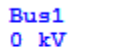# Lab # 06

Load Flow Analysis of Single line diagram

In this lab we will first implement/design the single line diagram in ETAP and then calculate load flow analysis. In the right side of etap we have element toolbar. Click on the Power grid icon one time and drag it.

U1
0 MVAsc

Now click on the bus and drag it in the workspace.

Bus1
0 kV

Now click on the two winding transformer.

T1
0 MVA
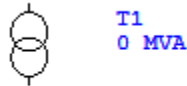
And then drag another bus. Also click on the motor and drag it in the one line diagram.

Mtr1
0 kW

Now to connect the pins we have three separate options. First you can find the connection pin at the end of one element click it once and extend it to the other element you are connecting to. The second way is to click on the element in simple way and drag it to the element you are connecting to. The final way is to double click on the element section and in the info section you have to specify the bus you are going to be connecting to. So you final single line diagram will be like this.

U1
0 MVAsc

Bus1
0 kV

T1
0 MVA

Bus2
0 kV

Mtr1
0 kW
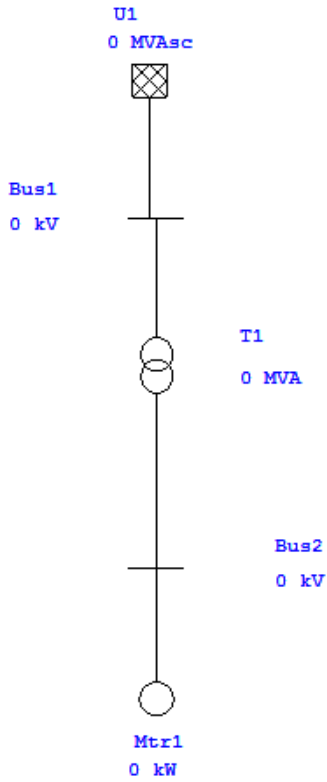
Now after this we enter the data for each element in this single line diagram and to run Load flow calculation. We will first start by entering the data in the transformer by double clicking the transformer icon and then click on the rating tab.
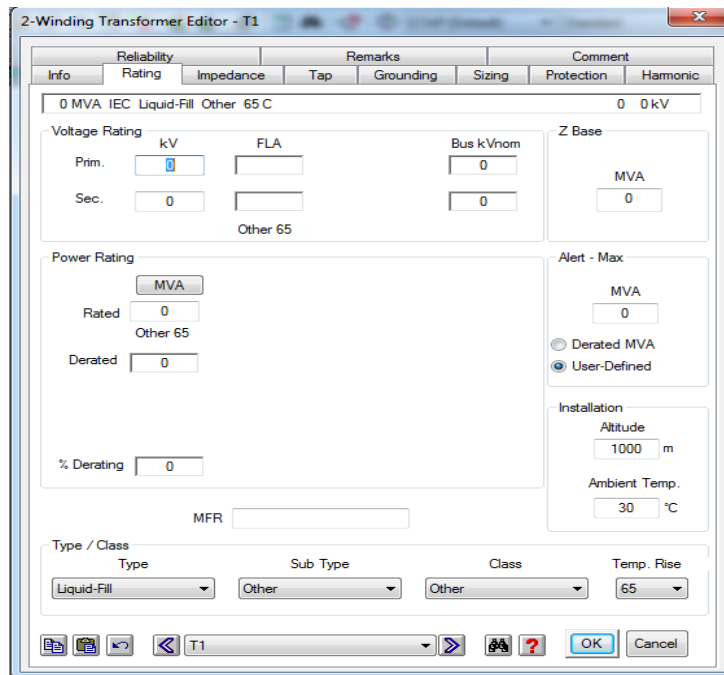
We will enter 13.8 kV in the Primary and for the secondary we will enter 14.6 KV and also enter the rated MVA as 10. When you enter the MVA rating you will notice that the etap automatically set the Max MVA to 10 and calculate the full load amps FLA primary and secondary.
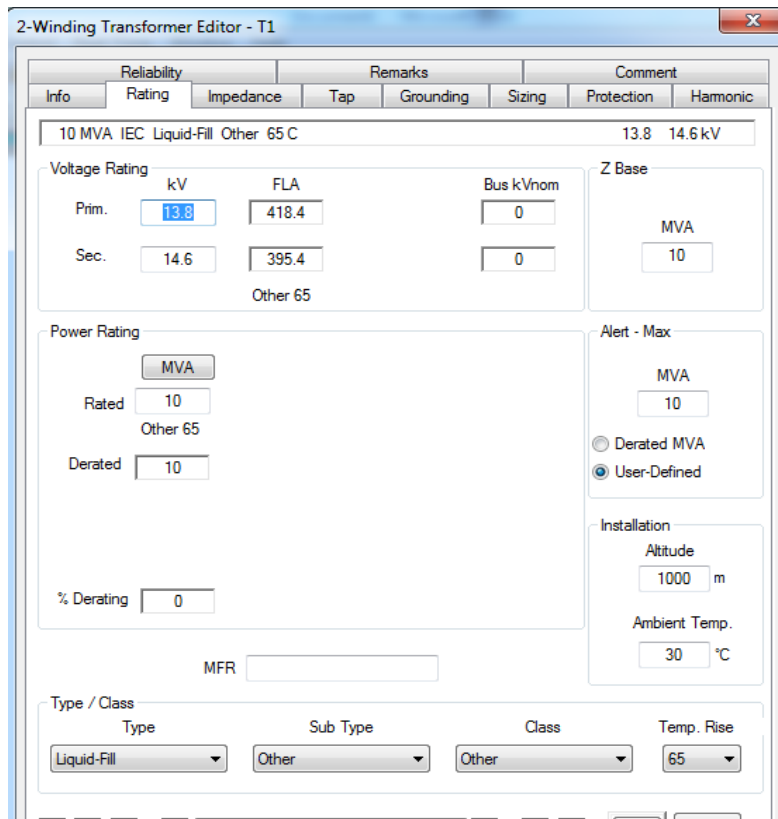

ETAP also provide typical values for various parameters. For example go to impedance page and click on the typical Z & X/R button. You will notice that the etap populate the %Z impedance and X/R ratio for transformer. Next select OK.
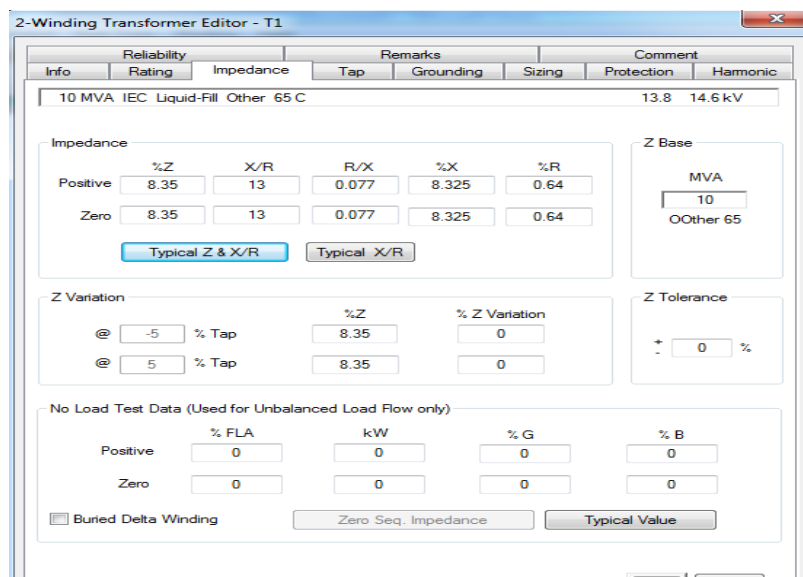
Now you will see that in the single line diagram both the bus 1 and bus 2 values will automatically updated.
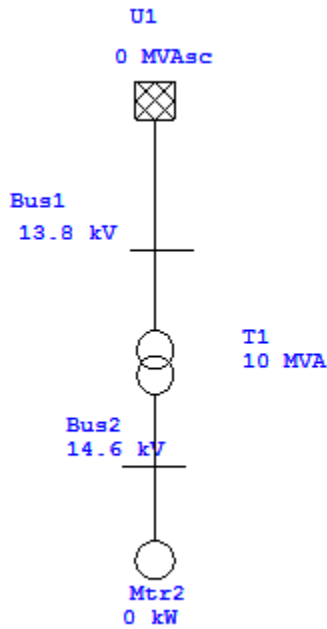
Now enter the data in the Power Grid. Double click the power grid icon and go to its rating page. Here you will see that etap will automatically update the nominal voltage for this element.
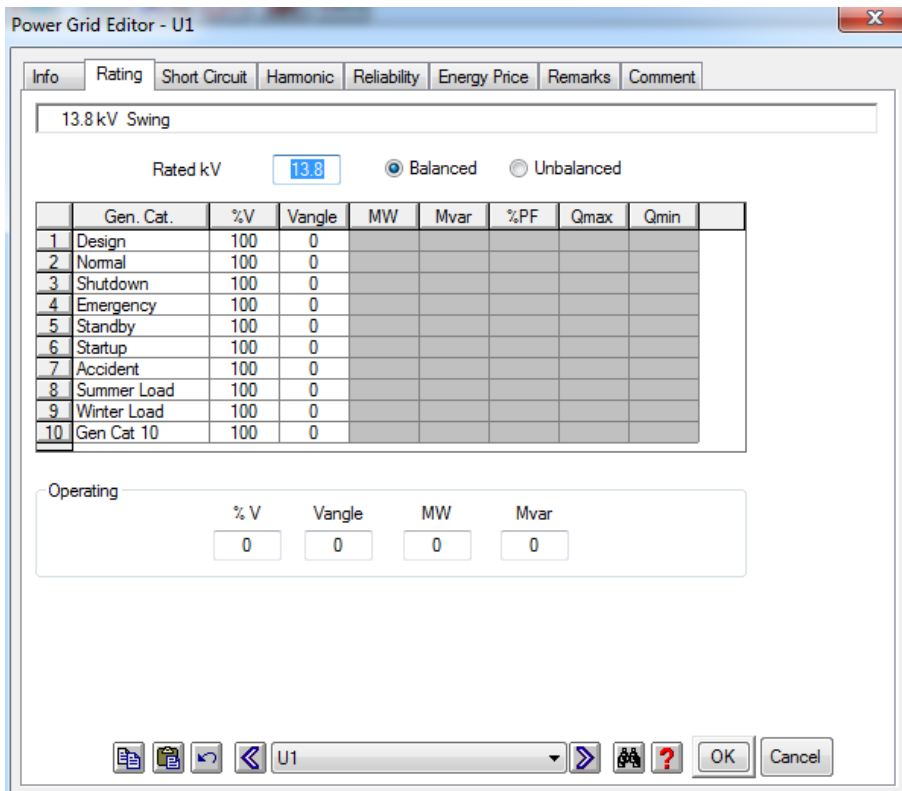
Now double click on the induction machine and go to the name plate page. Here we will see that the rated voltage will automatically be selected as standard rating. Now enter the KW power for this element. The KW power we will be entering is 500. When we enter this value and click outside the box etap will automatically update the Power factor its efficiency the full load amps and the other data.
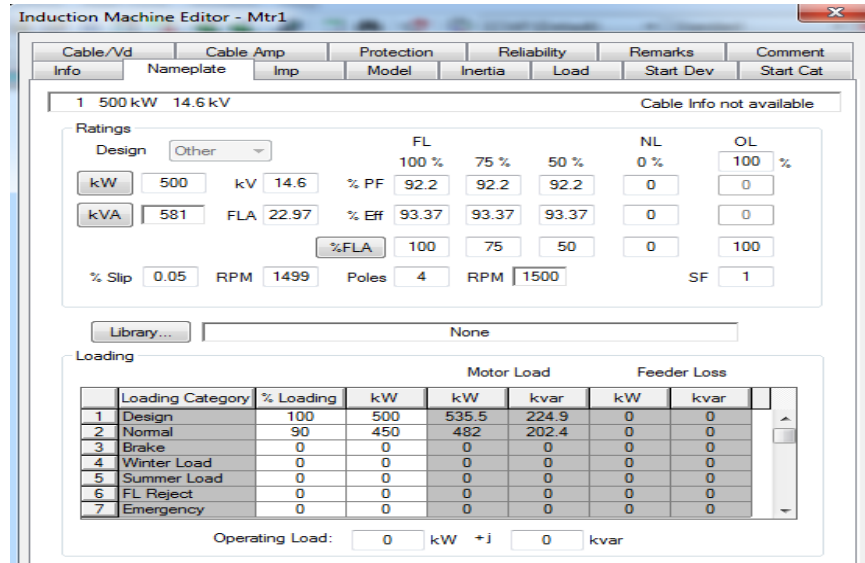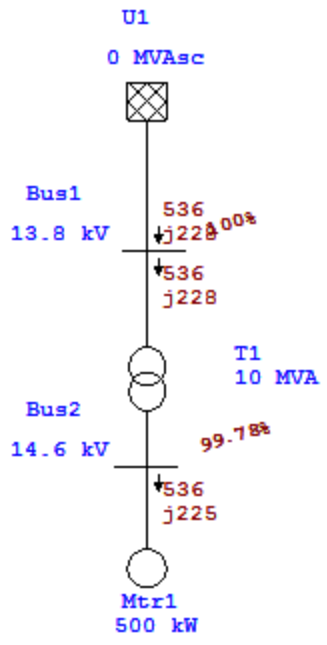

Now we have entered all the necessary data and ready for the load flow analysis. Click on the load flow icon on the left corner.
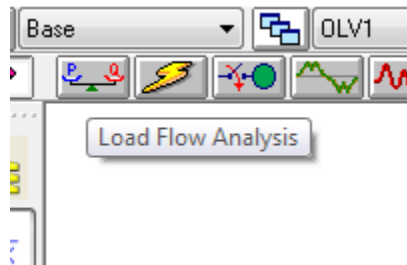
And then click on the right side corner run load flow analysis.
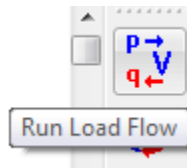
When you click on it will ask you report name so enter LFA for load flow. Then click OK ETAP will show you the calculation and the result of the single line diagram.

U1

0 MVAsc

Bus1

13.8 kV

536
j228 100%

536
j228

T1
10 MVA

Bus2

14.6 kV

99.78%

536
j225

Mtr1
500 kW

Lab Task:

Design the single line diagram as explain in the lab with different ratings and specifications.

Marks Obtained: ……………………….   **Remarks:** …………………….