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Roll No	2019-EE-381, 2019-EE-383, 2019-EE-389

Lab # 9

Earth Fault Monitoring

Objectives:

- Investigation of the relay behaviour for effective currents and of the direction of operation.

Equipment:

1 DL 1013T1	Three-phase power supply
1 DL 1017R	Resistive load
1 DL 1080TT	Three-phase transformer
1 DL 2108TAL-SW	Three-phase power supply unit
1 DL 2108T02	Power circuit breaker
1 DL 2108T16	Earth fault warning relay
1 DL 2109T2A5	Moving iron ammeter (2.5A)
1 DL BUZ	Acoustic continuity tester

Experiment procedure

Assemble the circuit in accordance with the foregoing topographic diagram.

Set the primary-side of the three-phase transformer in delta connection 380 V and the secondary-side to star U_N -15%.

The load condition prevalent prior to the earth-fault plays no role, thus the resistive load is set to Rl value so that only a slight current flows.

The resistive load is star connected with isolated neutral point.

Please pay carefully attention to ensure that the neutral point of the three-phase transformer may not be connected to the neutral conductor of the rest of the circuit, since otherwise in the case of single-phase fault this would not produce an earth fault but an earth short-circuit instead!

An earth fault in a network with isolated neutral point connection (and also when Petersen coils are connected) can be detected by the appearance of a displacement voltage, which can be measured everywhere in the network.

With the proposed circuit, only the presence of an earth fault can be detected, but not the location of the fault.
The relay and the power circuit breaker require an auxiliary voltage.

The following initial settings are to be made at the earth fault warning relay (see relevant Manual DL 2108T18).

Supply the auxiliary voltage of the relay and set the following values that are shown on the display: when lit, the indicator below the setting knob shows that the concerned setting value is being displayed.

SETTING DEVICE (DL 2108T18)

The following initial parameter setting are to be made at the overcurrent relay

- **To configure the equipment DL 2108T18 please refer to Appendix 1 of this document >RATED VALUE<**

  - V1 = 0.22 KV
  - V2 = 220V

- **To configure the equipment DL 2108T18 please refer to Appendix 1 of this document >FUNCTION<**

  - V> => DISABLE
  - V>> => DISABLE
  - V< => DISABLE
  - V0> => 0.2Vn timer 3 s

Set the supply voltage of the transmission line switching on the power circuit breaker and measure the voltage between terminals "e" and "n" of the tertiary winding of the three-phase voltage transformer:

U_{en} = ... V

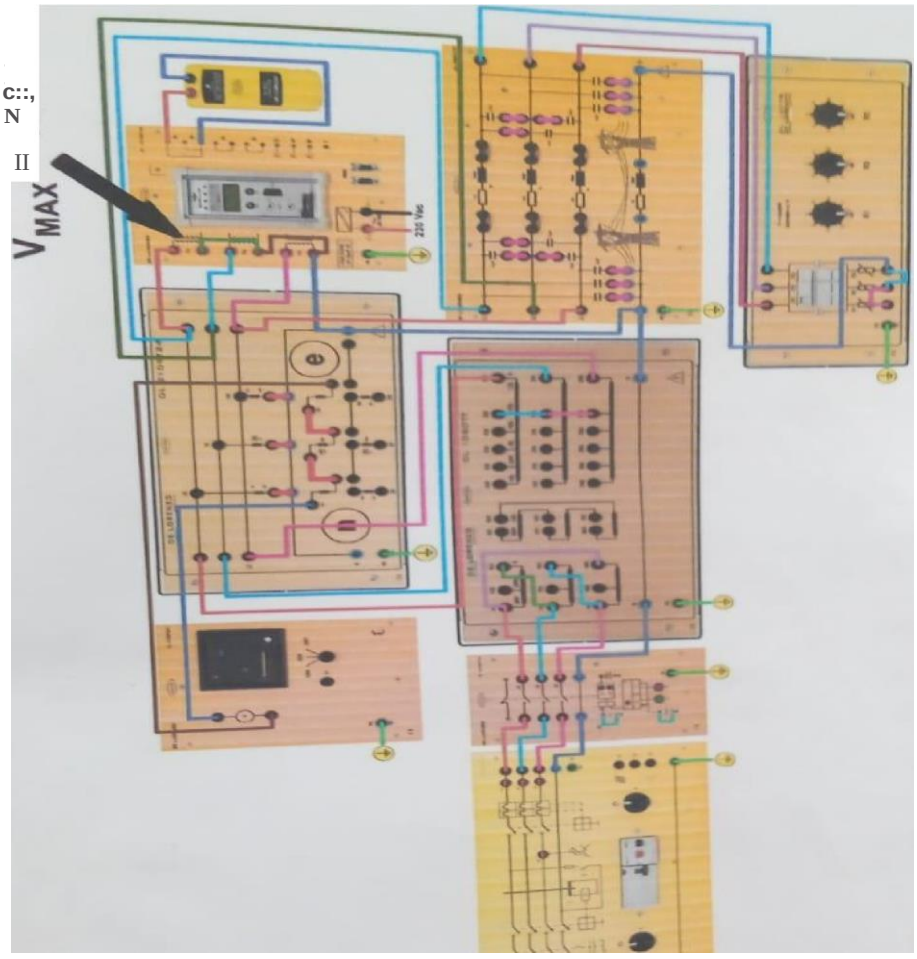
The expected value is V

In order to simulate a fault to ground connect one after the other in all three phases at the end of the transmission line by establishing a connection to the neutral conductor and then measure the respective voltage arising between the terminals "e" and "n" of the voltage transformer.

Earth-fault	Transformer voltage
Phase L_1	U_{en} = ... V
Phase L_2	U_{en} = ... V
Phase L_3	U_{en} = ... V

The expected values are different from zero and approximately equal.

The earth fault warning relay monitors the presence of a fault to ground and trips after the operate time elapses.

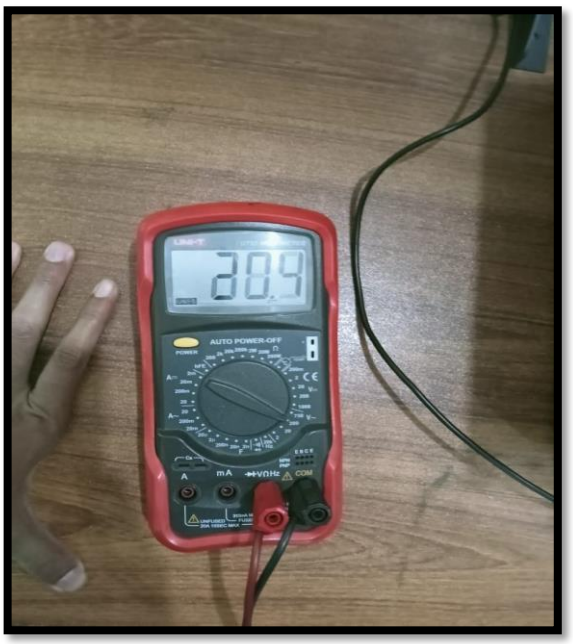


Load Setting:

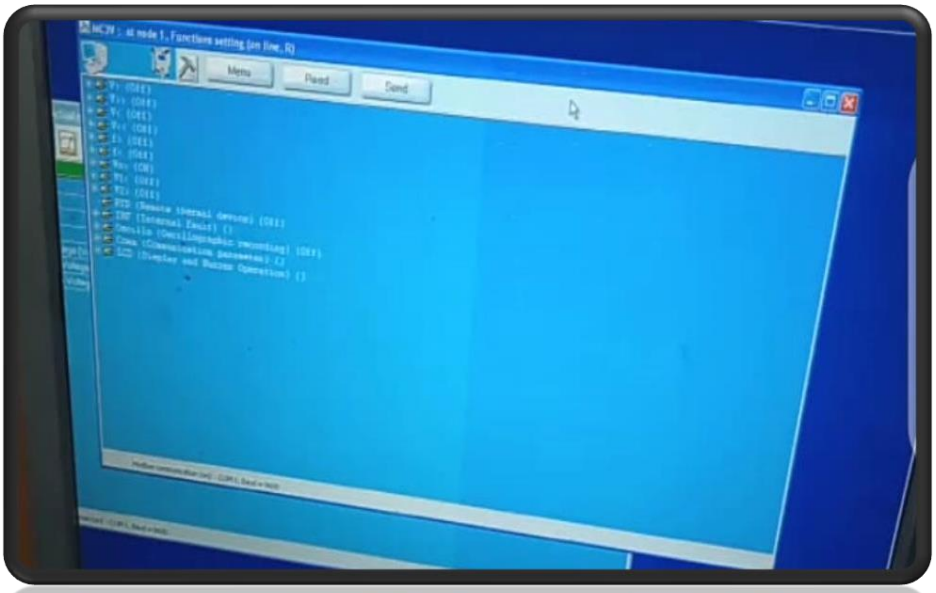
Maximum Load:

Unbalance load:

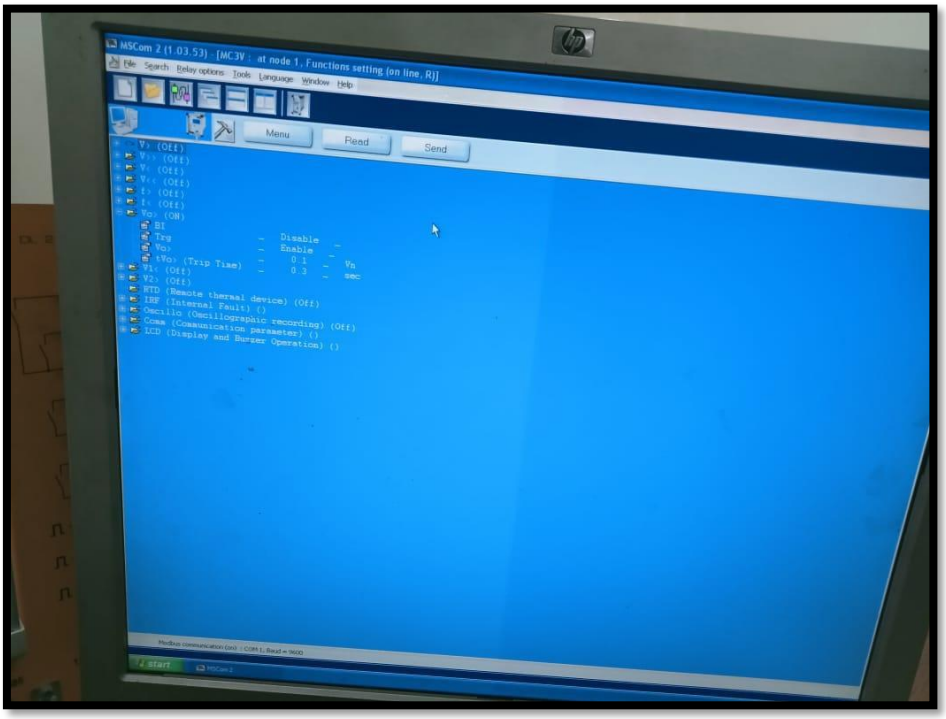
Measured Voltage:



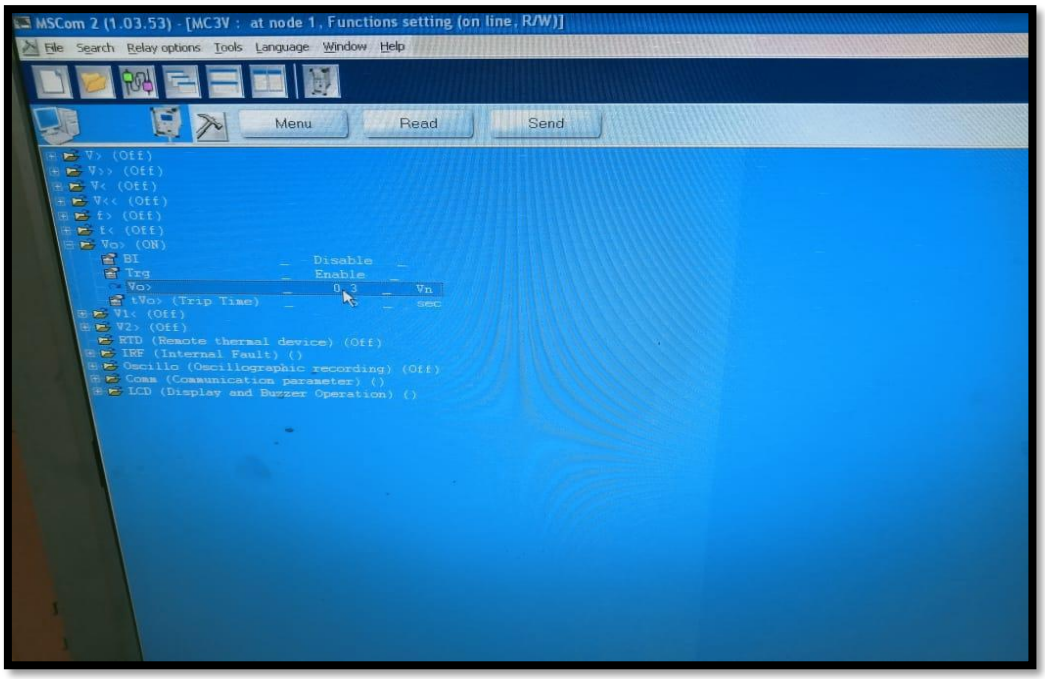
Function Setting:



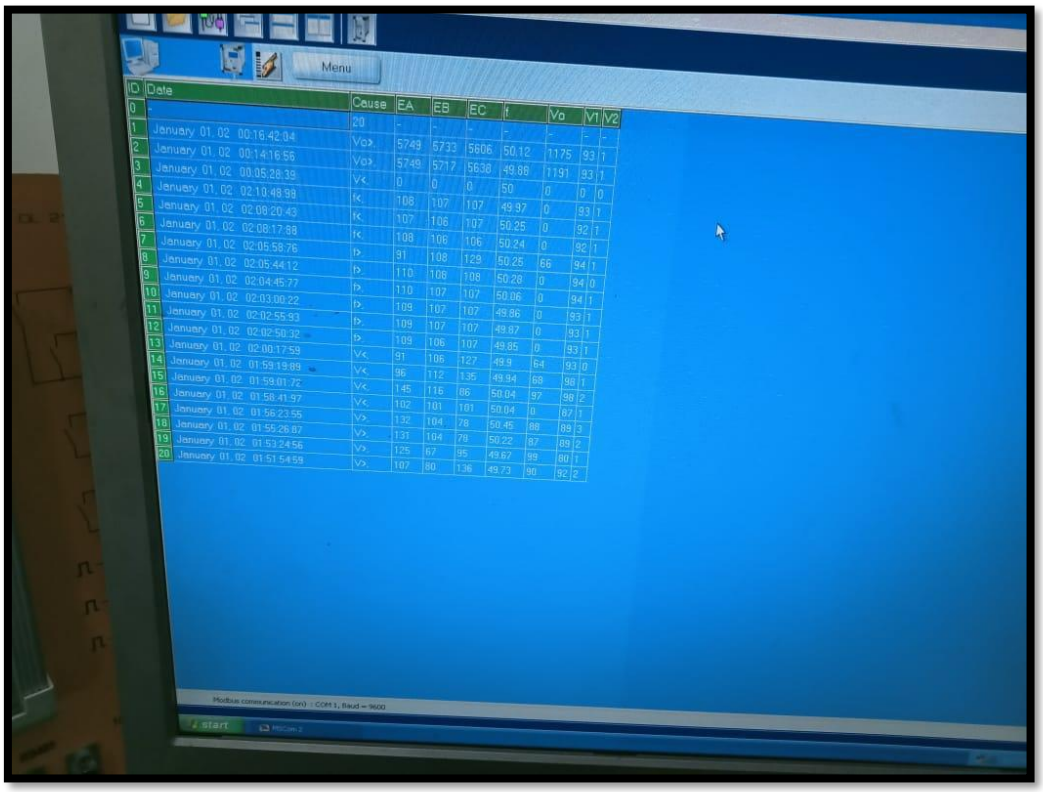
At Vo = 0.1:



At Vo = 0.3:



Last Tripping:



Conclusion:

In this lab we screen our earth issue however in our past analyses we can produce shortcoming and saw the tripping voltages. In this lab, we found out about the utilization of De Lorenzo power framework Assurance units. We carried out the Directional Earth Issue Hand-off by utilizing De Lorenzo power framework Security units. A hand-off is typically an electromechanical gadget that is enacted by an electrical flow. The ongoing streaming in one circuit causes the opening or shutting of another circuit. Transfers are used to safeguard electric power frameworks against inconvenience and power outages as well as to direct and control the age and circulation of force. We set the worth of evaluated current by utilizing programming and determined the outing esteem. We noticed the output value on programming and determined the blunder.