

Mass flow-meter
Elmetro-Flomac.
Service program CorService.
Interface description.

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1. Main window

The main window contains the following elements:

The screenshot shows the 'Elmetro-Flomac service program' main window. The interface includes a menu bar (File, Mode, Communication, Log, Language, ?), a 'Main menu' button, and a 'Functions tree' on the left. The central area displays 'Main variables' with dropdown menus for units and numerical input fields for current values. A 'Save changes?' dialog is visible. The bottom section contains a 'Log window' with system messages, a 'Status' indicator showing an error (err.num.: 5), and 'Communications statistics' (Received / Lost: 28 / 0). A status bar at the very bottom shows 'COM7' and 'Flowmeter is off-line'. Red callout boxes identify the following elements:

- Main menu
- Functions tree
- Initial value (pointing to the 'kg/h' unit dropdown)
- Data area of the current function (pointing to the numerical input fields)
- Log window
- Indicator (pointing to the status bar)
- Status bar
- Communications statistics
- Flow-meter messages indicator
- Current communication progress

2. Main menu

The main menu has the following structure:

Menu	Item	Action	Program operating mode
File	Register dump...	Opens the window to read and write registers dump. On working with a dump, see section 8	Online
	Values format...	Opens the window to setup the format of displaying values	All modes
	Initial values	Enables displaying initial values of editable parameters in shadowed fields near the edit controls	All modes
	Exit	Exit program	All modes
Mode	Online	Switches the program in Online mode. For more information on Online mode see section 7.2	Offline, File
	Offline	Switches the program in Offline mode. For more information on Offline mode see section 7.1	Online, File
	File	Switches the program in File mode. For information on File mode see section 7.3	Offline, Online
	Choose file...	Invokes the file opening dialog for the registers dump file when the program operates in File mode	File
	Auto-update indicator	Enables or disables the regular updating of the indicator	Online
	Save indicator values	Enables or disables the recording of all values displayed on the indicator. For information on indicator see section 6	Online
	Refresh page	Fills the controls and indicators that are in the data area of the current function with the actual values read from the flowmeter or from a file	Online, File
Communication	Communication setup...	Opens the window with the parameters of communication to flowmeter. On communication setup see section 7.2	Offline
	Polling interval...	Invokes the dialog to type-in the indicator polling interval	Online

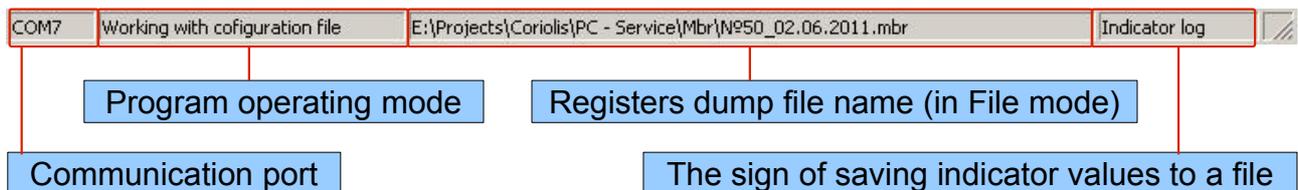
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Menu	Item	Action	Program operating mode
Log	Clear	Clears the log in the main window. For more information on log see section 5	All modes
	All	Switching the log mode to show all messages	All modes
	Errors	Switching the log mode to show only error-messages	All modes
	Nothing	Switching the log mode to show no messages	All modes
	View logs...	Invokes the window to read program logs of the previous sessions (days)	All modes
Language	Русский	Toggle interface into Russian	All modes
	English	Toggle interface into English	All modes
?	About...	Displays a window with information about the program	All modes

3. Status bar

The status bar contains the following fields:



4. Flow-meter errors indicator

Flow-meter errors indicator shows the following information:



The status LED on the front panel of flowmeter may be of the following colors:

Green	– no messages
Orange	– there are warnings
Red	– there are errors

The correspondence between the sign and the type of error:

SE	System error
SW	System warning
PE	Process error
PW	Process warning

5. System log

All the important events of the program is written to the system log. Example of the log file record:



The record may be one of two types:

[inf]	Information message
[err]	Error message

All log records are written to log file located in subdirectory `Logs` of program working directory. The log file name corresponds to the date of recording the messages. You may read log files corresponding to previous days using the form “Log files”, accessible through the main menu “Log → View logs...”.

Displaying system messages in the log window on the main form depends on the logging mode specified by the main menu “Log” (on Main menu see section 1):

All	All messages are displayed
Errors	Only error-messages are displayed
Nothing	No messages are displayed

6. Indicator

The indicator shows the current values of the measured parameters of the flowmeter. The exact parameters for displaying are specified by drop-down lists on the top of indicator panels.

Automatic update may be turned -on or -off with the main menu “Mode → Auto-update indicator”. Automatic update is only available in Online mode (for more information on modes read p.7). Interval of automatic updates is set by main menu “Communication → Polling interval...”.

In case of automatic update all measured values (including those, not selected by drop-down lists) may be recorded to indicator log file. Recording is turned -on and -off by the main menu “Mode → Save indicator values”. Indicator log files are located in subdirectory `IndicatorLogs` of program working directory.

7. Program operating modes

The program starts in Offline mode. The user may change the operating mode via the main menu “Mode”. The current operating mode is displayed in the status bar.

7.1. Offline mode

In Offline mode the communication port is closed and there is no exchange of data between the program and the flowmeter. All the functions related to communication to flowmeter are disabled (for example auto-update of indicator, reading and writing of registers dump, current-output calibration wizard and so on). Communication settings (with the flowmeter) are configured in Offline mode.

7.2. Online mode

When the user switch the operating mode to Online, communication port is opened and data exchange between the program and flowmeter is started according to selected tasks:

Regular exchange	– to periodically get new values for indicator, charts and data grids
Exchange on user demand	– to get new values for the data area of selected function (see the main window diagram in p.1)

In online mode all functions of the program are enabled, except configuring communication with flowmeter, because it requires the communication port to be closed.

If program being in Online mode fails to get an answer for several sequential requests to the flowmeter, the program is turned to Offline mode. In this case the following messages are displayed in system log (if logging mode is either “All” or “Errors”):

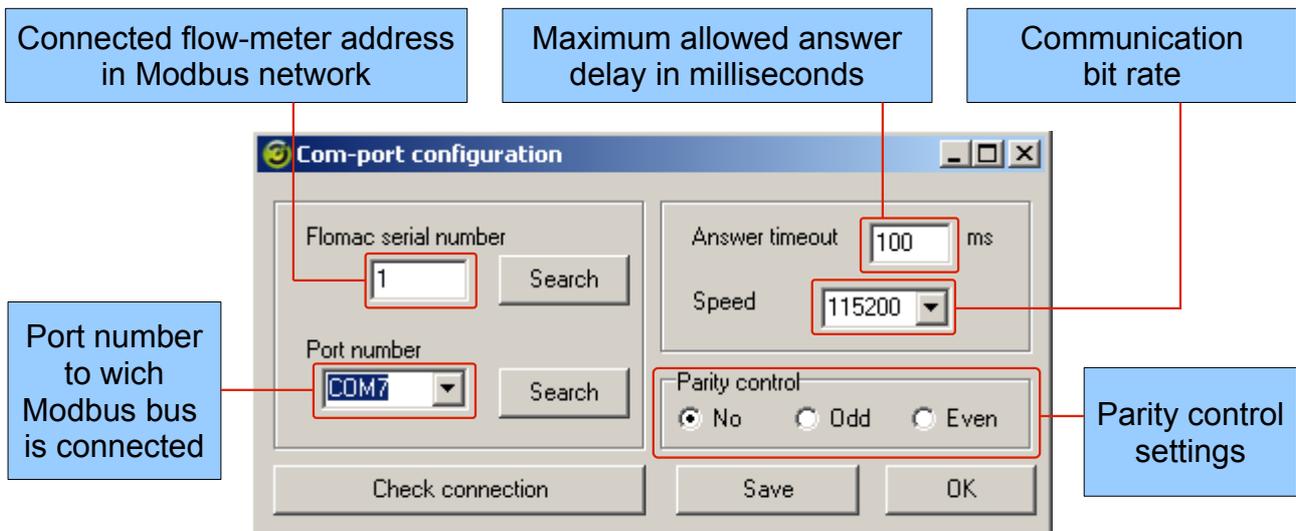
```
hh:mm:ss --> [err] No answer from flow-meter  
hh:mm:ss --> [inf] Port COMx closed  
hh:mm:ss --> [inf] Flow-meter is off-line
```

In this case the user needs to invoke “Com-port configuration” form from the main menu “Communication → Communication setup...”, verify communication settings and test connection to flow-meter.

Communication port setup and connection check

To invoke “Com-port configuration” window user must select “Communication → Communication setup...” main menu item.

The following controls are located in “Com-port configuration” window:



To setup communication user may proceed through the next steps:

1. Find out next flow-meter communication settings using its on-screen menu (Main menu “Basic Function → MODBUS RS485”):
 - flow-meter address in Modbus network (menu item «Address»);
 - communication speed, bps (menu item «Baudrate»);
 - parity control mode (menu item «Parity»);

2. Set program communication settings (“Com-port configuration” window) according to flow-meter settings;
3. Set value of «Port number» control according to PC serial port connected to Modbus network;
4. Push the button «Check connection»;
5. If successful press «OK» or «Save» button to use selected settings. Pressing “Save” writes settings to configuration file.

In case of **unknown flow-meter address** in Modbus network, and other communication setting are determined, user may select known settings and then press “Find” button near input field “Flowmeter address”. Program will start to sequentially query devices connected to Modbus network with addresses starting from 1 to 255. If trying to read Modbus Address register of the device, program will receive the value equivalent the device Modbus address, it will query user whether to use this flow-meter.

In case of **unknown port number** to which Modbus network is connected, and other communication setting are determined, user may select known settings and then press “Find” button near input field “Port number”. Program will start to sequentially open all available com-ports and query the device with specified Modbus address. If trying to read Modbus Address register of the device, program will receive the value equivalent the device Modbus address, it will query user whether to use this flow-meter.

7.3. File mode

File mode is intended to edit flow-meter parameters in previously saved register dump files.

This mode is similar to Online with the difference that program doesn't receive parameter values from flowmeter over Modbus line, instead it reads the values from selected register dump file.

When the user switches program to File mode, he is proposed to choose register dump file. The integrity of selected file is checked using the checksum. Checksum error may occur in following cases:

1. Register dump file is corrupted;
2. Dump was read from the flowmeter whose register map is different from register map of used service program.

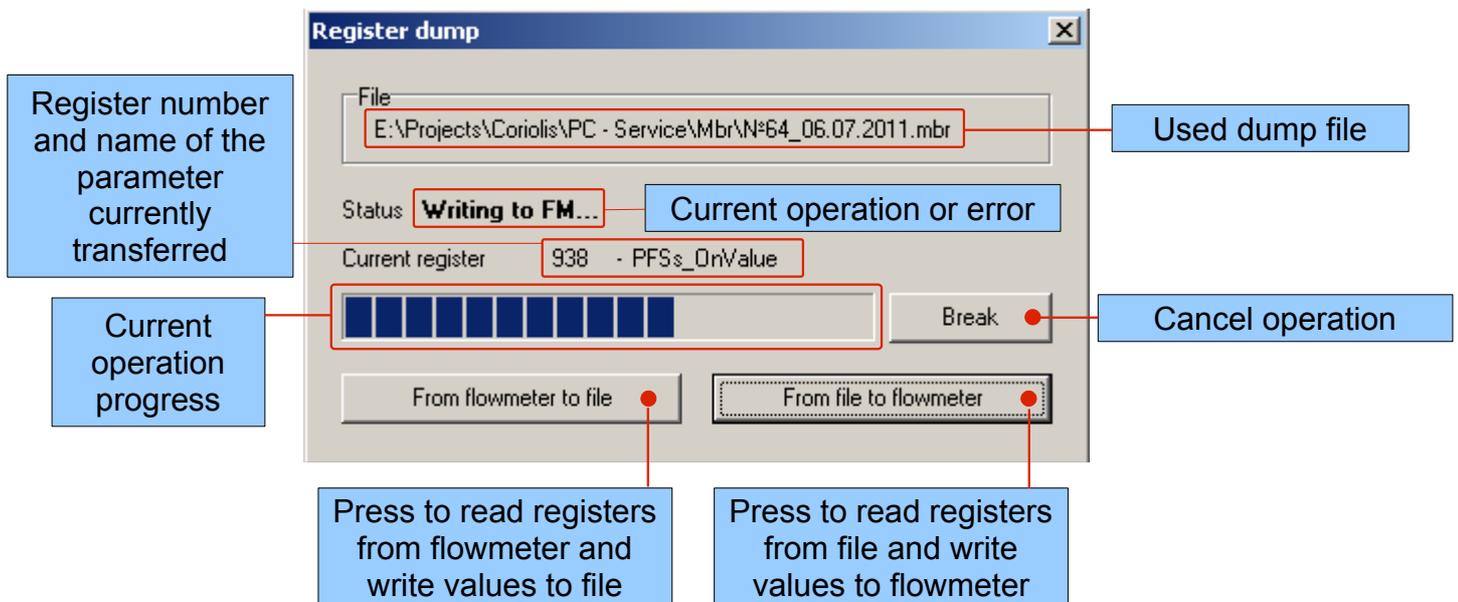
In File mode parameters values may be read and edited. If user confirms to save changes new values are written to register dump file.

Program functions connected with getting the results of measurement (indicator update, charts and so on) is unavailable in File mode. Measuring module data is also unavailable.

8. Reading and writing of registers dump

Reading a registers dump from the flowmeter and writing it to a file is used to save current configuration of the flowmeter. Similarly writing register dump from file helps to restore configuration or to initialize new flowmeter to match some predefined template.

The window “Register dump” is invoked using main menu “File → Register dump”. This window contains following controls:



When user press “From flowmeter to file” button, program reads all registers values from flowmeter then requests user to select file to save register dump.

When user press “From file to flowmeter” button, program requests user to select register dump file. The selected file is checked for consistency (using checksum). If success then register values are transferred to flowmeter.

Attention: when the source file is selected, program starts writing values to flowmeter without any additional request. Be careful selecting file.

If error occurs in progress of current operation, the operation is canceled and error-

message is displayed in “Status” field.

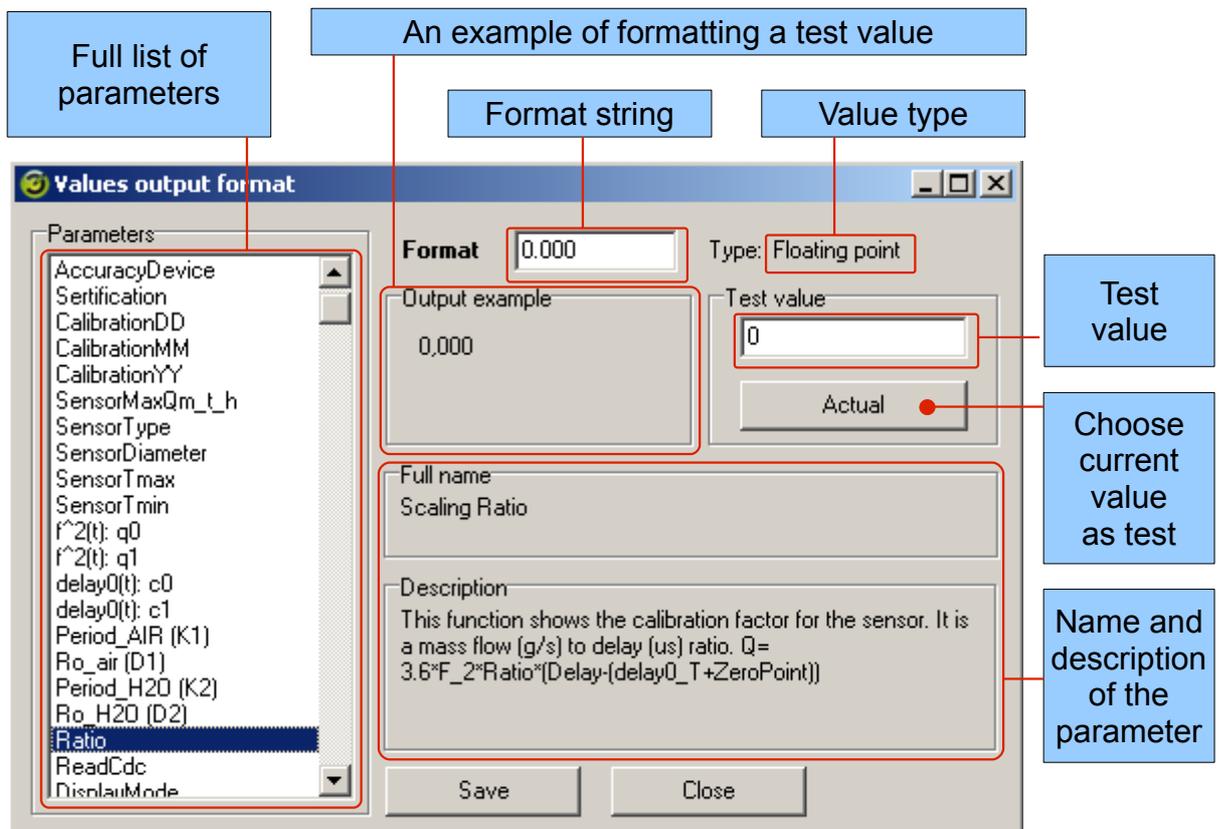
To change values in register dump file the user must use service program in File mode. Changing values in register dump file using text editor is prohibited because it will lead to checksum error on the next opening of this file with service program.

9. Setting the output format of parameters

Default output format of each parameter depends on its type:

- Integer values are output without leading zeros and without limiting the number of digits;
- Floating point values are formatted as follows:
 - If (the value $\geq 1e7$) OR (the value $\leq -1e7$) OR ((the value $> -0,001$) AND (the value $< 0,001$) AND (the value not equal to 0)), then the value is displayed in scientific notation;
 - Else in the fixed-point representation, with three characters after the decimal point.

The output format of each parameter can be changed using Form «Values output format» (main menu «File → Values format...»).



To change the output format of parameter, select it from the list on the left side. The type of the parameter is displayed in the field "Type":

- Integer;
- Floating point.

Current setting is displayed in the "Format". If the meter is connected, the value of selected parameter is requested and displayed in the "Test value", if the program works in File mode, it displays the value from the file, else it displays the last received value. Field "Output example" shows the Test value formatted according to given format.

The format string is different for the integer parameters and the parameters of a floating-point.

For integer parameters format is set in accordance with the rules for the formatting of printf() function in standard C++ library.

For the floating-point parameters format string can contain the following characters:

СИМВОЛ	Назначение
0	Digit place holder. If the value being formatted has a digit in the position where the '0' appears in the format string, then that digit is copied to the output string. Otherwise, a '0' is stored in that position in the output string
#	Digit placeholder. If the value being formatted has a digit in the position where the '#' appears in the format string, then that digit is copied to the output string. Otherwise, nothing is stored in that position in the output string
.	Decimal point. The first '.' character in the format string determines the location of the decimal separator in the formatted value; any additional '.' characters are ignored. The actual character used as a the decimal separator in the output string is specified in the Number Format of the International section in the Windows Control Panel
,	Thousand separator. If the format string contains one or more ',' characters, the output will have thousand separators inserted between each group of three digits to the left of the decimal point. The placement and number of ',' characters in the format string does not affect the output, except to indicate that thousand separators are wanted. The actual character used as a the thousand separator in the output is specified in the Number Format of the International section in the Windows Control Panel
E+	Scientific notation. If any of the strings 'E+', 'E-', 'e+', or 'e-' are contained in the format string, the number is formatted using scientific notation. A group of up to four '0' characters can immediately follow the 'E+', 'E-', 'e+', or 'e-' to determine the minimum number of digits in the exponent. The 'E+' and 'e+' formats cause a plus sign to be output for positive exponents and a minus sign to be output for negative exponents. The 'E-' and 'e-' formats output a sign character only for negative exponents
'xx' / «xx»	Characters enclosed in single or double quotes are output as-is, and do not affect formatting

When the user click "Save" button the formatting setting of selected parameter is stored in the configuration file.

10. Choosing the language

The program interface can be presented in different languages. User may use main menu "Language" to change interface language. When changing the language system log is cleared, the functions tree takes the original form (all inner nodes are collapsed), the contents of the data area of the current function corresponds to the "Start page" (the same as when the program starts).

The interface language can be switched in any operating mode of the program.