



THE POWER OF SECURITY: PROTECT HIGH-VALUE ROTATING EQUIPMENT WITH THE IGR-933 ROTATING EQUIPMENT ISOLATION DEVICE (R.E.I.D.) IDEA RELAY

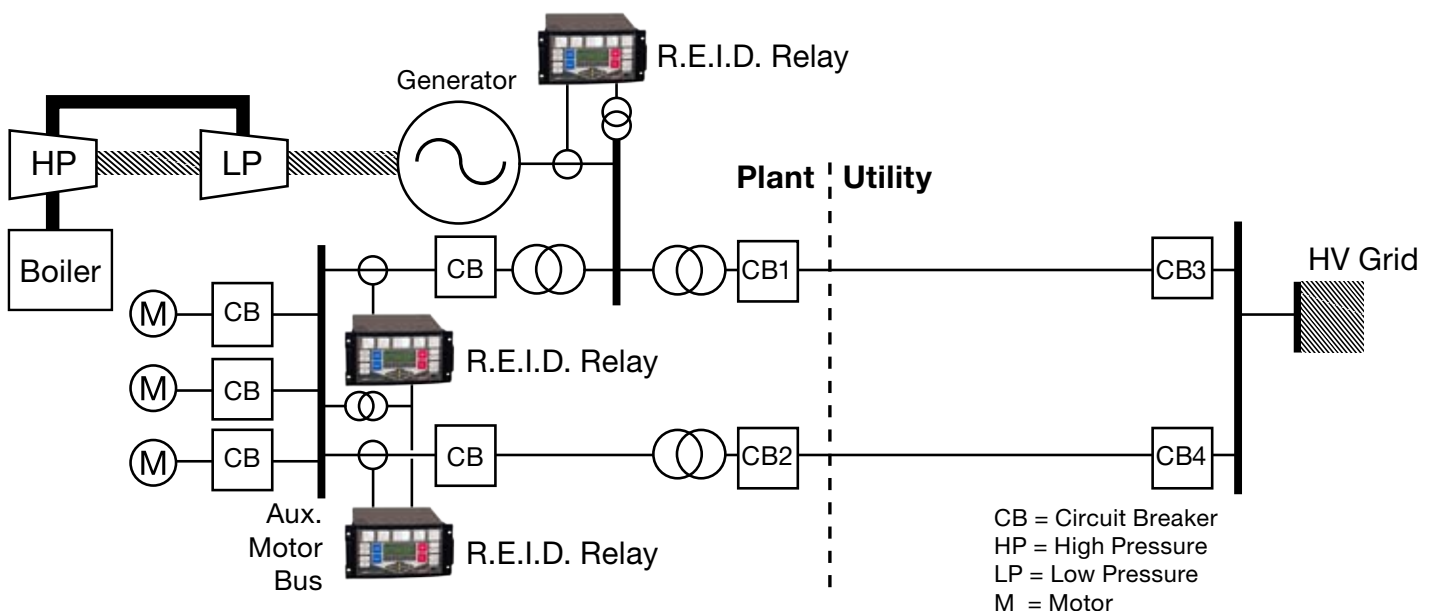
Timothy Day, Senior Relay Application Engineer, Cooper Power Systems

Cyber Security for digital protective devices and control systems applied to the electric grid continues to be a priority and a growing area of concern. Cyber attacks can result in mal-synchronization and damage of expensive and long-lead-time rotating equipment: generators and motors.

The North American Electric Reliability Council (NERC) June 2007 Electricity Sector Information Sharing and Analysis

Center (ESISAC) Advisory makes both short-term and long-term recommendations for addressing the need to detect cyber attacks and to provide isolation of rotating equipment. This includes the installation of security devices specifically designed to provide cyber security focusing on communications and remote access as well as long-term solutions that will provide proactive isolation of the equipment.

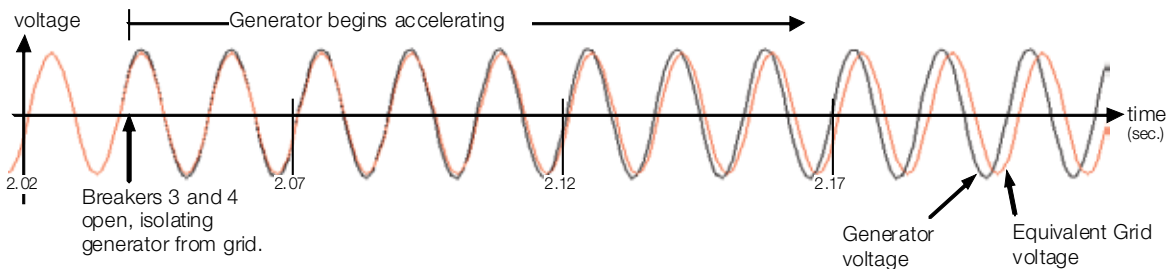
Cooper Power Systems, introduces the iGR-933 Rotating Equipment Isolation Device (R.E.I.D.) Idea relay—fully tested at the Idaho National Labs. The iGR-933 R.E.I.D. Idea relay enables plant managers to ensure rotating equipment is isolated from the grid when mal-synchronization due to cyber attacks appears imminent. The figure below shows an example of the R.E.I.D. relay's protection of a plant's generator and motors.



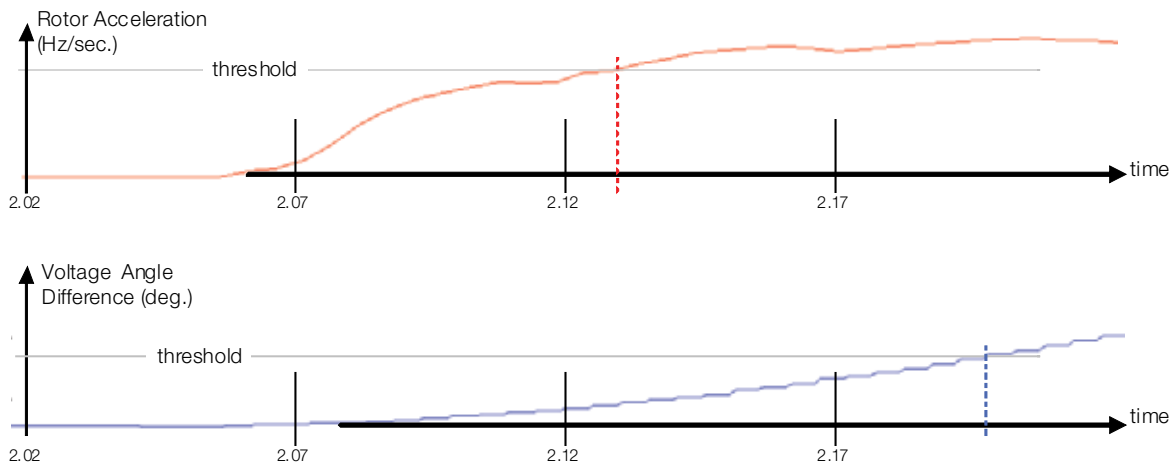
Examples of where R.E.I.D. Idea Relays fit into the protection scheme for rotating equipment.

More Than a Synchronism Relay

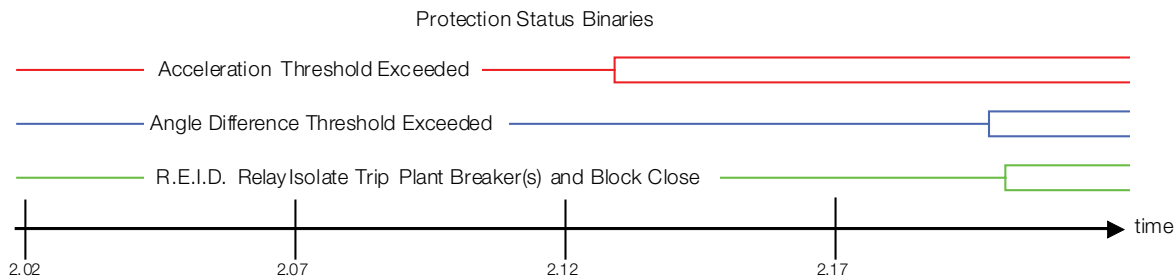
The R.E.I.D. Idea relay is more than a synchronism relay. It also detects equipment isolation due to remote breaker operation. The voltage waveforms at the local R.E.I.D. relay location may indicate an isolation caused by breaker(s) operating at a distant location, for example, Circuit Breakers 3 and 4. A synchronism check relay would require a reference voltage input thus limiting sensitivity to local breaker operations.



Based on locally measured signals, the R.E.I.D. relay calculates two essential quantities: rotor acceleration of the rotating equipment and angular difference between the voltage phasors at the machine's terminal and the grid. The equivalent grid voltage is retained in memory.



The traces above show the R.E.I.D. relay's internally calculated acceleration and voltage difference quantities during an isolation event. Isolation is positively declared when both values exceed pre-defined thresholds.



Apply the R.E.I.D. relay on single breaker or dual breaker terminations such as ring bus or breaker and half schemes. By monitoring overcurrent and undervoltage conditions, the R.E.I.D. relay prevents false isolation operation due to system fault and power swing events.

Comprehensive Isolation and Protection of Rotating Devices

The R.E.I.D. relay provides a stand-alone, easily installed, cost-effective, long-term solution for protecting rotating equipment upon detection of a cyber attack.

Contact your Cooper Power Systems representative to find out how you can apply the comprehensive cyber security functionality included with the R.E.I.D. Idea relay to your rotating machines. ■