Technical sheet

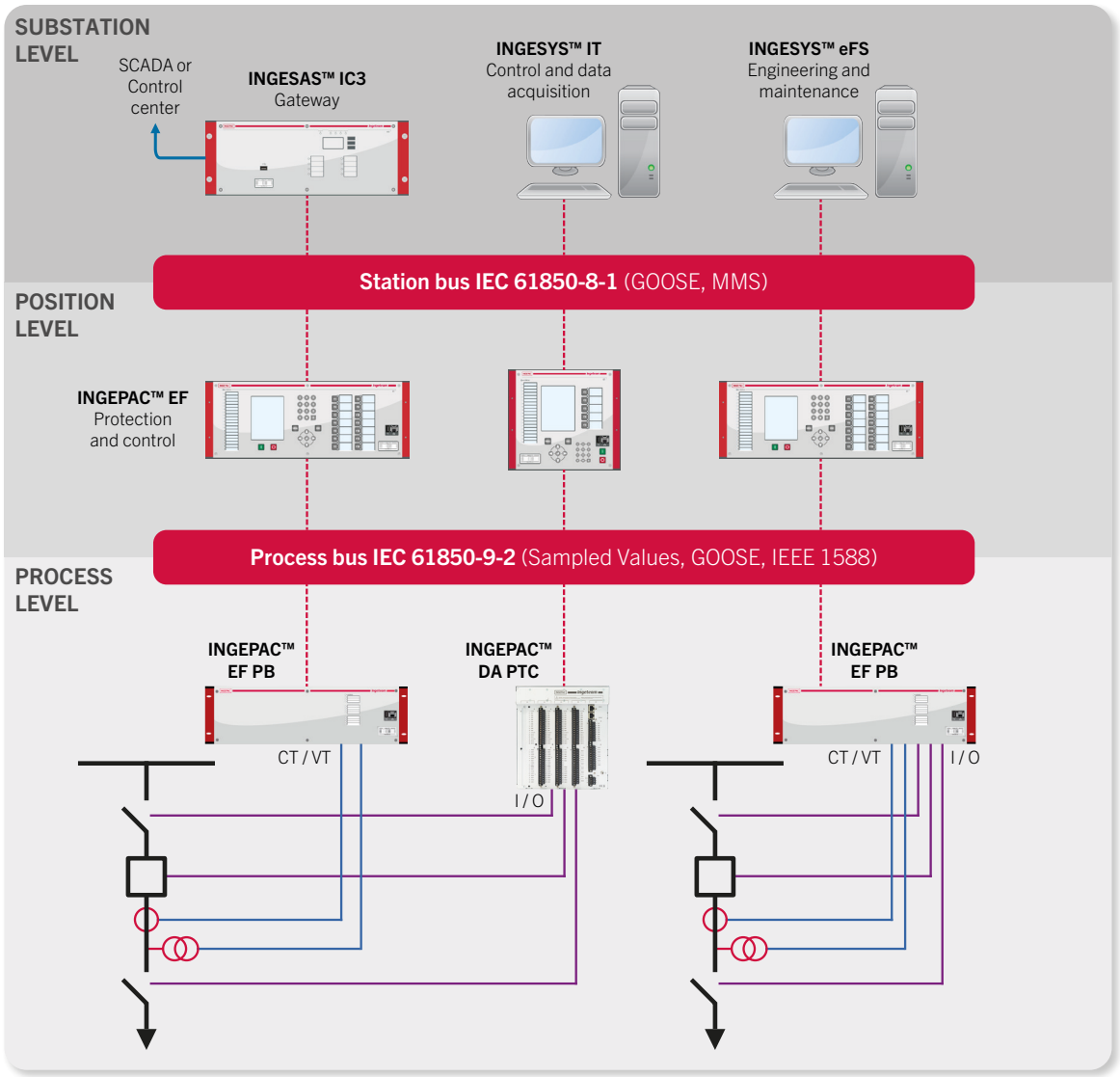
INGEPAC™

Process bus solutions

Digital substations

The evolution of the electrical grid in recent years and the advancement in the field of communications allow an increasing **digitization of the network**. The smart grid needs **information** to draw from, and this information is obtained from the substations and the equipment installed in it. This concept of information exchange has been called a **digital substation**.

The **process bus** is a communications network that allows the connection between the protection, measurement and control IEDs (Intelligent Electronic Device) and the primary switchyard equipment: voltage transformers, current transformers, circuit breakers, disconnectors, etc. The format in which the data is sent is standardized by the standards **IEC 61850-9-2** or **IEC 61869** for the case of analog values and **IEC 61850-8-1** for signaling and control values.



www.ingeteam.com
powergridautomation@ingeteam.com

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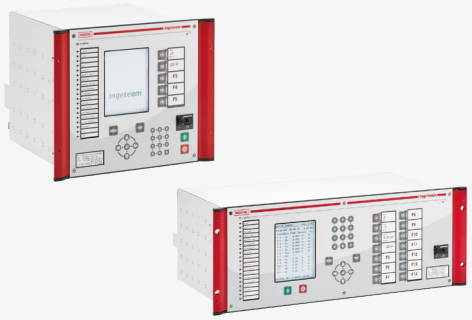
Main features

- IEC 61850 native platform
- Modular design
- High accuracy
- Event log and data adquisition in non-volatile memory
- Self-diagnostic
- IEC 62439-3 compliant HSR or PRP
- Programmable user logic with IEC 61131-3 based tools
- IEEE 1588 (PTP), SNTP, IRIG-B and PPS synchronisation
- Web access
- Cybersecurity
- Programmable with pacFactory free-licensed configuration software

Advantages

- Reduce copper wiring
- Use of standard hardware: simple, faster and reliable maintenance
- Reduce amount of labor and skill sets required
- Lower electrical failure ratings
- Improve measurements accuracy: shorter distance from CT/VTs to signal processor
- Low load in the CTs: wider measuring range, no saturation
- Detailed and real-time monitored diagnosis: faster recovery times
- Improve safety by achieving electrical isolation

Equipment



Protection and control IEDs

INGEPAC™ EF is a family of multifunctional, Intelligent Electronic Devices for grid and primary equipment control and protection applications that can be connected to merging units or electronic transformers.

- INGEPAC™ EF LD: Line differential protection
- INGEPAC™ EF ZT: Distance protection
- INGEPAC™ EF TD: Transformer differential protection
- INGEPAC™ EF BF: Breaker failure protection
- INGEPAC™ EF MD: Multifunction protection and control
- INGEPAC™ EF CD: Bay control unit

Merging Units

INGEPAC™ EF PB integrates conventional CT and VT into the process bus publishing the analog data as Multicast Sampled Values (MSV). Additionally, it allows GOOSE transmission/reception for control and monitoring.

Process I/Os Interface

INGEPAC™ DA PTC interface connects primary elements from the switchyard, such as circuit breakers, disconnectors or tap changers.

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