



VEBKO ONLINE HELP

Synchronizer Function Test in SIPROTEC Siemens 7SD82 Relay

Category	tester
Section	Testing of relays protection functions
Language	English
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In AMT Synchronizer, we're going to test the synchronous check function in Siemens' 7SD82 relay. This function can be used to synchronize the line and busbar, two busbars with coupling or a generator and busbar. This function, which is located in circuit breaker function group, can be used in different modes such as checking the synchronous of two systems, switching synchronous power systems, switching asynchronous power systems and switching the busbar line.

For this purpose, different stages can be used in the form of Synchrocheck Stage (with two stages) or Synchronous/Asynchronous Stage (with six stages). This function uses two voltages to check the connecting conditions. The reference voltage of the first side which is called V1 and the reference voltage of the second side which is V2. Choosing voltages to synchronize depends on the system connection on the primary side. In this test, a 4-input voltage connection is used, which includes a single-phase voltage and a three-phase combination. In this case, the voltage attached to the single-phase Measuring Point is the decisive reference.

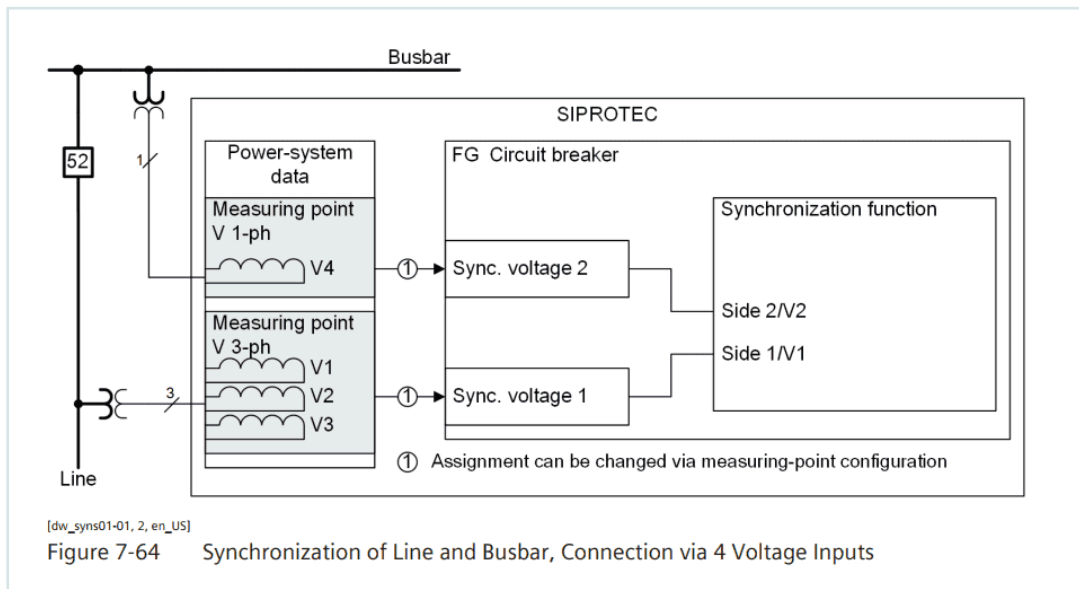


Figure 1

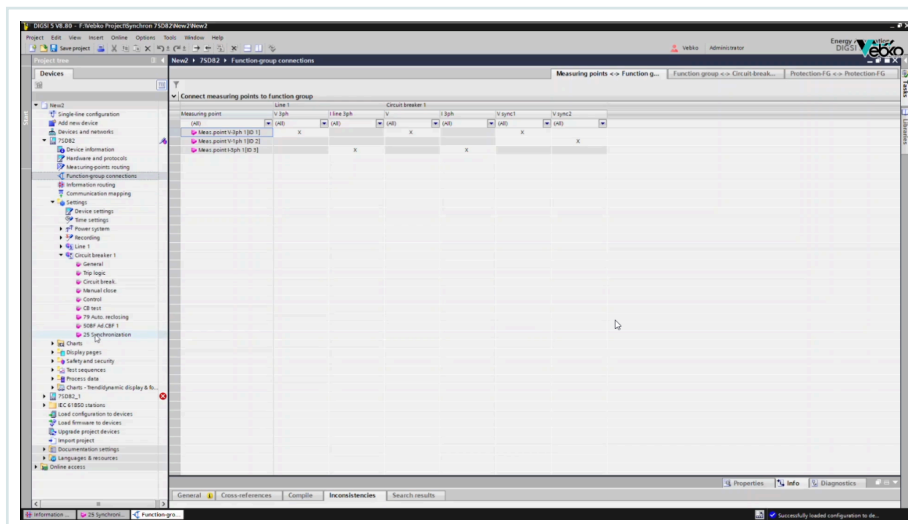


Figure 2

The measured values related to this performance are displayed on the relay as primary, secondary and percentage. When the function is activated, the values of Delta V, Delta F and Delta Alpha are checked to connect the synchronous of the two systems. The settings on the relay are as follow:

Sync. operating mode = on

(_:5071:122) Max. voltage diff. $V_2 > V_1 = 5.0 \text{ V}$

(_:5071:123) Max. voltage diff. $V_2 < V_1 = 5.0 \text{ V}$

(_:5071:117) Max. frequency diff. $f_2 > f_1 = 0.10 \text{ Hz}$

(_:5071:118) Max. frequency diff. $f_2 < f_1 = 0.10 \text{ Hz}$

(_:5071:124) Max. angle diff. $\alpha_2 > \alpha_1 = 10^\circ$

(_:5071:125) Max. angle diff. $\alpha_2 < \alpha_1 = 10^\circ$

If we want to differentiate between synchronous and asynchronous conditions, we should use synchronous/Asynchronous stage, whose voltage-frequency diagram is as followed:

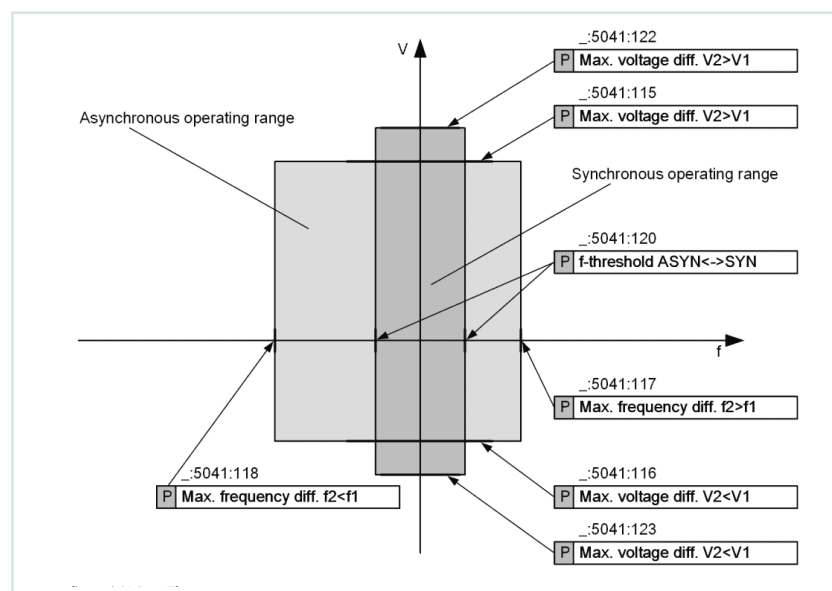


Figure 3

By opening the AMT Synchronizer room to enter the relay information for testing, the first task is to enter the relay nominal information in "Device". In this section, related settings for CT and VT conversion ratio are entered. Keep in mind that if there is a different VT conversion ratio between the two systems, a virtual VT should be used, according to the manual relay recipe, use a coefficient to

match the conversion ratio.

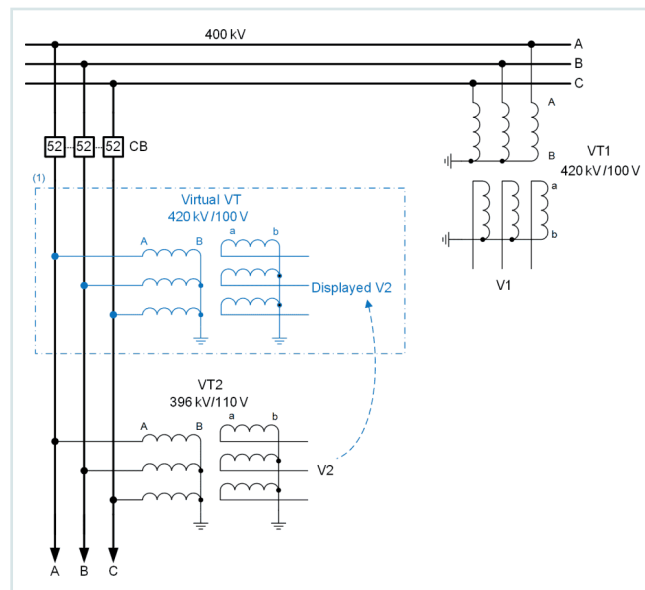


Figure 4

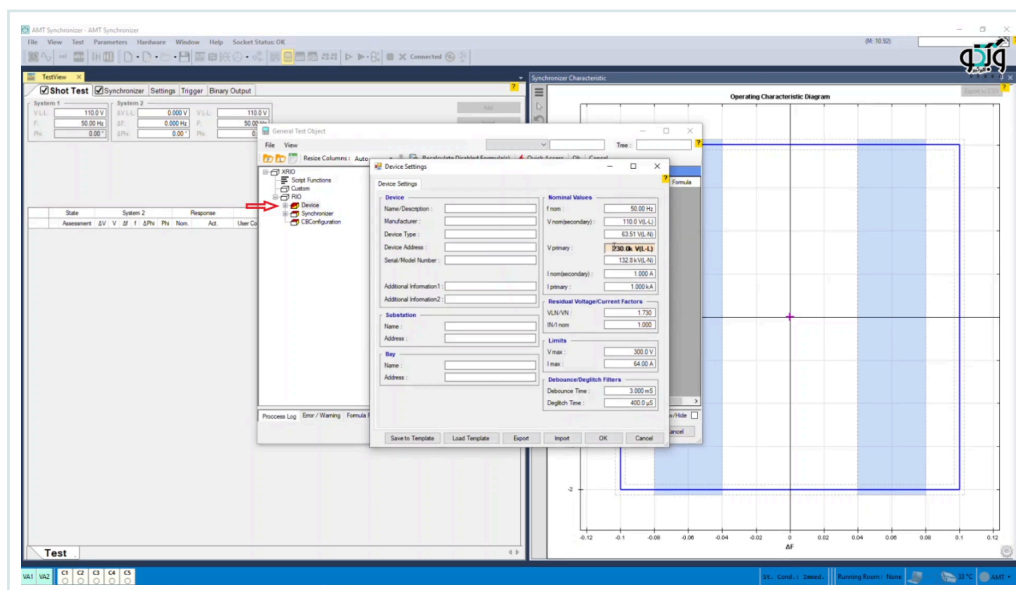


Figure 5

In the Hardware Configuration section, 5 Input binaries are defined by default to transfer relay outputs to the test device to adjust the voltage and frequency and issue the connecting command. Considering that in this test, alarms about voltage and frequency values are read from the relay, we only configure the binary related to the command connected by the relay.

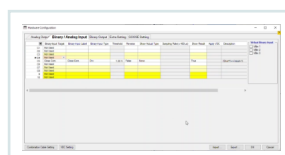


Figure 6

Next, in the Synchronizing Parameters window the relay settings are entered. By specifying the phase sequence, connected voltages, breaker connection settings, and secondary voltage in the Protection Device tab,

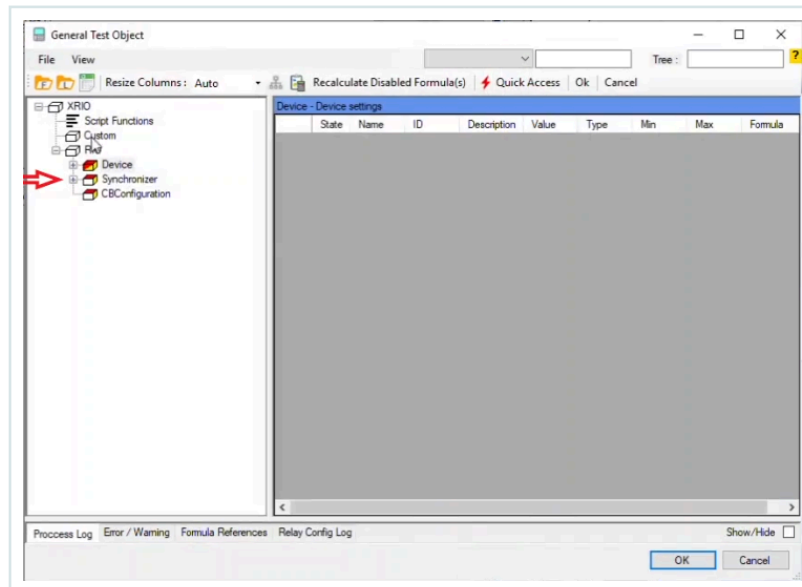


Figure 7

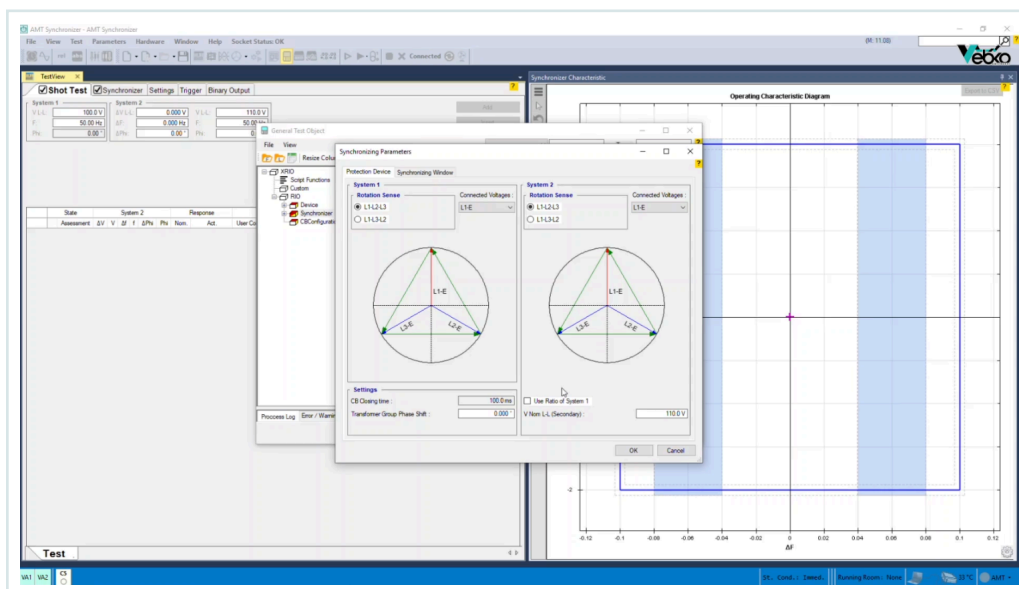


Figure 8

it is time to reach the Synchronizing Window tab. In this section, the minimum and maximum values for voltage and frequency parameters are entered, followed by the allowed tolerances for the Φ , V and f parameters. Keep in mind that for this relay, Dead Zone is not defined as an area where no output is exported from the relay. When the settings are confirmed, it is time to do the test.

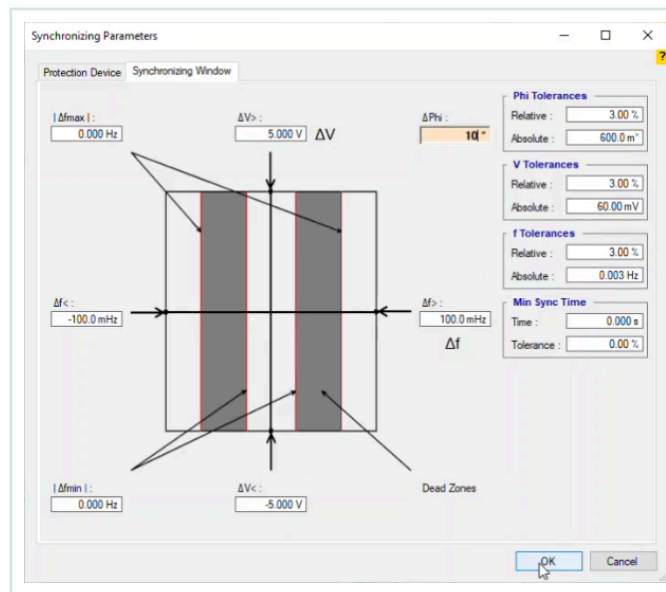


Figure 9

In this section, system settings 1 and 2 can be seen in the relevant tables. In addition to the possibility of manually entering specifications for two systems, it is possible to monitor the delta value of voltage, frequency and angle elements. In the next step, simply add points to the attribute and run the test. It is also possible to create points on either side of the characteristic boundary line using the Quick Test option.

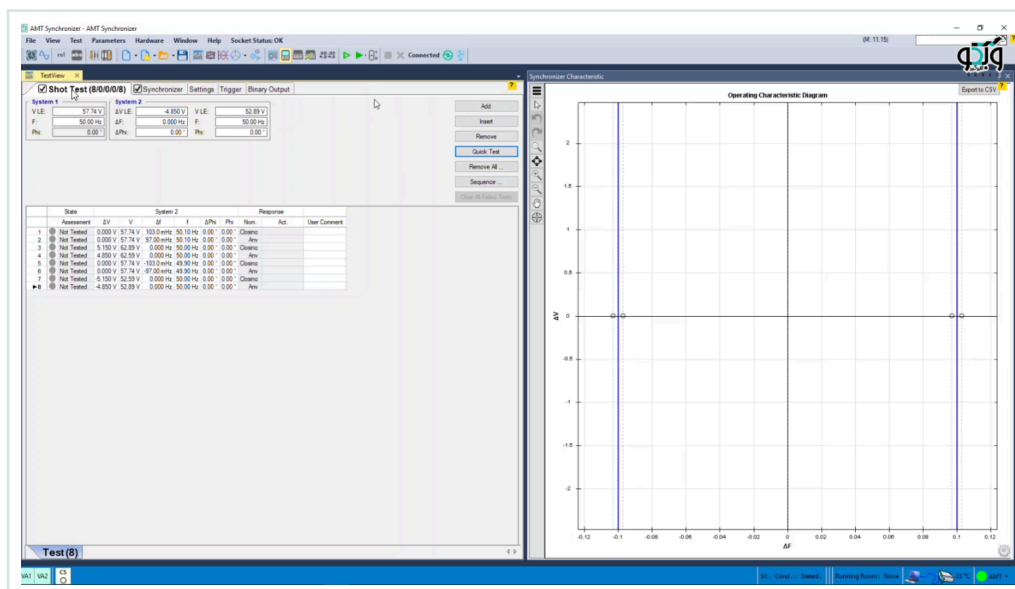


Figure 10

With the completion of the test, the selected items and elements can be viewed in the Report View window.



Figure 11

[jg1]Synchronizer_function_test_in_Siprotec_siemens_7SD82_relay