Grid Connect

Distributed Energy Resource (DER) Control System

Simplify site control for DERs

- Securely and economically control the point of common coupling (PCC) between the utility grid and power generation resources.

- Solve common DER interconnection issues, such as varying cloud cover, nonresponsive inverter controls, and unexpected voltage excursions.

- Use relay or meter data to control real and reactive power at the utility's PCC.

- Reduce development time and costs and more quickly deploy your renewable energy project with pre-engineered control system libraries.

SEL

Bringing Solar Energy Systems Online Simply and Economically

Interconnection standards are requirements for connecting solar and other electrical generation systems to the grid. SEL technology makes the interconnection process simple and economical, which prevents it from becoming a barrier to bringing a solar energy system online. The ability to interconnect to the grid on a reliable, cost-effective, and timely basis may determine whether a project moves forward or not.

SEL developed a control system that helps owners of renewable energy installations with dynamic VAR sources to meet interconnection utility and regulatory requirements. SEL Grid Connect is an add-on feature available for the SEL Real-Time Automation Controller (RTAC) family. It is designed to simplify interconnection control and solve common interconnection issues, such as adapting for varying cloud cover, nonresponsive inverter controls, and unexpected voltage excursions. This control system contains pre-engineered function blocks for controlling the PCC between the utility grid and a power generation source. Using SEL's pre-engineered control system library helps get renewable projects online sooner than developing custom project-specific controls.
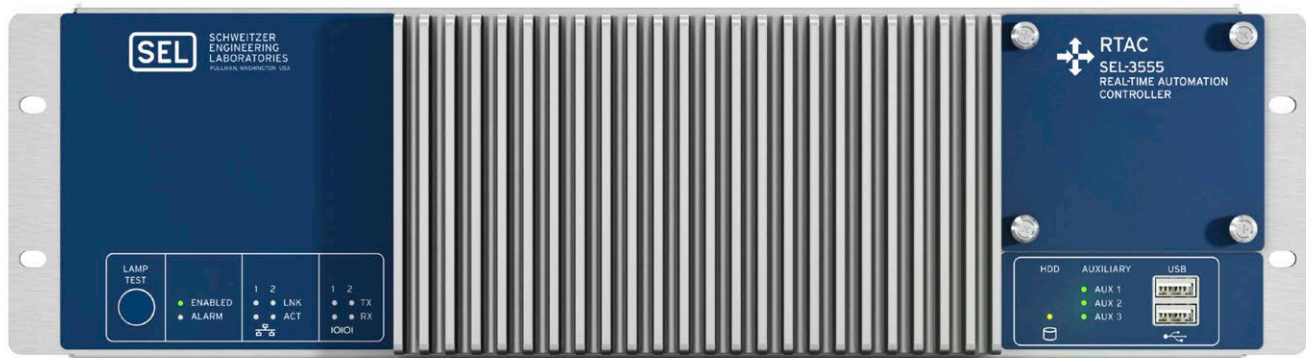
Features

The system contains a library with the following control features for interconnection of a renewable facility to the utility grid:

- Open-loop control of power factor (PF) at the PCC (i.e., passing the PCC set point directly to inverters)
- Closed-loop proportional plus integral (PI) control of PF at the PCC
- Open-loop control of power output limit at the PCC (i.e., simple power limit control)
- Closed-loop PI control of power output at the PCC (i.e., advanced power limit control)
- Closed-loop PI control of voltage at the PCC
- PCC voltage limit override when in PF control mode
- PCC PF limit override when in voltage control mode
- Integrated control of inverters and capacitor banks to provide aggregate control of the PCC
- Support of capacitor banks for additional PF correction and voltage support

Solar photovoltaic (PV) power plants can greatly impact the electrical networks into which they are being integrated. As a result, it is important to adjust the output of a solar plant (both real and reactive power) to minimize any effect the plant may have on grid reliability and other customers. Coordination of the PV plant and its intertie with the existing distribution and/or subtransmission electrical system is essential for reliable operations. By using the grid connection library, users can design and implement a control system that seamlessly adjusts the equipment operational points in response not only to commanded set-point changes, but also to variable conditions. This type of control system is designed to monitor the overall operations of the generation plant and the PCC and, based on the conditions, will adjust the equipment to meet operational, performance, and local interconnection requirements.

The library was designed to allow users to easily input the required interface details to ensure that all of the components are working together properly in order to minimize the control system development time and opportunity for error.
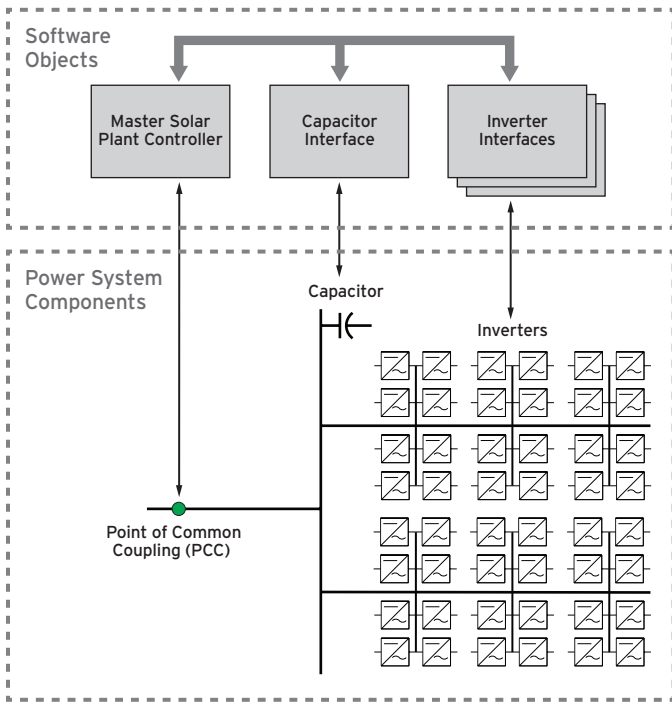
Mapping the software objects to the power system.
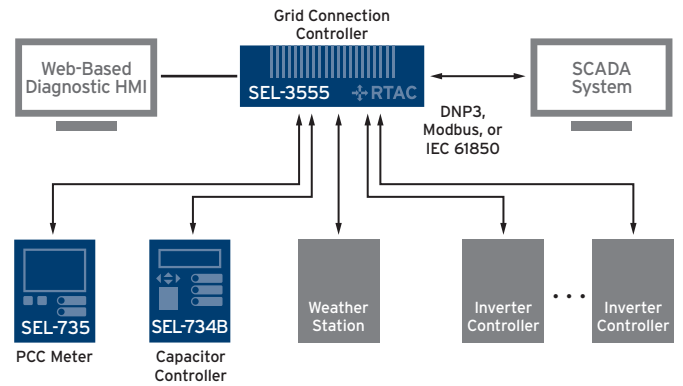
Simplified IED/communications architecture

In addition to providing internal plant monitoring and control functions, the system also serves as a single-point interface with external systems, where it supplies plant data and accepts control commands from the area electric power system. This single-point interface simplifies the communications burden on the electric power system while providing the necessary functionality to maintain critical voltage support features for the bulk electrical system.