HEAD-END
SYSTEM FOR CONTROL
AND METERING
UTILITIES

Based on “Milur”
technical equipment
complex
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«Milur Smart System» LLC created by "Roselectronics" holding of the Rostec State Corporation in conjunction with JSC «ICC Milandr». The company produces electricity meters under Milur trademark.

The approach of «Milur Smart System» LLC to the creation of Automatic system for commercial accounting of power consumption is based on collaborative work with a customer to choose the best option in each case. The solution based on Milur makes it possible to create systems of various functional content ranging from the simplest automatic systems for commercial accounting of power consumption that collect data from meters and organize commercial accounting, to multifunctional intelligent data measuring systems. Multifunctional automatic systems for commercial accounting of power consumption based on Milur provide a full technological cycle, including monitoring of technical condition and remote control of meters, detection of theft and other violations by consumers, control of electrical energy balance, formation of reporting documents, full-scale data exchange with related organizations.

Automatic system for commercial accounting of power consumption
From the simplest Head-end system with counter data collection and metering to multifunctional smart measuring complexes
Energy control
Automating energy accounting

«Milur Smart System» LLC provides integrated solution of automating energy resources accounting. The full Head-end system development cycle: design, assembly, implementation and support.

There are also various ways of interaction in automating energy accounting:

- Equipment supply for systems integrator.
- Technical support, service maintenance, software/hardware maintenance.
- Personnel training for Head-end system interface.
- Optionally the company can be as a partner at any stage of accounting system development.
Based on "Milur" technical equipment complex
Head-end system is designed for housing,
industrial installations and electricity grid
companies.
The technical decision corresponds to the
regulations requirements operating in the
Russian Federation. The received
data can be used
for financial settlements.

Head-end system is designed for the
employees from departments of energy
resources commercial accounting, for
technical experts and other specialists from
companies working in retail markets of
electric power industry sector.

Head-end system functions and capabilities

**Energy resources counting**
- Electricity in multi-rate mode.
- Hot and cold water consumption, drainage.
- Gas consumption.
- Heat accounting.

**Task automation**
- Automatic data collection from energy counters.
- Information transfer to the data collection and processing center.
- Balance control of received and shared electricity.
- Control of emergencies.
- Reporting.

**Additional functions**
- Monitoring of the components technical state.
- Remote configuration and components customization.
- Remote tariff change (for electricity counters).
- Quick access to counter readings.
- Control of violations by consumers.
- Consumers personal account functions.
Future possibilities
Head-end system is based on “Milur” technical equipment complex, which represents the modern software complex.

Measuring instruments of the technical equipment are certified and listed in the public register.

Microprocessor counters of electric energy
“Milur-107”. Single-phase multi-rate counter of electric energy.
“Milur-307”. Three-phase multi-rate counter of electric energy.

Universal RF-module
“MiLAN-RF.04”. Module that collects data from heat, gas and water counters.

Data concentrator
Multifunctional Data concentrator based on «MiLAN-IC.02» controller.

Central Server
MS SQL / PostgreSQL database
Application service
Data collection service

Computer workstations (CWS)
Based on web-interface and platform-independent solution.
The latest equipment and software
Smart electricity counters
Data channels
Data transmission is carried out with existing power grid – modern G3-PLC technology with RF (868 MHz) and RS-485 radio channel. To provide guaranteed data transmission two radio channels are used simultaneously. Technical means of data receiving and transmitting (channeling equipment) are part of components of the system.

Water, gas and heat accounting
Counters with pulse output of any developer can be integrated into the system for water, gas and heat accounting.

User interaction
Head-end system interaction with users occurs by using computer workstations (CWS). The system can be used with any computer, which meets operational requirements and connected to the Internet. Optional function – automatic notification about emergencies (flood, abnormal water flow, gas flow).

Operation mode
The system works at 24*7*365 basis and provides full secure Internet-access to energy consumption data.

Technology
Combined options of the system design are used for accounting energy resources. The basic option provides the installation of one or more counters with wireless adapter module on each floor (“Milur-107” or “Milur-307”). Without connection to external feeding, “MiLAN-RF.01” compact universal self-unit module is installed in apartments, attached with pulse outputs of water and gas counters, leakage and door opening sensors.

“MiLAN-RF.04” accounts resources and controls emergencies in the apartment by transmitting data to “Milur-107/307” energy counter with wireless data channel and then transmits data to the data collection and transmission device or to the server according to design.
Simple deployment
Head-end system design provides simple deployment of the system. To install Head-end system on the building site it suffices to replace electric energy counters with Data concentrator:
• No additional installation work is required
• Channeling equipment is not required - modems are included in the system.

Flexible configuration and scaling simplicity
Simple system design provides creating different configurations:
• At minimum configuration Head-end system can operate without the central server. In this case, the system automatically collects and transmits data for the reporting period through a multifunctional Data concentrator.
• Counter connection is based on plug and play principle - the connection is established automatically when installing new accounting points or replacing the existing ones.

Data exchange
Head-end system provides full-scale data exchange with related systems. The system performs:
• Data export to xml, xls, doc and pdf files.
• Support for 80020, 80030, 80040, 51070 layouts and others under the current version of the “Regulations for the commercial accounting of electricity and capacity.”
• Integration and data transmission to billing systems in IEC-61968-9 standard.
Reporting
The system allows reporting:
• Power consumption register.
• Balance register.
• Fixed maximums of average thirty-minute capacities register.
• Electric load diagram of average thirty-minute capacity.
• Option of creating reports at customer’s request.
• Option of exporting as: xls, csv, pdf, xml, doc files.
• Time interval selection for reporting.

Information security
The system is protected from unauthorized access at all levels. Confidentiality is provided through authorized access to the system and separation of access rights. To reduce the risks of providing data integrity and authenticity, the following methods of information protection are used:
• Data transmission in encrypted form.
• Authorized user access.
• Separation of access rights.
• Software identification.
• Database backup.

Alert System
Approximate real time monitoring of the system technical state allows to increase the responsiveness of the personnel in off-normal situations. The system generates alarms automatically when it detects:
• Failure of components functioning.
• Power failure.
• Unauthorized attempts to interfere counters functioning.
List of alarm events and algorithms, which could be observed in event log, are set on customer’s request.
Head-end system interaction with users occurs by using computer workstations (CWS):

**Operator CWS**

- Authorization and user authentication.
- Data collection process configuration.
- Monitoring the events of the data collection process.
- Data processing configuration.
- Data processing monitoring and correction.
- Reporting.

**Administrator CWS**

- Authorization and user authentication.
- Data input for CS software configuration.
- Counter and Data concentrator remote configuration.
- Differentiation of user rights.
User CWS (web-cabinet)

- Operational control of own consumption.
- Personal data revision: actual consumption, consumption history, payment, receipts.
- Energy supply companies feedback.
- Optimization of energy consumption expenses according to the proposed system scenarios.

*The system can be used with any computer, which meets operational requirements and connected to the Internet*
Solution based on the latest technology
• Easy deployment.
• Adaptable configuration.
• Large data array processing.
• High speed data collection.
• High security level.
• Complete validity of transmitted data.
• Component operational management.

Remote power management
• The system provides the possibility of remote power supply limitation for unscrupulous consumers. At customer’s request, the restriction can be made automatically or by command from the operator’s workstation.
• Online violations monitoring with the possibility of power-cut allows to reduce the loss of electrical energy caused by lawless actions.

Revenue accounting
• Automated consumption calculation for a given reference period for each accounting point.
• Application of rates for electricity differentiated by zones of the day.
• Option of remote rate change for electricity counters at the accounting site.
• Option of automatic receipts issuing for payment.
• Informing customers about payment status.

The system is built on the free hierarchy principle and has different options for implementation, depending on the customer needs.
**TWO-LEVEL DESIGN**

Small objects, up to 1000 points of accounting

**THE THIRD LEVEL**
The central server of the system collects data through modem connected to it, received data processing, commercial accounting, reporting, technical status monitoring and remote component system control.

**THE FIRST LEVEL**
Energy counters provide automatic measurements at the points of accounting connected to the system.

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**THREE-LEVEL DESIGN**

Large objects up to 1000 points of accounting

**THE THIRD LEVEL**
The central server of the system collects data through modem connected to it, received data processing, commercial accounting, reporting, technical status monitoring and remote component system control.

**THE SECOND LEVEL**
Data Collection and Transmission Device (Data concentrator) collects and transmits data to the central server.

**THE FIRST LEVEL**
Energy counters provide automatic measurements at the points of accounting connected to the system.
MI-LAN network developed to exchange information with public utilities
Data concentrator

• Data collection from electricity counters and self-unit modules for water, gas, and heat.
• Up to 350 interrogated devices and modules.
• Overload and short-circuit protection.
• Various communication interfaces for Head-end system integration - GPRS, Ethernet, USB.
• Web-based interface for data configuration and revision.
• Data concentrator basis is a processor with a 64-bit ARM-A9 core, which provides high performance.

Microprocessor electric energy counters

• Load current extended range.
• Option of displaying network preference (voltage, current, power consumption).
• Electricity measurement in multi-rate mode, measurement of active and reactive electricity with accuracy class of 0.2S / 0.5 (for transformer connection counters), 1/2 (for direct connection counters).
• Low power mode.
• Overload and short-circuit protection.
• Data storage period at power off is 10 years.
• Built-in power-cut relay.
• Various communication interfaces for Head-end system integration - PLC, RF, GPRS.
• Monitoring at neutral conductor.
• Magnetic field sensor with event logging.
• The counter basis is a unified board of high-performance low-power MDR32F23QI microcontroller with 32-bit RISC core ARM Cortex-M0 designed by “Milandr” company.
COMPETITIVE ADVANTAGE

FOR BUILDING COMPANIES

Information about the devices — additional advertising for residential sales

Developer’s equipment — with no extra charge and in the packaging you need

Design work, own assembly crew, equipment contract supervision

Additional savings — RF-module is already integrated into electricity counter

FOR MANAGING COMPANIES

Automatic data collection, 100% tenants data

Automatic data distribution, billing without delay

Radio modules do not require service: battery term of service — 10 years, equipment guarantee — 2-3 years

Software delivery and support
Automated system of control and metering of energy resources

HEAD-END
SYSTEM FOR CONTROL AND METERING UTILITIES

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