MILSOFT®
Utility Solutions

Engineering Analysis

Milsoft's WindMil® solution can handle every aspect of electric distribution system planning and analysis. This industry leading circuit modeling software will accurately represent a fully detailed circuit model including individual customers, inline and endpoint devices, and even distributed generation. The analytical capabilities encompass power flow and voltage drop modeling, reliability analysis, contingency and sectionalizing studies, short circuit and fault current calculations, protective device coordination and arc flash hazard analysis. These and many more analytical tools are combined with full geographic representation and MultiSpeak® interfaces to CIS, SCADA and AMR/AMI data sources.

For over two decades, WindMil has proven to be a dependable foundation for electric distribution system planning and analysis and is currently in use at a thousand electric utilities, consultants offices, universities and vendors in the US and abroad. There simply is not a more accurate, powerful, versatile or user friendly engineering analysis software solution available. And, as electric distribution system planning and operations become more complex, and as Smart Grid technologies and systems are deployed, WindMil will be there with the very best software for planning and analysis.

WindMil Features

- All voltage levels modeled and analyzed
- No software limits on circuit elements or number of circuits
- Both looped and radial solutions
- Unbalanced loading and impedance
- Charging current calculated for both overhead and underground
- Generators modeled as voltage source
- Display controls for zoom level, panning, label size, symbol size, colors, results boxes and entire reports
- Flexible work environment for single circuit, single substation or entire system analysis
- Circuit transfer - Extract individual substations or feeders into a separate database for editing and modeling and then reapply the changes
- File send option automatically zips users database model and attaches it to the preferred email utility

WindMil Circuit Elements

Overhead and Underground Lines

- Conductor may be the same on all phases or different on each phase of a multi-phase line element
- Use selectable or preferred neutral
- Spacing data may be as constructed or converted to equilateral equivalent (GMDP and GMDPN)
- Loading data may be entered for each load element or may be calculated using powerful load allocation functions
- User-selectable length units

Capacitors

- Model series and shunt
- Switching for manual, voltage, amps motor assist and reactive amps
- Delta or Wye connection

Regulators

- Single and three phase banks, balanced or unbalanced
- Line drop compensation accurately modeled
- Option to use first house protection
- Option to model step size and bandwidth

Overcurrent Devices

- User definable fuses, hydraulic reclosers, electronic reclosers, sectionalizers and relays
- Direct interface to time-current coordination program (LightTable)
- Show lines downline from a disconnected device, all or selected phases, as disconnected
- Load Control Point

Motors

- Loading data including size, efficiency rating and status (off, running, locked rotor or soft start)
- NEMA Type and locked rotor PF data
- Capacitor assist, impedance and auto transformer soft start
- Steady state, transient and sub-transient fault model

Transformers

- Transformer Models: Y-Y Grd, Y-Y ImpGrd, Y-Y Three Phase Core, Y-D Grd, Y-D unGrd, Y-D open, Y-D one, D-Y Grd, D-Y Open, D-Y One, D-D, D-D Open, D-D One, Y-Y-D Grd
- Transformer impedance defined by kVA, Impedance Percentage and X/R ratio
- User-defined rated voltage input and output

Switches

- Open, closed or looped status

Nodes

- Load Control Point
- Spot loading
- Bus Identification

Generators

- Modeled as negative load or swing kvar
- Steady state, transient and sub-transient fault model

Hardware requirements vary between options such as LightTable and LandBase Rapidly changing trends in computer hardware also makes listing requirements prone to error. For the most current hardware and software recommendations, visit www.milsoft.com or feel free to call our support team.

Behind-the-Meter (BTM)

Electric utilities can find significant value in adopting behind-the-meter (BTM) software for various reasons:

1. Enhanced Energy Efficiency and Demand Response:

- Energy Monitoring and Management: BTM software provides data on energy consumption, allowing utilities to identify inefficiencies and optimize energy use.
- Demand Response Programs: Utilities can implement demand response strategies, incentivizing customers to reduce or shift their energy usage during peak periods.

2. Improved Grid Stability and Reliability:

- Distributed Energy Resources (DER) Integration: BTM software helps manage and integrate DERs such as solar panels, batteries, and electric vehicles, ensuring a stable and reliable grid.
- Load Forecasting and Management: Accurate forecasting and load management improve grid stability and prevent overloads and outages.

3. Cost Savings and Revenue Generation:

- Operational Cost Reduction: By optimizing energy usage and reducing peak demand, utilities can lower operational costs.
- New Revenue Streams: Utilities can offer value-added services, such as energy management solutions and demand response programs, generating additional revenue.

Milsoft Behind-The-Meter Key Features

Run Load Flows to determine Solar PV effects on system conditions not only during clear sky days high intermittency periods but also during levels of high intermittency from cloud shading, undoubtedly the most critical being perceivable voltage changes in short periods of time from cloud weather patterns. Study the effects of potential voltage rise across secondary lines and distribution transformers to determine proper system equipment sizes and/or required changes to remain within ANSI voltage standards.

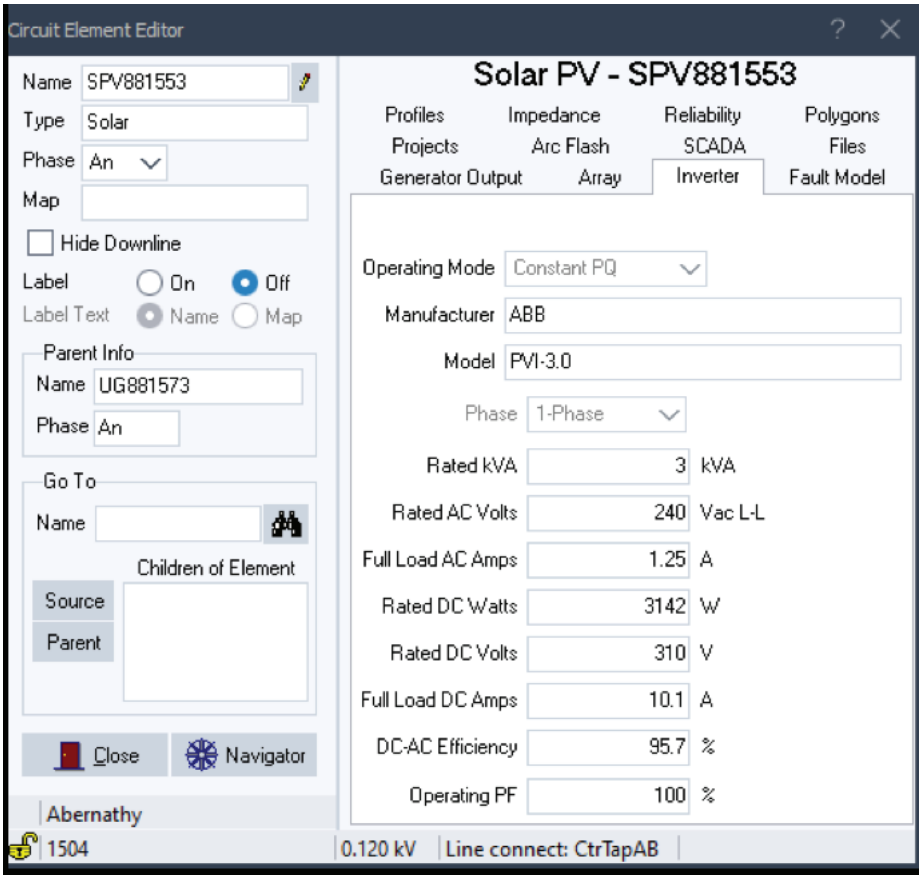
Utilities require a list of information and specifications for the equipment that customers would like to install on an interconnection request form. This list of equipment can be stored on the Solar PV element inside as part of the system model, resulting in different amounts of generation used in Voltage Drop analyses based upon this. Storing this information to the solar element makes it easy to reference for future studies and system scenarios.

Solar PV:

Model nameplate specifications for

- DC Panels kW
- Array Max Power Voltage and Current
- DC Losses
- Inverter Rated kVA
- Inverter Rated Amps and Volts
- Inverter DC-->AC Efficiency
- Inverter Operating Power Factor

The above calculates the Total Solar PV kW and kVAR output based on the ratings. Note some of the specs are for information only, while others are used in the total generation output results.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Type Solar
Phase An
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Parent Info
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Parent
Close
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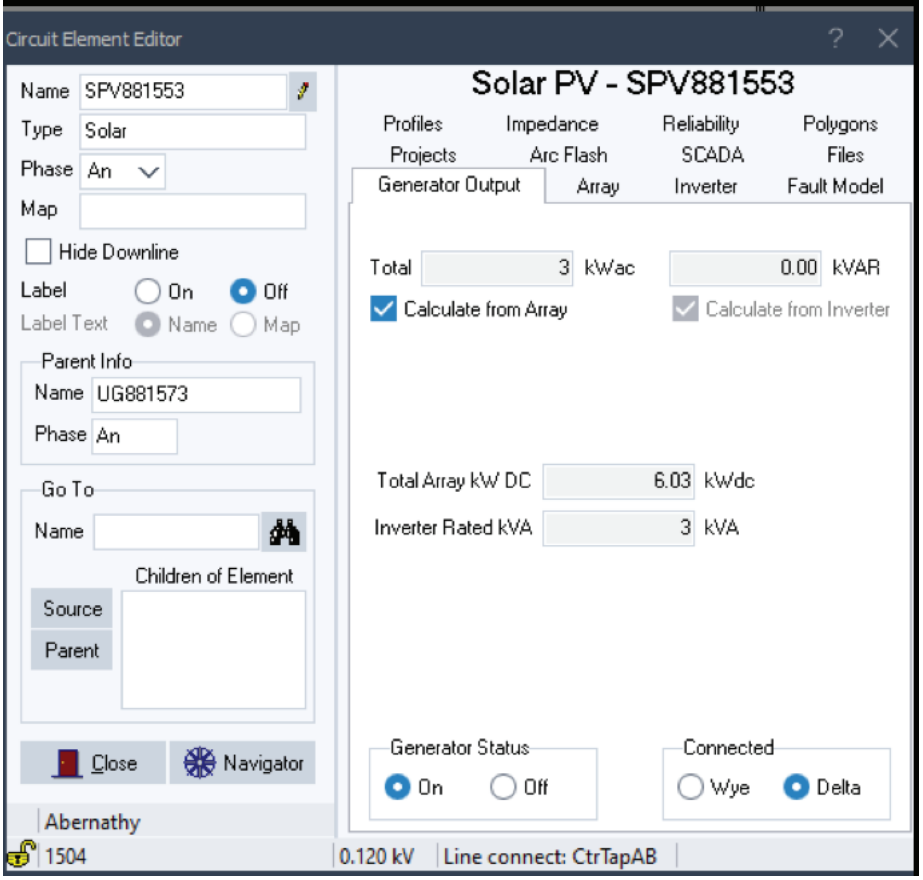
1504
Solar PV - SPV881553
Profiles Impedance Reliability Polygons
Projects Arc Flash SCADA Files
Generator Output Array Inverter Fault Model
Operating Mode Constant PQ
Manufacturer ABB
Model PVI-3.0
Phase 1-Phase
Rated kVA 3 kVA
Rated AC Volts 240 Vac L-L
Full Load AC Amps 1.25 A
Rated DC Watts 3142 W
Rated DC Volts 310 V
Full Load DC Amps 10.1 A
DC-AC Efficiency 95.7 %
Operating PF 100 %
0.120 kV
Line connect: CtrTapAB


Circuit Element Editor
Name SPV881553
Type Solar
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Label On Off
Label Text Name Map
Parent Info
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Phase An
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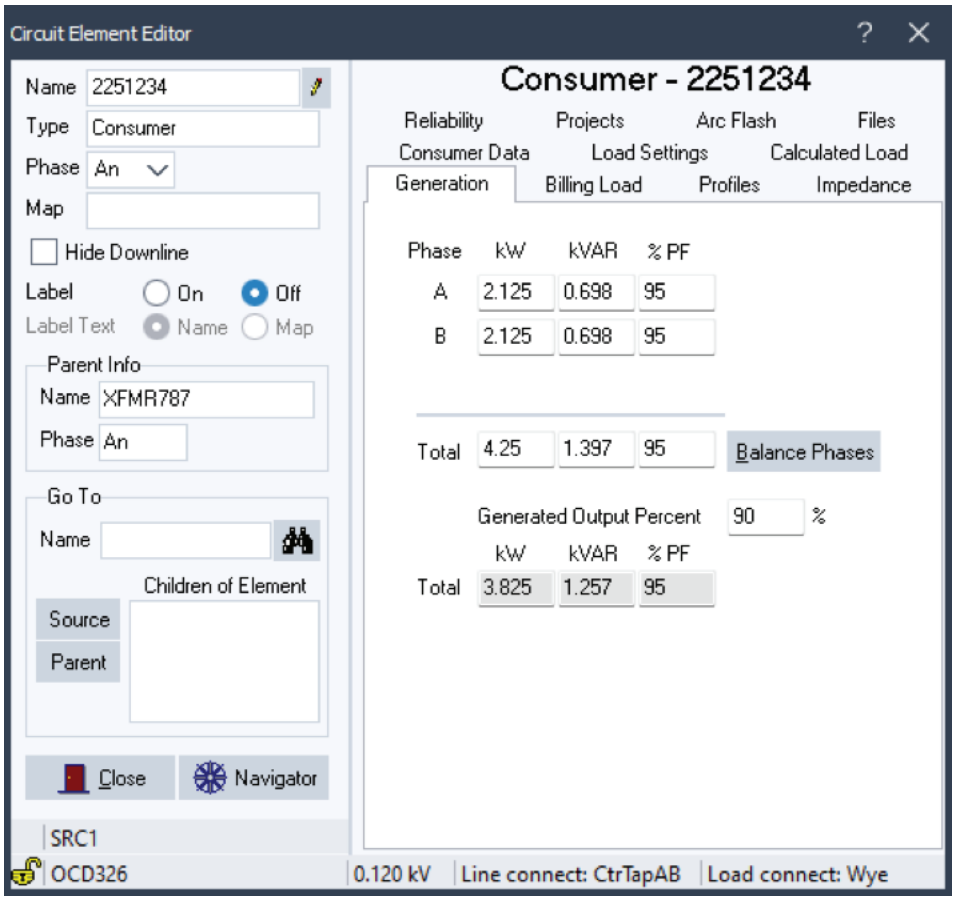
Name
Children of Element
Source
Parent
Close
Navigator
Abernathy
1504
Solar PV - SPV881553
Profiles Impedance Reliability Polygons
Projects Arc Flash SCADA Files
Generator Output Array Inverter Fault Model
Total 3 kWac 0.00 kVAR
Calculate from Array
Calculate from Inverter
Total Array kW DC 6.03 kWdc
Inverter Rated kVA 3 kVA
Generator Status
On Off
Connected
Wye Delta
0.120 kV
Line connect: CtrTapAB

Consumer elements now also have a setting to create generation capabilities to represent any form of DER, not only Solar PV but also Battery Storage. This Generation along with the consumers normal kW demand can then be used for loading and generation scenarios to ensure your system is operating within standards.

Consumers with Generation:

- Set a kW/kVAR value along with editing of generation output percent to accommodate solar intermittency PV scenarios.

Overall, behind-the-meter software offers electric utilities a comprehensive toolset to improve efficiency, enhance customer engagement, and achieve regulatory and sustainability goals, making it a valuable investment in the evolving energy landscape.



LandBase®

LandBase is a graphical add-on for WindMil users who wish to view geographical data such as roads, highways and water features on their electrical circuit models. With this powerful capability, LandBase fills a gap between engineering analysis and AM/FM or GIS systems.

LandBase allows for direct display and re-projection of map layers without data conversion. With LandBase, the user can have both the engineering analysis power and speed of WindMil and the visual convenience and data of a mapping system. Electrical circuit model features may be viewed in their correct relationship with geographical features and landmarks all in one powerful software platform. LandBase supports many standard vector and image layer formats.

Features

- Allows a composite view of connected map layers and the Milsoft electrical circuit model
- Maps are displayed directly behind WindMil's electrical model
- Supports virtually unlimited layers within a map, which can be tiled and overlaid to produce composite views
- Directly connect map layers to a map without data conversion
- Control layer display properties such as visibility and minimum/maximum view scale (zoom layering)
- ESRI® Shape files and point object symbol size can be fixed or scaled automatically depending on the map view scale (the color, style, and thickness of lines may be selected)
- Outputs the current map and electrical model to the clipboard for pasting into any Windows application supporting *.bmp
- Rescale-Rotate tool allows rescaling or rotation of the entire electrical model to a precise position on the map (users define two electrical points on an electrical model and two map points where the electrical model should be; the electrical model is then correctly scaled and positioned geographically)

Supported File Formats

- AutoCAD DWG (*. dwg) - A standard vector file format developed by Autodesk, Inc. and supported in many CAD/GIS/Mapping applications (release 2000 and earlier versions are supported)
- AutoCAD DXF (*. dxf) - A standard vector file format developed by Autodesk, Inc. and supported in many CAD/GIS/Mapping applications
- ESRI Shape File (*. shp) - A data file produced by ArcView® using shape files just as it uses coverages - as a data source for a feature theme
- MicroStation DGN (*. dng) - A standard vector file format developed by Intergraph and Bentley and supported in many CAD/GIS/Mapping applications (display is 2D only)
- TIFF (*.tif), JPEG (*.jpg) and BMP (*.bmp, *.dib)
- MrSID (*.sid) developed and patented by LizardTech for encoding or georeferenced raster graphics such as orthophotos

LightTable®

LightTable for Windows brings usability to the forefront in the art form of coordination. A little bit of art and a little bit of science - that's what manipulating time-current curves for protective coordination is all about. LightTable helps make the science part easier.

Trying to coordinate protective devices and tired of using outdated methods? Open LightTable's device list, add the desired devices to the graph and coordinate with ease. Shift the curves as needed; find the time separation between devices for a fault; specify the transformer being used and LightTable will apply the transformation shift automatically. In addition, LightTable allows selection of the devices on the circuit being coordinated in WindMil and will load the devices' curves with the press of a button. Even more exciting is the DDU (Device Data Update), which allows the automation of the fuse and recloser coordination of the entire circuit. Say goodbye to days and weeks of coordination studies. Let WindMil and LightTable remove the repetition and allow you to perform your study in less time.

Analysis Functions

- Automatically locates intersection points among multiple curves
- Automates fuse and recloser coordination according to user-defined rules
- Single-point data entry for overcurrent devices
- Provides users with the time values at a given fault value
- Provides users with differences in time values at a given fault value
- Allows curve removal beginning or ending at a specified amp value
- Shifts curves using time and amp adders and multipliers
- User-defined marks at specified fault values
- Adds points on selected curves
- Subtracts one curve from another
- Saves modified in group files

Curve Database Includes More Than 8,300 manufacturer's curves

- Conductors
- Digital Relays
- Electronic Reclosers
- Fault Interrupters
- Fuses
- Hydraulic Reclosers
- Mechanical Relays
- Pad-Mounted Switchgear
- Transformers

Features

- Display curves on the screen
- Shift curves
- Automatically re-scale grids
- Zoom and pan curves
- Find curve intersections
- Save groups of curves
- Print hardcopy display
- Display full color graphics
- Edit existing curves
- Database grid display
- Library of over 8,300 overcurrent curves
- Powerful overcurrent curve queries
- Reporting tools for settings sheets
- Integration with WindMil
- User-defined label formats for each device type
- Powerful device editors
- Dockable toolbars

Reliability Analysis

Reliability Analysis uses the distribution and number of consumers and the predicted failure rates of line and line equipment to calculate the predicted SAIFI, SAIDI, CAIDI, ASAI, ALIFI and ALIDI reliability indexes. The relative improvement or degradation in reliability indexes can help determine the effect of system improvement projects, maintenance decisions and overcurrent device location decisions.

- Conductors
- Digital Relays
- Electronic Reclosers
- Fault Interrupters
- Fuses
- Hydraulic Reclosers
- Mechanical Relays

Options

- Allow or ignore post fault restoration effects
- Time and percent improvement limit on post fault restorations
- Consider or ignore effect of coordination failure
- Set the number of crews working an outage
- Set the time required to find outage problem
- Set travel time
- Use or ignore existing overcurrent devices
- Set maximum number of overcurrent devices in series

Arc Flash Hazard Analysis

WindMil includes Arc-Flash calculation methods not only based upon IEEE Std. 1584 - 2018, Guide for Performing Arc-Flash Hazard Calculations, but also the National Electric Safety Code (NESC) Table 410-2, which includes analysis up to 24.9 kW. These enable the user to determine the incident energy level a worker could be exposed to at a specified distance from the arc. Arc-Flash also provides the distance to hazard levels at specified points in the modeled system.

Contingency Study

Contingency Study evaluates electrical distribution systems to determine an optimal system switching configuration for carrying load when system elements are removed from service. Multiple outage situations may be set to run sequentially.

With Contingency Study, users can establish emergency switching plans. Operations staff use an emergency switching plan to restore load during an extended outage. Based on the options selected, Contingency Study analyzes an outage situation to determine the switching configuration that serves the maximum possible load without violating loading and voltage limits. Contingency Study can also identify system improvements that, if implimented before an outage, can increase the system's power restoration via alternative methods.

Features

- Runs individual or multiple outage scenarios sequentially
- Reports include individual switching operations and new feeder loading conditions
- Ability to modify circuit model during Contingency Scenario and run Voltage Drops to see what is necessary to complete alternate feed

Options

- Load dropping options for correcting overloads and low voltage situations:
  - Drop no loads or all loads
  - Drop only interruptible and general loads
- Voltage limits:
  - Set maximum and minimum voltage levels to increase to maximum voltage limit to solve low voltage problems
- Switching options:
  - Use existing switches and devices
  - Allow new switches to be installed

Outage Selection Options

- Select all sources or select from a list of all sources
- Select all overcurrent devices or select from a list of all overcurrent devices
- Select any circuit element from circuit diagram

For more information or to schedule a demo:

Email us at: sales@milsoft.com

or

Call: 800.344.5647