



DesignBase from Power Analytics offers an extensive library of modules that enable users to perform highly accurate simulations of the electrical infrastructure design under an almost unlimited range of operating conditions, system parameters, and fault scenarios.

Extending our basic steady-state and transient analyses, these solution modules offer advanced analytic capabilities for every aspect of a mission critical power system design, allowing users to simulate and fully understand the pre and post operational behavior of their infrastructure.

Our analytical techniques employ vendor-specific device information, as well as advanced mathematical and applied physics to simulate, optimize, and create power system designs. They consider all aspects of power generation, transmission and distribution of power with associated operational strategies and constraints.

Powerful “what if?” capabilities extend to every aspect of the advanced design, allowing users to stress and verify nominal or steady state designs with extraordinary accuracy and real-world simulations.

Paladin DesignBase 6.0 introduces new industry leading capabilities in exciting areas including:

## Time Series Analysis (Quasi-Dynamic Simulation)

Time series is a new foundational element in DesignBase that is critical to the design and optimization of a microgrid (distributed generation, energy storage, renewable generation and dynamic loads) in particular but applies to any power generation/demand analysis. Today dynamic behavior from external events such as weather or controlled process directly benefit from time series analysis. The ability to use time series during power model analysis presents realistic results and helps to size assets and define constraints. It also links the operation of the system directly to the modeling, planning and simulation.

- A Time Series Study can be executed based on measured system data in different time frames and under different system operation scenarios
- Renewable sources such as Solar and Wind generation as well as system loads are a function of time (Generation depends on climate and weather changes including solar irradiance and wind speed)
- Network variations and outages (contingencies) are normally part of a study
- Generation control settings also can be evaluated according to time



- Results can be used for planning and sizing distributed generators and/or energy storage
- Energy (kWh) generation and consumption during different time scales are provided for loads/generations cost evaluation
- Renewable sources such as Solar and Wind generation are a function of time (Generation depends on climate and weather changes including solar irradiance and wind speed)
- Network variations and outages (contingencies) are normally part of a study
- Generation control settings also can be evaluated according to time
- Results can be used for planning and sizing diesel generator and/or energy storage
- Enhanced power flow control and Volt/Var support
- Energy (kWh) generation and consumption during different time scales are provided
- Exact time data (historical) from meters can be applied (imported)
- New two dead-band models
- New signal to signal exponentiation block
- Enable/Disable feature for blocks
- Enhance look-up table block
- New user defined model for Battery Energy Storage and PV models
- New sample files for Governor/AVR/Load Controllers as General Model
- Blocks explanation and error checking enhancements
- Creating user defined Power System Stabilizer (PSS) template

Arc flash is already one of the most important areas of power study work and research because of the devastating impact an arc flash event can have on equipment and personnel. In addition, real time arc flash is the single most requested option for the real time system and that is 100% based on the arc flash capability of DesignBase. This release includes the incorporation of the 2015 standards.

By definition, transients are not persistent or long duration phenomena and the impact they can have on a power network can range from loss of efficiency to catastrophic so being able to understand transients are critical to design and operation of a power network.

## Advanced Transient Program

- Activating Scope Function in the General Model and AVR Building Program
- New Signal Sources Block for User Defined Models: Step, Ramp, Sine, Saw tooth
- New second order polynomials (oscillator) block
- New rate limiter block

## AC & DC Arc flash Program

- New Arc flash Standard based on NFPA 70E 2015 and CSA Z462
- Using IEC 363 Short Circuit Results in the Arc flash calculation
- Applying maximum 50 “Fault Contribution Level” to look for upstream PDC curves
- Updated Labels and Results based on NFPA 70E 2015 and CSA Z462
- Applying Standard Color for Warning and Danger labels based on ANSI Z535
- Created a tabular data entry with saved data for network Arc flash program



- Added user defined breaker opening time for all breakers (mechanical delay)
- Added user defined maximum tripping time (reaction time) individually for every bus
- Added new Arc flash Labels
- Added Relay Interlock feature

Protective device coordination (PDC) is another of the fundamental power study processes. PDC is critical to delivering power for the mission, protecting equipment and protecting people. PDC can be very complex depending on the size of the power network and the complexity of devices. As with everything in today's world of power engineering, the presence of generation and load, rather than just load, increases complexity and difficulty. The release of Power Analytics DesignBase 6.0 represents a major integration between protection and safety by giving the power engineer the ability to see the impact of device settings on potential arc flash during the coordination process.

## Protective Device Coordination

- Added Equal Energy Lines for Arc flash PPEs for IEEE-1584 (Unique DB6.0 feature)
- Added PPE Category Method NFPA-70E 2015 boundaries (Unique DB6.0 feature)
- Added two axis plot for Voltage in TCC curve
- Added multi-segments relay curves (5 relays at a time)
- Added IEC-61363 SC results into PDC study
- Created remote CT data usage for relays
- Speed up the calculations for running SC through PDC

- Added Multi-selection feature for TCCs and Devices
- Added Interlock feature of switches/breakers for PDC studies
- Updates on PDC studies sorting
- Updates on graphical editor of TCC and PDC studies
- Updates on zooming and restoring
- Updates on TCC curves for motors/loads
- Updates on Reports and Annotations

## Short Circuit AC 3P, DC, 1Ph

- Added Line to Ground Fault PDE analysis based on IEEE C37.010 and IEC61909
- Annotation for Bus PDE and Duties Results based on IEEE C37.010
- Added SC tolerance option for single equipment for 3P SC
- Link SC study case feature into scenarios
- Display 1 level away branch contribution for multiple bus selection
- Updated calculation Options for IEC 60909
- Added New SC model for static converter
- Added New Function to Calculate Branch Currents which IEC 61363 Standard Does not Provide
- Enhanced IEC 363 annotation

## New Features in Editor and Build Programs

- New data entry tabs for Time-Series study
- Added Interlock data entry tab for Breakers/Relays/Switches
- Added relay opening time field
- Added PDC device settings in Text Editor
- New Ampacity temperature fields
- Import network model data from Excel (spreadsheet)



- Updated Recloser/Motor Circuit protector/Relay Build Programs
- Updated auto single-line generation
- Added IEC Cable into metric library
- Enhanced data entry for PDC settings

### Advanced Power Flow

- Applied New Strategy for Swing Bus Selection

### Advanced Motor Starting

- Applied generators PV/Swing modes for motor starting
- Applied governor response solution for motor starting
- Enhancements on Report and Editor data entry

### Ground Grid Design

- New feature for modeling circle ground design

### Power System Optimization

- Provided more currencies as £, € for energy cost function

### Advanced Harmonic Analysis

- Added Harmonic Source Enable/Disable based on Scenarios
- Added Scenario Dependent Harmonic Sources Rating/PF