



INSTRUMENTOS PARA TESTES ELÉTRICOS

Test Tutorial

Equipment Type: Protection Relay

Brand: SCHNEIDER (AREVA)

Model: P545

Functions: 27 or PTUV – Undervoltage & 59 or PTOV – Overvoltage

Tool Used: CE-6003, CE-6006, CE-6707, CE-6710, CE-7012 or CE-7024

Objective: Test the pick-up and actuation time of the undervoltage and overvoltage elements using the Quick software

Version Control:

Version	Descriptions	Date	Author	Reviewer
1.0	Initial Version	24/06/2022	M.R.C.	G.C.D.P.

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Statement of responsibility

The information contained in this tutorial is constantly verified. However, differences in description cannot be completely excluded; in this way, CONPROVE disclaims any responsibility for errors or omissions contained in the information transmitted.

Suggestions for improvement of this material are welcome, just user contacts us via email suporte@conprove.com.br.

The tutorial contains knowledge gained from the resources and technical data at the time was writing. Therefore, CONPROVE reserves the right to make changes to this document without prior notice.

This document is intended as a guide only; the manual of the equipment under test should always be consulted.



ATTENTION!

The equipment generates high current and voltage values during its operation. Improper use of the equipment can result in material and physical damage.

Only suitably qualified people should handle the instrument. It should be noted that the user must have satisfactory training in maintenance procedures a good knowledge of the equipment under test and also be aware of safety standards and regulations.

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Sequence for testing the P545 relay in the Quick software

1. Relay Connection to CE-6710

Appendix A-1 shows the relay terminal designations.

1.1 Auxiliary Source

Connect the positive (red terminal) of the Aux Source. Vdc to pin M2 on the relay terminal and the negative (black terminal) of the Source to pin M1 of the relay terminal.

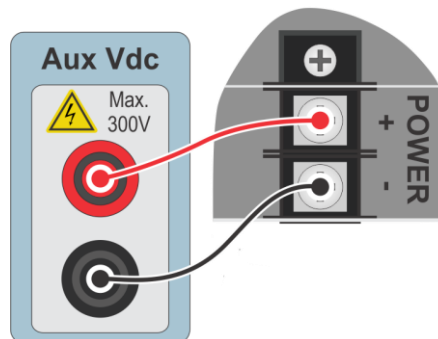


Figure 1

1.2 Voltage Coils

To establish the connection of voltage coils, connect channels V1, V2 and V3 with pins D19, D20 and D21 of the relay terminal and common to pins D22.

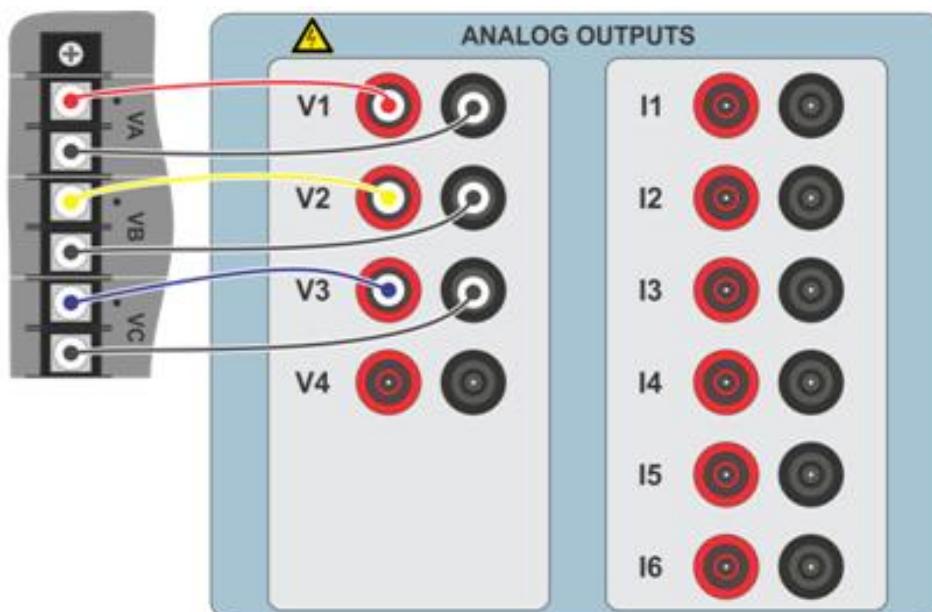


Figure 2

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1.3 Binary Inputs

Connect the binary inputs of the CE-6710 to the binary outputs of the relay.

- BI1 to pin L1 and its common to pin L2.
- BI2 to pin L3 and its common to pin L4.
- BI3 to pin L5 and its common to pin L6.
- BI4 to pin L7 and its common to pin L8.

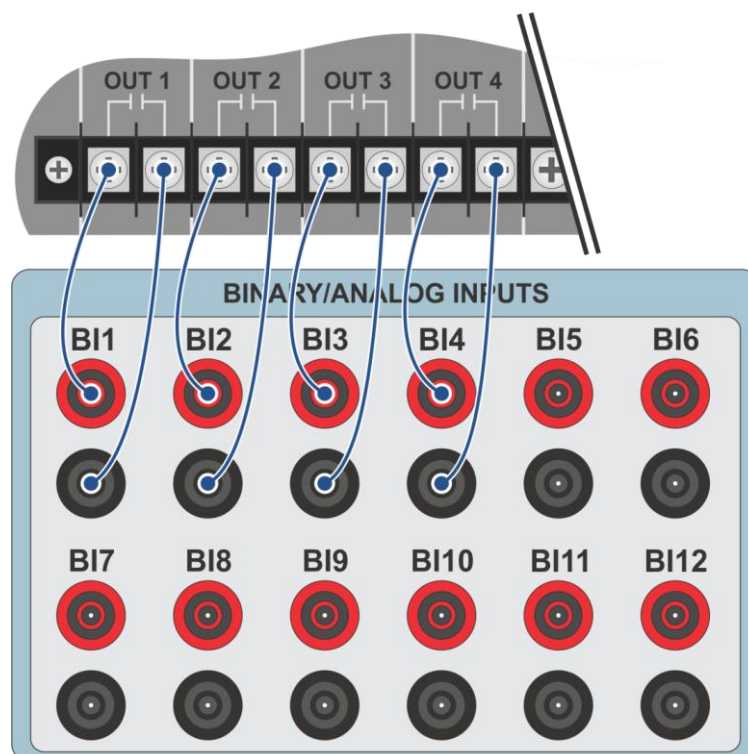


Figure 3

2. Communication with the Schneider P545 relay

First, open the Schneider Electric MICOM S1 Studio and connect a serial cable from the notebook to the relay. Then double click on the software icon.



Figure 4

Then click on the “*Quick Connect*” option. The relay software will automatically fetch the settings.

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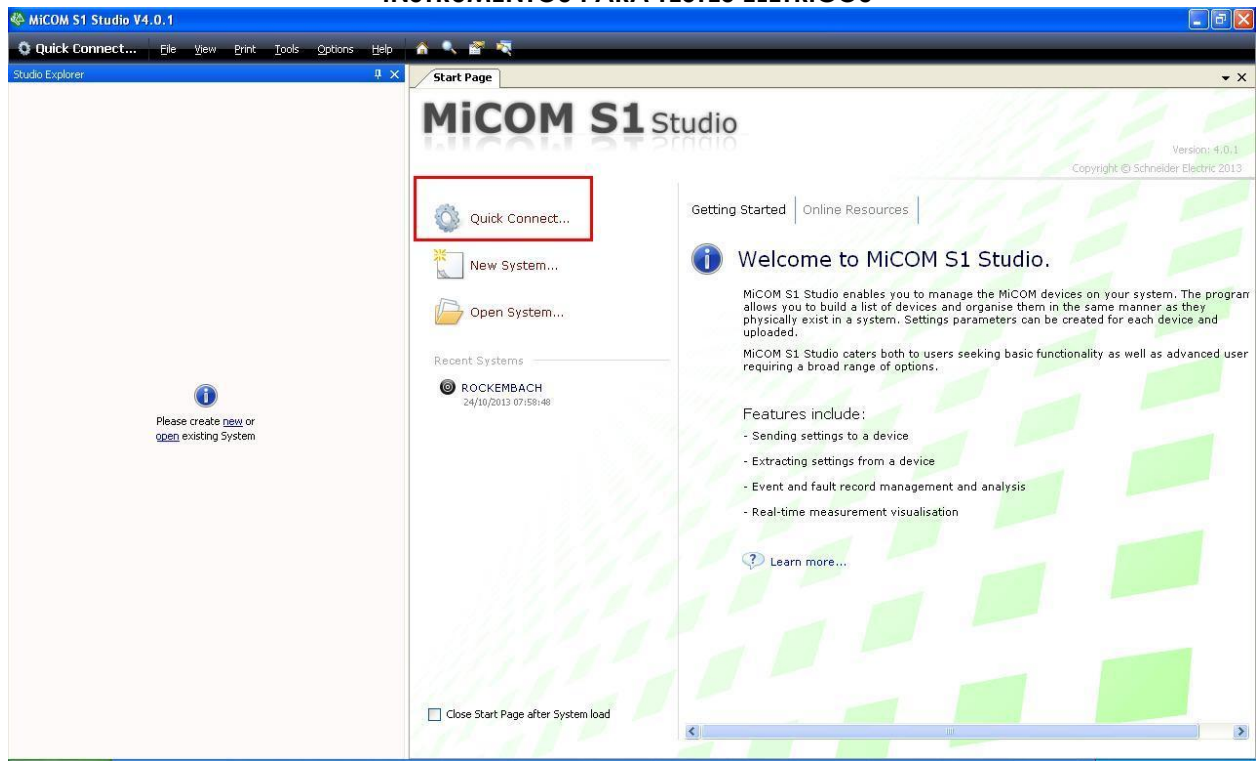


Figure 5

The next step is to create a new project and name it.

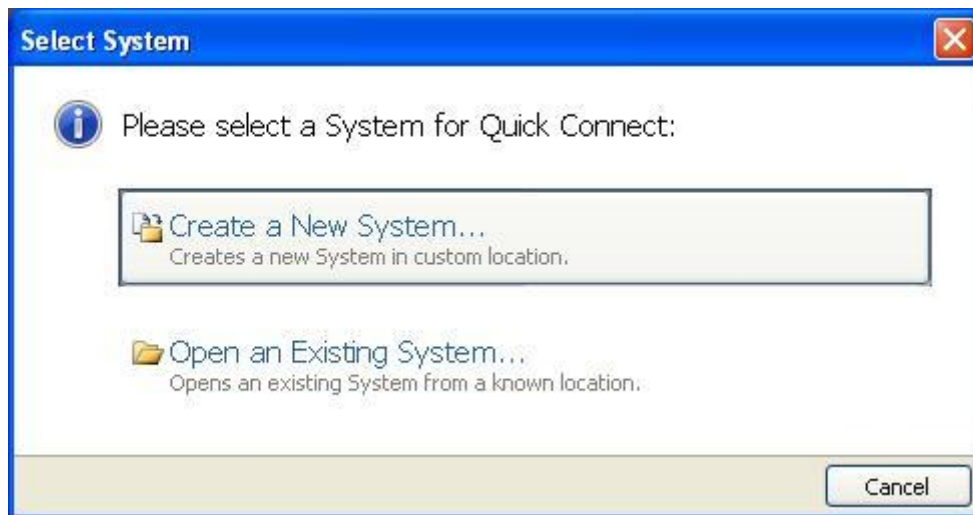


Figure 6

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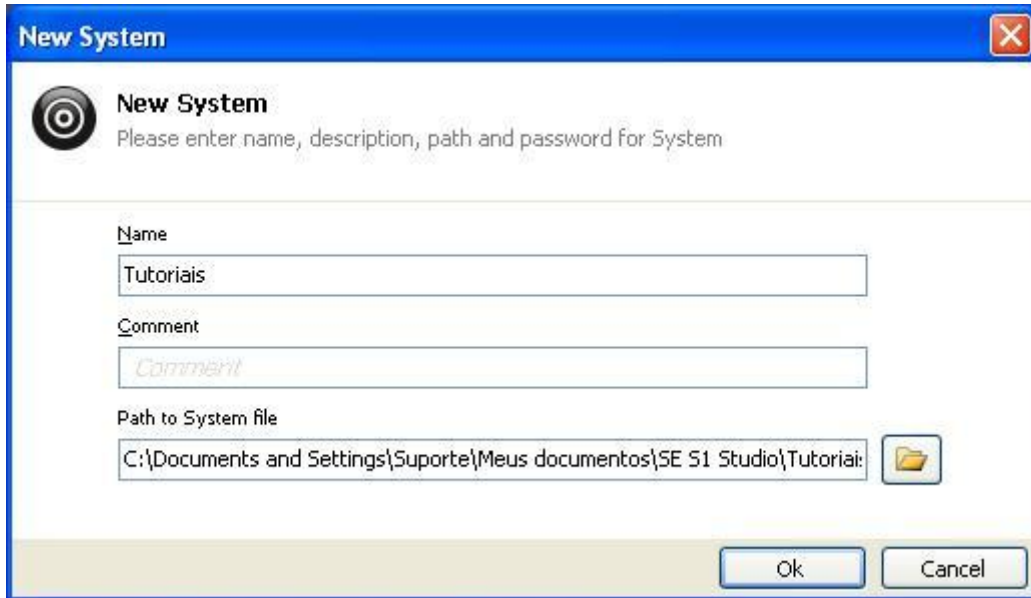


Figure 7

In the next window, choose the relay model. If you do not have the model, use the “Data Model Manager” software (installed together with Micom) to download it.



Figure 8

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Choose the way to communicate whether by serial port (back or front), by Ethernet or even via modem.

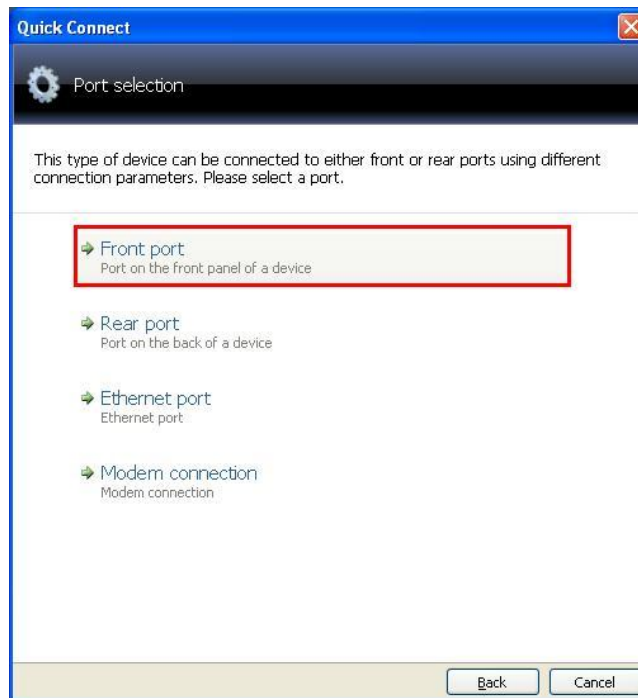


Figure 9

In the next window make sure which serial port “COM” is being used especially if you are using a USB/SERIAL converter and click on “Finish”.

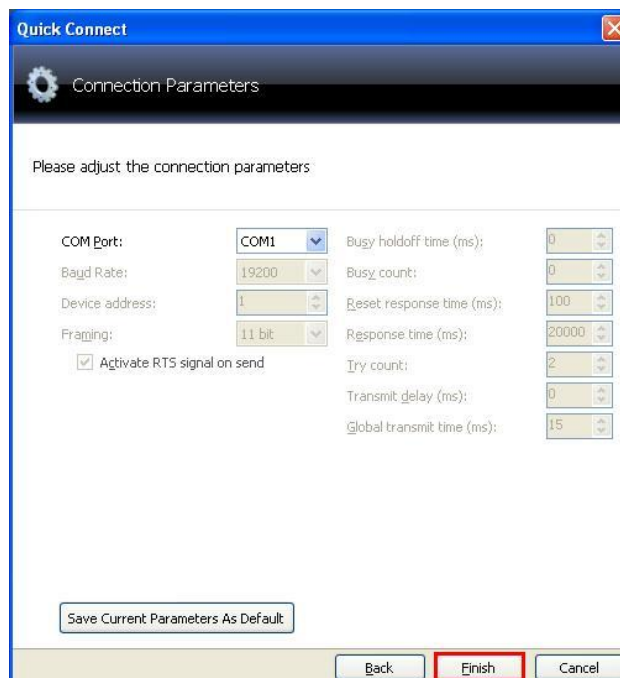


Figure 10

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The next screen shows that the connection was made successfully showing the relay type, model and serial number.

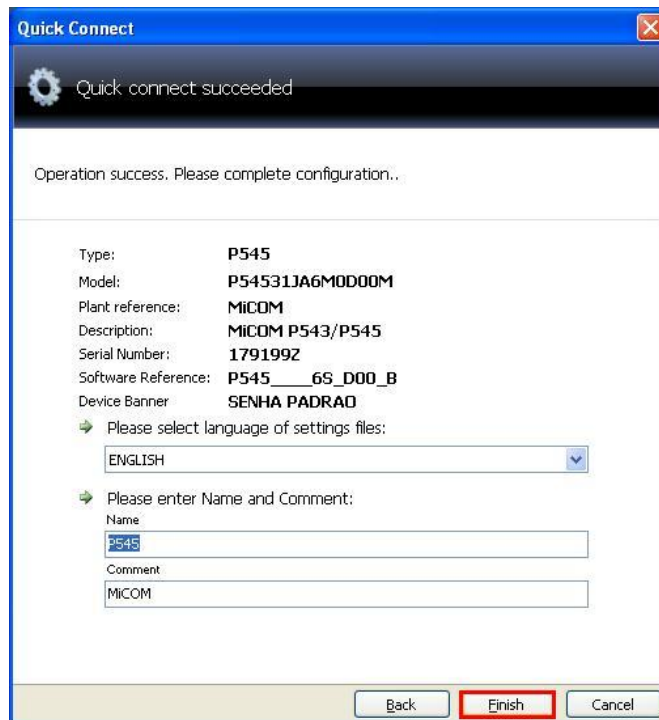


Figure 11

The next step is to extract all the information set in the relay. Right click on “Settings” and left click on “Extract Settings”.

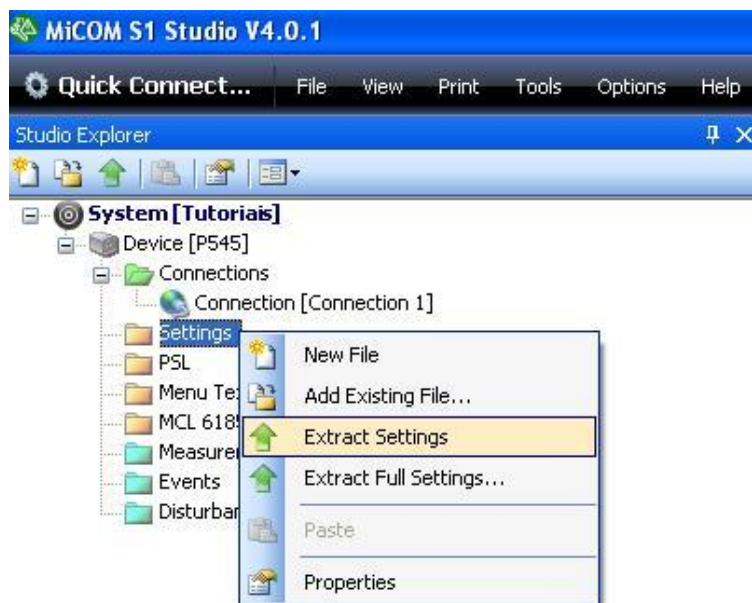


Figure 12

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Enter the password with the default value for this relay being AAAA.

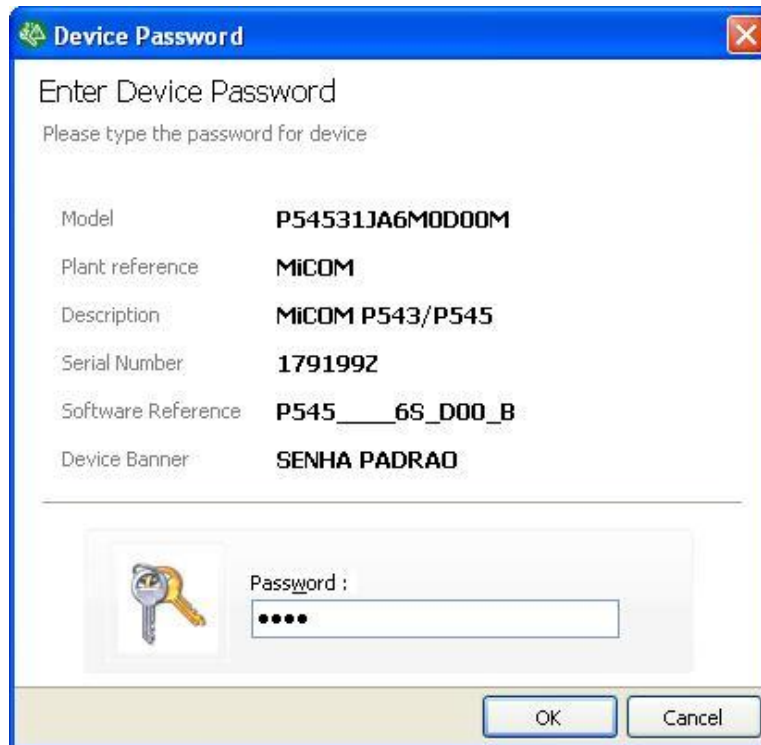


Figure 13

The reading of the settings will appear with the name of “000” and can be modified if necessary. In this case the file name was changed to “*Sub_Sobretensão*”.

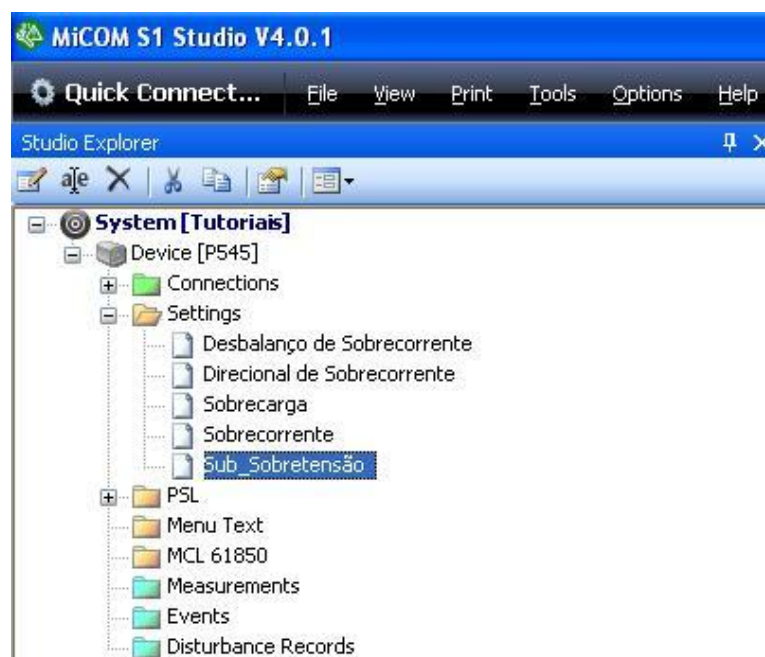


Figure 14

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3. Parameterization of the Schneider P545 relay

3.1 Frequency

After making a double click on the “*Sub_Sobretensão*” file, enter “*SYSTEM DATA*”, and then “*Frequency*”. Make sure the value set is 60Hz.

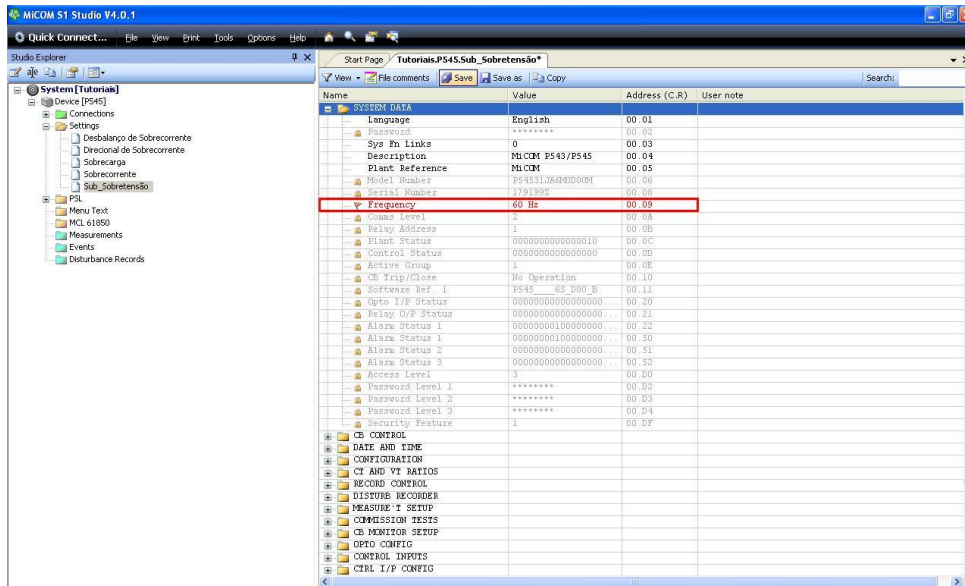


Figure 15

3.2 CONFIGURATION

Within the “*CONFIGURATION*” folder, group 1 and voltage protection are enabled. NOTE: All other functions must be disabled.

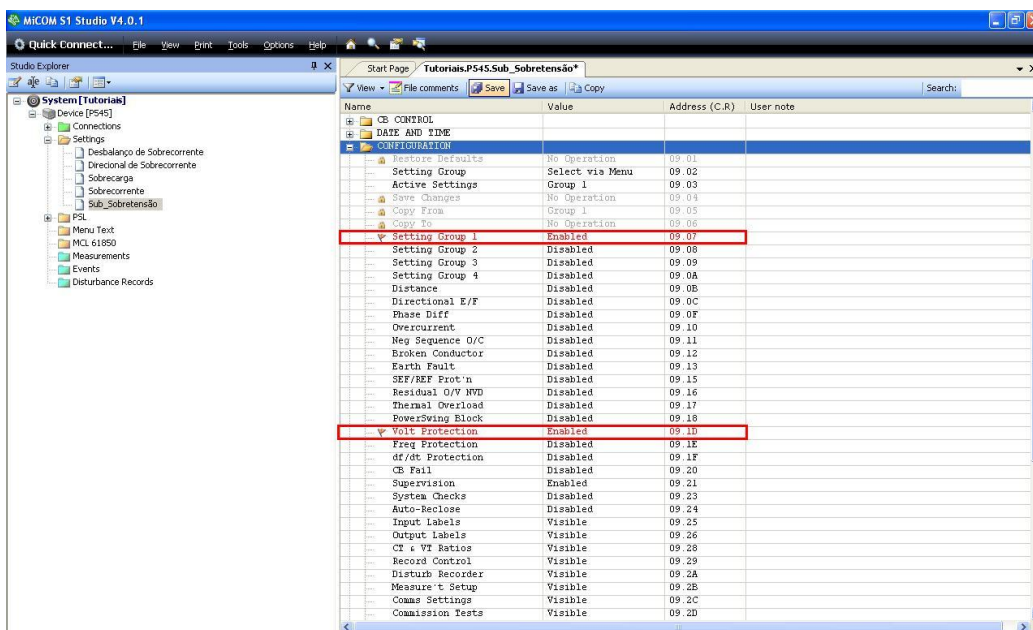


Figure 16

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3.3 Setting Values

All parameterization will be done with values referenced to the secondary.

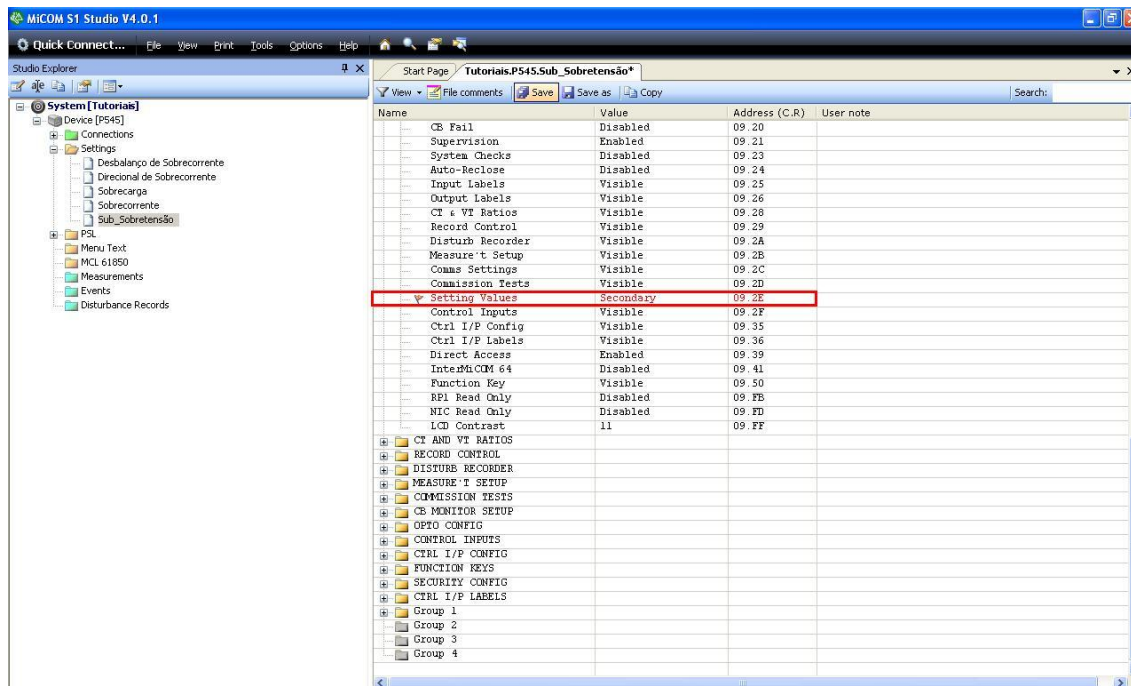


Figure 17

3.4 CT AND VT RATIOS

Adjust the PT primary and secondary voltage values.

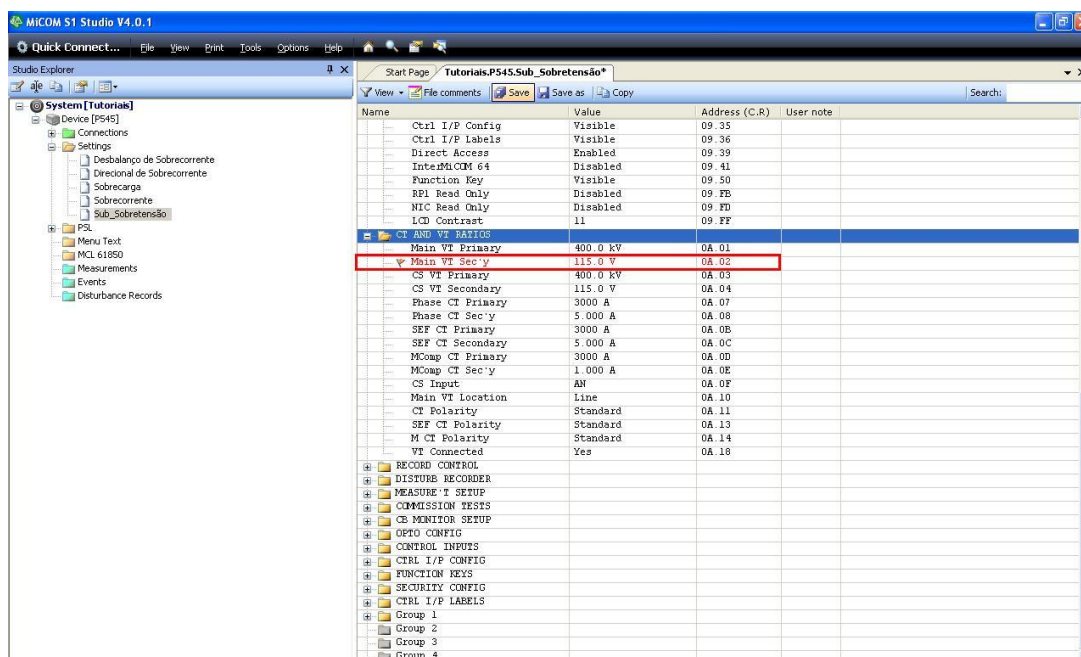


Figure 18

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3.5 Phase Sequence

Click the “+” sign under “GROUP” and “GROUP 1 LINE PARAMETERS”. In the “Phase Sequence” option, set the positive sequence.

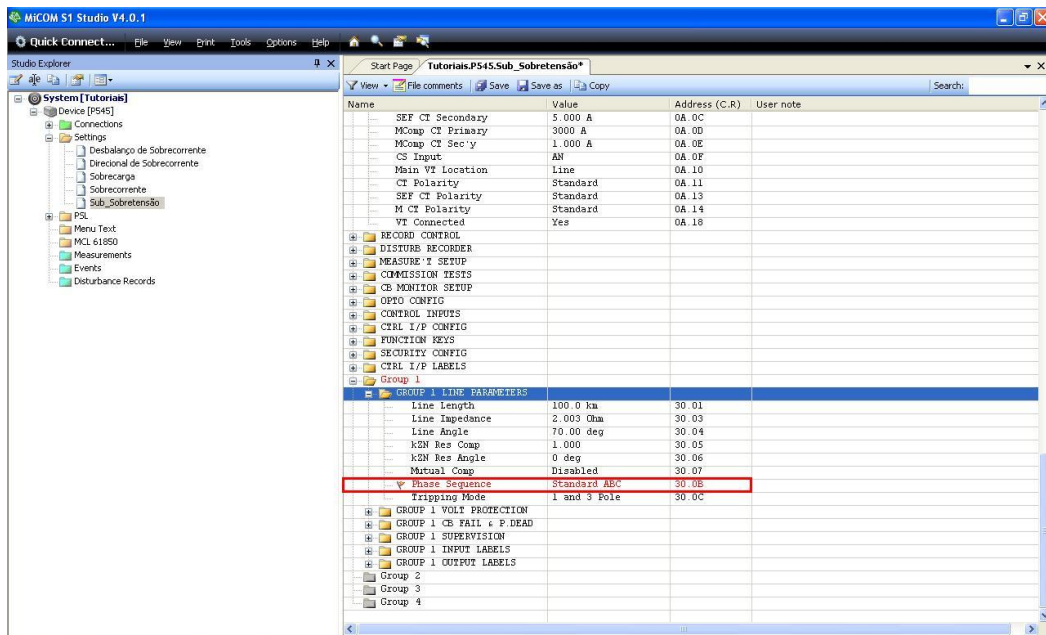


Figure 19

3.6 GROUP 1 VOLT PROTECTION

In this field, the undervoltage and overvoltage functions are parameterized.

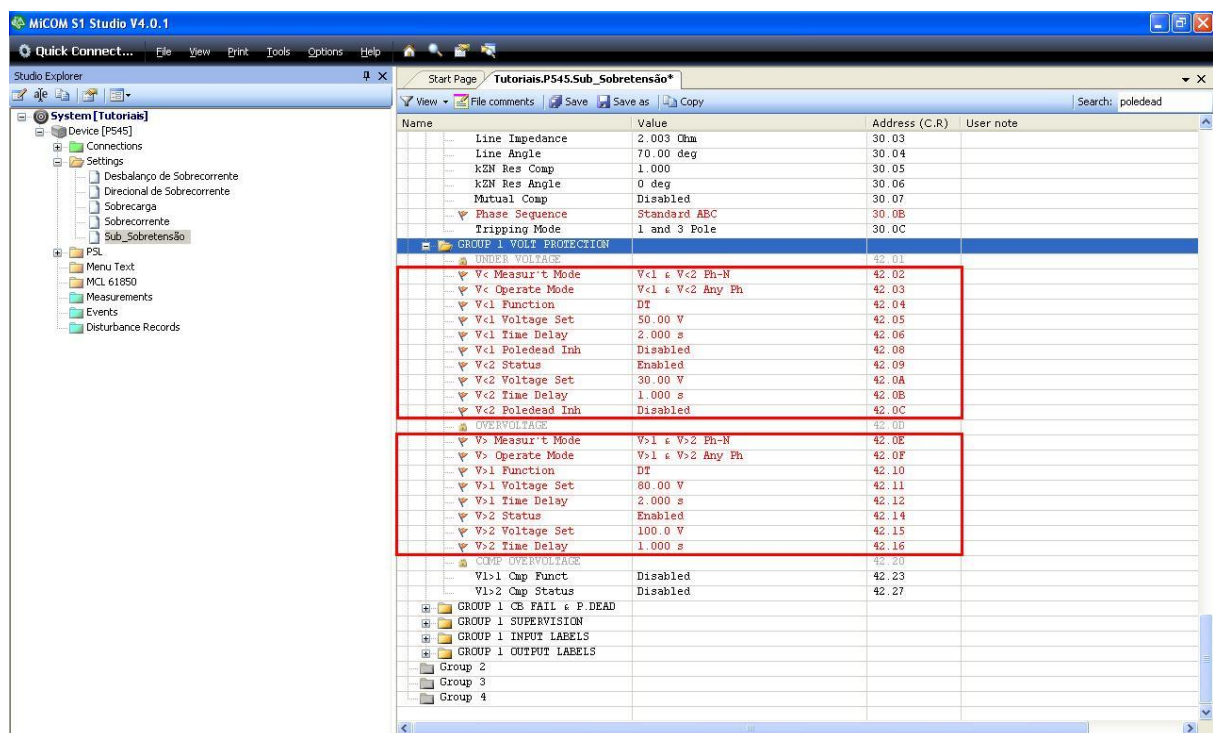


Figure 20

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The next step is to click on the highlighted icon to save the configuration.

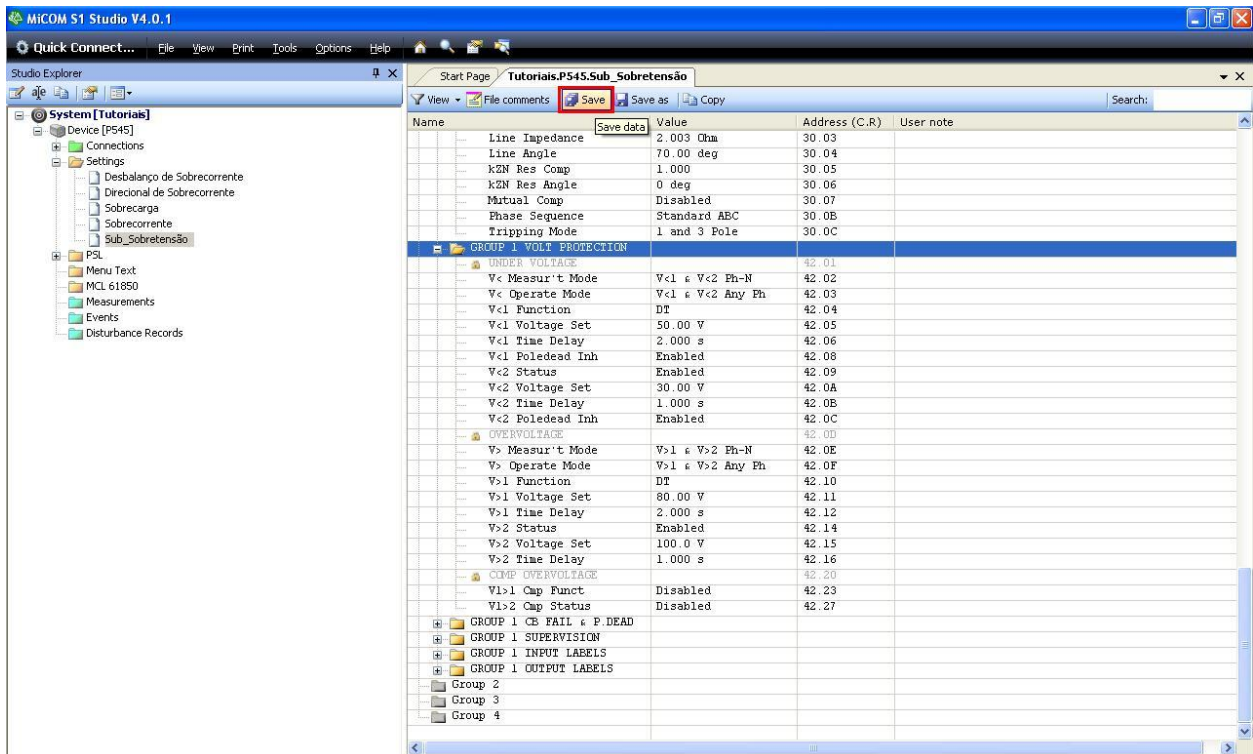


Figure 21

3.7 PSL

The configurations of the binary outputs are done through logic blocks being configured in another file. Right click on the “PSL” folder and then on “New File”.

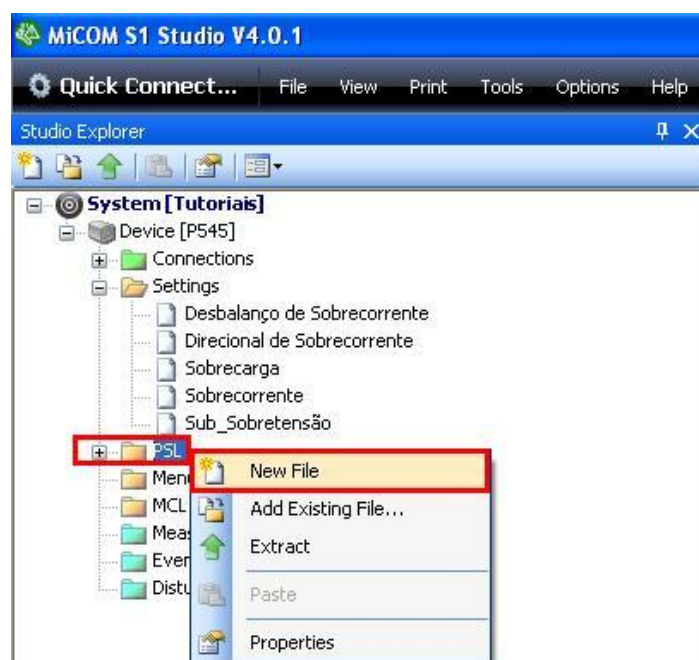


Figure 22

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The name of the file name appears as “000” change the name to “Sub_Sobretensão”.

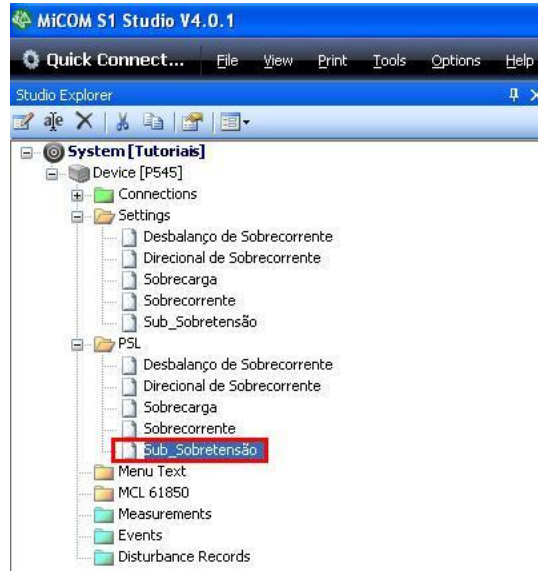


Figure 23

Double-click on this file to gain access to the logical blocks. Then click on the tool highlighted in red and zoom in on the region highlighted in green.

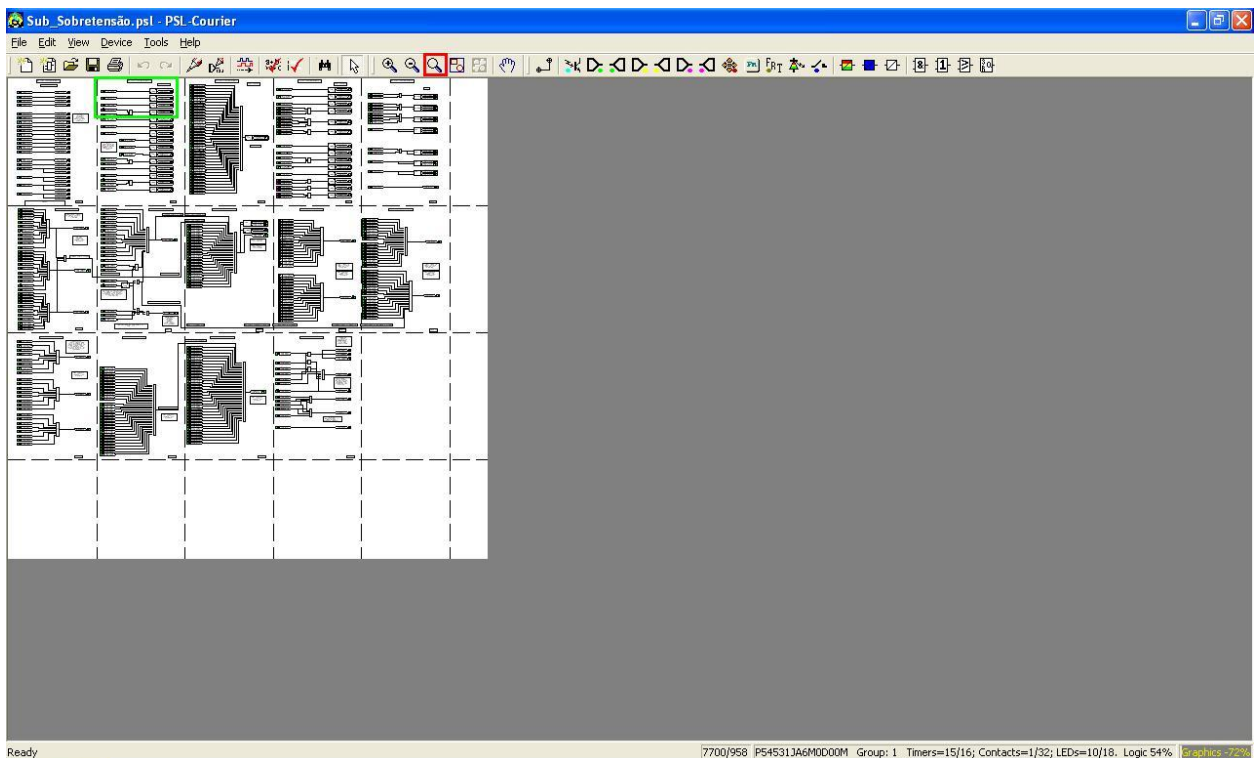


Figure 24

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Note that the first 3 outputs appear in the figure below (highlighted in red). In this tutorial, the first 4 outputs will be used. As in the standard file the fourth output is already being used, it must be deleted.

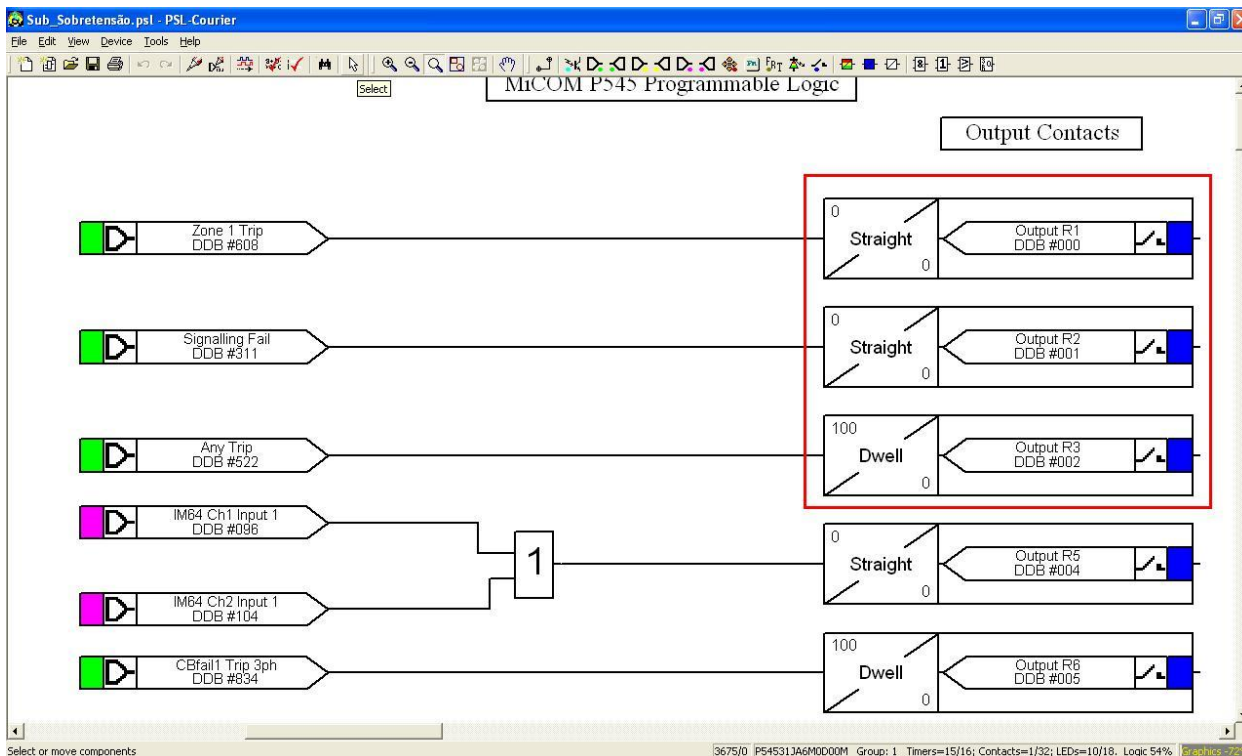


Figure 25

To find the fourth exit use the command “*Ctrl+F*”, type R4 and click the “*Find*” button.

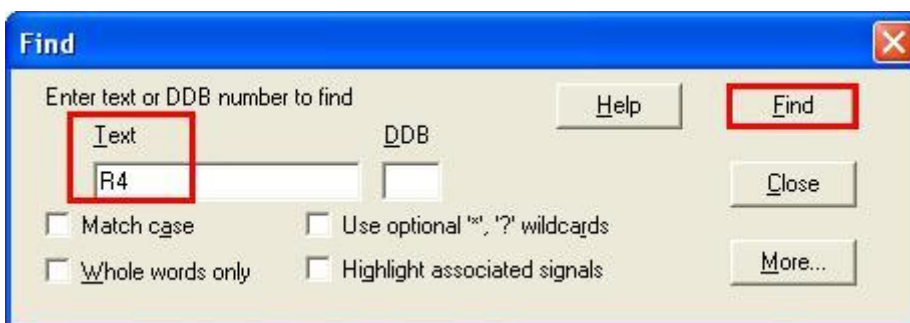


Figure 26

Click on the arrow icon and then on the block with the right button and click on “*Delete*”.

INSTRUMENTOS PARA TESTES ELÉTRICOS

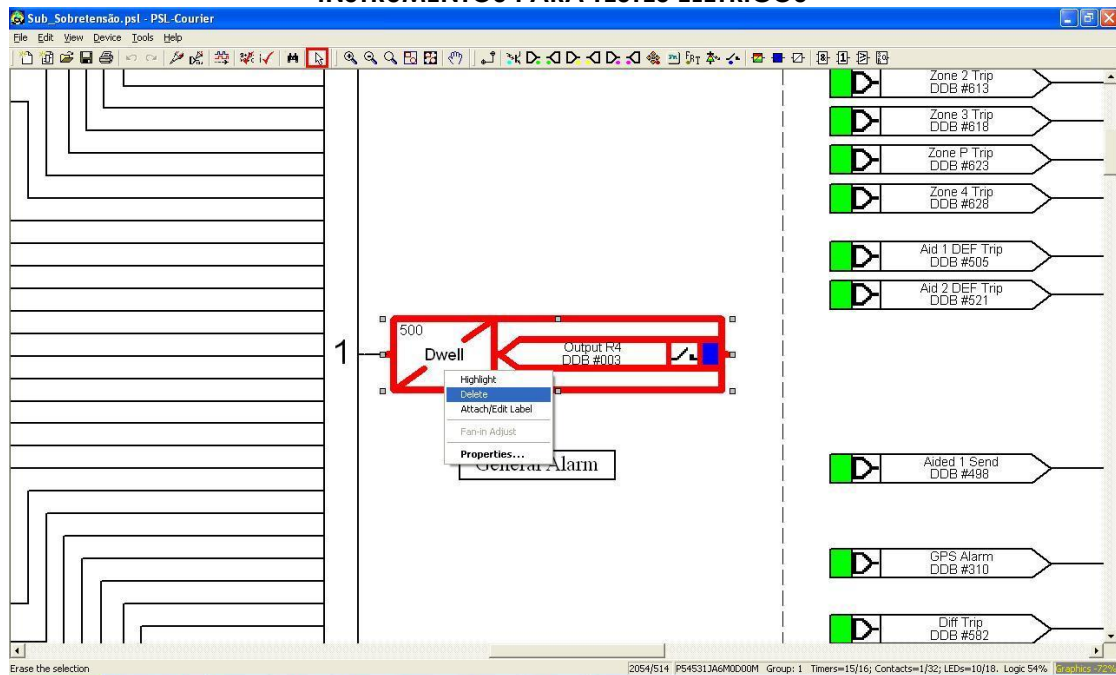


Figure 27

Return the first three exits. Erase all blocks leaving only the three exits.

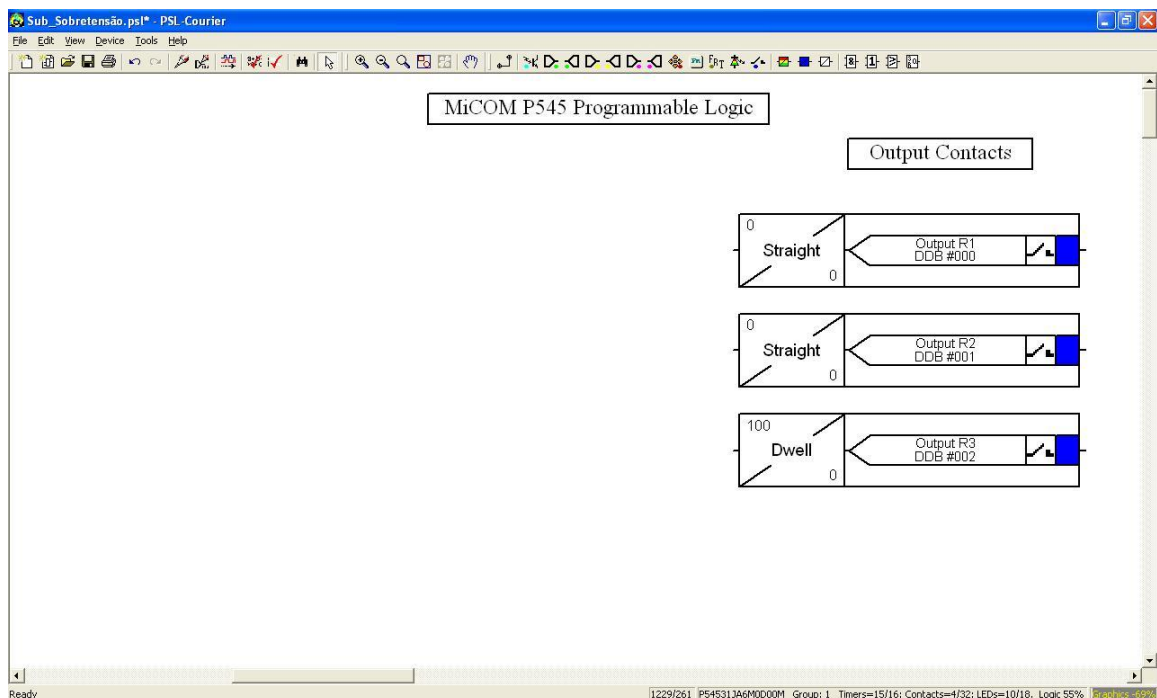


Figure 28

Click on the R1 block and change the “Mode” to “pickup” and in the “Pickup Value(ms)” option, set the value to zero. Repeat the procedure for blocks R2 and R3.

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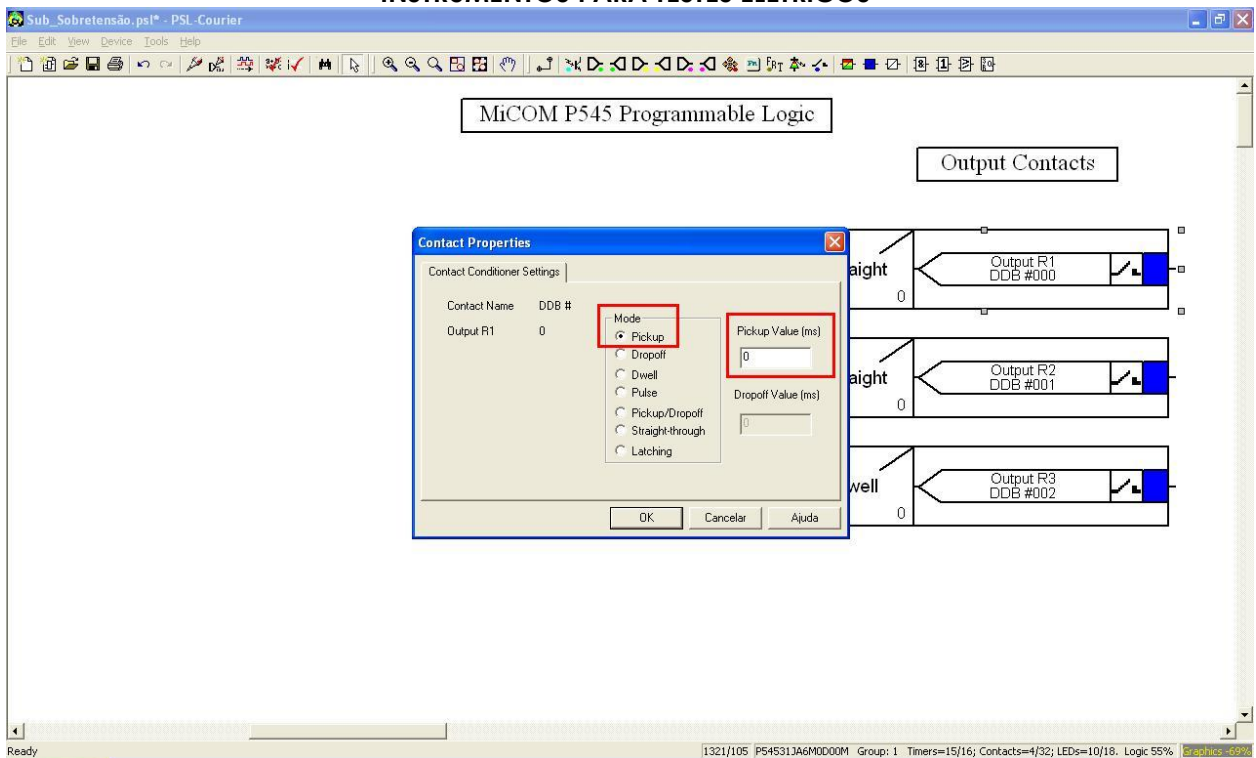


Figure 29

Click on the button highlighted in red and insert the R4 block with the same settings as the previous ones.

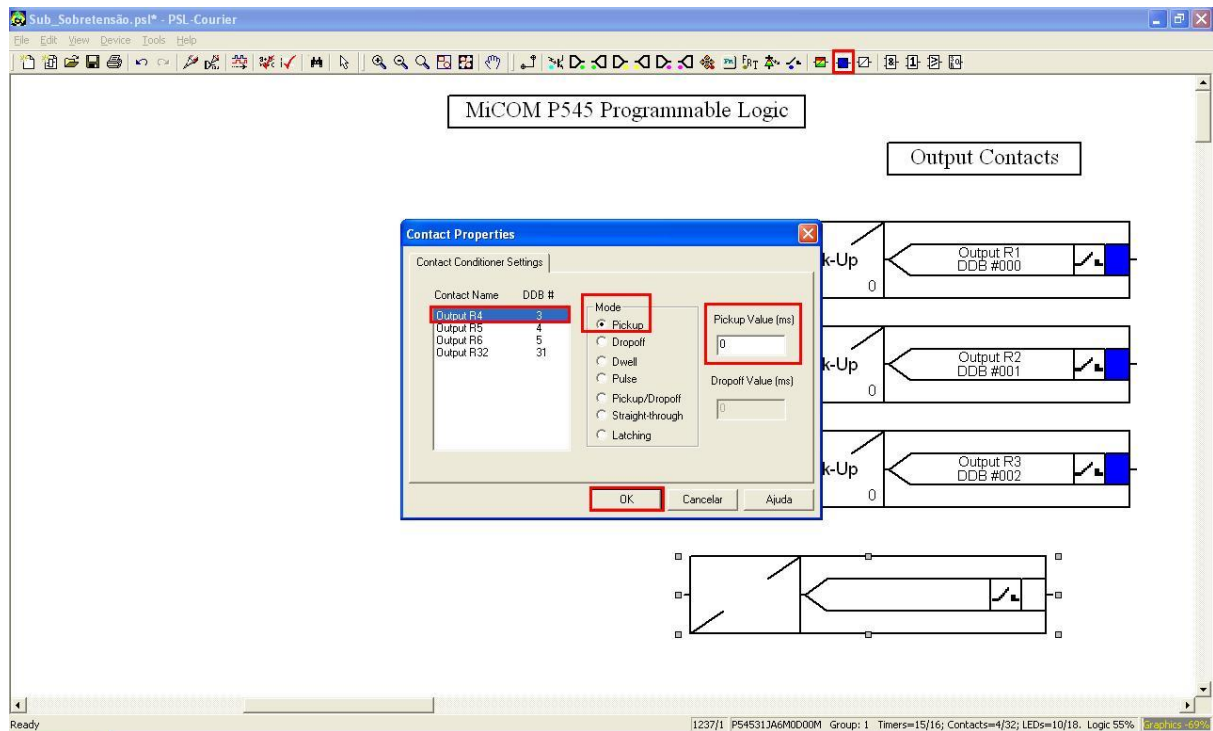


Figure 30

INSTRUMENTOS PARA TESTES ELÉTRICOS

The next step is to associate the signals to be monitored with the output blocks. Click the button highlighted in red and choose the following signal.

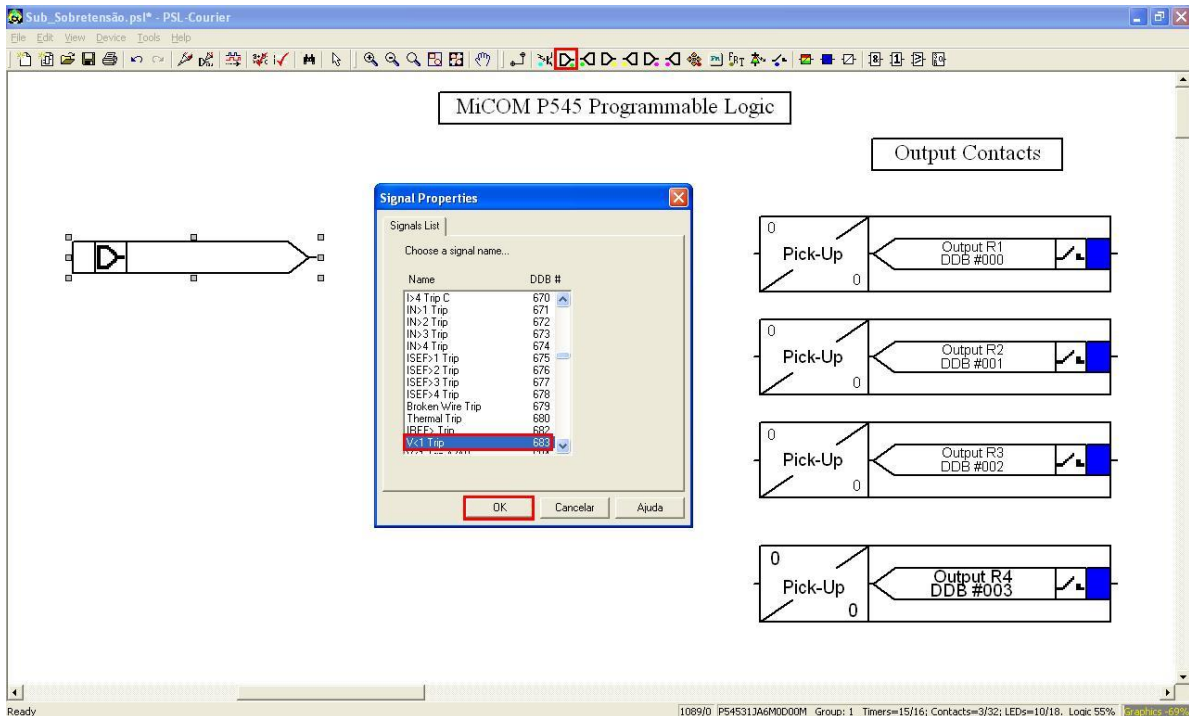


Figure 31

Repeat the previous procedure inserting three more blocks with the following signs “*V<2 Trip*”, “*V>1 Trip*” and “*V>2 Trip*”. Then click on the icon highlighted in red and connect the blocks.

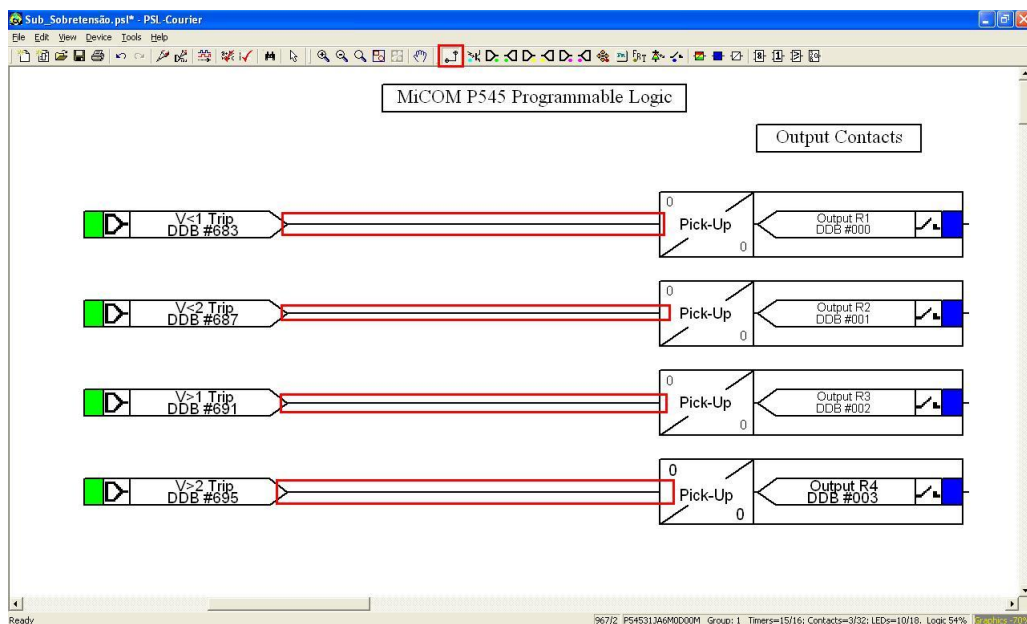


Figure 32

INSTRUMENTOS PARA TESTES ELÉTRICOS

Click on the highlighted icon to save the file, then close the logic block editor and return to the “*MiCOM*” software.

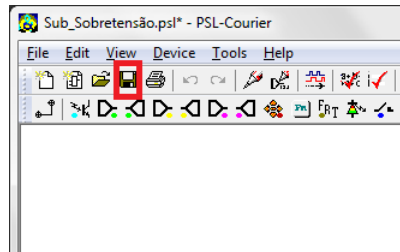


Figure 33

3.8 Sending Settings to the Relay

Click the “*Device [P545]*” icon then the icon highlighted in green.

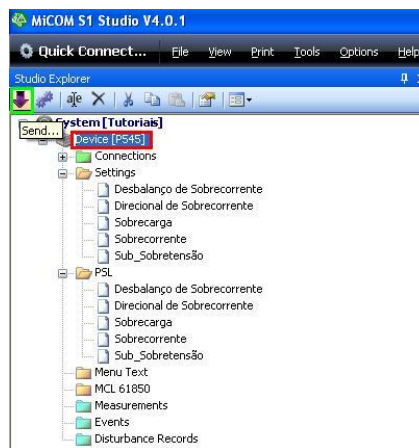


Figure 34

Send both function settings and logic block.

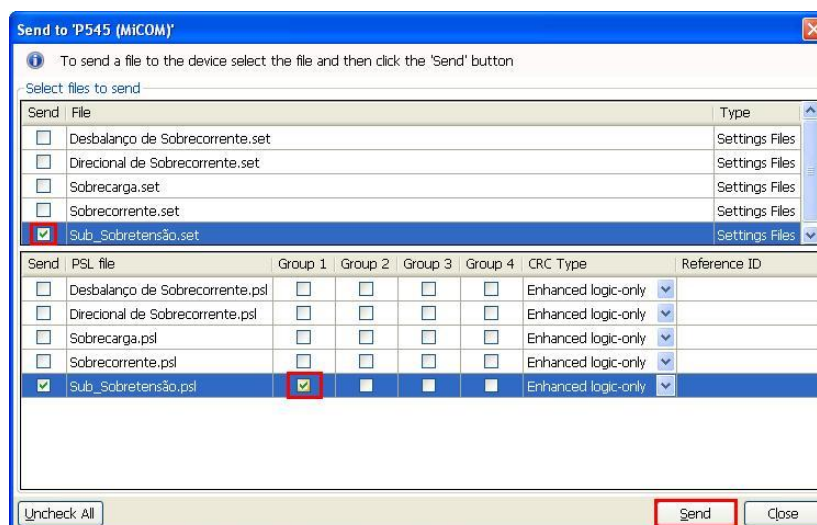


Figure 35

4. Quick software adjustments

4.1 Opening Quick

Click on the CTC application manager icon.



Figure 36

Click the Quick software icon.



Figure 37

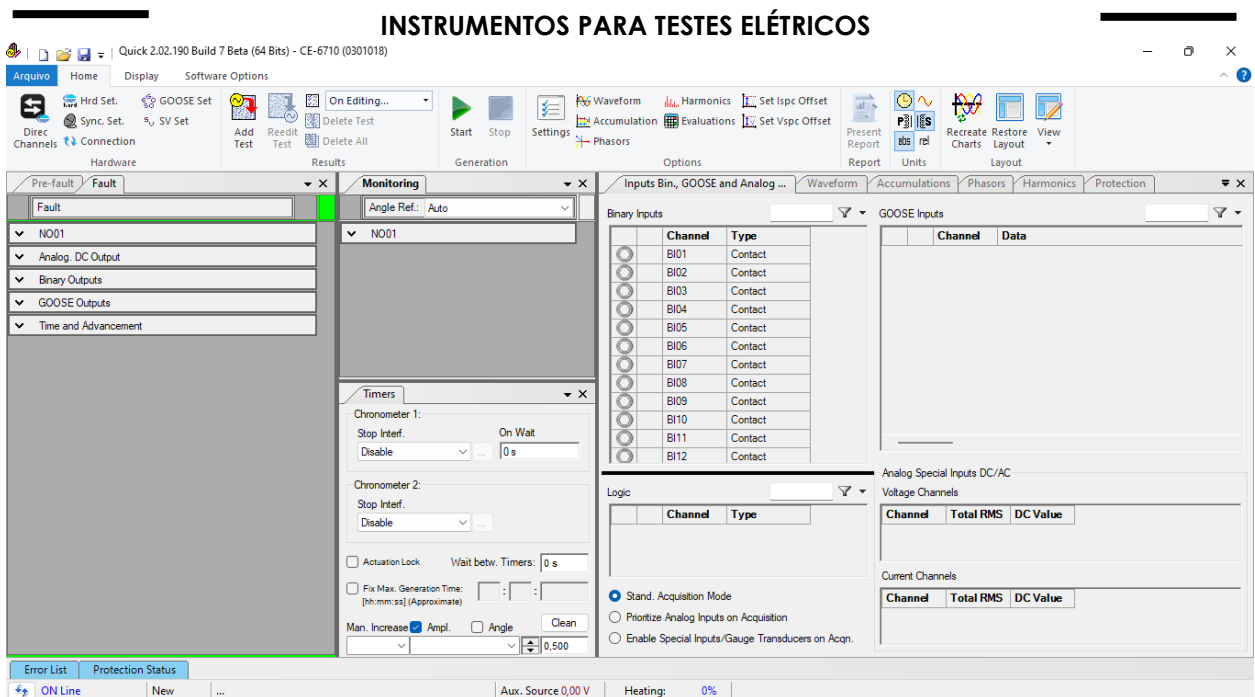


Figure 38

4.2 Configuring the Settings

When opening the software the “*Settings*” screen will open automatically (provided that the option “*Open Settings when Start*” found in the “*Software Options*” menu is selected). Otherwise click directly on the “*Settings*” icon.

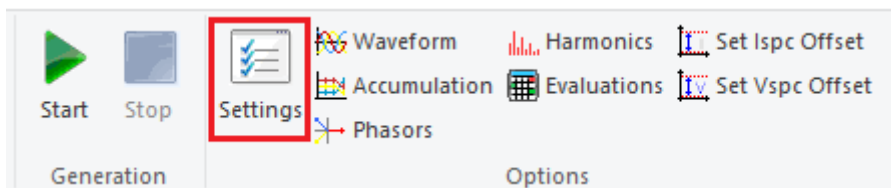
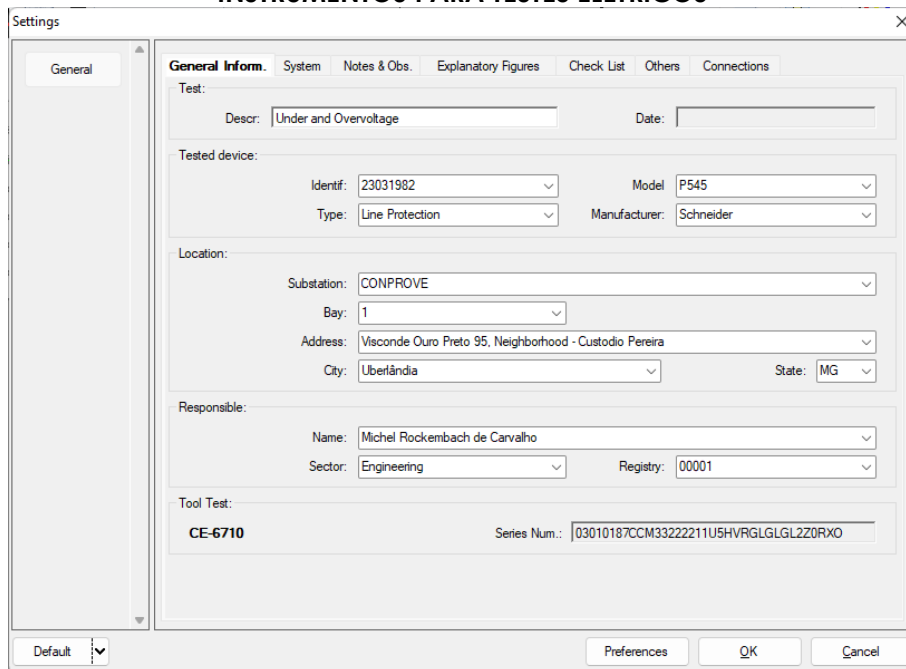


Figure 39

Inside the “*Settings*” screen, fill in the “*General Inform.*” with data from the “*Tested device*”, “*Installation location*” and the “*Responsible*”. This makes reporting easier, as this tab will be the first to be shown.

INSTRUMENTOS PARA TESTES ELÉTRICOS



Settings

General

General Inform. System Notes & Obs. Explanatory Figures Check List Others Connections

Test:
Descr: Under and Overvoltage Date:

Tested device:
Identif: 23031982 Model: P545
Type: Line Protection Manufacturer: Schneider

Location:
Substation: CONPROVE
Bay: 1
Address: Visconde Ouro Preto 95, Neighborhood - Custodio Pereira
City: Uberlândia State: MG

Responsible:
Name: Michel Rockembach de Carvalho
Sector: Engineering Registry: 00001

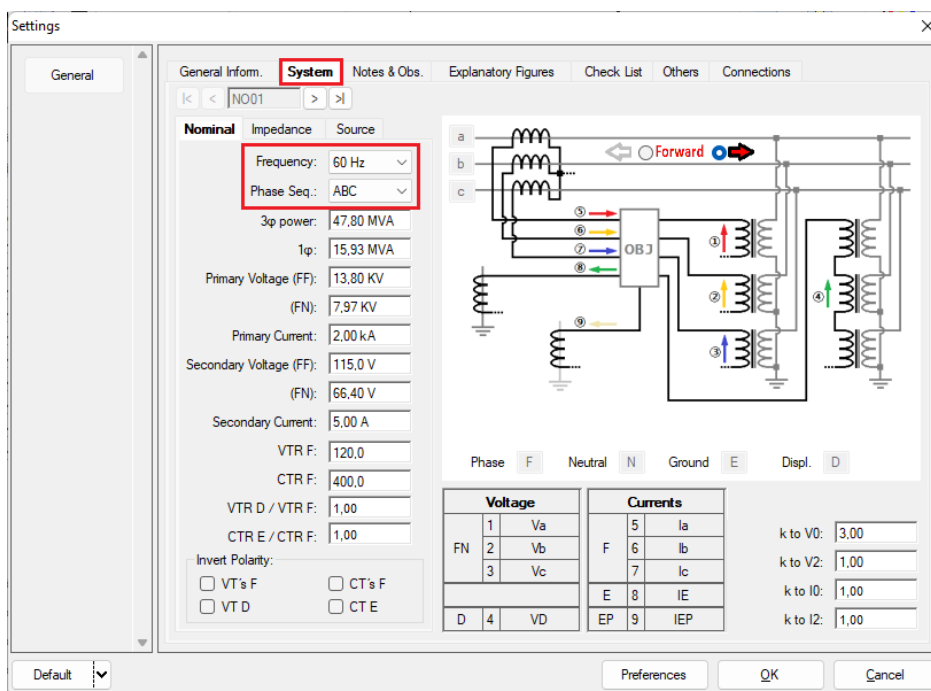
Tool Test:
CE-6710 Series Num.: 03010187CCM3322211U5HVRGLGL2Z0RXO

Default Preferences OK Cancel

Figure 40

4.3 System

In the following screen, within the “Nominal” sub tab, the values of frequency, phase sequence, primary and secondary voltages, primary and secondary currents, transformation ratios of VTs and CTs are configured. There are also two sub tabs “Impedance” and “Source” whose data is not relevant for this test.



Settings

General

General Inform. **System** Notes & Obs. Explanatory Figures Check List Others Connections

NO01

Nominal Impedance Source

Frequency: 60 Hz
Phase Seq.: ABC

3φ power: 47.80 MVA
1φ: 15.93 MVA

Primary Voltage (FF): 13.80 KV
(FN): 7.97 KV

Primary Current: 2.00 kA

Secondary Voltage (FF): 115.0 V
(FN): 66.40 V

Secondary Current: 5.00 A

VTR F: 120.0
CTR F: 400.0
VTR D / VTR F: 1.00
CTR E / CTR F: 1.00

Invert Polarity:
 VT's F CT's F
 VT D CT E

Phase F Neutral N Ground E Displ. D

Voltage			Currents		
FN	1	Va	F	5	Ia
	2	Vb		6	Ib
	3	Vc		7	Ic
			E	8	IE
D	4	VD	EP	9	IEP

k to V0: 3.00
k to V2: 1.00
k to I0: 1.00
k to I2: 1.00

Default Preferences OK Cancel

Figure 41

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There are other tabs where the user can enter notes and observations, explanatory figures, can create a “check list” of the procedures for carrying out the test and even create a schematic with all the schematic of the connections between the test set and the test equipment.

5. Channel Direction and Hardware Configurations

Click on the icon illustrated below.

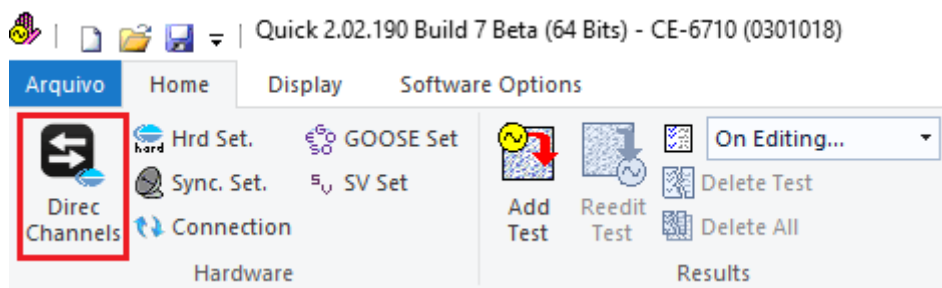


Figure 42

Then click on the highlighted icon to configure the hardware.

Channels Direct.

Model: CE-6710
Serial Number: 03010187CCM3322211U5HVRLGLGLZ20RXD

Reset for Hard. Connected

Basic
 Advanced

ON Line

Hard.: Adapt I/Os
Autoassociate
Clean

Nodes:
Autoassociate
Clean

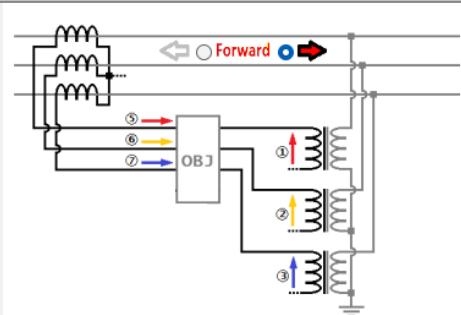
Confirm
Cancel
Import...
Export...

Outputs: Analog. and SV Inputs: Analog. and SV Outputs: Binary, GOOSE and Analog DC Inputs: Binary, GOOSE and Analog DC Logical

1/1

Nominal	Line	Source
Frequency:	60 Hz	
Phase Seq.:	ABC	
3 ϕ power:	47,80 MVA	
1 ϕ :	15,93 MVA	
Primary Voltage (FF):	13,80 KV	
(FN):	7,97 KV	
Primary Current:	2,00 kA	
Secondary Voltage (FF):	115,0 V	
(FN):	66,40 V	
Secondary Current:	5,00 A	
VTR F:	120,0	
CTR F:	400,0	
VTR D / VTR F:	1,00	
CTR E / CTR F:	1,00	

Reverse Polarity:
 VT's F CT's F
 VT D CT E
 Equal Parameters Among Nodes



Analog Outputs Sampled Value Outputs

Descr.	Hardware	Node	Point
AO_V01	V1	NO01	Va
AO_V02	V2	NO01	Vb
AO_V03	V3	NO01	Vc
AO_V04	V4	NO01	UD

Descr.	Hardware	Node	Point
AO_I01	I1	NO01	Ia
AO_I02	I2	NO01	Ib
AO_I03	I3	NO01	Ic
AO_I04	I4	NO01	UD
AO_I05	I5	NO01	UD
AO_I06	I6	NO01	UD

Voltage		Channel	Currents		Channel	
FN	1	Va	AO_V01	5	Ia	AO_I01
	2	Vb	AO_V02	6	Ib	AO_I02
	3	Vc	AO_V03	7	Ic	AO_I03
FF		Vab		8	IE	
		Vbc		9	IEP	
		Vca				
D	4	VD				
Calc.		k.V0				
		k.V2				
k	to V0	3,00	to V2	1,00		
			to I0	1,00	to I2	1,00

Figure 43

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Choose the channel configuration; adjust the auxiliary source and the method of stopping the binary inputs. To finish click on “OK”.

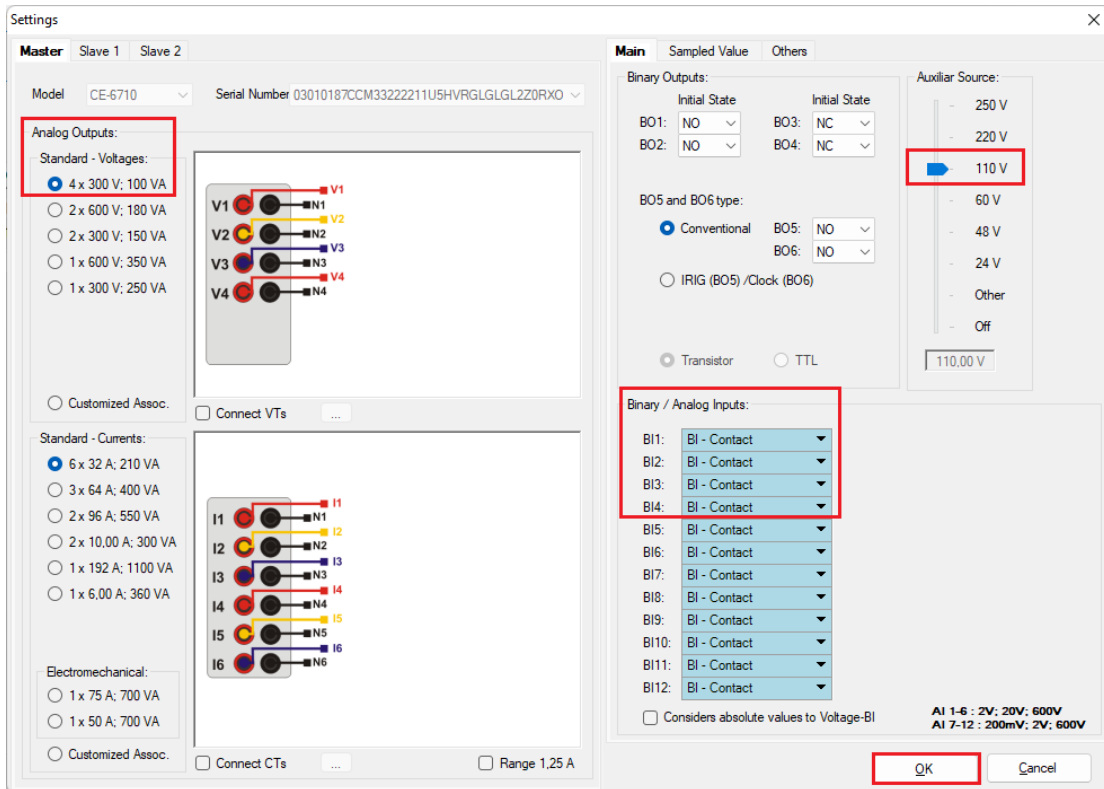


Figure 44

On the next screen choose “Basic” and on the next window (not shown) choose “YES”, finally click on “Confirm”.

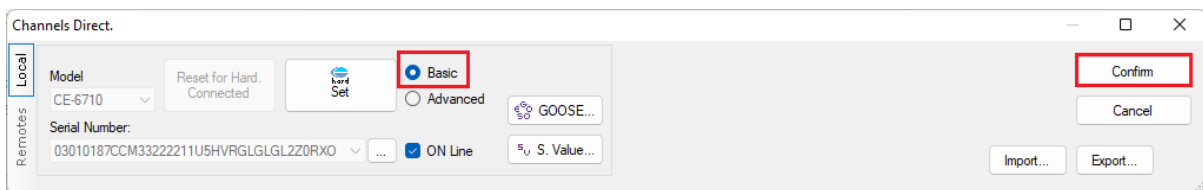


Figure 45

6. Test structure for function 27/59

6.1 Voltage x Time > Overvoltage screen

Click on the tab “Protection > Voltage x time > Overvoltage” so that the data set in the relay are configured in the software. Next to the voltage “V” chooses a node as a reference, in this case “AO_V01”. Only after choosing the node are the fields for setting function 59 active.

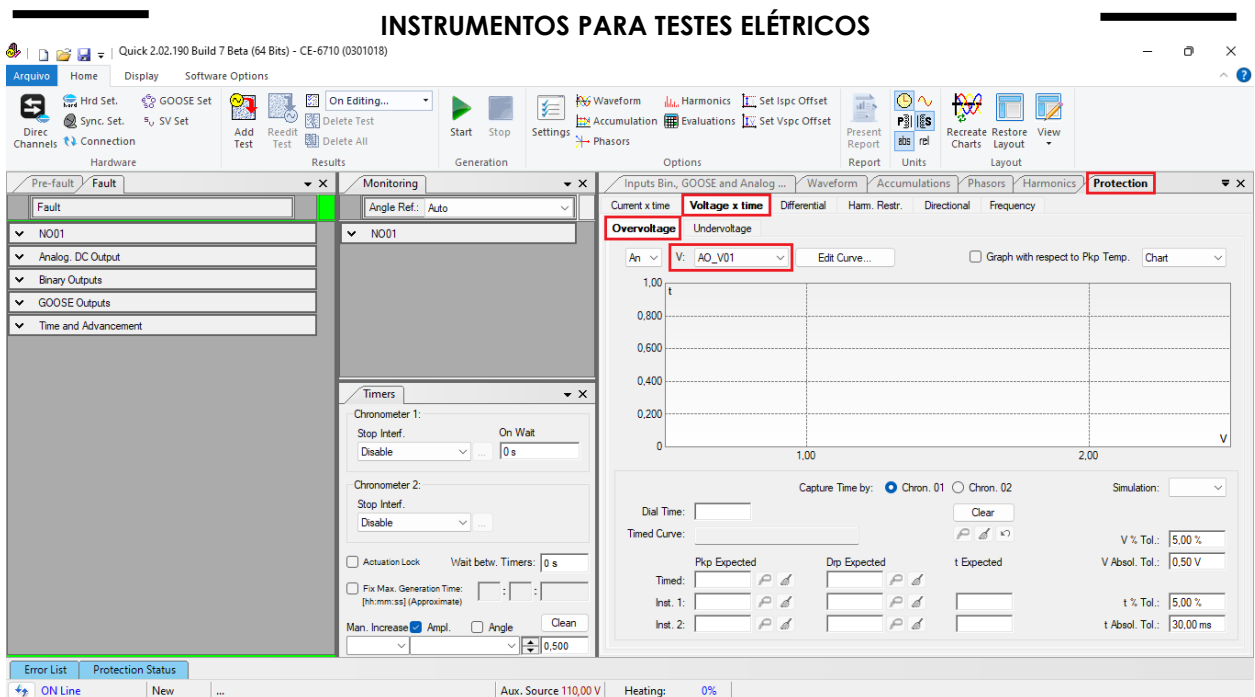


Figure 46

6.2 General Adjustments 59

According to the relay software settings, these values are entered in the “Quick” software. Element 59-1 pick-up equals 80.00V with actuation time equal to 2.0s and element 59-2 pick-up equals 100.00V with actuation time equal to 1.0s. Adjust the absolute and relative tolerances for both voltage and time. These values are taken from Appendix A.2. There is also a field where the type of simulation is required, being possible single-phase-ground, two-phase and three-phase.

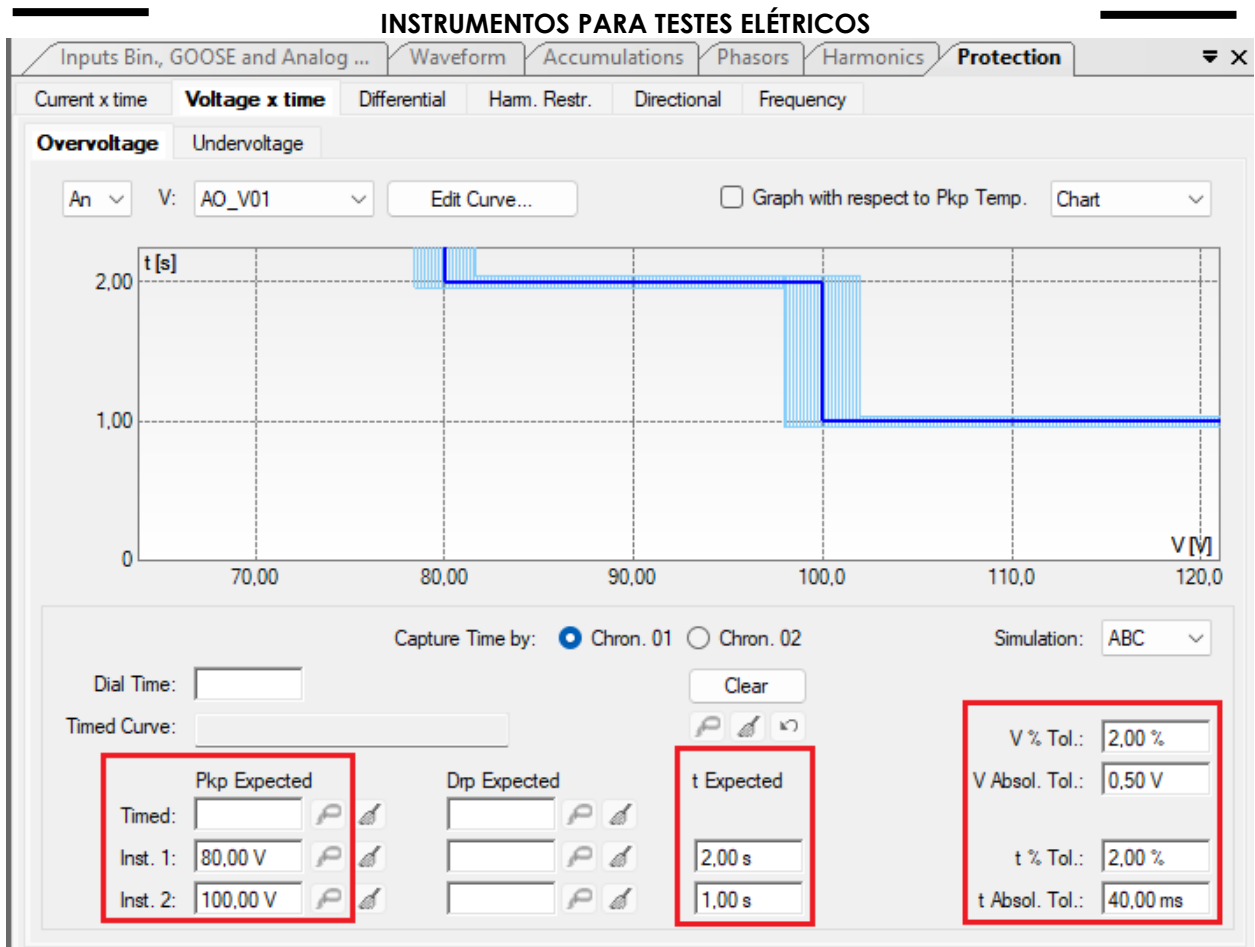


Figure 47

6.3 Timed Element Pick-up Test 59-1

For the pick-up test, a ramp is used to increase the voltage value. To do this, choose the “Ramp” option on the “Fault > N01” tabs and click on the highlighted icon.

INSTRUMENTOS PARA TESTES ELÉTRICOS

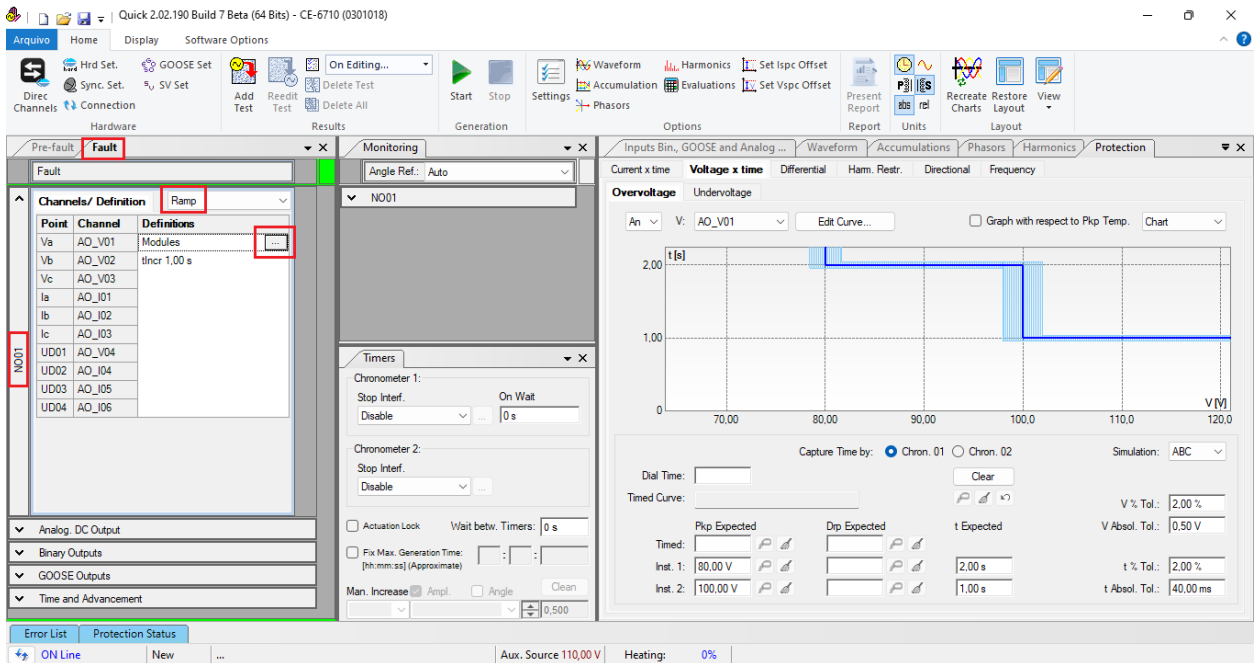


Figure 48

For the initial value, set 79.50V, for limit value 80.50V, with an increment of 100mV and a time of each increment as 3.0s.

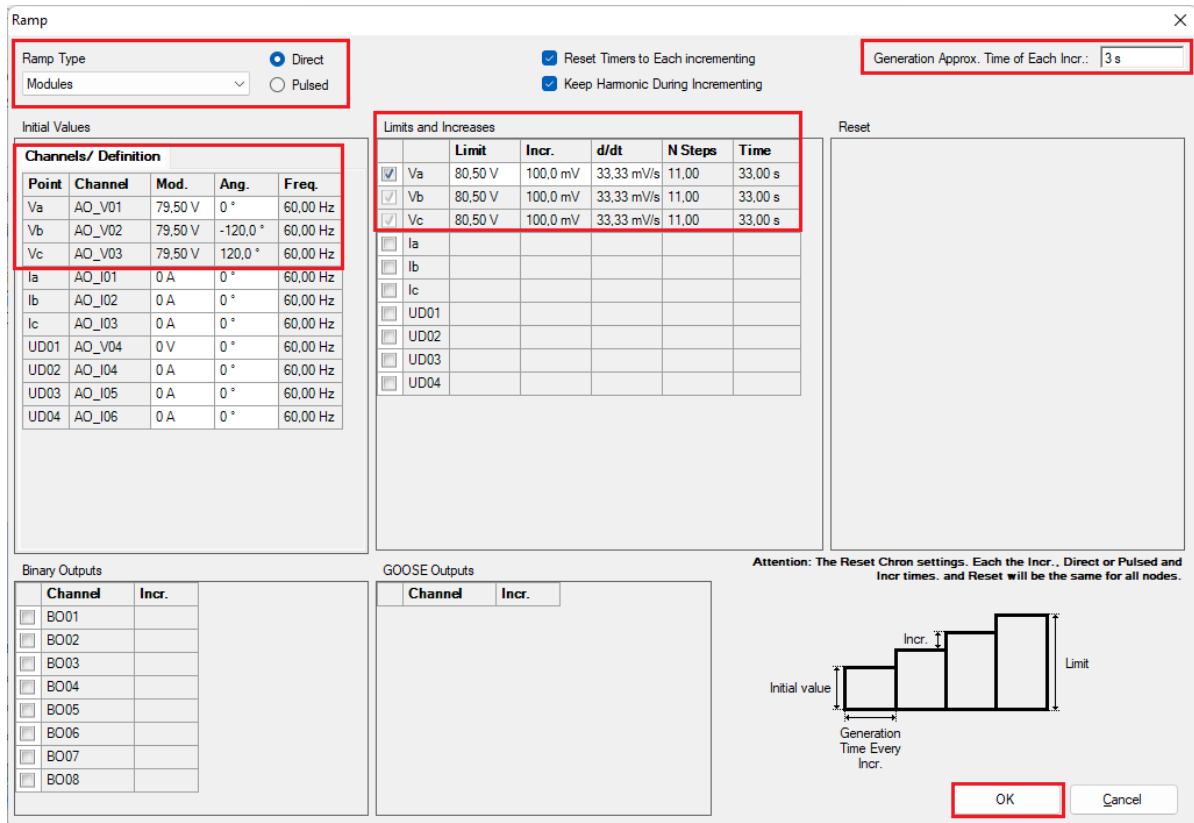


Figure 49

INSTRUMENTOS PARA TESTES ELÉTRICOS

Set the stop interface, which in this case is “*BI03*” and start the generation by clicking on the icon highlighted below or using the shortcut “*Alt + G*”.

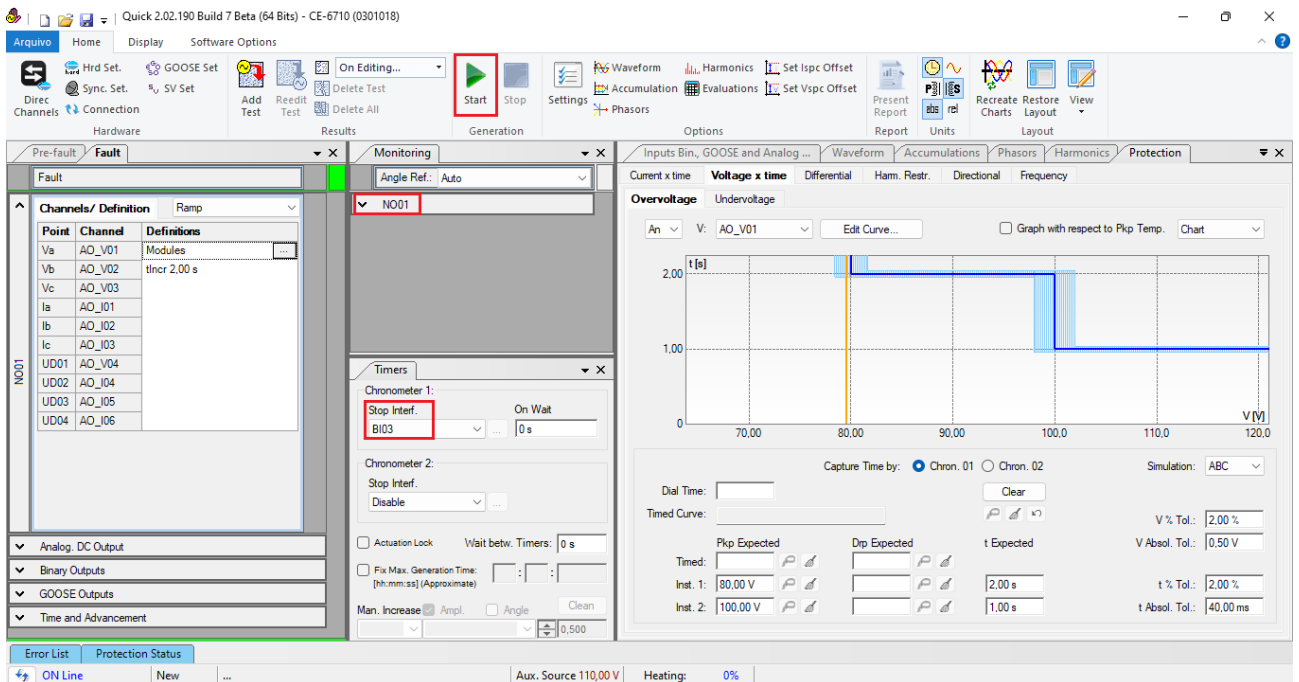


Figure 50

To view the values being generated, click on “*NO1*” within the “*Monitoring*” tab. After the performance, click on the highlighted icon to capture the point.

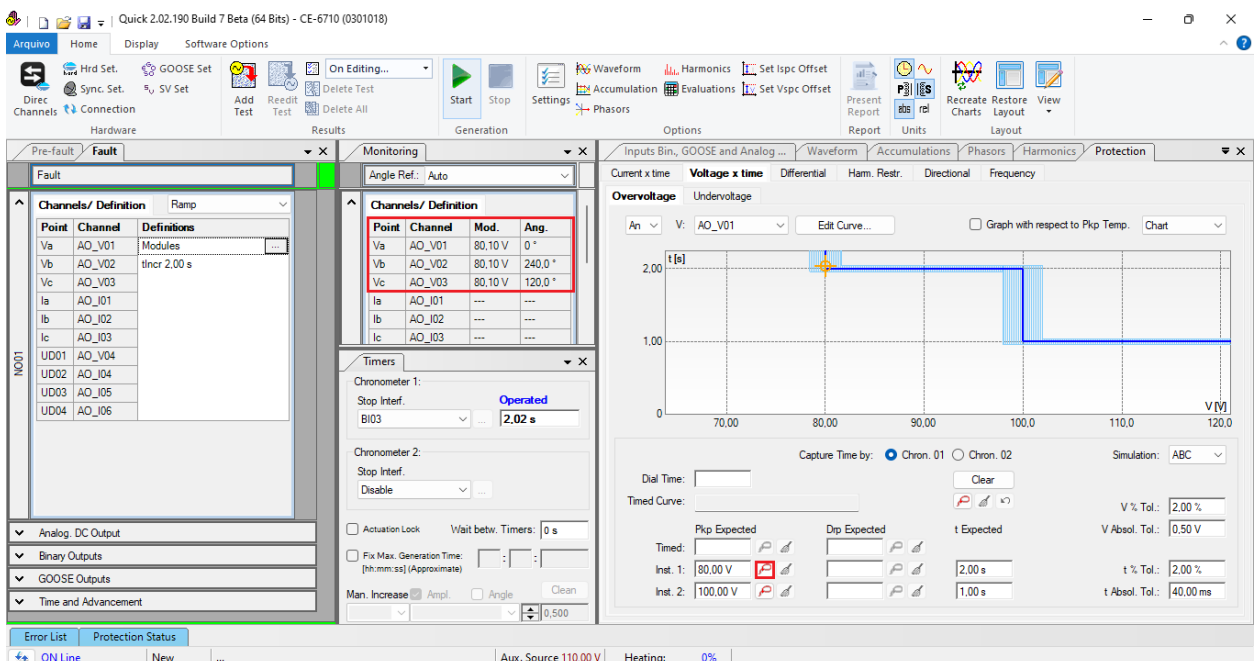


Figure 51

INSTRUMENTOS PARA TESTES ELÉTRICOS

In this case, the pickup found was 80.10V, being within the tolerance provided by the manufacturer.

6.4 Element 59-1 point test

To check the operating time of element 59-1, remove the “Ramp” by choosing the “Direct” option and inject voltage values above the pick-up value. Keep the stop interface at “BI03”. The following figure shows the value of 85.00V already captured and the value of 95.00V to be captured.

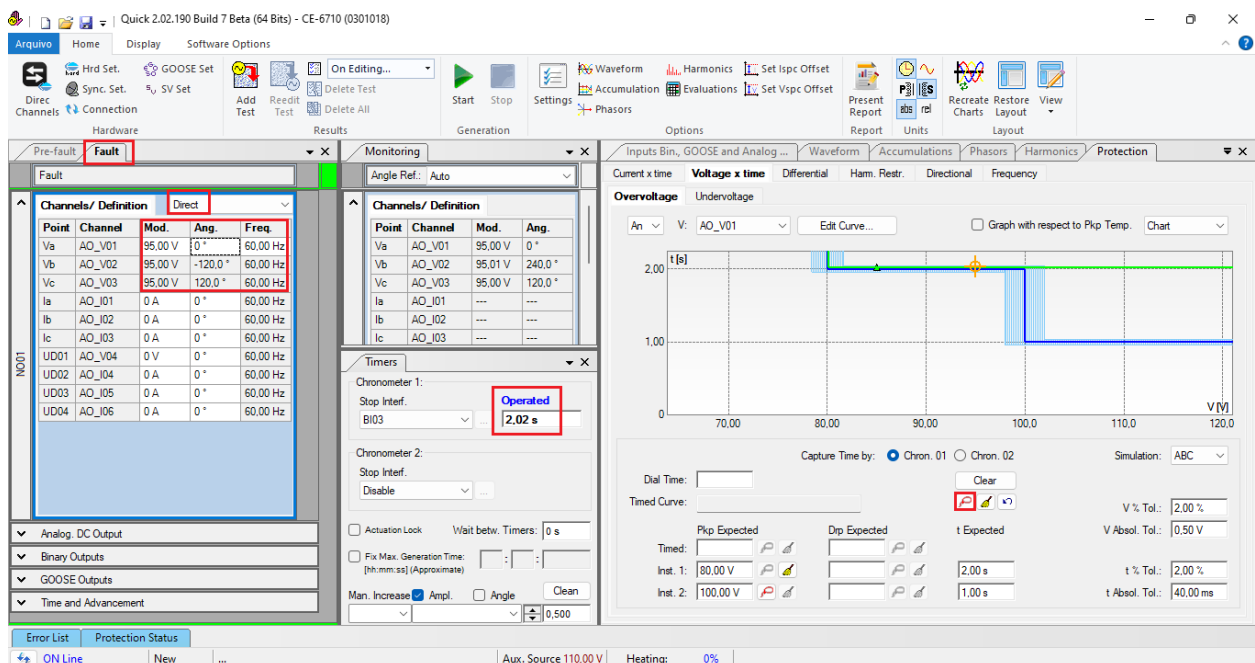


Figure 52

It is verified that the operating times are within the tolerance provided by the manufacturer.

6.5 Timed Element 59-2 Pick-up Test

Click on the “Fault” tab, choose the “Ramp” option and the “...” icon and enter an initial value of 99.50 V, limit value of 100.50V, with an increment of 100.0mV and a time of each increment as 2.0s.

INSTRUMENTOS PARA TESTES ELÉTRICOS

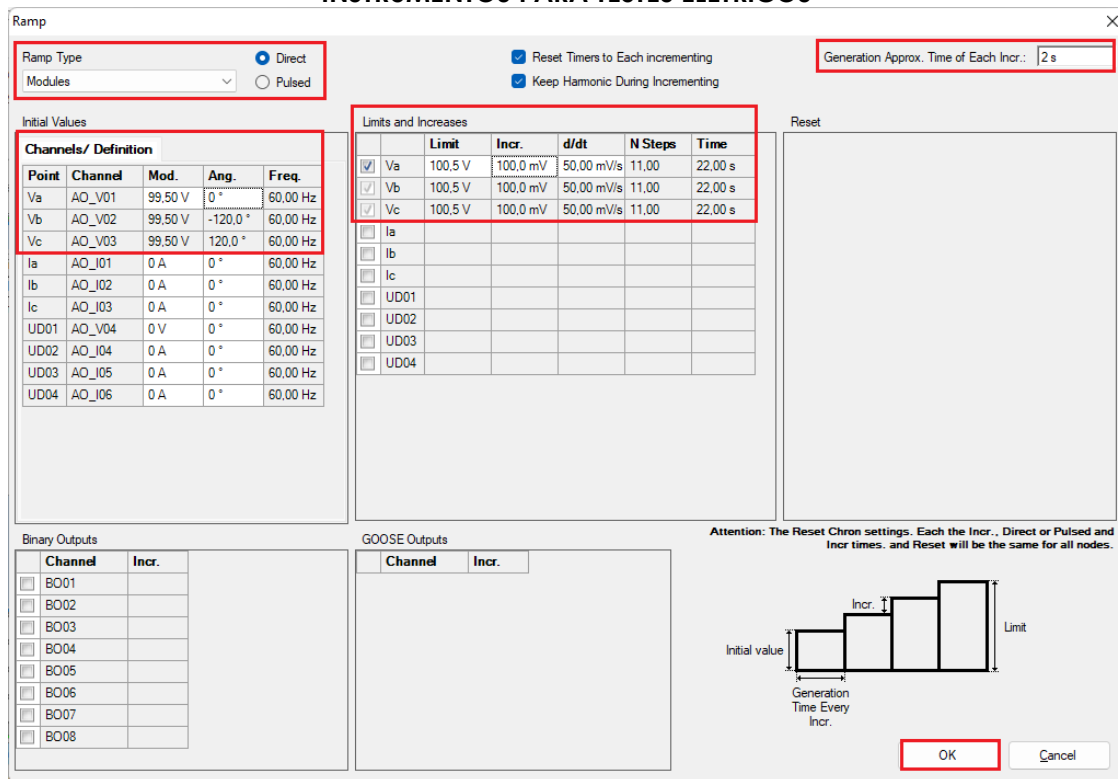


Figure 53

Change the interface to “BI04” and start the generation through the shortcut “Alt + G”.

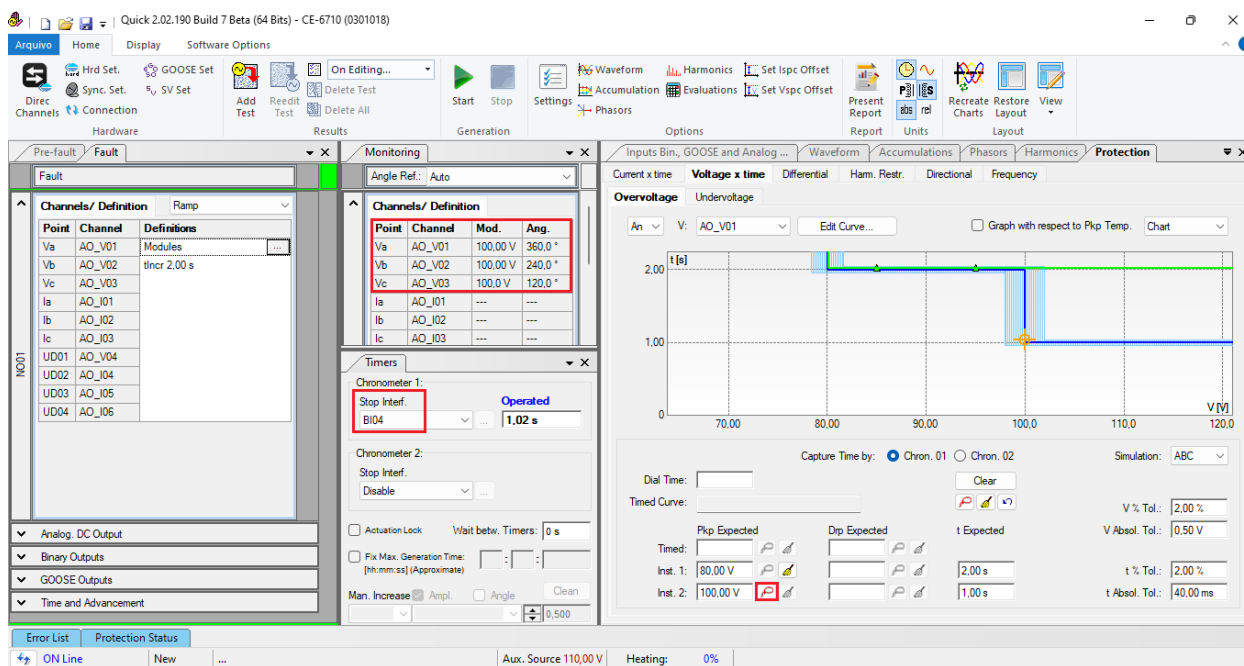


Figure 54

INSTRUMENTOS PARA TESTES ELÉTRICOS

The pick-up value found for element 59-2 was 100.00V, being exactly the parameterized value.

6.6 Element 59-2 point test

Return the “Channels/Definition” field to “Direct” to check the operating time of element 59-2. Points with voltage values above the pick-up must be tested. The figure below shows the value of 105.00V already captured and the value of 115.00V not yet captured.

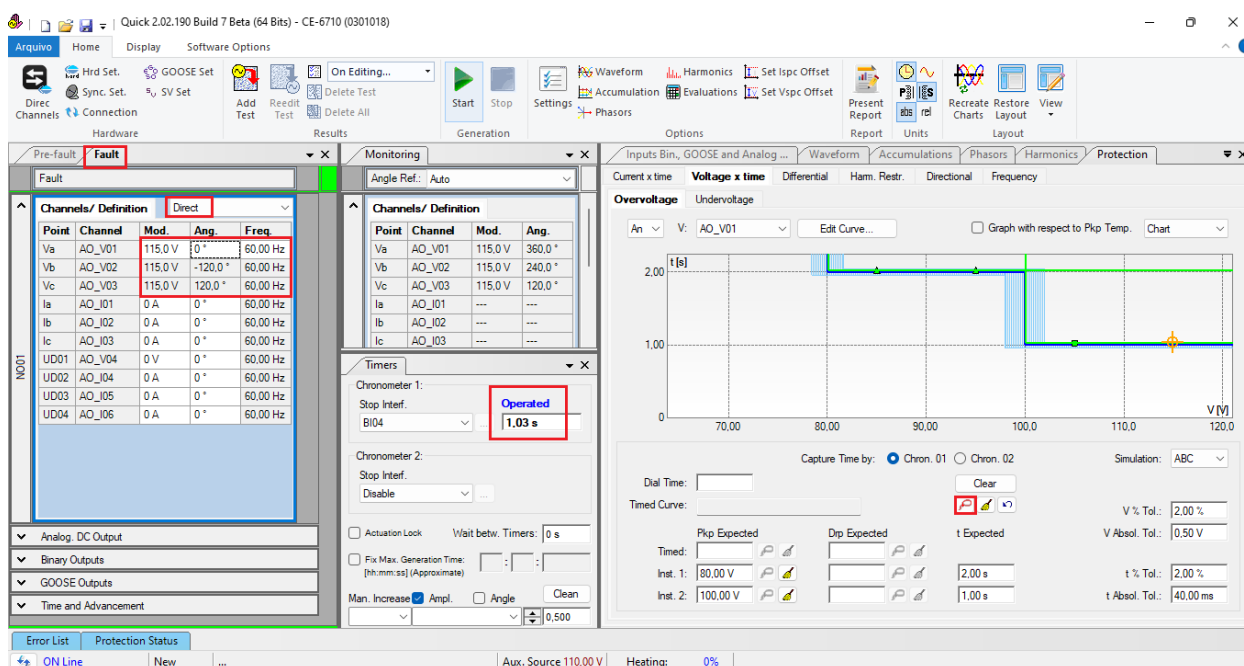


Figure 55

It is verified that the operating times are within the tolerance provided by the relay manufacturer.

6.7 Voltage x Time > Undervoltage screen

First, click on the tab “Protection > Voltage x time > Undervoltage” so that the data set in the relay are configured in the software. Next to the voltage “V” chooses a node as a reference, in this case “AO_V01”. Only after choosing the node are the fields for setting function 27 active.

INSTRUMENTOS PARA TESTES ELÉTRICOS

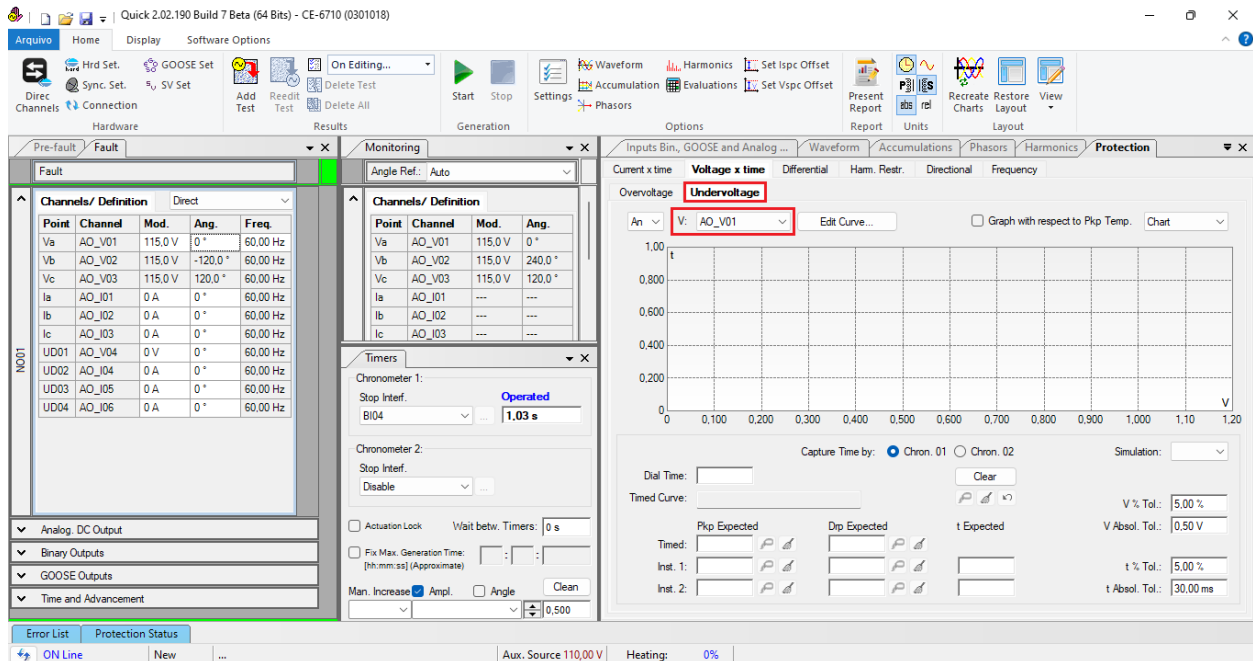


Figure 56

6.8 General Adjustments 27

According to the relay software settings, these values are entered in the Quick software. Element 27-1 pick-up equals 50.00V with actuation time equal to 2.0s and element 27-2 pick-up equals 30.00V with actuation time equal to 1.0s.

There are also fields where absolute and relative tolerances for both voltage and time must be entered. These values are taken from Appendix A.2.

INSTRUMENTOS PARA TESTES ELÉTRICOS

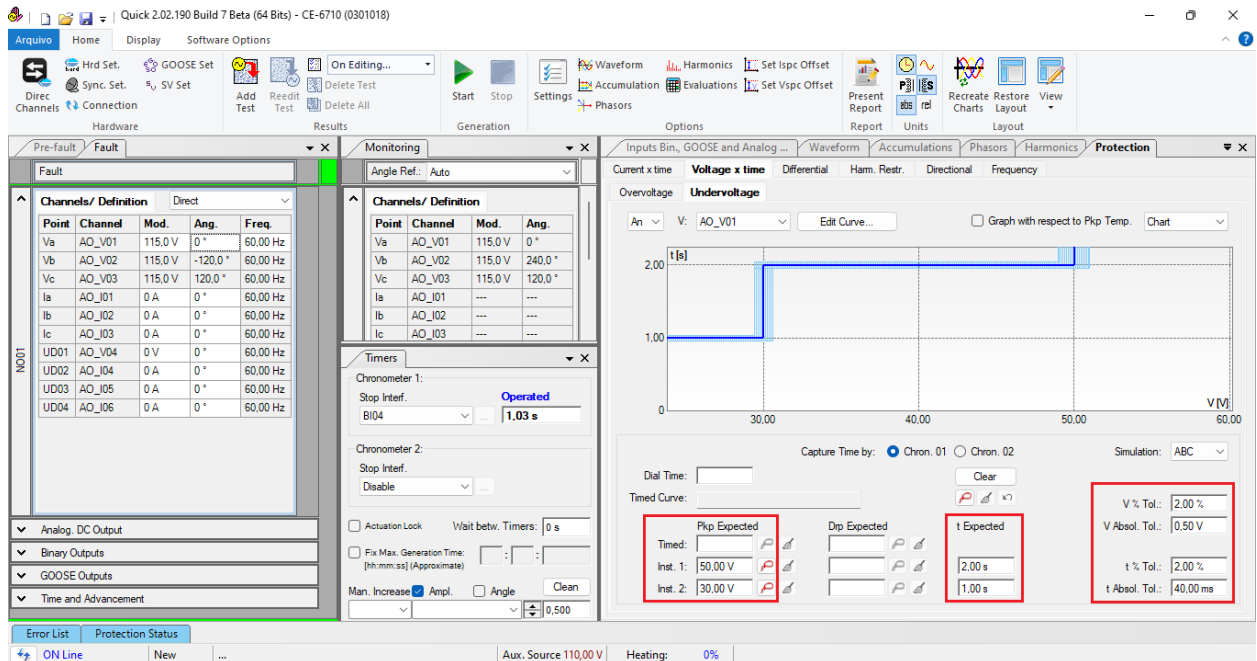


Figure 57

6.9 Timed Element 27-1 Pick-up Test

First change the stop binary to “BI01”. For the pick-up test, a ramp is used to decrease the voltage value. To do this, choose the “Ramp” option on the “Fault > NO1” tabs and click on the highlighted icon.

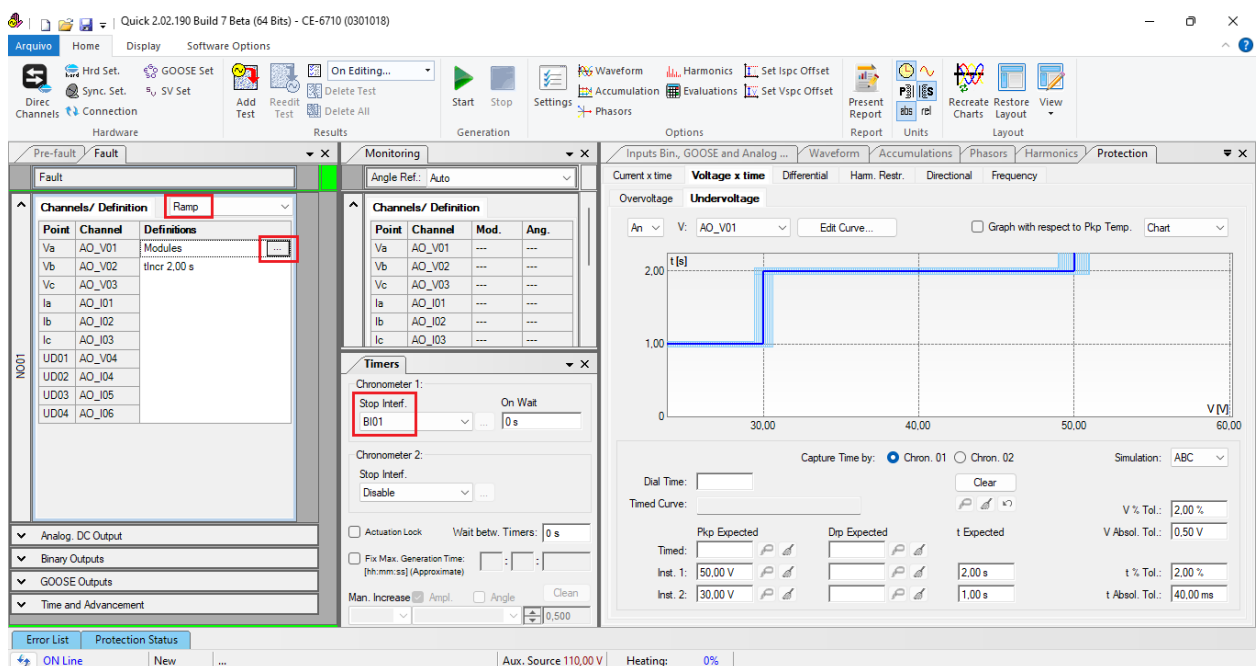


Figure 58

INSTRUMENTOS PARA TESTES ELÉTRICOS

Enter an initial value of 50.50V, threshold value of 49.50, with a decrement of -100.0mV and a time of each decrement as 3.0s.

Ramp

Ramp Type: Direct Pulsed
 Modules:

Reset Timers to Each Incrementing
 Keep Harmonic During Incrementing

Generation Approx. Time of Each Incr.:

Initial Values

Point	Channel	Mod.	Ang.	Freq.
Va	AO_V01	50,50 V	0 °	60,00 Hz
Vb	AO_V02	50,50 V	-120,0 °	60,00 Hz
Vc	AO_V03	50,50 V	120,0 °	60,00 Hz
Ia	AO_I01	0 A	0 °	60,00 Hz
Ib	AO_I02	0 A	0 °	60,00 Hz
Ic	AO_I03	0 A	0 °	60,00 Hz
UD01	AO_V04	0 V	0 °	60,00 Hz
UD02	AO_I04	0 A	0 °	60,00 Hz
UD03	AO_I05	0 A	0 °	60,00 Hz
UD04	AO_I06	0 A	0 °	60,00 Hz

Limits and Increases

	Limit	Incr.	d/dt	N Steps	Time	
<input checked="" type="checkbox"/>	Va	49,50 V	-100,0 mV/s	-33,33 mV/s	11,00	33,00 s
<input checked="" type="checkbox"/>	Vb	49,50 V	-100,0 mV	-33,33 mV/s	11,00	33,00 s
<input checked="" type="checkbox"/>	Vc	49,50 V	-100,0 mV	-33,33 mV/s	11,00	33,00 s
<input type="checkbox"/>	Ia					
<input type="checkbox"/>	Ib					
<input type="checkbox"/>	Ic					
<input type="checkbox"/>	UD01					
<input type="checkbox"/>	UD02					
<input type="checkbox"/>	UD03					
<input type="checkbox"/>	UD04					

Reset

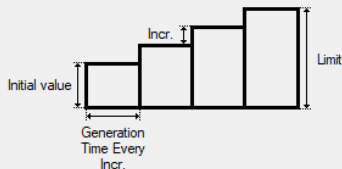
Attention: The Reset Chron settings. Each the Incr., Direct or Pulsed and Incr times, and Reset will be the same for all nodes.

Binary Outputs

Channel	Incr.
<input type="checkbox"/> BO01	
<input type="checkbox"/> BO02	
<input type="checkbox"/> BO03	
<input type="checkbox"/> BO04	
<input type="checkbox"/> BO05	
<input type="checkbox"/> BO06	
<input type="checkbox"/> BO07	
<input type="checkbox"/> BO08	

GOOSE Outputs

Channel	Incr.



OK Cancel

Figure 59

NOTE: An important detail is that pre-fault voltage must be entered so that the relay performs the drop-out. For this, click on “Actuation Lock”.

INSTRUMENTOS PARA TESTES ELÉTRICOS

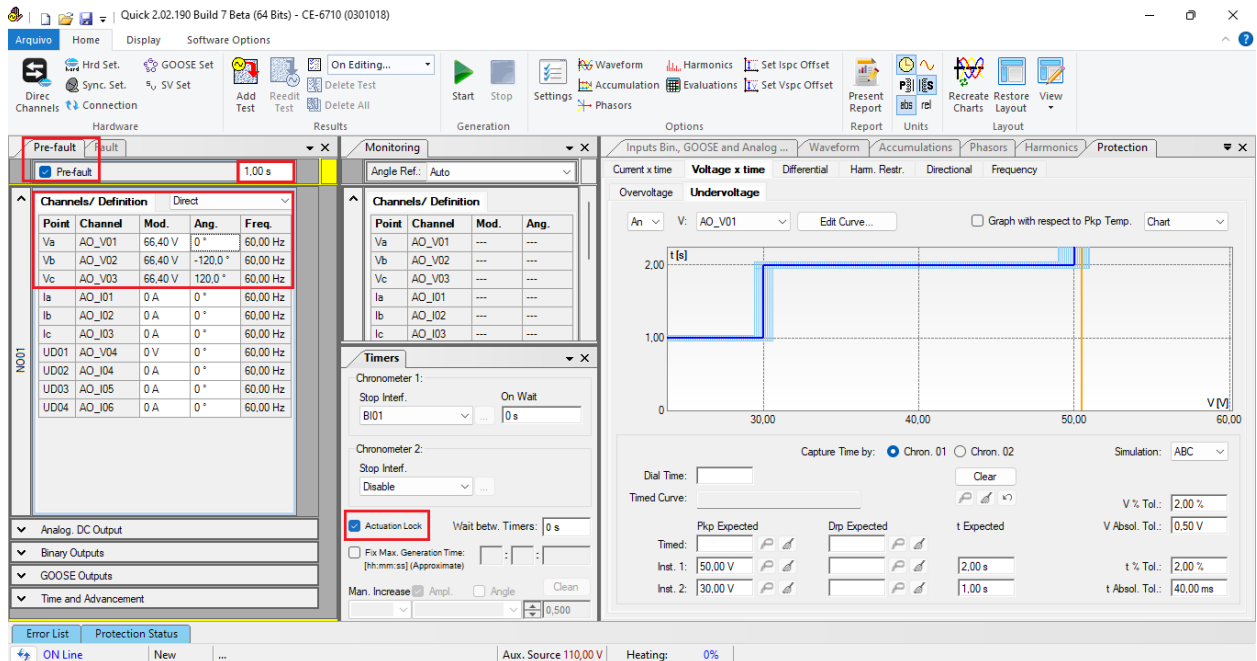


Figure 60

Start the generation by clicking on the “Start” icon or via the shortcut “Alt + G”.

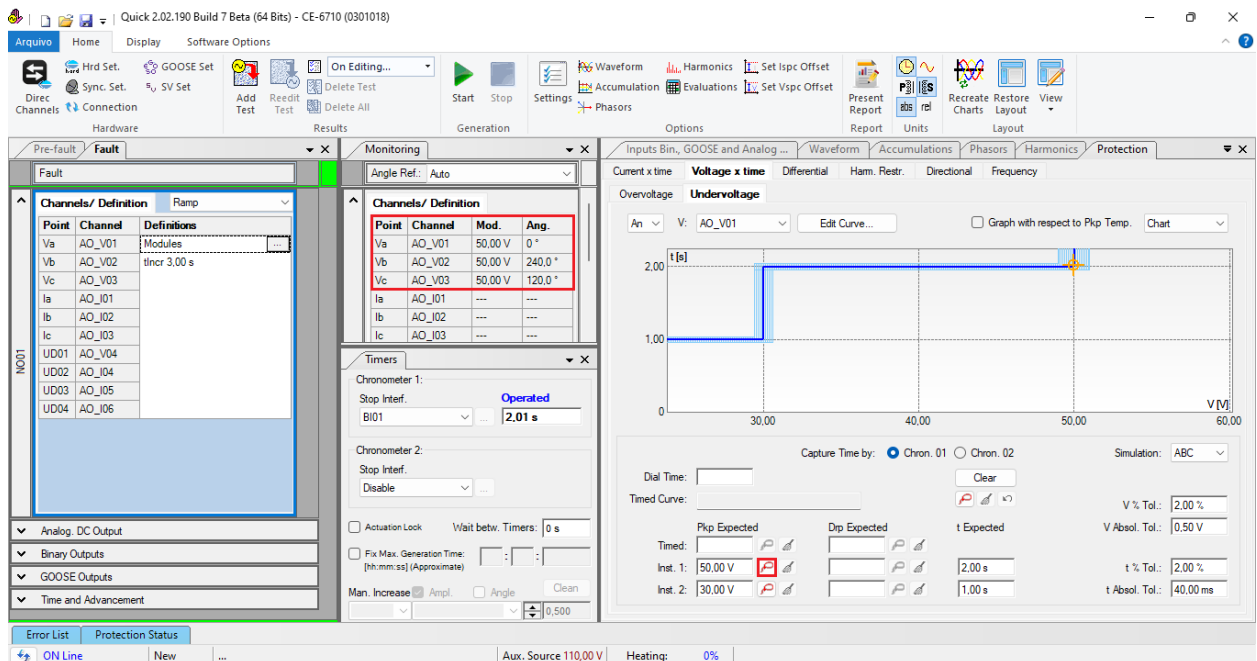


Figure 61

In this case, the pick-up found was 50.00V, being exactly the value adjusted in the relay.

INSTRUMENTOS PARA TESTES ELÉTRICOS

6.10 *Element 27-1 point test*

Return the “Channels/Definition” field to “Direct” to check the operating time of element 27-1. Points with voltage values below the pick-up must be tested. The figure below shows the value of 45.00V already captured and the value of 35.00V not yet captured.

NOTE: Remember to always block the first actuation.

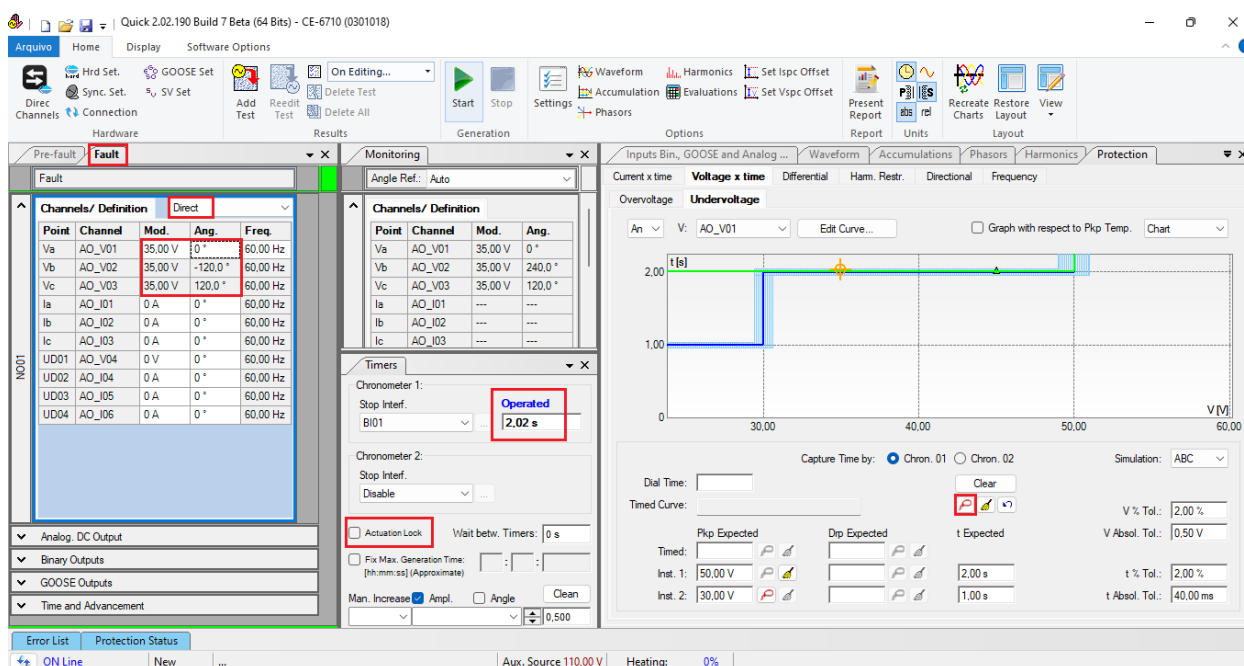


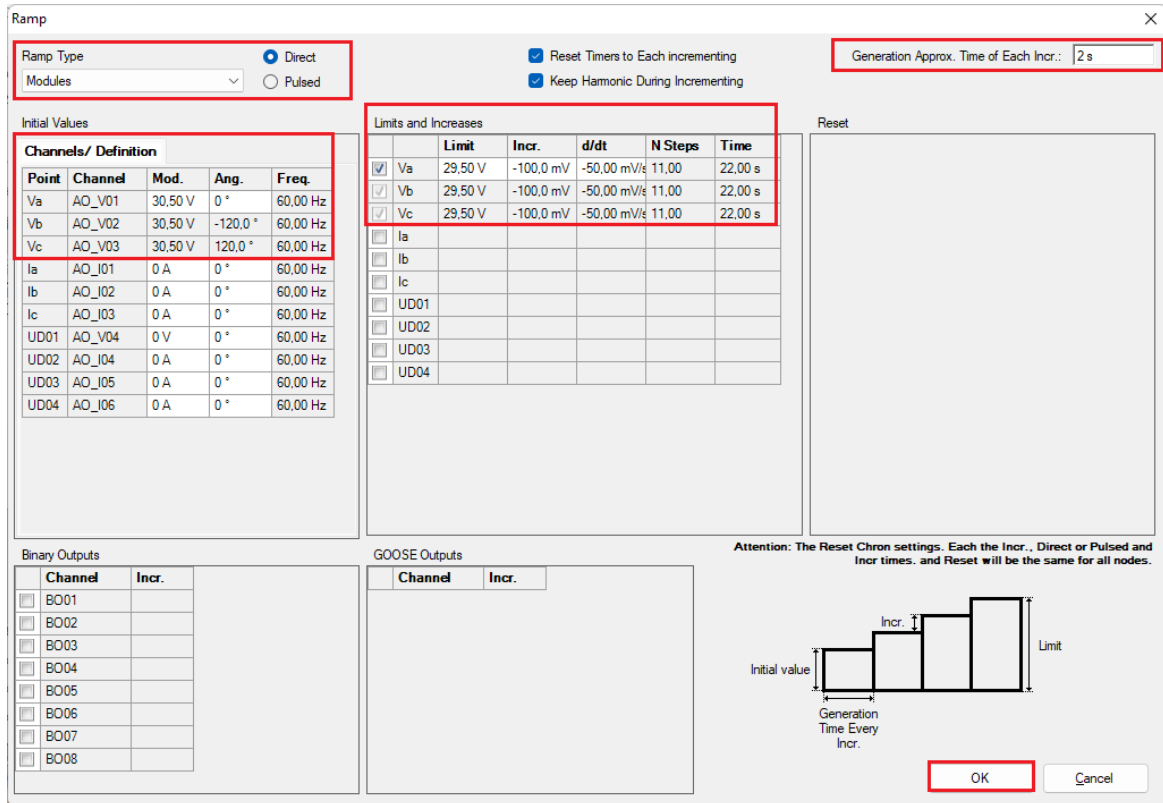
Figure 62

It is verified that the operating times are within the tolerance provided by the manufacturer.

6.11 *Timed Element 27-2 Pick-up Test*

Change the binary to “BI02”, click on the “Fault” tab, choose the “Ramp” option and the “...” icon and enter an initial value of 30.50V, limit value of 29.50V, with a decrement of - 100.0mV and the time of each decrement as 2.0s.

INSTRUMENTOS PARA TESTES ELÉTRICOS



Ramp

Ramp Type: Direct Pulsed

Reset Timers to Each incrementing: Keep Harmonic During Incrementing: Generation Approx. Time of Each Incr.: 2 s

Point	Channel	Mod.	Ang.	Freq.
Va	AO_V01	30,50 V	0 °	60,00 Hz
Vb	AO_V02	30,50 V	-120,0 °	60,00 Hz
Vc	AO_V03	30,50 V	120,0 °	60,00 Hz
Ia	AO_I01	0 A	0 °	60,00 Hz
Ib	AO_I02	0 A	0 °	60,00 Hz
Ic	AO_I03	0 A	0 °	60,00 Hz
UD01	AO_V04	0 V	0 °	60,00 Hz
UD02	AO_I04	0 A	0 °	60,00 Hz
UD03	AO_I05	0 A	0 °	60,00 Hz
UD04	AO_I06	0 A	0 °	60,00 Hz

	Limit	Incr.	d/dt	N Steps	Time	
<input checked="" type="checkbox"/>	Va	29,50 V	-100,0 mV/s	-50,00 mV/s	11,00	22,00 s
<input checked="" type="checkbox"/>	Vb	29,50 V	-100,0 mV/s	-50,00 mV/s	11,00	22,00 s
<input checked="" type="checkbox"/>	Vc	29,50 V	-100,0 mV/s	-50,00 mV/s	11,00	22,00 s
<input type="checkbox"/>	Ia					
<input type="checkbox"/>	Ib					
<input type="checkbox"/>	Ic					
<input type="checkbox"/>	UD01					
<input type="checkbox"/>	UD02					
<input type="checkbox"/>	UD03					
<input type="checkbox"/>	UD04					

Binary Outputs:

Channel	Incr.
<input type="checkbox"/> BO01	
<input type="checkbox"/> BO02	
<input type="checkbox"/> BO03	
<input type="checkbox"/> BO04	
<input type="checkbox"/> BO05	
<input type="checkbox"/> BO06	
<input type="checkbox"/> BO07	
<input type="checkbox"/> BO08	

GOOSE Outputs:

Channel	Incr.

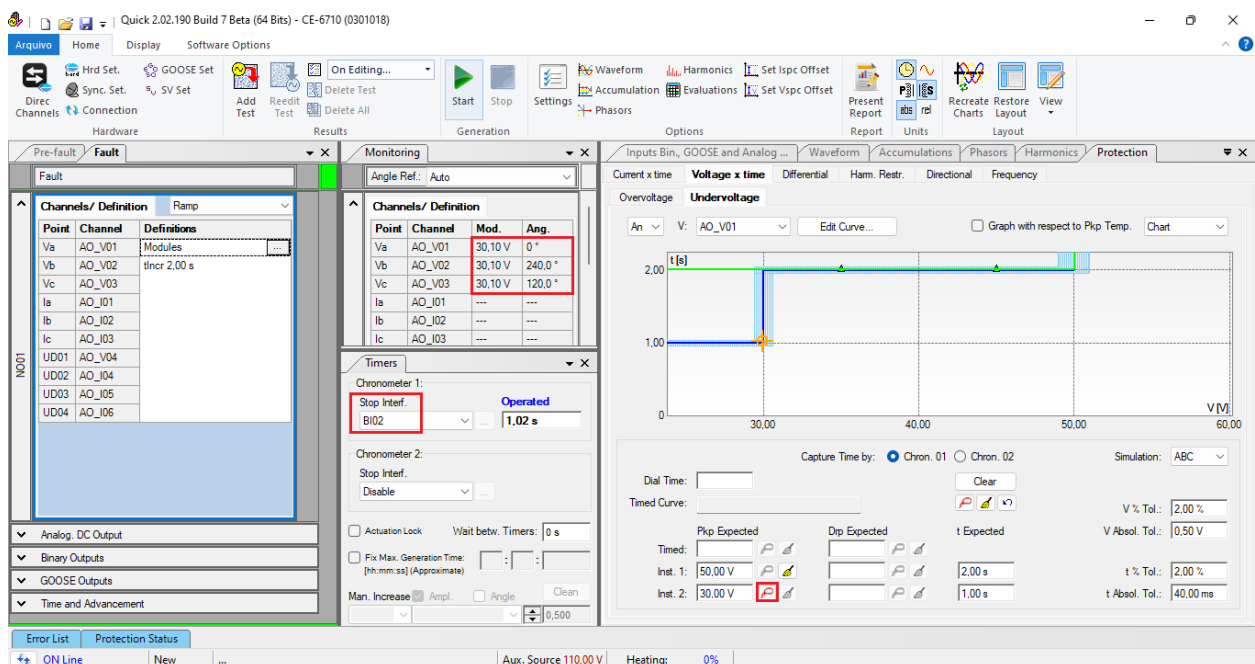
Attention: The Reset Chron settings. Each the Incr., Direct or Pulsed and Incr times, and Reset will be the same for all nodes.

Initial value, Generation Time Every Incr., Limit

OK Cancel

Figure 63

Check the field “Actuation Lock” and start the generation through the shortcut “Alt + G”.



Quick 2.02.190 Build 7 Beta (64 Bits) - CE-6710 (0301018)

Arquivo Home Display Software Options

On Editing... Start Stop Settings Phasors

Waveform Harmonics Set Ispc Offset Accumulation Evaluations Set Vspc Offset Present Report Units Recreate Charts Restore Layout View

Pre-fault Fault Monitoring Inputs Bin, GOOSE and Analog ... Waveform Accumulations Phasors Harmonics Protection

Current x time Voltage x time Differential Ham. Restr. Directional Frequency

Overvoltage Undervoltage

An V: AO_V01 Edit Curve... Graph with respect to Pkp Temp. Chart

2.00 1.00 0 30.00 40.00 50.00 60.00 V/M

Dial Time: Capture Time by: Chron. 01 Chron. 02 Simulation: ABC

Timed Curve: Pkp Expected Dip Expected t Expected V % Tol: 2.00 % V Absol. Tol: 0.50 V t % Tol: 2.00 % t Absol. Tol: 40.00 ms

Inst. 1: 50.00 V Inst. 2: 30.00 V

2.00 s 1.00 s

Chromometer 1: Stop Interf. BI02 Operated 1,02 s

Chromometer 2: Stop Interf. Disable

Actuation Lock Wait betw. Timers: 0 s

Fix Max. Generation Time: (hh:mm:ss) (Approximate)

Man. Increase Ampl. Angle Clean

Error List Protection Status ON Line New ... Aux. Source 110,00 V Heating: 0%

Figure 64

INSTRUMENTOS PARA TESTES ELÉTRICOS

The pick-up found for element 27-2 was 30.10V, being within the tolerance provided by the manufacturer.

6.12 *Element 27-2 point test*

The following figure shows the value of 29.00V already captured and the value of 25.00V not yet captured.

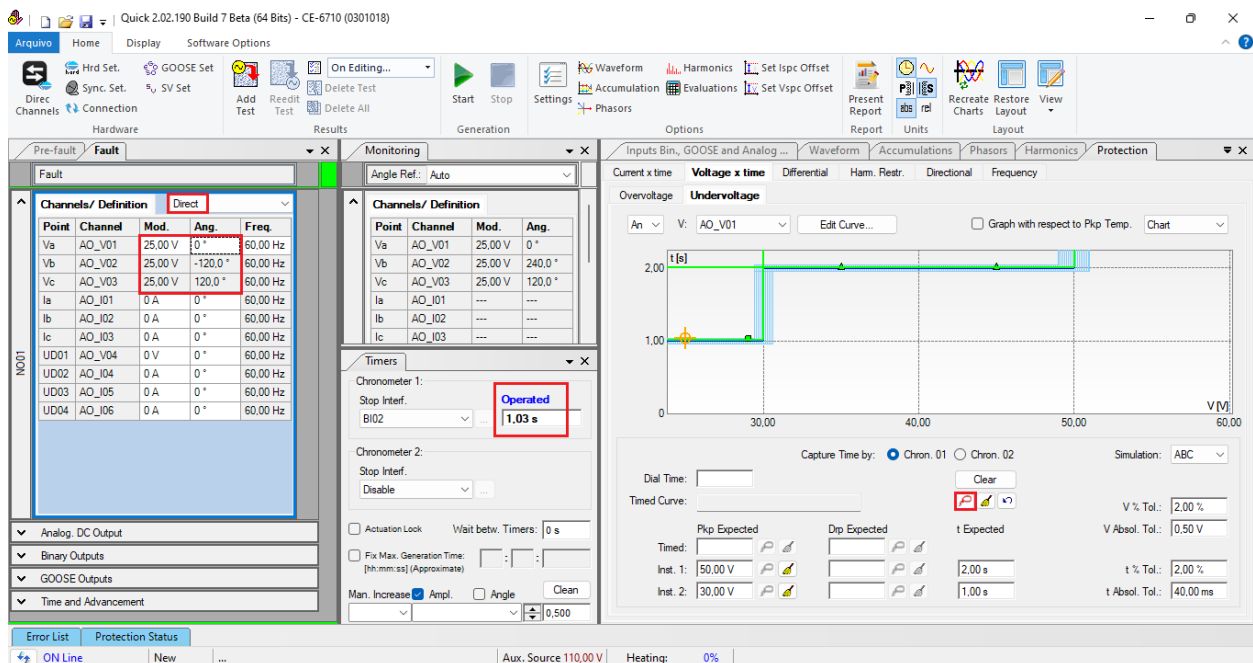


Figure 65

It is verified that the operating times are within the tolerance given by the manufacturer.

7. Report

After finishing the test, click on the icon “Present Report” in the previous figure or through the command “Ctrl +R” to call up the report pre-configuration screen. Choose the desired language as well as the options that should be part of the report.

INSTRUMENTOS PARA TESTES ELÉTRICOS

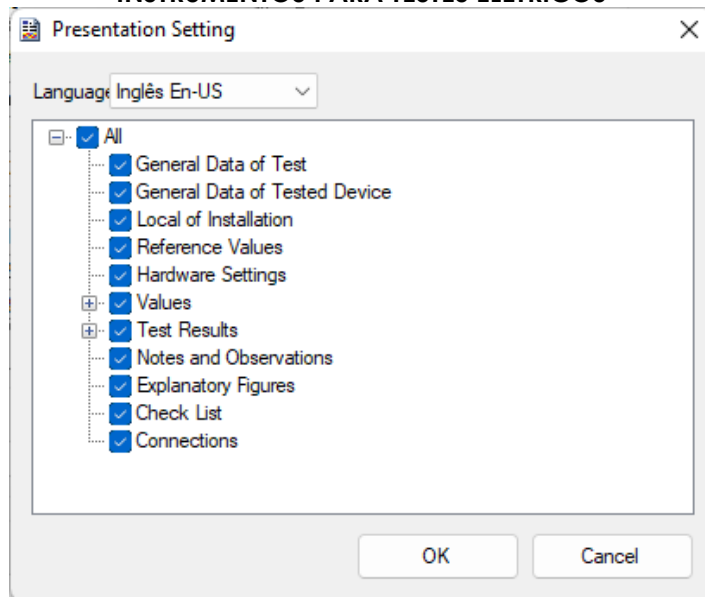


Figure 66

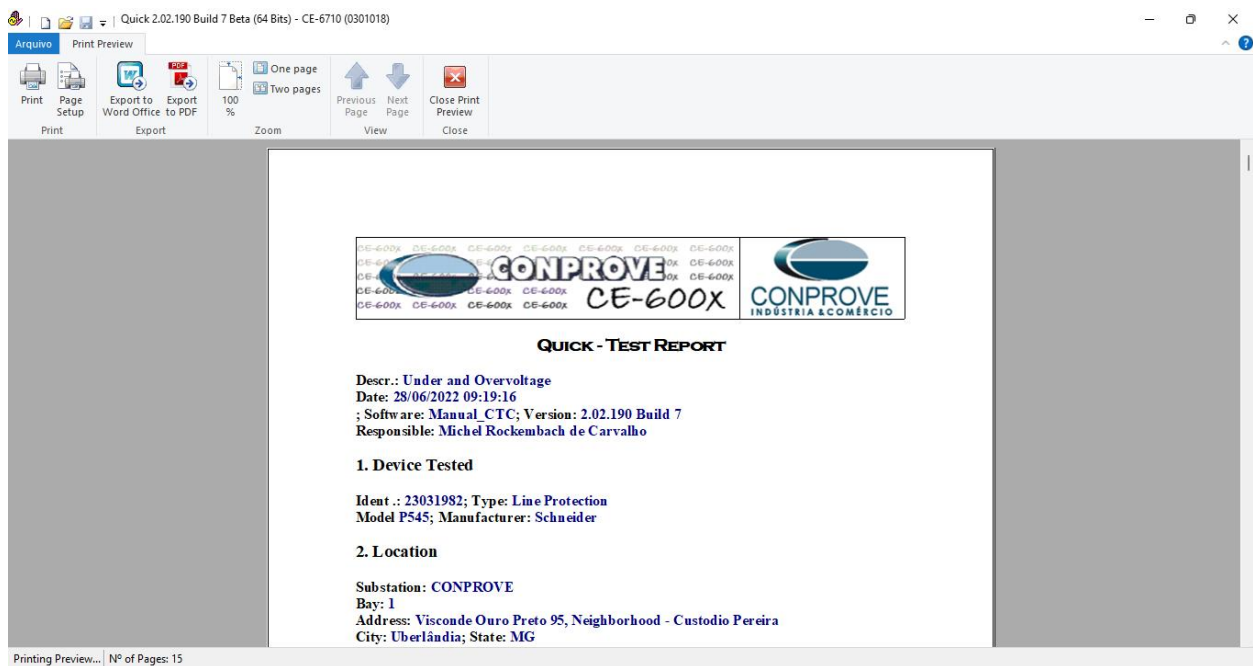


Figure 67

INSTRUMENTOS PARA TESTES ELÉTRICOS

APPENDIX A

A.1 Terminal Designations

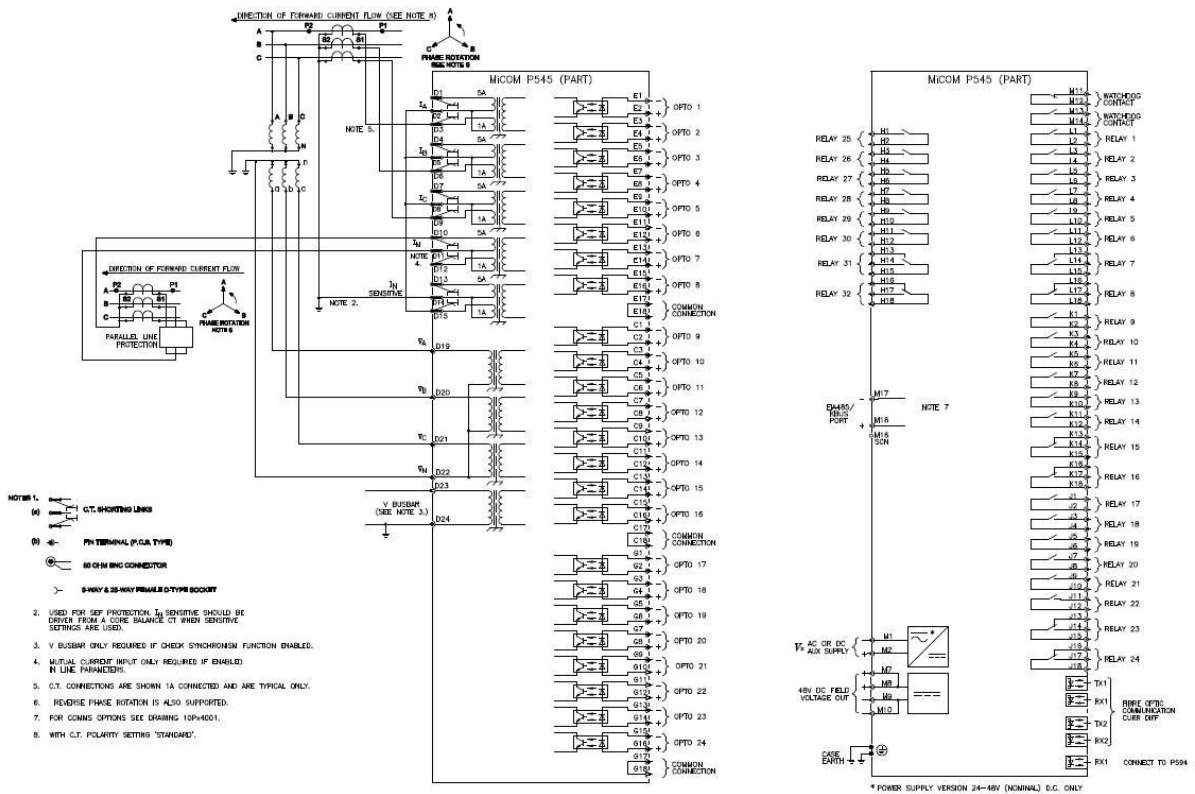


Figure 68

A.2 Technical data

Undervoltage

Accuracy

DT Pick-up: Setting $\pm 2\%$

IDMT Pick-up: 0.98 x setting $\pm 2\%$

Drop-off: 1.02 x setting $\pm 2\%$

Definite time operation:

± 40 ms or 2%, whichever is greater

Repeatability: 1%

IDMT characteristic shape:

± 40 ms or 2%, whichever is greater

Reset: < 75 ms

Overvoltage

Accuracy

DT Pick-up: Setting $\pm 1\%$

IDMT Pick-up: 1.02 x setting $\pm 2\%$

Drop-off: 0.98 x setting $\pm 2\%$

Definite time operation:

± 40 ms or 2%, whichever is greater

Repeatability: 1%

IDMT characteristic shape:

± 40 ms or 2%, whichever is greater

Reset: < 75 ms

APPENDIX B

Equivalence of software parameters and the relay under test.

Table 1

Quick Software		Schneider P545 Relay	
Parameter	Figure	Parameter	Figure
Overvoltage			
PKP_Instant.1	47	V>1 Voltage Set	20
Time_Instant.1	47	V>1 Time Delay	20
PKP_Instant.2	47	V>2 Voltage Set	20
Time_Instant.2	47	V>2 Time Delay	20
Undervoltage			
PKP_Instant.1	57	V<1 Voltage Set	20
Time_Instant.1	57	V<1 Time Delay	20
PKP_Instant.2	57	V<2 Voltage Set	20
Time_Instant.2	57	V<2 Time Delay	20