ENERGY AUTOMATION PRODUCTS

PowerLink IP

The consistent evolution in PLC Technology

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Where and why do I use PowerLink IP with PLC technology?

Deregulation of energy markets and rapidly growing distributed power generation are leading to more complex management of power grids with increasingly demanding redundancy requirements.
Traditional high-voltage (HV) substations require a low bit rate communication channel for applications like binary teleprotection signals, control center commands, or analog voice. Integration into enterprise IT is not required.

New digital HV substations typically use packet-based broadband communication infrastructure. Central data analytics and application services demand extended data bandwidth. The data flow is primarily asymmetrical; cybersecurity is an integral feature.

The new PowerLink IP solution is designed for Ethernet/IP environments typically found in digital HV substations. It supports extended bandwidth requirements and the integration of legacy interfaces. This combined with the new HF filter (small / broadband) allows PowerLink IP to seamlessly integrate with existing PLC and digital solutions.

Fields of application

PLC systems utilize the high-voltage line between transformer substations as an economical communication path for data, teleprotection, or voice. Such systems are typically used as primary or backup communication connection between HV substations.
Even in modern power line networks, there are many HV substations where the installation of fiber is not cost-effective and where wireless communication is not sufficiently reliable. In those cases, power line is the sole communication path between HV substations.
PowerLink IP serves as a single communications system for the diverse communication requirements of state-of-the-art HV substations. It supports any type of IP-based traffic as well the migration of analog RTU - or analog voice – traffic or the transmission of teleprotection signals.

The optionally embedded Teleprotection Signaling based on GOOSE provides highly reliable communication for distance protection schemes.

PowerLink IP is the best solution for ensuring highest availability by establishing an alternative communication path for critical grid applications (for example, protection devices, RTUs, and voice). In combination with fiber-optic communication technology PowerLink IP warrants the best possible reliability for critical HV links.

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Functions / Features

PLC functions / features

- Bandwidth
  - Narrowband (4 kHz to 16 kHz)
  - Broadband (32 kHz to 256 kHz)

- Integrated legacy interface for voice and data services

- Transmission rates up to 2 Mbps

- Efficient bandwidth utilization
  - Notching (non-contiguous frequency bands)
  - Channel spreading (dynamic transmission rate adaptation)
  - Asymmetrical data streams

- Integrated spectrum analyzer

- Stable operation and fast synchronization time even under adverse conditions

- Parallel operation to other PLC systems

- Primary or backup communication solution for HV power lines

Teleprotection functions / features

- Embedded teleprotection signaling system for use with 8 independent tripping commands

- Support of GOOSE (IEC61850) interfaces

- System alarms via alarm contacts or remote monitoring
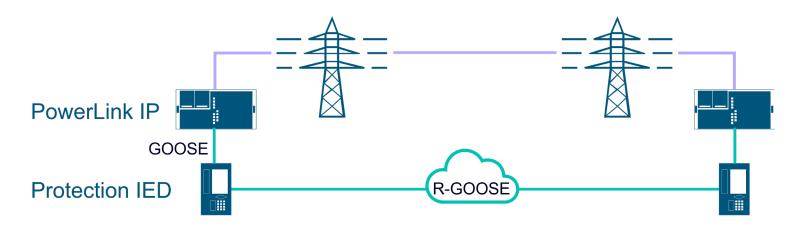
Packet function / features

- Pure packet-based architecture

- Web-based administration

- Integrated L2 switch

- Integration into network management system using latest SNMP technology

Cybersecurity

- RADIUS authentication for client web access

- Firmware signature

- MAC filtering / Acess-control

- Firewall

- Non-volatile recording of SYSLOG events

Benefits

- Simplification of Teleprotection Signaling archetecture

- Highly efficient utilization of scarce bandwidth resources

- Smart frequency management

- High availability and reliability

- Cloud connectivity for access to performance and quality data

- Optimized for packet-based architecture of modern HV substations

- Continuous updating of latest cybersecurity recommendations

- Seamless integration into existing PLC infrastructure

- Cost-efficient consolidation of traditional PLCs

- Alternative communication channel for video, highquality service telephony, or even data exchange

- Transition to packet-based substation at own pace through flexible migration scenarios (integration of legacy devices)

PowerLink IP

GOOSE

Protection IED

R-GOOSE