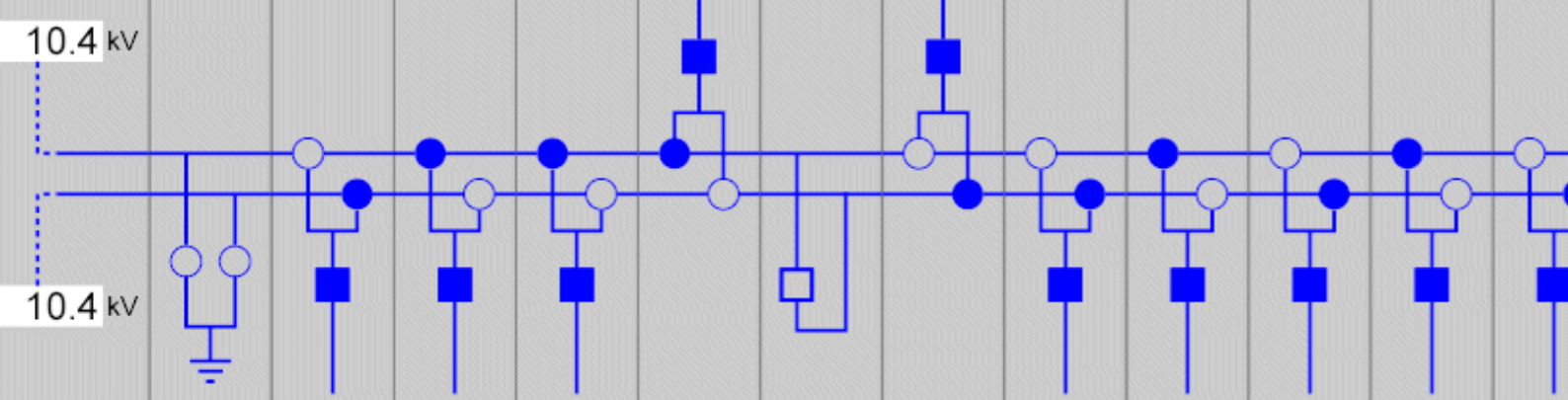


# SA**Sensor**<sup>®</sup>, the power of simplicity

## Long life substation automation



Spanning (kV)											
Nominaal (A)		400	400	400	1200	1200	1200	400	400	400	400
Stroom (A)		56	42	127	338	0	302	111	80	113	246
Thermische stroom (A)		56	45	128	333	0	303	112	84	114	240

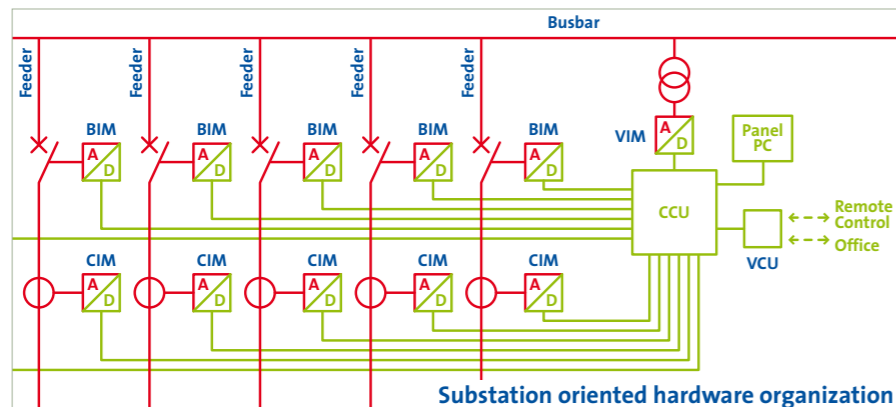
The unique idea behind the SA**Sensor**<sup>®</sup> technology is the separation between physical hardware (devices) and functionality (software). And moreover the separation of the long unalterable interface with the primary process (interface devices) and the fast ageing components (computing devices).

The double separation within the SA**Sensor** technology makes it possible to adapt it to the ever increasing demand of the grid, simply by software upgrades and/or computer performance improvements. The value of your present investment is guaranteed for decades.

SA**Sensor** covers the functional requirements of an integrated substation automation system and effectively resolves the perceived lifetime issues of digital equipment. SA**Sensor** offers e.g. the following functionality:

*Object oriented user interface is based on easy configurable real-time web technology.*

- Accurate data acquisition
- Remote and Local Control
- Alarm & Event handling
- Power Quality monitoring
- Digital Fault Recording
- (Directional) Time over-current protection
- (Directional) Earth fault protection
- Revenue metering
- IEC61850 compliancy



- Breaker Interface Module (BIM)
- Current Interface Module (CIM)
- Voltage Interface Module (VIM)
- Fiber optic Ethernet
- Computing device (e.g. CCU)
  - Protection
  - Control
  - Metering
  - IEC61850 compliant
- Communication Convertor (VCU)

# SA**Sensor**<sup>®</sup>

## Enables future needs

### Value of investment...

The SA**Sensor** technology is simple to understand. It consists of a few principle groups of physical devices.

The *interface devices* (called interface modules or *Sensors*) cover the digitization of the process values of voltage & current instrument transformers, position contacts and operation coils for switchgear and tap changers. Legacy secondary equipment is handled by the same type of devices. The expected technical and functional life of the interface modules will be more or less equal to the primary equipment.

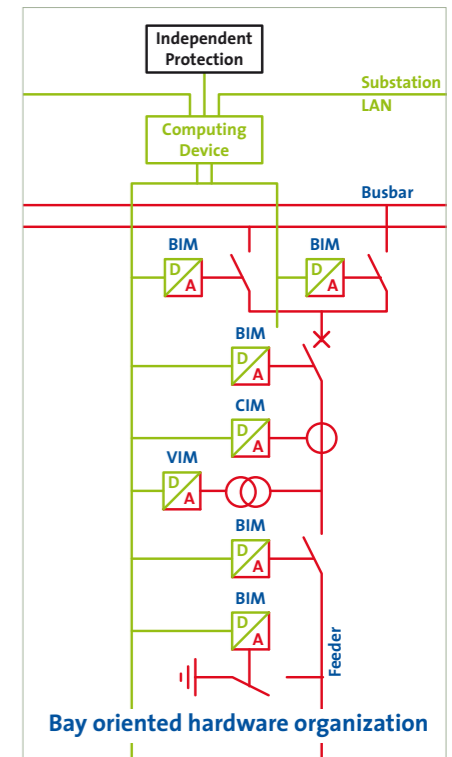
All functionality executes in software in *computing devices*. The computing device is always packed together with the Ethernet device. So they become

modular and scalable “one-box” units. They consist of Ethernet ports, an industrial single board computer and a substation hardened power supply. The communication media converter and active GPS antenna is also packed with an Ethernet device.

### Full functionality in software Simple upgrading

When new or different functionality is required, only the software in the computing device(s) need upgrading. Due to the over ranged specifications of interface devices, they remain untouched.

An easy and quick plug-and-play procedure is enough to install and configure the complete system.



*Dozens of systems installed*



# Nobody knows the future needs of Smart Grids!

## Therefore Locamation developed an open technology for a non-restricted future

### Functionality is software

All functionality is implemented in an open real-time software environment. The modularity of the software allows future upgrades and extensions to be implemented easily. Since the future requirements of a substation automation and protection system are not known today the feature of openness is not restricting you. The present release of SASensor with ready available functionality will give you a flying start. The comfort of future functional upgrading will give you an excellent position as a smart grid enabler.

### Basic substation automation functions

The SASensor functionality includes all common substation automation functions like control, alarm and event handling, interlocking, automatic voltage regulation – automatic tap changer control, configurable user functionality, legacy protocol conversion with remote control centers and so forth.

### Power quality

The sampling rate of the interface modules enable harmonics measurements up till the 50th harmonics. The power quality software in the control unit processes the data into a harmonic spectrum. All PQ functions are in accordance with EN50160.

### Protection

The current and voltage measurement interface modules are wide ranged and with proper dynamic specifications. The SASensor software contains the functions for (directional) time over-current and earth fault protection. The protection function will trip the concerning bay(s) by the breaker interface module. Other protection functions can be handled by external relays connected to the system on basis of IEC61850.

### WAN communication

For remote access the system supports secure connections called SAVPN™ with the outside world (WAN). This virtual private network technology enables accessibility for all authorized employees from any arbitrary location. Reading the on-line and stored data, and even upgrading of the system and application software can be done remotely.

### Revenue metering

The voltage and current interface modules are calibrated to compensate for value and phase errors. Additionally the errors of the conventional CTs and VTs can be measured as well and stored in an unique profile. The software in the computing devices uses these profiles to obtain revenue metering accuracy even on standard protection cores. At present the Dutch Metrology Institute (NMI) is evaluating this innovative method.

### Digital Fault Recording

Automatic monitoring of process disturbances enables the possibility for better process diagnostics. Digital Fault Recording is triggered by (user) definable events and stores sampled data steams and half cycle RMS values of all relevant process variables.

### Redundancy

Because all functionality is implemented in the computing devices solely, it is simple to duplicate the system. This creates redundancy for all functionality. All Interface Modules have a redundant fiber optic interface to support redundancy in the Ethernet switch and computing devices.

### Self-diagnostics

The technology is focused on the lowest possible level of undetected failures. Reliability and availability are maximized by design and architecture. The extreme high time coherency and accuracy of the data within the SASensor technology enable functions to check the plausibility and consistency of the overall information.

### Change Management

An integrated back-up system with version and change control ensures guaranteed management of data and software. With the SAServer™ functionality in the Remote Control Center it is possible to obtain fully automated backups and system management. The power of manageability is provided on all levels.

### Pilot projects

The system is implemented and tested in dozens of substations of Alliander, Enexis and Stedin in the Netherlands.

### New smart grid opportunities

Apart from substation automation and protection, SASensor offers a second important advantage. With the available digital data it is possible to develop new applications for a better management of the distribution networks.

Asset management, marketing & customer support, maintenance and engineering can improve by using the collected data for developing new algorithms performance optimization.

