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Ingenuity for life

SIPROTEC Process Bus Solutions

Digital Substations with SIPROTEC

www.siemens.com/processbus

Description

Protection functions require the measurement of voltages and currents. The analog values are measured via instrument transformer, then provided to the protection device and processed by the protection algorithm.

Conventional solution

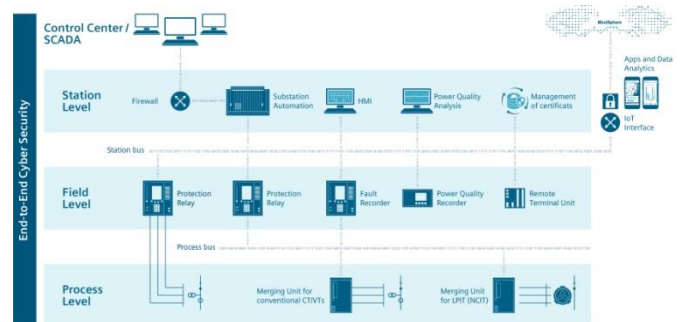
The conventional instrument transformers are directly connected to the protection devices with parallel copper lines. This solution is proven, but requires a lot of wiring effort, has physical limits (accuracy, saturation) and bears the risk of open CT circuits.

Process bus solution

This innovative solution involves positioning a Merging Unit close to the transformer. The Merging Unit records the measured values of the transformers, digitalizes them and sends them to one or more protection devices via a sampled measured values (SMV) data stream over fiber optical Ethernet.

The protection relays no longer work with analog values, but directly use the digital values from the sampled measured values data stream.

The Merging Unit is the interoperable interface between primary and secondary equipment for process bus solutions conforming to IEC 61869 and IEC 61850-9-2. Measured values of conventional and non-conventional transformers are converted into standardized, Ethernet-based telegrams (SMV).



SIPROTEC 5 Process bus solution

Benefits

- Cost saving - Copper cable reduction, faster installation and commissioning
- Interdependency - Interoperable design enables multi-vendor solutions based on IEC 61850 standard
- Flexibility and scalability - Easier adaptation to future requirements and integration of wider range of data sources (independent signal routing)

The use of non-conventional transformers (LPIT) makes the process bus solution even more efficient.

- Cost saving - Reduced space and 90 % reduced weight of transducers
- Cost saving – One LPIT type for protection and measurement in all feeders because of the wide dynamic range
- Operational safety – Danger of open CT circuits obsolete or reduced

Efficient and flexible

Merging Unit

The new SIPROTEC 6MU85* Merging Unit based on the flexible SIPROTEC 5 system has been designed for conventional and non-conventional instrument transformers (LPITs) and digitalizes all primary data close to the process. SIPROTEC 5 process bus provides versatile solutions and migration concepts for new and existing systems.



Merging Unit SIPROTEC 6MU85

Adapts to your requirements:

- Adapts to multiple CT, VT including LPIT sensors
- Trip circuit supervision
- Backup protection functions
- CB wear monitoring
- Scalable number of binary inputs and outputs (expandable by a 2nd row)
- Direct "high speed" tripping of circuit breaker < 1 ms
- Collection of additional data (temperature, pressure, tap changer positions, ...)

- Redundant power supply
- Extended temperature range (-40 °C to 70 °C)
- Time synchronization via IEEE 1588, PPS or IRIG-B
- Compliant to IEC 61869 and IEC 61850-9-2
- Full support of IEC 61850-8-1 GOOSE and MMS

Process bus client

SIPROTEC 5 protection devices can be equipped with the plug-in module ETH-BD-2FO with process bus client functionality.

- Easy expansion of SIPROTEC 5 devices
- Several process bus networks per device
- Up to 80 channels for Sampled Measured Values per SIPROTEC 5 device**

The SIPROTEC 6MU85 Merging Unit as well as the SIPROTEC 5 protection devices support:

- PRP and HSR (IEC 62439)
- Integrated web server
- Comprehensive engineering with DIGSI 5
- Full integration of whole substations in process bus technology

Siemens process bus solutions fulfill the international standards and create customer benefits.

*) planned for 2019; currently available SIPROTEC 6MU805

***) currently up to 24 channels using PB201



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For all products using security features of OpenSSL, the following shall apply:

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (www.openssl.org), cryptographic software written by Eric Young (eay@cryptsoft.com) and software developed by Bodo Moeller.