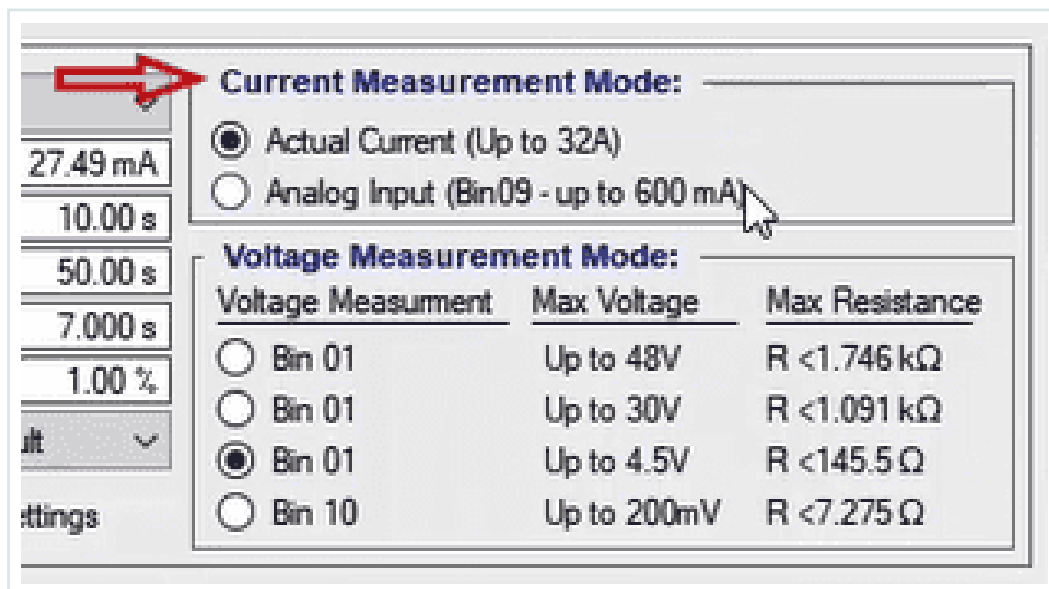
Stable Time: 7.000 s

Nominal Stability: 1.00 %

Add to Report: Just Result

☐ Don't Change Hardware Settings

Figure 3



Current Measurement Mode:

☒ Actual Current (Up to 32A)

☐ Analog Input (Bin09 - up to 600 mA)

Voltage Measurement Mode:

Voltage Measurement	Max Voltage	Max Resistance
☐ Bin 01	Up to 48V	R <1.746 kΩ
☐ Bin 01	Up to 30V	R <1.091 kΩ
☒ Bin 01	Up to 4.5V	R <145.5 Ω
☐ Bin 10	Up to 200mV	R <7.275 Ω

Figure 4

*The voltage measurement mode is specified in "Voltage Measurement Mode". Since the resistance measurement method divides voltage by the current, voltage Range of the binary inputs affects the measurement accuracy. Therefore, it is necessary to select one of the inputs of this section for measurement based on the winding resistance and the maximum resistance specified to each binary input. If the resistance is bigger than the specified range, the device shows an "Overvoltage" error, in which case, you need to either decrease the current or increase the resistance measurement range. Also, if you are facing an "Error Other" of the current outputs, you need to decrease the current.

Voltage Measurement Mode: 

Voltage Measurement	Max Voltage	Max Resistance
☐ Bin 01	Up to 48V	R <1.746 kΩ
☐ Bin 01	Up to 30V	R <1.091 kΩ
☒ Bin 01	Up to 4.5V	R <145.5 Ω
☐ Bin 10	Up to 200mV	R <7.275 Ω

Figure 5

Test Setting

Side:

ITest:

Initiated Time:

State Time:

Stable Time:

Nominal Stability:

Add to Report:

☐ Don't Change Hardware Settings

Current

☒ Actual 

☐ Analog

Voltage Measurement

☐ Bin 01

☐ Bin 01

☒ Bin 01

☐ Bin 10

Figure 6

*The order and the position of the "Taps" of the transformers are specified in "Insert Mode" and "Insert Position" section. The mentioned section has already been explained in the video related to the test. Another one of the most important options of the software, which helps a lot in accelerating the test, is "Sort Mode". Generally, for tap changer transformers it is suggested that this option is set at "Phase"; by doing so, it is possible to test all taps of a phase and then go to the next phase. But if "Tap No." is selected, first you need to measure the resistance of all three phases and then change the tap. For example, suppose that your transformer has 21 taps. By setting "Sort Mode" at Phase and selecting "Insert Rows" you can see that the rows are arranged according to the selected phase which helps a lot to increase the speed of the test. After creating the table, you need to select the intended row and then adjust the wiring according to the guide picture and then run the test by pressing "Apply Test".



Figure 7

Table	Plot	Tap	Phase	Label	Side	Time	VDC	IDC	Nominal Stability	Actual Stability	R act(20.00°)	R corr(75.00°)	R dev
1		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
2		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
3		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
4		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
5		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
6		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
7		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
8		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
9		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
10		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
11		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
12		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
13		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
14		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
15		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
16		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
17		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
18		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
19		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
20		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
21		A	A	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
22		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
23		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
24		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
25		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
26		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
27		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
28		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
29		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
30		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
31		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
32		B	B	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
33		R	R	HV	▼	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %

Figure 8

1 Running the Test and Analyzing the Results

*To perform this test, for example, the "HV" side with three "Offload" taps and 0.5 amps of current is tested for all three taps. The settings related to time is left at its default and "Sort by" is set at "Phase" and then by pressing "Insert Rows", the test table is created. The "Signal View" window is opened so that it is possible to view the current changes of the read voltage. To perform the test, the first row is selected, the wiring is adjusted in accordance with the guide picture. Then the first row is selected and test runs by pressing "Apply Test". By running the test, the changes of the measured voltage as well as the injected current can be viewed. You can see that by changing the voltage and

the current, the value of "Stability" changes as well and the test goes on until these changes reach below 1 percent. After the time test is finished, the actual voltage and current, "Stability" and the measured and corrected resistance (according to the reference temperature) are inserted in "Test Object". To continue the test, two other rows are selected and the test is applied. Then, the wiring is adjusted for the next phase according to the guide picture and three rows are selected and the test is applied. After the test is finished, in "Plot" tab, the curve resistance change in different "Taps" and phases can be viewed. In the end, by pressing "Add to Report", the results are added to the report.

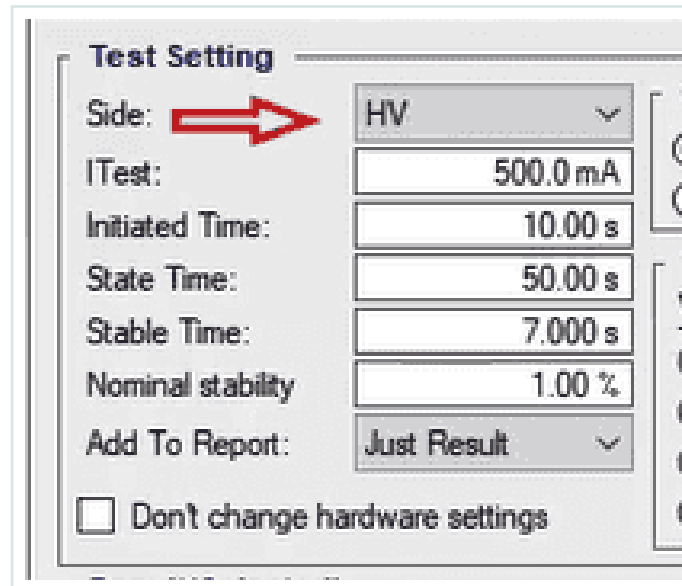
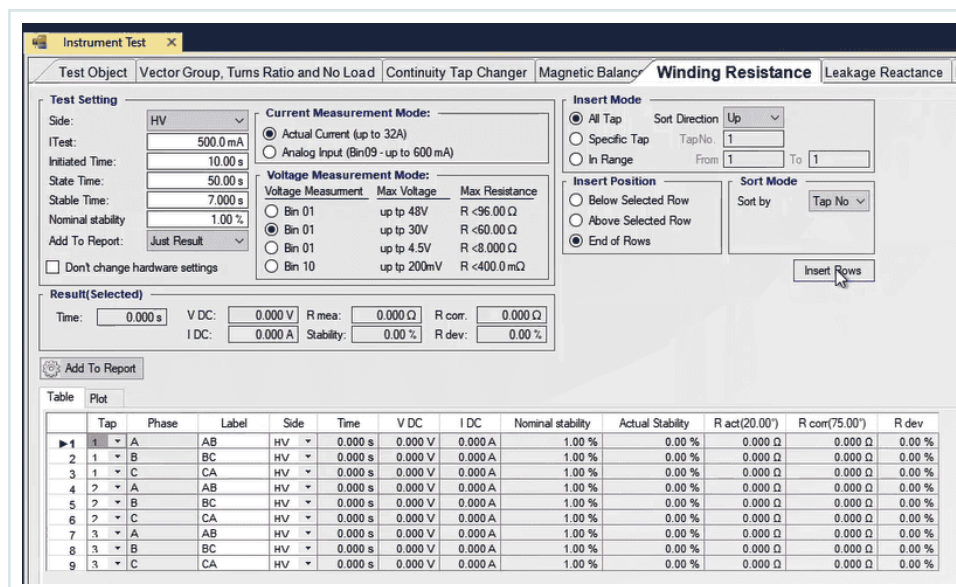


Figure 9



Tap	Phase	Label	Side	Time	V DC	I DC	Nominal stability	Actual Stability	R act(20.00')	R corr(75.00')	R dev
1	A	AB	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
2	B	BC	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
3	C	CA	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
4	A	AB	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
5	B	BC	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
6	C	CA	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
7	A	AB	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
8	B	BC	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
9	C	CA	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %

Figure 10



Figure 11



Figure 12

Add To Report

Table Plot

	Tap	Phase	Label	Side	Time	V DC	I DC	Nominal Stability	Actual Stability	R act(20.00°)	R cor(75.00°)	R dev
1	1	A	AB	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
			BC	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
			CA	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
			AB	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
			BC	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
			CA	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
			AB	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
8	3	B	BC	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %
9	3	C	CA	HV	0.000 s	0.000 V	0.000 A	1.00 %	0.00 %	0.000 Ω	0.000 Ω	0.00 %

Apply Test
Clear Result
Remove
Remove All

Figure 13

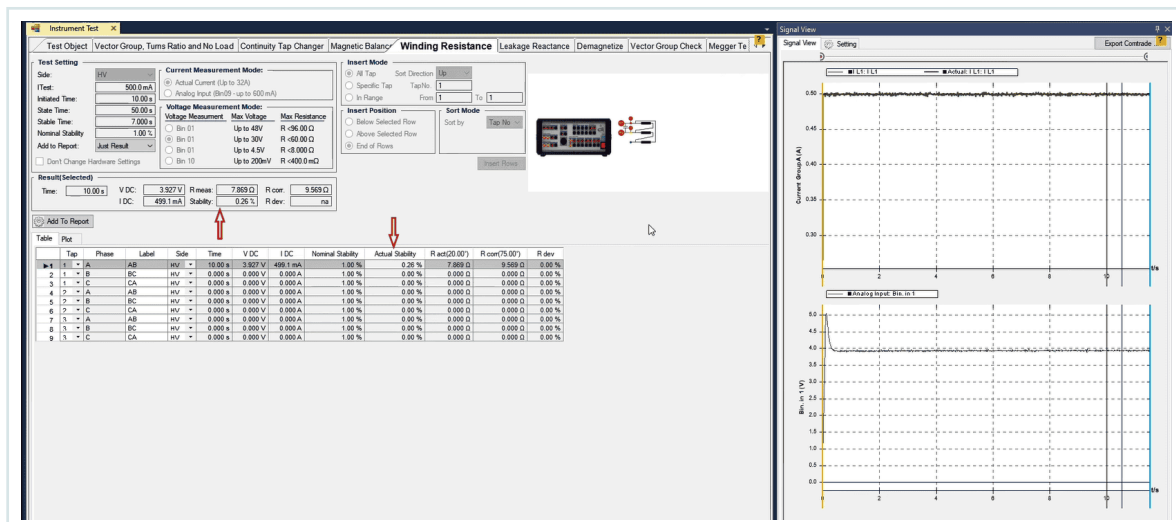


Figure 14

Add to Report: Just Result

☐ Don't Change Hardware Settings

☐ Bin 01 Up to 4.5V R <8.000 Ω

☐ Bin 10 Up to 200mV R <400.0 mΩ

Result(Selected)

Time: V DC: R meas: R corr:

I DC: Stability: R dev:

Figure 15

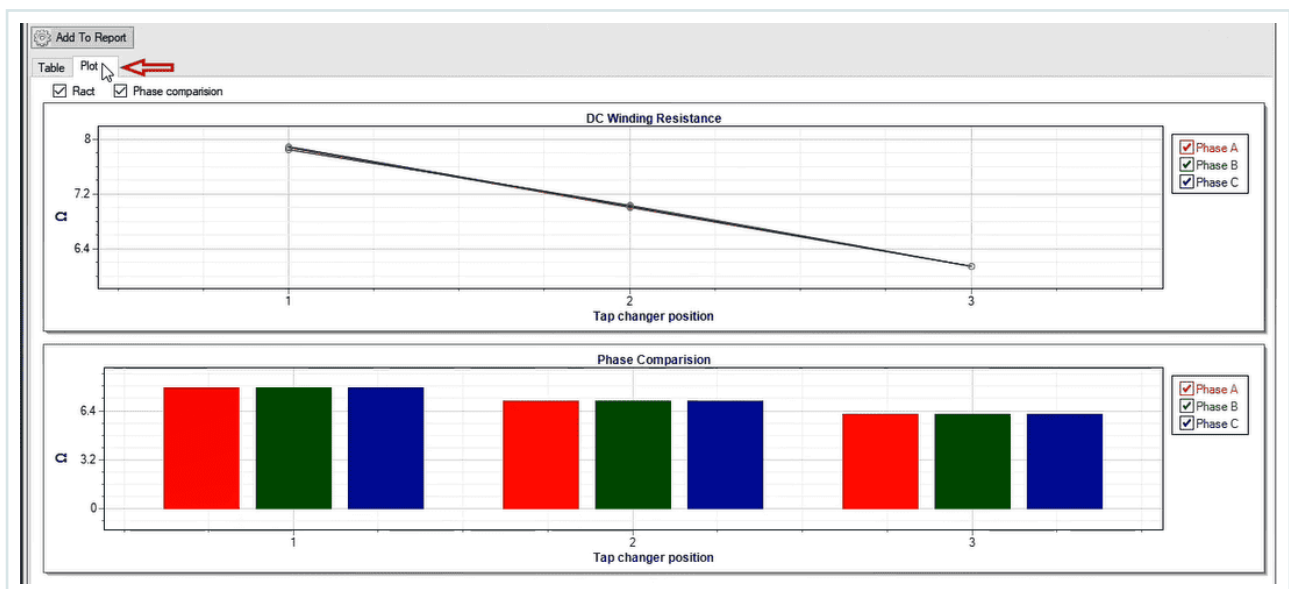


Figure 16

Report

AMPro Transformer:

1) Abstract:

1-1) Date and Time

Type	Date	Time
Report Date and Time(Period)	1999-10-01	10:18:07.44 PM

1-2) Test Module

Name: AMT Sequencer Version: 99102041

User Name: VEBKO Computer Name: PC-YENKA

Equipment: AMT-100 Serial Number: 243

2) Test Result:

2-1) Transformer Winding Resistance Test

2-1-1) Test Settings:

Test Settings

Setting	Value
Scale	10V
Print	500.000
Scale Time	50.00%
Current Measurement	Actual Current
Mode	Bin 01_20V
Voltage Measurement	Mode

2-1-2) Wiring:

2-1-3) Assessment:

* Measurements (sorted by Phase):

Tap	Phase	Label	Scale	Time	VDC	IDC	R act	Stability	R corr	R dev
1	A	7.865	3.927	499.1	7.865	0.26	9.569	na		
2	B	6.4	3.927	499.1	6.4	0.26	9.569	na		
3	C	6.4	3.927	499.1	6.4	0.26	9.569	na		

Report Signal View Table View Detail View (3) State 1 Measurement View

Figure 17

****Some Points about Winding Resistance Test**

*Since these transformers have a huge self-inductance, injecting "DC" current causes huge voltage "Spikes" and the more the injected current, the bigger the created voltage. This voltage causes two problems: the first problem is "Error Overvoltage" of the inputs of the device; as you know, if the voltage of the input is more than 0.1 second bigger than the value specified for it, the device displays an error. Therefore, if the caused voltage "Spikes" have too long durations, the device may display an error. Another problem is the voltage that occurs to the "Mosfets" of the device. In case of injecting too big currents, this voltage damages the device. Therefore, we suggest to consider these points while injecting the current.

[jg1]Winding_Resistance_Tab