



VEBKO ONLINE HELP

Resistance Test

Category	tester
Section	Resistance Test
Language	English
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By clicking on "Resistance" on the "Start" page of the software, ohm resistance test room opens. In this room it is possible to measure ohm resistance of various equipment in the "Resistance Test" tab. "Test Object" and "Megger Test Report" tabs are used to enter the nominal information of the equipment and the results of the "Megger" test, respectively.

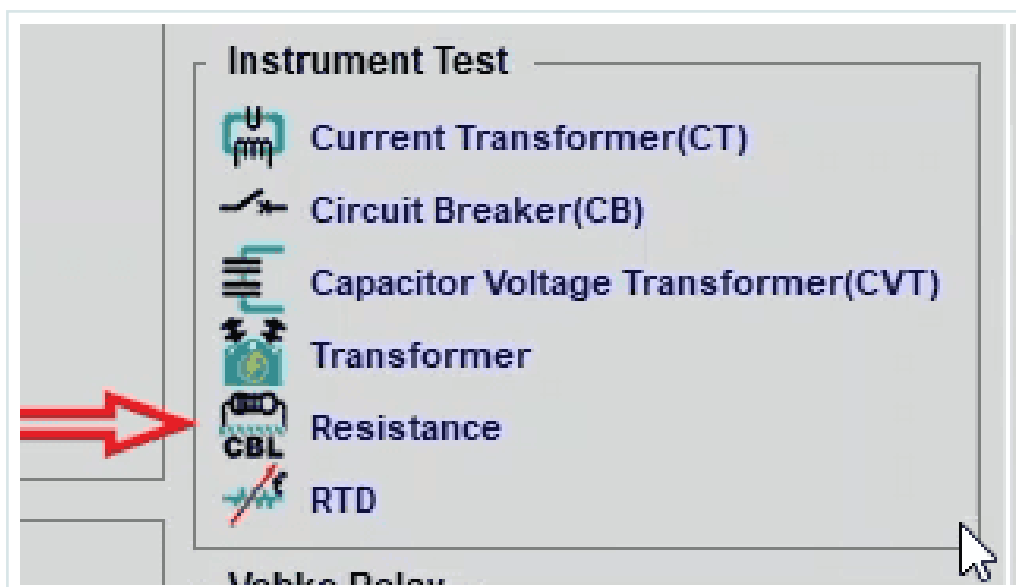


Figure 1

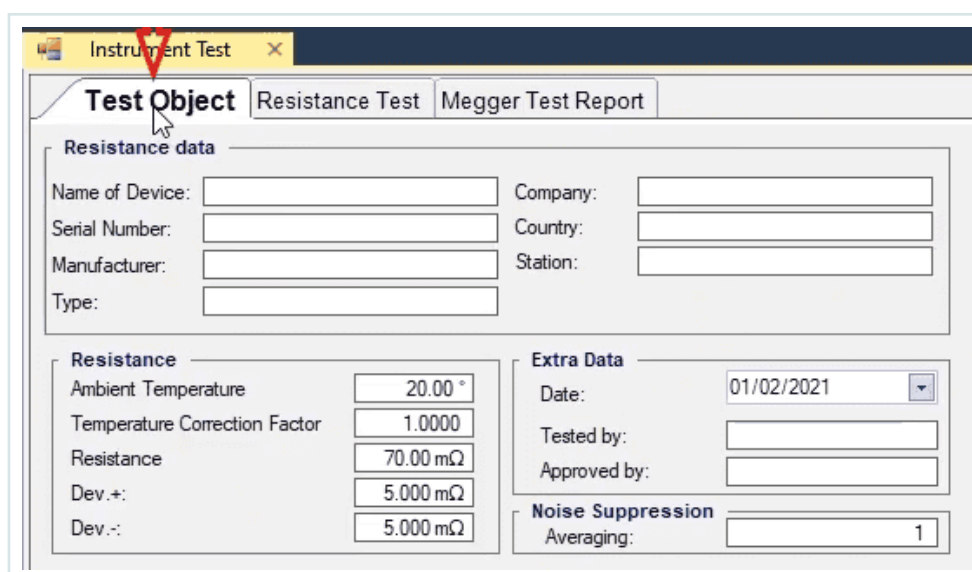


Figure 2

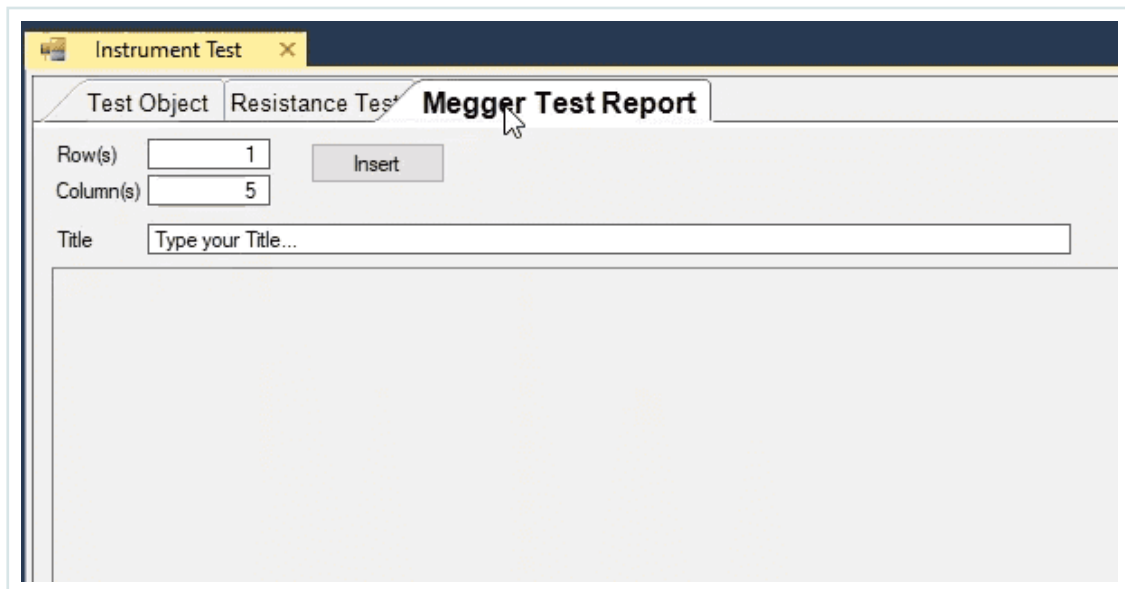


Figure 3

1 “Test Object” tab:

To perform a test, every module needs information about the equipment. This information is entered in “Test Object”. In “Resistance Data” section, the general information about the piece of equipment which is to be recorded in the output report is entered. The name of the equipment, serial number, name of manufacturer, type, name of company, name of country and the address to the location and the power station where the equipment is installed are entered in “Name of Device”, “Serial Number”, “Manufacturer”, “Type”, “Company”, “Country” and “Station” fields, respectively, to be added to the report.

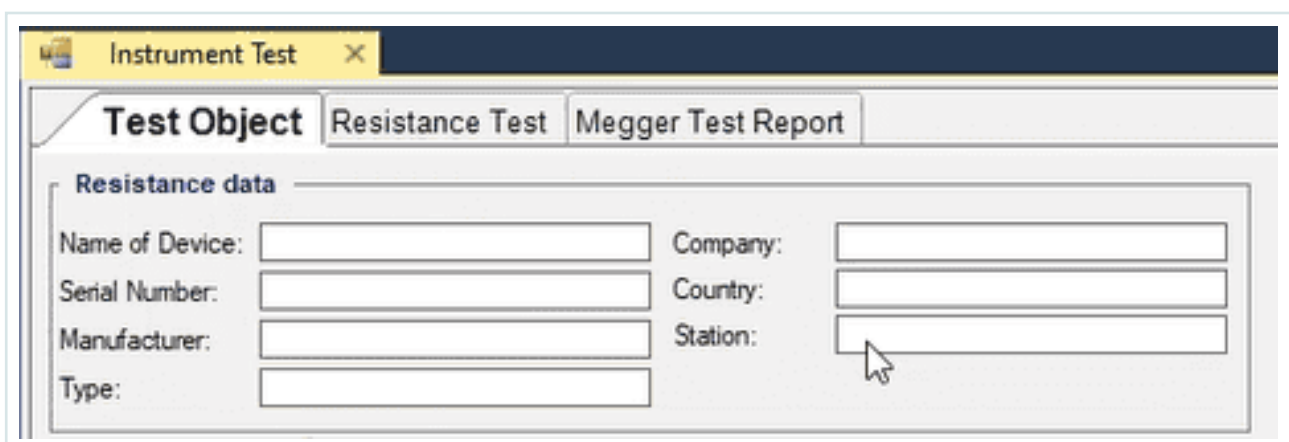
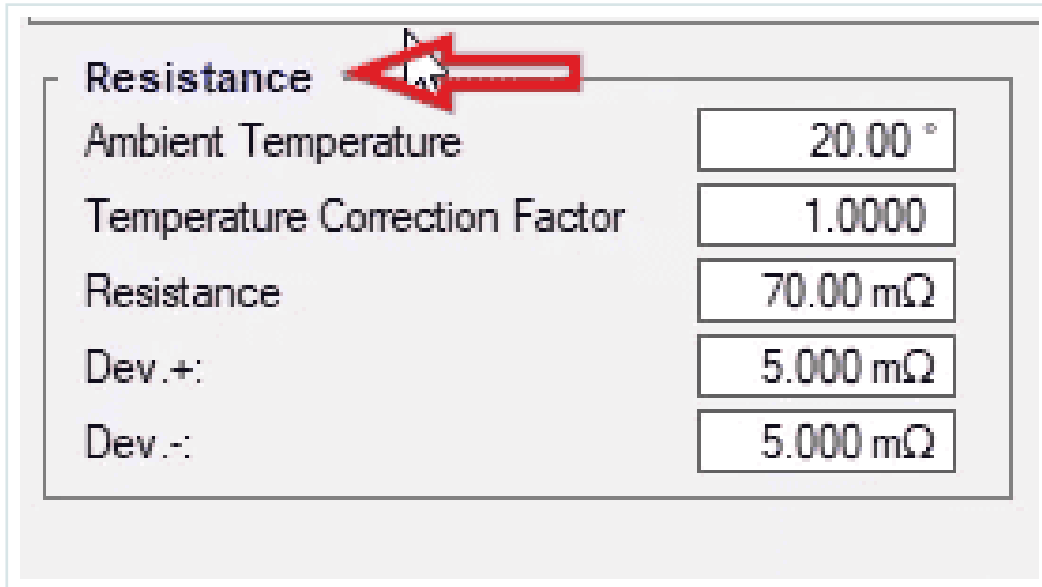


Figure 4

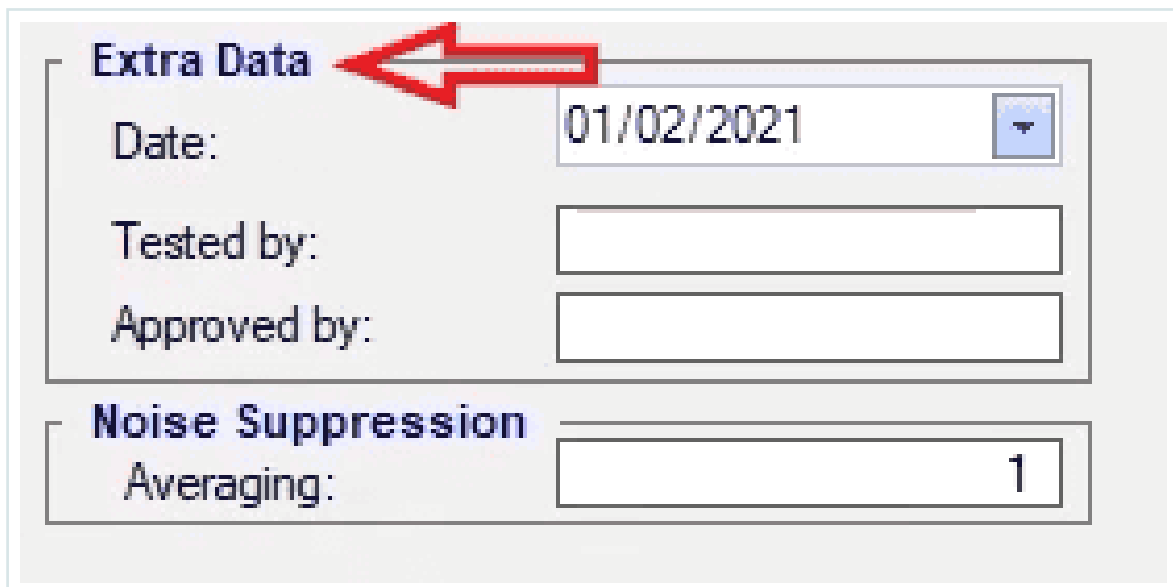
In "Resistance" section, the temperature and ohm range of the equipment are entered. The ambient temperature is entered in "Ambient Temperature" field while the temperature correction factor in accordance with the current ambient temperature and the reference temperature, and also the coil material, the amount of ohm resistance, and Dev+ and Dev- of the resistance tolerance are entered in "Temperature Correction Factor" field.



Resistance	
Ambient Temperature	20.00 °
Temperature Correction Factor	1.0000
Resistance	70.00 mΩ
Dev.+:	5.000 mΩ
Dev.-:	5.000 mΩ

Figure 5

In "Extra Data" section, the date of testing in Gregorian calendar, the information of the performer of the test, and the information of the supervisor are entered in "Date", "Tested By" and "Approved By" fields, respectively.



Extra Data	
Date:	01/02/2021
Tested by:	
Approved by:	
Noise Suppression	
Averaging:	1

Figure 6

The RMS value of each parameter is calculated based on the average of several time periods. The bigger number of time periods, the longer the calculation takes which consequently leads to higher accuracy and less fluctuations. The number of time periods is entered in Averaging field in Noise Suppression section. This field is the same as No. of Period field in Setting in Signal View window.

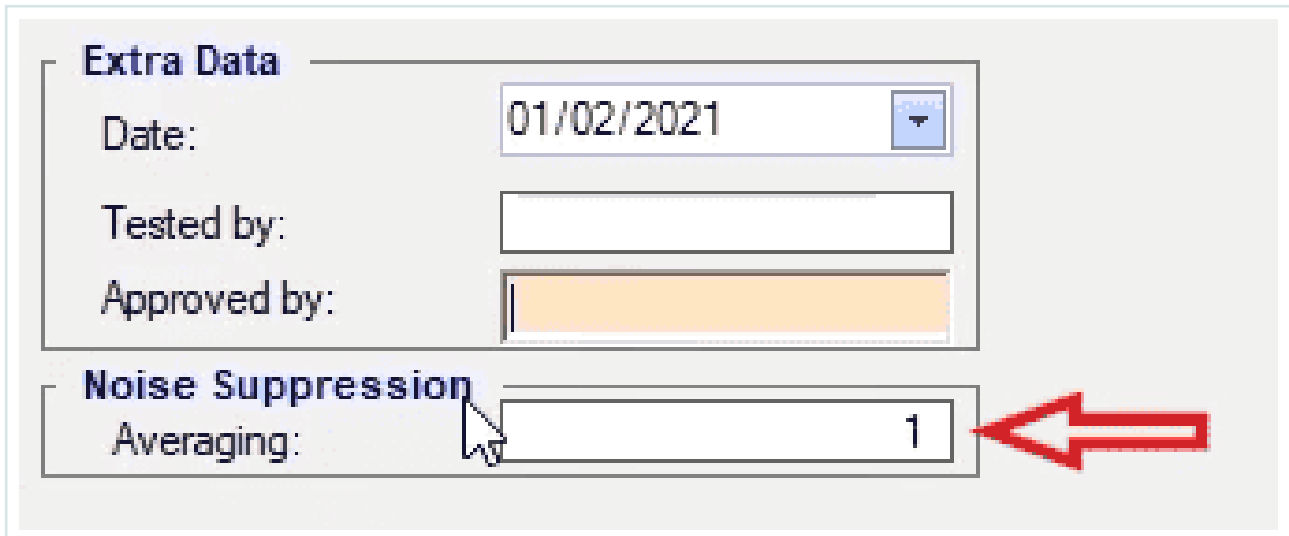


Figure 7

By clicking “Add to Report” option at the box at the bottom of the screen, this information is added to the report and a message saying “Report was added to the list” is displayed. It is possible to view the report by selecting “Report” window from the right toolbar. By clicking on “Delete Report” in the “Delete from Report” window, the added report is removed from the “Report” window. If “Set as Default” is selected, the entered information is set as default and displayed every time the “Resistance” room is opened.

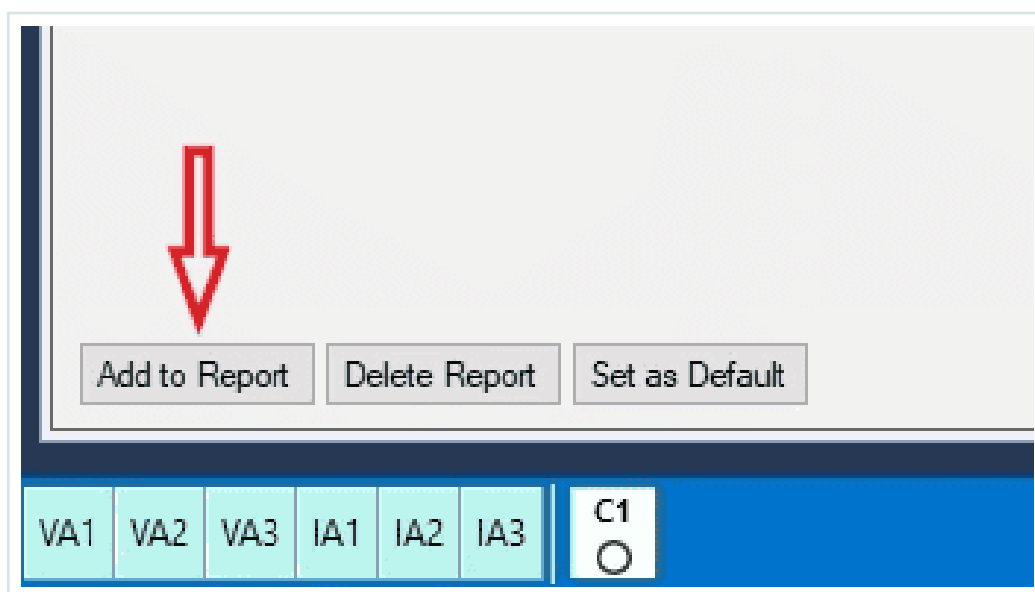


Figure 8

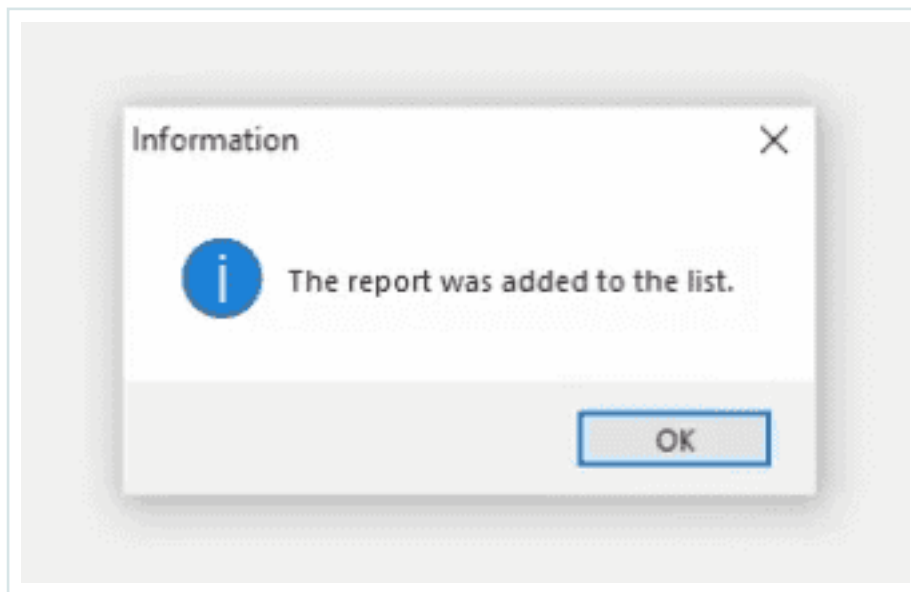


Figure 9

Report

PDF

AMPro Resistance:

1) Abstract:

1-1) Date and Time

Type	Date	Time
Report Date and Time(Persian):	1399/11/13	06:31:57.63 PM

1-2) Test Module

Name: AMT Sequencer Version: 99111201
 User Name: VEBKO Computer Name: PC-YEKTA
 Equipment: AMT105 Serial Number: 524

Edit & Delete Report

2) Test Object:

Tested By:

Date	Tested By	Approved By
01/02/2021		

Device data:

Device	Serial Number	Company	Country	Station	Manufacturer	Type

Resistance:

Ambedded temperature	temperature correction factor	Resistance	Dev+	Dev-
20.00°	1.0000	70.00mΩ	5.000mΩ	5.000mΩ

Report

Signal View Table View Detail View (SI: State 1) Measurement View

Figure 10

Manufacturer: Station:

Type: Delete From Report

Resistance: 20.00°
 Ambient Temperature: 1.0000
 Temperature Correction Factor: 70.00mΩ
 Resistance: 5.000mΩ
 Dev+: 5.000mΩ
 Dev-: 5.000mΩ

Delete From Report

Can Delete a report that added into main report in RESISTANCE mode Resistance Test

Row Index	Title	Insert Date Time
1		1399/09/01 16:31:55

Delete Selected Report

OK

Cancel

Add to Report Delete Report Set as Default

Figure 11

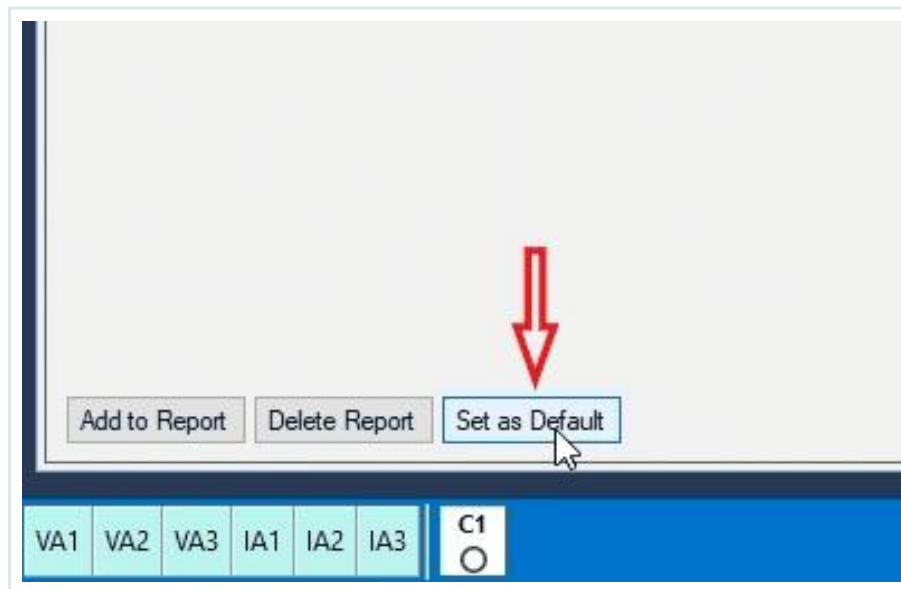


Figure 12

2 “Resistance Test” tab

To perform this test, it is necessary to enter the test current, time and the intended input for measuring the voltage in “State Setting” section in “I test”, “State Time” and “Analog Input Target” fields, respectively. Also, if the resistance of the equipment is low and you wish to have a more accurate measurement, it is recommended to select “Input 10”. In the next step, the connection type is to be selected from among “D-3ph, Y-3ph and Yn-3ph/1ph” in “Object Type” section.

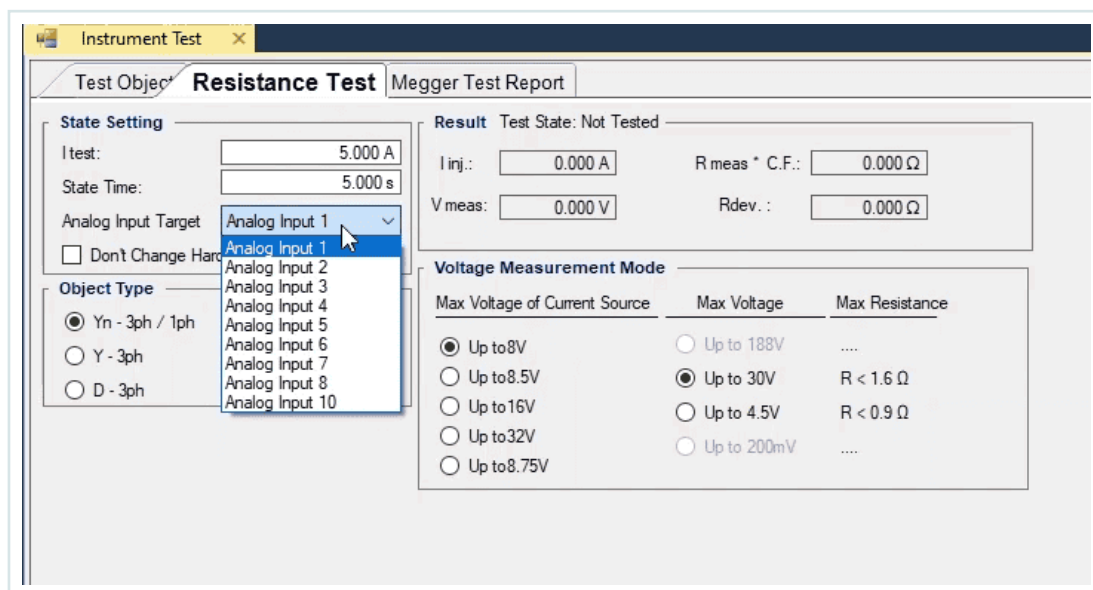


Figure 13

$$R=V/I$$

If the single-phase or three-phase equipment which is to be tested is star point grounded, the first radio button should be selected and the wiring should be adjusted in accordance with the range of the injected current as well as the voltage level as can be seen in the figure. The equivalent circuit for this type of wiring is displayed as follows and the ohm resistance is calculated using the following relation:

$$R=V/I$$

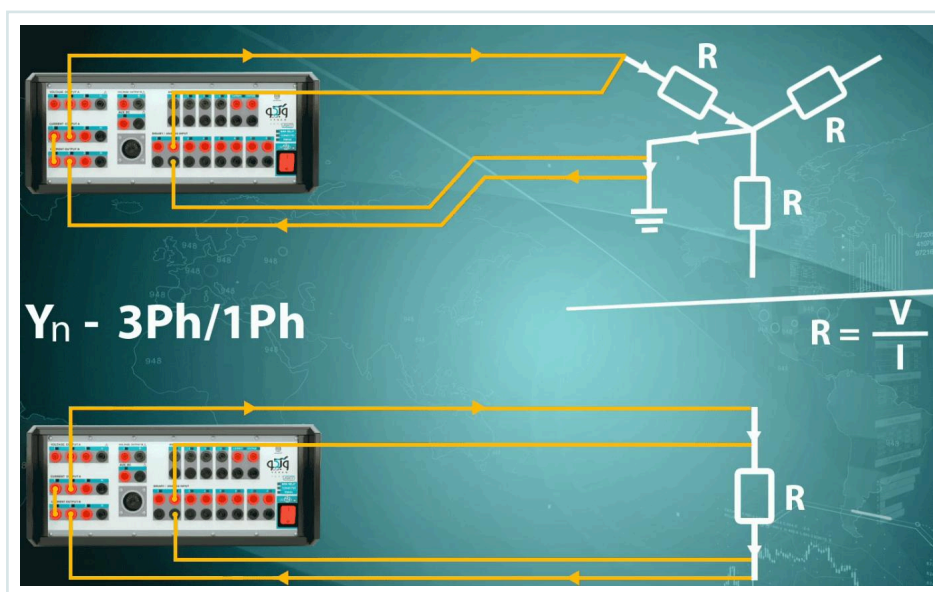


Figure 14

$$2R=V/I$$

For a three-phase equipment without a null point the second radio button should be selected and the wiring should be adjusted in accordance with the range of the injected current as well as the voltage level seen in the figure. The equivalent circuit for this type of wiring is displayed as follows and the ohm resistance is calculated using the following relation:

$$2R=V/I$$

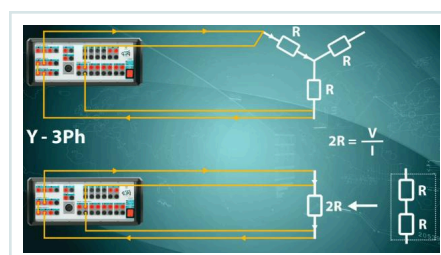


Figure 15

In D-3ph method, the wiring is adjusted in accordance with the range of the injected current and the voltage level as can be seen in the figure. The equivalent circuit for this type of wiring is displayed as follows and the ohm resistance is calculated using the following relation:

$$(2/3)R = V/I$$

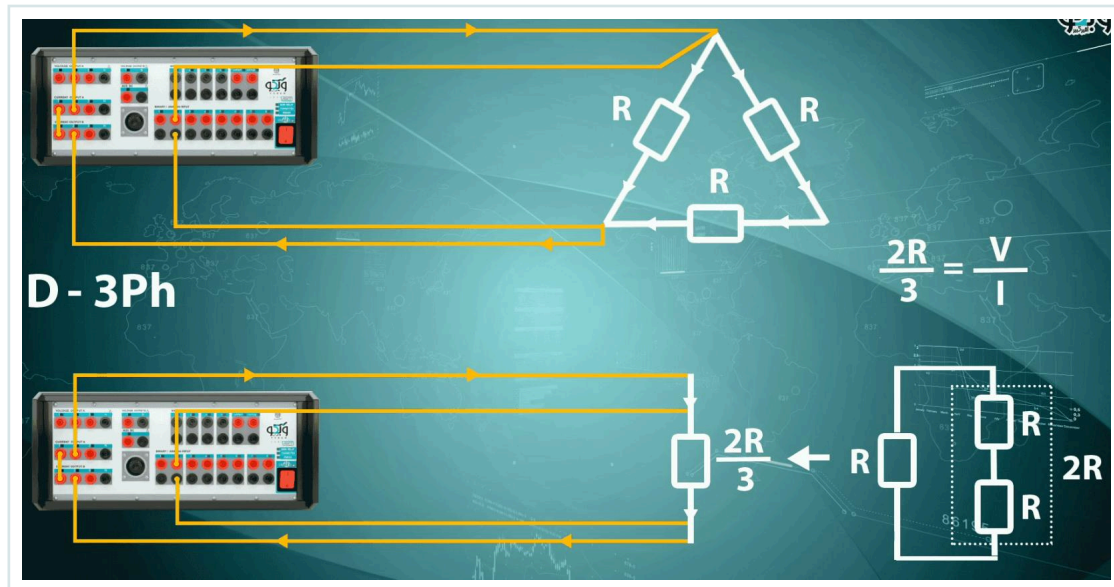


Figure 16

The voltage measurement mode is specified in "Voltage Measurement Mode". Since the method used to measure the resistance is dividing the voltage difference by the current, "Range" of the "Inputs" voltage is effective in measuring the accuracy of resistance. Therefore, for measuring the resistance, one of the inputs of this section should be selected in accordance with the coil resistance and the maximum resistance specified for every "Input". If the resistance is greater than the selected "Range", the device shows an "Overvoltage" error. In this case, either the current must be decreased or the resistance measurement "Range" must be increased. In case of facing an "Error Other" of the current outputs, the current needs to be decreased.

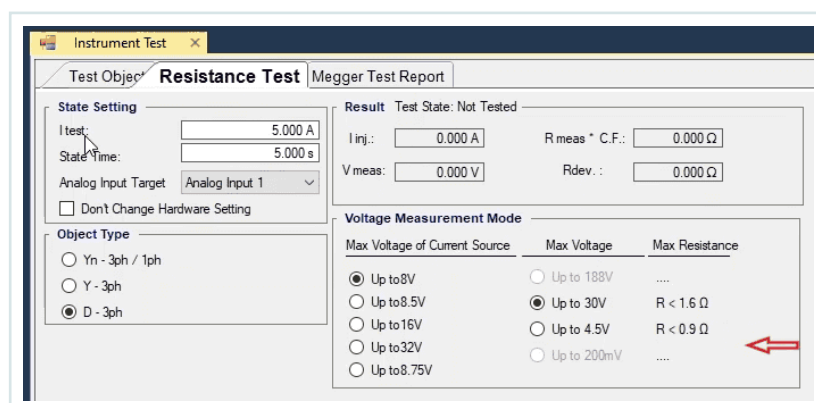


Figure 17

3 Running the test and analyzing the results

To begin the test, first in Test Object 200 milli ohm, 50 milil ohm, 10 amps, 1 second are specified as ohm resistance, upper and lower tolerance, current and test duration, respectively; also Input2 is selected "Analog Input Target". Then, Object Type is set at "Yn-3ph/1ph" and "VoltageMeasurement Mode" is set at Up to 28V and since the approximate resistance is smaller than 200 milli ohm, Max Voltage is set at Up to 4.5V and then wiring is adjusted according to the figure. It should be noted that it is possible to magnify the figure by double-clicking on it. In this wiring, "IA1" and "IB1" current output phases are "Jumpered" and "IA2" and "IB2" phases are directly connected to the equipment.

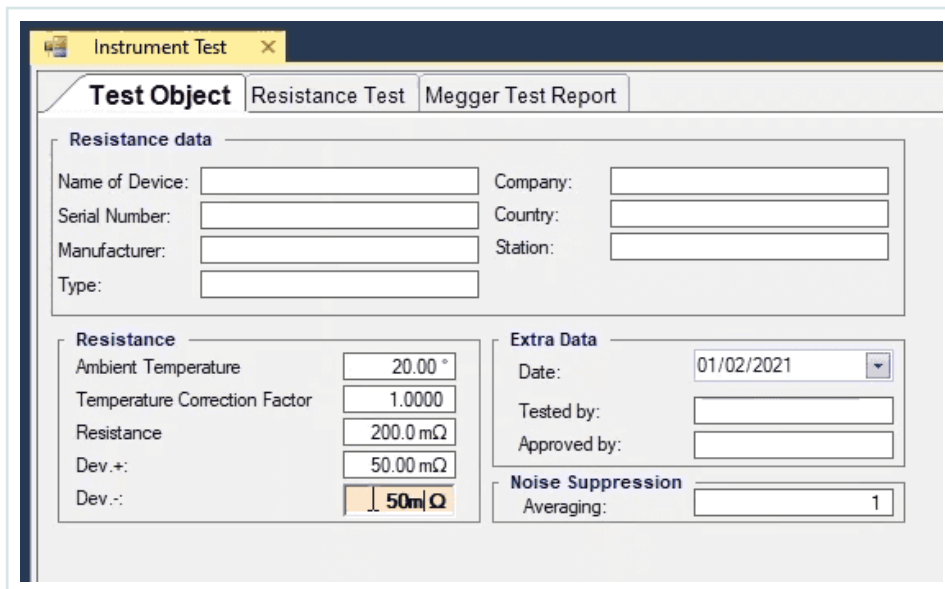


Figure 18

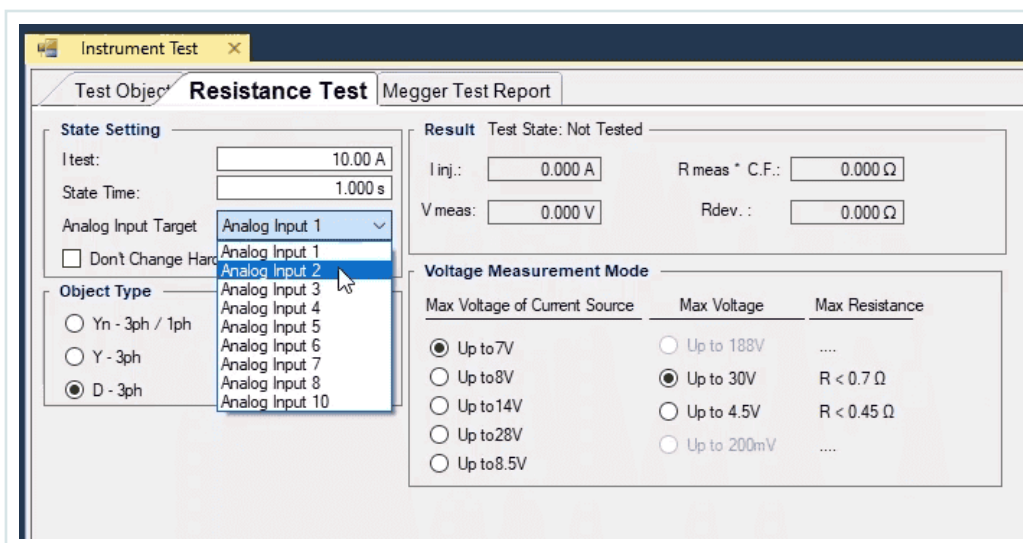
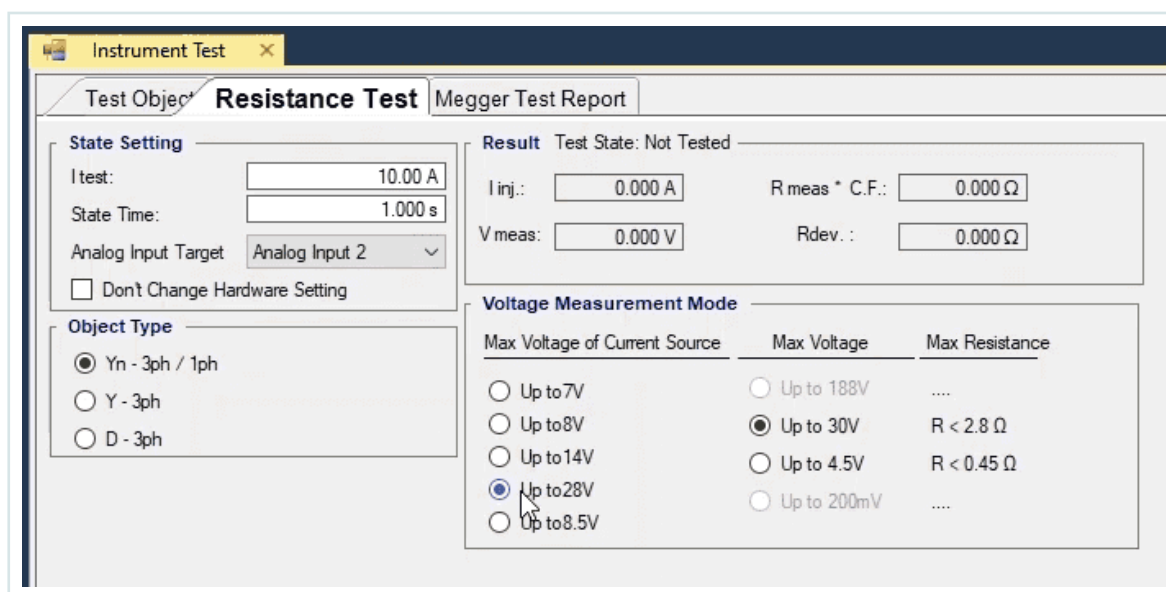
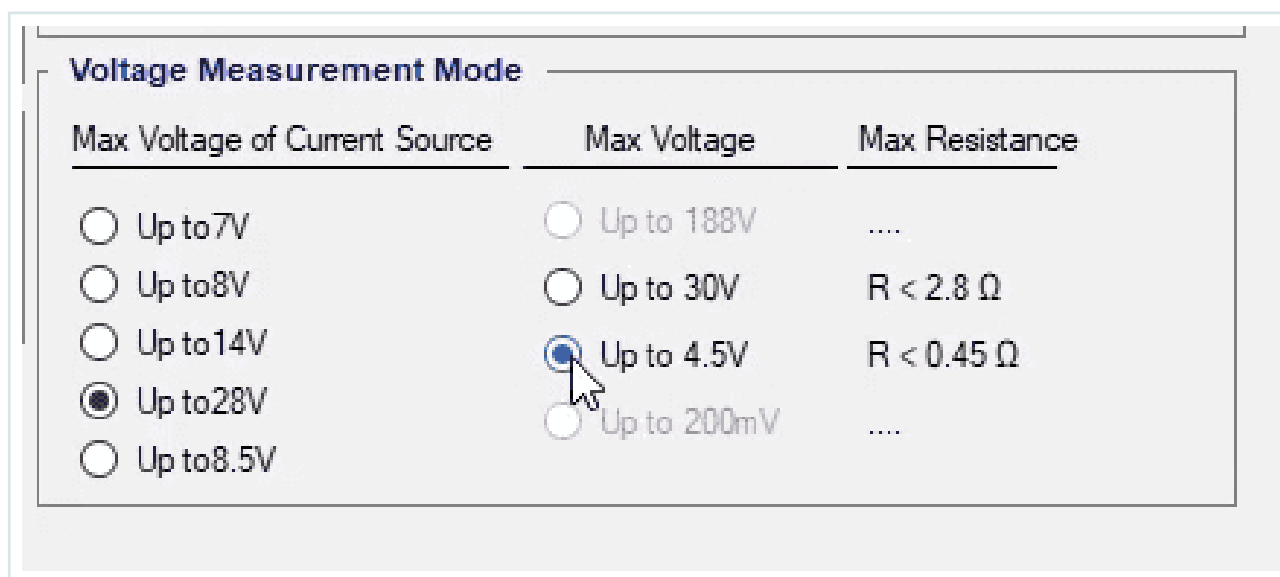


Figure 19



The screenshot shows the 'Instrument Test' window with the 'Resistance Test' tab selected. The 'Test Object' is 'Megger Test Report'. The 'State Setting' section includes 'I test: 10.00 A', 'State Time: 1.000 s', 'Analog Input Target: Analog Input 2', and a checkbox for 'Don't Change Hardware Setting'. The 'Object Type' section has radio buttons for 'Yn - 3ph / 1ph', 'Y - 3ph', and 'D - 3ph'. The 'Result' section shows 'Test State: Not Tested', 'I inj.: 0.000 A', 'R meas * C.F.: 0.000 Ω', 'V meas: 0.000 V', and 'Rdev.: 0.000 Ω'. The 'Voltage Measurement Mode' section has three columns: 'Max Voltage of Current Source', 'Max Voltage', and 'Max Resistance'. The 'Max Voltage of Current Source' column has radio buttons for 'Up to 7V', 'Up to 8V', 'Up to 14V', 'Up to 28V' (selected), and 'Up to 8.5V'. The 'Max Voltage' column has radio buttons for 'Up to 188V', 'Up to 30V' (selected), 'Up to 4.5V', and 'Up to 200mV'. The 'Max Resistance' column has values '....', 'R < 2.8 Ω', 'R < 0.45 Ω', and '....'.

Figure 20



The close-up shows the 'Voltage Measurement Mode' section with three columns: 'Max Voltage of Current Source', 'Max Voltage', and 'Max Resistance'. The 'Max Voltage of Current Source' column has radio buttons for 'Up to 7V', 'Up to 8V', 'Up to 14V', 'Up to 28V' (selected), and 'Up to 8.5V'. The 'Max Voltage' column has radio buttons for 'Up to 188V', 'Up to 30V', 'Up to 4.5V' (selected), and 'Up to 200mV'. The 'Max Resistance' column has values '....', 'R < 2.8 Ω', 'R < 0.45 Ω', and '....'.

Figure 21

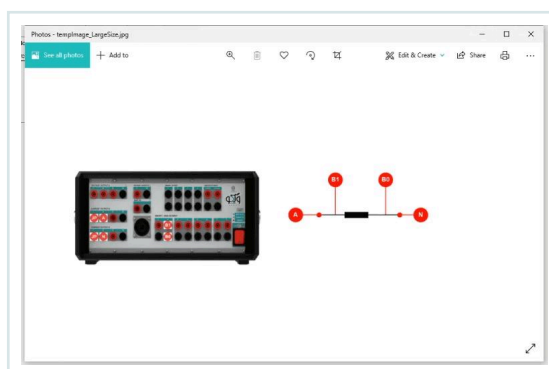


Figure 22

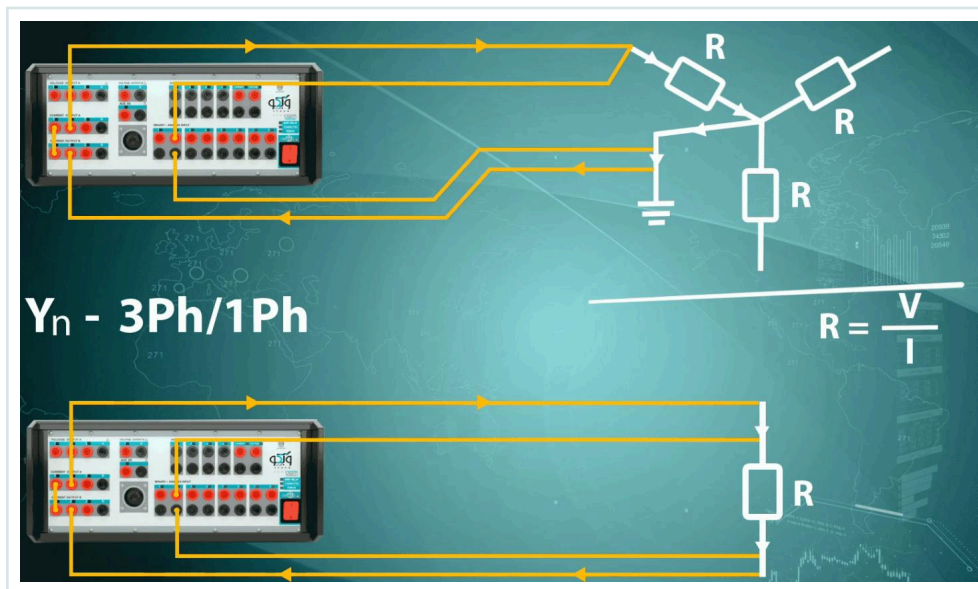


Figure 23

To measure the voltage difference, it is necessary to connect "Input2" to the test and further ahead of current injection connectors. It should be noted that before running the test it is necessary to click on "Init Test" so that the device "config" is adjusted automatically. By selecting this option, the settings related to current and test time as well as the hardware configurations related to "Hardware Configuration" including outputs of the device and "Binary/Analog Inputs" are adjusted automatically by the software. In "Analog Output" tab in "Hardware Configuration" section, you can see that the wiring of the device is set at "32A" with the maximum "Burden" of 400 milli amps and "Binary/Analog Input" #2 are activated to measure the voltage. After performing the test, in "Signal View" it is possible to view the current waveform along with its "Actual" values and the measured voltage and also examine the connections of the connectors.

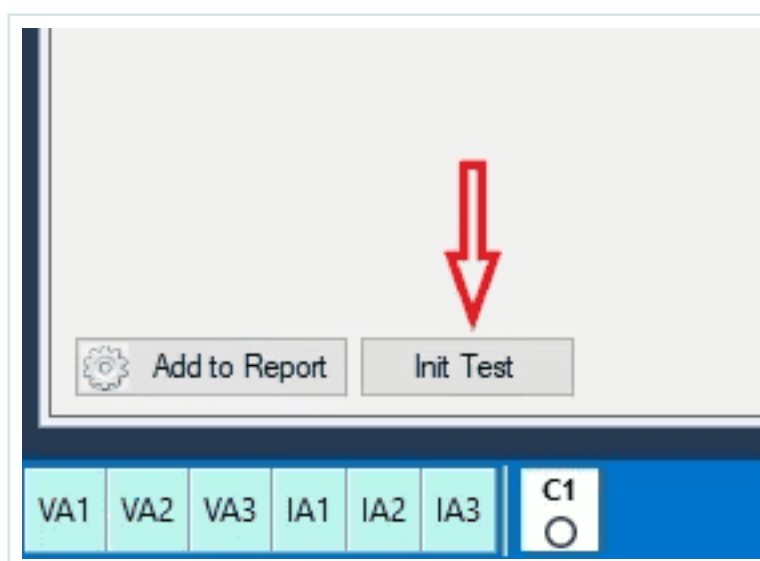


Figure 24

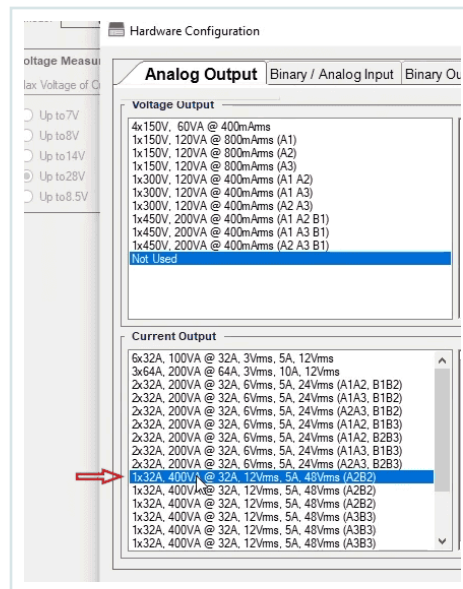


Figure 25

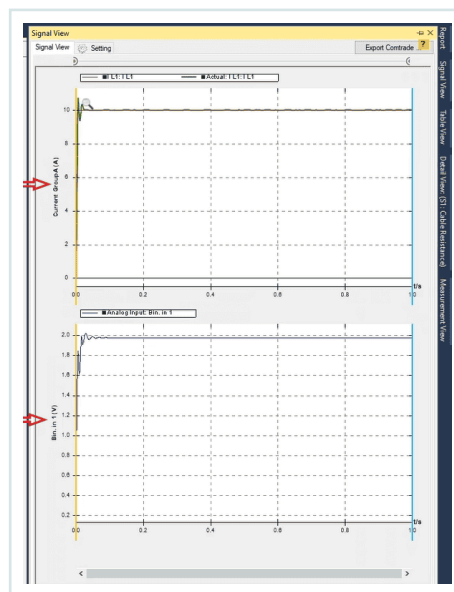


Figure 26

After the test is finished, the test results can be viewed in "Result" section. The results include "linj", "Vmeas", "Rmeas*C.F" and "Rdev" which refer to the amount of injected current, the measured voltage, the measured impedance and the difference between the nominal resistance and the resistance specified in "Rmeas*C.F" field, respectively. It should be noted that by holding the cursor on either of these two fields, the relations related to them are displayed. In the end, after the test is finished, it is necessary to add the evaluation results to the report which is done by selecting "Add To Report" in equipment test.

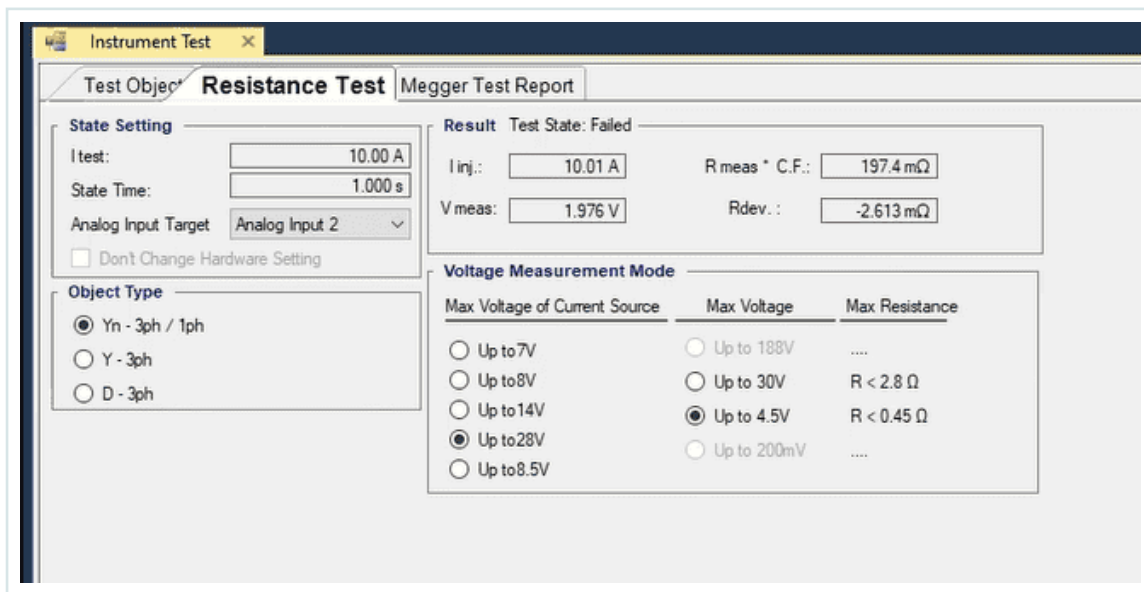


Figure 27

Also, if the user wishes to add specific parts of the evaluation to the report or edit the report, they need to use "Add to Report" cog. By clicking on this cog, the items that can be added to the "Report" are checked and the user can simply uncheck any of them which they do not need. It should be noted that the results are not automatically added to the report after each test when a test is performed it is necessary to add the test results to the output report by selecting "Add to Report" before "Clearing the Test". Also, if one of the "Analog Outs" is faulty, the specified "Binary Out" should be changed; to do this, you must first click on "Init Test", then tick "Don't Change Hardware Setting" option and by going to the "Hardware Configuration" window, in the "Analog Out" tab, "Output Target" change the selected wiring according to the wiring.

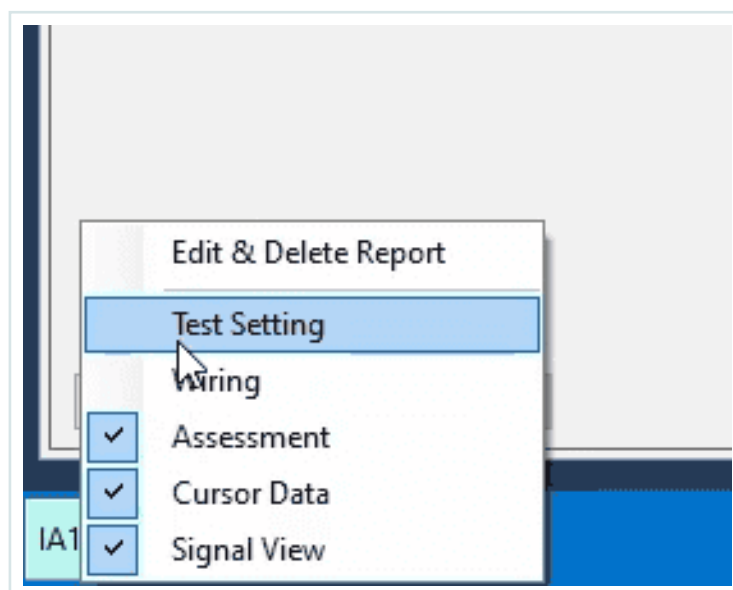


Figure 28

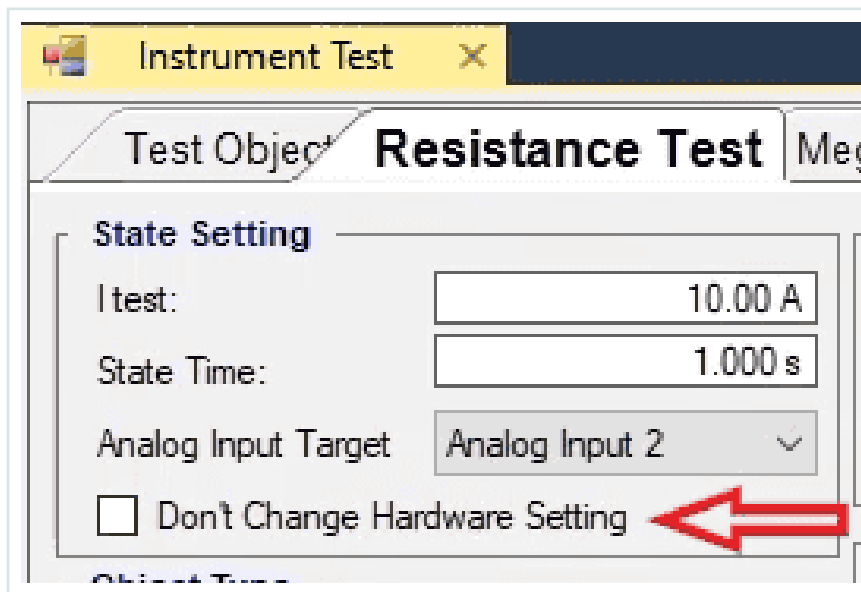


Figure 29

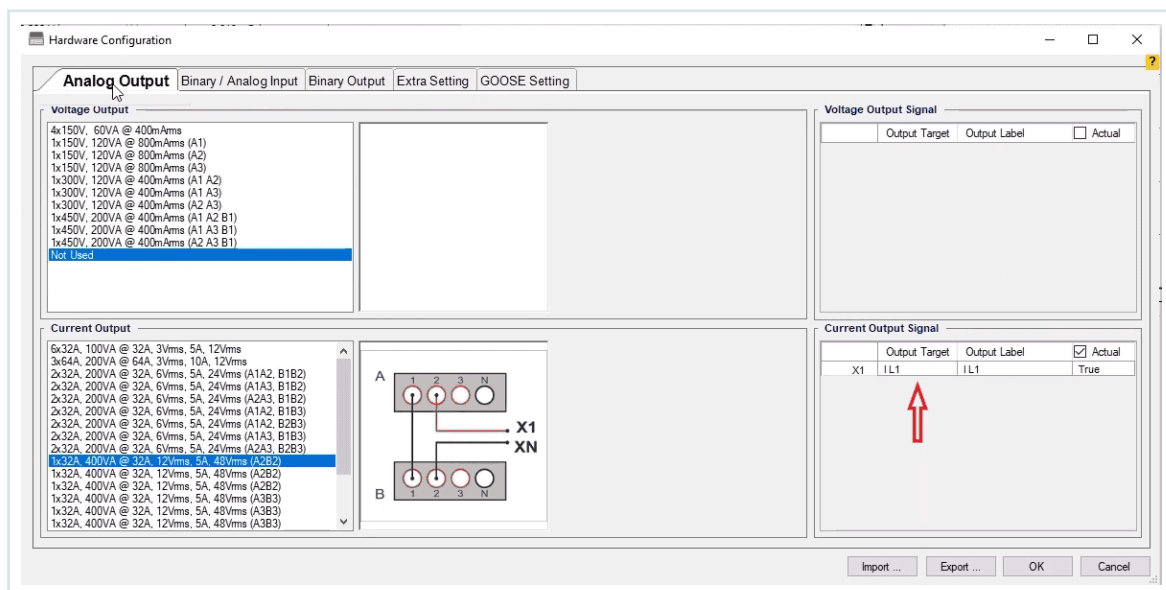


Figure 30

Two notable points about performing this test are that „Error Other“ during a test indicates that there is a problem in connection of the wirings or the resistance is too high that the device unable to provide the required „Burden“ for current injection. Therefore, in cases of facing this error, examine the „Actual“ current value in „Signal View“. If the current is injected from the device („Actual Current“) but its difference with the specified current is too big it means that the resistance is too high while if the „Actual Current“ is zero, this means that the route current injection is open. In cases where the resistance is too high, the test current needs to be decreased while if the „Actual Current“ is zero, the connection of the connectors needs to be examined. The second important point is that the voltage read by the binaries of the device must have similar cycles. If the read values have a too big or zero tolerance, this means that the connectors are not properly connected.



Figure 31

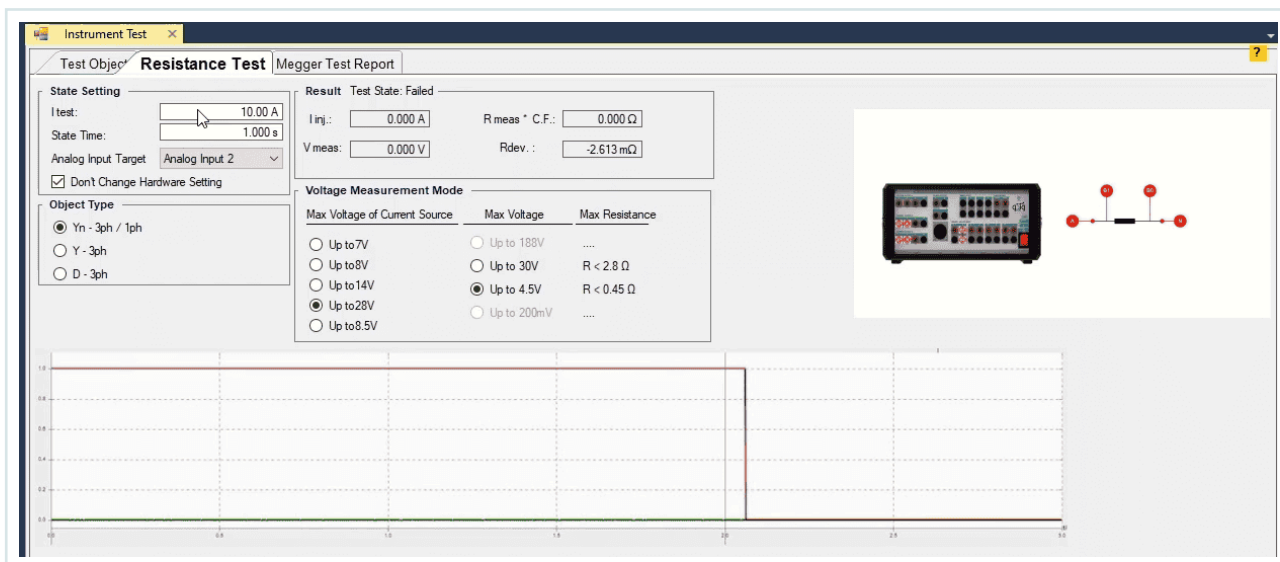


Figure 32

Since some users perform a “Megger” test for this equipment and they may need the results in a report, it is possible for them to enter their intended line and column in “Megger Test Report” tab and by selecting “Insert”, create their needed 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”, “Export” and “Import” are used to remove the information of this page from the report, exporting the output file only from the information of this page and importing it if necessary, respectively. Also, if the user wishes to set the characteristics of the created line and column as default for this section of the room, they can use “Set as Default” option.



Figure 33

[jg1]Resistance_Test