Energy Storage Applications Guide

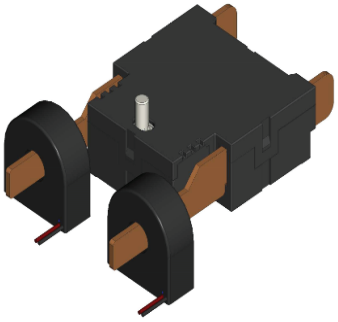
Introduction

As energy demands continue to increase globally, the need to effectively manage power generation and distribution to provide a stable and reliable power grid, becomes more and more critical. Utility and electricity customers alike are continuing to evaluate how they use, manage, and store electricity. A trend is seen where the average consumer is actively pursuing renewable energy technologies to offset utility usage costs and reduce their carbon footprint. Utility-scale storage systems are driven by the ability to offset much larger infrastructure upgrades by leveraging storing excess energy when available and instantly exporting stored energy when there is a demand on the grid. Electricity consumers are finding that the economics of home energy storage makes more sense as they assess increased power usage over the varying peak rates and tariffs that are becoming more common. The ability to monitor and control distributed energy resources is paramount to an effective energy system, and KG Technologies energy management portfolio has many options to assist with the development of new energy storage and load management solutions.

Applications

Energy Gateway / Microgrid Disconnect Solutions

KGT supplies the hardware that performs the most essential functions of an Energy Gateway/Microgrid Disconnect device. As energy storage systems become a fully integrated part of the electrical system, hybrid energy systems for on and off-grid use are becoming more frequent. With hybrid energy storage systems, a gateway/disconnect device becomes necessary to allow the energy system to operate independently from the grid in the event of an outage. KG Technologies' multi-pole latching relays provide a disconnecting option for these gateway devices that comply with the strict standards that ensure safety and performance.



While these hybrid energy systems are connected to the grid, information about utility power used becomes helpful to allow the storage system to be utilized most efficiently. KGT's monitoring solutions, such as CTs and shunts, can be designed into our latching relays to provide customized disconnecting and monitoring solutions to best fit your application.

Battery Management System (BMS)

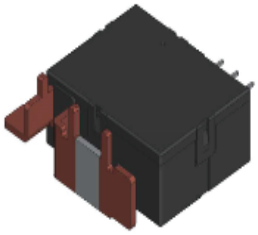
There are a variety of battery technologies available in the market today that use BMS systems to protect batteries against voltage, current and thermal runaway scenarios. These energy storage solutions all use BMS systems to primarily monitor voltage, current and temperature of the battery pack. Manufacturers program BMS' to nominal upper and lower thresholds of each of the mentioned parameters.

A KGT HVDC Relay is connected between the individual battery packs contained within the battery assembly and the output terminals of the battery module. The BMS can therefore disconnect the entire battery module from the load by operating the HVDC relay if voltage, current or temperature fall outside the safe operating parameters of these systems.

Inverter

DC energy is created by a renewable energy system on-site of which excess energy is stored in the batteries. Whether located within the battery enclosure or a separate unit, an inverter will be required to convert the DC energy to AC Power. KG Technologies' power relays, Current Transformers (CTs), and signal relays are solutions that can be incorporated into inverter solutions to achieve switching, monitoring and control of local and external components that are connected to the system. HVDC relays are used to disconnect the inverter from batteries to prevent deep discharge and excessive drain that could potentially damage batteries and drastically reduce their lifespan.

Load Monitoring and Control



Off-grid and hybrid energy storage systems must operate efficiently in order to maximize generated and stored energy. To avoid depleting stored energy too quickly, hybrid and off-grid energy systems can manage energy by using KGT relays or smart circuit breakers to shut off non-critical loads when stored energy is low. KGT's CTs can help measure load current and provide data to the energy management system through which the operator can better understand power usage trends to analyze them and make more informed decisions to optimize load control.

Conclusion

KGT has an extensive product line of energy management devices as well as the knowledge and expertise to aid your product development. By customizing and integrating switching and measuring components with in-house solutions, we can help reduce components and shorten your supply chain.

For More information Contact KG at:
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