

INSTRUMENTOS PARA TESTES ELÉTRICOS Test Tutorial

Equipment Type: Protection Relay

Brand: GE

Model: <u>SR745</u>

**Function:** <u>50 or PIOC- Instantaneous Overcurrent and 51 or</u> <u>PTOC – Time Overcurrent</u>

**Tool Used:** <u>CE- 6003; CE-6006; CE6707; CE-6710; CE-7012 or</u> <u>CE-7024</u>

**Objective:** <u>Timed pickup test of the units of Phase (51), timed</u> <u>curve survey, instantaneous pickup test of phase units (50).</u>

Version control:

Version	Descriptions	Date	Author	Reviewer
1.0	Initial Version	13/09/2021	M.R.C.	M.P.S



# 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 tested should always be consulted.



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 tested and also be aware of safety standards and regulations.

# Copyright

Copyright © CONPROVE. All rights reserved. The dissemination, total or partial reproduction of its content is not authorized, unless expressly permitted. Violations are punishable by law.



Sur	nmary	
1.	Relay connection to CE-6006	.4
1.1	Auxiliary Source	.4
1.2	Current Coils	.4
1.3	Binary Inputs	.5
2.	Communication with SR745 relay	5
3.	Parameterization of the relay SR745	6
3.1	System Setup	.6
3.2	Winding 1	7
3.3	Winding 2	7
3.4	W1 Phase Time OC	.7
3.5	W1 Phase inst. OC	.8
3.6	Relay 4	.9
3.7	Relay 5	.9
4.	Overcurrent software adjustments 1	0
4.1	Opening the Overcurrent1	0
4.2	Configuring the Settings1	1
4.3	<i>System</i> 1	2
5.	Overcurrent Adjustments 1	3
5.1	Overcurrent Screen > Settings1	3
5.2	Overcurrent Screen > Overcurrent Elements > Phase1	3
6.	Channel Targeting and Hardware Configurations1	5
7.	Test Structure for Function 50/51 1	6
7.1	Test Settings1	6
7.2	Pickup Screen1	17
7.3	Final Result of the Pickup Test1	8
7.4	Time Screen1	8
7.5	Final Result of the Time Test1	9
8.	Report2	20
API	PENDIX A	21
A.1	Terminal Designations	21
A.2	Technical data	22
API	PENDIX B2	23



## INSTRUMENTOS PARA TESTES ELÉTRICOS Sequence for SR745 relay tests in Overcurrent software

# 1. Relay connection to CE-6006

Appendix A-1 shows the relay terminal designations.

## **1.1** Auxiliary Source

Connect the positive (red terminal) of the Vdc Aux. Source to pin H12 of the relay and the negative (black terminal) of the Vdc Aux. Source to pin H11 of the relay.



# **1.2** Current Coils

Connect I1, I2 and I3 current channels of the CE-6006 to pins H1, H2 and H3 of the relay respectively, if the commons of the relay are short circuited, just connect the commons of the trunk channels to that point, otherwise connect the three common CE-6006 to G1 pins, G2 and G3 of the relay.



Figure 2

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202<br/>Fone (34) 3218-6800Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



# **1.3** Binary Inputs

Connect the binary inputs of the equipment to the binary outputs of the relay:

- BI1 to pin E2 and its common to pin F2;
- BI2 to pin E3 and its common to pin F3;
- BI3 to pin E4 and its common to pin F4;
- BI4 to pin E5 and its common to pin F5;



# 2. Communication with SR745 relay

Before starting the 745 relay test, open the EnerVista software and download the *"EnerVista 745"* software, if you already have it click directly on:



In the "EnerVista 745" software click on "Quick Connect".





Then click on "*Connect*" and choose the port being used and the baud rate read on the relay. In this case COM5 and 19200.

Quick Connect	
Quickly connect 745 Setup to a 745 Device.	
Interface Serial 💌	
COM Port COM5	
Baud Rate 19200 🚽	
Connect Cancel	
Figure (	_

Figure 6

The following figure shows the message after connecting.

745 Setup	×
i	Device "745 Quick Connect" added to the site "New Site"
	ОК

Figure 7

# 3. Parameterization of the relay SR745

## 3.1 System Setup

After the connection has been established, click on the "+" signs near to "New Site" > "745 Quick Connect" > "Settings" > "System Setup" and double-click on "Transformer", in it adjust the values nominal system frequency, phase sequence, primary/secondary connection as well as its angular offset. If you change any data, click on "Save" to send it to the relay.

Transformers			
SI	TTING	PARAMETER	II
Nominal Frequency	,	60 Hz	📸 Save
Phase Sequence		ABC	
Transformer Type		D/v30°	Restore
Load Loss at Rated	l Load	1250 kW	
Low Voltage Windi	ng Rating	Above 5 kV	🔛 Default
Frequency Tracking	g	Enabled	

Figure 8

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



# 3.2 Winding 1

In this field, the nominal voltage of the primary side, the nominal power and the transformation ratio of the phase and ground CTs are adjusted.

	📓 Windings 1 // New Site: 745 Quick Connect: Settings: 👝 📼 🎫					
	Windings 1					
	SETTING	PARAMETER				
	W1 Nominal Phase-to-Phase Voltage	138.0 kV	Save			
	W1 Rated Load	30.0 MVA				
	W1 Phase CT Primary	250 : 5 A	Restore			
	W1 Ground CT Primary	250 : 5 A				
	W1 Series 3-Phase Resistance	10.700 Ohm	🔛 Default			
ļ	745 Quick Connect   Settings: System	Setup: Windings	//			

## Figure 9

# 3.3 Winding 2

In this field, the nominal voltage of the secondary side, the nominal power and the transformation ratio of the phase and ground CTs are set.

🗑 Windings 2 // New Site: 745 Quick Connect: Settings: 💼 🔳 💌			
	Windings 2		
	SETTING	PARAMETER	
	W2 Nominal Phase-to-Phase Voltage	13.8 kV	🛗 Save
	W2 Rated Load	30.0 MVA	
	W2 Phase CT Primary	2000 : 5 A	Restore
	W2 Ground CT Primary	2000 : 5 A	
ľ	W2 Series 3-Phase Resistance	2.099 Ohm	🔛 Default
	745 Quick Connect   Settings: System	Setup: Windings	//

Figure 10

# 3.4 W1 Phase Time OC

Click on the "+" sign near to "*Elements*" > "*Phase Overcurrent*" and double-click on "*W1 Phase Time OC*". This option sets the pick-up value, the curve type and the time dial. The 745 allows only one curve to be used, responsible for monitoring winding 1. Remembering that " $1 \times CT$ " is equal to 5A. The binary output will be set to "*Relay 2*".



For the timed function, the following settings are configured:

Table 1			
<b>Pickup Current</b>	0,2  x CT = (1,0A)		
<b>Curve Standard</b>	IAC		
Type of curve	Very Inverse		
Time dial	7		

W1 Phase Time OC / W1 Phase Time OC	/ New Site:	745 Quick Connect: S	
SETTING		PARAMETER	1
W1 Phase TOC Function		Enabled	Save
W1 Phase TOC Relays		Relay : 2	
W1 Phase TOC Target		Self-reset	Restore
W1 Phase TOC Pickup		0.20 x CT	
W1 Phase TOC Shape		IAC Very Inv	🔛 Default
W1 Phase TOC Multiplier		7.00	
W1 Phase TOC Reset		Instantaneous	
W1 Phase TOC Block		Disabled	
745 Quick Connect Set	tings: Elem	ents: Phase Overcurrent	1.
	Fi	igure 11	

# 3.5 W1 Phase inst. OC

Click on the "+" sign near to "*Elements*" > "*Phase Overcurrent*" and double-click on "*W1 Phase Inst. OC*". On this tab the pick-up values of the definite time elements are set. Since it is possible to use up to 2 elements, in this test only one element with the following parameters is used. Remembering that " $1 \times CT$ " is equal to 5A. The binary output will be set to "*Relay 3*".

Table 2		
	Instantaneous -1	
Pick-up	3,0 x CT= (15A)	
Time delay	300ms	

W1 Phase Inst OC 1		
SETTING	PARAMETER	
W1 Phase IOC1 Function	Enabled	🛗 Save
W1 Phase IOC1 Relays	Relay: 3	
W1 Phase IOC1 Target	Self-reset	Restore
W1 Phase IOC1 Pickup	3.00 x CT 🚽 🕽	
W1 Phase IOC1 Delay	300 ms	🔛 Default
W1 Phase IOC1 Block	Disabled	



Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



## 3.6 Relay 4

Click on the "+" sign near to "Outputs > Outputs Relays" and double-click on "Relay 4". On this tab we will direct the pickup signal of function 51 to output relay 4. In the line "Output 4 Flexlogic equation 1" chooses the option "W1 Phase Time OC Pickup", as shown below.

Relay 4			
SETTING	PARAMETER	•	
Output 4 Name	Pickup		🗃 Save
Output 4 Operation	Self-resetting	-	
Output 4 Type	Control	=	🛱 Restore
FLEXLOGIC EQUATION			🔛 Default
Output 4 FlexLogic 1	W1 Phase Time OC Pickup	▼	
Output 4 FlexLogic 2	END		
Output 4 FlexLogic 3	END		
Output 4 FlexLogic 4	END		
Output 4 FlexLogic 5	END		
Output 4 FlexLogic 6	END	-	

Figure 13

# 3.7 *Relay* 5

Click on the "+" sign near to "Outputs > Outputs Relays" and double-click on "Relay 5". On this tab we will direct the pickup signal of function 50 to output relay 5. In the line "Output 5 Flexlogic equation 1" chooses the option "W1 Phase Inst OC Pickup", as shown below.

Relay 5			
SETTING	PARAMETER	•	
Output 5 Name	pickup		🛗 Save
Output 5 Operation	Self-resetting		
Output 5 Type	Trip	=	Restore
	-		
FLEXLOGIC EQUATION			🔛 Default
Output 5 FlexLogic 1	W1 Phase Inst OC 1 Pickup		Ep. Donum
Output 5 FlexLogic 2	END		
Output 5 FlexLogic 3	END		
Output 5 FlexLogic 4	END		
Output 5 FlexLogic 5	END		
Output 5 FlexLogic 6	END		
Output 5 ElexLogic 7	END	-	





# 4. Overcurrent software adjustments

## 4.1 Opening the Overcurrent

Click on the "Conprove Test Center" application manager icon.



Make a click on the "Overcurrent" software icon.



Figure 16

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



Signa Sync. Set	ttings			×	
Direc Connection Start Hardware	General	General Inform. System Notes & Obs. Test:	Explanatory Figures Check List Others Connections		
ickup Time Test Settings	Overcurrent	Descr:	Date:		
Insert/Edit Points     insert/Edit Points     General Options     Test Point     Sequence     Remove All      Test Points      Test      Test Points      Test      Te		Tested device:	Model     Manufacturer     Sta		Fault A-B-C Angle 0 ° Legend: Test Line Probus Found Colon: NT OK Error Information:
N <sup>e</sup> Fault Angle Status		Name: Sector: Tool Tool:	∽ Registry: [00001	~	- m: - t
		CE-6006	Series Num.: 17306166302101110011XXX		
Type: Groups ∨ ☑ Fault & Angle	Default 🗸		Preferences OK	Cancel	Mult Pkp

# 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.



Inside the "Settings" screen, fill in the "General Inform." with details of the tested device, installation location and the person responsible. This makes reporting easier, as this tab will be the first to be shown.



eneral	General Inform. System No.	otes & Obs. Explanatory Figures	Check List Othe	rs Connections	
	Test:				
ercurrent	Descr: Phase Overcur	rent	Date:		
	Tested device:				
	Identif:	23031982 ~	Model	SR745	~
	Type:	Transformer Protection ~	Manufacturer:	GE	~
	Location:				
	Substation:	CONPROVE			~
	Bay:	1	~		
	Address:	Visconde de Ouro Preto, 75 - Custód	io Pereira		~
	City:	Uberlândia	~	State:	MG ~
	Responsible:				
	Name:	Michel Rockembach de Carvalho			~
	Sector:	Engineering	<ul> <li>Registry:</li> </ul>	00001	~
	Tool Test:				
	CE-6006	Series Num	.: 17306166302101	110011XXX	

Figure 19

### 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 are not relevant for this test.

Caracter A	General Inform System Notes & Ob	s Evolanatory Figures	Check List Others Cr	onnections
General		o. Explanatory righted		
Overcurrent	Nominal         Impedance         Source           Frequency:         60 Hz         ✓           Phase Seq:         ABC         ✓           3φ power:         47.80 MVA         1φ:           19:         15.93 MVA         1φ:           Primary Voltage (FF):         13.80 KV         (FN):           77 KV         Primary Current:         2.00 kA           Secondary Voltage (FF):         115.0 V         (FN):           (FN):         66.40 V         (FN):		C Forward ()	
	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	Phase         F         Ne           Voltage         1         Va           FN         2         Vb           3         Vc	Utral N Ground E Currents 5 la F 6 lb 7 lc E 8 IE	<ul> <li>Displ.</li> <li>D</li> <li>k to V0:</li> <li>1.00</li> <li>k to V2:</li> <li>1.00</li> <li>k to I0:</li> <li>1.00</li> </ul>
~		D 4 VD	EP 9 IEP	k to l2: 1,00

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202<br/>Fone (34) 3218-6800Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



There are other tabs where the user can enter "*Notes & Obs., Explanatory Figures,*" can create a "*Check List*" of the procedures for carrying out the test and even create a diagram with all the schematic of the connections between the test set and the test equipment.

# 5. Overcurrent Adjustments

# 5.1 Overcurrent Screen > Settings

This tab adjusts whether the function has directionality, the way to view the current graph by time, the scale used and the tolerances for time, current and angle. These tolerances should be consulted in the relay manufacturer's manual.

Settings	×
General	Arrintions       Overcurrent Elements         General Options
Default 🗸	Preferences <u>O</u> K <u>C</u> ancel

Figure 21

# **5.2** Overcurrent Screen > Overcurrent Elements > Phase

Here you must configure the two overcurrent elements, one with an inverse curve and one with a definite time. To do this double clicks on the highlighted icon.





For the first element change the name to "*TOC*" choose the curve type, pickup value, time dial and dropout factor. Repeat the same procedure for the second changing the name to "*IOC1*", choosing definite time and parameterization the values of "*Pkp*", "*Tmp*" and "*Drp*".



Figure 23

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202<br/>Fone (34) 3218-6800Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



## INSTRUMENTOS PARA TESTES ELÉTRICOS 6. Channel Targeting and Hardware Configurations

Click on the icon illustrated below.

🖉   📄 🚔 🚽   Overcurrent 2.02.160 (64 Bits) - CE-6006 (1730616)							
Arquivo	Home	Display	Softwa	re Option	s		
Channels Direc	😭 Hrd Se 🗶 Sync. 9 📢 Conne	et ∉ <sup>s</sup> o GO Set ⁵ <sub>U</sub> SV ection	OSE Set Set	Start	Stop	<ul> <li>Next Point</li> <li>Next Line</li> </ul>	✓ Clear test ✓ Clear all
Hardware Generation							
Figure 24							

Then click on the highlighted icon to configure the hardware.





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





Figure 26

On the next screen choose "Basic" and on the next window (didn't shown) choose "YES", finally click on "Confirm".

Cha	nnels Direct.					×
Local	Model Reset for Hard. CE-6006    Connected	Set O Advanced	19. 00005		Confirm	
otes	Serial Number:		ଞ୍ଚତ GOOSE		Cancel	
Rem	03207116302101110011XXX	V V ON Line	<sup>5</sup> <sub>0</sub> S. Value	Import	Export	.:

Figure 27

# 7. Test Structure for Function 50/51

# 7.1 Test Settings

On this tab you must configure the direction of pickup and trip signals with the binary inputs, in addition to configuring the generation channels. You can configure pre-faults and post-faults if necessary.



	INSTRUMENTOS	S PARA TESTES ELETR	
🚰 🛃 🤿   Overcurrent 2.02.160 (64 Bits) - CE-6006 (1	730616)		- 0
Home Display Software Options			
Sync. Set % GOOSE Set Sync. Set % SV Set Start Stop	Next Point d Clear test Next Line d Clear all	Present Report abs rel Retreate Restore View Charts Layout	
Hardware Ge	neration Options	Report Units Layout	
Time Test Settings	_		
Out of Generation Channel         ▼           Generation Channel         ▼           ↓         ▼           ↓         ↓ <tr< td=""><td></td><td></td><td>Votage LL Appl.in faults LL [57:50 V Votage LN Appl.in otherfau [33:20 V VTRNeutral/VTR/ [1.00 CTRRound/CTRI [1.00 [1.00 [1.00][1.00</td></tr<>			Votage LL Appl.in faults LL [57:50 V Votage LN Appl.in otherfau [33:20 V VTRNeutral/VTR/ [1.00 CTRRound/CTRI [1.00 [1.00 [1.00][1.00
imulate Sampled Value Error			Inv. Ground
on of Operating Interfaces	Pickup Limits		Pickup Test
se Residual Seq + Seq - Seq 0	Initial NA VSeq-Min. 0V		Initial step: Absolute Hesolution: 100,00 mA
Curve Pickup Interf. Trip Interf.	ISeq-Min. 0 A		Helative Hesolution: 0,10 %
TOC BI03 (Hrd: BI3)  BI01 (Hrd: I	B(1) V 3V0 Min. 0 V		Wat Time for each Incrementation: 0,75 s
IOC1 BI04 (Hrd: BI4)  BI02 (Hrd: I	BI2) VSec + Min 0 V		Logic of Directional Lock (Appl. in faults LL): Neither
	ISeq + Min 0 A		Maximum Waiting Time of Non-Operation Region: 120,00 s
	* Limite are applied to faulte that		Waiting Overtime of Timed Curve: 100,00 ms
er Interf. Software V Trigger Logic	the components are present		Based Only in Generated Values
Aquardar PPS Trigger Delay 0.00 :	8		Cycle to Cycle Generation

Figure 28

# 7.2 Pickup Screen

On this tab click on "*New Point*" and choose the type of fault (it has all types), if you want to test dropout and the software searches for pickup and dropout fully automatically. In the figure below, the "*Fault Type*" ABC was chosen.

✓   □ ≥ ↓ Overcurrent 2.02.160 (64 Bits) - CE-6006 (1730616) Arguing Home Display Software Options											×
Image: Spin Constraint of the spin of	Waveform → Phasors Present Report Options Report	P) S bs rel Units	Recreate Charts	Restore \ Layout Layout	/iew ×						
Pickup Time Test Settings											
Inser/Edit Points  Fast Point  Fast Point  Fast Type: A-BC		0ve	rcurrent (	hart V	/aveform	Phasors	Direction				Fault A-B-C Angle 0 °
Sequence Multiple: Bemove 11 Fault: Remove 21 Confirm C	ancel	20 10			X						Test Line     Pickup Found     Dropout Found     Colors: NT OK Error
Test Points Ports Tested Nº Fault Angle Status		5,0									Information: Current Point: - m: - t
		1,0 0,50									
Type: Groups V V Fault & Angle		0,20 0,10 0,	50	1.0	2,0		5,0	10	20	Mult Pkp	
Errors List Protection Status  ON Line New	Aux Source: 110	),00V ⊨ Ire 29	leating:	0%							

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



Start the generation by clicking on the icon highlighted below or using the command "Alt + G".



Figure 30

# 7.3 Final Result of the Pickup Test

In this test, the values found for pickup, dropout and percentage and absolute errors can be viewed in order to pass or fail the test. Other options are generated values, dropout factor, reference curve, angle and fault.



# 7.4 Time Screen

On this tab, the operating times are evaluated. As the binary outputs of the curve and set time are separated there will be two evaluations of time in higher ratings to 15,00A (one time for each element). For convenience, a sequence of current values will be inserted for time evaluation. It was chosen value 2,00A as the initial value, 20,00A and the final value 2,00A as increment step and the fault ABC.





Start the generation by clicking on the icon highlighted below or using the command "Alt + G".



#### 🗋 🗃 🛃 🥃 | Overcurrent 2.02.160 (64 Bits) - CE-6006 (1730616) ٥ o Home Display Software Options Receive and the second seco Hardware Pickup Time Test Settings Insert/Edit Points Overcurrent Chart Waveform Phasors Directionality Fault A-B-C Insert/Edit tist Edit Line Test Point Mult Relative to... INom Faith Turne Angle 0 ° 50 Legend Fault Type: A-B-C 🗸 ---- Test Line Sequence Multiple 20 I Fault: 20.00 A Remove Points Tested 10 Remove <u>A</u>I Colors: NT OK Error 5,0 Test Points Information: Current Point: Time Nominal Nº Fault Angle Curve of Reference Time Real Time Error [%] Time Error Abs 2.0 - m: - t: Current Status тос 09-01 A-B-C 18,00 A 0,923 s 0,915 s -0,821 % -7,58 ms Passed 1.0 09-02 A-B-C 18,00 A IOC1 300,0 ms 330,4 ms 10,14 % 30,43 ms Passed 0.50 0 00 10-01 A-B-C 20.00 A TOC 0.894 s 0.877 s -1.87 % -16.73 ms Passed 0,20 10-02 A-B-C 20,00 A IOC1 300,0 ms 332,3 ms 10,76 % 32,27 ms Pass 0.10 0.50 Mult Pkg Type: Points 🗸 🗹 Fault 🗌 Multiple 🗹 IFIt & Ang 🗹 Ref. Curve 🗌 Acting 🗹 Time 🗹 Error 🗌 V & I 1.0 2,0 5.0 20 Errors List Protection Status Aux Source: 110,00 V Heating: 0% 🚯 ON Line New Figure 34

7.5 Final Result of the Time Test

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202<br/>Fone (34) 3218-6800Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br

0



It is verified that all operating times are within the range allowed by the relay manufacturer.

## 8. Report

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

Presentation Setting			×
Language Inglês En-US 🗸 🗸			
All     General Data Test     General Data of Tested Device     General Data of Test Bestings     General Settings     General Settings     General Data of Test Settings     General Data of Deservations     General Data of Deservations     General Data of Test Data of Data o			
	ОК	Cancel	

Figure 35



Figure 36



# APPENDIX A

## **A.1 Terminal Designations**



Figure 37

Rua Visconde de Ouro Preto, 77 - Bairro Custódio Pereira - Uberlândia – MG - CEP 38405-202<br/>Fone (34) 3218-6800Fone (34) 3218-6800Fax (34) 3218-6810Home Page: www.conprove.com.br-E-mail: conprove@conprove.com.br



# A.2 Technical data

# PHASE / NEUTRAL / GROUND / NEGATIVE SEQUENCE TIME OVERCURRENT

Pickup level:	0.05 to 20.00 × CT in steps of 0.01
Dropout level:	97 to 98% of pickup
Curve shapes:	ANSI extremely/very/moderately/normally inverse; definite time (0.1 s base curve); IEC curve A/B/C and short; FlexCurve™ A/B/C (programmable curves); IAC extreme/ very/inverse/short
Curve multiplier:	0.00 to 100.00 in steps of 0.01
Reset type:	instantaneous or linear
Level accuracy:	per current input
Timing accuracy:	$\pm$ 3% of trip time or $\pm$ 20 ms (whichever is greater) at $\ge$ 1.03 $\times$ pickup

# PHASE / NEUTRAL / GROUND / NEGATIVE SEQUENCE INSTANTANEOUS OVERCURRENT

Pickup level:	
Dropout level:	

Time delay:	0 to	60000	ms in	stens	of 1	1
Time deldy		00000	1112 111	steps		L

Level accuracy: .....per current input

Solid state output operate time:

at	1.2 ×	<pickup:< p=""></pickup:<>	 22	to	30	ms
at	20 x	c nickup.	18	to	26	ms

		pronap.	 	~~		
at 4.0	×	pickup:	 11	to	19	ms

Relay outputs 2 to 5 operate time:

at 1.2 × pickup:	28	to	36	ms
at 2.0 × nickup	2/1	to	32	me

ut 2.0 × pickup	24	10	52	1115
at 4.0 × pickup:	17	to	25	ms



# **APPENDIX B**

Equivalence of software parameters and the relay under test.

Table 3					
Overcurrent Software		GE 745 Relay			
Parameter	Figure	Parameter	Figure		
Frequency	20	Nominal Frequency	08		
Phase Seq.	20	Phase Rotation	08		
51					
Pkp	23	Pickup TOC1	11		
Dial / Time	23	TD Multiplier	11		
Curve	23	Curve	11		
50-1					
Pkp	23	Pickup IOC1	12		
Dial / Time	23	Delay IOC1	12		