DNU24:

Analog measurement

DC voltage (0 - 1000 V)	5 inputs
AC voltage (0 - 300 Veff)	6 inputs
DC currents (-1000 - 1000 A) or AC currents (0 - 1000 A)	3 inputs
Temperature	2 inputs

Digital inputs

Alarms (galvanic isolation)	4 inputs

Digital outputs control signals

Opticaly isolated	2 outputs
Realised with relays	2 outputs

Monitoring and Control center:

PC computer with Windows XP Professional

Software

GUI software for monitoring and control center
Software for control of AC voltage wave shapes
Communication software
Software for control
Administration software
Statistical data analysis software
Database software
Software for connecting with main center for monitoring and control

Interfaces

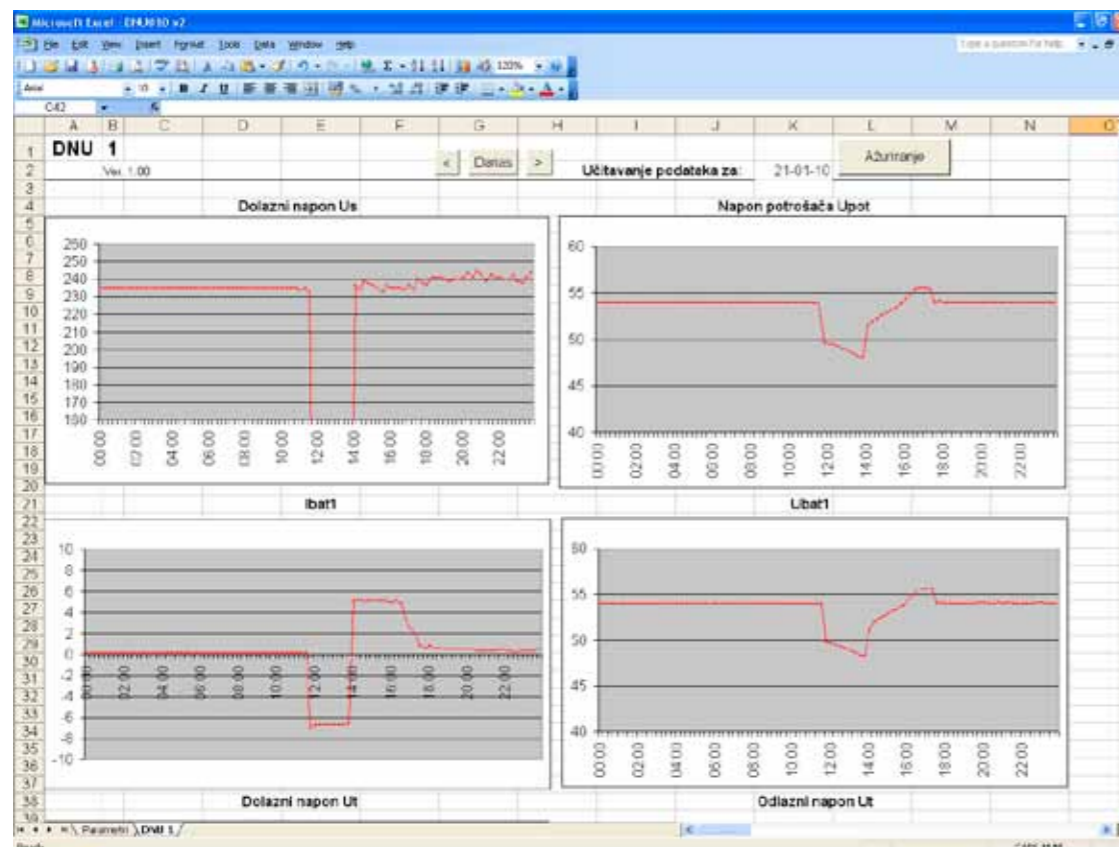|	
Local communication with other equipment	RS232, RS485
Communication with control and monitoring center	ISDN, Ethernet, GPRS

Constructed and tested according to

Safety	EN 60950 (UL1950)
EMC	EN 55022/CISPR22, class A

Environmental conditions

Working temperature	0 to +50°C
Dimensions (W x D x H)	440 x 210x 55 mm
Weight	3 kg

IRITEL a.d. BEOGRAD

POWER ELECTRONICS

SDNU
SYSTEM FOR REMOTE MONITORING & CONTROL OF POWER ELECTRONIC DEVICES

- Simultaneous monitoring and control of power electronics from different vendors, technologies and generation
- Modular system for monitoring and control of power electronic devices in remote locations:
  - Peripheral device for monitoring and control - DNU24
  - Monitoring and control center (local)
  - Main monitoring operations center
- Peripheral device for monitoring and control - DNU24:
  - Continuous measures of electrical and non-electric values in the remote objects and data forwarding to the monitoring center at its request
  - Measured electric and non-electrical values can be wireless send to DNU24
  - Monitoring of alarms and in the case of their appearance forwarding to the monitoring center
  - Control signals from the monitoring center are forwarded to power electronic devices which is possible to control
- Communication between monitoring and control center and DNU24 through TDM, IP and GSM telecommunication network
- Communication between monitoring and control center (local) and main monitoring operations center through SNMP
- Remote control of batteries quality with and without additional load

System Description

Monitoring and control system, for power electronics devices at remote locations, contains different number of DNU24 devices. Each device collecting and transmitting data to monitoring and control center.

DNU24 is connected with monitoring and control center over TDM (modem, ISDN), IP (Ethernet 10/100 baseTx) or GSM (GPRS) telecommunication network. Type of connection is defined by user in accordance with technical availability.

DNU24

- Capacity of DNU24 are 16 analogue and 8 digital signals
- Measurement and sending data related to electrical values: dc voltage, ac voltage, dc current
- Capturing, and sending to the monitoring and control center, signal wave shapes with 1 ms resolution
- Capturing, and sending data related to incident situations: measuring values 250 sec after and before incident happened
- Measurement and transmission of different values - temperature, pressure, liquid level and other non electrical values
- Data are collected and memorized in internal memory of DNU24 every 1 s
- Monitoring and control center collects data from DNU24 every 15 minutes
- Digital alarm signals, generated from devices under monitoring, DNU24 send to monitoring and control center immediately after their detection
- DNU24 have capacity of control over 4 output digital signals and over RS232 interface
- In case the power electronic devices have own ability for their remote control, DNU24 send their collected data to the monitoring and control center

Battery capacitive test

- Optionally connecting of batteries to additionally test load
- Recording batteries current discharge curves
- Comparison with manufacturer catalogue discharge curve
- Estimation of batteries quality

Monitoring and Control Center

PC with installed necessary software are located in center for remote monitoring and control. Measured data from DNU24 are periodically collecting. Data is stored in the particular database.

In the monitoring center, all data are presented in a clear manner so that the operator have a clear picture about the current state of the system. It is possible to generate a report with the results of measurements over a defined period of time.

On the monitor in the center for monitoring and control are presented:
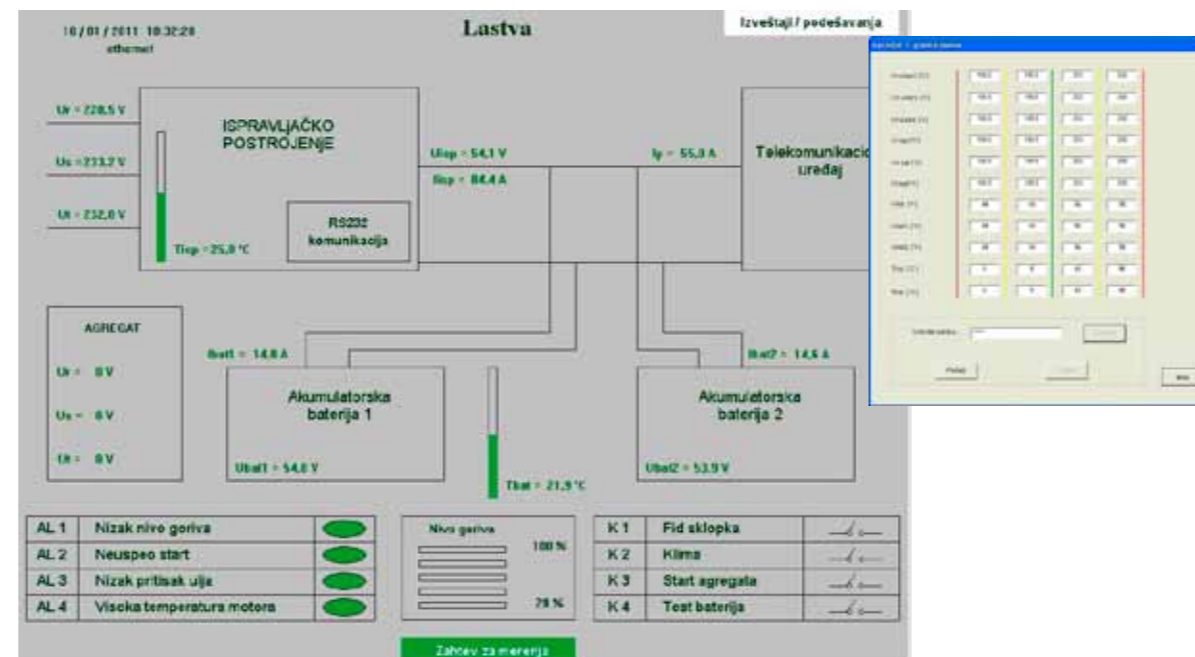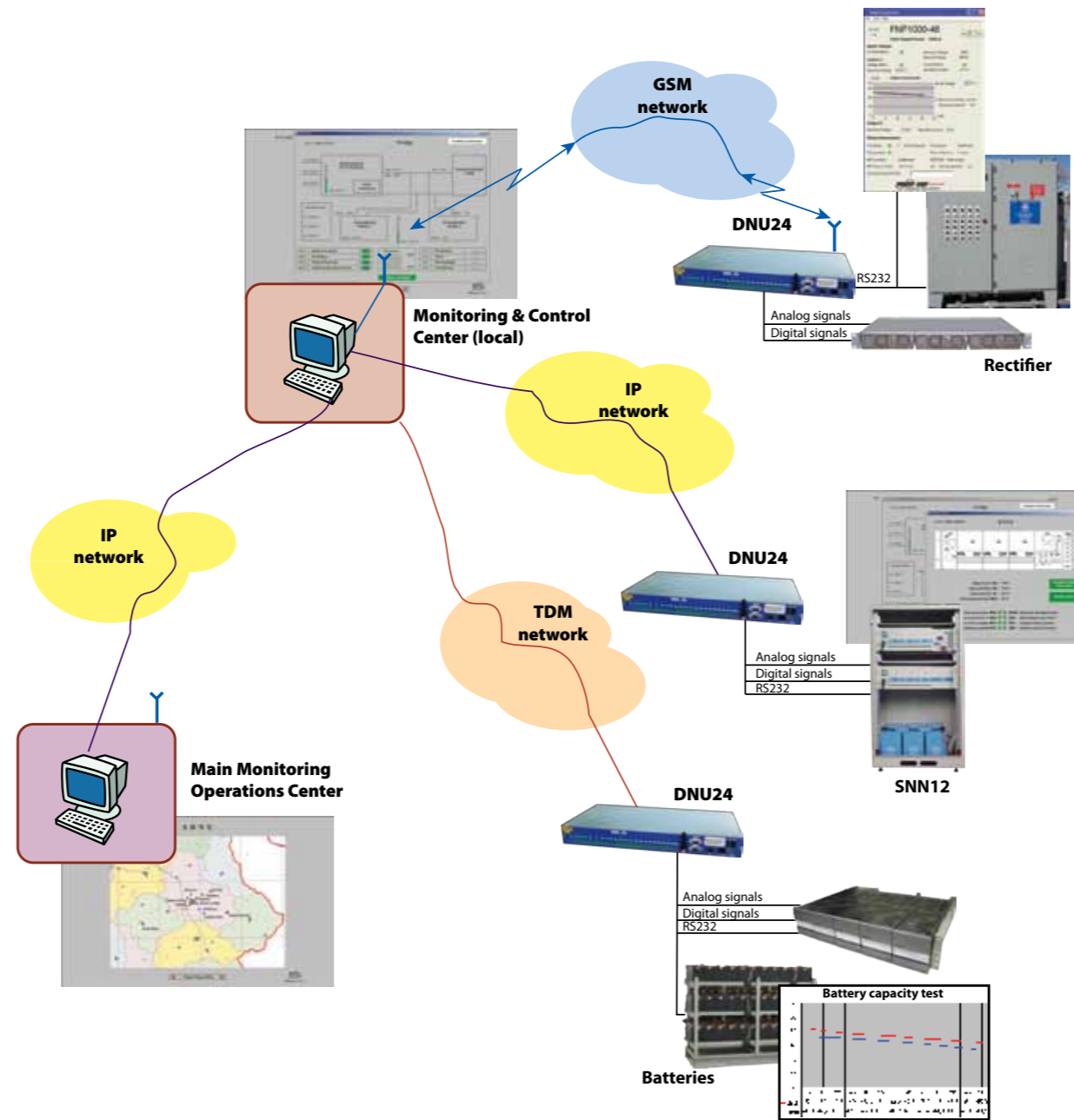
- The structure of the system for remote monitoring and control
- The structure of device that is monitored and controlled for each object
- The measured values of all parameters
- The on/off values on remote devices that are controlled
- The data required for system administration
- Statistical data

All data are presented in tabular and graphical way.

Measurement ranges can be changed from the monitoring and control center.

Alarms are present in the monitoring and control center until the authorized person terminate them or until they disappear because the cause is disappeared. No matter how alarms go away, the date and time of an alarm condition are registered and the moment and the reason when the are gone. Low battery alarm is combined with an estimation of how much time the object will have to work on battery.

Monitoring and control center and main monitoring operations center allow statistical analysis of all collected data and generating of reports on all the alarms and the measured values deviations from the nominal value.

Information stored in the database can be transferred to a standard format database (Access, SQL, Oracle, ...) for further processing and eventual integration into other systems for monitoring users.

Control of power electronics devices are available in two ways: through the digital control signals directly from DNU24 and through a defined communication protocol (given from manufacturer of the device which is under control in the object); in that case, communication flows through special ports of DNU24. Commands are given from the center for monitoring and control (sent to DNU24). When the command is executed by a digital signal from DNU24, it is realized as a time switch (time-limited duration with the possibility of interruption).

Monitoring and Control Network

Centers for monitoring and control can be connected in a hierarchical network for monitoring and control via an IP network to communicate with the main center.

Protocol for communication with the main monitoring operations center is standardized (SNMP).

Safety Procedures

- Authorization of access by user name and password
- Assigning user accounts that have limit access to options in the system
- Administration of system user - adding, deleting and changing data
- Over viewing of the user history (log files, filtering)