SKM Power*Tools

ELECTRICAL ENGINEERING SOFTWARE





SKM

Systems Analysis, Inc.

SKM Power*Tools®

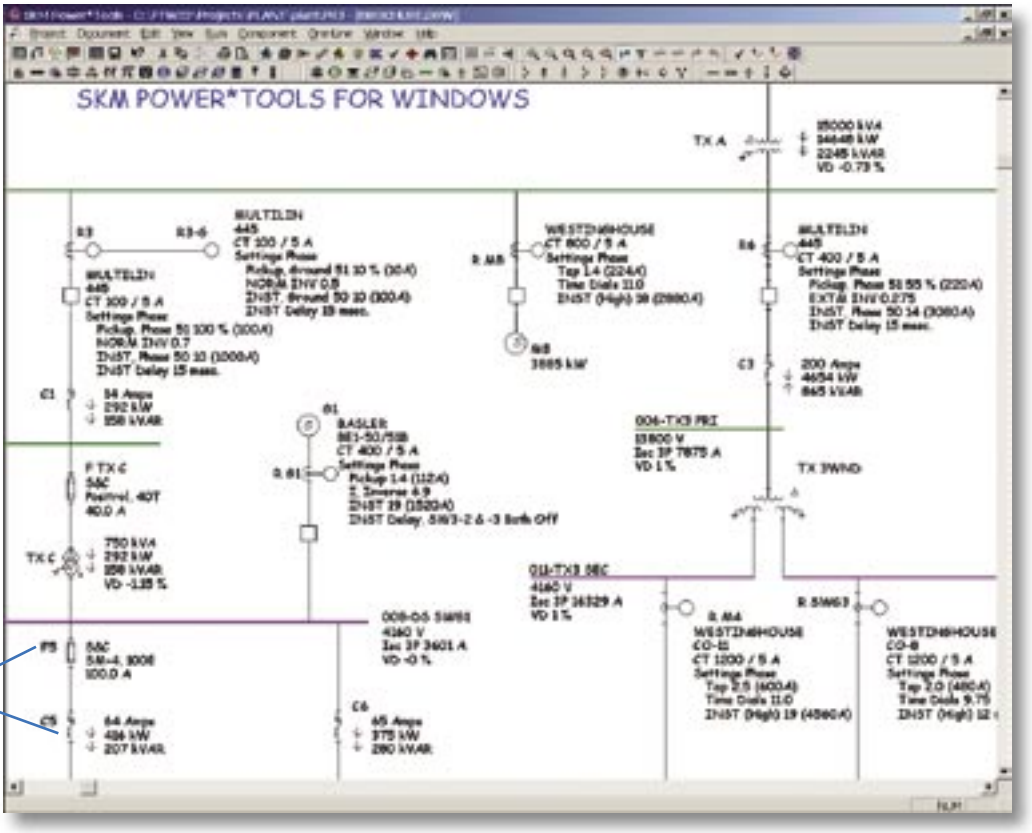
Integrated Software for Power Engineers

Introduction

SKM Power*Tools software helps you design and analyze electrical power systems. Interactive graphics, rigorous calculations and a powerful database efficiently organize, process and display information.

Unique Feature

Datablocks can display any combination of data stored in the project database.



Interactive One-line Diagram with User-Selectable Datablocks

Intelligent One-line Diagrams Automate Design & Documentation

- Multiple one-line diagrams can be associated with each project for better system organization and presentation.
- Datablocks let you define custom formats to dynamically display input data and study results on your one-line diagrams.
- Powerful drawing tools quickly create a structured, interactive one-line diagram system model.
- Copy/Paste saves time by replicating components or portions of a power system.
- Zoom, Zoom Area, Zoom Previous and Auto-scroll let you navigate large drawings quickly.
- Interchangeable ANSI and IEC symbols support global projects.
- Move, delete, and place equipment in or out of service with a click of the mouse.
- Automatically expand and collapse areas of the one-line diagrams to create custom drawings that best communicate the system design and study results.
- User-defined textblocks can be placed on the one-line diagrams to display notes, output reports and load schedules.
- De-energized portions of the one-line are automatically color-coded.
- Dynamic symbols indicate automatic transfer switch position and transformer connections.
- User-definable symbols and annotation allow you to customize your one-line diagrams.
- Save time by printing to pre-defined layouts and exporting to common file formats.

Features

SKM Power*Tools® for Windows

Component Editor Provides Efficient Interface to Display and Edit Data

- Component Editor is a dialog box that lets you easily add, edit, copy, and delete system components in a convenient list format.
- Automatically generate one-line diagrams from system data entered through the Component Editor.
- Equipment list expands to show connections between system components allowing easy navigation.
- Sort devices by type, or run queries to list equipment according to your own criteria such as component type, voltage drop limits, voltage range, group association, etc.

Integrated Studies Provide Maximum Efficiency

- Run single studies or a group of studies simultaneously.
- Compare study results to evaluate "what if" scenarios.
- Study messages help you locate and resolve system topology or data entry errors.
- Comprehensive studies include: Short Circuit (Traditional, ANSI, IEC), Demand Load Study, Load Flow, Feeder and Transformer Sizing, Motor Starting, Load Schedules, Protective Coordination, Equipment Evaluation, Arc Flash, Reliability, Transient Stability, DC Systems, Single-phase and Unbalanced 3-phase studies, Ground Grid Design, 3-D Cable Pulling, and more.

Queries Simplify Data Management

- Queries automate the selection of common groups such as all LV transformers, equipment at a selected voltage level, cables with greater than 3% voltage drop, etc.
- Numerous pre-defined queries are provided for your convenience.
- Easily define custom queries to organize data into manageable groups. Base your criteria on any combination of input data and study results.
- View query results either from the one-line diagrams or the Component Editor

Libraries Save Time, Automate Data Entry, and Standardize Designs

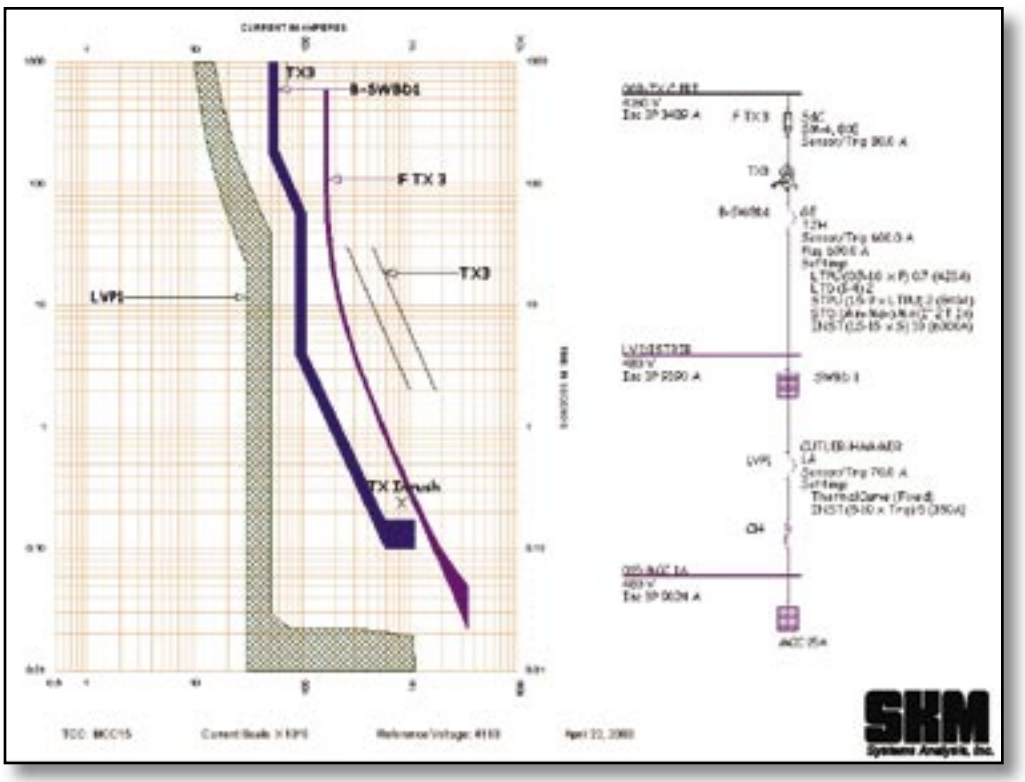
- User-definable libraries for cables, transformers, loads, motors and protective devices ensure consistency and minimize data entry.
- Customize libraries to precisely model equipment from the manufacturer's published data.
- Switch libraries within a single project to rapidly evaluate "what if" scenarios.
- Extensive default libraries can be applied directly to any project.
- Advanced libraries for sub-transient level generator and motor models, user-definable governors, exciters, power system stabilizers, frequency-sensitive loads, protective devices, harmonic sources, reliability failure rates, DC components, and transmission line configurations.

Import/Export Provides Flexibility, Saves Time and Reduces Errors

- Import and Export PTW project data to conveniently integrate with other databases.
- Enter, edit and review project data in spreadsheet format and import changes.
- Export project data, one-line diagrams, TCC drawings and graphical study results to common file formats for use with spreadsheets, databases and presentation software.
- Export report files to a wide range of industry formats including Excel, Word and RTF.
- Create custom report formats through datablock spreadsheets or Crystal Reports®.
- Project Merge allows portions of the system to be defined separately and merged together.

Plot or Print to Any Windows Printer

- Print one-line diagrams, TCC drawings, reports, titleblocks and logos to a single formatted page.
- Print one-line diagrams on multiple pages or automatically shrink to fit a single page.
- Print all or selected groups of One-lines, TCCs and Reports with a single Group Print function.
- Print or plot to various paper sizes, including full size plotters.
- Print comprehensive reports of input data and study results.
- Display input data and study results on the drawing for detailed presentation.
- Compatible with any printer or plotter configured for Windows.



Document System Components in Efficient Schedule Formats

- Panels, MCC, Switchboards.
- User-Defined Schedule Formats for Cables, Transformers, Motors, Loads, and Protection.
- Custom Formatted Crystal Reports for Printing or Export.
- Custom Spreadsheet Reports compatible with Excel.

PANEL: PANEL 33 — OC DEVICE TYPE: Breaker — ENCLOSURE: NEMA 1 — MAINS(A): MLO — BUS RATING(A): 225
LOCATION: Penthouse — DEVICE FAMILY: Bolt On — MOUNTING: Flush — WIRING: 3-Phase 3-Wire — WITHSTAND(A): 50000
FED FROM: 010-MSA — VOLTAGE: 480 — FAULT CURRENT(A): 7650
REVISION: 1 — 3TK

OC AMPS P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS P
0 3		010-MSA	NONE	41383	1	32535			2	58197	HEAT	Heater		100 3
**		**		-	3		32535		4	-		**		**
**		**		-	5			32535	6	-		**		**
0 3		L8	LTS	9700	7	7390			8	4157	LTS	Lights		20 1
**		**		-	9		7390		10	4157	LTS	Lights		20 1
**		**		-	11			7390	12	4157	LTS	Lights		20 1
0 3		L7	LTS	8000	13	6809			14	4157	LTS	Lights		20 1
**		**		-	15		6809		16	4157	LTS	Lights		20 1
**		**		-	17			6809	18	4157	LTS	Lights		20 1

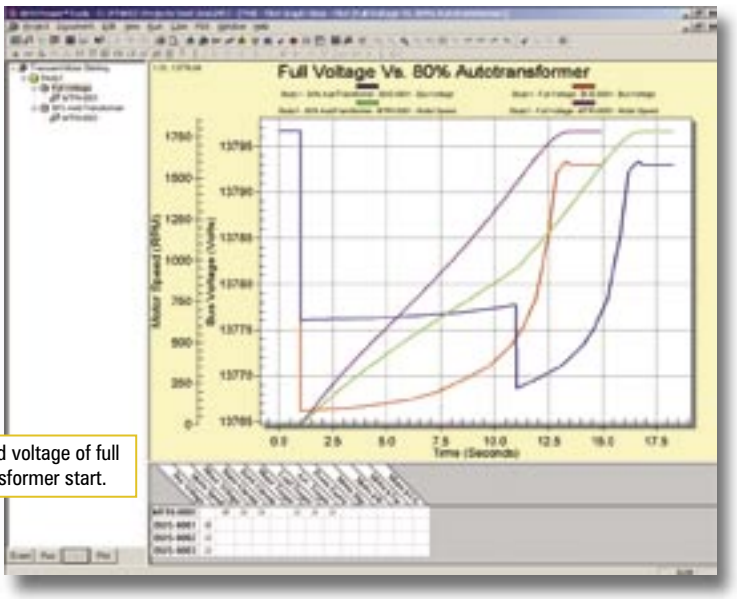
ALL CONNECTED	KVA	AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA	
TOTAL CONNECTED	139.74	168.1	* A-N	46578.6	168.1	CONNECTED	139.74	DATE: 17 Apr 2003
TOTAL DEMAND	139.74	168.1	* B-N	46578.6	168.1	DEMAND	139.74	TIME: 09:55:28
TOTAL DESIGN	172.71	207.7	* C-N	46578.6	168.1	DESIGN	172.71	

Features

SKM Power*Tools® for Windows

Study/Case Manager Stores and Compares Studies

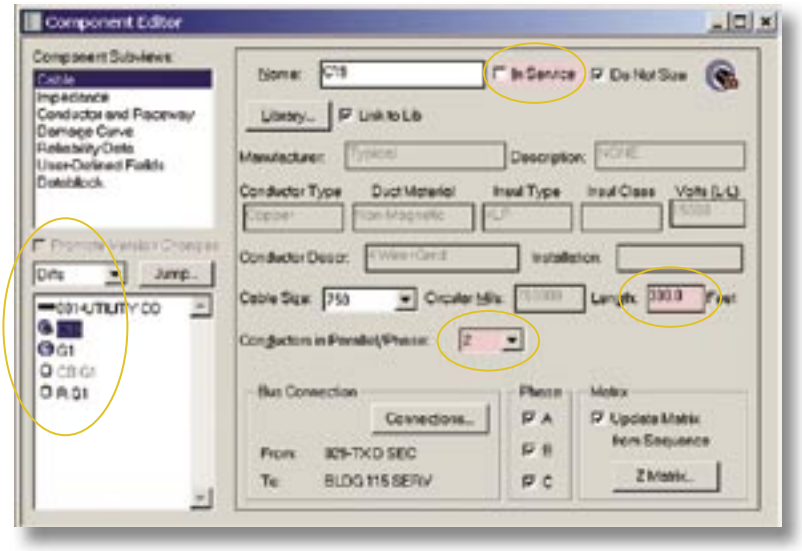
- The PTW Study/Case Manager is the ultimate tool for storing and comparing study results.
- Display any combination of variables from multiple studies/cases on a single graph.
- Communicate results more efficiently with graphical comparisons.
- Design better systems by comparing alternatives.
- Save time with copy/paste of existing cases.
- Print directly or export to common file formats.
- Annotate plots with custom notes.
- Plot in actual values or per unit.
- Full control of axis ranges.
- Full control of plot colors.
- Print multiple curves and reports together in a custom Form Print layout.



Comparison of speed and voltage of full voltage versus auto-transformer start.

Project Revision Manager Compares Multiple System Configurations

- Switch quickly between different project operating states.
- Each revision highlights components and component data that differs from the base project saving you time through visual feedback and better organization.
- Output results are stored with each revision for automated comparison.
- Changes in the base project can be promoted to all revisions.
- Copy and rename existing revision as starting point for new revision.
- Revisions can include new components and deleted components as well as state, connections, and data changes to existing components.



Unique Feature

Comparison Table for Revisions

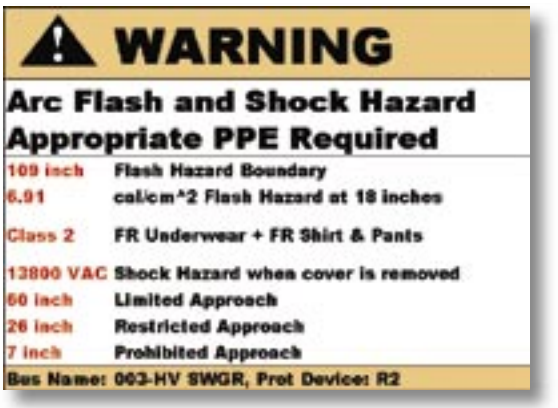
		Base Version	Revision 1	Revision 2	Revision 3
MV Sub 1	**LF Voltage**	4028 V	4010 V	4035 V	4102 V
	3-Phase Isc	8005 A	7950 A	8750 A	9025 A
LV Sub 2LF	**Voltage**	460 V	450 V	465 V	472 V
	3-Phase Isc	65050 A	62200 A	68200 A	69010 A

Features

SKM Power*Tools® for Windows

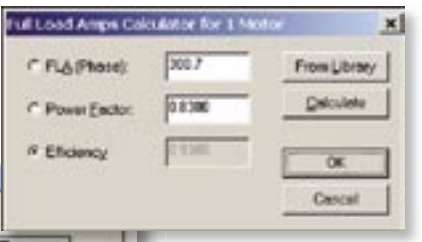
Integrated Arc Flash Calculations Improve Safety

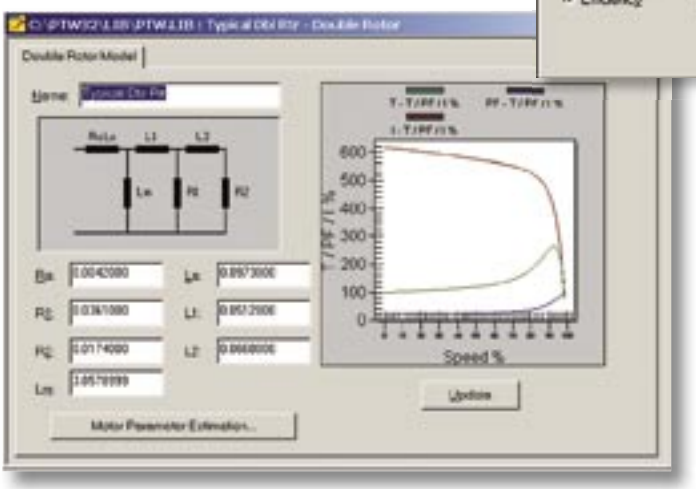
Arc Flash automatically calculates arcing fault currents, determines protective device trip times, and reports incident energy, flash boundary, and PPE in convenient label formats. Optional current-limiting equations may be used to improve accuracy.



Calculators Save Time

- Transmission Line Impedance
- Cable Parameters
- Motor Parameters
- Transformer Impedance
- Neutral Impedance
- Per Unit Conversions
- Phase to Sequence Conversations

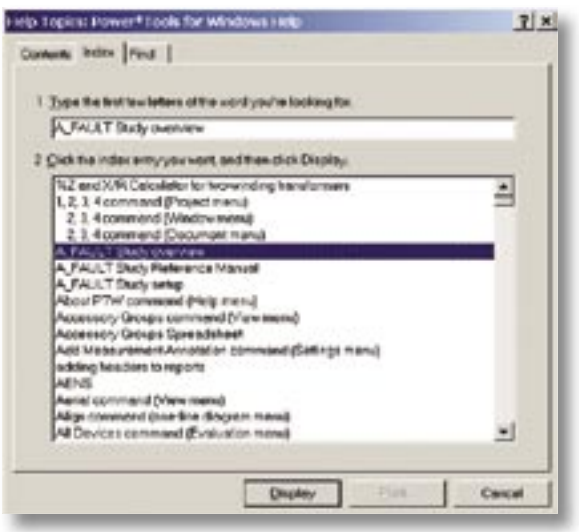


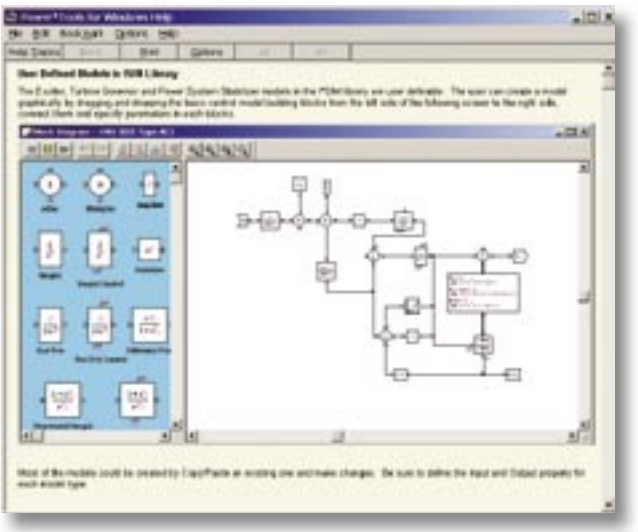


Default and Typical Data Provide Consistency

- Cables
- Transformers
- Motors
- Generators
- Transmission Lines
- Impedance

Extensive On-Line Documentation and Tutorials Reduce Learning Time





Features

SKM Power*Tools® Comparisons

Interface	SKM Power*Tools®	Competition
♦ Multiple one-line diagrams can be associated with each project for better system organization and presentation.	YES	NO
♦ Datablocks define custom formats for viewing and printing input data and study results on your one-line diagrams and TCCs.	YES	NO
♦ User-defined queries select and display groups of data with common attributes.	YES	NO
♦ Component Editor to display and edit components from scrolling list.	YES	NO
♦ Data Probe to display an interactive full size datablock.	YES	NO
♦ Interchangeable ANSI, IEC and Custom symbols.	YES	NO
♦ Automatically expand and collapse areas of the one-line diagrams to create custom drawings that best communicate the system design and study results.	YES	NO
♦ User-defined textblocks can be placed on one-line diagrams to display notes, study reports and load schedules.	YES	FEW
♦ Context sensitive on-line help with linked examples.	YES	FEW
♦ Project Revision and Study/Case Manager for "what if" comparisons.	YES	NO
Studies		
♦ Protective coordination fully integrated with one-line diagram and component editor interface.	YES	NO
♦ Arc Flash calculations fully integrated with protective coordination and fault studies.	YES	NO
♦ Fault analysis options for traditional, ANSI and IEC methods.	YES	FEW
♦ Efficient current injection power flow solutions.	YES	FEW
♦ Demand load analysis for reporting connected, demand and design loads for global diversity and sizing calculations.	YES	NO
♦ Feeder and transformer sizing calculations.	YES	FEW
♦ Dynamic Motor Starting calculations.	YES	FEW
♦ Integrated Panel, MCC and Switchboard Load Schedules.	YES	FEW
♦ Integrated Single-Phase and Unbalanced 3-Phase Studies for Demand Load, Load Flow, Short Circuit and Panel Schedules.	YES	NO
♦ Integrated DC Studies.	YES	FEW
♦ Integrated Transient Stability Studies and User-defined Models.	YES	NO
♦ Integrated Harmonic Analysis.	YES	FEW
Compatibility		
♦ Multi-user network support.	YES	FEW
♦ User-defined Import/Export data templates.	YES	NO
♦ Export to Windows Metafile, DXF and ASCII compatible files.	YES	FEW
Reporting		
♦ Output form options to print one-line diagrams, reports and TCC drawings to custom formatted page layout.	YES	NO
♦ Printing support for shrink to fit or multi-page output.	YES	NO
♦ Custom report formats through Crystal Reports.	YES	FEW
♦ Custom spreadsheet formats for reports, tables and schedules.	YES	NO
♦ Group print function to print selected group of one-lines, TCCs and reports in custom form layout (batch printing).	YES	NO

SKM Power*Tools®

Integrated Study Modules

PTW Offers a Wide Range of Integrated Study Module Options

- DAPPER - Distribution Analysis for Power Planning Evaluation and Reporting
  Demand Load Analysis, Feeder, Raceway and Transformer Sizing, Load Flow / Voltage Drop, Impact Motor Starting Simulation, Traditional Fault Analysis, and Load Schedule Documentation.
- CAPTOR - Computer Aided Plotting for Time Overcurrent Reporting
  Protective Coordination Drawings, One-lines and setting tables.
- A_FAULT - ANSI Fault Analysis Module
  Three phase and unbalanced fault analysis based on ANSI C37 and IEEE 141 standards.
- IEC_FAULT - IEC Fault Analysis Module
  Three phase and unbalanced fault analysis based on the IEC60909 or IEC 61363 standards.
- TMS - Transient Motor Starting Simulation
  Time-based motor starting simulation with motor, load and starter models.
- HI_WAVE - Harmonic Investigation, Wave Analysis and Voltage Evaluation
  Harmonic distortion and frequency scan simulations.
- I*SIM - Industrial Simulation and Transient Stability
  Dynamic system response and generator stability simulation for motor starting, load shedding, faults and other disturbances on generation systems.
- Equipment Evaluation - Automatically evaluates suitability of equipment based on continuous and short circuit ratings and study results.
- Unbalanced Three-phase and Single-phase Studies - Load flow, short circuit, demand load analysis, sizing and load schedules for single-phase and unbalanced three-phase systems.
- Arc Flash - Calculates incident energy and arc flash boundaries in compliance with OSHA, NFPA 70E, NEC 110.16 and IEEE 1584 requirements.
- Distribution Reliability - Calculates reliability indicies and costs for alternative system designs.
- DC Analysis - Battery sizing, load flow and short circuit analysis for DC systems.
- Ground Mat - Grounding grid design and analysis using finite element potential algorithms.
- CABLE-3D - 3 dimensional cable pulling tension and sidewall pressure calculations.

Who Benefits from PTW? Any Engineer or Designer who needs to:

- Design new electrical power systems.
- Document an existing power system.
- Check available system fault currents.
- Check system protective coordination.
- Summarize system loads and size equipment.
- Evaluate capacitor size and placement.
- Evaluate generator stability and protection.
- Study harmonic sensitivity.
- Study motor starting effects.
- Document Arc Flash hazard levels.

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