BeCOMS® / BCom Data Logger

User Manual

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Contents

I. Introduction

BeCOMs / BCom Data Logger is a PC application used in the BCom system for displaying and processing measurement data from engine in on-line mode.

BCom Evaluator collects and analyses the current values of thermo voltage and rotation speed of the engine measured by SRE sensor (Slip Ring Encoder) and sends this data through a serial data link. Evaluator also issues system status notifications and adds them to the data stream. BeCOMs / BCom Data Logger receives the data from Evaluator through a PC serial port. Some PCs can be equipped with several serial ports; this allows to monitor several engines simultaneously in the same PC application. BeCOMs / BCom Data Logger has several modifications which support different maximal number of connected Evaluators: 1, 2, 4, or 6.

Measurement data from each connected Evaluator are displayed by BeCOMs / BCom Data Logger in easy graphical form, and system status messages are shown in a text window. At the same time the data are stored in log files of special format for further analysis. The application can also act as a Modbus client and send all this data to a designated Modbus server over TCP/IP parallel to recording into log files.

motcom GmbH has also published customer-specific versions of BeCOMs / BCom Data Logger. These versions only differ in customer-specific labelling, the functionality and design are always the same.

II. Installation and setup

To install BeCOMS / BCom Data Logger on a computer, double-click setup.exe on a provided BeCOMS / BCom Data Logger installation CD or other media. Follow the instructions in setup program.

When the installation is complete, BeCOMS / BCom Data Logger can be started through a program group in Windows Start menu:
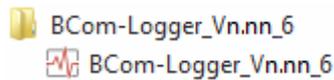
(or "BCom-Logger_Vn.nn_4" for the 4-system version, "BCom-Logger_Vn.nn_2" for the 2-system version, and "BCom-Logger_Vn.nn_1" for the 1-system version).

When BeCOMS / BCom Data Logger is started for the first time and its configuration file (BCom-logger.ini for 6-system version, BCom-logger_4.ini) is not found, a default ini-file will be created and the following message displayed:

Fig. II-1. BeCOMS / BCom Data Logger Setup warning

Please go to "**Setup**" menu (see IV, 2) to choose valid logfile paths, serial port numbers and other options.

If the paths for all-events logfile and sensor logfiles are not set correctly, the log files will not be created and the measurement data will be lost!

System requirements:

• Intel I5 processor 2.66 GHz or higher

• CD-Rom drive, recommended CD-R/W drive

• min. 4GB DDR2 RAM

• hard disk with a capacity of min. 500 GB

• supports Windows XP, Windows Vista, Windows 7, Windows 8.x, Windows 10

• up to 3 free PCI or PCI Express slots **,

• Display resolution 1280 x 1024 or higher **

**) depending on the number of BCom systems that have to be connected to the PC

III. Windows and functions

1. Main panel

The main panel of BeCOMs / BCom Data Logger contains 1, 2, 4 or 6 equally built sections depending on the program modification. Each section displays current measurement data of one of connected BCom Evaluators.

Figures III-1, III-2, III-3 and III-4 show the main panel of 6-, 4-, 2-, or 1-Evaluator modification of BeCOMs / BCom Data Logger.

If "Number of connected sensors" option in Setup Preferences dialog (see IV, 2.1) is set to a lower value than the maximum, idle sections stay dimmed.

Engine monitoring is started through menu Start/Stop Log (IV, 3) or automatically after BeCOMs / BCom Data Logger start, if the auto-start feature is preconfigured. If the program does not get a signal from some of configured Evaluators on start, a message "Evaluator [n] not connected" appears in the event log window (Fig. III-1, III-2, III-3, III-4 label [f]) for each missing Evaluator, where [n] is Evaluator ordinal number. The corresponding screens will display constant zero levels for measured signals.
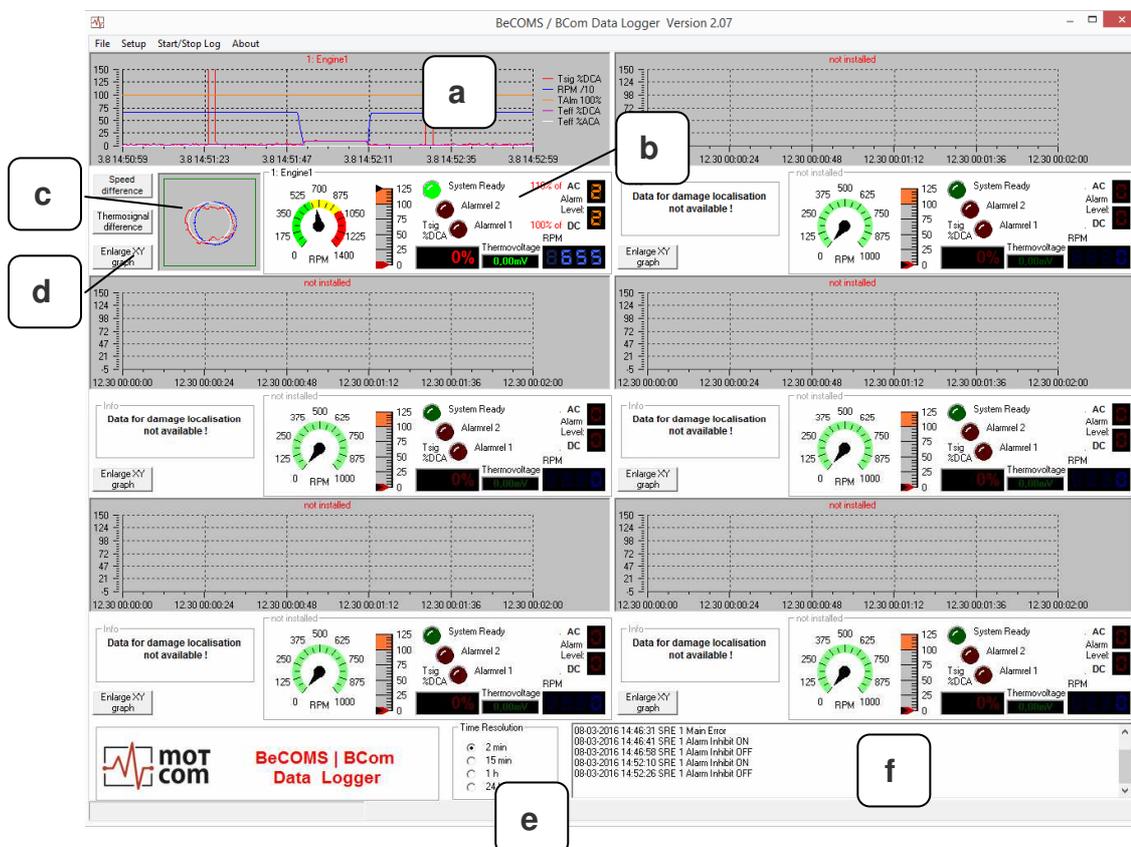
Fig. III-1. BeCOMs / BCom Data Logger main panel, modification for 6 systems
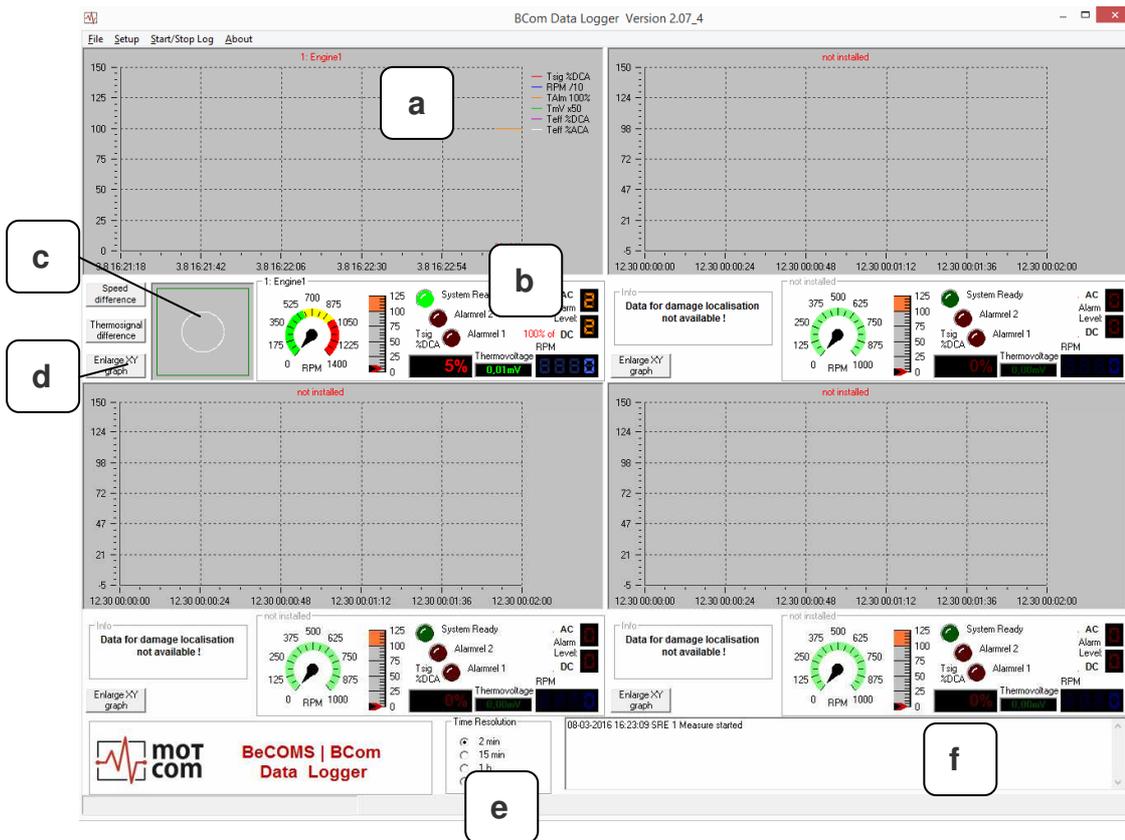
Fig. III-2. BeCOMs / BCom Data Logger main panel, modification for 4 systems
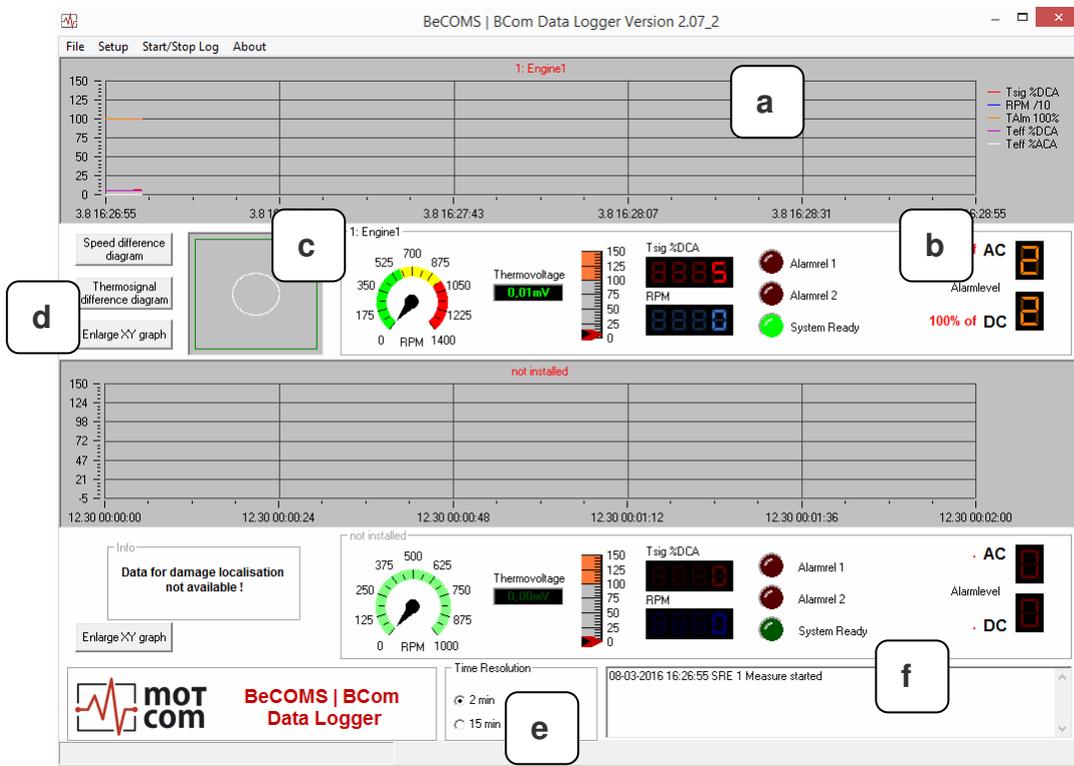
Fig. III-3. BeCOMs / BCom Data Logger main panel, modification for 2 systems
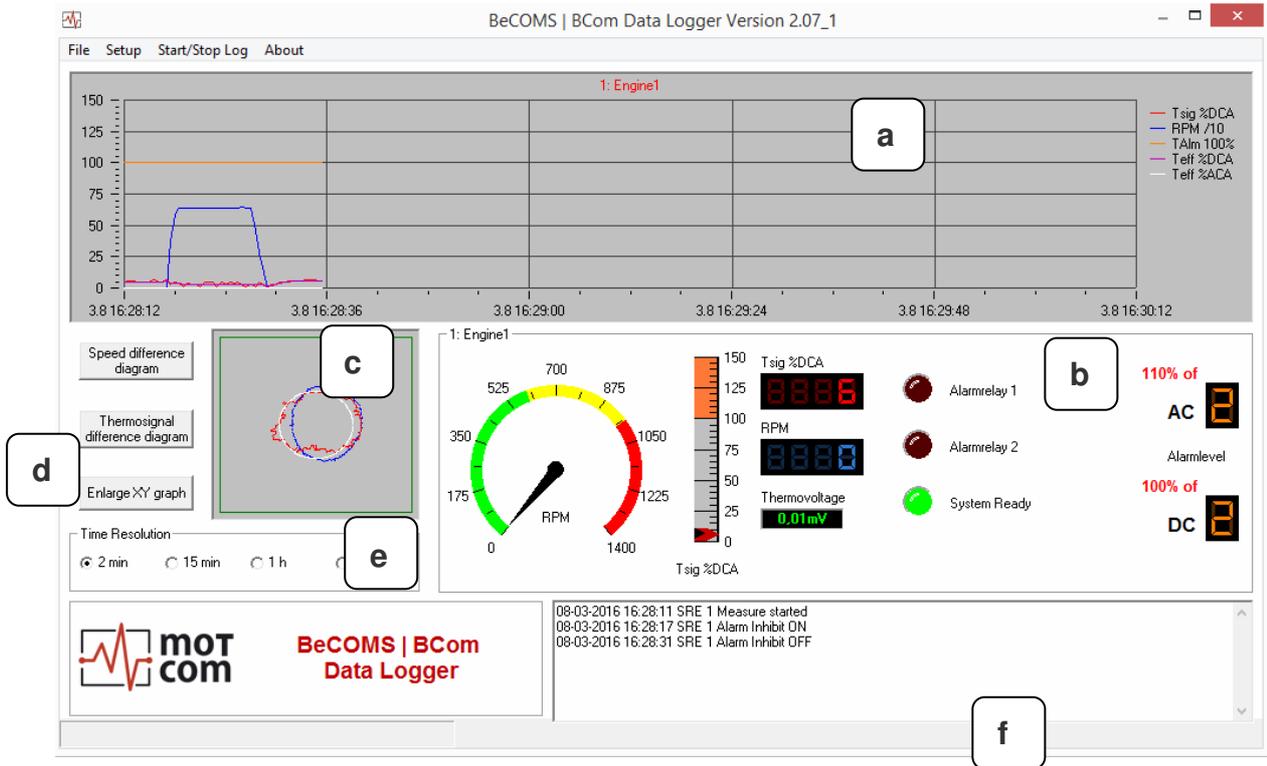
Fig. III-4. BeCOMs / BCom Data Logger main panel, modification for 1 system

1.1. Graph (XY-coordinates):   a

Displays engine measurement data at a time interval between program start and the current moment:

Tsig %   - thermo voltage signal in percent relative to pre-set alarm level
RPM / 10   - engine rotation speed (absolute value divided by 10)
TAlm 100%   - 100 % of alarm level
Teff %DCA   - effective thermo voltage in percent relative to DC alarm level
Teff %ACA   - effective thermo voltage in percent relative to AC alarm level.

Effective value of thermo voltage allows to smooth peaks in measurement values and thus to shorten the reaction time for DC and AC alarms. Because of the additional use of effective value it is possible to detect the DC and AC alarm point in the developing of the thermo signal earlier than with raw thermovoltage data.

It is possible to change the scale of the graph and to navigate through it with the help of its options. Double-click on the graph to switch on/off its options:
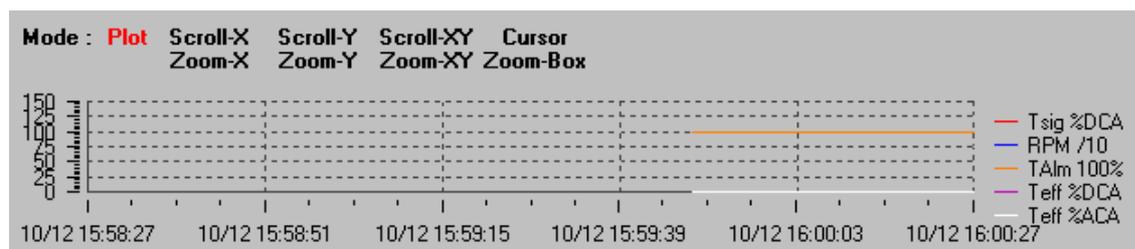
Fig. III-5. Graph options

Click an option to change the navigation mode of the graph.

Scroll-X (Scroll-Y):   scroll the graph along X- or Y-axis
Scroll-XY: scroll along both X- and Y-axis

To scroll, hold the left mouse button and move the mouse to the desired direction.

Zoom-X (Zoom-Y):   enlarge/shrink the graph along X- or Y-axis
Zoom-XY: enlarge/shrink along both X- and Y-axis

To zoom, hold the left mouse button and move the mouse to the right to enlarge and to the left to shrink the graph in X-axis direction. Or move the mouse upwards to enlarge and downwards to shrink along Y-axis.

Zoom-Box: enlarge selected area of the graph. Hold the left mouse button and move the mouse to select an area. Releasing the mouse button stretches the selection to the frame of the graph.

Cursor: display the X and Y values of the selected plot point.

Plot: return the graph to its default scale and continue plotting the data.

1.2. Instrument panel: b

Shows the current measurement data values:

o   current engine rotation speed in RPM, thermo voltage in mV and in percent of
alarm level:

Fig. III-6.
Engine rotation
speed in RPM

Fig. III-6 a).
Digital display of
engine rotation
 speed in RPM
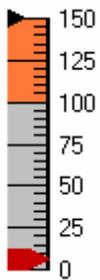
Fig. III-7 a).
Gauge,
thermosignal in %
of DC alarm level

Fig. III-7 b).
Digital display,
 thermosignal in %
 of DC alarm level

Fig. III-7 c).
Thermosignal,
 absolute value

It is also possible to view the effective value of thermovoltage signal in % of DC
alarm level at the gauge and at the digital display. To switch to the effective value, or
back to thermosignal view, double-click at the "Tsig %DCA" text label (Fig. III-7 b)),
or at "Teff. %DCA" text label (Fig. III-8 b)).
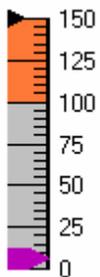
Fig. III-8 a).
Gauge,
effective thermosignal
in % of DC alarm level

Fig. III-8 b).
 Digital display,
 effective thermosignal
 in % of DC alarm level

The black arrow pointer at the gauge indicates the maximal measured value reached since BeCOMs / BCom Data Logger start. To set the pointer back, click at it with the left mouse button, hold the button and move the pointer.

o relay indicators of system status:
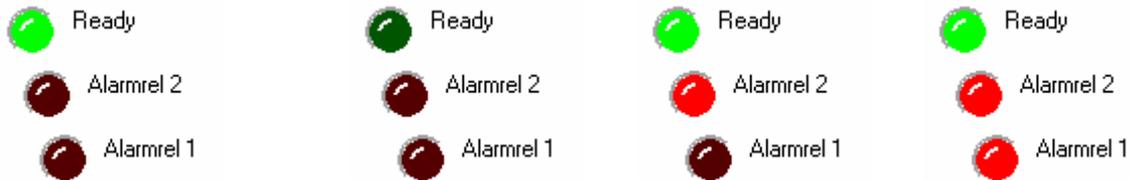
Fig. III-9. Relays:
a) Evaluator is connected,   b) Evaluator is   c) Pre-alarm   d) Main alarm
system is ready   not connected

When main alarm (AC or DC) is triggered by the system, the following window appears in addition to relay indicators:
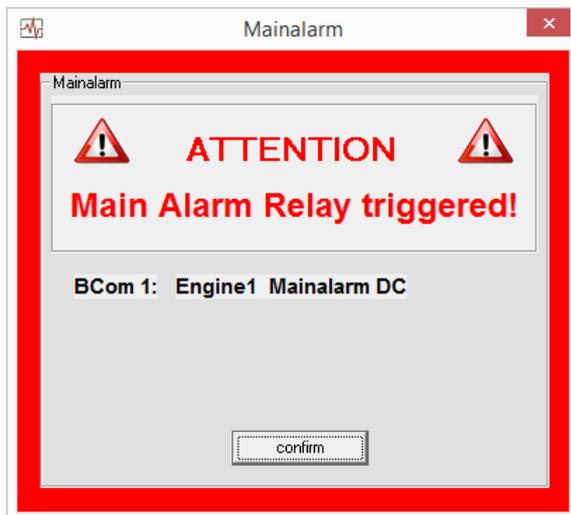
Fig. III-10. Main alarm window. To close the window, press "confirm" button.

o pre-configured alarm level:
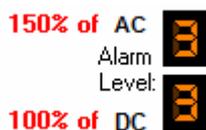
Fig. III-11. AC and DC Alarm levels

The red labels (f. i. "150% of") indicate AC Alarm and DC Alarm percentage parameters (fine control of alarm level).

If the "Start alarminhibit" parameter at connected Evaluator is larger than 0, a countdown timer is shown at the alarm relays indicators on engine start. The timer initial setting is the "Start alarminhibit" parameter value:

Fig. III-12. Alarm inhibit countdown timer

Fig. III-12 a). Dialog for resetting Alarm inhibit timer

If connected Evaluator has firmware version V3.21B1000 or higher, the alarm inhibit timer can be reset to its start value with double-click on the Alarm inhibit display.

1.3. Polar diagram: c

Represents thermo voltage and crankshaft angle acceleration data in polar coordinates during the most recent full combustion cycle.

Double-click on the diagram to see its enlarged view together with its rolled-out form (as xy-graph) and details:
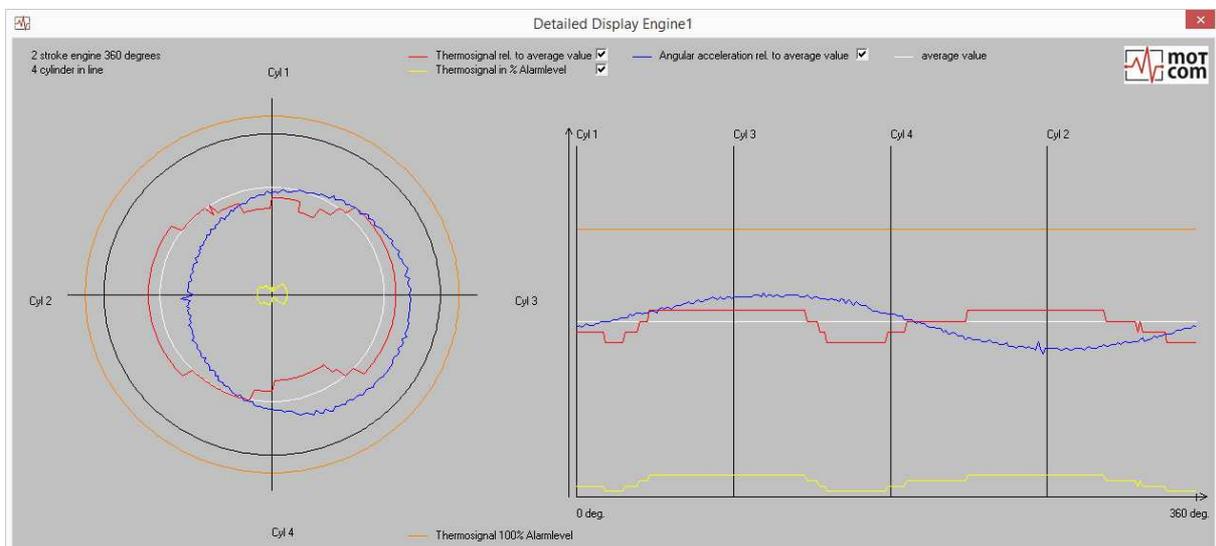
Fig. III-13. Detailed polar diagram

1.4. Additional diagram buttons: d

Speed difference diagram button:
Opens the cylinder speed difference diagram in a separate window.
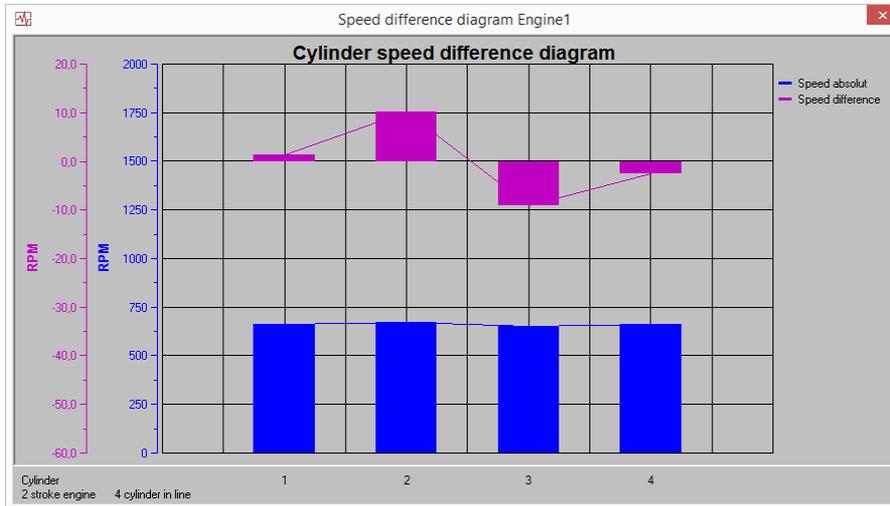
Fig. III-14. Speed difference diagram

The diagram shows absolute cylinder speed (blue bars) and a relative value (pink bars) to the cylinder average speed during the most recent full combustion cycle.

Thermosignal difference diagram button:
Displays the cylinder thermosignal difference diagram in a separate window:
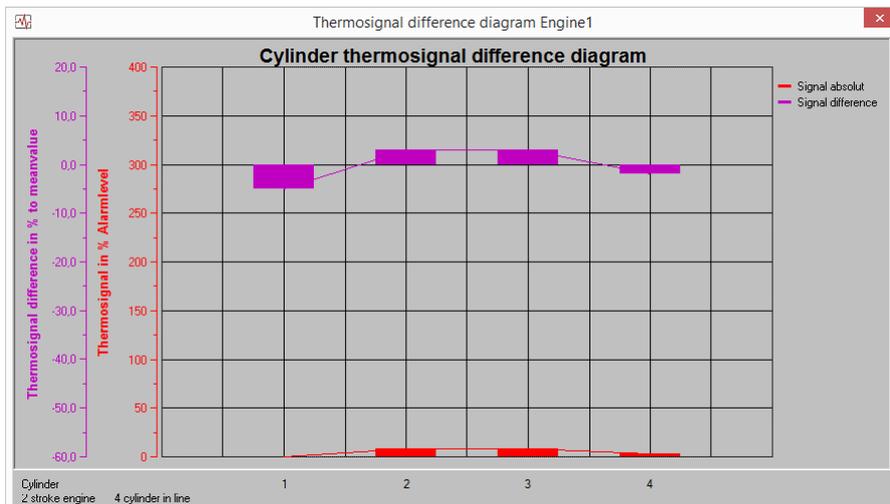
Fig. III-15. Thermosignal difference diagram

The red bars show thermo signal for cylinders in percent of alarm level during the recent full combustion cycle. The pink bars present this value relatively to the cylinder average thermo signal.

Enlarge XY graph button:
Shows the graph in a larger window. The caption of the button changes to "Reduce XY graph". Press it to return to a normal display.

1.5. Time resolution: e

Fig. III-16. Time resolution

Allows to set time resolution for the XY graph

1.6. Status window: f

Displays event messages and warnings produced by the system during monitoring. Double-click anywhere at its field to open a larger status window with event log.
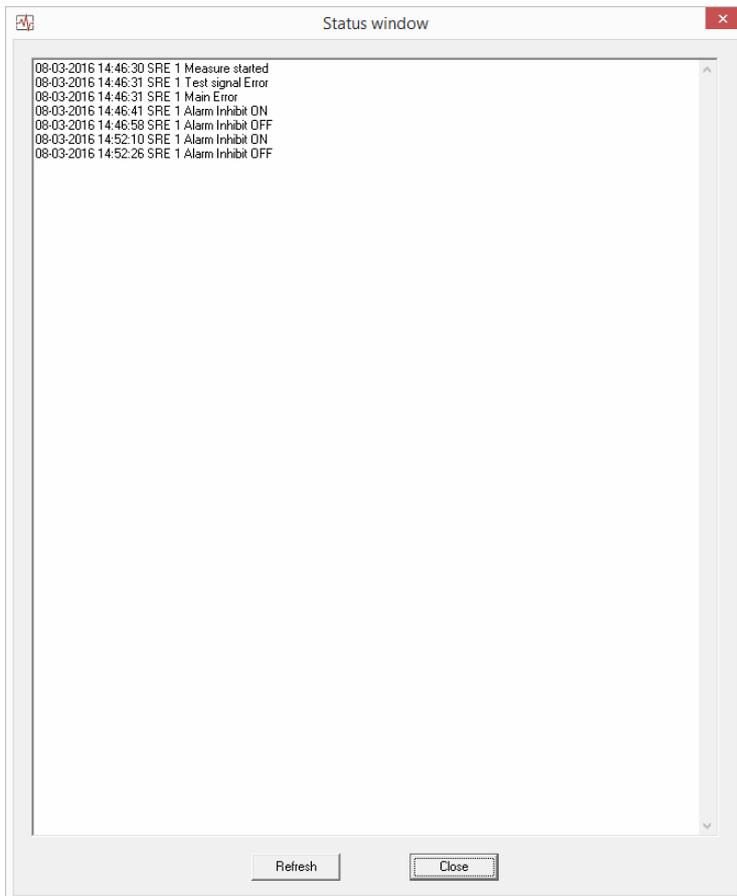
Fig. III-17. Status window

IV. Menus

1. File menu
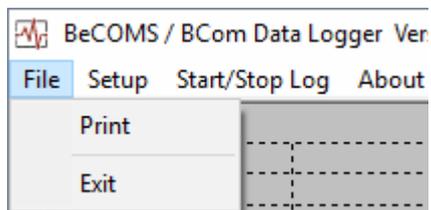
Fig. IV-1. File menu

File / Print command provides a way to print the current XY graph on an installed printer or to a file:
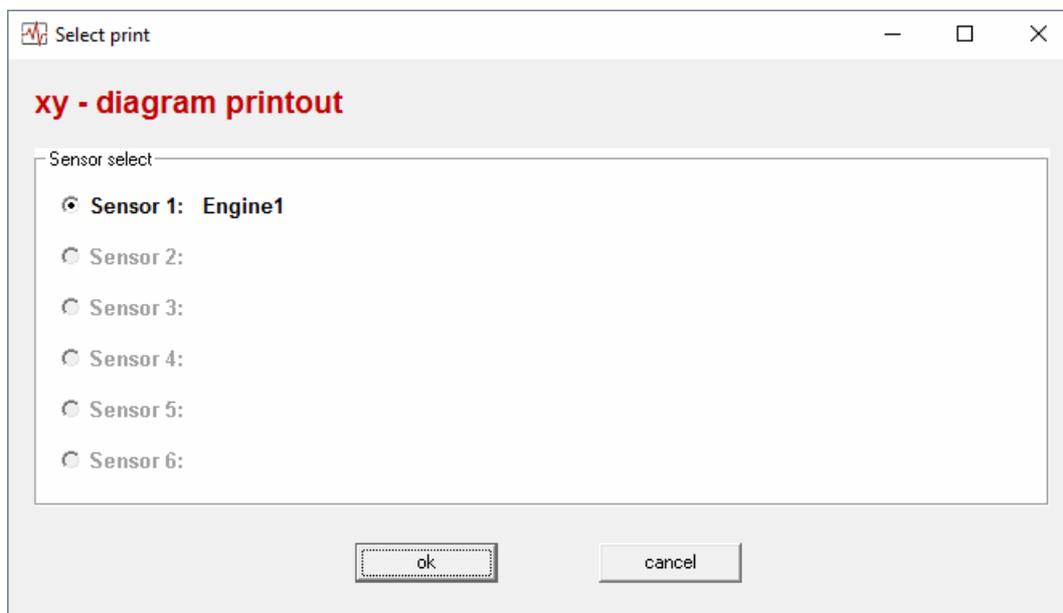
Fig. IV-2. Print dialog

Press "ok" and proceed in standard Windows Print dialogue.

2. Setup menu
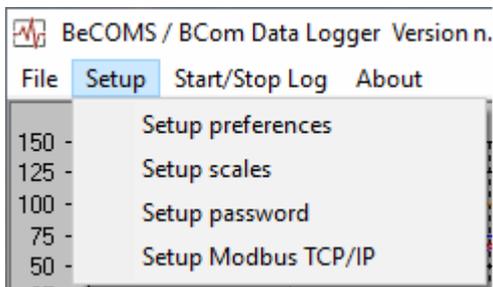
Fig. IV-3. Menu Setup

Note: It is only possible to change setup settings when logging is stopped.

2.1. Setup preferences
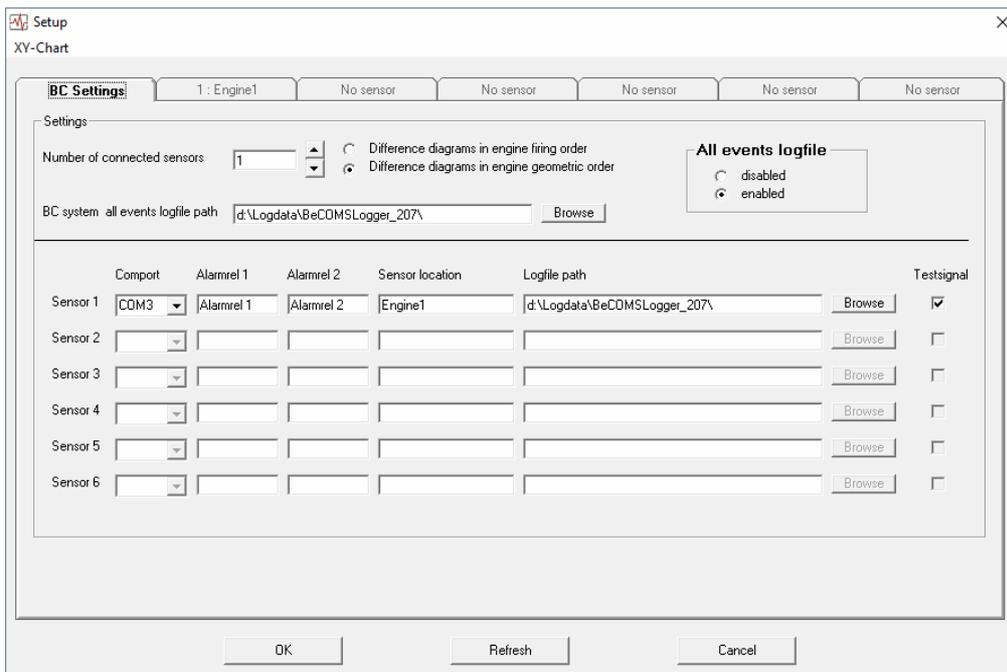
Fig. IV-4. Setup panel of 6-Evaluator modification

Note: Please be careful with settings on this panel; wrong parameters would affect the program's functionality!

Number of connected sensors
- set the number of BCom Evaluators connected to the PC through serial interface.

Difference diagrams options
- set the order in which cylinders must be displayed at speed difference and thermosignal difference diagrams: engine firing order or engine geometric order.

BC system all events logfile path
- full path to a hard disk folder where the all-events log file would be stored.

All events logfile
- enables or enables writing into the all-events logfile.

Sensor [n]
- settings for the corresponding connected Evaluator. BeCOMs / Data BCom Logger modifications for 1, 2 and 4 Evaluators have 1, 2 and 4 "Sensor [n]" sections accordingly.

Comport: the name of serial port

Alarmrel1, 2:   names that will be displayed at the instrument panel at LED alarm indicators

Sensor location: name for a folder where log file for the selected Evaluator will be saved. The string is also used for instrument panel name of corresponding Evaluator in the program main panel.

Logfile path: full path to a hard disk folder where log file for the selected Evaluator will be stored.

Testsignal: if checked, causes the BCom test signal to be displayed at XY-graph and polar diagram.

Note (!):   After any change made in Setup panel please close the program and re-start it.

XY-Chart
- Defines which measurement values are to be displayed at the XY-graph:
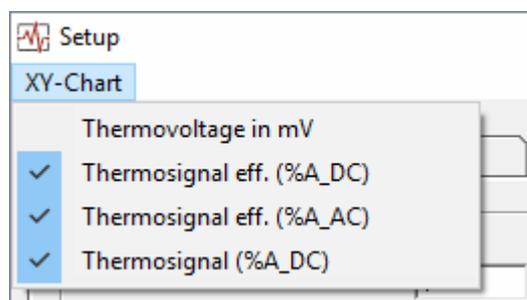
Fig. IV-5. Setup XY-Chart display

Thermovoltage in mV   - absolute value of thermovoltage
Thermosignal eff. (%A_DC)   - effective value of thermovoltage in percent of DC alarm level
Thermosignal eff. (%A_AC)   - effective value of thermovoltage in percent of AC alarm level
Thermosignal (%A_DC)   - thermovoltage in percent of DC alarm level

If checked, the value is displayed at the XY-graph, otherwise it is hidden from the graph field.

Note: Even if some item is not checked in menu, its values are always written in the log-file and can be viewed if the option is checked again.

During logging it is possible to view additional information about connected engines and some Evaluator settings. BeCOMs / BCom Data Logger modifications for 1, 2 and 4 Evaluators have 1, 2 and 4 engine sections accordingly.
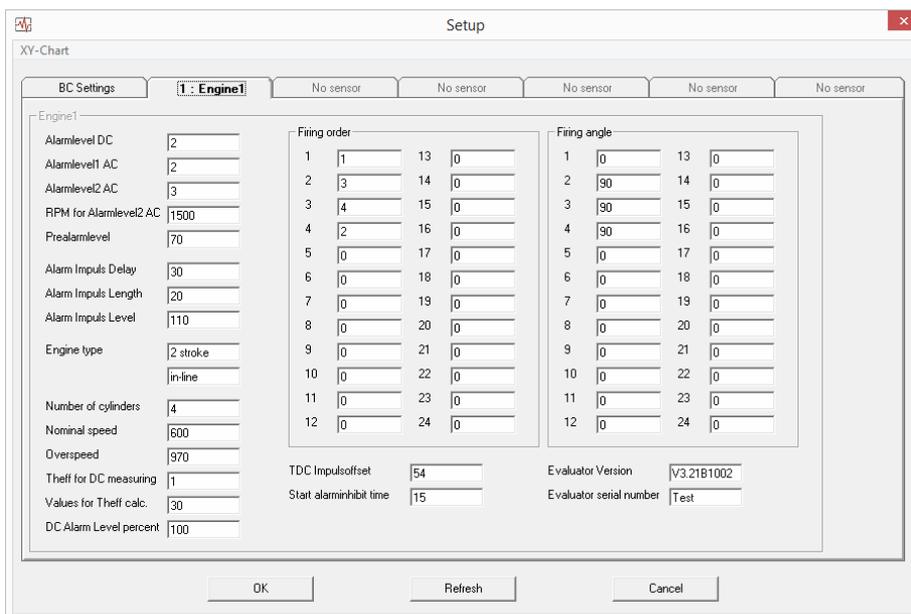
Fig. IV-6. Setup panel, engine information for 6-Evaluator modification

2.2. Setup scales
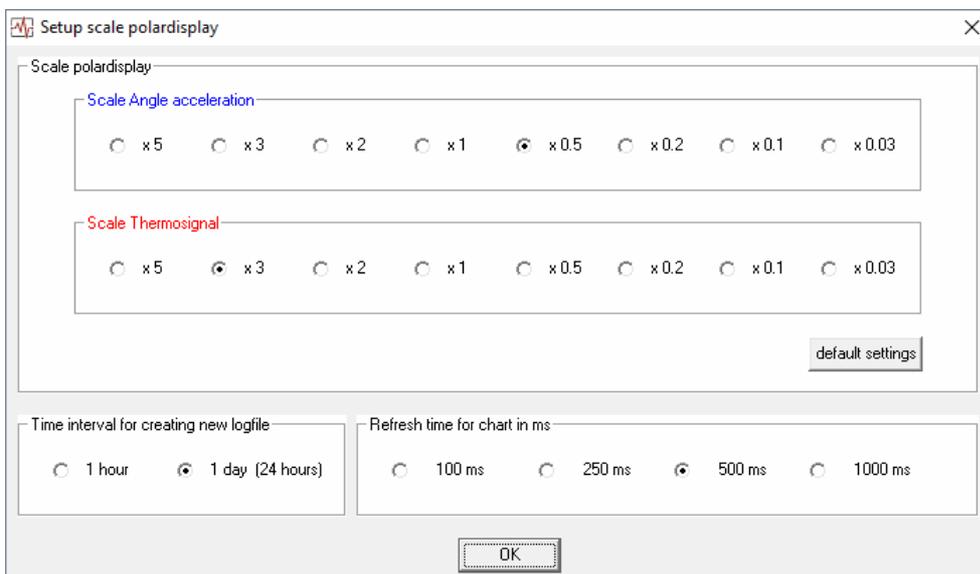
Fig. IV-7. Polar display scale setup, time interval for logfiles and refresh time setup

Scale polardisplay:

Sets the scale of angle acceleration and thermo voltage signals on the polar diagram (III, 1.3).

Time interval for creating new logfile:

Allows to select when is a new logfile is created.
When monitoring is started measurement data is written continuously into a log file. To avoid huge files a new empty log file is created periodically at an interval selected in this dialog.
The name of log file is assigned the following way:

   YYYYMMDD_[sensor location].log   - in case of 1 day (24 hours) interval, and

   YYYYMMDDHH_[sensor location].log - in case of 1 hour interval

where YYYY is the year, MM – months, DD – day, HH – hour, and [sensor location] is a string defined in Setup dialog (IV, 2.1), for example "20130715_Engine 1.log".

Refresh time for chart in ms:

Defines time interval at which data signals (rotation speed and thermo voltage) are to be refreshed.

2.3. Setup password
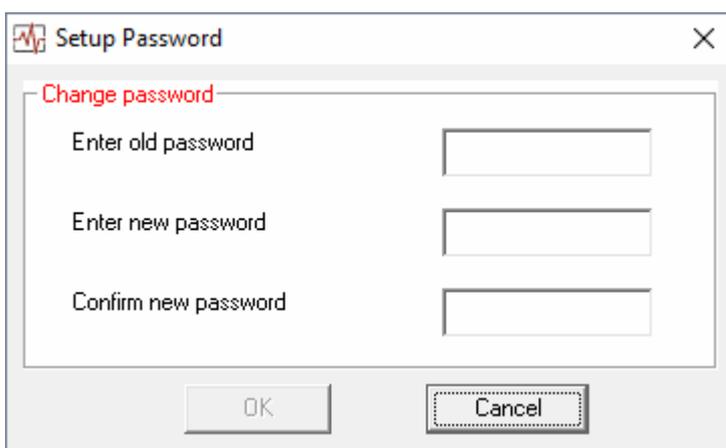
Fig. IV-8. Password setup

A password is used to prevent accidental stop of monitoring. The initial setting is "bcom".

2.4. Setup Modbus TCP/IP
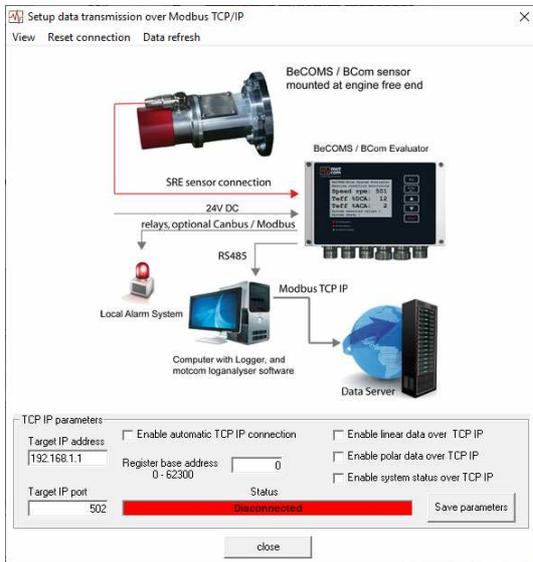
- Optional data transmission to a Modbus server over TCP IP can be configured here.
The standard form of this window represents a schematic view of connected devices.

The "View / Register Content" menu command switches between standard and extended form of the window:
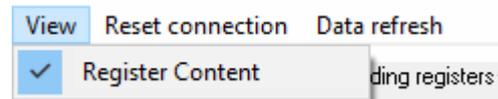
Fig. IV-9. Setup data transmission over Modbus TCP/IP, standard view

The extended form of TCP/IP setup window:
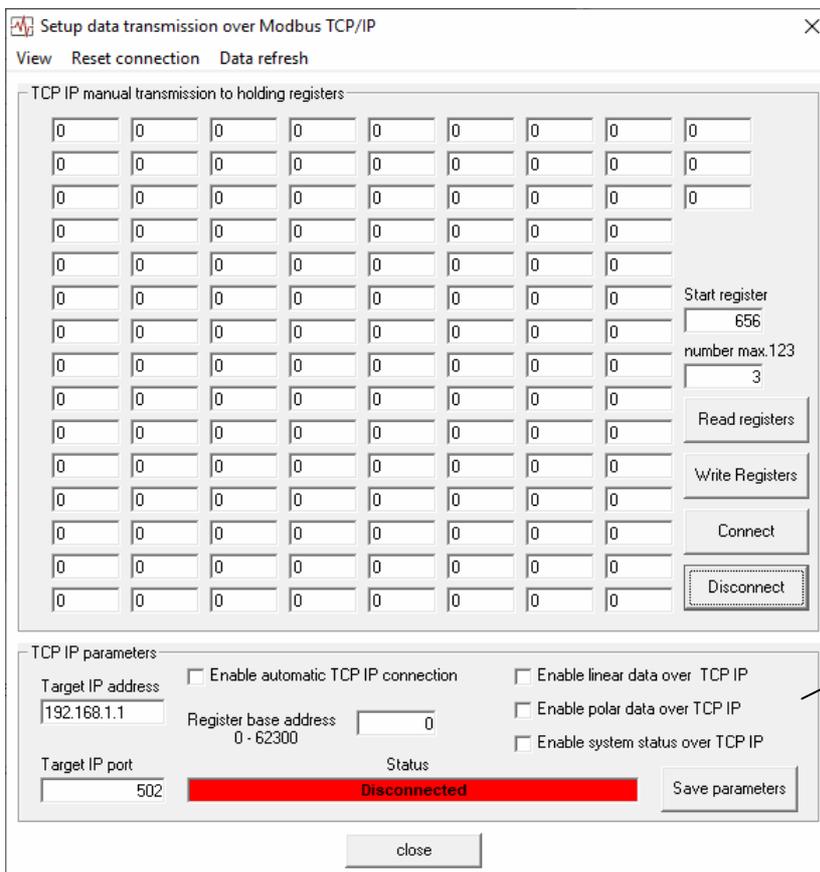
- "TCP IP manual transmission to holding registers" controls can be used to test the connection to the Modbus server.

To enable the test mode, the checkboxes "Enable linear data over TCP IP", "Enable polar data over TCP IP" and "Enable system status over TCP IP" must be cleared.

Fig. IV-10. Setup data transmission over Modbus TCP/IP, extended view

Modbus server that will receive measurement data should be defined by TCP IP parameters "Target IP address" and "Target IP port". Standard setting for the target IP port is 502.

If the "Enable automatic TCP IP connection" checkbox is marked, the data of type selected in "Enable linear data over TCP IP", "Enable polar data over TCP IP" and "Enable system status over TCP IP" checkboxes will be written in holding registers of the Modbus server starting from the register indicated in "Register base address" textbox. Recording of measurement data in a log file is not affected by these settings.

"Save parameters" button must be clicked for the changes to come into effect.

If the Modbus server is reachable and active, and either the "Enable automatic TCP IP connection" option is selected, or "Connect" button is clicked, the "Status" display changes, for instance:
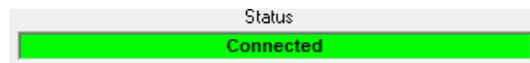
The "Reset connection" menu command attempts to re-establish a connection to the Modbus server.
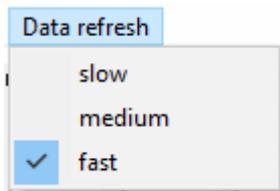
The "Data refresh" menu gives a choice of data transfer speed options.

Fig. IV-11. Setup data transmission over Modbus TCP IP window, "Data refresh" menu

3. Start/Stop Log menu
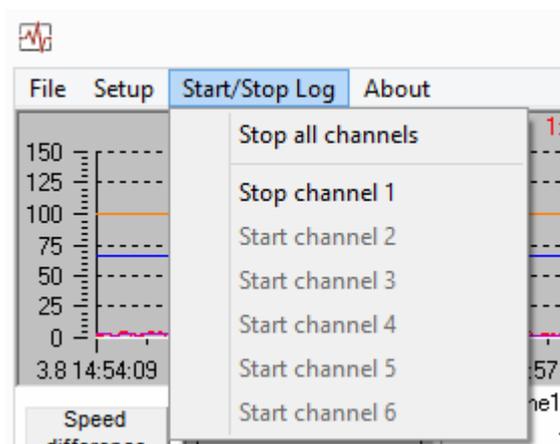
Fig. IV-12. Menu Start/Stop Log in BeCOMs / BCom Data Logger for 6 Evaluators

The menu commands start monitoring and recording measurement data. It is possible to activate monitoring for all connected Evaluators ("Start all channels") or at each Evaluator separately ("Start channel 1", etc.). After activation the menu captions change to "Stop all channels" ("Stop channel 1", etc. respectively). To stop monitoring a password is required (see IV, 2.3).
The 1-, 2- and 4-Evaluator modifications have accordingly 1, 2 and 4 "Start channel [n]" menu commands.