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AMETEK

POWER INSTRUMENTS

FOCUS

Fiber Optic Communications for Utility Systems

Is Your Pilot Wire Relay Scheme a Ticking Time Bomb?

Time is running out on your critical pilot wire circuits. Most pilot wire relay applications have been in service for many years.

The effects of time are beginning to be felt by the cables that your HCB relays depend on for communication. You may be asking yourself if pilot wire relaying still a good idea? The answer is most certainly Yes! Why? Because pilot wire relaying:

- is the best choice for short line protection
- does not require potential transformers
- provides high speed, reliable fault clearing
- provides high security from false tripping
- utilizes a simple, well proven, current differential concept

The solution to the pilot cable problem? *Fiber Optics!* The use of fiber optic cables in the utility industry has gained wide acceptance in the last ten years. Fiber allows substation communications, including pilot wire relaying, to be transmitted via a secure, proven medium. Fiber is especially beneficial for pilot relaying because:

- There are no ground mat potential difference problems.
- There are no mutually induced voltages or surges.
- Neutralizing or mutual drainage reactors are not required.
- You have independence from the phone company.
- Pilot wire maintenance is eliminated.
- It ensures more reliable relaying.
- Secure or dependable tripping during channel trouble is user selectable.
- Redundant channels through loop designs are available.
- It can extend the life of existing HCB relays.
- Pilot wire differential concept is maintained.

Since introduction in the 1930's, the HCB current differential relay has been the industry standard for Pilot Wire Relaying. PULSAR has pilot wire differential relay interfaces that directly connect existing or new pilot wire relays to a fiber optic network. Unlike traditional metallic pilot wire schemes, fiber optics allows for the relay communications to be rerouted in the event of a break in the fiber cable.

FOCUS is a fully integrated time division multiplexing unit that provides interfaces for pilot wire relaying, directional comparison relaying, SCADA and voice. The pilot wire interface is complete with a direct transfer trip channel included in a single DS0 channel. This allows replacement of the traditional metallic pilot wire and all associated pilot wire monitoring devices. The result is an ideal pilot wire allowing consistent HCB relay performance. A fiber optic link provides immunity from longitudinal induced voltages and station ground mat potential difference. Conditioning and protection devices, required for the metallic pilot wire, are eliminated from the system.

The pilot wire differential relays are connected, without any modifications, directly to the FOCUS HCB interface. The ac milliammeter and test switch can remain to periodically verify correct relay performance. Pilot wire supervision and monitoring hardware is removed since the HCB module continuously monitors the channel integrity. Alarm contacts are provided to indicate the relay channel status.

The Effects of Time on Pilot Relay Cables		
Past	Present	Effect
New Pilot Wire Cable	Pilot Wire Cables have aged significantly	Circuits are failing
Telephone Co. uses metallic wire everywhere including trunk lines	Telephone Co. has stopped using cable for trunk lines	Utilities can't locate metallic circuits where they need them
Easy to lease wire pairs from Telephone Co.	Telephone Co. ending leases & maintenance	Utilities turning to less effective relay schemes
Healthy connectors and splices	Corrosion in connectors and splices causes open circuits	Relays act as non-directional overcurrents

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