SIEMENS

DIGITAL SUBSTATION WITH SIPROTEC

Boost efficiency and reliability with

SIPROTEC Process Bus

siemens.com/processbus

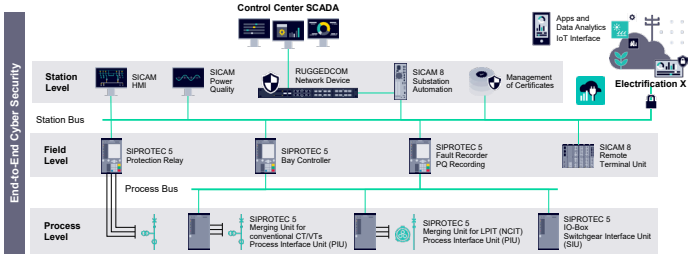
SIPROTEC Process Bus brings intelligence closer to the primary equipment. By placing a Merging Unit (MU) or Process Interface Unit (PIU) near instrument transformers and switching devices, analog signals are digitized at the source and transmitted as Sampled Values (SV) via fiber-optic Ethernet. SIPROTEC 5 bay control units and protection devices use standardized digital data for faster, more flexible, and reliable operation. The MU/PIU acts as a universal interface between primary and secondary systems, supporting conventional instrument transformers and LPIT sensors, and complying with IEC 61869-9 and IEC 61850-9-2.

Benefits

- Cost savings – Less copper cabling, faster installation, and commissioning
- Accelerated project delivery and minimize outage times – Leveraging modular designs and extensive offsite pre-fabrication reduces on-site installation and commissioning times. This streamlined approach ensures quicker project completion, greater agility for future expansions, and minimal operational disruption
- Optimized design – Smaller CT design due to the shorter distances and thus smaller burdens, less CT cores are required
- Space optimization – Smaller control rooms due to the reduction in the number of required panels
- Independency – Interoperable design enables multi-vendor solutions based on IEC 61850 standard
- Simplified Engineering – Typical-based engineering with reusable SV, GOOSE, MMS configurations
- Flexibility and scalability – Easier adaptation to future requirements and integration of a wider range of data sources (independent signal routing)
- Operational safety – Reduces risks from open CT circuits

LPITs further increase efficiency of Process Bus Solutions

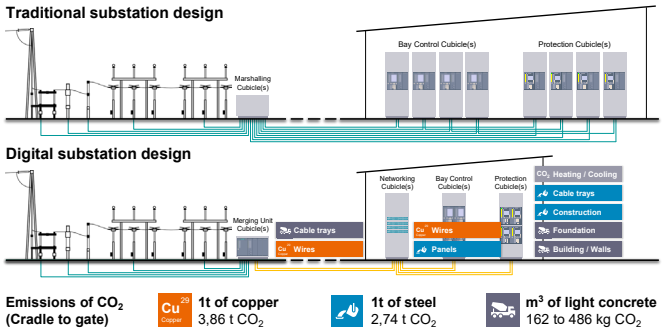
- Space optimization – Reduced space and 90 % reduced weight of instrument transformers
- Wide dynamic range – One LPIT type for protection and measurement across all feeders



Driving Sustainability with Digital Substations

Digital substations offer a powerful lever for enhancing environmental sustainability and reducing the carbon footprint of power infrastructure. By transitioning to a process bus architecture, utilities can unlock significant ecological benefits - though the exact impact depends on site-specific conditions. Key sustainability advantages of digital substations include:

- Space and Material Efficiency – Reduced physical footprint and minimized use of raw materials
- Lower Carbon Emissions – Fewer copper cables and less transport contribute to a smaller carbon footprint
- Optimized Asset Utilization – Intelligent data-driven operations extend equipment life and reduce waste



Sustainability levers of a Digital Substation

ETH-BD-2FO – The Key to Digital Substation Enablement

The ETH-BD-2FO plug-in module transforms any modular or non-modular SIPROTEC 5 devices into a digital substation ready component with SV publishing and subscribing capabilities.

- Seamless Upgrade Path – Add Merging Unit and Process Bus Client functionality to existing SIPROTEC 5 devices
- Network Redundancy – PRP and HSR (IEC 62439)
- Precision Time Synchronization – Via IEEE 1588, PPS, or IRIG-B for accurate data alignment
- Standards Compliance – IEC 61869-9, IEC 61850-9-2 for SV plus IEC 61850-8-1 for GOOSE and MMS
- Advanced Communication – Routable GOOSE (R-GOOSE) and multiple process bus access points
- WebUI & DIGSI 5 – Easy configuration and engineering
- Reliable Operation – Redundant power supply ensures continuous performance

Siemens process bus solutions align with international standards, delivering real value for smarter, sustainable substations.

Merging Unit (SV publisher) functionality

Digitize primary data right at the source with SIPROTEC 5. Any SIPROTEC 5 device can act as a Merging Unit, offering unmatched flexibility for both new and existing substations. At the heart of this portfolio is the SIPROTEC 6MU85 – a dedicated, high-performance Merging Unit designed for both conventional instrument transformers and LPITs, built on the proven SIPROTEC 5 platform.

Why Choose SIPROTEC 5 and 6MU85 for Your Process Bus?

- Sensor compatibility – Conventional CTs, VTs and LPITs
- Fast tripping – Direct "high speed" tripping of circuit breaker < 1ms
- Smart Monitoring & Protection – Includes trip circuit supervision, backup protection, Point-on-Wave (PoW) switching, and CB wear monitoring
- Scalable I/O – Expandable binary inputs/outputs
- Sensor Connectivity – Acquire substation data (pressure, temperatures, tap changers, etc.) via Modbus client
- Rugged design – Operates from -40 °C to +70 °C

Process bus client (SV subscriber) functionality

Empower your SIPROTEC 5 bay control units and protection devices with advanced Sampled Values (SV) subscriber capabilities - designed for seamless integration, scalability, and high-performance process bus applications.

- Redundant SV Stream Support - Subscribe to redundant SV streams with automatic or manual switchover for maximum reliability
- High Channel Capacity - Handle up to 96 SV channels per SIPROTEC 5 device - ideal for complex bay configurations
- Integrated Disturbance & Power Quality Recording - With the SIPROTEC 7KE85, gain deep insights into system behavior and power quality

Reliable Sample Synchronization

Accurate time synchronization is essential for SV in digital substations. SIPROTEC 5 offers a flexible and robust approach to ensure precise timing – with or without external time sources.

- Integrated IEEE 1588v2 Grandmaster – SIPROTEC 5 devices can act as PTP time servers, removing the need for external GNSS sources and ensuring independence from weather disruptions, jamming, or spoofing
- Enhanced Cybersecurity & Reliability – Enables isolated process bus operation, reducing dependencies and boosting system resilience
- Seamless Time Source Transition – Siemens-specific mode ensures uninterrupted process bus operation during time server transitions, avoiding protection function blocking
- Flexible Synchronization Options – Supports IEEE 1588v2/ PTP, PPS, and IRIG-B to suit various infrastructure needs

SIPROTEC 5 sample synchronization ensures your digital substation operates with precision, security, and stability – no matter the conditions.

Online Shop - Industry Mall

Expert Tutorial Series: SIPROTEC Process Bus

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