User manual
Envi logger G1
Version: R1E
Date: 2013-01-10

Contents

General

Envi logger G1 is a PC based data logger where all sensor data is stored in a database on the PC. Sensor data is stored in a raw format as measured by, or as sampled immediately after, the sensor. Data for all sensors present at the rig is stored continuously. Thus enabling access to all measure data at any time after drilling is finished.

Data is transferred from sensors to data logger over a CAN bus (CANopen). As a result the system is not sensitive to noise from external or internal sources. In an analogue system all received noise is added to the data as opposed to a digital system.

The user can determine what parameters to look at while drilling and what parameters to include when creating a file.

Currently available file formats are SGF/STD format or a tab separated format that is easily imported into Excel or equivalent software. More formats will be added based on customer requests.

All personal settings done by the user are remembered by the system and will be used for future usage until they are changed.

The software is divided into three applications:
EnviPackage   The platform/driver handling sensor readings and database communication
CptApplication   Application to use if you want to work with CPT
MWDapplication   Application to use if you want to work with MWD

When software is installed you will have two icons on your desktop. To start an application first ensure that the system has power and then double click the corresponding icon. The system will now start by doing a self test to verify that all CAN units are available and also that the PC is in contact with the gateway box.

Starting the system

A program is started by double clicking one of the icons. Only one application may be running at any one time. When you have started the application by double clicking the icon for it, all processes for database handling etc are initiated. This takes some time and you will receive a wait dialogue:
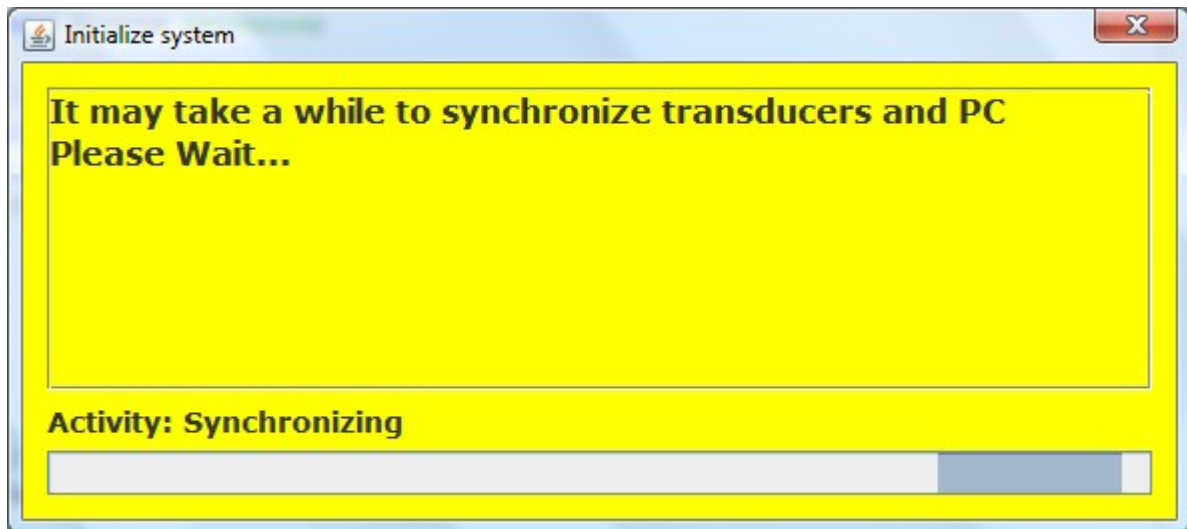
As soon as the application is started and ready to use this wait dialog is closed and you see the main window for the application.

If something goes wrong you will be notofied by a pop up window with error information.

If you start the application without being connected to the gateway box you will receive a pop up informing you of this (see below).


When you confirm this pop up the system will be started in off line mode, where you can view old soundings, create files etc.
The NEW button will be disabled so it is no new soundings can be recorded.

If the systems starts up correctly the main window will appear with the NEW button enabled, making it possible to record new soundings (see next page). No graph windows are shown and the system does not yet log any data.
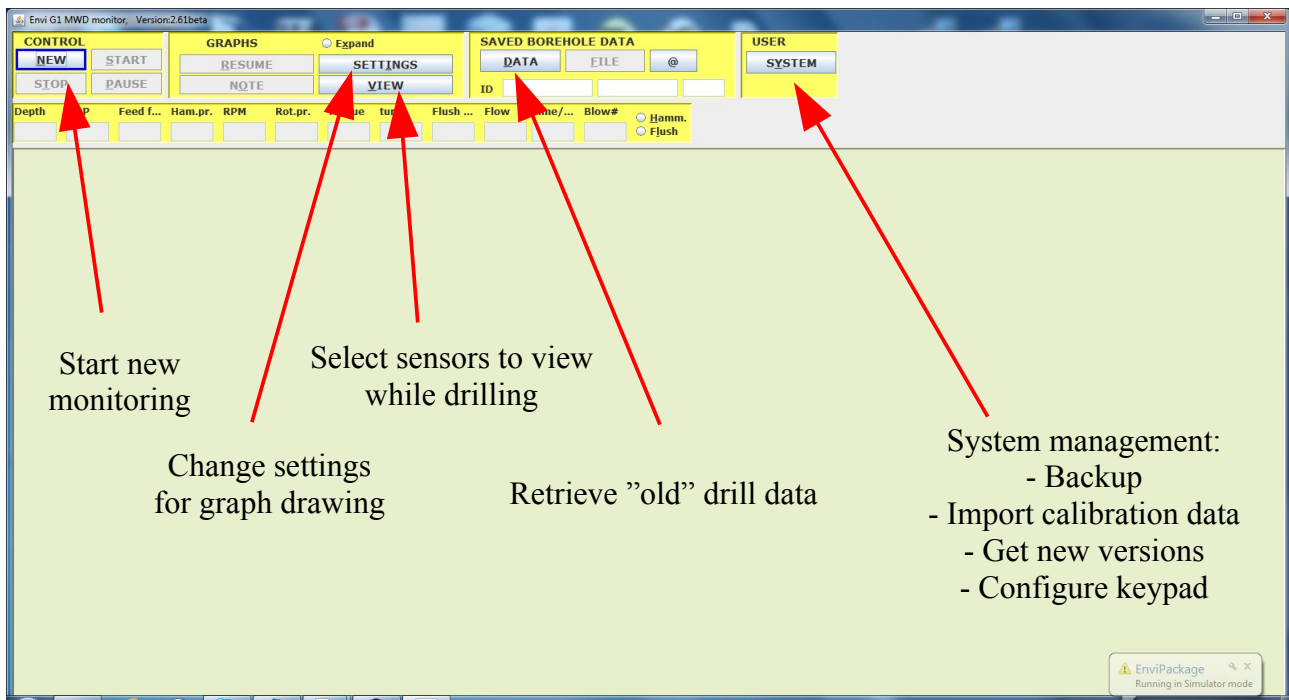
Please note that the leftmost button has a blue border. That is an indication saying that button is selected. To change button selected use the TAB-key.
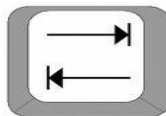
When you press the TAB button focus is changed between the different objects on screen until it once again is back on the object where you started. To push the selected button press space on your keryboard.

There are also keyboard commands for each key. One letter in each button name is underlined marking the key controlling that button. In order to control those keys you press ALT+<the key for the underlined letter>. For the NEW button you shall press ALT+N.

Below is a list of the keyboard commands for each button on main page:

NEW   ALT+N

START   ALT+S

PAUSE   ALT+P

STOP   ALT+T

RESUME   ALT+R

NOTE   ALT+O

SETTINGS   ALT+I

VIEW   ALT+V

DATA   ALT+D

FILE   ALT+F

Any button that is gray (as opposed to black) is non selectable. What buttons that are gray varies during operation depending on what you are currently doing. Initially buttons for START, STOP, PAUSE and FILE are gray since there there is not yet any drilling in progress nor drill data retrieved from database.

There are two basic options for how to proceed:

1. Initiate new borehole monitoring
2. Retrieve data for earlier boreholes from database

In addition to the above mentioned selections you may also select SETTINGS giving you the option to change different parameters. More about this later in this document.

The NOTE button is not gray but has no function at this time.

You can also control/maneuver the system using a keypad that is available as an accessory. This is described in detail in Appendix-2.

Prepare a new Sounding

If you select "NEW" you get a pop-up where you are expected to define administrative data for the drilling. You are **required** to to define at least project name, borehole ID and drill method to be able to save and close this dialogue.

The other text fields are optional to register. Presently you are required to manually enter GPS coordinates.

When you open the NEW dialogue fields will be automatically populated with data from previous borehole since it is assumed that data will be pretty much the same from one borehole to the other. When you have entered the data required plus any additional data you press "SAVE" and you will be transferred to the main window again and the system is ready for drilling.

To erase all data from the form choose "CLEAR". If you change your mind.

If you change your mind you can select "ABORT" to go back to main frame/window.

There are two menus for drill methods. The top one is for Nordic drill methods defined according to SGF (Swedish Geotechnical Society). The second one which is below the SGF methods menu contains a short list of all the methods you have used until now. The reason for having the latter menu is to make it easier to chose among the methods you generally use. If you just want to register drill parameters without relating on any Nordic method you can select the last method in the SGF menu, which is MWD and is actually not an SGF method.
You can only select method from one of the menus. As soon as you have made a selection in one of the menus the other menu will become disabled prohibiting choices from that menu. So in order to select a method from a disabled menu you must first change your menu choice to "Not Selected" in the other menu.

From version 2.80 the option to make your own methods have been removed.

Create a drilling plan

In upper right corner of NEW dialog there is a button called IMPORT. If you want to import a drill plan you press this button. You will then get a file dialog where you can select the file you want to use.
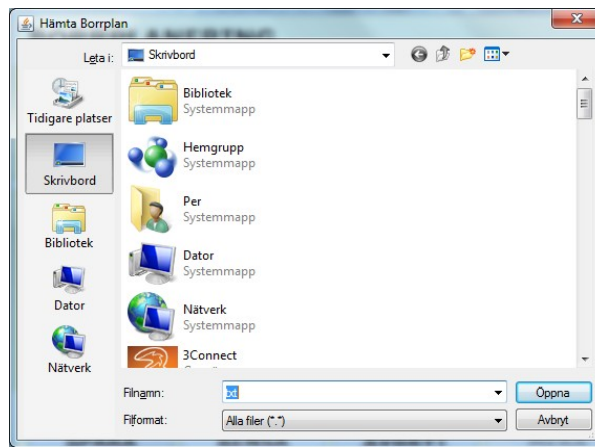

The planned drill holes imported in the drill plan will then appear in the drop down menu under the import button. If you mark the "USE" check box, the system will automatically select drill holes in the order they were added to the plan but you can also select yourself.

To create the drill plan you must create an Excel sheet according to agreement with Envi. Envi will come up with a standard Excel sheet that you can use within the coming months but until then it must be defined

Start drill monitoring

When system now presents graphs for the parameters/sensors you have selected to view for the chosen drill method. The first time you use a method you will get a pop-up window where you can select desired parameters to view graphically.
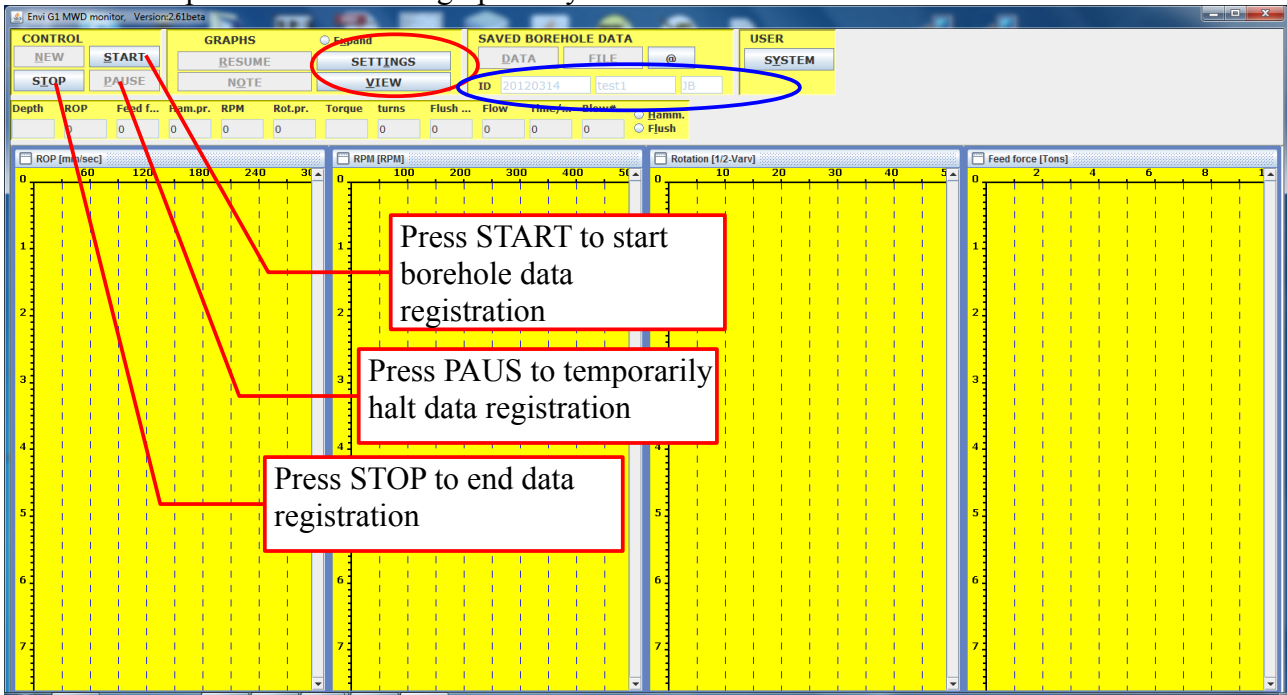
If you want to change graphs to view press "VIEW" (see red marking above) and select parameters. It is only possible to view parameters for which there is a sensor connected, other parameters will be disabled by the system. Select the check boxes for the parameters you want to view. Some boxes are disabled since the system does not have transducers for measuring those parameters. The selection you make in the VIEW dialog will not affect what data to include in the file later on.


The ID for a borehole is built up from *"Project ID"* + *"Borehole ID"* + *"Drill method"* and is written into text boxes marked with a blue ellipse.

For systems measuring force from hydraulic pressure both Force pressure and hold back pressure can be viewed as well as the resulting force.

For systems using having two rotation units all of "RPM", "RPM2", "Rotation count" and "Rotation count 2" will be selectable. If you chose one parameter from each rotation unit (such as both RPM and RPM2) the system will combine data from the two into one graph and one parameter when file is created.

Execute the sounding

To start the drill monitoring press "START". A dialogue for defining start depth appears.
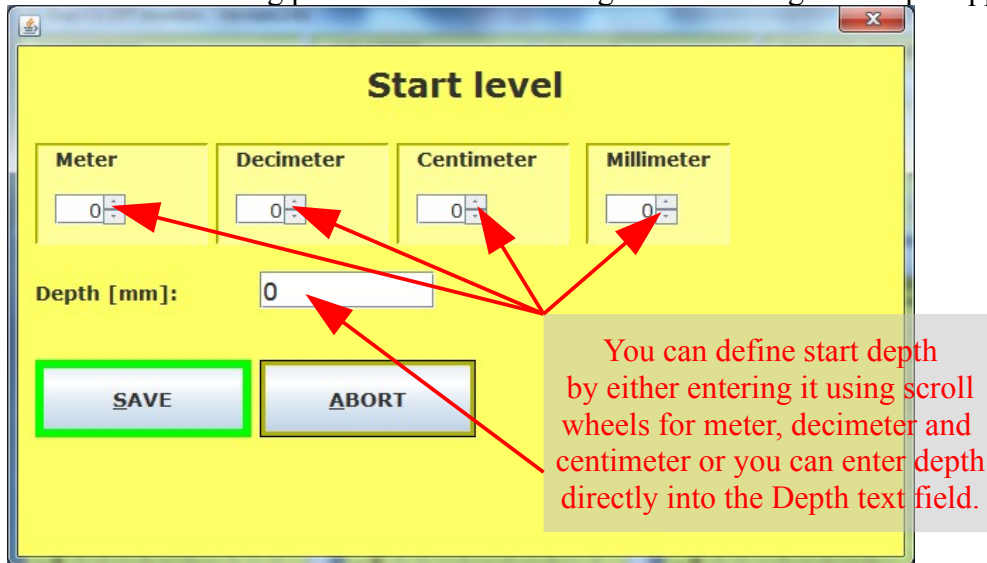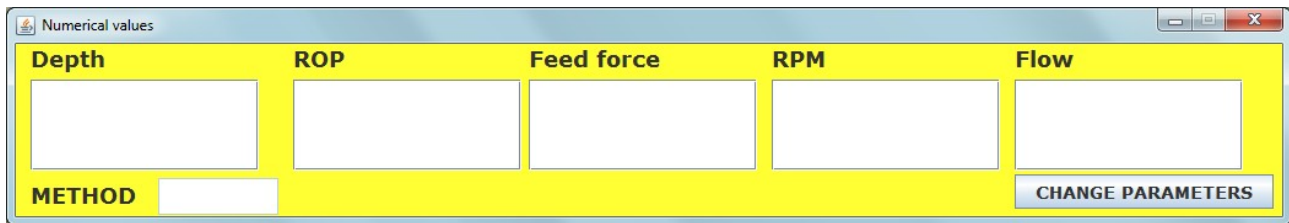

To save the start depth defined and start the drill monitoring press "SAVE" button (ALT+S). If "ABORT" is selected no monitoring is started and you are back to main window.

When you have pressed the "SAVE" button in the start depth dialogue the monitoring is started. As soon as the depth increases graphs are now plotted for the parameters you have selected. Parameter values can be seen in the upper part of each frame and in text fields between buttons and graphs.
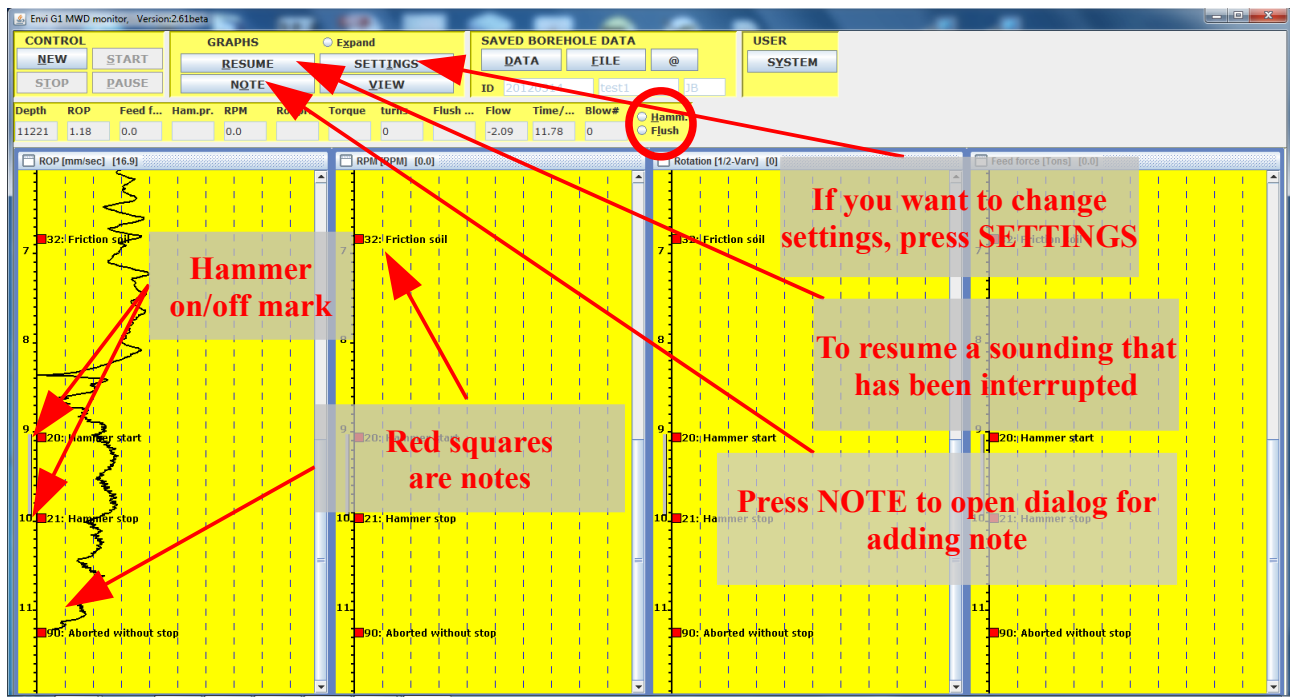
For manual registration of "Hammer on/off" and "Flush on/off" you press radio buttons in the main window (see red oval in picture above). The radio button shall be marked/filled when hammer/flush in on and not marked when hammer/flush is off. The note "20: Hammer Start" and "21: Hammer Stop" are automatically added when "Hammer on/off" button is marked or unmarked.

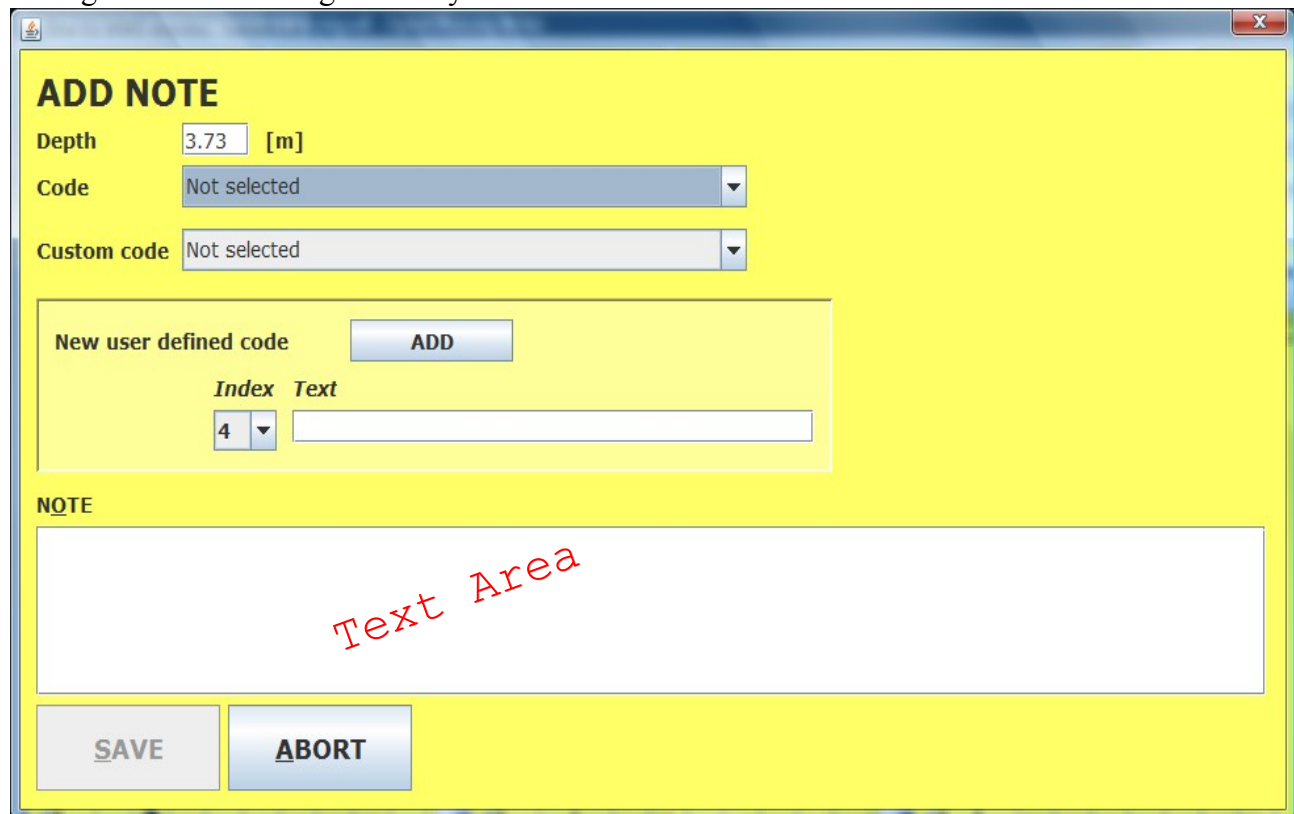## *Open window with large text for parameter values*

You can see 5 parameters as large text. Depth is mandatory but the other four can be selected from the available sensors. You can have different parameters as large text for different drill methods. If you select no method the selection is valid for all methods where no setting/definition has been made. The system remembers your choice for each method and the general setting.

Add notes/Comments during sounding

During borehole data registration you can add notes.

NB: The note will not become visible in graph window until new depth is registered or the data registration is terminated

In the drop down menu "CODE" there are some predefined codes according to SGF. The depth text field will be populated with the depth that was when the NOTE button was pressed.

You can create your own codes by using code numbers not already used and create your own standard notes with the code number selected and any text of your choice. The available codes are found in the "Custom Code" drop-down menu.

You can also use free text notes written in the text area. Such notes will be stored as regular notes with the text you have entered in the Text Area above and they will all be given code "0".

To save the comment with the drill data press "SAVE" (ALT+S). If you change your mind and no longer want to add a note press ABORT. Note dialogue is closed when you press any of the two buttons.

In the graphs in the main window you can update the notes by clicking on the red square belonging to the note and either drag and drop it or erase it.

Change Settings

To change graph settings you press the "SETTINGS" button. You then get the dialogue below with several options available:

Define if rod weight shall be added to force

You can define boldness of lines and size of note rectangle

You can chose unit of measure for ROP to mm/sek or cm/min and also if force shall be in metric tons or kN

Define parameters for graph presentation

Rod weight
☑ Manual   Level
☐ Auto   0
☐ Add rod weight

Registration
HAMMER   FLUSH
☑ Manual   ☑ Manual
☐ Auto   ☐ Auto

UNITS
ROP
☑ mm/sec ☐ cm/min

Feed force
☐ kN   ☑ Tons

You can chose automativ or manual detection of hammer and fluch on/off. NB. To have automatic detection sensors must be mounted

Notes
Separate file?
☐ Yes   ☑ No

Code On/Off
☑ Hammer On/Off
☑ FLUSH ON/OFF

Display
○ Code
● Code & Text
○ Nothing

APPEARANCE
Depth in text window ● Current ○ Deepest
Line width graph   2 [Pixels]
Line width coordinate axis   2 [Pixels]
Size o
Resolu

Bars
Bar settings
☑ Bars
☐ Sliding average

Specify if you want bars or floating average for counters (number of rotations and number of blows). You can also specify width of bars to 10, 15 or 20 cm.

Define if deepest depth or actual/current depth shall be given

File & Email   ABORT

You can define whether notes for hammer- and flush on/off shall be generated or not
Off = Not checked
On = Checked

Define how you want notes to be presented in the graphs Notes will be printed in file in the same format as presented in graphs. If you show code and text both will come out in file

To save settings press "SAVE" (ALT+S), or press "ABORT" (ALT+A) to exit without saving anything and go back to main window. Settings are saved by the system and used until changed. Some values will change immediately when you change values in the above dialog, but the system will only use them temporarily and will not remember the setting until SAVE has been pressed.

To change scale settings for a parameter you press with right mouse button somewhere to the right of the vertical coordinate axis (The depth coordinate axis) in the graph for that parameter.
This area is marked with green color below.
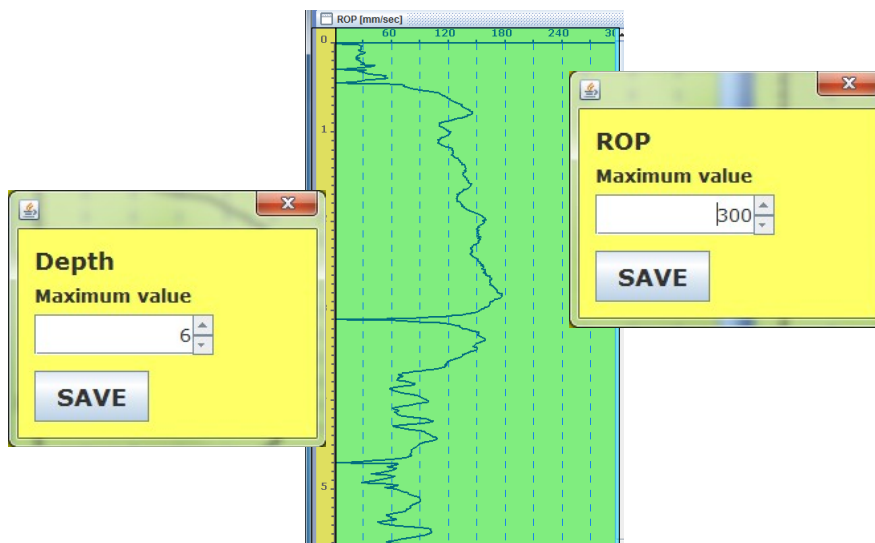
If you want to change the scale for depth you must click with the right mouse button to the left of the vertical coordinate axis. This area is marked with greyish color above.

Select the scale of your choice and press SAVE.

If you want the system to save a file automatically after each borehole and if you want the file also to be sent by email directly after completion of probing you can define the settings for it in the dialog you get up if you press the button "File & E-mail ". This dialog is depicted below.

If you tick the "Create files automatically after each drill hole" a file is created directly after completion of the borehole (completed when STOP in the main window has been pressed).

To be able to tick the "Send files automatically" one must first have selected the "Create files automatically after each drill hole" so that a file is created. You must also set your preferences to send Email. You enter the same settings as for your regular email account. You can find information in the account settings in your email client. Ask your PC technician for help if you do not know how to obtain such information. If you choose to send Email automatically after completion of the wells, you will be prompted for your password the first time that the system sends E-mail after having started. The system will then remember the password until it shuts down. For security reasons the password is deleted from the system when it shuts down.

View stored soundings

In order to view recorded borehole data press "DATA" button. You then get a dialogue where you can filter boreholes to find the one you are looking for. You can use the *Latest 20* drop down menu if you want to select between latest recorded boreholes. Alternatively you select borehole by filtering using a span of dates and then if desired pick one project and then you get all boreholes for that project in the "RETREIVED SOUNDINGS" menu. Then you can select any borehole from the list and press "OPEN" to get data for the borehole presented.

When a borehole has been selected and the date text field is populated with the date for drilling the hole selected.

The maximum depth of the borehole is printed in the Depth text field (with a blue ellipse around below).

Retrieved data is presented in the graphs in the main window. The system shows only graphs for parameters that will be printed to file for the specific method
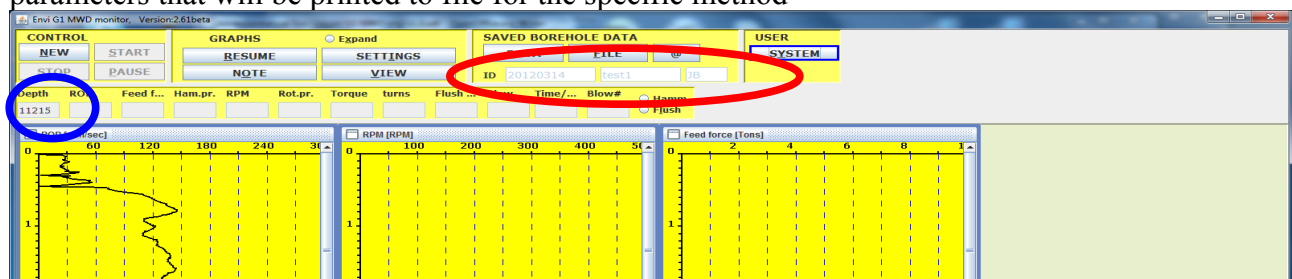
Now you can look at the graphs and also add new notes or edit existing notes if desired.

When a sounding is open you can chose to create a file. Of course you can also start a new registration or quit.

Create file

If you press button "FILE" after finishing a borehole or after having retrieved data from recorded boreholes you must first select what parameters to include in the file. The choice you make will be remembered by the system and used as default parameters for next file creation.

When you have selected what parameters to include in the file and pressed "SAVE" you must chose what file type you want to create:

The system sets a default file name for the borehole for which you create a file. That name is built up as follows:
"*project name*"_"*borehole name*"_"*drill method*".*std*.

The name is hence the same as data in the ID text fields in the "*SAVED SOUNDINGS*" panel. These fields are in the red ellipse two pictures up.

You now get a regular save file window. You can change file name and select file location:
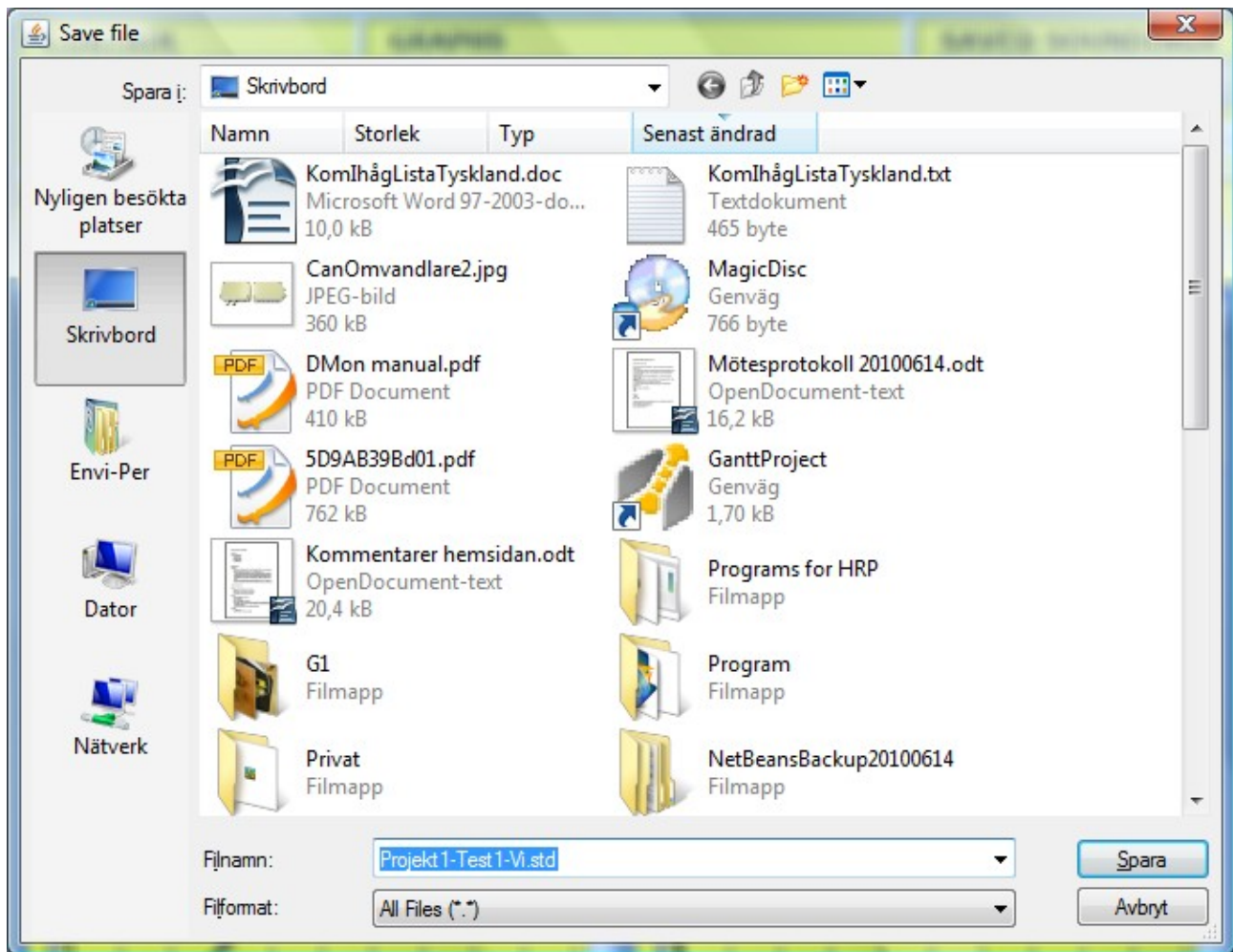
Sorry this window is in Swedish since I have that language on my PC

When you are done press SAVE and file is created. When it is done you get a pop window to confirm it.

Resuming borehole data registration

If you have stopped a borehole data registration and want to resume that registration you press the RESUME button. This works also if you load data from database. When you press RESUME new data registration will be added to the currently loaded/visible data.
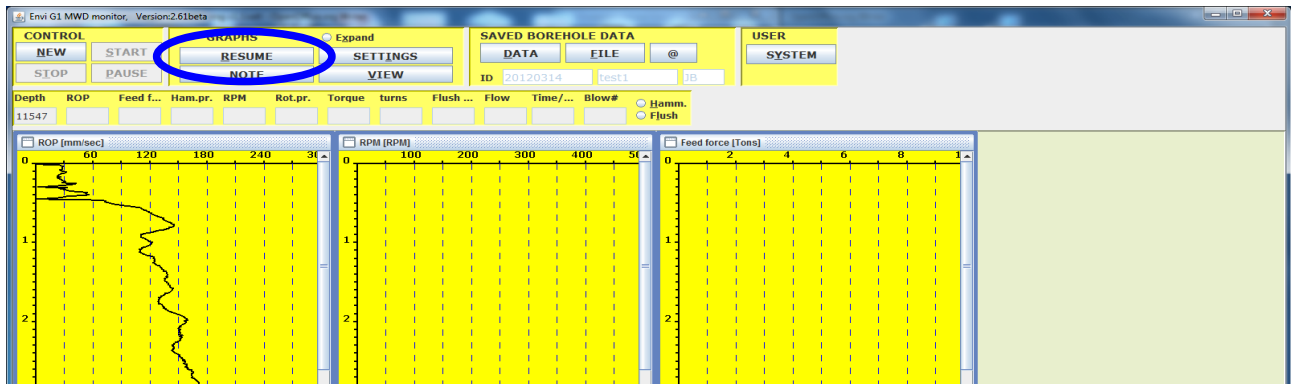
So you can resume registration for the borehole currently on screen

When you have pressed RESUME the registration for the selected borehole is reopened. To start the registration again you now press START which will open the start depth dialog. Press SAVE to resume the sounding.
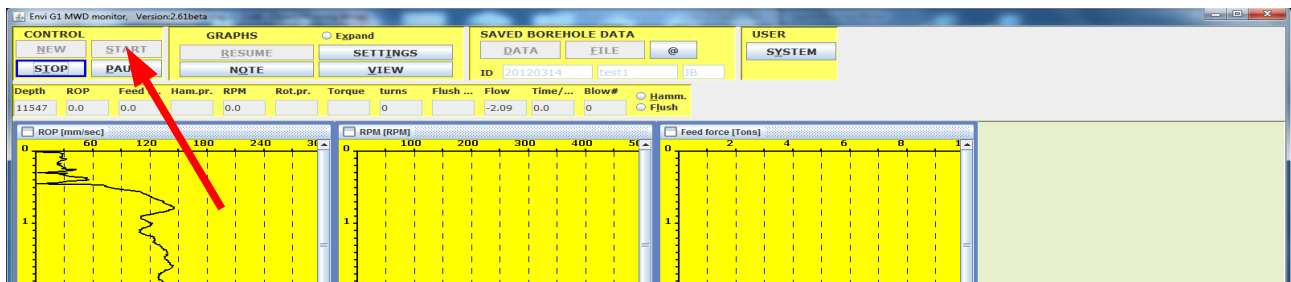
Please note that the START button is now disabled showing that registration for the borehole has been resumed.

System Management

To send log files to Envi press SYSTEM. You will then get the SYSTEM dialog where several tasks can be done.
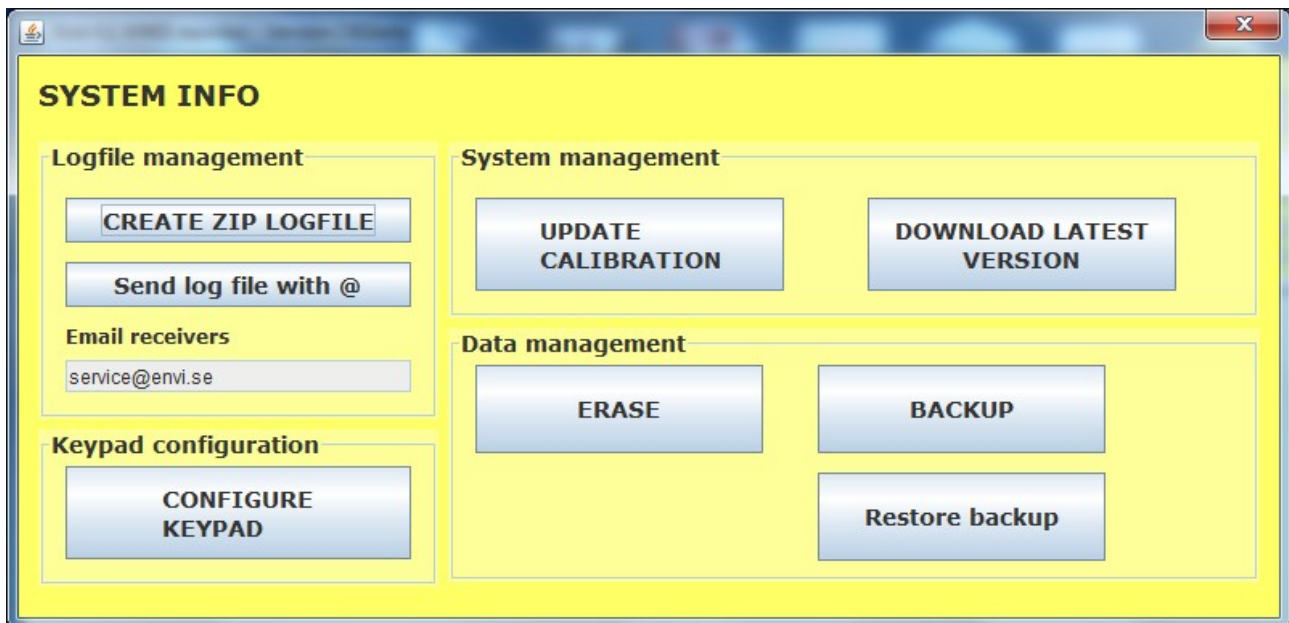
Log file handling

You can request the system to create log files. If your PC is not connected to the logger system only log files from applications will be compiled. If your PC is connected to the logger system and the system is running, parameters such as calibration etc will also be gathered and included in the zip folder. If you want to send log files by pressing button *Send log file with @*, you must have entered the correct data for your Email Account in the dialogue for sending borehole data (see chapter User Settings above).

Download latest version

In this dialog there are also functions for updating both the application software and the system calibration. If you press DOWNLOAD LATEST VERSION when your PC is connected to the Internet the application will look for newer versions and if found request to download it. You then install the new version by double clicking the downloaded msi file.

Update calibration

If you have received a new calibration file from Envi you import it to the system by pressing UPDATE CALIBRATION and then you chose the calibration file in the file selection dialog.

Erase data

If you want to erase data you press the ERASE button.

You can now chose what to erase:

1. A complete project. Select the project you want to delete the in Project menu and then press button ERASE

2. One specific sounding. First select a project from project menu and then select a sounding from the sounding menu. Press ERASE and only the selected sounding will be erased.

3. All soundings from oldest and up to a certain date. You specify the date up to which all soundings will be erased. Mark the check box and press ERASE. Now all soundings created before or on the specified date will be erased.

If you chose to erase the data you will be requested to confirm that before the data is erased.

NB: *IT IS NOT POSSIBLE TO UNDO ERASING DATA ONCE IT HAS BEEN DONE!*
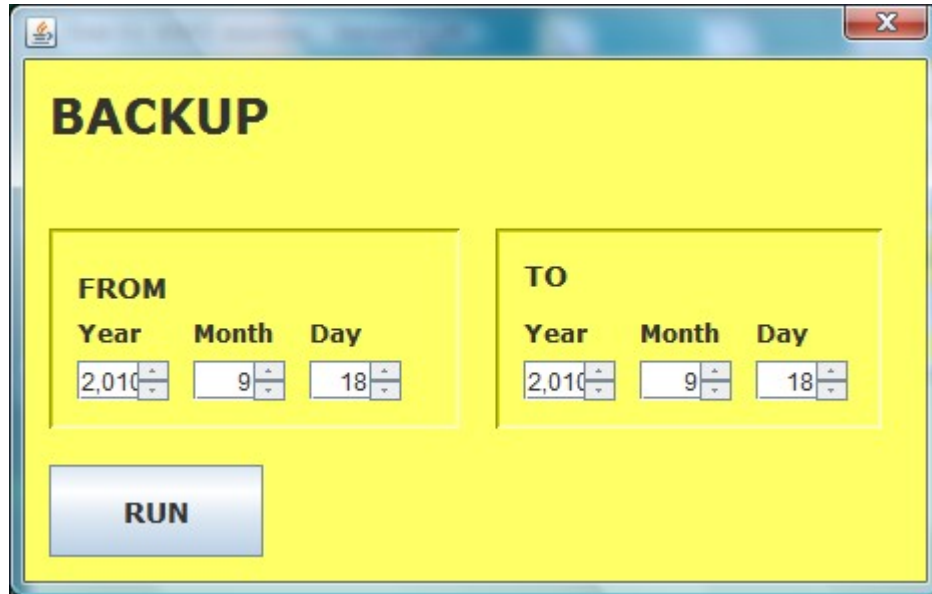
Configure keypad

CONFIGURE KEYPAD is described in chapter about the keypad.

Backup and Restore

You can always back up the data you have in the database. This is done by pressing the BACKUP button in the SYSTEM dialog.

You will get a dialog where you enter the From and To dates for the data you want to backup.

You specify the dates between which you want to backup data and press RUN.

To restore the database from a previous backup or load the backup on another computer, you must first place the backup file, always named ENVILOGGERG1BACKUP.ZIP, in the "C: / EnviLoggerG1 /" folder. You then press RESTORE BACKUP.

Appendix-1: Drill plan or Pre field preparations

You can create a drill plan prior to field work if you want to. The benefit is that you can import exact data for each drill hole and need not do any typing when you are doing field work. The format of this drill plan, which is must be an Excel sheet, must be discussed with Envi so if you have an interest in this please contact support@envi.se.

Appendix-2: Keypad

Installation

The keypad is easily installed. It is electrically connected to the CAN bus and there are four mounting holes under the lid. The system is prepared to recognize the keypad as soon as it is connected to the CAN bus so no extra effort required and the system is ready to go instantly after mounting.

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Only the green and the yellow buttons are preconfigured. The green button has the most functions and will be used for confirming messages and it also corresponds to the START button in the application. The yellow button corresponds to the PAUS button in the application and can also be used for aborting dialogs. Pressing green and yellow buttons simultaneously corresponds to STOP button in the application.

The blue buttons are used for selection in menus and to add notes when drilling.

How to handle notes

You can configure any note to any button, so the keypad is very flexible and can be used in a way that suites you. To correlate a note to a button you open the System Dialog (1) and press button "Configure Keypad" (2).
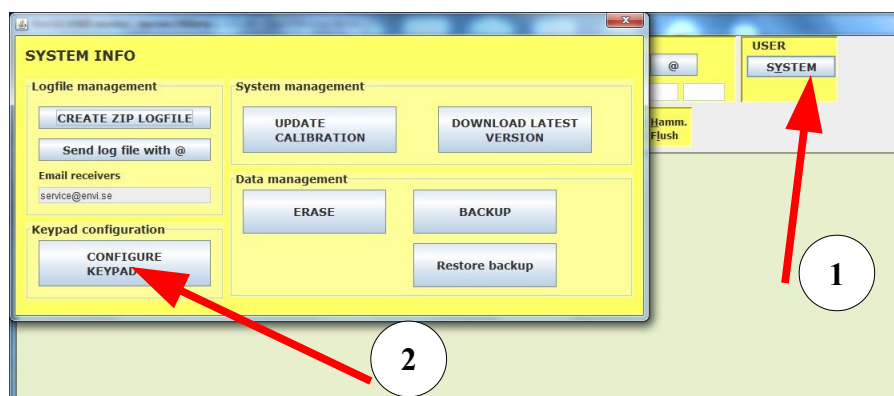
You will now get an image showing the keypad and buttons:

You press the button in that image that you want to. You will then get a dialog where you can select the appropriate note for the button.

You can chose standard notes (SGF standard) from the Code menu or you can make your own note by adding any text (Allowed characters: a-ö, 0-9, space) in the Free text area. You can not have both an SGF note and a free text note associated, only one is applicable. When you have chosen the code to associate with the button/key you press SAVE.
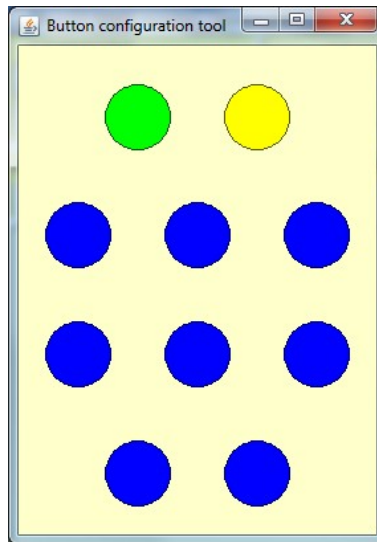
Buttons can correspond to different notes for different methods. If the note shall apply for all methods that does not have a method specific note for the button you select "Not Selected" in the METHOD menu. If you want to correlate the note for that button for only a specific method you select a method in the METHOD menu.

This procedure is then repeated for each button you want to add a code for.

When you are done remove the keypad window by clicking the cross in the right upper corner. The keypad is now ready to be used. Keys that have not been associated with a note will give no result but other buttons/keys will generate the note associated with them.

Menu selection using blue buttons

In some cases the system will open dialog windows where you can make manu selections. In those cases you can use blue buttons to select items in these menus. This applies only to "regular" dialogs and menus that you will always use when doing an ordinary sounding. Below these cases are described in detail.

Main window
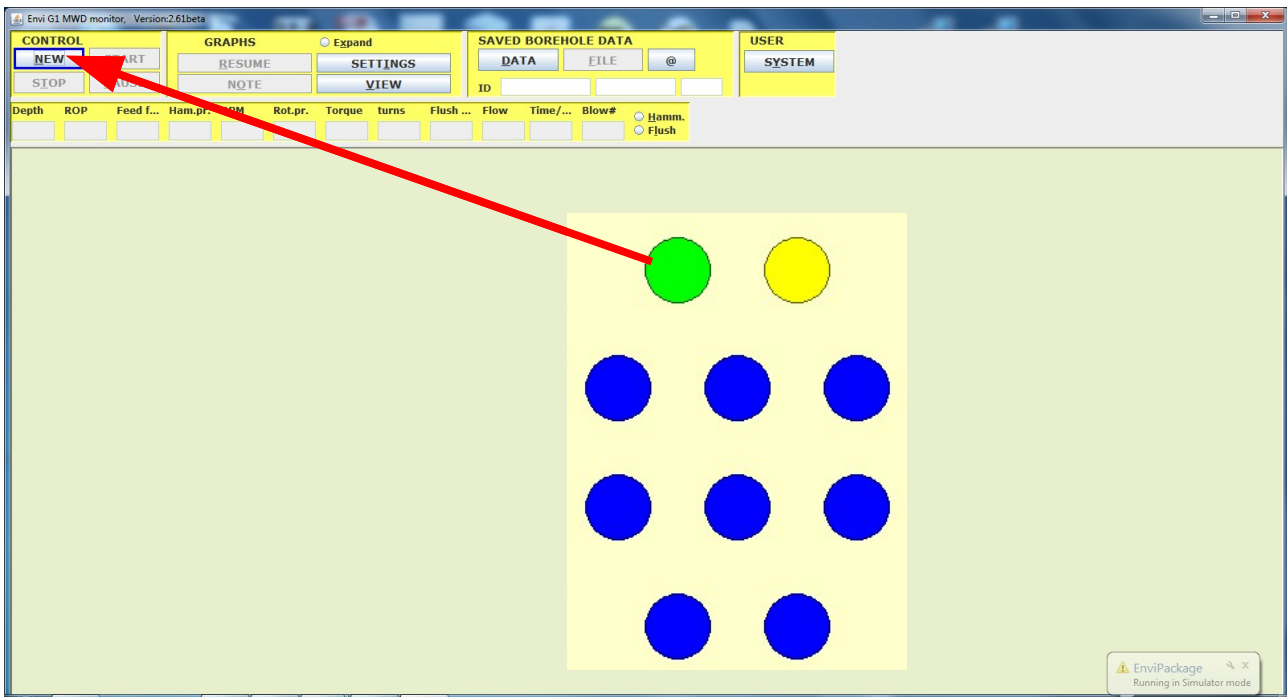
The only useful button at this stage is the green button for pressing NEW and initiating a new sounding.

NEW dialog

1. The trailing number in the borehole ID is increased by one every time you press this button. NB. Borehole ID must end with a number if this function shall work, e.g. sounding-1 or "TheHill345" or similar. Please also note that the number can not be decreased using the keypad only increased
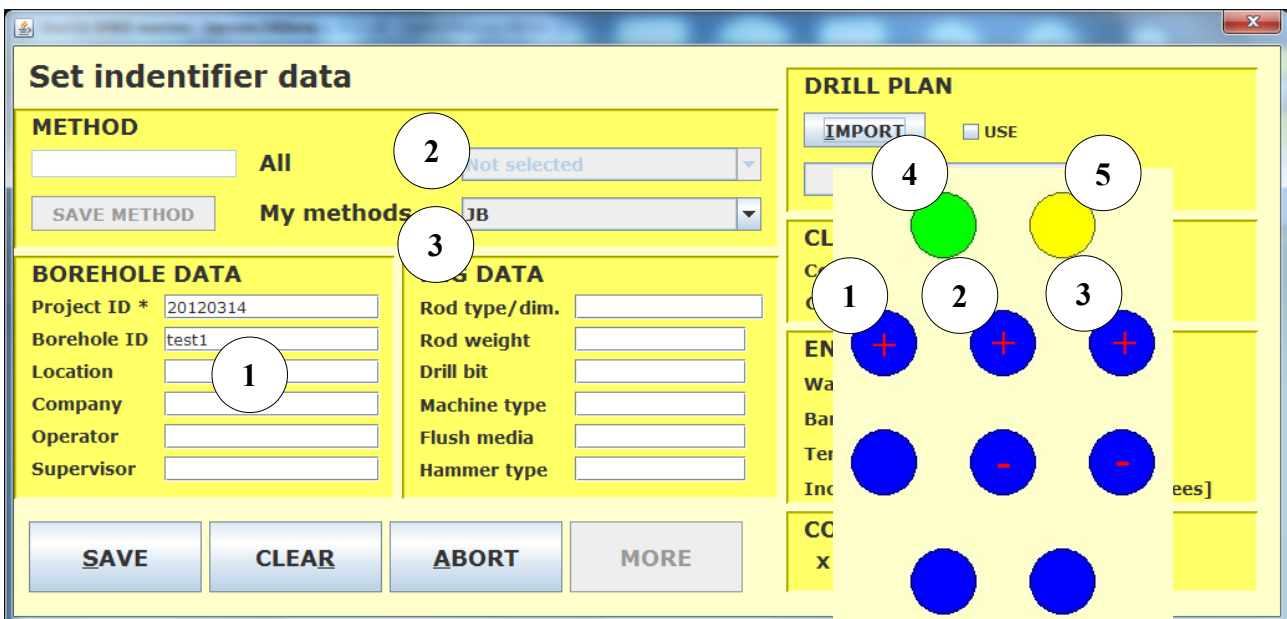
2. Using these two keys you can go up (+) or down (-) in the menu All methods. Please note that you can only chose items in the All methods menu when item Not Selected is selected in the My Methods menu and vice versa. Otherwise the menu will be disabled

- - - - - The list continues on the next page - - - - -

3. Using these two keys you can go up (+) or down (-) in the menu All methods. Please note that you can only chose items in the My Methods menu when item Not Selected is selected in the All methods menu and vice versa. Otherwise the menu will be disabled

4. The green button is used to press SAVE in the dialog window

5. The yellow button is used for pressing ABORT in the dialog window

Start the sounding
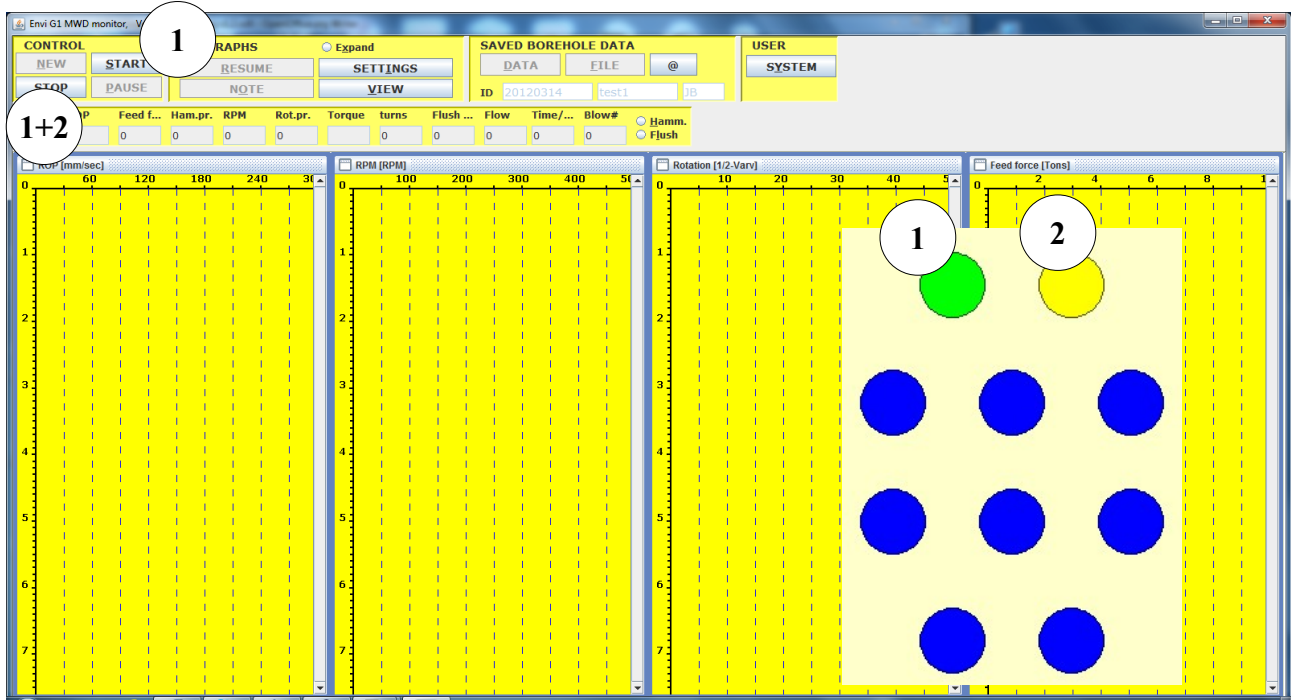
1. The green button is used to press START

2. The yellow button has no function at this stage

3. If you press both the green and yellow buttons simultaneously you press STOP in the application

START – select a start depth
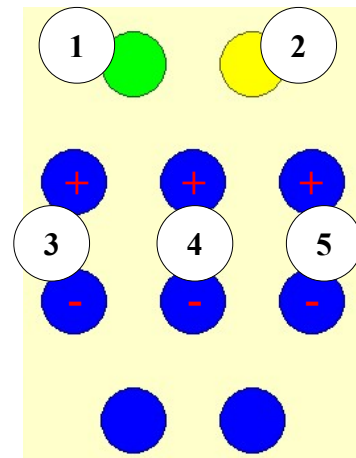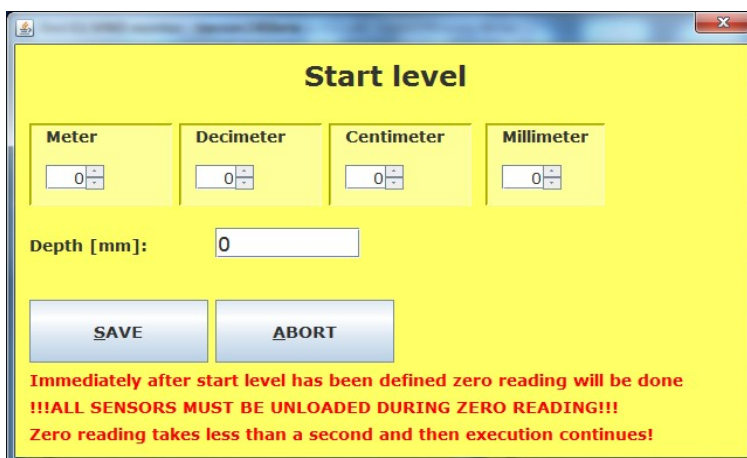
1. Press green button to SAVE start depth and continue

2. Press yellow button to ABORT and not start a new soounding

3. Use (+) to increase meters in start depth and (-) to decrease meters in start depth

4. Use (+) to increase decimeters in start depth and (-) to decrease decimeters in start depth

5. Use (+) to increase centimeters in start depth and (-) to decrease centimeters in start depth

You can not select start depth with millimeter resolution with the keypad but this is probably very uncommon and should not be a problem.
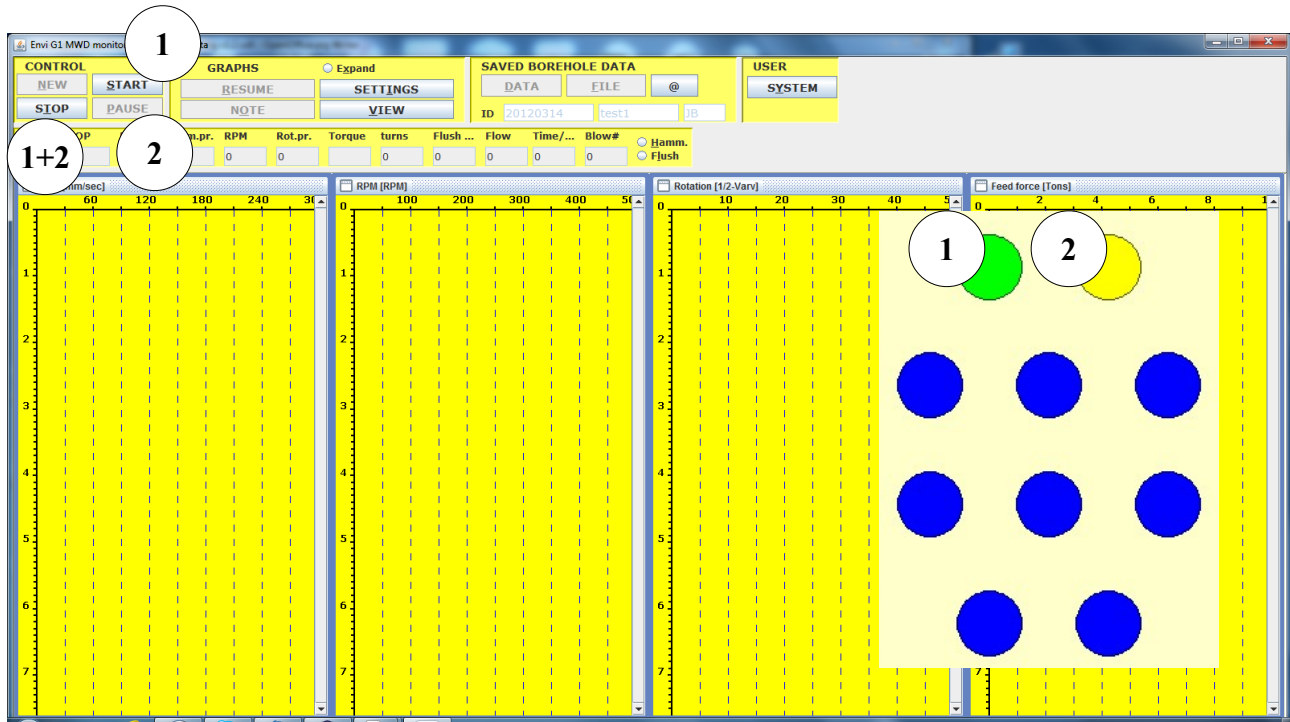
During drilling

1. Use green button to press START when adding a new rod or for exiting a paused state

2. Use yellow button to PAUSE the sounding and stop data regsitration temporarily

3. Blue buttons will generate notes according to what you have programmed

4. Press both green and yellow buttons simultaneously to STOP the sounding and discontinue data registration.

STOP sounding

The sounding is stopped by pressing STOP. This is done by simultaneously pressing green and yellow buttons on the keypad. You will then get a popup dialog requesting a stop code. The first stop code is 90 and will be selected by default. You can select other codes by stepping up and down in the menu using buttons (3) on the keypad. When the appropriate stop code is selected you press the green button to SAVE it.

- - - - - See image below - - - - -

ADD NOTE

Depth `0.0` [m]

Code `Not selected` ▾

Custom code `Not selected` ▾

New user defined code   **ADD**

Index   Text
`Ej vald` ▾   [   ]

NOTE
[   ]

SAVE   ABORT

Keypad buttons: **1** (green), **2** (yellow), **3** (blue, marked − and +)

1. Press green button on keypad to SAVE the stop code
2. Press yellow button to ABORT and return to the sounding
3. Press blue button (3) marked with + to step to the next code or – to step to the previous code

Appendix-3: Backup and Restore MySQL database

There are scripts available for complete uninstalling and reinstalling the database. This can be used if the database grows too large so you need to minimize it or if you want to uninstall the G1 software but keep data for possible later use. To avoid having to minimize the database you must remove some data from database every now and then by using Erase data according to description on page above

Do the following to save the database:
Steps 3-5 are valid only if you want to reinstall the database on a new PC

1. Download installDB.zip and EnviloggerBackupAnd Restore.zip (Contact Envi for instructions) and save them on an external device with enough space to later also contain the database backup. Unzip the zipped files and create folders with corresponding names (installDB and EnviloggerBackupAnd Restore) for the unzipped data to be stored in.
2. Connect the external device to the PC you want to create backup for and run EnviloggerBackup.bat by double clicking on it, or from command window, from its location on the external device. The backup a.k.a. dump will be placed in the same directory from where you run the script. If you use command window you must change directory until you are in the directory where the bat file is
3. Install the database on the new PC where you want to save the backed up data (the database installer will come as a link in separate Email)
4. Connect the external device to your new PC and restore the database by running the script EnviloggerRestore.bat by double clicking on it or from command window. The bat-file for restore must be in the same folder on the external device as the backup script and backup data. You must change directory until you are in the correct directory where the bat file is
5. Verify that data is correctly restored on the new PC
6. Remove the MySQL database from the PC by first using regular uninstall from control panel
7. Remove the MySQL folder, c:\mysql
8. Reinstall the database on the PC using the same approach as was used to install it on the new computer

Now you should be good to go...

To install the database and possibly also other software required for G1 software you run AUTORUN.EXE from folder installDB as described above. You will then get a dialog like below:
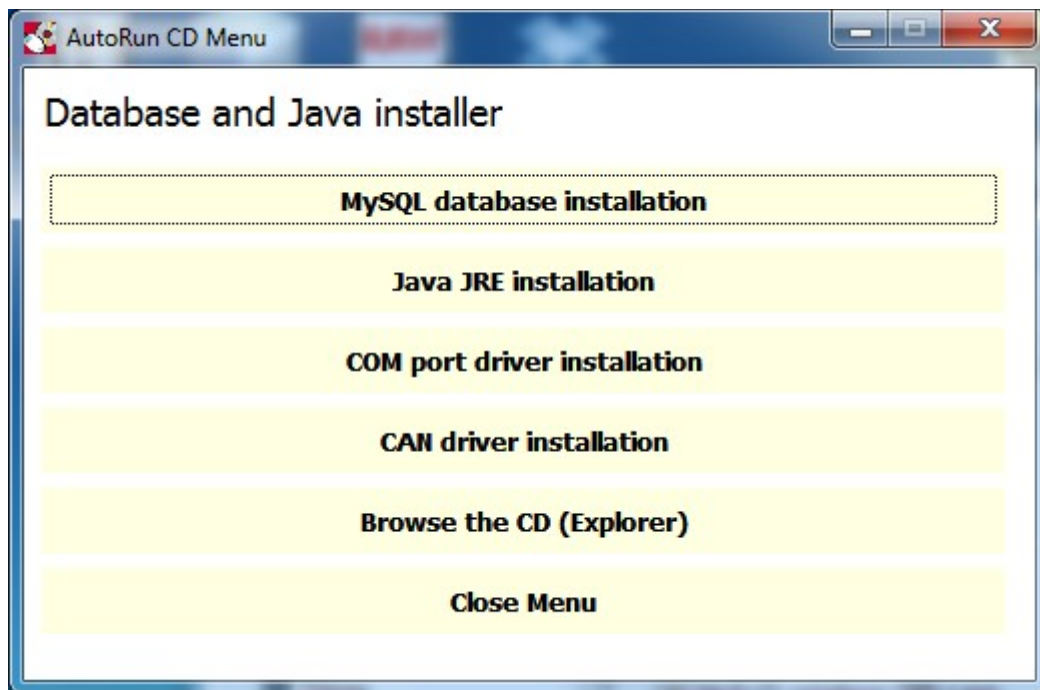
1. Press MySQL database installation (A command window will appear and request to be terminated when installation is finished)
2. Press Java JRE installation and follow instructions
3. Press COM port driver installation. This installer sometimes doesn't work as expected so to ensure that the software has been installed properly press it again a second time. This is software that we have not developed so unfortunately we can not improve this behavior.
4. Press CAN driver installation and follow instructions
5. Press Close Menu