WELL-BORING AND WORKOVER CONTROL

Software

for DEL-140 and DEL-150 Electronic Dynamometers

User Manual
Revision 1.3

2017

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This revision of the User Manual sets out a description of the «Well-boring and Workover Control» Software, Version 1.02

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1. Program Application

The «Well-boring and Workover Control» Software is designed to work with DEL-140 and DEL-150 devices and their modifications. It performs the following functions: monitoring the status and indications of the devices, processing these readings, exporting these readings into the Company's information systems and creating reports on measurement results.

2. Computer Requirements at the Workplace

To be able to work with the program, a personal computer with the following configuration is needed:

- Intel or AMD x86-compatible Processor, 2GHz and more;
- Operating Memory no less than 2GB;
- Free space on the hard disk to be no less than 200MB (without considering the size of the local database for measurements);
- 2 spare USB ports;
- Not less than 19" Monitor with screen resolution to be no less than 1600x900;
- Microsoft Windows 7 Operating System or later versions;
- Uninterrupted Power Supply Unit;
- Acrobat Reader Program pre-installed to read the e-version of this Manual.

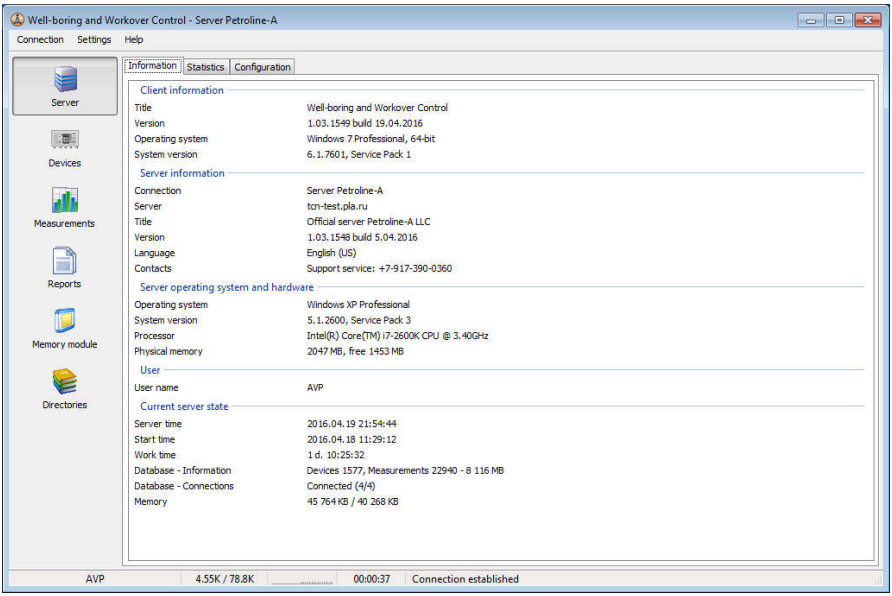
The information for system administrators regarding configuration of the Company's dedicated server and network connections of remote clients and devices is described in chapter 15 of the Manual.

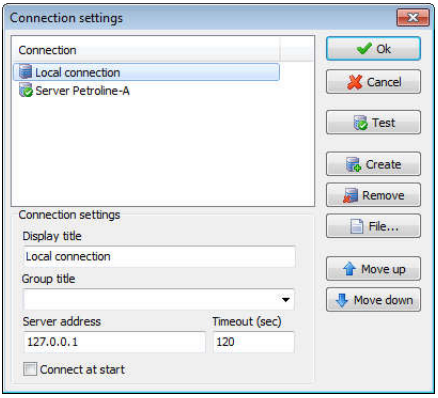
3. Installing the Program

The program is installed by starting up the distribution file of the program. It can be downloaded on the web site of NPP Petroline-A LLC http://www.pla.ru or can be found on the compact disk supplied as part of the DEL-140 or DEL-150 Kits. To initiate installation, start up distribution file toucan(*version No.*).exe. In the process of installation, it is required that a folder be specified into which the program will be installed. **Attention:** Changing the type of installation from "*Full"* to "*Custom"* is recommended for experienced users only. The *"Custom"* type of installation allows a set of selectable components of the program to be determined.

4. Getting started to with the Program

The program can be started up using the "*Well-boring and Workover Control*" icon on the Windows desktop, or by selecting in the menu of the programs "*Start* > *Programs* > *Well-boring and Workover Control*" the icon of the program.

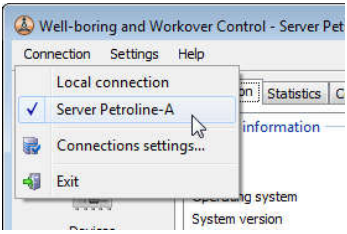




The main window of the program contains the menu, a panel of tabs on the left and the working area on the right. The menu has points from which to select connection to servers, program settings and to call reference information.

When the program is started up by default, connection is made to the local server of the program. To set up connection to the remote server, select the "*Connections settings…*" point in the "*Connection*" menu. Press the "*Create*" button to add an entry on the connection to the new server. Enter the title, address of the server and the timeout (maximum waiting time) for the server to carry out the commands. To check if the

connection is available, press "*Check*". If the selected server is available, the relevant confirmation will be issued.



You can change the existing connections, by selecting from the list of connections the relevant entry and by editing its settings.

After creating the new connection, it will be available for selection in the "*Connection*" menu.

When connecting to the remote server, it will be required to enter the user login and the password. In order to get this information, please contact the server administrator.

With the help of the "*Settings*" menu item, you can adjust the network connection, using the proxy server, you can select the displayed units of measurement and the format for presentation of time and dates, set up the display of the measurement and monitoring, set up the alarm to signal exceeded limits in the measurements and monitoring windows as well as to enable the service mode of the program operation, which is described in greater detail in chapter 14 of the Manual.

The "*Help*" item of the menu provides the capabilities of displaying the information about the program, its current version, the addresses of the manufacturer's web site and e-mail. Also in this menu item, you can check whether the new version of the program is available and open up this Manual in the PDF format. In order to be able to read the Manual, it will be required to install Acrobat Reader.

5. Basics

Having established communication with the server (local or remote), the user can perform the following operations in the program:

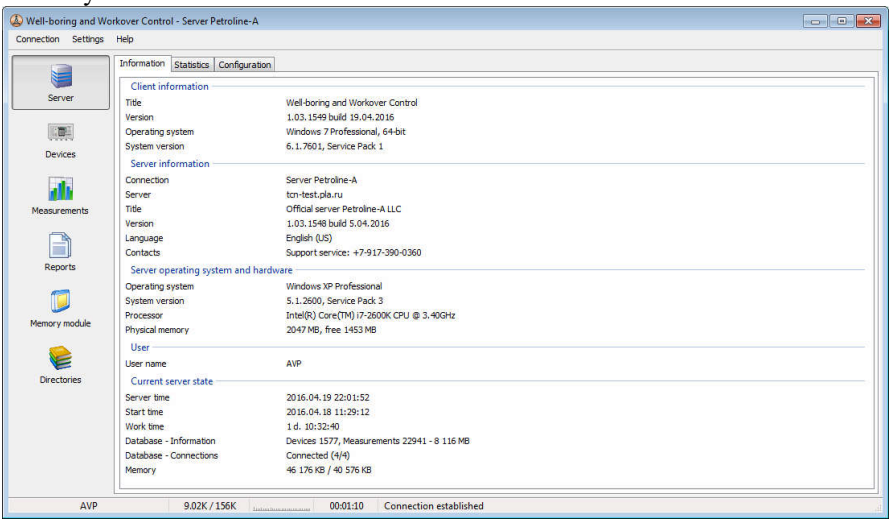
- control and manage connections of dynamometer devices which are connected to the server,
- work with measurements in the database of the server,
- import measurements into the database,
- export measurements from the database,
- read measurements from the memory module of the dynamometer kit,
- create and print out reports on measurements,
- edit reference information regarding the kits, work, users and company departments.

The above operations can be restricted by access rights, which are determined by the server administrator for the users.

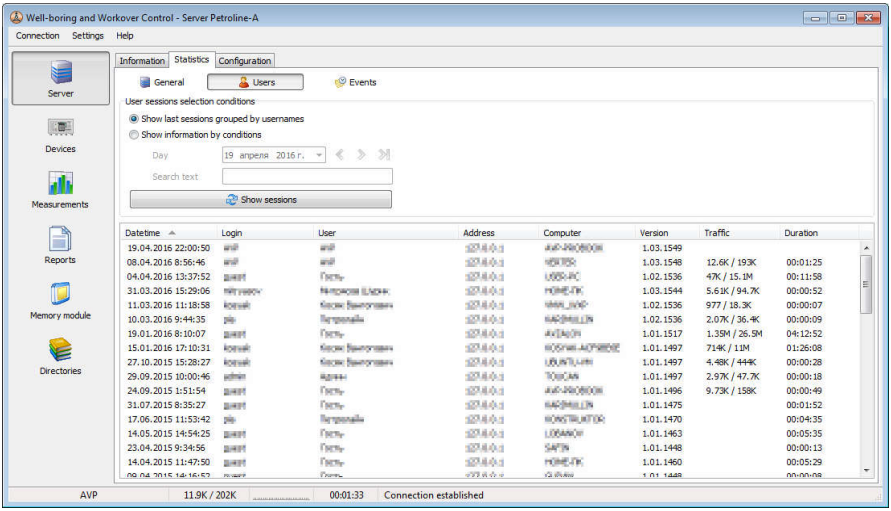
All the functions of the program are thematically divided into panels. The icons of the panels are on the left in the main window of the program: "*Server*", "*Devices*", "*Measurements*", "*Memory module*", "*Directories*". By selecting a specific icon on the panel, we display the relevant panel in the working area of the main window of the program.

6. “Server” Panel

The “*Server*” Panel gives the information about the currently connected server. The “*General*” tab contains the general data regarding the server and its version, about the operating system, the operating time of the server and other auxiliary information about it.

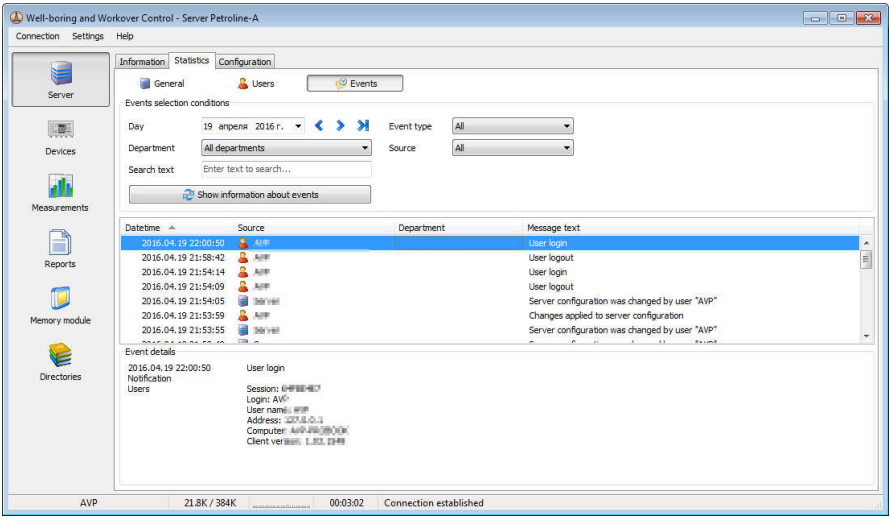


The “*Statistics*” tab contains statistical information about the server operation and the information about the users’ work sessions.



By default, the list displays the last sessions of the users. There is also a capability of reflecting sessions by specific days and searching for sessions by text conditions.

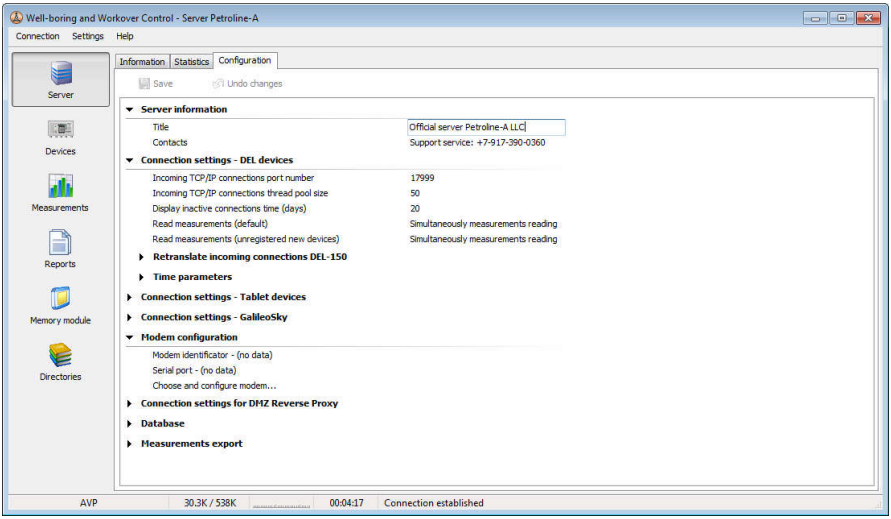
The "*Events*" tab contains the information about the server messages, user's critical actions and the messages from the kit.



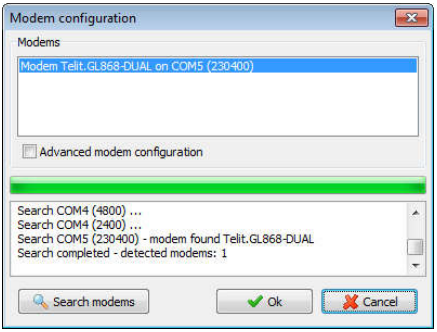
The "*Configuration*" tab determines the settings of the server: information about the server, connection parameters with the devices, modem settings, database connection settings, as well as parameters of integration with the corporate information systems and databases.

The parameters of connections contain configuration parameters of operation with DEL-140 and DEL-150 devices on various channels of communication.

For each type of communication, timeout values are set, i.e. maximum time of waiting for an device to respond in seconds, the number of times that command executions are repeated and the maximum size of the data packet to be transmitted. The default settings specified when installing the program are suitable for the majority of cases of the devices operation, however these settings can be updated for fine tuning. In case there are problems with data transmission from the devices, it is recommended that the setting of the timeout for awaiting response be increased as well as the number of attempts to call the device be increased while the size of the data packet transmitted be reduced. The connection parameters also include the modes of reading the measurements by default and for unknown input devices.



The setting of the reading mode "*by default*" is specified for all the connections when creating or starting up the server. The setting of the reading mode "*for unknown input devices*" is used for input connections with the devices which are not registered in the "*Directories*" of the program, which allows receipt of data from unidentified devices to be restricted. For more details about different reading modes, see the description in chapter 7 of this Manual.

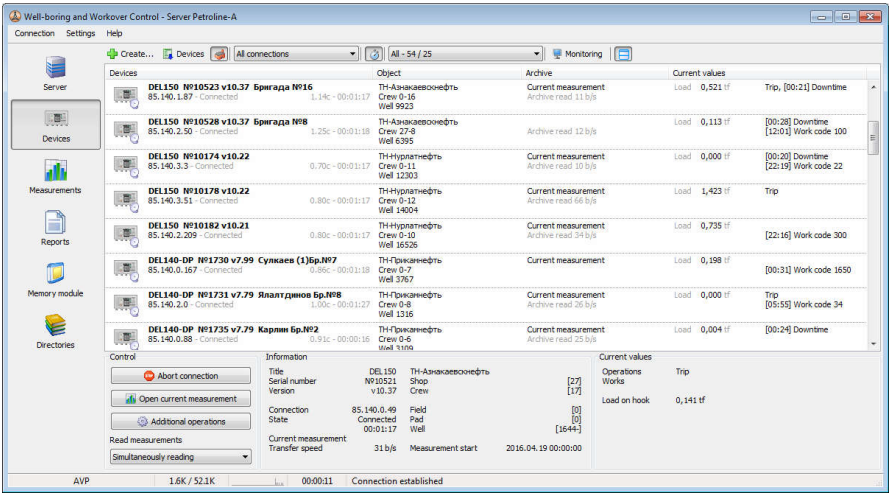


The modem is used to establish connection with the devices via CSD-channel (data transmission by fax). Before using the GSM-modem, check with your cell phone provider that the SIM card being used indeed supports the data transmission mode via CSD-channel. To set up, select the "*Choose and configure modem…*" entry, press the relevant editing button. Connect the modem to the computer and turn it on. Then press the "*Search modems*" button. The program will scan all the available serial ports of the computer and will try to find the connected modems. Then, you need to select from the list of the modems found the one which will be used by the program and press "*Ok*".

For fine tuning configuration of the modem, you can check the "*Advanced modem configuration*" option. In the advanced mode, you can set up the modem control commands and temporary parameters. It is recommended that this mode be used by experienced users only.

7. “Devices” Panel

The “*Devices*” panel reflects connection of the devices to the current server.



The information is given as a list where each item is a connection to the device and contains current brief information about it.

Below the panel, there is a control panel for the connection item selected, as well as detailed information corresponding to it. By pressing the right button of the mouse on the item, you can call the context menu with a list of possible connection operations.

Connection can be made via the following communication channels:

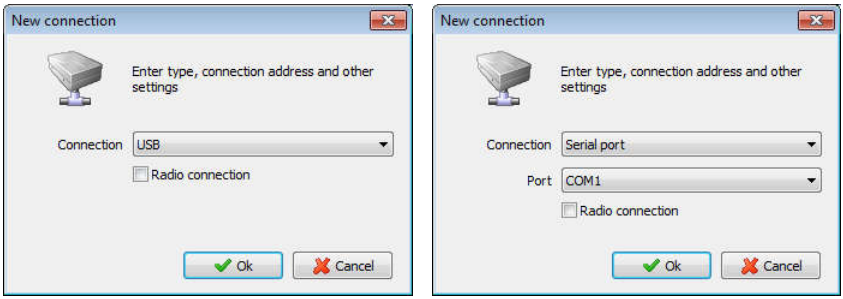
- Serial port;
- USB – port;
- Modem connection (using the GSM modem installed on the server);
- Outgoing TCP/IP connection;
- Incoming TCP/IP connection (including GPRS).

“*Incoming TCP/IP*” is the only “*incoming*” type of connection with which the device makes the connection with the server itself. In the other cases, connections are “*outgoing*” and the user, on his own, controls and configures the settings of the connection to the device.

To create a new outgoing connection, press the “*Create*” button on the tool panel at the top of the list. When working with the remote server, to perform this operation, the user needs to have the rights of the “*Managing outgoing device*

connections" level. After that, you will need to select the communication channel and connection address.

For the serial port, the serial port number will be its address (for example, COM1). Instead of the number, you can enter the "*Auto*" setting, for automatic search of the device on the available serial ports.



For USB connection, no address has to be selected, the server will establish the connection automatically. It must also be mentioned that in order to connect via USB or via the serial port, when radio modules are used, you will need to enable the "Radio connection" option in the same window.

For TCP/IP connection, you will be required to specify the IP address (e.g., 196.168.1.15). Connection will then be made to port 17999 of the specified IP address.

For modem connection, you will have to specify the telephone number (e.g., +79171112222), which corresponds to the SIM card, installed in the device. For this type of communication, GSM modem connected to the server is used. Preparation and configuration of the GSM modem is described in chapter 6 of this Manual.

After creating the connection, there will be a corresponding entry on the list with the information about its current status. By default, the outgoing connection is in the "*Idle*" state. To start up the connection, you will have to select the entry and perform the "*Start connection*" command. The server will then proceed to make the connection with the device in accordance with the specified connection configuration. If the connection is successful, the entry in the "*Device*" column will reflect the "*Connected*" status and the information about the serial number of the connected device, its model, software version. The clock indicator will show the time from the moment the connection was established. In the "*Object*" column, there will be information displayed regarding the crew and the well of the current measurement. In the "*Archive*" column, the information is displayed regarding the number of measurements and the overall size of the archive data to be read. The next line in this column will list the information about the archive reading speed or about other operations are currently executed by device. In the "*Current values*"

column, current measuring values of the device, codes of the work being done and active modes are shown.

Measurements can be read from the device in different modes. The reading mode is set on the connection control panel.

"*Don't read measurements*" – measurements are not read.

"*Archive priority*" – data reading is made from later data to the current measurement.

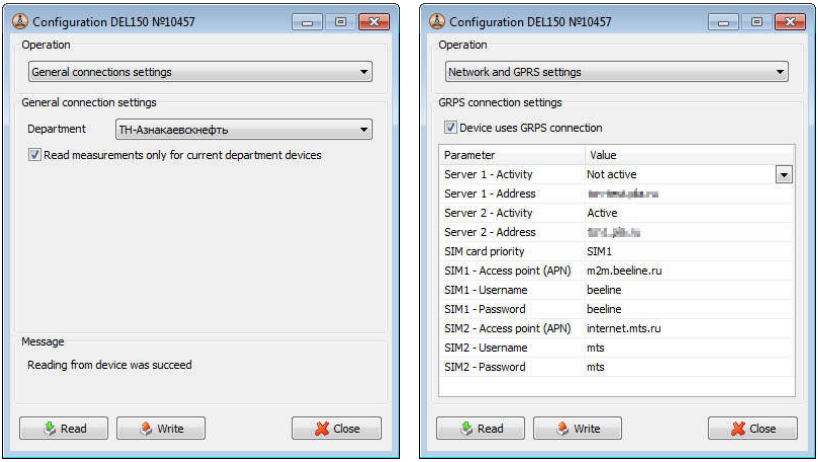
"*Simultaneous reading*" – data from the current measurement and from the archive are read in turns or alternately.

"*Current measurement priority*" – first the data from the current measurement are read, the archive is read only in case there are no current measurement data to be read.

The mode of reading measurements by default can be specified in the configuration of the server. A more detailed description of this is given in chapter 6 of this Manual.

To display the current measurement, execute the "*Open current measurement*" command. The window opened will automatically update the measurement as data from the device come in.

To adjust the connection and configuration of the device, there is the "*Device and connection configuration*" command. The configuration of the device can be adjusted if the device connection is active.



"*General connection settings*" of the configuration contain the linkage of the device to the department. The removable memory module of the device from which measurements are being read may contain the measurements made by other devices. To read from the device the measurements from the device of "your"

department only, the respective switch in the device configuration window can be used.

"*Network and GPRS settings*" set up the parameters for the device to establish communication with the server via the GPRS channel. The parameters include identifiers of the access points (APN) of the cell provider used, server addresses for communication to be established. Connection interval is defined by the time in minutes during which the device is in the stand-by mode before attempting to make connection. For constant connection, this parameter must equal zero.

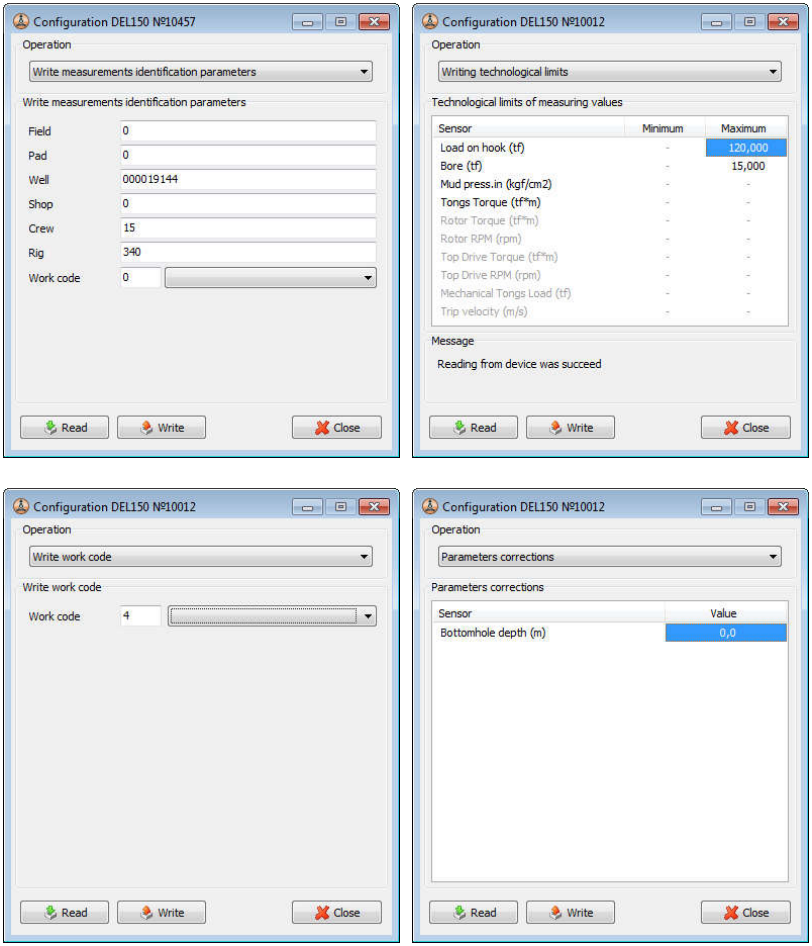
Edited parameters of the configuration are writed with the respective button "*Write*".

If the communication with the device breaks or there is no communication with the device, the connection will interrupt data exchange and pass over to the "*Pause*" mode. In 3 seconds, the server will try to re-establish communication with the device again.

In order to complete the operation of the outgoing connection, you will have to execute the "*Stop connection*" operation. The connection will break up communication with the device and go to the "*Idle*" mode.

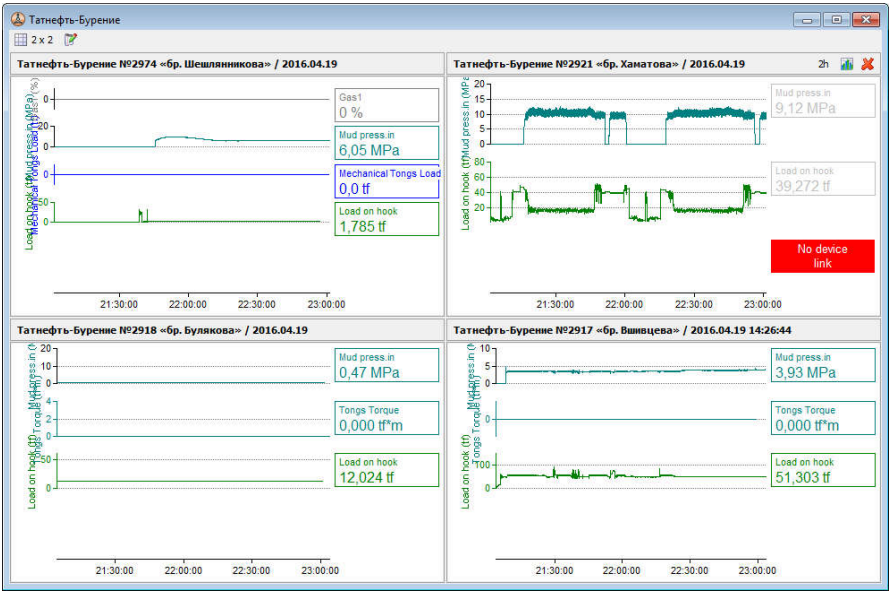
"*Incoming*" connections are made by the device itself. The set-up of the server and the network equipment for incoming connections to be made is described in chapter 15 of this Manual. The device makes the connection with the server via the GPRS channel or via the network in line with the configuration set in the device. By default, the server receives the incoming connections with the devices via port 17999. The port number can be changed in the server configuration. After the device has established communication with the server, the list will have an entry showing the device is connected. The user can execute the same operations with this connection as with the outgoing connection. The only difference consists in the user being able to execute the "*Break the Connection*" command only, instead of the commands to make or stop such a connection, as a result of which the server will break the connection with the device. It is noteworthy that the device, in the meantime, will not discontinue the attempts to establish communication with the server in view of what is specified in its configuration.

For purposes of an active connection with the DEL-150 device, the operations for remote set-up of the device are available: "*Edit work code*", "*Edit measurements identification parameters*", "*Edit technological limits*" and "*Parameters corrections*". Using them, you can change the respective working parameters of the DEL-150 device through active connection. When the measurements identification parameters are changed, the device will automatically create a new measurement.



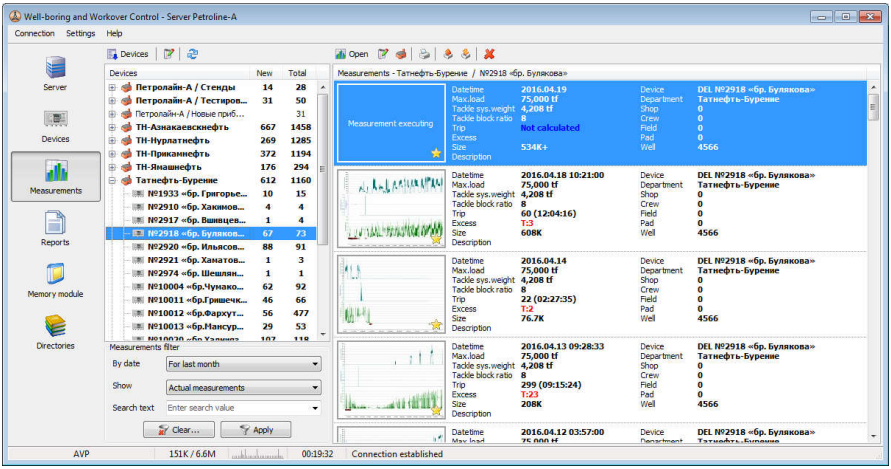
Display of the list of connections can be adjusted using the tool panel located at the top of the list. The list can be sorted out according to the device Nos., crew Nos., or communication channel. Having enabled the option of grouping connections according to departments, you can additionally split up the connections into groups of the same department. Also the list can be filtered out by choosing outgoing or incoming connections, according to the department chosen by the user or only active connections.

On the "*Devices*" Panel, display of "*Monitoring Windows*" is also controlled and adjusted, i.e. the special windows in which, in a grid form, the windows of graphs plotted based on the current active measurements of the devices are displayed. For more details on the windows of the monitors, see their description in chapter 10 of this Manual.


Татнефть-Бурение
2 x 2
Татнефть-Бурение №2974 «бр. Шешлянникова» / 2016.04.19
Gas1
0 %
Mud press.in
6,05 MPa
Mechanical Tongs Load
0,0 tf
Load on hook
1,785 tf
Татнефть-Бурение №2921 «бр. Хаматова» / 2016.04.19
2h
Mud press.in
9,12 MPa
Load on hook
39,272 tf
No device link
Татнефть-Бурение №2918 «бр. Булякова» / 2016.04.19
Mud press.in
0,47 MPa
Tongs Torque
0,000 tf*m
Load on hook
12,024 tf
Татнефть-Бурение №2917 «бр. Вшивцева» / 2016.04.19 14:26:44
Mud press.in
3,93 MPa
Tongs Torque
0,000 tf*m
Load on hook
51,303 tf
21:30:00
22:00:00
22:30:00
23:00:00

8. “Measurements” Panel

The “*Measurements*” Panel displays the measurements saved in the database of the program.

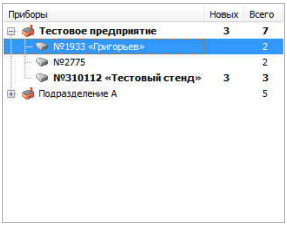


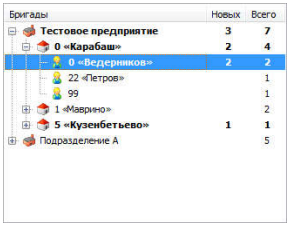
All the measurements have identifiers which are entered by the operator directly on the keyboard of the device when taking the measurement. Referred to the identifiers are: the date and time of the measurement, device No., shop and crew Nos., oil field No., cluster No. and well No.

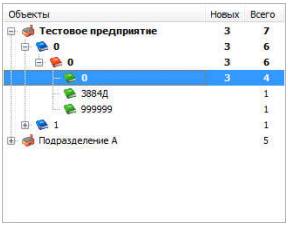
The “*Measurements*” Panel is divided into two parts: a tree of measurement identifiers and a list of measurements, which belong to the identifier selected in the tree.

The first level of grouping in the tree is always represented by the department names. The subsequent grouping can be made at the user’s option according to the following identifiers:

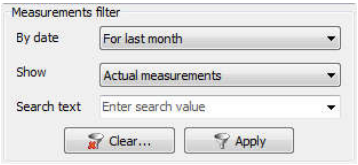
- According to the devices – model and No. of the device;
- According to the crews – shop and crew;
- According to the site – oil field, pad, well.







The tree and the list only display those measurements which satisfy the conditions defined in the "*Measurements Filter*".



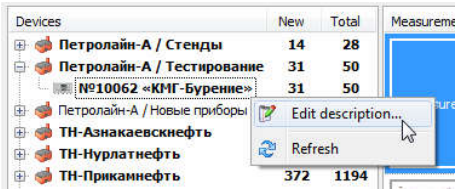
In the filter you can define the conditions for selection of measurements in terms of time: for the current twenty hour hours, yesterday's twenty four hours, for a week, for a month, for a quarter, as well as for a specific interval of the dates.

The database may contain a large number of measurements, therefore display of the list of measurements can take a considerable time. However, there is no constant need to see in the lists the measurements for whole time period. Therefore, it is strongly recommended to use time related conditions of the filter to speed up the work. As a rule, the most optimal is to use a display of measurements only for the last month.

Selection of the measurements in the filter can be made by type. Having chosen the "*New measurements*" type, the tree will only display the measurements which have been saved in the database, but which have not been opened a single time for the user to view them. To protect the data in the program, no physical deletion of measurements is provided. When the operation "*Delete measurements*" is executed, the measurements are only marked up as deleted, however they remain saved in the database of the program. Subsequently, in order to view such measurements, in the filter you can specify display of "*Deleted Measurements*". When "*Actual measurements*" are chosen, the measurements which are not deleted ones will be displayed.

In the filter, you can set selection of measurements according to a specific value of the identifier. For that purpose, you need to enter the value (crew or device No. or etc.) into the "*Search text*" field for input of the filter data.

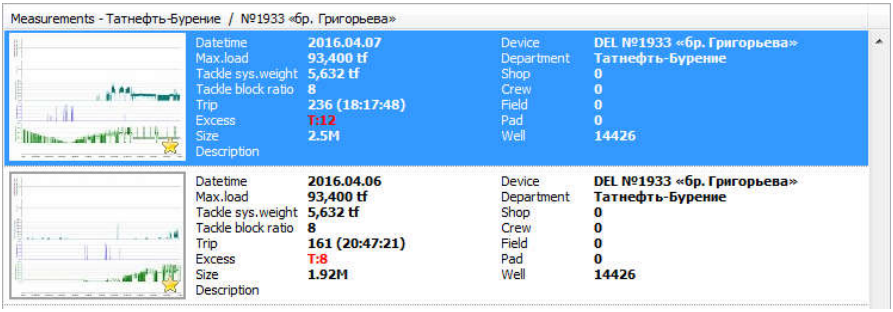
The "*Apply*" button displays the measurements in the tree and on the list in accordance with the conditions of the filter. The "*Clear*" button would reset all the conditions of the filter to the default conditions and would update the list and the tree of measurements.



Having chosen in the tree the entry standing for the identifier of the measurements, the list of measurements will automatically display the measurements with this identifier. By pressing the right button of the mouse on the identifier and having selected the item of the context menu "*Edit description*", the text description of the identifier can be changed. For example, you can sign for crew 15 of shop 4 by the family name of the crew leader "A.V. Petrov". Going forward, all the measurements of this crew will have the corresponding signature in this

identifier. The above operation aimed at creating text descriptions of the identifiers can be carried out for devices, shops, crews, oil fields, clusters and wells.

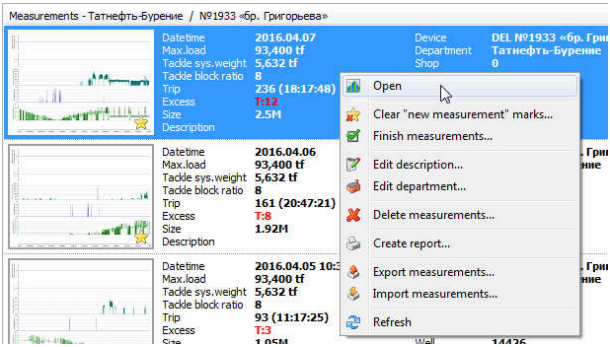
The list of measurements contains records of measurements with a summary of brief information.



Also the entry contains, for convenience's sake, a reduced sketch of the graphs. The sketch and preliminary data on calculations are reflected in the entry for the measurements completed by the device only. In case the entry corresponds to a measurement which is being made at the current moment, then the sketch and the estimations are not reflected until all the last data of this measurement are read and the device starts on a new current measurement.

To perform operations with measurements or a group of measurements, you need to select them from the list of measurements. To select several measurements, by holding the CTRL button of the keyboard, mark up using the mouse the measurements needed.

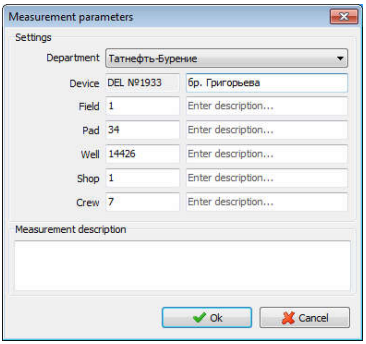
With the measurement chosen or several measurements, you can perform operations by pressing the relevant buttons on the tool panel located above the list or by choosing the necessary item of the context menu.



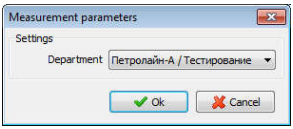
To be able to view a measurement twice, click with the mouse on the line of the measurement in the list. That will open a new window and the measurement will be downloaded. The window of measurements is described in detail in chapter 9 of this Manual.

When a measurement is saved into the database or additions are made to the measurement, the measurement acquires the attribute of a "*new*" measurement in the form of asterisk. Once the user opens the measurement to be viewed, the attribute of the "*new*" measurement is cleared. This is convenient because it allows tracking of the new information from the devices.

The operation "*Clear new measurement marks*" allows you to clear the attribute of the "*new*" measurement without the user viewing it.



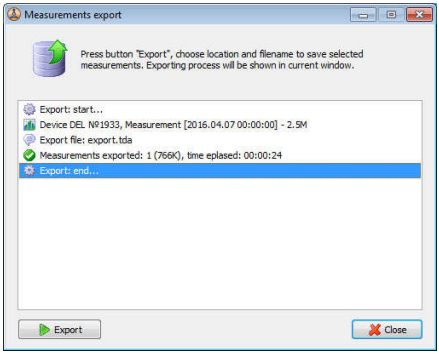
The operation "*Edit description*" makes it possible to change the relevance of the measurement to a department, to change the following identifiers of the measurement: oil field, pad, well, shop or crew. This is necessary if erroneous data have been entered into the device, which, going forward, would impede the processing of the measurement. Also, in this window, you can input a description for each of the identifiers and a description of the measurement itself. It is noteworthy that the original identifiers (as read from the device) will be saved in the measurement itself and will be available to be viewed in the measurement window. The operation "*Edit description*" can be executed only for one measurement.

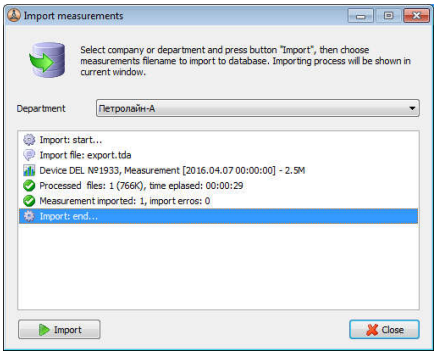


To change relevance of the measurement to a department of one or several measurements, you can use the operation "*Edit department*".

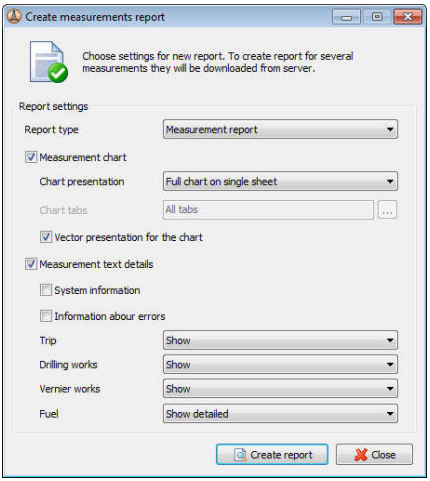
The operation "*Delete measurements*" will mark up the chosen measurements as deleted. You can view the deleted in the database, by selecting the "*Deleted measurements*" type in the filter of measurements.

To transfer the measurements to another computer or save them in a separate file is the purpose the operation "*Export measurements*" is designed for. Mark up the necessary measurements and select the above mentioned operation. Then enter the name of the file in which the measurements will be saved, and press "*Export*". The progress of the export operation will be reflected in the window as messages.



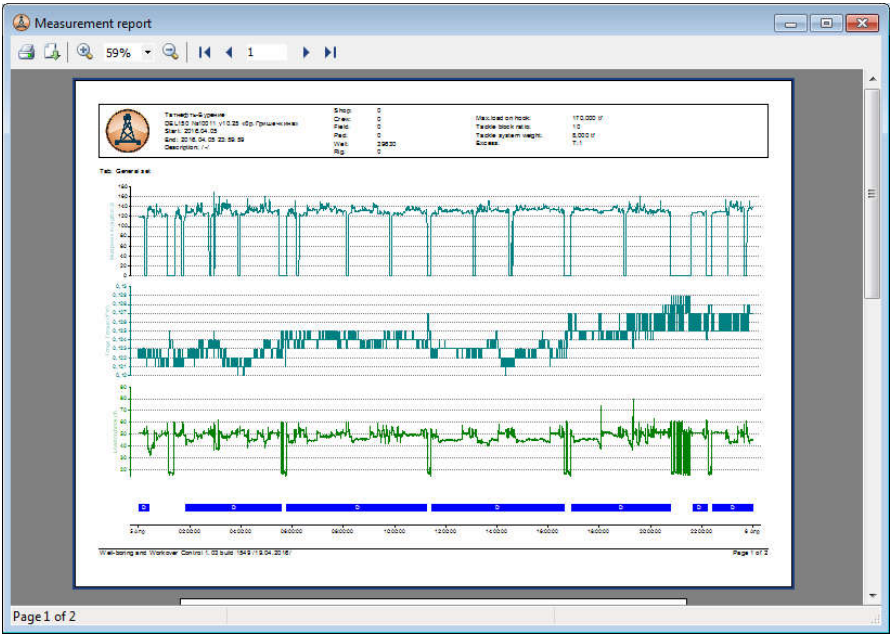


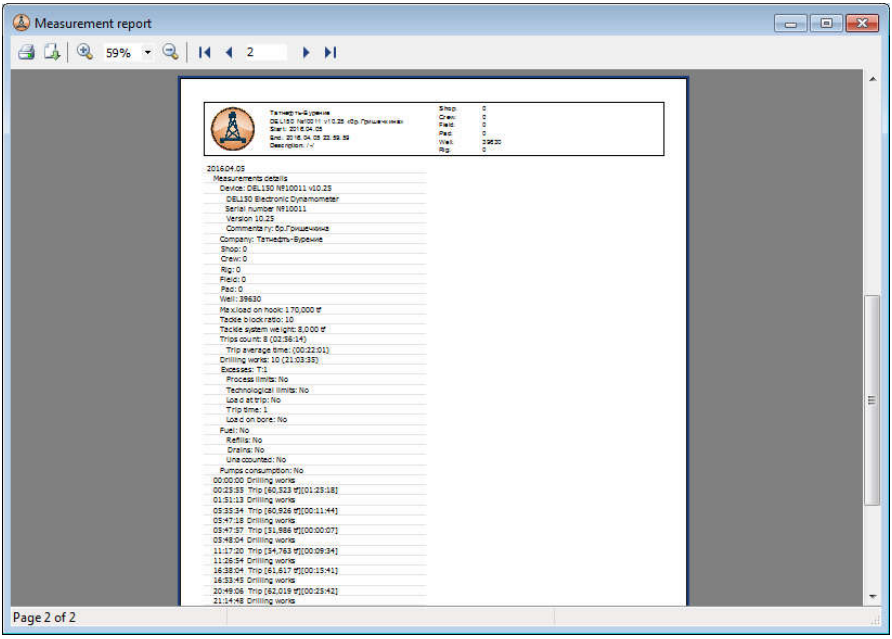
To import the measurements from files is the purpose the operation "*Import measurements*" is designed for. Select the department to which the measurements being imported will refer to, then press "*Import*" and specify the file from which you need to import the measurements. Similar to the export operation, the progress of the import operation will be reflected as relevant messages in the window.



The operation "*Create report*" is designed to establish reports on measurements to be subsequently printed out or to be saved in the PDF format. Select the measurements and then select the operation "*Create report*". Then you need to specify the parameters of the report to be created. Using the parameters for presentation of the graph in the report, you can set display of the whole graph on the sheet or display of the graph by parts, based on the pre-set number of hours per one sheet of the report. The parameters for text information breakdown include settings for display of system information, the information about errors, trip operations, drilling and vernier work. Then press the "*Create Report*" button. After downloading and processing measurements, the window of the established report will be opened. It, in line with the settings, will consistently display the graphs and the text information of each of the selected measurements.

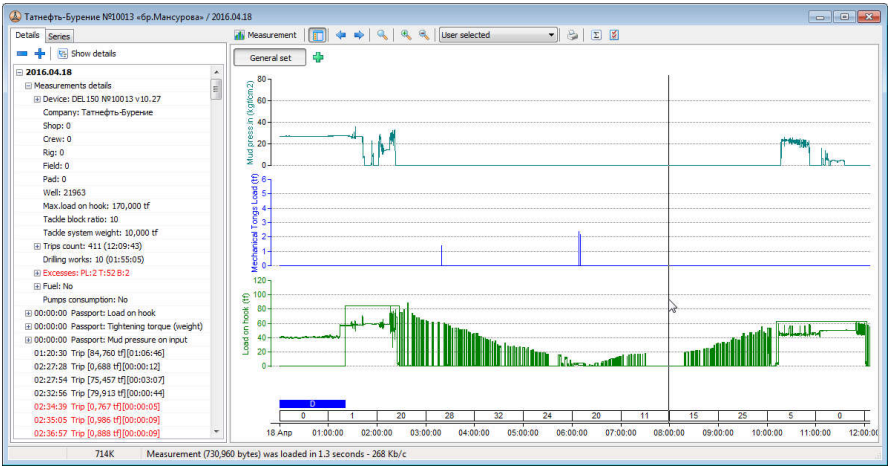
To print out the report or save the report into the PDF file, select the respective button on the tool panel of the report window.

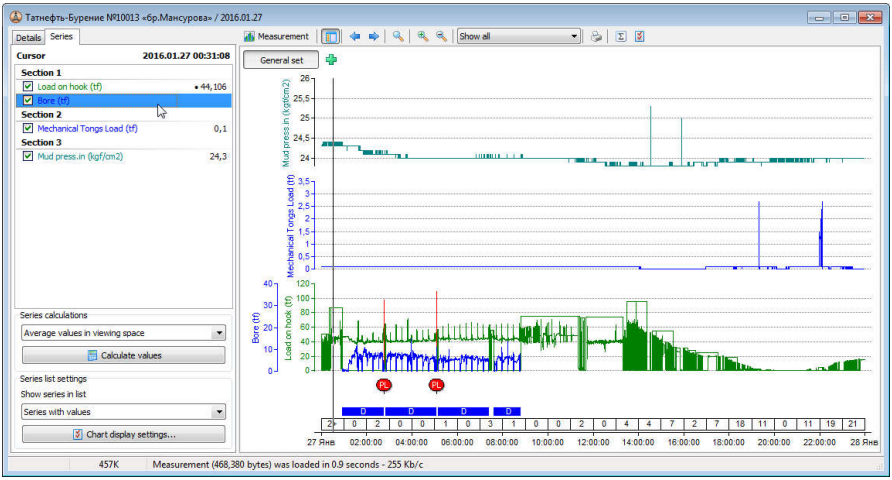

Measurement report
59%
1
Page 1 of 2


Measurement report
59%
2
2016.04.05
Measurements details
Device: DEL130 №10011 v10.25
DEL130 Electronic Dynamometer
Serial number №10011
Version 10.25
Company: Татнефть-Бурение
Well: 39630
Max load on hook: 170,000 tf
Tackle block ratio: 10
Tackle system weight: 8,000 tf
Excesses: T:1
Page 2 of 2

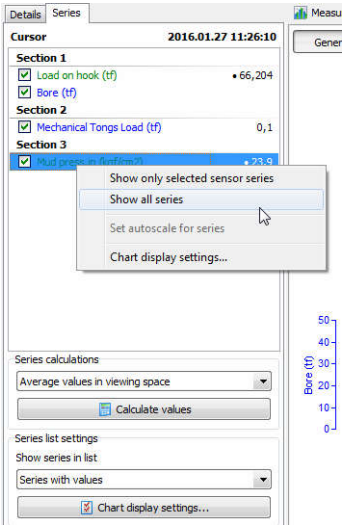
9. Measurements Window

The measurements window is designed to view and process the measurements. To open up the measurements, you will have to click twice on the measurements entry in the "*Measurements*" panel or on the entry of the device in the "*Devices*". The window of the measurement with active connection of the device is able to reflect the last current readings and to update them as data come from the device.





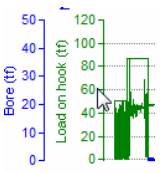
In the right part of the window, there is located the area of graphs for the measurement, while in the left part, there is a details of the measurement and information about the graphs in the form of a list.



In the area of the measurement graphs, sensor readings are shown, as registered by the device, event markings, errors, work being done, reflected on time scale basis. Next to the time axis, there is information about the number of trip operations, carried out for a certain hour, indicator lines of the drill and vernier modes.

The "*Series*" tab sets out a list of graphs. By default, the list reflects entries of the graphs which have readings sensor by sensor. By setting or removing a marking on the entry of the graph, you can either switch on or off its display. The value on the right in each entry of the list corresponds to the values of the graph in the selected position of the cursor. The displayed values will change with the cursor position changing in the area of the graphs. If you select the entry of the graph using the right button of the mouse, this will display a context menu with additional operations with regard to the graph.

In order to change the scale of the graphs, you can use the "*Zoom*", "*Unzoom*" buttons or by selecting a specific value of the graphs scale. To display an arbitrary section of the graphs, move the cursor to the beginning of the area, press the left button of the mouse and, holding the button pressed, move the cursor to the end of the section. The selected section will be zoomed in and displayed for the whole area of the graphs. To move the displayed area, press the right button of the mouse on the area of the graphs, while holding the button pressed and moving the cursor, select the area you want to be displayed. To move the area, you can also use the scrolling wheel of the mouse. To return to display of the whole graph in the window, use the operation "*Show all*" on the tool panel.

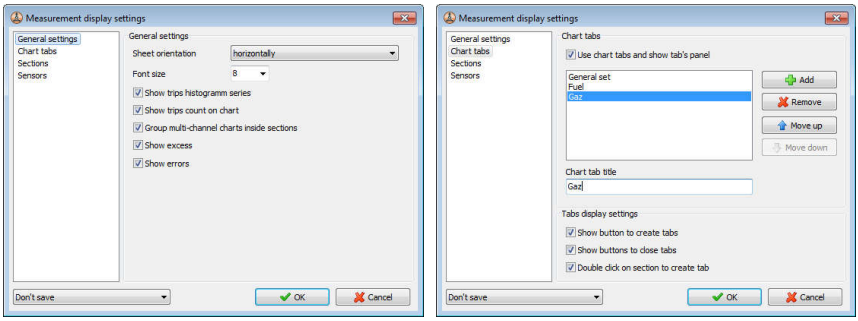


To change the scale of the graphs axes, aim the cursor on the axis. Then, holding the left button of the mouse and moving the cursor, select the position of the axis you want. To change the scale of the axis, perform the same operation using the right button of the mouse. To return to the initial scale of the axes, do "*Show all*".

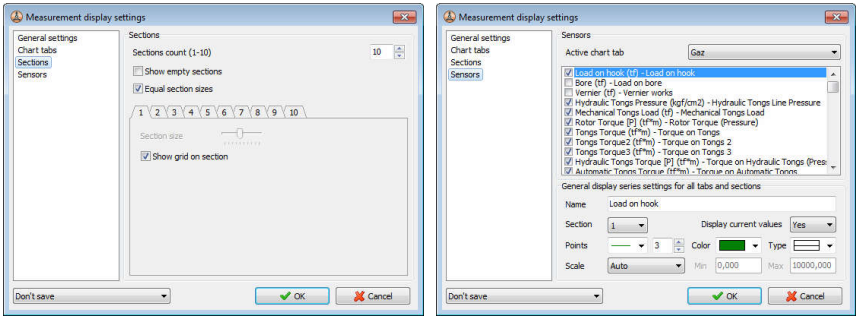
"*Measurement display settings*" allows the user to change the graphic depiction of the measurement. "*General settings*" includes the capability of vertical or horizontal orientation of the graph and changing the size of the font in axis captions and markings. Also on this tab, you can adjust display of

the histogram graph of trip operations, information about trip operations hour by hour, display of errors and exceeded values.

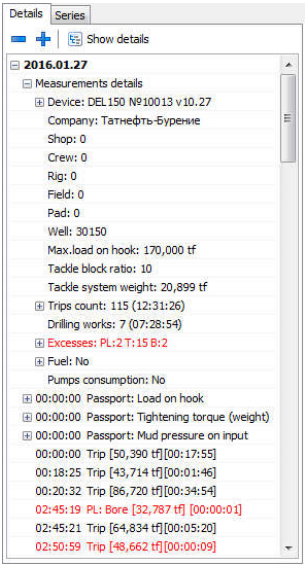
"*Chart tabs*" are intended to display graphs grouped together according to some attribute. For example, for the sake of convenience, you can create separate tabs for process parameters, for graphs of fuel change in the tanks and for other sensor readings, etc.



In "*Sections*" you can set up the number of graph sections, their size and presentation. In "*Sensors*" you can set up display of the sensor readings graphs: relevance to the section, color, thickness of the line, type of the value point on the graph and the scale of the axis – automatic, based on the measurement data or manual, based on the minimum and maximum values entered. You can also change display of the graph name.



The changed parameters of display can be saved either for all the measurements of the device, or for all the measurements of the department to which the device belongs.



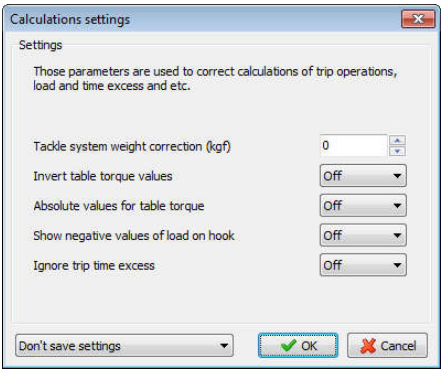
The "*Details*" tab contains text details regarding the measurement presented as a tree. The "*Show details*" button in the tool panel of the tab is designed to adjust display of the details.

The text details contain the information about identifiers of the measurement, about reference and calculation parameters, the information about the sensors connected, details about the trip operations, drill and vernier work, messages about events, exceeded readings, errors and the information about the work being done.

If the user has changed the values of the measurement identifiers, their values will be marked with the "*" sign. Having switched on the item "*Show original identifications*" you can view the original values of the identifiers read from the device or the memory module.

Estimated parameters include:

- Number of trip operations with total time of the operations given,
- Average time of trip operations,
- Number of exceeded values.
- Duration and number of drilling operations
- Consumption of flush fluid (mud)
- Consumption of fuel



The trip operations are counted automatically. The beginning of the trip operation is registered when the load on the hook is exceeded more than 300 kgf during more than 2 seconds. The end of trip operations is registered at the level of the load on the hook less than 300 kgf within more than 7 seconds. On the graph, the trip operations are shown as a histogram in the load graph with an indication of maximum level of the load registered in the course of trip operations. When the device is set up for the "drill" mode, it is understood that no trip operations are underway, therefore, while this mode is in operation, no count is taken.

With the help of "*Measurement calculation settings*" you can modify the algorithm for calculation of the number of trip operations. When the amount of weight of the block-and-tackle system is incorrect in the measurement,

determination of the beginning and the end of the trip operations may be hindered. The situation can be rectified by introducing an adjustment of the block and tackle system weight in the settings. The value of the adjustment introduced will be reflected in the chain falls weight parameter in brackets, for example – "Weight of the block and tackle system: 2.8tons force (+0.5 tons force)". The load graph display will not, in any way, be impacted by the adjustment introduced, and it will be only used by the algorithm of counting the number of trip operations. The modified parameters of the calculation can be either saved for this particular measurement, or for all the subsequent measurements made by the device.

Also in the window "*Measurement calculation settings*", it is allowed to set up display of measurement data without their modification, namely, inverting the value of torque on the rotor, display of negative load values and shutting down exceeded timing values in the procedure of counting trip operations and other settings.

The exceeded value parameter has the following meanings: "PL" is the number of exceeded process limits (minima and maxima), "TL" is the number of exceeded technological limits, "L" is the number of exceeded values of the weight on the hook, "B" is the number of exceeded limits of the load on the tool, "T" is the number of trip operations with duration of less than 9 seconds. The trip operations which have exceeded limits are marked up in the tree in red.

The process limits are determined by the minimum and maximum values of the sensor readings defined directly in the device. The technological limits can be specified remotely by users for DEL-150 devices and are designed to control technological operations in the conduct of work.

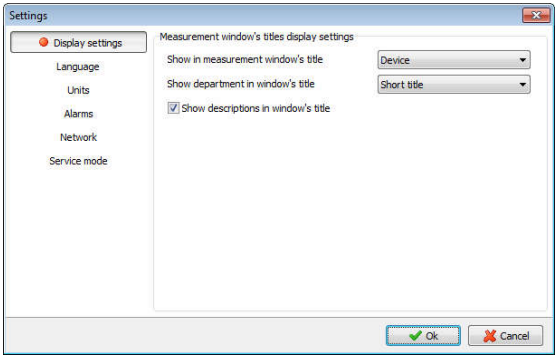
If the measurement is a current measurement being taken in the device and the option "*Auto refresh measurement*" is on, then upon arrival of new measurement data from the device, the window will automatically display them. If the option "*Show last values*" is on, then when an update is made, the graphs and details will be offset to display the last data while retaining the current time scale. This is convenient for monitoring of the work being done – graphs will keep on changing as time goes by in the automatic mode until the measurement is completed.

The functions "*Previous measurement*" and "*Next measurement*" are intended to download previous and subsequent measurements taken by the device without exiting the measurements window.

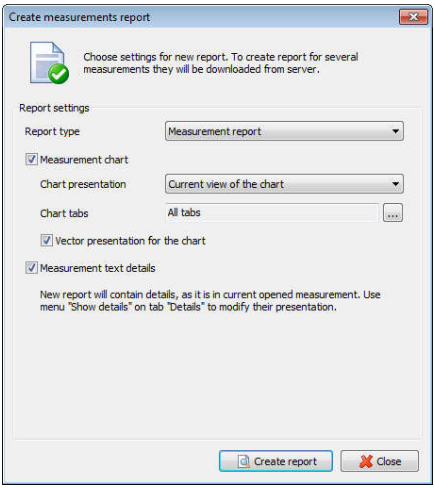
The operations "*Change work code*", "*Change identification params on device*", "*Edit technological limits*" and "*Parameters correction*" are meant to change the relevant parameters on the device through active connection and are accessible to the window with current active measurement of the device. For more details regarding the description of these functions, refer to chapter 7 of the Manual.

You can set up display of the headings for measurements windows in the item "*Settings*" of the main menu in the program. You can choose between the

setting of the department, choose the device, crew or well being measured for display in the heading of the window.



These settings are valid for the headings of the cells in the monitoring windows as well.

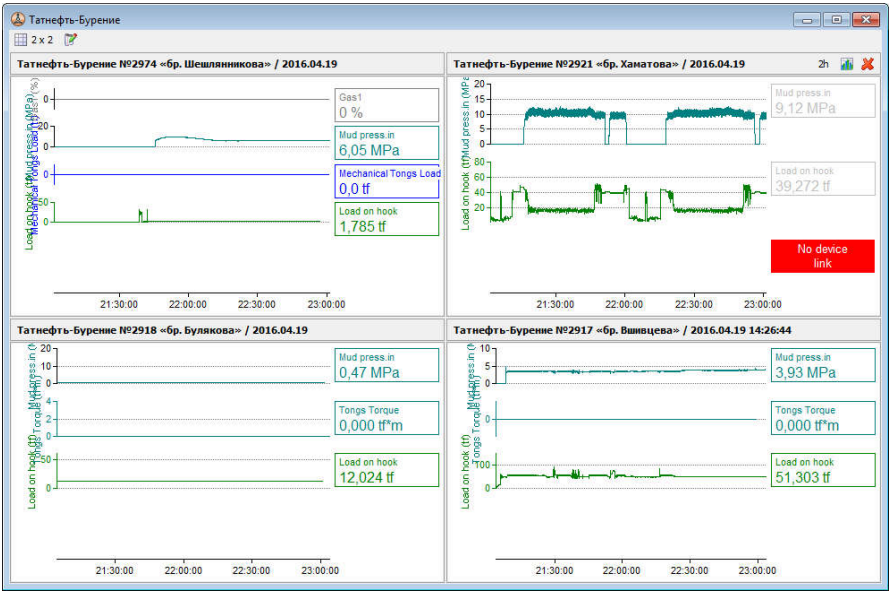


To print out the report or to save the report in PDF format on the opened measurement, select the button "*Create report*". Then you have to specify the parameters of the report being created. As parameters for presentation of the graph in the report, you can set up depiction of the whole graph on one sheet, that of only the current view of the graph or depiction of the graph part by part, depending on the specified number of hours per one sheet of the report. The text details of the report will correspond to the presentation of details in the tree of the measurement window. Then press the button "*Create report*". After processing the measurement, the window of the established report will be opened. It, in line with the settings, will display consistently the graphs and the text information of the measurement.

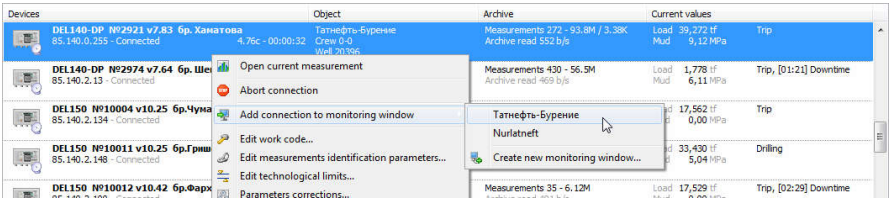
To print out the report or save the report into the file in PDF, select the corresponding button on the tool panel of the report window.

10. Monitoring Windows

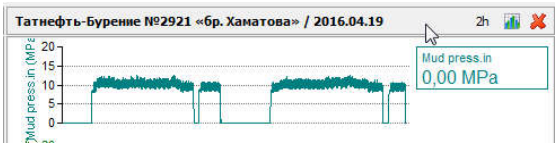
Monitoring windows are intended for online control of the current measurement data coming in from the devices.



The monitoring windows are created and controlled through corresponding functions in the "*Devices*" Panel. In order to create display of the current data of the connected device in the new or already existing monitoring window, in the "*Devices*" tab, select the line of the device, then using the right button of the mouse, call the context menu and select the corresponding item of the menu.



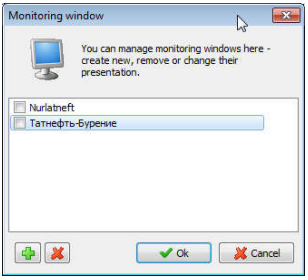
Holding the left button of the mouse on the heading of the cell, it can be moved to another cell of the monitoring window.



Also when the cursor is aligned with the heading of the cell, this makes accessible the button for opening the measurement window, the button for closing the cell, as well as selection of displayed time interval in the current cell.

The text of the cell heading corresponds to the text of the measurement window heading and can be adjusted in the item of the main menu "*Settings*".

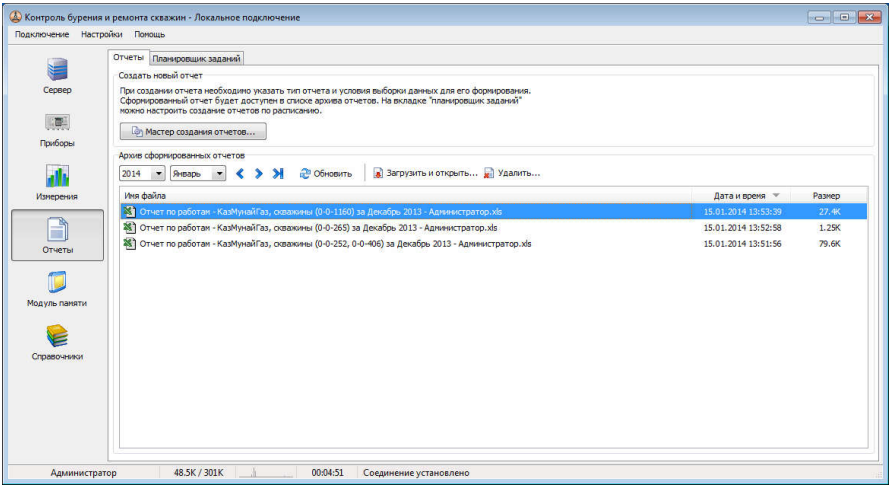
In the menu of the monitoring window, you can change the name of the window, as well as the sizing of the cell table from 1x2 to 6x3. To display a greater number of connections you will need to create a new monitoring window.

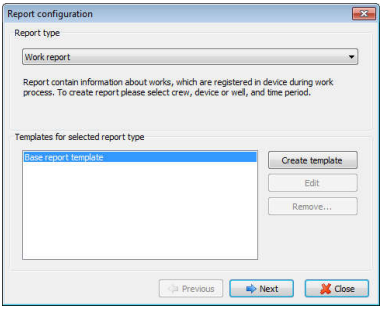


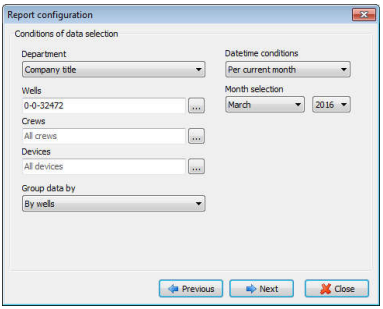
The program memorizes the last locations of the monitoring windows and creates them in the previous positions when the program is opened. You can adjust display and edit the list of existing monitoring windows on the "*Devices*" Panel in the "*Monitors*" Menu using the item "*Manage monitoring windows*".

11. “Reports” Panel

The “*Reports*” Panel is designed to generate analytical reports on measurements. The reports are generated in the form of files on the server and then become available for downloading and opening on the user’s computer.

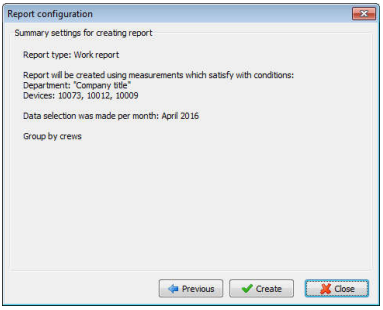






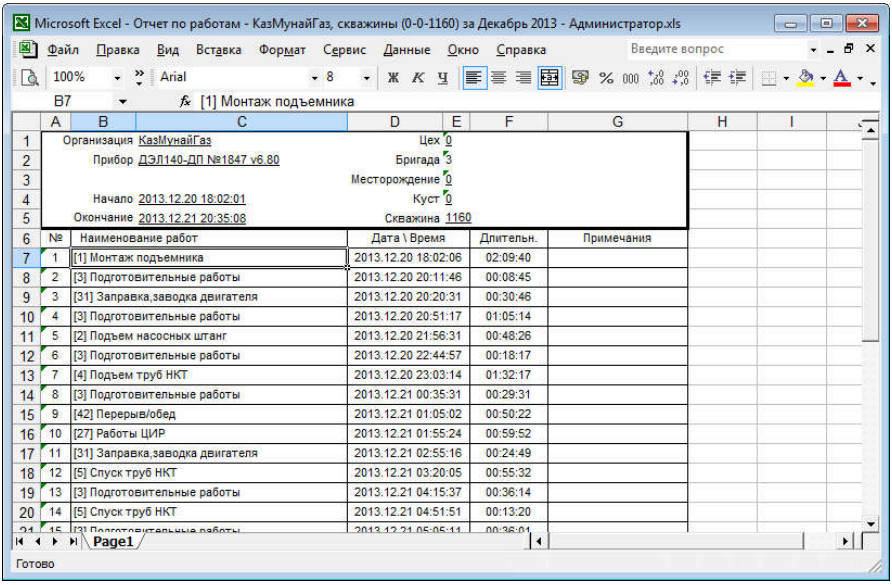
To create a report, you have to select “*Report wizard*” in the “*Reports*” tab. After that, consistently, step-by-step you have to specify the settings of the report to be created. First, you select the type of report to be established. On the basis of the basic template of the report, you can create your own templates using the built-in editor of templates.

Then parameters for sampling the measurement data for the report to be created are specified. You need to specify the department, identification data of the measurements (well Nos., crew Nos., device Nos.), several ones can be specified after a comma, time conditions and settings for grouping the data together in the report. At the next stage, you need to check all the specified settings and select “*Create*”. The assignment for the report to be established



will be sent to the server and will be placed in the general queue of tasks.

It must be also pointed out that for certain types of reports to be established, it may take a considerable time. In the list of reports, the entry of the task will be displayed in non-active color for the time period of its execution. After creation of the report is completed, the document will be accessible for downloading and opening.



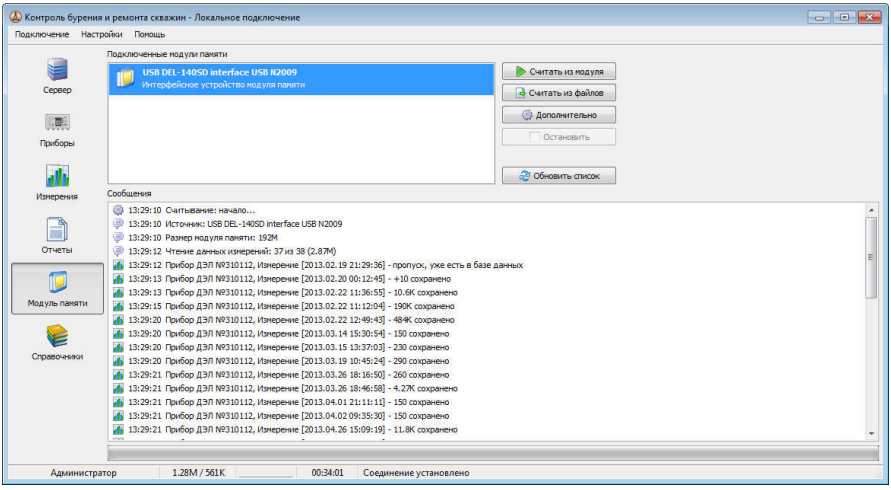
12. “Memory module” Panel

“*Memory module*” Panel is designed to read measurements from the removable memory module of the device and the file images of the measurements. Connect the interface to USB-port and insert into its connector the Memory Module. The list will reflect all the Memory Modules connected to the computer.

In the list, select the line of the interface or storage device and press “*Read from module*” to begin reading the measurements. In the process of work, there will be displayed status messages, messages about found measurements and saving them on the database. Having clicked twice on the entry of the message on the saved measurement, you can open this message to be viewed.

To read from the files, press “*Read from files*” and select the files from which you want to read the data. The reading process will be reflected similar to the process of reading from the Memory Module.

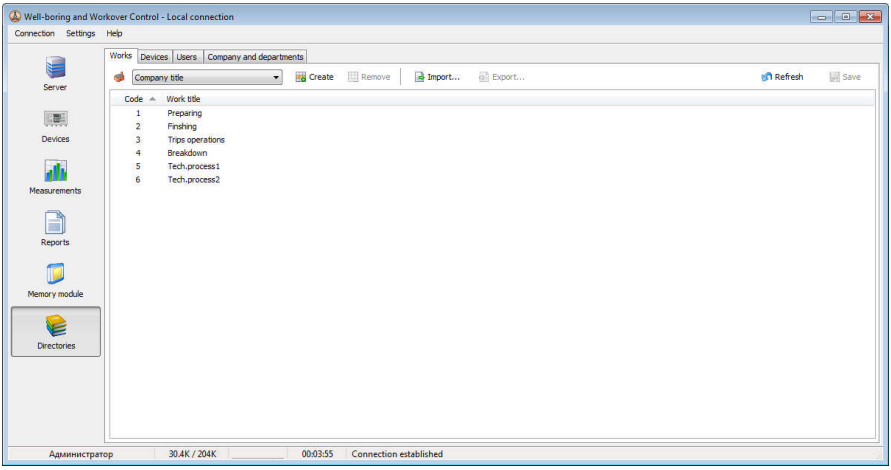
To speed up the reading of the measurements, the user may set the time interval for selective reading of the measurements: for the last month, quarter, year. This allows the old measurements which are not part of the sampling not to be read.



To clear the Memory Module, you have to press the button “*Additional*” and select the item “*Clear module…*”. **Attention!** After clearing, it will be impossible to bring back the measurements saved in the Memory Module.

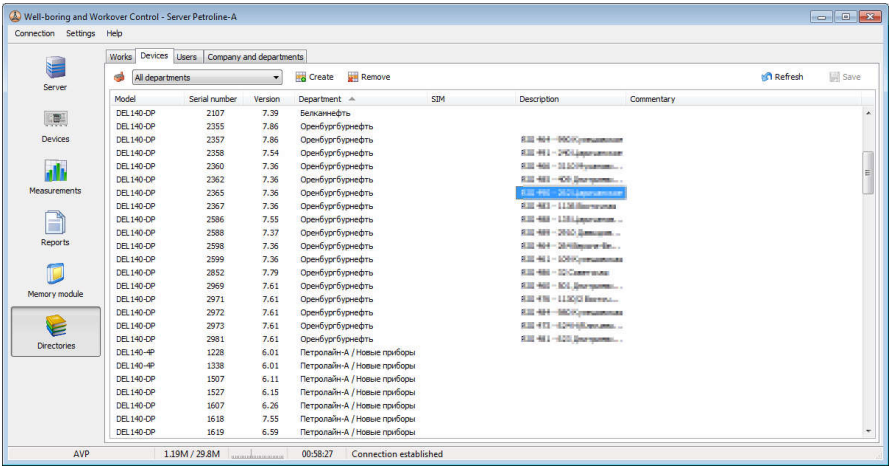
13. “Directories” Panel

The “*Directories*” Panel is meant for viewing and editing the reference information of the server about the codes of the work activities, devices, departments and users.

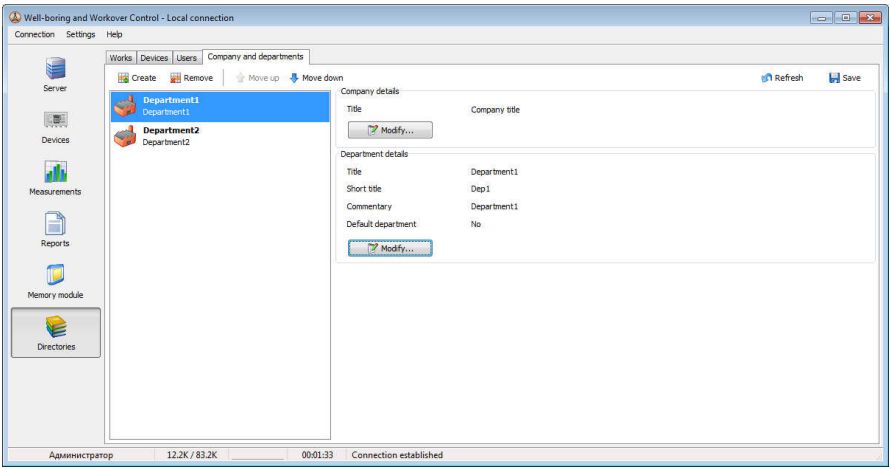


The “*Works*” tab contains the information presented in tabular form about the codes of the work activities for each of the departments. The department is selected on the tool panel of the tab. The codes of the work activities are used to mark up the beginning of the activities by the operator directly on the device. In the measurements window the codes entered by the operator into the device are presented as text, in accordance with the department of the device and the table of the work codes. The user is provided with the opportunities of creating, editing and removing entries from the table of activities codes. Also the user can export the table of activities codes into the text file or import it from the text file. This may be used to transfer the information between computers or servers. After introducing changes to the table of activities codes, you need to complete “*Save*” for the changes to be adopted.

The “*Devices*” tab contains the information about the devices registered on the server: serial No. of the device, model of the device, version of software, relevance of the device to the department and text description. An entry about the device can be created manually in the table by entering the serial number of the device. Also you can change relevance of the device to the department. When the measurement is saved, it will be assigned the relevance to the department, which corresponds to that in the entry of the device. If when the measurement is saved, the device is missing from the table of devices, its entry will be created automatically with specification of relevance to the department set by default.



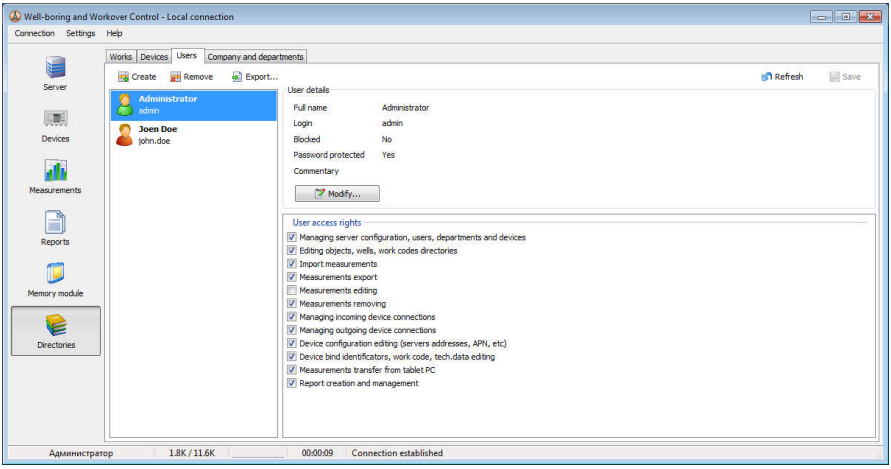
In the server configuration, you can restrict reception of data through input connections from unregistered devices. By setting up in the configuration the option "*Reading Measurements (Unregistered new devices)*" in the value "*Don't Read Measurements*", you can inhibit the reading and saving of the measurements for those devices which are not on the list of the devices.

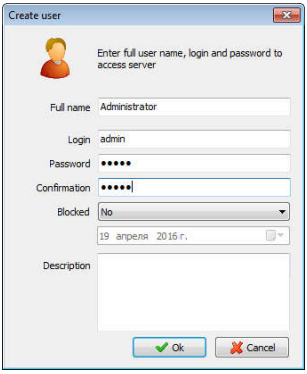


The "*Company and departments*" tab contains the information about the company and its departments. Available in the tab are the operations aimed at creating, editing and removing department entries. In the entry editing window,

you can also set up the attribute of the department by default for automatic creation of new devices.

The "*Users*" tab contains the information about the server users, their logins and passwords as well as the rights of access.





When a new user is created for access to the remote server, the user's full name is specified, the login name, the password for access to the server and description. To inhibit entry into the server, without deleting the user's record, you will need to use the "*Blocked*" option.

After the user has been created, the user is assigned the rights of access to the information and the functions of the server. The user can be authorized to work with the measurements and devices of only definite departments. For that purpose, in the list of the "*user's departments*" you will need to select and mark up the corresponding entries. In the list "*user's rights*" the rights are defined to perform operations by the user selected in the list.

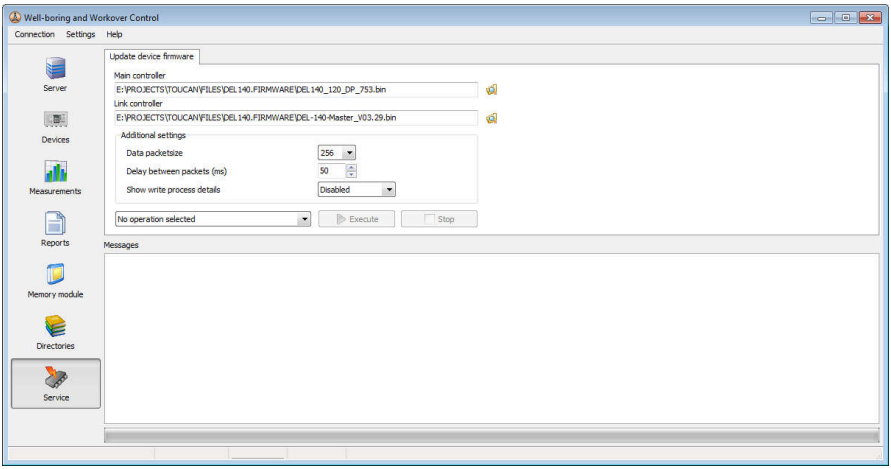
It is recommended that all the possible users of the server be divided into three generalized groups: administrators, users and guests. For administrators, you will need to specify access to all the departments and all the possible rights. The group of users will have to have their access restricted to such options as "*Managing server configuration, users, departments and devices*", "*Device configuration editing*", as well as assign the relevant departments to them. For guest access, it is recommended that all the markings in the rights of access be

removed. Guest access is usually used to work with the information without being able to introduce changes into it.

14. “Service” Panel

The “*Service*” Panel provides access to the service functions of the program. The service mode of the program operation is accessible to service centers only which carry out service and repairs of the devices. To enable the service mode, you will have, in the “*Settings*” menu, to select the item “*Service mode settings*”. Then, having marked up the respective item, you will be required to enter the password for access to the service mode. In case you have entered the correct password, after reloading the program, the icon of the “*Service*” Panel will be displayed.

The service mode provides capabilities of updating the software of the device’s control module. To update the software, select, in the corresponding fields, the files of micro-program updates. Connect the device to the computer and turn it on. Then select the operation to be executed as shown in the figure and press the “*Execute*” button. The progress of updating will be reflected in the relevant status messages. After the updating of the micro-programs is over, to put the device into the working mode, you will be required to complete the actions shown in the status messages.



15. Configuration of the Enterprise's Dedicated Server and Network Connections

The distribution file simultaneously contains the client part and the server part of the software. Using the server part, one can organize the general dedicated server of the enterprise which will be receiving connections of remote devices and with which all the users of the enterprise will be working.

The hardware requirements for the dedicated server are different from the requirements applying to the simple client workplace. The recommended minimal configuration of the server is as follows: CPU Intel Xeon, RAM 8GB, HDD RAID5 300GB, UPS, Microsoft Windows Server 2008R2.

Program installation on the dedicated server is identical to installation of the simple workplace.

Connection of the client part of the program to the local or remote server of the program is made via port 17997. Connection of the DEL devices to the server of the program is made via port 17999 (can be changed in the server configuration). Connection of the DEL videorecorders to the server of the program is made via port 17998 (can be changed in the server configuration). To organize connections of remote clients and devices to the server of the enterprise program, the following is required:

1. Set up in the router, with the help of which the local network of the enterprise is connected to the Internet provider, the forwarding of ports 17997, 17998, 17999 from the external static IP-address issued by the provider to the internal address of the dedicated server in the local network.

2. Check the settings of the firewall to authorize reception by the server processor (Toucan.Server.exe) of input connections via ports 17997, 17998, 17999.

3. Set up the DEL devices for connection to the dedicated server to the enterprise network's external static address.

4. At the client workplaces, in the program, create connection to the dedicated server via external static address or via the server's local address (for local clients).

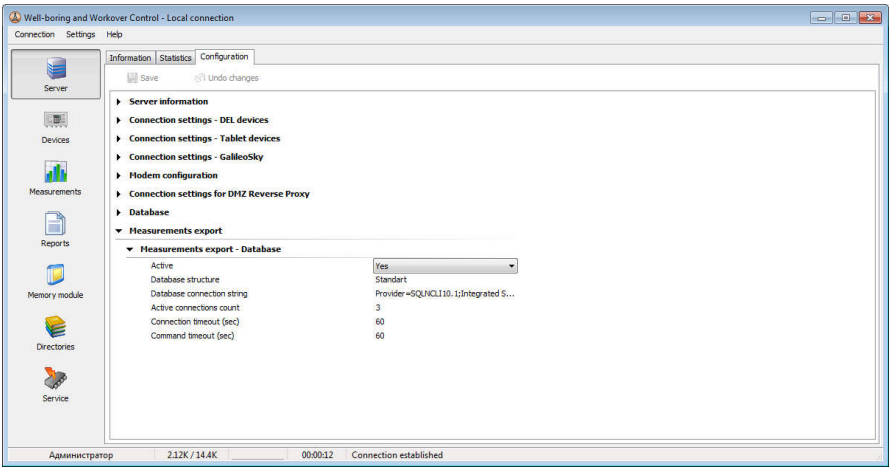
5. In the case of connections of the remote clients to the Internet via proxy server, set up the operation of the client application via proxy server in the item "*Settings*" of the main menu of the client software.

To complete the above mentioned actions, one has to contact the enterprise's system administrator.

16. Integration with the Information Systems

In the server part of the program, automatic export of data through ADO connection into the Database Management System (SQL Server, Oracle) is implemented. As the data from the devices reach the server of the application, they are unloaded into the export data base in the automatic mode.

The settings for connection to the export data base can be adjusted in the configuration tab to the server. The structure of the export data base is created and supported automatically, it suffices to specify empty data base in the line of the connection.



Please note that the volume of the data coming in to be saved is significant, therefore it is recommended that export be outputted to the server of the Database Management System with sufficient physical characteristics. Recommended minimum configuration of the Database Management System server is as follows: CPU Intel Xeon, RAM 16GB, HDD RAID5 500GB, UPS, Microsoft Windows Server 2008R2, SQL Server 2008.

Also the server of the "*Well-boring and Workover Control*" program is capable of transmitting data on measurements and current status of the devices to the information systems of the enterprises. The format and the protocol of data exchange are to be agreed within the framework of bi-lateral negotiations with the companies developers of the information systems.

Description of the structure of the export base and the configuration of the data exchange with outside systems are available upon request.

17. Technical Support

With respect to the technical issues, for purposes of consulting the experts responsible for production of the program as well as for purposes of expressing comments and suggestions regarding this program, please contact us directly using the following contact details.

The technical data which are communicated when you contact us can be used for internal purposes, including technical support of the software products and development of software.

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