

SVERKER 900

Application Note

Testing with SVERKER 900

To be used as demonstration/course material

Basic demonstration

General to all models

Short presentation of display

- Instrument included
- Home menu
- Igen/Ugen configuration menu

Main instrument

- On+Time
- Off+Time
- Hold Funktion

Other features

- VAM
- Ext.Timer
- BO

Prefault Fault instrument

Advanced demonstration

General to all models

Make a short presentation of "System configuration" menu

- "Change state on 0-crossing" e.g. the sequence instrument change state when I-gen 1 crosses zero.
- "IEC/IEEE" Makes different in curve form for CT-magnetization. See User manual.
- "Advanced mode" makes it possible to set two harmonics in e.g. "Main Instrument" up to number 10, see User's manual.

Standard and Expert model

- Ramping instrument
- Sequencer instrument
- CT-magnetization instrument

Expert model

- Impedance instrument

Extra

- Test file management

Equipment

SVERKER 900 with standard equipment including CTM box for magnetization curves.

One extra test CT for magnetization curves.

Documentation

- SVERKER 900 User's manual
- CT application and Testing-impedance-measurement application.

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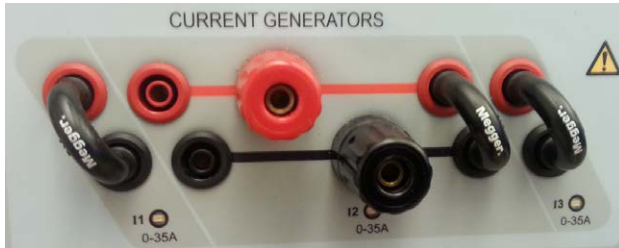
Main Instrument

Before starting the demonstration connect jumpers according to the picture below.

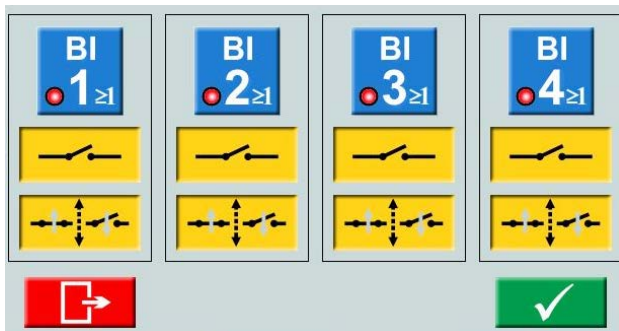
Shortcircuit all current generator with jumpers and use one jumper for simulating Trip and Pick-up drop out.

Use same connection for "Main", "Prefault-Fault", "Ramping" and "Sequence" Instrument.

For more information regarding the test, see the User's manual.

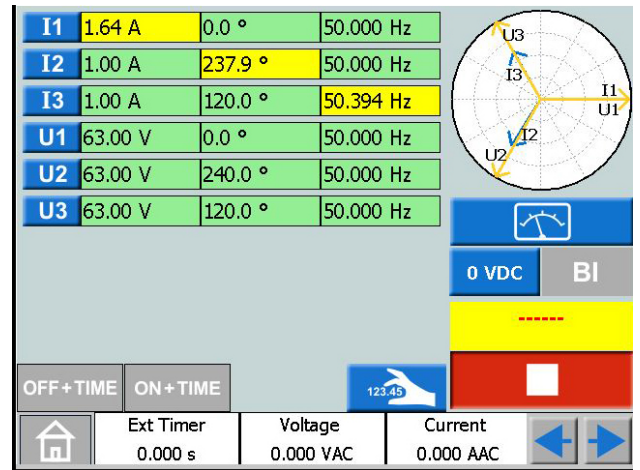


Demonstrate different configurations of BI1-4, used as wet/dry, and/or, different activation mode NC/NO/ Changing, and then set according to picture.



Changing of parameter values

- 1) Set values for different parameters by selecting (pressing) e.g. I1: current, angle or frequency.



- 2) Press to start generating, select again and change value by twisting knob, press measure for generated value.

On+Time

- 1) Select On+Time.
- 2) Start generating.
- 3) Connect a jumper on BI1.

I1	1.00 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz




Off+Time

- 1) Select Off+Time.
- 2) Start generating.
- 3) Stop generating – the timer starts.
- 4) Remove jumper.



Hold function

- 1) Start generating.

- 2] Press the hold button  (Hold 1).
- 3] Select I1.
- 4] Turn knob slowly to increase current.
- 5] Connect jumper.

I1	1.00 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz

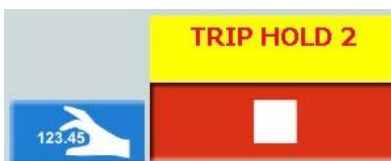


I1	1.18 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz



- 6] Press hold button again (Hold 2).
- 7] Decrease current slowly.
- 8] Remove jumper.
- 9] Turn off generating.

I1	0.990 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz

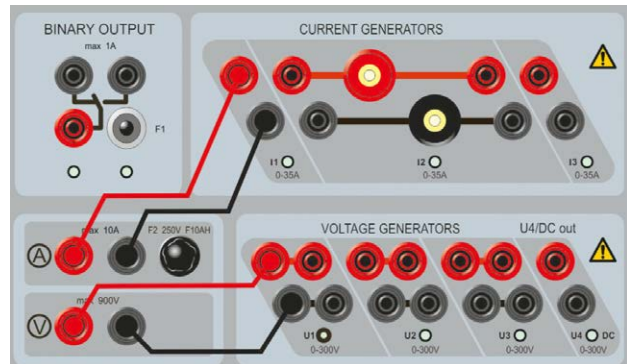



The value for pick-up and drop-out are presented and the hysteresis value in percent.

#	I1: A
1	1.180
2	0.990
(2/1)	0.839

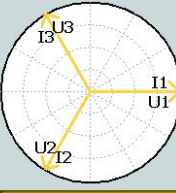
Control of VAM

- 1] Connect ampere meter to generator I1.
- 2] Connect voltage meter to generator U1, see picture below.



- 3] Set Igen to 1 A.
- 4] Set Ugen to 63 V.
- 5] Select hold on manual stop for voltage and current meter.
- 6] The other values can then be scrolled after generating is turned off
- 7] Start generating.
- 8] Scroll through VAM values using the right blue arrow.
- 9] Press measure symbol  for values generated from SVERKER.

I1	0.998 A	0.0 °	50.000 Hz
I2	0.999 A	240.0 °	50.000 Hz
I3	0.999 A	120.0 °	50.000 Hz
U1	63.09 V	0.0 °	50.000 Hz
U2	62.92 V	240.0 °	50.000 Hz
U3	62.95 V	120.0 °	50.000 Hz



0 VDC BI

OFF + TIME ON + TIME

Ext Timer 0.000 s Voltage 63.02 VAC Current 0.997 AAC

S 63.0 VA	P 63.0 W
cosφ 1.00 i	Q 1.1 var

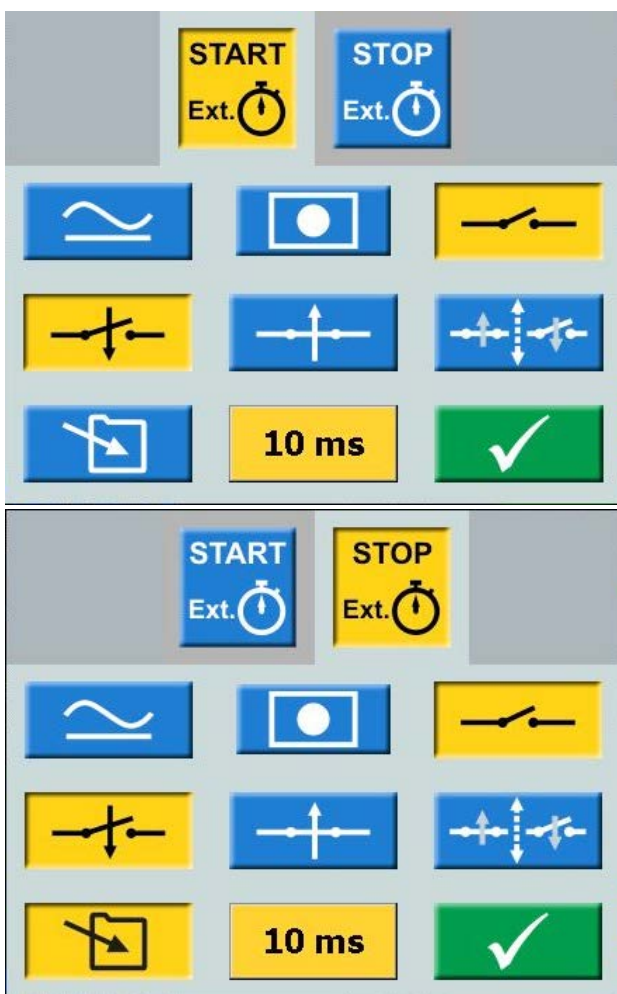
R 63.2 Ohm	Z 63.2 Ohm
X 1.1 Ohm	∅ 1.0 °

U Freq 50.00 Hz	I Freq 50.00 Hz
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- 10] Turn off generating and scroll through the holded values.

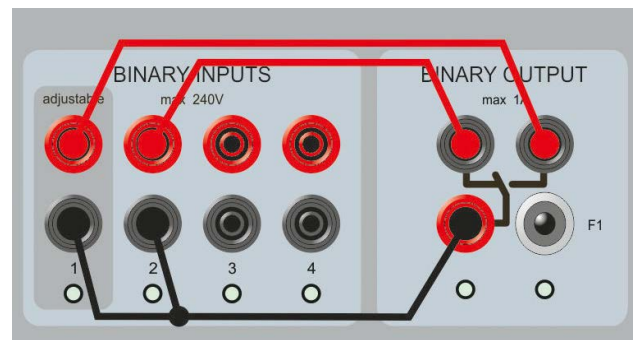
Control of Ext.Timer

- 1] Set start and stop for closing contact.
- 2] Simulate start and stop using a jumper.
- 3] Press folder symbol for saving.

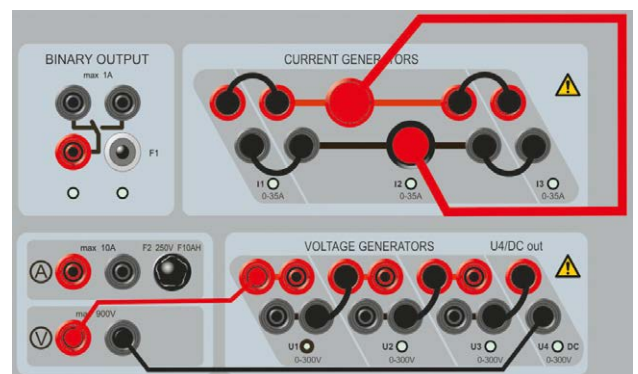



Control of BO

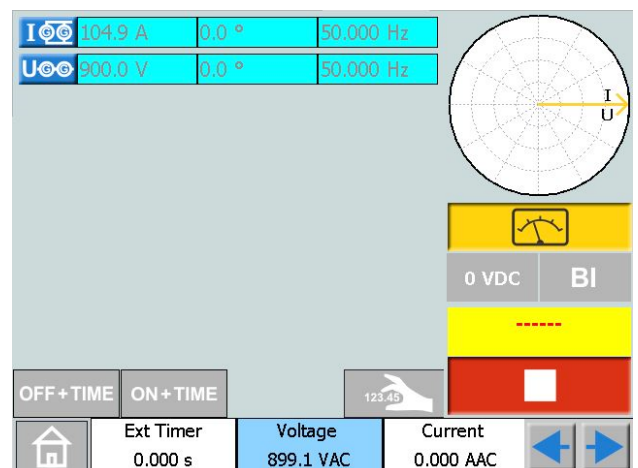
- 1] Connect according to picture below – BI2 should light up.
- 2] Start generate – BI1 should light up.



Connection for max current and voltage generation



- 1] Make a parallel configuration for Igen.
- 2] Connect the red 10 mm² standard cable.
- 3] Generate 105 A.
- 4] Make serial configuration for Ugen.
- 5] Connect to internal volt meter.
- 6] Generate 900 V.
- 7] Set voltmeter for "Hold on stop".
- 8] Start generating.
- 9] Press  to set the instrument in measuring mode.



Prefault – Fault Instrument

- 1] Set BI1 to be operating for closing contact.
- 2] Set values for “Prefault and “Fault” according to pictures below.
- 3] Select test menu.
- 4] Press start.
- 5] Simulate trip after 1 sec using a jumper.

Prefault

I1	0.500 A	0.0 °	50.000 Hz
I2	0.500 A	240.0 °	50.000 Hz
I3	0.500 A	120.0 °	50.000 Hz

Prefault:

Fault

I1	1.00 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz

Max: Off Delay:

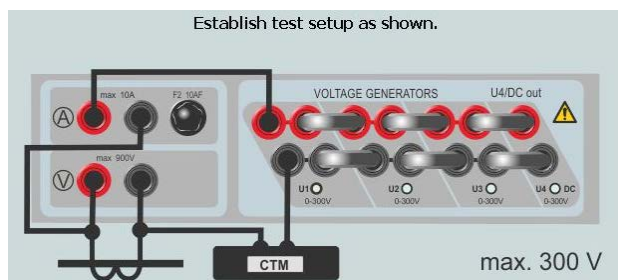
Test

I1	1.00 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz

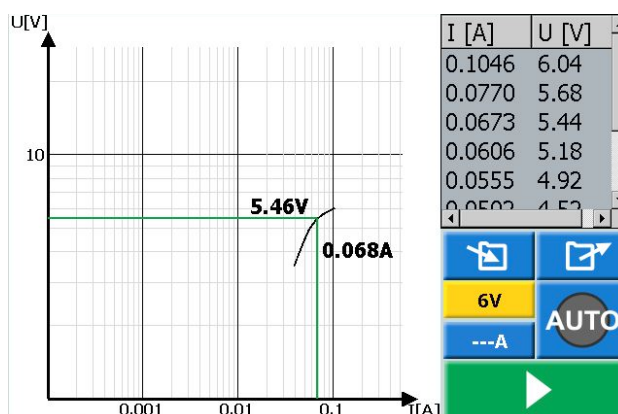
Max: Off Delay: **TRIP[1] 0.904 s**

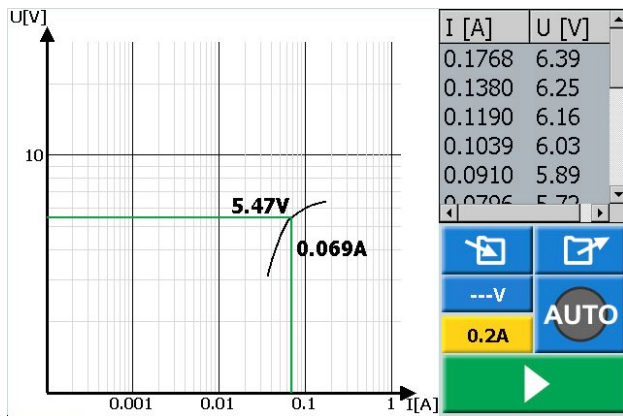
CT magnetization instrument

- 1] Connect according to picture below.
- 2] Make a manual test (manual plotting).



Select auto testing and set a limit for voltage and make one more test with limit for current.





Ramping Instrument

- 1] Set values for "Prefault", "Ramping speed" and "End value", see example below.

Prefault value and time

I1	0.500 A	0.0 °	50.000 Hz
I2	0.500 A	240.0 °	50.000 Hz
I3	0.500 A	120.0 °	50.000 Hz

Prefault:

Ramping speed

I1	0.010 ΔA/s	0.0 Δ°/s	0.000 ΔHz/s
I2	0.010 ΔA/s	0.0 Δ°/s	0.000 ΔHz/s
I3	0.010 ΔA/s	0.0 Δ°/s	0.000 ΔHz/s

End value

I1	0.700 A	-----	-----
I2	0.700 A	-----	-----
I3	0.700 A	-----	-----

Select test mode

I1	0.612 A	0.0 °	50.000 Hz
I2	0.612 A	240.0 °	50.000 Hz
I3	0.612 A	120.0 °	50.000 Hz

- 2] Press start and observe the ramping.
- 3] Simulate a trip around 0.6 A.

Sequence Instrument

- 1] Make setting in five states according to picture below.
- 2] Start generating.

After one second the sequence will go to state two and BO will change position.

- 3] Make a simulated trip on BI1. The sequence will continue to state three.

After one second the sequence will go to state four and BO will change position.

- 4] Simulate a trip on BI1. The sequence will go to state five and end.

State 1

I1	0.500 A	0.0 °	50.000 Hz
I2	0.500 A	240.0 °	50.000 Hz
I3	0.500 A	120.0 °	50.000 Hz

Control panel for State 1(5) showing navigation buttons (left, right, stop), a 'STATE' button with a right arrow, a 'BI' button, a '1000 ms' timer, a 'STATE' button with a square, a 'BO' button, and an 'END SEQ' button.

State 2

I1	1.00 A	0.0 °	50.000 Hz
I2	1.00 A	240.0 °	50.000 Hz
I3	1.00 A	120.0 °	50.000 Hz

Control panel for State 2(5) showing navigation buttons, a highlighted 'STATE' button with a right arrow, a highlighted 'BI' button, a '2000 ms' timer, a highlighted 'STATE' button with a square, a highlighted 'BO' button, and an 'END SEQ' button.

State 3

- 1] Make the same setting as in state 1.

State 4

- 1] Make the same setting as in state 2.

State 5




- 1] Same as in state 1 + "END SEQ". The sequence will stop and present current values and time for each state. BI and BO will also be presented.

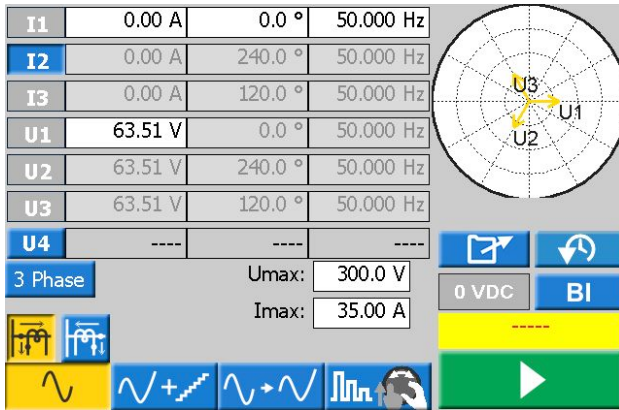
Control panel for State 5(5) showing navigation buttons, a 'STATE' button with a right arrow, a 'BI' button, a '1000 ms' timer, a 'STATE' button with a square, a 'BO' button, and a highlighted 'END SEQ' button.

#	I1: A	I2: A	I3: A	BI	Time...	BO
1	0.500	0.500	0.500		1000	0
2	1.000	1.000	1.000	1	1008	1
3	0.500	0.500	0.500		1000	0
4	1.000	1.000	1.000	1	876	1
5	0.500	0.500	0.500		1000	0

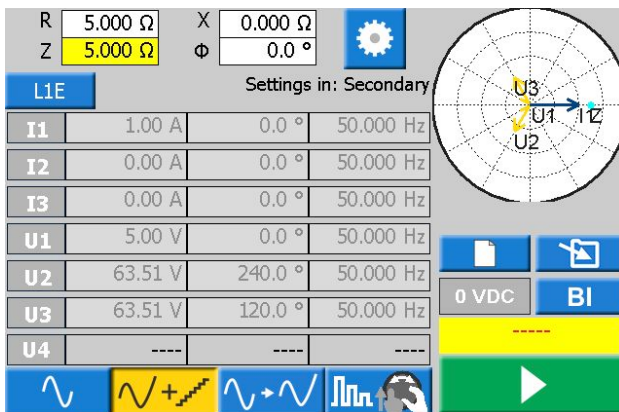
Impedance Instrument

Prefault meny

- 1] Press  to set default settings for current direction, U_{max} and I_{max} .
- 2] After test default settings are restored by pressing  and then 



Fault + manual pickup meny



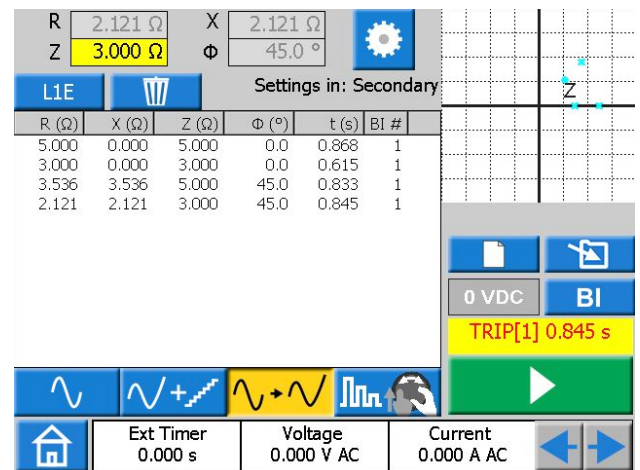
Fault + manual pickup and prefault-fault

Manually search for pick up level in Fault+manual pickup meny.

- 1] Set BI1 to be operating for closing contact.
- 2] Press start to generate prefault value.
- 3] Press on Z value and twist knob down to e.g. 4 ohm.
- 4] Plot a point by simulate a trip.
- 5] Select prefault-fault view, see below, the pick up level will remain and check the time.
- 6] Simulate a trip after 1 sec. (default time).
- 7] Go back to fault + manual pickup view.
- 8] Decrease the impedance value by turning the control knob to e.g. 3 ohms.


- 9] Repeat the test from step 3 to 5.
- 10] Select default value.
- 11] Change the angle to 45degree and make test from step 3 to 8.
- 12] The values can then be saved in a test file. Several test points can be taken before saving.

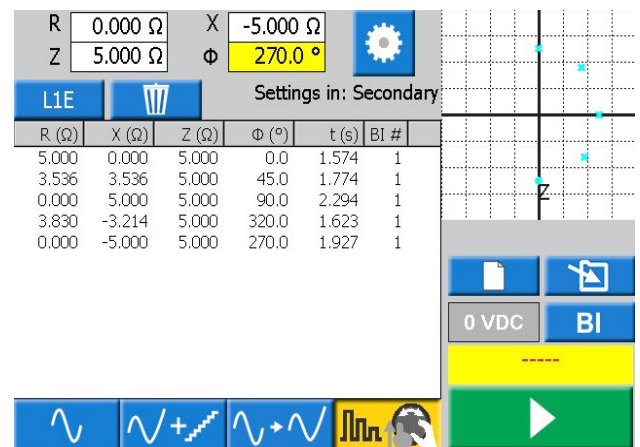
Prefault-fault meny




Manual binary search

This is a quick plotting test for different zones when impedance values and angles are known.

- 1] Set default value.
- 2] Start test by pressing 
- 3] Press the control knob to generate.
- 4] Simulate trip.
- 5] Simulate trip for different angles e.g. 45, 90, 315 and 270 degree.



- 1] Set default value.
- 2] Set angle to 45 degree.
- 3] Start test by pressing 
- 4] Press the control knob to generate.



- 5] Simulate trip.
- 6] Simulate trip at 45 degree angle for different impedance values e.g. 5, 4, 3 and 2 degree.

R (Ω)	X (Ω)	Z (Ω)	Φ (°)	t (s)	BI #
3.536	3.536	5.000	45.0	2.275	1
2.828	2.828	4.000	45.0	1.622	1
2.121	2.121	3.000	45.0	0.750	1
1.414	1.414	2.000	45.0	0.889	1
0.707	0.707	1.000	45.0	1.605	1
0.071	0.071	0.100	45.0	0.584	1

See section "Testing – impedance-measurement" for more information.

Saving procedure



The saving procedure is the same in all instruments. What will be saved is a test file including a printable report file and a setting file. The test file can be uploaded to SVERKER for repeated tests.

- 1] After completed test press  to open "Select test file for storage".
- 2] Save the test in an existing test file or press  to make a new test file.

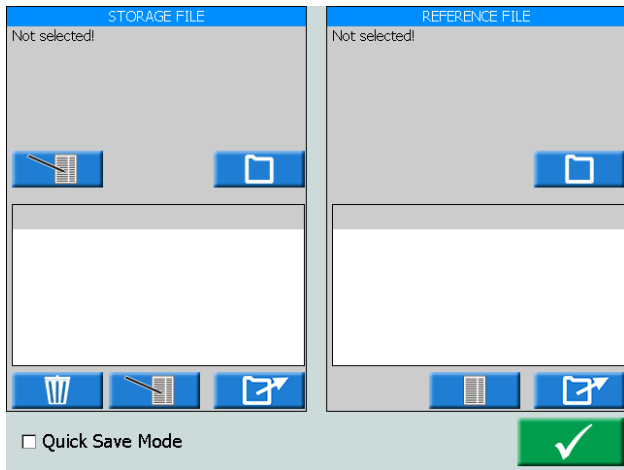
- When the first test is saved in a new test file next test will automatically be saved in the same test file.
- When a new test is made it will erase the first one.
- Each test has to be saved separately if you don't want it to erase the first one.

Note *When working in the impedance instrument more than one plotted point can be made before saving the test. All zones for an impedance or distance protection can therefore be saved into the same test.*

Date	Station	Position	Type	Serial...	#
2014-03-25	megger...	table	schne...	ty12	2
2014-03-31	Danderyd	H1	Test		1

- 1] To upload a test file press .
- 2] Press  under "Reference file".

Note *The test file you select to open must have been made in the same instrument as the one you try to open it in.*



For more information regarding saving or uploading test files see User's manual.

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