

SIPROTEC goes Process Bus

Build full digital substations with SIPROTEC

Description

Measurement of voltages and currents is necessary for protection. Currently sensors, delivering analog values, are directly wired to the protection devices. Since the relays in a substation are normally situated in a central building this wiring has to cover a distance. In an EMC critical area like a high voltage substation this demands high power signals resulting in big copper cables. For conventional instrument transformers this is proven technology.

In process bus a new approach is used. Instead of wiring the protection devices to the sensors a Merging Unit is placed near the sensor. The Merging Unit digitalizes the analog values and sends them via a Sampled Measured Value stream to one or more protection devices. The Sampled Measured Value stream is transmitted using fiber optical Ethernet, where EMC is no issue. As an additional advantage this enables new sensors that are not capable of generating high power signals.

The relays no longer have to sample the analog values but directly use the digital values out of the Sampled Value Stream.

Interoperability

Today's conventional instrument transformers provide an analog signal representing the high voltage signal. This is interoperable by definition. Measurement is done directly in the relays.

In process bus the interoperable interface is generated by the Merging Unit. The Merging unit works as a converting device. It converts proprietary sensor outputs to a standardized Ethernet based output. This additionally supports nonconventional instrument transformer.

To fashion interoperable devices in Energy Automation systems IEC 61850 was created. The standard not only covers message interchange based on IEC 61850-8-1 which is nowadays state of the art technology.



SIPROTEC 5 Process bus solution

In IEC 61850-9-2 the digital representation of analog values is standardized. This standard is the base for an interoperable process bus. Siemens supports IEC 61850-9-2 interface and focuses on interoperable solutions.

Benefits

- Minimize wiring by measuring directly at the sensors, operating at a central position and use of fiber optical Ethernet
- Enhanced safety by avoiding open wire condition at relays
- Easier extension / maintenance, adding a device only connection to the network necessary. No direct connection to the sensors required
- Maximum network reliability, through seamless redundancy protocols
- Interoperability ensured, standardized in IEC 61850-9-2
- Merging Units for conventional CT/VT offer process bus advantages without change in primary equipment



Devices

Siemens offers new Merging Unit SIPROTEC 7SC805 for conventional instrument transformers. This device allows conversion of current substations to process bus substations without change in the primary equipment. The advantages of process bus can be used, but also a mixed configuration of process bus / non-process bus is possible.



Merging Unit SIPROTEC 7SC805

The 7SC805 Merging Units are not only certified according IEC 61850-9-2LE for process bus applications but include a lot of additional features. Some, but not all, of the additional features are:

- extended temperature range (-40 °C – 70 °C)
- configurable 12 Binary Inputs / 8 Binary Outputs

**Please contact us for an individual consultation.
We are looking forward to your request!**

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The information in this document contains general descriptions of the technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.

- Time synchronization via PPS, IRIG-B or GPS
- full support IEC 61850-8-1 GOOSE

For SIPROTEC 5 relay family Siemens offers extension module PB201. This device extends all SIPROTEC 5 protection devices to process bus substations capable relays.

The extension module PB201 offers

- easy expansion of SIPROTEC 5 devices
- 24 channels for Sampled Measured Values
- On board resampling for maximum flexibility

Both SIPROTEC 7SC805 Merging Unit and SIPROTEC PB201 extension module support:

- PRP and HSR (IEC 62439)
- integrated Web-Server
- comprehensive engineering with DIGSI
- full integration of whole substations in process bus technology by keeping well known engineering concepts of SIPROTEC.

Siemens process bus solutions not only fulfill the standard but increase customer value beyond.

For more information, please contact your Siemens-Partner or our Customer Support Center.

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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).

This product includes cryptographic software written by Eric Young (eyay@cryptsoft.com).