ALMATY PROJECT

TECHNICAL DOCUMENTATION

RTU-325KZ

Combined manual

Operation · configuration · telecontrol



ENGLISH | Working technical translation

10 documents in one volume

Contents, chapter links and detailed bookmarks

Almaty Project / translated edition 19.10.2026

Using this manual

Navigation

The contents on the next page link to all ten documents. The detailed contents link to the main topics. The PDF bookmarks also include nested subsections.

Page numbering

The bottom-right corner shows the page number in this combined file. The top-right corner shows the page number in the original part. References in the original instructions use that local numbering.

Quick return

Use the Contents and Chapter start links at the bottom of each page. The individual parts also have clickable contents. Original software UI labels are retained in quotation marks and screenshots.

Translation status

Working machine-assisted technical translation. Figures, model identifiers, commands and navigation are retained. Terminology and safety passages have received selective review; the complete text has not undergone a professional technical translation review. Check against the Russian manual before release.

Scope

The hardware description applies to RTU-325KZ. The software instructions cover the RTU-325 family and software versions 3.xx. The interfaces and available functions depend on the device variant and installed software.

Source revisions

Supported devices uses revision 2, as stated inside the source document, although its original filename says revision 1. Web applications uses revision 10 from the cover; the obsolete revision 6 in the headers was removed.

Source discrepancy to verify

The original operation manual describes WDT as red on source page 24 and green on source page 37 (pages 37 and 50 here). Verify the colour for the specific device variant. The translation retains this unresolved source discrepancy.

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ALMATY PROJECT

SECTION 01

Operation manual

RE

SHKK 467449.063 RE 2025

RTU-325KZ Data Collection and Communication Devices

Almaty Project Consolidated Manual

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This operating manual (hereinafter referred to as RE) applies to the Data Collection and Communication device RTU-325KZ (hereinafter referred to as RTU) issued under the technical conditions of the SHKK 467449.063 TU

The RE together with the User Guide provides information on the characteristics of the RTU hardware and software (hereinafter referred to as software) necessary for operation and maintenance.

This EP material is intended for personnel who design automated energy information and measurement systems (electricity, thermal power, gas), telemechanics, TAA, installation, launch, operation and maintenance of RTU.

The RTU should be operated by highly qualified staff who have studied the RE and the User Manual, who have computer and software skills.

In view of the continuous improvement of the RTU equipment and software, the manufacturer reserves the right to modify the RTU without notifying the consumer. For information on the latest developments, please contact: LTA «Almaty Project», 040700, Republic of Kazakhstan, Almaty Region, Italy, S.A. Muhametzhan Tuimebaeva, Promzon 301. Email: kz.almaty.project@gmail.com

1. Description and operation

1.1. Intended use

The RTU is designed to build distributed, design-compatible, hierarchical, multifunctional automated electric energy control and accounting systems (ASCUE), automated electric energy accounting information and measurement systems (EMS) for the Wholesale and Retail Electricity and Power Markets (REPs), telemechanics, energy accounting systems, and technology control.

1.2. Technical specifications

1.2.1. The main specifications are given in Table 1.1.

Table 1.1.

No.	Parameter	Value
1	Non-volatile memory	At least 1 GB
2	Data retention in non-volatile memory without external power	At least 10 years
3	Mean time between failures (MTBF)	240000 h (+25 °C, 50% humidity)
4	Service life	At least 30 years
5	Ethernet	Ethernet 10/100 base TX: 3 ports. Galvanic isolation: U ≤ 1500 V for 1 minute.
6	RS-485/422	RS-485 2W: 4 ports (300…115200 kbs); RS-485 4W/2W: 1 port (300… 115200 kbs). Galvanic isolation: U ≤ 2500 V for 1 minute. Surge protection: 8/30 μs, 5 kV.
7	RS-232	RS-232: 4 ports (300…115200 kbs), without galvanic isolation.
8	USB 2.0	USB 2.0 - 2 units
9	Digital inputs	8 inputs. Operating threshold U ≥ 10 V; input current 13 mA at 24 V. Optical isolation: U ≤ 3750 V for 1 minute.
10	Digital outputs	2 outputs. Umax = 28 V, Imax = 300 mA. Reverse-polarity protection; output protected by a resettable fuse. Optical isolation: U ≤ 3750 V for 1 minute.
11	Supply input voltage. Power-input protection.	Input 1: 12…30 V; Input 2: 12…30 V

No.	Parameter	Value
	AC/DC power supplies: AC operating voltage range	For use with AC/DC power supplies: 220 (110) V ± 20%.
12	Maximum power consumption	15 W
13	Operating temperature	-20 °C to +60 °C; -40 °C to +70 °C for suffix T
14	Humidity	5% to 95%, non-condensing
15	Mass	Not more than 1.5 kg
16	Dimensions	100 (W) x 142 (D) x 178 (H) mm; 100 (W) x 142 (D) x 208 (H) mm with mounting base
17	Storage temperature	-50 °C to +70 °C
18	Vibration	5G, 10-150 Hz, amplitude 0.35 mm; also 0.1-100 Hz, maximum amplitude 1 mm, maximum acceleration 5 m/s^2.
19	Impact	25G, half-sine, duration 11 ms. Also 10-50 shocks per minute, 10 G, pulse duration 16 ms, total 1000 shocks.
20	Minimum enclosure protection rating under GOST 14254-96	IP30 without an outer enclosure; IP51 with an outer enclosure
21	Cooling method	Natural convection
22	RTU design	Single metal enclosure
23	Software watchdog timer	Yes
24	Automatic self-test interval	2 s
25	Battery-backed clock: absolute daily error	≤3 s
26	Minimum retention of daily data on hourly energy increments and the states of facilities and measuring instruments	90 days, from at least 750 meters
27	RTU status indication: running, communication and data availability	Yes

1.2.2. RTU-325KZ Functions

RTU-325KZ provides:

1. Parametering (set-up) at initial installation, after repair and when the meters, communication parameters, etc. are changed, only when the password is entered, and this event shall be recorded in «Журнале событий» with the date and time.

When parameterizing, events differ with fixation in «Журнале событий» :

- Introduction of the calculation coefficients of the channels of measurement (transformation factors of current and voltage transducers); - introduction/change of groups of measurement channels of electricity to calculate the aggregate values of the electric power for the groups of points of measurement; - setting (correction) of the current values of time and date.

2. Collection of measurement results from digital interfaces;

3. Processing of measurement results according to the set time of application

Parameters;

4. Provide an interface for access to the information collected;

5. Synchronization of time, both in the RTU itself and in the electric energy meters,

Directly transmitting information to the RTU;

6. Self-diagnosis with fixation in «Журнале событий».

7. Automatic maintenance «Журнала событий», which records the time and date of events:

1) Attempts to unauthorized access;
2) The relationship with RTU which led to any changes in data;
3) Restarting RTU (in case of loss of voltage, oblivion, etc.);
4) power outage.
5) The time correction, with the time to be fixed before, after, or after, the time to which the device has been adjusted.
6) Introduction of calculation tunnel coefficients
7) Introduction/change of groups of measurement channels
8) Have a time correction in meter
9) Self-diagnosis results

8. Measurement of time in built-in battery-backed clock.

9. Automatic correction (synchronization) of your own time from an external sync source (other RTU, server or directly connected GPS/GLONASS receiver).

The following means and methods may be used for this purpose:

1) GLONASS/GPS receivers with NMEA-0183 protocol;
2) GLONASS/GPS receivers with NMEA-0183 protocol and PPS signal;
3) Time server available on the global NTP v4 protocol network;
4) Time server in the PTP protocol local network;
5) By command of the ASCU IAC on the protocols of the AlphaCENTRE or RTU 325;

6) By command of the SCADA system for the ECC protocols 60870-5-104 (101).

10. Direct access to IAC-to-ICK instruments in «прозрачного канала» mode (including for remote change in the instrument configuration) without changing the interface cable switching.

11. Synchronization of the time connected to the device, including the electrical meters.

12. Performance of the switch-off (on) of consumers, including by using external remote control modules

13. Compliance with the load limit command, including the use of external remote control modules

14. Collection of information on the state of the means of measurement (under the condition of the measurement means the following parameters are understood: incubation/ offer; state of the load relay; event of magnetic field impact; electronic seal response event; state of digital inputs; result of self-diagnosis; other events 9 if present in the instrument.) and condition of the objects of measurement (under the condition of the object of measurement (network station, electrical input distribution device) means data; (i.e. from tele-signalling and tele-measuring channels.) as well as from measurements

15. Collection of information from accounting instruments on main and reserved digital interfaces

16. Taking evidence from all CSI controlled at a single point in time using function «Стоп-кадр»

17. The two-directed exchange of information between ICE and ICE, IAC, which provides data transfer, diagnostic information, etc.

18. Information exchange regimes with IIC and ICU (ISI) in different ways: by regulation (time tags), with remote setting of regulations, sporadically, upon request

19. Support the protocol of IEC standard 62056 (DLMS / COSEM), specification of Russian national standard (before its adoption - SPODES) with record-keeping devices

20. Bilateral information exchange using standard open protocols

21. Automatic search for meter and inclusion in the polling scheme (with appropriate modem)

22. Presentation of measurement results, information on the status of measurement tools and objects in the IACA ARM, including web interface

23. Operation of a built-in Web server that:

1) Resolves the main business accounting tasks (daily 30 minute graphs, meters, 3.5-year event log, multi-tariff calculations by group of measurement points, XML 80020, 8020* 80030 in manual and automatic modes)

2) Resolves the diagnostic tasks of the RTU subsystem,

3) Makes a daily statement in accordance with GOST 13109 and GOST 32144 for the analysis of electrical energy quality parameters in the case of electric energy quality measurement by the meters;

4) Allows you to look through the authorization log,

5) :: Addresses the tasks of monitoring the capacity, the parameters of the grid,

6) Builds vector diagrams on meter measurements

24. Capacity to transfer data to different software sets for further processing and storage, integration with TAA: state of the means and objects of measurement, measurement results, generic technical failure signals

25. Support for IEC protocols 60870-5 104 101, IEC 61850-8-1

26. Collection and transmission of tele-signalling and tele-measured data

27. Performance of remote control commands including external additional module

28. Management of the switchboard, including through the external additional module

29. Accounting for electricity losses from measurement point to metering point

30. Protect:

1. Fixing passwords at parameterization
2. Distribution of responsibilities of users at different levels
3. Data transfer codes
4. Security of data storage and software in both public and closed communications networks, including via a secure VPN channel with encryption

5. Avoiding the possibility of adjusting protocol data
6. Protection against fixation ("watchdog")
7. Recording of developments in information security
8. Automatic switching to backup power supply in and out of main power supply (with backup power supply)
9. In hardware (access to connectors, functional modules, etc.) - mechanical sealing or labelling

Additional useful functions

1. The update of the Squeaking version of the RTU may be carried out without loss of archival data and working configuration in the following ways:

1) FTP;
2) C USB storage, with re-storage;
3) C A USB storage device with software «Сервис-325» shall be fully re-recorded

2. Trace function

Allows communication sessions to be conducted with electric meters, heat meters, flow meters, RTU-controlled devices and other external devices.

3. The pseudo-measurement function(s)

The following functions are available in real time by telemapping:

1. By telemetry
   - sum of values,
   - Average
   - Minimum value
   - Maximum value.
2. By tele-signals:
   - Logical AND,
   - Logical OR.

4. RTU cold and hot standby support

hot standby applies to accounting systems, tele-mechanics systems and systems that integrate tele-mechanics and accounting.

Simultaneous configurations with RTU and RTU triangulation are allowed. In both modes, one RTU acts as a working person (works in «основном режиме»), the other RTU (one or two respectively) is in a hot standby, i.e. ready to take over the functions of the main device at any time. For upper level systems, RTU data are a single device and do not require any special software and additional configuration.

Recovery time with cold standby: no more than 5 min. Recovery time with hot standby: no more than 10 s.

5. Protection against unauthorized access

Protection against unauthorized access is provided by:

1. Support software access passwords
   - To the meter
   - To software RTU
   - Towards the re-engineering of RTU
   - RTU WEB server
2. Support the SSH (Secure Shell) V2 protocol with RTU configuration;
3. Recording in the log of events all changes in the RTU configuration, specifying the time and type of the modified parameters;
4. Supporting SFTP protocol;
5. Automatically blocking the RTU meter polling when the meter configuration is changed through its optical port;
6. Limiting the change in RTU time within 24 hours;
7. The function of the identification and authentication protocol using a single-directed MD5 hash function for each connection when transmitting data to the top level systems and in the RTU cascades.
8. In-line firewall filtering of packages with network address translation function.

6. Port data exchange traffic registration function

Allows you to count the number of bytes passing through the port on reception and transmission.

7. Calculation functions

1. Searching maximums for each of the 24 specified time zones
2. Calculation of energy consumption for any given groups
3. Calculation of electricity in aggregate for each of the 24 specified time zones

8. Compressive functions and crypto-protection of transmitted data

The RTU may include data compression functions (useable for half-hour load profiles for 24 hours, week, etc.) and data crypto-protection.

9. Electricity accounting function by accession

This function ensures:

1. Introduction of electrical connections into RTU by an integrated circuit editor with basic and backup metering points, discrete objects (mutual switches, etc.).
2. The possibility of introducing virtual discrete objects into electrical circuits to produce replacement operations for real data.
3. Collection of data from primary and backup metering points.
4. Collection of data on the status of discrete objects (joint switches and other active components of electrical connections).
5. Automatic calculation of the electrical energy consumption at the commercial connection interval, taking into account the position of the bypass switch.
6. Storage of raw and calculated accession data in RTU archives.
7. Transfer of primary and calculated protocol accession data: RTU-325 protocol; IEC protocols 60870-5-104/101;
8. Visualization of the electrical circuit history of the electrical connections to the external engineering remote.

10. Electrical circuit status function:

1. Introduction of electrical circuitry into RTU by an integrated circuit editor with active discrete objects (switches, connectors, etc.) and electrical circuit states corresponding to different alarm levels.
2. The possibility of introducing virtual discrete objects into electrical circuits to produce replacement operations for real data.
3. Collection of data from active discrete electrical circuit objects.
4. Automatic determination of electrical circuit conditions and corresponding alarm levels.
5. Storage of primary data from active discrete objects and electrical circuit status (disturbing) data in RTU archives.
6. Transmission of primary data and electrical circuit alarms to the protocols:
    - Protocol RTU-325;
    - IEC protocols 60870-5-104/101.
7. Visualize the history of electrical circuitry with the external engineering remote.

11. Diagnostic function

1) Sign of diagnostic message - control of com-point collection by enumerator,

2) A sign of the diagnostic message - time control of the meters,

3) A sign of diagnostic communication - control of the accident status of the meters,

4) A sign of diagnostic communication - control of the status of the tellers ' warnings

5) Sign of the diagnostic message - control of the imbalance of groups (cumulative),

6) Sign of diagnostic message - control of comport performance,

7) A single element sign of RTU warnings - restarting RTU,

8) A single element of RTU warnings - restarting software,

9) A single element of RTU warnings - a failed attempt at authorization,

10) One element of RTU alerts to authorized user entry,

11) A single element sign of RTU warnings-intotelnet,

12) Incoming ssh,

13) ftp entry,

14) Sftp entry,

15) One element of RTU event-change of RTU configuration,

16) One element of RTU event command to change time to RTU,

17) A single element of RTU event-inflicted lithium battery CPU RTU,

18) The single element of RTU event is the permissible size of RTU archives,

19) A single elemental sign of RTU-rehabilitation of the NTP server.

12. Automatic summer/winter transition function

Support microprocessor metering with automatic summer/winter shift.

13. Automatically switching from main to back-up.

14. Analysis of the reduction of electricity charges while maintaining its consumption for enterprises able to manage time loads.

The function allows for the analysis of electricity charges in different price categories, taking into account the target peak hours.

15. The lockdown function and «зависания» (hardware watchdog).

The machine WDT is a car generator with a 74-HC 6040 chip with time-sizing components.

For the processor module to function without discharge, the WDT meter must periodically drop the generator meter to zero, which will change the GP15 status of port I/O from time to time, every few seconds.

The RTU mode will flash the WDT LED.

In the event of a freeze (no auto-generator drop) or cold start - when the device is not running at a stable start, which occurs at very low temperatures - WDT with 90 seconds will release the processor before the program unit starts and the operating mode is generated.

In the case of processor maintenance, replacement software, or settings, where the WDT discharge sub-programme is not operational, the S1.4 switch shall be set to the OFF position, otherwise an unauthorized discharge will occur.

1.2.3. Reliability characteristics

RTU-325KZ is a continuous-use device that meets the requirements of GOST 27.003-90.

Mean time between failures: 240000 h (+25 °C, 50% humidity). Availability factor: at least 0.99. Recovery time with cold standby: no more than 5 min; with hot standby: no more than 10 s. Warranty period: 60 months from shipment. Average RTU service life: at least 15 years. Mean repair time for RTU hardware at the manufacturer: no more than 4 h. A non-volatile memory module preserves programs and data if the RTU fails. Automatic diagnostics run at least once every 2 s.

1.2.4. Safety characteristics

RTU is designed and constructed so that it does not pose a danger to the service staff under normal conditions and when malfunctions occur.

The RTU meets the security requirements of the ISO GOST 60950-1-2014.

RTU meets the requirements for fire safety:

• Non-burning materials shall not be used for flammable materials according to GOST 12.1004-91

• The fire hazard for hot wire and needle-burned burner tests corresponds to GOST 27483-87

• The fire hazard for the poor contact tests corresponds to GOST 27924-88

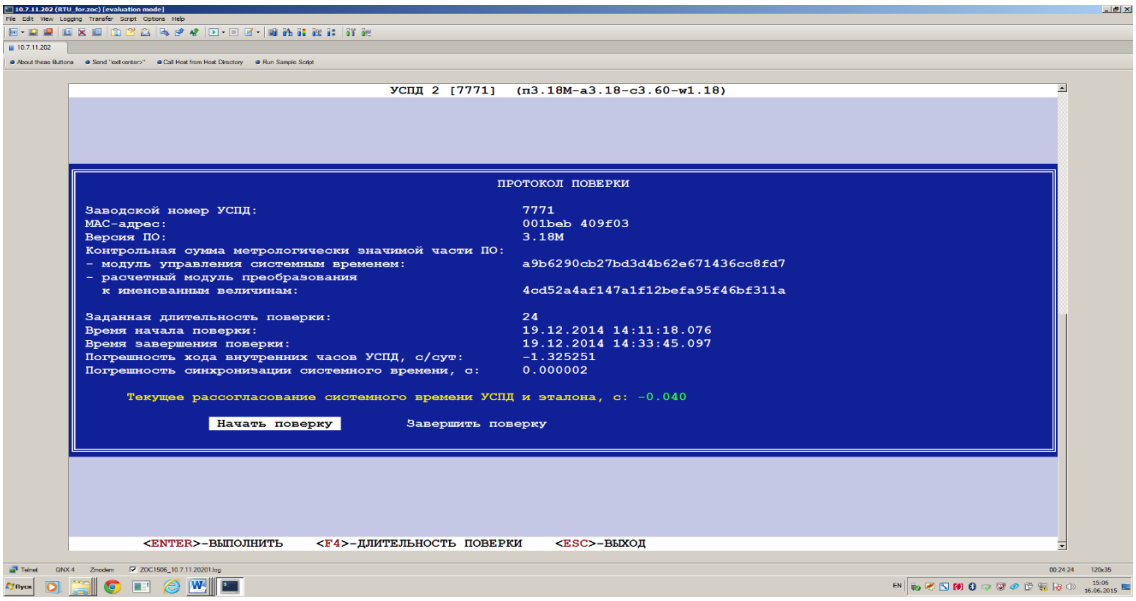
The method of protection against electric shock is RTU in class II of the CIE COST 60536-2-2001.

The RTU structure shall ensure safety against the spread of the lamp in accordance with the requirements of paragraph 9. GOST R 51350-99.

Persons authorized to operate and repair the apparatus shall be instructed in «Правилам технической эксплуатации электроустановок потребителей» and «Правилам техники безопасности при эксплуатации электроустановок потребителей» upon passing a qualification examination of not less than III safety requirements.

Protection against unauthorized access is in line with GOST R 50739-95 and is implemented at the programme and hardware levels. Security features in software and information:

- Set passwords at parameterization
- Different levels of user authority
- C. The possibility of coding the data transmitted
- security of data storage and software both in public networks and in closed communication networks, including via a secure VPN channel with encryption
- Avoiding the possibility of adjustment of protocol data
- Protection against fixation ("watchdog")
- Recording information security developments
- protection against unauthorized access to RTU resources
- Detecting distortions in the working environment of RTU
- Individual authority to access measurement data - each user has a level of access to data protected by password
- Access to the operating system and the RTU application software is also provided using the full-time security devices built into the RTU operating system with built-in network security features: (a) The use of the Security Shell protocol when working with the service software RTU (b) The built-in filtering firewall of packages with the network addresses software transmission function has identification data.



All embedded software is broken down into 2 parts: independent and metrologically dependent. Both parts are protected by a check. The MD 5. function is used. This information is available at any time and can be compared to the documentation. The level of protection of software from unintentional and deliberate changes corresponds to the level of protection «высокий» through R 50.2.077-2014

The mechanical protection of RTU is performed by filling the instrument compartments RTU.
The use of RTU in explosive spaces of all categories without an outer casing with appropriate protection is prohibited.

1.2.5. Meteorological characteristics

Absolute daily average error of hours per day without external synchronisation at + 30 °C not more than ± 3.0 s.

Intergovernmental interval of at least 10 years

Synchronization of time from external reference points:

- GLONAS/GPS (pPS) is equal to or less than 1 ms
- NTP protocol is as good as 10 ms on the local network.
- PTP protocol is as good as 1 ms on the local network.

Time at which the operating mode shall be established not more than:

- 3 minutes on internal software start-up procedures prior to start-up
- 30 min warm-up to reach the specified metrological performance.

1.2.6. Performance characteristics (resistance to external effects)

1.2.6.1. Climate performance

The climate performance of RTU corresponds to GOST 22261-94 for p. 5.

RTU shall withstand the GOST temperature limits of 26.205 to 88 from -20 °C to +65 °C and with a T index of -40 °C to +70 °C. RTU shall withstand a maximum humidity of 90 per cent at +30 °C. RTU shall operate at atmospheric pressure not less than 84-106.7 kPa according to GOST 15150. The maximum transport conditions are those of GOST 15150: The storage temperature limits are between -50 °C and +70 °C.

1.2.6.2. Mechanical performance

RTU corresponds to the mechanical performance group M38: Vibration resistance between 0.1 and 100 Hz, maximum amplitude 1 mm, maximum acceleration 5 m/s2 on GOST 30631-99, mechanical resistance corresponds to GOST 22261-94: number of strokes per minute 10-50, maximum acceleration 100 m/s2, pulse duration 16 ms, total number of impacts 1,000. For dust and water protection, the RTU body meets the IP30 level of protection and is no worse than IP 51 in the outer shell, according to GR 14254-96.

1.2.6.3. Electromagnetic compatibility characteristics

RTU meets the requirements of GOST P 51317.6.5-2006. The characteristics of electromagnetic compatibility are given in tables 1.2, 1.3, 1.4, 1.5 below.

Port of the Corps

Table 1.2.

Parameter	**Value**	**Conformity with documents**
Resistance to magnetic field of industrial frequency: - tension of continuous MHF - tension of short-term MHF	СЖ5 100 A/m (long term) СЖ5 1000 A/m (short term)	GOST R 50648-94; OT 56947007-29.240.044-2010
Resistance to magnetic field of industrial frequency	400 A/m	Methodological recommendations from the Russian Ministry of Energy. P.18.3
Resistance to radiated radiofrequency electromagnetic fields	СЖ3 10 V/m	GOST 30804.4.30-2013 OT 56947007-29.240.044-2010 Methodological recommendations of the Ministry of Energy of Russia. P.18.4
Stability to static electricity - contact level - air level	СЖ3 ± 6 kW ± 8 kW	GOST 30804.4.2-2013 STO 56947007-29.240.044-2010

Parameter	Value	Conformity with documents
Resistance to pulse magnetic field	СЖ4 300 A/M	GOST R 50649-94; OT 56947007-29.240.044-2010
Resistance to a swirling variable magnetic field	SW 5 100 A/M 10 s	GOST R 50652-94;

Signal ports

- RS-485 ports, Ethernet, digital inputs and exits

RTU interference at RS-485 ports, Ethernet ports as good as for Field type of GOST P 51317.6.5:

Table 1.3.

Parameter	Value	Conformity with documents
Recurring Fuse Resistance (MAC) of Repeated MAC Amplitude - scheme «провод-провод» - scheme «провод-земля» single MAC amplitude - scheme «провод-провод» - scheme «провод-земля»	СЖ2 0.5 kV СЖ2 1 kV СЖ3 1 kV СЖ3 2 kV	GOST 51317.4.12-99 STO 56947007-29.240.044-2010
Resistance to microsecondal high-energy pulses: - scheme «провод - провод» - scheme «провод - земля»	СЖ2 1 kV СЖ3 2 kV	GOST 51317.4.5-99 STO 56947007-29.240.044-2010
Resistance to nanosecond pulses :	СЖ4 2 kW	GOST 30804.4.4-2013 STO 56947007-29.240.044-2010
Resistance to conductive disturbances in the frequency band from 150 kHz to 80 MHz, frequency band from 0 kHz to 150 kHz	СЖ3 10 SW 4 30/300 В	GOST 51317.4.6-99 STO 56947007-29.240.044-2010
Stability to the ringing wave	SW 3	GOST IEC 61000-4-12- 2016

- RS-232 Ports RTU Interference at RS-232 Ports as close as for the local GOST P 51317.6.5:

Table 1.4.

Parameter	Value	Conformity with documents
Recurring Fuse Resistance (MAC) of Repeated MAC Amplitude - scheme «провод-провод» - scheme «провод-земля» single MAC amplitude - scheme «провод-провод» - scheme «провод-земля»	СЖ2 0.5 kV СЖ2 1 kV СЖ3 1 kV СЖ3 2 kV	GOST 51317.4.12-99 STO 56947007-29.240.044-2010
Resistance to microsecondal high-energy pulses: - scheme «провод - провод» - scheme «провод - земля»	СЖ1 0.5 kV СЖ2 1 kV	GOST 51317.4.5-99 STO 56947007-29.240.044-2010
Resistance to nanosecond pulse interference	СЖ3 1 kW	GOST 30804.4.4-2007 STO 56947007-29.240.044-2010
Resistance to conductive disturbances in the frequency band from 150 kHz to 80 MHz	СЖ3 10 V	GOST 51317.4.6-99 STO 56947007-29.240.044-2010

- The variable current supply port is as characteristic of the EMC RTU for the supply port as is shown in Table 1.5.

Table 1.5.

Parameter	Value	Conformity with documents
- voltage interruption - voltage failure	100 % (5 periods) 30% (50 periods) 60% (1 period)	GOST 51317.4.11-2007 (IEC 61000-4-11) STO 56947007-29.240.044-2010

Parameter	Value	Conformity with documents
Powering variable current resistance to harmonics and inter-harmonics, to signals from tele-control systems and to alarms in the voltage of the AC network. Resistance to voltage fluctuations. Resistance to dynamic changes in power voltage.	In accordance with the recommendations of the Ministry of Defence, table Б.1. Types of tests for interference resistance and interference of secondary equipment and recommended degrees of hardness СТО 56947007-29.240.044-2010 and requirements ГОСТ Р 51317.4.1-2000, ГОСТ Р 51317.4.14-2000, ГОСТ 30804.4.11-2013	GOST P 51317.4.1-2000 (IEC 61000-4-1-2000) GOST P 51317.4.14- 2000 (GOST P 61000-4-14- 2000). GOST 30804.4.11-2013 STO 56947007-29.240.044-2010
Resistance to changes in the power frequency of the AC network	СЖ3 (Jf/f1) 15%, t - 10c	GOST P 51317.4.28- 2000 STO 56947007-29.240.044-2010
Resistance to conductive disturbances, in a frequency band from 150 kHz to 80 MHz.	СЖ3 10 V	GOST P 51317.4.6-99 STO 56947007-29.240.044-2010
Resistance to variable extinct amplitude of repeated MACs: - in the scheme «провод-провод» - in the scheme «провод-земля» in the single MAC: - in the scheme «провод-провод» - in the scheme «провод-земля»	СЖ3 1 kV СЖ3 2.5 kV СЖ4 2 kV СЖ4 4 kV	GOST P 51317.4.12-99 STO 56947007-29.240.044-2010 GOST IEC 61000.4.18- 2016
Resistance to nanosecond pulse interference	СЖ4 4 kV	GOST 30804.4.4-2013 STO 56947007-29.240.044-2010
Resistance to microsecondal high-energy pulses (from lightning currents): - scheme «провод-провод» - scheme «провод-земля»	СЖ3 2 kV СЖ4 4 kV	GOST P 51317.4.5-99 STO 56947007-29.240.044-2010
Radiocomhexia interference from the equipment.	Class B in accordance with GOST R 30805.22 - 2013 GOST R 51318.11-2006 (SYSPR 11-97)	GOST 30805.22-2013 GOST P 51318.11-2006 (СИСПР 11-97)
Radiocomhexia interference from the equipment.	Class A	The methodological recommendations of the Russian Ministry of Energy. п.7.2
Resistance to radio frequency electromagnetic fields	SW 3	GOST 30804.4.4.3.-2013
Stability to the ringing wave	SW 4	GOST IEC 61000-4-12- 2016

Electrical strength of insulation (stable voltage) and impulse voltage tests conform to GOST 30328-95

In terms of industrial frequency interference, meets the requirements of GOST P 5.1317.4.1.6: 30 V long-term disturbances, 300 V short-term (1 (c) disturbances.

1.2.7. Constructive performance of RTU

RTU is made in a single metal shell. The cooling is performed by a natural convection. The Corps has an industrial performance. Several interfaces are available for data exchange with IIC. RTU is designed to be continuous with the possibility of being installed in restricted spaces (in cupboards, compartments, panels, etc.) and to provide a user-friendly service. If necessary, it is possible to install a RTU locker on the LOT support and to take the antennas to the first support. The shell has a dust and water protection IP 30 level, as required by fire safety. All RTU-325K modifications are unique to the number of interfaces and operating temperature range, and have the same built-in software.

Possible modifications to RTU-325KZ are given in section 1.3.

The appearance of RTU is shown in Figure 1.6.

Appearance of RTU



Figure 1.6. RTU RTU-325KZ. The general view.

Parameter	Background figure
Dimensions of shell	100 × 142 x 178 mm
Interfaces on the end panel	Ethernet: 3 ports; power outlets

The photograph shows the device's provided performance. The composition of the interfaces is specified by the designation of the modification.

Interface panel



Figure 1.7. The interface panel. The angle view.

Symbol	Reference RE appointment
COM1-COM4	4 Port RS-232
COM5-COM9	5 RS-485 Ports
USB 2.0	United States dollars
DI / DO	8 digital inputs / 2 digital outputs
PWR / WDT	Feeding indicator / hardware

Side and end panel



Figure 1.8. Side view. Shildick's on the hull. Figure 1.9. The food side and Ethernet.

Sildick.

An information sticker is placed on the side surface of the shell. The connection parameters and the purpose of the switches are shown below as read.

Nutrition and Ethernet

The LAN1-LAN3 and PWR1/PWR2 interfaces are located on the end panel of the shown performance. The particular device is checked by its marking and passport.

Switches S1

There are four switches under the S1 label. The following is a numbering pattern without a position statement.

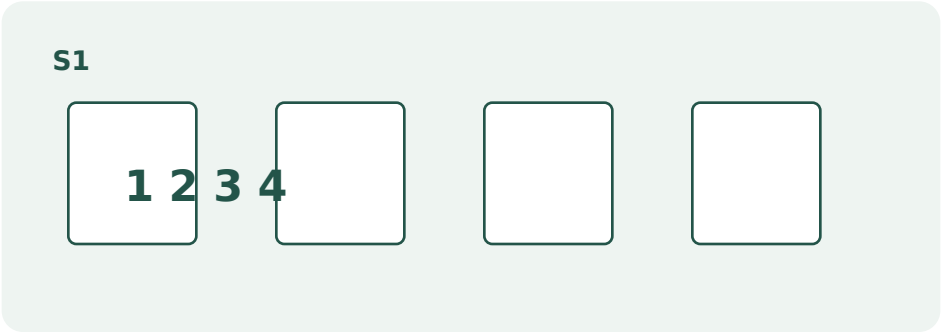


Figure 1.10. S1 switches numbering diagram

Switched	ON	OFF
S1.1	A hardware ban on configuration change; a warning is given in the configuration.	Change of configuration permitted.
S1.2	default IP connection: Ethernet1, 10.7.11202.	The IP address is used from the configuration.
S1.3	COM8: RS-485, 4W.	COM8: RS-485, 2W.
S1.4	The VDG machine is on.	The VDG machine is off.

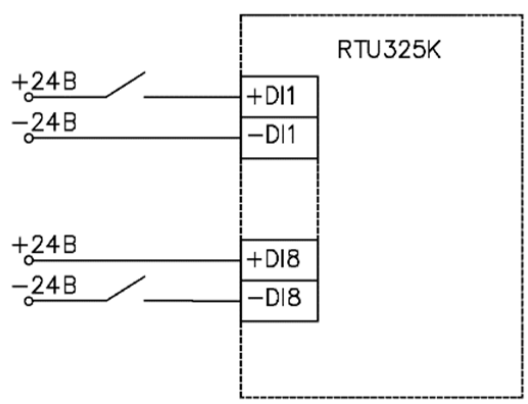
The table has been moved from the original R.E. The ON/OFF designations have been re-established instead of incorrect characters.

Shield reference data and indication

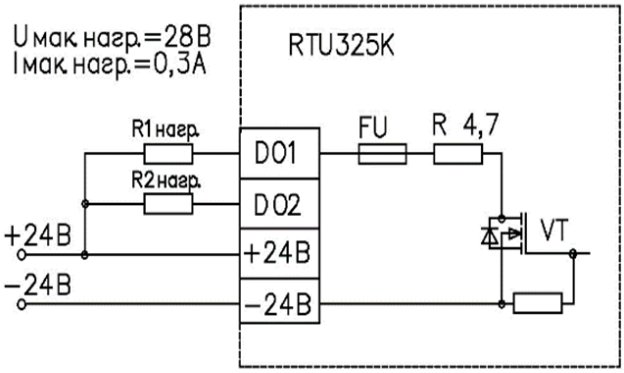
At S1.1 = ON: RTU configuration ban hardware. View mode work. To continue, press any key.

RTU-325K-E3-M4-B5-DI8-DO2-T · SHKK467449.063

Port	IP address	Subnet mask
Eth1	10.7.11.202	255.255.255.0
Eth2	192.168.11.202	255.255.255.0
Eth3	10.0.43.202	255.255.255.0



DI connection diagram



DO connections

Figure 1.11 Reference data for the original R.E. The purpose of S1 is given on the previous page; the photo of the shild is shown in Figure 1.8.

LED alarm on the hull

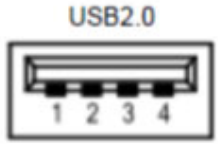
Status and appointment indicator
PWR is permanently green when fed at the inlet.
WDT is a red player: RTU and Watchdog.
Ethernet Yellow - Activity; Green - LINC.
COM Red is the transmitter of Tx; Green is the receiver of Rx.

1.2.8. Interface signal description

1.2.8.1. USB interface signals

USB2.0

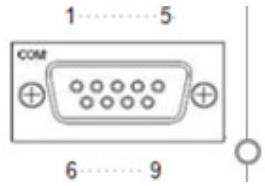
PIN	USB 2.0 signal
1	VCC
2	D-
3	D+
4	GND



1.2.8.2. COM1~COM4 comport signals

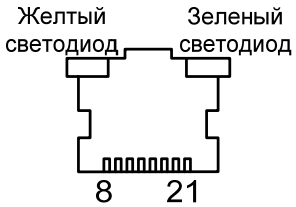
COM1, COM2, COM3, COM4 (DB9 interfaces) maintain RS-232.

Pin	RS-232
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



1.2.8.3. Ethernet signals

RJ-45 Ethernet LAN1,,, LAN3

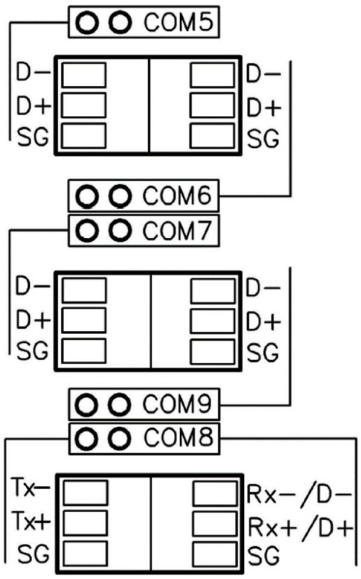


Interface contact	Name	Direction	Description
1	FTXD+	OUT	Transfer+
2	FTXD-	OUT	Transfer--
3	FRXIN+	IN	Reception+
4	NC	-	Not connected
5	NC	-	Not connected

6	FRXIN-	IN	Over.
7	NC	-	Not connected
8	NC	-	Not connected
Yellow LED	ACTIVITY	-	Activity
Green LED	LINK	-	Connection

1.2.8.3. RS-485 signals

The RS-485 connections are standard and marked on the shell and are shown in the figure below.



D-minus conductor/transmitor;

D+ the positive conductor of the receiver/transceiver;

SG signal ground (drain guide).

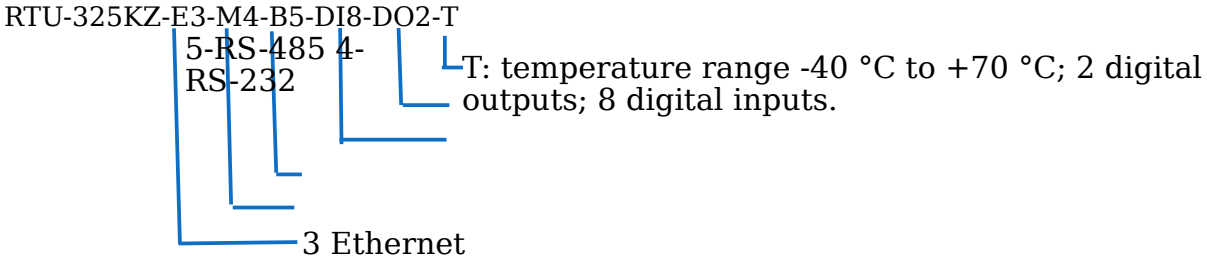
The operating mode of the port of COM8 may be either 2-conductor or 4-wire and the operating mode shall be assigned to the switch S1.3 (in the position OFF-RS485 2W, in the position of ON-RS485 4W);

1.3. Possible modifications to RTU-325KZ

RTU-325KZ modifications

No.	Symbol	Ethernet Number	Number RS-232	Number RS-485/RS-422
1	RTU-325KZ-E3-M4-B5-DI8-DO2-T	3	4	5

The RTU symbol diagram is as follows:



Comment: All RTU-325KZ modifications have 2 USB 2.0 interfaces.

A wide range of external modules connected to the Ethernet, RS485, USB, may be used to increase the number of discrete signals processed. The expansion of RS232 and RS485 ports is carried out by the installation of appropriate expansion modules, protected from high voltage voltages and galvanic isolation, to USB and Ethernet ports.

1.4. Use of RTU in systems

The simplified structure of the application of RTU in the systems is shown in Figure 2.

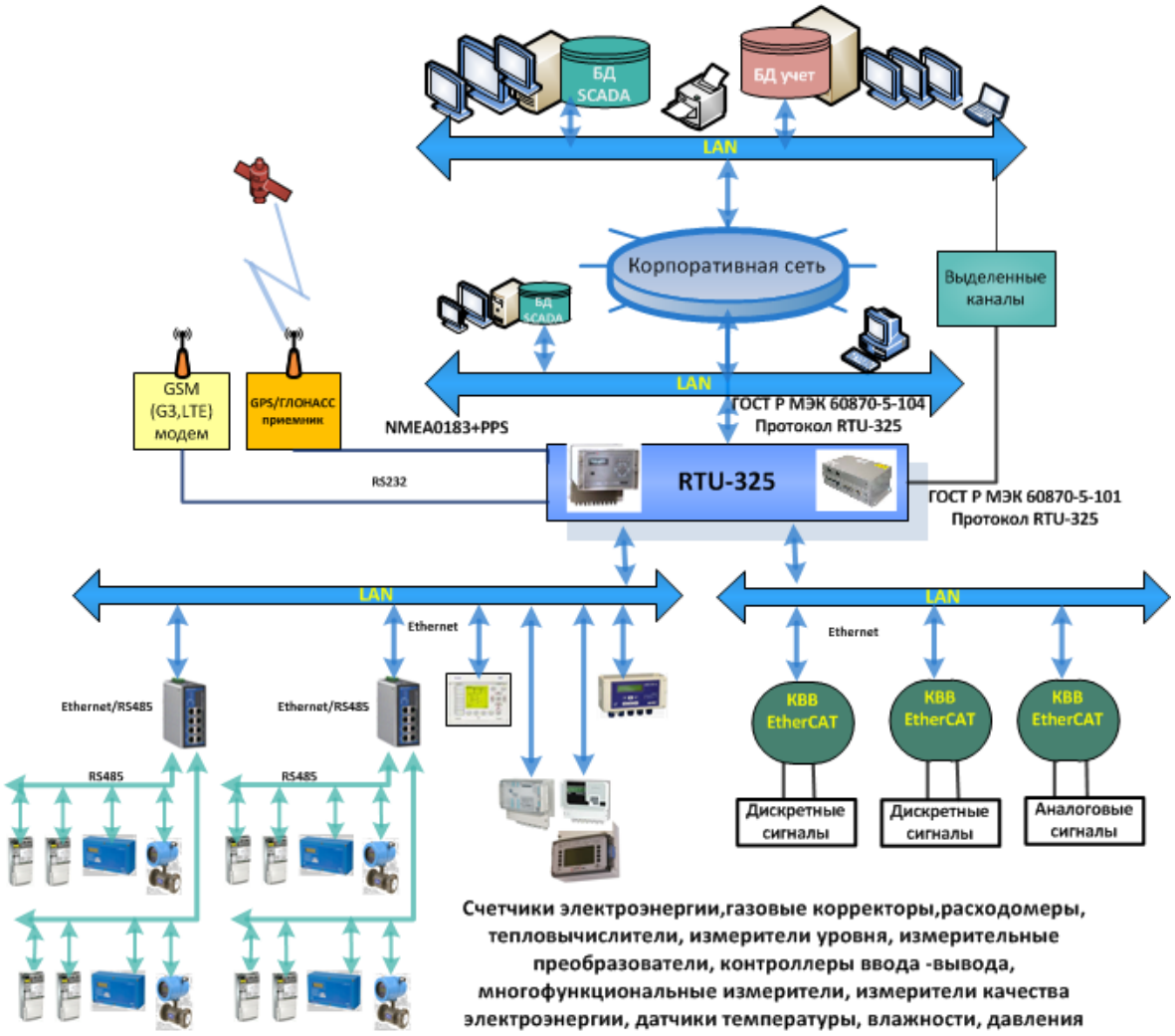


Figure 1.12.

RTU is the main component of the system at the facility level. It is connected by various devices: measuring, communication, physical sensors, input-output controllers, recorders, etc. using different interfaces and different protocols. RTU maintains a database of data received, data processing, web server data presentation, information exchange with top level servers, workstations for different protocols depending on specific tasks.

RTU maintains an information exchange on the following standard protocols:

1) GOST R IEC 60870-5-104
2) GOST R IEC 60870-5-101
3) IEC 61850-8-1
4) Modbus/TCP
5) Modbus RTU
6) M-bus

7) EtherCAT
8) MQTT(ISO/IEC PRF 20922)
9) COMTRADE
10) Access to RTU: Security Shell, FTP, HTTP, Telnet, SFTP, SNMP
11) NTP, SNTP
12) PTP
13) NMEA-0183
14) XML, JSON
15) HART
16) ANSI C12-19, C12-2, DLMS, IEC1107, SPODES, CoAP
17) OPC UA (IEC62541)
18) ISOonTCP (Siemens PLC S7)

RTU also supports information exchange through the firm protocols: АльфаЦЕНТР-RTU-325 and RTU-325 cascade, as well as through the protocols used in the devices listed below табл.1. RTU works with many top-level programs used in the wholesale and retail electricity market, as well as technical accounting of industrial enterprises: AlphaCenter, Pyramid 2.0, Pyramid-Net, Energosphere, Telescope+, Integral, Alpha-Smart, Metroscope.

RTU-325K maintains an information exchange with the following devices (starting with
In addition, the following systems (e.g., integrated software V3.18O RC18) are used in the systems: ASCU, Telemechanics, Control Control, ASYCUDA, Energy Accounting. The name of these devices is given in tables 1.6. to 1.11.

Table 1.6.

Electrical metering	
1) A1800 (Эльстер Метроника, Москва) 2) A1140 (Эльстер Метроника, Москва) 3) AS1350 (Эльстер, Германия) 4) AS1440 (Эльстер Метроника, Москва) 5) AS1500 (Эльстер, Германия) 6) AS3500 (Эльстер Метроника, Москва) 7) AS100 (Эльстер Метроника, Москва) 8) AS220 (Эльстер Метроника, Москва) 9) AS300 (Эльстер Метроника, Москва) 10) A3 (Эльстер Метроника, Москва) 11) ЕвроАльфа A1600 (Эльстер Метроника, Москва) 12) Альфа A1 (Эльстер Метроника, Москва) 13) Альфа Плюс (Эльстер Метроника, Москва) 14) Electricity meter A1700 (Эльстер Метроника, Москва)	30) СЭТ4ТМ.03(М) (The Enterprise). Frunze, Lower Novgorod) 31) ST4TM.02 (Bio. Frunze, Lower Novgorod) 32) ПСЧ-4ТМ.05(М, МС) (Ship. Frunze, Lower Novgorod) (33) ST4TM.02M (Super. Frunze, Lower Novgorod) (34) ПСЧ-3ТМ.05 (Supreme. Frunze, Lower Novgorod) 35) ПСЧ-3АРТ.07 (The ПСЧ-3АРТ.07 plant). Frunze, Lower Novgorod) (36) Lighthouse 301 (Boiling plant). Frunze, Lower Novgorod) 37) СЭБ-1ТМ.02 (Construction of the vehicle). Frunze, Lower Novgorod) 38) СЭБ-2А.07 (The СЭБ-2А.07 Project). Frunze, Lower Novgorod)

Electrical metering	
15) A1200 (Эльстер Метроника, Москва) 16) Axx1 (Honneywell, Германия) 17) Axx3 (Honneywell, Германия) 18) Меркурий230 (Инкотекс, Москва) 19) Меркурий233 (Инкотекс, Москва) 20) Меркурий234 (Инкотекс, Москва) 21) Меркурий236 (Инкотекс, Москва) 22) Меркурий200.02 (Инкотекс, Москва) 23) Electricity meter Меркурий203.2T (Инкотекс, Москва) 24) ЦЭ6850М (Энергомера, Ставрополь) 25) CE301 (Энергомера, Ставрополь) 26) CE303 (Энергомера, Ставрополь) 27) CE304 (Энергомера, Ставрополь) 28) Протон-К (Систел, Москва) 29) Фотон (Систел, Москва)	39) JEMStar (Ametek, USA) (40) ZMD (Landis&Gyr, Switzerland) (41) SL7000 (Actaris, France) (42) CEWE Prometer (CEWE Instruments AB, Sweden) (43) EPQS (Elgama Elektronika, Lithuania) (44) PMAC201HW (Zhuhai Pilot, China) (45) STAM-3 (A-2, Armenia) (46) АИСТ-1 (Gomelenergo, Belarus) (47) AIST-3 (Gomelenergo, Belarus) (48) CC301 (Grand of Electro, Belarus) 49) CC101 (Grand of Electro, Belarus) (50) Энергия-9/СТК-03 (Homelergo, Belarus) (51) Gamma3 (GFMCT, Ryazan)
52) E-calculators with SPODES protocol	53) Трансформатор тока электронный оптический (Профотек, Москва) 54) СТЭМ-300KZ (ТОО Almaty Project, Казахстан
Multifunctional measurement devices	
55) EM720 (Satec, Израиль) 56) Sentron PAC-4200 (Siemens, Германия) 57) EM/PM13x (Satec, Израиль) 58) ESM (Энергосервис, Архангельск)	59) ION8x00 (Schneider Electric, Канада) 60) ION7x00 (Schneider Electric, Канада) 61) ION6200 (Schneider Electric, Канада) 62) КИПП-2М (ССТ, С-Петербург)
Warm computers	
63) EW7001 (Honeywell, Германия) 64) EW7001 (Honeywell, Германия) 65) ТСР-025 (Взлет, Санкт-Петербург)	66) СПТ-961.2 (Logica, St. Petersburg) (67) TC-05 string (Grand Electro, Belarus) (68) TC-07 Strude (Grand Electro, Belarus)
Gas and flow meters	
1) Взлет КГ (Взлет, Санкт-Петербург) 2) СПГ-761 (Логика, Санкт-Петербург) 3) СПГ-761.2 (Логика, Санкт-Петербург) 4) Ирга-2 (Глобус,Белгород) 5) ЕК270 (Эльстер Газэлектроника,Арзамас)	6) FLOUGAZ (EPO Signal, Engels) (7) Amis-Vigre 200 (EC-200) (Emis, Chelabinski) (8) Metran 333 (GWP, Metran, Chelabinski) (9) ТЭКОН-19 (Create, Yekaterinburg)

Telemapping (assembly of the following devices and provision to the upper level of analog information on IEC protocols 60870-5-104/101)

Table. 1.7.

1) Измерительный преобразователь EtherCATBeckhoff EL3403 (Beckhoff, Германия) 2) Измерительный преобразователь EtherCATBeckhoff EL3413 (Beckhoff, Германия) 3) Трансформатор тока электронный оптический (Профотек, Москва) 4) Устройства РЗА БМРЗ-100 (Механотроника, г. С-Пб) 5) Устройства РЗА Сириус-2 (Радиус Автоматика, Зеленоград) 6) Устройства РЗА БЗП-01 (Микропроцессорные технологии, Новосибирск) 7) Устройства РЗА БЗП-02 (Микропроцессорные технологии, Новосибирск) 8) Устройство контроля изоляции IPDH275 (Bender, Германия) 9) Датчик уровня топлива LLS-30160 (Омникомм, Москва) 10) Многофунциональный измерительный прибор ЩМ120/96 (АО Электроприбор, Чебоксары) 11) Цифровой измерительный прибор переменного тока ЩП120/96 (АО Электроприбор, Чебоксары) 12) Цифровой измерительный прибор постоянного тока Щ120П/96П (АО Электроприбор, Чебоксары) 13) Многофунциональный измерительный прибор PD194 (KC/SFERE, Китай) 14) Цифровой измерительный прибор переменного тока PA194, PZ194, PS194 (KC/SFERE, Китай) 15) Цифровой измерительный прибор постоянного тока PA195, PZ195 (KC/SFERE, Китай)	16) Устройства взаимодействующие по протоколу ГОСТ Р МЭК 60870-5-104 17) Устройства взаимодействующие по протоколу ГОСТ Р МЭК 60870-5-101 18) Устройства, по протоколу Modbus/TCP 19) Устройства, взаимодействующие по протоколу Modbus RTU 20) Устройства удаленного ввода-вывода по протоколу EtherCAT 21) Устройства, взаимодействующие по протоколу HART 22) Абсолютный энкодер EtherCATAFM60A MT (Sick, Германия) 23) Регистратор Экограф-T/RSG30 (Endress+Hauser, Германия) 24) Регистратор DX1000/DX2000 (Yokogawa, Япония) 25) Регистратор Eurotherm 6100A (Schneider, Англия) 26) Регистратор KS3102 (PMA, Германия) 27) Устройство удаленного сбора аналоговых сигналов ADAM-6017 (Advantech, Тайвань) 28) Устройство удаленного сбора сигналов с термосопротивлений ADAM-6015 (Advantech, Тайвань) 29) Устройство удаленного сбора аналоговых сигналов ADAM-4013 (Advantech, Тайвань) 30) Устройства удаленного сбора аналоговых сигналов серии ET7000 (ICP DAS, Тайвань) 31) Модули сбора аналоговых сигналов (i8017H) установленные в контроллере i- 8KE8(4) (ICP DAS, Тайвань) 32) Устройство сбора и передачи данных (УСПД) RTU-325 разных модификаций) (Эльстер Метроника, Москва)

Television alarm (assembly of the following devices and provision of discrete information on IEC protocols 60870-5-104/101)

Table 1.8.

1) Data collection and communication device (RTU) RTU-325 different modifications) (Elster Metronica, Moscow)	11) (Microprocessor technology, Novosibirsk)

2) Устройство удаленного сбора дискретных сигналов ADAM-6050(Ethernet,12DI+6DO) (Advantech, Тайвань) 3) Устройство удаленного сбора дискретных сигналов ADAM-6052(Ethernet,8DI+8DO) (Advantech, Тайвань) 4) Контроллер удаленного сбора сигналов ADAM-5000/TCP с модулями дискретного ввода ADAM-5051S (Ethernet,до 8 модулей по 16DI) (Advantech, Тайвань) 5) Устройство удаленного сбора дискретных сигналов ioLogic-2210(Ethernet,12DI+8DO) (Моха, Тайвань) 6) Устройства удаленного сбора дискретных сигналов МВ110-хД (ОВЕН, Москва) 7) Устройства удаленного сбора дискретных серии ET7000 (ICP DAS, Тайвань) 8) Модули сбора дискретных сигналов (i8040,41,42) установленные в контроллере i-8KE8(4) (ICP DAS, Тайвань) 9) Многофункциональный измеритель Sentron PAC-4200 (Siemens, Германия) 10) Устройства РЗА БМРЗ-100 (Механотроника,г.С-Пб)	12) Устройства РЗА БЗП-02 (Микропроцессорные технологии, Новосибирск) 13) Устройства удаленного ввода-вывода серии ECAT-2000 (ICP DAS, Тайвань) 14) Устройства удаленного ввода-вывода USB-2051, USB-2055 (ICP DAS, Тайвань) 15) Устройства взаимодействующие по протоколу ГОСТ Р МЭК 60870-5-104 16) Устройства взаимодействующие по протоколу ГОСТ Р МЭК 60870-5-101 17) Устройства, взаимодействующие по протоколу Modbus/TCP 18) Устройства, взаимодействующие по протоколу Modbus RTU 19) Устройства удаленного ввода-вывода по протоколу EtherCAT 20) Регистратор Экограф-Т/RSG30 (Endress+Hauser, Германия) 21) Регистратор DX1000/DX2000 (Yokogawa, Япония) 22) Регистратор Eurotherm 6100A (Schneider, Англия) 23) Устройства РЗА Сириус-2 (Радиус Автоматика, Зеленоград) 24) Устройства РЗА БЗП-01

Television management (upper-level management of IEC protocols 60870-5-104/101)

Table 1.9.

1) Устройство сбора и передачи данных (УСПД) RTU-325(Эльстер Метроника, Москва) 2) Устройство удаленного сбора дискретных сигналов ADAM-6050(Ethernet,12DI+6DO) (Advantech, Тайвань) 3) Устройство удаленного сбора дискретных сигналов ADAM-6052(Ethernet,8DI+8DO) (Advantech, Тайвань) 4) Устройство удаленного сбора дискретных сигналов ioLogic-	11) Устройства РЗА Сириус-2 (Радиус Автоматика , Зеленоград) 12) Устройства РЗА БЗП-01 (Микропроцессорные технологии, Новосибирск) 13) Устройства РЗА БЗП-02 (Микропроцессорные технологии, Новосибирск) 14) Устройства телемеханики I· DS HVD3 RTU5/EM3 Топаз (PLC Technology) (3.19+) 15) Контроллер телемеханики SCADAPack- 333E (Schneider Electric,Канада) (3.19+)

E2210(Ethernet,12DI+8DO) (Moxa, Тайвань) 5) Устройства удаленного сбора дискретных сигналов серии ET7000 (ICP DAS, Тайвань) 6) Модули сбора дискретных сигналов (i8040,41,42) установленные в контроллере i-8KE8(4) (ICP DAS, Тайвань) 7) Устройства удаленного ввода-вывода серии ECAT-2000 (ICP DAS, Тайвань) 8) Устройства удаленного ввода-вывода USB-2055 (ICP DAS, Тайвань) 9) Многофункциональный измеритель Sentron PAC-4200 (Siemens, Германия) (3.19+) 10) Устройства РЗА БМРЗ-100 (Механотроник , г. С-Пб)	16) Контроллер телемеханики SCADAPack- 313E (Schneider Electric,Канада) (3.19+) 17) Устройства удаленного ввода-вывода серии ECAT-2000 (ICP DAS, Тайвань) 18) Устройства, взаимодействующие по протоколу ГОСТ Р МЭК 60870-5-104 19) Устройства, взаимодействующие по протоколу ГОСТ Р МЭК 60870-5-101 20) Устройства, взаимодействующие по протоколу Modbus/TCP 21) Устройства, взаимодействующие по протоколу Modbus RTU 22) Устройства удаленного ввода-вывода по протоколу EtherCAT

Formation, archiving, presentation and transmission of COMTRADE files (IEC60255-24-2013)

Table. 1.10.

1) Instrument reading and preservation of current parameters (electric meters, heat computers, transducers)	2) Регистратор Экограф-Т/RSG30 (Endress+Hauser, Германия) 3) Регистратор DX1000/DX2000 (Yokogawa, Япония) 4) Регистратор Eurotherm 6100A (Schneider, Англия) 5) Регистратор KS3102 (PMA, Германия)

RTU operates with the devices shown in the table.

Table 1.11.

Ethernet-RS232/422/485 (direct-TC server) converters - Test devices: 1) NPort-5xxx (Moxa, Taiwan) (2) tDS-735i (ICP DAS, Taiwan) 3) tDS-718i (ICP DAS, Taiwan) (4) tDS-715i (ICP DAS, Taiwan)	12) USB-RS232/422/485 converters (13) USB-RS232/422/485 ADAM-4561 converter (Adventech, Taiwan) (14) USB-RS232 Defender USR130 (Omega Electronics, China) (15) USB-RS232 STLab USB-Serial-4 converter (16) USB-RS232 Gembird converter

Модули разветвления шины EtherCAT 5) ICP DAS ECAT-2512 6) Omron GX-JC03 7) Omron GX-JC06 PLC-модемы: 8) IT7000-MIM-1181 PLC-RS232/485 (работает со счетчиками Эльстер) (Yitran, Израиль) 9) M2.01 (работает со счетчиками НЗиФ) (НЗиФ, Нижний Новгород) 10) Меркурий-225.21(технология PLC-II, работает со счетчиками Меркурий-233, Меркурий-203) (Инкотекс, Москва) 11) Преобразователь Mbus PadPuls M2 (Relay, Германия)	17) Преобразователь USB-RS232/422/485 Expert EX9530 18) Преобразователь USB- CAN/RS485/ RS232 Меркурий-221 (Инкотокс, Москва) Преобразователь USB-RS422/RS485 ПИ-2 (НЗиФ, Нижний Новгород) 19) Преобразователь USB-RS232/422/485 i7561 (ICP, Тайвань) 20) Преобразователь USB-RS485 tM7561 (ICP, Тайвань) 21) Преобразователь USB-RS485 АЦДР.426469.032 (Bolid, Королев) 22) Преобразователь интерфейсов С2000- USB (Bolid, Королев) 23) Преобразователь USB-RS485 АС4 (Овен, Москва) 24) Преобразователи на базе микросхем Silicon Labs CP210x Exar XR21B1411
U.S.B. concentrates (one level of connection through concentrates maintained)	

1.5. Means of measurement, tool and accessories

The RTU service software modules are operated by an external engineering remote. The external engineering remote is a laptop or personal computer with installed terminal emulators and FTP clients.

The external engineering remote will provide:

(a) RTU configuration and diagnosis,

(b) Receiving and display on the display of the engineering remote of information from RTU in a suitable form for analysis.

For more information on the work with the external engineering remote control unit, see the documentation "RTU data collection and communication device (RTU) of the RTU-325 series. Software. User manual. Part 4. External engineering remote."

1.6. Marking and sealing

1.6.1 The RTU marking corresponds to the GOST 26828-86. The symbols correspond to the requirements of the State Enterprise for the Environment (GEE) 60536-2-2001.

1.6.2. Each RTU indicates:

1) The manufacturer's trade name;

2) The name and symbol of the RTU type;

3) The manufacturer's number and date of manufacture;

4) Nominal power voltage and current consumption;

5) Nominal frequency in hertzes; (if supplied by variable frequency current)
6) Type approval mark;
7) Certification mark

1.6.3. The manufacturer ' s sealing of RTU is done by stamping the guarantee marks.

1.7. Supply package and packaging

The RTU package is shown in table 8. Note - The verification method is sent out at the request of the organizations that verify RTU.

Table 8

No.	Name of equipment, product	Number	Note
1	RTU RTU-325KZ with integrated software	1 Unit	
2	USB flash drive for the software (Recovery Disk)	1 Unit	Delivered optional
3	Layout Key	1 Ex...	FLS 467449.063
4	Maintenance documentation	1 Unit	Maintenance documentation consisting of the RTU 325 RTU Data Collection and Communication Unit (RTU) RTU 325 RE operating manual 467449.063. User guide on software available upon request - kz.almaty.project@gmail.com
5	Box	1 Unit	Carton Box
6	AC/DC power supply unit	1	Delivered optional

- Operating manual of the SKM 467449.063 RE
- The user manual" with the following sections:

  - «Основные принципы работы»
  - «Встроенное ПО»
  - «Конфигуратор»
  - « Журнал событий»
  - « Встроенный пульт ввода/вывода»
  - « WEB - приложения»
  - «Телемеханика»

RTU is packed in a cardboard box to ensure that it is preserved during transport and storage under the conditions specified in the relevant sections of this manual. The form is placed in the RTU box.

2. Operation for the intended purpose

2.1. Operating restrictions

2.1.1 Before operating the RTU, carefully read its operating documentation.

2.1.2 All RTU installation work must be performed with the power supply disconnected.

2.1.3 The AC supply voltage applied to the AC/DC power supply must be within 176 V to 264 V.

2.1.4 The RTU contains a lithium cell that maintains the built-in calendar and real-time clock when external power is disconnected.

2.1.5 With no external power, the lithium cell is guaranteed to remain operational for at least 3 years.

2.2. Preparation of RTU for use.

2.2.1. Connecting RTU

WARNING! After transport at sub-zero temperatures, unpack the RTU only after keeping it at (20 ± 5) °C for at least 12 h.

Use a shielded cable (for example, Belden 9539, Belden 9505 or an equivalent) to connect devices to the RTU RS-232 ports. Connect the cable shield to the earth bus as close to the RTU as possible. The cable must be no longer than 15 m.

Use a shielded cable (for example, Belden 9842, Teldor 9392002129 or an equivalent) to connect devices to the RTU RS-485 ports. Connect the cable shield to the earth terminals of the cabinet or panel used to install the RTU.

Use a shielded 4x2x24AWG cat 5e FTP (SFTP) cable to connect the RTU to Ethernet.

When connecting long communication lines to the RTU, RS-485 and Ethernet surge protection devices are recommended.

To maintain the specified operating performance, earth the RTU at the power terminal block.

2.2.2. Installation of RTU at the place of use

RTU can be placed on panels and in instrument cabinets.

Remove RTU from the package and perform an external inspection. Ensure that there are no visible damage to the shell and that the seals are present and preserved.

Check the complete supply of RTU according to the relevant section of the SHQ Form 467449.063.

WARNING! All RTU installation work must be performed with the power supply disconnected.

Activate power voltage and verify that RTU has activated:

(a) A luminous indicator «питание»; (b) The loading of RTU shall be accompanied by an audible signal (modification E-2) and a light signal (periodic WDT engine). (c) After loading of RTU on the display of the engineering remote (when connected to RTU), the system time RTU shall be displayed. (d) Check the installation date and date of entry into service form.

2.2.3. RTU Settings

The RTU requires a specific customization of the facility by means of an integrated configuration, in accordance with the ED User Guide and the design documentation, when operating in the ECU AIS, TUE AIS systems.

RTU should be structured by trained technical personnel of the launcher organization, who are qualified in computing skills and familiar with the tasks of the ASCU, CMW.

With the correct installation and configuration (both RTU itself in the system and associated microprocessors and other devices), the RTU will start operating as soon as the software (power supply) is on and on.

The RTU shall be produced with a specified memory distribution to store different data, e.g. electric energy consumption profiles. In a particular project, there may be its own requirements for storage volumes in the RTU database. The following methodology should be used to calculate the storage capacity for parameters:

Methodology for calculating the volume of NVM.

NVM

RTU-325K is divided into two independent sections, one section is used to store RTU V3.xx software and office archives, the second section is used to store archives and only one section is to be taken into account in calculating the required NVM volume.

The required volume shall be calculated by summating the required NVM volume according to the following data for the calculation elements based on the design data per system. The NVM storage data shall be less than 730 Mb for one RTU supply option.

Computing NVM volume calculations.

K.1 Handbooks and system operating configuration.

Calculation formula

V = 2+0.05*(number of system elements *1)+1*(number of telecontrol configurations) Mb.

K.2 Technical profile of electric energy consumption at the meter interval.

Calculation formula for pulse-specific meters *2:

V = (70+number of profiles)*(number of days)*(number of meters)*(profile intervals per day)/1000000 Mb.

Example of a calculation per 1 4-piece meter:

Profile interval	Storage 1 day	Storage 1 month
1 minute	0.107 Mb	3.3 Mb
3 minutes	0.036 Mb	1.1 Mb
5 minutes	0.021 Mb	0.7 Mb
15 minutes	0.007 Mb	0.21 Mb
30 minutes	0.004 Mb	0.12 Mb

Calculation formula for technical profile meters with floating point number *3:

V = (70+7*number of profiles)*(number of days)*(number of meters)*(profile intervals per day)/1000000 Mb.

Example of a 1-score meter with 8 retained profiles:

Profile interval	Storage 1 day	Storage 1 month
1 minute	0.181 Mb	5.4 Mb
3 minutes	0.060 Mb	1.8 Mb
5 minutes	0.036 Mb	1.1 Mb
15 minutes	0.012 Mb	0.4 Mb
30 minutes	0.006 Mb	0.2 Mb

K.3 An electric energy consumption profile archive at a commercial interval in kWh.

Calculation formula for 30 minutes interval:

V = (70+7*number of profiles)*(number of days)*(number of meters and connections)*48/1000000 Mb.

Calculation example for 4 retained profile meters:

Number of meters/adherences	Storage 1 month	Storage 1 year
1 meter	0.15 Mb	1.8 Mb
40 Rectors/adherences	6.0 Mb	72.0 Mb

K.4 The design profile archive at the commercial interval.

Calculation formula for 30 minutes interval:

V = (70+7*number of profiles)*(number of days)*(number of meters)*48/1000000 Mb.

Calculation example for 4 retained profile meters:

Number of meters	Storage 1 month	Storage 1 year
1 meter	0.15 Mb	1.8 Mb
40 meters	6.0 Mb	72.0 Mb

K.5 Sub-interval profile archive.

Calculation formula:

V = (70+7*number of profiles)*(60*24/subinterval duration)*(number of days)*(number of meters)/1000000 Mb.

Example of calculation for 4 retained 3-minute sub-interval meters:

Number of meters	Storage 7 days	Storage 1 month
1 meter	0.33 Mb	1.4 Mb
40 meters	13.2 Mb	56.0 Mb

K.6 The profile archive of the calculation imbalances by group.

Calculation formula for the 30 minute imbalance calculation interval:

V = 80*(number of days)*(number of balance groups)*48/1000000 Mb.

Calculation example for 4 retained profile meters:

Number of balance sheets	Storage 1 month	Storage 1 year
1 Group	0.12 Mb	1.44 Mb

K.7 Power consumption archive in kWh.

Calculation formula:

V = 0.0001*365*(number of years) *(number of meters) Mb.

Calculation example:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.0365 Mb	0.1825 Mb
40 meters	1.46 Mb	7.3 Mb

K.8 Power consumption archive at 24-hour tariffs in kWh.

Calculation formula:

V = 0.0001*365*(number of years) *(number of tariffs) *(number of meters) Mb.

Calculation example for 4 tariffs:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.146 Mb	0.73 Mb
40 meters	5.84 Mb	29.2 Mb

K.9 Electric energy consumption archive at the calculation period, kWh.

Calculation formula (calculation period - month):

V = 0.0001*12*(number of years) *(number of tariffs) *(number of meters) Mb.

Calculation example for 4 tariffs:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.0048 Mb	0.024 Mb
40 meters	0.192 Mb	0.96 Mb

K.10 Electric energy consumption archive for the design period in kWh.

Calculation formula (calculation period - month):

V = 0.0001*12*(number of years)*(number of tariffs)*(number of groups) Mb.

Calculation example for 4 tariffs:

Number of groups	Storage 1 year	Storage 5 years
1 Group	0.0048 Mb	0.024 Mb
10 groups	0.048 Mb	0.24 Mb

K.11 An archive of power values at commercial intervals in power zones in kW.

Calculation formula:

V = 0.0001*365*(intervals per day) *(number of meters) Mb.

Calculation example for 2 power zones of 2 hours (total 8 intervals per day):

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.292 Mb	1.46 Mb
40 meters	11.68 Mb	58.4 Mb

K.12 An archive of power values at commercial intervals in power zones by group in kW.

Calculation formula:

V = 0.0001*365*(intervals per day) *(number of groups) Mb.

Calculation example for 2 power zones of 2 hours (total 8 intervals per day):

Number of groups	Storage 1 year	Storage 5 years
1 Group	0.292 Mb	1.46 Mb
10 groups	2.92 Mb	14.6 Mb

K.13 Record of meter readings (autoreading).

Calculation formula:

V = 0.04*12*(number of years)*(number of meters) Mb.

Calculation example:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.48 Mb	2.4 Mb
40 meters	19.2 Mb	96.0 Mb

K.14 An electrical quality index archive.

Calculation formula:

V = 0.00004*(number of parameters) *(measurements per hour)*24* (number of days)*(number of meters) Mb.

Calculation example (measure 5 parameters at 3 min interval):

Number of meters	Storage 10 days	Storage 30 days
1 meter	0.96 Mb	2.88 Mb
40 meters	38.4 Mb	115.2 Mb

K.15 A magazine of events.

Calculation formula:

V = 0.0002*(events per system element) *(number of meters) Mb.

Example of calculation at 150 events per component of system:

Number of system elements	150 events on the element
2 (meter + RTU)	0.06 Mb
41	1.2 Mb

K.16 A log of the stress of the meters.

Calculation formula:

V = 0.0001*(voltage dips per meter) *(number of meters) Mb.

Example of calculation at 500 voltage failures per meter:

Number of meters	500 failures on the meter
1	0.05 Mb
40	2.0 Mb

K.17 Auto-diagnosis log.

Calculation formula:

V = 0.001*(self-test events per check) Mb.

Example of calculation for 100 auto-diagnosis events per test:

V=0.001*100=0.1Mb

K.18 Register of changes in the status of discrete objects(s).

Calculation formula:

V = 0.0001*(changes per digital object)*(number of meters) Mb.

Example of calculation at 500 changes in the state of the discrete object:

Number of discrete objects	500 site changes
1	0.05 Mb
50	2.5 Mb

K.19 A log of changes in the status of accidents and warnings in electrical circuits.

Calculation formula:

V = 0.0001*(changes per alarm or warning) *(number of meters) Mb.

Example of calculation for 100 changes in accident status or warning:

Number of accidents/warnings	100 State of change
1	0.01 Mb
50	0.05 Mb

K.20 Combination traffic records.

Calculation formula:

V = 0.0075*(number of days) *(connections with traffic accounting enabled) Mb.

Calculation example with 30 days of half-hour traffic:

Number of connections, including traffic	Storage of 30 minutes Profiles - 30 days
1	0.225 Mb
20	4.5 Mb

K.21 The records of traffic through the sessions of switched access.

Calculation formula:

V = 0.0075*(number of sessions) *(connections with traffic accounting enabled) Mb.

Calculation example with 30 days of half-hour traffic:

Number of connections, including traffic	Storage of 100 sessions at connection
1	0.75 Mb
4	3.0 Mb

*1 System element - System elements include local and remote RTU, meters, groups, accessions, discrete and analog objects.

*2 Pulse-based technical meters: Alpha, Euro Alpha, Alpha+, A3, A1800, СЭТ-4ТМ, ПСЧ-4ТМ05, ПСЧ-3ТМ05, Меркурий230, СС-301, PadPuls

*3 Meters with a technical profile represented as floating-point pulse counts: A1700, A1140, A1200, EM720, EPQS, SL7000, ZMD, Гамма3, ION, ЦЭ6850М, CE303, CE304, Меркурий20х, ПСЧ3, ТСР-02х, ЭРСВ-310, Взлет РСЛ

2.3. Use of RTU

The RTU work of the ASCU is performed automatically (collection, storage and transmission of data on electrical consumption and grid parameters). All RTU ports can be used by the user to incorporate RTU into the ASCU.

RTU provides data transmission speeds for successive interfaces ranging from 300 od to 115,200 odes.

RS-232, both basic and additional interfaces conform to the EIA 232 standard and support signals: TxD, RxD, RTS, CTS, DSR, DCD, DTR, RI.

To increase the number of RS-485 interfaces, it is possible to use the Ethernet server TCP/IP-COM with RS-485 interfaces that conform to the EIA-485 standard and support work on both the two-conductor and the four-conductor pattern.

3. Maintenance

3.1. General instructions

RTU maintenance may be performed only by personnel of the operating organisation who have studied this manual, received safety instruction, hold at least electrical safety qualification group III for installations up to 1000 V, completed the manufacturer's specialist training programme, and are authorised to maintain and repair the RTU.

The requirements of GOST «Система стандартов безопасности труда. Изделия электротехнические. Общие требования безопасности», "Правилами технической эксплуатации электроустановок потребителей" and "Межотраслевыми правилами по охране труда (правила безопасности) при эксплуатации электроустановок" shall apply to installation, commissioning, operation and maintenance of RTU.

3.2. Safety precautions

WARNING! Disconnect the power supply before performing any RTU maintenance.

3.3. RTU maintenance arrangements

List of maintenance and maintenance frequency (periodicity - according to the planning and warning schedule of the operating organization): dust removal from the RTU body once a year; (a) verification of earth reliability once a year; (b) verification of the reliability of the connection between the RTU power and interfaces once a year; (c) verification of the operation of RTU; (d) scheduled periodic performance monitoring; RTU testing and setting status verification by staff. (e) Replacement of the CMOS battery is recommended for further metrological verification at the manufacturer or service centre. BR2032, 3V battery type, at least 190 mA.

3.4. RTU Performance Test

The performance check consists of periodic monitoring of the performance of RTU:

(a) Visually (b) remotely (b) from the Automated Work Place (ARM) of the top level of AIIS of the CSE. (c) by means of an external engineering remote control. In order to prevent the loss of commercial data, the frequency of observation shall not exceed the time of storage of the accounting data in the microprocessor meters.

less the time required to restore the performance of RTU in the event of failure (as specified in the maintenance or repair contract). The function is determined by the auto-diagnosis interface, the data transmitted to RTU, the correct time on RTU hours and the event log.

At the end of the maintenance, mark the form.

4. Routine repair

4.1 General instructions

4.1.1 The RTU must not be repaired at the installation site. If it fails, send it to the manufacturer for repair.

4.1.2 The customer's maintenance personnel must remove the RTU from the system and send it for repair, describing the fault.

4.1.3 Before removing the RTU, back up its configuration (settings), if possible, so that it can be restored after repair. Back up the working configuration as described in the software documentation. Save and document the RTU settings whenever they are changed during operation.

4.1.4 When disconnecting external circuits, identify and label the wires if this was not done during installation, so that they can be reconnected correctly after repair.

4.1.5 After receiving the repaired RTU, install it in accordance with the project documentation, configure it and put it into service.

4.1.6 If the non-volatile memory (CF card) fails, it may be replaced at the installation site in accordance with the instructions. Record the replacement in the RTU equipment logbook.

4.2 Instruction to replace an non-volatile memory module of the CF in RTU-325K

The actions of the in-service personnel to replace the non-volatile memory module depend on the mode of operation of RTU-325KZ.

There are two modes of RTU operation in the RTU-325 series:

1. Using USB DR-325 for RTU RTU-325 (Recommended method).

2. Without using USB DR-325.

The following is a description of the actions of the operating personnel for each of the two operations.

Case.

1. Operation staff actions to replace the ComputerFlash non-volatile memory module using USB DR-325.

Note. The use of the USB DR-325 module for RTU services implies that it contains copies of the RTU connections and operating configuration stored after the installation.

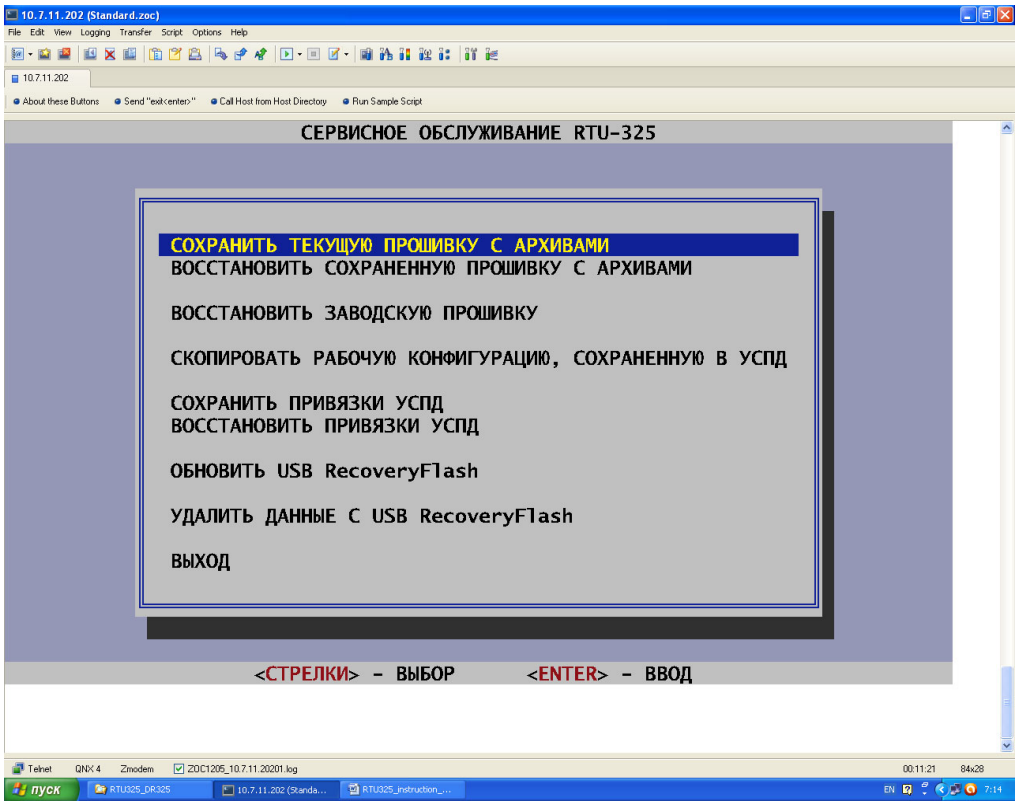
1.1. Replace the defective ComputerFlash non-volatile memory module in RTU-325K with a new one from the manufacturer.

1.2. Load RTU-325KZ with USB DR-325.

1.3. Connect the Ethernet computer to RTU-325KZ using the ZOC terminal emulator program with the following parameters:

Login: recovery Password: 325

1.4. The main menu of the USB DR-325 software module should be available:



1.5. Select paragraph «ВОССТАНОВИТЬ ПРИВЯЗКИ УСПД» .

1.6. From the proposed linkage list, select the required RTU.

1.7. To withdraw from the programme (item «ВЫХОД»).

1.8. Remove USB DR-325 from RTU.

1.9. Reboot RTU.

1.10. Connect the Ethernet computer to RTU-325KZ using the ZOC terminal emulator program in a regular way.

1.11. Reset the RTU-325KZ configuration. To this end, on the main menu of the built-in software RTU select «Импорт/Экспорт данных…» / «Импорт/ Экспорт данных» / «Импорт» / «Рабочая конфигурация» / «Накопитель USB» and then in the directory «Update» - RTU saved work configuration file.

1.12. RTU is ready for work.

2. Operation staff actions to replace the ComputerFlash non-volatile memory module without using USB DR-325.

2.1. Replace the defective ComputerFlash non-volatile memory module in RTU-325K with a new one from the manufacturer.

2.2. Send an e-mail application to the manufacturer for a RTU link with the RTU RTU-325KZ model, the manufacturer's number and the IAU addresses of Ethernet network interfaces.

2.3. Get a link file from the manufacturer.

2.4. Connect the Ethernet computer to RTU-325KZ using the ZOC terminal emulator program in a regular way.

2.5. Connect the Ethernet computer to RTU-325KZ using the FTP client program (e.g. WinSCP) .

2.6. Copy the reference file to the directory «/update» RTU-325KZ.

2.7. Copy the file of copies of the RTU configuration to the directory «/update» RTU-325K if it has been previously stored after setting up on an external medium (USB storage device or computer hard drive).

2.8. Connect the computer to the Ethernet network to RTU-325KZ using the ZOC terminal emulator program in a regular way.

2.9. Set up a tie. To this end, on the main menu of RTU, select «Наладка / Смена версии ПО / Инсталляция» / «Рабочая конфигурация» / «Накопитель USB» and then in the directory «Update» - the reference file.

2.10. Reset the RTU-325KZ configuration. To this end, on the main menu of the built-in software RTU select «Импорт/Экспорт данных…» / «Импорт/Экспорт данных» / «Импорт» / «Рабочая конфигурация» / «FTP: /update/» and then select the saved RTU file.

2.11. If the RTU file has been saved on the USB repository (section «FAT» or «FAT32»), then in order to restore the RTU-325K on the main menu of the integrated software RTU, select «Импорт/Экспорт данных…» / «Импорт/Экспорт данных» / «Импорт» / «Рабочая конфигурация» / «Накопитель USB» and further in the «Update» directory - the work configuration file.

2.12. If the configuration file has not been saved, RTU needs to re-establish the RTU manufacturer number in «Конфигуратор», paragraph «УСПД / «Локальное УСПД», «Заводской номер» . The configuration of the RTU and the installation of the system should be carried out.

2.13. RTU is ready for work.

4.3 Safety precautions

4.2.1 Before disconnecting external circuits, verify that the RTU supply voltage is absent and take measures to prevent other persons from unintentionally reconnecting the power.

4.2.2 To avoid damage to the RTU digital interfaces, connect or disconnect external devices only when the power supply is disconnected.

5. Storage

The storage conditions of the RTU shall be in accordance with the conditions established for the electronic SSP, the storage conditions at the acceptable temperature from minus 55° C to plus 70° C.

The devices shall be stored in closed or other spaces with natural ventilation without artificially regulated climatic conditions. The average time for RTU to be preserved in consumer packagings in heated rooms, without conservation, is 2 years.

6. Transportation

Conditions for transport of RTU in the manufacturer ' s transport packaging

RTU in transport packagings may be transported by all types of closed vehicles and in heated sealed aircraft compartments, without limits on distances. For carriage in railway wagons, the type of shipment is small, not ton-rich.

Packaged RTU in vehicles shall be secured for

To ensure stability, to avoid displacement and to strike each other.

The requirements of the marks affixed to the transport packaging shall be strictly observed when handling and transporting.

After transport at sub-zero temperatures, unpack the RTU only after keeping it at (20 ± 5) °C for at least 12 h.

7. Disposal

The RTU contains a lithium battery. Lithium batteries must be disposed of by specialised organisations.

WARNING! Do not burn lithium batteries or dispose of them with household waste.

Do not handle batteries with damaged casings with bare hands.

When storing lithium batteries before disposal, prevent short circuits between their terminals. Store clean, undamaged batteries in a sealed polyethylene bag.

If many batteries are stored, place the polyethylene bags in a closed metal container filled with vermiculite.

RTU does not contain other hazardous or poisonous substances that may be harmful to human health or the environment, and therefore the recycling of the product can be done according to the rules for the disposal of general industrial waste.

The source describes the RTU housing as both metal and plastic and states that it may be recycled. This inconsistency in the source wording requires verification.

E-payment and separations contain very small values of precious metals and, therefore, secondary processing is not appropriate.

SECTION 02

Operating and configuration principles

Part 1

Edit 12 · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

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1. Introduction.

The RTU 325 series is designed to collect, process, store, transfer to related systems and visual representation (through an integrated WEB server) of commercial and technical energy accounting data. RTU may be used either as an independent device or as part of distributed systems.

RTU is a configuration device. The main concepts and rules used in the configuration process are discussed below.

Data collection and transmission to RTU is done by physical lines connected to RTU ports.

The port is the RTU hardware interface. Many external devices may be connected to the port on one physical line.

The external devices are the metering, switch sensors, subordinates of RTU, related systems and other devices with which RTU exchanges data. The external devices can be local and remote connections.

External local connections - connected directly to local RTU.

Remote connections are connected to other external devices in the system, and their data are accessed through the exterior local connections.

For ease of reference and flexibility, the data configuration of different external devices is defined as "соединение".

The connection is a logical data channel between one port and a multitude of external devices operating on one physical line of communication. A single physical line of communication from one port may be connected to several individual parameters.

In the RTU cascade, a separate connection must be identified for each RTU subordinate. The same connection will be used to interview data from remote meters and sensors connected to a subordinate RTU.

For the reservation of connections, a group of connections is to be defined for operation with the data of an external device with different priorities of the back-up connections and operating modes.

For each connection, the data receiving/transmitting protocol with external devices shall be defined.

The protocol is a program executed module that implements an algorithm to work with a specific type (multiple types) of external devices.

Under the operating mode, «активные» and «пассивные» types of protocols are distinguished.

«Активные» Protocols:

- Take data from the RTU initiative request (work with RTU meters);
- RTU data transfer (protocol «Гонец»). «Пассивные» protocols:
- Data acceptance in passive waiting mode (telemetric protocols);
- Data transmission on request from the outside (protocol «УСПД ответ» / «RTU-325 ответ»). If external devices of different types are connected on one physical line and are serviced by different protocols, they shall be defined for different connections, each with its own type of protocol.

To determine the exact number of data received/transmitted for the protocol, the tasks are configuration at the connection. In RTU, two types of tasks can be reconfigured:

- Combination assignment;

• It's an external device assignment. The connection tasks are a list of tasks that are performed for each device on a given connection. Entered for ease of configuration - one list of tasks for all devices.

Combination tasks may be configuration:

- For «активных» protocols (example of external devices, RTU data transmission);
- For «пассивных» protocols (transmission on demand of the external system).

The tasks on the connections may include all types of operations to operate with all types of devices on a given connection.

No task to connect. In this case, the tasks for the external devices are performed.

The tasks for an external device are a list of tasks that are performed for a particular external device. The tasks on the external device have the highest priority to perform before the connection tasks.

Only the type-specific operating devices can be activated in the tasks of the external device.

From the list of operations, only those operations that do not contradict the list of operations of the external device are performed.

In tasks on the external device of a transaction, the sign «запрещено» may be given. This ensures that the operation is removed from the list of operations for connection tasks when operating with the device. It's been introduced for configuration flexibility.

There may be no assignment to an external device. In this case, the connection tasks shall be performed for the device.

In the absence of both connection and external device tasks, the following regulations shall be complied with:

- for «активных» protocols (exposure polling, RTU data transmission) - nothing is done.

• For «пассивных» protocols (transmission on demand of the external system) - all protocol commands shall be executed. In the absence of connection tasks and the presence of only sign «запрещено» in the task of the external transaction device, the following regulations shall be complied with:

- for «активных» protocols (exposure polling, RTU data transmission) - nothing is done.
- For «пассивных» protocols (transmission on demand of the external system) - nothing is done. As a result of the correct configuration of the main structural components:

«порт» - «соединение» - «протокол» - «задание» - «внешние устройства» , RTU conducts primary data interview and processing to obtain accounting data.

Primary data are raw data without conversion from external devices. RTU receives, stores and transmits to related systems the following types of primary data:

- Digital profiles of microprocessor meter intervals;
- Digital profiles of sub-intervals of micro-processors power;
- The reading(s) from the microprocessors;
- Ice output profiles;
- Microprocessor meter power grid parameters;

- Data on the status of the switches (switches) sensors.

The accounting data are converted by approved methods to a named or logical value of the primary data from the external devices. RTU calculates and stores records of metering points, accessions, groups, alarms and electrical circuit warnings in the archives.

The metering point is the connection to the line of current and voltage measuring transformers. The RTU configuration is a list of metering points linked to them.

RTU calculates and stores the following types of account data from the account point:

- Electrical consumption profile at commercial interval (referenced to meter);
- Electricity consumption per day;
- 24-hour electricity consumption;
- Electric energy consumption at tariffs over the period of calculation;

• the power at commercial intervals in the power zones. Accession is an electrical circuit consisting of primary and back-up metering points and switches (of common switches) designed to maintain continuous counting along the output line. The RTU configuration of the list of attachments, where each accession is formed by an electrical circuit editor.

Upon accession, the RTU automatically handles the input signals of the switches, calculates and stores the following types of accounts:

- Electrical energy consumption profile at commercial intervals;

• Change of metering points. The group is an arithmetical grouping of the same-name accounting data of the different accounting objects. An object of account may be included in a group with a negative value (as a sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-sub-subscriber). The group may include accounting data for metering points, accessions, other groups. The RTU configuration of the list of groups and their composition.

For the RTU group, the following types of accounts are calculated and stored in the archives:

- Electricity consumption in the calculation period;
- Electric energy consumption at tariffs over the period of calculation;

• the power at commercial intervals in the power zones. Electrical circuit alarms/warnings are the state of the electrical circuitry of the 'warning' or 'warning' type defined by the user. The electrical circuitry shall be configurationd in the electrical circuit editor. RTU automatically forms an alarm/warning log, processing in real time external sensor signals.

The history of electrical circuit changes (adhesion, alarms/warnings) can be seen as a chronological sequence of electrical circuit images to illustrate the situation.

All switches in the electrical circuit shall be recorded with a millisecond resolution.

Primary and accounting data can be customized for transmission to related systems and/or viewing using an integrated Web server, an integrated RTU input/output remote control, and an external engineering remote control.

Software for configuration, installation and maintenance is embedded in the RTU and is accessible using an external engineering remote control.

2. The method of interviewing the meter.

2.1. The interview task is to interview the meter.

For each meter, the «Конфигуратор» program defines the task to be performed. For this purpose, the connection task and/or directly to the meter can be defined.

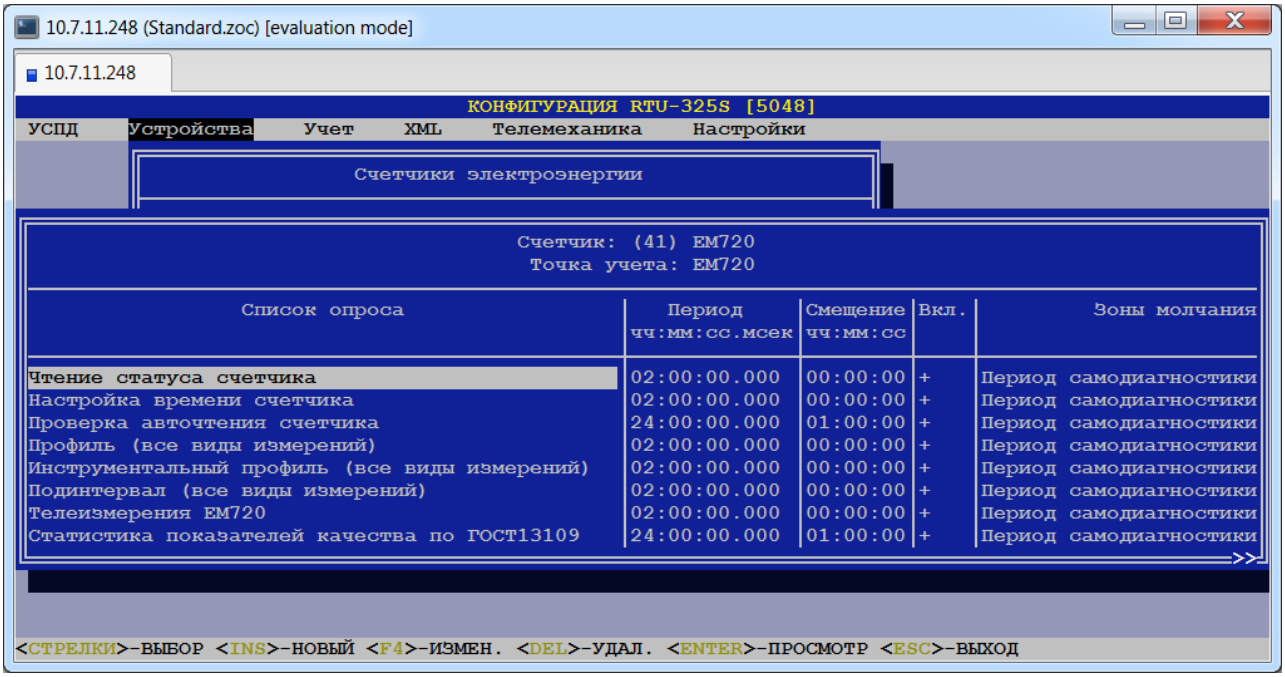
If connection and device polling tasks are used to interview the device, all operations of both tasks will be performed.

If the operation is to be excluded from the connection task list for the device, the operation with the sign '-' (the sign 'Vcl' in the interview) should be included in the device interview list.

The task of interviewing the meter is a set of parameters:

- polling list
- interview period, ch:mm:ss
- Change of interview, ch:mm:ss
- On/off
- Silence zones.

For each meter, several polling tasks can be identified:



Limitation: The reading operations of the meter profiles should be in the same interview.

2.1.1. The interview list.

The polling list is a set of meter operations (see annex 1). The meter operations are:

- Reading from the meter according to the type of meter;

• Setup of meter time. The user forms the polling list with «Конфигуратор» . The polling list can be given a name that reflects the physical meaning of the action. For example, the title of the "читать профиль 2-направленного счётчика активной и реактивной энергии" list makes sense to assign the following set of meter transactions:

- Read the active energy profile;

- Read the active energy profile;
- Read the reactive energy profile;

• Read the reactive energy profile. The RTU has several pre-configurated most commonly used interview lists.

2.1.2. Interview period.

The polling period is the time interval between the completion of the polling task. Determines the frequency of reading from the data meter. The boundaries of polling periods are calculated from the beginning of the day (i.e. from 00:00:00).

Limitation: the time period for the interview must be given by the number of minutes the hour has to be painted or multiple hours (i.e. 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, etc.).

Recommendation: It is not recommended that this parameter should be 0. In so doing, the task of the It is expected to be continuous, which will usually result in inefficient use of communication channels and increased downloading of RTU.

2.1.3. The interview is shifting.

The change in the polling is the time interval between the time of the polling and the actual polling. The reasons for the need for his task are as follows:

- At the end of the day (00:00:00) the calculator performs self-diagnosis.
- The flow profile of the meter itself shall be recorded at the meter interval. The displacement task allows you to get the latest data from the meter.
- If multiple tasks are to be configurationd for a single meter, it is necessary to determine the sequence of tasks performed for a polling. For this purpose, different sample displacements in different tasks for a single meter are configuration.

Limitation: For ease of installation of RTU in the system configuration, a single system is introduced for all The minimum permitted time to move the polling (see paragraph «Настройки» of programme «Конфигуратор»). In the case of a polling offset in a given order that is less than the minimum time allowed to be offset, the minimum time allowed shall be used.

2.1.4. On/off

The sign '+' is the assignment is on, the sign '-' is off.

2.1.5. Silence zones.

Silence zones are periods of time during the day when RTU fails to perform the task.

For each interview, a silence area must be set up in the mission. By default, the 'Regulator Self-diagnosis' zone is set. The user can set another area of silence by selecting it from the list of available. The list of silence zones is set out in paragraph «УСПД» > «Справочник: Зоны молчания» of programme «Конфигуратор» .

2.2. Doing the interviewer's task.

2.2.1. How do you do your interview?

- The meter polls at one consecutive port are carried out in a sequence. - The meter polls connected to the various successive ports are carried out in parallel (i.e. independently). - The interviewer's tasks are performed by organizing periodic interview sessions with the meter. - In case of overlap between multiple polling assignments, one interview session is formed with the meter in which all time-related tasks are operated. The priority of meter operations in the meter link session is given below. - After each interview assignment, the results of some meter operations are checked for late polling tasks and, if any, they are done on an ad hoc basis. - If the result of some meter operations is an error, the transaction will be repeated at specified time intervals. The number of repeats for error of operation and the time interval between repeats of a transaction when operating with a meter are given in the «Конфигуратор» menu item:

«УСПД» > «Соединения» > «Параметры соединений» > Dop.parameters

2.2.2. Checker link session («Альфа», «ЕвроАльфа», «Альфа Плюс»).

2.2.2.1. Communicating.

Communication (phase «handshake») is:

- Package packages «who are you» (initiative package meter communication form) from RTU to meter,
- Waiting for the answer from the meter.

Packages «who are you» shall be provided by:

- Until the meter answers, or
- The number of packages will exceed the value defined by the program «Конфигуратор».

The number of packages «who are you» at a successful or failed previous connection shall be adjusted separately. This option reduces the time of the connection phase with the meter offline.

In the absence of a response from the calculator, the time interval given by the program «Конфигуратор» repeats a series of packages (phase «handshake»). The number of packages is set by «Конфигуратор» . After executing the specified number of packages series in the absence of a response , the event «нет соединения со счётчиком» (event code 8) is recorded with the additional code 257 - «нет соединения» . The next attempt to install «handshake» will be made after the time determined by the program «Конфигуратор» for repeat session attempts in connection error. If one of the subsequent series still succeeds in connecting, the event log records the message «соединение со счётчиком не с первой попытки» (event code 10). In the event of a successful connection with a previous unsuccessful attempt, the event log records the event «восстановление связи со счётчиком» (event code 9).

After package «who are you» RTU awaits a 15-byte response package - if the first byte of the message was received and then there was a pause between the bytes that exceeded this parameter - the whole package timeout occurs and the answer is considered to be wrong with an additional error code 250 - «неполный пакет» . Since this error arises during the package package package package series «who are you», it will appear in the event log in the rare case where the error occurred in the last request of the last session.

2.2.2.2. Data exchange with the meter.

The exchange of data with the meter (commanding/quiring for parameters) is a sequence of packages to the meter and the responses received from it. The communication session is conducted in accordance with the exchange protocols with the metering in half-duplex mode. The trigger for the request is always RTU - the meter responds to the request.

2.2.2.3. End of the communication session.

The end of the communication session is a sequence of two packages to the meter and the receipt/waiting of answers from it. After all commands/demands are completed, a command shall be formed to install the minimum possible timeout on the meter. The answer is to execute the command and send the command "Завершить сессию" ("terminate session"). According to the protocol, the meter does not respond to this command, but this is not the case in irregular situations, so RTU waits for an answer, if it is received, sends again "завершить сессию", otherwise it considers the session to be complete after the time-out to receive the first byte response.
Thus, the only option to be used in the end-of-communication phase is time time time of time while awaiting the first byte response from the meter after the package has been delivered inside the session (the menu item «УСПД» > «Соединения» > «Параметры соединений» > Up. Options > "Ожидание ответа в сеансе связи, мсек"). The RTU meter link session is considered open and another meter on this channel cannot be interviewed until this timeout has passed.

2.2.3. Priority for operations in the meter link session.

1) Read meter configuration;
2) Read the settings of the meter and the metering point (from the subordinate RTU);
3) Read the current status of the meter;
4) Reading the meter reading;
5) Reading the readings of the meter machine;
6) The reading of electricity parameters;
7) Profile reading;
8) Reading sub-intervals;
9) Read the journal of events;
10) Reading the meter class;
11) Recording of the meter class;
12) time setting.

Note: A number of parameters that are modelled as independent are converted into a session

I'm not sure if I'm gonna have any contact with the meter in one request. Thus, the output of the active energy profile, the output of the reactive energy profile, etc., is converted into a "чтение профилей" request with a number of composite parameters (as defined by the system configuration). Similar composite requests are "Параметры электросети" , "Конфигурация счётчика"

and "Текущий статус счётчика". The user is not given the means to execute the requests for the individual parameters of the "Конфигурация счётчика" and "Текущий статус счётчика" commands, despite their compositional nature. The user can only request all the parameters available for this type of calculator.

2.3. Performing individual meter operations.

2.3.1. Checker configuration.

Each meter configuration operation is activated for a single run on the RTU automatically, although it is not available in the meter interview assignments.

The meter configuration is a predetermined set of meter parameters that cannot be changed during measurement and change is possible only by programming the meter.

The meter configuration set may differ from one meter to another, so all known RTU parameters from all supported meters are requested when the "Конфигурация счётчика (чтение)" command is issued. The driver processing the request returns the parameters defined for the particular meter type. RTU compares the configuration parameters read from the meter with the corresponding parameters in the archives set up when the RTU is configurationd. In case of non-conformity:

- There's an entry in the event log.

• All periodic interviews from the interview schedule are prohibited (recurring requests, such as `show_meter', are not prohibited and are executed as they become available). The list of parameters that would prohibit periodic interviews if they were inconsistent with the values set by the «Конфигуратор» program is as follows:

- Pulse conversion coefficient to named units (UKE);
- The position of the decimal point on the meter screen when the energy is displayed (DPLOSE);
- The position of the decimal point on the meter screen when the power is displayed (DPLOCD);
- The serial number of the meter (MTRSN);
- Large load profile factor (RPLSCAL);
- Load profile interval (LPLEN).

Recommendation: Include meter configuration reading command in polling task only

In the event of a possible unauthorized change of the meter parameters through the optical port to form an automatic ban on real-time reading of the meter. The inclusion of this command in the polling task significantly (!) increases the time of the meter session.

Cascade activation: It is not required to include this command in a remote meter interview that is connected to a subordinate RTU. It is recommended that the remote meter configuration be included in the "Параметры счётчика и точки учёта" command list, which works with the files of the subordinate RTU.

If this command is included in a remote meter interview, connected to a subordinate RTU, there will be a real communication session with the remote meter to read configuration. This will slow down the data exchange time for the stunt-on RTU.

2.3.2. Current meter status.

The meter status is a predetermined set of meter parameters that change during measurement if an event occurs. The meter status sets are different for different meter models, so all known RTU parameters are requested from all supported meters when the "Текущий статус счётчика" command is issued. The driver processing the request returns the parameters defined for the particular meter type.

The parameters defined when processing the results of the request "Текущий статус счётчика (чтение)" are errors and warnings arising from the meters, as well as information on the reprogramming of the meter.

In the event of an error/disappearance/warning, the following entries in the event log shall be made on the meter:

- «Возникла внутренняя ошибка счётчика» (Speed code 3);
- «Пропала внутренняя ошибка счётчика» (Speed code 4);
- «Возникло внутреннее предупреждение на счётчике» (Speed code 5);
- «Пропало внутреннее предупреждение на счётчике» Additional event code shall in all cases identify the type of error/warning.

If the class has been programmed on the meter during the previous status request, the event shall be recorded in the event log:

- «Изменение конфигурации счётчика» (code of event 2). Since changing the status information on the meter does not result in the RTU being notified, the time of events recorded is when RTU sent a request and received information about the change of the status parameters, not the time when the event occurred directly on the meter.

Cascade activation: It is not required to include this command in a remote meter interview that is connected to a subordinate RTU. Information on the status of the remote meter will be available on the higher RTU after the transmission of the event log from the subordinate RTU.

If this command is included in the remote meter interview, which is connected to the subordinate RTU, there will be a real communication session with the remote meter to read the status. This will slow down the data exchange time for the stunt-on RTU.

2.3.3. Profile reading.

The operation is logical and not independent. The meter exchange protocol automatically integrates the following profile reading operations into one "чтение профиля" in a meter communication session:

- Active energy consumed (by profile reading);
- Actively generated energy (by profile reading);
- Reactive energy consumed (reception of profile);
- Reactive output energy (reception of profile);
- Quadrant 1 energy (proximity reading);
- Quadrant 2 energy (Read profile);
- Quadrant 3 energy (by profile reading);
- Quadrant 4 energy (by profile reading);
- Full power (by profile reading). This command results in the reading of technical profiles on the specified energy types, with flags of status for each interval.

The date at which profiles are downloaded from the meter is determined as follows:

1) After rebooting, RTU reads the time of the last interval in the archive.

2) If the time of the last interval is greater than the minimum date specified by the «Конфигуратор» program for downloading the meter profiles (paragraph «Настройки» > «Дата загрузки профилей счётчиков»), a request shall be made for the required profiles from the date of the last interval.

3) Otherwise, the starting date specified in the «Конфигуратор» program is used.

If any profile is missing from the meter, an event «Ошибка конфигурирования счётчика» (fault code 12) is recorded in the RTU event log.

If the meter does not have the profile data from the requested time, the profile data available in the meter shall be returned and a data entry flag shall be installed at the first interval before the interval. There are also signs that an event recorded in the meter event log occurred during the interval.

The diagrams from the meter obtained by the command "чтение профиля" shall be recorded in the electrical energy consumption profiles of the pulses at the meter interval and shall be used to calculate the commercial data (such as costs and capacity by tariff and group, business interval profile in named units).

If the "чтение профиля" command contains an event sign on the meter in one of the returned profiles, the interview plan automatically puts a command to read the meter event log, which is removed after the request has been completed.

Due to the characteristics of the protocol, «ЕвроАльфа» and «АЛЬФА ПЛЮС» profiles are read in calendar days.

The number of meter profiles supported by RTU depends on the type of meter, for example:

- Alpha, Alpha Plus - 4 profiles from (A+, A-, R+, R-, Q1, Q2, Q3, Q4);
- Euro Alpha - 8 profiles from (A+, A-, R+, R-, Q1, Q2, Q3, Q4);
- A3 and A1800 - 8 profiles from (A+, A-, R+, R-, Q1, Q2, Q3, Q4);
- A1700 - 8 profiles from (A+, A-, R+, R-, Q1, Q2, Q3, Q4, kVA);
- A1200 - 2 profiles from (A+, A-, R+, R-, KVA+, kVA-);
- СЭТ4ТМ.02/.01 - 4 profiles from (A+, A-, R+, R-).

Attention: The time interval is set in the meter. If there's a reconciliation The time between RTU and the meter, then the time of the last recorded interval isn't related to the time of the RTU and is determined exclusively by the current time on the meter.

Recommendation: Do not list this transaction when compiling the polling list.

2.3.4. Reading an event magazine.

This operation is automatically included in the polling plan for one execution if the profile interval is read in at least one given time interval, the event on the meter has been established. Therefore, it is not necessary to include this command in the polling task of locally attached meters.

For meters that do not have an indication of an event on the meter during the profile interval, it is mandatory to include this operation in the polling assignment. Below is a list of such meters:

- EM720, - EPQS, - ION8x00, - ION7x00, - Grand-Electro CC-301,

- Mercury 20x, - СЭБ2А.07, - PPM-3ART.07(D), - PSP-3TA.07, - Flowmeter "Взлёт УРСВ-510" .

The time of the event in the event log depends on whether the event is part of the meter or RTU. The RTU event time in the event log (e.g. related to the meter link session) is the RTU time. The time of the meter event in the event log (e.g., missing/dating on the meter, correction of the time on the meter) is the time of the meter.

Cascade activation: When the RTU is on a cascade, to get events from a subordinate RTU, it is necessary to connect to a remote RTU to create a task to interview RTU with operation "Журнал событий подчинённого УСПД". The remote RTU may be with built-in software version 2.xx or 3.xx.

Operation "Журнал событий подчинённого УСПД" reads events from a subordinate RTU to those parts of the system (RTU, meters, etc.) that are reconfigured on a local RTU. The RTU meters should be placed at the countpoint.

This operation will produce all the events that have been formed so far in the subordinate RTU.

2.3.5. The timing of the meter.

The procedure for performing this operation in a polling order for a meter connected to a local RTU is as follows:

1. Checking for meter time and RTU.
2. If the time reconciliation is greater than the permissible time reconciliation, RTU is using the meter time correction algorithm. The value of the allowable meter time reconciliation and RTU is given in «Настройки» > «Время» > «Параметры коррекции времени счётчиков» of the «Конфигуратор» program. For a description of the meter time correction algorithm, see «Время на счётчиках» .

Cascade: To correct the time of a subordinate RTU, this command needs to be included in the interview list of any one permanently present meter. The inclusion of this command in the polling list of all the meterings is not appropriate due to the increased traffic of queries/responses on cascade inclusion. This should be done by setting a time reference on the subordinate RTU "Верхний уровень" in the «Настройки» > «Время» > «Эталон времени» menu item.

The procedure for performing this operation in a polling order for a meter connected to a subordinate RTU in the cascade is as follows:

1. Checking the reconciliation between the time of the subordinate RTU and the higher RTU.
2. If the time reconciliation is greater than the acceptable time reconciliation value RTU and the standard given in the menu item «Настройки» > «Время» > «Параметры коррекции времени УСПД» in the program «Конфигуратор», the subordinate RTU shall perform the time correction algorithm. See section «Время УСПД» for a description of the time correction algorithm RTU.

2.3.6. Checker auto-reading.

This operation reads new data on autoreading in the meter.

Depending on its configuration, the meter shall record its readings at a certain point in time. This reading is used by RTU to calculate the readings on the load profile meter both to display the information on the RTU screen and to provide it to the top level. RTU does not receive any asynchronous notification from the meter that the new readings were autoreaded on the meter. Therefore, it is normal to include operation "Проверка авточтения счётчика" in a long time-interview interview, for example, once a day for daily auto-readers.

Recommendation: When a given operation is included in a meter interview, request a shift--
It's relatively 00:00:00, because at the beginning of every day, the calculator does a self-diagnosis.

Cascade: To read the auto-reading data of the remote meter under RTU, this command needs to be included in the interview list. The data are read from the records of the subordinate RTU.

2.3.7. The time and date of the meter.

This operation reads the current time and date of the meter. Regardless of the set of tasks for the meter, this operation is used for special purposes by diagnostic programs.

Recommendation: This operation should not be included in the meter interview assignment.

2.3.8. The meter readings.

This operation reads the current meter readings. Regardless of the set of tasks for the meter interview, this operation is used to present the current reading of the meter on the RTU display and diagnostic programs.

Recommendation: This operation should not be included in the meter interview assignment.

2.3.9. The meter and account points (RTU cascade).

This operation is designed only for the cascade activation of RTU and reads the meter and the countpoint from the remote meter of the subordinate RTU. The data are read from the records of the subordinate RTU. RTU compares the meter and countpoints obtained with the corresponding parameters in the archives set up by the configuration of RTU. In case of non-conformity:

- There's an entry in the event log.

• All periodic interviews from the interview schedule are prohibited (recurring requests, such as `show_meter', are not prohibited and are executed as they become available). The list of meter parameters and countpoints that prohibit periodic interviews when they are inconsistent with the values set by the «Конфигуратор» program is as follows:

- Pulse conversion coefficient to named units (UKE);
- The position of the decimal point on the meter screen when the energy is displayed (DPLOSE);
- The position of the decimal point on the meter screen when the power is displayed (DPLOCD);

- The serial number of the meter (MTRSN);
- Large load profile factor (RPLSCAL);
- Load profile interval (LPLEN);
- Kt;
- Kn.

Recommendation: Include this operation in the remote meter interview task
The RTU is designed to monitor the conformity of data in the files of the subordinate and the upper RTU.

Limitation: This operation does not transfer the sub-interval value from the sub-supplier--
This is the RTU. The control of the sub-interval value in the RTU cascade is on the user.

3. Power grid parameters.

The grid parameters are instantaneous values at the time of the interview and are not supported in the meter profile. The list of supported grid parameters and how they are calculated depends on the meter model (see documentation per meter).

3.1. Supported types of meter.

A list of the RTU-325 series' RTU meterings is given in Annex 1 (paragraph «Телеизмерения»).

3.2. Recommended grid configuration algorithm.

In the items of the «Конфигуратор» menu, perform the following actions.

1. **Allow the recording of the electrical grid parameters into the archive.**
   «Настройки» > «Архивы» > "Параметры электросети" . Set: "Да" .

2. **Set the required depth of the electrical grid archive.**
   «Настройки» > «Размер архивов» > "Параметры электросети" . Recommended value: 3 days

3. **Set up a task for the grid meter.**
   «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» . Create a new polling task or add to an existing polling task the required grid parameters with the necessary interview period and offset of 0.

4. **Restart the RTU when you leave the program «Конфигуратор».**

4. Sub-intervals.

RTU supports two types of sub-interval:

- power exchanges,
- profile sub-points. Only one type of sub-interval can be reconfigured for each meter.

4.1. Power exchanges.

4.1.1. Formation of power sub-intervals.

The sub-intervals of power recorded by RTU are just a few of the sub-intervals of power, which have resulted in energy consumption. Thus, the methodology for sub-intervals is documented in the appropriate meters with this characteristic.

4.1.2. Supported types of meter.

RTU supports the collection of power sub-intervals from all the meters with this function (see documentation per meter).

4.1.3. The meter requirements.

In order to form power sub-intervals, the above-mentioned meters need to be programmed for the required time of the power sub-interval and the corresponding power interval.

The possible range of the above-mentioned meters shall be from 1 minute to the power interval of the meter (subject to the condition that the maximum permissible power interval to power exchange ratio is 15). For more details, see the documentation for the meters.

4.1.4. Continuous interview requirements.

All power sub-intervals will be counted without loss if communications are interrupted for no longer than a power interval minus one power sub-interval.

4.1.5. The questions of metrology.

The readable meter registers retain the power sub-intervals with less precision than the load profile. The fraction of the value shall not be discarded, but shall be added to the next sub-interval. Therefore, the sum of the sub-interval values during the profile interval will not exactly match the profile value. However, since the error does not accumulate, the maximum possible total error in the calculation over several (as much as possible) profile intervals does not exceed the maximum possible error in one profile interval defined by the meter configuration. The accuracy of the power measurement depends on the value of the DPLOCD meter. The larger the DPLOCD value, the better the metric characteristics of the sub-interval power measurement.

4.2. Profile sub-intervals.

4.2.1. Formation of profile sub-intervals.

The profile sub-intervals are formed in the RTU by a special algorithm for processing meter reading requests.

4.2.2. Supported types of meter.

The profile sub-intervals are recorded for all types of meters supported by RTU.

4.2.3. The meter requirements.

The meter profile interval should be stolen from the profile interface. The length of the profile sub-interview is limited to the time of the meter interview. RTU was tested with a profile sub-interval of 1 minute or more.

4.2.4. Continuous interview requirements.

All profile sub-intervals will be filled-in without loss if the communication sessions are interrupted from one to two profile intervals. Since the current readings are not generated during the absence of requests, the missing sub-interval flow will be calculated on the basis of a second-to-second flow between the last available reading and the current reading, which is averaged.

4.2.5. The questions of metrology.

The cost of profile sub-intervals will be equal to the cost per profile interval. The exception is one section interval, the first time since the RTU was launched, there was no flow between two sub-interval requests. This difference is due to the fact that, after the RTU is started, the readings at the beginning of the section interval are calculated and, in the absence of a load, the RTU at the beginning of the interval takes the measured value from the meter. The amount of error depends on the accuracy of the calculation of the readings at the first cross-sectional. The accuracy of the measurement of sub-interval costs depends on two parameters:

1. Accuracy of time measurement.
   Since the time on the meter is measured to the accuracy of a second, the error in calculating the time between the two measurements can reach 2 seconds. This may lead to a redistribution of costs between adjacent profile sub-intervals, especially with a short profile sub-interview.
2. Inequitability between the two measurements.
   This has an impact on the redistribution of costs between neighbouring sub-intervals.

4.3. Recommended sub-interval configuration algorithm.

In the items of the «Конфигуратор» menu, perform the following actions.

1. **Allow the recording of sub-intervals in the archive.**
   «Настройки» > «Архивы» > "Подинтервал" .
   Set: "Да"
2. **Set the required depth of the sub-interval archive.**
   «Настройки» > «Размер архивов» > "Подинтервалы" .
   Recommended value: 3 days.
3. **Set the amount of the sub-interval.**
   For power sub-intervals:
   «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» > "Подинтервал мощности" .
   Set a value equal to that programmed in the meter. If you automatically read the parameters from the meter on the key <F5> this parameter is read directly from the meter. «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» > "Подинтервал профиля"

   The profile sub-interval value shall be 0. For profile sub-intervals:

   «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» > "Подинтервал профиля" .
   Set the required value. If you automatically read the parameters from the meter using the key <F5> this parameter is 0. The zero value of the profile sub-interval prohibits the registration of profile sub-intervals and allows the registration of power sub-intervals. «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» > "Подинтервал мощности" .

   For a non-zero profile sub-interfer, the power sub-interval value is not used and can take any value.
4. **Set up a task to interview the meter with the required sub-interval view.**
   «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» .
   Create a new polling assignment or add to the existing sub-interval task the required parameters (A+, A-, P+, P-) with an equal sub-interval period and a offset of 0.
5. **Enter «Зоны молчания» for time correction operation.**
   Since the sub-intervals on the meters are being dropped when the time is corrected, the time correction on the meters must be prohibited during power tracking. «УСПД» > «Справочник: зоны молчания»

   Create zones of silence equal to the time of power tracking. «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» .
   Attach the established silence zones to the polling task "Настройка времени".
6. **Enter «Зоны молчания» for power sub-intervals.**
   Since the sub-intervals on the meters are being dropped when the time is corrected, the time of the meters must be prohibited from interviewing the power intervals. «УСПД» > «Справочник: зоны молчания»

   Create silence zones equal to time correction periods on meters. «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков»

   Attach the established silence zones to the polling of power sub-intervals.

7. **Restart the RTU when you leave the program «Конфигуратор».**

5. RTU archives.

5.1. Description of RTU archives.

Limitation: The maximum number of profiles stored per meter in archives is 16.

1) An electric energy consumption profile on the sub-interval of the meter power (per meter).

- Date/time mark in the archive (in winter time) - beginning of the interval.
- Data storage depth - the number of full days per 00:00:00 (in winter time).
- After the data is cut from the calculator at 00:00:00 (winter time), the data is deleted according to the depth of storage.

2) The electrical energy consumption profile of the pulses at the meter interval (to the meter).

- Date/time mark in the archive (in winter time) - beginning of the interval.
- Data storage depth - the number of full days per 00:00:00 (in winter time).
- After the data is cut from the calculator at 00:00:00 (winter time), the data is deleted according to the depth of storage.

3) Commercial electric energy consumption profile archive, Wh(per meter).

- Date/time mark in the archive (in winter time) - beginning of the interval.
- Data storage depth - the number of full days per 00:00:00 (in winter time).
- After the data is cut from the calculator at 00:00:00 (winter time), the data is deleted according to the depth of storage.

4) 24-hour electric consumption archive, Wh.

- Date/time mark in the archive (season time) - beginning of day.
- Data depth - the number of full days per 00:00:00 (in seasonal time).
- After the data is cut from the calculator at 00:00:00 (seasonal time), the data is deleted according to the storage depth.
- 24-hour cost, including winter/summer transition.

5) 24-hour electric energy consumption archive, Wh (to metering point).

- Date/time mark in the archive (season time) - beginning of day.
- Data depth - the number of full days per 00:00:00 (in seasonal time).
- After the data is cut from the calculator at 00:00:00 (seasonal time), the data is deleted according to the storage depth.
- 24-hour cost, including winter/summer transition.

6) The electric energy consumption archive for the calculation period, Wh (to the metering point).

7) Electric energy consumption archive for the calculation period, Wh(per group).

8) The electric energy consumption archive for the calculation period, Wh (per group).

9) An archive of power at commercial intervals in power zones, W (to the metering point).

10) An archive of power at commercial intervals in power zones, W (per group).

11) Recording archive (autoreading).

- Date/time mark in the archive (in winter time) - beginning of the interval.
- Data depth - a given number of complete calculation periods at 00:00:00 (in winter time).
- After the data is cut from the calculator at 00:00:00 (winter time), the data is deleted according to the depth of storage.
- If auto-reading is not available at the time the micro-processor meter is connected to RTU, RTU automatically reads the meter at the meter profile interval and records it with the current time tag as the auto-reading values in the archive. With monthly auto-reading in the meter, this allows you to transmit to the top-level system the meter readings without waiting for the first auto-reading of the meter. Since the meter readings are read in real time by RTU and are not fixed to the meter profile time tags, there is a certain error in the reading values. When the meter load is high, this may lead to errors in the upper-level readings of the meter before the first «истинного» self-reading of the meter.

For the record: meter reference = auto-reading + technical in--
I'm gonna go get you.

12) An archive of grid parameters.

13) The log of the event log.

14) Office archives.

These archives are intended for installation work.

5.2. Checking the completeness of RTU archives.

In RTU, a fixed memory size is defined for each number of non-volatile memory containers to store the entire archive. In the event of an excess of the set value of the archives, RTU will release additional memory units for the archives with the recording of the message «Превышен размер архива» into the event log. When this report is made available in the event log, the depth of the archives should be reduced. In the normal mode of operation, RTU with the best storage depth of the archives in the event log should not appear messages of this type.

5.3. RTU archives size.

The maximum total size of all RTU data storage archives shall not exceed the NVM RTU section for the storage of archives. The methodology for calculating the maximum aggregate size of RTU archives and the limit value of the NVM RTU for storage of archives for each RTU model are given in annex No. 2 to this manual.

6. Multi-tariff electricity accounting and recording of power intervals in peak power zones.

Multi-tariff electricity accounting is used for groups of metering points. This requires:

1) Determine the calendar characteristics for each day of the calendar year.
2) Establish a list of tariff grids.
3) Identify the list of tariff schemes.

Recording of power intervals in peak power zones is applied to groups of metering points, i.e. the sum of the power intervals of all metering points in the group is calculated for each power interval cut. This requires:

1) Determine the calendar characteristics for each day of the calendar year.
2) Identify the power grid list.
3) Identify a list of power grid schemes.

6.1. Definition of calendar characteristics.

The purpose of determining the calendar characteristics is to assign the type of day of the season to each day of the week per year.

For different periods of calendar year (seasons) to be applied, a series of seasons must be determined. The season grid is a consistent list of non-overlapping seasons that represents a full calendar year. Each day of the week of each season shall then be brought into line with one of the following types of days:

- Worker,
- Saturday,
- Sunday,

• It's a party. Thus, each day of the week per year corresponds to a specific type of day of the season. For example, each season environment «Зима» has a season «Рабочий (Зима)» type of day, and each season Saturday «Весна» has a season «Суббота (Весна)» type of day.

The determination of calendar characteristics is done in the menu item «Учёт» > «Учёт электроэнергии» > «Календарь» of the «Конфигуратор» programme.

6.2. Definition of the list of special dates.

In this paragraph, the user may specify a list of special dates that are not included in the calendar characteristics. For special dates, it is possible to define their tariff and power grids for each group of metering points.

Special dates may be repeated and non-recurring. A day of the week must be set for repeated dates. If the recurring date is on a given day of the week, the date will be special.

The list of special dates is defined in «Учёт» > «Учёт электроэнергии» > «Группы» > «Специальные даты» of the «Конфигуратор» programme.

6.3. Definition of the list of tariff grids.

The tariff is the name of the time zone. The tariff grid is a consistent list of non-overlapping tariff zones (e.g. «Ночь», «Утро» etc.) each with its time range, which represents full 24 hours.

One tariff can be in the tariff grid several times. For example, the rate «Ночь» is : 00:00-05:00 and 23:00-24:00.

A list of tariff grids should be established in order to align each season ' s type of day.

The list of tariff grids is defined in the menu item «Учёт» > «Учёт электроэнергии» > «Тарифы» > «Тарифные сетки» of the «Конфигуратор» programme.

6.4. Definition of the list of tariff schemes.

The tariff scheme is a list of all types of season days in which each type of season day is adjusted to a specific tariff grid.

Different tariff schemes can be identified for different groups of metering points. The list of tariff schemes is defined in «Учёт» > «Учёт электроэнергии» > «Тарифы» > «Тарифные схемы» of the «Конфигуратор» programme.

6.5. Determination of the power grid list.

The power grid is a list of non-overlapping peak power areas for one day.

A list of power grids is needed to ensure that each type of day of each season is aligned with its power grid.

The list of tariff grids is defined in the menu item «Учёт» > «Учёт электроэнергии» > «Тарифы» > «Сетки мощности» of the «Конфигуратор» programme.

6.6. Identification of list of power grid schemes.

The power grid scheme is a list of all types of seasonal days in which each type of season day is adjusted to a specific power grid.

For different groups of metering points, different circuits of power grids can be identified. The list of power grid diagrams is defined in «Учёт» > «Учёт электроэнергии» > «Тарифы» > «Схемы сеток мощности» of the «Конфигуратор» programme.

6.7. Group of points of account.

Groupings of metering points can be created in RTU for:
- Group calculation of electricity consumption by tariffs, - recording of total power intervals in power zones group, - group calculation of the electricity balance. Groupings of metering points can have an embedded structure. Each group may contain other groups and/or metering points, accessions. The group's investment is unlimited.

Group calculations are performed in real time as data become available. No group recalculations have been made since then. The results of the calculations can only be seen on an integrated RTU input-output bullet.

Group configuration is performed in «Учёт» > «Учёт электроэнергии» > «Группы» > «Группы» of the «Конфигуратор» programme.

7. Calculation of the electricity balance by group of metering points.

The RTU calculates the electricity balance by group of metering points (busbar, substation, etc.). For this purpose, the set of metering points created must be entered in the balance sheet list (the menu item «Учёт» > «Учёт электроэнергии» > «Группы» > «Балансовые группы» of the «Конфигуратор» program).

The calculation of the electricity balance shall be carried out according to the regulatory document "Model instruction for accounting for electricity production, transmission and distribution. RD 34.09.101-94".

The calculation shall be performed in real time with a cycle equal to the commercial interval for each group.

The results of the calculation are recorded in the RTU archive, the storage depth of which is configurable. The balance sheet archive can be viewed in «Архивы» the main menu of integrated RTU software.

Operational monitoring of the balance sheet results for each group is done by means of the built-in web server RTU and in paragraph «Сервис» > «Контроль небаланса групп» of the main menu of the integrated RTU software.

In order to obtain the results of operational control of the calculation of the balance sheets of all groups as a single integral value in the subsystem «Автодиагностика УСПД», there is an operation "Контроль небаланса групп (сводный)" . The result of this operation will be «Предупреждение» if the result of the calculation of the balance is «Небаланс» for at least one group.

7.1. Method of calculating the electricity balance.

1) The actual imbalance of the substation shall be calculated by the formula:

$$НБ_{Ф.П} = \frac{W_П - W_О - W_{С.Н} - W_{Х.Н} - W_{П.Н} - \Delta W_{ТР}}{W_П} 100\% \qquad (1)$$

2) The actual busbar imbalance shall be calculated by the formula:

$$НБ_{Ф.Ш} = \frac{W_П - W_О}{W_П} 100\% \qquad (2)$$

where WП is the electricity supplied to the substation busbars; WO is the electricity delivered; WC.H, WX.H and WП.H are electricity consumption for the substation auxiliary, utility and production needs; ΔWTP is the electricity loss in the substation power transformers.

3) The permissible imbalance between busbars and the substation as a whole shall be calculated by the formula:

$$НБ_Д = \pm\sqrt{\sum_{i=1}^{k} \delta_{Пi}^2 d_{Пi}^2 + \sum_{i=1}^{m} \delta_{oi}^2 d_{oi}^2} \qquad (3)$$

where δПi (δOi) is the total relative error of the i-th measuring system comprising a voltage transformer, current transformer and meter measuring incoming (outgoing) electricity; dПi (dOi) is the share of electricity received (delivered) through that measuring system; see formula (4).

k is the number of measuring units that account for the electricity supplied to the bus(s) of the power plant; m is the number of measuring units that take into account the electricity released (intakes) (including the own and economic needs of the power plant).

4) The percentage of electricity taken into account by the i-m measuring complex is determined by the formula:

$$d_i = \frac{W_i}{W_{П(о)}} \qquad (4)$$

where Wi is the electricity measured by the i-th measuring system during the reporting period; Wп(o) is the total electricity received (delivered) at the power station busbars during the reporting period.

5) Limit of permissible relative error of i-th measuring complex is the formula:

$$\delta_i = \pm 1{,}1\sqrt{\delta_I^2 + \delta_U^2 + \delta_Л^2 + \delta_{O.C}^2} \qquad (5)$$

where δI and δU are the permissible relative error limits of the current transformer (GOST 7746-89) and voltage transformer (GOST 1983-89), respectively, in %; δЛ is the permissible voltage loss in the meter-to-voltage-transformer wiring under the electrical installation rules, in %; δO.C is the permissible basic relative error limit of the meter, in %.

6) The calculation shall be based on measurement (from the meter) and reference information (storage) from the RTU.

Measurement data: WП, WO, WC.H, WX.H and WП.H are aggregate parameters calculated as the sum of the metering points assigned to the corresponding parameter, using the following formula:

$$W = \sum_{i=1}^{k} Wi \qquad (6)$$

List of reference information: <i - calculated in advance and entered into RTU as a constant, or the entire set of reference data for the measuring complex is entered into the RTU and calculated using the formula (5). ΔWTP - calculated in advance and entered into RTU as a constant (WP coefficient). The calculation shall be made according to "R.D. 34.09.253. Instructions for the calculation and analysis of the electrical energy consumption for transmission of power systems and power connections to electrical networks."

7) After calculation, the actual imbalance value obtained is compared to the value of the permissible imbalance. This defines a sign of control of the imbalance. The sign of balance control is «Норма» if the NBFP <= NBB otherwise the sign of balance control is «Предупреждение» and RTU can perform the following actions:

- Journal of Unbalance; RTU Journal of Events; - Indication of an imbalance control sign by an integrated web server RTU; - Inclusion of an alarm (if RTU output controls are present) in the subsystem «Автодиагностика УСПД» .

8) A simplified calculation of the balance sheet may be made:

The permissible imbalance for the busbars and the substation as a whole is calculated using the following formula:

$$НБ_{Д} = \pm\sqrt{\sum_{i=1}^{k}\delta_{Пi}^{2} + \sum_{i=1}^{m}\delta_{oi}^{2}} \qquad (8)$$

The constituent formulas (8) are given above. The value obtained shall be entered into the RTU as a constant. The background information (<i and ΔWTP) shall be calculated in advance and entered into RTU as a constant.

The calculation of imbalances takes into account the digital way in which the data are obtained from the meters (sequence polling). The calculation of the imbalances shall only take place after commercial intervals have been made available for all balance-group metering points for a given time period.

7.2. Method of configuration of balance-point groups.

1) Set the storage depth of the electricity balance calculation results in the menu item «Настройки» > «Размер архивов» > `Regular Control Journal of Unbalances, Days' of the program «Конфигуратор» .

2) Establishment of groups of points of account in the menu item «Учёт» > «Учёт электроэнергии» > «Группы» > «Группы» of the «Конфигуратор» programme.

3) Establishment of a list of "балансовых групп" (groups for which the electricity balance will be calculated) in the menu item «Учёт» > «Учёт электроэнергии» > «Группы» > «Балансовые группы» of the «Конфигуратор» programme.

4) Edit balance sheet parameters. The user must ask:

- Should the results of the calculation be recorded in the RTU ' s balance and event logs - the need to put the imbalances on the web page - should the group be taken into account in operations "Контроль небаланса групп (сводный)" of the «Автодиагностика УСПД» subsystem - should the permissible imbalance be calculated or be assigned by the user as a constant - the loss in transformers - the error of the measuring complex if the allowable imbalance is to be calculated.

5) Reload RTU to update input parameters (when you leave «Конфигуратор»).

8. The status of electrical circuits.

In the RTU, the user can create electrical circuits with switching devices linked to real discrete input signals and arrange automatic electrical circuit status.

The electrical circuit may be:
- accession scheme, alarm or warning scheme. The accession scheme consists of switches and metering points. The alarm and warning schemes consist of switches. The difference between alarms and alerts is logical and is used to produce disturbing events of different levels. The state of the switchboards in the electrical circuit where an alarm or warning occurs shall be determined by the user.

Warning schemes may contain warning schemes. Adhesive schemes may contain warning and/or alarm schemes. It is recommended that warning diagrams be created first to create the input diagrams, then alarm diagrams and, last but not least, connection diagrams.

As a result of the recording of the status of discrete switching signals in the RTU archives, a log of changes in the state of the switching machines is being created. This journal contains primary information on the timing of the change in condition and the current state of the switches.

As a result of the processing of alarms and warnings, the RTU archives form an alarm and warning log. In addition to the alarm and warning log, it is possible to allow separate (or all) alarms and warnings to be recorded in the RTU event log.

The following items in the main menu of the integrated RTU software can be viewed from the recorded state of the switches and electrical circuits, electrical circuit events:

- «Архивы» - Provide information on accessions, alarms and warnings in tabular form.
- «История переключений» - Provide information on changes in the state of the diagrams in the form of electrical circuits. It is possible to view both chronologically in all the configuration diagrams and in one selected pattern. The information is provided for all the diagrams introduced in RTU: accession diagrams, warning diagrams, and alarm diagrams. The electrical circuit diagrams of the account facility are configuration in the RTU in the relay scheme language according to IEC 61131-3. The electrical circuit editor is supplied with the integrated RTU software.

8.1. Method of configuration of electrical circuits.

Electrical circuit configuration is done in «УСПД», «Устройства», «Учёт» «Конфигуратор» items.

1) Create a connection to read discrete local connections.

«УСПД» > «Соединения» > «Параметры соединений» .

In order to record the state of the electrical circuit switches connected to the local digital inputs of RTU, the user must create a log-in system.

The RTU local digital input connection from a type «di» hardware port and define its parameters.

Protocol type on connection - «Чтение дискретных сигналов» .

2) Create a connection to read discrete remote signals.

«УСПД» > «Соединения» > «Параметры соединений» .

In order to record the status of electrical circuit switches connected to remote remote input devices for discrete signals of RTU, the user must establish a logical connection to read the relevant digital inputs from the hardware port to which the remote input devices for discrete signals are connected and define its parameters.

The type of report on the connection shall be the same as the type of remote input device for discrete signals.

3) Entering discrete objects.

«Устройства» > «Дискретные объекты» .

At this stage, the user must create discrete objects of the type "Сигнал дискретного ввода" that are linked to the connections of the type «di» or to the connections with the remote input devices of the discrete signals.

4) Entry of metering points (for accession schemes).

«Учёт» > «Учёт электроэнергии» > «Точки учёта» .

At this stage, the user shall verify that all metering points necessary for electrical connections have been identified.

5) Establish a list of busbars of electrical circuits (for connections).

«Учёт» > «Учёт электроэнергии» > «Присоединения (Редактор эл. схем)» > «Шины» .

At this stage, the user may create a list of busbars for the adhesion schemes.

6) Establishment of warning schemes (as required).

«Учёт» > «Учёт электроэнергии» > «Присоединения (Редактор эл. схем)» > «Предупреждения» .

At this stage, the user can create a warning list and the corresponding electrical circuits.

7) Establishment of alarm schemes (as required).

«Учёт» > «Учёт электроэнергии» > «Присоединения (Редактор эл. схем)» > «Тревоги» .

At this stage, the user can create an alarm list and the corresponding electrical circuits.

8) Creation of accession schemes.

«Учёт» > «Учёт электроэнергии» > «Присоединения (Редактор эл. схем)» > «Присоединения» .

At this stage, the user can create a list of attachments and the corresponding electrical circuits.

9) Quitting «Конфигуратор» with rebooting of the RTU software.

After rebooting, the RTU will start operating in the data collection and state processing mode of the user's electrical circuit.

9. The electricity count on the accessions.

The connection electric energy accounting subsystem is designed to carry out commercial electricity accounting according to the state of electrical connections. RTU provides a fully functional automatic accounting with automatic tracking of the switching gear, which allows the RTU to perform the accounting task at bypass switches. The records for each accession are maintained in the RTU archives as follows:

- The consumption profile of the accession at the commercial interval (when this RTU profile is formed, automatically calculates the flow in the line depending on the state of the switching machines). For top-level systems, this information can be provided as a cost profile of the commercial interval using a virtual meter.
- Connection/de-activation log. In this magazine, RTU records changes in the processing of the electrical circuitry of the object. This log allows for the identification of which metering points have provided accounting for a specific accession at this time.

A view of the recorded and calculated data can be found in paragraph «Профиль» > «Присоединения» of the «Архивы» main menu of the built-in software RTU.

The user can create a group of attachments. In addition, accessions may be joined by other metering points and groups.

9.1. Method of configuration of the electricity accounting on accessions.

1) Entering points of account.

«Учёт» > «Учёт электроэнергии» > «Точки учёта» .

At this stage, the user shall verify that all metering points necessary for electrical connections have been identified.

2) Establish a list of electrical circuits.

«Учёт» > «Учёт электроэнергии» > «Присоединения (Редактор эл. схем)» > «Шины» .

At this stage, the user may create a list of busbars for the adhesion schemes.

3) Create electrical connections.

«Учёт» > «Учёт электроэнергии» > «Присоединения (Редактор эл. схем)» > «Присоединения» .

At this stage, the user must create a list of connections and the corresponding electrical circuits.

4) Quitting «Конфигуратор» with rebooting of the RTU software.

After rebooting, the RTU will start operating in the data collection and state processing mode of the user's electrical connections.

10. RTU time.

RTU time is «зимнее» time. The choice of time zone RTU (local, Moscow etc.) is determined by the user.

In RTU, the «Конфигуратор» program should set the dates of transition to and from summer time. This shall be used in the following cases:

- to indicate time on the display of the built-in on-call control.
- for calculating electricity consumption by tariffs and for determining power areas in RTU.

10.1. Initiating RTU time when activated.

When the RTU power is activated during the downloading of the software, RTU time automatically initializes CMOS CPU RTU hardware hours.

10.2. RTU manual time correction.

Once the manual time correction procedure has been completed, the RTU automatically installs CMOS CPU RTU hardware clocks.

10.2.1. Time correction RTU program «Конфигуратор» .

In order to assign time correction to RTU, the «Конфигуратор» user must enter a password with appropriate access rights.

10.2.2. Correcting RTU time from built-in input/output remote.

To correct the time of RTU from the built-in input/output remote, the user must enter the password with the corresponding access rights.

10.3. Automatic time correction RTU.

After the automatic time correction procedure has been completed, the RTU automatically installs CMOS CPU RTU hardware clocks.

10.3.1. RTU time frame.

The RTU time reference is the source of the exact time according to which an automatic time correction of RTU is made.
The type of RTU time reference is selected in the menu item «Настройки» > «Время» > «Эталон времени» of the program «Конфигуратор» from the following list.

- **GPS/Glonass.**

The choice of this type of time reference RTU means that the time correction task is given by the GPS time signal receiver.

The exact time of the GPS receiver is Greenwich time. For this type of time reference RTU needs to be defined in the «Конфигуратор» program to set the time shift configuration RTU relative to Greenwich time in the menu item «Настройки» > «Время» > «Параметры коррекции времени УСПД» > "Часовой пояс (UTC), час" .

- **Top level.**

The choice of this type of time reference RTU means that the time correction task is given by command of the responding protocol to the external systems or RTU in the cascade «УСПД ответ» / «RTU-325 ответ» . For this purpose, the connection to the protocol «УСПД ответ ...» in the «УСПД» > «Соединения» > «Параметры соединений» menu item shall be determined.

- **OS RTU.**

The choice of this type of time reference RTU means that RTU time has not been corrected during its operation.

- **CMOS RTU.**

The choice of this type of time reference RTU means that the time correction task is given by CMOS CPU RTU hardware clock.

- **External device.**

The choice of this type of time reference RTU means that the time correction task is given on the requester ' s command for the RTU communication protocol in the cascade «УСПД запрос» / «RTU-325 запрос» . This must be done by defining the connection with the protocol «УСПД запрос ...» in the «УСПД» > «Соединения» > «Параметры соединений» menu item.

- **PTP (IEEE1588).**

The choice of this type of time reference RTU means that time correction is accepted in the PTP protocol (IEEE1588).

- **NTP.**

The choice of this type of time reference RTU means that the time correction is accepted in the NTP protocol.

- **Quartz МИ2.**

Reserved.

- **GOST R IEC 60870-5.**

The choice of this type of time reference RTU means that time correction is taken under the GOST R protocol IEC 60870-5.

10.4. Time correction parameters RTU.

10.4.1. Maximum time reconciliation between RTU and standard.

Exceeding this parameter requires a command to correct the time of RTU.

10.4.2. Time synchronic period RTU and standard.

This parameter is the time interval between successive comparisons of RTU and standard times for automatic correction.

10.5. Time correction types RTU.

10.5.1. Time correction RTU «скачком» .

If the given time correction assignment RTU exceeds the maximum time-disbursement for smooth correction, the time-time for RTU changes instantaneously, i.e. «скачком».

If the maximum agreed time for a smooth correction is set to 0, the time correction «скачком» is prohibited.

The maximum time reconciliation for a smooth time correction of RTU is set in «Конфигуратор» in «Настройки» > «Время» > «Параметры коррекции времени УСПД» .

10.5.2. Swimming time correction RTU.

If the given time correction assignment RTU does not exceed the maximum time-discording time for smooth correction, a smooth time correction RTU shall be performed. The floating time correction RTU consists of the time correction RTU each system «тик» by a value defined by the set time time correction rate RTU. The time correction rate RTU is set in «Конфигуратор» in «Настройки» > «Время» > «Параметры коррекции времени УСПД» menu item.

Limitation: permissible time correction rates RTU = 1..100 ms/s.

11. It's time on the meter.

11.1. Set the date/time for the summer/ winter shift.

In general, RTU supports any mode of metering:

• operating without automatic switching to summer/winter time in the meter.

• Automatically switching to summer/winter time in the meter. The date of transition to summer/winter time in the meters shall correspond to the date of transition to summer/winter time in RTU.

11.2. RTU time correction on the meter.

11.2.1. Time settings on the meter.

The commands are described according to the protocol for the exchange of data with the Elster Metronique meters.

Limitation: "Настройка времени и даты" command is currently used only When the RTU is started in special mode.

- **Command "настройка времени" .**

This command shall make a change in time within one date. Access rights: «billing read» .

- **Command "настройка времени и даты" .**

This command changes the time and date. Access rights: «unrestricted» .

11.2.2. Time correction condition on the meter.

Time correction shall be performed if the time split between RTU and the meter in «Конфигуратор» in «Настройки» > «Время» > «Параметры коррекции времени счётчиков» > "Допустимое рассогласование времени счётчика и УСПД" is exceeded.

11.2.3. The time correction on the meter.

11.2.3.1. Time correction on meter «скачком» .

11.2.3.2. Swimming time correction on the meter.

- Swimming time correction on the meter slow.
- Swimming time correction on the meter at a fast pace.

12. The RTU meter configuration.

In general, RTU supports meters with the following interfaces:

- digital serial interface type RS-232/422/485,
- digital interface type «Ethernet» ,

• Pulse exit. The digital serial interface meters can be interviewed in the RTU in three ways:

- using the RTU type RS-232/422/485 (local connection) built-in serial ports,
- Using serial ports of type RS-232/422/485 of the TCP/IP-COM server connected to the RTU by interface «Ethernet» ,

• It's a remote RTU cascade switch. This chapter sets out both general and private methodologies for the configuration of meters with different interfaces and different modes of connection.

The menu items in the quotations refer to the «Конфигуратор» program. Details of the menu items are given in the «Конфигуратор» program manual.

12.1. General methodology for the configuration of the local interface meters.

1) Viewing/correcting/filling the general settings of RTU.

«Настройки» .
In the list of general settings RTU, complete the items related to the meter.

2) Selecting the port to connect the meter.

«УСПД» > «Порты» .
At this stage, the user must select the RTU port (hard interface) to connect the meter and define its parameters. The design of the communication ports of the meters connected to the selected port should be consistent with its parameters.

3) Create a connection to the metering at the selected port.

«УСПД» > «Соединения» .
At this stage, the user must create a logical connection to connect to the meter at the selected port and define its parameters. It is possible to create several connections from one port (e.g. metering on different switching lines).

4) Set up task lists for connections.

«УСПД» > «Соединения» > «Задания на соединения» . At this stage, the user may create tasks for connections. The connection tasks shall be performed by protocol for all external devices on the assembly in the same way. If an individual transaction list is required for a meter at a connection, see paragraph «Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» or «Устройства» > "Censors"

electrical energy → «Задания на опрос счётчиков» of the «Конфигуратор» program (similar to heat meters and cost gauges).

The tasking of the connection may be defined for the following types of protocols:

- All types of electrical meter protocols;
- All types of heat meter protocols;
- All types of flowmeter protocols.

The following operations should be included in the polling assignments for each local connection meter:

- Operation of the required profiles,
- "Текущий статус счётчика" ,
- "Настройка времени счётчика" ,
- "Показания авточтения счётчика" . For more details see «Методика опроса счётчиков» . The list of operations for working with specific types of meters is given in Appendix No 1. For the parameters of the electrical network, values are recorded for each phase (total 3).

Attention: No more than one interview assignment is allowed on the polling list Profiles and sub-intervals. All profiles and sub-intervals must be recorded in the same interview list and, accordingly, in one interview request.

5) Reload RTU to update input parameters (when you leave «Конфигуратор»).

6) Viewing/correcting/filling of meter interview guides (as required). «Устройства» > «Счётчики электроэнергии» > «Справочник: операции счётчиков» . «УСПД» > «Справочник: Зоны молчания» .

Create the required data sets if not available in the handbooks.

7) Definition of the current list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

The current list of polling tasks is attached to each new meter introduced into the RTU configuration. The list of tasks for each meter can then be adjusted (see below).

8) Entering a new meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

The meter parameters are automatically entered by interviewing the meter using the <F5> key. Exceptionally, the meter parameters can be manually entered.

9) Repeat paragraphs 6...8 for all RTU meters.

10) Correct the list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» .

Adjust the list of tasks to interview the required meters.

11) Adjustment of password list (as required).

«Устройства» > «Счётчики электроэнергии» > «Список паролей» .

Adjust the password lists of the required meters.

12) Entering the metering point and linking the meter to it.

«Учёт» > «Учёт электроэнергии» > «Точки учёта» .

Enter the parameters of the metering point, identify the meter it corresponds to and set the date of installation at the meter metering point.

13) Certification.

«Учёт» > «Учёт электроэнергии» > «Календарь» , «Тарифы» , «Группы» .

The work on these menu items is required if necessary to group the electricity and power by tariffs and power areas, with the input/output remote of the RTU.

14) Reload RTU to update the input parameters and start the RTU in the data collection mode (when you leave the program «Конфигуратор»).

12.2. Common configuration of the metering system connected through the TCP/IP-COM server.

The TCP/IP-COM server is connected to the RTU on a type «ETHERNET» hardware interface.

The TCP/IP-COM server should be reconfigured to operate on the TCP/IP server mode. For example, for a «Moxa NPort5430» configuration tool, the following shall be fitted:

«Main Menu» > «Op Mode Set» > «Select Mode» > «TCP Server» . The design of the communication ports of the meters connected to the selected TCP/IP-COM server port shall be consistent with its parameters.

1) Viewing/correcting/filling the general settings of RTU.

«Настройки» .

In the list of general settings RTU, complete the items related to the meter.

2) Create connections to work with metering devices connected through the TCP/IP-COM server. «УСПД» > «Соединения»

At this stage, the user must create connections to and define the connections to the meters connected through the TCP/IP-COM server, which in turn is connected to the «Ethernet» RTU port. The connections shall be provided for a port of type «Ethernet». For each connection, a protocol corresponding to the type of meter shall be determined. The total number of connections created shall be equal to the number of different types of meter(s).

3) TCP/IP-COM server configuration.

«УСПД» > «Удалённые TCP-COM серверы» .

At this stage, the user should create a 'TCP/COM-port' server and define its parameters.

The number of groups of connections shall be equal to the number of consecutive TCP/IP-COM server ports used if one type of meter is connected to each port. If different types of meters are connected to a serial port, a group of connections for each type of meter must be created.

Each group of connections corresponds to a specific serial port of the TCP/IP-COM server and has to have an IP address and TCP port within «Соединение 1» (connect to the relevant protocol).

4) Set up task lists for connections.

«УСПД» > «Соединения» > «Задания на соединения» . At this stage, the user may create tasks for connections. The connection tasks shall be performed by protocol for all external devices on the assembly in the same way. If an individual transaction list is required for a meter at a connection, see paragraph «Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» or «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» of the «Конфигуратор» programme (similar to the heat and flow meters).

The tasking of the connection may be defined for the following types of protocols:

- All types of electrical meter protocols;
- All types of heat meter protocols;
- All types of flowmeter protocols. The following operations should be included for each meter in the polling assignments:
  - Operation of the required profiles,
  - "Текущий статус счётчика" ,
  - "Настройка времени счётчика" ,
- "Показания авточтения счётчика" . For more details see «Методика опроса счётчиков» . The list of operations for working with specific types of meters is given in Appendix No 1. For the parameters of the electrical network, values are recorded for each phase (total 3).

Attention: No more than one interview assignment is allowed on the polling list Profiles and sub-intervals. All profiles and sub-intervals must be recorded in the same interview list and, accordingly, in one interview request.

5) Reload RTU to update input parameters (when you leave «Конфигуратор»).

6) Viewing/correcting/filling of meter interview guides (as required). «Устройства» > «Счётчики электроэнергии» > «Справочник: операции счётчиков» . «УСПД» > «Справочник: Зоны молчания» .

Create the required data sets if not available in the handbooks.

7) Definition of the current list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

The current list of polling tasks is attached to each new meter introduced into the RTU configuration. The list of tasks for each meter can then be adjusted (see below).

8) Entering a new meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

The meter parameters are automatically entered by interviewing the meter using the <F5> key. Exceptionally, the meter parameters can be manually entered.

9) Repeat paragraphs 7...8 for all RTU meters (as required).

10) Correct the list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» .

Adjust the list of tasks to interview the required meters.

11) Adjustment of password list (as required).

«Устройства» > «Счётчики электроэнергии» > «Список паролей» .

Adjust the password lists of the required meters.

12) Entering the metering point and linking the meter to it.

«Учёт» > «Учёт электроэнергии» > «Точки учёта» .

Enter the parameters of the metering point, identify the meter it corresponds to and set the date of installation at the meter metering point.

13) Certification.

«Учёт» > «Учёт электроэнергии» > «Календарь» , «Тарифы» , «Группы» .

The work on these menu items is required if necessary to group the electricity and power by tariffs and power areas, with the input/output remote of the RTU.

14) Reload RTU to update the input parameters and start the RTU in the data collection mode (when you leave the program «Конфигуратор»).

12.3. The general method of configuration of the meters connected to the remote RTU.

1) Viewing/correcting/filling the general settings of RTU.

«Настройки» .

In the list of general settings RTU, complete the items related to the meter.

2) Selecting the port to connect the meter.

«УСПД» > «Порты» .

At this stage, the user must select the RTU port (hard interface) to connect the remote RTU to which the meters are connected and set its parameters.

3) Create a connection to the remote RTU.

«УСПД» > «Соединения» .

At this stage, the user must create a logical connection to connect to the remote RTU, define its parameters and the corresponding communication protocol.

4) Set up task lists on the connections to work with the meter.

«УСПД» > «Соединения» > «Задания на соединения» . At this stage, the user may create tasks for connections. The connection tasks shall be performed by protocol for all external devices on the assembly in the same way. If an individual transaction list is required for a meter at a connection, see paragraph «Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» or «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» of the «Конфигуратор» programme (similar to the heat and flow meters).

The tasking of the connection may be defined for the following types of protocols:

- All types of electrical meter protocols;
- All types of heat meter protocols;
- All types of flowmeter protocols.

For each remote meter under RTU, the following operations should be included in the polling assignments:

- Operation of the required profiles,
- "Показания авточтения счётчика" . For more details see «Методика опроса счётчиков» . The list of operations for working with specific types of meters is given in Appendix No 1. For the parameters of the electrical network, values are recorded for each phase (total 3).

Attention: No more than one interview assignment is allowed on the polling list Profiles and sub-intervals. All profiles and sub-intervals must be recorded in the same interview list and, accordingly, in one interview request.

5) View/correct/fill RTU operations manuals (as required). «УСПД» > «Удалённые УСПД» > «Справочник: операции УСПД» .

Create the required data sets if not available in the handbooks.

6) Create a list of assignments for a remote RTU interview.

«УСПД» > «Удалённые УСПД» > «Задания на опрос УСПД» .

At this stage, the user must create a task for the remote RTU interview.

7) Reload RTU to update input parameters (when you leave «Конфигуратор»).

8) Viewing/correcting/filling of meter interview guides (as required). «Устройства» > «Счётчики электроэнергии» > «Справочник: операции счётчиков» . «УСПД» > «Справочник: Зоны молчания» .

Create the required data sets if not available in the handbooks.

9) Definition of the current list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

The current list of polling tasks is attached to each new meter introduced into the RTU configuration. The list of tasks for each meter can then be adjusted (see below).

10) Enter a new meter from the remote RTU.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

To enter remote RTU meter parameters in the cascade setting, you need to use a key-to-key polling:

<F6> - read the parameters directly from the remote meter (communication session);
<F7> - read the parameters of the meter from the records of the subordinate RTU (recommended), faster than the communication session with the remote meter does not take place.

11) Repeat paragraphs 8...10. for all RTU meters.

12) Correct the list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» .

Adjust the list of tasks to interview the required meters.

13) Adjustment of password list (as required).

«Устройства» > «Счётчики электроэнергии» > «Список паролей» .

Adjust the password lists of the required meters.

14) Entering the metering point and linking the meter to it.

«Учёт» > «Учёт электроэнергии» > «Точки учёта» .

Enter the parameters of the metering point, identify the meter it corresponds to and set the date of installation at the meter metering point.

15) Certification.

«Учёт» > «Учёт электроэнергии» > «Календарь» , «Тарифы» , «Группы» .

The work on these menu items is required if necessary to group the electricity and power by tariffs and power areas, with the input/output remote of the RTU.

16) Reload RTU to update the input parameters and start the RTU in the data collection mode (when you leave the program «Конфигуратор»).

12.4. СЭТ-4ТМ.02 meter.

12.4.1. SET- 4TM.02 meter configuration features in RTU.

1. Selecting the port to connect the meter.

«УСПД» > «Порты» .

Port parameters should be in line with the settings of the communication port of the СЭТ-4ТМ.02 meter.

Attention: By default the СЭТ-4ТМ.02 meters come with the communication-port, which differ from the settings of the manufacturing calculators «Эльстер Метроника». Calculators СЭТ-4ТМ.02 have a bit of consistency. When configuring the port in the RTU it is necessary to set the parameter "Четность" equal to 1 (by default set to 0) or reprogram the meter.

2. Create a connection to the meter at the selected port.

«УСПД» > «Соединения» .

Protocol type for this connection: "Счётчики СЭТ4, ПСЧ4, СЭБ1" .

3. Definition of the current list of polling assignments.

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

This calculator allows you to make time adjustments once a day. Therefore, it makes no sense to set the period of execution of an operation "Настройка времени" to be less than 86400 seconds (days).

For the parameters of the power grid, the values for each phase and the sum of (total 4) shall be recorded. For parameter "температура счётчика" one value shall be recorded.

4. Entering a new meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

In the input window, the type of meter used should be determined: «СЭТ4ТМ.01» or «СЭТ-4ТМ.02».

Warning: The СЭТ-4ТМ.02 meter password consists of 6 characters rather than 8 as in the series. «Альфа» Production «Эльстер Метроника» : If more than 6 characters are entered in the password field, the extra symbols on the right are discarded.

12.4.2. Metrology.

Because there is no auto-reading for a given meter, the values of auto-reading in RTU are calculated values. The daily auto-reading for a given meter in RTU is calculated from two consecutive meter requests:

- Request for total pulses (from the time the meter is activated);

• Pulse call from 00:00 on the current day. If the pulses were counted between these two requests and the meter was loaded, there will be a discrepancy between the number of pulses calculated by profile and the number of impulses calculated by auto-reading (paragraph «Тест» of the «Архивы» programme). This discrepancy is not accumulated and depends on the load on the feeder at the time of autoreading (equal to the number of pulses between two consecutive readings from the meter).

12.5. The meter «Альфа» .

Attention: Events recorded in the meter event log on the day of transfer from 00:00 By 02:00 winter time, they may be moved by an hour about their occurrence depending on the time of reading the event log.

12.6. The meter «A1700» .

12.6.1. Features of the configuration of the A1700 meter in RTU.

1. Selecting the port to connect the meter.

«УСПД» > «Порты» .

The port parameters should be in line with the A1700 communications port settings.

If the parameters of the serial port RTU and the A1700 meter respectively are set to the format:

- Size 8 bits,
- There's no bat of evenness,

• 1 stopping bit, then RTU will automatically work with calculators A1700 on this port using the accelerated DSM protocol (Data stream mode - data stream mode).

If the parameters of the serial port RTU and the A1700 meter respectively are set to the format:

- Size 7 bits,
- 1 bit of evenness,

• 1 stop bit, then the meter-connectivity sessions will be in slow "совместимом" mode.

2. Create a connection to the meter at the selected port.

«УСПД» > «Соединения» .

Protocol type for this connection: "Счётчики A1700" .

3. Definition of the current list of polling assignments.

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

This meter supports 10 profiles. In addition, the meter keeps the full power profile on a continuous basis.

Operation "настройка времени" in meter A1700 is implemented as follows. Once the time correction command is issued, the meter at the beginning of each profile interval automatically adjusts the time by no more than 5 seconds. The maximum time for correction is 450 seconds, the rate of correction is constant and is 5 seconds per section interval. Thus, with a 30-minute meter profile, you can adjust time by no more than 4 minutes per day (48*5=240 s). The time correction rate for A1700 is independent of the RTU time correction configuration. When a new command is issued, the old "забывается" assignment begins to develop the new command for correction. Based on the above, the period of implementation "Настройки времени" may be arbitrary, similar to other Elster Metronique meters.
For the parameters of the power grid, the values for each phase and the sum of the value (total 4 values) shall be recorded.

4. Entering a new meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

For this meter, the power sub-interval is not supported, so as a return value of the power sub-interval, the value will be equal to the section interval in seconds.

12.7. The meter «A1200» .

The A1200 meter has no built-in memory to store the load profile. The RTU itself forms the interval and profile sub-interview at the time of the meter interview. For the RTU user, the work with the A1200 meter is no different from that with other meter having a profile. The following are the configuration of the A1200 meter, taking into account the ASCU performance requirements and the configuration of the A1200 meter in RTU.

12.7.1. The A1200 meter configuration.

Use A1200 ALPHA 1.0 to configure the meter for operation with an RTU in an automated electricity metering system. Read the configuration (meter program) from the meter and save it. Adjust the configuration to meet the system requirements, then write it back to the meter.

After reading the meter configuration(s), the following parameters should be established:

- Bookmark «Список опциональных компонент»
  Set up all components.
- Bookmark «Идентификаторы и кнопки»
  Set the required password (default 8 zeros).
- Bookmark «Измерения»
  «Измерение энергии 1» - establish the required type of value measured.
  «Измерение энергии 2» - also, if the meter permits.
- Bookmark «Дисплей»
  - Bookmark «Время/Дата»
    Set the DD-MM-HG date format.
  - Bookmark «Форматы»
    Set the tick to «ID чтение в EDIS формат» . The total energy should be in 87654.123. The capacity should be 54.123.
  - Bookmark «Отображаемые параметры»
    The parameters in the following table should necessarily be included in the list of parameters of this bookmark to read their RTU. The indication of the parameter (in normal or alternative mode) affects the display of the option on the meter display and does not affect the transmission of the parameter on demand from the communications port. It is assumed that the parameter required for the ASCU is not displayed on the meter display, but must be present on the list without ticks opposite the normal and alternative display mode.

№	Parameter name	Parameter (English)	EDIS ID		Required
1	Current Time	Present Time	0.5	0.9.1	Yes
2	Current date	Present Date	0.6	0.9.2	Yes
3	Total energy measurement 1	Energy Quantity 1 Total Energy	†.0 ‡	.8.0	Yes
4	Total energy measurement 2	Energy Quantity 2 Total Energy	†.0 ‡	.8.0	If 2nd measurement is available
5	Active power +kW -kW	Active Power +kW -kW	8.0 8.1	1.7.0 2.7.0	When measuring this power grid parameter
6	Reactive power +kVAR -kVAR	Reactive Power +kVAR -kVAR	8.2 8.3	3.7.0 4.7.0	When measuring this power grid parameter

№	Parameter name	Parameter (English)	EDIS ID		Required
7	Apparent power +kVA -kVA	Apparent Power +kVA -kVA	8.4 8.5	9.7.0 10.7.0	When measuring this power grid parameter
8	Phase A current	Current Phase L1	L1	31.7.0	When measuring this power grid parameter
9	Phase B current	Current Phase L2	L2	51.7.0	When measuring this power grid parameter
10	Phase C current	Current Phase L3	L3	71.7.0	When measuring this power grid parameter
11	Phase A voltage	Voltage Phase L1	L1	32.7.0	When measuring this power grid parameter
12	Phase B voltage	Voltage Phase L2	L3	52.7.0	When measuring this power grid parameter
13	Phase C voltage	Voltage Phase L3	L3	72.7.0	When measuring this power grid parameter
14	System error *	System Errors (on Error Condition Only)	F.F	F.F	Yes
15	System warning *	System Warnings (on Warning Condition Only)	F.1	F.1	Yes
16	Service error *	Service Errors (on Error Condition Only)	F.2	F.2	Yes
17	Averaging interval (min)	Demand Interval Length (minutes)	5.0	0.8.0	Yes
18	Meter serial number	Meter Serial Number	0.1	C.1.0	Yes
19	Time before the last date and time change	Time Before Last Time/ Date Change	7.1	C.63.1	Yes
20	Date before the last date and time change	Date Before Last Time/ Date Change	7.3	C.63.2	Yes
21	Time after the last date and time change	Time After Last Time/ Date Change	7.2	C.63.4	Yes
22	Date after the last date and time change	Date After Last Time/ Date Change	7.4	C.63.5	Yes
23	Transformer ratio	Transformer Factor	0.7	0.4.1	Yes (reference)

* - the English names of the parameters are given because in the Russian-language version of the calculator configuration program it is impossible to distinguish 2 of the parameters 14 ... 16 (it is necessary to change the interface to English: Settings - System options - Main - Application Language).

- Bookmark «Многотарифность»
  «Спец. датах» The transition of summer/winter time should be similar to that set in RTU.
- Bookmark «Удалённая связь»

Set the required device address (number without gaps(!)). Set the sign «Фиксированная скорость» and the required speed of the communications port. When the meter configuration is corrected, write it down in the meter.

12.7.2. Features of the configuration of the A1200 meter in RTU.

The configuration of the calculators A1200 in the RTU is done according to the general setup methodology for the calculators of the «Альфа» series of production «Эльстер Метроника» , including configuration at cascading incorporation.

The A1200 meter shall be programmed to automatically pass the winter/year time only if such a transition is in RTU. Winter/summer transition dates in the meter should coincide with the dates of winter/summer transition to RTU.

The paragraphs below are those that require particular attention.

1. **Determination of the parameters of a serial port.**
   «УСПД» > «Порты» .
   At the time the RTU with the A1200 meter was de-activated, the A1200 meter plants were in line with the following parameters of the RTU serial port:
   Speed: 9,600. Equivalence: 2. Size: 7. Number stop.bit: 1.

2. **Create a connection to the meter at the selected port.**
   «УСПД» > «Соединения» .
   Protocol type for this connection: "Счётчики A1200" .

3. **Definition of the current list of polling assignments.**
   «Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .
   The required profile reading operation shall be included at intervals of the meter profile interface at the beginning of the next interval/interpoint.
   Operation "Показания счётчика" shall be activated to be completed at the end of the profile interval:
   - For 2 30-minute profilers on the same line, 29 min 30 sec.
   - For 4 30-minute profilers on the same line, with a shift of 29 min 00 seconds.

   • etc. This is necessary in order to reduce the time interval at which the meter readings at the main profile boundary (usually 30-min interval) are generated and thus to improve the accuracy of the meter reading at the interval boundary.

   For A1200, the following parameters of the power grid are maintained (flow and voltage for 3 phases and power only total):
   - current and current*10;
   - voltage and voltage *10;
   - Full power;
   - Active power;

   • Reactive power; Operation "Чтение журнала событий" should be included in the interview list of the locally connected meter. The RTU event log will also record events about the time correction on the meter directly from the meter.

4. **Entering a new meter.**
   «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

Note: the A1200 meter password consists of 8 characters.

For this meter, the power sub-interval is not supported, so as a return value, the power sub-interval will be equal to the section interval in seconds.

Attention: parameter "Интервал профиля" is equal to parameter "Long averaging interval (min)" (see para. 17 of the table in para. 13.7.1 of this manual).

12.7.3. Metrology.

The profile for the A1200 meter is generated by a calculation method based on the difference between the readings before and after the profile line. Therefore, the accuracy of the reading at a time equal to the section boundary depends on the length of the interval between the two measurements and the nature of the load. A possible error, however, is not an accumulationable value and, consequently, an error in the calculation of expenditures is less than the longer the interval at which the flow is calculated.

12.8. «SL7000» meter (Actaris / Schlumberger).

12.8.1. SL7000 meter configuration features in RTU.

1. Definition of the current list of polling assignments.

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

For SL7000, the following parameters of the power grid are maintained (flow and voltage for 3 phases and power only total):

- Frequency;
- current and current*10;
- voltage and voltage *10;
- Full power;
- Active power;
- Reactive power;
- U angle;
- angle I;
- Phase power factor;
- The temperature of the meter.

2. Entering a new meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

The "Ожидание ответа в сеансе связи, мсек" parameter in the menu item «УСПД» > «Соединения» > «Параметры соединения» > Dop.parameters are equal to 5,000 (and more).

At the time of de-setting the RTU with the SL7000 meter, the SL7000 meter plants were as follows:

Contact number: 17.

3. Correcting the password list.

«Устройства» > «Счётчики электроэнергии» > «Список паролей» .

Different passwords «READ ONLY» and «BILLING READ» (should be the same) shall not be supported.

At the time of de-setting the RTU with the SL7000 meter, the SL7000 meter plants were as follows:

Password «READ ONLY» : ABCDEFGH

12.9. The meter «ZMD/ZFD» . (Landis & Gyr).

12.9.1. The configuration features of the ZMD/ZFD meter in RTU.

1. Entering a new meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

At the time of de-fitting the RTU with the ZMD/ZFD meter, the ZMD/ZFD installations were as follows:

Contact number: = 4 last digits of meter number + 1000.

12.10. The method of configuration of the impulse exit meter.

The RTU of all modifications with discrete signal input interfaces support the operation of impulse output meters.

The characteristics of the pulse signals from the meters shall meet the following conditions:

- Pulse length is at least 20 ms.

• The pulse frequency is not more than 10 Hz. The following logic shall be used for the configuration. RTU has one logical port of the type «impulse» which contains a certain number of hardware channels to operate with impulse meter exits. One impulse output of the meter is connected to each channel. Channel numbering starts with 1. The meter may have several impulse exits with different types of energy registered (A+, A-, P+, P-).

For an impulse exit meter, the profile sub-interval, the technical profile of the meter and the commercial profile are registered.

The following is a method for mapping the impulse output meters.

1. Viewing/correcting/filling the general settings of RTU.

«Настройки» .

In the list of general references, the RTU will complete the items relating to the meters.

2. Checking the port to connect the impulse output of the meters.

«УСПД» > «Порты» .

The list of ports should contain one port «impulse» . For this type of port, no parameters should be established.

3. Create connection to port «impulse» .

«УСПД» > «Соединения» .

For all impulse meters, one connection to port «impulse» may be created. The creation of multiple connections to port «impulse» for different groups of impulse output meters is required only if different pulse lines are used. The following parameters need to be defined for connection:

Port:	«impulse».
Protocol:	«импульсные счётчики» .
(user input) Minimum impulse pause, msek:	(user input). min. % of pulse filling:
(user input) Min. impulse length, msek:	(user input) Max. % pulse:

The last four parameters are smooth for a given impulse line.

4. Viewing/correcting/filling of meter interview guides (as required). «Устройства» > «Счётчики электроэнергии» > «Справочник: Операции счётчиков» . «УСПД» > «Справочник: Зоны молчания» .

Create the required data sets if not available in the handbooks.

5. Definition of the current list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» .

In addition to reading the required frequency profiles and sub-intervals per local connection meter, the following operations should be included in the polling assignments:

- Checker auto-reading.

Cascade activation: In addition to reading the required profiles of the intervals and sub-intervals for each remote RTU meter, the following operations should be included in the polling assignments:

• Checker auto-reading. The current list of polling tasks is attached to each new meter introduced into the RTU configuration. The list of tasks for each meter can then be adjusted (see below).

Attention: No more than one interview assignment is allowed on the polling list Profiles and sub-intervals. All profiles and sub-intervals must be recorded in the same interview list and, accordingly, in one interview request.

6. Entering a new impulse-exit meter.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

For an impulse exit meter, the following parameters need to be manually completed:

(user input)

(user input). K coefficient (kWh/impe): (intakes by user). Multiplying factor (shilde): (injects by user). Spinal part of energy:

(user input) Power fraction: (injects by the user). Profile interval, min:

(user input) Profile sub-interval, sec: (user input). Scale factor: (injects by user). Energy units: K. Power units: K. RTU:

	(user input)
Combination 1:	(user input)
Contact number:	(Injects the user, shall be equal to the minimum number of impulse channels of the energy to be recorded, see below).
Profile A+:	(RTU impulse channel connected number).
Profile A-:	(RTU impulse channel connected number).
Profile P+:	(RTU impulse channel connected number).
Profile R-:	(RTU impulse channel connected number).

Cascade: To enter the output parameters of the remote meters of the subordinate RTU in the cascade, you need to use the <F7>--read the settings of the meter from the files of the subordinate RTU.

7. Repeat paragraphs 4....6. for all RTU meters.

8. Correct the list of polling assignments (as required).

«Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» .

Adjust the list of tasks to interview the required meters.

9. Entering the metering point and linking the meter to it.

«Учёт» > «Учёт электроэнергии» > «Точки учёта» .

Enter the parameters of the metering point, identify the meter it corresponds to and set the date of installation at the meter metering point.

10. Certification.

«Учёт» > «Учёт электроэнергии» > «Календарь» , «Тарифы» , «Группы» .

The work on these menu items is required if necessary to group the electricity and power by tariffs and power areas, with the input/output remote of the RTU.

11. Reload RTU to update the input parameters and start the RTU in the data collection mode (when you leave the program «Конфигуратор»).

12. Enter the current reading of the recorded energy of the impulse output meter. «Устройства» > « «Счётчики электроэнергии» > «Параметры счётчиков»

On the running RTU on the <F2> key, enter current meter readings. The current reading shall be entered in real time from the meter indicator. It is recommended that the current reading be entered at the lowest time of loading of the fider to reduce the input error.

13. The method of replacing the meter.

1. **Dismantle the meter.**

The meter is disabled when RTU is in its normal operation. If the Feder is under load, it is advisable to proceed with the dismantling immediately after another RTU with the meter. This ensures the completeness of the data collected for this Fed in RTU.

2. **Stop readings of this meter on the RTU.**

This operation is necessary if the new meter has the same contact number as the old meter and the meter interviewer does not have a meter configuration reading operation. Otherwise, RTU will automatically start interviewing the new meter against this contact number, using the configuration parameters of the old meter, which is unacceptable.

The RTU meter polling is suspended by the «Конфигуратор» program . In the menu item «Учёт» → «Учёт электроэнергии» → «Точки учёта» in the parameter window of the metering point, logical removal of the accountant from the metering point is required - fill in the field "Дата снятия счётчика" with the date/time of dismantling the accountant. Restart the RTU to allow configuration changes to take effect.

3. **Run an installation that connects to the RTU of the new meter.**

4. **Reconfigurate the new meter in RTU program «Конфигуратор».**

The new meter shall be configuration according to «Руководством пользователя» :

- Paragraph «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» : record the meter parameters in RTU.
- Paragraph «Учёт» > «Учёт электроэнергии» > «Точки учёта» : Amend the old meter to the new «Счётчики» window of the relevant metering point.
- Paragraph «Учёт» > «Учёт электроэнергии» > «Точки учёта» : set the date/time of installation of the meter in paragraph «Дата установки счётчика» of the appropriate metering point window.

14. Data transfer to top level systems.

Data transfer to top level systems is done using communication protocols via RTU hardware interfaces (ports).

14.1. Protocol «УСПД ответ» / «RTU-325 ответ»

14.1.1. General description.

The protocol «УСПД ответ» / «RTU-325 ответ» is designed to transmit data to top level systems for the following integrated RTU hardware interface(s):

- Ethernet 10/100 MB;
- RS-232;

• RS-422/485. RS-232 serial ports maintain the protocol with the following external communication devices and lines:

- Switchable telephone lines (e.g. «ZyXEL U-336» modems, «INPRO IDC-5614BXL/VR» , other Hayes-compatible modems);
- Selected telephone lines (e.g. «ZyXEL U-336» series modems);
- GSM modems (e.g. «SIEMENS TC35»);

• Radiomodems (e.g. «MDS 4710B/9710B»). The protocol is structured on technology «клиент» - «сервер» . The customer(s) is the upper level system and the «сервера» (the responsible party) is the RTU.

The time tags in the data transmitted correspond to the time tags in the RTU archives. The protocol automatically checks the integrity of the information transmitted.

In transmitting data for this protocol, the RTU may be:

- RTU top level hierarchy in cascade activation;
- Programme complex «АльфаЦентр» ;
- Other software and hardware systems supporting the protocol.

14.1.2. RTU configuration methodology for data transmission.

The following menu items refer to the «Конфигуратор» program.

1. Select the hardware interface to communicate with the top level system and define its parameters.

«УСПД» > «Порты» .

2. For the selected port, create a connection to the upper level system and define its parameters.

«УСПД» > «Соединения» .

In this menu paragraph, the user must necessarily define "Протокол" as one of the following:

- RTU response (TCP/IP);
- RTU Response (Last)

• RTU Response (RRR). The type of protocol chosen by the user shall be the type of protocol of the upper level system.

The parameter «TCP/IP порт» shall be 5002.

3. Restart the RTU to update the input parameters (when you leave the program «Конфигуратор».

RTU is ready to receive top-level queries and transmit data.

14.2. Protocol for the satellite radio model «Гонец - (P-AT4)» .

Relevant documentation shall be made available to the maintenance service upon request.

15. RTU cascade.

This chapter deals with the cascade inclusion of RTU. The RTU cascade is a connection between RTU on various hardware interfaces and communication channels to transfer data from RTU to the top of the RTU hierarchy. The upper RTU can collect data and maintain archives on local connection meters and all RTU-subordinate lower cascade levels.

Support is provided for a multi-layer cascade connection with RTU (up to 10 levels) and for the simultaneous connection of the meters and the subordinates of RTU to the RTU of any level of cascade activation.

Data collection on the meter from a subordinate RTU comes from the records of the subordinate RTU.

Data from subordinates of RTU connected via different channels of communication are collected in parallel (simultaneously).

15.1. The configuration of the subordinate RTU.

See paragraph 14.1.2 «Методика конфигурирования УСПД для передачи данных» under «Передача данных в системы верхнего уровня» .

15.2. The top RTU configuration.

The following menu items refer to the «Конфигуратор» program.

1. Select the hardware interface to communicate with the subordinate RTU and define its parameters. «УСПД» > «Порты»

2. For the selected port, create a connection to connect with the subordinate RTU and define its parameters. «УСПД» > «Соединения»

3. Include the subordinate RTU in the RTU archive list and define its parameters. «УСПД» > «Удалённые УСПД»

4. Restart the RTU to update the input parameters (when you leave the program «Конфигуратор».

5. Reconfigurate the RTU meters.

See 12.3 «Общая методика конфигурирования счётчиков, подключенных к удалённому УСПД» .

Attention: To automatically complete the meter parameter list, it is recommended that:

Use the key <F7> (read the parameters from the RTU archive). In exceptional cases, it is possible to interview the parameters directly from the remote meter using the <F6> key.

6. Include reading of an event log from a subordinate RTU.

«УСПД» > «Удалённые УСПД» > «Задания на опрос УСПД» .

Add operation «Журнал событий УСПД» to the list of tasks.

7. Enter the time correction for the RTU.

«УСПД» > «Удалённые УСПД» > «Задания на опрос УСПД» .

Add operation «Настройка времени УСПД» to the list of tasks.

8. Do not use «Текущий статус счётчика» command.

«Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков» . Do not include the operation «Текущий статус счётчика» in the list of polling tasks for all remote calculators connected to a subordinate RTU (see п.2.3.2).

9. Increase the time of timeout to the account of the subordinate RTU.

«Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» > > "Таймаут счётчика, сек" . When requesting data from a subordinate RTU meter, it is possible to increase the response time compared to a direct meter interview. This is related to the capacity of the lines of communication, the size of the archives and the degree of loading of the subordinate RTU, etc. Therefore, it is recommended that, in general, time of time of time of time per RTU meter be increased by approximately 10 seconds (defined in the installation phase).

10. Use operation "Параметры счётчика и точки учёта" instead of operation "Конфигурация счётчика" . «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков»

Operation "Параметры счётчика и точки учёта" reads data from the records of the subordinate RTU.

16. RTU auto-diagnosis.

RTU auto-diagnosis is a real-time automatic diagnostic subsystem of RTU functions and the transfer of control results to external devices or systems in various ways.

A list of the required functions and their configuration is given in «УСПД» > «Задания по автодиагностике УСПД».

16.1. Auto-diagnosis functions of RTU.

RTU autodiagnosis automatically performs test diagnostic functions. The result of each function is an evaluation of: «Норма» or «Предупреждение».

If the function is performed on multiple objects, the assessment «Норма» shall be obtained if the performance of the function for each object produces an estimate of «Норма» (logical operation «И»). If the performance of a given function for a given object produces an evaluation of «Предупреждение», the overall evaluation of that function shall be «Предупреждение».

The following is a description of the test functions of the RTU auto-diagnosis.

1) Control of the RTU operating mode.
This function is designed to monitor the absence of malfunctions and the suspension of RTU hardware.
The criterion for this function is the functionality of the system time RTU.

2) Control of the operating mode of the ESS (GPS).
This function is designed to check the functionality of the system time synchronizer, the SEMS (GPS receiver).
The criterion for this function is that the time allowed for the inactive condition of the SES is exceeded.

3) Monitoring the collection of commercial intervals by meter.
This function is designed to control the full collection of commercial intervals by meter.
The criterion for this function is to obtain all the data before the time allowed for the time for the time to be delayed for the specified number of meters.

4) Monitoring of the collection of commercial accession intervals.
This function is designed to monitor the full collection of commercial accession intervals.
The criterion for this function is to obtain all data before the time allowed for the lateness of all accessions.

5) Monitoring of data transmission on <Honets>.
This function is designed to monitor the transmission of data from the satellite system «Гонец».
The criterion for this function is to obtain confirmation of the transmission of all data prior to the expiry of the allowable time of non-confirmation of data transmission.

6) Checking time.
This function is designed to control the reconciliation of meter time and RTU.

The criterion for this function is not to exceed the permissible time-disbursement of each meter and RTU.

7) Checking the meter crash status.

This function is designed to monitor the crash status of the meter. The crash status is generated in the meter and transmitted to the RTU using the digital interface.

The criterion for this function is the lack of crash status in all meters.

8) Checking the meter alert status.

This function is designed to monitor the meter alert status. Warning status is generated in the meter and transmitted to the RTU via digital interface.

The criterion for this function is the lack of alert status on all meters.

9) Checking the status of accidents in electrical circuits.

This function is designed to monitor the crash status of the electrical circuit configuration of the RTU. The electrical circuit accident is a certain combination of the state of the switches that is automatically recorded in the RTU.

The criterion for this function is the lack of crash status in all electrical circuits.

10) Control of alert status in electrical circuits.

This function is designed to control the alert status of electrical circuits that are configurationd into RTU. The warning in the electrical circuit is a certain combination of the state of the switches, which is automatically recorded in the RTU.

The criterion for this function is the absence of warning status in all electrical circuits.

11) Control of group imbalances (cumulative).

This function is designed to quickly control the balance sheets of groups of counting and/or accession points. The balance of each group shall be calculated periodically after the end of each commercial interval and the collection of all data.

The criterion for this function is not to exceed the calculated actual imbalance over the permissible group.

12) Inspection of the performance of IEC 60870 (responses).

This function is designed to monitor the operation of all the protocols of the GOST R IEC 60870-5-104/101 < replies> on this RTU.

The criterion for this function is to have all working protocols connected and not exceed the time allowed for the lack of data exchange for all assigned working protocols.

13) IEC 60870 (request) performance control.

This function is designed to monitor the operation of all the protocols of the GOST R IEC 60870-5-104 <demand> on this RTU.

The criterion for this function is to have all working protocols connected and not exceed the time allowed for the lack of data exchange for all assigned working protocols.

16.2. The way the auto-diagnosis results are coming out.

RTU supports several ways to achieve auto-diagnosis results. It is possible to transmit the results simultaneously in different ways.

1) The signal is discrete.

A digital output signal may be used to control, for example, LED, lamp, sound indication.

The control can be performed by either integrated or remote digital output control modules.

Logic signal '0' is the state «Норма», logic signal '1' is the state «Предупреждение» .

2) RTU software built-in.

The built-in software RTU contains a paragraph «Сервис» > «Автодиагностика УСПД» that allows real-time monitoring of auto-diagnosis functions.

The result of each function is displayed as a status line from two elements: graphical and text. The graphal element of the state line is a colour rectangle. Green-colored triangle - state «Норма» , red-coloured rectangle - state «Предупреждение» .

3) RTU built-in Web server.

The built-in web server RTU contains a paragraph «Автодиагностика УСПД» that allows real-time monitoring of auto-diagnosis functions.

The result of each function is displayed in the State column. The value «Отсутствует» indicates that there are no objects to perform the function (no GPS, TCP-COM servers, etc.). In order to hide the function with the evaluation «Отсутствует», it is necessary to place '-' in front of these functions in the 'Chart' program or to press the button <Check> in the current session.

In the case of an evaluation of «Норма» the row contains . In the case of an evaluation of «Предупреждение» the row contains a button . The user will be provided with a list of the objects that caused the alert state.

4) Report of the GOST R IEC 60870-5-104 < replies>.

The result of each function can be transmitted by the protocol of the GOST R IEC 60870-5-104 tele-signal (TC) tele-mechanics. When a telecontrol configuration is created, 60870-5-104 < answer> with the type of measurement list «Максимальный» the work results are included in the default configuration. For configuration with a different type of measurement list, the user shall manually incorporate the function results.

Note: The function «Контроль рабочего режима УСПД» produces the result as a flash-to-be. a signal with the frequency specified in the program «Конфигуратор» .

17. Data traffic records.

The RTU records data traffic, which includes the data received and transmitted by the RTU hardware interface(s) and connections at fixed time intervals as follows:

- 30 minutes,
- 1 hour
- Day,
- A month,

• A year. The RTU hardware interface(s) traffic records at time intervals includes the following data:

- Number of bytes transferred,
- Number of bytes accepted,
- Number of packages transferred
- Number of packages accepted
- Number of bags accepted with incorrect password,
- Number of packages accepted with an incorrect RTU address. The recording of data traffic on connections at time intervals includes the following data:

- Number of bytes transferred,
- Number of bytes accepted,
- Number of packages transferred
- Number of packages accepted
- Number of failed packages (incomplete),
- Number of packages with incorrect CRC,
- Number of packages accepted with an incorrect RTU address,
- Number of packages without response,
- Number of successful communications sessions,
- Number of failed communications sessions,
- Number of communications sessions not completed
- Total duration of communication sessions in seconds,
- Number of communications dial_up of sessions
- Number of communications sessions not completed
- Total dial_up sessions in seconds,
- Time to start the first communication session in the interval,
- The time at which the last communication session ends during the interval,
- A sign of incomplete data (0-per-cent, 1-not all data per interval). For a look at the results of the data traffic account, see «Профиль» > «Трафик по интервалам» of the «Архивы» main menu of the built-in software RTU.

In addition, the following data shall be recorded on connections using switched modems at a time interval of type «Коммутируемый сеанс»:

- Commencing session starting,
- End of switch session,
- Number of bytes transferred in the communication session,
- Number of bytes received in the communication session. The results of the data flow for switched connections can be viewed in «Профиль» > «Трафик по сессиям» of the «Архивы» main menu of the integrated software RTU.

18. Function «Сквозной канал УСПД»

18.1. Destination.

The modern automated commercial/technical energy accounting systems and tele-mechanics (CSE AIS, ASCU, SMTIS, ASDA) built on this RTU, operate with a wide range of digital smart external devices such as metering, TCP/COM-port servers, remote collection modules of analog and discrete signals removed by RTU 325, modems, etc.

These external devices are usually supplied by a manufacturer with recommended software for configuration and diagnosis. This involves directly connecting the user ' s computer to an external device.

In an automated system, all external devices are connected to the RTU. The «Сквозной канал RTU» function allows the user's computer (external engineering controller) to be connected to the RTU and to gain «прозрачный» access to all external devices connected to the RTU via digital communications lines.

18.2. Cross-channel arrangements.

In general, the structure of the channel is divided into two parts:

1. Access from the user's computer to RTU.

2. Access by RTU to external devices with which the channel is required to be installed. The function «Сквозной канал УСПД» supports two ways of accessing RTU from the user ' s computer:

1. Access to RTU in a sequence:
   - Direct connection;
   - Line selected;
   - Switched access (including through GSM modems).
2. Access to RTU via TCP/IP (local network or Internet).

The function «Сквозной канал УСПД» supports three modes of RTU access to the external devices with which the channel is required to be installed:

1. RTU interviews the external device on the serial line RS232/422/485, using its built-in serial ports.
2. RTU interviews the external device on TCP/IP using:
   - Any of Ethernet ' s own ports (to access remote modules subordinate to RTU or TCP/COM servers for configuration);
   - External TCP/COM server port (to access the electric meter through them).
3. RTU interviews the required device via the USB-COM converter (RS232/422/485) using:
   - Its built-in USB ports;
   - U.S.B.C. ports.

18.3. RTU configuration.

To ensure user access to the RTU in a sequence, the required serial RTU port must be reconfigured to the protocol:

«УСПД ответ (послед)» : To ensure user access to RTU via TCP/IP, the required «Ethernet» type port in the RTU configuration must be connected to the protocol:

«УСПД ответ (TCP/IP)» . (See the menu item «УСПД» > «Соединения» > «Параметры соединений» of the «Конфигуратор» programme.)

The two above-mentioned types of connection are usually used to transmit data to «АльфаЦентр» or to the higher RTU in the cascade.

Attention: As RTU ports are used to operate the channel function, The external devices are connected in the normal operation mode, and before using the channel function, RTU must be able to operate normally with the external devices in the normal operation mode (to ensure that RTU port parameters are correctly set).

18.4. The user's (external engineering remote) computer is configuration with OS Windows.

The client configuration on Windows is made up of several steps, some of which need to be done once, and others for each organization of the channel. The sequence is designed for connections without the specified user and password. If the user and/or password is present at the RTU connection, the customer requires a connection user (not implemented at this time).

1. Create binary files (.bph files) for the building of the channel.
   In order to organize a channel to a specific physical serial port, RTU or IP address/TCP-port (identifying a serial port on the TCP-COM server), a specified file for each destination port must be transferred to the receiving port. These files are dependent only on the port of destination (name of port for real physical ports or combination IP address/TPC port for ports via Ethernet).

   For physical ports com1…4, coma1….8, comb1….8, comc1……8, .bph files with a pre-set timeout of 300 s are on the attached CD-ROM at \UTIL\trow_channel. For Ethernet appointments or serial ports with another timeout value for the break-in of the channel, these files can be generated in any RTU directory/update using an integrated utilitate and taken to Windows client by ftp.

2. Organization of a consistent channel of communication (real or virtual) to RTU.
   If there is a physical consistent communication channel, a connection between the client machine and RTU must be established, i.e. in the case of switched communications, the modems must be reached and the modems installed.

   In connection with RTU on TCP/IP (Ethernet), as most of the task-configuration tasks of the electronic metering system are designed to work on a serial port, it is necessary to use tasks that emulate work on a serial port for TCP/IP connections. The test was carried out with the "Serial to Ethernet Con- nector 5.0" Eltima Software program (a full 14-day demo version of this software is available on the attached CD-ROM at \WIN_UTIL\sertoeth).

   The meter configurations usually support com3 and com4 ports, so it is recommended that the ports be used as virtual serial ports.
   An example of this is the setting for the RTU connection to IP address 10.7.11.223 via the virtual serial port com3. It is necessary to establish the type of connection in «Connect serial port to remote host(Client)» , select the required serial port (e.g. com3), install the IP address of RTU through which it will be formed.

This is the same service as the protocol «УСПД ответ» and the port is 5002 (figure 1).

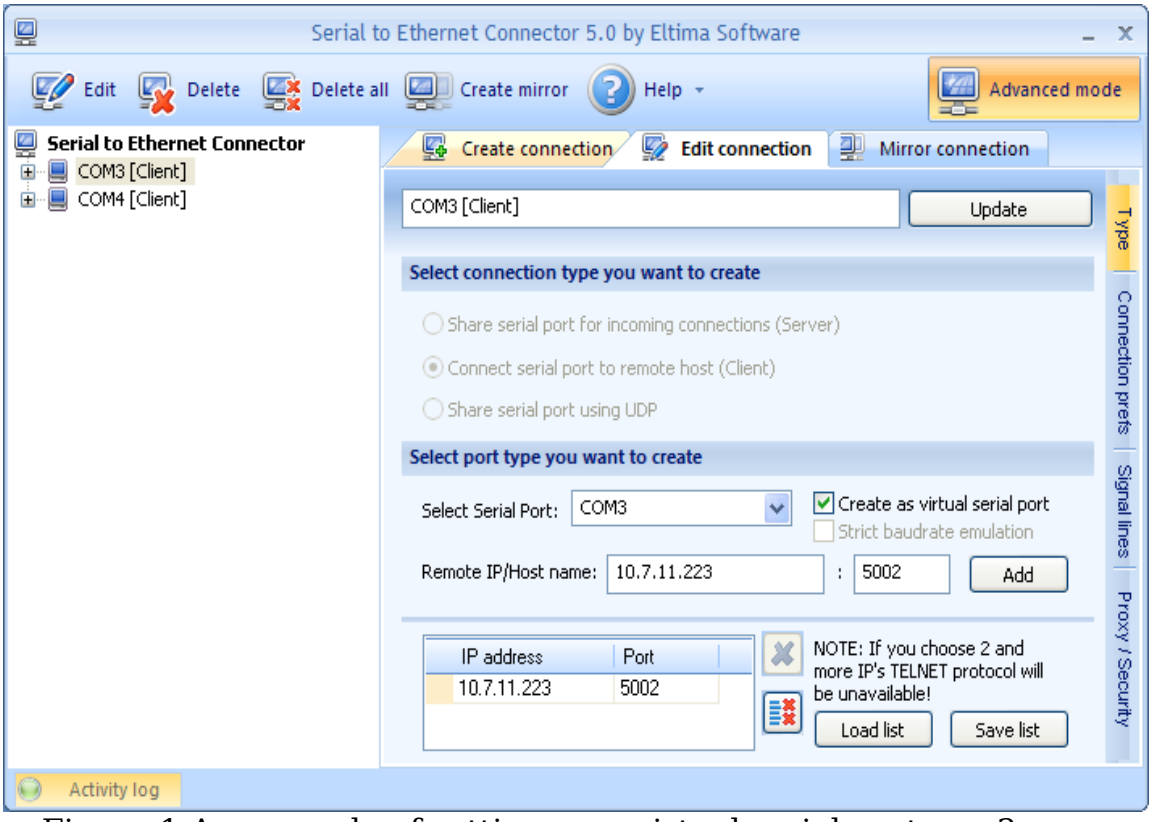


Figure 1 An example of setting up a virtual serial port com3.

The connection to RTU should also be prohibited when the client is separated from the virtual serial port by removing the tick at «Connect to remote end only when local virtual port is open» in Advance mode from the Connection prefs tab (figure 2).

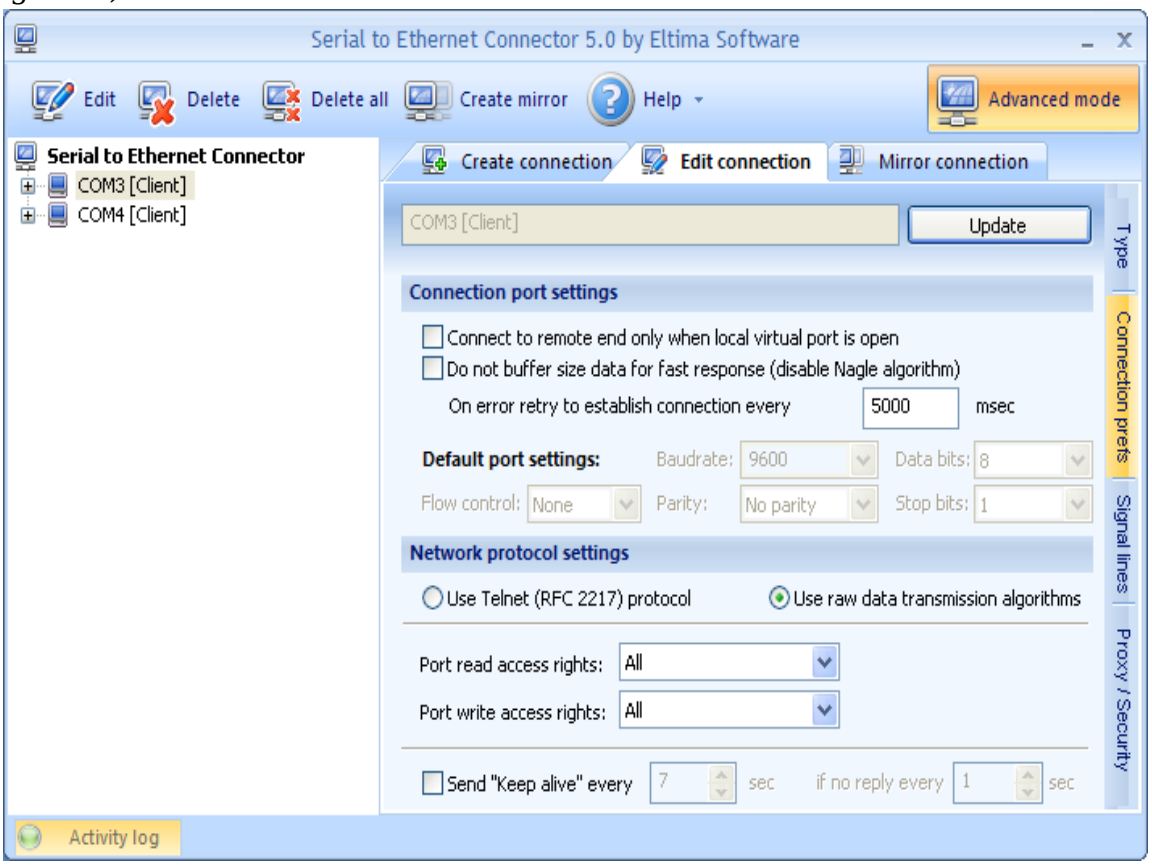


Figure 2. An example of setting up a virtual serial port com3 (Connection prefs).

3. The building of a channel through.
   In order to organize the channel to a specific physical serial port RTU or IP address/TPK port (identifying the serial port on the TCP-COM server), a file prepared in paragraph 1 should be transferred to the receiving port. For this purpose, the regular text editor needs to correct the command file open_thech.bat by replacing the file name .bph to the appropriate destination port on RTU, and the port name to which it is required to send the file to a serial port (physical or virtual) Windows client. The file .bph and command file open_thch.bat should be located in the same directory. Do the command file (opening the channel can be monitored in the RTU virtual consoles in the relevant protocol «УСПД ответ…»).

4. Work with the software delivered with the meter.
   After the completion of paragraph 3, RTU acts as a simple non-intellectual router: everything to be received at the receiving port will be transferred to the destination port and, on the contrary, everything to be received from the destination port will be transferred to Windows client. So RTU does not analyse and influence traffic (other than temporary delays) which allows the operation of the normal configuration devices that support a direct serial connection with the meter. (On the day of writing, work with the A1800 meters via MeterCat 2.1 and the Гамма3 И2 meters is tested and checked)
   In the case of a non-interruptible link on the channel during the time set for the creation of the .bph file (5 minutes default), the channel will be disabled. Disablement of the channel is also due to the breakage of the switch.

SECTION 03

Supported devices

Annex 1, Part 1

Revision 2 on the title sheet · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

Navigation: total content, detailed bookmarks and transitions in the lower column.

Annex 1.

RTU series RTU-325. Supported exterior devices.

1. Commercial and technical energy accounting (compilation of the following devices and up-to-date accounting information for RTU-325 protocols, IEC 60870-5-104/101, IEC61850-8-1, MQTT/WebSocket, Modbus TCP).

1.1. RTU-325 cascade activation data collection and communication devices (Elster Metronica)

1.2. SPODES protocol electric meters:

1.2.1. СТЭМ-300 (SI-ART).
1.2.2. Mirteck W32 (MIRTEC).
1.2.3. ESM-HV400 (CI Energy Services).
1.2.4. Mercury 234 (Incothex).
1.2.5. Биком3 (Algorithm)
1.2.6. Neva CT413 (Typit measuring instruments).
1.2.7. Nartis И300 (Nartis).
1.2.8. ROTK PTM03 (PNC ROTEC).
1.2.9. TE3000 (TechnoEnergo)
1.2.10. TE2000 (TechnoEnergo)
1.2.11. TE1000 (TechnoEnergo)
1.2.12. ПСЧ-4ТМ.06Т (Technical Energo).
1.2.13. СЭБ-1ТМ.04Т (TechnoEnergo).

1.3. Electric meter A1800 (Elster Metronica)
1.4. Electric meter A1140 (Elster Metronica)
1.5. AS1350 electric meter (Elster, Germany).
1.6. AS1440 electric meter (Elster Metronica)
1.7. AS1500 electric meter (Elster, Germany).
1.8. AS3500 electric meter (Elster Metronica)
1.9. AS100 electric meter (Elster Metronica)
1.10. AS220 electric meter (Elster Metronica)
1.11. AS300 electric meter (Elster Metronica)
1.12. Electric meter A3 (Elster Metronica)
1.13. Euro Alpha A1600 electric meter (Elster Metronic).
1.14. Alpha A1 electric meter (Elster Metronica)
1.15. Alpha Plus.
1.16. Electric meter A1700 (Elster Metronica)
1.17. Electric meter A1200 (Elster Metronica)
1.18. Axx1 electric meter (Honneywell).
1.19. Axx3 electric meter (Honneywell).
1.20. СЭТ4ТМ.03(М) electric meter (Frunze Plant).
1.21. СЭТ4ТМ.02 electric meter (Frunze Plant).
1.22. ПСЧ-4ТМ.05(М,МС) (Frunze Plant).
1.23. СЭТ4ТМ.02М electric meter (Frunze Plant).
1.24. ПСЧ-3ТМ.05 (Frunze Plant).
1.25. ПСЧ-3АРТ.07 (Frunze Plant).
1.26. Mayak 301 electric meter (Frunze Plant).
1.27. The СЭБ-1ТМ.02 electric meter (Frunze Plant).
1.28. СЭБ-2А.07 electric meter (Frunze plant.
1.29. EM720 electric meter (Satec).
1.30. EM/PM13x electric meter (Satec).

1.31. JEMStar electric meter (Ametek).
1.32. ZMD electric meter (Landis&Gyr).
1.33. SL7000 electric meter (Actaris).
1.34. ION8x00 electric meter (Schneider Electric).
1.35. ION7x00 electric meter (Schneider Electric).
1.36. ION6200 electric meter (Schneider Electric).
1.37. CEWE Prometer.
1.38. EPQS electric meter (Elgama Elektronika).
1.39. PMAC201HW (Zhuhai Pilot) electric meter.
1.40. АИСТ-1 electric meter (Homeliergo)
1.41. АИСТ-3 electric meter (Homeliergo)
1.42. Mirteck W32 electric meter.
1.43. CC301 electric meter (Gran Electric)
1.44. CC101 electric meter (Gran Electric)
1.45. Electric meter energy-9/ STC-03 (Homelergo).
1.46. Mercure meter230 (Incothex).
1.47. Меркурий233 (Incothex) electric meter.
1.48. Меркурий234 (Incothex) electric meter.
1.49. Меркурий236 (Incothex) electric meter.
1.50. Mercury meter 200.02 (Incothex).
1.51. Mercury meter203.2T (Incothex).
1.52. Gamma 3 electric meter (EMGF)
1.53. ЦЭ6850М electric meter (Energomer)
1.54. CE301 electric meter (Energomer)
1.55. CE303 electric meter (Energomer)
1.56. CE304 electric meter (Energomer)
1.57. КИПП-2М electric meter (STS).
1.58. Proton-K electric meter (Sistel)
1.59. Photon electric meter (Sistel)
1.60. Ф610 FTP DC meter (LEMH).
1.61. 6/10kV РИМ384.0x (RIM) direct counting meter.
1.62. The Sentron PAC-4200 multi-functional meter (Siemens).
1.63. SICAM P/SIMEAS P (Siemens) multifunctional meter.
1.64. Multifunctional measuring instrument of the ЩМК120С (Electrometer).
1.65. Multifunctional ESM measurement device (Энергосервис).
1.66. Electronic optical current transformer (Profotech)
1.67. EW7001 heat calculator (Honeywell).
1.68. RRT meter 022 (Slip).
1.69. TCP-025 heat calculator (Chuckles)
1.70. STT 961.2 (Logica) heat calculator.
1.71. Heat calculator TC-05 Strude (Grand Electro).
1.72. Heat calculator TC-07 Strude (Grand Electro).
1.73. Gas regulator GG lift (Chuckles)
1.74. СПГ-761 Gas Corrector (Logica)
1.75. CNG 761.2 Gas Corrector (Logica)
1.76. Irga 2 Gas Corrector (Globus)
1.77. EK270 Gas Corrector (Elster Gas Electronics)
1.78. FLOUGAZ Gas Corrector (EPO Signal)
1.79. Gas regulator/Meran flow meter 333 (Metran)
1.80. Gas regulator/Emis-Vigre 200 (ЭВ-200) (Emis).
1.81. УРСВ-510 (Fly).
1.82. Flash-flower (Chuckles)
1.83. ЭР310 flow meter (Chuckles)

1.84. The EM Profi (Fly) charger.
1.85. HART flow meters (n-r., Metran 370 (Metran)).
1.86. Mbus PadPuls M2 converter (Relay).
1.87. ТЭКОН-19 (Create) metering converter.

2. Telemetry (assembly of the following devices and transmission to the upper level of measurements of analog signals on the RTU-325 protocols, IEC 60870-5-104/101, IEC61850-8-1, MQTT/WebSocket, Modbus TCP).

2.1. RTU-325 cascade activation data collection and communication devices (Elster Metronica)
2.2. SPODES protocol electric meters:
2.2.1. СТЭМ-300 (SI-ART).
2.2.2. Mirteck W32 (MIRTEC).
2.2.3. ESM-HV400 (CI Energy Services).
2.2.4. Mercury 234 (Incothex).
2.2.5. Биком3 (Algorithm)
2.2.6. Neva CT413 (Typit measuring instruments).
2.2.7. Nartis И300 (Nartis).
2.2.8. ROTK PTM03 (PNC ROTEC).
2.2.9. TE3000 (TechnoEnergo)
2.2.10. TE2000 (TechnoEnergo)
2.2.11. TE1000 (TechnoEnergo)
2.2.12. ПСЧ-4ТМ.06Т (Technical Energo).
2.2.13. СЭБ-1ТМ.04Т (TechnoEnergo).
2.2.14. Phobos (Telematical Solutions)
2.2.15. CE308 (Energy)
2.2.16. Милур307 (Millour IP)
2.3. Electric meter A1800 (Elster Metronica)
2.4. Electric meter A1140 (Elster Metronica)
2.5. Electric meter A3 (Elster Metronica)
2.6. Euro Alpha A1600 electric meter (Elster Metronic).
2.7. Electric meter A1700 (Elster Metronica)
2.8. AS1440 electric meter (Elster Metronica)
2.9. AS3500 electric meter (Elster Metronica)
2.10. AS100 electric meter (Elster Metronica)
2.11. AS220 electric meter (Elster Metronica)
2.12. AS300 electric meter (Elster Metronica)
2.13. Axx1 electric meter (Honneywell).
2.14. Axx3 electric meter (Honneywell).
2.15. СЭТ4ТМ.03(М) electric meter (Frunze Plant).
2.16. СЭТ4ТМ.02 electric meter (Frunze Plant).
2.17. ПСЧ-4ТМ.05(М,МС) (Frunze Plant).
2.18. СЭТ4ТМ.02М electric meter (Frunze Plant).
2.19. ПСЧ-3ТМ.05 (Frunze Plant).
2.20. The СЭБ-1ТМ.02 electric meter (Frunze Plant).
2.21. ZMD electric meter (Landis&Gyr).
2.22. SL7000 electric meter (Actaris).
2.23. EM720 electric meter (Satec).
2.24. EM/PM13x electric meter (Satec).
2.25. ION8x00 electric meter (Schneider Electric).

2.26. ION7x00 electric meter (Schneider Electric).
2.27. ION6200 electric meter (Schneider Electric).
2.28. EPQS electric meter (Elgama Elektronika).
2.29. CEWE Prometer.
2.30. PMAC201HW (Zhuhai Pilot) electric meter.
2.31. АИСТ-1 electric meter (Homeliergo)
2.32. АИСТ-3 electric meter (Homeliergo)
2.33. CC301 electric meter (Gran Electric)
2.34. CC101 electric meter (Gran Electric)
2.35. Electric meter energy-9/ STC-03 (Homelergo).
2.36. Mercure meter230 (Incothex).
2.37. Меркурий233 (Incothex) electric meter.
2.38. Меркурий234 (Incothex) electric meter.
2.39. Меркурий236 (Incothex) electric meter.
2.40. Mercury meter 200.02 (Incothex).
2.41. Mercury meter203.2T (Incothex).
2.42. Gamma 3 electric meter (EMGF)
2.43. ЦЭ6850М electric meter (Energomer)
2.44. CE301 electric meter (Energomer)
2.45. CE303 electric meter (Energomer)
2.46. CE304 electric meter (Energomer)
2.47. КИПП-2М electric meter (STS).
2.48. Proton-K electric meter (Sistel)
2.49. Photon electric meter (Sistel)
2.50. Ф610 FTP DC meter (LEMH).
2.51. 6/10kV РИМ384.0x (RIM) direct counting meter.
2.52. The Sentron PAC-4200 multi-functional meter (Siemens).
2.53. The Senron PAC-3100 multi-functional meter (Siemens).
2.54. The Sentron PAC-3200 (Siemens) multifunctional meter.
2.55. SICAM P/SIMEAS P (Siemens) multifunctional meter.
2.56. Multifunctional ESM measurement device (Энергосервис).
2.57. Multifunctional OVEN meter МЭ210-701 (Oven).
2.58. Multi-functional measuring instrument ЩМ120/96 (Electro-Mechanic).
2.59. Multifunctional measuring instrument of the ЩМК120С (Electrometer).
2.60. PD194 multifunctional measuring device (KC/SFERE).
2.61. A digital variable current instrument, PSP 120/96 (Electric Instrument AO).
2.62. A digital DC measuring device Щ120П/96П (Equipment AO).
2.63. PA194/PZ194/PS194 (KC/SFERE) variable current digital measuring device.
2.64. PA195/PZ195 (KC/SFERE) DC digital measuring device.
2.65. EtherCAT Beckhoff EL3403 (Beckhoff) transducer.
2.66. EtherCAT Beckhoff EL3413 (Beckhoff) transducer.
2.67. Electronic optical current transformer (Profotech)
2.68. BISDR 100 devices (Mechanotronics)
2.69. RSA Сириус-2 devices (Radius Automatica)
2.70. RAZ БЗП-01 devices (Microprocessor technologies).
2.71. RAZ БЗП-02 devices (Microprocessor technologies).
2.72. Isolation control device IPDH275 (Bender).
2.73. EW7001 heat calculator (Honeywell).
2.74. RRT meter 022 (Slip).

2.75. TCP-025 heat calculator (Chuckles)
2.76. STT 961.2 (Logica) heat calculator.
2.77. Heat calculator TC-05 Strude (Grand Electro).
2.78. Heat calculator TC-07 Strude (Grand Electro).

2.79. Gas regulator GG lift (Chuckles)
2.80. СПГ-761 Gas Corrector (Logica)
2.81. CNG 761.2 Gas Corrector (Logica)
2.82. Irga 2 Gas Corrector (Globus)
2.83. EK270 Gas Corrector (Elster Gas Electronics)
2.84. FLOUGAZ Gas Corrector (EPO Signal)
2.85. Gas regulator/Emis-Vigre 200 (EC-200) (Emis).
2.86. Gas regulator/Meran flow meter 333 (Metran)

2.87. SHORT-MP SALW 510 (Chuckles)
2.88. Flash-flower (Chuckles)
2.89. ЭР310 flow meter (Chuckles)
2.90. EM Profi charger (Chuckles)
2.91. HART Protocol flow meters (Mr. Metran 370 (Metran)).
2.92. ТЭКОН-19 (Create) metering converter.
2.93. LLS-30160 fuel level sensor (Omenim)

2.94. ADAM-6017 (Adventech) analog signal collection device.
2.95. ADAM-6015 (Adventech) thermo-column signal collection device.
2.96. ADAM-4013 (Adventech) analog signal collection device.
2.97. ET7000 (IPC DAS) analog signal collection devices.

2.98. I-8KE8(4) controller with analog signal collection modules (i8017H) (ICP DAS).

2.99. PLC Simatic S7-400 / S7-300 (Siemens).

2.100. The devices with the GOST R. IEC protocol 60870-5-104.
2.101. Devices with the GOST R protocol IEC 60870-5-101.
2.102. Devices with Modbus/TCP protocol.
2.103. The devices with the Modbus RTU protocol.
2.104. Devices with EtherCAT protocol.
2.105. Devices with HART protocol.

2.106. EtherCAT AFM60A MT (Sick) is an absolute encoder.
2.107. LumaSense Impac Pierometer IS140 (LumaSense).
2.108. Registeror Экограф-T/RSG30 (Endress+Hauser).
2.109. Registerer DX1000/DX2000 (Yokogawa).
2.110. Registerer Eurotherm 6100A (Schneider).
2.111. KS3102 Registrar (PMA).

3. Television alarm (assembly of the following devices and transmission to the upper level of discrete signals on RTU-325 protocols, IEC 60870-5-104/101, IEC61850-8-1, MQTT/WebSocket, Modbus TCP).

3.1. RTU-325 cascade activation data collection and communication devices (Elster Metronica)

3.2. Data collection and communication devices (RTU) RTU-325K

3.3. ADAM-6050 (Advantech) discrete signal collection device.
3.4. ADAM-6052 (Adventech) discrete signal collection device.
3.5. The device for collecting discrete ioLogic-E2210 signals (Moxa).
3.6. Devices for collecting discrete MB110-xД signals (OVEN).
3.7. Devices for collecting discrete ET7000 (ICP DAS) signals.
3.8. ECAT-2000 (ICP DAS) in-use and output devices.

3.9. I-8KE8(4) controller with discrete signal collection modules (i8040, i8041, i8042) (ICP DAS).

3.10. ADAM-5000/TCP controller with ADAM-5051S discrete signal collection modules (Advantech).

3.11. PLC Simatic S7-400 / S7-300 (Siemens).

3.12. The Sentron PAC-4200 multi-functional meter (Siemens).
3.13. Multifunctional OVEN meter МЭ210-701 (Oven).
3.14. BISDR 100 devices (Mechanotronics)
3.15. RSA Сириус-2 devices (Radius Automatica)
3.16. RAZ БЗП-01 devices (Microprocessor technologies).
3.17. RAZ БЗП-02 devices (Microprocessor technologies).
3.18. The devices with the GOST R. IEC protocol 60870-5-104.
3.19. Devices with the GOST R protocol IEC 60870-5-101.
3.20. Devices with Modbus/TCP protocol.
3.21. The devices with the Modbus RTU protocol.
3.22. Devices with EtherCAT protocol.
3.23. Registeror Экограф-T/RSG30 (Endress+Hauser).
3.24. DX1000/DX2000 (Yokogawa).
3.25. The registrar is Eurotherm 6100A.

4. Television (upper-level control of IEC protocols 60870-5-104/101, MQTT and digital outputs of the following devices).

4.1. Data collection and communication devices (RTU) RTU-325K

4.2. ADAM-6050 (Adventech) discrete signal output device.
4.3. ADAM-6052 (Advantech) discrete signal output device.
4.4. A device for the release of discrete ioLogic-E2210 signals (Moxa).
4.5. Discretionary ET7000 (IPC DAS) output devices.
4.6. ECAT-2000 Induction and Output Devices (ICP DAS).

4.7. The Sentron PAC-4200 multi-functional meter (Siemens).

4.8. I-8KE8(4) controller with discrete signal output modules (i8040, i8041, i8042) (ICP DAS).

4.9. BISDR 100 devices (Mechanotronics)
4.10. RSA Сириус-2 devices (Radius Automatica, Zelenograd).
4.11. RAZ БЗП-01 devices (Microprocessor technologies).
4.12. RAZ БЗП-02 devices (Microprocessor technologies).

4.13. The devices with the GOST R. IEC protocol 60870-5-104.
4.14. Devices with the GOST R protocol IEC 60870-5-101.
4.15. Devices with Modbus/TCP protocol.
4.16. The devices with the Modbus RTU protocol.
4.17. Devices with EtherCAT protocol.

5. Data recorder mode (data collection from the following devices to form, store and transfer COMTRADE files (IEC60255-24-2013) to the top of rsync/ftp/sftp protocols).

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5.2. Devices with Modbus/TCP protocol.
5.3. The devices with the Modbus RTU protocol.
5.4. Siemens S7-400/S7-300 (Siemens).
5.5. Овен-МЭ210-701 meter (Oven).
5.6. LumaSense Impac Pierometer IS140 (LumaSense).
5.7. Electronic optical (Profotech) current transformer.
5.8. Ф610 (LEMZ) DC-ACFCs.
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5.9.2. Mirteck W32 (MIRTEC).
5.9.3. ESM-HV400 (CI Energy Services).
5.9.4. Mercury 234 (Incothex).
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5.9.6. Neva CT413 (Typit measuring instruments).
5.9.7. Nartis И300 (Nartis).
5.9.8. ROTK PTM03 (PNC ROTEC).
5.9.9. TE3000 (TechnoEnergo)
5.9.10. TE2000 (TechnoEnergo)
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5.9.13. СЭБ-1ТМ.04Т (TechnoEnergo).
5.10. Registeror Экограф-Т/RSG30 (Endress+Hauser).
5.11. DX1000/DX2000 (Yokogawa).
5.12. The registrar is Eurotherm 6100A.
5.13. KS3102 Registrar (PMA).

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6.1.2. tDS-735i (ICP DAS).
6.1.3. tDS-718i (ICP DAS).
6.1.4. tDS-715i (ICP DAS).
6.1.5. DS-2235i (ICP DAS).
6.1.6. USR-DR302 (USRIOT).

6.2. USB-RS232/422/485 converters.

6.2.1. On the basis of the Prolifec PL2303x chip:

6.2.1.1. USB-RS232/422/485 ADAM-4561 (Advantech).
6.2.1.2. USB-RS232 Defender USR130 (Omega Electronics).
6.2.1.3. USB-RS232 STLab USB-Serial-4 (STLab).
6.2.1.4. USB-RS232 Gembird (Gembird).
6.2.1.5. USB-RS232/422/485 Expert EX9530 (Expert).

6.2.2. On the basis of the FTDI2232x chip:

6.2.2.1. USB-CAN/RS485/RS232 Меркурий-221 (Incotax).
6.2.2.2. USB-RS422/RS485 ПИ-2 (NZIF).
6.2.2.3. USB-RS232/422/485 i7561 (ICP DAS).
6.2.2.4. USB-RS485 tM7561 (ICP DAS).

6.2.3. On Silicon Labs CP210x:

6.2.3.1. USB-RS485 AC4 (Oven).

6.2.4. On the basis of the Exar XR21B1411 chip:

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6.4. EtherCAT busbar branching modules.

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SECTION 04

Non-volatile memory sizing method

Annex 2, Part 1

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Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

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Annex 2.

RTU series RTU-325. Methodology for calculating the volume of NVM.

The method of calculating the volume of the RTU series RTU-325 is designed to determine the total size of the data archives. The depth of data storage in each type of archive is set when configured. It is necessary that the total size of all archives after the configuration of the RTU does not exceed the size of the PPSU determined for each RTU model RTU-325.

The NVM RTU-325 series is divided into two independent sections, one section is used to store RTU software and office archives, and the second section is used to store archives. The size of the NVM section used to store archives depends on the RTU RTU-325 model and is shown in Table K.1.

RTU-325 model	NVM size for archives storage
RTU-325S	650 Mb
RTU-325K	650 Mb
RTU-325TM	1000 Mb

Table K.1 Maximum NVM size for archives storage

The required volume shall be calculated by summating the required NVM volume according to the following data for the calculation elements based on the design data per system. The device used shall have an area size of NVM intended to store archives greater than the calculated value.

Computing NVM volume calculations.

K.1 Handbooks and system operating configuration.

Calculation formula

V = 2+0.05*(number of system elements *1)+1*(number of telecontrol configurations) Mb.

K.2 Technical profile of electric energy consumption at the meter interval.

Calculation formula for pulse-specific meters *2:

V = (70+number of profiles)*(number of days)*(number of meters)*(profile intervals per day)/1000000 Mb.

Example of a calculation per 1 4-piece meter:

Profile interval	Storage 1 day	Storage 1 month
1 minute	0.107 Mb	3.3 Mb
3 minutes	0.036 Mb	1.1 Mb
5 minutes	0.021 Mb	0.7 Mb
15 minutes	0.007 Mb	0.21 Mb
30 minutes	0.004 Mb	0.12 Mb

Calculation formula for technical profile meters with floating point number *3:

V = (70+7*number of profiles)*(number of days)*(number of meters)*(profile intervals per day)/1000000 Mb.

Example of a 1-score meter with 8 retained profiles:

Profile interval	Storage 1 day	Storage 1 month
1 minute	0.181 Mb	5.4 Mb
3 minutes	0.060 Mb	1.8 Mb
5 minutes	0.036 Mb	1.1 Mb
15 minutes	0.012 Mb	0.4 Mb
30 minutes	0.006 Mb	0.2 Mb

K.3 An electric energy consumption profile archive at a commercial interval in kWh.

Calculation formula for 30 minutes interval:

V = (70+7*number of profiles)*(number of days)*(number of meters and connections)*48/1000000 Mb.

Calculation example for 4 retained profile meters:

Number of meters/adherences	Storage 1 month	Storage 1 year
1 meter	0.15 Mb	1.8 Mb
40 Rectors/adherences	6.0 Mb	72.0 Mb

K.4 The design profile archive at the commercial interval.

Calculation formula for 30 minutes interval:

V = (70+7*number of profiles)*(number of days)*(number of meters)*48/1000000 Mb.

Calculation example for 4 retained profile meters:

Number of meters	Storage 1 month	Storage 1 year
1 meter	0.15 Mb	1.8 Mb
40 meters	6.0 Mb	72.0 Mb

K.5 Sub-interval profile archive.

Calculation formula:

V = (70+7*number of profiles)*(60*24/subinterval duration)*(number of days)*(number of meters)/1000000 Mb.

Example of calculation for 4 retained 3-minute sub-interval meters:

Number of meters	Storage 7 days	Storage 1 month
1 meter	0.33 Mb	1.4 Mb
40 meters	13.2 Mb	56.0 Mb

K.6 The profile archive of the calculation imbalances by group.

Calculation formula for the 30 minute imbalance calculation interval:

V = 80*(number of days)*(number of balance groups)*48/1000000 Mb.

Calculation example for 4 retained profile meters:

Number of balance sheets	Storage 1 month	Storage 1 year
1 Group	0.12 Mb	1.44 Mb

K.7 Power consumption archive in kWh.

Calculation formula:

V = 0.0001*365*(number of years)*(number of meters) Mb.

Calculation example:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.0365 Mb	0.1825 Mb
40 meters	1.46 Mb	7.3 Mb

K.8 Power consumption archive at 24-hour tariffs in kWh.

Calculation formula:

V = 0.0001*365*(number of years)*(number of tariffs)*(number of meters) Mb.

Calculation example for 4 tariffs:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.146 Mb	0.73 Mb
40 meters	5.84 Mb	29.2 Mb

K.9 Electric energy consumption archive at the calculation period, kWh.

Calculation formula (calculation period - month):

V = 0.0001*12*(number of years)*(number of tariffs)*(number of meters) Mb.

Calculation example for 4 tariffs:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.0048 Mb	0.024 Mb
40 meters	0.192 Mb	0.96 Mb

K.10 Electric energy consumption archive for the design period in kWh.

Calculation formula (calculation period - month):

V = 0.0001*12*(number of years)*(number of tariffs)*(number of groups) Mb.

Calculation example for 4 tariffs:

Number of groups	Storage 1 year	Storage 5 years
1 Group	0.0048 Mb	0.024 Mb
10 groups	0.048 Mb	0.24 Mb

K.11 An archive of power values at commercial intervals in power zones in kW.

Calculation formula:

V = 0.0001*365*(intervals per day)*(number of meters) Mb.

Calculation example for 2 power zones of 2 hours (total 8 intervals per day):

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.292 Mb	1.46 Mb
40 meters	11.68 Mb	58.4 Mb

K.12 An archive of power values at commercial intervals in power zones by group in kW.

Calculation formula:

V = 0.0001*365*(intervals per day)*(number of groups) Mb.

Calculation example for 2 power zones of 2 hours (total 8 intervals per day):

Number of groups	Storage 1 year	Storage 5 years
1 Group	0.292 Mb	1.46 Mb
10 groups	2.92 Mb	14.6 Mb

K.13 Record of meter readings (autoreading).

Calculation formula:

V = 0.04*12*(number of years)*(number of meters) Mb.

Calculation example:

Number of meters	Storage 1 year	Storage 5 years
1 meter	0.48 Mb	2.4 Mb
40 meters	19.2 Mb	96.0 Mb

K.14 An electrical quality index archive.

Calculation formula:

V = 0.00004*(number of parameters)*(measurements per hour)*24* (number of days)*(number of meters) Mb.

Calculation example (measure 5 parameters at 3 min interval):

Number of meters	Storage 10 days	Storage 30 days
1 meter	0.96 Mb	2.88 Mb
40 meters	38.4 Mb	115.2 Mb

K.15 A magazine of events.

Calculation formula:

V = 0.0002*(events per system element)*(number of meters) Mb.

Example of calculation at 150 events per component of system:

Number of system elements	150 events on the element
2 (meter + RTU)	0.06 Mb
41	1.2 Mb

K.16 A log of the stress of the meters.

Calculation formula:

V = 0.0001*(voltage dips per meter)*(number of meters) Mb.

Example of calculation at 500 voltage failures per meter:

Number of meters	500 failures on the meter
1	0.05 Mb
40	2.0 Mb

K.17 Auto-diagnosis log.

Calculation formula:

V = 0.001*(self-test events per check) Mb.

Example of calculation for 100 auto-diagnosis events per test:

V=0.001*100=0.1Mb

K.18 Register of changes in the status of discrete objects(s).

Calculation formula:

V = 0.0001*(changes per digital object)*(number of meters) Mb.

Example of calculation at 500 changes in the state of the discrete object:

Number of discrete objects	500 site changes
1	0.05 Mb
50	2.5 Mb

K.19 A log of changes in the status of accidents and warnings in electrical circuits.

Calculation formula:

V = 0.0001*(changes per alarm or warning)*(number of meters) Mb.

Example of calculation for 100 changes in accident status or warning:

Number of accidents/warnings	100 State of change
1	0.01 Mb
50	0.05 Mb

K.20 Combination traffic records.

Calculation formula:

V = 0.0075*(number of days)*(connections with traffic accounting enabled) Mb.

Calculation example with 30 days of half-hour traffic:

Number of connections, including traffic	Storage of 30 minutes Profiles - 30 days
1	0.225 Mb
20	4.5 Mb

K.21 The records of traffic through the sessions of switched access.

Calculation formula:

V = 0.0075*(number of sessions)*(connections with traffic accounting enabled) Mb.

Calculation example with 30 days of half-hour traffic:

Number of connections, including traffic	Storage of 100 sessions at connection
1	0.75 Mb
4	3.0 Mb

SECTION 05

Embedded software

Part 2

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Data collection and communication devices of the RTU-325 family

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1. Introduction.

RTU is supplied with integrated software for configuration, diagnosis and additional service functions.

An external engineering remote control remote is used to access the integrated RTU software.

The external engineering remote is a laptop or personal computer with installed software that allows the user to perform the following functions when connected to the RTU:

- RTU configuration;
- Review of RTU archives;
- Update of the RTU integrated software version;
- Re-establishment of the initial or operational configuration of RTU;
- Receive RTU files of official archives, RTU operating configuration, configuration seal, etc.;
- «Сквозной канал УСПД» = operation of "родным" software (from manufacturer) with external devices connected to the RTU on digital lines.

To perform the above functions, it is recommended that the following programmes be installed on the OS Win-dows external engineering remote control:

- Terminal emulator programme «ZOC/Pro6.27» http://www.emtec.com/);
- FTP client programme «FileZilla version 2.1.9a» (www.sourceforge.net/projects/filezilla) or «WinSCPversion 4.3.7 (Build 1679)» (http://www.winscp.net/);
- Programme «Serial to Ethernet Connector 5.0 by Eltima Software»

This guide is valid for all RTU models.

2. Connecting the external engineering remote to RTU.

2.1. RTU hardware interfaces to connect the external engineering remote.

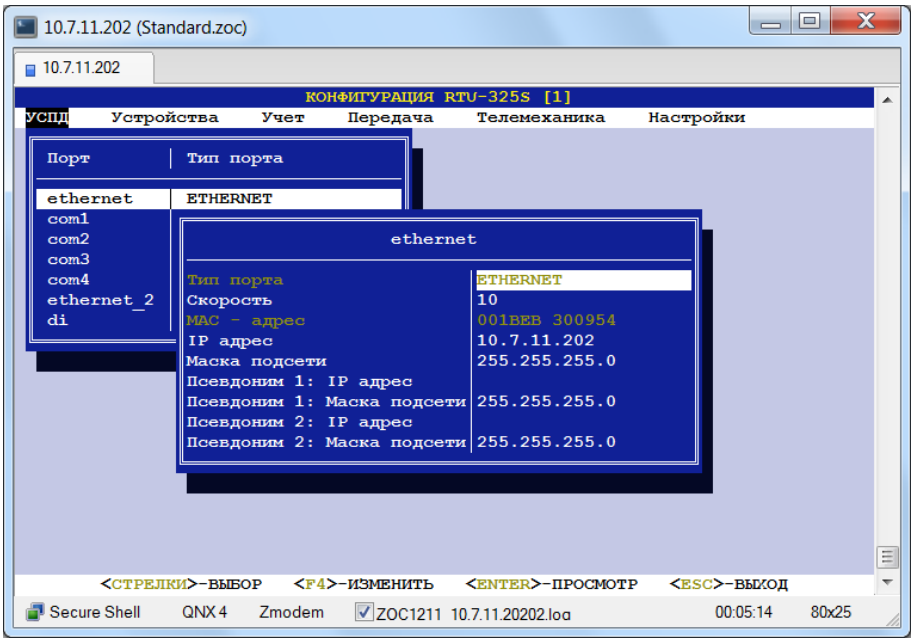
The following types of integrated RTU hardware interfaces can be used to access integrated software:

- Ethernet;
- RS-232;
- RS-485.

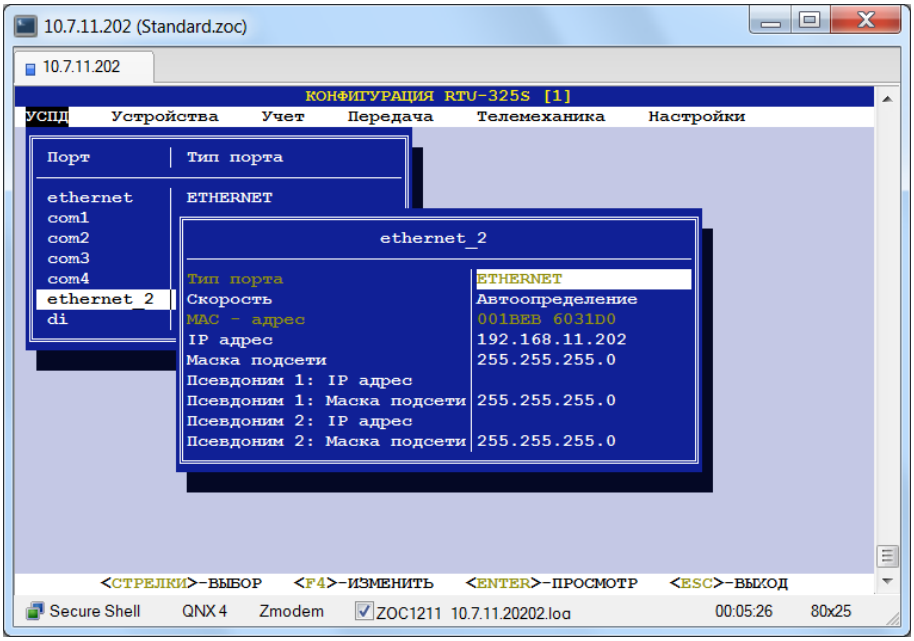
2.2. Connecting the external engineering remote to RTU on ETHERNET.

The RTU models with one ETHERNET interface are supplied with the pre-established IP address 10.7.11202.
In RTU models with two ETHERNET interfaces (marked on RTU «LAN1» and «LAN2»), you can connect to any ETHERNET interface. Such RTU shall be supplied with the following pre-established IP addresses:

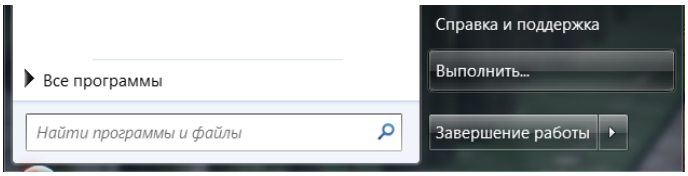
- 10.7.11.202 for «LAN1» :



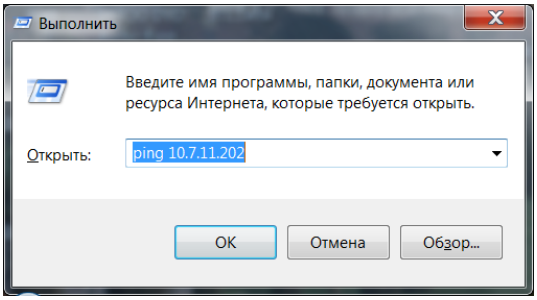
- 192.168.11.202 for «LAN2» :



Checking the correct connection and settings of the TCP/IP protocol is done from the command line OS Windows («Пуск» > «Выполнить») of the external engineering remote control:



ping XXX.XXX.XXX , where XXX.XXX.XXX.XXX - IP address RTU:



2.3. Connect the external engineering remote to the RS-232 RTU interface.

For all RTU models, the external engineering remote control can be connected to any of the successive RS-232 interfaces.

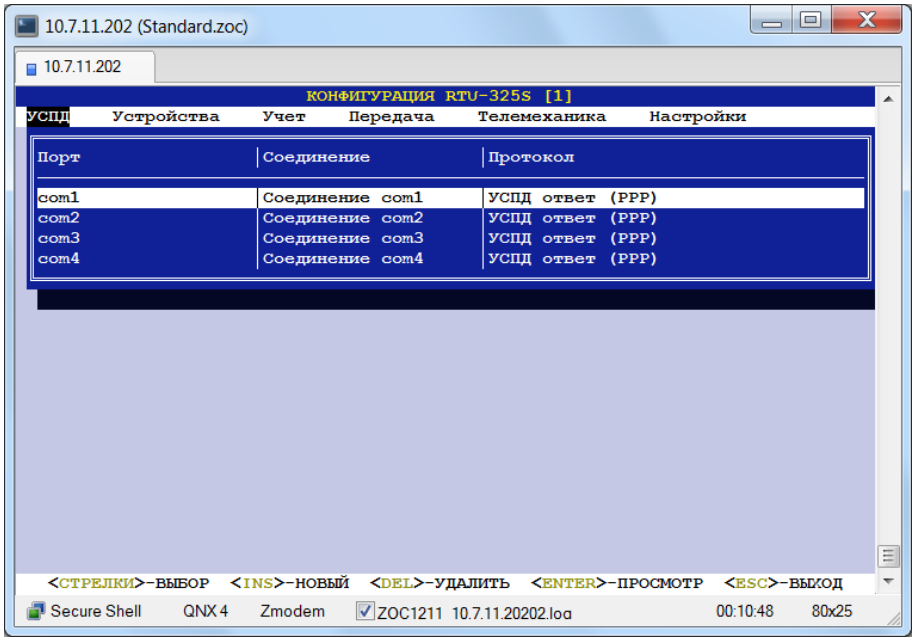
The connection of the external engineering remote to the RS-232 RTU interface can be made by means of the following lines of communication:

- RS232 - RS232 - RS232 Node-modem cable;
- Telephone lines identified;
- Connectable lines of communication;
- Cell phone.

2.3.1. This connection is based on the N.O.S.232 - RS232.

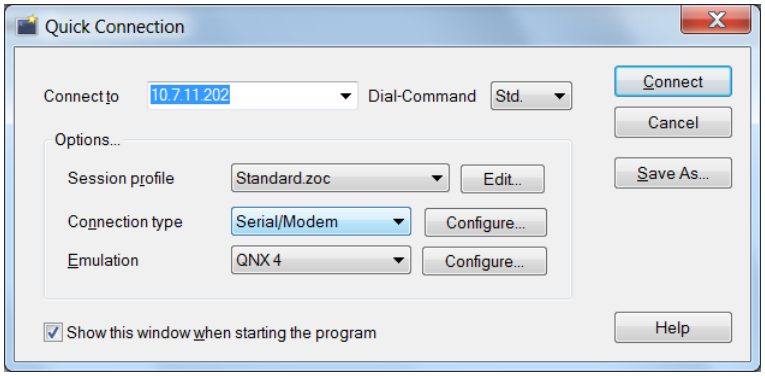
Only the terminal emulator programme (e.g. «ZOC») can be used for this connection.
For RS-232 RTU, a connection to the external engineering remote control unit should be established and defined (the menu item «Порты» / «УСПД» > «Соединения» of the «Конфигуратор» programme). In this menu item, the type of protocol should be defined:

- RTU Response (RRR):



In the «ZOC» program, in Quick Connection, install:

- in Connection Type - «Serial/Modem» :



In this case, the «ZOC» programme is operating in terminal mode. The remaining program settings «ZOC» are described in paragraph «Программное обеспечение для встроенного инженерного пульта» > «Программа эмулятора терминала "ZOC/Pro 6.27"» .

2.3.2. The connection to the selected telephone line.

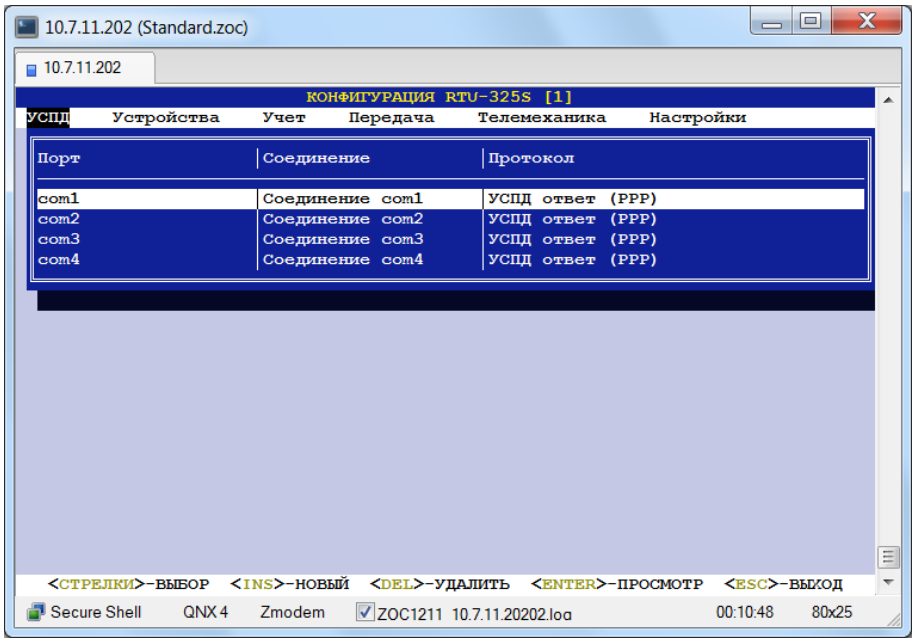
This connection is possible using modems with RS-232 interface in the selected line mode. For the rest, see 2.3.1.

2.3.3. Switch line connection.

This connection is possible using the Hayes-compatible modems and GSM modems with RS-232.

For RS-232 RTU port, create a connection to the external engineering remote control and define its parameters (the menu item «Порты» / «УСПД» > «Соединения» of the «Конфигуратор» programme). In this paragraph, the menu must define the type of protocol:

- RTU Response (RRR):



On an external engineering bullet in OS WINDOWS, create a dial-up connection and call RTU. Programme settings «ZOC» and «FileZilla» / «WinSCP» are described in paragraph «Программное обеспечение для встроенного инженерного пульта» .

If the RTU already has a connection to the type of protocol «УСПД ответ (PPP)» for connection to the upper level system (e.g. «АльфаЦентр»), it can be used to connect the external engineering remote control when the communication line is free and there are no interviews from the upper level system.

2.4. Connect the external engineering remote to the RS-485 RTU interface.

This connection is possible using an external interface converter module RS-485 to RS-232 (e.g. ADAM-4520). Further work is similar to that of RS-232 interface (see para. «Подключение внешнего инженерного пульта к последовательному интерфейсу RS-232 УСПД»).

3. Software for built-in engineering remote control.

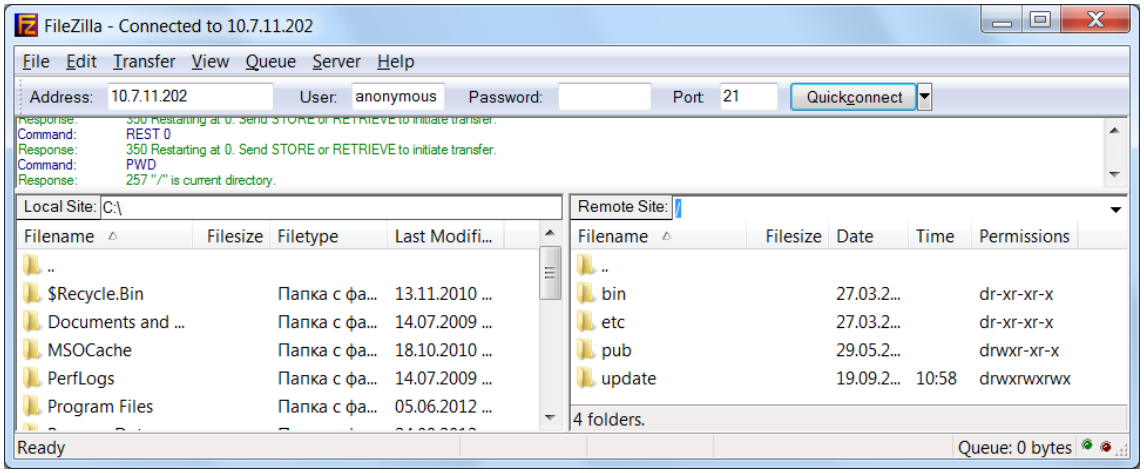
3.1. FTP client program «FileZilla» .

The FTP client «FileZilla» is designed to copy files (e.g. RTU files) with RTU to an external engineering remote or an external engineering remote to RTU (e.g. RTU upgrade files).

The FTP client «FileZilla» program needs to be copied with CD-ROM and installed in OS Windows 2000/XP/7. Once the programme is launched, it is necessary to:

- Set in FileZilla:
  - In the Address field - RTU address, in the User - anonymous field, the Password and Port fields may not be filled in.

- Connect by pressing QuickConnect.
- The RTU file system catalogues should appear in the RemoteSite window:



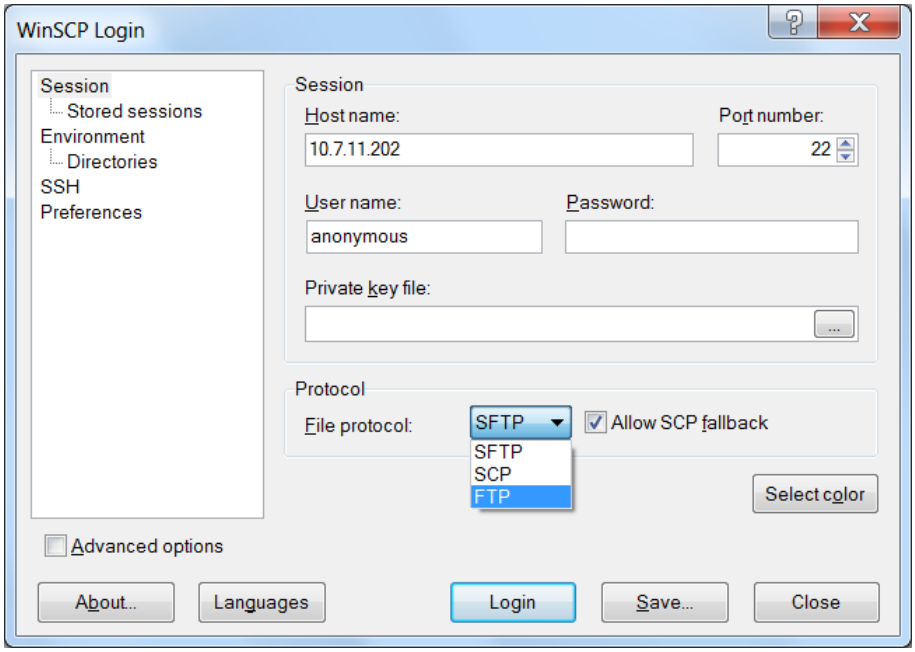
Then you can transfer files to RTU or to RTU.

3.2. FTP client program «WinSCP» .

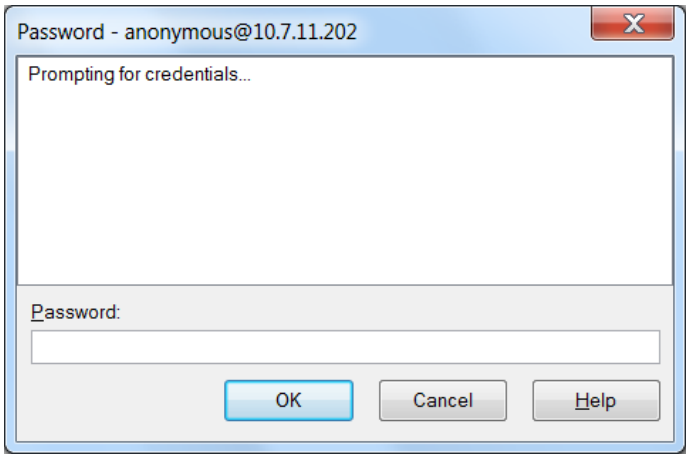
The FTP client «WinSCP» is designed to copy files (e.g. RTU files) with RTU to an external engineering remote or an external engineering remote to RTU (e.g. RTU upgrade files).

The FTP client «WinSCP» program needs to be copied with CD-ROM and installed in OS Windows 2000/XP/7. Once the programme is launched, it is necessary to:

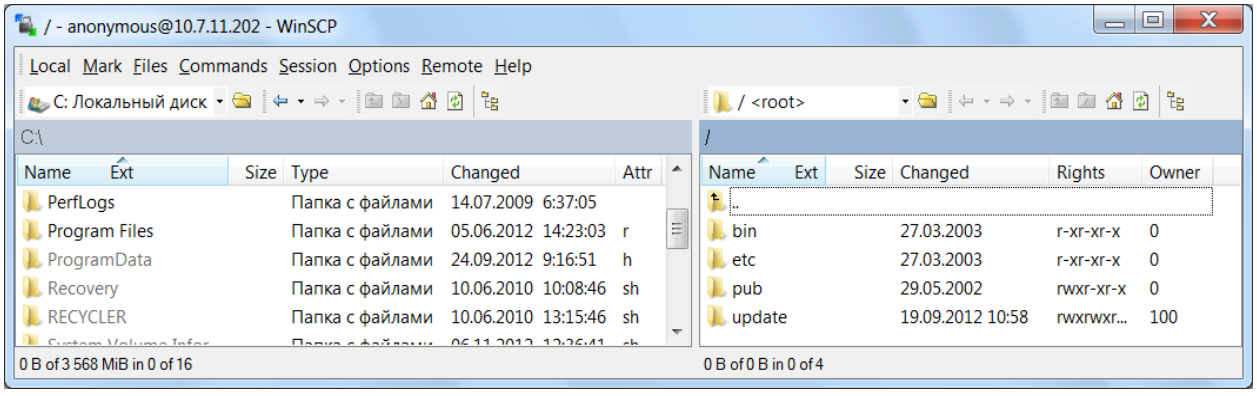
- Set in Session form:
  - In the field of Hostname - TRD, the address of RTU - in the field of User name - anonymous - in the field of File protocol - select FTP, the fields of Password and Port may not be filled in.



- Press Login and open OK window:



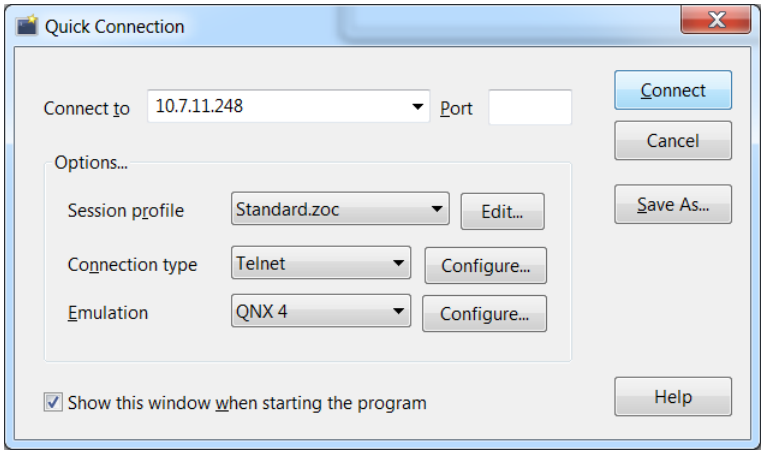
- The RTU file system catalogues should appear in the right part of the open window:



Then you can transfer files to RTU or to RTU.

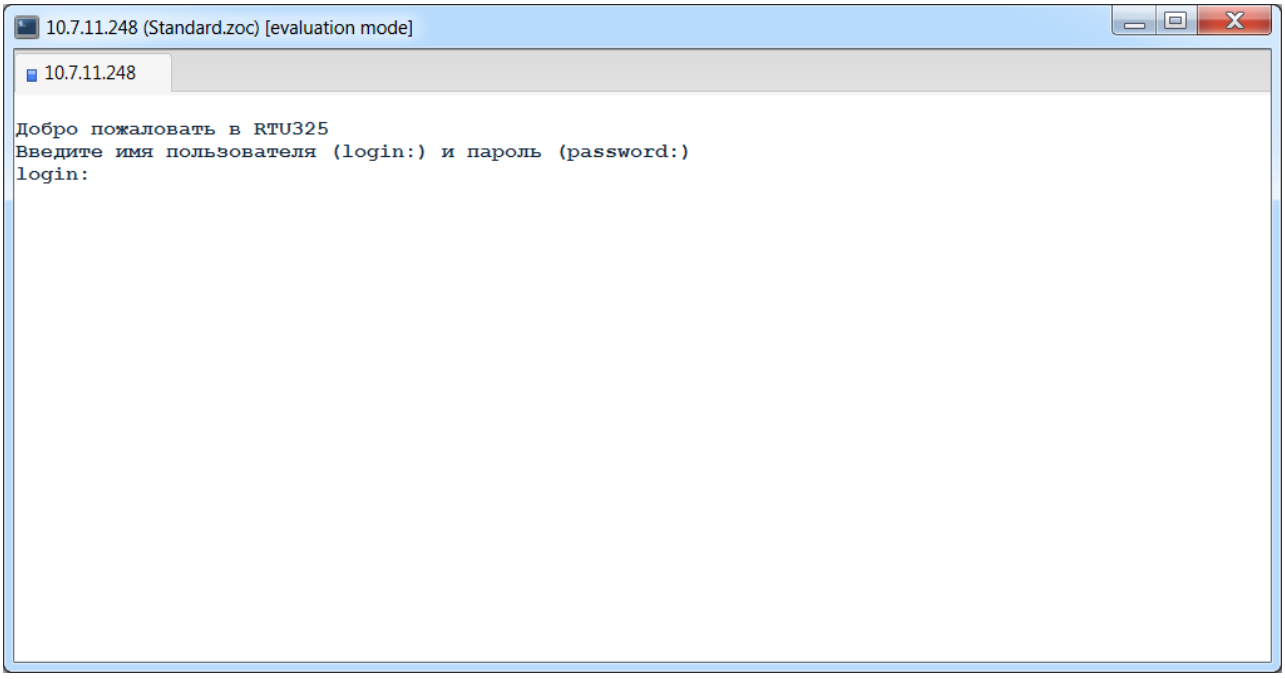
3.3. Terminal emulator program «ZOC/ Pro6.27» .

The terminal emulator programme «ZOC» is designed to access and operate the integrated RTU software.
The program «ZOC» needs to be copied from the CD-ROM supplied with RTU and installed in OS Windows 2000/XP/7. Once the programme is launched, it is necessary to:

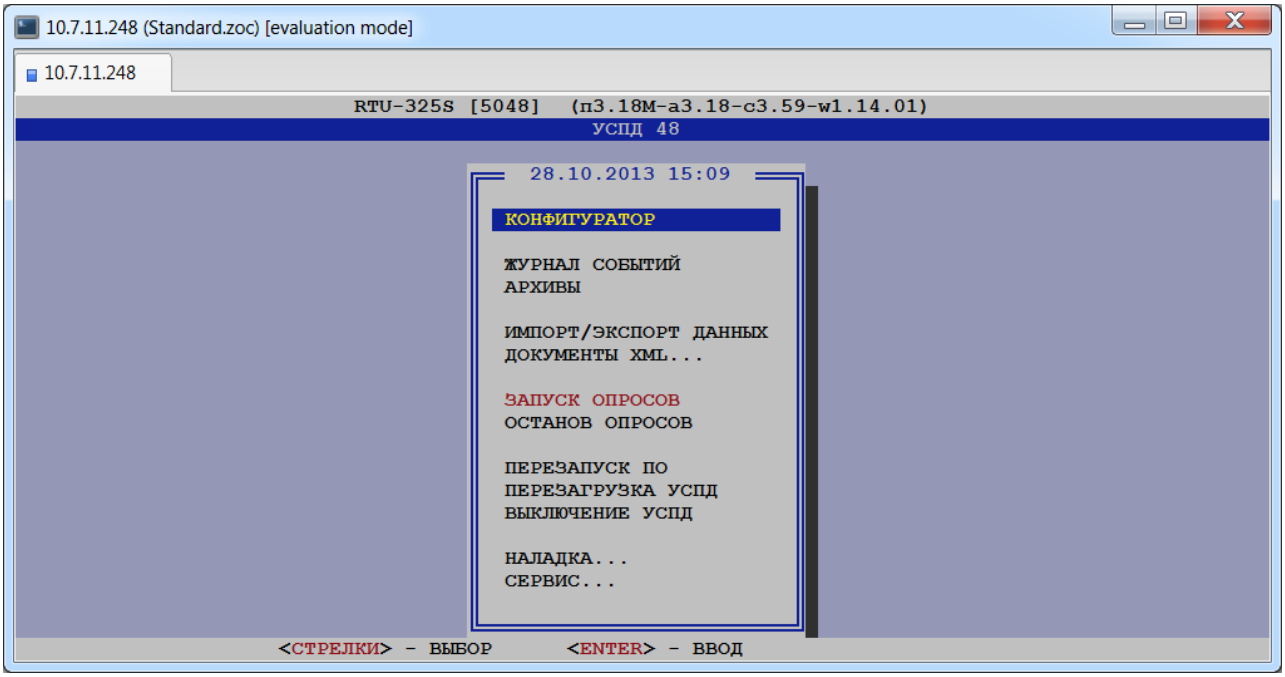


- Set up in Quick Connection:
  - in the field Connect to RTU, in the field Connection Type - «Telnet» («Secure Shell» for software No. 3), in the field Emulation - «QNX4» .

- Enter username (login/username) and password (password):

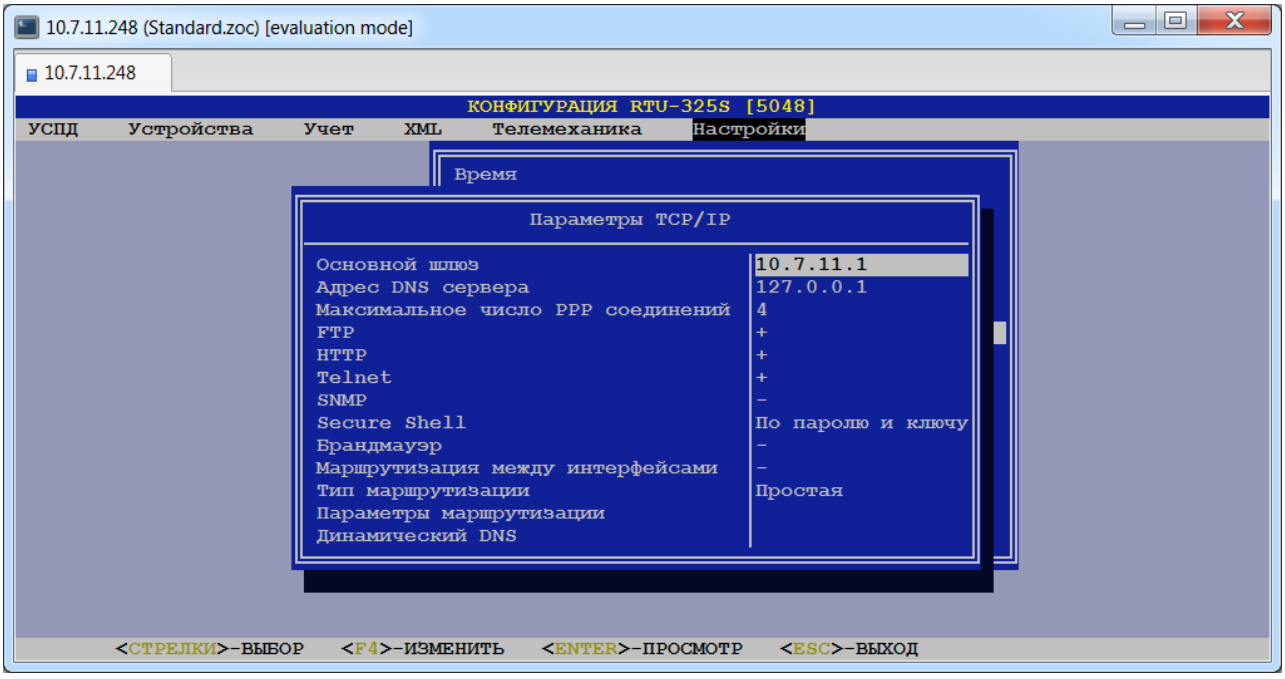


- Select the required main menu item of the integrated software RTU:



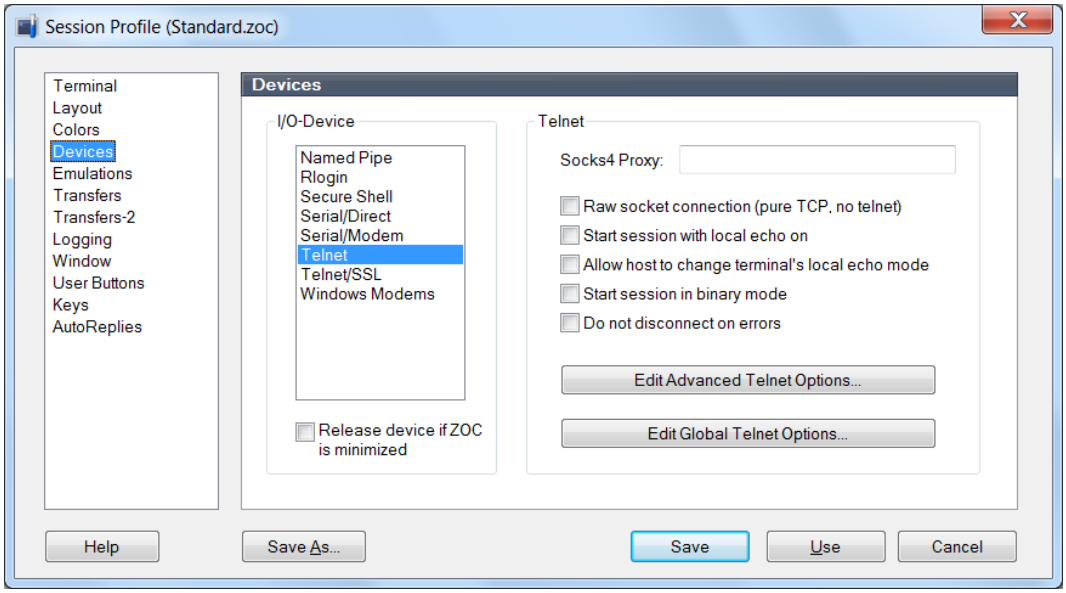
Note: RTU reboots from integrated software
The connection between the RTU software and the external engineering remote control. Once rebooted, RTU needs to reconnect to RTU with «ZOC» external engineering remote control.

Attention: RTU plants with version of Software No. 3.xx include a first-time manager. but only in mode «Secure Shell» (Connection Type field). Any other access on the TCP/IP protocol (FTP, HTTP, Telnet) is impossible for safety reasons! Access to RTU using these services should be deliberately reconfigured by the user («Справочники» / «Настройки» > «Параметры TCP/IP»):

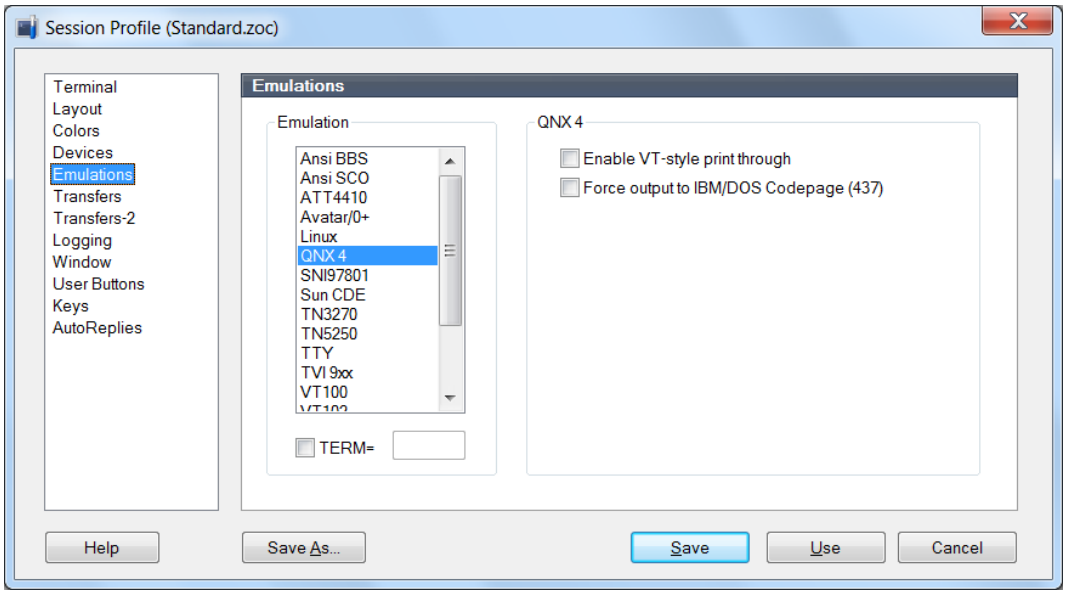


In case of problems, verify the recommended setting of the «ZOC» programme parameters as set out below.

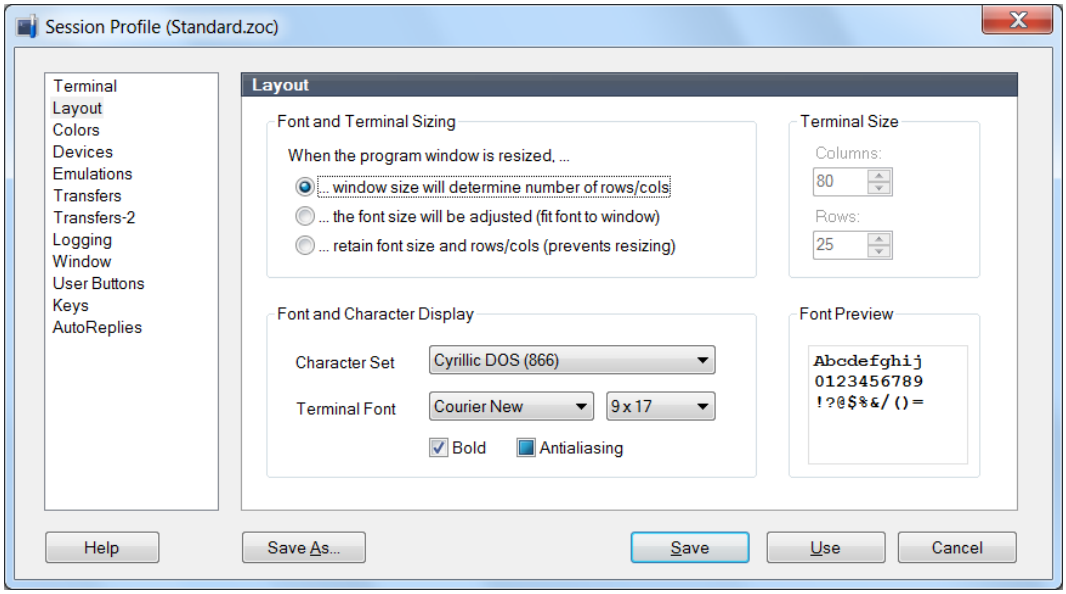
1. Service programme settings «Telnet» :
   - Start program «ZOC» .
   - Select paragraph «Options» .
   - Select «Edit Session Profile...».
   - Select a bookmark «Device» .
   - In section «I/O Device», select paragraph «Telnet».
   - In the bottom line of the window «Session Profile» press «Save»:



2. Settings of the program to correctly display the symbols on the external engineering remote screen:
   - Start program «ZOC» .
   - Select paragraph «Options» .
   - Select «Edit Session Profile...».
   - Select a bookmark «Emulation» .
   - In section «Emulation», select paragraph «QNX4» :



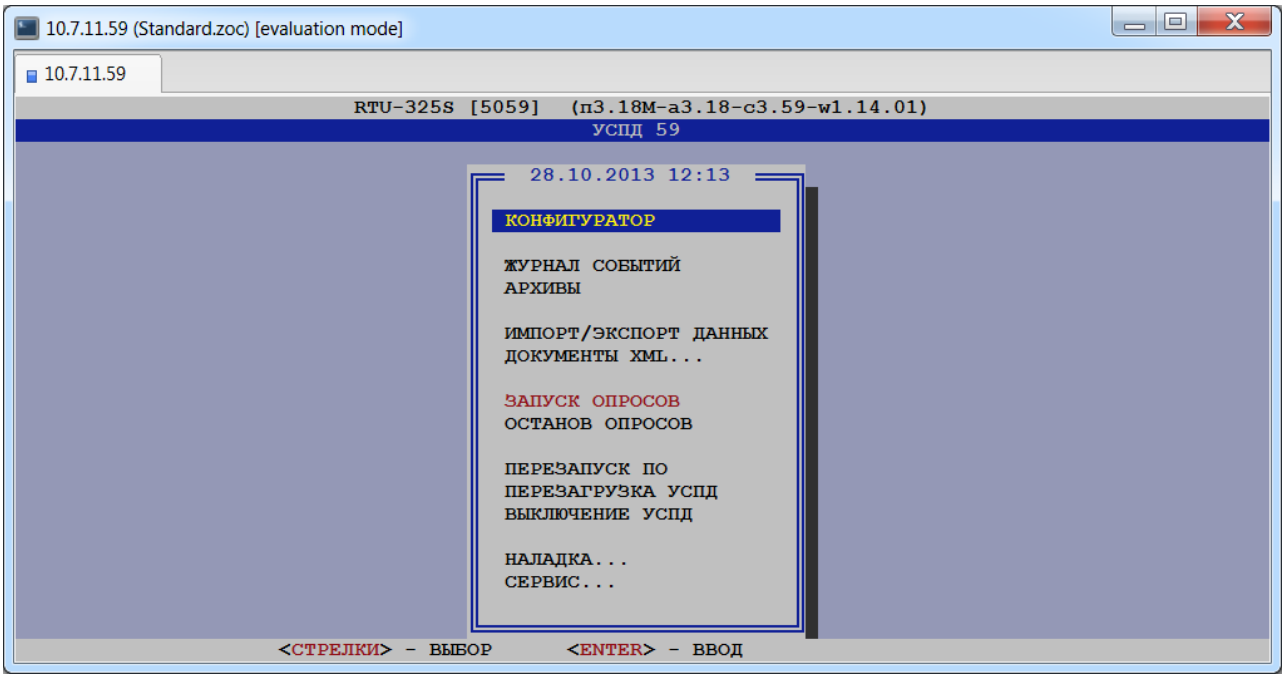
- Select a bookmark «Layout» .



- In section «Font and Character Display», establish:
  - Parameter «Char. Set» : Cyrilic DOS (866)
  - Parameter «Terminal Font» : Courier New
- In the bottom line of the window «Session Profile» press «Save» button.

4. RTU software built-in.

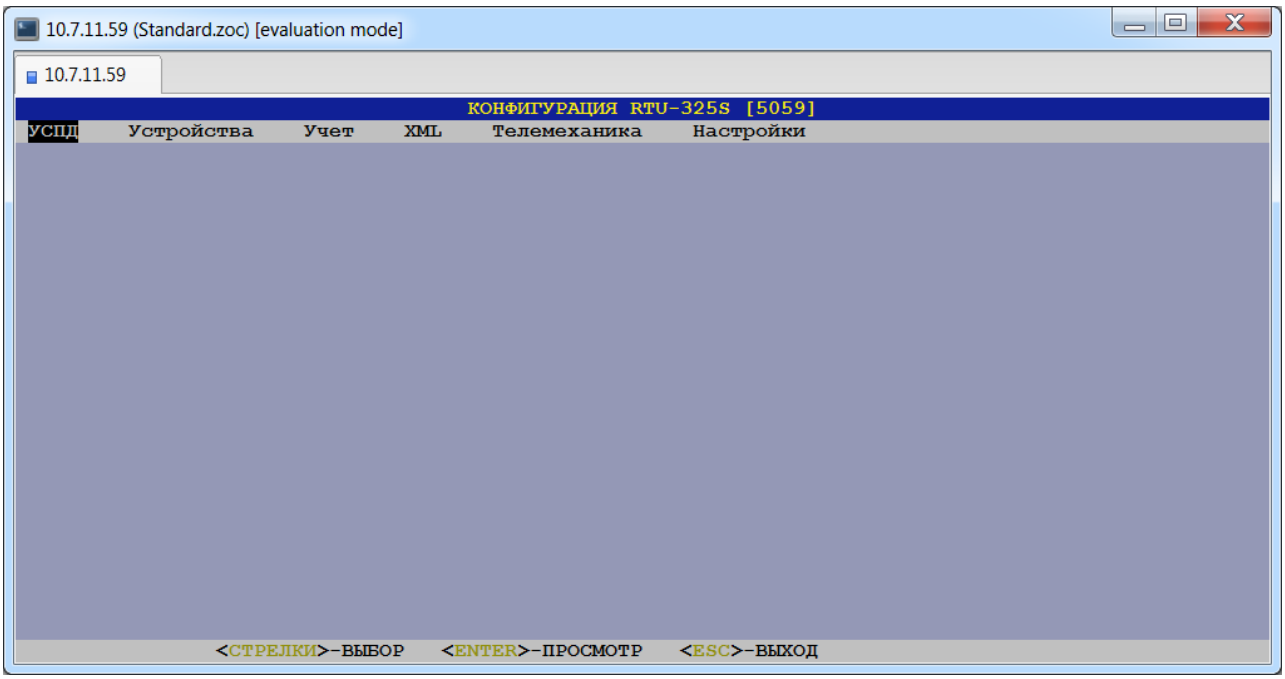
Once the external engineering remote is connected to the RTU, the user can access the integrated RTU software using the terminal emulator program. The result of the successful connection of the terminal emulator program to RTU is the introduction of the main menu of the built-in software RTU:



The following is a description of the items in the menu.

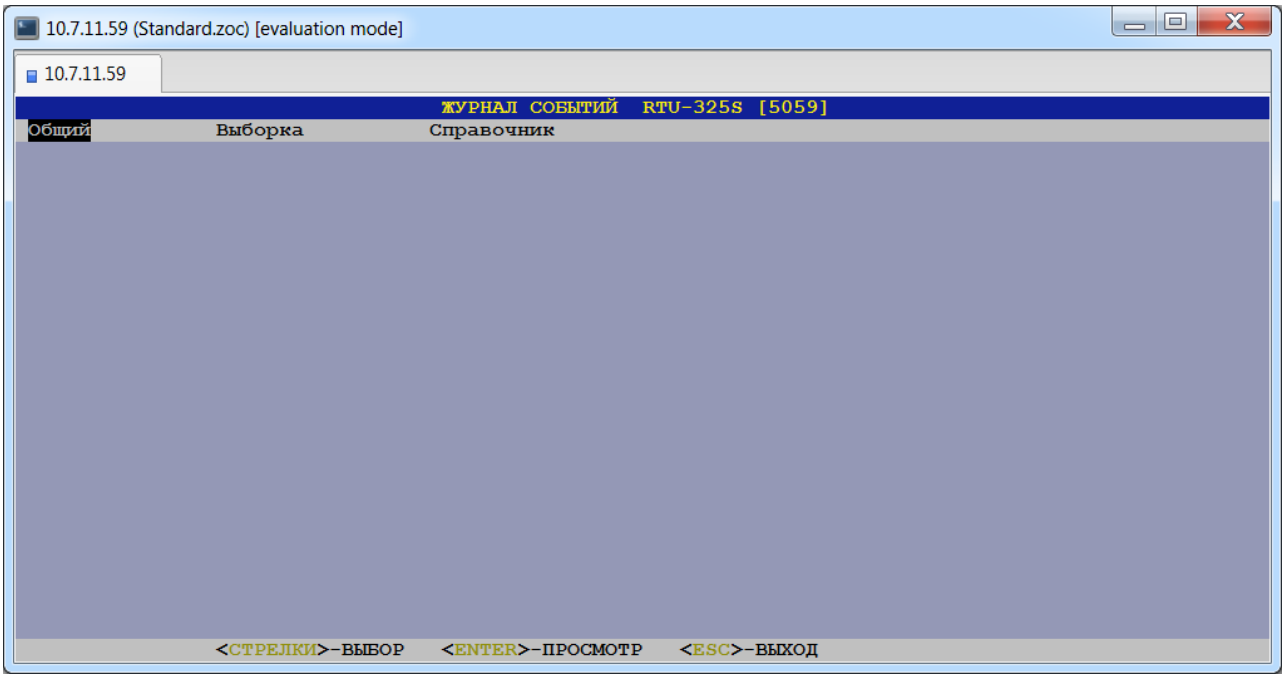
4.1. The configuration.

The «Конфигуратор» program is designed to define the configuration of RTU. The programme is described in a separate manual «Конфигурирование УСПД».



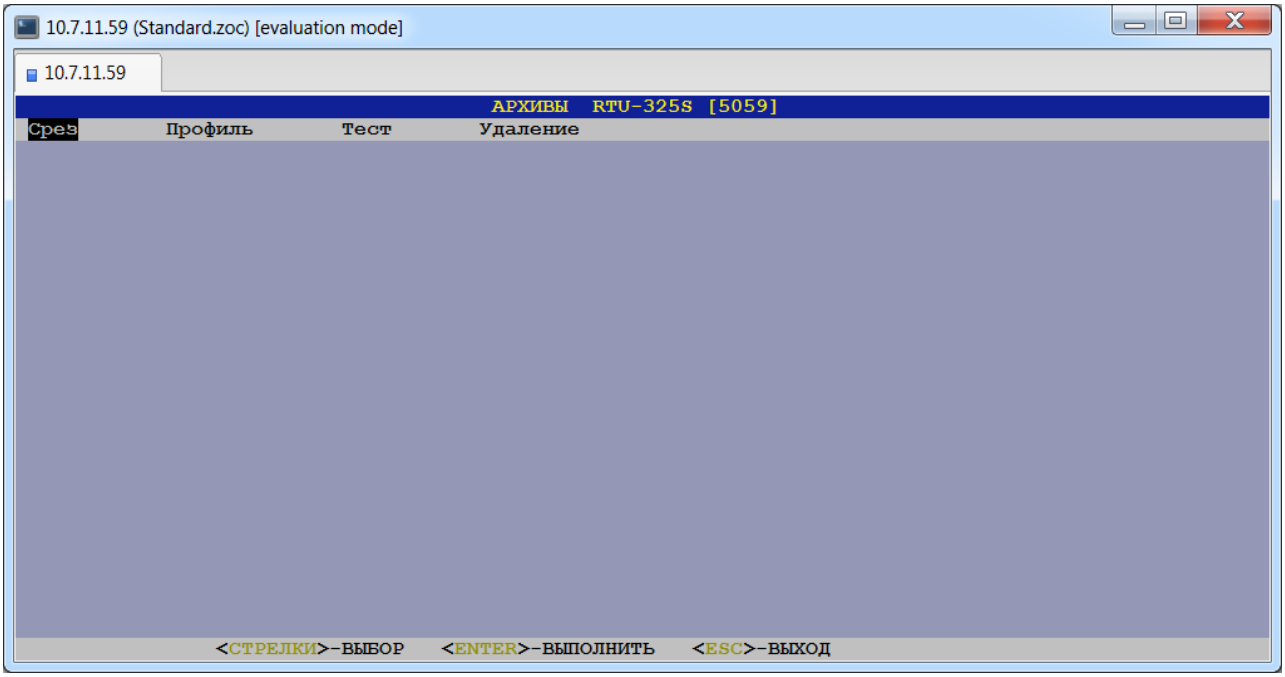
4.2. A magazine of events.

The program «Журнал событий» is designed to view the RTU event log. The programme is described in a separate manual «Журнал событий УСПД».



4.3. Archives.

The programme «Архивы» is designed to handle data from RTU archives. The following is a description of the items in the menu.



- **Cut**

In this paragraph, the user may look at the latest or initial data of the selected account object.

- **Profile**

In this paragraph, the user can look at the selected time period for the selected account object.

- **Test**

In this paragraph, the user can check the readable and stored data in the RTU archives.

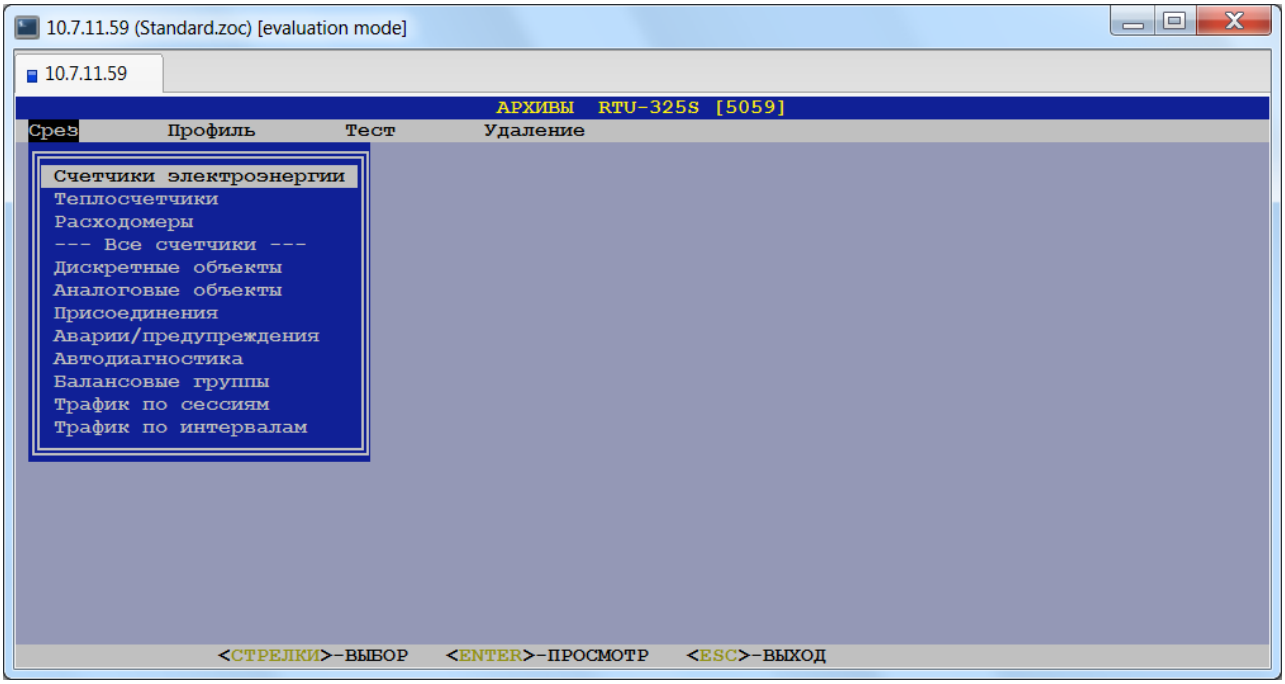
- **Disposal**

  In this paragraph, the user can remove the selected data from the RTU archives.

4.3.1. The «Срез» menu item.

In this menu paragraph, the user can look at the initial or latest data from the selected accounting object type. Viewing the initial and latest data is similar.

After selecting the type of data cut, the user must choose the type of object to account for:

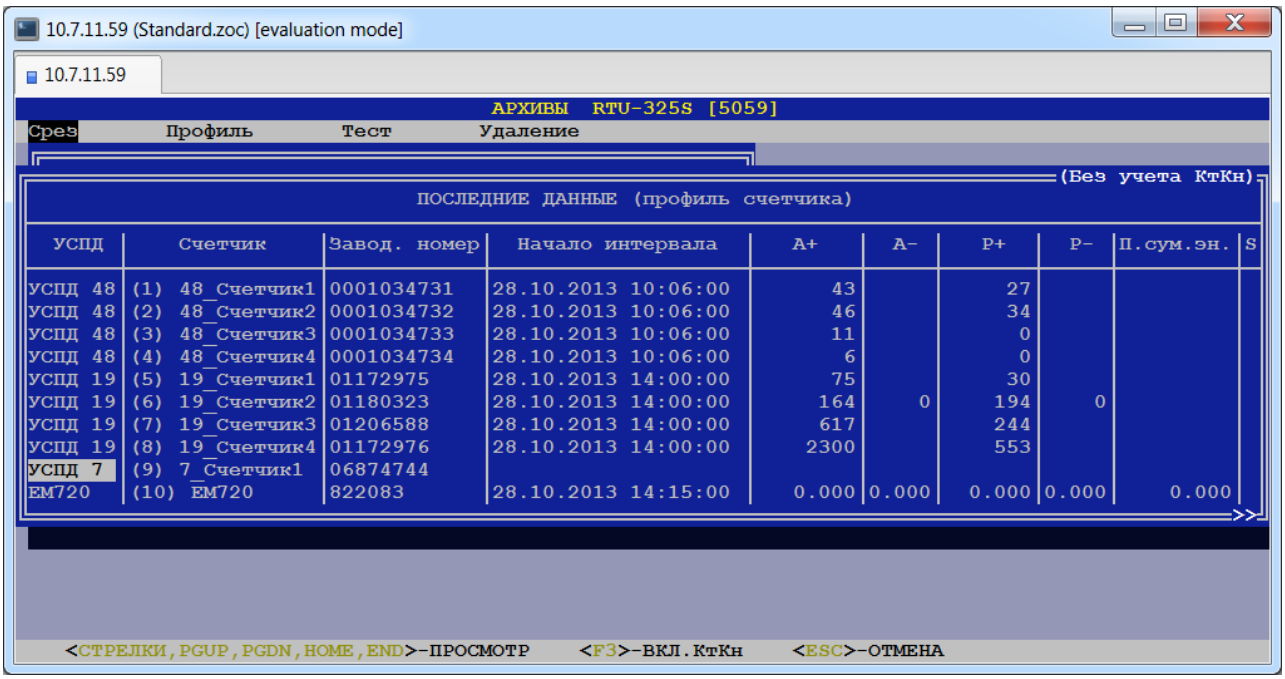


4.3.1.1. Electric metering, heat metering, metering.

Viewing data for the types of objects that account for 'All metering', 'Electric meters', 'Telemeters' and 'Earmarks' are similar. After selecting the required object, the user in the open menu must select the type of data to view. The following example is given of a data view for an object called 'Electrical Cells'. Navigation keys are needed to move on the tables (see below screen clue).

- **The meter profile.**

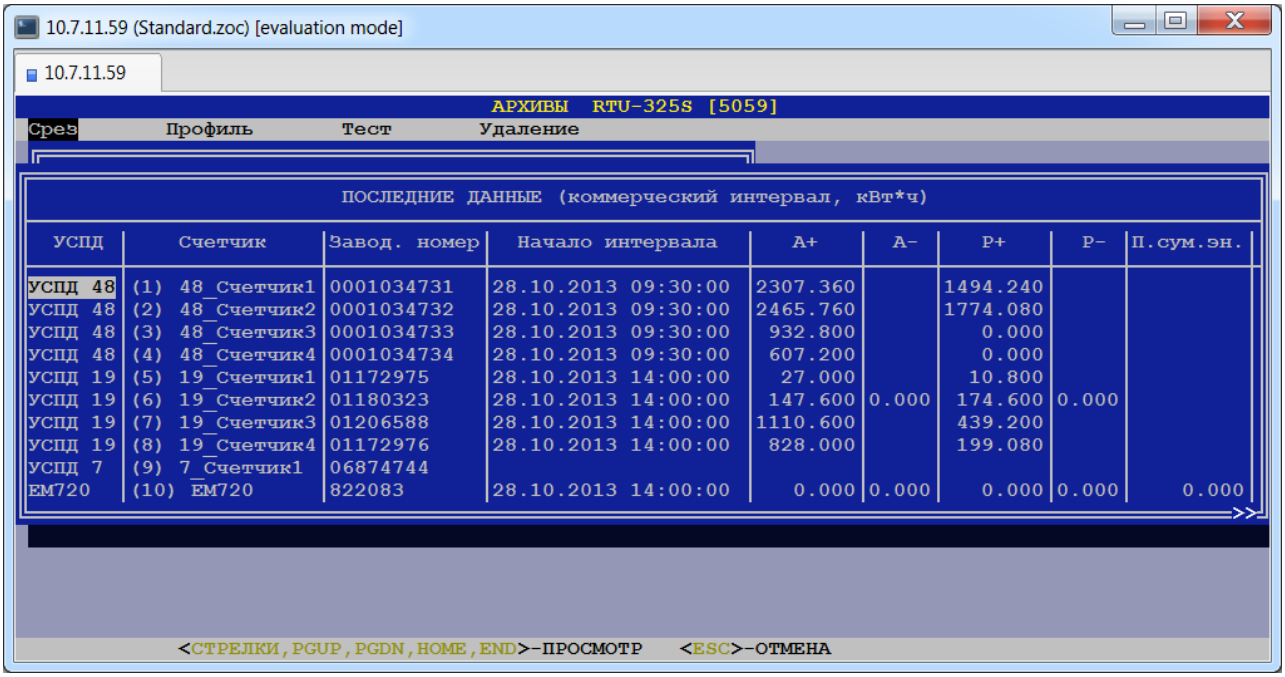
When selecting this menu item, the user will be provided with the following data table:



When loaded, the table contains values without taking into account the factors Kt and KN. The key <F3> must be pressed to view the KtKn data.

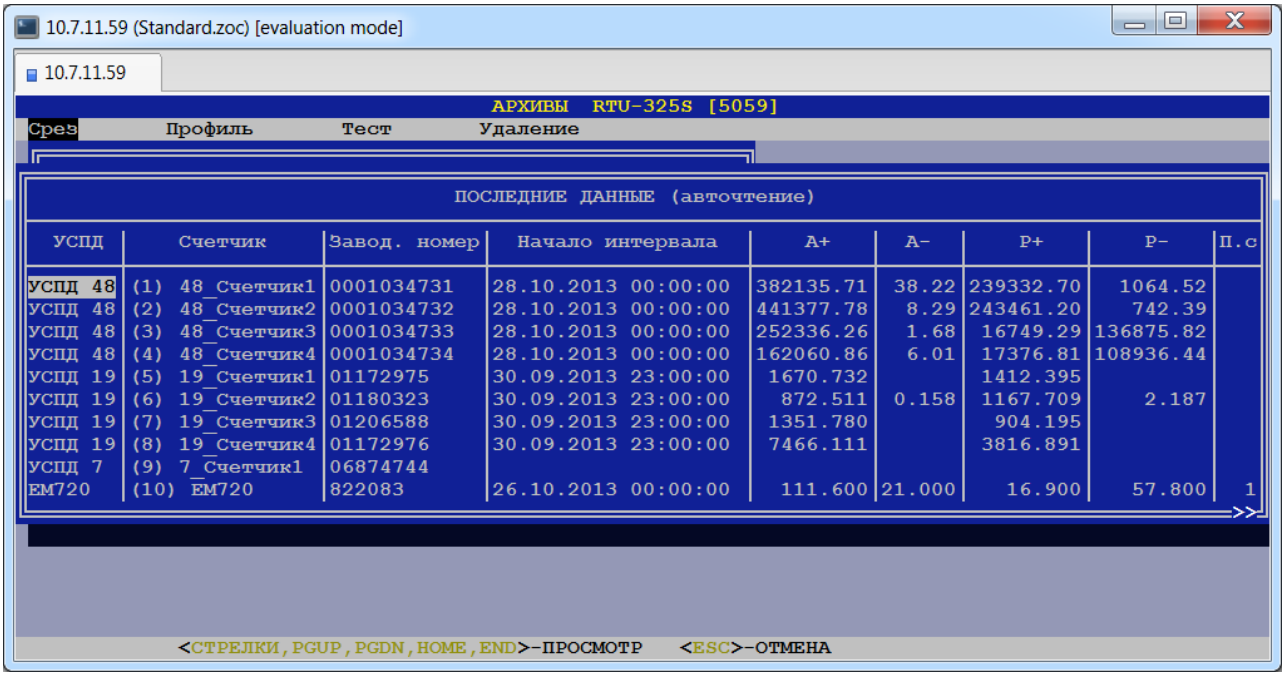
- **Commercial interval.**

When selecting this menu item, the user will be provided with the following data table:



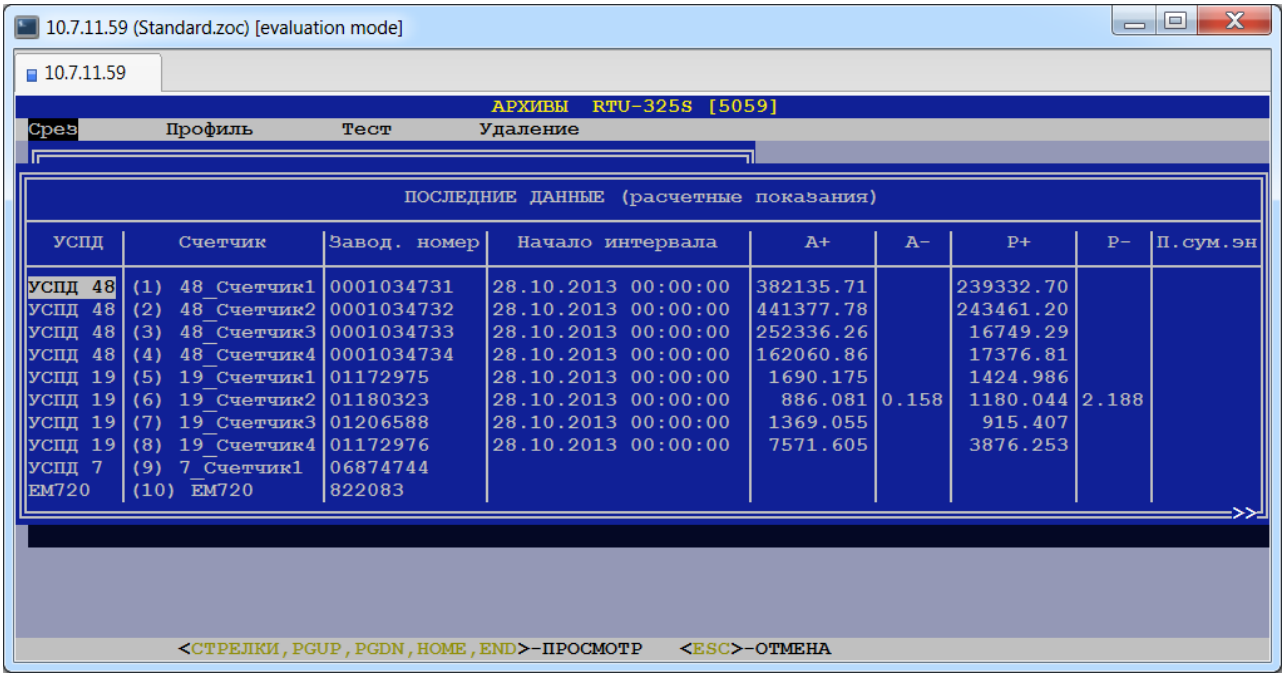
- **Autoreading.**

When selecting this menu item, the user will be provided with the following data table:



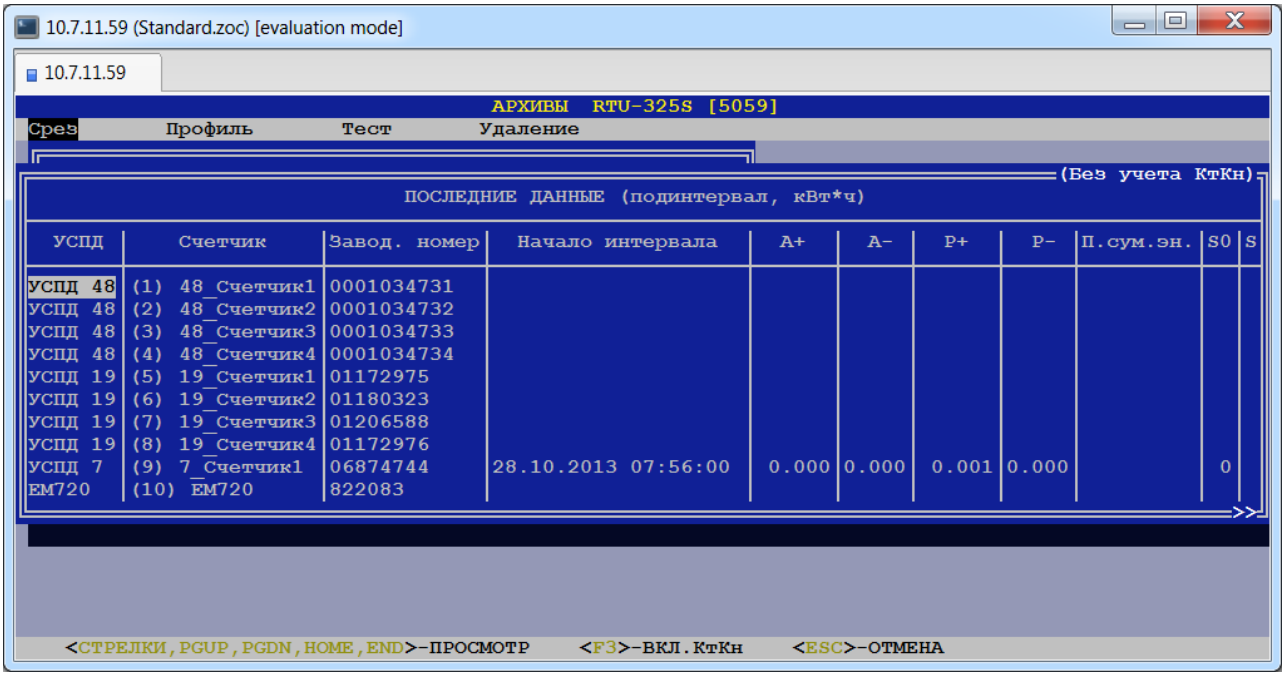
- **Earnings.**

When selecting this menu item, the user will be provided with the following data table:



- **The sub-interval.**

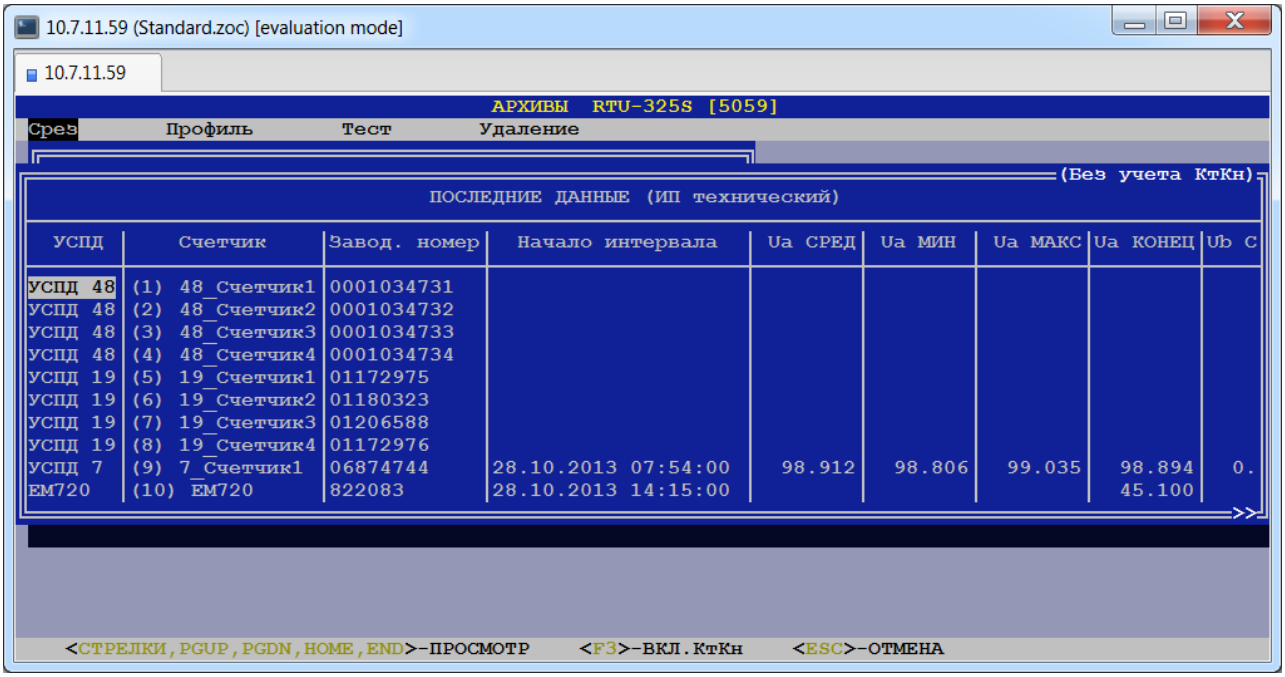
When selecting this menu item, the user will be provided with the following data table:



When loaded, the table contains values without taking into account the factors Kt and KN. The key <F3> must be pressed to view Kt and Kn.

- **Technical.**

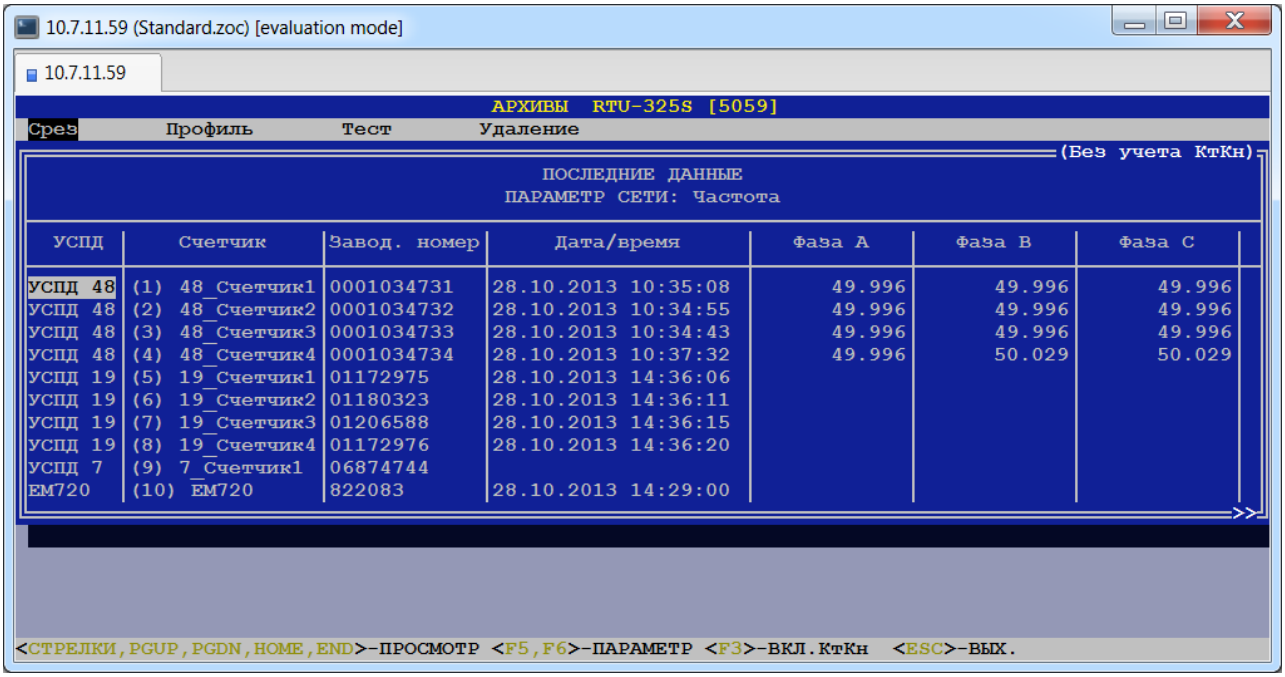
When selecting this menu item, the user will be provided with the following data table:



When loaded, the table contains values without taking into account the factors Kt and KN. The key <F3> must be pressed to view Kt and Kn.

- **Network parameters.**

When selecting this menu item, the user will be provided with the following data table:

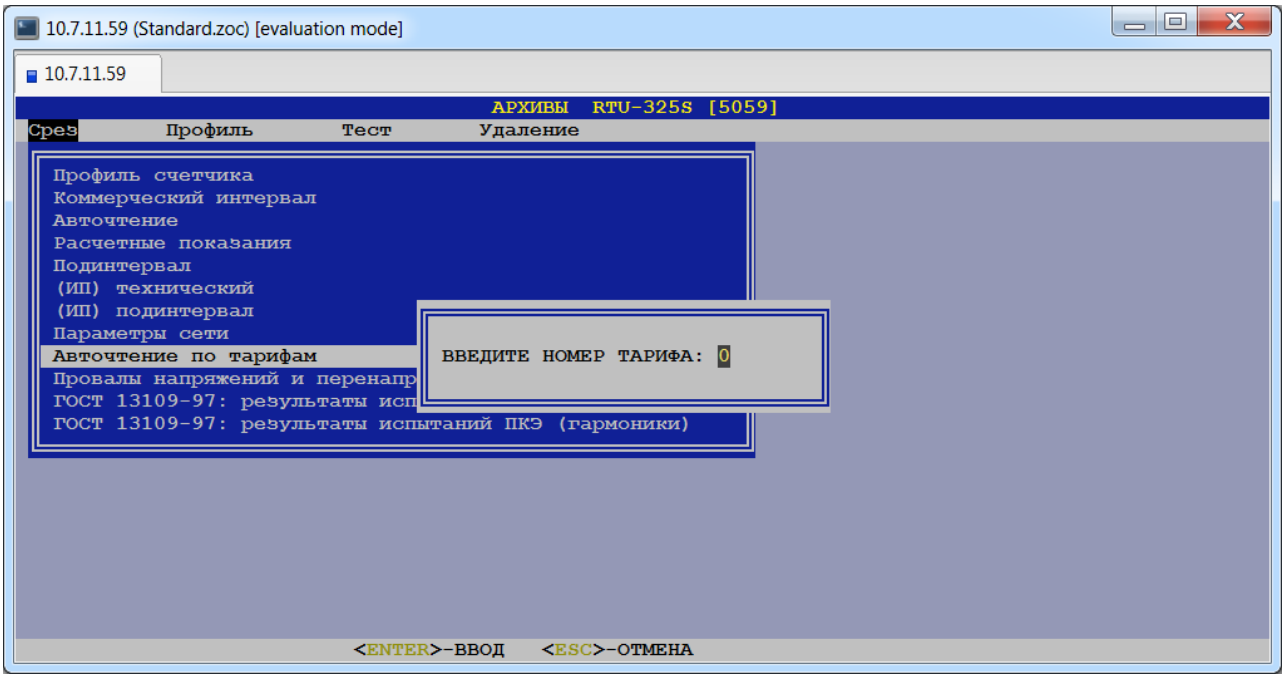


When loaded, the table contains values without taking into account the factors Kt and KN. The key <F3> must be pressed to view Kt and Kn.

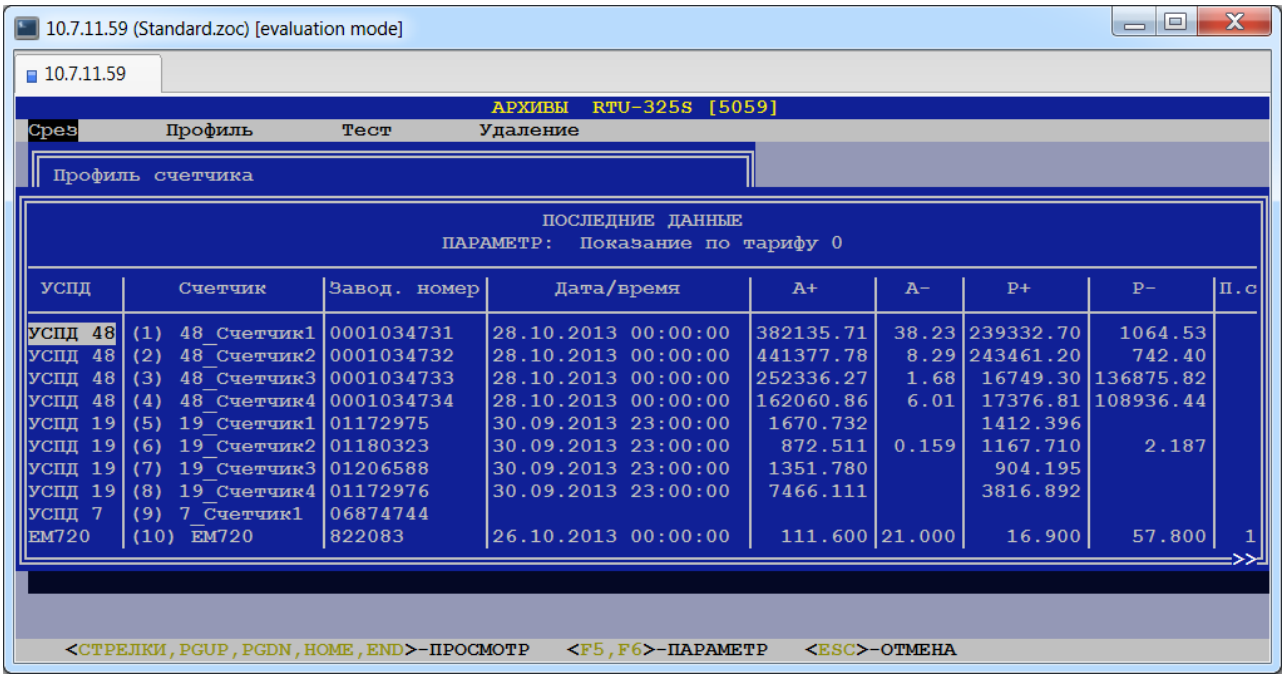
The table shows data for any one network parameter. To view the data for other parameters, the keys <F5> (reverse) and <F6> (forward) must be pressed.

- **Auto-reading on tariffs.**

When selecting this item, the user will be asked to enter the tariff number:



The following data table is provided after the tariff number is entered:

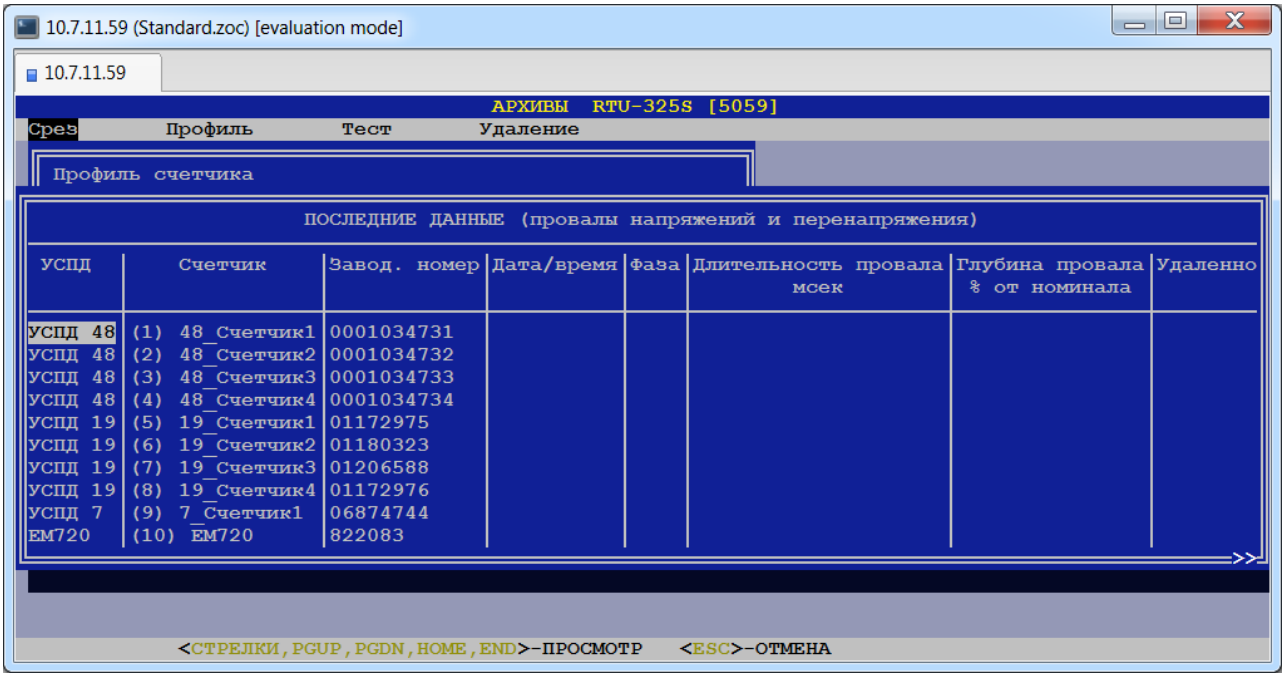


When loaded, the table contains the value of the given tariff. The user can look at the following data:

- tariff indication - maximum tariff power - maximum tariff time - cumulative maximum tariff - maximum tariff combined. To view data for all parameters, the keys <F5> (reverse) and <F6> (forward) must be pressed.

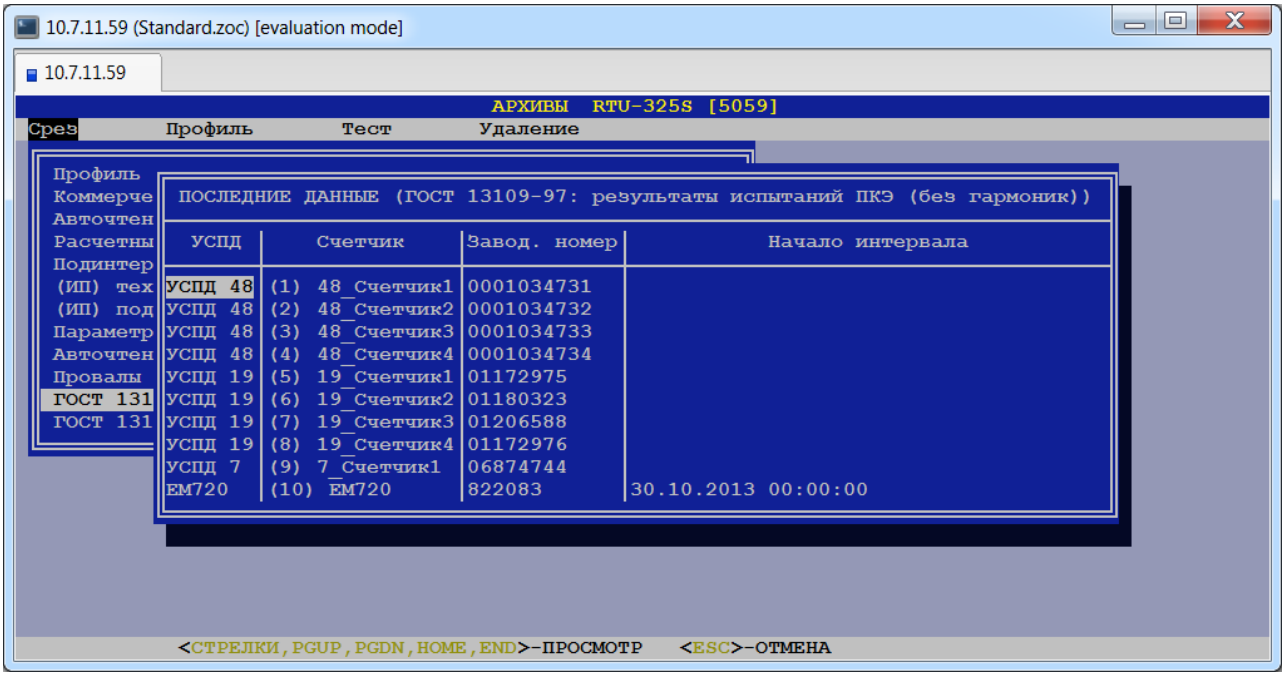
- **Frustrations of tension and tension.**

When selecting this menu item, the user will be provided with the following data table:



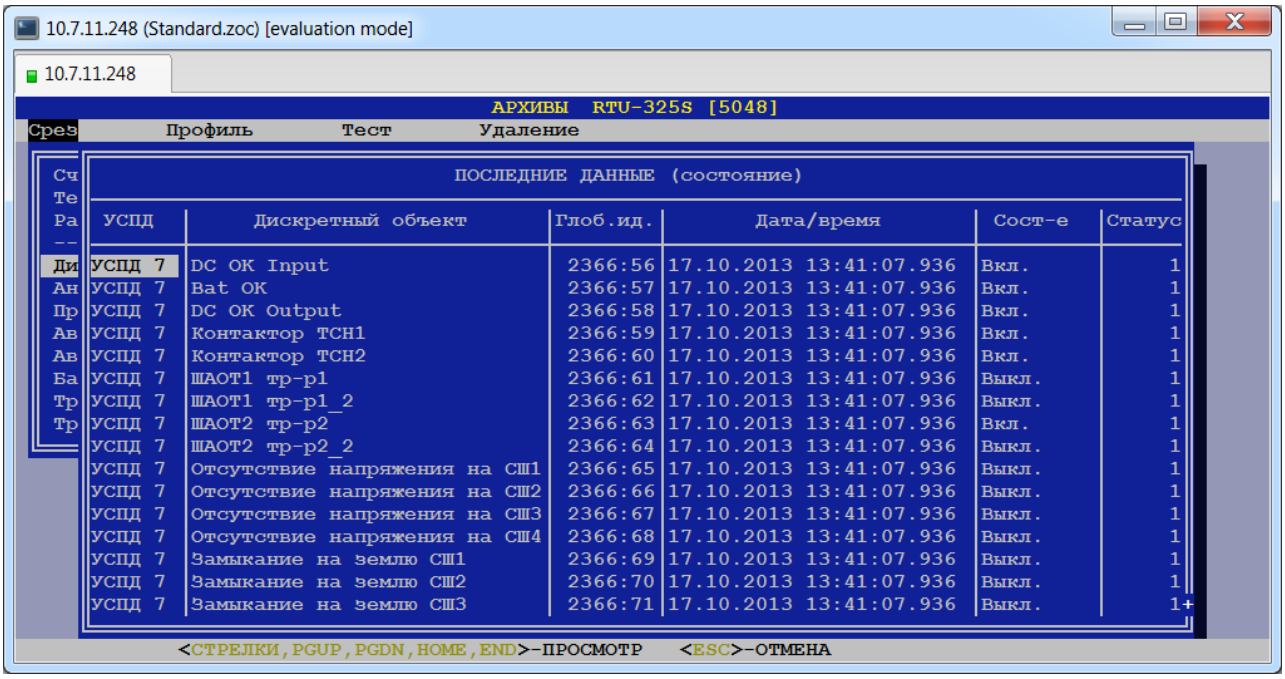
- **GOST 13109-97: Test results of SCE.**

When selecting this menu item, the user will be provided with the following data table:



4.3.1.2. Discrete objects.

After selecting the type of object to account for `Discrete objects', the following table will be presented to the user:



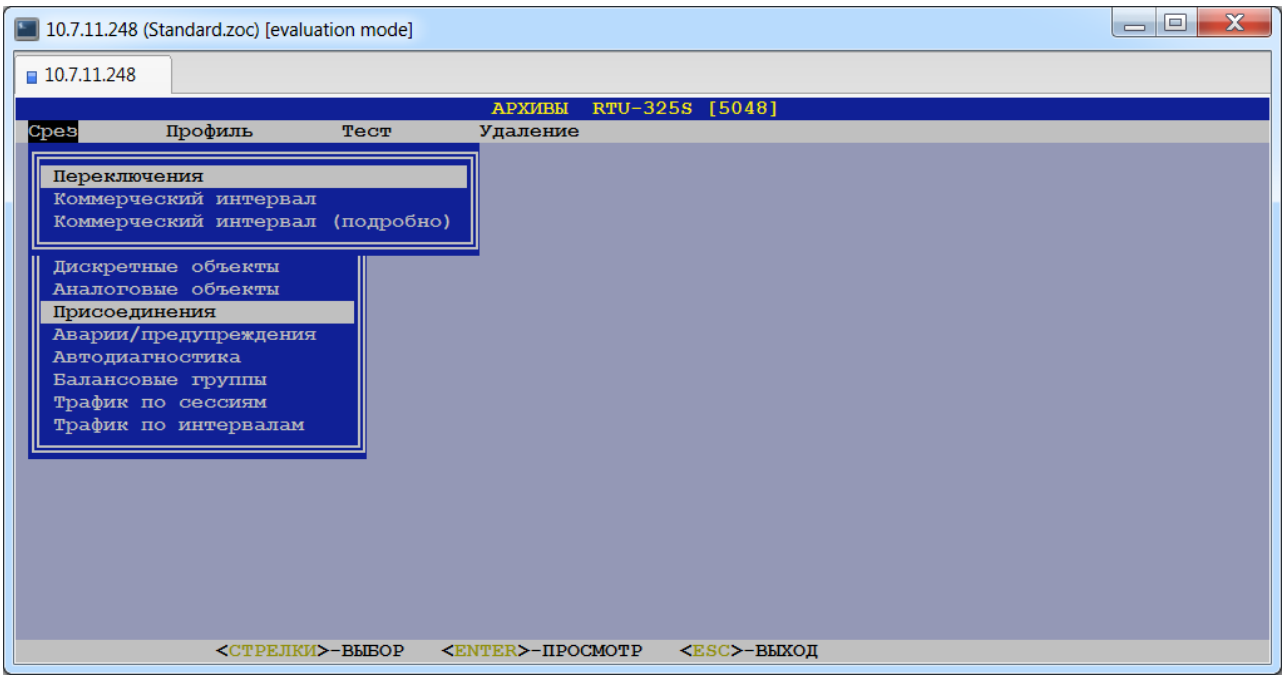
4.3.1.3. Analog objects.

Once the type of object is selected, the user will be provided with a table.

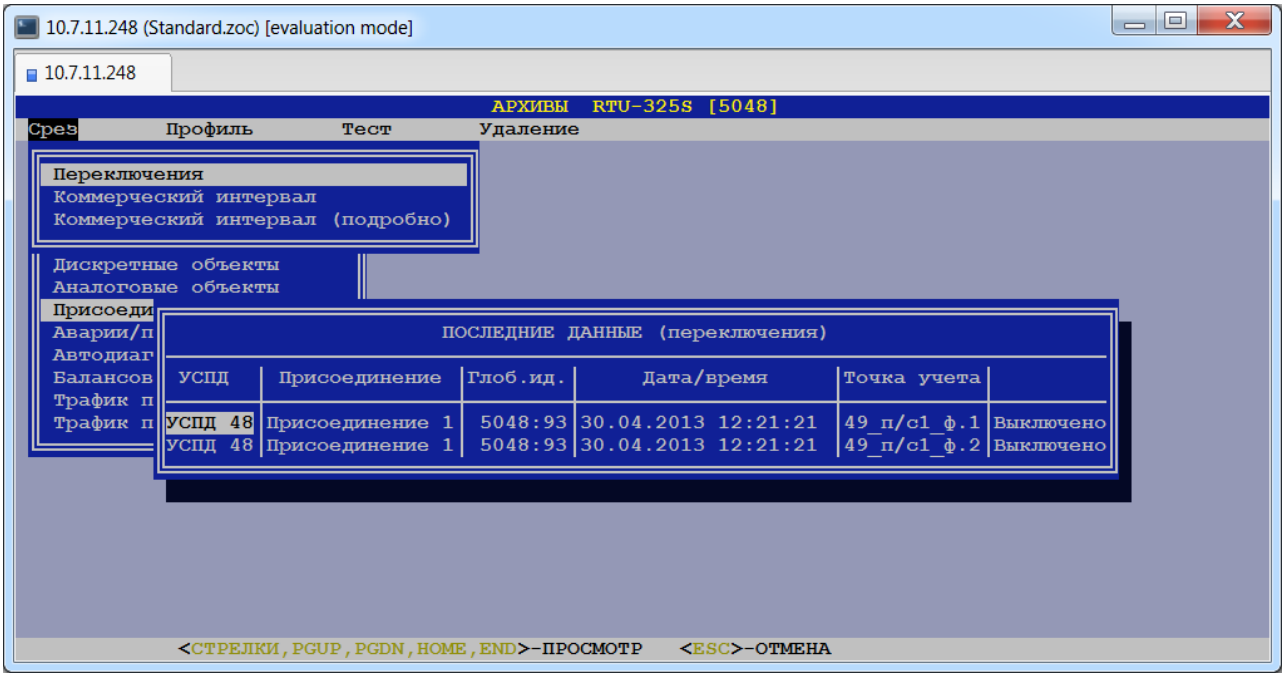
4.3.1.4. Accessions.

For this type of object, the user may look at the following types of data:

1. Switches
2. Business interval
3. Commercial interval (detailed)

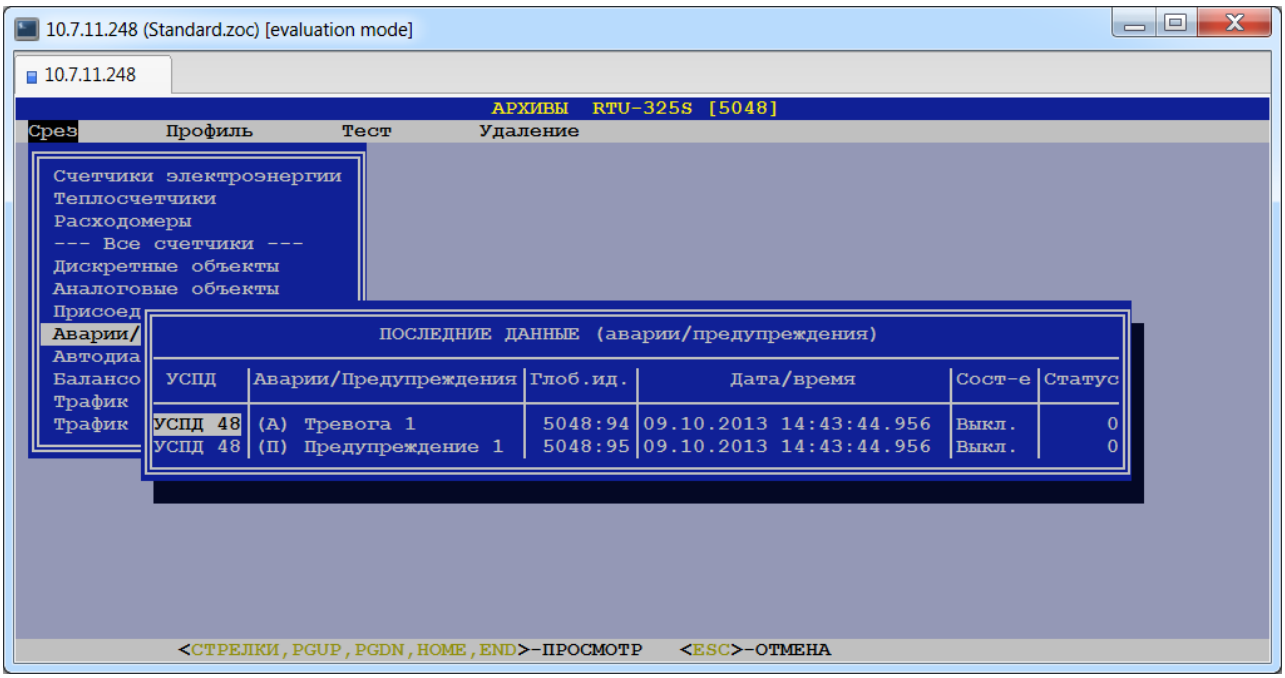


The following table will be made available to the user after selecting the type of data:



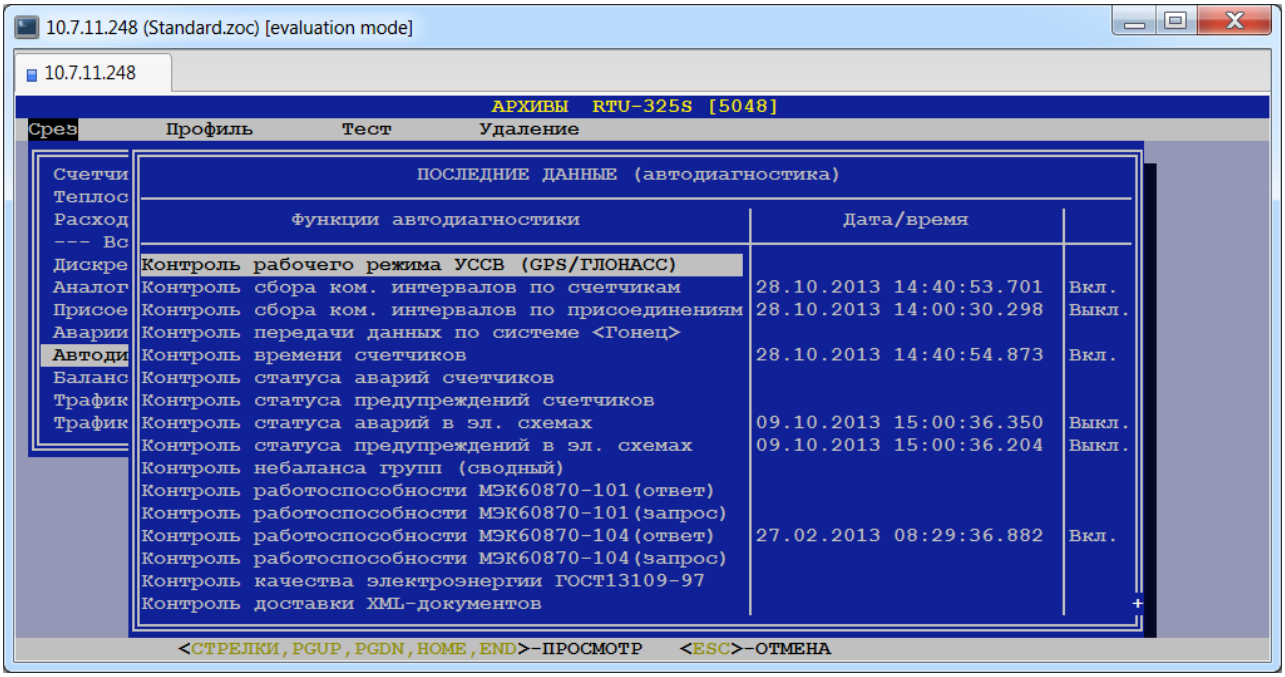
4.3.1.5. Accidents/warnings.

Once this paragraph is selected, the user will be provided with the following table:



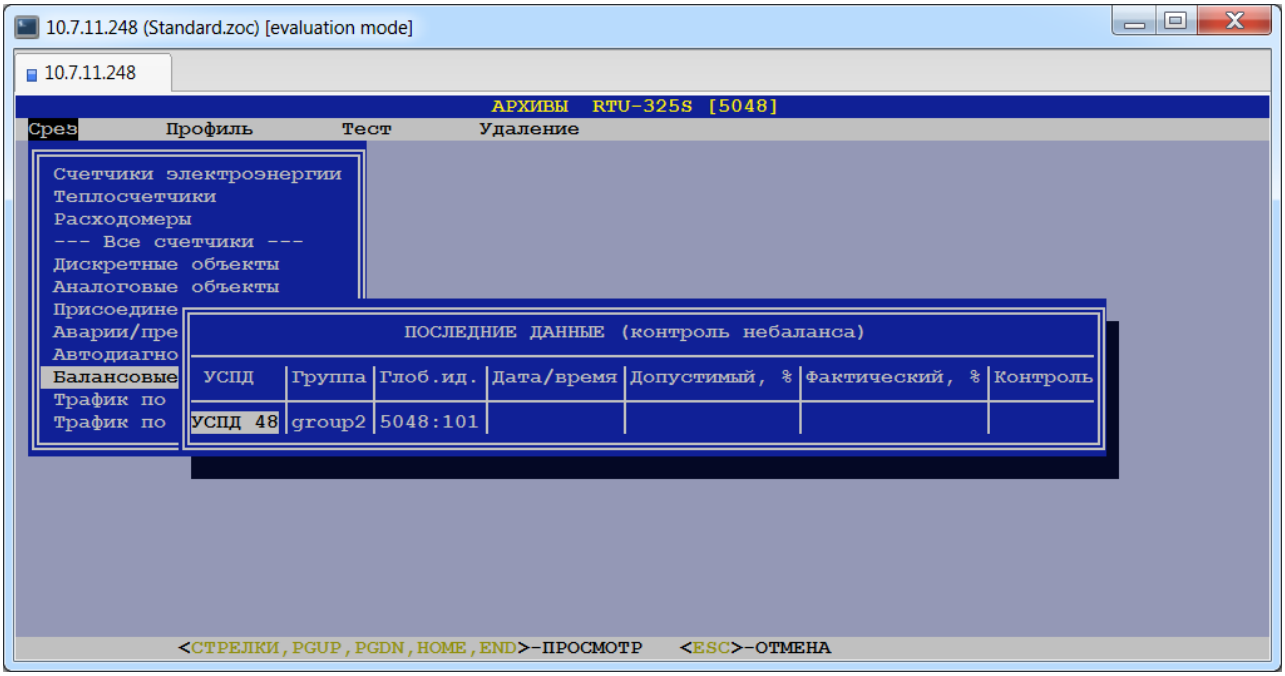
4.3.1.6. Auto-diagnosis.

Once this paragraph is selected, the user will be provided with the following table:



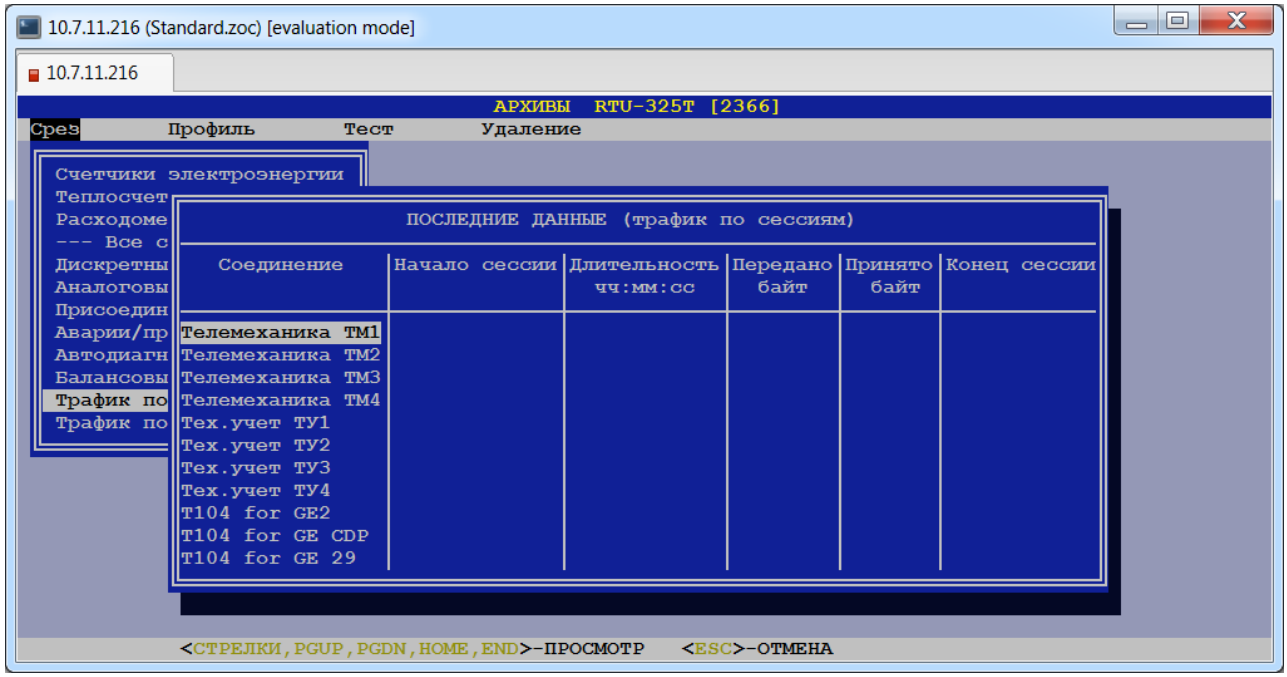
4.3.1.7. Balance sheets.

Once this type of object has been selected, the user will be provided with the following table:



4.3.1.8. Traffic by session.

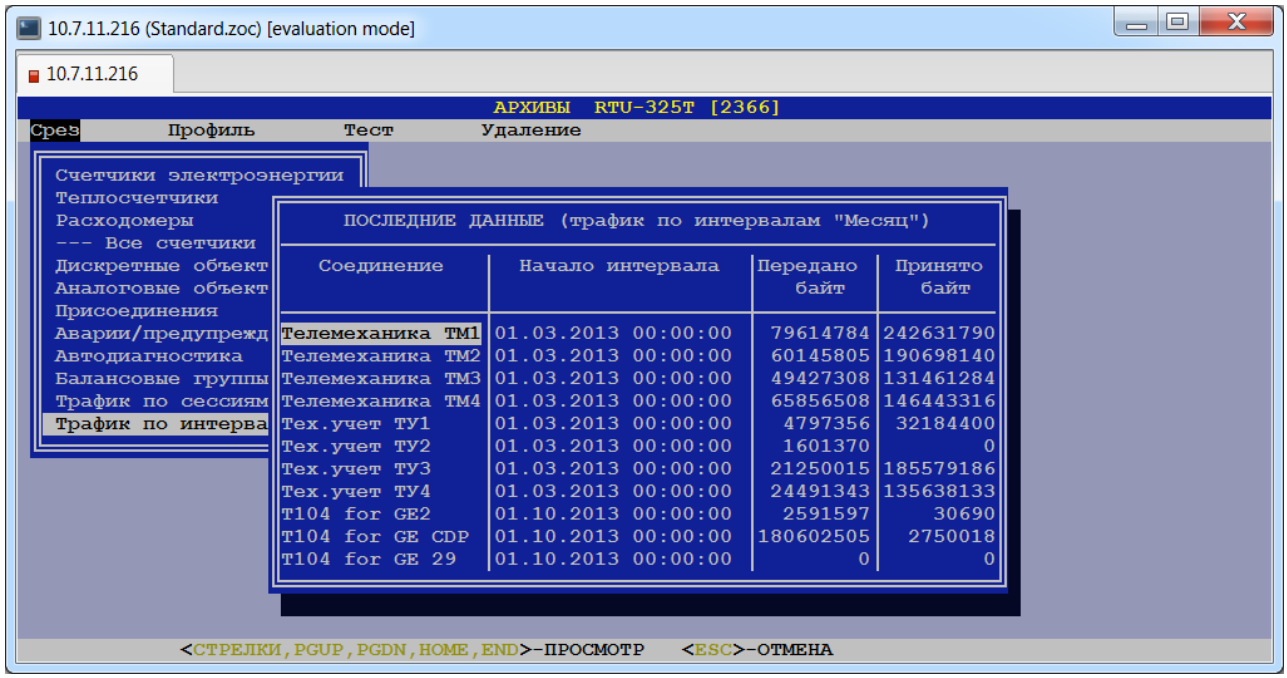
Once this paragraph is selected, the user will be provided with the following table:



This paragraph shows data traffic information for connections where traffic records are assigned in connection parameters.

4.3.1.9. Traffic by interval.

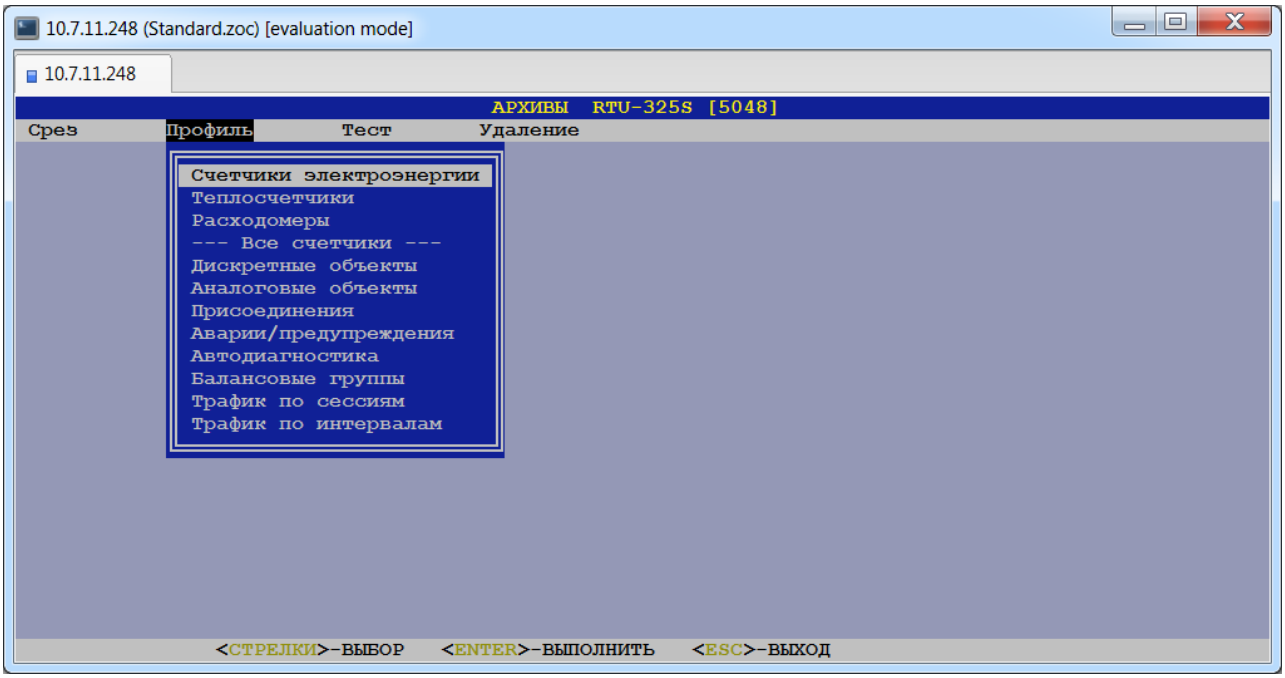
After selecting this paragraph and selecting the interval, the user will be provided with the following table:



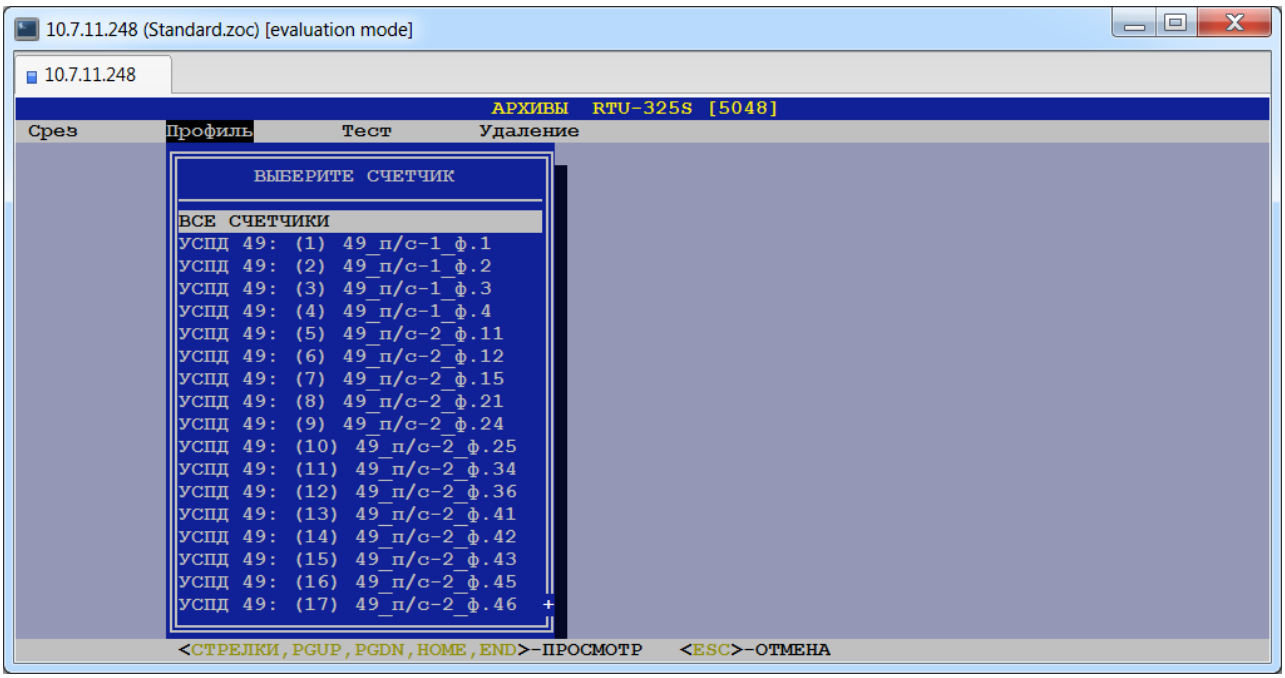
This paragraph shows data traffic information for connections that have traffic accounting in connection parameters and "Настройки" «Конфигуратор» data traffic recording for any interval.

4.3.2. The «Профиль» menu item.

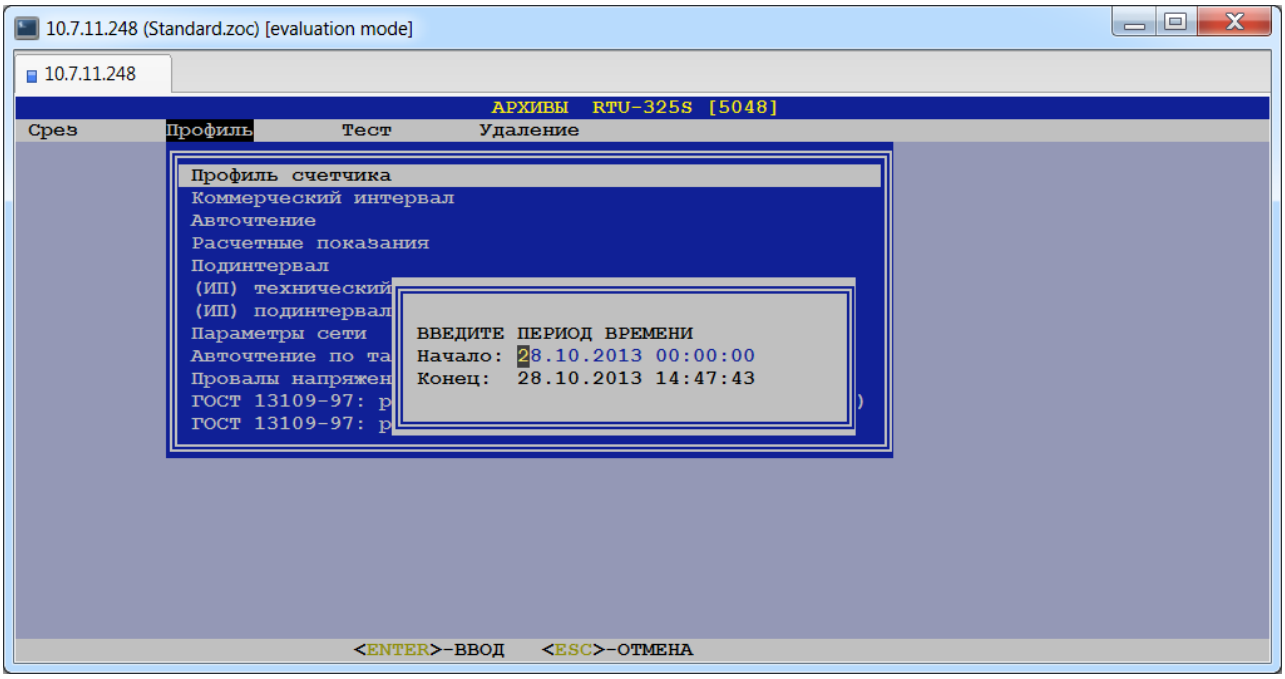
In this paragraph, the user must select the type of objects to account for in the open menu:



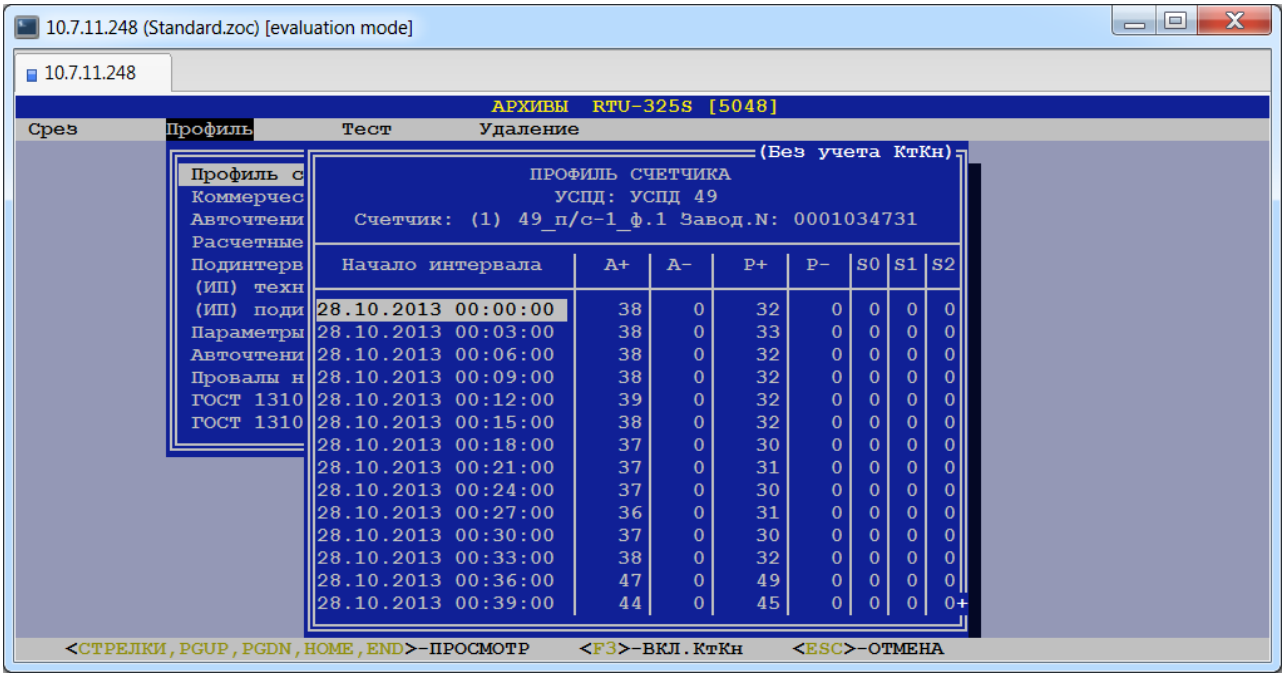
Once the type of account item is selected, the user must select the account object from the list submitted:



After selecting an object, the user must select the type of data to view and, in the open window, set the time period:



The user will then be provided with a data table:

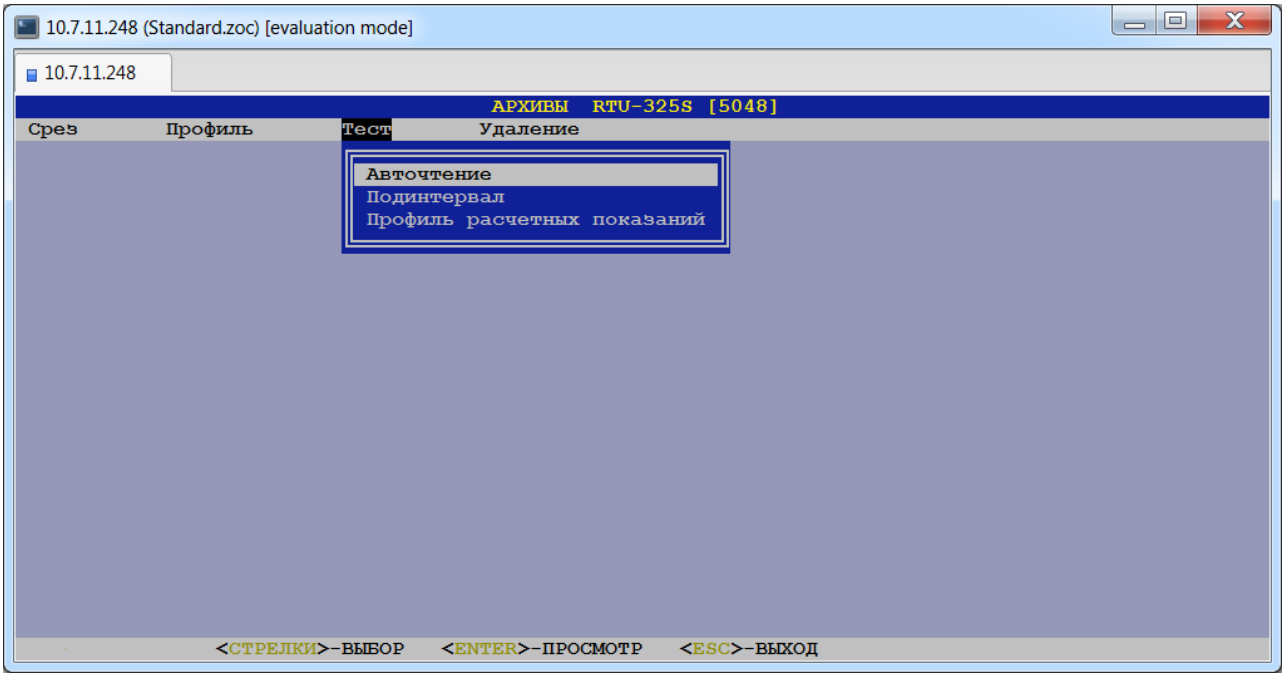


Similarly, the user can look at tables of values for other data types.

4.3.3. The «Тест» menu item.

In this paragraph, the user must select the account object from the drop-out menu: In this paragraph the user can check the readable and stored in the RTU archives:

- The auto-reading and meter profiles for the selected period,
- Sub-intervals and commercial intervals for the day selected,
- the calculated-reading profile and meter profile for the selected period.



The auto-reading and meter profiles for the selected period shall be checked using the following algorithm:

1. The upper end of the selected period shall be calculated by autoreading according to the formula:

upper count self-reading = lower auto-reading + meter profile flow rate.

2. Comparison of the upper self-reading and upper auto-reading, read from the meter, and calculation of the absolute deviation and deviation in percentage terms.

The sub-intervals and commercial intervals for the day selected shall be checked using the following algorithm:

1. The amount of commercial intervals per day is calculated.
2. The amount of sub-intervals per day is calculated.
3. The calculated amounts are compared and the absolute deviation and percentage deviation are calculated.

• the calculated-reading profile and meter profile for the selected period.

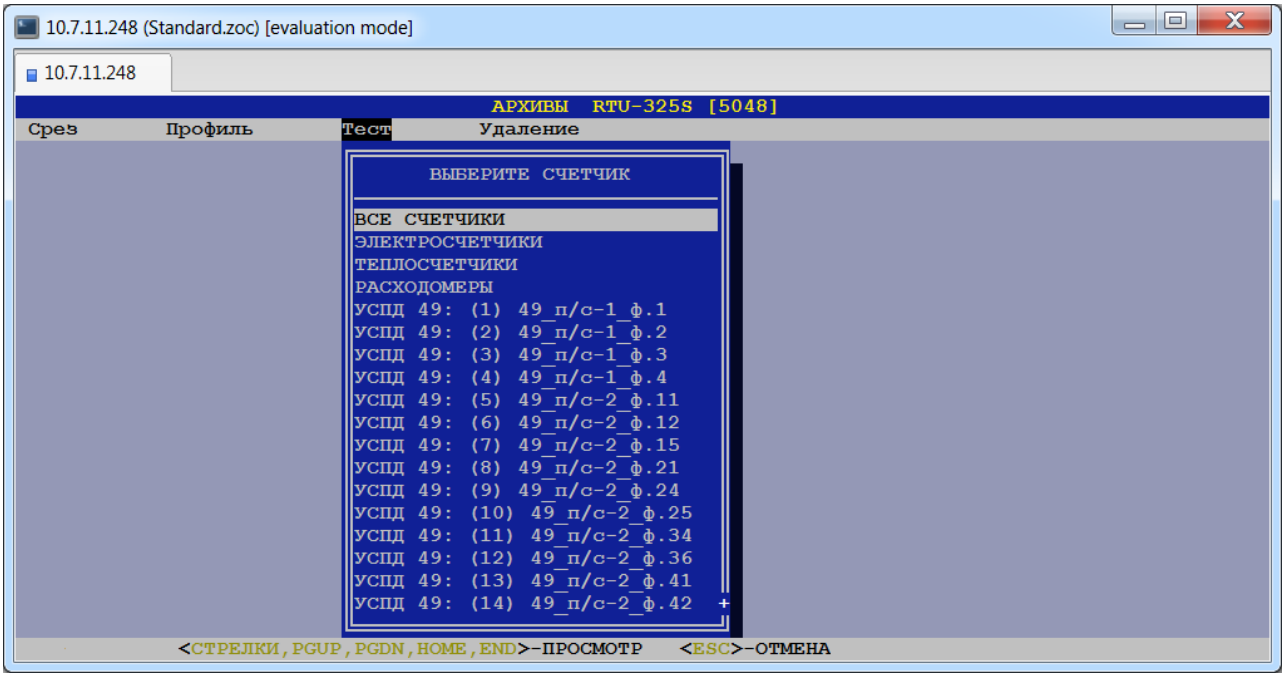
1. Calculate the upper part of the selected period using the formula:
   upper calculated value = lower value + meter profile flow rate
2. The upper calculated reading and the upper output of the meter calculation profile are compared, and the absolute deviation and the percentage deviation are calculated.

If the calculated deviations are 0, the test data are correct.

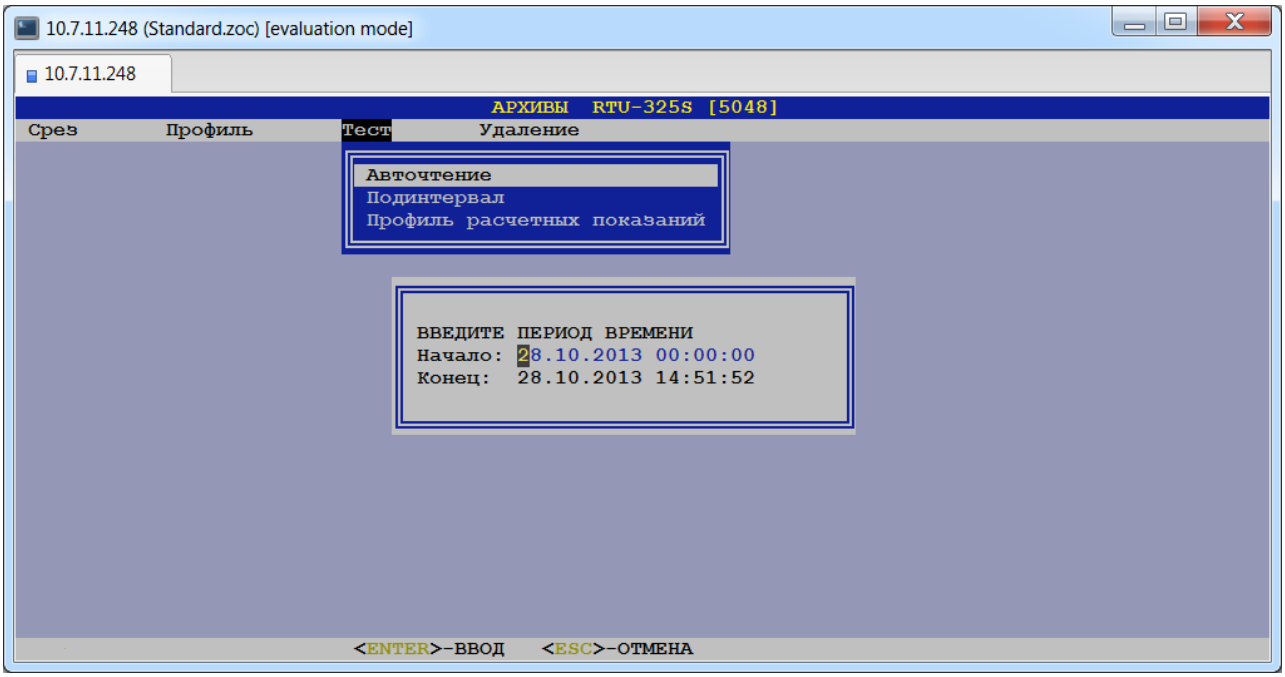
For electric energy meters, the test shall be carried out according to the following types of energy:

- Actively consumed,
- Active output,
- Reactive consumed,
- Jet release,
- Quadrant energy.

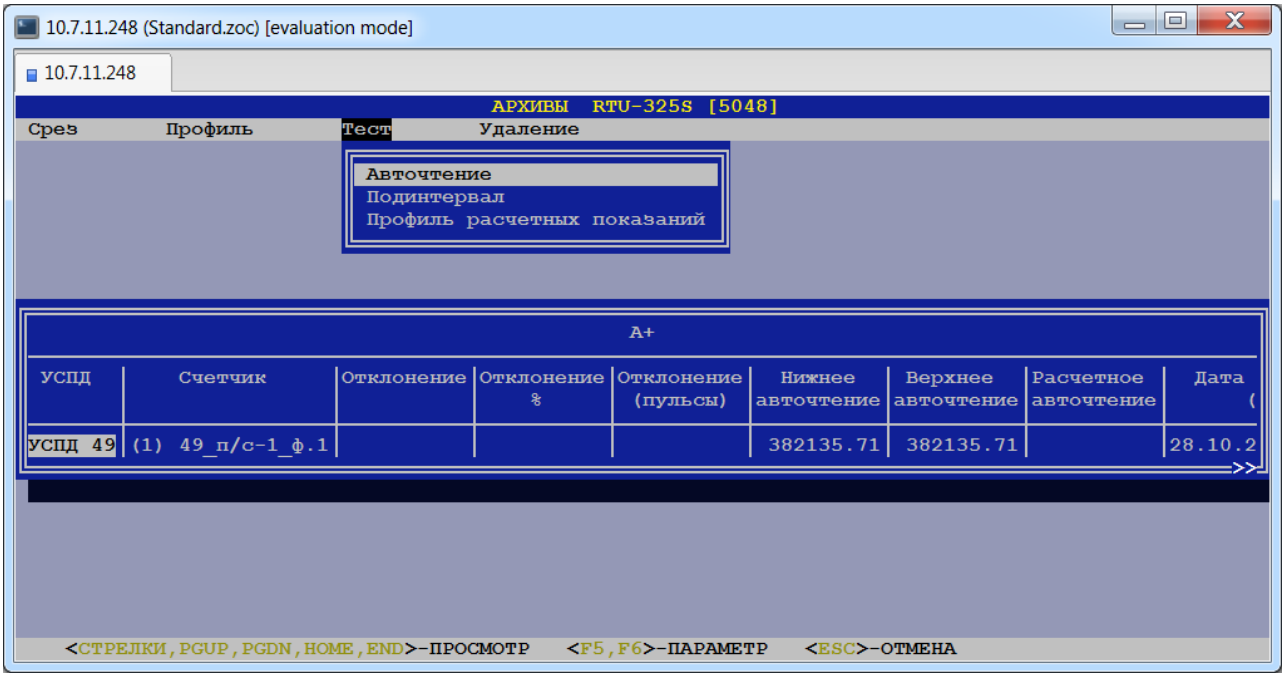
Once the type of test is selected, the user will be asked to select the object of the account:



and set the time period:



As a result, the following table will be made available to the user:



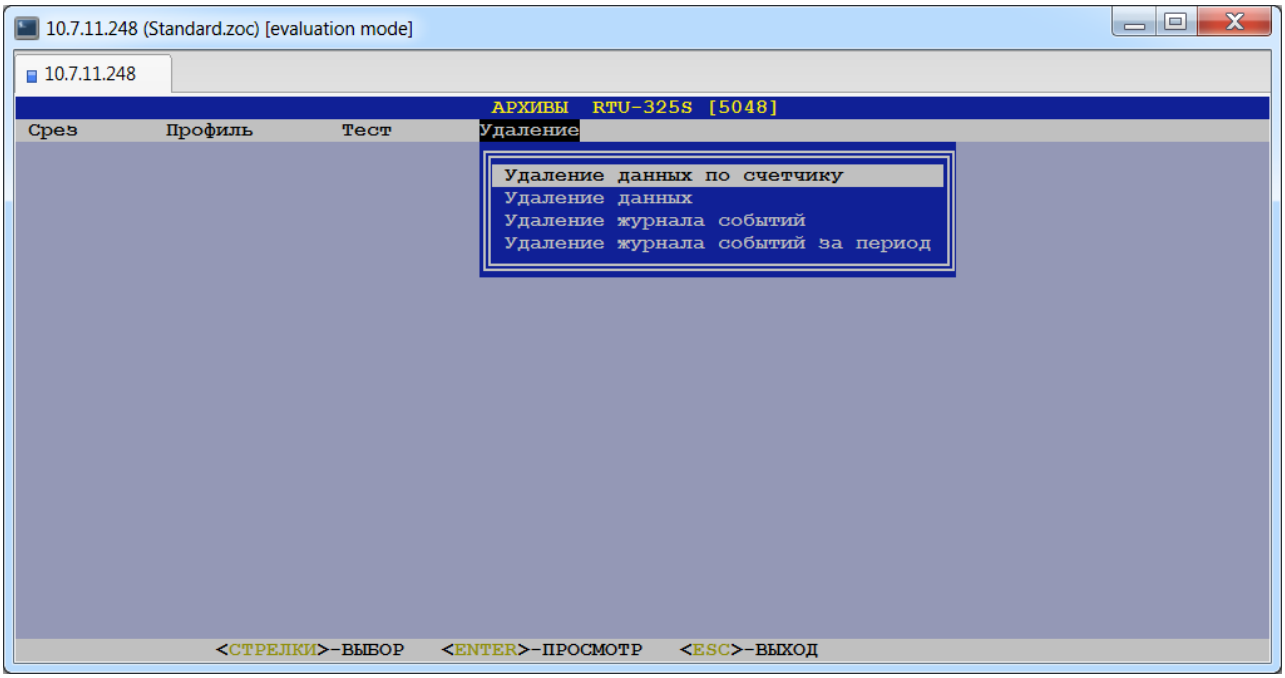
The keys <F5> and <F6> must be pressed to view data for different types of energy.

4.3.4. The «Удаление» menu item.

In this paragraph, the user may:

- Delete the data for the individual meter,
- Delete all data,
- Remove all data from the event log,
- Delete the data from the event log for the selected period.

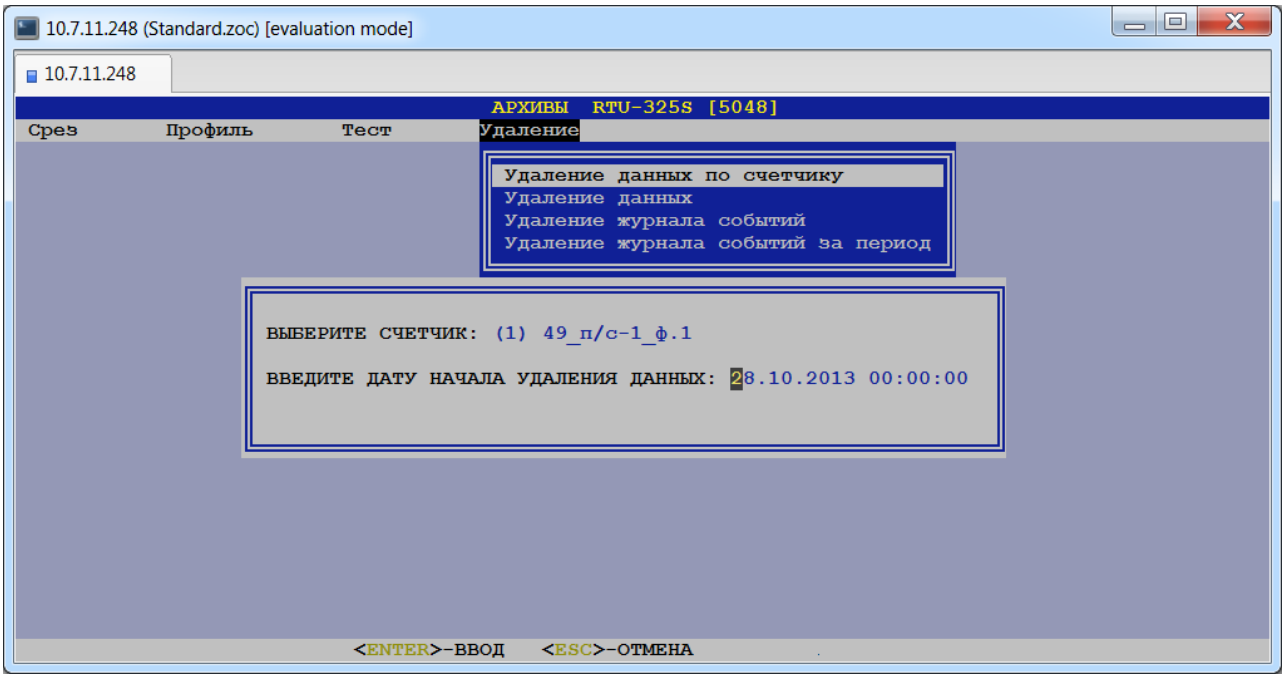
Once selected, the user will be provided with the following menu to select the type of data to be removed:



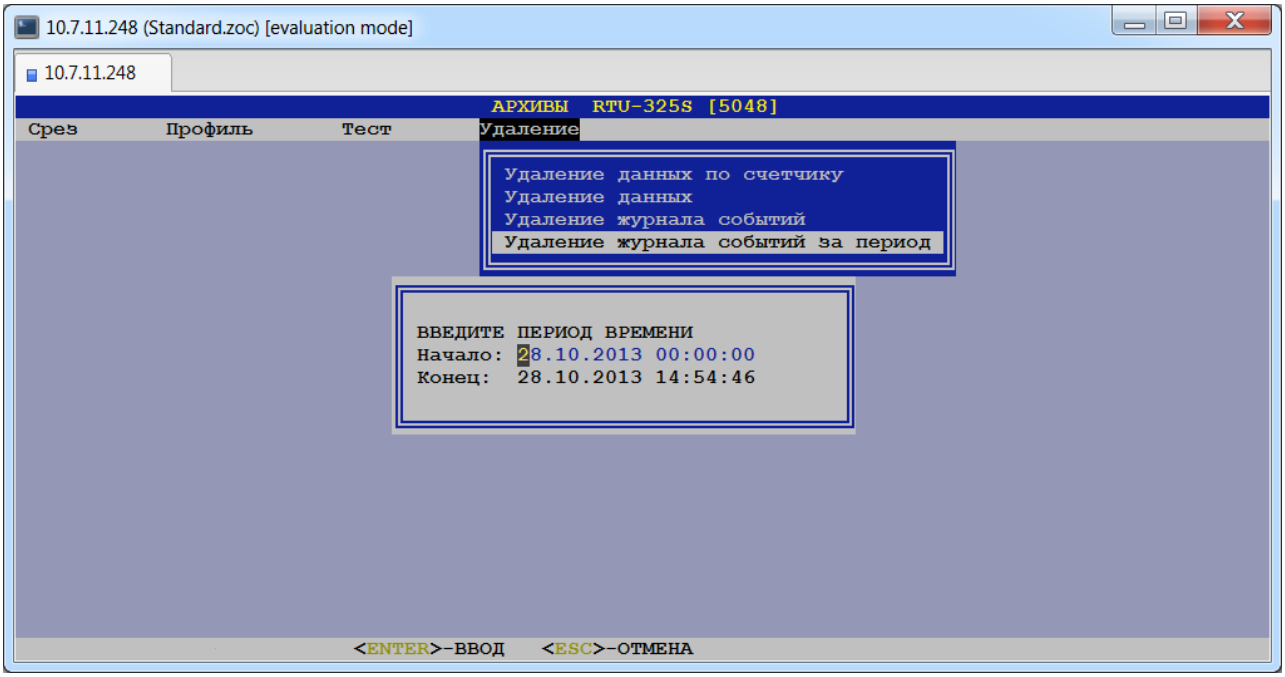
At the first two points, the user can remove the following data from the RTU archives:

- Checker profiles
- Commercial interval profiles
- Sub-interval profiles
- Data archives
- Event log
- Autoreading
- Network parameters.

When selecting paragraph «Удаление данных по счётчику», the user shall select the meter, press the key <Induction> and set the date when the data will begin to be removed:



When selecting paragraph «Удаление журнала событий за период», the user shall set the time period for data removal:



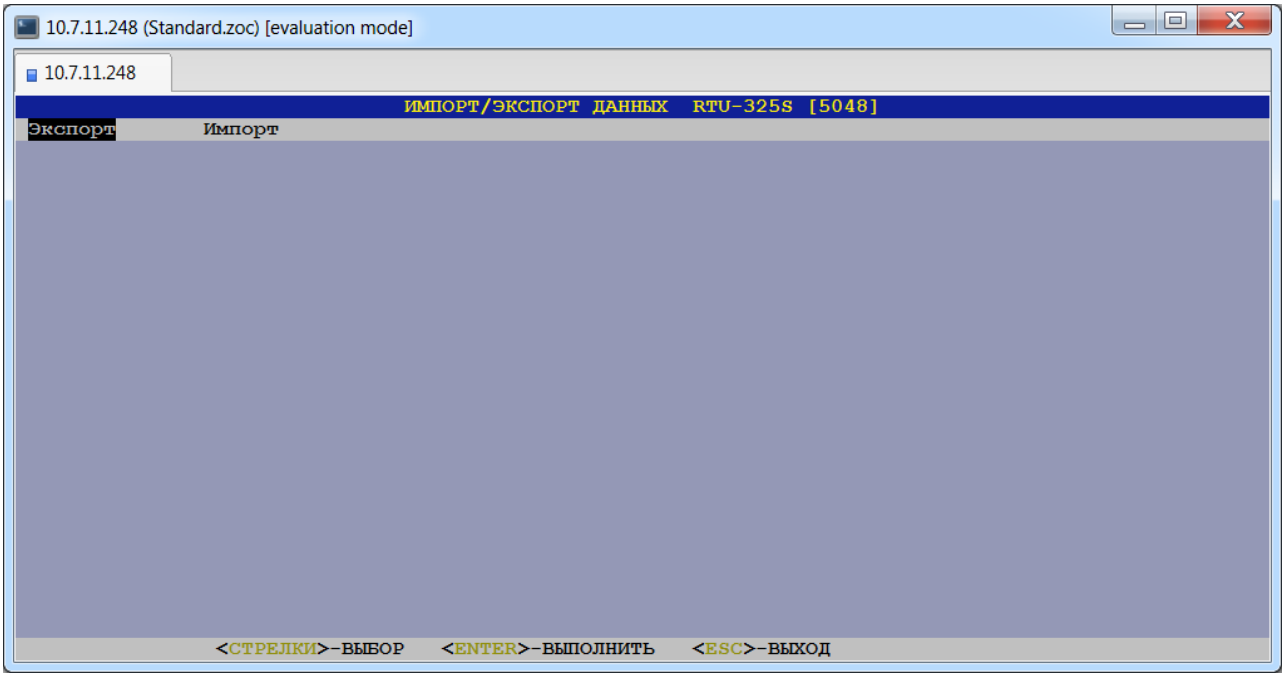
Once the required parameters (if required) have been set, the user must press the <Induction> key to confirm the removal of the data or <Esc> to cancel the transaction. Once the data removal operation is complete, RTU will be rebooted.

4.4. Data imports/exports.

The «Импорт/экспорт данных» programme is accessible to users at the level of the system manager and is designed to perform the following functions:

- Export of RTU operating configuration;
- Export a complete copy of the archives (data work configuration);
- The configuration seal;
- The tele-mechanical configuration seal;
- Export of telecontrol configuration for SCADA "ГРАФэнерго-325" ;
- Import the initial configuration of RTU;
- Import the RTU operating configuration;
- development of XML 800x0 documents

The following menu will be presented to the user at the start of the application:



The RTU export procedure uses the following routes for export:

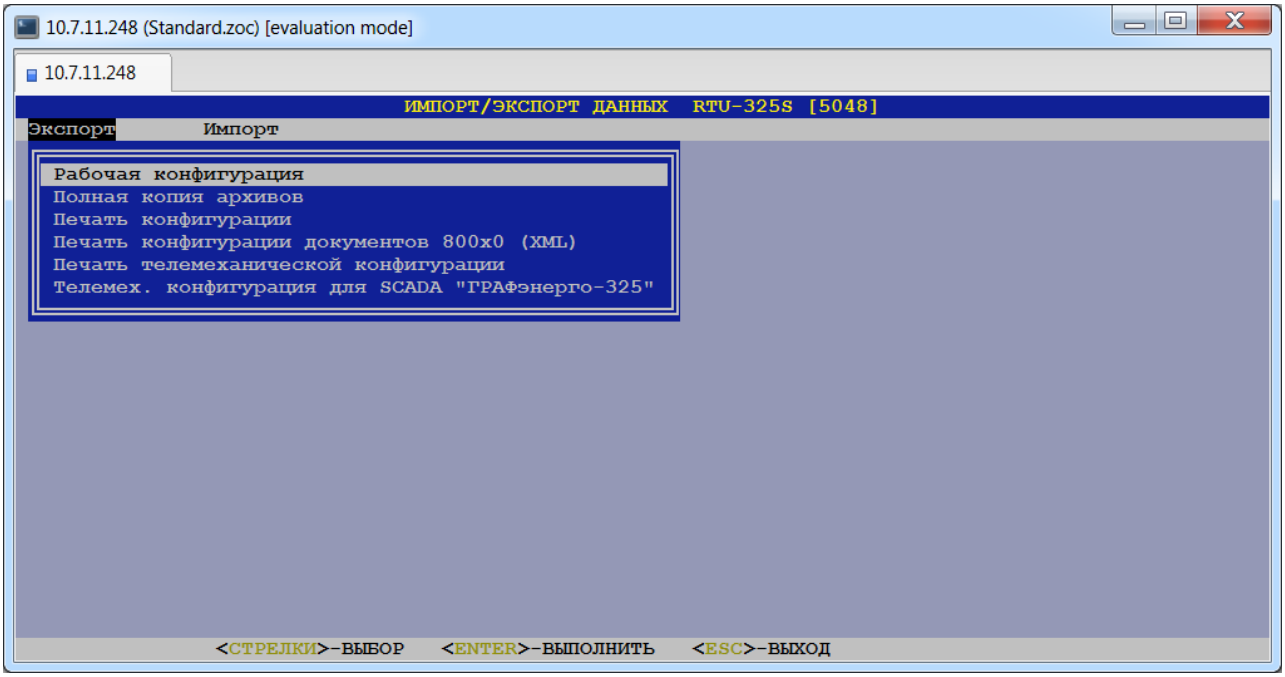
- **FTP: /update/.**
  This route implies that the export files will be kept in the /update/. directory once the export procedure has been completed, the required files from the RTU directory need to be copied with the help of the FTP client programme.

- **U.S.B. Accumulated.**
  This route assumes that export files will be stored on the USB storage device in section FAT32 or FAT16. Before choosing this route, it is necessary to verify that the USB storage device is connected to the USB-port RTU.

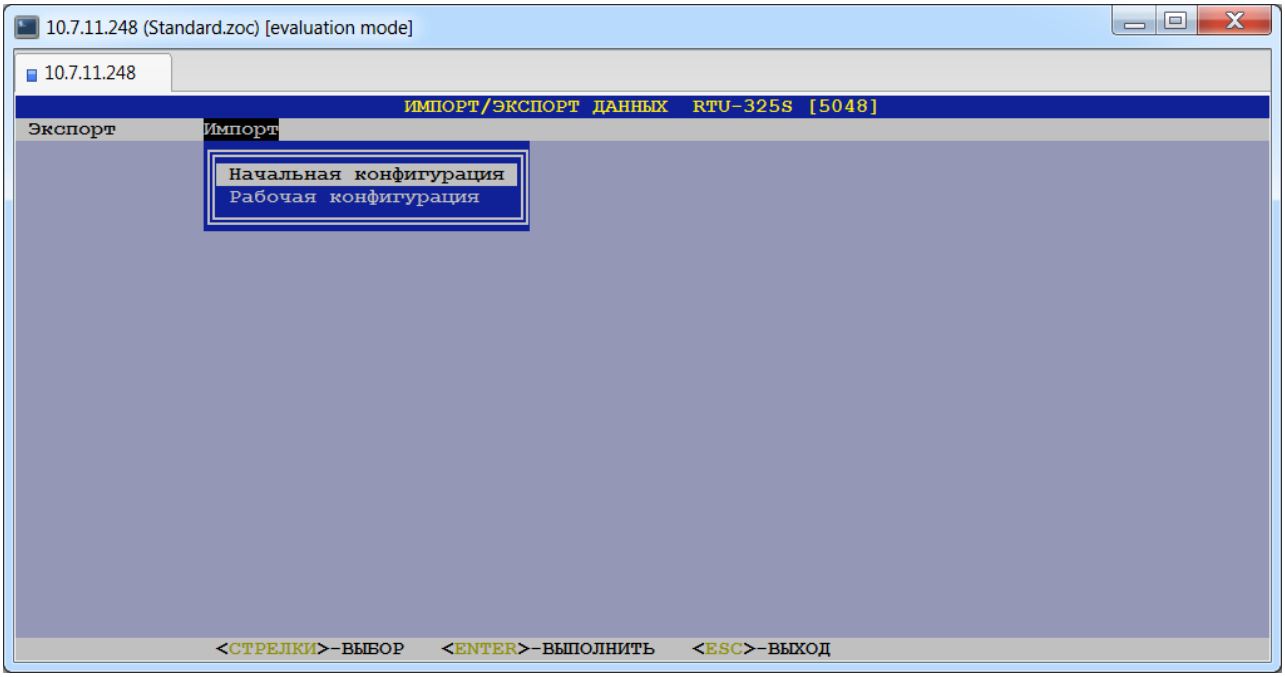
- **FTP: /GE_Import/.**
  This route implies that the SCADA "ГРАФэнерго-325" telematics export files will be kept in the directory /GE_Import/. Once the export procedure has been completed, the required files from the RTU directory need to be copied with the help of the FTP client.

The RTU import procedure uses the following routes to search for files for imports:

- **RTU.**
  This route implies that the required import file is stored in the non-volatile memory of RTU.
- **FTP: /update/.**
  This route implies that the required import files are located in the /update/. directory before choosing this route, it is necessary to copy the required update files to the RTU directory with the help of the FTP client program.
- **U.S.B. Accumulated.**
  This route implies that the import files are placed on the USB storage device in section FAT32 or FAT16. Before choosing this route, it is necessary to verify that the USB storage device is connected to the USB-port RTU.
- **Manual input.**
  This route involves the manual introduction of the required directory (full route) and should be applied only on the basis of the specific recommendations of the technical support service. In selecting the menu item «Экспорт», the following menu will be presented to the user:



In selecting the menu item «Импорт», the following menu will be presented to the user:



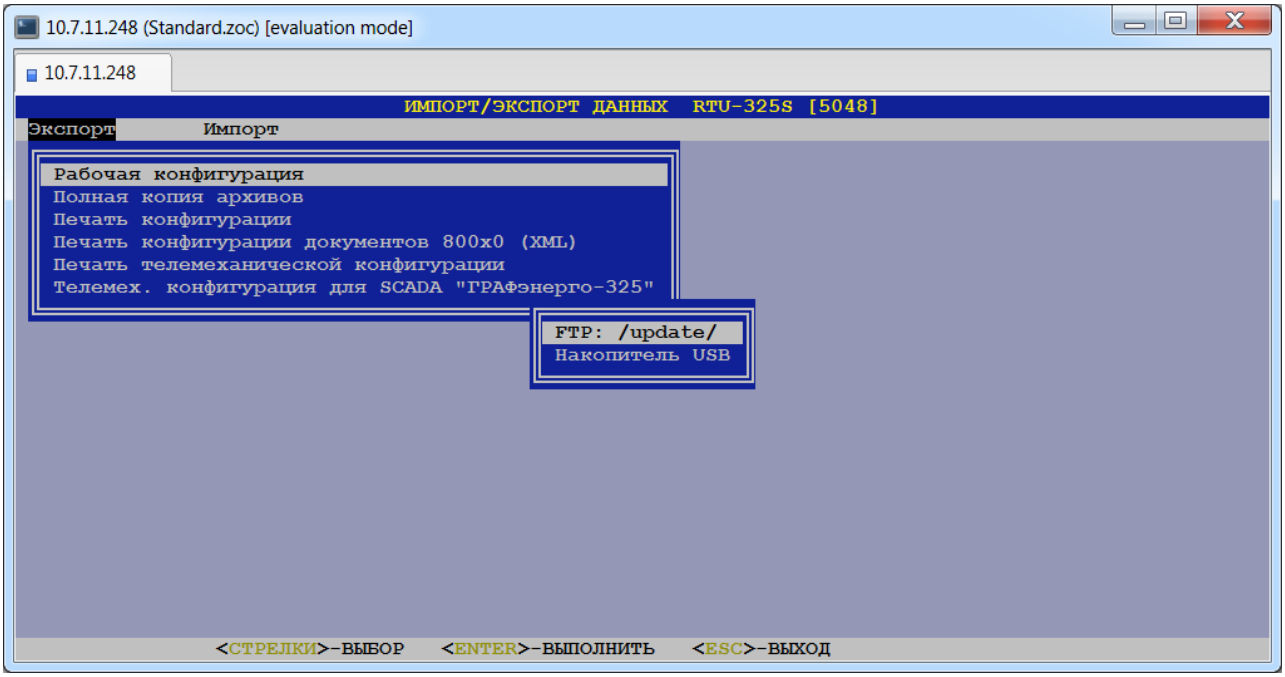
These menu items are described below.

4.4.1. Export of RTU configuration (the menu item «Экспорт» > «Рабочая конфигурация»).

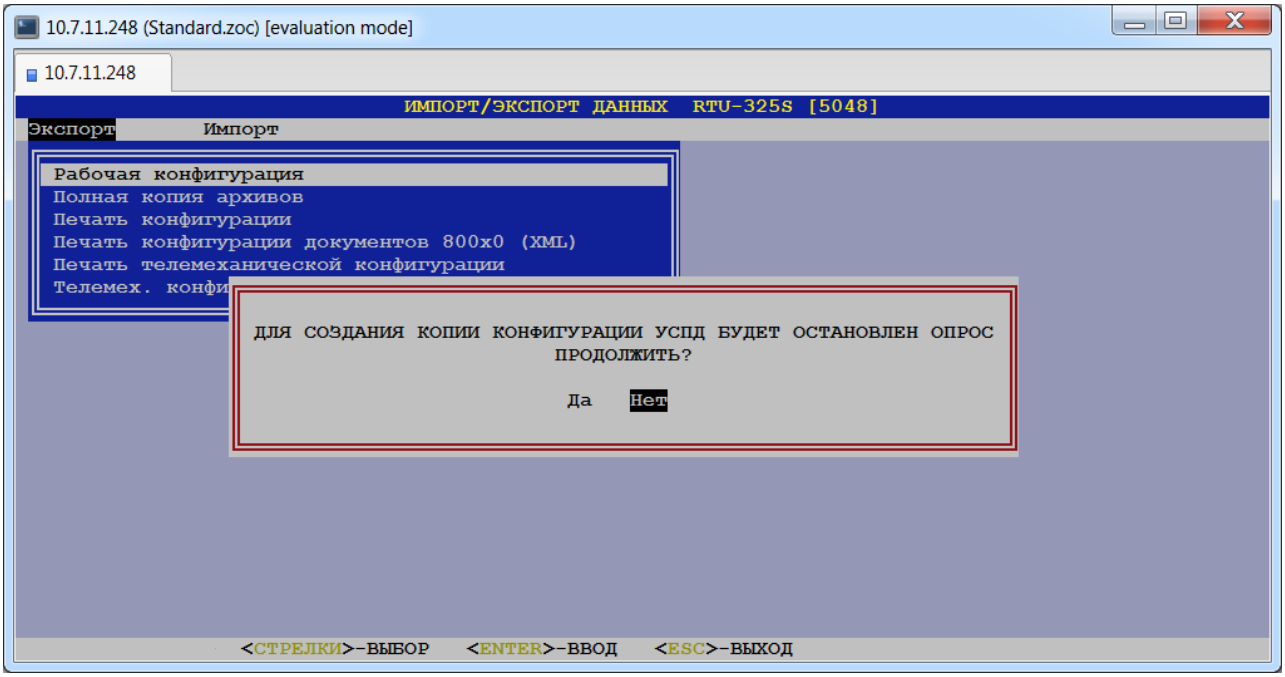
Once the work has been completed, the ASCU configuration should be maintained in both the non-volatile memory RTU and the external USB. This menu item is intended for this purpose.

In this menu paragraph, the user needs to perform the following operations:

1) In the menu, select the export route:



2) Allow stop (choice «Да» in the request window):



3) As a result, the RTU configuration file will be created with the name: [заводской_номер_УСПД]_DB_cfg_[дата_создания]_[время_создания]. Download this file from the RTU to external storage using an FTP client. The RTU deletes the file at the next restart.

4) The current configuration can be stored in the non-volatile memory of RTU. To this end, the question: «Сохранить текущую конфигурацию в УСПД?» should be answered by «Да». The current configuration can then be restored to RTU (the menu item «Импорт» > «Рабочая конфигурация АСКУЭ»).

5) Reset the RTU to restore the interviews.

4.4.2. Export a complete copy of the archives (item «Экспорт» > «Полная копия архивов»).

A complete copy of the archives is exported upon request by the Technical Support Service in case of an irregular situation in the configuration or operation of RTU. Exports can only be performed on USB storage in RTU models with USB port. To this end, the user needs to perform the following operations:

1) Connect the USB storage device to the USB port of RTU.

2) Select «Экспорт» > «Полная копия архивов» .

3) Select a directory for export.

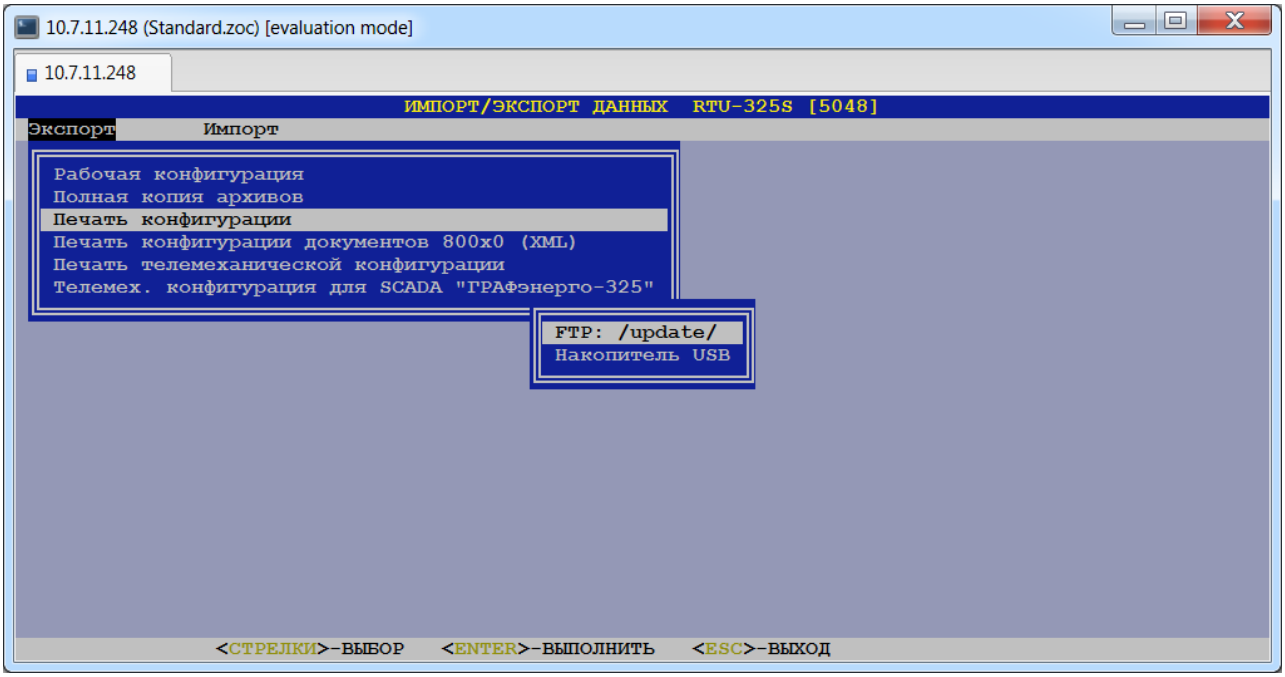
4) A file with a full copy of the archives will be created using the <F3> key on the USB medium: [заводской_номер_УСПД]_DB_backup_[дата_создания]_[время_создания].7z

5) Reset the RTU to restore the interviews.

4.4.3. Printing the configuration (menu item «Экспорт» > «Печать конфигурации»).

This paragraph is intended to form a text document with ASCU working configuration parameters. The user needs to perform the following operations:

1) In the menu, select the export route:



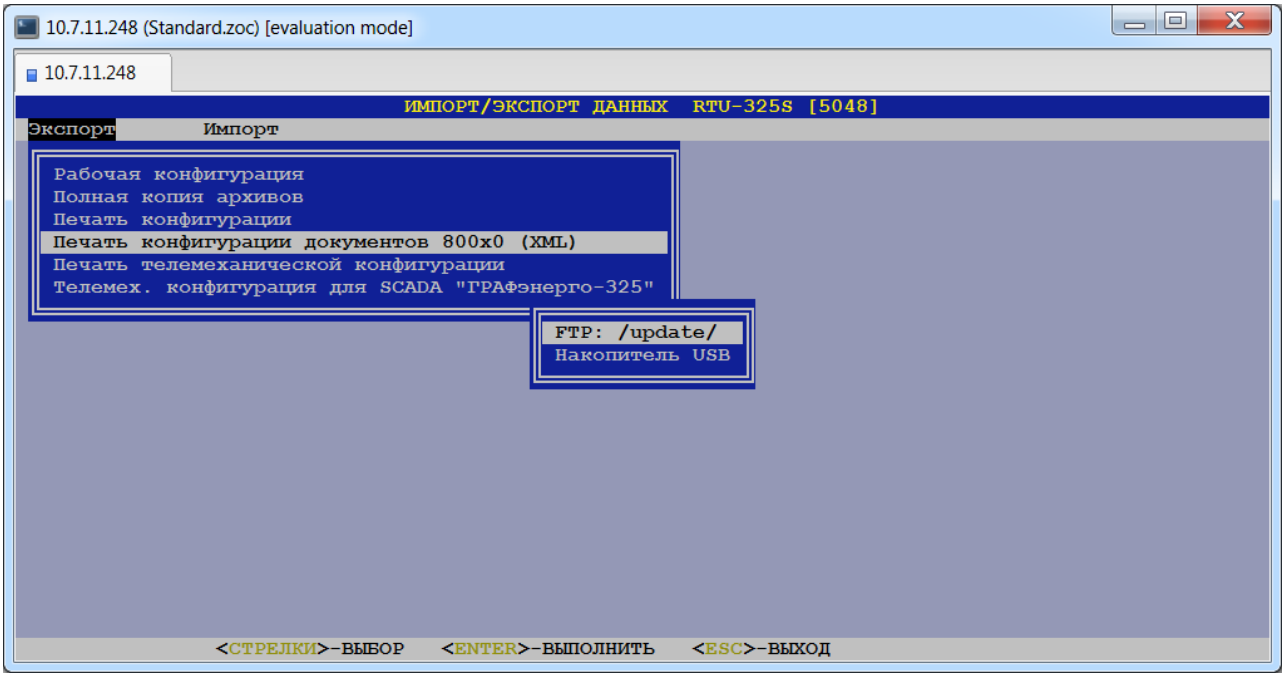
2) A test file in CP866(DOS) coded with the following name will be created: [заводской_номер_УСПД]_DBcfg_prn_[дата_создания]_[время_создания]. Download this file from the RTU to external storage using an FTP client. The RTU deletes the file at the next restart.

3) Reset the RTU to restore the interviews.

4.4.4. Print XML configuration of documents (item of «Экспорт» > «Печать конфигурации документов 800x0 (XML)»).

This paragraph is intended to form a text document with XML document configuration parameters. To this end, the user needs to perform the following operations:

1) In the menu, select the export route:



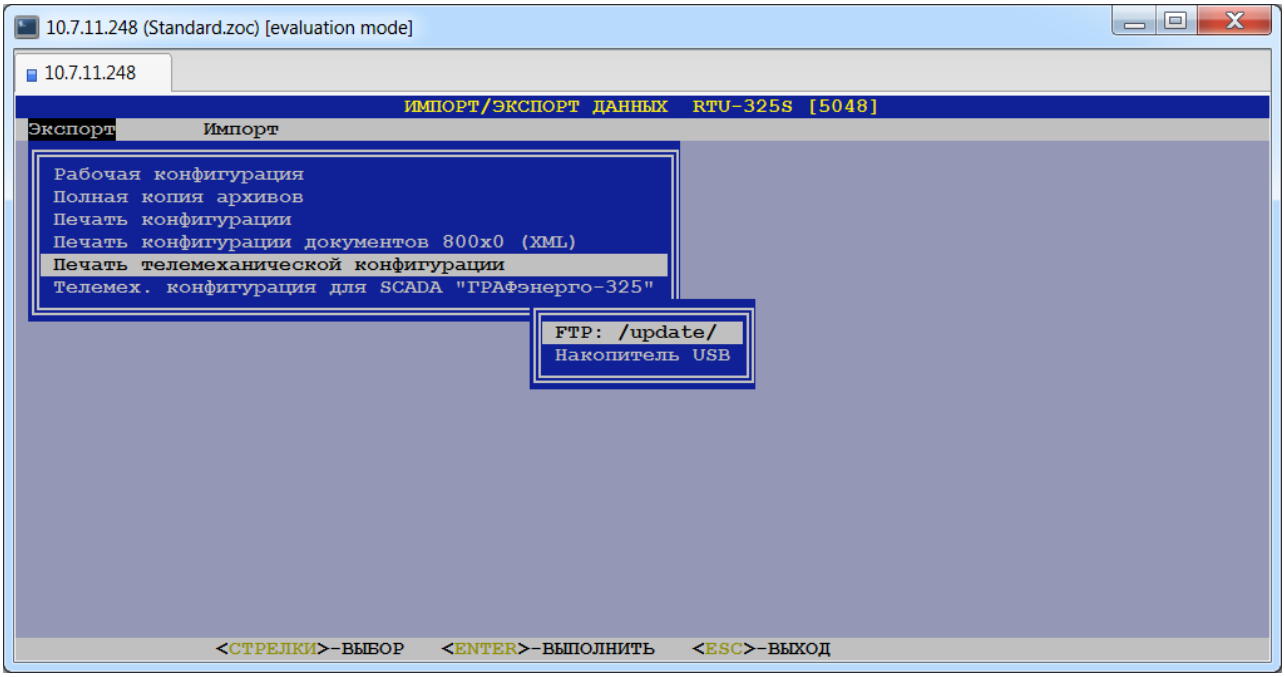
2) A test file in CP866(DOS) coded with the following name will be created: [заводской_номер_УСПД]_DBxmlcfg_prn_[дата_создания]_[время_создания]. Download this file from the RTU to external storage using an FTP client. The RTU deletes the file at the next restart.

3) Reset the RTU to restore the interviews.

4.4.5. Printing the telemechanics configuration (menu item «Экспорт» > «Печать телемеханической конфигурации»).

This paragraph is intended to form a text document with the parameters of the RTU tele-mechanic configuration. To this end, the user needs to perform the following operations:

1) In the menu, select the export route:



2) The following test files will be created in CP866(DOS): [заводской_номер_УСПД]_DBtcfg_prn_[дата_создания]_[время_создания], [заводской_номер_УСПД]_DBtcfgXX_prn_[дата_создания]_[время_создания], [заводской_номер_УСПД]_DBtacfgXX_prn_[дата_создания]_[время_создания], [заводской_номер_УСПД]_DBta2cfgXX_prn_[дата_создания]_[время_создания], where XX is the internal identifier of the telecontrol configuration in the RTU.

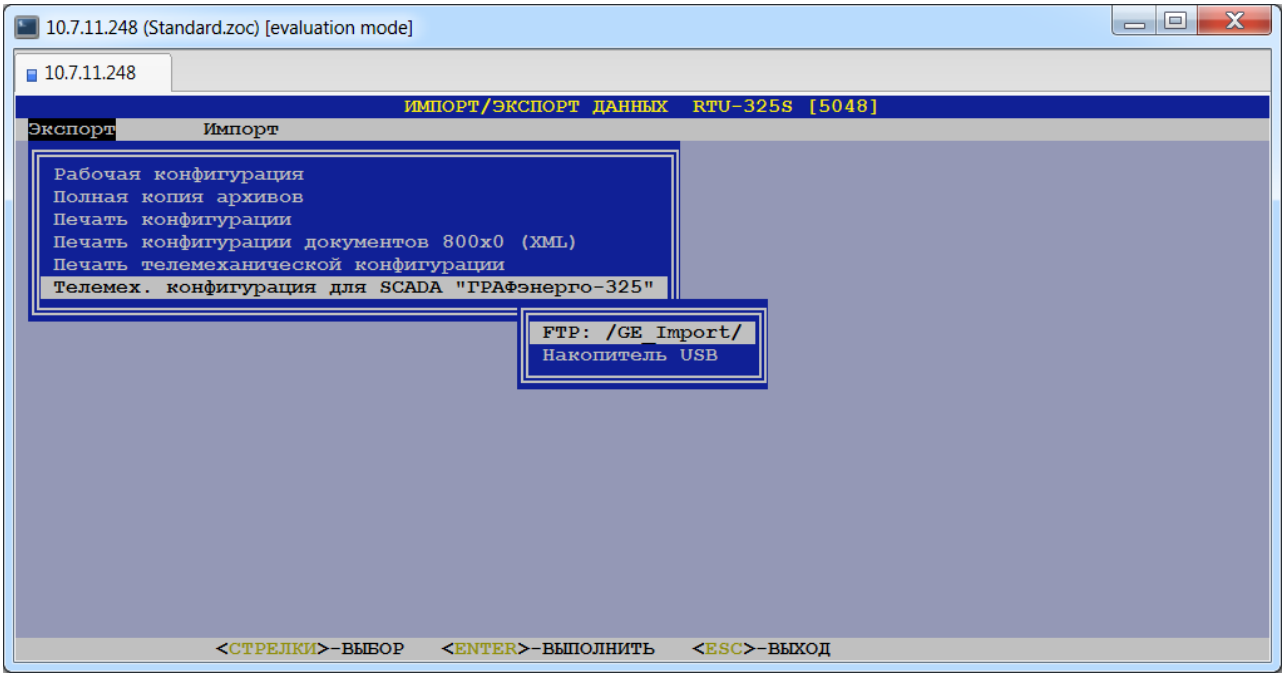
   Download the files from the RTU to external storage using an FTP client. The RTU deletes the files at the next restart.

3) Reset the RTU to restore the interviews.

4.4.6. Export of tele-mechanic configuration for SCADA "ГРАФэнерго-325" (item of «Экспорт» > «Телемех. конфигурация для SCADA "ГРАФэнерго-325"»).

This paragraph is intended to form a text document with the parameters of the RTU tele-mechanic configuration for SCADA "ГРАФэнерго-325" . The following operations are required of the user:

1) In the menu, select the export route:



2) Test files will be created in the CP866(DOS) coding, one per component, with the file name of the component. For example, the file name may be seen as:

Сч_[ID_счётчика]_[наименование счётчика].txt - for a meter, [заводской_номер_УСПД]_DI.txt

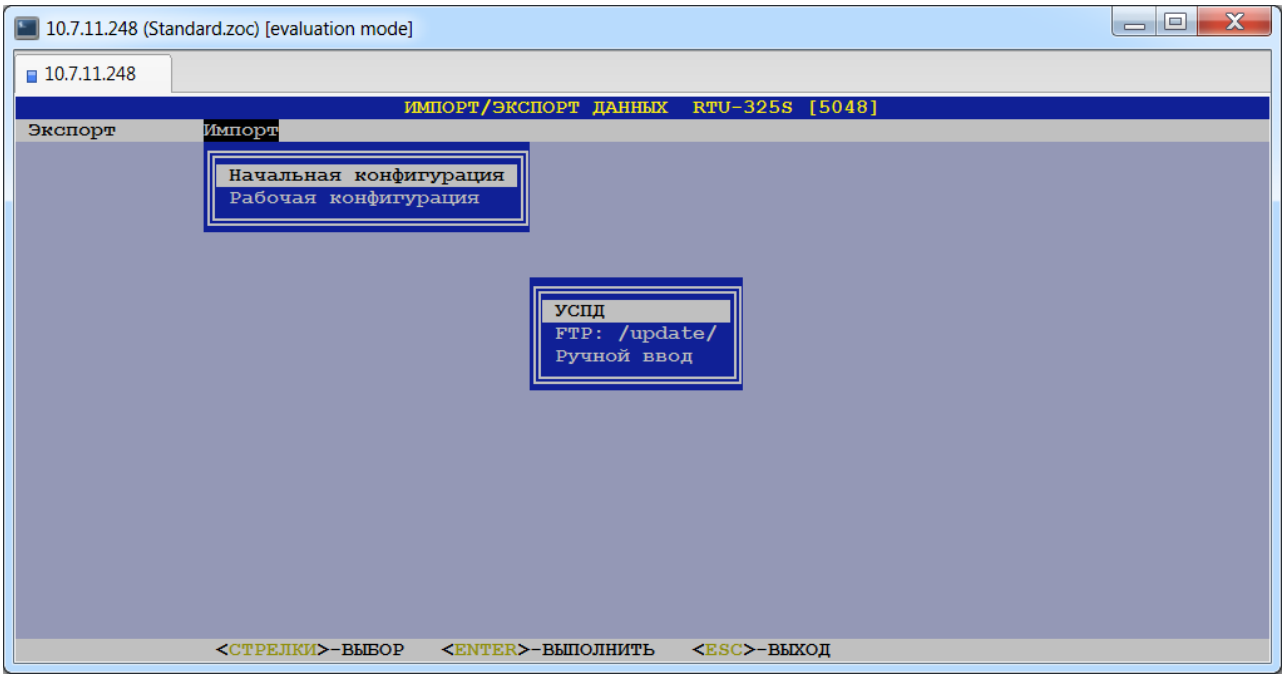
- for discrete objects. Files should be counted as external with RTU as FTP's client. Files will be removed from RTU at the next restart.

3) Reset the RTU to restore the interviews.

4.4.7. Import the initial configuration RTU (the menu item «Импорт» > «Начальная конфигурация»).

This point can be used by the user if the initial ASCU configuration needs to be restored. This requires the following operations:

1) In the menu, select the route for the import file:



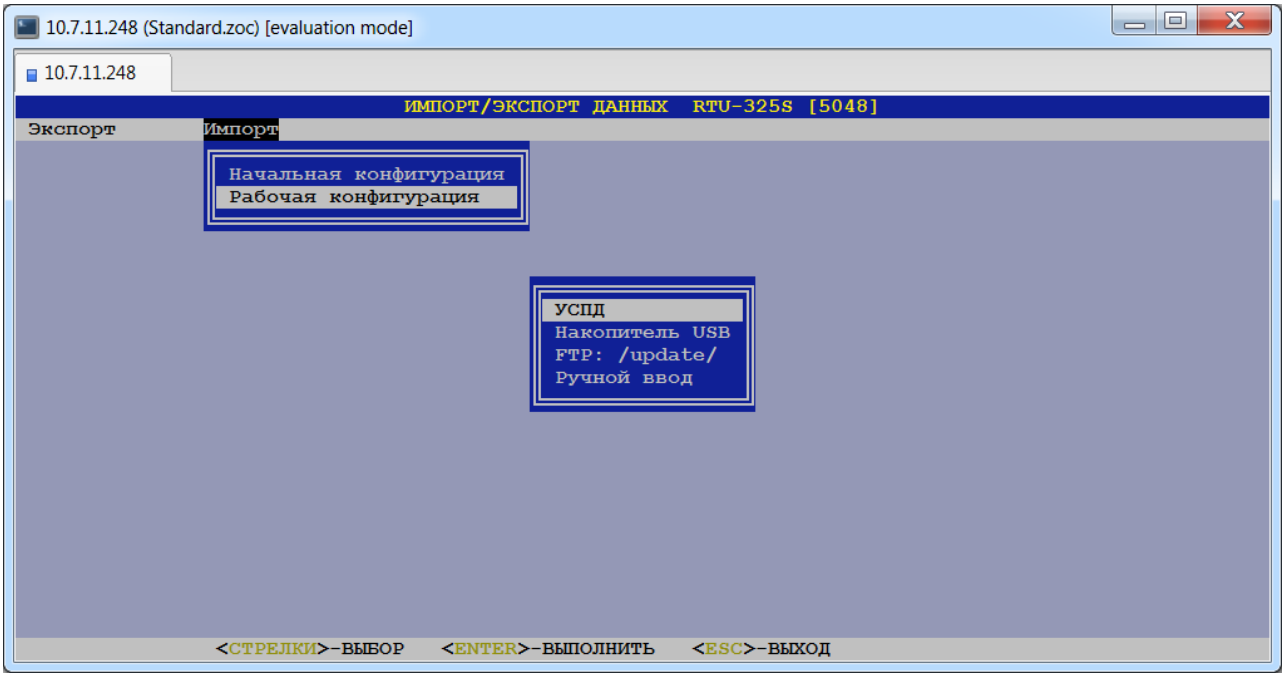
2) Confirm the clearance to erase the RTU configuration and data.

3) Restart RTU.

4.4.8. Import the RTU configuration (the menu item «Импорт» > «Рабочая конфигурация»).

This point may be used by the user if it is necessary to re-establish the ASCU operating configuration, which was previously retained in paragraph «Экспорт» > «Рабочая конфигурация» . The following operations need to be performed:

1) In the menu, select the route for the import file:



2) Confirm the clearance to erase the RTU configuration and data.

Note: Re-engineering of the business configuration is possible only if The following current parameters are consistent with the parameters in the retained configuration:

- The archives version,
- Contact number RTU,

• The TP/IP parameters. If a parameter is not in agreement, a report will be issued indicating that it is not possible to import the configuration and recommending which parameters should be set. Set the necessary parameters in the current configuration with the RTU configuration program.

3) There will be a warning of the duration of the operation. The text lines then show the import process. The longest time is to form the pre-set size of the RTU archive, and the message on the screen is: «% ALTER DB SPACE SYSTEM ADD nnnn» . The duration of the operation depends on the size of the NVM RTU and may exceed 10 minutes.

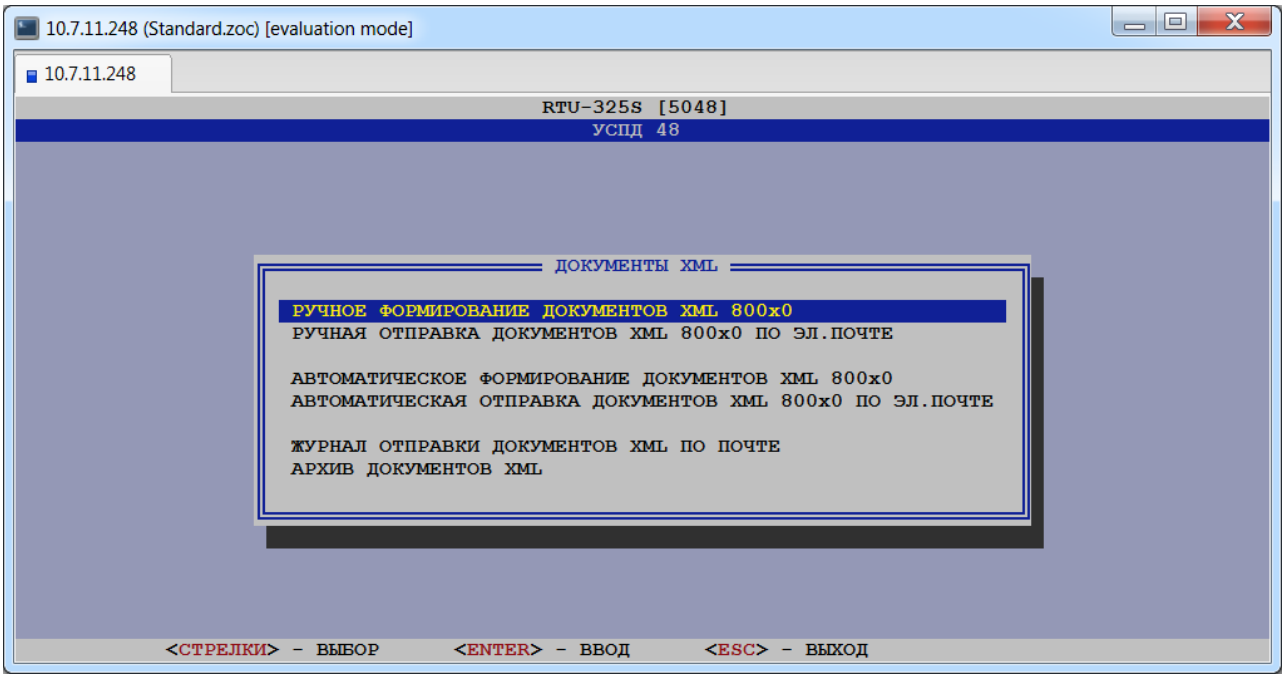
4) Restart RTU.

Note: If the import of the work configuration was made from a file formed by On RTU with another factory number, it is necessary to restore the factory number RTU in the archives for conformity with the manufacturer's number on the RTU shilde.

4.5. XML documents...

This item is designed to work with XML 800x0: Formation, Mailing and Viewing of the Archives of Formed Documents.

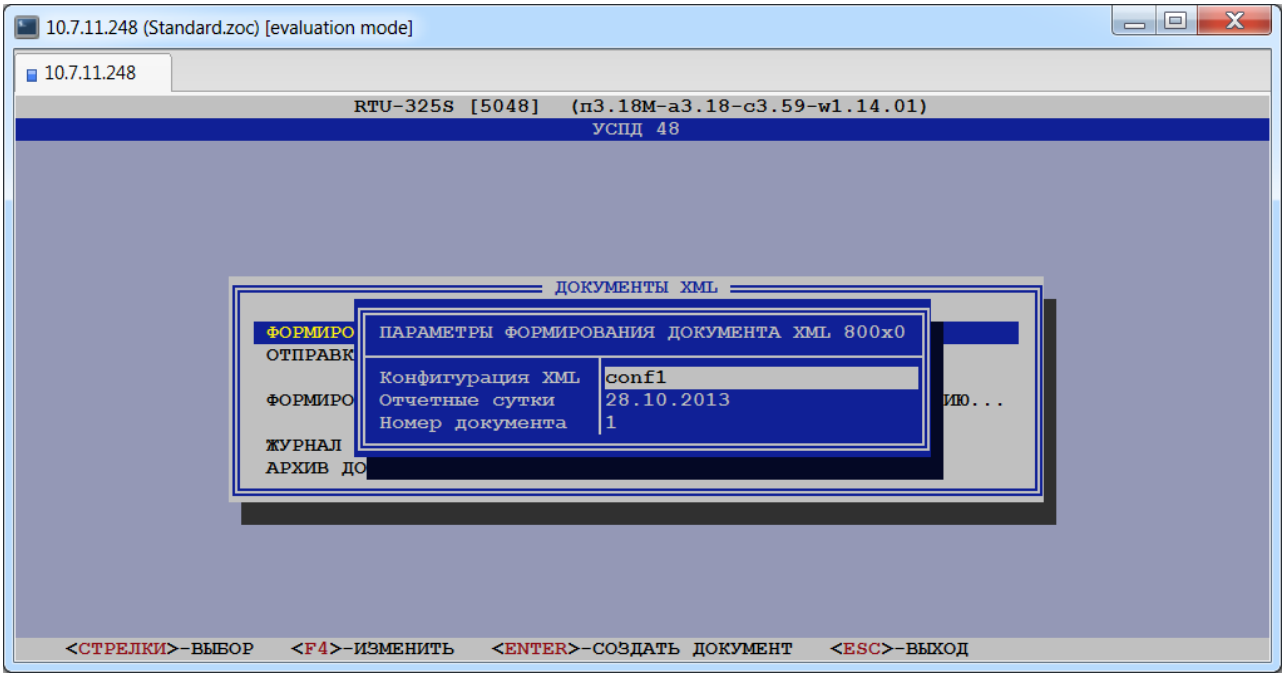
The following menu will be presented to the user when selecting this paragraph:



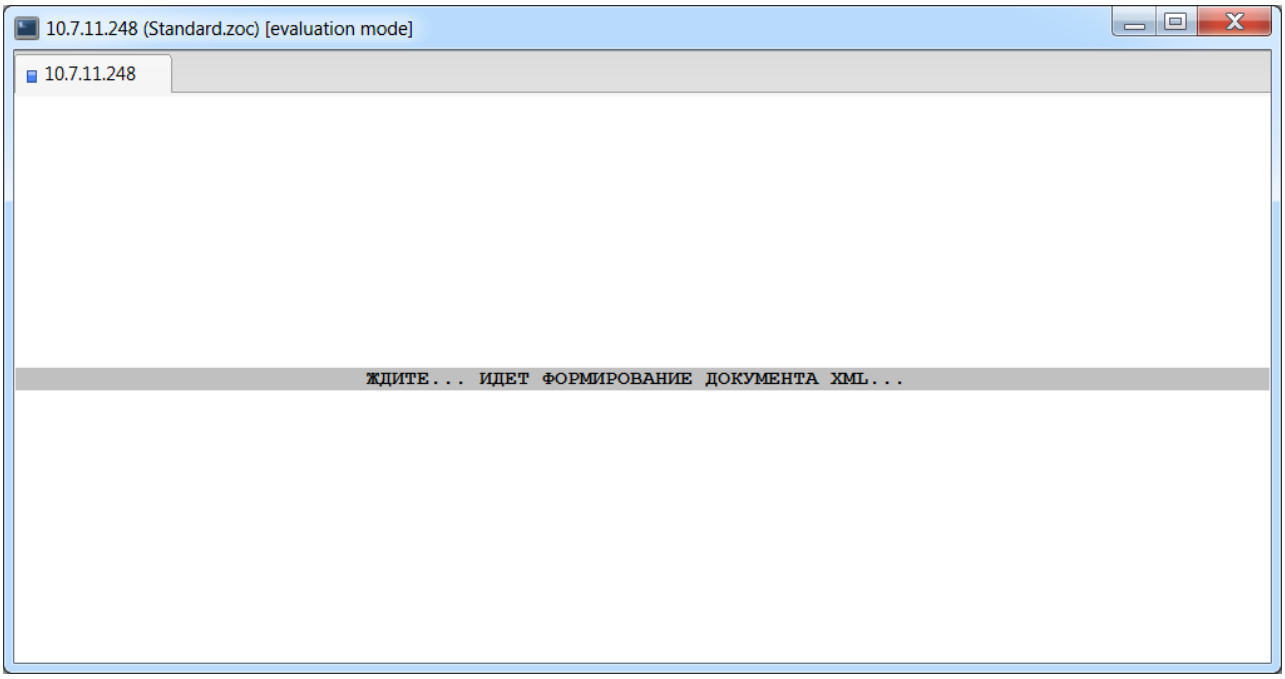
4.5.1. Hand-made XML 800x0 documents.

In this paragraph, the user can form XML in the required 24-hour report.

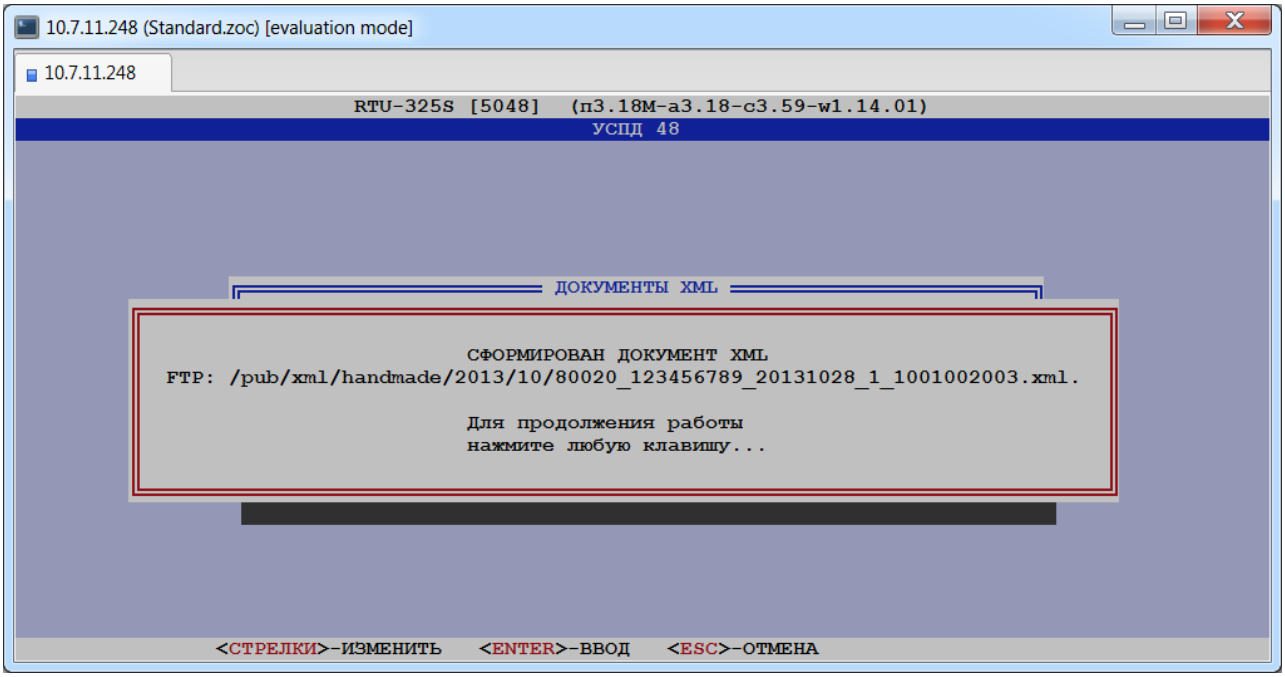
When selecting this paragraph, the user will be provided with the following form to complete the parameters:



Once the required configuration and reporting days have been selected, the key <Enter> must be pressed, resulting in the following message:



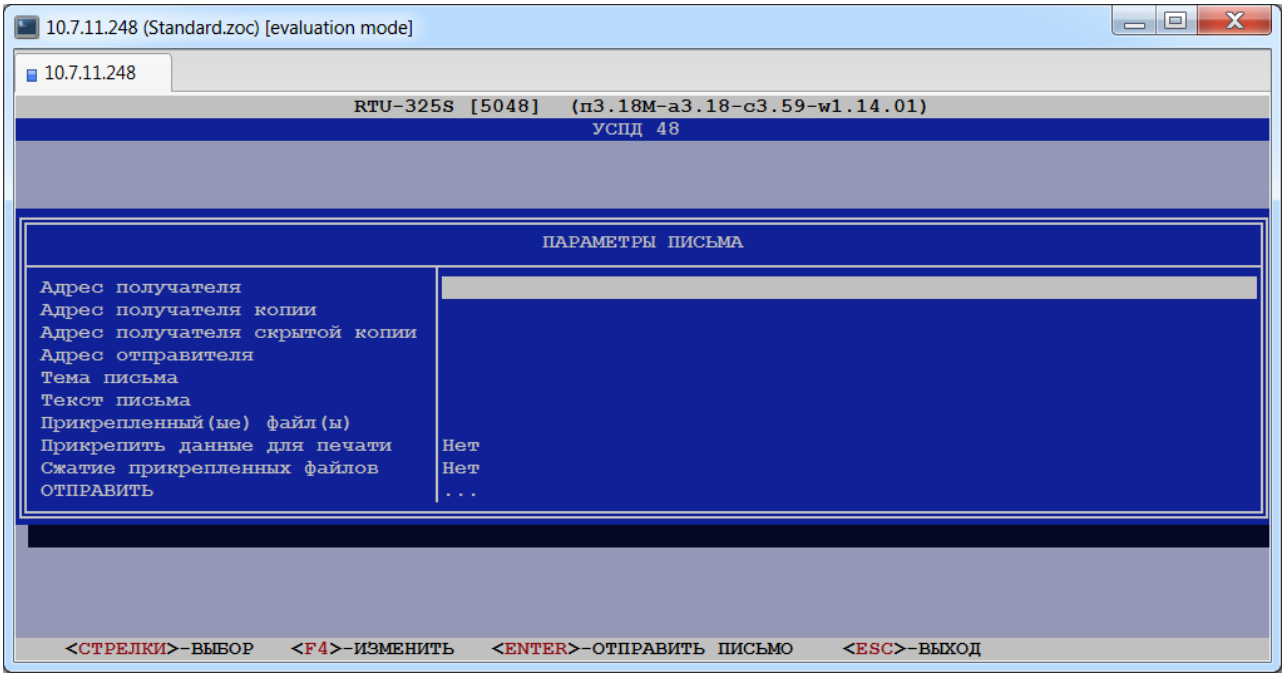
At the end of the operation, the following message will appear on the screen:



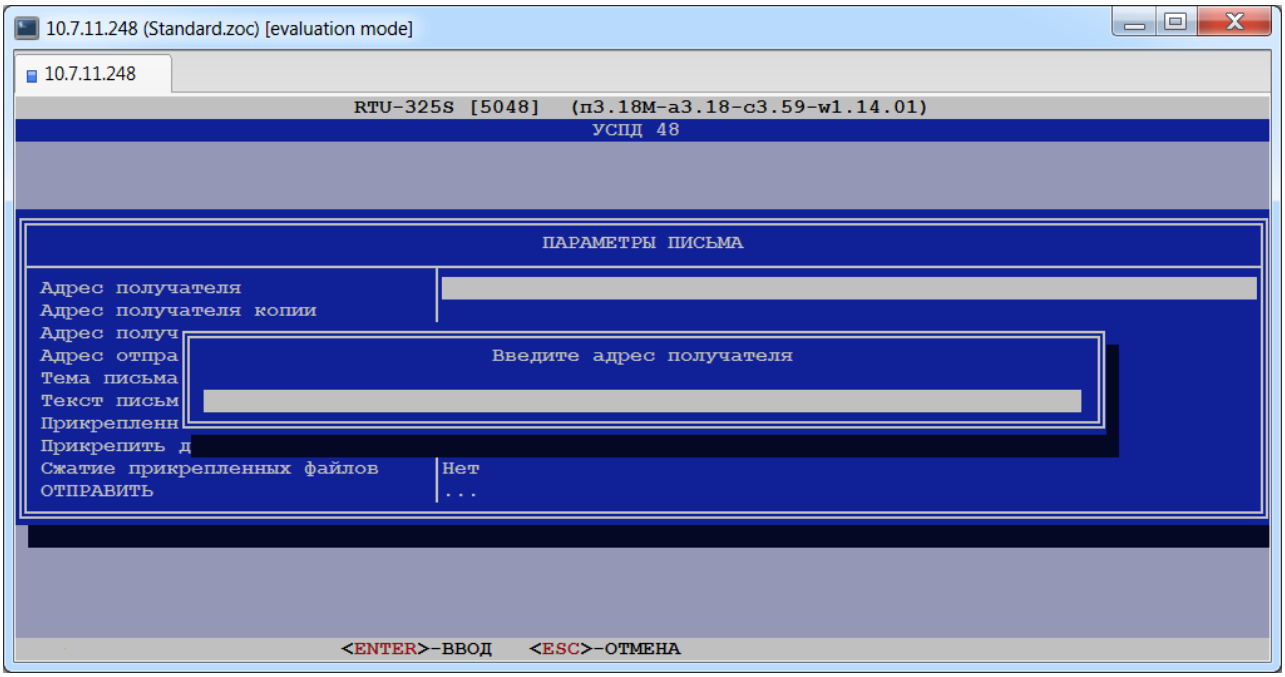
4.5.2. Hand-mailed XML 800x0 documents.

This paragraph gives the user the opportunity to mail the document(s) that has been created.

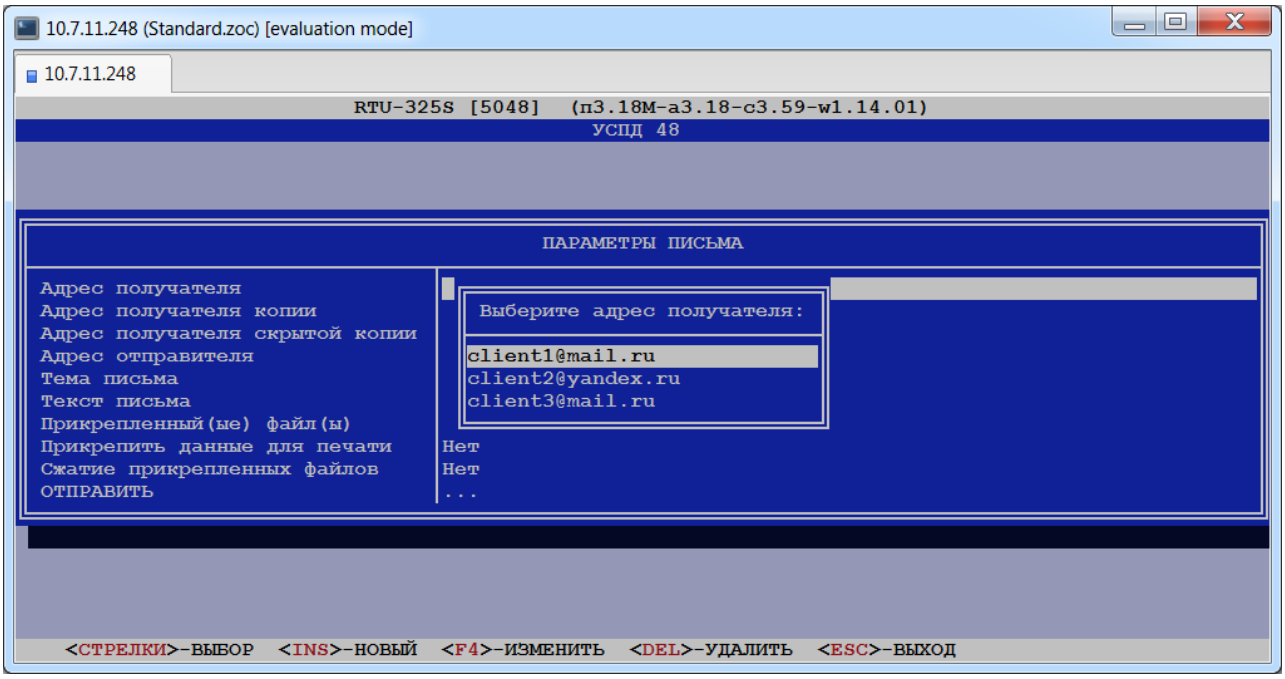
To this end, the user needs to complete the following form:



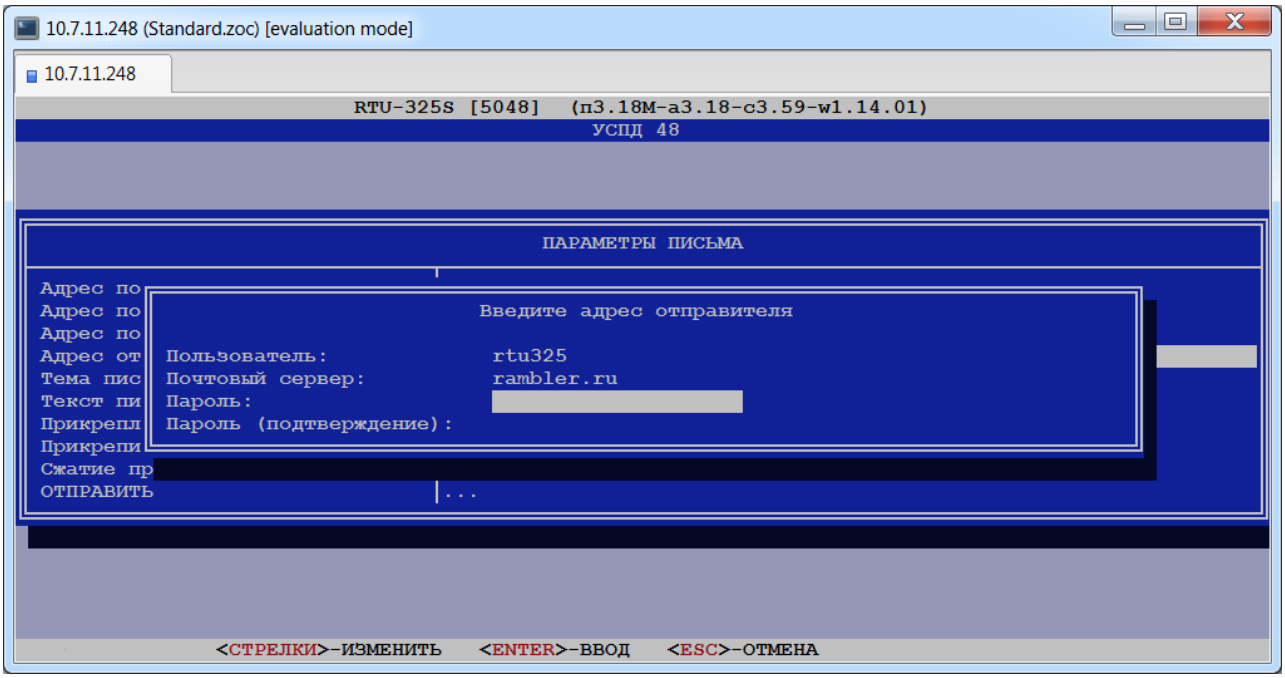
If no recipient address is saved in the RTU, the following entry form will appear when the key <F4> is pressed in the field "Адрес получателя ...":



If the address of the recipient has previously been saved, the user will be asked to select the address of the recipient from the list:

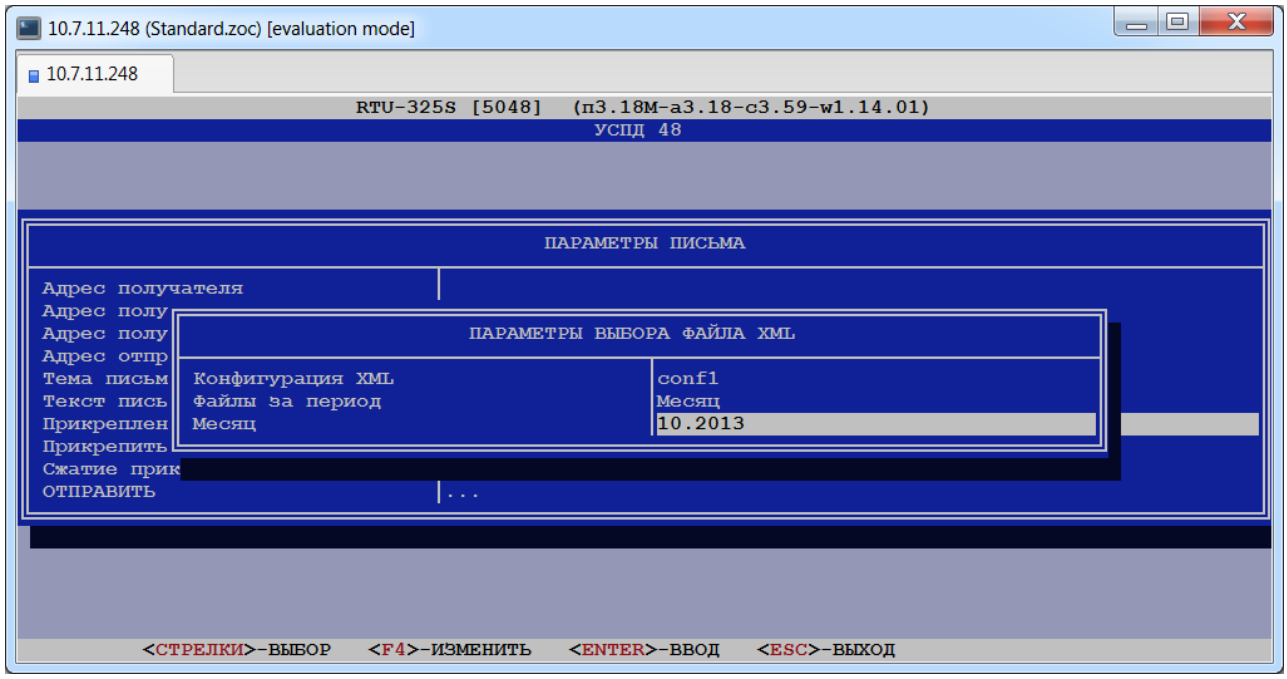


The sender's address must be selected. If no address has previously been saved, the user will be asked to create it:

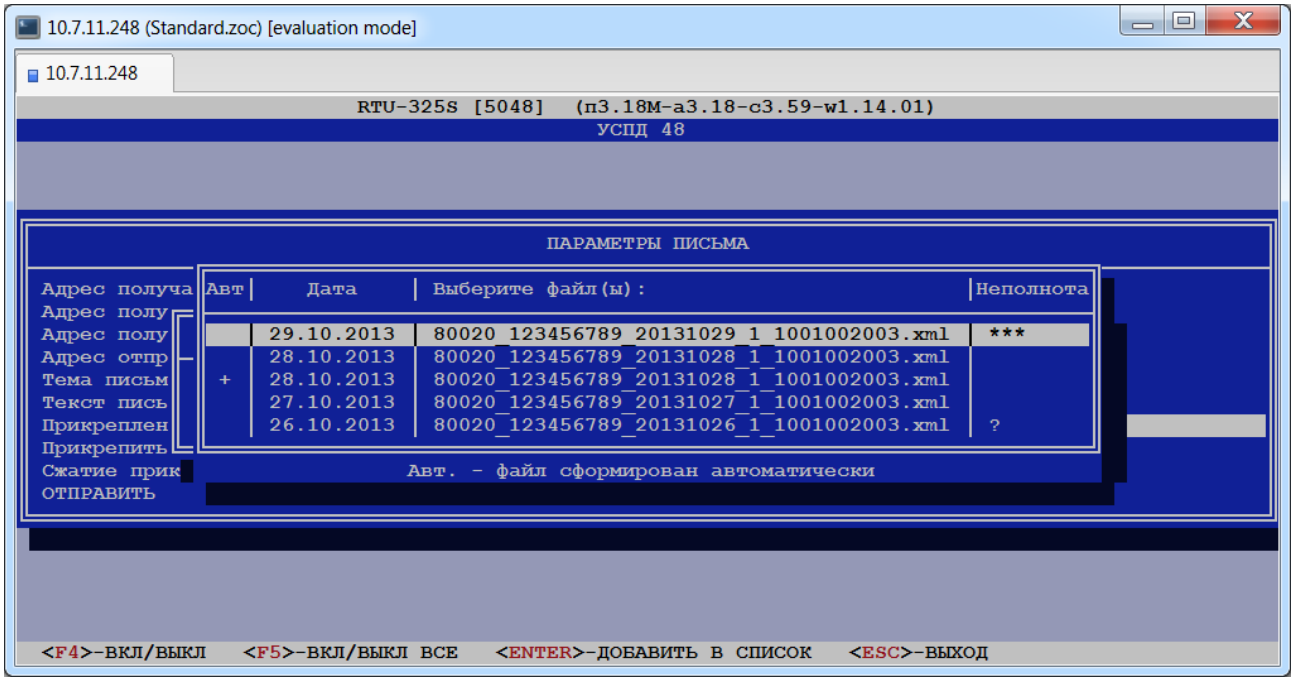


In fields "Тема письма" and "Текст письма", the user may send appropriate text messages.

In field "Прикрепленный(ые) файл(ы)", the user must select one or more files to be sent to the recipient(s):



All the files, all the files in the 24-hour account or in the month can be sent. Once the required parameters have been set and the key has been pressed <Enter>, a list of files that meet the specified parameters will be available:

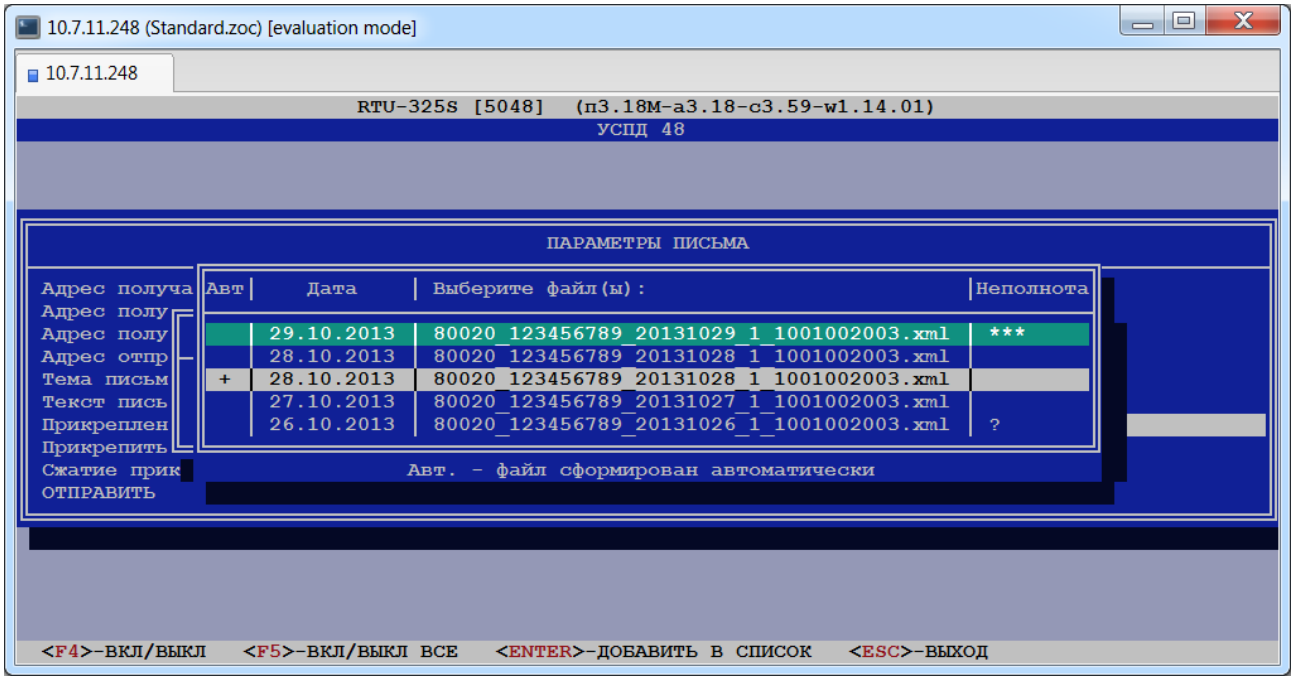


If a file is marked with a "+" in column "Авт", then this means that the file was created automatically.

If a file is marked as '***' in column "Неполнота", this means that the file contains incomplete data. If there is a sign '' in column "Неполнота" opposite the file, this means that there is no information on the completeness of the data in the file. An empty field in column "Неполнота" indicates that the file contains complete data.

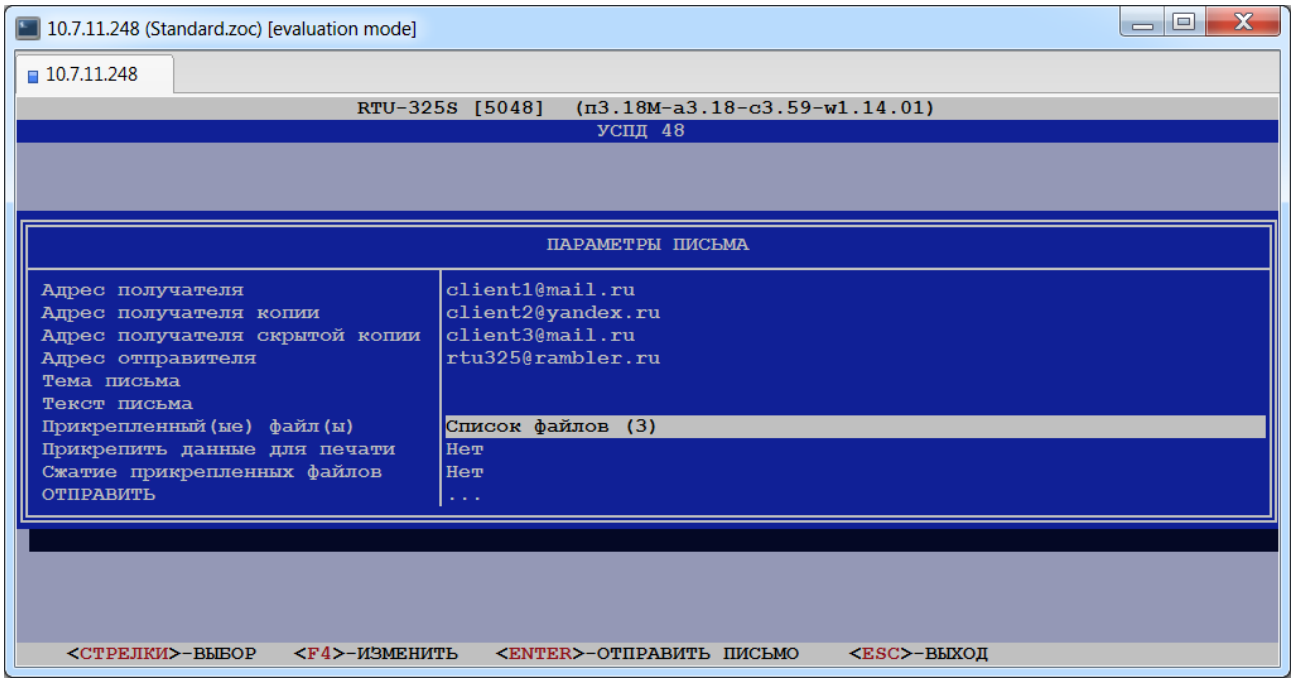
This list can be edited by pressing the keys <F4> or <F5>.

On the <F4> key, the user may add a selected file to the list or remove it from the list if the selected file was previously included in the list. If the file is included in the list, the line containing the file will be lit blue:



On the <F5> key, the user may list all files or remove them from the list.

Once the required file list has been created, you need to press the <Enter> key to save the attached file list. When returned to the form of the letter parameters in the field "Прикреплённый(ые) файл(ы)", the name of the attached file will be displayed if it is one or a phrase, as shown below, if the files are multiple:



In the field "Прикрепить данные для печати", a `Yes' should be selected if a printed form with the document is to be sent with XML.

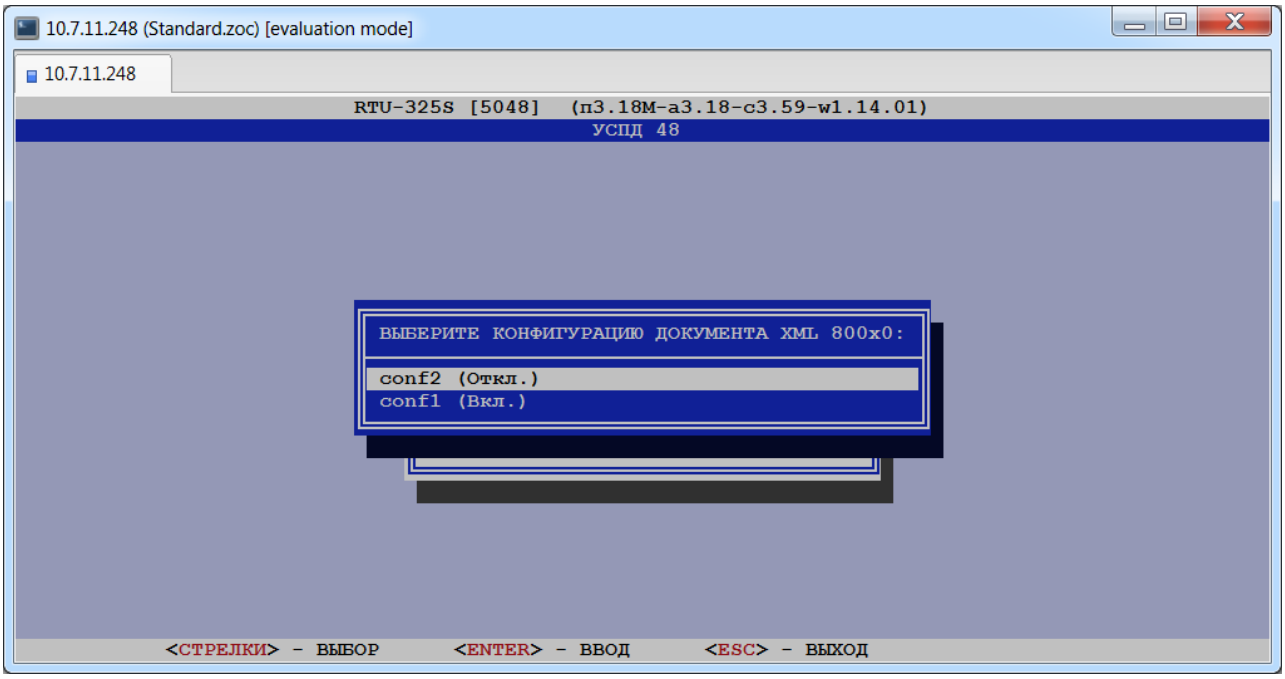
In field "Сжатие прикрепленных файлов", you must select 'Yes' if the sent files need to be pressed.

Once the required parameters have been set, you need to move to the "ОТПРАВИТЬ" field and press the <Enter> key. Once the procedure has been completed, the user will be informed of the success of sending the letter or of the error of dispatch.

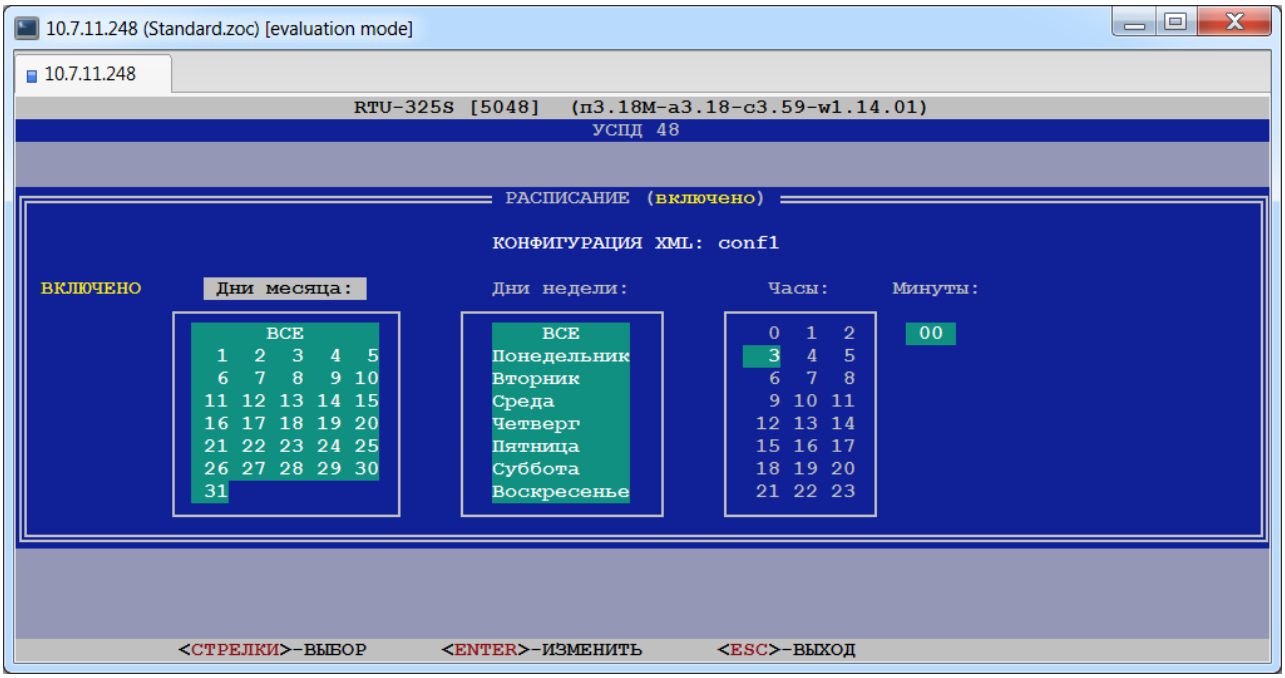
4.5.3. Automatic creation of XML 800x0 documents.

In this paragraph, the user can ask XML to create documents on time.

When selecting this paragraph, the user must select an XML configuration that requires automatic document creation:

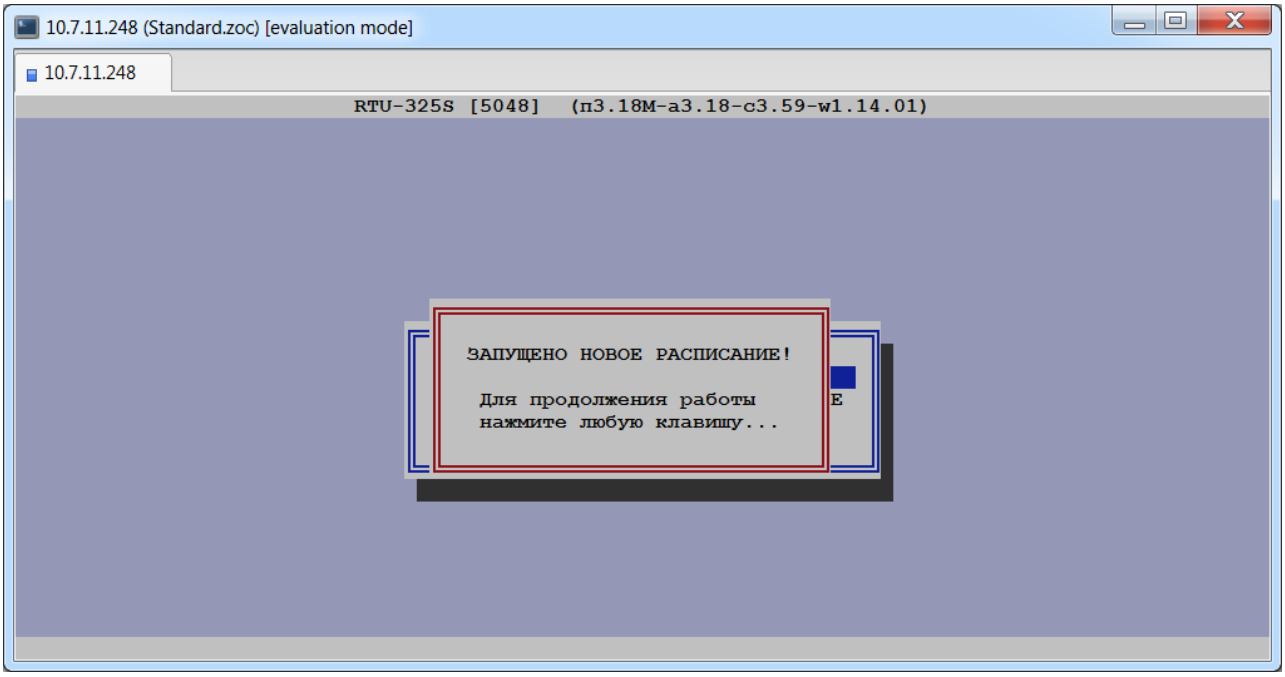


Once the configuration is selected, the user will be provided with a form to complete the scheduling parameters:



For the form shown above, a file will be generated every day at 3 a.m.

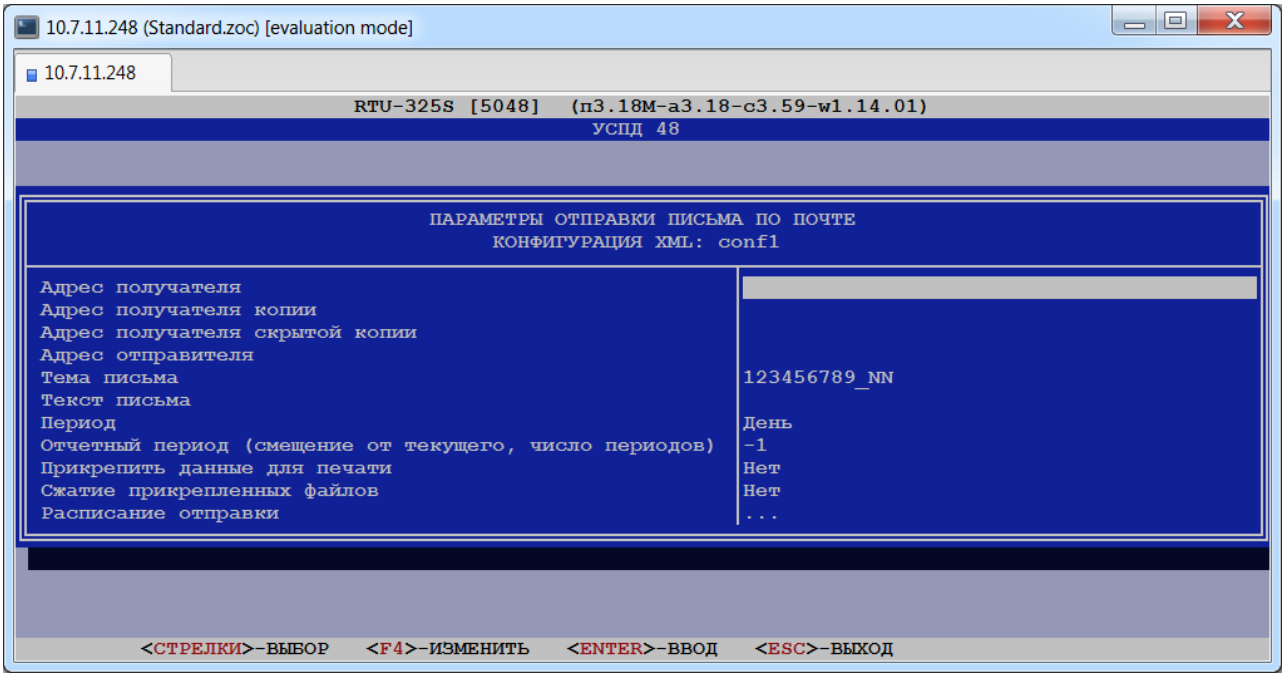
Once the required parameters have been completed, the <Esc> key has been pressed and the schedule has been confirmed that changes to the schedule file are still in place, the schedule will be re-opened and the following message will be received:



4.5.4. Automatic e-mailing of XML 800x0 documents.

In this paragraph, the user can specify the parameters for sending XML documents automatically by post.

When selecting this paragraph, the user will be provided with the following form to complete the parameters:



Fields "Адрес получателя", "Адрес получателя копии", "Адрес получателя скрытой копии", "Адрес отправителя", "Тема письма", "Текст письма", "Прикрепить данные для печати", "Сжатие прикрепленных файлов" forms shall be filled in as described in paragraph

4.5.2. Hand-sent XML 800x0 documents.

In field "Период", a time interval should be set for letters: day or month.

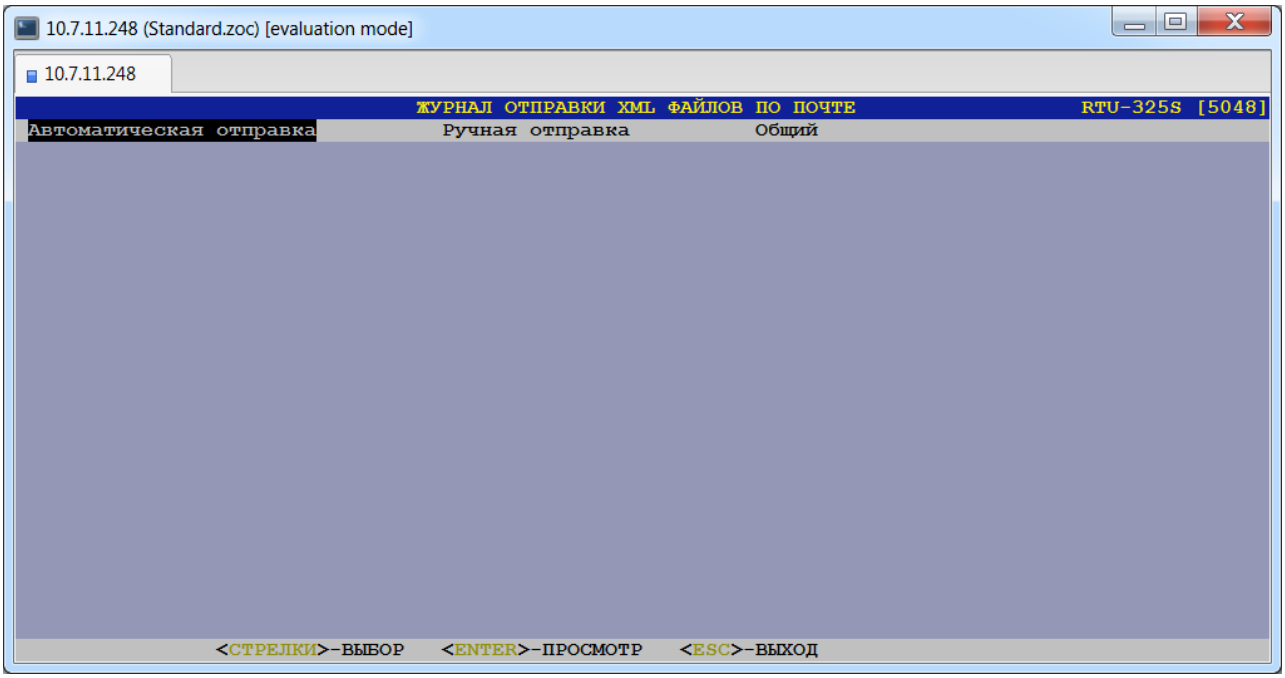
In the field "Отчетный период (смещение от текущего, число периодов)", a reference period should be given to the field "Период". For example, for the form above, letters will be sent daily in the previous 24 hours. For the `month' period, letters will be sent monthly for the previous month.

To set the sending schedule, select the “Расписание отправки” field and press <Enter>. A form similar to the one described in section 4.5.3, Automatic generation of XML 800x0 documents, will appear.

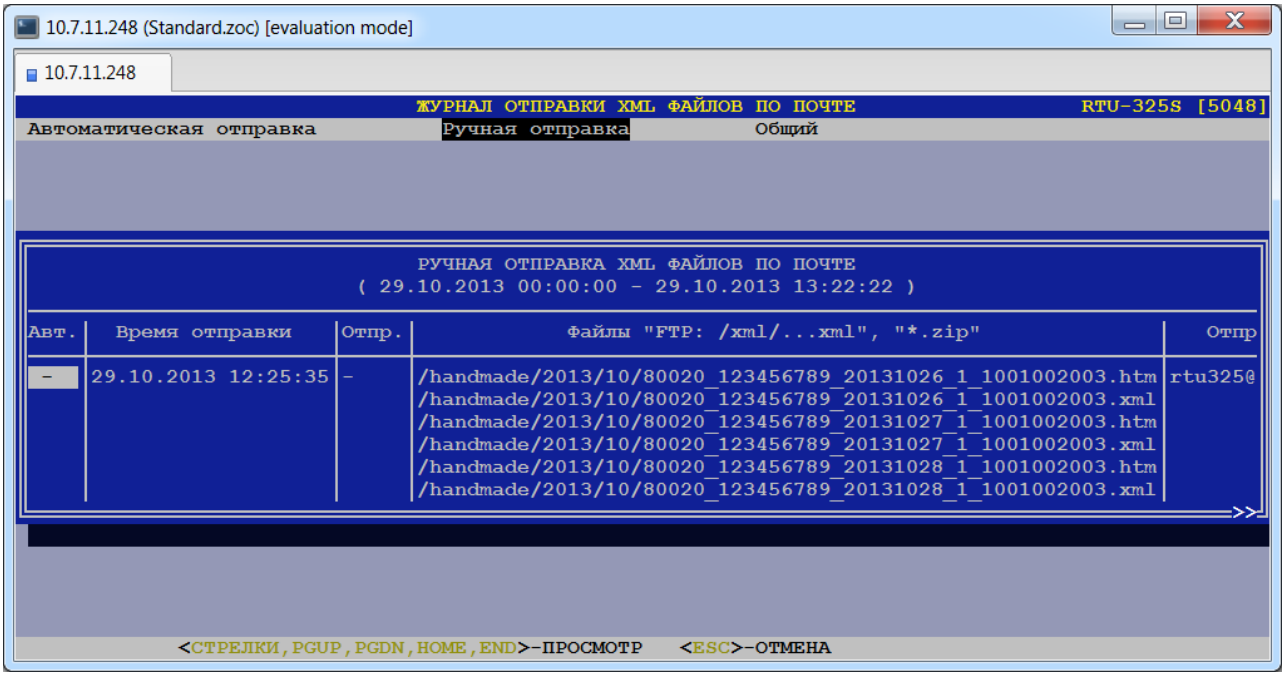
Once all the necessary parameters have been completed and the changes in the schedule file have been confirmed, the schedule will be rebooted and the message will be posted.

4.5.5. XML documents are sent by mail.

In this point, the user can view the XML mail log. The following menu item should be selected to view the journal:

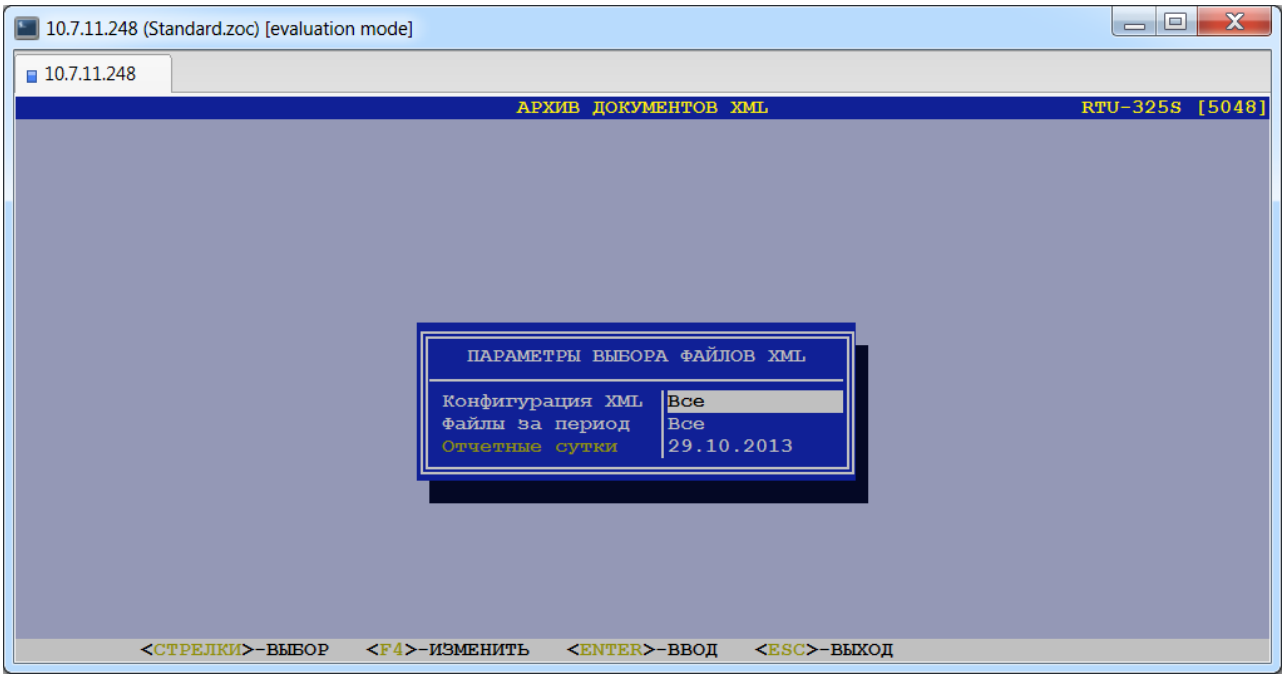


Once the required paragraph has been selected, a period must be set for which data are required. As a result, the user will be provided with the shipping report for the specified period:

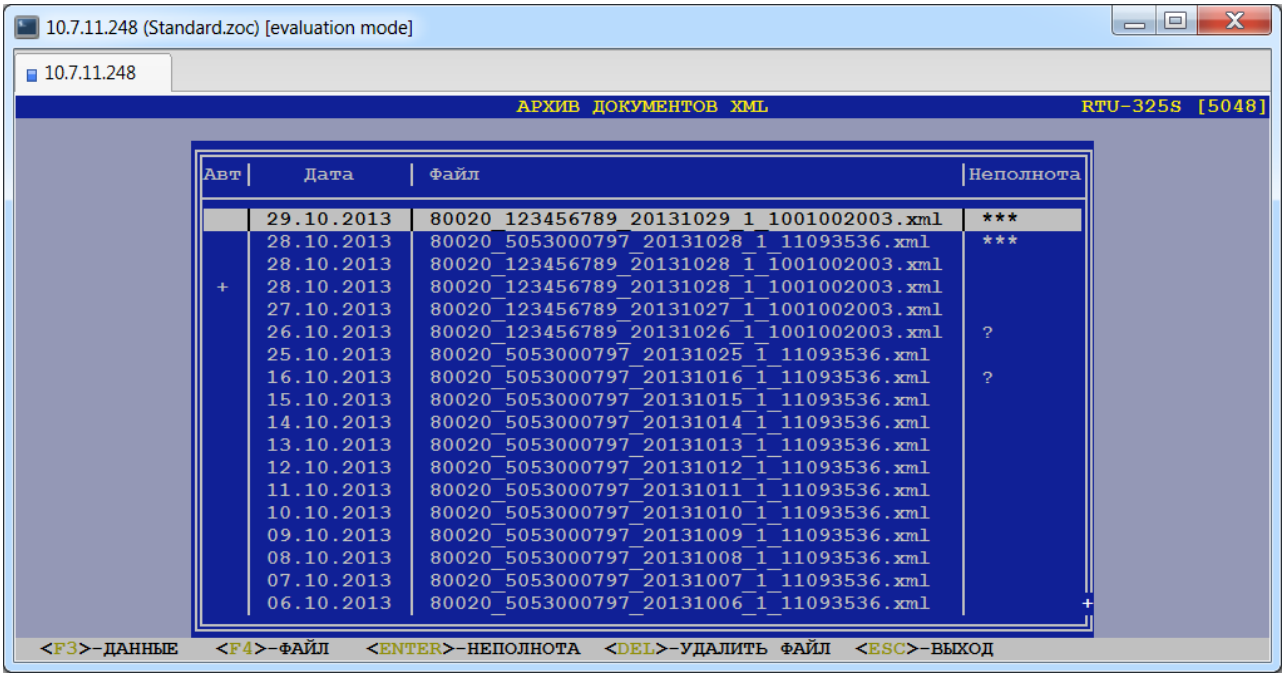


4.5.6. XML document archive.

In this paragraph, the user can look at a list of XML documents that are formed according to the user ' s specified parameters:

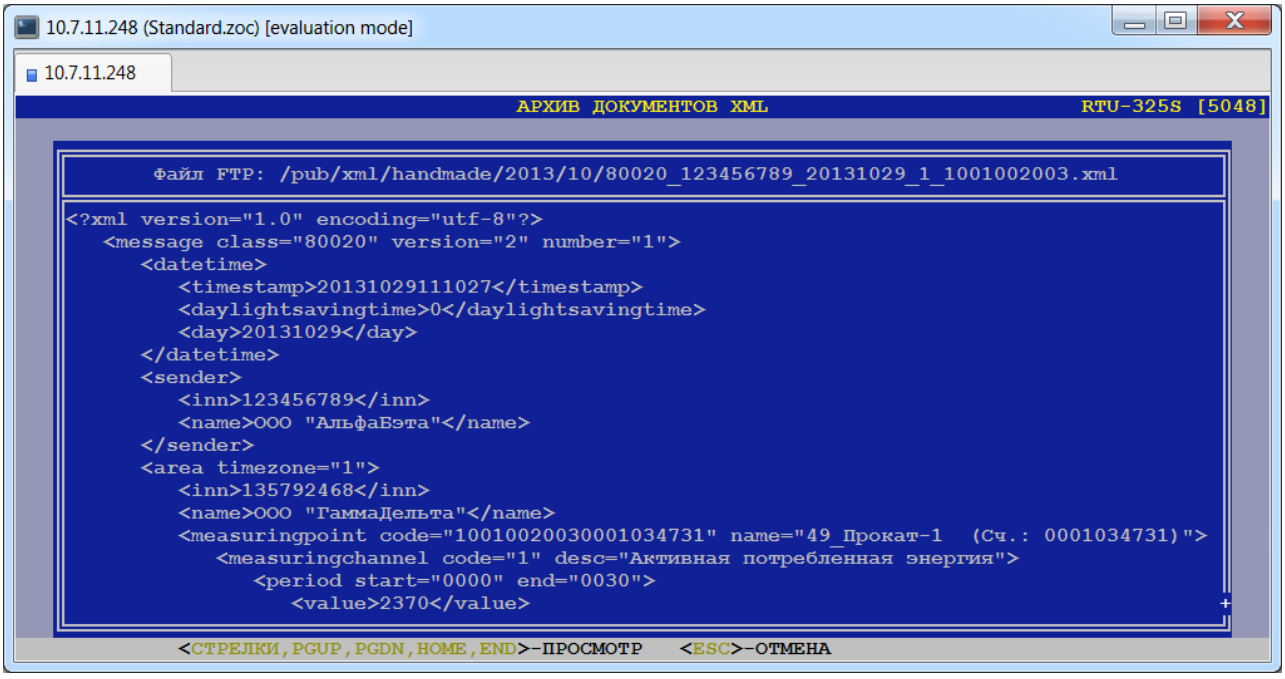


Once the required parameters have been completed, the user will be provided with a list of files:

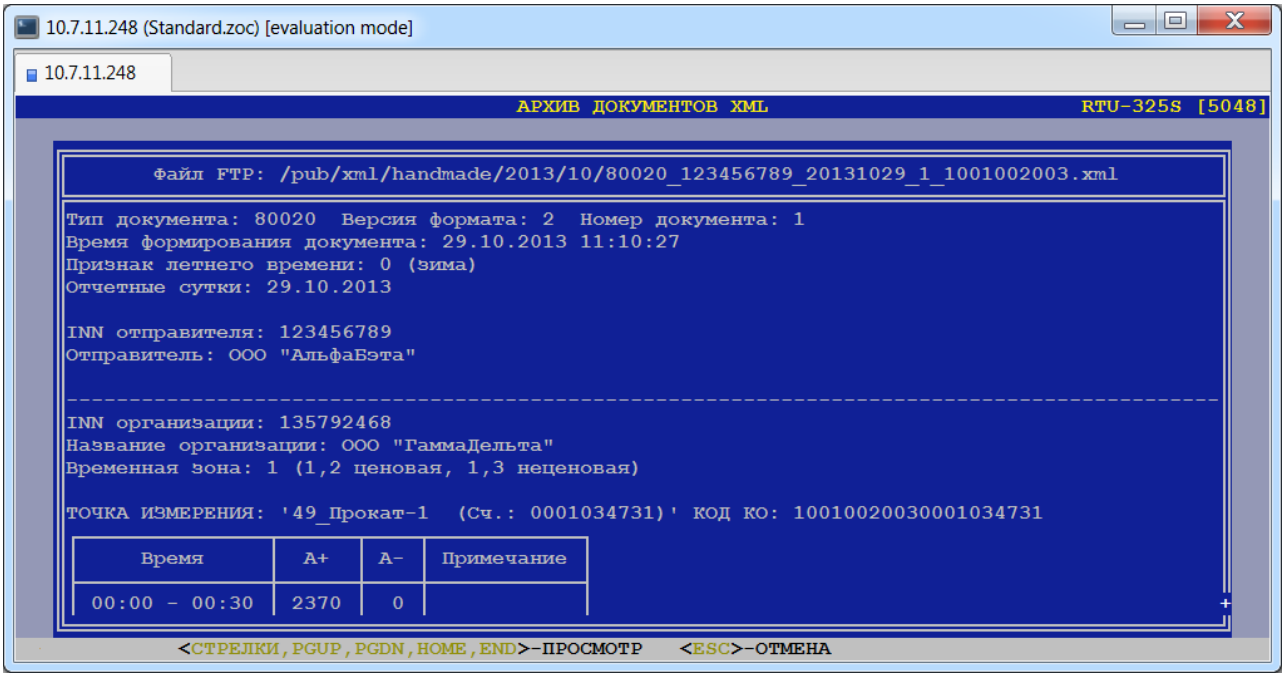


The files formed automatically are marked in column "Авт" with the symbol `+'. The icon '***' in column "Неполнота" is marked with incomplete data. By a badge '?', "Неполнота" column notes files for which there is no information on data completeness.

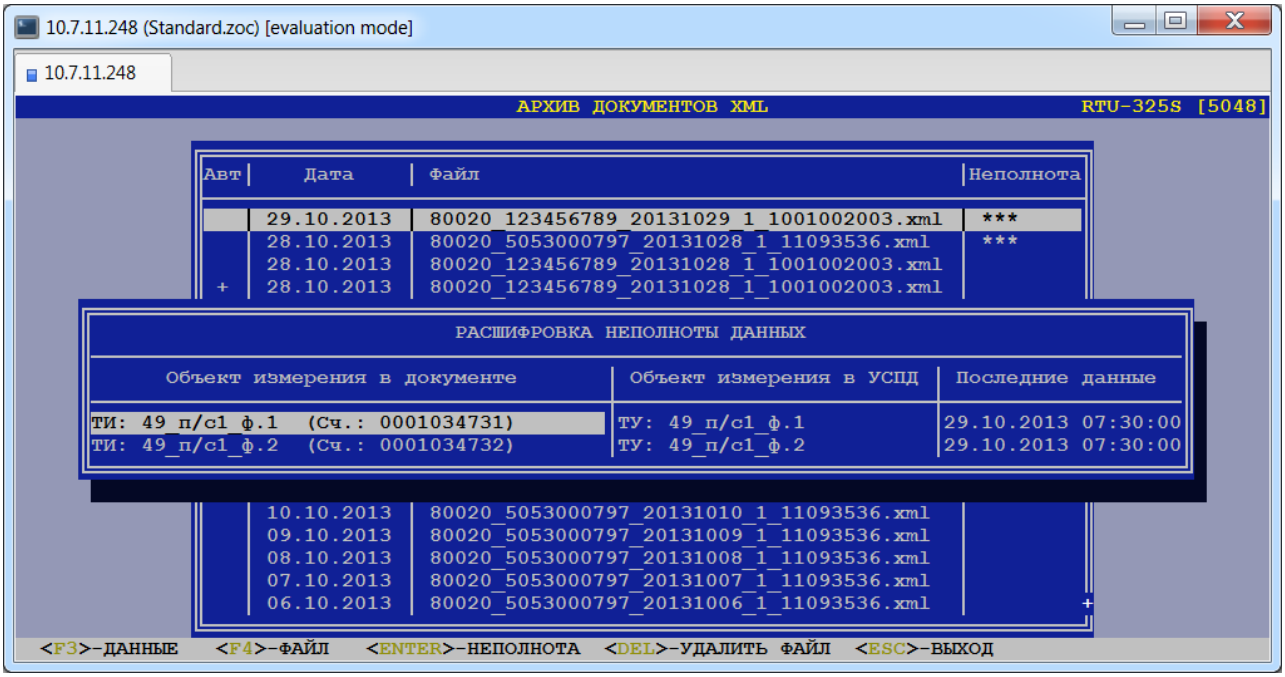
The file contents can be viewed from the <F4> key:



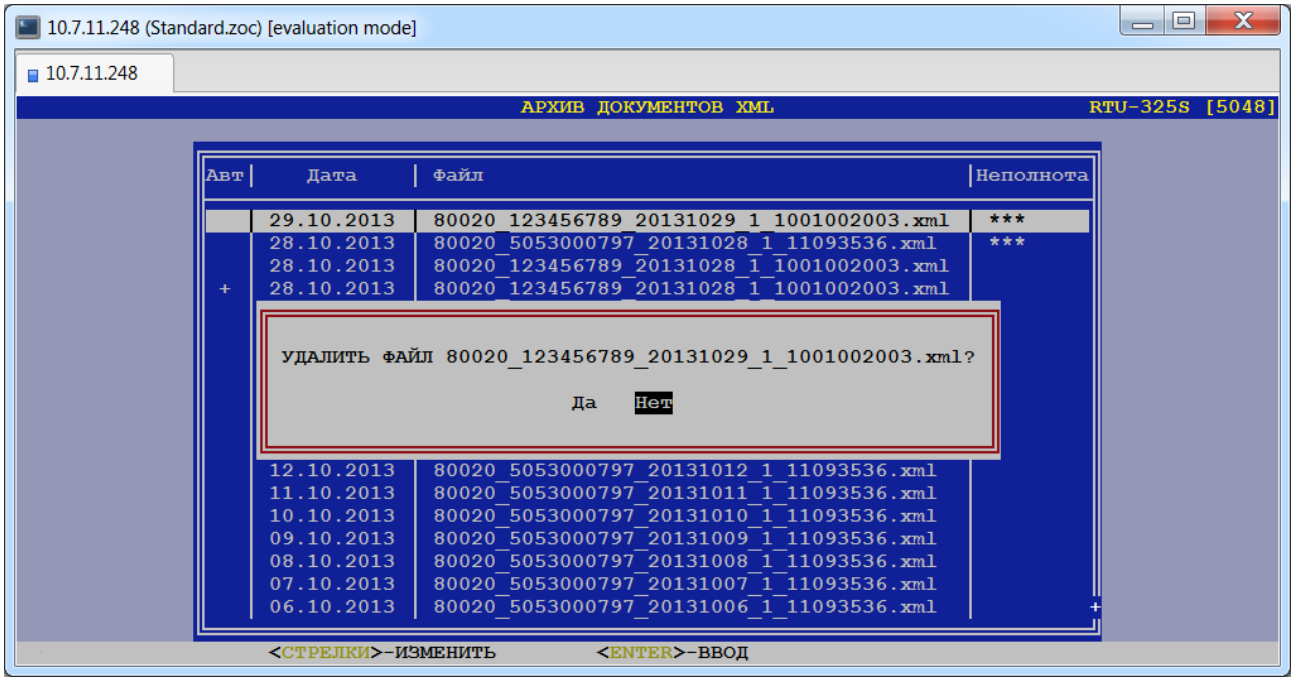
You can view the data in the selected file by using the <F3> key:



The key <Enter> can be viewed as incomplete in the selected document:



The selected document can be deleted from the archive by using the <Del> key:



4.6. Launching of interviews.

This point is accessible to users of the system's level decoupler and is designed to launch RTU interviews if they have been stopped. If RTU is in regular operation, the paragraph is red and is not accessible.

4.7. Stopping the polls.

This point is available to users of the system's level of controller and is designed to stop RTU interviews if they have been launched. Stopping of interviews is recommended to be used prior to working with «Конфигуратор» for faster operation of the programme. If the interviews were stopped, the point is red and unavailable.

4.8. Restart software.

This point is accessible to users of the system's level of decoupling and is designed to re-start only the RTU application in case of a non-usage situation.

4.9. Reboot RTU.

This point is available to users of the system lining level and is designed to reload RTU.

4.10. Shut down RTU.

This item is designed to correctly complete the RTU software before physically shutting down the RTU.

4.10.1. For RTU models without an integrated uninterruptible power supply (UPS).

This menu operation must be performed before switching off the external power supply, to shut down the software correctly.

After selecting this item, the service information messages on the software stoppage are available on the screen. These messages are designed for diagnostic purposes and do not require any action from the user.

When this menu operation completes, the screen displays «ВЫКЛЮЧИ ПИТАНИЕ» (SWITCH OFF POWER). The user may then switch off the external power supply to the RTU.

4.10.2. For RTU models with an integrated uninterruptible power supply (UPS).

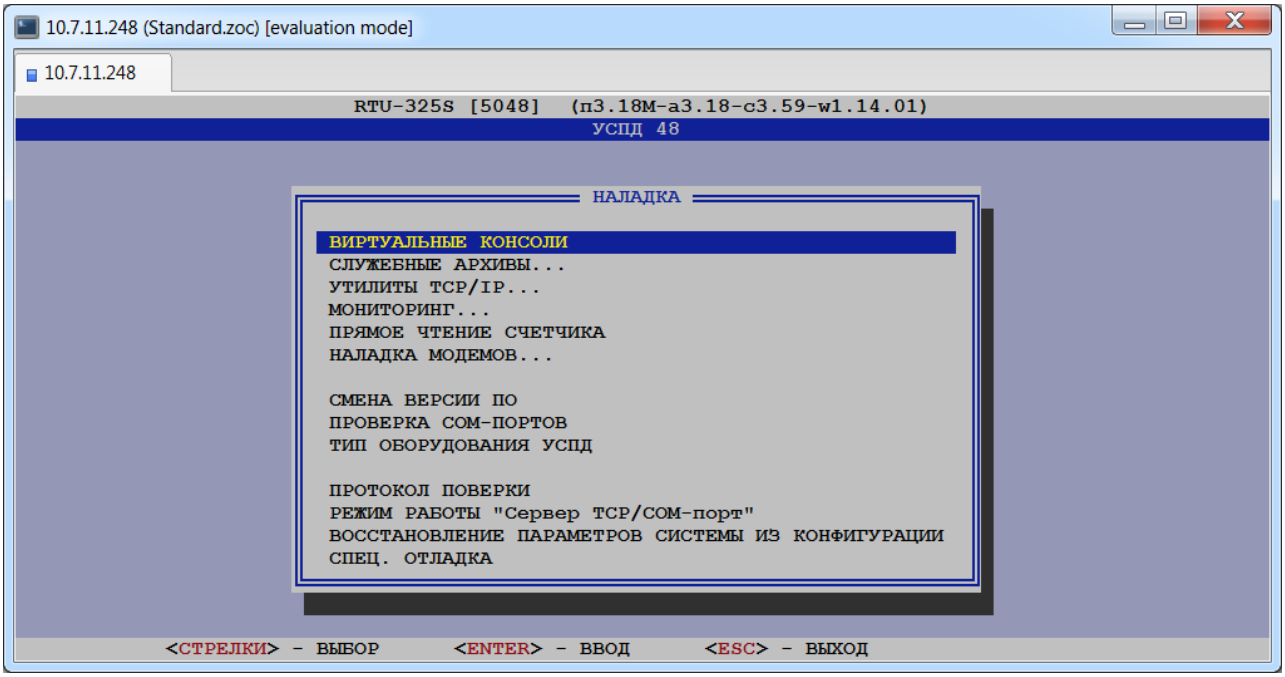
This point is required to shut off the RTU power from the battery when the external power is removed.

After selecting this item, the service information messages on the software stoppage are available on the screen. These messages are designed for diagnostic purposes and do not require any action from the user.

When this menu operation completes, the screen displays «ВЫКЛЮЧИ ПИТАНИЕ» (SWITCH OFF POWER). The user may then switch off the external power supply to the RTU.

4.11. The rinse...

This menu item is available to users of the system lining level and contains software that can be used for the installation and maintenance of RTU. These programmes are described below:

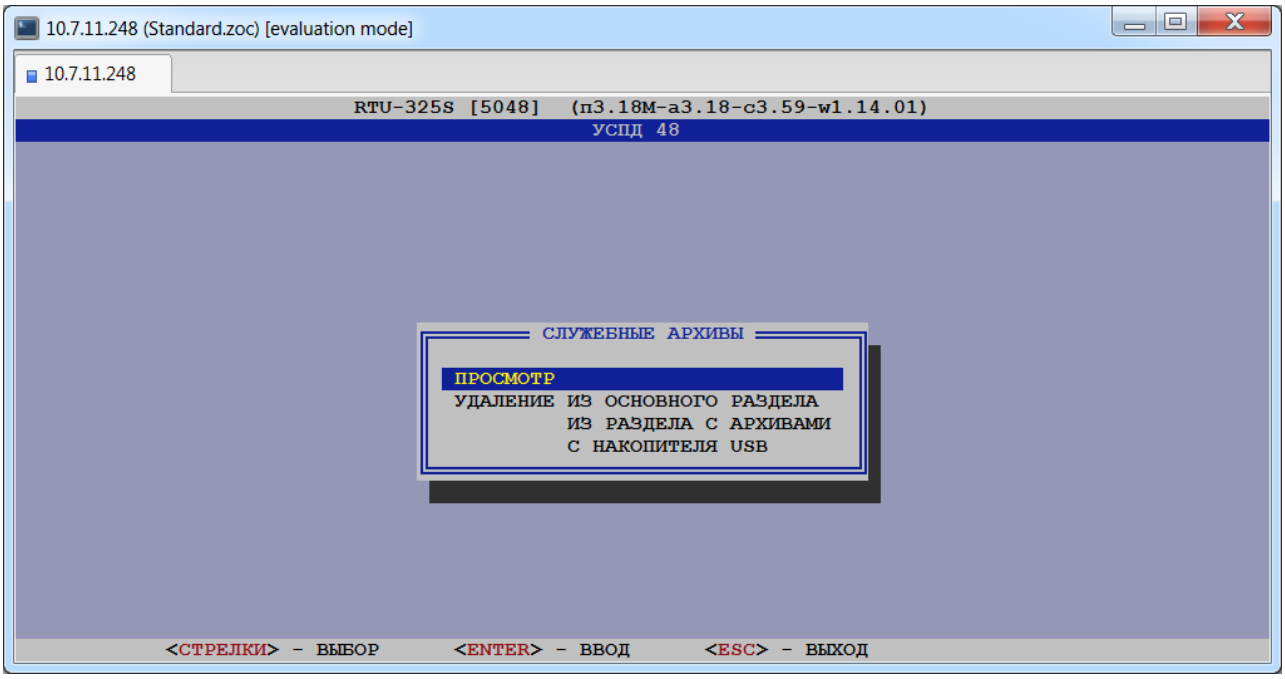


4.11.1. Virtual consoles.

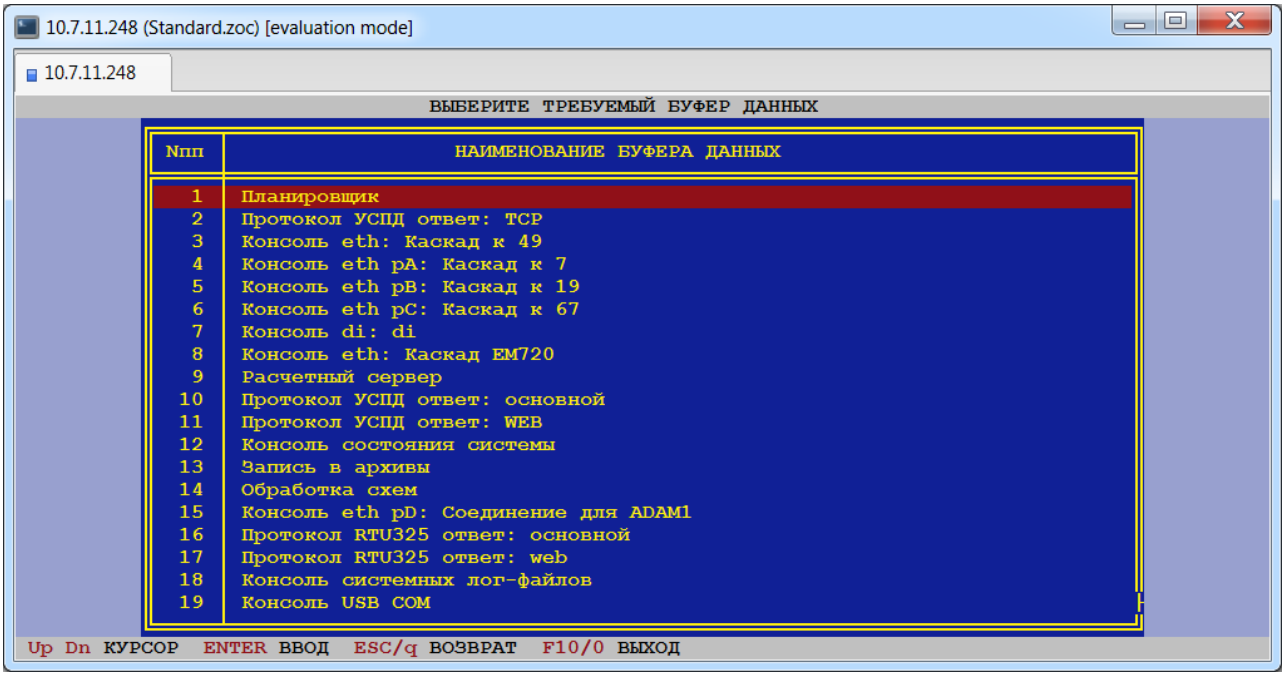
The purpose of this point is to monitor real-time current records of service archives buffers.

4.11.2. Office archives...

The purpose of this paragraph is to review and remove the official archives:



The user can view the service records for the day selected from the selected data buffer:



The following data buffers are always present:

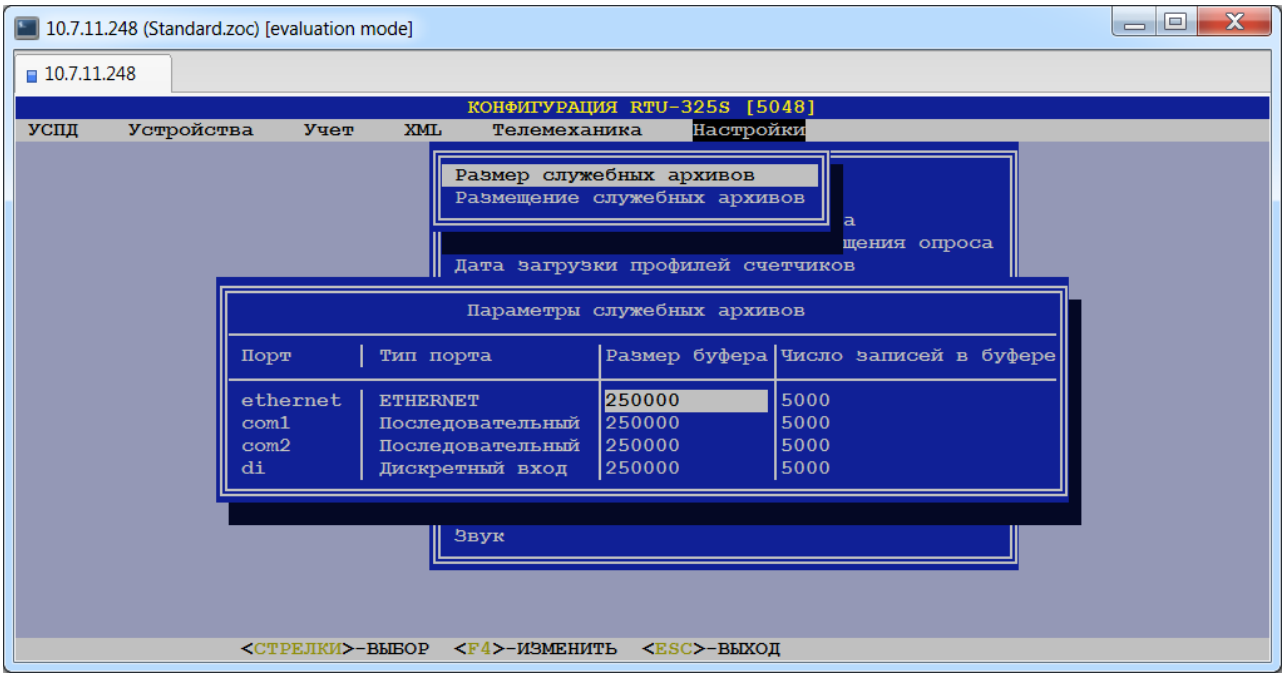
- Planner
- Account server
- RTU protocol response: main
- RTU protocol response: WEB
- System status console (RTU loading can be evaluated)

- Recording
- Schematic processing
- RTU325 Response: Main
- RTU325 Response: Web
- Console of system logs
- Diagnostic server
- Consul of the Communications Statistics server (can trace the PPP connections in GPRS mode, dynamic DNS service)
- Data server console in RAM
- Web Console

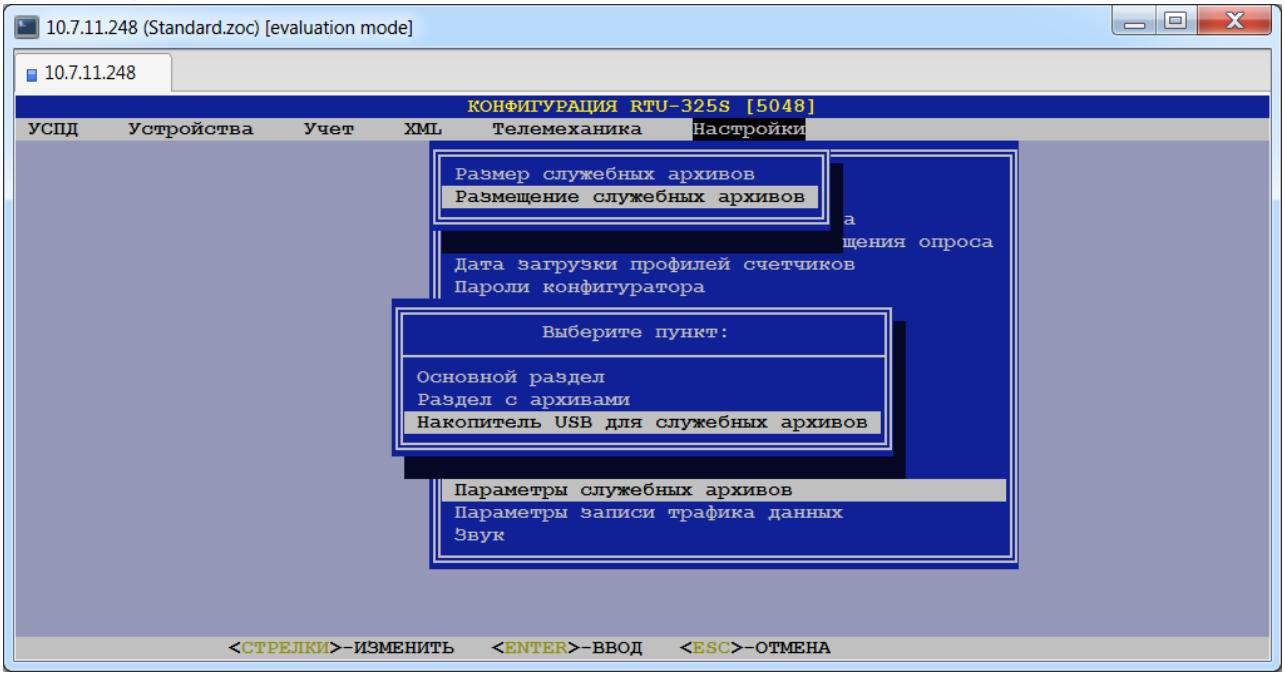
• Application server console. Data buffers (consols) are added to each reconfigured connection.

Messages in the data buffers are internal service information from RTU applications. This information is of an informal technical nature and is intended to analyse the work of RTU in the construction phase. In case of non-staff situations, the RTU office archives may be transferred upon request by the technical support service.

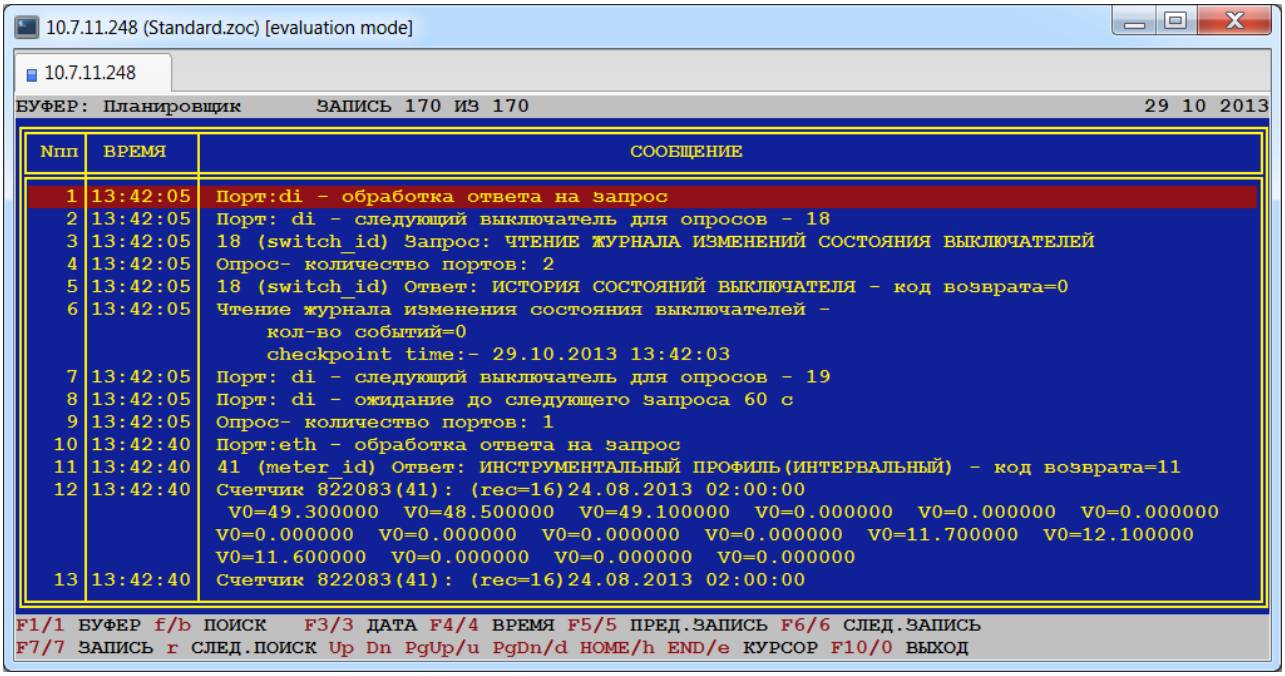
The data storage depth is modelled in paragraph «Настройки» > «Параметры служебных архивов» > «Размер служебных архивов» of the «Конфигуратор» programme:



The location of office archives is possible under the main heading, with archives and on the USB host. The appropriate section can be selected in paragraph «Настройки» > «Параметры служебных архивов» > «Размещение служебных архивов» of programme «Конфигуратор»:



The user must choose the date and buffer to view the data. Then, in an emerging list of selected data buffers for the selected day, select the record with the required start time. The user will then be provided with a list of the selected entries in chronological order:



The user is provided with the following navigation keys:

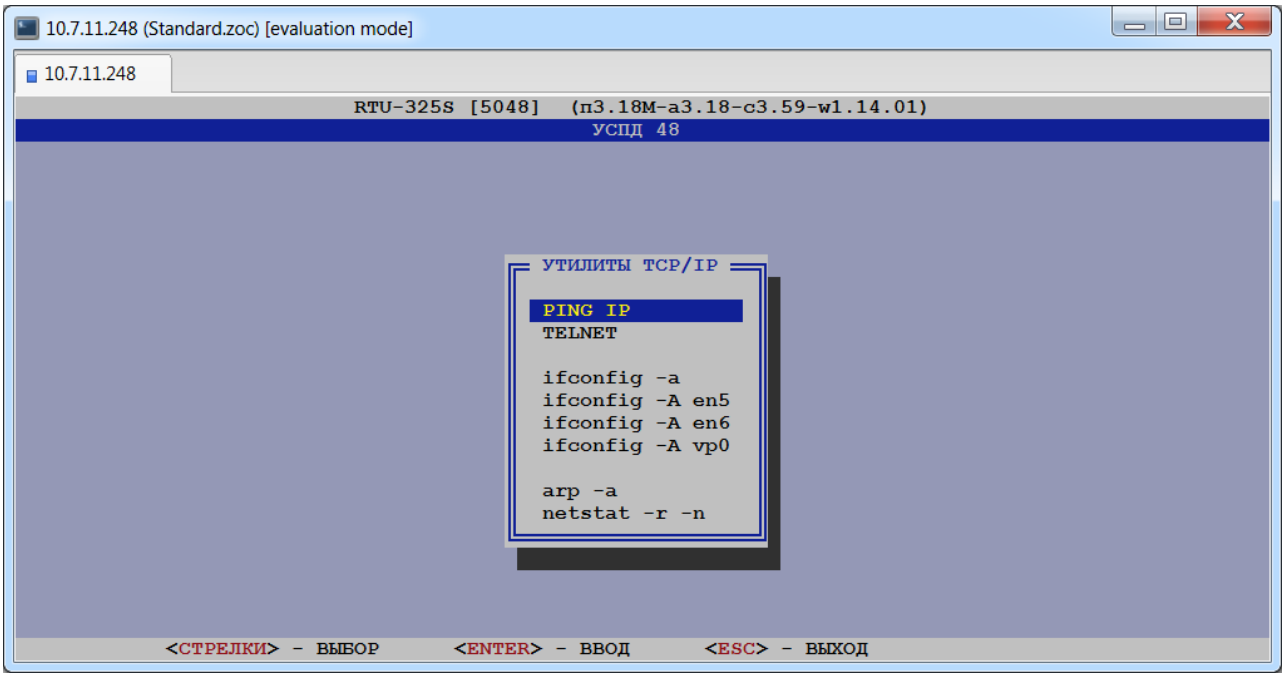
Key	**Event**
ESC	Quit Message View
F1/1	Selection of the data buffer from the list
f/b	Searching the text string on the buffer record
F3/3	Select date to view
F4/4	Select time(s) to view

Key	Event
F5/5	View previous entry
F6/6	View next entry
F7/7	Recording the current data buffer on a disk as a binary file to the directory /pub/data / year/month/day that can be downloaded from ftp.
r	Continue previous search
Up, Dn, PgUp/u, PgDn/d, HOME/h, END/e	Message Viewer
F10/0	Quitting the program
F8/8	Recording the current data buffer on the disk as a text file of pvconxxx.txt or piotracexxx.txt in the directory /pub/data / year/month/day that can be downloaded from the FTP protocol.

To remove the data, the user must choose the buffer from which to remove the data.

4.11.3. TCP/IP utiliters...

This paragraph contains the following tCP/IP tibilis:

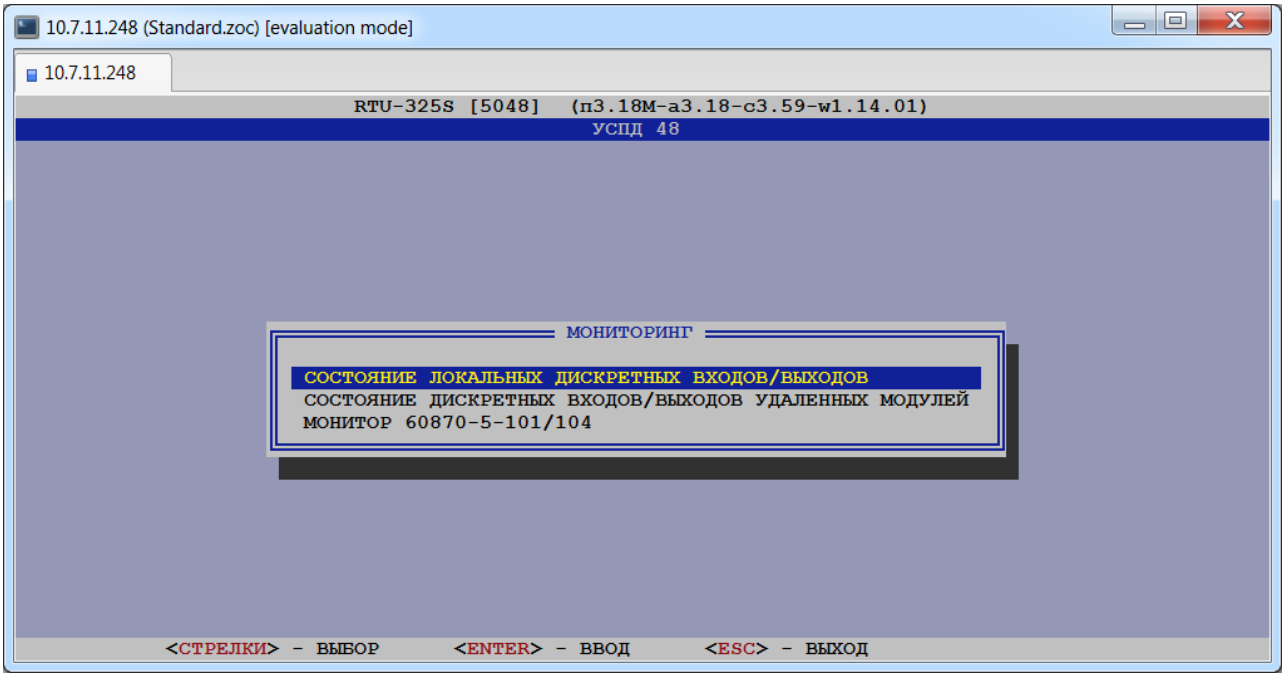


Note: To leave the utilith 'Telnet', press <Ctrl>+<>> and beyond «quit».

4.11.4. Monitoring...

This paragraph is intended to monitor in real time the status of digital inputs/outputs and the transmission of protocol data 60870-5-101/104.

The following menu will be presented to the user when selecting this paragraph:



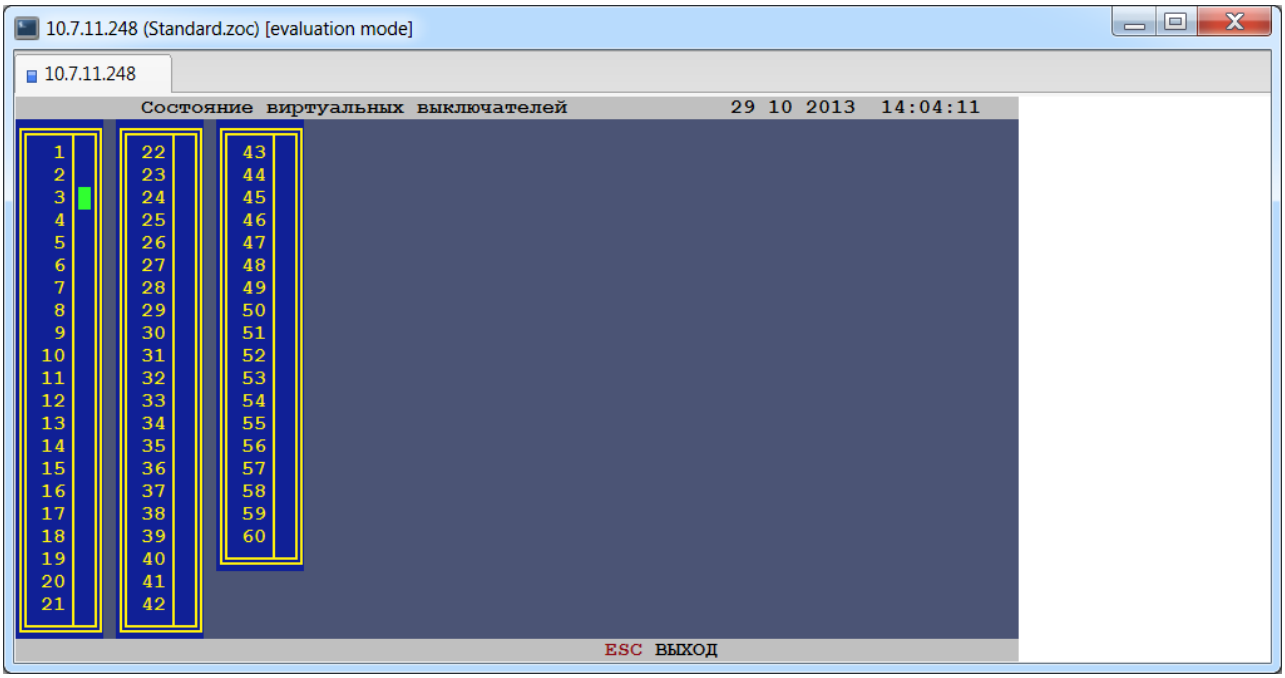
4.11.4.1. Status of local digital inputs/exits.

In this paragraph, the user may look at the current status of the following discrete objects:

- Local virtual switches,
- Local digital inputs,

• Local digital outputs. The program provides a list of all possible discrete objects present in the RTU hardware configuration.

A green-colored triangle to the right of the discrete object number indicates that it is in «Включено» position:

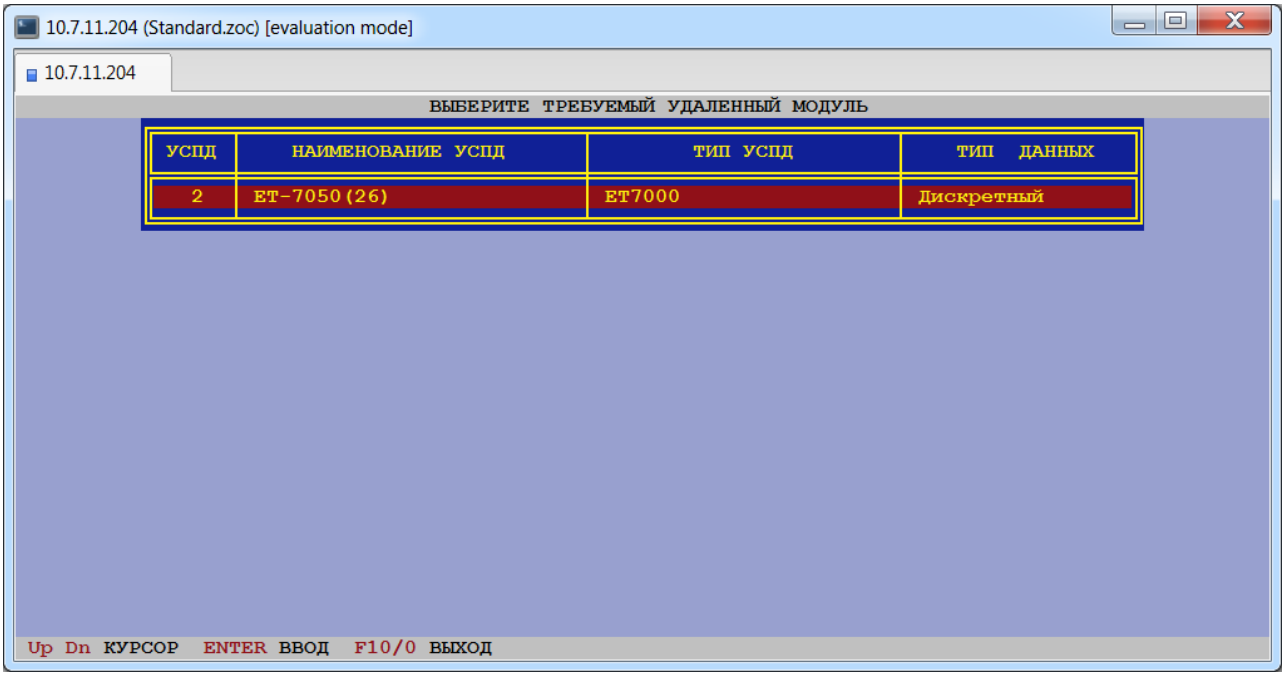


4.11.4.2. Status of discrete entries/exits of remote modules.

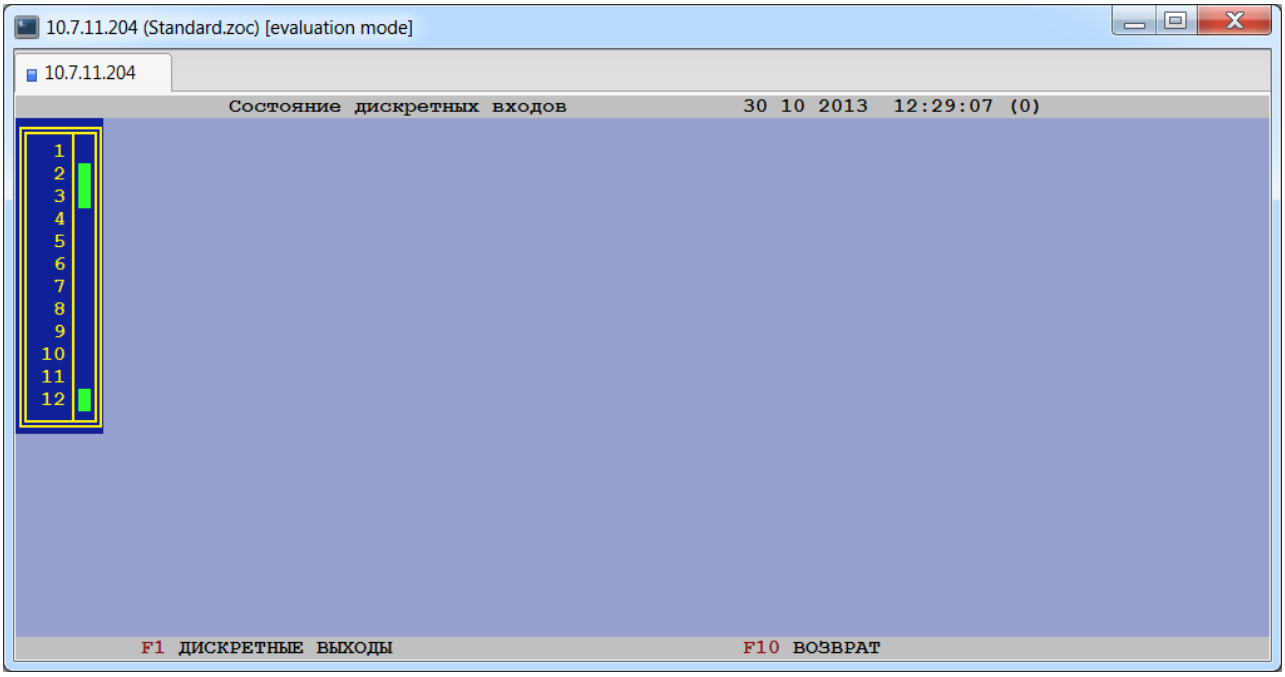
In this paragraph, the user can view the current status of discrete objects of remote modules.
The following configuration in the programme "Конфигуратор" shall be established to monitor the status of discrete input/exit of remote input/output modules:

1) In the menu item "УСПД" > "Соединения" > "Параметры соединений", a connection to the remote input/output module should be created.
2) In the menu item "УСПД" > "Удалённые УСПД / модули ВВ" > "Параметры модулей ВВ", a remote input/output module should be created.
3) In the menu item "Устройства" > "Дискретные объекты" > "Параметры дискретных объектов", at least one discrete object connected to this input/output module should be created.
4) In the menu item "Телемеханика" > "Телемеханический режим соединений", it is necessary to set the tele-mechanic mode for the connection.

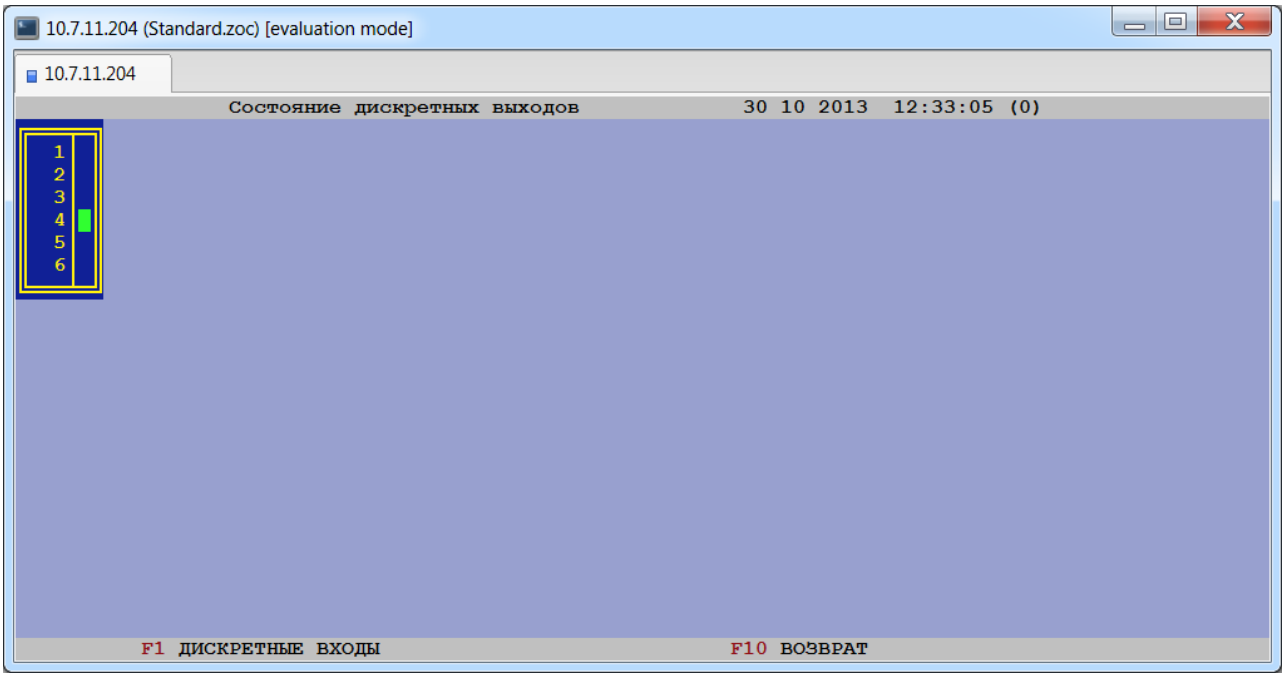
After all the actions described above and the selection of this paragraph in the menu that has been introduced, the user must select the remote input/output module:



The program will provide a list of all discrete entries of the remote input/output module. A green-colored triangle to the right of the discrete object number indicates that it is in «Включено» position:



The key <F1> shall be pressed to view the digital outputs status of the remote input/output module:

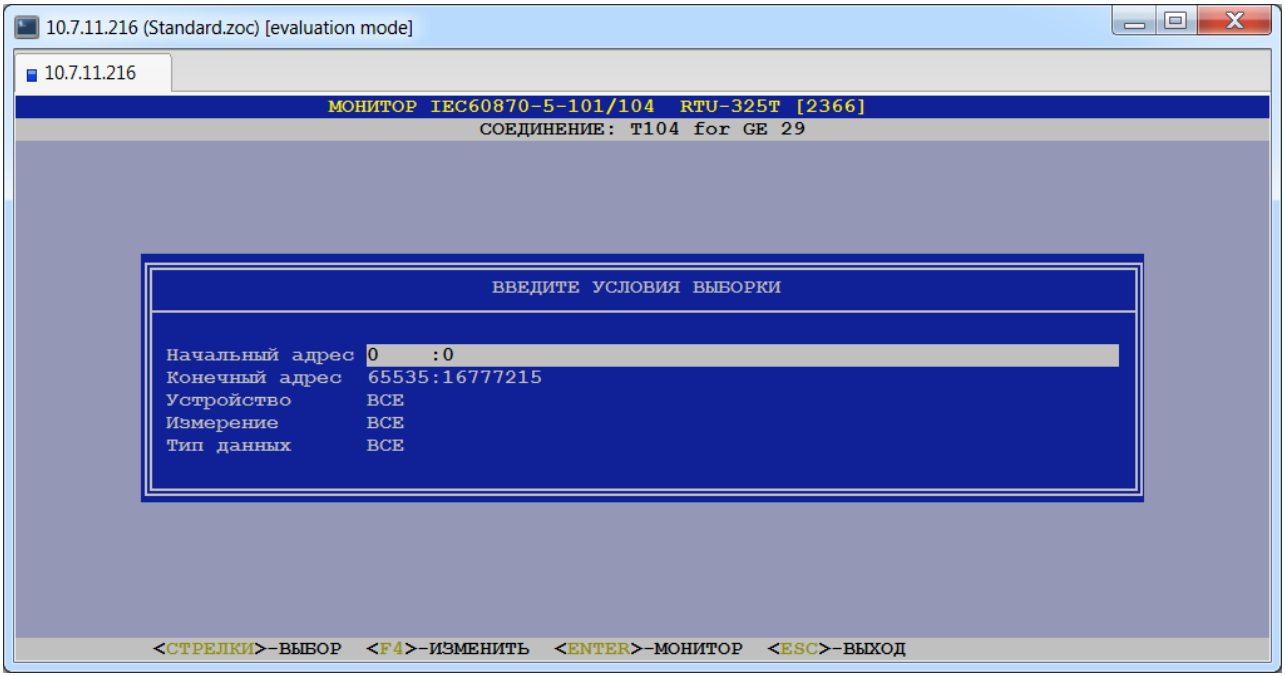


Next, the key <F1> is switched between viewing the state of digital inputs and exits.

The upper right corner shows the time of the last scan of the state of discrete objects. The scan period can be set in the 'Scans Period' field, msek' connection parameters.

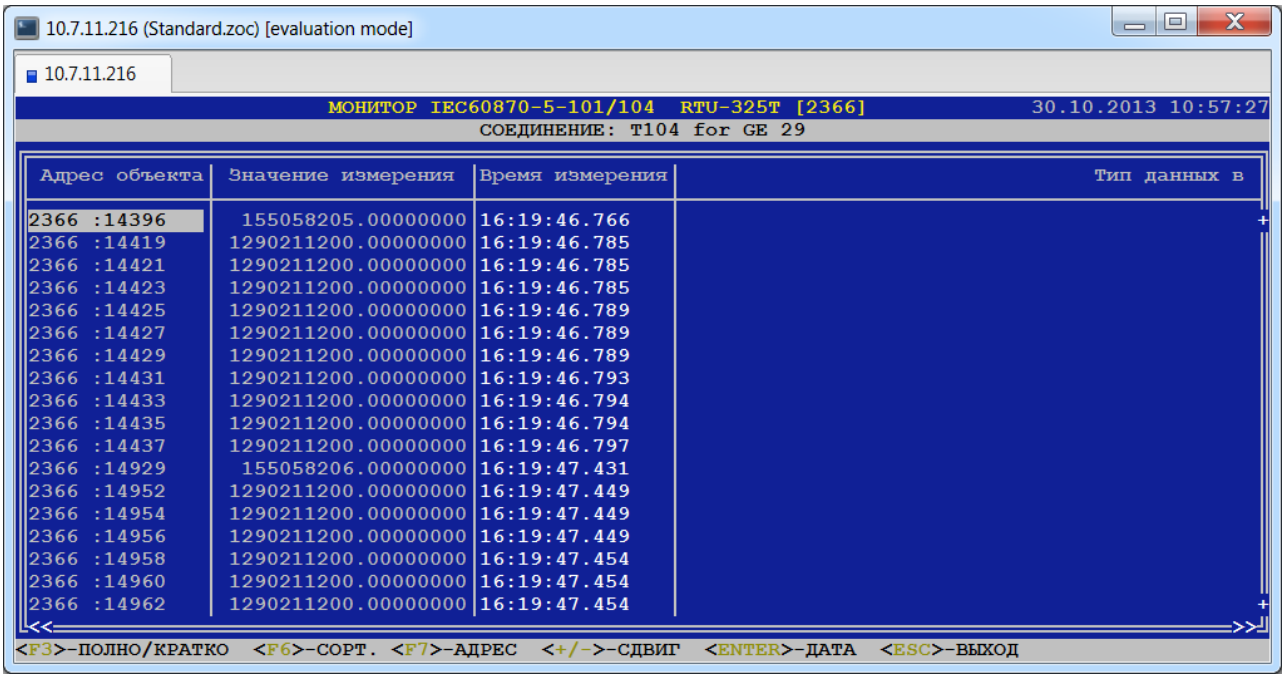
4.11.4.3. Monitor 60870-5-101/104.

Once this item is selected, the user will be provided with a table of the list of configuration connections with protocols 60870-5-101/104 (responses). Once the required connection has been selected, the sample conditions form will be presented:



- **Initial address**
  The entry of the initial address for the sample can be entered in this field.
- **End address**
  In this field, you can enter the end of the sample address.
- **Device**
  In a given field, you can select a sampling device from the list.
- **Measurement**
  In this field you can choose the measurement for the sample from the list.
- **Data type**
  In this field you can choose the type of data to be taken from the list.

The following table will be presented to the user after all the required conditions have been determined:



Each row of this table has the following information fields:

- device, - Measurement, - Object Address, - Measurement Value, - Measurement Time, - Data Type in ASDU, - Reason for transmission to ASDU, - Value in ASDU, - Time in ASDU, - Flag, - Translated, - Quited. A description of possible field values «Флаг» is given in a separate manual "RTU325. Data collection and communication device for the ICUS systems and telematics. The communication interface subsystem for the protocols of the GOST R IEC 60870-5-101-2006 and IEC 60870-5-104:2006 (GEST R IEC 60870-5-104-2005)".

For a single element switch, the values of fields «Значение измерения» and «Передано» are identical and may take the following values:

'0' is off, '1' is on. For a two-way switch, the values of fields «Значение измерения» and «Передано» are not identical and may take the following values:

Status	**Measurement value**	**Transmitted**
Disabled	‘0’	‘1’
Included	‘1’	‘2’
Undefined or intermediate	‘2’	‘0’
Undefined	‘3’	‘3’

The user is provided with the following navigation keys:

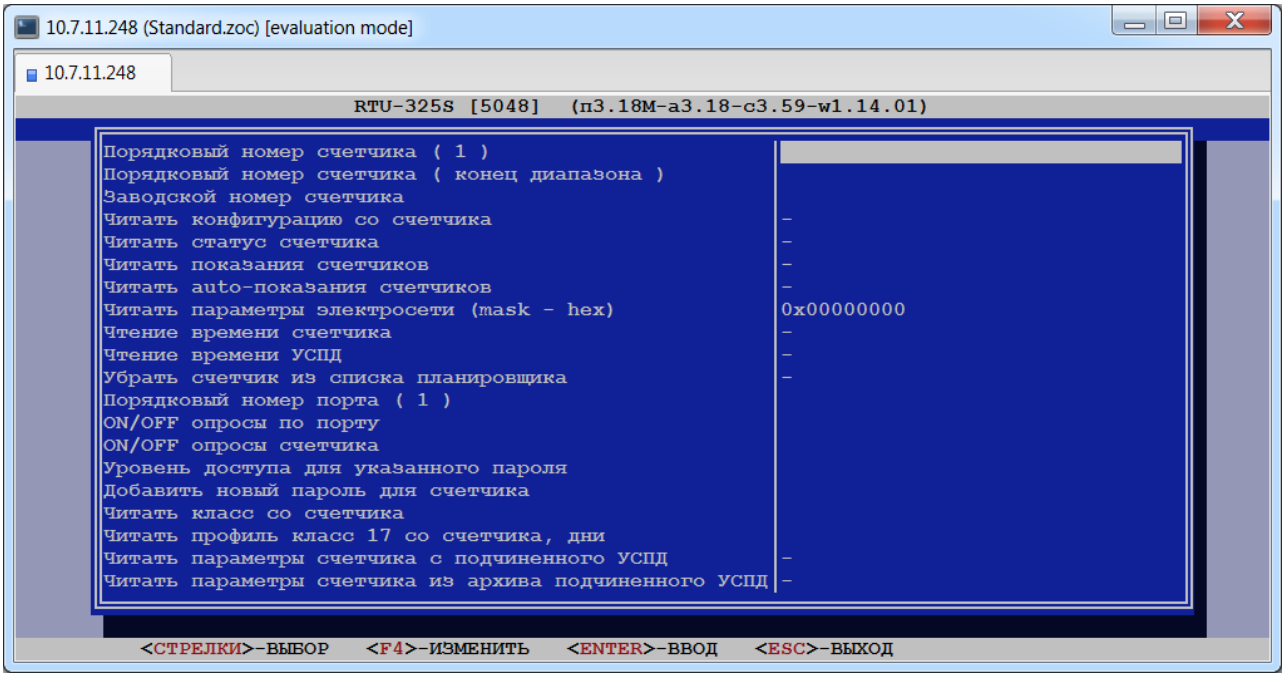
Key	Event
ESC	Withdrawal
F3	Change of presentation of values in fields «Тип данных в ASDU» and «Причина передачи в ASDU» : in the form of a numerical code or text description.
F6	Sorting by the user ' s column. The order of the columns in the sorting is also determined by the user.
F7	Search for measurement address
+/-	Move the current column in the table for ease of viewing. '+' to right, '-' to left.
ENTER	View dates in fields «Время измерения» and «Время в ASDU» .

The values in the fields «Время измерения» and «Время в ASDU» are indicated in a different colour if the time mark of the transmitted value has a date different from the current calendar day.

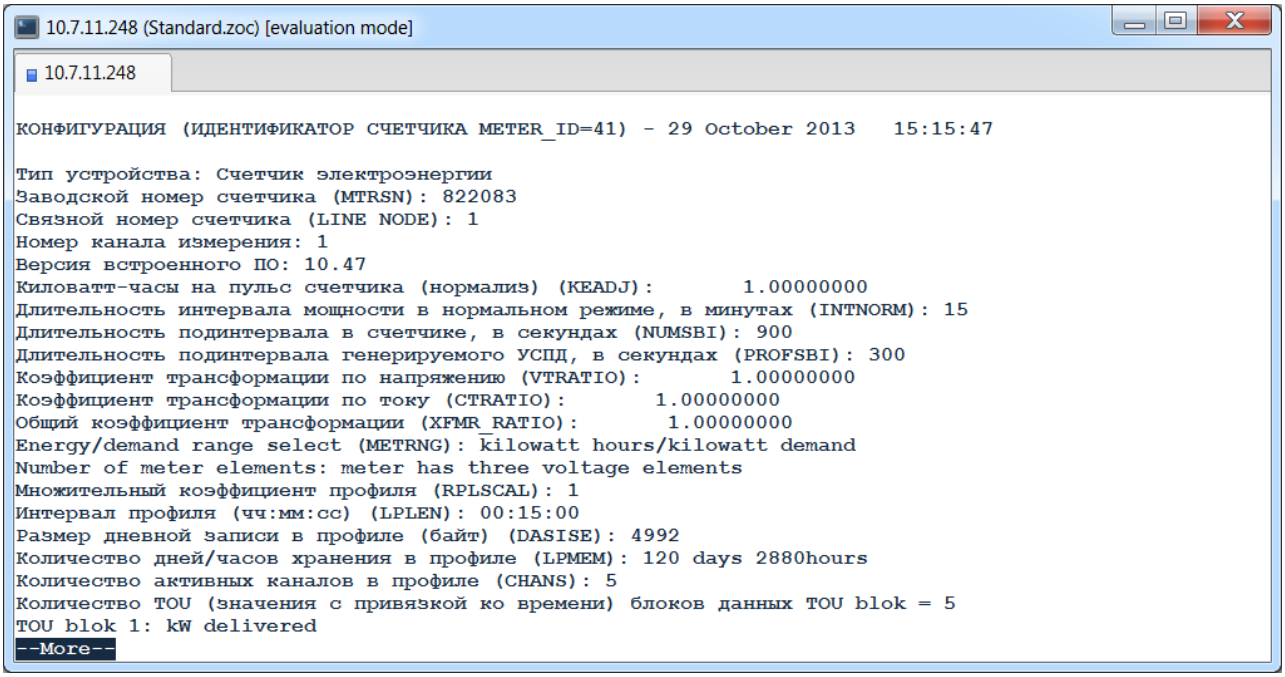
4.11.5. Direct reading of the meter.

This point is accessible to users of the system lining level and is designed for direct reading of meters and a number of other customizations.

In selecting this paragraph, the user will be provided with a form to fill in:



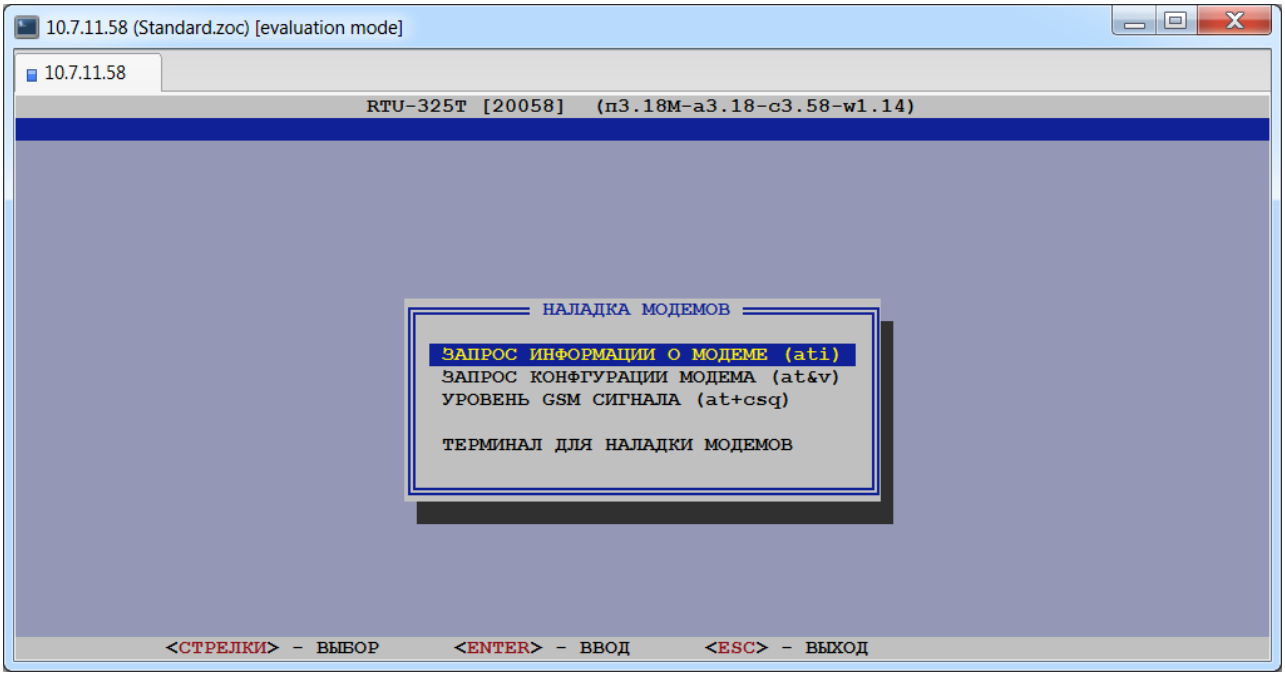
The following is an example of a configuration reading from a meter with serial number 41:



Navigation keys should be used to view all data.

4.11.6. Fixing modems...

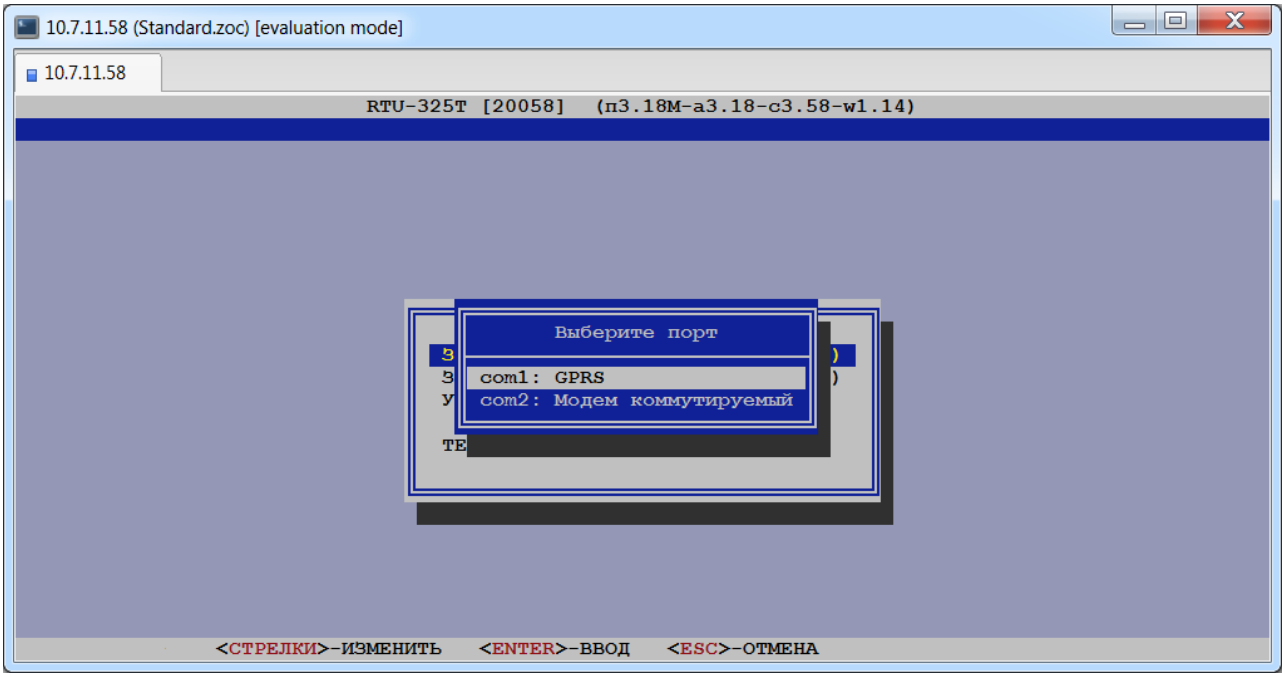
In this paragraph, the user may look at the information about the modem connected to the RTU, its configuration, the GSM signal level or the modem setting.



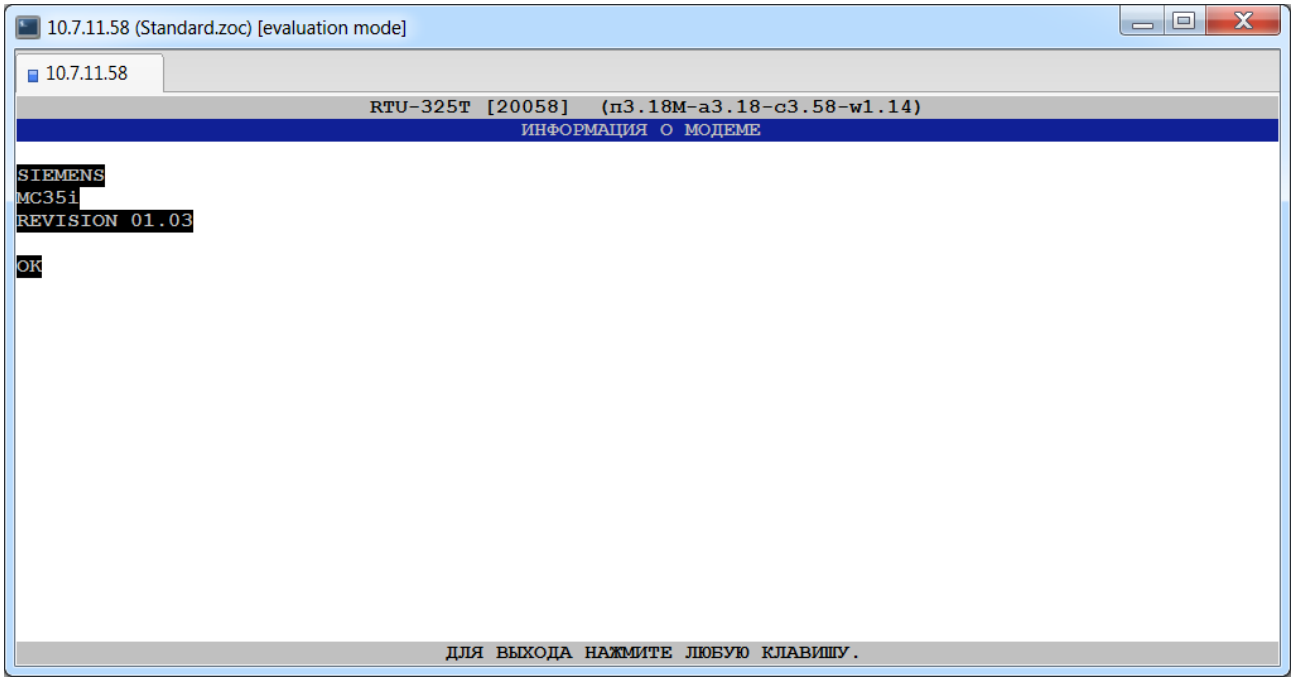
4.11.6.1. Requesting modem information.

In this paragraph, the user can view the modem information returned by the ati command.

In selecting this paragraph, the user will be asked to select the port to which the modem is connected:



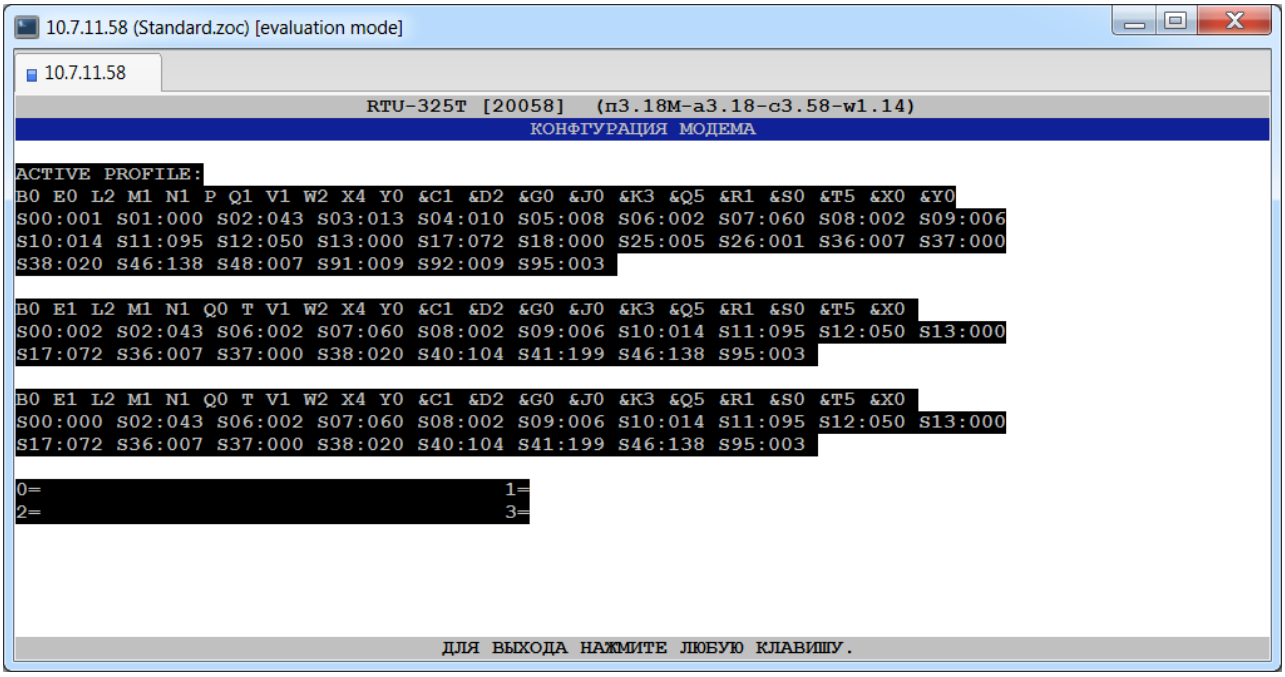
Once the port is selected, relevant information will be available on the screen:



4.11.6.2. Modem configuration request.

In this paragraph, the user can view the modem configuration information returned by the at&v command.

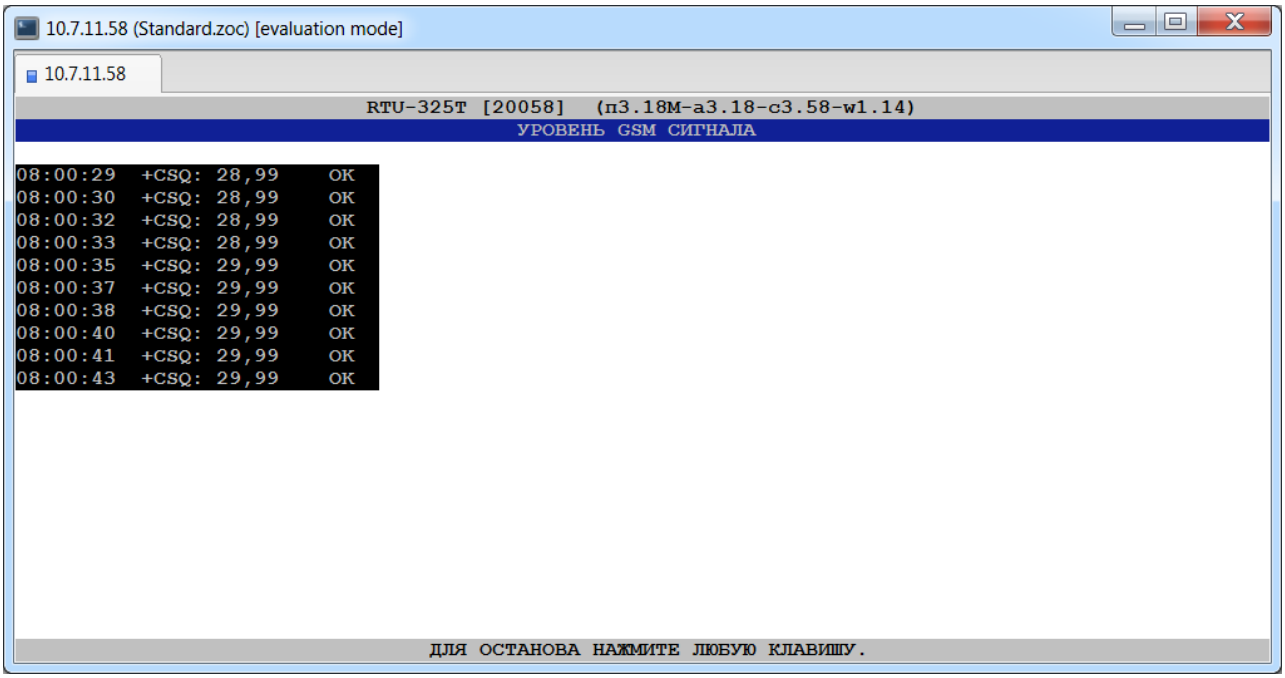
Once the required port is selected, the relevant information will be available on the screen:



4.11.6.3. GSM signal level.

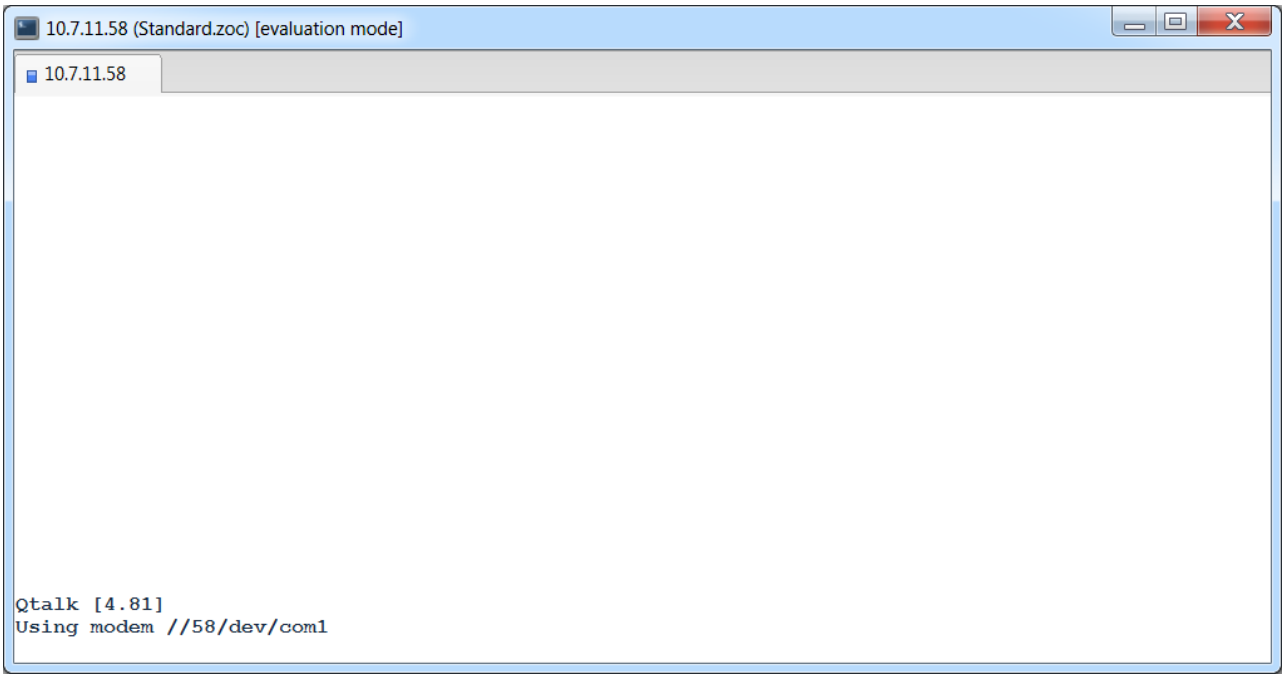
In this paragraph, the user can check the GSM signal level returned by the command at+csq.

Once the required port is selected, the relevant information will be available on the screen:



4.11.6.4. Modem terminal.

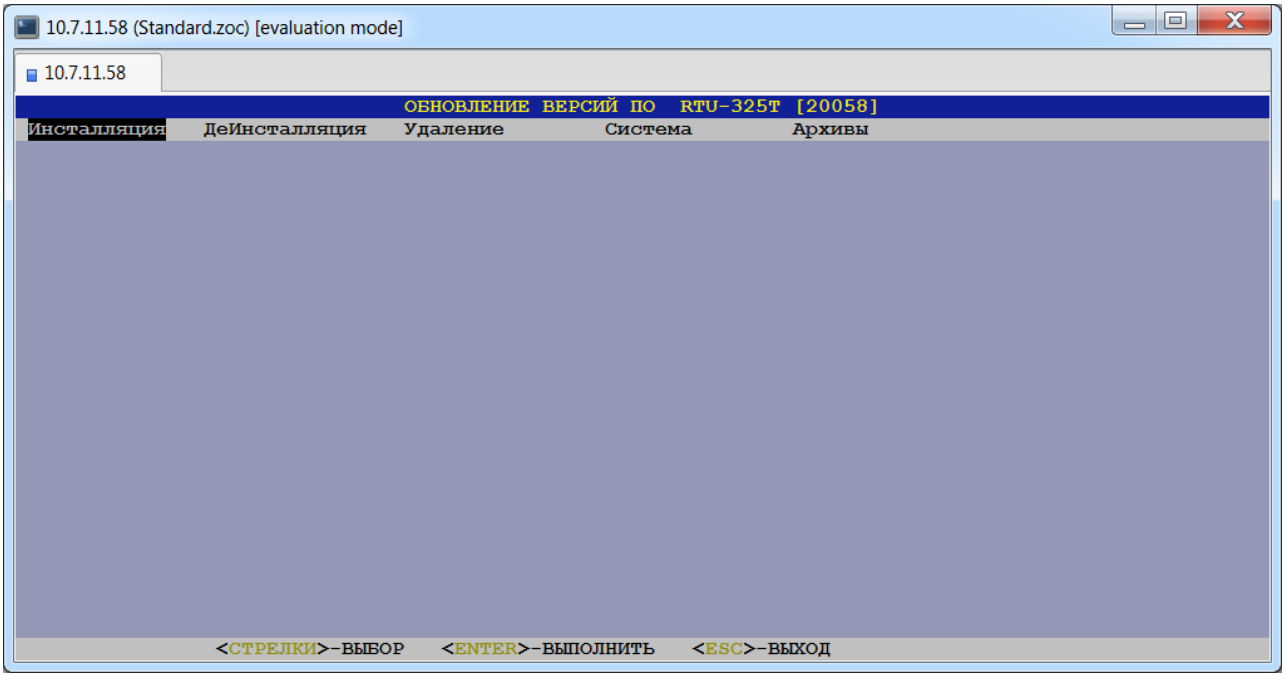
In this paragraph, the user may set up the modem. Once the required port has been selected, the terminal programme will be loaded to operate the selected modem:



To leave the terminal program, you need to press the keys <Ctrl>+<A>.

4.11.7. Change of software.

The following menu will be presented to the user when selecting this paragraph:



This point is accessible to users of the system lining level and is designed to install new versions on the RTU:

- application software;
- System software
- The structure of the RTU archives;
- The RTU web server has been built into it.

The current versions of all the above components of the system can be identified from the top line of the main menu of the built-in software RTU: «пX.XX - aX.XX - cX.XX - wX.XX» , where X is the current software version;

PX.XX - current version of the application software; AX.XX - current version of the structure of archives; SX.XX - current version of the system software; wX.XX - current version of the built-in web server RTU; (e.g. «п3.18M-a3.18-c3.59-w1.14»). The updated versions of the integrated software RTU are marked as follows:

rtu325_vXXX - update of application software
where XXX is the number of the new version (without a mid-point);
system_vXXX.upd is the update of the system software;

where XXX is the number of the new version (without a mid-point);
db_vXXX.upd is the update of the structure of the RTU archives;

where XXX is the number of the new version (without a point in the middle).

Note: Please note that when working with an external engineering remote control unit, OS WINDOWS on the ETHERNET interface (e.g. FTP client) shows the names of the OS WINDOWS files on the top register.

The algorithms for updating the built-in software RTU, discussed below, describe the update of all software components and require the following files to be available in the given route:

- All files of the architecture update of archives type 'db_vXXX.upd'; - File of the required version of the system software type 'system_vXXX.upd'; - File of the required version of the application software type 'rtu325_vXXX'. This description is necessary to better understand the overall work pattern and, accordingly, the private cases of the update of the integrated software RTU. Note how the individual components of the system are updated.

The RTU software update procedure uses the following routes to search for updated version files:

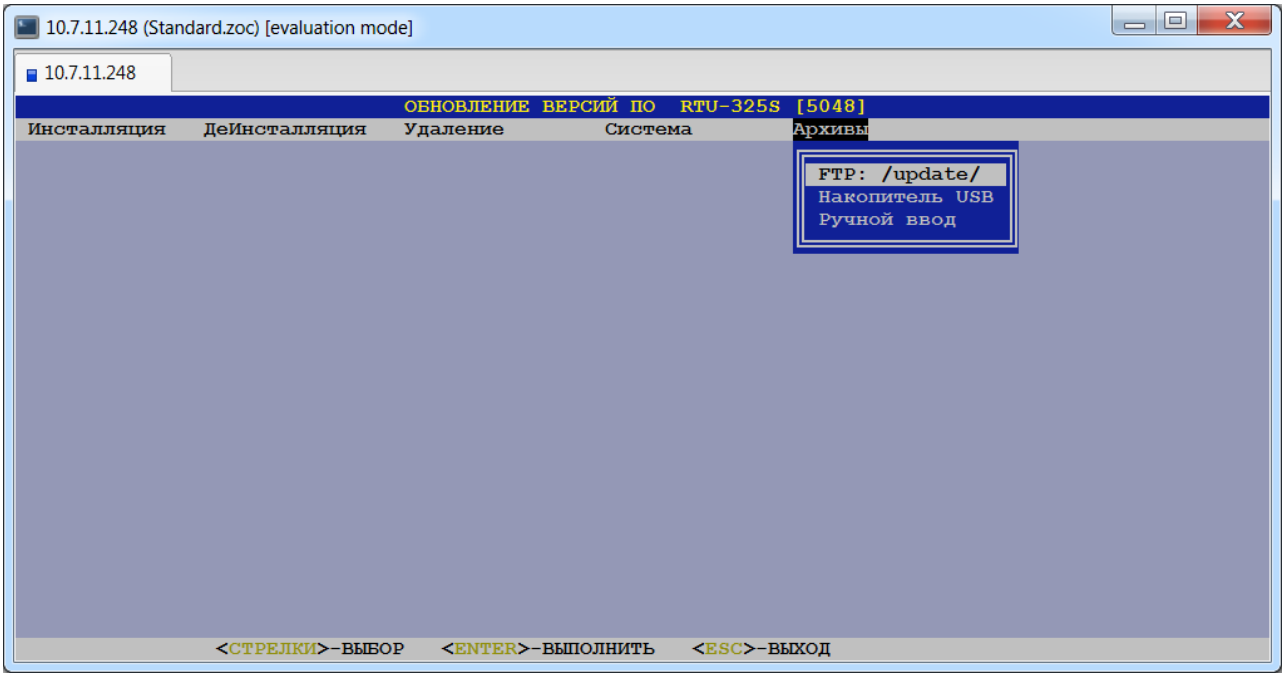
- **FTP: /update/.**
  This route assumes that the required update files are located in the directory / update/, which is accessible under the FTP protocol.
- **U.S.B. Accumulated.**
  This route implies that the required update files are placed on the USB storage device in section FAT32 or FAT16.
- **Manual input.**
  This route involves the manual introduction of the required directory (full route) and should be applied only on the basis of the specific recommendations of the technical support service.

4.11.7.1. A common algorithm to work with «Смена версии ПО» to update the RTU software.

1. Connect the USB storage device with updates files to the USB-port RTU or copy the required update files to the directory / update/ RTU with FTP client software.

2. Set up a new version of the archives structure.
   · Select «Архивы» menu item.

· In the proposed list, select the location of the update files:



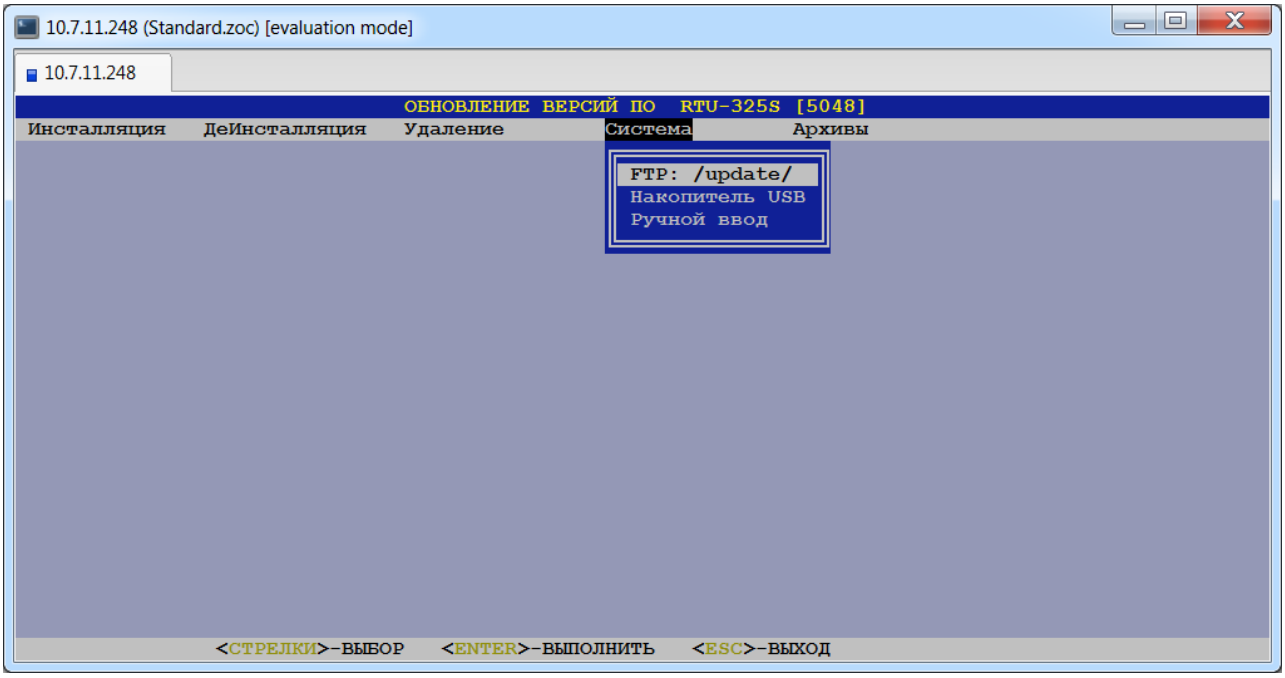
· To update from the USB storage device, select the required directory with the type 'db_vXXX.upd' of the required version.

· In the proposed list, select the new version number.

3. Set up a new version of the system software.

· Select paragraph «Система» .

· In the proposed list, select the location of the update files:



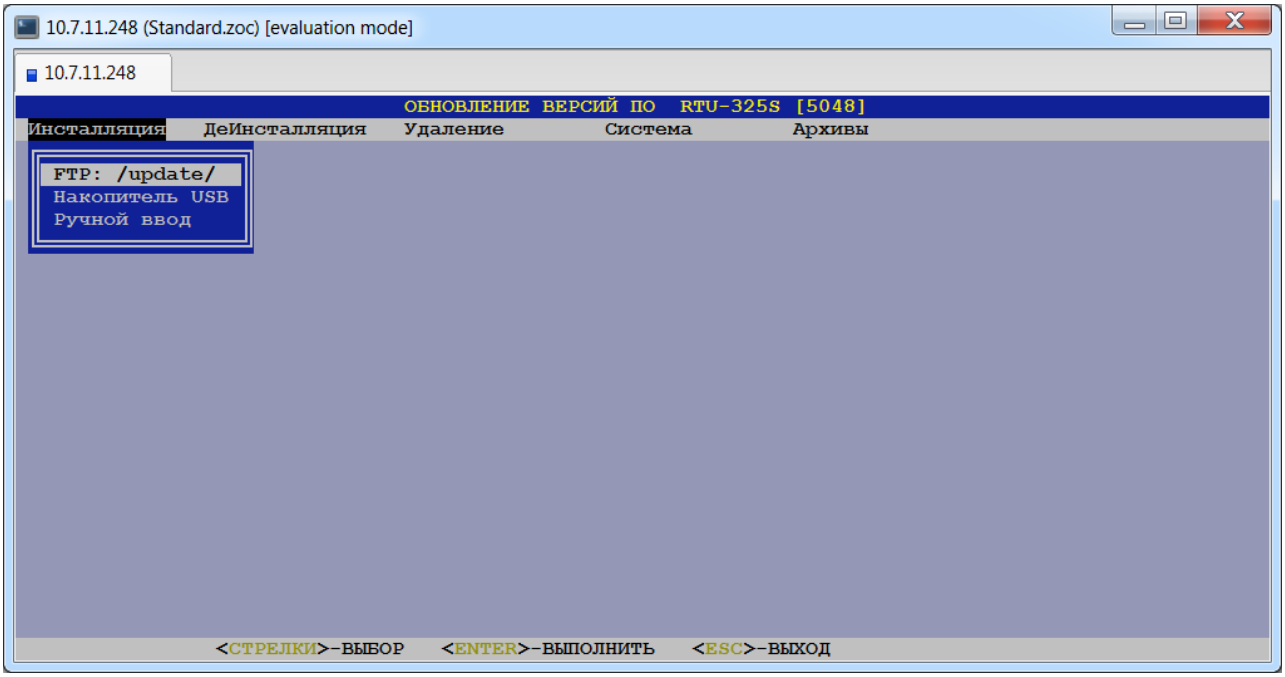
· To update the USB storage device, select the required directory with the 'system_vXXX.upd' file for the required version.

· In the proposed list, select the new version number.

4. Set up a new version of the application software.

· Select «Инсталляция» menu item.

· In the proposed list, select the location of the update files:



· To update the USB storage device, select the required directory with the file 'rtu325_vXXX.upd' of the required version.

· Select an update file from the list.

5. Quit «Смена версии ПО» with reboot RTU.

Notes:

· When rebooting RTU (P.5), the following shall be taken into account. Warnings at the bottom of the external engineering remote screen show RTU rebooting. The appearance on the screen of the external engineering remote control of the main menu software RTU means the start of the download of RTU. Between the appearance on the screen of the main menu software RTU and the start of the main menu items, there is a certain amount of time required for the full download of the RTU.

Take your time to press the keyboards and turn off the RTU power!!!!!!

· After a successful update of the software version, when returned to the main menu in the title, the old software version number remains, which does not reflect the actual cut version number. The performance of RTU is not affected. The correct cut number will be displayed when the next connection of the engineering remote to the RTU (after rebooting the engineering remote or while simultaneously pressing the keys <Ctrl>+<Break>).

4.11.7.2. Restore the previous version of the application software (item «ДеИнсталляция»).

The update of the application software may be complete or partial. A complete update of the application software is an update from a file with the name 'rtu325_vXXX.upd'. A partial update from a file with any other name containing small additions and/or corrections.

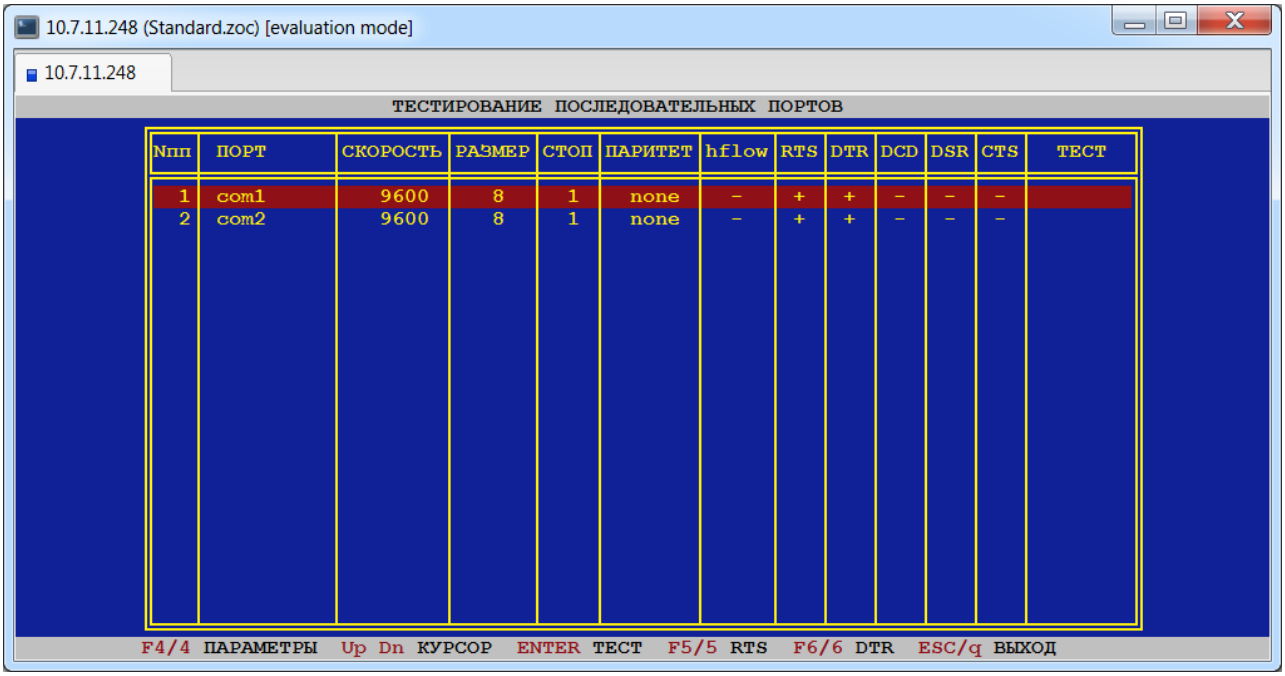
If the user has updated the application software (the archives and systems have remained the same) and there is an irregular situation associated with the incorrect operation of the new application software, then the previous version of the complete update of the application software, based on the RTU, can be restored.

4.11.7.3. Delete the previous version of the application software (the menu item «Удаление»).

This paragraph is designed to remove the previous version of the application software to make room in the main section of RTU. Once the previous version of the application software has been deleted, it will not be possible to restore the previous version of the application software update!

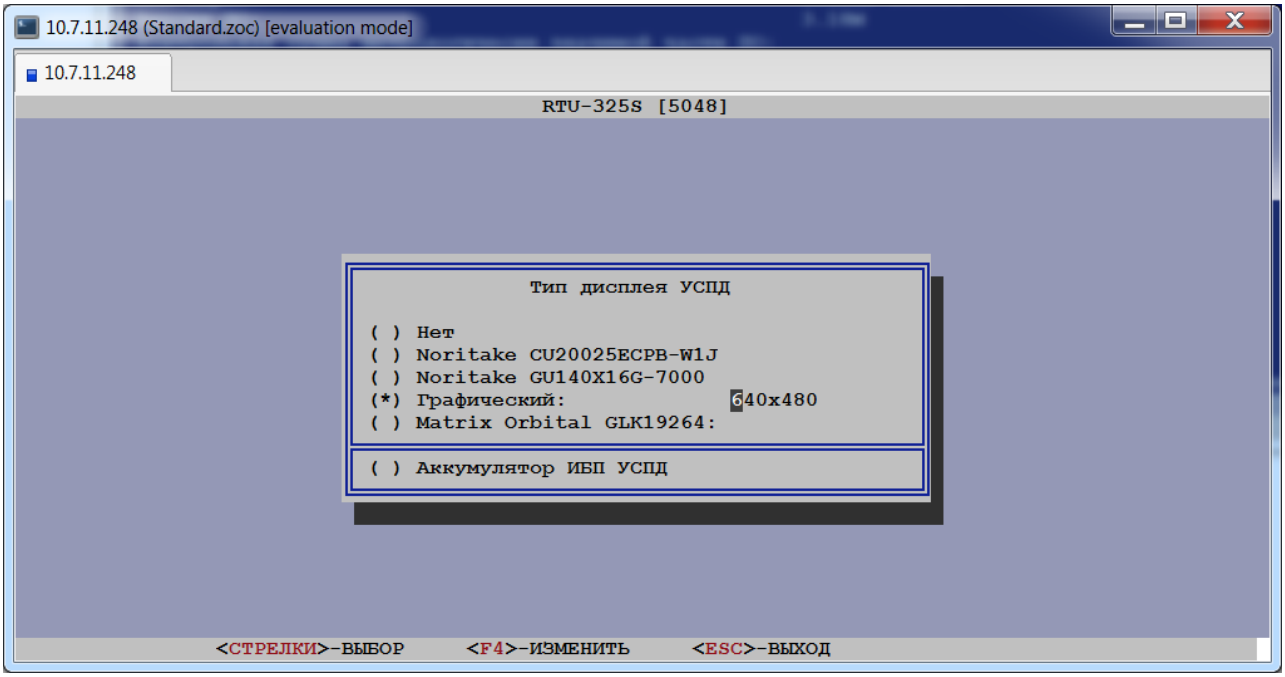
4.11.8. Checking FAX ports.

This point is accessible to users of the system's level of debugger and is designed to test successive RTU ports:



4.11.9. Type of RTU equipment.

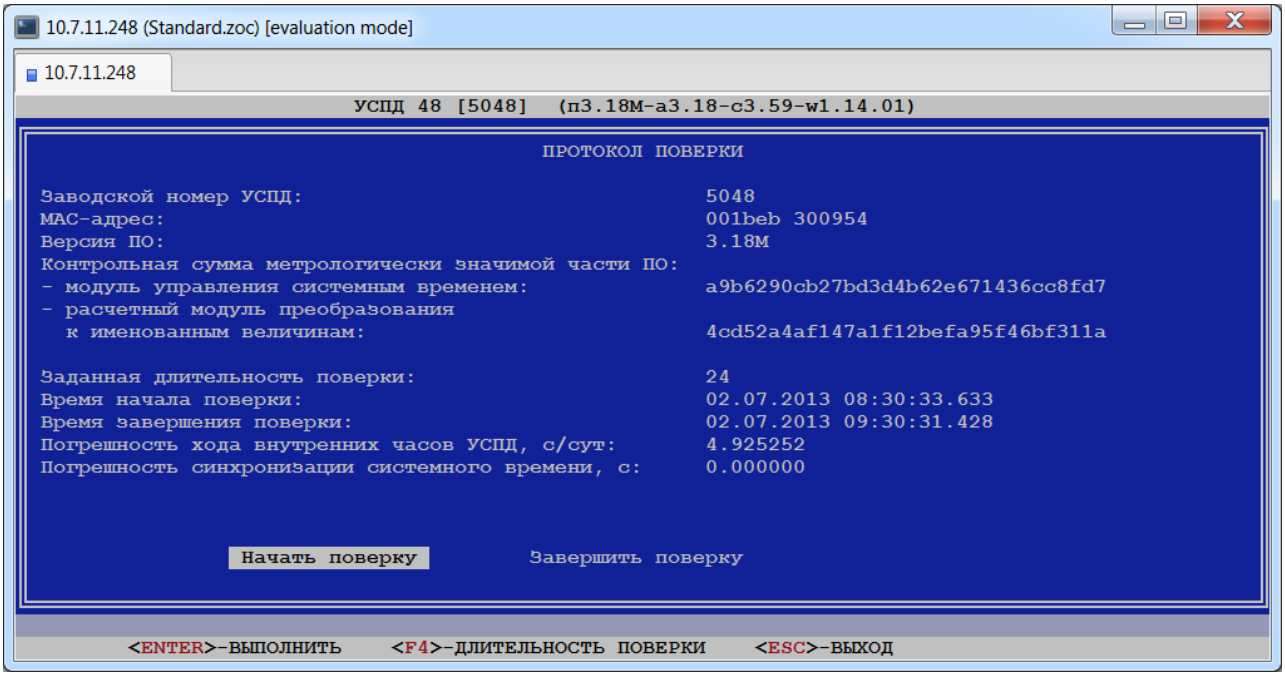
This point is accessible to users of the system lining level and is designed to configuration the RTU hardware:



4.11.10. The verification report.

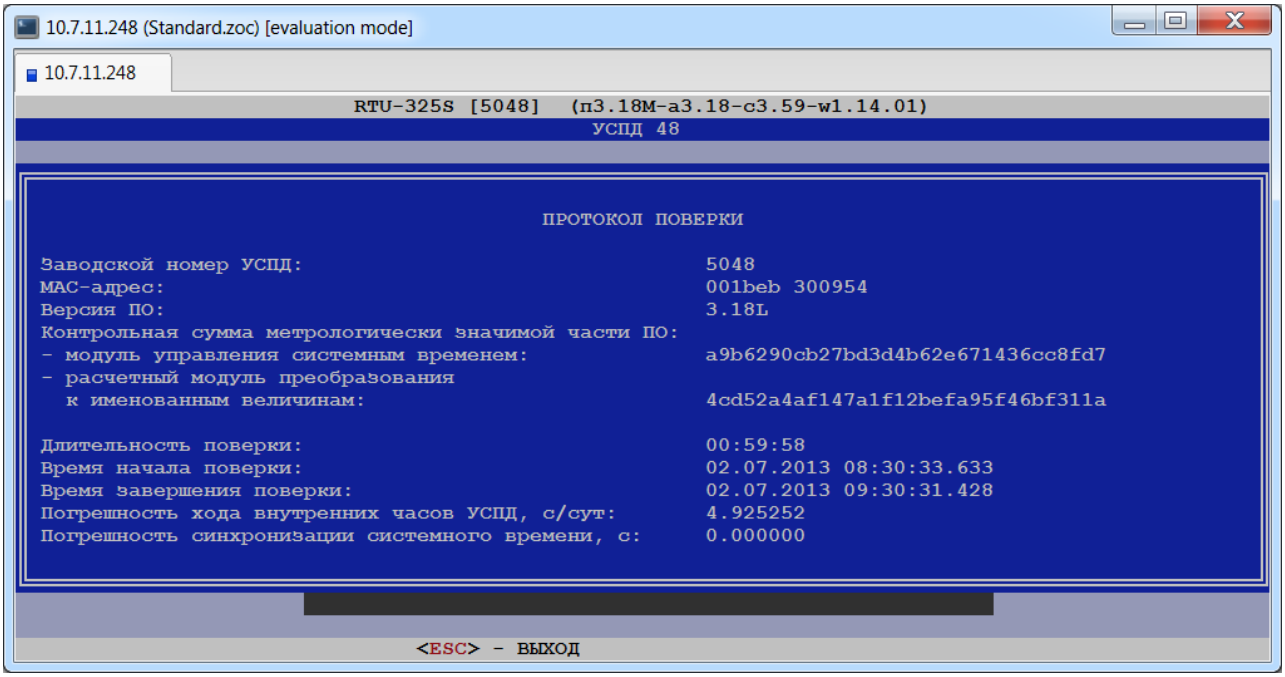
This point is available to users of the system lining level and is designed to view the verification protocol file.

In order to create the verification protocol file, you need to connect to the RTU using Telnet with the user name 'poverka'. The following window will be presented to the user:



By setting up the required verification time and pressing the <Install> key, the user will start the verification procedure, which will result in the verification report file.

In this paragraph, the user can view the previous verification report file:



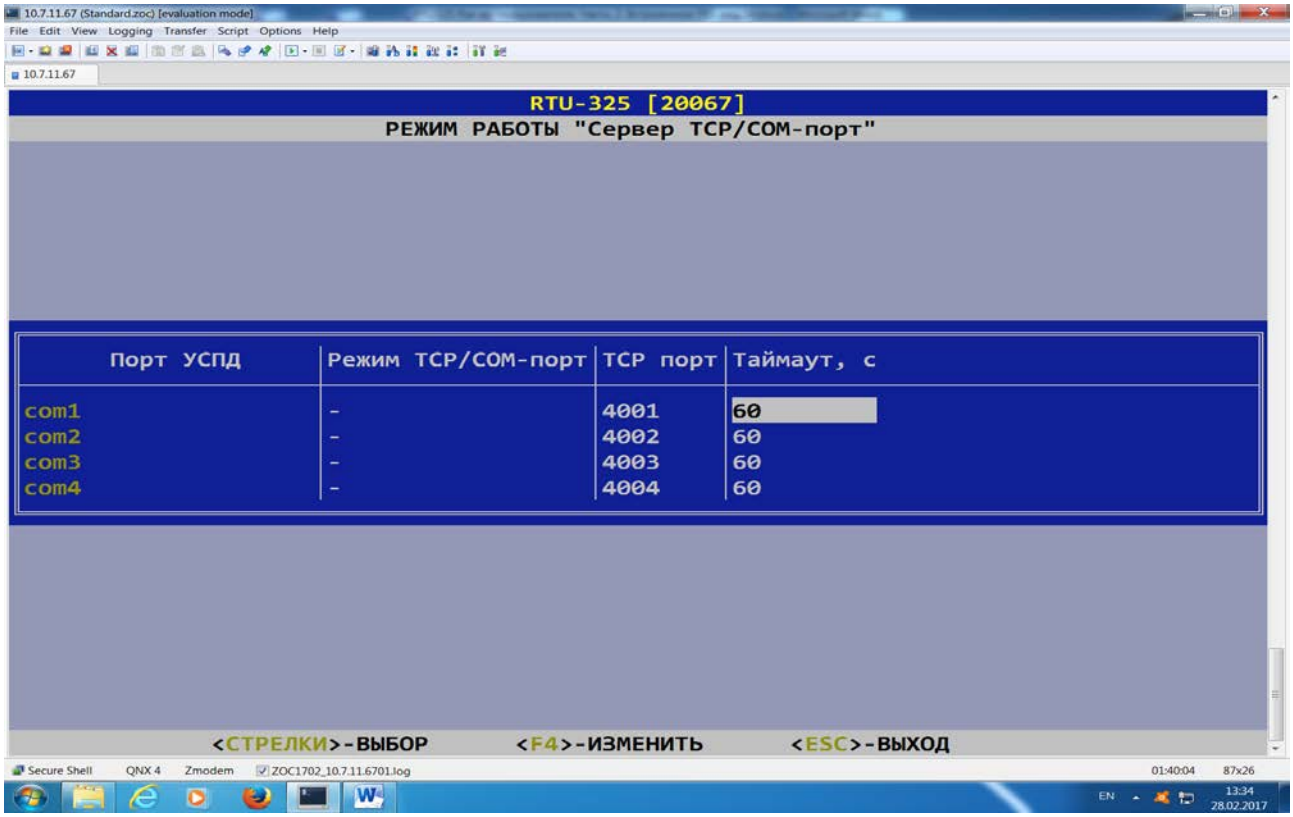
4.11.11. Working mode "Сервер TCP/COM-порт" .

In this paragraph, the user can set up access to built-in serial RTU ports in the TCP/COM server mode. This point is designed to access the smart instruments(s) connected to built-in RTU ports using their own software(s) from the instrument manufacturer.

The external requests for the IP address RTU and the TCP port defined in this paragraph will interrupt the RTU scheduled routine polls for this serial port and will be transmitted further to the serial port, i.e. the serial port will be provided for external requests.

In the absence of activity during the time set in the Timeout field, the serial port will be returned to RTU for regular operation.

A table with a list of accessible serial ports and customized parameters is proposed for the configuration of the operating mode «Сервер TCP/COM-порт»:



Each row of the table has the following information fields:

; RTU Port.
This field contains the name of the serial port RTU and is not subject to change. TCP/COM mode.

For the selected serial port, switch on/off the mode TCP/COM-port. Possible values: «+» - turn on, «-» - turn off.

; TCP port.
A port value of TCP is required in this field and will correspond to the selected RTU serial port for operating in TCP/COM-port mode. Plants are shown in the figure above.

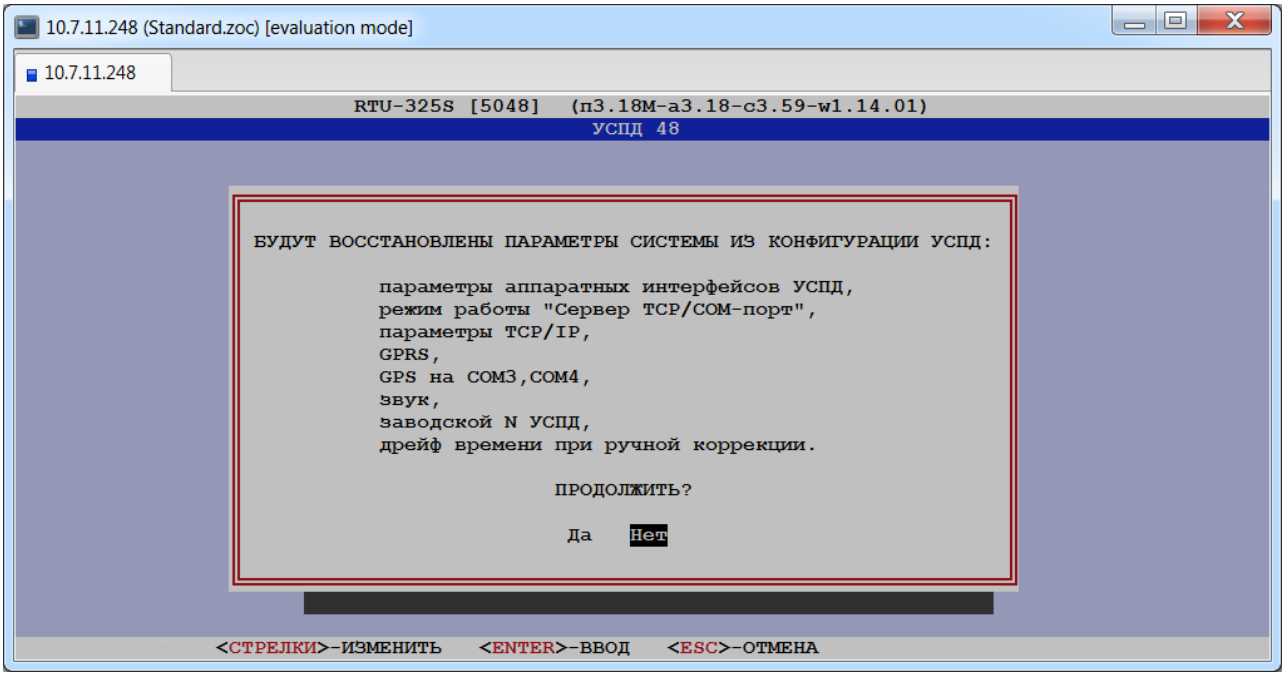
; Timeout, c.
This field needs to have a time in seconds, which is the maximum time of permitted absence for the selected RTU serial port in mode TCP/COM-port, after which it will be in the regular operating mode. Plants are shown in the figure above. Warning: when operating in a given mode with RTU connected to the device

---

(the meter) off-site software (e.g. the manufacturer ' s meter configuration) should take into account the time lags due to the double conversion of the transferable information packages (in TCP/IP on the computer side and back to a consistent format on the RTU side) and adjust the time settings (timeouts) of the software accordingly.

4.11.12. Re-assembly system parameters from configuration.

This point is available to users of the level of the system handler and is designed to restore the system parameters from the RTU configuration:

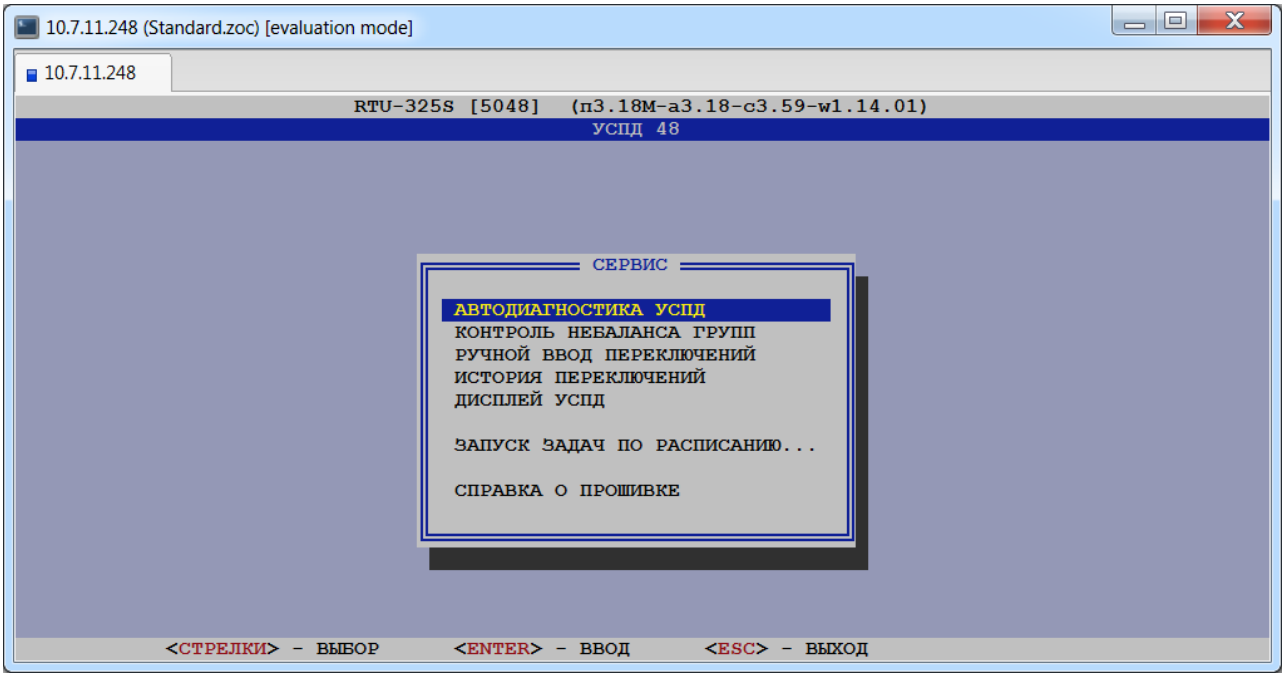


4.11.13. Special debugging.

This point is accessible to users at the level of the system handler and should be used only upon the special recommendation of the technical support service.

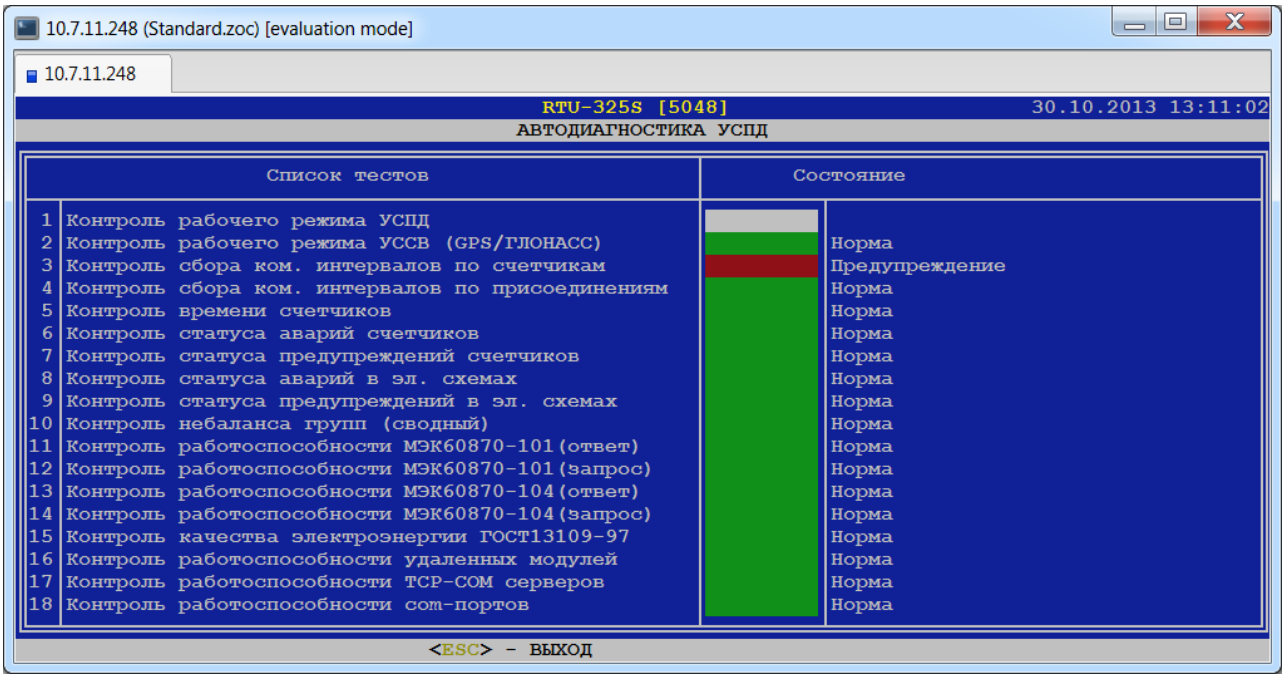
4.12. Service...

This menu item contains programs that provide additional service functions to the RTU user. The following programmes are described:



4.12.1. RTU auto-diagnosis.

This paragraph is intended to automatically diagnose in real time the functions performed by RTU and to transfer the results of the control in various ways to external devices or systems:

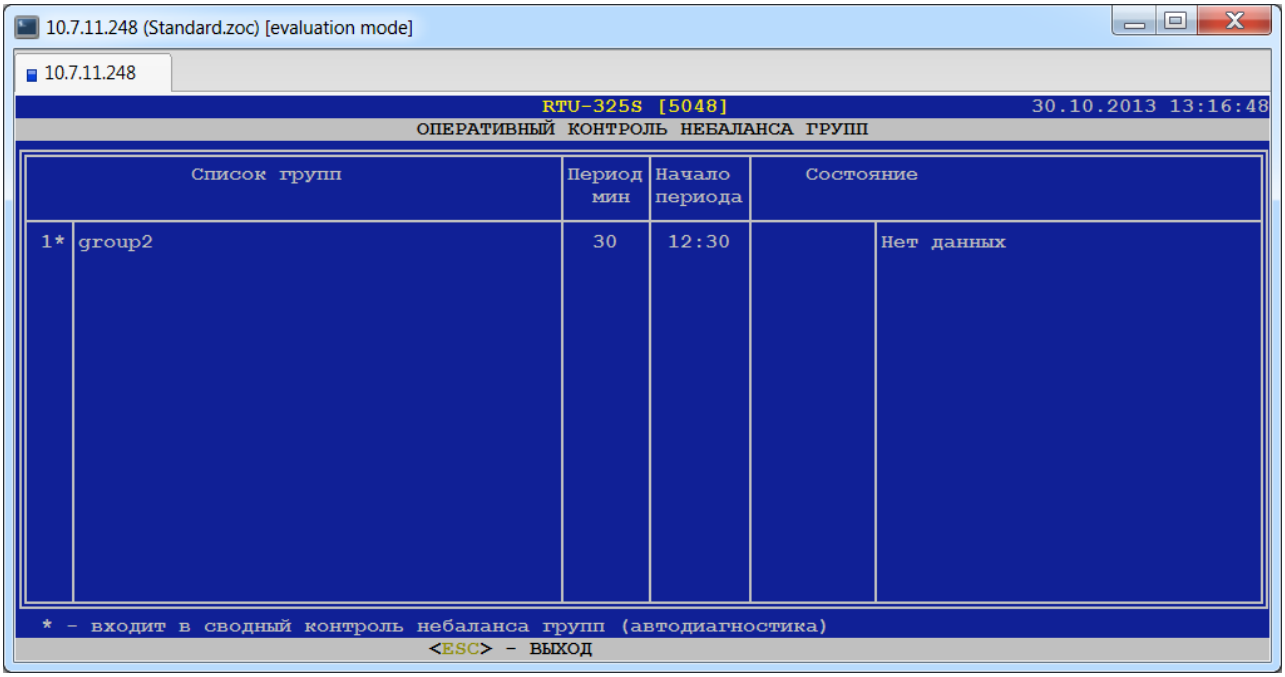


For more details, see section «Автодиагностика» of the handbook «Основные принципы работы и конфигурирования» .

4.12.2. Control of group imbalances.

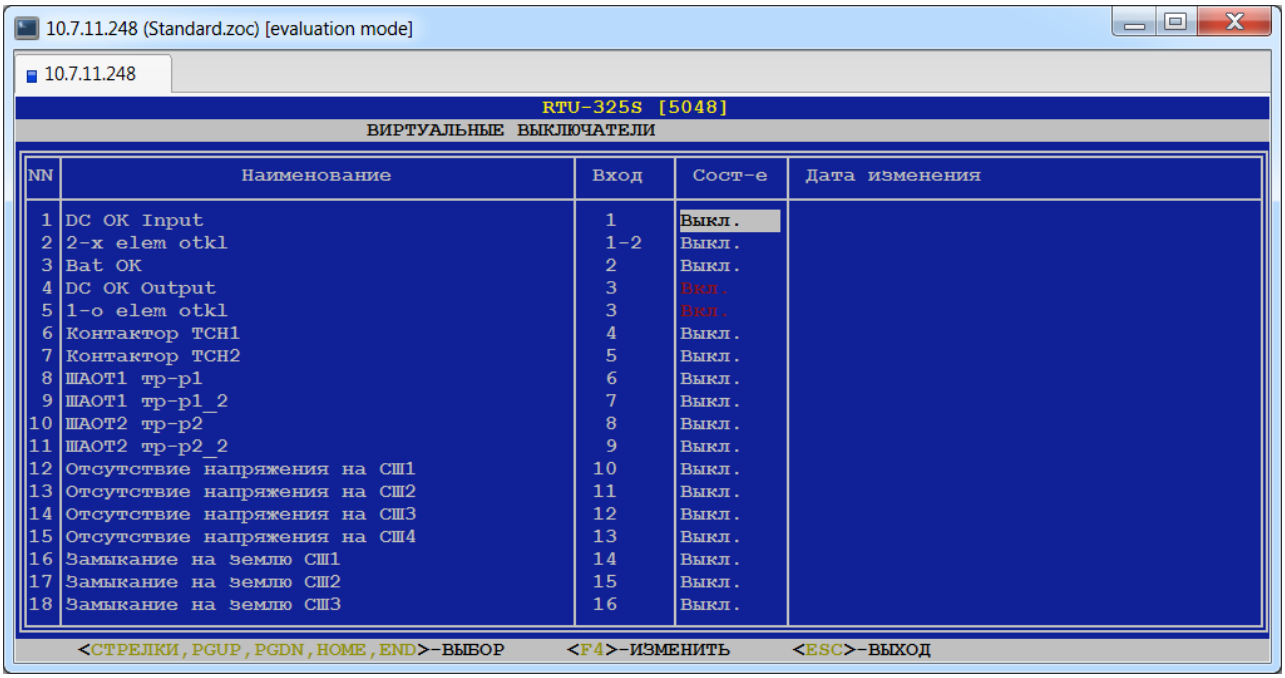
This paragraph is intended to monitor the balance sheet results for each group of metering points (busbars, substation, etc.) in a timely manner. The calculation shall be performed in real time with a cycle equal to the commercial interval for each group. For more details, see section «Расчёт баланса электроэнергии по группе точек учёта» of the handbook «Основные принципы работы и конфигурирования» .

In selecting this paragraph, the following report will be made available to the user:



4.12.3. Hand-held switching.

This point is accessible to users of the system lining level and is designed to change the status of virtual switches. Once selected, the user will be provided with a table of the list of configuration virtual switches:



Each row of the table has the following information fields:

· **NN**
This field contains a virtual switch serial number. This field is not subject to change. Name

This field contains the name of the virtual switch. This field is not subject to change.

; Entry
This field contains a discrete RTU entry number that corresponds to this virtual switch. This field is not subject to change. St-r-e

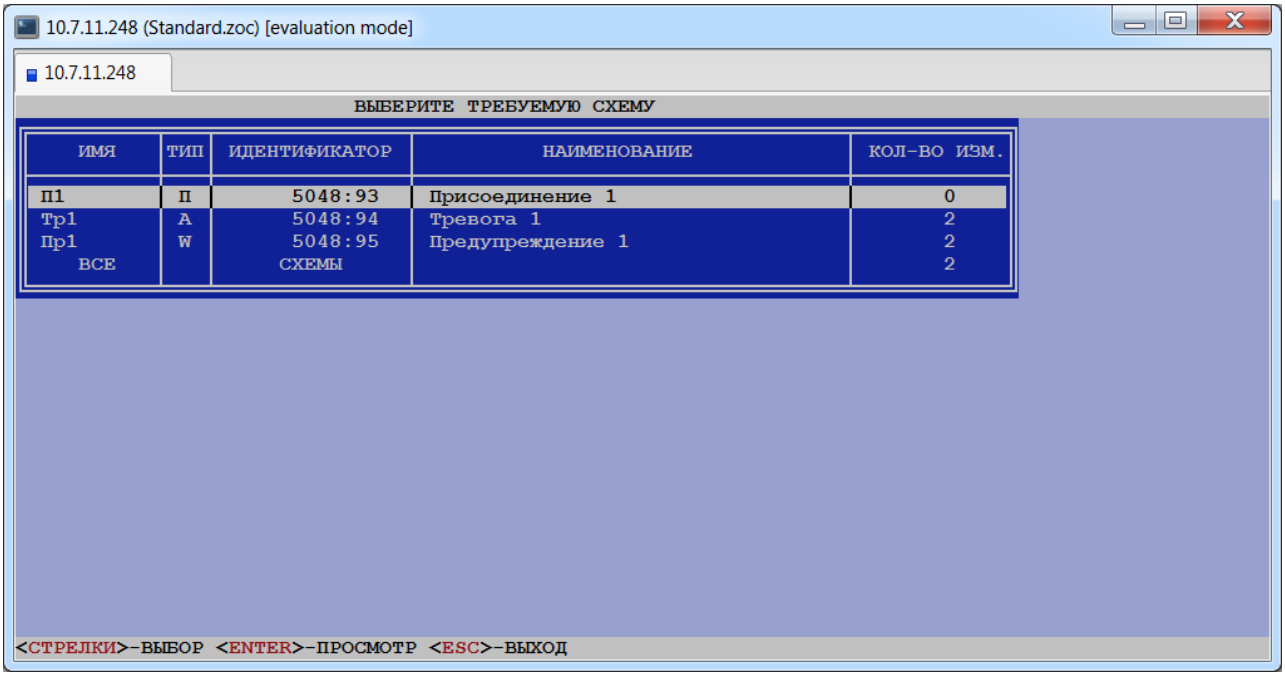
This field contains the current status of the virtual switch. The key <F4> can change the status of the virtual switch. For convenience, all states «Вкл.» are marked in red. Date of amendment

This field contains the date and time of the last change in the status of the virtual switch in the current session of the program. An empty field means that no change of status for a given switch was made in the current session.

4.12.4. Change story.

In this paragraph, the user can look at the status of the selected electrical circuit over the selected day by events (changes in the state of switching machines) in chronological order (direct and reverse).

Once the date has been selected, the user will be provided with a table of the list of existing electrical circuits:



Each row of the table contains the following information fields:

; Name
This field contains the name of the electrical circuit. Type

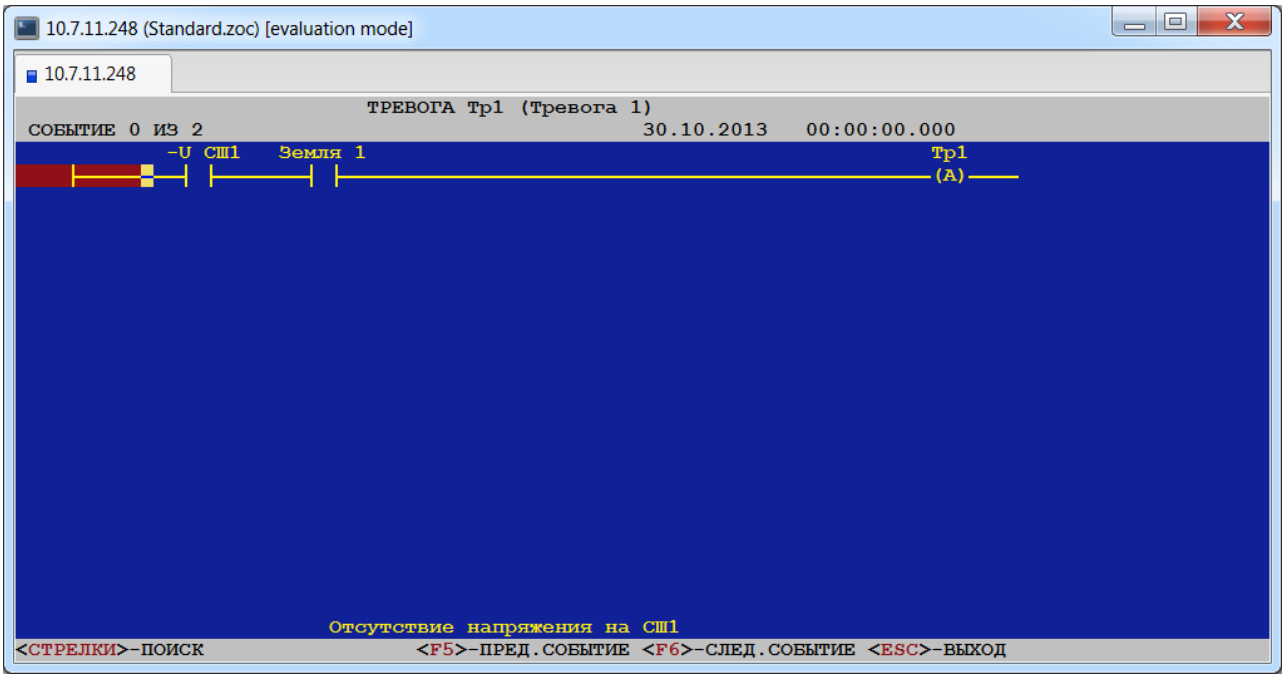
This field contains the type of electrical circuit («П» - accession, «А» - alarm (alarm), «W» - warning (warning)). Identification

This field contains a global electrical circuit identifier. Name

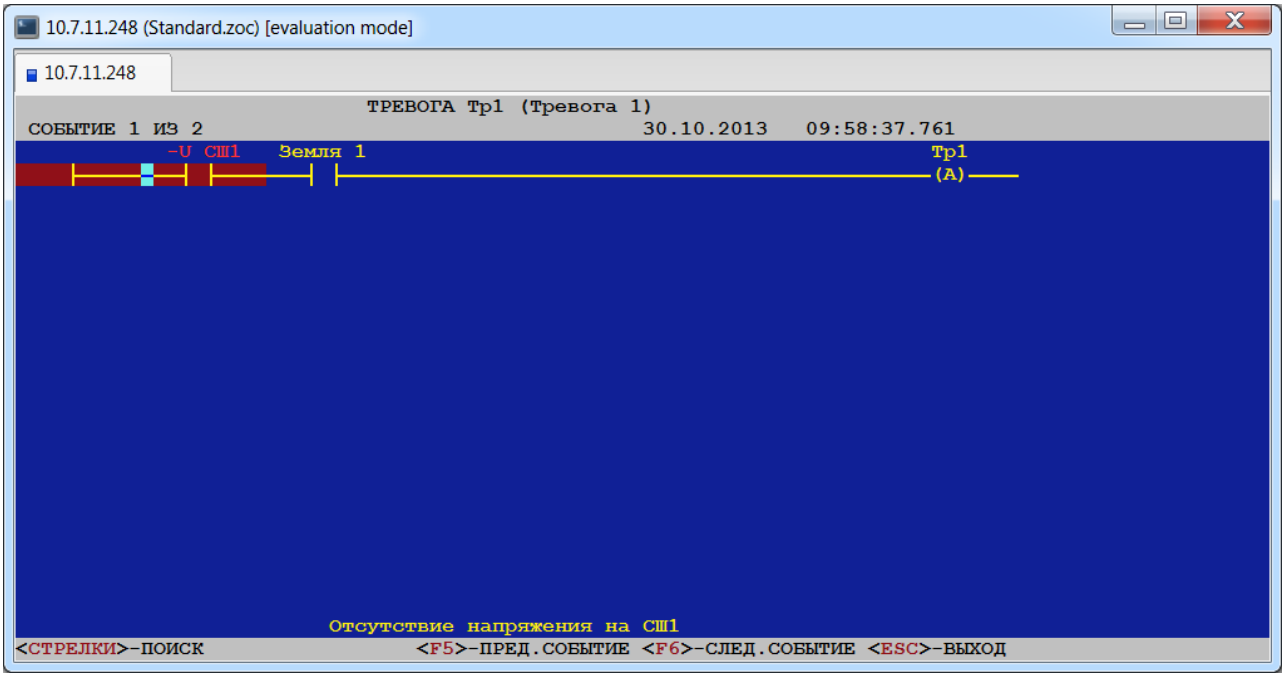
This field contains the name of the electrical circuit. I'm fine.

This field contains the number of changes in electrical circuit status over the day.

When the electrical circuit is opened, the state of the circuit is shown at the beginning of the selected day (00:00:00.000) - event 0.



The key <F6> shows the status of the diagram in chronological order of the changes in the state of the switches. The key <F5> is used to look at the status of the diagram in reverse chronological order. A change in the state of the electrical circuit is a change in the state of one switch. The date and time of the change shall be drawn up above the screen to within milliseconds:



Note: When the electrical circuit states are viewed in reverse chronological order The date and time at the top of the screen are released on a white background.

The name of the switchboard, which has changed, is red. The state of the switchboard can be seen from the background color on which it is displayed:

- blue background - the switchboard is in condition «Выключено»
- Red background - the switchboard is in «Включено» condition.

The red background of the line on the electric circuit means it's closed. If the image flashes, it is in an uncertain state (no data available).

In addition to viewing the selected electrical circuit, a view of all diagrams can be performed (choosing «ВСЕ СХЕМЫ» in the table of the electrical circuit list). In this case, a chronological order of the changes in the state of all switches in electrical circuits with automatic switching of the electrical circuits to be displayed will be viewed. If the switchboard is present in different electrical circuits, the state of these circuits can be viewed by switching the display to <F4>.

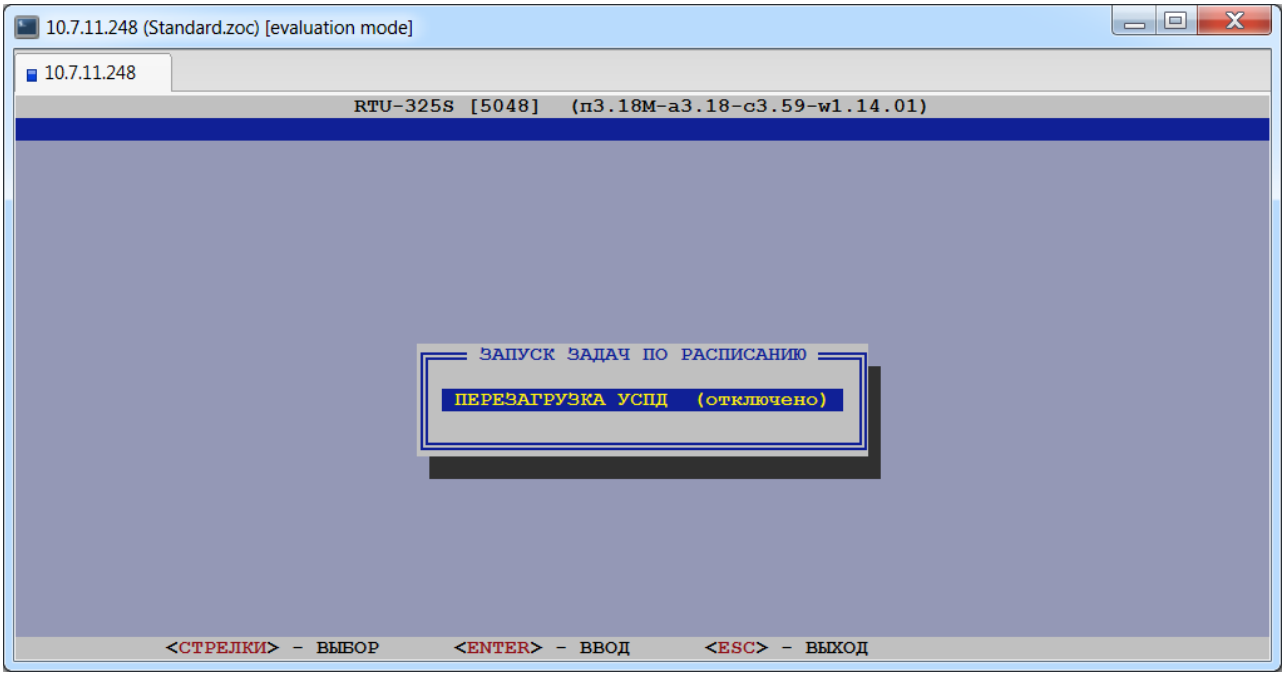
4.12.5. RTU display.

This is an emulator that allows all of the input/output functions of the RTU basic model RTU-325 using an external engineering remote remote control. The features of the use of the «Дисплей УСПД» program are described in the «Встроенный пульт ввода/вывода» manual.

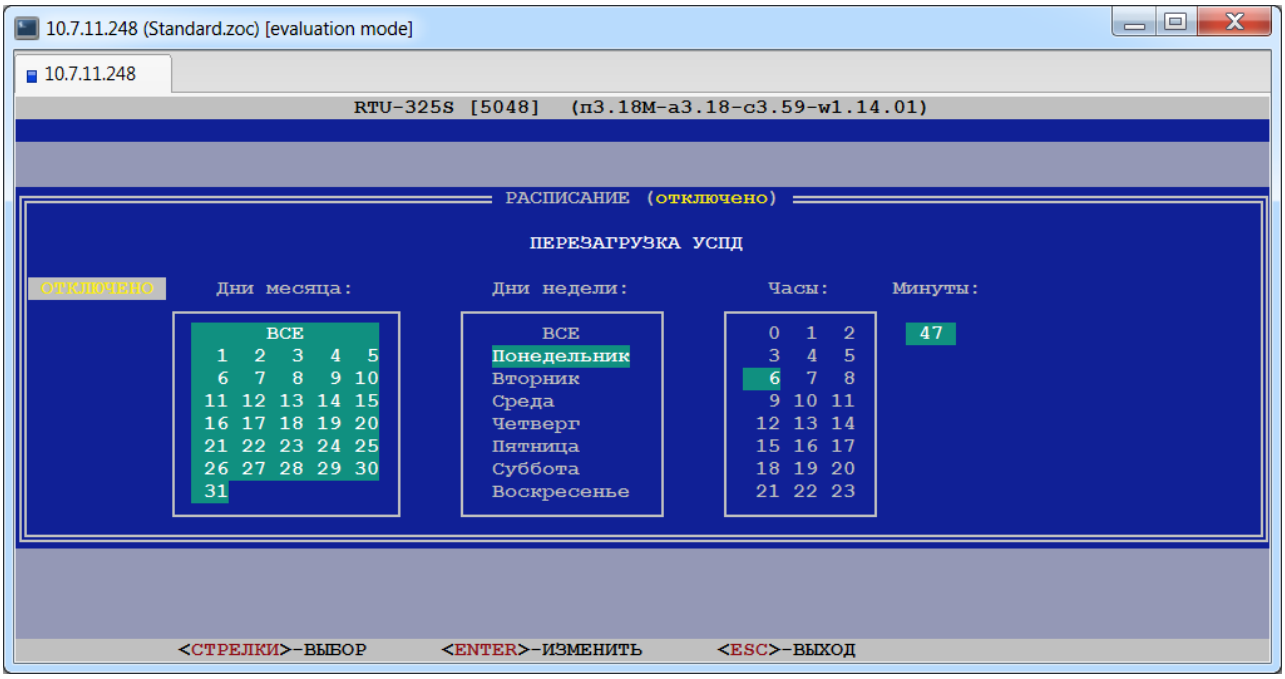
4.12.6. Start scheduling tasks...

In this menu paragraph, the user is given the opportunity to schedule the start-up of the tasks at a given time.

The following list of tasks will be presented to the user when selecting this paragraph:



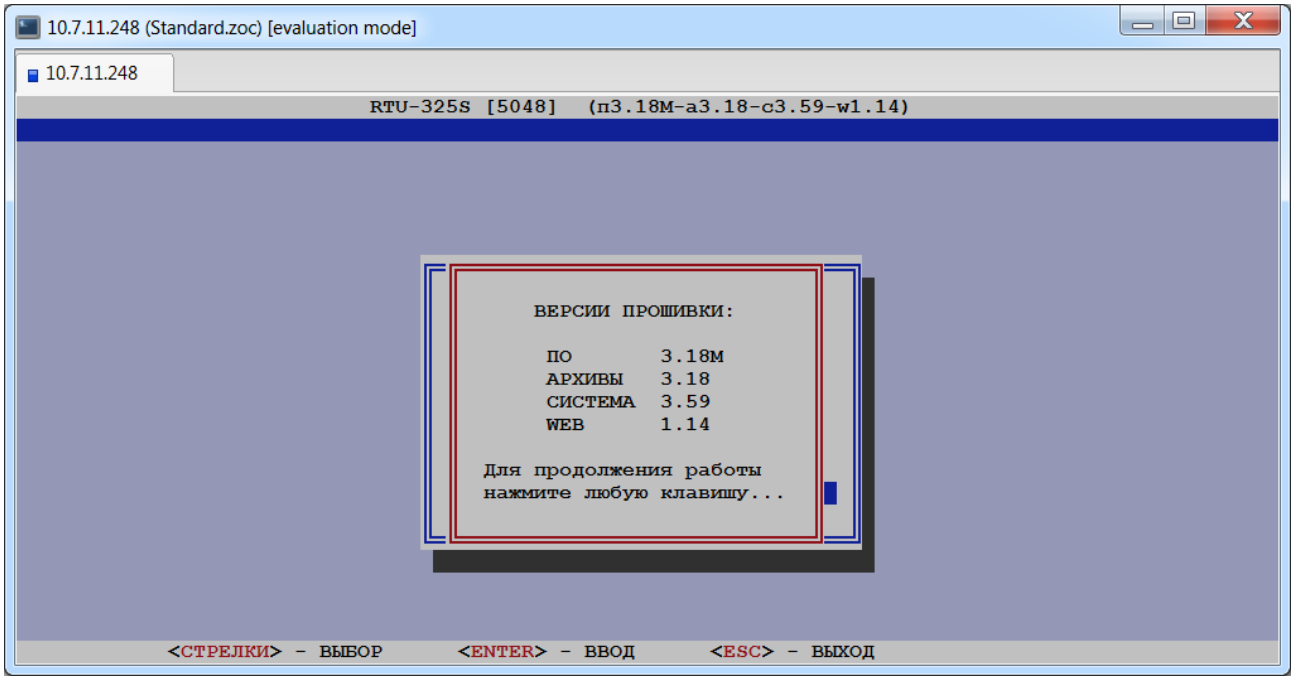
When the required task is selected, the following form will be available on the screen to complete the scheduling parameters:



Once the required parameters have been set, it is necessary to confirm that the changes have been maintained or cancelled. Next on the screen will be a request to restart the task schedule.

4.12.7. Squeaking certificate.

In this point, the user can view the versions of the application software, system, archives and built-in web server RTU:



SECTION 06

RTU Configurator

Part 3

Edit 16 · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

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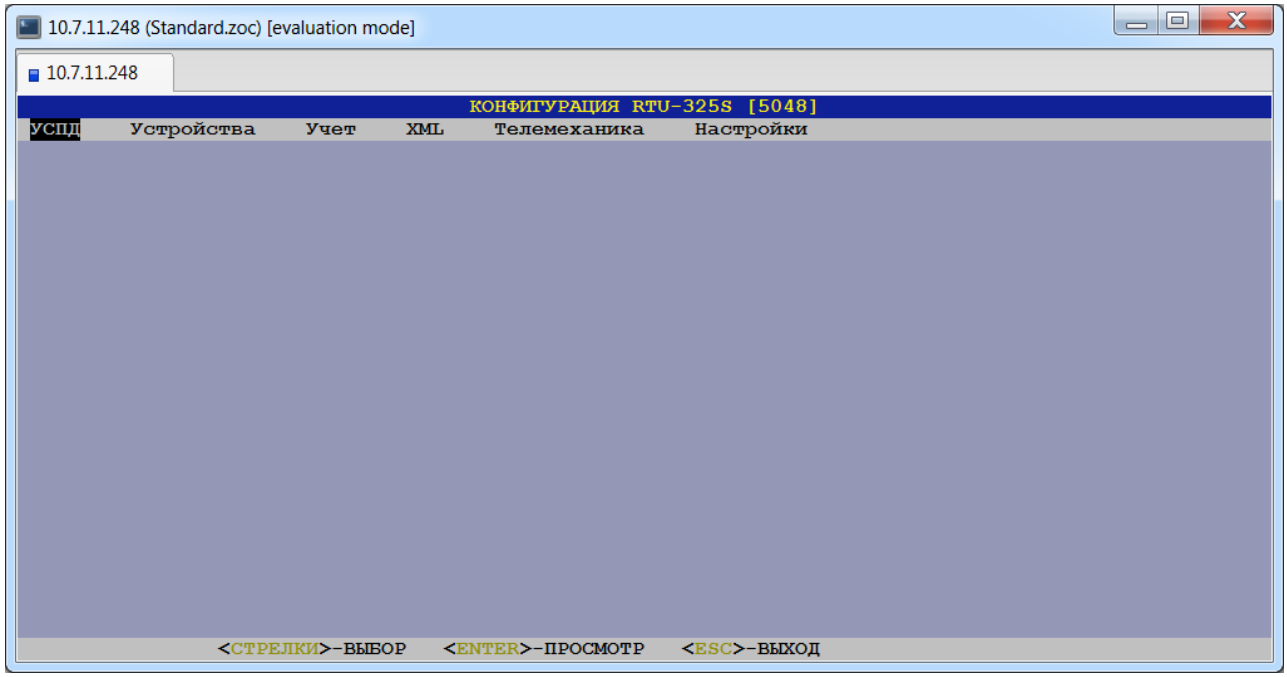
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1. Introduction.

The RTU configuration is implemented by the «Конфигуратор» program. The «Конфигуратор» program is launched from the main menu of the integrated RTU software. Access to integrated RTU software for all models is possible with external engineering remote control (see «Встроенное программное обеспечение УСПД» manual) and for some models with built-in input/output remote control (see «Встроенный пульт ввода/вывода» manual).

Once the program «Конфигуратор» is launched, an image of the main menu of the program «Конфигуратор» shall appear on the external engineering remote screen:



The top line of the screen contains the main menu title:

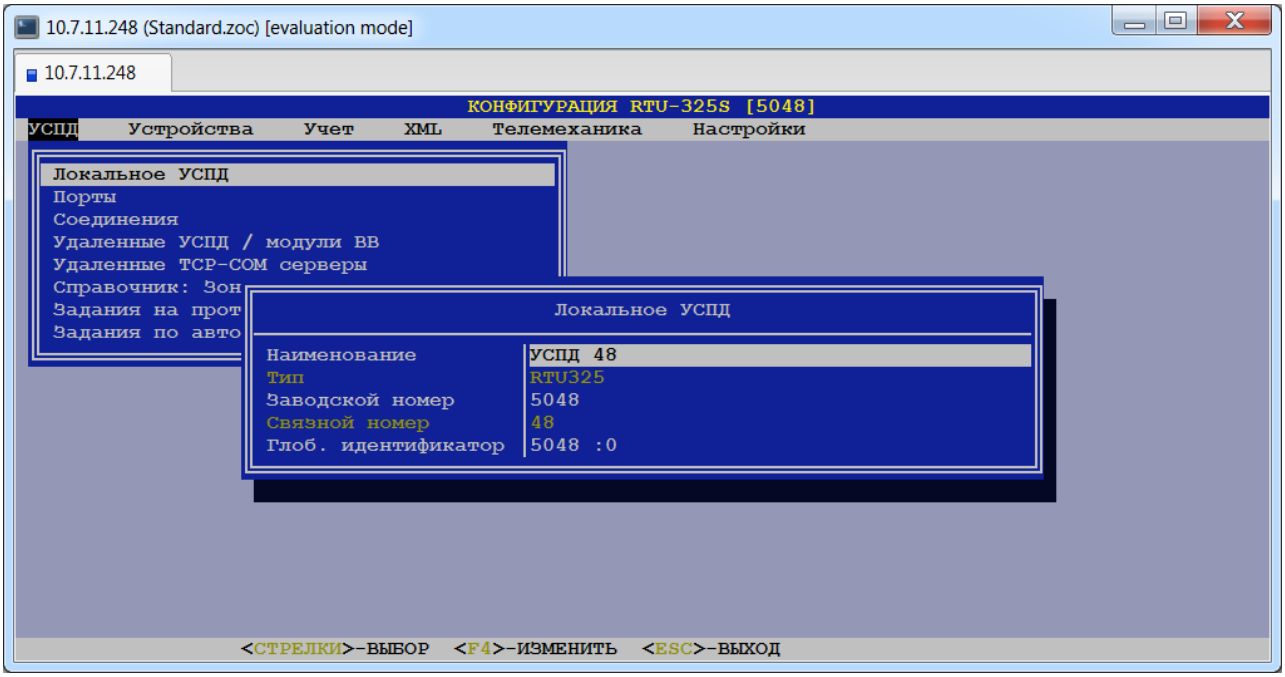
«КОНФИГУРАЦИЯ RTU-325x [zz]» ,

where:

x is the RTU model, zz is the manufacturer's RTU number, defined in the RTU archives. This makes it easier to identify RTU by connecting the external engineering remote to different RTUs.

The bottom line of all screen forms contains the current clue.

If the name and/or value of the field of the parameter in the screen forms is brown, this information is not to be checked and changed. In the example given, this is the fields 'Tip' and 'Conversation Number':



The items in the main menu of the programme «Конфигуратор» are described below.

Note: Switching the keyboard from English to Russian and back
The key is operated by pressing <F12>.

Attention: All modifications made by the programme «Конфигуратор» shall enter into force after **Rebooting RTU.**

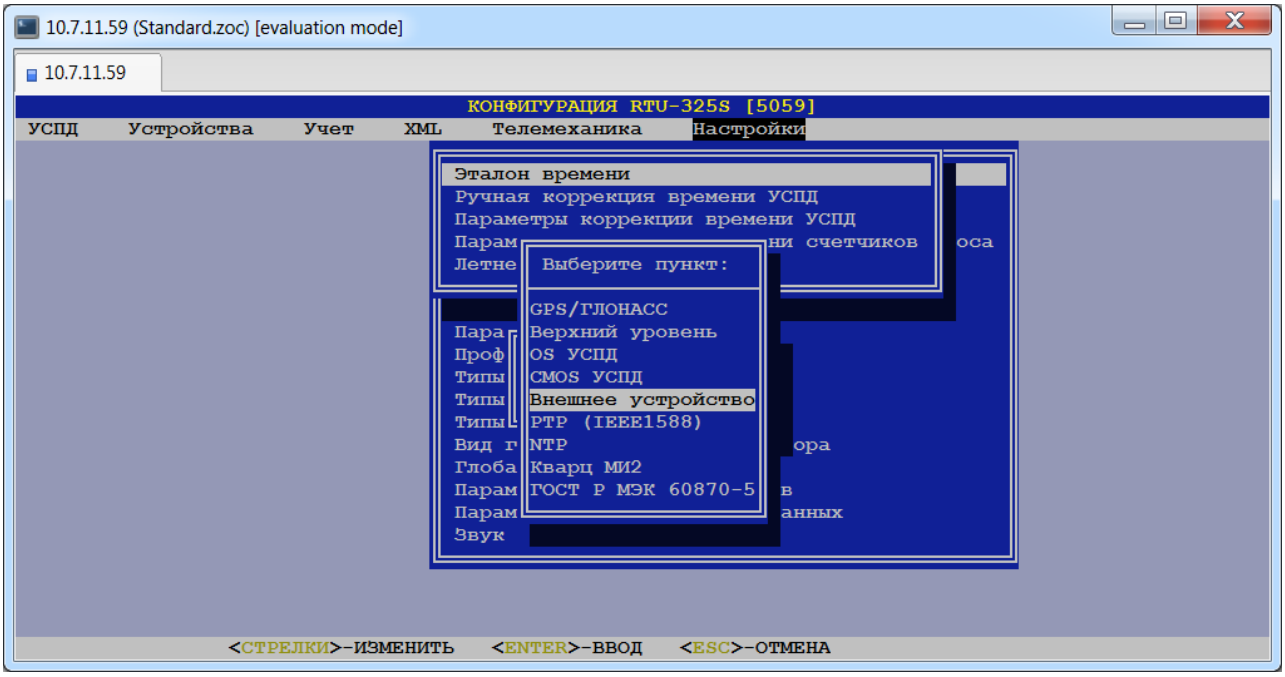
2. Recommended RTU configuration algorithm for power meters.

1. View/correct/fill the general RTU settings.
2. Definition of RTU identification parameters.
3. Selecting and setting up RTU ' s work ports.
4. Installation of connections from RTU service ports to metering units.
5. Setting up jobs to work with metering on connections.
6. Reboot RTU!!!!!!! (exit from «Конфигуратор» rebooted RTU) to activate the input parameters of the operating ports and connections.
7. View/correct/fill the meter directory (if necessary).
8. Definition of the current list of polling tasks (in the absence of connection tasks), which is automatically attached to each input meter.
9. Checkers and their parameters (automatically search procedure or manual procedure).
10. Entering metering points and their parameters, linking them to the meter.
11. Repeat paragraphs 8...9. for all meters connected to this RTU (configuration of RTU with local meter connections) or to the lower RTU in the cascade (configuration of RTU at the top level in the meter-set cascade circuits).
12. Correct the list of questions for each meter (as required).
13. Correction of the password list for each meter (as required).
14. RTU restart!!! (exit from the program «Конфигуратор» with RTU restart).
15. The RTU is in operating mode (start of operation) and performs meter communication sessions according to the configuration of the tasks.

3. Viewing/correcting/filling the general settings of RTU.

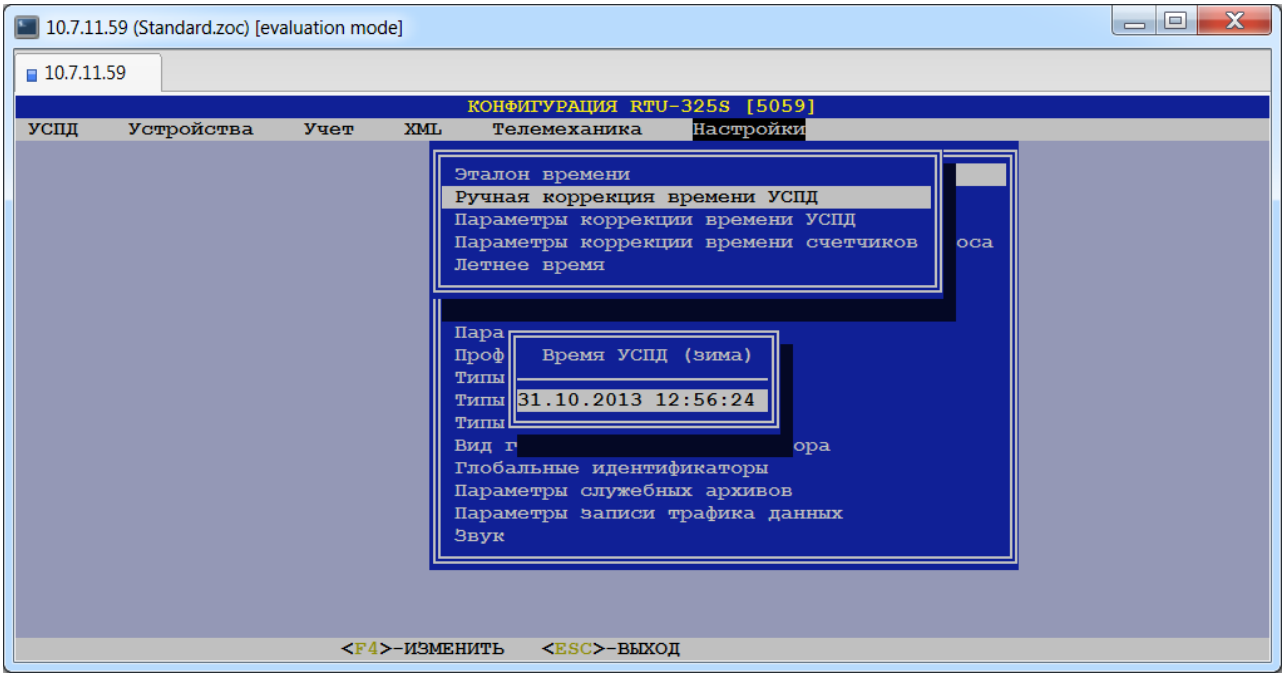
3.1. «Настройки» > «Время» > «Эталон времени» .

This paragraph allows the RTU time bar to be selected when automatically corrected from the following list:



3.2. «Настройки» > «Время» > «Ручная коррекция времени УСПД» .

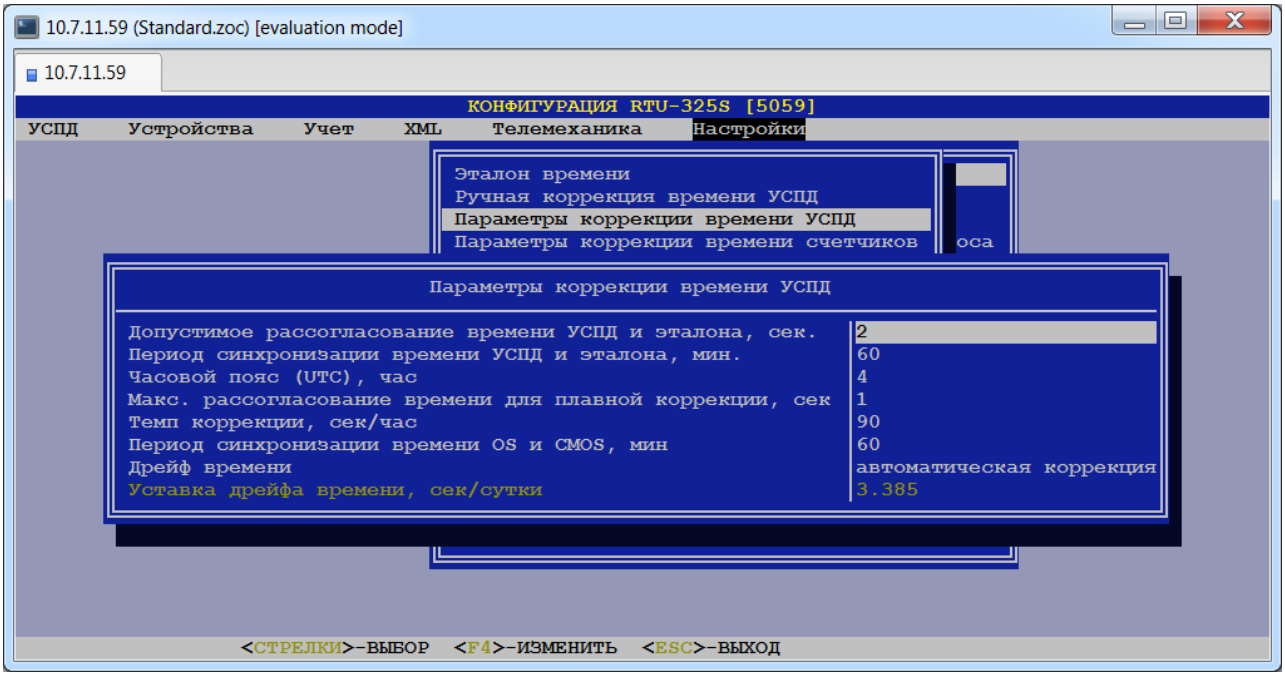
This paragraph allows for manual adjustment of RTU time within the current day:



Attention: RTU time must always be set in winter time!

3.3. «Настройки» > «Время» > «Параметры коррекции времени УСПД» .

When selecting this paragraph, the user will be provided with the following table:



- **Allowable time reconciliation between RTU and standard, sec.**

Exceeding this parameter triggers the RTU time correction procedure. The parameter operates both manually and automatically.

- **Time synchronous period RTU and reference, min.**

This parameter defines the time between the consecutive times of RTU and the standard for automatic correction.

- **Hour Belt (UTC), hour.**

This parameter defines the shift of RTU time relative to Greenwich time. You have to ask when selecting the RTU time frame for accurate time signals on Greenwich (GPS).

- **Max. Time-for smooth adjustment, sec.**

Exceeding this parameter causes the time correction procedure RTU «скачком», otherwise a smooth correction is made. If this parameter is 0, correction «скачком» is prohibited.

- **Correction rate, sec/hour.**

This parameter defines the time correction rate of RTU for the smooth time correction procedure of RTU.

- **Time synchronisation period OS and CMOS, min.**

This parameter defines the time between the system time recording operations of RTU from CMOS RTU. This operation is performed regardless of the type of time reference RTU. This operation is designed to ensure that the system time OS and CMOS RTU are synchronized and, accordingly, the system time RTU is correctly initialized when the RTU is activated/rebooted. The value of a parameter equal to 0 prohibits the operation.

- **Time drift.**

Allowable values: {«Автоматическая коррекция», «Ручная уставка»}. Plant: «Автоматическая коррекция» . If this parameter is used, «Автоматическая коррекция» time drift will be automatically formed by the corresponding algorithms in RTU.

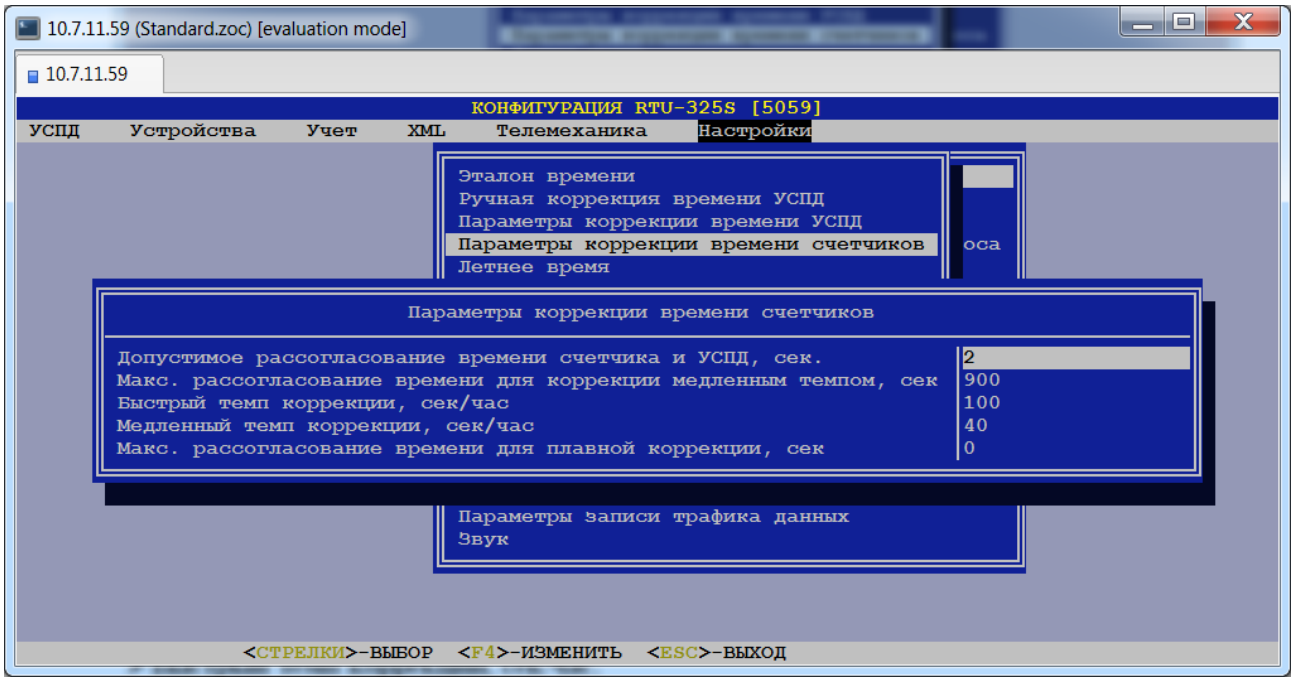
If this parameter is used, «Ручная уставка» the time drift shall be given by the user in the following paragraph.

- **Time drift, sec/day.**

Data type: the physical number. This parameter defines the amount of time drift at its manual balding (see «Дрейф времени»).

3.4. «Настройки» > «Время» > «Параметры коррекции времени счётчиков» .

When selecting this paragraph, the user will be provided with the following table:



- **Allowable time reconciliation between meter and RTU, sec.**

Exceeding this parameter causes the RTU meter time correction procedure.

- **Max. Time alignment to adjust slow pace, sec.**

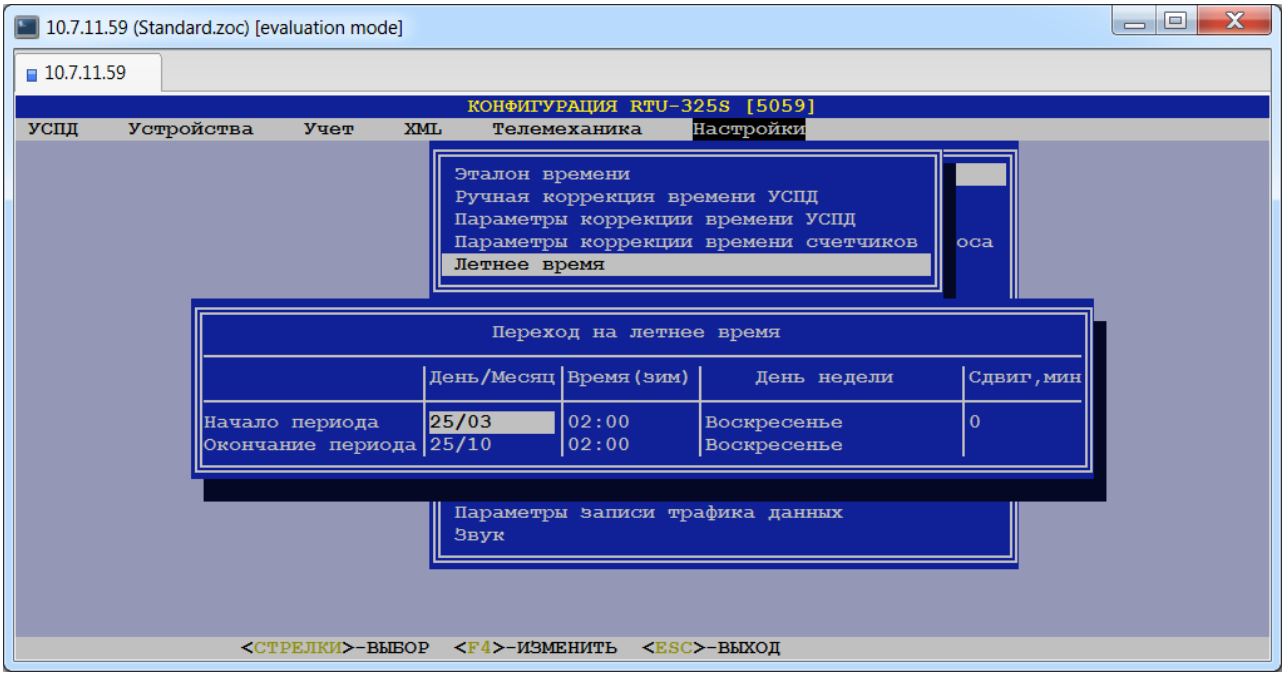
Exceeding this parameter causes the RTU meter time correction procedure to be fast, otherwise the correction is slow.

- **Rapid rate of correction, sec/hour.**
  Determination of the rapid rate of correction of the RTU meter time.
- **Slow correction rate, sec/hour.**
  Determination of the slow pace of the RTU meter time correction.
- **Max. Time-for smooth adjustment, sec.**

Exceeding this parameter causes the time correction procedure of the RTU «скачком» meter, otherwise a smooth correction is made. If this parameter is 0, correction «скачком» is prohibited.

3.5. «Настройки» > «Время» > «Летнее время» .

This menu item defines the dates of the change to and from summer time:



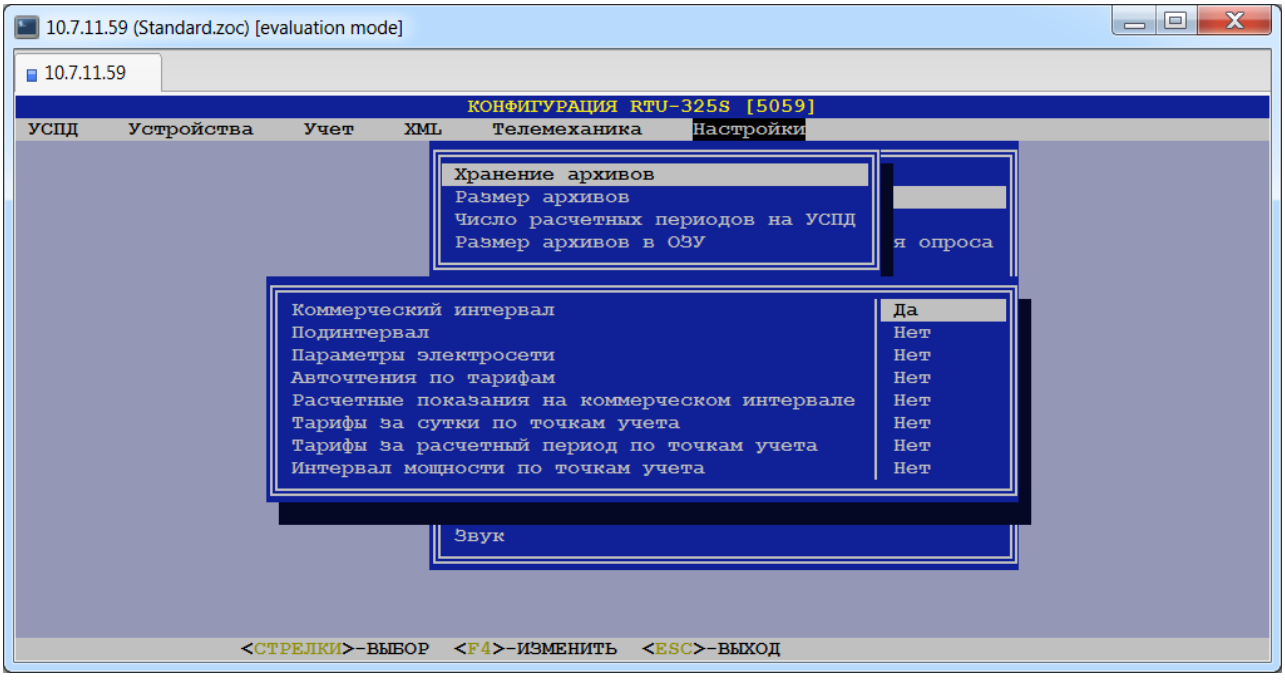
The transition is set by the day of the week starting with a certain day of the month (e.g. the first Sunday after 25 March). The time of transition to and from summer time is always set in winter time.

The determination of the summer transition is used in RTU:

- To indicate the time on the integrated on-call control display;
- for calculating electricity consumption by tariffs and for determining power areas in RTU.

3.6. «Настройки» > «Архивы» > «Хранение архивов» .

In this paragraph, the menu provides an indication of the need to maintain an appropriate archive in RTU by selecting from the list of values «Да» or «Нет» :

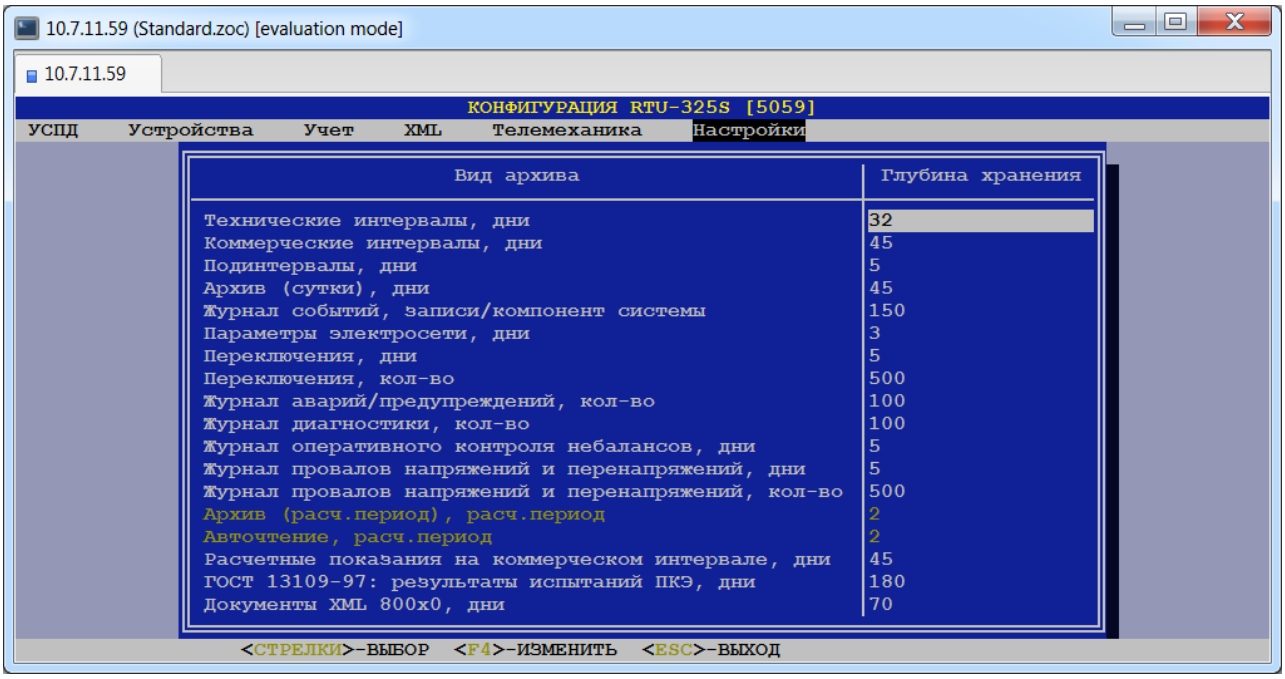


Note: The machine-reading on tariffs is used to work with I'm gonna get a payoff from the meter. At the value of 'No', only daily auto-reading will be recorded at the commercial interval in the RTU archive. If in

The meter is reconfigured by monthly auto-reading, then the daily readings will be calculated. At the value of 'Yes', the calculation at the commercial interval will be recorded. The 24-hour rates for the points of account, the counting period for the points of account and the power interval for the points of account are used for setting up the RTU tariff.

3.7. «Настройки» > «Архивы» > «Размер архивов» .

This menu item specifies the dimensions (in-depth storage) of the archives stored in RTU:



Data type: whole number.

Recommendation: The user should request the minimum necessary size of the archives.

The large size of the archives increases RTU's response time to requests from top-level systems and when viewing the RTU archives from an external engineering remote. The following is a list of archives and their comments.

- **Technical intervals, days.**

An electric energy consumption profile at a meter interval counted from the meter. The value of storage depth is true for each meter.

Recommendation: A value should be set for monthly auto-readers

32 Or more. This is necessary to ensure that the meter readings are transferred to the upper level, which is calculated by the formula: meter reading = Autoreading + Technical interval flow rate.

- **Commercial intervals, days.**

An electric energy consumption profile at a commercial interval in the named values of RTU. The value of storage depth is true for each meter.

- **Sub-intervals, days.**

An archive of sub-intervals of power or sub-intervals of the meter profile. The value of storage depth is true for each meter.

- **Archives (days), days.**

The electric energy consumption archive for 24 hours at tariffs and totals in the known values. The value of storage depth is valid for each metering point.

Recommendation: Set a value of 0 (t.s. used in the installation phase).

- **Event log, recording/system component.**

An event archive on the meters and on the RTU (composed by components of the system: individual meters, RTU (including cascades), connection to RTU port, RTU port, etc.). The size of the archive is set as the number of records per component of the system.

- **Power grid parameters, days.**

An archive of grid parameters. The value of storage depth is true for each meter.

- **Switches, days.**
- **Switching, number.**

Switch archive. The value of storage depth is valid for each switch. The storage depth in days (the first parameter) is limited by the total number of records in the archive (the second parameter) to protect against high frequency «дребезга» contact.

- **Accident/warning log, number.**

Accident/warning archive. The storage depth value is valid for each electrical circuit in RTU.

- **Diagnosis log, number.**

The diagnostics of the communication channels. The value of storage depth is valid for each channel of communication.

- **Operational control log of imbalances, days.**

The operational control archive of imbalances. The value of storage depth is valid for each balance group.

- **A log of stress failure and overwork, days.**
- **A log of stress failure and overwork, number.**

An archive of stress and overwork failure. The storage depth in days (the first parameter) is limited by the total number of records in the archive (the second parameter) to protect against the overfilling of the archive. The value of storage depth is true for each meter.

- **Archive (calculation period), comb. time.**

The electrical energy consumption archives by tariff and summation in the known values (by metering point and by group).

Archives of power at commercial intervals in power zones (by countpoint and group).

These archives are necessary for the RTU itself to be tariffed if RTU is used without a top-level system.

The size of the archives is given in the number of calculation periods (see menu item «Настройки» > «Архивы» > «Число расчётных периодов на УСПД»).

This menu item is for reference and is not corrected here.

- **Auto-reading, comb.**

Recording (autoread) (each meter). The size of the archives is given in the number of calculation periods (see menu item «Настройки» > «Архивы» > «Число расчётных периодов на УСПД»).

This menu item is for reference and is not corrected here.

- **Computation at commercial intervals, days.**

Recording archive (auto-read + commercial) (each meter).

- **GOST 13109-97: SCE test results, days.**

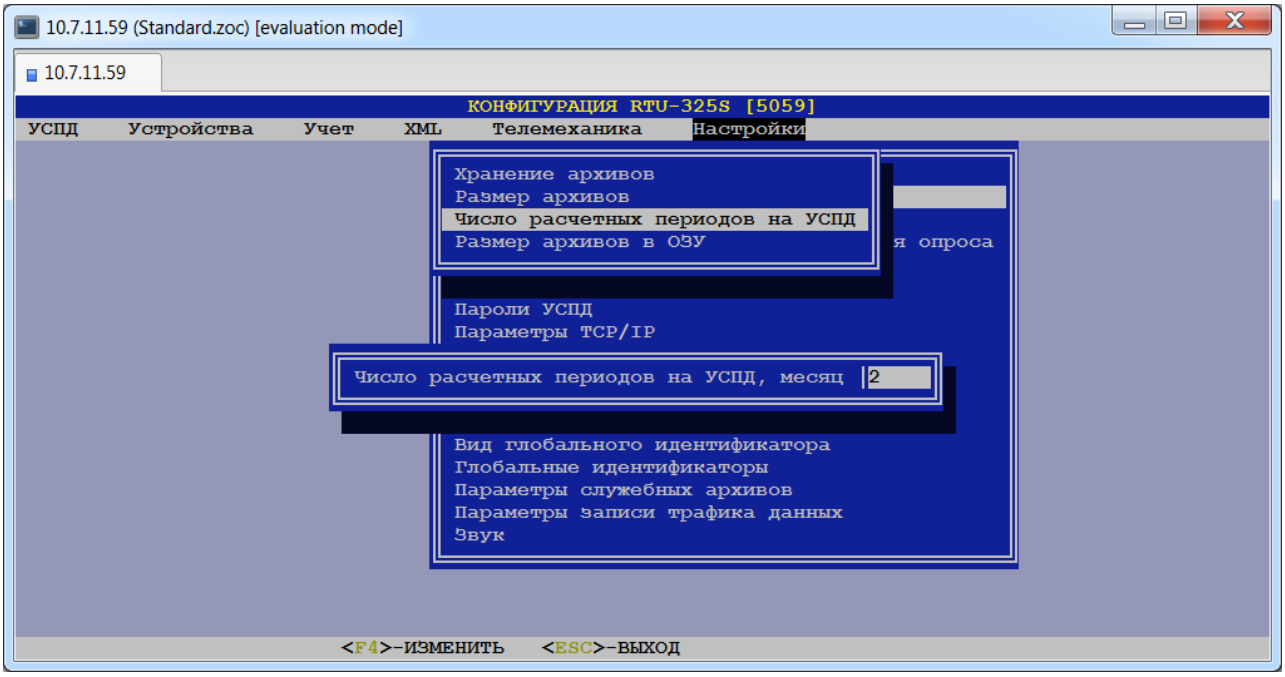
Inventory of SCE test results for GOST 13109-97. The value of storage depth is true for each meter.

- **XML documents 800x0, days.**

XML document archive 800x0. The value of storage depth is valid for all documents related to the given days.

3.8. «Настройки» > «Архивы» > «Число расчётных периодов на УСПД» .

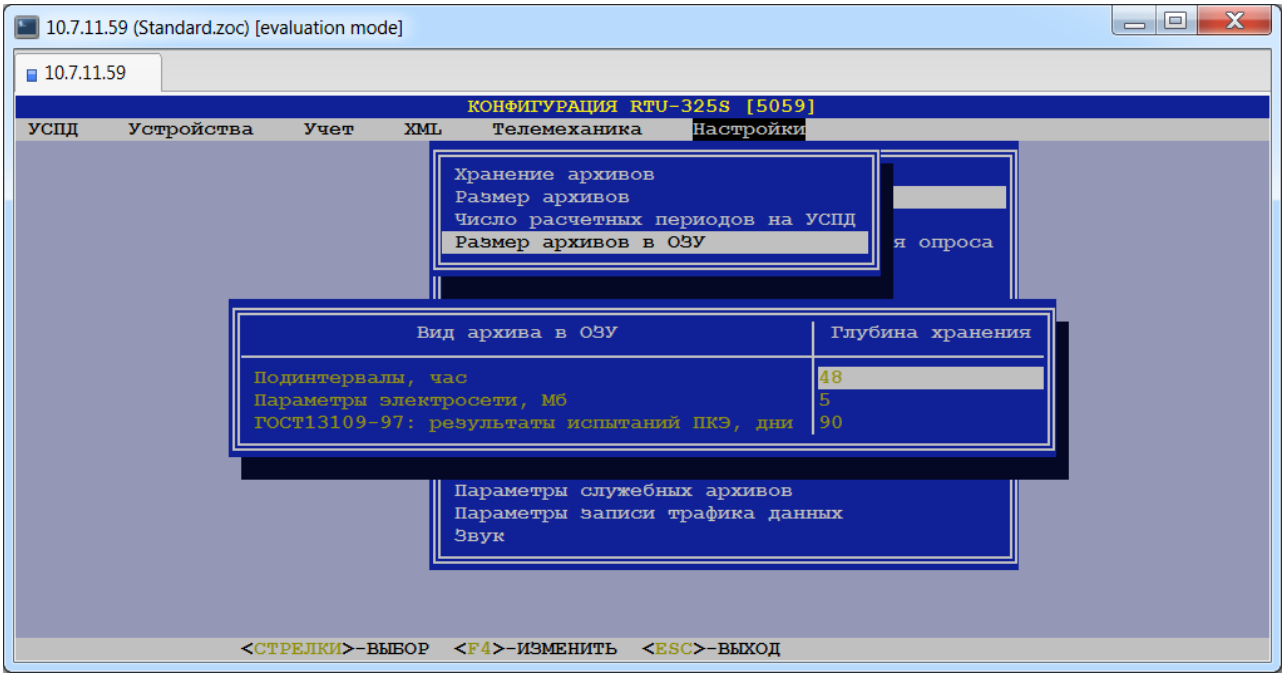
When selecting this paragraph, the user will be provided with the following window:



Data type: whole number. Plant: 2. Acceptable values: [1...100]. This parameter defines the depth of storage of the meter records (autoreading), electric energy consumption records and power values in power zones over an accounting period (month). This will lead to the input/output of the RTU.

3.9. «Настройки» > «Архивы» > «Размер архивов в ОЗУ» .

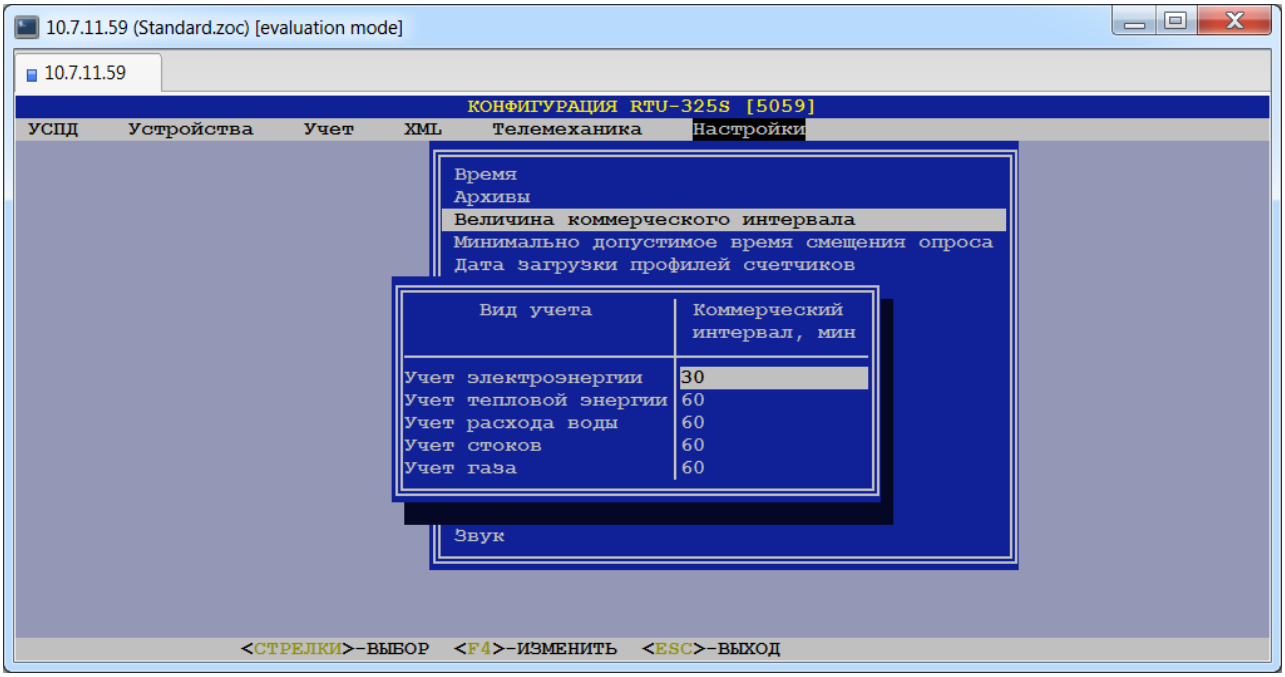
This paragraph contains data storage depth values for the purposes of monitoring and analysing the Web applications of the SCE:



All values are referenced and not available for change.

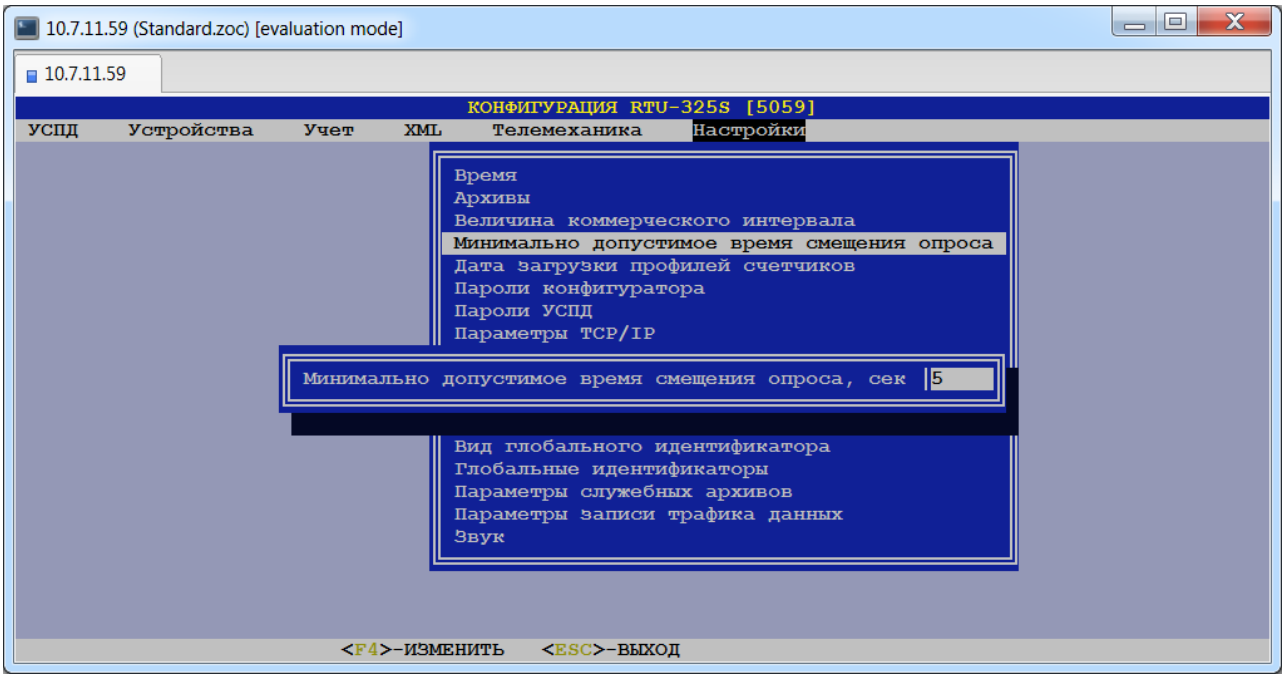
3.10. «Настройки» > «Величина коммерческого интервала» .

Data type: whole number. Allowable values: values, multiples of the meter interval. This parameter is used to store energy consumption profiles at commercial intervals and determines the commercial interval for the following types of accounts in RTU:



3.11. «Настройки» > «Минимально допустимое время смещения опроса» .

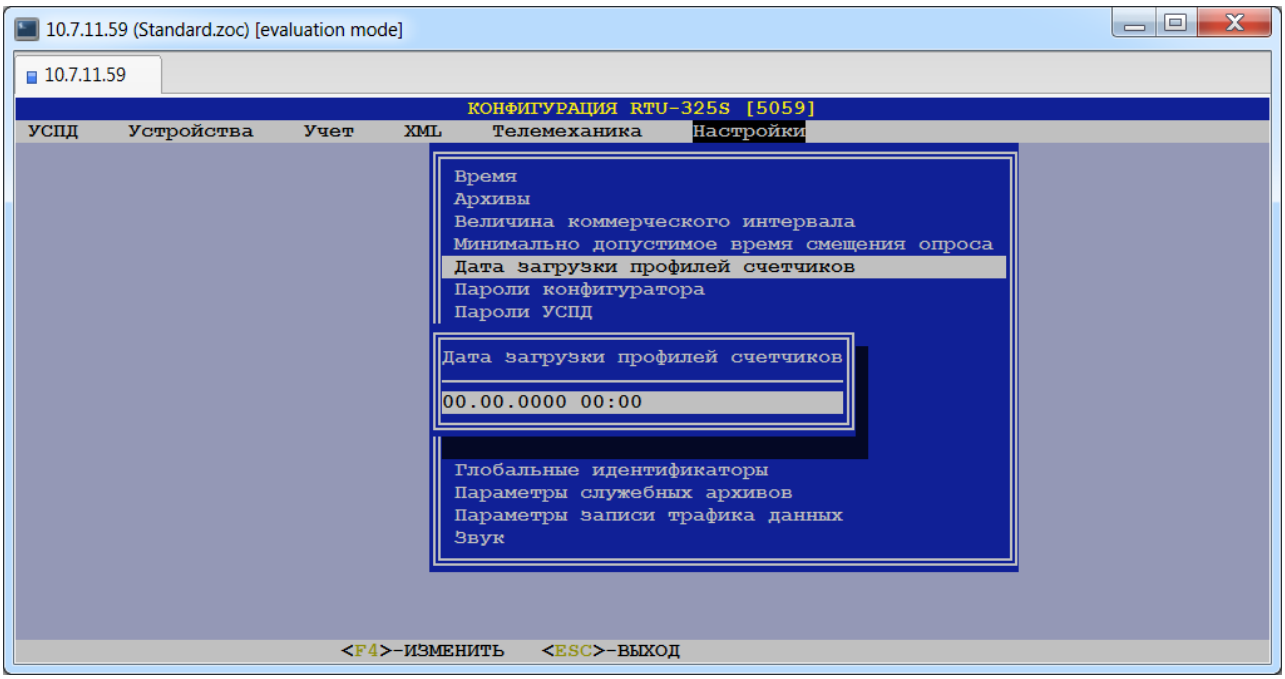
One option for all polling assignments for all meterings at the minimum time allowed to move the polling in seconds (see section «Методика опроса счётчиков» of the «Основные принципы работы и конфигурирования» manual):



Recommendation: Set a value of 5 seconds.

3.12. «Настройки» > «Дата загрузки профилей счётчиков» .

This parameter determines the date/time from which RTU should download the meter profiles and form the relevant archives. If no date is specified, zero values shall be placed on the screen. This means that the meter profiles will be downloaded from 00:00:00 p.m. on current days:

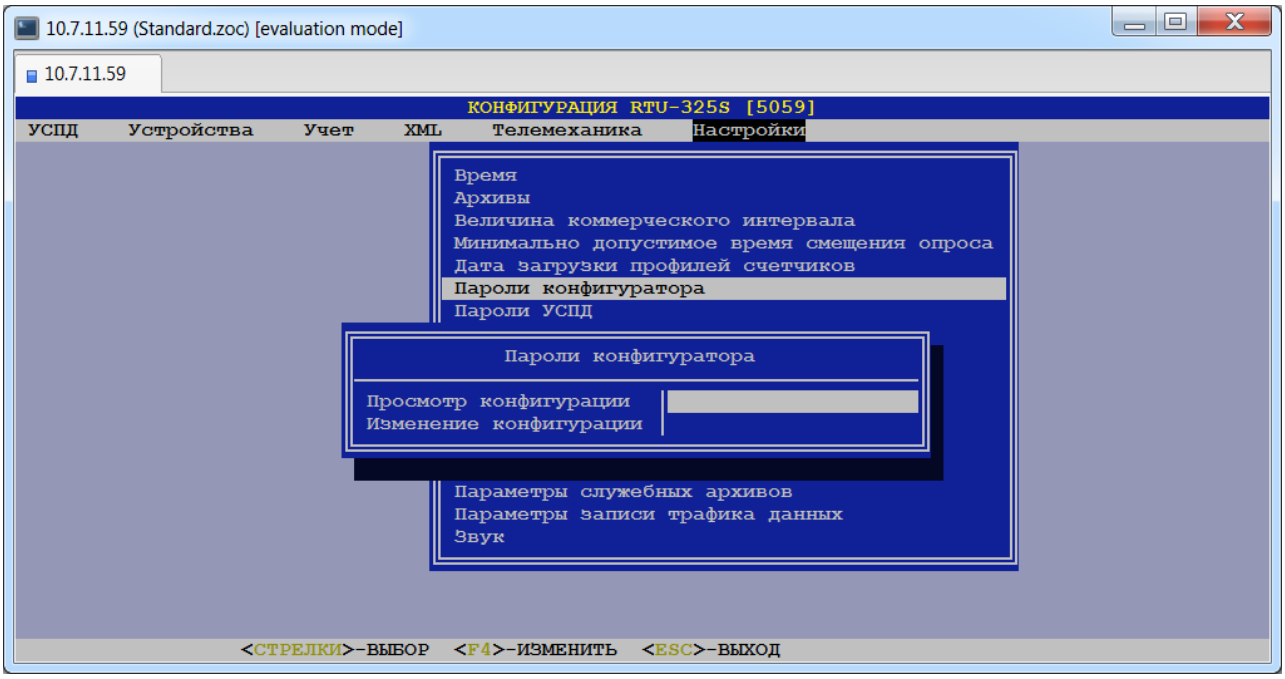


Attention: RTU time must always be set in winter time!

Recommendation: The user should specify minimum loading depth required Checkers. The large download depth of the meter profiles greatly increases the time of downloading.

3.13. «Настройки» > «Пароли конфигуратора» .

Work with «Конфигуратор» is possible with two levels of passwords:



Data type: Text string up to 20 characters. If:

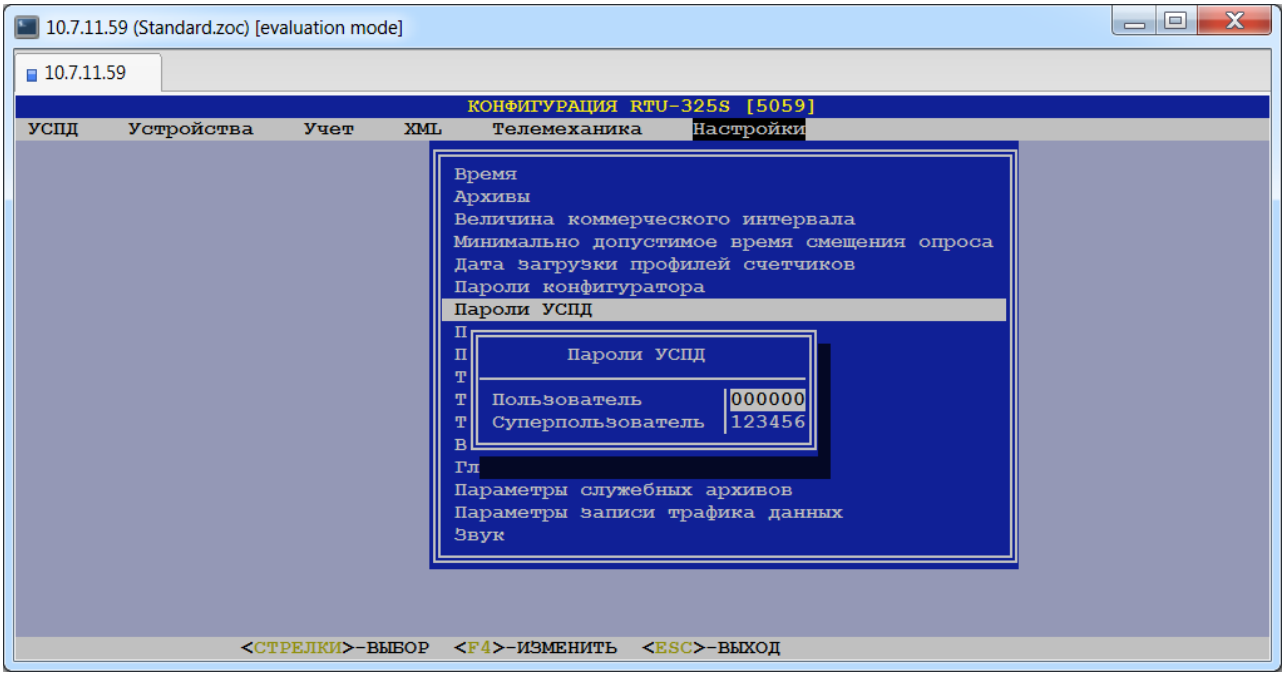
; the password «Изменение конфигурации» is not specified, the password entry is not required and access to the main menu items of the «Конфигуратор» program with configuration rights is ensured. If:

; password «Изменение конфигурации» is given, ; password «Просмотр конфигурации» is not specified, then when the «Конфигуратор» program is started in the password enterr window by clicking on the <Enter> key (i.e. without password input) the «Конфигуратор» menu items with only configuration viewing rights are available. A password is required to operate with the configuration rights.

If both passwords are specified, the password entry into the program «Конфигуратор» is mandatory.

3.14. «Настройки» > «Пароли УСПД» .

Working with an integrated input/output remote control RTU is possible with two levels of passwords:



Data type: 6-digit number. If:

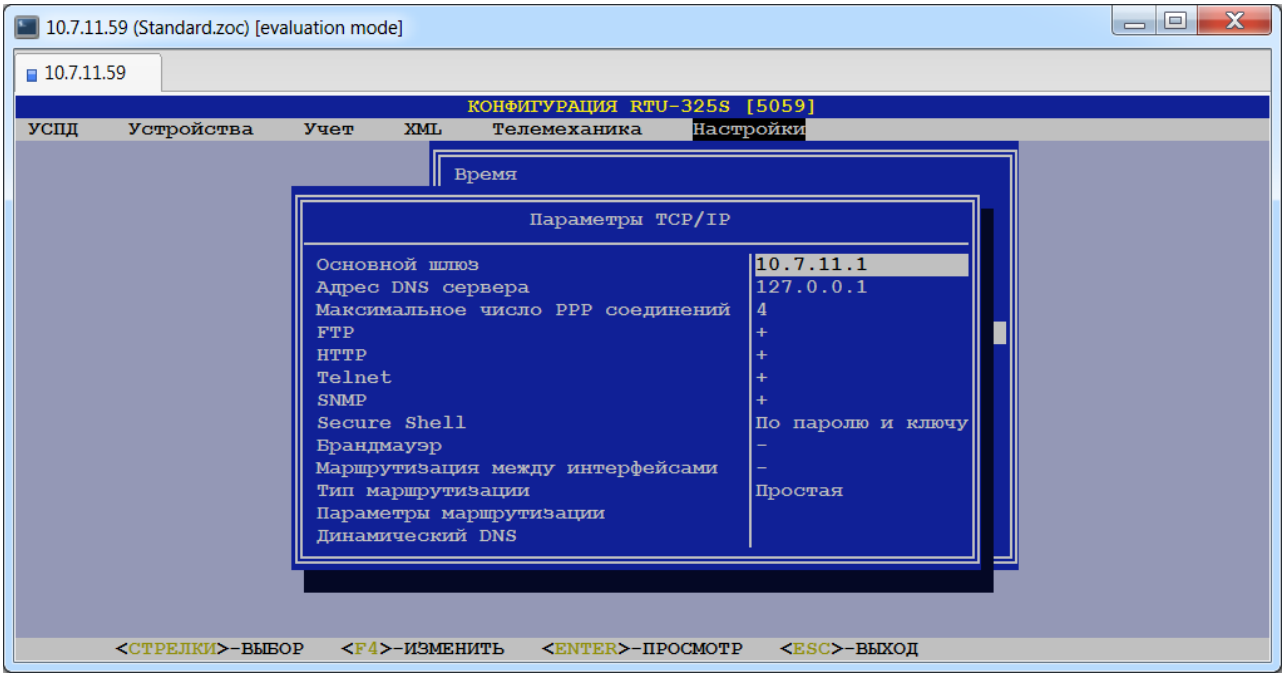
; password «Суперпользователь» not specified, password entry is not required and access to RTU with superuser rights is ensured. If:

; password «Суперпользователь» given, ; password «Пользователь» is not specified, then without the password pressing <Enter> access to the main menu items of the built-in input/output remote with user rights. A password is required for handling the rights of the superuser.

If both passwords are specified, the input of the password to operate with the input/output remote is mandatory.

3.15. «Настройки» > «Параметры TCP/IP» .

RTU may have several ETHERNET hardware interfaces. But the TCP/IP protocol's software stack is one for all ETHERNET interfaces. The settings of the TCP/IP parameters given in this menu paragraph are those of the TCP/IP protocol stacks and thus refer to all ETHERNET interfaces:



- **The main airlock.**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 10.7.11.1.
- **DNS server address.**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 127.0.0.1.
- **Maximum number of PPP connections.**
  Data type: whole number in the range [1..10]. Plant: 4.

- **FTP.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . The plant: «+» . With version 3.18I, the change to this parameter becomes effective immediately after the storage and does not require reloading of RTU or software.

- **HTTP.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

- **Telnet.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . The plant: «+» . With version 3.18I, the change to this parameter becomes effective immediately after the storage and does not require reloading of RTU or software.

- **SNMP.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

- **Secure Shell.**
  Allowable values: {«Запрет», «По паролю», «По ключу», «По паролю и ключу»}.

Plant: «По паролю и ключу» .

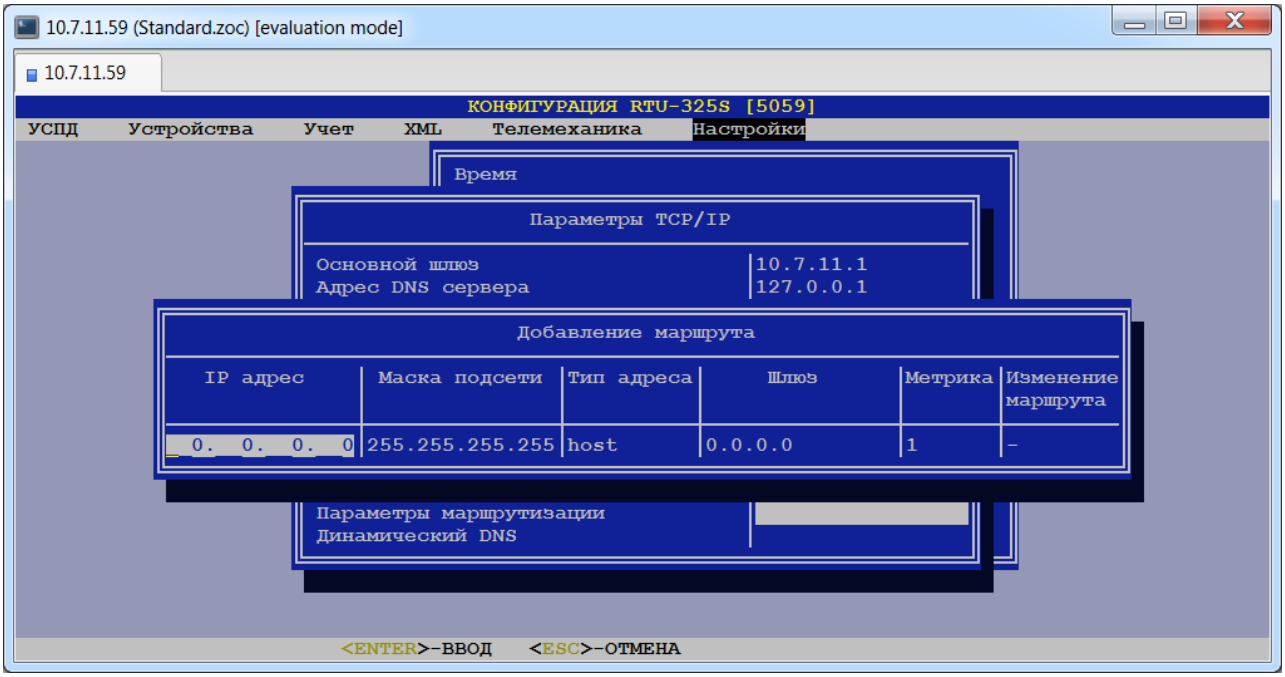
- **Brandmauer.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

- **Inter-interface routes.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

- **Type of routed.**
  Allowable values: {«Простая», «Статическая», «Динамическая»}. Plant: «Простая» .

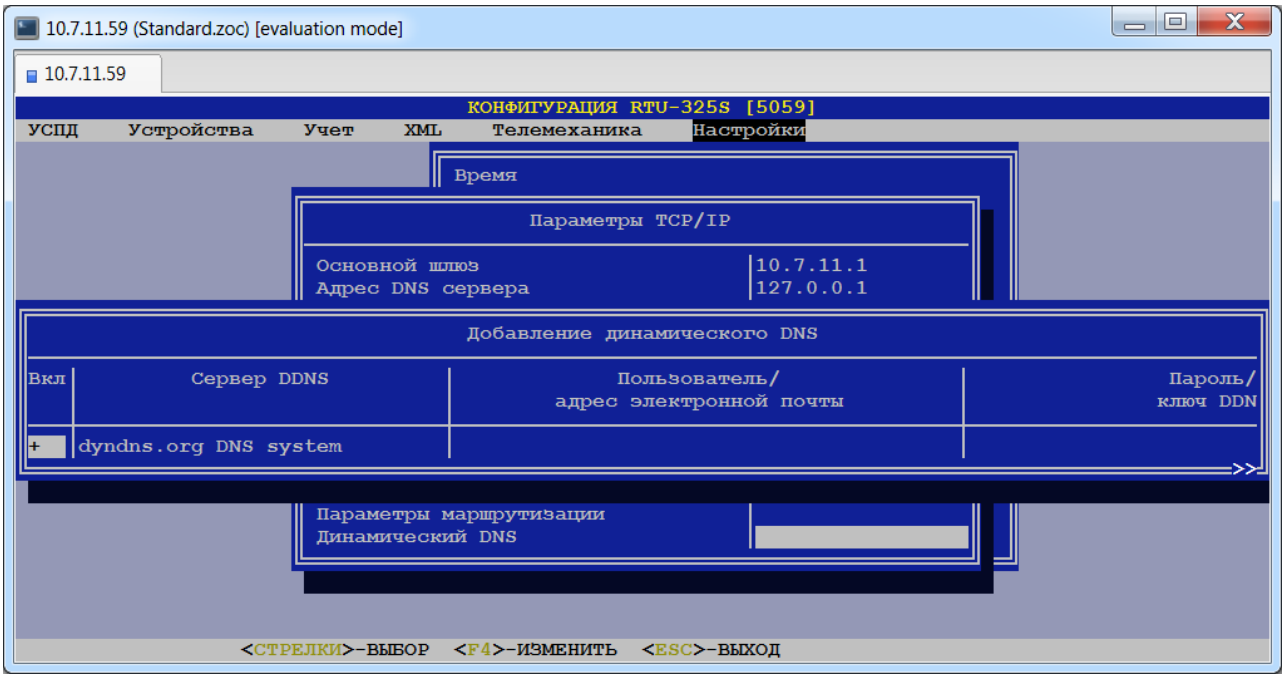
- **The router parameters.**

When selecting this menu item, the user will initially be provided with a chart of routeting parameters:

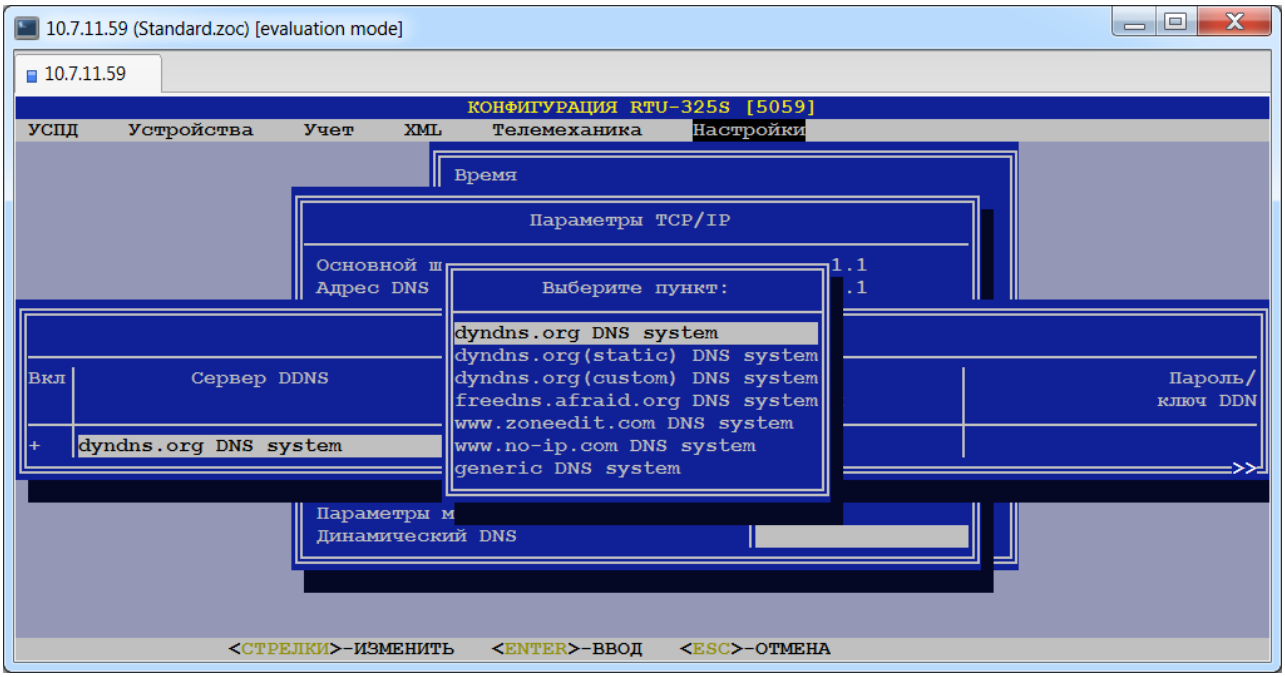


- **IP Address**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 0.0.0.0.
- **Suit yourself.**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 255.255.255.255.
- **Type of address**
  Allowable values: {«host», «network»}. Plant: «host» .
- **Half**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 0.0.0.0.
- **Meteric**
  Data type: an integer in the range [1 ... 15]. factory default: 1.
- **Change of route**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

· **Dynamic DNS.**
The following table will be made available to the user when the key is pressed<Enter>:



- **Including**
  Allowable values: «+» ("включен") or «-» ("выключен" .
  Sign of «Динамический DNS» mode activation/deactivation.
- **DDNS server**
  List of supported dynamic DNS servers:

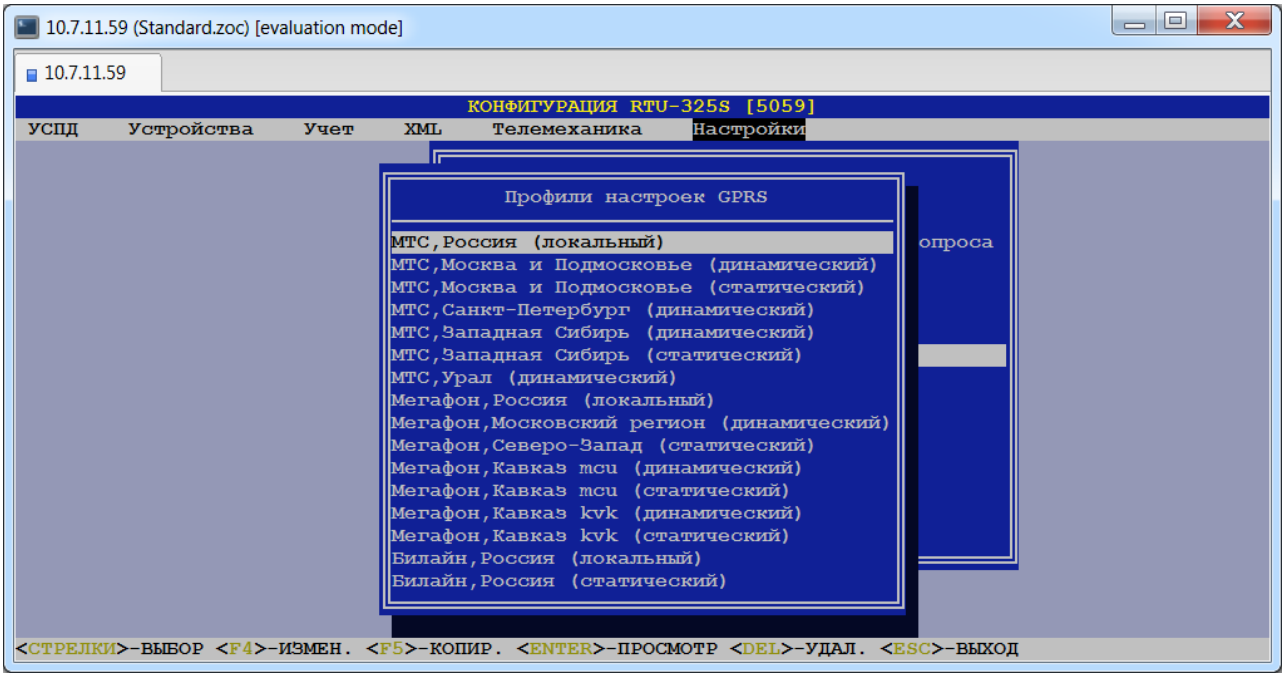


- **User/e-mail address**
  The user name must be entered in the field. The username requirement is defined by the selected DDNS server (in particular, the username may be the e-mail address).
- **DDNS password/key**
  The user ' s password for registration on the DDNS server should be entered in the field.
- **Global host name**
  In this field, you need to introduce the symbolic name RTU, which will be used as the global name of the host.

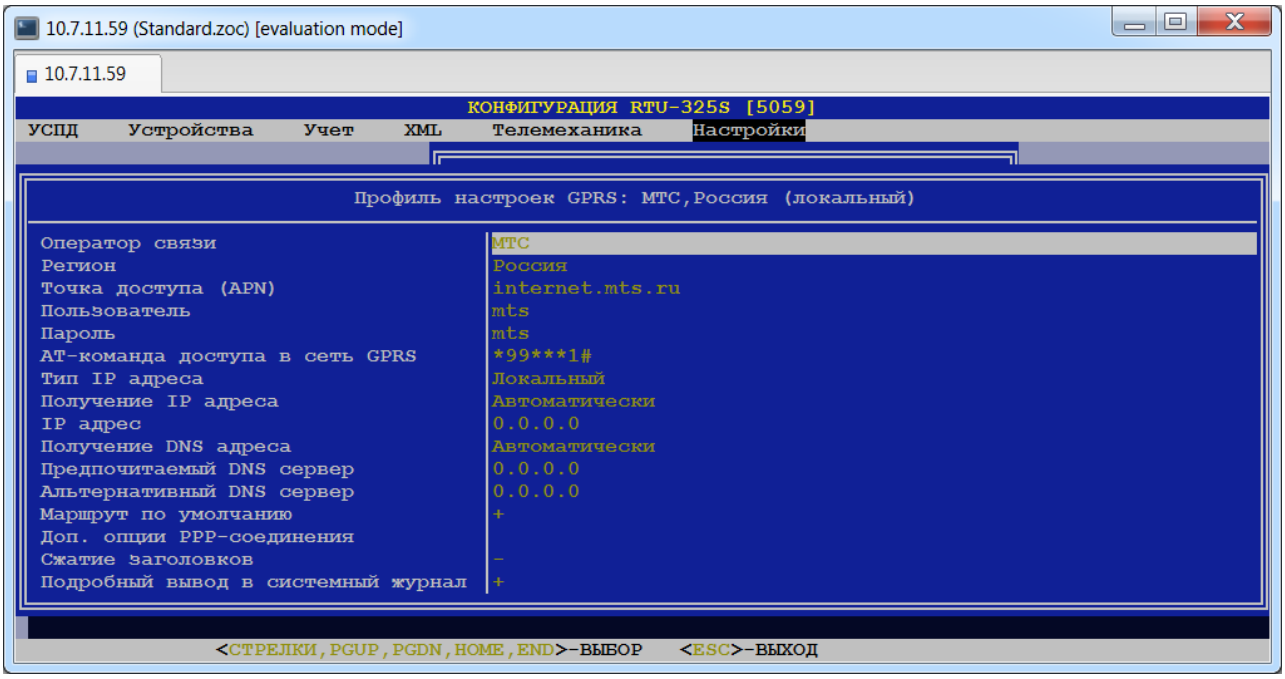
- **IP address verification period**
  In this field, a time period is set for synchronizing the global host name and the dynamic IP address RTU on the DDNS server.

3.16. «Настройки» > «Профили настроек GPRS» .

In this paragraph, the user will be provided with a list of the standard profiles of the GPRS of some Russian telecommunications operators:



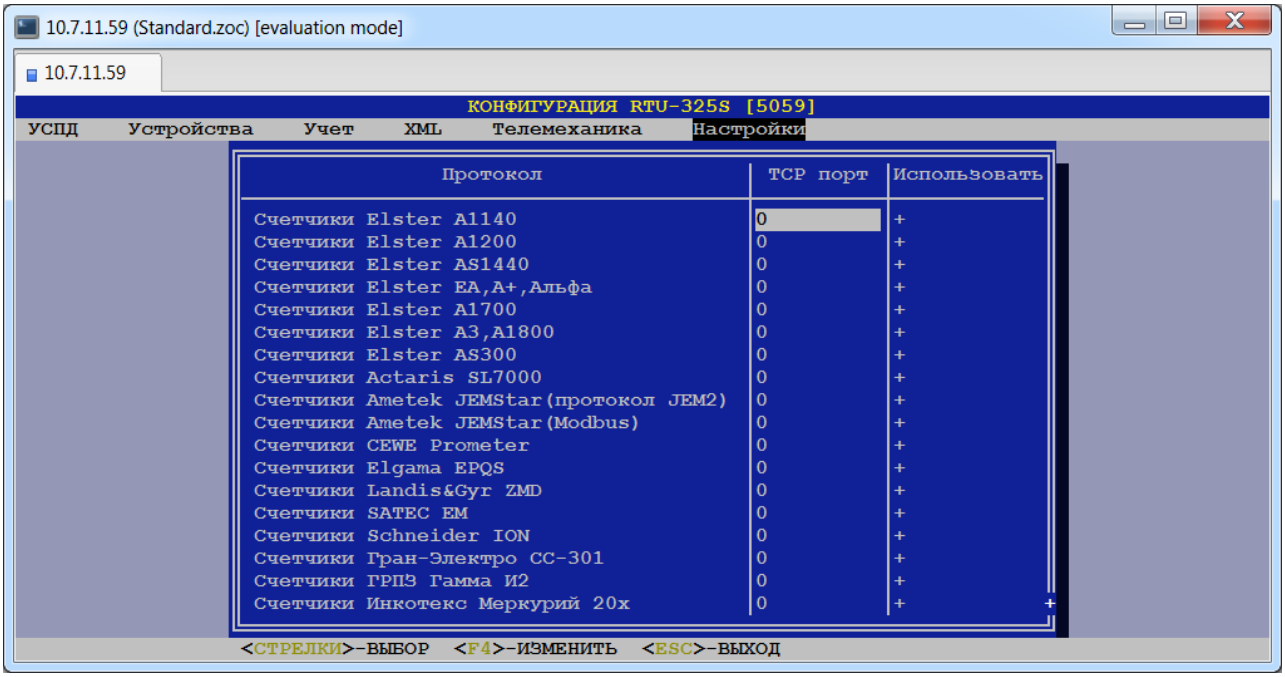
A list of parameter values for this profile will be provided when the key is pressed <Enter>:



In order to create a new profile, it is necessary to copy an existing profile on the <F5> key and then modify the necessary parameters.

3.17. «Настройки» > «Типы протоколов» .

In selecting this paragraph, the user will be provided with a list of all types of protocols available in the RTU:



The user should identify a list of the types of protocols that will be available for further configuration of RTU in the paragraph:
«УСПД» > «Соединения» > «Параметры соединений» > "Протокол" . This should be done to minimize the number of menu items selected to reduce the time for the configuration of RTU.

The parameter value for each protocol shall be:

- **«Использовать»**
  Allowable values: «+» ("разрешить") or «-» ("запретить" .

Recommendation: The types of protocols not used in this draft are recommended «запретить» , i.e., to put the sign «-» .

For some types of protocol, the port number should be defined in the parameter:

- **«TCP порт»**
  Data type: whole number.

The following are the notes to the individual protocols:

• Pulse meters. This protocol is used to polling the impulse output meters.

• GPS/Glonass. This protocol is used to obtain information from the time signal receiver and to automatically correct the time of RTU. Works on RS-232.

Recommendation: Prior to setting this type of protocol, the user must check The accuracy of the time to be obtained with GPS by setting up the «GPS тест» protocol. This is necessary to avoid triggering an automatic correction procedure for RTU time and, therefore, the time of all system meters with wrong time.

• GPS/Glonass test. This protocol is used on a given connection instead of «GPS» protocol to install GPS and allows the virtual console of this protocol to be visually evaluated

The accuracy of the time transfer with GPS. The time of RTU is not corrected.

• PTP (IEEE 1588) Master. The time frame protocol from this network node. There can only be one node with this protocol on the network. There can only be one such protocol on one connection.

• PTP (IEEE 1588) client. The protocol for taking the time frame. There may be many knots with this protocol online. The protocol will operate under the following conditions:

• There's only one protocol on one connection.
• Timeline set «PTP»

• NTP server. The time frame protocol from this network node.

• NTP's a client. The protocol for taking the time frame.

• **Arbitration of reserved RTU is a master.**

• Arbitration of reserved RTU is the lead. These protocols are used to create highly reliable fail-safe systems with duplicate RTU.

• RTU response (TCP/IP). This protocol is used to communicate with the top level when RTU is connected to ETHERNET. Similar to the ETHERNET hardware interface is always available in the system (access via TCP port 5002).

Restriction: At present should not be used in connection configuration.
Its presence on this list of protocols is reserved for possible future modifications of the system software.

• RTU Response (Last). The protocol is used to communicate with the upper level (including the higher RTU with cascade activation) for the following types of ports: serial, selected modem, switched modem.

Recommendation: For the operation of this protocol, for the selected or switched modem
The user must: Program modem into «Автоответ» mode. ; Prohibit the release of the resulting codes and echo from the modem.

• RTU Response (PPP). This protocol is used to communicate with the upper level for the following types of ports: switched modem.

Limitation: currently not to be used for cascade activation
RTU.

Recommendation: For the work of this protocol on switched modem
Has to: To program modem to modem «Автоответ» after two calls or to ban mode «Автоответ» . ; Programme output code issuance from modem as rows.

• RTU-325 response (TCP/IP). This protocol is used to communicate with the top level when RTU is connected to ETHERNET. Similar to the ETHERNET hardware interface is always available in the system (access via TCP port 5005).

Restriction: At present should not be used in connection configuration. Its presence on this list of protocols is reserved for possible future modifications of the system software.

• RTU-325 response (last). The protocol is used to communicate with the upper level (including the higher RTU with cascade activation) for the following types of ports: serial, selected modem, switched modem.

Recommendation: For the operation of this protocol, for the selected or switched modem The user must: Program modem into «Автоответ» mode. ; Prohibit the release of the resulting codes and echo from the modem.

• 60870-5-104 response. The protocol of the television mechanics IEC 60870-5-104 slave / GOST R IEC 870-5-104 reply.

• 60870-5-101 response. The protocol of the tele-mechanics IEC 60870-5-101slave / GOST R IEC 870-5-101 reply.

• RTU Request (TCP/IP). This protocol is used in the cascading of RTU to connect the higher RTU with the subordinates of ETHERNET ports.

• RTU Request(s) This protocol is used in the cascading of RTU to connect the higher RTU with the subordinates for the following port types:

- consecutive,
- The modem selected,
- The modem is switched.

• RTU-325 Request (TCP/IP). This protocol is used in the cascading of RTU to connect the higher RTU with the subordinates of ETHERNET ports.

• RTU-325 Request (Last). This protocol is used in the cascading of RTU to connect the higher RTU with the subordinates for the following port types:

- consecutive,
- The modem selected,
- The modem is switched.

• 60870-5-104 request. The protocol of the tele-mechanics IEC 60870-5-104 Master / GOST R IEC 870-5-104 Request.

• Modbus/TCP request. Data transmission protocol Modbus/TCP request.

• Modbus RTU request. Data transmission protocol Modbus RTU request.

• Reading a discrete signal. This protocol is used to record the state of the external discrete signal only from the port of the configuration RTU type of digital input.

• Discretionary control. This protocol is used to provide an external discrete signal only from the port of the type of discrete RTU.

• ADAM5000/6000. This protocol supports the following remote input-output devices of the ADAM5000 series and ADAM6000 companies «ADVANTECH» operating on ETHERNET:

- ADAM5000/TCP controller with discrete ADAM-5051S input modules (up to 8 The modules in the controller, each module 16 digital inputs).
- ADAM-6015 is a remote input module for thermo-resistance signals (6 canals).
- ADAM-6017 is a remote input module for analog signals (8 channels).
- ADAM-6050 - Remote Discrete Injection/Exit module (12 channels) (i.e. digital inputs, 6 digital outputs).
- ADAM-6052 remote input-output module for discrete signals (8 channels) 8 channels of digital outputs). The above devices are configured as remote RTUs.

• Simple signal. This protocol is used to monitor the status of the IPB by the RS-232 consecutive interface.

• MOXA ioLogik. This protocol supports the following remote input-output devices of MOXA iioLogik of «MOXA» company, operating on ETHERNET.

- ioLogikE2210 - Remote Scream Injector-Exit module (12 channels) 8 channels of digital outputs). This device is configured as a remote RTU.

• ADAM4000 ASCII. This protocol supports the remote ADAM-4,000 ADAM-4,000 series input-output devices of «Advantech» .

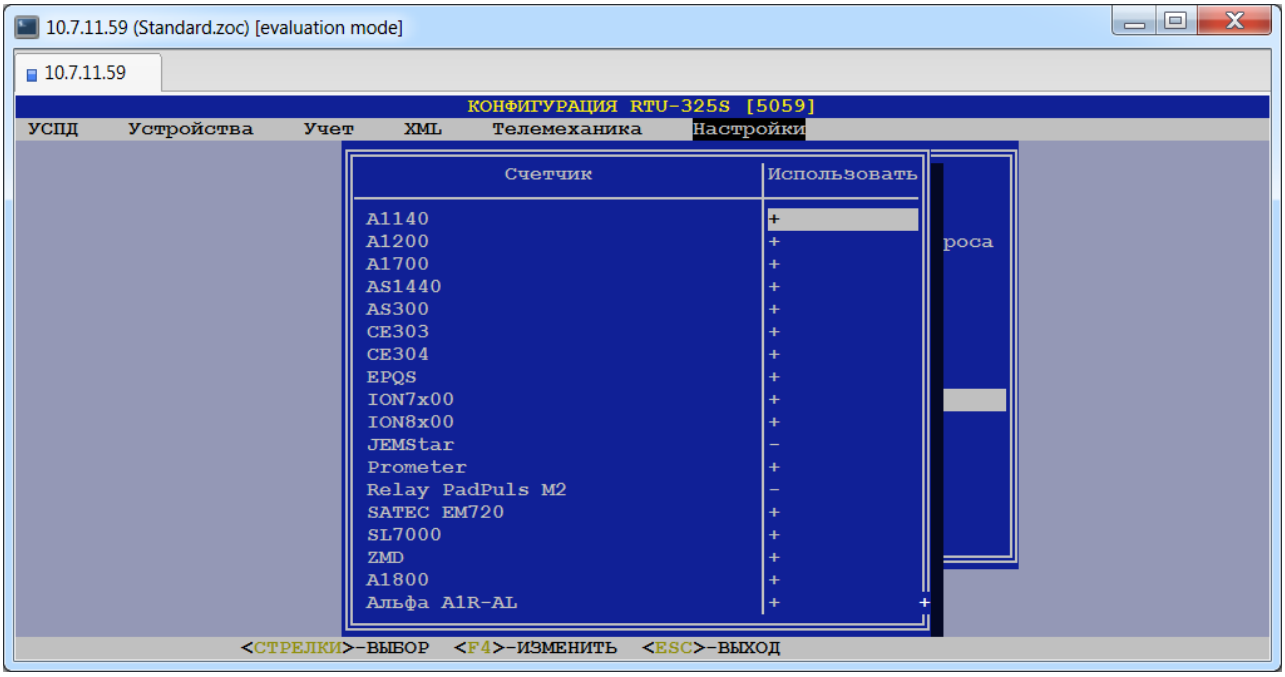
• XML 800x0. Reserved.

• ET7000/i8000. This protocol supports remote ET7000/i8000 «ICPDAS» input-output devices.

Note: MEGA-DATA, Gonets and Gonets - (P-AT4) are present to support obsolete devices.

3.18. «Настройки» > «Типы счётчиков» .

When selecting this paragraph, the user will be provided with a list of all types of meters available in RTU:



The user should identify a list of the types of meters that will be available when the RTU is further configuration in «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» > "Тип счётчика" .

This should be done in order to minimize the number of menu items selected to reduce the time for the configuration of RTU.

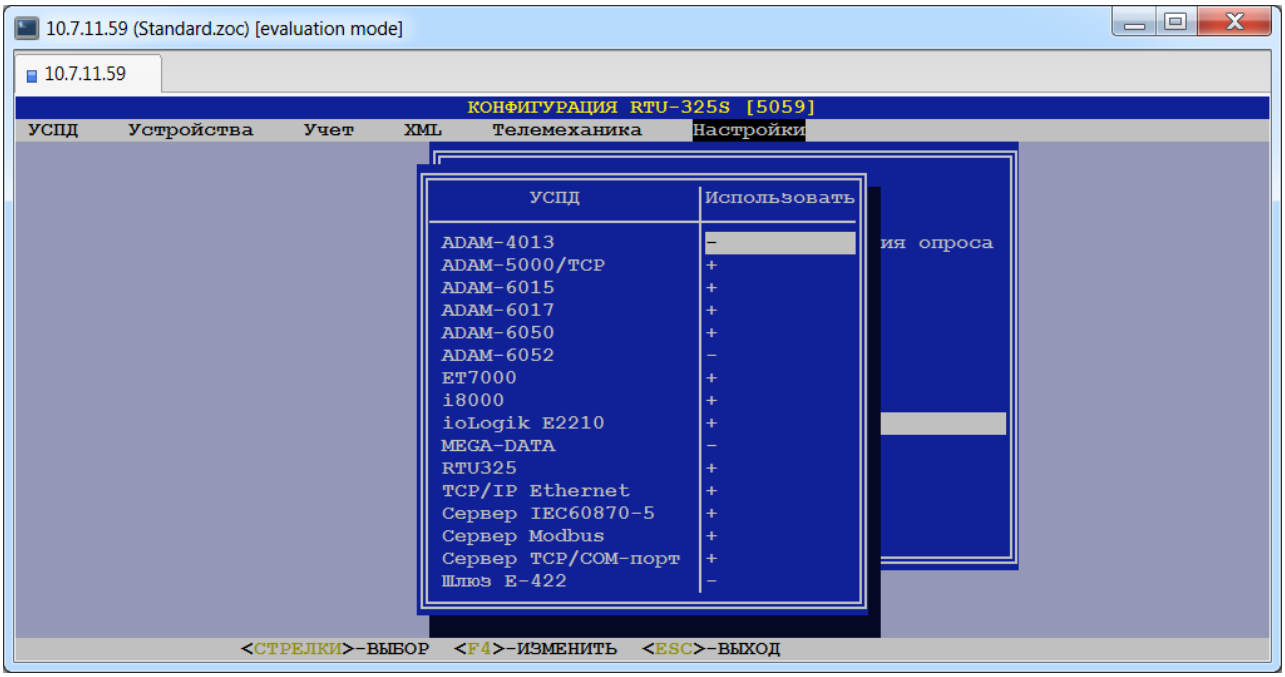
For each type of meter, the following parameter shall be established:

- **«Использовать»**
  Allowable values: «+» ("разрешить") or «-» («запретить» .

Recommendation: The types of meter not used in this project are recommended «запретить» , i.e., to put the sign «-» .

3.19. «Настройки» > «Типы УСПД» .

In selecting this paragraph, the user will be provided with a list of all available types of RTU:



The user should identify a list of types of remote RTU that will be available for further configuration of RTU in the paragraph:
«УСПД» > «Удалённые УСПД» > «Параметры УСПД» > «Тип» . This should be done to minimize the number of menu items selected to reduce the time for the configuration of RTU.

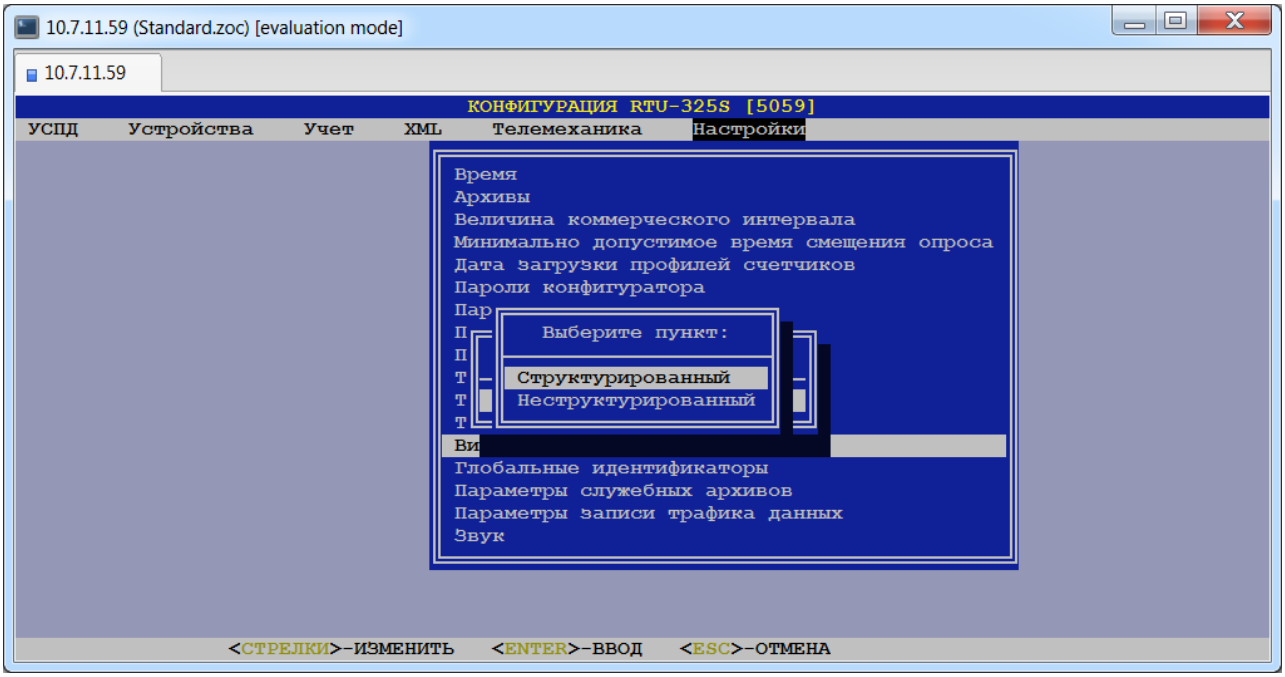
For each type of remote RTU, the parameter value shall be set:

- **«Использовать»**
  Allowable values: «+» ("разрешить") or «-» («запретить» .

Recommendation: Unused types of remote RTU are recommended «запретить» , i.e., to put the sign «-» .

3.20. «Настройки» > «Вид глобального идентификатора» .

This parameter defines the type of global identifier on the external engineering remote screen:



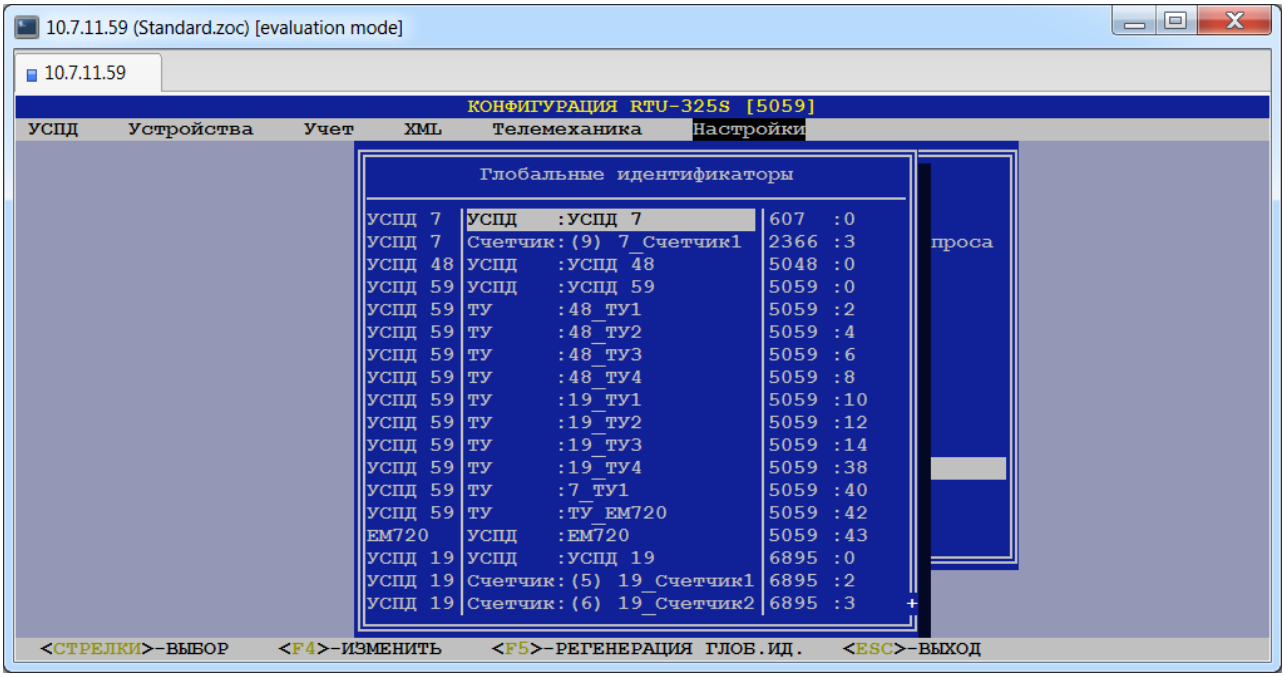
- **Structured.**
  Data type: two whole numbers in the XXXxx:XXXXXX, where XXXXXX is the whole number in The range [0...65000].
- **Unstructured.**
  Data type: an integer in the range [0 ... 4000000000].

Note: Internal representation of the global identifier in RTU archives It depends on its type and is an entire number of 4 bytes.

Attention: In distributed cascade activation systems RTU on all RTU species The global identifier must be the same! This provides a single way to present the global identifier value on the external engineering remote screen.

3.21. «Настройки» > «Глобальные идентификаторы» .

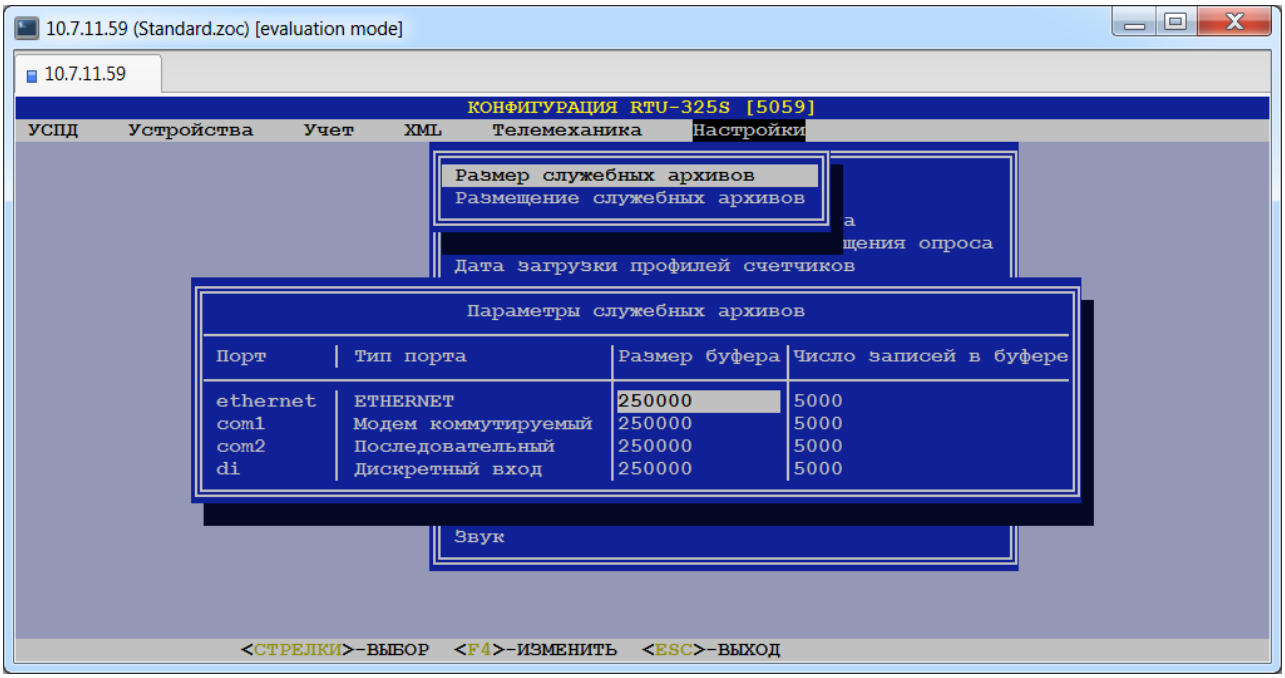
This paragraph provides a list of the system ' s global identifiers in RTU with the possibility of manual correction or automatic regeneration (renumbered):



Automatic regeneration is only possible for local RTU objects. Manual correction is possible for all system objects, including system objects connected to remote RTU.

3.22. «Настройки» > «Параметры служебных архивов» > «Размер служебных архивов» .

For each hardware interface «Порт», the size of the service archive buffer shall be given, limited by the number of entries in the buffer to protect against overfilling:



- **The size of the buffer.**
  Data type: whole number. Plant: 250,000.

Determines the memory size of RAM RTU in bytes to store the binary information transmitted/received by the port. This information is periodically recorded in the service archives for solid memory of RTU.

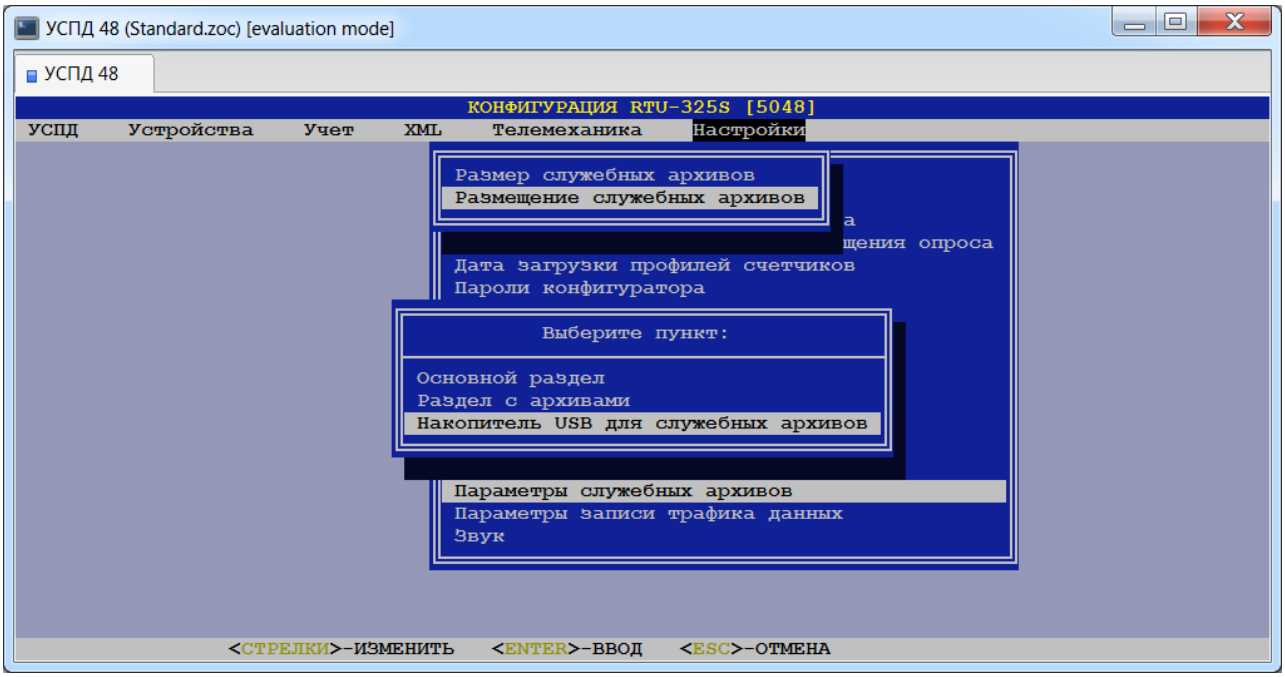
- **The number of entries in the buffer.**
  Data type: whole number. Plant: 5,000.

The value of 0 for a parameter prohibits the use of office archives.
Recommendation: use default values

parameters.

3.23. «Настройки» > «Параметры служебных архивов» > «Размещение служебных архивов» .

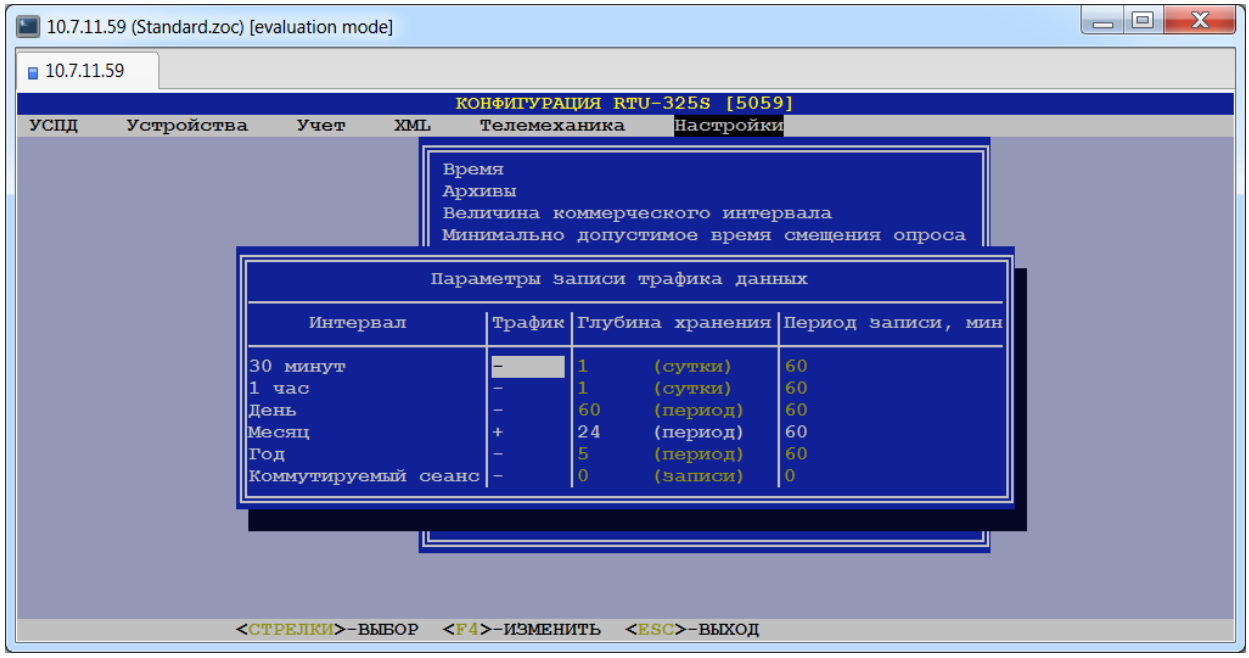
In this point, the user can determine the location of the official archives:



In the plant, the office archives will remain in the main section. In the case of non-recording of office archives (there is no current-day data on the review of office archives), which means no room for recording, the location of office archives on the USB repository for office archives should be chosen. In the absence of a USB storage device, paragraph «Раздел с архивами» should be selected for the official archives.

3.24. «Настройки» > «Параметры записи трафика данных» .

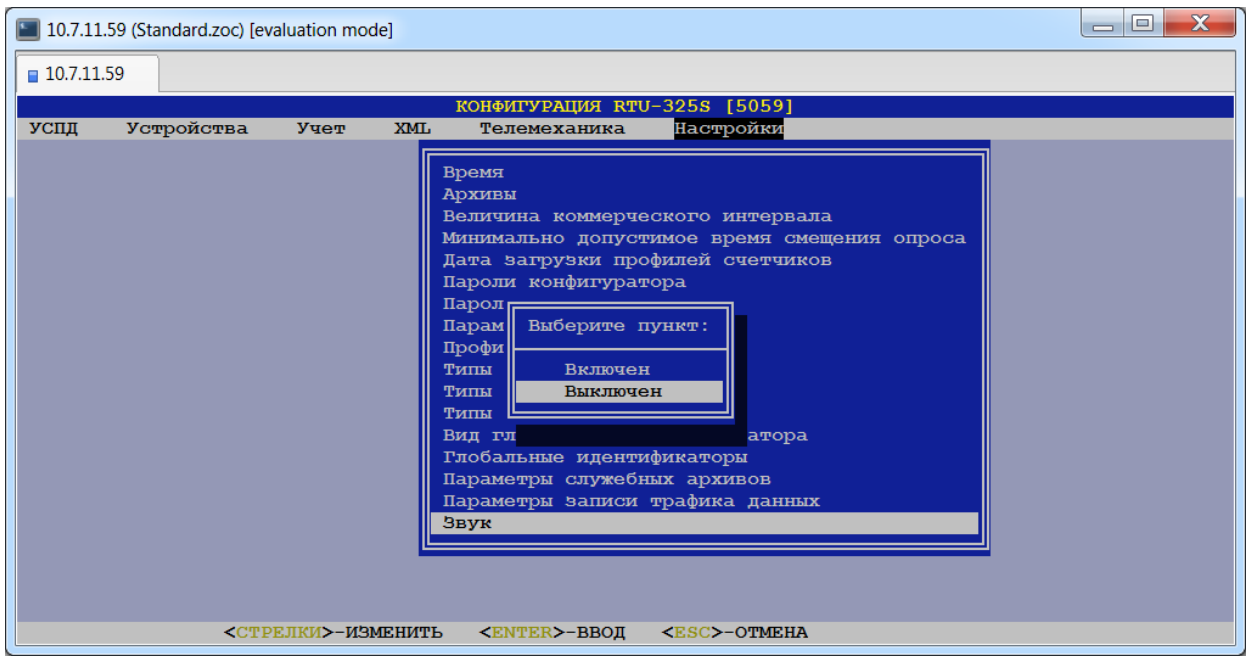
This paragraph provides a list of data traffic registration periods:



- **Traffic.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-» . The following fields are available for editing if the recording of data traffic is permitted.
- **The storage depth.**
- **Recording period, min.**
  Data type: whole number.

3.25. «Настройки» > «Звук» .

RTU sound signal:

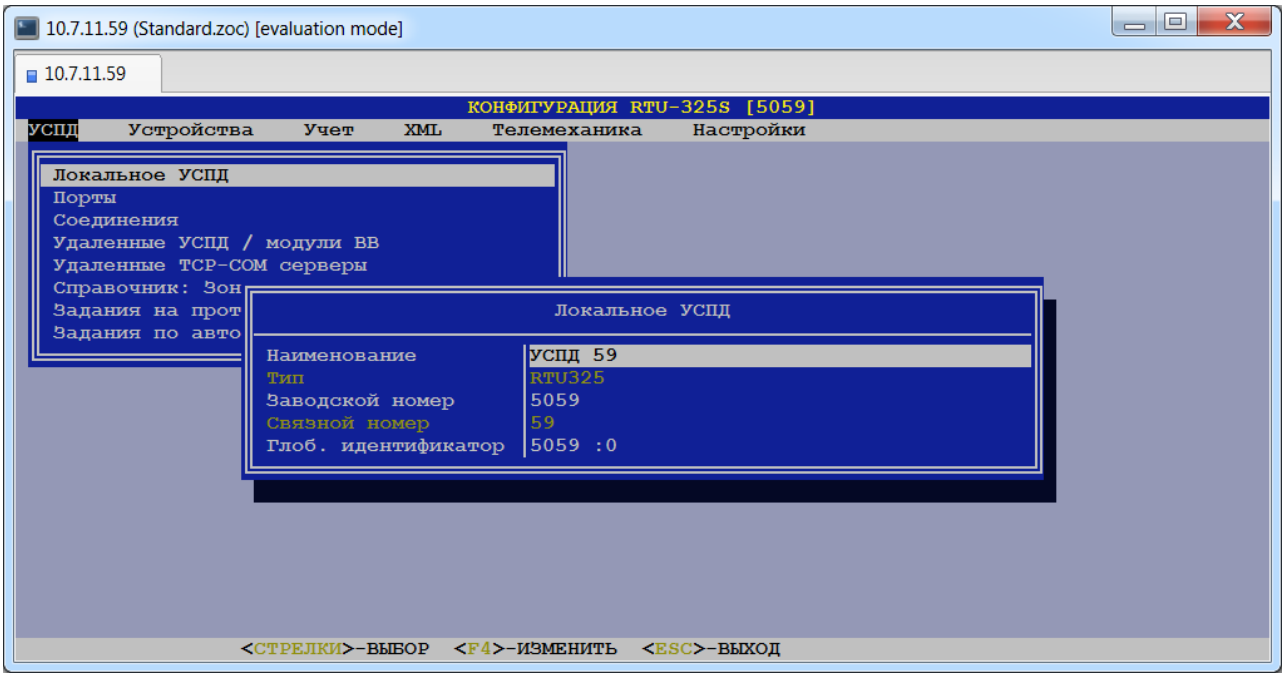


Allowable values: «Включен» or «Выключен» . Plant: «Включен» .

4. Identification of local RTU.

(Check item «УСПД» > «Локальное УСПД»)

In this paragraph, the user must specify the local RTU parameters:



- **Name.**

Data Type: A string of symbols. The local RTU name is used for the convenience of RTU identification in screen forms and reports and is also used for the installation of the on-call input/output remote.

- **Type.**

This parameter is present for reference and is not subject to change.

- **The factory room.**

Data Type: A string of symbols. The RTU manufacturer number is used in the data transmission protocols and shall be strictly consistent with the RTU casing.

- **Contact number.**

This parameter is used by the RTU Technical Support Service, is present for reference and is not subject to change.

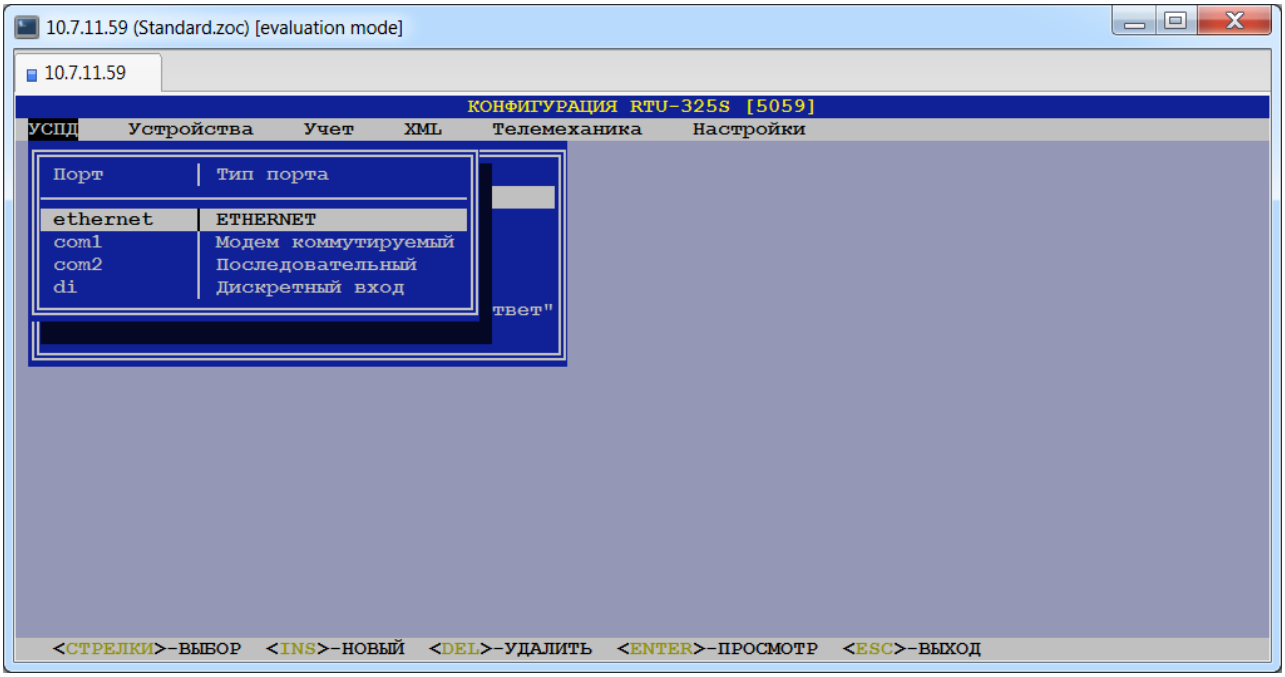
- **Global identifier.**

The way the global identifier is presented and edited depends on the settings in the «Настройки» > «Вид глобального идентификатора» menu item.

5. Choice of local RTU working ports.

(Check item «УСПД» > «Порты»)

In this menu item, the user should create a working list of local RTU hardware interfaces (ports) needed to work with RTU meters and external communications:

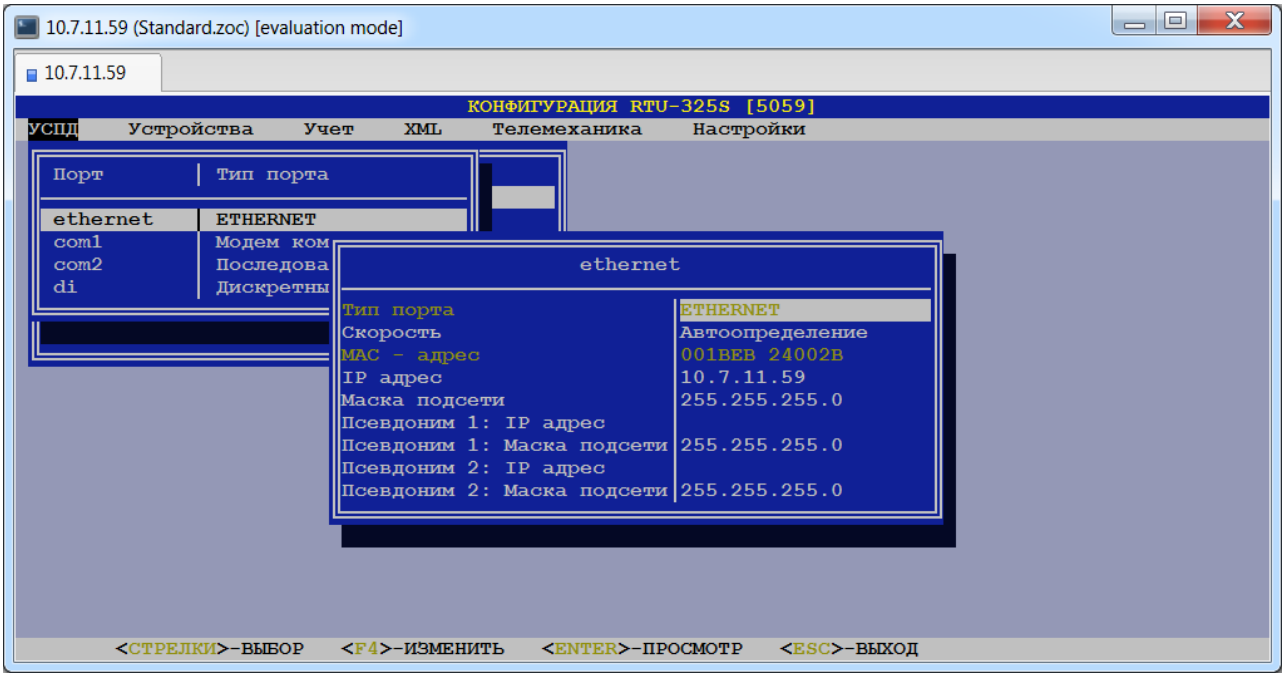


When a new port is added to the general list of ports of work, a choice is made from the list of accessible hardware ports of the RTU. The definition of the list of accessible local RTU ports is done automatically by the system when the RTU is activated.

For each port from the general list of ports, the user must determine its characteristics.

5.1. Port «ethernet»

Port «ethernet» is present at all times and is not subject to disposal. There may be more than one «ethernet» port in the system, which is designated by «ethernet_2», «ethernet_3», etc., and selected from the list of accessible ports when adding a new port. Each port needs to define its own set of characteristics:



- **Port type.**
  Port type - «ETHERNET» , not subject to change.
- **Speed.**
  Allowable values: {«Автоопределение», «10», «100», «1000»}. Plant: «Автоопределение»

Recommendation: If network characteristics allow, use 100.

- **MAC is the address.**
  This parameter is not subject to change for information.
- **IP address.**

Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. Factory setup: 10.7.11.202. If an IP address ' 0.0.0.1' is specified, then the IP address value will be automatically obtained from the DHCP server.

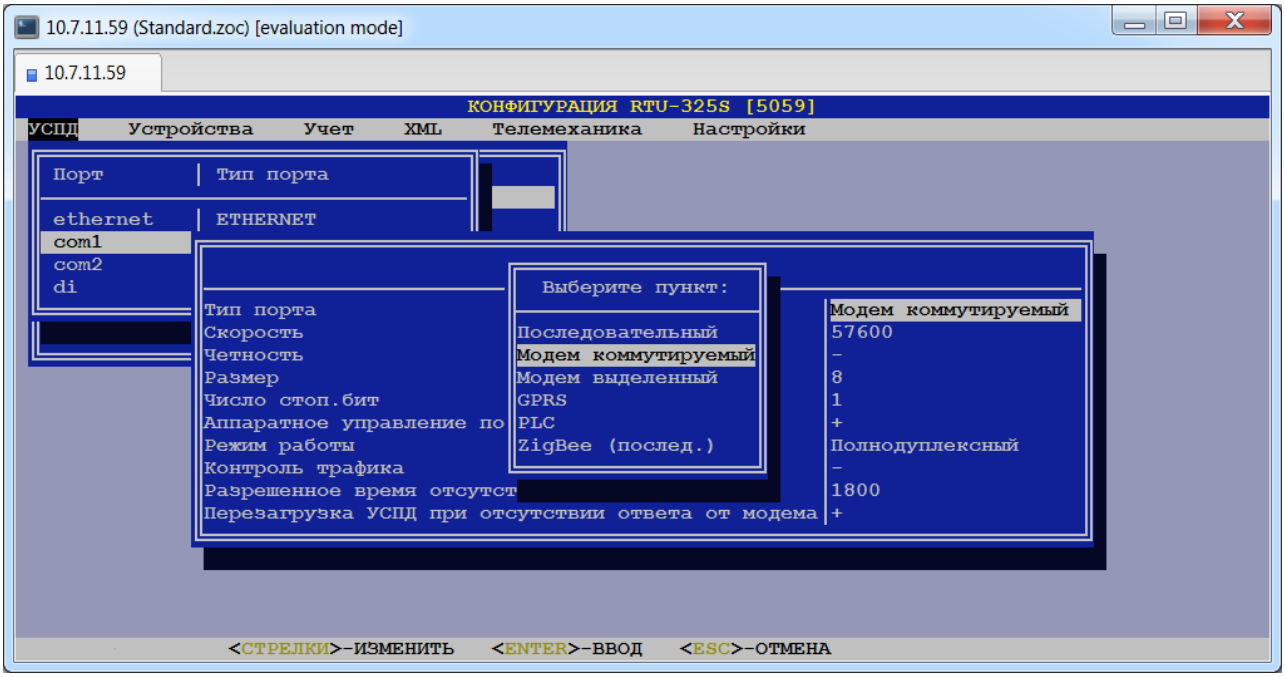
- **Put the mask on.**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 255.255.255.0.

For each interface «ethernet» you can set three combinations «IP адрес» - «Маска подсети» . The second combination is called «Псевдоним 1» , the third is «Псевдоним 2» .

- **P.E. 1: IP address.**
- **P.E. 2: IP address.**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: not known.
- **Psychonym 1: Mask subnet.**
- **The alias 2: Mask under the net.**
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 255.255.255.0.

5.2. Port «COMxx»

- **Port type.**
  For port «COMxx», the following types of ports are possible:



The facilities for ports «COMxx» are as follows:

Port	Port type	Speed
com1	Switchable modem	57600
com2	Consequent	9600
com3	Consequent	9600
com4	Consequent	38400

The following is a list of characteristics common to types of ports «Последовательный», «Модем коммутируемый», «Модем выделенный», «GPRS», «PLC», «ZigBee (послед)» .

- **Speed.**
  Acceptable values:
  For port type «Последовательный»: {50, 75, 110, 150, 300, 600, 1200, 2400, 4800, 9,600, 19200, 28800, 38400, 57600, 115200, 230400, 460800, 921600} for port type «Модем коммутируемый» and «Модем выделенный»: {50, 75, 110, 150, 300, 1200, 2400, 4800, 7200, 9600, 14400, 16800, 19200, 28800, 33600, 38400, 57600, 115200}.

- **Equivalence.**
  Permissible values: {«-», «Контроль нечётности», «Контроль чётности» «Бит чётности = 0» , «Бит чётности = 1» }. Plant: «-» (no verification).

- **Size.**
  Allowable values: {6, 7, 8}. Plant: 8. The number of bits in the bats.

- **Number of stop. bat.**
  Allowable values: {1, 2}. Plant: 1. Number of stabbing bits in the bat.

- **RTS/CTS (Hflow) flow control system.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" .

Plant: «+» .

Recommendation: Always use flow control hardware if connected
The equipment supports this property (more reliable work is being done).

- **Working mode.**
Allowable values: {«Полнодуплексный», «Полудуплексный»}. Plant: «Полнодуплексный» .

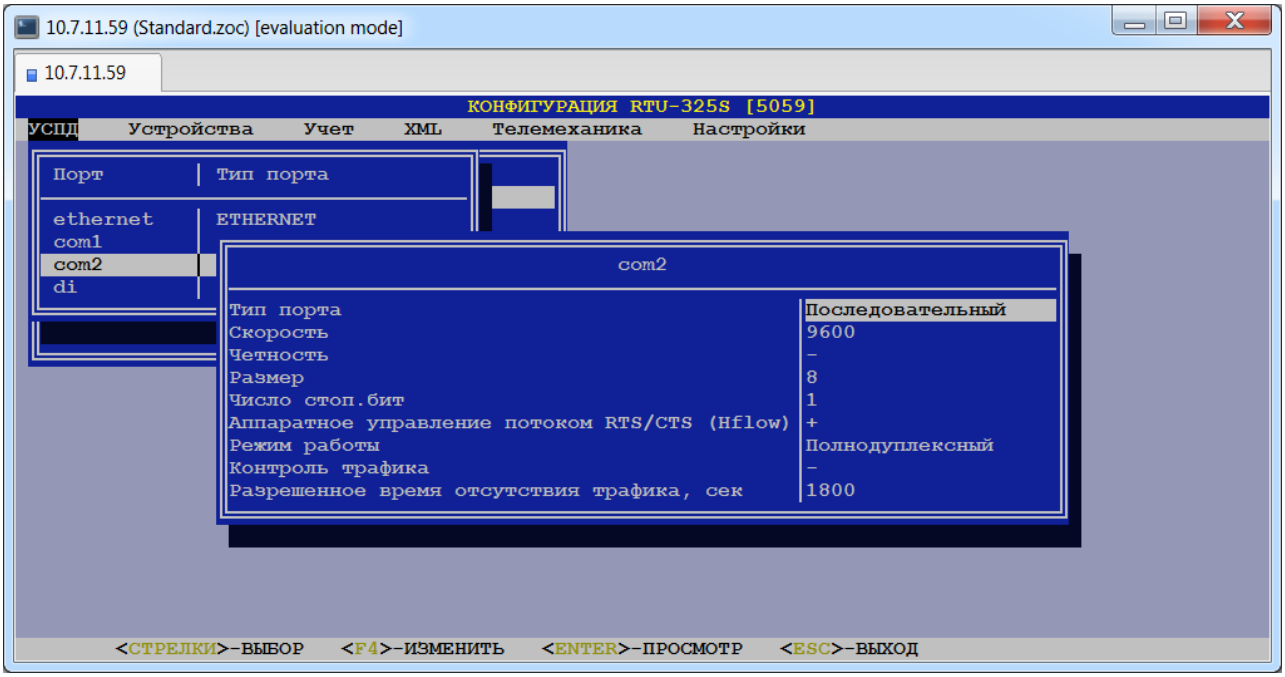
Recommendation: Use «Полудуплексный» mode when working with meters.

- **Traffic control.**
Allowable values: {«−», «Входящий», «Исходящий», «Оба направления»}. Plant: «−» . The setting of this parameter results in a diagnostic signal for the presence (logic `0') or absence (log '1') of a given direction data traffic. This diagnostic signal can be reconfigured to be transmitted via the IEC telemetric protocol 60870-5-104/101. The total diagnostic signal (logic operation «ИЛИ» on diagnostic signals of all successive ports) shall be displayed in the auto-diagnosis of RTU (paragraph «Контроль работоспособности COM-портов»).

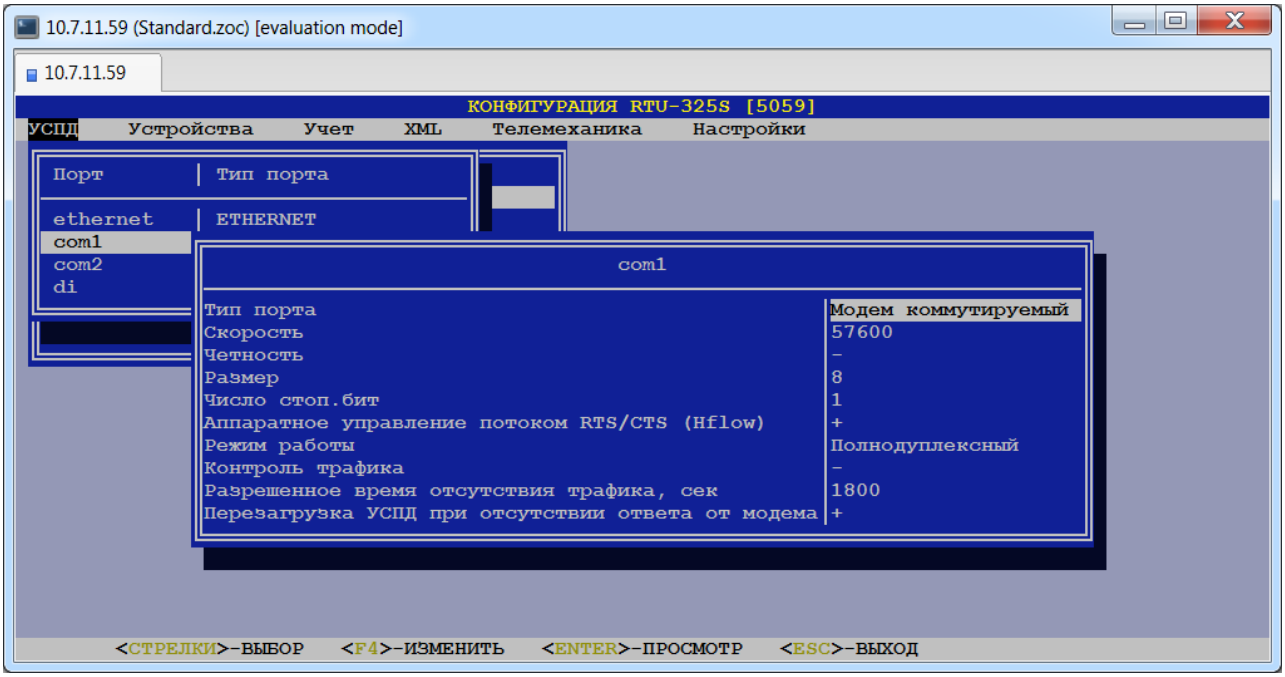
- **Allowed time of absence of traffic, sec.**
Data type: whole number. This parameter defines the maximum time allowed for the absence of data traffic, which is exceeded by the development of a diagnostic signal for the absence of data traffic.

Examples for possible combinations «порт-тип порта» are given below:

5.2.1. Port «COMxx» = port type «Последовательный» .



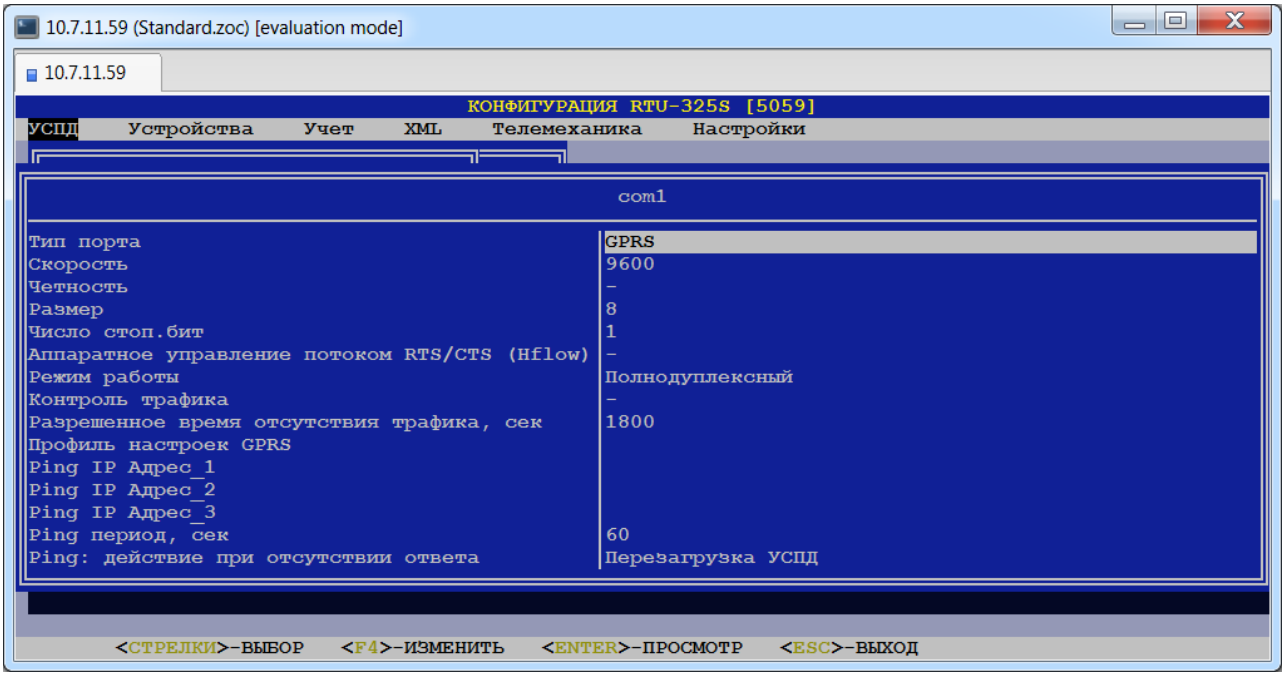
5.2.2 Port «COMxx» - Port type «Модем коммутируемый», «Модем выделенный» .



The following parameter shall be used for this type of port in addition to the above:

- **Reboot RTU if no modem response is available.**
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «+»

5.2.3. Port «COMxx» = port type «GPRS» .



For this type of port, the following parameters shall be used in addition to those described above:

- **GPRS configuration profile**

This parameter assigns the GPRS profile name from the specified in «Настройки» > "Профили настроек GPRS" . With the settings, a GPRS connection will be installed.

- **Ping IP Адрес_1**
- **Ping IP Адрес_2**
- **Ping IP Адрес_3**

Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: not known. The working algorithm of the guard timer is as follows: With the interval «Ping период, сек» ping «IP Адрес_1…» is executed . If the remote node responds, the GPRS connection is believed to be operational. If it doesn't respond, an attempt is made to ping through «IP Адрес_2…». If the remote node responds, the GPRS connection is believed to be operational. If it doesn't respond, an attempt is made to ping through «IP Адрес_3…» . If the answer is no, then the GPRS connection is not considered. After this, attempts are made to re-establish the ppp connection. After 10 cycles of unsuccessful attempts to set up the ppp-connection, the RTU is restarted and the entire cycle is repeated until the GPRS-connection is set up (full cycle time is about 40 minutes at the 60 second period of the watch timer).

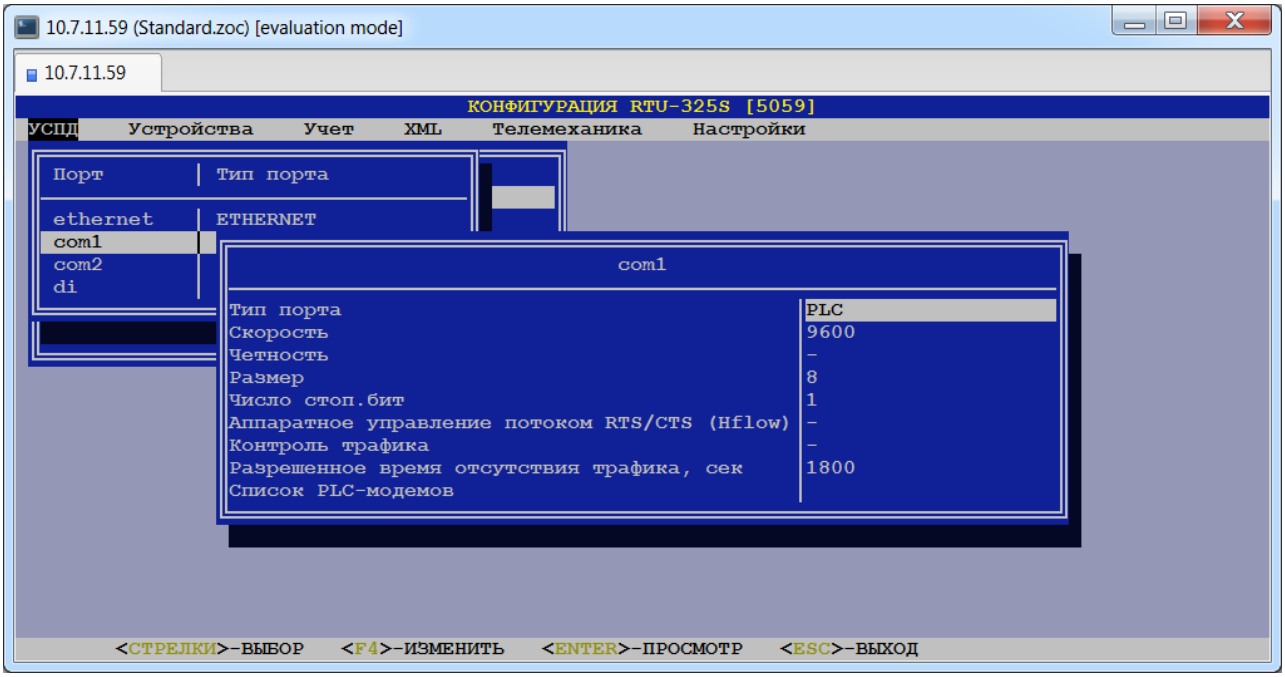
- **Ping period, sec**

  Data type: whole number. Plant: 60. This option sets the period for ping (see above).

- **Ping: no response.**

Allowable values: {«-», «Перезагрузка УСПД»}. Plant: «Перезагрузка УСПД» . This parameter determines whether RTU should be rebooted if no response is available.

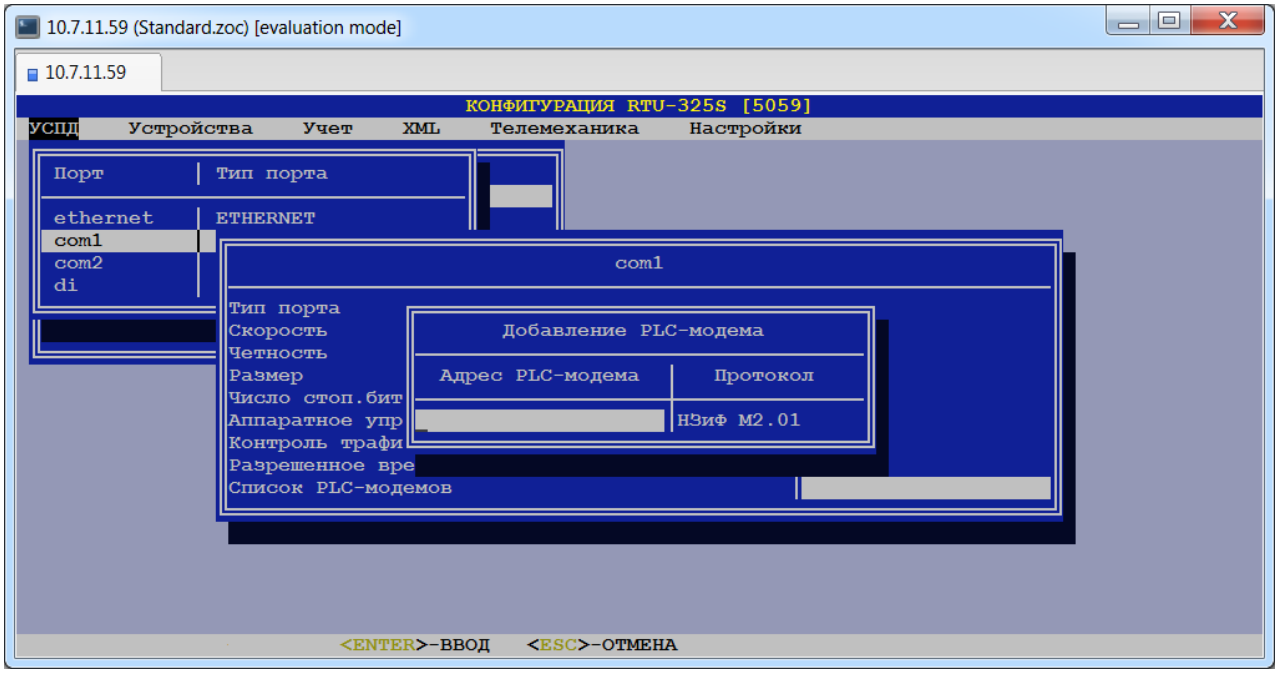
5.2.4. Port «COMxx» = port type «PLC» .



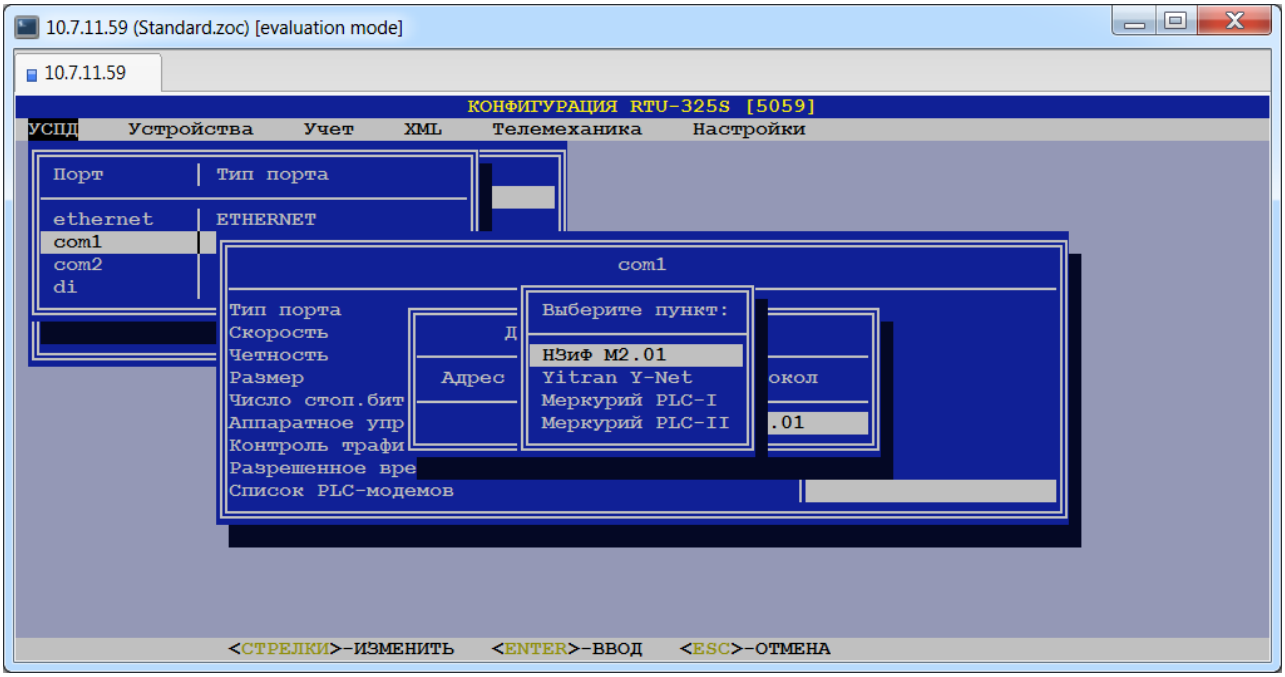
The following parameter shall be used for this type of port in addition to the above:

- **PLC Model List**

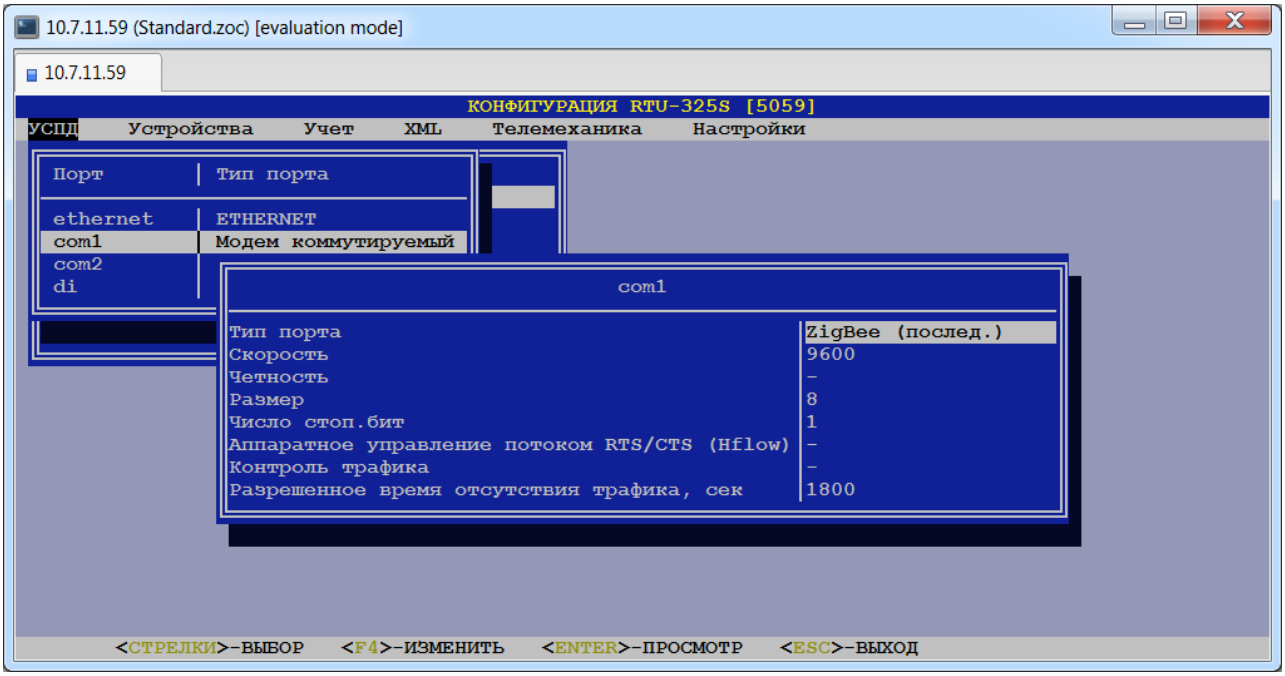
In this paragraph, the user must ask a list of PLC models:



This requires the introduction of a PLC modem address and the selection of a protocol from the list:

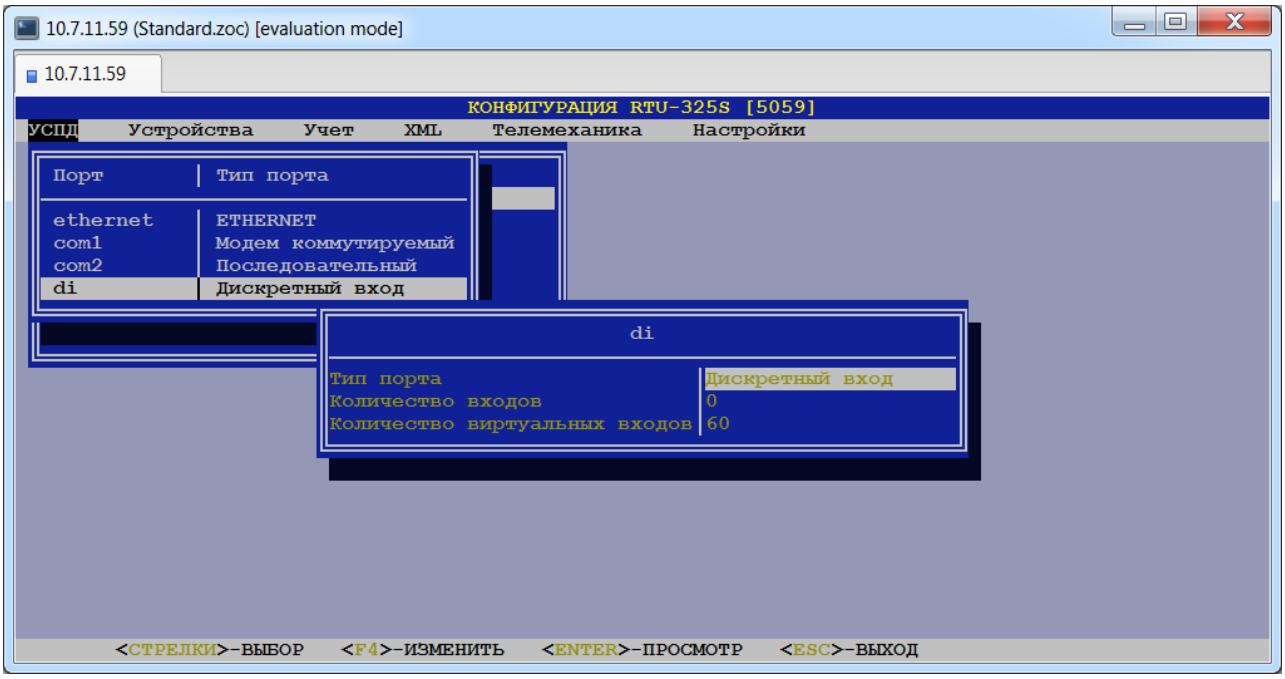


5.2.5 Port «COMxx» - port type «ZigBee (послед.)» .



5.3. Port «DI» (digital input).

At this point, the user can look at the port parameters «Дискретный вход» :



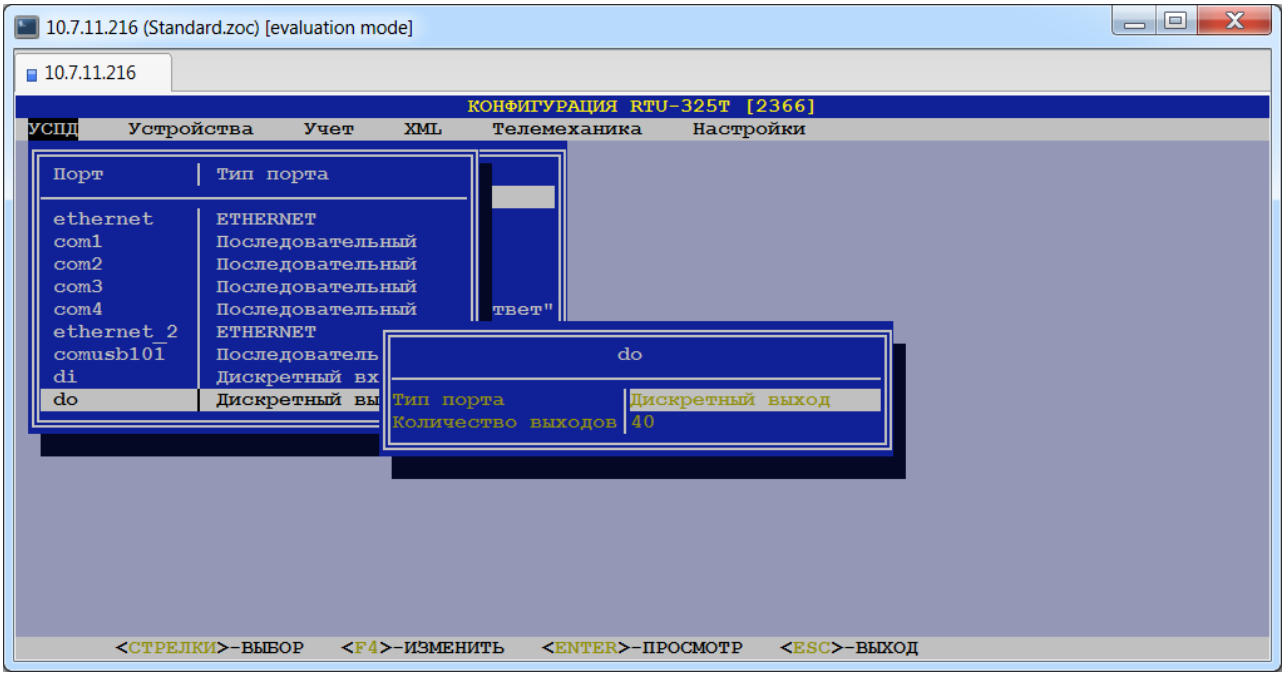
All parameters are not subject to change.

- **Port type.**
  Port type - «Дискретный вход» .
- **Number of entrances.**
  Shows the number of local digital inputs of this RTU.
- **Virtual entrances.**

Shows the number of virtual digital inputs of this RTU. Virtual entrances are the logical digital inputs used to model the operation of real digital inputs when they are not available in RTU.

5.4. Port «DO» (digital output).

At this point, the user can look at the port parameters «Дискретный выход» :



All parameters are not subject to change.

- **Port type.**
  Port type - «Дискретный выход» .
- **Number of exits.**
  Shows the number of local digital outputs of this RTU.

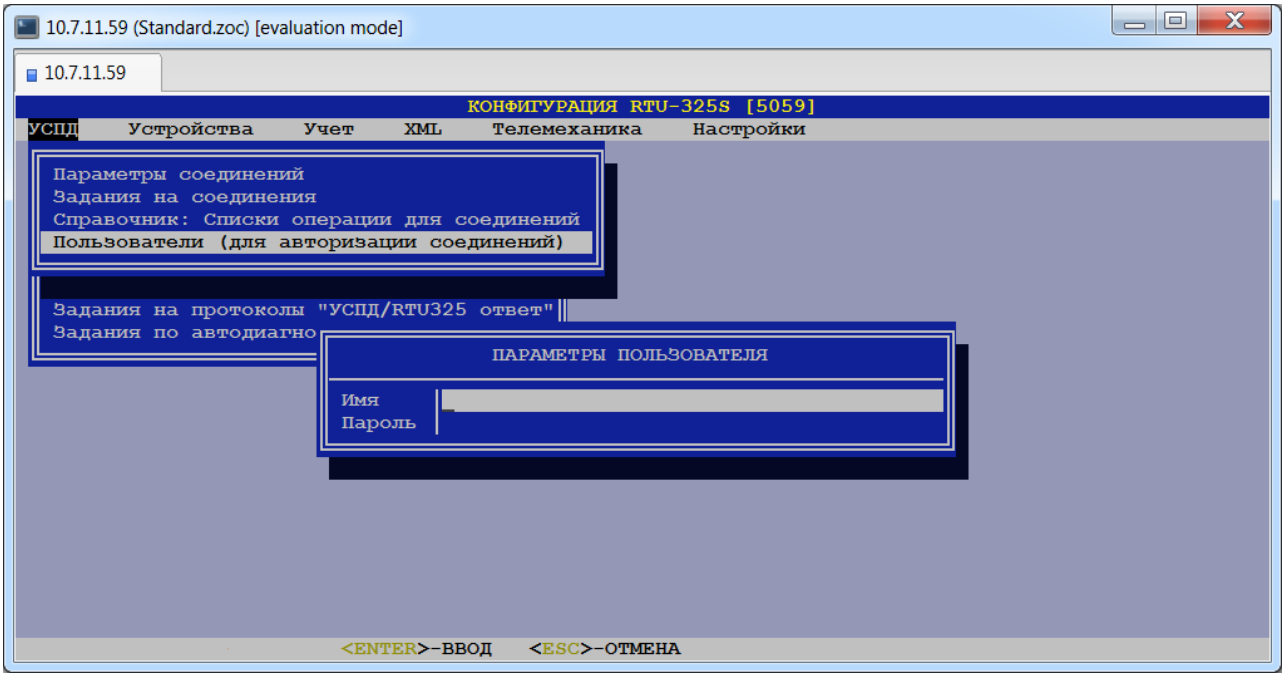
6. Formation of connections from RTU ports.

(Check item «УСПД» > «Соединения»)

6.1. List of users for the authorization of connections.

(Chart item «УСПД» > «Соединения» > «Пользователи (для авторизации соединений)»)

If it is necessary to perform the user authentication procedure at the connection, the user parameters should be entered into the general list:



- **Name.**
  Data Type: A string of symbols.
- **The password.**

Data Type: A string of symbols. These parameters "Имя" and "Пароль" are used to authenticate the user while working on the protocols:

- RTU Response (TCP/IP),
- RTU Response (Last),
- RTU Request (TCP/IP),
- RTU Request (Last),
- RTU-325 response (TP/IP),
- RTU-325 Response (Last),
- RTU-325 Request (TP/IP),

• RTU-325 Request (Last). In order to successfully authenticate the user for the purpose of transmitting/demanding data, parameters "Имя" and "Пароль" shall be accurate to the same parameters of the other party.

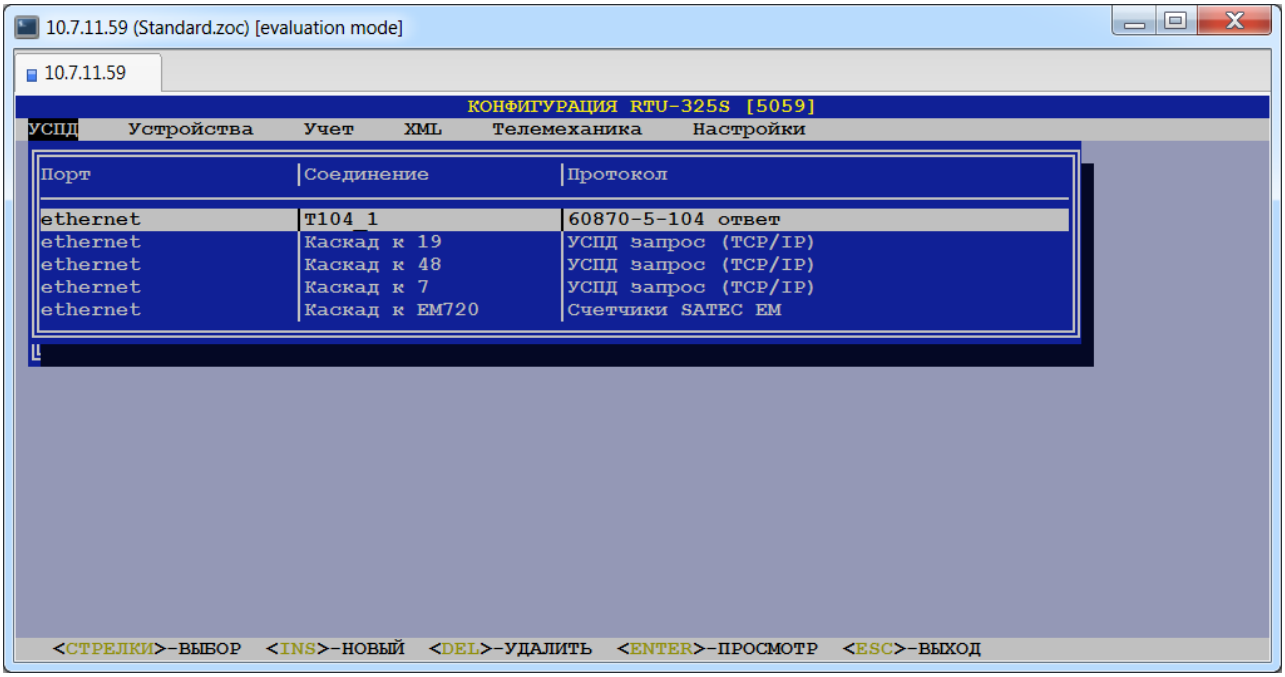
6.2. Combination parameters.

(Chart item «УСПД» > «Соединения» > «Параметры соединений»)

In this menu item, the user should create the connections from RTU ports necessary to work with RTU meters and external communications.

It is possible to create several connections from one RTU port, for example, a switchbell to a switch modem for several RTU subordinates in a cascade or several RS-485 lines with metering.

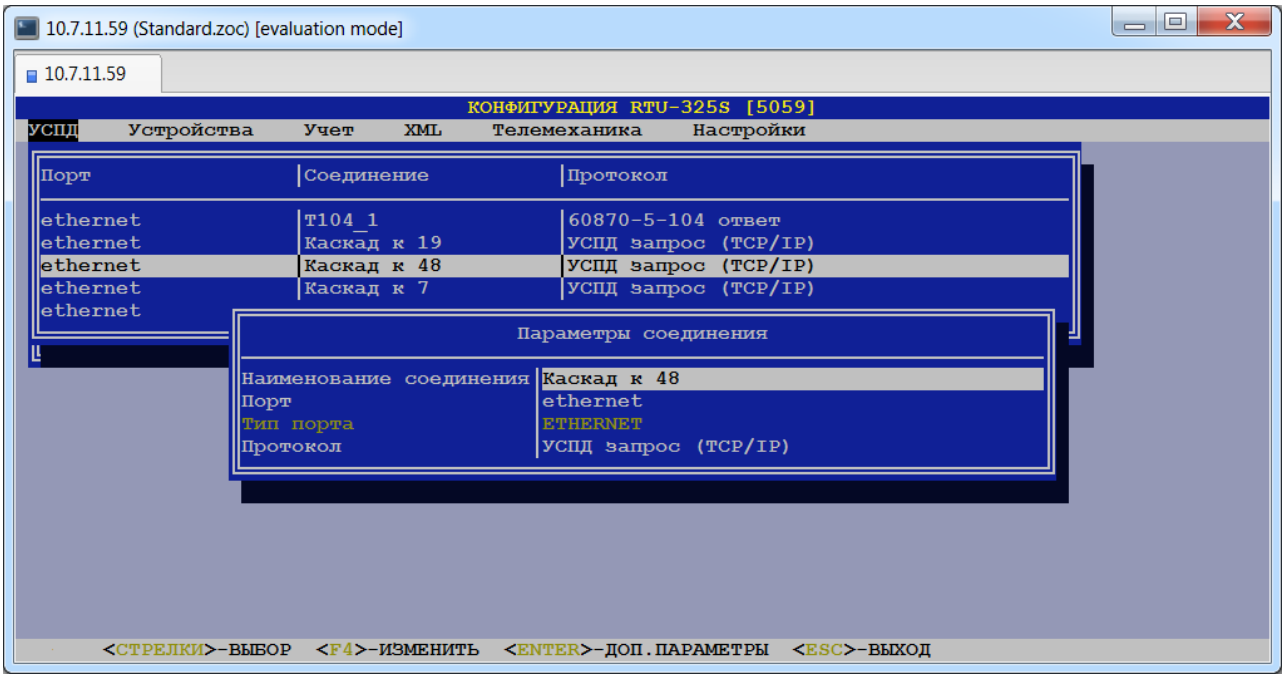
The following table of connections will appear when selecting this paragraph:



For each connection, the user must define general and additional parameters, the composition of which depends on a combination of «порт-протокол» values.

6.2.1. List of general parameters for connection.

When selecting a connection from the list and when a new connection is created, the user will be provided with the following list of common connection parameters:



- **Name of connection.**
  Data Type: A string of symbols. Entered by the user to identify the connection.

- **Port.**

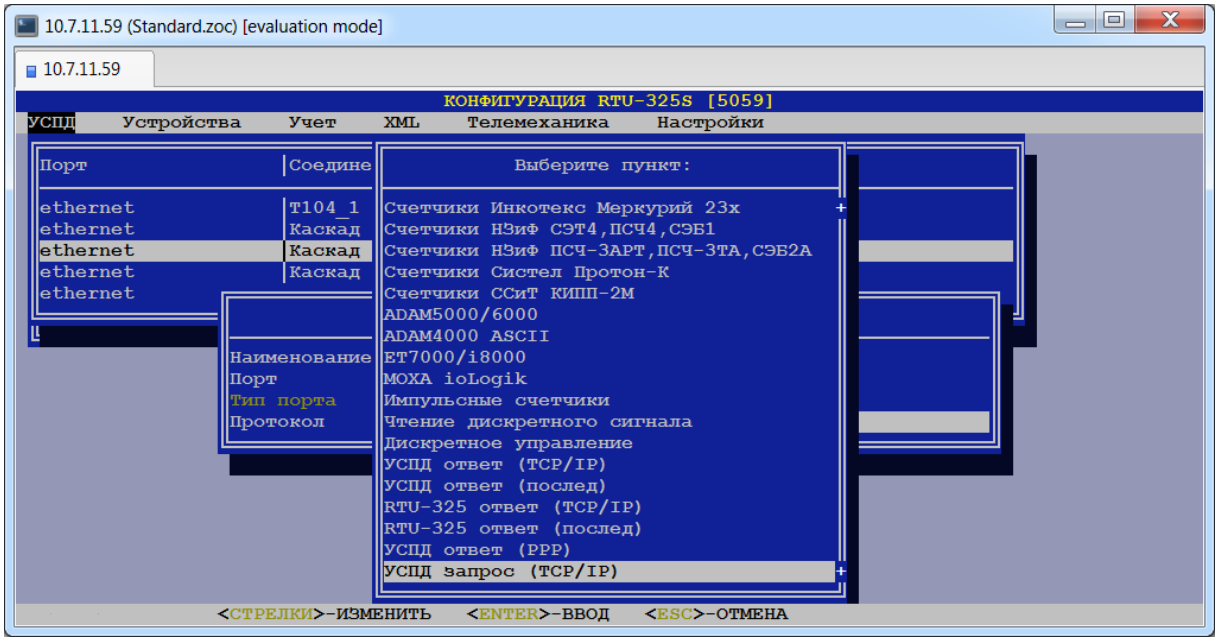
The user must choose the port to which the connection is defined. The choice of port is made from the list of RTU operating ports previously defined (item of the menu «УСПД» > «Порты»).

- **Port type.**

The value of this parameter is derived for information from the RTU operating port list and cannot be edited by the user.

- **Protocol.**

The user must choose the protocol that will work on the connection. This item will present for selection a list of protocols marked with «+» in «Настройки» > «Типы протоколов»:



6.2.2. List of additional connections.

The list of additional parameters for the connection depends on the port at which the protocol works, i.e. the combination of «порт-протокол» .

- **Maximum number of TCP compounds (RTU response (TP/IP)).**

Data type: whole number. Plant: 5. This parameter defines the maximum number of simultaneously operating TCP compounds.

- **Request waiting time (RTU response (TCP/post), sec.**

Data type: whole number. Plant: 30. This parameter defines the maximum time between the top-level communication sessions.

If this parameter is exceeded, the protocol task is removed and the protocol task is re-initiated for a new RTU session. This operation increases the response time of RTU.

Recommendation: In order to minimize RTU response time, this parameter must be More time between the top-level system requests.

- **Allowable break in request (RTU answer(s)), sec.**

Data type: whole number. Plant: 5.

This parameter defines the interbyte time interval during the upper-level communication session of the protocol «УСПД ответ (послед)».

Recommendation: This option can be increased to accommodate RTU c Ah, noisey lines of communication.

- **The number 'handshake'.**
  Data type: whole number. Plant: 3. This parameter represents the number of sets of packages «who are you».

Recommendation: The default value is 3 attempts.

This value is the same for all the meterings attached to this channel. For more details, see section «Методика опроса счётчиков» of the handbook «Основные принципы работы и конфигурирования» .

- **Pause m/u 'handshake', sec.**

Data type: whole number. Plant: 5. This parameter represents the time interval after a failed series until a new set of package packages «who are you», when the number of package packages series does not exceed the configuration set (paragraph "Число 'handshake'").

Recommendation: A default value of 5 seconds.

This value is the same for all the meterings attached to this channel. For more details, see section «Методика опроса счётчиков» of the handbook «Основные принципы работы и конфигурирования» .

- **Number of attempts in 'handshake' (OK).**

Data type: whole number. Plant: 15. This parameter represents the number of packages of the package «who are you» (set format initializing the meter session), provided that the previous attempt to hold the session was successful.

Recommendation: A default value of 15 attempts.

This value is the same for all the meterings attached to this channel. For more details, see section «Методика опроса счётчиков» of the handbook «Основные принципы работы и конфигурирования» .

- **Number of attempts in 'handshake' (FAIL).**

Data type: whole number. Plant: 6. This parameter represents the number of packages «who are you» provided that the previous attempt to hold the session was unsuccessful.

Recommendation: The default value is 6 attempts.

This value is the same for all the meterings attached to this channel. For more details, see section «Методика опроса счётчиков» of the handbook «Основные принципы работы и конфигурирования» .

- **Pause m/a phase 'handshake', sec.**

Data type: whole number. Plant: 90. This parameter represents the time interval after an unsuccessful attempt to re-supplied the package «who are you», when the number of packages does not exceed the package package set in configuration (paragraph "Число попыток в 'handshake'").

Recommendation: Preset default value is 90 seconds.

This value is the same for all the meterings attached to this channel. For more details, see section «Методика опроса счётчиков» of the handbook «Основные принципы работы и конфигурирования» .

- **The size of the package on a profile request, byte.**

Data type: an integer in the range [64 ... 4032 byte with step 64 byte. The value is not 64 times round to a larger number of 64 times. Plant: 64. This parameter is only for «Альфа», «ЕвроАльфа», «Альфа Плюс», «Альфа А3», «Альфа А1800» .

For meters «Альфа А3» and «Альфа А1800», this parameter defines the maximum package size for any request.

For meters «Альфа», «ЕвроАльфа» and «Альфа Плюс», this parameter defines the maximum possible package size on a profile request.

When requesting profile data from the meter protocol «ЕвроАльфа» and «Альфа Плюс», the minimum data portion is the profile of one current day. The larger size of the parameter, with a good quality line, allows for faster communication at "выкачивания профиля" for fewer queries/responses.

When asking for data in the RTU cascade, this parameter determines the size of the response package in the protocol bytes «УСПД ответ» / «RTU-325 ответ» .

For the record: size of one profile day for a single-directed 3-minute meter The profile interval is 1926 bytes, for a two-directed meter with a 3-minute section interval, 3,846 bytes.

Recommendation: The default value is 64 bytes.

- **Number of attempts to obtain a response.**

Data type: whole number. Plant: 2. This parameter determines the number of attempts to obtain an unmistakable response package (the number of attempts to reread the meter class) in a meter link session by a request from the protocol command - "resend last packet" . Request for retransfer of the package shall be made if the following conditions are met:

- In configuration, attempts to re-transfer the package over 1 have been determined and this number is not exceeded.
- This package is a class data request, and it wasn't the last package in the request.

If the package is corrected, retransmitted, the event «Ошибка сеанса связи» shall be recorded in the event log. (11) with additional code 122.

In the case where an error could not be corrected, the event log shall also record «Ошибка сеанса связи» (fault code 11), but with an additional code indicating the type of error:

- Additional code NoNo 1...4, 6 - the error code returned by the meter in the NACK packet;
- Dop. Code No. 5 - «был получен пакет с неверным CRC» ;
- Code No. 22 - «ошибка формата пакета» (incorrect package heading);
- Sub-code No. 250 - «неполный пакет» (the number of data received is not equal to the number of data defined in the package heading);
- Code No. 1009 - «ответный пакет больше ожидаемого по протоколу» .

- **RTS control.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-» . This option allows the RTS signal control procedure of the RTU serial port to be turned on/off. The control procedure involves the installation of the RTS signal prior to the data transmission and the release of the RTS signal after the data transmission. It is only necessary!!!!!! when connecting to the serial RTU port the specialized communication equipment that requires such a procedure.

Recommendation: According to the above, in most cases the value of this The parameter shall be «-».

- **The initialization line of the modem.**

Data Type: A string of symbols. The installation: «ATZ» .The initialization line (AT command for Hayes-compatible modem) is set by the user according to the modem manual and is released to switched modem prior to each communication session.

Recommendation: Use the initialization line for the selected modem Only in the last case where the modem cannot be configuration independently. RTU cannot trace the shut-off/activation process of the selected modem and believes it is permanently connected.

- **The number line.**

Data Type: A string of symbols. Plant: not defined. The modem number line (AT command for Hayes-compatible modem) is set by the user according to the modem manual and is released when working with the switched modem before each communication session.

- **Number of attempts to connect.**

Data type: whole number. Plant: 3. This parameter defines the number of commands issued with the number set to the switched modem.

If the connection cannot be installed, the communication session is considered to be unsuccessful.

- **Time to wait for connection, sec.**

Data type: whole number. Plant: 300. This parameter defines the waiting time of the RTU connection installation software (reacting to the switch modem to the number set command).

If the waiting time is longer than this parameter, then the RTU "вешает трубку" software.

- **Time to rupture the switchup, sec.**

Data type: whole number. Plant: 5. This parameter determines the time between the end of the communication session and the release of the command for the rupture of the switchable connection.

Recommendation: The default value is 5 seconds.

- **Receiving/transmission time, msek.**

Data type: whole number. Plant: 0. This parameter defines the time between receiving and then transmitting information in the meter-connector session, the technical characteristics of which include a similar mode of operation with certain mode shift delays.

Recommendation: The recommended minimum values for this parameter are as follows:

For some types of meter: Alpha, Euro Alpha, Alpha Plus (2nd wire circuit RS-485) 50 ms; Alpha, Euro Alpha, Alpha Plus (4th wire scheme RS-485) 0 ms; Alpha A1700

200 msek;

Alpha A1200 50 msek;

CЭТ4ТМ.02/.01 0 It's a msek.

- **Compressive.**
  Allowable values: {«Нет сжатия», «GZIP»}. Plant: «Нет сжатия» . This parameter is used to activate the compression procedure.

- **Code.**
  Allowable values: {«Нет кодирования», «AES», «IEC62351-3», «ГОСТ 28147-89»}. factory default: «Нет кодирования» . This parameter is used to incorporate the data coding procedure.

- **User.**

Data type: whole number. Plant: 3. This parameter is used to incorporate a specific user ' s authentication procedure on a given connection. Only one user can be identified on the connection. Additional connections per user should be created to allow access to RTU data by several users. The user selection is made from the user list defined in the menu item «УСПД» > «Соединения» > «Пользователи» .

- **Traffic.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-» . This parameter is used to include/disable the recording of transfer/received data traffic.

- **Authorisation.**
  Permissible values: {«Нет авторизации», «RTU325», «IEC62351-3», «IEC62351-5», «ГОСТ Р 34.10-2001» }. Plant: «RTU325» . This parameter defines the method of authorization procedure.

- **Telemetric mode.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . This parameter is used for information purposes and is not subject to change. The telemetric mode of operation of the connection is defined in paragraph «Телемеханика» > «Телемеханический режим соединений» .

- **The cross-channel.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-» . This parameter allows "Сквозной канал" function for direct access to meters.

- **The level of detail of the virtual console output.**

Data type: whole number in the range [0...100]. Plant: 50. This parameter determines the extent to which debugging information is transferred from the software to the virtual console and the records to the service archives.

With a high level of detail, a virtual console may be overfilling the ring buffer. This results in the absence of records in the office archives. In this situation, it is recommended that this parameter be reduced.

- **Waiting for the first byte response 'handshake', msek.**

Data type: whole number. Plant: 500. This parameter represents time time of timeout while waiting for the first byte of the meter response after the package is delivered «who are you» .

Recommendation: default preset value 500 milliseconds (0.5 seconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Allowable break in response 'handshake', msek.**

Data type: whole number. Plant: 500. This parameter represents time of timeout in the middle of the meter response package to the package «who are you».

Recommendation: default preset value 500 milliseconds (0.5 seconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Waiting for an answer in the communication session, msek.**

Data type: whole number. Plant: 3,000. This parameter represents time-time while waiting for the first byte response from the meter after the package is delivered.

Recommendation: A default pre-set value of 3,000 milliseconds (3 seconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Allowable break in communication, msek.**

  Data type: whole number. Plant: 10,000. This parameter represents time-time in the middle of the response package from the meter.

Recommendation: The default value is 10,000 milliseconds (10 seconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

After the package is delivered, RTU awaits the return package heading, which determines the size of the rest of the package. If the first byte of the answer was received and then there was a pause between the bytes that exceeded this parameter, there was a time-out of waiting for the full package and the answer was considered to be wrong with an additional error code 250 - «Неполный пакет» (in the case of an erroneous first byte of the answer - it should be STX - error code 22).

- **The number of repeats in the error of the operation.**

Data type: whole number. Plant: 3. This parameter defines the number of repeats in the error of meter operation.

- **Time interval between surgery repeats, sec.**

Data type: whole number. Plant: 90. This parameter defines the time interval between repeats of meter operations. A separate meter communication session may be organized at a high frequency for repeat operations.

- **Delay at «включение» msek.**

Data type: whole number. Plant: 50. This parameter shall be used for digital input filtering ("защита от дребезга"). The input signal shall not be changed during the specified time in «включено». Only then will the status of this discrete signal «включено» be recorded.

This parameter is used only for port combinations: 'di (Secret Entry)'-- protocol: 'Reading a discrete signal' and port: 'Apparent...(Continuing)' - protocol: 'Simple Signal'.

- **Delay at «выключение» msek.**

Data type: whole number. Plant: 50. This parameter shall be used for digital input filtering ("защита от дребезга"). The input signal shall not be changed during the specified time in «выключено». Only then will the status of this discrete signal «выключено» be recorded.

This parameter is used only for port combinations: 'di (Secret Entry)'-- protocol: 'Reading a discrete signal' and port: 'Apparent...(Continuing)' - protocol: 'Simple Signal'.

- **Minimum period between change of state "вкл" / "выкл", msek.**

Data type: whole number. Plant: 500. This parameter shall be used for digital input filtering ("защита от дребезга"). The change of the input signal shall be recorded after the time interval specified in the parameter. For example, once the status «включено» is recorded, the system will start the discrete input analysis for «выключено» only after the time interval specified in the parameter.

The value of this parameter depends on the nature of the controlled object. For example, an oil switch cannot change its state at 10 Hz.

This parameter is used only for port combinations: 'di (Secret Entry)'-- protocol: 'Reading a discrete signal' and port: 'Apparent...(Continuing)' - protocol: 'Simple Signal'.

- **Logic of the input signal.**

Allowable values: {«Отрицательная», «Положительная»}. factory default: «Положительная» . This parameter is used only for port combinations: 'di (Secret Entry)' - protocol: 'Reading a discrete signal' and port: 'Arm... (Continuing)' - protocol: 'Simple Signal'.

- **Scanning period, msek.**

Data type: whole number. Plant: 1000. The scan period determines the time between the remote input/output module polls.

This parameter is used for port combinations: 'ETHERNET' - the protocols: ' ADAM5000/6000 ', ' ADAM4000 ASCII', 'ET 7000/i8000', 'MOXA ioLogik' and port: 'SOM...(Consecutive) ' - the protocol: ' ADAM4000 ASCII'.

- **Waiting for the first byte, msek.**

Data type: whole number. Plant: 200. This parameter represents time time of timeout while awaiting the first byte response from the remote input/output module after sending the request.

This parameter is used for port combinations: 'ETHERNET' - protocols: ' ADAM5000/6000 ',' ADAM4000 ASCII', 'ET 7000/i8000', 'MOXA ioLogik'.

- **Timeout t0 when connecting, msek.**

Data type: whole number. Plant: 30,000.

This option is used only for port combinations: 'ETHERNET' - protocols: '60870-5-104 response', '60870-5-104 request'.

- **Timeout t1 for APDU, msek.**

Data type: whole number. Plant: 15,000. This option is used only for port combinations: 'ETHERNET' - protocols: '60870-5-104 response', '60870-5-104 request'.

- **Timeout t2 confirmation in the absence of APDU with data, msek.**

Data type: whole number. Plant: 10,000. This option is used only for port combinations: 'ETHERNET' - protocols: '60870-5-104 response', '60870-5-104 request'.

- **Timeout t3 packages of test blocks, msek.**

Data type: whole number. Plant: 20000. This option is used only for port combinations: 'ETHERNET' - protocols: '60870-5-104 response', '60870-5-104 request'.

- **Maximum number of unconfirmed APDU (K).**

Data type: whole number. Plant: 12. This option is used only for port combinations: 'ETHERNET' - protocols: '60870-5-104 response', '60870-5-104 request'.

- **Maximum number of unconfirmed APDU data (W).**

Data type: whole number. Plant: 8. This option is used only for port combinations: 'ETHERNET' - protocols: '60870-5-104 response', '60870-5-104 request'.

- **The transmission system.**

Allowable values: {«Небалансная», «Балансная»}. Plant: «Небалансная» . This parameter defines the method of the transmission system and is used only for protocol `60870-5-101 response' in conjunction with any type of AVM port.

- **Long channel-level address, byte.**

Allowable values: { 1 , 2 }. factory default: 1. This parameter defines the channel level address length in bytes and is only used for ' 60870-5-101 response', ' 60870-5-101 query' protocols in conjunction with any type of SOM port.

- **Type of channel-level address.**

Allowable values: {«Неструктурированный», «Структурированный»}. Plant: «Неструктурированный» . This parameter defines the type of channel level address and is used only for protocols `60870-5-101 response', `60870-5-101 request' in conjunction with any type of AK-port.

- **Address at the channel level.**

Data type: a whole number. factory default: 2. This parameter is used only for ' 60870-5-101 response', ' 60870-5-101 request' protocols in combination with any type of SOM port.

- **Address of the channel level of the control station.**

Data type: whole number.

factory default: 2. This parameter is used only for ' 60870-5-101 response', ' 60870-5-101 request' protocols in combination with any type of SOM port.

- **Maximum frame length.**

Data type: a whole number. factory default: 255. This parameter is used only for ' 60870-5-101 response', ' 60870-5-101 request' protocols in combination with any type of SOM port.

- **Use the single control symbol E5H.**

Allowable values: «+» ("разрешить") or «-» ("запретить"). factory default: «+» . This parameter is only used for the protocols ' 60870-5-101 response', ' 60870-5-101 request' in combination with the SOM port of any type.

- **It's time for a cyclical interview.**

Data type: whole number. Plant: 0. This option is used only for port combinations: 'ETHERNET' - protocol: '60870-5-104 request'.

- **A group for a cyclical interview.**

Data type: whole number. Plant: 0. This option is used only for port combinations: 'ETHERNET' - protocol: '60870-5-104 request'.

- **Functional code.**

Data type: whole number. Plant: 0. This option is used for the combination of the port: 'ETHERNET' - protocol: 'Modbus/TCP Request' and for the 'Modbus RTU Request' protocol in conjunction with any type of AXO port.

- **Data type.**

Permissible values: {«Логический тип» , «Целое со знаком (1 байт)» , «Целое без знака (1 байт)» , «Короткое целое со знаком» , «Короткое целое без знака» , «Целое со знаком (4 байта)» , «Целое без знака (4 байта)» , «Длинное целое со знаком» , «Длинное целое без знака» , «Символ UNICOD» , «Число с плав.точкой одинарной точности» , «Число с плав.точкой двойной точности» , «Целое для финансовых расчётов» , «Строка» , «Двоичные данные» , «Битовая маска (16 бит)» , «Битовая маска (32 бита)» }. Plant: «Логический тип» This parameter is used for a combination of the port: 'ETHERNET' - protocol: 'Modbus/TCP Request' and for the `Modbus RTU Request' protocol in combination with any type of AX-port.

- **Order byte.**
  Permissible values: {«LE (Intel/IBMPC 0-1-2-3)» , «BE (Motorola/сетевой порядок байт 3-2-1-0)» , «Modbus BE (сетевой порядок байт Modbus 1-0-3-2)» }. Plant: «LE (Intel/IBMPC 0-1-2-3)» . This parameter is used for a combination of port: `ETHERNET' - protocol: 'Modbus/TCP Request' and for the `Modbus RTU Request' protocol in conjunction with any type of AK-port.

- **Field length in bats.**
Plant: 1. This field is not subject to change for information. This option is used for the combination of the port: 'ETHERNET' - protocol: 'Modbus/TCP Request' and for the 'Modbus RTU Request' protocol in conjunction with any type of AXO port.

- **Time of the interview cycle, msek.**
Data type: whole number. Plant: 250. This option is used for the combination of the port: 'ETHERNET' - protocol: 'Modbus/TCP Request' and for the 'Modbus RTU Request' protocol in conjunction with any type of AXO port.

- **Timeout, msek.**
Data type: whole number. Plant: 500. This parameter is used for a combination of port: 'ETHERNET' - protocol: 'Modbus/TCP Request'.

- **GPS protocol.**
Allowable values: {«NMEA-0183», «Бинарный ГеоС-1»}. Plant: «NMEA-0183» . This parameter is used only for a combination of port: 'COM... (Continuing)' - protocol: 'GPS/Glonass'.

- **PPS Discrete.**
Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-» . This parameter is used to activate/disable the PPS signal processing procedure from the GPS receiver for a combination of port: 'COM...(Continuing)' - protocol: 'GPS/Glonass'.

The following 7 parameters are only available if the value of "Дискретный сигнал PPS" is equal to «+» for port combination: 'COM...(Consistent) ' - protocol: 'GPS/Glonass'.

- **PPS port.**
  Acceptable values: serial ports and digital inputs { «com1» , «com2» , «com3» , «com4» , «di» }. This option is used to identify a serial RTU port that is connected to a discrete PPS signal from a GPS receiver.

- **Port entrance for PPS.**
Allowable values: consistent port contacts {«RI», «CD»}. Plant: «CD» . This parameter is used to identify the contact of a serial RTU port to which a discrete PPS signal from a GPS receiver is connected.

- **Signal level logic.**
  Allowable values: {«По нарастающему фронту», «По спадающему фронту»}. Plant: «По нарастающему фронту» .

This parameter is used to identify the logic of the PPS signal level with the GPS receiver, which is used to accurately fix the time.

- **Time to start correction, msek.**

Data type: whole number. Plant: 2000. This parameter is used only to shape an event «Начало коррекции» in an event log. The smooth time correction procedure RTU using the GPS receiver PPS signal is continuously performed. Recommendation: default preset 2 sec (2000 milliseconds).

- **Time to finish correction, msek.**

Data type: whole number. Plant: 100. This parameter is used only to shape an event «Окончание коррекции» in an event log. The smooth time correction procedure RTU using the GPS receiver PPS signal is continuously performed. Recommendation: The default value is 0.1 sec (100 milliseconds).

- **Ratio of the proportional part of the regulator.**

Data type: whole number. Plant: 10. The PI control parameter of the RTU time smooth correction procedure using the GPS receiver signal. Recommendation: The default value is 10.

- **Coefficient of the integrated part of the regulator.**

Data type: whole number. Plant: 1000. The PI control parameter of the RTU time smooth correction procedure using the GPS receiver signal. Recommendation: The default value is 1,000.

- **Disbursement of time for smooth correction, sec.**

Data type: whole number. Plant: 0. This parameter defines the maximum reconciliation before which the time smooth correction algorithm is used. If this value is exceeded, the time correction will be made by leaping. Recommendation: The default value is 0 (always smooth correction).

- **Detailed conclusion to the virtual console.**

Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-» . This parameter is used to incorporate/disable the debugging information of the protocol on the RTU virtual console.

- **List of Protocol configurations IEC870.**

  This parameter is not subject to change for information.

- **Processing of information substitution commands.**

  Permissible values: {«Запрет команд», «Выполнение только по своему соединению» , «Выполнение по всем соединениям» }. Plant: «Запрет команд» . This parameter defines the method of authorization procedure.

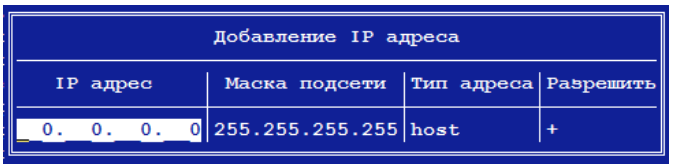
- **Transmitting replacement information.**

  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

This option is used to include/disable the transmission of replaced information.

- **IP address list.**

This parameter defines the table IP addresses of remote nodes in the network with which this protocol is/is not permitted to operate. You can fill in any number of authorized/prohibited network nodes. To this end, the following fields need to be identified in each row of the table:



- IP address.
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 0.0.0.0.
- Put the mask on.
  Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 255.255.255.255.
- The address type.
  Allowable values: {«host», «network»}. Plant: «host» .

  The value of «host» determines that this row of the table sets one node on a network with a specified IP address.
  The value of «network» determines that this row of the table sets out multiple nodes on the network defined by the IP address of the network and the mask of the sub-network.
- Allow me.
  Allowable values: «+» ("разрешить") or «-» ("запретить" . Plant: «-»

  «+» - allows the network nodes defined in this row of the table. «-» - prohibits the network nodes defined in this row of the table.

- **Fixed strategist.**

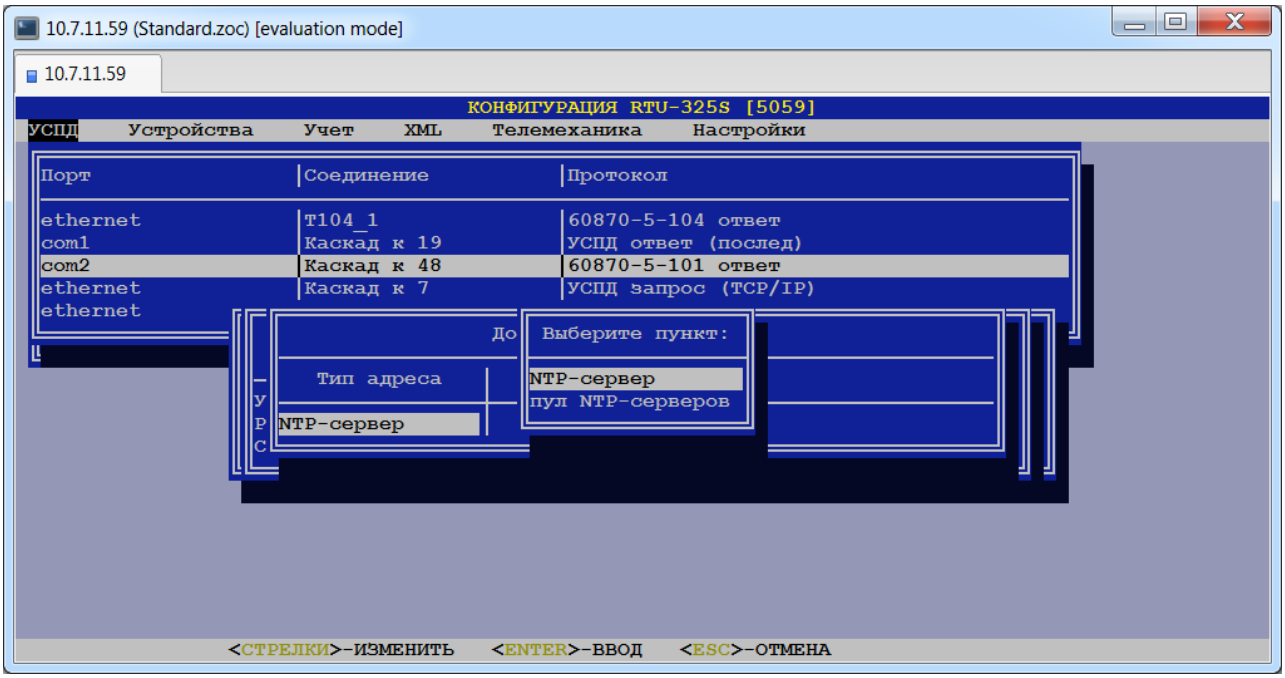
Data type: whole number. Plant: -1. This parameter is used to force the strome of a run NTP server. The default value means that the strategist is determined by the higher NTP server hierarchy (based on the server's reference time + 1).

This option is used only for a combination of port: 'ETHERNET' - protocol: 'NTP server'.

- **A list of authorized clients.**

This parameter defines a list of authorized customers for a NTP server. The absence of this list permits any NTP clients.
This option is used only for a combination of port: 'ETHERNET' - protocol: 'NTP server'.

- **List of NTP servers or NTP servers.**
  Identify the NTP server(s) that serve as reference for this RTU:



This option is used only for a combination of port: 'ETHERNET' - protocol: 'NTP client'.

- **Min. Pulse duration, msek.**

Data type: whole number. Plant: 20. The parameter value determines the minimum time to record the pulse signal at which the input pulse is taken into account.

This option is used only for a combination of port: 'di (Secret Entry)' - protocol: 'Pulsive meters'.

- **Momentum/pulse pause, msek.**

Data type: whole number. Plant: 50. The parameter value determines the minimum time for recording the absence signal, at which the pause between input pulses is taken into account.

This option is used only for a combination of port: 'di (Secret Entry)' - protocol: 'Pulsive meters'.

- **Min. % filling pulse.**

Data type: whole number. Plant: 80. The parameter value shall determine the minimum percentage of the number of measurements of the pulse signal for the minimum pulse duration (see above) at which input pulse is taken into account.

This option is used only for a combination of port: 'di (Secret Entry)' - protocol: 'Pulsive meters'.

- **Max. % pause.**

Data type: whole number. Plant: 20. The parameter value shall determine the maximum percentage of the number of measurements of the pulse signal for the minimum duration of the pause between the pulses (see above), at which the pause between the input pulses is taken into account.

This option is used only for a combination of port: 'di (Secret Entry)' - protocol: 'Pulsive meters'.

The following parameters are used only for a combination of ports: 'AXO... (Continuing)' - protocols: 'Honets' and/or 'Honets - (P-AT4)'.

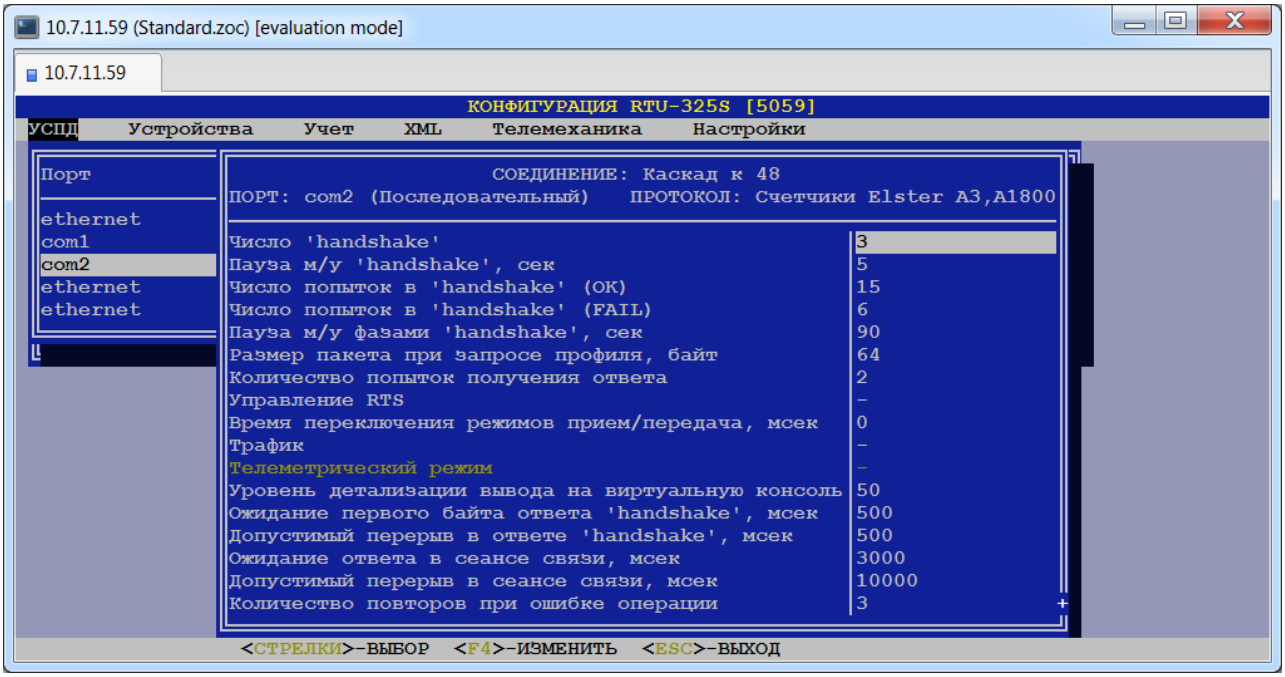
- **Address of the recipient.**
  Data type: whole number.
- **The size of the message.**
  Data type: whole number.
- **Message type.**
  Data type: whole number.
- **The urgency of the message.**
  Data type: whole number.
- **Maximum number of messages in P-AT4.**
  Data type: whole number.
- **Time to fill out the message, s.**
  Data type: whole number.
- **Data start date.**
  Data type: Date/time in dd.mm.ggch:mm.
- **Time shift, hour (hour belt (UTC).**

This parameter defines the time shift of RTU relative to Greenwich time and is not subject to change.

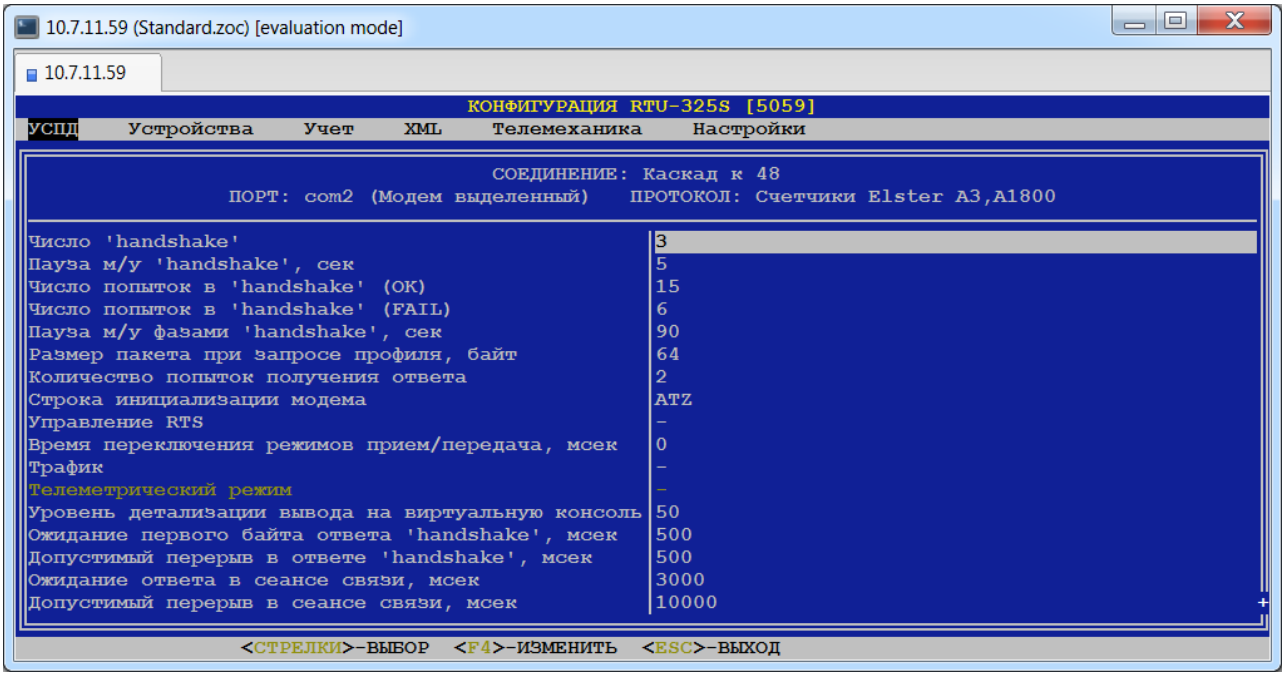
Examples of lists of additional parameters for different combinations «порт-протокол» are given below.

Note: The symbol 'protocol «Счётчики ...»' includes all protocols Power meter, protocol «Теплосчётчики Взлёт», protocol «Расходомеры ВзлётМР», protocol «Расходомеры ЭР-310», protocol «Расходомеры ВзлётРСЛ» .

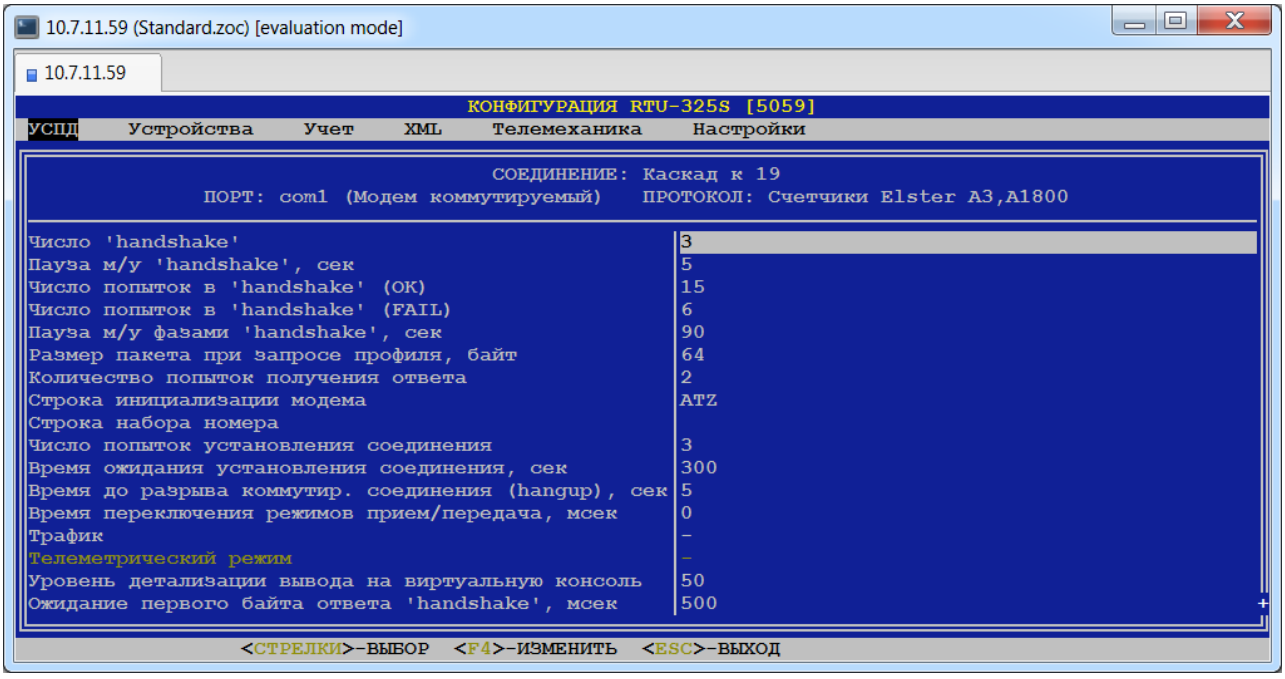
6.2.2.1. Port «COM...» - protocol «Счётчики ...» (type of port - «Последовательный»).



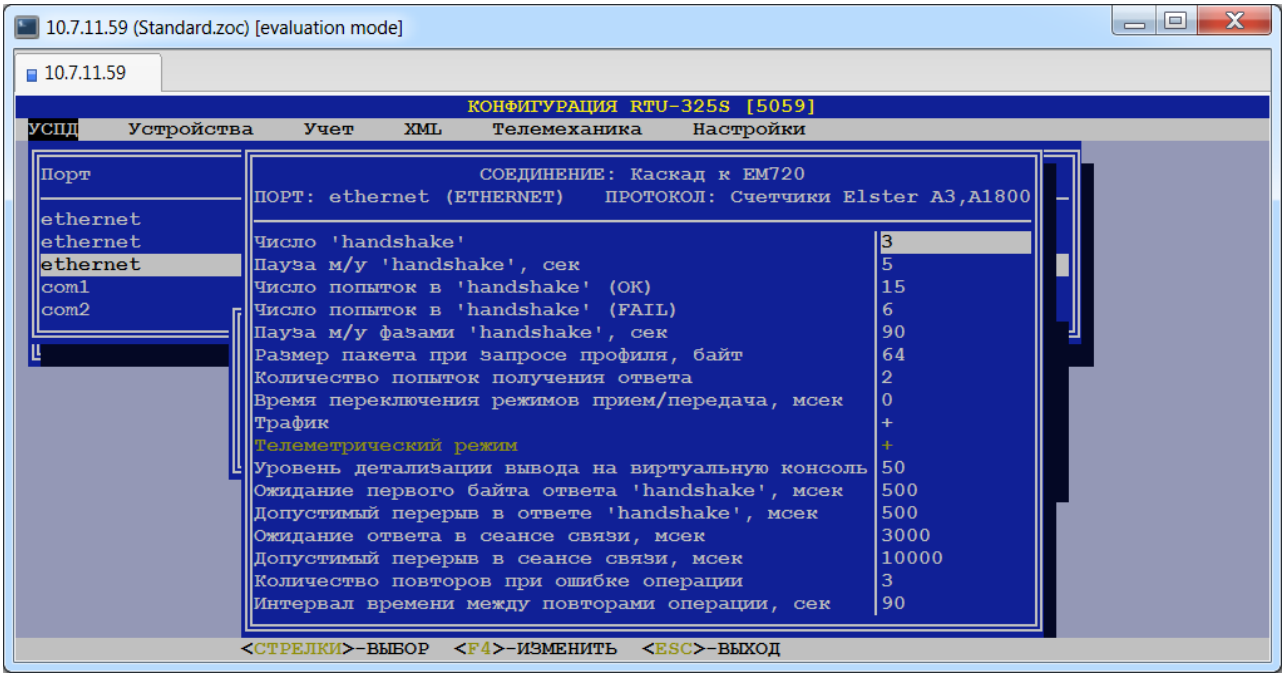
6.2.2.2. Port «COM...» - protocol «Счётчики ...» (type of port - «Модем выделенный»).



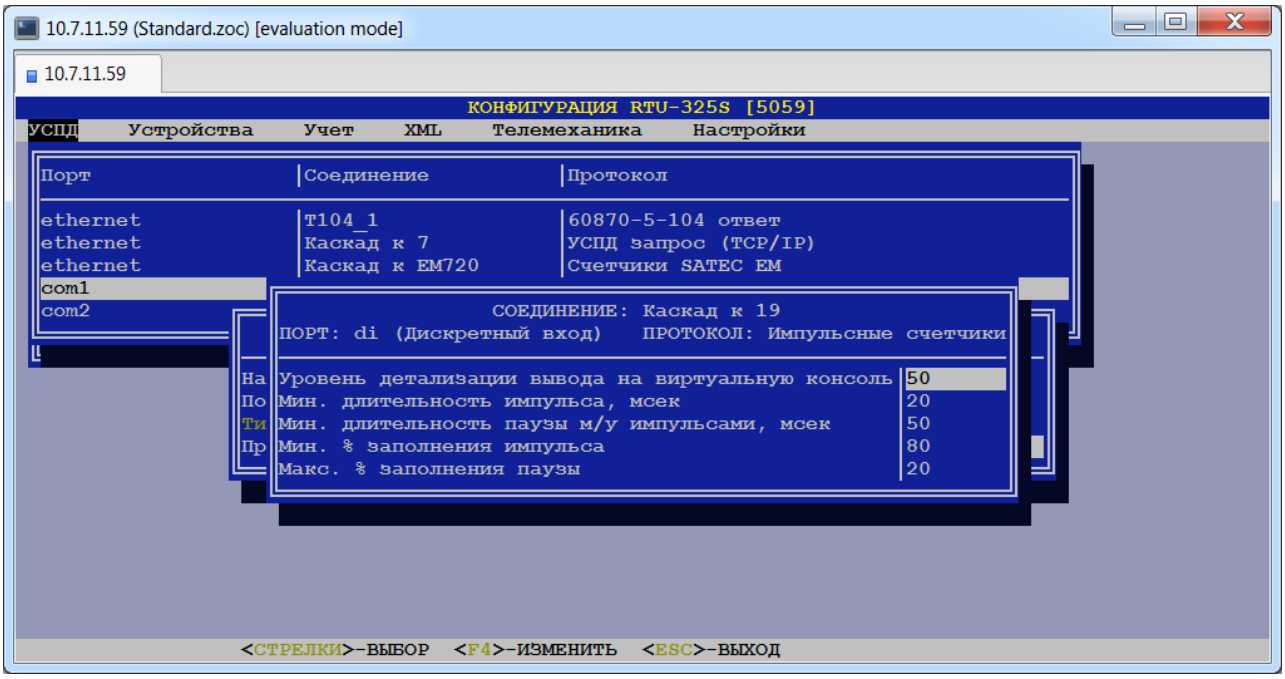
6.2.2.3. Port «COM...» - protocol «Счётчики ...» (type of port - «Модем коммутируемый»).



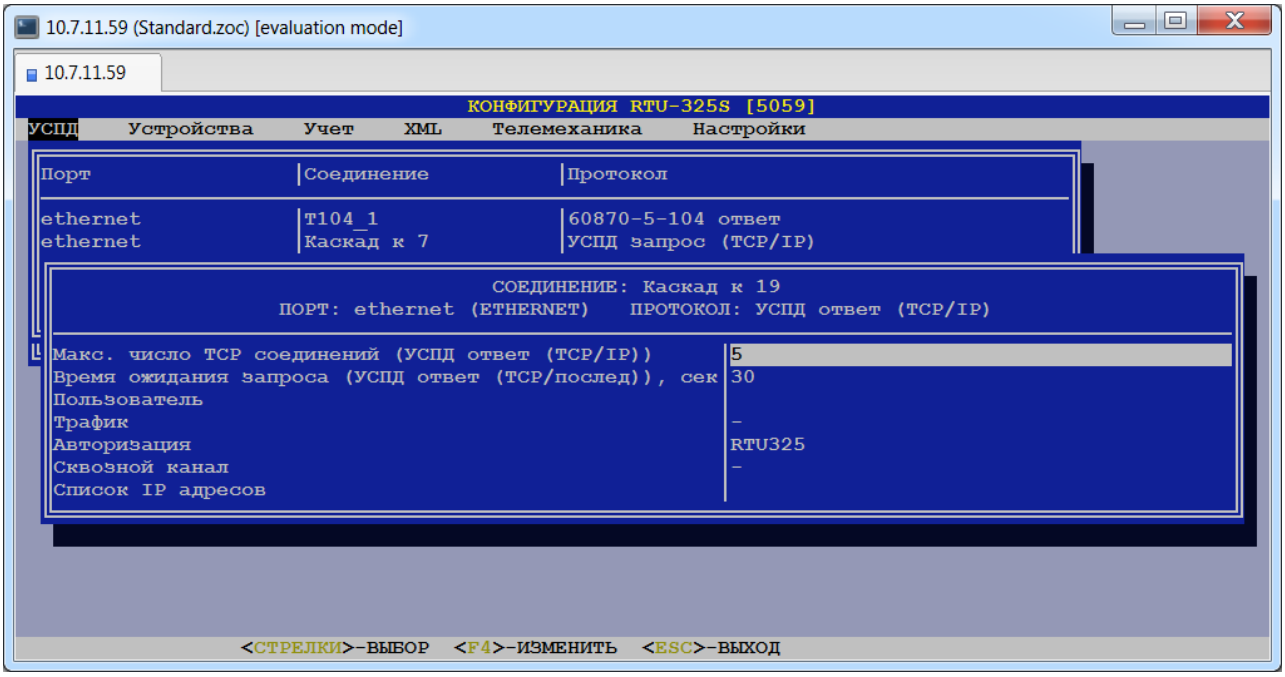
6.2.2.4. Port «ETHERNET» - protocol «Счётчики ...» . This combination «порт - протокол» applies to meters connected via remote interface conversion device «ETHERNET» - RS-485 («TCP/COM-сервер»).



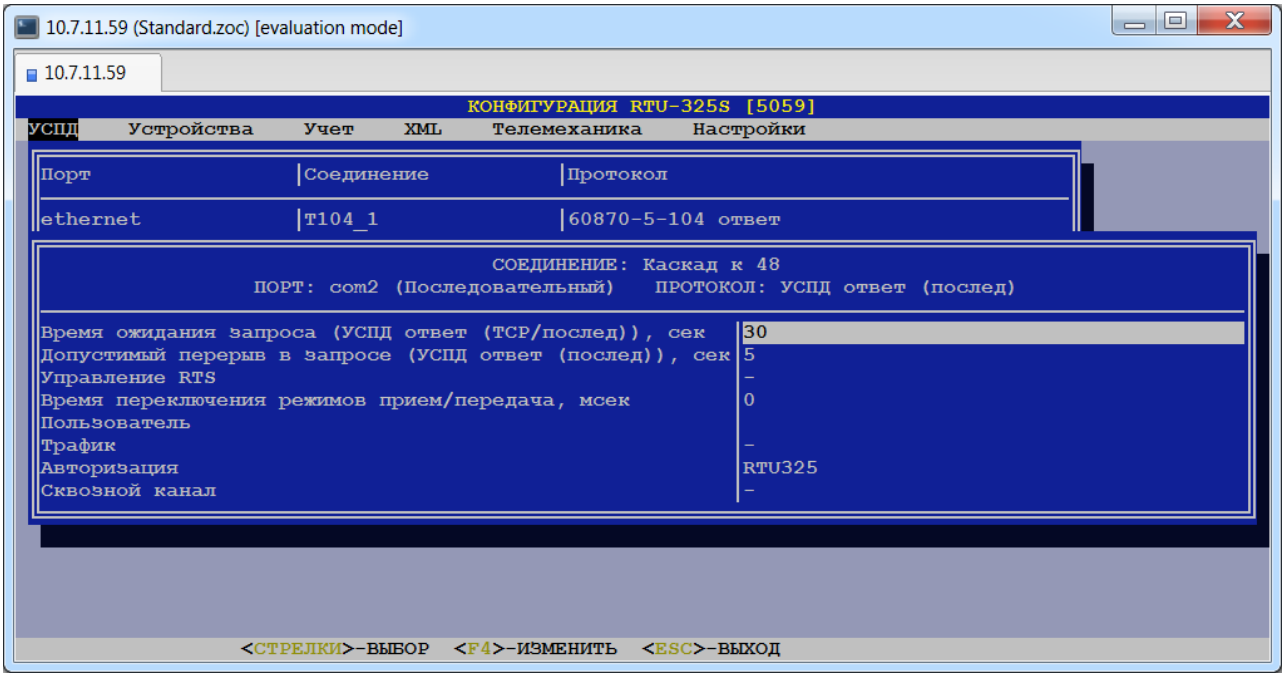
6.2.2.5. Port «di» = protocol «Импульсные счётчики» . The following parameters are valid when the impulse exits of the meters are connected to the local discrete RTU entrances:



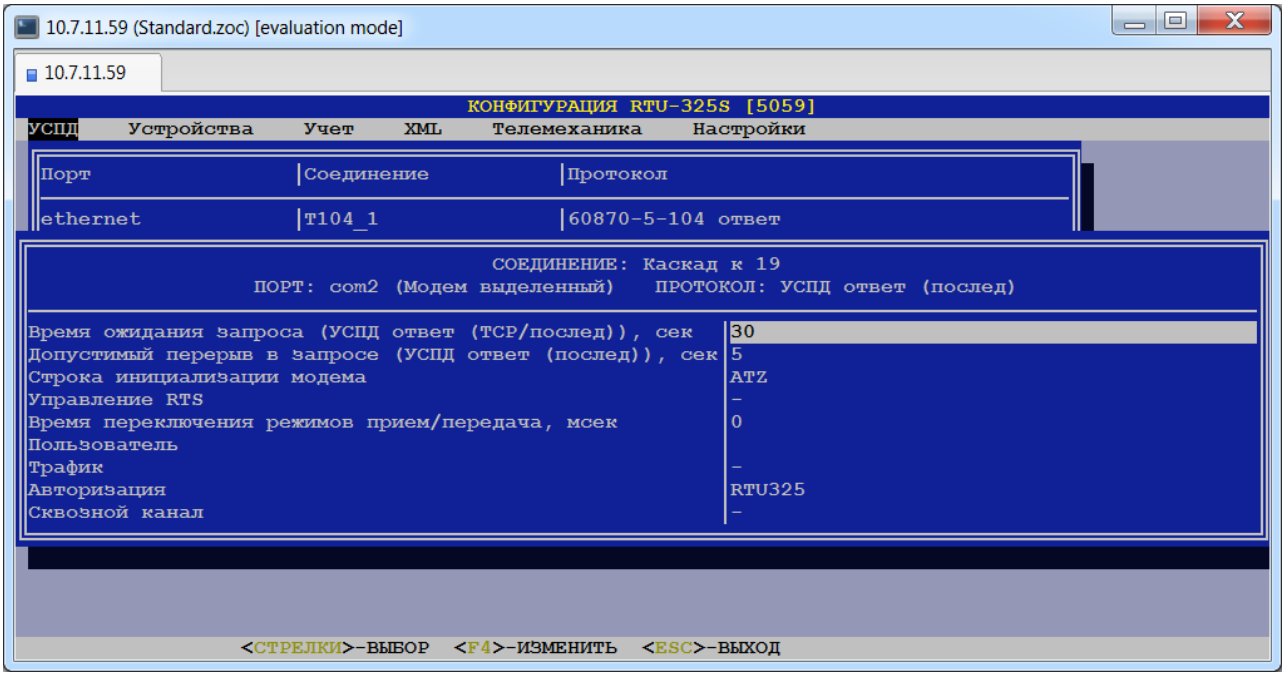
6.2.2.6. Port «ETHERNET» - protocol «УСПД ответ (TCP/IP)» .



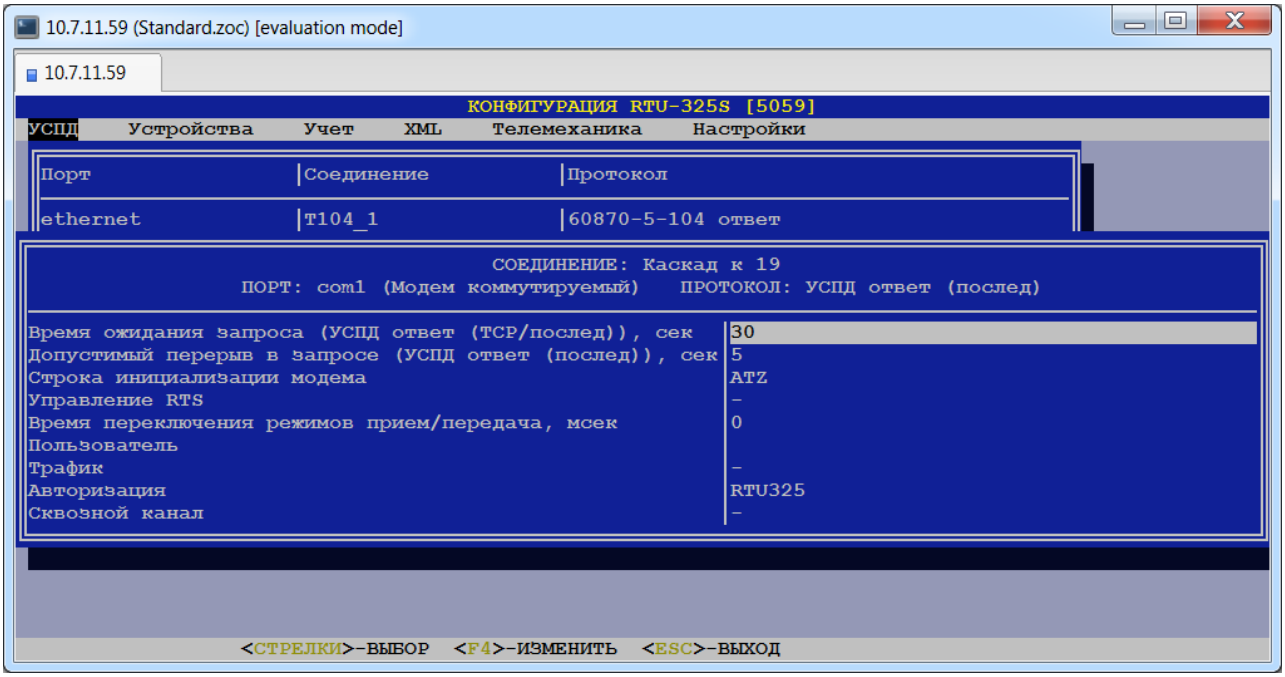
6.2.2.7. Port «COM...» - protocol «УСПД ответ (послед)» (type of port - «Последовательный»).



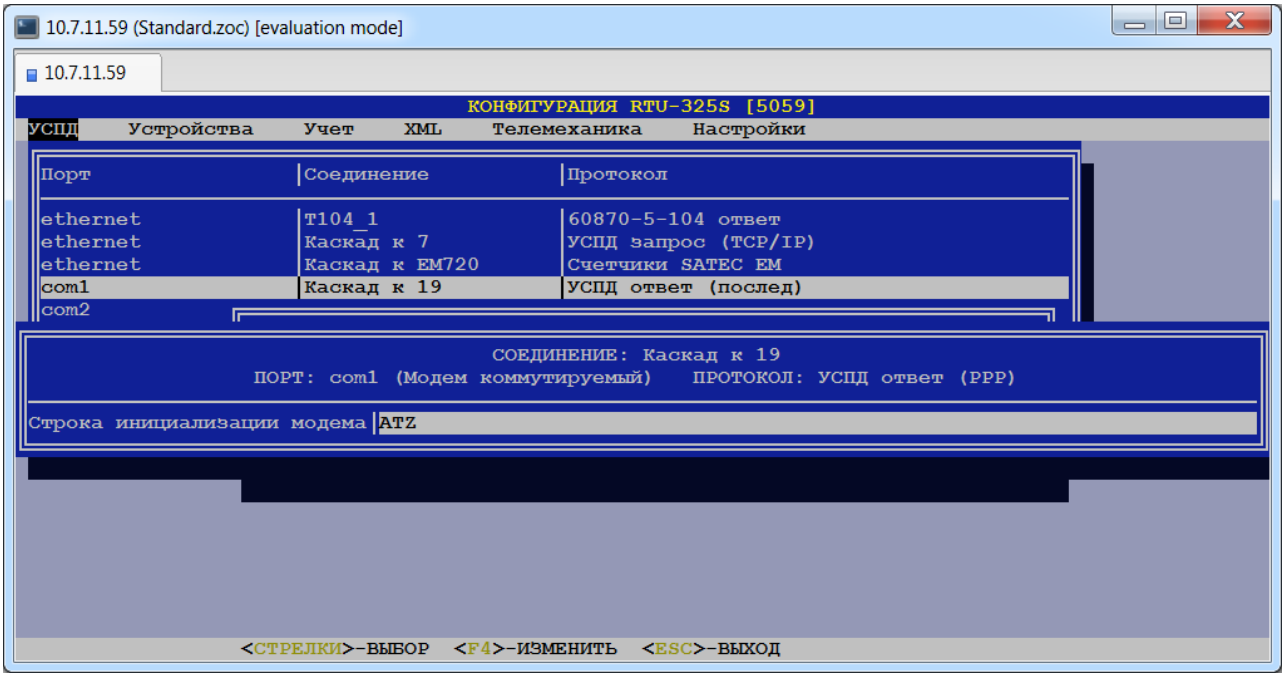
6.2.2.8. Port «COM...» - protocol «УСПД ответ (послед)» (type of port - «Модем выделенный»).



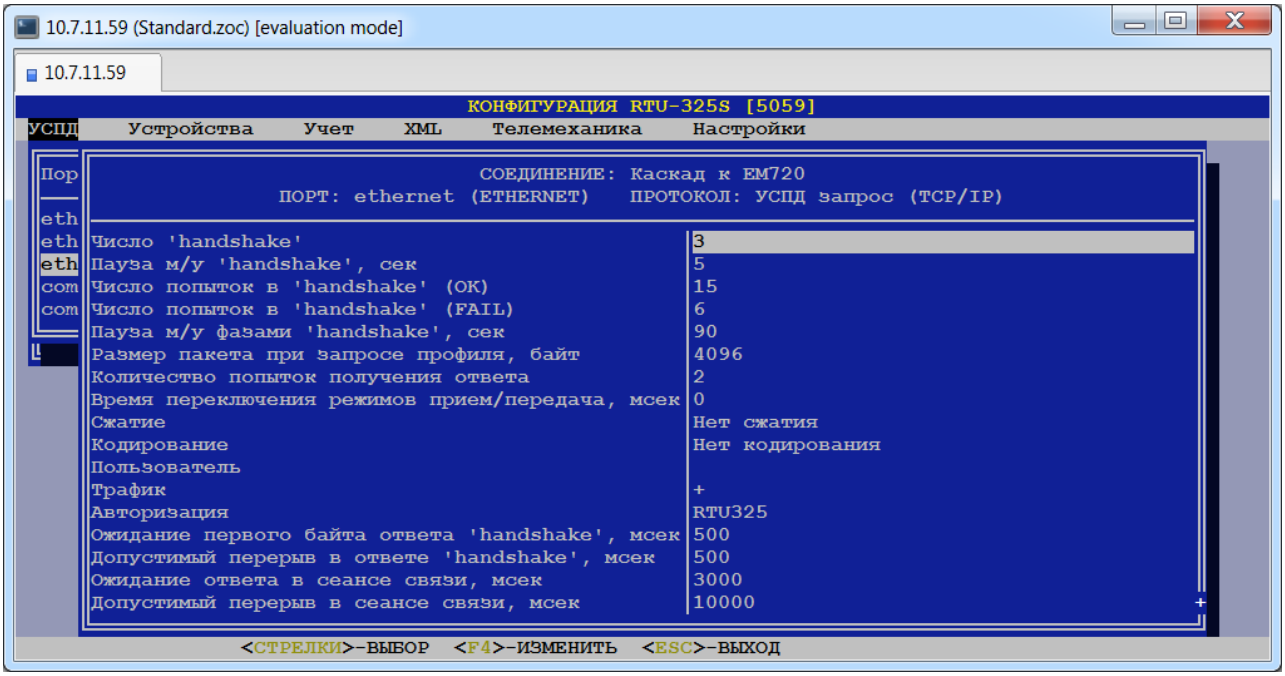
6.2.2.9. Port «COM...» - protocol «УСПД ответ (послед)» (type of port - «Модем коммутируемый»).



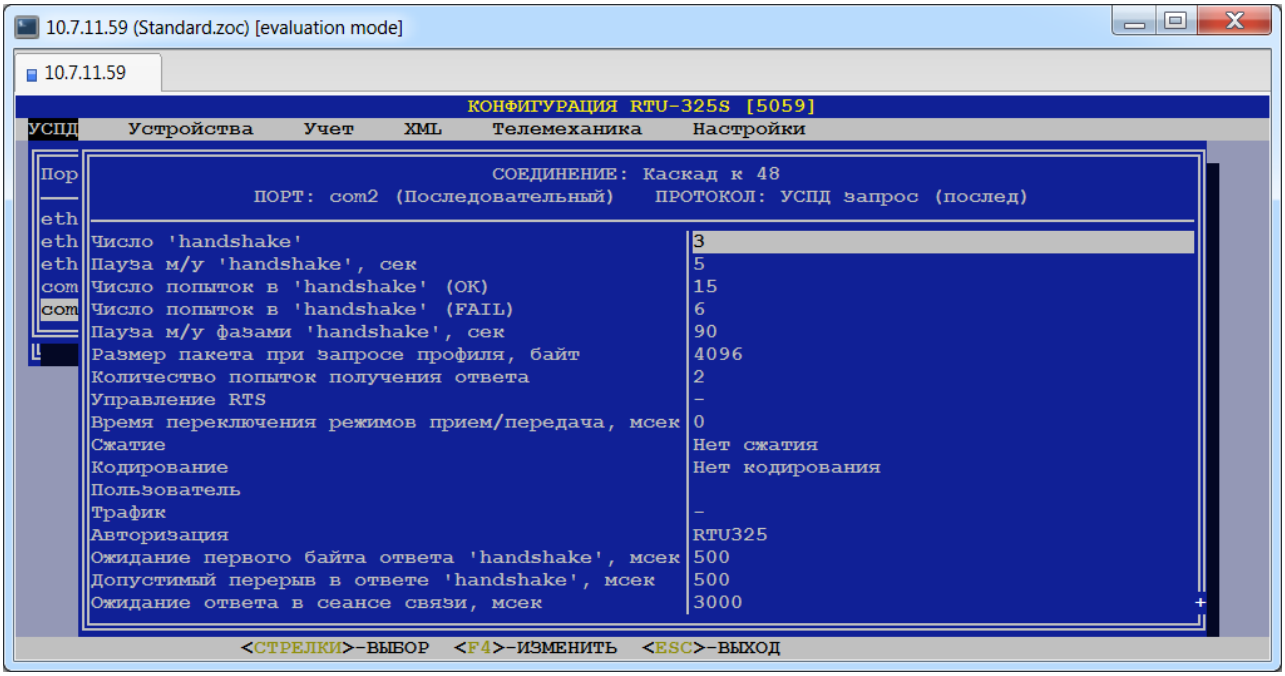
6.2.2.10. Port «COM...» - protocol «УСПД ответ (PPP)» . For this combination «порт-протокол» additional parameters are similar for all types of ports:



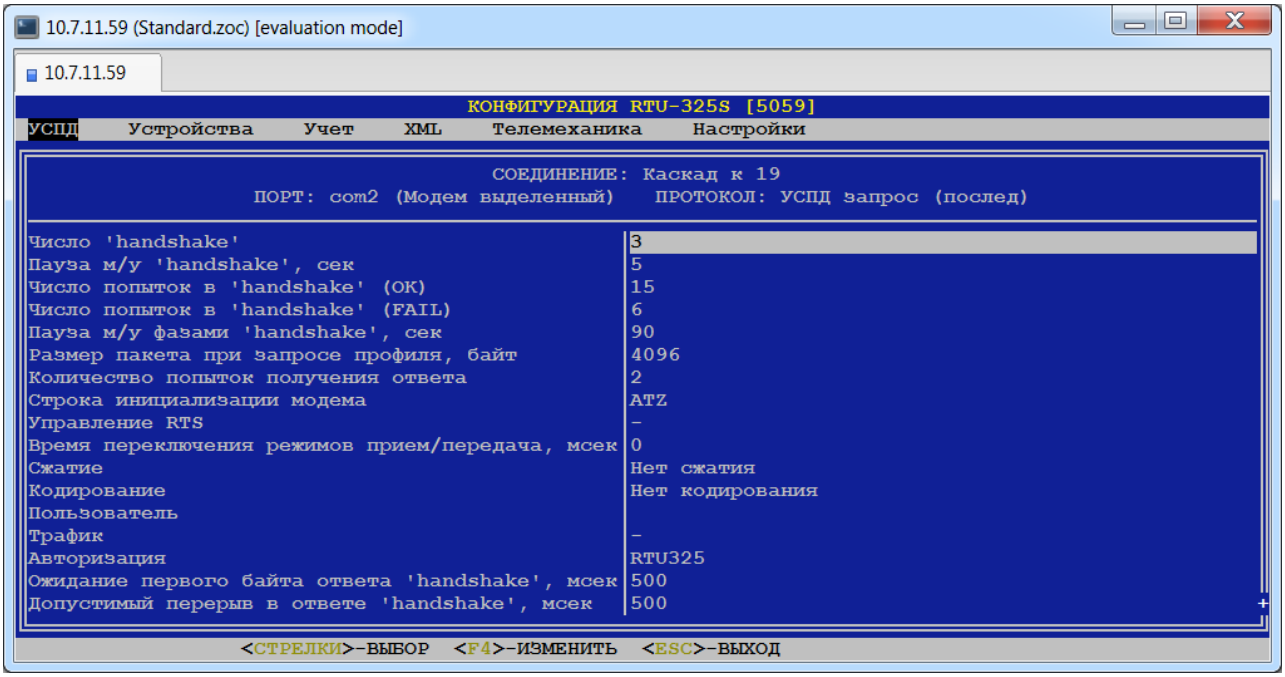
6.2.2.11. Port «ETHERNET» - protocol «УСПД запрос (TCP/IP)» This combination «порт - протокол» is used for the top RTU in the cascade circuit.



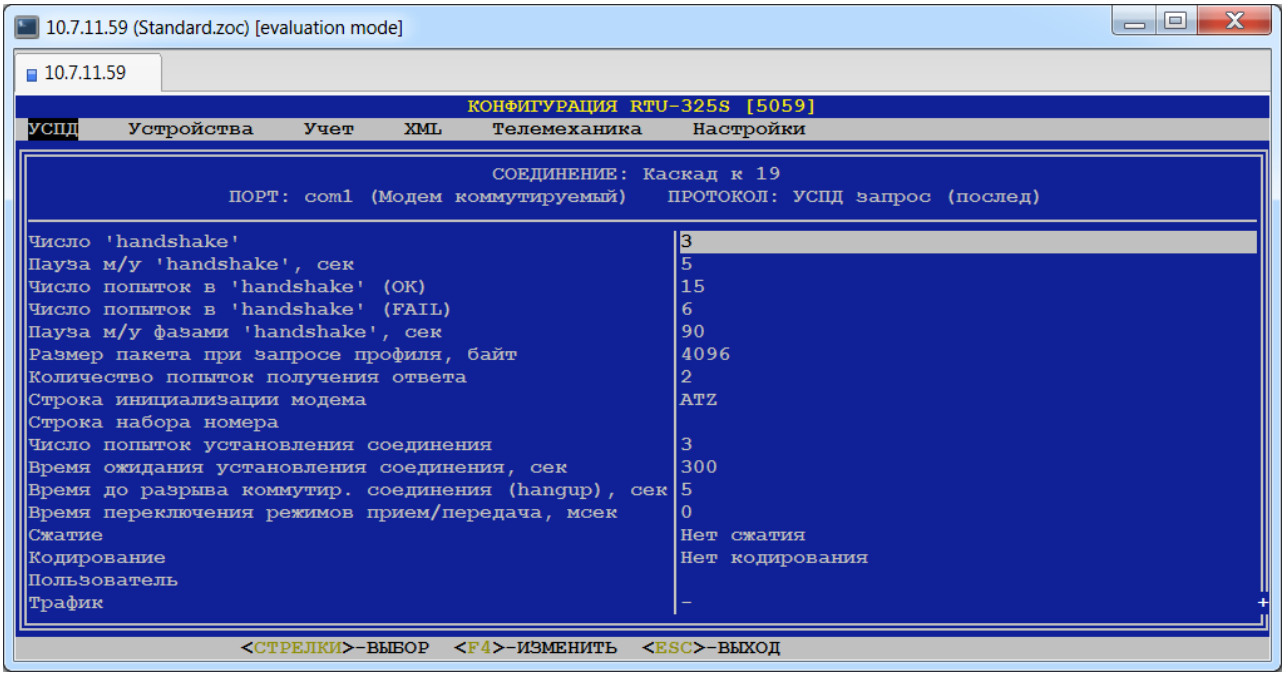
6.2.2.12. Port «COM...» - protocol «УСПД запрос (послед)» (type of port - «Последовательный»).



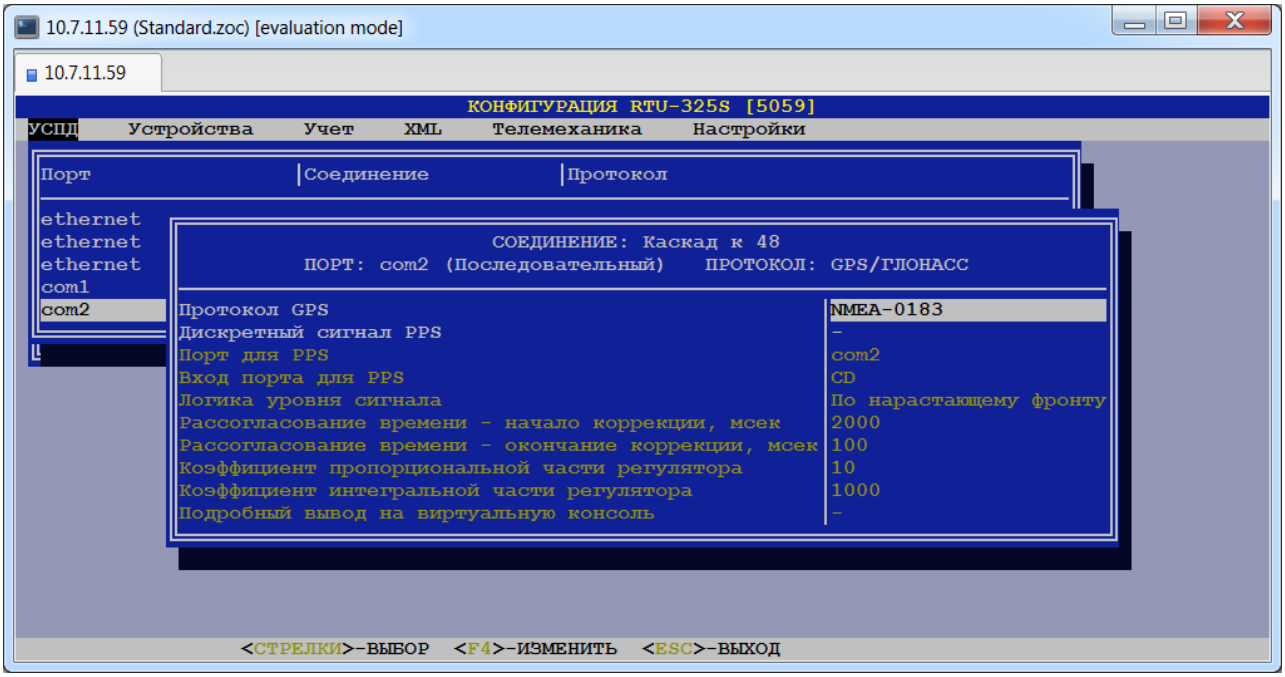
6.2.2.13. Port «COM...» - protocol «УСПД запрос (послед)» (type of port - «Модем выделенный»).



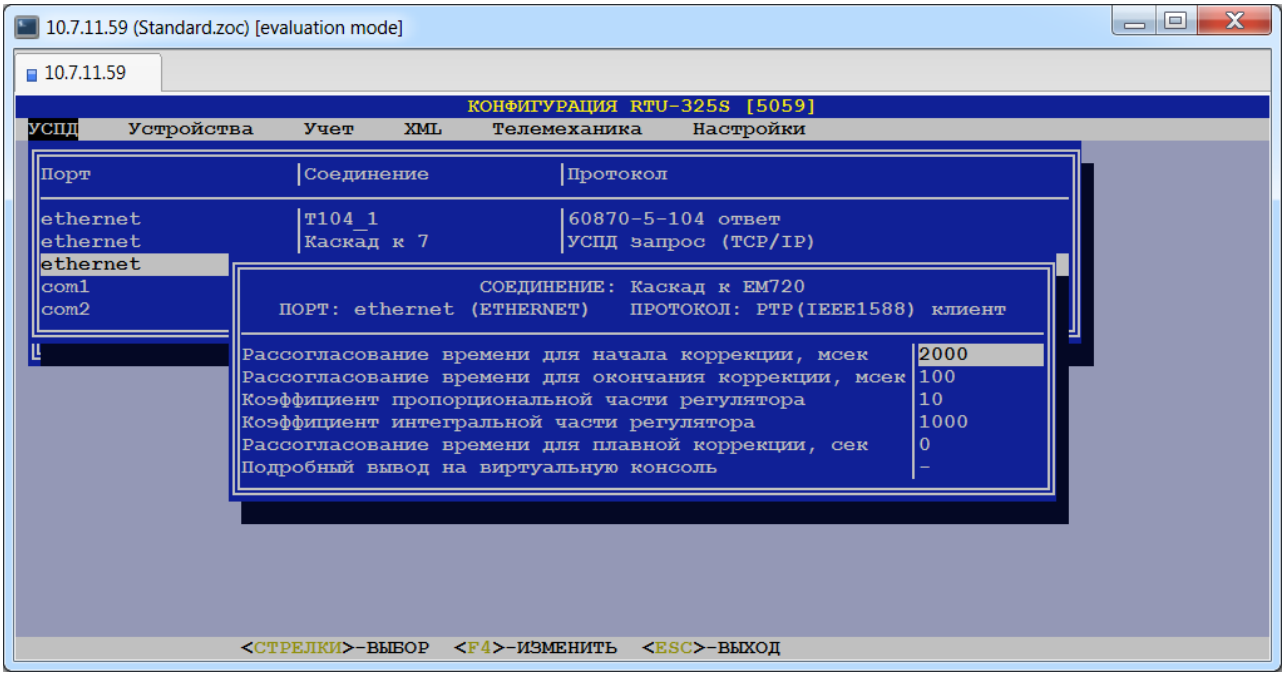
6.2.2.14. Port «COM...» - protocol «УСПД запрос (послед)» (type of port - «Модем коммутируемый»).



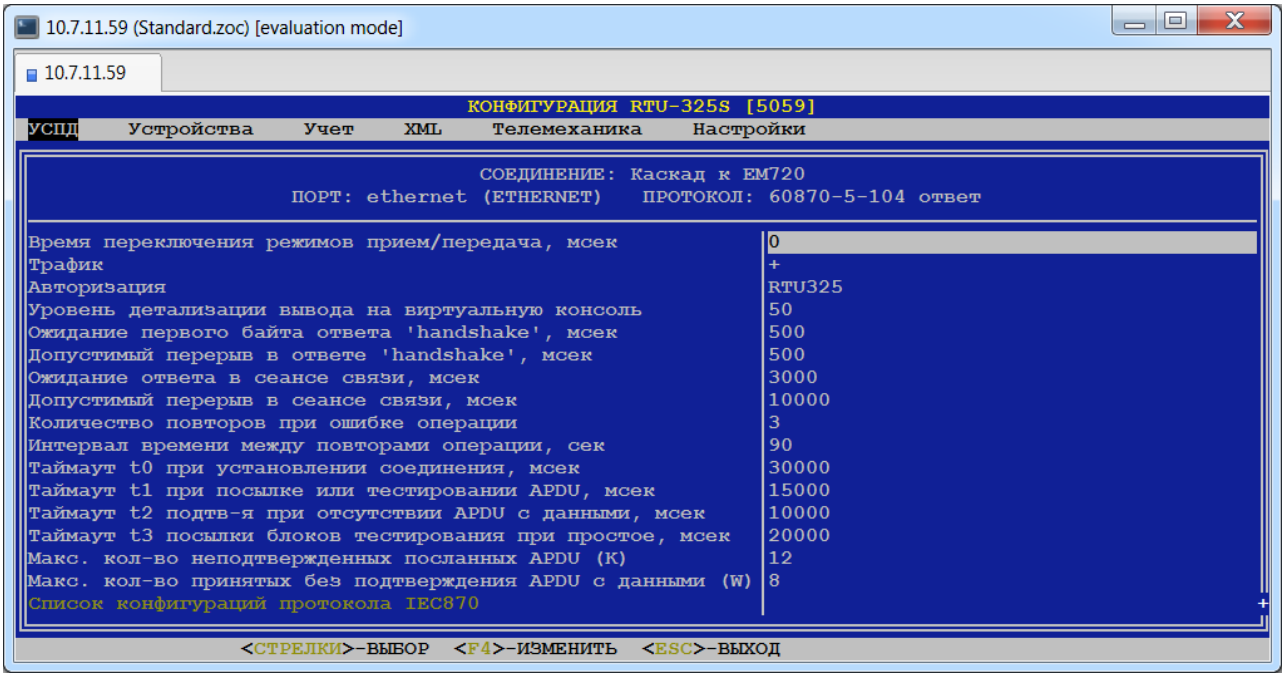
6.2.2.15. Port «COM...» - Protocols «GPS/ГЛОНАСС», «GPS/ГЛОНАСС тест» (type of Port - «Последовательный»).



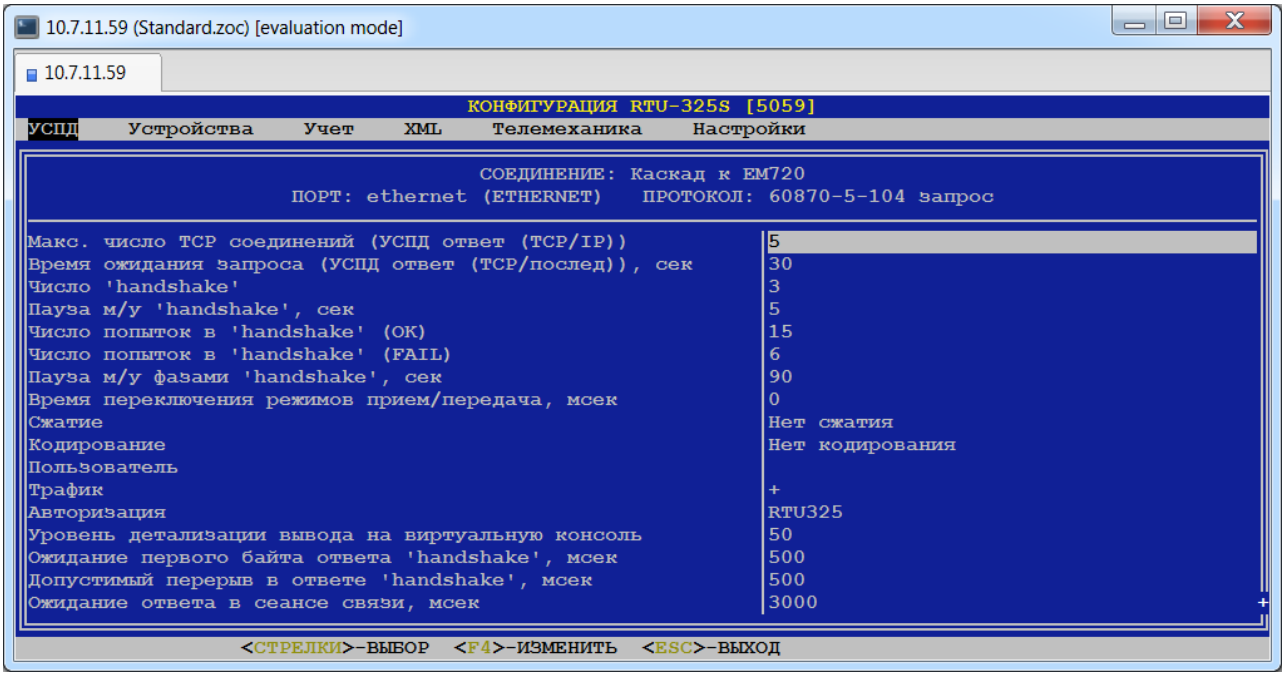
6.2.2.16. Port «ETHERNET» - Protocols «PTP (IEEE1588) клиент», «PTP (IEEE1588) мастер» .



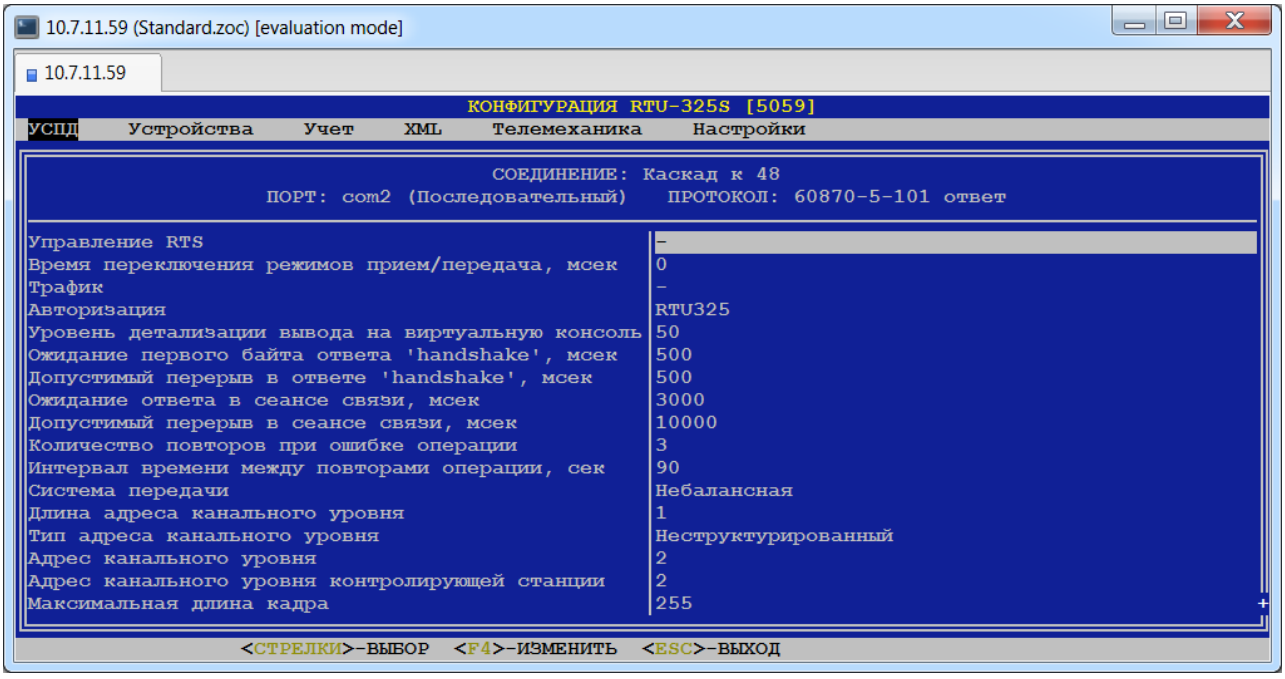
6.2.2.17. Port «ETHERNET» - protocol «60870-5-104 ответ» .



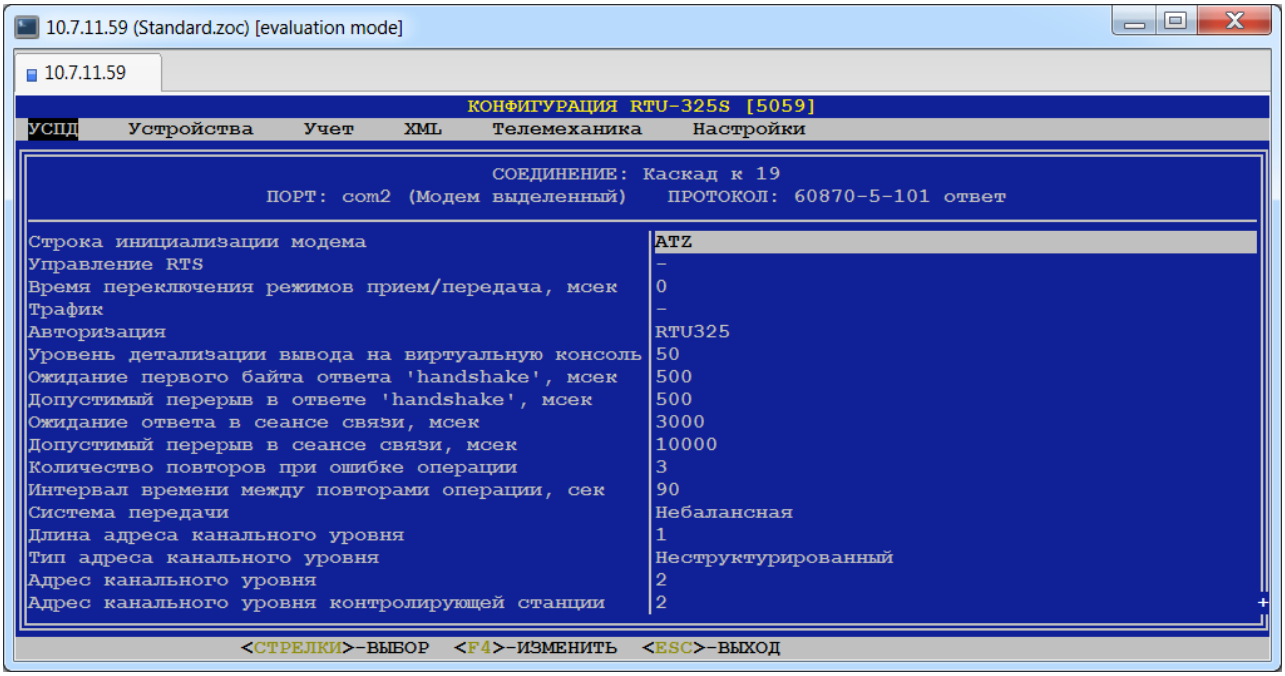
6.2.2.18. Port «ETHERNET» - protocol «60870-5-104 запрос» .



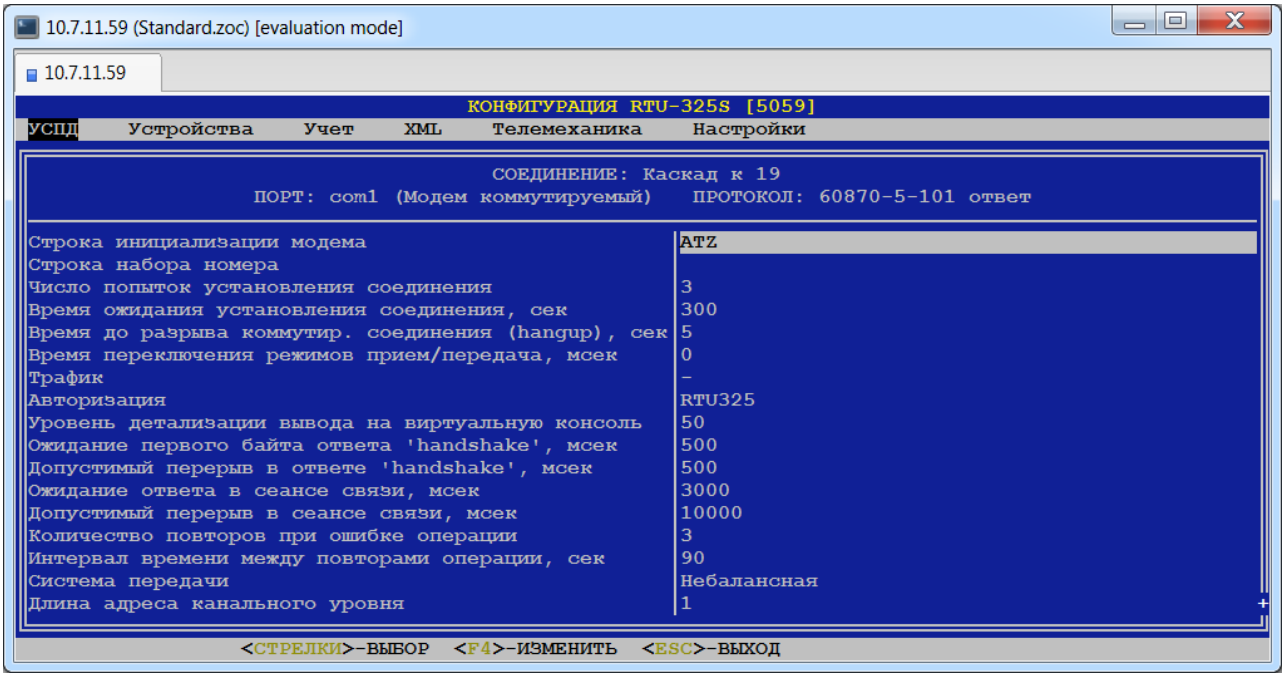
6.2.2.19. Port «COM...» - protocol «60870-5-101 ответ» (type of port - «Последовательный»).



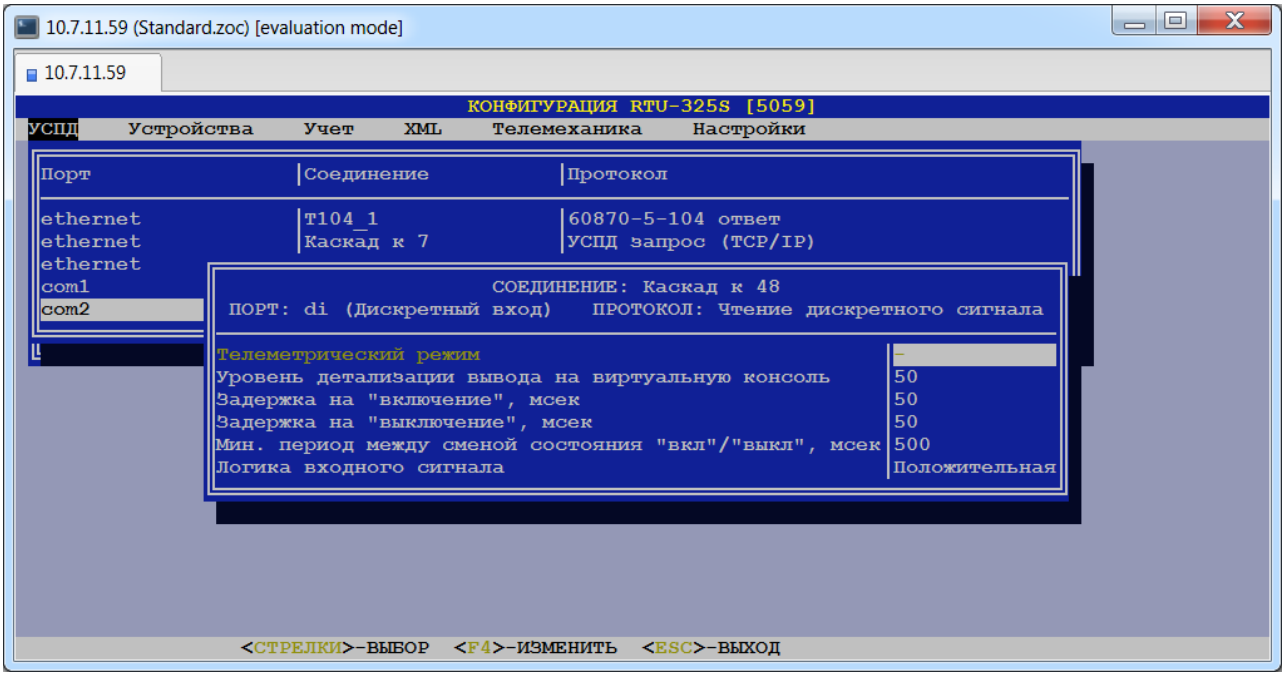
6.2.2.20. Port «COM...» - protocol «60870-5-101 ответ» (type of port - «Модем выделенный»).



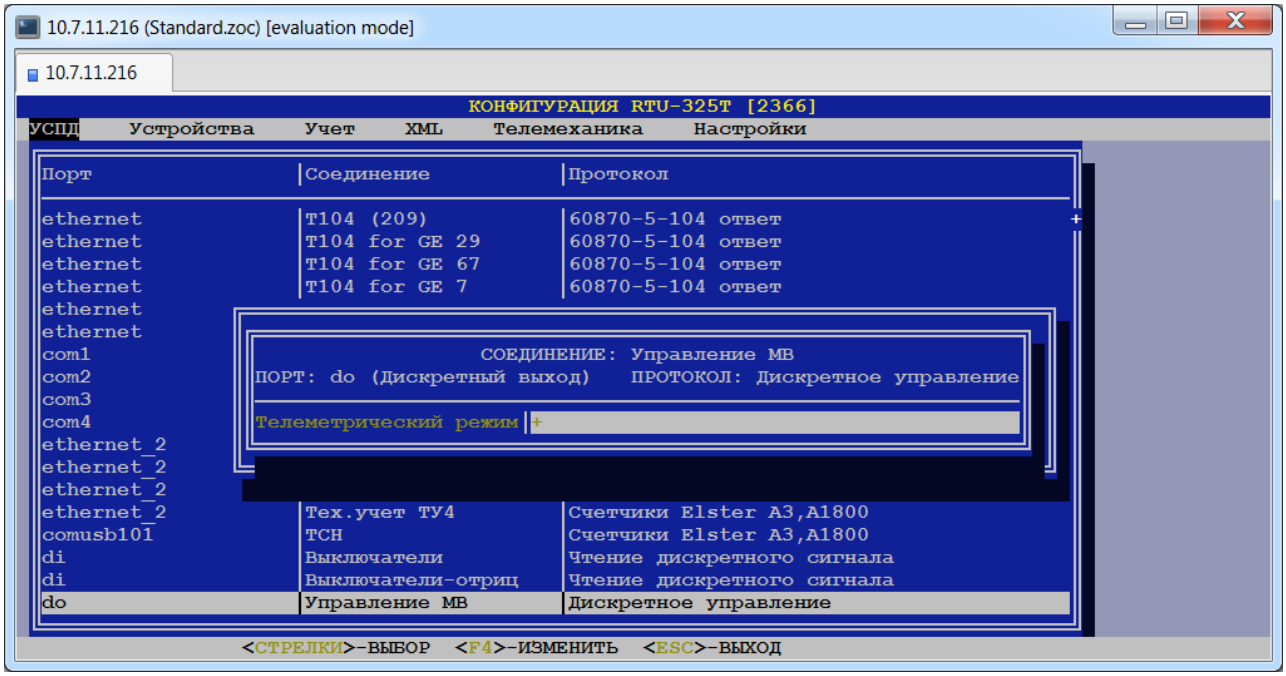
6.2.2.21. Port «COM...» - protocol «60870-5-101 ответ» (type of port - «Модем коммутируемый»).



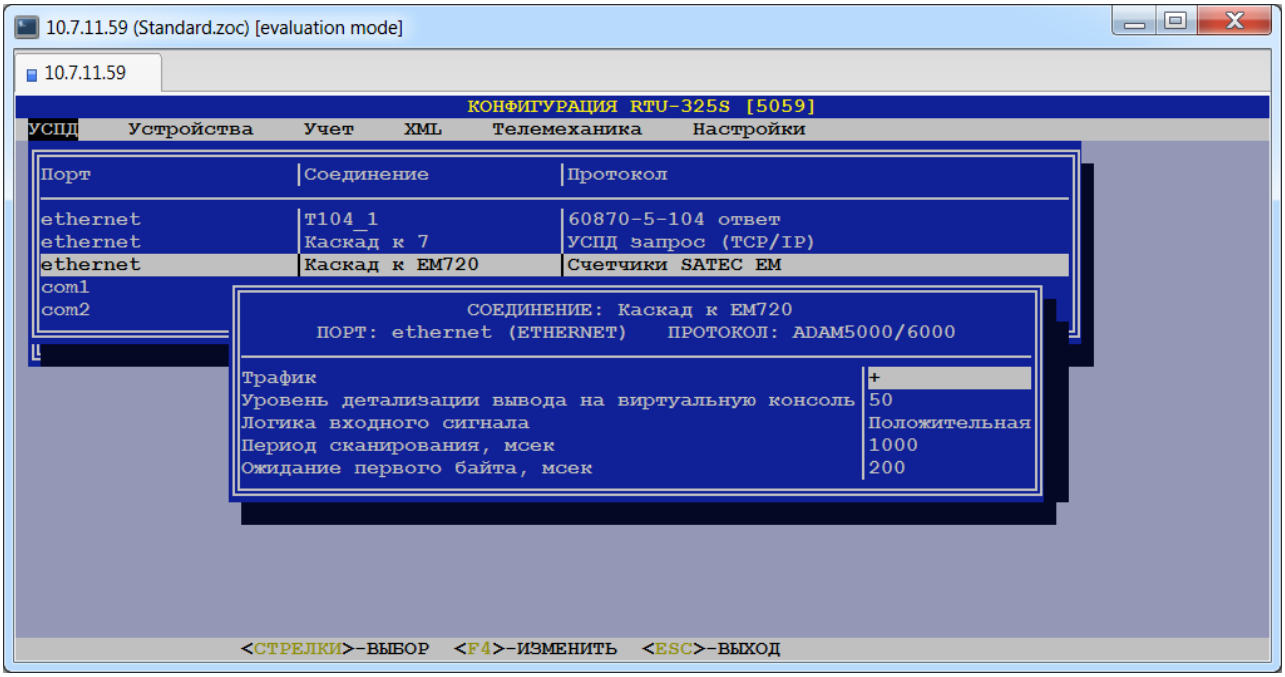
6.2.2.22. Port «di» - protocol «Чтение дискретного сигнала» (type of port - «Дискретный вход»).



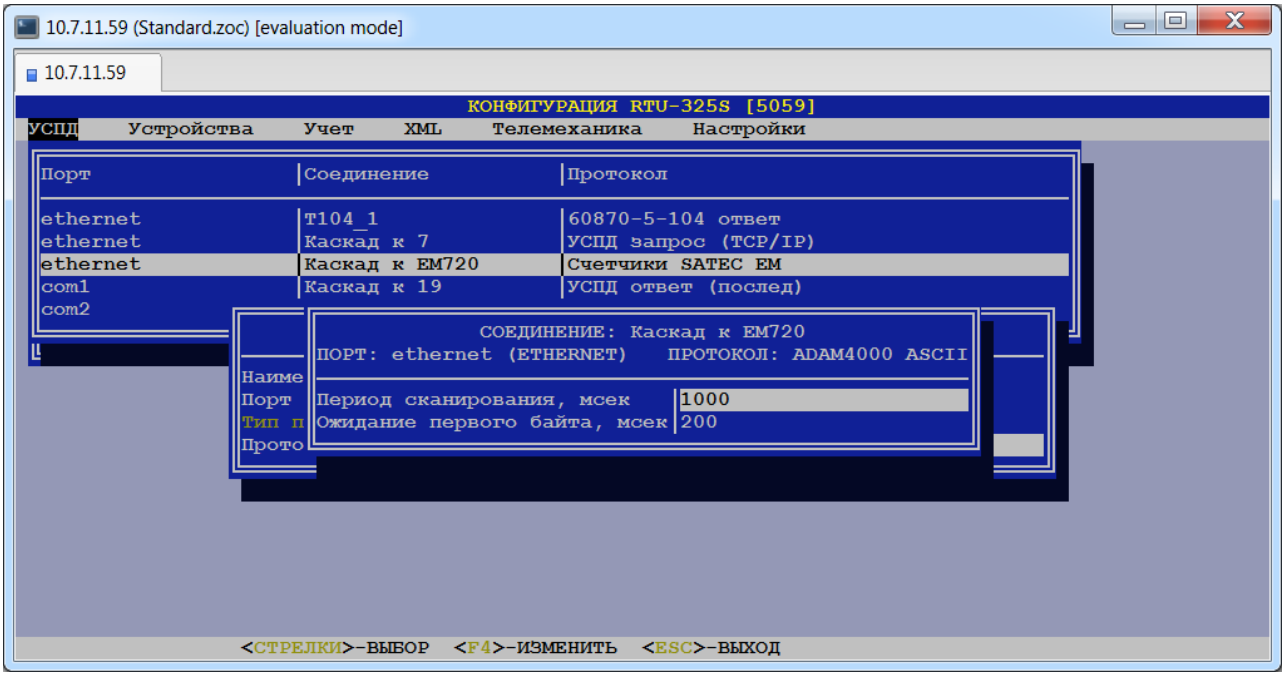
6.2.2.23. Port «do» - protocol «Дискретное управление» (type of port - «Дискретный выход»).



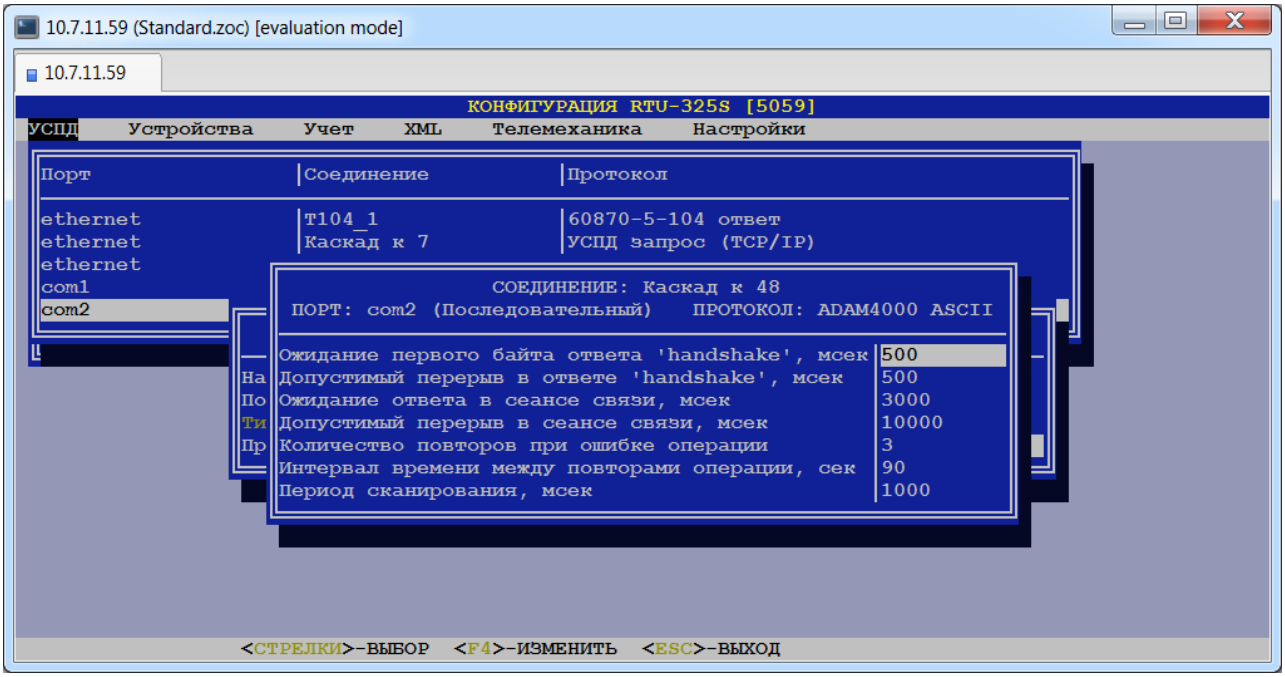
6.2.2.24. Port «ETHERNET» - Protocols «ADAM 5000/6000», «ET7000/i8000», «MOXA ioLogik» .



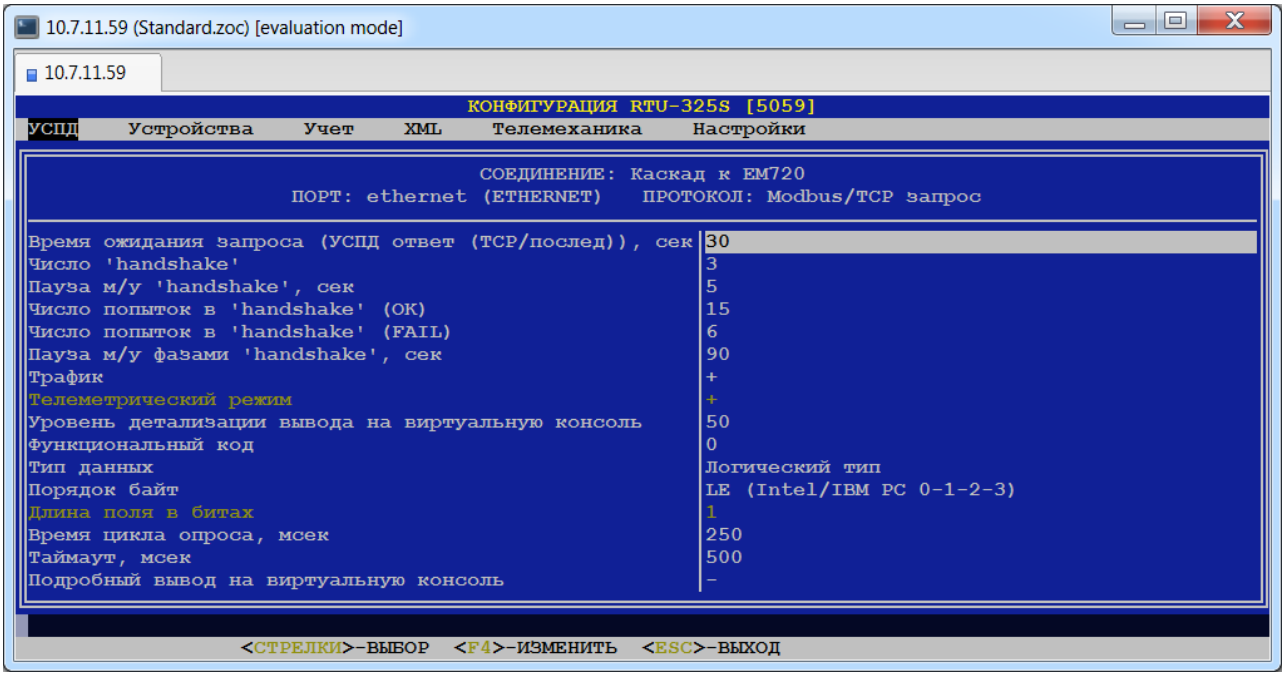
6.2.2.25. Port «ETHERNET» - protocol «ADAM4000 ASCII» .



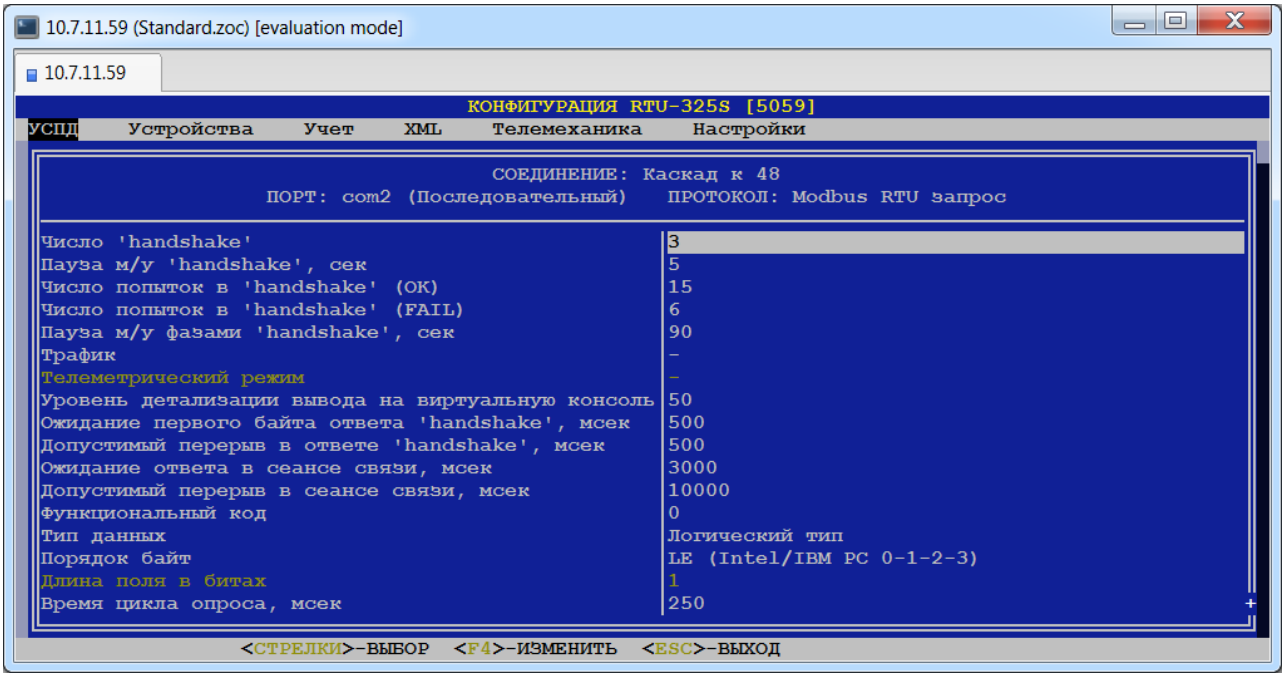
6.2.2.26. Port «COM...» - protocol «ADAM4000 ASCII» (type of port - «Последовательный»).



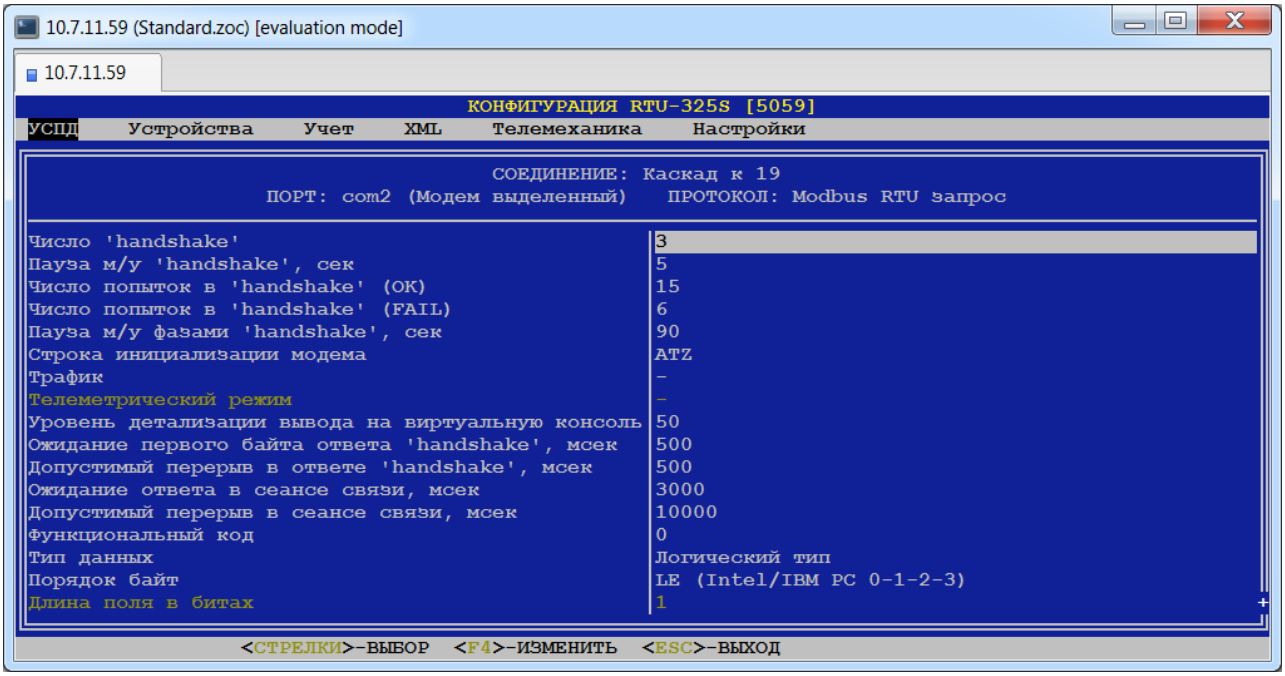
6.2.2.27. Port «ETHERNET» - protocol «Modbus/TCP запрос» .



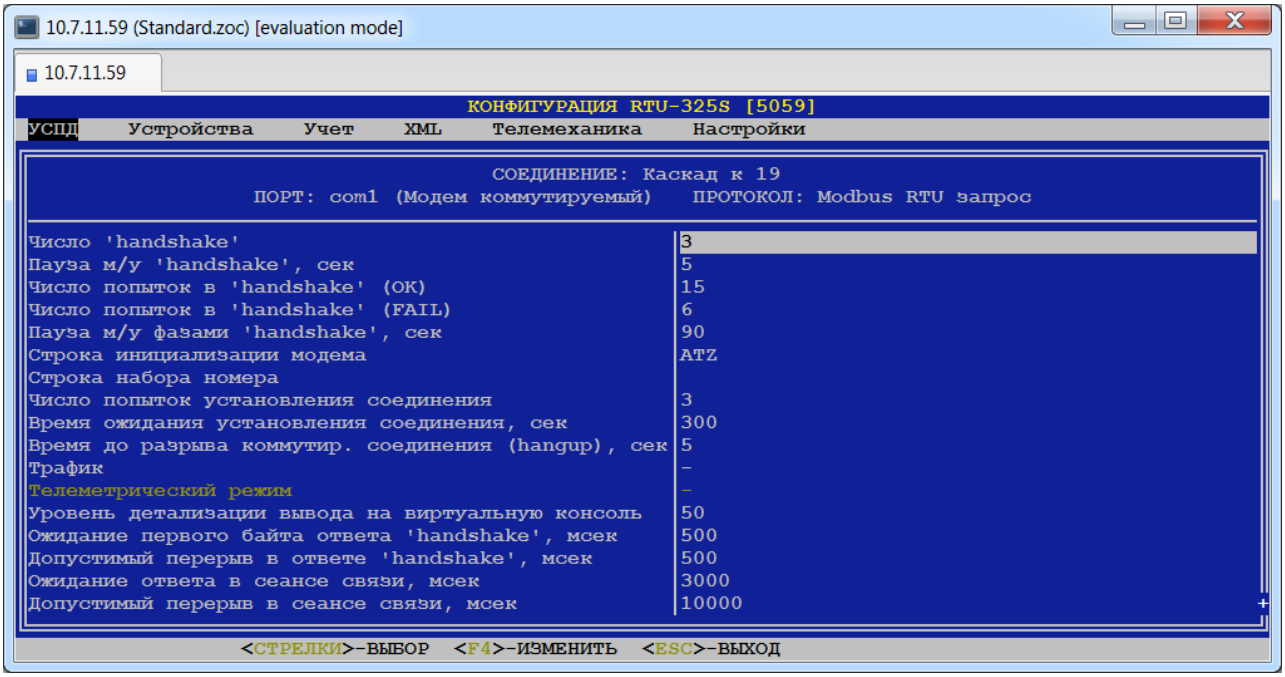
6.2.2.28. Port «COM...» - protocol «Modbus RTU запрос» (type of port - «Последовательный»).



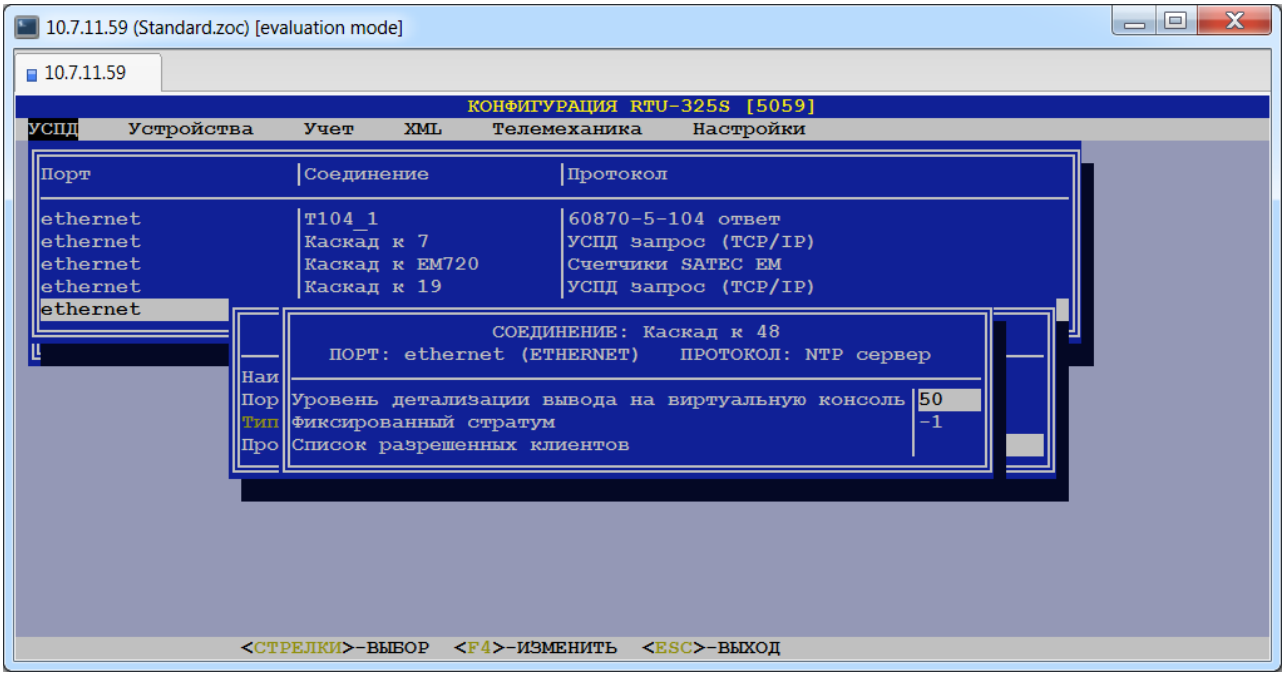
6.2.2.29. Port «COM...» - protocol «Modbus RTU запрос» (type of port - «Модем выделенный»).



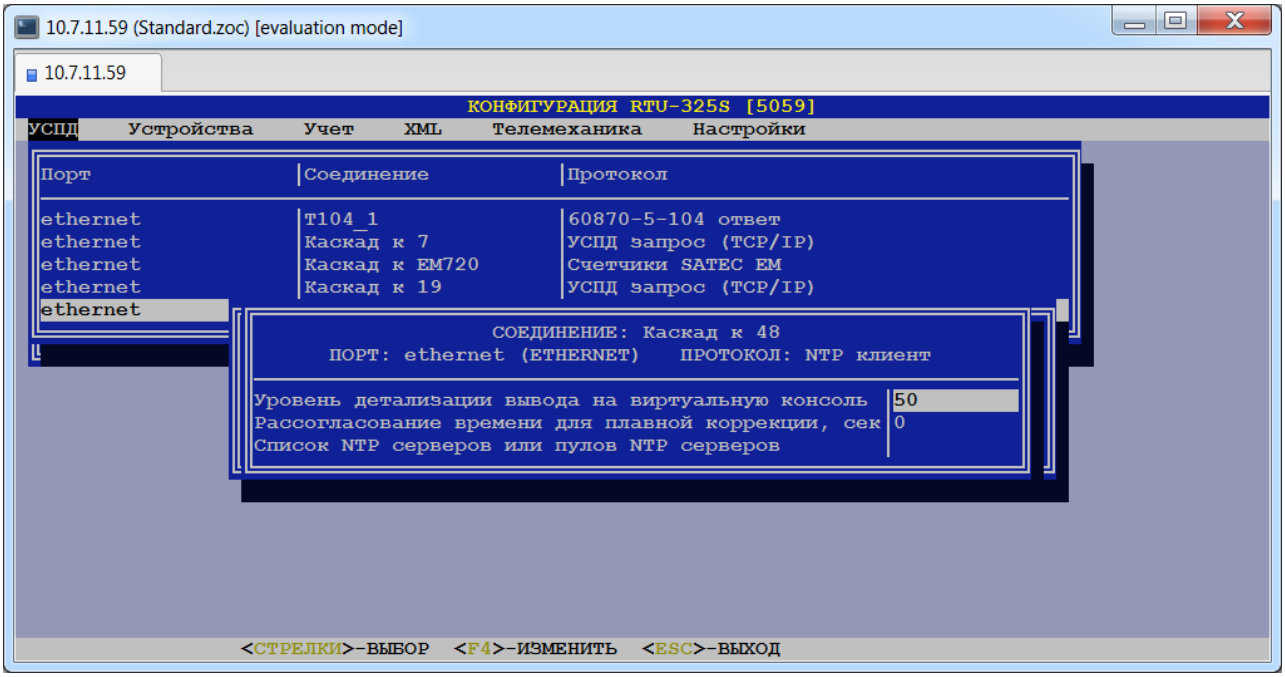
6.2.2.30. Port «COM...» - protocol «Modbus RTU запрос» (type of port - «Модем коммутируемый»).



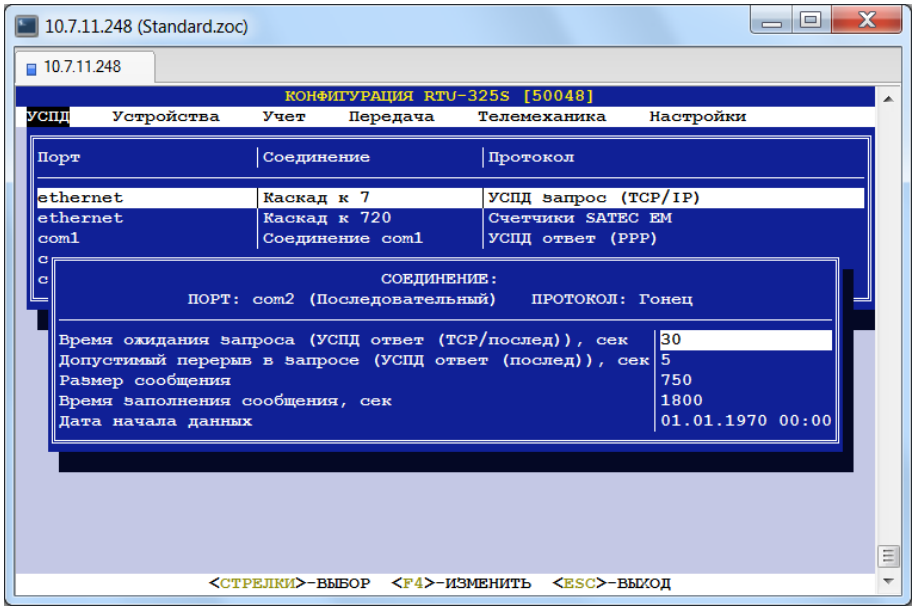
6.2.2.31. Port «ETHERNET» - protocol «NTP сервер» .



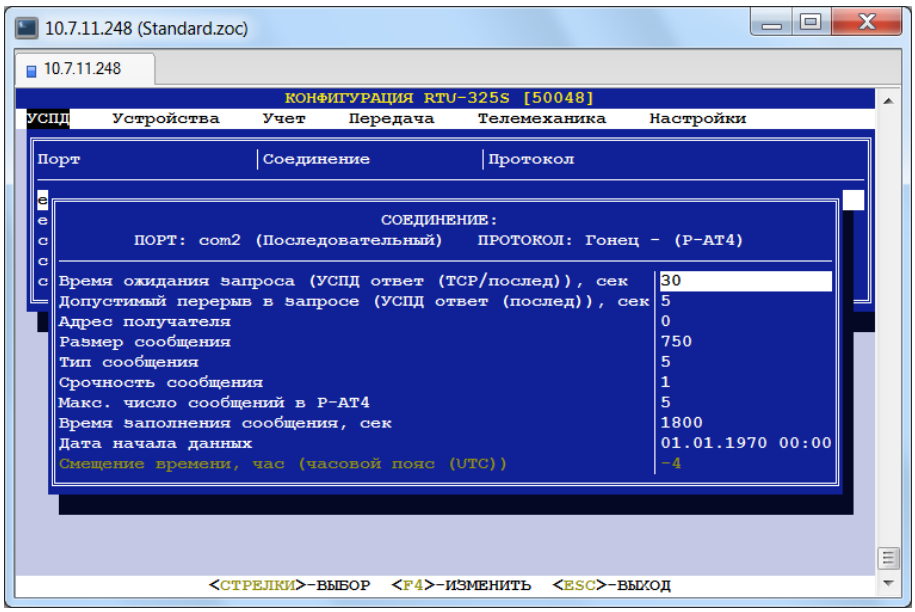
6.2.2.32. Port «ETHERNET» - protocol «NTP клиент» .



6.2.2.33. Port «COM...» - protocol «Гонец» (type of port - «Последовательный»).



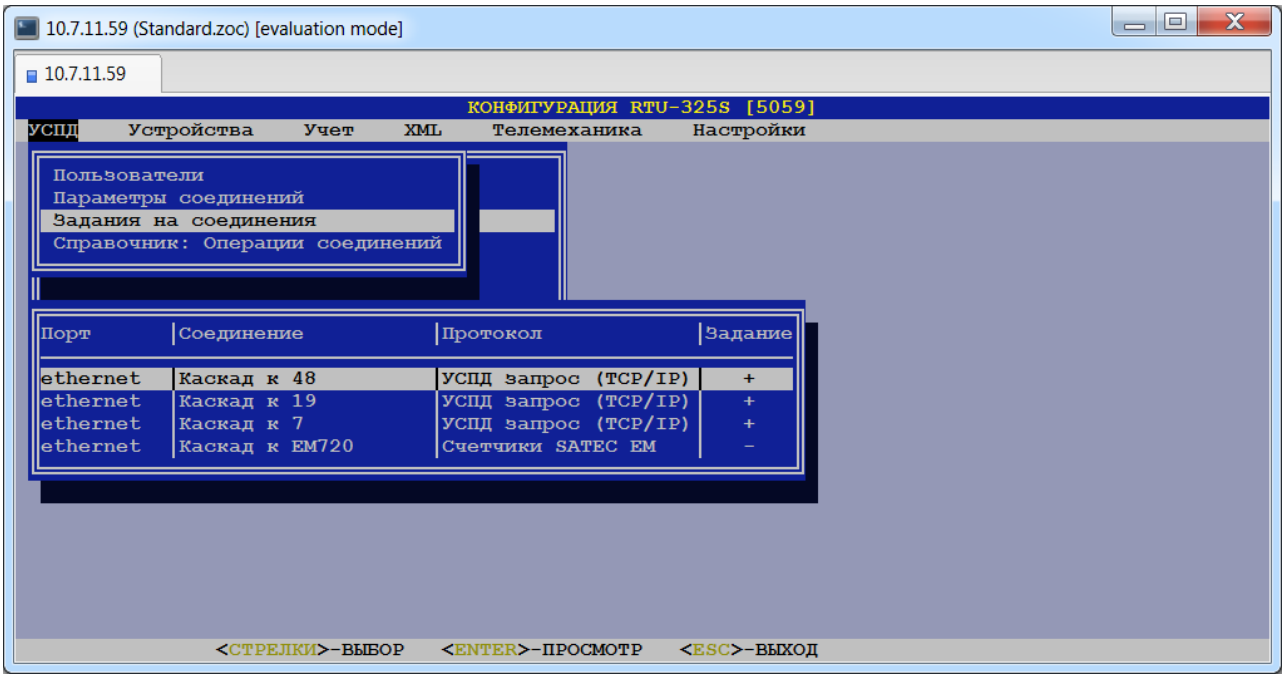
6.2.2.34. Port «COM...» - protocol «Гонец - (P-AT4)» (type of port - «Последовательный»).



6.3. Defining tasks on connections.

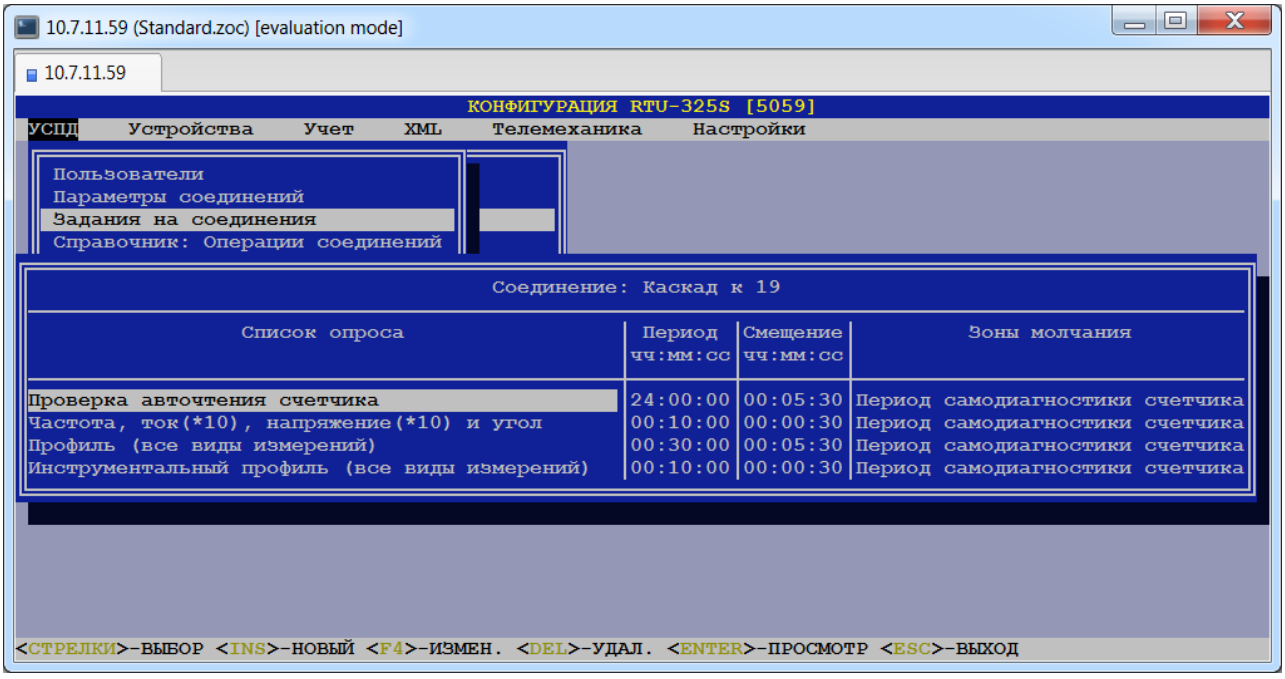
(Chart item «УСПД» > «Соединения» > «Задания на соединения»)

This menu item presents a table with a list of the connections for which the selected connection can be assigned (recommended):



This is done to facilitate the configuration process of RTU. In this case, it is possible not to configuration the task for each device at the connection.

If in the table the field value "Задание" is equal to `+', then there are tasks on this connection. The view key will present a list of tasks for the connection, which can be edited:



If in the table the field value "Задание" is `-', there is no task at this connection. A list of connection tasks will be proposed using the view key.

The connection tasks shall be performed by protocol for all external devices on the assembly in the same way. If an individual transaction list is required for a meter at a connection, see paragraph «Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос» or «Устройства» > "Censors

electrical energy → «Задания на опрос счётчиков» (similar to heat meters and power meter).

The tasking of the connection may be defined for the following types of protocols:

- All types of electrical meter protocols;
- All types of heat meter protocols;
- All types of flowmeter protocols;
- Protocol «Чтение дискретного сигнала»

Attention: polling of local discrete RTU entries recording the status log into the archive RTU and processing of electrical circuit status (port «di», protocol "Чтение дискретного сигнала") is only possible when the connection task with operation "Журнал состояния локальных выключателей" is configuration. In this case, the task parameter "Период" determines the frequency of recording the status log in the RTU archive (recommended from 10 seconds or more). Without a connection task, the "Чтение дискретного сигнала" protocol only provides data transmission to the telecontrol protocols.

Each task in the task table contains the following fields to fill in:

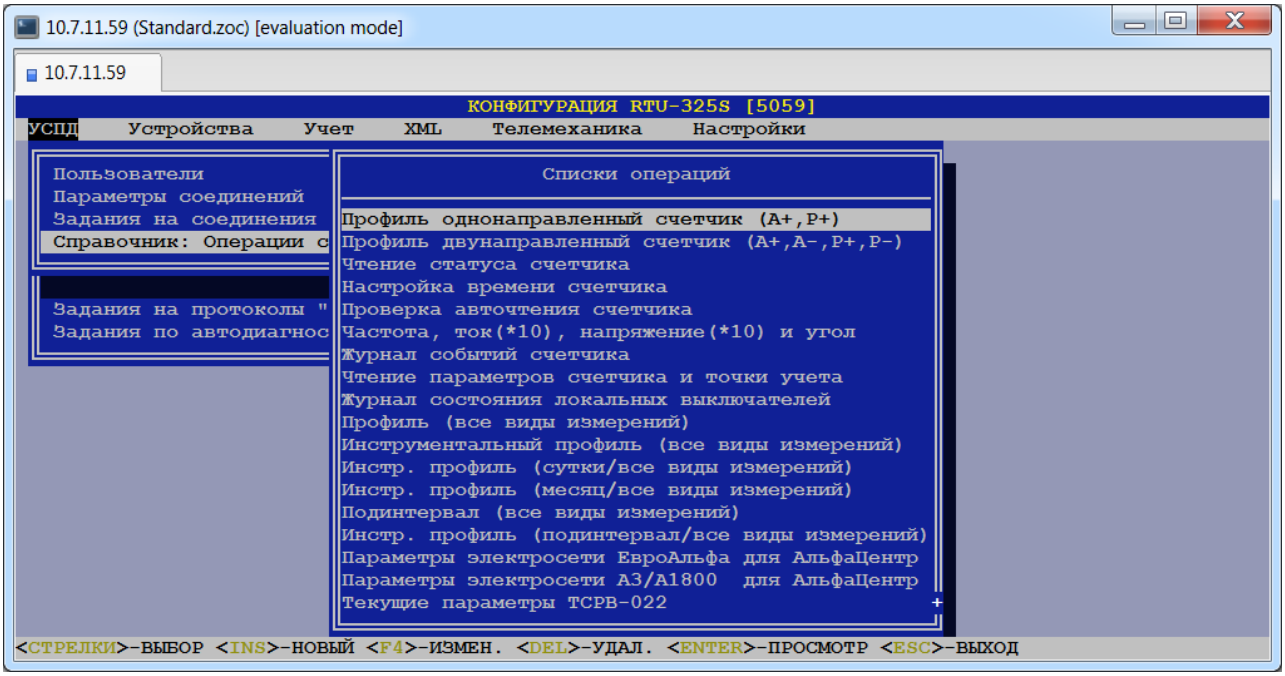
- The interview list.
- Period, ch:mm:ss (hh:mm:ss.ms - in tele-mechanical mode of connection)
- Offset, ch: hm:ss.
- Silence zones. For a detailed description of the parameters of the task, see «Основные принципы работы и конфигурирования» manual.

The list of operations for connection tasks is defined in the menu item «УСПД» > «Соединения» > «Справочник: Операции соединений» .

6.4. Definition of transaction lists for connection assignments.

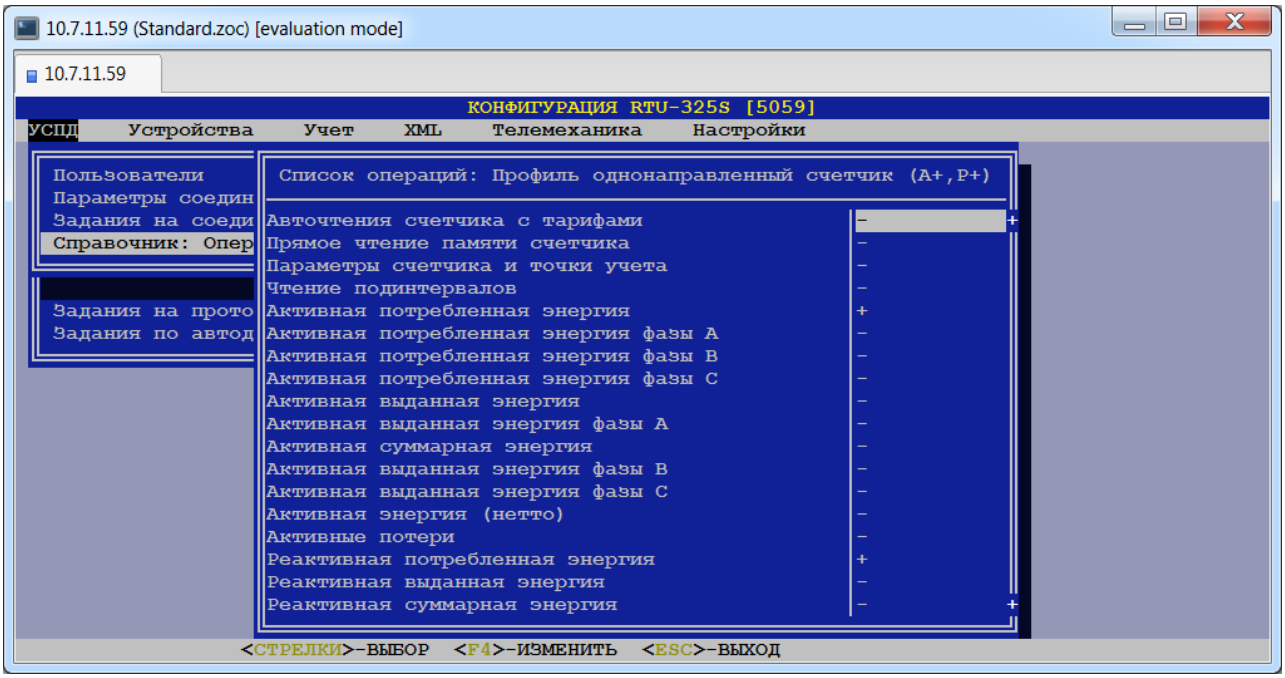
(Chart item «УСПД» > «Соединения» > «Справочник: Операции соединений»)

This menu item creates/edited/edited transaction lists for connection assignments. For ease of reference, RTU is supplied with a set of transaction lists most commonly used in practice:



If necessary, the user may establish his or her transaction lists or edit existing ones. To do this, you have to enter the selected transaction list.

and to place «+» in operations to be performed and «-» in operations not to be performed:



7. Identify the operation of remote RTU and cascade input/output modules and relate them to connections.

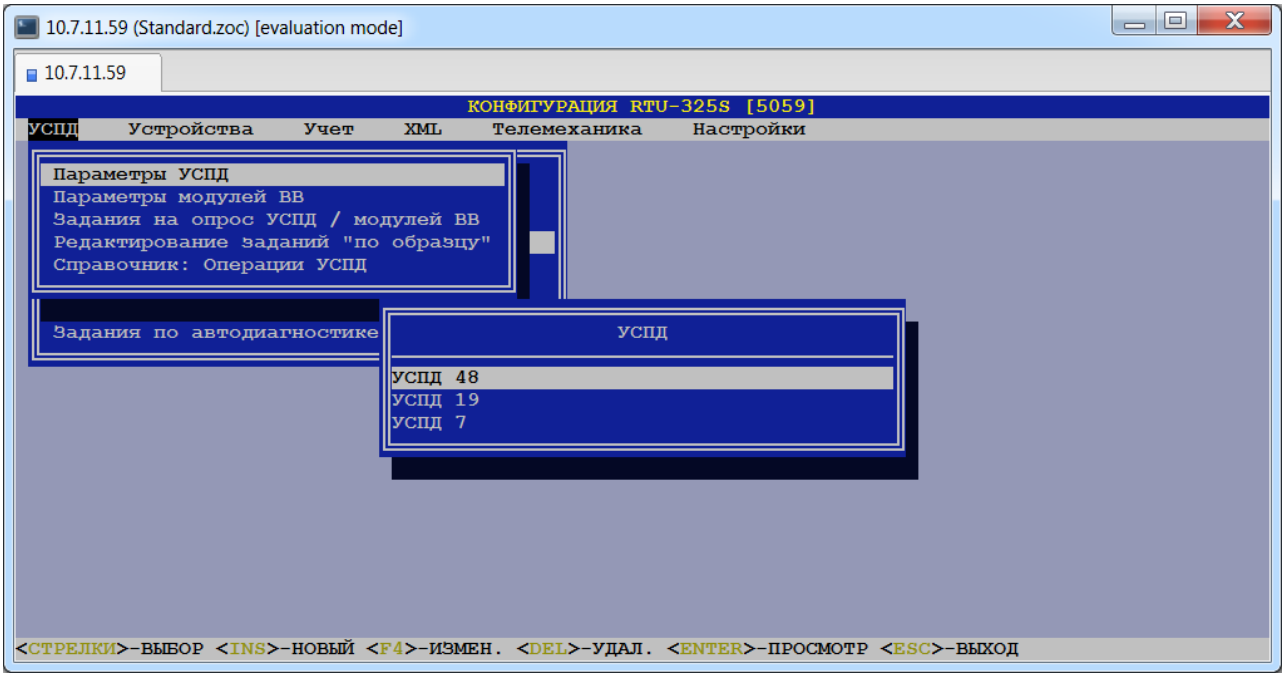
(Check item «УСПД» > «Удалённые УСПД / модули ВВ»)

7.1. Definition of remote RTU parameters.

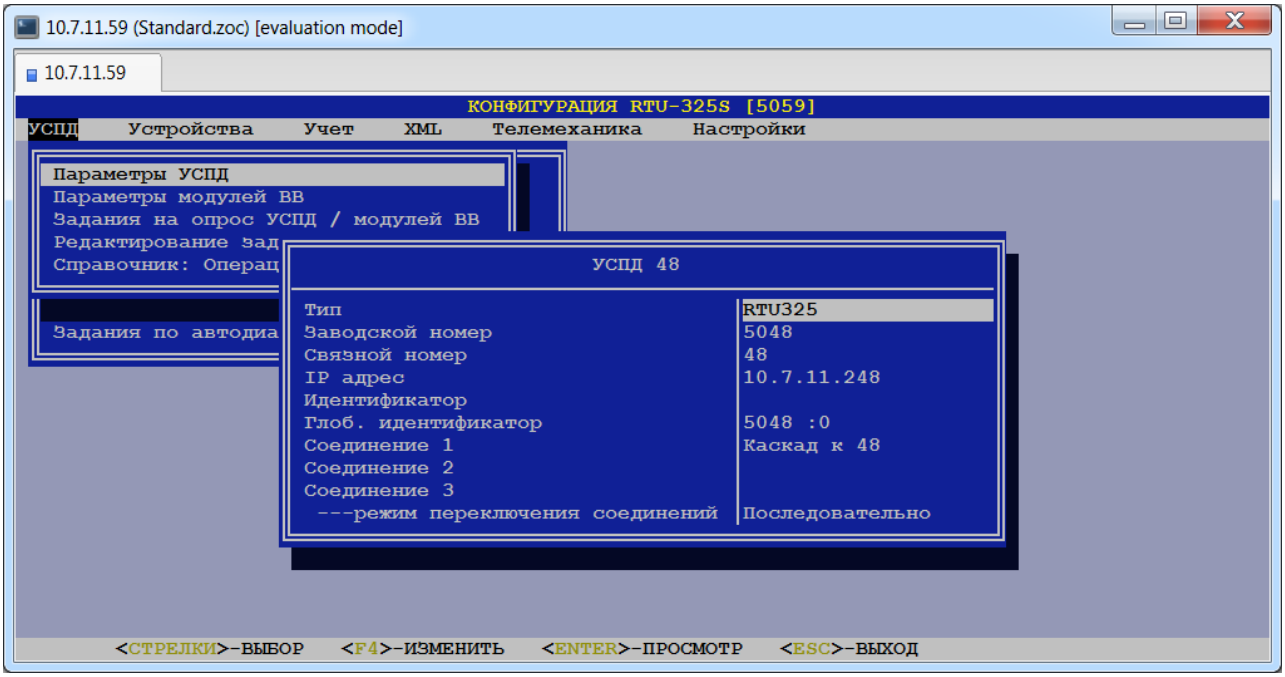
(Chart item «УСПД» > «Удалённые УСПД» > «Параметры УСПД»)

In this menu item, the list of RTU is filled in, which should include all subordinates of RTU in the cascade circuit.

Once this item is selected, a list of RTU names should appear:



The name RTU is defined by the user. Once the required RTU has been selected, a table of RTU parameters will appear in the list of names or the addition of a new RTU. For each RTU, the following parameters must be completed:



- **Type.**
  Allowable values: selected from the list of types of RTU defined in the menu item «Настройки» > «Типы УСПД» Plant: «RTU325» used to identify the RTU model and its protocol.

- **The factory room.**
  Data Type: Text Line. Plant: shall conform exactly to the marking on the RTU shell (after
  The manufacturer's number is not specified and the user must manually enter the manufacturer's number). This parameter is used to identify RTU:

  ; In the form of file names in data export operations, RTU. As an address in the operations of the lower RTU cascade and top level interview. When reading the lower RTU settings using the keys <F5>/<F6>/<F7>.

Attention: In the system, all remote RTUs should have unique factory numbers.

- **Contact number.**
  Data type: whole number. Plant: 2.

- **IP address.**

Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: 10.7.11.202. If a remote RTU has multiple IP addresses, the <Enter> key will provide the user with a table to enter the second and subsequent addresses.

- **Identifier.**

Data Type: Text Line. This parameter is used only for RTU type «MEGA-DATA» and «Шлюз E-422» . RTU type «MEGA-DATA» requires an identifier of 8 characters (see RTU documentation).

RTU of type «Шлюз E-422» requires an Identifier task as: "E422" .

- **Global identifier.**

The way the global identifier is presented and edited depends on the settings in the «Настройки» > «Вид глобального идентификатора» menu item.

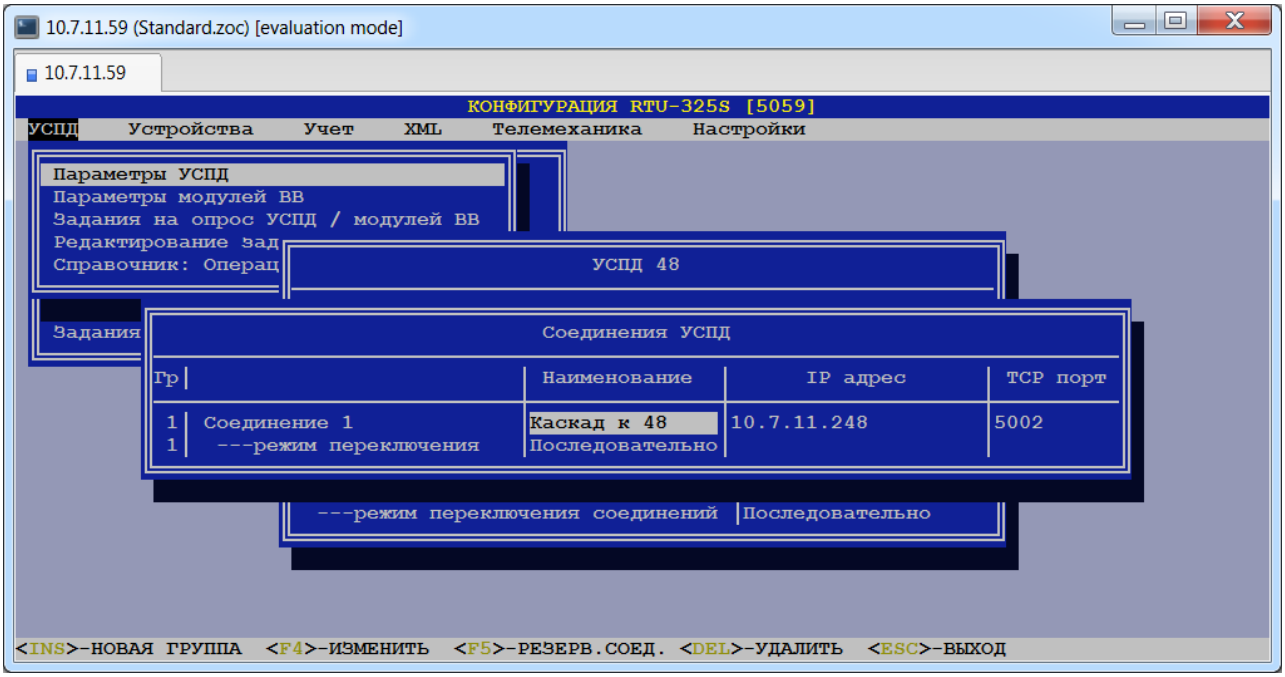
- **Combination 1.**
- **Combination 2.**
- **Combination 3.**

These paragraphs are the connections of group 1 of table «Соединения УСПД» .
To enter/correct the value of this option, the user must open any of these points (see the bottom-up clue). A table «Соединения УСПД» will appear on the screen. The table presents groups of connections, each with its own stand-by mode.

«Соединение 1» in each group has the highest priority 1 and must necessarily be determined.

«Соединение 2» has priority 2. «Соединение 3» has priority 3 and is filled in only when «Соединение 2» is completed.

In table «Соединения УСПД», the following fields are filled:



- Name(s).
  It's selected from the list of connections.
- **IP address.**

Selects from the IP list the addresses defined in table IP addresses of this deleted RTU (item «УСПД» > «Удалённые УСПД» > «Параметры УСПД» > > "IP адрес").

- **TCP port.**
  Data type: whole number.

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When using back-up connections (completed paragraphs «Соединение 2», «Соединение 3»), the user shall select the switching mode from the following list:

• Consistently. In this mode, RTU starts a communication session with remote RTU on connection «Соединение 1». In the absence of a connection, RTU attempts to hold a communication session on connection with a lower priority, etc. before connection «Соединение 3». The first successful connection found becomes operational for all subsequent communication sessions. If there is no connection for all connections, this communication session is considered to be unsuccessful, and the next communication session is conducted according to the order for the metering, starting with the connection «Соединение 1».

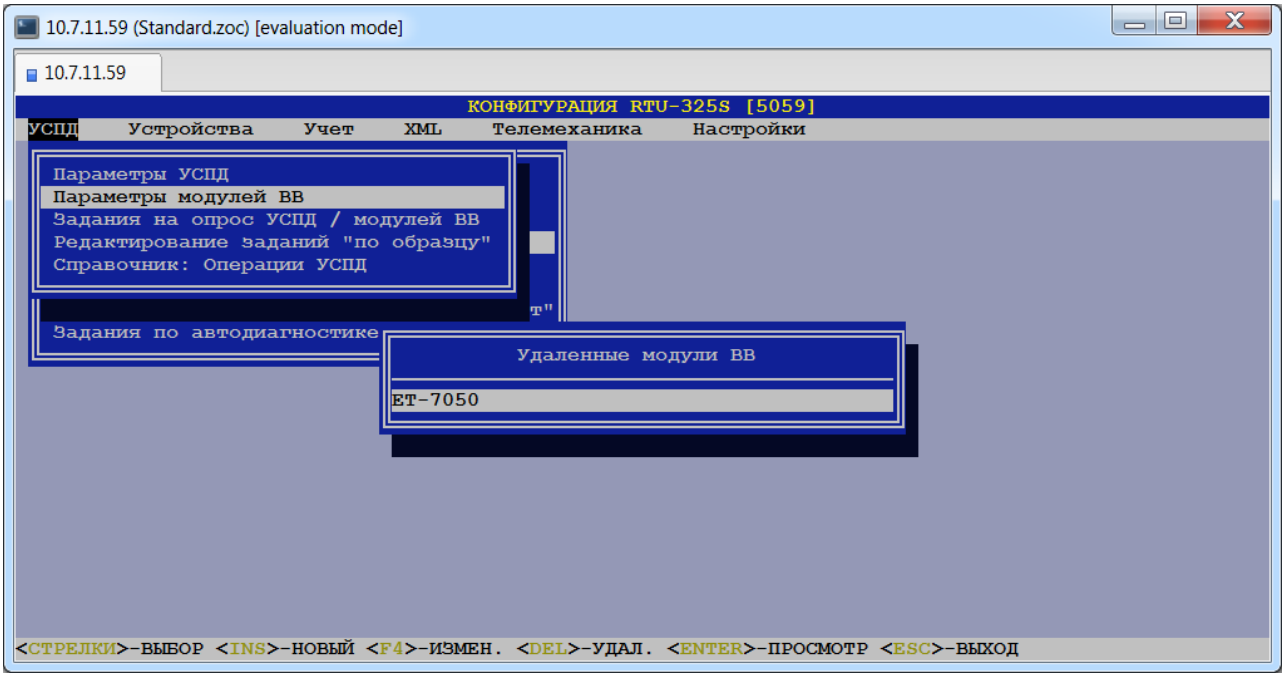
• Priority. In this mode, RTU starts a communication session with remote RTU on connection «Соединение 1» . In the absence of a connection, RTU attempts to hold a communication session on connection with a lower priority, etc. before connection «Соединение 3» . The first successful connection found becomes operational only for the current communication session. Regardless of the outcome of the previous communication session, the next communication session is conducted according to the task of interviewing the meter, starting with the connection «Соединение 1» .

7.2. Definition of remote input/output modules.

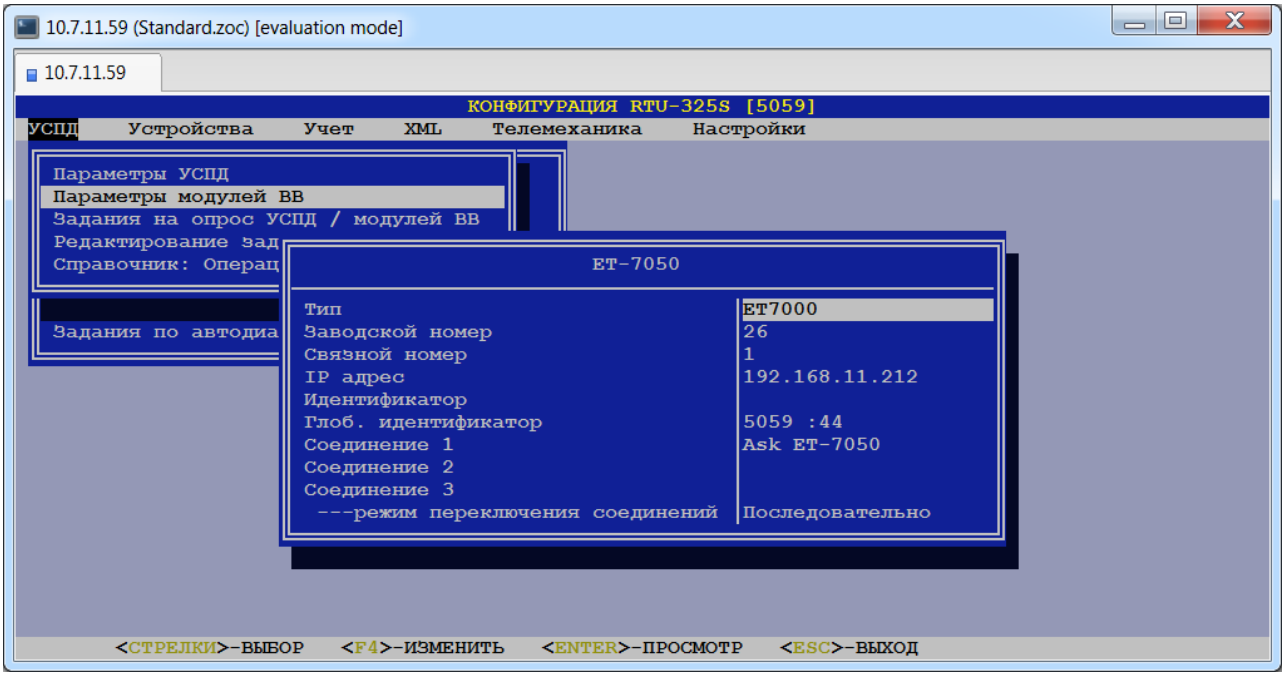
(Chart item «УСПД» > «Удалённые УСПД / модули ВВ» > «Параметры модулей ВВ»)

This menu item completes the list of input/output modules, which should include all subordinate input/output modules in the cascade circuit.

Once this item is selected, a list of the names of the input/output modules will be available:



The name of the input/output module shall be determined by the user. Once the required input/output module is selected, a table of its parameters will appear from the list. For each input/output module, the following parameters need to be completed:



- **Type.**

Allowable values: selected from a list of types of input/output modules identified by the in the «Настройки» > «Типы УСПД» menu item, used to identify the model of the input/output module and its protocol accordingly.

- **The factory room.**

Data Type: Text Line. This option is used to identify the remote input/output module of the RTU configuration.

- **Contact number.**

Data type: a whole number. factory default: 1. Allowable values: [1 ... 255].

- **IP address.**

Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. factory default: not. If the remote input/output module has multiple IP addresses, the <Enter> key will provide the user with a table to input the second and subsequent addresses.

- **Identifier.**

Data Type: Text Line.

- **Global identifier.**

The way the global identifier is presented and edited depends on the settings in the «Настройки» > «Вид глобального идентификатора» menu item.

- **Combination 1.**
- **Combination 2.**
- **Combination 3.**

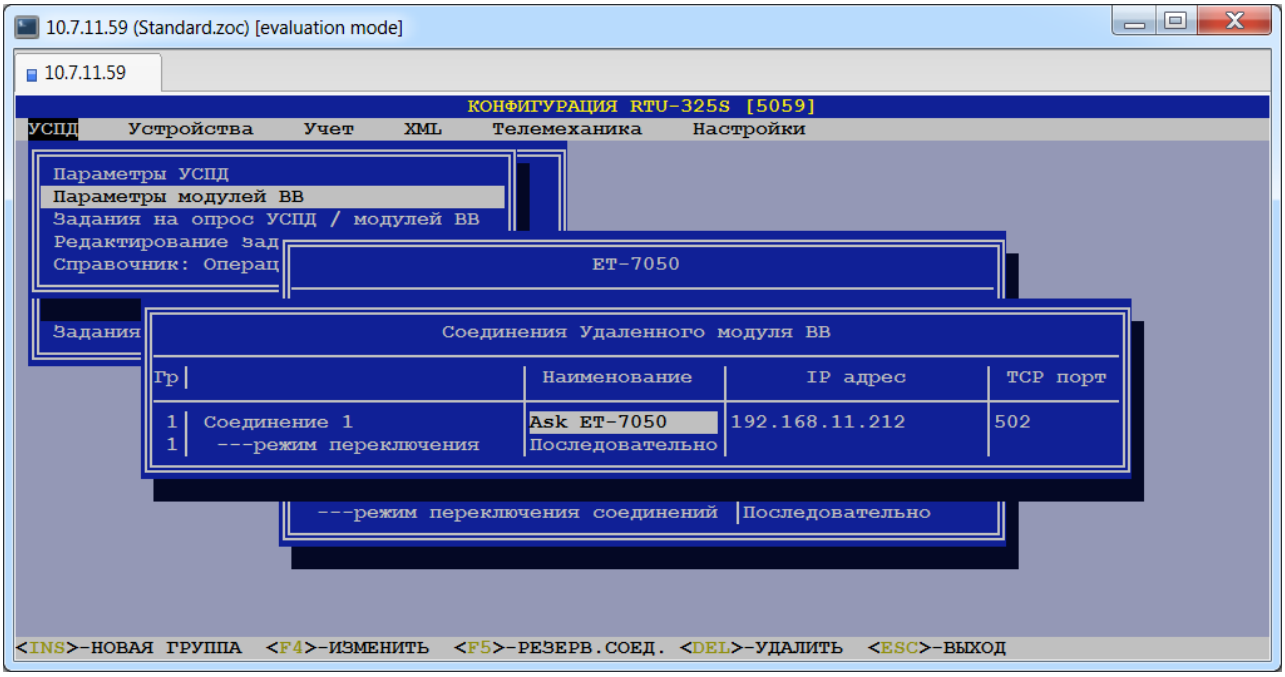
These paragraphs are the connections of group 1 of table «Соединения удалённого модуля ввода/вывода» .

To enter/correct the value of this option, the user must open any of these points (see the bottom-up clue). A table «Соединения удалённого модуля ввода/вывода» shall appear on the screen.

«Соединение 1» in each group has the highest priority 1 and must necessarily be determined.

«Соединение 2» has priority 2. «Соединение 3» has priority 3 and is filled in only when «Соединение 2» is completed.

In table «Соединения удалённого модуля ввода/вывода», the following fields are filled:



- Name(s).

It is selected from the list of accessible compounds.

- **IP address.**

The IP addresses defined in table IP addresses of this remote input/output module are selected (paragraph «УСПД» > «Удалённые УСПД / модули ВВ» > «Параметры модулей ВВ» > "IP адрес").

- **TCP port.**

Data type: whole number.

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When using back-up connections (completed paragraphs «Соединение 2», «Соединение 3»), the user shall select the switching mode from the following list:

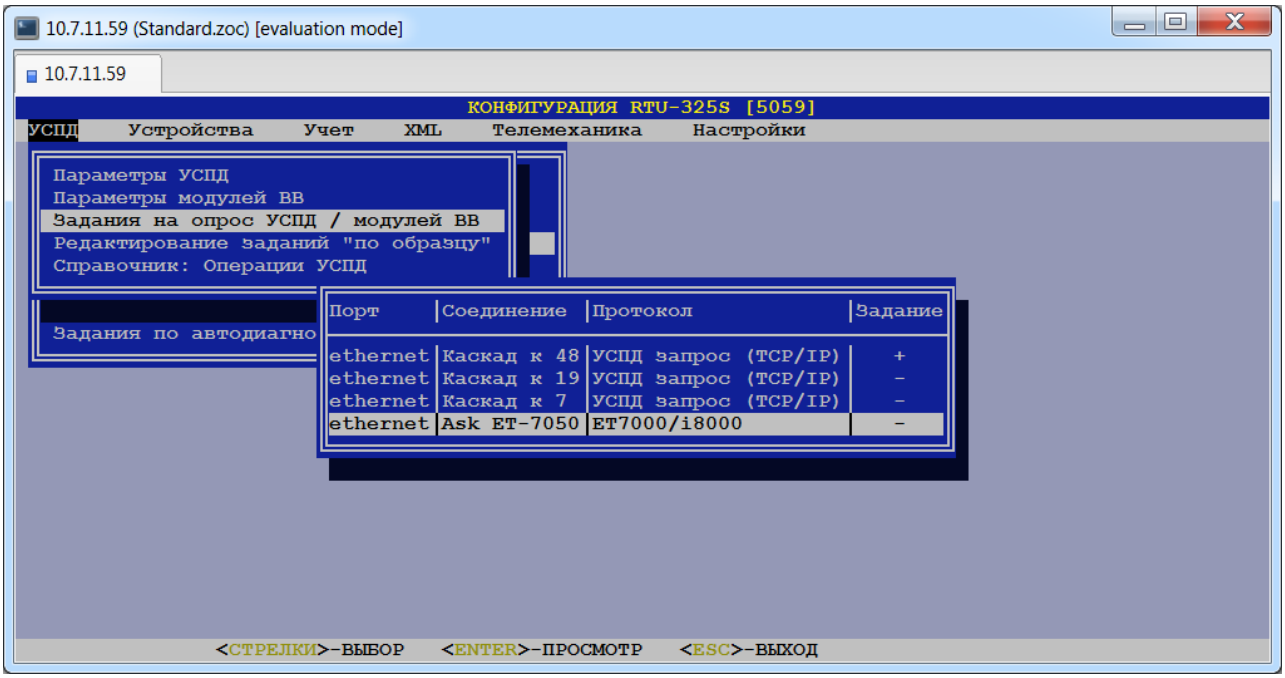
• Consistently. In this mode, RTU starts the communication session with the remote connection input/output module «Соединение 1». In the absence of a connection, RTU attempts to hold a connection session with a lower priority, etc. before connection «Соединение 3». The first successful connection found becomes operational for all subsequent communication sessions. If there is no connection for all connections, this communication session is considered to be unsuccessful, and the next communication session is conducted according to the order for the metering, starting with the connection «Соединение 1».

• Priority. In this mode, RTU starts a communication session with the remote input/output module from the connection «Соединение 1». In the absence of a connection, RTU attempts to conduct a communication session on the connection with a lower priority, etc. before the connection «Соединение 3». The first successful connection found becomes operational only for the current communication session. Regardless of the outcome of the previous communication session, the next communication session is conducted according to the task of interviewing the meter, starting with the connection «Соединение 1» .

7.3. Definition of tasks for remote RTU and input/ output modules.

(Chart item «УСПД» > «Удалённые УСПД / модули ВВ» > «Задания на опрос УСПД / модулей ВВ»)

This menu item presents a table with a list of connections for which remote RTU or input/output modules can be assigned:



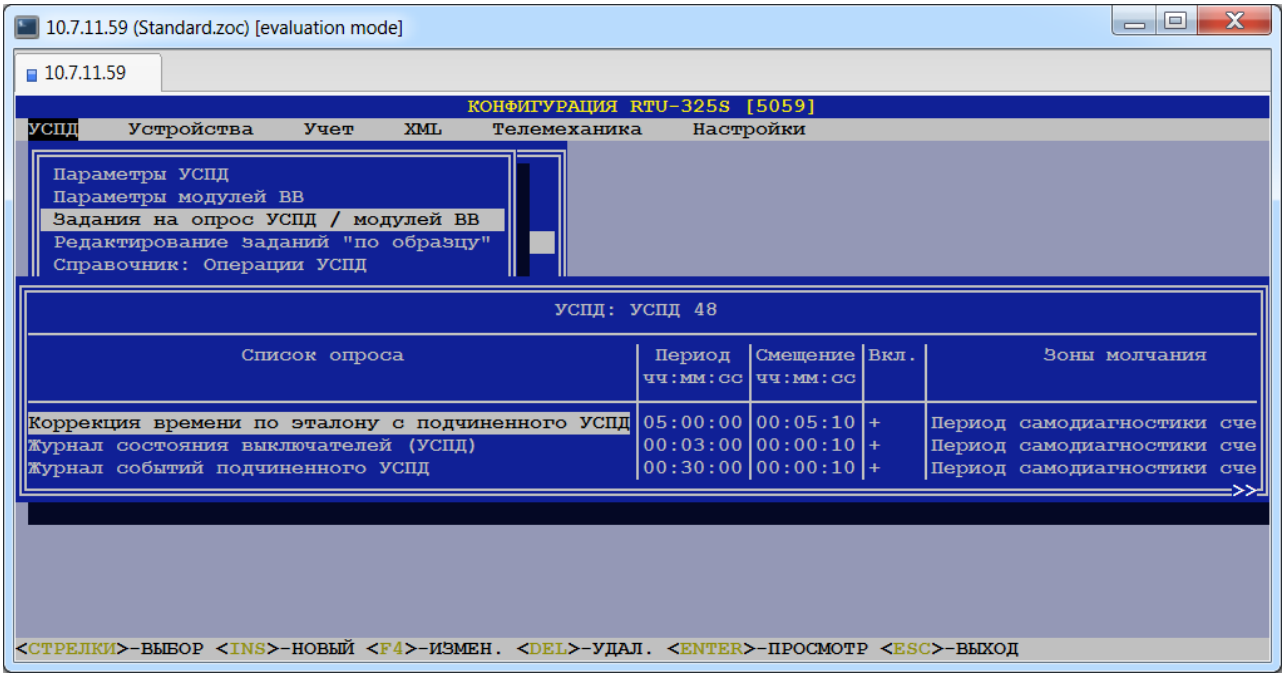
If in the table the field value "Задание" is equal to `+', then there are tasks on this connection. The view key will provide a list of tasks for the connection, which can be changed and edited.

If in the table the field value "Задание" is `-', there is no task at this connection. A list of connection tasks will be proposed using the view key.

Each line in the task table contains the following fields for filling in:

- The interview list.
- Period, hh:ms.

- Offset, ch: hm:ss.
- Introduction
- Silence zones.



A detailed description of the parameters of the assignment is provided in the «Основные принципы работы и конфигурирования» manual.

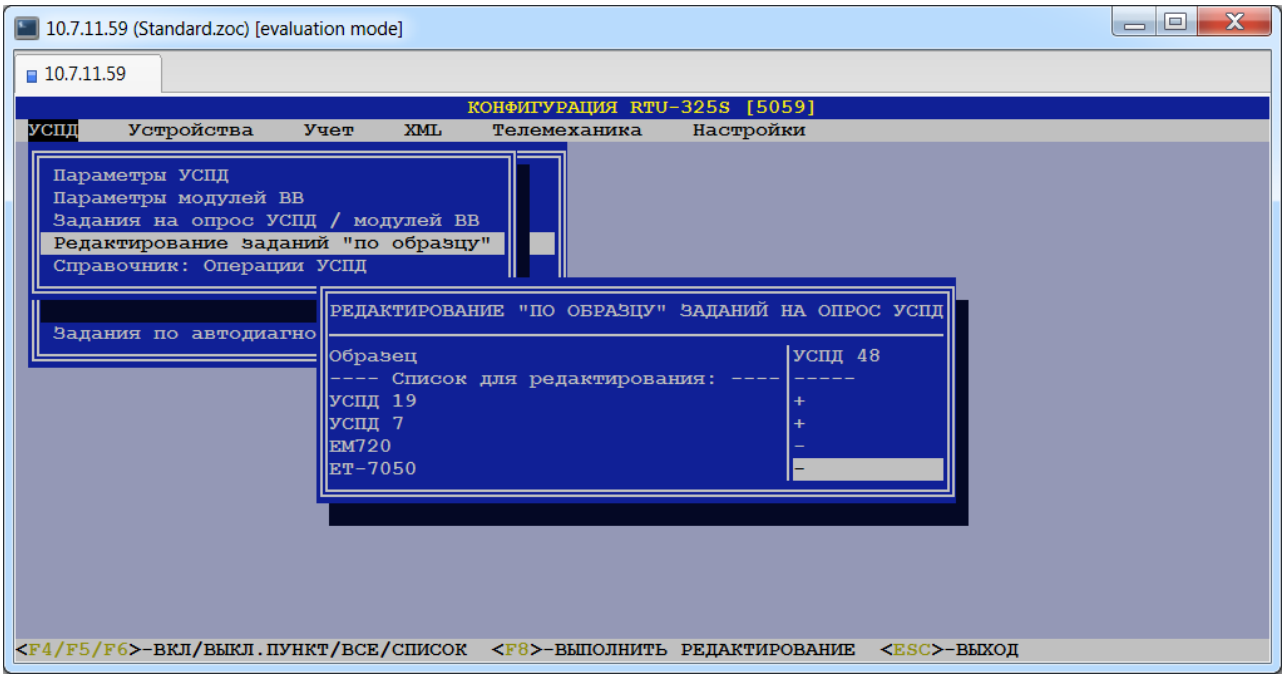
The list of tasks is defined in the menu item «УСПД» > «Удалённые УСПД» > «Справочник: Операции УСПД» .

7.4. Edit "по образцу" to interview remote RTUs and input/output modules.

(Chart item «УСПД» > «Удалённые УСПД / модули ВВ» > «Редактирование заданий "по образцу"»)

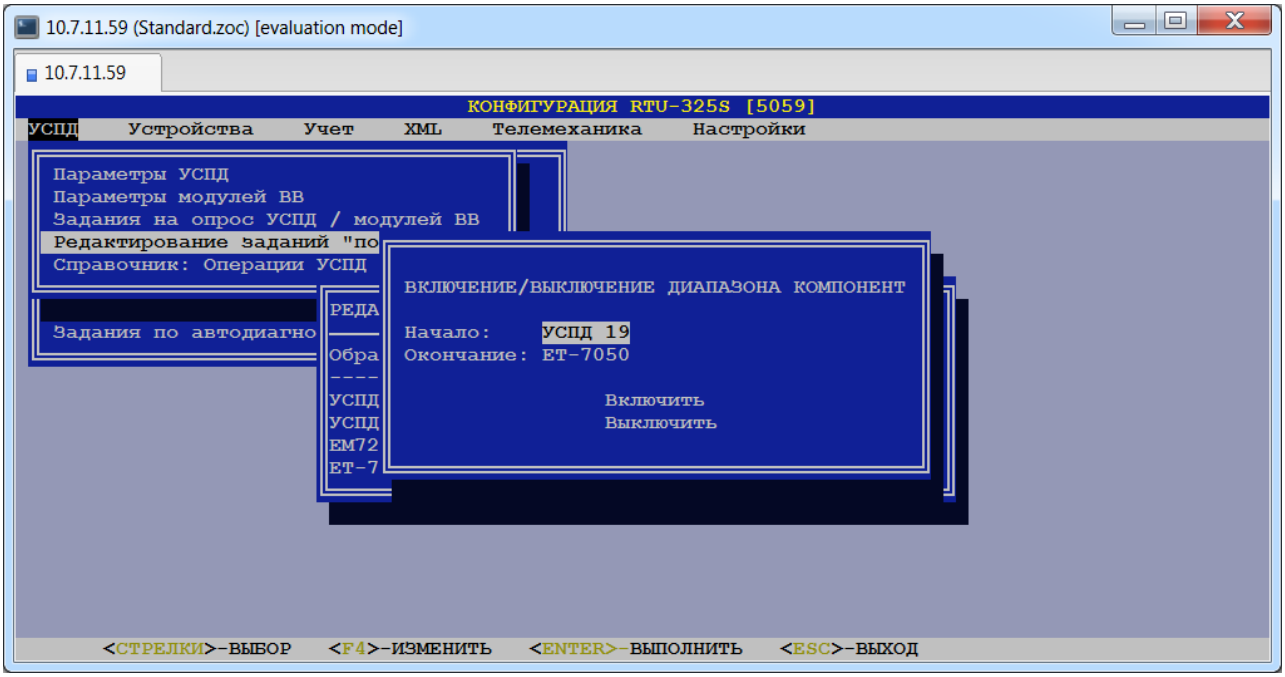
In this menu item, the user can edit the task to interview the remote RTU and the input/output modules using one of the remote devices as a sample.

In the form submitted, the user must select the remote device "образец" and mark the «+» device with the following tasks:



Add (delete) RTU to the list (from the list) for editing by the following means:

1. While in the line with the required RTU, press the key <F4>.
2. Press the key <F5> to activate/exclude all RTU.
3. Press the <F6> key and in the open form set the required parameters:



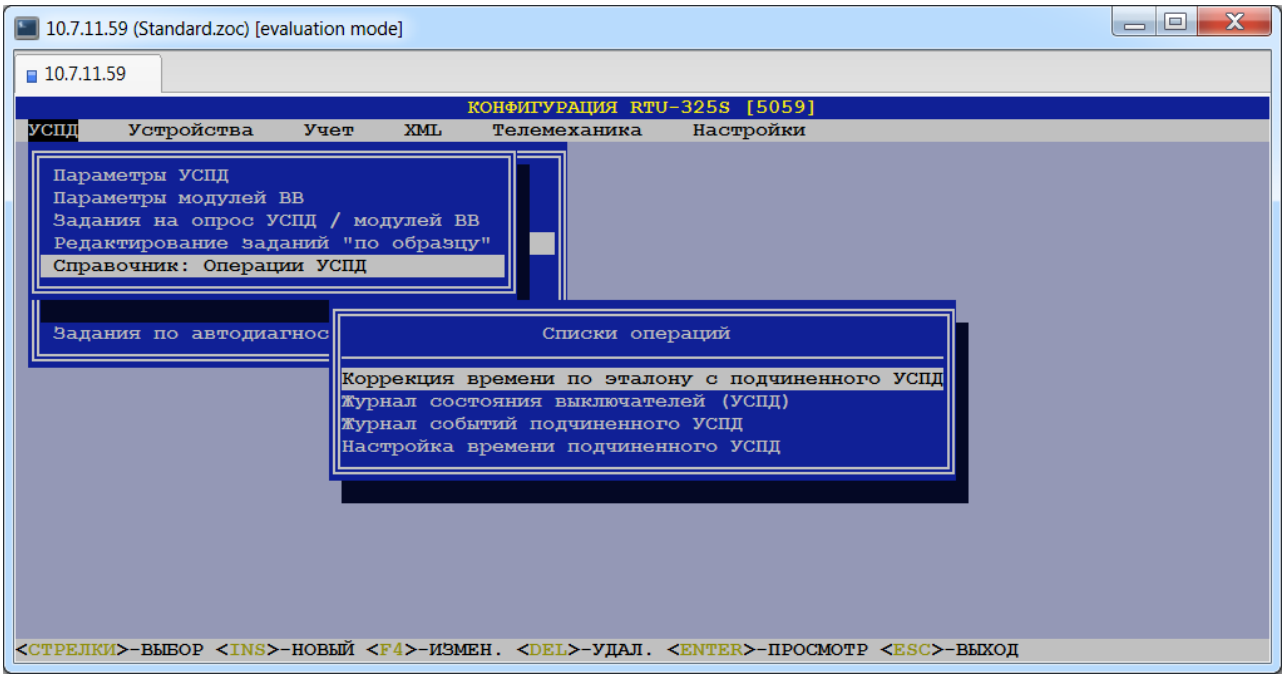
Next, press the <F8> key and confirm the editorial work.

7.5. Definition of transaction lists for remote RTU and input/output modules.

(Chart item «УСПД» > «Удалённые УСПД / модули ВВ» > «Справочник: Операции УСПД»)

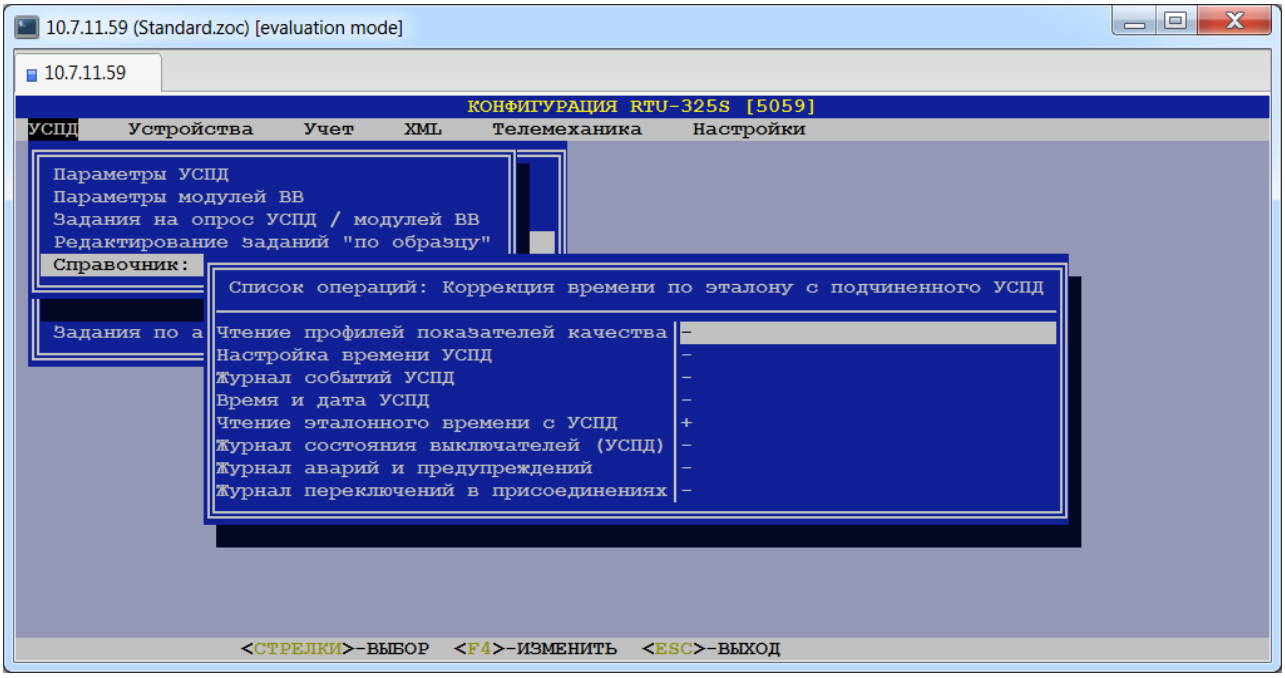
This menu item creates/edited/edited transaction lists for remote RTU interviews and input/output modules.

For ease of reference, RTU is supplied with a set of transaction lists most commonly used in practice:



If necessary, the user may establish his or her transaction lists or edit existing ones. This requires entering the selected list of operations and placing «+» on the operations to be performed and «-» on operations not to be performed.

The following is a complete list of RTU operations with notes on their use:



- **Reading quality profiles.**

This operation initiates the reading of quality profiles (defined for EM720).

- **RTU time setting.**

This operation initiates the setting (correcting) procedure of the remote RTU.

- **RTU event log.**

This operation reads the journal of events of the remote RTU.

- **Time and date RTU.**

This operation reads the time and date of the remote RTU and links the data to the virtual RTU console. This is done for information purposes for ease of reference.

- **Reading reference time with RTU.**

This operation initiates the setting (correcting) procedure for the time of the configuration of the RTU over the time of the remote RTU.

- **Disablement Log (RTU).**

This operation records the status log of the remote RTU switches into the archives of the configuration RTU.

For a remote RTU, the 'Period' parameter is recommended to be set from 1 minutes or more.

For remote input-output devices in the task, the 'Period' parameter is recommended to be 30 seconds or more.

- **Accident and warning logs.**

This operation records the crash and warning log of the remote RTU into the archives of the configuration of the RTU.

The 'Period' parameter is recommended to be set from 1 minutes or more.

- **Switch logs on accessions.**

This operation records the switch log in the remote RTU accessions to the archive of the configuration RTU.

The 'Period' parameter is recommended to be set from 1 minutes or more.

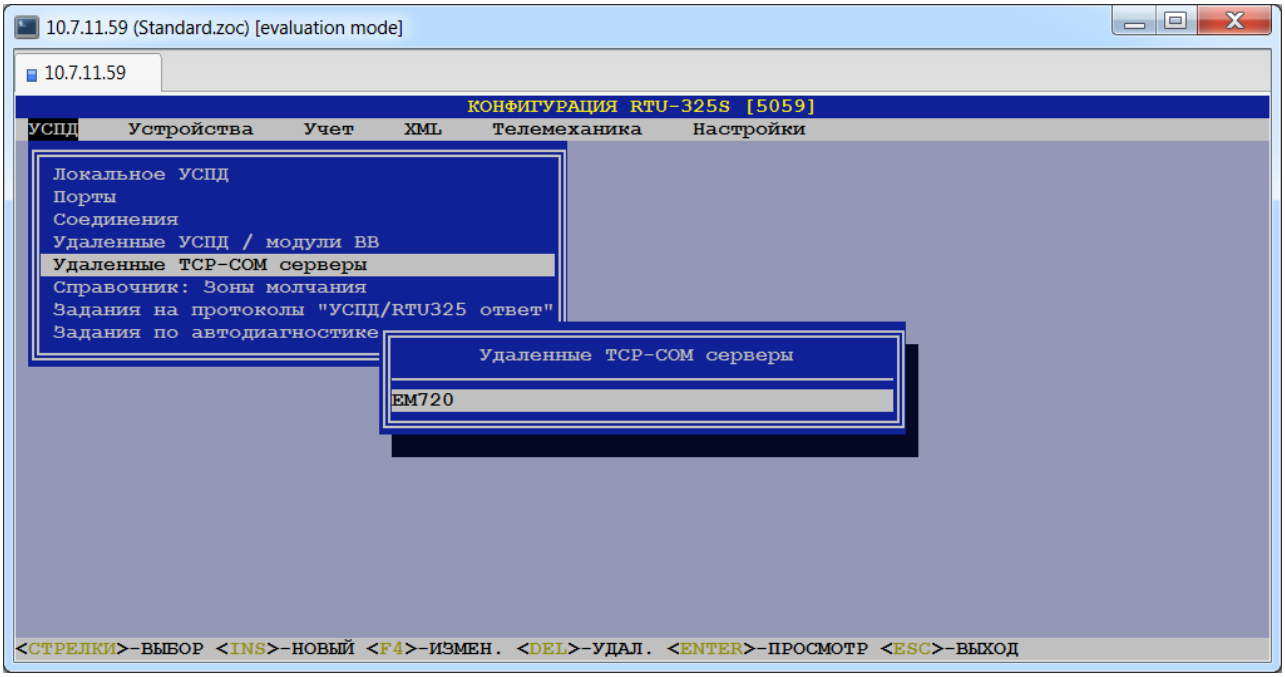
8. Identify the operation of remote TCP-COM servers in the cascade and link them to connections.

(Check item «УСПД» > «Удалённые TCP-COM серверы»)

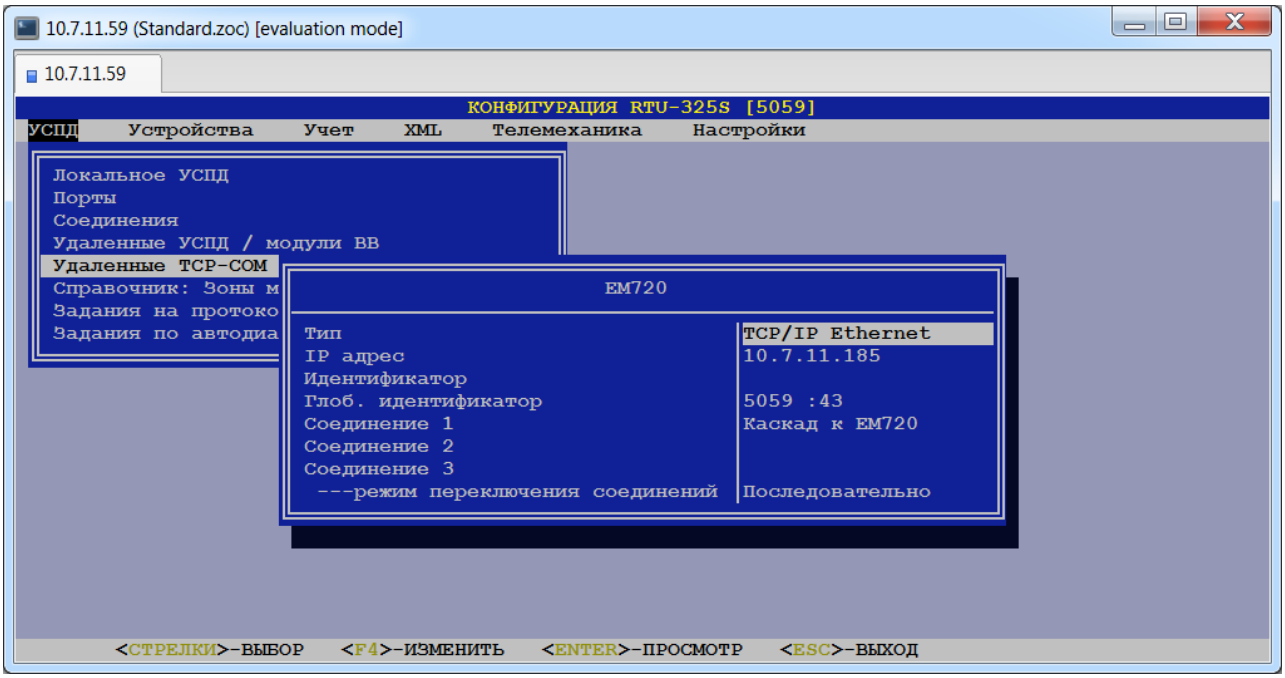
8.1. Definition of remote TCP-COM servers.

(Check item «УСПД» > «Удалённые TCP-COM серверы»)

This menu item fills out a list of deleted TCP-COM servers in the cascade circuit.
The selection of this item will provide a list of the names of the remote TCP-COM servers:



The name of the remote TCP-COM server is defined by the user. Once the required TCP-COM server has been selected, the following form of the TCP-COM server will be submitted to the user for filling in:



- **Type.**
  Permissible values: {«TCP/IP Ethernet», «Сервер TCP/COM-порт»} (to be determined in The menu item «Настройки» > «Типы УСПД»). Plant: «TCP/IP Ethernet» . used to identify the TCP-COM server model and its protocol accordingly.

- **IP address.**

Data type: integers in the X.X.X.X. template, where X is an integer in the range [0 ... 255]. If a remote RTU has multiple IP addresses, the <Enter> key will provide the user with a table to enter the second and subsequent addresses.

- **Identifier.**

Data Type: Text Line. This parameter is used only for the TCP-COM type «Шлюз E-422» server and requires an Identifier to be assigned as: "E422".

- **Global identifier.**

The way the global identifier is presented and edited depends on the settings in the «Настройки» > «Вид глобального идентификатора» menu item.

- **Combination 1.**
- **Combination 2.**
- **Combination 3.**

These paragraphs are the connections of group 1 of table «Соединения удалённого TCP-COM сервера» .

To enter/correct the value of this option, the user must open any of these points (see the bottom-up clue). A table «Соединения удалённого TCP-COM сервера» shall appear on the screen.

«Соединение 1» in each group has the highest priority 1 and must necessarily be determined.

«Соединение 2» has priority 2. «Соединение 3» has priority 3 and is filled in only when «Соединение 2» is completed.

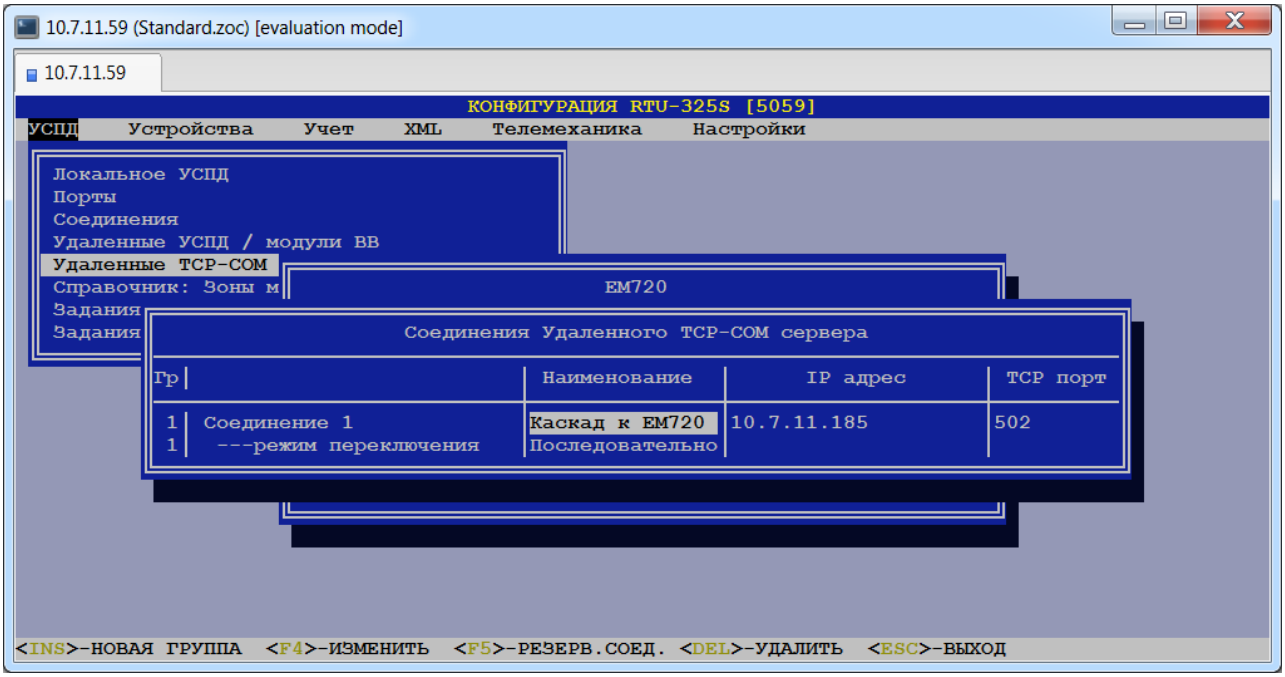
The number of groups of connections shall be equal to the number of consecutive TCP/IP-COM server ports used if one type of meter is connected to each port. If different types of meters are connected to a serial port, a group of connections for each type of meter must be created.

Each group of connections corresponds to a specific serial port of the TCP/IP-COM server and has to have an IP address and TCP port within «Соединение 1» (connect to the relevant protocol).

For example, if single-type meters are connected to one COM-port of the TCP/COM-port server, one group of connections with the relevant protocol should be created for them.

If two different types of meters are connected to one COM-port of the TCP/COM-port, two groups of connections, each with a protocol, should be established. And so on.

In table «Соединения удалённого TCP-COM сервера», the following fields are filled:



- Name(s).
  It's selected from the list of connections.
- **IP address.**

Selects from the IP list of addresses defined in the IP table the addresses of this remote TCP-COM server (paragraph «УСПД» > «Удалённые TCP-COM сервера» > > "IP адрес").

- **TCP port.**
  Data type: whole number.

. **----------**

When using back-up connections (completed paragraphs «Соединение 2», «Соединение 3»), the user shall select the switching mode from the following list:

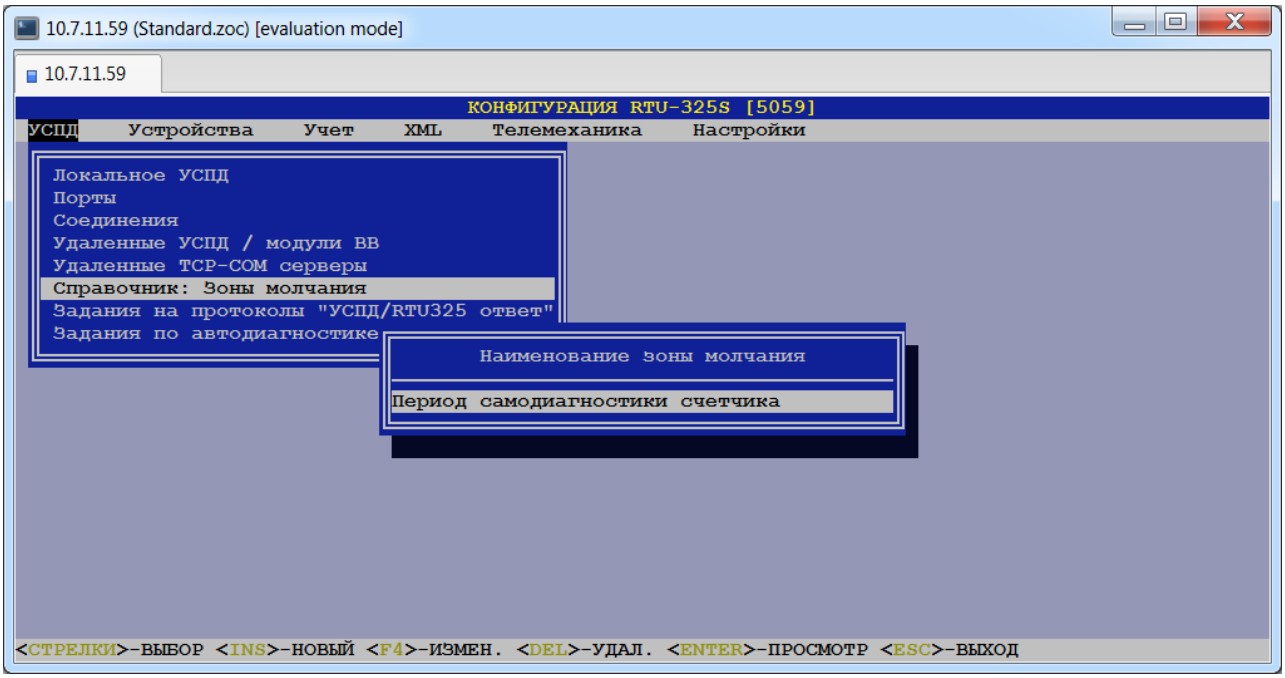
• Consistently. In this mode, RTU starts a communication session with remote RTU on connection «Соединение 1». In the absence of a connection, RTU attempts to hold a communication session on connection with a lower priority, etc. before connection «Соединение 3». The first successful connection found becomes operational for all subsequent communication sessions. If there is no connection for all connections, this communication session is considered to be unsuccessful, and the next communication session is conducted according to the order for the metering, starting with the connection «Соединение 1».

• Priority. In this mode, RTU starts a communication session with remote RTU on connection «Соединение 1» . In the absence of a connection, RTU attempts to hold a communication session on connection with a lower priority, etc. before connection «Соединение 3» . The first successful connection found becomes operational only for the current communication session. Regardless of the outcome of the previous communication session, the next communication session is conducted according to the task of interviewing the meter, starting with the connection «Соединение 1» .

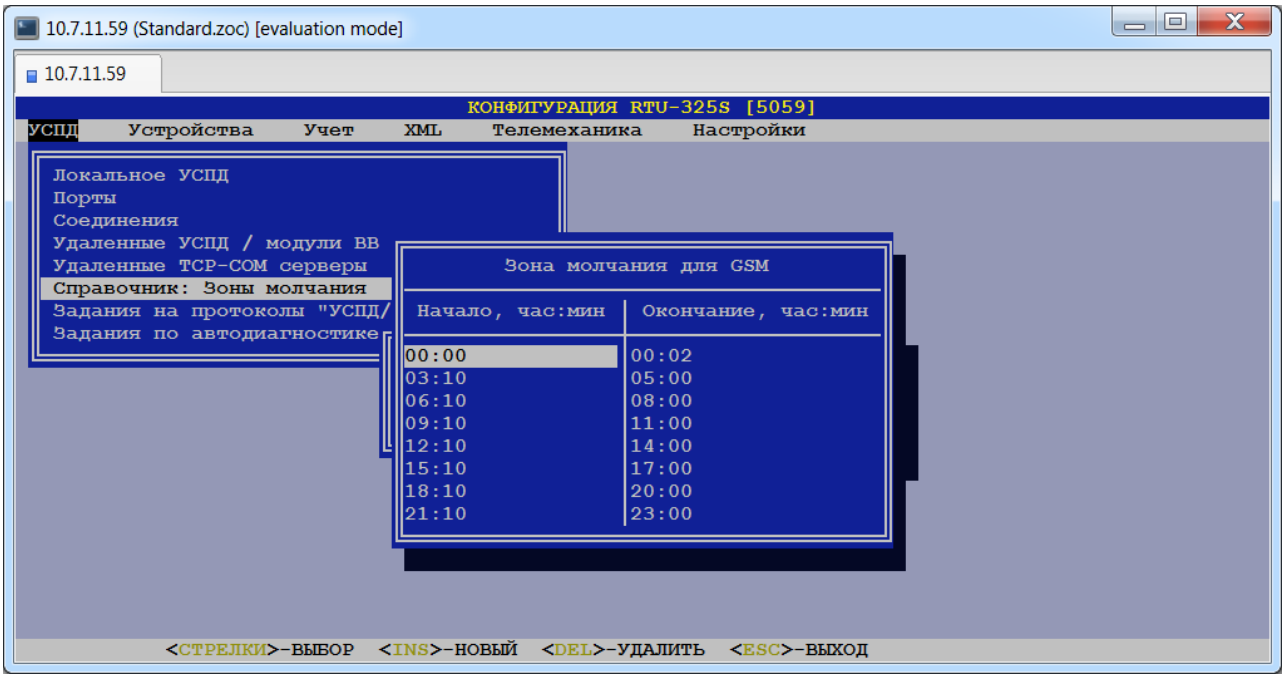
9. Definition of the list of silence zones RTU.

(Check item «УСПД» > «Справочник: Зоны молчания»)

In this menu item, the user can specify a list of the RTU silence areas to be included in any RTU tasks:



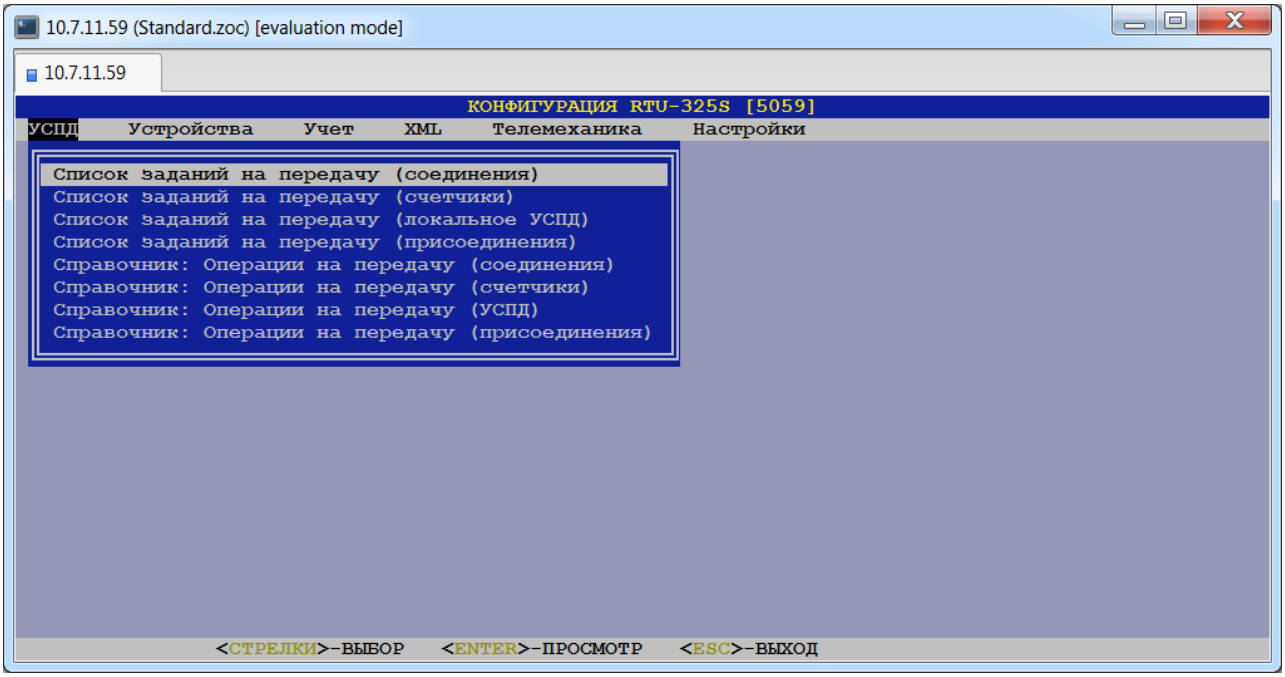
Silence zones are periods of time during the day when the RTU does not work with remote RTUs, i.e. does not perform a list of operations in the task if the task specifies these silence zones. The time limits of the silent zone are set in hours and minutes. If the end of the silent zone is 23:59, then the RTU actually sets the time 23:59:59 (by the end of the day). In other cases, the clock and minute set is perceived RTU exactly, i.e. time 10:32 means 10:32:00:



10. Restricting access to RTU data.

(Check item «УСПД» > «Задания на протоколы "УСПД/ RTU325 ответ"»)

This paragraph defines the transmission tasks (filters) to limit access by external systems under the private protocol «УСПД ответ» / «RTU-325 ответ» .



If the transmission task for a specific component of the system (connect, meter, local RTU, accession) is not defined, any requested type of information for that component of the system is permitted to be transferred to the top-level communication protocol.

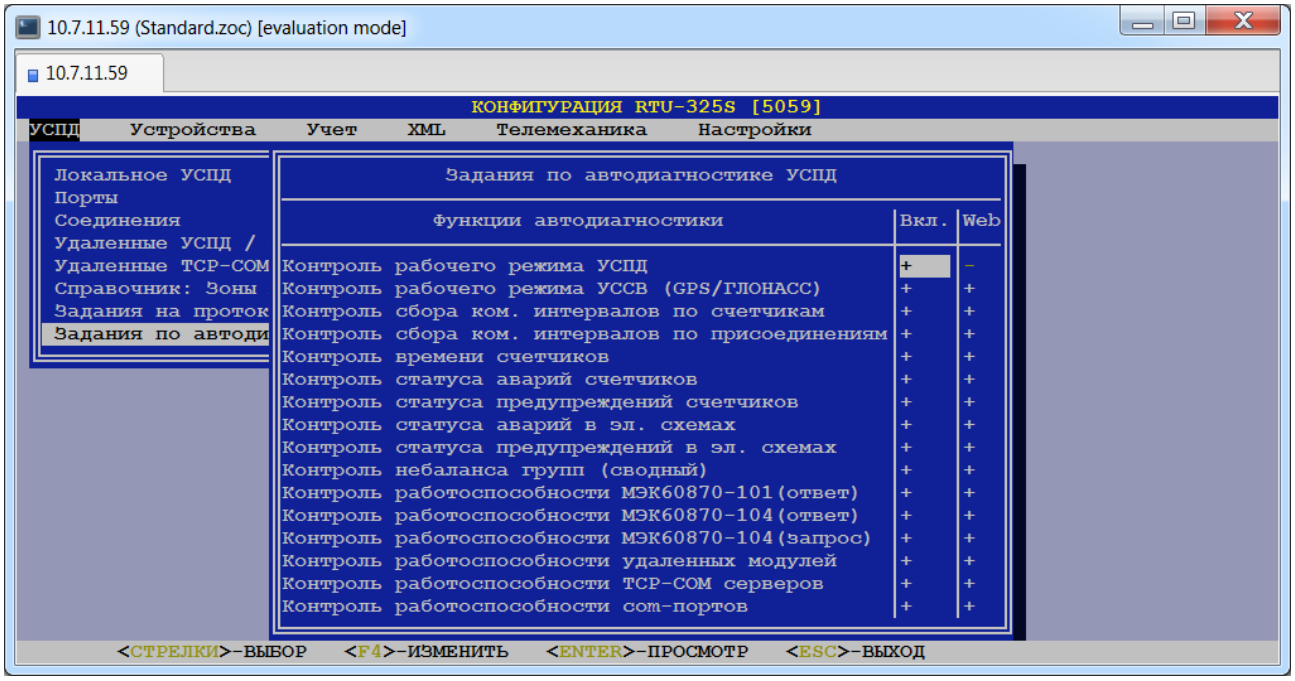
If the transmission task for a specific component of the system (connect, meter, local RTU, accession) is defined, the transmission of the requested type of information will be permitted or prohibited according to the configuration of the task.

11. Definition of RTU auto-diagnosis tasks.

(Check item «УСПД» > «Задания по автодиагностике УСПД»)

In this menu item, the user can select the required automatic RTU diagnostics from the list presented, identify the necessary parameters for the tasks and provide a display of the results with the tools of the built-in web interface RTU.

In selecting this item, the menu will present a list of auto-diagnosis functions:



For each function, two fields must be reconfigured: «Вкл.» and «Web» . For field «Вкл.» the sign '+' - function is active, the sign '-' - function is not working. For the field «Web» sign '+' - the output of the function will be displayed by an integrated Web server, the sign '-' - function is not shown.

A list of configuration parameters will appear when selecting a specific function. The following parameters are present in the list of parameters of all functions:

- **The connection.**
  In order to produce the output of this function in the form of a digital output, the user must select a connection from the proposed list for which the digital output is controlled.
- **digital output.**
  Data type: whole number. Plant: 0.

  In order to produce the output of this function in the form of a digital output, the user must give a serial number of the digital output.

For each required function, the two parameters described above and the following parameters shall be completed:

1) Control of the RTU operating mode.

- **The connection.**
- **digital output.**
- **Time of the output signal, sec.**
  Data type: whole number. Plant: 4.

  Determines the frequency of flashing of the output signal.

2) Control of the operating mode of the ESS (GPS/GLONASS).

- **The connection.**
- **digital output.**
- **Allowable time for inactivity of the SMS, sec.**
  Data type: whole number. Plant: 0.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Allowable time of failure of PPS of SMS, sec**
  Data type: whole number. Plant: 10.

  Exceeding this parameter results in a signal «Предупреждение» .

3) Monitoring the collection of commercial intervals by meter.

- **The connection.**
- **digital output.**
- **It's time to be late, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:00:00.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Checking the meter.**
  Allowable values: {«Выкл.», «Вкл.»}. Plant: «Выкл.» .

  The sign is "Screw." - monitoring the collection on all the metering units.
  Sign 'Vcl' is the monitoring of the collection by number of meters specified in "Количество счётчиков" (see below).
- **Number of meters.**
  Data type: whole number. Plant: 0.

  It's set if there's a sign of 'Cl' in the preceding paragraph.

4) Monitoring of the collection of commercial accession intervals.

- **The connection.**
- **digital output.**
- **It's time to be late, sec.**
  Data type: whole number. Plant: 0.

  Exceeding this parameter results in a signal «Предупреждение» .

5) Checking time.

- **The connection.**
- **digital output.**
- **Allowable reconciliation of meter time with RTU, sec.**
  Data type: whole number. Plant: 0.

  Exceeding this parameter results in a signal «Предупреждение» .

6) Checking the meter crash status.

- **The connection.**
- **digital output.**

7) Checking the meter alert status.

- **The connection.**
- **digital output.**

8) Checking the status of accidents in electrical circuits.

- **The connection.**
- **digital output.**

9) Control of alert status in electrical circuits.

- **The connection.**
- **digital output.**

10) Control of group imbalances (cumulative).

- **The connection.**
- **digital output.**
- **The calculation period, one hour:minus.**
  Permissible values: {«00:00», «00:30», «01:00», «01:30», «02:00», «03:00», «04:00», «06:00», «08:00», «12:00», «24:00»}. Plant: «00:30»

  The period of calculation of the group imbalance. It has to be a commercial interval.

11) Inspection of the performance of IEC 60870 (responses).

- **The connection.**
- **digital output.**
- **Allowable time off, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:00:30.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Allowable time of absence, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:02:00.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Number of non-working responding connections.**
  Data type: whole number. Plant: 0.

  The target number of non-working connections will not be taken into account in the output of this function.

12) The operation control of IEC 60870-104 (request).

- **The connection.**
- **digital output.**
- **Allowable time off, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:00:30.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Allowable time of absence, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:02:00.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Number of non-working requesting connections 60870-5-104.**
  Data type: whole number. Plant: 0.

  The target number of non-working connections will not be taken into account in the output of this function.

13) Checking the functionality of remote modules.

- **The connection.**
- **digital output.**

- **Allowable time off, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:00:30.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Number of non-working remote modules.**
  Data type: whole number. Plant: 0.

  This parameter determines the number of non-working remote modules.

14) TCP-COM server functionality control.

- **The connection.**
- **digital output.**
- **Allowable time off, ch:mm:ss.**
  Data Type: Text Line in PM:MM:SS. Plant: 00:00:30.

  Exceeding this parameter results in a signal «Предупреждение» .
- **Number of non-working TCP-COM servers.**
  Data type: whole number. Plant: 0.

  This parameter defines the number of non-working TCP-COM servers.

15) Checking comport performance.

- **The connection.**
- **digital output.**

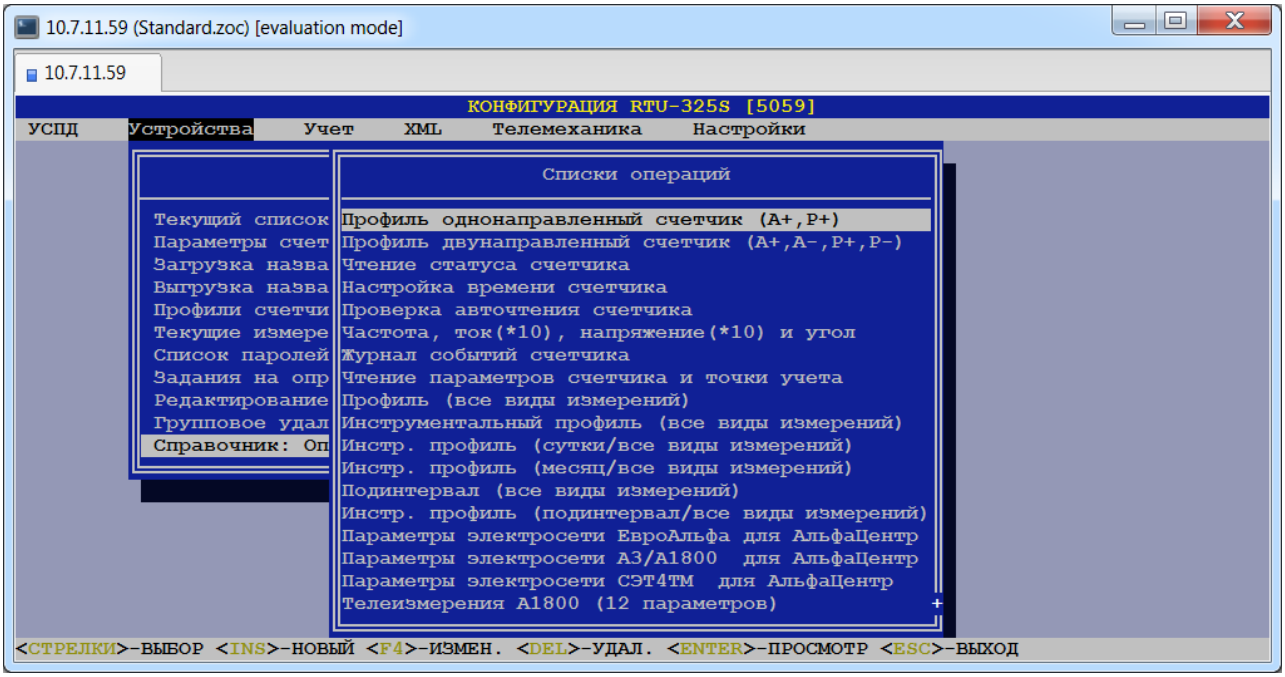
12. Determination of the electrical energy meters and their connection to the connections.

(Check item «Устройства» > «Счётчики электроэнергии»)

12.1. Viewing/correcting/deposing the list of electric energy meters.

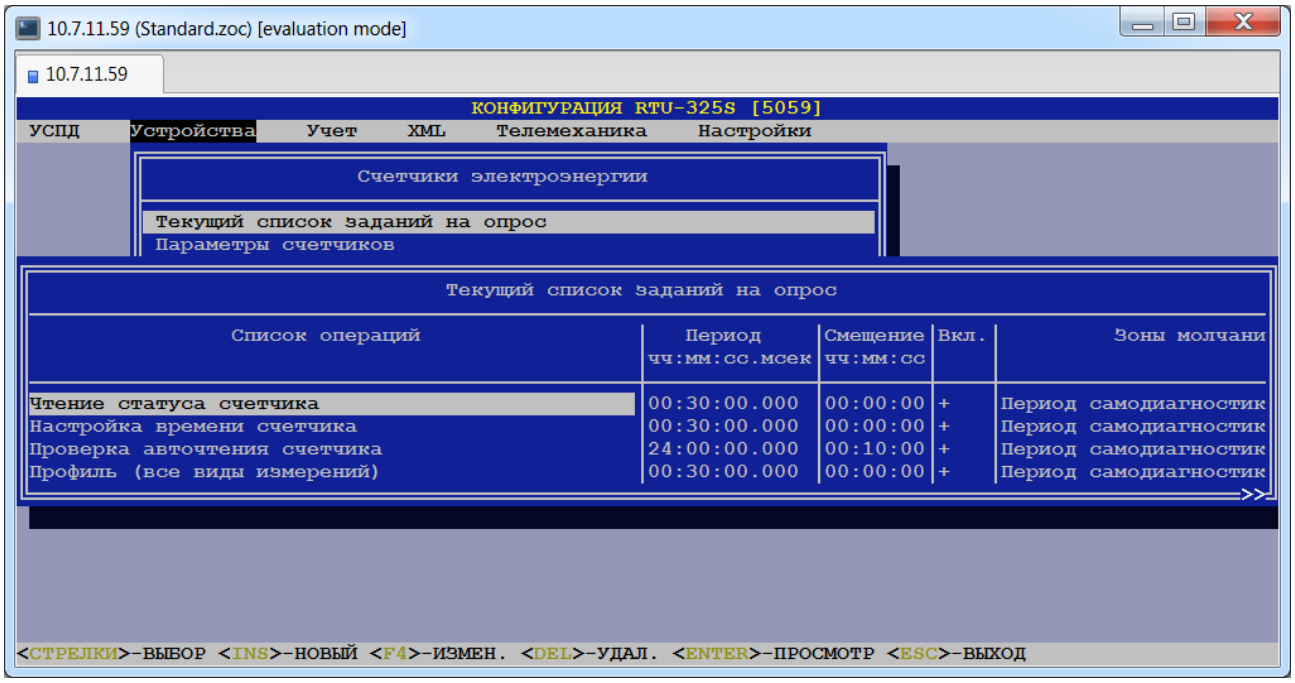
(Chart item «Устройства» > «Счётчики электроэнергии» > «Справочник: Операции счётчиков»)

In this menu paragraph, the user can edit, enter a new or delete the existing transaction list.



12.2. Definition of the current list of polling assignments. (Chart item «Устройства» > «Счётчики электроэнергии» > «Текущий список заданий на опрос»)

In this menu item, the user can edit the current list for the meter interview:



If connections are used to interview external devices and these tasks are sufficient to work, the list of tasks in this paragraph should be empty (the user needs to remove the tasks from the current list).

If connections are used to interview external devices, but individual tasks are required for several devices, the following solutions are possible:

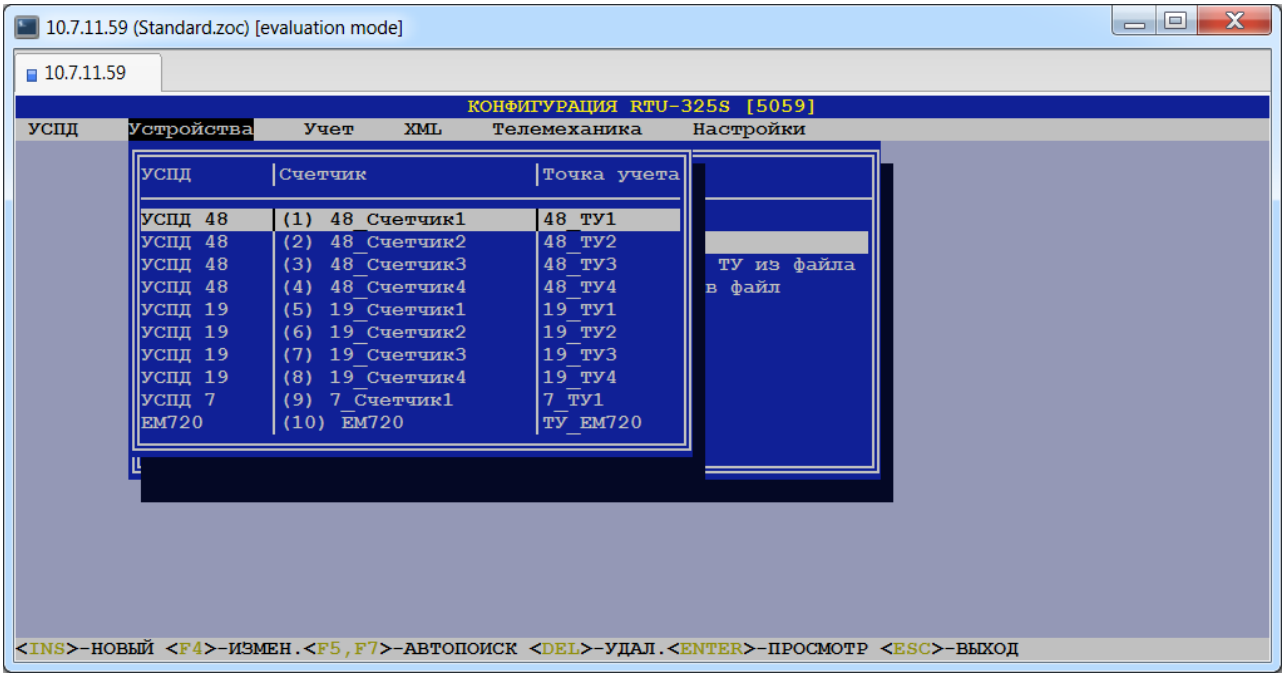
1. Immediately before these devices are introduced, configuration «Текущий список заданий на опрос» for these devices. The current list will be automatically assigned later to each newly entered meter.
2. If these devices are already in place, individual tasks may be introduced/ corrected in «Задания на опрос счётчиков».

Attention: If connection and task tasks are used to polling the device
A device interview, then all operations will be performed on both missions. If the operation is to be excluded from the list of connection tasks for the device, the operation with the sign '-' (a sign 'Vcl' in the request for a polling) should be included in the list of tasks for interviewing the device. If no connection tasks are used, this paragraph shall be completed before the devices are introduced.

12.3. Entering the meter and its parameters.

(Chart item «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков»)

In this menu item, the user should enter the meter into the general meter table:



The general table of the meters indicates the connection of the meter to a specific RTU (relevant to cascade circuites) and the location of the meter at the metering point.

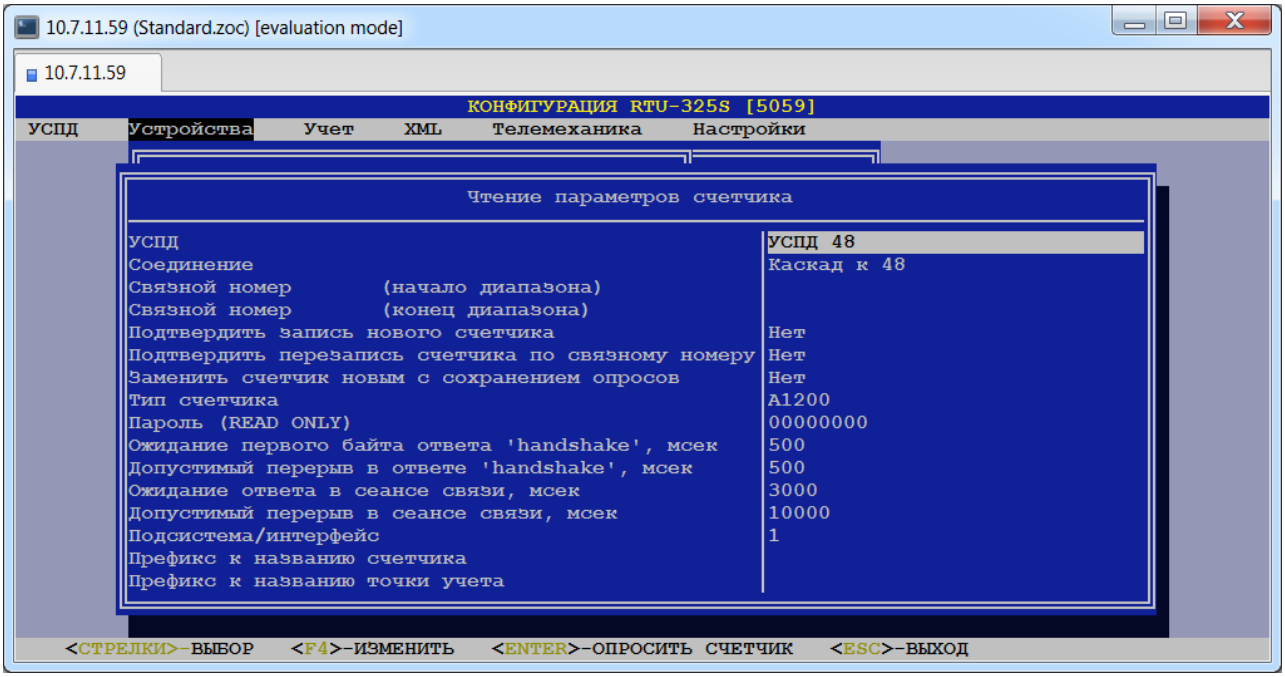
At this level, the user can perform the following actions:

- **Run auto search on the meter (connected to local RTU).**
- **Add a new meter.**
- **View/change meter settings.**
- **Change the name of the meter.**

· Remove meter. The list of keys by which actions are performed is shown below the screen.

12.3.1. Auto search for the meter.

The search for the meter is performed by clicking on the <F5> key. The parameter table for the search for the meter in the specified range of contact numbers will be provided:



The following is a description of the parameters of this table:

- **RTU.**

In this paragraph, the user should select from the proposed list a local RTU or TCP/IP-COM converter.

- **The connection.**

In this paragraph, the user must select the required connection to the selected RTU.

- **Contact number (beginning range).**
- **Contact number (end of range).**

Data type: whole number. In these points, the user must give the contact numbers of the start and end of the search range.

- **Confirm the recording of the new meter.**

Allowable values: «Да» or «Нет» . Plant: «Нет» . If this parameter is used, «Нет» will be recorded in archives without a request for confirmation.

- **Confirm re-recording of the contact number meter.**

Allowable values: «Да» or «Нет» . The plant: «Нет» . If this parameter «Нет» is used, the existing meter (with the same contact number) will be re-recorded into the archives without requesting confirmation.

- **Replace the meter with a new one with the preservation of the interview.**

Allowable values: «Да» or «Нет» . Plant: «Нет» . If this parameter is used, «Да» will be requested to replace the existing meter found by the meter. Interviews of the existing meter will be saved for the new meter found.

- **The type of meter.**

In this paragraph, the user must choose the type of meter. The auto search must be performed for each type of meter separately.

- **Code (READ ONLY).**

Data Type: A string of symbols. Plant: «00000000» . In this paragraph, the user must give a password to establish a connection to the meter.

- **Waiting for the first byte response 'handshake', msek.**

Data type: whole number. Plant: 500. This parameter represents time time of timeout while waiting for the first byte of the meter response after the package is delivered «who are you» .

Recommendation: The default value is 0.5 sec (500 milliseconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Allowable break in response 'handshake', msek.**

Data type: whole number. Plant: 500. This parameter represents time of timeout in the middle of the meter response package to the package «who are you».

Recommendation: The default value is 0.5 sec (500 milliseconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Waiting for an answer in the communication session, msek.**

Data type: whole number. Plant: 3,000. This parameter represents time-time while waiting for the first byte response from the meter after the package is delivered.

Recommendation: default pre-set value 3 seconds (3,000 milliseconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Allowable break in communication, msek.**

  Data type: whole number. Plant: 10,000. This parameter represents time-time in the middle of the response package from the meter.

Recommendation: default pre-set 10 seconds (10,000 milliseconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

After the package is delivered, RTU awaits the return package heading, which determines the size of the rest of the package. If the first byte of the answer was received and then there was a pause between the bytes that exceeded this parameter, there was a time-out of waiting for the full package and the answer was considered to be wrong with an additional error code 250 - «Неполный пакет» (in the case of an erroneous first byte of the answer - it should be STX - error code 22).

- **Subsystem/interface.**

  Data type: whole number. Plant: 1.

In multiple digital interfaces, electricity meters are a unique identifier of the digital interface. If the meter is connected to one RTU on two interfaces (e.g. one interface is data collection for commercial electricity accounting and the other one is telemeasured), two meters with the same manufacturer number and different subsystem values should be positioned in the RTU.

In heat calculators, it's the number of the heat system.

- **Prefix to the meter name.**

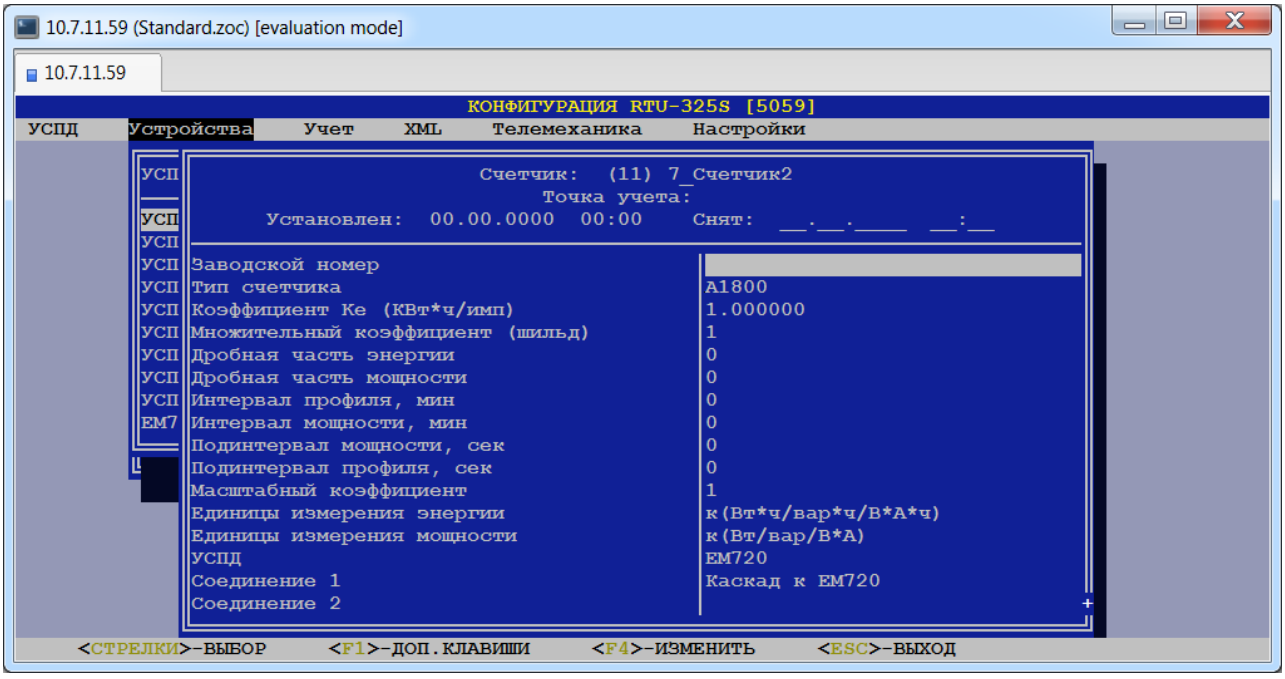
Data Type: A string of symbols. This parameter is designed to be easy to identify the ownership of the RTU and modules. The user ' s prefix will be added to the beginning of the name of each meter found.

- **Prefix to the name of the metering point.**

Data Type: A string of symbols. This parameter is designed to be easy to identify the ownership of the RTU and modules. The user ' s prefix will be added to the beginning of the name of each meter found.

12.3.2. Adding a new meter.

To enter a new meter, you need to press the key <Ins>. This will result in the user being provided with a form to fill in the parameters of the added meter:



Note: It should be noted that automatic generation of object addresses

The information for the protocols 60870-5-101/104 shall be entered into the RTU configuration. Therefore, it is recommended that the required procedure be followed for the introduction of new metering in the RTU configuration to obtain the appropriate sequence of information object addresses when automatically generated in the future.

12.3.3. View/correct meter parameters.

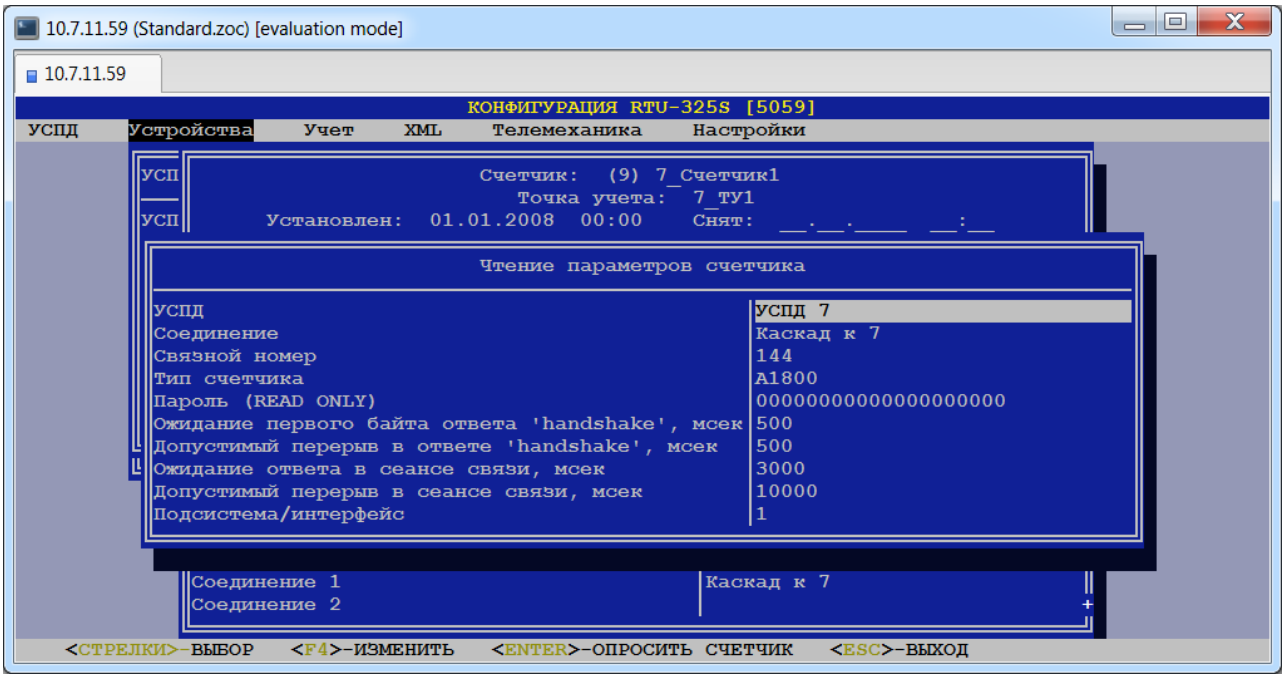
The meter view/correction form will be provided to the user when adding a new meter or when viewing the existing meter on the <Enter> key in the meter list.

The meter parameters can be corrected in two ways:

- Hand-held.
- Automatically. The manual method provides for the normal filling of required fields in the table (not recommended).

The automatic method involves interviewing the parameters directly from the meter itself or reading the parameters from the files of the subordinate RTU, showing their values on the screen by the «Конфигуратор» program and after the user has confirmed that the values are entered in the counterframe. Automatic mode of filling is applicable:

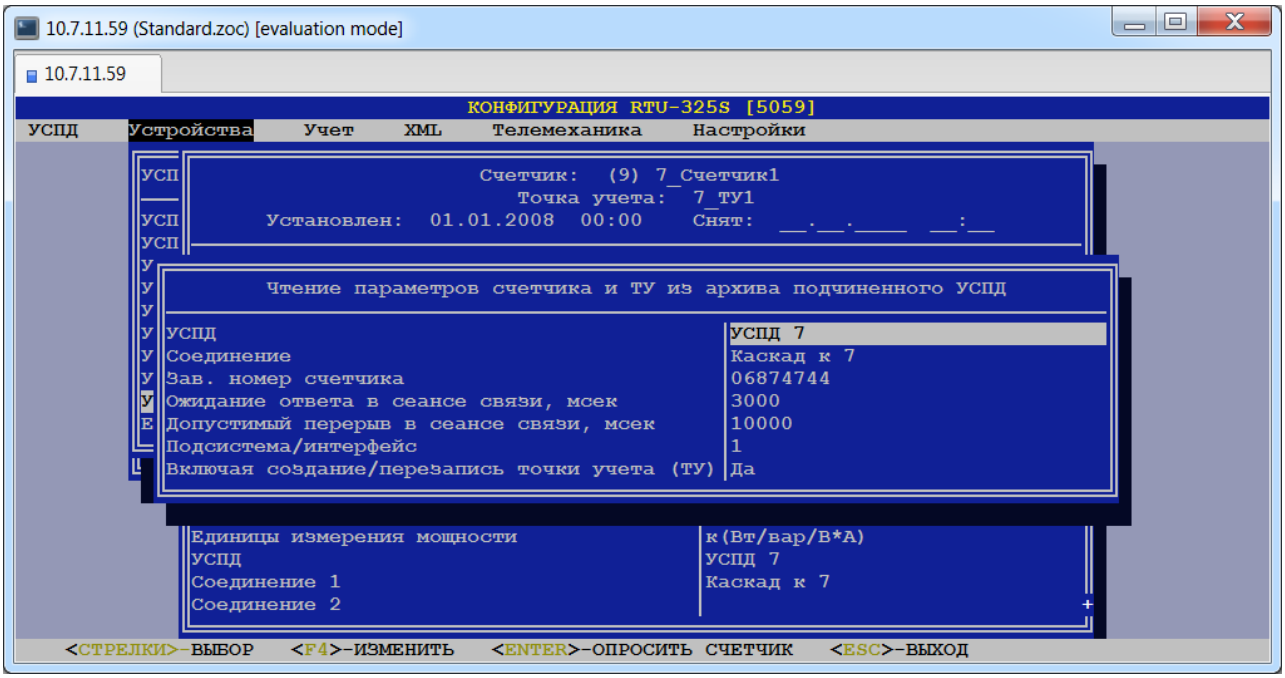
- Local metering connected to this RTU;
- To remote meters connected to a subordinate RTU in cascade circuit. The automatic filling of the local meter is run using the <F5> key. The parameters for reading the meter configuration are similar to those given above for the search:



Attention: For all meters except «Альфа», «Альфа Плюс» and «ЕвроАЛЬФА» In a successful configuration polling, there is a window with a warning that not all parameters from the meter (a fraction of the energy and a fraction of the power) are considered. In the meter window, the parameter values are equal to -1. It's okay, because there's no such thing for this meter. Once the parameters are stored, the parameters `duplicate part of energy' and `duplicate part of power' shall be manually displayed as the required number of characters after the decimal point when this meter is displayed by the RTU software. These parameters do not affect the calculations, but they can set the same accuracy on the meter display and on the RTU display. It is recommended to use the <F7> key (reading the parameters from the RTU archive) to automatically complete the remote meter list.

In exceptional cases, it is possible to interview the parameters directly from the remote meter on the <F6> key. The request is directed to a subordinate RTU, which produces an extraordinary meter link session and returns the required data. This operation takes a lot of time for a subordinate RTU.

To read the remote meter configuration (based on <F6> and <F7>), the user must specify the following parameters:



- **RTU.**

In this paragraph, the user should select from the proposed RTU list to which the meter is connected.

- **The connection.**

In this paragraph, the user must select the required connection to the selected RTU.

- **The plant number of the meter.**
  Data Type: A string of symbols. In this paragraph, the user must give the manufacturer's meter number.

- **meter Type**
  In this paragraph, the user must select the type of meter from the list submitted.

- **Waiting for an answer in the communication session, msek.**

Data type: whole number. Plant: 3,000. This parameter represents time-time while waiting for the first byte response from the meter after the package is delivered.

Recommendation: default pre-set value 3 seconds (3,000 milliseconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

- **Allowable break in the communication session, ms.**
  Data type: whole number. Plant: 10,000. This parameter represents time-time in the middle of the response package from the meter.

Recommendation: default pre-set 10 seconds (10,000 milliseconds).

Step 100 milliseconds (0.1 s). At a given value of not more than 100 milliseconds, it shall be rounded up in the higher direction.

After the package is delivered, RTU awaits the return package heading, which determines the size of the rest of the package. If the first byte of the response was received and then there was a pause between the bytes that exceeded this parameter, there is a timeout waiting for the full package and the answer is considered wrong with the additional error code.

250 - «Неполный пакет» (in the case of an incorrect first byte of the answer - it should be STX - error code 22).

- **Subsystem/interface.**

Data type: whole number. Plant: 1. In multiple digital interfaces, electricity meters are a unique identifier of the digital interface. If the meter is connected to one RTU on two interfaces (e.g. one interface is data collection for commercial electricity accounting and the other one is telemeasured), two meters with the same manufacturer number and different subsystem values should be positioned in the RTU.

In heat calculators, it's the number of the heat system.

- **Including creation/re-recording of the Account Point (TU).**

Allowable values: {«Нет», «Да»}. Plant: «Да» . In this field, the user requires the creation/repeal of the account point.

Recommendation: To minimize input errors in RTU configuration always Use an automatic way to fill in the meter parameters.

Note: the «Эльстер Метроника» output meter password consists of 8 characters. If more than 8 characters are entered in the password field, the extra characters are discarded on the right.

12.3.4. A list of the parameters of the meter.

A list of the parameters of the meter and the comments thereon are given below.

- **The factory room.**

Data Type: A string of symbols. The meter is identified and used in the automatic filling of remote meter parameters on a subordinate RTU. Shall correspond to the markings on the meter body, including the leading digits 0.

Attention: All metering in the system must have unique factory numbers.

- **The type of meter.**

Allowable values: selected from a list of types of meters defined in paragraph The «Настройки» > «Типы счётчиков» menu identifies the type of meter and is used:

- In the operation of automatically filling the remote meter parameters connected to the subordinate RTU.
- To provide a correct meter type list of possible parameters(s) to be recorded in the meter parameter table. Should match the markings on the meter body.

- **K coefficient (kWh/impe).**

Data type: the physical number. Plant: 1,000,000. This factor includes the following:

- The coefficient is large.

• Keyj coefficient. This parameter is the coefficient of the output of the meter profile pulses to the corresponding named value. This value represents the electric energy consumption on the secondary side of the metering transformer on the meters.

Transformative activation and primary electric energy consumption on direct-activation meters.

- **Multiplying factor (shilde).**

Data type: whole number. Plant: 1. The meter readings shall be multiplied by the given factor to determine the true electric energy consumption of the meter. Should match the markings on the meter's shell.

- **A fraction of the energy.**

Data type: whole number. Plant: 0. Determines the position of the decimal point on the meter LIC when the electric energy consumption is indicated.

- **A fraction of power.**

Data type: whole number. Plant: 0. Determines the position of the decimal point on the meter LINE when the power values are indicated at the power interval of the meter.

- **Profile interval, min.**

Data type: whole number. Plant: 0. Determines the load profile interval of the meter.

- **Power interval, min.**

Data type: whole number. Plant: 0. Determines the power interval of the meter.

- **Power exchange, sec.**

Data type: whole number. Plant: 0. Determines a sliding sub-interval of meter power.

- **Profile sub-interview, sec.**

Data type: whole number. Plant: 0. Determines the meter profile sub-interval (accounting for meter reading). RTU can register only one type of sub-interval. At the specified profile sub-interval (more 0) Registration of sub-interval profile in RTU. The power sub-interval shall not be recorded.

- **The coefficient is large.**

Data type: whole number. Plant: 1. It is a large-scale multiplier of the meter profile pulses. It's used to calculate the known values.

- **Units of energy measurement.**

Permissible values: {«а(Вт*ч/вар*ч/В*А*ч)», «ф(Вт*ч/вар*ч/В*А*ч)», «п(Вт*ч/вар*ч/В*А*ч)» «н(Вт*ч/вар*ч/В*А*ч)» , «мк(Вт*ч/вар*ч/В*А*ч)» , «м(Вт*ч/вар*ч/В*А*ч)» , «с(Вт*ч/вар*ч/В*А*ч)» , «д(Вт*ч/вар*ч/В*А*ч)» , «(Вт*ч/вар*ч/В*А*ч)» , «да(Вт*ч/вар*ч/В*А*ч)» , «г(Вт*ч/вар*ч/В*А*ч)» , «к(Вт*ч/вар*ч/В*А*ч)» , «М(Вт*ч/вар*ч/В*А*ч)» , «Г(Вт*ч/вар*ч/В*А*ч)» , «Т(Вт*ч/вар*ч/В*А*ч)» , «П(Вт*ч/вар*ч/В*А*ч)» , «Э(Вт*ч/вар*ч/В*А*ч)» }. Plant: «к(Вт*ч/вар*ч/В*А*ч)» . Determines the units of measurement of electric energy consumption when the meter is taken out on the LIS.

- **Units measuring power.**
  Permissible values: {«а(Вт/вар/В*А)», «ф(Вт/вар/В*А)», «п(Вт/вар/В*А)», «н(Вт/вар/В*А)», «мк(Вт/вар/В*А)» , «м(Вт/вар/В*А)» , «с(Вт/вар/В*А)» , «д(Вт/вар/В*А)» , «(Вт/вар/В*А)» , «да(Вт/вар/В*А)» , «г(Вт/вар/В*А)» , «к(Вт/вар/В*А)» , «М(Вт/вар/В*А)» , «Г(Вт/вар/В*А)» , «Т(Вт/вар/В*А)» , «П(Вт/вар/В*А)» , «Э(Вт/вар/В*А)» }. The plant shall: «к(Вт/вар/В*А)» . Identify units of power measurements when the meter is taken to the LIC.

- **RTU.**

The user should choose from the proposed RTU list to which the meter is connected.

- **Combination 1.**

The user should select from the proposed list the connection on which the meter will be interviewed. This paragraph must be completed. This connection has the highest priority 1.

- **Combination 2.**
  This paragraph is used to determine a back-up connection to priority 2.
- **Combination 3.**

This paragraph is used to determine a back-up connection to priority 3. To be completed only when «Соединение 2» has been completed.

- **----------**

When using back-up connections (completed paragraphs «Соединение 2», «Соединение 3»), the user shall select the switching mode from the following list:

• Consistently. In this mode, RTU will start a communication session with the meters or subordinates of RTU (in cascade circuit) on the connection «Соединение 1» . If there is no connection, RTU will try to conduct a communication session on the connection with a lower priority, etc. before the connection «Соединение 3». The first successful connection found becomes operational for all subsequent communication sessions. If there is no connection for all connections, this communication session is considered to be unsuccessful, and the next communication session is conducted according to the order for the metering, starting with the connection «Соединение 1».

• Priority. In this mode, RTU will start a communication session with the meters or subordinates of RTU (in cascade circuites) on the connection «Соединение 1» . If there is no connection, RTU will try to conduct a communication session on the connection with a lower priority, etc. before the connection «Соединение 3». The first successful connection found becomes operational only for the current communication session. Regardless of the outcome of the previous communication session, the next communication session is conducted according to the task of interviewing the meter, starting with the connection «Соединение 1» .

- **Contact number.**
  Data type: whole number. Checker contact number.

- **The time of the meter, the sec.**

Data type: whole number. Plant: 3. This option represents the time of time of the meter. If a pause occurs during the meter communication session that exceeds the given time, the meter will finish the session and will not respond to further queries.

Recommendation: A default value of 3 seconds.

Step of change of 0.5 sec. At a given value not multiples of 0.5 seconds, it shall be rounded up in the higher direction. The values of less than 3 seconds are perceived as 3 seconds.

- **Records of official archives.**
  Permissible values: «-» (not to be used), «+» (use). Plant: «+» .

- **Global identifier.**

It can be applied to multilevel hierarchical systems for the purpose of unique identification of all accounting objects.

- **Subsystem/interface.**

Data type: whole number. Plant: 1. In multiple digital interfaces, electricity meters are a unique identifier of the digital interface. If the meter is connected to one RTU on two interfaces (e.g. one interface is data collection for commercial electricity accounting and the other one is telemeasured), two meters with the same manufacturer number and different subsystem values should be positioned in the RTU.

In heat calculators, it's the number of the heat system.

- **The number of tariffs.**

Data type: whole number. Plant: 0. Should match the number of tariffs in the meter. If you automatically fill the meter parameters, the value is counted from the meter.

- **The connection pattern.**

Allowable values: {« », «2-проводная», «3-проводная», «4-проводная»}. Plant: « » . For some types of meter, this option may be automatically completed by reading the parameters from the meter.

Parameters "Схема подключения" and "Количество элементов" shall be used to correctly present the parameters of the power grid.

Since this parameter did not exist previously, the value « » is used to support data in legacy systems (e.g., reading cascade data with RTU with old embroidery versions).

- **Number of elements.**

Data type: whole number. Plant: 3. Parameters "Схема подключения" and "Количество элементов" shall be used to correctly present the parameters of the power grid.

- **U conversion factor (high side).**

Data type: the real number. factory default: 1.00000000. This parameter represents the voltage transformation coefficient sewn into the meter. It fills automatically when you read the meter parameters. Used only to transmit data via telemetric protocols (e.g. voltage value (U) on the high side).

- **Conversion factor I (high side).**

Data type: the real number. factory default: 1.00000000. This parameter represents the voltage transformation coefficient sewn into the meter. It fills automatically when you read the meter parameters. Used only for transmitting data via telemetric protocols (e.g., the current value (I) on the high side).

- **The conversion rate is total.**

It is a work of two of the above parameters. It is for information and is not subject to change.

- **Profile A+ (active energy consumed).**
- **Profile A- (active output energy).**
- **Profile P+ (reactive energy consumed).**
- **Profile R- (reactive output energy).**
- **AS profile (active total energy).**
- **PS profile (reactive total energy).**
- **A profile of КВАД-1 (power of the 1st quadrant).**
- **A profile of КВАД-2 (power of the 2nd Quadrant).**
- **A profile of КВАД-3 (power of the 3rd Quadrant).**
- **A profile of КВАД-4 (Quadrant 4 energy).**
- **Profile of P.sum.en. (full total energy).**
- **Profile P.en.+ (full energy consumed).**
- **Profile P.en.- (full output of energy).**
- **Anet profile (active energy (net)).**
- **Pnet profile (reactive energy (net)).**
- **Profile Pq14 (reactive energy (Q1+Q4)).**
- **Profile Pq23 (reactive energy (Q2+Q3)).**
- **Profile Пq1 (full energy (quadrant 1)).**
- **Profile Пq2 (full energy (quadrant 2)).**
- **Profile Пq3 (full energy (quadrant 3).**
- Profile Пq4 (full energy (quadrant 4). The composition of the above parameters "Профиль..." depends on the type of meter. The parameters are marked automatically by the `+' (use) symbol when reading from the meter on the key <F5>. In the future, the user can note the '-' (do not use) profile that is not required to be recorded in the RTU.

12.4. Uploading the name of the meter and/or the TU parameters from the file.

(Chart item «Устройства» > «Счётчики электроэнергии» > «Загрузка названий счётчиков и/или параметров ТУ из файла»)

In this menu item, the user can download the following meter configuration parameters from the external file (parameters 1, 2, 11) and metering points (parameters 3..10):

	Parameter	Data format
1.	Plant number	Whole number
2.	Accountant name	Symbol Line
3.	U1 (U on primary wrapping)	Whole number
4.	U2 (U on secondary wrapping)	Whole number
5.	I1 (I on primary wrapping)	Whole number
6.	I2 (I on secondary wrapping)	Whole number
7.	Date of installation of meter on dd.mm.yyyhh:mm	
8.	Account Point Name	Symbol Line
9.	Account point name (for diagrams)	Symbol Line
10.	Type of account point (for diagrams)	Whole number (0-core, 1-reserve)
11.	Subsystem	Whole number

Before doing so, the user must enter the meters in «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» and copy the completed file to the FTP directory: / update/ FTP client program.

File format description:

- The file should have text format in UTF-8, Windows-1251 or MS-DOS. - Each line in the file corresponds to one meter. - If the first line symbol is «#» or «//», this line is considered a comment and is omitted when processing and displaying the file contents. - In each line the configuration parameters should follow the order given above and be separated by a partitioning symbol;; or '!'.For example, the row may be:

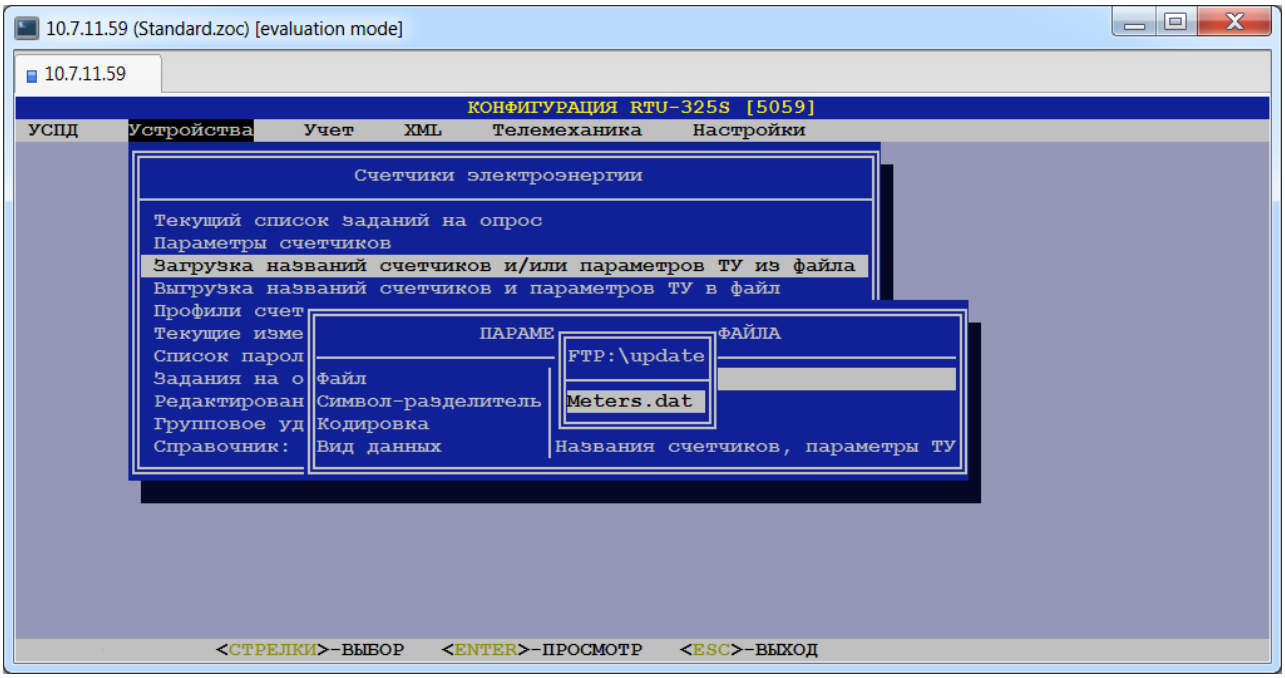
1234567 ; Счетчик1 ; 10000 ; 100 ; 1500 ; 5 ; 1.1.2000 0:0 ; ТУ_Счетчик1 ; ТУ_Сч1 ; 0 ; 1 − Any field may be missing except the name of the meter. If there's no field, just put the field divider symbol. For example, a line might look like:

1234567! Счетчик1! 10000! 100 !!!! ТУ_Счетчик1 !! 1 − The last set parameter in the string of symbol-separators can be dropped. For example, a line might look like:

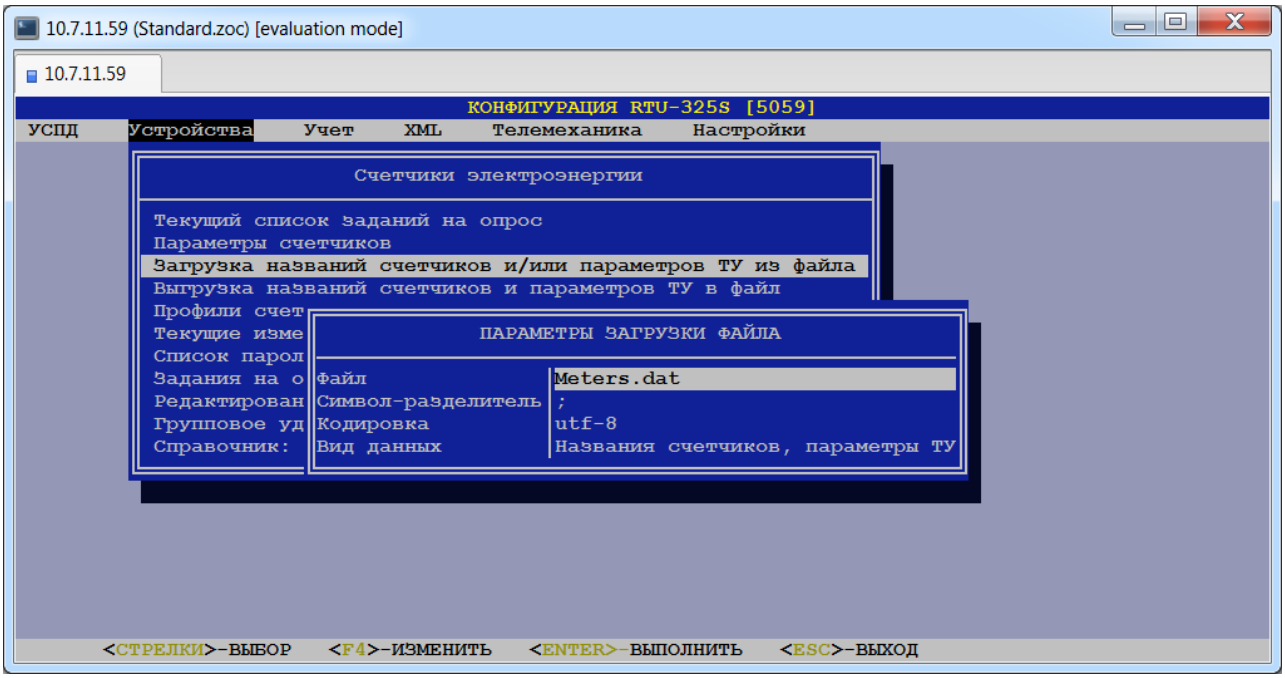
1234567; Compute 1/10000; 100; 1500;5;1.1.2,000 0:0 - The following values will be added instead of missing parameters in the row:

U1 = 1 U2 = 1 I1 = 1 I2 = 1 date of installation of the meter = current time (summer) Name of TO = from the name of the meter Name Name of the TOT (for diagrams) = from the name of TOT Type TOT (for diagrams) = "Основная" Subsystem = 1.

When entering this menu item, the user will be provided with a list of files to select from the FTP directory: /update/:



Once the required file is selected, a table will appear on the screen to assign the downloadable file parameters:



In this table, the user should choose the following download parameters:

- **File.**
  The user selected file will be displayed.
- **A symbol-separation.**

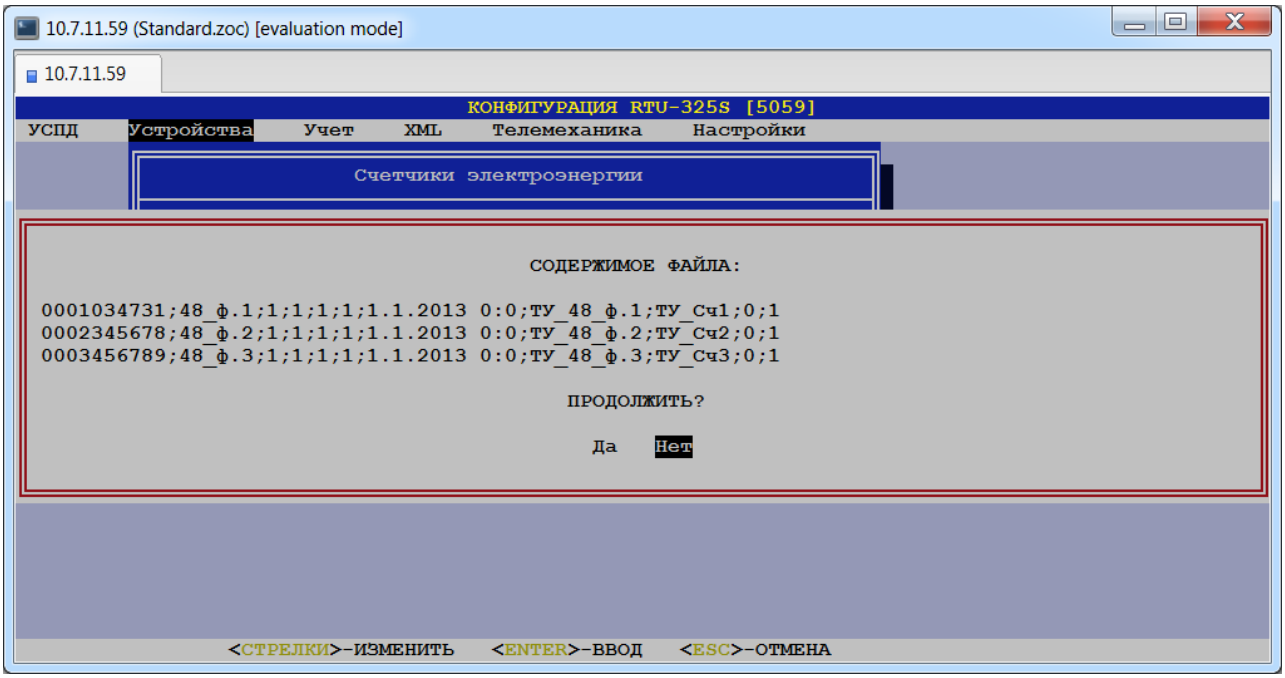
Allowable values: «;» or «!» . In this paragraph the user shall select the partition symbol used to separate fields in the file.

- **Code.**
  Allowable values: {«utf-8», «windows1251», «ms-dos»}. In this paragraph, the user should choose to encode the text file.
- **Data type.**
  Permissible values: {«Названия счётчиков, параметры ТУ», «Названия счётчиков» , «Параметры ТУ» }. Each possible value of this paragraph determines the loading group. In selecting «Названия счётчиков, параметры ТУ», an attempt will be made to read all parameters from 1 to 11.

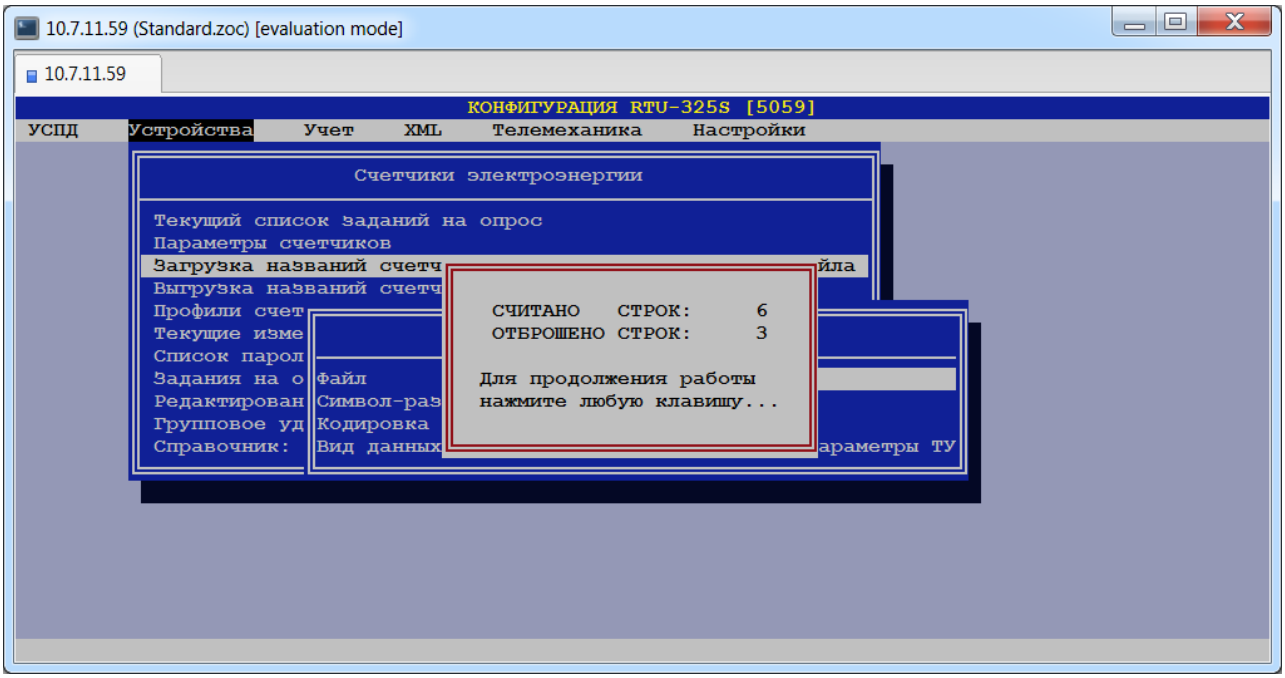
In selecting «Названия счётчиков», only parameters Nos. 1 and 2 will be attempted.
When selecting «Параметры ТУ», only 3 to 10 parameters will be attempted. In this case, the name of the meter may also be missing. For example, a line may be of the following kind:

;; 10000 ; 100 ; 1500 ; 5 ; 1.1.20000:0 ; ТУ_Счетчик1 ; ТУ_Сч1 ; 1

After all the parameters have been completed, the user will be provided with the file content window to confirm the download:

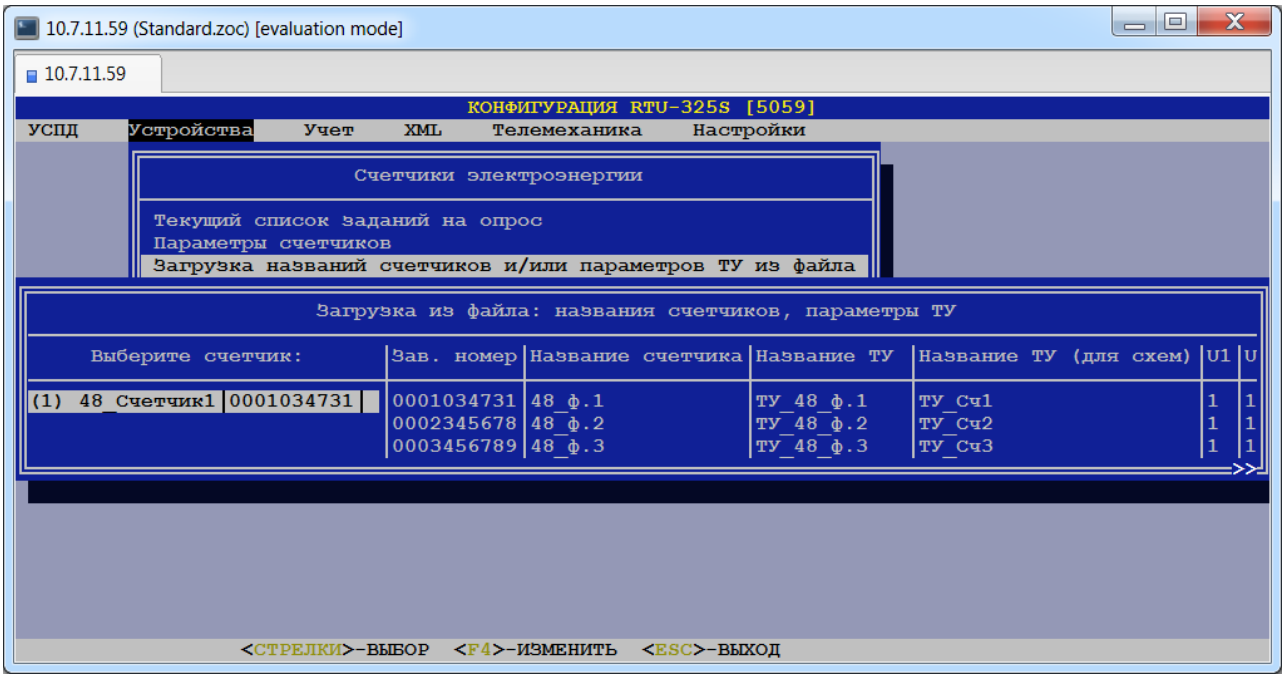


The following message will be issued after the file has been reviewed:

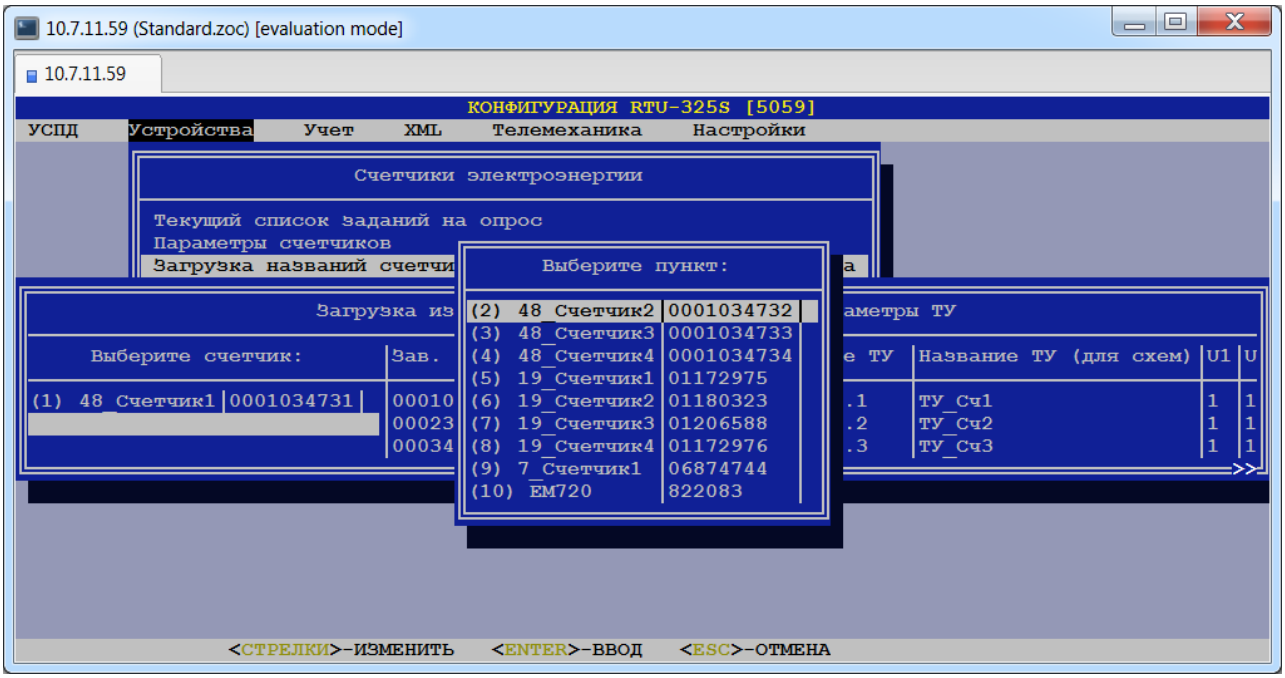


The number of lines counted is the number of lines that were able to be taken to the parameters. Number of lines deleted - number of lines in which errors are made (e.g. missing divider).

The user will then be provided with a table in which the few parameters are aligned with the meter:



If a manufacturer number is given in the meter file, the line will be aligned with the same plant number when the parameters are loaded. If the manufacturer number is missing or the specified manufacturer number is not available in the system, the user must select each line from the file for the appropriate meter:

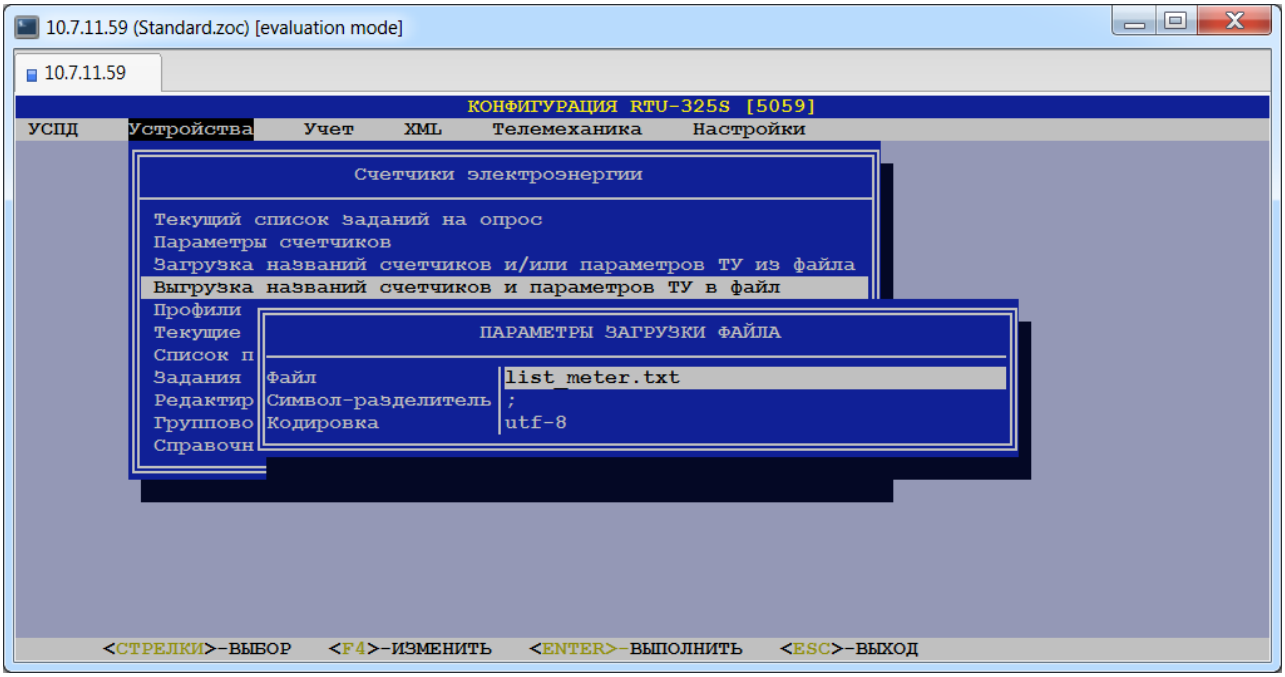


12.5. Unload the meter names and account point parameters to the file.

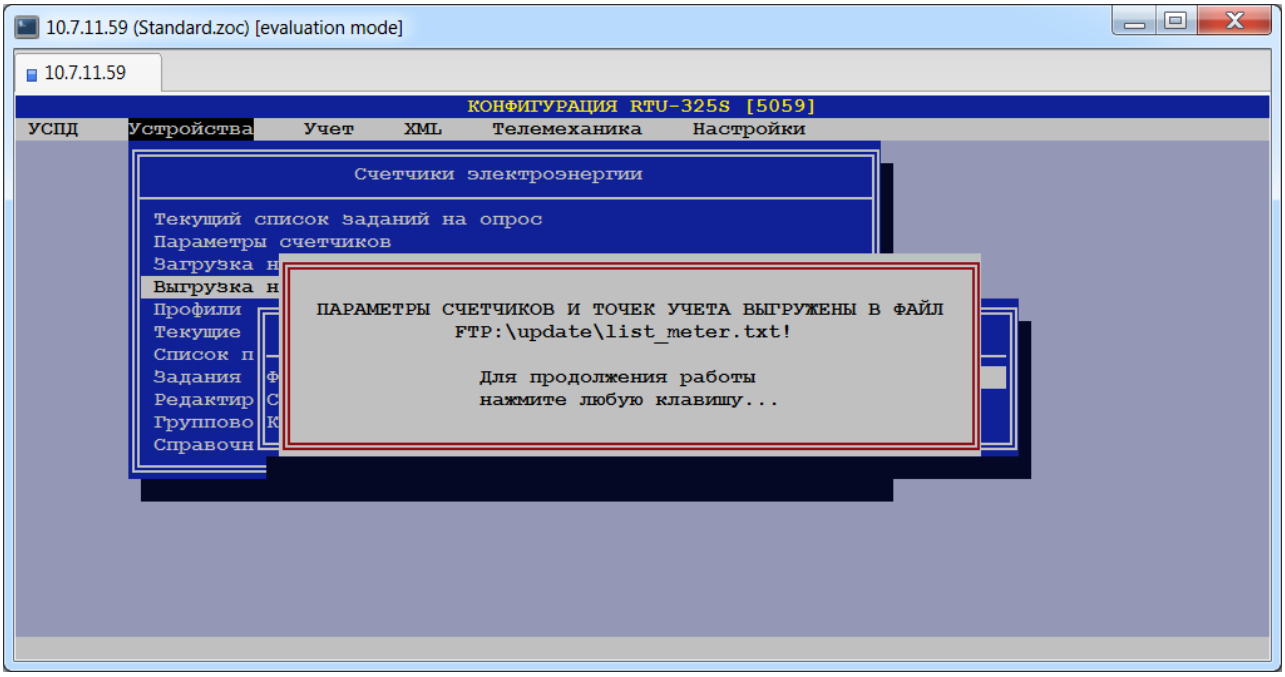
(Chart item «Устройства» > «Счётчики электроэнергии» > «Выгрузка названий счётчиков и параметров ТУ в файл»)

In this menu item, the user can download the meter configuration and account points into the external file.

When selecting this paragraph, the user will be provided with the following form:



The user must enter the file name to save, select the partition symbol and encoding from the proposed lists and press the <Enter> key. Once discharged, a message will appear on the screen:

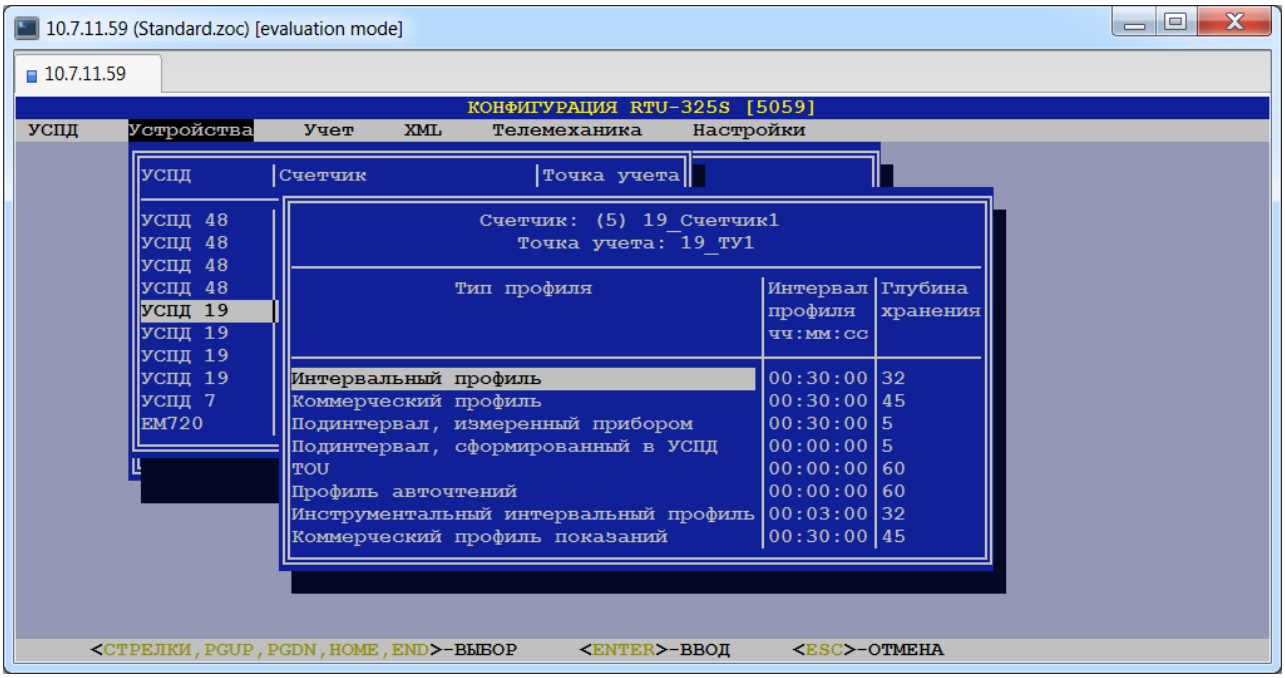


12.6. Checker profile correction.

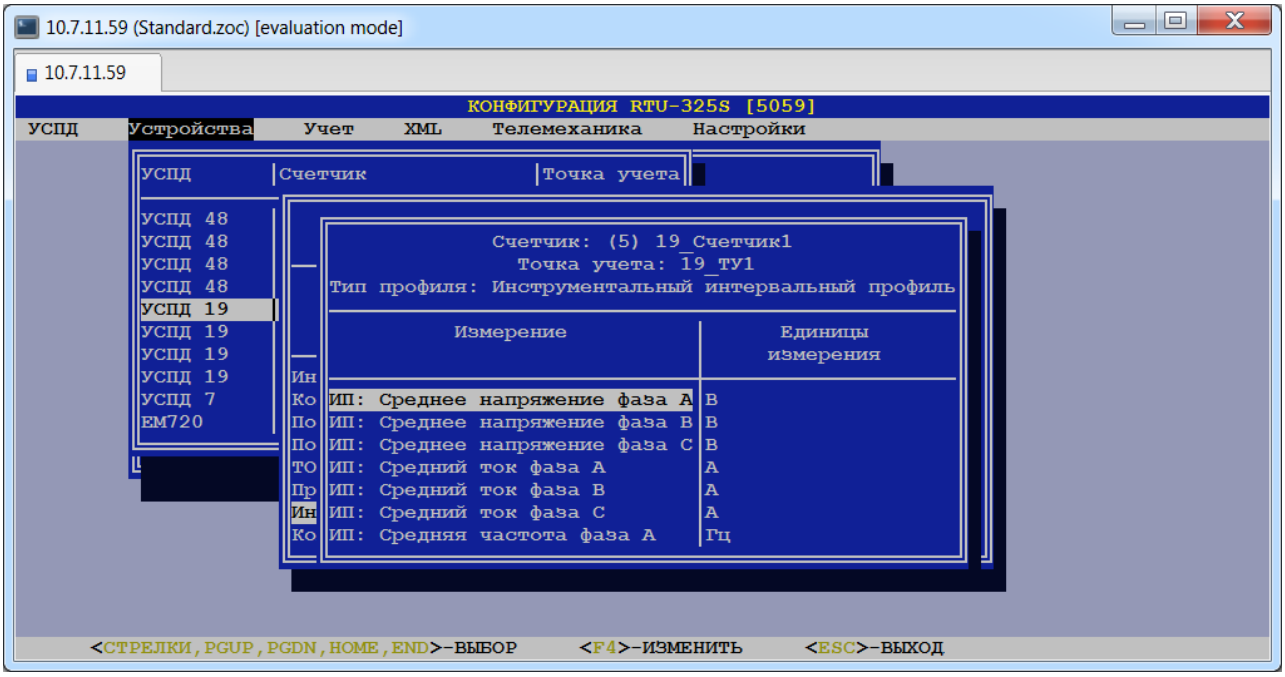
(Chart item «Устройства» > «Счётчики электроэнергии» > «Профили счётчиков»)

This item presents a list of profiles supported by RTU for each meter. This paragraph is for reference. This directory is not supported for remote RTU meters with a software version of 2.x.

When selecting this item and selecting the meter from the list, the user will be provided with the following table:



By selecting the profile type and pressing the <Enter> key, the user can look at the profile's measurement list:

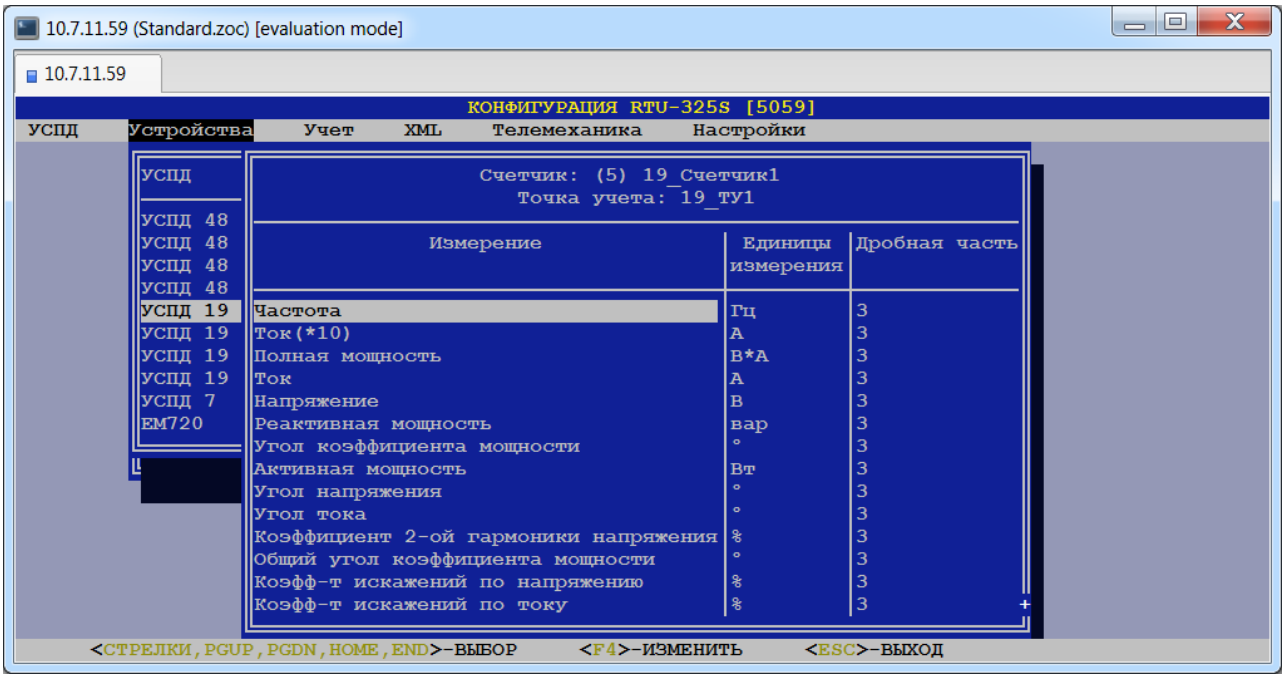


12.7. Correction of current measurements of the meters.

(Chart item «Устройства» > «Счётчики электроэнергии» > «Текущие измерения счётчиков»)

This paragraph presents a list of measurements supported by RTU for each meter. This paragraph is given for reference (only the field "Дробная часть" that is used in the display of the measured values can be corrected). This directory is not supported for remote RTU meters with a software version of 2.x.

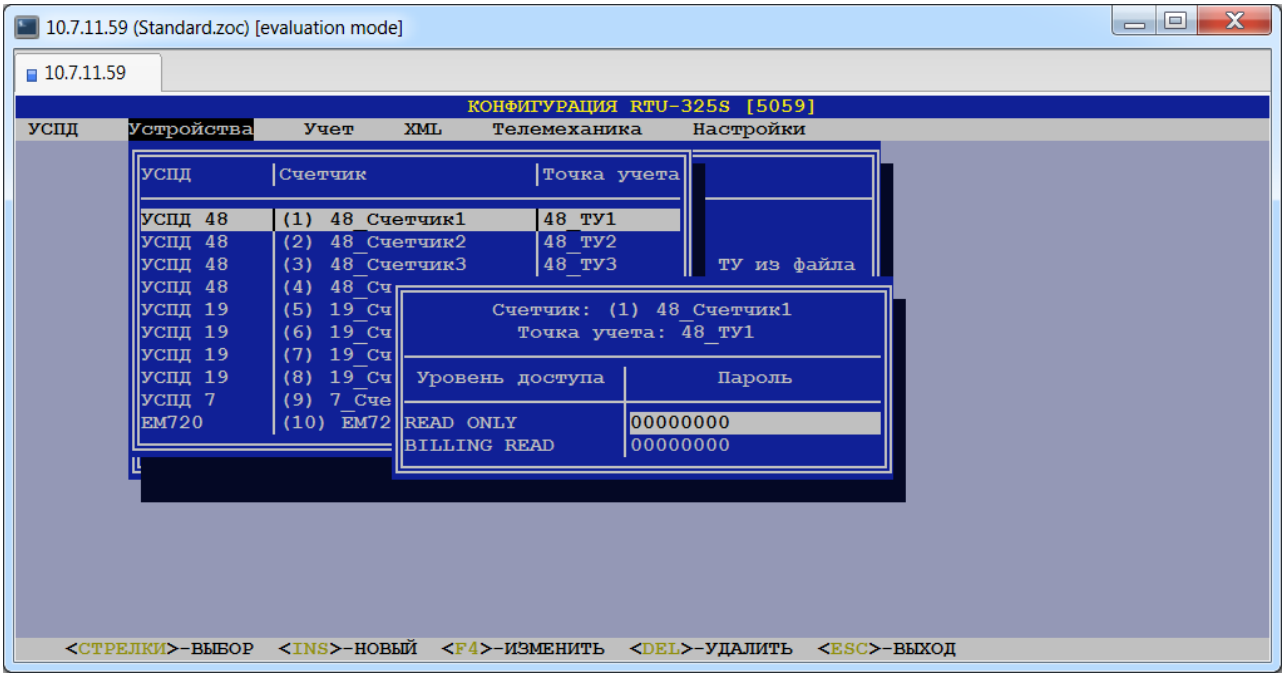
When selecting this item and selecting the meter from the list, the user will be provided with the following table:



12.8. Checker password correction.

(Chart item «Устройства» > «Счётчики электроэнергии» > «Список паролей»)

In this menu item, the user can adjust the meter password list if necessary. The zero-value passwords are automatically assigned to the meter when entered into the system:



Entered passwords will be used in meter communication sessions. The passwords can be reconfigured for two levels of access:

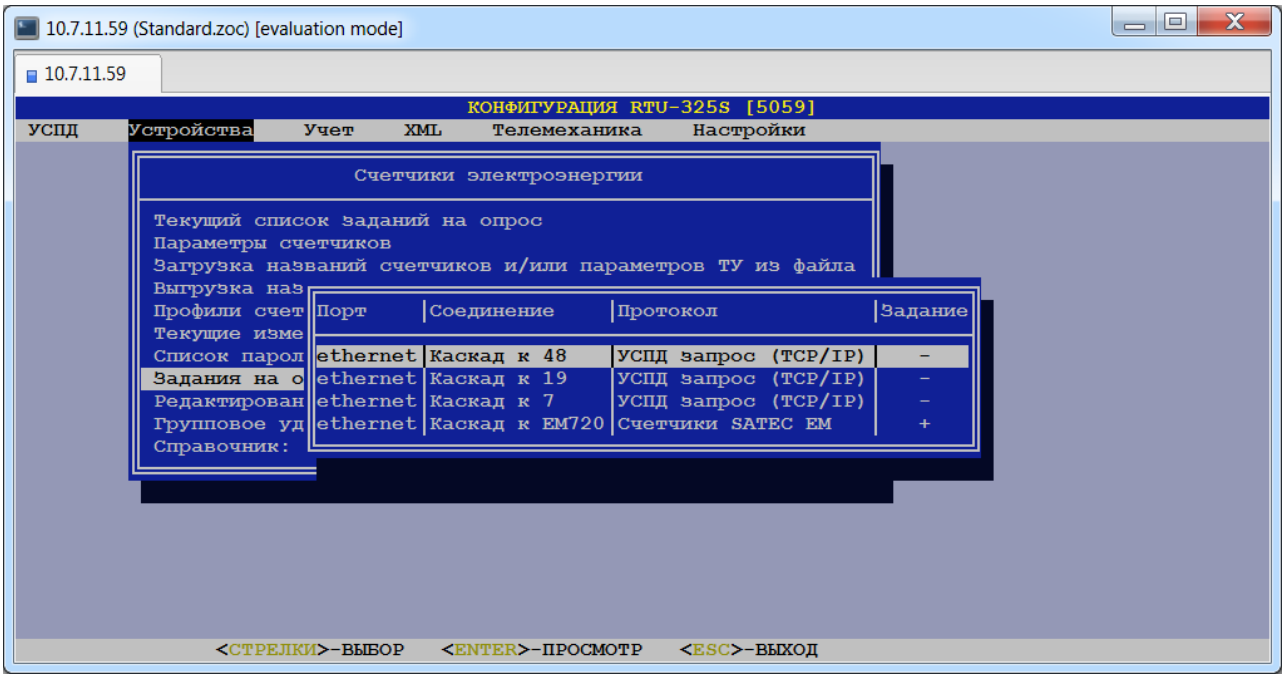
- READ ONLY,
- BILLING READ.

12.9. Correcting the meter interview list.

(Chart item «Устройства» > «Счётчики электроэнергии» > «Задания на опрос счётчиков»)

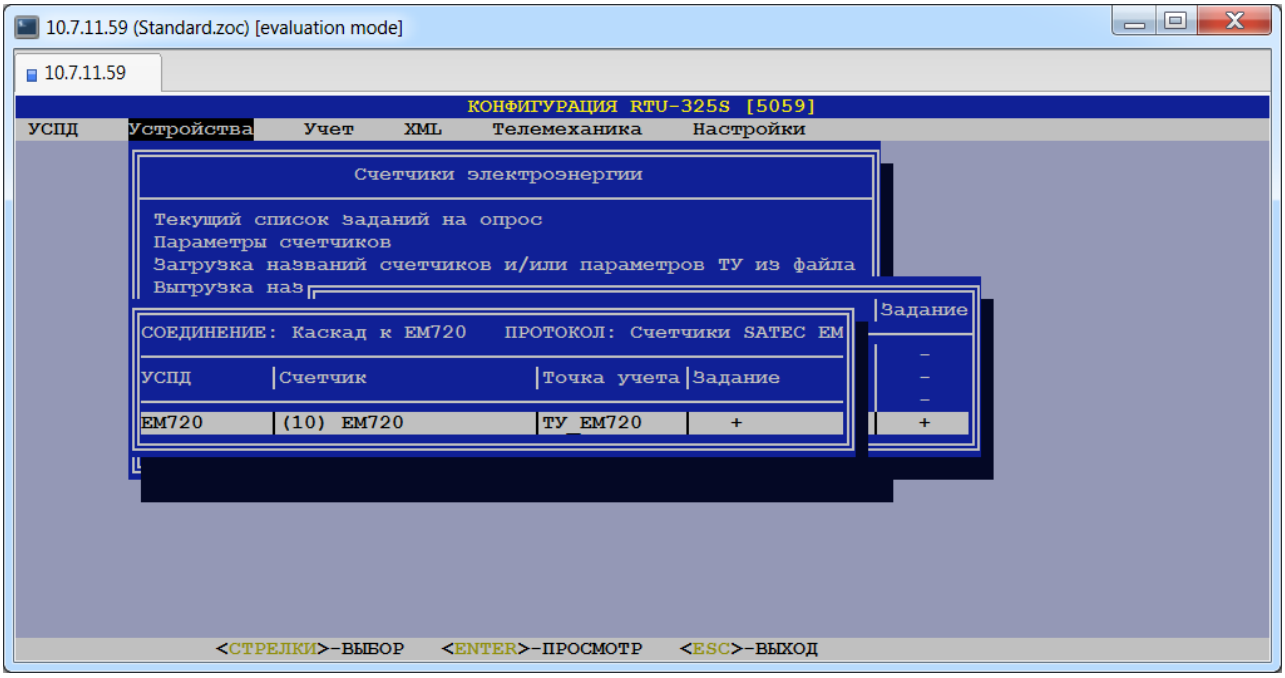
In this menu item, the user can adjust the worklist for the required meter if necessary.

Attention: If connection and task tasks are used to polling the device
A device interview, then all operations will be performed on both missions. If the operation is to be excluded from the connection task list for the device, the operation with the sign '-' (the sign 'Vcl' in the interview) should be included in the device interview list. When selecting this paragraph, the user must select the connection from the list presented:



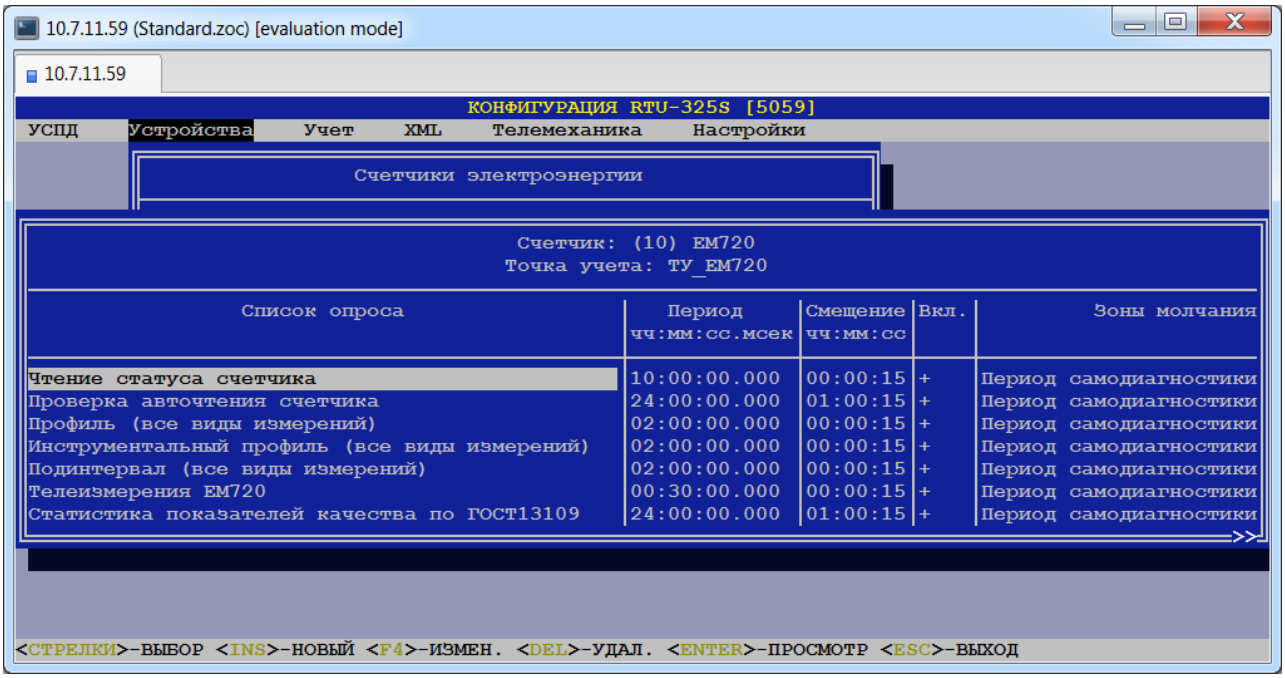
The '+' sign in the 'Team' box means that the device's interview tasks are used for the metering in a given connection.

Once the connection has been selected, a table of the meters on this connection will appear on the screen:



The '+' sign in the 'Team' box means that the device's interview tasks are used for this meter.

Once the meter has been selected, a table of the interview list will appear on the screen:



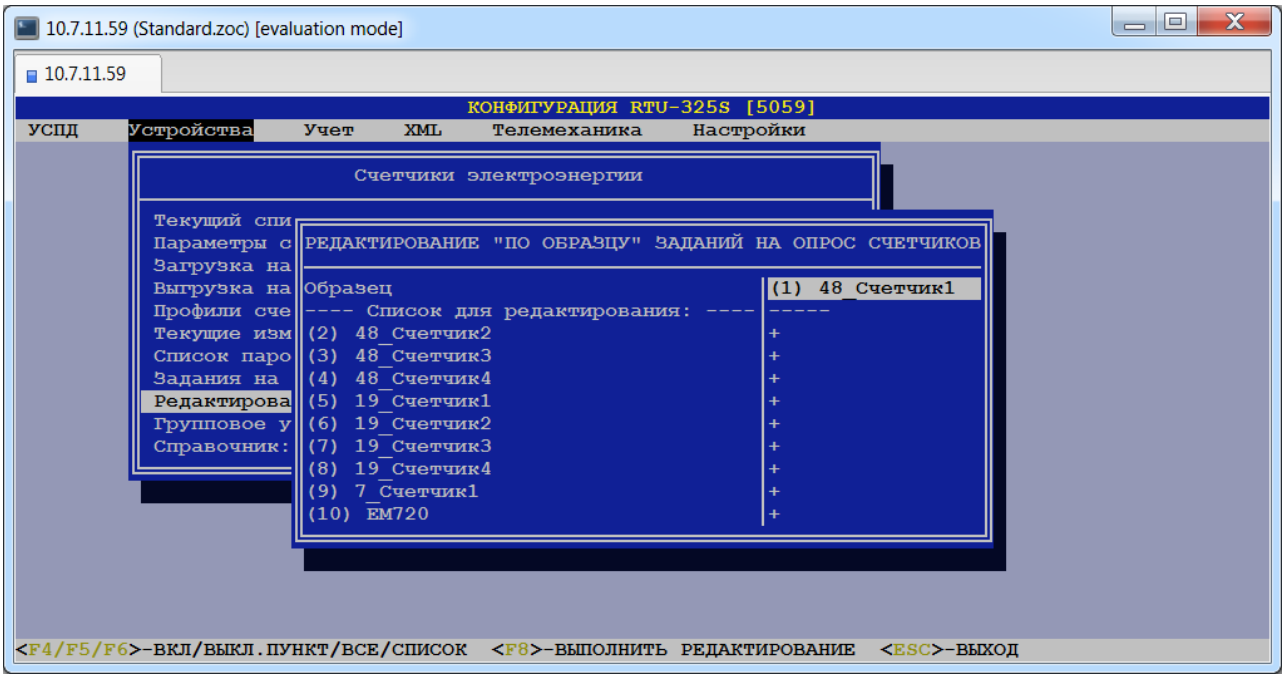
A description of the fields of the table is given in paragraph «УСПД» > «Соединения» > «Задания на соединения» . The difference is that a field "Вкл." has been added. The sign `+' in it means that this task is `on' and RTU will do a question with a given period and a shift. The user can turn off the task from the interview list by selecting the sign '-'. In this case, the task will not be performed.

12.10. Correct the list of tasks for the meter polling for "образцу".

(Chart item «Устройства» > «Счётчики электроэнергии» > «Редактирование заданий "по образцу"»)

In this menu item, the user can specify a list of tasks for the required meters "по образцу" of the selected meter.

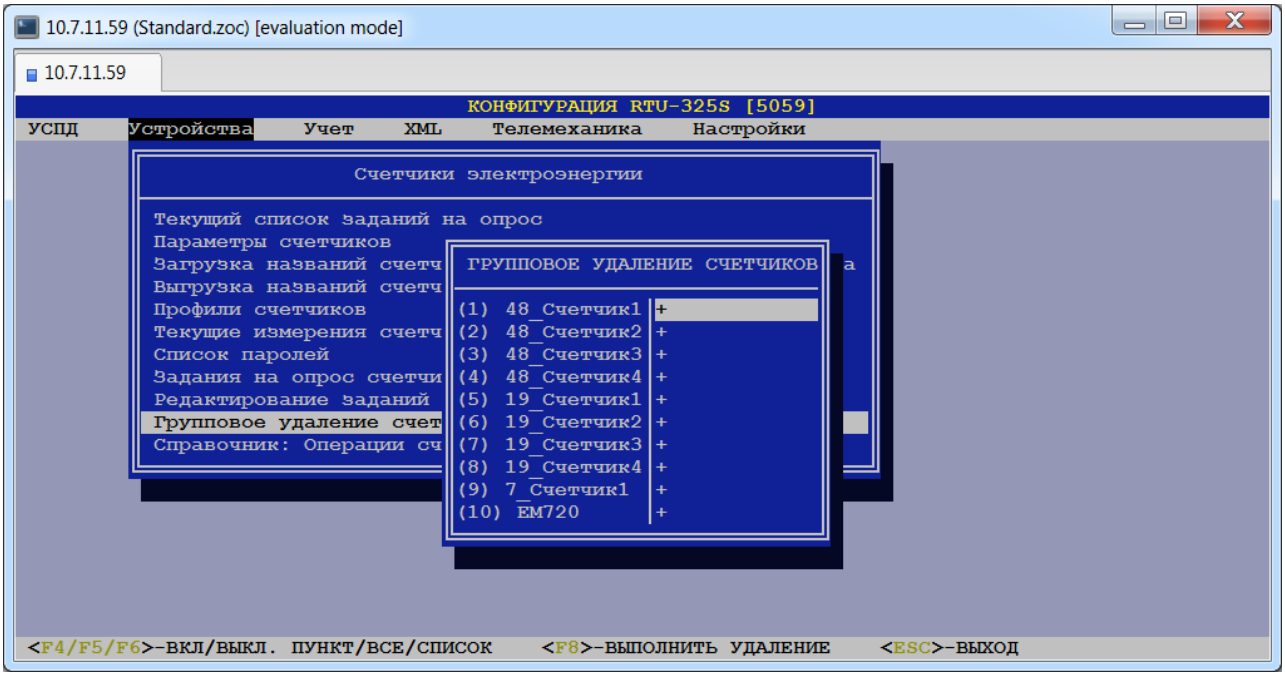
In selecting this item, the user will be asked to select a meter and a list of meters to edit the interview tasks:



12.11. Remove the group of meters.

(Chart item «Устройства» > «Счётчики электроэнергии» > «Групповое удаление счётчиков»)

In this menu item, the user can remove a group of meters by noting the meters that need to be removed by the `+' sign:



13. Determination of heat metering and connection to connections.

(Check item «Устройства» > «Теплосчётчики»)

The algorithm used for heat metering in the RTU is similar to that given in paragraph 12 for electric power meters.

14. Determination of flow meters and their reference to connections.

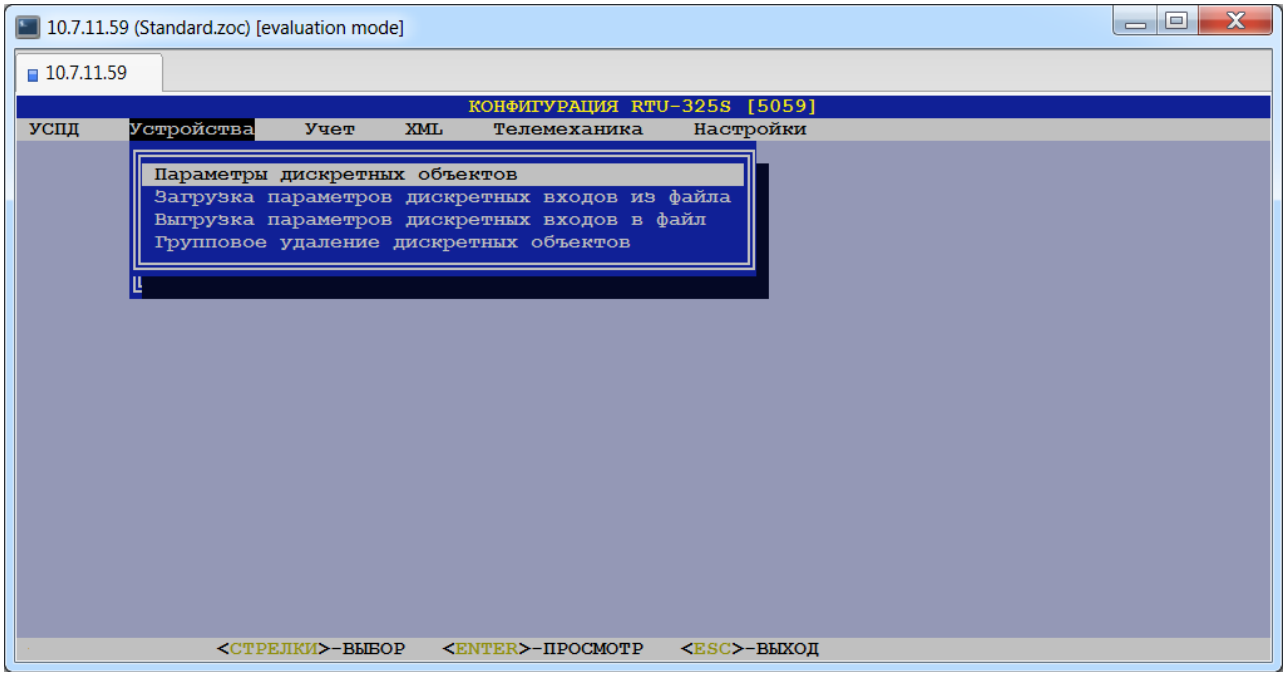
(Check item «Устройства» > «Расходомеры»)

The algorithm of the flow meter input actions in RTU is similar to that given in paragraph 12 for the electric meters.

15. Identify discrete objects and link them to connections.

(Check item «Устройства» > «Дискретные объекты»)

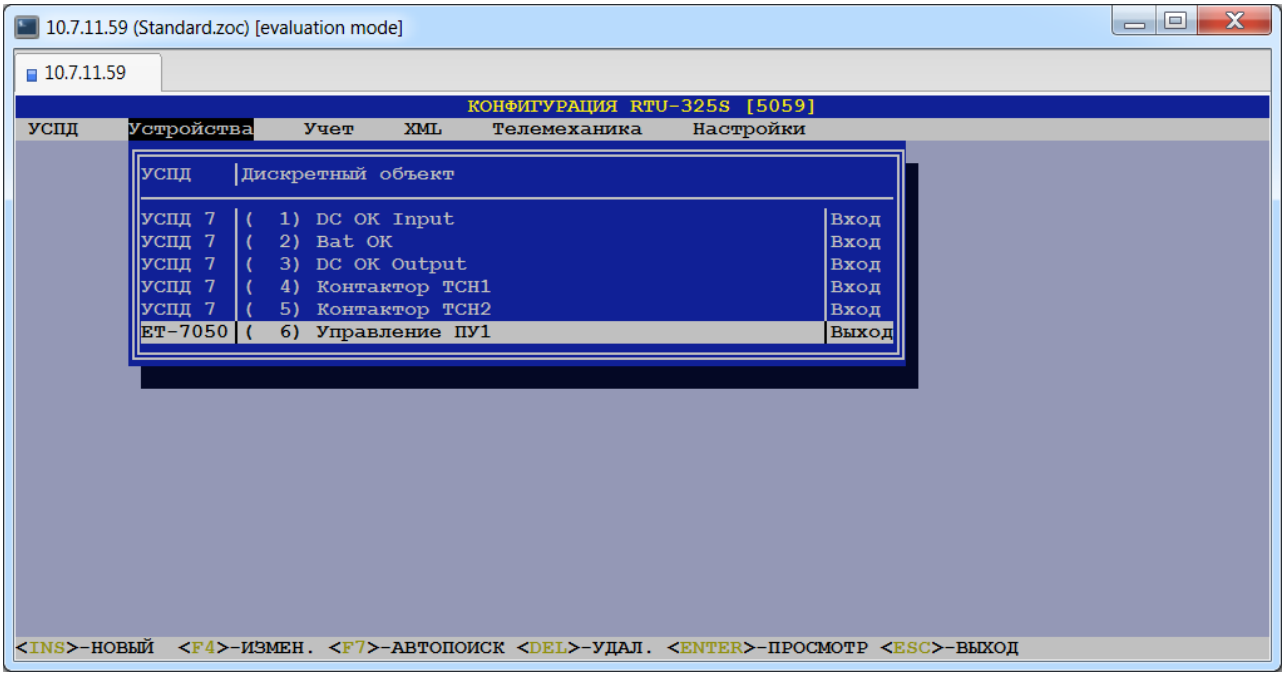
This item is intended to identify a list of discrete RTU objects. In selecting this paragraph, the user will be provided with the following menu for the configuration of discrete objects:



15.1. Creation of discrete objects.

(Chart item «Устройства» > «Дискретные объекты» > «Параметры дискретных объектов»)

When selecting this paragraph, the user will be provided with a table of discrete objects with the possibility of adding new objects or removing existing ones:



Each discrete object in the table has an indication «вход» or «выход» depending on the nature of the discrete object.

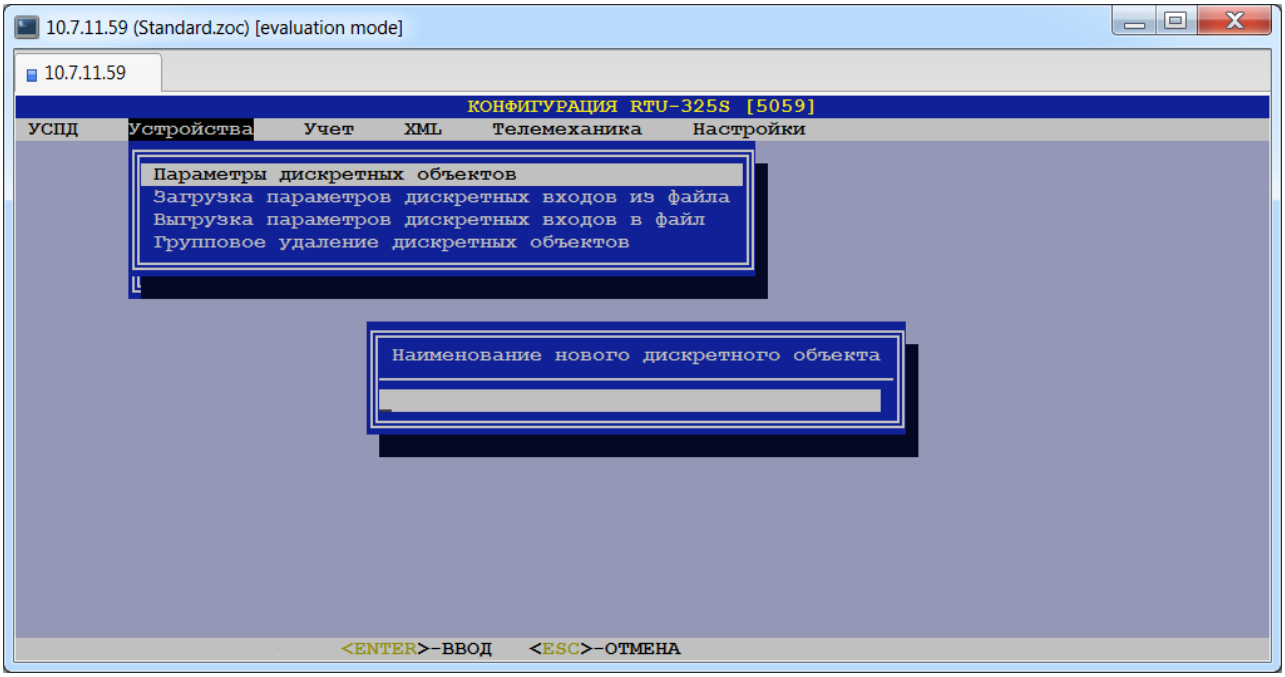
The sign «вход» has discrete objects, the condition of which is described by the dual logic of «включено» / «выключено», and this state is recorded in RTU by connecting to digital input ports (local or remote).

The sign «выход» has discrete objects, the condition of which is described by the dual logic of «включено» / «выключено» and the switch between these states is made by RTU by controlling the ports of digital output (local or remote). Note: It should be noted that automatic generation of object addresses

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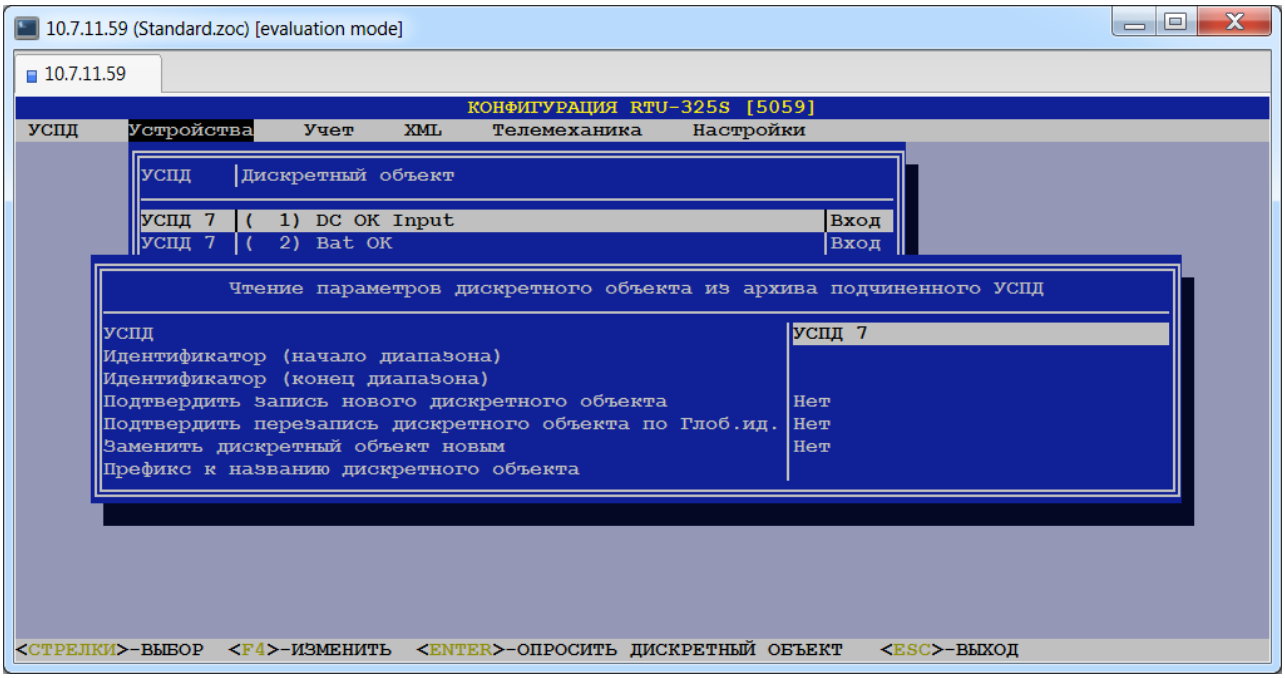
The information for the protocols 60870-5-101/104 shall be entered into discrete objects in the RTU configuration. Therefore, it is recommended that the required procedure for introducing new discrete objects into the RTU configuration should be followed to obtain the appropriate sequence of information object addresses when automatically generated in the future. Two ways to enter a new discrete object are:

1.) A new discrete object will be added using the <Ins> key and the user will enter its name (text line) and complete the list of object parameters:



2. The key <F7> will search for discrete objects in the files of the subordinate RTU. Once an object is in a subordinate RTU, the parameters of a discrete object will automatically be counted.

To read the parameters of discrete objects from the records of a subordinate RTU, you need to fill out an open form:



- **RTU.**

The user should choose from the proposed RTU list, to which a discrete object is connected.

- **Identifier (beginning range).**
- **Identifier (end of range).**

Data type: whole number. These parameters determine the range of identifiers to search for discrete objects in the files of the subordinate RTU.

- **Confirm the recording of a new discrete object.**

Allowable values: «Нет» or «Да» . The plant: «Нет» . If this parameter is used, «Нет» will record the identified discrete object in the archives without requesting confirmation.

- **Confirm a re-record of a discrete object using a global identifier.**

Allowable values: «Нет» or «Да» . Plant: «Нет» . If this parameter is used «Нет», the existing discrete object (with the same global identifier) will be re-recorded in the archives without a request for confirmation.

- **Replace the discrete object with a new one.**

Allowable values: «Нет» or «Да» . Plant: «Нет» . If this parameter is used, «Да» will be requested to replace the existing discrete object found by a discrete object.

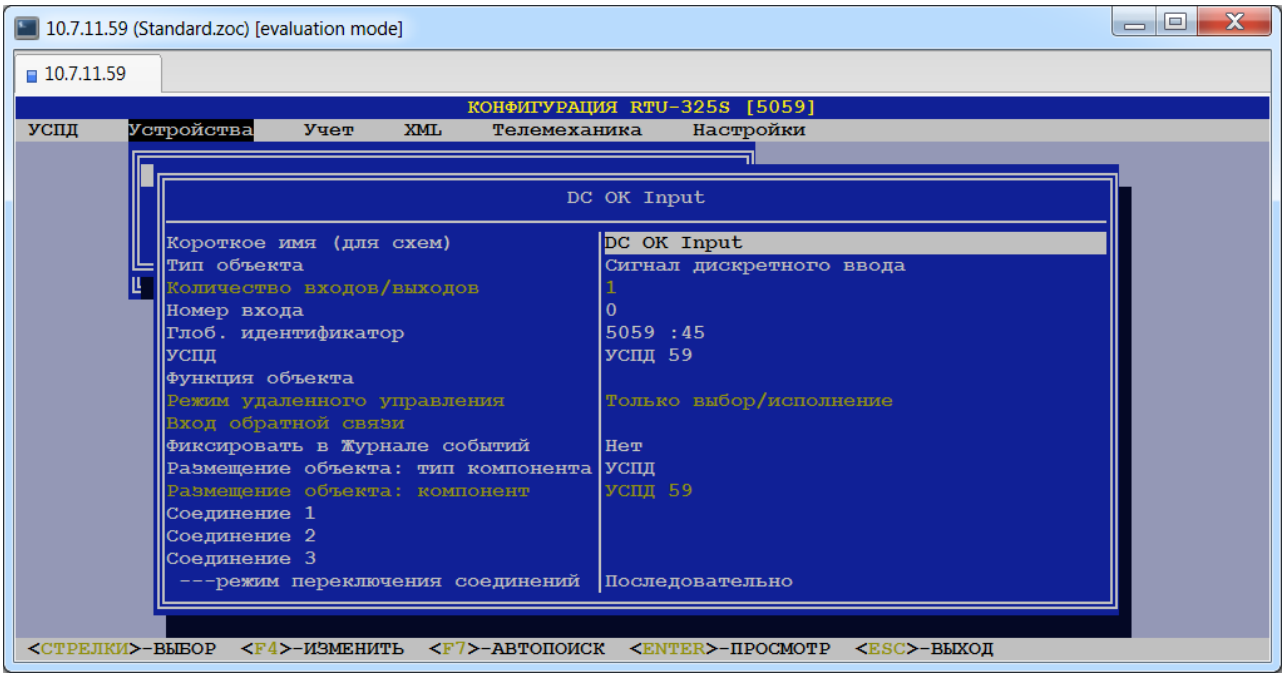
- **Prefix to the name of a discrete object.**

Data Type: A string of symbols. This parameter is designed to be easy to identify discrete objects belonging to different remote RTUs and modules.

After completing the required parameters and pressing the key <Enter>, auto-search will be made for discrete objects of the RTU. To enter discrete objects from other RTUs, the auto search must be repeated with appropriate parameters.

If there are no discrete objects in the RTU, the user will be asked to choose one of the methods described above for entering discrete objects.

The following is a list of the parameters of discrete objects with notes:



- **Short name (for diagrams).**

Data Type: A string of symbols. A short name is used to identify a discrete object on the electrical circuit in RTU (the menu item «Учёт» > «Учёт электроэнергии» > «Присоединения (редактор эл.схем)»). Initially, the short name is identical to the name of the discrete object entered in the creation. The short name can then be edited.

- **Type of object.**

Permissible values: {«Сигнал дискретного ввода» , «Двухэлементный выключатель» , «Сигнал дискретного ввода RS232» , «Сигнал дискретного ввода LPT» , «Сигнал дискретного управления» , «Управление двухэлементным выключателем» , «Сигнал дискретного управления RS232» , «Сигнал дискретного управления LPT» }.

Discretes of type «Сигнал дискретного ввода» and «Двухэлементный выключатель» shall be connected to discrete RTU entrances or remote input/output devices.

Discrete objects of the type «Сигнал дискретного управления» and «Управление двухэлементным выключателем» shall be connected to digital outputs of RTU or remote input/output devices.

Discrete objects of the type «Сигнал дискретного ввода RS232», «Сигнал дискретного ввода LPT», «Сигнал дискретного управления RS232», «Сигнал дискретного управления LPT» have not been implemented to date.

- **Number of entrances/exits.**

This parameter shows the number of digital inputs or digital outputs required to connect a discrete object. The value of this parameter depends on

The value of the previous parameter "Тип объекта" shall be given for information and shall not be changed.

For object types «Сигнал дискретного ввода» and «Сигнал дискретного управления» the number of entrances/outputs is 1.

For object types «Двухэлементный выключатель» and «Управление двухэлементным выключателем», the number of entrances/outputs is 2.

- **Entry/exit number.**

This paragraph should include a discrete entry or exit number to which the discrete object is connected. For local digital inputs/exits, RTU numbering begins on 1.

The numbering of virtual digital inputs begins immediately after the numbering of local digital inputs of RTU has been completed. For example, if RTU has 120 local digital inputs and the number of virtual entrances is 60, the numbering of entrances will be:

Local 1-120, virtual 121-180. If RTU does not have local digital inputs and the number of virtual entrances is 60, the numbering of virtual entrances will be 1 to 60.

- **Entry/exit number "отключено" .**
- **Entry/exit number "включено" .**

This paragraph shall include the digital inputs or digital outputs to which the discrete object is connected. The fields are filled in for two-way switches.

- **Global identifier.**

  Used to identify the object of the multilevel hierarchical systems.
- **RTU.**

The user should choose from the proposed RTU list, to which a discrete object is connected.

- **Object function.**

  Permissible values: {« » ,
  «Сигнал наличия питания УСПД» , «Сигнал - батарея ОК» , «Сигнал выключения УСПД» , «Управление записью осциллограмм» }.

  This option is reserved for further modification of the software.
- **Remote control mode.**

  Permissible values: {«Запрещено» ,
  «Прямое исполнение или выбор/исполнение» ,
  «Только выбор/исполнение» }.

This parameter refers only to discrete control objects (with the sign «выход») and defines the control mode of the IEC telemetric protocols 60870-5 to 101/104.

The value «Запрещено» cancels all discrete object control commands coming from telemetric protocols.

The value «Прямое исполнение или выбор/исполнение» shall allow the relevant control commands to be performed for the telemetric protocols.

The value «Только выбор/исполнение» allows the corresponding control command of the telemetric protocols to be performed.

- **Incoming feedback.**

Allowable values: discrete objects with a sign «вход». This option selects a discrete object with a sign «вход» for this discrete control object, which is feedback. This is used in telemetric protocol control commands.

- **Combination 1.**

The user should select from the proposed list the connection on which the meter will be interviewed. This paragraph must be completed. This connection has the highest priority 1.

- **Combination 2.**

This paragraph is used to determine a back-up connection to priority 2.

- **Combination 3.**

This paragraph is used to determine a back-up connection to priority 3. To be completed only when «Соединение 2» has been completed.

- **----------**

See the description of the menu item «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

15.2. Uploading of discrete entries from the file.

(Chart item «Устройства» > «Дискретные объекты» > «Загрузка параметров дискретных входов из файла»)

In this menu item, the user can download the discrete input configuration from the external file.

Before doing so, the user should form and copy a prepared file to the FTP directory: /update/FTP client program.

File format description:

- The file should have a text format in UTF-8, Windows-1251 or MS-DOS. - Each line in the file corresponds to one discrete entry. - If the first line symbol is «#» or «//», this line is considered a comment and is omitted when processing and displaying the file contents. - In each line the configuration parameters should follow the order given below and be separated by a partitioning symbol;' or '!'.For example, a line may be:

1 ; 1 ; 123456789 ; Discrete input 1 ; DI1 ; 3 ; 607 ; 0 ; 0 − Any field may be absent except the following fields:

- **Type of object;**
- **The name of the digital input;**
- The entry number is for local digital inputs and digital inputs to remote input/output modules;
- Global identifier for remote digital inputs;
- Site location: the type of component for digital inputs to remote input/output modules;
- Site location: component for digital inputs to remote input/output modules; If there is no field, then just put a field separation symbol. For example, a line may be of the following kind:

1;1; Secret entrance 1;;;;;;; or 1;;;; 123456789; Secret entrance 1;;;;; - The last selected parameter in the line of the partition symbols may be deleted. For example, a line may be of the following kind:

1;;;1234567; Classified entry 1 - The following values will be added to the row instead of missing parameters:

Short name (for diagrams) = 20 object name characters Location of object: type of component = RTU

Site location: component = local RTU Object function = « » Record in Event Journal = no

The parameters are described below:

- **Type of object.**
  Permissible values: 1 ("Сигнал дискретного ввода") or 3 ("Dual element" (i.e. switch).
- **Entry number / Entry number "отключено"**

Data type: whole number. This parameter indicates the local RTU entry number to which the discrete entry is connected. If an unacceptable entry number is given in the discrete entry line, this line will be dropped when loaded.

When the local objects are loaded according to the parameters "Tip of the object" and "Incoming Number" of the digital input, the local digital input, which was previously converted into RTU, will be aligned.

For an object «Двухэлементный выключатель» this parameter corresponds to «отключено» status.

- **Entry number "включено" .**

For an object «Двухэлементный выключатель» this parameter corresponds to «включено» status.

- **Global identifier.**

Data type: whole number. This option defines the global remote entry identifier for the remote RTU. When downloading discrete remote RTU objects from the global discrete entry identifier, the discrete entry will be aligned with the discrete entry previously converted into RTU.

- **The name of the digital input.**

Data Type: A string of symbols. This field is the name of the digital input and must necessarily be specified by the user.

- **Short name (for diagrams).**

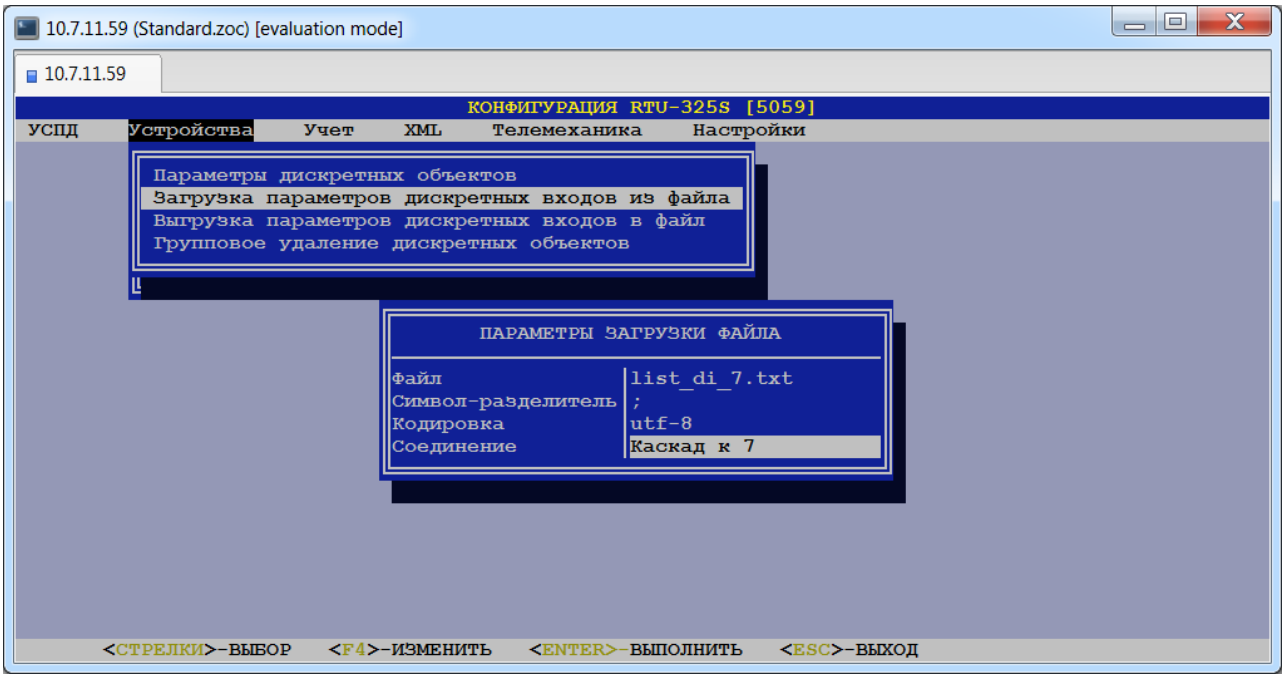
Data Type: A string of symbols. This field is the short name of a discrete entry for the display on electrical circuits.

- **Location of the object: type of component.**
  Data type: 1 (meter) or 3 (RTU). This parameter indicates the type of component to which the discrete inlet is connected.
- **Site location: component.**

Data type: whole number. This parameter indicates the manufacturer's meter number/RTU, to which a discrete entry is connected.

- **Object function.**
  Permissible values: {0 (no), 1 (power supply signal), 2 (OK battery signal), 3 (RTU stop signal), 4 (RTU shut-off control), 5 (Oscilogram recording control)}.
- **Record it in the Journal of Events.**
  Permissible values: {0 (no), 1 (any change), 2 (transmission only) 1), 3 (only transition to 0)}}. This option defines what changes to the status of a discrete object will be recorded in the RTU event log.

The user will be provided with a download form when entering this menu item:



The following fields need to be filled in in this form:

- **File.**

The user should select the file from the list by pre-copying it to the directory / ftp/update.

- **A symbol-separation.**

Allowable values: «;» or «!». In this paragraph, the user must select the partition symbol used to separate fields in the file.

- **Code.**

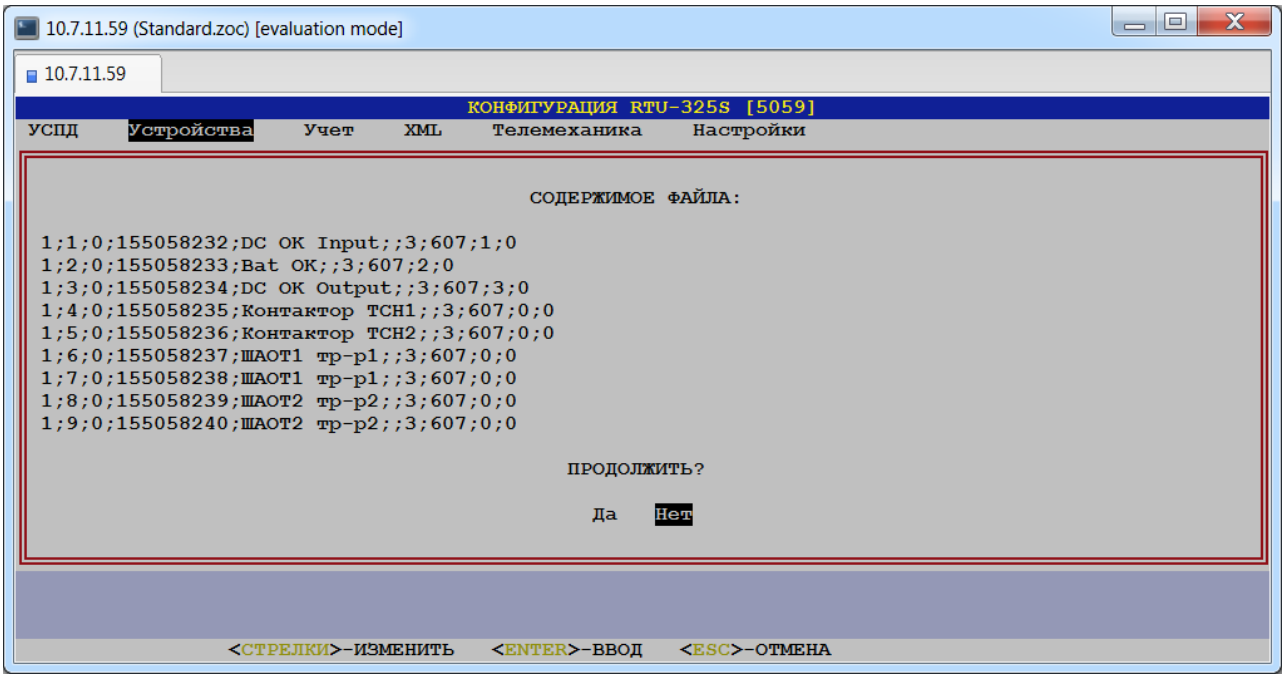
Allowable values: {«utf-8», «windows1251», «ms-dos»}. In this paragraph, the user should choose to encode the text file.

- **The connection.**

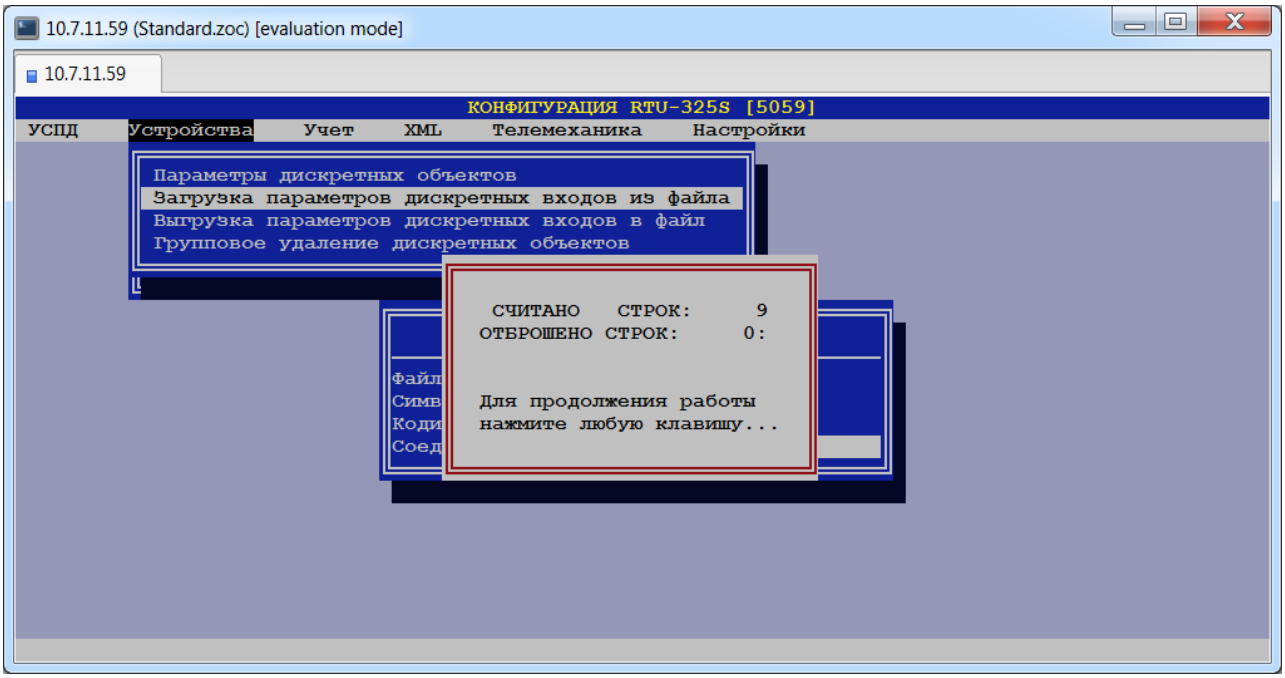
The user must select from the list a connection to be connected to digital inputs.

If discrete entries for different connections are to be inserted into RTU, a separate file and a separate download must be made for each connection.

The following message will appear on the screen after the necessary download and key-pressing parameters are completed:



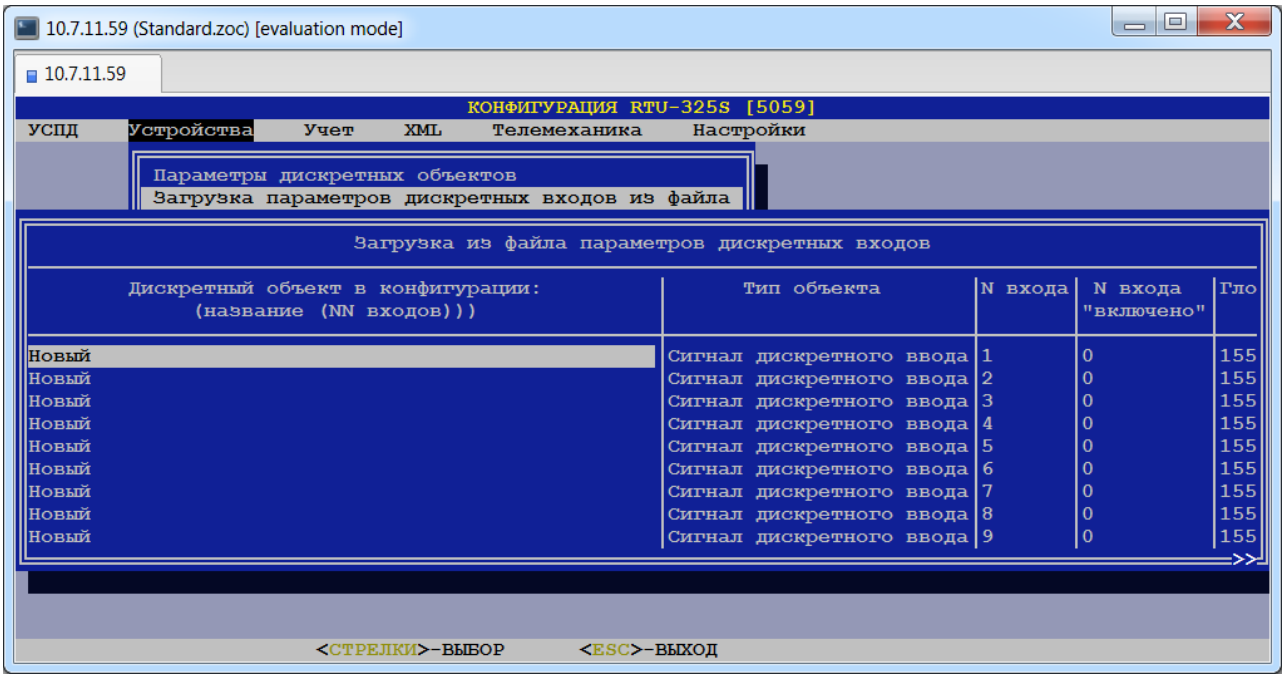
After press "Да", the result report of the file will be submitted to the user:



The lines shall be dropped if:

- (a) Fields that are compulsory for filling;
- No dividers;
- The type of discrete object is not acceptable;
- No entry numbers are given.

Then a table of the compliance of the loaded digital inputs to the digital inputs of the RTU will appear on the screen:



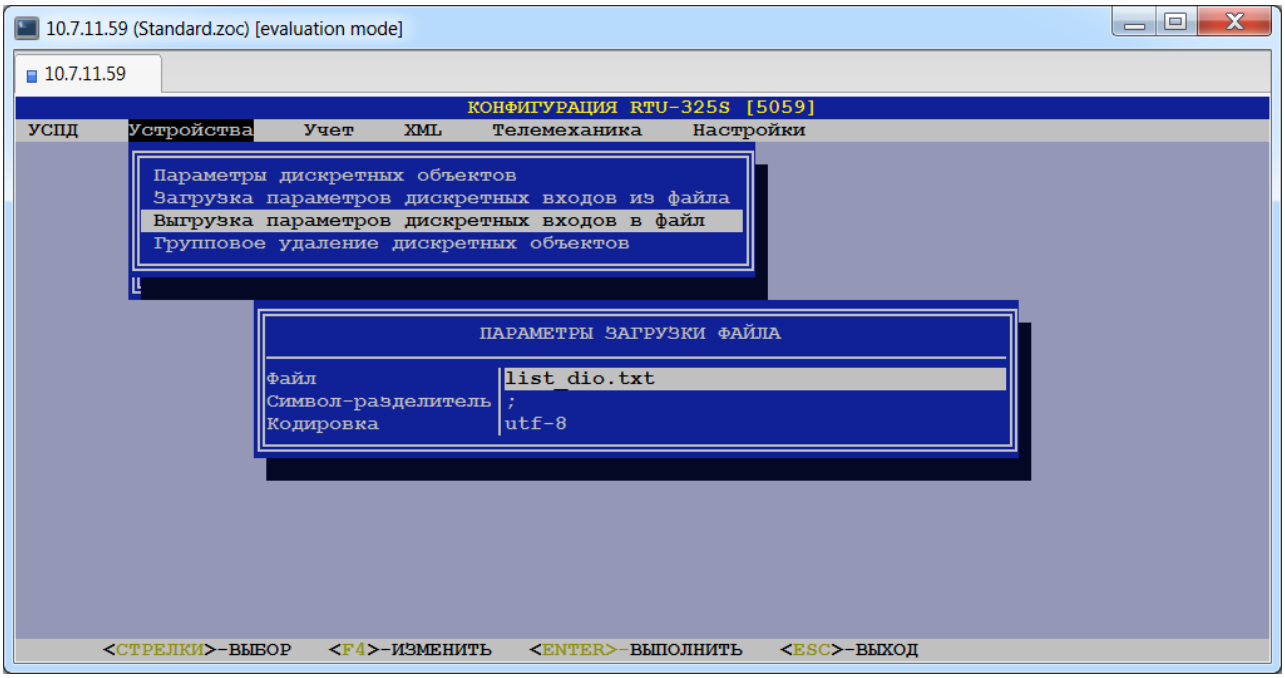
If the discrete object has not been able to match the existing RTU discrete entry or the RTU has not yet been reconfigured discrete objects, then in the "Discrete in configuration" field the object will be marked as "New".

15.3. Unload discrete entry parameters to the file.

(Chart item «Устройства» > «Дискретные объекты» > «Выгрузка параметров дискретных входов в файл»)

This point is intended to unload discrete entries to a file for subsequent loading into a top level system or higher RTU in a cascade.

When selecting this point, the user will be provided with the discharge specification form:



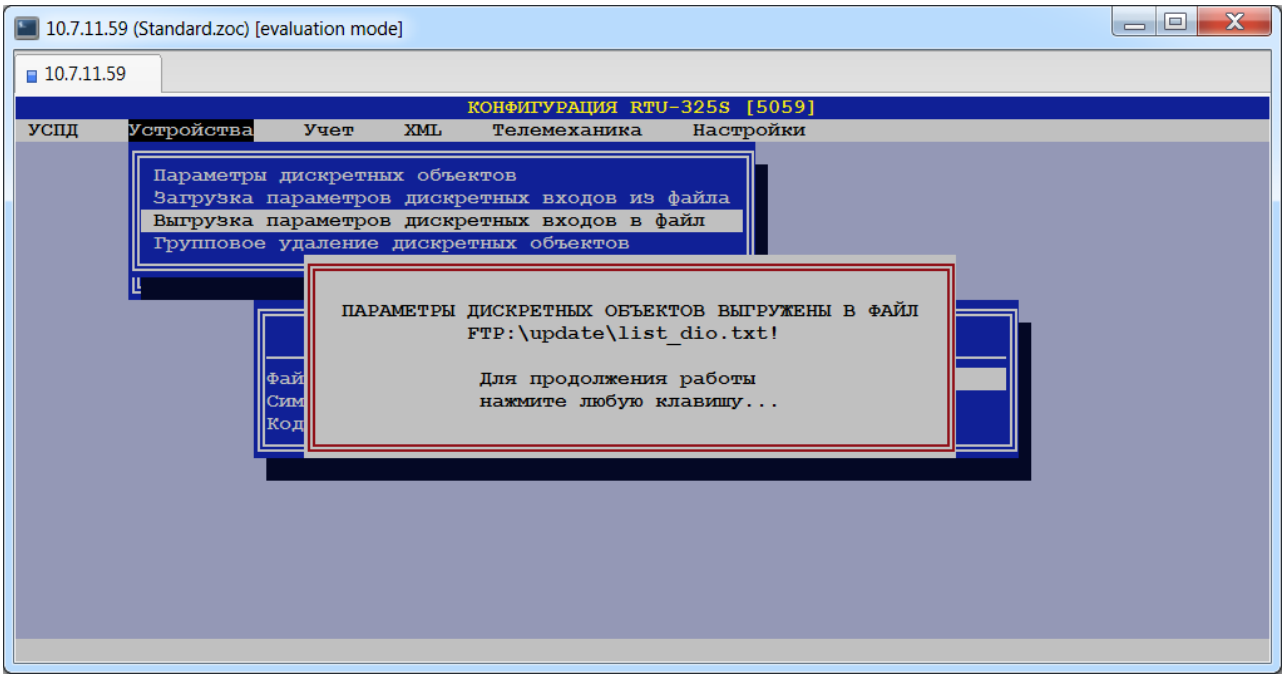
- **File.**
  The user must enter the file name for unloading.

- **A symbol-separation.**

Allowable values: «;» or «!». In this paragraph, the user must select the partition symbol to be used to separate fields in the file.

- **Code.**

Allowable values: {«utf-8», «windows1251», «ms-dos»}. In this paragraph, the user should choose to encode the text file. Once the key <Enter> has been pressed, the digital inputs to the user ' s given file will be unloaded and the corresponding message will be available:



File format description:

- The file has a text format in the user code. - Each line in the file corresponds to one discrete entry. - In each line the configuration parameters follow the order given below and are divided by the user's partition symbol. The parameters are described below:

- **Type of object.**

This parameter defines the type of discrete object: 1 - "Сигнал дискретного ввода" or 3 - "Двухэлементный выключатель" .

- **Entry number / Entry number "отключено"**

This parameter indicates the entry number ("отключено") RTU to which the discrete entry is connected.

- **Entry number "включено" .**

This parameter indicates the entry number ("включено") RTU to which the discrete entry is connected.

- **Global identifier.**

This option shows a global discrete entry identifier in two types: unstructured and further in brackets in a structured way. For example:

155058232 (2366:56).

- **The name of the digital input.**

This field is the name of the digital input.

- **Short name (for diagrams).**

This field is the short name of a discrete entry for the display on electrical circuits.

- **Location of the object: type of component.**

This parameter indicates the type of component to which the discrete inlet is connected: 1 - meter, 3 - RTU.

- **Site location: component.**

This parameter indicates the manufacturer's meter number/RTU, to which a discrete entry is connected.

- **Object function.**

This field is a function of an object: 0 - no, 1 - power supply signal, 2 - battery OK, 3 - deactivation signal RTU, 4 - control of RTU, 5 - control of the recording of oscillograms.

- **Record it in the Journal of Events.**

This field is a sign of recording changes in the discrete entry in the Journal of Events: 0 - not to record, 1 - record any change, 2 - record only the transition to 1, 3 - record only the transition to 0.

- **Remote control mode.**

This field is a remote control mode: 2 only selection/performance.

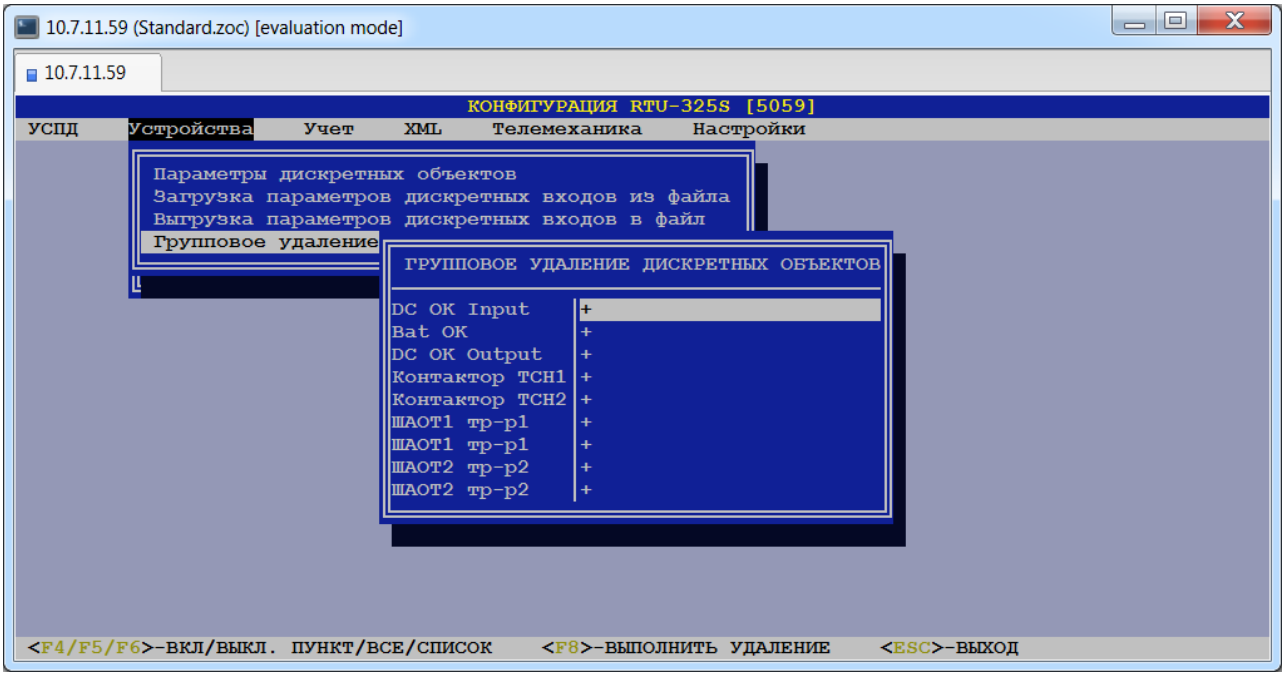
- **Incoming feedback.**

This field is an input that is feedback.

15.4. Remove a group of discrete objects.

(Chart item «Устройства» > «Дискретные объекты» > «Групповое удаление дискретных объектов»)

This point is intended to remove a group of discrete objects. In selecting this paragraph, the user will be provided with a form in which to mark the discrete objects that need to be deleted:



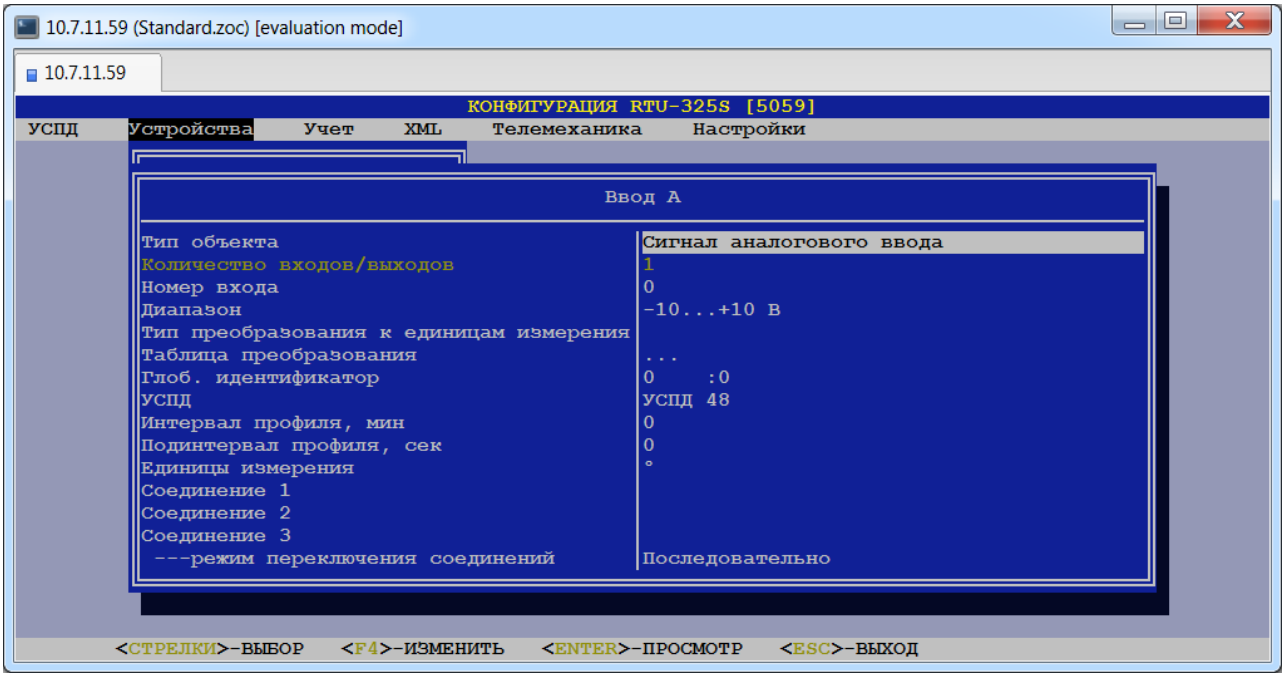
16. Identification of analog objects and their connection to connections.

(Check item «Устройства» > «Аналоговые объекты»)

In this menu paragraph, the user will be provided with a table of analog objects with the possibility of adding new objects or removing existing ones. Analog objects with a sign of «вход» are currently being maintained.

The sign «вход» has analog objects whose condition is described by a continuous analog physical value and this condition is recorded in RTU by connecting to analog ports (local or remote).

The following is a list of parameters of analog objects with notes:



- **Type of object.**
  Allowable values: {«Сигнал аналогового ввода»}.

- **Number of entrances/exits.**

This parameter shows the number of analog entrances required to connect an analog object. For the type of object «Сигнал аналогового ввода», the value of this parameter is 1, given for information and not subject to change.

Analog objects of the type «Сигнал аналогового ввода» are connected to analog entrances of RTU or remote input/output devices.

- **The entrance number.**

Data type: whole number. The entry number of the analog entry to which the analog object is connected shall be entered in this paragraph.

- **Range.**
  Permissible values: {«-10...+10 В», «0...+10 В», «0...20 мА», «4...20 мА», «-5...+5 В», «0...+5 В», «-1...+1 В», «0...+1 В», «-0.5...+0.5 В», «0...+0.5 В», «-0.15...+0.15 В», «0...+0.15 В», «PT-100 -50...150», «PT-100 0...100», «PT-100 0...200», «PT-100 0...400», «PT-100 -200...200», «PT-1000 -40...160», «Balco 500 -30...120»,

«Ni 518-80...100» , «Ni 518 0...100» , «16-бит целое(+-)» , «16-бит целое(+)» , «32-бит целое(+-)» , «32-бит целое(+)» , «Плав. точка» , «-20...+20мА» , «-15...+15 мВ» , «0...+15мВ» , «-50...+50мВ» , «0...+50мВ» , «-100...+100мВ» , «0...+100мВ» , «-2.5...+2.5В» , «0...+2.5В» , «Термопара J-тип» , «Термопара K-тип» , «Термопара T-тип» , «Термопара E-тип» , «Термопара R-тип» , «Термопара S-тип» , «Термопара B-тип» , «-1.25...+1.25 В» , «0...+..25 В» , «Автоопределение» }.

This option sets the measurement range for the selected analog entry, which must be accurate to the hardware characteristics of the analog entry.

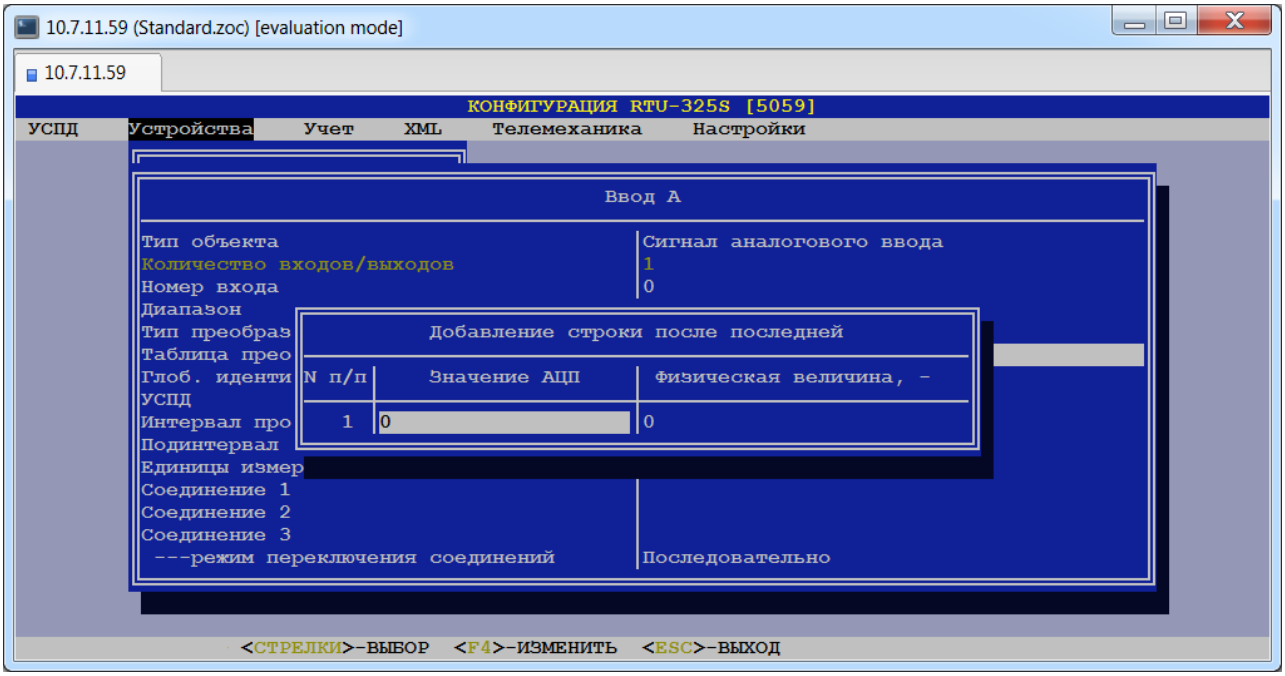
- **Type of conversion to units of measure.**

Allowable values: {« », «Кусочно-линейное»}. The value of « » ("пусто"] means the absence of conversion, i.e. the measurement of an analog signal itself as the physical value of an analog object.

The value «Кусочно-линейное» sets the procedure for converting the measured analog signal to the physical value of an analog object, which uses a table with a list of conformity points (see the description of parameter «Таблица преобразования» below).

- **The transformation table.**

At the entry of this item, the menu will be presented with a table with the option to enter/delete/edit the list of conformity points:



At each point, the value of the APC (analogic digital transformation) shall be the value of the physical value of an analog object. Linear interpolation will be performed between conformity points when measuring analog value.

Attention: No partial-line interpolation procedure should be introduced Less than two points.

- **Global identifier.**

Could be used in multilevel hierarchical systems to identify the object of the account.

- **RTU.**

The user should select from the proposed RTU list, to which an analog object is connected.

- **Profile interval, min.**

This parameter defines the profile interval of a measured analog object (taking into account the type of conversion) at which RTU will record:

- Minimum value;
- Average;
- Maximum value;
- The value at the interval boundary.

- **Profile sub-interview, sec.**

This parameter defines the profile sub-interval value of a measured analog object (taking into account the type of conversion) on which RTU will record:

- Minimum value;
- Average;
- Maximum value;
- The value at the interval boundary.

- **Units of measurement.**

This parameter gives a unit of measurement of the physical value of a given analog object. The complete list of units is given in Annex No. 1 to this manual.

- **Combination 1.**

The user should select from the proposed list the connection on which the meter will be interviewed. This paragraph must be completed. This connection has the highest priority 1.

- **Combination 2.**

This paragraph is used to determine a back-up connection to priority 2.

- **Combination 3.**

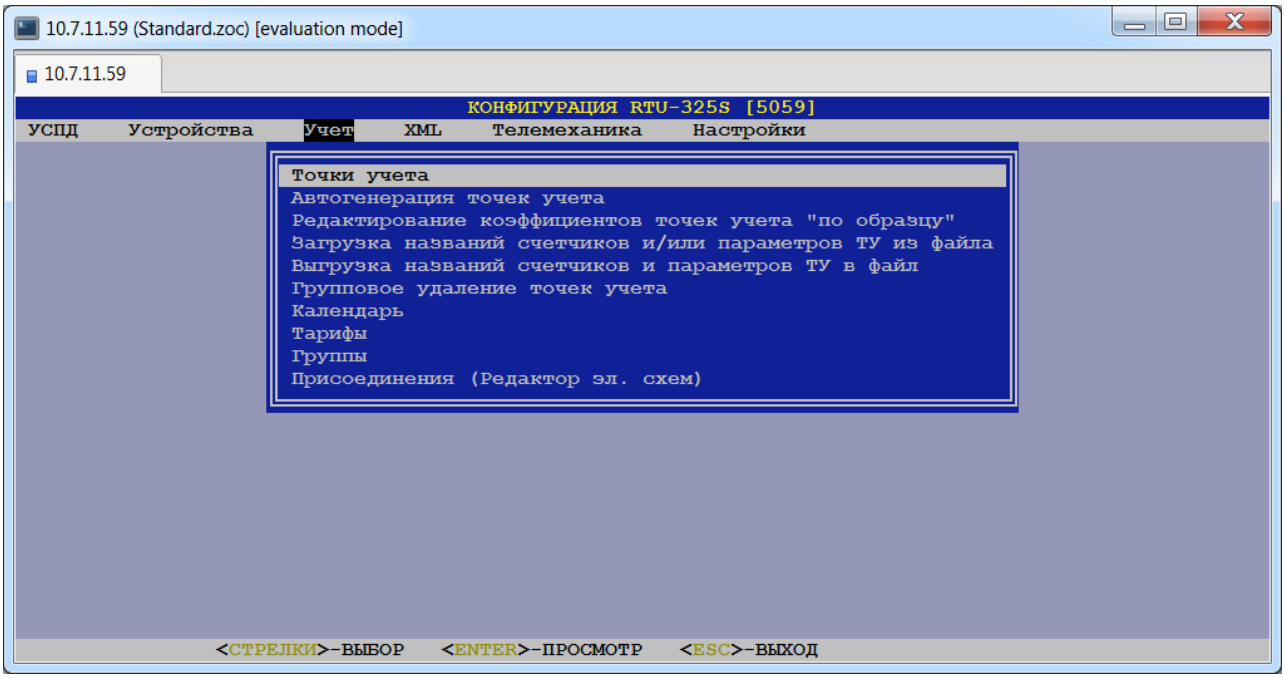
This paragraph is used to determine a back-up connection to priority 3. To be completed only when «Соединение 2» has been completed.

- **----------**

See the description of the menu item «Устройства» > «Счётчики электроэнергии» > «Параметры счётчиков» .

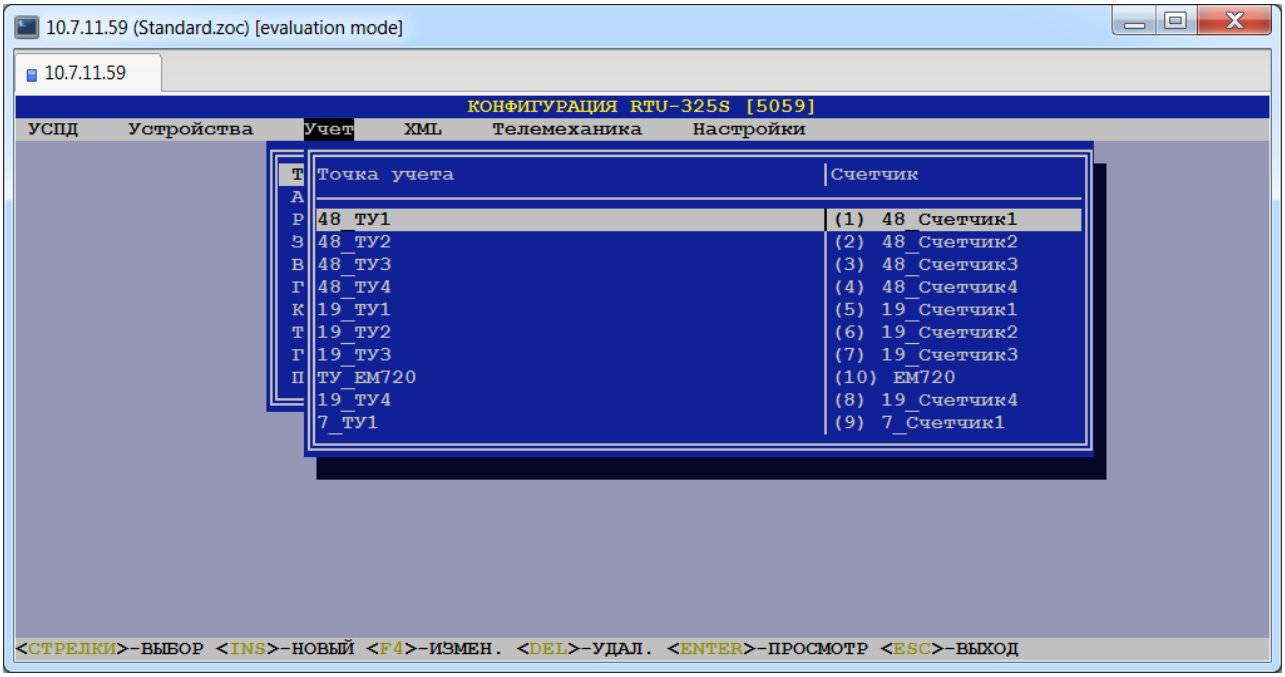
17. Entering the metering points and linking them to the meter. (Check item «Учёт» > «Учёт электроэнергии»)

In this menu item, the user should create account points and tie the meter to them. The creation of metering points can be done manually or automatically:

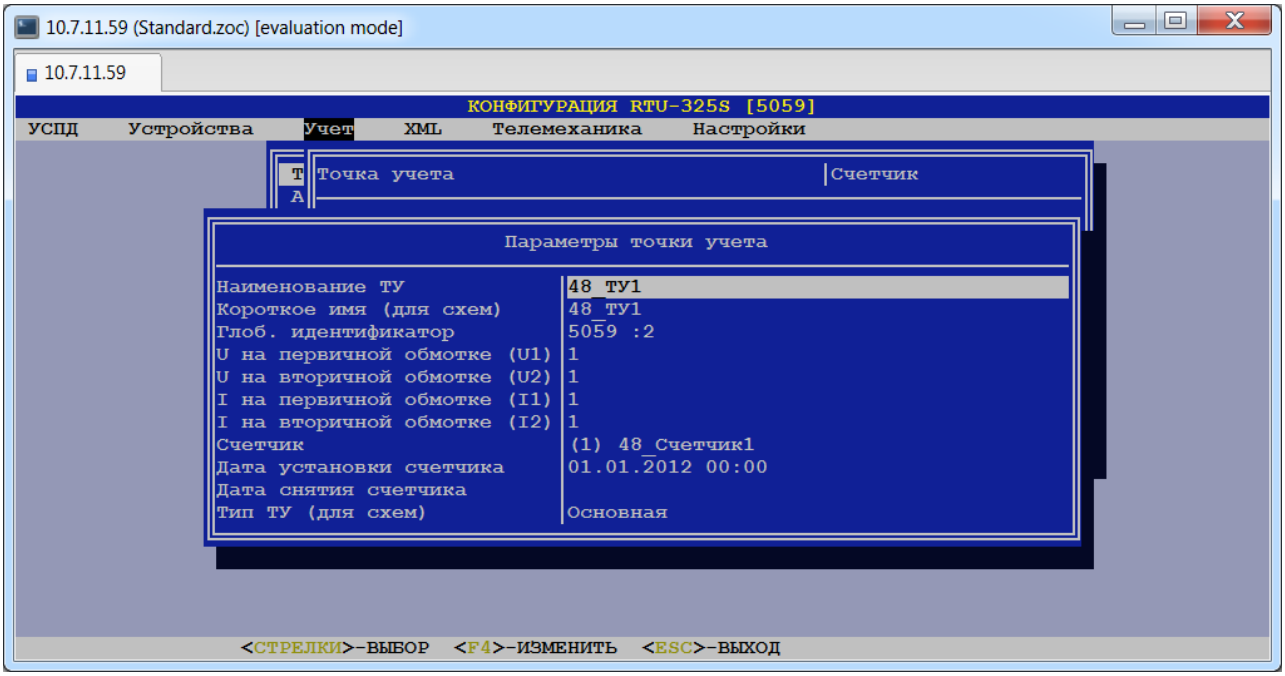


17.1. Manual entry of the metering point and the reference to it by the meter. (Chart item «Учёт» > «Учёт электроэнергии» > «Точки учёта»)

In this menu item, the user must enter the metering point into the general table of the metering points (see the bottom-up clue):



To correct the parameters of the metering point, it is necessary to select it from the general table of metering points. In both cases, the user is finally provided with a table of the parameters of the selected/new metering point for correction/filling:



A list of the parameters of the metering point and the comments thereon are given below.

- **The name of the metering point.**

Data Type: A string of symbols. The name of the account point is used for ease of identification of RTU in screen forms and reports and is also used for the installation of the on-call input/output remote.

- **Short name (for diagrams).**

Data Type: A string of symbols. Short name for the display on the electrical circuits.

- **Global identifier.**

Could be used in multilevel hierarchical systems to identify the object of the account.

- **U on primary wrapping (U1).**
- **U on secondary wrapping (U2).**
- **I on primary wrapping (I1).**
- **I on a secondary wrap (I2).**

The relationship between the above parameters is Kt and Kn respectively. These coefficients are used in RTU to calculate the archive of called commercial intervals. These coefficients need to be entered into RTU if they are not programmed in the meter.

- **The meter.**

The user should select a meter to put the account from the list of available meters in the RTU database on a given point.

- **Date of installation of the meter.**

The setting of this parameter corresponds to the installation of the meter on the countpoint. If the value of the parameter is not determined (empty string), the meter is not considered to be installed at the metering point and the meter is not surveyed.

Once this option has been completed, the meter will be interviewed after re-starting RTU.

In order to release the definition of this parameter (induction of an empty line), all field positions of the parameter value shall be filled with «0» .

- **The date of the meter withdrawal.**

The setting of this parameter corresponds to the removal of the meter from the metering point.

Once this option has been completed, the meter remains in the RTU database, but after re-start, RTU will not be questioned.

In order to release the definition of this parameter (induction of an empty string), all field positions of the parameter value shall be filled with «0» . If the date of installation of the meter is determined, the meter will be questioned after re-starting the RTU.

- **Type of TOT (for diagrams).**

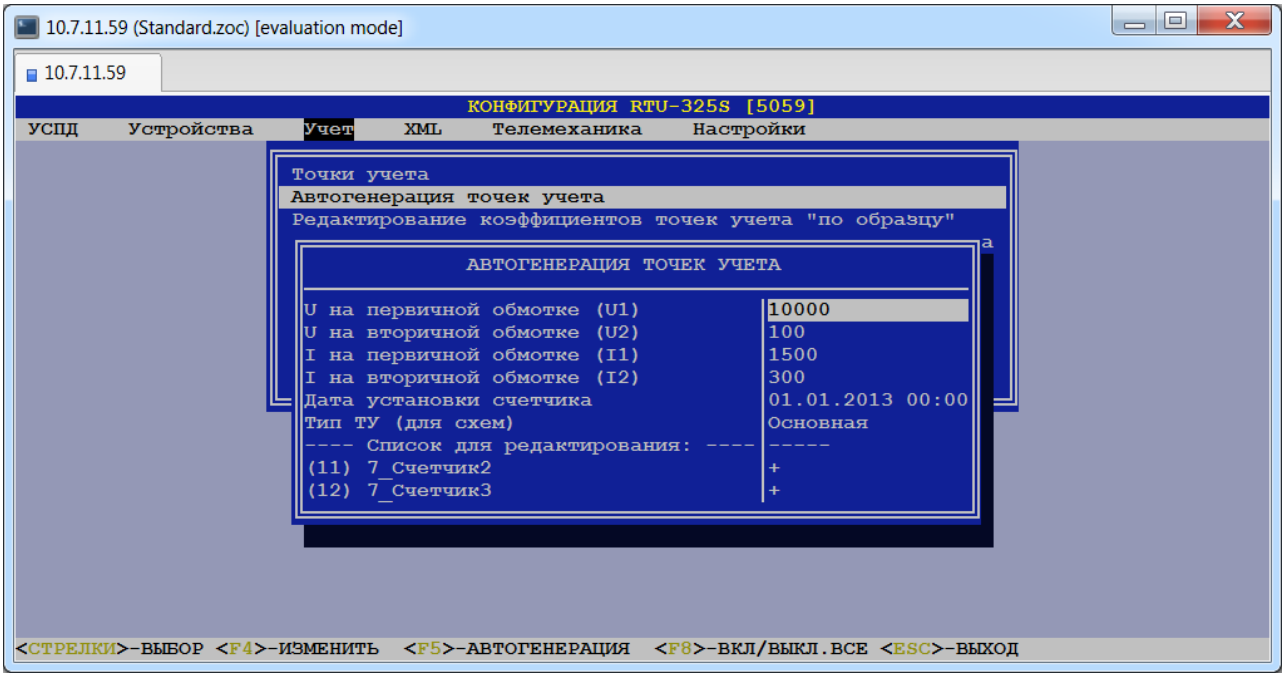
Allowable values: {«Основная», «Резервная»}. This parameter is used to implement the count in the circuit diagrams using a bypass switch. In other cases, leave the default value «Основная».

17.2. Automatic generation of metering points.

(Chart item «Учёт» > «Учёт электроэнергии» > «Автогенерация точек учёта»)

In this menu item, the user can automatically create account points for meters that are not placed on the countpoint.

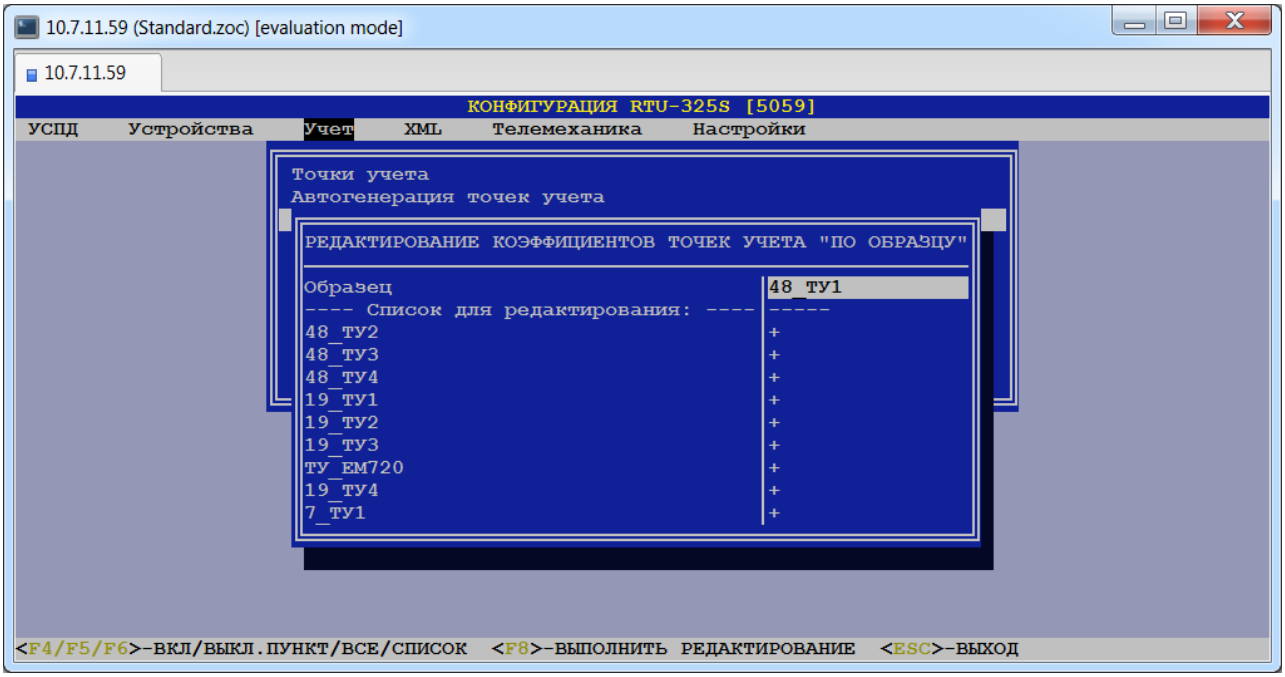
When selecting this paragraph, the user must set the parameters of the reference point template and select the meters for which the reference points with the given template will be generated:



17.3. Edit the factors of "по образцу" metering points.

(Chart item «Учёт» > «Учёт электроэнергии» > «Редактирование коэффициентов точек учёта "по образцу"»)

In this menu paragraph, the user can edit the coefficients of the group of metering points "по образцу" of the selected metering point.
In selecting this item, the user will be asked to select the account point as a sample and list of account points to edit the coefficients:



17.4. Uploading of accounter names and/or account point parameters from the file.

(Chart item «Учёт» > «Учёт электроэнергии» > «Загрузка названий счётчиков и/или параметров ТУ из файла»)

This paragraph duplicates paragraph 12.4 for ease of reference.

17.5. Unload meter names and account point parameters to the file

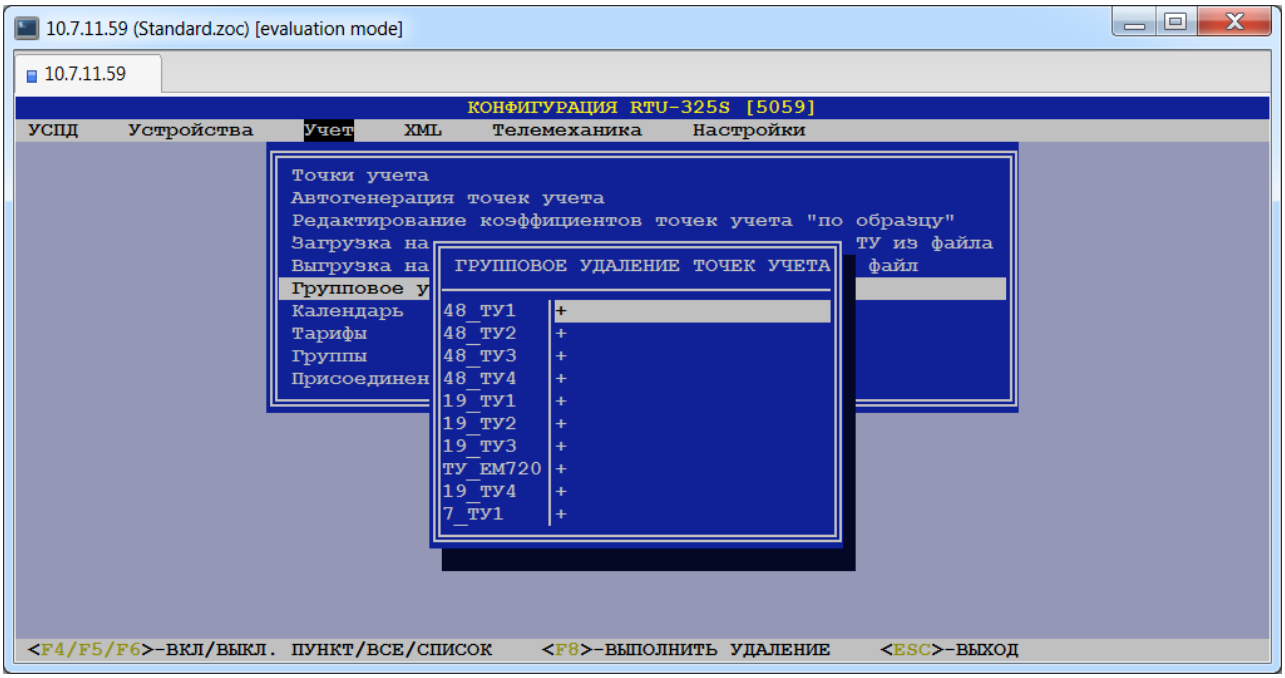
(Chart item «Учёт» > «Учёт электроэнергии» > «Выгрузка названий счётчиков и параметров ТУ в файл»)

This paragraph duplicates paragraph 12.5 for ease of reference.

17.6. Group removal of metering points.

(Chart item «Учёт» > «Учёт электроэнергии» > «Групповое удаление точек учёта»)

In this menu paragraph, the user can delete a group of metering points by noting the account points to be deleted by the sign `+' and press the <F8> key:



18. Definition of time-frame characteristics for tariffication.

(Chart item «Учёт» > «Учёт электроэнергии» > «Календарь»)

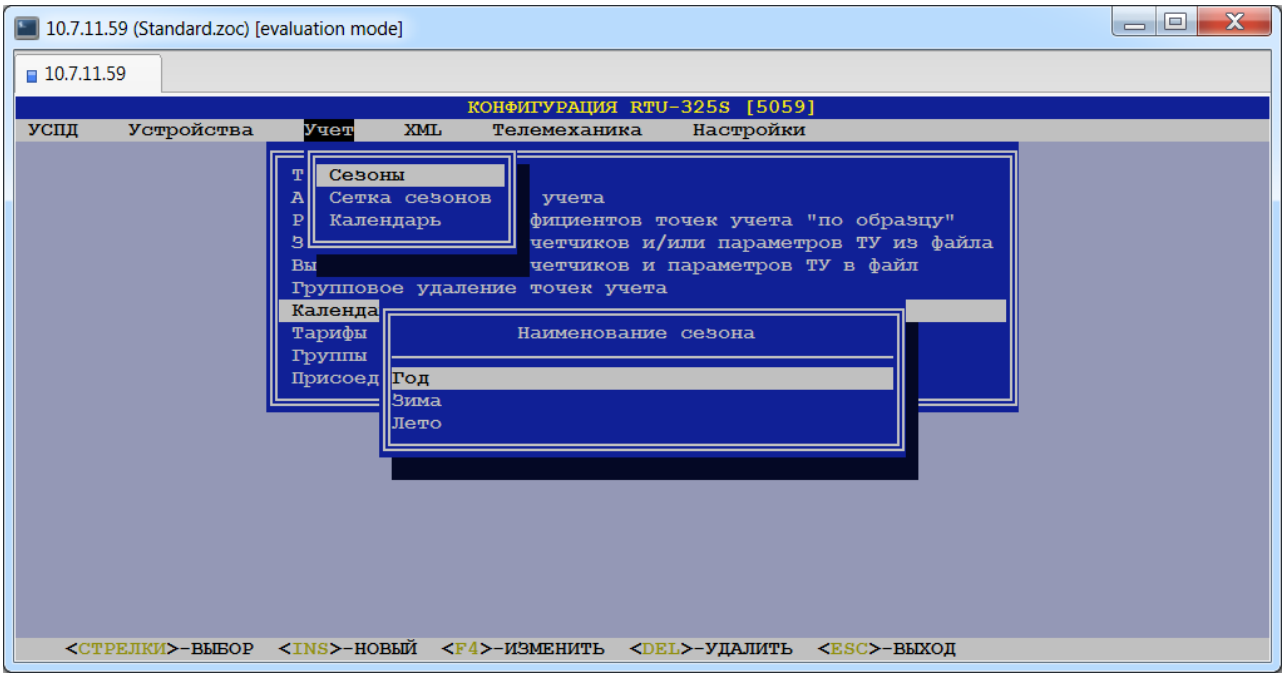
This paragraph defines the timing characteristics for tariffication as used in the Alpha series of production «Эльстер Метроника» meters.

The purpose of this item is to assign each day of the week per year the type of season day that is later used in the tariff account.

18.1. A list of seasons.

(Check item «Сезоны»)

In this point, the user can create/edit/delete the names of the seasons in the season list. RTU is delivered with one season: «Год» . The user may ask the arbitrary name of the season, for example: «Весна», «Лето», etc.:



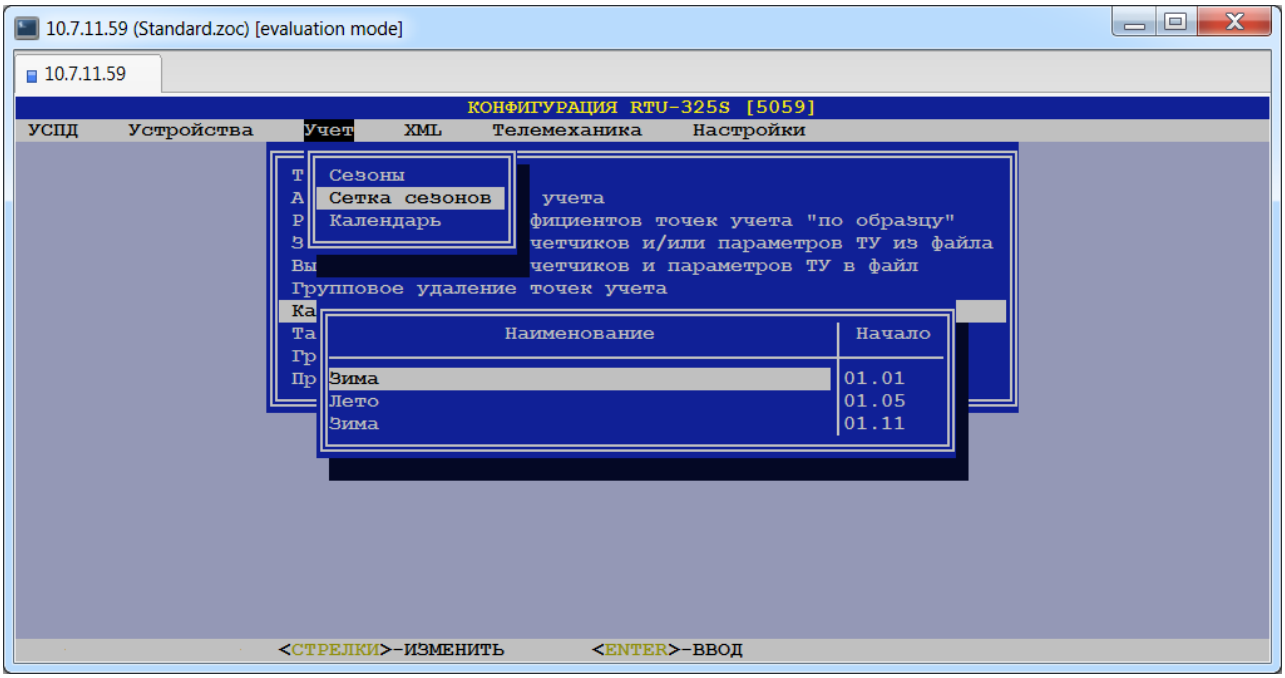
18.2. The season grid.

(Check item «Сетка сезонов»)

In this point, the user can form a series of seasons. The season grid is a consistent list of non-overlapping seasons that represents a full calendar year.

RTU is delivered with one season in the grid with the start date of `01.01' for example. When entering new seasons into the grid, the name of the season should be selected and the date of its beginning should be set. The user may then edit the name and date of the season or remove it from the season grid.

The end date of each season is the date preceding the beginning of the next season on the list (in chronological order):



The row of the seasonal grid table contains the following information fields: ; Name.

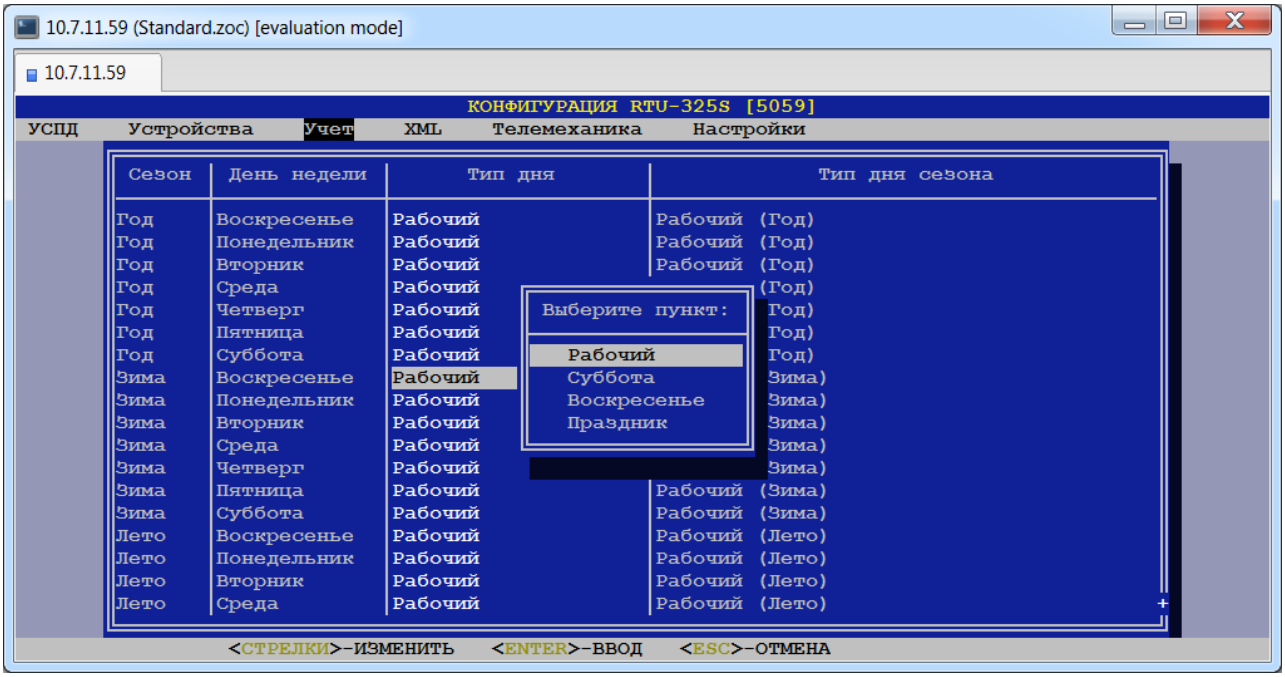
This field contains the name of the season. The beginning.

This field contains the start date of the season in the DD.MM format.

18.3. Calendar.

(Check item «Календарь»)

In this paragraph, each day of the week of each season is aligned with one of the following types of days:



In selecting this paragraph, the user will be provided with a table, each row of which contains the following information fields:

; Season.
This field contains the name of the season and is not edited.

; Day of the week.
This field contains the name of the day of the week and is not edited; Like a day.

This field contains a name for the type of day that the user can choose from the opening list. It's like a season day.

This field is not edited and contains the resulting type of season day, for example: «Рабочий (Весна)», «Суббота (Лето)», etc.

19. Certification.

(Chart item «Учёт» > «Учёт электроэнергии» > «Тарифы»)

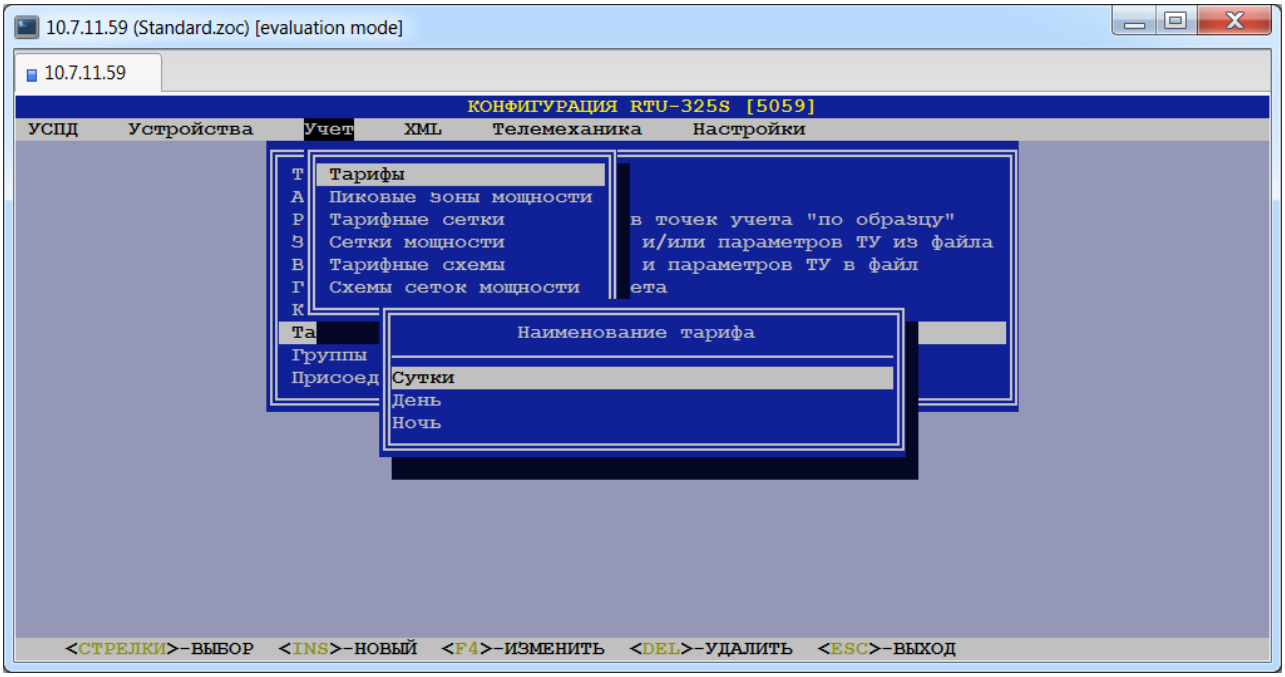
This paragraph defines tariff and power grid schemes for RTU calculations. The calculations are done in real time. No group recalculations have been made since then. The results of the calculations can be seen on the built-in RTU input-output bullet and the built-in Web server reports.

19.1. The tariff list.

(Check item «Тарифы»)

In this paragraph, the user may create a new tariff or edit/remove existing ones.

The tariff is the name of the time zone. RTU is delivered with the same tariff: «Сутки» . The user may give an arbitrary tariff name, e.g.: «Утро», «День», etc.:



19.2. List of tariff grids.

(Check item «Тарифные сетки»)

In this paragraph, the user may establish a list of tariff grids. The tariff grid is a consistent list of non-overlapping tariffs, which represents a full 24 hours from 00:00 to 24:00.

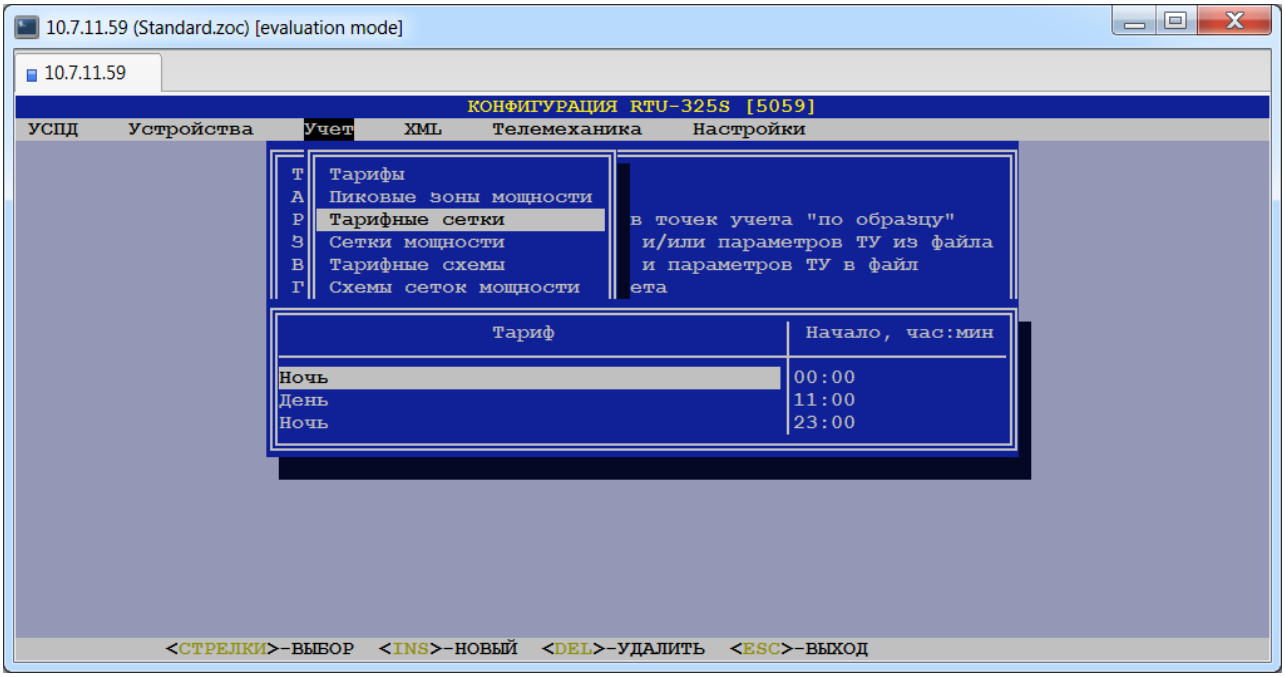
RTU is supplied with one tariff network «Энергия (Сутки)» which contains one tariff «Сутки» (00:00-24:00). This tariff line cannot be deleted/edited.

When a new tariff grid is introduced, it should be named and a list of tariffs should be established, indicating the start time of each. The user may later edit the name of the tariff grid, remove the tariff grids or separate tariffs in them, add new tariffs.

The time of completion of each tariff is the time before the next tariff starts on the list (in chronological order).

One tariff can be in the tariff grid several times. For example, the rate «Ночь» is : 00:00-05:00 and 23:00-24:00.

The menu item will first list the tariff grids. Once a specific tariff grid is selected from the list, a table will be presented to the user, each line of which contains the following information fields:



; Tariff.
This field contains the name of the tariff and is not edited; It's starting at 1:00.

This field contains the start time of the tariff and is not edited. In order to change the time at which the tariff begins, the tariff must be removed and then re-enacted with the new time at which the tariff begins.

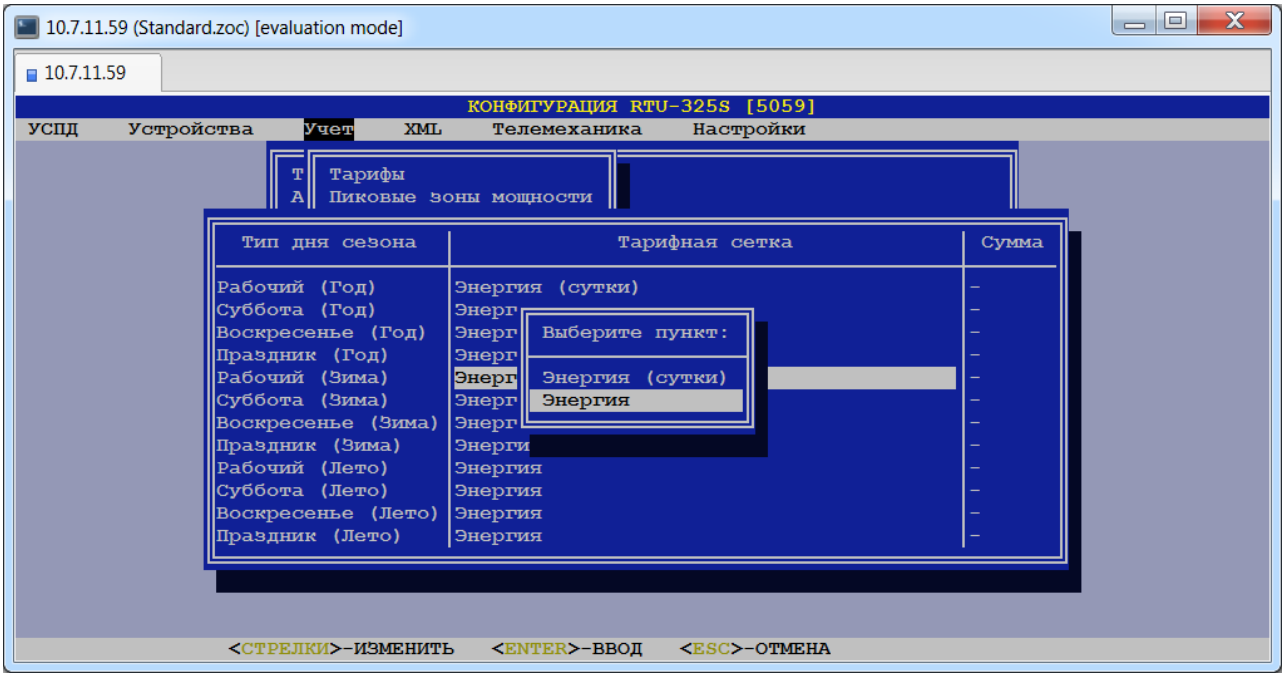
19.3. List of tariff schemes.

(Check item «Тарифные схемы»)

This paragraph defines a tariff grid from the list defined in paragraph «Тарифные сетки» for each type of season day.
The tariff scheme is a list of all types of season days in which each type of season day is adjusted to a specific tariff grid.
RTU is supplied with the same tariff scheme «Энергия (Сутки)», which defines the «Энергия (Сутки)» tariff grid for all types of season days. This tariff scheme cannot be removed. In this scheme, another tariff grid may be assigned to a type of season day, and the calculation of total energy per day (mark `+' in column «Сумма») may be included if the chosen tariff grid contains more than one tariff.

When a new tariff grid is introduced, the name of the network should be introduced and the tariff grids for each type of season day on the list should be edited. In the case where the selected tariff grid has more than one tariff, the calculation of total energy per day may be included. The user may then edit the name of the tariff scheme and assign another tariff grid to a type of season day, as well as remove the tariff schemes.

The list of tariff schemes will first be presented in this item of the menu. Once a specific tariff scheme is selected from the list, the user will be provided with a table containing each row of the following information fields:



; It's like a season day.
This field contains the name of the season day type and is not edited. The tariff grid.

In this field, the user may choose a tariff grid corresponding to the type of season day. Amount.

This field contains the sign '+'/'-'. The sign '+' includes the function of calculating total energy in a 24-hour period with the RTU archive in case the selected tariff grid contains more than one tariff and the sign '-' turns it off.

19.4. List of peak power zones.

(Check item «Пиковые зоны мощности»)

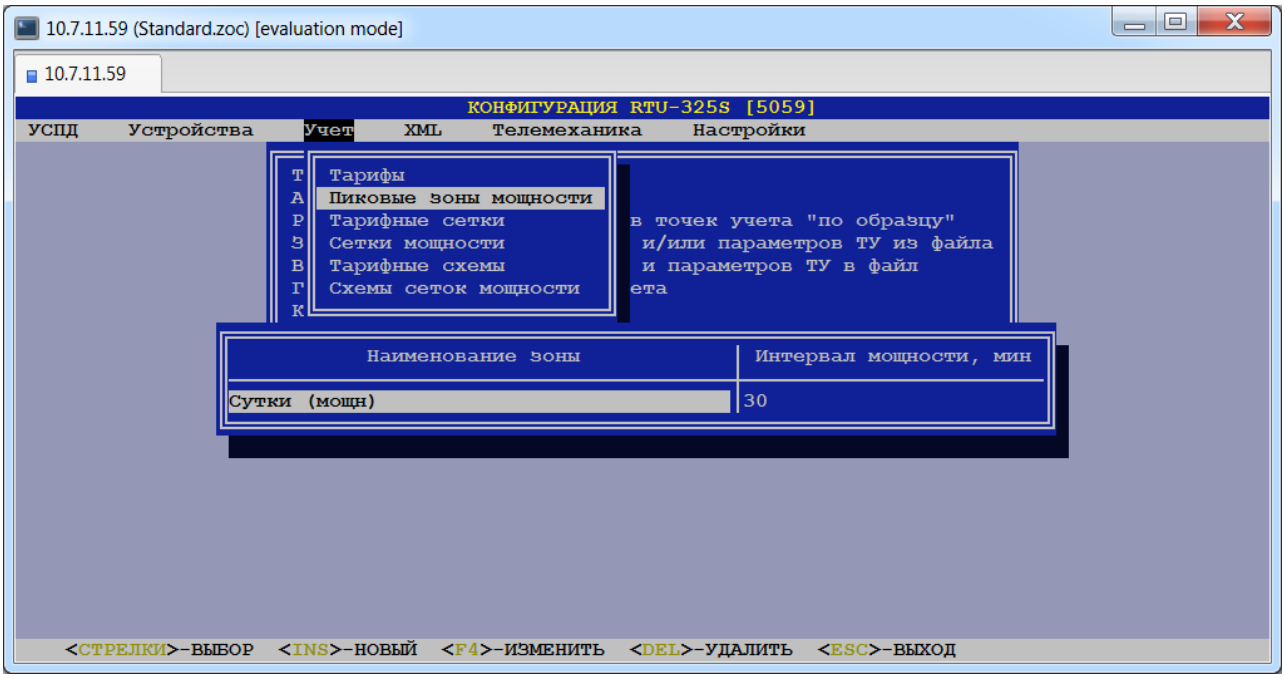
In this paragraph, the user can create/edit/delete peak power areas.

The peak zone of power is the name of the time zone of the day. When introducing new peak power zones, the zone name and the power interval in minutes should be introduced.

RTU is supplied with one peak power zone «Сутки (мощн)». This peak power zone cannot be removed. The power interval can only be changed.

When a new zone is introduced, its name and power interval shall be entered. The user may then edit the name of the zone and the power interval and remove the peak power zone.

In selecting this paragraph, the user will be provided with a table, each row of which contains the following information fields:



; Name of the zone.
This field contains the name of the zone. Power interval, min.

In this field, the user can set the power interval.

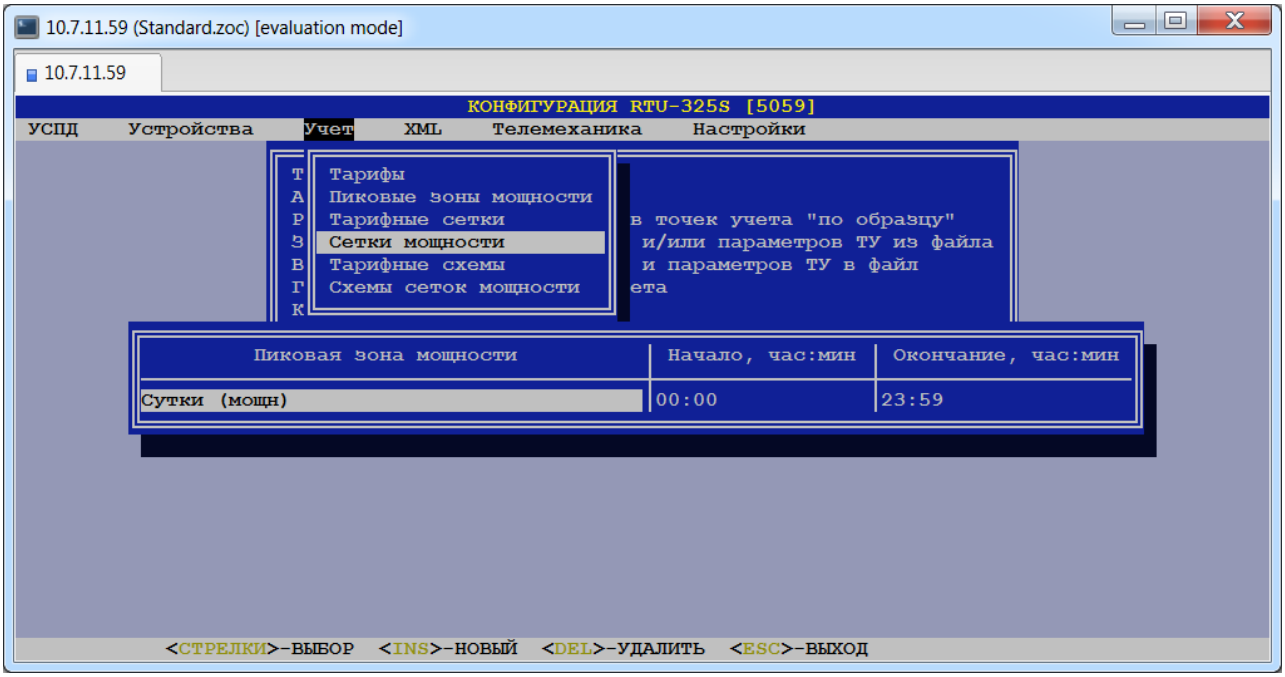
19.5. The power grid list.

(Check item «Сетки мощности»)

In this paragraph, the user may establish a list of power grids. The power grid is a list of non-overlapping peak power areas for one day.

RTU is supplied with one power grid «Мощность (сутки)» (00:00-23:59). This power grid cannot be edited or removed.
When a new power grid is introduced, the name of the peak power area shall be selected from the list defined in paragraph «Пиковые зоны мощности» and the start and end time shall be set.

This menu item will first present a list of power grids. Once a specific power grid is selected from the list, a table will be presented to the user, each row of which contains the following information fields:



; Peak zone of power.

This field contains the name of the peak power zone and is not edited. It's starting at 1:00.

This field contains the start time of the peak power zone and is not edited. End, hour:minus.

This field shall contain the end time of the peak power zone and shall not be edited.

Note: To change the starting and/or ending time of the peak zone
If the power is to be removed, then the area must be re-entered with the required start and end time.

19.6. A list of power grid schemes.

(Check item «Схемы сеток мощности»)

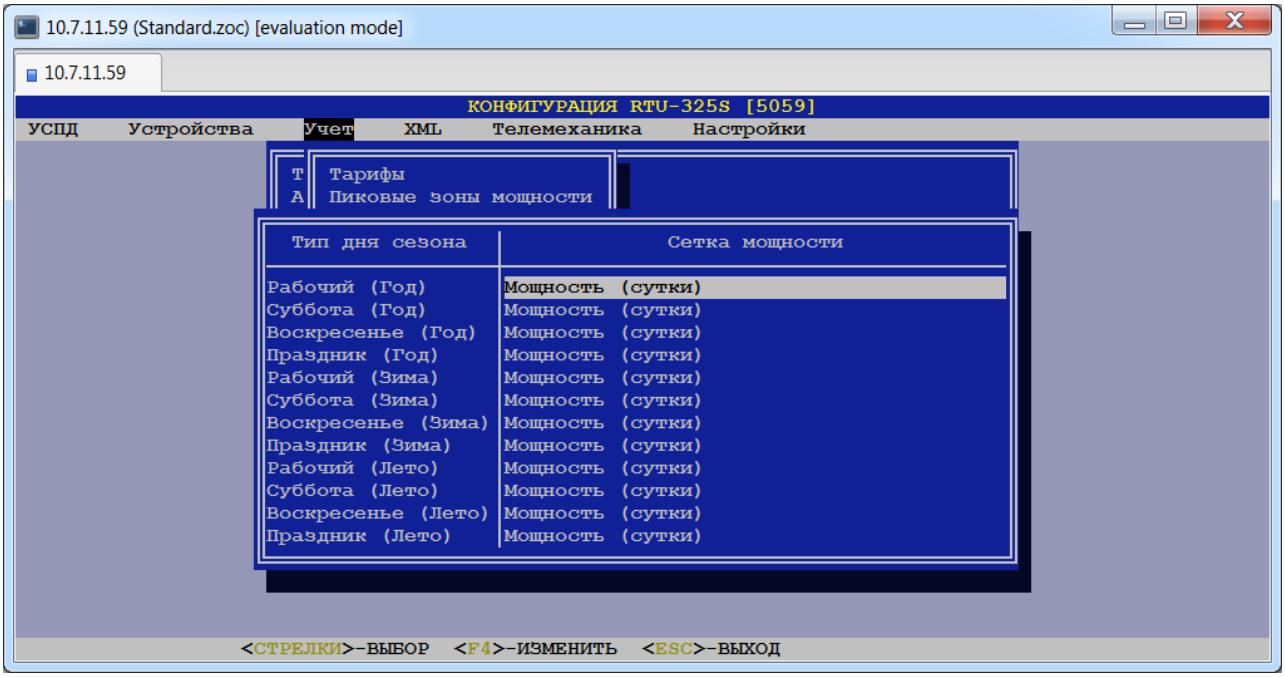
This paragraph defines the power grid from the list defined in paragraph «Сетки мощности» for each type of season day.

The power grid scheme is a list of all types of seasonal days in which each type of season day is adjusted to a specific power grid.

RTU is supplied with the same power grid scheme «Мощность (Сутки)», which defines the power grid «Мощность (Сутки)» for all types of season days. This power grid scheme cannot be removed. In this scheme, another power grid may be assigned to a type of season day.

When a new power grid scheme is introduced, the name of the grid should be inserted and the power grids for each type of season day on the list should be edited. The user may then edit the name of the power grid scheme and assign another power grid to a type of season day and remove the power grid diagrams.

This menu item will first present a list of power grid diagrams. Once a specific power grid scheme is selected from the list, a table will be presented to the user, each row of which contains the following information fields:



; It's like a season day.
This field contains the name of the season day type and is not edited. Power grid.

In this field, the user can choose a power grid corresponding to the type of season day.

20. Determination of groups of metering points.

(Chart item «Учёт» > «Учёт электроэнергии» > «Группы»)

This paragraph defines groups of metering points for RTU calculation. The calculations are done in real time. No group recalculations have been made since then. The results of the calculations can only be seen on an integrated RTU input-output bullet.

20.1. Determination of groups of metering points.

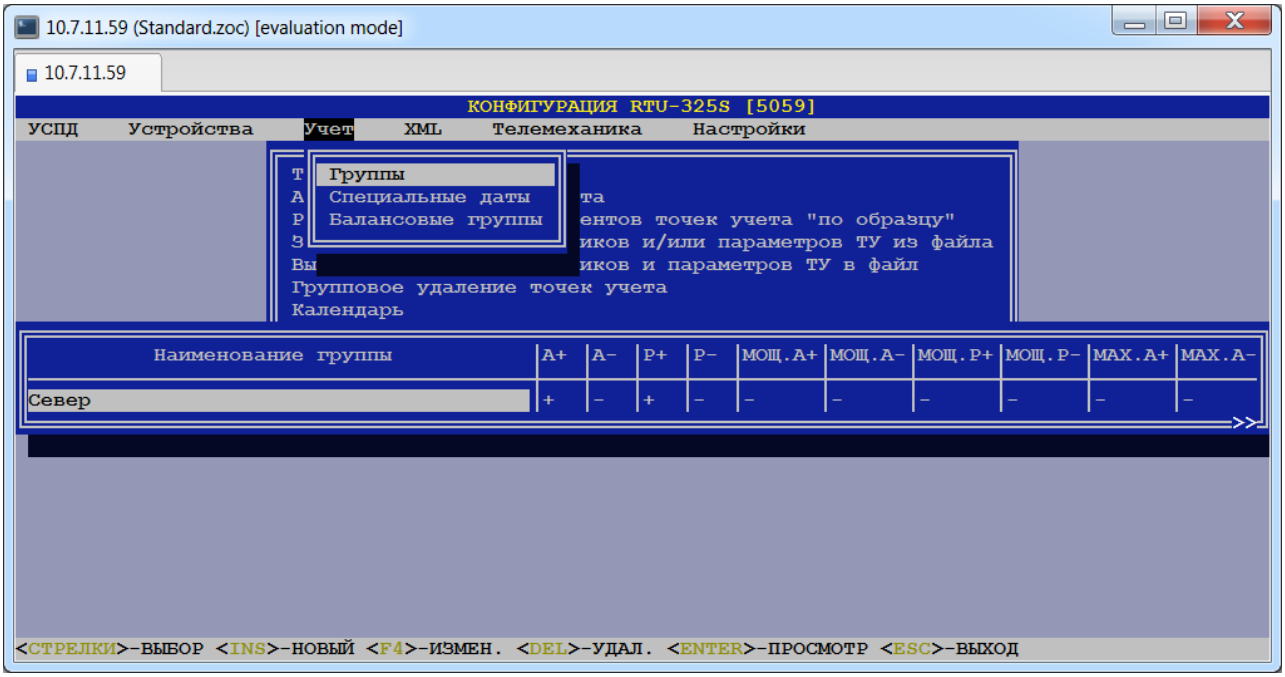
(Check item «Группы»)

This paragraph defines groups of metering points for calculating electricity consumption by tariffs, recording power intervals in power zones and calculating the electricity balance.

The user may create new groups as well as edit/remove existing ones.

When a group is formed, the name of the group must be entered and its parameters edited in an open window. The user can then remove the group and edit the name of the group and its parameters.

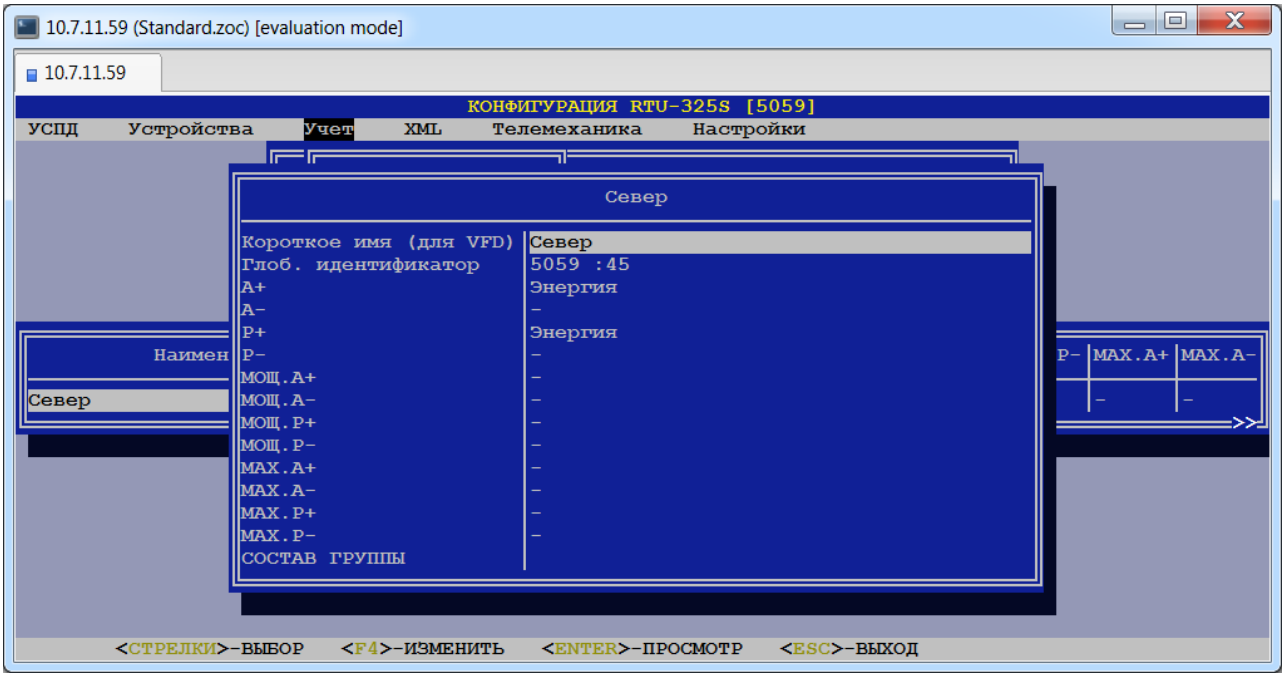
When selecting this item, the menu will first present a table, each line of which contains the following information fields:



; Group name.
In this field, the user may enter the name of the group. A+; A. ; P+ ; R-; MY MUSIC.A+.; MY MUSIC.A.-; MY MUSH.R+; MUSIC.R. ; MAH.A+; MAH.A- ; MAC.R+.

; MAH.R.
The fields include a sign (mark `+') of a given group of tariff schemes (A+, A-, P+, P-), power grid schemes (MOTE.A+, POWE/A-, POSS.P+, POSS.P-) and records of RTU maximum power values in the respective power zones. For each measurement the calculation shall be given by the user when editing the group parameters.

In selecting a particular group from the list of groups, the user will be provided with a table of the following parameters for editing:



- **Short name (for VFD).**

Data Type: A string of symbols. The name of the group is used to determine the results for the integrated input/output remote control RTU.

- **Global identifier.**

Can be used for multilevel hierarchical systems to identify the object of the account.

- **A+.**
- **Ahh.**
- **P+.**
- **R-**

These parameters allow for a tariff scheme to account for the active energy consumed, active issued, jet consumed and reactivated energy issued at tariffs, respectively.

- **MY MUSIC.**
- **IT'S OKAY.**
- **MY MUSIC. R+.**
- **MEET.R.**

These parameters provide a power grid diagram to record the power intervals of the active energy consumed, active, reactive and jet generated in the power areas respectively.

- **MAC.A+.**

Permissible values: «+» or «-» .

At «+», the maximum power values of the active energy consumed in the respective power areas shall be recorded in the RTU archives.

- **MAH.A.**

Allowable values: «+» or «-» . «+» shall record the maximum power output values in the respective power areas in the RTU archives.

- **MAC.R+.**

Allowable values: «+» or «-» . «+» shall record the maximum power of the reactive energy in the respective power areas in the RTU archives.

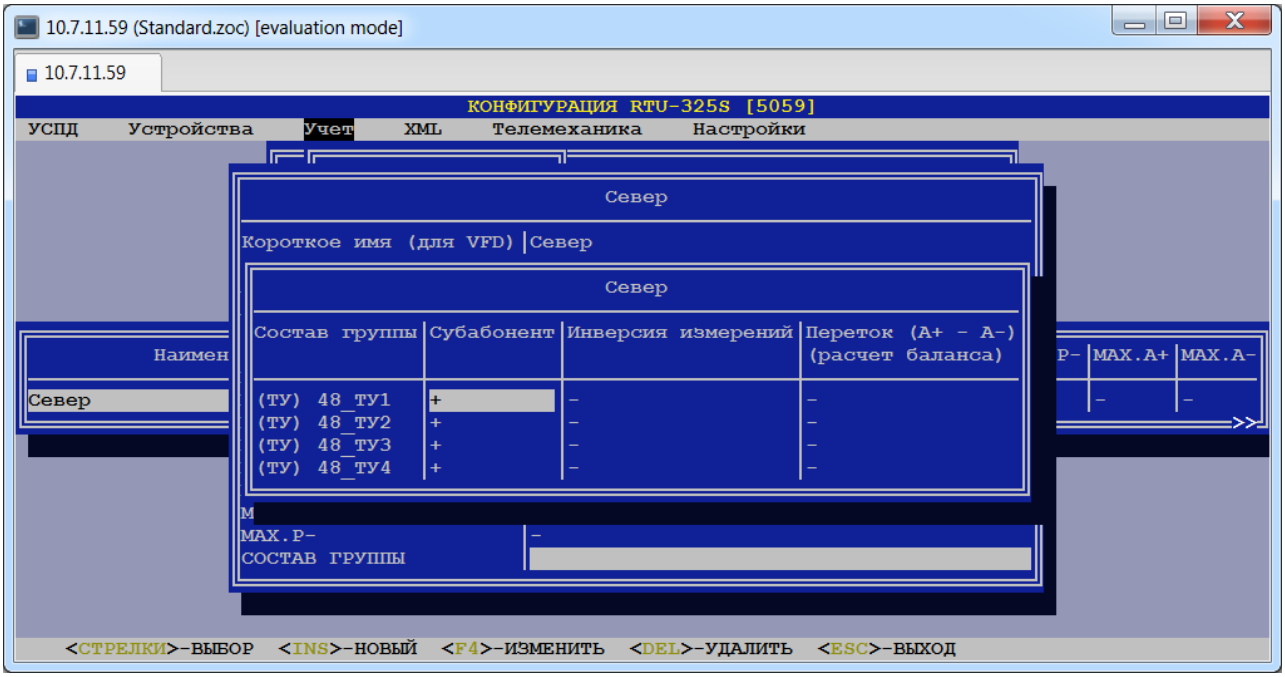
- **MAH.R.**

Acceptable values: «+» or «-» . «+» shall record the maximum power of the reactive energy generated in the respective power areas in the RTU archives.

- **GROUP COMPOSITION.**

This parameter allows the composition of a group that may contain objects of account (metering points, accessions and other groups). The group's investment is unlimited.

In selecting this parameter, a table will appear, each row of which contains the following information fields:



; Composition of the group.

This field contains the name of the item in the group and is not edited; Subabonant.

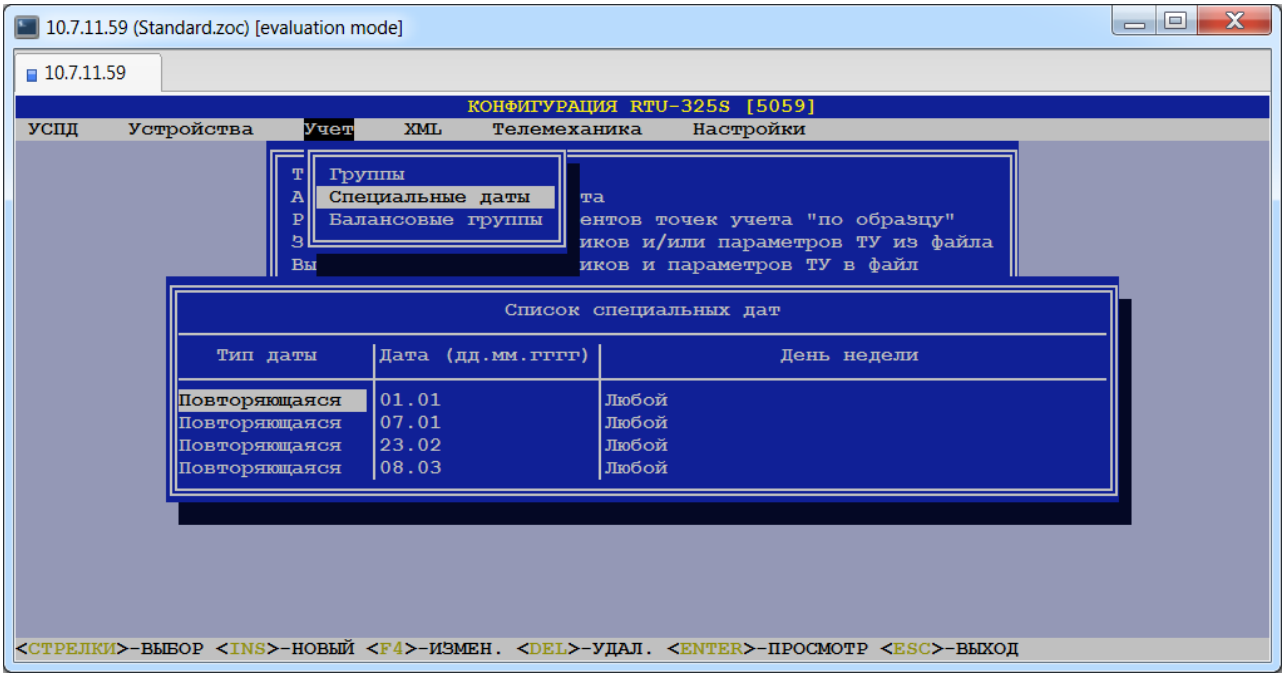
Allowable values: «+» or «-» . This field contains a sign with which the value of the object is included in the group. The sign '+' - the value of the object is added to the group value, the sign '-' - is deducted from the group value. Inversion of measurements.

Allowable values: «+» or «-» . With the value of «+» the energy consumed will be interpreted in group calculations as the value of the energy emitted, and vice versa (A+ as A-, A- as A+, P+ as P-, R- as P+). Same for power.

20.2. Establishment of a list of special dates.

(Check item «Специальные даты»)

In this paragraph, the user may specify a list of special dates. Special dates may be created/edited/deleted. When selecting this item, the user will be provided with a table, each row of which contains the following information fields:

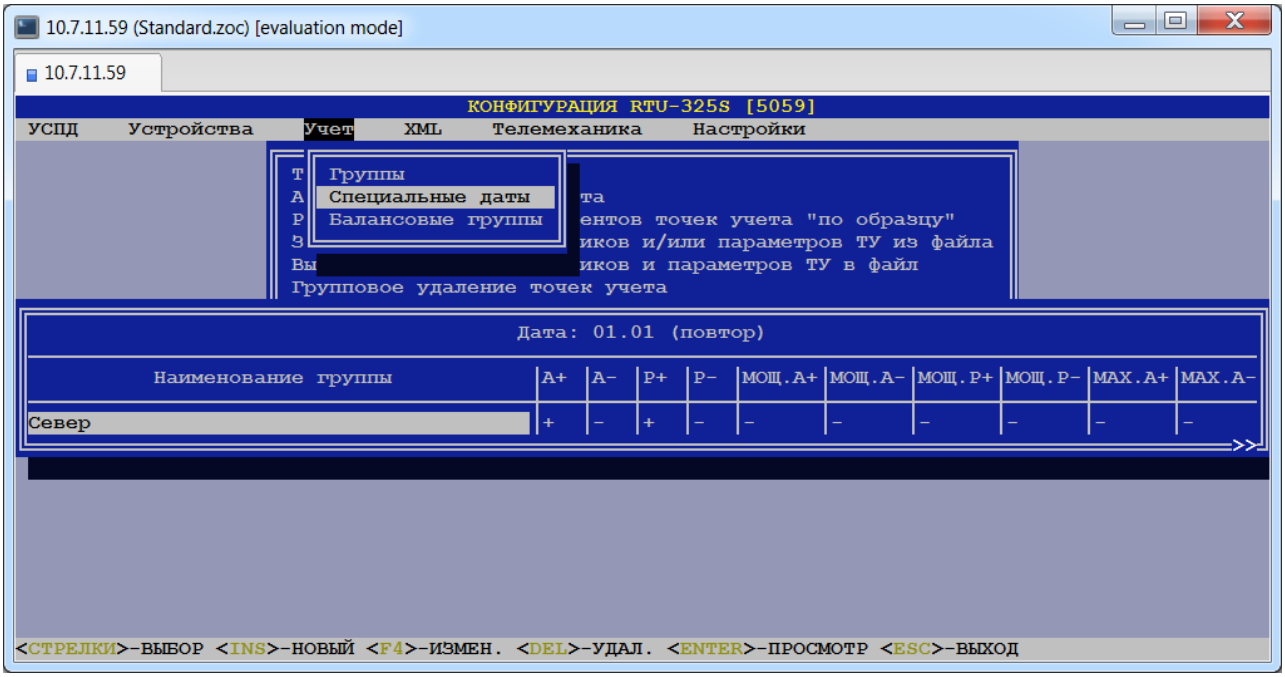


; The kind of date.
Permissible values: {«Неповторяющаяся», «Повторяющаяся»} . . ; Date (dd.mm.gg).

In this field, the user may set a calendar date, which is a special date. Data type: date in «ДД.ММ.ГГГГ» - if the date type «Неповторяющаяся» is selected, Date in «ДД.ММ» format - if date type «Повторяющаяся» is selected.

; Day of the week.
Permissible values: for the date type «Неповторяющаяся» { «Любой»}, for the type of date «Повторяющаяся» { «Любой», «Воскресенье», «Понедельник», «Вторник», «Среда», «Четверг», «Пятница», «Суббота»}. The date set in the field «Дата (дд.мм.гггг)» will be considered special if it coincides with the scheduled day of the week.

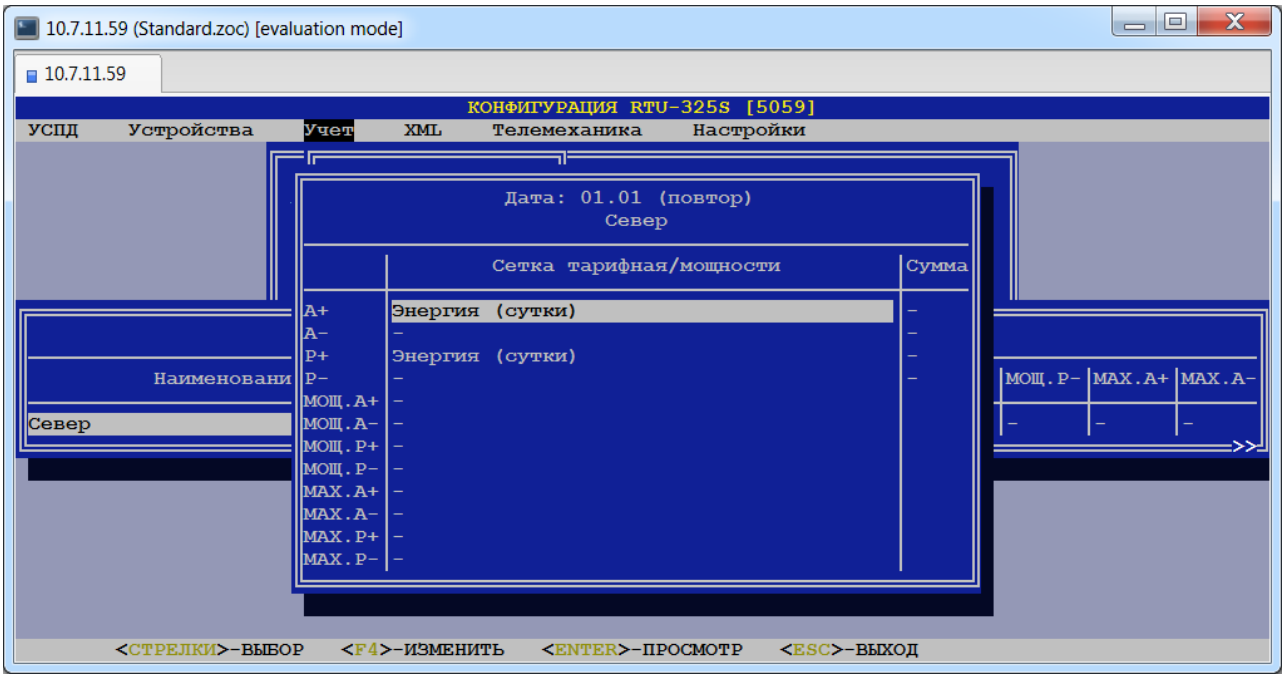
After the introduction/selection of a specific special date, the user will be provided with a table of the list of groups to which the special date applies. Each line of this table contains the following information fields:



; Group name.
This field contains the name of the group to which the selected special date applies. A+; A. ; P+ ; R-; MY MUSIC.A+.; MY MUSIC.A.-; MY MUSH.R+; MUSIC.R. ; MAH.A+; MAH.A- ; MAH.R+; MAH.R.

The fields include a sign (mark `+') of the special date of the tariff grid (A+, A-, P+, P-), the power grid (LOC.A+, MAC.A-, MAC.P+, MAC.P-) and the recording in the archives of the RTU of the maximum power in the respective power zones.

In selecting a particular group, the user will be provided with a table with the following parameters:



- **A+.**
- **Ahh.**
- **P+.**
- **R-**

These parameters allow for a tariff grid to account for the active energy consumed, active issued, jet consumed and reactive energy issued at tariffs, respectively. Also in the field "Сумма", the user can include (sign '+') a 24-hour total energy calculation function with a recording in the RTU archives.

- **MY MUSIC.**
- **IT'S OKAY.**
- **MY MUSIC. R+.**
- **MEET.R.**

This option allows the power grid to be set to record the intervals of the power of the active energy consumed, actively produced, jet consumed, and jet generated energy in the power zones respectively.

- **MAC.A+.**

Acceptable values: «+» or «-» . «+» shall record the maximum power of the active energy consumed in the respective power areas in the RTU archives.

- **MAH.A.**

Allowable values: «+» or «-» . «+» shall record the maximum power output values of the relevant power areas in the RTU archives.

- **MAC.R+.**

Allowable values: «+» or «-» . «+» shall record the maximum power of the reactive energy in the respective power areas in the RTU archives.

- **MAH.R.**

Acceptable values: «+» or «-» . «+» shall record the maximum power of the reactive energy emitted in the respective power areas in the RTU archives.

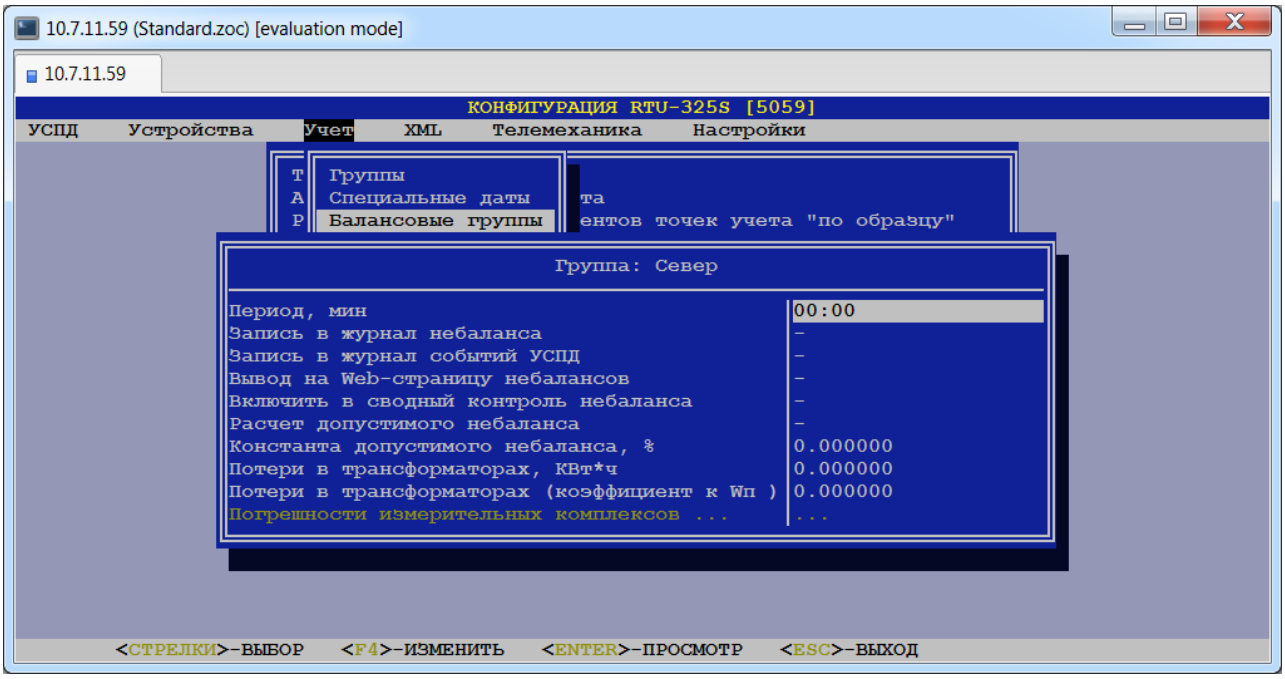
20.3. Definition of balance sheets.

(Check item «Балансовые группы»)

This paragraph defines the groups for which the electricity balance will be calculated. The calculation shall be done according to the regulatory document "Model instruction for accounting for electricity production, transmission and distribution. RD 34.09.101-94».

In this menu item, a list of balance sheets will be presented first, if defined. Once a particular balance sheet group is selected, the user will be provided with a table with the parameters described below, which the user can edit.

When entering a new balance sheet group, the following parameters should be selected from the list defined in paragraph «Группы» and edited in the open table:



- **Period, min.**

This option allows the calculation cycle of the electricity balance to be set. Recommendation: Set an equal commercial interval (30 min).

- **It's in the balance sheet.**
  Permissible values: «+» (recording in RTU archives of the balance sheet) or «-» (not recorded).
- **Recorded in the RTU event log.**
  Permissible values: «+» (recording of events about imbalances in RTU event log) or «-» (not recorded).
- **Conclusion on the web page of imbalances.**
  Permissible values: «+» (read the results of this group on web-based (page) or «-» (no output).
- **Put it in the consolidated control of the imbalance.**
  Permissible values: «+» (insert group into the consolidated balance control) or «-» (not include).
- **Calculation of the acceptable imbalance.**
  Permissible values: «+» (calculate permissible group imbalances) or «-» (no calculation).
- **Permissible imbalance constant, %.**
  Data type: the physical number.

The introduction of an acceptable imbalance in constant is necessary when the previous parameter "Расчёт допустимого небаланса" specifies the sign «-».

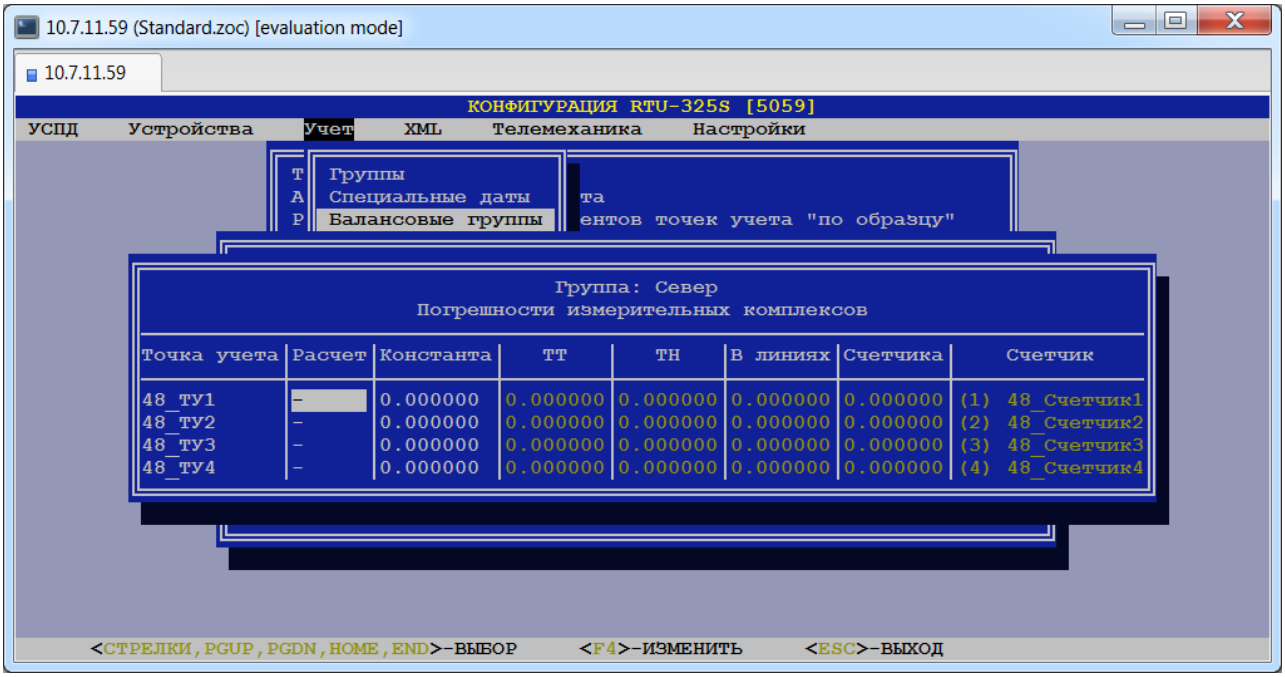
- **Losses in transformers, kWh.**
  Data type: the physical number. This parameter allows the value of the losses in transformers to be set in kWh.
- **Losses in transformers (Wp coefficient).**

Data type: the physical number. This parameter gives the value of the losses in the transformers as the ratio of the power output to Wp.

- **The errors of the measuring complexes...**

This paragraph is only available when the "Расчёт допустимого небаланса" parameter specifies the sign «+» '.

In selecting this option, a table will be presented to the user, each row of which contains the following information fields:



; Countdown point.
This field contains the name of the account point within the balance sheet group. Truck.

Allowable values: «+» or «-» . At the value of «+», the permissible relative error of the measuring set of the given metering point will be calculated. For «-» the user shall be given a permissible relative error as a constant.
Constanta.

This parameter defines the value of the limit of the permissible relative error of the measuring set of the given metering point as a constant.

The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «-». TT.

This parameter defines the value of the permissible relative error limit of the current transformer.

The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «+». TN.

This parameter defines the value of the permissible relative error limit of the voltage transformer.

The input of this parameter is required when the parameter "Расчёт" specifies the sign «+».

; In the lines.

This parameter defines the voltage loss in the meter accession lines to the voltage transformer.

The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «+». The meter.

This parameter determines the limit of the allowable basic error of the meter.

The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «+». The meter.

This field contains the name of the meter at the given metering point, is not for information and editing.

21. The accession account.

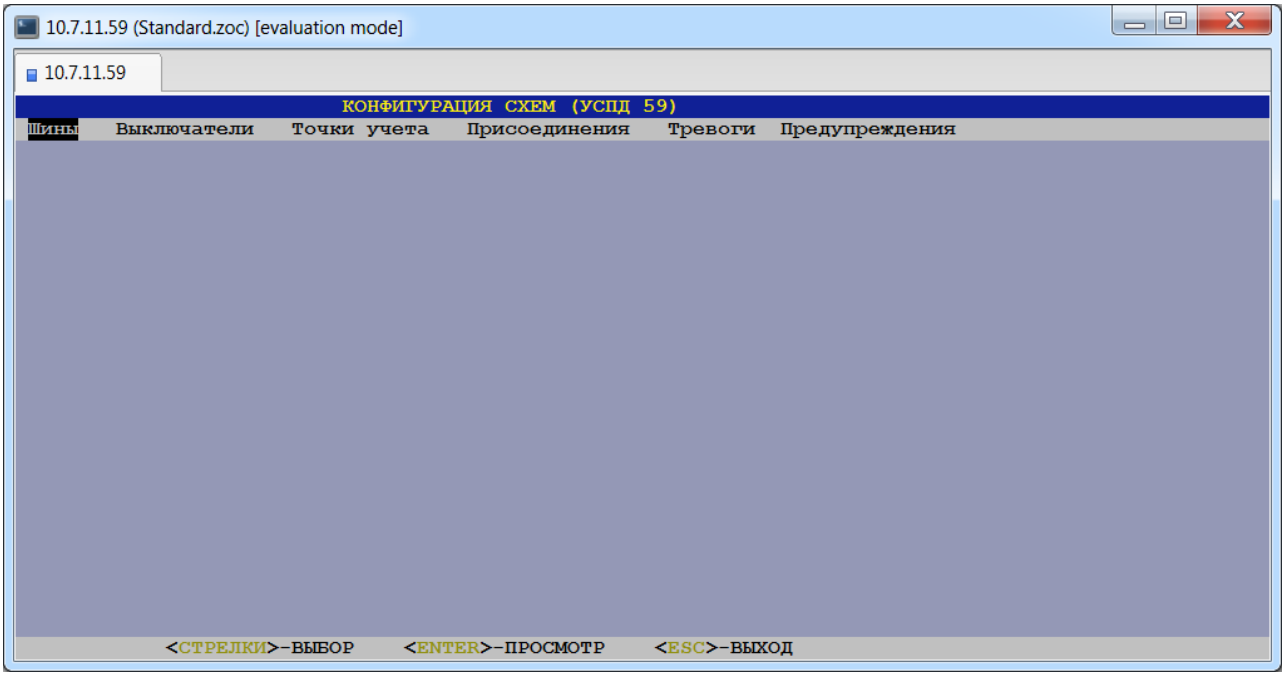
(Chart item «Учёт» > «Учёт электроэнергии» > «Присоединения (редактор эл. схем)»)

This paragraph defines electrical circuits by means of an electrical circuit editor:

- Account objects with bypass switch(s) showing the emergency conditions of the switch(s) showing the conditions of the switch(s) at which the warning shall be generated (warning schemes). The user must determine for himself which of the electrical circuits shall be assigned to the crash diagrams or warning diagrams. The difference between accident patterns and warnings is logical and is used to generate alarming messages at different levels.

The crash patterns may contain warning schemes. Accession schemes may contain warning schemes and/or accident diagrams. It is recommended that warning schemes be established first to create the attached schemes, then accident diagrams and, last but not least, connection diagrams.

The electrical circuit editor will open when selecting this paragraph:



The items of the electrical circuit editor are described below.

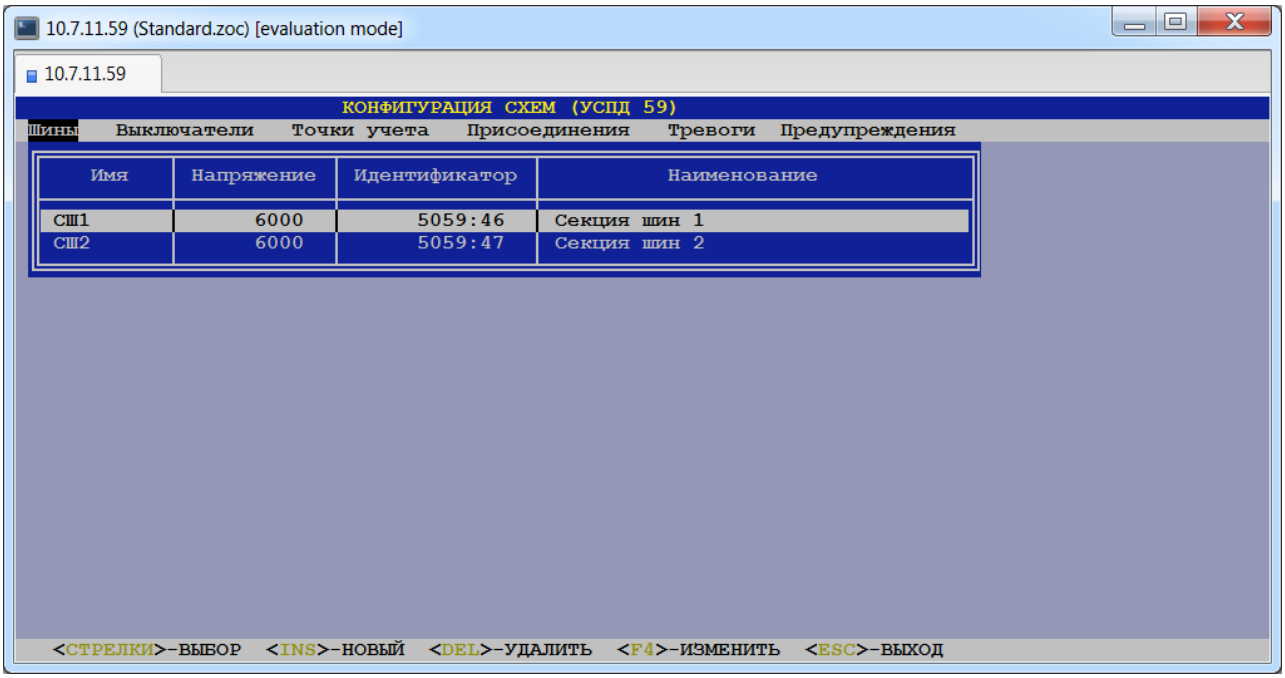
21.1. Definition of the busbar list.

(Check item «Шины»)

In this menu paragraph, the user must identify the list of electrical circuit busbars.

The user may create new busbars as well as edit/remove existing ones. If a busbar is created, the fields described below shall be filled in the open table.

In selecting this paragraph, the user will be provided with a table, each row of which contains the following information fields:



; Name.
This field contains the name of the busbar of the electrical circuit. Stress.

Data type: whole number. This parameter defines the busbar voltage. Identifier.

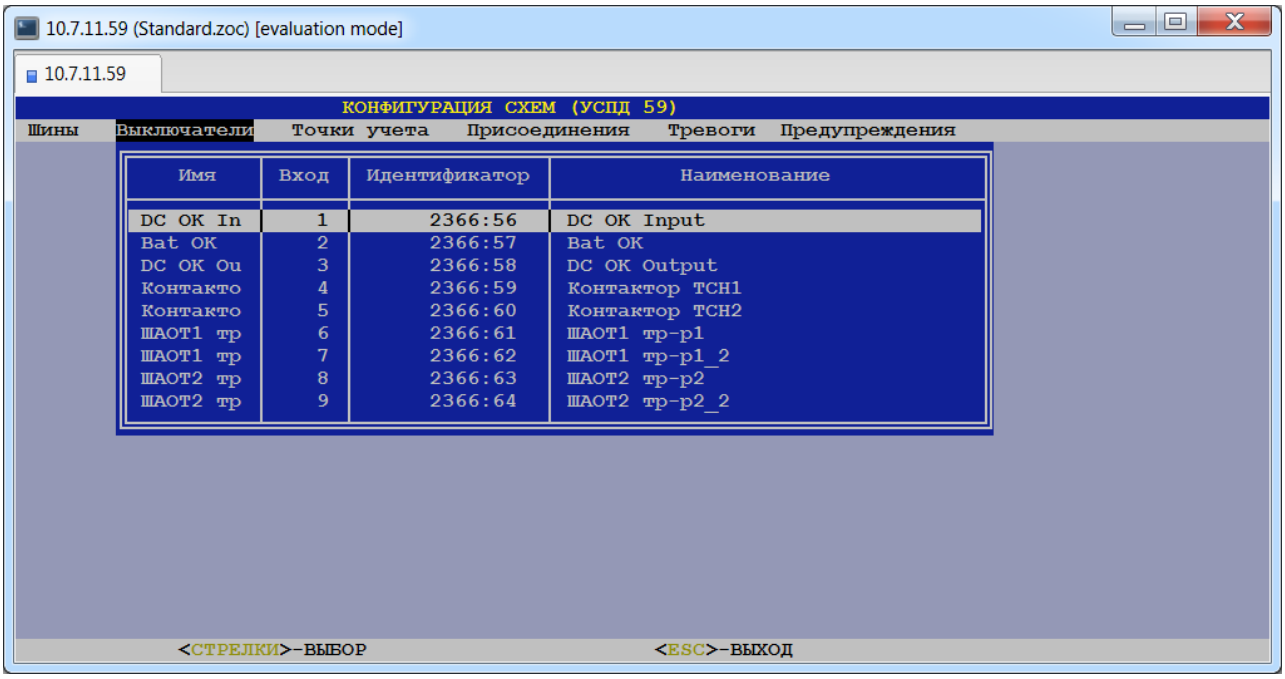
Data Type: Text Line. May be used for multilevel hierarchical systems to identify the object of the account. Name.

Data Type: Text Line. This field contains a description of the busbar.

21.2. List of switches.

(Check item «Выключатели»)

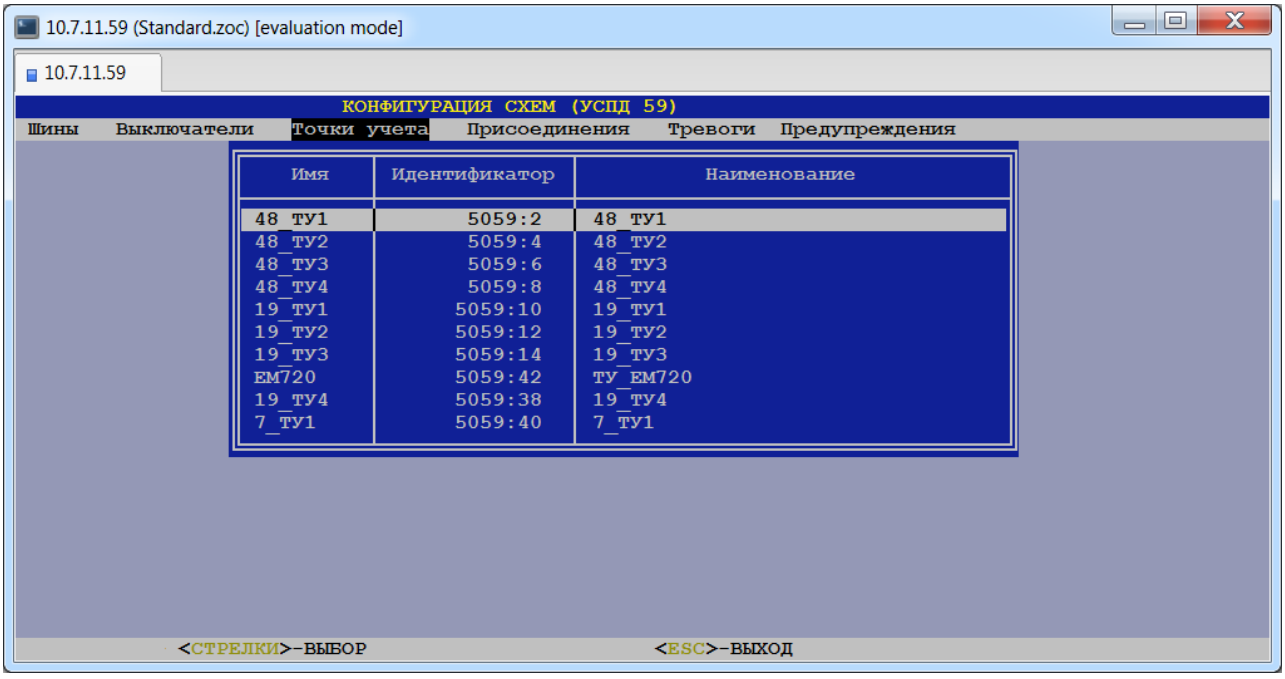
This menu item presents a table with a list of switches that have been reconfigured in the «Устройства» > «Дискретные объекты» menu item:



21.3. List of points of account.

(Check item «Точки учёта»)

This menu item presents a table with a list of the metering points that have been reconfigured in the «Учёт» > «Учёт электроэнергии» > «Точки учёта» menu item:



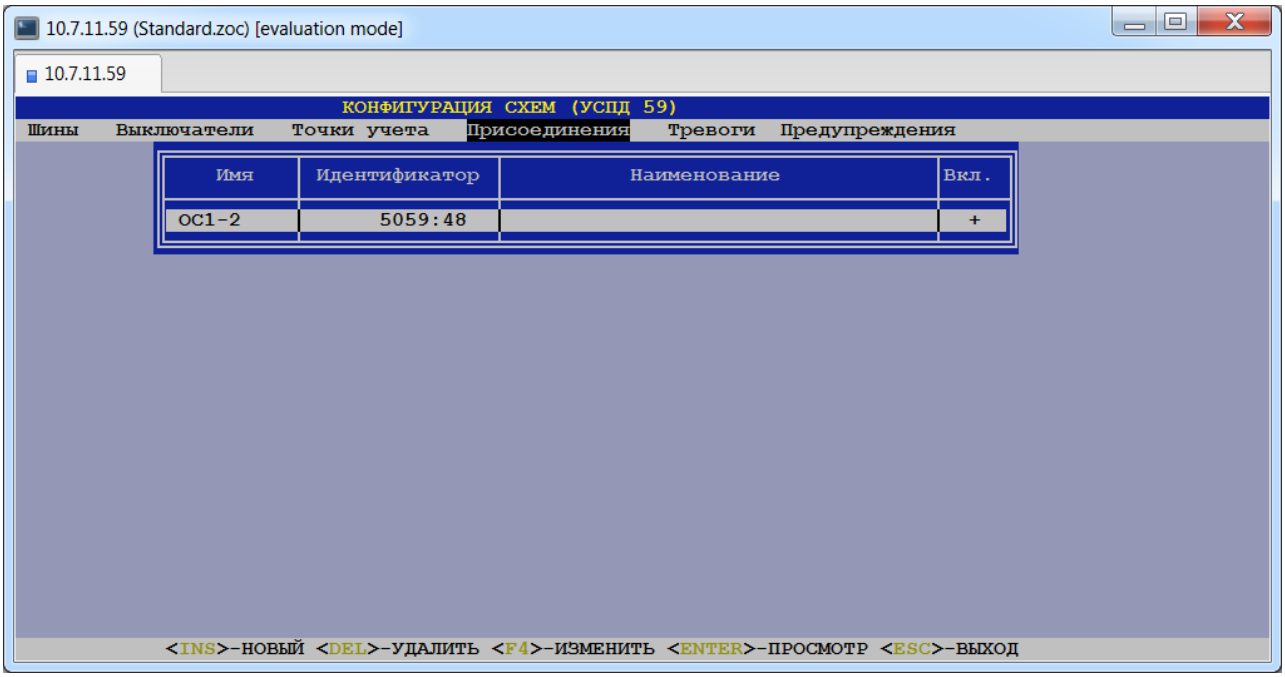
21.4. Creation of accession schemes.

(Check item «Присоединения»)

In this menu paragraph, the user should create a list of the attachments and corresponding electrical circuits of the objects to account for.

The user may create new accessions as well as edit/remove existing ones. In the case of accession, the fields described below should be filled in the table that has been opened.

In selecting this paragraph, the user will be provided with a table, each row of which contains the following information fields:



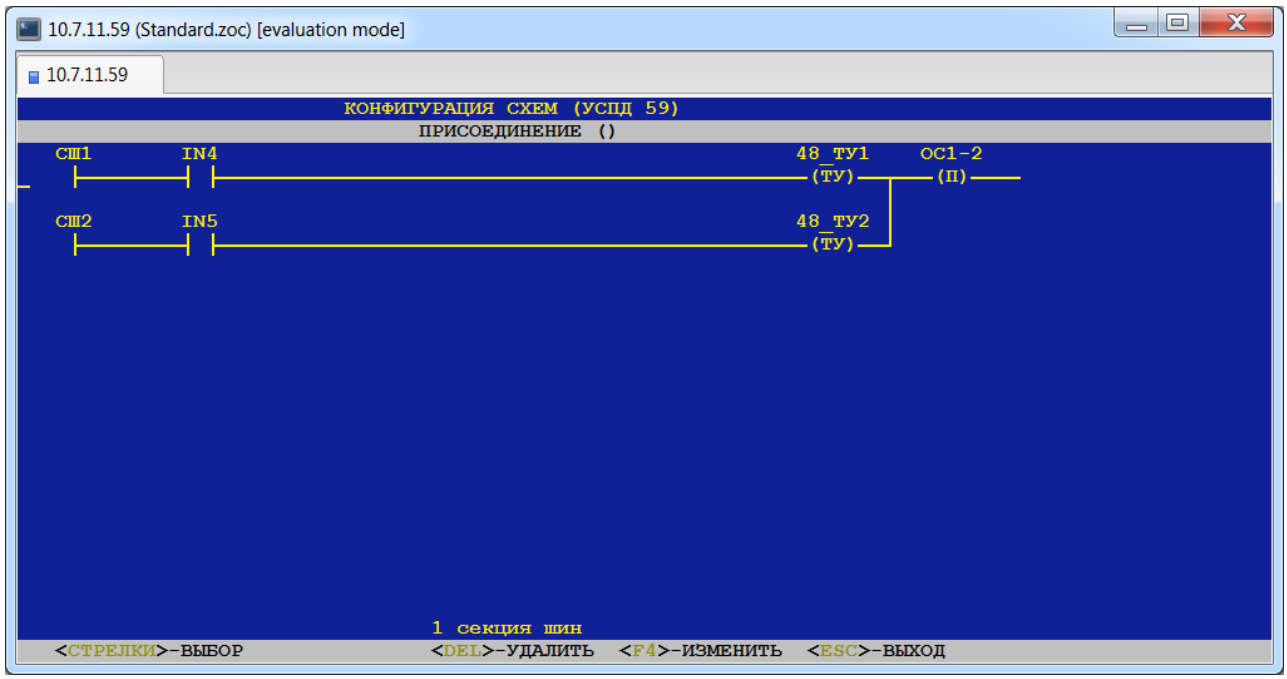
; Name.
This field contains the short name of the attachment for the electrical circuit. Identifier.

Data Type: Text Line. May be used for multilevel hierarchical systems to identify the object of the account. Name.

Data Type: Text Line. This field contains the name of the accession. Introduction

Allowable values: «+» - RTU will process the electrical circuit,
«-» - RTU will not process this electrical circuit.

When selecting a specific attachment, the user will be provided with an electrical circuit that the user can edit (see paragraph «Редактирование электрической схемы»):



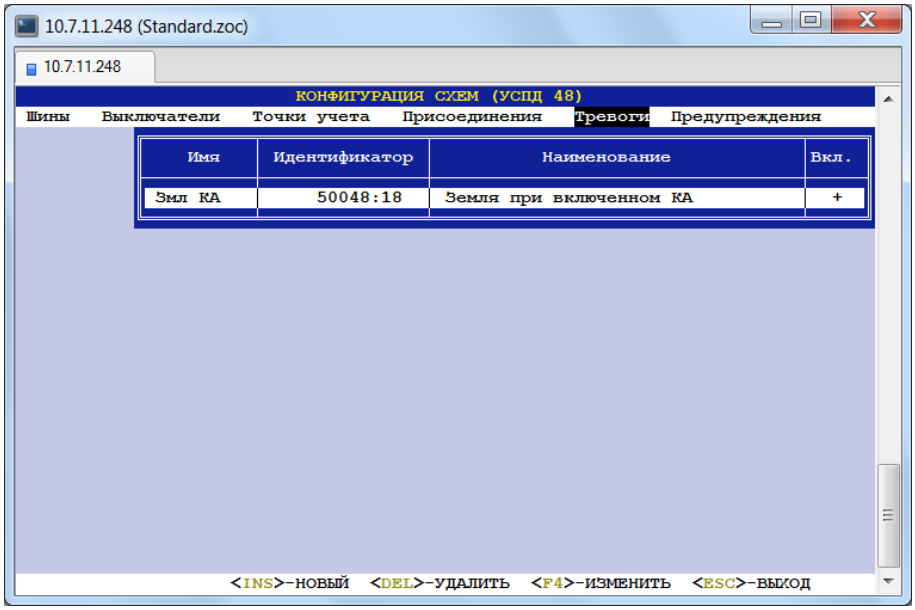
21.5. Create alarm patterns.

(Check item «Тревоги»)

In this menu paragraph, the user can create a list of alarms and corresponding electrical circuits of the objects.

The user may create new alarms as well as edit/remove existing ones. When creating an alarm, the following fields must be filled in in the open table.

In selecting this paragraph, the user will be provided with a table, each row of which contains the following information fields:



; Name.

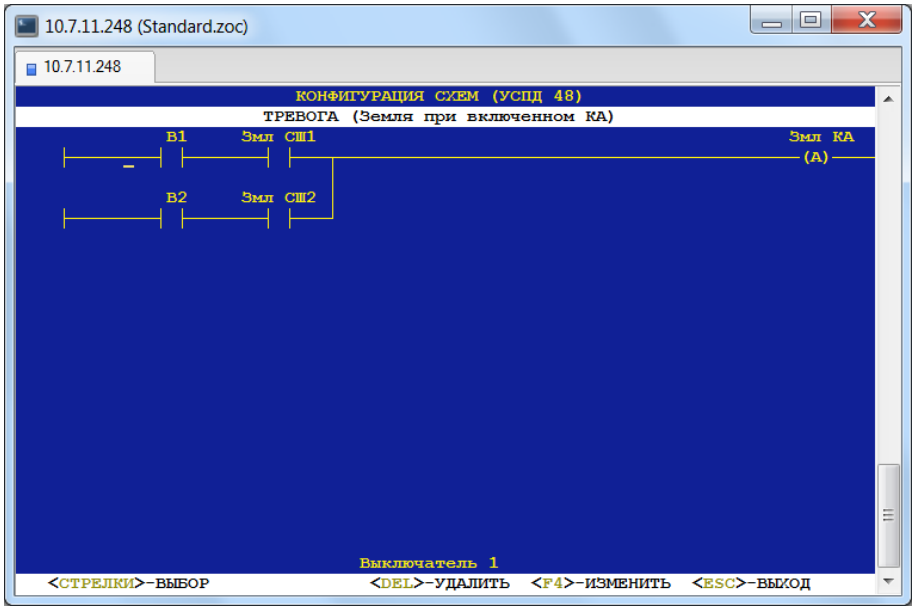
This field contains the name of the alarm. Identifier.

Data Type: Text Line.

May be used for multilevel hierarchical systems to identify the object of the account. Name.

Data Type: Text Line. This field contains a description of the alarm. Introduction

Allowable values: «+» - RTU will process the electrical circuit, «-» - RTU will not process this electrical circuit. When selecting a specific alarm, the user will be provided with an electrical circuit which the user can edit (see paragraph «Редактирование электрической схемы»):



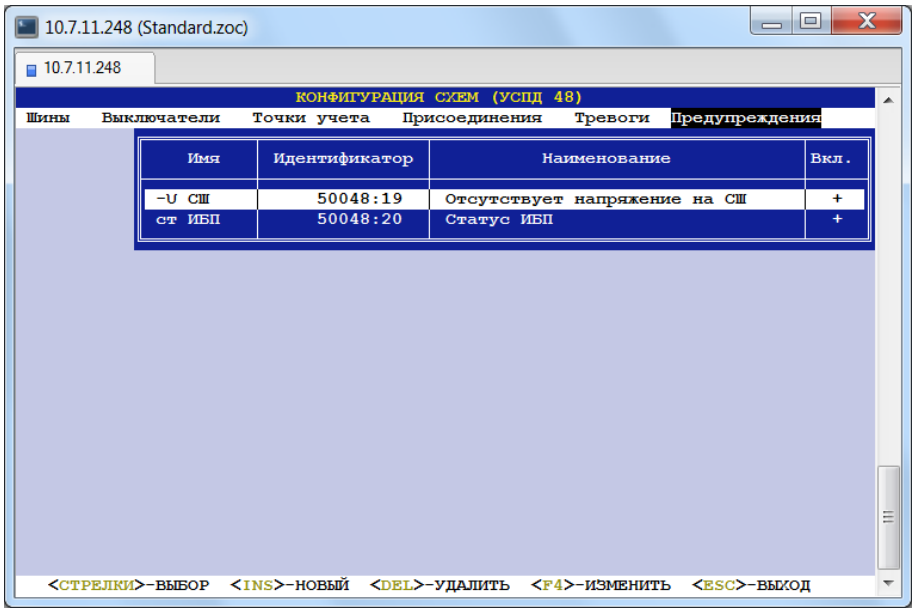
21.6. Creation of warning schemes.

(Check item «Предупреждения»)

In this menu paragraph, the user can create a list of warnings and corresponding electrical circuits of the objects.

The user may create new warnings as well as edit/disposal existing ones. When warning is created, the fields described below must be filled in the table that is open.

In selecting this paragraph, the user will be provided with a table, each row of which contains the following information fields:

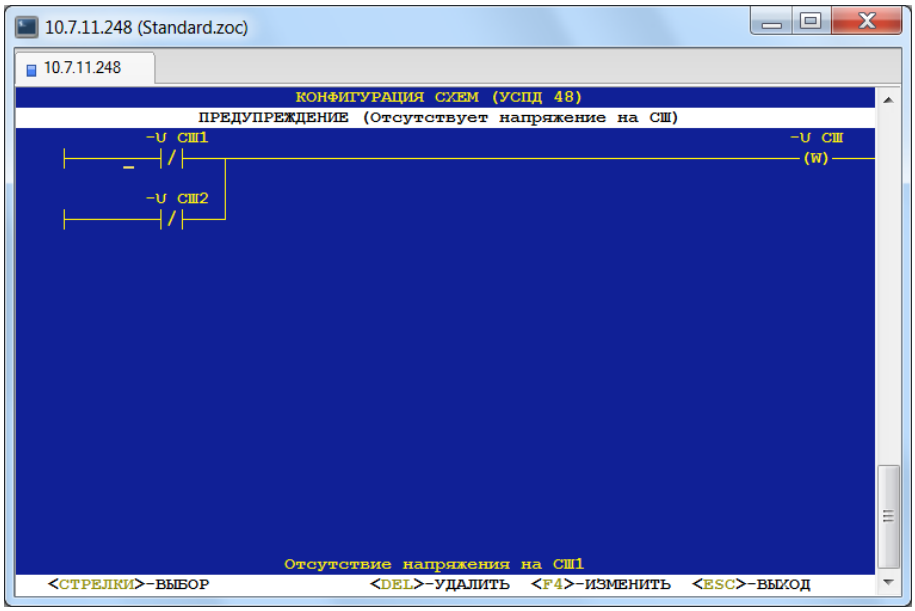


; Name.
This field contains the name of the warning. Identifier.

Data Type: Text Line. May be used for multilevel hierarchical systems to identify the object of the account. Name.

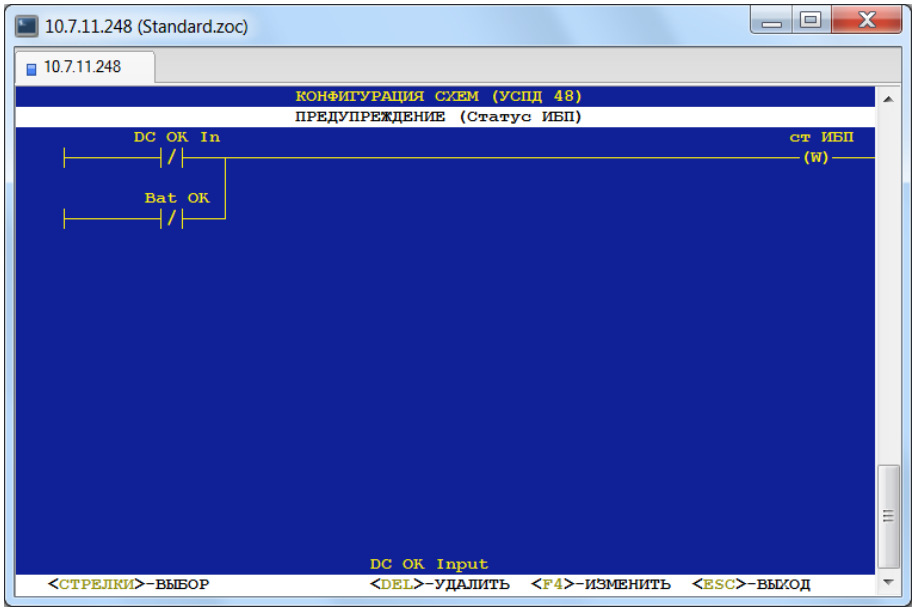
Data Type: Text Line. This field contains a description of the warning. Introduction

Allowable values: «+» - RTU will process the electrical circuit, «-» - RTU will not process this electrical circuit. When selecting a specific warning, the user will be provided with an electrical circuit which the user can edit (see paragraph «Редактирование электрической схемы»):

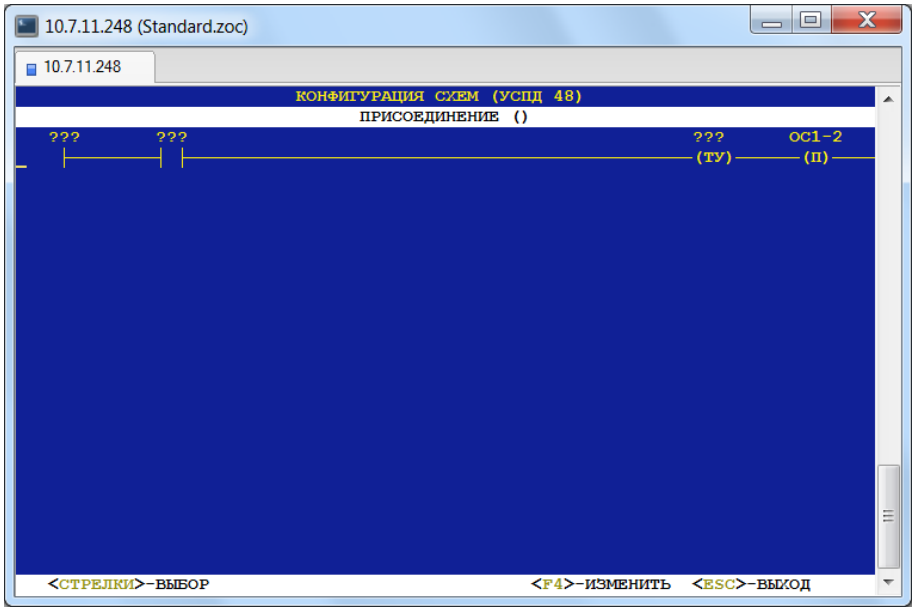


21.7. Edit the electrical circuit.

Following the selection of joining/accident/warning (see descriptions above), the user will be provided with an electrical circuit for viewing/reforming:



In the event of a new accession/accident/warning, the user will be provided with an initial electrical circuit template for editing:



One electrical circuit (adherence diagram, crash diagram, warning scheme) may be located on only one monitor screen.

The electrical scheme of accession may contain the following elements:

- Busbar,
- Switch switch,
- The alarm,
- A warning,
- horizontal line,
- vertical line,
- Countdown point.

The electrical alarm scheme may contain the following elements:

- Switch switch,
- A warning,
- horizontal line,

- vertical line.

The electrical warning scheme may contain the following elements:

- Switch switch,
- horizontal line,

• a vertical line. On an electrical circuit, up to 6 elements can be placed on each of the 7 possible horizontal lines (e.g., a tire) of the elements.

There are two modes of editing - editing the layout and editing the current element.

The current element is selected in the chart editing mode with a crucifix that is located to the left of the cell and the name of the item is displayed at the bottom of the screen. The exception is an element «вертикальная линия» where the italics is selected to the right of the cell. The operation of adding, editing or removing an existing element is performed by using the relevant keys (see bottom-up clue).

In the mode of editing the current element, the italics illuminates the name of the current element. The chart editing mode is done using the <Esc> key.

22. Accounting for thermal power, water and runoff.

(Chart items «Учёт» > «Учёт тепловой энергии», «Учёт расхода воды», «Учёт стоков»)

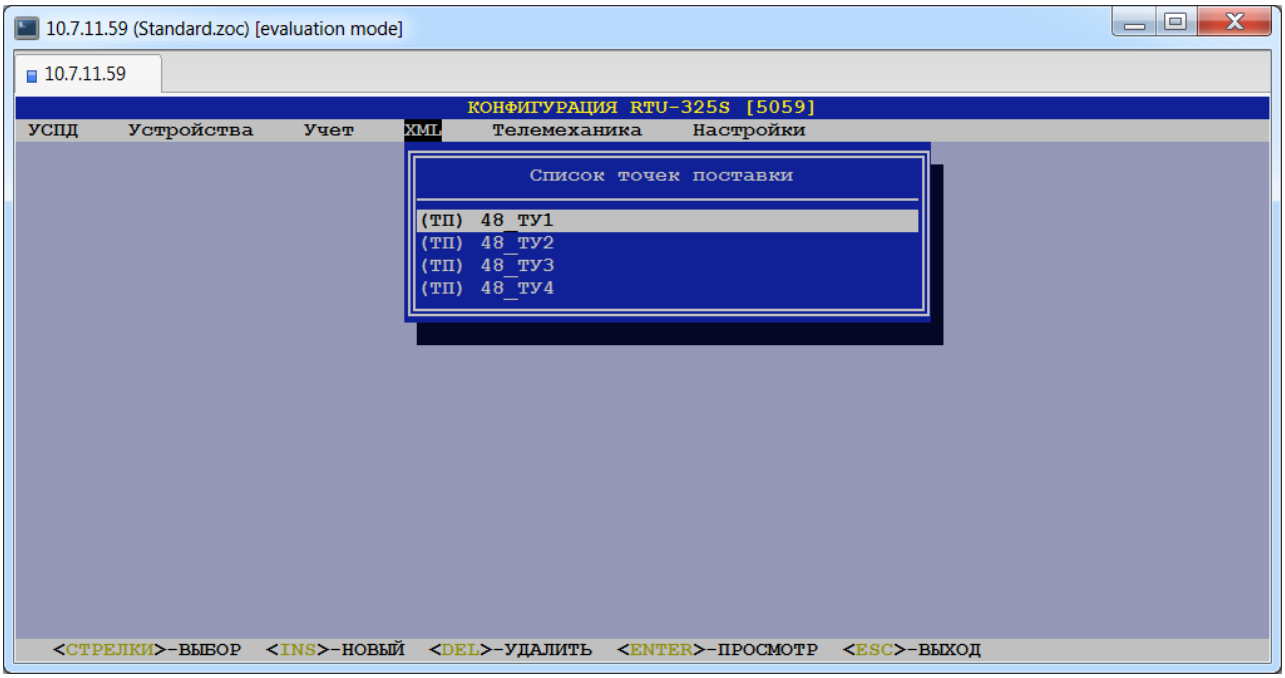
These points identify the metering points, calibrations and groups for heat metering and flow meters. The configuration in these paragraphs is similar to that given in paragraphs 17 to 20.2 above.

23. XML: document 800x0.

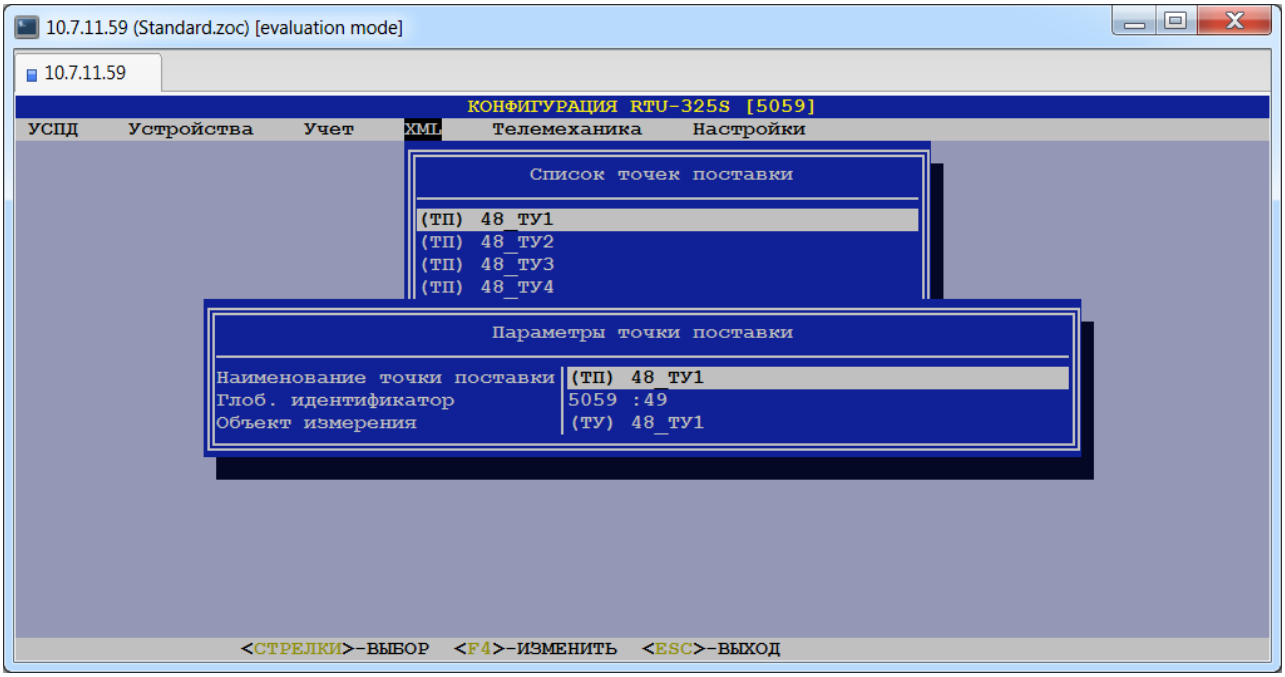
This menu item is designed to create document configurations of 800x0.

23.1. Supply points.

In this menu item, the user should create a list of delivery points:



When a new delivery point is created, the user must select the measuring object from the list of metering points provided. When selecting a specific delivery point, the user will be provided with a table of the delivery point parameters for viewing/revision:



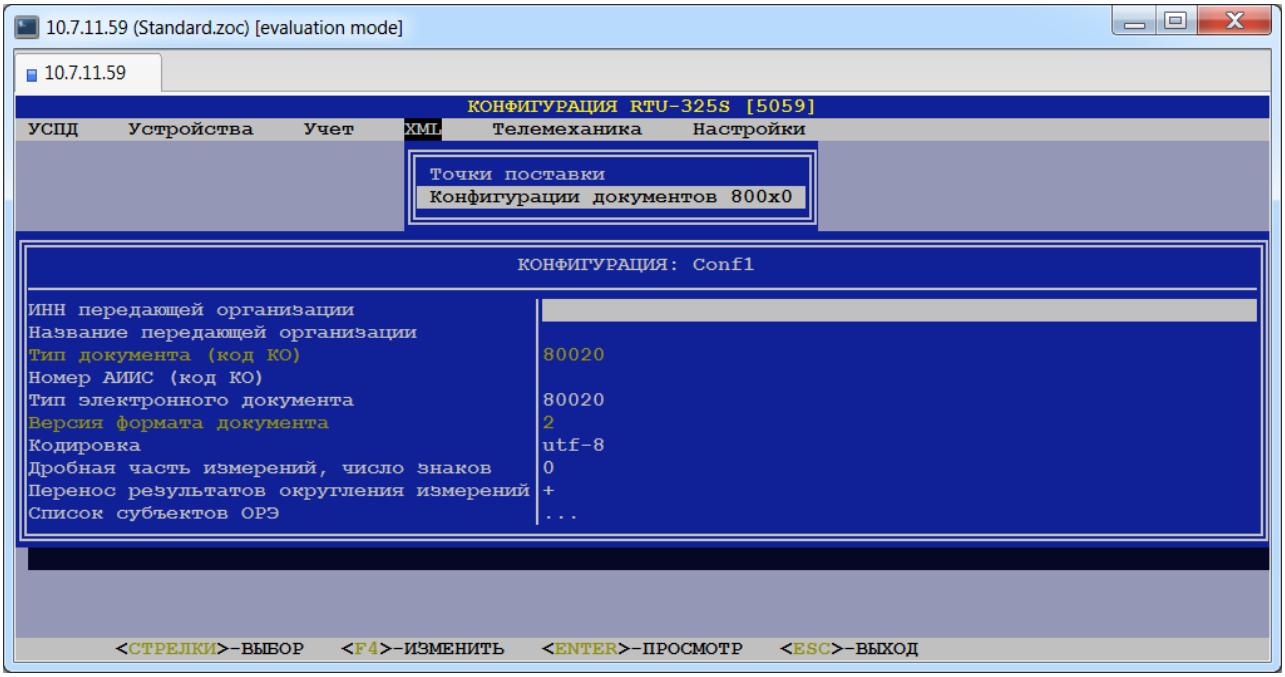
; Name of delivery point.
This field contains the name of the delivery point. Global identifier.

Can be used in multilevel hierarchical systems to identify all accounting objects in a unique way. Subject.

This field contains the name of the object of measurement.

23.2. Document configuration 800x0.

In this point, the user should create document configurations of 800x0. Once the name of the new configuration has been introduced, the user will be provided with a table to perform the following parameters:



; The INN of the transmitting organization.
Data Type: A string of symbols. This field contains the INN of the transmitting organization. Name of transmitting organization.

Data Type: A string of symbols. This field contains the name of the transmitting organization. Type of document (CO code).

Plant: 80020. This field contains the number assigned to the DA of this type of document. The field is not subject to change and reference. AIIS number (CO code).

Data Type: A string of symbols. This field contains a code assigned to the organization ' s AIIS CA. Type of electronic document.

Allowable values: {«80020», «80030», «80020*»}. Plant: 80020. This field contains the type of electronic document. Type of document 80020 - used for transmission of measurement results. Type of document 80030 - used to transmit data on the state of the means and objects of measurement. Type of document 80020* - used for transmission of measurement results (MEHNEGROSS). Document format version.

Plant: 2. This field is not subject to change and reference. Code.

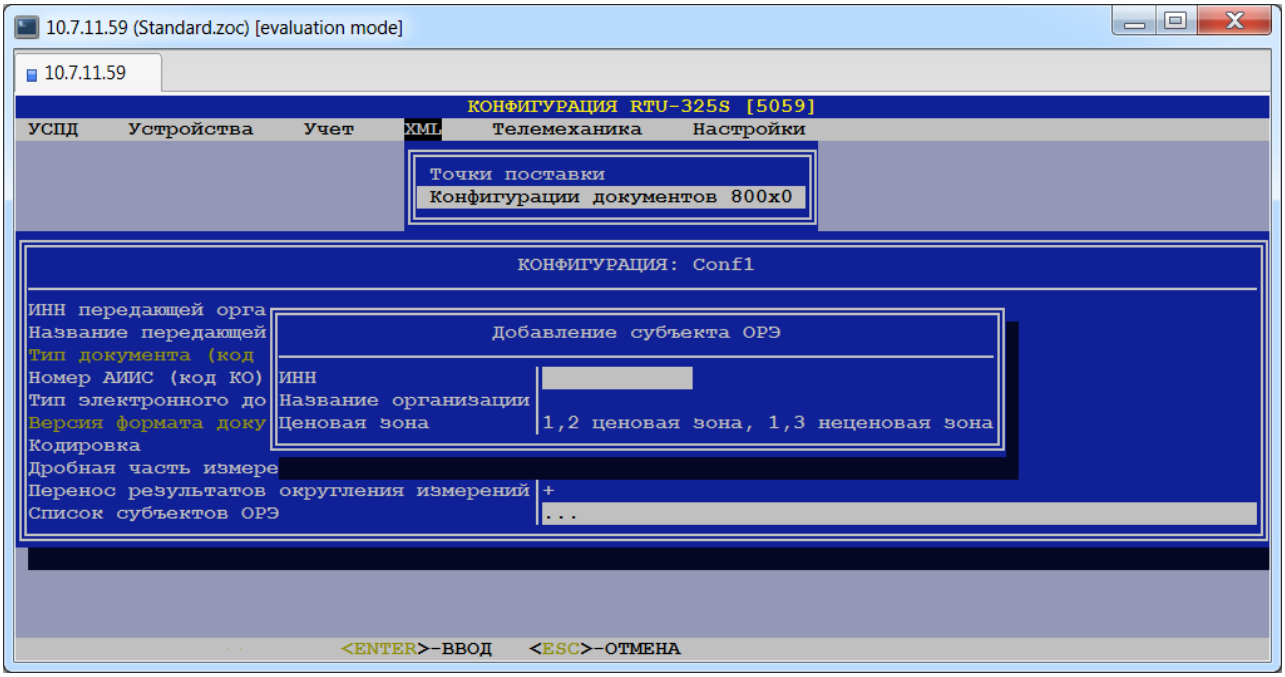
Allowable values: {«utf-8», «windows-1251»}. In this field, the user must select the required document coding from the list. A fraction of the measurements, number of signs.

Data type: whole number.

Plant: 0. In this field, the user may specify the accuracy of the data presentation. Transport of the results of the rounding.

Permissible values: «+» or «-» .

; List of entities of the EDP.
When selecting this paragraph, the user will be provided with a table to complete the list of EPR entities.



- **INN**
  This field contains the organization ' s INS.
- **Name of organization**
  This field contains the name of the organization.
- **Price zone**
  Allowable values: {«1,2 ценовая зона, 1,3 неценовая зона», «2 неценовая зона»}. In this field, the user must select the price area from the list.

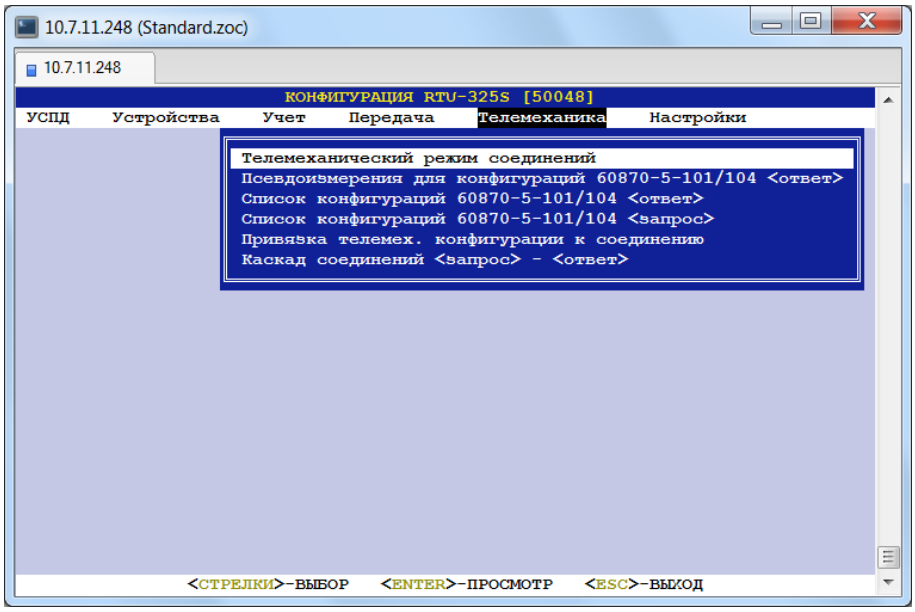
24. RTU in HTM mode (teletechnics) and PPP mode (transmission station).

(Check item «Телемеханика»)

RTU for HTM (telemechanics) is structured in accordance with the RMEC GOST 60870-5-101 and the RMEC GOST 60870-5-104.

Before configuring GOST R МЭК 60870-5-101 /104 protocols, the user must configure the RTU to collect data from external devices (electricity meters, discrete objects, analog objects, etc.) in the menu items «Настройки» , «RTU» , «Устройства» , «Учёт» .

The following menu will be presented to the user when selecting this item:



24.1. Choice of telecontrol mode of connections.

(Check item «Телемеханика» > «Телемеханический режим соединений»)

The RTU work in HTM and PPP mode involves synchronizing the protocols for handling external devices (e.g. electric power meters) with those of telemechanics 60870-5-101/104 (real time mode) for the speediest possible data transmission. The data are transmitted directly without using the archives in the non-volatile memory of RTU. This is a fundamental difference from the standard operation of RTU when data transfer to top level systems occurs asynchronously with the operation of the protocols of external devices. In standard operating mode RTU, incoming data are first recorded in the non-volatile memory archive and only then available for reading by transmission protocols to the upper level systems operating «по запросу».

The operation of tele-mechanics protocols 60870-5-101/104 requires the indication of tele-mechanical operation of the relevant protocols of external devices.

This menu item contains a list of protocol connections that can be operated in tele-mechanic mode. The following is a description of the characteristics of the operation of the specific protocols in tele-mechanical mode.

The «Счётчики ...» protocol in tele-mechanical mode of the connection shall be operated in a special mode «быстрого» of collecting information from the meter and shall provide:

- Direct transmission of all data in the polling and telecontrol configuration, telecontrol protocols without recording into the RTU non-volatile memory archive;

• Recording of RTU's profile and event logs to the RTU's non-volatile memory archive according to the RTU standard operating mode settings. Such protocol functions in tele-mechanical mode connection provide for the use of electric meters not only with two but also with one interface in integrated tele-mechanics and accounting systems.

The «Чтение дискретного сигнала» protocol in telecontrol mode of the connection provides for the direct transmission of recorded changes to external discrete signals to telecontrol protocols even in the absence of a connection task.

The «Дискретное управление» protocol in the telecontrol mode of the connection allows the performance of telecontrol control commands.

24.2. Pseudometry for configuration 60870-5-101/104 < response>.

(Check item «Телемеханика» > «Псевдоизмерения для конфигураций 60870-5-101/104 <ответ>»)

Pseudometry is the calculated value that results from the processing of the selected multiple measurements of one of the following functions.

When selecting this menu item, the user will initially be provided with a table of the list of existing pseudo-measures for editing/deleting or, if not, a proposal to create a new pseudo-measuring. Each pseudo-measuring is presented in a separate line in the table of the list of pseudo-measures.

The table line of the list of pseudo-measures contains the following information fields: Pseudo-measuring for 60870-5-101/104 < answers>.

This field contains the name of the pseudo-measurement. Function.

This field defines a function that will apply to the selected set of measurements. The following measurement treatments are supported.

Telemeasurement processing functions:

- sum of values,
- Average
- Minimum value
- Maximum value. Tele-signal processing functions:

- Group I,
- The association is I.E.

In selecting a specific pseudo-measuring, a table of the list of measuring converters with the number of measurements shall be opened. A list of the measurements to be included in the pseudo-measuring will be provided when selecting the measuring converter. The measurements of the appropriate measuring converters may be added/deleted in these tables.

24.3. List of configurations 60870-5-101/104 < replies>.

(Check item «Телемеханика» > «Список конфигураций 60870-5-101/104 <ответ>»)

RTU supports simultaneous operation of several protocols 60870-5-101/104, each of which may have an individual tele-mechanic configuration. In addition, several telecontrol options are often required during the installation phase

The configuration for one protocol is one working and the other debugging. This includes supporting a list of multiple tele-mechanic configurations.
In this menu paragraph, the user can create a new or delete any existing tele-mechanic configuration, as well as modify configuration parameters.

When selecting this menu item, the user will initially be provided with a table of the list of existing tele-mechanic configurations or, in the absence of this, with a proposal to create a new tele-mechanic configuration. Each tele-mechanic configuration is presented in a separate row in the table of the tele-mechanical configuration list.

The table line of the tele-mechanics list contains the following information fields (without editing):

; List of configurations 60870-5-101/104 < replies>.
This field contains the name of the telecontrol configuration.

- **«60870-5-101». • «60870-5-104».**

These fields define the protocol for which the telecontrol configuration is created (sign «+»). One tele-mechanic configuration can be designed to work with both of the above protocols.

; «Уникальные адреса» .
This field contains an indication of the results of the uniqueness test of all addresses in the configuration:
- Sign «+» - all the addresses of the configuration are unique. - Sign «-» - addresses of the configuration are unique. The normal operation of a telecontrol protocol is possible only if all telematics addresses are unique. If the addresses of any tele-mechanic configuration are not unique (sign «-»), the configuration will not be tied to the connection by «Конфигуратор» (see menu item «Телемеханика» > «Привязка телемех. конфигурации к соединению»).

In the table of the list of telecontrol configurations, the user can perform the following functions (see the bottom-up clue):

- Create a new telecontrol configuration.
- Create a new telecontrol configuration by copying the existing one.
- Remove existing tele-mechanic configuration.
- Change the name of the telecontrol configuration.
- Change the tele-mechanic configuration. The functions are described below.

24.3.1. Create a new telecontrol configuration.

The development of a new telecontrol configuration takes place in three phases. In step 1: The user is requested to define the general characteristics of the configuration to be created by filling in the following fields in the proposed table.

; The configuration name.
Data Type: Text Line.

- **60870-5-101. • 60870-5-104.**

Plant: «+» . Permissible values: Sign «+» or «-» («Да» / «Нет»). These features determine the protocol for which a new tele-méchanic configuration is being created. You can create a new tele-mechanic configuration simultaneously for both of the above protocols. The configuration created for protocol only 60870-

5-101 may not then be used for 60870-5-104 if the configuration defines the length of the general address field of less than 2, the field length is the reason for the transmission of less than 2 and the field length of the information object address is less than 3.

; Type of measurement list.

Plant: «По умолчанию» . Permissible values: {«Средний», «Минимальный», «Максимальный» , «Коммерческий» : This characteristic defines the list of measurements for which the non-zero addresses will automatically be formed. This parameter is not subject to change after the new tele-meteorological configuration has been created. However, for any configuration, measurements can be added/deleted and all address parameters changed.

The value «Минимальный» (assured by default) shall be selected for the assignment of non-zero addresses for the following measurements:

- electrical grid parameters; - discrete input signals; - discrete output signals; - analog input signals. In addition, when selecting the value «Минимальный» for the measurement parameters, the address of the measurement shall not be separate but shall be used. The addresses of the information objects for the minimum list shall be assigned consecutively from 2. The general address shall be assigned to the same factory number RTU.

The value «Максимальный» shall be selected to assign non-zero addresses to the entire measurement list.

The value of «Коммерческий» shall be selected for the assignment of non-zero addresses to the business account measurement list (an address for integrated measurements (costs, readings) shall be automatically assigned.

The value «Средний» shall be selected for the assignment of the non-zero address «оптимальному» of the measurement list.

At 2 stage: after the <Esc> key is removed from the general characteristics table:

- automatically a new tele-mechanic configuration is formed,
- The unique addresses of the information objects are checked;
- The user is given the opportunity to modify the parameters of the tele-mechanical configuration that has been created. The configuration parameters are described in paragraph «Просмотр/изменение телемеханической конфигурации» > «Параметры конфигурации» below.

At 3 stage: after the <Esc> key is removed from the configuration parameters table, the addresses of the information objects are checked for uniqueness and the user is given the opportunity to save the created telecontrol configuration in the RTU archives.

24.3.2. Create a new telecontrol configuration by copying the existing one.

This function allows the user to use the existing tele-mechanic configuration as a template for creating a new one with the necessary changes thereafter. It is recommended that a copy be made of the operating tele-mechanics systems to enable «возврата к начальной точке» before changes are made to the operating tele-mechanics configuration.

24.3.3. Remove existing tele-mechanical configuration.

This function removes the user-selected tele-mechanic configuration.

24.3.4. Change of name of tele-power configuration.

This function allows the user to change the name of the tele-power configuration.

24.3.5. View/change telecontrol configuration.

This function allows the user to view/change the telecontrol configuration by selecting the necessary items from the proposed list:

- The configuration parameters;
- General addresses;
- Addresses of information objects;
- Measurement parameters;
- Transmission parameters;
- Add a component;
- Add component measurement;
- Remove component;
- Editing "по образцу" ;
- Move the addresses in the range;

• A complete list of the addresses of the objects. When you leave this item, the menu is checked for the uniqueness of the addresses of the objects.

The above paragraphs are described below.

24.3.5.1. The configuration settings.

· **Type of measurement list.**
Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter is not subject to change for information. This option can only be changed if a new tele-meteorological configuration is created. The parameter is described above in «Создание новой телемеханической конфигурации» .

· **Address of the proponent.**
Data type: a whole number. factory default: 0. Allowable values: [0 ... 254]. GOST parameter Р МЭК 60870-5-101 /104. Used when the parameter "Длина поля причины передачи" is equal to 2.

· **The type of address of the object.**
Plant: «Структурированный» . Permissible values: {«Неструктурированный», «Структурированный»}. The ISO GOST parameter of IEC 60870-5-101/104. This parameter is only set and available for change at the stage of the creation of a new tele-mechanic configuration with a value of "Тип списка измерений" equal to «Средняя» or «Максимальный».

If the value of parameter "Тип списка измерений" is «Минимальный» , the parameter "Тип адреса объекта" is not structured and is not subject to change.

Recommendation: If necessary, consistent designation of site addresses
The value of this parameter shall be set «Неструктурированный».

- **Enter remote devices in configuration.**

Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter is only applicable for remote RTU cascade related to RTU data under the «УСПД ответ» / «RTU-325 ответ» protocol, which is applicable for commercial/technical energy accounting.

This parameter defines the inclusion of remote devices (e.g. electrical meters connected to the remote RTU in the cascade) into the new tele-meteorological configuration being created. The measurement data shall be present in the menu items «Устройства» > «Счётчики электроэнергии» > «Профили счётчиков» or «Устройства» > «Счётчики электроэнергии» > «Текущие измерения счётчиков» .

This parameter is set at the stage of creating a new tele-mechanical configuration.

- **2 addresses for integrated indicators.**

Plant: «+» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter defines the transfer of an integral measurement of the type 'duble' (a material variable with double accuracy) by two whole numbers with consecutive unique addresses to avoid losing the accuracy of the measurement. A whole part of the measurement (in the requested units) is transferred to the smaller address, and a fraction times 109 is transferred to the larger address.

This parameter is set at the stage of creating a new tele-mechanical configuration.

- **Type of parameter address of the value measured.**

Plant: «Равен адресу измеряемой величины» at the value of "Тур" measurement list" is equal to «Минимальный» or «Коммерческий» . factory default: «Индивидуальный для каждого параметра» with parameter value "Тип списка измерений" equal to «Средняя» or «Максимальный» . Permissible values: {«Равен адресу измеряемой величины», «Один дополнительный» , «Индивидуальный для каждого параметра» }. Parameter on recommendations of the GOST R IEC 60870-5-101/104: «Индивидуальный для каждого параметра» .

Implementation parameters of the ECG-MEC protocol 60870-5-101/104 for this RTU: «Равен адресу измеряемой величины»; «Один дополнительный» .

Determines the order of destination and the number of addresses for the parameters to be measured.

This parameter is set at the stage of creating a new tele-mechanical configuration.

- **Allow parameters from the private range.**

Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter expands the range of parameters measured for the IEC GOST R 60870-5-101/104:

  - Threshold value(s);
  - Lower level for transmission;
- Highest level for transmission. Private range parameters:
  - Global identifier;

- Physical units;
- The multiplier of physical units;
- Position of decimal point;
- Minimum value (normalization);

• Maximum value (normalization). This parameter is set at the stage of creating a new tele-mechanical configuration.

· **Only standard ASDU-COT combinations.**
Plant: «+» at "Тип списка измерений" equal «Минимальный» : Plant: «-» at "Тип списка измерений" value equal to "P default" or «Максимальный» . Allowable values: «+» («Да») or «-» («Нет» . Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter allows for the expansion of the standard «идентификатор типа»- «причина передачи» combinations (for the IEC GOST 60870-5-101/104).

This parameter is set at the stage of creating a new tele-mechanical configuration.

· **Select addresses under OBIS ACDE.**
Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter can be changed only if the following conditions are met simultaneously:

- The value of parameter "Тип списка измерений" is «Средний» or «Максимальный» .
- The value of the parameter "Разрешить параметры из частного диапазона" is «+».

· **Select addresses to the globe identifiers.**
Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter can be changed only if the following conditions are met simultaneously:

- The value of parameter "Тип списка измерений" is «Средний» or «Максимальный» .
- The value of the parameter "Разрешить параметры из частного диапазона" is «+».

· **Transformative transmission for integrated indicators.**
Plant: «Последнее и новые значения» . Permissible values: {«Последнее и новые значения», «После установки времени» , «Новые значения» }. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter defines which integrated data will be transmitted sporadically after the connection has been installed. When installed, «Последнее и новые значения» the last readable value will be transmitted and all re-incoming measurements will be transmitted sporadically, when setting the parameter in «Новые значения» - only the newly-incoming measurements will be transmitted. «После установки времени» at the time of writing (V3.18) is not supported.

· **Prohibition of occasional transfer of time to RTU.**
factory default: «-» . Allowable values: «+» («Да») or «-» («Нет»). The implementation parameter of the GOST R МЭК 60870-5-101 /104 protocol for this RTU. Prohibits the allowed default (1) time at the beginning of the hour) sporadic transmission of current time RTU (value «+»). The RTU time transmission at the beginning of the hour is carried out by the C_CS frame (TI= 103 type identifier) and the transmission cause= 3 (sometimes), this frame can be used by the upper level to form the date when transmitting data with short (3-байтовыми) time tags.

- **Type of data for time-sharters.**

Plant: «32-бит time_t» . Permissible values: {«32-бит time_t», «ASDU 103»}. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. Applicable for commercial/technical energy accounting systems using the protocols of the GOST R IEC 60870-5-101/104.

This parameter is set at the stage of creating a new tele-mechanical configuration.

- **Use field "день недели" in time.**

Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). The ISO GOST parameter of IEC 60870-5-101/104. This parameter is set at the stage of creating a new tele-mechanical configuration.

- **Use field "замена" in time.**

Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). The ISO GOST parameter of IEC 60870-5-101/104. This parameter is set at the stage of creating a new tele-mechanical configuration.

- **A time mark.**

Plant: «Локальное зимнее время» . Tolerances: {«Локальное зимнее время», "Universally coordinated Time (UTC)", «Локальное время с учётом DST»} Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU.

- **Package M_EI for each LRU.**

Plant: «+» . Tolerances: «+» («Да») or «-» («Нет»). The ISO GOST parameter of IEC 60870-5-101/104. When this parameter is installed, when the connection is installed at a canal level, the M_EI (TI=70) type identifier for each of the generic addresses (LRU) defined in the tele-meteorological configuration will be transferred.

- **Time period. No activity interview, s.**

Data type: whole number. Plant: 3,600. Acceptable values: [0 ...2000000000]. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter allows for a period of mandatory transmission of tele-measures in the absence of sporadic transmission or interview transmission. Data will be transferred to cause 1 (periodic data).

- **The background scan time will dissect objects, s.**

Data type: whole number. Plant: 3,600. Acceptable values: [0 ...2000000000]. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter allows for a period of mandatory tele-signal transmission in the absence of sporadic transmission or interview transmission. The data will be transmitted to cause 2 (phone scan).

- **RTU time validation period without correction, s.**

Data type: whole number. Plant: 3,600. Acceptable values: [0 ...2000000000]. The ISO GOST parameter of IEC 60870-5-101/104. This parameter is used only when using the time reference «ГОСТ Р МЭК 60870» .

- **Maximum delay in the execution of commands, ms.**

Data type: whole number. Plant: 5,000. Acceptable values: [0 ...2000000000]. The ISO GOST parameter of IEC 60870-5-101/104. This parameter defines the maximum delay between the selection frame and the execution frame in secure command mode (function «выбор и исполнение»).

- **Short pulse duration on command, ms.**

Data type: whole number. Plant: 1000. Acceptable values: [0 ...2000000000]. The ISO GOST parameter of IEC 60870-5-101/104. Determines the duration of the output signal pulse when the control command is issued for the short pulse of the control signal.

- **Long pulse on command, ms.**

Data type: whole number. Plant: 5,000. Acceptable values: [0 ...2000000000]. The ISO GOST parameter of IEC 60870-5-101/104. Determines the duration of the output signal pulse when the control command is issued for a long pulse of the control signal.

- **The flag's address of the overfilling protocol buffers.**

Data type: whole number. Plant: 1. Acceptable values: [0 ...2000000000]. The ISO GOST parameter of IEC 60870-5-101/104. This parameter defines the address of the single element object of the information generated by RTU for tele-signal of the protocol's internal buffer. The general address of this object of information is the general address with the established sign «основной».

- **Address configuration file.**

Data type: whole number. Plant: 2. Acceptable values: [0 ...2000000000]. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. So far, the configuration file has not been transferred.

- **Return the parameters to the global polling.**

Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This option allows the transmission of the parameters of the measured values (type 110...112 identifiers) in a global polling.

- **Group to read the parameters.**

Data type: a whole number. factory default: 0. Allowable values: [0 ... 32000]. The implementation parameter of the GOST R МЭК 60870-5-101 /104 protocol for this RTU. This parameter determines the number of the group to which the parameters of the measured values will be read.

- **Prohibition of the use of parameters.**

Plant: «-» . Permissible values: Sign «+» or «-» («Да» / «Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU.

This parameter prohibits the use of the parameters of the measured values.

- **Control ban.**

Plant: «-» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter prohibits the performance of telecontrol control functions in a given telecontrol configuration.

- **Television measurements with Kt/Kn.**

Plant: «+» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter is used to transmit the tele-measures to Kt and Kt of the electrical metering point when using the digital interface as primary sensors.

- **TC signal mode.**

Plant: «Значения после глоб. опроса» . Permissible values: {«Все значения», «Значения после глоб. опроса» , «Новые значения» }. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This parameter defines the TC signals transmitted after the protocol has been initialized and when the connection breaks. In the case of a factory default «Значения после глоб. опроса», RTU will occasionally transmit changes to the television signals after the upper level of the general polling (type-Identifier = 100), in the future, when the connection breaks, all changes to the TC will be retained in the telecontrol buffer and, when the connection is reconnected, all changes will be sporadically transferred to the upper level. When this parameter is set to «Новые значения», values will be discarded when there is no connection, otherwise the data transmission is similar to «Значения после глоб. опроса» . The «Все значения» parameter implies the sporadic transmission of any changes to the TC signals, including without connection to the top level and prior to the general polling.

- **T.T. signal mode.**

Plant: «Новые значения» . Permissible values: {«Все значения», «Значения после глоб. опроса» , «Новые значения» }. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. The values of this parameter have the same «Режиму передачи ТС» effect, but only extend to telemeasurements (TI). Since the TI change rate is significantly higher than the TC change rate, it is proposed that the default not be remembered and then, when the connection is re-established, that the data not be transmitted during the absence of the connection.

- **The action is in a second general interview.**

Plant: «Передавать отрицательную квитанцию» . Tolerances: {«Передавать отрицательную квитанцию», "Stop the total ...poll and restart", "Передать все повторно" (retransmit all)}. This parameter controls the implementation of GOST R IEC 60870-5-101/104 for this RTU. It defines the response to a new general interrogation frame (type identifier = 100) when transmission for the preceding request is still incomplete. With frequent general interrogations, "Передать все повторно" may overflow the RTU telecontrol buffer. "Прервать общий опрос и начать снова" (abort the general interrogation and restart) may prevent some measurements from being sent. With the default "Передавать отрицательную квитанцию" (send a negative acknowledgement), frequent requests mean that the upper-level system, for some of its general interrogations...

The level will receive a negative receipt, which means that it is not possible to comply with the request at this time.

- **Act when you overfill the buffer.**
  Plant: «Удалить наиболее старое» . Permissible values: {«Удалить наиболее старое», «Игнорировать новое»}. Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU.

- **Max. Allowed time leap, s.**

Data type: a whole number. factory default: 120. Allowable values: [0 ... 32000]. The implementation parameter of the GOST R МЭК 60870-5-101 /104 protocol for this RTU. This parameter determines the maximum time alignment of the RTU and the upper level at which it is possible for the GOST R МЭК 60870-5-101 /104 to change the controller time by jumping. Changing time by protocol 60870-5 is only possible if the RTU defines «ГОСТ Р МЭК 60870-5» as the time reference.

- **Number of troubles. Trying before resolution of any time settings.**

Data type: a whole number. factory default: 3. Allowable values: [0 ... 32000]. The implementation parameter of the GOST protocol R МЭК 60870-5-101 /104 for this RTU. RTU-325 allows the time setting command when dissonance is more than defined in «Макс. разрешенное изменение времени скачком» in case this command is given «Число неуд. попыток перед разрешением любой настройки времени» the number of times with a break between attempts not more than 5c.

- **Limited sign "Переполнение буфера ТМ протокола", %.**

Data type: a whole number. factory default: 95. Allowable values: [0 ... 32000]. The implementation parameter of the GOST R МЭК 60870-5-101 /104 protocol for this RTU. Determines the level of the maximum filling of the telecontrol buffer at which the diagnostic information flag is formed «Переполнение буфера ТМ протокола» .

- **Signal interval "Тенденция к переполнению буфера ТМ", min.**

Data type: a whole number. factory default: 10. Allowable values: [0 ... 32000]. The implementation parameter of the GOST R МЭК 60870-5-101 /104 protocol for this RTU.

Determines the averaging time at which the dynamics of filling the telecontrol buffer are determined. If, within three consecutive time intervals, the number of free cells in the telecontrol buffer decreases, the flag of diagnostic information «Тенденция к переполнению буфера ТМ» shall be formed.

- **Long field of reason for transmission.**
  Data type: whole number. Plant: 2. Permissible values: [1..2] for the IEC GOST R 60870-5-101. For GOST R IEC 60870-5-104, the value of this parameter is always 2.

- **The length of the general address field.**
  Data type: whole number. Plant: 2. Permissible values: [1..2] for the IEC GOST R 60870-5-101. For GOST R IEC 60870-5-104, the value of this parameter is always 2.

- **The length of the object's address field.**
  Data type: whole number. Plant: 3. Permissible values: [1..3] for the IEC GOST R 60870-5-101. For GOST R IEC 60870-5-104, the value of this parameter is always 3.

- **Long time tag format.**

Plant: «+» . Permissible values: Sign «+» or «-» («Да» / «Нет»). The ICE GOST parameter is 60870-5-101. This parameter is not currently used. The format of the time mark is defined by a given type identifier.

- **Number of back-up groups of connections.**

Data type: a whole number. factory default: 0. Allowable values: [0 ... 32000]. The GOST R МЭК 60870-5-104. parameter is currently not used. Reservations were made via the «Телемеханика» → «Привязка телемех. конфигурации к соединению» menu .

- **Maximum delay in transmission, ms.**

Data type: a whole number. factory default: 0. Allowable values: [0 ... 32000]. GOST parameter P МЭК 60870-5-104. Value 0 - verification of the maximum delay when transmitting the command is not performed.

24.3.5.2. Common addresses. This menu item contains a table of the general addresses used in this tele-mechanic configuration.

When a telecontrol configuration is created, the common address table is created automatically and contains a number of lines equal to the number of all RTU (local RTU and all deleted RTU) in the general configuration RTU (paragraph «УСПД»). One line represents the local RTU and the other lines represent the deleted RTU.

Each row of the table contains two fields: ; «Общий адрес».

Data type: whole number. Allowable values: [0...65000]. Once a new telecontrol configuration has been created, the general address is equal to the factory number RTU (for plant numbers see paragraphs «УСПД» > «Локальное УСПД» and «УСПД» > «Удалённые УСПД» > «Параметры УСПД»).

; «Основной» .

Data type: «+» («Да») or «-» («Нет» . Sign «Основной» (sign «+») is present at all times and can only be found at one common address. This means that this general address will automatically be attached to the addresses of the objects of information listed in table «Параметры конфигурации» (see previous paragraph) and not able to enter the common address when configuration is made. Delete the common address with the sign «Основной» cannot be deleted. If the tele-mechanic configuration is connected to the connection, the table of common addresses is used for viewing only. If the telecontrol configuration is not linked to the connection, the user may introduce new, edit and remove existing common addresses.

24.3.5.3. Addresses of the objects. This menu item allows two main functions for a given tele-mechanical configuration:

- View/change the addresses of selected information objects;

• Allow/prohibit the transmission of certain information objects. For user convenience, the information object selection procedure is broken down into 3 consecutive steps:

1. Selection of the component of the system;
2. The choice of measurement;
3. Selection of the required object of information.

In step 1, the user must select the component containing the required information object from the system component list table. The row in the table consists of 3 fields, the assignment of each of which is given below.

; «Компонент» .
Type and name of the component of the system. This table field is not subject to information and editing.

; «Общий адрес» .
This implementation of the protocol recognizes that all information objects of one component of the system have one common address. Therefore, the overall address is only presented for viewing/revision in the list table of the system component.

The overall address can be edited if the tele-mechanical configuration is not linked to the connection.

The general address cannot be edited (red) if the telecontrol configuration is tied to the connection.

; «Выкл» .
If there is a sign «Выкл.» in this field, this means that all measurements of this component of the system have a sign «Выключено» (see the description below step 2). If one dimension of this component of the system has a sign «Включено», the field will be empty.

This table field is not subject to information and editing.

In step 2, the user must select the desired measurement from the measurement list table. The row in the table consists of 2 fields, the assignment of each of which is given below.

; «Измерение» .
The name of the measurement. This table field is not subject to information and editing.

; «Вкл» .
Data type: «+» («Включено») or «-» («Выключено» . This field allows or prohibits protocol transmission of this measurement.

Sign «Включено» (sign «+») permits transmission of measurement, and sign «Выключено» (sign «-») prohibits transmission of measurement.

The user is working on a 3-step table of the addresses of the information objects. The row in the table consists of 3 or 4 fields, each of which is assigned as follows.

; «Тип адреса» .
Name of address type. A specific set of types depends on the type of measurement. List of possible types:

- Value,
- The fraction of the value,
- Type of value (BISACDE),

- Parameter (all or filtering),
- Hesteresis for transmission,
- The smoothing filter,
- Lower limit for transmission,
- The upper limit for transmission,
- Global communication identifier,
- Physical units,
- Multiple physical units,
- Position of decimal point (large),
- Minimum value (normalization)
- Maximum value (normalization). This table field is not subject to information and editing.

; «Адрес объекта» .
The address of the object can be edited if the tele-méchanic configuration is not linked to the connection.
The address of the object cannot be edited (red) if the telecontrol configuration is tied to the connection.

; «Вкл» .
Data type: «+» («Включено») or «-» («Выключено» . This field permits or prohibits the transmission of protocol information to the facility.

Sign «Включено» (sign «+») permits the transmission of the object of information, and sign «Выключено» (sign «-») prohibits the transfer of the object of information.

; «Описание» .
This table field may be present for individual measurements and contains a textual description of the object of the information.

24.3.5.4. The measurement parameters. This menu item allows you to set the measurement parameters (MI). For user convenience, the procedure for setting measurement parameters is broken down into 3 consecutive steps:

1. Selection of the component of the system;
2. The choice of measurement;
3. Set the parameters of the chosen measurement.

In step 1, the user must select the component containing the required measurement from the system component list table.

By 2 steps, the user must select the required measurement in the table of the list of measurements.

By 3 steps, the user is running with a measurement table. A specific set of parameters depends on the type of measurement. A list of possible parameters with comments is given below:

- Physical units.
  This parameter is defined by the nature of the physical value measured, given for information and not subject to change.

- The multiplier of physical units (level 10).
  This parameter (number) (10) Determines the numerical factor (10 to the specified degree) to the measurement value. The parameter is selected from the proposed list according to the international system of SI units (GOST 8.417-2002). THE UNITS OF THE GREAT:

-24 (iocto), -21 (zepto),	-18 (atto), -15 (fento),	-12 (peak), -9 (nano),	-6 (micro), -3 (milli),

-2 (santi), -1 (deci), 0, 1 (deca),	2 (heto), 3 (kilo), 6 (mega), 9 (giga),	12 (tera), 15 (peta), 18 (exa), 21 (zetta),	24 (Jotta)

- Threshold value(s).
  This parameter is the threshold change between the last protocol-transmitted measurement and the current measurement, the exceedance of which results in sporadic transmission (if permitted) of the current measurement value of the protocol. Otherwise, the current measurement is not transmitted.

  This parameter is set in physical units. In the case where TI is used as the measuring converter of the electric energy meter, the parameter shall be set on the low side of the measuring transformer (without the conversion factors).

- Lower limit for transmission.
  This parameter is a threshold value for measurements that is exceeded by the prohibition of sporadic transmission under the protocol.
  This parameter is set in physical units. In the case where TI is used as the measuring converter of the electric energy meter, the parameter shall be set on the low side of the measuring transformer (without the conversion factors).

- The upper limit for transmission.
  This parameter is a threshold value for measurements that results in a sporadic transfer under the protocol.
  This parameter is set in physical units. In the case where TI is used as the measuring converter of the electric energy meter, the parameter shall be set on the low side of the measuring transformer (without the conversion factors).

- The position of the decimal point (larger).
  This parameter applies to the following types of identifiers: 11, 12, 35 (value of the value measured, scale value).

- Minimum value (normalization).
  This parameter applies to the following identifiers: 9, 10, 34 (value of the value measured, normalized value).
  This parameter is set in physical units. In the case where TI is used as the measuring converter of the electric energy meter, the parameter shall be set on the low side of the measuring transformer (without the conversion factors).

- Maximum value (normalization).
  This parameter applies to the following identifiers: 9, 10, 34 (value of the value measured, normalized value).
  This parameter is set in physical units. In the case where TI is used as the measuring converter of the electric energy meter, the parameter shall be set on the low side of the measuring transformer (without the conversion factors).

24.3.5.5. Transmission parameters. This menu item allows you to ask for the selected object:

- Data type;
- The reason for the transmission.

For user convenience, the procedure for setting the transmission parameters is broken down into 4 consecutive steps:

1. Selection of the component of the system;
2. Selecting the object of information;
3. Select the transmission parameter template.
4. Computing transmission parameters.

In step 1, the user must select the component containing the required measurement from the system component list table.

In step 2, the user must select the desired information object from the information object list table.

By 3 steps, the user should select the required template from the list of transmission parameters presented in the table.

The number of templates in the list and the composition of the parameters in the template are determined by the manufacturer and depend on measurement. Each template is a set of combinations of reasons for transmission with a data type (type identifier) that determines the volume and type of information transmitted by the selected object. For the protocol transmission of the selected object, the user must make one of the templates available to the operator (to produce sign «Рабочий» in the right column of the table).

By a step 4 of the selected template, the user may change the type of data (type identifier) of the required reason for the transmission or prohibit transmission (sign «Нет передачи» in the field "Тип данных"). The data type (type identifier) for transmission in the selected interview group can be further defined.

24.3.5.6. Add component. This menu item allows for the addition of a new component to the existing configuration. For example, if a new meter has been introduced after the creation of a tele-mechanic configuration, it can be added to the existing tele-mechanic configuration in this paragraph.

24.3.5.7. Add component measurement. This menu item is intended to be used after the RTU version of the archives is updated, when new measurements have been made for any existing component in the RTU tele-mechanical configuration and need to be added to the existing tele-mechanical configuration.

24.3.5.8. Editing by "образцу". In this menu item, the user can create the required measurement list of any single component and then "образцу" edit one or more components of the same type in this configuration.

24.3.5.9. Move the addresses in range. This menu item allows group addresses to be corrected. This can be done if the telecontrol configuration is not tied to the connection.

24.3.5.10. A complete list of the addresses of the objects. This menu item will provide the user with a table containing a complete list of the addresses of the information objects.

24.4. List of configurations 60870-5-101/104 <demand>.

(Check item «Телемеханика» > «Список конфигураций 60870-5-101/104 <запрос>»)

This menu item is necessary when using the PPP (received station) function in RTU.
In this menu paragraph, the user can create a new or delete any existing tele-mechanic configuration, as well as modify configuration parameters.

When selecting this menu item, the user will initially be provided with a table of the list of existing tele-mechanic configurations or, in the absence of this, with a proposal to create a new tele-mechanic configuration.
The table of the tele-méchanical configuration list contains the following information fields (without editing):

; List of configurations 60870-5-101/104 <demand>.
This field contains the name of the telecontrol configuration.

• «60870-5-101». • «60870-5-104».

These fields define the protocol for which the telecontrol configuration is created (sign «+»). There may be a telecontrol configuration for both of the above protocols simultaneously.

; «Уникальные адреса» .
This field contains an indication of the uniqueness of all addresses in a given configuration:
; Sign «+» - all the addresses of the configuration are unique. Sign «-» - the addresses of the configuration are not unique. If the addresses of the configuration are not unique (a sign «-»), the configuration cannot be linked to the connection (see menu paragraph «Телемеханика» > «Привязка телемех. конфигурации к соединению»).

In the table of the list of telecontrol configurations, the user can perform the following functions (see the bottom-up clue):

- Create a new telecontrol configuration.
- Create a new telecontrol configuration by copying the existing one.
- Remove existing tele-mechanic configuration.
- Change the name of the telecontrol configuration.
- Change the tele-mechanic configuration. The functions are described below.

24.4.1. Create a new telecontrol configuration.

The development of a new telecontrol configuration takes place in three phases. In step 1: The user is requested to define the general characteristics of the configuration to be created by filling in the following fields in the proposed table.

; The configuration name.
Data Type: Text Line.

• 60870-5-101. • 60870-5-104.

Allowable values: «+» («Да») or «-» («Нет» . The plant: «+» . These features define the protocol for which the new tele-mechanical configuration is being created. It is possible to create a new tele-mechanic configuration simultaneously for both of the above protocols.

At 2 stage: after the <Esc> key is removed from the general characteristics table:

• automatically a new tele-mechanic configuration is formed,

• Checks for unique addresses of information objects

• The user is given the opportunity to modify the configuration. The configuration parameters are described in paragraph «Просмотр/изменение телемеханической конфигурации» > «Параметры конфигурации» below.

At 3 stage: after the <Esc> key is removed from the configuration parameters table, the addresses of the information objects are checked for uniqueness and the user is given the opportunity to save the created telecontrol configuration in the RTU archives.

24.4.2. Create a new telecontrol configuration by copying the existing one.

This function allows the user to use the existing tele-mechanic configuration as a template for creating a new one with the necessary changes thereafter.

24.4.3. Remove existing tele-mechanical configuration.

This function removes the user-selected tele-mechanic configuration.

24.4.4. Change of name of tele-power configuration.

This function allows the user to change the name of the tele-power configuration.

24.4.5. View/change telecontrol configuration.

This function allows the user to view/change the telecontrol configuration by selecting the necessary items from the proposed list:

• The configuration parameters;

• General addresses;

• Address conversion. When you leave this item, the menu is checked for the uniqueness of the addresses of the objects.

The above paragraphs are described below.

24.4.5.1. The configuration settings.

· Type of data for time-sharters.

· Use field "день недели" in time.

· Use field "замена" in time.

· Act when you overfill the buffer.

· Long field of reason for transmission.

· The length of the general address field.

· The length of the object's address field.

· Long time tag format. The above parameters are similar to those in the «Телемеханика» > «Список конфигурации 60870-5-101/104 <ответ>» menu item.

- Initiate a global inquiry.
  Plant: «+» . Tolerances: «+» («Да») or «-» («Нет»). Implementation parameter of the ECC Protocol of the GOST R 60870-5-101/104 for this RTU. This option allows a global request to be completed after the protocol has been initialized.

24.4.5.2. Common addresses. The description of this menu item is similar to that described in the «Телемеханика» > «Список конфигурации 60870-5-101/104 <ответ>» menu item.

24.4.5.3. Address conversion. The «запрос» protocol always works in pairs with the «ответ» protocol. In this paragraph, the user may request the conversion of the received addresses into «запрос» protocol to the required addresses of the «ответ» protocol.

The conversion of the addresses is permitted only if the tele-mechanic configuration is not linked to the connection.
In selecting this item, the user will be provided with a table of the list of existing addresses changes or, if not, with a proposal to create a new address conversion. Each row of the table represents the transformation of the range of successive addresses of the type <demand> to the range of successive addresses of the type < response>.

The address conversion table contains the following editorial fields:

; «Общий адрес <запрос>» .
This field contains the common address of the object of the <demand> protocol.

; «Адрес объекта <запрос>,начало диапазона» .
This field contains an address for the beginning of the range of conversion addresses of the protocol's type <demand>.

; «Адрес объекта <запрос>,окончание диапазона» .
This field contains the end of the range of transformable addresses of the protocol type <demand>. The address value shall be equal to or greater than the beginning address of the range. If the beginning and end addresses of the range are equal, the single address will be converted.

; «Общий адрес <ответ>» .
This field contains the common address of the object of the type <response> protocol.

; «Адрес объекта <ответ>» .
This field contains the address of the object of the <response> protocol. In the address conversion table, the user can perform the following functions (see sub-screen clue):

- Create a new address conversion line.
- Delete the existing address conversion line.
- Edit the fields of the existing address conversion line.

24.4.5.4. Addresses of the objects. This point provides the user with the possibility to view/change the addresses of the objects of this tele-meteorological configuration.

This table contains the following editorial fields: ; «Компонент».

This field contains the name of the component; «Общий адрес» .

This field contains the general address of the object.

; «Адрес объекта» .
This field contains the address of the object.

24.5. Linking the telecontrol configuration to the connection.

(Check item «Телемеханика» > «Привязка телемеханической конфигурации к соединению»)

In this menu paragraph, the user can perform the following functions:

- Tie the tele-mechanic configuration to the required connection;

• Reserving data transmission on selected connections. After the tele-mechanical configuration is created, it is necessary to attach it to the connection. For this purpose, in the proposed list table of all connections with protocols 60870-5-101/104 it is necessary to match the telecommunications configuration from the proposed list to the required connection.

In addition, in this table, the user may request a reservation of data transmission. This requires:

- Tie one telecontrol configuration to two or more connections;

• Specify for these compounds a sign of a single process pattern (sign «+» in field «Единый образ процесса»). The fields of the tele-mechanical connections table are described below:

; «Соединение (порт, протокол)» .
This field contains the name of the connection corresponding to the RTU port and the protocol. Not to be edited. ; «Телемех. конфигурация» .

In this field, the user can select the required tele-méchanic configuration from the proposed list of previously created configurations.
The choice of empty line in the proposed list means that there is no telecontrol configuration on the connection. ; «Единый образ процесса»

Allowable values: Sign «+» / «-» («Да» / «Нет»). In this field, the user may select the reservation mode of the connection (mark «+»). For reservation, two or more connections shall be marked with «+».

24.6. Definition of cascade compounds <demand>-<responses>.

(Check item «Телемеханика» > «Каскад соединений <запрос> - <ответ>»)

This menu item is necessary when using the PPP (received station) function in RTU.
For this purpose, the user must link one or more connections of the type <demand> from the proposed list of accessible compounds of the type <demand> to the selected connection.

Annex No 1: Coding of physical units of measurement of representation of variables used in RTU. RTU uses the IEC 62056-62:2002 (DLMS) encoding offered by the RTU to encode physical units with private firm extensions for backup codes 52 ... 109:

Physical Unit Identifier		Name	Memonics	Used for measurement
<0>	:=	no physical units		
<1>	:=	Year	g	time
<2>	:=	Month	mrs	time
<3>	:=	week	n/	time
<4>	:=	24 hours	Day	time
<5>	:=	hour	c/	time
<6>	:=	minute	min	time
<7>	:=	second	c	time
<8>	:=	degree	º	angle (phase)
<9>	:=	Celsius	°C	thermodynamic temperature
<10>	:=	local currency		Money
<11>	:=	meter	m	length
<12>	:=	meters per second	m/s	speed
<13>	:=	cubic metre	m3	volume
<14>	:=	cubic metre	m3	corrected volume
<15>	:=	cubic metres per hour	m3/h	volume flow
<16>	:=	cubic metres per hour	m3/h	corrected volume flow
<17>	:=	cubic metres per day	m3/day	volume flow
<18>	:=	cubic metres per day	m3/day	corrected volume flow
<19>	:=	litre	l	volume
<20>	:=	kg	kg	Mass
<21>	:=	Newton	n/	force
<22>	:=	Newton per meter	N*m	Energy
<23>	:=	Pascal	Pa	pressure
<24>	:=	bar	bar	pressure
<25>	:=	Joul	J	Energy
<26>	:=	Joule per hour	J/h	thermal power
<27>	:=	watt	W	Active power
<28>	:=	Volt-amper	B*A	Total power
<29>	:=	Ware	Ware	Reactive power
<30>	:=	watt-hour	Whh.	Active energy
<31>	:=	Volt-amper-hour	B*H	Total energy
<32>	:=	War-hour	Var*h	Reactive energy
<33>	:=	Amber	A	electric current
<34>	:=	Doll	Cle	Electrical charge
<35>	:=	Volt	B	Electrical voltage
<36>	:=	Volt per metre	B/m	electrical field tension
<37>	:=	of the Farad	F	receptacle
<38>	:=	Om	Ohm.	resistance
<39>	:=	ome per metre	Om*m2/m	Specific resistance
<40>	:=	Webber	WB	Magnetic flux
<41>	:=	Tesla	Til	Electromagnetic induction
<42>	:=	Amper by meter	A/m	Magnetic field tension
<43>	:=	Genry	Mr.	Inductiveness
<44>	:=	Duke.	Hz	frequency
<45>	:=	Unit per watt-hour	1/(Wh)	constant meter to convert impulses to active energy

Physical Unit Identifier		Name	Memonics	Used for measurement
<46>	:=	unit per war hour	1/(ar*h)	constant meter to convert impulses to reactive energy
<47>	:=	Unit per voltampper-hour	1/(B*Ah)	constant meter to convert impulses to total energy
<48>	:=	Voltquadrat-hour	B2 *h	constant meter to convert pulses to voltquadrate-hours
<49>	:=	Amperquadrat-hour	A2*h	constant meter to convert pulses into amperquadrat-hours
<50>	:=	kg/second	kg/s	mass speed
<51>	:=	symence	C	conductivity
<52>	:=	Calvin	K	thermodynamic temperature
<53>	:=	Unit per voltquadrate hour	1/B2*h	constant meter to convert pulses to voltquadrate-hours
<54>	:=	Unit per amperquadrat-hour	1/A2*h	constant meter to convert pulses into amperquadrat-hours
<55>	:=	unit per metre cubic	1/m3	constant meter to convert impulses to volume
<56>	:=	%	%	
<57>	:=	Amber-hour	Ahh.	receptacle
<60>	:=	watt-hour per cubic metre	Wh/m3	energy per volume
<61>	:=	Joule per cubic metre	Дж/м3	thermal capacity
<62>	:=	molar content	Moth %	molar part of gas composition
<63>	:=	gram per metre cubic	g/ m3	density
<64>	:=	Pascal per second	Pa*c	Pressure dynamics
<100>	:=	calories	Cal	Energy
<101>	:=	ton	t	Mass
<102>	:=	litres per minute	l/min	consumption
<103>	:=	litres per hour	l/h	consumption
<104>	:=	litres per second	p/s	consumption
<105>	:=	cubic metres per minute	m3/min	volume flow
<106>	:=	cubic metres per second	m3/s	volume flow
<107>	:=	kg/square metre	kg/m2	pressure
<108>	:=	kg/square inch	kg/cm2	pressure
<109>	:=	kg/ cubic metre	kg/m3	density
<254>	:=	The other unit is not defined here		
<255>	:=	No size, number		

SECTION 07

Event log

Part 4

Edit 6 · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

Navigation: total content, detailed bookmarks and transitions in the lower column.

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1. Introduction.

The RTU event log is a special archive in which certain events in the system are recorded. The event log may be viewed from an external engineering remote or transferred to a top level system, including a higher RTU in the cascade. Events in the event log are recorded for each element in the system:

- For each RTU from the RTU list, including the subordinates of RTU in the cascade;
- For each meter in the meter list, including remote connection meters on the subordinates RTU.

All events are divided into two classes: commercial and technical.

Commercial developments include:

- All events, read out of the event logs of the meter;
- The configuration events of the parameters on which the commercial data in RTU depend;
- Events of RTU activation/deactivation;
- Time correction events on RTU.

2. The characteristics of the event.

Each RTU event has the following features:

- Event code;
- Event Name
- A parameter of events;
- Comment to the event;
- The class of event;
- Time for the event to begin;
- Time to end event;
- The RTU plant number at which the event took place;
- Type of system element;

• System element identifier. Event code - identifies the event name in the RTU event directory. The list of events can be viewed in «Справочник» → «События» of the program «Журнал событий» . The event parameter is the value of an entire type that depends on the event code (see section «Описание событий»). Commentary on the event - depends on the event code (see section «Описание событий»). Event class - characterizes an event and defines the component of the system that generated that event:

1. The meter event (from the meter event log);
2. RTU event (developed by internal software);
3. A technical event (developed by the «Конфигуратор» programme when the user changes the technical parameters);
4. a commercial event (made by the «Конфигуратор» programme when the user changes the commercial parameters);
5. Warning (diagnosis).

Type of system component - defines the type of system component to which the event relates:

1. The meter;

2. RTU. System element identifier - defines the system element to which the event relates:

- For metering, the internal meter identifier in this RTU;
- For RTU, the manufacturer's number RTU is 16-bit (Junior 16-bit if the number is greater than 65535).

3. The depth of storage and the sequence of recording events.

The RTU provides for automatic maintenance of a certain storage depth in the event log. The depth of storage and the policy of recording events in an event log is determined by the event class.

The storage depth of the event classes No. 1 (the meter) and No. 2 (the RTU event) is set when RTU is configuration by one parameter (the default 150 events per system element) (see paragraph «Справочники» > «Размер архивов» of the program «Конфигуратор»). Thus, all elements of the system have an equal depth of independent storage. In addition, the same events that follow on a single part of the system (only one event is recorded) shall be filtered. This may occur in the emergency condition of a component of the system that will continuously generate the same messages. In this case, other events of this component of the system will not disappear in the event log due to the fixed storage depth.
The storage depth of event class 4 (commercial events) is equal to the storage depth of commercial intervals on RTU. All events of this class are recorded in the event log.

The storage depth of event class No. 5 (warning) is similar to that of classes No. 1 and 2. The event log records all events of this class without filtering repeated events.

4. A description of the events.

A complete list of events and their main features are given below.

4.1. (Code (1) Activation/deactivation of the voltage on the meter.

An event from the meter event log (set by the meter).

For impulse meters, the event is formed by RTU and reflects the period of time when RTU did not count the pulses.

Top-level transmission: Yes.

4.2. (Code (2) Change in meter configuration.

The event captures a change in the time of the last entry into the class from the account log.

Event Class: An event is formed by RTU if there is an operation «чтение текущего статуса счётчика» in the interview order.

System Element: The meter identifier.

Top-level transmission: Yes.

4.3. (Code 3) There was an internal error in the meter.

The event captures a sign of error in the meter's error logs.

Event Class: An event is formed by RTU if there is an operation «чтение текущего статуса счётчика» in the interview order.

System Element: The meter identifier Comment to the event: The following values are defined:

2001 - ERRPERS - personality error checksum
2002 - Class checksum error
2003 - 37,768 kHz oscillator error
2004 - TOU block rollover error
2005 - I2C bus error
2006 - Inter-module communication error
2007 - Optional board compatibility error
2008 - Warning treated as an error
2009 - Class checksum error 19
2010 - Class checksum error 20
2011 - Class checksum error 21
2012 - Class checksum error 22
2013 - Class checksum error 23
2014 - Power-failure memory error
2015 - Class checksum error 24
2016 - Class checksum error 14
2017 - Class checksum error 0
2018 - Class checksum error 1
2019 - Class checksum error 2
2020 - Class checksum error 3
2021 - Class checksum error 4
2022 - Class checksum error 5
2023 - Class checksum error 6
2024 - Class checksum error 7
2025 - Stack error (A+)
2026 - Class error 14, 15, 70, 71 (A+)
2027 - Class error 80 or 89 (A+)
2028 - Class error 57, 58, 59 (A+)
2029 - Class error 54, 55, 56 (A+)
2030 - Watchdog timer error (EA)
2031 - EEPROM error
2032 - RAM error
2033 - Configuration error

Event Parameter: 32-seat word with a set bit, corresponding error - similar to the bit mask of a status request. The flags are as follows:

Word 0 (musk[0])

0x00000001 - Warning treated as an error (EA, A+, A)
0x00000002 - Watchdog timer error (EA)
0x00000004 - I2C bus error (EA, A+, A)
0x00000008 - TOU block rollover error (EA, A+, A, A1700)
0x00000010 - 37,768 kHz oscillator error (EA, A+, A, A1700, СЭТ)
0x00000020 - Class checksum error (EA, A+, A, A1700, СЭТ)

0x00000040 - ERRPERS - personality error checksum (EA, A+, A, A1700)
0x00000080 - Class checksum error (EA, A+, A)
0x00400000 - Stack error (A+) Word 1 (mask[1])

0x00000100 - EEPROM error (СЭТ)
0x00000200 - RAM error (СЭТ)
0x00000400 - Configuration error (СЭТ).

Top-level transmission: Yes.

4.4. (Code (4) The internal error of the meter is missing.

The event captures the loss of the error sign in the meter's log.

Event Class: An event is formed by RTU if there is an operation «чтение текущего статуса счётчика» in the interview order.

System Element: The meter identifier.

Top-level transmission: Yes.

4.5. (Code (5) Internal warning was given in the meter.

The event records a warning in the meter event logs.

Event Class: An event is formed by RTU if there is an operation «чтение текущего статуса счётчика» in the interview order.

System Element: The meter identifier Comment to the event: The following values are defined:

4001 - <disc perversion> (for a single-directed meter) 4002 - Overdue power tolerance of 4003 - Battery discharged of 4004 - No phase 4005 - IC (microscheme) of the meter does not work in normal mode of 4006 - Earl count error of 4007 - Class 28, 31, 32, 33 errors of the reference sum of 4008 - Busbar test run 4009 - I2C - Communication problems between microcontroller and DSP 4010 - No phase A 4011 - No phase B 4012 - Missing phase C 4013 - Temperature measurement (E-28, E-30, E-30) E-39) 4014 - Warning for time setting 4015 - EEPROM1 recording security

Event parameters: 32-seat word with set bits, corresponding error - similar to the bit mask of a status request. The flags are as follows:

Word 0 (musk[0])
0x00000100 - Class 28, 31, 32, 33 checksum errors (EA,A+)
0x00000200 - I2C bus: communication problems between the microcontroller and DSP (EA, A+, A)
0x00000400 - Phase missing (EA, A+, A, A1700)

0x00000800 - Battery discharged (EA, A+, A, СЭТ, MEGA)
0x00001000 - Configured permitted power exceeded (EA, A+, A, A1700)
0x00002000 - Reverse <disc rotation> detected (unidirectional meter) (EA,A+, A, A1700)
0x00004000 - Phase missing A (EA,A+,A,A1700)
0x00008000 - Phase missing B (EA,A+,A1700)
0x00010000 - Phase missing C (EA,A+,A,A1700)

Word 1 (Mask[1])
0x00010000 - Temperature measurement warning (E-28, E-30, E-39) (СЭТ)
0x00020000 - Time setting warning (СЭТ)
0x00040000 - EEPROM1 hardware write protection (СЭТ).

Top-level transmission: Yes.

4.6. (Code (6) Internal warning missing in the meter.

The event captures the missing warning in the meter event logs.

Event Class: An event is formed by RTU if there is an operation «чтение текущего статуса счётчика» in the interview order.

System Element: The meter identifier.

Top-level transmission: Yes.

4.7. (Code (7) Change in time on the meter.

The event captures a change in time on the meter. Event Class: Event from the meter event log (set by meter). System Element: The meter identifier.

Top-level transmission: Yes.

4.8. (Code (8) No connection to the meter.

The event is formed by RTU if the number of attempts to establish a meter link failed. The number of attempts and the interval between repeated attempts shall be determined for local connections when the connections are configuration («Число «handshake» and «Пауза между «handshake»). The event is formed after a failed first attempt:

- If the polling was initiated by an external source (executed outside the interview schedule, i.e. out of line);
- In the case of a switchable connection, failure to connect between modems (number of sub-call attempts is determined by another connection parameter: «Число попыток установления соединения»). Event Class: The event is formed by RTU for digital meters. System Element: The meter identifier ~~Comment to~~ the event: The following values for the meter have been determined:

1 - Check amount error (CRC) from meter 3 - Syntax error from meter
4 - shot error (framing error) 5 - Check amount error (CRC) from RTU
6 - Wrong password

22 - No start byte of package 77 - Unsupported type of meter 250 - Partial package 257 - No connection established

501 - Line occupied (BUSY returned modem) 502 - Consistent modem port occupied by another device 503 - Unable to connect modems («NO CARRIER») 504 - CTS 505 signal not installed - Message received from fax 506 - Remote modem does not take off tube («NO ANSWER») 507 - No load («NO DIALTONE») 508 - No telephone number entered for sub-call 509 - Not received «OK» from modem 513 - Uncorrected serial port 514 - Unable to open serial port for protocol "Счётчики EA,A,A+"

700 - Error in identifying the meter contact number for the record "Счётчики СЭТ4ТМ"

408 - Internal error returned by the meter for protocol "Счётчики A1700"

760 - Error in identifying the A1700 meter contact number

Event parameters: Number of comments similar.

Top-level transmission: Yes.

4.9. (Code 9. Re-establishing the meter connection.

The event is formed by RTU after setting up a meter link, provided that the previous attempt to install the session was unsuccessful.

Event Class: The event is formed by RTU for digital meters. System Element: The meter identifier.

Top-level transmission: Yes.

4.10. (Code (10) Combining with the meter is not the first time.

The event is formed by RTU after the meter link has been established, provided that the communication session has not been set at the first attempt.

Event Class: The event is formed by RTU for digital meters. System Element: The meter identifier.

Transfer to top level: None.

4.11. (Code (11) Error during meter communication.

An event is formed by RTU if any interview from a list of interviews or an extraordinary interview on a one-time execution command returned the error or warning as a return code.

Supported for all types of meter. Event Class: The RTU Event. System Element: The meter identifier Comment to the event:

The values are as follows:
1 - Check amount error (CRC) from meter 3 - Syntax error from meter 4 - Capture error (framing error) 5 - Check amount error (CRC) from RTU 7 - Request non-conformity and energy types 11 - Incomplete data in the meter - Retry 12 - Unable to distinguish memory 14 - Error value of parameter 22 - Error value not received by pack 34 - No start-up byte value of argument 35 - No given type 77 data - Unsupported type 122 - Error, Amended re-transmission package 250 - Partial package 257 - No connection for protocol "Счётчики EA,A,A+"

410 - The result of the request for electricity quality indicators is not ready for the protocol "Счётчики СЭТ4ТМ"

16 - The result is not ready 408 - Internal error returned by the calculator 409 - The time correction command was already issued 750 - Error in the profile header 751 - Error in the checksum of the profile header 752 - Error in the format of the calculator's profile 753 - Error read from the calculator's profile For protocol "Счётчики A1700"

410 - The result of the request for electricity quality indicators is not ready 760 - Error in identifying the A1700 meter contact number

Event parameters: An Identifier of the request during which the event occurred. The following identifiers have been identified:

1001 - Reading the meter configuration 1002 - - Reading the clock configuration 1003 - Reading the event log 1004 - Reading section 1005 - Reading the current status of the meter 1006 - Reading the time and date of the meter 1007 - Reading the meter 1008 - Command for the discharge of the section 1009 - Command for the clean-up of the event log 1010 - Reading the machine reading meter 1011 - Reading the electricity quality indicators 1012 - Setting the date and time of the meter 1013 - Reading the data class of meter 1017 - Cleaning the bits of the meter 1019 - Recording Testimonial readings of pulse meter 1026 - Reading meter parameters and metering points 1027 - Reading sub-intervals 1028 - Reading configuration information from RTU archive.

Transfer to top level: None.

4.12. (Code (12) Error in configuration of the meter on RTU.

An event is formed by RTU if the parameters in the RTU archive, installed when the configuration is applied, do not match those read from the meter.

Event Class: The event is formed by RTU for digital meters. System Element: The meter identifier Comment to the event:

6001 - Doesn't match UKE (conversion coefficient from meter units to denominated values) 6002 - Doesn't match DPLOCE (coefficient determining decimal shift on the meter energy indicator) 6003 - Doesn't match DPLOCD (coefficient, determining the decimal point shift on the power calculator indicator) 6004 - Doesn't match the factory number of the calculator 6005 - Doesn't match the profile interval 6006 - Doesn't match SCALE (profile multiplier coefficient) 6008 - Requested type of energy that is not in the calculator 6009 - Doesn't match the transformation coefficient at the point of account Event parameters: Number, similar to comments.

Transfer to top level: None.

4.13. (Code 13. Activation/deactivation of the meter test mode. Event Class: Event from the meter event log (set by meter). System Element: The meter identifier.

Top-level transmission: Yes.

4.14. (Code 14) Discharge of the measurement of power on the meter.

Event Class: Event from the meter event log (set by meter). System Element: The meter identifier.

Top-level transmission: Yes.

4.15. (Code (15) The profile was overcrowded.

The event is formed by RTU based on the flag analysis of the meter profile. Supported for all types of built-in meters. Event Class: Accountant Event (from the meter event log).

Top-level transmission: Yes.

4.16. (Code (16) Restarting «reset» of the meter.

Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Top-level transmission: Yes.

4.17. (Code (17) Restart («reset») of the load profile.

Event Class: Accountant Event (from the meter event log).

System Element: The meter identifier.

Top-level transmission: Yes.

4.18. (Code 18) Phase A voltage loss.

Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Top-level transmission: Yes.

4.19. (Code (19) Phase B voltage loss.

Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Top-level transmission: Yes.

4.20. (Code 20) Phase C voltage loss.

Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Top-level transmission: Yes.

4.21. (Code (21) The meter is opened (electronic seal).

Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Top-level transmission: Yes.

4.22. (Code (22) Network frequency exit/return. Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Time to begin: Time to leave the upper border of the NLS of network frequency. End time: Time to return network frequency from the upper NRMM boundary.

Top-level transmission: Yes.

4.23. (Code (23) Network frequency exit/return from the lower border of the NRMM. Event Class: Accountant Event (from the meter event log). System Element: The meter identifier.

Time to begin: Time to enter the lower NRMM border of network frequency. End time: Time to return network frequency from the lower NRMM boundary.

Top-level transmission: Yes.

4.24. (Code (24) Phase 1 voltage exit/return from the upper limit of the NLD. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to exit phase 1 VLS from the upper border.

Time to end event: Time to return tension from the upper NRMM boundary Phase 1.

Top-level transmission: Yes.

4.25. (Code (25) Phase 1 voltage exit/return from the lower limit of the NLB. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to enter the lower NLB of phase 1 voltage. Time to end event: Time to return tension from the lower limit of the NRMM Phase 1.

Top-level transmission: Yes.

4.26. (Code (26) Phase 2 voltage exit/return from the upper border of the NLB. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to move beyond the upper limit of the NRMM to phase 2. Time to end event: Time to return tension from the upper NRMM boundary Phase 2.

Top-level transmission: Yes.

4.27. (Code (27) Phase 2 voltage exit/return from the lower limit of the NLD. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to begin event: Time to exit the lower border of the NLB of Phase 2 voltage. Time to end event: Time to return tension from the lower limit of the NRMM Phase 2.

Top-level transmission: Yes.

4.28. (Code (28) Phase 3 voltage exit/return from the upper limit of the NRMM. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to exit the upper limit of the NRMM of phase 3. Time to end event: Time to return tension from the upper NRMM boundary Phase 3.

Top-level transmission: Yes.

4.29. (Code (29) Phase 3 voltage exit/return from the lower NLD boundary. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to begin: Time to exit the lower border of the NLD of phase 3. Time to end event: Time to return tension from the lower limit of the NRMM Phase 3.

Top-level transmission: Yes.

4.30. (Code (30) Network frequency exit/return. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to leave the upper limit of the APL of the frequency of the network. End time: Time to return network frequency from the upper limit of the PLB.

Top-level transmission: Yes.

4.31. (Code (31) Network frequency exit/return. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to begin: Time to enter the lower AV border of network frequency. End time: Time to return network frequency from the lower PVR boundary.

Top-level transmission: Yes.

4.32. (Code 32 Exit/Return of Phase 1 EDP upper limit. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to exit the upper limit of the APL of phase 1 voltage. Time to end event: Time for return of tension from the upper limit of the PVR Phase 1.

Top-level transmission: Yes.

4.33. (Code (33) Phase 1 voltage exit/return. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to enter the lower limit of the APL of phase 1 voltage.

Time to end event: Time for return of stress from the lower PVD boundary Phase 1.

Top-level transmission: Yes.

4.34. (Code (34) Exit/return of phase 2 HDV beyond the upper boundary. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to exit phase 2 HDV beyond the upper boundary. Time to end event: Time for return of tension from the upper limit of the PVR Phase 2.

Top-level transmission: Yes.

4.35. (Code (35) Step 2 voltage exit/return from the lower ALD boundary. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to enter the lower limit of the PVD of phase 2. Time to end event: Time for return of stress from the lower PVD boundary Phase 2.

Top-level transmission: Yes.

4.36. (Code (36) Exit/return of phase 3 HVV voltage beyond the upper boundary. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to move beyond the upper limit of the APL of phase 3. Time to end event: Time for return of tension from the upper limit of the PVR Phase 3.

Top-level transmission: Yes.

4.37. (Code (37) Exit/return beyond the lower limit of the ALD of phase 3. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to begin: Time to enter the lower APL line of phase 3 voltage. Time to end event: Time for return of stress from the lower PVD boundary Phase 3.

Top-level transmission: Yes.

4.38. (Code (38) Exit/return to the upper limit of PVS of interphase voltage 12. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for cross-phased tension to cross the upper border 12. Time to end event: Time to return from the upper limit of the APL between phases 12 voltage.

Top-level transmission: Yes.

4.39. (Code (39) Exit/return from the lower AV line of interphase voltage 12. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for cross-phased tension to cross the lower border 12. Time to end event: Time to return from the lower boundary of PLS between phases 12 voltage.

Top-level transmission: Yes.

4.40. (Code (40) Exit/return of the upper limit of the NRMM with interphase voltage 12. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the beginning of the event: Time for cross-phased tension to cross the upper border of the NRMM 12. Time to end event: Time to return from the upper border of NRMM between phases 12 voltage.

Top-level transmission: Yes.

4.41. (Code (41) Exit/return of the lower NLB of interphase voltage 12. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the start of the event: Time for cross-phased tension to cross the lower border of the NRMM 12. Time to end event: Time to return from the lower border of NRMM between phases 12 voltage.

Top-level transmission: Yes.

4.42. (Code (42) Exit/return to the upper limit of PVS of interphase voltage 23. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for cross-phased tension to cross the upper border 23. Time to end event: Time to return from the upper limit of the APL between phases 23 voltage.

Top-level transmission: Yes.

4.43. (Code (43) Exit/return from the lower APL of interphase voltage 23. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for cross-phased tension to cross the lower border 23. Time to end event: Time to return from the lower boundary of PLS between phases 23 voltage.

Top-level transmission: Yes.

4.44. (Code (44) Exit/return of interphase voltage 23 from the upper border of the NLB. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the beginning of the event: Time for cross-phased tension to cross the upper border of the NRMM 23. Time to end event: Time to return from the upper border of NRMM between phases 23 voltage.

Top-level transmission: Yes.

4.45. (Code (45) Exit/return of the lower NLB of interphase voltage 23. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the start of the event: Time for cross-phased tension to cross the lower border of the NRMM 23. Time to end event: Time to return from the lower border of NRMM between phases 23 voltage.

Top-level transmission: Yes.

4.46. (Code (46) Exit/return of interphase voltage 31. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for cross-phased tension to cross the upper border 31. Time to end event: Time to return from the upper limit of the APL between phases 31 voltage.

Top-level transmission: Yes.

4.47. (Code (47) Exit/return of the lower AV border of interphase voltage 31. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for cross-phased tension to cross the lower border 31. Time to end event: Time to return from the lower boundary of PLS between phases 31 voltage.

Top-level transmission: Yes.

4.48. (Code (48) Exit/return of interphase voltages 31 from the upper border of the NLB. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to exit the upper border of NVS of interphase voltage 31. Time to end event: Time to return from the upper border of NRMM between phases 31 voltage.

Top-level transmission: Yes.

4.49. (Code (49) Exit/return of the lower border of the NVV of interphase voltage 31. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for exit from the lower border of the NRMM of inter-phase tension 31. Time to end event: Time to return from the lower border of NRMM between phases 31 voltage.

Top-level transmission: Yes.

4.50. (Code (50) Exit/return of the APL to the foreign AV of the sinusoidality factor of phase 1 voltage. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and range of phase 1 voltage. Time to end event: Time to return the distortion factor from abroad

The sinusoidal intensity of phase 1 voltage.

Top-level transmission: Yes.

4.51. (Code (51) Exit/return of the NRMS to a foreign country with a sinusoidality factor of phase 1 voltage. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and range of phase 1 voltage. Time to end event: Time to return the distortion factor from abroad

The sinusoidal intensity of phase 1 voltage.

Top-level transmission: Yes.

4.52. (Code (52) Exit/return of the VAM to the foreign air of phase 2 sinusoidal voltage. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and range of phase 2 voltage. Time to end event: Time to return the distortion factor from abroad

The sinusoidal voltage of phase 2.

Top-level transmission: Yes.

4.53. (Code (53) Exit/return of the Sine-Synchronous Voltage Deformity Rate of Phase 2 to the NLB abroad. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and range of phase 2 voltage. Time to end event: Time to return the distortion factor from abroad

The sinusoidal voltage of phase 2.

Top-level transmission: Yes.

4.54. (Code (54) Exit/return of the VAM to foreign air-to-air factor of the sinusoidality of phase 3 voltage. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and range of phase 3 voltage. Time to end event: Time to return the distortion factor from abroad

The sinusoidal voltage of phase 3.

Top-level transmission: Yes.

4.55. (Code (55) Exit/return of the Sine-Synchronous-Logation Ratio of Phase 3 voltage abroad. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and range of phase 3 voltage. Time to end event: Time to return the distortion factor from abroad

The sinusoidal voltage of phase 3.

Top-level transmission: Yes.

4.56. (Code (56) Exit/return of the VAM to foreign air of the sinusoidality factor of the interphase voltage 12. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and range of interphase voltage 12. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the interphase voltage 12.

Top-level transmission: Yes.

4.57. (Code (57) Exit/return of the Sine-Synchronous-Synchronous Velocity Rate 12 to the NLB abroad. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and range of interphase voltage 12. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the interphase voltage 12.

Top-level transmission: Yes.

4.58. (Code (58) Exit/return of the VAM to foreign air of the sinusoidality factor of the interphase voltage 23. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and range of interphase voltage 23. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the interphase voltage 23.

Top-level transmission: Yes.

4.59. (Code (59) Exit/return of the NLS to the border of the sinusoidality factor of the interphase voltage 23. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and range of interphase voltage 23. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the interphase voltage 23.

Top-level transmission: Yes.

4.60. (Code (60) Exit/return of the APL to foreign air of the sinusoidality factor of the interphase voltage 31. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and range of interphase voltage 31. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the interphaseal voltage 31.

Top-level transmission: Yes.

4.61. (Code (61) Exit/return of the NRMS to the NVS of the sinusoidality factor of the interphase voltage 31. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and range of interphase voltage 31. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the interphaseal voltage 31.

Top-level transmission: Yes.

4.62. (Code (62) Exit/return of the APL of the sinusoidality factor of the zero sequence. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad zero sequence range. Time to end event: Time to return the distortion factor from abroad

The sinusoidal range of the zero sequence.

Top-level transmission: Yes.

4.63. (Code (63) Exit/return of the NLS to the foreign exchange of the sinusoidality factor of the zero sequence. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad zero sequence range. Time to end event: Time to return the distortion factor from abroad

The sinusoidal range of the zero sequence.

Top-level transmission: Yes.

4.64. (Code (64) Exit/return of the APL meter-gap sinusoidality factor. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time of occurrence: Time of entry of the sinuso-sine distortion factor abroad and the range of the inverse sequence. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the reverse sequence.

Top-level transmission: Yes.

4.65. (Code 65) Exit/return of the NRMS to the meter-inverse sinusoidality factor. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the event: Time for the entry of the sinuso-sine distortion factor abroad and the range of the inverse sequence. Time to end event: Time to return the distortion factor from abroad

The sinusoidality of the reverse sequence.

Top-level transmission: Yes.

4.66. (Code (66) Exit/return of direct line voltage beyond the upper limit of the APL. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to exit the upper limit of the AV voltage in a straight line
It's a sequence. Time to end event: Time to return tension from the upper limit of PVR
My sequence.

Top-level transmission: Yes.

4.67. (Code (67) Exit/return of direct line voltage beyond the lower ALD boundary. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to enter the lower limit of the AV at a straight line
It's a sequence. Time to end event: Time to return the lower limit of PVR tension
My sequence.

Top-level transmission: Yes.

4.68. (Code (68) Exit/return of direct-sequence voltage beyond the upper limit of the NLB. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start: Time to exit the upper limit of the NRMM of direct voltage
It's a sequence. Time to end event: Time to return tension from the upper NRMM border
My sequence.

Top-level transmission: Yes.

4.69. (Code (69) Exit/return of direct sequence voltage beyond the lower limit of the NLB. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time for the start of the event: Time for the exit from the lower border of the NRMM of direct voltage
It's a sequence. Time to end event: Time to return tension from the lower NRMM boundary
My sequence.

Top-level transmission: Yes.

4.70. (Code 70) Excess of the average active power (A+) threshold. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Start time: Time to exceed the threshold of average active power (A+). End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.71. (Code (71) Initiating a second power profile. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start event: Time to initialize second set of power profile. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.72. (Code (72) Excess of the average active power (A-) threshold. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Start time: Time to exceed the threshold of average active (A-) power. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.73. (Code 73) Exceedance of the threshold of medium jet (P+) power. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Start time: Time to exceed the threshold of average jet (P+) power. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.74. (Code (74) Exceedance of the threshold of medium jet (P-) power. Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Start time: Time to exceed the threshold of medium jet (P-) power. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.75. (Code (75) Commencement/off of backup power.

Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time to shut down backup power. End time: Time to activate backup power.

Top-level transmission: Yes.

4.76. (Code (76) Unauthorised access to the meter.

Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: Time for unauthorized access to the meter. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.77. (Code 77) Reprogramming of the meter.

Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Time to start the event: It's time to reprogram the meter. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.78. (Code 88) Current availability without phase A voltage.

Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Start time: Time to detect current when no voltage is present
Phase A. Time of the event ' s end: Time of the event ' s disappearance.

Top-level transmission: Yes.

4.79. (Code 89) Current availability without phase B voltage.

Event Class: Accountant Event (from the meter event log). Type of system element: A meter. System Element: The meter identifier.

Start time: Time to detect current when no voltage is present
Phase B. Time of end of event: Time of disappearance of the event.

Top-level transmission: Yes.

4.80. (Code (90) Current availability without phase C voltage.

Event Class: Accountant Event (from the meter event log). Type of system element: A meter.

System Element: The meter identifier.

Start time: Time to detect current when no voltage is present
Phase C. Time of the event ' s end: Time of the event ' s disappearance

Top-level transmission: Yes.

4.81. (Code (100) Disable/activate RTU.

The event is formed by RTU when it is loaded after shut-off/restart. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the ~~subordinate~~ RTU - manufacturer number RTU).

Top-level transmission: Yes.

4.82. (Code (101) Change in configuration of RTU.

The event is formed by the «Конфигуратор» program when it is launched with the rights to edit the RTU configuration and the hardware lock-in to stop the configuration.

Implemented in software v.2.02 and above. Event Class: The RTU Event.

Top-level transmission: Yes.

4.83. (Code 102) Attempted RTU session with incorrect password. The event is formed by the top-level communication protocol when attempting to establish a communication session with RTU with an incorrect dairest «пользователь:пароль» .

Implemented in software v.2.02 and above. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - ~~manufacture~~r number RTU).

Top-level transmission: Yes.

4.84. (Code 103) The time change command for RTU has been issued.

The event is formed by RTU when the system time correction command RTU from the time reference is received.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Top-level transmission: Yes.

4.85. (Code (104) End of time change in RTU.

The event shall be formed by RTU at the end of the smooth change cycle of the system time RTU at the set speed. Then RTU is ready to work on a new command to change the system time of RTU.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Top-level transmission: Yes.

4.86. (Code (105) Warning in RTU.

The event is formed by RTU under certain operating conditions. It is intended for the diagnosis of RTU.

Event Class: The RTU Event. System Element: The meter identifier. Comments on the event:

28 - Initialization error - No free descriptors 411 - Error in receiving the result of the request from driver 412 - Unable to execute single request to meter 414 - Error in initializing meter 419 - Incorrect time in profile 422 - Could not restore date in CMOS 6007 - Unsupported type of event meter:

Error return code or a number similar to the comment.

Transfer to top level: None.

4.87. (Code 106) Error in configuration of RTU.

Event Class: The RTU Event.

Transfer to top level: None.

4.88. (Code (107) software watchdog timer.

The event is formed by RTU during the non-usual operation of RTU. The event is due to the automatic re-start of RTU.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU). Comments on the event:

415 Not enough free memory in RAM 420 - Error in the chain of command 421 - Planning error.

Transfer to top level: None.

4.89. (Code (108) Change in CMOS hours.

The event is formed by RTU when implementing a time correction command at CMOS RTU, where the CMOS RTU clock is not a reference time and time is agreed between CMOS RTU and the system time RTU.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Transfer to top level: None.

4.90. (Code (109) CPU RTU lithium battery defective.

The event is formed by RTU if the CMOS RTU has a power failure flag. The flag shall be checked only when rebooting RTU.

Event Class: The RTU Event.

System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Top-level transmission: Yes.

4.91. (Code 110) Test version of RTU software.

The event is formed by RTU when it is restarted and shows a breach of the RTU assembly system. In this case, RTU works in demonstration mode and the stable operation of RTU is not guaranteed. If the event is present, it should be reported to the Technical Support Service.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Transfer to top level: None.

4.92. (Code 111) Event generated by IBP.

The event shall be formed by RTU if it contains a DC-DC power supply with a built-in uninterrupted power supply.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU). Comments on the event:

600 - Power supply power set 601 - Power supply shut off 602 - Battery discharged 603 - Battery voltage at operating range 604 - Battery fully charged 605 - Battery not fully charged.

Top-level transmission: Yes.

4.93. (Code (112) RTU configuration warning.

Event Class: The RTU Event.

Transfer to top level: None.

4.94. (Code 113) No connection to RTU.

The event is formed by RTU if the RTU failed to communicate with the subordinate RTU in a given number of attempts. The number of attempts and the interval between repeated attempts shall be determined when the connections are configurationd. The event is formed after a failed first attempt:

- If the polling was initiated by an external source (executed outside the interview schedule, i.e. out of line);
- In the case of a switchable connection, failure to connect between modems (number of sub-call attempts is determined by connection parameter: «Число попыток установления соединения»).

Event Class: The RTU Event. System Element: The meter identifier. Comments on the event: The following values are defined:

4 - Framing error.

5 - Error in reference amount (CRC) from RTU 6 - Wrong password 22 - No start byte package 77 - Unsupported type of transaction 250 - Partial package 257 - Unestablished for switched modem

501 - Line occupied (modem returned «BUSY») 502 - Consistent port for modem communication occupied by another device 503 - Could not connect modems («NO CARRIER» 504 - No signal CTS 505 - Message received from fax 506 - Remote modem does not take off tube («NO ANSWER» 507 - No load («NO DIALTONE») 508 - No telephone number entered for sub-call 509 - Not received "OK" from modem 513 - Uncorrect position of serial port 514 - Unable to open serial port

For TCP/IP connection
238 - Descriptor is not a 239 Skettle - - Receivable address 240 - - Communication too large 241 - Mistaked protocol type 242 - Protocol not available 243 - Protocol not supported 244 - Unsupported Socket type 246 - Unsupported protocol family 247 - Address not supported by protocol 248 - Address already used 249 - Unable to assign requested address 251 - TCP/IP Network not available 252 - TCP/IP network severed connection during discharge 253 - Software provided breakage 254 - Second-side connection break 255 - No accessible buffers 256 - Socket is already connected 258 - Could not perform the transmission after the locker 259 is disabled - Very many references: No 260 - Connect could be separated by time-out 261 - Connection rejected 264 - Host 265 - No route to host for protocol "Счётчики УСПД запрос"

8 - Error returned by the protocol under RTU 710 - Error in initializing the TPS/IP 711 structure - Undefined return code from the report under RTU 712 - Package Identifier is not equal to the expected 713 - RTU number is not equal to the expected 714 - Return Protocol «нет данных»

Event parameters: Number of comments similar.

Top-level transmission: Yes.

4.95. (Code (114) Re-establishment of the connection to RTU.

The event is formed by RTU after establishing a communication session with a subordinate RTU, provided that the previous attempt to install the session was unsuccessful.

Event Class: The RTU Event. System Element: The meter identifier.

Top-level transmission: Yes.

4.96. (Code 115) Error during RTU communication.

An event is formed by RTU if any interview from a list of interviews or an extraordinary interview on a one-time execution command returned the error or warning as a return code.

Event Class: The RTU Event. System Element: The meter identifier.
Comments on the event: The following values are defined:

4 - Error frame (framing error) 5 - Error in reference amount (CRC) of RTU 7 - Inconformance of request and energy available in energy meter 11 - Incomplete data - Retry 12 - Unable to distinguish memory 14 - Error value of parameter 22 - Not received starting byte package 34 - Inacceptable value of argument 35 - No data type 77 - Unsupported type of operation 122 - Error corrected retransmission package 250 - Incomplete package 257 - Not specified

238 - Descriptor is not a 239 Skettle - - Receivable address 240 - - Communication too large 241 - Mistaked protocol type 242 - Protocol not available 243 - Protocol not supported 244 - Unsupported Socket type 246 - Unsupported protocol family 247 - Address not supported by protocol 248 - Address already used 249 - Unable to assign requested address 251 - TCP/IP Network not available 252 - TCP/IP network severed connection during discharge 253 - Software provided breakage 254 - Second-side connection break-out 255 - No available buffers 256 - Socket is already connected 258 - Could not perform the transmission after deactivation 259 - Very many references - Unable to separate 260 - Connection broken down via timemaout 261 - Connection rejected 264 - Host disabled 265 - No route to host

For protocol "Счётчики УСПД запрос"

8 - Error returned by the protocol of the subordinate RTU 16 - The previous time correction command 17 - The last RTU event identifier received is less than the one already recorded in the archive 710 - Error in initializing the structure of the TP/IP 711 - Undefined return code from the record of the subordinate RTU 712 - Package Identifier is not equal to the expected 713 - RTU number is not equal to the expected 714 - Protocol returned «нет данных» 715 - Sorting back in the subordinate RTU more than one interval of the event parameters: The request identifier during which the event occurred. The following identifiers have been identified:

1001 - Reading the meter configuration 1002 - - Reading the clock configuration 1003 - Reading the event log 1004 - Reading section 1005 - Reading the current status of the meter 1006 - Reading the time and date of the meter 1007 - Reading the meter 1008 - Command for the discharge of the section 1009 - Command for the clean-up of the event log 1010 - Reading the machine reading meter 1011 - Reading the electricity quality indicators 1012 - Setting the date and time of the meter 1013 - Reading the data class of meter 1017 - Cleaning the bits of the meter 1019 - Recording Testimonial readings of pulse meter 1026 - Reading meter parameters and metering points 1027 - Reading sub-intervals 1028 - Reading configuration information from RTU archive.

Transfer to top level: None.

4.97. (Code (116) The size of the archives is exceeded.

The event is formed by RTU each time the size of the RTU archives is automatically increased. The archives have a fixed size pre-established during the production of RTU and an increase in the size is an error in the configuration of the RTU. The storage depth of archives by «Конфигуратор» should be reduced.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Transfer to top level: None.

4.98. (Code (117) Change in commercial configuration RTU.

The event is formed by the RTU program «Конфигуратор» when the configuration with the changed commercial parameters is recorded in the archive.

Event Class: Commercial Event. System Element: A meter identifier or RTU (if requested by the subordinate RTU, the manufacturer's RTU number). Comments on the event:

6001 - Changed UKE (change factor from meter units to known values); 6002 - Amended DPLOSE (Direct shift factor on the energy meter indicator); 6003 - Amended DPLOCD (to determine the shift of the decimal point on the power meter indicator); 6004 - Re-set number of the manufacturer; 6005 - The section interval has been changed; 6006 - Changed SCALE (multiplying profile factor); 6010 - The voltage at the primary wrapping of the voltage transformer has been changed; 6011 - Changed voltage at secondary wrapping of voltage transformer; 6012 - The current of the primary current transducer is changed; 6013 - The current is changed on the secondary wrapping of the current converter; 6014 - Changed multiplier factor (shilde); 6015 - Changed units of energy measurement; 6016 - Power units modified; 6017 - Business interval changed; 6018 - The date of installation of the meter to the countpoint has been changed; 6019 - The date of removal of the meter has been changed from the metering point; 6020 - The meter; 6021 - Removal. Top-level transmission: Yes.

4.99. (Code (118) Change in technical configuration RTU.

The event is formed by the RTU program «Конфигуратор» when the configuration with the modified technical parameters is recorded in the archive. The type of modified technical parameters is not defined.

Event Class: Technical Event. System Element: A meter identifier or RTU (if requested by the subordinate RTU, the manufacturer's RTU number).

Top-level transmission: Yes.

4.100. (Code 119) Relaying of the record to archive.

The event is formed by RTU when there is an error in recording. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the ~~subordinate~~ RTU - manufacturer number RTU).

Transfer to top level: None.

4.101. (Code (150) An electrical accident occurred.

This event is produced in RTU when an electrical accident occurs.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Time of occurrence: Time of occurrence of an electrical accident. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.102. (Code 151) An electrical accident has disappeared.

This event is produced in RTU when an electrical accident is lost. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the ~~subordinate~~ RTU - manufacturer number RTU).

Time to start the event: Time of the accident in the electrical circuit. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.103. (Code (152) A warning was given in the electrical circuit.

This event shall be produced in RTU when a warning occurs in the electrical circuit.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Start time: Time of warning in electrical circuit. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.104. (Code (153) The warning was lost in the electrical circuit.

This event is produced in RTU when the warning is lost in the electrical circuit.

Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Start time: Time of alert in electrical circuit. End time of event: Not determined (equal to -1).

Top-level transmission: Yes.

4.105. (Code 200) No connection to GPS.

The event is formed by RTU if the NMEA-0183 protocol does not arrive at the port defined by the GPS receiver configuration.

Implemented in software v.2.02 and above. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - ~~manufacture~~r number RTU).

Top-level transmission: Yes.

4.106. (Code (201) Re-establishing the GPS connection.

The event is formed by RTU in the event that NMEA-0183 data were received at the port defined by the GPS receiver configuration, while the previous GPS polling did not contain a data receiver.

Implemented in software v.2.02 and above. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - ~~manufacture~~r number RTU).

Top-level transmission: Yes.

4.107. (Code 202. There's no right time in GPS.

The event is formed by RTU in the event that the data from the GPS receiver missing the required number of satellites to ensure the correct time of the GPS built-in hours. In this case, the GPS receiver returns inaccurate time (without satellite correction) from its own built-in hours as time.

Implemented in software v.2.02 and above. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Top-level transmission: Yes.

4.108. (Code 203) Recovering the correct time in GPS.

The event is formed by RTU if the data from the GPS receiver appear after the disappearance (the event code) 202. Significance of the number of satellites required to ensure the correct time of GPS in-use hours. In this case, the GPS receiver returns the exact time (with the satellite atomic clock correction) from its own built-in hours as time.

Implemented in software v.2.02 and above. Event Class: The RTU Event. System Element: RTU Identifier (if requested by the subordinate RTU - manufacturer number RTU).

Top-level transmission: Yes.

SECTION 08

Built-in input/output panel

Part 5

Edit 7 · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

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1. RTU basic RTU-325 model.

The built-in RTU input/output remote control of the RTU-325 basic model consists of:

- vacuum fluorescent Rusified Display (VFD) with resolution of 2 rows of 20 characters; - 12 keyboard functional keyboard.

1.1. Designation of built-in input/output remote.

The RTU integrated input/output remote control has the following functions:

- Current-time indicator RTU.
- Display the state of RTU at its launch or reboot.
- Enter the password at the required level to access the data.
- View the archives of the measured RTU parameters in the selected group.
- View current meter readings by direct reading from the meter.
- View current meter readings by calculation method (auto-read).
- Reboot RTU software.
- RTU time correction.
- Stopping RTU software.
- RTU power cut-off (a model with integrated IBP).
- Testing the functionality of the built-in input/output remote.

1.2. General rules for operation with input/output remote.

• If there is a symbol «←», «→», «↑» or «↓» in the last position of the display, this line is the current active menu point, and the above symbols are the clue as to which key to change the menu item.

• The selected active menu item is entered by pressing the key <ENTER>.

• The entry to the previous level of the menu is done by clicking on the <Esc> key.

• On-call access from any level of the menu is performed by pressing the «Alpha» key (key <F10> in the «Дисплей УСПД» control program) or automatically at a certain time after the last click on any key.

• The integrated input/output display of the first RTU models supports a limited number of letters of the Russian alphabet that are simultaneously displayed on the display. If the restriction is exceeded, the Russian letters are replaced by the underlined sign «_» . The performance of RTU is not affected. It is recommended that the name of the group, tariff or power area (programme «Конфигуратор») be changed to reduce the number of letters of the Russian alphabet on the display that are different from the English letters.

1.3. Schematic chart of the screen menu of the input/ output remote display.

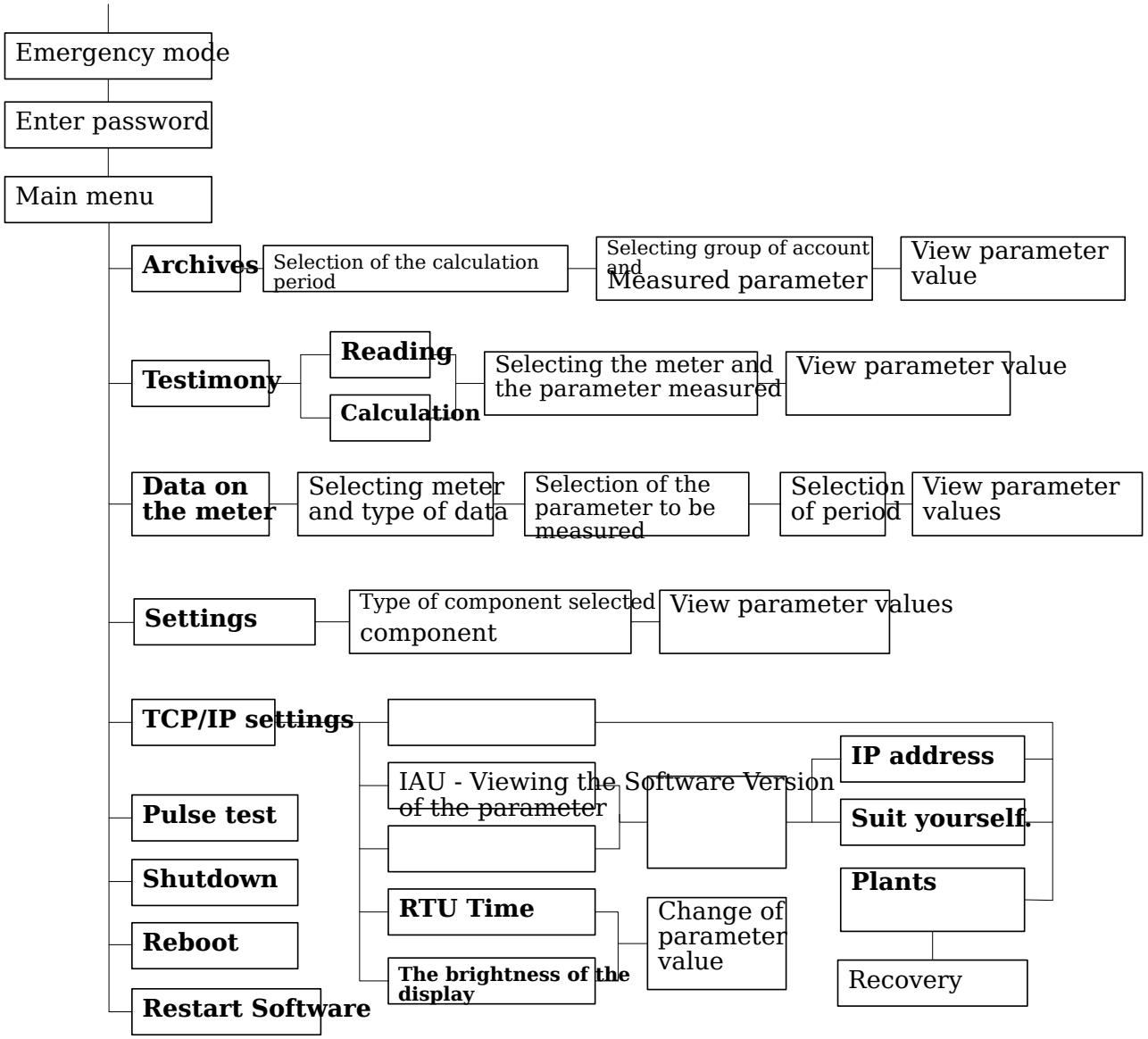


Figure 1. Schematic chart of the screen menu of the input/output remote display.

1.4. On-call.

After the RTU power is turned on, the 2 stage is run: loading and initializing, and the RTU display displays the corresponding messages. When the RTU is loaded, it is on duty and displays (рис.1) :

• In the first line, the current date and time, taking into account winter/summer transition. Winter/summer transition conditions are defined in the programme «Конфигуратор».

• In the second line, the name RTU is given in the program «Конфигуратор».

	1	0	.	0	1	.	0	1			1	7	:	5	0	:	0	1	
							У	С	П	Д		п	/	с	3	4	0			

Figure 1 The RTU display is on call.

1.5. The main menu.

The key «Alpha» (the key <F10> in the «Дисплей УСПД» programmator) and the invitation of the system to enter the password (figure 2) shall be pressed for the system entry.

			В	в	е	д	и	т	е		п	а	р	о	л	ь	:		
						?	?	?	?	?	?								

Figure 2. RTU display in password mode.

The password is the six-digit decimal place. The selection of a figure in the type indicated by the italics is made by the key <Alt> (Latin key <A> in the «Дисплей УСПД» program) and the movement of the italics to the right and to the left by the keys < > > > and <>, respectively.

The display password is entered by pressing the key <ENTER>. If the password is correctly entered, the main menu items of the system will appear. In case of incorrect password input, RTU returns to on-call mode. There are two levels of passwords:

• User;

• Super user. A limited number of functions are available to the user with the user password. The user with the super-user password is accessible to all in-line input/output functions (see the notes to the function description).

The passwords are specified in «Конфигуратор» in «Настройки» > «Пароли УСПД» . If the password of the first user is not specified, the password entry is not required, the menu screen (Figure 2) does not appear and access to the main menu items with the first user rights is ensured.

If the user's password is specified and the user's password is not specified, the key key <ENTER> is accessed by the user's key without the password being entered.

If both passwords are specified, password input is mandatory.

The RTU main menu (figure 3) contains the following items:

• «Архивы» - a view of the system parameters recorded.
• «Показания» - view current readings.
• «Данные по счётчику» - a look at the meter.
• «Конфигурация» - Viewing meter configurations, RTU, ports, compounds and TCP/IP.
• «Настройки» - View/change the RTU settings.

- «Тест пульта» = RTU input/output test of the integrated remote control.
- «Выключение» - shut down RTU.
- «Перезагрузка» = RTU program restart.
- «Перезапуск ПО» - Restart only the RTU application.

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
A	R	X	AND		TO		YOU		>										

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<					П	О	К	А	З	А	Н	И	Я						>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<	Д	А	Н	Н	Ы	Е		П	О		С	Ч	Е	Т	Ч	И	К	У	>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<				К	О	Н	Ф	И	Г	У	Р	А	Ц	И	Я				>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<					Н	А	С	Т	Р	О	Й	К	И						>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<				Т	Е	С	Т		П	У	Л	Ь	Т	А					>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<					В	Ы	К	Л	Ю	Ч	Е	Н	И	Е					>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<				П	Е	Р	Е	З	А	Г	Р	У	З	К	А				>

			В	Ы	Б	Е	Р	И	Т	Е		П	У	Н	К	Т	:		
<			П	Е	Р	Е	З	А	П	У	С	К		П	О				

Figure 3. RTU display in main menu mode.

The selection of the main menu items is done by the keys < > > and <>>, as shown on the display. The required menu item is entered by pressing the key <EN-TER>.

1.5.1. A look at the archives.

In this paragraph, the user must choose the calculation period (Figure 4).

			Р	а	с	ч	е	т	.		п	е	р	и	о	д	:		
<				Т	Е	К	У	Щ	И	Й		(	Р	П	0	)			

			Р	а	с	ч	е	т	.		п	е	р	и	о	д	:		
<		П	Р	Е	Д	Ы	Д	У	Щ	И	Й		(	Р	П	1	)		>

Figure 4. The RTU display is in the calculation period mode.

The calculation periods shall be numbered from the current to the previous periods (e.g. current to РП0, previous to РП1, etc.). The number of calculation periods displayed on the RTU display shall be determined by «Конфигуратор» in paragraph «Настройки» > «Архивы» > «Число расчётных периодов на УСПД» .

After selecting the calculation period (figure 4), the group of accounts and the parameter to be measured for viewing (figure 5) shall be selected:

				Г	р	.	1	0	1		(	Р	П	0	)				>
V			А	+						т	а	р	и	ф	_	А			

<				Г	р	.	1	0	2		(	Р	П	0	)				>
V			А	+						т	а	р	и	ф	_	Σ			^

<				Г	р	.	1	0	2		(	Р	П	0	)				>
V		М	О	Щ	.	А	+					з	о	н	а	_	1		^

Figure 5. The RTU display is in group selection mode and the parameter is measured. List of parameters measured:

- A+ is the electric energy consumed.
- A---it's an active power source.
- P+ is the jet power consumed.
- R-- is the jet power output.
- MUST A+ = values of maximum power of the active energy consumed.
- MUST A-- the maximum power values of the given active energy.
- MUSH.P+ = values of maximum power of the reactive energy consumed.
- MUSH.R-- value of the maximum power of the reactive energy produced.

Viewing the electricity consumed.

Once the required active/reactive energy consumed/outlet is selected for this group, the readings for the given tariff or the sum of the RTU display (figure 6) shall be calculated and indicated.

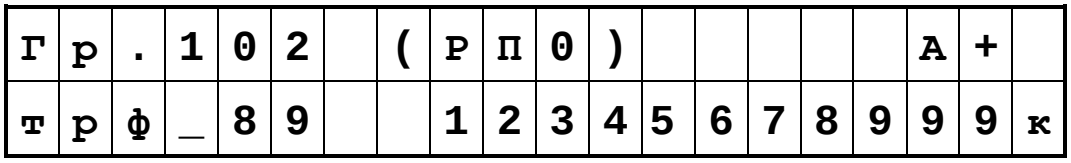


Figure 6. The RTU display is in the electric input mode.

View maximum power values.

After selecting the required power type for this group, the maximum power reading (figure 7) for the power area on the RTU display shall be calculated and indicated:

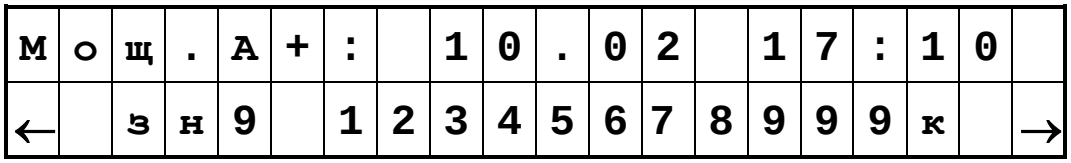


Figure 7. RTU display in power indication mode.

The interval values for the given area shall be viewed by the keys according to the clue.

1.5.2. Checking the meter readings.

Once the main menu item «ПОКАЗАНИЯ» has been selected, one of the following menu items should be selected (figure 8):

- «Чтение» = direct reading of the current reading of the measured parameter from the meter.
- «Расчёт» = calculation of the value of the current value of the measured parameter on the meter from the last auto-reading (current meter = last auto-reading + flow after last auto-reading).

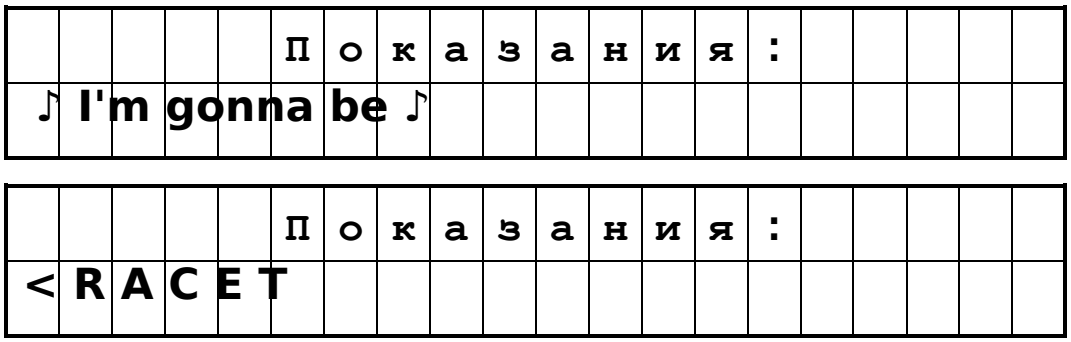


Figure 8. The RTU display is in mode of type selection.

After the type of meter response (figure 8), the required meter and the measured parameter for viewing (figure 9) shall be selected:

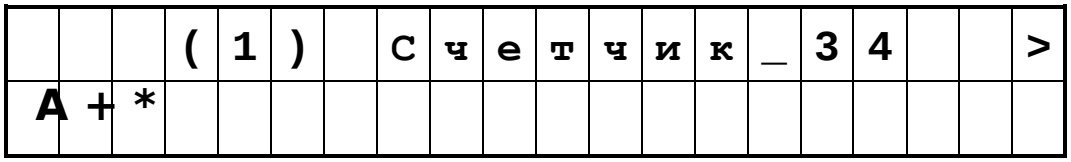


Figure 9. The RTU display is in the meter selection mode and the measured parameter.

Viewing the current readings of the meter.

After selecting the meter and the parameter measured (figure 9), the current meter reading on the RTU display shall be viewed:

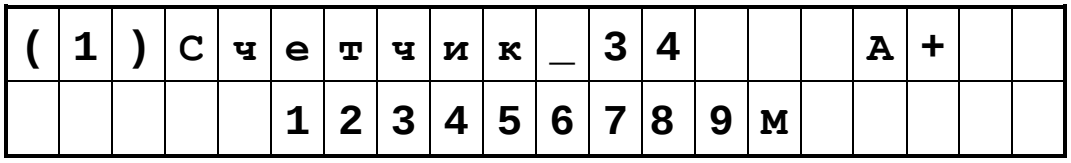


Figure 10. RTU display in the current meter mode.

1.5.3. Checking the meter.

Once the main menu item «Данные по счётчику» is selected, the required meter and data type should be selected for viewing (figure 11).

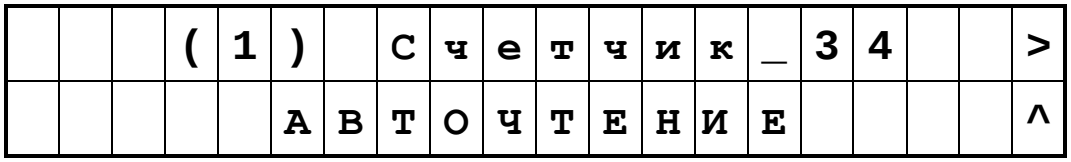


Figure 11. RTU display in meter selection mode and data type.

The data view is available for the following data types:

- auto-reading,
- meter profile,
- commercial interval,
- The sub-interval,
- Electrical parameters,

• It's time from the meter. After selecting the meter and data type (figure 11), the measured parameter for the viewing (figure 12) shall be selected:

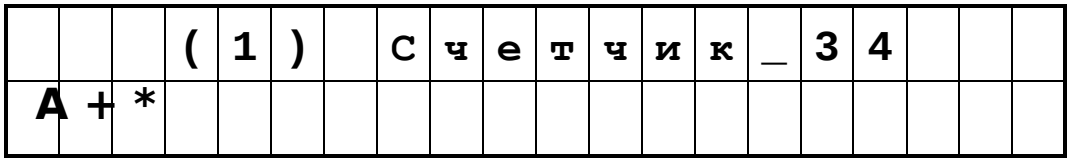


Figure 12. RTU display in the mode of choice of the measured parameter.

After selecting the measured parameter (figure 12), the viewing period (figure 13) shall be selected:



Figure 13 RTU display in time selection mode.

The data viewing period is:

- for the honors of the month,
- for the meter profile and the commercial interval, day,
- for the sub-interval and network parameters - one hour.

Checking the meter.

Following the selection of the period (Figure 13), the user-selected data will be viewed on the RTU display:

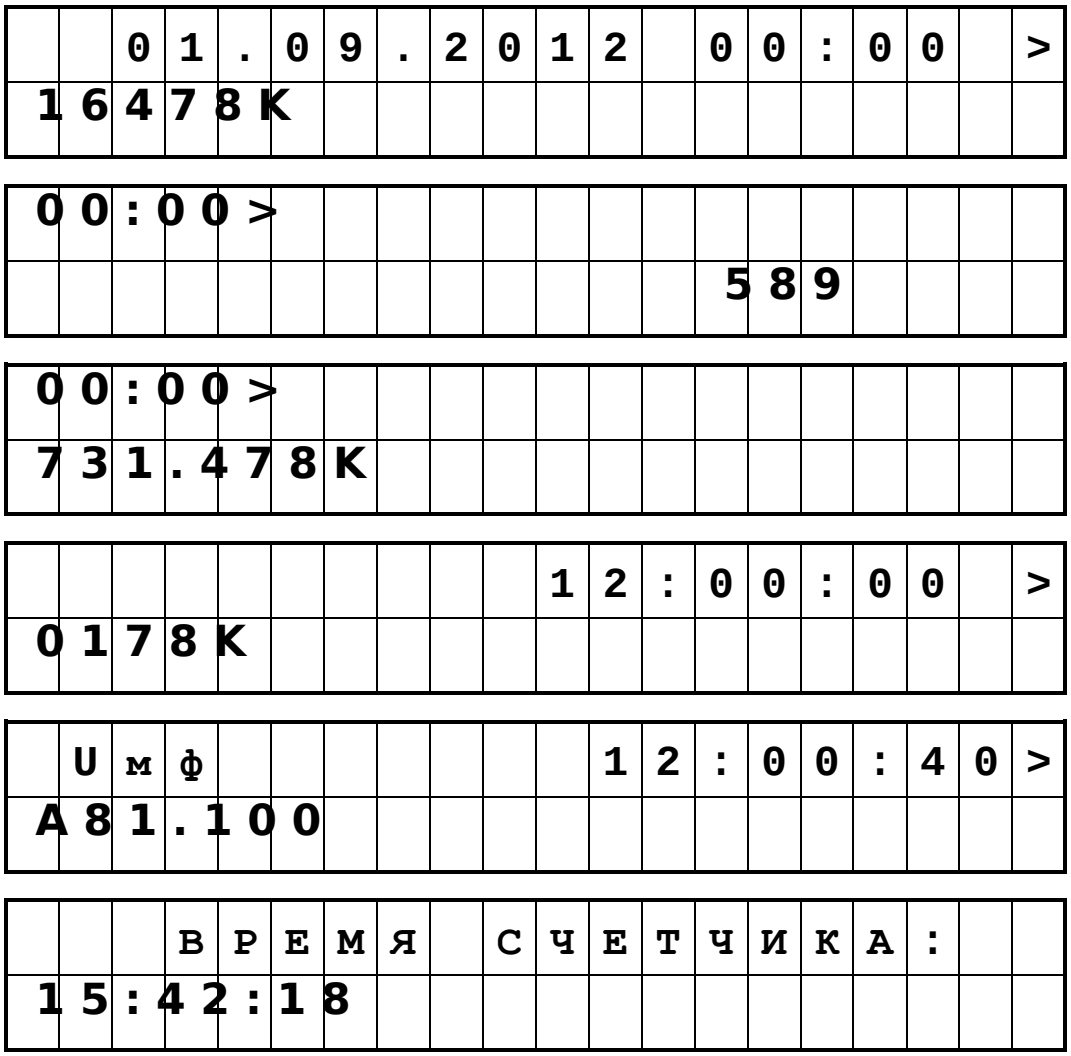


Figure 14. RTU display in meter mode.

1.5.4. View configuration parameters.

Once the main menu item «КОНФИГУРАЦИЯ» is selected, the type of component of the system and the required component should be selected to view its parameters (figure 15):

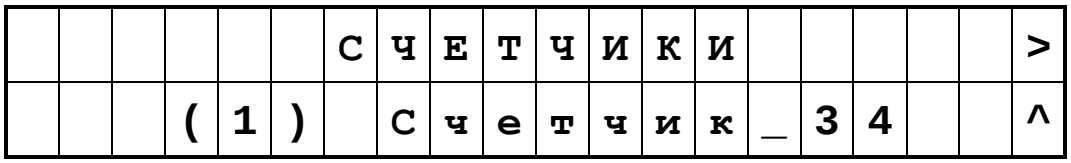


Figure 15. RTU display in the system type and component selection mode.

Data view (figure 16) is possible from:

- to the meter,
- RTU,
- port,
- a connection,
- TCP/IP.

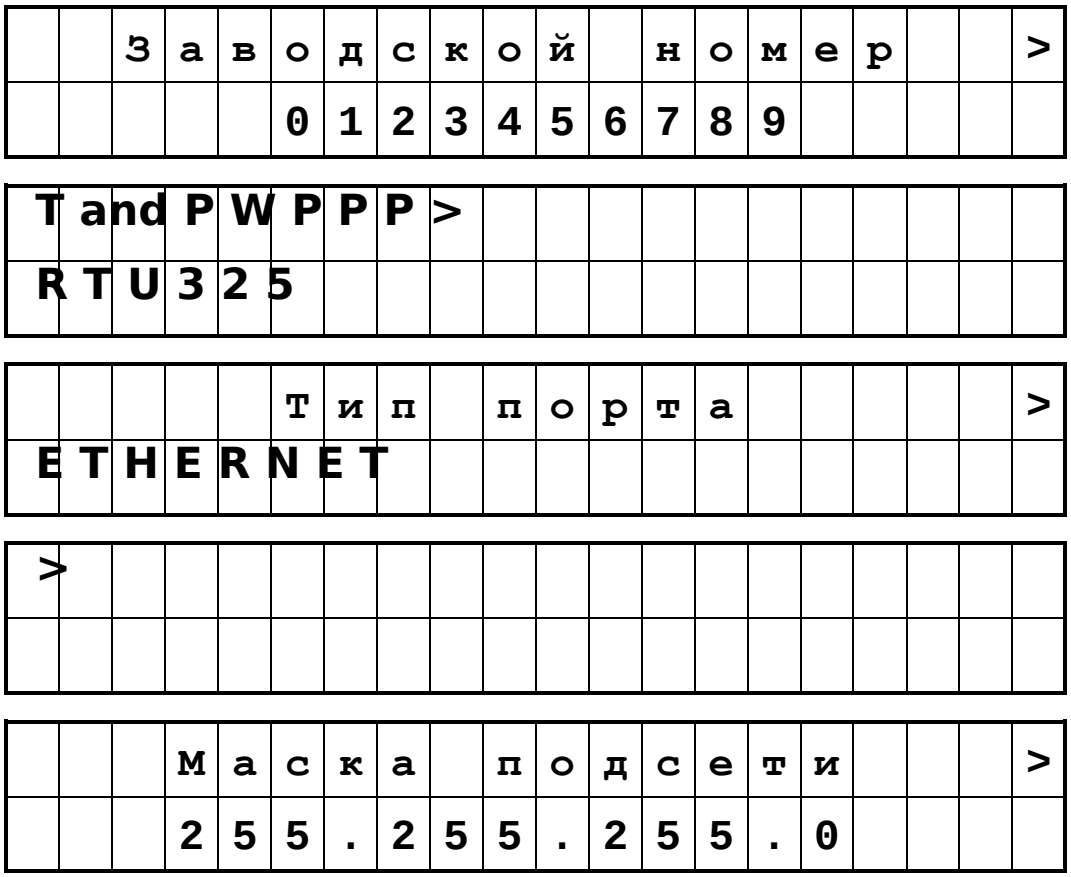


Figure 16. RTU display in configuration mode.

1.5.5. The settings.

Once the main menu item «НАСТРОЙКИ» has been selected, the required view/change parameter should be selected (figure 17):





Figure 17. The RTU display is in configuration mode.

After selecting the parameter (Figure 17), the value of the parameter is viewed on the RTU display.

IA address viewer.

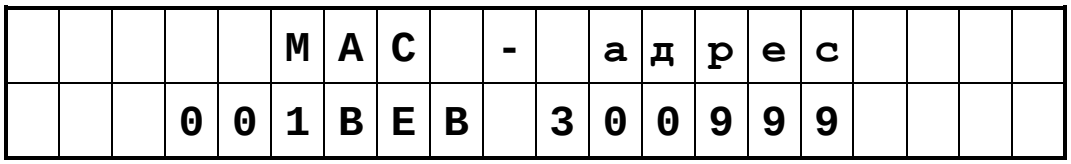


Figure 18. RTU display in the IAU address mode.

View/change RTU time.

In this paragraph, the user can view the current time of RTU. Users with top level password (superuser) may make manual correction of RTU time within one date (figure 19). The change in the number indicated by the italics is done by the <Alt> key, and the movement of the italics to the right and to the left by the keys < > > and < and>, respectively.

The display time and the time correction mode shall be entered by pressing the key <ENTER>. The time correction mode shall leave without introducing changes to RTU by pressing the key <ESC>.



Figure 19. RTU display in the IAU address mode.

Viewing/rehabilitating the TCP/IP parameters.

In this paragraph, the user can look at the following TCP/IP parameters:

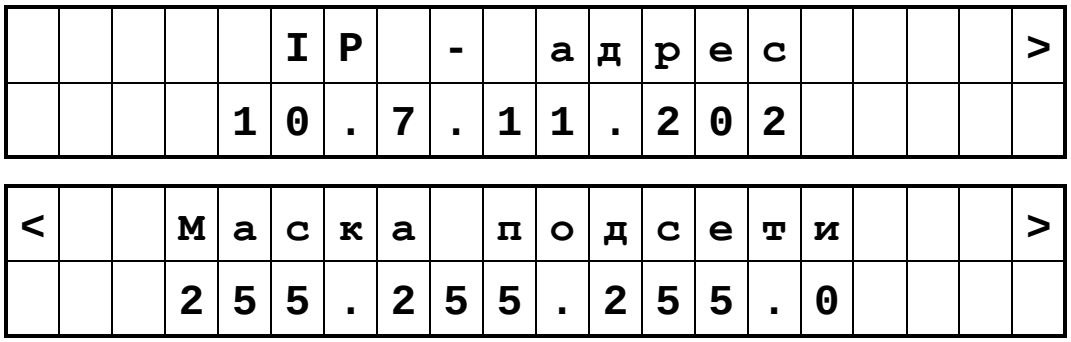


Figure 20. RTU display in TCP/IP mode.

For users with top level password (superuser), the TCP/IP plant may also be re-established:



Figure 21. RTU display in re-activation mode of the TCP/IP plant.

To restore the TCP/IP plant, the key <ENTER> must be pressed, and the key <ECS> must be pressed to cancel the operation.

Viewing software versions.

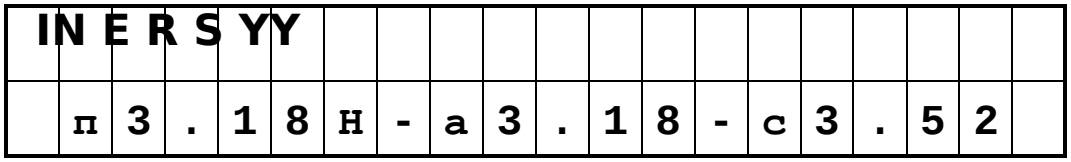


Figure 22. The RTU display is in the software version mode.

View/change display luminance value.

In this paragraph, the user can view and change the brightness of the display:



Figure 23. RTU display with view/change the brightness of the display.

1.5.6. Pulse test.

It is used to verify the in-line input/output control of RTU. Once this menu item is selected, the RTU display screen is cleaned. The pressure on any keyboard keyboard of the built-in input/output control shall cause the RTU display to display the name of the key. The keynames shall be removed consecutively from the left top to the right lower angle of the display. Thus, each keyboard keyboard and each sign of the RTU display can be checked.

The release from the integrated input/output control test mode RTU is performed by pressing the key <ESC>.

1.5.7. Shutdown.

For RTU models without an integrated uninterruptible power supply (UPS). Before shutting off the external power, this paragraph must be fulfilled to ensure that the software is properly completed!!!!!

For RTU models with an integrated uninterruptible power supply (UPS). This point is required to shut off the RTU power from the battery when the external power is removed.

After selecting this menu item, the RTU display provides service information on the status of the software stoppage. These messages are designed for diagnostic purposes and do not require any action from the user.

When this menu operation completes, the screen displays «ВЫКЛЮЧИ ПИТАНИЕ» (SWITCH OFF POWER). The user may then switch off the external power supply to the RTU.

- Disable the power of RTU from the battery (and, respectively, shut down the RTU display) in integrated power supply (UPS) models.
- A resolution of «ВЫКЛЮЧИ ПИТАНИЕ» on the RTU display in models without a built-in uninterruptible power supply (UPS).

For models without UPS, the external power can only be switched off after the permission is given on the RTU display:

		В	Ы	К	Л	Ю	Ч	Е	Н	И	Е		У	С	П	Д		
		В	Ы	К	Л	Ю	Ч	И		П	И	Т	А	Н	И	Е		

Figure 24. RTU display in power-off mode.

After the above message is available on the RTU display, the user can turn off the external power of the RTU. In this mode, the RTU software and the built-in input/output remote, respectively, are not operational. The only way to restore the performance of RTU is by shutting off/activating external power.

1.5.8. Reboot.

It is used to install RTU software and hardware. After selecting this menu item, the RTU display provides service information on the status of the software stoppage. These messages are designed for diagnostic purposes and do not require any action from the user.

When this menu operation completes, the screen displays «ВЫКЛЮЧИ ПИТАНИЕ» (SWITCH OFF POWER). The user may then switch off the external power supply to the RTU.

1.5.9. Restart software.

It is used to install RTU software and hardware. The result of this menu item is the re-start of the RTU software and the introduction of the on-call screen on the RTU display.

2. RTU models RTU-325L, RTU-325S, RTU-325T, RTU-325TM, RTU-325M. The RTU models RTU-325L, RTU-325S, RTU-325T, RTU-325TM and RTU-325M do not have an integrated input-output remote control.

The RTU of these models has a standard DB-15 (VGA) connector for the monitor and a standard PS/2 connector for the keyboard connection. If necessary, you can connect the monitor and keyboard to the RTU and access the integrated software. In this case, the external monitor and the external keyboard represent a complete analogy with the external engineering remote control.

Attention: The connection of the external monitor and keyboard to RTU shall be made with the RTU power off.

3. RTU model RTU-325H.

The built-in RTU input/output remote control of the RTU-325H model consists of: - a colour graphic display (TFT) with standard resolution (VGA) of 640 x 480 points; - 12 keyboard functional keyboard.

The built-in input/output remote is designed to operate in a view mode with the integrated RTU software in a similar way to the external engineering remote in a viewer mode. The view mode is partly limited to the 12 keyboard functional keyboards, which do not allow the insertion of letters and figures. However, it is possible to select the menus with the arrow keys.

Recommendation: to protect against any unauthorized configuration change
RTU keyboard keyboards need to enter the password for editing in «Конфигуратор» (the menu item «Настройки» > «Пароли конфигуратора», the password «Изменение конфигурации») and leave the password to view the configuration empty line (the menu item «Настройки» > «Пароли конфигуратора», the password «Просмотр конфигурации»). In this case, the key <Enter> of the functional keyboard should simply be pressed to enter «Конфигуратор» in the password request mode.

To completely ban working with «Конфигуратор» from the functional keyboard , you need to enter both of the program's «Конфигуратор» passwords .

If you need full-functional access to an integrated RTU software with the ability to edit the current configuration, you can connect the external keyboard to any USB distribution of RTU. In this case, the built-in RTU display and the external keyboard represent a complete analogy of the external engineering remote.

Note: U.S. external keyboard and integrated functional keyboard
The RTU keyboard works in parallel.

4. RTU 325 is an integrated input/output display tool for the RTU basic model. The built-in RTU software of any RTU-325 model contains the RTU 325 basic model emulator program. This is an emulator that allows all of the input/output functions of the RTU basic model RTU-325 using an external engineering remote remote control. The features of the use of the «Дисплей УСПД» control are described in the description of the built-in RTU input/output remote control of the RTU-325 basic model.

For the RTU 2.xx version of the software emulator, the RTU display is located in the «Дисплей УСПД» main menu of the integrated RTU software.
For the RTU 3.xx version of the software emulator, the RTU display is located in «Сервис...» > «Дисплей УСПД» of the main menu of the integrated RTU software.

SECTION 09

Web applications

Part 6

Edit 10 · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

Navigation: total content, detailed bookmarks and transitions in the lower column.

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Introduction.

The RTU-325 series has an integrated Web server. The user is provided with access to the Web applications from the Firefox browser of any computer connected to the RTU on the TCP/IP network.

No more than 5 users can work simultaneously. RTU has two sets of Web applications - one for access over TCP/IP high-speed networks (e.g., Ethernet local area network), and the other for access over low-speed TCP/IP networks (e.g., GPRS). Web applications for low-speed connections have a limited set of features and use minimal traffic between the RTU Web server and the user's browser.

In the initial configuration of RTU, access to the Web applications for speed connections is based on the following user names (each name will retain its Web application configuration profile):

1. Login: web325 Password: 3250
2. Login: web325_1 Password: 3251
3. Login: web325_2 Password: 3252
4. Login: web325_3 Password: 3253
5. Login: web325_4 Password: 3254
6. Login: web325_5 Password: 3255,

and for low-speed compounds:

1. Login: www325 Password: 3250
2. Login: www325_1 Password: 3251
3. Login: www325_2 Password: 3252
4. Login: www325_3 Password: 3253
5. Login: www325_4 Password: 3254
6. Login: www325_5 Password: 3255

Web-based applications for high-speed connections have the following functions:

- Calculations by price category (Regulation No. 442 of 04.05.2012).
- Formation and e-mailing of XML800x0 documents.
- Calculation of electricity consumption/generation for specified periods by meter.
- Registration and analysis of GOST 13109 electricity quality parameters.
- Monitoring of metering data.
- Monitoring the status of discrete objects.
- Monitoring of power, grid parameters and group imbalances.
- RTU auto-diagnosis.
- Formation of records on RTU archive data in tabular and graphic form.
- RTU.
- View the RTU verification report.

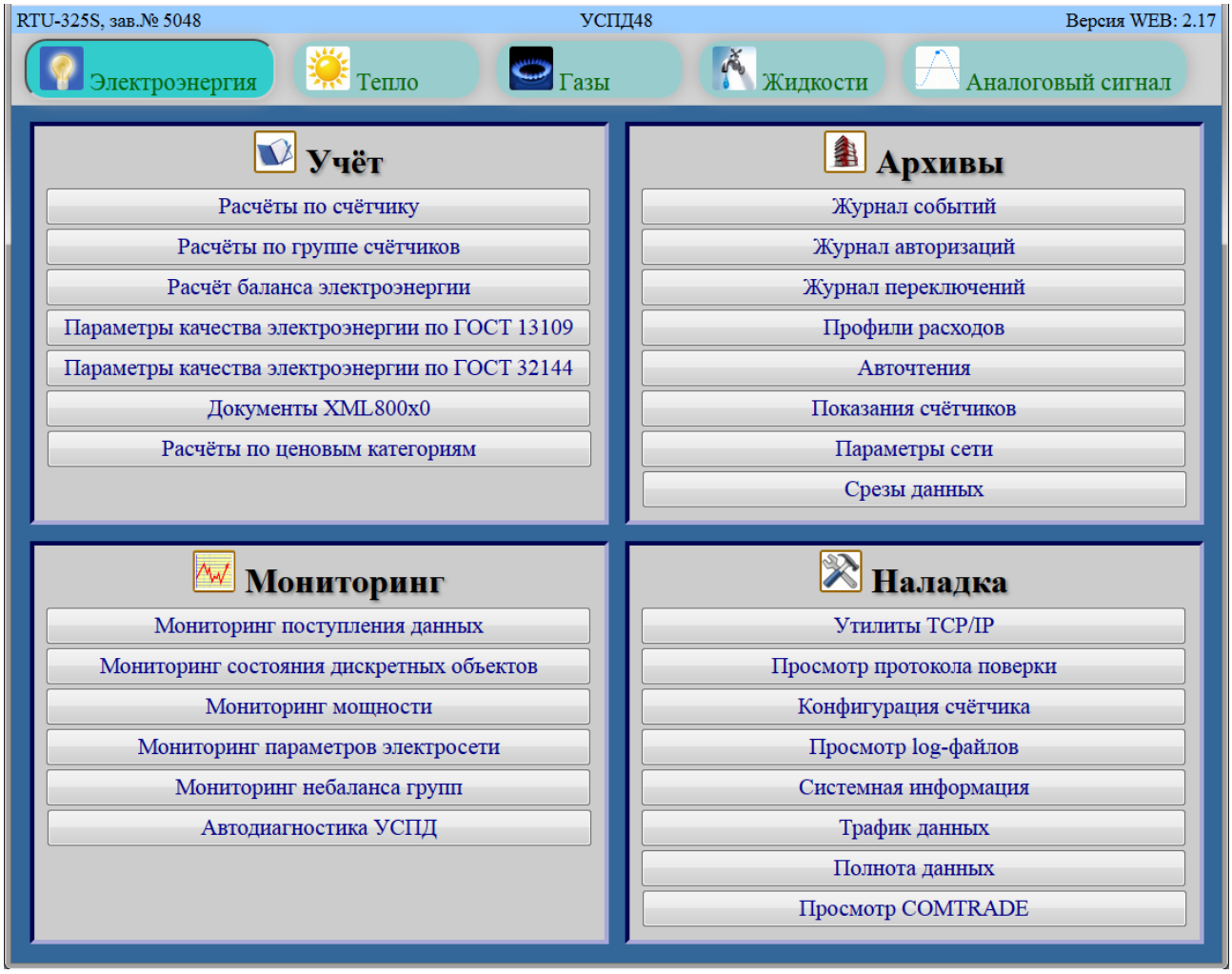
Web applications for low-speed connections have the following functions:

- Compiling expense reports on the meter.
- Compiling the meter reports.
- Create XML800x0 documents with access to the FTP protocol.
- RTU auto-diagnosis.
- Monitoring of group imbalances.
- View the RTU verification report.

The annexes for each type of connection are described below.

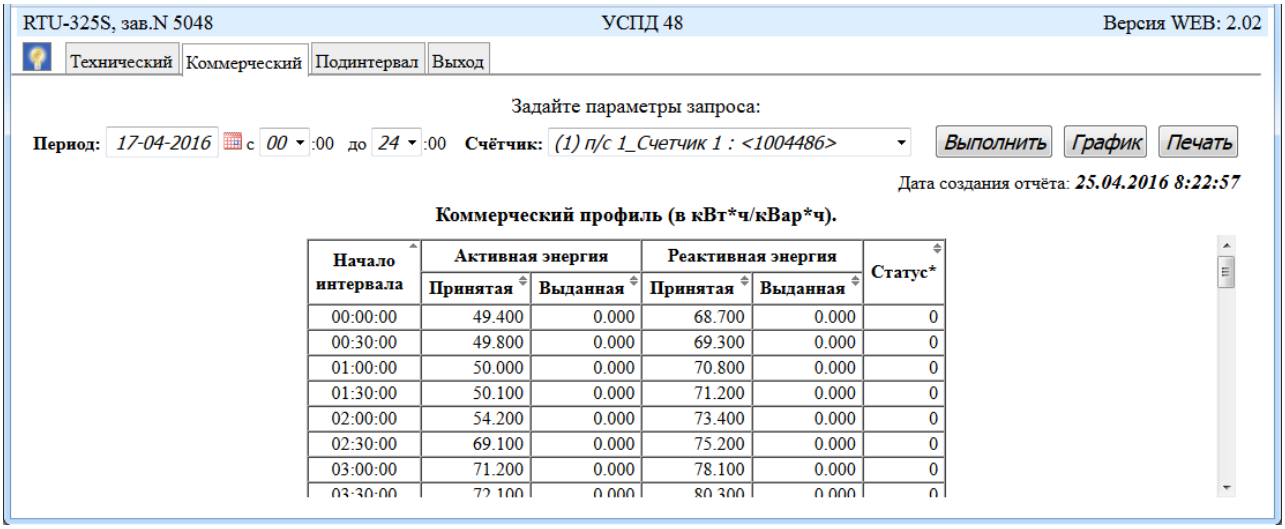
1. Web applications for high-speed connections.

The main menu will be presented to the user when the browser is connected to the integrated web server RTU on the high-speed connection:



In general, once the application has been selected and the required parameters have been completed, the user will be provided with a table-based report. The report can be viewed in the browser window, shown graphically or printed.

The tabulated view of the report is maintained by standard browser navigation tools.

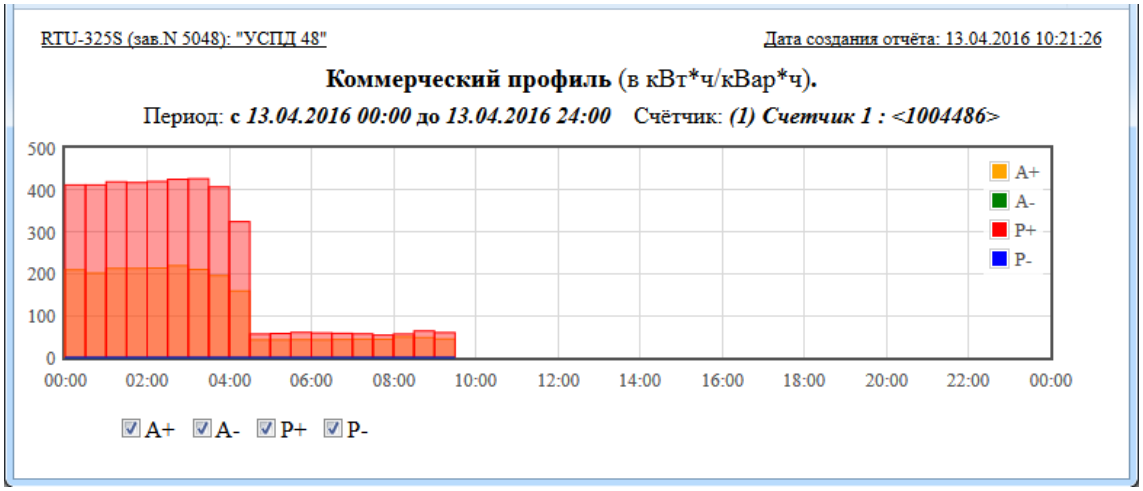


Начало интервала	Активная энергия		Реактивная энергия		Статус*
	Принятая	Выданная	Принятая	Выданная	
00:00:00	49.400	0.000	68.700	0.000	0
00:30:00	49.800	0.000	69.300	0.000	0
01:00:00	50.000	0.000	70.800	0.000	0
01:30:00	50.100	0.000	71.200	0.000	0
02:00:00	54.200	0.000	73.400	0.000	0
02:30:00	69.100	0.000	75.200	0.000	0
03:00:00	71.200	0.000	78.100	0.000	0
03:30:00	72.100	0.000	80.300	0.000	0

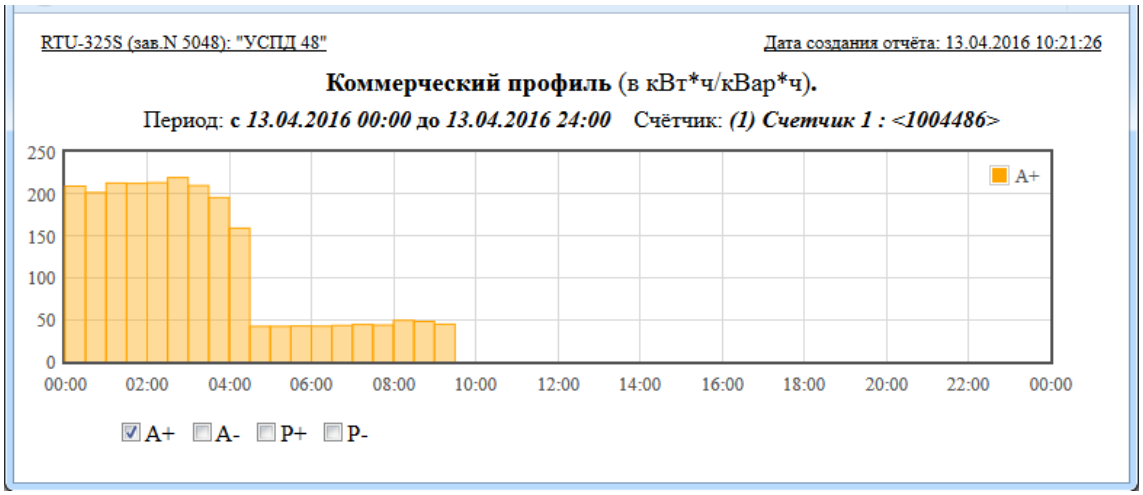
The data in the report table can be sorted in a straight and reverse order from the columns marked by the icon in the upper right corner of the column heading. One arrow icon ( ) indicates a column by which the sorting has been performed. The direction of the arrow indicates the direction of the sorting. Badge with two arrows ( )

indicates the possibility of sorting. For sorting, the user must point the mouse pointer to the title of the required column and click the left mouse button.

To view the data in graphic form, you need to press the <Graphic> button. This will open a window showing the data of the report table, for example:

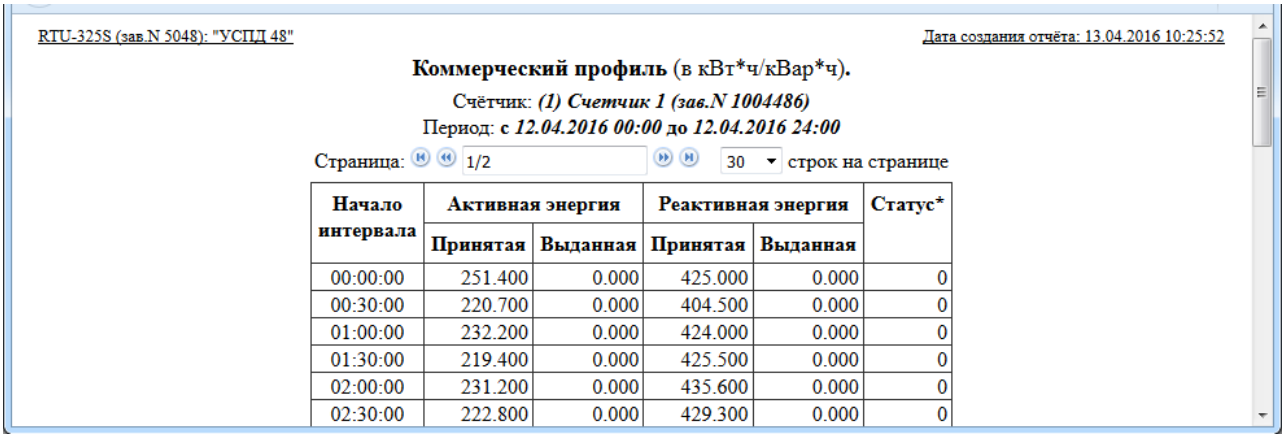


The graph shows data on the types of energy recorded in the RTU for the selected meter. The different energy graphs are shown in different colors. It is possible to switch on/off the display of data for an energy type by clicking on a square to the left of the corresponding name, for example:



The window with the schedule can be scaled. In doing so, the graph itself will be scaled up to a relatively new size of the window.

To form the document prepared for printing, press the button <Steam>. A new window will be opened, for example:



RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 13.04.2016 10:25:52

Коммерческий профиль (в кВт*ч/кВар*ч).

Счётчик: *(1) Счетчик 1 (зав.N 1004486)*

Период: с *12.04.2016 00:00* до *12.04.2016 24:00*

Страница: 1/2 30 строк на странице

Начало интервала	Активная энергия		Реактивная энергия		Статус*
	Принятая	Выданная	Принятая	Выданная	
00:00:00	251.400	0.000	425.000	0.000	0
00:30:00	220.700	0.000	404.500	0.000	0
01:00:00	232.200	0.000	424.000	0.000	0
01:30:00	219.400	0.000	425.500	0.000	0
02:00:00	231.200	0.000	435.600	0.000	0
02:30:00	222.800	0.000	429.300	0.000	0

If the data table can't fit into the 1 printed sheet, it's broken down into pages. In this case, the first 30 lines of the data table will be displayed on the screen. You can change the number of lines displayed on the page by selecting the appropriate

the value on the list. The field "Страница" is shown: current page/total page number. Page navigation is done with the following buttons:

- -front page,
- -Last page,
- -switching to the next page,
- -going to the previous page.

For this document to be printed, the user must click the left mouse button on the button in the right corner of the browser window and select 'Stamp' in the open menu. Next, the standard browser tool is to set the required page orientation, field and scale and print the page.

1.1. Countdown.

This paragraph provides the user with the opportunity to form different types of reports. The following types of reports can be compiled:

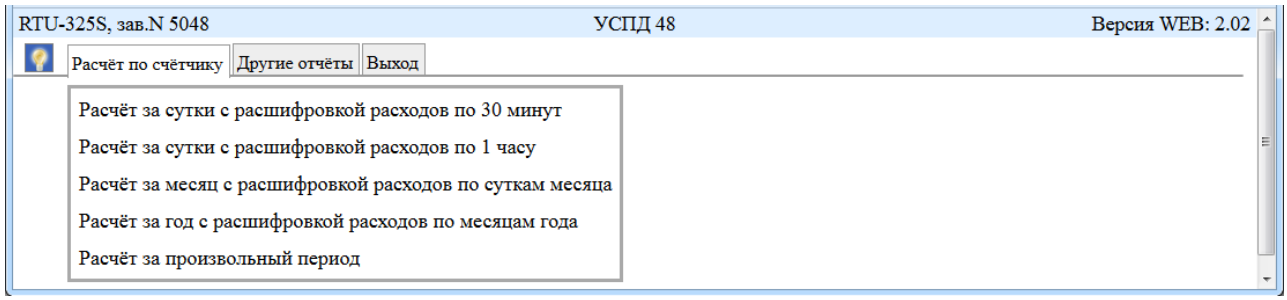
- The meter counts,
- The calculations for the group of metering units,
- Balance calculation for the group of metering units,
- GOST quality parameters 13109 and 32144
- documents XML 800x0,
- Price categories.

1.1.1. The meter counts.

In this paragraph, the user can create a electricity consumption report for the selected period using the selected meter. The calculation is performed using commercial intervals from the RTU archive. The report is possible with the following details:

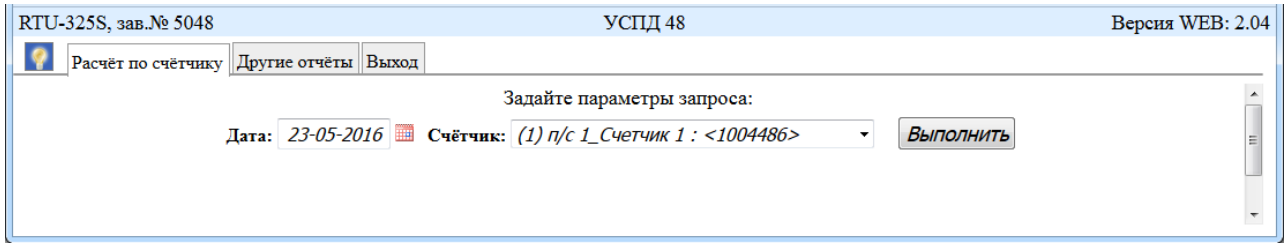
- daily calculation with a 30-minute consumption breakdown; - daily calculation with an hourly breakdown; - monthly calculation with a daily breakdown; - annual calculation with a monthly breakdown; - calculation for a user-defined period. In the “Другие отчёты” tab, the user can create a daily or monthly snapshot report of meter readings. The report uses meter readings stored in the RTU archive.

1.1.1.1. The meter count. When selecting the tab "Расчёт по счётчику", the user will be presented with a menu to select the type of report (details):

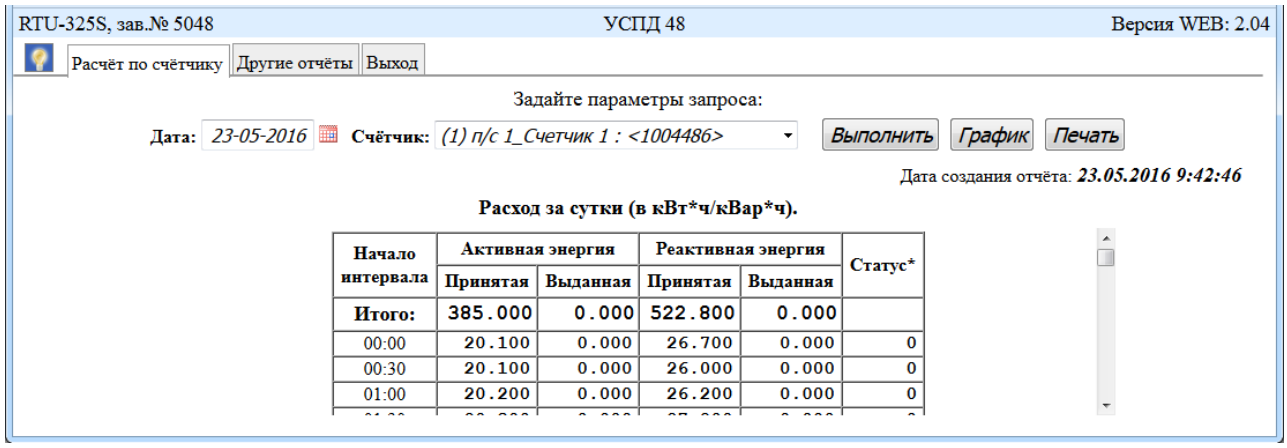


A 24-hour, 30-minute cost decipher.

When selecting this type of report, the user will be provided with the following form for filling in:



The user should set the date, select the meter and press the button <Do>. The result will be the following report:



Начало интервала	Активная энергия		Реактивная энергия		Статус*
	Принятая	Выданная	Принятая	Выданная	
Итого:	385.000	0.000	522.800	0.000	
00:00	20.100	0.000	26.700	0.000	0
00:30	20.100	0.000	26.000	0.000	0
01:00	20.200	0.000	26.200	0.000	0

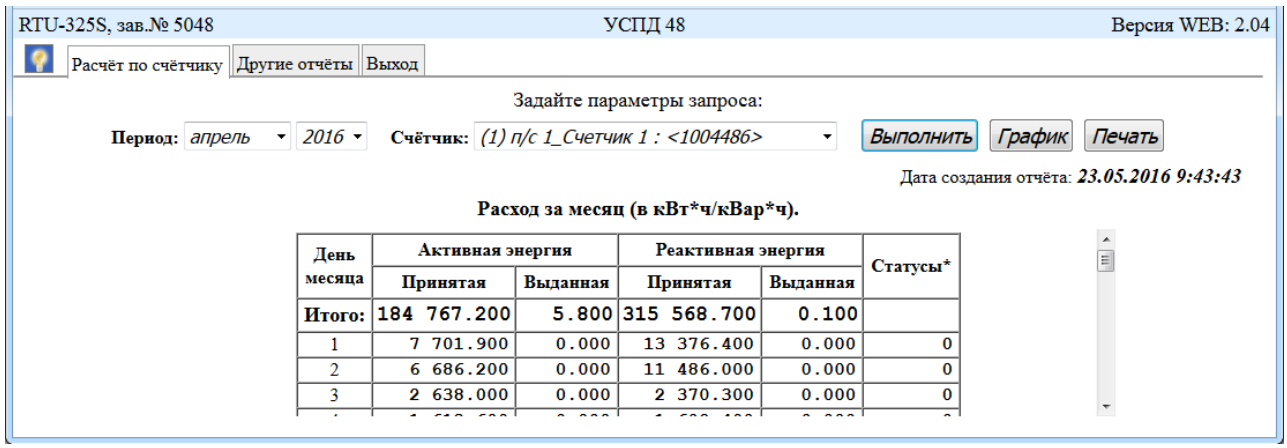
The data shown in the report can be viewed graphically or a list for the press.

24-hour, 1-hour cost decipher.

This report is similar to the 30-minute cost classification report (see above).

A month's bill, decrypting the costs for the days of the month.

When selecting this type of report, the user must choose the month, year and meter in the form presented. The following report will be displayed on the screen when the button <Enact> is pressed:

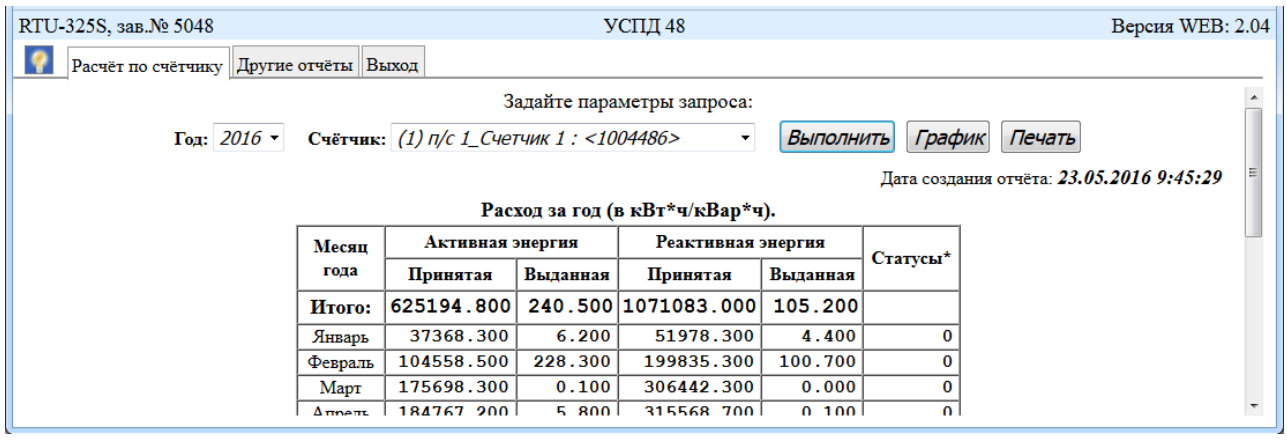


День месяца	Активная энергия		Реактивная энергия		Статусы*
	Принятая	Выданная	Принятая	Выданная	
Итого:	184 767.200	5.800	315 568.700	0.100	
1	7 701.900	0.000	13 376.400	0.000	0
2	6 686.200	0.000	11 486.000	0.000	0
3	2 638.000	0.000	2 370.300	0.000	0

The data shown in the report can be viewed graphically and printed.

A year's cost-deciphered account for the months of the year.

When selecting this type of report, the user must choose the reporting year and the meter in the form presented. The following report will be displayed on the screen when the button <Enact> is pressed:

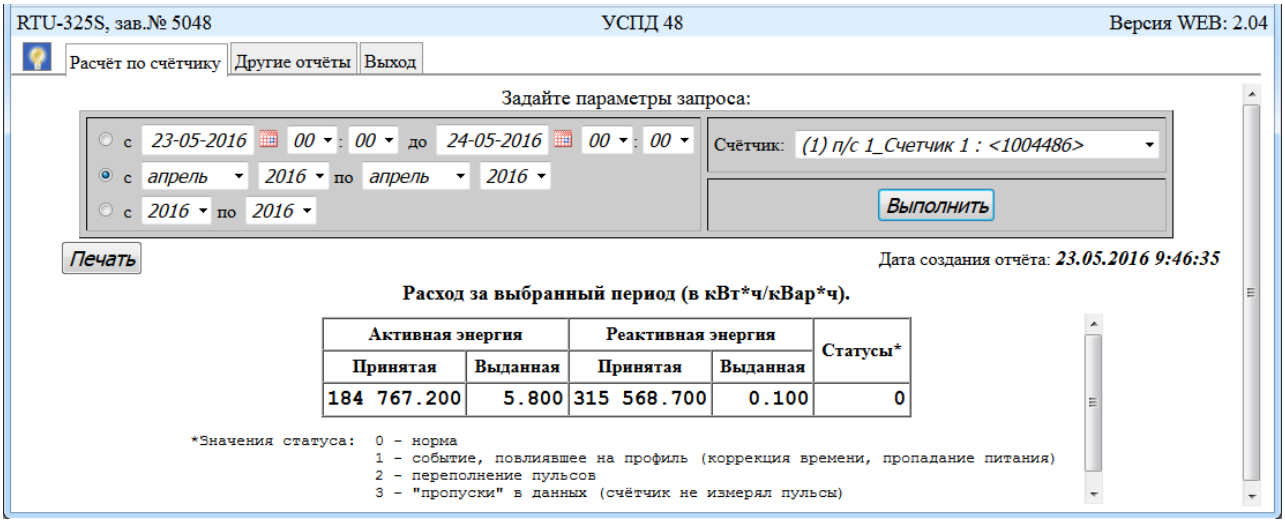


Месяц года	Активная энергия		Реактивная энергия		Статусы*
	Принятая	Выданная	Принятая	Выданная	
Итого:	625194.800	240.500	1071083.000	105.200	
Январь	37368.300	6.200	51978.300	4.400	0
Февраль	104558.500	228.300	199835.300	100.700	0
Март	175698.300	0.100	306442.300	0.000	0

The data shown in the report can be viewed graphically and printed.

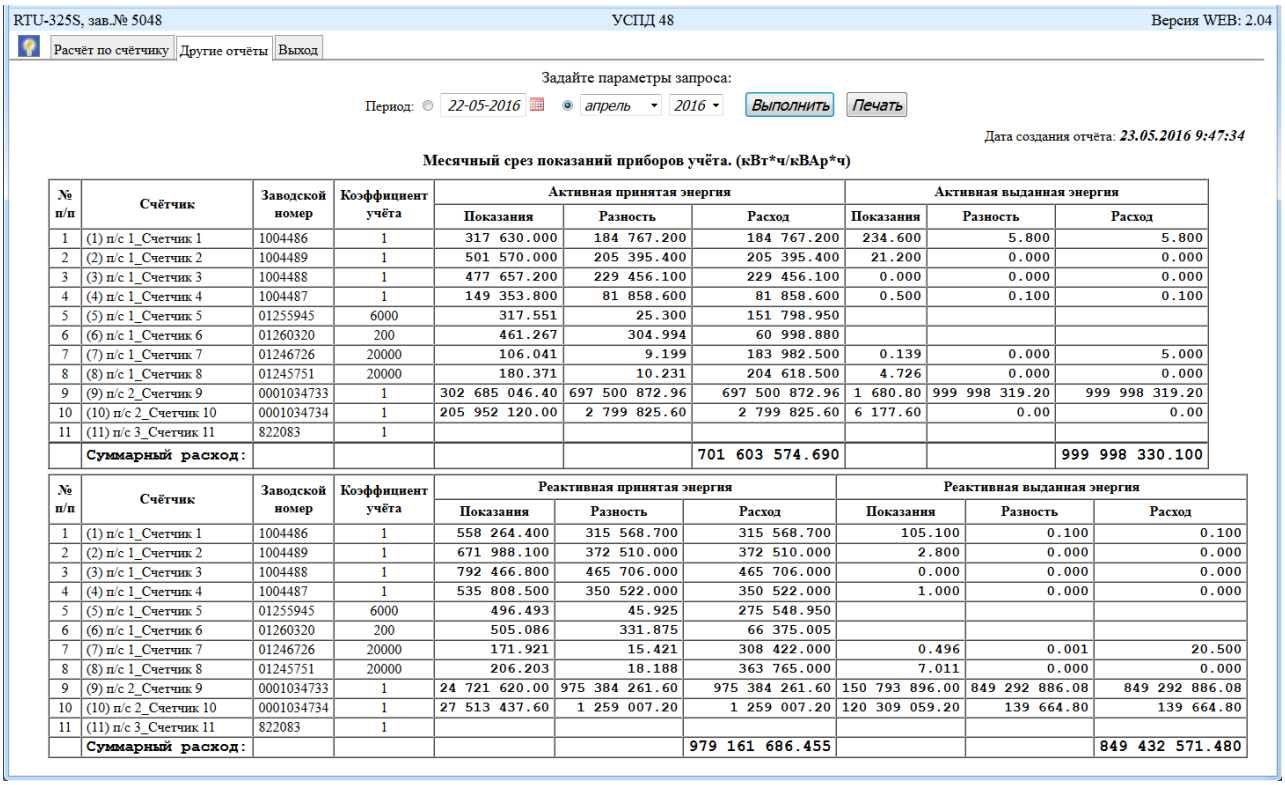
The settlement is arbitrary.

When selecting this type of report, the user must select the reporting period and the meter in the form provided. The following report will be displayed on the screen when the button <Enact> is pressed:



This report can be printed.

1.1.1.2. Daily/month cut of recorders. In this tab, the user can create a daily or monthly cut report for the recorders. The report is based on the readings of the meter stored in RTU. The following report will be displayed on the screen when the button <Enact> is pressed:



№ п/п	Счётчик	Заводской номер	Коэффициент учёта	Активная принятая энергия			Активная выданная энергия		
				Показания	Разность	Расход	Показания	Разность	Расход
1	(1) п/с 1_Счетчик 1	1004486	1	317 630.000	184 767.200	184 767.200	234.600	5.800	5.800
2	(2) п/с 1_Счетчик 2	1004489	1	501 570.000	205 395.400	205 395.400	21.200	0.000	0.000
3	(3) п/с 1_Счетчик 3	1004488	1	477 657.200	229 456.100	229 456.100	0.000	0.000	0.000
4	(4) п/с 1_Счетчик 4	1004487	1	149 353.800	81 858.600	81 858.600	0.500	0.100	0.100
5	(5) п/с 1_Счетчик 5	01255945	6000	317.551	25.300	151 798.950			
6	(6) п/с 1_Счетчик 6	01260320	200	461.267	304.994	60 998.880			
7	(7) п/с 1_Счетчик 7	01246726	20000	106.041	9.199	183 982.500	0.139	0.000	5.000
8	(8) п/с 1_Счетчик 8	01245751	20000	180.371	10.231	204 618.500	4.726	0.000	0.000
9	(9) п/с 2_Счетчик 9	0001034733	1	302 685 046.40	697 500 872.96	697 500 872.96	1 680.80	999 998 319.20	999 998 319.20
10	(10) п/с 2_Счетчик 10	0001034734	1	205 952 120.00	2 799 825.60	2 799 825.60	6 177.60	0.00	0.00
11	(11) п/с 3_Счетчик 11	822083	1						
	Суммарный расход:					701 603 574.690			999 998 330.100

№ п/п	Счётчик	Заводской номер	Коэффициент учёта	Реактивная принятая энергия			Реактивная выданная энергия		
				Показания	Разность	Расход	Показания	Разность	Расход
1	(1) п/с 1_Счетчик 1	1004486	1	558 264.400	315 568.700	315 568.700	105.100	0.100	0.100
2	(2) п/с 1_Счетчик 2	1004489	1	671 988.100	372 510.000	372 510.000	2.800	0.000	0.000
3	(3) п/с 1_Счетчик 3	1004488	1	792 466.800	465 706.000	465 706.000	0.000	0.000	0.000
4	(4) п/с 1_Счетчик 4	1004487	1	535 808.500	350 522.000	350 522.000	1.000	0.000	0.000
5	(5) п/с 1_Счетчик 5	01255945	6000	496.493	45.925	275 548.950			
6	(6) п/с 1_Счетчик 6	01260320	200	505.086	331.875	66 375.005			
7	(7) п/с 1_Счетчик 7	01246726	20000	171.921	15.421	308 422.000	0.496	0.001	20.500
8	(8) п/с 1_Счетчик 8	01245751	20000	206.203	18.188	363 765.000	7.011	0.000	0.000
9	(9) п/с 2_Счетчик 9	0001034733	1	24 721 620.00	975 384 261.60	975 384 261.60	150 793 896.00	849 292 886.08	849 292 886.08
10	(10) п/с 2_Счетчик 10	0001034734	1	27 513 437.60	1 259 007.20	1 259 007.20	120 309 059.20	139 664.80	139 664.80
11	(11) п/с 3_Счетчик 11	822083	1						
	Суммарный расход:					979 161 686.455			849 432 571.480

1.1.2. Countings for a group of meters.

In this paragraph, the user can create an electric energy consumption report for the selected period on the meter list. The calculation is performed using commercial intervals from the RTU archive. The report is possible with the following details:

- daily calculation with a 30-minute consumption breakdown; - daily calculation with an hourly breakdown; - monthly calculation with a daily breakdown; - annual calculation with a monthly breakdown; - calculation for a user-defined period.

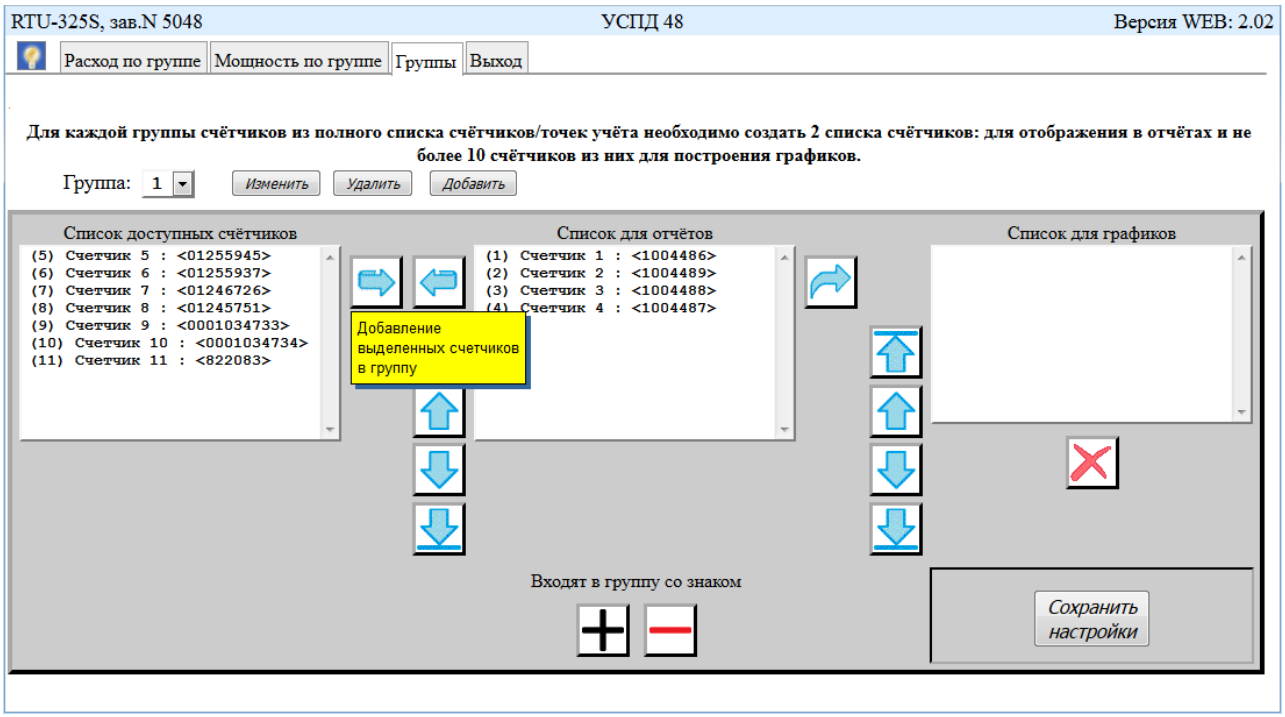
The reports are summary tables with data from the meter list. If the user has not created lists for reports and graphs (not maintained), the summary reports will show data for all of the meters that have been configurationd into RTU and the graphs will be based on the first 10 meters.

To display the data by a certain number of meters in a given order, the user needs to configuration the counterlists for the reports and graphs.

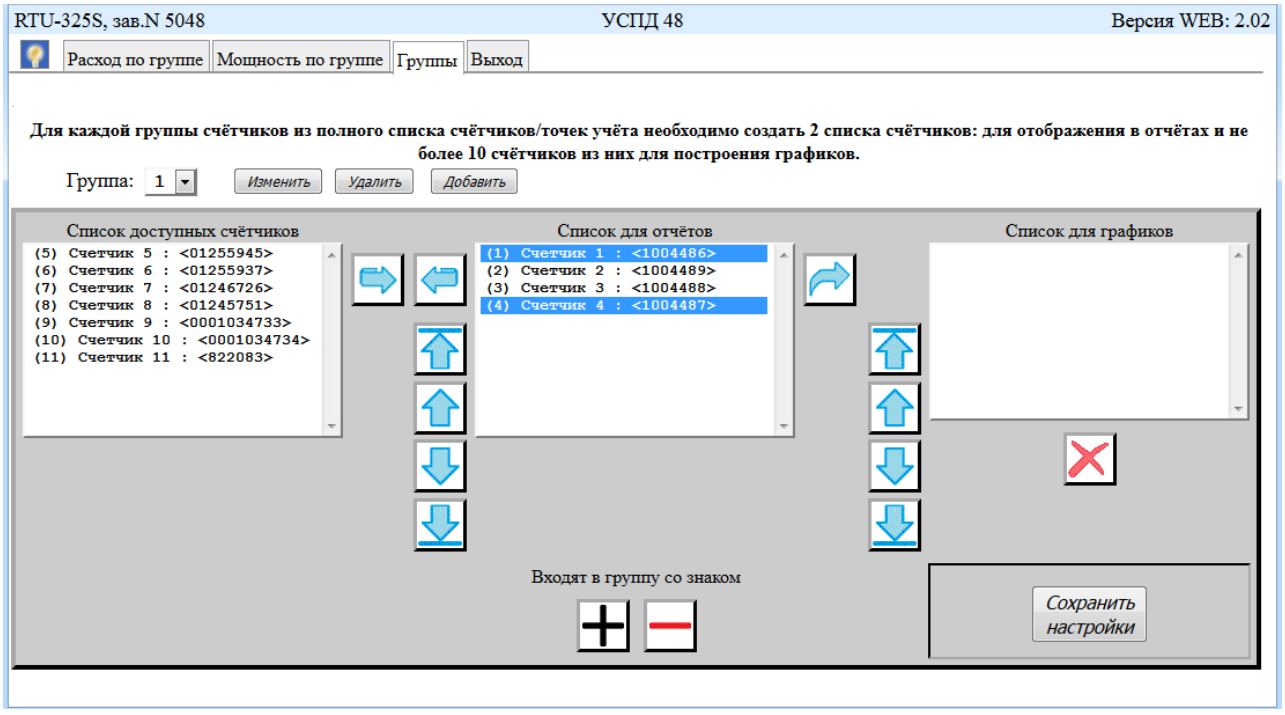
1.1.2.1. Groups. This item is intended to create lists of calculators. For each group it is necessary to create a 2 list of meters. The first list (the "Reporting List") should include only those calculators that are included in the group. To do this, the user must select a meter or a list of counteres (pressing <Ctrl> or <Shift>):



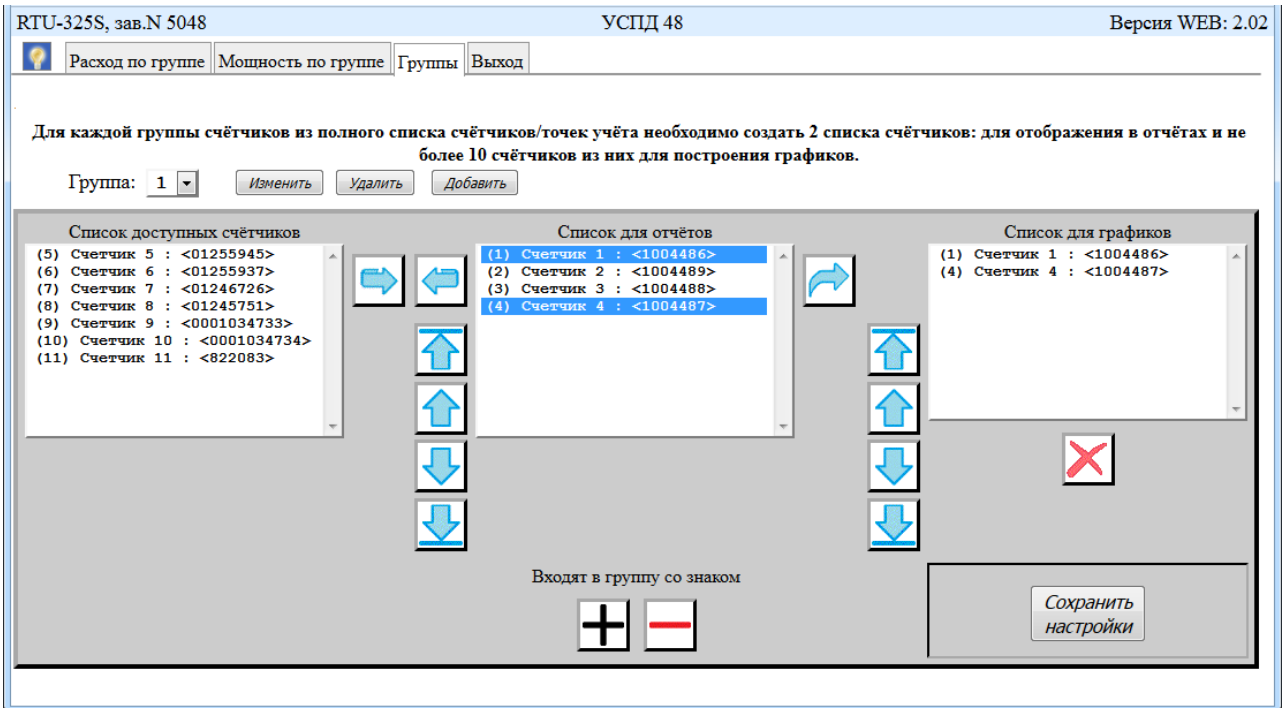
And press the button. As a result, the selected meters will be moved to the report list:



The second list ('Chart for Graphics') should include no more than 10 graphs on which the graphs will be based. To do this, in the Report List, it is necessary to select the required meters:



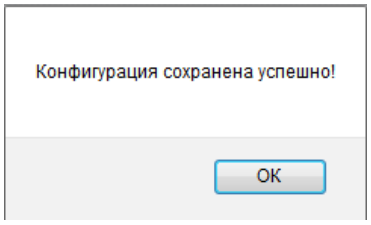
and press the button:



To remove the meter(s) from the 'Report List', you have to select it and press the button. To remove the meter(s) from the 'Chart of Graphics' you have to select it and press the button. Each of the lists created can be sorted in order. This requires that the required meter(s) be selected and moved up or down to the required position. The following keys are used to move the meter:

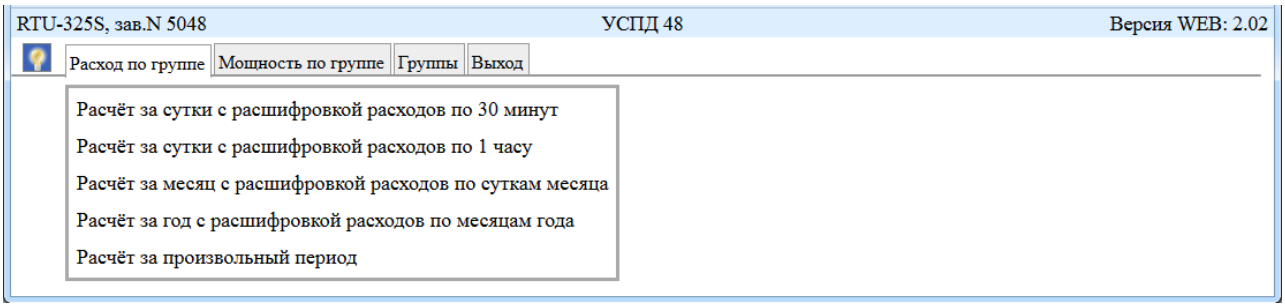
- movement to the beginning of the list; - movement to 1 position up; - movement to 1 position down; - movement to the end of the list.

The created lists need to be stored in RTU by pressing the key <Save settings>. The result of this is the following message:



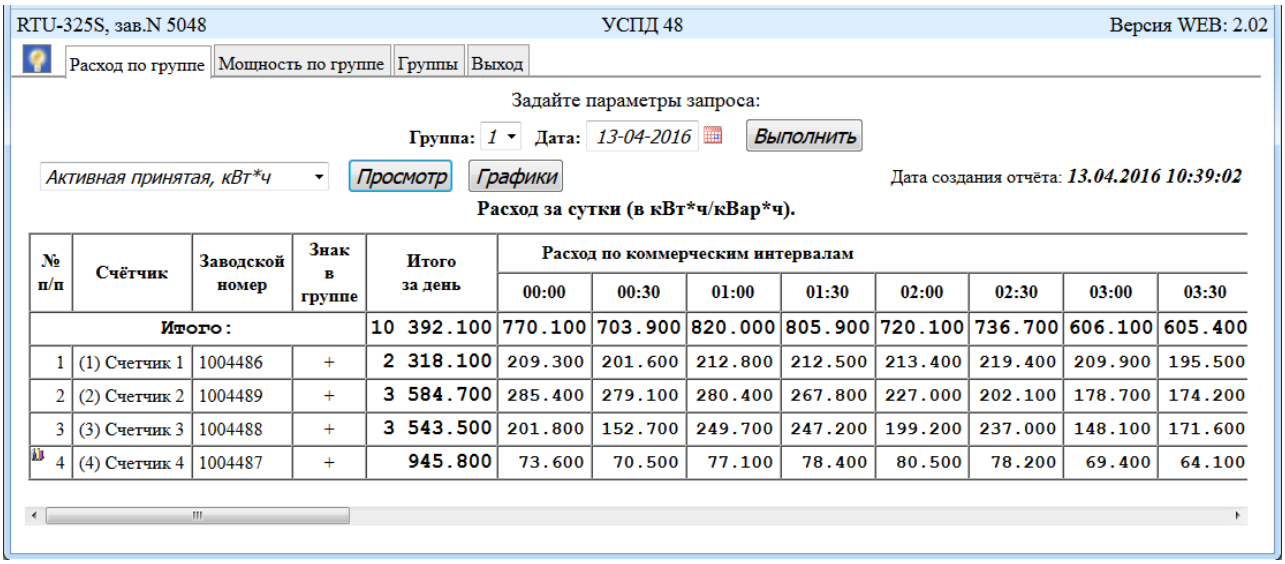
Once the lists are maintained, only the required meters will be present in the summary tables. The meters on which graphs will also be drawn are marked with a badge in the tables.

1.1.2.2. Group cost. When selecting the tab "Расход по группе", the user will be presented with a menu to select the type of report (details):



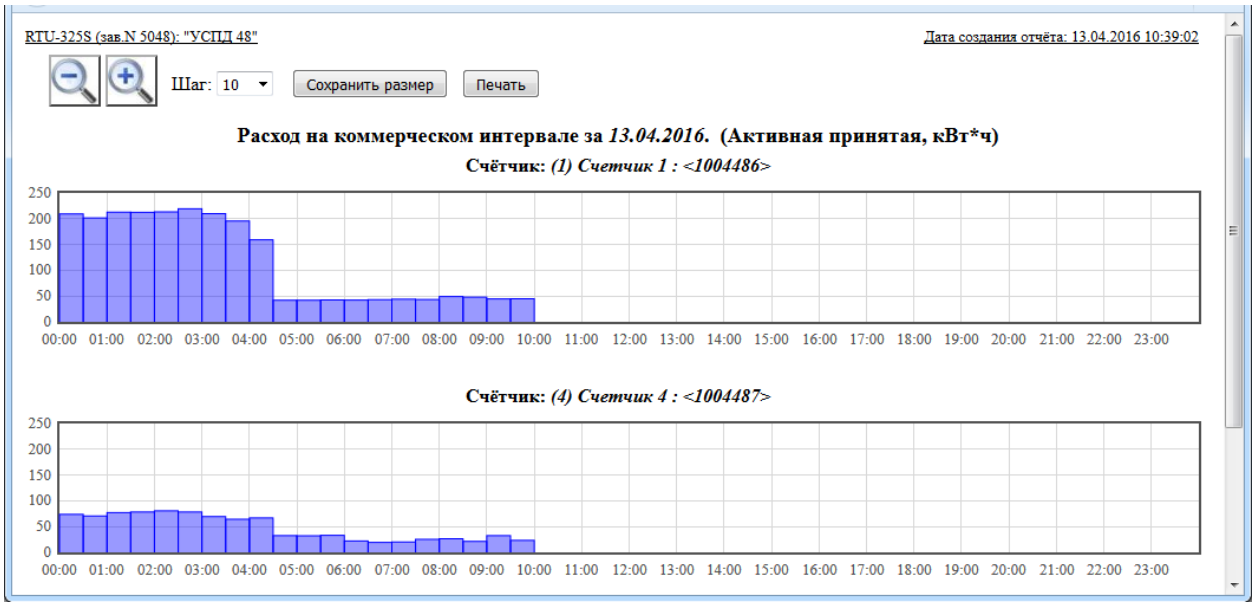
A 24-hour, 30-minute cost decipher.

When selecting this paragraph, the user should choose the group and date in the format presented and press the button <Perform>. Next, select the energy type and press the button < View>. The result will be the following report:



№ п/п	Счётчик	Заводской номер	Знак в группе	Итого за день	Расход по коммерческим интервалам							
					00:00	00:30	01:00	01:30	02:00	02:30	03:00	03:30
Итого:				10 392.100	770.100	703.900	820.000	805.900	720.100	736.700	606.100	605.400
1	(1) Счетчик 1	1004486	+	2 318.100	209.300	201.600	212.800	212.500	213.400	219.400	209.900	195.500
2	(2) Счетчик 2	1004489	+	3 584.700	285.400	279.100	280.400	267.800	227.000	202.100	178.700	174.200
3	(3) Счетчик 3	1004488	+	3 543.500	201.800	152.700	249.700	247.200	199.200	237.000	148.100	171.600
4	(4) Счетчик 4	1004487	+	945.800	73.600	70.500	77.100	78.400	80.500	78.200	69.400	64.100

The following type of window will be presented to the user using the <Graphic> button:



This window can be scaled. It is also possible to scale the height of the graph field. To do this, we need to set a step that will change the height for one.

Once and press button(s) or (increase) The current field height of graphs can be saved in RTU by pressing the <Save Size> button.

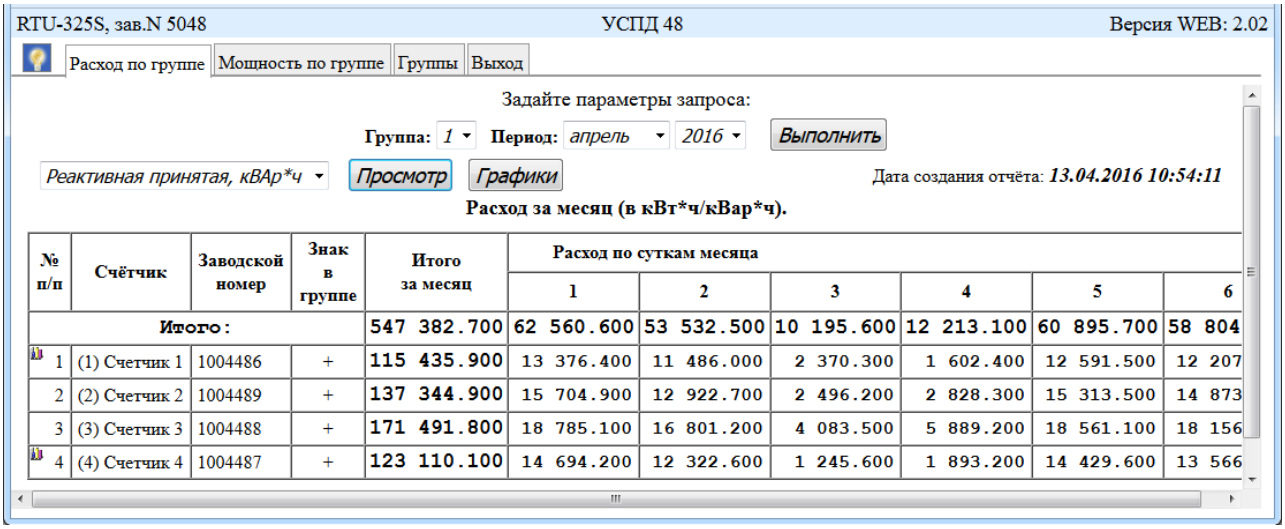
set equal to the stored. If successfully saved, the message «Размер сохранён» will appear on the screen.
The chart page can be printed out. The button <Speech> will open a window prepared for printing.

24-hour, 1-hour cost decipher.

This report is similar to the 30-minute cost classification report (see above).

A month's bill, decrypting the costs for the days of the month.

When selecting this paragraph, the user should select the group, year and month in the format presented and press the button <Perform>. Next, select the energy type and press the button < View>. As a result, the following report will be presented on the screen:

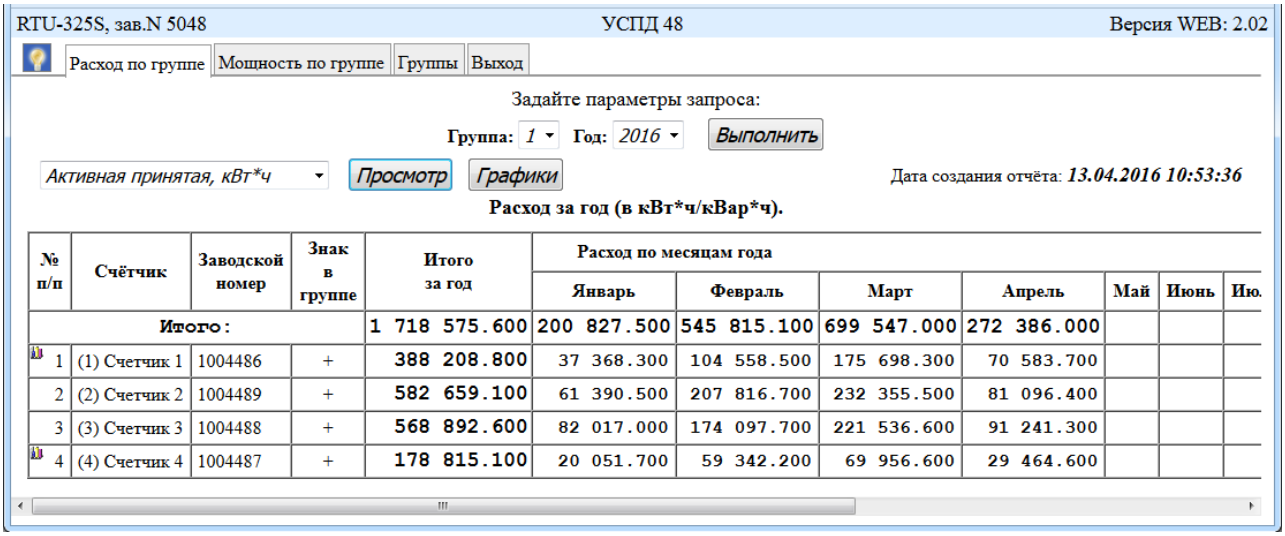


№ п/п	Счётчик	Заводской номер	Знак в группе	Итого за месяц	Расход по суткам месяца					
					1	2	3	4	5	6
Итого:				547 382.700	62 560.600	53 532.500	10 195.600	12 213.100	60 895.700	58 804
1	(1) Счетчик 1	1004486	+	115 435.900	13 376.400	11 486.000	2 370.300	1 602.400	12 591.500	12 207
2	(2) Счетчик 2	1004489	+	137 344.900	15 704.900	12 922.700	2 496.200	2 828.300	15 313.500	14 873
3	(3) Счетчик 3	1004488	+	171 491.800	18 785.100	16 801.200	4 083.500	5 889.200	18 561.100	18 156
4	(4) Счетчик 4	1004487	+	123 110.100	14 694.200	12 322.600	1 245.600	1 893.200	14 429.600	13 566

This report can be viewed in graphic form for the scored meters.

A year's cost-deciphered account for the months of the year.

When selecting this type of report, the user should select the group and year in the format presented and press the button <Perform>. Next, select the energy type and press the button < View>. As a result, the following report will be presented:

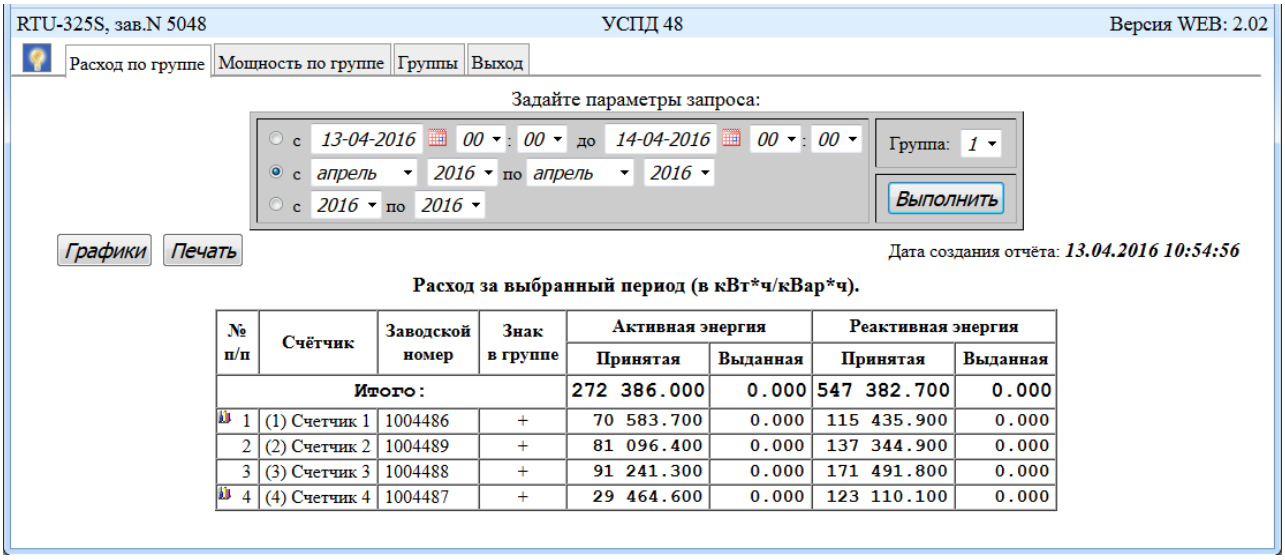


№ п/п	Счётчик	Заводской номер	Знак в группе	Итого за год	Расход по месяцам года						
					Январь	Февраль	Март	Апрель	Май	Июнь	Ию
Итого:				1 718 575.600	200 827.500	545 815.100	699 547.000	272 386.000			
1	(1) Счетчик 1	1004486	+	388 208.800	37 368.300	104 558.500	175 698.300	70 583.700			
2	(2) Счетчик 2	1004489	+	582 659.100	61 390.500	207 816.700	232 355.500	81 096.400			
3	(3) Счетчик 3	1004488	+	568 892.600	82 017.000	174 097.700	221 536.600	91 241.300			
4	(4) Счетчик 4	1004487	+	178 815.100	20 051.700	59 342.200	69 956.600	29 464.600			

This report can be viewed in graphic form for the scored meters.

The settlement is arbitrary.

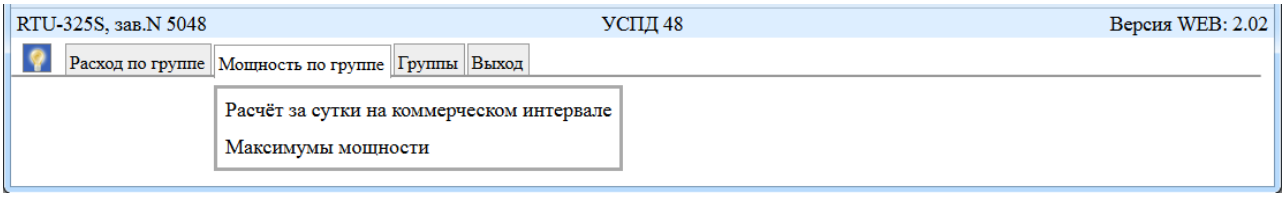
When selecting this type of report, the user should select the reporting period in the form presented and press the button < Do>. The result will be the following report:



№ п/п	Счётчик	Заводской номер	Знак в группе	Активная энергия		Реактивная энергия	
				Принятая	Выданная	Принятая	Выданная
Итого:				272 386.000	0.000	547 382.700	0.000
1	(1) Счетчик 1	1004486	+	70 583.700	0.000	115 435.900	0.000
2	(2) Счетчик 2	1004489	+	81 096.400	0.000	137 344.900	0.000
3	(3) Счетчик 3	1004488	+	91 241.300	0.000	171 491.800	0.000
4	(4) Счетчик 4	1004487	+	29 464.600	0.000	123 110.100	0.000

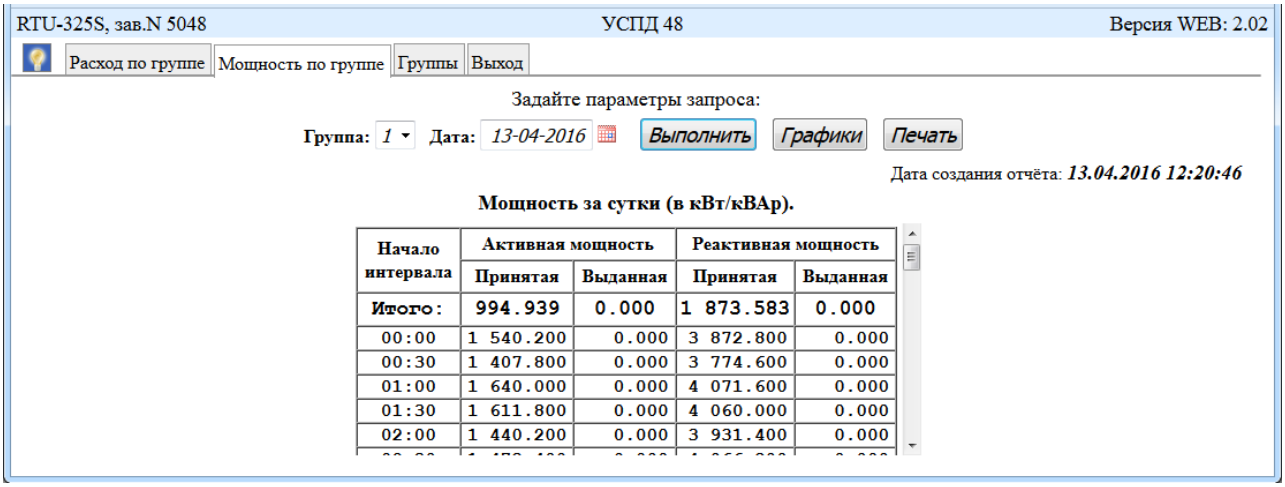
This report can be viewed graphically for the scored meters and printed.

1.1.2.3. Group power. When selecting the tab "Мощность по группе", the user will be presented with a menu to select the type of report (details):



A 24-hour settlement at a commercial interval.

When selecting this type of report, the user must select the year and date in the format presented and press the button < Do>. The result will be the following report:



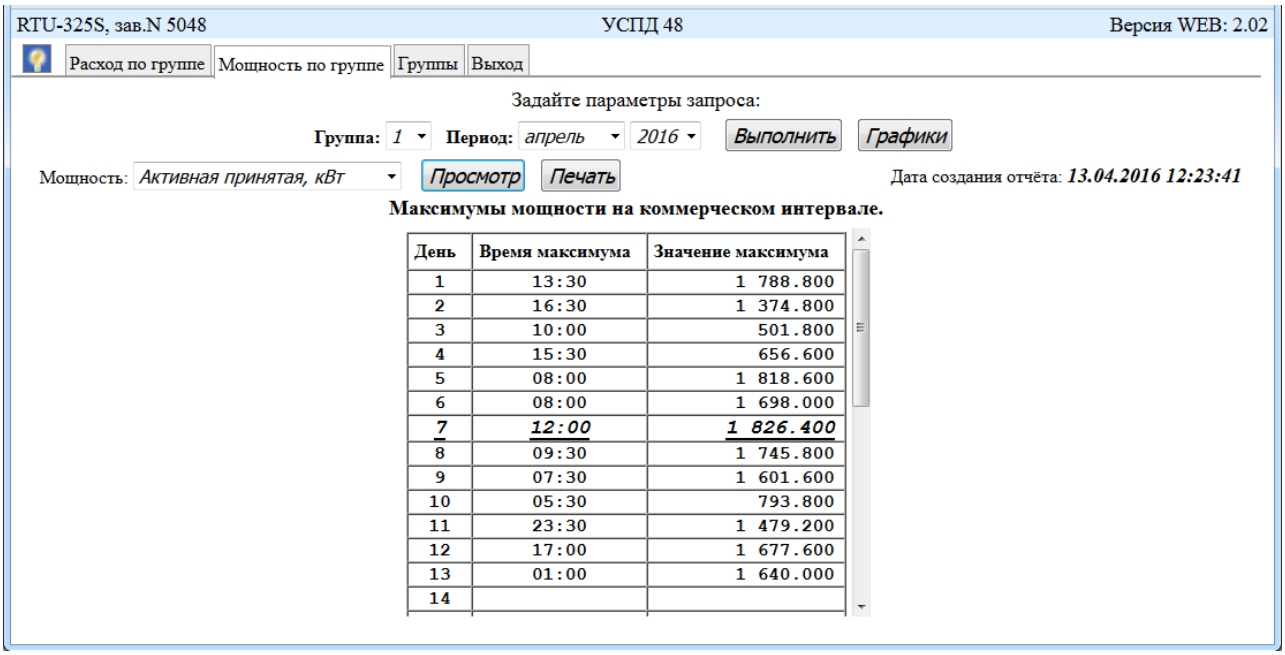
Начало интервала	Активная мощность		Реактивная мощность	
	Принятая	Выданная	Принятая	Выданная
Итого:	994.939	0.000	1 873.583	0.000
00:00	1 540.200	0.000	3 872.800	0.000
00:30	1 407.800	0.000	3 774.600	0.000
01:00	1 640.000	0.000	4 071.600	0.000
01:30	1 611.800	0.000	4 060.000	0.000
02:00	1 440.200	0.000	3 931.400	0.000

This report can be viewed graphically and printed.

The maximums of power.

When selecting this type of report, the user must select the group, month and year in the format presented and press the button <do>. Next, the view should be selected.

The following report will be displayed on the screen:



День	Время максимума	Значение максимума
1	13:30	1 788.800
2	16:30	1 374.800
3	10:00	501.800
4	15:30	656.600
5	08:00	1 818.600
6	08:00	1 698.000
7	12:00	1 826.400
8	09:30	1 745.800
9	07:30	1 601.600
10	05:30	793.800
11	23:30	1 479.200
12	17:00	1 677.600
13	01:00	1 640.000
14		

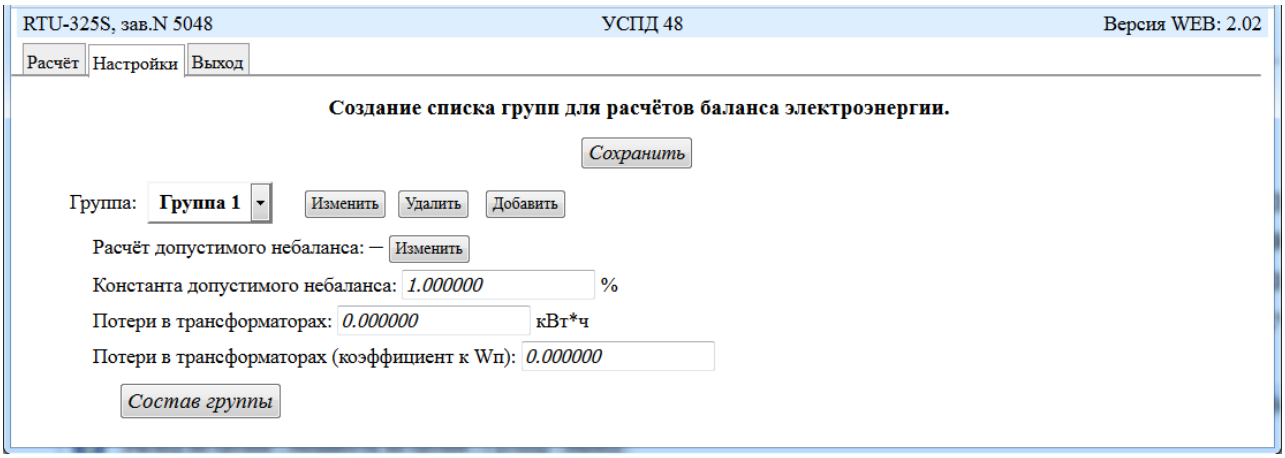
The report contains the time and value of maximum power for each day of the month. The day with the highest maximum power value is highlighted.

This report can be printed.

1.1.3. Calculation of the electricity balance.

In this paragraph, the user can create an electric balance report for the selected period by group of meters. The calculation is performed using the commercial intervals from the RTU archives. The calculation shall be done according to the regulatory document "Model instruction for accounting for electricity production, transmission and distribution. RD 34.09.101-94".

1.1.3.1. The settings. This point is intended to create a counterlist. In this menu paragraph, the user must enter the name of the group if the list of groups is empty. Once a particular balance sheet group has been created or selected, the user will be provided with a list of parameters for entering:



- **Calculation of the acceptable imbalance.**
  Permissible values: «+» (calculate permissible group imbalances) or «-» (no calculation).

· **Permissible imbalance constant, %.**

Data type: the physical number. The introduction of an acceptable imbalance in constant is necessary when the previous parameter "Расчёт допустимого небаланса" specifies the sign «-».

· **Losses in transformers, kWh.**

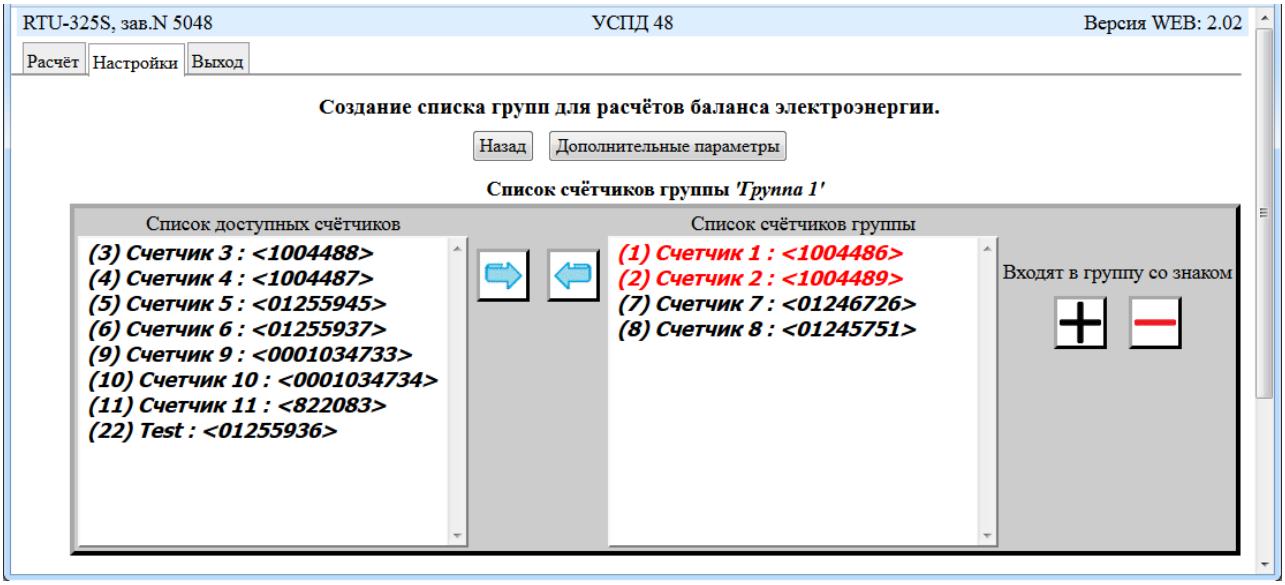
Data type: the physical number. This parameter allows the value of the losses in transformers to be set in kWh.

· **Losses in transformers (Wp coefficient).**

Data type: the physical number. This parameter gives the value of the losses in the transformers as the ratio of the power output to Wp.

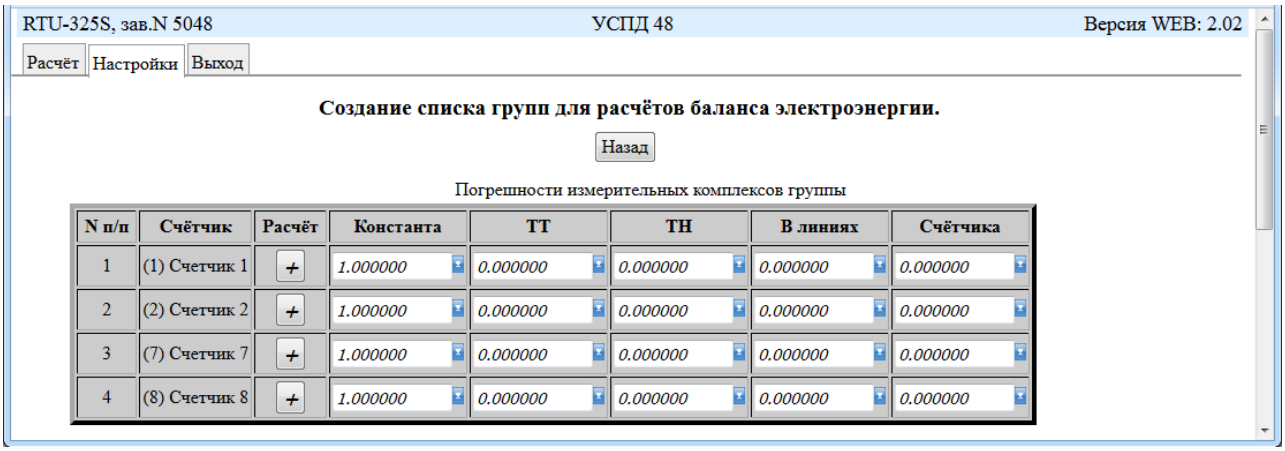
· **Composition of the group.**

The user will be provided with a form for determining the group's meters by the button <Group composition>.



If "Расчёт допустимого небаланса" has a value of «+» , the user will be provided with a form for input errors of group measuring complexes on the <Addiform Parameters> button.

· **The errors of the group measuring complexes.**



In selecting this option, a table will be presented to the user, each row of which contains the following information fields:

; The meter.

This field contains the name of the meter in this balance sheet group. Truck.

Permissible values: «+» or «-» .

At «+», the permissible relative error of the measuring complex of the meter will be calculated. For «-» the user shall be given the permissible relative error of the constant. Constanta.

This parameter defines the value of the permissible relative error limit of the measurement set of the given meter as constant. The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «-». TT.

This parameter defines the value of the permissible relative error limit of the current transformer. The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «+». TN.

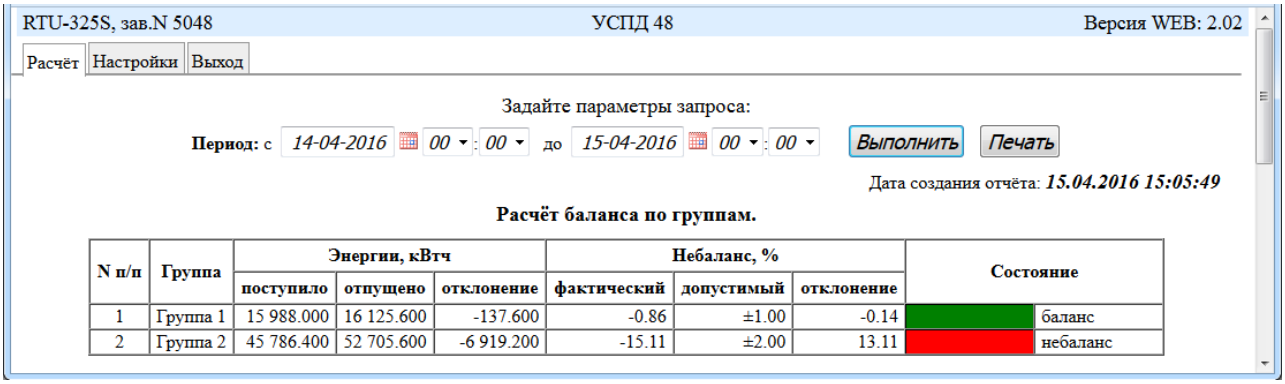
This parameter defines the value of the permissible relative error limit of the voltage transformer. The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «+». In the lines.

This parameter defines the voltage loss in the meter accession lines to the voltage transformer. The input of this parameter is necessary when the parameter "Расчёт" specifies the sign «+». The meter.

This parameter determines the limit of the allowable basic error of the meter. The input of this parameter is required when the parameter "Расчёт" specifies the sign «+».

After all the necessary parameters have been set, you need to go back to the first form and press the <Save> button.

1.1.3.2. Truck. In this tab, the user can create and print the balance sheet report by group. After the assignment of the calculation period and the push of the button <do>, the following report will be made available to the user:



1.1.4. Energy quality parameters for GOST 13109.

This application allows the user to assess the compliance of the electricity quality indicators (CCE) with the GOST 13109-97 standards. The conformity assessment shall be performed according to the following parameters:

- The variation of voltage in the most and least load modes;
- 24-hour variation of voltage;
- The coefficient of distortion of the sinusoidality of the voltage curve;
- The non-symmetry factor of the inverse sequence;
- A factor of zero voltage in sequence;

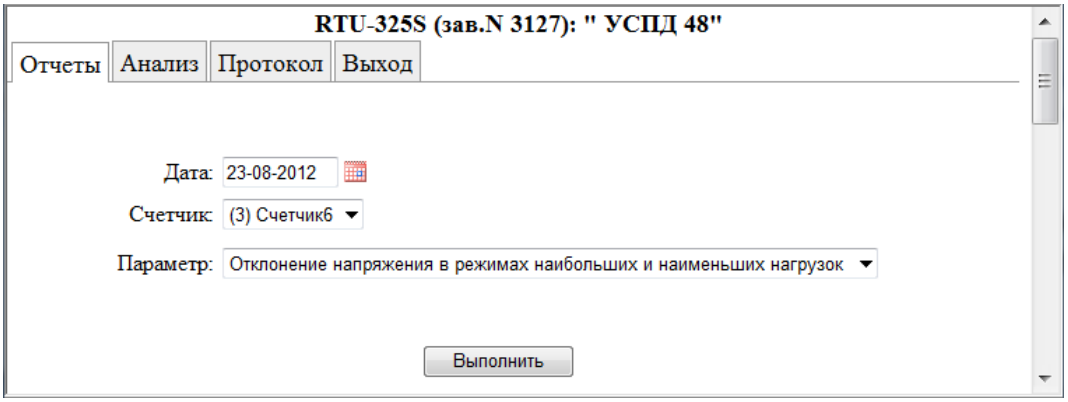
- The frequency deviation;
- coefficient of the n-harmonic voltage component.

The annex shall perform the following functions:

- Creation of 24-hour electrical energy test reports;
- Analysis of the electrical energy test results over an arbitrary period for the required sub-comprising of the SCE and for any number of meters(s) connected to the RTU;
- Establishment of a certification test protocol for electrical energy on the quality indicators established by GOST 13109-97.

These functions are described below. Any report can be printed out with standard browsers.

1.1.4.1. Create 24-hour electrical energy test reports. The "Отчёты" tab will be opened to the user when the application is launched. This tab will provide the user with a form to complete the report parameters:



The user must set the date, select the meter (SKE meter) and the required parameter (PET). Once the button <fail> is pressed, the required report will be made available to the user. Examples of all possible reports are given below.

· Report: Set voltage deviation for the most and least voltage modes
Loads:

RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012.*

Счетчик: ***(3) Счетчик6.***

Показатель КЭ: ***Установившееся отклонение напряжения в режимах наибольших и наименьших нагрузок.***

В процентах

Режим наибольших нагрузок					Режим наименьших нагрузок				
Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2	Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
Прямой последовательности									
$\delta U_н^I$	0	-5	0		$\delta U_н^{II}$	0	0	0	
$\delta U_в^I$	0	5			$\delta U_в^{II}$	0	0		
$\delta U_{нм}^I$	0.84	-10		0	$\delta U_{нм}^{II}$	0	0		0
$\delta U_{нб}^I$	2.74	10			$\delta U_{нб}^{II}$	0	0		
Фазное (междуфазное) A (AB)									
$\delta U_н^I$	0	-5	0		$\delta U_н^{II}$	0	0	0	
$\delta U_в^I$	0	5			$\delta U_в^{II}$	0	0		
$\delta U_{нм}^I$	2.11	-10		0	$\delta U_{нм}^{II}$	0	0		0
$\delta U_{нб}^I$	4.01	10			$\delta U_{нб}^{II}$	0	0		
Фазное (междуфазное) B (BC)									
$\delta U_н^I$	0	-5	0		$\delta U_н^{II}$	0	0	0	
$\delta U_в^I$	0	5			$\delta U_в^{II}$	0	0		
$\delta U_{нм}^I$	0.42	-10		0	$\delta U_{нм}^{II}$	0	0		0
$\delta U_{нб}^I$	2.95	10			$\delta U_{нб}^{II}$	0	0		
Фазное (междуфазное) C (CA)									
$\delta U_н^I$	0	-5	0		$\delta U_н^{II}$	0	0	0	
$\delta U_в^I$	0	5			$\delta U_в^{II}$	0	0		
$\delta U_{нм}^I$	2.11	-10		0	$\delta U_{нм}^{II}$	0	0		0
$\delta U_{нб}^I$	4.01	10			$\delta U_{нб}^{II}$	0	0		

Погрешность измерений

Обозначение	Результат	Нормативное значение
$\Delta_{\delta U}$		

где: $\delta U_н$, $\delta U_в$ - нормально допустимые значения (нижнее, верхнее),
$\delta U_{нм}$, $\delta U_{нб}$ - предельно допустимые значения (наименьшее, наибольшее),

· Report: 24-hour voltage deviation determined:

RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012.*

Счетчик: ***(3) Счетчик6.***

Показатель КЭ: ***Установившееся отклонение напряжения за сутки.***

В процентах

Суточный режим нагрузок									
Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2	Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
Прямой последовательности					**Фазное (междуфазное) A (AB)**				
$\delta U_н$	0	-5	0		$\delta U_н$	0	-5	0	
$\delta U_в$	0	5			$\delta U_в$	0	5		
$\delta U_{нм}$	0.84	-10		0	$\delta U_{нм}$	2.11	-10		0
$\delta U_{нб}$	2.74	10			$\delta U_{нб}$	4.01	10		
Фазное (междуфазное) B (BC)					**Фазное (междуфазное) C (CA)**				
$\delta U_н$	0	-5	0		$\delta U_н$	0	-5	0	
$\delta U_в$	0	5			$\delta U_в$	0	5		
$\delta U_{нм}$	0.42	-10		0	$\delta U_{нм}$	2.11	-10		0
$\delta U_{нб}$	2.95	10			$\delta U_{нб}$	4.01	10		

Погрешность измерений

Обозначение	Результат	Нормативное значение
$\Delta_{\delta U}$		

где: $\delta U_н$, $\delta U_в$ - нормально допустимые значения (нижнее, верхнее),
$\delta U_{нм}$, $\delta U_{нб}$ - предельно допустимые значения (наименьшее, наибольшее),
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

· Report: Sine-soil distortion factor of the voltage curve:

RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012*.

Счетчик: ***(3) Счетчик6***.

Показатель КЭ: ***Коэффициент искажения синусоидальности кривой напряжения***.

В процентах

Измеряемая характеристика	Фаза «А»			Фаза «В»			Фаза «С»			Нормативное значение
	Результат измерений	T_1	T_2	Результат измерений	T_1	T_2	Результат измерений	T_1	T_2	
$K_{U_в}$	0	100		0	100		0	100		8
$K_{U_{нб}}$	11.9		0	12.2		1	11.6		0	12

Погрешность измерений		
Обозначение	**Результат**	**Нормативное значение**
ΔK_U		

где: $K_{U_в}$ - верхнее нормально допустимое значение,
$K_{U_{нб}}$ - верхнее предельно допустимое значение,
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

· Report: Inverse stress ratio:

RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012*.

Счетчик: ***(3) Счетчик6***.

Показатель КЭ: ***Коэффициент несимметрии напряжений по обратной последовательности***.

В процентах

Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
$K_{2U_в}$	0	2	0	
$K_{2U_{нб}}$	0.2	4		0

Погрешность измерений		
Обозначение	**Результат**	**Нормативное значение**
ΔK_{2U}		

где: $K_{2U_в}$ - верхнее нормально допустимое значение,
$K_{2U_{нб}}$ - верхнее предельно допустимое значение,
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

· Report: Zero-sequence voltage ratio:

RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012*.

Счетчик: ***(3) Счетчик6***.

Показатель КЭ: ***Коэффициент несимметрии напряжений по нулевой последовательности***.

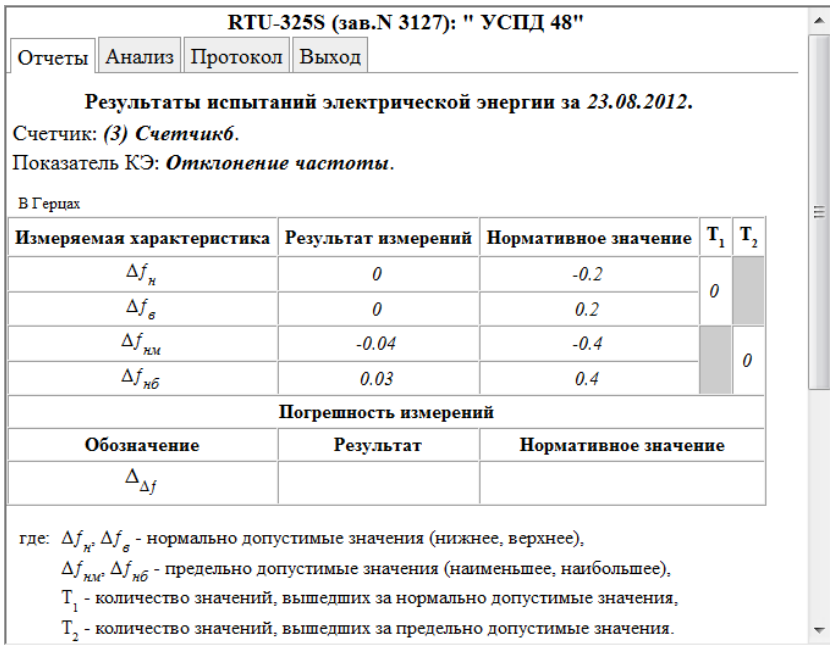
В процентах

Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
$K_{0U_в}$	0	2	0	
$K_{0U_{нб}}$	1.2	4		0

Погрешность измерений		
Обозначение	**Результат**	**Нормативное значение**
ΔK_{0U}		

где: $K_{0U_в}$ - верхнее нормально допустимое значение,
$K_{0U_{нб}}$ - верхнее предельно допустимое значение,
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

· Report: Frequency deviation:



RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012.*

Счетчик: ***(3) Счетчик6***.

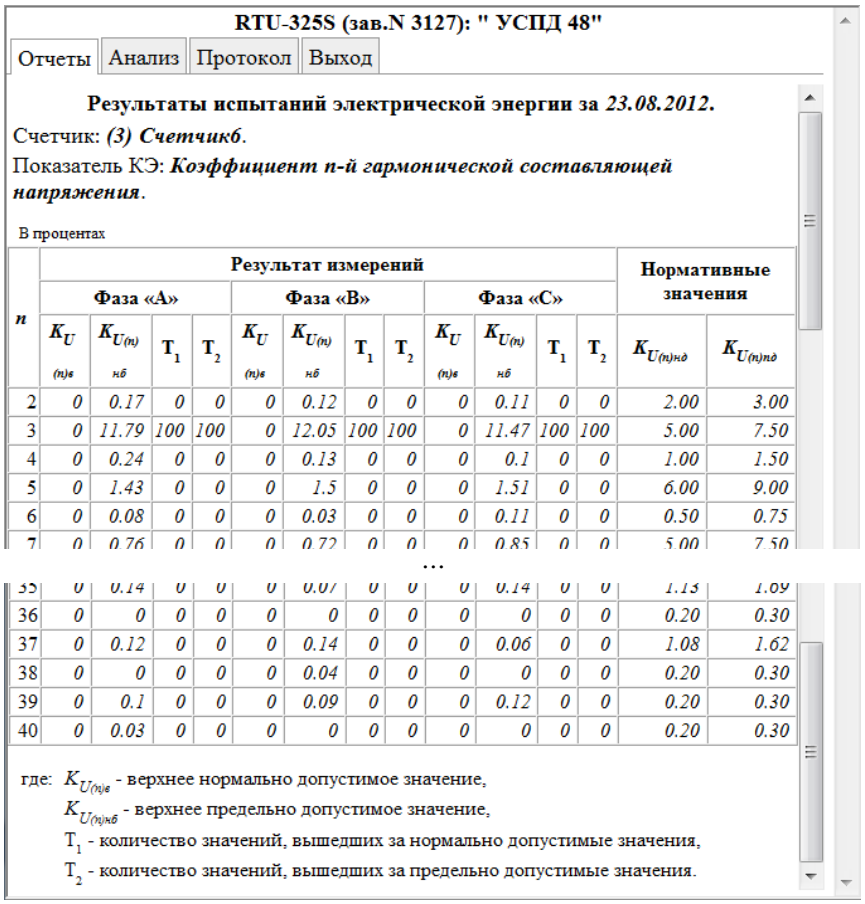
Показатель КЭ: ***Отклонение частоты***.

В Герцах

Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
$\Delta f_н$	0	-0.2	0	
$\Delta f_в$	0	0.2		
$\Delta f_{нм}$	-0.04	-0.4		0
$\Delta f_{нб}$	0.03	0.4		
Погрешность измерений				
Обозначение	**Результат**	**Нормативное значение**		
$\Delta_{\Delta f}$				

где: $\Delta f_н$, $\Delta f_в$ - нормально допустимые значения (нижнее, верхнее),
$\Delta f_{нм}$, $\Delta f_{нб}$ - предельно допустимые значения (наименьшее, наибольшее),
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

· Report: N coefficient of harmonic voltage:



RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Результаты испытаний электрической энергии за *23.08.2012.*

Счетчик: ***(3) Счетчик6***.

Показатель КЭ: ***Коэффициент n-й гармонической составляющей напряжения***.

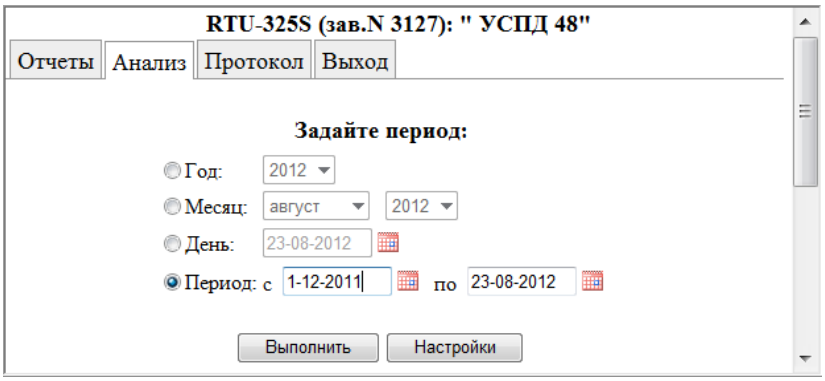
В процентах

n	Результат измерений												Нормативные значения	
	Фаза «А»				Фаза «В»				Фаза «С»					
	$K_{U(n)в}$	$K_{U(n)нб}$	T_1	T_2	$K_{U(n)в}$	$K_{U(n)нб}$	T_1	T_2	$K_{U(n)в}$	$K_{U(n)нб}$	T_1	T_2	$K_{U(n)нд}$	$K_{U(n)пд}$
2	0	0.17	0	0	0	0.12	0	0	0	0.11	0	0	2.00	3.00
3	0	11.79	100	100	0	12.05	100	100	0	11.47	100	100	5.00	7.50
4	0	0.24	0	0	0	0.13	0	0	0	0.1	0	0	1.00	1.50
5	0	1.43	0	0	0	1.5	0	0	0	1.51	0	0	6.00	9.00
6	0	0.08	0	0	0	0.03	0	0	0	0.11	0	0	0.50	0.75
7	0	0.76	0	0	0	0.72	0	0	0	0.85	0	0	5.00	7.50
...														
35	0	0.14	0	0	0	0.07	0	0	0	0.14	0	0	1.13	1.69
36	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0.30
37	0	0.12	0	0	0	0.14	0	0	0	0.06	0	0	1.08	1.62
38	0	0	0	0	0	0.04	0	0	0	0	0	0	0.20	0.30
39	0	0.1	0	0	0	0.09	0	0	0	0.12	0	0	0.20	0.30
40	0	0.03	0	0	0	0	0	0	0	0	0	0	0.20	0.30

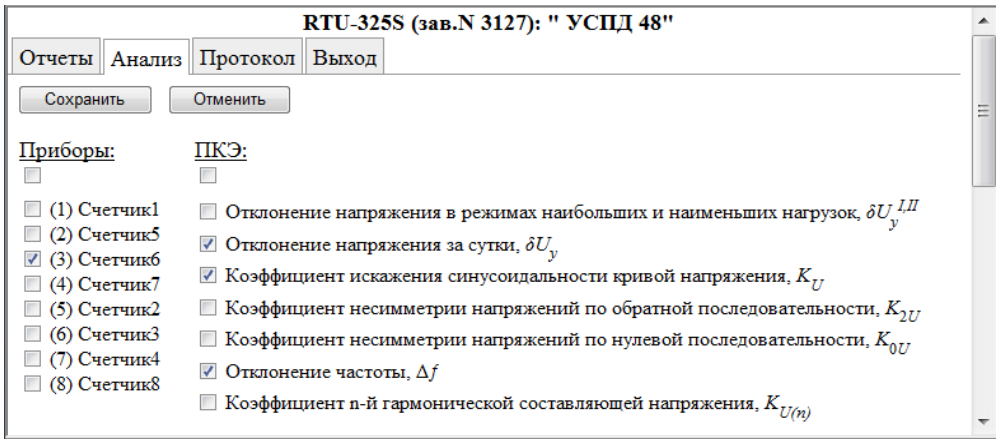
где: $K_{U(n)в}$ - верхнее нормально допустимое значение,
$K_{U(n)нб}$ - верхнее предельно допустимое значение,
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

1.1.4.2. Analysis of electrical energy test results. In this paragraph, the user can perform an analysis of the electrical energy test results over an arbitrary period for the required sub-number of SCEs and for any number of SKE meters (SKE measurements) connected to the RTU. The analysis of results will be presented in the form of an integrated assessment for each year of the selected period, followed by details by months and days.

When selecting the tab "Анализ", the user will be provided with the following form for the assignment of the period:



The user must identify the meters and parameters to be analysed. To do this, the user must press the <structure> button and in open form note the required meters and parameters:



To maintain the changes, you must press the button <Save>. Otherwise you must press the button < Cancel>. As a result, the user will return to the previous form.

The resulting table of integrated annual estimates will be presented to the user using the <implement> button:



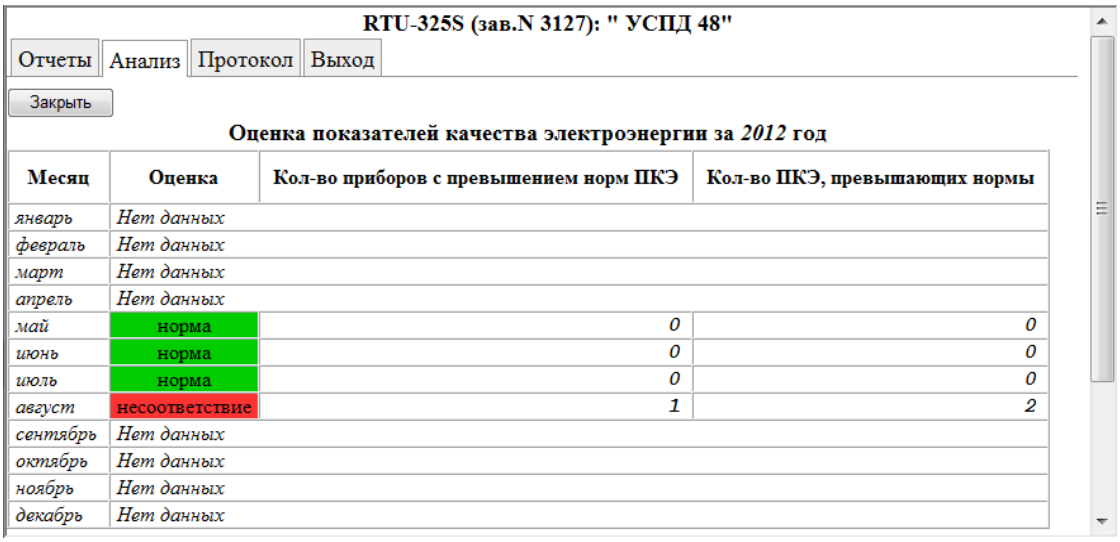
In each line, column "Оценка" will present integrated indicators of compliance with the standard of the user-selected electricity quality for the selected meter per year. If all the SCEs of all the meters for the corresponding period (year) are in accordance with the standards, then the estimate for the period is «Норма» on a green background. If at least one SCE of any meter does not meet the standard, the estimate is «Несоответствие» on a red background.

Each line of column "Кол-во приборов с превышением норм ПКЭ" shows the number of meters with which at least one SCE does not meet the standard.

Each line of column "Кол-во ПКЭ, превышающих нормы" shows the number of SCE species from the user selected that do not meet the standards of at least one meter.

In order to detail the integrated indicators for the months of the year, the user must bring the mouse index to the corresponding year line and press the left mouse key. B

The result will be presented to the user with the resulting table of integrated monthly estimates:



RTU-325S (зав.N 3127): " УСПД 48"

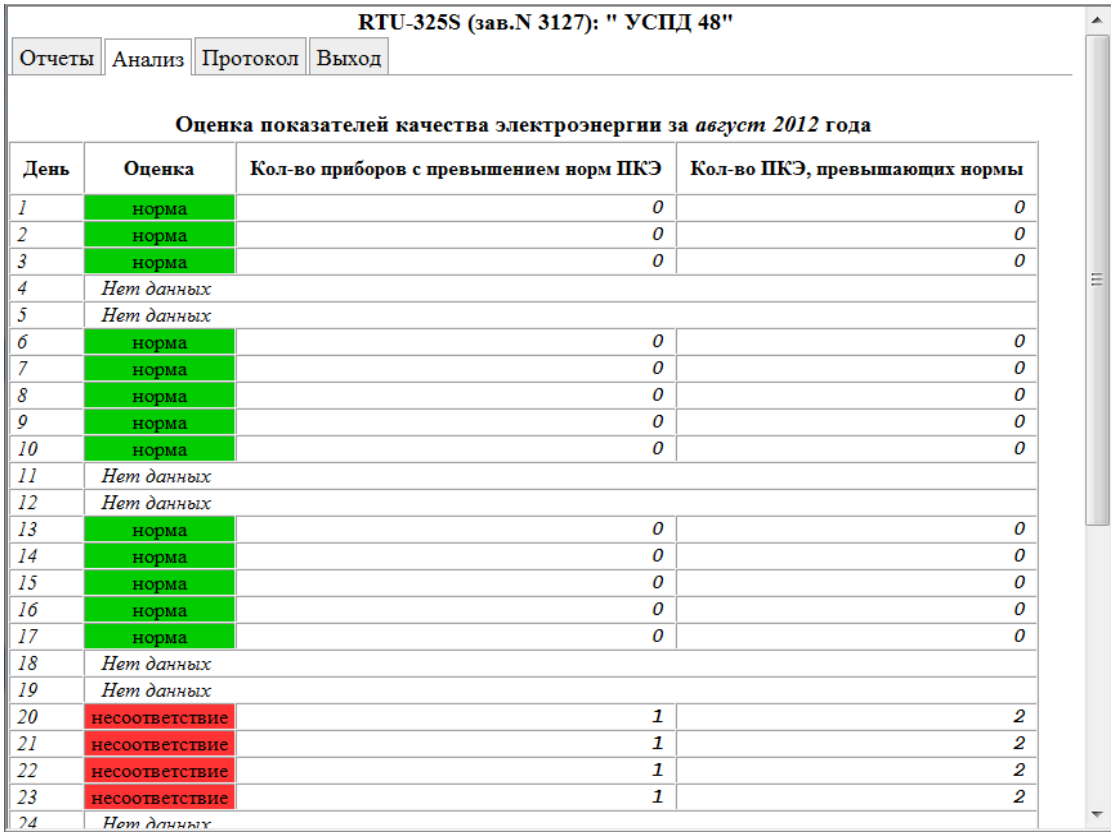
Отчеты | Анализ | Протокол | Выход

Закрыть

Оценка показателей качества электроэнергии за *2012* год

Месяц	Оценка	Кол-во приборов с превышением норм ПКЭ	Кол-во ПКЭ, превышающих нормы
январь	*Нет данных*		
февраль	*Нет данных*		
март	*Нет данных*		
апрель	*Нет данных*		
май	норма	*0*	*0*
июнь	норма	*0*	*0*
июль	норма	*0*	*0*
август	несоответствие	*1*	*2*
сентябрь	*Нет данных*		
октябрь	*Нет данных*		
ноябрь	*Нет данных*		
декабрь	*Нет данных*		

The composition of the table is similar to that described above. In order to detail the integrated indicators for the days of the month, the user must bring the mouse index to the relevant month line and press the left mouse key. As a result, the resulting table of integrated assessments by day will be presented to the user:



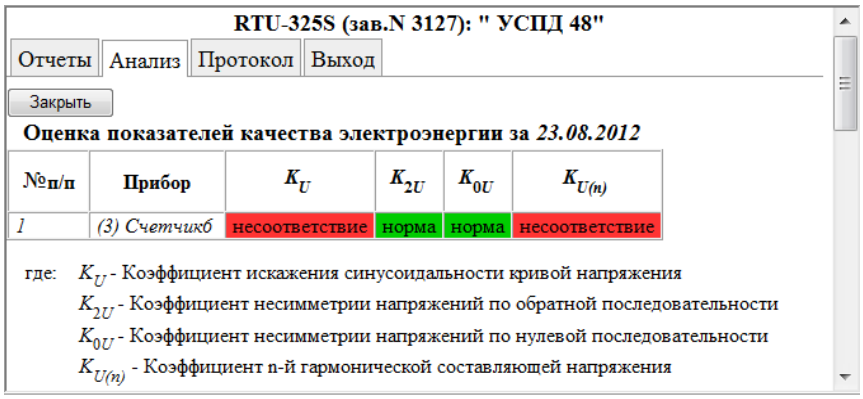
RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Оценка показателей качества электроэнергии за *август 2012* года

День	Оценка	Кол-во приборов с превышением норм ПКЭ	Кол-во ПКЭ, превышающих нормы
1	норма	*0*	*0*
2	норма	*0*	*0*
3	норма	*0*	*0*
4	*Нет данных*		
5	*Нет данных*		
6	норма	*0*	*0*
7	норма	*0*	*0*
8	норма	*0*	*0*
9	норма	*0*	*0*
10	норма	*0*	*0*
11	*Нет данных*		
12	*Нет данных*		
13	норма	*0*	*0*
14	норма	*0*	*0*
15	норма	*0*	*0*
16	норма	*0*	*0*
17	норма	*0*	*0*
18	*Нет данных*		
19	*Нет данных*		
20	несоответствие	*1*	*2*
21	несоответствие	*1*	*2*
22	несоответствие	*1*	*2*
23	несоответствие	*1*	*2*
24	*Нет данных*		

In order to detail the integrated measures of the meters, the user must bring the mouse index to the line of the day and press the left mouse key in a day. As a result, the resulting table will be presented to the user:



RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Закрыть

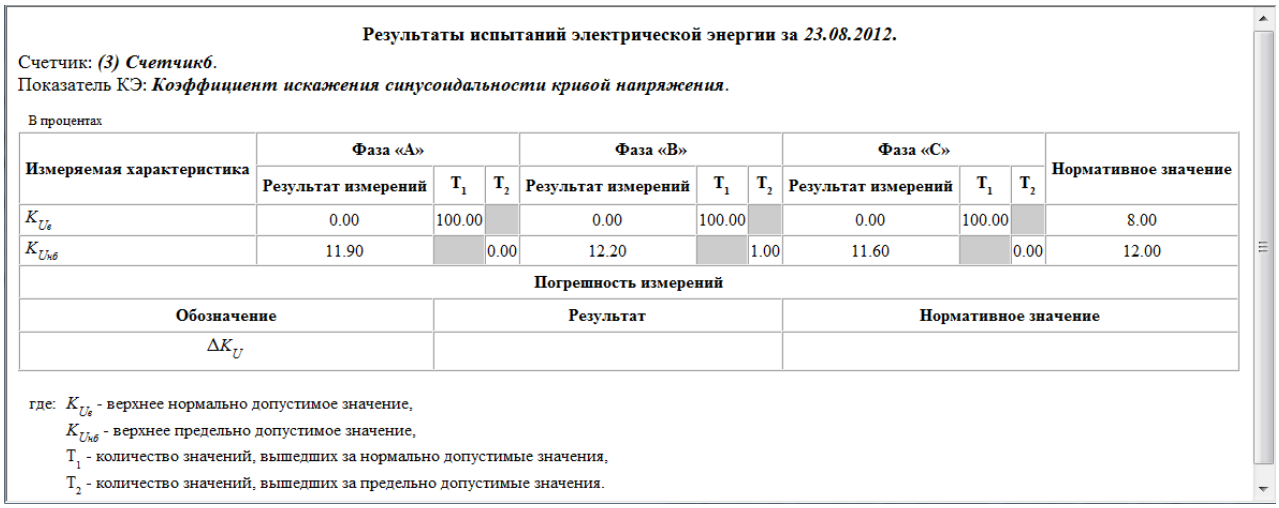
Оценка показателей качества электроэнергии за *23.08.2012*

№п/п	Прибор	K_U	K_{2U}	K_{0U}	$K_{U(n)}$
1	*(3) Счетчик6*	несоответствие	норма	норма	несоответствие

где: K_U - Коэффициент искажения синусоидальности кривой напряжения
K_{2U} - Коэффициент несимметрии напряжений по обратной последовательности
K_{0U} - Коэффициент несимметрии напряжений по нулевой последовательности
$K_{U(n)}$ - Коэффициент n-й гармонической составляющей напряжения

Each row of the table shows the SCE ' s compliance assessments for a particular meter. In order to view the report on a specific SCE, the required meter must be used by the user to bring the mouse index to the appropriate evaluation and press the left mouse key.

This user report can also be obtained when selecting the "Отчёты" tab. As a result, the user will be provided with the report window:



Результаты испытаний электрической энергии за *23.08.2012*.

Счетчик: ***(3) Счетчик6***.
Показатель КЭ: ***Коэффициент искажения синусоидальности кривой напряжения***.

В процентах

Измеряемая характеристика	Фаза «А»			Фаза «В»			Фаза «С»			Нормативное значение
	Результат измерений	T_1	T_2	Результат измерений	T_1	T_2	Результат измерений	T_1	T_2	
K_{U6}	0.00	100.00		0.00	100.00		0.00	100.00		8.00
$K_{Uнб}$	11.90		0.00	12.20		1.00	11.60		0.00	12.00

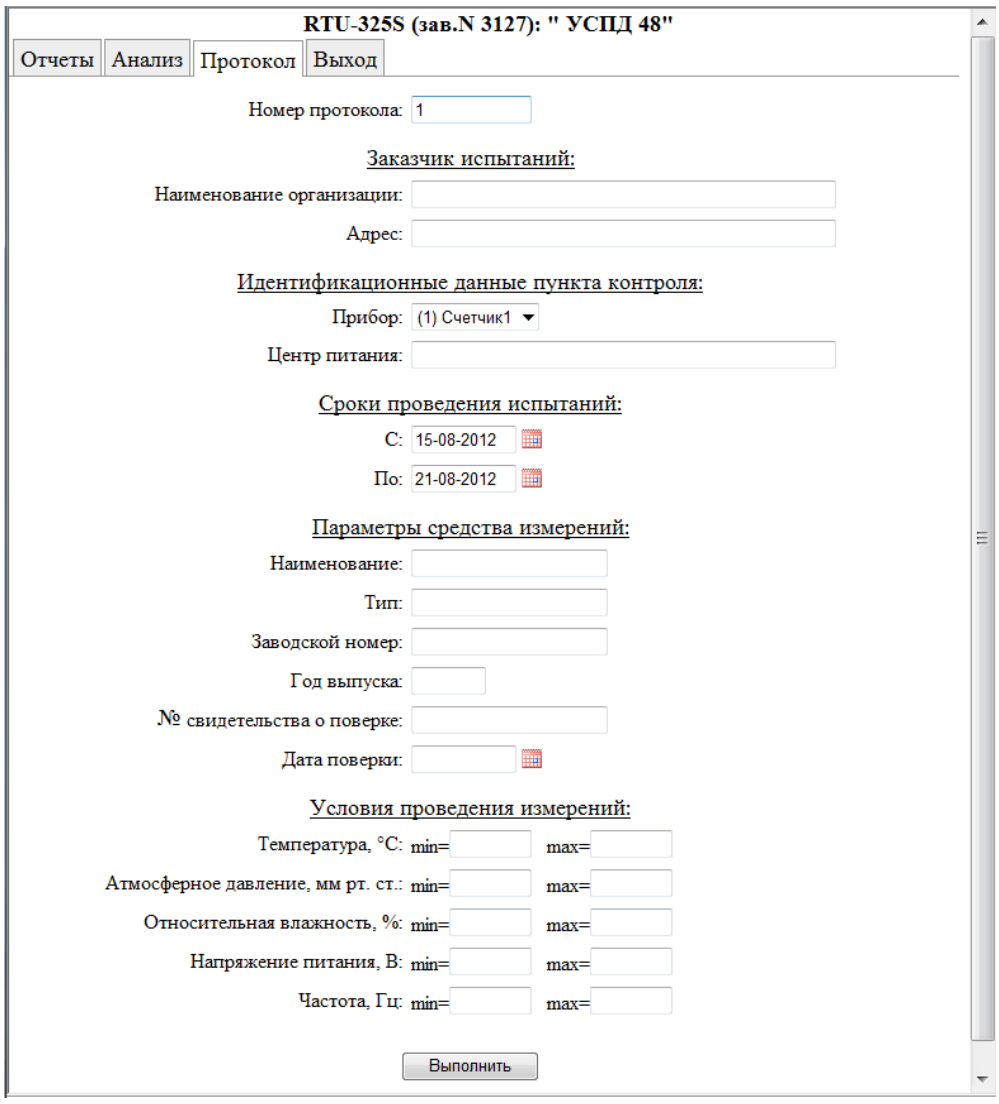
Погрешность измерений

Обозначение	Результат	Нормативное значение
ΔK_U		

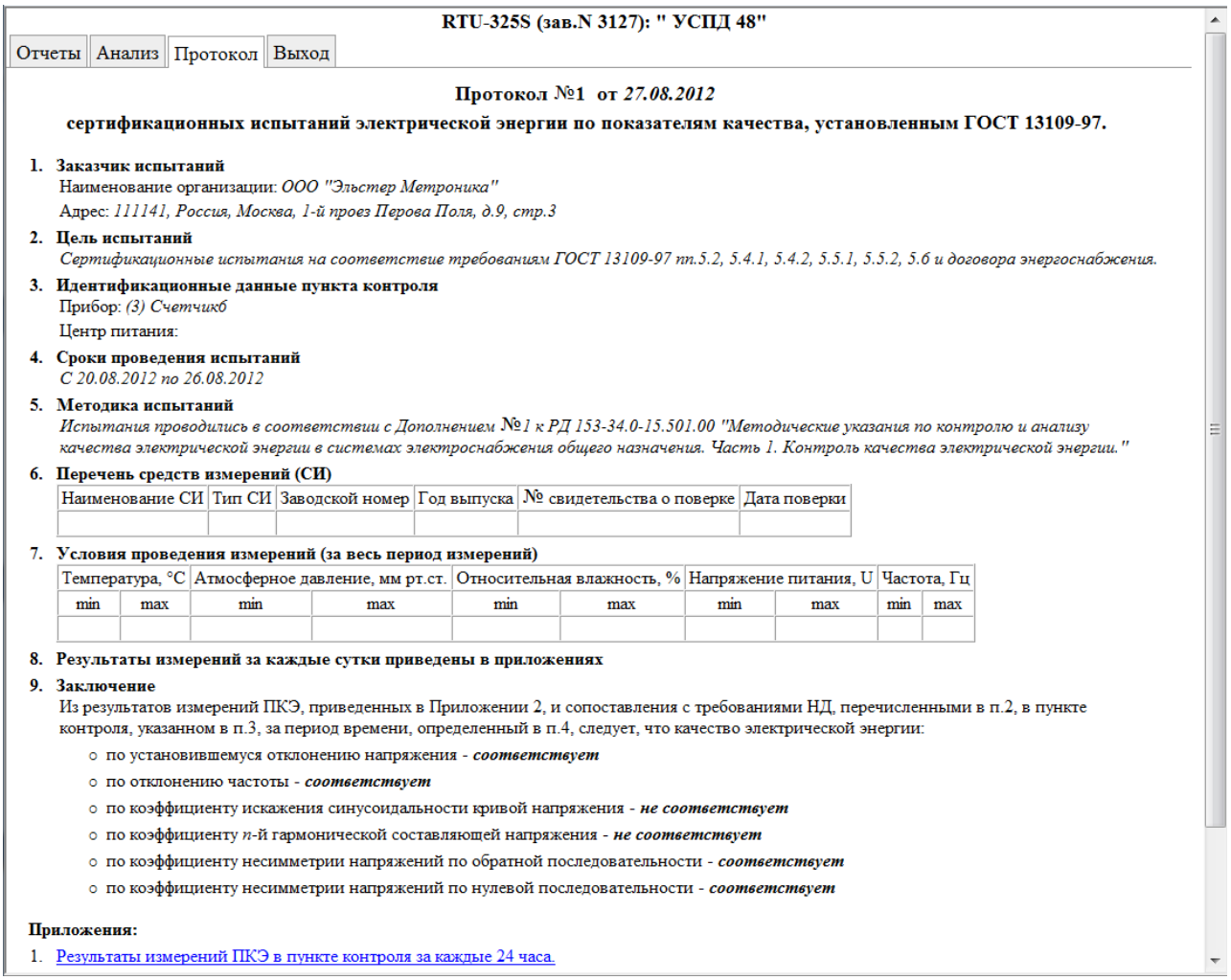
где: K_{U6} - верхнее нормально допустимое значение,
$K_{Uнб}$ - верхнее предельно допустимое значение,
T_1 - количество значений, вышедших за нормально допустимые значения,
T_2 - количество значений, вышедших за предельно допустимые значения.

1.1.4.3. Establishment of a certification test protocol for electrical energy as defined by GOST 13109-97. In this paragraph, the user may create an electrical energy certification test report and annex «Результаты измерений ПКЭ в пункте контроля за каждые 24 часа» in a separate file, which is available after selecting the corresponding point on the bottom of the screen.

In selecting the tab "Протокол", the following form will be submitted to the user for filling in:



The user shall fill the required fields and press the button <Enact>. The result will be a test report to the user as follows:



RTU-325S (зав.N 3127): " УСПД 48"

Отчеты | Анализ | Протокол | Выход

Протокол №1 от *27.08.2012*

сертификационных испытаний электрической энергии по показателям качества, установленным ГОСТ 13109-97.

1. **Заказчик испытаний**
   Наименование организации: *ООО "Эльстер Метроника"*
   Адрес: *111141, Россия, Москва, 1-й проез Перова Поля, д.9, стр.3*
2. **Цель испытаний**
   Сертификационные испытания на соответствие требованиям ГОСТ 13109-97 пп.5.2, 5.4.1, 5.4.2, 5.5.1, 5.5.2, 5.6 и договора энергоснабжения.
3. **Идентификационные данные пункта контроля**
   Прибор: *(3) Счетчик6*
   Центр питания:
4. **Сроки проведения испытаний**
   С 20.08.2012 по 26.08.2012
5. **Методика испытаний**
   Испытания проводились в соответствии с Дополнением №1 к РД 153-34.0-15.501.00 "Методические указания по контролю и анализу качества электрической энергии в системах электроснабжения общего назначения. Часть 1. Контроль качества электрической энергии."
6. **Перечень средств измерений (СИ)**

Наименование СИ	Тип СИ	Заводской номер	Год выпуска	№ свидетельства о поверке	Дата поверки

7. **Условия проведения измерений (за весь период измерений)**

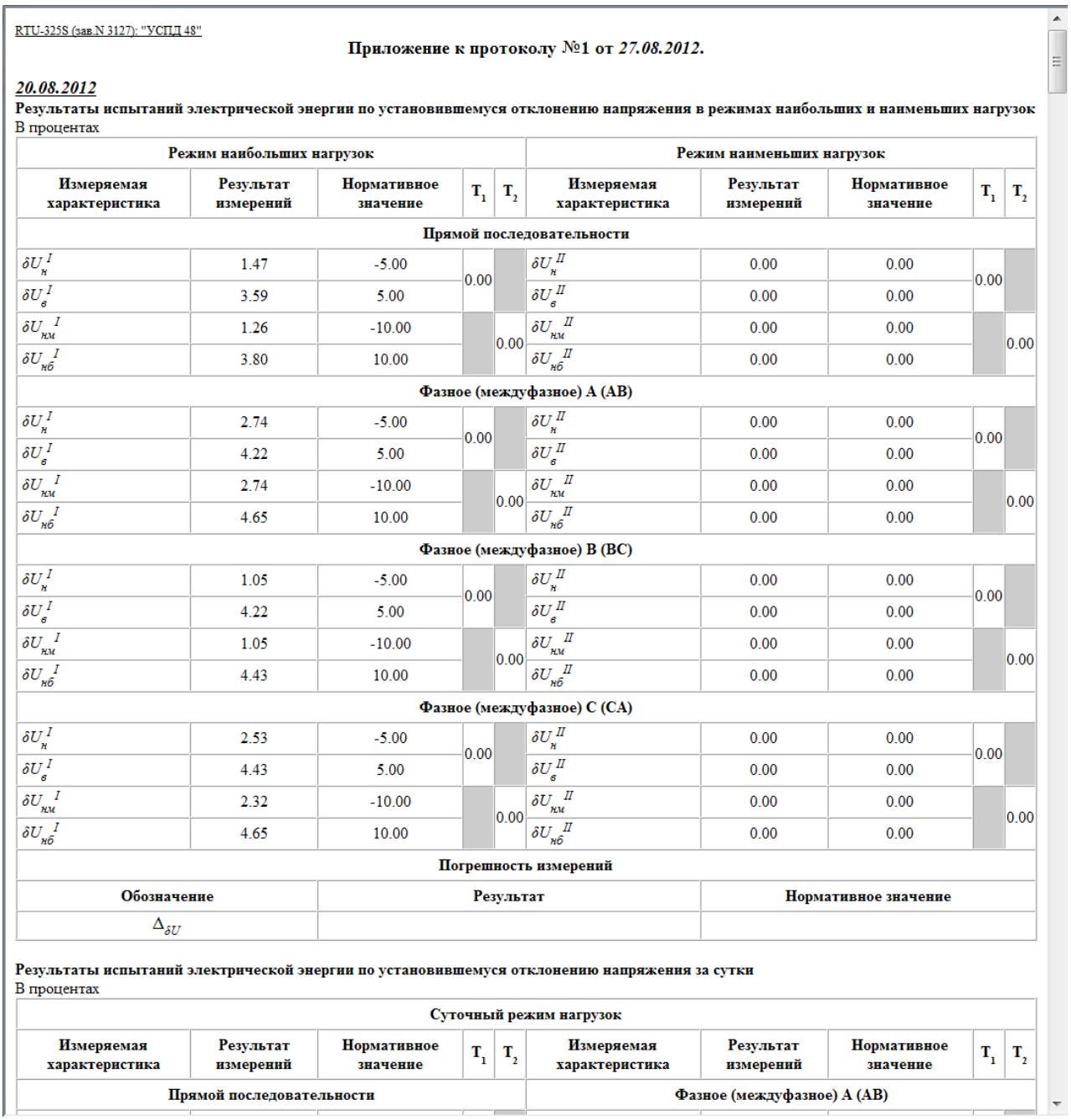
Температура, °C		Атмосферное давление, мм рт.ст.		Относительная влажность, %		Напряжение питания, U		Частота, Гц	
min	max	min	max	min	max	min	max	min	max

8. **Результаты измерений за каждые сутки приведены в приложениях**
9. **Заключение**
   Из результатов измерений ПКЭ, приведенных в Приложении 2, и сопоставления с требованиями НД, перечисленными в п.2, в пункте контроля, указанном в п.3, за период времени, определенный в п.4, следует, что качество электрической энергии:
   - по установившемуся отклонению напряжения - ***соответствует***
   - по отклонению частоты - ***соответствует***
   - по коэффициенту искажения синусоидальности кривой напряжения - ***не соответствует***
   - по коэффициенту *n*-й гармонической составляющей напряжения - ***не соответствует***
   - по коэффициенту несимметрии напряжений по обратной последовательности - ***соответствует***
   - по коэффициенту несимметрии напряжений по нулевой последовательности - ***соответствует***

Приложения:

1. Результаты измерений ПКЭ в пункте контроля за каждые 24 часа.

By reference to the bottom screen, the user will be provided with an annex window to the test report:



RTU-325S (зав.N 3127): "УСПД 48"

Приложение к протоколу №1 от *27.08.2012.*

20.08.2012

Результаты испытаний электрической энергии по установившемуся отклонению напряжения в режимах наибольших и наименьших нагрузок

В процентах

Режим наибольших нагрузок					Режим наименьших нагрузок				
Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2	Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
Прямой последовательности									
$\delta U_н^I$	1.47	-5.00	0.00		$\delta U_н^{II}$	0.00	0.00	0.00	
$\delta U_в^I$	3.59	5.00			$\delta U_в^{II}$	0.00	0.00		
$\delta U_{нм}^I$	1.26	-10.00		0.00	$\delta U_{нм}^{II}$	0.00	0.00		0.00
$\delta U_{нб}^I$	3.80	10.00			$\delta U_{нб}^{II}$	0.00	0.00		
Фазное (междуфазное) A (AB)									
$\delta U_н^I$	2.74	-5.00	0.00		$\delta U_н^{II}$	0.00	0.00	0.00	
$\delta U_в^I$	4.22	5.00			$\delta U_в^{II}$	0.00	0.00		
$\delta U_{нм}^I$	2.74	-10.00		0.00	$\delta U_{нм}^{II}$	0.00	0.00		0.00
$\delta U_{нб}^I$	4.65	10.00			$\delta U_{нб}^{II}$	0.00	0.00		
Фазное (междуфазное) B (BC)									
$\delta U_н^I$	1.05	-5.00	0.00		$\delta U_н^{II}$	0.00	0.00	0.00	
$\delta U_в^I$	4.22	5.00			$\delta U_в^{II}$	0.00	0.00		
$\delta U_{нм}^I$	1.05	-10.00		0.00	$\delta U_{нм}^{II}$	0.00	0.00		0.00
$\delta U_{нб}^I$	4.43	10.00			$\delta U_{нб}^{II}$	0.00	0.00		
Фазное (междуфазное) C (CA)									
$\delta U_н^I$	2.53	-5.00	0.00		$\delta U_н^{II}$	0.00	0.00	0.00	
$\delta U_в^I$	4.43	5.00			$\delta U_в^{II}$	0.00	0.00		
$\delta U_{нм}^I$	2.32	-10.00		0.00	$\delta U_{нм}^{II}$	0.00	0.00		0.00
$\delta U_{нб}^I$	4.65	10.00			$\delta U_{нб}^{II}$	0.00	0.00		

Погрешность измерений

Обозначение	Результат	Нормативное значение
$\Delta_{\delta U}$		

Результаты испытаний электрической энергии по установившемуся отклонению напряжения за сутки

В процентах

Суточный режим нагрузок									
Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2	Измеряемая характеристика	Результат измерений	Нормативное значение	T_1	T_2
Прямой последовательности					**Фазное (междуфазное) A (AB)**				

1.1.5. Energy quality parameters for GOST 32144.

This application allows the user to assess the compliance of the electricity quality indicators (CCE) with the GOST standards 32144-13/54149-10. The conformity assessment shall be performed according to the following parameters:

- Voltage deviation;
- The frequency deviation;
- The non-symmetry factor of the inverse sequence;
- A factor of zero voltage in sequence;
- The combined coefficients of the harmonics of the stresses;
- Short-term dose of flea;
- Long-term dose of flea;
- Number of voltages at maximum voltage and duration;
- Number of voltage failures for residual voltage and duration;

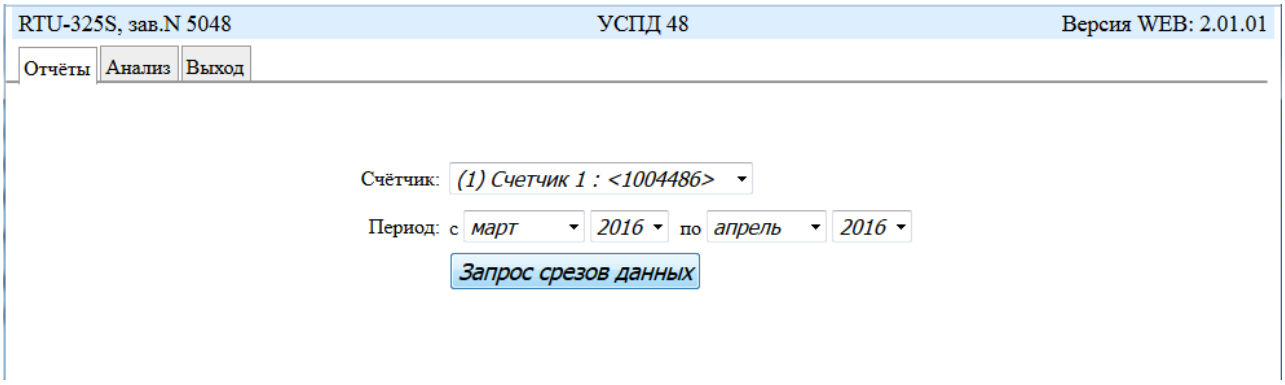
- Number of stress interruptions at residual voltage and duration;
- harmonic coefficients of the voltages in the order n;
- Interharmonic coefficients of the voltages in the order n.

The annex shall perform the following functions:

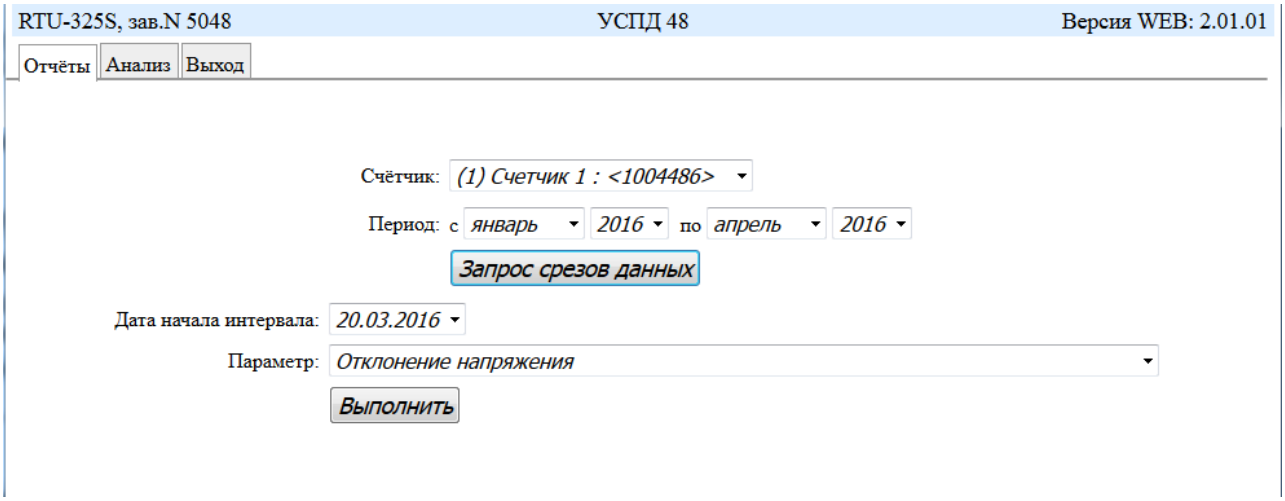
- Creation of 24-hour electrical energy test reports;
- Analysis of electrical energy test results over an arbitrary period.

These functions are described below. Any report can be printed out with standard browsers.

1.1.5.1. Create electrical energy test reports over an interval. The "Отчёты" tab will be opened to the user when the application is launched. This tab will provide the user with a form to complete the report parameters:



The user should select a meter (the SCE meter) and set a time frame for requesting data cuts from the RTU archives. Once the button <Requirement of data clips> is pressed, the user will be provided with a list of clippings for viewing:



The required report will be submitted to the user after the starting date and the required parameter. Examples of all possible reports are given below.

· Report: Voltage deviation:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 08:51:31

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Отклонения напряжения***.

Режим наибольших нагрузок			
Обозначение ПКЭ	**Результат измерений**	**Нормативное значение**	**T_2^{I}, %**
Напряжение фазное A (междуфазное AB)			
$\delta U_{(-)}^{I}$, %	-2.73	-10.00	0.00
$\delta U_{(+)}^{I}$, %	2.61	10.00	
Напряжение фазное B (междуфазное BC)			
$\delta U_{(-)}^{I}$, %	-2.75	-10.00	0.00
$\delta U_{(+)}^{I}$, %	2.58	10.00	
Напряжение фазное C (междуфазное CA)			
$\delta U_{(-)}^{I}$, %	-2.89	-10.00	0.00
$\delta U_{(+)}^{I}$, %	2.28	10.00	
Режим наименьших нагрузок			
Обозначение ПКЭ	**Результат измерений**	**Нормативное значение**	**T_2^{II}, %**
Напряжение фазное A (междуфазное AB)			
$\delta U_{(-)}^{II}$, %	0.00	0.00	0.00
$\delta U_{(+)}^{II}$, %	0.00	0.00	
Напряжение фазное B (междуфазное BC)			
$\delta U_{(-)}^{II}$, %	0.00	0.00	0.00
$\delta U_{(+)}^{II}$, %	0.00	0.00	
Напряжение фазное C (междуфазное CA)			
$\delta U_{(-)}^{II}$, %	0.00	0.00	0.00
$\delta U_{(+)}^{II}$, %	0.00	0.00	
Неопределённость измерений			
Обозначение	**Оценка**	**Допускаемое значение**	
$U_{p\delta U}$, %			

где: $\delta U_{(-)}^{I}$, $\delta U_{(+)}^{I}$ - отрицательное и положительное отклонения напряжения электропитания в режиме наибольших нагрузок,
$\delta U_{(-)}^{II}$, $\delta U_{(+)}^{II}$ - отрицательное и положительное отклонения напряжения электропитания в режиме наименьших нагрузок,
T_2 - относительное время превышения допускаемых значений ПКЭ, установленных для 100% результатов измерений.

· Report: Frequency deviation:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:09:34

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Отклонения частоты***.

Обозначение ПКЭ	**Результат измерений**	**Нормативное значение**	**T_1, %**	**T_2, %**
$\Delta f_{н(95\%)}$, Гц	-0.03	-0.20	0.00	
$\Delta f_{в(95\%)}$, Гц	0.02	0.20		
$\Delta f_{нм(100\%)}$, Гц	-0.06	-0.40		0.00
$\Delta f_{нб(100\%)}$, Гц	0.05	0.40		
Неопределённость измерений				
Обозначение	**Оценка**		**Допускаемое значение**	
$U_{p\Delta f}$, %				

где: Δf - отклонение частоты,
$\Delta f_{н(95\%)}$, $\Delta f_{в(95\%)}$ - значения нижней и верхней границы диапазона, которому принадлежат 95% измеренных в течение времени испытаний значений отклонения частоты,
$\Delta f_{нм(100\%)}$, $\Delta f_{нб(100\%)}$ - наименьшее и наибольшее из всех измеренных в течение времени испытаний значений отклонения частоты,
T_1 - относительное время превышения допускаемых значений ПКЭ, установленных для 95% результатов измерений,
T_2 - относительное время превышения допускаемых значений ПКЭ, установленных для 100% результатов измерений.

· Report: Inverse stress ratio:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:12:11

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Коэффициенты несимметрии напряжений по обратной последовательности***.

Обозначение ПКЭ	Результат измерений	Нормативное значение	T_1, %	T_2, %
$K_{2U(95\%)}$, %	0.20	2.00	0.00	
$K_{2U(100\%)}$, %	0.20	4.00		0.00
Неопределённость измерений				
Обозначение	**Оценка**		**Допускаемое значение**	
$U_{pK_{2U}}$, %				

где: K_{2U} - коэффициент несимметрии напряжений по обратной последовательности,

$K_{2U(95\%)}$ - значение верхней границы диапазона, которому принадлежат 95% значений, измеренных за период измерений,

$K_{2U(100\%)}$ - значение верхней границы диапазона, которому принадлежат 100% значений, измеренных за период измерений,

T_1 - относительное время превышения допускаемых значений ПКЭ, установленных для 95% результатов измерений,

T_2 - относительное время превышения допускаемых значений ПКЭ, установленных для 100% результатов измерений.

· Report: Zero-sequence voltage ratio:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:13:04

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Коэффициенты несимметрии напряжений по нулевой последовательности (для четырёхпроводной трёхфазной сети)***.

Обозначение ПКЭ	Результат измерений	Нормативное значение	T_1, %	T_2, %
$K_{0U(95\%)}$, %	0.10	2.00	0.00	
$K_{0U(100\%)}$, %	0.10	4.00		0.00
Неопределённость измерений				
Обозначение	**Оценка**		**Допускаемое значение**	
$U_{pK_{0U}}$, %				

где: K_{0U} - коэффициент несимметрии напряжений по нулевой последовательности,

$K_{0U(95\%)}$ - значение верхней границы диапазона, которому принадлежат 95% значений, измеренных за период измерений,

$K_{0U(100\%)}$ - значение верхней границы диапазона, которому принадлежат 100% значений, измеренных за период измерений,

T_1 - относительное время превышения допускаемых значений ПКЭ, установленных для 95% результатов измерений,

T_2 - относительное время превышения допускаемых значений ПКЭ, установленных для 100% результатов измерений.

· Report: Combined harmonic coefficients of stresses:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:13:52

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Суммарные коэффициенты гармонических составляющих фазных (междуфазных) напряжений***.

Обозначение ПКЭ	Напряжение A (AB)			Напряжение B (BC)			Напряжение C (CA)			Нормативное значение
	Результат измерений	T_1, %	T_2, %	Результат измерений	T_1, %	T_2, %	Результат измерений	T_1, %	T_2, %	
$K_{U(95\%)}$, %	0.60	0.00		0.60	0.00		0.50	0.00		8.00
$K_{U(100\%)}$, %	0.70		0.00	0.70		0.00	0.60		0.00	12.00
Неопределённость измерений										
Обозначение	**Оценка**						**Допускаемое значение**			
U_{pK_U}, %										

где: K_U - суммарный коэффициент гармонических составляющих напряжения,

$K_{U(95\%)}$ - значение верхней границы диапазона, которому принадлежат 95% значений, измеренных за период измерений,

$K_{U(100\%)}$ - значение верхней границы диапазона, которому принадлежат 100% значений, измеренных за период измерений,

T_1 - относительное время превышения допускаемых значений ПКЭ, установленных для 95% результатов измерений,

T_2 - относительное время превышения допускаемых значений ПКЭ, установленных для 100% результатов измерений.

· Report: Short-term dose of flier:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:16:04

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Кратковременная доза фликера***.

Обозначение ПКЭ	Напряжение A (AB)	Напряжение B (BC)	Напряжение C (CA)	Нормативное значение
P_{st}, о.е.	1.02	1.13	1.05	1.38
Неопределённость измерений				
Обозначение	**Оценка**		**Допускаемое значение**	
$U_{pP_{st}}$				

где: P_{st} - кратковременная доза фликера.

· Report: Long-term dose of flier:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:16:34

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Длительная доза фликера***.

Обозначение ПКЭ	Напряжение A (AB)	Напряжение B (BC)	Напряжение C (CA)	Нормативное значение
P_{lt}, о.е.	0.72	0.81	0.77	1.00
Неопределённость измерений				
Обозначение	**Оценка**		**Допускаемое значение**	
$U_{pP_{lt}}$				

где: P_{lt} - длительная доза фликера.

· Report: Number of voltages at maximum voltage and duration:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:17:04

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Число перенапряжений по максимальному напряжению и длительности***.

Значение перенапряжения u, % опорного напряжения	Длительность перенапряжения $\Delta t_{пер}$, с					
	$0{,}01 < \Delta t_{пер} \le 0{,}2$	$0{,}2 < \Delta t_{пер} \le 0{,}5$	$0{,}5 < \Delta t_{пер} \le 1$	$1 < \Delta t_{пер} \le 5$	$5 < \Delta t_{пер} \le 20$	$20 < \Delta t_{пер} \le 60$
$110 < u \le 120$	0.00	0.00	0.00	0.00	0.00	0.00
$120 < u \le 140$	0.00	0.00	0.00	0.00	0.00	0.00
$140 < u \le 160$	0.00	0.00	0.00	0.00	0.00	0.00
$160 < u \le 180$	0.00	0.00	0.00	0.00	0.00	0.00
Неопределённость измерений						
Обозначение	**Оценка**			**Допускаемое значение**		
$U_{p\Delta U_{пер}}$, %						

где: u - временное перенапряжение,
$\Delta t_{пер}$ - длительность временного перенапряжения.

· Report: Number of voltage failures for residual voltage and duration:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:17:26

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Число провалов напряжений по остаточному напряжению и длительности***.

Остаточное напряжение *u*, % опорного напряжения	**Длительность провала напряжения Δt_n, с**					
	$0{,}01 < \Delta t_n \le 0{,}2$	**$0{,}2 < \Delta t_n \le 0{,}5$**	**$0{,}5 < \Delta t_n \le 1$**	**$1 < \Delta t_n \le 5$**	**$5 < \Delta t_n \le 20$**	**$20 < \Delta t_n \le 60$**
$90 > u \ge 85$	0.00	0.00	0.00	0.00	0.00	0.00
$85 > u \ge 70$	0.00	0.00	184.00	0.00	0.00	0.00
$70 > u \ge 40$	0.00	0.00	0.00	0.00	0.00	0.00
$40 > u \ge 10$	184.00	0.00	0.00	0.00	0.00	0.00
$10 > u \ge 0$	0.00	0.00	0.00	0.00	0.00	0.00

Неопределённость измерений		
Обозначение	**Оценка**	**Допускаемое значение**
$U_{p\Delta U_n}$, %		

где: ***u*** - остаточное напряжение при провалах напряжения,
Δt_n - длительность провала напряжения.

· Report: Number of stress interruptions at residual voltage and duration:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:17:42

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Число прерываний напряжений по остаточному напряжению и длительности***.

Остаточное напряжение *u*, % опорного напряжения	**Длительность прерывания напряжения $\Delta t_{пр}$, с**							**Наибольшая продолжительность, с**
	$\Delta t_{пр} \le 0{,}5$	**$0{,}5 < \Delta t_{пр} \le 1$**	**$1 < \Delta t_{пр} \le 5$**	**$5 < \Delta t_{пр} \le 20$**	**$20 < \Delta t_{пр} \le 60$**	**$60 < \Delta t_{пр} \le 180$**	**$180 < \Delta t_{пр}$**	
$5 > u \ge 0$ (прерывание)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Неопределённость измерений		
Обозначение	**Оценка**	**Допускаемое значение**
$U_{p\Delta U_{пр}}$, с		

где: ***u*** - остаточное напряжение при прерываниях напряжения,
$\Delta t_{пр}$ - длительность прерывания напряжения.

· Report: Harmonic coefficients of the voltages in the order n:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 11.04.2016 09:18:14

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) Счетчик 1 : <1004486>***.

Показатель КЭ: ***Коэффициенты гармонических составляющих фазных (междуфазных) напряжений порядка n***.

n	**Результат измерений , %**												**Нормативные значения**	
	Напряжение A (AB)				**Напряжение B (BC)**				**Напряжение C (CA)**					
	$K_{U(n)}$ (95%), %	$K_{U(n)}$ (100%), %	T_1, %	T_2, %	$K_{U(n)}$ (95%), %	$K_{U(n)}$ (100%), %	T_1, %	T_2, %	$K_{U(n)}$ (95%), %	$K_{U(n)}$ (100%), %	T_1, %	T_2, %	$K_{U(n)}$ (95%), %	$K_{U(n)}$ (100%), %
2	0.10	0.11	0.00	0.00	0.10	0.12	0.00	0.00	0.10	0.12	0.00	0.00		
3	0.25	0.33	0.00	0.00	0.20	0.26	0.00	0.00	0.20	0.23	0.00	0.00		
4	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00		
5	0.35	0.45	0.00	0.00	0.30	0.40	0.00	0.00	0.25	0.36	0.00	0.00		
6	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00		

...

36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
37	0.00	0.07	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.07	0.00	0.00		
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
39	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00		
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

где: ***n*** - номер гармонической составляющей напряжения (гармоники),
$K_{U(n)}$ - коэффициент ***n***-й гармонической составляющей напряжения,
$K_{U(n)(95\%)}$ - значение верхней границы диапазона, которому принадлежат 95% значений, измеренных за период измерений,
$K_{U(n)(100\%)}$ - значение верхней границы диапазона, которому принадлежат 100% значений, измеренных за период измерений,
T_1 - относительное время превышения допускаемых значений ПКЭ, установленных для 95% результатов измерений,
T_2 - относительное время превышения допускаемых значений ПКЭ, установленных для 100% результатов измерений.

· Report: Interharmonic stress coefficients of order n:

RTU-325S (зав.N 5048): "УСПД 48" Дата создания отчёта: 22.04.2016 14:13:10

Результаты испытаний электрической энергии за *20.03.2016.*

Счётчик: ***(1) n/c 1_Счетчик 1 : <1004486>***.

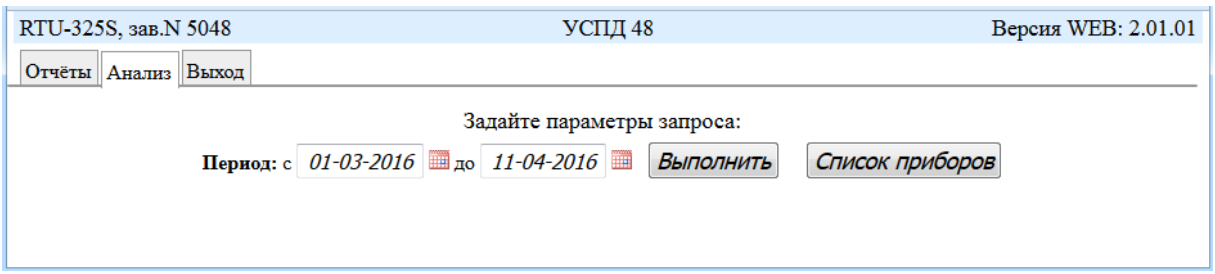
Показатель КЭ: ***Коэффициенты интергармонических составляющих напряжений порядка n***.

n	**Результат измерений , %**		
	Напряжение A (AB)	**Напряжение B (BC)**	**Напряжение C (CA)**
	$K_{U_{isg(n)}}$	$K_{U_{isg(n)}}$	$K_{U_{isg(n)}}$
2	0.08	0.08	0.08
3	0.05	0.05	0.05
4	0.03	0.03	0.03
5	0.02	0.02	0.02
		...	
37	0.01	0.01	0.00
38	0.00	0.00	0.00
39	0.00	0.00	0.00
40	0.00	0.00	0.00

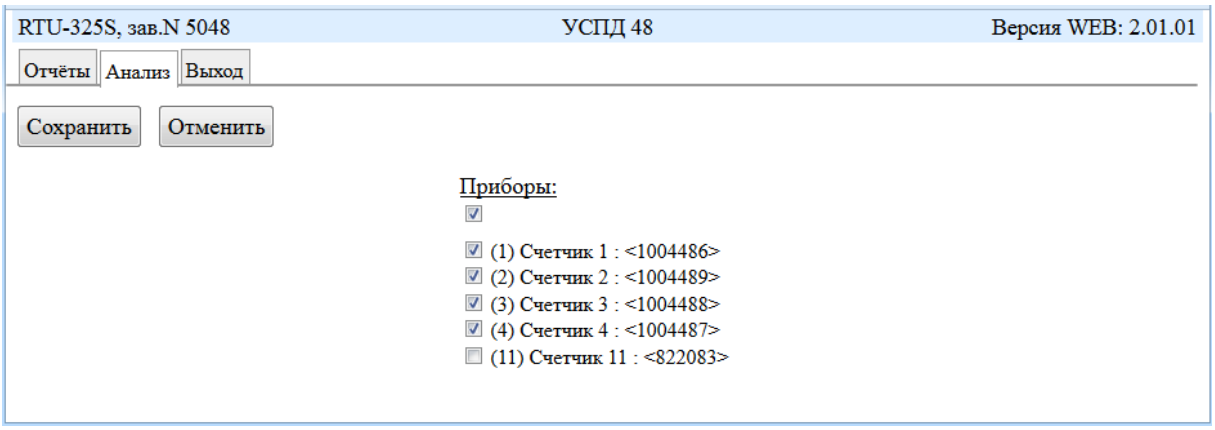
где: ***n*** - номер гармонической составляющей напряжения (гармоники),
$K_{U_{isg(n)}}$ - коэффициент интергармонической центрированной подгруппы, расположенной выше гармоники порядка ***n***.

1.1.5.2. Analysis of electrical energy test results. In this paragraph, the user may perform an analysis of the electrical energy test results over an arbitrary period on the list of instruments (SCE measurements) connected to the RTU. An analysis of the results will be presented as an integrated assessment for each interval that begins in the given period.

When selecting the tab "Анализ", the user will be provided with the following form for the assignment of the period:

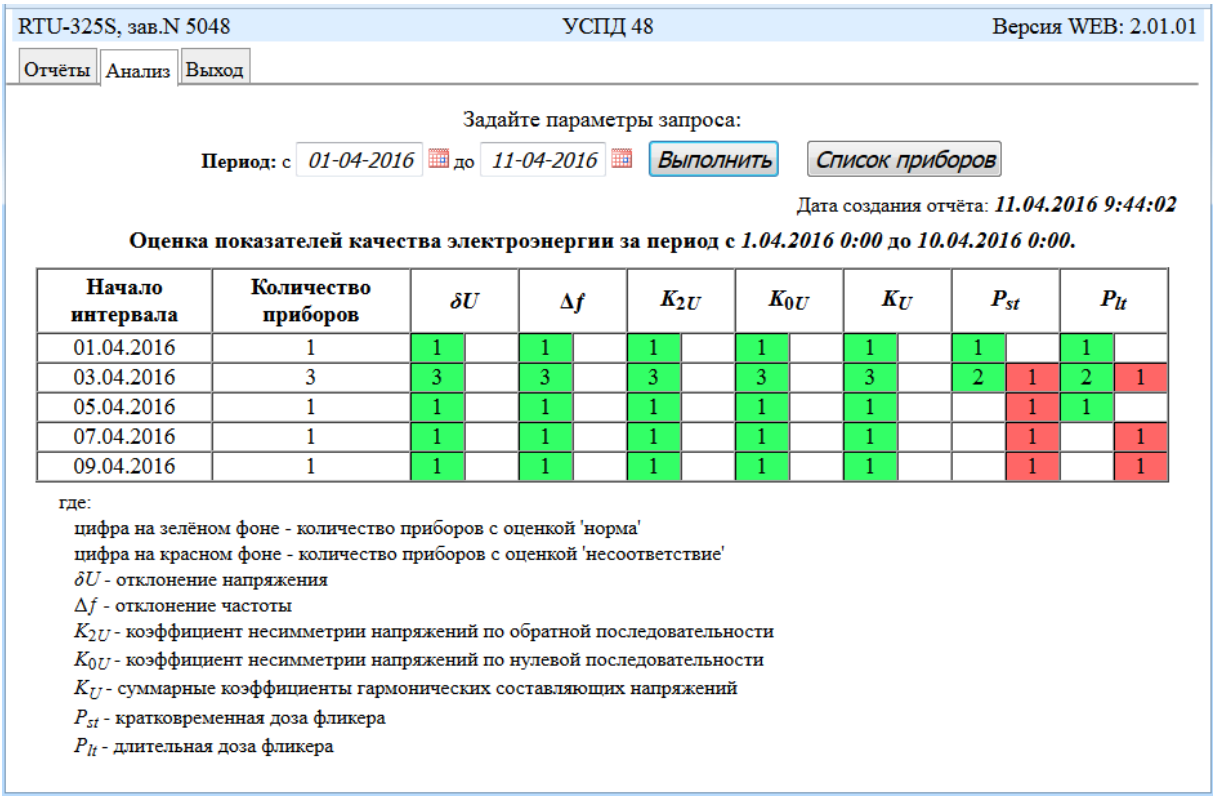


The user must identify the meters to be analysed. For this purpose, the required meters should be noted in the open form on the <Chart List> button:



To maintain the changes, you must press the button <Save>. Otherwise you must press the button < Cancel>. As a result, the user will return to the previous form.

The resulting table of integrated assessments for the intervals that start during the user's given period will be presented to the user using the <fail> button:

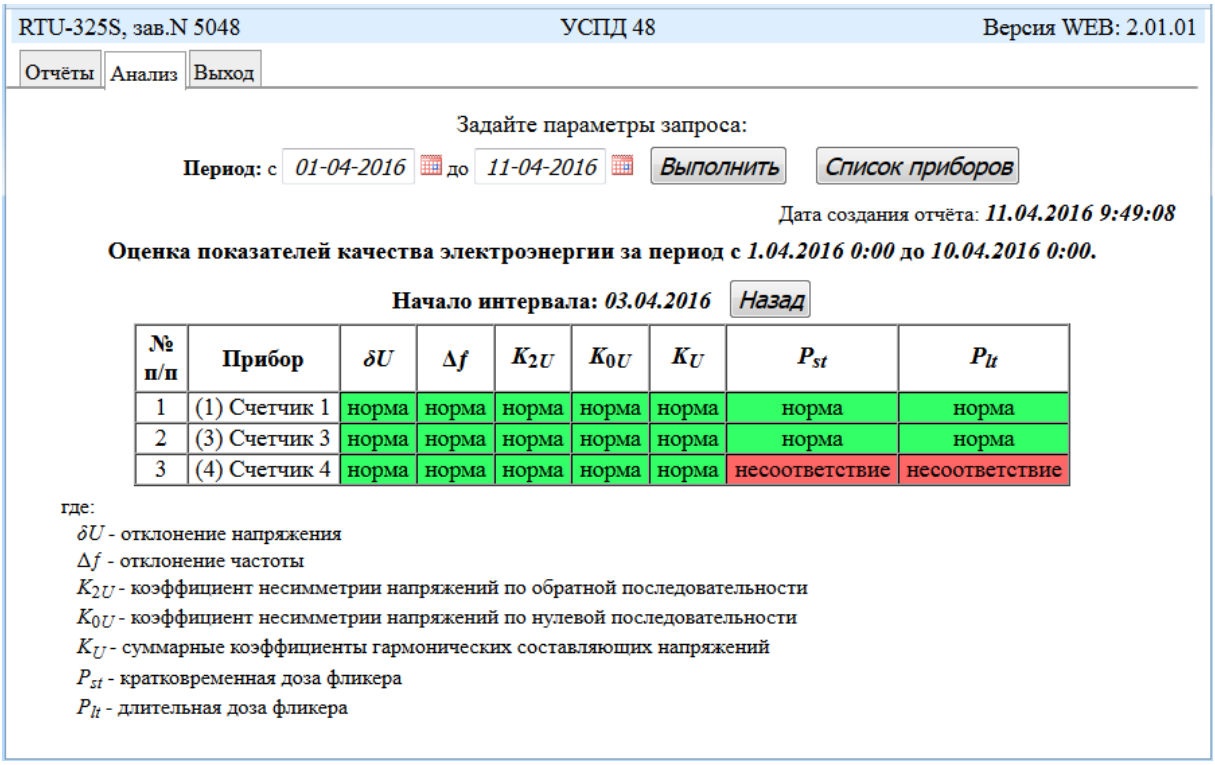


Начало интервала	Количество приборов	δU		Δf		K_{2U}		K_{0U}		K_U		P_{st}		P_{lt}	
01.04.2016	1	1		1		1		1		1		1		1	
03.04.2016	3	3		3		3		3		3		2	1	2	1
05.04.2016	1	1		1		1		1		1			1	1	
07.04.2016	1	1		1		1		1		1			1		1
09.04.2016	1	1		1		1		1		1			1		1

где:
цифра на зелёном фоне - количество приборов с оценкой 'норма'
цифра на красном фоне - количество приборов с оценкой 'несоответствие'
δU - отклонение напряжения
Δf - отклонение частоты
K_{2U} - коэффициент несимметрии напряжений по обратной последовательности
K_{0U} - коэффициент несимметрии напряжений по нулевой последовательности
K_U - суммарные коэффициенты гармонических составляющих напряжений
P_{st} - кратковременная доза фликера
P_{lt} - длительная доза фликера

Each row of the column presents the beginning of the interval, the number of instruments that have a cut at a given beginning of the interval, and the integral indicators of compliance with the established standards of electric quality for the selected meters. The number of meters on a green background is the "норма" meter for this quality measure. The number of meters on a red background is "несоответствие" for this quality measure.

In order to detail the integrated indicators on one cut, the user must bring the mouse index to the corresponding cut line and press the left mouse key. As a result, the resulting instrument evaluation table will be presented to the user:



RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 2.01.01

Отчёты | Анализ | Выход

Задайте параметры запроса:

Период: с 01-04-2016 до 11-04-2016 Выполнить Список приборов

Дата создания отчёта: ***11.04.2016 9:49:08***

Оценка показателей качества электроэнергии за период с *1.04.2016 0:00* до *10.04.2016 0:00*.

Начало интервала: *03.04.2016* Назад

№ п/п	Прибор	δU	Δf	K_{2U}	K_{0U}	K_U	P_{st}	P_{lt}
1	(1) Счетчик 1	норма	норма	норма	норма	норма	норма	норма
2	(3) Счетчик 3	норма	норма	норма	норма	норма	норма	норма
3	(4) Счетчик 4	норма	норма	норма	норма	норма	несоответствие	несоответствие

где:

δU - отклонение напряжения

Δf - отклонение частоты

K_{2U} - коэффициент несимметрии напряжений по обратной последовательности

K_{0U} - коэффициент несимметрии напряжений по нулевой последовательности

K_U - суммарные коэффициенты гармонических составляющих напряжений

P_{st} - кратковременная доза фликера

P_{lt} - длительная доза фликера

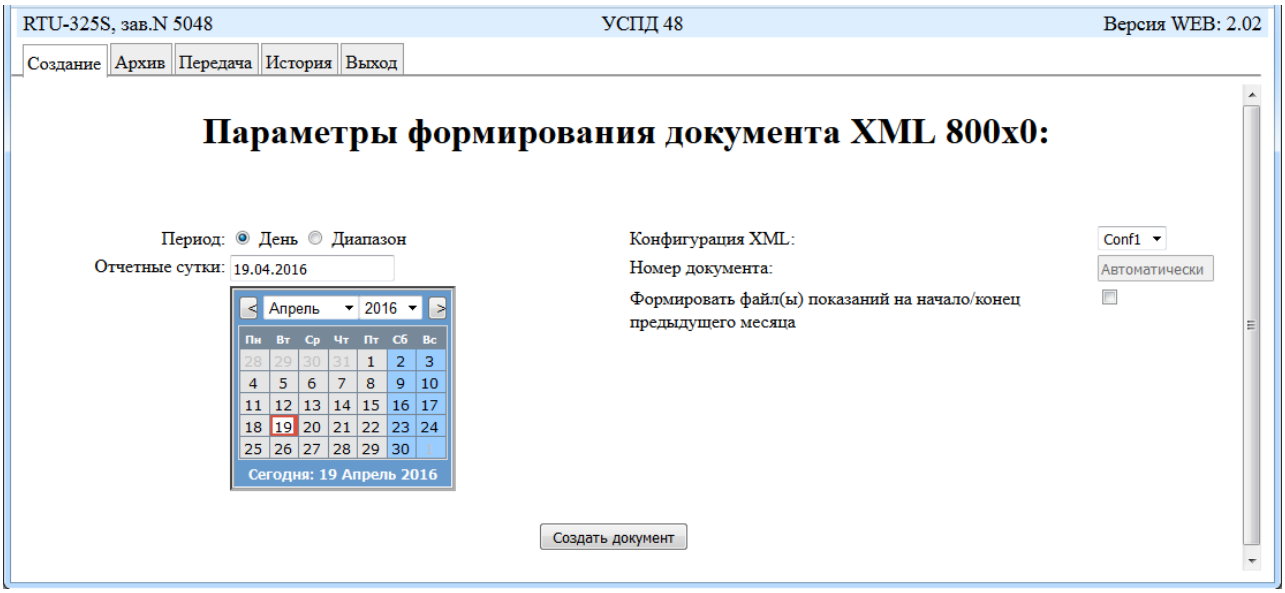
Each row of the table shows the SCE ' s compliance assessments for a particular meter. In order to view the report on a specific SCE, the required meter must be used by the user to bring the mouse index to the appropriate evaluation and press the left mouse key. As a result, a report window will be provided to the user and can also be viewed in "Отчёты" tab.

1.1.6. Documents XML800x0.

In this point, the user can create XML 80020, 80030 and 80020*, look through the archive of previously created documents, send selected e-mail documents, view the history of shipments, download on his computer the documents created in the current session in the "Создание" tab, or FTP protocol from the / pub/xml/handmade/YYYY/MM directory where YYYYY is the year of the document ' s date and MM is the month of the document ' s date.

1.1.6.1. Creating an XML document. This menu item lets the user create XML documents. Configure the documents first in the RTU embedded “Конфигуратор” program, under ‘Передача’ > ‘XML: документ 800x0’.

In selecting this paragraph, the user will be provided with the form for selecting the parameters for the document:



The user must select the date and required XML configuration. Once the button <Convent document> is pressed, the XML document will be formed and a message issued. The message may contain a phrase "В документе неполные данные!" if the document is formed for the current part of the day or part of the data is not available in the selected day.

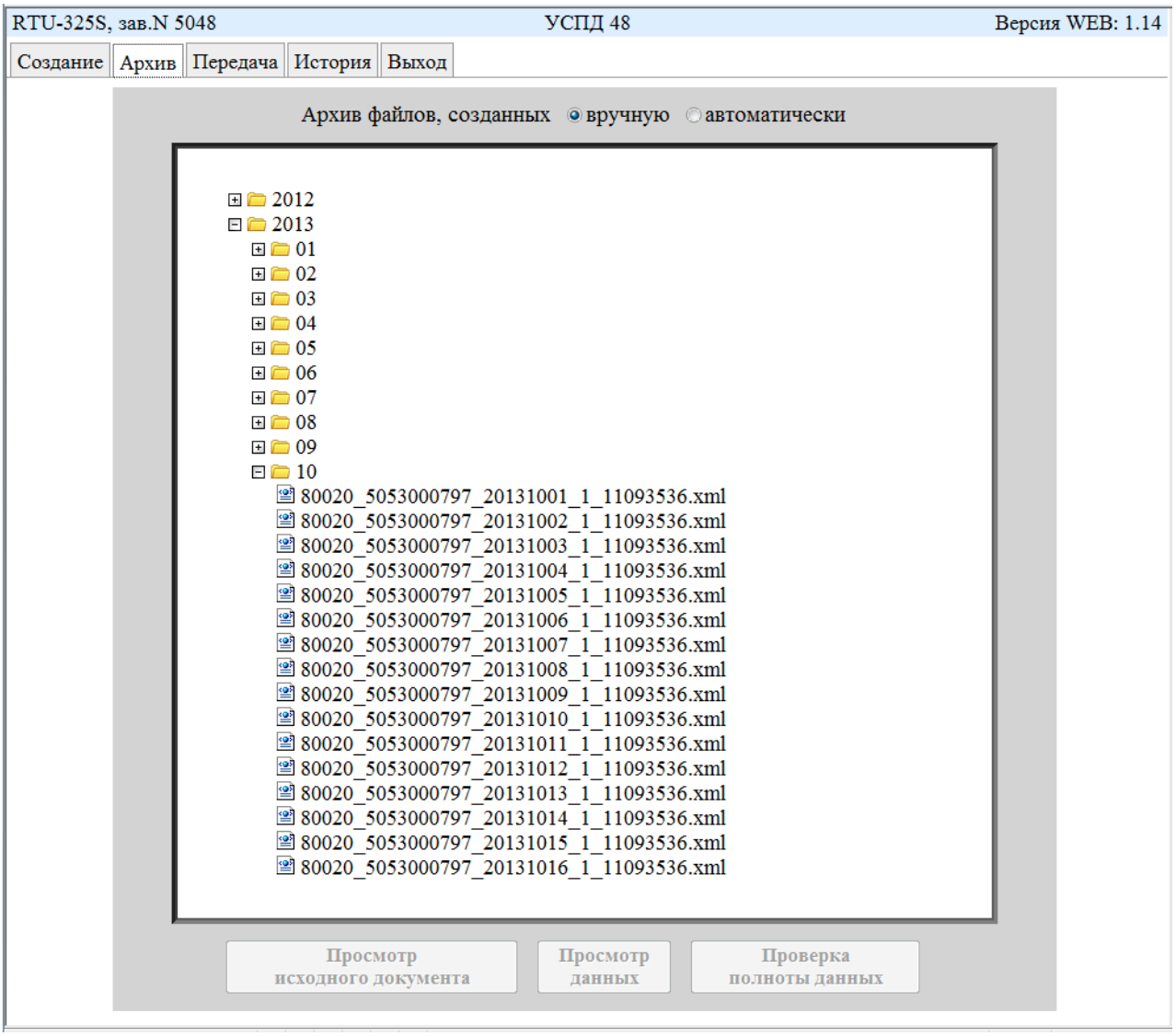
At the bottom of the page, links will be made to XML documents formed in the current session. In blue, references to documents with complete data are highlighted. References to incomplete documents are shown in red.

To view the document, the user must switch to the appropriate link. To download a document on your computer, you have to click with the right mouse button on the appropriate link and select in the context menu 'Save Object as...'. This function depends on the browser's ability.

1.1.6.2. XML document archive. In selecting this paragraph, the user will be provided with an archive of previously created XML documents. There are two types of archives on RTU:

- Archives of documents created manually; - archives of documents created automatically.

The type of archive must first be selected to view the document archive. The user will be provided with an archive of documents created manually when downloading.



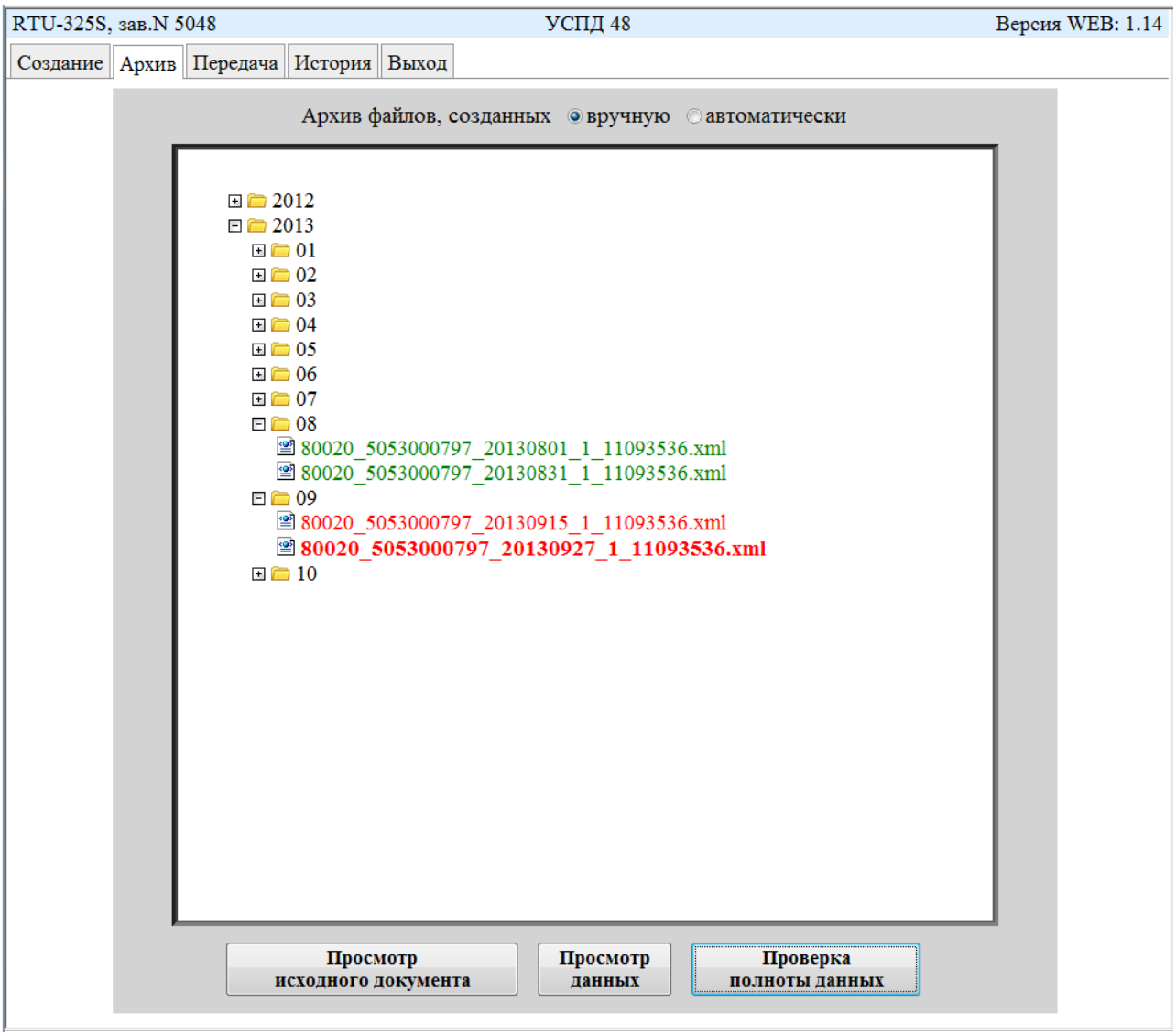
The user may look at the required document in its original form or look at the data contained in the document. It is also possible to verify the completeness of the document.

To view the selected document in its original form, you need to press the < View of the original document>. A new window with the text of the document will be opened.

To view the data contained in the selected document, you need to press the < Data View> button. A new window will be opened to display the data in a structured form.

To verify the completeness of the data contained in the selected document, a button <Search the completeness of the data> shall be pressed and a fullness or incomplete data message window opened.

Once checked, this file will be shown in green if it contains complete data. Otherwise, the file will be red:

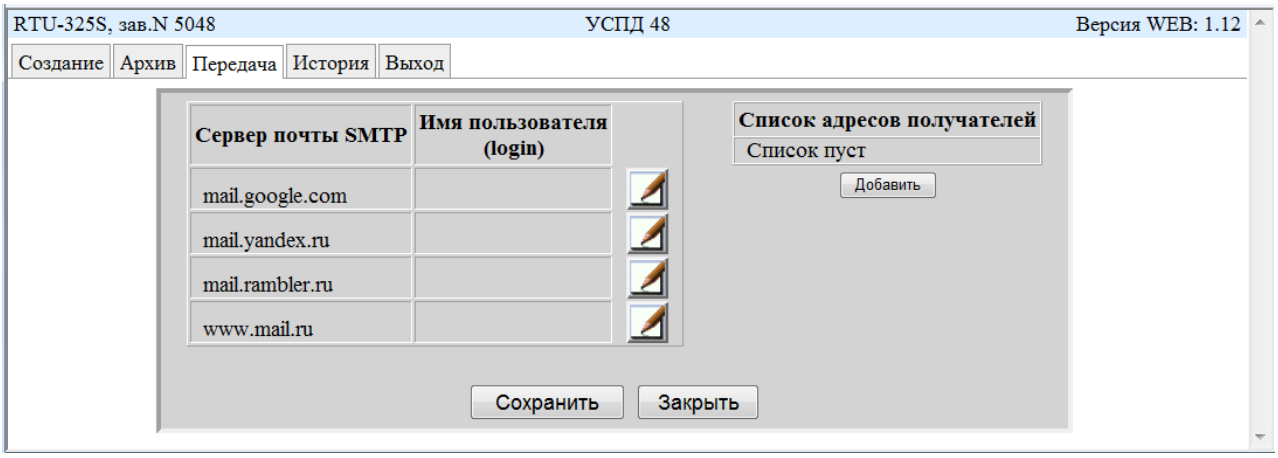


1.1.6.3. Transfer of XML documents. For XML documents to be transmitted, the RTU must be registered on one or more mail servers from the following:

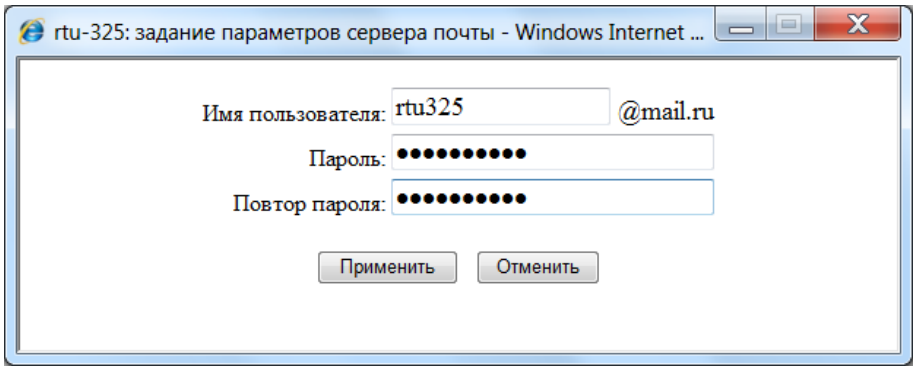
− mail.google.com − mail.yandex.ru − mail.rambler.ru − www.mail.ru.

The settings.

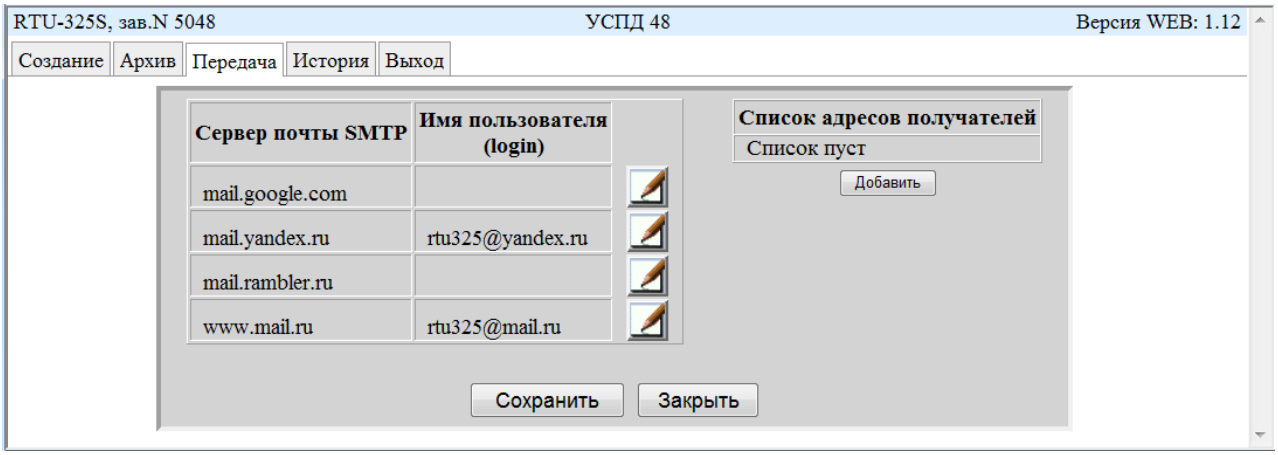
On the first application launch, the user will be provided with the configuration page:



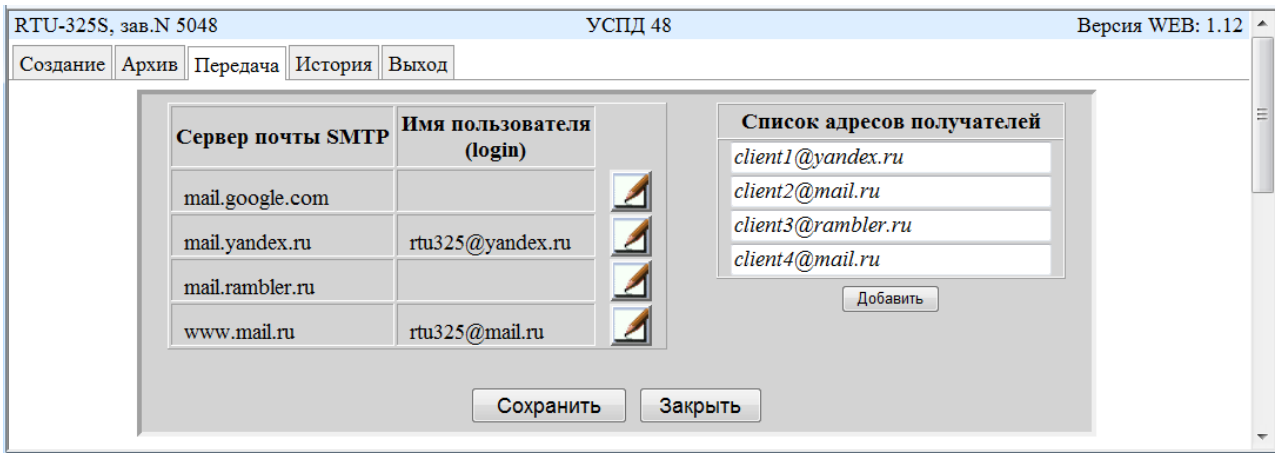
In this form at least one username (login) is required. To do this, press the button and enter the required parameters in the open window:



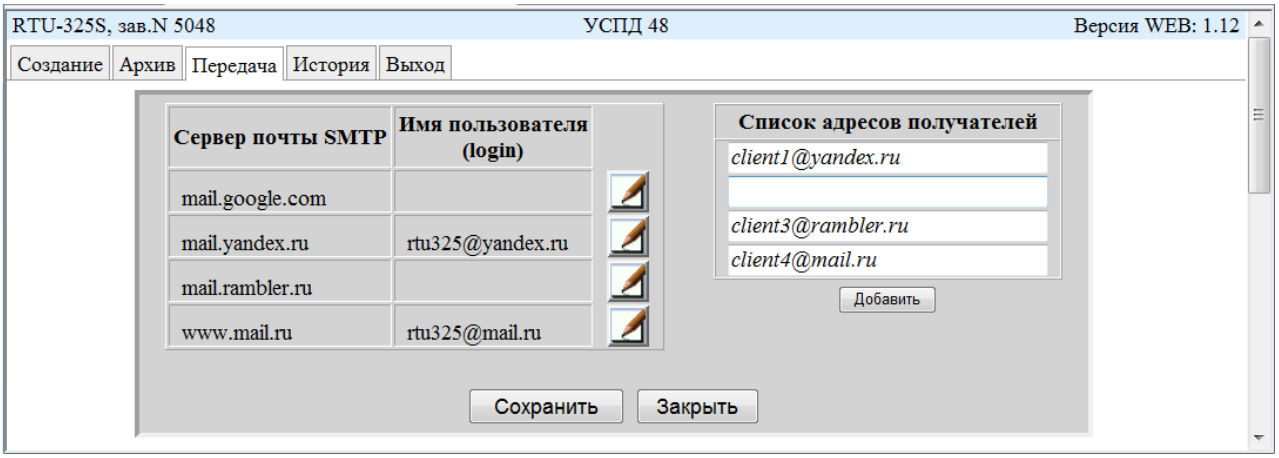
The window will close using the <Use> button and the username entered will appear in the mail server table. On RTU, you can save one to four user names (one on each of the mail servers):



The user can also create a list of the recipients' addresses. To do this, you must press the button <Add> and, in an emerging entry field, give the required address:



To remove the address from the list, the appropriate field must be cleaned:

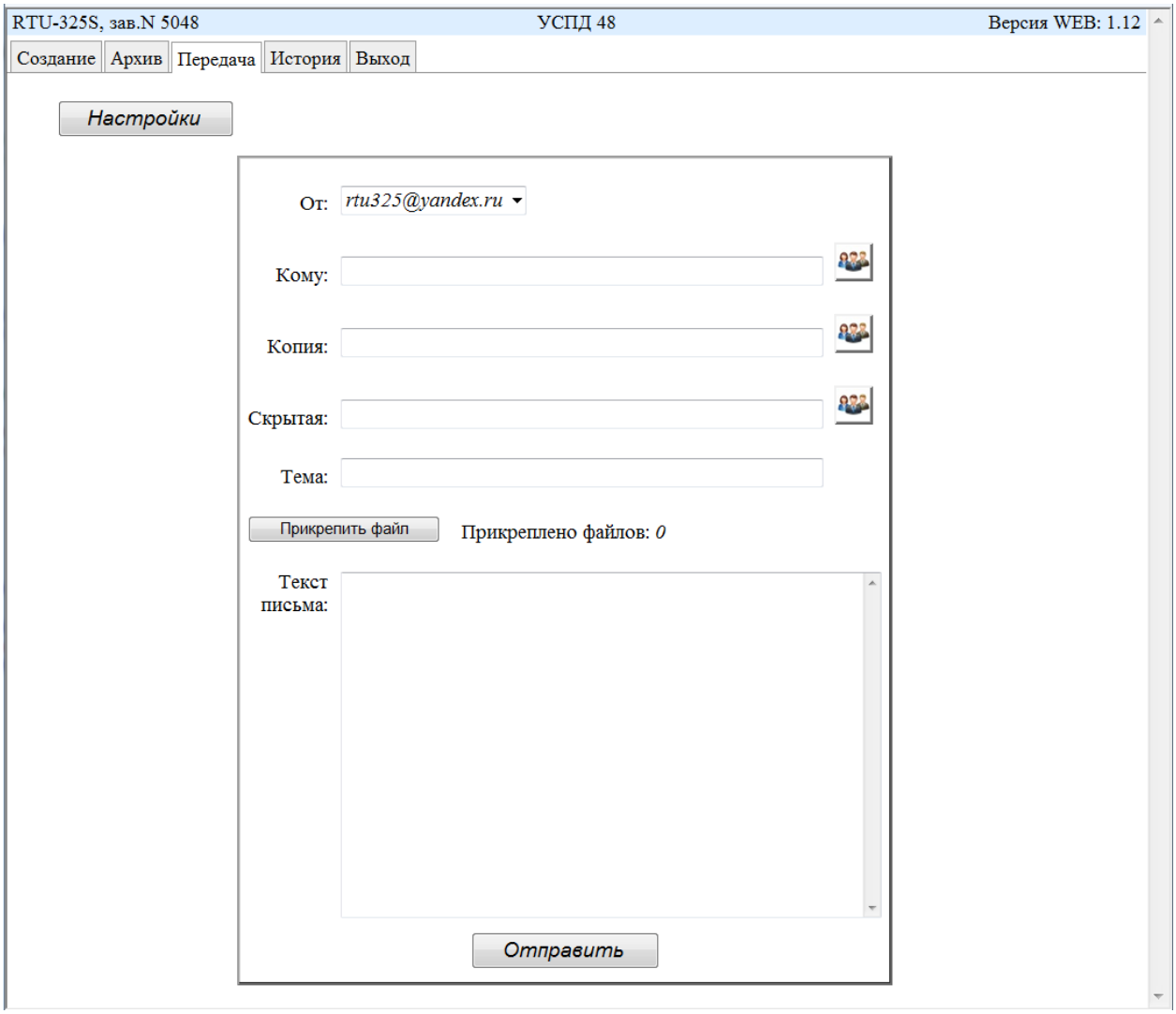


Once the required settings have been entered, the settings in the RTU must be maintained by pressing the <Save> button, and after the successful configuration message, close the settings window by clicking the < Close> button.

Later, you can go through the settings window by clicking on the page of the consignment at the <Destruction>.

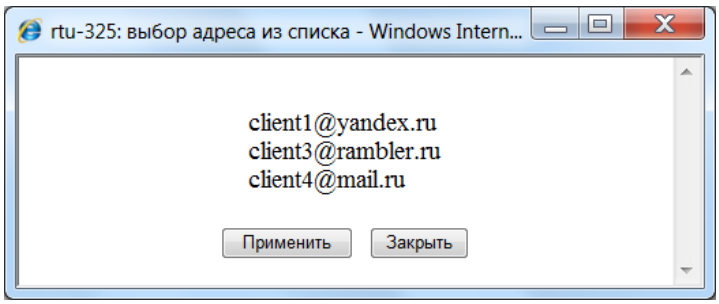
Transfer.

If the user name is retained in RTU, the following form will be provided to the user by using the <Close> button or by switching over the "Передача" tab:



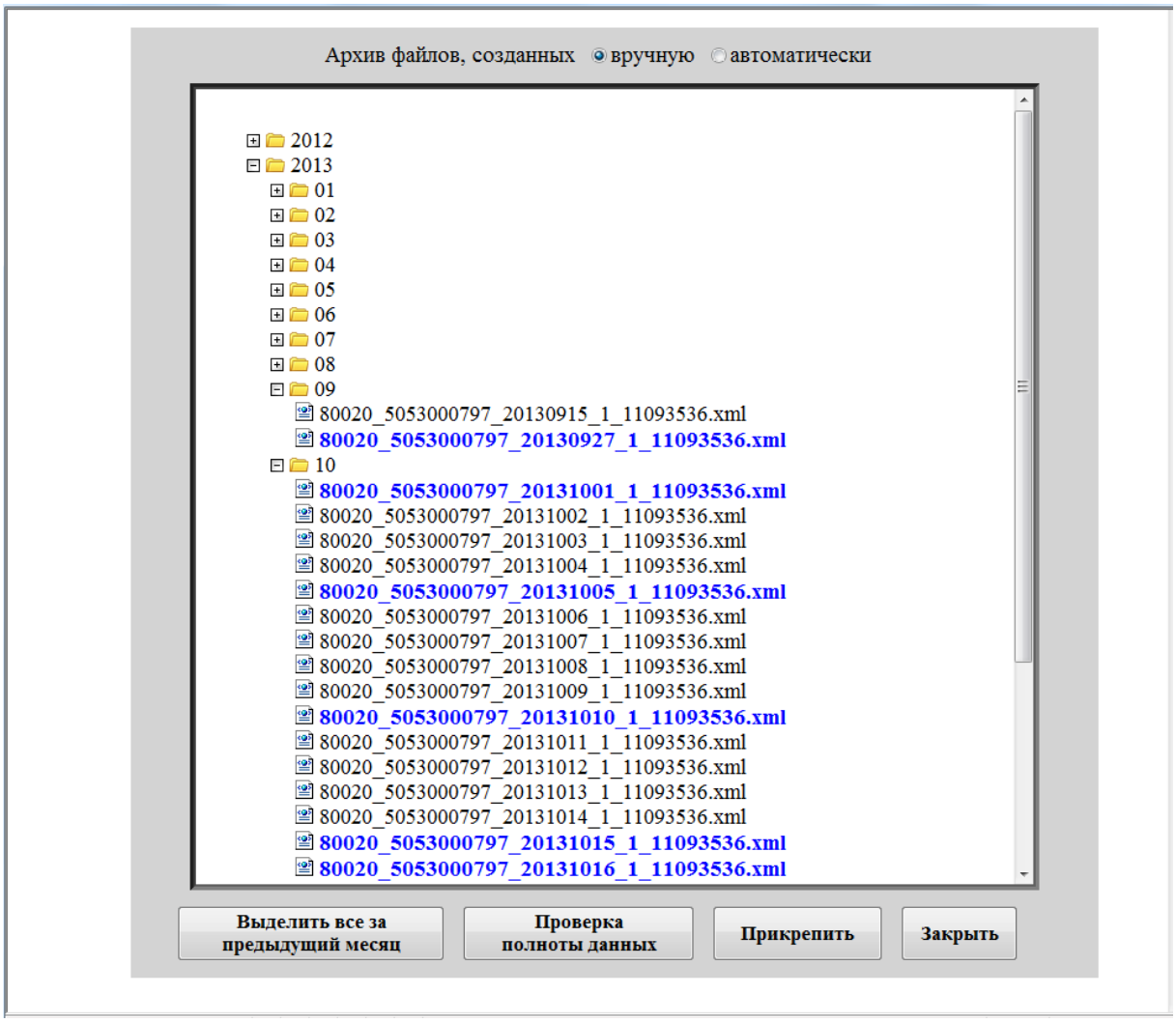
For dispatch, you must give the recipient's address (to whom's field) and attach the file. The remaining fields are filled if necessary.

To assign the recipient address, the user may enter the address in the appropriate field or by pressing the button, select an address from the previously reconfigured list of recipients ' addresses on the "Настройки" page:



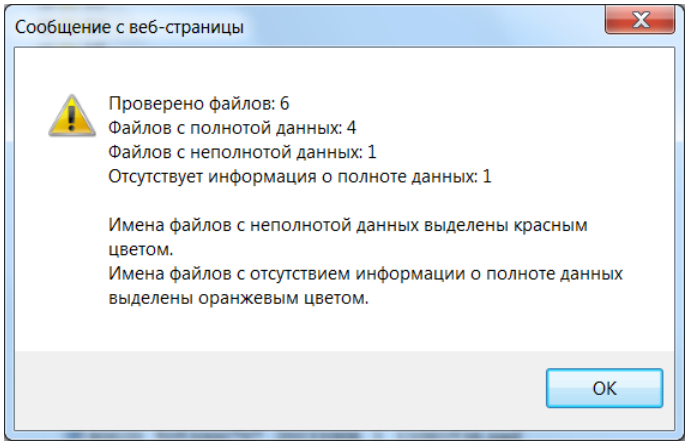
And press the button <Apply>. Similarly, the fields 'Copia' and 'Scene' are filled in. In the 'Them' field, the subject of the letter is asked. In the "Text of the Letter" field, the subject of the letter is asked. To attach the files, you must press the button < Attach the file>. As a result, a new window will be opened with a list of manually created files. To select a file created automatically, you have to install a 'hand-on' switch on 'automatic'.

You can choose one file or hold the keys <Ctrl> or <Shift> of the file group.

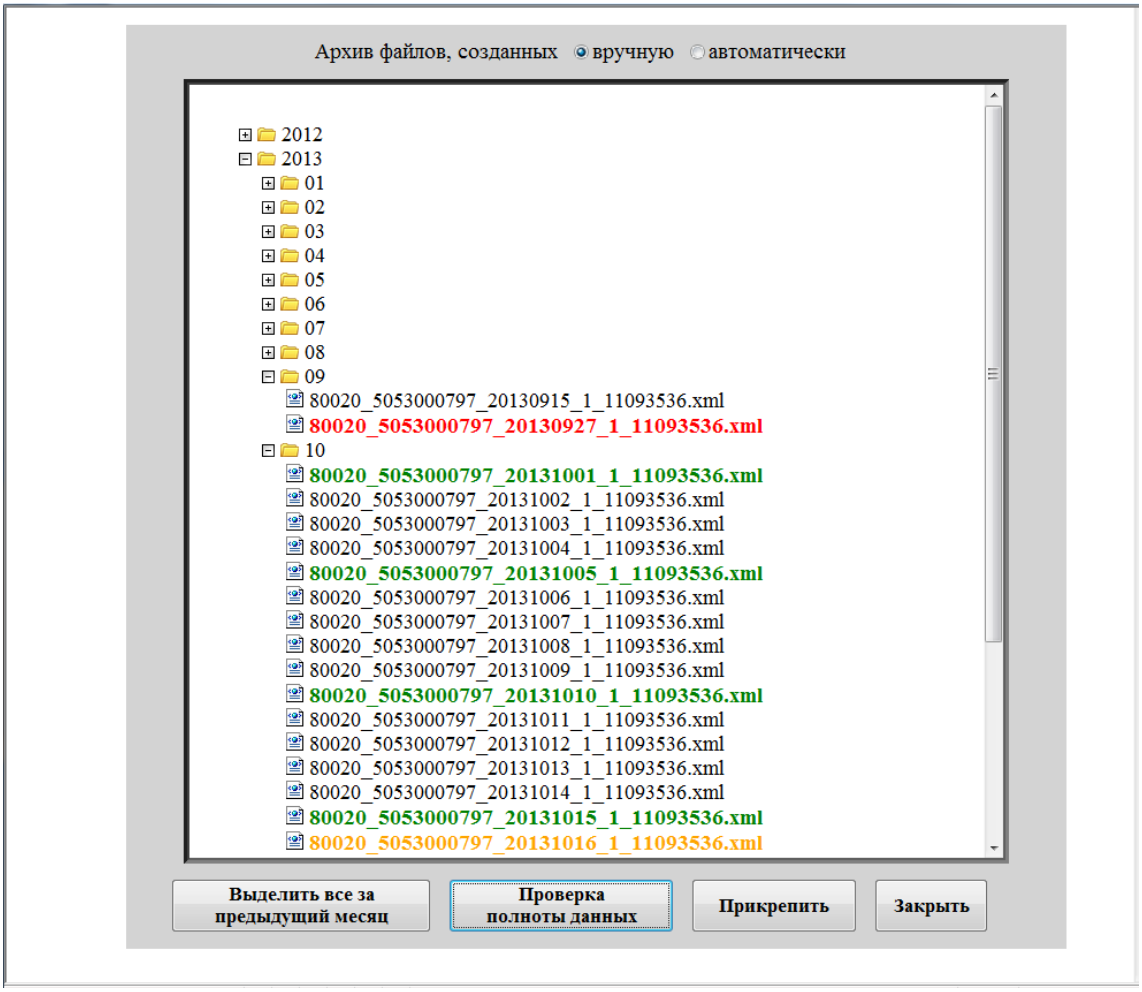


You can also select all files from the previous month by pressing the appropriate button.

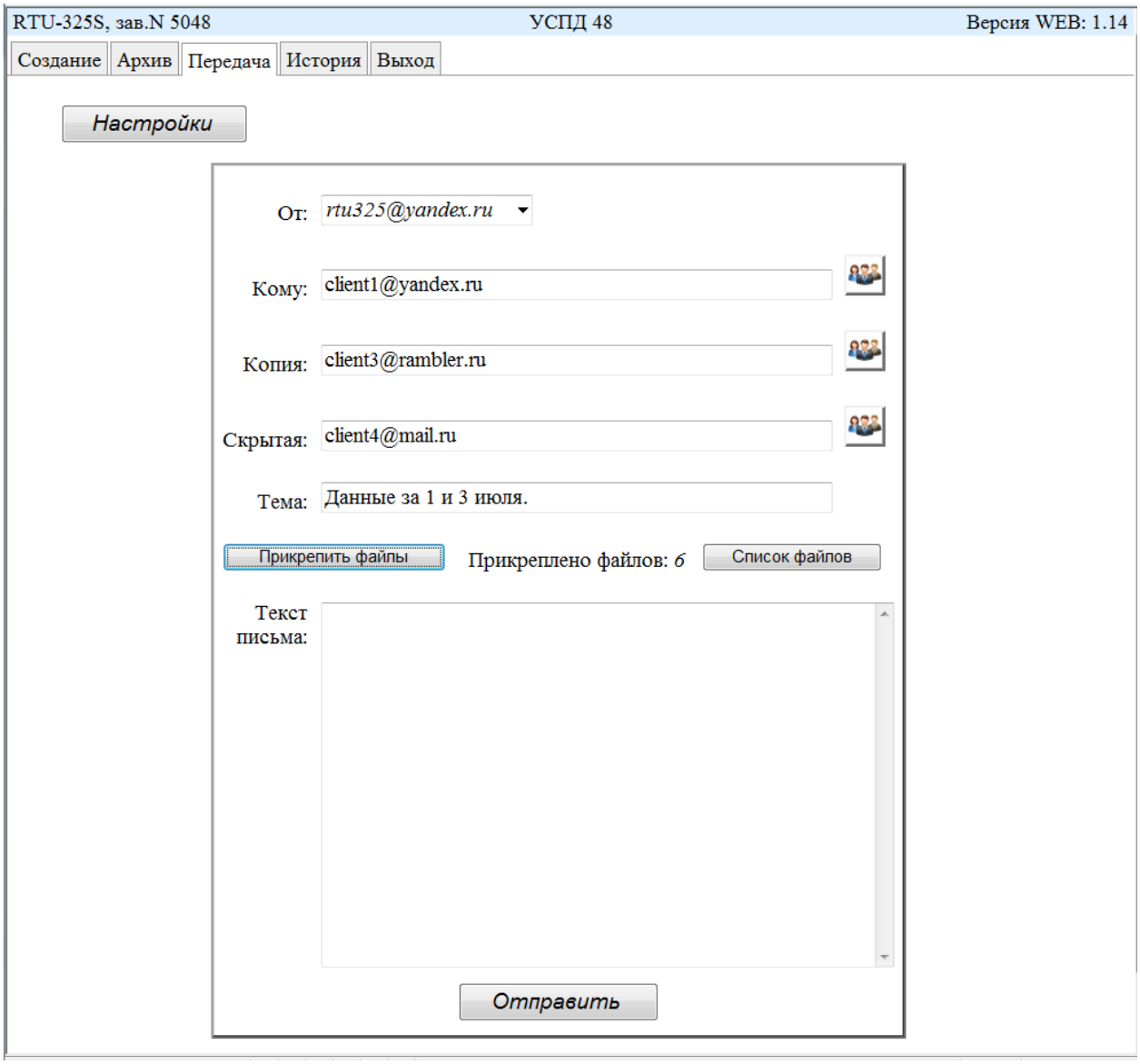
Before sending the files, it is possible to check the completeness of the data contained in these files. To do this, you need to select the required files and press the button <Requirement of completeness>. The result will be a report of the results of the check:



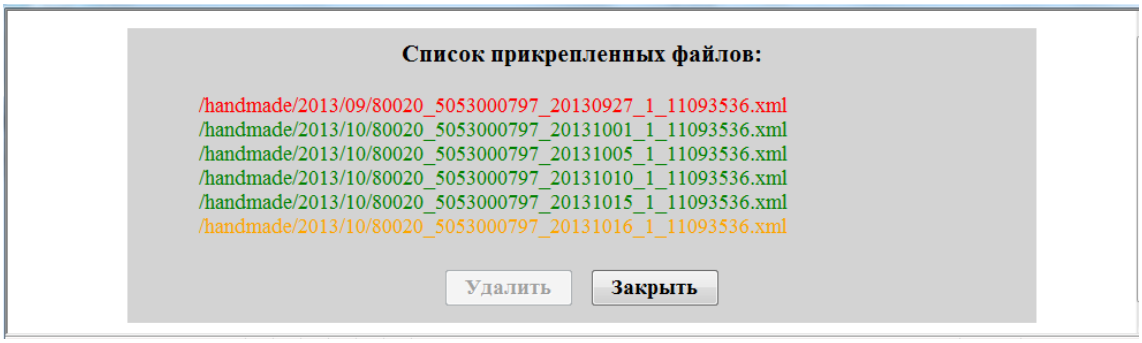
The checked file will be shown in green if it contains complete data. If the file contains incomplete data, it will be highlighted in red. If complete data in the file is not available, such a file will be identified in orange.



Once all the necessary files are selected, press the button < Attach>. This window will close and show the number of attached files in the 'Accorded Files' field:

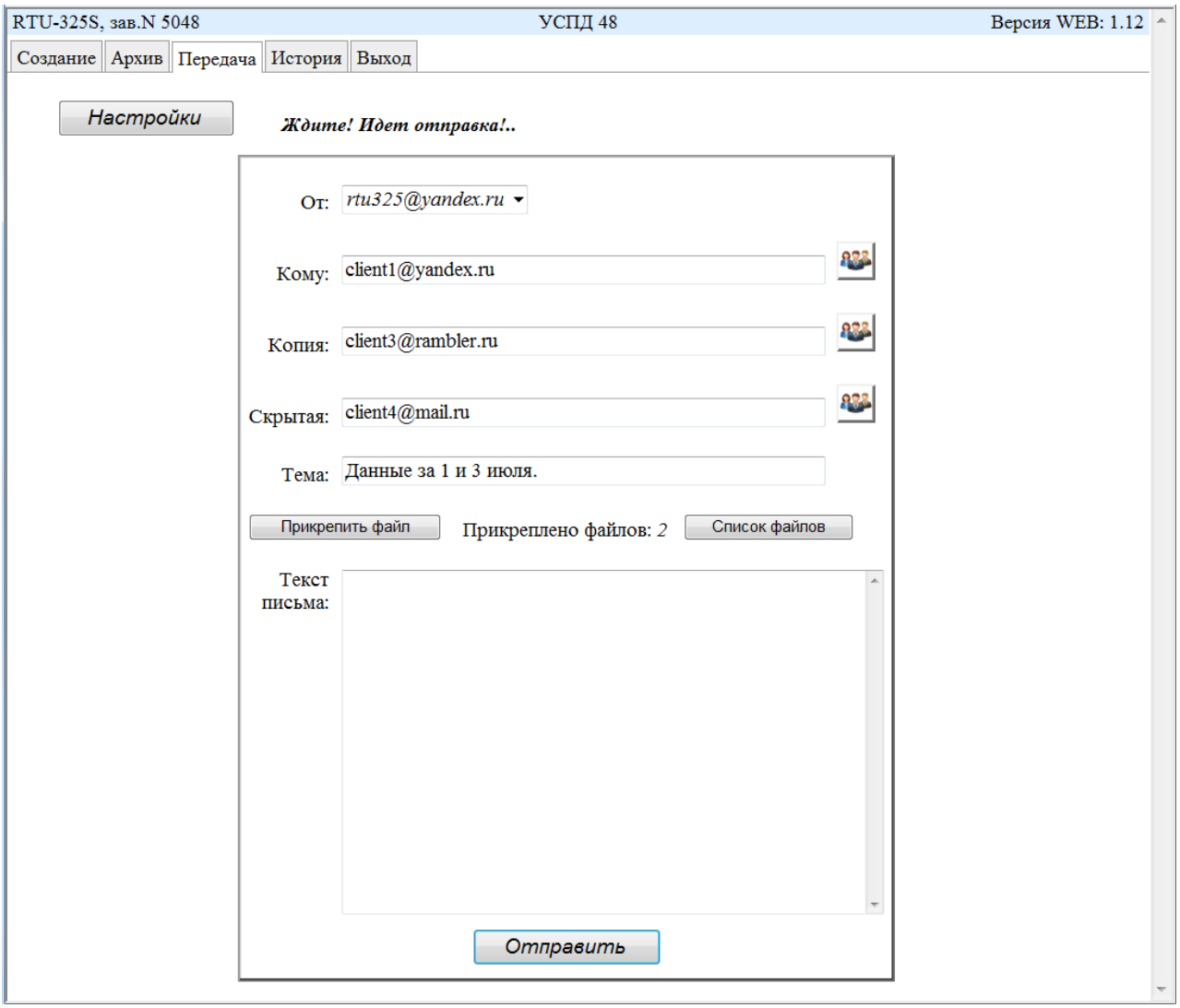


Next you can press the < File List> button and in the open window view and edit the attached file list:

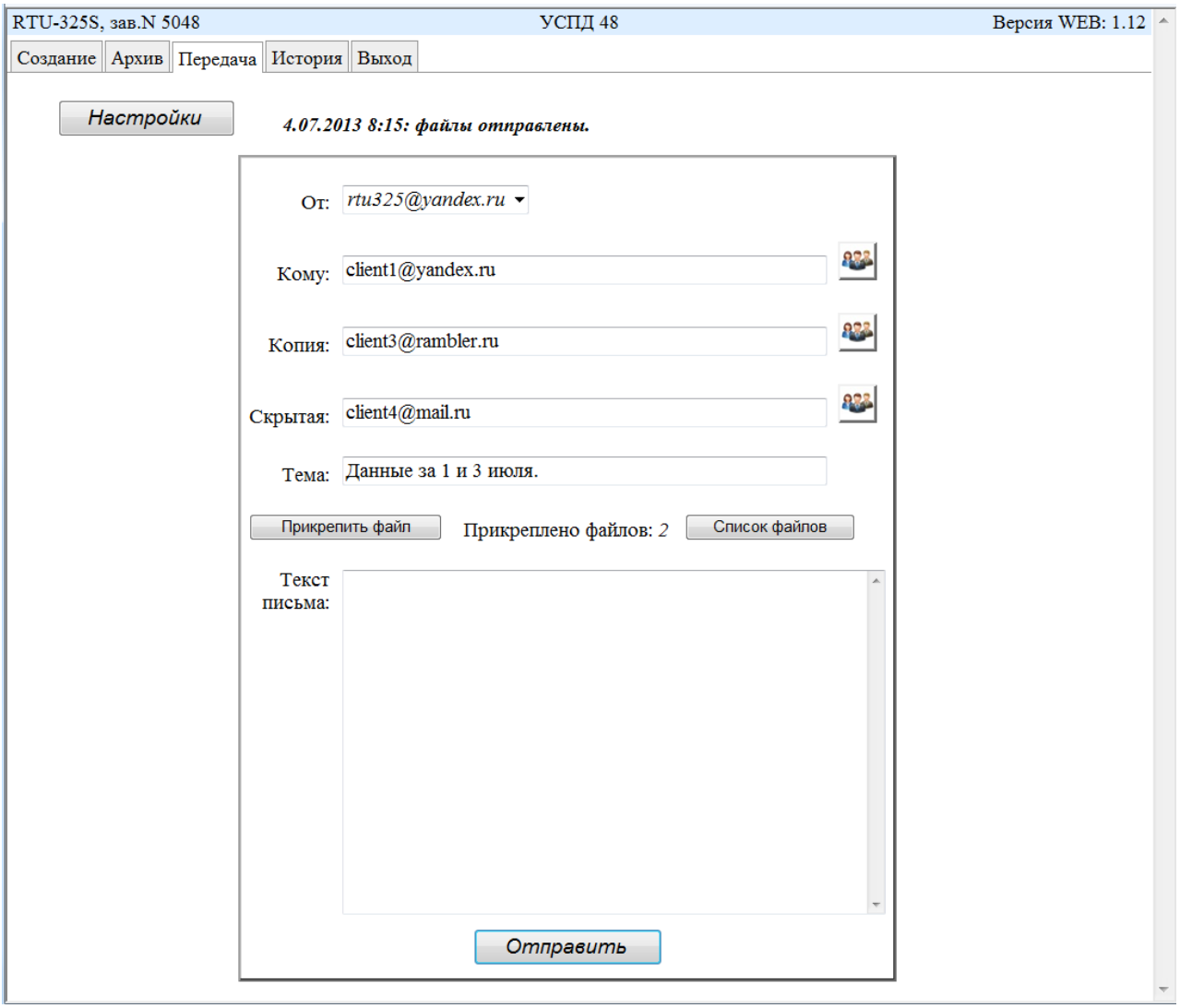


You can remove the unnecessary files from the list. To do this, you need to select the required file and press the button <Delete>.

After all the necessary dispatch parameters have been performed, press the button <Send>. The form of dispatch will be followed by a dispatch message:

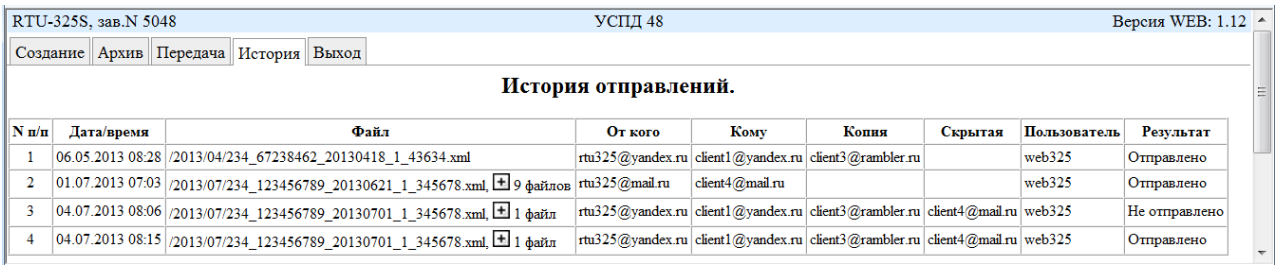


At the end of the transmission, the result will be reported:



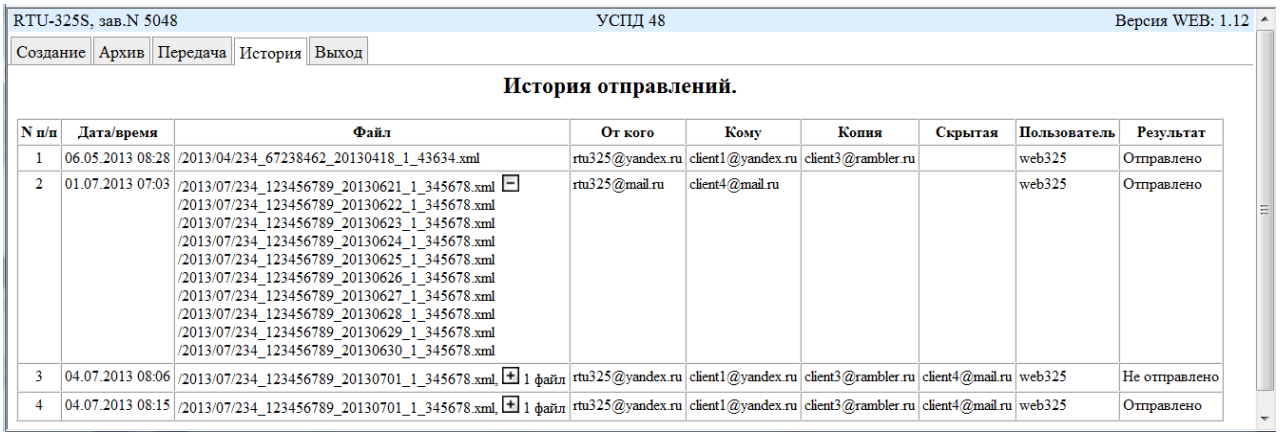
Later, you can look at the history of the shipments by going over the "История" tab.

1.1.6.4. Viewing XML Document Story. This paragraph provides an overview of the history of XML documents. In selecting this paragraph, the following report will be made available to the user:



N п/п	Дата/время	Файл	От кого	Кому	Копия	Скрытая	Пользователь	Результат
1	06.05.2013 08:28	/2013/04/234_67238462_20130418_1_43634.xml	rtu325@yandex.ru	client1@yandex.ru	client3@rambler.ru		web325	Отправлено
2	01.07.2013 07:03	/2013/07/234_123456789_20130621_1_345678.xml, 9 файлов	rtu325@mail.ru	client4@mail.ru			web325	Отправлено
3	04.07.2013 08:06	/2013/07/234_123456789_20130701_1_345678.xml, 1 файл	rtu325@yandex.ru	client1@yandex.ru	client3@rambler.ru	client4@mail.ru	web325	Не отправлено
4	04.07.2013 08:15	/2013/07/234_123456789_20130701_1_345678.xml, 1 файл	rtu325@yandex.ru	client1@yandex.ru	client3@rambler.ru	client4@mail.ru	web325	Отправлено

If more than 1 files were attached to the letter, the 'File' column will display the name of the first of the attached files, and indicate the number of files whose names are hidden. To view all attached files , click on the following icon:


RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 1.12

Создание | Архив | Передача | История | Выход

История отправлений.

N п/п	Дата/время	Файл	От кого	Кому	Копия	Скрытая	Пользователь	Результат
1	06.05.2013 08:28	/2013/04/234_67238462_20130418_1_43634.xml	rtu325@yandex.ru	client1@yandex.ru	client3@rambler.ru		web325	Отправлено
2	01.07.2013 07:03	/2013/07/234_123456789_20130621_1_345678.xml /2013/07/234_123456789_20130622_1_345678.xml /2013/07/234_123456789_20130623_1_345678.xml /2013/07/234_123456789_20130624_1_345678.xml /2013/07/234_123456789_20130625_1_345678.xml /2013/07/234_123456789_20130626_1_345678.xml /2013/07/234_123456789_20130627_1_345678.xml /2013/07/234_123456789_20130628_1_345678.xml /2013/07/234_123456789_20130629_1_345678.xml /2013/07/234_123456789_20130630_1_345678.xml	rtu325@mail.ru	client4@mail.ru			web325	Отправлено
3	04.07.2013 08:06	/2013/07/234_123456789_20130701_1_345678.xml, 1 файл	rtu325@yandex.ru	client1@yandex.ru	client3@rambler.ru	client4@mail.ru	web325	Не отправлено
4	04.07.2013 08:15	/2013/07/234_123456789_20130701_1_345678.xml, 1 файл	rtu325@yandex.ru	client1@yandex.ru	client3@rambler.ru	client4@mail.ru	web325	Отправлено

Hide the last files by pressing the badge.

1.1.7. Price categories.

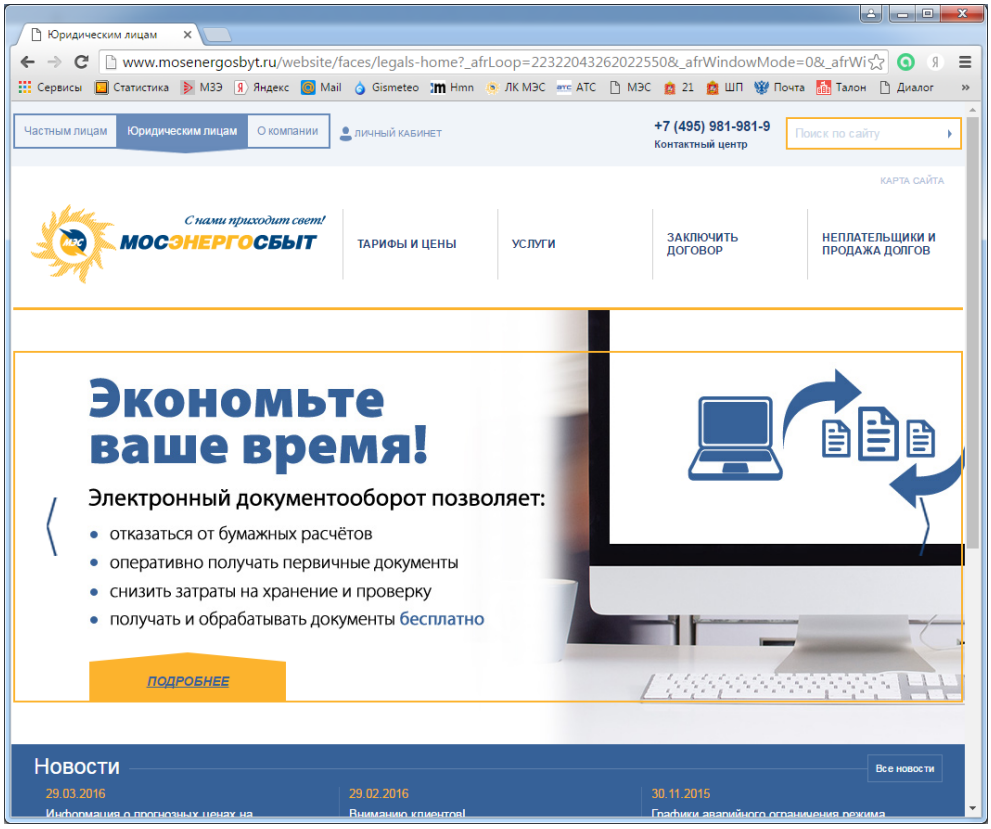
In this paragraph, the user can calculate the cost of the electricity purchased in 1-6 price categories and create a report on the consumption and cost of the electricity in the selected price category over the selected period for the selected group of meters. The calculation is performed using the commercial intervals from the RTU archives.

Loading.

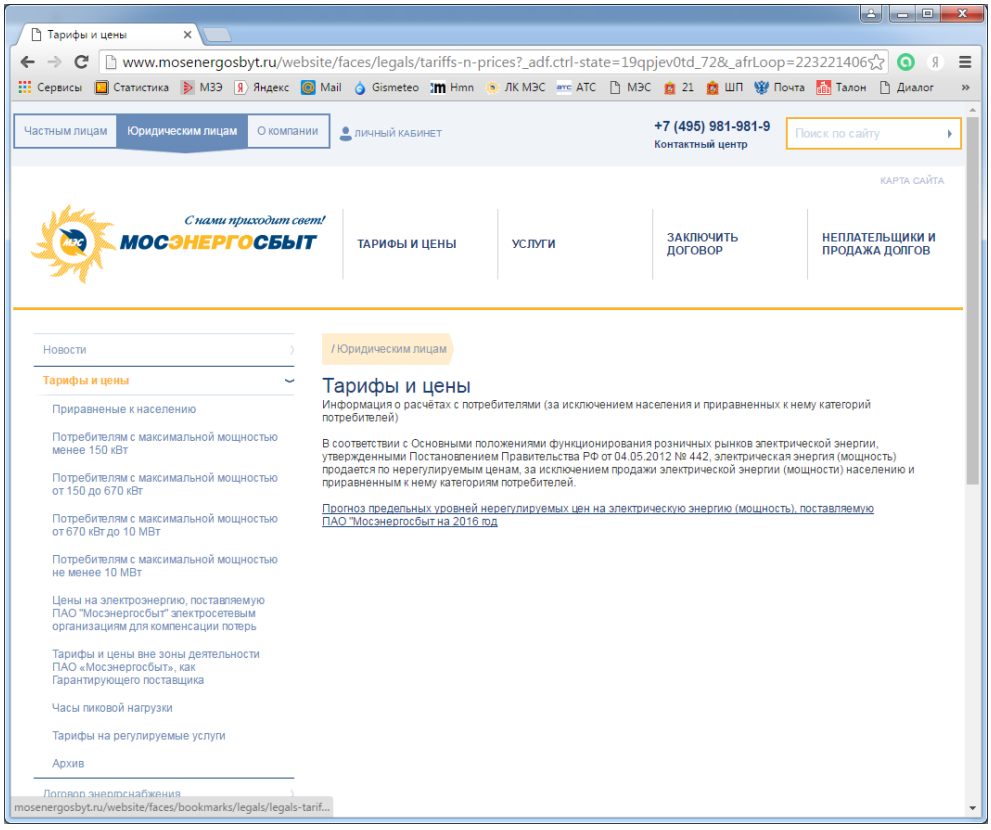
Before calculating, the user must upload the electricity and power rates, the peak hours of the month required and the scheduled peak hours for the year required. Paragraph "Загрузка" is intended for this purpose.

The following steps must be taken to load electricity and power rates:

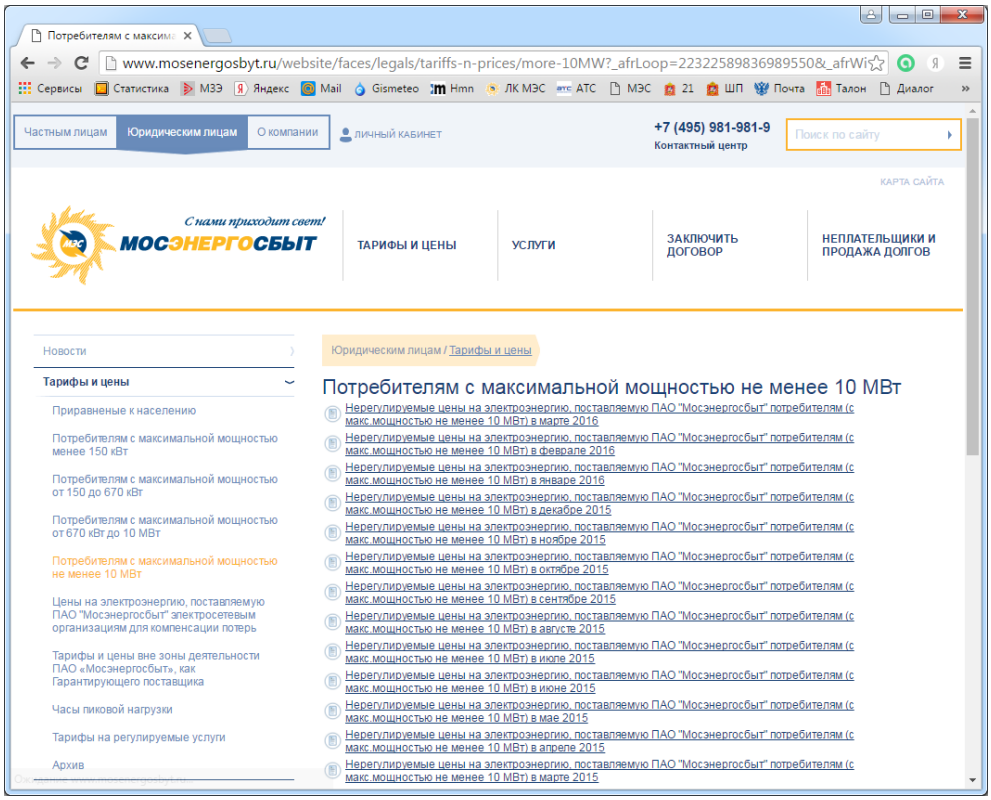
1. Enter PAO «Мосэнергосбыт» website and move to the section `Tariths and Prices':



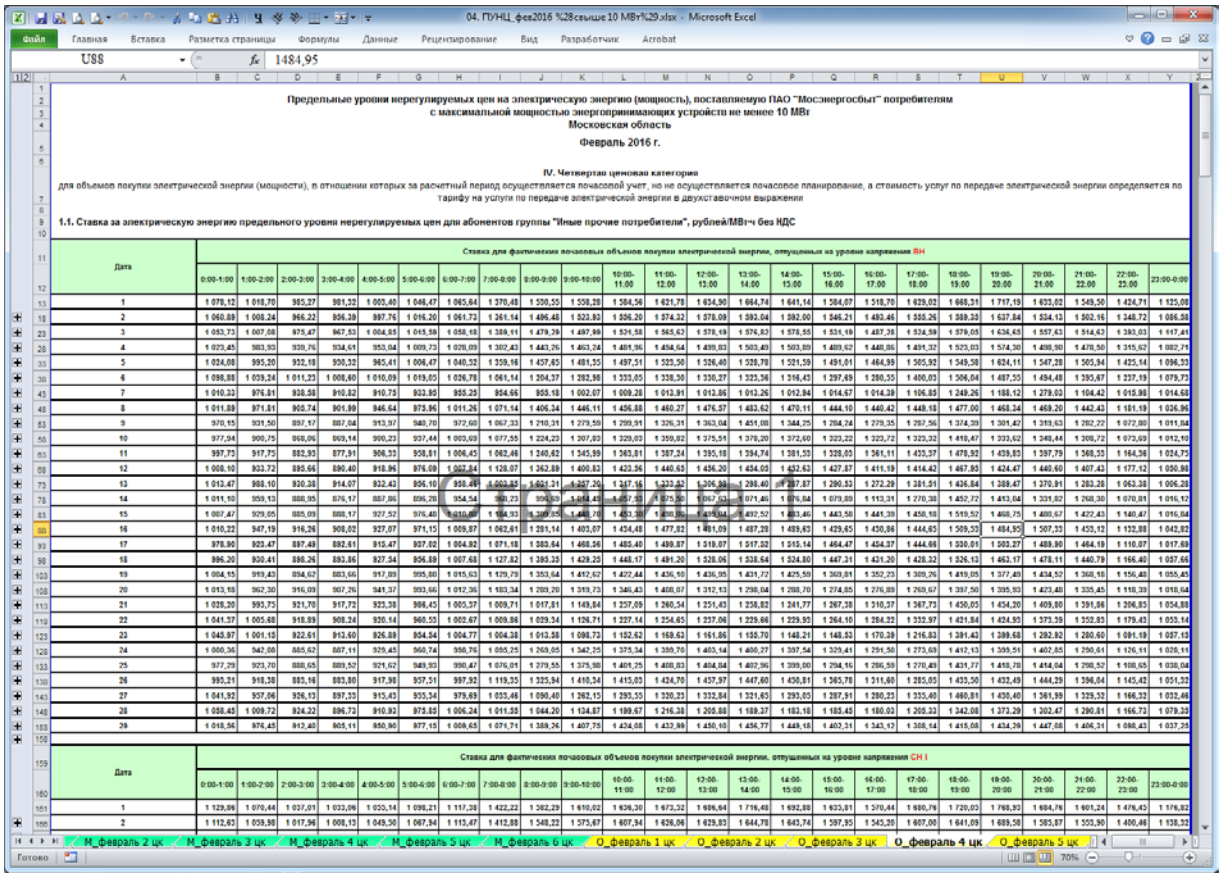
2. Select a paragraph corresponding to the maximum contractual capacity:



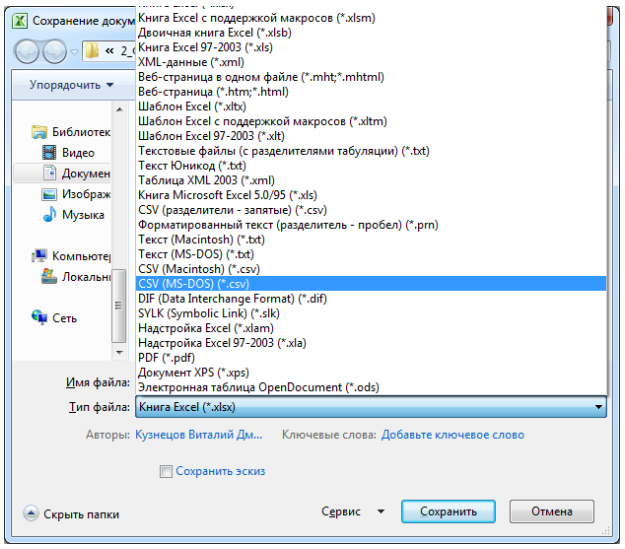
3. download the Unadjusted Electricity Prices file for the year and month required:

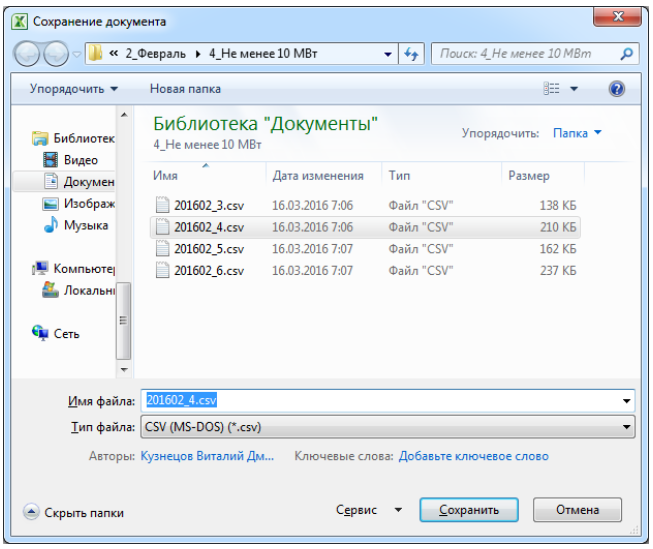


4. Open the file to MS Excel.
5. Select a page that corresponds to the required category:



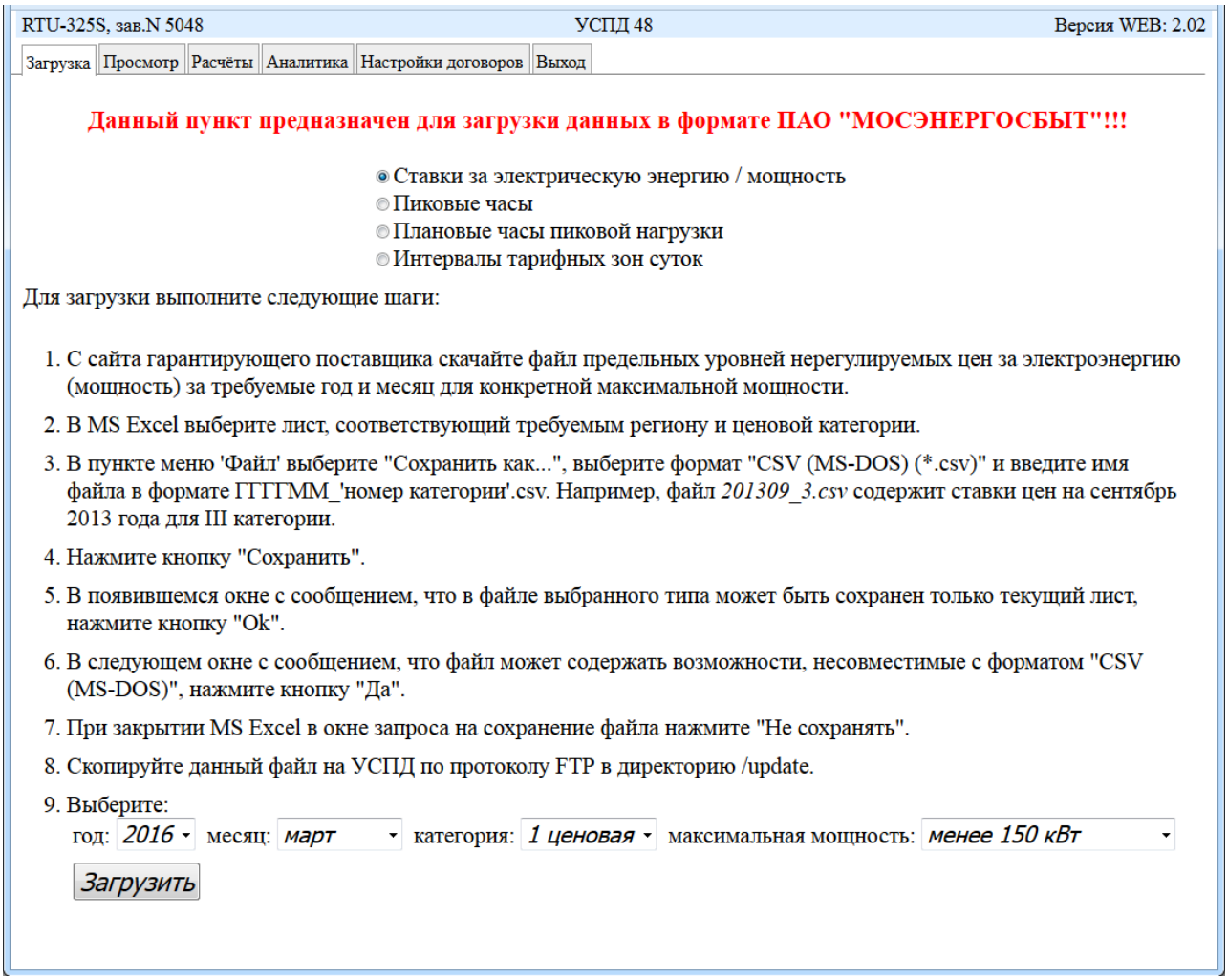
6. In the menu, select 'Save as'. In the 'Tip File' field, select 'CSV' (MS-DOS) (*).csv', select the file name in 'DGGM_<price category>' and click <Save>:





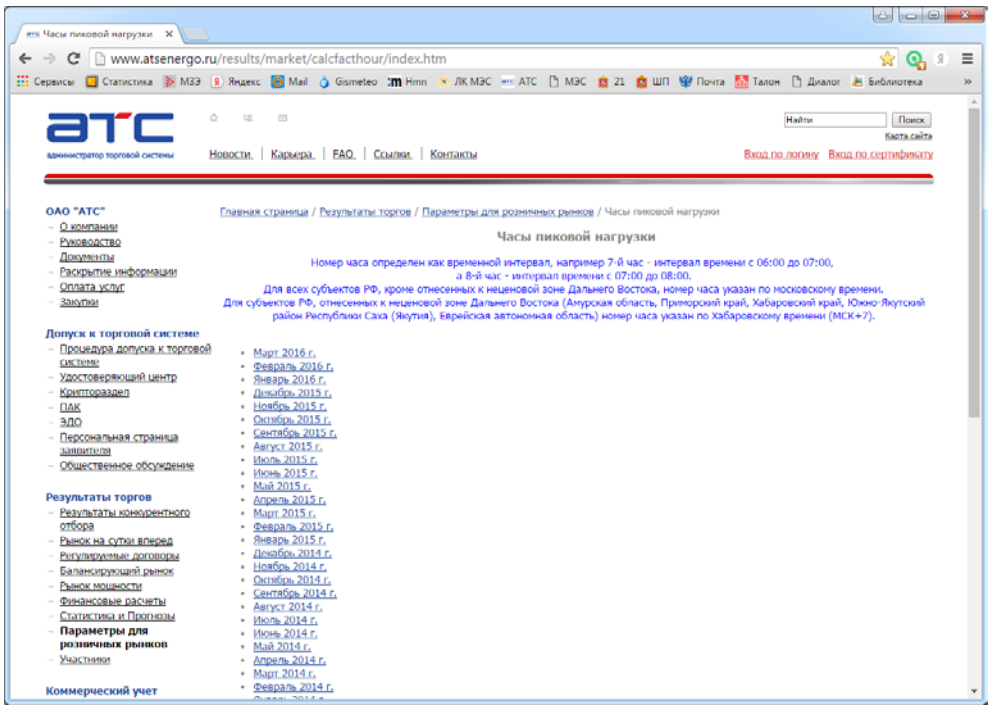
7. Copy the FTP file on the RTU to the directory / update.

8. In the "Загрузка" tab, set the switch to the 'Electric Power / Power Hatch' position. In paragraph 9, set the year, month, category and maximum power by contract and press the button <load>:

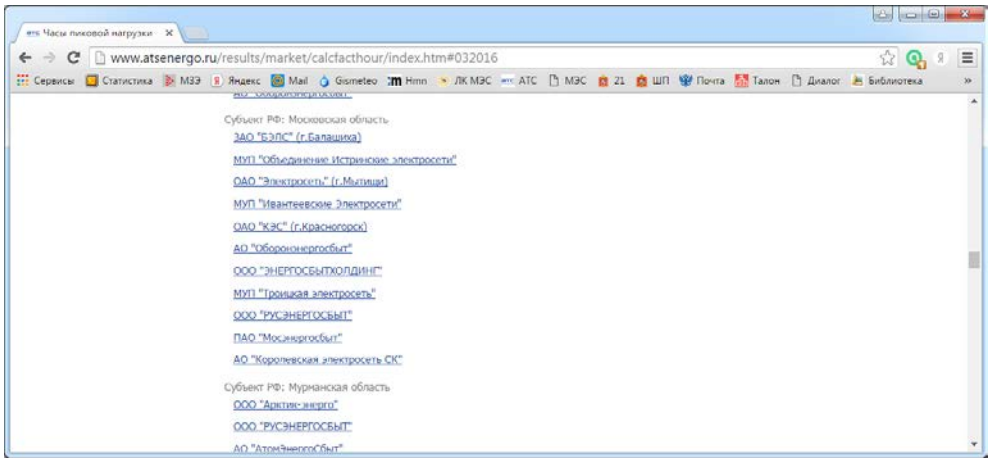


9. As a result, the data will be downloaded on RTU, and the corresponding message will appear at the bottom of the screen.
10. Steps 5 to 8 need to be repeated to load data for other price categories.
11. Steps 2 to 10 shall be repeated for loading data for other maximum capacity.

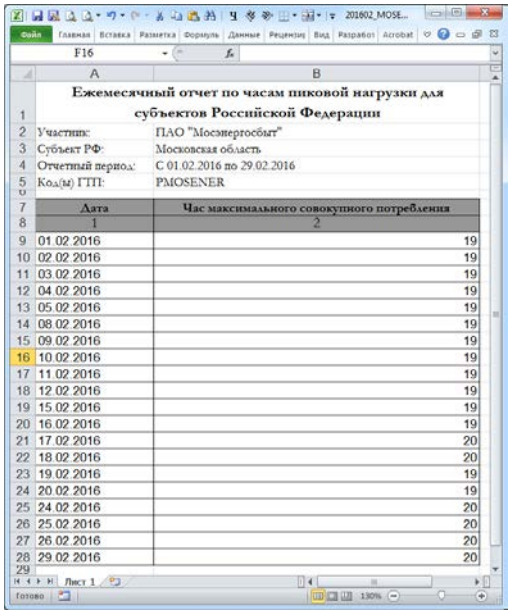
The following steps must be taken to load peak hours:
1. Enter the OAO «ATC» website at the retail market parameters and select the year and month required:



2. Run the page down and find a section with the required entity of the Russian Federation:

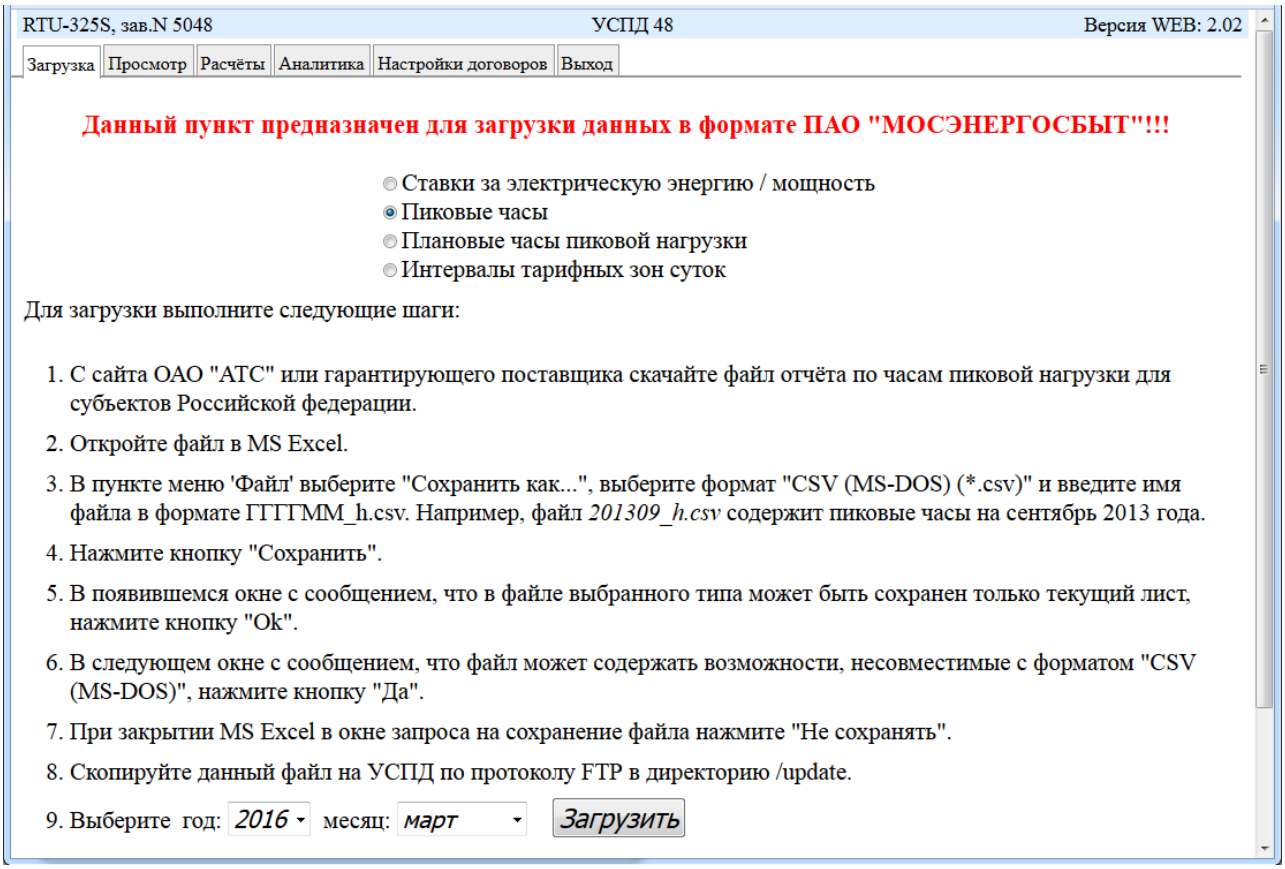


3. To download the electrical supplier file.
4. Open the file to MS Excel.



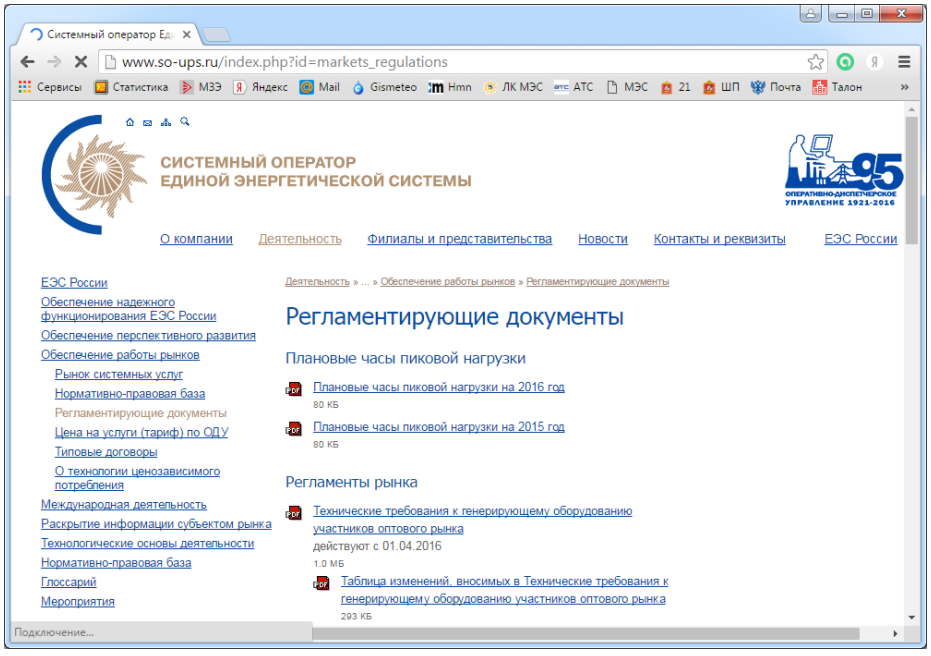
	A	B
1	Ежемесячный отчет по часам пиковой нагрузки для субъектов Российской Федерации	
2	Участник:	ПАО "Мосэнергосбыт"
3	Субъект РФ:	Московская область
4	Отчетный период:	С 01.02.2016 по 29.02.2016
5	Код(ы) ГТП:	PMOSENER
7	Дата	Час максимального совокупного потребления
8	1	2
9	01.02.2016	19
10	02.02.2016	19
11	03.02.2016	19
12	04.02.2016	19
13	05.02.2016	19
14	08.02.2016	19
15	09.02.2016	19
16	10.02.2016	19
17	11.02.2016	19
18	12.02.2016	19
19	15.02.2016	19
20	16.02.2016	19
21	17.02.2016	20
22	18.02.2016	20
23	19.02.2016	19
24	20.02.2016	19
25	24.02.2016	20
26	25.02.2016	20
27	26.02.2016	20
28	29.02.2016	20

5. In the menu, select 'Save as' in the 'Tip File Field' to select 'CSV (MS-DOS)' (*.csv)', to select the file name in 'DGGM_h' and click <Save>.
6. Copy the FTP file on the RTU to the directory / update.
7. On the "Загрузка" tab, set the switch to the `Reporting Hours' position. In paragraph 9, set the year, month and press the button < upload>:

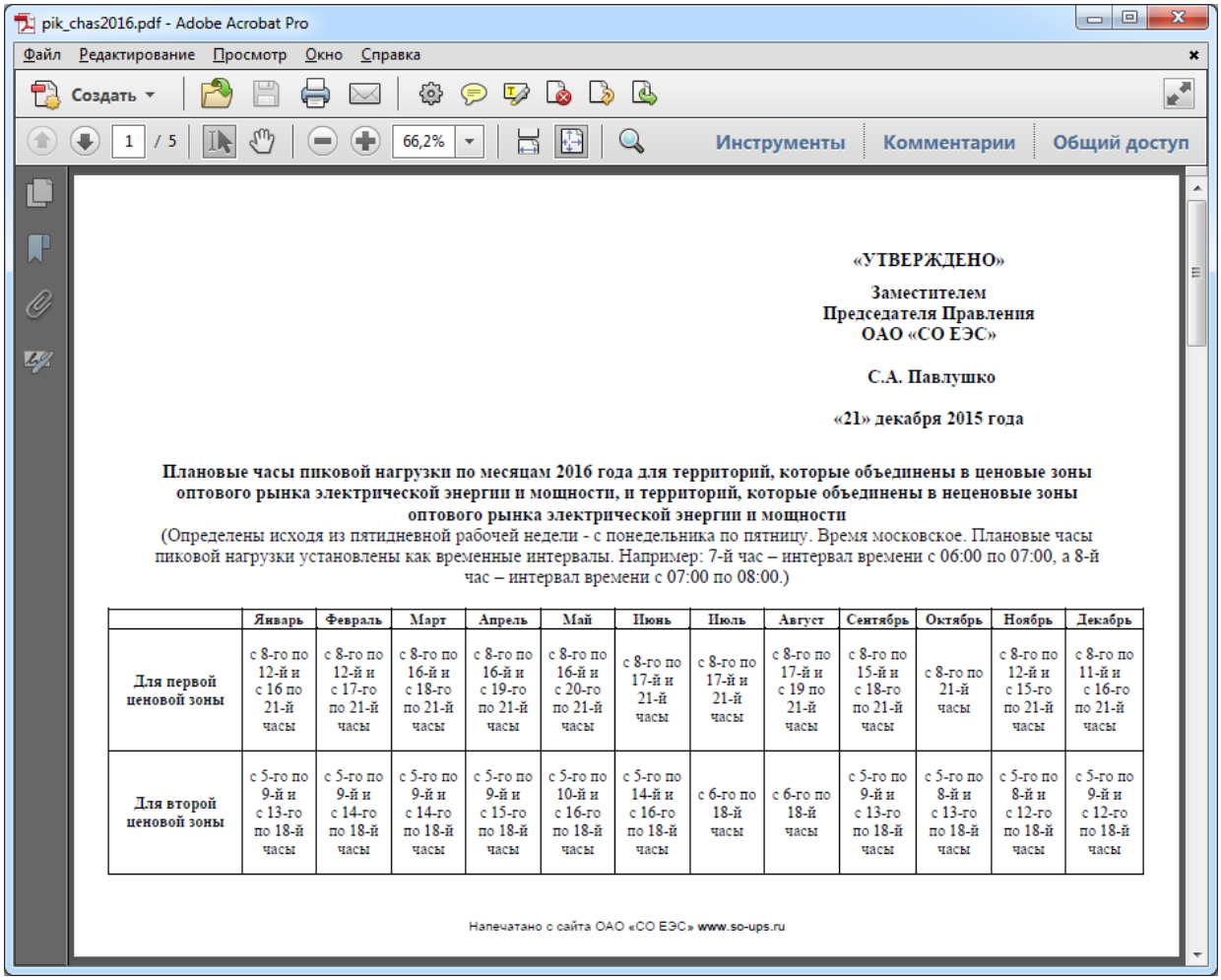


As a result, the data will be downloaded on RTU, and the corresponding message will appear at the bottom of the screen.
For 4 and 6 price categories, the target peak hours must be downloaded.

1. This requires access to the system operator ' s website at www.so-ups.ru. Go to `Action' > `Ensuring markets' > `Regulation documents'. In `Pumpload planning hours', go to `Pumpload planning hours on GMG year' and save the document.



As a result, the document will be saved, as shown below:



«УТВЕРЖДЕНО»

Заместителем
Председателя Правления
ОАО «СО ЕЭС»

С.А. Павлушко

«21» декабря 2015 года

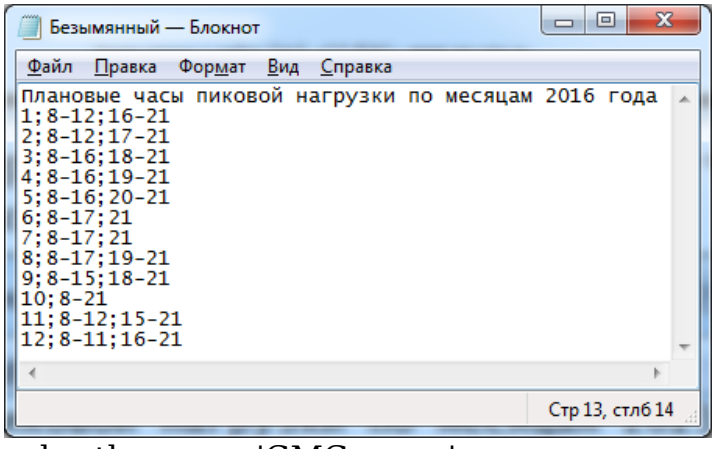
Плановые часы пиковой нагрузки по месяцам 2016 года для территорий, которые объединены в ценовые зоны оптового рынка электрической энергии и мощности, и территорий, которые объединены в неценовые зоны оптового рынка электрической энергии и мощности

(Определены исходя из пятидневной рабочей недели - с понедельника по пятницу. Время московское. Плановые часы пиковой нагрузки установлены как временные интервалы. Например: 7-й час – интервал времени с 06:00 по 07:00, а 8-й час – интервал времени с 07:00 по 08:00.)

	Январь	Февраль	Март	Апрель	Май	Июнь	Июль	Август	Сентябрь	Октябрь	Ноябрь	Декабрь
Для первой ценовой зоны	с 8-го по 12-й и с 16 по 21-й часы	с 8-го по 12-й и с 17-го по 21-й часы	с 8-го по 16-й и с 18-го по 21-й часы	с 8-го по 16-й и с 19-го по 21-й часы	с 8-го по 16-й и с 20-го по 21-й часы	с 8-го по 17-й и 21-й часы	с 8-го по 17-й и 21-й часы	с 8-го по 17-й и с 19 по 21-й часы	с 8-го по 15-й и с 18-го по 21-й часы	с 8-го по 21-й часы	с 8-го по 12-й и с 15-го по 21-й часы	с 8-го по 11-й и с 16-го по 21-й часы
Для второй ценовой зоны	с 5-го по 9-й и с 13-го по 18-й часы	с 5-го по 9-й и с 14-го по 18-й часы	с 5-го по 9-й и с 14-го по 18-й часы	с 5-го по 9-й и с 15-го по 18-й часы	с 5-го по 10-й и с 16-го по 18-й часы	с 5-го по 14-й и с 16-го по 18-й часы	с 6-го по 18-й часы	с 6-го по 18-й часы	с 5-го по 9-й и с 13-го по 18-й часы	с 5-го по 8-й и с 13-го по 18-й часы	с 5-го по 8-й и с 12-го по 18-й часы	с 5-го по 9-й и с 12-го по 18-й часы

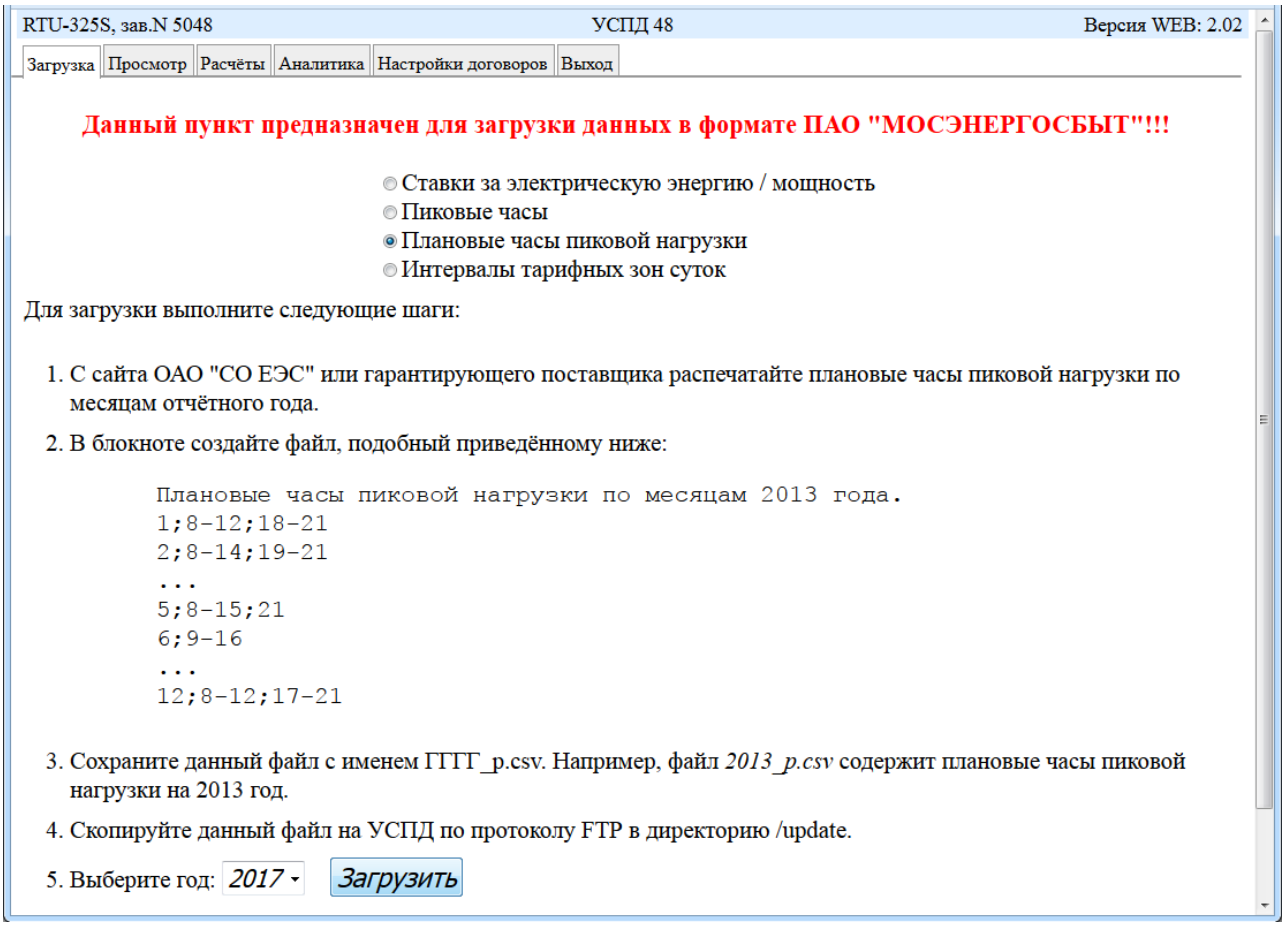
Напечатано с сайта ОАО «СО ЕЭС» www.so-ups.ru

2. In any text editor, to create a document with target peak hours with the following format:



3. Save the file under the name 'GMG_p.csv'.
4. Copy the created FTP protocol file on RTU to the directory / update.

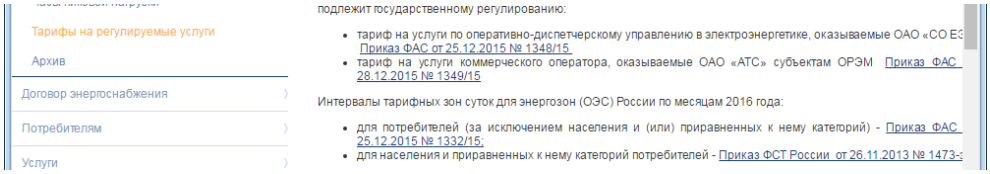
5. On the "Загрузка" tab, set the switch to the 'Pumpload Plan Hours' position. In paragraph 5, set the year and press the button < upload>:



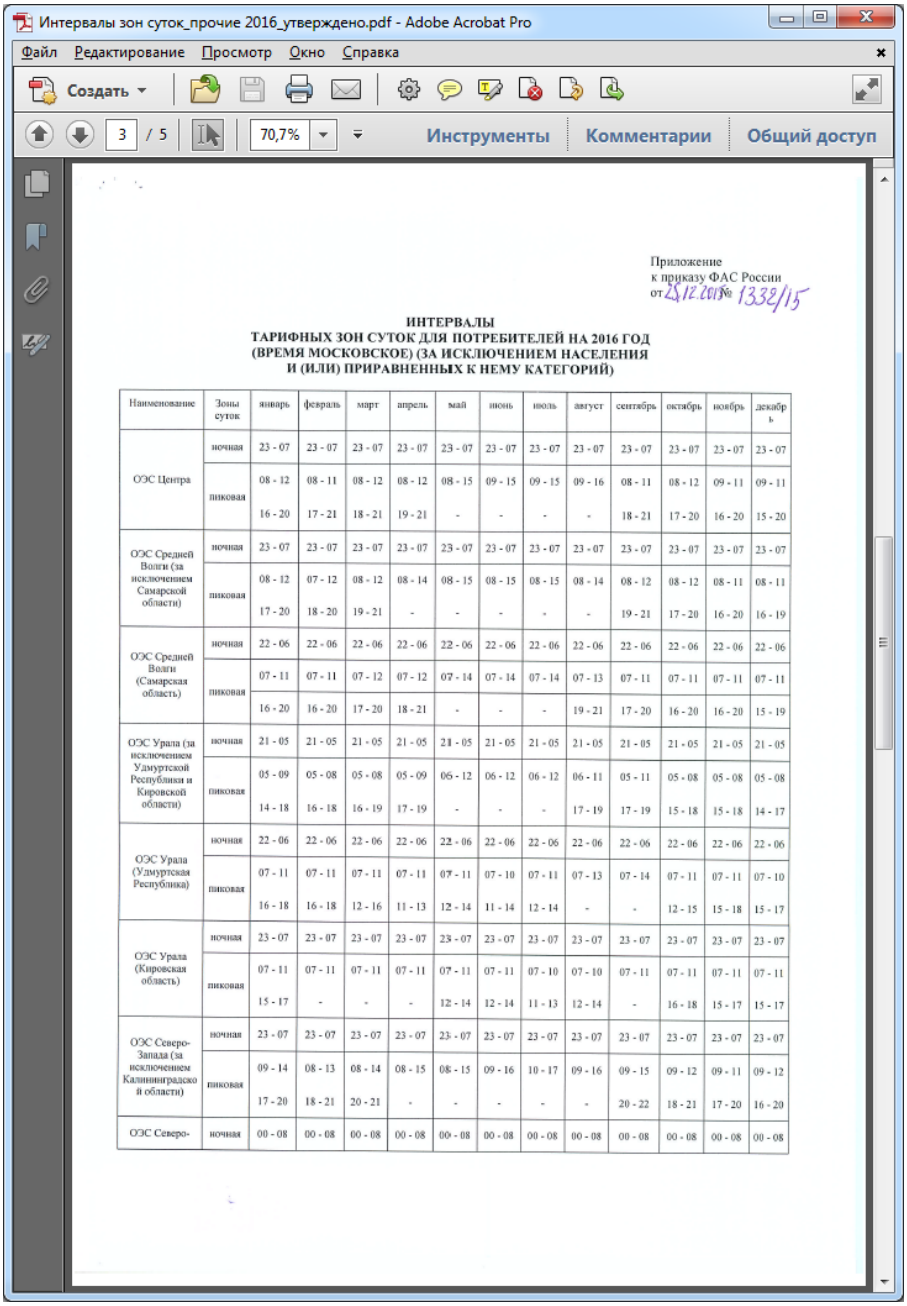
6. As a result, the data will be downloaded on RTU, and the corresponding message will appear at the bottom of the screen.

For the 2 price categories, data on tariff zones must be downloaded.

1. To do so, you have to go to the PAO «Мосэнергосбыт» website. Go to the section `Tariths and prices' > `Tariths for regulated services'. In the paragraph `Tarvals of tariff zones for the months of the GGGG of the year', go to `for consumers' and save the document.



As a result, the document will be saved, as shown below:

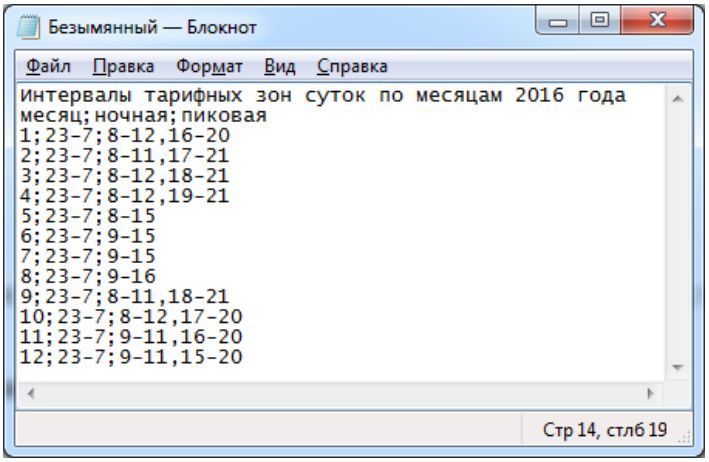


Приложение
к приказу ФАС России
от 25.12.2015 № 1332/15

ИНТЕРВАЛЫ
ТАРИФНЫХ ЗОН СУТОК ДЛЯ ПОТРЕБИТЕЛЕЙ НА 2016 ГОД
(ВРЕМЯ МОСКОВСКОЕ) (ЗА ИСКЛЮЧЕНИЕМ НАСЕЛЕНИЯ
И (ИЛИ) ПРИРАВНЕННЫХ К НЕМУ КАТЕГОРИЙ)

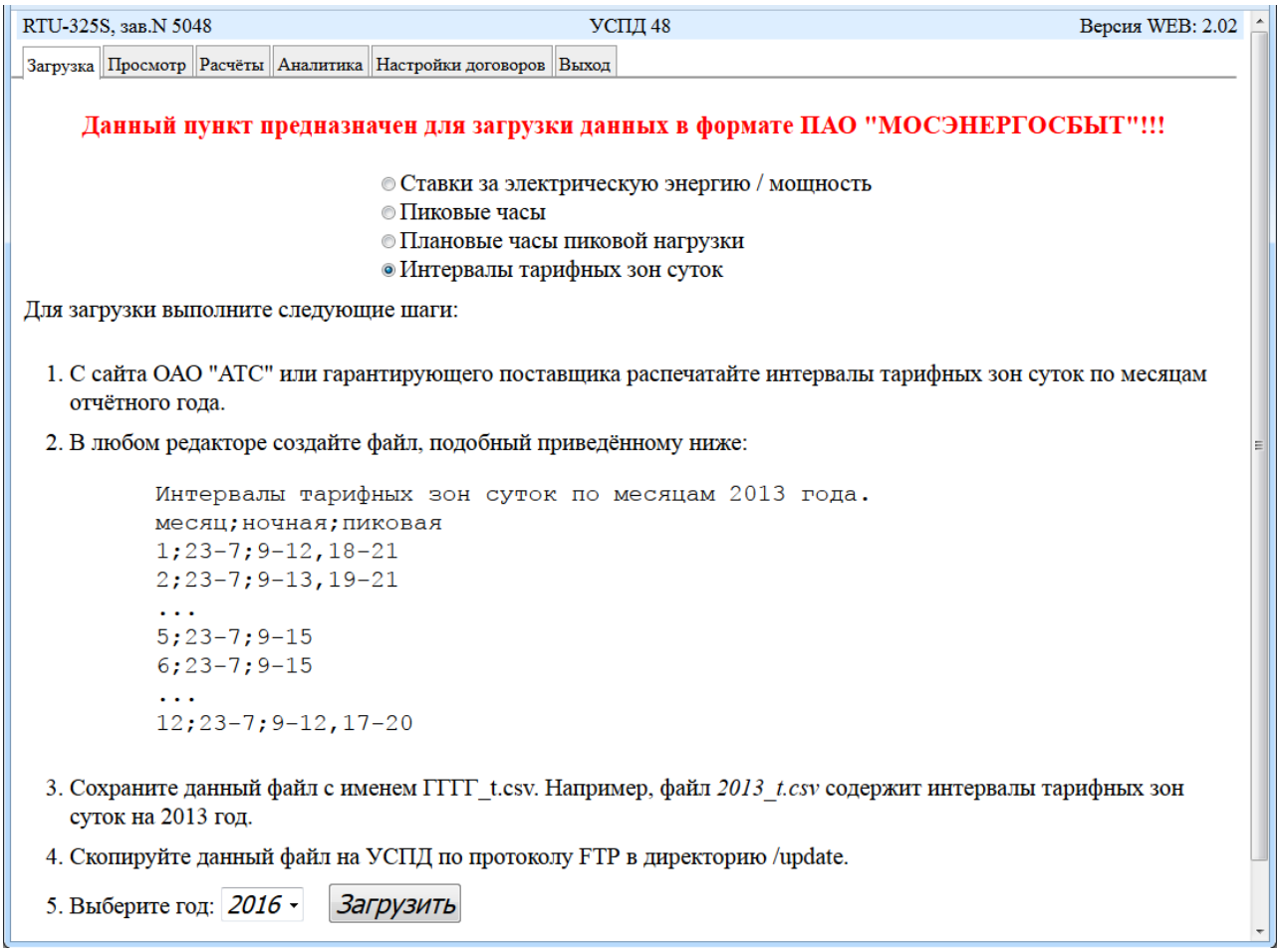
Наименование	Зоны суток	январь	февраль	март	апрель	май	июнь	июль	август	сентябрь	октябрь	ноябрь	декабрь
ОЭС Центра	ночная	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07
	пиковая	08 - 12	08 - 11	08 - 12	08 - 12	08 - 15	09 - 15	09 - 15	09 - 16	08 - 11	08 - 12	09 - 11	09 - 11
		16 - 20	17 - 21	18 - 21	19 - 21	-	-	-	-	18 - 21	17 - 20	16 - 20	15 - 20
ОЭС Средней Волги (за исключением Самарской области)	ночная	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07
	пиковая	08 - 12	07 - 12	08 - 12	08 - 14	08 - 15	08 - 15	08 - 15	08 - 14	08 - 12	08 - 12	08 - 11	08 - 11
		17 - 20	18 - 20	19 - 21	-	-	-	-	-	19 - 21	17 - 20	16 - 20	16 - 19
ОЭС Средней Волги (Самарская область)	ночная	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06
	пиковая	07 - 11	07 - 11	07 - 12	07 - 12	07 - 14	07 - 14	07 - 14	07 - 13	07 - 11	07 - 11	07 - 11	07 - 11
		16 - 20	16 - 20	17 - 20	18 - 21	-	-	-	19 - 21	17 - 20	16 - 20	16 - 20	15 - 19
ОЭС Урала (за исключением Удмуртской Республики и Кировской области)	ночная	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05	21 - 05
	пиковая	05 - 09	05 - 08	05 - 08	05 - 09	06 - 12	06 - 12	06 - 12	06 - 11	05 - 11	05 - 08	05 - 08	05 - 08
		14 - 18	16 - 18	16 - 19	17 - 19	-	-	-	17 - 19	17 - 19	15 - 18	15 - 18	14 - 17
ОЭС Урала (Удмуртская Республика)	ночная	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06	22 - 06
	пиковая	07 - 11	07 - 11	07 - 11	07 - 11	07 - 11	07 - 10	07 - 11	07 - 13	07 - 14	07 - 11	07 - 11	07 - 10
		16 - 18	16 - 18	12 - 16	11 - 13	12 - 14	11 - 14	12 - 14	-	-	12 - 15	15 - 18	15 - 17
ОЭС Урала (Кировская область)	ночная	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07
	пиковая	07 - 11	07 - 11	07 - 11	07 - 11	07 - 11	07 - 11	07 - 10	07 - 10	07 - 11	07 - 11	07 - 11	07 - 11
		15 - 17	-	-	-	12 - 14	12 - 14	11 - 13	12 - 14	-	16 - 18	15 - 17	15 - 17
ОЭС Северо-Запада (за исключением Калининградской области)	ночная	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07	23 - 07
	пиковая	09 - 14	08 - 13	08 - 14	08 - 15	08 - 15	09 - 16	10 - 17	09 - 16	09 - 15	09 - 12	09 - 11	09 - 12
		17 - 20	18 - 21	20 - 21	-	-	-	-	-	20 - 22	18 - 21	17 - 20	16 - 20
ОЭС Северо-	ночная	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08	00 - 08

2. In any text editor, create a document at intervals of tariff zones:



3. Save the file under the name 'GMG_t.csv'.
4. Copy the created FTP protocol file on RTU to the directory / update.

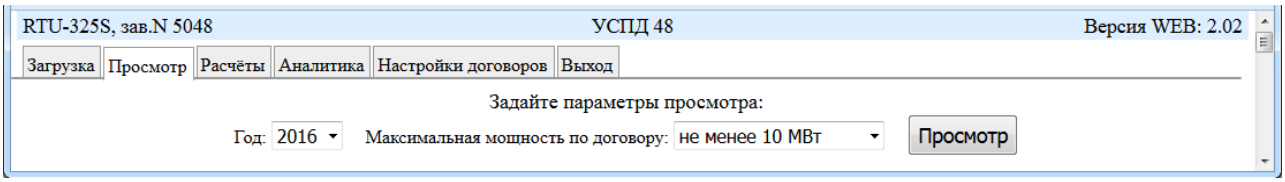
5. On the "Загрузка" tab, set the switch to the 'Target Area Intervals' entry. In paragraph 5, set the year and press the button <load>:



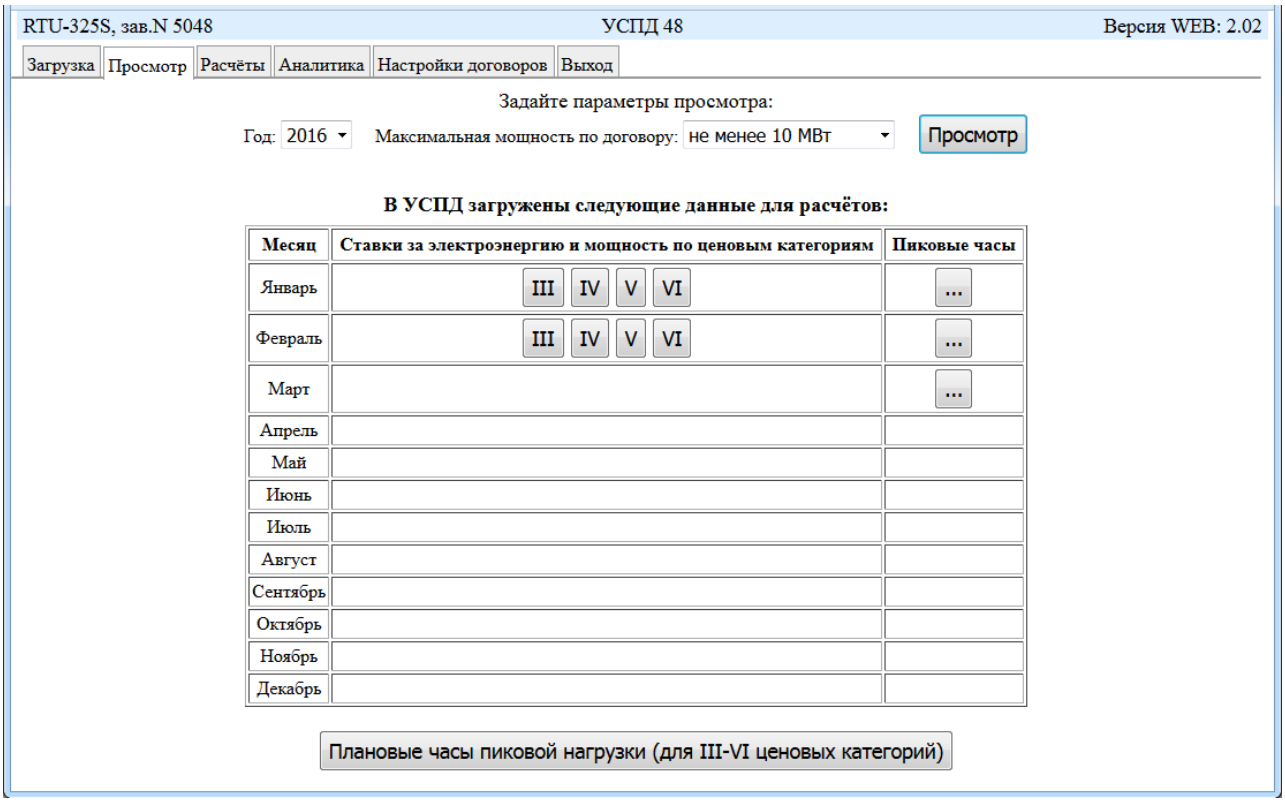
6. As a result, the data will be downloaded on RTU, and the corresponding message will appear at the bottom of the screen.

View.

This paragraph is designed to view the data downloaded in RTU in tabular form. The following form will be submitted to the user for the year and maximum contractual power on the "Просмотр" tab transition:



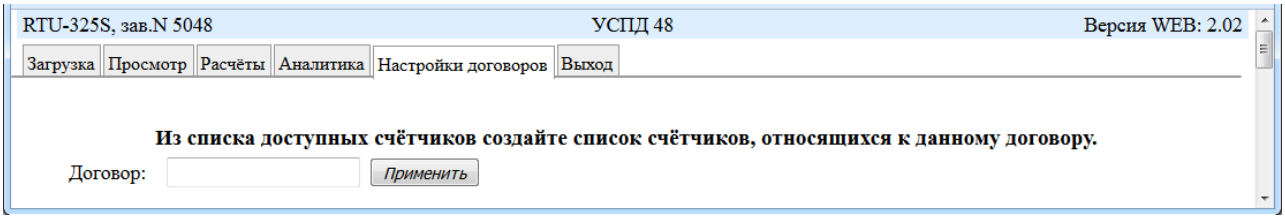
The following table will be presented to the user after all the settings have been set up and clicks on the < View> button:



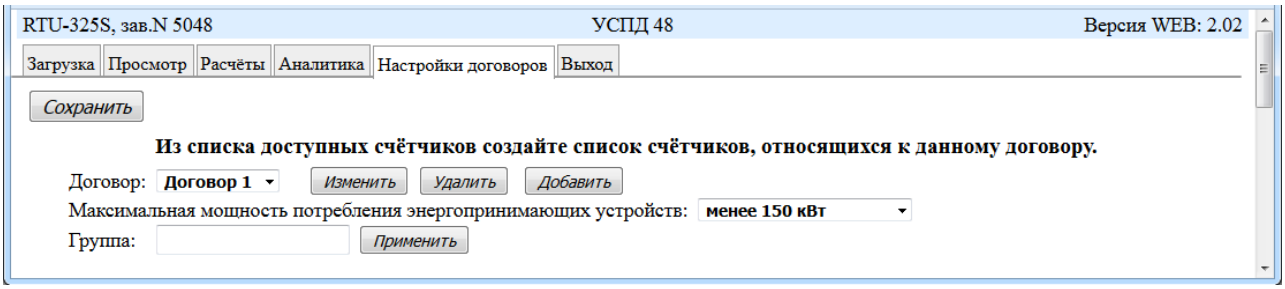
This table summarizes the availability of RTU data for the months of the year selected. To view the loaded data themselves, press the appropriate button. As a result, the window will open from that

Treaty layouts.

A list of treaties must be established to carry out the calculations. This paragraph is intended to do so. If previously the RTU has not been maintained, the following form for entering the contract name will be submitted to the user when switching over the "Настройки договоров" tab:

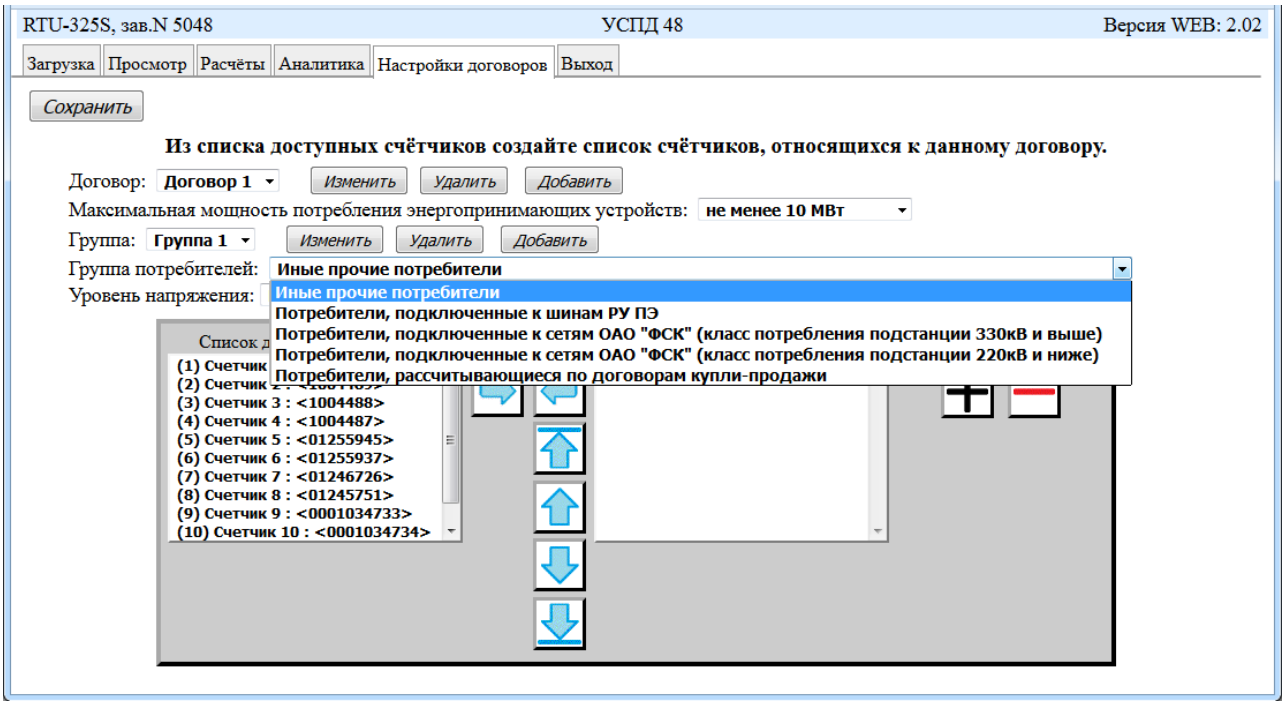


The user needs to enter the name of the contract and press the button <Apply>:

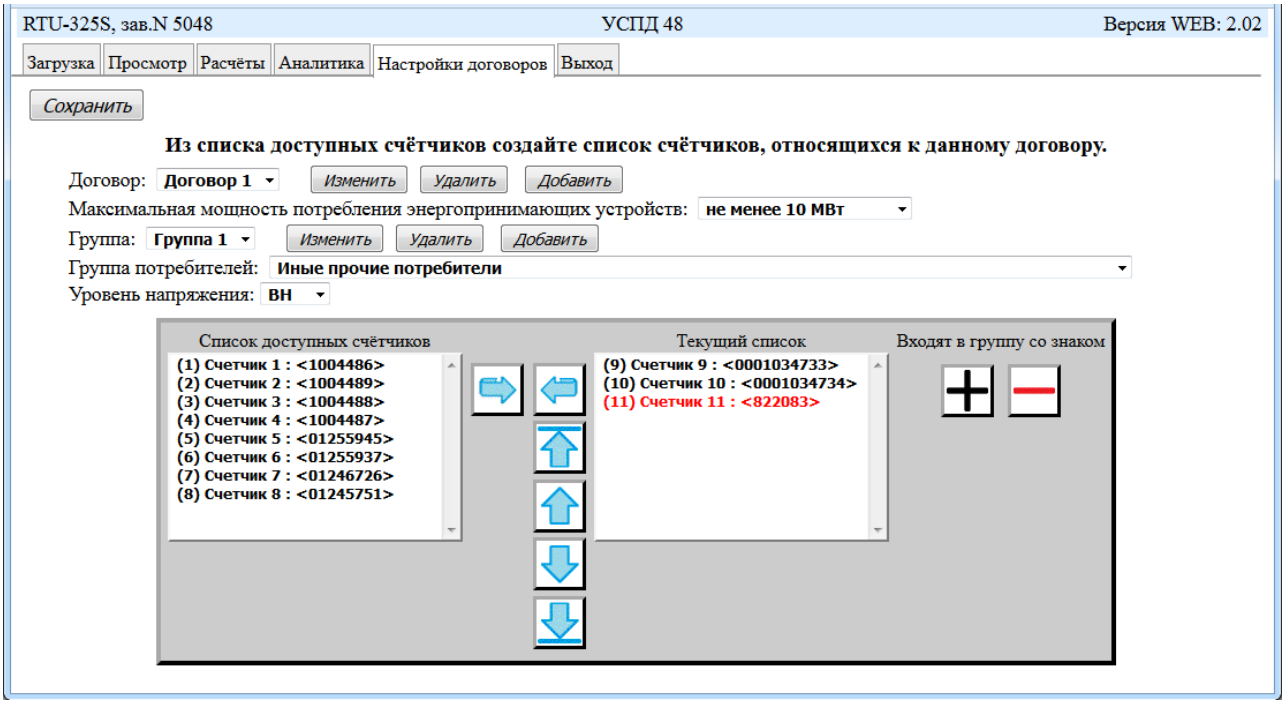


It is then necessary to choose the maximum power under the treaty and to create one or more groups of meter-measures related to the treaty. The contract may contain several groups for different groups of consumers. The group may, in turn, contain up to four graphs for different stress levels.

Once the name of the group is completed, the user will be provided with the form for the assignment of the group of users to which the group belongs and for the creation of the group's meters for each voltage level:



In order to create the meter list, it is necessary to select the required voltage level, select from the available meter list and move the required meters to the current list. If a meter is part of a group with a sign '-', you need to select it in the current list and press the button. In the current list, the meters in the group with a sign '-' will be shown in red:



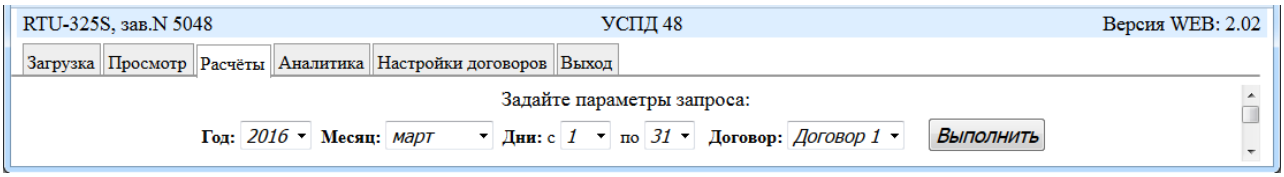
Once the meters have been established at the required voltage levels, the user may add a new group, change the name or delete the current group.

Once the contract(s) has been created, the button <Save> shall be pressed to maintain the configuration in RTU. The result will be a successful configuration statement on the screen.

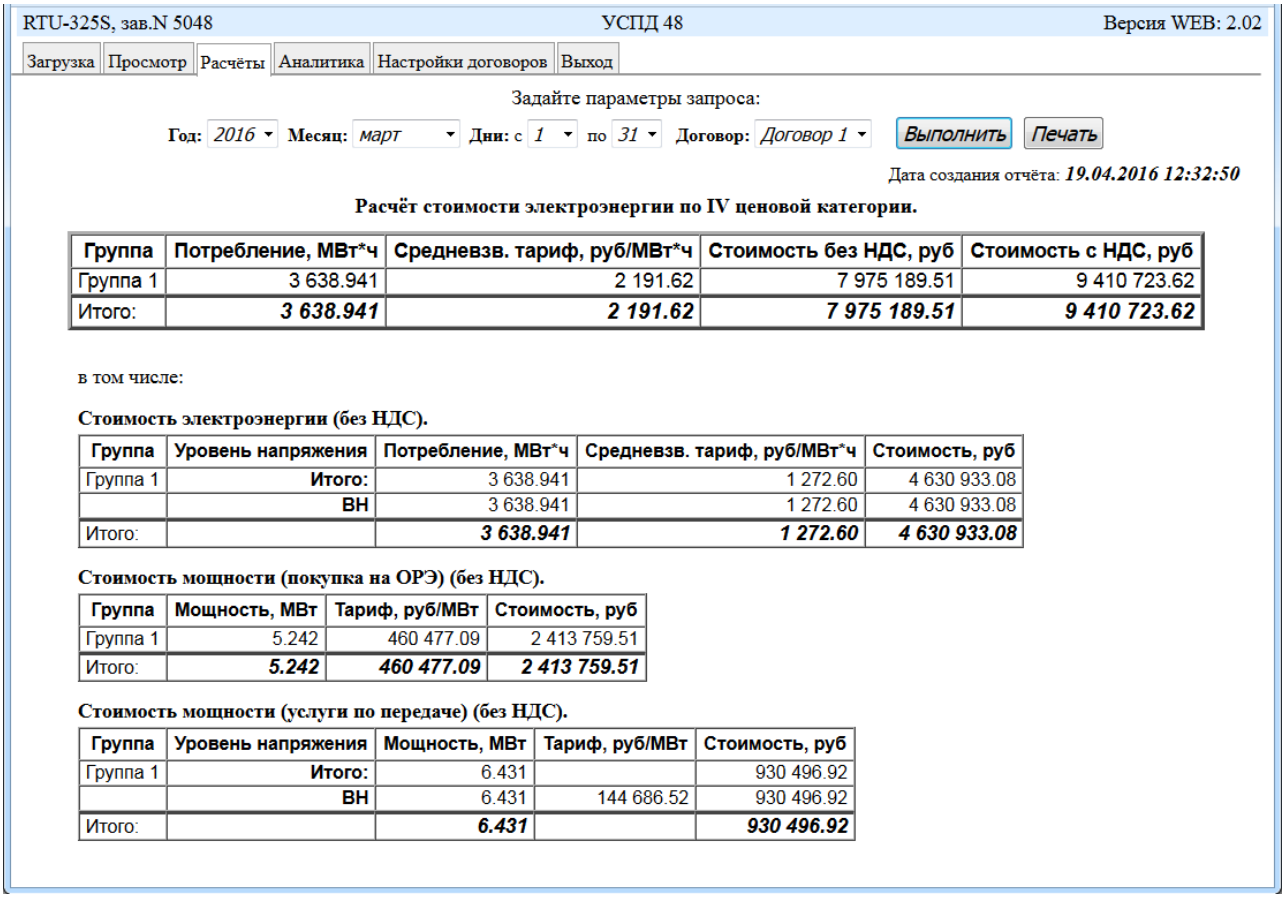
Calculations.

Once the contract(s) configuration is maintained and RTU data is downloaded for calculation, the user can calculate the cost of electricity by price zone. Prix

The "Расчёты" tab transition should select the price category for calculation and complete the form as presented below:



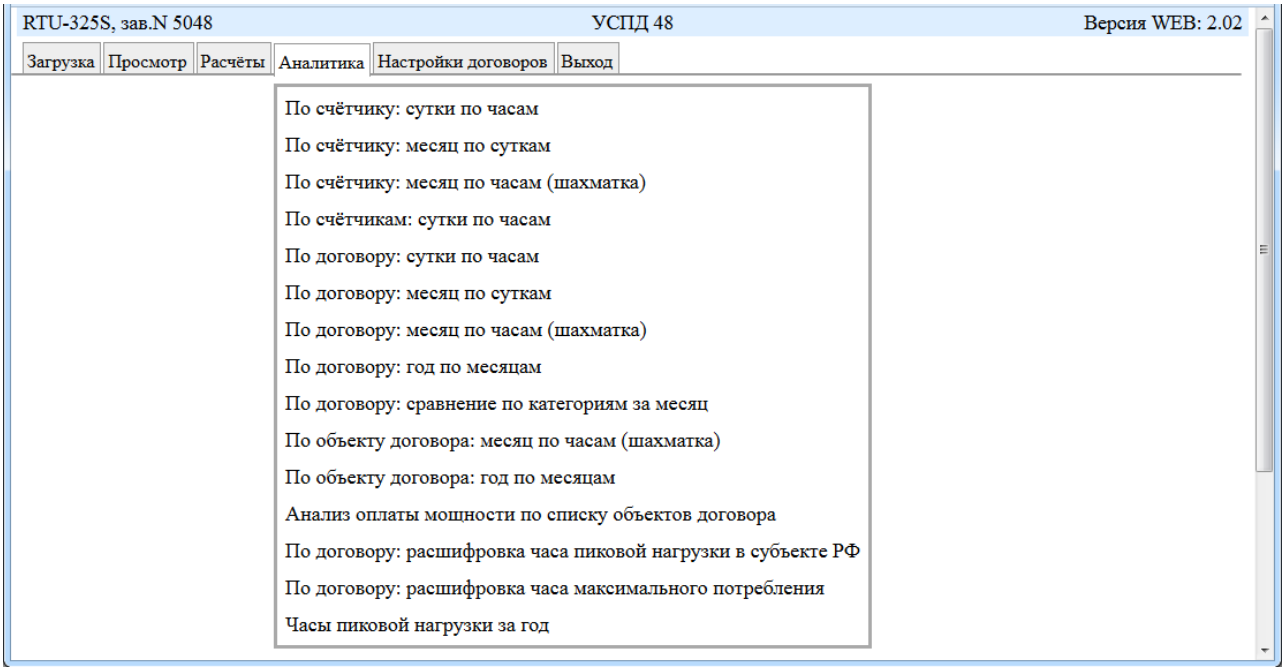
In the form presented, you need to set a year, a month, a time range for calculation, choose the contract and press the <fail> button. The calculations may take a long time. Once the calculations have been completed, the user will be provided with the relevant report:



This report can be printed by pressing the button <Steam>.

Analysis.

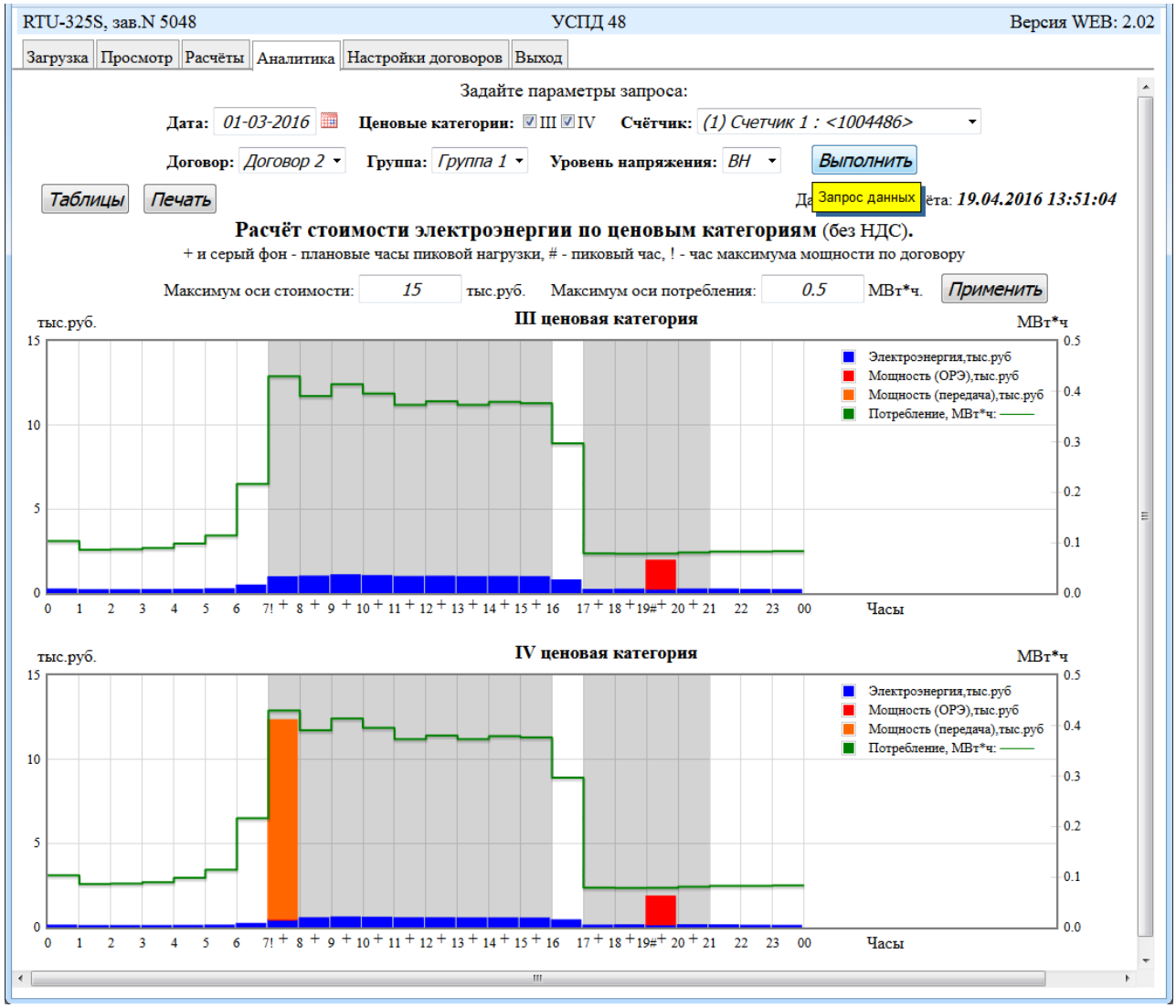
This paragraph is designed to create different types of treaty reports, facilities and metering in the context of a given contract. The following menu will be presented to the user when selecting this tab:



Each paragraph serves to create a specific report. The following are the descriptions of each type of report.

- **On the meter, 24/7.**
- **By contract: 24 hours per hour.**

These applications are used to report on the consumption and cost of electricity for hours.



On the left, a scale of value in thousands of rw, on the right, a scale of consumption in MET*h. The Green Line has a consumption in MW*. The full cost of an hour is derived from the cost of electricity, the cost of power (purchase of EMS) and the cost of power (transfer services). Each of these components is identified in columns with different colours.

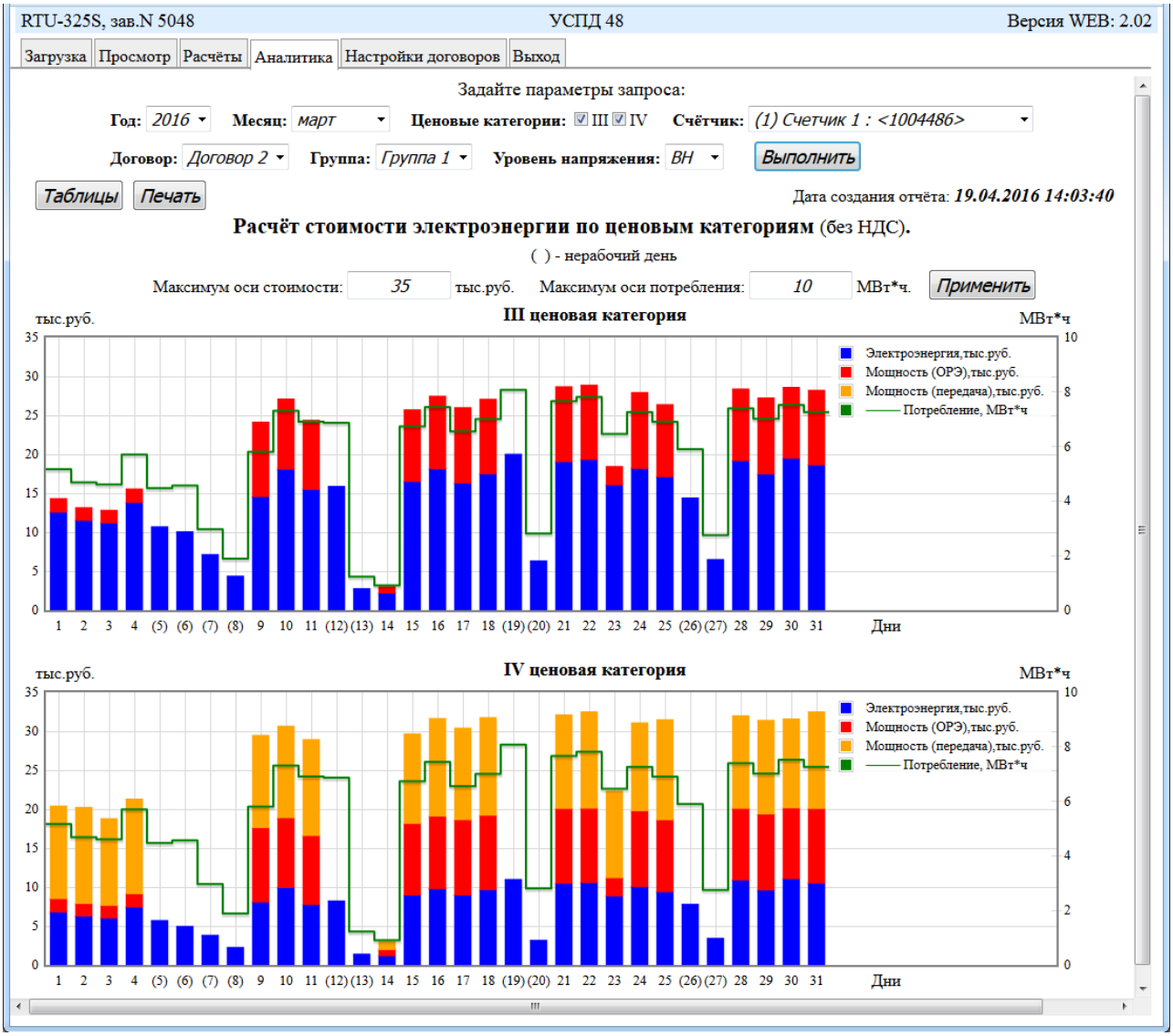
The blue columns show the cost of electricity every hour. The red column shows the cost of power (purchase for ERI) (at the peak hour for the region). The orange color shows the cost of power (transfer services) (in the maximum hour per contract group at the appropriate voltage level for the IV price category).

Gray background is marked by scheduled peak load hours. A month's maximum for the region is marked by a familiar '#'. A maximum of an hour for the contract group at the corresponding voltage level is marked by the familiar '!'.

This report can be viewed in tabular form and printed out.

- **On the meter, a month by day.**
- **It's a month by day.**

These applications are used to report on consumption and cost of electricity per day of the month.



The graphs are similar to those described above, except for the signature of the x-axis. Days in brackets are days off. On these days, the full cost is derived only from the cost of electricity.

This report can be viewed in tabular form and printed out.

- **On the meter, a month by hour.**
- **By contract: one month by hour.**
- **By object of contract: month by hour.**

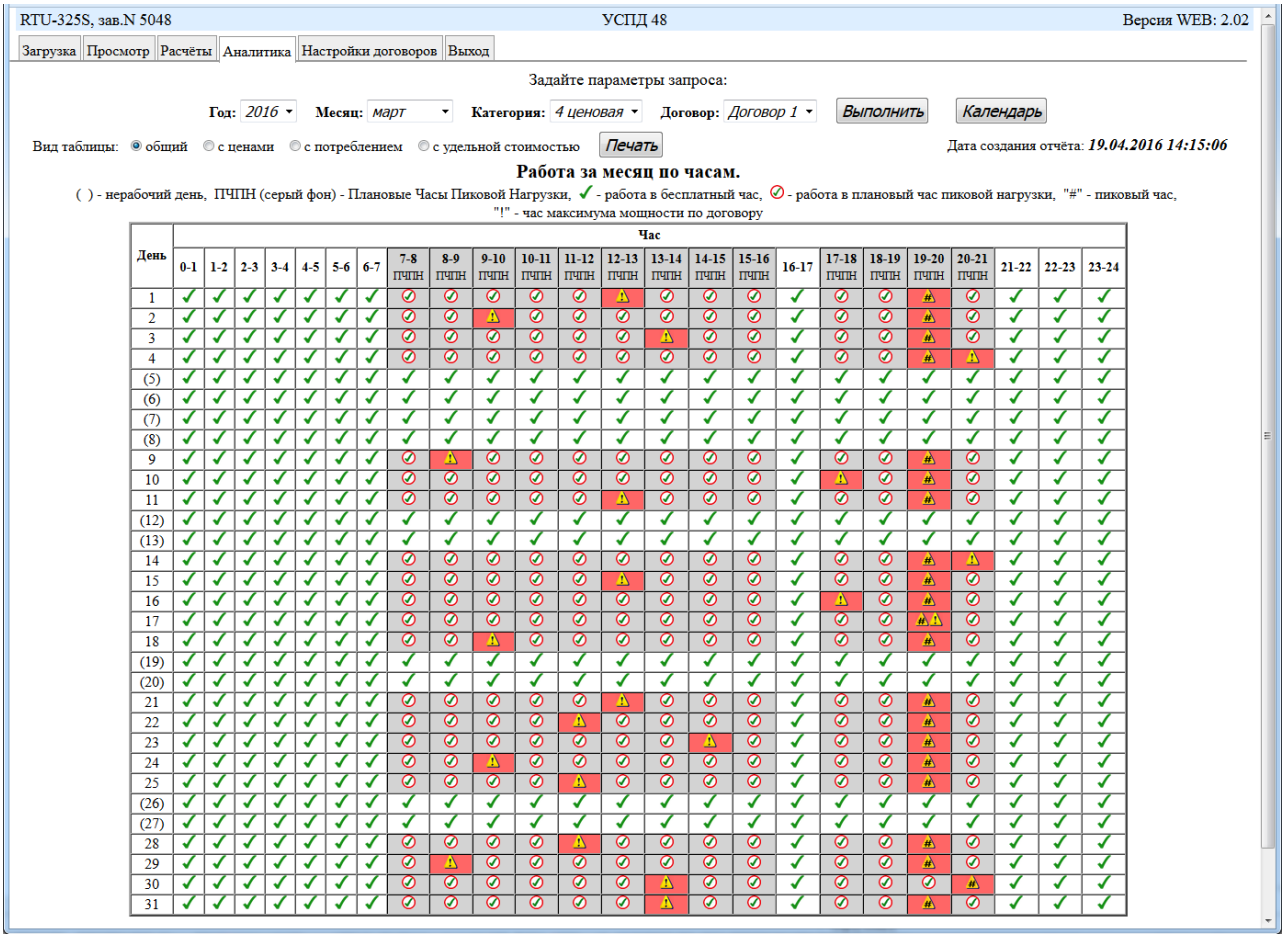
These applications are used to generate a report on the consumption and cost of electricity per hour of the month. This report is presented as a table, with the first column showing the days of the month and the top line showing the hours of the day. The target peak hours are shown in grey.

The table has 4 views: general, prices, consumption and unit cost.

In general, each hour of the month has one of the following markings:

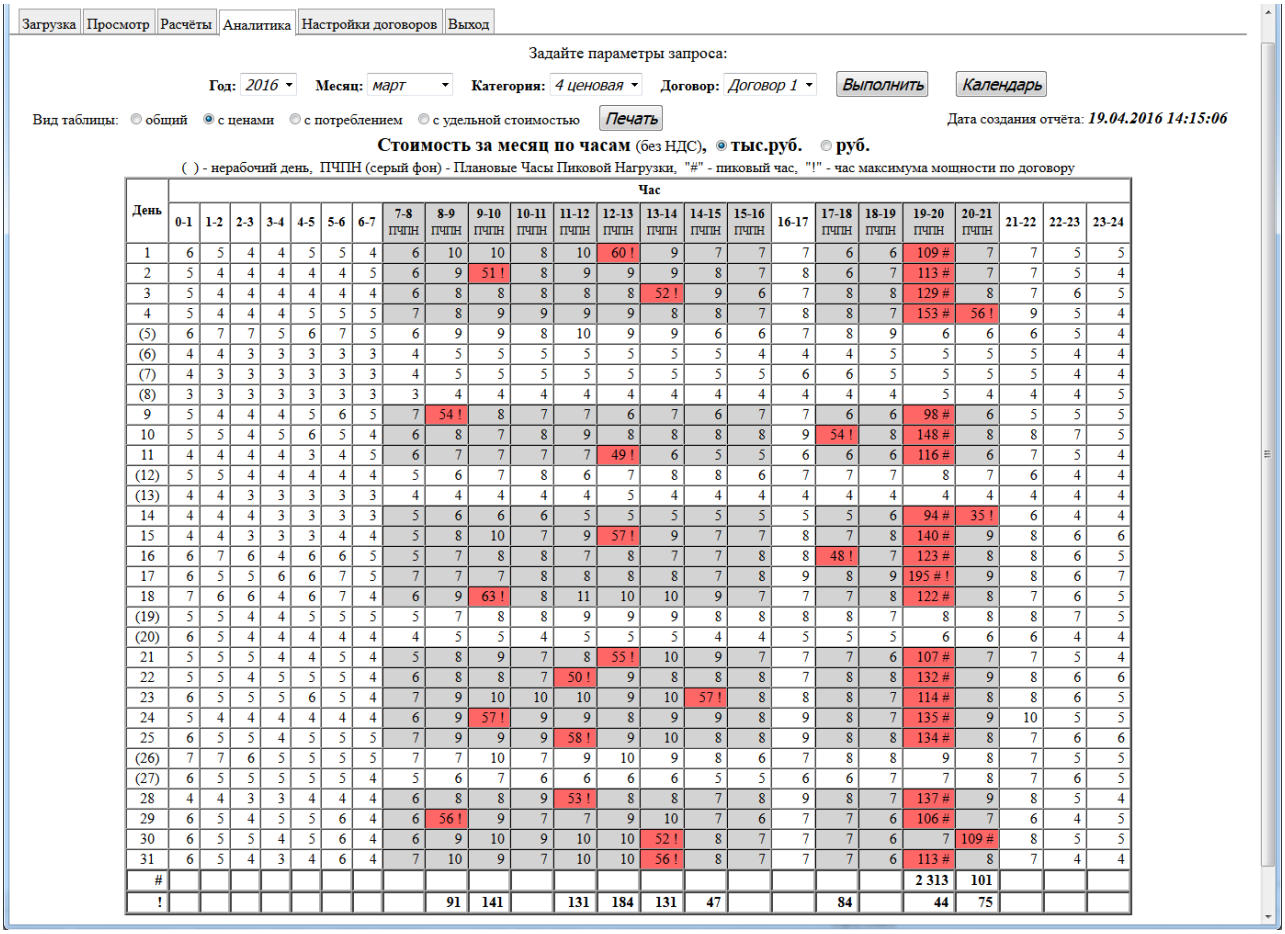
- work in "бесплатный" hour (out of scheduled peak load hours). At this time, only the electricity used is paid.
- working during the target peak hour. At this time, payment will be made not only for the electricity consumed but also for the power (buying for EDP) if the hour has a peak for the region, as well as for the power (transfer services) if the hour has a maximum for the group of contracts at an appropriate voltage level.

- This hour is the maximum hour for the region. Power will be paid for at this time (purchase for EDP).
- This hour is the maximum hour per contract group at the appropriate voltage level. Capacity (transfer services) will be paid for at this time.



День	Час																							
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8 ПЧПН	8-9 ПЧПН	9-10 ПЧПН	10-11 ПЧПН	11-12 ПЧПН	12-13 ПЧПН	13-14 ПЧПН	14-15 ПЧПН	15-16 ПЧПН	16-17	17-18 ПЧПН	18-19 ПЧПН	19-20 ПЧПН	20-21 ПЧПН	21-22	22-23	23-24
1	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⚠	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⚠	✓	✓	✓
(5)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(7)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(8)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓	⊘	⚠	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⚠	⊘	⚠#	⊘	✓	✓	✓
11	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
(12)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(13)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⚠	✓	✓	✓
15	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
16	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⚠	⊘	⚠#	⊘	✓	✓	✓
17	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠# ⚠	⊘	✓	✓	✓
18	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⚠	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
(19)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(20)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
21	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
22	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
23	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⚠	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
24	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⚠	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
25	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
(26)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(27)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
28	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⚠	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
29	✓	✓	✓	✓	✓	✓	✓	⊘	⚠	⊘	⊘	⊘	⊘	⊘	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓
30	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	✓	⊘	⊘	⊘	⚠	✓	✓	✓
31	✓	✓	✓	✓	✓	✓	✓	⊘	⊘	⊘	⊘	⊘	⊘	⚠	⊘	⊘	✓	⊘	⊘	⚠#	⊘	✓	✓	✓

The price table shows the cost of electricity for each hour of the month.

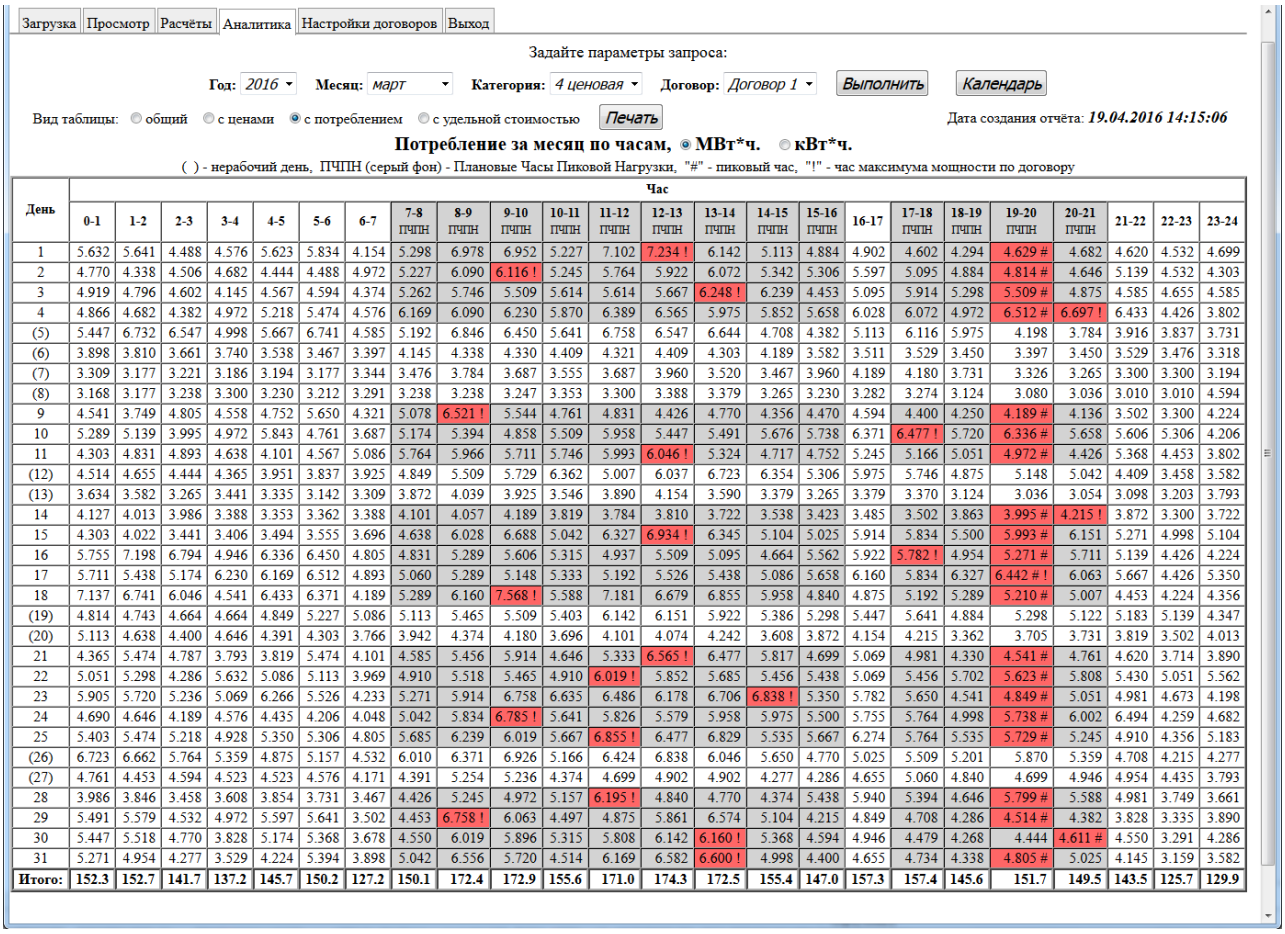


День	Час																							
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8 ПЧПН	8-9 ПЧПН	9-10 ПЧПН	10-11 ПЧПН	11-12 ПЧПН	12-13 ПЧПН	13-14 ПЧПН	14-15 ПЧПН	15-16 ПЧПН	16-17	17-18 ПЧПН	18-19 ПЧПН	19-20 ПЧПН	20-21 ПЧПН	21-22	22-23	23-24
1	6	5	4	4	5	5	4	6	10	10	8	10	60 !	9	7	7	7	6	6	109 #	7	7	5	5
2	5	4	4	4	4	4	5	6	9	51 !	8	9	9	9	8	7	8	6	7	113 #	7	7	5	4
3	5	4	4	4	4	4	4	6	8	8	8	8	8	52 !	9	6	7	8	8	129 #	8	7	6	5
4	5	4	4	4	5	5	5	7	8	9	9	9	9	8	8	7	8	8	7	153 #	56 !	9	5	4
(5)	6	7	7	5	6	7	5	6	9	9	8	10	9	9	6	6	7	8	9	6	6	6	5	4
(6)	4	4	3	3	3	3	3	4	5	5	5	5	5	5	5	4	4	4	5	5	5	5	4	4
(7)	4	3	3	3	3	3	3	4	5	5	5	5	5	5	5	5	6	6	5	5	5	5	4	4
(8)	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	5	4	4	4	5
9	5	4	4	4	5	6	5	7	54 !	8	7	7	6	7	6	7	7	6	6	98 #	6	5	5	5
10	5	5	4	5	6	5	4	6	8	7	8	9	8	8	8	8	9	54 !	8	148 #	8	8	7	5
11	4	4	4	4	3	4	5	6	7	7	7	7	49 !	6	5	5	6	6	6	116 #	6	7	5	4
(12)	5	5	4	4	4	4	4	5	6	7	8	6	7	8	8	6	7	7	7	8	7	6	4	4
(13)	4	4	3	3	3	3	3	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4
14	4	4	4	3	3	3	3	5	6	6	6	5	5	5	5	5	5	5	6	94 #	35 !	6	4	4
15	4	4	3	3	3	4	4	5	8	10	7	9	57 !	9	7	7	8	7	8	140 #	9	8	6	6
16	6	7	6	4	6	6	5	5	7	8	8	7	8	7	7	8	8	48 !	7	123 #	8	8	6	5
17	6	5	5	6	6	7	5	7	7	7	8	8	8	8	7	8	9	8	9	195 # !	9	8	6	7
18	7	6	6	4	6	7	4	6	9	63 !	8	11	10	10	9	7	7	7	8	122 #	8	7	6	5
(19)	5	5	4	4	5	5	5	5	7	8	8	9	9	9	8	8	8	8	7	8	8	8	7	5
(20)	6	5	4	4	4	4	4	4	5	5	4	5	5	5	4	4	5	5	5	6	6	6	4	4
21	5	5	5	4	4	5	4	5	8	9	7	8	55 !	10	9	7	7	7	6	107 #	7	7	5	4
22	5	5	4	5	5	5	4	6	8	8	7	50 !	9	8	8	8	7	8	8	132 #	9	8	6	6
23	6	5	5	5	6	5	4	7	9	10	10	10	9	10	57 !	8	8	8	7	114 #	8	8	6	5
24	5	4	4	4	4	4	4	6	9	57 !	9	9	8	9	9	8	9	8	7	135 #	9	10	5	5
25	6	5	5	4	5	5	5	7	9	9	9	58 !	9	10	8	8	9	8	8	134 #	8	7	6	6
(26)	7	7	6	5	5	5	5	7	7	10	7	9	10	9	8	6	7	8	8	9	8	7	5	5
(27)	6	5	5	5	5	5	4	5	6	7	6	6	6	6	5	5	6	6	7	7	8	7	6	5
28	4	4	3	3	4	4	4	6	8	8	9	53 !	8	8	7	8	9	8	7	137 #	9	8	5	4
29	6	5	4	5	5	6	4	6	56 !	9	7	7	9	10	7	6	7	7	6	106 #	7	6	4	5
30	6	5	5	4	5	6	4	6	9	10	9	10	10	52 !	8	7	7	7	6	7	109 #	8	5	5
31	6	5	4	3	4	6	4	7	10	9	7	10	10	56 !	8	7	7	7	6	113 #	8	7	4	4
#																				2 313	101			
!									91	141		131	184	131	47			84		44	75			

If an hour is marked with "#", that hour accounts for a peak of consumption for the region. If an hour is marked with "!", that hour shall have the maximum consumption per contract group at an appropriate voltage level. These two maximum consumptions may be for one hour, such as from 1900 to 2000 17th.

At the bottom of the table are the total cost of power (purchase for EDP) and power (transfer services) in the relevant hour.

The consumption table shows electricity consumption for each hour of the month.



Загрузка | Просмотр | Расчёты | Аналитика | Настройки договоров | Выход

Задайте параметры запроса:

Год: 2016 Месяц: март Категория: 4 ценовая Договор: Договор 1 Выполнить Календарь

Вид таблицы: общий с ценами с потреблением с удельной стоимостью Печать Дата создания отчёта: 19.04.2016 14:15:06

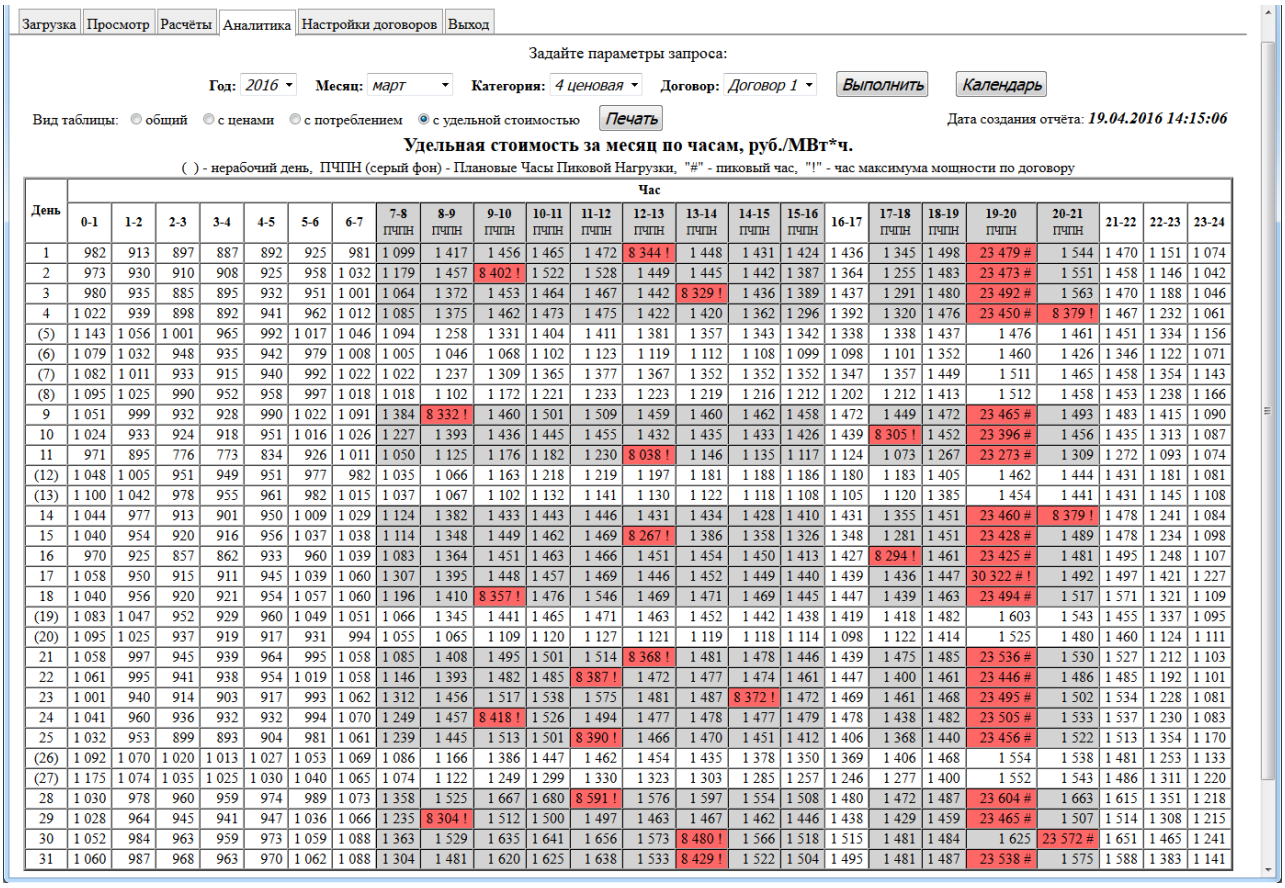
Потребление за месяц по часам, МВт*ч. кВт*ч.

( ) - нерабочий день, ПЧПН (серый фон) - Плановые Часы Пиковой Нагрузки, "#" - пиковый час, "!" - час максимума мощности по договору

День	Час																							
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8 ПЧПН	8-9 ПЧПН	9-10 ПЧПН	10-11 ПЧПН	11-12 ПЧПН	12-13 ПЧПН	13-14 ПЧПН	14-15 ПЧПН	15-16 ПЧПН	16-17	17-18 ПЧПН	18-19 ПЧПН	19-20 ПЧПН	20-21 ПЧПН	21-22	22-23	23-24
1	5.632	5.641	4.488	4.576	5.623	5.834	4.154	5.298	6.978	6.952	5.227	7.102	7.234 !	6.142	5.113	4.884	4.902	4.602	4.294	4.629 #	4.682	4.620	4.532	4.699
2	4.770	4.338	4.506	4.682	4.444	4.488	4.972	5.227	6.090	6.116 !	5.245	5.764	5.922	6.072	5.342	5.306	5.597	5.095	4.884	4.814 #	4.646	5.139	4.532	4.303
3	4.919	4.796	4.602	4.145	4.567	4.594	4.374	5.262	5.746	5.509	5.614	5.614	5.667	6.248 !	6.239	4.453	5.095	5.914	5.298	5.509 #	4.875	4.585	4.655	4.585
4	4.866	4.682	4.382	4.972	5.218	5.474	4.576	6.169	6.090	6.230	5.870	6.389	6.565	5.975	5.852	5.658	6.028	6.072	4.972	6.512 #	6.697 !	6.433	4.426	3.802
(5)	5.447	6.732	6.547	4.998	5.667	6.741	4.585	5.192	6.846	6.450	5.641	6.758	6.547	6.644	4.708	4.382	5.113	6.116	5.975	4.198	3.784	3.916	3.837	3.731
(6)	3.898	3.810	3.661	3.740	3.538	3.467	3.397	4.145	4.338	4.330	4.409	4.321	4.409	4.303	4.189	3.582	3.511	3.529	3.450	3.397	3.450	3.529	3.476	3.318
(7)	3.309	3.177	3.221	3.186	3.194	3.177	3.344	3.476	3.784	3.687	3.555	3.687	3.960	3.520	3.467	3.960	4.189	4.180	3.731	3.326	3.265	3.300	3.300	3.194
(8)	3.168	3.177	3.238	3.300	3.230	3.212	3.291	3.238	3.238	3.247	3.353	3.300	3.388	3.379	3.265	3.230	3.282	3.274	3.124	3.080	3.036	3.010	3.010	4.594
9	4.541	3.749	4.805	4.558	4.752	5.650	4.321	5.078	6.521 !	5.544	4.761	4.831	4.426	4.770	4.356	4.470	4.594	4.400	4.250	4.189 #	4.136	3.502	3.300	4.224
10	5.289	5.139	3.995	4.972	5.843	4.761	3.687	5.174	5.394	4.858	5.509	5.958	5.447	5.491	5.676	5.738	6.371	6.477 !	5.720	6.336 #	5.658	5.606	5.306	4.206
11	4.303	4.831	4.893	4.638	4.101	4.567	5.086	5.764	5.966	5.711	5.746	5.993	6.046 !	5.324	4.717	4.752	5.245	5.166	5.051	4.972 #	4.426	5.368	4.453	3.802
(12)	4.514	4.655	4.444	4.365	3.951	3.837	3.925	4.849	5.509	5.729	6.362	5.007	6.037	6.723	6.354	5.306	5.975	5.746	4.875	5.148	5.042	4.409	3.458	3.582
(13)	3.634	3.582	3.265	3.441	3.335	3.142	3.309	3.872	4.039	3.925	3.546	3.890	4.154	3.590	3.379	3.265	3.379	3.370	3.124	3.036	3.054	3.098	3.203	3.793
14	4.127	4.013	3.986	3.388	3.353	3.362	3.388	4.101	4.057	4.189	3.819	3.784	3.810	3.722	3.538	3.423	3.485	3.502	3.863	3.995 #	4.215 !	3.872	3.300	3.722
15	4.303	4.022	3.441	3.406	3.494	3.555	3.696	4.638	6.028	6.688	5.042	6.327	6.934 !	6.345	5.104	5.025	5.914	5.834	5.500	5.993 #	6.151	5.271	4.998	5.104
16	5.755	7.198	6.794	4.946	6.336	6.450	4.805	4.831	5.289	5.606	5.315	4.937	5.509	5.095	4.664	5.562	5.922	5.782 !	4.954	5.271 #	5.711	5.139	4.426	4.224
17	5.711	5.438	5.174	6.230	6.169	6.512	4.893	5.060	5.289	5.148	5.333	5.192	5.526	5.438	5.086	5.658	6.160	5.834	6.327	6.442 # !	6.063	5.667	4.426	5.350
18	7.137	6.741	6.046	4.541	6.433	6.371	4.189	5.289	6.160	7.568 !	5.588	7.181	6.679	6.855	5.958	4.840	4.875	5.192	5.289	5.210 #	5.007	4.453	4.224	4.356
(19)	4.814	4.743	4.664	4.664	4.849	5.227	5.086	5.113	5.465	5.509	5.403	6.142	6.151	5.922	5.386	5.298	5.447	5.641	4.884	5.298	5.122	5.183	5.139	4.347
(20)	5.113	4.638	4.400	4.646	4.391	4.303	3.766	3.942	4.374	4.180	3.696	4.101	4.074	4.242	3.608	3.872	4.154	4.215	3.362	3.705	3.731	3.819	3.502	4.013
21	4.365	5.474	4.787	3.793	3.819	5.474	4.101	4.585	5.456	5.914	4.646	5.333	6.565 !	6.477	5.817	4.699	5.069	4.981	4.330	4.541 #	4.761	4.620	3.714	3.890
22	5.051	5.298	4.286	5.632	5.086	5.113	3.969	4.910	5.518	5.465	4.910	6.019 !	5.852	5.685	5.456	5.438	5.069	5.456	5.702	5.623 #	5.808	5.430	5.051	5.562
23	5.905	5.720	5.236	5.069	6.266	5.526	4.233	5.271	5.914	6.758	6.635	6.486	6.178	6.706	6.838 !	5.350	5.782	5.650	4.541	4.849 #	5.051	4.981	4.673	4.198
24	4.690	4.646	4.189	4.576	4.435	4.206	4.048	5.042	5.834	6.785 !	5.641	5.826	5.579	5.958	5.975	5.500	5.755	5.764	4.998	5.738 #	6.002	6.494	4.259	4.682
25	5.403	5.474	5.218	4.928	5.350	5.306	4.805	5.685	6.239	6.019	5.667	6.855 !	6.477	6.829	5.535	5.667	6.274	5.764	5.535	5.729 #	5.245	4.910	4.356	5.183
(26)	6.723	6.662	5.764	5.359	4.875	5.157	4.532	6.010	6.371	6.926	5.166	6.424	6.838	6.046	5.650	4.770	5.025	5.509	5.201	5.870	5.359	4.708	4.215	4.277
(27)	4.761	4.453	4.594	4.523	4.523	4.576	4.171	4.391	5.254	5.236	4.374	4.699	4.902	4.902	4.277	4.286	4.655	5.060	4.840	4.699	4.946	4.954	4.435	3.793
28	3.986	3.846	3.458	3.608	3.854	3.731	3.467	4.426	5.245	4.972	5.157	6.195 !	4.840	4.770	4.374	5.438	5.940	5.394	4.646	5.799 #	5.588	4.981	3.749	3.661
29	5.491	5.579	4.532	4.972	5.597	5.641	3.502	4.453	6.758 !	6.063	4.497	4.875	5.861	6.574	5.104	4.215	4.849	4.708	4.286	4.514 #	4.382	3.828	3.335	3.890
30	5.447	5.518	4.770	3.828	5.174	5.368	3.678	4.550	6.019	5.896	5.315	5.808	6.142	6.160 !	5.368	4.594	4.946	4.479	4.268	4.444	4.611 #	4.550	3.291	4.286
31	5.271	4.954	4.277	3.529	4.224	5.394	3.898	5.042	6.556	5.720	4.514	6.169	6.582	6.600 !	4.998	4.400	4.655	4.734	4.338	4.805 #	5.025	4.145	3.159	3.582
Итого:	**152.3**	**152.7**	**141.7**	**137.2**	**145.7**	**150.2**	**127.2**	**150.1**	**172.4**	**172.9**	**155.6**	**171.0**	**174.3**	**172.5**	**155.4**	**147.0**	**157.3**	**157.4**	**145.6**	**151.7**	**149.5**	**143.5**	**125.7**	**129.9**

If an hour is marked with "#", that hour accounts for a peak of consumption for the region. If an hour is marked with "!", that hour shall have the maximum consumption per contract group at an appropriate voltage level. These two maximum consumptions may be for one hour, such as from 1900 to 2000 17th.

The unit cost table shows the unit cost of electricity for each hour of the month as the ratio of total cost to electricity consumed.



Загрузка | Просмотр | Расчёты | Аналитика | Настройки договоров | Выход

Задайте параметры запроса:

Год: 2016 Месяц: март Категория: 4 ценовая Договор: Договор 1 Выполнить Календарь

Вид таблицы: общий с ценами с потреблением с удельной стоимостью Печать Дата создания отчёта: 19.04.2016 14:15:06

Удельная стоимость за месяц по часам, руб./МВт*ч.

( ) - нерабочий день, ПЧПН (серый фон) - Плановые Часы Пиковой Нагрузки, "#" - пиковый час, "!" - час максимума мощности по договору

День	Час																							
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8 ПЧПН	8-9 ПЧПН	9-10 ПЧПН	10-11 ПЧПН	11-12 ПЧПН	12-13 ПЧПН	13-14 ПЧПН	14-15 ПЧПН	15-16 ПЧПН	16-17	17-18 ПЧПН	18-19 ПЧПН	19-20 ПЧПН	20-21 ПЧПН	21-22	22-23	23-24
1	982	913	897	887	892	925	981	1 099	1 417	1 456	1 465	1 472	8 344 !	1 448	1 431	1 424	1 436	1 345	1 498	23 479 #	1 544	1 470	1 151	1 074
2	973	930	910	908	925	958	1 032	1 179	1 457	8 402 !	1 522	1 528	1 449	1 445	1 442	1 387	1 364	1 255	1 483	23 473 #	1 551	1 458	1 146	1 042
3	980	935	885	895	932	951	1 001	1 064	1 372	1 453	1 464	1 467	1 442	8 329 !	1 436	1 389	1 437	1 291	1 480	23 492 #	1 563	1 470	1 188	1 046
4	1 022	939	898	892	941	962	1 012	1 085	1 375	1 462	1 473	1 475	1 422	1 420	1 362	1 296	1 392	1 320	1 476	23 450 #	8 379 !	1 467	1 232	1 061
(5)	1 143	1 056	1 001	965	992	1 017	1 046	1 094	1 258	1 331	1 404	1 411	1 381	1 357	1 343	1 342	1 338	1 338	1 437	1 476	1 461	1 451	1 334	1 156
(6)	1 079	1 032	948	935	942	979	1 008	1 005	1 046	1 068	1 102	1 123	1 119	1 112	1 108	1 099	1 098	1 101	1 352	1 460	1 426	1 346	1 122	1 071
(7)	1 082	1 011	933	915	940	992	1 022	1 022	1 237	1 309	1 365	1 377	1 367	1 352	1 352	1 352	1 347	1 357	1 449	1 511	1 465	1 458	1 354	1 143
(8)	1 095	1 025	990	952	958	997	1 018	1 018	1 102	1 172	1 221	1 233	1 223	1 219	1 216	1 212	1 202	1 212	1 413	1 512	1 458	1 453	1 238	1 166
9	1 051	999	932	928	990	1 022	1 091	1 384	8 332 !	1 460	1 501	1 509	1 459	1 460	1 462	1 458	1 472	1 449	1 472	23 465 #	1 493	1 483	1 415	1 090
10	1 024	933	924	918	951	1 016	1 026	1 227	1 393	1 436	1 445	1 455	1 432	1 435	1 433	1 426	1 439	8 305 !	1 452	23 396 #	1 456	1 435	1 313	1 087
11	971	895	776	773	834	926	1 011	1 050	1 125	1 176	1 182	1 230	8 038 !	1 146	1 135	1 117	1 124	1 073	1 267	23 273 #	1 309	1 272	1 093	1 074
(12)	1 048	1 005	951	949	951	977	982	1 035	1 066	1 163	1 218	1 219	1 197	1 181	1 188	1 186	1 180	1 183	1 405	1 462	1 444	1 431	1 181	1 081
(13)	1 100	1 042	978	955	961	982	1 015	1 037	1 067	1 102	1 132	1 141	1 130	1 122	1 118	1 108	1 105	1 120	1 385	1 454	1 441	1 431	1 145	1 108
14	1 044	977	913	901	950	1 009	1 029	1 124	1 382	1 433	1 443	1 446	1 431	1 434	1 428	1 410	1 431	1 355	1 451	23 460 #	8 379 !	1 478	1 241	1 084
15	1 040	954	920	916	956	1 037	1 038	1 114	1 348	1 449	1 462	1 469	8 267 !	1 386	1 358	1 326	1 348	1 281	1 451	23 428 #	1 489	1 478	1 234	1 098
16	970	925	857	862	933	960	1 039	1 083	1 364	1 451	1 463	1 466	1 451	1 454	1 450	1 413	1 427	8 294 !	1 461	23 425 #	1 481	1 495	1 248	1 107
17	1 058	950	915	911	945	1 039	1 060	1 307	1 395	1 448	1 457	1 469	1 446	1 452	1 449	1 440	1 439	1 436	1 447	30 322 # !	1 492	1 497	1 421	1 227
18	1 040	956	920	921	954	1 057	1 060	1 196	1 410	8 357 !	1 476	1 546	1 469	1 471	1 469	1 445	1 447	1 439	1 463	23 494 #	1 517	1 571	1 321	1 109
(19)	1 083	1 047	952	929	960	1 049	1 051	1 066	1 345	1 441	1 465	1 471	1 463	1 452	1 442	1 438	1 419	1 418	1 482	1 603	1 543	1 455	1 337	1 095
(20)	1 095	1 025	937	919	917	931	994	1 055	1 065	1 109	1 120	1 127	1 121	1 119	1 118	1 114	1 098	1 122	1 414	1 525	1 480	1 460	1 124	1 111
21	1 058	997	945	939	964	995	1 058	1 085	1 408	1 495	1 501	1 514	8 368 !	1 481	1 478	1 446	1 439	1 475	1 485	23 536 #	1 530	1 527	1 212	1 103
22	1 061	995	941	938	954	1 019	1 058	1 146	1 393	1 482	1 485	8 387 !	1 472	1 477	1 474	1 461	1 447	1 400	1 461	23 446 #	1 486	1 485	1 192	1 101
23	1 001	940	914	903	917	993	1 062	1 312	1 456	1 517	1 538	1 575	1 481	1 487	8 372 !	1 472	1 469	1 461	1 468	23 495 #	1 502	1 534	1 228	1 081
24	1 041	960	936	932	932	994	1 070	1 249	1 457	8 418 !	1 526	1 494	1 477	1 478	1 477	1 479	1 478	1 438	1 482	23 505 #	1 533	1 537	1 230	1 083
25	1 032	953	899	893	904	981	1 061	1 239	1 445	1 513	1 501	8 390 !	1 466	1 470	1 451	1 412	1 406	1 368	1 440	23 456 #	1 522	1 513	1 354	1 170
(26)	1 092	1 070	1 020	1 013	1 027	1 053	1 069	1 086	1 166	1 386	1 447	1 462	1 454	1 435	1 378	1 350	1 369	1 406	1 468	1 554	1 538	1 481	1 253	1 133
(27)	1 175	1 074	1 035	1 025	1 030	1 040	1 065	1 074	1 122	1 249	1 299	1 330	1 323	1 303	1 285	1 257	1 246	1 277	1 400	1 552	1 543	1 486	1 311	1 220
28	1 030	978	960	959	974	989	1 073	1 358	1 525	1 667	1 680	8 591 !	1 576	1 597	1 554	1 508	1 480	1 472	1 487	23 604 #	1 663	1 615	1 351	1 218
29	1 028	964	945	941	947	1 036	1 066	1 235	8 304 !	1 512	1 500	1 497	1 463	1 467	1 462	1 446	1 438	1 429	1 459	23 465 #	1 507	1 514	1 308	1 215
30	1 052	984	963	959	973	1 059	1 088	1 363	1 529	1 635	1 641	1 656	1 573	8 480 !	1 566	1 518	1 515	1 481	1 484	1 625	23 572 #	1 651	1 465	1 241
31	1 060	987	968	963	970	1 062	1 088	1 304	1 481	1 620	1 625	1 638	1 533	8 429 !	1 522	1 504	1 495	1 481	1 487	23 538 #	1 575	1 588	1 383	1 141

If an hour is marked with "#", that hour accounts for a peak of consumption for the region. If an hour is marked with "!", that hour shall have the maximum consumption per contract group at an appropriate voltage level. These two maximum consumptions may be for one hour, such as from 1900 to 2000 17th.

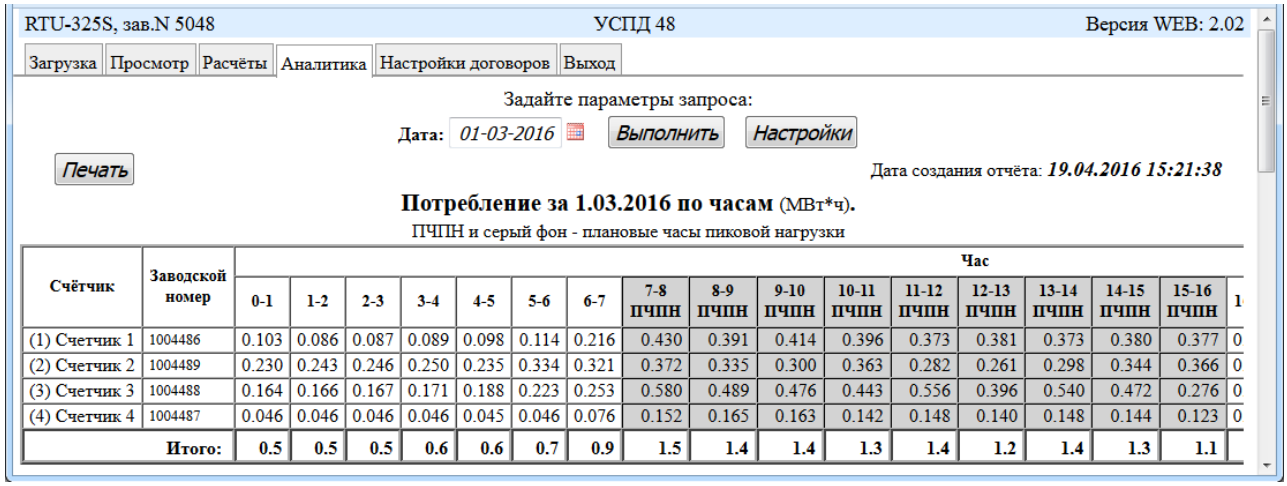
This report is for the current month. In this case, only the 2 type of table will be represented: general and with consumption. To calculate the maximum power per contract group for the corresponding voltage level, information about the working days of the month is required. This information is in the peak time file. But until they're uploaded to RTU, the user needs to create a list of working days for each month of the year. You can do this by clicking Calendar. After that, the user will be presented with a calendar for the year by day of the month. The red colour marks the non-working days, the black colour marks the working days. To change the current sign, you need to click the left mouse key at the appropriate bottom. The color and the mark will change. After adjusting the calendar, you need to press Save.

Any of the types of report can be printed by pressing the button <Steam>.

- **On the meters, 24/7.**

This application is used to generate an hour-long electric energy consumption report for the selected meter list. Before writing the report, you need to create a checklist by clicking on the <Construction> button by creating a list for the report from the Access Checklist, and by keeping the settings.

After setting a date in the submitted form, the user will receive the following report:



Потребление за 1.03.2016 по часам (МВт*ч).

ПЧПН и серый фон - плановые часы пиковой нагрузки

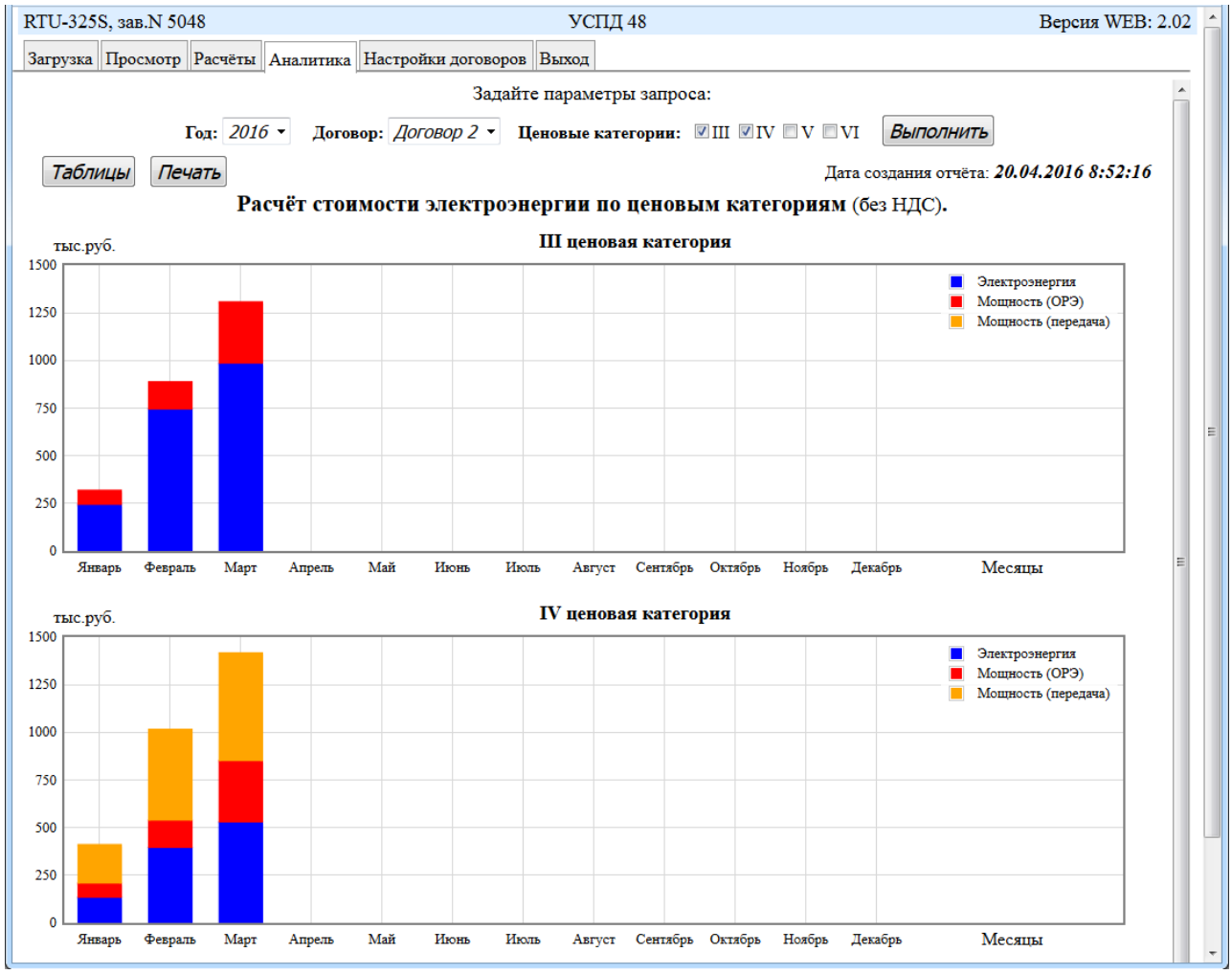
Счётчик	Заводской номер	Час															
		0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8 ПЧПН	8-9 ПЧПН	9-10 ПЧПН	10-11 ПЧПН	11-12 ПЧПН	12-13 ПЧПН	13-14 ПЧПН	14-15 ПЧПН	15-16 ПЧПН	1
(1) Счетчик 1	1004486	0.103	0.086	0.087	0.089	0.098	0.114	0.216	0.430	0.391	0.414	0.396	0.373	0.381	0.373	0.380	0.377	0
(2) Счетчик 2	1004489	0.230	0.243	0.246	0.250	0.235	0.334	0.321	0.372	0.335	0.300	0.363	0.282	0.261	0.298	0.344	0.366	0
(3) Счетчик 3	1004488	0.164	0.166	0.167	0.171	0.188	0.223	0.253	0.580	0.489	0.476	0.443	0.556	0.396	0.540	0.472	0.276	0
(4) Счетчик 4	1004487	0.046	0.046	0.046	0.046	0.045	0.046	0.076	0.152	0.165	0.163	0.142	0.148	0.140	0.148	0.144	0.123	0
Итого:		**0.5**	**0.5**	**0.5**	**0.6**	**0.6**	**0.7**	**0.9**	**1.5**	**1.4**	**1.4**	**1.3**	**1.4**	**1.2**	**1.4**	**1.3**	**1.1**	

This report can be printed by pressing the button <Steam>.

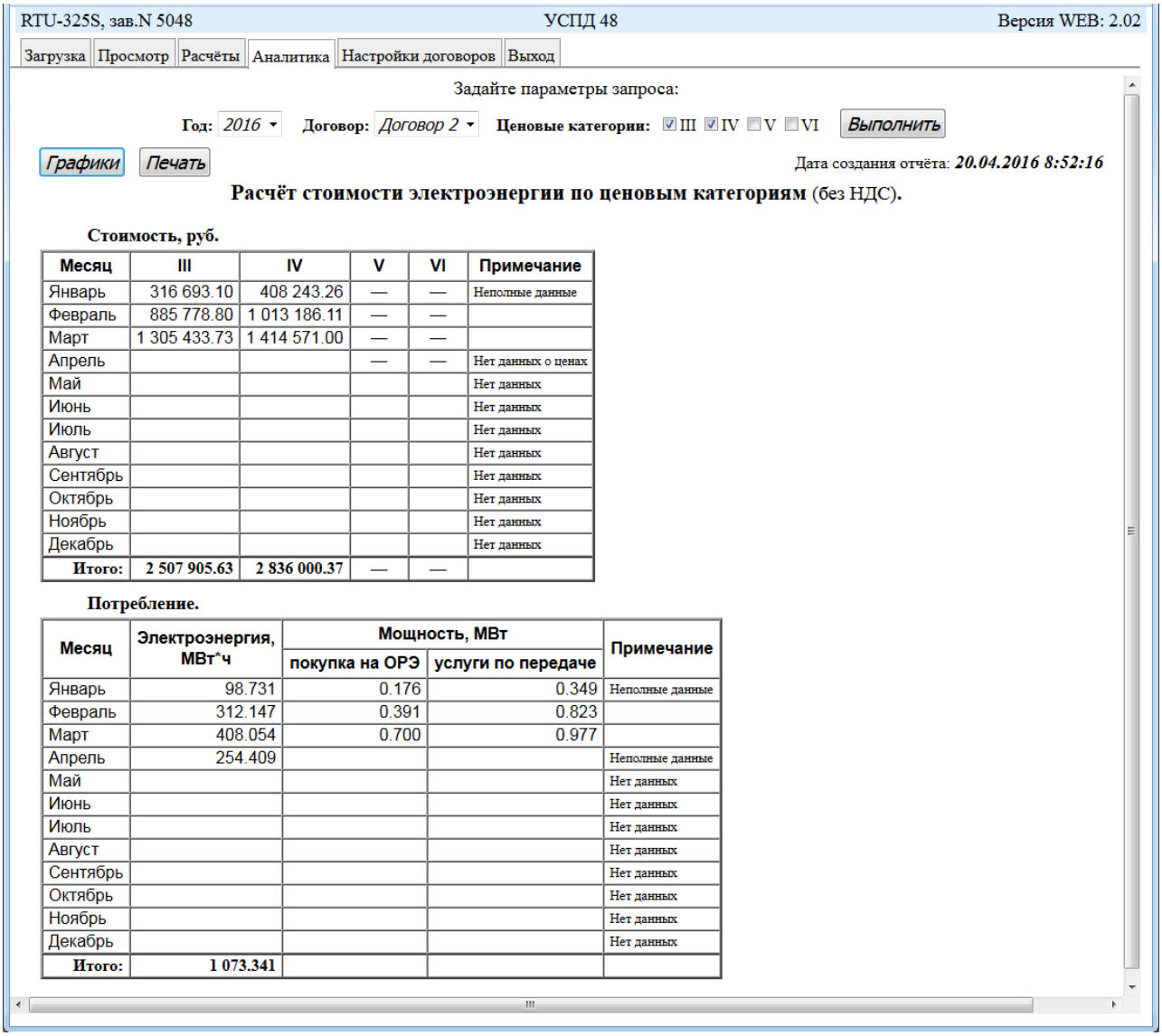
- **By contract: one year by month.**

This application is used to produce a report on consumption and cost of electricity for months of the year under contract.

To create the report, you have to choose the year, the contract, the categories to be used for the calculation and press the button <do>. As a result, the following report will be submitted to the user:



This report can be presented in tabular form:



RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 2.02

Загрузка | Просмотр | Расчёты | Аналитика | Настройки договоров | Выход

Задайте параметры запроса:

Год: 2016 Договор: Договор 2 Ценовые категории: ☑ III ☑ IV ☐ V ☐ VI Выполнить

Графики Печать Дата создания отчёта: 20.04.2016 8:52:16

Расчёт стоимости электроэнергии по ценовым категориям (без НДС).

Стоимость, руб.

Месяц	III	IV	V	VI	Примечание
Январь	316 693.10	408 243.26	—	—	Неполные данные
Февраль	885 778.80	1 013 186.11	—	—	
Март	1 305 433.73	1 414 571.00	—	—	
Апрель			—	—	Нет данных о ценах
Май					Нет данных
Июнь					Нет данных
Июль					Нет данных
Август					Нет данных
Сентябрь					Нет данных
Октябрь					Нет данных
Ноябрь					Нет данных
Декабрь					Нет данных
Итого:	**2 507 905.63**	**2 836 000.37**	—	—	

Потребление.

Месяц	Электроэнергия, МВт*ч	Мощность, МВт		Примечание
		покупка на ОРЭ	услуги по передаче	
Январь	98.731	0.176	0.349	Неполные данные
Февраль	312.147	0.391	0.823	
Март	408.054	0.700	0.977	
Апрель	254.409			Неполные данные
Май				Нет данных
Июнь				Нет данных
Июль				Нет данных
Август				Нет данных
Сентябрь				Нет данных
Октябрь				Нет данных
Ноябрь				Нет данных
Декабрь				Нет данных
Итого:	**1 073.341**			

The upper table shows the full cost of electricity for the price categories for each month of the year.

The lower table shows monthly consumption and power values. These reports can be printed by pressing the button <Speech>.

- **By contract: Comparison by category per month.**

This application is used to produce a monthly report to compare the cost of electricity for different price categories.

To create the report, you have to choose the year, month, contract, list the categories for calculation and click the button <do>. The result will be that the user will receive the following report:

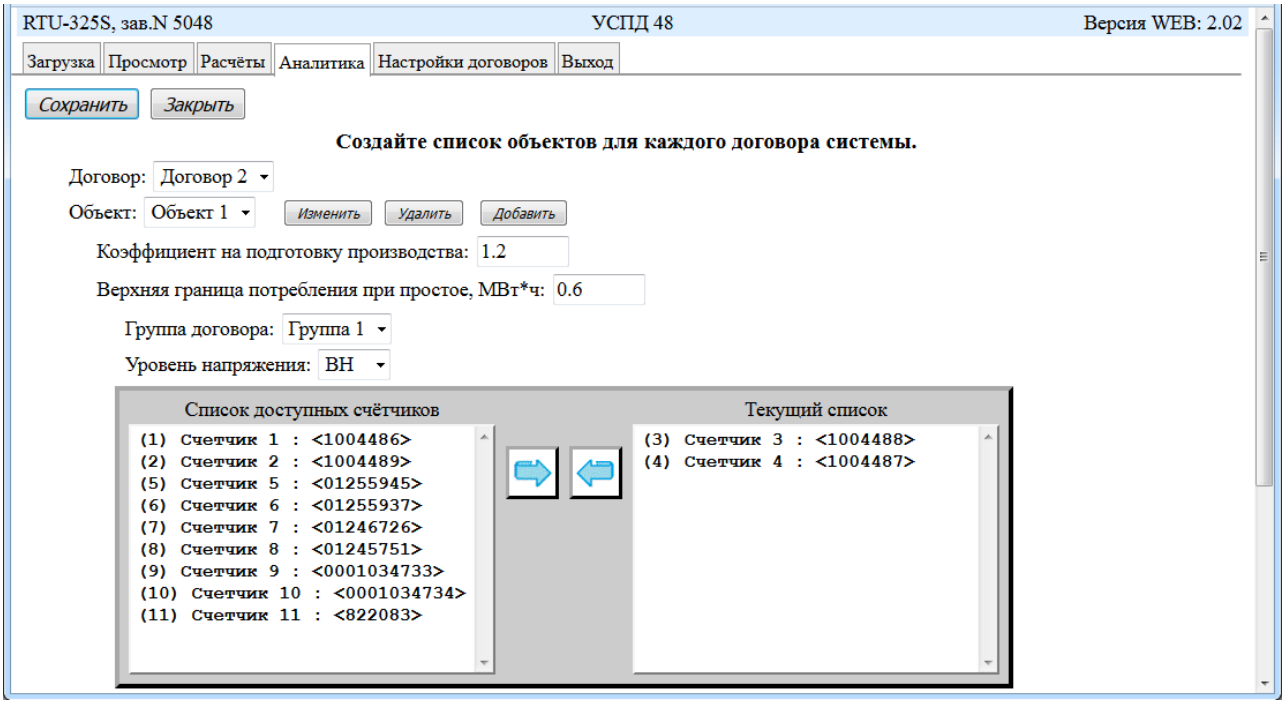


The report is presented in graphical and tabular form to illustrate the value comparison. This report can be printed by pressing the button <Steam>.

- **By object of contract: one year by month.**

The application is used to produce a report on the consumption and cost of electricity for the months of the year according to the subject matter of the contract.

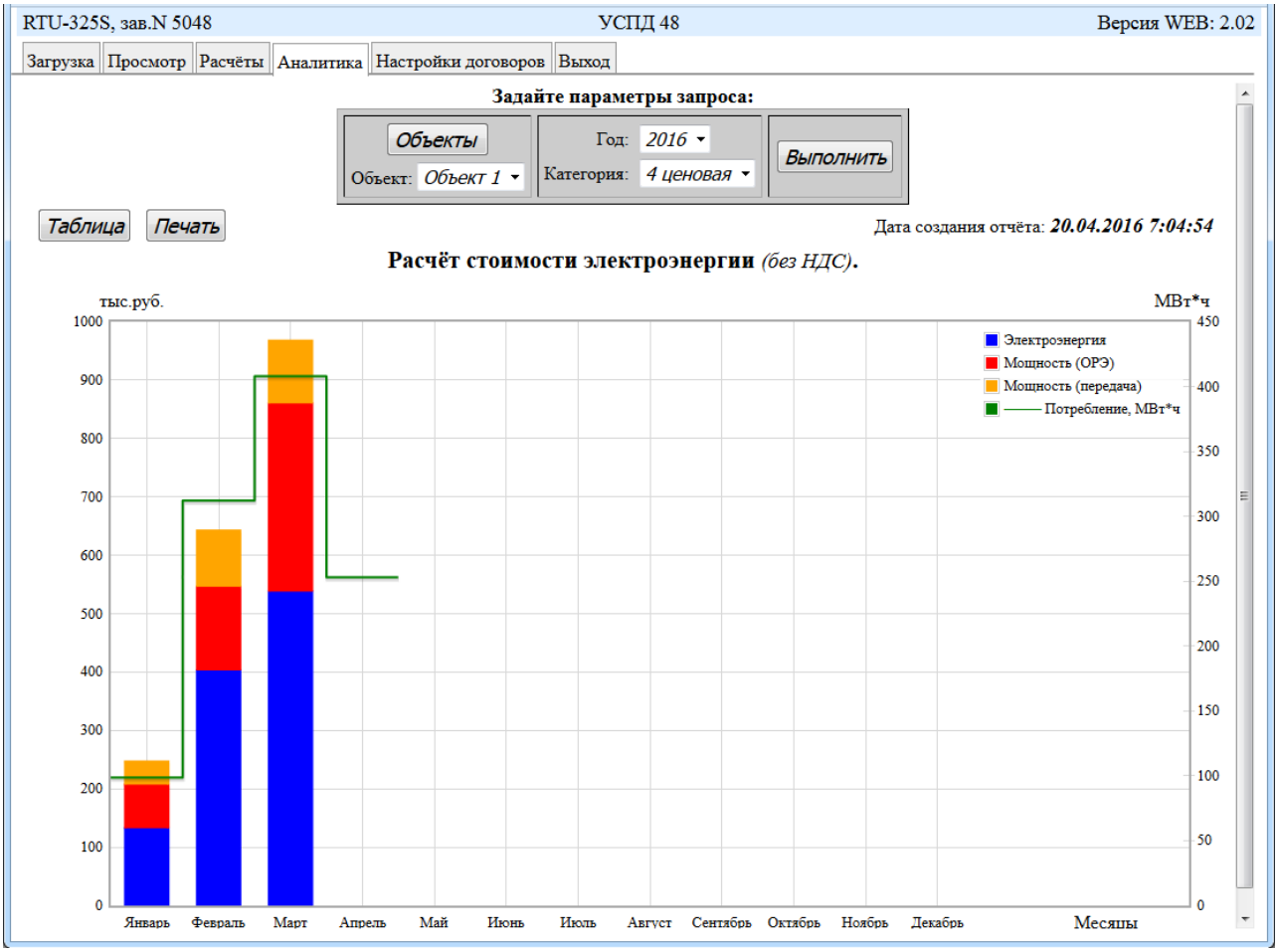
The application requires the creation of a list of the objects of the contract, such as the machine, the shop, the building, etc. To do this, you must press the <Injections> button and set the following parameters:



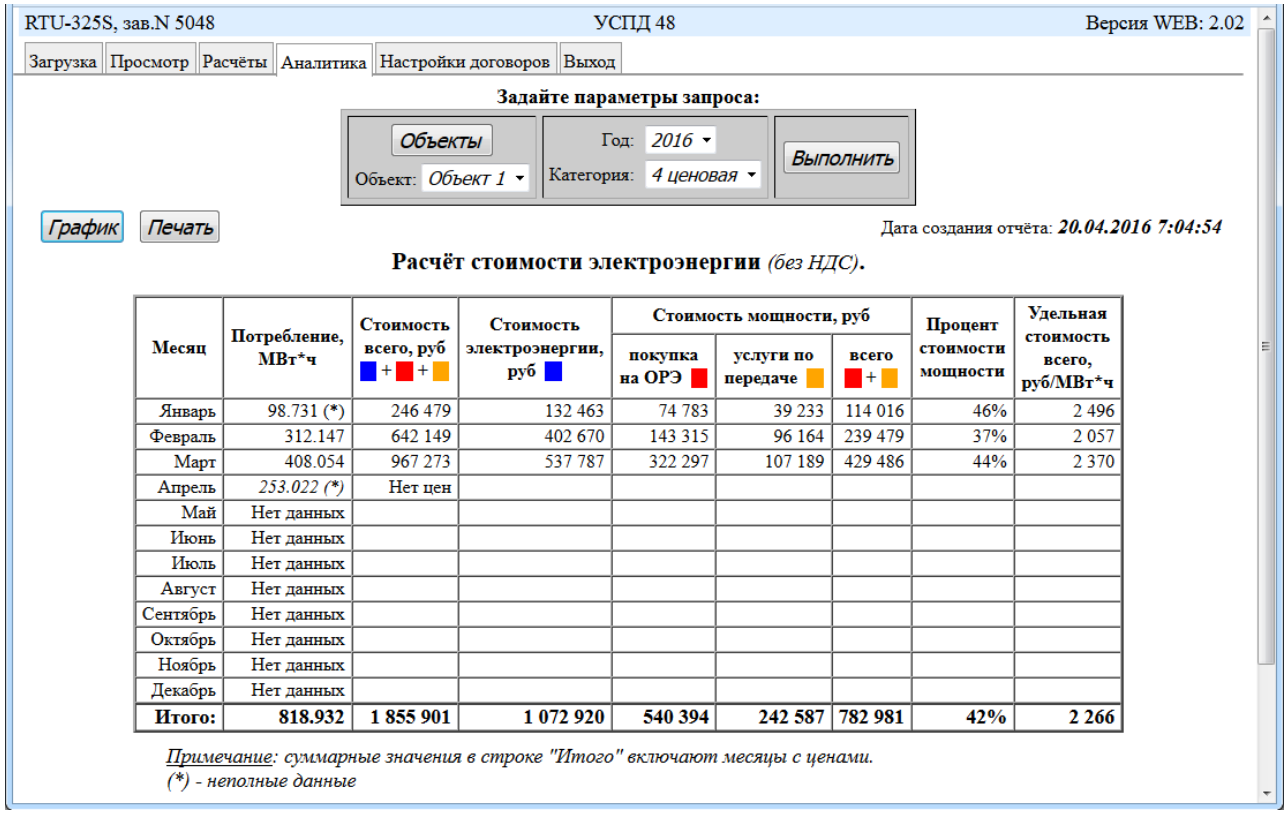
The production cycle consists of the phase of electricity consumption and the phase without electricity consumption, e.g. preparation of production. To account for the phase of production without electricity consumption, a generic production preparation factor is introduced - the production preparation factor.

Upper limit of consumption at simple - «фоновое» consumption at non-working production. If consumption is below this boundary, the object is considered not to have worked.

To create the report, you have to select an object, a year, a category for calculation and press the button <do>. The result will be the following report to the user:



This report can be presented in tabular form:



Месяц	Потребление, МВт*ч	Стоимость всего, руб	Стоимость электроэнергии, руб	Стоимость мощности, руб			Процент стоимости мощности	Удельная стоимость всего, руб/МВт*ч
				покупка на ОРЭ	услуги по передаче	всего		
Январь	98.731 (*)	246 479	132 463	74 783	39 233	114 016	46%	2 496
Февраль	312.147	642 149	402 670	143 315	96 164	239 479	37%	2 057
Март	408.054	967 273	537 787	322 297	107 189	429 486	44%	2 370
Апрель	*253.022 (*)*	Нет цен						
Май	Нет данных							
Июнь	Нет данных							
Июль	Нет данных							
Август	Нет данных							
Сентябрь	Нет данных							
Октябрь	Нет данных							
Ноябрь	Нет данных							
Декабрь	Нет данных							
Итого:	**818.932**	**1 855 901**	**1 072 920**	**540 394**	**242 587**	**782 981**	**42%**	**2 266**

Примечание: суммарные значения в строке "Итого" включают месяцы с ценами.
(*) - неполные данные

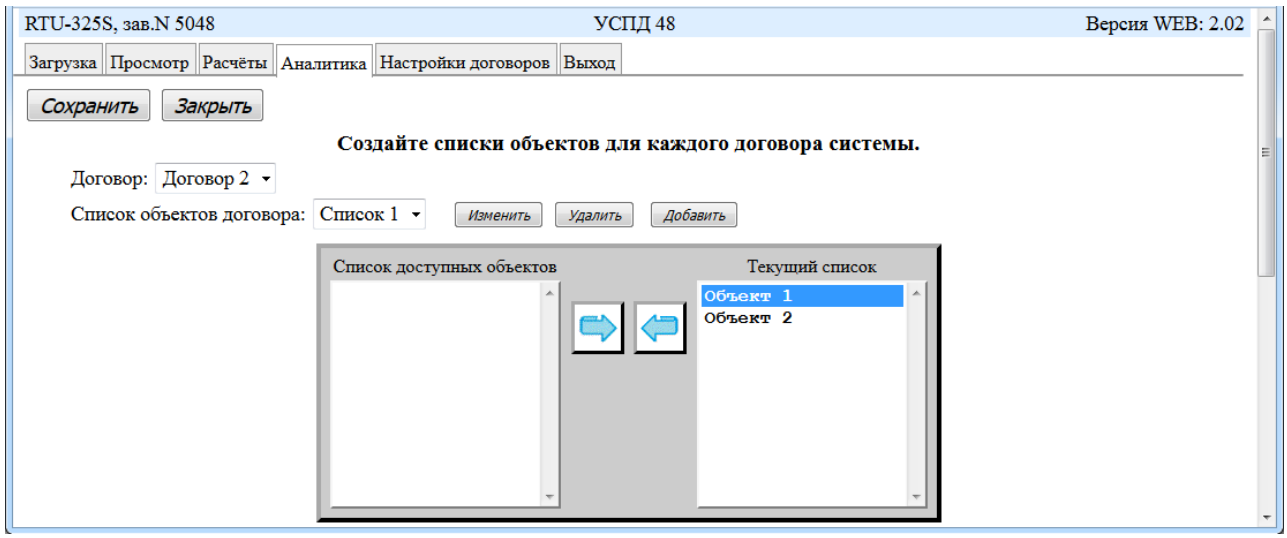
The table shows the three components of the cost of electricity, the percentage of the full cost of power and the unit value as the ratio of full cost to consumption.

These reports can be printed by pressing the button <Speech>.

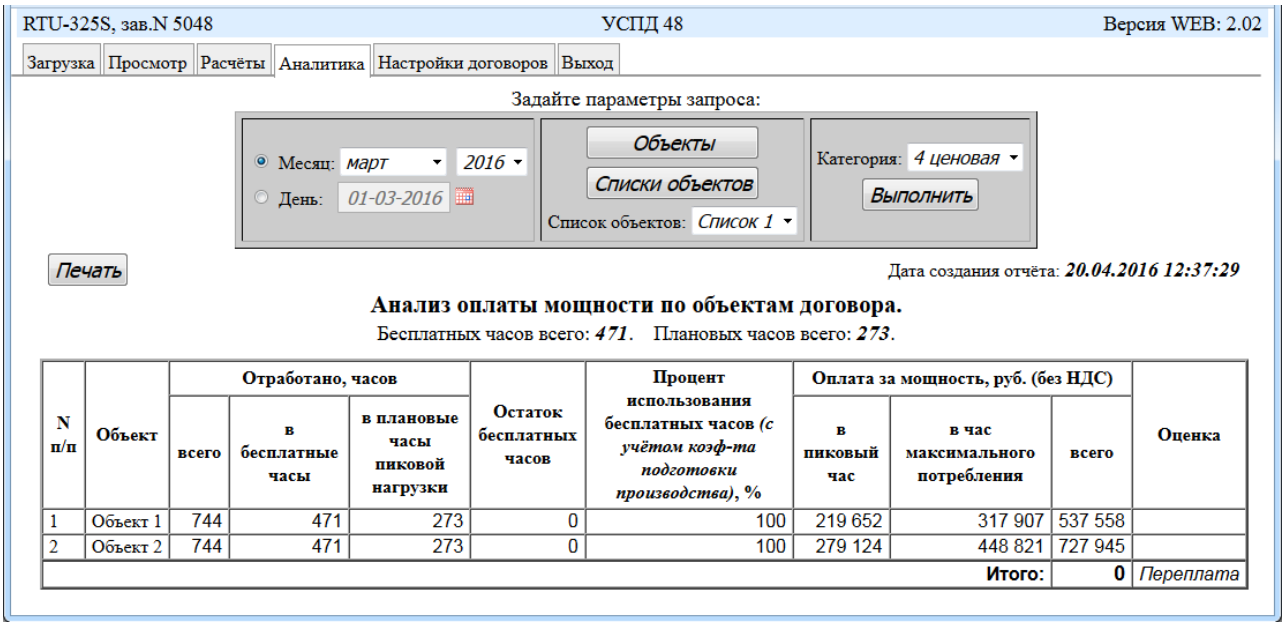
- **Analysis of the capacity charge on the list of contract items.**

This annex serves to form a performance report on the performance of the object of the contract in terms of minimizing the payment for power.

The annex requires the establishment of lists of treaty objects. To do this, you need to press the < Object List> button, create the required object lists for each contract, and press the <Save> button:



To create the report, you have to select from the list of objects, the period, the category for calculation and press the button <do>.



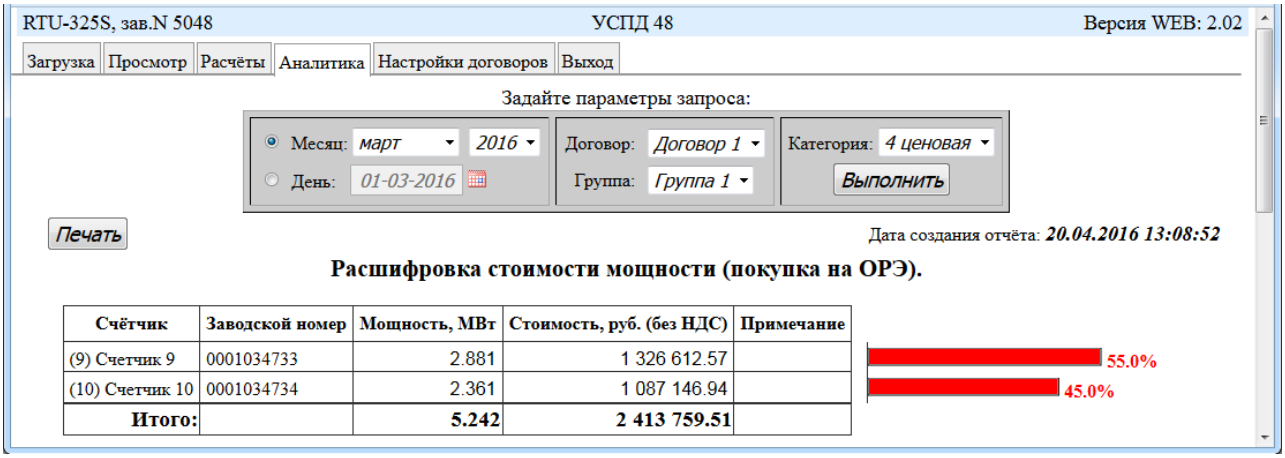
N п/п	Объект	Отработано, часов			Остаток бесплатных часов	Процент использования бесплатных часов (с учётом коэф-та подготовки производства), %	Оплата за мощность, руб. (без НДС)			Оценка
		всего	в бесплатные часы	в плановые часы пиковой нагрузки			в пиковый час	в час максимального потребления	всего	
1	Объект 1	744	471	273	0	100	219 652	317 907	537 558	
2	Объект 2	744	471	273	0	100	279 124	448 821	727 945	
								Итого:	0	Переплата

This table gives a symbolic estimate of overpayment for power. If free hours were left (hours outside scheduled peak hours), the cost of capacity could be reduced by shifting the facility beyond scheduled peak hours. In this case, in the "assessment" box, the object will stand "Переплата".

The total amount of overpayment for capacity in rubles is given in the row. The total value would include the cost of power for those facilities assessed "Переплата".

- **By contract: decrypting the peak load hour in the constituent of the Russian Federation.**
- **By contract: decrypting the maximum hour of consumption.**

These applications are used to form a report on the cost of power (purchase for ERI) or power (transfer services) for each meter in the contract.



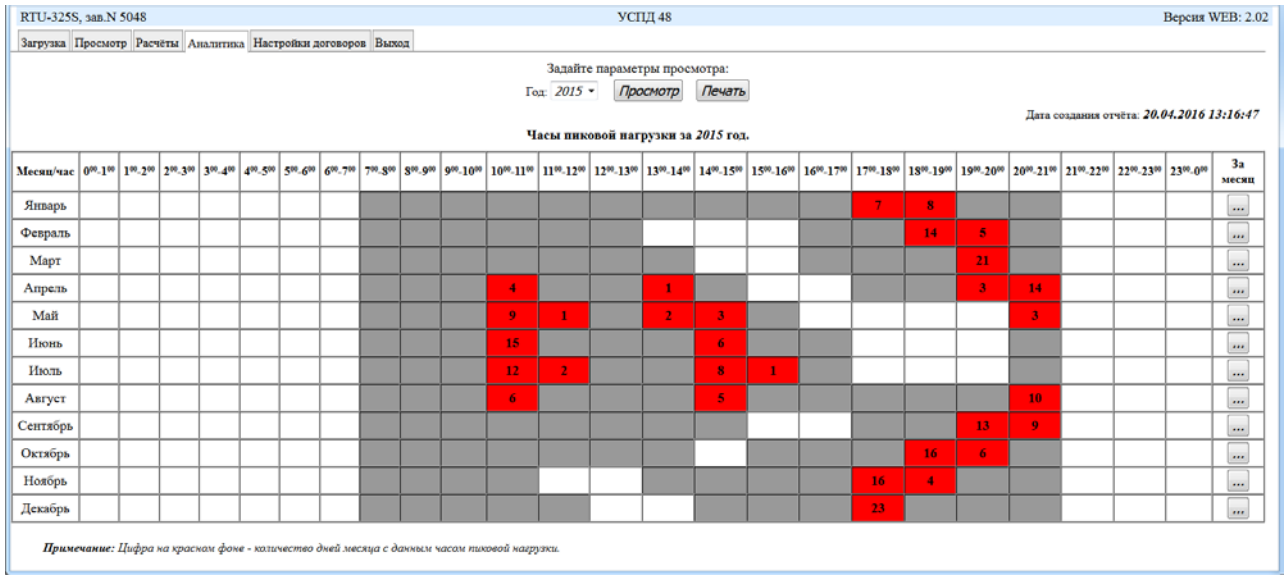
Счётчик	Заводской номер	Мощность, МВт	Стоимость, руб. (без НДС)	Примечание
(9) Счетчик 9	0001034733	2.881	1 326 612.57	
(10) Счетчик 10	0001034734	2.361	1 087 146.94	
Итого:		5.242	2 413 759.51	

The first column of the table lists the names of the meter in order of the reduction of the power cost. The right side is the graphical representation of the percentage of the power value on the meter against the full cost of the power type under the contract as a whole.

This report can be printed by pressing the button <Steam>.

- **The peak hour of the year.**

This application allows for an analysis of peak load hours by month of year. The user must choose the year and press the button < View>:



Месяц/час	0⁰⁰-1⁰⁰	1⁰⁰-2⁰⁰	2⁰⁰-3⁰⁰	3⁰⁰-4⁰⁰	4⁰⁰-5⁰⁰	5⁰⁰-6⁰⁰	6⁰⁰-7⁰⁰	7⁰⁰-8⁰⁰	8⁰⁰-9⁰⁰	9⁰⁰-10⁰⁰	10⁰⁰-11⁰⁰	11⁰⁰-12⁰⁰	12⁰⁰-13⁰⁰	13⁰⁰-14⁰⁰	14⁰⁰-15⁰⁰	15⁰⁰-16⁰⁰	16⁰⁰-17⁰⁰	17⁰⁰-18⁰⁰	18⁰⁰-19⁰⁰	19⁰⁰-20⁰⁰	20⁰⁰-21⁰⁰	21⁰⁰-22⁰⁰	22⁰⁰-23⁰⁰	23⁰⁰-0⁰⁰	За месяц
Январь																		7	8						...
Февраль																			14	5					...
Март																				21					...
Апрель											4			1						3	14				...
Май											9	1		2	3						3				...
Июнь											15				6										...
Июль											12	2			8	1									...
Август											6				5						10				...
Сентябрь																				13	9				...
Октябрь																			16	6					...
Ноябрь																		16	4						...
Декабрь																		23							...

This report is presented in the form of a table, the cells of which are shown in red if the hour was the hour of peak load on the constituent of the Russian Federation in any of the days of the month. The number of such days is shown on the red background.

By pressing the button in the month column, the window will open with the peak hour report for the month in question.

The report can be printed by pressing the button <Speech>.

1.2. Monitoring.

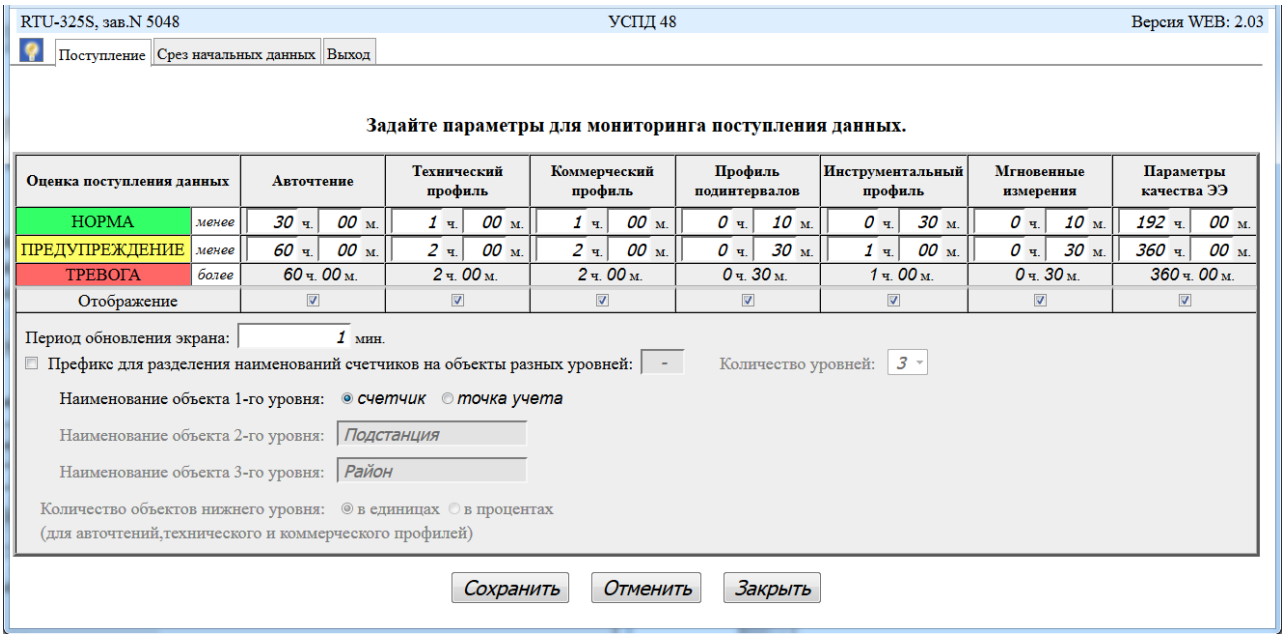
This section provides the user with web-based applications to enable real-time monitoring of relevant indicators. In this mode, the indicators change automatically when new data are received.

1.2.1. Data monitoring.

This application serves to monitor data flow.

The settings.

On the first start of this application, the user will be provided with a program configuration window that can save the user ' s selected parameters. Later you can go through this window using the "Construction" button:



In this window, the user should set the values of the data input estimation parameters for each type of data. These parameters are the time intervals for the permissible lateness of data for each estimate.

In the box "Expectation", the user should tick those data types that will be displayed on the monitoring page.

In the screen update field, the user must set the required period in minutes.

The fields below are designed to divide objects into levels that take account of the Prefix. To do this, the user must tick to the left of the "Prefix" box to divide the names of the meters into objects at different levels. The following fields will then be available for editing:

- **Prefix to divide the number of meter names into objects at different levels.**
  In this field, a symbol used as a prefix in the name of the meters/accounts should be given.
- **Number of levels.**
  In this field, the user must choose the number of levels to which the name of the meter/account should be divided.

; Name of the 1-ro level object.
  In this field, the user must select the names of the meters or account points to be shown in the monitoring tables.

; Name of the 2-ro level object.

- **Level 3 object name.**

In these fields, the user can give the names of the second and third level objects for display on the monitoring page.

- **Number of lower level objects.**

In this field, the user must choose the type of representation of the number of lower level objects at each assessment interval, in units or in percentage. For level 3 objects, the number of level 2 or the percentage of level 2 objects. This parameter is used only for automails, technical and commercial profiles. For level-2 objects, this could be the number of meters or the percentage of meters. After all the necessary parameters are tested, the user can save the selected parameters on the RTU button <Save>. Then, at the next application launches, the monitoring task will work with the saved parameters.

If necessary, the user may cancel the changes he made in the current session using the <Cancell> button.

The button <Close> shall be pressed to move to monitoring.

Incoming.

This tab will provide the user with a monitoring table for data input, taking into account the separation of objects at different levels or without accounting depending on the user ' s settings.

If the Prefix monitoring is performed, the user will be provided with a table with the list of the highest level objects at the start of the application. The following example shows a table of level 2 objects.



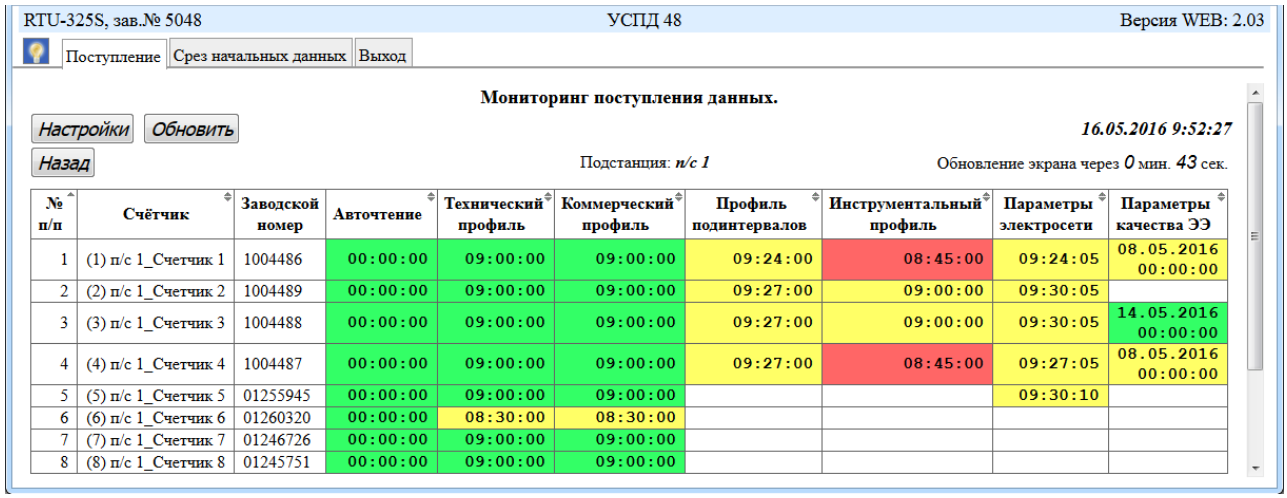
№ п/п	Подстанция	Авточтение			Технический профиль			Коммерческий профиль			Профиль подинтервалов			Инструментальный профиль			Параметры электросети			Параметры качества ЭЭ		
1	п/с 1	8			7	1		7	1			4			2	2		5		1	2	
2	п/с 2	2			2			2														
3	п/с 3		1		1			1									1			1		

This table displays data input estimates for each of the data types assigned by the user: how many 2-го level objects have that or other estimate. Under each data type is the 3 column: 'norm', 'warning', 'worry'.

If any of the 1-го level objects has a 'Trevoga' rating for a particular data type, the relevant cell will be painted red. If any of the 1-го-level objects have a 'Warning' rating for a particular data type, the relevant cell will be painted yellow. If any of the 1-го-level objects has a 'Norm' rating for a particular data type, the corresponding cell will be painted green. Additionally, the cell will display the number or percentage of objects that have an appropriate rating.

The upper right corner shows the time of the last update of the screen (RTU time). Below is a countdown of time until the next update of the screen. The user can manually update the screen using the <update>.

To view a level 2 object, you have to click on the appropriate row of the table. The user will be provided with a table for monitoring the data for the selected level 2 facility:



№ п/п	Счётчик	Заводской номер	Авточтение	Технический профиль	Коммерческий профиль	Профиль подинтервалов	Инструментальный профиль	Параметры электросети	Параметры качества ЭЭ
1	(1) п/с 1_Счетчик 1	1004486	00:00:00	09:00:00	09:00:00	09:24:00	08:45:00	09:24:05	08.05.2016 00:00:00
2	(2) п/с 1_Счетчик 2	1004489	00:00:00	09:00:00	09:00:00	09:27:00	09:00:00	09:30:05	
3	(3) п/с 1_Счетчик 3	1004488	00:00:00	09:00:00	09:00:00	09:27:00	09:00:00	09:30:05	14.05.2016 00:00:00
4	(4) п/с 1_Счетчик 4	1004487	00:00:00	09:00:00	09:00:00	09:27:00	08:45:00	09:27:05	08.05.2016 00:00:00
5	(5) п/с 1_Счетчик 5	01255945	00:00:00	09:00:00	09:00:00			09:30:10	
6	(6) п/с 1_Счетчик 6	01260320	00:00:00	08:30:00	08:30:00				
7	(7) п/с 1_Счетчик 7	01246726	00:00:00	09:00:00	09:00:00				
8	(8) п/с 1_Счетчик 8	01245751	00:00:00	09:00:00	09:00:00				

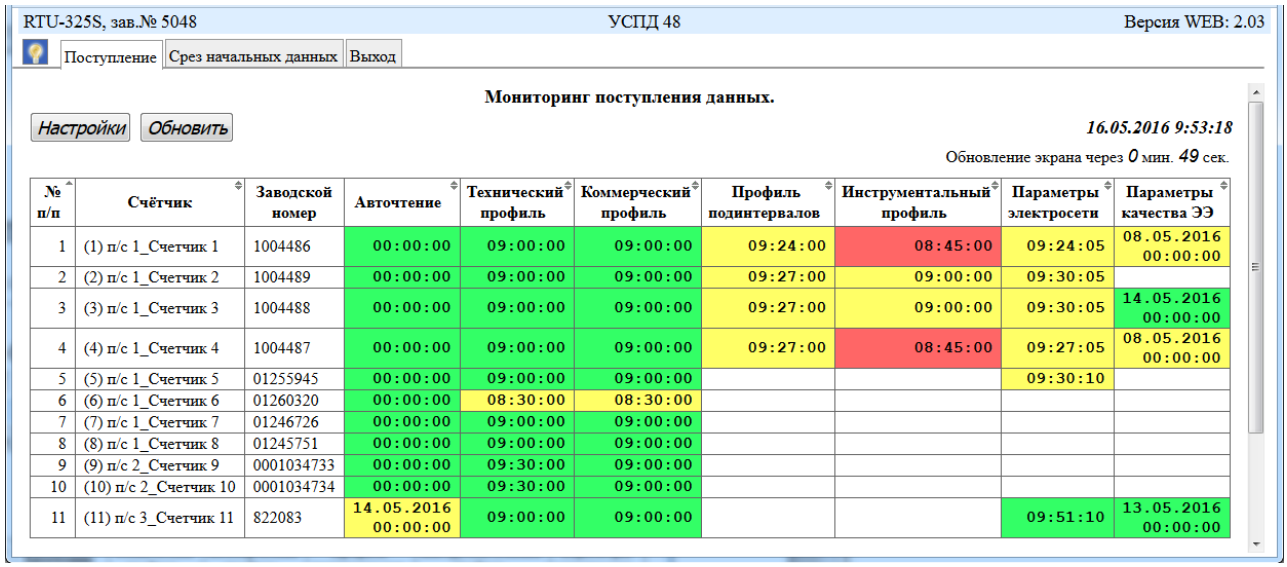
When viewing the monitoring table for level 1 sites (to the meters), each cell shall be coloured to the appropriate estimate. If the time of the latest data comes from the current day, only time will be displayed in the cell in the format 'ch:mm:s'. If time refers to the previous day, the cell will display the date and time in the format 'dd.mm.ggch:mm:s'.

If you look at data for lower level objects, you can return to the monitoring of the upper level object using the <Back> button. The background of the line numbers with the object on which it was viewed will be highlighted.



№ п/п	Подстанция	Авточтение	Технический профиль	Коммерческий профиль	Профиль подинтервалов	Инструментальный профиль	Параметры электросети	Параметры качества ЭЭ
1	п/с 1	8	7 1	7 1	4	2 2	5	1 2
2	п/с 2	2	2	2				
3	п/с 3	1	1	1			1	1

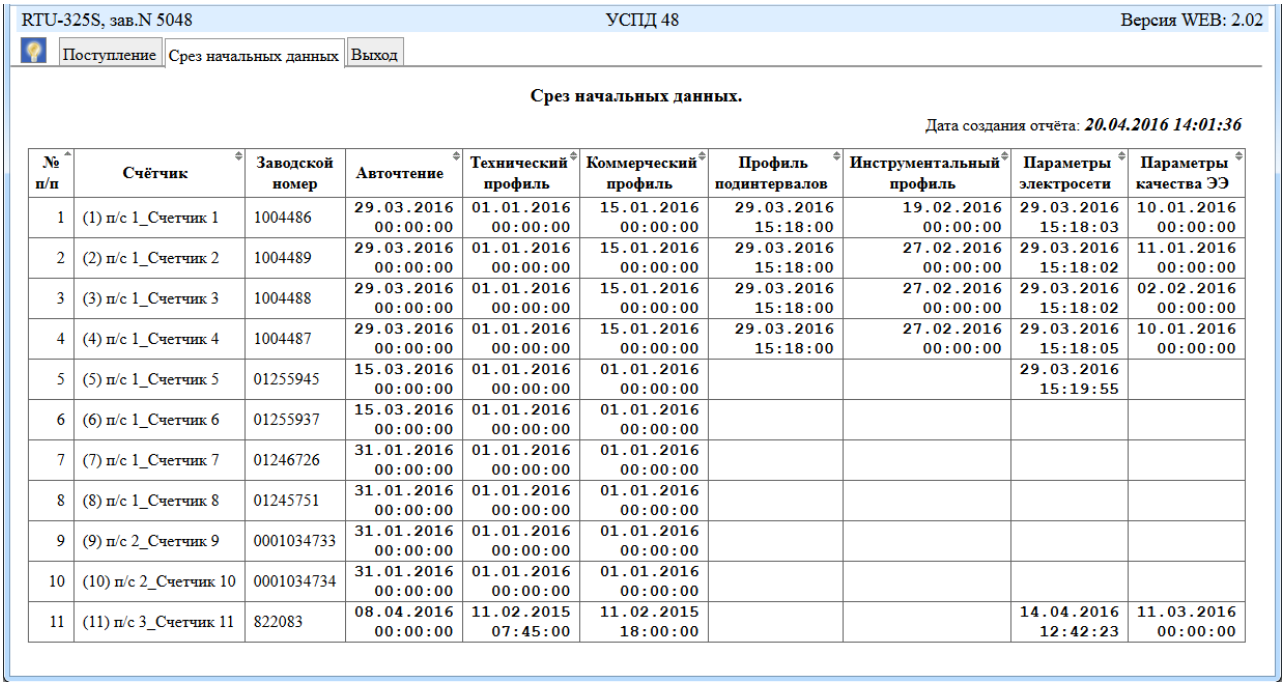
A table with all RTU meters will be provided to the user in the non-prefix monitoring mode:



№ п/п	Счётчик	Заводской номер	Авточтение	Технический профиль	Коммерческий профиль	Профиль подинтервалов	Инструментальный профиль	Параметры электросети	Параметры качества ЭЭ
1	(1) п/с 1_Счетчик 1	1004486	00:00:00	09:00:00	09:00:00	09:24:00	08:45:00	09:24:05	08.05.2016 00:00:00
2	(2) п/с 1_Счетчик 2	1004489	00:00:00	09:00:00	09:00:00	09:27:00	09:00:00	09:30:05	
3	(3) п/с 1_Счетчик 3	1004488	00:00:00	09:00:00	09:00:00	09:27:00	09:00:00	09:30:05	14.05.2016 00:00:00
4	(4) п/с 1_Счетчик 4	1004487	00:00:00	09:00:00	09:00:00	09:27:00	08:45:00	09:27:05	08.05.2016 00:00:00
5	(5) п/с 1_Счетчик 5	01255945	00:00:00	09:00:00	09:00:00			09:30:10	
6	(6) п/с 1_Счетчик 6	01260320	00:00:00	08:30:00	08:30:00				
7	(7) п/с 1_Счетчик 7	01246726	00:00:00	09:00:00	09:00:00				
8	(8) п/с 1_Счетчик 8	01245751	00:00:00	09:00:00	09:00:00				
9	(9) п/с 2_Счетчик 9	0001034733	00:00:00	09:30:00	09:00:00				
10	(10) п/с 2_Счетчик 10	0001034734	00:00:00	09:30:00	09:00:00				
11	(11) п/с 3_Счетчик 11	822083	14.05.2016 00:00:00	09:00:00	09:00:00			09:51:10	13.05.2016 00:00:00

A cut of the initial data.

This tab will provide the user with a table that will cut the initial data for all meters.



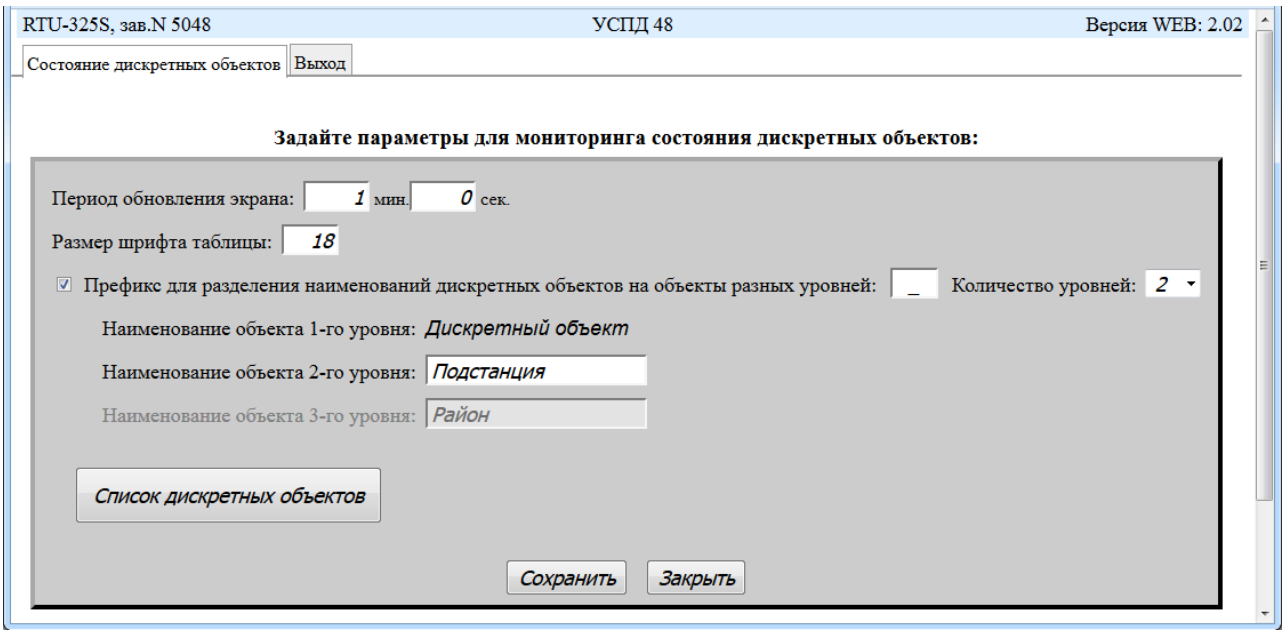
№ п/п	Счётчик	Заводской номер	Авточтение	Технический профиль	Коммерческий профиль	Профиль подинтервалов	Инструментальный профиль	Параметры электросети	Параметры качества ЭЭ
1	(1) п/с 1_Счетчик 1	1004486	29.03.2016 00:00:00	01.01.2016 00:00:00	15.01.2016 00:00:00	29.03.2016 15:18:00	19.02.2016 00:00:00	29.03.2016 15:18:03	10.01.2016 00:00:00
2	(2) п/с 1_Счетчик 2	1004489	29.03.2016 00:00:00	01.01.2016 00:00:00	15.01.2016 00:00:00	29.03.2016 15:18:00	27.02.2016 00:00:00	29.03.2016 15:18:02	11.01.2016 00:00:00
3	(3) п/с 1_Счетчик 3	1004488	29.03.2016 00:00:00	01.01.2016 00:00:00	15.01.2016 00:00:00	29.03.2016 15:18:00	27.02.2016 00:00:00	29.03.2016 15:18:02	02.02.2016 00:00:00
4	(4) п/с 1_Счетчик 4	1004487	29.03.2016 00:00:00	01.01.2016 00:00:00	15.01.2016 00:00:00	29.03.2016 15:18:00	27.02.2016 00:00:00	29.03.2016 15:18:05	10.01.2016 00:00:00
5	(5) п/с 1_Счетчик 5	01255945	15.03.2016 00:00:00	01.01.2016 00:00:00	01.01.2016 00:00:00			29.03.2016 15:19:55	
6	(6) п/с 1_Счетчик 6	01255937	15.03.2016 00:00:00	01.01.2016 00:00:00	01.01.2016 00:00:00				
7	(7) п/с 1_Счетчик 7	01246726	31.01.2016 00:00:00	01.01.2016 00:00:00	01.01.2016 00:00:00				
8	(8) п/с 1_Счетчик 8	01245751	31.01.2016 00:00:00	01.01.2016 00:00:00	01.01.2016 00:00:00				
9	(9) п/с 2_Счетчик 9	0001034733	31.01.2016 00:00:00	01.01.2016 00:00:00	01.01.2016 00:00:00				
10	(10) п/с 2_Счетчик 10	0001034734	31.01.2016 00:00:00	01.01.2016 00:00:00	01.01.2016 00:00:00				
11	(11) п/с 3_Счетчик 11	822083	08.04.2016 00:00:00	11.02.2015 07:45:00	11.02.2015 18:00:00			14.04.2016 12:42:23	11.03.2016 00:00:00

1.2.2. Monitoring the status of discrete objects.

This paragraph monitors the status of selected discrete objects.

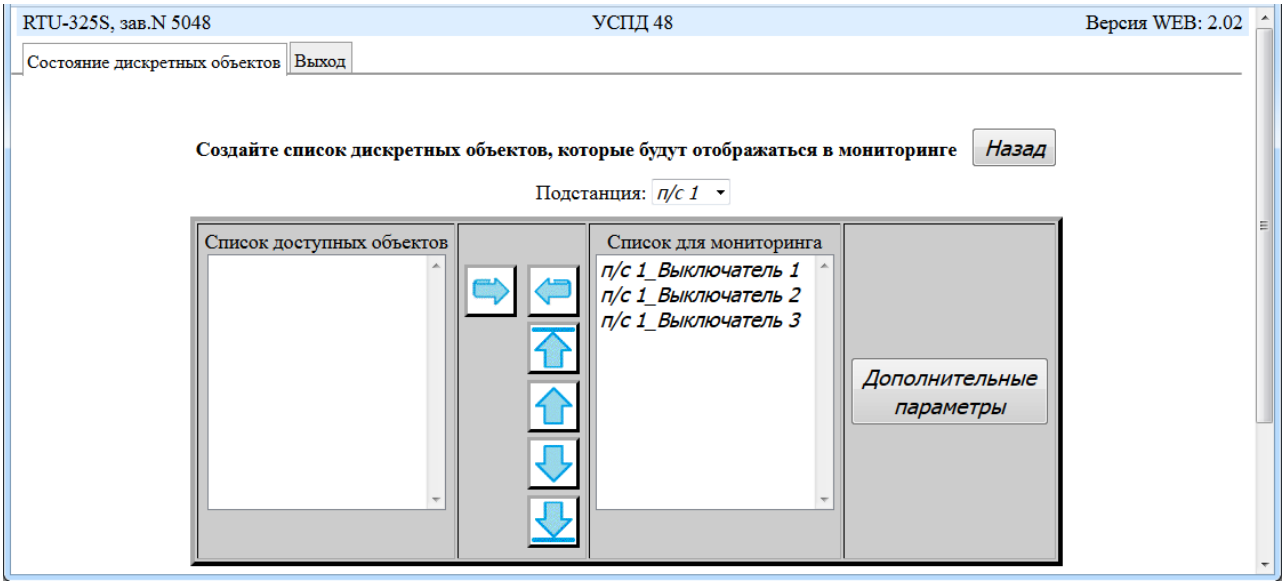
The settings.

The user can store a list of discrete objects on the RTU for which monitoring is required. To do this, press the "Настройки" button, which will provide the user with a form to assign the necessary parameters:



In the format presented, the user can set a time frame for the display update, the font size to which the data in the monitoring table will be displayed and whether the precursor for the break-up to different levels is taken into account.

If the application settings were not previously maintained in RTU, then all discrete objects that are configuration into RTU will be displayed by default in monitoring without account being taken of the Prefix. The user can edit the monitoring list by removing the meters and changing the order of the meters:



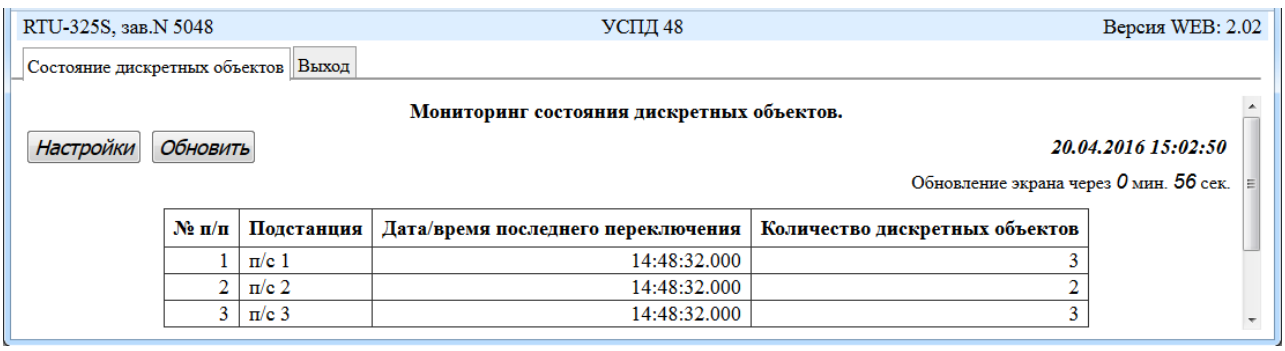
Once an orderly counterlist is established, the user can change the name and colour of each of the possible states of discrete objects. To do this, press the < Additional Options> button and in the open form, set the necessary parameters:



Then we need to go back to the shape of the main settings by pressing the < Back> button and keeping the settings.

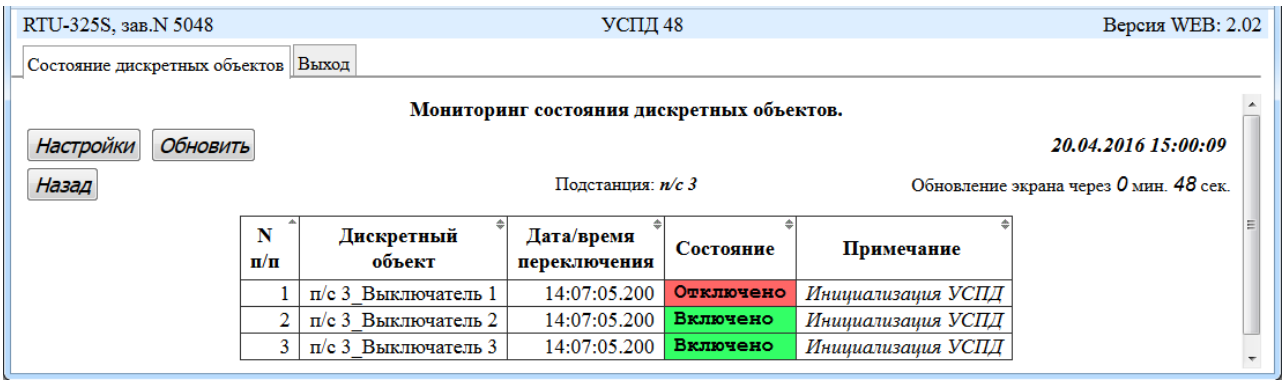
Monitoring.

In selecting the tab "Состояние дискретных объектов", the user will be provided with table monitoring. The following table is divided into different levels of objects:



This table presents, for each level 2 object, the time of the last switching of a discrete object related to the object and the number of discrete objects for which the switch was made during the observed time.

To view a level 2 object, you have to click on the appropriate row of the table. The user will be provided with a table for monitoring the data for the selected level 2 facility:



The update period will be as stored in the settings if it was saved. Otherwise, the default value is 1 minute. You can also update the screen by clicking the button <update>.

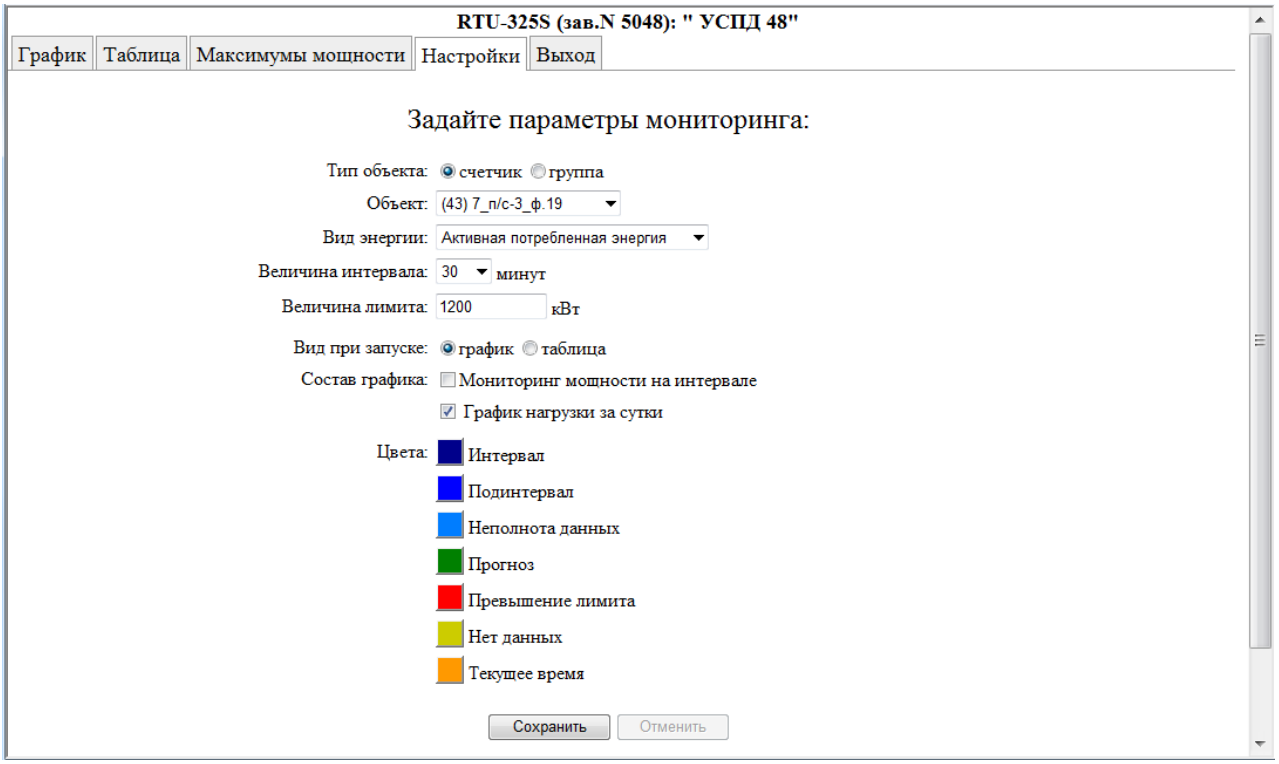
1.2.3. Power monitoring.

This paragraph monitors the power by the selected meter and/or group of meter. Monitoring is conducted using sub-intervals recorded by RTU. The great sub-interval is a sub-interval of meter power or a profile sub-interval formed by RTU. According to the configuration rules, RTU collects power sub-intervals from the meter if the profile sub-interval is zero. If the profile sub-interval is greater than zero, RTU forms profile sub-intervals, and power sub-intervals are not collected from the meter.

The group may include meters with different sub-points. In this case, the minimum frequency of all group sub-intervals will be automatically selected for the group.

Monitoring is possible either graphically or in tabular form. The user is also given the opportunity to view the maximum capacity of the metering and the metering group at the storage depth of the sub-intervals in RAM (the menu item "Настройки" > "Архивы" > "Размер архивов в ОЗУ" > 'Conintervals' of the configuration).

1.2.3.1. The settings. At the start of this application, the user will be provided with a settings window to perform the monitoring parameters. Later you can go through this window from the "Настройки" tab:



In this paragraph, the user must select the meter or group of meters and the type of energy for which the monitoring will be carried out, the amount of the monitoring interval, and set the power limit for the selected interval. The monitoring interval shall be a multiple of the individual meter sub-interval or sub-interval value of all the group meters.

The user should then select the type of monitoring, graphical or table, which will be automatically started on the next application start, which graphs will be displayed in the graphic monitoring and the colours that will display the relevant data on the graphs.

To improve the visual perception of the data displayed in the graphs, the user may choose the following colors:

- **Interval**
  This color shows the intervals with the data completeness.
- **Sub-interval**
  This color on the graphs shows the sub-intervals of the meters as well as the sub-intervals of the group of meters showing the completeness of the data (the group ' s total sub-interval includes sub-intervals for all the meters in the group).
- **Data incomplete**
  This color shows the data incomplete intervals as well as the sub-intervals of the group of meters showing the incompleteness of the data (the group sub-interval does not contain sub-intervals for any of the group ' s meters).
- **Projection**
  This color on the projection graph shows the projected average value over the interval if this value does not exceed the user's specified value in the box 'Glory limit'.
- **Excess of limit**
  This color on the projection graph shows the projected average over the interval if this value exceeds the user's target in the box 'Glory limit'.

- **No data**
  This color on the graphs shows vertical lines showing that RTU is missing at the appropriate time.
- **Current Time**

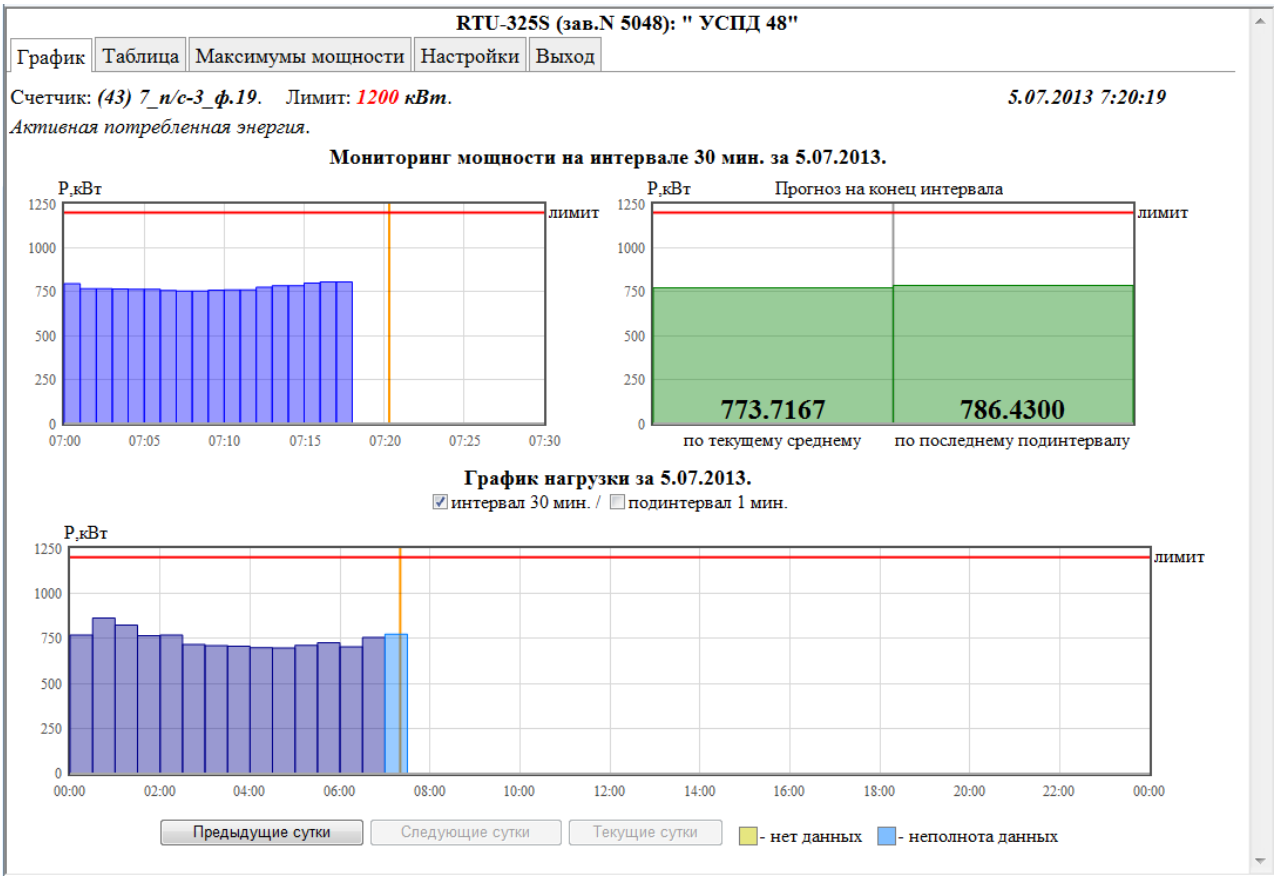
This color on the graphs shows a vertical band that shows the current time of RTU. After completing all the necessary parameters, the user can save the selected parameters on the RTU button <Save>.

1.2.3.2. Graphic monitoring.

In selecting the input "График", graphic monitoring of power will be provided to the user. The presentation of the data in this paragraph depends on the parameters given by the user in the "Construction" paragraph. The composition of the graph determines the number of graphs on the screen:

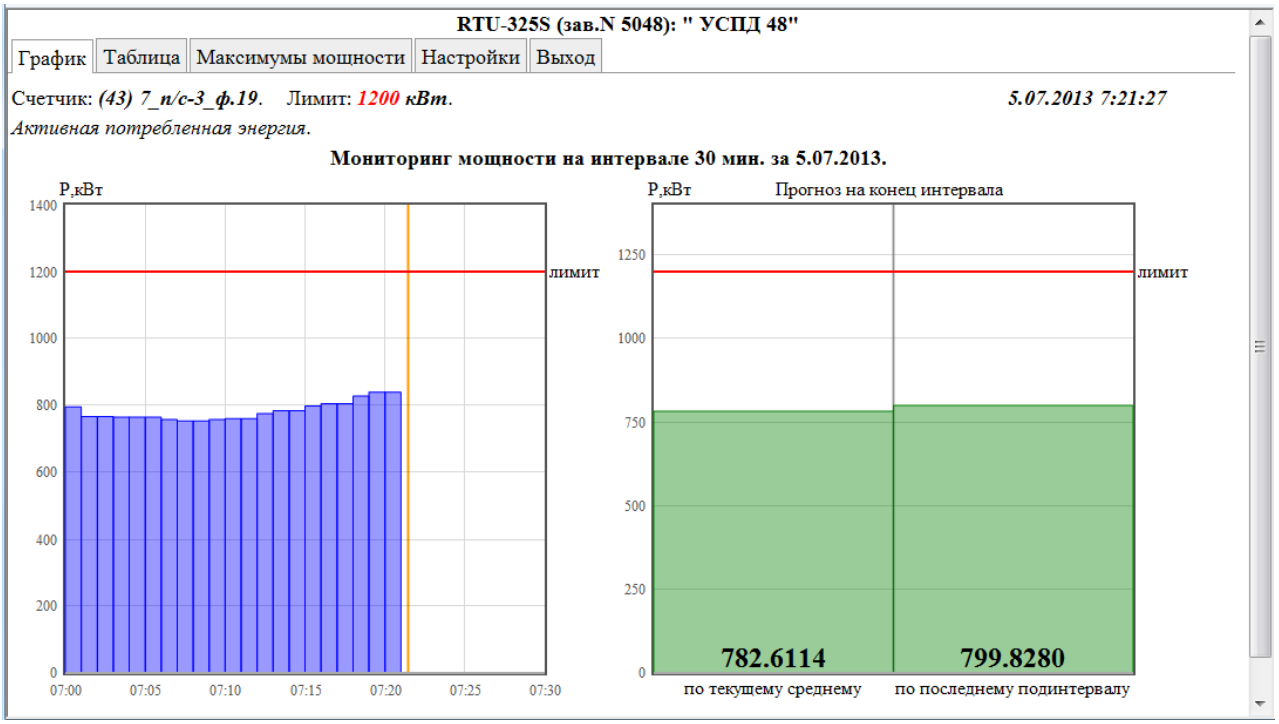
- only the time schedule for monitoring power at intervals, only the load schedule per day, both schedules at the same time.

If two graphs are chosen simultaneously, the window will be divided into two vertical parts. At the top of the window, the monitoring schedule will be displayed at an interval and at the bottom, the load schedule per day will be shown:



Time schedule for monitoring power at intervals.

This type of graph is divided into two parts:



The left side of the window shows monitoring of sub-interval input from the selected meter/score group. In the case where a group of meters is selected, the color of the chart column shows the completeness of the total sub-interview data for all the meter numbers in the group.

If the sub-interview is complete, the column colour will be as given in the "Construction" paragraph > 'Cveta' > 'Sub-interval'. If any of the total meter-interpoint values are missing, the column colour will be as specified in the "Construction' > 'Clute' > 'Incomplete data' paragraph.

The projection graph is shown in the right side of the window. This schedule uses 2 power forecasting methods:

- at the current average power at the interval,
- Last sub-interval of meter power/specter group.

Each method corresponds to the column on the projection graph. The left column shows a projection of the current average power at the last interval.

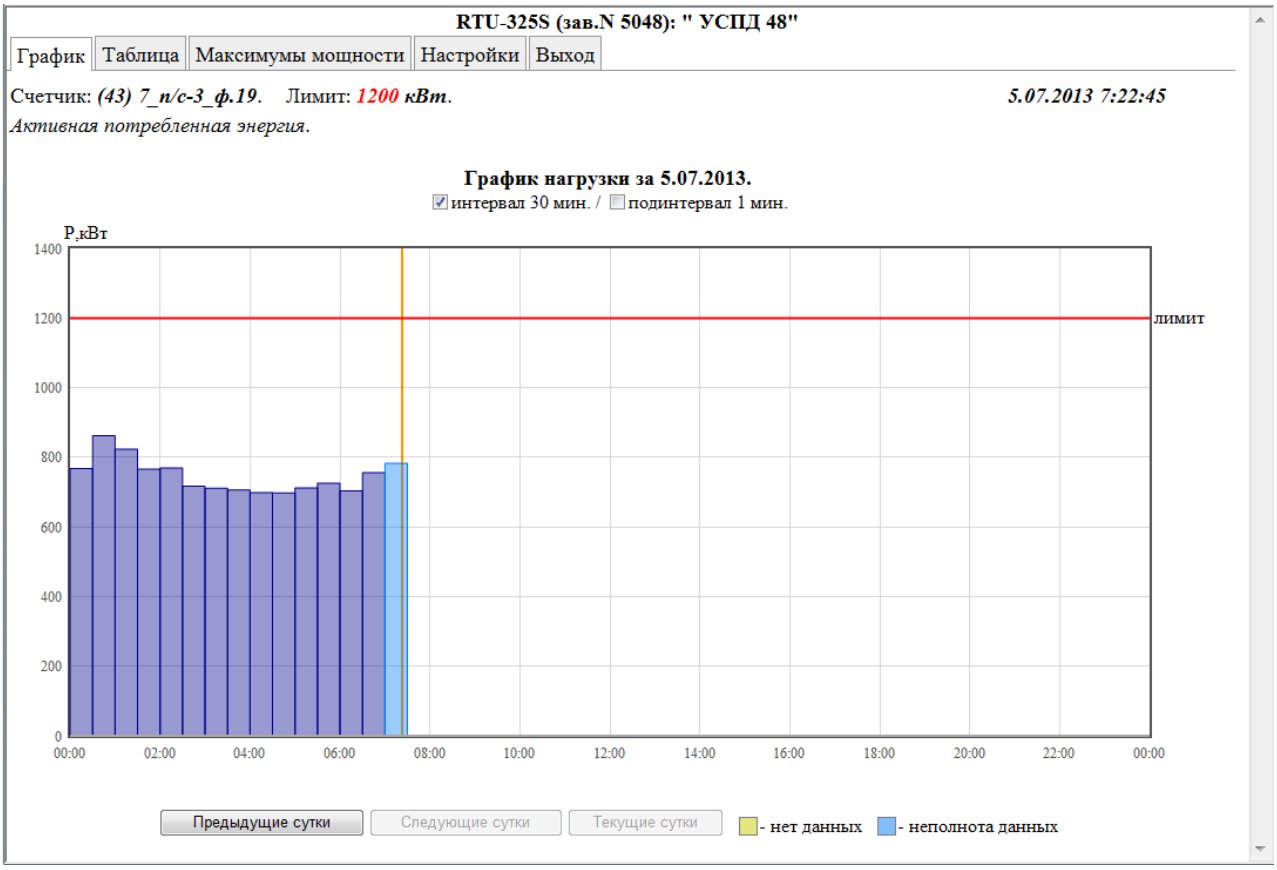
The right column shows the projection of the average over the interval if the values of all subsequent sub-intervals of the interval are equal to the last sub-interval of the meter or the last total sub-interval of the group of meters. However, the last total meter-interval may be incomplete, as the sub-intervals from the meters do not occur simultaneously (see the color of the last column on the left graph).

The color of the columns will be as given in the paragraph 'Construction' > 'Cveta' > 'Expectation' if the projection value is less than the limit given by the user. Otherwise, the colour will be set as given in the paragraph 'Construction' > 'Cluster' > 'Exceeding the limit'.

The red line in the graphs indicates the limit value given by the user in the "Construction" point.

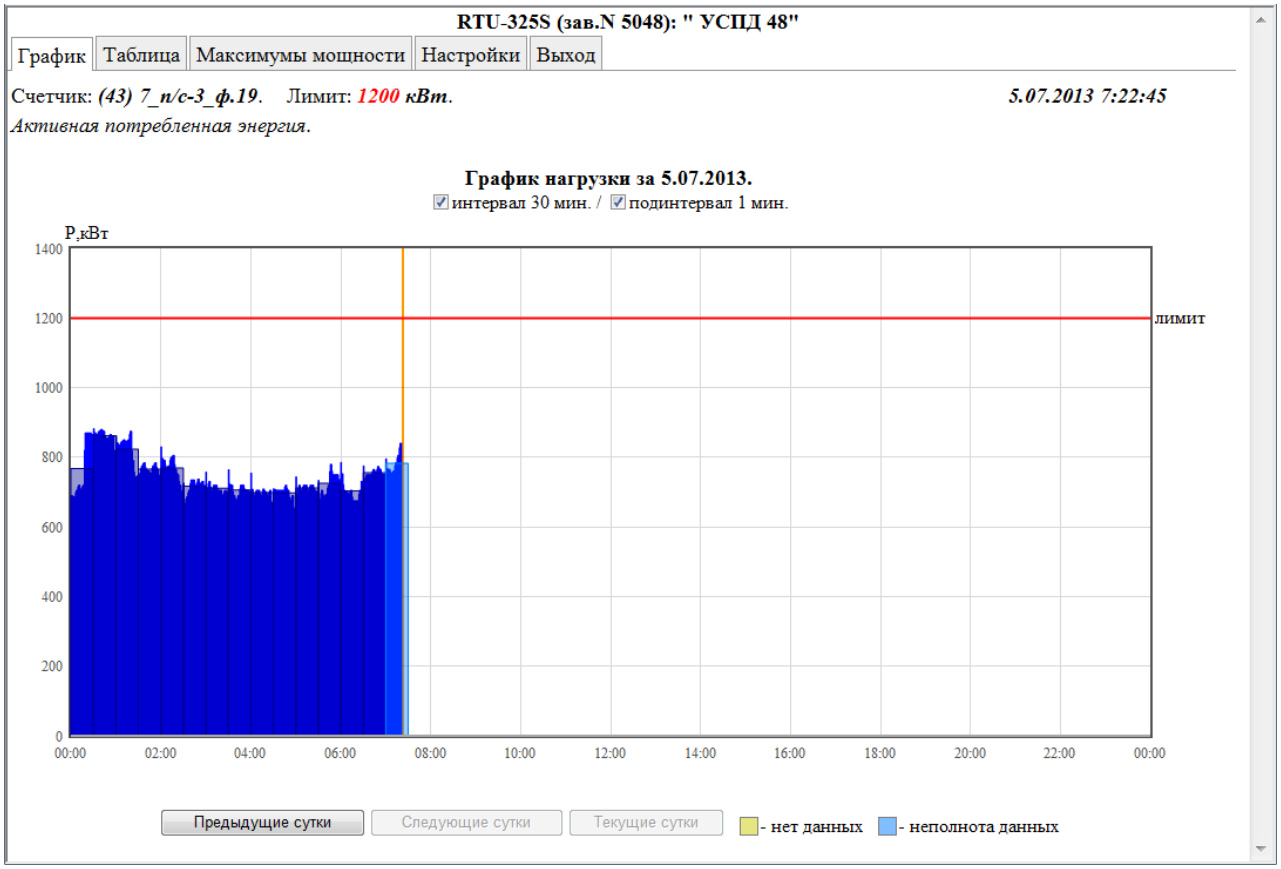
A 24-hour load schedule.

This type of graph shows average power values at 24-hour intervals:

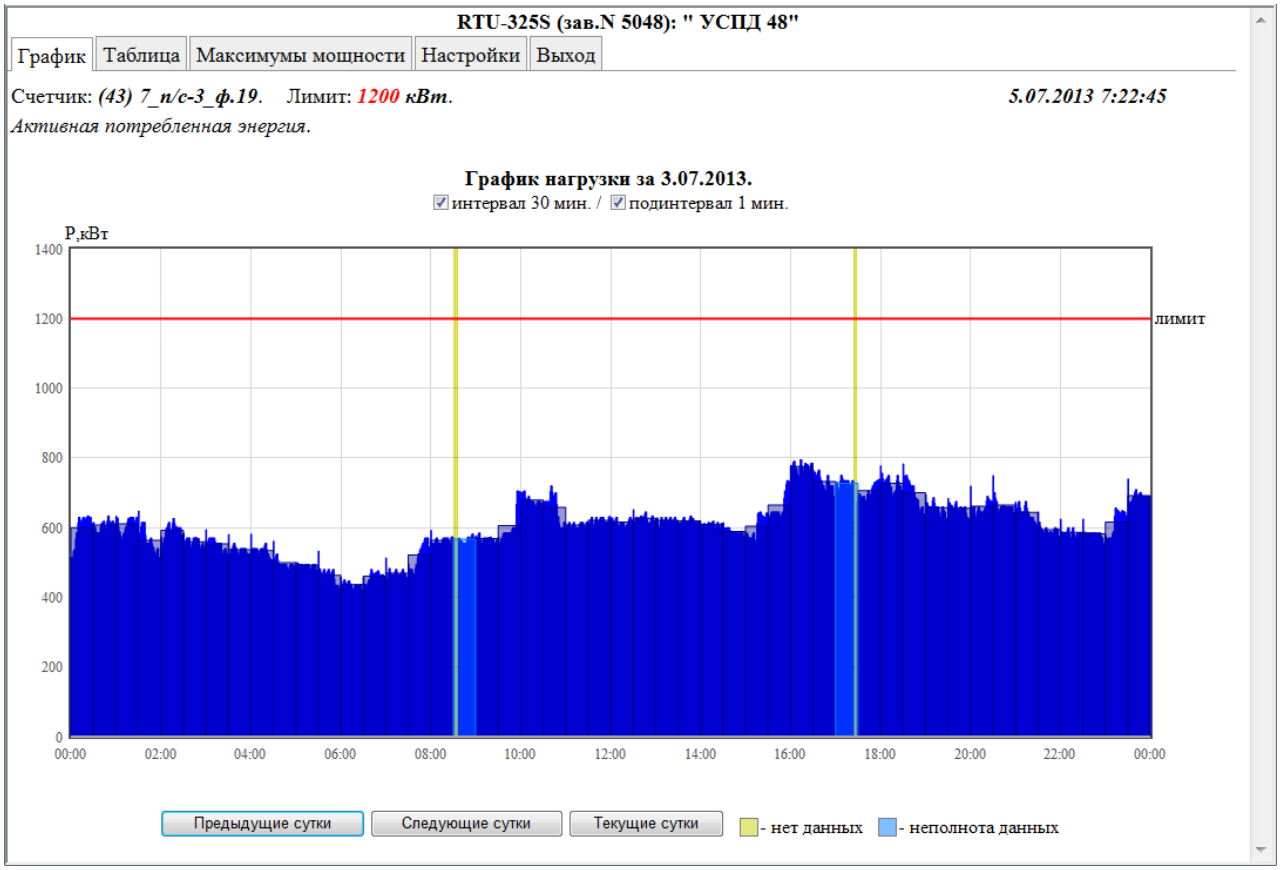


Column colours will correspond to the colors selected by the user in the paragraphs "Construction" > "Tweet" > "Interval" and "Construction" > "Tweet" > "Incomplete data" for complete and incomplete intervals respectively.

On the graph, the user may display intervals and/or sub-intervals. The required values for this purpose should be noted by the symbol. Example of a graph with the data on the intervals and sub-intervals:



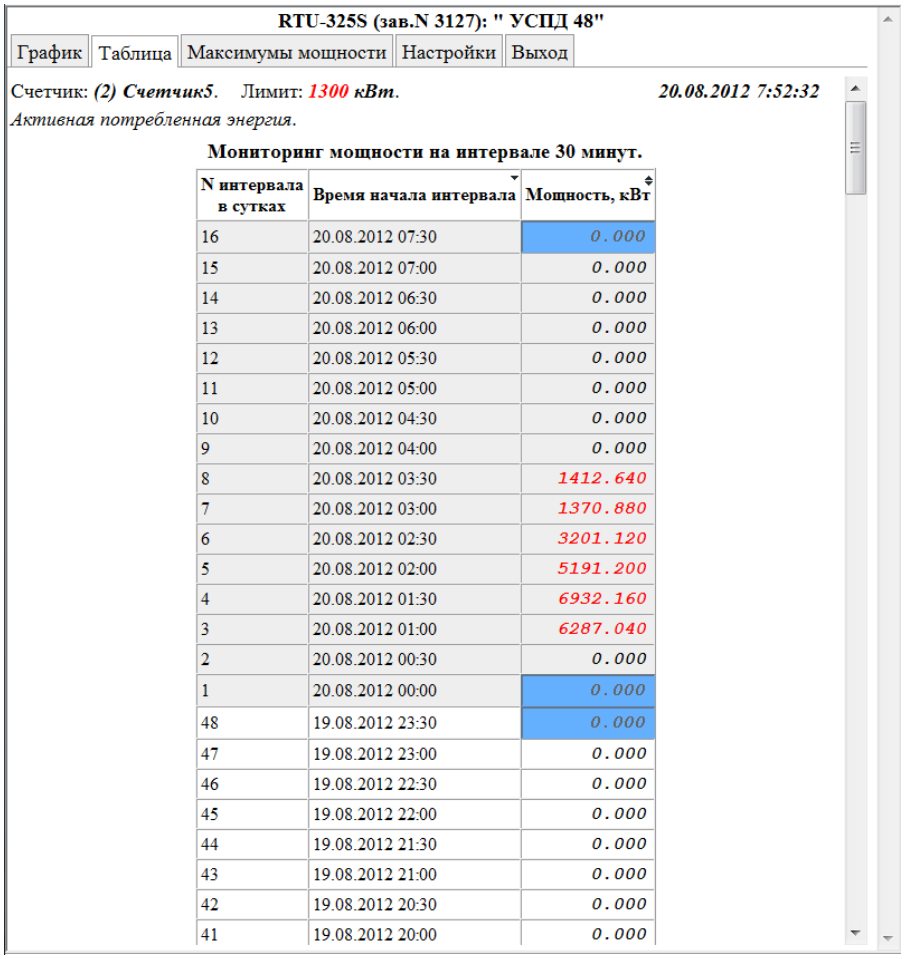
This graph shows the data flow in real time. You can also look at the data from the previous few days. To do this, press the button < preceding 24 hours>:



To return to the current day, press the button <Next day> or <Todays").

The red line on the graph indicates the limit given by the user in the "Construction" point.

1.2.3.3. Table monitoring. When selecting the input "Таблица", the user will be provided with the following monitoring table by frequency:



RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Максимумы мощности | Настройки | Выход

Счетчик: *(2) Счетчик5*. Лимит: *1300 кВт*. *20.08.2012 7:52:32*

Активная потребленная энергия.

Мониторинг мощности на интервале 30 минут.

N интервала в сутках	Время начала интервала	Мощность, кВт
16	20.08.2012 07:30	0.000
15	20.08.2012 07:00	0.000
14	20.08.2012 06:30	0.000
13	20.08.2012 06:00	0.000
12	20.08.2012 05:30	0.000
11	20.08.2012 05:00	0.000
10	20.08.2012 04:30	0.000
9	20.08.2012 04:00	0.000
8	20.08.2012 03:30	1412.640
7	20.08.2012 03:00	1370.880
6	20.08.2012 02:30	3201.120
5	20.08.2012 02:00	5191.200
4	20.08.2012 01:30	6932.160
3	20.08.2012 01:00	6287.040
2	20.08.2012 00:30	0.000
1	20.08.2012 00:00	0.000
48	19.08.2012 23:30	0.000
47	19.08.2012 23:00	0.000
46	19.08.2012 22:30	0.000
45	19.08.2012 22:00	0.000
44	19.08.2012 21:30	0.000
43	19.08.2012 21:00	0.000
42	19.08.2012 20:30	0.000
41	19.08.2012 20:00	0.000

The table presents real-time data. When new data are received, the table is automatically updated.

The frequency values are shown at the depth of the monitoring data. Different background colours (white and grey background) are distinguished for readability.

The total value at the interval shall be displayed in black if the power limit value given by the user in the `Construction' > 'Glory limit' is not exceeded. Otherwise, the color of the number will be as given in the paragraph 'Construction' > 'Tweet' > 'Exceedance of the limit'. The incompleteness of the data at the interval is displayed by the background color given in the paragraph 'Construction' > 'Tweet' > 'Incomplete data'.

Also in this paragraph, the user can look at sub-interval data for the selected interval. To do this, you have to put the mouse pointer on the line at the required interval and click the left mouse button. The result will be that the following table will be submitted to the user, which contains the meter sub-interval values at the selected interval:



RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Максимумы мощности | Настройки | Выход

Счетчик: *(2) Счетчик5*. Лимит: *0 кВт*. *20.08.2012 11:32:34*

Активная потребленная энергия.

Мощность на подинтервалах.
Начало интервала: *20.07.2012 3:30:00*.

N п/п	Объект	Мощность на интервале, кВт	Мощность на подинтервалах, кВт																						
			3:30	3:31	3:32	3:33	3:34	3:35	3:36	3:37	3:38	3:39	3:40	3:41	3:42	3:43	3:44	3:45	3:46	3:47	3:48	3:49	3:50	3:51	3
1	(2) Счетчик5	1412.6	2023.2	2029.2	1995.6	2038.3	1978.3	1988.3	1311.9	1566.6	1873.5	3145.7	4790.5	5023.7	4773.6	3631.3	4209.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0

For the group of meters, the averages of the group sub-intervals (fat typeface) will be shown and the following rows (normal typeface) will be placed with the sub-points for each group meter:


RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Максимумы мощности | Настройки | Выход

Группа: ***Группа 2***. Лимит: ***200 кВт***. ***20.08.2012 14:02:20***

Активная потребленная энергия.

Мощность на подинтервалах.
Начало интервала: ***20.07.2012 13:00:00***.

Подробнее...

N п/п	Объект	Мощность на интервале, кВт	Мощность на подинтервалах, кВт					
			13:00	13:05	13:10	13:15	13:20	13:25
1	**Группа 2**	***616.2***	***633.5***	***637.5***	***619.6***	***603.7***	***607.5***	***604.1***
2	(3) Счетчик6	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
3	(4) Счетчик7	*616.2*	*633.5*	*637.5*	*619.6*	*603.7*	*607.5*	*604.1*

If the group includes meters with different sub-points, the minimum value of the sub-interval will be taken as the minimum multiple of all sub-intervals. Then the user will be provided with a detailed table containing sub-interval values for each meter, using the <detail...> button:

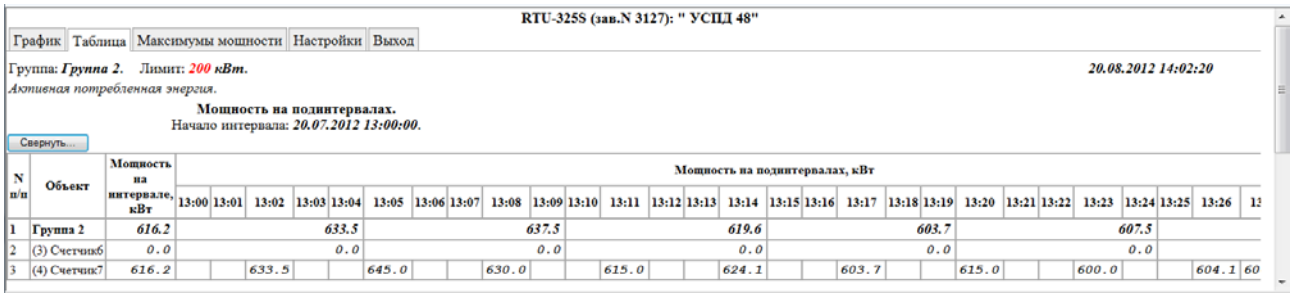

RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Максимумы мощности | Настройки | Выход

Группа: ***Группа 2***. Лимит: ***200 кВт***. ***20.08.2012 14:02:20***

Активная потребленная энергия.

Мощность на подинтервалах.
Начало интервала: ***20.07.2012 13:00:00***.

Свернуть...

N п/п	Объект	Мощность на интервале, кВт	Мощность на подинтервалах, кВт																												
			13:00	13:01	13:02	13:03	13:04	13:05	13:06	13:07	13:08	13:09	13:10	13:11	13:12	13:13	13:14	13:15	13:16	13:17	13:18	13:19	13:20	13:21	13:22	13:23	13:24	13:25	13:26	13
1	**Группа 2**	***616.2***					***633.5***					***637.5***					***619.6***					***603.7***					***607.5***				
2	(3) Счетчик6	*0.0*					*0.0*					*0.0*					*0.0*					*0.0*					*0.0*				
3	(4) Счетчик7	*616.2*			*633.5*			*645.0*			*630.0*			*615.0*			*624.1*			*603.7*			*615.0*			*600.0*			*604.1*	*60*

To return to the monitoring mode, the interval power shall be applied to the "Таблица" tab.

1.2.3.4. The search for maximum power. In selecting the input "Максимумы мощности", the user will be provided with the following form of selection of the maximum power period:

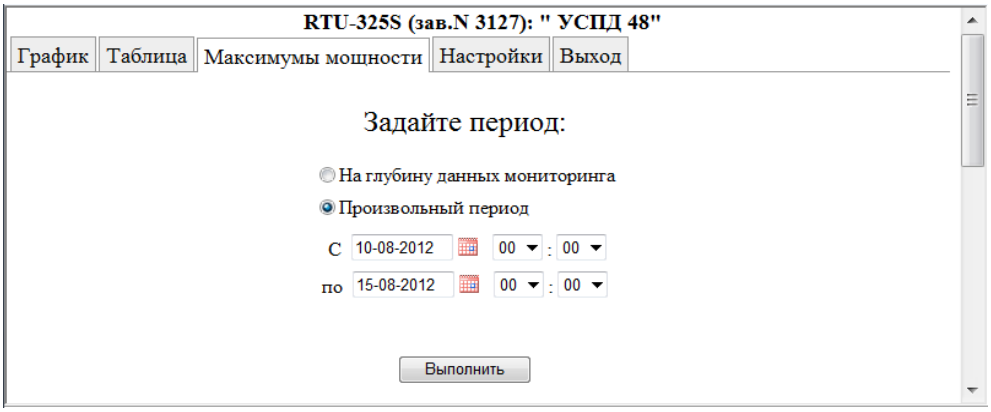

RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Максимумы мощности | Настройки | Выход

Задайте период:

На глубину данных мониторинга

Произвольный период

С 10-08-2012 00 : 00

по 15-08-2012 00 : 00

Выполнить

Maximums can be determined over the entire period at the depth of monitoring data or over an arbitrary period within the depth of monitoring data. The following table will be presented to the user after the period and the push of the button <Enact>:

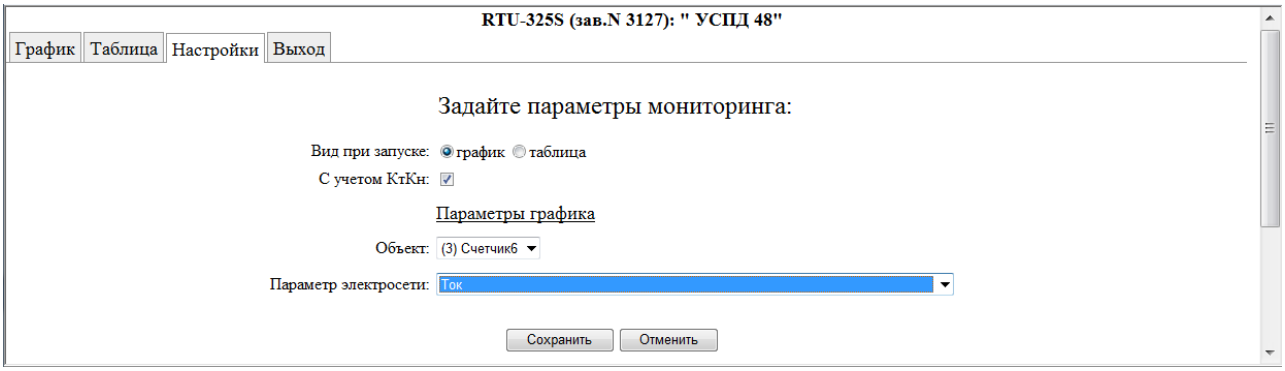


This table contains a list of all RTU meters and groups that are registered with sub-intervals.

1.2.4. Monitoring of grid parameters.

This paragraph monitors the electrical grid parameters against the selected meter. Monitoring is possible either graphically or in tabular form. The user is also given the opportunity to view the grid parameters at the storage depth of the RAM data (the menu item "Настройки" > "Архивы" > "Размер архивов в ОЗУ" > 'Designator' Parameters).

1.2.4.1. The settings. When this application is launched, the user will be provided with a program configuration window that can be stored in RTU. Later you can go through this window from the "Настройки" tab:

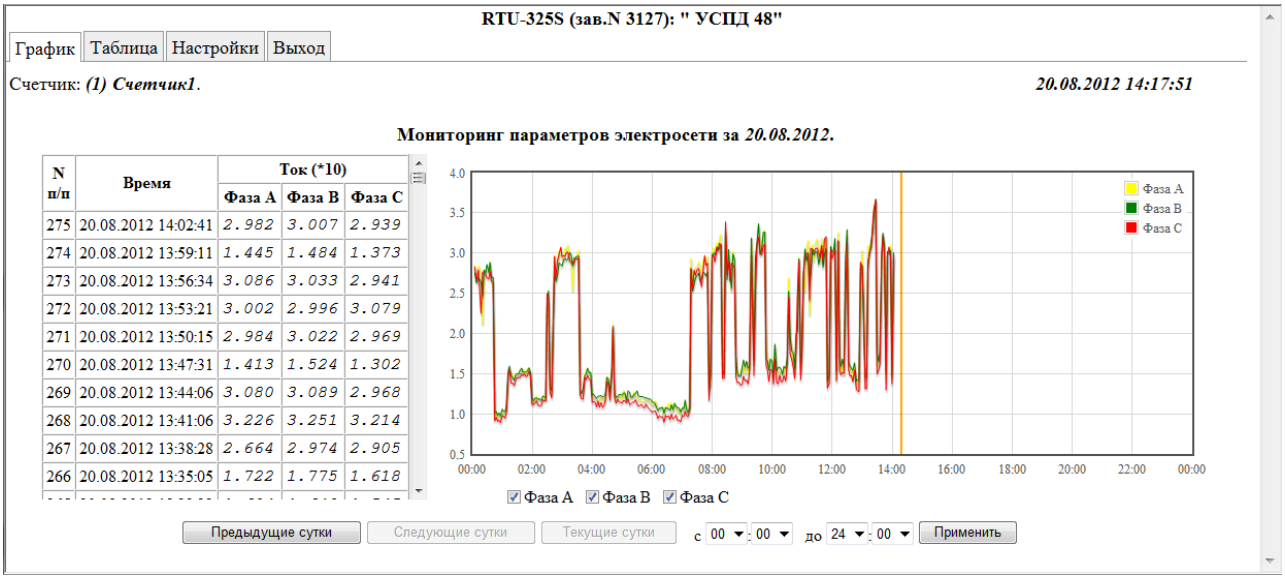


In this window, the user must select the type of monitoring that will be displayed at the next application start and take into account the Kt and Kn coefficients in the data display.

At the bottom of the window, the meter and the power grid parameter to be monitored need to be selected.

After completing all the necessary parameters, the user can save the selected parameters on the RTU button <Save>.

1.2.4.2. Graphic monitoring. In selecting the input "График", the user will be provided with graphical monitoring of the grid parameters for the selected meter and parameter. A table monitoring of graphic data is provided to the left of the graph.



N п/п	Время	Ток (*10)		
		Фаза A	Фаза B	Фаза C
275	20.08.2012 14:02:41	2.982	3.007	2.939
274	20.08.2012 13:59:11	1.445	1.484	1.373
273	20.08.2012 13:56:34	3.086	3.033	2.941
272	20.08.2012 13:53:21	3.002	2.996	3.079
271	20.08.2012 13:50:15	2.984	3.022	2.969
270	20.08.2012 13:47:31	1.413	1.524	1.302
269	20.08.2012 13:44:06	3.080	3.089	2.968
268	20.08.2012 13:41:06	3.226	3.251	3.214
267	20.08.2012 13:38:28	2.664	2.974	2.905
266	20.08.2012 13:35:05	1.722	1.775	1.618

When loaded, the display period on the graph will be set to the full day. The graph shows data for all possible phases for this parameter. The graphs of the different phases are shown in different colours.

The user may change the timescale of the schedule by setting the hours and minutes of the beginning and end of the period (changes will enter into force by pressing the button <Apply>. The user may change the range of the values displayed on the Y-axis:

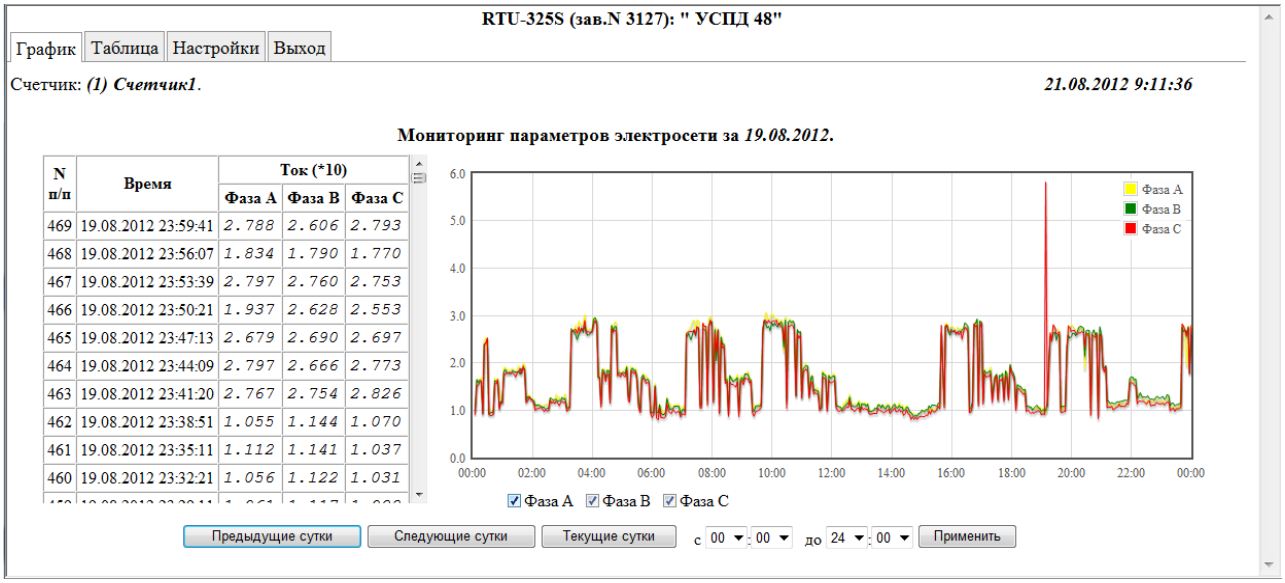
- from zero to maximum graph value,
- from the minimum to the maximum value of the given graph.

The switch between display ranges is done by clicking the left mouse button on the graph field.

You can turn on/off the phase display by clicking on the left square from the corresponding phase name.

The above graph shows the data flow in real time. The vertical orange stripe marks the current RTU.

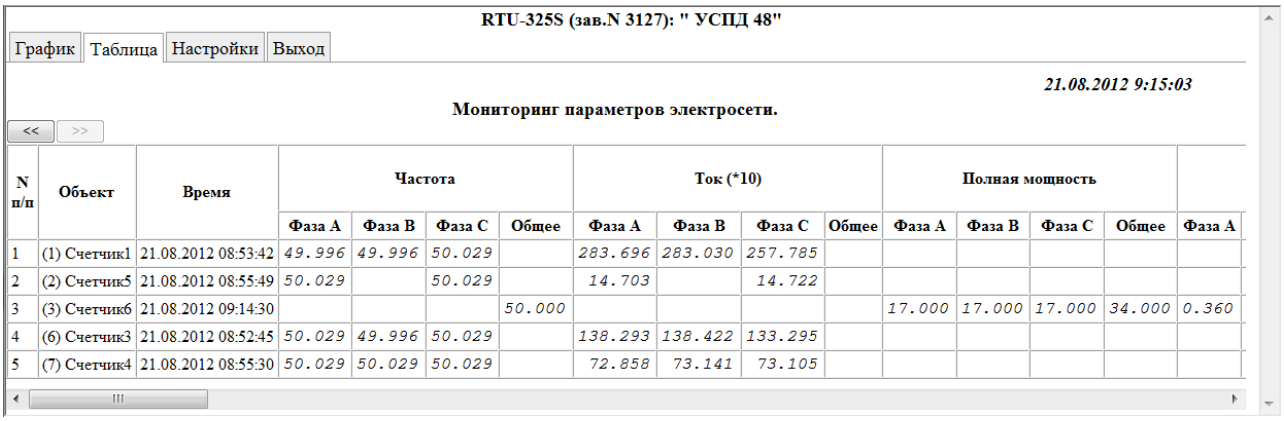
It is also possible to look at the data from the previous few days at the depth of the monitoring data by pressing the key <the previous day>:



N п/п	Время	Ток (*10)		
		Фаза A	Фаза B	Фаза C
469	19.08.2012 23:59:41	2.788	2.606	2.793
468	19.08.2012 23:56:07	1.834	1.790	1.770
467	19.08.2012 23:53:39	2.797	2.760	2.753
466	19.08.2012 23:50:21	1.937	2.628	2.553
465	19.08.2012 23:47:13	2.679	2.690	2.697
464	19.08.2012 23:44:09	2.797	2.666	2.773
463	19.08.2012 23:41:20	2.767	2.754	2.826
462	19.08.2012 23:38:51	1.055	1.144	1.070
461	19.08.2012 23:35:11	1.112	1.141	1.037
460	19.08.2012 23:32:21	1.056	1.122	1.031

To return to the current day, press the button <Next day> or <Todays").

1.2.4.3. Table monitoring. When selecting the input "Таблица", the user will be provided with table monitoring of the power grid input for all RTU meters:



RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Настройки | Выход

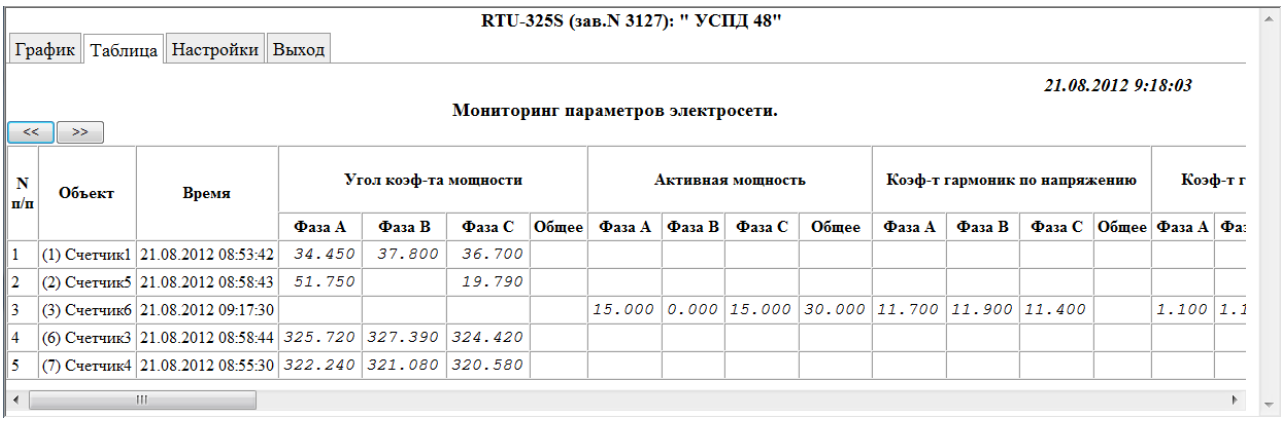
21.08.2012 9:15:03

Мониторинг параметров электросети.

<< >>

N п/п	Объект	Время	Частота				Ток (*10)				Полная мощность				
			Фаза А	Фаза В	Фаза С	Общее	Фаза А	Фаза В	Фаза С	Общее	Фаза А	Фаза В	Фаза С	Общее	Фаза А
1	(1) Счетчик1	21.08.2012 08:53:42	49.996	49.996	50.029		283.696	283.030	257.785						
2	(2) Счетчик5	21.08.2012 08:55:49	50.029		50.029		14.703		14.722						
3	(3) Счетчик6	21.08.2012 09:14:30				50.000					17.000	17.000	17.000	34.000	0.360
4	(6) Счетчик3	21.08.2012 08:52:45	50.029	49.996	50.029		138.293	138.422	133.295						
5	(7) Счетчик4	21.08.2012 08:55:30	50.029	50.029	50.029		72.858	73.141	73.105						

For ease of reference, the user may move the columns to the left/right by pressing the buttons and :



RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Настройки | Выход

21.08.2012 9:18:03

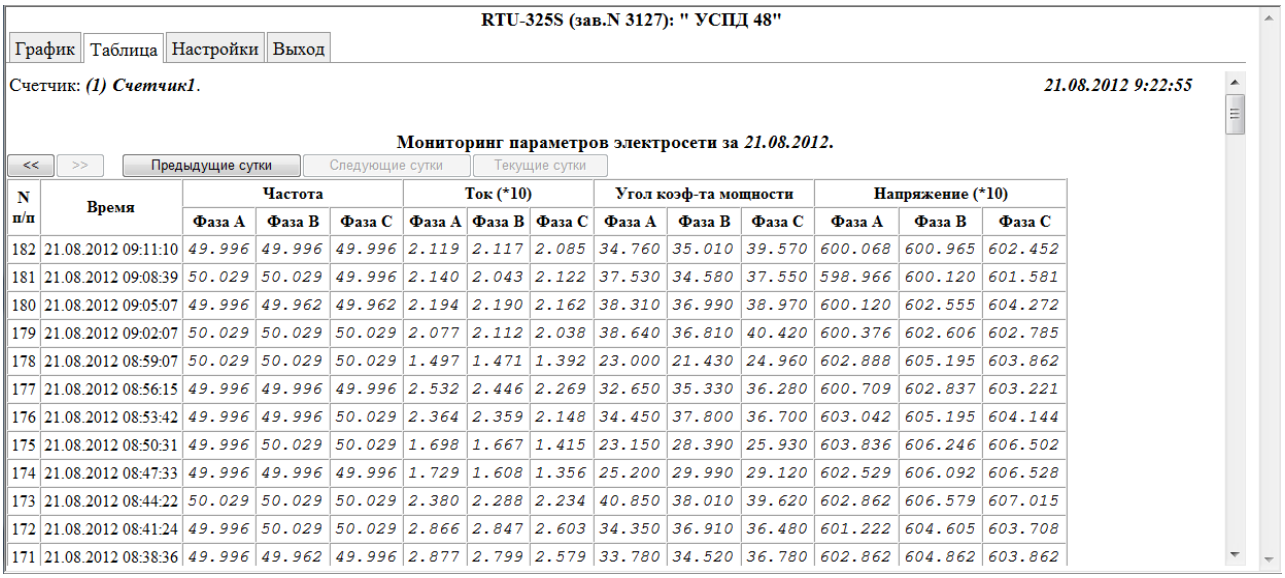
Мониторинг параметров электросети.

<< >>

N п/п	Объект	Время	Угол коэф-та мощности				Активная мощность				Коэф-т гармоник по напряжению				Коэф-т г	
			Фаза А	Фаза В	Фаза С	Общее	Фаза А	Фаза В	Фаза С	Общее	Фаза А	Фаза В	Фаза С	Общее	Фаза А	Фа
1	(1) Счетчик1	21.08.2012 08:53:42	34.450	37.800	36.700											
2	(2) Счетчик5	21.08.2012 08:58:43	51.750		19.790											
3	(3) Счетчик6	21.08.2012 09:17:30					15.000	0.000	15.000	30.000	11.700	11.900	11.400		1.100	1.1
4	(6) Счетчик3	21.08.2012 08:58:44	325.720	327.390	324.420											
5	(7) Счетчик4	21.08.2012 08:55:30	322.240	321.080	320.580											

When the left mouse button is clicked on a table cell with a grid parameter, graphic monitoring of the corresponding meter/parameter will be provided to the user (see graphical monitoring).

The user will be provided with a table of data monitoring for the current day selected meter when the left mouse button is clicked on the cell of the table with the name of the object:



RTU-325S (зав.N 3127): " УСПД 48"

График | Таблица | Настройки | Выход

Счетчик: *(1) Счетчик1*. 21.08.2012 9:22:55

Мониторинг параметров электросети за *21.08.2012*.

<< >> Предыдущие сутки Следующие сутки Текущие сутки

N п/п	Время	Частота			Ток (*10)			Угол коэф-та мощности			Напряжение (*10)		
		Фаза А	Фаза В	Фаза С	Фаза А	Фаза В	Фаза С	Фаза А	Фаза В	Фаза С	Фаза А	Фаза В	Фаза С
182	21.08.2012 09:11:10	49.996	49.996	49.996	2.119	2.117	2.085	34.760	35.010	39.570	600.068	600.965	602.452
181	21.08.2012 09:08:39	50.029	50.029	49.996	2.140	2.043	2.122	37.530	34.580	37.550	598.966	600.120	601.581
180	21.08.2012 09:05:07	49.996	49.962	49.962	2.194	2.190	2.162	38.310	36.990	38.970	600.120	602.555	604.272
179	21.08.2012 09:02:07	50.029	50.029	50.029	2.077	2.112	2.038	38.640	36.810	40.420	600.376	602.606	602.785
178	21.08.2012 08:59:07	50.029	50.029	50.029	1.497	1.471	1.392	23.000	21.430	24.960	602.888	605.195	603.862
177	21.08.2012 08:56:15	49.996	49.996	49.996	2.532	2.446	2.269	32.650	35.330	36.280	600.709	602.837	603.221
176	21.08.2012 08:53:42	49.996	49.996	50.029	2.364	2.359	2.148	34.450	37.800	36.700	603.042	605.195	604.144
175	21.08.2012 08:50:31	49.996	50.029	50.029	1.698	1.667	1.415	23.150	28.390	25.930	603.836	606.246	606.502
174	21.08.2012 08:47:33	49.996	49.996	49.996	1.729	1.608	1.356	25.200	29.990	29.120	602.529	606.092	606.528
173	21.08.2012 08:44:22	50.029	50.029	50.029	2.380	2.288	2.234	40.850	38.010	39.620	602.862	606.579	607.015
172	21.08.2012 08:41:24	49.996	50.029	50.029	2.866	2.847	2.603	34.350	36.910	36.480	601.222	604.605	603.708
171	21.08.2012 08:38:36	49.996	49.962	49.996	2.877	2.799	2.579	33.780	34.520	36.780	602.862	604.862	603.862

This table shows the data for the previous few days at the monitoring depth. For this purpose, the user can move 24 hours a day ago/forward by pressing the keys < preceding 24 hours>, <the next 24 hours>, <current 24 hours>.

1.2.5. Monitoring of group imbalances.

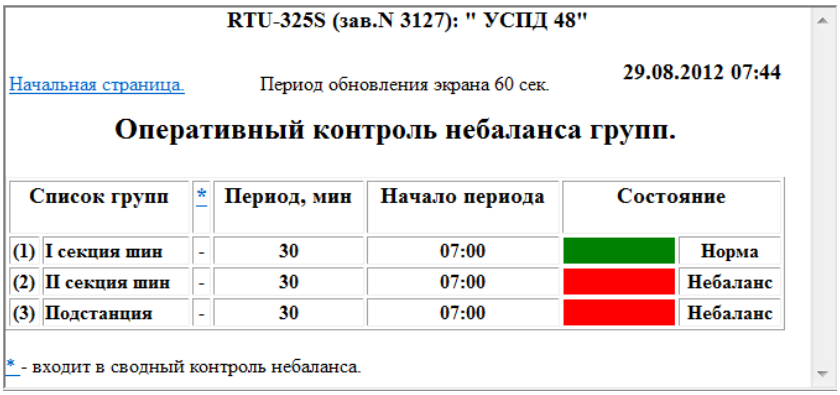
This paragraph monitors the imbalance of groups. The calculation of the imbalance shall be performed according to the regulatory document "Model instruction for accounting for electricity production, transmission and distribution. RD 34.09.101-94".

A list of groups for which the monitoring of the imbalance is needed should be established by the user in paragraph «Учёт» > «Учёт электроэнергии» > «Группы» > «Балансовые группы» of the «Конфигуратор» programme.

This application is the equivalent of «Сервис...» > «Контроль небаланса групп» built-in software RTU.

The methodology for calculating the imbalance and functioning of this annex is described in document «Часть 1. Основные принципы работы и конфигурирования».

The following report will be submitted to the user at the time of the application launch:



RTU-325S (зав.N 3127): " УСПД 48"

Начальная страница Период обновления экрана 60 сек. 29.08.2012 07:44

Оперативный контроль небаланса групп.

Список групп	*	Период, мин	Начало периода	Состояние	
(1) I секция шин	-	30	07:00		Норма
(2) II секция шин	-	30	07:00		Небаланс
(3) Подстанция	-	30	07:00		Небаланс

* - входит в сводный контроль небаланса.

1.2.6. RTU auto-diagnosis.

RTU auto-diagnosis is a real-time automatic diagnostic subsystem of RTU functions and the transfer of control results to external devices or systems in various ways.

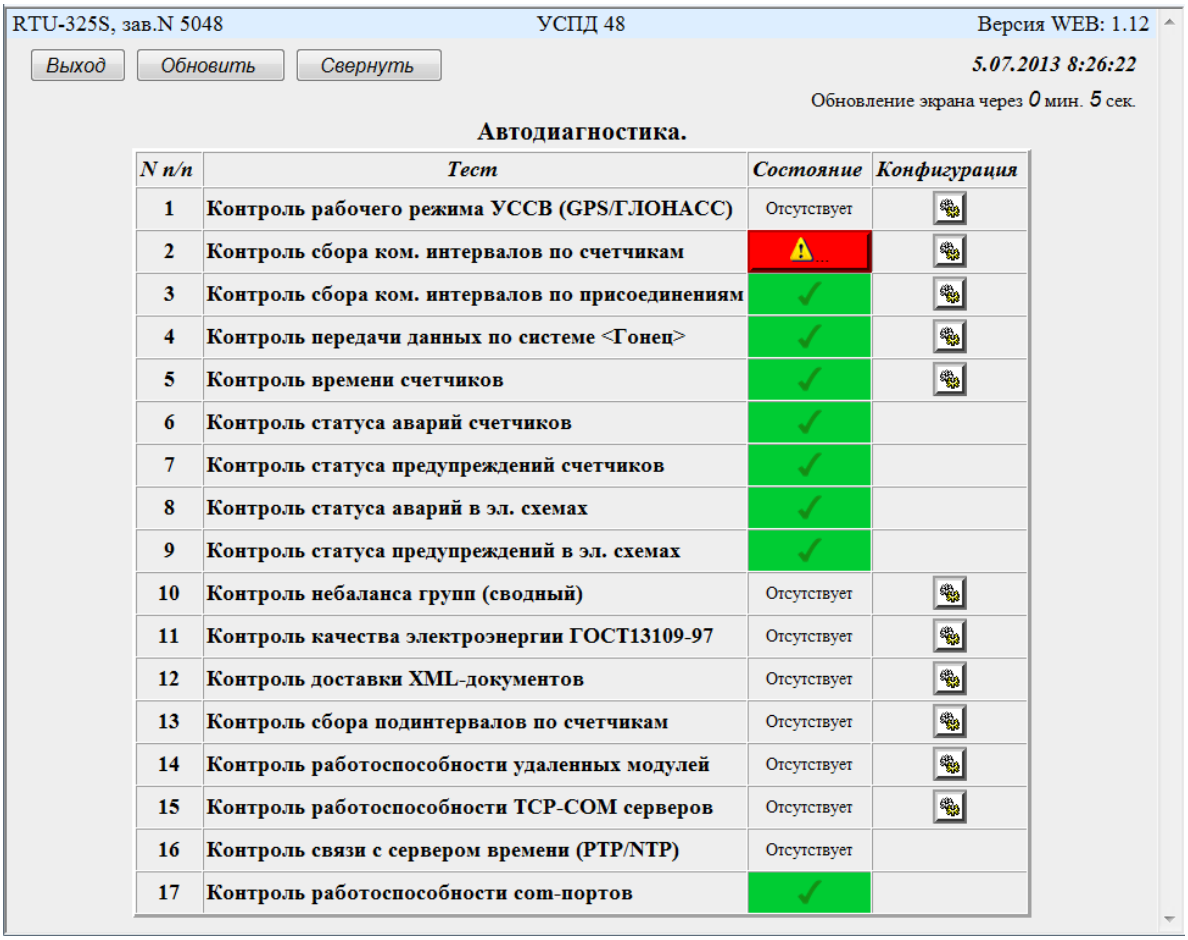
A list of the required functions and their configuration is given in «УСПД» > «Задания по автодиагностике УСПД».

RTU autodiagnosis automatically performs test diagnostic functions. The result of each function is an evaluation of: «Норма» or «Предупреждение».

The auto-diagnosis functions of RTU are described in document «Часть1. Основные принципы работы и конфигурирования».

If the function is performed on multiple objects, the assessment «Норма» shall be obtained if the performance of the function for each object produces an estimate of «Норма» (logical operation «И»). If the performance of a given function for a given object produces an evaluation of «Предупреждение», the overall evaluation of that function shall be «Предупреждение».

The following table will be presented to the user at the start of the application:



N n/n	Тест	Состояние	Конфигурация
1	Контроль рабочего режима УССВ (GPS/ГЛОНАСС)	Отсутствует	
2	Контроль сбора ком. интервалов по счетчикам	⚠	
3	Контроль сбора ком. интервалов по присоединениям	✓	
4	Контроль передачи данных по системе <Гонец>	✓	
5	Контроль времени счетчиков	✓	
6	Контроль статуса аварий счетчиков	✓	
7	Контроль статуса предупреждений счетчиков	✓	
8	Контроль статуса аварий в эл. схемах	✓	
9	Контроль статуса предупреждений в эл. схемах	✓	
10	Контроль небаланса групп (сводный)	Отсутствует	
11	Контроль качества электроэнергии ГОСТ13109-97	Отсутствует	
12	Контроль доставки XML-документов	Отсутствует	
13	Контроль сбора подинтервалов по счетчикам	Отсутствует	
14	Контроль работоспособности удаленных модулей	Отсутствует	
15	Контроль работоспособности TCP-COM серверов	Отсутствует	
16	Контроль связи с сервером времени (PTP/NTP)	Отсутствует	
17	Контроль работоспособности com-портов	✓	

The upper right corner shows the time of the last update of the screen (RTU time). Below is a countdown of time until the next update of the screen. The user can manually update the screen using the <update>.

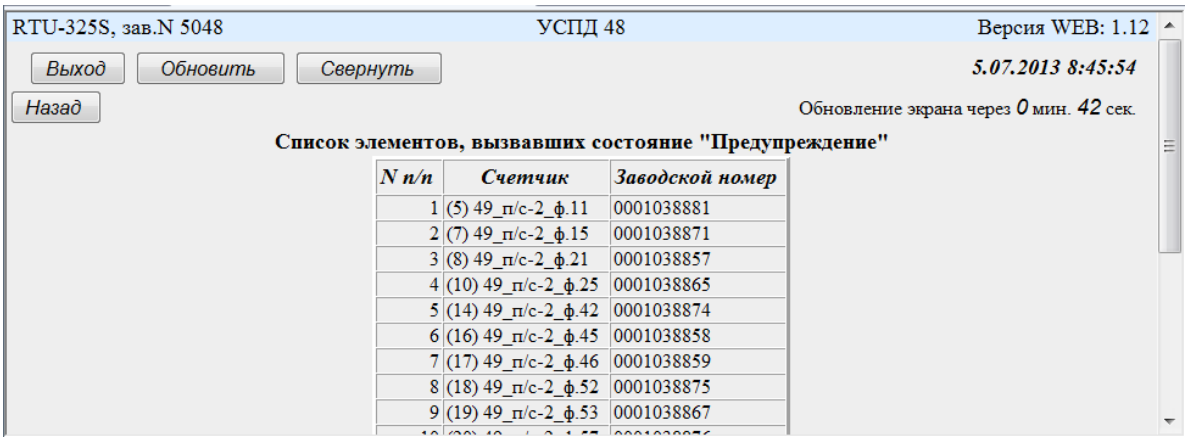
The State column assesses the performance of the function. The value «Отсутствует» indicates that there are no facilities to perform the function (no GPS, TCP-COM servers, etc.). In order to hide the function with the evaluation «Отсутствует», it is necessary to place '-' in front of these functions in the 'Chart' program or to press the button <Check> in the current session:



N n/n	Тест	Состояние	Конфигурация
1	Контроль сбора ком. интервалов по счетчикам	⚠	
2	Контроль сбора ком. интервалов по присоединениям	✓	
3	Контроль передачи данных по системе <Гонец>	✓	
4	Контроль времени счетчиков	✓	
5	Контроль статуса аварий счетчиков	✓	
6	Контроль статуса предупреждений счетчиков	✓	
7	Контроль статуса аварий в эл. схемах	✓	
8	Контроль статуса предупреждений в эл. схемах	✓	
9	Контроль работоспособности com-портов	✓	

To display all functions, click the < Deploy> button. In case of an evaluation of «Норма» the row contains . ✓

In the case of an evaluation of «Предупреждение» the box contains a button. By pressing it, the user will see a list of objects that caused the alert state:



To return to monitoring, press the button <Return>.

1.3. Archives.

This paragraph provides the user with an opportunity to view data from the RTU archives. The following data can be viewed:

- a journal of events,
- Authorisation journal,
- Switch log,
- Cost profiles,
- Self-reading,
- meter readings,
- Electrical parameters,
- Data cuts.

1.3.1. A magazine of events.

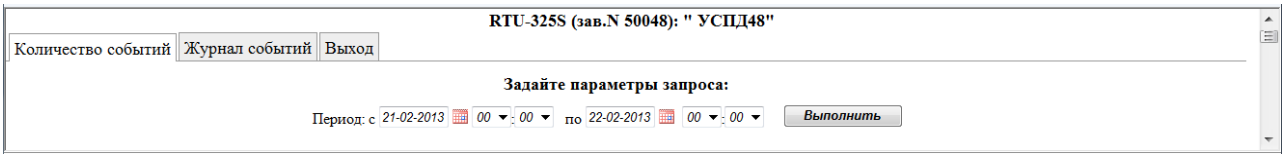
This paragraph provides the user with an opportunity to view the event log from the RTU archive.

The following tabs are available to the user:

- The number of events.
- The journal of events.

The work of the annex on these tabs is described below.

1.3.1.1. Number of events. The "Количество событий" tab will be opened to the user when the application is launched with a request form:



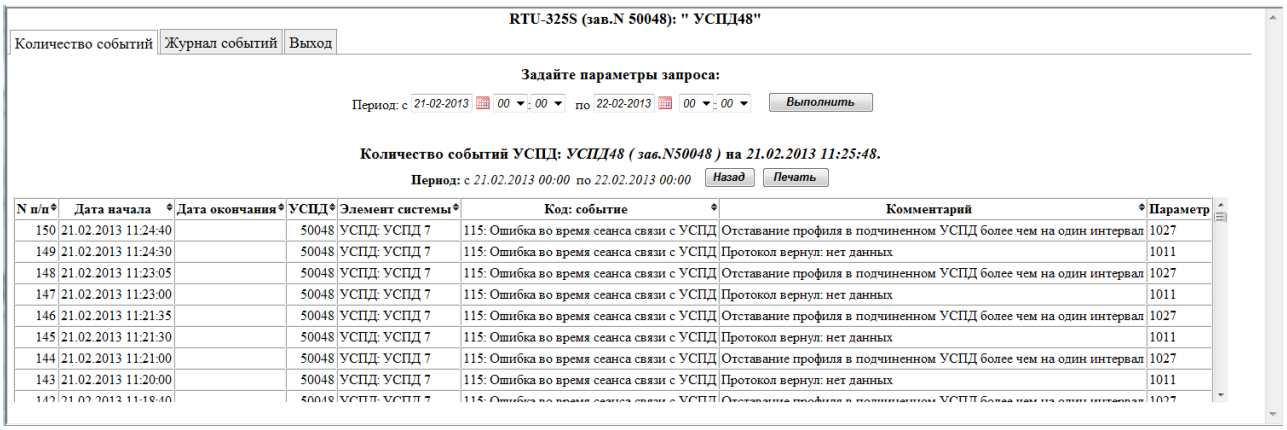
In this window, the user should set the time period for requesting the data and press the button <fail>. The result will be the following report to the user:



УСПД	Элемент системы	Количество	Код: Событие
50048	УСПД: УСПД 7	150	115: Ошибка во время сеанса связи с УСПД
50048	УСПД: УСПД 49	147	115: Ошибка во время сеанса связи с УСПД
649	УСПД: УСПД 49	1	104: Окончание изменения времени в УСПД
649	УСПД: УСПД 49	1	103: Выдана команда на изменение времени в УСПД
649	УСПД: УСПД 49	1	108: Изменение времени в CMOS часах
50048	УСПД	1	123: Авторизованный вход в УСПД
50048	Счетчик (41) EM720	1	11: Ошибка во время сеанса связи со счетчиком
50048	Счетчик (41) EM720	1	9: Восстановление соединения со счетчиком

In order to change the data viewing period, the user must set a new period and press the button <do>. A new request to the RTU archives to obtain the newly registered RTU data will be completed using the <update data> button.

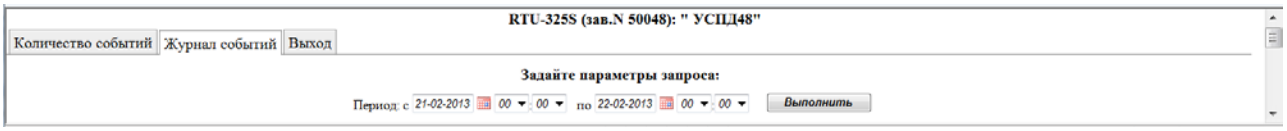
Next, the user can look at the details of the events by the selected code by button in the relevant line:



N п/п	Дата начала	Дата окончания	УСПД	Элемент системы	Код: событие	Комментарий	Параметр
150	21.02.2013 11:24:40		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
149	21.02.2013 11:24:30		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011
148	21.02.2013 11:23:05		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
147	21.02.2013 11:23:00		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011
146	21.02.2013 11:21:35		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
145	21.02.2013 11:21:30		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011
144	21.02.2013 11:21:00		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
143	21.02.2013 11:20:00		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011

To return to the previous table, press the button < Back>. The button <Steam> opens a window with a document prepared for printing. For this document to be printed, the user must click with the right mouse button in the open window and select "Sing..." on the context menu.

1.3.1.2. A magazine of events. In selecting the tab "Журнал событий", the following form will be submitted to the user for filling in:



The user will be provided with the current 24-hour event report:



N п/п	Дата начала	Дата окончания	УСПД	Элемент системы	Код: событие	Комментарий	Параметр
303	21.02.2013 11:26:30		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
302	21.02.2013 11:26:01		50048	УСПД: УСПД 49	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011
301	21.02.2013 11:26:00		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011
300	21.02.2013 11:25:24		50048	УСПД: УСПД 49	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
299	21.02.2013 11:24:40		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
298	21.02.2013 11:24:30		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011
297	21.02.2013 11:23:05		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Отставание профиля в подчиненном УСПД более чем на один интервал	1027
296	21.02.2013 11:23:00		50048	УСПД: УСПД 7	115: Ошибка во время сеанса связи с УСПД	Протокол вернул: нет данных	1011

To change the viewing parameters, the user must select the required filter parameters:

- It's great.
- RTU.
- The meter.
- The event code.
- Data request period.

After all the necessary parameters are performed, the user must press the button <Do> to display filtered data. A new request for RTU archives to obtain newly registered RTU data will be completed using the <update> button.

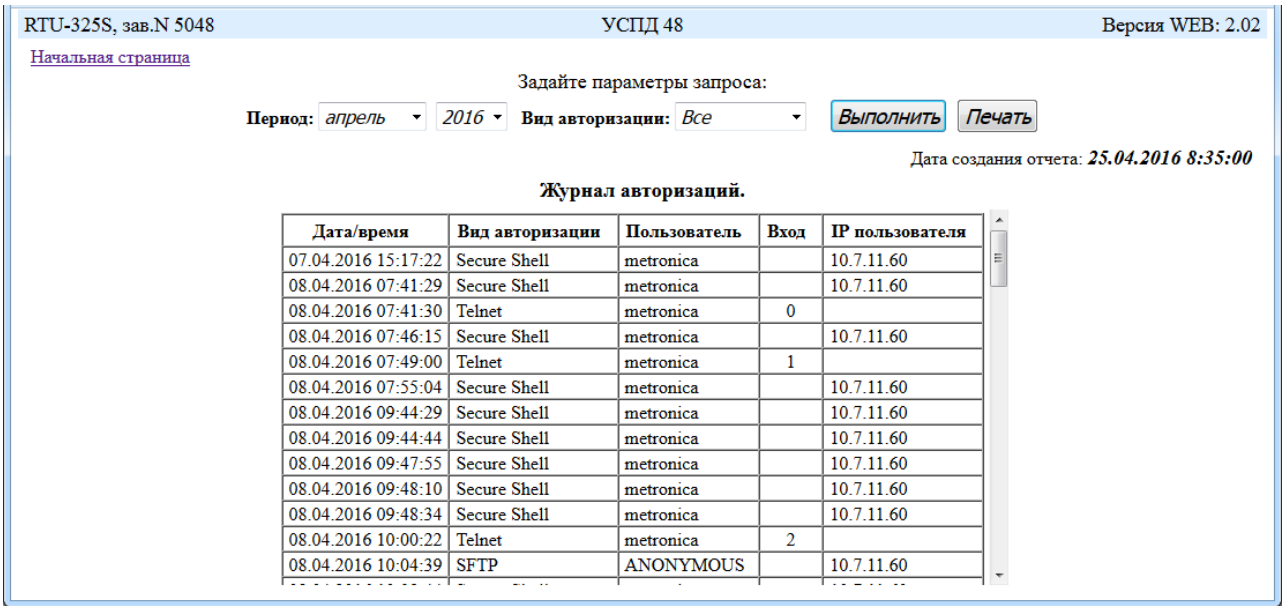
The button <Steam> will open a window with a document prepared for printing. For this document to be printed, the user must click with the right mouse button in the open window and select "Sing..." on the context menu.

1.3.2. Authorisation log.

This paragraph provides the user with the opportunity to view the RTU Authorisation Log. A view of the magazine is possible for all types of authorization and for one of the following:

- Telnet,
- SecureShell,
- SFTP,
- Web.

In selecting this application, the user will be provided with the form in which the period and type of authorization is required and press the button <Do>. As a result, the user will be provided with an authorisation report:



Дата/время	Вид авторизации	Пользователь	Вход	IP пользователя
07.04.2016 15:17:22	Secure Shell	metronica		10.7.11.60
08.04.2016 07:41:29	Secure Shell	metronica		10.7.11.60
08.04.2016 07:41:30	Telnet	metronica	0	
08.04.2016 07:46:15	Secure Shell	metronica		10.7.11.60
08.04.2016 07:49:00	Telnet	metronica	1	
08.04.2016 07:55:04	Secure Shell	metronica		10.7.11.60
08.04.2016 09:44:29	Secure Shell	metronica		10.7.11.60
08.04.2016 09:44:44	Secure Shell	metronica		10.7.11.60
08.04.2016 09:47:55	Secure Shell	metronica		10.7.11.60
08.04.2016 09:48:10	Secure Shell	metronica		10.7.11.60
08.04.2016 09:48:34	Secure Shell	metronica		10.7.11.60
08.04.2016 10:00:22	Telnet	metronica	2	
08.04.2016 10:04:39	SFTP	ANONYMOUS		10.7.11.60

This report can be printed by pressing the button <Steam>.

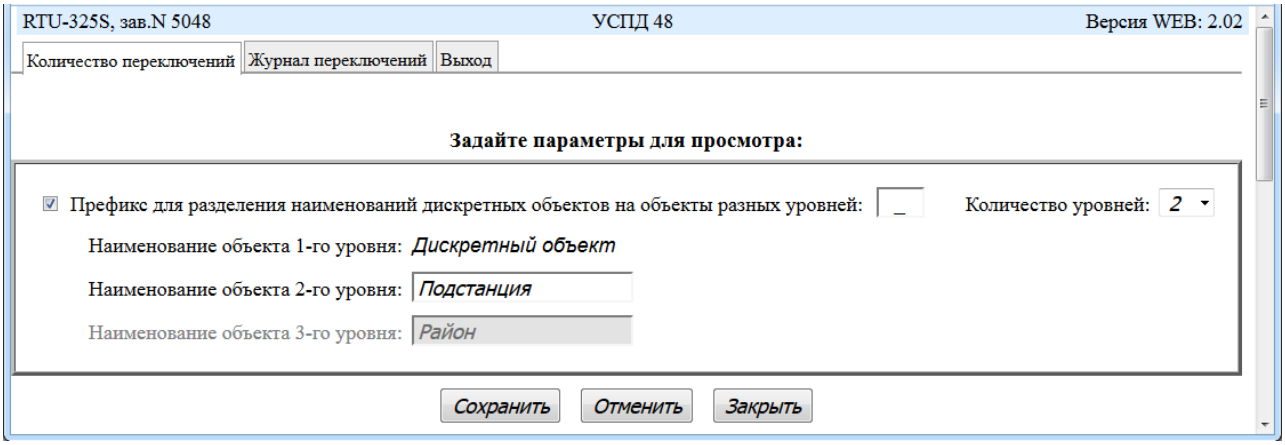
1.3.3. Switch log.

This option allows the user to view the switch log from the RTU archive.

1.3.3.1. Number of switches. When this application is launched, the user tab "Number of Switches. The application allows for a review of the number of changes that occurred over a given period at different levels.

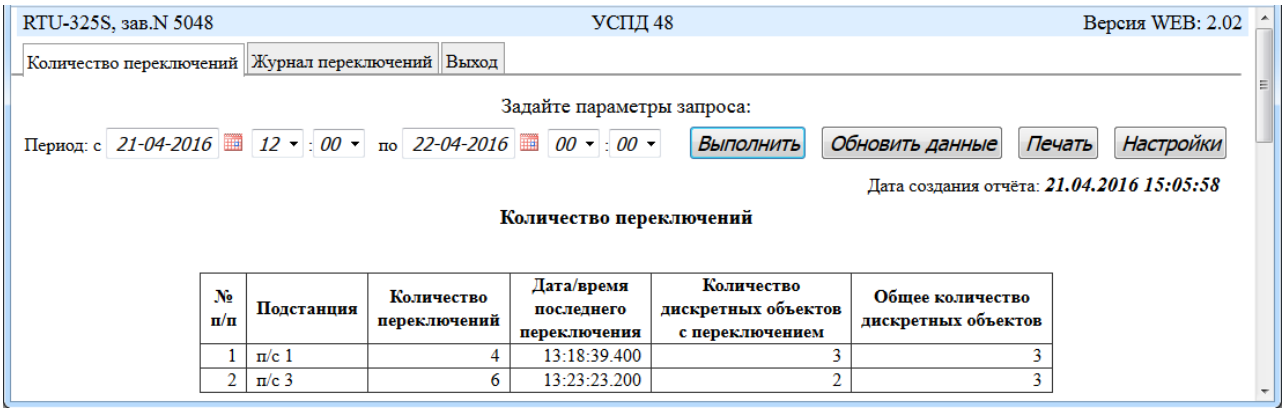
The settings.

To view the number of switches, the user must indicate whether break-ups of discrete objects to different levels are required. To do so, press the <structure> button, set all necessary parameters and press the <Save> button:



Report.

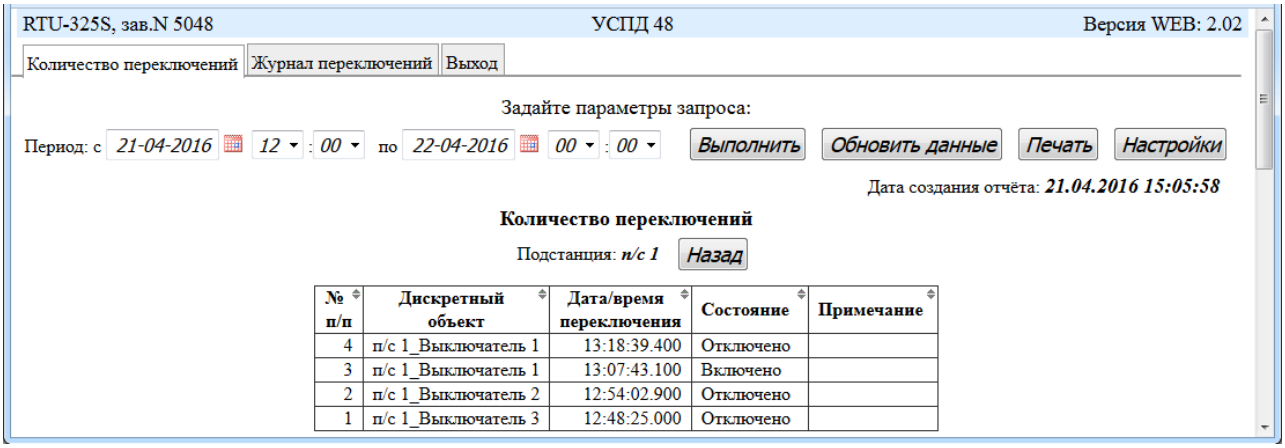
When moving over this tab, the user should set the time to view and press the button < Do>. The result will be the following report:



№ п/п	Подстанция	Количество переключений	Дата/время последнего переключения	Количество дискретных объектов с переключением	Общее количество дискретных объектов
1	п/с 1	4	13:18:39.400	3	3
2	п/с 3	6	13:23:23.200	2	3

This example presents a report for level 2 objects. For each object, the number of switches for discrete objects belonging to this level 2 object is shown.

For detailing the level-2 report, click on the appropriate row of the table. As a result, the following table will be presented:



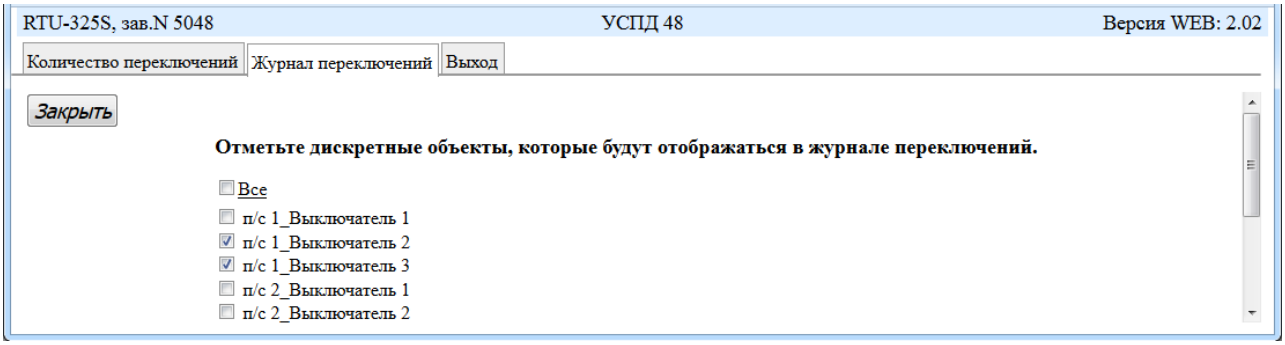
№ п/п	Дискретный объект	Дата/время переключения	Состояние	Примечание
4	п/с 1_Выключатель 1	13:18:39.400	Отключено	
3	п/с 1_Выключатель 1	13:07:43.100	Включено	
2	п/с 1_Выключатель 2	12:54:02.900	Отключено	
1	п/с 1_Выключатель 3	12:48:25.000	Отключено	

The user can update the data from the <update data>. This report can be printed by clicking on <Steam>.

1.3.3.2. Switch log. In this tab, the user can view the switch log for a given period in chronological order for selected discrete objects.

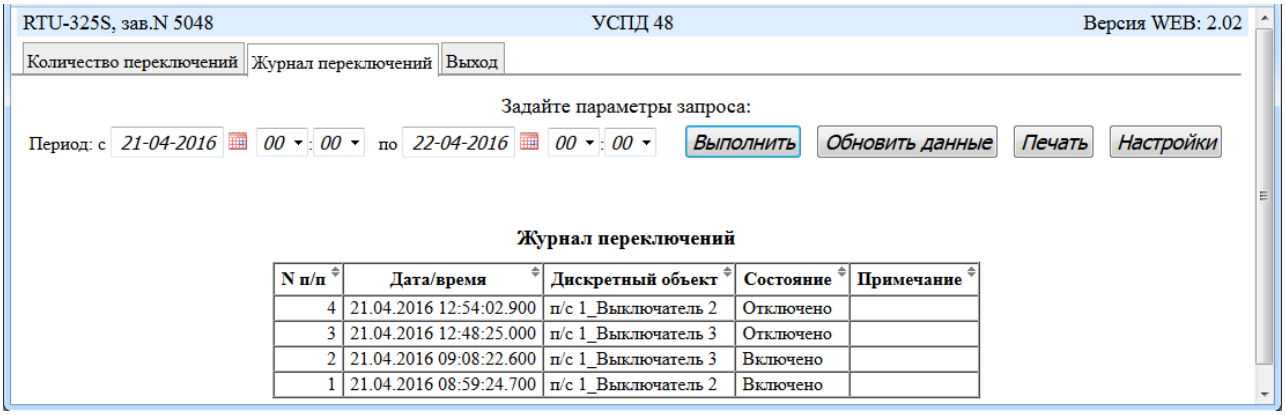
The settings.

When viewing the switch log, the user can filter a list of discrete view objects. To do this, press the <Construction> button, note those discrete objects that need to display the switch log and press the <Close> button:



Report.

When moving over this tab, the user should set the time to view and press the button < Do>. The result will be the following report:



The user can update the data from the <update data>. This report can be printed by clicking on <Steam>.

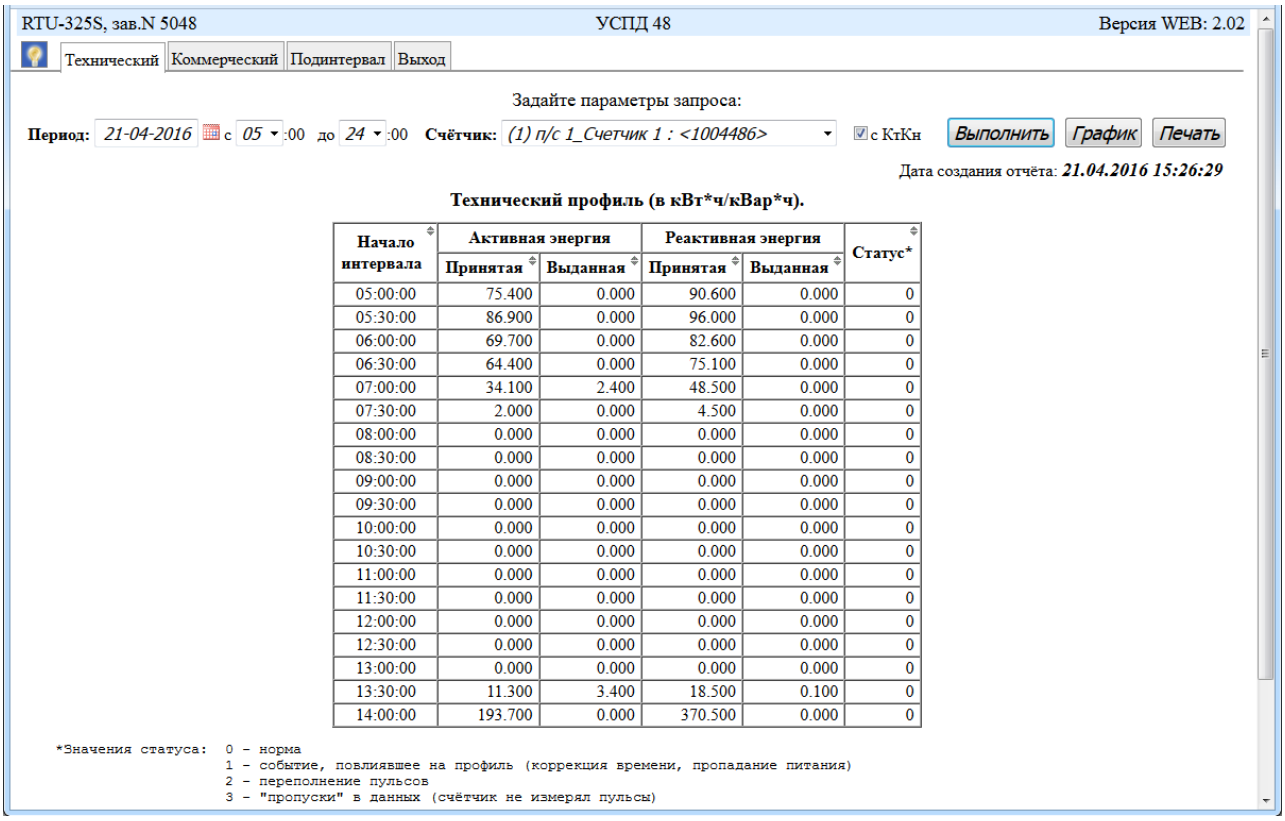
1.3.4. Cost profiled.

This paragraph provides the user with the opportunity to view the cost profile data. The following cost profiles may be viewed:

- Technical,
- Commercial,

• I'm gonna have to go to the subway. The user actions to obtain the required type of technical profile report (box "Технический") are described below. Reports on other profiles can be obtained in the same way.

When moving over the tab "Технический", the user will be provided with a form to complete the request parameters. The user should set the required period in days, select the meter from the list and tick the Kt and Kn factors when reporting. The following report will be submitted to the user after the required parameters have been performed and the button <Enact> has been pressed:



RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 2.02

Технический | Коммерческий | Подинтервал | Выход

Задайте параметры запроса:

Период: 21-04-2016 с 05 :00 до 24 :00 Счётчик: (1) п/с 1_Счетчик 1 : <1004486> с КтКн Выполнить График Печать

Дата создания отчёта: 21.04.2016 15:26:29

Технический профиль (в кВт*ч/кВар*ч).

Начало интервала	Активная энергия		Реактивная энергия		Статус*
	Принятая	Выданная	Принятая	Выданная	
05:00:00	75.400	0.000	90.600	0.000	0
05:30:00	86.900	0.000	96.000	0.000	0
06:00:00	69.700	0.000	82.600	0.000	0
06:30:00	64.400	0.000	75.100	0.000	0
07:00:00	34.100	2.400	48.500	0.000	0
07:30:00	2.000	0.000	4.500	0.000	0
08:00:00	0.000	0.000	0.000	0.000	0
08:30:00	0.000	0.000	0.000	0.000	0
09:00:00	0.000	0.000	0.000	0.000	0
09:30:00	0.000	0.000	0.000	0.000	0
10:00:00	0.000	0.000	0.000	0.000	0
10:30:00	0.000	0.000	0.000	0.000	0
11:00:00	0.000	0.000	0.000	0.000	0
11:30:00	0.000	0.000	0.000	0.000	0
12:00:00	0.000	0.000	0.000	0.000	0
12:30:00	0.000	0.000	0.000	0.000	0
13:00:00	0.000	0.000	0.000	0.000	0
13:30:00	11.300	3.400	18.500	0.100	0
14:00:00	193.700	0.000	370.500	0.000	0

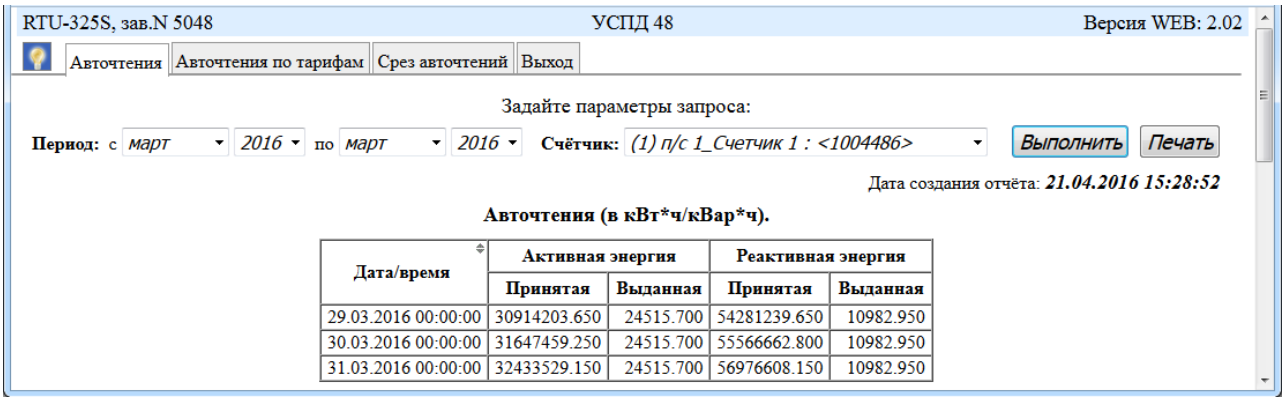
*Значения статуса: 0 - норма
1 - событие, повлиявшее на профиль (коррекция времени, пропадание питания)
2 - переполнение пульсов
3 - "пропуски" в данных (счётчик не измерял пульсы)

The data presented in the report table can also be viewed graphically. Both types of reports (table and graphic) can be printed.

1.3.5. Auto-reading.

This paragraph provides the user with the opportunity to view the auto-reading data of the meters on tariffs (Back "Авточтения по тарифам") and without (Back "Авточтения") and to obtain the auto-reading data on all meters.

1.3.5.1. Auto-reading. The "Авточтения" tab will be opened to the user when the application is launched. In the requested form, the user must set the required period of one to several months and select the meter from the list. After pressing the button <To be implemented>, the following report will be submitted to the user:



RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 2.02

Авточтения | Авточтения по тарифам | Срез авточтений | Выход

Задайте параметры запроса:

Период: с март 2016 по март 2016 Счётчик: (1) п/с 1_Счетчик 1 : <1004486> Выполнить Печать

Дата создания отчёта: 21.04.2016 15:28:52

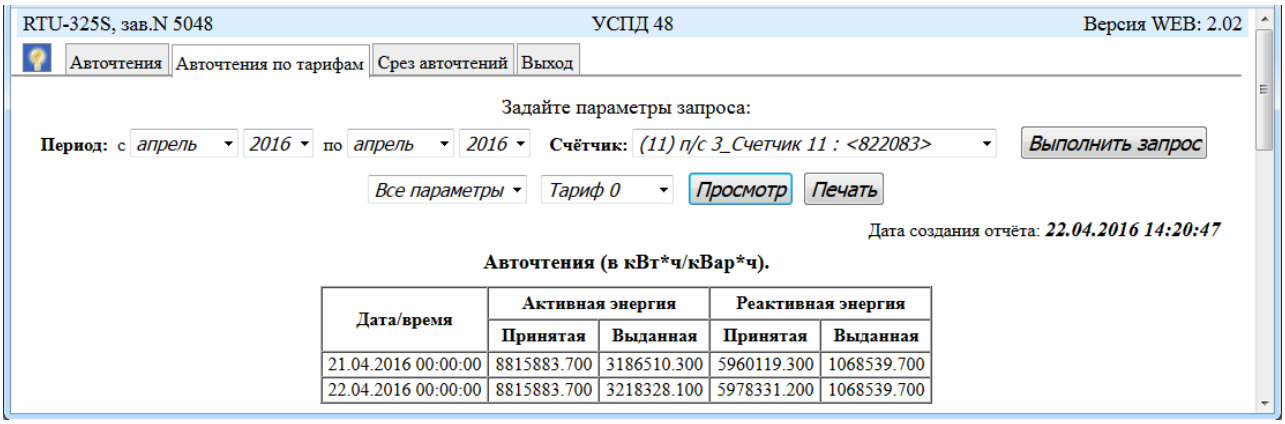
Авточтения (в кВт*ч/кВар*ч).

Дата/время	Активная энергия		Реактивная энергия	
	Принятая	Выданная	Принятая	Выданная
29.03.2016 00:00:00	30914203.650	24515.700	54281239.650	10982.950
30.03.2016 00:00:00	31647459.250	24515.700	55566662.800	10982.950
31.03.2016 00:00:00	32433529.150	24515.700	56976608.150	10982.950

This report can be printed by pressing the button <Steam>.

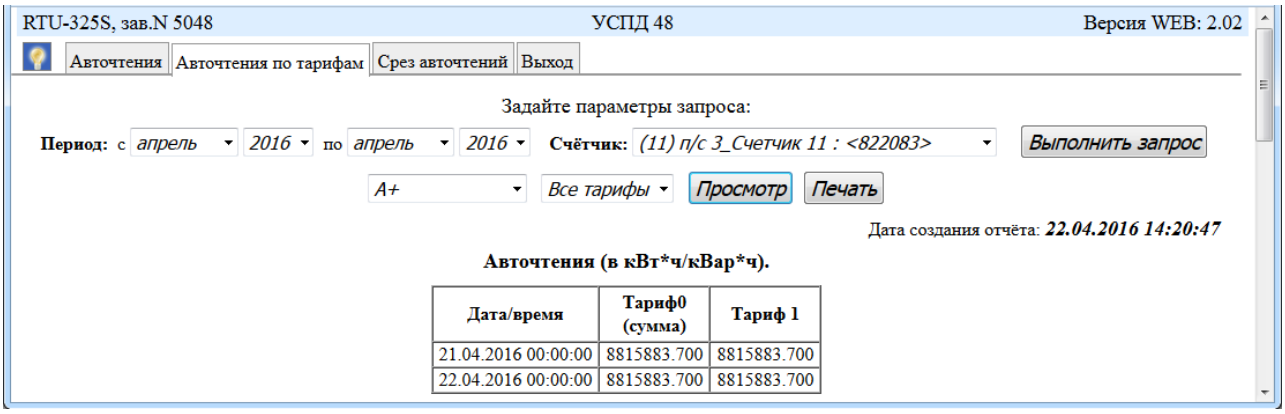
1.3.5.2. Auto-reading on tariffs. In selecting the "Авточтения по тарифам" tab, the user will be provided with a form for the assignment of a period of one to several months and the selection of a meter from the list. Once the button <To execute the request> is pressed, a line of data views will be available.

The report can be compiled for all parameters and one tariff:



Дата/время	Активная энергия		Реактивная энергия	
	Принятая	Выданная	Принятая	Выданная
21.04.2016 00:00:00	8815883.700	3186510.300	5960119.300	1068539.700
22.04.2016 00:00:00	8815883.700	3218328.100	5978331.200	1068539.700

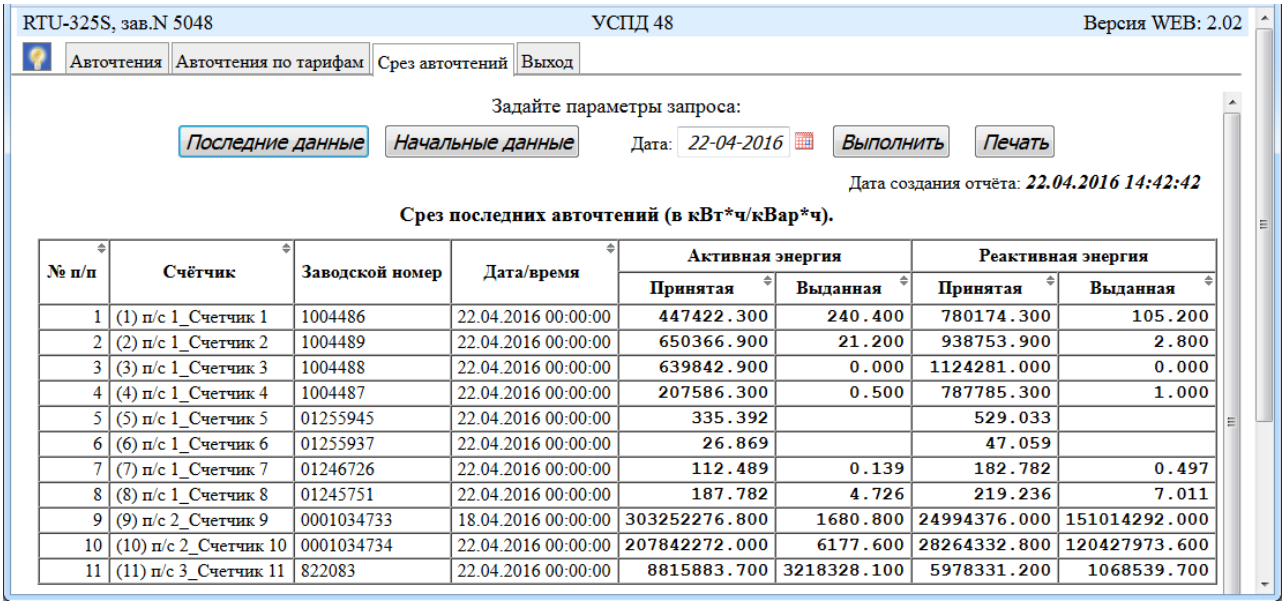
or all tariffs and one parameter:



Дата/время	Тариф0 (сумма)	Тариф 1
21.04.2016 00:00:00	8815883.700	8815883.700
22.04.2016 00:00:00	8815883.700	8815883.700

This report can be printed by pressing the button <Steam>.

1.3.5.3. It's auto-dream. In the "Срез авточтений" tab, the user can view the latest auto-reading, first auto-reading, or auto-mailing at a specific date:



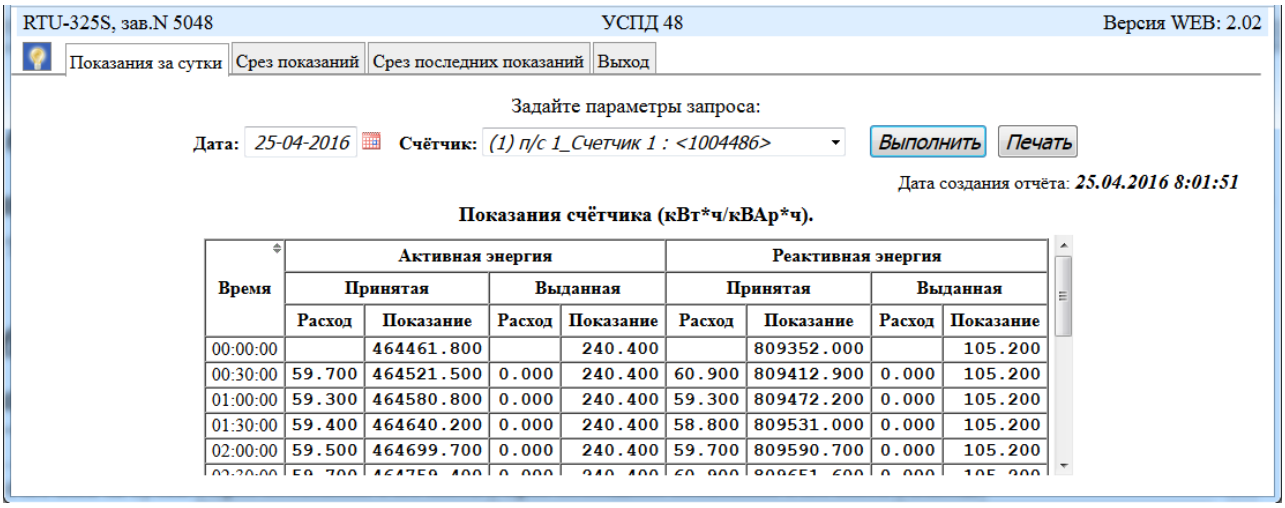
№ п/п	Счётчик	Заводской номер	Дата/время	Активная энергия		Реактивная энергия	
				Принятая	Выданная	Принятая	Выданная
1	(1) п/с 1_Счетчик 1	1004486	22.04.2016 00:00:00	447422.300	240.400	780174.300	105.200
2	(2) п/с 1_Счетчик 2	1004489	22.04.2016 00:00:00	650366.900	21.200	938753.900	2.800
3	(3) п/с 1_Счетчик 3	1004488	22.04.2016 00:00:00	639842.900	0.000	1124281.000	0.000
4	(4) п/с 1_Счетчик 4	1004487	22.04.2016 00:00:00	207586.300	0.500	787785.300	1.000
5	(5) п/с 1_Счетчик 5	01255945	22.04.2016 00:00:00	335.392		529.033	
6	(6) п/с 1_Счетчик 6	01255937	22.04.2016 00:00:00	26.869		47.059	
7	(7) п/с 1_Счетчик 7	01246726	22.04.2016 00:00:00	112.489	0.139	182.782	0.497
8	(8) п/с 1_Счетчик 8	01245751	22.04.2016 00:00:00	187.782	4.726	219.236	7.011
9	(9) п/с 2_Счетчик 9	0001034733	18.04.2016 00:00:00	303252276.800	1680.800	24994376.000	151014292.000
10	(10) п/с 2_Счетчик 10	0001034734	22.04.2016 00:00:00	207842272.000	6177.600	28264332.800	120427973.600
11	(11) п/с 3_Счетчик 11	822083	22.04.2016 00:00:00	8815883.700	3218328.100	5978331.200	1068539.700

This report can be printed by pressing the button <Steam>.

1.3.6. The meter reading.

This point provides the user with the opportunity to view the 24-hour meter and the cut-off of all the meters.

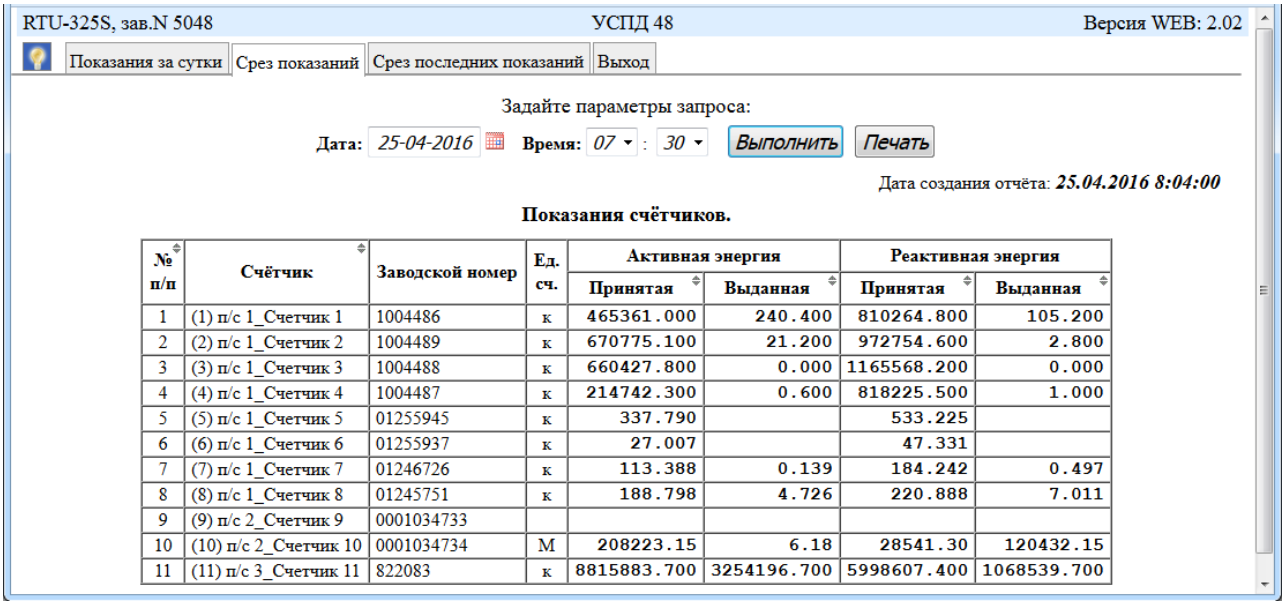
1.3.6.1. A 24-hour meter reading. The "Показания за сутки" tab will be opened when the application is launched. The user must select the date and meter and press the button <do>. The result will be the following report:



Время	Активная энергия				Реактивная энергия			
	Принятая		Выданная		Принятая		Выданная	
	Расход	Показание	Расход	Показание	Расход	Показание	Расход	Показание
00:00:00		464461.800		240.400		809352.000		105.200
00:30:00	59.700	464521.500	0.000	240.400	60.900	809412.900	0.000	105.200
01:00:00	59.300	464580.800	0.000	240.400	59.300	809472.200	0.000	105.200
01:30:00	59.400	464640.200	0.000	240.400	58.800	809531.000	0.000	105.200
02:00:00	59.500	464699.700	0.000	240.400	59.700	809590.700	0.000	105.200

This report can be printed by pressing the button <Steam>.

1.3.6.2. Cut off the meter readings. In selecting the tab "Срез показаний", a request form will be opened, in which the user must select the date and time of the interval and press the button <Do>. The result will be the following report:



№ п/п	Счётчик	Заводской номер	Ед. сч.	Активная энергия		Реактивная энергия	
				Принятая	Выданная	Принятая	Выданная
1	(1) п/с 1_Счетчик 1	1004486	к	465361.000	240.400	810264.800	105.200
2	(2) п/с 1_Счетчик 2	1004489	к	670775.100	21.200	972754.600	2.800
3	(3) п/с 1_Счетчик 3	1004488	к	660427.800	0.000	1165568.200	0.000
4	(4) п/с 1_Счетчик 4	1004487	к	214742.300	0.600	818225.500	1.000
5	(5) п/с 1_Счетчик 5	01255945	к	337.790		533.225	
6	(6) п/с 1_Счетчик 6	01255937	к	27.007		47.331	
7	(7) п/с 1_Счетчик 7	01246726	к	113.388	0.139	184.242	0.497
8	(8) п/с 1_Счетчик 8	01245751	к	188.798	4.726	220.888	7.011
9	(9) п/с 2_Счетчик 9	0001034733					
10	(10) п/с 2_Счетчик 10	0001034734	М	208223.15	6.18	28541.30	120432.15
11	(11) п/с 3_Счетчик 11	822083	к	8815883.700	3254196.700	5998607.400	1068539.700

This report can be printed by pressing the button <Steam>.

1.3.6.3. Cutting off the latest readings. In selecting the tab "Срез последних показаний", the request will be fulfilled and the following report will be submitted:



RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 2.02

Показания за сутки | Срез показаний | Срез последних показаний | Выход

Обновить Печать

Срез последних показаний счётчиков на *25.04.2016 08:07:09*.

№ п/п	Счётчик	Заводской номер	Ед. сч.	Дата/время	Активная энергия		Реактивная энергия	
					Принятая	Выданная	Принятая	Выданная
1	(1) п/с 1_Счетчик 1	1004486	к	25.04.2016 07:30:00	465361.000	240.400	810264.800	105.200
2	(2) п/с 1_Счетчик 2	1004489	к	25.04.2016 07:30:00	670775.100	21.200	972754.600	2.800
3	(3) п/с 1_Счетчик 3	1004488	к	25.04.2016 07:30:00	660427.800	0.000	1165568.200	0.000
4	(4) п/с 1_Счетчик 4	1004487	к	25.04.2016 07:30:00	214742.300	0.600	818225.500	1.000
5	(5) п/с 1_Счетчик 5	01255945	к	25.04.2016 07:30:00	337.790		533.225	
6	(6) п/с 1_Счетчик 6	01255937	к	25.04.2016 07:30:00	27.007		47.331	
7	(7) п/с 1_Счетчик 7	01246726	к	25.04.2016 07:30:00	113.388	0.139	184.242	0.497
8	(8) п/с 1_Счетчик 8	01245751	к	25.04.2016 07:30:00	188.798	4.726	220.888	7.011
9	(9) п/с 2_Счетчик 9	0001034733	М	18.04.2016 06:00:00	303256.32	1.68	24994.38	151024.18
10	(10) п/с 2_Счетчик 10	0001034734	М	25.04.2016 08:00:00	208225.34	6.18	28542.03	120432.15
11	(11) п/с 3_Счетчик 11	822083	к	25.04.2016 07:30:00	8815883.700	3254196.700	5998607.400	1068539.700

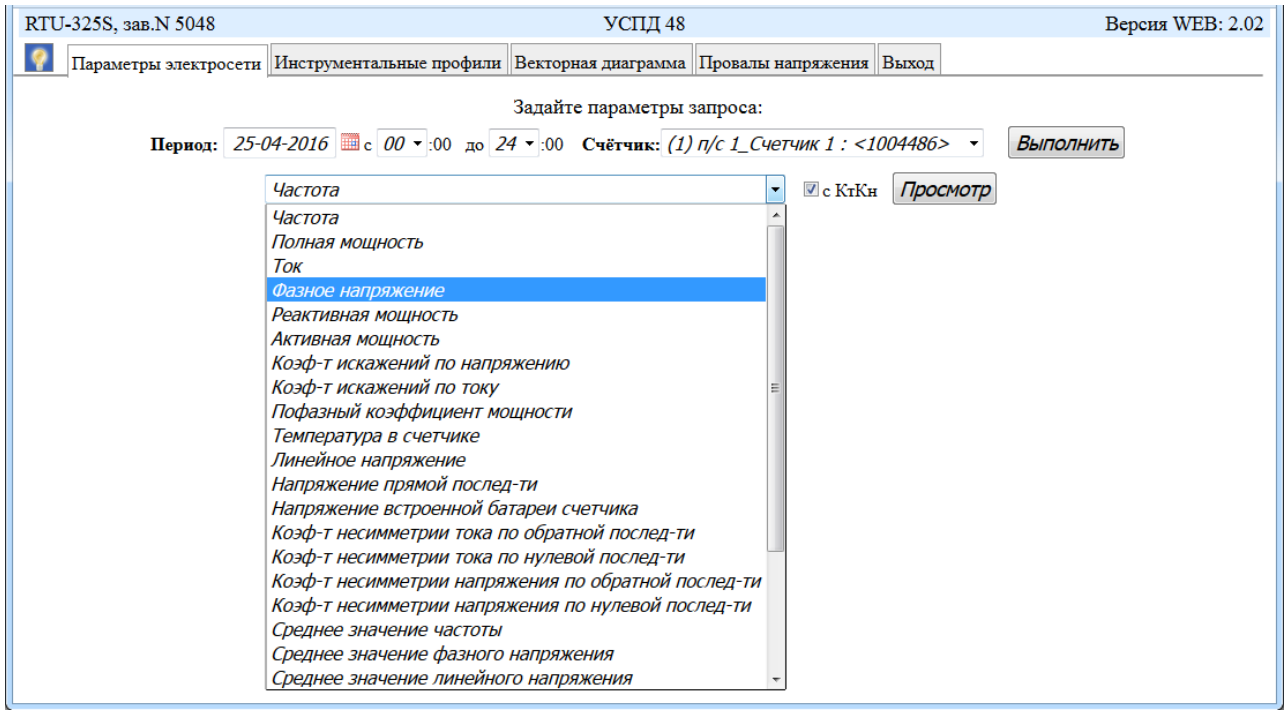
A request for new RTU data will be completed using the <update> button.

This report can be printed by pressing the button <Steam>.

1.3.7. Power grid parameters.

This paragraph allows the user to view the parameters of the power grid, the tool profiles, vector diagrams and the power and voltage failure log.

1.3.7.1. Power grid parameters. The "Параметры электросети" tab will be opened when the application is launched. In the format provided, the user should set the period in the day and select the meter from the list. The view filter will be available on the <fail> button:



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Параметры электросети | Инструментальные профили | Векторная диаграмма | Провалы напряжения | Выход

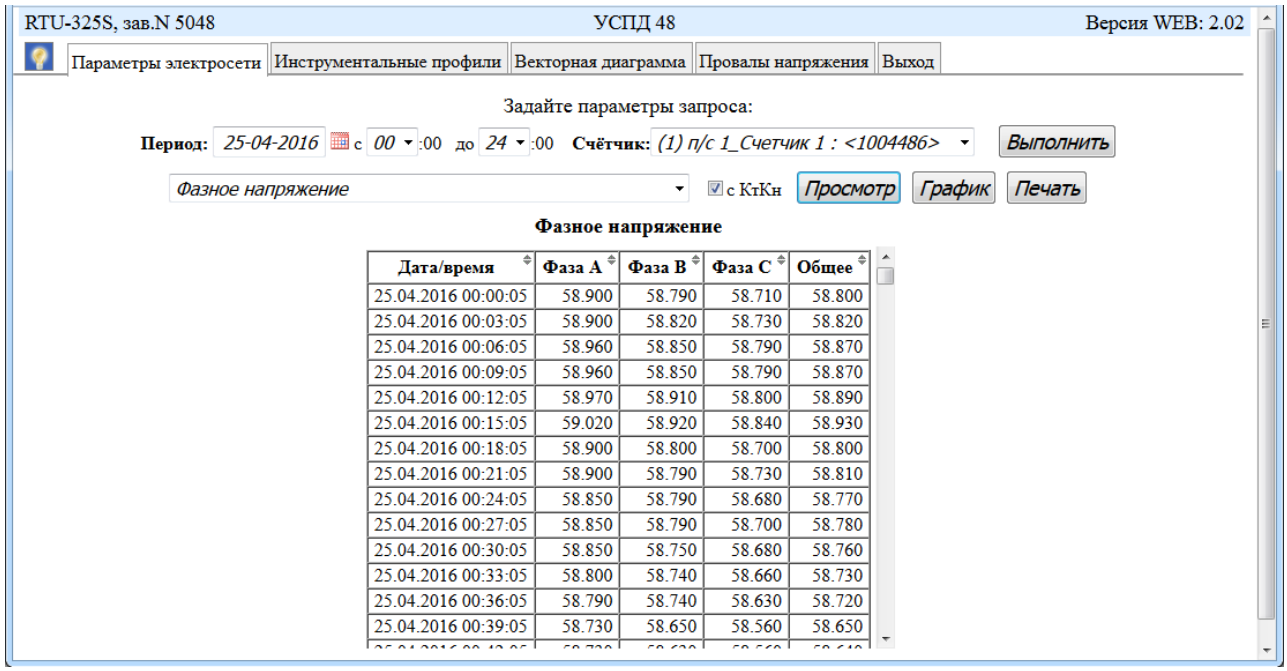
Задайте параметры запроса:

Период: 25-04-2016 с 00 :00 до 24 :00 Счётчик: (1) п/с 1_Счетчик 1 : <1004486> Выполнить

Частота с КтКн Просмотр

Частота
Полная мощность
Ток
Фазное напряжение
Реактивная мощность
Активная мощность
Коэф-т искажений по напряжению
Коэф-т искажений по току
Пофазный коэффициент мощности
Температура в счетчике
Линейное напряжение
Напряжение прямой послед-ти
Напряжение встроенной батареи счетчика
Коэф-т несимметрии тока по обратной послед-ти
Коэф-т несимметрии тока по нулевой послед-ти
Коэф-т несимметрии напряжения по обратной послед-ти
Коэф-т несимметрии напряжения по нулевой послед-ти
Среднее значение частоты
Среднее значение фазного напряжения
Среднее значение линейного напряжения

After selecting the required parameter and pressing the button < View>, the following report will be made available to the user:

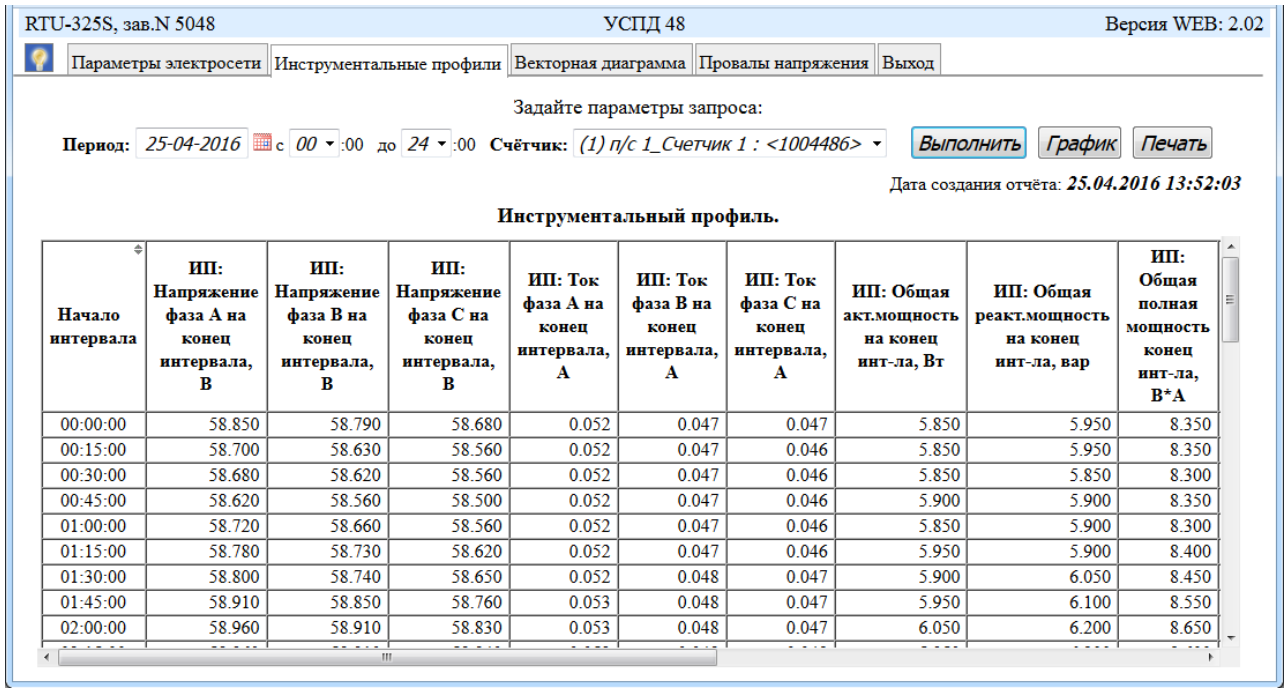


Фазное напряжение

Дата/время	Фаза А	Фаза В	Фаза С	Общее
25.04.2016 00:00:05	58.900	58.790	58.710	58.800
25.04.2016 00:03:05	58.900	58.820	58.730	58.820
25.04.2016 00:06:05	58.960	58.850	58.790	58.870
25.04.2016 00:09:05	58.960	58.850	58.790	58.870
25.04.2016 00:12:05	58.970	58.910	58.800	58.890
25.04.2016 00:15:05	59.020	58.920	58.840	58.930
25.04.2016 00:18:05	58.900	58.800	58.700	58.800
25.04.2016 00:21:05	58.900	58.790	58.730	58.810
25.04.2016 00:24:05	58.850	58.790	58.680	58.770
25.04.2016 00:27:05	58.850	58.790	58.700	58.780
25.04.2016 00:30:05	58.850	58.750	58.680	58.760
25.04.2016 00:33:05	58.800	58.740	58.660	58.730
25.04.2016 00:36:05	58.790	58.740	58.630	58.720
25.04.2016 00:39:05	58.730	58.650	58.560	58.650

The data presented in the report table can also be viewed graphically. Both types of reports (table and graphic) can be printed.

1.3.7.2. Tool profiles. When selecting the "Инструментальные профили" tab, the user will be provided with a request form in which the time in the day is to be set and the meter selected from the list. The following report will be shown on the button <Implementation>:



Инструментальный профиль.

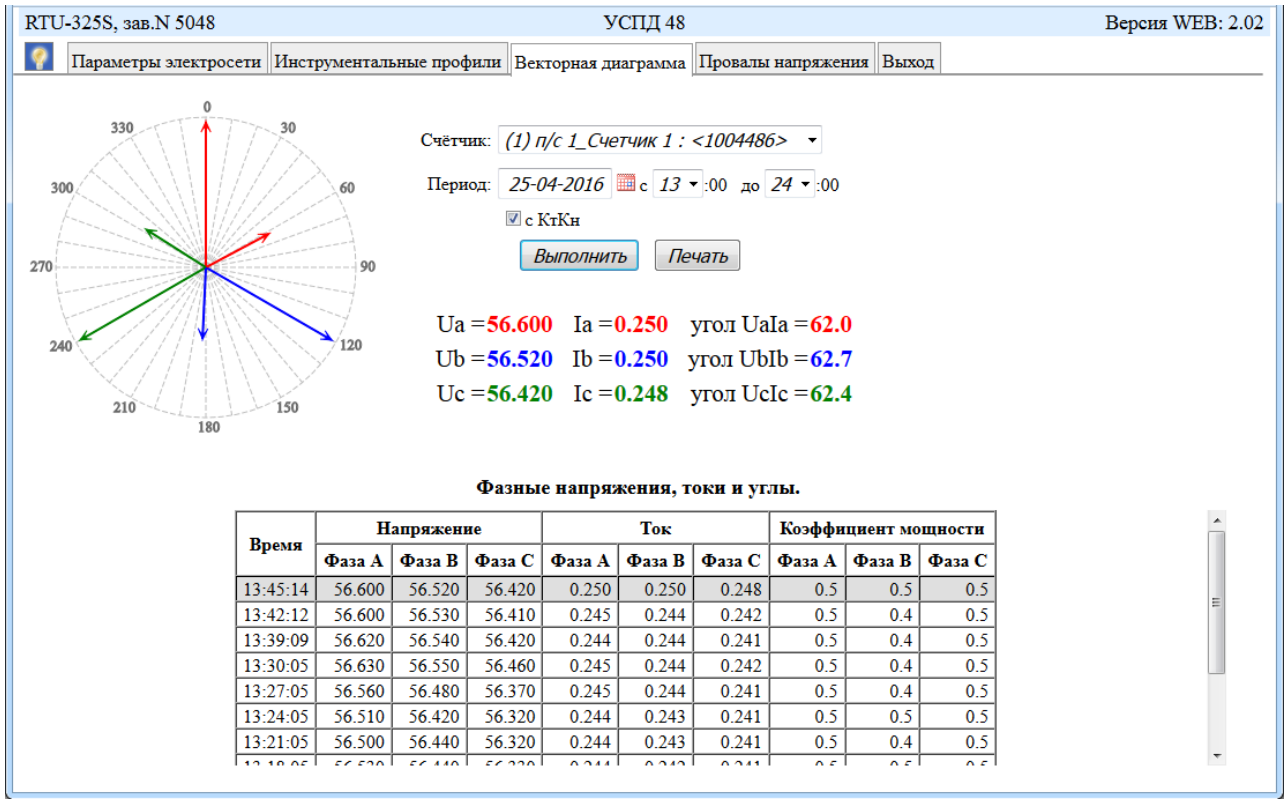
Начало интервала	ИП: Напряжение фаза А на конец интервала, В	ИП: Напряжение фаза В на конец интервала, В	ИП: Напряжение фаза С на конец интервала, В	ИП: Ток фаза А на конец интервала, А	ИП: Ток фаза В на конец интервала, А	ИП: Ток фаза С на конец интервала, А	ИП: Общая акт.мощность на конец инт-ла, Вт	ИП: Общая реакт.мощность на конец инт-ла, вар	ИП: Общая полная мощность конец инт-ла, В*А
00:00:00	58.850	58.790	58.680	0.052	0.047	0.047	5.850	5.950	8.350
00:15:00	58.700	58.630	58.560	0.052	0.047	0.046	5.850	5.950	8.350
00:30:00	58.680	58.620	58.560	0.052	0.047	0.046	5.850	5.850	8.300
00:45:00	58.620	58.560	58.500	0.052	0.047	0.046	5.900	5.900	8.350
01:00:00	58.720	58.660	58.560	0.052	0.047	0.046	5.850	5.900	8.300
01:15:00	58.780	58.730	58.620	0.052	0.047	0.046	5.950	5.900	8.400
01:30:00	58.800	58.740	58.650	0.052	0.048	0.047	5.900	6.050	8.450
01:45:00	58.910	58.850	58.760	0.053	0.048	0.047	5.950	6.100	8.550
02:00:00	58.960	58.910	58.830	0.053	0.048	0.047	6.050	6.200	8.650

The data presented in the report table can also be viewed graphically. Both types of reports (table and graphic) can be printed.

1.3.7.3. Vector diagram.

When selecting the tab "Векторная диаграмма", the user must select the meter, set the time to view and press the button < Do>. After downloading the data, a vector diagram will be constructed using the latest data received in the following data:

by the user ' s given time period (upline of the table in grey). These data are also shown in the parameter list to the right of the diagram. The values and vectors corresponding to different phases are distinguished by different colours:



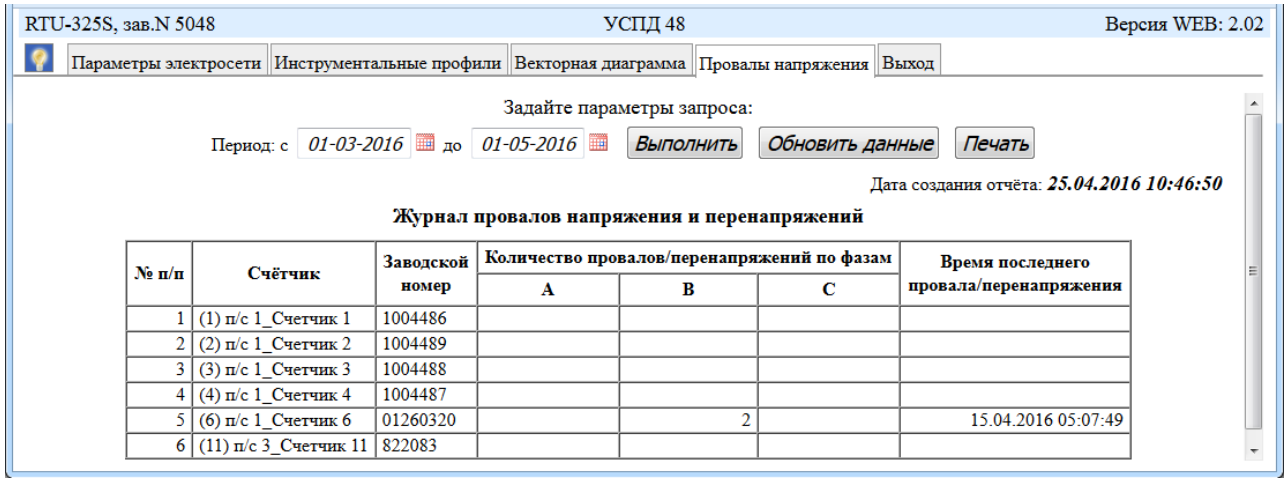
Время	Напряжение			Ток			Коэффициент мощности		
	Фаза A	Фаза B	Фаза C	Фаза A	Фаза B	Фаза C	Фаза A	Фаза B	Фаза C
13:45:14	56.600	56.520	56.420	0.250	0.250	0.248	0.5	0.5	0.5
13:42:12	56.600	56.530	56.410	0.245	0.244	0.242	0.5	0.4	0.5
13:39:09	56.620	56.540	56.420	0.244	0.244	0.241	0.5	0.4	0.5
13:30:05	56.630	56.550	56.460	0.245	0.244	0.242	0.5	0.4	0.5
13:27:05	56.560	56.480	56.370	0.245	0.244	0.241	0.5	0.4	0.5
13:24:05	56.510	56.420	56.320	0.244	0.243	0.241	0.5	0.5	0.5
13:21:05	56.500	56.440	56.320	0.244	0.243	0.241	0.5	0.4	0.5

After selecting the required line by clicking the left mouse button or by using the keys ',', ', 'Pgup', 'PgDn', 'Home', 'End', the corresponding vector diagram will be constructed.

This report can be printed by pressing the button <Steam>.

1.3.7.4. A log of stress and stress failure.

When selecting the tab "Провалы напряжения", the user should set the time to view and press the button < Do>. The following report will be displayed after downloading:

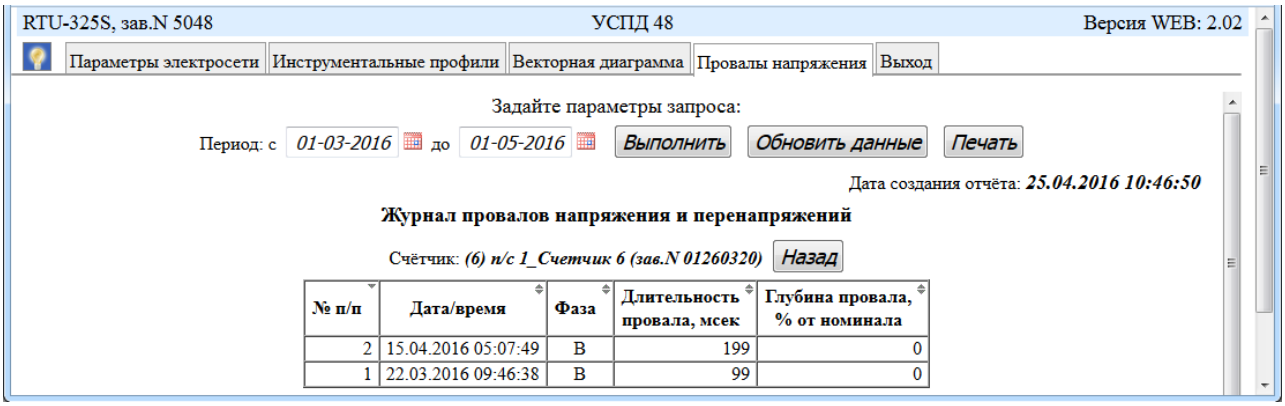


№ п/п	Счётчик	Заводской номер	Количество провалов/перенапряжений по фазам			Время последнего провала/перенапряжения
			A	B	C	
1	(1) п/с 1_Счетчик 1	1004486				
2	(2) п/с 1_Счетчик 2	1004489				
3	(3) п/с 1_Счетчик 3	1004488				
4	(4) п/с 1_Счетчик 4	1004487				
5	(6) п/с 1_Счетчик 6	01260320		2		15.04.2016 05:07:49
6	(11) п/с 3_Счетчик 11	822083				

Only those meters for which data on stress/stress failure will be collected will be present in the report table.

A request for new RTU data will be completed using the <update> button.

To view detailed information from a particular meter, you need to click the left mouse button on the appropriate line. As a result, the following report will be submitted to the user:



№ п/п	Дата/время	Фаза	Длительность провала, мсек	Глубина провала, % от номинала
2	15.04.2016 05:07:49	B	199	0
1	22.03.2016 09:46:38	B	99	0

These reports can be printed by pressing the button <Speech>.

1.3.8. Data cuts.

This paragraph gives the user the opportunity to view the various data clips for all meters. The user can look at the initial data, the latest data, or data for the specified beginning of the interval. The following types of data can be viewed:

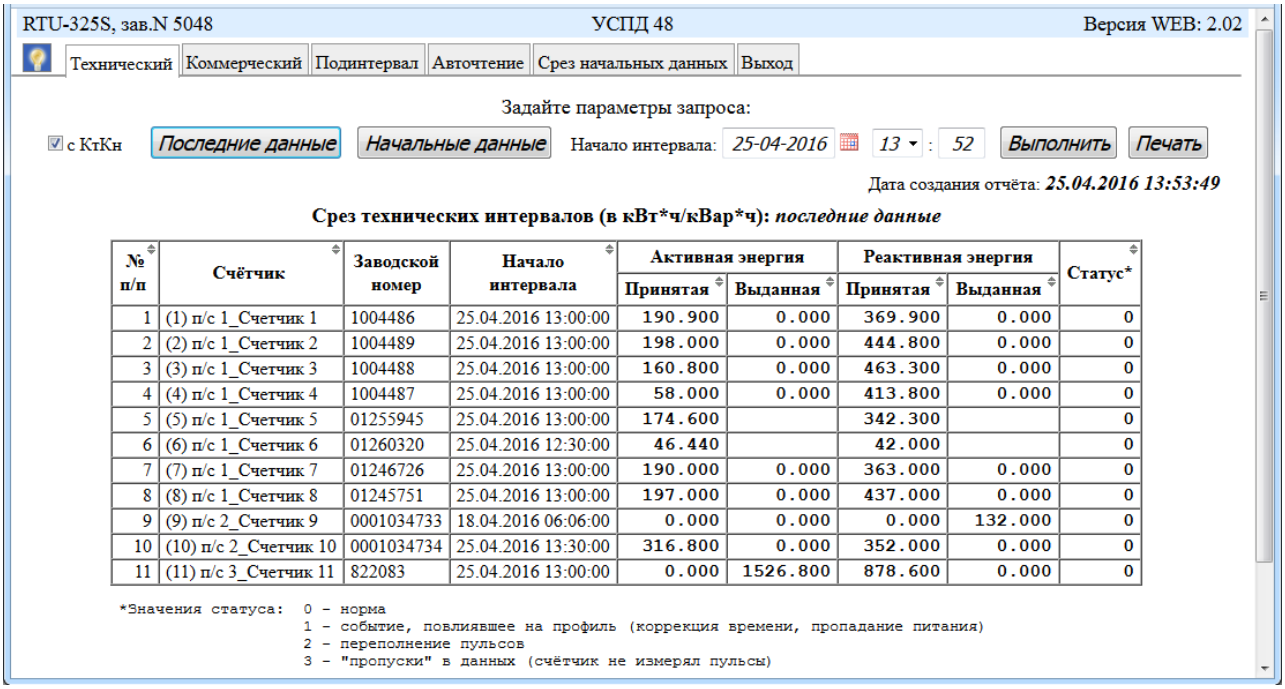
- Technical,
- Commercial,
- The sub-interval,
- auto-reading,
- Cut the initial data.

The user actions to obtain the required type of technical profile report (box "Технический") are described below. Reports on other profiles can be obtained in the same way.

1.3.8.1. The technical intervals. When switching over the "Технический" tab, the user shall ask for the Kt and Kn coefficients to be taken into account and the start of the data viewing interval at a particular time of starting the interval.

To view the latest data, you need to press the button <last data>. To view the initial data, you need to press the button <start data>. To view the data at the specified beginning of the interval, you need to press the button < Act>.

As a result, the following report will be submitted to the user:



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Технический | Коммерческий | Подинтервал | Авточтение | Срез начальных данных | Выход

Задайте параметры запроса:

с КтКн | Последние данные | Начальные данные | Начало интервала: 25-04-2016 13 : 52 | Выполнить | Печать

Дата создания отчёта: **25.04.2016 13:53:49**

Срез технических интервалов (в кВт*ч/кВар*ч): ***последние данные***

№ п/п	Счётчик	Заводской номер	Начало интервала	Активная энергия		Реактивная энергия		Статус*
				Принятая	Выданная	Принятая	Выданная	
1	(1) п/с 1_Счетчик 1	1004486	25.04.2016 13:00:00	190.900	0.000	369.900	0.000	0
2	(2) п/с 1_Счетчик 2	1004489	25.04.2016 13:00:00	198.000	0.000	444.800	0.000	0
3	(3) п/с 1_Счетчик 3	1004488	25.04.2016 13:00:00	160.800	0.000	463.300	0.000	0
4	(4) п/с 1_Счетчик 4	1004487	25.04.2016 13:00:00	58.000	0.000	413.800	0.000	0
5	(5) п/с 1_Счетчик 5	01255945	25.04.2016 13:00:00	174.600		342.300		0
6	(6) п/с 1_Счетчик 6	01260320	25.04.2016 12:30:00	46.440		42.000		0
7	(7) п/с 1_Счетчик 7	01246726	25.04.2016 13:00:00	190.000	0.000	363.000	0.000	0
8	(8) п/с 1_Счетчик 8	01245751	25.04.2016 13:00:00	197.000	0.000	437.000	0.000	0
9	(9) п/с 2_Счетчик 9	0001034733	18.04.2016 06:06:00	0.000	0.000	0.000	132.000	0
10	(10) п/с 2_Счетчик 10	0001034734	25.04.2016 13:30:00	316.800	0.000	352.000	0.000	0
11	(11) п/с 3_Счетчик 11	822083	25.04.2016 13:00:00	0.000	1526.800	878.600	0.000	0

*Значения статуса: 0 – норма
1 – событие, повлиявшее на профиль (коррекция времени, пропадание питания)
2 – переполнение пульсов
3 – "пропуски" в данных (счётчик не измерял пульсы)

These reports can be printed by pressing the button <Speech>.

1.3.8.2. A cut of the initial data. For a description of this paragraph, see 1.2.1. Monitoring of data entry > Cut-off of initial data.

1.4. It's a setup.

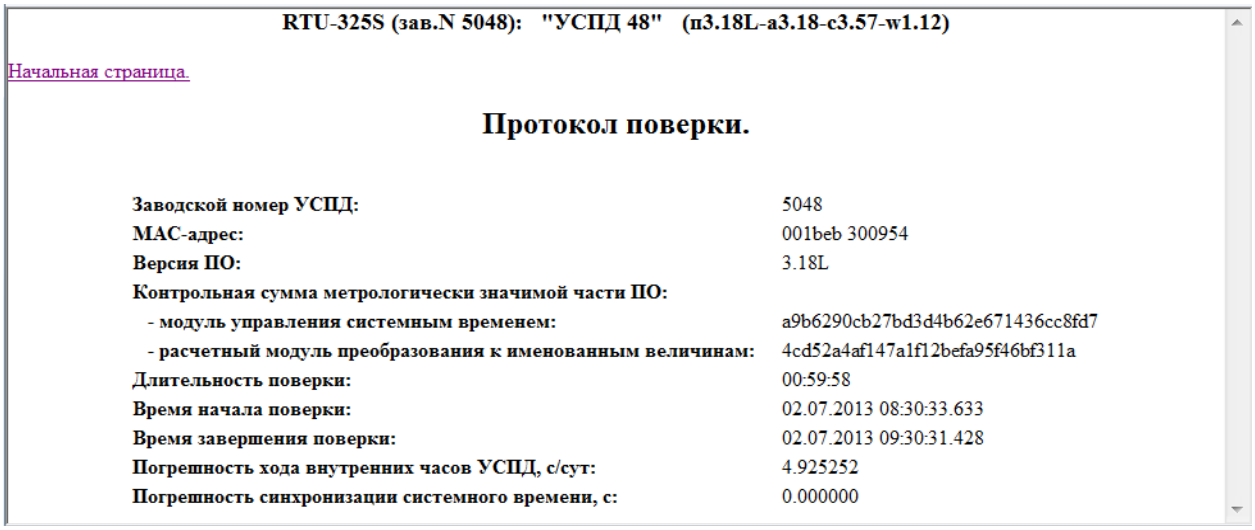
1.4.1. TCP/IP Utilities.

In this paragraph, the user may open the required tab to view the work result of one of the following:

- ifconfig -a
- ifconfig -A en5
- ifconfig -A en6
- ifconfig -A vp0
- arp -a
- netstat -r

1.4.2. Checking the verification report.

This paragraph provides the user with the opportunity to view the verification report:



RTU-325S (зав.N 5048): "УСПД 48" (п3.18L-а3.18-с3.57-w1.12)

Начальная страница

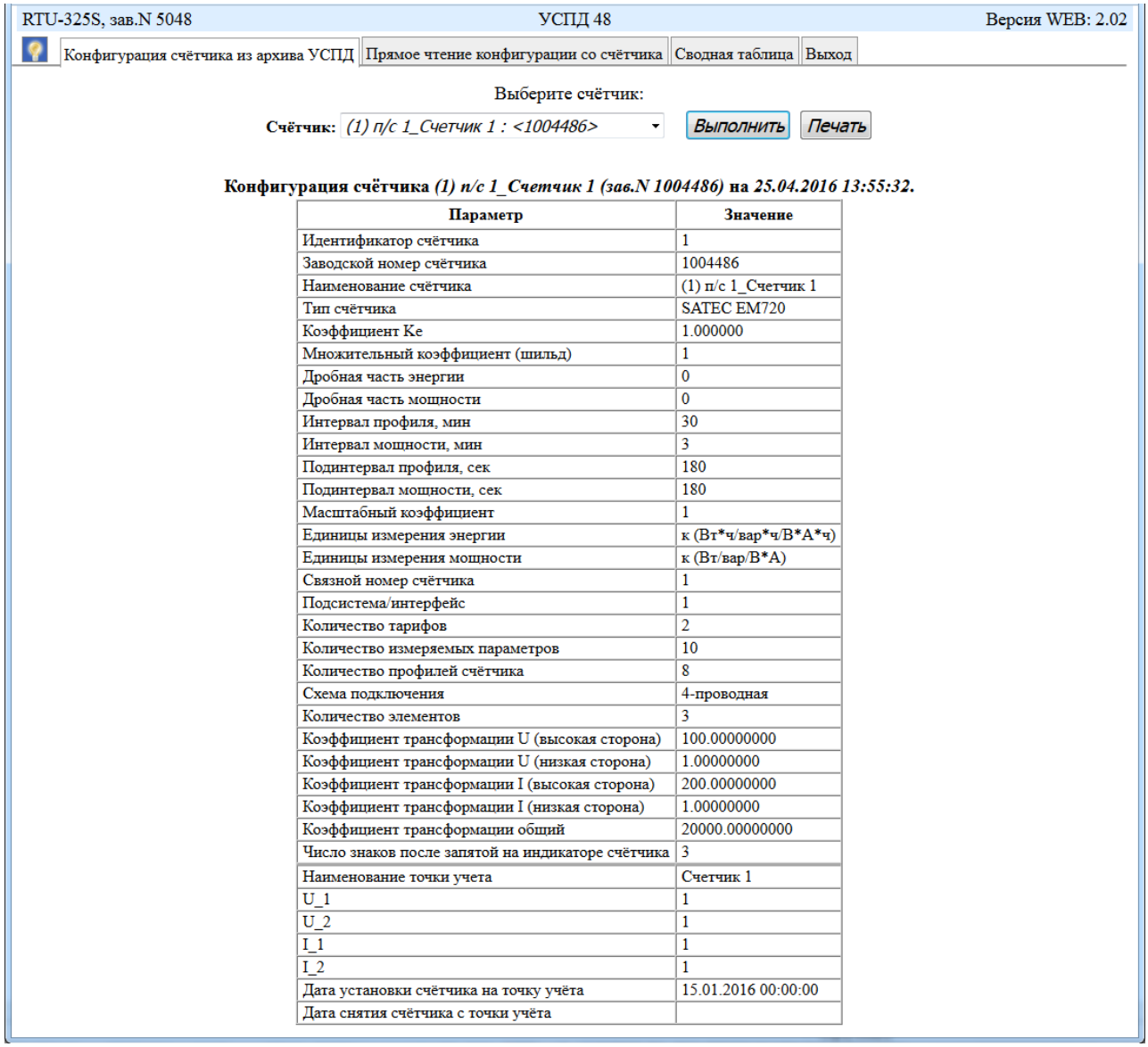
Протокол поверки.

Заводской номер УСПД:	5048
MAC-адрес:	001beb 300954
Версия ПО:	3.18L
Контрольная сумма метрологически значимой части ПО:	
- модуль управления системным временем:	a9b6290cb27bd3d4b62e671436cc8fd7
- расчетный модуль преобразования к именованным величинам:	4cd52a4af147a1f12befa95f46bf311a
Длительность поверки:	00:59:58
Время начала поверки:	02.07.2013 08:30:33.633
Время завершения поверки:	02.07.2013 09:30:31.428
Погрешность хода внутренних часов УСПД, с/сут:	4.925252
Погрешность синхронизации системного времени, с:	0.000000

1.4.3. Checker configuration.

This option allows the user to view the meter configuration from the RTU archive and to read the meter configuration directly. Also, the user can view the composite table for the selected configuration parameters for all the metering.

1.4.3.1. Checker configuration. The user can view the meter configuration from both the RTU archive and a direct reading of the meter configuration. When selecting the appropriate tab, a form will be opened in which the user will select the meter and press the button < Do>. The following report will be provided on the page:



RTU-325S, зав.N 5048 УСПД 48 Версия WEB: 2.02

Конфигурация счётчика из архива УСПД | Прямое чтение конфигурации со счётчика | Сводная таблица | Выход

Выберите счётчик:

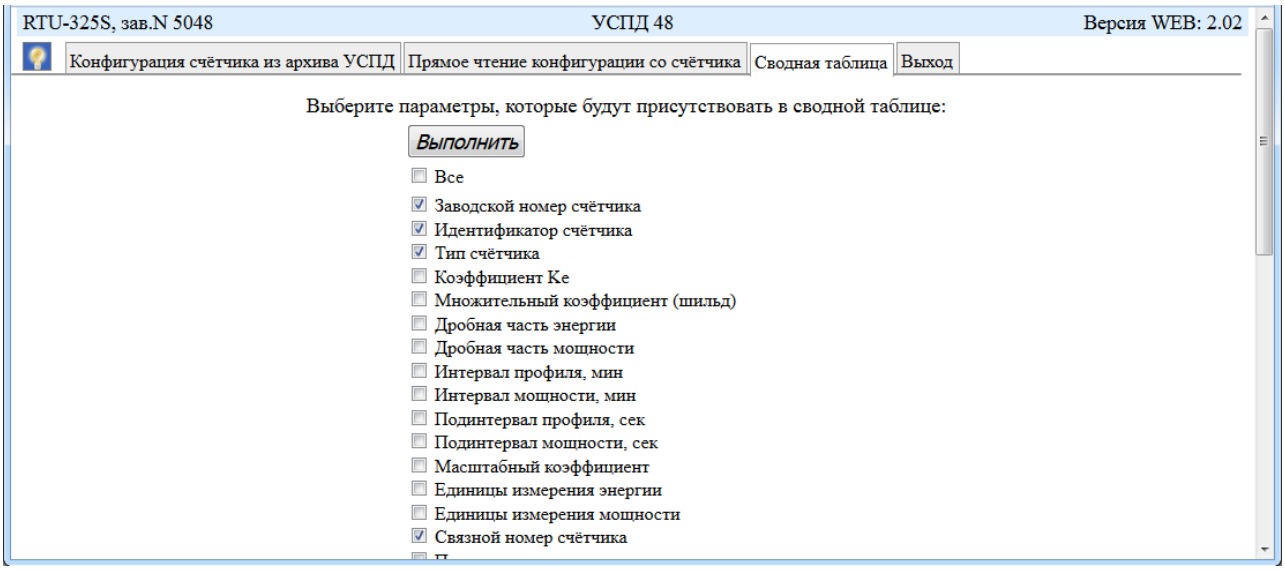
Счётчик: (1) п/с 1_Счетчик 1 : <1004486> Выполнить Печать

Конфигурация счётчика *(1) п/с 1_Счетчик 1 (зав.N 1004486)* на *25.04.2016 13:55:32.*

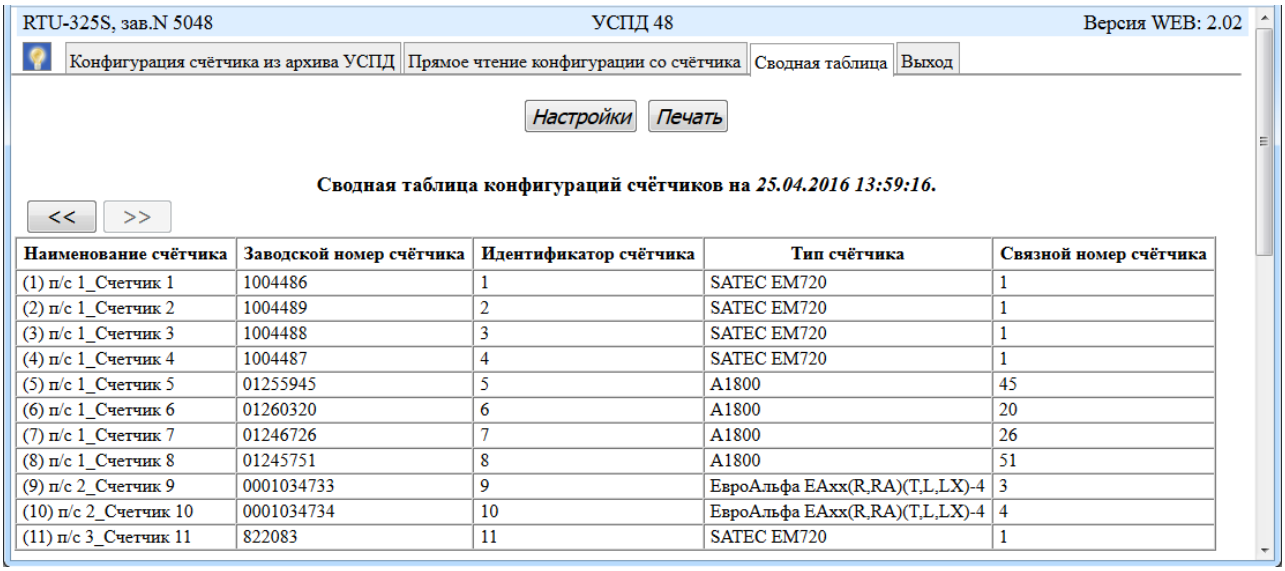
Параметр	Значение
Идентификатор счётчика	1
Заводской номер счётчика	1004486
Наименование счётчика	(1) п/с 1_Счетчик 1
Тип счётчика	SATEC EM720
Коэффициент Ke	1.000000
Множительный коэффициент (шильд)	1
Дробная часть энергии	0
Дробная часть мощности	0
Интервал профиля, мин	30
Интервал мощности, мин	3
Подинтервал профиля, сек	180
Подинтервал мощности, сек	180
Масштабный коэффициент	1
Единицы измерения энергии	к (Вт*ч/вар*ч/В*А*ч)
Единицы измерения мощности	к (Вт/вар/В*А)
Связной номер счётчика	1
Подсистема/интерфейс	1
Количество тарифов	2
Количество измеряемых параметров	10
Количество профилей счётчика	8
Схема подключения	4-проводная
Количество элементов	3
Коэффициент трансформации U (высокая сторона)	100.00000000
Коэффициент трансформации U (низкая сторона)	1.00000000
Коэффициент трансформации I (высокая сторона)	200.00000000
Коэффициент трансформации I (низкая сторона)	1.00000000
Коэффициент трансформации общий	20000.00000000
Число знаков после запятой на индикаторе счётчика	3
Наименование точки учета	Счетчик 1
U_1	1
U_2	1
I_1	1
I_2	1
Дата установки счётчика на точку учёта	15.01.2016 00:00:00
Дата снятия счётчика с точки учёта	

This report can be printed by pressing the button <Steam>.

1.4.3.2. Summary table. When selecting the tab "Сводная таблица", a list of meter configuration parameters will appear on the screen. Later, you can go through this window by using the following button <Instrument>:



The user should note the parameters that need to be included in the summary table and press the button <do>. The result will be the following report:



Наименование счётчика	Заводской номер счётчика	Идентификатор счётчика	Тип счётчика	Связной номер счётчика
(1) п/с 1_Счетчик 1	1004486	1	SATEC EM720	1
(2) п/с 1_Счетчик 2	1004489	2	SATEC EM720	1
(3) п/с 1_Счетчик 3	1004488	3	SATEC EM720	1
(4) п/с 1_Счетчик 4	1004487	4	SATEC EM720	1
(5) п/с 1_Счетчик 5	01255945	5	A1800	45
(6) п/с 1_Счетчик 6	01260320	6	A1800	20
(7) п/с 1_Счетчик 7	01246726	7	A1800	26
(8) п/с 1_Счетчик 8	01245751	8	A1800	51
(9) п/с 2_Счетчик 9	0001034733	9	ЕвроАльфа EAxx(R,RA)(T,L,LX)-4	3
(10) п/с 2_Счетчик 10	0001034734	10	ЕвроАльфа EAxx(R,RA)(T,L,LX)-4	4
(11) п/с 3_Счетчик 11	822083	11	SATEC EM720	1

For ease of reference, the user can move the columns to the left/right by pressing the buttons and . This report can be printed by pressing the button <Speech>.

1.4.4. Log-file viewer.

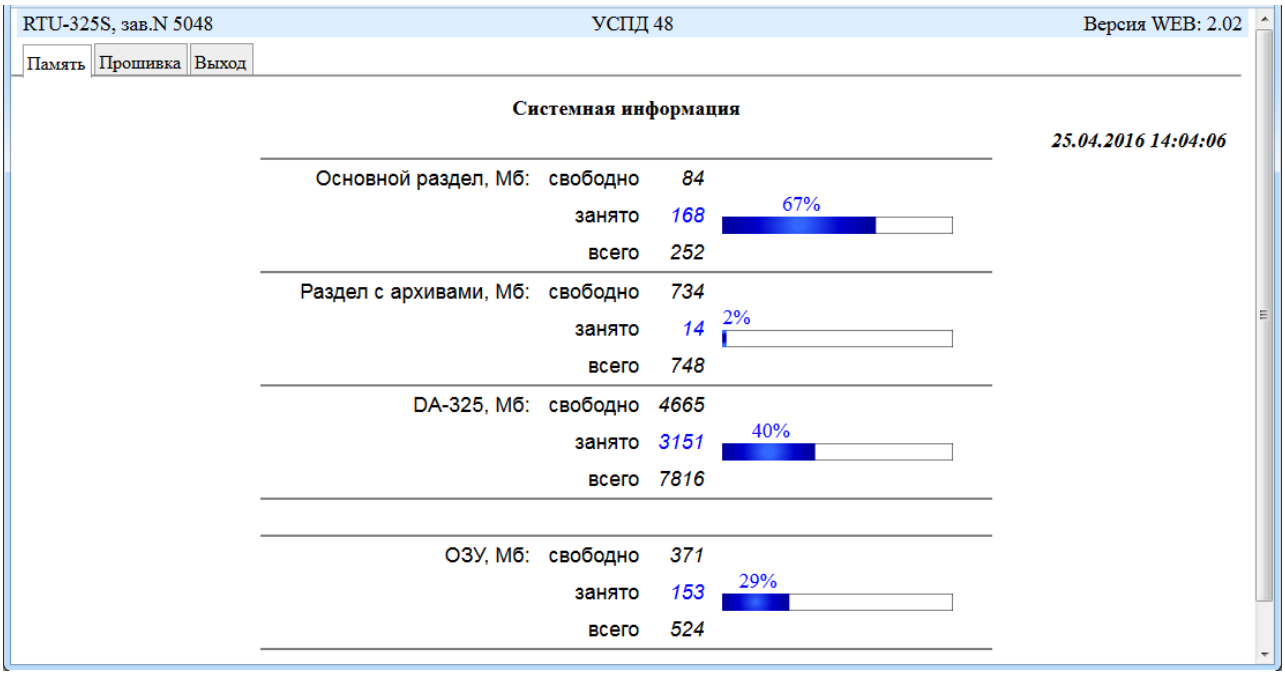
This paragraph allows the user to view the following log files:

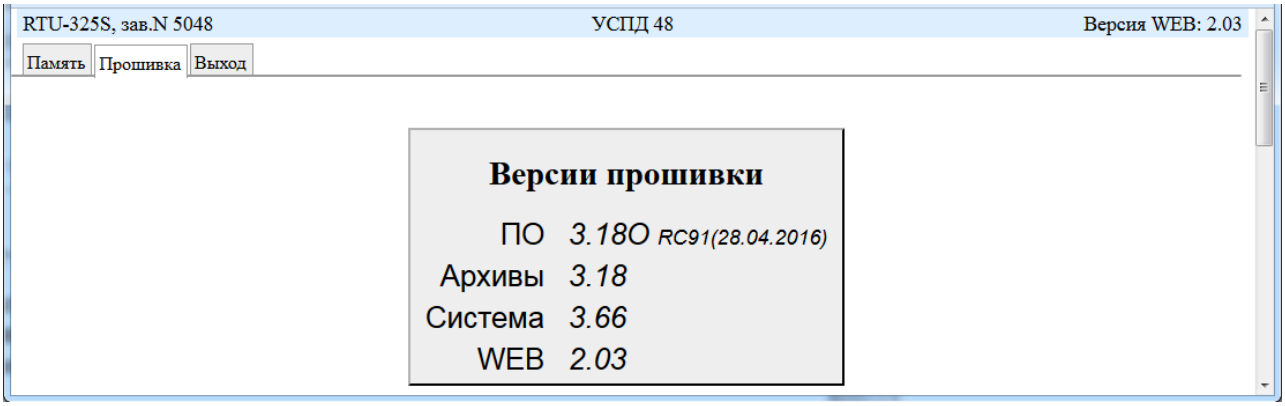
- GPRS connection - Dynamic DNS - Web server - Ethercat

A tab should be selected to view the required file.

1.4.5. System information.

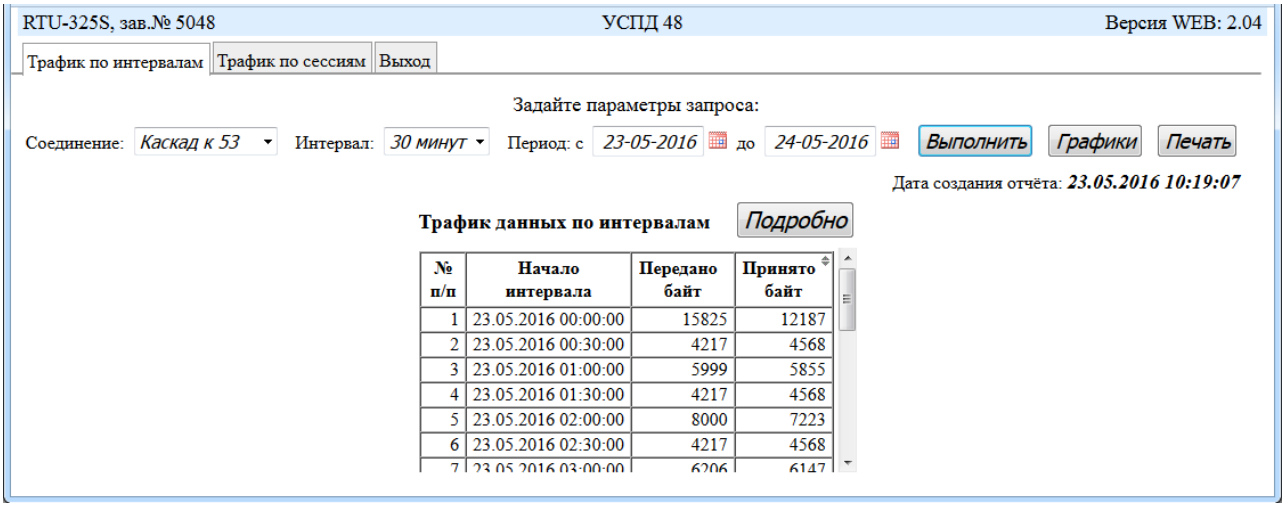
This paragraph provides the user with the opportunity to view the system information on memory and embroidery of the device.
The following tab should be selected to view the required information:





1.4.6. Data traffic.

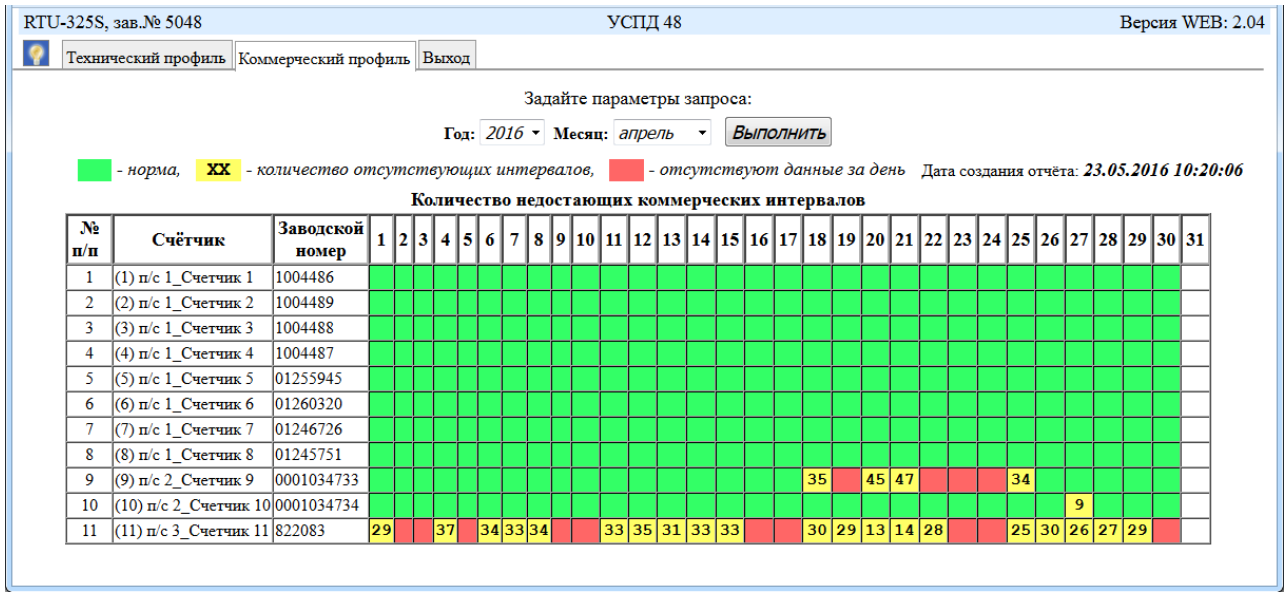
This paragraph allows the user to view the data traffic for the connections for which the data traffic is accounted for. Viewing is possible by intervals or by sessions:



1.4.7. Full data.

This paragraph provides the user with an opportunity to view the completeness of the technical and commercial profiles stored in the RTU archives.

The following report will be submitted to the user after the transition of the tab, year selection, month and push button <do>:



№ п/п	Счётчик	Заводской номер	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	(1) п/с 1_Счетчик 1	1004486																															
2	(2) п/с 1_Счетчик 2	1004489																															
3	(3) п/с 1_Счетчик 3	1004488																															
4	(4) п/с 1_Счетчик 4	1004487																															
5	(5) п/с 1_Счетчик 5	01255945																															
6	(6) п/с 1_Счетчик 6	01260320																															
7	(7) п/с 1_Счетчик 7	01246726																															
8	(8) п/с 1_Счетчик 8	01245751																															
9	(9) п/с 2_Счетчик 9	0001034733																		35		45	47				34						
10	(10) п/с 2_Счетчик 10	0001034734																											9				
11	(11) п/с 3_Счетчик 11	822083	29			37		34	33	34			33	35	31	33	33			30	29	13	14	28			25	30	26	27	29		

Green background shows the days of the month in which all the intervals are present. The red background shows the days of the month in which the data are not available. The days of the month in which several intervals were missing are marked by a yellow background showing the number of missing intervals

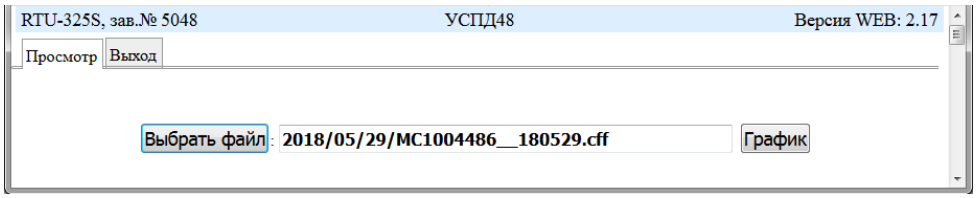
1.4.8. View COMTRADE.

This paragraph allows the user to view the file contents in COMTRADE format.

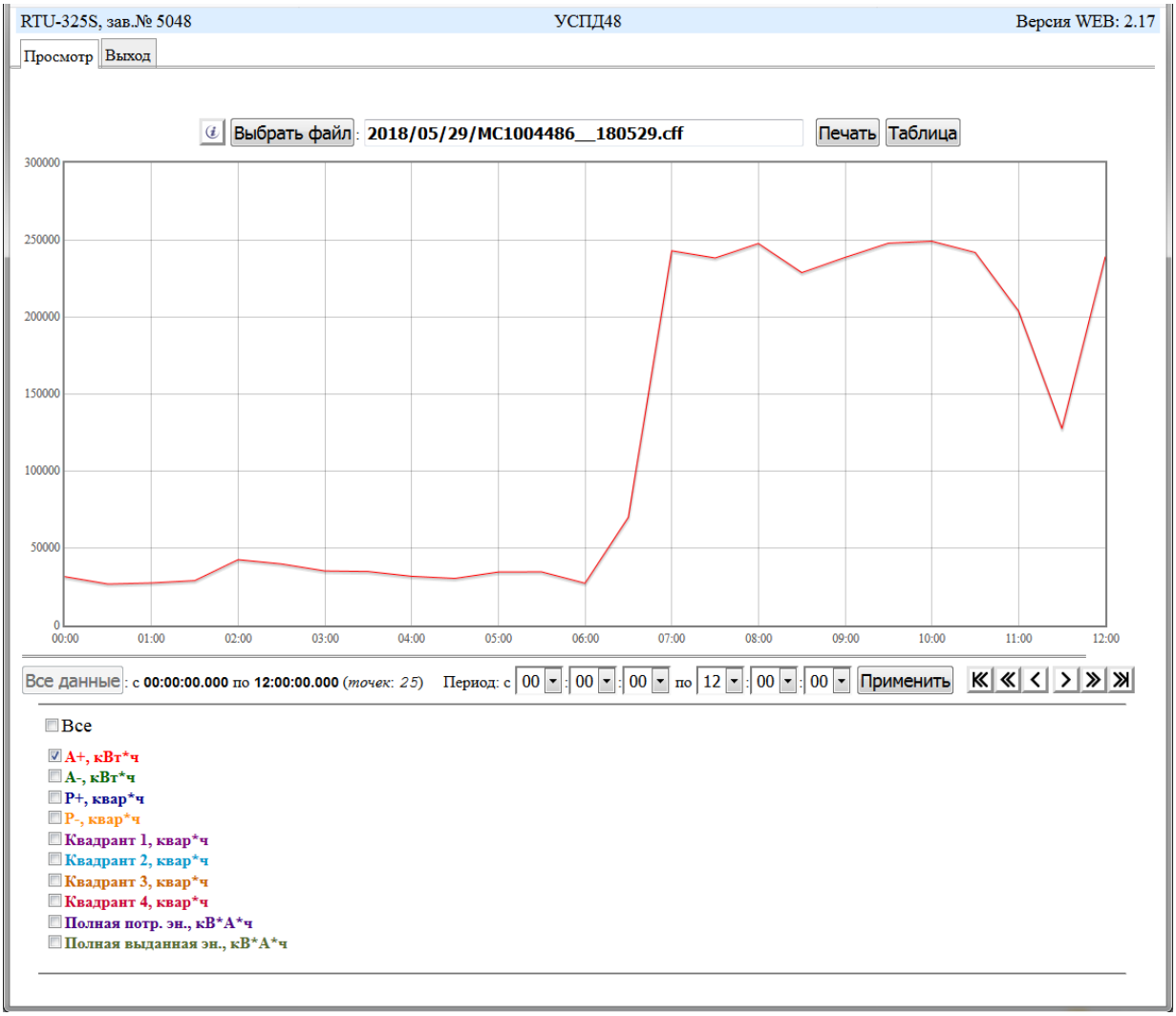
In selecting this paragraph, the user will be asked to select a file to view:



Once the file is selected, its name will appear in the file selection field:

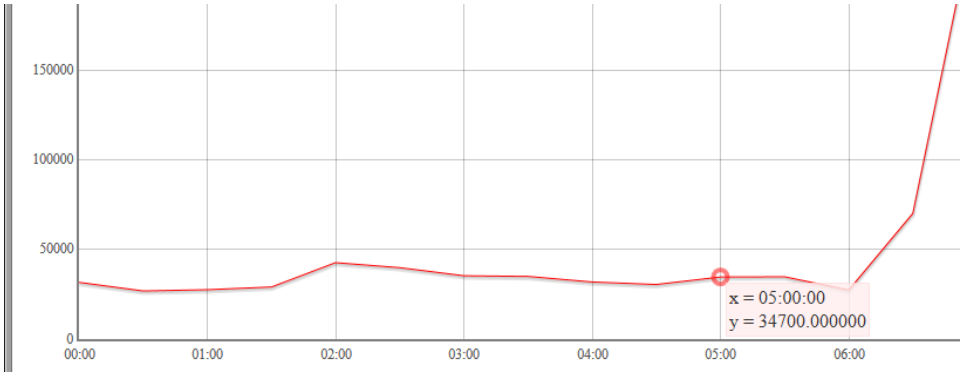


When the button <Grafik> is pressed, the graphic presentation of the data will be shown:



On the first display, the graph will be built on the first channel to the full depth of the data.

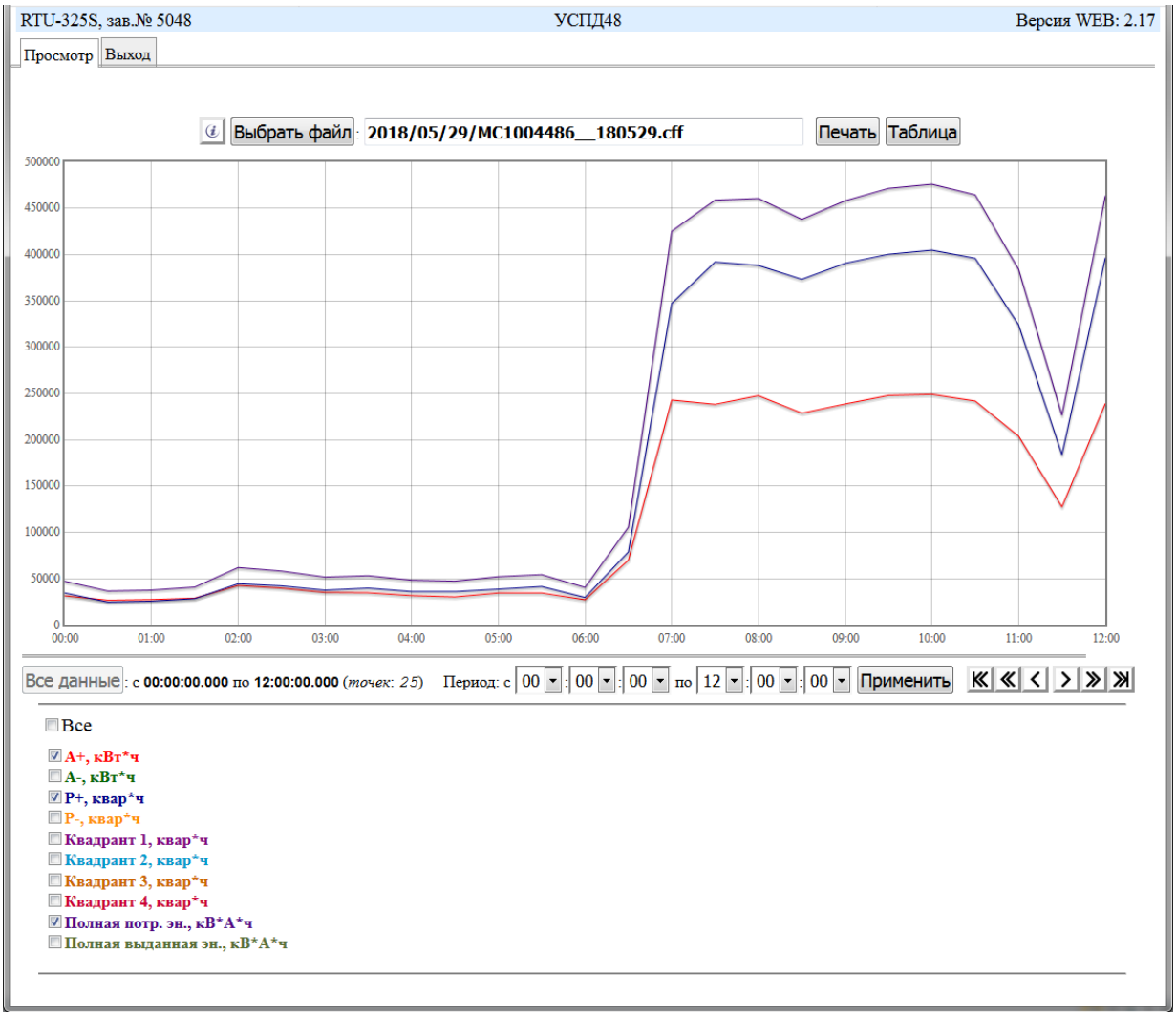
When the mouse pointer points the point on the graph, the point will be selected and a clue will appear indicating the time mark (x) and the value (y):



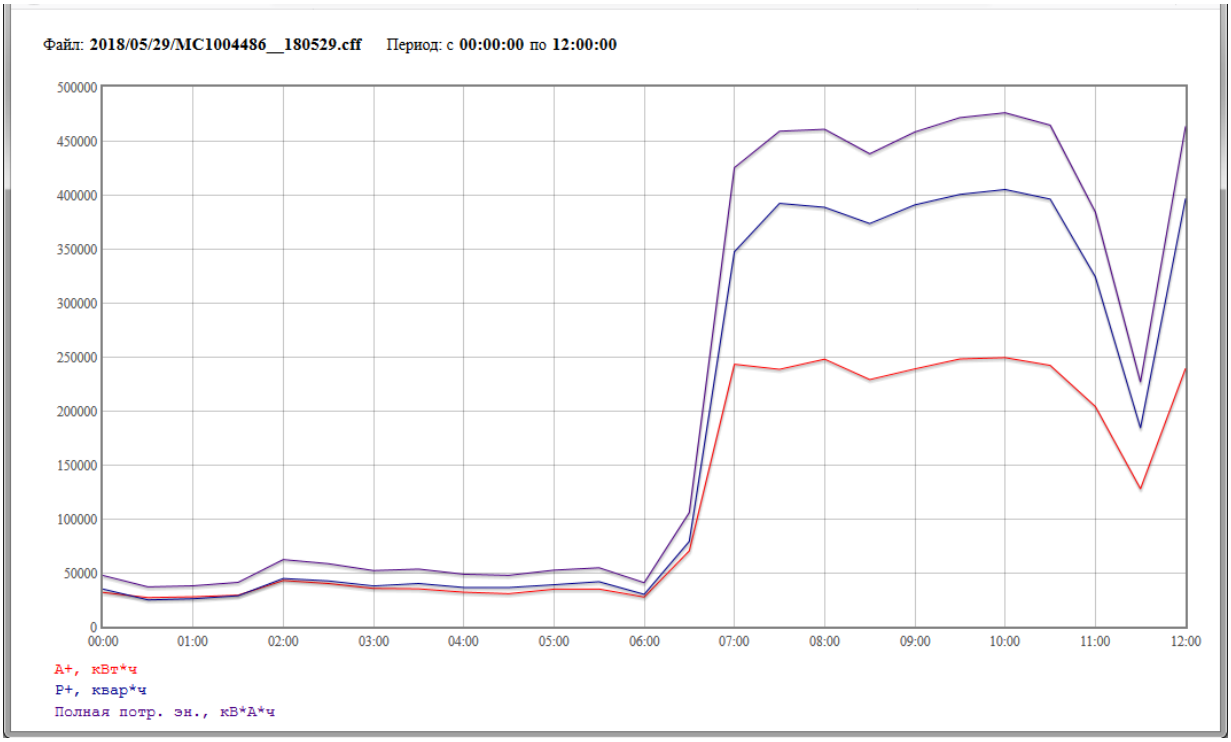
The schedule shows the time of the initial and the latest data. The total number of data clippings is indicated in parentheses.

The user can then set a period for more detailed data viewing. This requires an hour, minutes and seconds for the beginning and end of the period and press the button <Use>. The buttons to the right and to the left can be moved on the schedule with the given period. Using the <All data> button, the graph is set to the full data depth.

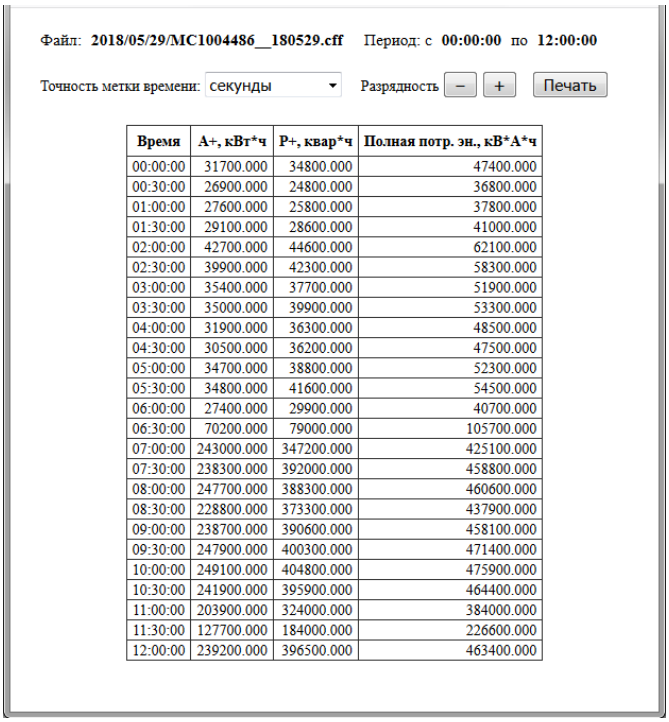
Below is a list of channels. The color of the channel name corresponds to the colour of the corresponding graph. It is possible to turn on/off the display on a channel by clicking on a square to the left of a given name, for example:



A document for printing will be prepared by using the <Search> button:



The <Table> button will open a window with a table presentation of the data shown on the graph:

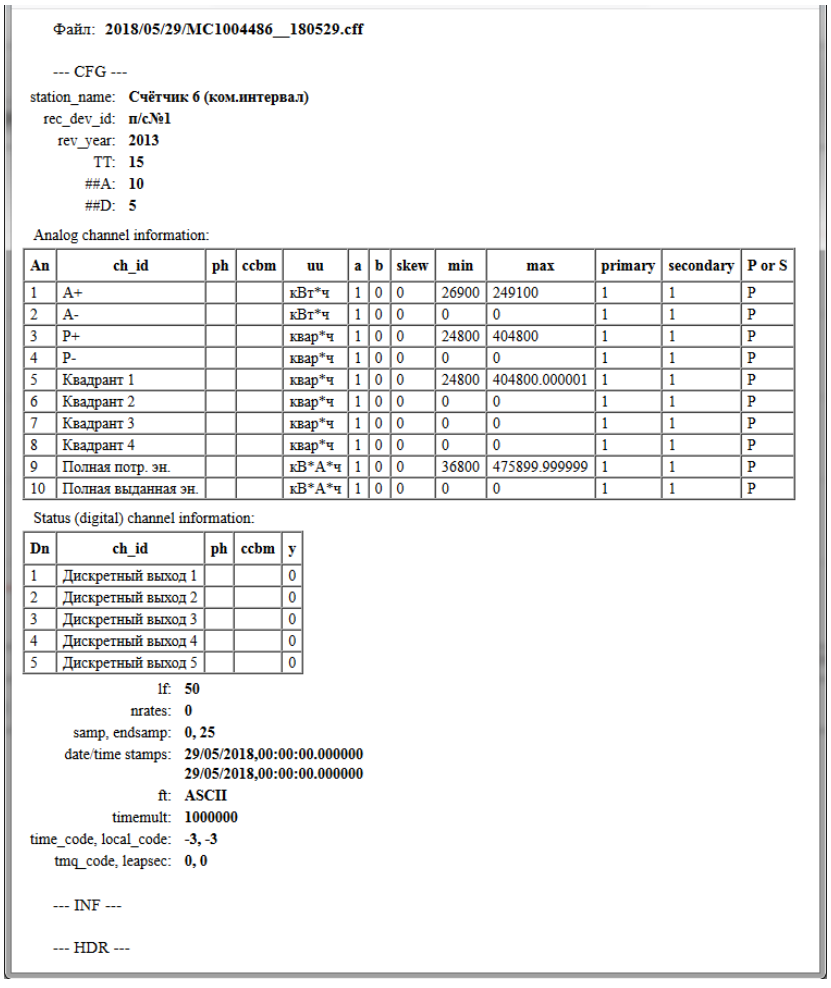


Файл: **2018/05/29/MC1004486__180529.cff** Период: с **00:00:00** по **12:00:00**

Точность метки времени: секунды Разрядность – + Печать

Время	A+, кВт*ч	P+, квар*ч	Полная потр. эн., кВ*А*ч
00:00:00	31700.000	34800.000	47400.000
00:30:00	26900.000	24800.000	36800.000
01:00:00	27600.000	25800.000	37800.000
01:30:00	29100.000	28600.000	41000.000
02:00:00	42700.000	44600.000	62100.000
02:30:00	39900.000	42300.000	58300.000
03:00:00	35400.000	37700.000	51900.000
03:30:00	35000.000	39900.000	53300.000
04:00:00	31900.000	36300.000	48500.000
04:30:00	30500.000	36200.000	47500.000
05:00:00	34700.000	38800.000	52300.000
05:30:00	34800.000	41600.000	54500.000
06:00:00	27400.000	29900.000	40700.000
06:30:00	70200.000	79000.000	105700.000
07:00:00	243000.000	347200.000	425100.000
07:30:00	238300.000	392000.000	458800.000
08:00:00	247700.000	388300.000	460600.000
08:30:00	228800.000	373300.000	437900.000
09:00:00	238700.000	390600.000	458100.000
09:30:00	247900.000	400300.000	471400.000
10:00:00	249100.000	404800.000	475900.000
10:30:00	241900.000	395900.000	464400.000
11:00:00	203900.000	324000.000	384000.000
11:30:00	127700.000	184000.000	226600.000
12:00:00	239200.000	396500.000	463400.000

The user can give the required accuracy of the time and value tag. A document for printing will be prepared using the <Steam> button. To the left of the file selection button will be a icon to view the service information in the file:



Файл: **2018/05/29/MC1004486__180529.cff**

--- CFG ---

station_name: **Счётчик 6 (ком.интервал)**
rec_dev_id: **п/с№1**
rev_year: **2013**
TT: **15**
##A: **10**
##D: **5**

Analog channel information:

An	ch_id	ph	ccbm	uu	a	b	skew	min	max	primary	secondary	P or S
1	A+			кВт*ч	1	0	0	26900	249100	1	1	P
2	A-			кВт*ч	1	0	0	0	0	1	1	P
3	P+			квар*ч	1	0	0	24800	404800	1	1	P
4	P-			квар*ч	1	0	0	0	0	1	1	P
5	Квадрант 1			квар*ч	1	0	0	24800	404800.000001	1	1	P
6	Квадрант 2			квар*ч	1	0	0	0	0	1	1	P
7	Квадрант 3			квар*ч	1	0	0	0	0	1	1	P
8	Квадрант 4			квар*ч	1	0	0	0	0	1	1	P
9	Полная потр. эн.			кВ*А*ч	1	0	0	36800	475899.999999	1	1	P
10	Полная выданная эн.			кВ*А*ч	1	0	0	0	0	1	1	P

Status (digital) channel information:

Dn	ch_id	ph	ccbm	y
1	Дискретный выход 1			0
2	Дискретный выход 2			0
3	Дискретный выход 3			0
4	Дискретный выход 4			0
5	Дискретный выход 5			0

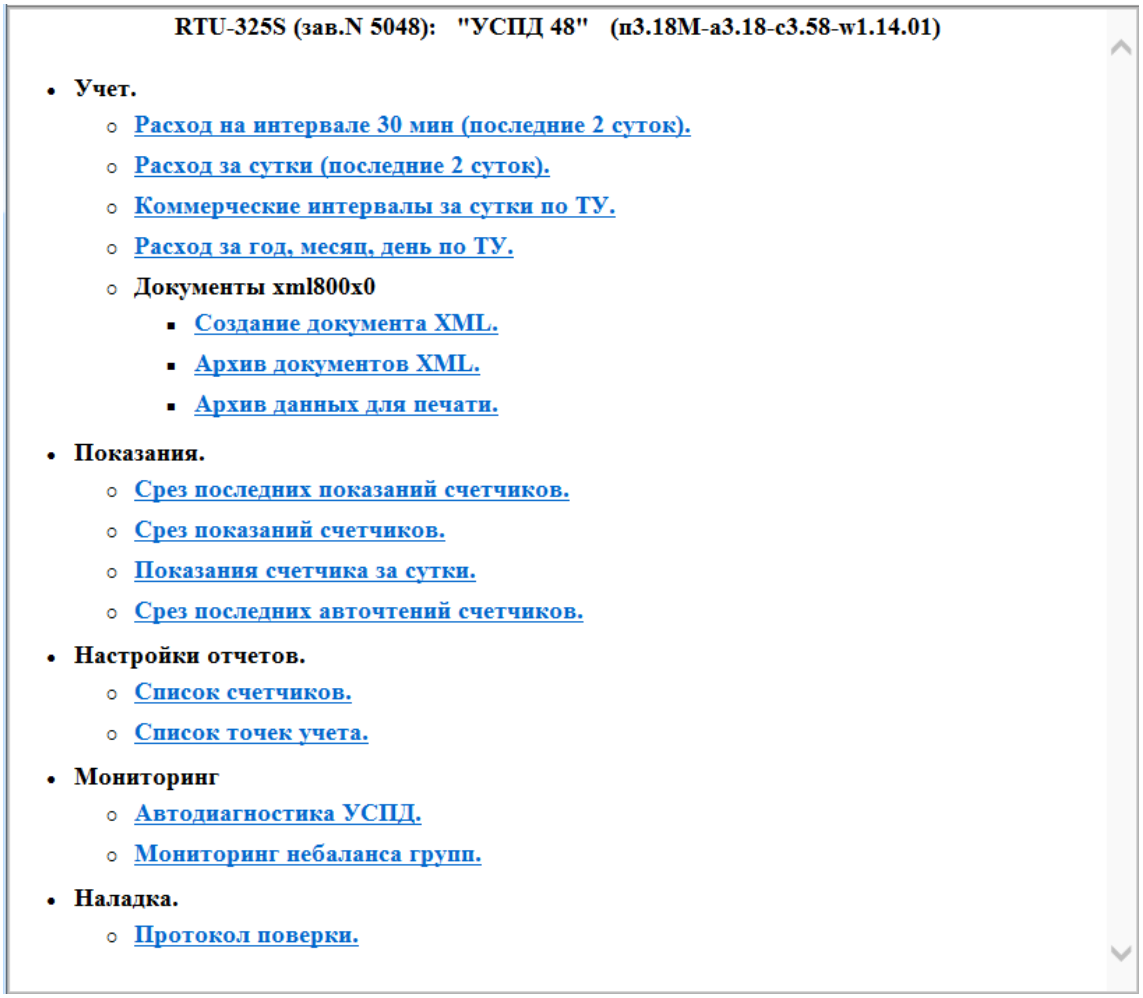
lf: **50**
nrates: **0**
samp, endsamp: **0, 25**
date/time stamps: **29/05/2018,00:00:00.000000**
29/05/2018,00:00:00.000000
ft: **ASCII**
timemult: **1000000**
time_code, local_code: **-3, -3**
tmq_code, leapsec: **0, 0**

--- INF ---

--- HDR ---

2. Web applications for low-speed connections.

The main menu will be presented to the user when IE browser is connected to an integrated RTU web server on a low-speed connection:



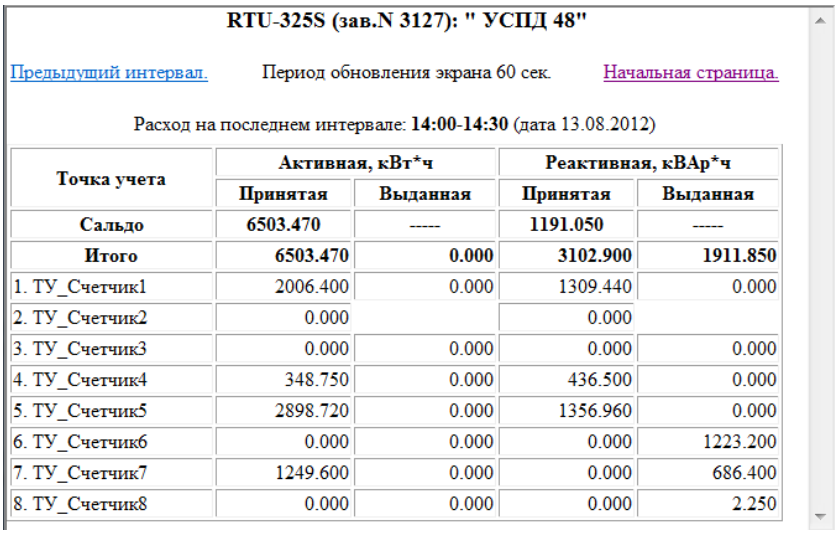
2.1. Countdown.

2.1.1. Flow rate at 30 minutes (last 2 days).

This paragraph provides the user with:

- Monitoring of commercial intervals with 60 seconds of automatic update for all account points of this RTU,
- Viewing commercial slots over the last 2 days across all metering points of this RTU.

When selecting this paragraph, the user will be provided with a table-monitoring window:



RTU-325S (зав.N 3127): " УСПД 48"

Предыдущий интервал. Период обновления экрана 60 сек. Начальная страница.

Расход на последнем интервале: **14:00-14:30** (дата 13.08.2012)

Точка учета	Активная, кВт*ч		Реактивная, кВАр*ч	
	Принятая	Выданная	Принятая	Выданная
Сальдо	**6503.470**	-----	**1191.050**	-----
Итого	**6503.470**	**0.000**	**3102.900**	**1911.850**
1. ТУ_Счетчик1	2006.400	0.000	1309.440	0.000
2. ТУ_Счетчик2	0.000		0.000	
3. ТУ_Счетчик3	0.000	0.000	0.000	0.000
4. ТУ_Счетчик4	348.750	0.000	436.500	0.000
5. ТУ_Счетчик5	2898.720	0.000	1356.960	0.000
6. ТУ_Счетчик6	0.000	0.000	0.000	1223.200
7. ТУ_Счетчик7	1249.600	0.000	0.000	686.400
8. ТУ_Счетчик8	0.000	0.000	0.000	2.250

The commercial slots shall be viewed by reference "Предыдущий интервал", "Следующий интервал" . The last interval shall be returned to the monitoring mode.

2.1.2. Expenditure per day (last 2 days).

In this paragraph, the user can look at the total 24-hour expenditure for all metering points of the RTU for the current and previous 24 hours:



RTU-325S (зав.N 3127): " УСПД 48"

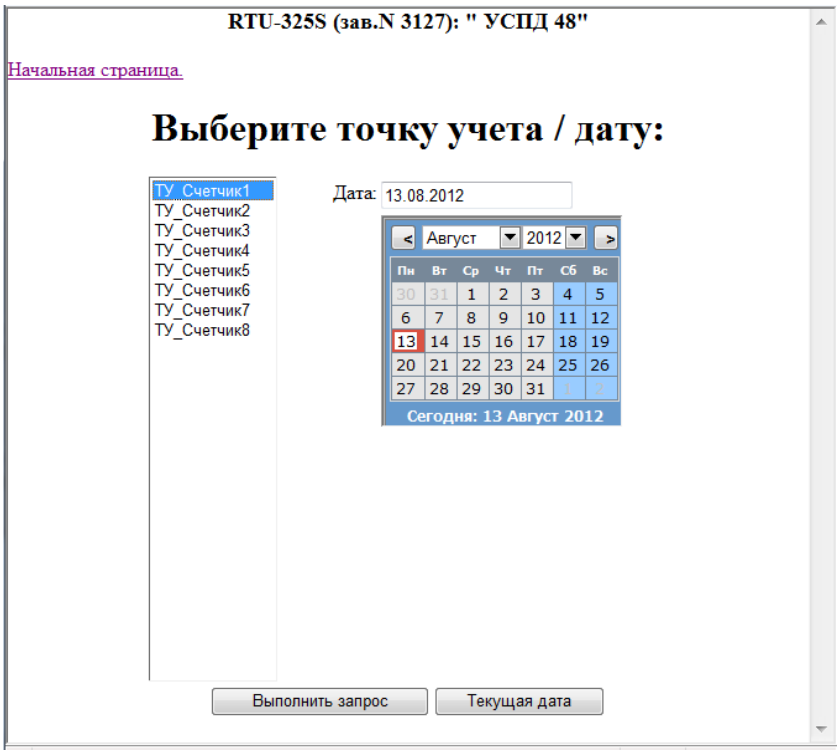
Предыдущие сутки. Начальная страница.

Расход за текущие сутки: **13.08.2012**

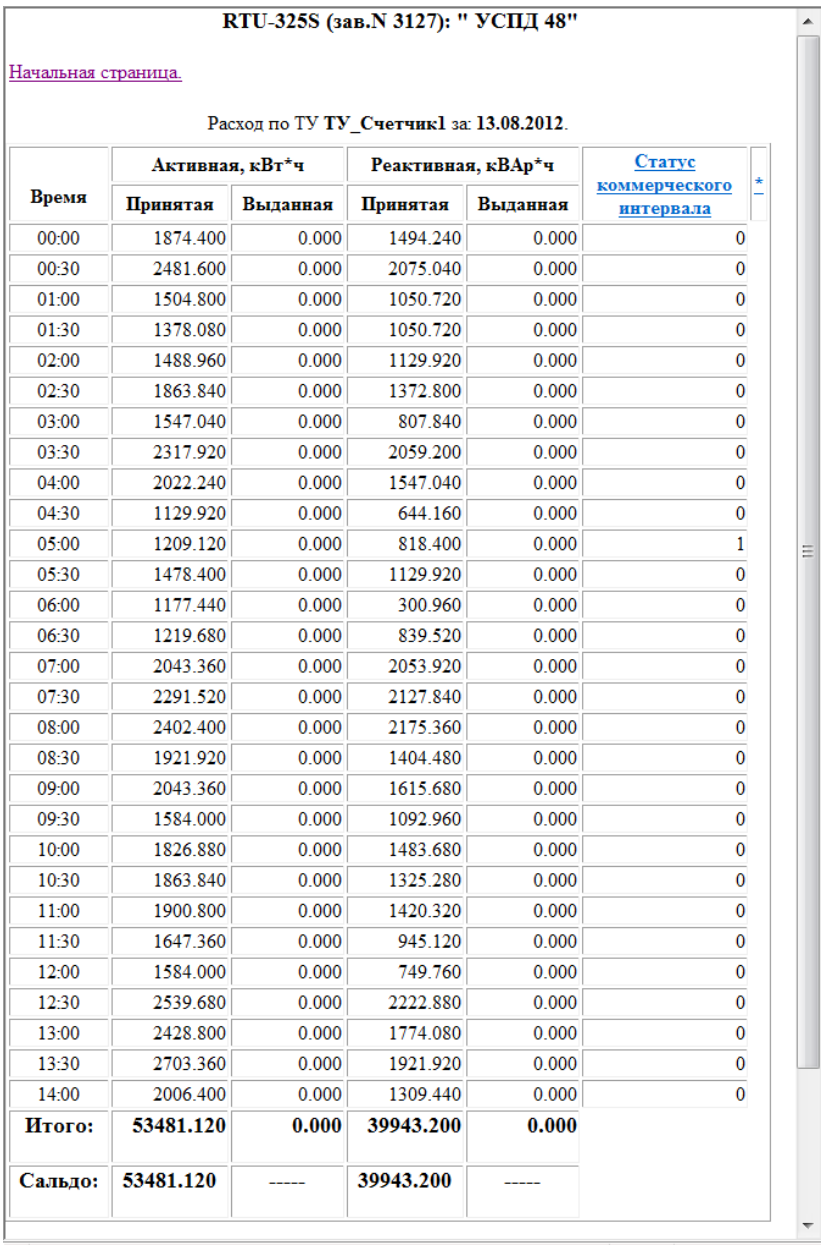
Точка учета	Активная, кВт*ч		Реактивная, кВАр*ч	
	Принятая	Выданная	Принятая	Выданная
Сальдо	**176379.920**	-----	**25576.050**	-----
Итого	**176379.920**	**0.000**	**85377.600**	**59801.550**
1. ТУ_Счетчик1	53481.120	0.000	39943.200	0.000
2. ТУ_Счетчик2	0.000		0.000	
3. ТУ_Счетчик3	0.000	0.000	0.000	0.000
4. ТУ_Счетчик4	7565.250	0.000	10164.000	0.000
5. ТУ_Счетчик5	81496.800	0.000	35270.400	0.000
6. ТУ_Счетчик6	202.400	0.000	0.000	36414.400
7. ТУ_Счетчик7	33633.600	0.000	0.000	23302.400
8. ТУ_Счетчик8	0.750	0.000	0.000	84.750

2.1.3. Commercial intervals in 24-hour U.S.

At this point, the user can obtain a report at commercial intervals 24 hours a day from the selected account point. To do this, it is necessary to select the metering point from the list and the date in the form below:



Once the key has been clicked, the following report will be made available to the user:



RTU-325S (зав.N 3127): " УСПД 48"

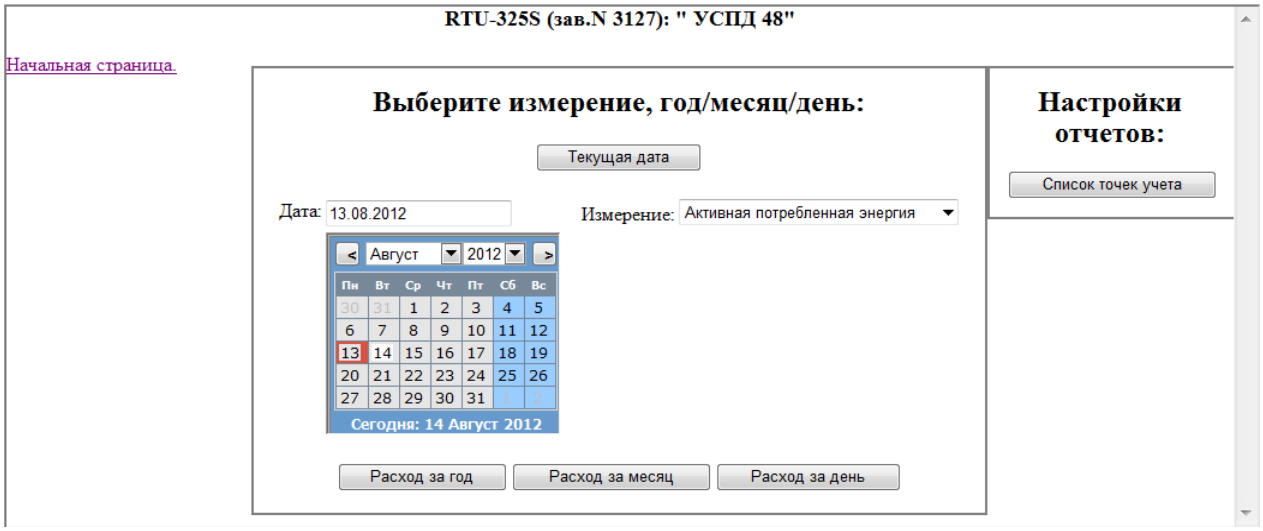
Начальная страница.

Расход по ТУ **ТУ_Счетчик1** за: **13.08.2012**.

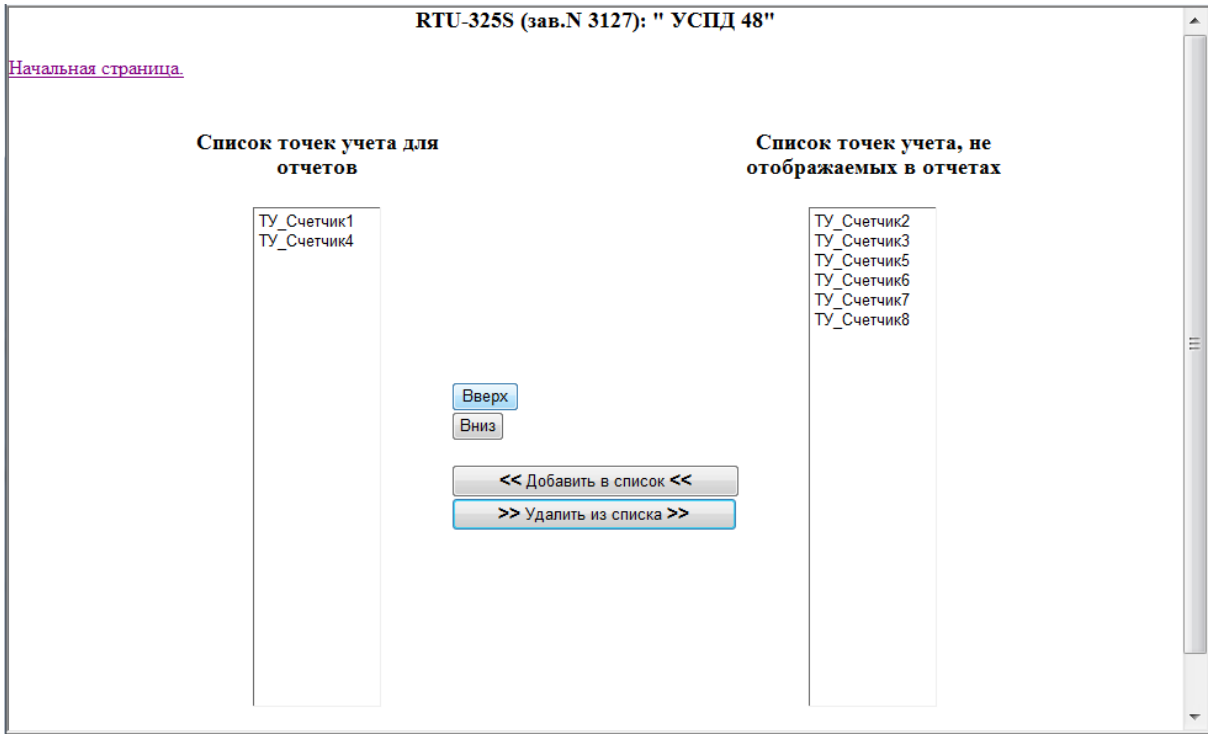
Время	Активная, кВт*ч		Реактивная, кВАр*ч		Статус коммерческого интервала	*
	Принятая	Выданная	Принятая	Выданная		
00:00	1874.400	0.000	1494.240	0.000	0	
00:30	2481.600	0.000	2075.040	0.000	0	
01:00	1504.800	0.000	1050.720	0.000	0	
01:30	1378.080	0.000	1050.720	0.000	0	
02:00	1488.960	0.000	1129.920	0.000	0	
02:30	1863.840	0.000	1372.800	0.000	0	
03:00	1547.040	0.000	807.840	0.000	0	
03:30	2317.920	0.000	2059.200	0.000	0	
04:00	2022.240	0.000	1547.040	0.000	0	
04:30	1129.920	0.000	644.160	0.000	0	
05:00	1209.120	0.000	818.400	0.000	1	
05:30	1478.400	0.000	1129.920	0.000	0	
06:00	1177.440	0.000	300.960	0.000	0	
06:30	1219.680	0.000	839.520	0.000	0	
07:00	2043.360	0.000	2053.920	0.000	0	
07:30	2291.520	0.000	2127.840	0.000	0	
08:00	2402.400	0.000	2175.360	0.000	0	
08:30	1921.920	0.000	1404.480	0.000	0	
09:00	2043.360	0.000	1615.680	0.000	0	
09:30	1584.000	0.000	1092.960	0.000	0	
10:00	1826.880	0.000	1483.680	0.000	0	
10:30	1863.840	0.000	1325.280	0.000	0	
11:00	1900.800	0.000	1420.320	0.000	0	
11:30	1647.360	0.000	945.120	0.000	0	
12:00	1584.000	0.000	749.760	0.000	0	
12:30	2539.680	0.000	2222.880	0.000	0	
13:00	2428.800	0.000	1774.080	0.000	0	
13:30	2703.360	0.000	1921.920	0.000	0	
14:00	2006.400	0.000	1309.440	0.000	0	
Итого:	**53481.120**	**0.000**	**39943.200**	**0.000**		
Сальдо:	**53481.120**	-----	**39943.200**	-----		

2.1.4. A year's expenditure, a month, a day's gonna be a day.

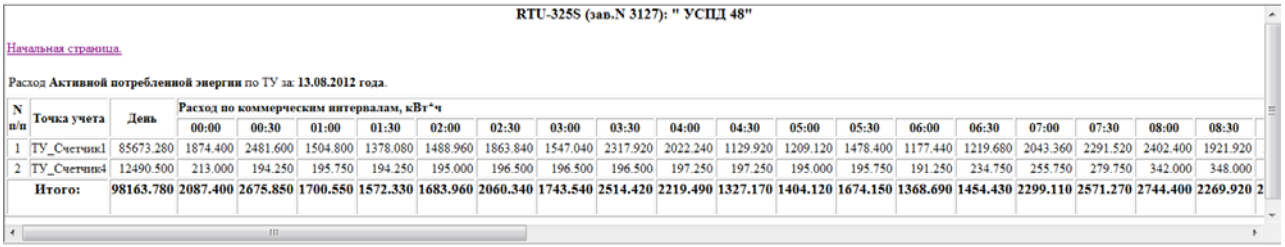
In this paragraph, the user can obtain the electric energy consumption report from the selected metering points and the required measurement for the day, month or year. To do so, a date, measurement and button must be selected to meet the required period. The required period shall be determined from the date selected:



The user can pre-set the reports - identify the list of account points that will be shown in the reports:

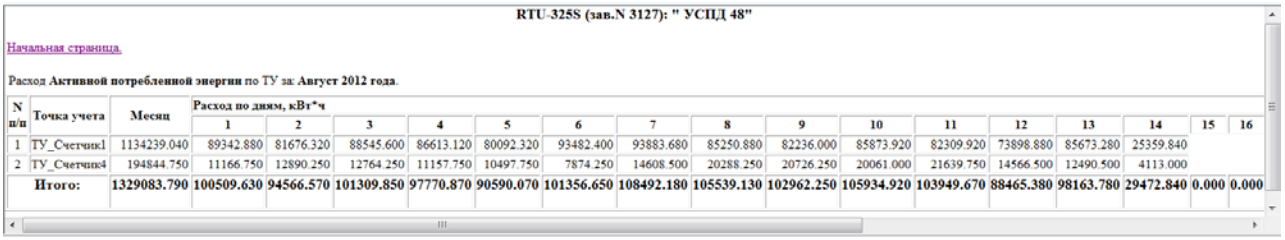


After pressing the key <day cost>, the user will be provided with a daily flow report detailing the commercial intervals:



N п/п	Точка учета	День	Расход по коммерческим интервалам, кВт*ч																
			00:00	00:30	01:00	01:30	02:00	02:30	03:00	03:30	04:00	04:30	05:00	05:30	06:00	06:30	07:00	07:30	08:00	08:30
1	ТУ_Счетчик1	85673.280	1874.400	2481.600	1504.800	1378.080	1488.960	1863.840	1547.040	2317.920	2022.240	1129.920	1209.120	1478.400	1177.440	1219.680	2043.360	2291.520	2402.400	1921.920
2	ТУ_Счетчик4	12490.500	213.000	194.250	195.750	194.250	195.000	196.500	196.500	196.500	197.250	197.250	195.000	195.750	191.250	234.750	255.750	279.750	342.000	348.000
Итого:		98163.780	2087.400	2675.850	1700.550	1572.330	1683.960	2060.340	1743.540	2514.420	2219.490	1327.170	1404.120	1674.150	1368.690	1454.430	2299.110	2571.270	2744.400	2269.920

Once the key has been pressed < Monthly Expenditure>, the user will be provided with a monthly expenditure report detailing the month's days:



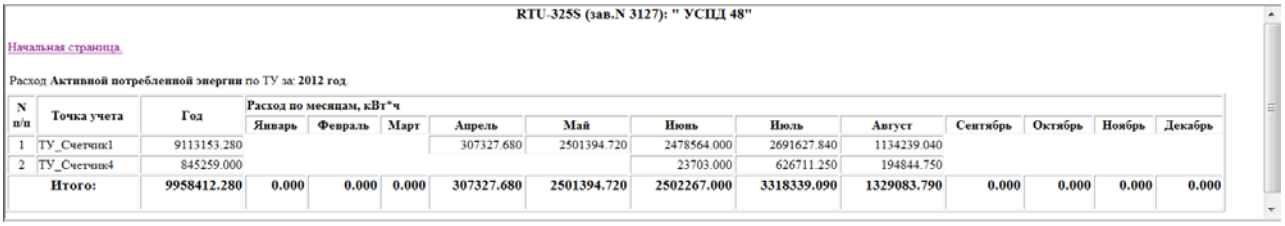
RTU-325S (зав.N 3127): " УСПД 48"

Начальная страница

Расход **Активной потребленной энергии** по ТУ за: **Август 2012 года**.

N п/п	Точка учета	Месяц	Расход по дням, кВт*ч															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	ТУ_Счетчик1	1134239.040	89342.880	81676.320	88545.600	86613.120	80092.320	93482.400	93883.680	85250.880	82236.000	85873.920	82309.920	73898.880	85673.280	25359.840		
2	ТУ_Счетчик4	194844.750	11166.750	12890.250	12764.250	11157.750	10497.750	7874.250	14608.500	20288.250	20726.250	20061.000	21639.750	14566.500	12490.500	4113.000		
Итого:		**1329083.790**	**100509.630**	**94566.570**	**101309.850**	**97770.870**	**90590.070**	**101356.650**	**108492.180**	**105539.130**	**102962.250**	**105934.920**	**103949.670**	**88465.380**	**98163.780**	**29472.840**	**0.000**	**0.000**

Once the key has been pressed < Cost per year>, the user will be provided with the annual consumption report, with details by month of year:



RTU-325S (зав.N 3127): " УСПД 48"

Начальная страница

Расход **Активной потребленной энергии** по ТУ за: **2012 год**

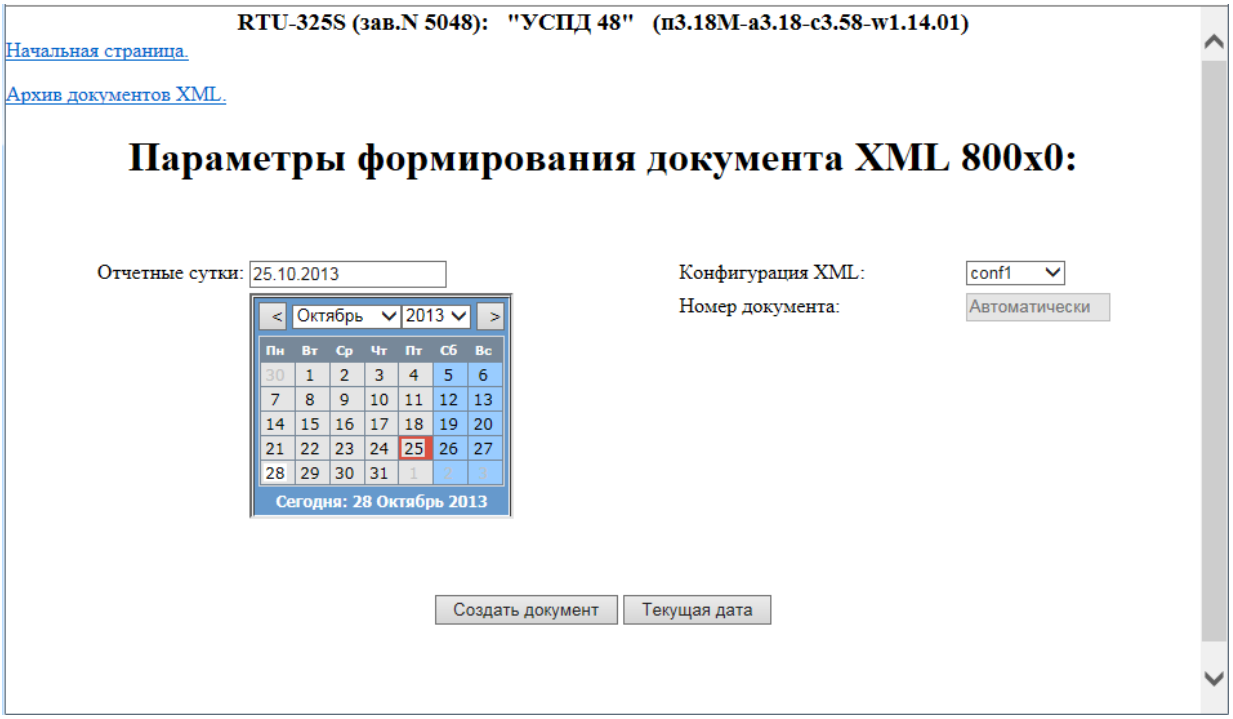
N п/п	Точка учета	Год	Расход по месяцам, кВт*ч											
			Январь	Февраль	Март	Апрель	Май	Июнь	Июль	Август	Сентябрь	Октябрь	Ноябрь	Декабрь
1	ТУ_Счетчик1	9113153.280				307327.680	2501394.720	2478564.000	2691627.840	1134239.040				
2	ТУ_Счетчик4	845259.000						23703.000	626711.250	194844.750				
Итого:		**9958412.280**	**0.000**	**0.000**	**0.000**	**307327.680**	**2501394.720**	**2502267.000**	**3318339.090**	**1329083.790**	**0.000**	**0.000**	**0.000**	**0.000**

2.1.5. Documents xml800x0.

In this point, the user can create XML 80020, 80030 and 80020* documents, view the archive of previously created documents and download the required FTP protocol document on the user ' s computer.

2.1.5.1. Creating an XML document. This menu item lets the user create XML documents. Configure the documents first in the RTU embedded “Конфигуратор” program, under ‘Передача’ > ‘XML: документ 800x0’.

In selecting this paragraph, the user will be provided with the form for selecting the parameters for the document:



RTU-325S (зав.N 5048): "УСПД 48" (п3.18M-a3.18-c3.58-w1.14.01)

Начальная страница

Архив документов XML

Параметры формирования документа XML 800x0:

Отчетные сутки: 25.10.2013

< Октябрь 2013 >

Пн	Вт	Ср	Чт	Пт	Сб	Вс
30	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

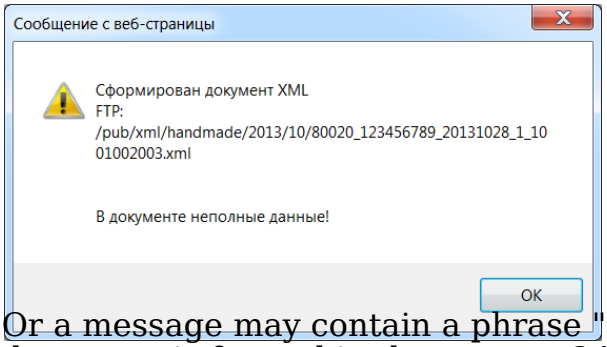
Сегодня: 28 Октябрь 2013

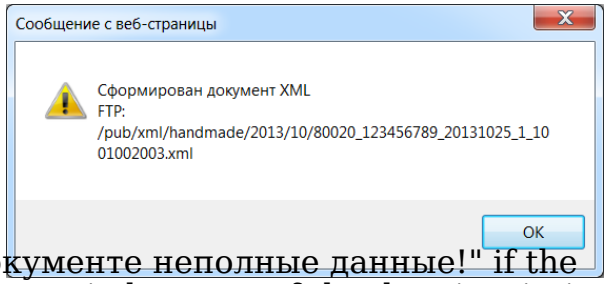
Конфигурация XML: conf1

Номер документа: Автоматически

Создать документ | Текущая дата

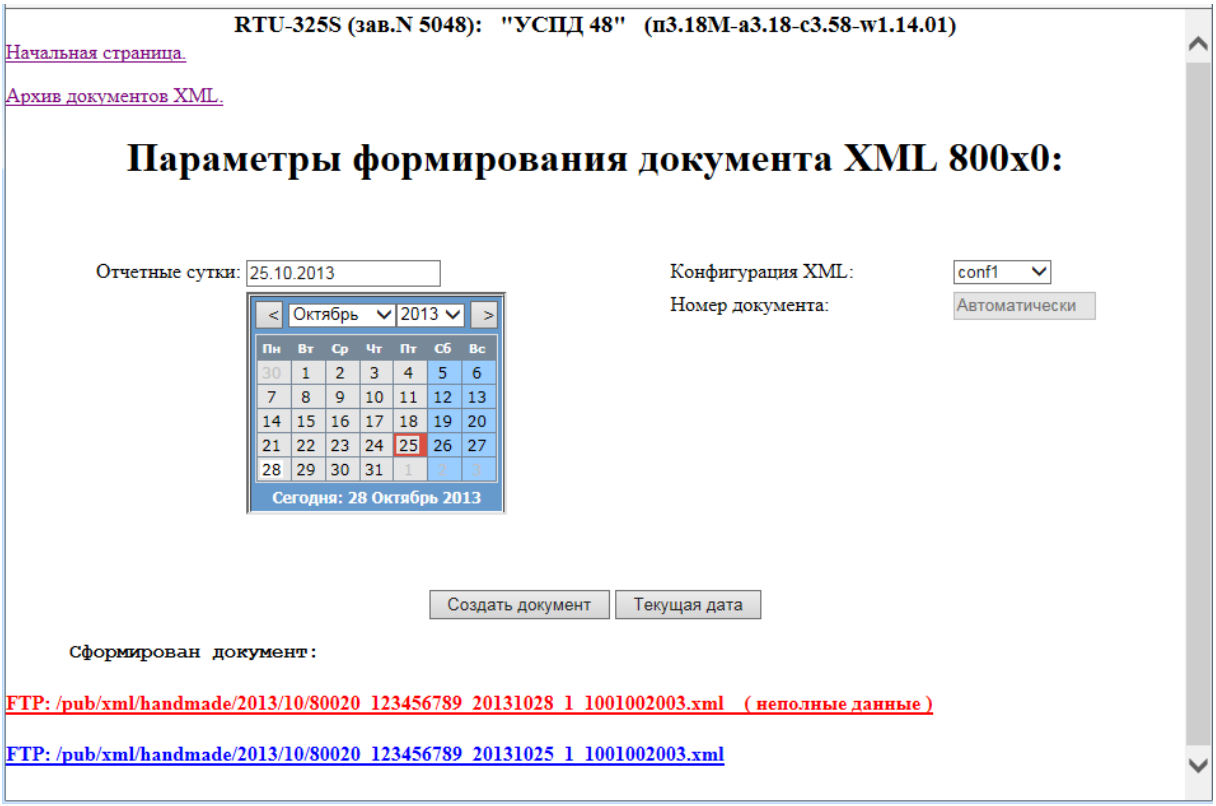
The user must select the date and required XML configuration. Once the button <Convent document> is pressed, the relevant XML document will be formed and the following message will be issued:





Or a message may contain a phrase "В документе неполные данные!" if the document is formed in the current 24-hour period or part of the data is missing in the selected days.

This page contains a link to XML documents formed during the current session:

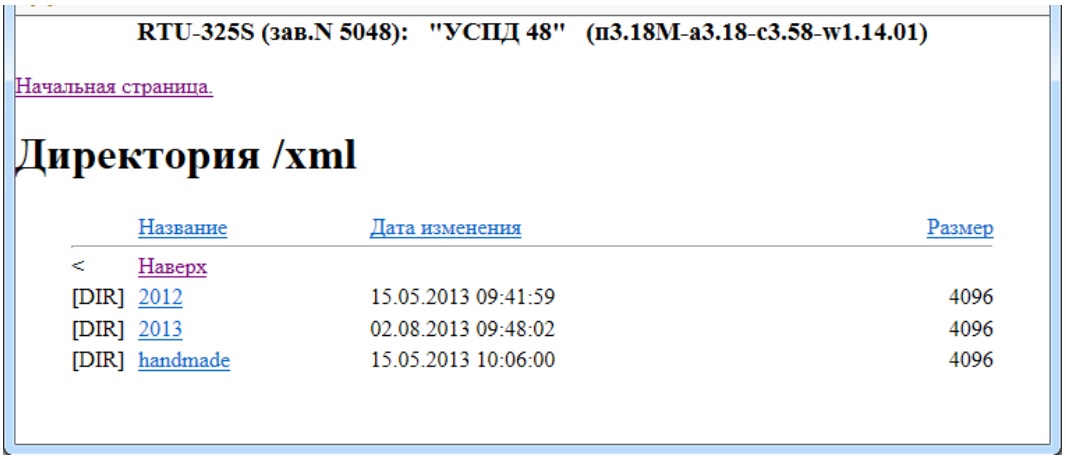


In blue, references to documents with complete data are highlighted. References to incomplete documents are shown in red.

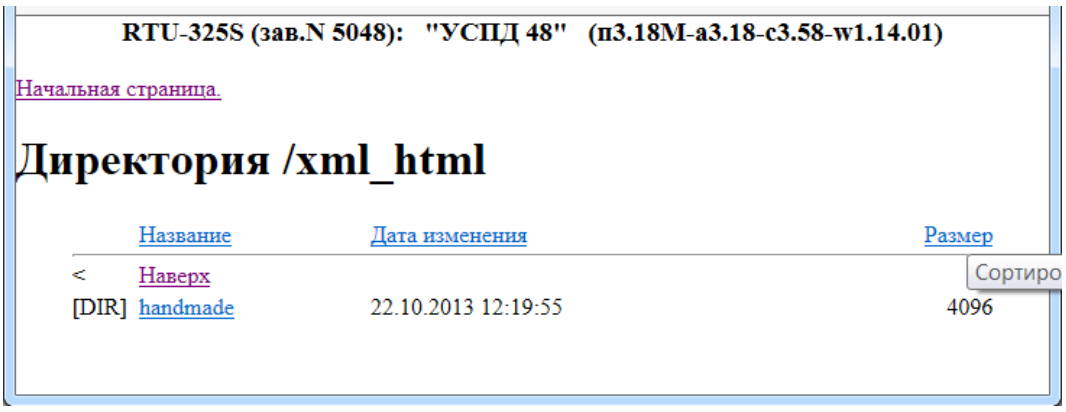
To view the document, the user must switch to the appropriate link. To download a document on your computer, you have to click with the right mouse button on the appropriate link and select in the context menu 'Save Object as...'. This function depends on the browser's ability.

This page contains a reference to the XML document archive, which is described below.

2.1.5.2. XML document archive. In selecting this paragraph, the user will be provided with an archive of XML-formed documents. The user may view the required document or download the FTP protocol from the /pub/xml / [handmade/]YYYY/MM, where YYYY is the year of the document date and MM is the month of the document date. Handmade/handmade documents are stored under the directory.



2.1.5.3. Data archive for the press. The user will be provided with an archive of the generated documents for data viewing and printing when selecting this paragraph. The user may view the required document or download the FTP protocol from the /pub/xml_html / [handmade/]YYYY/MM, where YYYY is the year of the document date and MM is the month of the document date.



Once the required document is selected, the user will be provided with the data contained in the viewing and printing document:

Файл: 80020_123456789_20131026_1_1001002003.htm

Тип документа: 80020 Версия формата: 2 Номер сообщения: 1
Отчетные сутки: **26.10.2013** Время формирования документа: **28.10.2013 07:57:12** Признак летнего времени: **0 (зима)**
ИНН отправителя: **123456789** Отправитель: **ООО "АльфаБэта"**

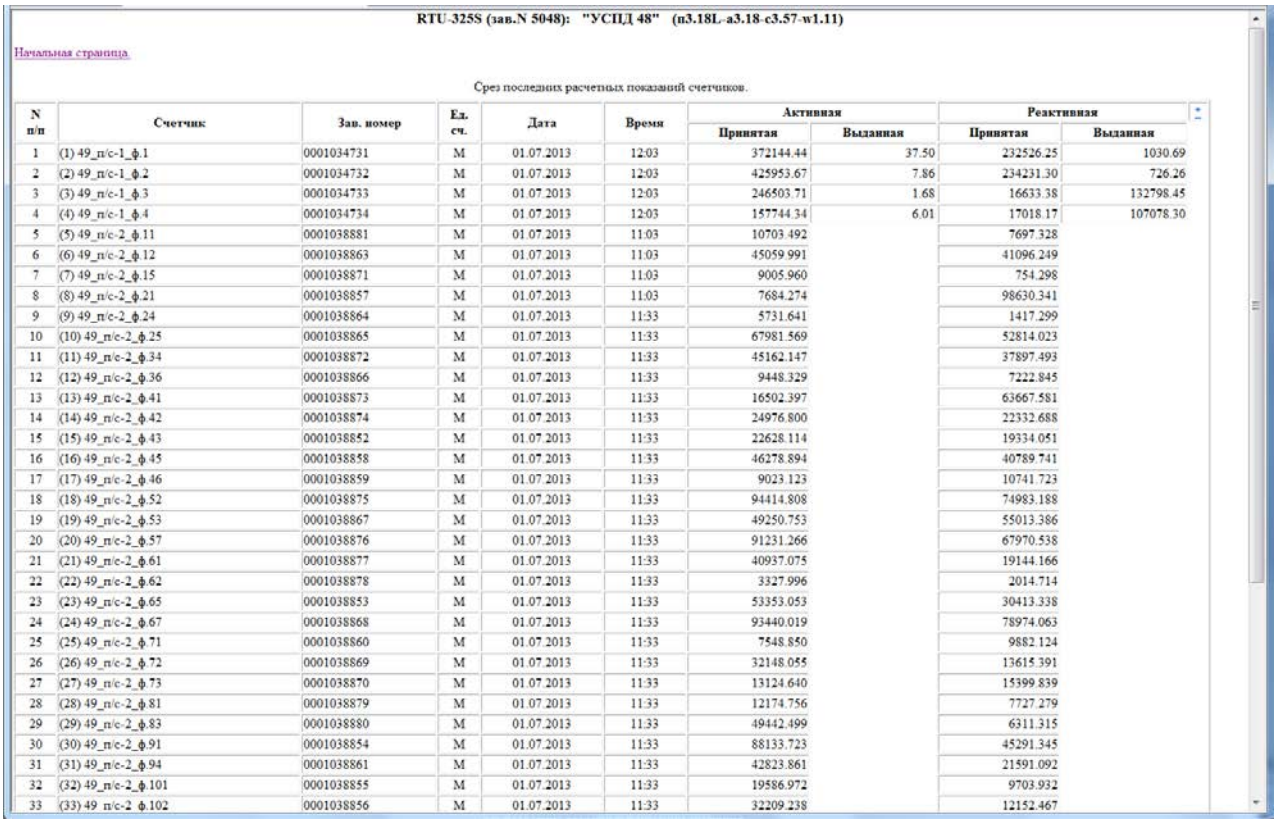
ИНН субъекта ОРЭ: **135792468** Субъект ОРЭ: **ООО "ГаммаДельта"**
Временная зона: **1 (1,2 ценовая зона, 1,3 неценовая зона)**
Точка измерения: **'49_Прокат-1 (Сч.: 0001034731)'** Код КО: **10010020030001034731**

Время	Активная потребленная энергия (1)	Активная выданная энергия (2)	Примечание
00:00 - 00:30	1600	0	
00:30 - 01:00	1394	0	
01:00 - 01:30	1336	0	
01:30 - 02:00	1357	0	
02:00 - 02:30	2297	0	
02:30 - 03:00	2545	0	
03:00 - 03:30	1943	0	
03:30 - 04:00	1605	0	
04:00 - 04:30	1621	0	
04:30 - 05:00	1394	0	
05:00 - 05:30	1240	0	
05:30 - 06:00	1247	0	
06:00 - 06:30	2254	0	
06:30 - 07:00	2392	0	
07:00 - 07:30	1959	0	
07:30 - 08:00	1779	0	
08:00 - 08:30	1795	0	
08:30 - 09:00	1611	0	
09:00 - 09:30	2772	0	
09:30 - 10:00	2561	0	
10:00 - 10:30	1974	0	
10:30 - 11:00	1891	0	
11:00 - 11:30	1789	0	
11:30 - 12:00	2445	0	
12:00 - 12:30	2688	0	
12:30 - 13:00	2011	0	
13:00 - 13:30	1780	0	
13:30 - 14:00	1721	0	
14:00 - 14:30	1346	0	
14:30 - 15:00	1215	0	
15:00 - 15:30	1061	0	
15:30 - 16:00	2434	0	
16:00 - 16:30	1901	0	
16:30 - 17:00	1959	0	
17:00 - 17:30	1732	0	
17:30 - 18:00	2117	0	

2.2. Testimony.

2.2.1. Cutting off the latest readings.

In this paragraph, the user can look at the latest meter readings:



RTU-325S (зав.N 5048): "УСПД 48" (п3.18L-a3.18-c3.57-w1.11)

Начальная страница

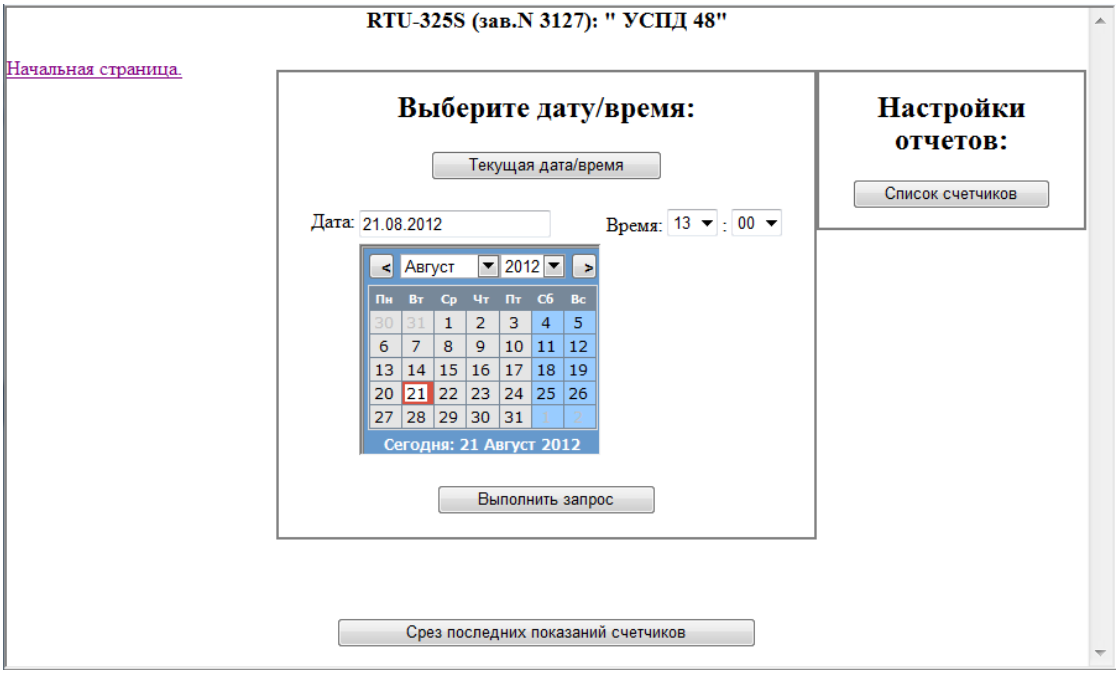
Срез последних расчетных показаний счетчиков.

N п/п	Счетчик	Зав. номер	Ед. сч.	Дата	Время	Активная		Реактивная	
						Принятая	Выданная	Принятая	Выданная
1	(1) 49_п/с-1_ф.1	0001034731	M	01.07.2013	12:03	372144.44	37.50	232526.25	1030.69
2	(2) 49_п/с-1_ф.2	0001034732	M	01.07.2013	12:03	425953.67	7.86	234231.30	726.26
3	(3) 49_п/с-1_ф.3	0001034733	M	01.07.2013	12:03	246503.71	1.68	16633.38	132798.45
4	(4) 49_п/с-1_ф.4	0001034734	M	01.07.2013	12:03	157744.34	6.01	17018.17	107078.30
5	(5) 49_п/с-2_ф.11	0001038881	M	01.07.2013	11:03	10703.492		7697.328	
6	(6) 49_п/с-2_ф.12	0001038863	M	01.07.2013	11:03	45059.991		41096.249	
7	(7) 49_п/с-2_ф.15	0001038871	M	01.07.2013	11:03	9005.960		754.298	
8	(8) 49_п/с-2_ф.21	0001038857	M	01.07.2013	11:03	7684.274		98630.341	
9	(9) 49_п/с-2_ф.24	0001038864	M	01.07.2013	11:33	5731.641		1417.299	
10	(10) 49_п/с-2_ф.25	0001038865	M	01.07.2013	11:33	67981.569		52814.023	
11	(11) 49_п/с-2_ф.34	0001038872	M	01.07.2013	11:33	45162.147		37897.493	
12	(12) 49_п/с-2_ф.36	0001038866	M	01.07.2013	11:33	9448.329		7222.845	
13	(13) 49_п/с-2_ф.41	0001038873	M	01.07.2013	11:33	16502.397		63667.581	
14	(14) 49_п/с-2_ф.42	0001038874	M	01.07.2013	11:33	24976.800		22332.688	
15	(15) 49_п/с-2_ф.43	0001038852	M	01.07.2013	11:33	22628.114		19334.051	
16	(16) 49_п/с-2_ф.45	0001038858	M	01.07.2013	11:33	46278.894		40789.741	
17	(17) 49_п/с-2_ф.46	0001038859	M	01.07.2013	11:33	9023.123		10741.723	
18	(18) 49_п/с-2_ф.52	0001038875	M	01.07.2013	11:33	94414.808		74983.188	
19	(19) 49_п/с-2_ф.53	0001038867	M	01.07.2013	11:33	49250.753		55013.386	
20	(20) 49_п/с-2_ф.57	0001038876	M	01.07.2013	11:33	91231.266		67970.538	
21	(21) 49_п/с-2_ф.61	0001038877	M	01.07.2013	11:33	40937.075		19144.166	
22	(22) 49_п/с-2_ф.62	0001038878	M	01.07.2013	11:33	3327.996		2014.714	
23	(23) 49_п/с-2_ф.65	0001038853	M	01.07.2013	11:33	53353.053		30413.338	
24	(24) 49_п/с-2_ф.67	0001038868	M	01.07.2013	11:33	93440.019		78974.063	
25	(25) 49_п/с-2_ф.71	0001038860	M	01.07.2013	11:33	7548.850		9882.124	
26	(26) 49_п/с-2_ф.72	0001038869	M	01.07.2013	11:33	32148.055		13615.391	
27	(27) 49_п/с-2_ф.73	0001038870	M	01.07.2013	11:33	13124.640		15399.839	
28	(28) 49_п/с-2_ф.81	0001038879	M	01.07.2013	11:33	12174.756		7727.279	
29	(29) 49_п/с-2_ф.83	0001038880	M	01.07.2013	11:33	49442.499		6311.315	
30	(30) 49_п/с-2_ф.91	0001038854	M	01.07.2013	11:33	88133.723		45291.345	
31	(31) 49_п/с-2_ф.94	0001038861	M	01.07.2013	11:33	42823.861		21591.092	
32	(32) 49_п/с-2_ф.101	0001038855	M	01.07.2013	11:33	19586.972		9703.932	
33	(33) 49_п/с-2_ф.102	0001038856	M	01.07.2013	11:33	32209.238		12152.467	

The user can pre-set the reports by identifying a list of account points that will be shown in the reports.

2.2.2. Cut off the meter readings.

At this point, the user can look at the meters:



The user can pre-set the reports by identifying a list of account points that will be shown in the reports.

The following report will be submitted to the user after the date, the interval and the button is started: <To execute the request>:



RTU-325S (зав.N 3127): " УСПД 48"

Начальная страница

Срез последних расчетных показаний счетчиков.

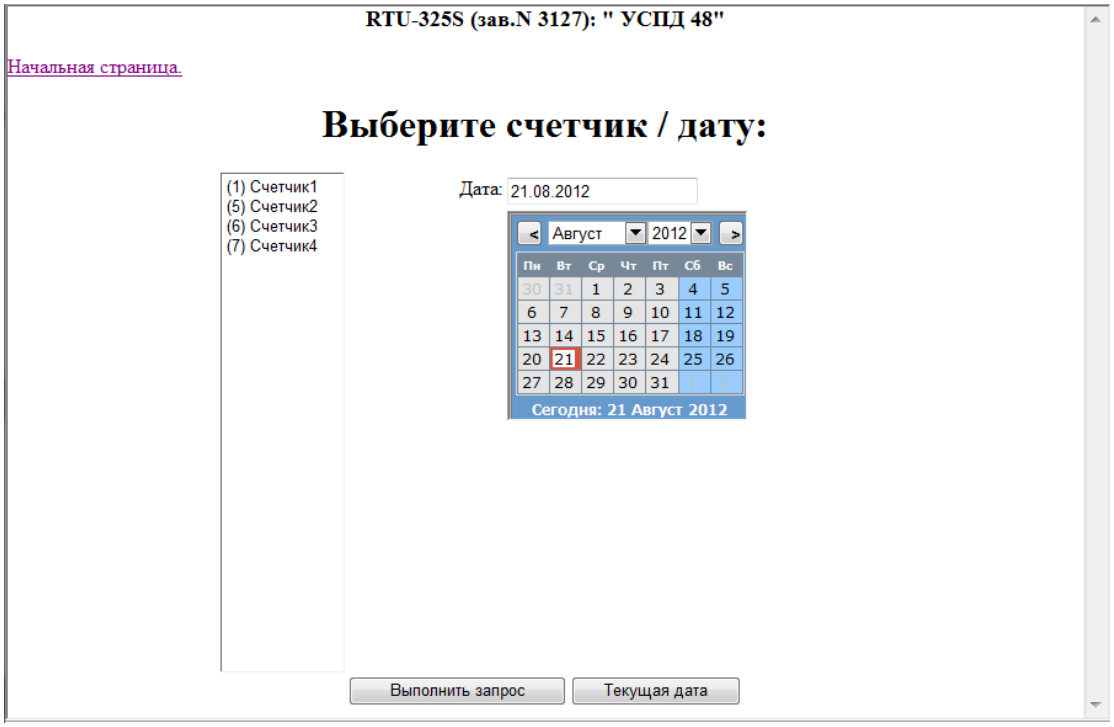
N п/п	Счетчик	Зав. номер	Ед. сч.	Дата	Время	Активная		Реактивная		*
						Принятая	Выданная	Принятая	Выданная	
1	(1) Счетчик1	0001034731	M	21.08.2012	13:33	342118.04	36.73	213420.06	1009.80	
2	(5) Счетчик2	0001034732	M	21.08.2012	13:33	383056.69	7.52	212355.04	707.54	
3	(6) Счетчик3	0001034733	M	21.08.2012	13:33	230402.99	1.68	16368.14	122378.95	
4	(7) Счетчик4	0001034734	M	21.08.2012	13:33	145767.68	6.01	16372.71	101185.38	

* - количество отсутствующих интервалов профиля.

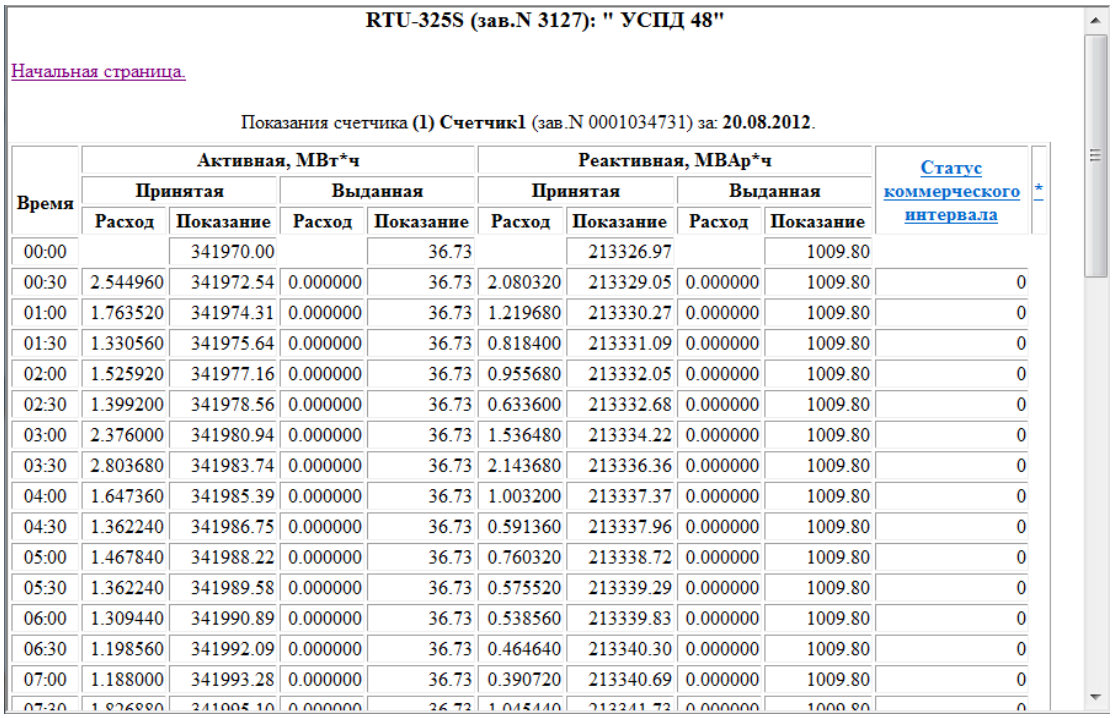
The user will be provided with the relevant report on the <Supreme of the latest readings>.

2.2.3. A 24-hour meter reading.

When selecting this paragraph, the user will be provided with the following form to complete the report:



The user must choose the meter and date. The following report will be submitted on the button <To execute the request>.



RTU-325S (зав.N 3127): " УСПД 48"

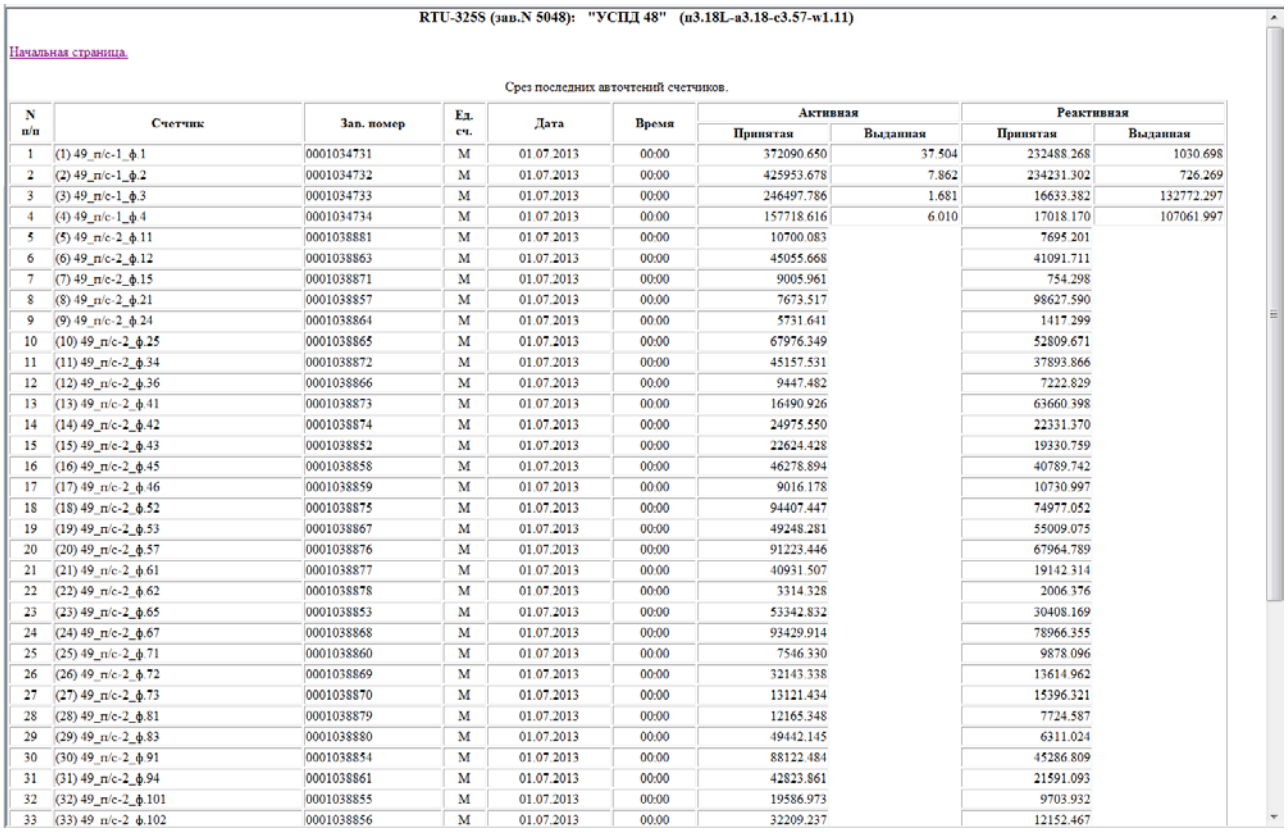
Начальная страница

Показания счетчика **(1) Счетчик1** (зав.N 0001034731) за: **20.08.2012**.

Время	Активная, МВт*ч				Реактивная, МВАр*ч				Статус коммерческого интервала	*
	Принятая		Выданная		Принятая		Выданная			
	Расход	Показание	Расход	Показание	Расход	Показание	Расход	Показание		
00:00		341970.00		36.73		213326.97		1009.80		
00:30	2.544960	341972.54	0.000000	36.73	2.080320	213329.05	0.000000	1009.80	0	
01:00	1.763520	341974.31	0.000000	36.73	1.219680	213330.27	0.000000	1009.80	0	
01:30	1.330560	341975.64	0.000000	36.73	0.818400	213331.09	0.000000	1009.80	0	
02:00	1.525920	341977.16	0.000000	36.73	0.955680	213332.05	0.000000	1009.80	0	
02:30	1.399200	341978.56	0.000000	36.73	0.633600	213332.68	0.000000	1009.80	0	
03:00	2.376000	341980.94	0.000000	36.73	1.536480	213334.22	0.000000	1009.80	0	
03:30	2.803680	341983.74	0.000000	36.73	2.143680	213336.36	0.000000	1009.80	0	
04:00	1.647360	341985.39	0.000000	36.73	1.003200	213337.37	0.000000	1009.80	0	
04:30	1.362240	341986.75	0.000000	36.73	0.591360	213337.96	0.000000	1009.80	0	
05:00	1.467840	341988.22	0.000000	36.73	0.760320	213338.72	0.000000	1009.80	0	
05:30	1.362240	341989.58	0.000000	36.73	0.575520	213339.29	0.000000	1009.80	0	
06:00	1.309440	341990.89	0.000000	36.73	0.538560	213339.83	0.000000	1009.80	0	
06:30	1.198560	341992.09	0.000000	36.73	0.464640	213340.30	0.000000	1009.80	0	
07:00	1.188000	341993.28	0.000000	36.73	0.390720	213340.69	0.000000	1009.80	0	
07:30	1.826880	341995.10	0.000000	36.73	1.045440	213341.73	0.000000	1009.80	0	

2.2.4. Cutting off the latest auto-readings.

When selecting this paragraph, the user will be provided with the following form to complete the report:



RTU-325S (зав.N 5048): "УСПД 48" (u3.18L-u3.18-c3.57-w1.11)

Начальная страница

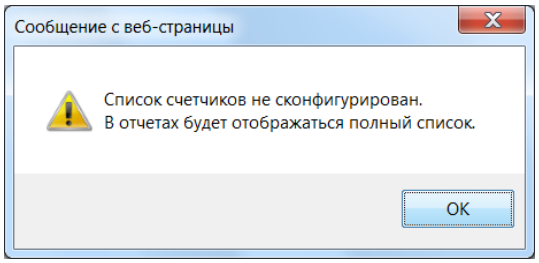
Срез последних авточтений счетчиков.

N п/п	Счетчик	Зав. номер	Ед. сч.	Дата	Время	Активная		Реактивная	
						Принятая	Выданная	Принятая	Выданная
1	(1) 49_п/с-1_ф.1	0001034731	M	01.07.2013	00:00	372090.650	37.504	232488.268	1030.698
2	(2) 49_п/с-1_ф.2	0001034732	M	01.07.2013	00:00	425953.678	7.862	234231.302	726.269
3	(3) 49_п/с-1_ф.3	0001034733	M	01.07.2013	00:00	246497.786	1.681	16633.382	132772.297
4	(4) 49_п/с-1_ф.4	0001034734	M	01.07.2013	00:00	157718.616	6.010	17018.170	107061.997
5	(5) 49_п/с-2_ф.11	0001038881	M	01.07.2013	00:00	10700.083		7695.201	
6	(6) 49_п/с-2_ф.12	0001038863	M	01.07.2013	00:00	45055.668		41091.711	
7	(7) 49_п/с-2_ф.15	0001038871	M	01.07.2013	00:00	9005.961		754.298	
8	(8) 49_п/с-2_ф.21	0001038857	M	01.07.2013	00:00	7673.517		98627.590	
9	(9) 49_п/с-2_ф.24	0001038864	M	01.07.2013	00:00	5731.641		1417.299	
10	(10) 49_п/с-2_ф.25	0001038865	M	01.07.2013	00:00	67976.349		52809.671	
11	(11) 49_п/с-2_ф.34	0001038872	M	01.07.2013	00:00	45157.531		37893.866	
12	(12) 49_п/с-2_ф.36	0001038866	M	01.07.2013	00:00	9447.482		7222.829	
13	(13) 49_п/с-2_ф.41	0001038873	M	01.07.2013	00:00	16490.926		63660.398	
14	(14) 49_п/с-2_ф.42	0001038874	M	01.07.2013	00:00	24975.550		22331.370	
15	(15) 49_п/с-2_ф.43	0001038852	M	01.07.2013	00:00	22624.428		19330.759	
16	(16) 49_п/с-2_ф.45	0001038858	M	01.07.2013	00:00	46278.894		40789.742	
17	(17) 49_п/с-2_ф.46	0001038859	M	01.07.2013	00:00	9016.178		10730.997	
18	(18) 49_п/с-2_ф.52	0001038875	M	01.07.2013	00:00	94407.447		74977.052	
19	(19) 49_п/с-2_ф.53	0001038867	M	01.07.2013	00:00	49248.281		55009.075	
20	(20) 49_п/с-2_ф.57	0001038876	M	01.07.2013	00:00	91223.446		67964.789	
21	(21) 49_п/с-2_ф.61	0001038877	M	01.07.2013	00:00	40931.507		19142.314	
22	(22) 49_п/с-2_ф.62	0001038878	M	01.07.2013	00:00	3314.328		2006.376	
23	(23) 49_п/с-2_ф.65	0001038853	M	01.07.2013	00:00	53342.832		30408.169	
24	(24) 49_п/с-2_ф.67	0001038868	M	01.07.2013	00:00	93429.914		78966.355	
25	(25) 49_п/с-2_ф.71	0001038860	M	01.07.2013	00:00	7546.330		9878.096	
26	(26) 49_п/с-2_ф.72	0001038869	M	01.07.2013	00:00	32143.338		13614.962	
27	(27) 49_п/с-2_ф.73	0001038870	M	01.07.2013	00:00	13121.434		15396.321	
28	(28) 49_п/с-2_ф.81	0001038879	M	01.07.2013	00:00	12165.348		7724.587	
29	(29) 49_п/с-2_ф.83	0001038880	M	01.07.2013	00:00	49442.145		6311.024	
30	(30) 49_п/с-2_ф.91	0001038854	M	01.07.2013	00:00	88122.484		45286.809	
31	(31) 49_п/с-2_ф.94	0001038861	M	01.07.2013	00:00	42823.861		21591.093	
32	(32) 49_п/с-2_ф.101	0001038855	M	01.07.2013	00:00	19586.973		9703.932	
33	(33) 49_п/с-2_ф.102	0001038856	M	01.07.2013	00:00	32209.237		12152.467	

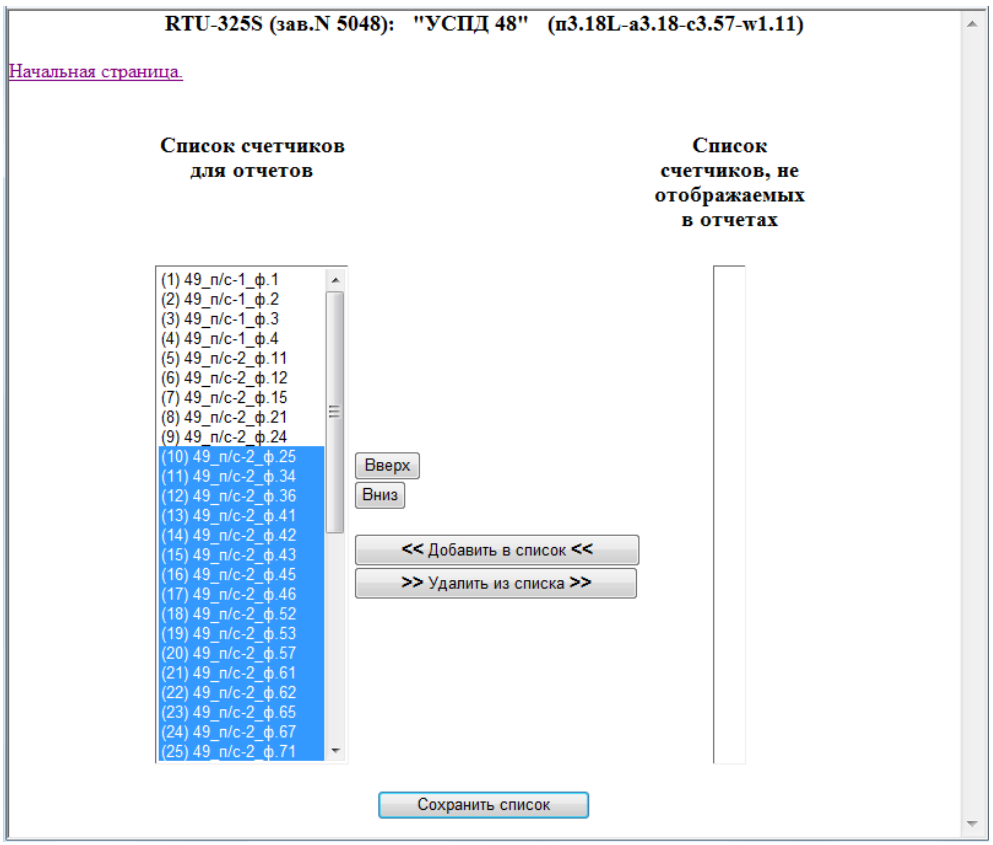
2.3. Report settings.

2.3.1. Checklist.

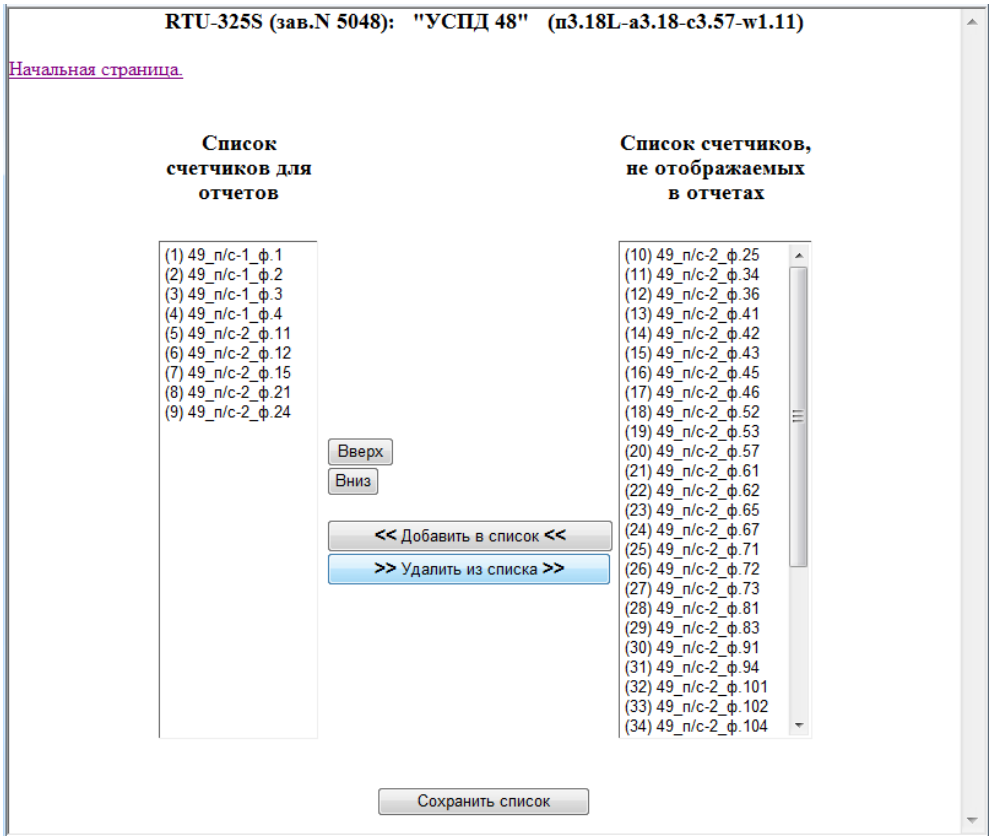
In this paragraph, the user can set a list of the meters that will be displayed in the reports.
If the list for the accounts has not been pre-configurated, the following message will be provided to the user when selecting this paragraph:



Next, you need to select the meters that should not be shown in the reports:



and press the button < Delete from the list>:



You could add a meter to the score list for the reports. The user can change the order of the metering in the reports. To do this, you need to select a meter and press the button <Up> and <Low> to move the meter to the appropriate position.

In order to display the user-configurable meter list in the reports, you need to press the <Save the list>.

2.3.2. List of points of account.

The list of account points shown in the reports is similar to the meter list (see paragraph 2.3.1.).

2.4. Monitoring.

This section provides the user with web-based applications to enable real-time monitoring of relevant indicators. In this mode, the indicators change automatically when new data are received.

2.4.1. RTU auto-diagnosis.

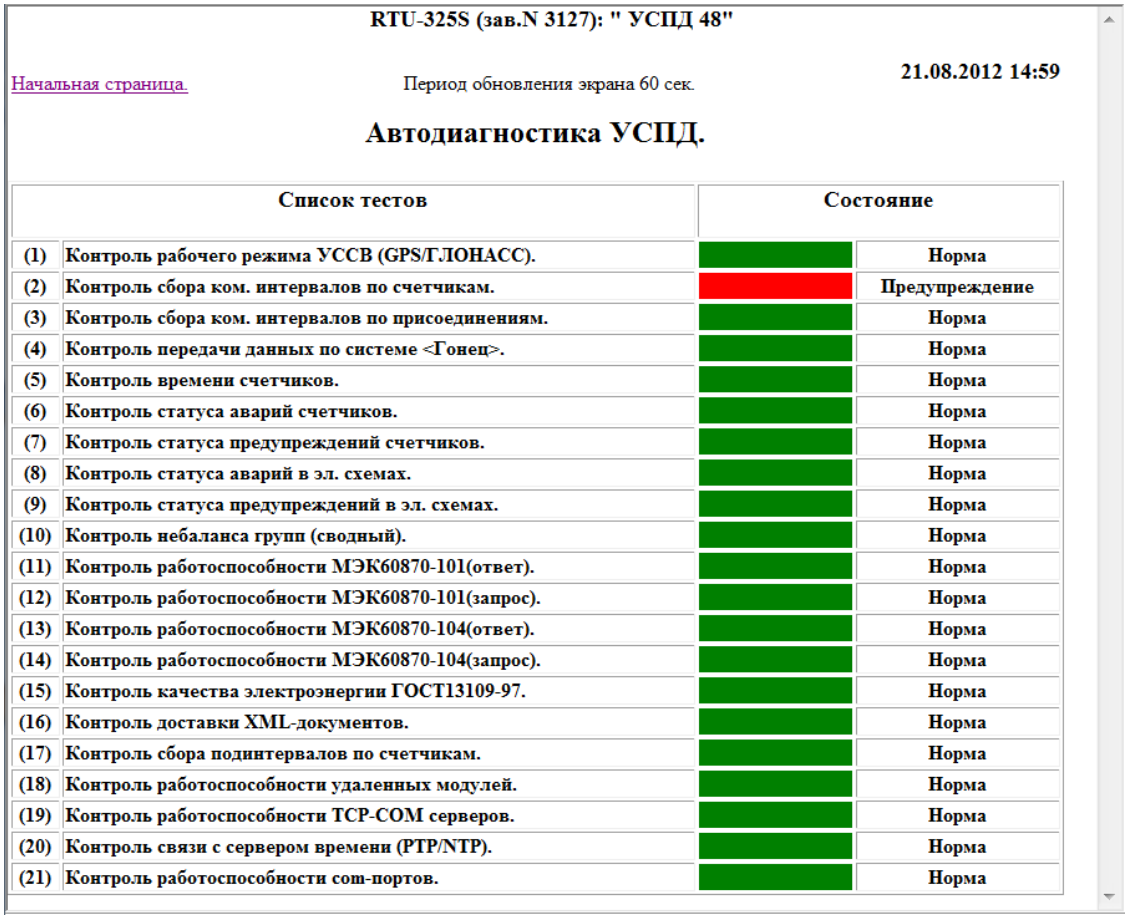
RTU auto-diagnosis is a real-time automatic diagnostic subsystem of RTU functions and the transfer of control results to external devices or systems in various ways.

A list of the required functions and their configuration is given in «УСПД» > «Задания по автодиагностике УСПД».

RTU autodiagnosis automatically performs test diagnostic functions. The result of each function is an evaluation of: «Норма» or «Предупреждение».

If the function is performed on multiple objects, the assessment «Норма» shall be obtained if the performance of the function for each object produces an estimate of «Норма» (logical operation «И»). If the performance of a given function for a given object produces an evaluation of «Предупреждение», the overall evaluation of that function shall be «Предупреждение».

The following table will be presented to the user at the start of the application:



RTU-325S (зав.N 3127): " УСПД 48"

Начальная страница Период обновления экрана 60 сек. 21.08.2012 14:59

Автодиагностика УСПД.

	Список тестов	Состояние
(1)	Контроль рабочего режима УССВ (GPS/ГЛОНАСС).	Норма
(2)	Контроль сбора ком. интервалов по счетчикам.	Предупреждение
(3)	Контроль сбора ком. интервалов по присоединениям.	Норма
(4)	Контроль передачи данных по системе <Гонец>.	Норма
(5)	Контроль времени счетчиков.	Норма
(6)	Контроль статуса аварий счетчиков.	Норма
(7)	Контроль статуса предупреждений счетчиков.	Норма
(8)	Контроль статуса аварий в эл. схемах.	Норма
(9)	Контроль статуса предупреждений в эл. схемах.	Норма
(10)	Контроль небаланса групп (сводный).	Норма
(11)	Контроль работоспособности МЭК60870-101(ответ).	Норма
(12)	Контроль работоспособности МЭК60870-101(запрос).	Норма
(13)	Контроль работоспособности МЭК60870-104(ответ).	Норма
(14)	Контроль работоспособности МЭК60870-104(запрос).	Норма
(15)	Контроль качества электроэнергии ГОСТ13109-97.	Норма
(16)	Контроль доставки XML-документов.	Норма
(17)	Контроль сбора подинтервалов по счетчикам.	Норма
(18)	Контроль работоспособности удаленных модулей.	Норма
(19)	Контроль работоспособности TCP-COM серверов.	Норма
(20)	Контроль связи с сервером времени (PTP/NTP).	Норма
(21)	Контроль работоспособности com-портов.	Норма

This application is the equivalent of «Сервис…» > «Автодиагностика УСПД» built-in software RTU.

The auto-diagnosis functions of RTU are described in document «Часть1. Основные принципы работы и конфигурирования».

2.4.2. Monitoring of group imbalances.

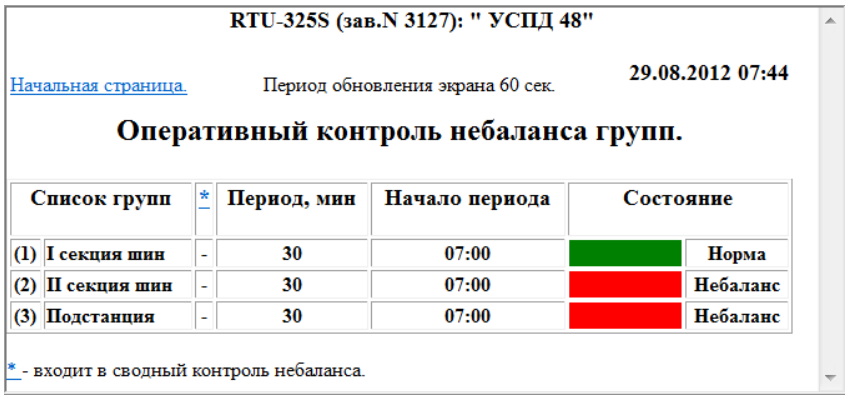
This paragraph monitors the imbalance of groups. The calculation of the imbalance shall be performed according to the regulatory document "Model instruction for accounting for electricity production, transmission and distribution. RD 34.09.101-94".

A list of groups for which the monitoring of the imbalance is needed should be established by the user in paragraph «Учёт» > «Учёт электроэнергии» > «Группы» > «Балансовые группы» of the «Конфигуратор» programme.

This application is the equivalent of «Сервис...» > «Контроль небаланса групп» built-in software RTU.

The methodology for calculating the imbalance and functioning of this annex is described in document «Часть 1. Основные принципы работы и конфигурирования».

The following report will be submitted to the user at the time of the application launch:



RTU-325S (зав.N 3127): " УСПД 48"

Начальная страница. Период обновления экрана 60 сек. 29.08.2012 07:44

Оперативный контроль небаланса групп.

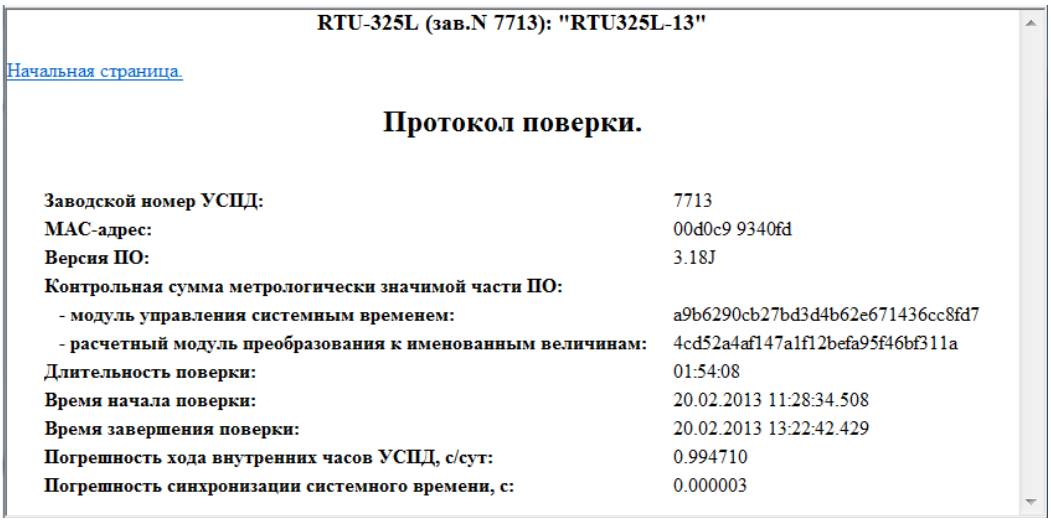
Список групп		*	Период, мин	Начало периода	Состояние	
(1)	I секция шин	-	30	07:00		Норма
(2)	II секция шин	-	30	07:00		Небаланс
(3)	Подстанция	-	30	07:00		Небаланс

* - входит в сводный контроль небаланса.

2.5. It's a setup.

2.5.1. The verification report.

This paragraph provides the user with the opportunity to view the verification report:



RTU-325L (зав.N 7713): "RTU325L-13"

Начальная страница

Протокол поверки.

Заводской номер УСПД:	7713
MAC-адрес:	00d0c9 9340fd
Версия ПО:	3.18J
Контрольная сумма метрологически значимой части ПО:	
- модуль управления системным временем:	a9b6290cb27bd3d4b62e671436cc8fd7
- расчетный модуль преобразования к именованным величинам:	4cd52a4af147a1f12befa95f46bf311a
Длительность поверки:	01:54:08
Время начала поверки:	20.02.2013 11:28:34.508
Время завершения поверки:	20.02.2013 13:22:42.429
Погрешность хода внутренних часов УСПД, с/сут:	0.994710
Погрешность синхронизации системного времени, с:	0.000003

SECTION 10

Telecontrol

Part 7

Edit 6 · software 3.xx

Data collection and communication devices of the RTU-325 family

Almaty Project Consolidated Manual

Navigation: total content, detailed bookmarks and transitions in the lower column.

1. Introduction.

Together with commercial and technical energy accounting, RTU-325 can act as a CMV (telecommunications mechanics of the controlled point) and PPP (receivering station).

The configuration of UTM IP and PPP functions is carried out by the «Конфигуратор» programme that is part of the integrated RTU-325 software (see «Руководство пользователя» . Part 3. «Конфигурирование УСПД»).

Access to integrated RTU-325 software is made by means of an external engineering remote control (see «Руководство пользователя» Part 2. «Встроенное программное обеспечение УСПД»).

The manual addressed the performance and practical application of the functions of tele-mechanics in RTU-325.

2. A general configuration of RTU-325 for CT-mode operation (Telemation equipment for controlled point).

The following algorithm describes the overall sequence of configuration operations in the «Конфигуратор» integrated RTU-325 software.

1. View/correct generic settings.
2. View/correct local RTU-325.
3. Choice and setting of working ports.
4. Reboot RTU-325.
5. Create and install connections for the collection of TI, TC and information with CAAA.
6. Create tasks on connections for TC (local port of digital inputs).
7. Create and adjust remote input-output modules, RTU and RTU.
8. Restarting the RTU 325 software.
9. Intake and settings of the measuring converters.
   9.1. Definition of the current list of polling assignments.
   9.2. Introduction of new electric energy meters (measured converters) and their parameters.
   9.3. Entering and linking the electric energy meters (measure converters).
10. Entering and setting discrete objects.
11. Introduction and configuration of analog objects.
12. Set the connections as a sign of tele-mechanic mode of operation.
13. Restart software RTU-325 and check data collection.
14. Establishment and setting up of connections for the protocols of the GOST R of IEC 60870-5-101/104.
15. Creation of telecontrol configuration.
16. Viewing/correcting telecontrol configuration parameters.
17. View/correct common addresses.
18. View/correct the addresses of the objects.
19. View/correct measurement parameters.
20. View/correct transmission parameters.
21. Linking the telecontrol configuration to the connection.
22. Restarting the RTU 325 software.
23. Verification of the completeness of data collection and transmission of the protocols of the GOST R IEC 60870-5-101/104 programme «Монитор 60870-5-101/104» in section «Настройка» of the integrated RTU-325 software.

3. Method of configuration of tele-measures (TI) and tele-signalling (TC) in RTU-325 (example No. 1).

Composition of the system equipment:

• RTU-325 with a local port of digital inputs, serial RS-232, successive RS-485 ports, two Ethernet interfaces: «ethernet» and «ethernet_2»;

• ASS (system time synchronizer) GPS with a second-on PPS pulse signal. The GPS digital interface is connected to the serial port RS-232 («com1») using the three-conductor connection circuit TX-RX-GND. The electrical circuit controlled by the PPS signal is connected to the DTR and DCD of RS-232 («com1») port and is synchronized with the astronomical time on the growing front.

• A1800 electricity meters used as measuring transducers, connected to the local RS-485 serial port («com3») of the RTU-325.

• TCP/COM server (e.g. «MOXA NPort» etc.) connected to the «ethernet_2» interface through the concentrater.

• A1800 electricity meters used as measuring transducers, connected to the local RS-485 serial port («com3») of the RTU-325.

• Remote collection modules of ADAM-6050 TC connected to the «ethernet_2» interface through the concentrater.

• Remote collection modules TI ADAM-6015/6017 connected to the «ethernet_2» interface through the concentrater.

• RTU-325 is connected to the SCADA upper-level interface system «ethernet» for the transmission of data on the GOST R protocol of IEC 60870-5-104.

Functions performed. The configuration of RTU-325 is required to perform the following functions:

• Set up the system time synchrone system RTU-325;

• Collection of TI from A1800 local connections;

• Collection of TI from A1800 remote connections (through remote TCP/COM-port servers);

• Collection of TI from remote collection modules ADAM-6015/6017;

• Collection of TC from the local port of digital inputs RTU-325;

• Collection of TC from remote collection modules ADAM-6050;

• Recording of changes of TC to RTU-325 archives;

• Transfer of collected data (TI and TC) on protocol 60870-5-104 to SCADA - upper level system.

The following is the methodology for the configuration of RTU-325 for the purpose of the task. The required parameter values are specified. The references to the menu items refer to programme «Конфигуратор» unless otherwise indicated.

3.1. View/correct generic settings.

In «Настройки», insert the following sub-paragraphs:

- «Настройки» / «Время» / «Эталон времени» : - «GPS» .
- «Настройки» / «Параметры TCP/IP» / : = required values.
- «Настройка» / «Параметры служебных архивов» / ...: - for the port of Ethernet, where protocol 60870-5-104 will operate, set the value of fields:
  - «Размер буфера» : 2500000;
  - «Число записей в буфере» : 50000.

In the remaining subparagraphs, plant installations may be left or the required correction made.

3.2. View/correct local RTU-325.

In «УСПД» / «Локальное УСПД», insert the following sub-paragraphs:

- «УСПД» / «Локальное УСПД» / «Наименование» : - unique name RTU.

In the remaining subparagraphs, plant installations may be left.

3.3. Choice and setting of working ports.

In «УСПД» / «Порт» / «ethernet», insert the following sub-paragraphs:

- «Скорость» : «100» , if the characteristics of the network permit;
- ... (the remaining subparagraphs): the required values;

In «УСПД» / «Порт» / «ethernet_2», insert the following sub-paragraphs:

- «Скорость» : «100» , if the characteristics of the network permit;
- ... (the remaining subparagraphs): the required values;

In «УСПД» / «Порт» / «com1», insert the following sub-paragraphs:

- **«Тип порта» : «последовательный» ;**
- «Скорость» : required value (usually «4800»);
- «Четность» : required value (usually «-», i.e. no even bit);
- «Размер» : Required value (usually «8»);
- «Число стоп. бит» : required value (usually «1»);
- «Аппаратное управление потоком RTS/CTS (hflow)» : «-» ;
- «Режим работы» : «Полудуплексный» .

In «УСПД» / «Порт» / «com3», insert the following sub-paragraphs:

- **«Тип порта» : «последовательный» ;**
- «Скорость» : required value;
- «Четность» : required value;
- «Размер» : Required value (usually «8»);
- «Число стоп. бит» : required value (usually «1»);
- «Аппаратное управление потоком RTS/CTS (hflow)» : «-» ;
- «Режим работы» : «Полудуплексный» .

3.4. Reboot RTU-325.

For changes to port parameters to enter into force, RTU-325 must be rebooted (item «Перезагрузка УСПД» of the main menu of the integrated software RTU).

3.5. Create and install links to collect information with the SES (GPS with the PPS).

The «УСПД» / «Соединения» / «Пользователи» menu item is not used for this task.

In paragraph «УСПД» / «Соединения» / «Параметры соединений», create a new connection with the following general parameters:

- «Наименование соединения» : unique name;
- «Порт» : **«com1»;**
- «Протокол» : «GPS»;

Additional parameters of the new connection:

- «Дискретный сигнал PPS» : «+» ;
- «Порт для PPS» : **«com1»;**
- «Вход порта для PPS» : «CD» ;
- «Логика уровня сигнала» : «По нарастающему фронту» ;
- «Рассогласование времени - начало коррекции, мсек» : plant;
- «Рассогласование времени - окончание коррекции, мсек» : plant;
- «Коэффициент пропорциональной части регулятора» : plant;
- «Подробный вывод на виртуальную консоль» : «-» .

3.6. Create and adjust TI collection connections.

To collect TI from A1800 meters connected to the local serial port RS-485 («com3» in this example) RTU 325, in paragraph «УСПД» / «Соединения» / «Параметры соединений», create a new connection with the following general parameters:

- «Наименование соединения» : unique name;
- «Порт» : **«com3»;**
- «Протокол» : **«Счетчики А3, А1800» ;**

Additional parameters of the connection:

- «Размер пакета, байт» : «256» ;
- ... (the remaining subparagraphs): Plant plants.

In order to collect TI from A1800 meters connected to successive ports RS-485 TCP/COM-port servers, in paragraph «УСПД» / «Соединения» / «Параметры соединений», create the required number of new connections per port RS-485 TCP/COM-port with the following general parameters:

- «Наименование соединения» : unique name;
- «Порт» : **«ethernet_2»;**
- «Протокол» : **«Счетчики А3, А1800» ;**

Additional parameters for each connection:

- «Размер пакета, байт» : «256» ;
- ... (the remaining subparagraphs): Plant plants.

To collect TI using remote collection modules ADAM-6015/6017 in paragraph «УСПД» / «Соединения» / «Параметры соединений», to create the required number of new compounds per remote collection module ADAM-6015/6017 with the following general parameters:

- «Наименование соединения» : unique name;
- «Порт» : **«ethernet_2»;**
- «Протокол» : **«ADAM5000/6000»;**

Additional parameters for each connection:

- ... (all subparagraphs): Plant plants.

3.7. Create and adjust connections for the collection of TC.

To collect TC using remote collection modules ADAM-6050 in «УСПД» / «Соединения» / «Параметры соединений», create the required number of new compounds per remote collection module ADAM-6050 with the following general parameters:

- «Наименование соединения» : unique name;
- «Порт» : **«ethernet_2»;**
- «Протокол» : **«ADAM5000/6000»;**

Additional parameters for each connection:

- ... (all subparagraphs): Plant plants.

To collect TC using local discrete RTU-325 ports in «УСПД» / «Соединения» / «Параметры соединений», create one connection with the following general parameters:

- «Наименование соединения» : unique name (n-p, «Выключатели»);
- «Порт» : «di»;
- «Протокол» : **«Чтение дискретного сигнала» ;**

Additional parameters for each connection:

- «Логика входного сигнала» : according to the connection scheme;
- ... (the remaining subparagraphs): Plant plants.

3.8. Create connection tasks for TC (local port of digital inputs).

To collect TC using the local port of discrete RTU-325 entrances in «УСПД» / «Соединения» / «Задания на соединения», establish a task for the respective connection (from port «di») with the following parameters:

- **«Список опроса» : «Журнал состояния локальных выключателей»);**
- «Период, час:мин:сек.мсек» : «00:00:10.000» ;
- «Смещение, час:мин:сек» : «00:00:00.000» ;
- «Зоны молчания» : Plant plant.

3.9. Create and install remote TCP/COM-port servers.

In the configuration of RTU-325, the remote TCP/COM-port server (e.g. «MOXA NPort» etc.) is considered as remote RTU.

In the paragraph of the menu «Настройки» / «Типы УСПД», the type of the remote RTU «Сервер TCP/COM- порт» shall have a parameter «Использовать» bearing the sign «+».

In order to collect TI from the A1800 (measure converters) electrical meters connected to the TCP/COM-port servers, in paragraph «УСПД» / «Удаленные УСПД» / «Параметры УСПД» of the proposed RTU list, create the required number of new RTU (Server TCP/COM-port) with the following parameters:

- «Тип» : **«Сервер TCP/COM-порт» ;**
- «Заводской номер» : unique value;
- «Связной номер» : Plant plant (not used);
- «IP адрес» : The required value;
- «Идентификатор» : Plant plant (used only in «Шлюз E-422»);
- «Глоб. идентификатор» : Plant plant;
- «Соединение 1» : Select this paragraph and enter in table «Соединения УСПД» the required number of groups of connections (by «INS» key) per group per COM-port. In each group, complete the first two lines corresponding to the parameters selected for this group COM-port. For example, for the first group, it is necessary to introduce:

1 Line:

; «Гр» : «1»; « » : «Соединение 1»; ; «Наименование» : select the required connection from the list; ; «IP адрес» : required value (choosing «←» keys, «→»); ; «TCP порт»: required value. 2 lines:

; «Гр» : «1»; « » : «---режим переключения»; «Наименование» : «Последовательно»; ; «IP адрес» : not used; ; «TCP порт» : not used.

3.10. Create and install remote collection modules of TI ADAM-6015/6017.

To collect TI using remote collection modules ADAM-6015/6017 in «УСПД» / «Удаленные УСПД» / «Параметры УСПД» in the proposed RTU list, create the required number of new RTUs (ADAM-6015/6017) with the following parameters:

- «Тип» : **«ADAM-6015» or «ADAM-6017»**
- «Заводской номер» : required value;
- «Связной номер» : Plant plant;
- «IP адрес» : The required value;
- «Идентификатор» : Plant plant;
- «Глоб. идентификатор» : Plant plant;
- «Соединение 1» : Select this paragraph and insert the first two lines in table «Соединения УСПД»:

1 Line:

; «Гр» : «1»; ; « » : «Соединение 1»; ; «Наименование» : select the required connection from the list; ; «IP адрес» : value required; ; «TCP порт» : value required. 2 lines:

; «Гр» : «1»; « » : «---режим переключения»; «Наименование» : «Последовательно»; ; «IP адрес» : not used; ; «TCP порт» : not used.

Note: Since RTU records are not required in this case, there is no need to define connection tasks.

3.11. Create and install remote collection modules of ADAM-6050.

To collect TC using remote collection modules ADAM-6050 in «УСПД» / «Удаленные УСПД» / «Параметры УСПД» in the proposed RTU list, create the required number of new RTU (ADAM-6050) with the following parameters:

- «Тип» : **«ADAM-6050»;**
- «Заводской номер» : required value;
- «Связной номер» : Plant plant;
- «IP адрес» : The required value;
- «Идентификатор» : Plant plant;
- «Глоб. идентификатор» : Plant plant;
- «Соединение 1» : Select this paragraph and insert the first two lines in table «Соединения УСПД»:

1 Line:

; «Гр» : «1»; ; « » : «Соединение 1»; ; «Наименование» : select the required connection from the list; ; «IP адрес» : value required; ; «TCP порт» : value required. 2 lines:

; «Гр» : «1»; « » : «---режим переключения»; «Наименование» : «Последовательно»; ; «IP адрес» : not used; ; «TCP порт» : not used.

Further, in paragraph «УСПД» / «Удаленные УСПД» / «Задания на опрос УСПД», create tasks for the relevant connections with the following parameters (for recording changes of TC to RTU-325):

- **«Список опроса» : «Журнал состояния выключателей (УСПД)»);**
- «Период, час:мин:сек.мсек» : «00:00:10.000» ;
- «Смещение, час:мин:сек» : «00:00:00.000» ;
- «Зоны молчания» : Plant plant.

3.12. Restarting the RTU 325 software.

In order for the above configuration parameters to enter into force and for the electric energy meters to be automatically readable, it is necessary to restart the software RTU-325.

Restarting the software RTU 325 is done when you leave the program «Конфигуратор» by answering in the affirmative the relevant question about the need to restart the software RTU-325.

3.13. Intake and settings of the measuring converters.

3.13.1. Definition of the current list of polling assignments.

In the «Устройства» / «Счетчики электроэнергии» / «Текущий список заданий на опрос» menu item, the user should identify the current list of tasks for the meter interviewer (the default list). The current list will be automatically subsequently assigned to each newly introduced meter.

Guidance is given below to establish a current list of tasks for the purpose of collecting TI from the A1800 (measured converters) electric energy meters in telecontrol mode. Since the task of accounting for electricity is not included in this example, the tasking for setting the time of the meters and collecting the data from the A1800 electric meters is not given.

In order to comply with the requirements of Order No. 603 of 09.09.2005 "On the adaptation of telematics and communications systems in the power generation plants that are part of the RAO holding system «ЕЭС России» to the requirements of the balancing market", the RTU-325 provides for an appropriate pre-established list of operations called "Telemation 1,800 (ECR 603 RAO Order).

In table «Текущий список заданий на опрос», one task should be created with the following parameters:

- **«Список операций» : «Телеизмерения 1800 (приказ РАО ЕЭС 603)» .**
- «Период, чч:мм:сс.мсек» : «00:00:01.000» .
- «Смещение, чч:мм:сс» : «00:00:00» .
- «Вкл.» : «+».
- «Зоны молчания» : Not used in telemetric mode.

3.13.2. Introduction of new electric energy meter(s) and their parameters.

In the «Устройства» / «Счетчики электроэнергии» / «Параметры счетчиков» menu item, the user shall enter the required number of electric energy meters (measure converters) connected to remote TCP/COM-port servers.

It should be noted that the automatic generation of information object addresses for 60870-5-101/104 protocols is carried out in the order of input of meters into RTU-325. configuration. Therefore, it is recommended to observe the required order of input of new meters into RTU-325 configuration to obtain the corresponding sequence of addresses of information objects when they are automatically generated in the future.
It is recommended to use an automatic method (by interviewing the meter on the <F5>) to input the value of the meter parameters. The following initial parameters for the meter-connector session need to be set:

- «УСПД» : Select from the proposed list.
- «Соединение» Select from the proposed list.
- «Связной номер» : Enter the required value.
- «Тип счётчика» Select from the proposed list.
- «Пароль (READ ONLY)» : Enter the required value.
- «Ожидание первого байта ответа 'handshake', мсек» : Plant.
- «Допустимый перерыв в ответе 'handshake', мсек» : Plant.
- «Ожидание ответа в сеансе связи, мсек» : Plant.
- «Допустимый перерыв в сеансе связи, мсек» : Plant.
- «Подсистема» : «1» .

Note: The parameter «Подсистема» is «1» , since only one digital interface is used to transfer data from the meter to RTU-325. If the meter is connected to one RTU on two interfaces (e.g. one interface is data collection for commercial electricity accounting and the other one is telemeasured), two meters with the same manufacturer number and different subsystem values should be positioned in the RTU.

3.13.3. Entering and linking the electric energy (measured converters) points.

In the «Учёт» / «Учёт электроэнергии» / «Точки учёта» menu item, the user shall enter the metering points and their parameters, including the installation of the electric energy meters (measure converters) at the respective learning points.

In the proposed table of metering points, the following parameter values for each metering point should be inserted:

- «Наименование точки учёта» : A unique name.
- «Короткое имя (для схем)» : Plant plant.
- «Глобальный идентификатор» : Plant plant.
- «U на первичной обмотке» : required value.
- «U на вторичной обмотке» : required value.
- «I на первичной обмотке» : required value.
- «I на вторичной обмотке» : required value.
- «Счетчик» : Select from the proposed meter list.
- «Дата установки счетчика» : required value.

• «Дата снятия счетчика» : Plant plant (empty value).

3.14. Entering and setting discrete objects.

In the menu item «Устройства» / «Дискретные объекты», the user shall enter into the list of external discrete objects RTU-325 the required discrete system objects that are the source of TC.

It should be borne in mind that the automatic generation of addresses of information objects for protocols 60870-5-101/104 is done by entering discrete objects into the RTU-325 configuration. Therefore, it is recommended that the required procedure for introducing new discrete objects into the RTU-325 configuration be followed to obtain the appropriate sequence of information object addresses when they are automatically generated thereafter.

The following parameters should be introduced when each new discrete object is introduced:

• «Наименование дискретного объекта» : A unique name.

• «Короткое имя (для схем)» : Plant plant.

• «Тип объекта» : required value («Сигнал дискретного ввода» or «Двухэлементный выключатель»).

• «Количество входов/выходов» : the parameter does not change (for information).

• «Номер входа/выхода» : the discrete entry number of the remote collection module ADAM-6050, to which the discrete object is connected. If for this discrete object the number of entrances is greater than 1, then this parameter indicates the smallest discrete entry number. In this case, the discrete object shall occupy digital input channels that are numbered consecutively. For example, if the value of «Номер входа/выхода» is 1 and the value of «Количество входов/выходов» is 2, the discrete object shall be connected to channel 1 and channel 2.

• «Глобальный идентификатор» : Plant plant.

• «УСПД» : Select from the proposed RTU (ADAM-6050) remote collection module) to which the discrete object is connected.

• «Функция объекта» : Plant plant (empty value).

• «Соединение 1» : Select from the proposed list of compounds.

• «Соединение 2» : Plant plant (empty value).

• «Соединение 3» : Plant plant (empty value).

• «---режим переключения соединений» : Plant plant.

3.15. Introduction and configuration of analog objects.

In the menu item «Устройства» / «Аналоговые объекты», the user should enter into the list of external analog objects RTU-325 the required analog system objects that are the source of the TI.

It should be borne in mind that the automatic generation of addresses of information objects for protocols 60870-5-101/104 is done in the order in which analog objects are introduced into the configuration of RTU-325. Therefore, it is recommended that the required procedure be followed for the introduction of new analog objects into the RTU-325 configuration in order to obtain the appropriate sequence of information object addresses when they are automatically generated in the future.
The following parameters should be introduced when each new analog object is introduced:

- «Наименование аналогового объекта» : A unique name.
- «Тип объекта» : **«Сигнал аналогового ввода» .**
- «Количество входов/выходов» : the parameter does not change (for information).
- «Номер входа/выхода» : Analog entry number of the remote collection module ADAM-6015/6017, to which the analog object is connected.
- «Диапазон» : Select the required value from the proposed list.
- «Тип преобразования к единицам измерений» : Select the required value.
- «Таблица преобразования» : for the type of conversion «Кусочно-линейное» . At the entry into this paragraph, the menu will be presented with a table with the possibility to enter/delete/edit the list of conformity points. At each point, the value of the APC (analogic digital transformation) shall be the value of the physical value of an analog object. The linear interpolation procedure (transformation type «Кусочно-линейное») will be performed between conformity points when measuring analog value.
- «Глобальный идентификатор» : Plant plant.
- «УСПД» : Select from the proposed RTU list (the remote collection model TI ADAM-6015/6017), to which the discrete object is connected.
- «Интервал профиля, мин» : Plant plant.
- «Подинтервал профиля, сек» : Plant plant.
- «Единицы измерения» : Select from the proposed list.
- «Соединение 1» : Select from the proposed list of compounds.
- «Соединение 2» : Plant plant (empty value).
- «Соединение 3» : Plant plant (empty value).
- «---режим переключения соединений» : Plant plant.

3.16. Set the connections as a sign of tele-mechanic mode of operation.

The operation of tele-mechanics protocols 60870-5-101/104 requires the indication of tele-mechanical operation of the relevant protocols of external devices.

The «Телемеханика» / «Телемеханический режим соединений» menu item contains a list of protocol connections that can be operated in tele-mechanical mode. A value of «+» shall be set in the field «Телемеханический режим» for the required compounds.

3.17. Restart software RTU-325T and check data collection.

To enter into force of the above configuration parameters and to verify the data collection, a software RTU-325 must be restarted.

Restarting the software RTU 325 is done when you leave the program «Конфигуратор» by answering in the affirmative the relevant question about the need to restart the software RTU-325.

Select paragraph «Наладка» / «Виртуальные консоли» of the built-in RTU-325 software to verify the data collection. Further, select the required connections in sequence, observing the data flow.

3.18. Establishment and setting up of a connection for the COST R Protocol IEC 60870-5-104.

For the operation of the telecontrol protocol 60870-5-104, a connection to port «ethernet» with the following general parameters is required:

- «Наименование соединения» : unique name;
- «Порт» : **«ethernet»;**
- «Протокол» : **«60870-5-104 ответ» ;**

Additional parameters for each connection:

- «Список IP адресов»: Enter the IP addresses of the top level system node:
  - «IP адрес» : required value
  - «Маска подсети» : required value
  - «Тип адреса» : required value
  - «Разрешить» : «+» ;
- ... (the remaining subparagraphs): Plant plants.

3.19. Creation of telecontrol configuration.

In the «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» menu item, the user should create a new tele-mechanic configuration.

The development of a new telecontrol configuration takes place in three phases.

At 1 stage: the user must determine the general characteristics of the configuration being created by filling in the following fields in the proposed table.

- «Наименование конфигурации» : A unique name.
- «60870-5-101»: «-».
- «60870-5-104»: «+».
- «Тип списка измерений» : «Минимальный» .

At 2 stage: after the <ESC> key is removed from the general characteristics table: ; a new telecontrol configuration is automatically formed; the addresses of information objects are checked for uniqueness; the user is given the opportunity to change the parameters of the created telecontrol configuration.

The parameters of the set-up of the telecontrol configuration to accomplish the task should be as follows:

- «Адрес инициатора» : The required value (usually equals 0).
- «Запрет спорадической передачи времени RTU» : required value.
- «Использовать поле «день недели» in time": required value (usually «-»).
- «Посылка пакета M_EI для каждого LRU» : required value (usually «+»).
- «Время период. опроса при отсутствии активности, сек.» : required value.
- «Время фонового сканирования дискрет. объектов, сек.» : required value.
- «Телеизмерения с учетом Кт/Кн» : required value (usually «+»).
- ... (rest subparagraphs): Plant plants.

At 3 stage: after leaving the <ESC> key from the configuration parameters table, the addresses of the information objects are checked for uniqueness and the user must save the created telecontrol configuration in the RTU archives by selecting a positive answer in the proposed dialog box.

3.20. Viewing/correcting telecontrol configuration parameters. Once a new telecontrol configuration has been created, the user may return to the «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / required configuration / «Параметры конфигурации» menu item to view or correct the required parameters.

3.21. View/correct common addresses. When a telecontrol configuration is created, the common address table is created automatically and contains a number of lines equal to the number of all RTU-325 (local RTU-325 and all remote RTU-325) in the general configuration RTU-325 (paragraph «УСПД»).

In this case, the table will contain one line that represents the local RTU-325 and consists of two fields, the values of which should be set out in the paragraph of the menu «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / required configuration / «Общие адреса» :

- «Общий адрес» : required value according to project agreement sheet.
- «Основной» : Plant plant (unable to change).

3.22. View/correct the addresses of the objects. When a telecontrol configuration is created, the addresses of the objects are automatically created.

At this stage, the user should check and adjust, if necessary, the addresses of the objects according to the project agreement sheet.

If necessary, the change of address within the range may be done by the user in the menu paragraph «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / required configuration / «Сдвинуть адреса в диапазоне» .

Next, in the menu paragraph «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / required configuration / «Адреса объектов информации», the user can perform two main functions for a given tele-power configuration:

- View/change the addresses of selected information objects;
- Allow/prohibit the transmission of individual information objects.

3.23. View/correct measurement parameters. When a telecontrol configuration is created, measurement parameters are created automatically.

At this stage, the user should check and adjust, if necessary, the measurement parameters in the «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / required configuration / «Параметры измерений» menu as required by the project.

The procedure for setting the measurement parameters is broken down into 3 consecutive steps:

1. Selection of the component of the system;
2. The choice of measurement;
3. Set the parameters of the chosen measurement.

In step 1, the user must select the component containing the required measurement from the system component list table.

By 2 steps, the user must select the required measurement in the table of the list of measurements.

By 3 steps, the user is running with a measurement table. A specific set of parameters depends on the type of measurement. In this table, the user shall enter the following parameter values for each measurement:

• «Физические единицы» : This parameter is defined by the nature of the measured physical value, given for information and not subject to change.

• «Множитель физических единиц (степень 10)» : required value.

• «Порог изменения (в процентах)» : This parameter is the threshold change between the last protocol-transmitted measurement and the current measurement, the exceedance of which results in sporadic transmission (if permitted) of the current measurement value of the protocol. Otherwise, the current measurement is not transmitted.

  This parameter is set in physical units. In the case where TI is used as the measuring converter of the electric energy meter, the parameter value shall be set on the low side of the measuring transformer (excluding conversion factors).

• «Нижний предел для передачи» : required value (usually a plant that allows all measurements to be transmitted).

• «Верхний предел для передачи» : required value (usually a plant that allows all measurements to be transmitted).

• «Положение десятичной точки (масштаб.)» : factory default (that is, type 11, 12, 35 identifiers are not available in the established configuration with the type of measurement list «Минимальный»).

• «Минимальное значение (нормализация)» : factory default (that is, type 9, 10, 34 identifiers are not available in the established configuration with the type of measurement list «Минимальный»).

• «Максимальное значение (нормализация)» : factory default (that is, type 9, 10, 34 identifiers are not available in the established configuration with the type of measurement list «Минимальный»).

3.24. View/correct transmission parameters. When telecontrol configuration is created, the transmission parameters of the information objects are automatically created.

At this stage, the user should check and adjust, if necessary, the transmission parameters of the information objects in the «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / required configuration / «Параметры передачи» menu as required by the project.

The procedure for assigning the transmission parameters is broken down into 4 consecutive steps:

1. Selection of the component of the system;
2. Selecting the object of information;
3. Select the transmission parameter template.
4. Computing transmission parameters.

In step 1, the user must select the component containing the required measurement from the system component list table.

In step 2, the user must select the desired information object from the information object list table.

By 3 steps, the user should select the required template from the list of transmission parameters presented in the table.

The number of templates in the list and the composition of the parameters in the template are specified by the manufacturer and depend on measurement. Each template is a set of combinations of reasons for transmission with a data type (type identifier) that determines the volume and type of information transmitted for the selected object. For the protocol transmission of the selected object, the user must make one of the templates available to the operator (to produce sign «Рабочий» in the right column of the table).

By a step 4 of the selected template, the user may change the type of data (type identifier) of the required reason for the transmission or prohibit transmission (sign «Нет передачи» in the field «Тип данных»). The data type (type identifier) for transmission in the selected interview group can be further defined. When requiring the top level system (e.g. transmission to the RSD), the data objects with 3-byte time tags need to be changed from 7-byte time tags to 3-byte.

3.25. Linking the telecontrol configuration to the connection.

After the tele-mechanical configuration is created, it is necessary to attach it to the connection. For this purpose, in the proposed table of the list of all connections with protocols 60870-5-101/104 it is necessary to match the created tele-mechanical configuration to the required connection (choose from the proposed list).

The following values shall be entered in the fields of the table linking the tele-mechanical configurations created to the connection:

- «Соединение (порт, протокол)» : This field contains the name of the connection corresponding to the RTU port and the protocol. It is not to be edited.
- «Телемех. конфигурация» : required value (from the proposed list). Selecting an empty line in the proposed list means that there is no telecontrol configuration on a given connection.
- «Единый образ процесса» : Plant plant («-»).

3.26. Restarting the RTU 325 software.

To enter into force the above configuration parameters and to verify data collection and transmission, a software RTU-325 must be restarted.

Restarting the software RTU 325 is done when you leave the program «Конфигуратор» by answering in the affirmative the relevant question about the need to restart the software RTU-325.

3.27. Verification of the completeness of data collection and transmission of the protocols of the GOST R IEC 60870-5-101/104.

For verification of data collection and transmission under the protocols of the GOST R IEC 60870-5-101/104, select paragraph «Наладка» / «Монитор 60870-5-101/104» of the integrated RTU-325 software. Further, select the required connections in a sequence, observing data flow, transmission and calibrating.

4. Common configuration methodology for RTU-325 for PPP (reception and transmission station) mode.

The following algorithm describes the overall sequence of configuration operations in the «Конфигуратор» integrated RTU-325 software.

1. View/correct generic settings.

The «Настройки» menu item.

2. View/correct local RTU-325.

The menu item «УСПД» / «Локальное УСПД»

3. Choice and setting of working ports.

The menu item «УСПД» / «Порты»

4. Reboot RTU-325.

5. Establishment and setting up of «запрос» type connections for the protocols of the GOST R IEC 60870-5-101/104.

The menu item «УСПД» / «Соединения» / «Параметры соединений» .

6. Creation of remote RTU with a similar «ответ» type protocol, from which data will be accepted and related to the required «запрос» type compounds.

The menu item «УСПД» / «Удаленные УСПД» / «Параметры УСПД» .

7. Establishment and setting up of «ответ» type connections for the protocols of the GOST R IEC 60870-5-101/104.

The menu item «УСПД» / «Соединения» / «Параметры соединений» .

8. Establishment of telecontrol configurations for connection of type «запрос» .

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <запрос>»

8.1. Viewing/correcting telecontrol configuration parameters.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <запрос>» / ... required configuration ... / «Параметры конфигурации»

8.2. View/correct common addresses.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <запрос>» / ... required configuration ... / «Общие адреса»

8.3. Transforming the addresses of the objects (as required).

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <запрос>» / ... required configuration ... / «Преобразование адресов»

8.4. Add addresses of objects of information (e.g. from other ASS TA systems).

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <запрос>» / ... required configuration ... / «Адреса объектов информации»

9. Establishment of a telecontrol configuration for connection of type «ответ» .

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>»

9.1. Viewing/correcting telecontrol configuration parameters.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / ... required configuration ... / «Параметры конфигурации»

9.2. View/correct common addresses.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / ... required configuration ... / «Общие адреса»

9.3. View/correct the addresses of the objects.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / ... required configuration ... / «Адреса объектов информации»

9.4. View/correct measurement parameters.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / ... required configuration ... / «Параметры измерений»

9.5. View/correct transmission parameters.

The menu item «Телемеханика» / «Список конфигураций 60870-5-101/104 <ответ>» / ... required configuration ... / «Параметры передачи»

10. Linking of telecontrol configurations of the type «запрос» / «ответ» to the respective connections.

The menu item «Телемеханика» / «Привязка телемех. конфигурации к соединению»

11. One or more connections of the type «запрос» to the required connection of the type «ответ» .

The menu item «Телемеханика» / «Каскад соединений <запрос> - <ответ>»

12. Restarting the RTU 325 software.

13. Verification of the completeness of data collection and transmission of the protocols of the GOST R IEC 60870-5-101/104 programme «Монитор 60870-5-101/104» in section «Настройка» of the integrated RTU-325 software.