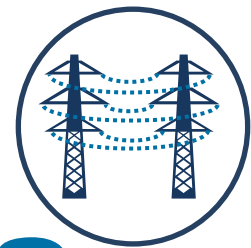
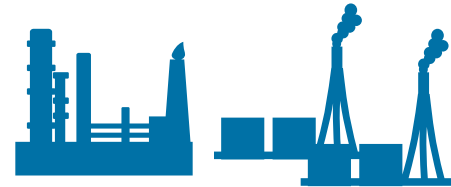


What's EPN Library?

EPN (Electric Power Network) library is a library that can be used as an option for the plant dynamic simulator "Visual Modeler", which is the core of the integrated dynamic simulation environment "OmegaLand".

The power grid library is a facility unit that modularizes general electric equipment such as transformers, power transmission lines, busbars, and electric motors, and the power supplied from each generator in the power system and the load transmitted through transformers, power transmission lines, etc. It consists of a solver that performs so-called power flow calculations, which calculates the flow of active and reactive power in the power system and the phase of each equipment when the power consumption is given.



Can be used in EPN of various plants

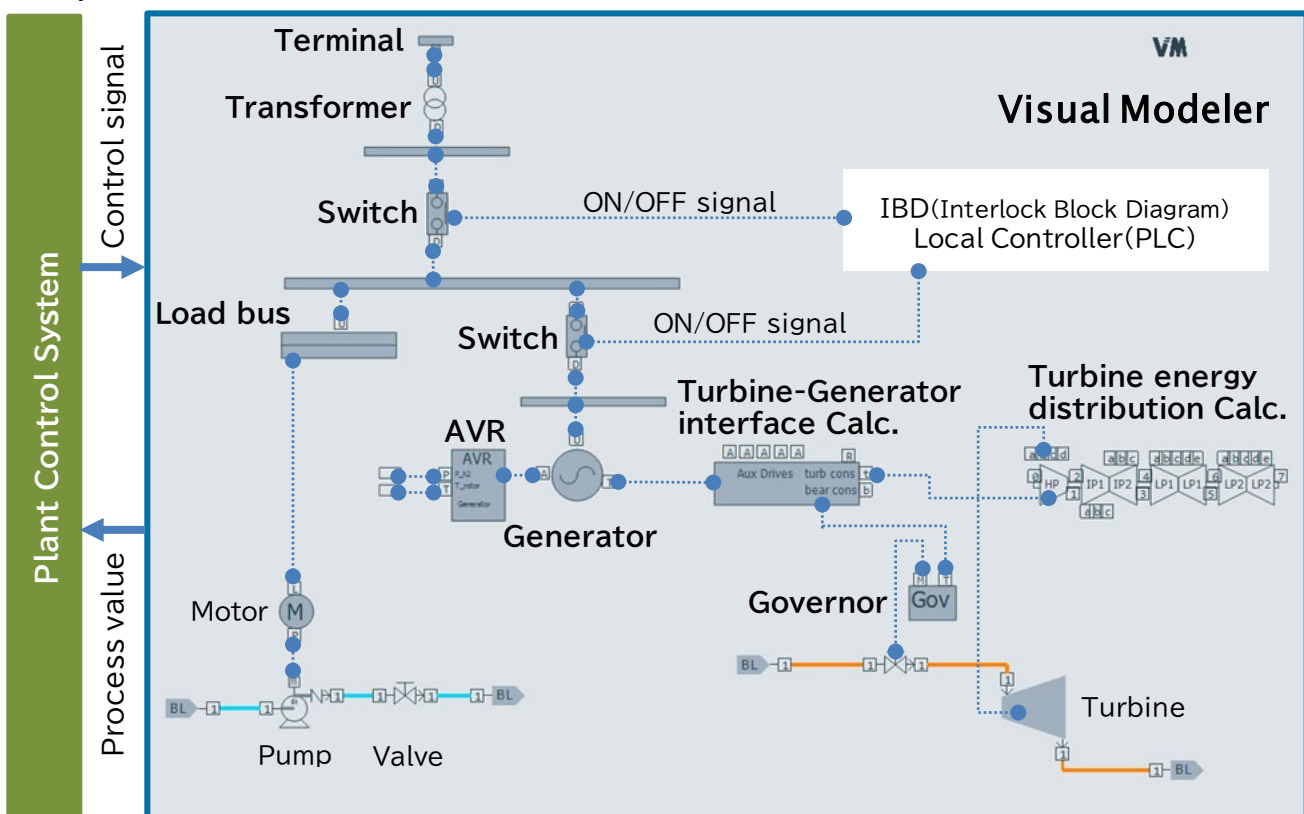
Why do we need EPN library?

So-called industrial plants, such as petroleum, petrochemical, and power plants, generate, receive, and consume large amounts of electricity. By introducing EPN library, it becomes possible to perform power flow calculations within a plant on a dynamic simulator, regardless of the size of the plant. Furthermore, by combining the built plant model with EPN library using Visual Modeler's standard unit library, you can calculate the power supply and demand balance, train for the occurrence of abnormal conditions such as power outages and tripping of rotating equipment, and perform power system switching operations. It can be used for verifying plans, etc.

The technology that forms the basis of EPN library has been widely used in plant operation training systems, mainly at power plants, since 1985. It was sold as a package in 1997 under the product name Plant+, and has a track record of delivering more than 50 licenses globally. Among the functions of Plant+, this power grid library provides Plant+'s electric equipment unit model and power flow calculation engine as an option for Visual Modeler.




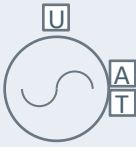
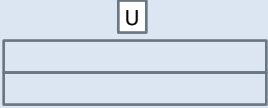


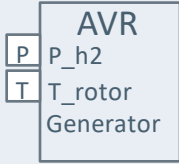




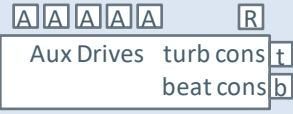
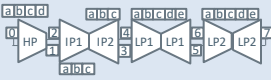
Configuration Example

Here is an example of configuration of a simulator that connects a control system and Visual Modeler using EPN library.



Provided unit

The list of units provided as EPN library is summarized in the table below.

Unit	Description	Unit	Description
 Busbar	<ul style="list-style-type: none"> Unit model to represent electrical busbar 	 Terminal	<ul style="list-style-type: none"> Unit model to represent electrical termination point i.e. a battery limit
 Switch	<ul style="list-style-type: none"> Unit model to represent circuit breaker 	 Generator	<ul style="list-style-type: none"> Unit model to represent three phase synchronous generator Excitation is calculated in another unit model (typically AVR or Diesel)
 ElecLoad	<ul style="list-style-type: none"> Unit model to represent electric load 	 Reactance	<ul style="list-style-type: none"> Unit model to represent electrical reactance.
 Transf02	<ul style="list-style-type: none"> Unit model to represent two winding transformer Unit calculates heat generated in windings Tap changing function is available to change the winding ratio 	 AVR	<ul style="list-style-type: none"> Provides excitation voltage to Generator unit with voltage regulation. Functions as a PI controller of generator terminal voltage via rotor excitation voltage. Including limitation based on Operation range and Generator capability curve
 Transf03	<ul style="list-style-type: none"> Unit model to represent three winding transformer Unit calculates heat generated in windings Tap changing function is available 	 TransLine	<ul style="list-style-type: none"> Unit model to represent transmission line. Can be used for simulating behavior inside the power station and connection between power station and the system.
 BESS	<ul style="list-style-type: none"> Unit model to represent battery energy storage system (BESS) Unit behaves in a similar manner to a terminal in a network i.e. provides a source of power 	 Capacitor	<ul style="list-style-type: none"> Unit model to represent electrical capacitance. Causes reactive power to flow to busbar when energized.
 Trbsup_cal	<ul style="list-style-type: none"> Performs electro-mechanical calculations related to the turbine and generator Calculates: <ul style="list-style-type: none"> Turbine-Generator speed Turbine casing and shaft expansion, including both total expansion and differential expansion between casing and shaft. Shaft eccentricity (bending while stopped). 	 trbsup_trb	<ul style="list-style-type: none"> Accurate dynamic simulation of industrial turbines frequently requires use of multiple units so determine the process pressure, flow, and temperature conditions.

For more information, please contact

Omega Simulation Co.,Ltd.

2-20-9, Nishi-Waseda, Shinjuku-ku, Tokyo, 169-0051 Japan TEL : +81-(0)3-3208-4921

Email: sales@omegasim.co.jp <http://www.omegasim.co.jp>