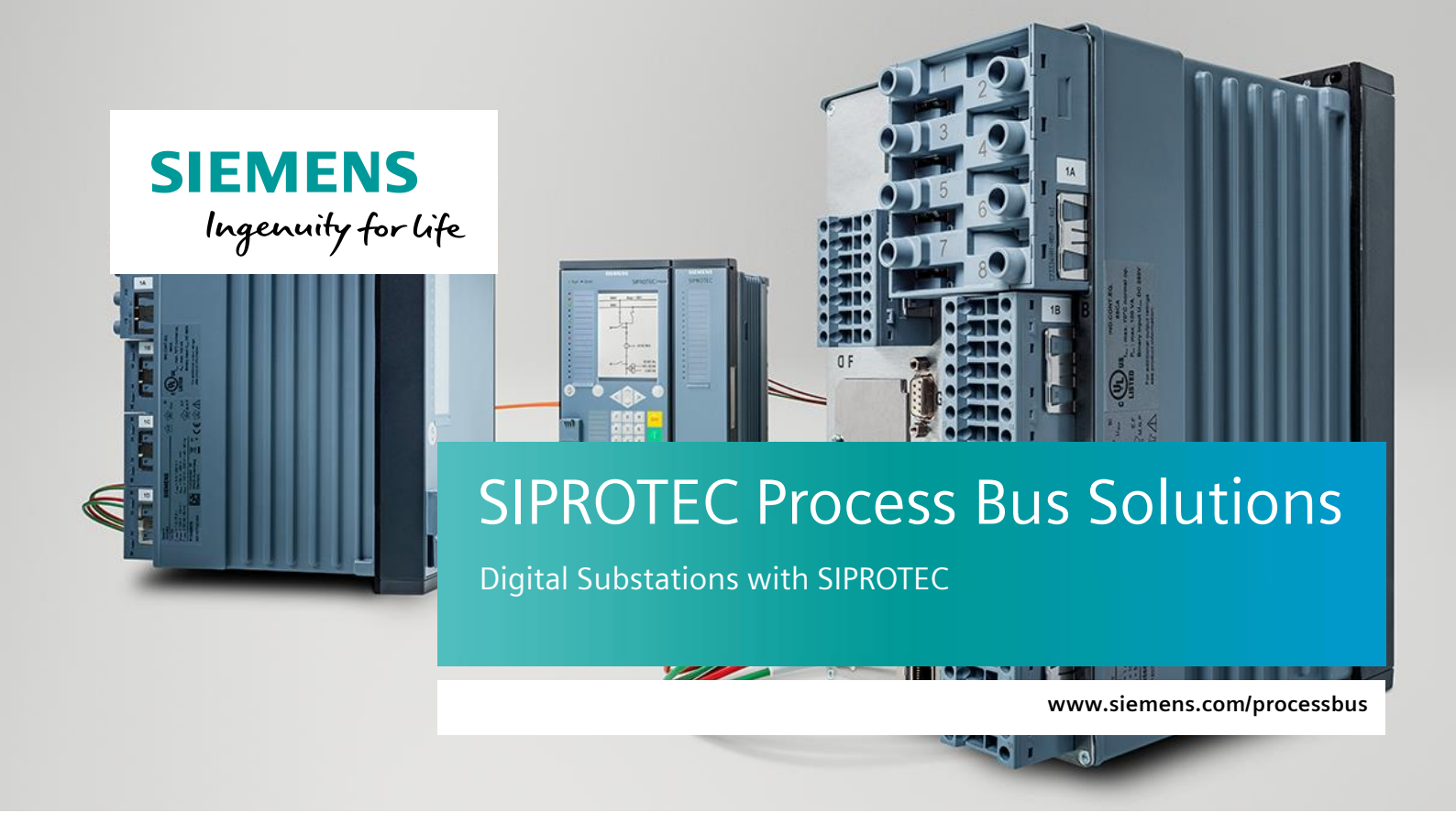

SIEMENS
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SIPROTEC Process Bus Solutions

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.

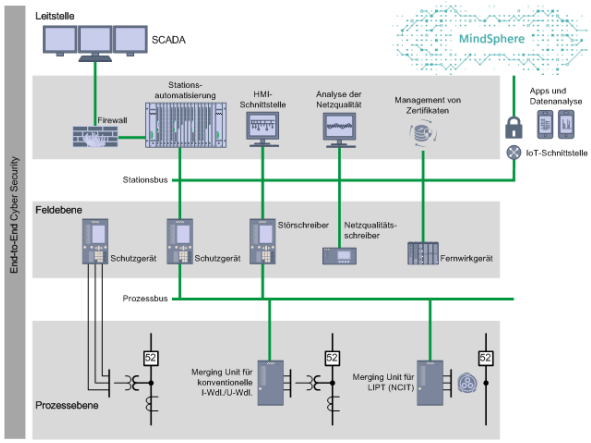
Process bus solution
This innovative solution involves positioning a merging unit close to the transformer. The merging unit reads the measured values of the instrument transformers, digitalizes them and sends them to one or more protection devices via a sampled measured values (SMV) data stream over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

The protection relays no longer work with direct connected analog values but uses 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).

Benefits

- Cost saving - Copper cable reduction, faster installation and commissioning



SIPROTEC 5 Process bus solution

- Independency - 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)
- Operational safety – Danger of open CT circuits obsolete for LPITs and reduced for conventional instrument transformers

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

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 < 1ms
- 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

Modular SIPROTEC 5 protection devices can be used as a merging unit by adding the ETH-BD-2FO Ethernet plug-in module, allowing to retrofit and expand existing installations for example with a process bus based distributed busbar protection system.

Process bus client

Modular 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 all modular SIPROTEC 5 protection devices support:

- PRP and HSR* (IEC 62439)
- Integrated web server
- Full integration of whole substations in process bus technology

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

*) in preparation
LPIT = Low Power Instrument Transformer

Siemens 2020

Smart Infrastructure
Digital Grid
Humboldtstrasse 59
91459 Nuremberg,
Germany

For the U.S. published by Siemens Industry Inc.

100 Technology Drive
Alpharetta, GA 30005
United States

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