SVERKER 900

Relay and Substation Test System

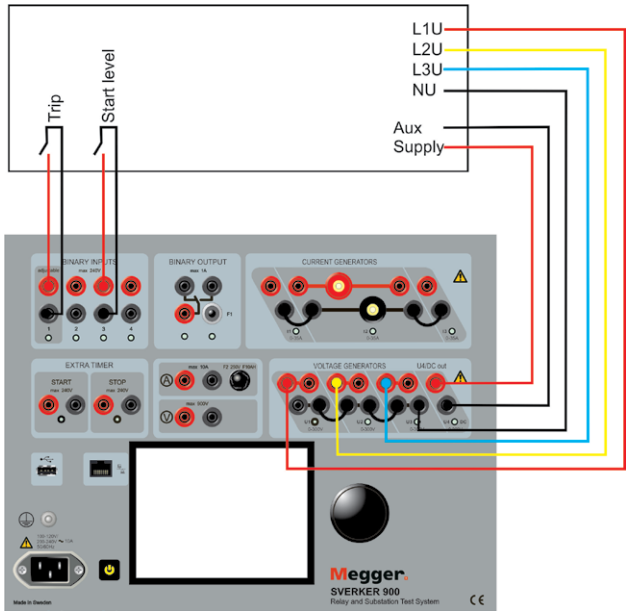
Application Note

Check of ROCOF protection

Rate Of Change Of Frequency (ROCOF) protection is used in distributed or embedded generation schemes, where a local generator is connected directly to the distribution network, as specified in national standards such as Ansi 81R or G59/3

The role of the function is to detect power supply failures and to isolate the generator in the event of a loss of supply. If the power flow from the utility supply prior to an islanding generator is not zero, the frequency changes to the islanded systems natural resonance frequency. Islanding can be dangerous to utility workers, who may not realize that a circuit is still powered, and it may prevent automatic re-connection of devices. For that reason, distributed generators must detect islanding and immediately stop producing power.

ROCOF protection is quicker to detect frequency changes than conventional frequency protection functions. The SVERKER 900 tests these functions



using the Ramping instrument (see section 4.5 in the SVERKER 900 User's manual).

Connecting

Connect the SVERKER 900 according to the figure below, using the aux supply if needed.

Select the Binary Input for trip and start level, (see the section on "Binary Inputs" in the SVERKER 900 user's manual).

Settings

Note *If no selective plane is made always use the settings recommended by the manufacturer.*

Settings are dependent on the power generator used. Below is one example of settings for power generators 2-10 MVA and over 10 MVA

Generator power	2 to 10 MVA	>10 MVA
Settings		
Low set point dfs/dt	0.5 Hz/s	0.2 Hz/s
T	500 ms	500 ms
High set point dfs/dt	2.5 Hz/s	1 Hz/s
T	150 ms	150 ms

In this example the Rocof protection (Sepam S84) is set for generators 2 to 10MVA.

Megger

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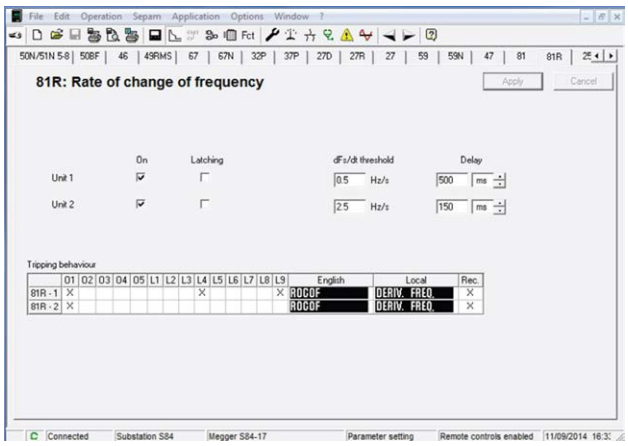


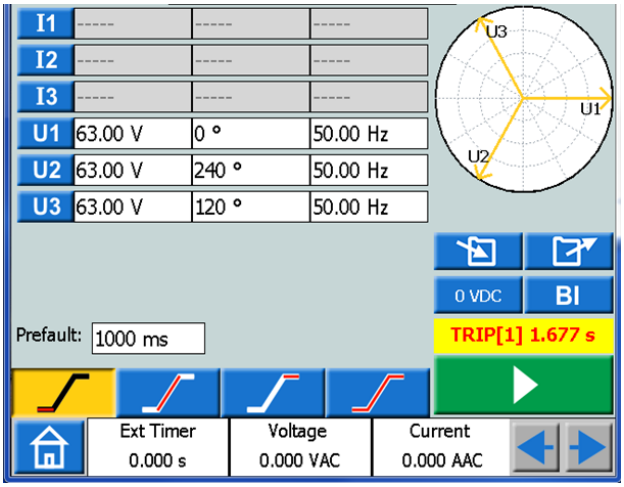
The low set point (Unit 1) is set to 0.5 Hz/s with time delay 500 ms , the high set point (Unit 2) is set to 2.5 Hz/s with time delay 150 ms.

Using the SVERKER 900 Ramping instrument for testing

Start criteria

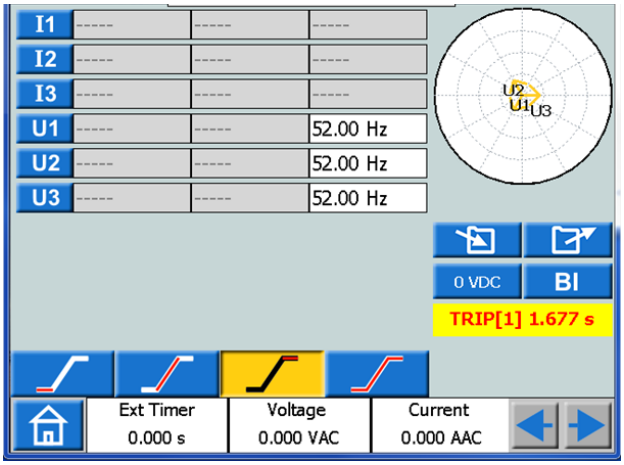
Set the start criteria according to system voltage, frequency and phase rotation.

In the example below a prefault time is set before moving to the faulty state.



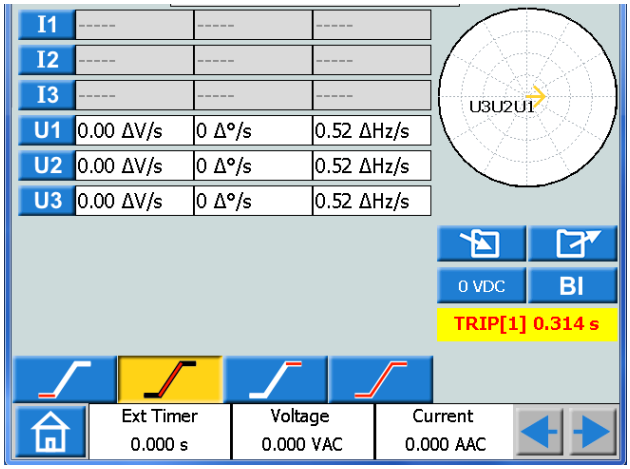
Stop criteria

Set the stop criteria high enough to give the delay function enough time to be activated, see example below.

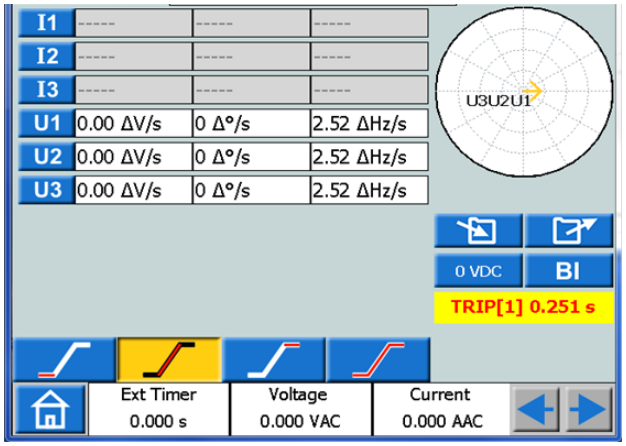


Step 1: Check the start of low and high level trip

1] Set the ramping speed for SVERKER 900 just above the start for low/high level trip.



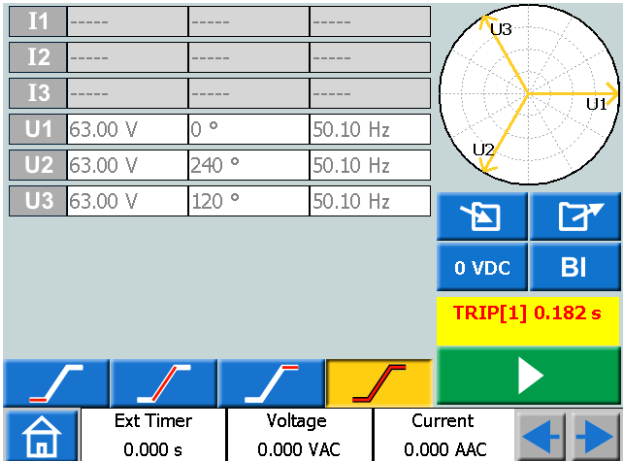
Low level trip



High level trip

2] Press  button and then  to initiate a test.
If the start for low/high level trip is not activated before the stop criteria has been reached, increase the ramping speed with 0.01 Hz/s and initiate a new ramp test.

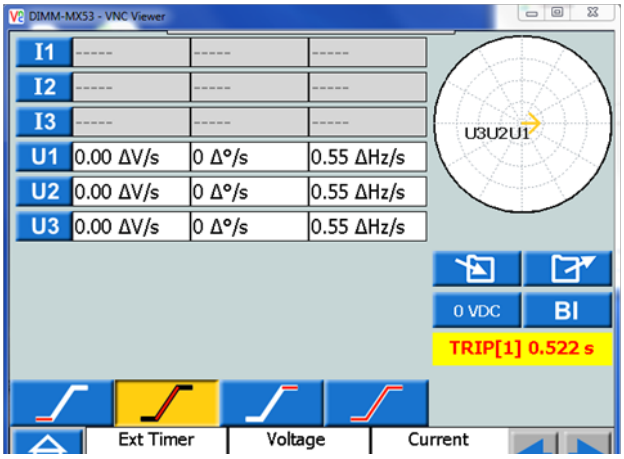
3] Repeat until the start for low/high level trip from protection is obtained.



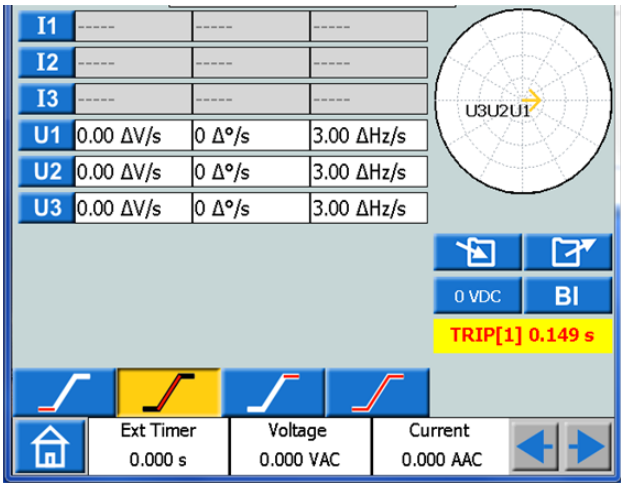
Example: Check of start for low level trip

Step 2: Check trip time delay of low and high level operation

1] To get a god value for the delay time set the ramping speed 10-20% higher than the low/high level trip.



Delay time low level trip



Delay time high level trip

2] Press  button and then  to initiate a test.

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