1) Turbine controller and protection system (TCS/TPS)

We design and implement control and protection systems for turbines of all types and outputs from basic design through implementation at the customer to warranty and post-warranty service

Solution options:
- Field instrumentation and cabling
- Data collection and their processing in the control system
- Visualization
- Communication with other power unit systems
- Control of auxiliary technologies, eg synchronization of turbine rotating equipment

Technical requirements for the control system:
- The turbine island control system works in real time. It consists of autonomous redundant microprocessor stations capable of independent operation and independent of the function of other control systems of the unit.
- We supply the turbine controller (TCS) in a redundant design with a duplex I / O interface.
- We provide the turbine protection system (TPS) in a redundant design with a triplex I / O interface for the implementation of a selection of 2 out of 3 for triple measurements and control of triple actuators.

For TCS, we offer our own SandRA Z200 control system or control system compatible with the control of the entire unit according to customer requirements.

2) Turbine controller (TCS)

The main tasks performed by the turbine regulator:
- Reading, filtering and verification of process data
- Regulating loops
- Binary logic control
- Communication with the visualization system
- Data exchange with other systems and with the superior control system
- Technological requirements - special tasks

Regulating loops:
- Regulation valve (RV)
- AP revolution, power and pressure regulation

Other modes:
- RV manual control
- Island operation (operation in a separate network)

Special tasks:
- Revolution measurement (speed and accuracy requirements)
- 3 revolution sensors (eg EPRO PR9376)
- Selection and verification 2 of 3 measurements, evaluation of levels and forbidden speed acceleration, max. speed
- Processing of the entire speed control loop up to 20ms
- Control of HV hydraulics elements (speed requirements)
- Implementation of a position loop for controlling regulation valves
- Calculation processing time 5 ms

Compact turbine regulator Z211 CTC

The compact Z211 CTC turbine controller is an alternative to the robust SandRA Z200-based TCS / TPS systems. It is based on customer requirements for cheap and simple solutions for the regulation of small turbines in thermal and hydro power plants. The compact turbine controller can be built into a suspended switchboard. The main part of the switchboard are user-programmable units of the SandRA Z211 file fulfilling the TCS / TPS functions. A control computer can be installed on the front door to control and parameterize the system.

The compact TCS / TPS system can be used both for new orders and for the replacement or reconstruction of existing systems.

Customers are electricity operators, EPCs or technology suppliers.

Advantages of compact turbine regulator (from the customer's point of view):
- Ability to respond to the requirements of technology operation
- Possibility of individual solution due to implementation at the SandRA instrumentation
- The same quality of production as other ZAT products
- Lower price than the Z200 instrumentation, lower than the competition
- The same delivery parameters as for other ZAT projects
- Faster and cheaper solution design
- Availability of all support for the operation of the control system - documentation, individual configuration

3) Turbine protection system (TPS)

The main tasks realized by the turbine protection system:
- Reading, filtering and verification of process data
- Binary logic control - protection algorithms
- Evaluation of the first received message
- Communication with the visualization system
- Data exchange with other systems and with the superior control system
- The system is certified in the safety integrity level SIL3 (Safety Integrity Level) according to a number of standards ČSN EN 61508

4) Turbine generator synchronization (TGS)

The synchronization of the turbine rotating equipment is designed on the SandRA Z110 system. It is used for smooth connection of the rotating device to the turbine during shutdown of the machine unit. Used communications: Ethernet, CAN, USB

We provide monitoring and visualization with the help of products from Czech and foreign manufacturers. The Czech manufacturers are Geovap (Reliance) and Moravské přístroje a.s. (ControlWeb), producers of software applications. The foreign manufacturers are Aveva (InTouch) and Siemens (WinCC).

The diagnostic system is part of the SandRA Z200 process stations.