



VEBKO ONLINE HELP

"Set Mode and Fault Type" : Part 2

Category	tester
Section	AMT Sequencer Module
Language	English
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As mentioned before, using options in "Set Mode" field in "Set Mode and Fault Type" part, the user can introduce certain parameters into software to test in "Analog Output Channels" table and produce the device voltage and the current corresponding to them.

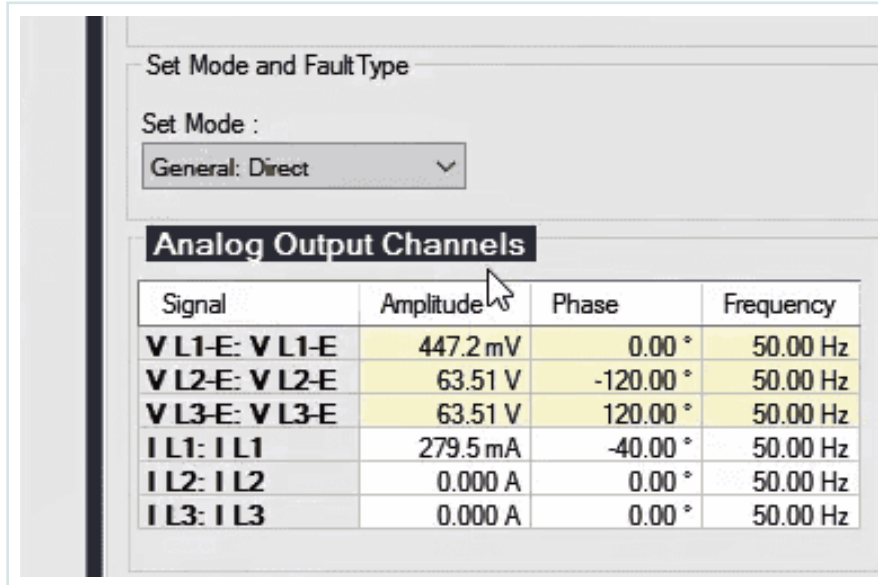


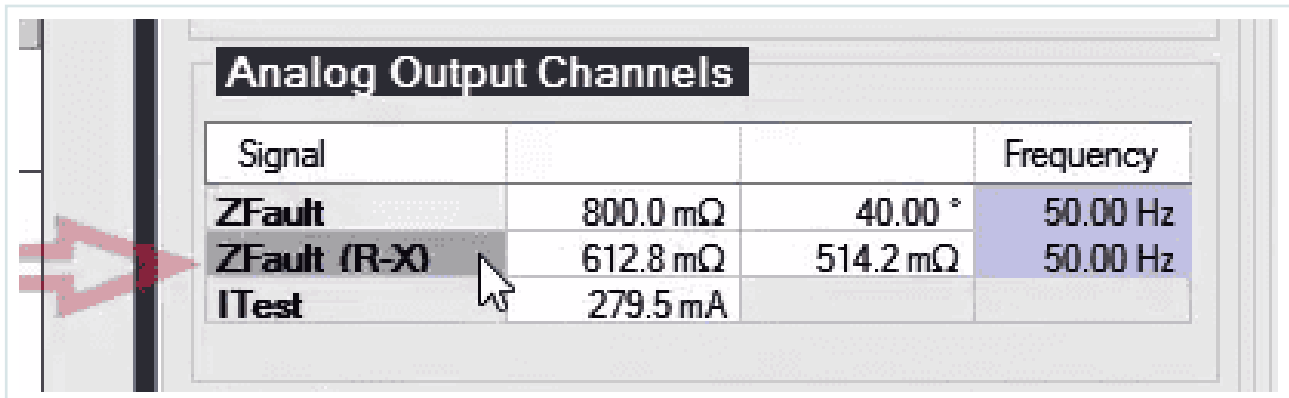
Figure 1

1 "Distance: Z-I const" mode

is used for impedance and distance functions, in this mode, the user enters fault impedance and test current, and the device injects the corresponding current and voltages to it. If user determines the fault impedance in terms of magnitude and angle, the software calculates "R" and "X" values and displays them in the second row. For example, the impedance value of 1 ohm (Ω) has been entered with a 45° angle, and the "R" and "X" values are shown in the second row. If the fault impedance is also adjusted in terms of "R" and "X", the software calculates the impedance and angle and shows it in the first row. For example, the value of "R" and "X" has been adjusted to be 100 milliohm ($m\Omega$) and 50 $m\Omega$, respectively, and the values of impedance and fault angle are shown in the first row. In this case, the test current of 2 A is entered for dual phase fault "L1-L2" and the software calculates the voltage and test current values using mathematical relations and shows them in "Table view". In "Distance: Z-V const" mode, by keeping voltage constant and adjusting it by user, and by adjusting the fault impedance value, the test current value is calculated using mathematical relations and displayed in "Table View". Additionally, in "Distance: Z-Zs const" mode, the value of fault impedance and "SIR" parameter value, which is the ratio of source impedance to fault impedance, are adjusted and the values of current and test voltage are calculated using mathematical relations and are displayed in "Table View".

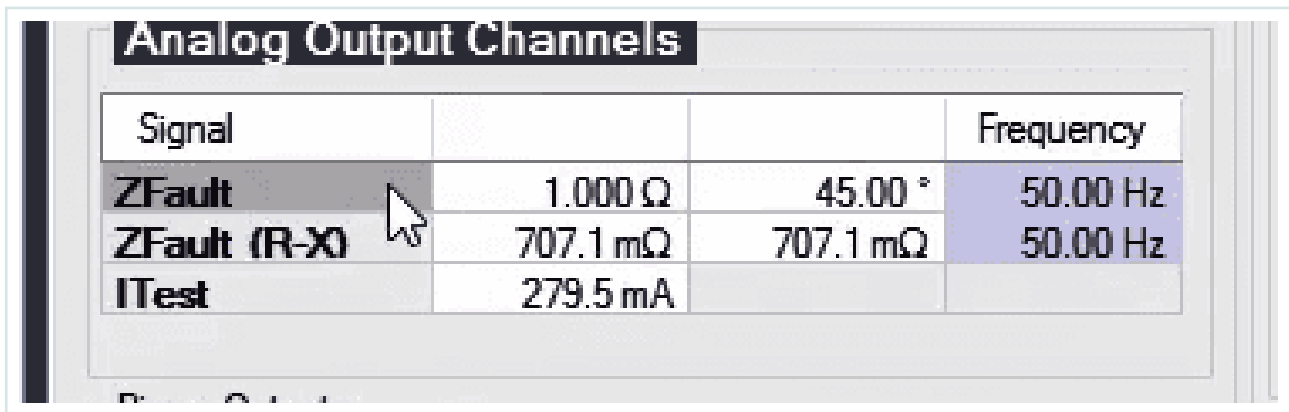


Figure 2



Signal			Frequency
ZFault	800.0 mΩ	40.00 °	50.00 Hz
ZFault (R-X)	612.8 mΩ	514.2 mΩ	50.00 Hz
ITest	279.5 mA		

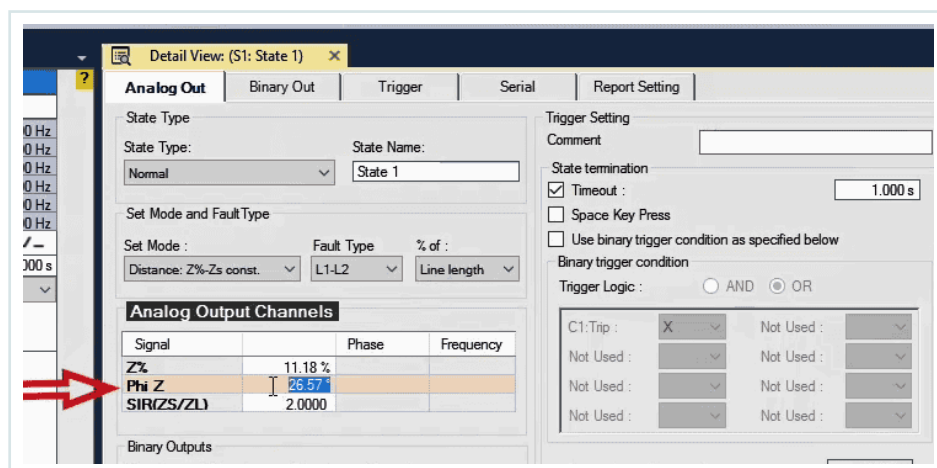
Figure 3



Signal			Frequency
ZFault	1.000 Ω	45.00 °	50.00 Hz
ZFault (R-X)	707.1 mΩ	707.1 mΩ	50.00 Hz
ITest	279.5 mA		

Figure 4

Now if user wants to consider the fault impedance in terms of a percentage of a parameter, he can use three modes: "Distance: Z%-I const", "Distance: Z%-V const", and "Distance: Z%-Zs const. " in the "% of" part, it has been determined that fault impedance should be selected as a percentage of line impedance. In the "Z%" part, it is determined that what percentage of the selected value the fault impedance should be, and in "phiZ" part, the impedance angle is adjusted.



Detail View: (S1: State 1)

State Type: Normal State Name: State 1

Set Mode and Fault Type

Set Mode: Distance: Z%-Zs const. Fault Type: L1-L2 % of: Line length

Signal	Phase	Frequency
Z%	11.18 %	
Phi Z	26.57	
SIR(ZS/ZL)	2.0000	

Binary Outputs

Trigger Setting

Comment

State termination

☒ Timeout: 1.000 s

☐ Space Key Press

☐ Use binary trigger condition as specified below

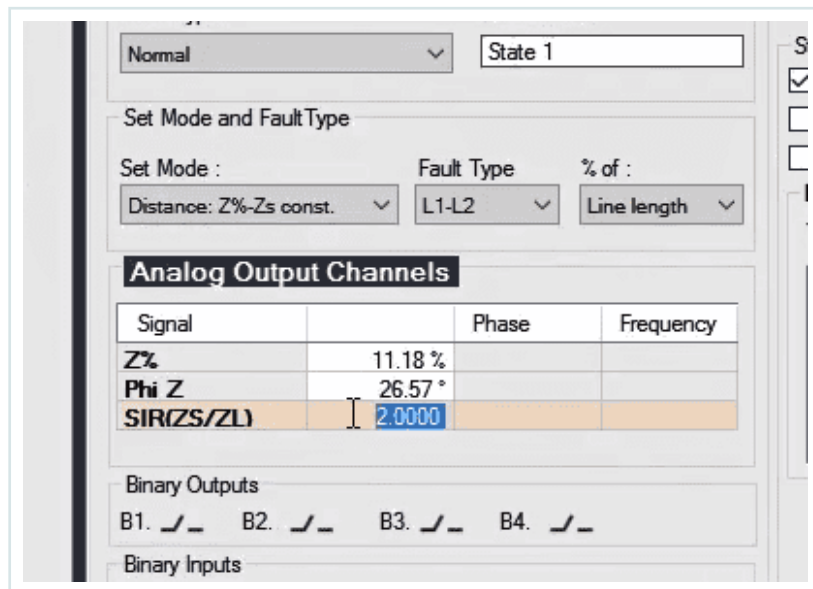
Binary trigger condition

Trigger Logic: ☐ AND ☒ OR

C1: Trip	X	Not Used	
Not Used		Not Used	
Not Used		Not Used	
Not Used		Not Used	

Figure 5

In "Distance: Z%-I const" mode, the fault current is constant and the software calculates its corresponding voltage and current based on the fault type and impedance. In addition, the value of fault voltage is constant in "Distance: Z%-V const", and when the user adjusts it, the test current values are calculated by software. Additionally, by adjusting "SIR" parameter in "Distance: Z%-V const" mode, the value of current and test voltage is calculated in software. It should be noted that the current and test voltage values are also calculated using the above mentioned formulas with the difference that the impedance value is selected to be a percentage of the line impedance. For example, in "Distance: Z%-Zs const" mode, the impedance test point is selected to be 80% of the line impedance with a 40° angle and "SIR" value is adjusted to be 10. Now the values of voltage and test current are calculated using the above mentioned mathematical relations and displayed in "Table View".



Signal	Phase	Frequency
Z%	11.18 %	
Phi Z	26.57 °	
SIR(ZS/ZL)	2.0000	

Figure 6

If user wants to conduct "OverCurrent" test in this room, he should adjust "Set Mode" on "Overcurrent: ITest" and adjust current, current angle, and voltage for directional functions in "Analog Output Channels" table. In "Table View" page, the values of voltage and test current are calculated based on the selected "Fault Type". For example, for two phase fault "L1-L2", the test current of 1 A with a 40° angle and voltage of 5 V was adjusted and the values of current and test voltage can be observed in "Table View".

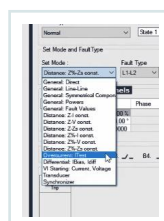


Figure 7

Analog Output Channels			
Signal		Phase	Frequency
ITest Overcur...	0.000 A		
Angle	35.00 °		
Voltage	0.000 V		

Binary Outputs

Figure 8

Additionally, in order to test differential relays in this room, the user should open "Hardware Configuration" window and disable the voltage outputs and enable all 6 current phases. Then in "Detail View" window adjust the "Set Mode" on "Differential: IBias, Idiff". By adjusting "IDiff" and "IBias" values to be 0.5 and 7 times of the nominal current in "Analog Output Channels" table, the current of different phases is calculated for differential function and displayed in "Table View" window. Pay attention that these values are calculated based on the parameters adjusted in "Differential" block of "Test Object" page, and the user is required to enter the specifications of the protected equipment and tested relay.

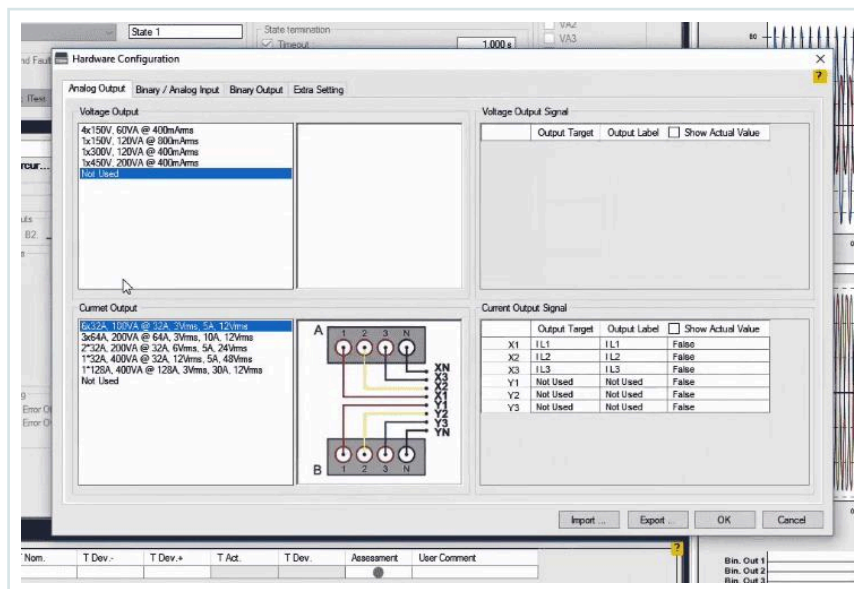


Figure 9



Figure 10

[jg1]Set_Mode_and_Fault_Type_Part2