



Elektrometal Energetyka SA



# SCADA System e<sup>2</sup>YANKEE



00 Konstrukcja

Elektrometal Energetyka SA  
**FT1 TELEMECHANIKA**



Elektrometal Energetyka SA

Elektrometal Energetyka SA  
**FR1 TRANSFORMATOR 110/15 kV TR1**



EL-SIGMA  
AJ WIĘCEJ  
ODDUKTAM  
KI



## Energizing ideas!

Backed by a team of experienced specialists, ELEKTROMETAL ENERGETYKA SA offers services in the field of solutions for the power industry.

We employ professional engineers with great practical knowledge and years of industry experience. Combining the synergy of our competences with openness to innovative ideas and leading edge practices that guarantee the highest quality of services, we strive for harmonious, dialogue-based partnership with Customers, building trust by immediately responding to their needs.

Apart from manufacturing medium-voltage switchgears and switching devices as well as digital protective relays, we offer additional services that maximize efficiency and minimize costs. Customers will benefit from our innovative proposition, integrating the finest, proven solutions for the energy industry and customising them based on individual needs.

We constantly increase our potential and improve our offer. We are a rapidly growing business that stays on top of industry trends.

At Elektrometal Energetyka SA, our golden rule is clarity of procedures and documentation. We prioritise our Customers' needs, such as reliability, simplicity of use, problem-free operation, and intuitive design of devices. We believe that with positive energy in relations, both sides can achieve much more, and that is why our team remains fully dedicated to the partnership.

Our company is built on a belief that Customer trust and satisfaction are the cornerstones of success. That is why the high quality of our solutions is one of ELEKTROMETAL ENERGETYKA SA's most distinctive features.

We operate an Integrated Management System that comprises: an ISO 9001 Quality Management System, an ISO 14001 Environmental Management System, and an OHSAS 18001 Occupational Health and Safety Management System. Our implemented systems conform to the highest standards of management and dictate the daily practices in our operations, which aim at offering professional services to our Customers while maintaining the highest standards in terms of health and environmental protection. Our products hold certificates confirming full type testing performed by bodies such as the Institute of Power Engineering and the Electrotechnical Institute in Warsaw.



# FEATURES OF THE e<sup>2</sup>YANKEE SCADA SYSTEM

e<sup>2</sup>YANKEE is a state-of-the-art, user friendly and intuitive SCADA class control system designed for monitoring power stations. Its main functions are to visualise current switchgear statuses, control switching devices, display and archive measured values, read and manage event, fault and criterion recorders of individual safety devices, and access and analyse historical data with the ability to create reports. In a typical implementation, the system comprises a hub cabinet containing a server to gather and archive data, communication devices, and a local/service station as well as external operator stations. The system's scope of functionality is customised on a case-by-case basis.

e<sup>2</sup>YANKEE can be managed from traditional operator stations (local or remote), mobile devices (laptops, tablets and smartphones) or through the internet (web browsers). The system offers alarm status notifications via e-mail or text message and supports multiple displays and numerous languages.



Synoptic diagram of the e<sup>2</sup>YANKEE system for switchgear in the MV substation



Implementations map of the e<sup>2</sup>YANKEE system in Poland

# FEATURES FOR THE e<sup>2</sup>YANKEE SCADA SYSTEM FOR PV FACILITIES

The e<sup>2</sup>YANKEE supervisory system has a function dedicated specifically to RES (Renewable Energy Sources), including photovoltaic and wind farms. Thanks to its modular structure, it can be extended according to the customer's possibilities and needs, e.g. during a step-by-step modernisation by adding more switchgear or even single panels, or by replacing the protections themselves. There is the possibility of remote access, facilitating the operation of many farms simultaneously, far from the investor. The e<sup>2</sup>YANKEE system allows up to 1,000 farms to be operated at the same time. In addition, e<sup>2</sup>YANKEE offers the possibility for the investor to manage the energy part of the farms and a two-way exchange of information with the systems of the DSO and TSO at the request of the client.



Synoptic diagram of the e<sup>2</sup>YANKEE system for photovoltaic farm and MV substation

## APPLICATION

e<sup>2</sup>YANKEE's modular design makes it the choice for both small and complex sites. The system can be used to control sites running multiple devices as well as multi-device substations (transformer, distribution stations). e<sup>2</sup>YANKEE is ideal for dispersed systems collecting data from multiple sites (e.g. stations located within an administrative region). It can operate and control complex systems (a single system running the switchgear, CCTV, other devices such as pumps, belt conveyors, turbines, mills, etc.) as well as production processes (e.g. producing electrical energy in hydropower plants or wind farms) with metering and reporting functions. It can be used to control rectifiers and inverters, UPS devices, generators and skids, operate power-system protection devices, PLCs, network analysers, recorders, metering transducers, utility meters (energy, water, gas, heat) and other devices allowing for remote data retrieval.

The e<sup>2</sup>YANKEE SCADA system allows viewing from cameras installed in switchgear bays, giving information about the current position of apparatuses. The functionality allows the dispatching staff to see the so-called visible break in the circuit, which increases the safety of work on the site.



outdoor and overhead switchgears



CCTV cameras



wind and solar power plants bays



water and biogas plants bays



other industrial equipment

## ADAPTABILITY

The e<sup>2</sup>YANKEE system is designed with future upgrades in mind, allowing Customers to increase its functionality as needed. Examples of such additional functionality include: a grounding log module, station operation command management module (issue, approve, accept), a feeder passport module to save any text information related to a specific feeder (e.g. equipment parameters, maintenance schedules), and a power guard module to set the ordered capacity for incoming and outgoing feeders along with balancing.

## BENEFITS



**can be integrated with multi-display stations**



**camera view**  
control of the current position of the devices in the switchgear



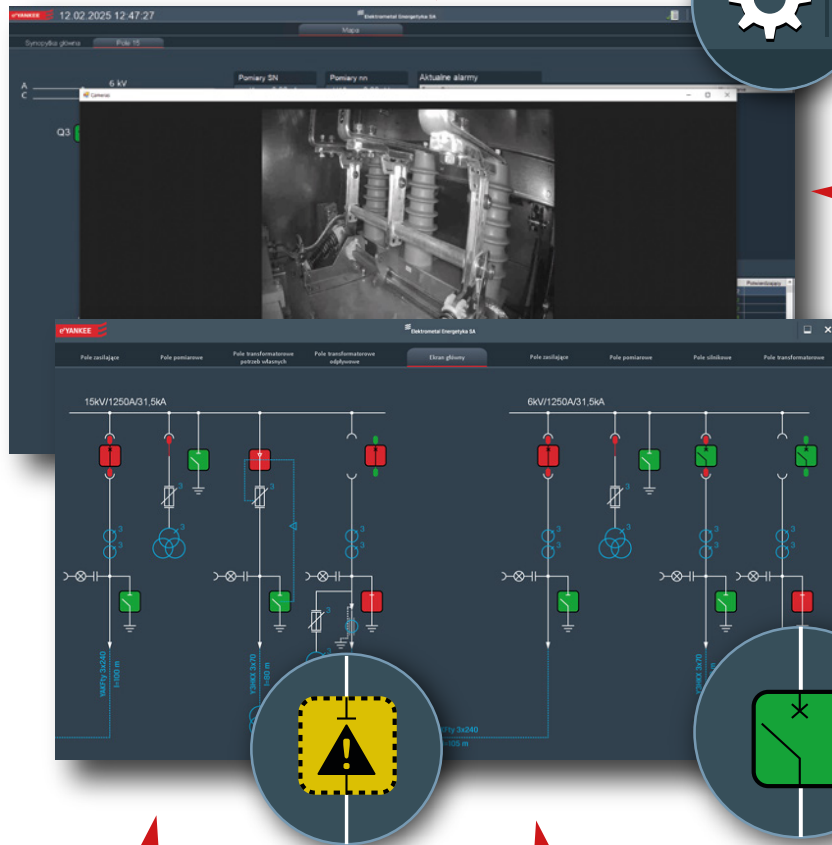
**access control and multiple languages**

controlled access to operating functions, ability to switch languages "on the fly"



**constant data readout and archiving**

archiving measured values, events from bay controllers and fault recorders, clearing events, archiving and creating reports



**alarm statuses**



**access to application in a web browser**

using the most common browsers



**remote notifications**

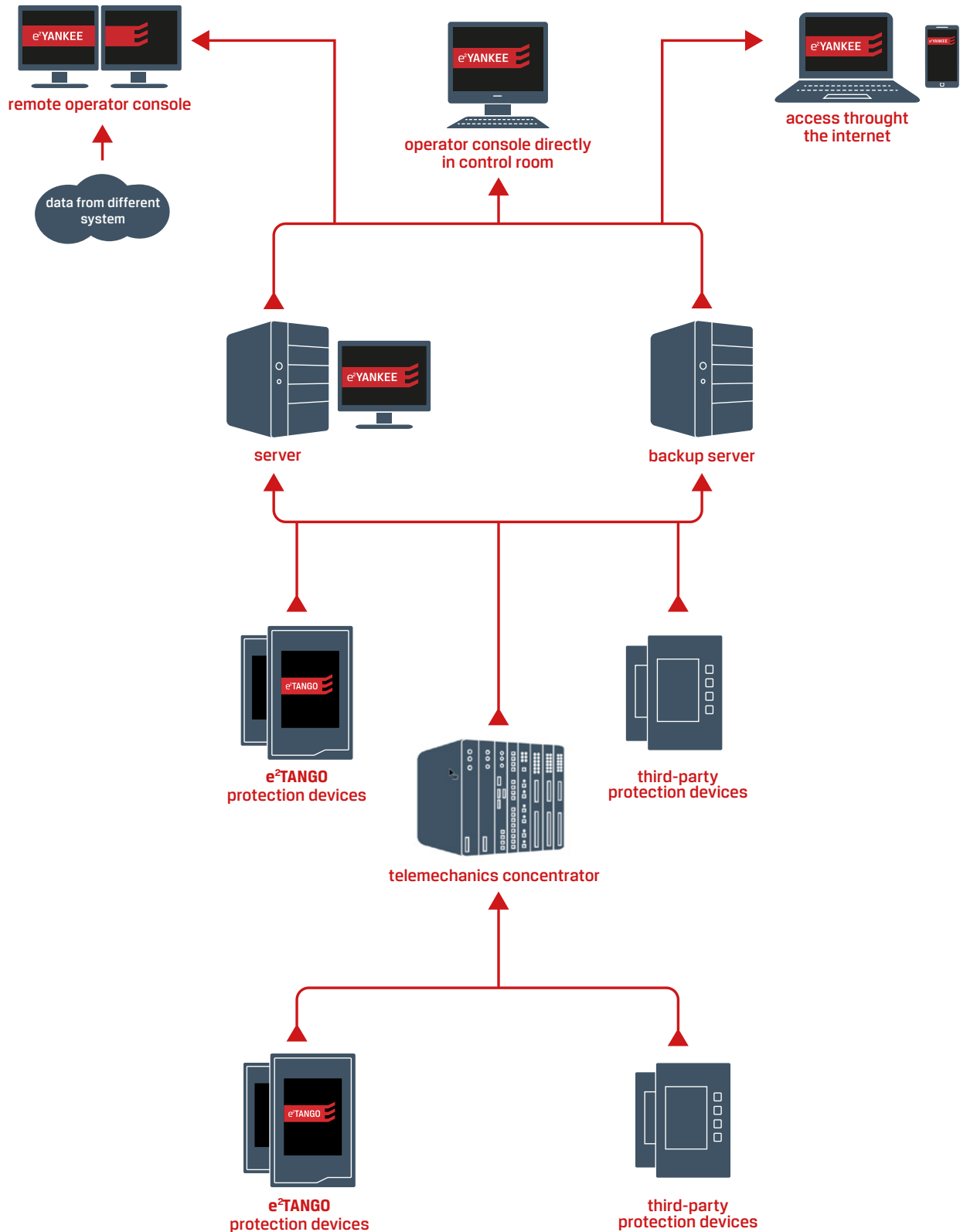
notifications through text and e-mail messages

**interactive visualisation**

switchgear status updates with option to operate switches

# SYSTEM STRUCTURE

With e²YANKEE's modular design, the Customer can achieve any configuration based on their needs and expected reliability. Smaller systems based on a single operator station collect data from and control devices. Medium systems are equipped with a data collecting hub and a local or remote operator console accessed through the internet. Large systems can include multiple hubs with full redundancy as well as numerous operator consoles and remote stations accessed through the internet for the purposes of system operation.



## ACCESS TO DEVICE DATA

e<sup>2</sup>YANKEE allows for real-time readout and archiving of recorder data. With data collection functionality, the user can perform analysis at a later date. Data collected from the event recorder is displayed in an intuitive table layout. Events can be displayed all at once or individually for each feeder and can be filtered by category. Fault recorder data is archived in COMTRADE format and can be accessed through a browser supplied with the e<sup>2</sup>YANKEE system or through any software that supports the format.

## COMMUNICATION

e<sup>2</sup>YANKEE supports numerous types of communication protocols. Internal communication is based on typical network devices that can operate in ring or radial type layout. Communication with devices (controllers) is based on protocols and communication interfaces shared by the devices.

To increase reliability, e<sup>2</sup>YANKEE can connect to devices by means of numerous independent communication channels, e.g.: Ethernet as the main channel and RS485 as the backup channel.

Supported communication standards:

- ethernet
- RS485 serial interface
- optical fibre connection (single-mode, multi-mode, plastic)
- GPRS
- GSM/LTE
- radio connection
- current loop

Examples of supported data exchange protocols:

- modbus RTU
- modbus TCP
- modbus ASCII
- DNP3
- IEC 61850
- OPC/OLE/DDE
- other protocols according to customer requirements

## ACCESS CONTROL

Our solution offers a multi-layer authorization and access control system for the application. An unlimited number of system operators can access the application. At the same time, the system offers multi-layer authorization restrictions which allow only select operators to access and operate connectors, view statuses and manage events. Depending on credentials, any user or user group can have their access to parts or the entirety of the application restricted.

## MODERNIZATION

The flexible design of e<sup>2</sup>YANKEE allows for multi-stage upgrades. Depending on the Customer's needs, e<sup>2</sup>YANKEE can be upgraded with additional operator stations as well as remote consoles accessed through the internet. The interface can be enhanced with new functionalities and support for further controllers (protective devices). Full scalability allows for effortless modernization of the communication and server portions of the system. At any time, the system can be equipped with redundant devices and additional communication channels.

Depending on the configuration of the system, we also supply communication cabinets together with the application, including server cabinets with redundancy in various types of local and remote communication. The e<sup>2</sup>YANKEE system can function in a server cabinet (telemechanics cabinet), among other things, by collecting data from the switchgear bays, not only monitoring the operation of the equipment, but also making it possible to control it.

For distributed facilities such as photovoltaic or wind farms, we also supply smaller facility cabinets where the e<sup>2</sup>YANKEE system interacts with inverters, collects weather data and enables investors to control power.



PV object cabinet



Telemechanics cabinet

## RTU CONCENTRATORS

Elektrometal Energetyka has a range of RTUs that can act as a data concentrator or protocol gateway enabling the collection and processing of data from multiple devices within a substation using various protocols used in the power generation and industry.

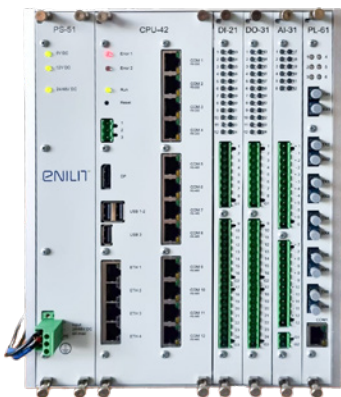
An RTU is a microprocessor-controlled electronic device that connects objects in the physical world to a distributed DCS or overarching supervisory and SCADA control system (e.g. e<sup>2</sup>YANKEE). Thanks to its modular and open architecture, it is used in automation solutions in, among other areas:

- electricity generation
- monitoring and control of chemical and petrochemical plants and pipelines;
- traffic control systems (railways, metros, trams);
- data acquisition and control in building engineering systems (escalators, lighting, air conditioning);
- electricity transmission and distribution networks;
- municipal and regional utility networks (gas, electricity, water, sewerage, district heating).

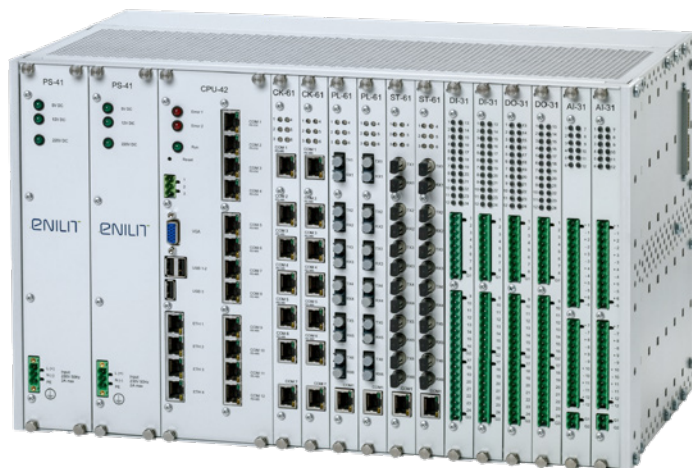
The Enilit RTUs are available in standard 19-inch 6U frames made of high-quality aluminium. The RTUs are modular and can be expanded with additional cassettes for more extensive applications. Half RACK, backplane-mountable solutions are also available. The variety of expansion cards makes it possible to adapt the configuration to actual needs and to expand in the future.

The primary task of the Enilit RTU is to collect directly connected process information and transmit it to a higher-level control system such as the e<sup>2</sup>YANKEE SCADA system. The unit can communicate with various subordinate RTUs, IEDs and master RTUs, SCADA systems using all available protocols at the same time. Each communication port is independently programmable for individual protocols.

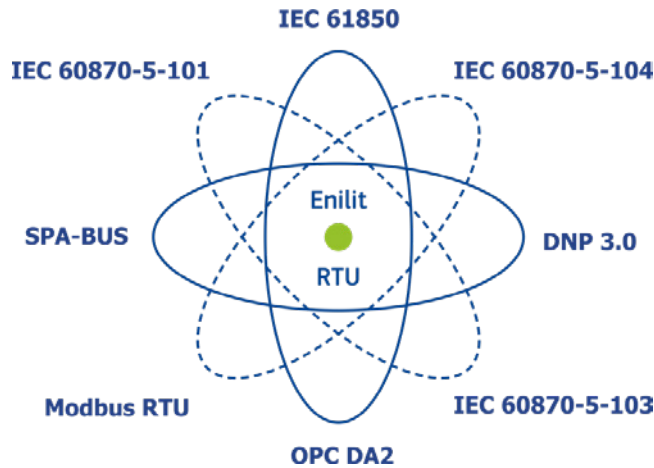
Enilit RTU concentrators enable redundancy in both the power supply and processing areas. It is possible to build in two independent galvanically separated power supply modules in each cassette. Two redundant CPU modules can also be built into a single cassette. A redundancy function between independent Enilit RTU Concentrators is also available. In addition to cassette-based solutions for the professional power industry, we also offer DIN rail-mounted mini RTU Concentrators for smaller applications such as PV farms or distribution stations in industrial facilities.



RTU Concentrator Small - half-Rack



RTU Concentrator - full Rack



Protocols supported by the RTU concentrator

## TECHNICAL PARAMETERS OF THE ENILIT CONCENTRATOR

<b>POWER SUPPLY</b>		<b>STANDARD DIGITAL OUTPUT MODULES</b>	
PS-1	230 AC/DC	Outputs	24 x single-pole relay with 1x NO contact
PS-31	110 DC	Capacity	AC15, 250 VAC, 3 A
PS-51	48 DC		DC13, 24 VDC, 2 A
<b>CPU</b>			DC13, 250 VDC, 0.2 A
Family	Intel Atom 64-bit, 1.6 Ghz	<b>ANALOG INPUT MODULE</b>	
Cache	2GB RAM DRAM	Inputs	12x optically isolated analog input
Embedded memory	32GB SSD (software, databases, events, waveforms)	Range	AI 31 current: -20 mA to +20 mA AI 31 voltage: -10 V to 10 V
Communication ports	4 x Ethernet port (10/100/1000 Base-TX) 12 x COM RS232/485 ports (RJ45 interface)	Communication Modules	6 x RJ-45 or FO ST/PL (IEC 60870-5-101/103, DNP 3.0, Modbus)
<b>OTHER CPU VERSIONS</b>		Operating temperature	-25 ~ +85°C
CPU 41	12 x RS485 ports	Operating humidity	0 ~ 95% RH without condensation
CPU 42	4 x RS232 ports 8 x RS485 ports	Dimensions	265.9x482.6x238
CPU 43	8 x RS232 ports 4 x RS485 ports		
CPU 44	12 x RS232 ports		
<b>STANDARD DIGITAL INPUT MODULES</b>			
Inputs	24x optically isolated digital input		
Input signal	digital, BCD code, pulse counter		
Range	DI 11: 24 VDC (16...30 V) DI 21: 48 VDC (34...72 V) DI 31: 110 VDC (80...150 V) DI 41: 220 VDC (150...264 V)		

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