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A - Introduction

**alfanar** provide complete Substation Automation System with system integrator of Sprecher-Automation. Sprecher Automation GmbH offers automation solutions for energy, industry and infrastructure processes. Our customers are power utilities, industries, transportation companies, municipal utilities and public institutions.

Company-own developments and cooperations with technology partners lead to a unique product portfolio consisting of traditional electrical technologies as well as high-tech electronics.
The SPRECON - V460 Energy Edition is a reliable and open platform with special features for the energy industry. Valuable configuration time is saved by optimized processes in SPRECON - V460 Configuration Editor and by fully integration into the SPRECON E – parameterization.

For large and small energy companies, industry companies with their own power supply, the SPRECON - V460 Energy Edition offers outstanding automation control, performance, stability and scalability. The SPRECON-V460 Energy Edition is tailored to the needs of energy generation, transmission, distribution and available in different licensable variables expansions for Server and Client.

- V460 meets all demands of modern control center systems concerning monitoring, evaluation of the processes, generation, Scaleability, Redundancy
- Beside the standard protocol IEC60870-5-104&101 and IEC61850 with built in handerds of proprietary protocols
- New consept to facilite V460 in all proesses vesaulization level
  • Local HMI
  • HMI workstations at station control Level , Machine control level or local power plant system
  • Hot standby , mulit hierarichical Scada system for Various graid and netwrok station like complete control center
Substation Automation System solution

C - SPRECON-E-C (Bay control unit for any voltage level)

- based on a uniform and modular system architecture in terms of hardware, data structures, communications logical function
- High scalability range the devices applied as RTU, BCU, Protection Device
- High performance and manufacturer-independent CPU acts as the core of the process oriented hardware with multi cards suitable for any processing input and output
- Support attachable control panel and alarm panel

D - Engineering software and work flow

- SPRECON-E Engineering center is workflow oriented software platform for SAS equipment’s it cover configuration parameterization, maintenance
- The platform designed to be comply with project management and international standards like IEC61850 incl.
  PRP functionality for seamless switch over in case of network.

- GPS (time synchronizing clock with SNTP, NTP and PRP functionality for seamless switch over in case of LAN problems)
E - Ethernet switch

( comply with IEC61850, PRP communication, HSR, RSTP )

- Using IEC61850 communication switch with different topology (Ring, star, Mesh)
- Fully Redundancy, with very high availability

F - Industry Work station

- high availability for client and server applications
- redundancy power supply, SSD storage HD, and FO ports with PRP

G - Protection IEDs

( all vendor comply with international standards, more than 300 legacy protocol supported )
Advanced Distribution Automation solution A–DAS

_alfanar_ provide complete Distribution Automation system, the competencies came from the partnership with one of the unique supplier worldwide and and _alfanar_ manufacturer capability for most of power Equipment’s like RMU.

PSI’s highly available energy systems play a key role in ensuring a stable and dependable supply of electricity, gas, oil, heat and water in the growing energy markets.

**A – PSI Control**

PSIcontrol was developed for maximum productivity increase of operational network management. With this control system, a small staff can reliably and securely operate very large networks with a high number of objects even during extreme information loads.

This increased efficiency is possible only by state-of-the-art application functions.

The sophisticated system technology provides the platform for the realization of the control system and its acceptance by the network management staff. The unique system-technical features are based on comprehensive network capabilities and the purposeful implementation of communication standards.

**PSIcontrol has been designed for sophisticated and economic management of**
- Electrical transmission networks,
- Regional electrical distribution networks,
- Networks for multi-utility supply of electricity, gas, district heating, and water,
- Railway electricity networks, and
- Industrial networks.
B - PSI system features

a) Structural Flexibility
Maximal structural flexibility in the control system design. A PSIcontrol control system is not limited in terms of location. It is possible to sub-divide the control system architecture and to set up sub-systems in different locations. This is particularly beneficial in terms of security and redundancy.

b) Highest system performance by parallel processing
The parallel processing provides the shortest possible system response and processing times, even during worst-case situations and extreme information throughput.

c) Unsurpassed Availability
Parallel processing structures can be added redundantly as needed without affecting the system performance. The PSIcontrol redundancy management handles all error situations even during occurrence of simultaneous errors or multiple errors. As long as one component on each system level remains functional, the entire system remains operational without limitations. In most of the implemented projects, availability of nearly 100% is achieved.

d) System virtualization provides additional potential for savings
Multiple sub-systems running in separate hardware components can be virtualised and run on less hardware.

C - DAS platform component

a) DAS software
- PSIcontrol

b) Power Equipment’s
- RMU, automatic reclosers, RTU, Servers, LCD etc

c) Communication system
- GPRS, Ethernet technology IEC6870-5-104, serial technology through fiber optics IEC6870-5-101
Smart SFA–RM (Gas Insulated Switchgears)

A - Overview

Alfanor new SFA RM is designed for supplying sustainable energy, protecting electrical equipment in secondary distribution networks up to 17.5 kV.

<table>
<thead>
<tr>
<th>Rated Short Time Withstand Current</th>
<th>21 kA / 1 Sec, 21 kA / 3 Sec, 25 kA / 3 Sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Arc Classification</td>
<td>A (FLR) 21kA / 1 Sec (indoor &amp; outdoor)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>100%</td>
</tr>
<tr>
<td>IP Class (Gas Tank / Indoor / Outdoor)</td>
<td>IP 67 / IP41 / IP54</td>
</tr>
<tr>
<td>Applied Standard</td>
<td>IEC 62271-100</td>
</tr>
<tr>
<td></td>
<td>IEC 62271-200</td>
</tr>
<tr>
<td></td>
<td>IEC 62271-103</td>
</tr>
<tr>
<td></td>
<td>IEC 62271-102</td>
</tr>
<tr>
<td></td>
<td>IEC 62271-1</td>
</tr>
</tbody>
</table>

B - Features

- Self-power RMU
- 3G/4G Communication, VPN Security “IPsec”
- IEC60870-5-104/101 and DNP3
- Accurate Measurements for voltage and current in all switching elements
- Switching units sealed in SF6 gas filled stainless steel tank
- High level operator safety and operating reliability
- Maintenance free unit offering life expectation of over 30 years
- With embedded cable testing compartment, easy and safe cable testing Without cable connection removal
- Smart interlocking with padlocking system for maximum operator safety
- Different feeder combinations with switch disconnector and vacuum circuit breaker
- High resistance to pollution and humidity
- Compact design up to 17.5 kV
- KEMA & CESI type tested
C - Smart SFA-RM, main component

a) ZIV-TCA/D (RTU with built-in directional Fault Passage Indicator)

Key Features of ZIV-TCA/D
1 - Powerful programmable logic engine.
2 - 2500 event log and five Fault Registers (TCA-D/E 4000).
3 - Oscillography recorder (five COMTRADE files and a sampling rate of 7200 Hz).
4 - Diagnosis and Maintenance WebUI.
5 - TCA-D/E:
   - Up to 5 FPI functions per IED.
   - Up to 64 digital inputs.
   - 16 configurable digital outputs for alarm signalling or LBS control commands.
   - 24 analogue channels.
   - Voltage measurement supported: directly in busbar or installed in feeder bushings.
   - 4000 event logger and oscillography recorder function (sample rate 4800 Hz).
   - Fault Isolation Automatism (FIA).
   - Cybersecurity: Authentication and encryption

b) Power supply and batteries:
   The proposed Smart RMU is self-power unit, the supplied power come from the CPT (Control Power Transformer) connected directly to the live bus and provide the LV circuit by 220VAC.

All used equipment like: aux relays, RTU, modem & trip close motors coils are operate by 24VDC which come from the AC/DC converter capable to provide a sufficient power, also this unit has battery system to ensure the sustainability of the power supply.

c) ZIV-IRS (Self-Powered Overcurrent Protection)
   Where dependable auxiliary power source is not available, the IRS Relay can be energized either directly from Main Current Transformers, AC/DC Auxiliary Voltage or through the USB Front Port.
Integrated solutions for HV, MV & LV Systems and Metering

Substation Automation Systems (SAS) for transmission and distribution substations

Robust and flexible solutions for integrated protection, control and telecommunication systems. Our support centers provide engineering services based on experience and latest technology to optimize the cost and resources of every single project, based on:

- Well experienced protection, automation and communication engineers.
- A full range of products with in-house developed technology: P&C, Communications, Automation
- Dedicated R&D & Application resources to fully support the products.
- A total commitment to customer satisfaction.

Clients
- Generation, Renewables, EPCs & Industrial Companies

TSOs
- Substation Automation Systems: Gateway, HMI, protection, telecommunication and networking
  Engineering services, training and commissioning

DSOs
- IEC 61850 ed 2 certified
  IEDs for digital transmission and distribution substations.

Solutions
- DER Integration (ZIV - ANM)

Products
- Distance, Line Differential, Feeder, Transformer Protection Relays
- Capacitor Bank Protection Relays
- Automatic Voltage Regulator (AVR)
- Busbar Protections

Substation Gateways
- HV Powerline Carrier & Teleprotection Systems
- Plus networking solutions
**Distribution Automation Solutions**

Advanced systems providing intelligence to underground and overhead MV / LV networks.

To improve distribution grid visibility and manageability, to face the constraints introduced by growing DER, to reduce energy losses and to increase the quality of supply.

**Metering & EV Charging Solutions**

A complete, interoperable and standard based solution portfolio from the pioneer company in large metering rollouts.

As experts in metering, we also develop intelligent EV charging solutions compatible with Charge Management Systems.

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**Retailers & Consumers**

**AMI**

LV Grid monitoring
Advanced metering and supervision
Device integration
IED management

**EV Charging Solution**

**Retailers & Consumers**

**AMI**

LV Grid monitoring
Advanced metering and supervision
Device integration
IED management

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**MV**

MV Grid monitoring, automation and protection
Underground and overhead lines
Secondary substation
Circuit breakers
Microgrids

**LV**

LV Grid monitoring
Advanced metering and supervision
Device integration
IED management

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Substation Gateways
HV Powerline Carrier & Teleprotection Systems
Plus networking solutions

LV supervision devices
Routers, switches
Sensors & Couplers

PLC, 4G LTE & radio single and three-phase smart meters. DCUs, gateways and complete smart grid cabinets