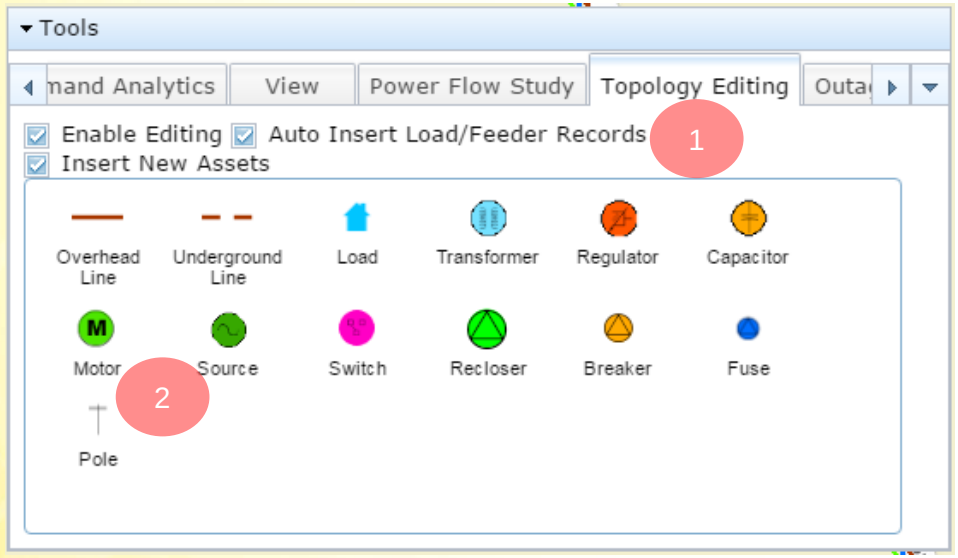
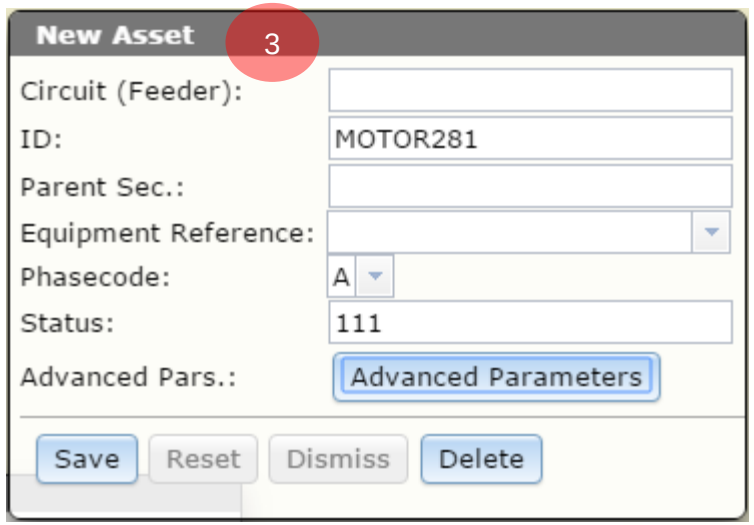
GridSight

Motor Addition and Motor Starting Analysis

Adding a motor in GridSight

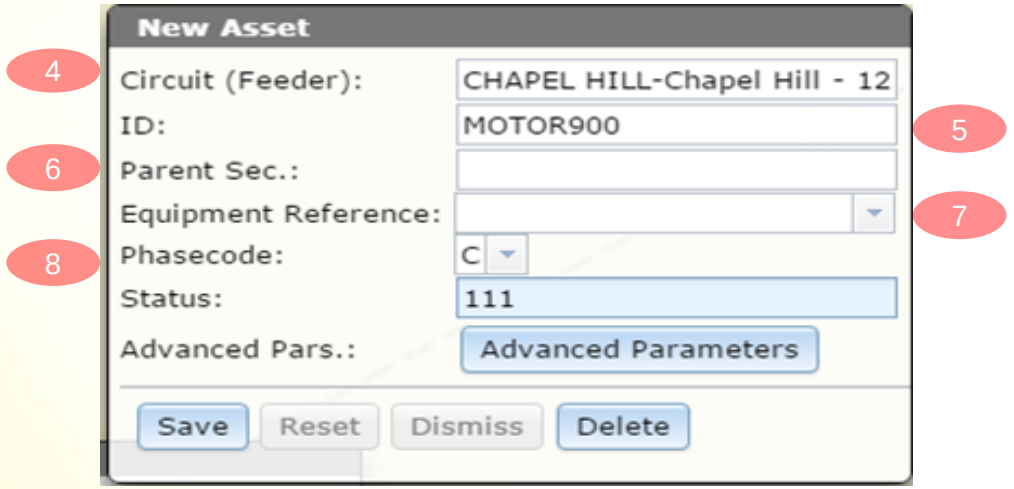
1. Go to Tools > Topology Editing, check the Enable Editing and Insert New Assets.
2. Select Motor in the window and click on the specific point the motor is desired to be located. A new window will open called New Asset.
3. In this window, most of the parameters related to the added motor are asked from the user.





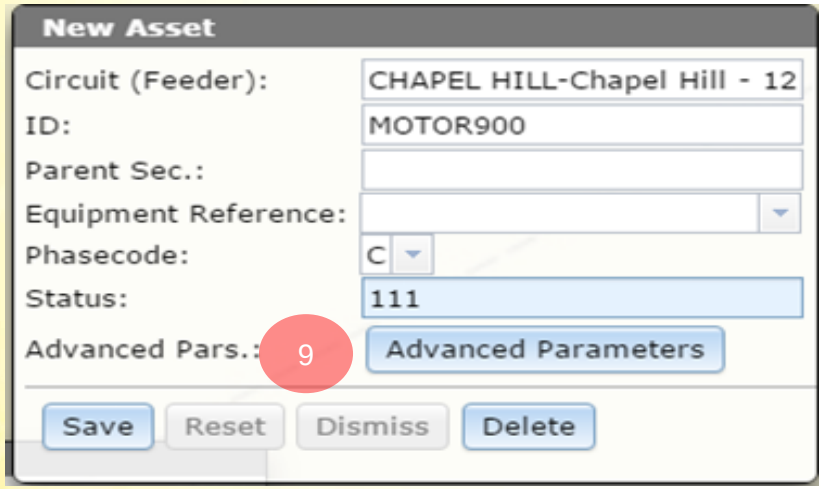
4. In Circuit (Feeder), Select the name of the Feeder (Substation)
5. In ID, Select a name for the added motor.
6. In Parent Sec. Select the equipment ID (for example, a conductor) to which the motor is connected.
7. In Equipment Reference, Select an ID for the motor's reference.
8. In Phasecode, Select the phasecode of the motor.

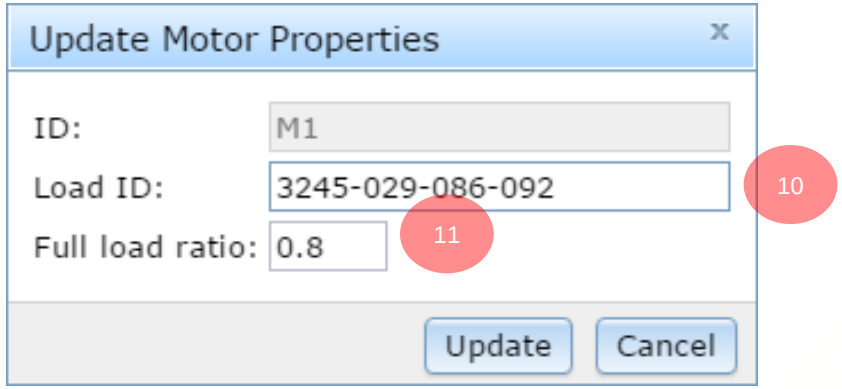
- (The phase can be single phase, V-phase or three phase. But it's obvious that the phasecode of the motor's parent and the load must be considered. In other words, the motor's phasecode must be a subset of the load and motor's parent phasecodes.)



9. Click on Advanced Parameters and assign other properties to the motor.
10. Select Load ID, and choose the load to which the motor is connected.
11. Select Full load ratio which is the portion of the load that is due to the motor (Motor Kvar = Full Load Ratio*Load Kvar).

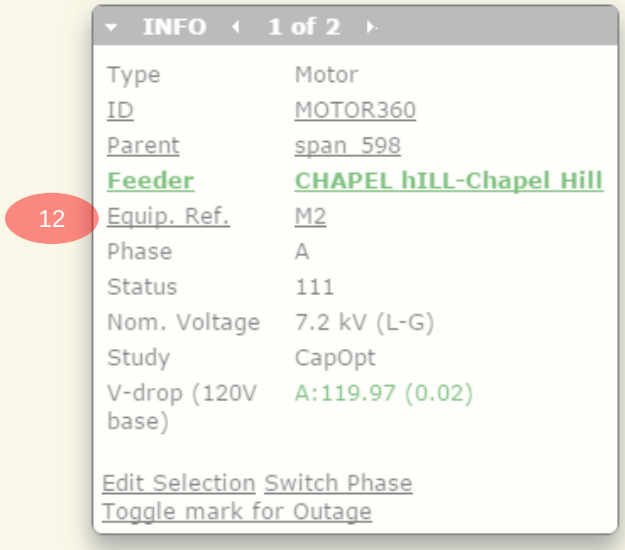
- Example: A plant has three similar motors, in normal operation, 90% of the plant load is due to the motors, hence, full load ratio for each motor is 0.9/3=0.3 . It is also possible that each of these three motors has a different full load ratio, so the loads are distributed between the motors based their full load ratios.

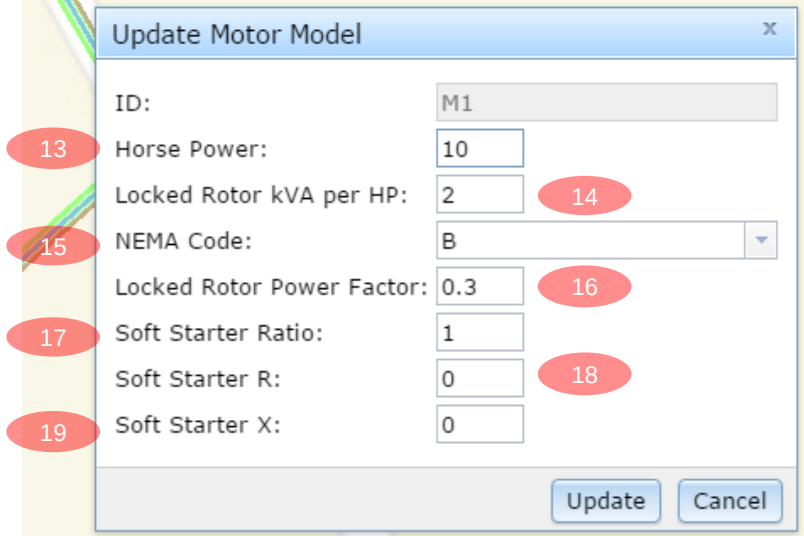




In the next step for completing the procedure of adding the motor, the editing mode must be disabled. Then click on motor icon in the model and an INFO window opens.

12. Click on Equip. Ref.
13. Select “Horse Power”
14. Select “Locked Rotor kVA per HP”
15. Select “NEMA Code”
16. Select “Locked Rotor Power Factor”
17. Select “Soft Starter Ratio”
18. Select “Soft Starter R”
19. Select “Soft Starter X”





Motor Start Analysis

- All the calculations are based on the assumption that the motor and its load are connected to the same parent, so they have the same V(Bus).

1) $V_{Bus\ (load)} = V_{Bus\ (motor)}$

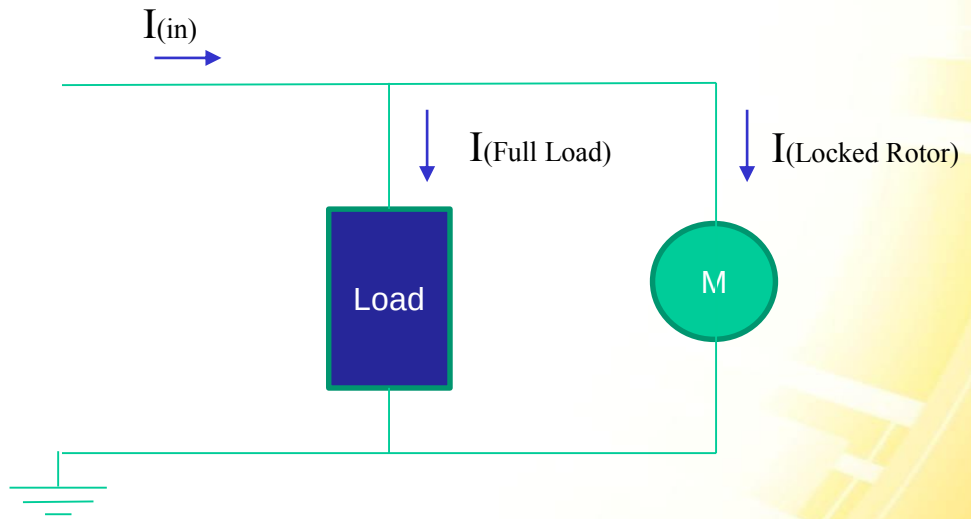
2) $I_{Locked\ Rotor} =$

$$((Hp \times KVA/Hp)/V_{Bus\ (motor)}) \times (Pf_{Motor} - jSin(arcCos(Pf_{Motor})))$$

3) $I_{Full\ Load} = \frac{Kw_{Load}/Pf_{Load}}{V_{Bus\ Load}} \times (Pf_{Load} - jSin(arcCos(Pf_{Load})))$

4) $I_{in} = I_{Locked\ Rotor} + I_{Full\ Load}$

5) $Z_{total} = \frac{V_{Bus}}{I_{in}}$ $\quad (Z_{total} = Z_{Motor} || Z_{Load})$

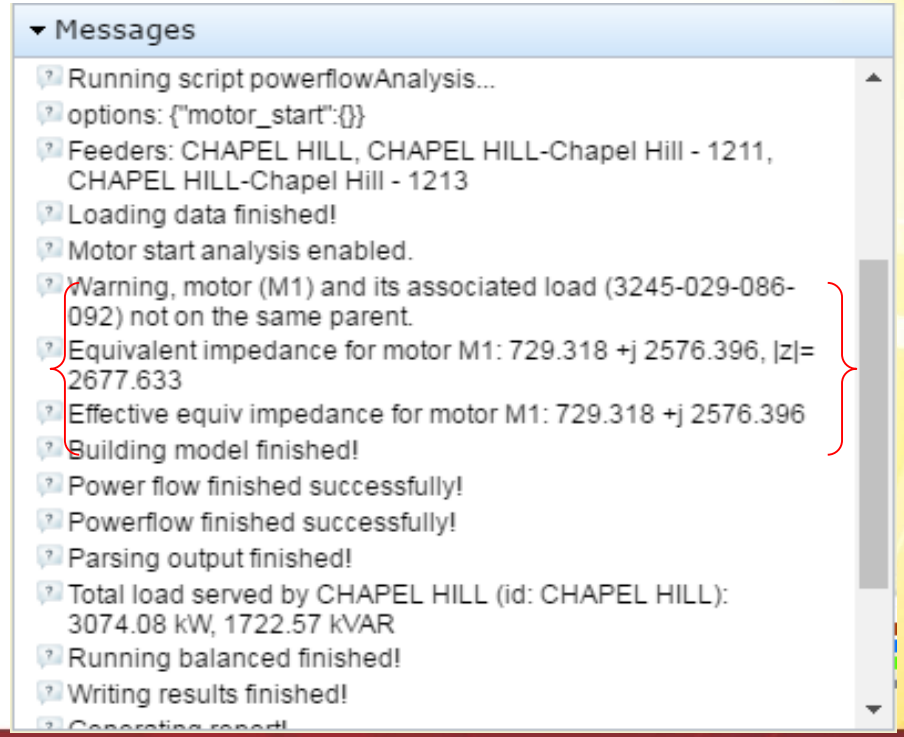


Performing Motor Starting Analysis

In order to perform a Motor Starting Study, take the following steps:

1. Go to Tools / Power Flow Study
2. Choose the Substations and Bays for the study.
3. Choose the Load Profile
4. Choose the Load Scaling
5. Check the Perform Motor Start Calculations
6. Click on Run Case Study
7. Open the Messages dialog box for seeing the results.

In Messages dialog box, equivalent impedance for motors and any warning regarding motor connections appears. For example if the motor and the associated load are not connected to a same parent, GridSight can not do any measurements



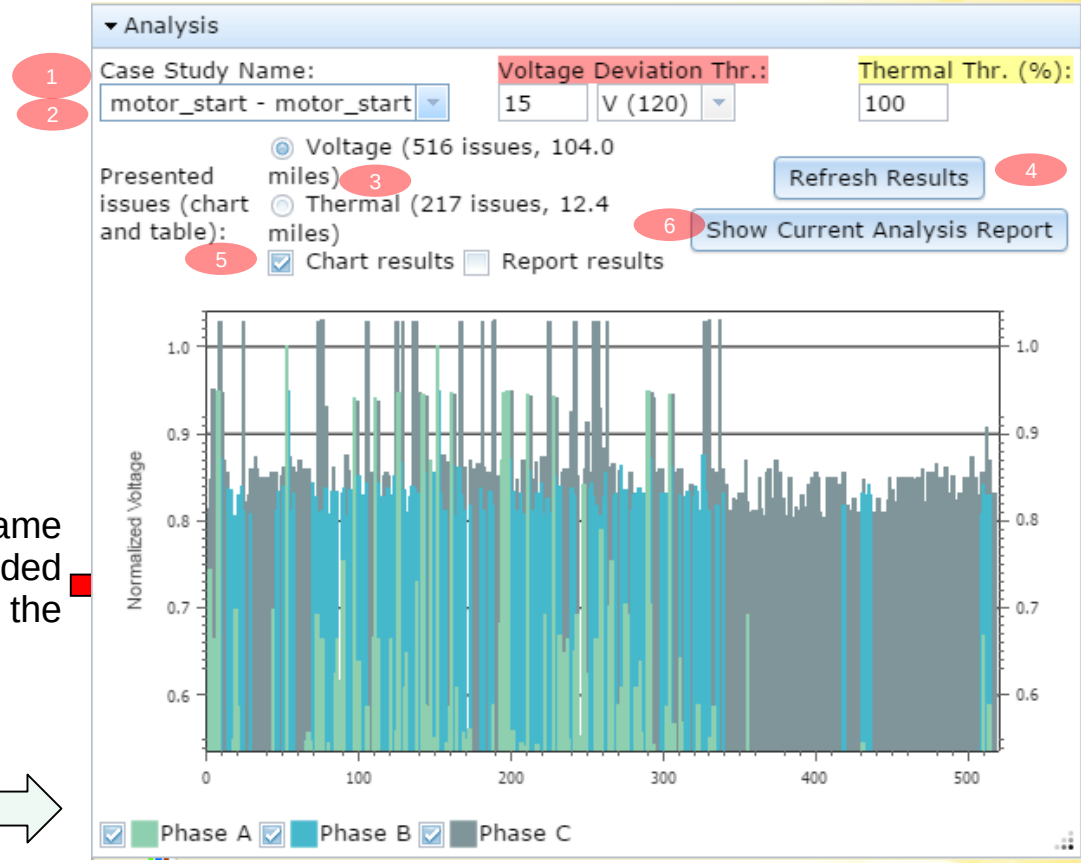
Evaluating the performed Motor Starting Analysis

In order to see results, take the following steps:

1. Go to Analysis
2. Choose the Case Study Name that you have performed (before or after) and enter appropriate values in Voltage Deviation Thr. and Thermal Thr.(%).
3. Choose between Voltage issues and Thermal issues
4. Click on Refresh Results to update the latest study.
5. Choose between Chart results and Report results.
6. Click on Show Current Analysis Report.

❖ By choosing the Chart results, a chart appears below the same window and indicates voltage or thermal issues. The user be guided to the issue location on the model by clicking on the issue on the chart.

The user can also choose the phase or phases for which the chart shows the results



Evaluating the performed Motor Starting Analysis-cont'd

- By choosing the Report Results and then clicking on Show Current Analysis Report , a new tab opens and shows the issues in a report.

	1202		Aluminum																				
S3071E0D	MILANO-1202	S3071E40	#4 Aluminum	0.04	7.2		20.1		140		10			15.0			76.7			0.85			0.0	
S2FB86A1	PETTIBONE-1201	S440E1B7	#4 Aluminum	0.06	7.2			17.7	140									0.0			1.00			
S31B3255	SILVER CITY-1202	S2FBBDDE	#4 Aluminum	0.13	7.2			17.1	140			3			4.3			23.0			0.85			0.0
S2FB86AA	PETTIBONE-1201	S2FB845B	#4 Aluminum	0.24	7.2			16.5	140			30			42.9			226.4			0.84			0.0
S3072068	MILANO-1202	S31B1E2E	#4 Aluminum	0.20	7.2		19.2		140		17			25.1			129.5			0.85			0.0	
S3071B68	MILANO-1202	S3071B59	#4 Aluminum	0.03	7.2		23.2		140		0			1.3			6.5			0.85			0.0	
S2FB861D	PETTIBONE-1201	S2FB862F	#4 Aluminum	0.27	7.2			18.5	140			8			12.1			63.0			0.84			0.0
S3CCA51A	SILVER CITY-1202	S2EBA482	#1/0 Aluminum	0.12	7.2	-0.2	6.2	15.2	200	8	23	40	17.8	47.8	80.6	123.7	315.5	462.5	0.96	0.96	0.91	0.0	0.0	0.0
S3071BD7	MILANO-1202	S3071BBE	#4 Aluminum	0.04	7.2		22.6		140		0			0.8			4.1			0.85			0.0	
S2FBBD95	SILVER CITY-1202	S31B37E5	#4 Aluminum	0.44	7.2			16.7	140			17			24.4			128.6			0.85			0.0
S3071C80	MILANO-1202	S3071C9E	#4 Aluminum	0.17	7.2		20.2		140		0			0.6			3.5			0.85			0.0	
S2FB86C0	PETTIBONE-1201	S3DED369	#4 Aluminum	0.45	7.2			17.6	140			10			15.0			78.4			0.84			0.0
S2FB86CB	PETTIBONE-1201	S3DED369	#4 Aluminum	0.26	7.2			17.3	140									0.0			1.00			
S3BD743E	SILVER CITY-1202	S345C5DC	#4 Aluminum	0.05	7.2			15.8	140			0			0.2			1.2			0.85			
S40FA1B6	SILVER CITY-1202	S2FBBD1B	#4 Aluminum	0.04	7.2			17.3	140			0			0.6			3.2			0.85			
S2FBBEAF	SILVER CITY-1202	S2FBBE94	#4 Aluminum	0.01	7.2			16.8	140			1			1.7			9.2			0.85			0.0
S2FBBE3A	SILVER	S2FBBDE5	#4	0.02	7.2			17.0	140			2			3.5			18.5			0.85			0.0

Exporting the Results of a Motor Starting Study

In order to export the results in a report for further study, take the following steps:

1. Go to Tools / Reporting
2. Choose Case Study Name.
3. Select the same Substations and Bays for the study.
4. Click on Generate Report File.
5. Go to Messages dialog and a link appears for opening the report. Click on the link and a new tab in your browser opens showing the report.