International Journal of Engineering and Information Systems (IJEAIS)
ISSN: 2643-640X
Vol. 4 Issue 10, October - 2020, Pages: 131-133

Types of Communication Channels in Automatic System for Monitoring and Accounting of Energy Resources and Their Interfaces

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***Abstract* —** *This article analyzes the management of the automatic system for monitoring and accounting of energy resources.*

Keywords — Counters; automatic system; diagnostics of counters; data processing and generation;
Organization of automated information systems with conducting counter surveys via an optical port.

This is the easiest way to organize an ASC. Counters are not United among themselves. There is no connection between the tag and the data collection centerнеТ. All tags are polled sequentially when the operator crawls the tags. Surveys are conducted via an optical port using a program hosted on a portable computer that generates a file of survey results. On the computer of the data collection center, the necessary Software modules are created, which form a file-task for the interview and upload the information to the main database (DB). The time of counters is synchronized during the interview process with the time of the portable computer. Synchronization of the time of the portable computer with the time of the data collection center is performed at the time when the task files are received for interviewing counters. The disadvantages of this image of the ASC organization are the high complexity of collecting data from counters and the inability to use induction or electronic counters with pulse output in the system. And given the fact that Most meters and flow meters of various resources are not equipped with optical ports, this option of the organization can be recommended, mainly for electricity metering.

The organization of the automatic system for monitoring and accounting of energy resources with conducting counter surveys via an optical port allows you to solve the Following tasks:

• accurate measurement of the parameters of supply / consumption;

• commercial and technical accounting of energy resources for the enterprise, its infrastructure elements (boiler house and residential buildings), workshops, subsections, sub-subscribers.

• control of energy consumption by points and accounting objects in the specified time interval (30 minutes, zones, changes, time, decades, months, quarters and years) relative to the specified power limits and other restrictions;

• data processing and generation of electricity accounting reports;

• description of electrical connections of objects and their characteristics;

• diagnostics of counters;

• supports unified system time.

The organization of a self-monitoring system with an automatic survey of counters and a data collection and processing center.

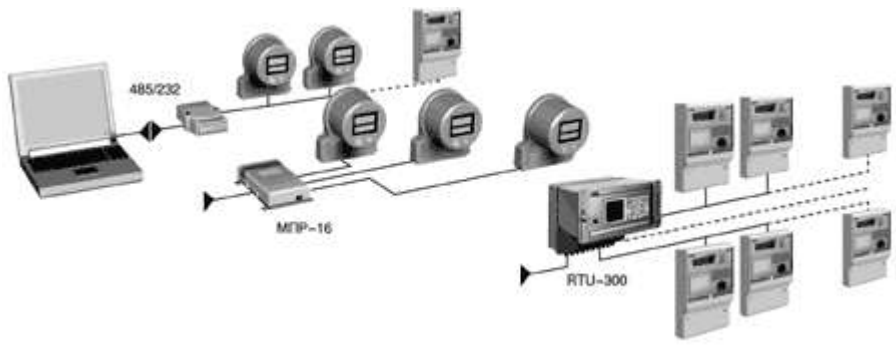

Figure 2. Scheme of the organization of automatic system for monitoring and accounting of energy resources with an automatic survey of counters and a data collection and processing center.

Automatic system for monitoring and accounting of energy resources with the automatic survey of counters and the data collection and processing center is constantly connecteda to the collection center by direct communication channels and interrogated According to a set schedule. Primary information from counters is recorded in the database. The time of counters is synchronized during the interview process with the time of the data center's computer. A local PC is used as the data collection center's computer. It is also used for data processing and database maintenance. Data is collected in the database periodically with a specified interval.

The organization of automated metering systems with automatic survey of meters by local data collection and processing centers allows you to organize the accounting of any energy resources and solve the Following tasks:

• accurate measurement of the parameters of supply / consumption;

* comprehensive automated commercial and technical accounting of energy resources for the enterprise, its infrastructure elements (boiler house and residential buildings, workshops, subsections, sub-components.

• control of energy consumption and power quality parameters (PCE) by points and accounting objects in the specified time interval (5 minutes, 30 minutes, zones, changes, time, decades, months, quarters and years) relative to the specified capacity limits and technological limits;

• data processing and generation of energy accounting reports;

* recording deviations of controlled parameters of energy resources, their estimation in absolute and relative units for the analysis of both energy consumption and production processes.

• signaling (by color, sound) of deviations of controlled values from the allowed range of values;

* data completeness diagnostics;

• description of electrical connections of objects and their characteristics;

* parameterization of communications and survey characteristics;

• system diagnostics;

• supports unified system time.

The structure of a geographically distributed urban automatic system for monitoring and accounting of energy resources allows commercial and technical accounting of electricity, heat, water, gas and other telemetric parameters at the level of an individual subscriber, a group of subscribers, a residential building, a business, a quarter, a district and the city as a whole. The radial structure of the system at the highest levels ensures information exchange between the Central control room, district control rooms, terminal controllers. The communication range is from 40-60 km (when using a radio channel) and more (when using PBX, GSM). Non-polar two-wire lines are used as communication channels at the lower level (subscriber level). At the lower level of the system, sources of accounting and measuring information (IE, counters, etc.) are placed.

Average client nodes is established data gathering and data transmission, controllers, communication equipment (telephone exchanges, radio link, fiber optic link, cellular, etc.). On the upper level are organised by local (regions, districts) and the city of ASPE, which represent software and hardware control system, display devices, document and database storage, communications equipment, uninterruptible power supply etc. with necessary support staff.

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