



LFH Web Application

10-JAN-2025

Overview

The Load Flow GUI application is designed to provide a comprehensive platform for simulating, analyzing, and visualizing load flows within electrical power systems. The application will primarily focus on eight components namely Bus, Generator, Induction Motor, Load, Shunt, Filter, Transmission Line and 2-winding Generator allowing users to input detailed Power System Component specifications and perform accurate load flow analyses.

Goals

1. To understand how the elements work when placed into canvas.
2. To determine their behavior after LFH engine integration

Installation Guide

Steps for engine automation

- Install Node.js and the npm package on your local machine.
- Unzip the `engine-script.zip` file.
- Open the `start-server.bat` file in Notepad.
- Copy the engine directory path and replace "`E:\web-works\engine-script`" in the file with your path.
- Save the file.
- Run this command in the engine directory
 - `npm install` - After running this command, you will see a new folder called `node_modules` created in the directory.
- Place it in the Startup folder:
 - Press Windows + R
 - Type `shell:startup`
 - Copy your batch file there
- Finish the wizard, and your Node.js server will start automatically on system startup. It will open the command prompt to run the server. Please don't close the command prompt.

Note: after complete the setup run the `start-server.bat` file one time only.

Step for Install the Node js(Frontend & Backend)

1. **Download the Installer:**
 - Visit the [Node.js official website](https://nodejs.org/en/).
 - Navigate to the **Downloads** section and choose the **Windows** installer for version 18.6.0 (LTS or current release).
2. **Run the Installer:**
 - Double-click the downloaded `.msi` file.
 - Follow the prompts in the Node.js Setup Wizard.
 - Accept the license agreement.

- Choose the installation directory or leave it as the default.
 - Select components (keep the default settings for most cases).
3. **Install Dependencies (Optional):**
 - Ensure the option to install **chocolatey** or **native tools** (if prompted) is checked.
 4. **Verify Installation:**
 - Open a **Command Prompt** or **PowerShell** and run:
Bash: `node -v`
 - This should display `v18.6.0`.
 - Test the **npm** installation:
Bash: `npm -v`
 - This should display the npm version installed with Node.js.

Please check the youtube for Sqlite install : https://www.youtube.com/watch?v=-bDwNR_C0dE

Timestamp : 0:00 to 3:11

Backend File: backend_latest.zip

Frontend File: frontend_latest.zip

Backend setup:

1. Unzip the `backend_latest.zip` file.
2. Open `.env` file in any editor. Set the port number in this variable: `PORT=8005`
3. Run this command in the backend directory
 - a. `npm install` - After running this command, you will see a new folder called `node_modules` created in the directory.
4. Run this command for start the server.

Frontend setup:

1. Unzip the `frontend_latest.zip` file.
2. Open `.env` file in any editor. Set the backend server url in this variable:
`REACT_APP_API_BASE_URL=https://localhost:8005`
3. Run this command in the backend directory
 - a. `npm install` - After running this command, you will see a new folder called `node_modules` created in the directory.
4. Run this command for start the server.

Elements set

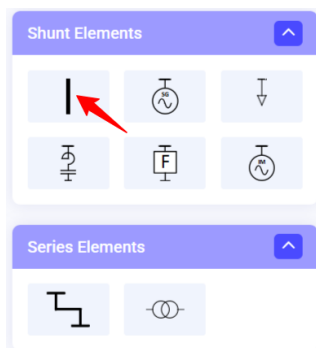
Shunt Elements	Shunt Element
1	1. Bus
2	2. Induction Motor
3	3. Load
4	4. Shunt Device
5	5. Filter
6	6. Generator
Series Elements	Series Element
7	7. Transmission Line
8	8. Transformer

1. Understanding Bus

A bus is a circuit element that connects all other circuit elements. A bus is a graph node in a single-line diagram. In this tutorial we will represent the bus with this icon |

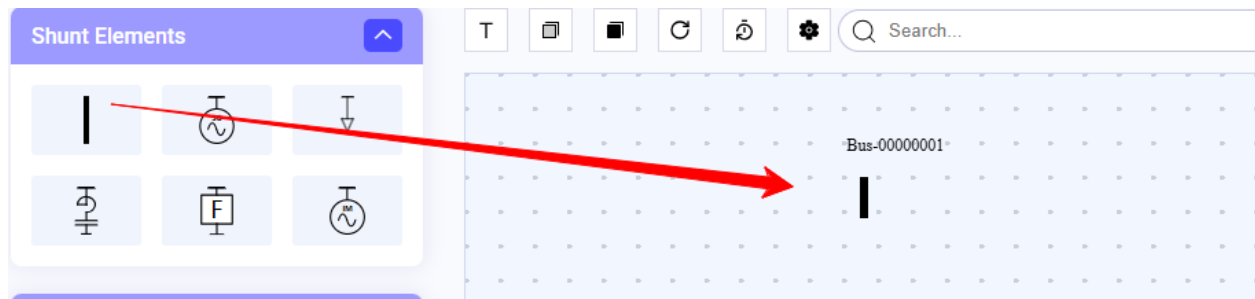
To add a Bus on Editor,

Step 1 : Need to click the the Bus Icon (|) at the left hand side panel and Drag it to the editor.



Step 2 : The Bus should be invoked to the Editor at the same point where the user drops

the Bus.



Bus Properties

Step 1: Double-click on any bus within the canvas to open its property window.

Edit Bus Data					
No:	Busbar Name:	Area Number:			
1	Bus-00000001	0			
Nominal Voltage (kV):	Voltage magnitude (p.u.):	Voltage angle (deg.):			
220.0	1.0	0.0			
Submit					

Following are the properties user can set from the property window -

No

Busbar Name

Area Number

Status

Status:

In service

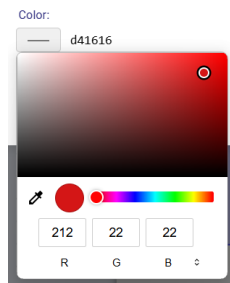
In service
Out of service
black

Nominal Voltage

Voltage Magnitude

Voltage Angle

Color

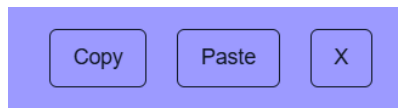


Copy Bus Property -

Users can Copy->Paste bus property data from one bus to another bus. Users need follow the steps below -

Step 1: Double click on any of the bus present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



Step 3: Double click on the target bus where users need to paste the property data .

Step 4: Click the Paste button .

2. Understanding Generator

A Generator is a Shunt element that connects with a Bus. A generator circuit is a circuit that includes a generator, which is a machine that converts energy into electricity. In this tutorial we will represent the Generator with this icon below Icon

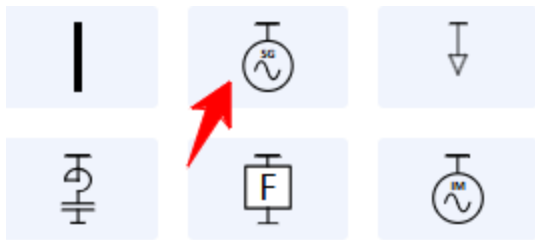


To add a Generator on Editor,

Step 1 : Need to click a Bus Icon (|) at the left hand side panel and Drag it to the editor.

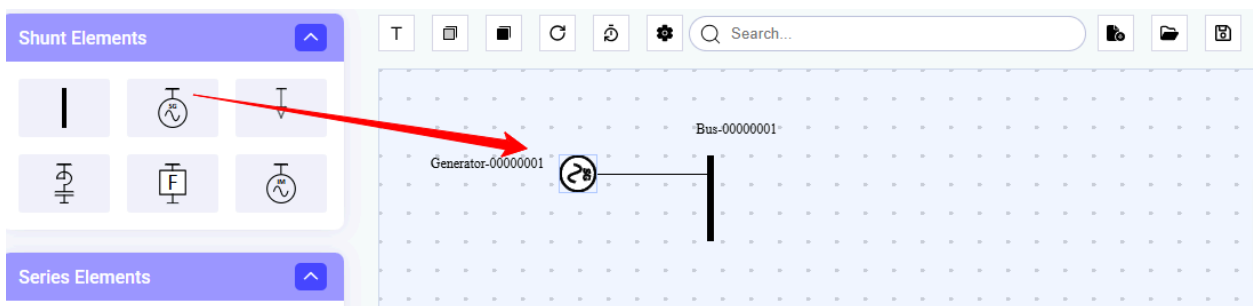
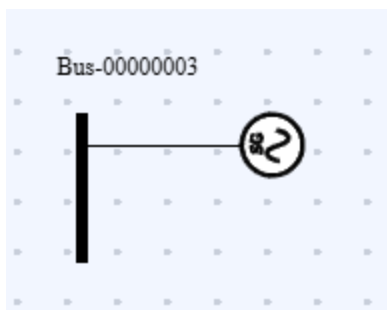


Step 2 : Now Select a Bus and click the Generator Icon at left hand side panel



Step 3 : Drag the Generator to the selected Bus and drop it

Step 4 : After dropping it and connected with Bus, Drag the Generator and enlarge the connection as per requirement



Generator Properties

Step 1: Double-click on any Generator within the canvas to open its property window.

Edit Generator Data

No: <input type="text" value="3"/>	Generator Name: <input type="text" value="Generator-00000003"/>	Name of Busbar Generator is connected to: <input type="text" value="Bus-00000003"/>	Unit Number: <input type="text" value="3"/>
Status: <div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;"> In service ▼ </div>	Real Power Generation (MW): <input type="text" value="0.0"/>	Reactive Power Generation (MVAR): <input type="text" value="0.0"/>	Minimum Reactive Power Generation (MVAR): <input type="text" value="-100.0"/>
Maximum Reactive Power Generation (MVAR): <input type="text" value="-100.0"/>	Rating1: <input type="text" value="0.0"/>	Positive Sequence Resistance (p.u.): <input type="text" value="0.002"/>	Synchronous Reactance (p.u.): <input type="text" value="1.05"/>
Transient Reactance (p.u.): <input type="text" value="0.3"/>	Sub-Transient Reactance (p.u.): <input type="text" value="0.2"/>	Zero sequence Resistance (p.u.): <input type="text" value="0.002"/>	Zero sequence Reactance (p.u.): <input type="text" value="0.15"/>
Negative sequence Resistance (p.u.): <input type="text" value="0.002"/>	Negative sequence Reactance (p.u.): <input type="text" value="0.15"/>	Maximum Active Power (MW): <input type="text" value="100.0"/>	

Following are the properties user can set from the property window -

No

Generator Name

Name of Busbar Generator is connected to

Unit Number

Status

In service
▼

In service

Out of service

-100.0

Real Power Generation (MW)

Reactive Power Generation (MVAR):

Minimum Reactive Power Generation (MVAR)

Maximum Reactive Power Generation (MVAR)

Rating1

Positive Sequence Resistance (p.u.)

Synchronous Reactance (p.u.)

Transient Reactance (p.u.)

Sub-Transient Reactance (p.u.)

Zero sequence Resistance (p.u.)

Zero sequence Resistance (p.u.)

Negative sequence Resistance (p.u.)

Negative sequence Reactance (p.u.)

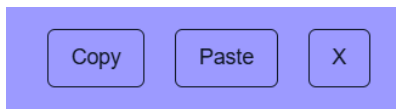
Maximum Active Power (MW)

Copy Generator Property -

Users can Copy / Paste Generator property data from one Generator to another Generator .Users need follow the steps below -

Step 1: Double click on any of the Generators present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



Step 3: Double click on the target Generator where users need to paste the property data .

Step 4: Click the Paste button .

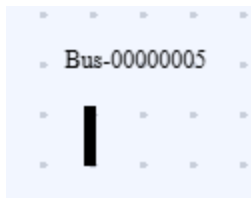
3. Understanding Load

A Load is a Shunt element that connects with the Bus. load is a force that is applied to a structure or body. Loads can cause stresses, deformations, or accelerations in a structure. In this tutorial we will represent the Load with this icon below Icon.

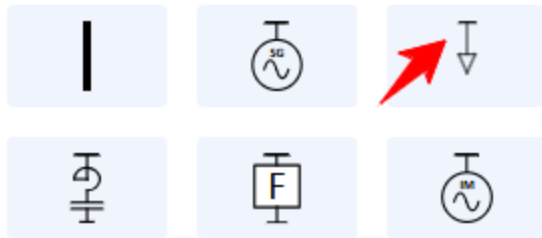


To add a Load on Editor,

Step 1 : Need to click a Bus Icon (|) at the left hand side panel and Drag it to the editor.



Step 2 : Now Select a Bus and click the Load Icon at left hand side panel



Step 3 : Drag the Load to the selected Bus and drop it

Step 4 : After dropping it and connected with Bus, Drag the Load and enlarge the connection as per requirement



Load Properties

Step 1: Double-click on any Load within the canvas to open its property window.

Edit Load Data
Copy Paste X

No:	Load Name:	Busbar Name:	Unit Number:
<input type="text" value="1"/>	<input type="text" value="Load-00000001"/>	<input type="text" value="Bus-00000005"/>	<input type="text" value="1"/>

Status:	Active Power (MW):	Reactive Power (MVar):
<div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;"> In service ▼ </div>	<input type="text" value="100.0"/>	<input type="text" value="20.0"/>

Submit

Following are the properties user can set from the property window -

No

Load Name:

Busbar Name: Name of Busbar Generator is connected to

Unit Number

Status:

Status:



Active Power (MW)

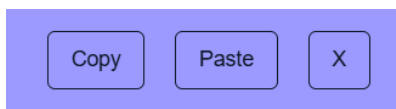
Reactive Power (MVar)

Copy Load Property -

Users can Copy / Paste Load property data from one Load to another Load .Users need follow the steps below -

Step 1: Double click on any of the Load present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.

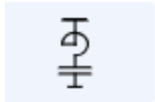


Step 3: Double click on the target Load where users need to paste the property data .

Step 4: Click the Paste button .

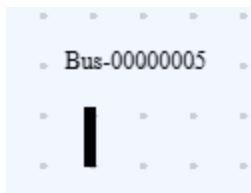
4. Understanding Shunt Device

A Shunt is an element that connects with the Bus. A shunt is a device that allows an electrical current to flow through a low-resistance path. Shunts are used in many applications, including electrical measurement, power distribution, and automotive systems. In this tutorial we will represent the Shunt Device with this icon below.

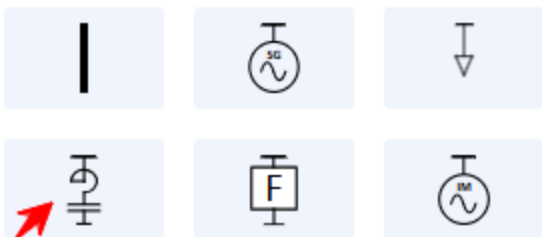


To add a Shunt on Editor,

Step 1 : Need to click a Bus Icon (|) at the left hand side panel and Drag it to the editor.

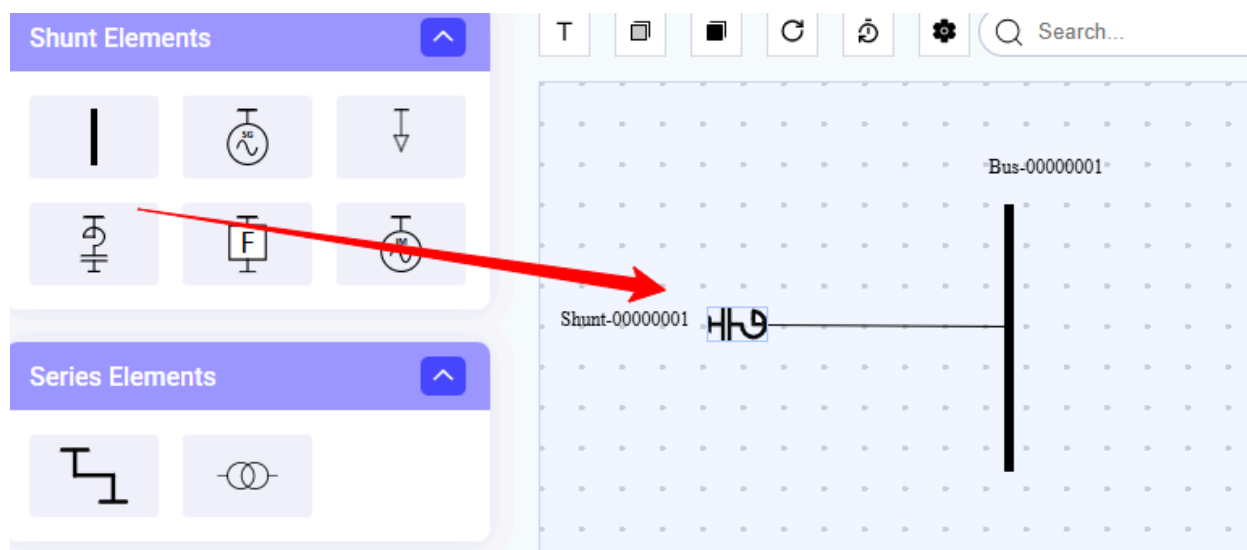


Step 2 : Now Select a Bus and click the Shunt Icon at left hand side panel



Step 3 : Drag the Shunt Element to the selected Bus and drop it

Step 4 : After dropping it and connected with Bus, Drag the Shunt Element and enlarge the connection as per requirement



Shunt Properties

Step 1: Double-click on any Shunt Element within the canvas to open its property window.

Edit Shunt Device Data
Copy Paste X

No:	Shunt Element Name:	Busbar Name shunt is connected to:	Unit Number:
<input type="text" value="1"/>	<input type="text" value="Shunt-00000001"/>	<input type="text" value="Bus-00000006"/>	<input type="text" value="1"/>
Status:	Rating (MVA):	Circuit Parameters in per unit based on:	Resistance (p.u.):
<div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;">In service ▼</div>	<input type="text" value="100.0"/>	<div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;">COMMON ▼</div>	<input type="text" value="0.0"/>
Reactance (p.u.):	Susceptance (p.u.):		Add Fields
<input type="text" value="0.0"/>	<input type="text" value="1.0"/>		
Submit			

Following are the properties user can set from the property window -

No

Shunt Element Name

Busbar Name shunt is connected to

Unit Number

Status

Status:

In service

In service

Out of service

Rating (MVA)

Circuit Parameters in per unit based on

Circuit Parameters in per unit based on:

COMMON

COMMON

OWN

Resistance (p.u.)

Reactance (p.u.)

Susceptance (p.u.)

Add Fields Button - By clicking the Buttons user can able to replicate following mentioned fields.

No:	Shunt Element Name:	Busbar Name shunt is connected to:	Unit Number:
1	Shunt-00000001	Bus-00000006	1
Status:	Rating (MVA):	Circuit Parameters in per unit based on:	Resistance (p.u.):
In service	100.0	COMMON	0.0
Reactance (p.u.):	Susceptance (p.u.):		Add Fields
0.0	1.0		

To Node

From Node

R (ohm)

L (H)

C (uF)

Additional Fields Set 1:


To Node:	From Node:	R (ohm):	L (H):
C (uF):			

Delete Button : Clicking Delete Button user can remove Additional Field Set panel

Additional Fields Set 1:

To Node: From Node: R (ohm): L (H):

C (uF):




Add Fields Button : By clicking this Button user can able to replicate Additional Field Set in another Panel.

Additional Fields Set 2:

To Node: From Node: R (ohm): L (H):

C (uF):




Remove Fields Button : Clicking Remove Fields Button user can remove all the Additional Fields from Additionally added panel

Additional Fields Set 1:

To Node: From Node: R (ohm): L (H):

C (uF):

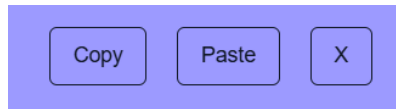


Copy Shunt Element Property -

Users can Copy / Paste Shunt Element property data from one Shunt Element to another Shunt Element. Users need follow the steps below -

Step 1: Double click on any of the Shunt Element present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



Step 3: Double click on the target Shunt Element where users need to paste the property data .

Step 4: Click the Paste button .

5. Understanding Filter

An electrical Filter is a circuit that modifies an electrical signal by changing its amplitude or phase characteristics. Filters are used to remove unwanted frequencies and pass only the frequencies that are needed. In this tutorial we will represent the Filter with this icon below Icon.

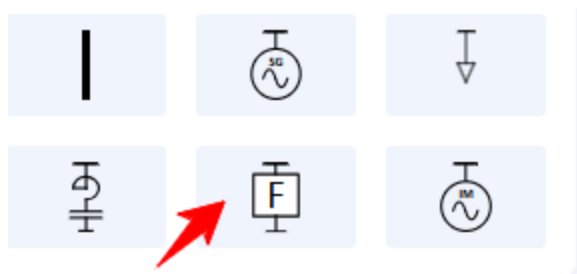


To add a Filter on Editor,

Step 1 : Need to click a Bus Icon (|) at the left hand side panel and Drag it to the editor.

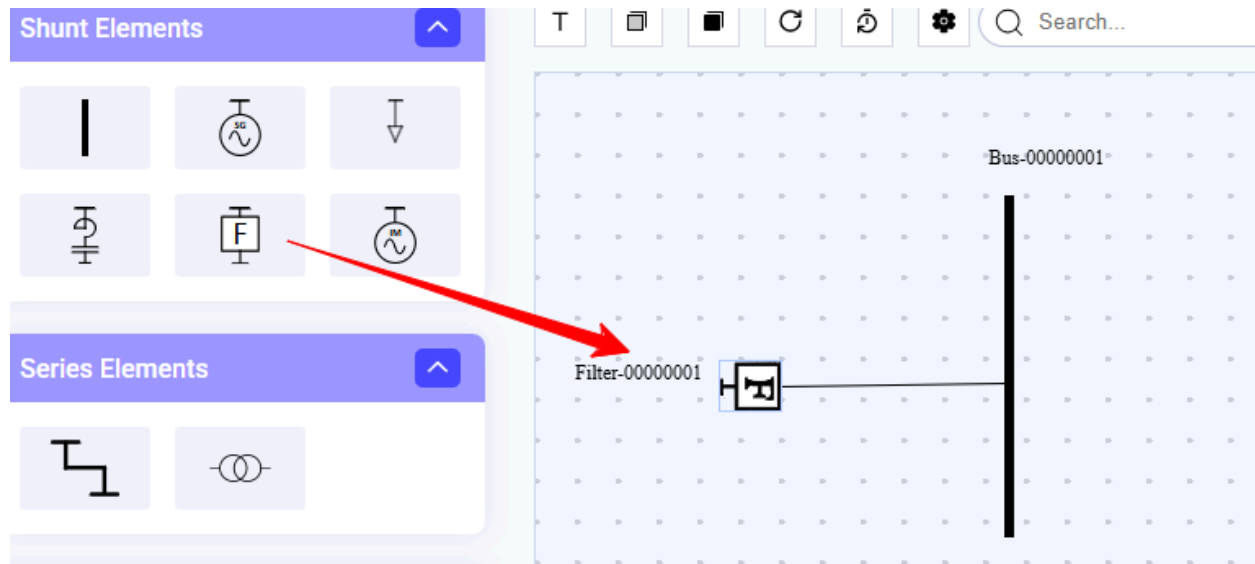


Step 2 : Now Select a Bus and click the Filter Icon at left hand side panel



Step 3 : Drag the Filter to the selected Bus and drop it

Step 4 : After dropping it and connected with Bus, Drag the Filter and enlarge the connection as per requirement



Filter Properties

Step 1: Double-click on any Filter within the canvas to open its property window.

Edit Filter Data
Copy Paste X

No: <input type="text" value="1"/>	Filter Name: <input type="text" value="Filter-00000001"/>	Busbar Name: <input type="text" value="Bus-00000001"/>	Status: <input type="text" value="In service"/>
From Node: <input type="text" value="1"/>	To Node: <input type="text" value="1"/>	R(ohm): <input type="text" value="0.0"/>	L(H): <input type="text" value="0.001"/>
C(uF): <input type="text" value="1.0e-06"/>			Add Fields
Submit			

Following are the properties user can set from the property window -

No

Filter Name

Busbar Name Filter is connected to

Status

Status:

In service

In service

Out of service

From Node

To Node

To Node

L(H)

C(uF)

Add Fields Button - By clicking the Buttons user can able to replicate following mentioned fields.

Edit Filter Data

Copy Paste X

No: 1 Filter Name: Filter-00000001 Busbar Name: Bus-00000001 Status: In service

From Node: 1 To Node: 1 R(ohm): 0.0 L(H): 0.001

C(uF): 1.0e-06

Add Fields

Submit

To Node

From Node

R (ohm)

L (H)

C (uF)

Additional Fields Set 1:

To Node:

From Node:

R (ohm):

L (H):

C (uF):

Delete Button : Clicking Delete Button user can remove Additional Field Set panel

Additional Fields Set 1:

To Node:

From Node:

R (ohm):

L (H):

C (uF):



Delete

Add Fields Button : By clicking this Button user can able to replicate Additional Field Set in another Panel.

Additional Fields Set 2:

To Node:

From Node:

R (ohm):

L (H):

C (uF):

Delete



Add Fields

Remove Fields

Remove Fields Button : Clicking Remove Fields Button user can remove all the Additional Fields from Additionally added panel

Additional Fields Set 1:

To Node:

From Node:

R (ohm):

L (H):

C (uF):

Delete



Add Fields

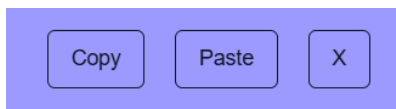
Remove Fields

Copy Filter Property -

Users can Copy / Paste Filter property data from one Filter to another Filter .Users need follow the steps below -

Step 1: Double click on any of the Filter present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



Step 3: Double click on the target Filter where users need to paste the property data .

Step 4: Click the Paste button .

6. Understanding Induction Motor

An induction motor is an alternating current (AC) electric motor that uses electromagnetic induction to create torque. It's also known as an asynchronous motor. In this tutorial we will represent the Induction Motor with this icon below Icon.

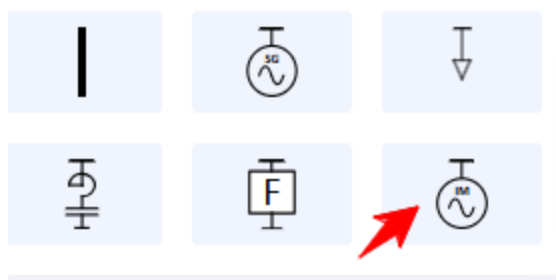


To add a Induction Motor on Editor,

Step 1 : Need to click a Bus Icon (|) at the left hand side panel and Drag it to the editor.

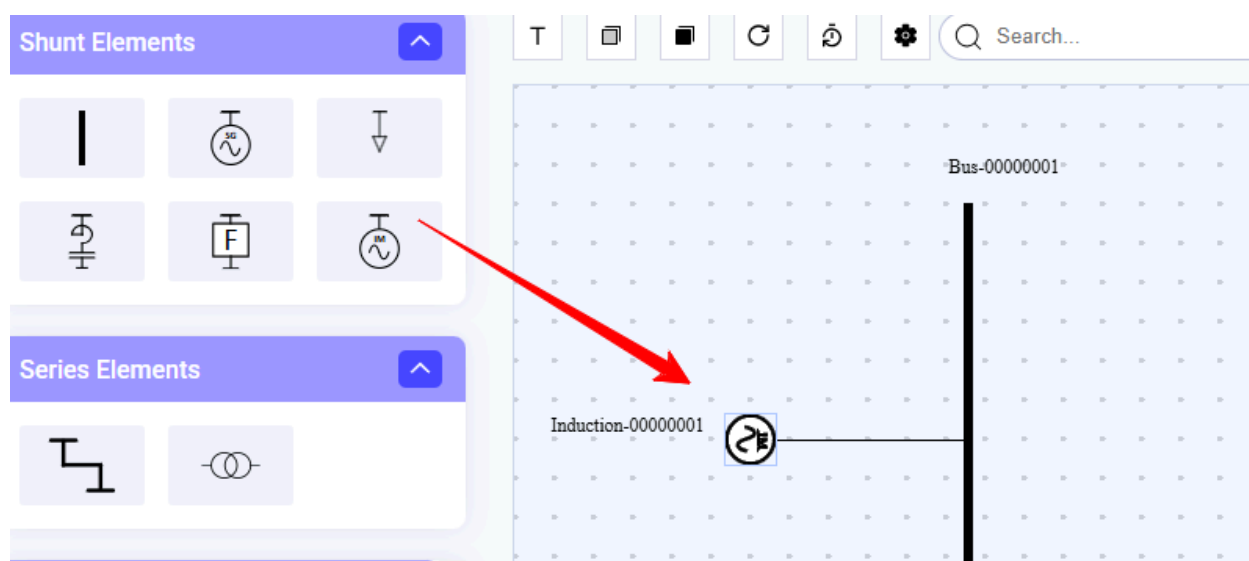


Step 2 : Now Select a Bus and click the Induction Motor Icon at left hand side panel



Step 3 : Drag the Induction Motor to the selected Bus and drop it

Step 4 : After dropping it and connected with Bus, Drag the Induction Motor and enlarge the connection as per requirement



Induction Motor Properties

Step 1: Double-click on any Induction Motor within the canvas to open its property window.

Edit Induction Motor Data				Copy	Paste	X
No:	Induction Motor Name:	Busbar Name:	Unit Number:			
1	Induction-00000001	Bus-00000001	1			
Status:	Mechanical Power Output (MW):	Slip (%):	Operating Mode:			
In service	100.0	4.0	POWER			
Rating1:	Stator Resistance (p.u.):	Stator Reactance (p.u.):	Magnetising Reactance (p.u.):			
0.0	0.07	0.011	0.011			
Inner Squirrel Cage Resistance (p.u.):	Inner Squirrel Cage Reactance (p.u.):	Outer Squirrel Cage Resistance (p.u.):	Outer Squirrel Cage Reactance (p.u.):			
0.011	0.011	0.011	0.011			
Sub Transient Reactance:						
0.011						
Submit						

Following are the properties user can set from the property window -

No

Induction Motor Name

Busbar Name Induction Motor is connected to

Unit Number

Status

Status:

In service

In service

Out of service

Mechanical Power Output (MW)

Slip (%)

Operating Mode

Operating Mode:

POWER

POWER

SLIP

0.011

Rating1

Stator Resistance (p.u.):

Stator Reactance (p.u.)

Magnetising Reactance (p.u.):

Inner Squirrel Cage Resistance (p.u.)

Inner Squirrel Cage Reactance (p.u.)

Outer Squirrel Cage Resistance (p.u.)

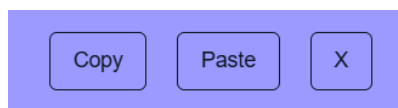
Sub Transient Reactance

Copy Induction Motor Property -

Users can Copy / Paste Induction Motor property data from one Induction Motor to another Induction Motor .Users need follow the steps below -

Step 1: Double click on any of the Induction Motor present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



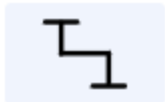
Step 3: Double click on the target Induction Motor where users need to paste the property data .

Step 4: Click the Paste button .

Series Elements

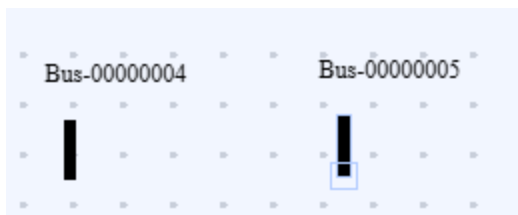
7. Understanding Transmission Line

An electrical transmission line is a structure that carries large amounts of electricity over long distances at high voltages. In this tutorial we will represent the Transmission Line with this icon below Icon.



To add a Transmission Line on Editor,

Step 1 : Need to click two Buses Icon (|) with the same Voltage at the left hand side panel and Drag it to the editor.

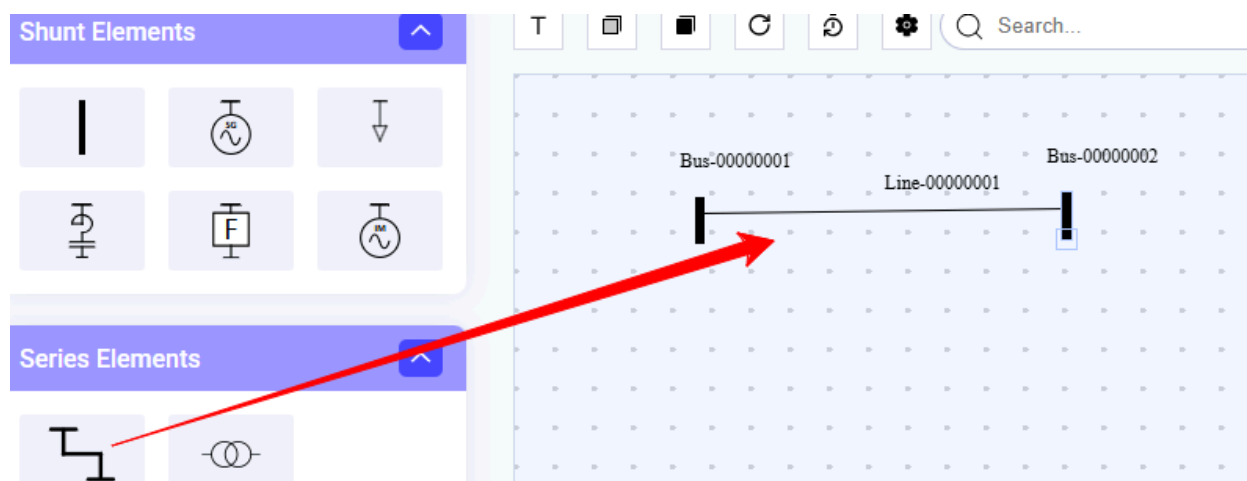


Step 2 : Now Select a Bus and click the Transmission Icon at the left hand side panel..



Step 3 : Then Click the same Bus and click the other Bus with whom it will be connected to.

Step 4 : After dropping it and connected with two Buses, Drag the Buses and enlarge the connection as per requirement



Transmission Line Properties

Step 1: Double-click on any Transmission Line within the canvas to open its property window.

Edit Transmission Line Data Copy Paste X

No: <input type="text" value="1"/>	Line Name: <input type="text" value="Line-00000001"/>	Sending Busbar Name: <input type="text" value="Bus-00000002"/>	Receiving Busbar Name: <input type="text" value="Bus-00000003"/>
Unit Number: <input type="text" value="1"/>	Status: <input type="text" value="In service"/>	Line Length (km): <input type="text" value="1.0"/>	Summer Rating (MVA): <input type="text" value="100.0"/>
Winter Rating (MVA): <input type="text" value="100.0"/>	Circuit Parameters given as: <input type="text" value="Per Unit"/>	Positive Sequence Resistance(p.u.): <input type="text" value="0.05"/>	Positive Sequence Reactance(p.u.): <input type="text" value="0.35"/>
Positive Sequence Susceptance(p.u.): <input type="text" value="3.5e-06"/>	Zero Sequence Resistance(p.u.): <input type="text" value="0.5"/>	Zero Sequence Reactance(p.u.): <input type="text" value="1.0"/>	Zero Sequence Susceptance (p.u.): <input type="text" value="2.1e-06"/>
Negative sequence Resistance(p.u.): <input type="text" value="0.05"/>	Negative sequence Reactance (p.u.): <input type="text" value="0.35"/>	Negative Sequence Susceptance(p.u.): <input type="text" value="3.5e-06"/>	

Submit

Following are the properties user can set from the property window -

No

Line Name

Sending Busbar Name

Receiving Busbar Name

Unit Number:

Status

Status:

In service	▼
In service	
Out of service	

Line Length (km)

Summer Rating (MVA)

Winter Rating (MVA)

Circuit Parameters given as

Circuit Parameters given as:

Per Unit	▼
Per Unit	
Actual	

Positive Sequence Resistance(p.u.)

Slip (%)

Operating Mode

Operating Mode:

POWER	▼
POWER	
SLIP	
0.011	

Positive Sequence Reactance(p.u.):

Positive Sequence Susceptibility(p.u.):

Zero Sequence Resistance(p.u.):

Zero Sequence Reactance(p.u.)

Zero Sequence Susceptibility (p.u.)

Negative sequence Resistance(p.u.)

Negative sequence Reactance (p.u.)

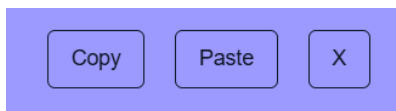
Negative Sequence Susceptibility(p.u.):

Copy Transmission Line Property -

Users can Copy / Paste Transmission Line property data from one Transmission Line to another Transmission Line .Users need follow the steps below -

Step 1: Double click on any of the Transmission Line present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



Step 3: Double click on the target Transmission Line where users need to paste the property data .

Step 4: Click the Paste button .

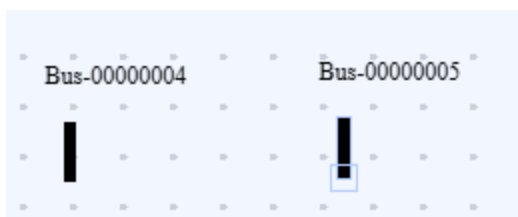
8. Transformer

A transformer is a device that transfers electrical energy between circuits by changing the voltage or current. Transformers are used in many applications, including power transmission, lighting, and audio systems. In this tutorial we will represent the Transformer with this icon below.



To add a Transformer on Canvas,

Step 1 : Need to click two Buses Icon (|) with the same or different Voltage at the left hand side panel and Drag it to the editor.

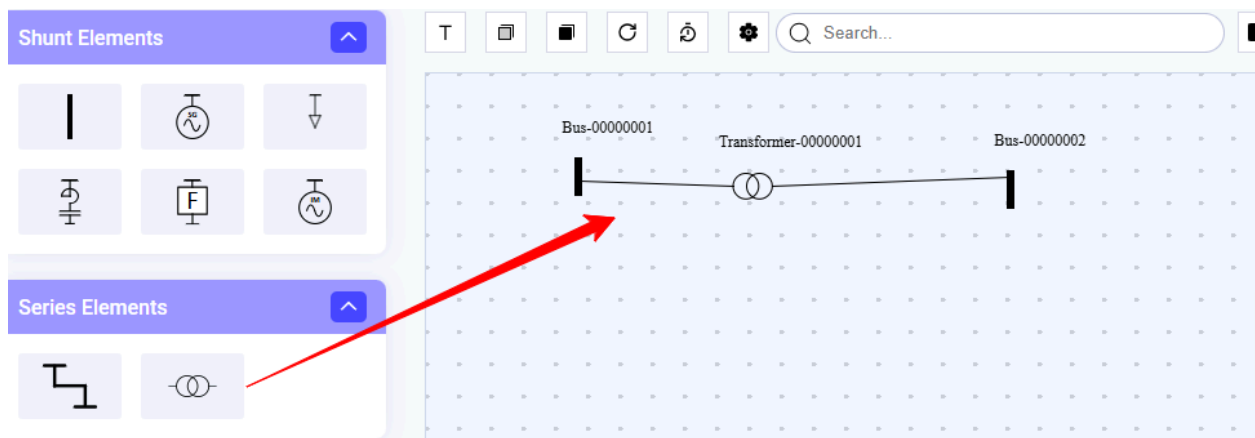


Step 2 : Now Select a Bus and click the Transmission Icon at the left hand side panel..



Step 3 : Then Click the same Bus and click the other Bus with whom it will be connected to.

Step 4 : After dropping it and connected with two Buses, Drag the Buses and enlarge the connection as per requirement



Transformer Properties

Step 1: Double-click on any Transformer within the canvas to open its property window.

No.	Transformer Name:	High Voltage Busbar Name:	Low Voltage Busbar Name:
1	Transformer-00000001	Bus-00000007	Bus-00000006
Unit Number:	Status:	High voltage winding connection code:	Low voltage winding connection code:
1	In service	Y-G	D
Vector Group:	Location of ON-LOAD tap changer(OLTC):	Location of where specified voltage applies to:	Rating (MVA):
0	HV	LV	100.0
Rating1:	Positive Sequence Resistance (p.u.):	Positive Sequence Reactance (p.u.):	Zero sequence Resistance (p.u.):
0.0	0.02	0.1	0.02
Zero sequence Reactance (p.u.):	Negative sequence Resistance (p.u.):	Negative sequence Reactance (p.u.):	Tap Position (%):
0.1	0.02	0.1	10.0
Minimum Tap position (%):	Maximum Tap position (%):	Tap step (%):	Rate of change of reactance with tap position:
-10.0	10.0	0.2	0.0

Specified Voltage (p.u.):

Following are the properties user can set from the property window -

No

Transformer Name

High Voltage Busbar Name

Low Voltage Busbar Name

Unit Number

Status

Status:

In service

In service

Out of service

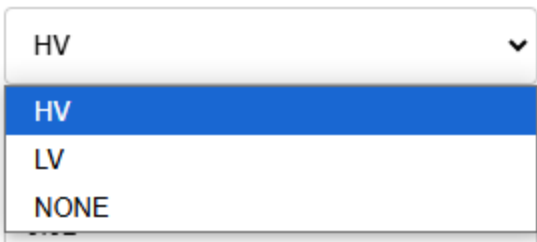
High voltage winding connection code:

Low voltage winding connection code:

Vector Group:

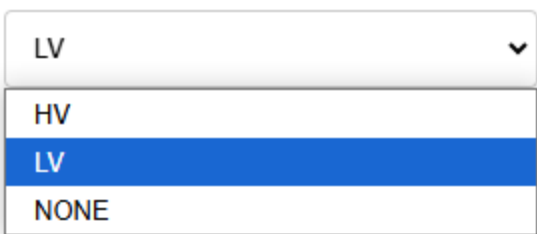
Location of ON-LOAD tap changer(OLTC)

Location of ON-LOAD tap changer(OLTC):

A dropdown menu with a white background and a grey border. The top bar is white and contains the text 'HV' followed by a downward arrow. Below this, the menu is open, showing a list of options: 'HV' (highlighted in blue), 'LV', and 'NONE'.

Location of where specified voltage applies to

Location of where specified voltage applies to:

A dropdown menu with a white background and a grey border. The top bar is white and contains the text 'LV' followed by a downward arrow. Below this, the menu is open, showing a list of options: 'HV', 'LV' (highlighted in blue), and 'NONE'.

Rating (MVA)

Rating1

Positive Sequence Resistance (p.u.)

Zero sequence Resistance (p.u.)

Zero sequence Reactance (p.u.)

Negative sequence Resistance (p.u.)

Negative sequence Reactance (p.u.)

Tap Position (%)

Minimum Tap position (%)

Maximum Tap position (%)

Tap step (%)

Rate of change of reactance with tap position

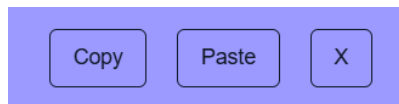
Specified Voltage (p.u.)

Copy Transformer Property -

Users can Copy / Paste Transmission Line property data from one Transformer to another Transformer .Users need follow the steps below -

Step 1: Double click on any of the Transformer present in the canvas to open the property window.

Step 2: On the top right corner of the property window header there are two buttons: Copy and other one is Paste. In order to copy properties data users need to click the copy button.



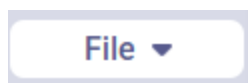
Step 3: Double click on the target Transformer where users need to paste the property data .

Step 4: Click the Paste button .

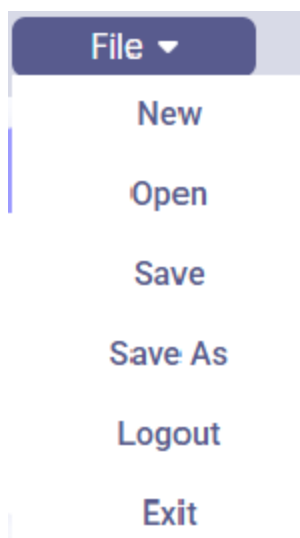
Features :

File - Dropdown Option

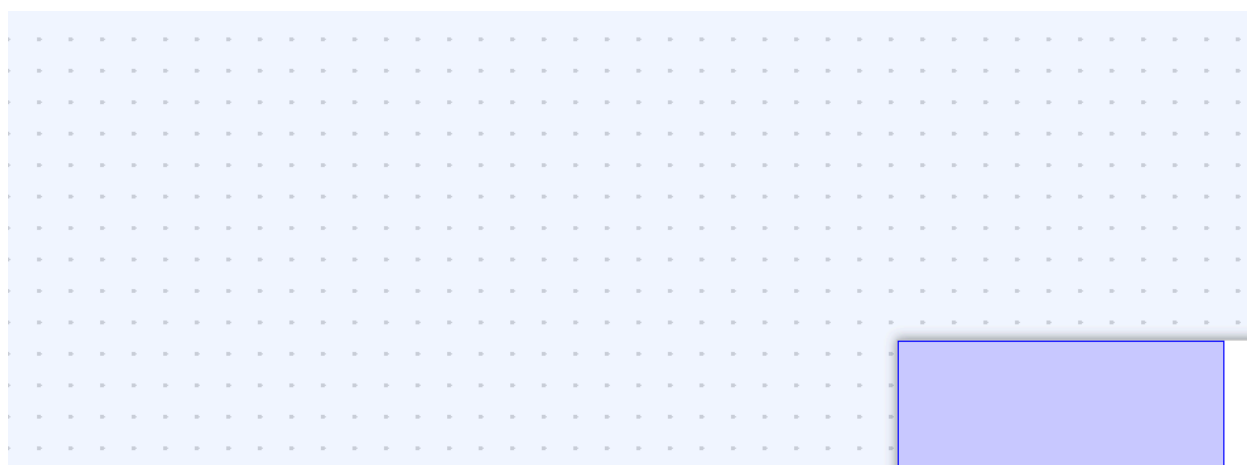
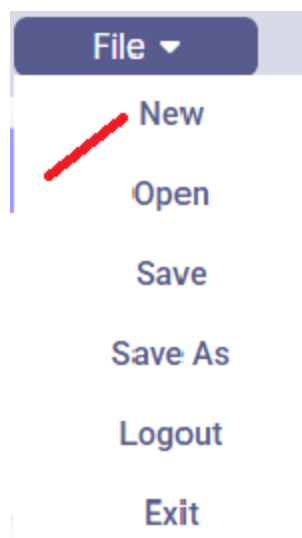
User can find this option at the top left corner in Header



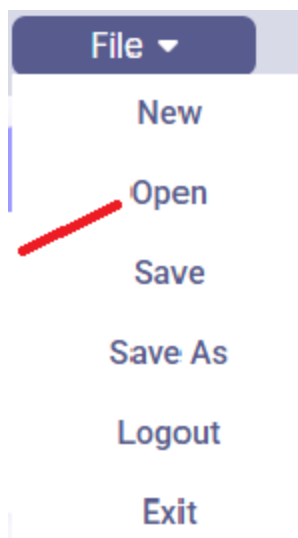
After opening the Dropdown user can find the following options






New - By clicking this option the user can able to open a new Editor Layout.






Open - By clicking this option user can able to view all the previously Saved diagrams.



ALL Canvas ×		
Name	Image	Action
TestCase2		Load
First Canvas		Load
Test 2		Load

Load - By clicking Load Button along with each Saved Diagram the network will be opened on Editor.


ALL Canvas ×		
Name	Image	Action
TestCase2		Load
First Canvas		Load
Test 2		Load

Save Button - By clicking this Button an interface will open where user can provide the name of the Diagram and can Save it.

The image shows a software interface with a 'File' menu and a 'Save the Load Flow' dialog. The 'File' menu is open, showing options: New, Open, Save, Save As, Logout, and Exit. A red arrow points to the 'Save' option. Below the menu is a dialog box titled 'Save the Load Flow' with a close button (X). Inside the dialog, there is a text input field labeled 'Load Flow Name:' and a 'Submit' button.

Save As - By clicking this Button an interface will open where user can provide the name of the Diagram and can Save it.

The image shows a software interface with a 'File' menu. The menu is open, showing options: New, Open, Save, Save As, Logout, and Exit. A red arrow points to the 'Save As' option.



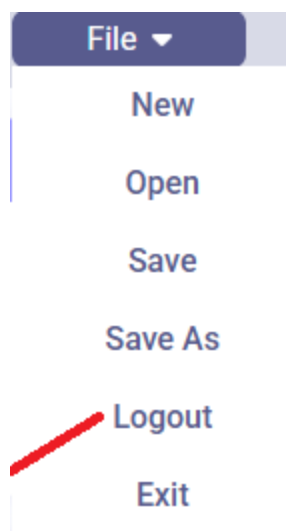
Save As the Load Flow

x

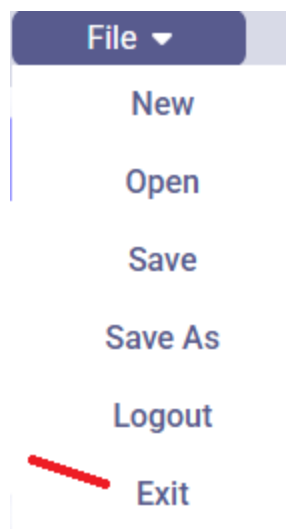
Load Flow Name:

Submit

Logout - By clicking this option the current session of the user will be ended and user will be redirected to Login page.



Exit - By clicking Exit option the whole GUI Layout will be closed



Edit - Dropdown Option



Undo - By clicking this option user can able to revert back the last changes. Every time after clicking that it revert back to previous stage.



Redo - By clicking this option user can able to forward back to the next changes. Every time after clicking that it forward back to next stage.



Copy - Before clicking this option user has to click the element which needs to be copied. After selecting the element click Copy.



Paste - After Copied an element user needs to click Paste option to replicate all the properties of the copied element on Editor.



Delete - Before clicking this option user has to click the element which needs to be removed from Editor. After selecting the element click Delete.



Text Icon - At the top of the Editor, By clicking the Icon user can set the Font Size of the text inside Editor



Copy Icon - At the top of the Editor, After selecting an Element, By clicking the Icon user can able to copy all the properties of selected component



Paste Icon - At the top of the Editor, After clicking the Icon user can able to replicate all the properties of selected Copied element on Editor



Rotate Icon - At the top of the Editor, After selecting an element if user clicks on Rotate Icon the element will rotate as 90 Degree, 180 Degree, 270 Degree, 360 Degree upon each click on Rotate Icon



Clock Icon - At the top of the Editor, The Clock Icon is for Reset the Editor. By clicking this all the input inside Editor get removed and Canvas will get initialized



Settings Icon - At the top of the Editor, By clicking this Icon an interface will open from where user can configure the UI



The Interface should be like the following

Setup System Properties
✕

SLACK BUSBAR:

BASE POWER (MVA):

BASE FREQUENCY (Hz):

GENERATOR HARMONIC MODEL:

B▼

TRANSFORMER HARMONIC MODEL:

B▼

LOAD HARMONIC MODEL:

B▼

TRANSMISSION LINE HARMONIC MODEL:

B▼

Submit

The properties are :

SLACK BUSBAR

BASE POWER (MVA)

BASE FREQUENCY (Hz)

GENERATOR HARMONIC MODEL

GENERATOR HARMONIC MODEL:

B	▼
A	
B	
C	

TRANSFORMER HARMONIC MODEL

TRANSFORMER HARMONIC MODEL:

B	▼
A	
B	
C	

LOAD HARMONIC MODEL

LOAD HARMONIC MODEL:

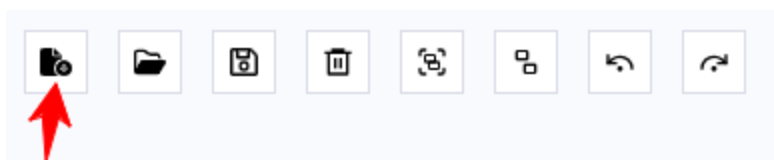
B	▼
A	
B	
C	

TRANSMI_LINE HARMONIC MODEL

TRANSMI_LINE HARMONIC MODEL:

B	▼
A	
B	
C	

New Icon - At the top right of the Editor, By clicking the Icon user can open a new Canvas.

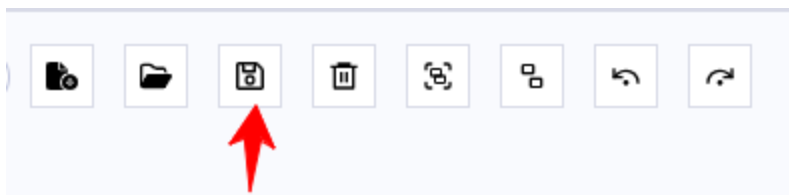


Open Icon - At the top right of the Editor, By clicking the Icon user can able to view all the previously saved models

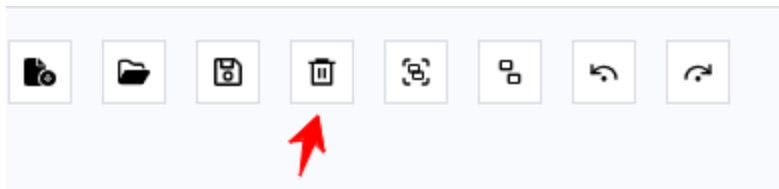


ALL Canvas X		
Name	Image	Action
TestCase2		Load
First Canvas		Load
Test 2		Load

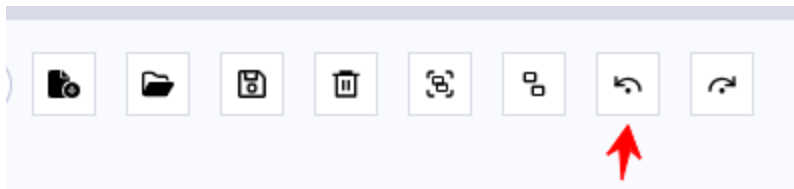
Save Icon - At the top right of the Editor, By clicking the Icon user can able to Save the open Diagram on the Editor.



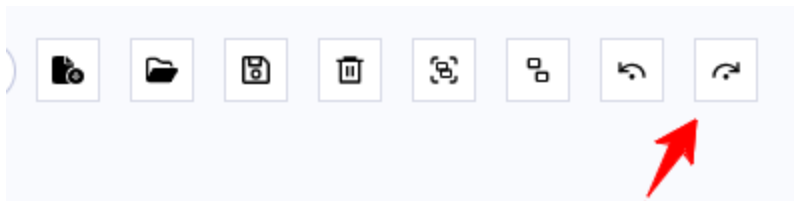
Trash Icon - At the top right of the Editor, By clicking the Icon after selecting a component on Editor the Component will be removed from the Diagram



Undo Icon - At the top right of the Editor, By clicking this option user can able to revert back the last changes. Every time after clicking that it revert back to previous stage

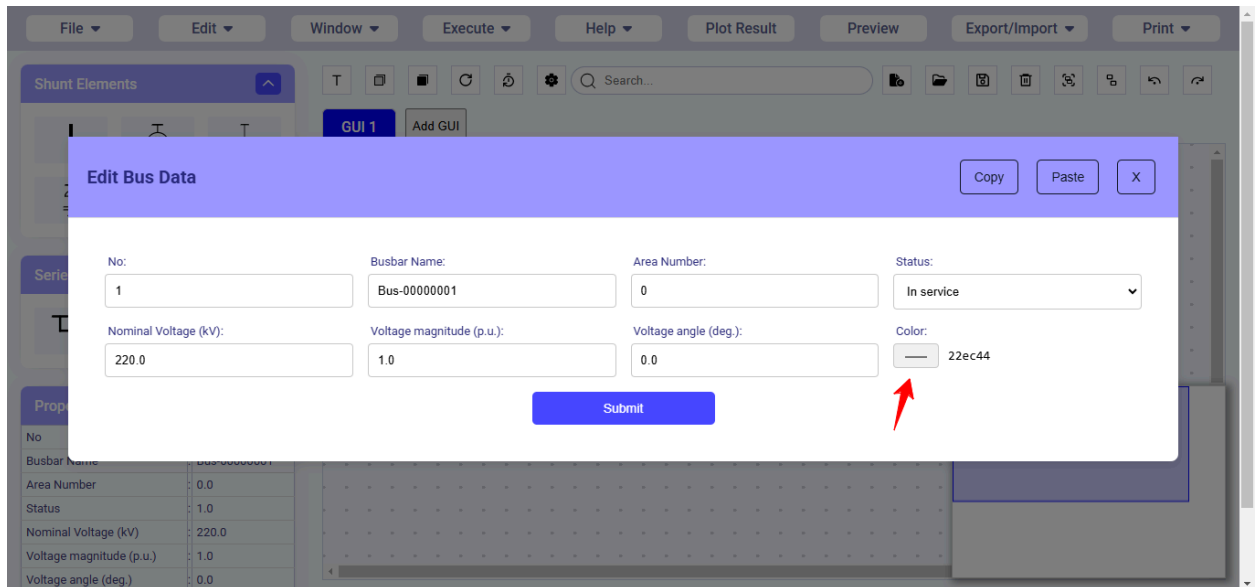


Redo Icon - At the top right of the Editor, By clicking this option user can able to forward back to the next changes. Every time after clicking that it forward back to next stage



Definition of Color Code :

Users can find the Color option by clicking on Bus twice and opening the Bus Properties.



After changing the Color, Bus will look like below image



If the Bus Voltage is default and color is green then while adding another Bus with same default Voltage, The newly added Bus will invoke the color "green" as the Voltage are same



If user changes the Voltage of a Bus from default 220 v to 440 v and changes the color should be changed to default (Black)



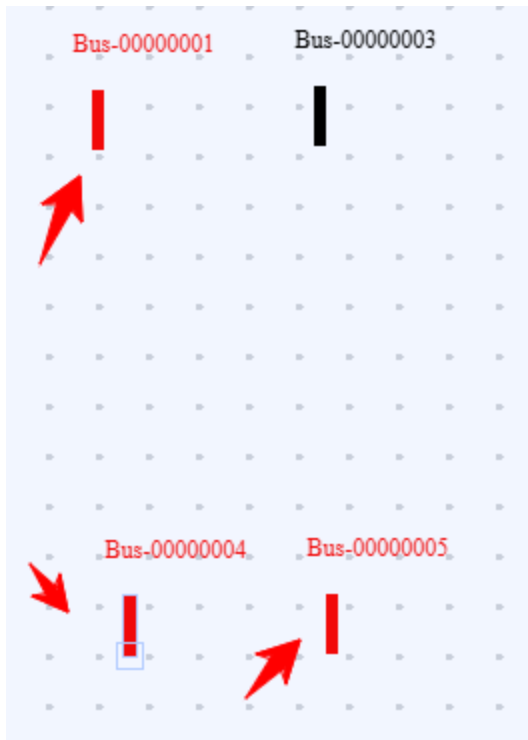
Now user changes the color of 440 v Bus from default to red. After that adding a new Bus with default Voltage. The Bus with 440 v will remain in red and default Bus will be in black



Now change the newly added Bus Voltage to 440 v. The color of the Bus should be turned to red



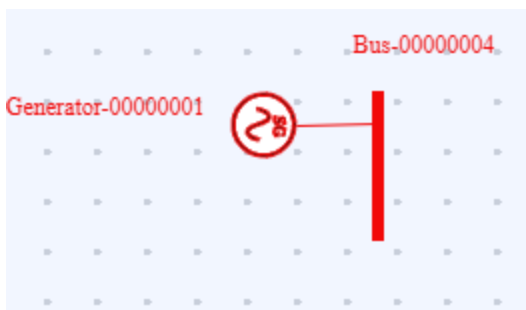
By changing the Color of a Bus with a particular Voltage, The color should be reflected to all the Bus with same Voltage property on Canvas



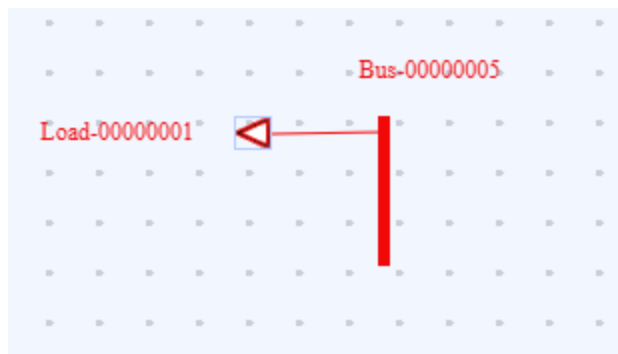
Color of Bus and Shunt Elements :

The color of Shunt Elements with whom the Buses are connected, Should invoke the Color property of Bus Elements. Like Generator, Load, Shunt Device, Filter, Induction Motor

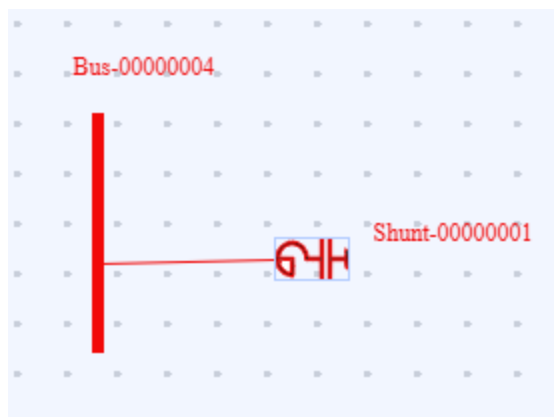
Generator :



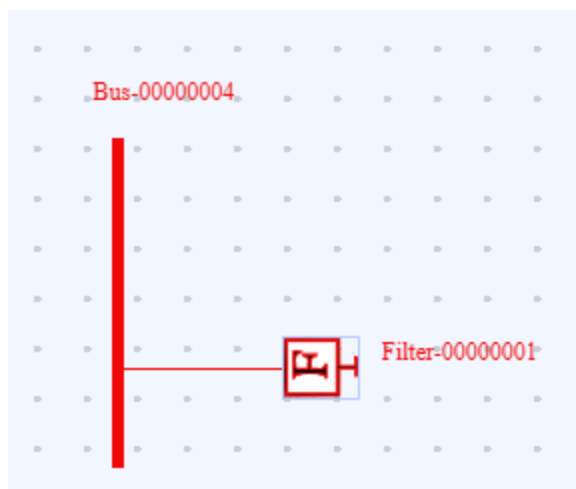
Load :



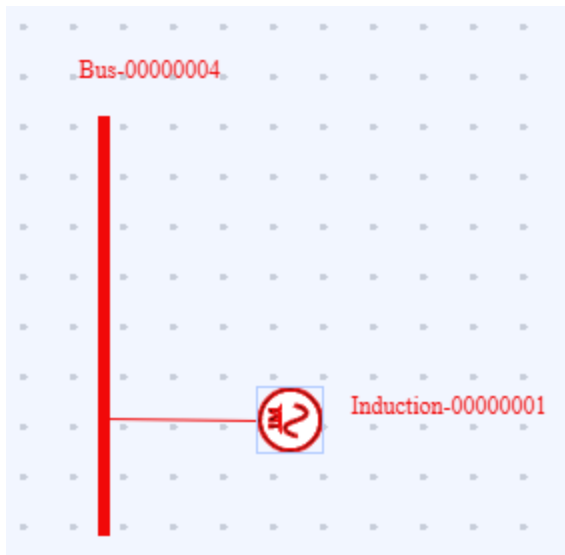
Shunt Device :



Filter :



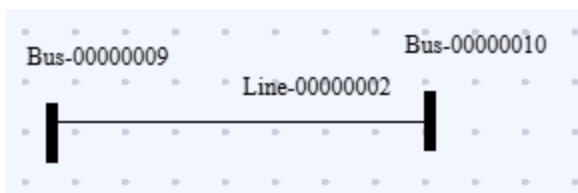
Induction :



Color of Bus and Series Elements :

Transmission Line :

If two Buses with same Voltage as well as same color are connected with a Transmission Line, Then the Color Code of the Transmission Line should invoke the Color of connected Buses

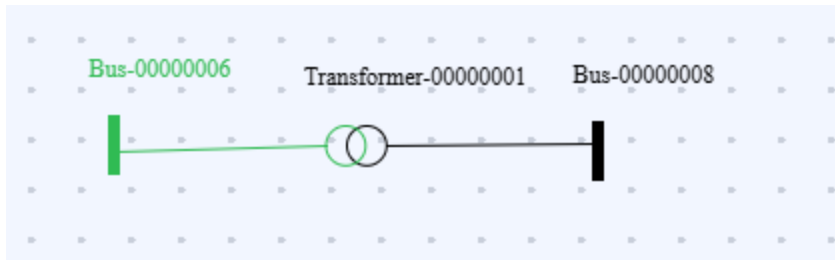


Transformer :

If one Bus a Transformer is connected to two Buses with different Voltage and Color Code, Then the color of Transformer wire should invoke the color of corresponding connected Bus

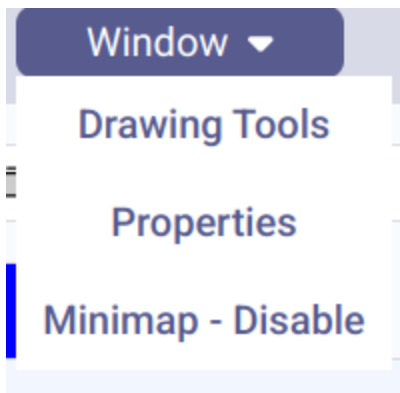
1. Bus with 220 v is green
2. Bus with 440 v is Black

So the Transformer wire which is connected with 220 v, Must be in green and the other side of the Transformer which is connected to 440 v, Must be in Black



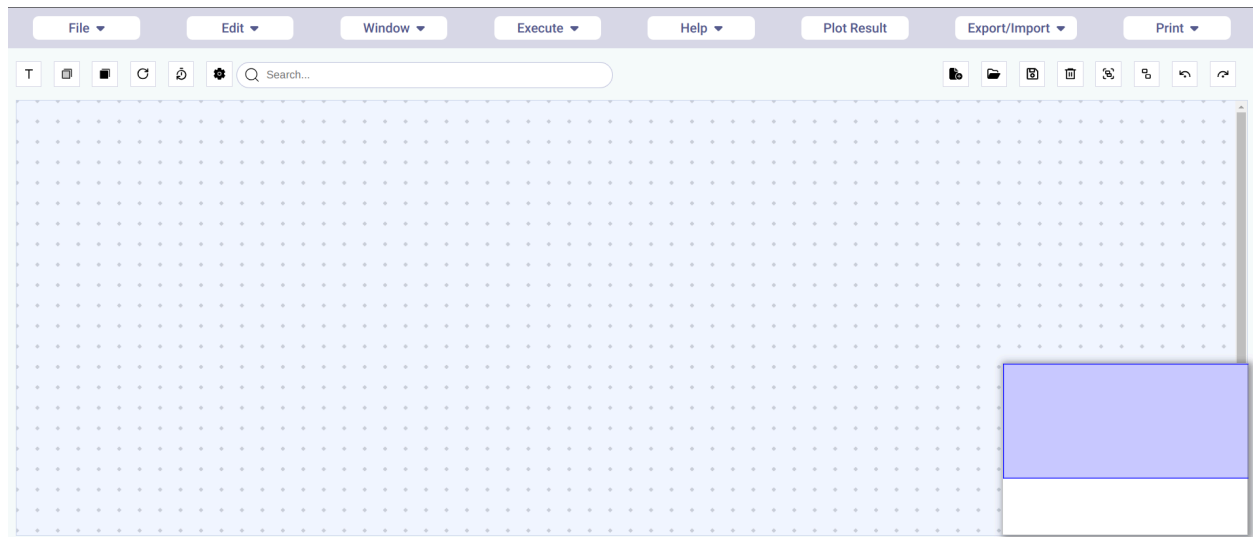
Windows:

When the user clicks the link, Submenu will open



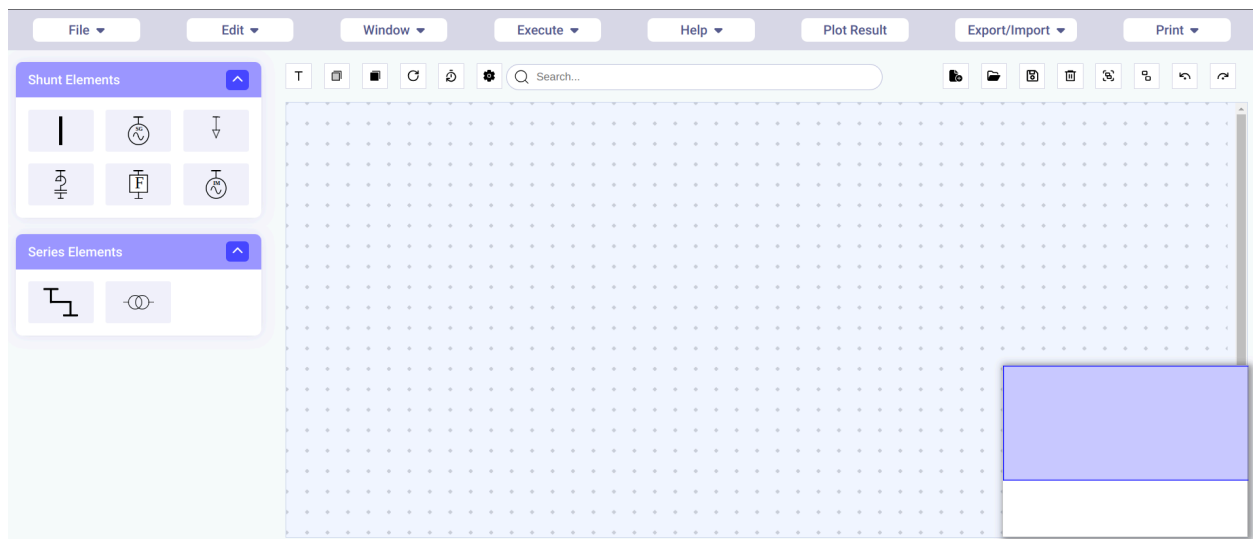
Drawing Tools:

When the user clicks the link, the side panel will hide, and the canvas will switch to full-view mode.



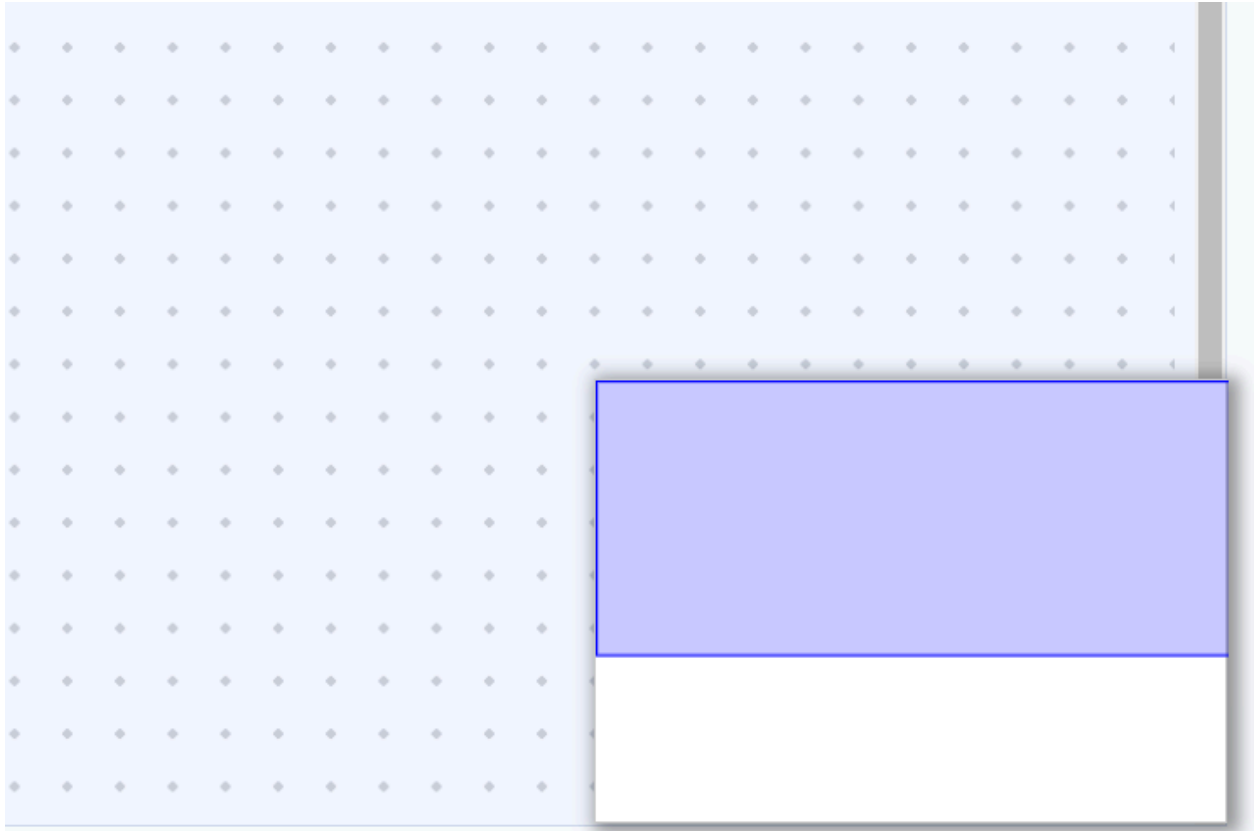
Properties:

When the user clicks the link, the side panel will appear, and the canvas will resize to half-view mode.



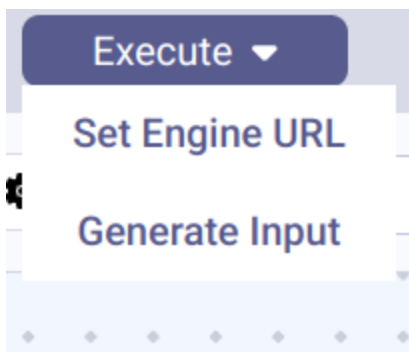
Minimap:

When the user clicks the link, the minimap on the canvas will toggle (show/hide).



Execute:

When the user clicks the link, Submenu will open



Set Engine URL:

When the user clicks the link, a popup will open.

The user can set the Engine Input Path and the Case Name (read-only field).

Notes: Ensure the current canvas is saved or load a canvas from saved data. The canvas name will be loaded into the case name.



Generate Input:

When the user clicks the link:

An input file will be created in the Engine Input Path.

The engine script will then be executed.

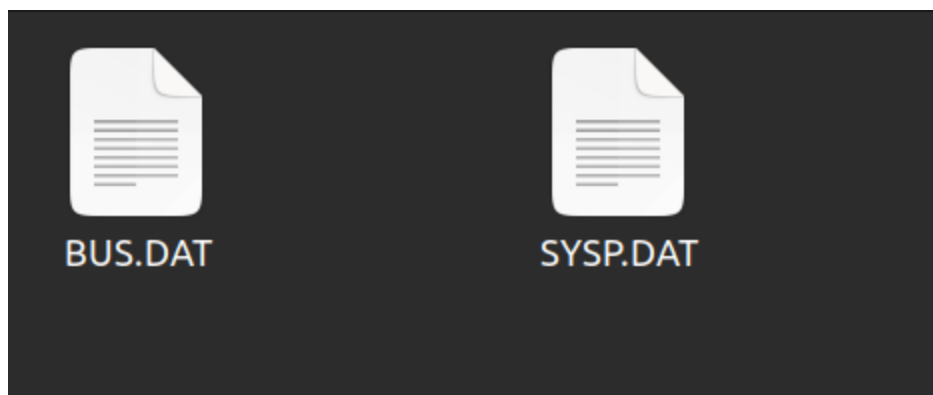
After execution, the user can test and generate the output from the engine.

Example:

Engine Path: C:/lfg

Case Name: testCanvas

Input File: C:/lfg/testCanvas/input.DAT



Plot Result:

When the user clicks the link, data will be fetched from the engine directory's output file.

The retrieved data will then be displayed in the respective elements on the canvas.

Export / Import:

When the user clicks the link, Submenu will open

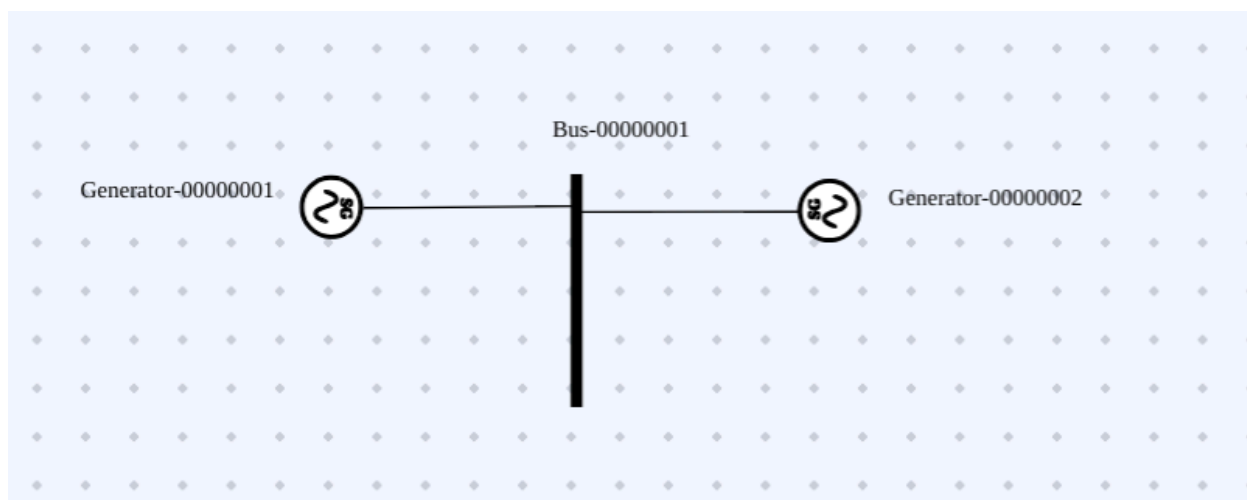


Export:

When the user clicks the link, the canvas element data can be exported in xlsx sheet format.

We stored the separate sheet for each elements.

Example :



Export like :

Import:

The purpose of this menu is to facilitate bulk updates of element properties.

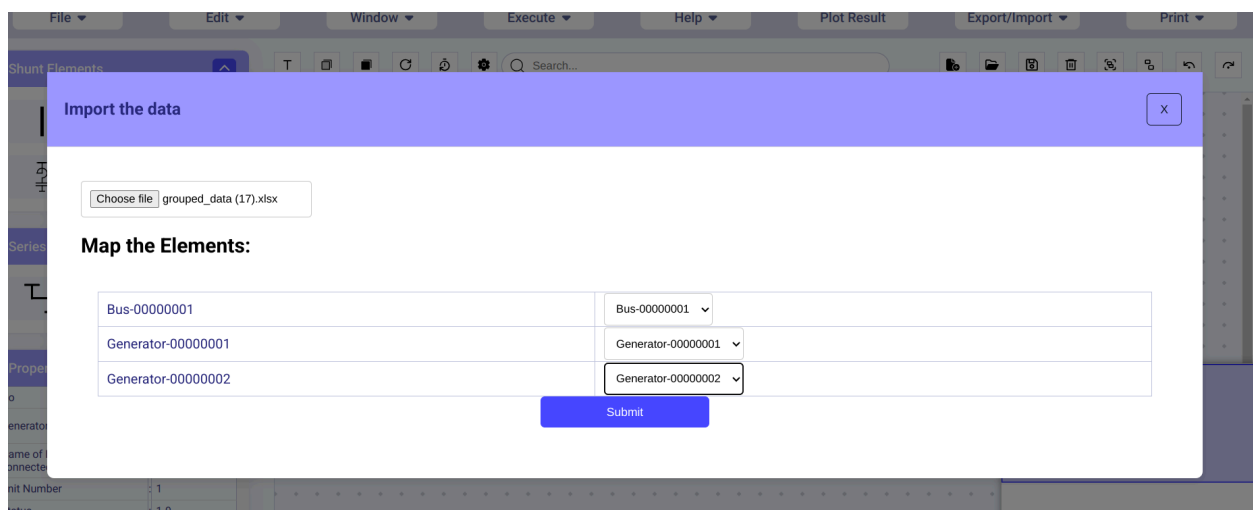
When the user clicks the link, a popup will open, allowing the user to upload an **.xlsx** file.



Once the file is uploaded, a table is displayed in the popup.

In the table view:

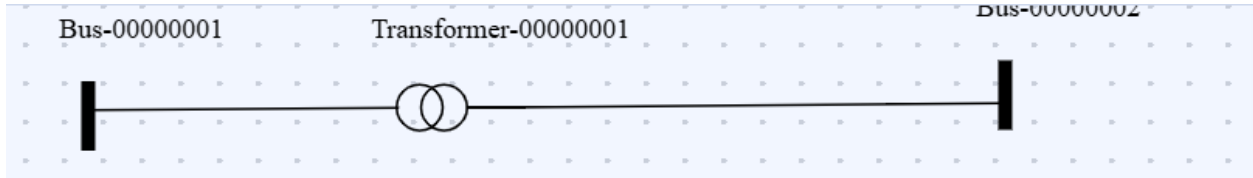
- The left column shows the current element names.
- The right column displays the corresponding element data from the uploaded **.xlsx** file.



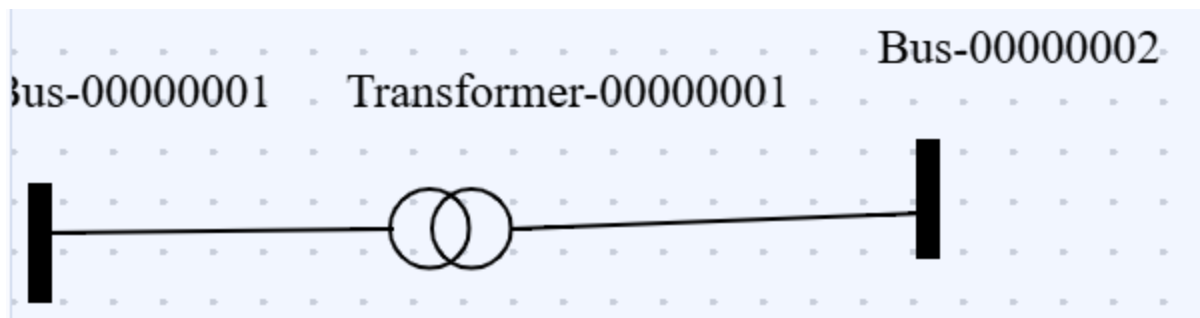
After mapping the data, the user can click "Save" to apply the changes.

Zoom View :

User can Zoom the Diagram to 2X by left clicking on the Canvas (Editor) twice



User can Zoom the Diagram to 4X by left clicking on the Canvas (Editor) twice over the 2X view



User can Zoom out the Diagram to normal view by clicking twice over the Canvas (Editor) from 4X view

