motcom loganalyser

User Manual

Part No. 2 900 04 10000

Release 03.02.2021 English

revision 240123

Contents

Introduction

motcom loganalyser is a PC program for viewing and analysing measurement data collected by BeCOMS®, SiCOMS® and OQCOMS® systems during their operation.

Each of these systems can record engine condition-related measurements in daily or hourly logfiles on a connected PC. Assessing this data is vital for evaluating engine state and for planning maintenance works.

motcom loganalyser with its advanced tools provides an extended insight into some engine measured values either at a certain time point or also at user-defined time intervals.

The program is capable of "offline" reading the logfiles recorded earlier as well as of scanning the data written by BeCOMS® Logger software in online mode. This continuous monitoring of engine measurements helps to forecast possible problems and thus contributes to optimization of engine operation and maintenance and to reducing maintenance costs.

I. Getting started

1. Installation

To install motcom loganalyser on a PC with Windows operating system run the installer "motcom loganalyser_*nnn*.msi" where "nnn" is the version and build number.

System requirements

- Dual- or multi-core processor 2.4 GHz or higher
- Min. 4GB RAM
- Screen resolution 1280 x 768 dots or higher, at least 256 colors
- Supported operating systems: Microsoft Windows XP, Windows 7, Windows 8.x, Windows 10, Windows 11. Runs as a desktop application
- Internet connection is required for automatic e-mail notifications

After installation motcom loganalyser can be launched through a desktop shortcut or through Windows program menu **Start** / **Programs** / **motcom loganalyser**.

To start loganalyser with minimized main window, use command line argument "/mnz":   [application path]\loganalyser.exe /mnz

When first installed on a system, the loganalyser application can display a window requiring a valid registration ID. Please consult motcom GmbH representatives for information on it if necessary.

2. Functions

Main program window provides operating mode command buttons on its left side: **Single file analysis**, **Multiple file analysis** and **Online monitoring** mode.

Fig.1. Main window, single logfile analysis panel

Single logfile analysis is the default panel (the corresponding command button is highlighted).

Its command buttons open respective analysis windows for BeCOMS® logfiles (also with simulated BeCOMS® alarm level), for SiCOMS® logfiles, and for OQCOMS® logfiles (Fig. 1).

Multiple logfile analysis panel allows to load up to 4 BeCOMS® logfiles at the same time for comparing (chapter III.)
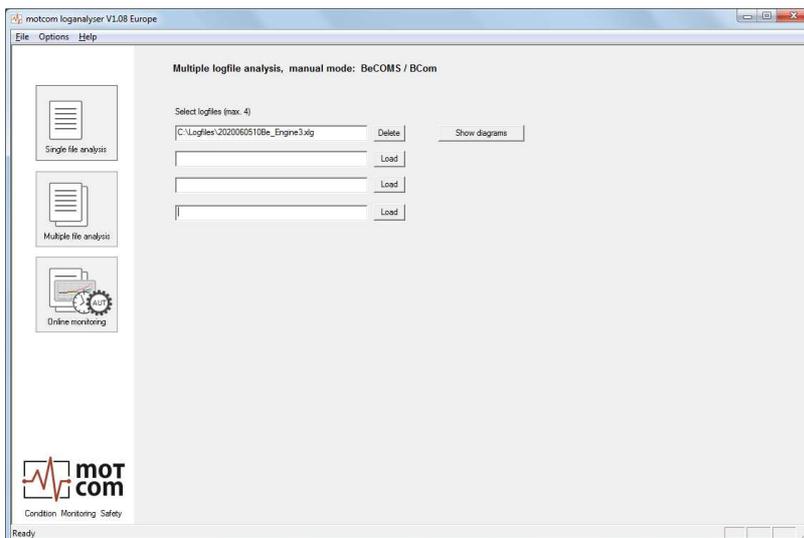

Fig.2. Multiple logfile analysis panel

Online monitoring panel gives access to setup of logfile scanning, and to scan results in text or graphical form. See chapter IV for information.
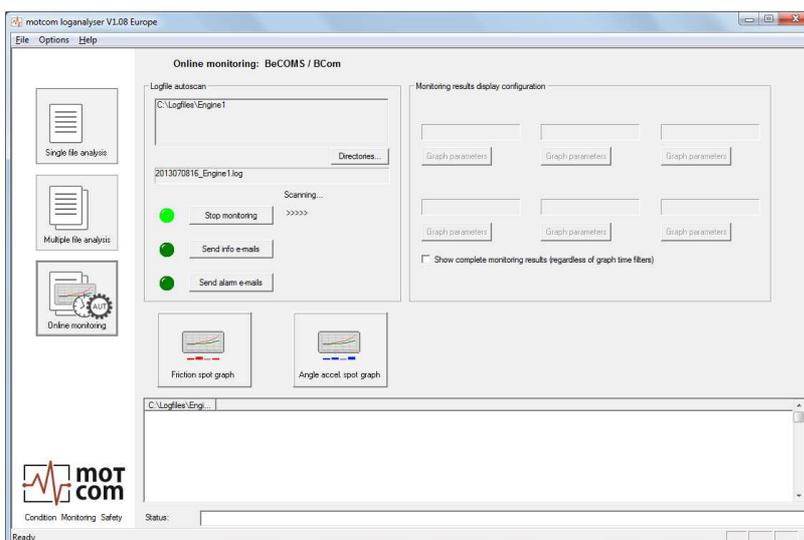

Fig.3. Online monitoring panel

II. Single file analysis
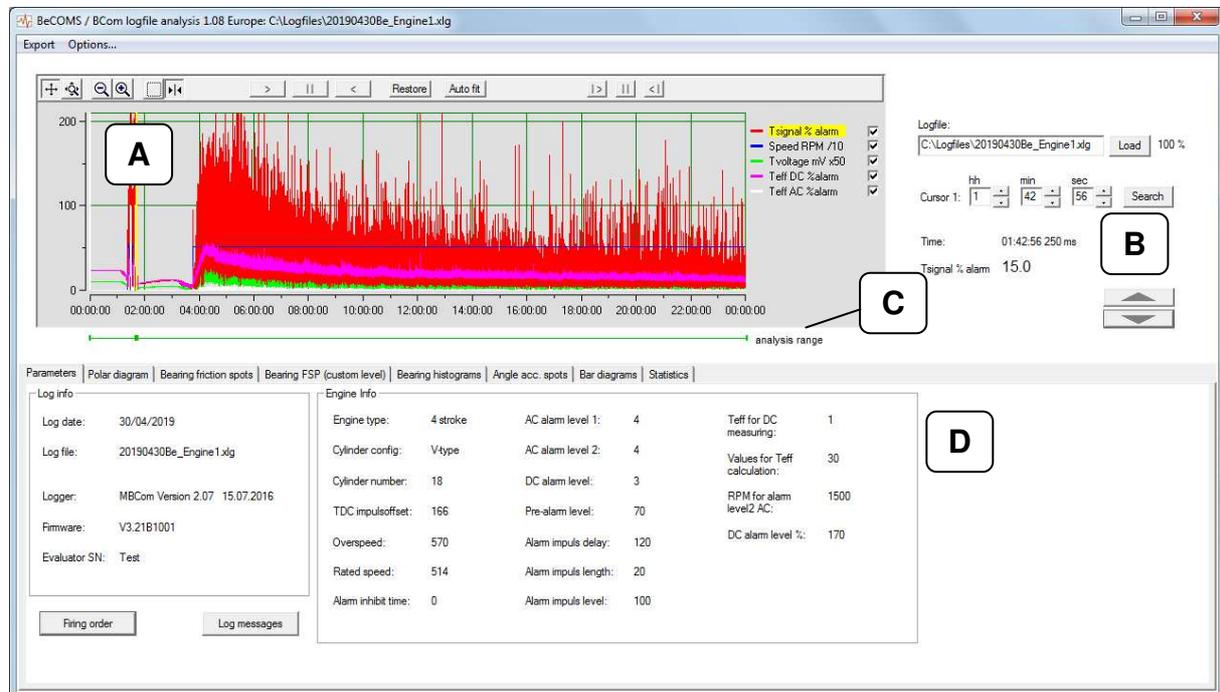
1. BeCOMS® / BCom

Fig.4. BeCOMS® logfile analysis window

To open a BeCOMS® logfile for analysis press the **Load** button. The button caption is changed to "Cancel" during load, pressing it again will stop reading for the current file, so that only a part of the file is available for analysis.

1.1. Linear plot
(Fig. 4, A)

The XY-graph at the upper part of the window shows linear time diagram of measured data ("data channels"):

Tsignal % alarm	- measured thermo voltage in percent of alarm level
Speed RPM /10	- engine rotation speed in RPM (scaled by the factor 1/10)
Tvoltage mV x50	- thermo voltage in mV (scaled by the factor 50)
Teff DC % alarm	- thermo voltage DC effective value in percent of DC alarm level. The value reflects global thermosignal trend. It can be configured by evaluator parameter "Values for Teff calculation".
Teff AC % alarm	- thermo voltage AC effective value in percent of AC alarm level. It characterizes the shape and size of thermosignal peaks and has three defining evaluator parameters: "Alarm impulse delay", "Alarm impulse length" and "Alarm impulse level".

The diagram can be scrolled and zoomed in and out using command buttons on its toolbar:

⊹ - scroll mode (click on x- or y-axis with the left mouse button, hold the button and move the mouse to scroll)

⊕ - zoom mode (click on x- or y-axis with the left mouse button, hold the button and move the mouse to zoom)

Restore - return to default view (or **Autofit** button to fit the complete logfile data into the diagram window)

1.2. Time cursor controls and view mode switching
(Fig. 4, B)

By default two time cursors are available at the XY-graph in form of vertical lines: yellow (main cursor) and white (additional cursor). They can be moved along the time axis using mouse pointer while the left mouse button is pressed. Alternatively, arrow keys (left and right arrows) can be used to move main cursor exactly one data point forwards or backwards when the XY-graph has control focus. When XY-graph catches focus, symbol [+] is displayed in its right bottom corner.

Time cursor controls to the right of the diagram (**Cursor 1** group with **hh**, **min**, **sec** fields) display and allow to change the position of the main cursor. To put the cursor to the selected time point click **Search** button.

The main cursor can also be moved automatically along the X-axis (one position forwards or backwards, usually 1% of the displayed time interval) using the following buttons at the diagram toolbar:

> - start running the main cursor forwards
< - start running the main cursor backwards
|| - stop the cursor movement

or from one data point to another with the following buttons:

▷ - start moving the main cursor between data points forwards
◁| - start moving the main cursor between data points backwards
|| - stop the cursor movement

The "**Time**" text field at the right of XY-graph displays the exact time, and the next field below - the value of selected data channel at the current main cursor position. Data channels can be selected by clicking at their labels in the legend at the right side of XY-graph.

The logfile window can be reduced from full size to half-size (upper pane or lower pane view). Toggle the views with ▲ and ▼ buttons:
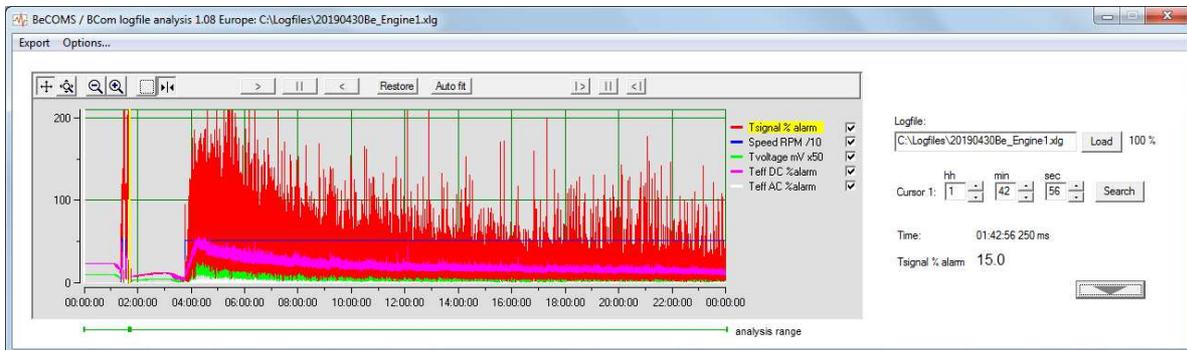

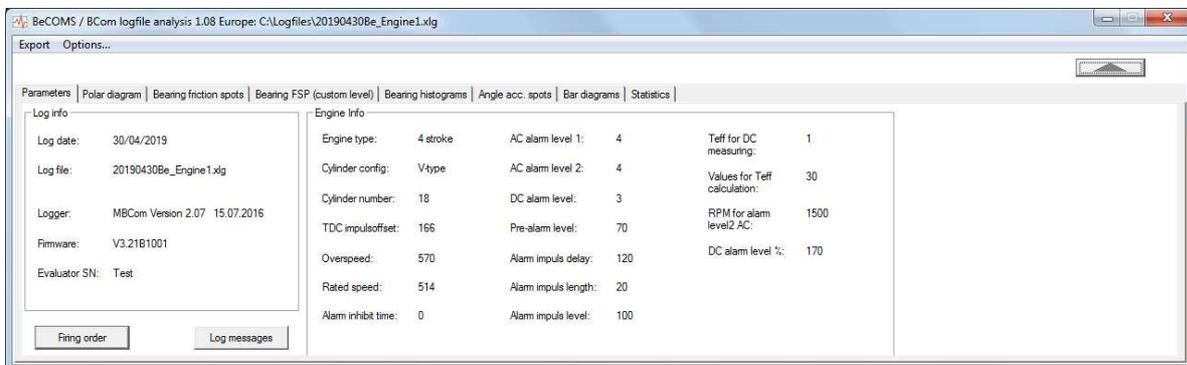Fig.5. BeCOMS® logfile analysis window, upper pane

Fig.6. BeCOMS® logfile analysis window, lower pane

1.3. Analysis range
(Fig. 4, C)

The horizontal bar below the linear plot is a time range indicator for additional analysis diagrams displayed below in tabs (Fig. 4, **D**).

Some graphs show data for a single time point (like polar diagram, p. 1.4.2 and bar diagrams, p. 1.4.7), therefore analysis range takes the form of a single tick and marks the position of the yellow cursor on the linear diagram:

For some other diagrams the user can select a custom time interval by setting the white and the yellow cursors as range boundaries (f. i., for bearing friction spots, p. 1.4.3, 1.4.4, and angle acceleration spots, p. 1.4.6). In this case, a bar at the analysis range indicator shows the selected range:

There are also diagrams that use the data from the whole logfile (like bearing histograms, p. 1.4.5), for them the bar always covers the entire range:

1.4. Analysis diagrams
(Fig. 4, D)

Information at the lower part of the window is organised in tabs:

- engine and system parameters,
- polar data diagram,
- bearing friction spots,
- bearing friction spots, or FSP, (custom level),
- bearing histograms for friction spots maximum percentage,
- angle acceleration spots,
- bar diagrams for cylinder thermosignal and cylinder speed difference,
- statistics.
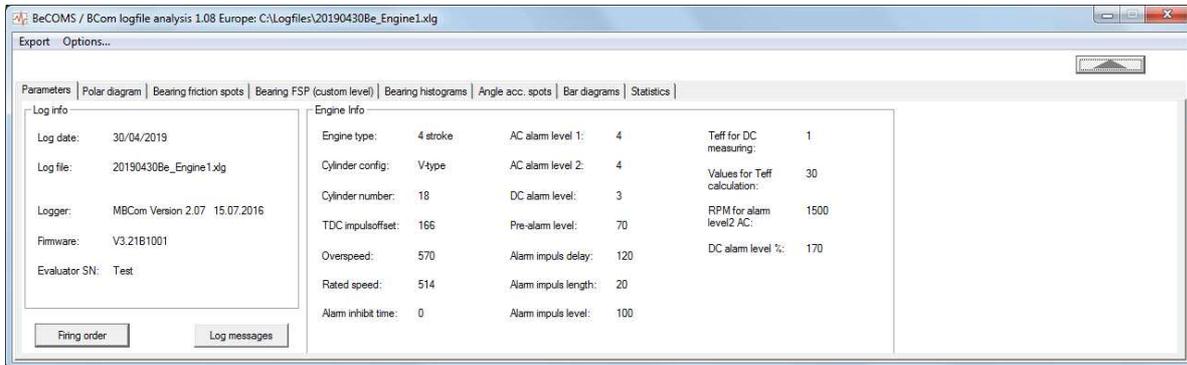

1.4.1. Parameters

Fig.7. BeCOMS® logfile analysis window (lower pane), parameters

The default tab displays engine and system parameters from the loaded logfile.

Firing order and **Log messages** buttons open corresponding windows:
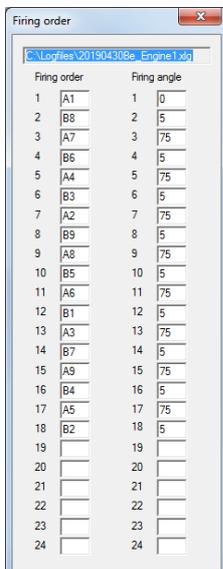

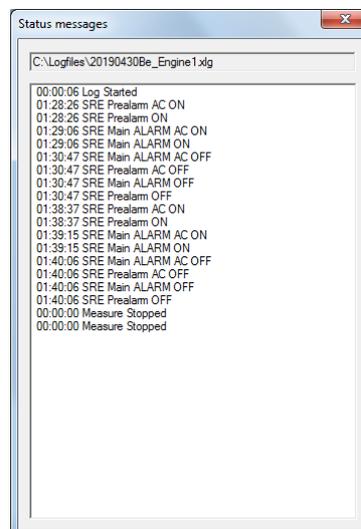Fig.8. Engine firing order

Fig.9. Status messages from the logfile
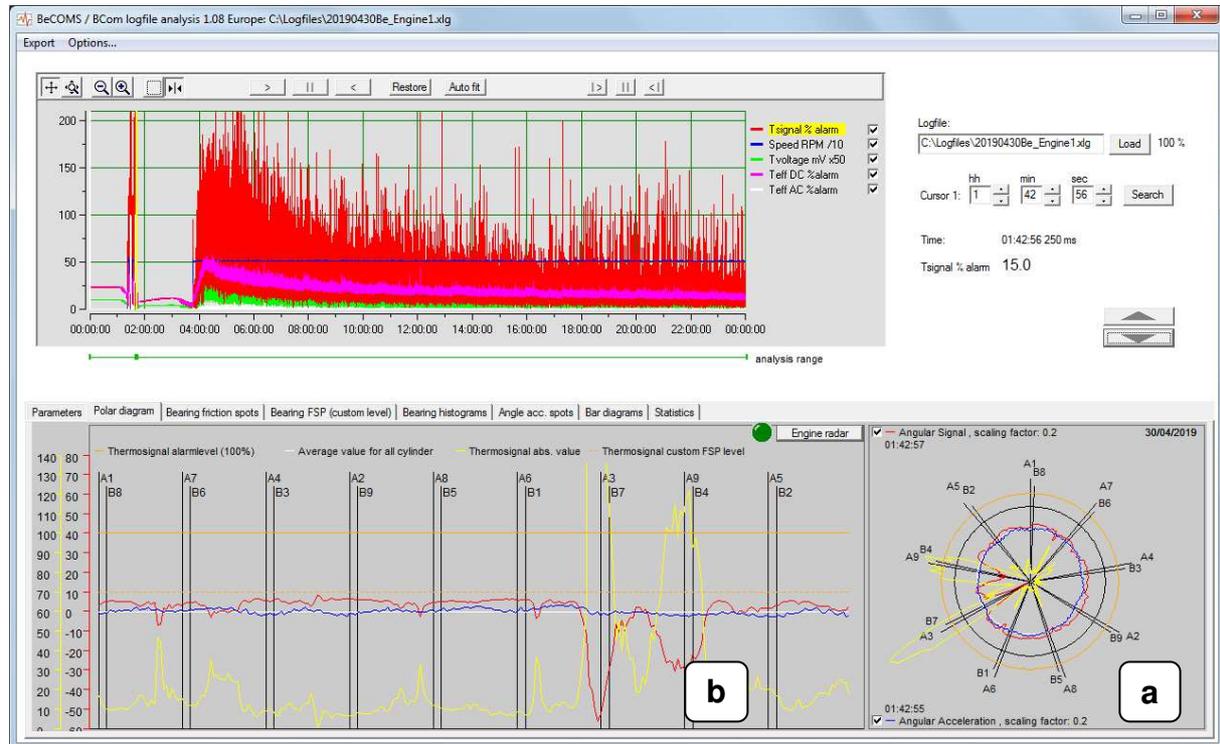
1.4.2. Polar diagram

Fig.10. BeCOMS® logfile analysis window, polar diagram tab

Polar diagram displays data measured during the full combustion cycle nearest to the time point of main (yellow) cursor at the above linear plot. The data are:

— thermosignal (indicated at the polar diagram as 'angular signal') relative to its average value during the combustion cycle

— thermosignal in percent to alarm level

— crankshaft angular acceleration

— 100% of thermosignal alarm level

····· custom thermosignal level in percent of alarm level

Note: Polar data is only recorded by BeCOMS® Logger into logfiles when the crankshaft rotates, while linear data is present even when the engine is stopped.

Diagram **a** shows polar data in a manner similar to polar coordinates, rotation angle running clockwise. Diagram **b** represents the same data in flat form as a xy-diagram. The black lines with labels mark the cylinder firing positions during full combustion cycle.

The y-axis of the polar xy-diagram can be scrolled up and down as well as scaled. Put the mouse pointer on the y-axis scale, press the left mouse button and pull the scale up or down to scroll. If the Ctrl key is pressed down at the same time, the y-axis will be scaled.

Polar diagram offers an additional tool for inspecting engine condition: a movable graphic simulating engine cylinders motion. Each position of rotating crankshaft and of cylinders in a full combustion cycle corresponds to a location at the polar graph (marked by a green "cursor" at the diagram below:
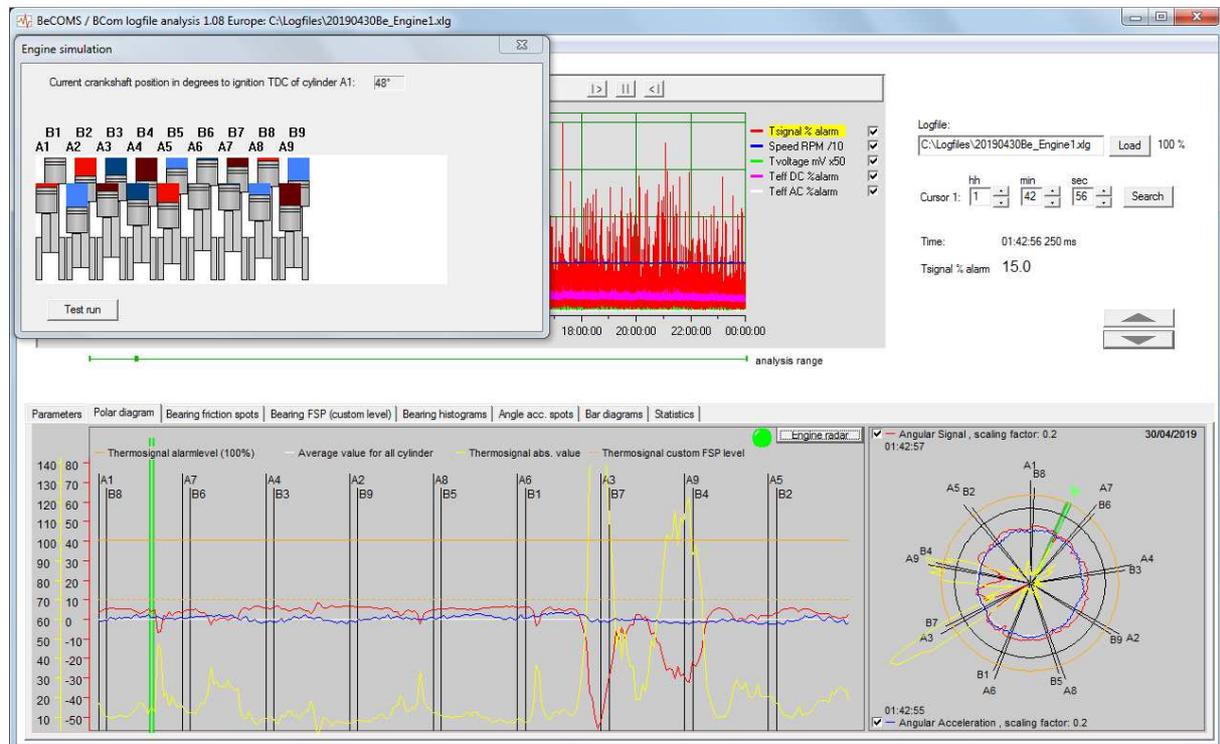

Fig.11. BeCOMS® logfile analysis window, polar diagram with engine simulation window

The crankshaft position is given in degree relative to the ignition TDC of the first cylinder. For 2-stroke engines, it reflects one full rotation of the crankshaft, from 0° to 360°. For 4-stroke engines, full combustion cycle involves two full revolutions, and thus the position takes values between 0° and 720°.

Press **Engine radar** button on the polar panel to open the **Engine simulation** window. The **Test run** button in this window starts animation of crankshaft rotation. Alternatively the green cursor in the polar xy-diagram can be moved manually: move the mouse pointer onto the green line, press the left mouse button and move in desired direction, then release the mouse button.
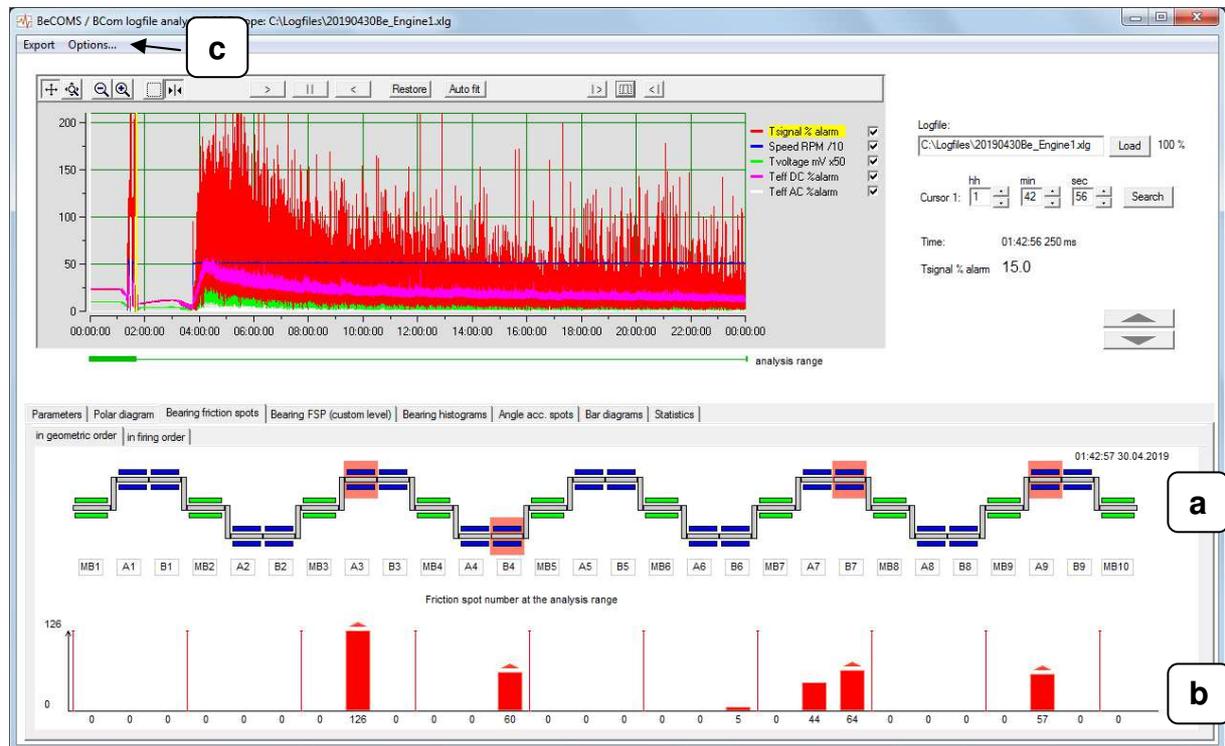
1.4.3. Bearing friction spots

Fig.12. BeCOMS® logfile analysis window, bearing friction spots

Thermovoltage value peaks in polar data provide hint at possible friction at con-rod or main bearings, or at cylinder liners. The tab above displays number of friction spots registered for bearings at the analysis range in form of bars.

a: schematic model of the crankshaft.
Blue stripes represent big end bearings, green stripes are main bearings.
If angular thermosignal in percent of DC alarm level in polar data reaches or exceeds 100% at some time point, and if this peak is within so-called cylinder range (see below) for some bearing, a friction spot is registered for this bearing. Each time the user sets main cursor at the XY-graph to this time point the bearing is marked with a red rectangle, and its corresponding indicator bar shows increase.

The number of polar data points assigned to a cylinder at each side of the cylinder firing position mark is called cylinder range and can be set in the **Options** menu (**c**) of BeCOMS® logfile analysis window (see p. 1.5.2).

b: friction spot indicators.
Each bar represents the number of friction spots observed for the corresponding bearing at the analysis range (here: from the beginning of logfile up to main cursor).

c: **Options** menu

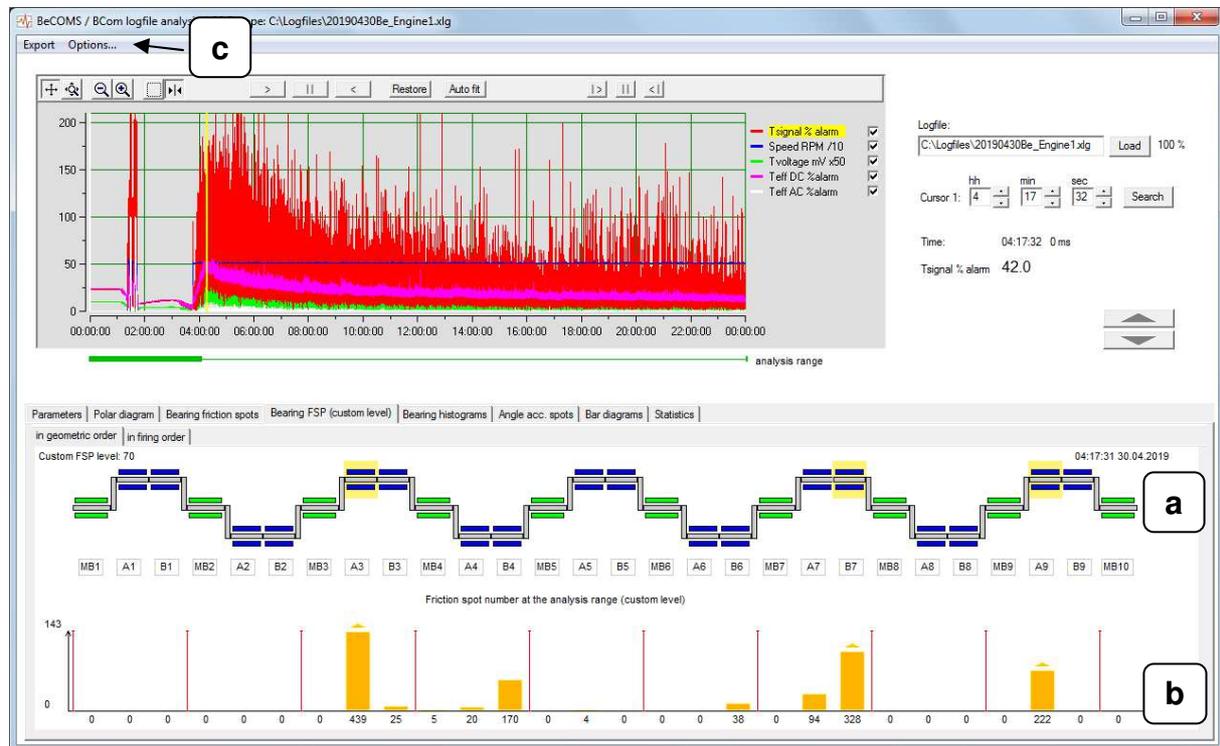### 1.4.4. Bearing friction spots with custom level

Fig.13. BeCOMS® logfile analysis window, bearing friction spots with custom level

If the threshold for friction spot detection is set to a lower value than 100% DC alarm level it might help in some cases to see early signs of problems because even smaller thermosignal peaks are counted.

Custom threshold can be set for the current logfile in the menu **Options** (**c**) (see p. 1.5.2).

a, b: see the previous section, 1.4.3.

c: **Options** menu

Here at Fig. 13 the custom level is set to 70%. Bearings where thermosignal peaks in polar data reach this custom threshold at the time pointed by diagram main cursor are marked with yellow rectangles. The yellow bars display increase. Peaks that get over 100% DC alarm level would be marked with red rectangles as in p. 1.4.3.
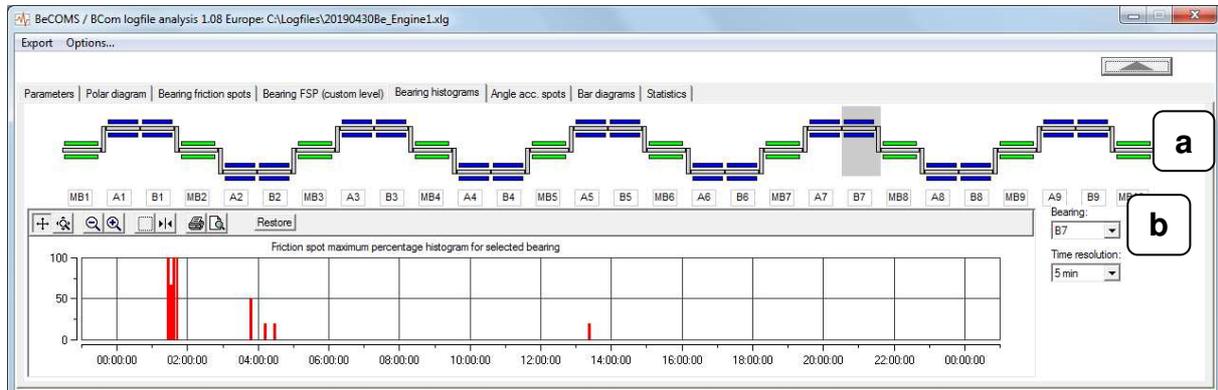
1.4.5. Bearing histograms

Fig.14. BeCOMS® logfile analysis window (lower pane), bearing histograms, time resolution 5 minutes

This tab gives an overview of friction spot development over the time in a logfile.

It provides an interactive crankshaft model (**a**) or alternatively **Bearing** selection field (**b**) for choosing a big-end or main bearing. The diagram below the crankshaft is a time interval histogram of friction spot percentage for the bearing.

That is, the whole logging time is divided in equal intervals that can be chosen here in the **Time resolution** selection field. Inside these time intervals a sliding 'base time' window is applied to calculate number of friction spots in percent to number of polar data points in this base time window. The base window is moved through all resolution time intervals, and the maximum friction spot percentage at each interval is represented by a red bar at the diagram.

The base time interval can be selected in the **Options** / **General options** menu of the main program window (chapter V, p. 2.1).
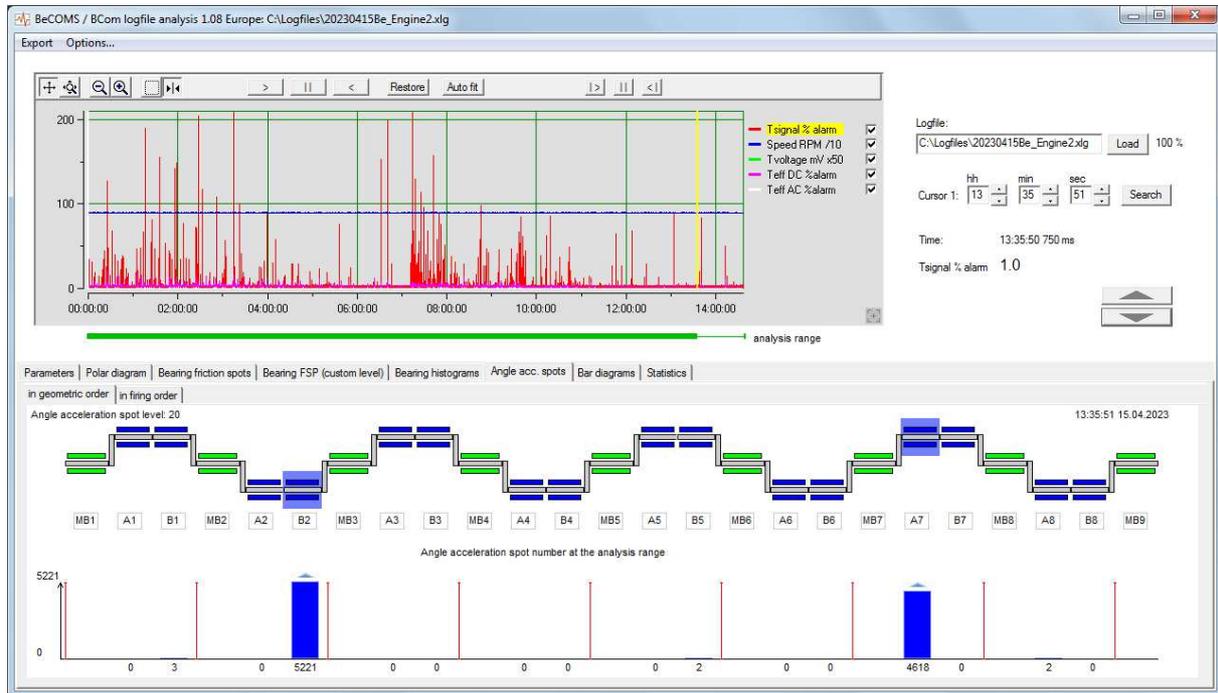
1.4.6. Angle acceleration spots

Fig.15. BeCOMS® logfile analysis window, angle acceleration spots

If a peak in angle acceleration polar signal exceeds a certain threshold at the time pointed by main cursor, and if this peak is within the cylinder range to some bearing, an angle acceleration spot in registered for this bearing.

Angle acceleration threshold level is given in RPM. Its value can be set for a loaded logfile in the menu **Options** (see p. 1.5.2).Only peaks showing slowdown of cylinders are evaluated at the moment, the speed-up peaks are ignored.
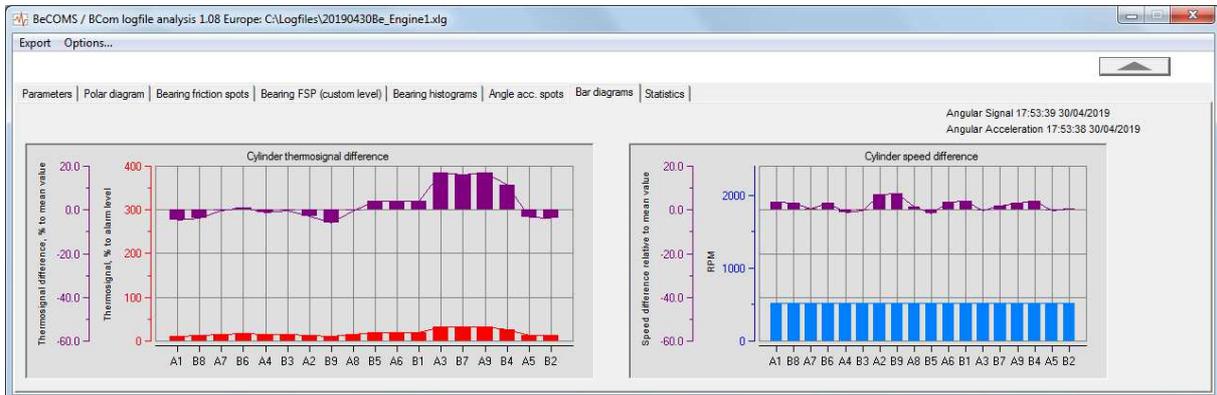
1.4.7. Bar diagrams

Fig.16. BeCOMS® logfile analysis window (lower pane), bar diagrams

These graphs represent polar data in the combustion cycle nearest to the time of main cursor of the linear plot in a different form. The bars are evaluated as signal average for each cylinder at the cylinder range (see p. 1.5.2, Cylinder range).

Cylinder thermosignal difference:
The red bars are built of angular thermosignal in percent of alarm level. The purple bars represent difference of thermosignal at each cylinder to the average for all cylinders in this combustion cycle.

Cylinder speed difference:
The diagram shows cylinder angular acceleration in RPM (blue bars) and the difference of cylinder values to the average angular acceleration for all cylinders (purple bars).
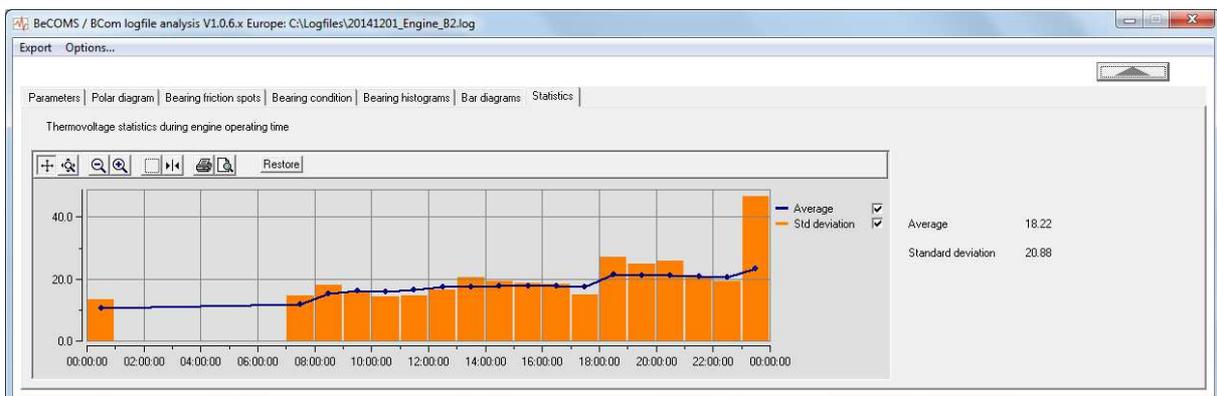
1.4.8. Statistics

Fig.17. BeCOMS® logfile analysis window (lower pane), statistics

Dark blue points here represent the average of linear thermosignal in percent to alarm level for every hour of engine operation, orange bars - thermosignal standard deviation. The values are only calculated during engine operating time.
Thermosignal average and standard deviation for the whole logfile are shown at the right side of the panel.

1.5. BeCOMS® / BCom logfile analysis window menu

1.5.1. Export

BeCOMS® / BCom logfiles can be exported to text files in CSV (comma separated) format.

1) Export basic linear data

This menu opens a "Save As" window where a target file name can be selected for the converted data. On pressing "Save", linear data are extracted from the logfile and recorded in rows, each row having the following fields in it:

- seconds elapsed from logging start with millisecond precision
- thermosignal in percent of DC alarm level
- engine crankshaft rotation in RPM,
- thermovoltage in mV multiplied by 100
- thermovoltage DC effective value in percent of DC alarm level
- thermovoltage AC effective value in percent of AC alarm level

2) Export extended data set…

The menu also displays a "Save As" window for selecting a target file name. On pressing "Save" button a window opens for choosing which data to export: linear, polar, or evaluated polar data (all three options are selected by default):
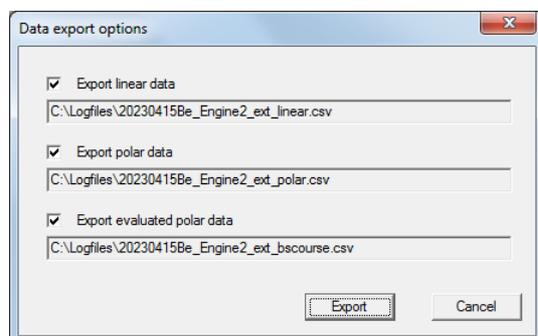

Fig.18. BeCOMS® logfile analysis window, Data export options

Exported linear data have the same format as described above for "Export basic linear data" command with one additional field: time stamp in form of "hh:mm:ss".

Polar data are extracted into rows with following fields:

- time stamp "hh:mm:ss"
- seconds elapsed from logging start with millisecond precision
- polar record type (angular thermosignal or angular acceleration)
- all polar sampling points of the current record type for the time stamp in question.

Evaluated polar data also contains time stamp as "hh:mm:ss", seconds elapsed from logging start and polar record type. Instead of polar sampling points, the exported data contains the maximal thermosignal value detected for each bearing during the combustion cycle nearest to the considered time point.

1.5.2. Options

The menu opens a window for setting up

- Cylinder range, which is the number of encoder steps (or, in other words, polar data points) that are related to a cylinder firing position in the polar data,

- Custom level for friction spot detection (given in percent of DC alarm level),

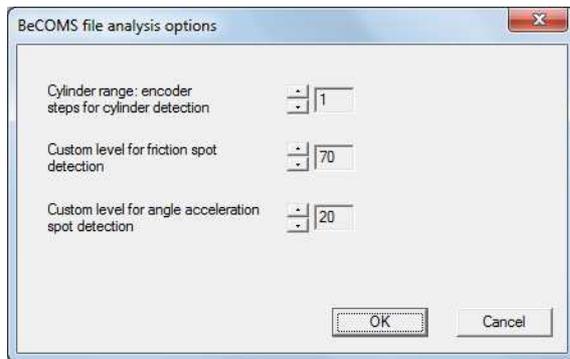- Custom level for angle acceleration spot detection (in RPM).

Fig.19. BeCOMS® logfile analysis window, BeCOMS® file analysis options

2. BeCOMS® / BCom with simulated alarm level

The "Tsignal % alarm" and "Teff DC %alarm" data channels of BeCOMS® system are calculated based on DC alarm level which is defined by two BeCOMS® parameters: **Alarm level DC**, and **DC alarm percent** (fine control coefficient).
In some cases it can be useful to see what impact a different DC alarm level would have on the displayed values and on alarm triggering.

The **New simulated BeCOMS® / BCom session** menu of the program main menu bar opens a window where both DC alarm level parameters can be changed. Pull the slider using mouse pointer to select different values:
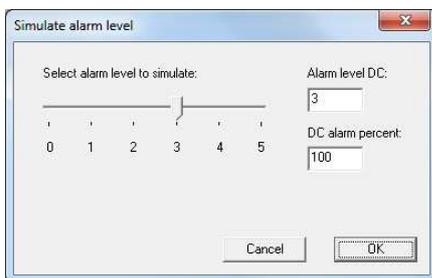

Fig.20. "Simulate alarm level" window

Pressing **OK** button opens a new BeCOMS® logfile analysis window with dark red frame. For each subsequently loaded logfile the linear thermovoltage signal, the thermovoltage DC effective value and the angular thermosignal are recalculated according to the modified DC alarm level:
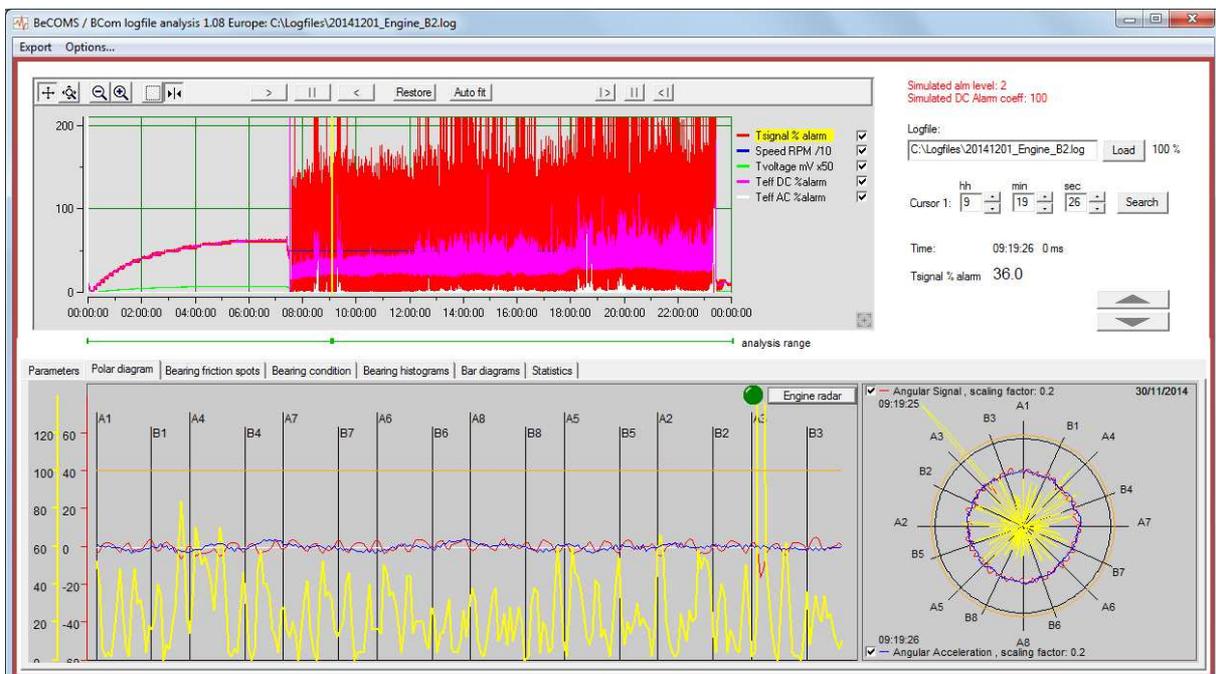

Fig.21. BeCOMS® logfile analysis window, simulated alarm level 2
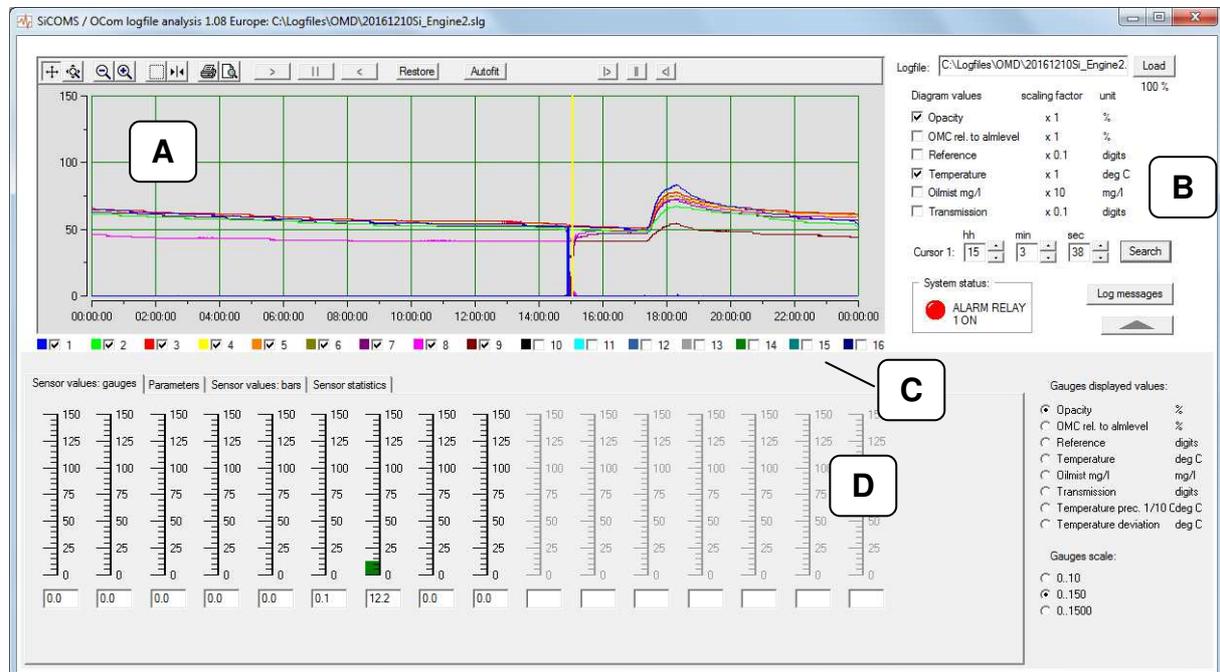
3. SiCOMS® / OCom

Fig.22. SiCOMS® / OCom logfile analysis window

To open a SiCOMS® logfile for analysis, use **Load** button. Loading progress in percent is displayed to the right of it.

3.1. XY-diagram
(Fig. 22, A)

The XY-graph at the upper part of the window shows the time diagram of the data measured by OMD sensors.

The diagram can be scrolled and zoomed in and out using command buttons on its toolbar:

- ⊕ - scroll mode. Click on x- or y-axis with the left mouse button, hold the button and move the mouse to scroll the graph

- ⊕ - zoom mode. Click on x- or y-axis with the left mouse button, hold the button and move the mouse to zoom the graph.

- Restore - return to original view (fits the complete logfile data into the diagram window)

Time axis of the XY-graph has a cursor in form of a yellow vertical line. Time cursor controls to the right of the diagram (**Cursor 1** group with **hh**, **min**, **sec** fields) display and allow to change the position of the cursor. To put the cursor to the selected time point click "Search".

See chapter II, 1.2, "Time cursor controls and view mode switching", for more information on cursor positioning.

3.2. Diagram values checkboxes and other options
(Fig. 22, B, C)

The **Diagram values** checkboxes (Fig. 22, **B**) define which OMD measured data should be displayed at the XY-diagram:

Opacity:

opacity level in percent. 0% = transparent environment, infra red light beam reaches destination without loss; 100% = opaque environment.

OMC rel. to Almlevel:

oil mist concentration in percent relative to alarm level

Reference:

basis value for calculating "Opacity" and "Opacity rel to Alarmlevel" values, given in digits

Temperature:

sensor temperature in °C with a resolution of 1°C

Oilmist mg/l:

absolute concentration of oil mist in mg/l

Transmission:

amount of light that reaches destination in the measuring unit of OMD sensor. Given in digits, a raw measurement value. Sensor initially calibrated in a transparent environment shows transmission about 1000 digits

Sensor number checkboxes (Fig. 22, **C**) allow to display or hide all measured values for a selected sensor at the XY-diagram:

System status indicator reflects Evaluator LED and relays state at the selected time point:

- Double-click the **System status** indicator to open a sensor status window:
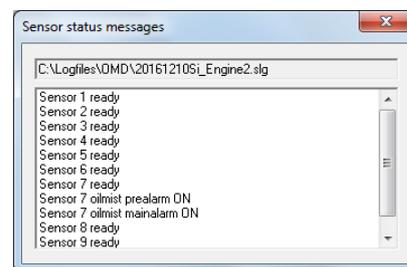
Fig.23. System status

Fig.24. Sensor status

Clicking the **Log messages** button opens a window with all text status messages recorded in the logfile.

3.3. Gauges and additional diagrams
(Fig. 22, D)

The panel below the XY-diagram contains additional instruments for displaying measured OMD sensor data.

Gauges tab and sensor statistics tab display an OMD measurement value selected in the **Gauges displayed values** checkboxes at the right side of the panel.

Gauges can be scaled to adapt to different ranges of OMD values.

Fig.25. Gauges displayed values

The following OMD values are only shown at the gauges, not in XY graph:

Temperature 1/10 deg.: sensor temperature in °C with a resolution of 0.1°C

Temperature deviation: deviation of sensor temperature from the average value of all measured sensors.

3.3.1. Sensor values: gauges
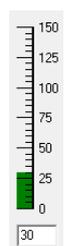
Each gauge displays the selected measurement value of the corresponding OMD sensor at the time point marked by the cursor at the XY-diagram.

digital display of measurement value at the corresponding gauge

Fig.26. Gauge

3.3.2. Parameters

Some SiCOMS® system parameters defined in Evaluator and recorded by SiCOMS® Logger into the logfile are shown at the **Parameters** tab.

3.3.3. Sensor values: bars
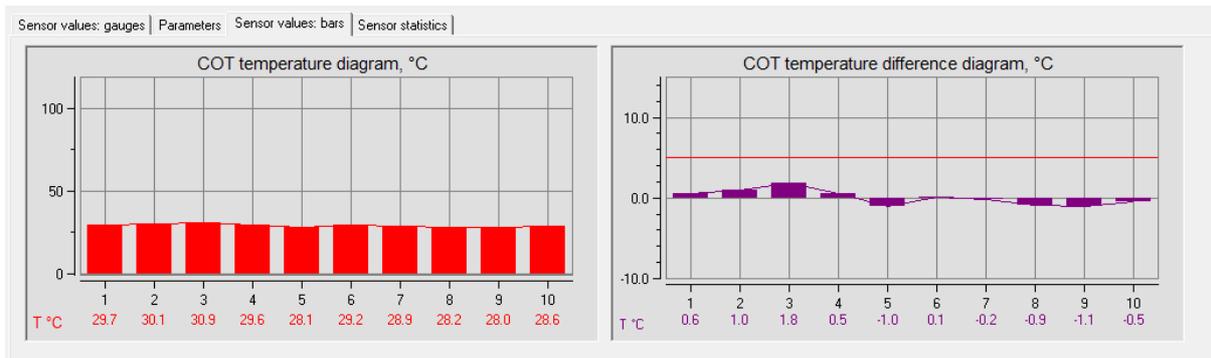
Fig.27. Sensor values: COT temperature and temperature difference diagrams.

COT temperature diagram shows sensor temperature (Crankpin Oil Temperature) in °C with a resolution of 0.1°C at the time point selected at XY-diagram.

COT temperature difference diagram displays the temperature deviation of each sensor from the average temperature of all sensors at the time point selected at XY-diagram.

3.3.4. Sensor statistics
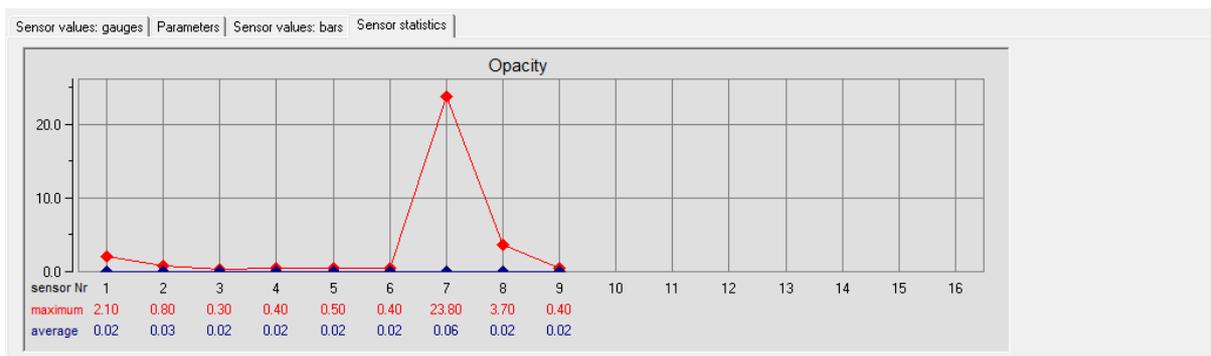
Fig.28. Sensor statistics: the opacity maximum and average for each sensor.

The diagram shows the maximum and the average over the whole measurement time of logfile for the OMD value selected in **Gauges displayed values** checkboxes for each sensor. (For **Temperature deviation** value the minimum is displayed instead of average.)

4. OQCOMS®
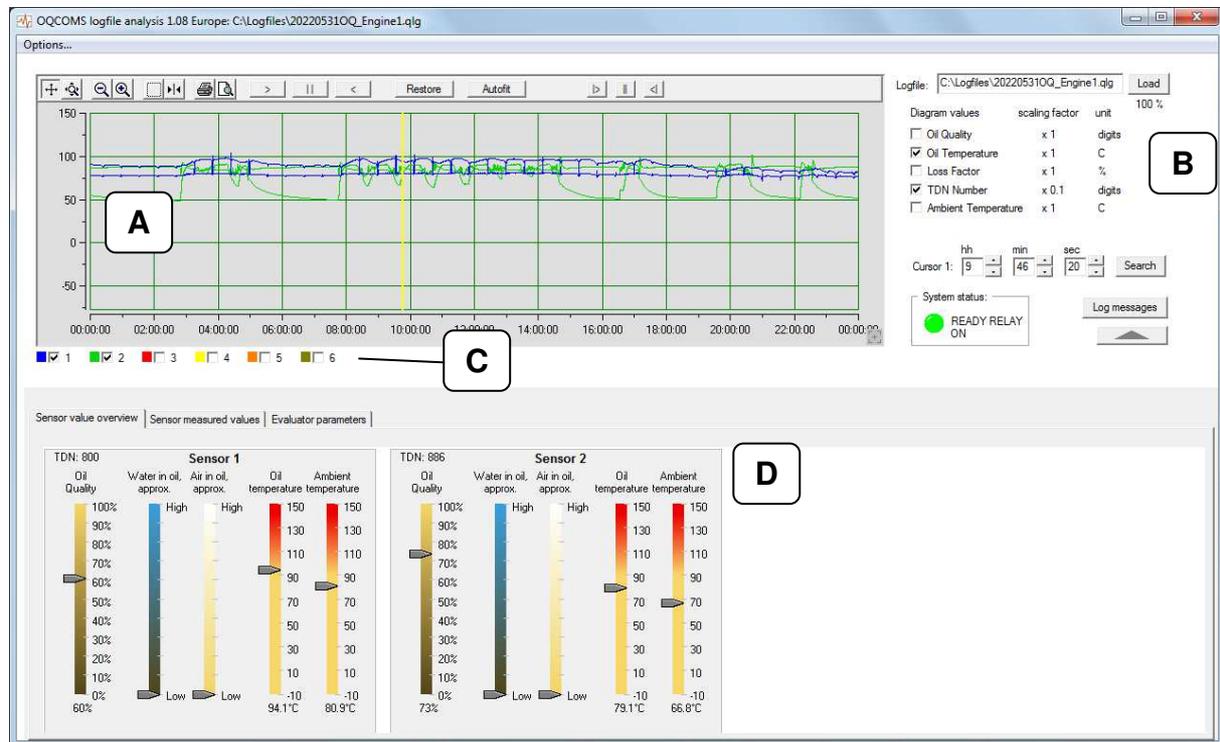
Fig. 29. OQCOMS® logfile analysis window

OQCOMS® logfile can be opened by pressing the **Load** button. The progress is displayed to the right of the button in percent.

4.1. XY-diagram

(Fig. 29, A)

The XY-plot at the upper part of the window shows the time diagram of measurement data at OQCOMS® sensors.

Scrolling and zooming at the plot is performed by the following buttons on its toolbar:

- scroll mode. Click on x- or y-axis with the left mouse button, hold the button and move the mouse to scroll the graph

- zoom mode. Click on x- or y-axis with the left mouse button, hold the button and move the mouse to zoom the graph in or out.

- return to original view (the complete logfile data is fit into the diagram window)

Time axis of the XY-graph has a cursor: a yellow vertical line. Time controls to the right of the diagram (**Cursor 1** group with **hh**, **min**, **sec** fields) display the position of the cursor. It can be moved with the mouse pointer (keep the mouse left button pressed), or by setting a desired time in time controls and clicking "Search".

See chapter II, 1.2, "Time cursor controls and view mode switching", for more information on cursor positioning.

4.2. Diagram values checkboxes and other options
(Fig. 29, B, C)

The **Diagram values** checkboxes (Fig. 29, **B**) control which OQCOMS® measured data is displayed at the XY-diagram:

Oil Quality:	An integer number in a range from -2 to 21, it serves as an indicator for oil wear: the higher the number, the lower the quality of oil is:

-2 – 0:	'fault region', no oil detected / no connection
1 – 13:	'usability region', oil is in good condition, no action needed
14 – 17:	'warning region', oil has become worn, oil change is recommended
18 – 21:	'danger region', oil is unusable; oil change is necessary.

Oil Temperature:	The temperature of oil as measured inside the sensor, in °C.
Loss factor %:	Loss factor percentage, a real number between -20% and 250%. This is a measured rate of oil degradation, it increases as the oil ages. Clean oil has a Loss Factor Percentage around 0%, the oil that's worn out – between 25% and 30%. Values less 0% can indicate that no oil is detected (sensor is surrounded by air). The other side of the scale (Loss Factor % > 30%) shows severe contamination of oil with other substances.
TDN number:	Tan Delta Number, an integer in a range from 1200 to 0 based upon the Loss Factor Percentage. The value decreases as oil quality degrades: new oil displays TDN between 950 and 850, severely worn oil - about 300. Similar to Loss Factor Percentage, the values between 1200 and approximately 1000 mean that no oil is detected, and values less than 300 indicate critical oil contamination.
Ambient Temperature:	The environment temperature in the near proximity of the sensor, in °C.

Sensor number checkboxes (Fig. 29, **C**) can display or hide graphs for the respective sensor at the XY-diagram:

■☑ 1   ■☑ 2   ■☑ 3   ■☑ 4   ■☑ 5   ■☑ 6

System status indicator reflects Evaluator LED and relays state at the time point selected by the cursor at xy-plot:
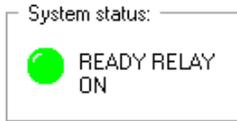
Fig.30. System status
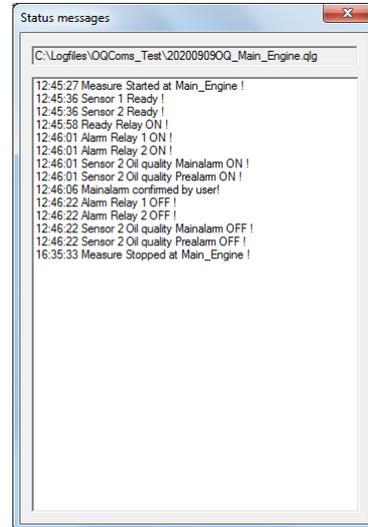
Clicking the **Log messages** button opens a window with all text status messages recorded in the logfile:

Fig.31. Status messages

4.3. Gauges and parameters
(Fig. 29, D)

The panel below the XY-diagram contains additional instruments for displaying measured OQCOMS® sensor data.

4.3.1. Sensor value overview
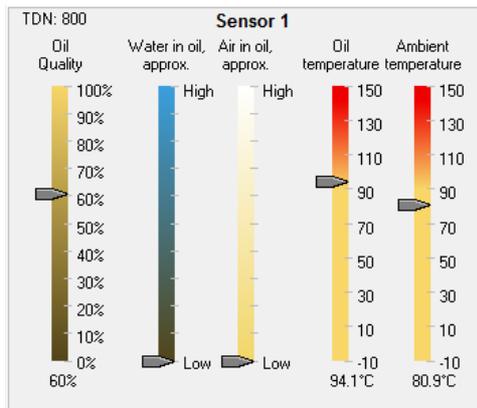
- this tab has one section with gauges for each connected sensor.

Fig.32. OQCOMS logfile analysis, sensor value overview for Sensor 1

The values at the gauges are:

Oil quality — estimation for the quality grade in percent, 0% for unusable oil, 100% the best grade

Water in oil — approximate content of water in oil

Air in oil — approximate proportion of air in oil

Oil temperature — measured oil temperature, in °C

Ambient temperature — measured surrounding environment temperature, in °C

4.3.2. Sensor measured values

The tab presents two forms of displaying the sensor data. One uses scales with customised diffuse ranges, simply to give an impression of oil condition and temperature. Another form has sharp range boundaries as defined by Tan Delta Number guidelines.
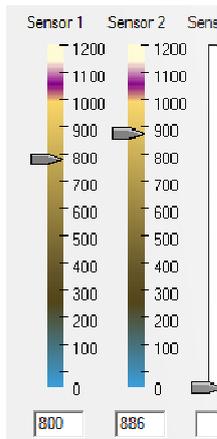
Fig.33, a). OQCOMS logfile analysis, sensor measured values, estimated ranges
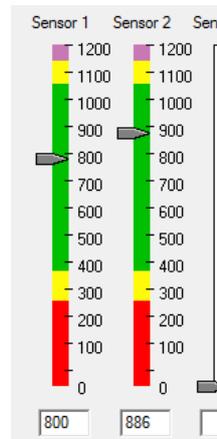
Fig.33, b). OQCOMS logfile analysis, sensor measured values, exact ranges

Checkboxes at the right side of the panel switch between the displays.

4.3.3. Evaluator parameters

Selected system parameters are written by Evaluator into logfiles, they are displayed at the text fields of this tab.

4.4. OQCOMS logfile analysis window menu

The Options command opens a window where gauge range boundaries can be adjusted:
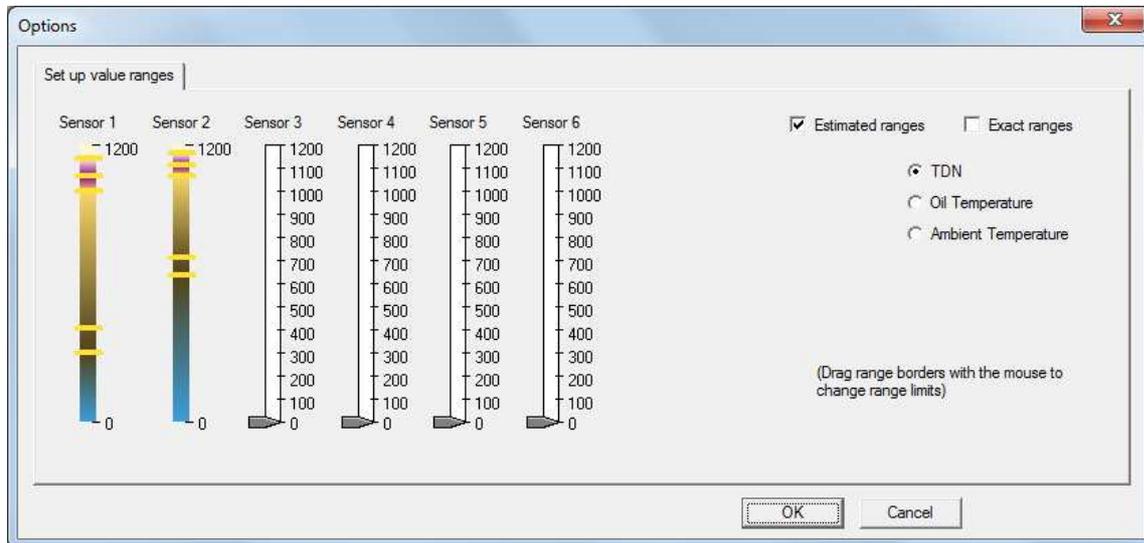
Fig.34. OQCOMS logfile analysis, Options window

In order to adapt gauge display to the sort of oil and to the type of machine it is used for, the flexible boundaries can be positioned by clicking with the mouse left button on yellow lines and moving the mouse pointer.

III. Multiple file analysis

This function is used to open several (in the current version, up to 4) BeCOMS®
logfiles at the same time for comparing.
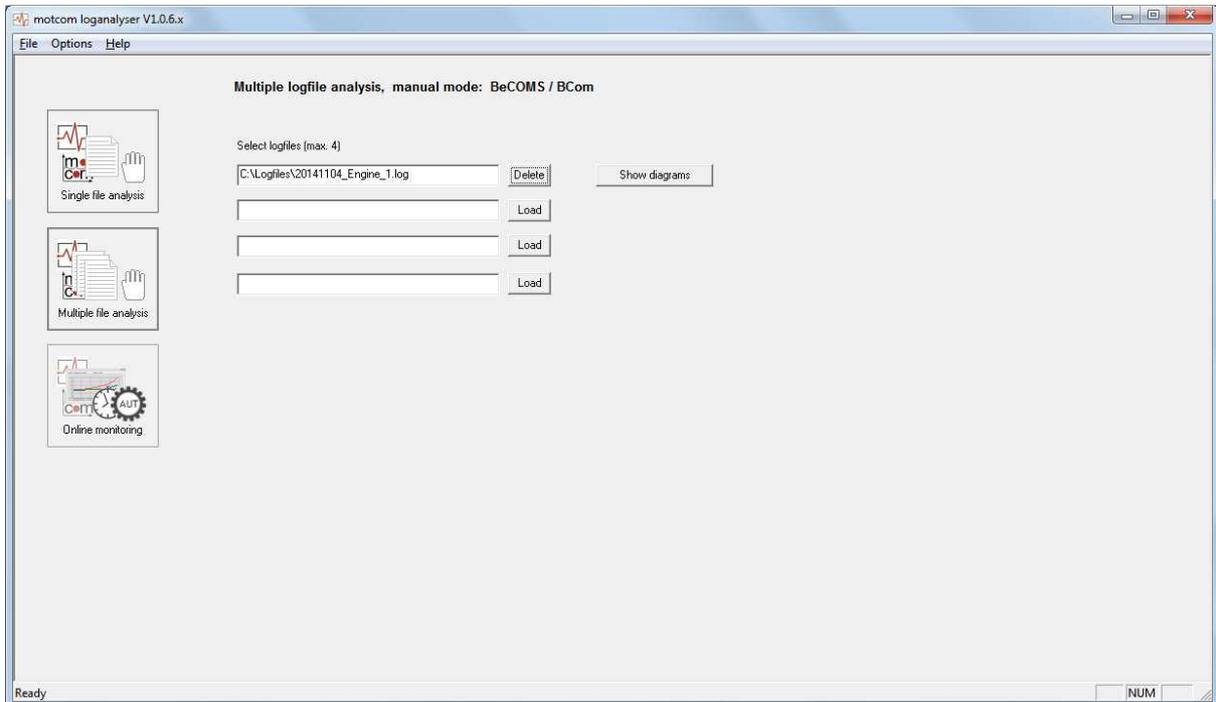
Fig.35. Multiple logfile analysis window

Load buttons are used for selecting BeCOMS® logfile paths and names. When the
file is selected, the button caption changes to "Delete" to allow removing or changing
the selection.

Press the **Show diagrams** button to open the analysis windows with selected
logfiles. Only the upper pane of analysis window is shown by default, but the
windows can be restored to full size.

IV. Online monitoring

Motcom loganalyser can be used for detecting long-time trends in engine condition. This is implemented through automatic reading and analysing the pre-recorded logfiles for the engine.

The purpose of such logfile "scanning" is to detect high thermovoltage values in polar data which in most cases indicate friction in a bearing, at a cylinder liner, or at some other moving engine parts. Every such thermovoltage signal peak (hereinafter referred to as "friction spot") which exceeds 100% of DC alarm level is counted, that means the evaluation of bearing condition begins long before an alarm situation is detected by the BeCOMS® system.

The system status messages are also extracted from the logfiles during scanning.

It is possible to use automatic scanning as a one-time routine or as a monitoring task performed regularly at a certain time interval, for instance parallel to BeCOMS® Logger running at the same PC. One-time scan routine extracts information from logfiles collected over a certain time period. Monitoring routine also checks regularly for newly created logfiles and for changes in a logfile currently being written by BeCOMS® Logger, and adds this new information to the existing auto-scan results.
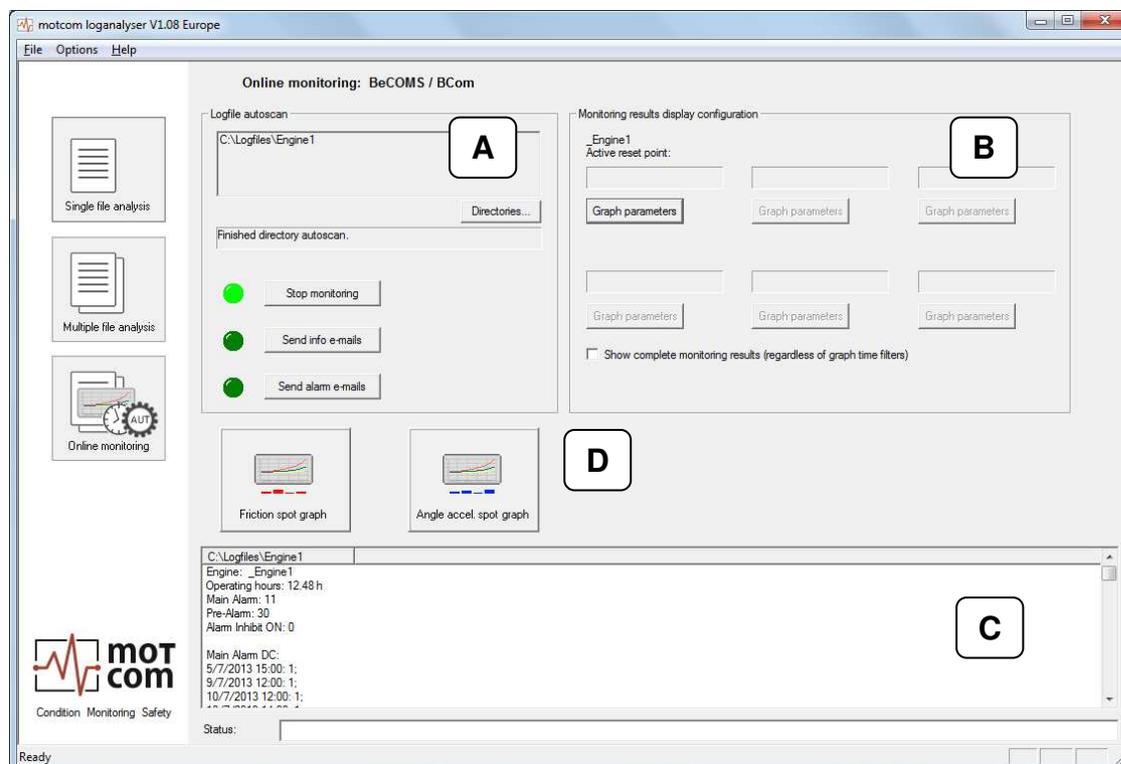

Fig.36. Online monitoring window

To set up autoscan, use **Options** / **Logfile autoscan options** menu (chapter V, p. 2.2).

Logfile autoscan

(Fig. 36, A)

This field group presents the following information:

- selected logfile directories to be scanned (press "Directory" button for setup)
- the name of a logfile currently being scanned, or autoscan status messages
- control buttons and LED indicators of monitoring tasks (🟢 - ON / 🟢 - OFF):

Start monitoring button – starts logfile monitoring process. If one-time scan is set up in options ("Scan all logfiles once" mode, chapter V, p. 2.2), the button's caption is "Scan once". After start it changes to "Stop monitoring" (or "Stop scanning").

Send info e-mails button – starts the background service for creating regular notification e-mails and/or PDFs. The button caption changes to "Stop sending".

Send alarm e-mails button – if it is pressed, an e-mail and/or a PDF file containing short report ("alarm e-mail") will be created each time when new important system messages are detected. After start the button caption changes to "Stop sending".

Monitoring results display configuration

(Fig. 36, B)

- The section contains a **Graph parameters** button and a text field showing the time of the latest reset point for each scanned directory. Reset points are time markers used to delimit the displayed BeCOMS® logfile scan results by showing only statistics for data recorded after a reset point.

Pressing a **Graph parameters** button opens a window for reset points controlling:
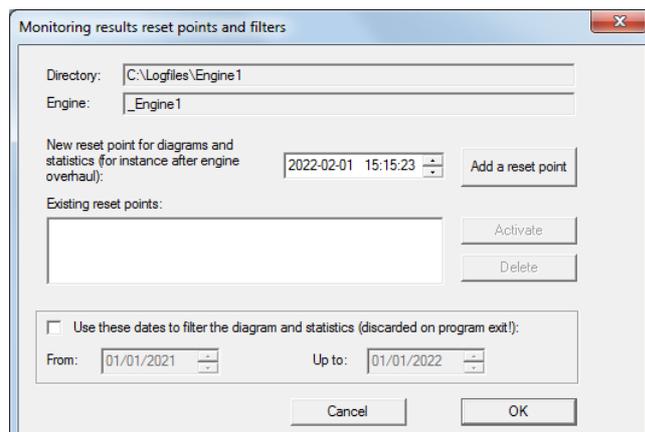
- press **Add a reset point** button to add a new reset time marker. The list of earlier reset points is shown below. It is possible to remove list entries by selecting them and pressing **Delete** button. **Activate** button selects a reset point to use as a filter.

Fig.37. Monitoring results reset points and filters window

This window also offers a possibility to filter the measurement statistics by choosing a time window. Set the **Use these dates to filter diagrams and statistics** checkbox, and select **From** and **Up to** dates. To confirm the filters press **OK**.

If **Show complete monitoring results** checkbox at the online monitoring panel is unchecked, only statistics for logfiles starting from the latest reset point or for logfiles between time filter boundaries will be included in scan results. Otherwise statistics for all scanned logfiles are shown.

To update the autoscan results after changing options first stop running scan (if any), then press **Start monitoring** (or **Scan once**) button.

Scan results field
(Fig. 36, C)

- contains information extracted from logfiles during scan in text form: engine operating hours, number of recorded system messages (Main Alarm, Pre-Alarm, etc.), and number of registered friction spots at affected bearings.

Friction spot graph and **Angle acceleration spot graph** buttons
(Fig. 36, D)

- each button opens a corresponding logfile autoscan report window, friction spot or angle acceleration spot report respectively:
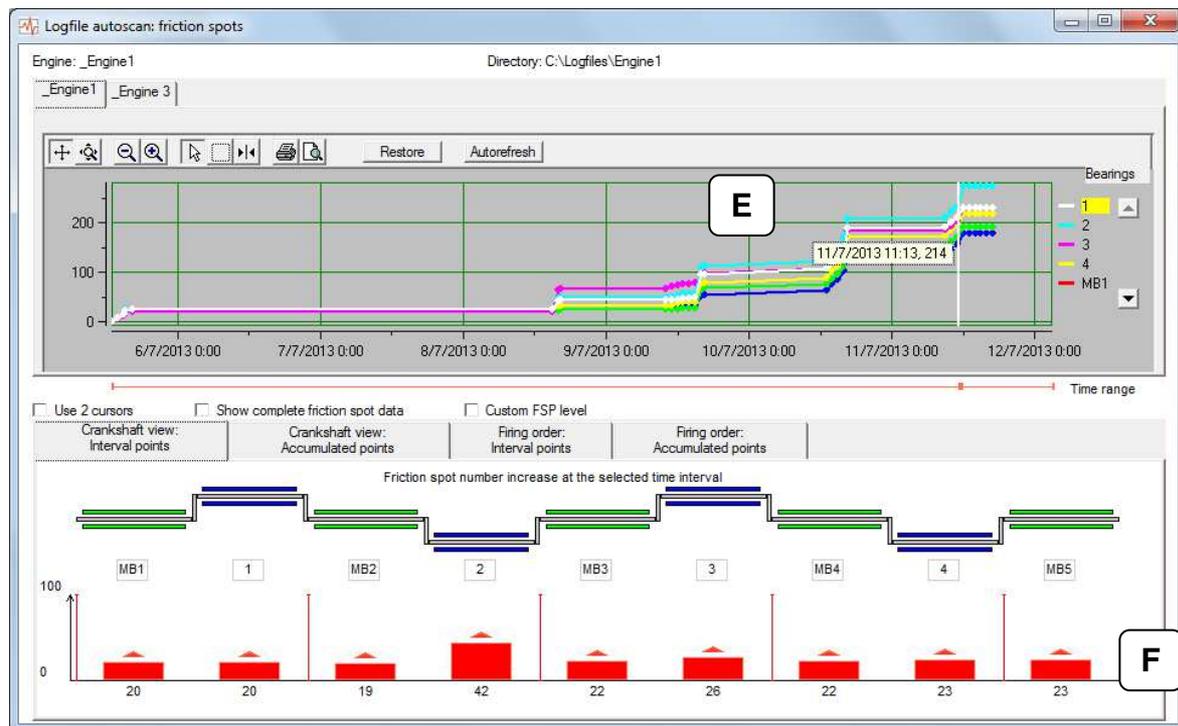

Fig.38. Logfile autoscan: friction spots

Friction spots detected in logfiles are shown as cumulative graphs in the upper diagram (Fig. 38, **E**). The tab control at the top has one diagram for each engine. Each graph in these diagrams represents an engine bearing, the colours of graph lines with bearing names are listed in the legend to the right of the diagram.

The x-coordinate of each graph point is the latest time stamp of the corresponding logfile. The y-coordinate is the sum of friction spots up to this point over a time period taking into account reset points and filters (as described in **Monitoring results display configuration**).

A click on a graph point extends it to a group of single friction spots with their actual time of detection if any were recorded on that day (the diagram must have the "Select" mode activated in its menu:).

Double-clicking on any of single points will bring the diagram back to showing one point for the whole logfile.

If scanning is started as a monitoring task, the result windows and diagrams are updated automatically. If there're newly detected friction spots in a current logfile, they are displayed at the diagram as single spots with their actual time stamps.

The tab control at the window's lower part (Fig. 38, **F**) displays accumulated friction spots in form of bars. Which friction spots are considered depends on selected tab and on cursor position in the diagram (**E**) as described below:

Selected tab and cursor options	The bars display:
"Interval points" tabs, single cursor is used	Increase of friction points between two graph points where the cursor is positioned
"Interval points" tabs, "Use 2 cursors" checkbox is ticked	Friction points are summed up for all graph points between two cursors
"Accumulated points" tab	Friction points are summed for all graph points between the earliest applicable time mark and the cursor

Friction point bars can be sorted in engine geometric order (see "Crankshaft view" tabs at Fig. 38, **F**), and in firing order ("Firing order" tabs).

The **Time range** indicator bar reflects the chosen boundaries for friction spot sums, for instance ——————————————+ for an interval between two diagram points.

Fig.39. Logfile autoscan: angle acceleration spots
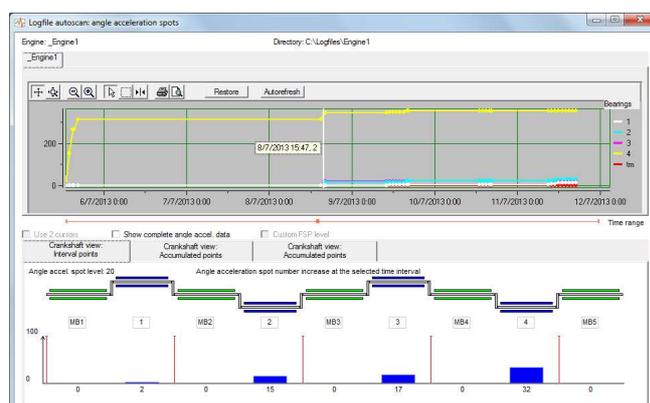
Similar report is produced for angle acceleration spots (see Chapter II, p. 1.4.6. for details).

V. Menu

1. File

1.1. File / New BeCOMS / BCom session

This menu item opens a new BeCOMS® / BCom logfile analysis window (see chapter II, p. 1). Another way to do it is pressing the **BeCOMS / BCom** button at Single logfile analysis panel (chapter I, p. 2).

1.2. File / New BeCOMS / BCom simulated session

Opens a new BeCOMS® / BCom logfile analysis window with simulated DC alarm level (see chapter II, p. 2). Alternatively this can be done using the corresponding **BeCOMS / BCom (simulated alarm level)** button at Single logfile analysis panel.

1.3. File / New SiCOMS / OCom session

Opens a new SiCOMS® / OCom logfile analysis window (see chapter II, p. 3). The same is done with **SiCOMS / OCom** button at Single logfile analysis panel.

1.4. File / New OQCOMS session

Opens a new OQCOMS® logfile analysis window (see chapter II, p. 4). Clicking the **OQCOMS** button at Single logfile analysis panel is another way to get this window open.

1.5. File / Exit

Closes the application if online monitoring functions are not active, otherwise all application windows are minimized. To close loganalyser, stop all monitoring functions first.
Close button (X) of the application window has the same effect.

2. Options

All options are only available for modification if online monitoring process is NOT running. Otherwise the option controls are read-only and greyed. Stop the online monitoring to enable options for modification!

2.1. Options / General options

- Opens a window with several tab panels on it:

2.1.1. General
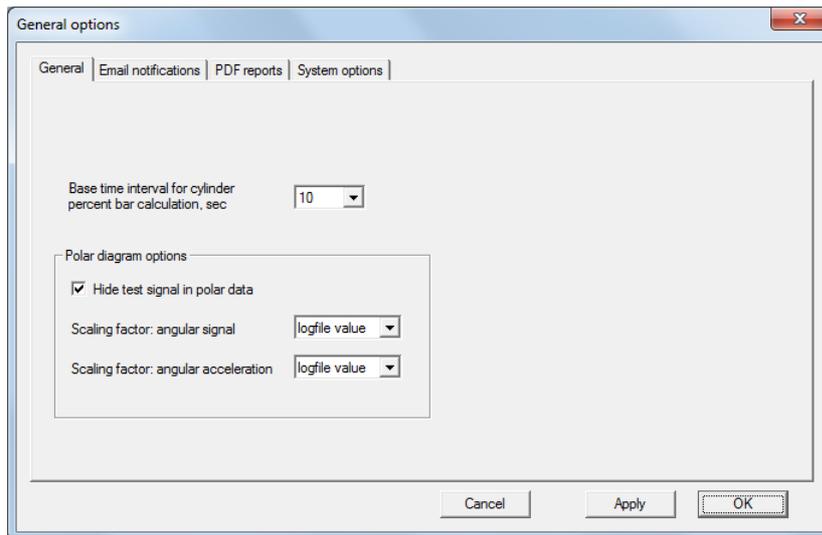
Fig.40. Options / General panel

Base time interval for cylinder percent bar calculation – this is the base sample time for friction spot bars calculation at the **Bearing histograms** tab (chapter II, p. 1.4.5) for BeCOMS® logfiles.

Polar diagram options:

Hide test signal in polar data – the option is for test and calibration purposes.

Scaling factor: angular signal – this value defines how angular signal looks at the polar diagram. Selected value is multiplied with the polar signal values. If "logfile value" option is selected, scaling factor from the BeCOMS® logfile is used (this is the default case).

Scaling factor: angular acceleration – the same for angular acceleration.

Press **OK** to confirm the values and close the window. **Cancel** button closes the window and dismisses the modified values.

2.1.2. Email notifications

The following settings configure automatic notification e-mails. Two types of notifications are available: regular reports with status messages statistics and friction spot diagrams, and alarm reports which contain only important system status messages.

Regular reports can be sent once or continuously at certain time intervals. Alarm reports are only sent if new important status messages are detected in logfiles during online monitoring within the autoscan time interval.
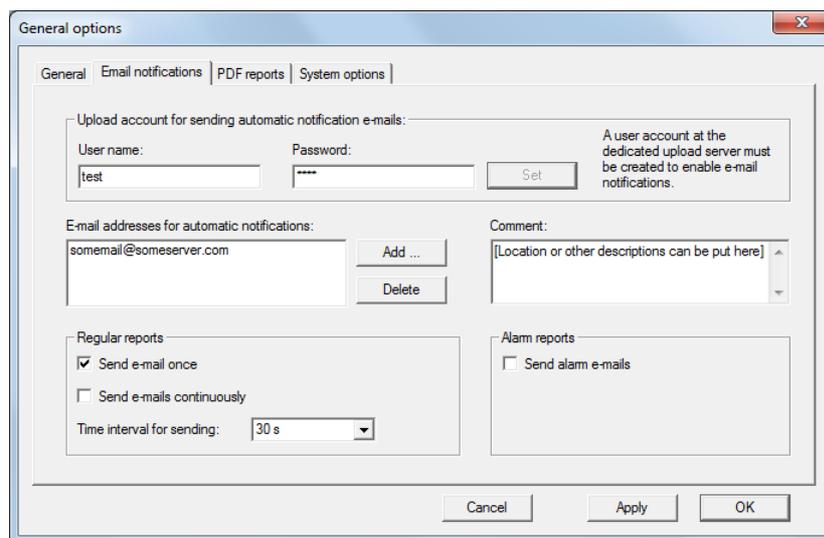

Fig.41. Options / Email notifications panel

Upload account for sending automatic notifications – user name and password on the upload server of motcom GmbH. This account is necessary for using automatic notification function, and can be created at a customer request by motcom GmbH administrators.

User name is entered as clear text, while password is masked with "*" signs during input. Changing user name automatically clears password field; it is required to re-enter the password.

(Important!) To save the upload account data, press **Set** button. Without this, modified account info is ignored even at pressing **OK**.

E-mail addresses for automatic notifications – the list of e-mail addresses which will receive automatic notifications when the corresponding service is started.
To add an e-mail to the list, press **Add…** button. A new empty entry is created in the list with cursor blinking in it. Type the e-mail (format: [*recipient name*]@[*mail server*]), then press Enter key or click anywhere at the list box outside the new entry field to finish editing.
To delete an entry, click on it in the list box and press **Delete** button.

Send e-mail once – if the option is checked, a regular report will be sent immediately on pressing **Send info e-mails** button if there's any scanned logfile information in the **Scan results** field of the Online monitoring window (chapter IV).

Send e-mails continuously – if this option is checked, a background service for sending regular reports at configured time intervals will be started when **Send info e-mails** button is pressed at the Online monitoring window (chapter IV).

Time interval for sending – when this selected time interval elapses, a regular report is sent (if **Send e-mails continuously** option is checked), and a new interval timer is started.

Comment – text written into every e-mail report as short signature info.

Send alarm e-mails – this option has to be checked to enable sending alarm reports each time some important status messages are detected during online monitoring.

Press **OK** to confirm the values and close the window. On **Cancel** button the window is closed without saving the modified values.

2.1.3. PDF reports

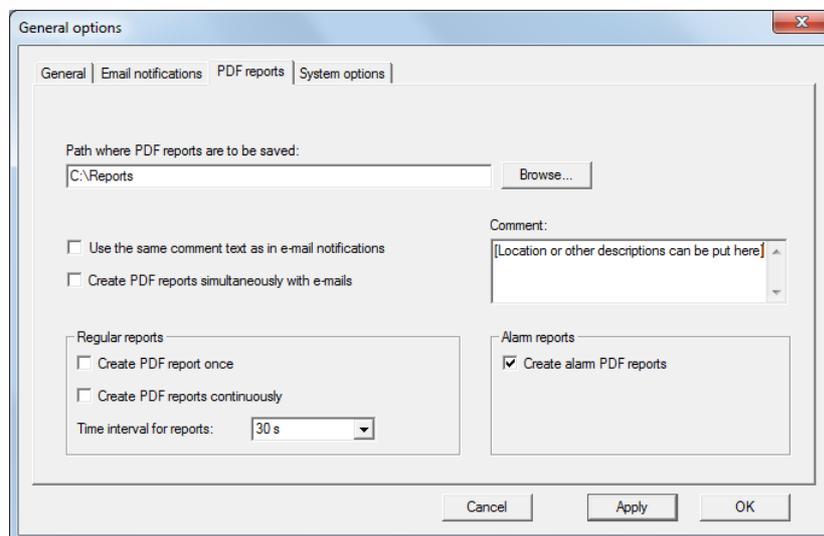The same information described in p. 2.1.2 can be stored at some location in PDF format:

Fig.42. Options / PDF reports

PDF reports can be produced parallel to e-mail notifications or independently.

Use the same comment text as in e-mail notifications – this option affects the content of comment field in PDF reports. Checking the box will copy the **Comment:** field text from that of e-mail reports.

Create PDF reports simultaneously with e-mails – checking this option causes all PDF reports to be produced together with e-mail notifications. Otherwise the following parameters apply:

Create PDF report once – if the option is checked, a regular PDF report is created immediately on pressing **Send info e-mails** button if **Scan results** field of the Online monitoring window is not empty.

Create PDF reports continuously – if checked, a background service is started for regular reports at configured time intervals as soon as **Send info e-mails** button is pressed (Online monitoring window, chapter IV).

Time interval for reports – every time this interval elapses, a regular report is sent if **Create PDF reports continuously** option is checked.

Comment – a short signature text for every PDF report.

Create alarm PDF reports – if this option is checked alarm reports will be created each time some important status messages are detected during online monitoring.

Press **OK** to confirm the values and close the window.
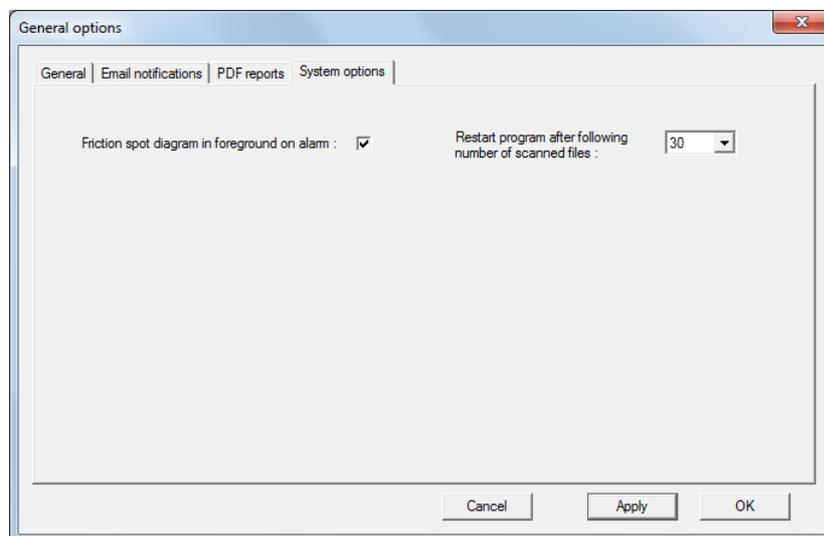
2.1.4. System options

Fig.43. Options / System options

Friction spot diagram in foreground on alarm – this option determines whether logfile autoscan report window should be displayed on top of the main window in case the system detects alarm messages.

Restart program after following number of scanned files – to avoid problems during scan of directories with a large number of files, the program restarts automatically after processing the declared number of logfiles.

2.2. Options / Logfile autoscan options

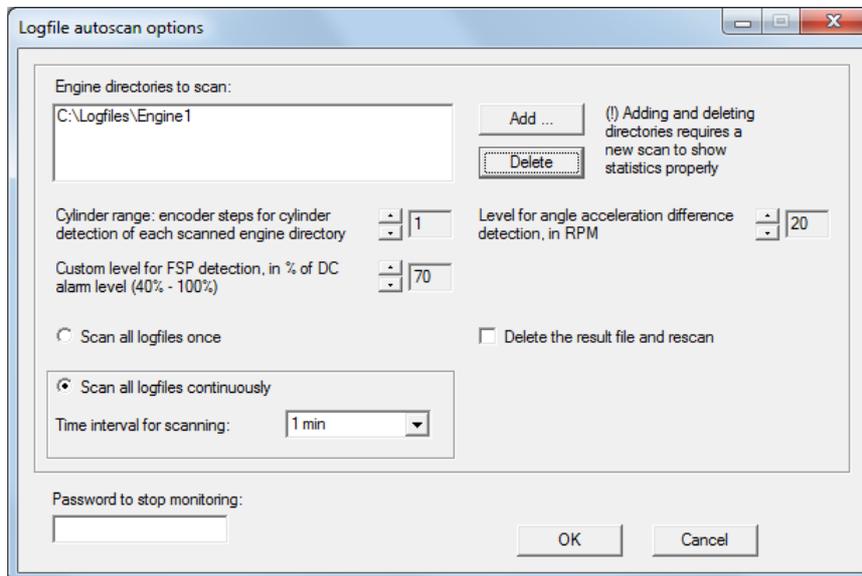The following window contains configuration settings for auto-scan functions.

Fig.44. Logfile autoscan options window

Engine directories to scan – list of directories to be scanned and analysed (up to 6 directories can be added here).

To add a directory to the list, press **Add…** button. A window for selecting a hard disk directory is shown. Browse for a directory, click on it and press **OK**.
To delete an entry, click on it in the list box and press **Delete** button.

A log directory must contain logfiles only for one engine. Engine name is contained in logfile names. If a different engine name or different engine configuration is detected in a logfile in the same directory, such logfile is ignored.

Cylinder range: encoder steps for cylinder detection of each scanned engine directory – this value defines how many polar data points are related to a cylinder in the polar data of scanned logfiles in the selected directory.

Custom level for FSP detection, in % of DC alarm level – the value determines custom level which is used for all logfiles of the selected directory if the user chooses the corresponding checkbox.

Level for angle acceleration difference detection – this value is applied as threshold for counting angle acceleration spots for the selected directory.

Scan all logfiles once – this option is to be checked for a one-time scan of selected directories. Scanning of a large amount of logfiles can take a considerable amount of time when performed for the first time.

Scan all logfiles continuously – if the option is checked, pressing **Start monitoring** button in the monitoring window starts a background process that checks for changes in logfiles periodically at selected time intervals and includes detected changes in the monitoring statistics.

(Important!) This option, if checked, also defines the program behaviour on its next start: the online monitoring process will be started automatically.

Time interval for scanning – the value defines how often the logfile directories will be scanned for changes.

Delete the result file and rescan – if this option is checked, special system file that contains autoscan results will be deleted next time before scanning. All logfiles in the listed directories will be re-scanned. This could be useful when, for instance, a new loganalyser application version displays warnings about old autoscan file format.

Password to stop monitoring – to protect the online monitoring process from accidental stop, a password can be used. The input in this text field is masked with "*" signs.

Press **OK** to confirm the values and close the window. Press **Cancel** button to close the window and dismiss the modified values.