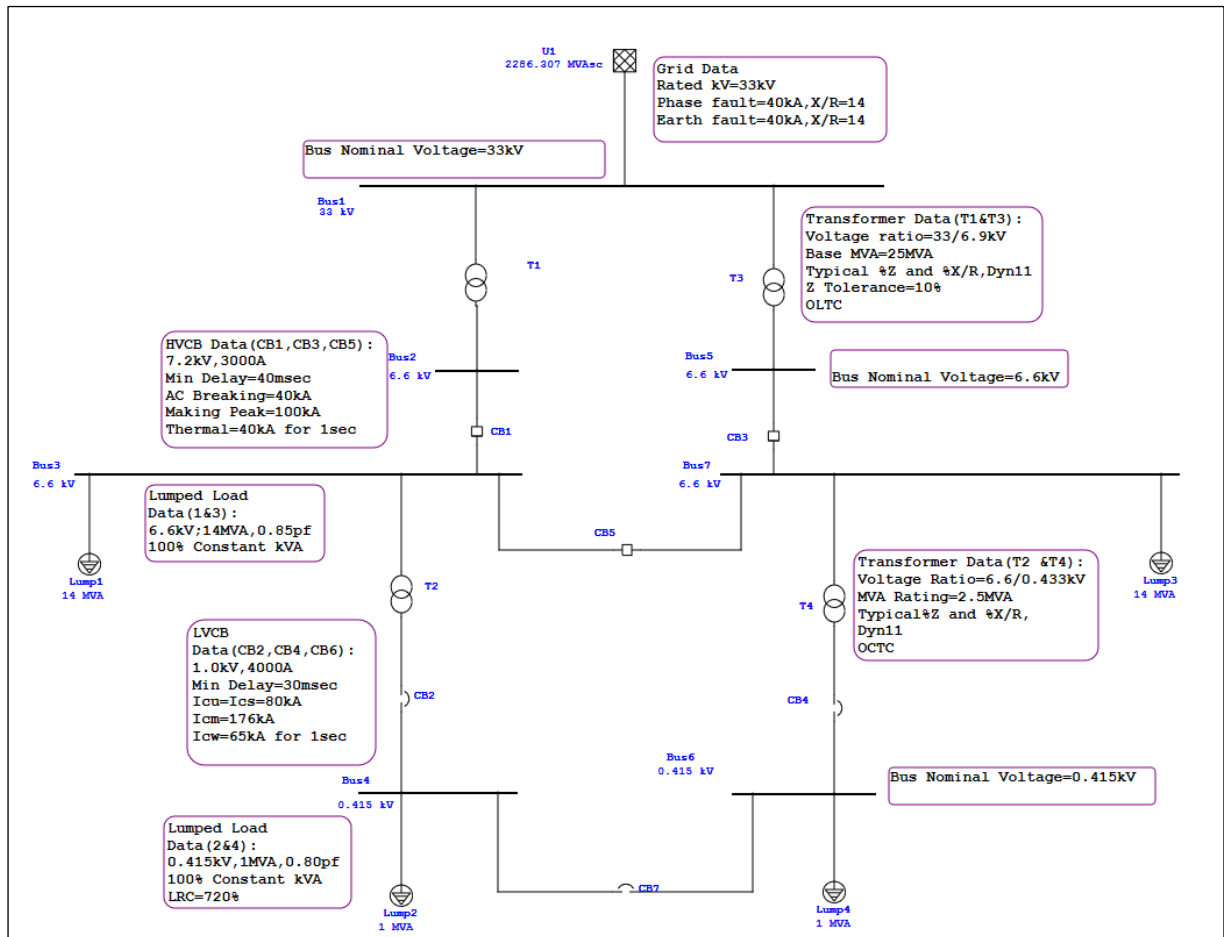


Creating New Project File & One Line Diagram

Purpose and Description

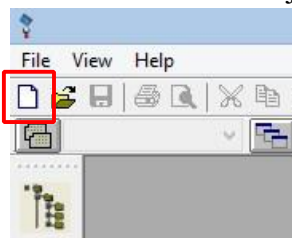
The purpose of this exercise is to introduce one-line diagram interface by building a double ended normally open tie power system. The alignment tools, keyboard shortcuts, project merge and templates can be used to build the system.

This exercise involves creating the below shown SLD and entering the corresponding data. The detail modelling of the SLD is shown in the subsequent steps.



Procedure

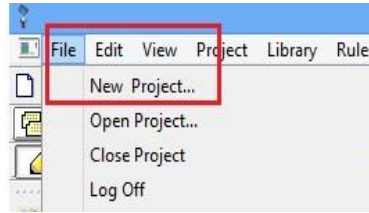
1. Open ETAP by double clicking on the ETAP Icon on your desktop.
2. To start a new project, click 'New' button on the Project Toolbar.



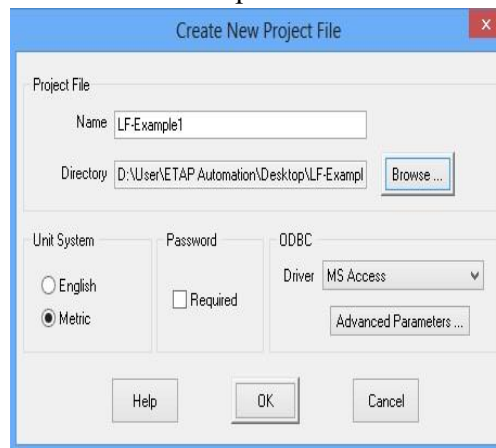
Creating New Project File & One Line Diagram

OR

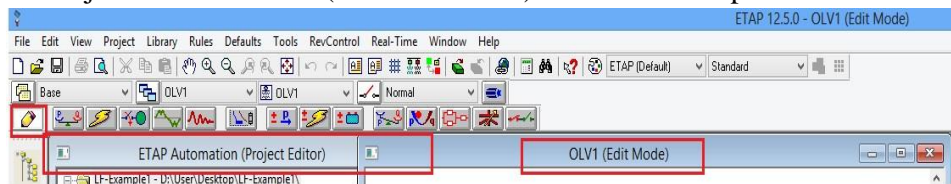
Click on File and select New Project. This opens the Create New Project File dialog box.



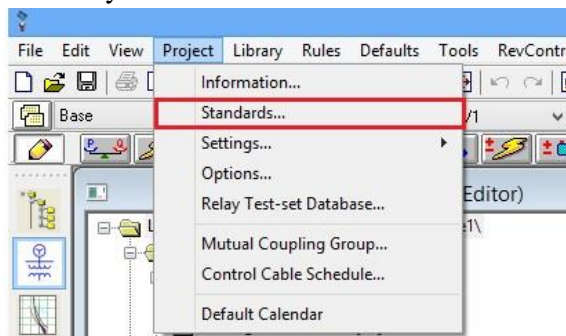
3. Enter the project file name as 'LF-Example1' & select the Unit System as 'Metric'.



4. ETAP Project Editor & OLV (One Line View) windows will open.

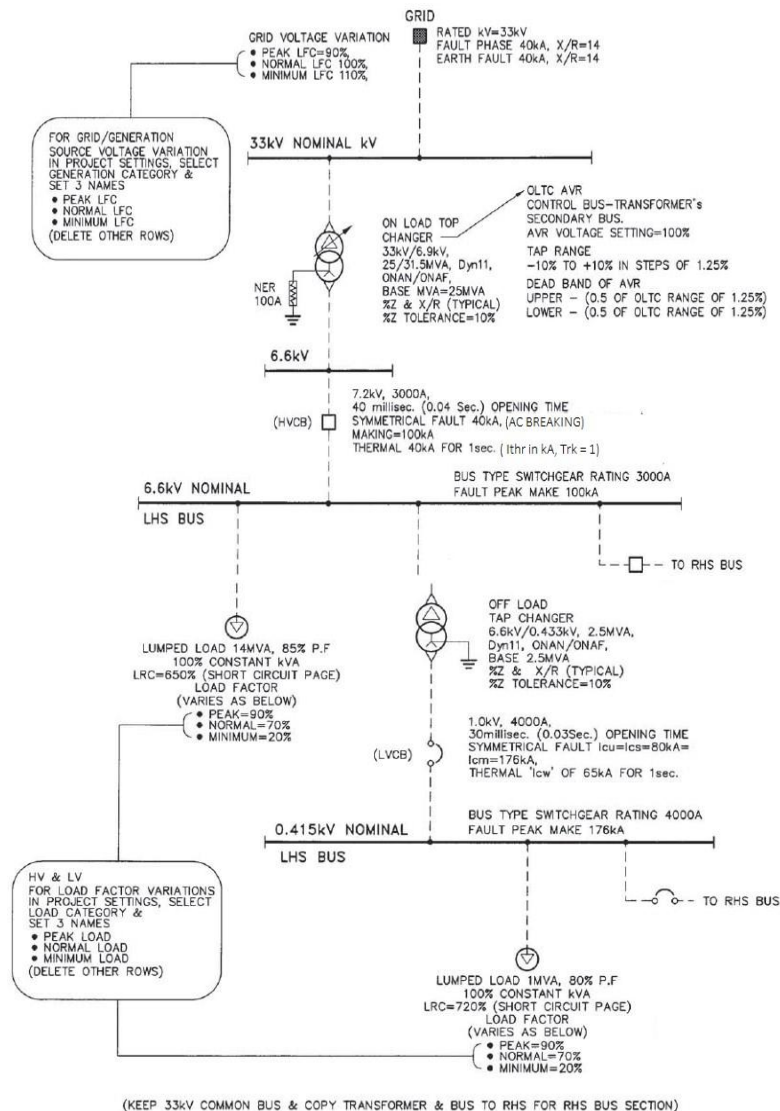


5. Click on the Project Menu, select Information and fill the Project details in Project Information window.
6. Click on the 'Project' Menu & select Standards. Make sure that IEC standard with 50 Hz frequency and metric unit system are selected.



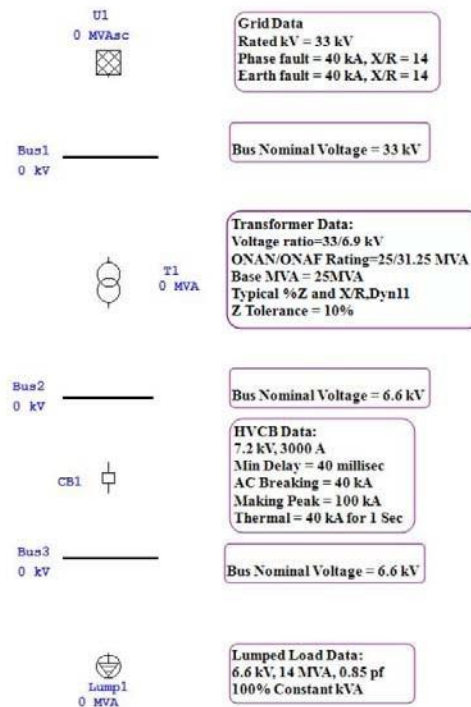
7. Create new project OLV based on given input data as shown below.

Creating New Project File & One Line Diagram

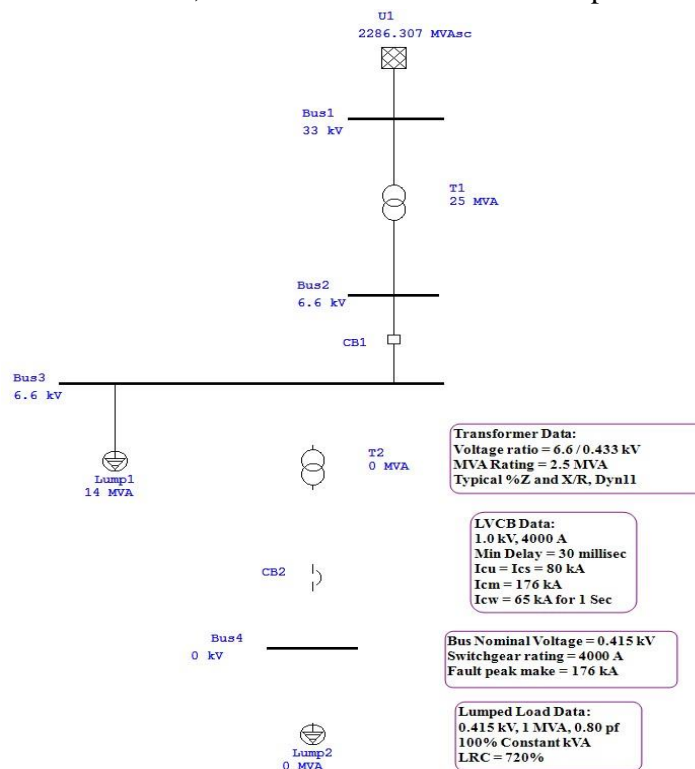


8. Drag and place grid, transformer, buses, lump load and circuit breaker on OLV and proceed to enter the input data as shown below.

Creating New Project File & One Line Diagram



9. Extend the size of Bus3, add extra elements and enter input data as shown below.

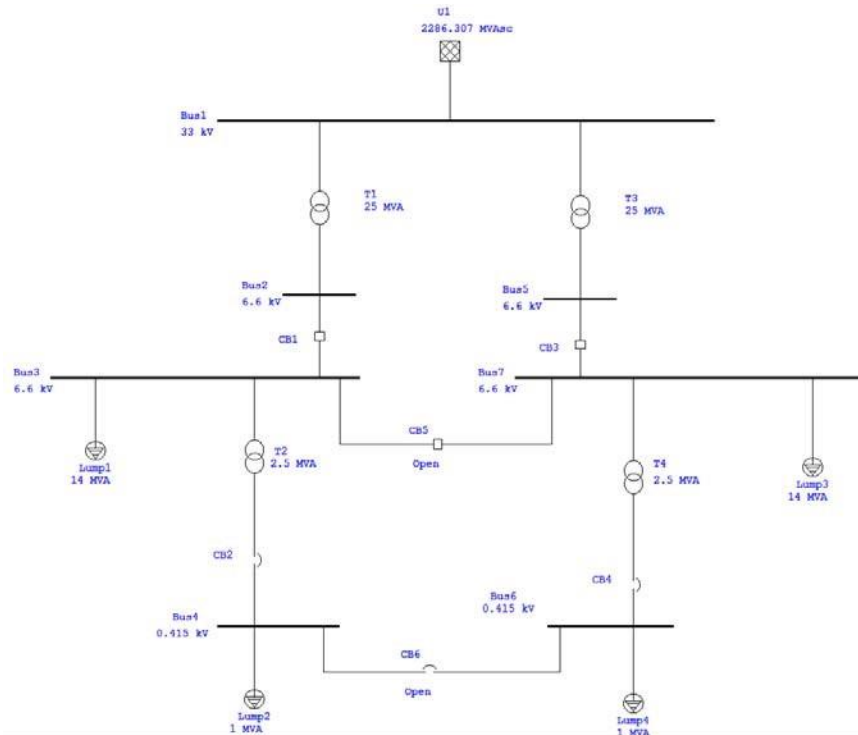


10. Extend the length of Bus1 towards the right side.

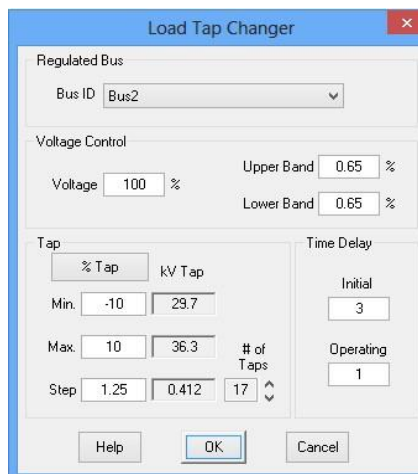
11. Copy all the elements on the OLV except U1 and Bus1.

Creating New Project File & One Line Diagram

12. To paste the elements, right click on mouse, select Move From Dumpster and connect them to Bus1.
13. Make sure to ungroup the elements (right click after highlighting the elements).
14. Drag and place high voltage and low voltage circuit breakers, connect them to secondary side of HV and LV transformers respectively as shown below.
15. Use keyboard shortcut 'Ctrl+R' to rotate elements.



16. Double click on T1, go to Tap page & check AVR primary button and proceed entering LTC data as shown below.

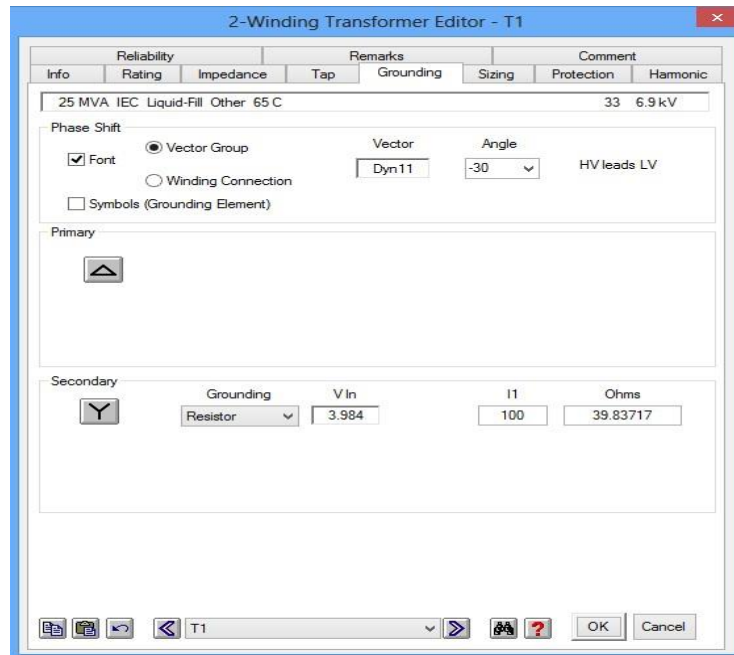


The 'Load Tap Changer' dialog box is shown with the following settings:

- Regulated Bus:** Bus ID: Bus2
- Voltage Control:**
 - Voltage: 100 %
 - Upper Band: 0.65 %
 - Lower Band: 0.65 %
- Tap:**
 - % Tap: -10 to 10
 - kV Tap: 29.7 to 36.3
 - Step: 1.25
 - 0.412
 - # of Taps: 17
- Time Delay:**
 - Initial: 3
 - Operating: 1
- Buttons:** Help, OK, Cancel

17. Go to Grounding page, change Angle to -30 using drop down button. In Grounding, select Resistor and enter I1= 100 as shown below.

Creating New Project File & One Line Diagram



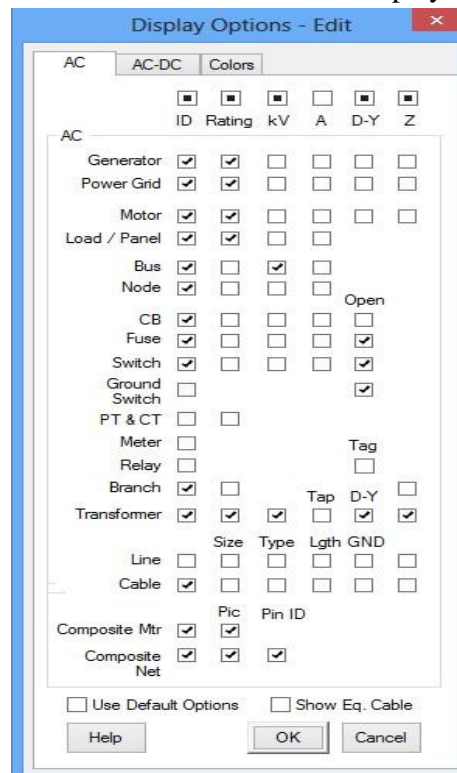
The dialog box '2-Winding Transformer Editor - T1' is shown with the 'Info' tab selected. It contains the following fields and options:

- Reliability:** 25 MVA, IEC, Liquid-Fill, Other, 65 C
- Remarks:** 33, 6.9 kV
- Phase Shift:**
 - ☒ Font
 - ☒ Vector Group
 - ☐ Winding Connection
 - ☐ Symbols (Grounding Element)
- Vector:** Dyn11
- Angle:** -30
- Primary:** (Empty field)
- Secondary:**
 - Grounding:** Resistor
 - V In:** 3.984
 - I1:** 100
 - Ohms:** 39.83717

Buttons at the bottom: OK, Cancel.

18. Similarly, repeat step 16 & 17 for the T3.

19. Go to Display options, check the fields which are to be displayed in OLV as shown below.

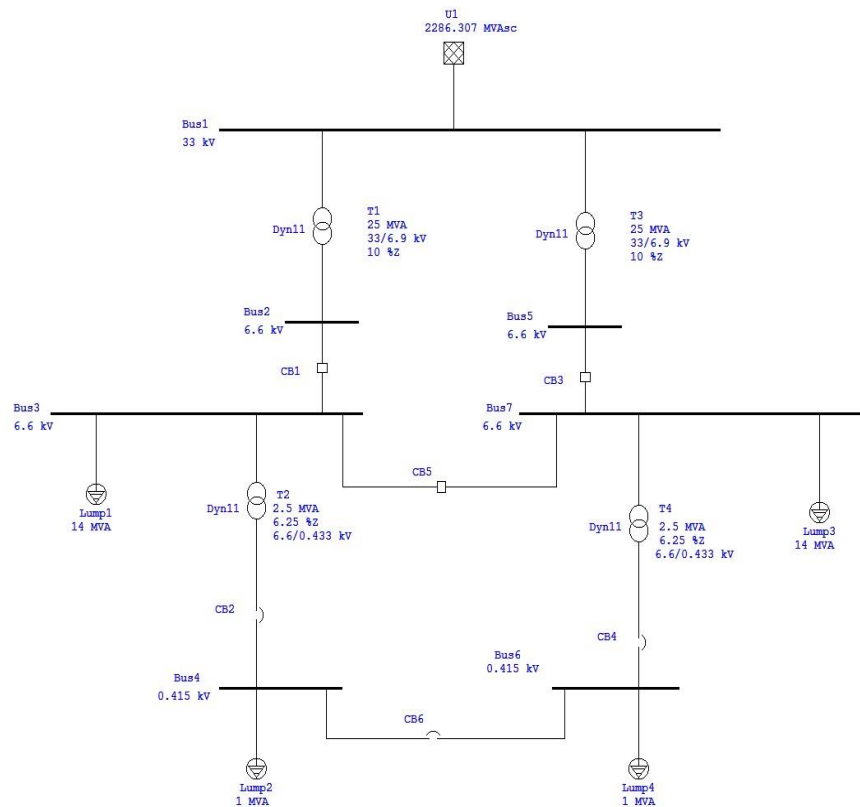


The dialog box 'Display Options - Edit' is shown with the 'AC' tab selected. It contains the following fields and options:

- AC-DC:** AC, DC
- Colors:** ID, Rating, kV, A, D-Y, Z
- AC:**
 - Generator: ☒ ☒ ☐ ☐ ☐ ☐
 - Power Grid: ☒ ☒ ☐ ☐ ☐ ☐
 - Motor: ☒ ☒ ☐ ☐ ☐ ☐
 - Load / Panel: ☒ ☒ ☐ ☐ ☐ ☐
 - Bus: ☒ ☐ ☒ ☐ ☐ ☐
 - Node: ☒ ☐ ☐ ☐ ☐ ☐
 - CB: ☒ ☐ ☐ ☐ ☐ ☐
 - Fuse: ☒ ☐ ☐ ☐ ☒ ☐
 - Switch: ☒ ☐ ☐ ☐ ☒ ☐
 - Ground Switch: ☐ ☐ ☐ ☐ ☒ ☐
 - PT & CT: ☐ ☐ ☐ ☐ ☐ ☐
 - Meter: ☐ ☐ ☐ ☐ ☐ ☐
 - Relay: ☐ ☐ ☐ ☐ ☐ ☐
 - Branch: ☒ ☐ ☐ ☐ ☐ ☐
 - Transformer: ☒ ☒ ☒ ☐ ☒ ☒
 - Line: ☐ ☐ ☐ ☐ ☐ ☐
 - Cable: ☒ ☐ ☐ ☐ ☐ ☐
 - Composite Mtr: ☒ ☒ ☐ ☐ ☐ ☐
 - Composite Net: ☒ ☒ ☒ ☐ ☐ ☐
- Use Default Options:** ☐
- Show Eq. Cable:** ☐

Buttons at the bottom: Help, OK, Cancel.

Creating New Project File & One Line Diagram



20. Select the entire one line diagram, click on 'Add to OLV template' button located on project toolbar to save one line diagram in .xml file format for future use. Name the template as LF-Example1.
21. View the template using 'Get Template' button located on project toolbar.